Delft University of Technology

Faculty of Architecture and the Built Environment

Graduation studio Explorelab, November 2014

Image front cover: Altman 1975, p. 61

The private house & the collective home

IN SEARCH OF PRIVACY IN DWELLING

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November, 2014

"A large share of man's activities are social, but they ultimately, however practical and outgoing, have their source in privacy."

(Chermayeff & Alexander 1963, p. 16)

Figure 1. 1 Picture from the the book Material world: a global family potrait by Peter Menzel. The picture shows the enormous amount of stuff of an average American household.

Preface.

Until one year ago my grandfather, 88 years old, fixed bikes as a hobby. He worked as a bike mechanic when he was young, and after a career as a bus-driver, he retired but kept his hobby. During my grandmothers knitting sessions in the house, he worked on our bikes, which kept him quite busy. My grandparents had a small shed in the backyard, not more than two by three meters, barely enough for all the stuff he had. My grandfather would have loved to do his hobby in a collective environment, a workshop, having everything he needed around him to fix his bikes and people around him to talk to.

Quite early on in the process I noticed the skepticism with any domestic form of life that comprised the words 'sharing' and 'collective'. People seem allergic for doing things together, even if they are continuously part of a bigger community in their public life. I am very much aware of this skepticism and the negative association that collective living has, but I am still very much convinced that a more collective model of domestic living would be much more beneficial for our contemporary living than the private way in which we live today.

I would like to thank Robert Nottrot, Egbert Stolk and Ype Cuperus for their guidance. They helped me to define what is important in the design throughout the design process. Also many thanks go out to my girlfriend Alejandra, my mother Jacoline, my father Eric, my sisters Nienke and Marijke and my brother for helping me to get through the graduation process and the struggles I had. For that I am also very grateful to Thomas, Tim, Jan Jouke, Merijn and Bas.

Delft, July 2014

Content.

1. Introduction.

The goal of my graduation project is to design a residential building where most of daily and domestic life of the inhabitant is organized in the collective space of the residential building. Inhabitants share domestic facilities and services and the private domain of the inhabitant is minimized. The 'house' or 'home' of a person, thus not any more is delimited to the private dwelling, but extends in the collective space of the residential building.

The reasons for this organizational model have a social, economical and practical foundation. Collective life brings many advantageous for every individual; a group transcends the possibilities and opportunities that an individual has.

When starting this graduation project I was very much aware of the difficulties of implementing a collective organizational model in the domestic environment. The dwelling is the sole basis of the private. It is a place of seclusion, a place where people can hide from the outside world. People need to feel safe, in control and alone when they want to. Simply organizing domestic activities in collective space would inevitably lead to a complete failure of the idea.

Therefore, this research focuses on human behavior in relation to the built environment and particularly to the residential environment. By investigating people's privacy behavior in relation to the built environment and the dwelling this research creates a framework that forms the basis of the design of the residential building. The final design will have a similar comfortable, secluded and controlled environment for every individual, as a private dwelling would give. But then with the advantages of collective living.

The subject of this project is motivated by many developments in my personal life and in society in general, of which I will state the main two. They are presented in paragraph 1.1. Hereafter follows the goals of the design and the research in paragraph 1.2. In paragraph 1.3 the research approach is presented, followed by the research questions in paragraph 1.4 that form the framework of the structure of research, presented in paragraph 1.5.

1.1 Project motivation.

There is a growing tendency in both domestic and daily life in where communal initiatives search for new ways of collectively organizing parts of people's daily life. Many examples are found in the most divers corners of society: collective insurances such as the Broodfonds; collective studios for freelance workers such as A-lab, a communal vegetable garden such as 'I can change the world with my two hands'. Where these initiatives are flourishing it seems that people feel the need for collectively and communally organizing parts of their daily life. A research of the Dutch 'Council for housing, Spatial planning and the Environment' notes a similar development in domestic life. A second reason for this project is a research I have done on the utopian socialist Charles Fourier. His utopian societal model, named the Phalanstere inspired me. Both this research and experiences in outside my personal life convinced me of rethinking and improving the way domestic life is currently organized.

1.1.1 Living with likeminded others.

In 2009 a study of the Dutch 'Council for housing, Spatial planning and the Environment', named *Living in space and time,* defined new tendencies in residential living in the Netherlands. The study emphasized the need for a home environment that transcends to what the home environment currently has to offer (VROM 2009).

In their report the council notes that people have a growing need to live with likemind-

ed others. People find a higher level of comfort and quality in domestic life, when living with others who have shared interests and similar lifestyles (VROM 2009, p. 69). This creates for them an environment of inclusion, security and recognition and creates more possibilities. Facilities can be shared and activities can be performed collectively. Neighbors can exchange information and knowledge about their interests; help each other when help is needed; and arrange things more easily. Neighbors alternate in taking care of the children, for example, or daily errands are done when a neighbor breaks his leg.

The council sees the reason for the need of living with like-minded in the decrease of the average household composition. In 1950 a dwelling counted an average of five persons. This number dropped till an average of 2,2 persons per dwelling in 2008 (Ibid., p. 29). The decrease in household composition is mainly due to the increase of small households in the Netherlands. The council determines that currently single households already inhabit 35 percent of Dutch housing (Ibid., p. 29) In cities this number is even higher. In Amsterdam, Leiden and Groningen more than half of the households are single households (Broek et al. 2008). At the same time the average dwelling became bigger.

Although people have much more space at their disposal, the dwelling is becoming increasingly multifunctional. Basic residential activities such as sleeping and eating are accompanied by divergent activities of the daily life that previously were performed outside the house. Not only does a dwelling need to facilitate in people's living, it also becomes a place to work and recreate.

A second reason for the need of living with like-minded others is the development of social networks that spread over long distances. These social networks delimited the local network of the neighborhood. Consequential people try to restore for a local residential community they feel familiar with and they can identify with. They feel more identifiable with a neighborhood when more people with a similar lifestyle will live

there.

1.1.2 Charles Fourier and the Phalanstere.

A drawing of the *Phalantere* started my interest in the ideas of Charles Fourier. He theorized a renewed organized society that would solve the in his eyes ongoing 'societal crisis' in 19th century France. Large-scale poverty had shown him that society was unproductive and inefficient. Because daily activities were privately organized, society fails to use two-thirds of its population optimally, according to Fourier. He questioned the situation that work, production, consumption and domestic activity were done and facilitated mainly privately.

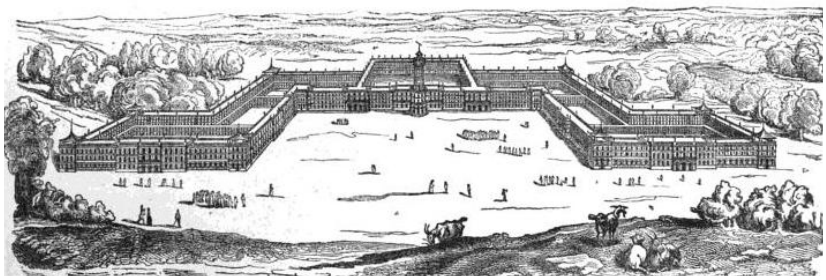


Figure 1.2 A drawing of the Phalanstere of Charles Fourier drawn after his death by one of his followers. Although the theory of Fourier is really extensive, he never visualized his building own.

Searching for a renewed balance in his harmonious society, his reasons were very much practical. Time, energy, money and stuff could be used more efficient when most domestic and daily activities were organized collectively. For example, instead of 300 kitchens that are used by 300 families, only 5 kitchens and a handful of women would suffice, if families would cook collectively.

Fourier advocated a new harmonious society of communities of around 1600 people that would live and work in Versailles-like buildings on the countryside. The building would, among other things, comprise shared dining halls, interior gardens, an opera, theaters, music rooms, a library, offices, rooms for prayer, ceremonial rooms, meeting rooms and workshops. Daily life would be organized collectively and every individual would voluntarily contribute in his share of labor and household, even the children. Individuals, rotating constantly between groups and tasks to prevent them from getting bored and to let them learn a lot from others, would perform all the tasks that were needed.

Fourier is not shy in his re-organizational models. He denounces the monogamous marriage and even proposes big collective orgies to fulfill people's sexual passions. In his harmonious society no negative passions would exist, thus no jealousy or hate between individuals would occur. Fathers not only take care of their own children, but also can 'adopt' other children that share similar interests. Children are mainly raised by older children and through nurseries. Their whole education is focused on participating in the community.

The theory of Fourier is rather complex and comprises thousands of pages. Some ideas and visions go way beyond the absurd. Still the theory is very inspirational and much can be learned from his collectively organized harmonious society. Not only can daily and domestic activities be performed much more efficiently, collective facilities and services can be collectively organized that are of value for every individual inhabitant.

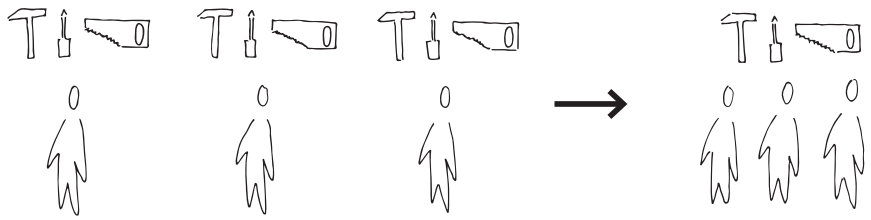


Figure 1.3 A Making efficient use of stuff, services and facilities through sharing.

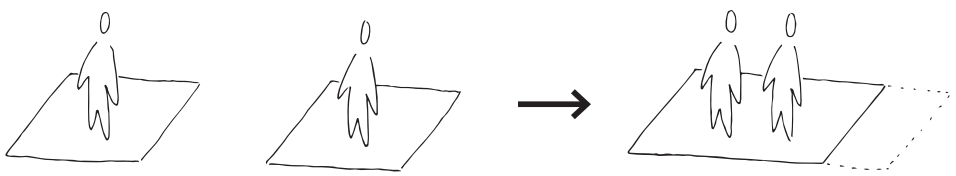


Figure 1.3 B Increasing the space of the inhabitants while at the same time decreasing the total amount of (costly) space.

Figure 1.3 Advantages of collective living.

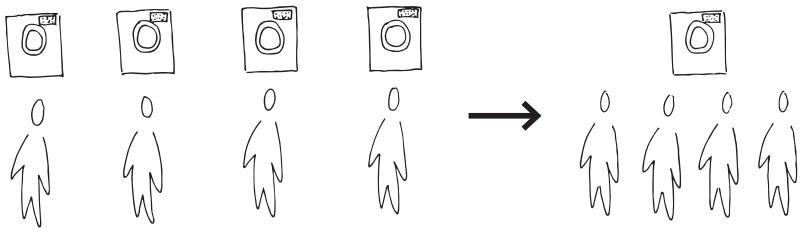


Figure 1.3 C By sharing stuff, space, services and facilities the cost of living can be enormously reduced.

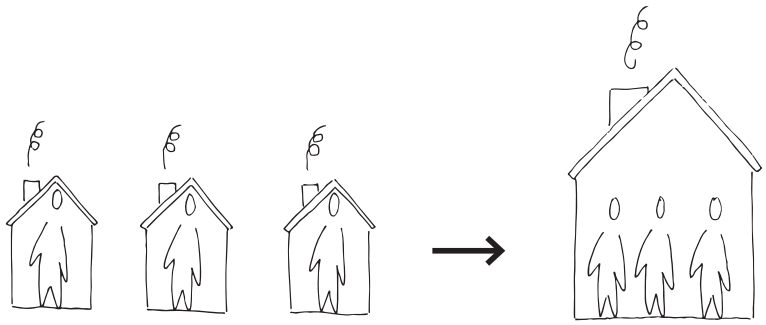


Figure 1.3 D Strongly improving individual life through a high level of social cohesion and communal identity.

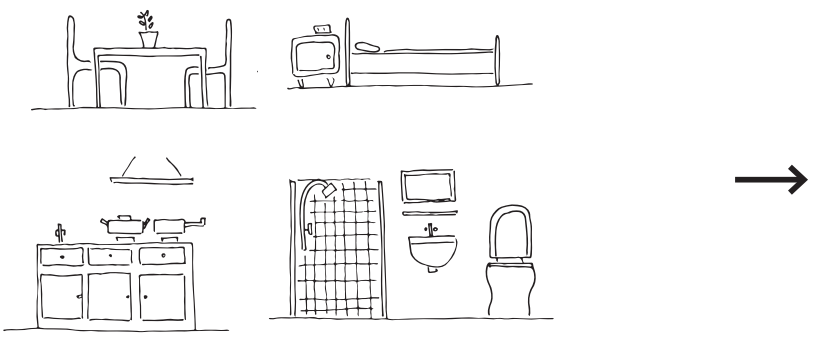
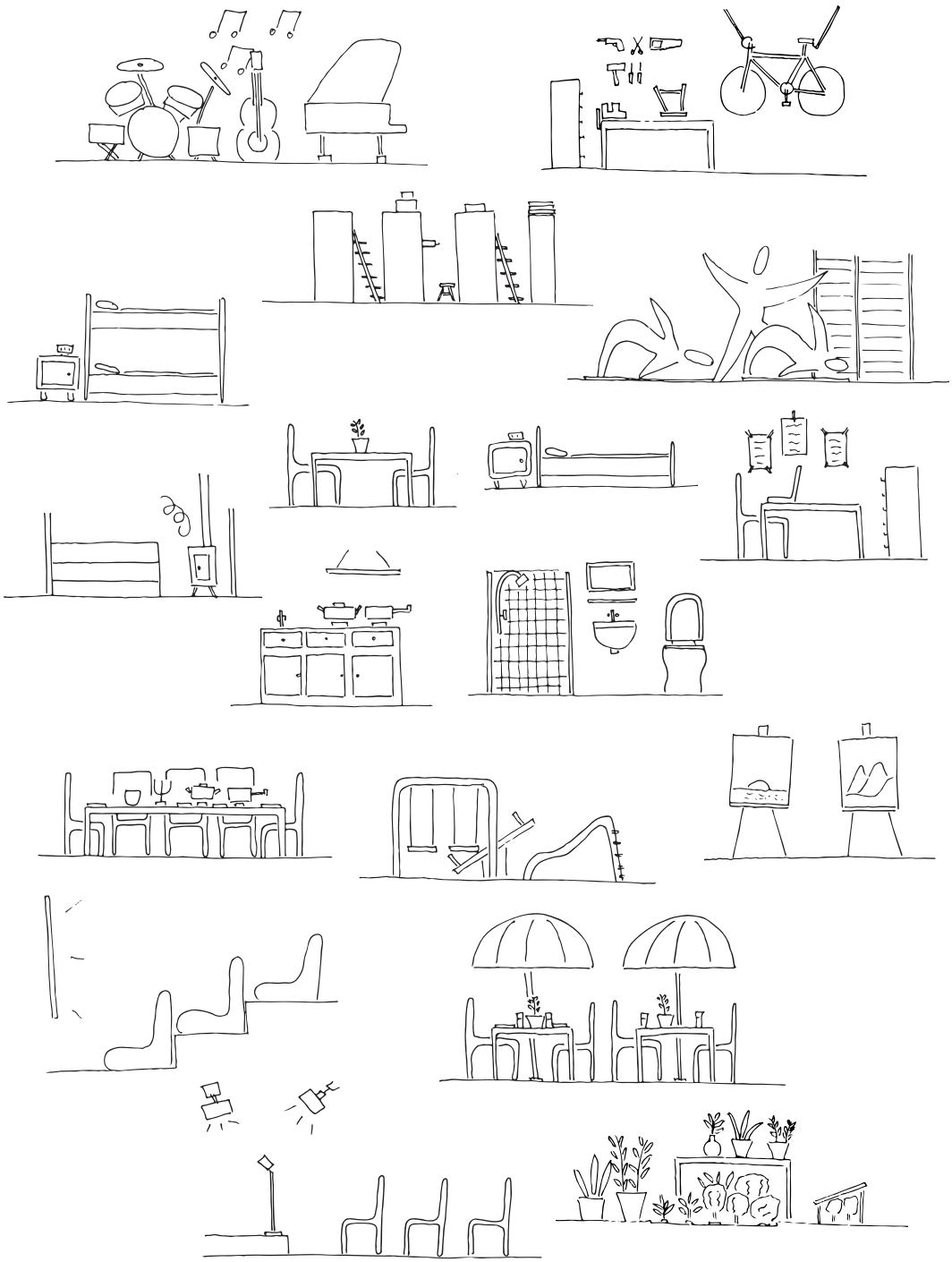


Figure 1.3 E Advantages of collective living: Enabling numerous new divers and divergent possibilities for every individual inhabitant.



1.2 Design goal.

Fascinated by the collective organization of the *Phalanstere* I will design a residential building in where facilities and services are shared and exchanged between the neighbors, and the domestic life of the individual inhabitant predominantly takes place in the collective.

Imagine, for example, that all residents have a communally shared spatial kitchen. They can choose to eat alone, with their family or with many other people. There are collective places to read a book in private, get a cup of coffee in the collectively owned coffeehouse and places to simply relax. If work needs to be done, there are workplaces to go to and work concentrated and in quietness, although in the presence of others with whom information and knowledge can be exchanged. The workshop has all the machines and tools the individual household cannot afford, and in the music room instruments can be played without causing any inconvenience to surrounding neighbors. In a theatre the residents can see small performances or practice their dance lessons and they can go watch a movie in the small cinema.

The advantages are both instrumental and social. On the one hand a more efficient way of living can be obtained, through the efficient use of money, stuff and space and the possibility of collectively used and communally managed facilities and services. On the other hand this residential building will give its inhabitants a stronger communal identity and strengthen the social cohesion between the neighbors. The inhabitants can exchange with each other; learn from each other; organize things collectively, and help each other when help is needed.

Summarizing defines the following design goal: Designing a residential building wherein most of the domestic and daily activities of the inhabitants are facilitated in the collective space of the residential building, minimizing the activities facilitated by the private house.

1.3 Research approach.

With the design goal in mind the research approach can be determined. The research will form the framework that guides and validates the design throughout the design process.

There are two ways to create the framework that is needed for the design of the residential building. One is a case study research on existing housing projects that have a strong similarity with the design. These case study projects are both very inspirational in built form and organization and give much information on what is feasible and what is not feasible. The second approach is a psychological approach. When researching how people behave in the social and built environment, rules can be formulated about the design of the built environment. For this research is chosen for the second approach. This research approach is explained in paragraph 1.3.2. The choice for this approach will be explained at the end of paragraph 1.3.1.

1.3.1 Case study Co-housing.

Co-housing is an abbreviation of collaborative housing. From the 1960's onward hundreds of co-housing projects are initiated, mostly in Europe and the United States. Although they are differently executed, they all have a common ground. Co-housing projects are organized and designed by a group of households that share common facilities and services collectively, dependent on the group's wishes. Most co-housing projects have a shared kitchen, dining area, a laundry room, workshops and guest rooms, facilitated in a common house that is central to the project. Although emphasis is put on common areas, every household has its own private dwelling. These private dwellings are mostly smaller in size than the average private dwelling, but still facilitate most domestic activities.

Much can be learned from researching the co-housing projects. Because many are

already around for decades they became social experiments of what can be done collectively and what does not. Also, the projects show how collective housing projects should be managed and controlled and how the built environment should be designed to strengthen the communal identity and social cohesion of the individual households.

Residents of co-housing projects initiate their project out of the belief that in the residential environment more domestic activities can be organized than the average housing project offers. It searches for a certain level of collectivity, depended on the wishes of the future inhabitants. These inhabitants define their ideas about co-housing, according to their current housing situation. Co-housing projects therefore retain a strong emphasis on the private dwelling. The common facilities are foremost an extension of the dwelling.

The design goal of this graduation, however, tries to go a step beyond that approach. It intentionally questions how far can be gone in collectivizing domestic activities, without diminishing the comfortable and controlled environment of every individual inhabitant. To succeed in this design goal it is most important to understand how individuals behave in the private and collectively shared spaces in the design. The research therefore focuses on individual behavior in relation to the environment. Still a small study on co-housing models that was of help with certain design decisions is attached in appendix 1.

1.3.2 Environmental psychology.

The relation between people and environment is the field of study of environmental psychology. "The environment is here both the social environment (other people) and the physical environment (built environment and natural environment)" (Dorst 2005, p. 24). Environmental psychology differs from environmental sociology, where it approaches behavior from an individual perspective, instead of the perspective of a group of people. In this research the environmental psychological approach is preferred:

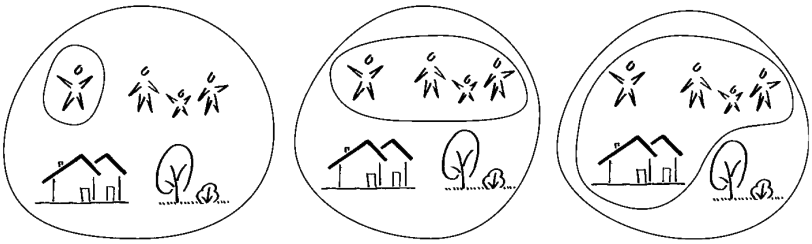
"A residential environment (street, neighborhood or district) does have a clearly defined group of residents, but this group is not a community. … Social networks in the residential environment are traceable in family connections, friendships, schooling, religion, clubs or culture, but the common use of a residential environment is a weak motivation for social networks" (Ibid., p. 25).

Although communally shared facilities, space and services would create a higher level of communal identity of the residents than in an average residential environment, the inhabitants of the building still do not form one social network. Therefore, the research focuses on the relation between the individual inhabitants. The field of environmental psychology emphasizes the relation between behavior and the (built) environment. Both environment and behavior cannot be seen separately. The design of the built environment influences how people behave in the built environment. Similarly, the behavior of people influences the design of the built environment. The interaction between the environment and behavior shows that common behavior can define rules for the design of the built environment.

The most central process of people's individual and social behavior is people's privacy behavior. It defines the social interaction individuals have with others. When creating a collectively used space it is thus very important to understand the privacy needs of the individuals using that space and the way that the individuals control their desired levels of social interaction with others. Therefore the focus of this research will be on people's privacy behavior.

1.4 Research question.

With the given research approach the project goal can be defined out of the design goal: Designing a residential building wherein most of the domestic and daily activities of the inhabitants are facilitated in the collective space of the residential building, minimizing the activities facilitated by the private house, *wherein the private and collective space*



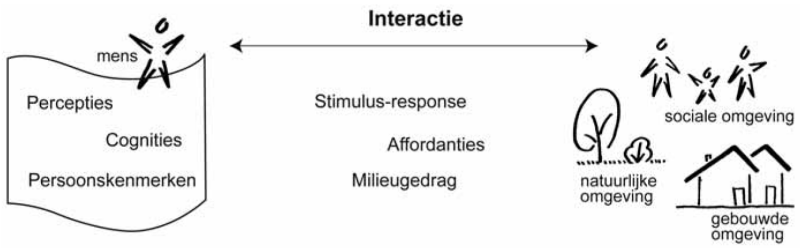


Figure 1. 4 "The perspectives on (people) - environment(s) of respectively environmental psychology, environmental sociology (including social geography and sociology of the city) and environmental science" (Dorst 2005, p. 24).

Figure 1. 5 Relation between people and the environment (social environment, natural environment and built environment) (Dorst 2005, p. 26).

and places of the residential building can afford control of the desired level of privacy of individuals to achieve their desired level of privacy.

Out of the project goal follows the main research question:

How can the private and collective space of a residential building afford daily activity to take place that achieves the desired level of privacy of the individual?

The main research question implies a common understanding of the behavior of individuals in the environment. This defines the first sub question that is discussed in part one:

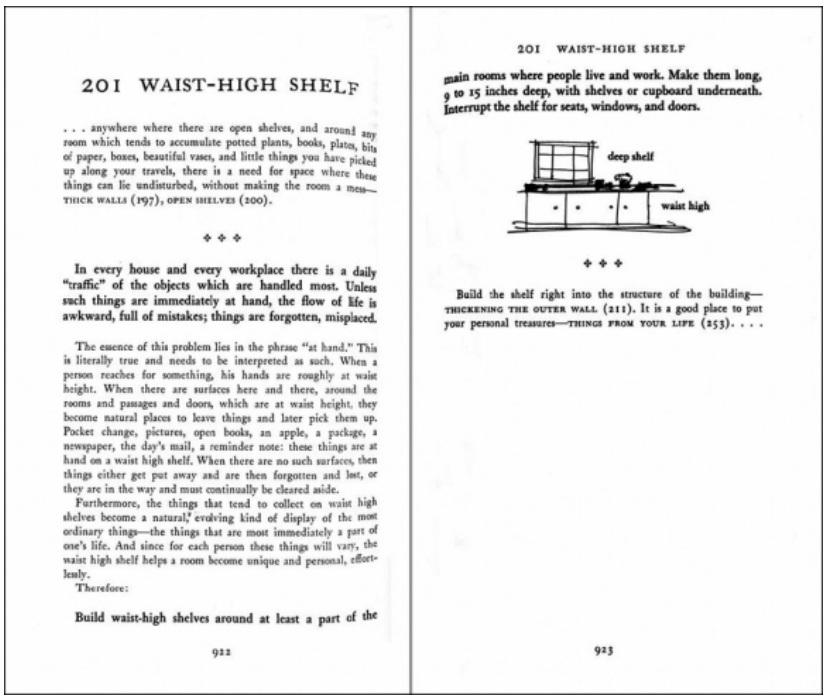
What is privacy and how do individuals control their desired level of privacy?

The following two sub questions focus on the relation between behavior and the built environment. Both sub questions form a framework that is used in the design process to define and validate the design. These frameworks form part one and part three.

Which daily activities take place in the home environment and how much privacy do people need when performing these activities?

Which physical elements of the built environment contribute to a satisfactory condition of privacy?

To compose the research framework in a helpful and organized way the outcomes of the second and third part of the research are written in a so-called pattern language. This language derived from the book 'a pattern language' from Christopher Alexander. In paragraph 1.4.1 I will elaborate on the use of the pattern language in the research and design process.



201 WAIST-HIGH SHELF

. . . anywhere where there are open shelves, and around any room which tends to accumulate potted plants, books, plates, bits of paper, boxes, beautiful vases, and little things you have picked up along your travels, there is a need for space where these things can lie undisturbed, without making the room a mess—THICK WALLS (197), OPEN SHELVES (200).

❖ ❖ ❖

In every house and every workplace there is a daily "traffic" of the objects which are handled most. Unless such things are immediately at hand, the flow of life is awkward, full of mistakes; things are forgotten, misplaced.

The essence of this problem lies in the phrase "at hand." This is literally true and needs to be interpreted as such. When a person reaches for something, his hands are roughly at waist height. When there are surfaces here and there, around the rooms and passages and doors, which are at waist height, they become natural places to leave things and later pick them up. Pocket change, pictures, open books, an apple, a package, a newspaper, the day's mail, a reminder note: these things are at hand on a waist high shelf. When there are no such surfaces, then things either get put away and are then forgotten and lost, or they are in the way and must continually be cleared aside.

Furthermore, the things that tend to collect on waist high shelves become a natural, evolving kind of display of the most ordinary things—the things that are most immediately a part of one's life. And since for each person these things will vary, the waist high shelf helps a room become unique and personal, effortlessly.

Therefore:

Build waist-high shelves around at least a part of the

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201 WAIST-HIGH SHELF

main rooms where people live and work. Make them long, 9 to 15 inches deep, with shelves or cupboard underneath. Interrupt the shelf for seats, windows, and doors.

❖ ❖ ❖

Build the shelf right into the structure of the building—THICKENING THE OUTER WALL (211). It is a good place to put your personal treasures—THINGS FROM YOUR LIFE (253). . . .

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Figure 1. 6 A pattern in the book of 'A pattern language' by Christopher Alexander.

1.4.1 A pattern language.

To challenge the many design problems during the design process, the design is decomposed into single problems. Every single problem is solved looking at the relation between human behavior and the built environment in a particular context. This solution is built up as an instruction and does not need to be followed one to one, but serves as an important guideline to solve the problem. Every single problem-solution entry forms a design pattern.

The created design patterns are an extension on the patterns that are already written by Christopher Alexander. The newly written design patterns, however, are more specified. They primarily focus on the built environment of the residential building in relation to people's individual privacy behavior. To grasp only the necessary elements needed for the design, the problems relate to the behavior and the built environment that the inhabitants of the residential building will come across daily. For part two therefore every design pattern is a subdivision of the most common domestic activities that are performed daily in the home environment. Part three makes a distinction in the most common physical elements of the built environment that form a physical, visual, auditory or olfactory privacy-boundary between people.

Every design pattern has the same format. The title explains the content of the pattern and is followed by an archetypal picture or a scheme. Third is a headline, which is in bold type. The headline gives the essence of the problem. After the headline the problem is explained in the body of the pattern. Then, in bold, follows the solution. This is the most central element of the pattern. In here solutions and guidelines are given to solve the particular design problem.

1.5 Structure of research.

The research consists of three parts. Each part discusses a different sub question. In the first part people's privacy behavior is explained. The second part distinguishes the most common domestic activities and discusses the desired level of privacy for these activities. The third part defines the most common physical elements that can be used in the residential building to create privacy boundaries between people. The research concludes with a conclusion and a discussion. This research makes use of scientific research from the field of environmental psychology. Also much use has been made of the book 'A pattern language' by Christopher Alexander.

Part 1 discusses the first sub-question: What is privacy and how do individuals control

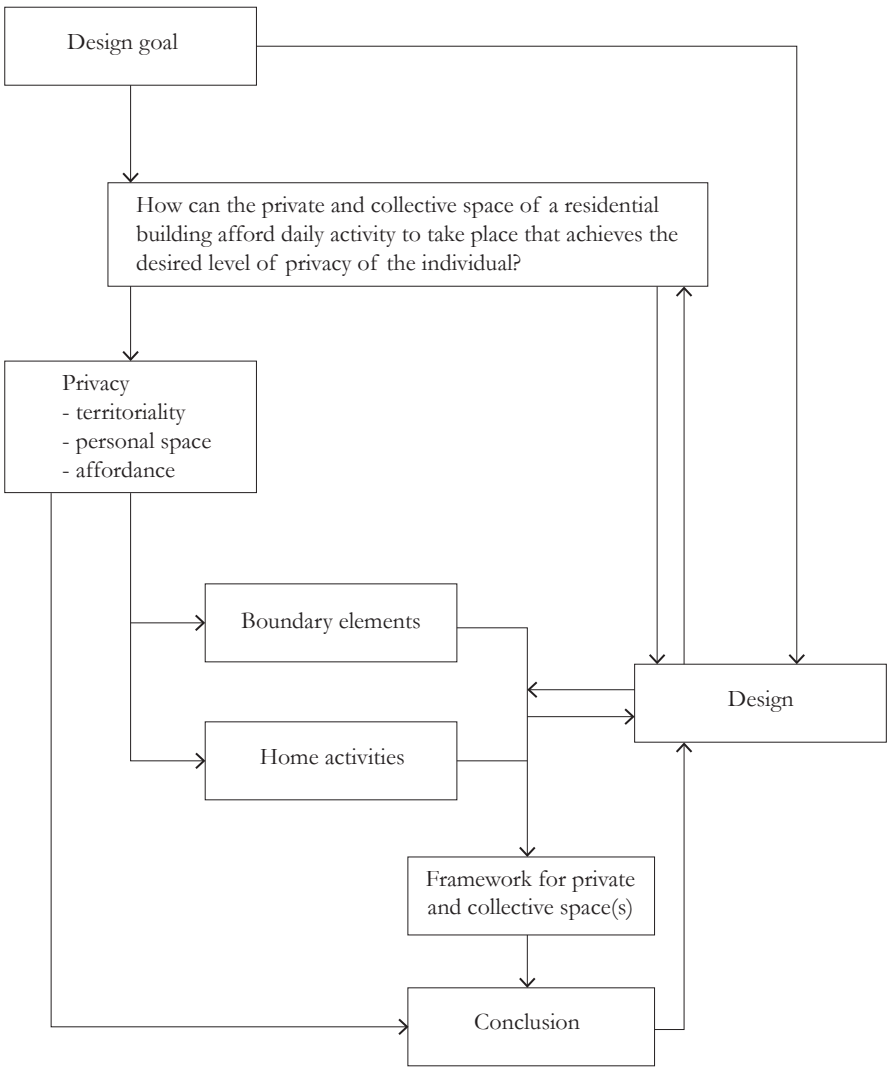


Figure 1.7 Research scheme

their desired level of privacy? The first part of the paragraph investigates people's privacy behavior. It explains what privacy behavior is and shows how people control their desired level of privacy. The important difference between the desired level of privacy and the achieved level of privacy is discussed. Then follows a research on affordances. It explains the theory of affordances and relates privacy behavior to the built environment. Through the theory of affordances guidelines are formed about the built environment from the perspective of behavior. The paragraph concludes with three guidelines that form the basis of the design of the residential building.

Part 2 discusses the second sub-question: Which daily activities take place in the home environment and how much privacy do people need when performing these activities? This part defines the most common activities that are performed in the dwelling and the residential environment. Twenty common activities are distinguished. Through the use of design patterns, similar to the patterns in the book 'A pattern language', the privacy need for each activity is investigated. Each pattern begins with a statement and concludes with guidelines for the design of the residential building.

Part 3 discusses the third sub-question: Which physical elements of the built environment contribute to a satisfactory condition of privacy? To answer this sub-question part 3 makes use of design patterns, similar to part two. Each design pattern discusses a physical element in the built environment resulting in guidelines for the use of the physical element in the built environment to perform as a boundary element for people's privacy need. The concluding guidelines of each design pattern are used in the design of the residential building.

Chapter five concludes the research. The results of the research are used to answer the main question: How can the private and collective space of a residential building afford daily activity to take place that achieves the desired level of privacy of the individual? This chapter relates the research on privacy behavior to the design of the residential building and shows how privacy behavior should be taken into account to succeed in

designing a residential building in where much of domestic living is collectively organized. The chapter concludes with a discussion about many elements that are not discussed in this research, but should be taken into account when designing a collectively used and shared residential environment.

PART 1 – Understanding privacy.

This chapter gives an understanding of people's privacy behavior. It answers the first sub question: *What is privacy and how do individuals control their desired level of privacy?* The first section describes the behavioral process of privacy. In the second section people's privacy behavior is put in a cultural context. The third section describes what happens when the privacy level of an individual cannot be met. In the fourth and fifth section privacy behavior is related to the built environment. The chapter concludes with guidelines for the built environment.

2. Privacy.

An upset Merkel demanding apologies and protocols, after being tapped for multiple months by the NSA; a person entering your room without knocking; or the uncomfortable feeling when standing in a crowded train, people are continuously confronted with their need of privacy. Since communication-technologies are improving, the term is more and more politically charged. Searching the word on Internet gives main topics relating to espionage and companies' knowledge and use of *our* information. Privacy, in these contexts, is valued as a state of *being private*, where not much more is meant than persons being alone, away from others, and especially without the intrusion from others. This view on privacy as a condition or a state of being appears to be incomplete. Scientific research seems to share the value of privacy, but shows a great variety of interpretations about it. Privacy is seen as an instrument for achieving individual social needs; a place or quality of place; a process of boundary control, it is seen as a process, attitude, goal, state and behavior, and many actors and disciplines are interfering in it's meaning (Newell 1995). This makes that 'privacy', besides being valued for its existence, lacks a shared denominated approach. Terms as 'ownership', 'control' and 'choice' are mostly heard in its discussion, but the divergent disciplines (law, politics, sociologists, psychologists and even physiologists) describe privacy concepts differently.

As is mentioned above, political science and law dominate contemporary debates on privacy. However, it is even as important to understand privacy as one of the most central processes of people's individual and social behavior. Hall and Sommer are two main authors in this field of research. They approach privacy as a form of control of personal space and individual and group territoriality. Privacy, in that sense, should be understood as a behavioral process of a person or group that sometimes want to be alone and sometimes in contact with others. Both authors relate to the essence of priva-

cy behavior that is defined most clearly by Altman. In his book *the environment and social behavior* he states that:

"privacy is better approached as a changing self/other boundary-regulation process in which a person or group sometimes wants to be separated from others and sometimes want to be in contact with others" (Altman 1975).

Both Hall, Sommer and Altman make an important distinction in privacy being a final result or a state of being and privacy as a continuing process of adaptation and adjustment. All three relate to the latter and put an emphasis on connecting privacy and social interaction, being mutual social behavior. Persons have a lot of interaction with others during their lives. People need this social interaction, but, to a certain extent, depending on the situation persons are in and the persons they are surrounded with. Altman states privacy to be a *dialectic process of openness-closeness*. Privacy should not be seen as being shut of from others, but as a dynamic process wherein the individual or group continuously

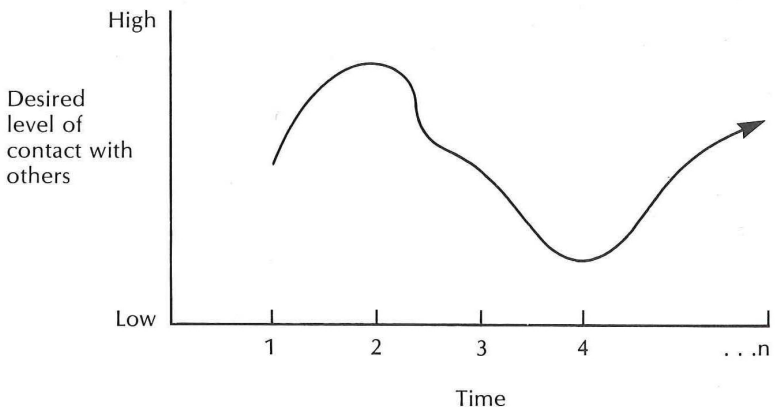


Figure 2.1 Privacy as a dialectic process (Altman 1975, p. 26).

shifts their position of social interaction to others, according to the situation a person or group is in.

Much research found the importance of the duration of people being in a certain situation of social interaction. For example, a person doesn't mind being in a crowded elevator, knowing that he or she will get out after half a minute. Being in a crowded train for more than an hour already becomes more problematic, and a day working next to someone who doesn't stop talking can make people go crazy. Where in many situations the physical setting is fixed and demands adaptation to this situation, most situations allow persons to change or adjust their situation to a higher level of comfort. In the case of the elevator a person can take the stairs (although the cost of walking up to the twentieth floor probably doesn't counterweigh taking the crowded elevator for half a minute). Looking outside; listening to music; reading a book; or, nowadays more commonly, looking stoical at a telephone, prevents the interaction with others. Although surrounded by others, a person isolates himself. In the case of the noisy neighbor, there are many actions to adapt or, more commonly, change the situation a person is in. Multiple agitated looks to someone make him or her quite easily understand his or her behavior is not appreciated, and a person can always tell someone else to keep quiet. Besides a person has the opportunity of changing the physical setting by closing a door or moving to another place, and with that limiting the social interaction to a person's desired level.

This defines another important aspect of privacy: it is an optimizing process. Persons seek for the optimal situation of their desired level of privacy within a certain situation and during a certain activity. Where this privacy-need continuously changes, the achieved level of privacy within a certain setting also does. Persons (and groups) search for the most optimal within these situations, creating an achieved level of privacy through adaptation and adjustment that equals or closely approaches the individual desired level. The emphasis on the distinction between the desired level of privacy and the achieved level of privacy, as stated by Altman, is important for understanding the

occurrence of stress in persons. This idea is more closely looked in to in paragraph 2.3.

Privacy is not only a process controlled by a person or a group, but is strongly depended on the social environment of a person or a group. Although an individual can adapt and change certain situations to his or her own desires, the behavior of others strongly influences the achieved level of interaction in a certain situation. A person can feel the need to be alone in a train and isolate himself by listening music, but if the person beside him is loudly talking, the private barrier doesn't function. Closing one's self of from others in a private room, is of no use, when someone is walking in all the time.

Thus, privacy is interpersonal. Controlling it needs both output from the person to others and input from others to the person. Altman, speaks of an *interpersonal-boundary process*, whereby the accessibility to a person or group is controlled (Ibid., p. 27). As much as a person signals his or her desired level of privacy, others should also perceive this privacy-need:

"the important aspect of privacy is the ability to choose it and see that the choice is respected" (Newell 1995, p. 97)

2.1 Behavioral mechanisms.

"Defining privacy in terms of personal control relates it to the power to make certain choices rather than the way in which we choose to exercise this power" (Gavison 1984, p. 97).

The fact that people are able to choose the level of social interaction implies the principle of control. Privacy, in this view, should be seen as a regulatory process through which social interaction between individuals and groups is controlled and obtained. To do this people make use of their behavioral mechanisms. These mechanisms define and signal the limits and boundaries of a person or a group and thus control the social

interaction with others. Verbal behavior or verbal communication is a direct way to control or adjust/change a situation, for example, by simply saying others to be quiet, or to keep out. Para-verbal behavior (the tone in which the message is communicated) signals the emotion of the individual and therefore whether the individual, within a particular setting, accepts others' behavior. Both verbal and para-verbal (what is said, and how it is said), therefore, are important mechanisms for persons to communicate their needs.

More subtle, but often a lot more effective, is the use of non-verbal behavior, also termed as body language. Various parts of the body are used to communicate a person's privacy-need. Just subtly using an elbow to push surrounding people away to make some room, when standing in a crowded train; putting a finger on the mouth to give the sign of silence; or an agitated look to someone signaling his or her behavior to be unaccepted, those are all behavioral mechanisms for persons to redefine their desired levels of privacy when being intruded:

"Thus, non-verbal behaviors in reaction to unwanted 'immediacy' of others reflects attempts to restore acceptable boundaries round the self. And when we inadvertently come too close to other, we use all manner of nonverbal cues to display our discomfort and often apology. … It is as if we are conveying the message. We are all intruding on one another, so all we can do is show our discomfort and demonstrate that we are doing our best not to inappropriately intrude on one another" (Altman 1975, pp. 34-35).

Verbal, para-verbal and non-verbal behaviors are reactive mechanisms to intrusive behavior by others. It signals the discomfort people have with a situation, while at the same time it functions to restore the desired level of privacy of a person or a group, by redefining the boundaries and communicating these boundaries to others. As is stated before this is not a one-way process. Where the privacy-need of a person is signaled, this need is also perceived and interpreted by others. Notice, for example, the apologetic behavior of people when interfering a person or group, or even coming to close to a person that stands in public space. Groups and individuals seem to have an invisible

shell between them and others that is not only perceived by others, but also interpreted and respected by them. This working principle of this shell is explained in the next paragraph.

2.1.1 Personal space.

Naturalists such as Hediger were the first to address the interpersonal space distancing between humans. They found that animals obtained a certain distance between each other.

"Territoriality, he says, insures the propagation of the species by regulating density. It provides a frame in which things are done – places to learn, places to play, safe places to hide. Thus it co-ordinates the activities of the groups and holds the group together. It keeps animals with communicating distance of each other, so that the presence of food or enemy can be signaled." (Hall 1966, p. 8)

Hediger found that the animals he studied not only defended a place-oriented territory, he noticed that there was an interpersonal distance between the animals, that was defended by the animals and that regulated the interaction between animals. Hediger described this spacing or distance as an invisible bubble surrounding every animal (Hediger 1950). This space controlled the amounts of species within a certain area, so that a certain environment could not be overexploited. Hall, when introducing personal space of humans in the book *the Hidden Dimension*, exemplified the spacing between animals through a research done on the deer population of a certain island. When starting the research there were 300 deer on the island, soon dropping to around 80, although there were no predators on the island that were a danger to the deer. When examining the deer the researchers found that the deer had high levels of chemicals in their body that caused high levels of stress. They concluded that this was caused by the deer's overpopulation on the island. The deer's seemed to control their population on the island through mutual extinction. Ethnologists such as Hall related the high stress-levels and

Figure 2.2 Space distancing between animals and people (Hall 1966).

the controlled population had much to do with the personal space surrounding every animal. Through the high density of deer on the island, each deer wasn't able to control his distance with others, causing high levels of stress, which eventually resulted in the dead of the majority of the deer population.

Research done in the same period found similar results for rats and crabs, and it didn't take long before the theory of personal distancing was related to humans. Hall stated that people also need a certain space around them that they can control to create a feeling of comfort when being surrounded by others. Sommer introduced the notion of personal space. He speaks of an emotionally charged zone around each person, which helps to regulate the spacing between individuals:

Personal space is a dynamic person-centered spacing mechanism obtained by individual desire for a level of privacy, changing over time and through changing circumstances. This spacing cannot make sense in the absence of others. What appears to be an invisible bubble around an individual is in fact a dimension of interpersonal communication that controls the interaction with others.

The interesting thing about this behavioral mechanism is that people use it unconsciously, without even noticing what their signaling and communicating to others. More importantly, persons are able to perceive and interpret others actions without further explanation. Personal space is culturally defined. During childhood a person learns to distance himself to others and perceive the boundaries that they signal. Personal space, therefore, has a much more preventive character than the other behavioral mechanisms. People use it to signal their privacy-need on forehand, according to the activity that they perform. Hall, in his book 'the hidden dimension' defines this process of interaction:

"When people communicate they do much more than just toss the conversational ball back and forth. My own studies as well as those of others reveal a series of delicately controlled, culturally conditioned servomechanisms that keeps life on an even keel,

much like the automatic pilot on the airplane. All of us are sensitive to subtle changes in the demeanor of the other person as he responds to what we are saying or doing" (Hall 1966, p. 5).

2.1.2 Distances of interaction.

Hall states that how people feel strongly influences the spacing of interaction between others. Also their own personality and the perception and interpretation of the mood and personality of others are important for distancing the self with them. Being angry makes people stand closer to others (although others will try to keep more distance) and introverted people need more space between others than people with an extraverted character. Thus, personal space is both personal and interpersonal. The relation the person has to the other defines the distance of interaction. This interpersonal relation depends on the situation and the activity people are in. A person will stand closer when talking to a good friend than to his boss. But he will obtain less distance with his boss when having an informal conversation at the coffee machine than when having his job evaluation. Altman summarizes factors that influence the distance between people as follows:

(1) Individual factors deal with properties of specific persons; (2) interpersonal factors refer to social relationships among people; (3) situational factors deal with the general setting within which people or groups function (Altman 1975, p. 66).

Hall distinguished four different distances of interaction, which he termed intimate, personal, social and public.

Within intimate distance (less than 0,45m) the presence of someone else is felt most strongly and is quite easily overwhelming. "Sight (often distorted), olfaction, heat from the other person's body, sound, smell, and feel of the breath all combine to signal un-

mistakable involvement with another" (Hall 1966, p. 116). This space zone is only limited to a small number of people strongly related to a person. Where this distance, as the term suggests, is most intimate, this distance also creates most and strongest uncomfortable situations. When standing in a crowded train others will easily interfere in this zone, making persons being able to sense each other. Especially in western cultures this sensory experience makes people uncomfortable. Smelling others, as in Arabic culture is common and normal, is in the Netherlands an unwanted experience, causing our strong emphasis on masking bodily odors through the use of perfume and deodorant. Because a person's view gets distorted in the intimate distance a person is less able to control the situation, which needs to put more trust on the interfering person. With our strong reliance on focus, having a distorted view, which occurs in this intimate distance, makes us less able to control the situation, which puts much trust on the interfering other. A person, therefore, is restrained for strangers entering this distance.

Personal distance (between 0,45m and 1,2m) is the zone used by persons to keep others at a comfortable distance to converse with them. Subjects that are discussed within this zone are of personal interest and involvement. People interact and converse with friends, family and people quite well known to the person, within this distance.

Social distance (between 1,2m and 3,6m) is the distance in which people have their (business) meetings, which are more impersonal and formal. Social distance contains two phases. The close phase defines more involvement; people who work together work in close phase. According to Hall, this zone runs to around 2m. Social gatherings will also occur within this distance. More formal interaction and gatherings that need less involvement of the person occur in the far phase. Within this phase people are able to continue their activity when others are present, without being left out of the social interaction.

Public distance (between 3,6m and 7,2m and beyond) is used for public speaking and is also a distance that is set around important figures. Hall found that people automatically

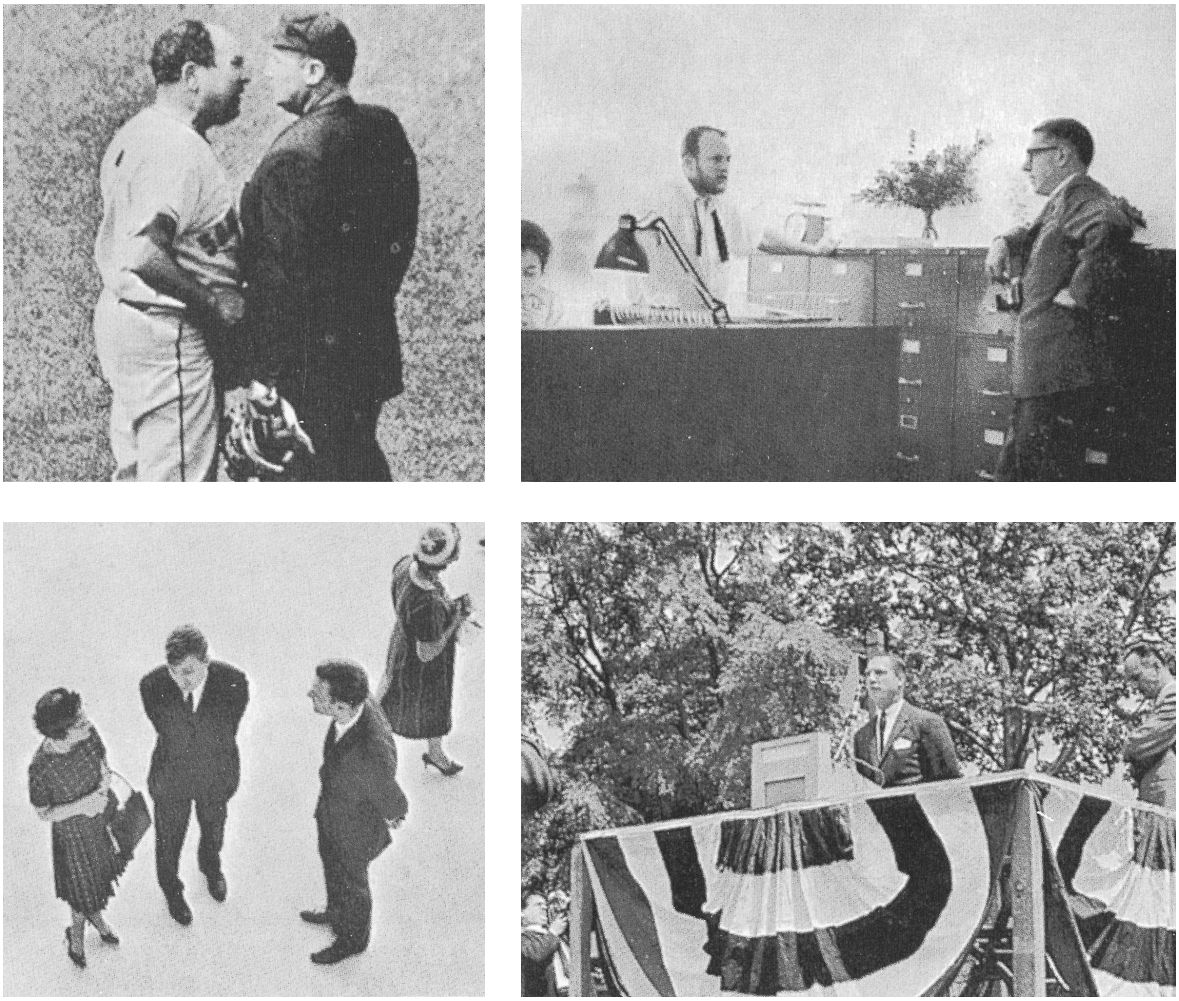


Figure 2.3 Distances of interaction: Intimate distance, social distance, personal distance & public distance (Hall 1966)

obtain more distance to others that have more status. For example, people will keep more distance to a just elected politician or a promoted colleague.

Personal space in the view of Hall is closely related to the way people behave in private and public space. Their level of privacy and with that the level of comfort in which they interact with others is strongly depended on the activity they are performing and others interpret their privacy behavior accordingly. When talking about personal matters a person will retain a close distance to the other person, and when a person is working concentrated, a person doesn't want others to sit close. Unconsciously, surrounding people will keep the appropriate distance. Thus, personal space is an important behavioral mechanism for controlling the level of privacy of people, and by that controlling the level of interaction they have with others.

2.1.3 Territoriality.

With the term personal space Sommer also refers to "the process by which people mark out and personalize the spaces they inhabit" (Sommer 1969, p.viii). He states that people not only control the spaces directly around them, but also the spaces that people inhabit. Sommer named personal space therefore also a portable territory, "since the individual carries it with him wherever he goes" (Sommer 1969, p. 27). Personal space is defined as a fourth type of territoriality, besides public, home and interactional territories (Lyman & Scott 1967). Altman, following Sommer's theory, makes a clear distinction between these two definitions and speaks of personal space and territoriality, which are strongly intertwined but also have a strong distinction. Where personal space mainly focuses on the 'territory' around a person, territoriality is termed in relation to a specific place. It refers to a place-centered mechanism. Persons personalize the places and spaces they inhabit, making it 'their own', and claiming the space around them as theirs. Altman defines territorial behavior as follows:

"Self/other boundary-regulation mechanism that involves personalization of or mark-

ing of a place or object and communication that it is owned by a person or group. Personalization and ownership are designed to regulate social interaction and to help satisfy various social and physical motives." (Altman 1975, p. 107)

As people territorialize or control the space directly around them, people also feel the desire to claim objects and places. They perceive not only a house, but also a pen, book or desk as if they own it, when they only make use of the object or space. Altman states that territory is less fixed on specific areas. People can make spaces theirs by only certain objects to personalize this space with. When moving from desk to desk in a new office setting persons perceive a desk to be theirs when placing some possessions or personal objects in or on it, only a simple family-picture suffices. Altman classified territories into three types, according to the degree of control a person can have over a certain area.

Primary territories are exclusively owned by a person or group and are clearly defined and perceived by others as theirs. It is highly valued by people within this territory to control this territory, and intruding it has serious meaning, especially when this intrusion is repeated. Family homes or bedrooms are main examples of this type of territorial demarcation. *Secondary territories* are less defined and less exclusive. Rules and ownership of these territories are not perceived as strongly as the primary territories. This leads many times to misinterpretation and miscommunication and can even result in conflict. Examples of secondary territories are entrance halls; arcades and galleries. *Public territories* facilitate temporal territoriality. These places have free access and little or none degree of ownership by individuals. The control of these places happens through institutions, norms and customs. Within these territories people often have to rely on other privacy mechanisms, such as personal space and nonverbal and verbal behavior to signal their boundaries.

An office desk in an open-office environment will be perceived less as a territory than a desk standing in a person's own office space. And a desk in an open office environment

that is pointed out to be a person's desk is a stronger territory than the available desk that is chosen every morning. Time in this classification is an important dimension, according to Altman. The duration a person 'owns' a place influences the person's and others' perception of the territorial claim to that place. Sommer gives a very interesting example of an elderly home where people in an open living room setting claim a chair, as it is theirs. During a short period of time they routinized their sitting-activity to one particular chair. Not only the person that used the chair, but also other residents and the nurses perceived the chair belonging to the particular resident. Although this territorial claim sounds rather neurotic, people do it all the time, everywhere and mostly without even being conscious of it. I noticed, for example, a certain day that someone else was sitting at the spot where I normally sat. Not only did it strike me that in the previous days (and even weeks) I every time had chosen the same spot, I noticed myself thinking that the person sat on the spot that was actually mine, even when it was in a public space. Although these examples can be interpreted as an act of dominance and power, territorial behavior should not be seen as such. The reason for (most) territorial behavior is merely one of organization; it smooth's social interaction with others, where it makes certain behavioral processes redundant. A certain spot doesn't have to be chosen over and over again, for example.

To territorialize a space or an object people use symbolic and physical markers. Sommer emphasizes the importance of territorial markers. These indicate ownership and belonging to a certain place. Fences and signs are exemplary as territorial markers, but even a person's coat or newspaper can be used to claim a certain place. In a café or restaurant people mark their place by hanging their coat on a chair and a book on a table in a library is mostly enough to keep a table or desk vacant. The power of territorial markers struck me when I once sat in the university-library. The table spot next to me was 'occupied' by some study books and some notes, nicely stacked. After a couple of hours, with the library becoming increasingly crowded, a student sat at the spot. I thought it was rather rude to sit at the place, while someone else had marked the spot and had clearly showed 'ownership' by use of the books. Until a couple of hours later

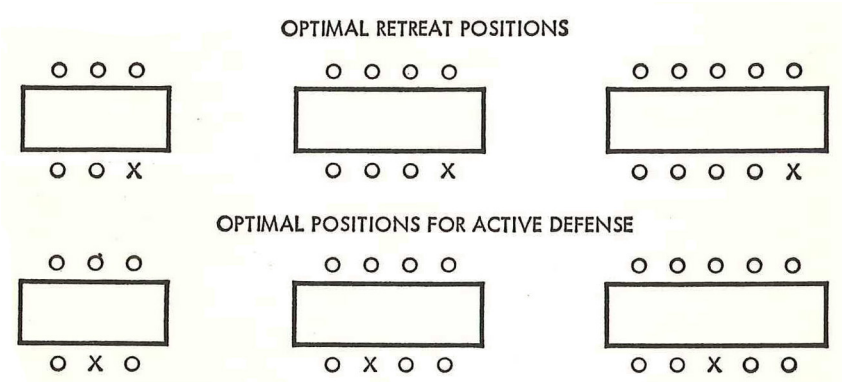


Figure 2.4 Defensive seating positions (Sommer 1969, p. 49)

the 'owner' came pick up his stuff, which he apparently had forgotten three days ago. The use of territorial markers and the misperception of territorial markers is problematic in most collective spaces. Chairs in cafes keep vacant because people put their coats on them, and only two people use tables for eight people, because of the way they place their belongings.

Sommer pointed out the importance of the neighbor in these kinds of situations. He studied how certain markers are perceived as territorial markers and the time these marks can claim a spot as being owned. He found that even rather impersonal markers, such as a random magazine, claimed a certain spot for a longer period of time. He also noticed that people who perceived the empty spot and marker, most of the time asked the neighbor next to the spot if the place was taken. The perception of the marker and the duration the spot was empty influenced the response of the neighbor in three stages. In first instance he or she gave a firm no. But after a certain period of time, and depending on the kind of marker used, the neighbor started answering in more doubt if the person would return or not, finally resulting in the neighbor saying that the spot was marked, but he or she didn't expect the person to return, so the person asking could

take it.

The use of territorial markers is a tool to defend the territory a person feels as theirs. But not only through physical objects, also by the use of body language people can claim a place as theirs and defend it from intrusion. Sommer noticed, for example, the seating arrangements on a table by persons with different privacy needs. When more privacy is desired people will seat themselves more in the middle of a table and clearly mark the table as theirs. When less privacy is needed people sit more to the side of the table indicating for others the possibility to join. According to Sommer there are three ways for persons to defend a place, which are almost always combined according to the privacy-need of the performed activity and the situation a person is in.

"Whereas position refers to a person's location with reference to external coordinates, posture describes his particular stance – whether he spreads out his belongings "as if he owned the place", or pulls himself in to take up as little room as possible. Gesture can also be used to defend a given area, a person indicating by his expression that he is receptive for company or prefers to be by himself" (Sommer 1969, p. 47).

Both personal space and territorial behavior serves to control the desired level of privacy of individuals. When privacy needs change, behavior shifts to adapt or adjust to the newly formed privacy needs. The mechanisms territoriality and personal space, therefore, continuously change over time and circumstances and persons continuously adapt and adjust to inputs and outputs from others, which makes the control of privacy strongly a dynamic process. Territorial behavior is an important instrument for organizing people's social interaction:

"Edney (Edney 1975) described the role of territoriality as providing a stable social organization in humans as well as in animals. He stated that territories serve a stabilizing and regulatory role at individual, group, and community levels – to smooth social interaction, to provide a set of cues to others, and to make explicit role relationships and

status hierarchies in a readily observable fashion" (Altman 1975, p. 138).

"In a sense, such spatial habits make life easier to live. With everyone having 'places', there is no need to continually negotiate who belongs where or who has right to what, so that day-to-day life smoothens out by virtue of territorial assignment of ownership" (Altman 1975, p. 140).

People thus (unconsciously) signal, control and defend their desired level of privacy through the mentioned behavioral mechanisms. Territorial markers and physical boundaries define and defend person's territorial boundaries. Gesture and posture and the choice of positioning a location that indicates a clear meaning to others, define the personal space persons need. These signaled boundaries are clear to others. The behavior of people is (most of the time) perceived and interpreted directly as such and therefore simply makes further explanatory communication of the perceived behavior unnecessary. Thus others know how they need to behave accordingly, leading to the respect for a person's signaled right to a place, without further negotiation.

2.2 Proxemics.

But what if others misperceive a person's need for privacy? And, even more importantly, what happens when the desired privacy needs of people cannot be met?

A while ago, when talking to a friend, I noticed after having talked for half an hour we had moved from the spot we had started our conversation from. Although not being intruded by others, I noticed, when continuing the conversation that we kept moving around in the space we were talking in. The conversational distance we kept to each other didn't seem to match. Because I have a bigger personal space than my friend, we were continuously adjusting the personal desired distance to each other, which resulted in some sort of slow 'dance' in the space. These situations occur often, and mostly without negative consequences. Hall however describes a lot of situations in

daily life where others' behavior (or their misperception of a person's behavior) results in uncomfortable situations and even stress. He introduced the theme *proxemics,* which strongly relates boundary mechanisms to culture (Hall 1966). What seems to be normal behavior within a certain culture can be completely misinterpreted by people from another culture, because of differences in their behavioral norms and perception. Hall states, for example, how Germans and Americans differ strongly in how they perceive a closed door. Germans think that an open door signals a sloppy organization. Americans, on the other hand, think of an open door as being inviting and socially accepted. A closed door signals for Americans that a person is not willing to participate in the office-community, while Germans don't make a distinction in the participatory willingness that persons signal through an open or a closed door. Cultural differences in perception, such as in the example of the door, lead in many (international) office environments to misperceived behavior. But not only the office environment, all settings in where persons from different cultures interact can form situations of misperceived behavior. When talking about differences between Arabs and Westerners Hall gives an interesting exemplary situation where an Arab stood uncomfortably close to him when Hall sat in an empty hotel lobby.

"…I had seated myself in a solitary chair outside the normal stream of traffic. In such a setting most Americans follow a rule, which is all the more binding because we seldom think about it, that can be stated as follows: as soon as a person stops or is seated in a public place, there balloons around him a small sphere of privacy which is considered inviolate. The size of the sphere varies with the degree of crowding, the age, sex, and the importance of the person, as well as the general surroundings. Anyone who enters this zone and stays there is intruding. … Pursuing this line of inquiry, I found that in Arab thought I had no rights whatsoever by virtue of occupying a given spot; neither my place no my body was inviolate! For the Arab, there is no such thing as an intrusion in public. Public means public. … I learned, for example that if A is standing on a street corner and B wants his spot, B is within his rights if he does what he can to make A uncomfortable enough to move" (Ibid., p. 156).

The Dutch, like the Americans, have a strong interpersonal feeling of a person's boundaries. This is culturally defined, and without further notice perceived and interpreted by others. Although differences are occurring, most Western cultures share about the same boundaries of privacy and personal space. Asian and Arabic cultures, however, define these boundaries differently. When two divergent cultures behave in close vicinity, someone's privacy needs and behavioral actions can be misperceived and misinterpreted, which can lead to stressful feelings as in Hall's example of the hotel lobby. This cultural defined behavior became the subject of many studies starting from the sixties, and is still a trending topic in behavioral sciences.

Within a similar culture, however, misperceived privacy behavior is also very much occurring. Someone who comes walking into the room without knocking violates the boundary of a closed door; when standing in a crowded train people intrude in a person's personal space. In many situations the desired level of privacy of a person cannot be obtained. Altman, therefore, states the important difference between the desired level of privacy and the achieved level of privacy, which is discussed in paragraph 2.3.

2.3 Crowding and isolation.

People have a desired level of privacy, which derives from personal (mood or feeling), interpersonal (liking for others) and situational (setting and features) factors. Through the behavioral mechanisms verbal (what people say), para-verbal (how people say it), nonverbal, personal space and territoriality people define and control these desired levels of privacy to achieve the desired level of privacy. But, where within the collective sphere many divergent desired levels of privacy of persons need to be facilitated, situations will occur that the desired levels of privacy cannot be achieved. The privacy boundaries of a person (or group) cannot be obtained and social interaction won't occur on the level that is desired. Altman states that there are three external inputs shifting the achieved level of privacy:

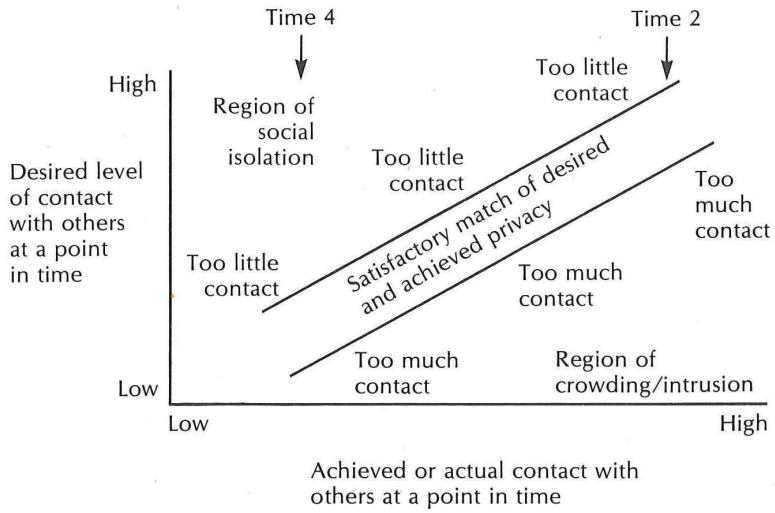


Figure 2.5 Privacy as an optimization process (Altman 1975, p. 26).

"Intrusion generally refers to a person or groups being approached too closely by others or to infringement on a territory without the owner's permission. Blocking access to resources occurs when someone is prevented from reaching a desired goal. … Social interference is a catchall and occurs when an ongoing activity is interfered with by interruption" (Altman 1975, p. 157).

Intrusion finally results in an undesired level of social interaction for a person, distinguished in two possible occurring situations. A person gets less interaction than he or she wants to. The person is thus socially isolated. This can result in feelings of boredom and loneliness. Secondly, situations will also occur in where individuals get (a lot) more interaction than they desire, creating a state of crowding. Both situations occur when the behavioral mechanisms fail to control the inputs of others and/or the output of the person itself and lead to uncomfortable feelings and even stress, conflict or withdrawal.

Crowding and isolation are phenomena that are strongly influenced by the density of the population that is surrounding a person within a certain area. Crowding and isolation give psychological meaning to density that is defined as not more than a physical quality of a certain place, according to the amount of people per unit of space. An increasing density of people in a certain place will increase the probability of social interaction between persons and the chance that undesired interaction would occur. It is, therefore, an influencing factor on the privacy levels that are achieved. Although higher density increases the likelihood of interaction, both physically and socially, it is not the physical quality itself that results in undesired interaction. Research on density in trains, for example, showed that not the total amount of people in a train unit influenced the experience of crowding, but the immediate presence of others, thus the intrusion in a persons' personal space (Evans & Wener 2007).

Crowding and isolation should not be seen as a direct result of increasing or decreasing density. Both phenomena can occur in many divergent situations, independent of the level of density. A person can feel being crowded in a situation where only one other person is present, as, for example, much occurs when standing in an elevator. But a person can also feel being isolated in a dense area. Think, for example, a crowded bar or reception. While surrounded by people a person can still feel being socially isolated.

The undesired situation of isolation or crowding makes people readjust the behavioral mechanisms or so as to realize the original desired level of privacy. Privacy-regulation is an interpersonal feedback-process. Where circumstances will change continuously, a person is also continuously trying to achieve its desired level of privacy. Thus, the process adjusts and readjusts due to changing circumstances and influential factors. This can be done until a desired level of privacy is achieved or a desired outcome is obtained. However, it is also possible that the desired level of privacy cannot be obtained, creating an imbalance between desire and outcome. A person may eventually accept this undesired situation. When standing in a crowded train or elevator not much can be done to stop surrounding people from intruding a person's personal space. These situations,

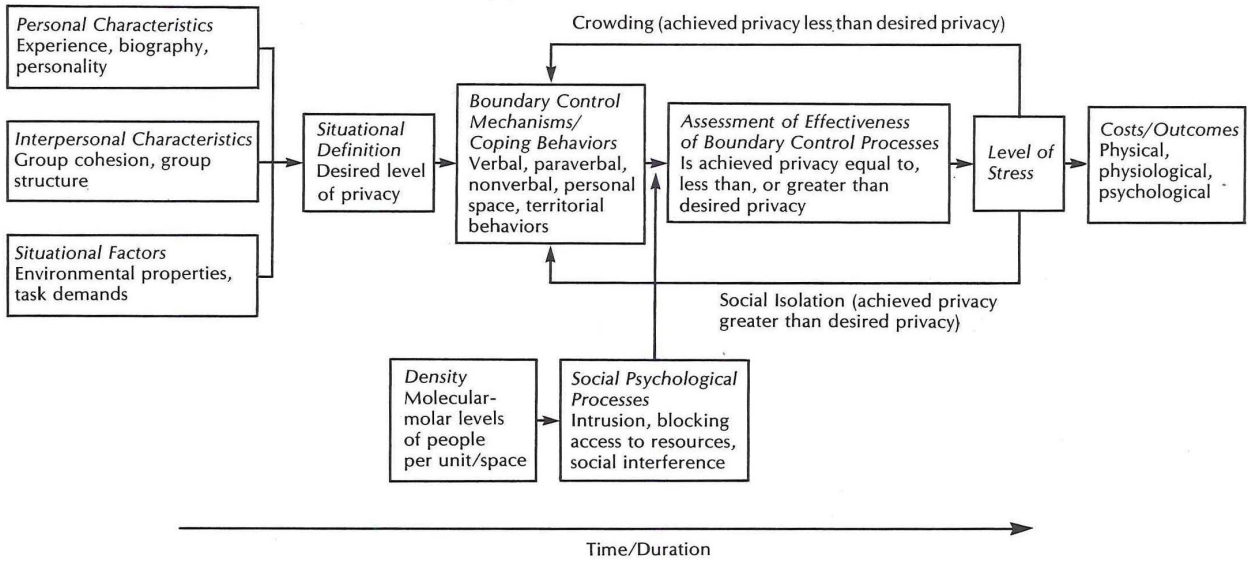


Figure 2.6 A model of crowding (Altman 1975, p. 155).

however, are mostly bound to a certain time period, which lead persons to accept more easily. It is also possible the desired level of privacy of a person changes along the way.

An important aspect of the feedback-process is the cost it needs a person to achieve his desired level of privacy. When people continuously need to adjust to changing external inputs and intrusion will cost a person a lot of energy. Becoming frustrated and even aggressive brings high psychological cost and can even lead to a mostly undesired situation of conflict. High levels of stress can also lead to a response of flight or concealment of the person. A person withdraws from the undesired interaction. Both the physical and the social environment of a person have an important influence in achieving the desired level of privacy. Therefore privacy behavior should always be related to the (built) environment. In paragraph 2.4 the relation between the built environment and privacy behavior is discussed.

2.4 Affordances.

Thus privacy should be seen as a network of conditions. It is not only depended on density, but also other situational, personal and interpersonal factors; the duration of intrusion; the feeling of stress; coping responses to this stress through behavioral mechanisms and the personal cost of these responses physically and psychologically. Undesired privacy levels originate from imbalanced interpersonal interaction as a result of miscommunication between persons, which causes the phenomena crowding and isolation to occur. These social errors can be diminished or even prevented when both personal behavior and the environment allow a person to communicate his need for privacy.

Even as important to what a person signals, the interpretative perception of the other person is important for people's communication. Hall states that people's visual perception is not only a matter of sight, but also of screening out and association (Hall 1966, p. 45). Similar are the other senses associative. During childhood people learn to filter

out types of information and to pay more attention to other information. Sight and knowledge, therefore, form a strong interplay when people perceive things. This results in the situation that people see things differently when actively looking at a similar thing. A couple of weeks ago my mother and brother were quite excited about something they had *seen* on television, an example that is quite commonly used. When a calculation task was showed, on the background a monkey was passing by. My brother hadn't seen this monkey, my mother did. Where my brother is quite good in math, he had the knowledge to perform the calculation, focusing on answering it. My mother, completely failing her math course in high school, didn't even started thinking about the calculation, less focusing on the information that was given in the example. Both perceived the same situation differently, screening out the information that was given.

This example is rather specific, but it shows that people perceive the (built) environment differently, dependent on their behavior and activity. Gibson, therefore, stated the importance of connecting a person, his activity and his environment with each other, creating the concept of affordance.

In his book 'The ecological approach to visual perception' Gibson introduced in 1979 the concept of Affordances. "The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill" (Gibson 1979, p. 127). The theory states that the qualities of the environment are relative to the user; they are unique for the user. He gives the example of a surface.

"If a terrestrial surface is nearly horizontal (instead of slanted), nearly flat (instead of convex or concave), and sufficiently extended (relative to the size of the animal) and if its substance is rigid (relative to the weight of the animal) then the surface affords support" (Ibid., p. 127).

The physical properties horizontal, flat, extended and rigid are relative to the animal and the behavior of the animal: its layout affords the animal's need to be supported. Surfac-

es, however, afford a lot of other behavior of the animal. In their different layout they can for example be 'walk-on-able', 'climb-on-able' and 'fall-of-able'. When the physical qualities of the surface are met and a person wants to stand on the surface, then it is perceived by the user as a stand-able surface. If the surface has the physical properties horizontal, flat, extended and rigid, and is also on a sit-able height, it affords sitting on. The user perceives the surface as sit-able object if the person needs to sit. Although the shapes can be very much different, if it's functional layout is sit-on-able it affords sitting. This affordance is relative to the user and the perception of the user. A sit-able height for a child is different than that of an adult.

Thus affordances are strongly depended on the perception of the user and his/her interpretation relative to the self. If a surface looks sit-on-able for the user it can be seated on. The idea of affordances was a break with the assertion in orthodox psychology that animals discriminate the properties and qualities of physical objects. Animals don't distinguish all the features of an object. Instead, Gibson states that: "what we perceive when we look at objects are their affordances, not their qualities" (Gibson 1979, p.135). Perception by that is economical:

"Those features of a thing are noticed which distinguish it from other things that it is not - but not all the features that distinguish it from everything that it is not" (Ibid., p. 286).

This means that features in objects or environments have many affordances in them. These affordances don't change as the need of the observer changes; it is always there to be perceived. An animal will only perceive the affordance according to its needs, more specifically, perceive the affordance that affords its needs. This brings me to a more specific understanding of affordance:

Affordances are the properties and qualities (features) of objects and environment that are perceived by its observer according to his needs.

Although above is mainly spoken about the physical features in the environment, the social environment (other people) of a person is equally important for people's behavior, according to Gibson:

"The richest and most elaborate affordances are provided by other animals, for us other people. ...in short, they interact with the observer and with one another. Behavior affords behavior, ...all depended on the perceiving of what another person or other persons afford, or sometimes on the misperceiving of it." (Ibid., p. 135).

However, for the field of architecture it is particularly interesting to focus on affordances of the physical environment. Affordances in architecture and the built environment relate the activities of people to the features of the built environment. People behave, according to their needs and according to the afforded and perceived features of the built environment. Their daily activities cannot be grasped in simple facts and figures; the perception and experience of the built environment are important.

The theory of affordances is of great help to understand the relation between people's

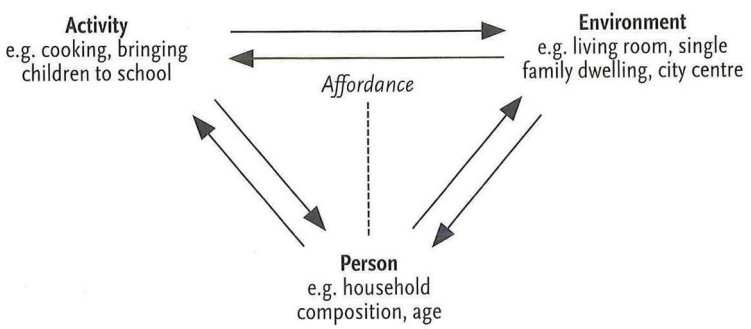


Figure 2.7 Interrelation between people, activity and environment (Meesters 2005, p. 167).

behavior and the environment and to understand why behavior occurs within a certain physical context. In case of the simple example of a chair it is expected that people will use the chair to sit on, because it is culturally accepted that this is the most common behavior for a chair. However, the physical qualities of the chair also allow other behavior to occur. It can be used to stand on and even be used to throw with.

In case of a more unambiguous environment, behavior also becomes more ambiguous and less clearly defined. Maier & Fadel (2009) address the common error of a door-handle in many public buildings. Where a door only moves in one direction, most of the time the door has on both sides a pull-able door-handle. People, in their need to open the door, perceive the pull-able door-handle on the door, and behave according to their need to open the door. They pull the door, where it is necessary to push the door instead. Such behavior occurs when the built environment signals incorrect or ambiguous use. Most of these errors can be prevented easily, when the environment clearly signals the expected use of the environment.

The theory of affordance can thus be used to translate people's privacy behavior into a comfortable physical environment. In this environment the privacy needs of the users can be controlled and clearly signaled. Similarly facilitates the built environment expected privacy behavior of its users. Out of both the perspective of the built environment and privacy behavior rules can be defined for the built environment that affords different and changing needs of its users, creating a comfortable environment for divergent behavior. These rules are described in paragraph 2.5.

2.5 Affording privacy.

Now privacy is a bit more understood enables to create a built environment that interprets privacy behavior into a physical design. Thus, besides functionality and form, behavior becomes an important design dimension.

To afford people their desired level of privacy foremost needs people to be able to be in control of their environment, both the social and the physical environment. This control is achieved by people's behavioral mechanisms that communicate, define and defend the desired level of privacy. The research on affordances shows the strong interconnection between behavior and the built environment. The built environment not only affects people's privacy behavior; performed behavior cannot be seen without its physical context. Both act on each other. To afford a person to control his or her desired level of privacy in the design of the residential building, therefore, needs concluding guidelines for the design of the residential building. Three statements become central in the design process and define part two and part three of this research. The first two statements are defined from the perspective of the built environment. The last statement is defined from the perspective of privacy behavior.

1. Privacy is a matter of choice.

2. Privacy is a matter of boundaries.

3. Every activity has a desired level of privacy.

2.5.1 Privacy is a matter of choice: Multiplicity of spaces.

Control implies the possibility of choice. People need to be able to choose the level of interaction they want to have with others, and thus choose a setting or sub-setting according to the activity they are performing. Because privacy-regulation is a continuously changing dynamic process, the built environment should afford behavioral and physical adaptation and adjustment over time and through varying activity.

The importance of choice becomes evident in research Sommer conducted on persons' seating arrangements at a table. He found, among other things, that people sit differently at a table, dependent on their activity. When having a casual conversation people sit

Seating Arrangement	PERCENTAGE OF Ss CHOOSING THIS ARRANGEMENT			
	Condition 1 (conversing)	Condition 2 (cooperating)	Condition 3 (co-acting)	Condition 4 (competing)
X / X □	42	19	3	7
X □ X	46	25	32	41
X □ / X	1	5	43	20
X □ / X	0	0	3	5
X / X □	11	51	7	8
X / □ / X	0	0	13	18
TOTAL	100	100	100	99

Figure 2.8 Seating preference at rectangular tables (Sommer 1969, p. 62).

corner-to-corner or face-to-face. Face-to-face talking is mostly used with more formal conversations. Persons sit next to each other when performing co-operative activity, but when working separately, they prefer to sit crossways, which allows staring in space instead of staring in the face of the other person (Sommer 1969, pp. 62-63). The seating arrangement is exemplary for most used spaces that have a certain level of ambiguity.

According to Sommer, for a person to be able to choose his or her desired level of privacy demands an environment that is both flexible and various:

"By variety I mean a multiplicity of settings and spaces a person can select to suit his individual needs. …Rather than installing benches of one kind or size in parks and recreation areas, it is preferable to vary one's purchases and arrangements. Flexibility is expressed in such terms as multipurpose, multiuser, and convertible spaces." (Ibid., p.164).

For the design of the residential building the first emphasis therefore is put on the creation of a multiplicity of spaces and places that are various and are able to adapt and adjust over time and through varying or changing activity. Part 3 discusses the way in which multiple spaces are designed in the residential building.

2.5.2 Privacy is a matter of boundaries: Demarcation of spaces.

This statement derived from a phrase in Sommer's book Personal space: the behavioral basis of design: "…privacy is a matter of barriers, rather than square footage" (Ibid., p. 250). It states that, for people to use a space comfortably, the space should not as much be designed according to size and physical distance, but according to the boundaries it facilitates its users. Boundaries communicate a person's desired level of privacy. These boundaries can be social, physical or juridical. The position, gesture and posture of a person signals a person's privacy need. Similarly does a person signal his or her privacy needs through the use of surrounding physical features. Think, for example of the

use of a door that signals different privacy needs depending whether the door is open, closed or half-closed. The physical environment forms a strong part of interpersonal communication.

Unclear boundaries and rules make territories easily be miscommunicated and misperceived regarding its use and ownership. This increases the probability of discomfort and stress in persons, which can even result in conflict or withdrawal. The problem of miscommunicated and misperceived boundaries occurs in many semi-public areas, such as hallways, arcades and entranceways to buildings. Areas that show high levels of deterioration and crime most often are the areas in where the privacy needs of its users are not clearly defined and signaled to others. When there is no clear ownership of a space, a person will not personalize the space. Because people feel they cannot personalize these spaces they lack the responsibility to control, defend and maintain them (Lyman & Scott 1967).

But not only does the lack of boundaries lead to escalating or conflicting situations, it also results in illogical and inefficient use of space. Sommer exemplifies this on the basis of a table that facilitates eight people to sit on but that won't be used by more than two persons, because the table lacks its users to define clear boundaries between others. Books, papers, coats and bags are needed to demarcate their territory. A similar situation occurs in many coffee houses, where upon one third of the chairs can be taken by coats that are used as markers for defining the personal space around a person.

Habraken emphasizes the importance for a person to be in control of his or her environment, through the use of social and physical boundaries. They divide and distinguish a space, thus allowing for divergent behavior to take place. But more importantly they define the relation a person has with others and improves people's behavior and social interaction. "Good fences make good neighbors" (Habraken 2000).

Although territoriality is mostly interpreted as an expression of power and dominance,

it is thus mere a mechanism for smoothing social organization. A person repeats much behavior so that he or she does not have to think about the process anymore. This is, for example, the reason that people sit in the same chair or at the same spot at the table or use the same desk at work. Sommer even found that certain chairs in a commuter train are kept vacated for a particular commuter that sits in that spot every day.

Thus the second emphasis is put on defining physical boundaries between spaces and thus demarcating these spaces. Only when the physical boundaries in the residential buildings are well defined, the multiplicity of spaces becomes fully utilized:

"A wall, a seat or some steps on which to repose, talk, wait or watch; a table around which people gather for an occasion; a balustrade, wall or lamppost against which one can lean and smoke a pipe, a door which allows one to tarry with dignity. All these things are not spaces as such but they constitute place in the most direct physical sense. They are tangible points of focus from which space is appreciated. Their experience value belongs to the body of space - to its place potential - but they are not space as such, although they impart a feeling of belonging, of being somewhere specifically" (Eyck, Ligtelijn, Strauven 2008, p. 69).

Part 3 elaborates on the use of physical boundary elements in the design of the residential building. It defines the degree of privacy that specific boundary elements offer looking at physical, visual, olfactory and acoustic privacy.

2.5.3 Every activity has a desired level of privacy: Hierarchy & Domains

Now that privacy is understood as a behavioral process instead of a state of being it becomes clear that every activity performed in public, collective and private space desires a certain level of privacy. To create a residential environment in where people can perform their activity comfortably, thus demands to distinct the activities that are performed in the dwelling and the residential environment, after which for every activity

research can be done on the desired level of privacy for that activity. For this research the most common activities in the dwelling and residential environment are investigated, according to a research that Meesters has done on the meaning of activities in the dwelling and the residential environment (Meesters 2009).

When the desired levels of privacy are defined for every common home activity, the activities in the dwelling and residential environment can be grouped according to the desired level of privacy and communality. This results in a framework of domains that is much emphasized by Chermayeff and Alexander:

"Such an urban anatomy must provide special domains for all degrees of privacy and all degrees of community living, ranging from the most intimately private to the most intensely communal" (Chermayeff & Alexander 1963, p. 37).

In part 2 the emphasis is put on defining the privacy needs of the most common activities in the dwelling and residential environment. According to the desired level of privacy, these activities are grouped in domains that range from a high level of privacy to a high level of communality.

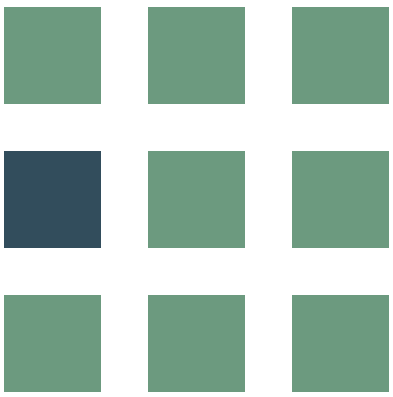
2.6 Privacy and the built environment

In this paragraph a summary is given that focuses on answering the first sub-question of the research: *What is privacy and how do individuals control their desired level of privacy?* It then concludes with the three guidelines that are the basis of the design of the residential building and form the introduction to part two and part three of the research.

Privacy is not a state of being of a person, but it is a behavioral process, in where a person sometimes wants to be separated from other persons, and sometimes want to be in contact with others. People have a desired level of privacy, which derives from personal, interpersonal, and situational factors. Through the behavioral mechanisms (verbal, pa-

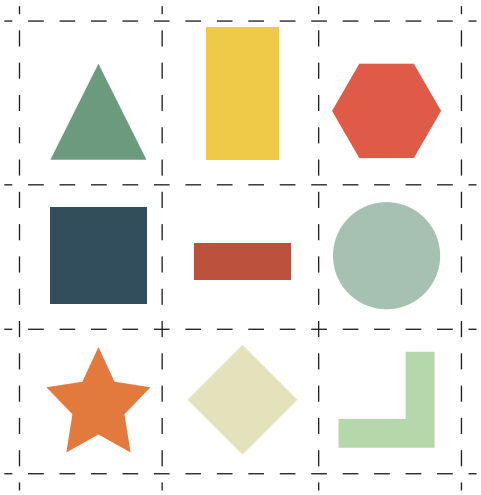
ra-verbal, nonverbal, personal space and territoriality) people define and control these desired levels of privacy. Situations will occur that the desired levels of privacy cannot be achieved, which results in crowding (too much interaction) and isolation (too little interaction). These situations give people high levels of stress and can even result in conflict and withdrawal. Crowding and isolation, therefore, should be prevented. They can be diminished and mostly be prevented when both personal behavior and the social and physical environment allow a person to communicate the desired level of privacy. According to the theory of affordances rules and guidelines for the environment can be defined that make this communication possible and thus create a comfortable environment for divergent behavior.

Three guidelines, therefore, become central in the design of the residential building. 1) The design should afford a multiplicity of spaces; 2) boundary elements should define, communicate and demarcate the desired level of privacy of individuals and groups thus creating a hierarchy of spaces, according to the desired level of physical, visual, olfactory and auditory privacy; and 3) domains should be created according to the desired level of privacy of every common activity in the dwelling and residential environment.

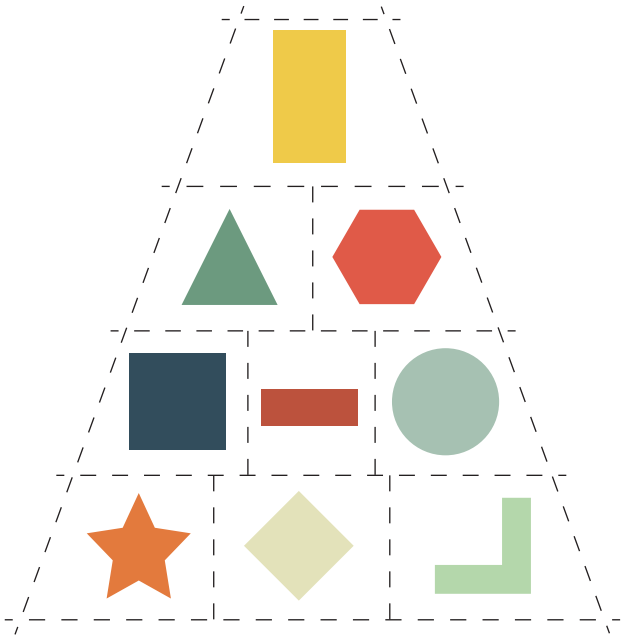


Private & Collective

Choice & Multiplicity



Control & Demarcation



Hierarchy & Domain

Figure 2.9 Three statements on the design.

PART 2 - Home activities.

This chapter distinguishes the common activities that are performed in the dwelling and the residential environment and defines the desired level of privacy in which these activities are most comfortably performed. It answers the second sub-question: *Which daily activities take place in the home environment and how much privacy do people need when performing these activities?* The activities are discussed through a pattern language, which is described in paragraph 1.4.1. Every pattern begins with a statement and concludes with guidelines for the design of the residential building.

One of the concluding guidelines of part 1 was to create a hierarchy of spaces according to the desired level of privacy of every common activity in the dwelling and residential environment. The spaces need to provide for all degrees of privacy, from the intimate and private level to the highly communal level. Therefore, concluding part 2 a scheme is presented that distinguishes the twenty home activities into five domains: private – multiple – group – collective – public-collective. The concluding part of this research elaborates on the activity patterns and the distinction into the five domains.

3. Home activity patterns.

The common activities in the dwelling and residential environment are distinguished according to a PhD research of Meesters (2005), who has done research on the meaning of activities in the dwelling and the residential environment. Among other things shows this research the activities that are mostly performed in and around the dwelling and in the residential environment. The activities that are defined as most common are included in this research. Additional activities are defined of which I think are important or necessary to be distinguished in the design, but are not specified in the research of Meesters. An example of such an activity is 'doing laundry'. To keep this research manageable, the research is constructed out of twenty activity patterns.

The twenty patterns include both specific activity-patterns, for example the activity 'sleeping', and generic activity patterns, for example 'activities outside the house'. The generic activity patterns encompass multiple activities. These activities have similar privacy needs or do not need to be defined individually for the design. Therefore they are researched within one activity pattern. The activity pattern 'relaxing', for example, includes the activities watching TV, reading and listening to music. Similarly, many specific activities are not individually defined, but are included in the patterns. Examples of such activities are 'being at the computer, laptop or tablet'. These activities are done both to relax and to work. Therefore, the activity pattern 'relaxing' and 'working at home' define the privacy needs of these activities.

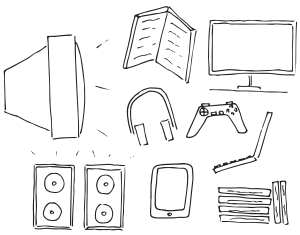
The patterns also encompass activities that do not entail specific 'actions' from the user, but have an important meaning in the dwelling and the residential environment. These patterns are important to define certain spaces in the design of the residential building. An example of such an activity is storage.

Besides the distinction between activity pattern and activities it is also important to state the difference between activities and actions. Every activity could be specified into more specific actions. Cleaning for example encompasses a broad spectrum of actions, such as vacuum cleaning or cleaning windows. For this research, however, the focal point on activities and the activity patterns suffices to understand and research people's privacy need.

Figure 3.1 shows the twenty activity patterns. After this scheme every single activity pattern is discussed. Figure 3.2 concludes with the subdividing the activity patterns into domains.

Sleeping.

Cleaning.

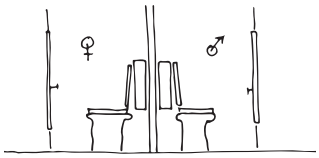


Relaxing.

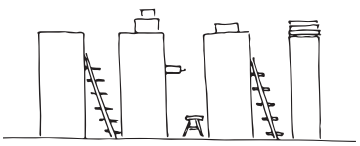
Dressing.

Doing laundry.

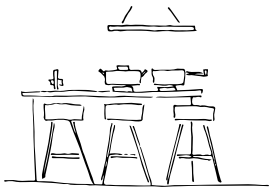
Communal eating.



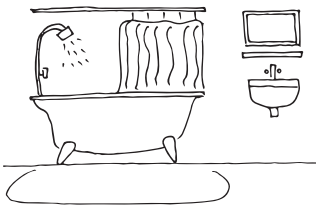
Communal toilet.



Communal storage.

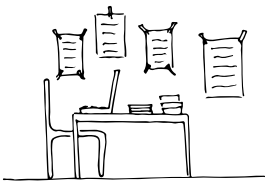


Communal cooking.



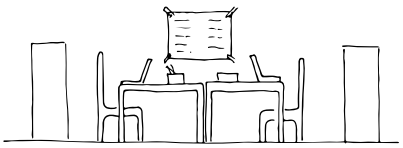
Personal care & Communal bathing.

Private storage.

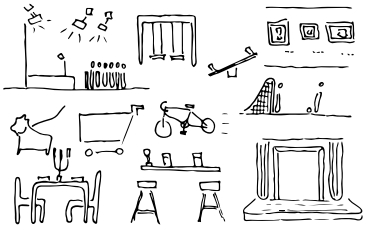


Working at home.

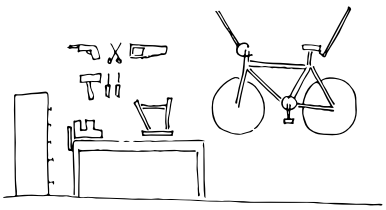
Figure 3.1 The most common dwelling and residential activities in twenty activity patterns.



The workplace.



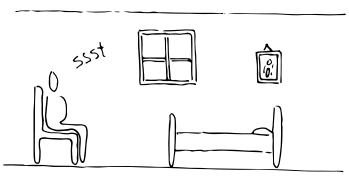
Activities outside the collective home.



Hobby.

Being with the nuclear family.

Being outside.

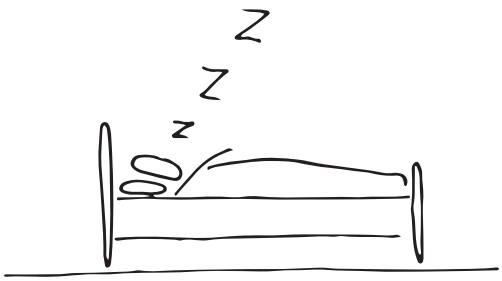


Being alone.

Gardening.

Entertaining guests.

I. Sleeping.



The activities before going to sleep and after waking up are the most intimate for two persons.

It can be stated that sleeping doesn't need any privacy at all; people can sleep in a communal or even public setting. When sleeping in this collective setting it demands, however, a certain level of trust in the people surrounding the person that wants to sleep, because when a person is asleep he or she loses control over the situation. When traveling I heard quite many stories of people that got robbed while sleeping in a communal hostel room.

Not as much is the act of sleeping an activity that needs to be done alone, it is the ac-

tivity before going to sleep and after waking up that needs a bedroom to afford persons privacy. These situations are most of the time the most intimate moments in someone's relation and therefore need a high privacy level. Theoretically this means that the act of sleeping and the acts before and after sleeping can be done in different privacy settings. This, however, besides being quite unpractical, also creates the need for specific intimacy or love settings, which are uncomfortable for its users when they are strongly emphasized as such. These settings make persons signal the intimate activities they are going to perform, which doesn't offer them a lot of privacy. Simply people don't want to signal to others that, for example, they are going to have sex.

The sexual overtone of sleeping needs the bedroom to afford a high level of privacy. The bed not only is a place of sleeping, but also of intimacy and love. Where sleeping is the main activity in the bedroom, the spaces around it are much less used. These spaces mostly function for accessing the bed and become leftover spaces that are filled with functions such as storage, dressing and even working; activities that can easily be done in other settings that offer more and more comfortable spaces for that. Thus, a bedroom can be brought back to an alcove, not very much bigger than the bed itself, although offering enough spaciousness for people to feel comfortable. People should easily can go in and come out of the bed. The bed-alcove should afford enough privacy for its users, while still being connected with the main room. This can be done through a simple sliding door or curtain.

Although the activity sleeping became stigmatized by privacy and sexuality, it also has an important social function. Before going to sleep people converse with their partner. Lying in bed forms one of the occasional private moments couples have. But not only for persons within the family this communal moment is important. People are more and more befriended with persons over longer distances. When having friends over the dwelling needs to afford them to stay overnight. A bedroom should therefore not only afford a person or a family in sleeping, but should, through small adjustments, afford multiple friends to sleep over.

Thus, a bedroom should be limited to a bed alcove that is not very much bigger than the bed itself. It still should be spacious enough, but in its appearance be very much distinctive from the main room on which it is situated. The space should have enough privacy, but still be connected with the main room, and should, by simple adjustment, afford multiple persons to sleep over.

II. Dressing.

People need their visual privacy while dressing; they tend to turn away from others while putting on or taking of their clothes.

The problem with clothes is that they are mostly lying everywhere in the house. With the wardrobe mostly standing in the dressing room, the whole bedroom becomes a place for dressing. Clothes disturb people in other activities and make a place look messy. Clothes are moved back and forth to make way for certain activities. It, therefore, needs attention to create a specific room to dress, that doesn't afford any other activity to occur.

Dressing is a transitional activity; it is done between phases or activities during the day. People dress after waking up or going to bed; when they came out of the shower or are taking one; and before going out of the house or coming back home. The bedroom and

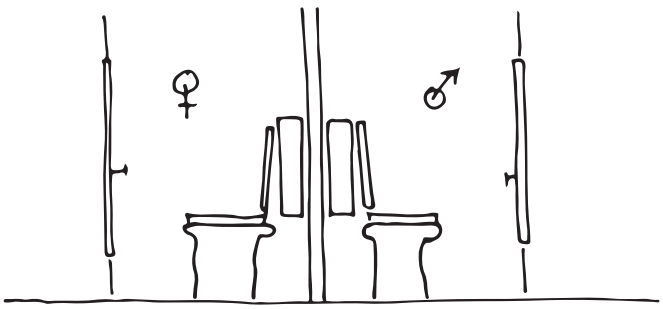
the bathroom are closely connected to dressing, for the activity is almost always done before or after sleeping and bathing or showering. The space affording dressing, therefore, needs to be in close connection with these two activities, preferably in between.

Alexander notes the need for privacy while dressing (Alexander 1977, p. 873). People tend to turn away from others when they take their clothes on and of, even when they dress in the presence of persons they are intimate with. Think, for example, being on the beach, the strange feeling of privacy loss when taking of a t-shirt. Or taking of a pants while you already have your swimming shorts on. People mostly tend to sit while doing this, not particularly because of ease. The reason for the privacy need while dressing is not entirely clear, but what can be stated is that a dressing room needs to afford a high level of visual privacy. Olfactory and acoustical privacy is not needed and mostly even unwanted. In communal dressing areas, such as in clothing stores, people dress and undress in visually private spaces, through the use of small partitions and curtains.

A dressing room needs to afford enough space for persons to dress. Because the space is only affording the activity of dressing it should function as a dressing place for multiple persons without diminishing the need for privacy. Thus, wardrobes for multiple persons can be connected to one dressing room. When a dressing room affords dressing for multiple households, the dressing room should still be positioned closely to the spaces that afford sleeping and bathing. The distance between the spaces that afford sleeping, bathing and dressing should be minimal.

Thus, a dressing room needs to be a place on its own, either private or shared. The room should have enough space for a person to dress, without bumping into everything. The dressing room needs to afford individual visual privacy, while affording multiple households to make use of it. The position of the dressing room depends on the position of the spaces affording sleeping and bathing, it should be closely connected to these.

III. The communal toilet and the problem of olfactory privacy.



Persons don't want to be smelled by others.

Hall explains that thousands of years ago people used to rely mostly on their olfactory senses. The nose was a more important sense-instrument for humans than the eyes. In densely forested areas humans were able to smell danger, long before they could see it. Hall says that with humans starting to live in trees, the importance of smell was being devalued below sight. Over time visual information became more important. Whether this theory is valid or not is not very much clear, but what can be stated is the accentuation of sight above smell, in people's daily life. Can we really 'smell fear' or is this mostly a visual perception?

Sommer (1969) noticed that when people are close to each other they prevent eye contact to occur to control the level of privacy they have with the other. Looking at someone when being close feels as an intrusion of personal space. Smell doesn't afford this control of privacy. We smell as we breathe, and we need to breathe not to die. We cannot choose not to smell others, other then through closing our nose with our fingers and breathing through our mouth, which still doesn't stop us from smelling our surroundings. The fact that smell, both in signaling and perceiving, can hardly be controlled, makes it difficult to create olfactory privacy for humans.

Many animals use odor to inform others of their (sexual) mood or feelings and use the nose to perceive this olfactory information. Humans, however, not being able to control the level of olfactory information they are signaling to others, have blocked this information completely, through the use of other odors. Eau de toilettes, deodorant and chewing gum blend persons' own olfactory stimuli to the commonly excepted odor. Clothes are washed with perfumed detergent; houses are filled with odor sprays that should smell like forests and the sea.

These smells at first hand seem to be used as positive contributors to the olfactory stimuli of the self and others. A person simply needs olfactory stimuli through the smell of different odors: the smell of freshly baked bread at the baker; the smell of flowers; and the smell of coffee when waking up. However, in the perspective of privacy, the use of other, strongly present, odors should also be seen as a way to control persons' olfactory privacy.

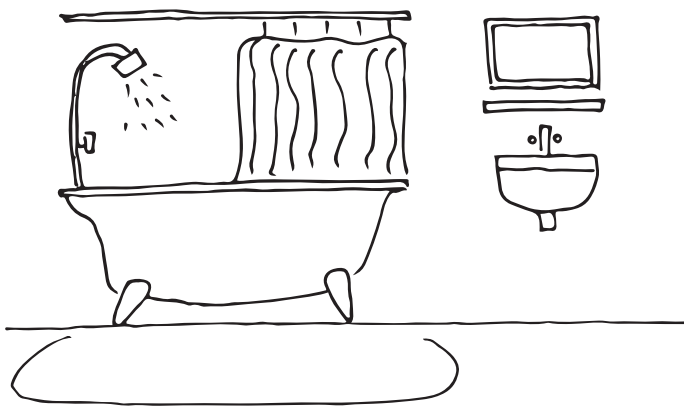
The fact that persons completely block their olfactory information made that a persons' smell became a very intimate matter. He or she prevents it for others to be perceived or masks it with other odors. This means that malodor became a negative output for others. Persons don't like others to smell their stinky armpits or feet; their bad breath; or the fart they just produced. Although our body produces these smells during the day or during a certain activity, people prevent others from smelling them.

This makes a person to prevent situations and activity in where others can smell their odor, or keep their distance from them, which brings me to the problem of the communal toilet. People mostly feel uncomfortable using them, because of the possibility that others smell them. They wait for defecating until they are home, or till no other person can see them. I heard friends saying that they wait before coming out of the toilet till everyone in the communal toilet is gone. Most importantly for the toilet therefore, besides to prevent olfaction, but giving people a very high level of privacy, both while being on the toilet, as when going to it and coming out of it. In a communal building where everyone knows each other, especially the latter is important.

Half-high walls and doors mostly enclose the American toilets in public places, which gives little visual, acoustical and olfactory privacy, when using the toilet. The toilet in my student house cannot be completely closed; a hook is used to lock the door. This makes going to the toilet very uncomfortable, more so because multiple people can see that someone goes to it, because he or she has to pass others' rooms.

Communal toilets as they had in Roman ages, don't give persons the privacy they need when going to the toilet to defecate. Privacy is very important for people to go comfortably to a toilet. Therefore, a toilet should afford as much olfactory, visual and acoustical privacy as possible. A communal toilet should not be directly connected with a public place in where others can see a person entering and leaving the toilet. Best is to enter a toilet through an already more private zone or the give the toilet two entries.

IV. Personal care, communal bathing and the problem of nakedness.



People attach strongly to being naked privately.

With the reformation the body became a thing to hide, nakedness a thing of immorality. Although the sixties put some relief, we have not recovered from this way of thinking. Still people don't feel comfortable being naked. Besides the last decades nakedness became directly affiliated with sexuality. A person can only be naked with the partner they are with. Thirdly within society the perfect body is put on a pedestal. Where almost no one meets these requirements of the perfect body, persons tend to hide their body from others. Although personal view of the imperfect body fades when people are aging,

from puberty on persons need a high level of privacy of the body from others.

This made bathing and personal care activities that need a high level of privacy, performed when completely separated from others. It is performed in an efficient box and solely seen as an activity of cleaning. Bathing, however, is also a pleasurable activity; it affords people to relax. People evaluate their day or think about the day ahead. When designing the bathroom the notion of bathing to be an act of pleasure should be taken into account.

Although people should need to relax more about their nakedness, this relaxation has its limitations that differ for every person. People still need to have the opportunity to be naked privately, unseen by others. It is therefore important to create a setting in where people can be comfortably naked while performing certain activities that both need or allow them to be naked. This asks for a setting where the toilet, bath, shower, basin and even dressing room are directly connected with each other. People don't need to dress for going to other parts. Thus, the functions of the bathroom should be together in one setting.

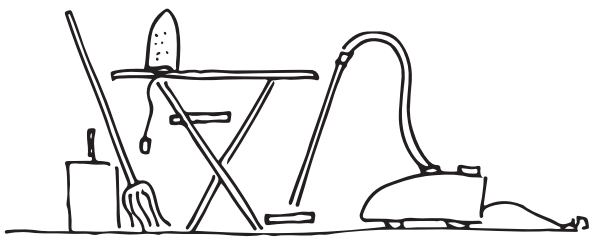
The setting should be positioned between the common areas and the private domain of the individual or couple, so that it can be accessed by others without them passing through the private realm. This is particularly important when multiple households communally use the bathing area. The path to the bathing area should not be visible from the common areas, affording a high level of visual privacy from others, so that persons don't need to dress up.

The bathroom is barely used during the day. From this point of view it would be much more efficient for this setting when it is communally shared. However, because people don't like to be naked privately, the bathing area should need to afford a high level of privacy when multiple persons are using it. Acts of personal care need to allow less privacy than others. The bathing setting, therefore, needs to be subdivided into multiple

parts. The part of personal care, including the basin and shelves can be more public. It forms the transition zone between outside and the more private areas in the bathing setting. The toilets need to be in a different part connected with the area of personal care, because of the need for olfactory privacy. The door to this area should afford both visual, acoustical and olfactory privacy. The showers and bathing part need to have visual privacy through opaque doors or curtains. They should be directly connected with the dressing room, without persons having to go through the area of personal care, for persons to move between these areas nakedly. The bathing area is the foremost place of relaxation and pleasure. The bath therefore should be large enough for multiple persons and needs a more comfortable environment than the more efficiently used shower areas.

Thus, the bathing area should afford a high level of privacy, for persons to be naked privately and comfortably. It should be positioned between the private realms and common areas. The path to the bathing area should not be visible from the common area. The activities of personal care should function together in one setting, including the toilets, basins, showers, bath and dressing area. The bathing area needs to be subdivided into different parts that are connected with each other, while still remaining the desired privacy of every part. Persons need to be able to move from the shower and bath area to the dressing room comfortably naked. Divergent boundary elements should be used, although the door, in different forms, should be the element used mainly. Bathing is not only an act of personal cleaning, but also of relaxation and pleasure.

V. Cleaning and the problem of responsibility.



People keep spaces clean they feel responsible for.

Creating a collective space, used and owned by the collective, doesn't define the responsibility its users have of that space. Where all own the collective space, it is also nobody's. Similar as with the use of collective stuff, space isn't maintained by the group, if it is not clearly defined of whom this space is.

In a chapter of the book *Setting Boundaries: The Anthropology of Spatial and Social Organization* (Rodman 1996) a resident of a cohousing community complained about other residents not willing to maintain small outdoor areas they had the responsibility for. He, therefore, did almost all the maintenance work himself, which was for the other resi-

dents an even more strong affirmation that they didn't need to feel responsible for the space. In most cohousing projects the problem of responsibility is the most occurring problem that eventually can cause a lot of friction between its residents. Where many divergent persons use the collective space of the residential building, persons value their own responsibility and the responsibility of others differently than other persons. Many persons don't clean or maintain the places they use, and don't feel responsible for doing.

This problem cannot be overlooked when creating a collectively used space, and it cannot be solved through disciplining users, which only creates a more hostile environment. People feel more responsible for keeping a street clean when the street is already clean itself. This sounds logical, but it important to note. Think, for example, on the kitchen table that is empty. This table will be kept clean for a longer duration. When, in the course of time, some things are put on the table, the table very easily will be filled with other things and soon be filled completely, until someone will clean it up. The same thing happens within collective space.

The collective space needs to be subdivided into zones. The private zone is the responsibility of the resident or residents; the zone of the residential group takes care of the areas that are the domain of this group. External cleaners should clean the collective space that is used by all.

VI. Doing laundry.

Because most households have a private laundry machine, doing laundry is an expensive activity.

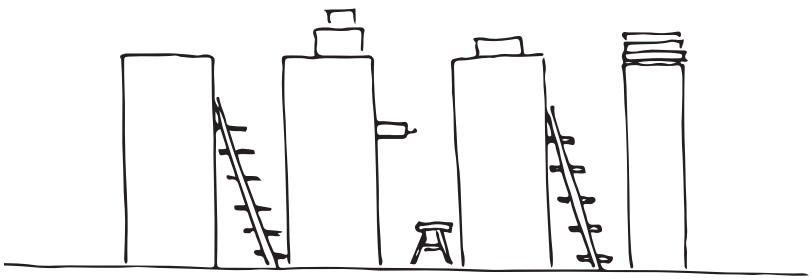
No household in the Netherlands washes laundry by hand, because it is too much work intensive and costs too much time. The arrival of the laundry machine was a helpful solution, but came with high financial costs. Although buying clothes became cheaper and cheaper through mass production in low-wage countries, the introduction of the privately used laundry machine made cleaning of (low-cost) clothes expensive. Where the focal point still lies on the cheap purchase of clothes, cleaning these clothes still is a relatively expensive activity because of the privately used laundry machine. Although every household has a laundry machine of their own, these expensive machines are only

used sporadically during the week. Where a laundry machine soon costs a couple hundred euros, this situation is illogical.

The activity 'doing laundry' doesn't need to afford any privacy. The only situation persons feel being uncomfortable with is their (dirty) underwear seen by others, but this is not felt as a major interference in someone's privacy. In many other countries 'doing laundry' is a very much social activity. It is a moment of the day or week people interact with their neighbors and others.

Its sporadic use makes it possible to share a laundry machine with multiple households. This is more cost efficient. A launderette is a setting for social interaction with each other. The launderette, besides its functionality, should afford this social interaction.

VII. Communal storage and the problem of ownership.



People have a lot of stuff that they don't (or only sporadically) use.

Marketing, advertisement and mass consumerism convinced modern society of the need for more and more private stuff, and with that the need for more space. Social status is constituted on amounts. People forgot to keep asking the question whether 'they really need everything that they want' and by that whether 'they need everything that they have'.

The dwelling is not only a place to live in; it also is the main domain for storing. Households store much stuff privately for the sporadic occasion of usage. A suitcase is need-

ed when going on a trip, only used during the few weeks a year a person goes away. A drill or other tools are used when, for example, hanging a painting or photo-frame, but the rest of the time they are not used at all. A vacuum cleaner is used more frequent, but still it is standing still and unused in the closet besides the half hour a week (or month) that it is needed.

Alexander, when writing about storage (Alexander 1997, p. 687), suggests that the house needs at least 15 till 20 percent of the space in the dwelling reserved for storage. And, as noted in *storage and the perception of space,* people feel a dwelling to be inadequate particularly when the dwelling is lacking in storage space. Storage, therefore, is an important element within the home environment.

Where private things are only stored and used privately, their use is inefficient and comes with high cost of purchase. When stuff would be owned and shared collectively, financial cost of both purchasing and storing should reduce dramatically. Examples of collective use and sharing are already present in upcoming online communities such as *Peerby, floow2* and *ShareNL,* but these initiatives still base their sharing on private ownership; someone owns something and lends it to someone else. It would be more efficient when this ownership is spread over all the actors involved in sharing. A person partially owns all the things he or she shares.

This communal ownership makes the possession of collective stuff difficult to control. Firstly, people value things differently. A car can be emotionally valuable to someone, and doesn't have any emotional value to someone else. Same counts for books, bikes, tools and so on. A dwelling therefore still needs to afford households to store the stuff they want to keep for themselves, however this private storage space is reduced to a minimum.

A second problem is the lack of responsibility people have when they share things with many. The communal fridge in the kitchen of my student house is not cleaned at all,

because nobody feels responsible for it. Other collectively used stuff is damaged or missing more easily. This not only happens because of lack of responsibility, but also on the lack of knowledge about its usage. To control this lack of responsibility feeds the need for control of usage, and for that the return of the caretaker. He or she keeps an eye on the use of collective stuff in the building.

Thirdly, the problem occurs when multiple persons need a specific thing at the same time. In the weekend, for example, it is more common to work in and around the house, cleaning and maintaining the dwelling. This demands during these times of the week certain things to be present in more amounts than on others. A simple solution for this is not possible. The only thing that can solve this situation is by controlling and spreading the periods of time people make use of them. An online system can make persons to see and reserve the things they need for a certain period, which make people to control the time they are doing certain activities. When a thing or tool is taken or reserved, a person should adjust its planning accordingly. This will apply to many situations in which people share things collectively.

Therefore, the building needs a place, or multiple places, where collectively used stuff, things and tools are stored and where people can go to when they need certain things for certain activities. Communal stuff and storage needs the return of a caretaker that keeps an eye on this. The private dwellings, however, still needs space for private storage, although minimized to emotional stuff only. An online system in the building should make the users of the building able to control and plan the time they can use certain things according to their needs.

VIII. Private storage and the perception of space.

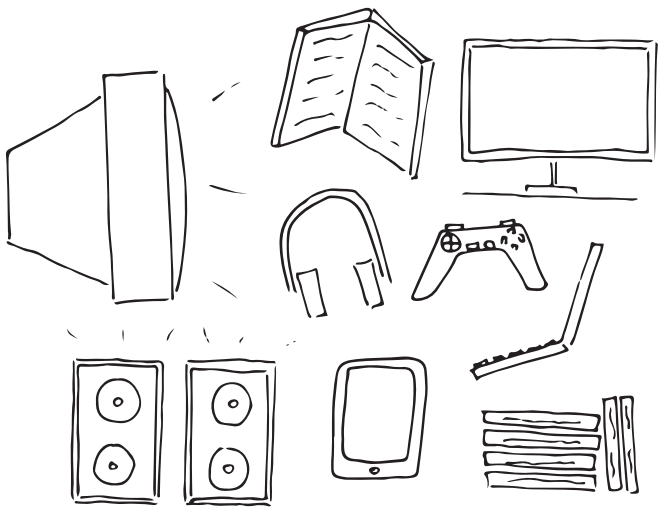
People perceive a dwelling as being too small mainly because of the small amount of storage space they have in the house.

Research showed that people who addressed their dwelling inadequate attributed this to the size of the dwelling, but moreover to the lack of storage space (Oseland & Raw 1991). This is an interesting finding, particularly because storage space is mostly overlooked or ignored within architecture.

Because storage space is lacking in most dwellings, other rooms need to afford storing. The bedroom, for example, is a common place, diminishing its affordance of sleeping, but also corridors and leftover spaces are much used spaces for storage. The amount of storage space is questionable, and also very much dependent on the user of the dwelling. This needs balancing between too much storage space, that invites users to store more than they need to. Too less, however, doesn't afford everything to be stored. Alexander states the need for at least 15 till 20 percent of the space in the dwelling to be reserved for storage space. Through the use of mostly communal owned stuff and storage this percentage can be reduced to half of this percentage, which still needs a dwelling to afford at least 10 percent of the space for storage of stuff with emotional value or things that people want to own themselves.

Thus, a simple way of providing a more spatial feeling of the dwelling is through the addition of more storage space. Particularly in a collectively used building, in where the dwelling is reduced to a minimum the presence of enough storage space is important. The dwelling should at least afford 10 percent of the space for storage.

IX. Relaxing.



People need to relax and forget about their daily work or routine.

The living room in a dwelling is a place that affords many divergent and even contradicting activities. It is a place where people eat; entertain guests; be at the computer; where children play; the family comes together; and where people perform their hobbies (Meesters 2009, p. 70). But most importantly the living room is for people a place of relaxation.

Many activities afford people to relax, but when being in the living room people particularly associate reading and watching television as relaxation activities (Ibid., p.71). Additional it can be stated that through social media being at the computer/laptop/tablet/phone also became a dominant relaxation activity. Although these activities don't need any physical or visual privacy from others, the setting in where people watch TV or read needs to afford a certain level of quietness. Thus, for relaxing, persons need a certain level of acoustical privacy.

The level of relaxation depends mainly on the level of distraction persons have from others. When watching TV a person doesn't want someone else to block the screen, or constantly walk through his or her view. While reading a person doesn't want to be distracted by noise or others trying to interact. The level of 'involvement' for the program or film that is being watched or the book or magazine that is being read mainly influences the level of distraction or privacy people need.

The living room is mostly defined as one fixed setting within the private domain of the dwelling. Creating a collectively used living space besides the private dwelling allows more opportunities for different sub-settings and therefore more possibilities for people to relax according to their desired level of (acoustical) privacy and distraction.

Relaxing, most often, allows for a certain level of social interaction. Therefore, people can relax among others. Certain sub-settings within collective space need to afford persons to relax. These settings need to facilitate a person in acoustical privacy, for him or her to be able to watch TV or read, while still signaling to others the possibility to interfere. For a person not to be distracted continuously while relaxing a setting should have well defined boundaries and it should be physically protected from collective passageways, while still being visually connected to that collective.

The coffeehouse

Extending the primary home-territory in collective space.

The coffee is more expensive than at home, and sometimes even tastes a lot worse than coming from out of your own machine. Going to a coffeehouse embraces much more than only for drinking a cup of coffee. It is a place where many different activities are performed. People read the newspaper, books; study and interact with others. After introducing Wi-Fi-spots, the café even became a place to work. Its setting can be seen as the most elementary extension of the house, facilitating many and most divergent home activities within collective space. But where people in their house are mostly protected from others, being in the coffeehouse means being very public. People meet, drink and eat; relax; but whatever their activity, they share the place with others, and are being surrounded by them. A coffeehouse, therefore, in its setting is most interesting. Where it creates a strong homelike feeling, people are not alone or secluded.

The home-like environment of a coffeehouse makes it to be the most direct extension of the house in collective space. People similarly treat it this way. This makes a coffeehouse a setting of conflicting (primary) territories, while being a collective space where people come together. Most importantly, the focus of the coffeehouse should be on creating sub-settings of separation that facilitate person's primary territories, without denying that the coffeehouse is a collective space.

This demands two important focal points: (1) creating a strong variety of places with different characters within the coffeehouse; (2) that clearly signal the boundaries of the place and that can be controlled by the individual or the group occupying it.

The coffeehouse not only needs to facilitate places to meet and interact, it also needs places for reading, working, studying and place for people just to sit and watch and be watched. The coffeehouse needs a smooth transitioning from the public street to the more private reading areas in the back. The bar area, therefore, is an important semi-public area and should be placed close to the entrance.

The coffee company, Delft

The bar is closely to the entrance, where it doesn't interfere the flows of people passing. The area of the bar functions as a buffer, between the public street and the more private sitting area, more in the back. It is being experienced as semi-public. When entering the coffeehouse a person feels immediately directed to the bar, where he will order his cup of coffee. From there, the person has the choice to further enter the coffeehouse or go outside again. Many of the visitors only enter to get a cup of coffee to go. However, some continue their coffee-experience in the coffeehouse. They can choose to stay in the semi-public space at the bar, where they can sit at the long table stretching along the street window next to the door; or take the stair up or down to enter the more private 'living-room' of the coffeehouse. This is the area where a person's private living should be facilitated and manifested. Multiple settings can be uncovered.

1. The long table on the entrance side along the street-window. The big windowpane makes the user of this sitting area more strongly participating in urban street life, not only his or her eyes on the street, but also being clearly perceived by the people on the street. The user of this area is more willing to be part of the interplay of 'seeing and being seen' on the street. When entering the coffeehouse a woman was sitting in the middle of the table, dominating the whole table. She clearly signaled to be left alone through the way she was seated (position, gesture and posture), which made the five leftover chairs vacant.

2. The long table along the wall. This table, as the one before, demand persons to sit in a clear direction: facing the wall. The persons seated here are less participatory in what is happening in the coffeehouse and more focused on their individual activity, facing their back to others. Where they withdraw from actively participation in the coffeehouse, however, they still feel the need for passive interaction: watching others. I noticed that only on the chairs on the window sides people sat. These persons were alone. After an hour a couple seated themselves three chairs away from me, on the spot that was lacking a view to the outside. Their need for conversation (being quite intimate) asked not to be distracted by what happened outside, both actively and passively withdrawing from interaction.

3. The lounge chair arrangement: On the upper floor there were three sitting arrangements with lounge chairs and couches. These areas, interestingly, were all arranged so that outsiders or newcomers could easily access them. Where the furniture invited people to converse, because the furniture faced towards each other, individuals, that didn't need to share any interaction, mostly occupied these seats. Through their arrangement the person was seated signaling more willingness and openness to social interaction. During the two hours I sat inside, the persons sitting in the lounge chairs were multiple times participating in a small conversation with others.

4. The long reading-table. Where people read their book or newspaper mostly in other sub-settings, people working on their computer or studying mainly used the reading table. Also here individuals mainly occupied the setting. Persons sat as far from each other as possible. The table already signaled to be full when only half of the chairs were occupied. The tendency for conversation was also lacking, all seemed to be completely dissolved in their personal bubble. This sub-setting, therefore, felt like being experienced differently. The more relax home-environment is combined by a more formal office-like feeling, which seemed to prevent persons that liked to relax of sitting here.

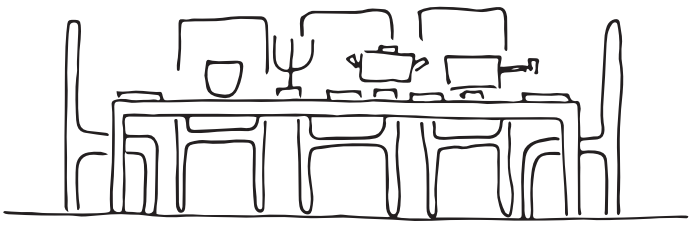
5. The two-person table: Where pubs or restaurant most of the time is filled with ta-

ble-arrangements like these, this coffeehouse only had one. It was situated along the middle wall, but positioned to much in left-over space, too close to the long reading-table, why it was rarely used or, when used, prevented persons for using the reading-table chairs directly nearby.

A wall with two openings separated the 'living-room' and the more formal 'study'. Although this wall was structurally necessary it became an important dividing element between the coffeehouse settings, separating the study and the living-room setting, without visually obstructing them. The area downstairs became a sub-setting on its own; there it is both physically and visually separated from the rest of the coffeehouse.

Important to state is the problematic consequence of persons claiming their territory, where the furniture or sub-setting didn't facilitate persons to control their own privacy. Coats and bags were placed on the nearby chairs and especially the long-table setting and the couch setting were, therefore, not at all efficiently used.

X. Communal eating.



Eating and drinking are social activities.

The activities eating and cooking afford a high level of social interaction. Only exceptionally people want to eat alone. Communal eating binds people together and makes them become members of a group. But more importantly, activities that involve eating and drinking are the activities for people to meet others.

In modern society persons have the opportunity to choose the people they like to be with. Not any more are groups defined by constraint to the community a person lives in, but a person can expand and connect to everyone and every community within society. Social media made this connection even easier. Common denominators can be easily signaled to others and be perceived by them. Problematic within this situation of endless connection, although people share things in common, the domain and denominator of the group is vague and more importantly the groups a person is part of are big and undefined.

Thus, although people continuously have opportunities to meet others, they keep con-

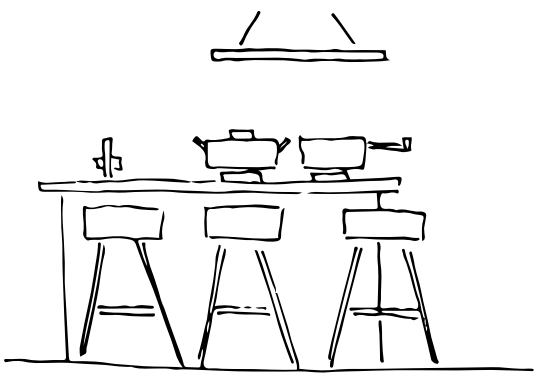
straint to the people they happened to run into. Alexander hypothesized that there are three things necessary for persons to meet others they have affinity with (Alexander 1977, pp.696-700). 1) There needs to be an overlap between different social groups, so that a person can easily move and connect between these social groups. 2) The group needs well defined 'group territories'; settings that afford groups to go to for having social interaction with each other within the group. 3) Communal eating and drinking is an important factor for the people when interacting with others and therefore is important for others to meet.

It should be stated that the threshold for others to 'intrude' in the group should be as low as possible, while still affording the group to signal their group territory. The problem with groups mostly is that they consciously or unconsciously seclude the group from others, creating domains that allow the group to interact mutually, but that keep out people from outside the group.

Through collective living people already have more in common and share more. Where many activities are done collectively increases the occasions for its users to interact and meet. Because eating most often doesn't need to afford any privacy for a person this activity is very important for persons to interact and meet with others. Groups can be formed that cook and eat communally. People can join and be invited by group members and are also free to join persons in other groups they have affinity with, thus creating an atmosphere of social interaction during communal eating.

Communal eating needs sub-settings that afford both signaling the group territories as well be inviting for others to join. The settings for eating need persons and groups to create sub-settings within and have minimal boundary elements from the surrounding collective space. Their aim should be to create one communal eating-setting within the building with different places within, directly connected to other settings that afford high levels of social interaction.

XI. Communal cooking.



Cooking is much more than an activity with the means of producing food.

Although the goal is for people to provide a meal cooking includes much more than only in its functionality. People cook to relax, for many it is a hobby. More importantly, cooking has also a social dimension.

The kitchen is a place where people eat together with friends and family and where they enjoy each other's company" (Meesters 2009, p.73).

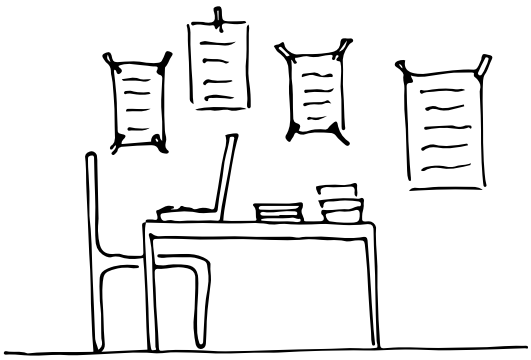
When servants were introduced in the households of the rich, the kitchen got separated

from the dining room. With houses for the middle class becoming bigger, they associated status with having a separated kitchen. The kitchen became isolated from the rest of the house, which it continued to be for decades. The separation of the eating area and the area where the food was prepared felt clean and neat. When in social housing hygiene became focal point, the separated kitchen remained accepted. The layout of the dwelling, therefore, still shows the kitchen as an isolated part of the dwelling.

Open floor plans in dwelling projects of the last couple of decades show a tendency for partial separation of the kitchen with the living and dining area. These open floor plans make persons that are cooking feel more connected with what is happening. However, still the focal point of the kitchen and of cooking lies in the means of producing food. The kitchen lies (far) back in the house and is mostly limited in it size and thus functionality. Cooking is still seen as a task to be done with the purpose of preparing a meal. It is, however, as much a social activity for people as is eating.

Therefore, the (sub-) settings that afford cooking need to be central in communal areas; they should be integrated in a bigger setting, connected with the settings that afford people to eat. Where cooking doesn't need much privacy and even has a high social dimension, cooking can be facilitated in collective space, acting as a transitional zone between more collective and more private places.

XII. Working at home.



When working at home the meaning of home as a place of security and relaxing becomes affected. The activity 'work' becomes interwoven with other divergent activities performed in the home. Through this interweaving a person cannot clearly distinguish relaxation and work, which makes the home uncomfortable for persons to be in and can even create the situation in where people feel the need to escape their dwelling.

The last decade the amount of freelance workers increased dramatically. Both government and companies started to emphasize on this type of employment. Besides companies allow, and even stimulate, their workers to partially work outside the office. People, therefore, more often (partially) work at home. Particularly among young professionals

this is a gradual development.

Where the office environment makes workers surrounded by colleagues, when working at home a person is mostly alone; isolated from others. Working at home, however, has for them many advantages. It means that people can work concentrated and in quietness. They can take care of the children; are more flexible in how they spend their day; and in view of the freelance worker it saves money for not having to rent office space. Being close to family and friends is a major advantage of working at home. Through zoning policy originated a clear separation of living and working. For a person to go to work he or she mostly needs to cross a considerable distance. Around the home environment there aren't many possibilities to work, thus people don't have many other choices then to sit at home.

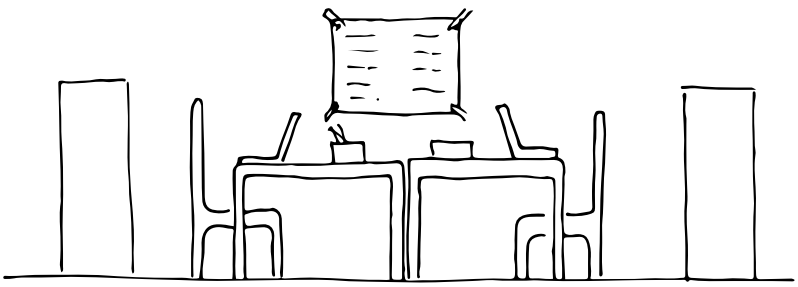
When working at home a person is strongly isolated from the life outside his or her dwelling. People don't have the possibility to interact with others; exchange information; and being stimulated by them. Thus a person cannot be positively influenced and challenged by others. Because work forms a major part of a person's life, this lack of social interaction is problematic. People simply need to interact with others.

Besides that, through working at home the dwelling can change in meaning for people. Home is defined as a place of seclusion and security; a place for people to relax and forget about work or other things in life. Work, however, is an activity of production and pressure that needs people to be concentrated. Thus, home life and work have a different meaning. When both meanings become strongly interwoven it is difficult for a person to distinguish them, which make him not being able to fully relax or work concentrated when at home. This situation can already be very much diminished when performing relaxation and work activities in different rooms in the dwelling. However, it would be more effective for persons to have a setting outside the dwelling where they can go to when they need to work. For people still having the advantages of working at home these settings need to be close to the dwelling.

Interesting startup examples such as *A-lab* and *the hub* already show a tendency for freelance workers to join in one building in where they have the advantages of the facilities of an office-environment, while being in a 'home like' setting. These settings, however, same as most offices, are quite far away from the home environment of a person, which diminishes the advantages working at home has.

Thus, create places within the collective space of the home environment in where people can work. These places should, in contrast with the office environment, have a 'home like' feeling, but still afford people to work concentrated. The places should afford interaction while still allowing people in their need for privacy, quietness and concentration. Still the work-environment should have a low threshold for others to disturb. Define the work-settings according to the *workplace.*

XIII. The workplace.



The development of multimedia and the Internet affords people much more mobility in their choice for a workplace. They can work where they have a laptop. However, for a place to afford persons to work comfortably the workplace should be well defined.

1. A work-environment needs to be both flexible and various. Because it is mostly unclear who the user of an office environment will be, the focal point lies on flexibility when designing these spaces. The resulting open office landscape, however, mostly doesn't afford people to have a high level of privacy while working. Besides, persons feel swallowed by the big mass of people and space, which creates an uncomfortable feeling. The use of partitions, on the other hand, makes it mostly impossible to change

a particular setting, because this will influence the surrounding settings as well, which is mostly not a desired change. Both situations don't adapt to specific work environments and, therefore, lack in their flexibility. The emphasis within the work environment should not only lie on flexibility, but also on the variety of spaces. Through smart positioning of columns different sub-settings can be defined without the loss of flexibility. A variety in floor and ceiling (height) signals the presence of different spaces without the loss of the open office-landscape setting. A difference in place is signaled without the setting being clearly defined.

2. People prefer small workplaces. It is essential that people are not forced to work in one huge undifferentiated space, but instead can divide their workspace in smaller parts. People feel oppressed when working in an undifferentiated space, but also feel uncomfortable when forced to work in isolation. Not more than 10 people should work in a certain defined sub-setting. These workplaces should be spatial and identifiable. When more people work in a workplace the level of interaction becomes less, because people feel less associated with each other. Variety creates different places and affords persons to choose their setting. More importantly, through variety of spaces a person is able to define and signal his or her boundaries, which make him or her able to control the level of privacy from others.

3. People should be positioned so that they can partially see the persons working around them, without distracting them and being distracted by them. The advantage of working in groups is the stimulus and exchange of knowledge with others. The threshold for persons to disturb others working in the same workspace should be as minimal as possible, while still allowing the individual person to work concentrated. Persons need to be able to look in the empty distance while thinking. Therefore they should not be positioned in the direct frontal sight of others.

4. Work has as much a social dimension as most other activities of living. The workplaces should be connected with other workplaces and the space surrounding the

workplace. The elements that define the space should afford a level of interaction, both visually and physically. To afford a person to work concentrated a high level of acoustical privacy is necessary when the workplace is directly connected with an intensively used and noisy collective space. A quieter surrounding affords leaving out acoustical boundaries.

5. Every workplace needs a buffer between the actual space a person works and the collectively used surrounding area of the workplace. This buffer acts as a transition zone between the collective space that affords more social interaction and the more private workspace of a person, in where a person can be concentrated. For a person not being able to control the people that are disturbing him is very much uncomfortable.

6. Workplaces should not all be clustered in one area, but be distributed over the entire collective space of the residential building. This allows a workplace always be in close distance with the surrounding dwellings, which makes it easy for persons to walk back and forth between their workplace and their dwelling, when needed.

7. Workplaces need common areas with common facilities. These places are important because they increase the possibility for people to bump into each other, which increases the chance of social interaction to occur. Many things are discussed at the coffee machine of an office. These common areas should lie between the different workplaces they connect.

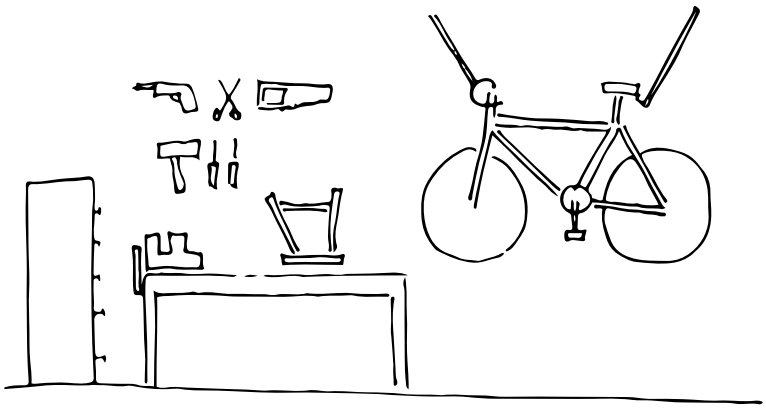
8. The workplaces should be positioned so that they afford people to walk around without bridging large distances for reaching common areas or facilities or other workplaces. Walking around makes people to change the reflection on their work; the change of scene lets them relax. Vertical distance in buildings feels being relatively more for a person than the horizontal distance in a building, which should be taken into account when using many stairs. The distance people have to bridge to reach a common area or facility should not be felt as a burden, but still be as much as possible for a person to

have enough distraction from his or her work.

9. Even within collective space work should be separated from relaxing. Both activities should be afforded in different sub-settings for a person to distinguish and choose according to his or her needs for concentration and work or relaxation and distraction. This prevents intermixing of both activities causing a person not being able to fully relax or be fully concentrated.

Thus, a workplace should be both flexible and various; affords not more than 10 people; affords a low threshold between its users; is connected with other workplaces and the surrounding space; has a buffer between the private workspace and the collective space; is decentralized; has common areas with common facilities; allows people to walk around; is distinct from relaxing areas.

XIV. Hobby.



People mostly are forced to adapt to work according to the needs and wants of the market. Although people mostly have a job they prefer their work doesn't allow developing certain specific things they like to do, because the market simply doesn't demand this work or the work is not profitable. Hobbies are very valuable for the community.

These kinds of work, however, allow people to develop themselves in the things they like, doing work that makes both stimulates and relaxes them. Therefore they are as much needed as a person's paid job. They not so much have the goal to make money, but are a way for people to do the things they like; be creative and relax. The activity

relaxing and hobby fulfill similar needs; they both have their meaning in relaxation, personal stimulation and enjoyment. Thus, the activity hobby is within this pattern not so much seen as an umbrella term for all leisurely activities, but focuses on activities in which people work, create and make. Hobbies mainly encompass handcrafts; people need them besides their working life.

The dwelling, mostly doesn't afford performing hobbies, because of limited space or the lack of facilities. The example of my grandfather showed the limitations of the shed functioning as a workshop for repairing bikes. When he would have had accessibility to a much larger space with the necessary tools within reach, he would be able to work a lot more comfortably.

A person should be able to explore many different kinds of work. Workplaces afford people to work concentrated, mainly behind their laptop or computer. Handcrafts, however, need a different defined space to afford people to work. The collective space of a building, therefore, needs spaces that afford people to do their hobbies. These workshops need to be spatial enough and allow persons to store the tools they need for the handcrafts they perform.

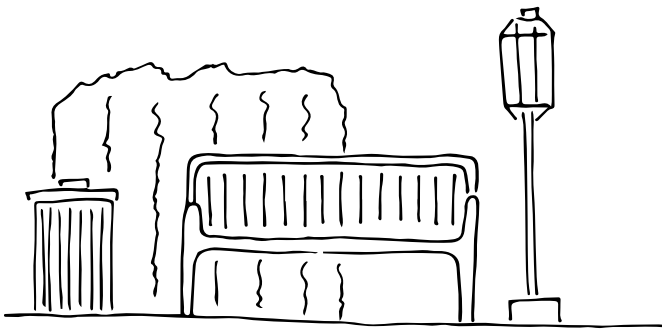
Where people have a lot of divergent hobbies, the workplace should allow these divergent hobbies to be performed without them interfering each other. Not only should a workshop have enough space, it also needs a variety of spaces, according to handcrafts that need and allow similar levels of noise; concentration; and distraction. The workshops need big tables for people to work on, but also have open spaces that allow handcrafts and hobbies that need space. The workshop, most importantly, needs to be very flexible in its layout, affording the most divergent hobbies thinkable.

Where the activity work needs quite a high level of privacy, for a hobby to be performed in comfort a high level of privacy is most of the times a lot less of an issue. Workshops, therefore, can have a strong relation with the immediate surroundings.

When workshops are connected to the street, public life can take notice of what happens inside. People like to look at other people that are performing their hobby; handcraft-activities are mostly interesting to look at and people can even learn something from it. It is, therefore, important for workshops to be placed along the public street and are connected with this street, so that people can look in and out. The hobbyists become the spectated of the public. This makes the workshop an important setting for (visually) connecting collective life within the building with the public life on the street. It enlivens both the collective community within as the public neighborhood surrounding the building.

Thus, place workshops along the public street and connect them with the street so that people can see in and out. Make the workshop big enough to afford people to work. Include big tables to work on and big open spaces that can be used according to divergent hobbies. Make the workshops flexible and create different places that allow more or less noise.

XV. Being outside.



People like to be outside. But they give different meaning to private outdoor places and public outdoor places. When designing a collectively used outdoor space the high level of desired privacy of these places should be afforded.

The private outdoor space differs in meaning from the public outdoor space. A public outdoor space is mostly valued because of its contribution to the livability of the residential neighborhood. When going outside these places afford people to experience nature. The private outdoor space, in contrary, is much less valued because of its affordance of nature. These spaces mainly need to afford its users a certain level of privacy and seclusion from the outside world (Coolen & Meesters 2012).

Meesters found that the private outdoor space functions as a place of activities very similar to those performed in the indoor living room (Meesters 2009, p. 77). The private garden is a place for leisure, as much as the weather allows it. It therefore can be seen as an extension of the private living room. It is a place to relax and enjoy. As in the indoor space of a dwelling, a person has the freedom to do what he or she likes within this space, being unobserved by the public and in control of the surrounding space.

The private outdoor space is seldom seen as an integral part of the dwelling, when designing the home environment, other than a strong focus on the visual connection from inside (Coolen & Meesters 2012, p. 51). However, where private gardens almost always have a high level of enclosure, but lack a ceiling, people can feel private, while still enjoying the weather. The private outdoor space, therefore, forms an important setting for people's living.

For outdoor spaces to afford in a persons need for privacy, the spaces need to be well enclosed through the use of physical boundaries. The space needs to be divided in different private places that afford people to sit; relax; read; sleep; and do all the activities they would normally perform in private indoor rooms. In contemporary settings the front garden is less used, because it is mostly well exposed to the public street. The back garden, on the other hand, is mostly completely isolated from its surroundings. When designing the private outdoor space, there needs to be a balance of enclosure and exposure.

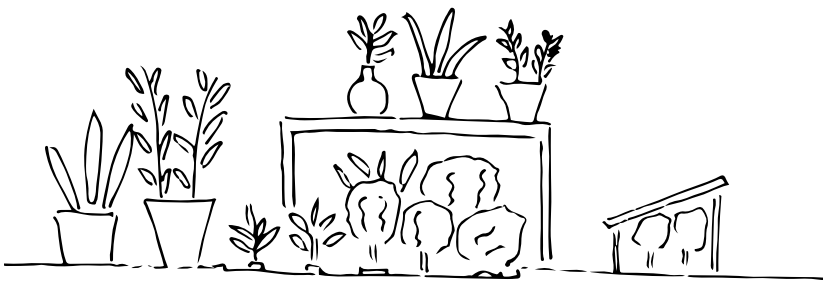
Coolen found that 80% of the people in the Netherlands prefer a garden and 20% prefer a balcony (Ibid., p.51). Urban environments, however, through the high density of the built environment, mostly lack in space that affords for a private garden. A solution can be found in the presence of the high amount of building-roofs in these environments. These roofs have the advantage that they are more exposed to the sun, an important need for people when being outside. The roof outdoor space should be treated as any other private outdoor space. However, for a person to make comfortably

use of it, an additional focal point should lie on the physical threshold for entering this space. This needs to be as minimal as possible. The roof should be directly connected to multiple actively used indoor spaces. People should be able to directly walk onto the roof, preferably from the same floor level. When a stair is needed this stair should be well inviting for persons to enter the roof.

Besides a high level of enclosure the roof still needs to be connected with the neighborhood surrounding the roof. The disadvantage of the roof opposed to the private outdoor space on street level is the lack of direct social interaction people can have with the public street. Therefore, besides affording persons in their privacy, the roof should afford places that visually connect its users with the public streets surrounding the roof. The roof needs to allow people to see the surroundings and to be seen (by) its surroundings, both being spectators and spectated.

When a person wants to go outside he needs to be able to control the level of privacy he desires from others, as much as is needed in indoor spaces. Where public outdoor spaces mostly don't allow for a high level of privacy, the collectively used outdoor spaces mostly need to afford a certain level of privacy. These outdoor spaces need to be enclosed by many boundary elements so that they feel like a room, although they are open to the sky and the sun. In urban environment roofs are great settings for private outdoor spaces, though these roofs need places that are visually connected with the public street. They also should be directly connected with collectively used indoor spaces and have easily accessible and inviting entrances from indoor spaces.

XVI. Gardening.



Not only do people like to be outside, they like to be in touch with nature as well. The urban environment affords this need through public green parks. But closely connected to the dwelling people should have a garden as well.

Although some people see gardening as being a chore, necessary for keeping the garden nice, most people find the activity to be relaxing and enjoy it. The meanings of gardening are similar of that of hobby. It is a way for people to relax; be stimulated; and kept busy. Collective gardening, besides that, is for people an activity of social interaction. Like when performing hobbies collectively, people can converse and be together while gardening. It is more exciting for them when they produce something collectively, an

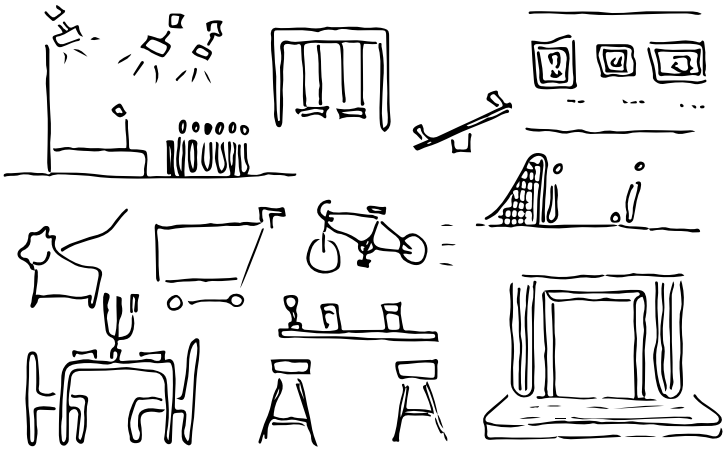
end product that they can be proud of and gives them collective identification. Therefore, eatable plants and flowers should be grown.

But more importantly than the activity itself, people, when surrounded by plants and trees, can be in most intense solitude, peace and quietness. Living in a city in where people are continuously surrounded by high levels of activity they need places like these to relax, being closed of from the surroundings visually and acoustically. For a garden to succeed in this need, the garden needs to be of a considerable size that can hardly be reached within a collective garden.

Both situations demand a different kind of garden type: one in where people can have social interaction and one for people to be in solitude with nature. These types, however, don't exclude each other. Importantly for the collective garden is to create a mixture of privacy needs through balancing visual and partly acoustical enclosure and exposure. This can be done through the use of plants with different heights and density. There needs to be a variety in view from eye level while standing. It is important to create clearly defined places in where people can be alone and that signal to others that the person or the persons within want to be in solitude.

Thus, create a garden with plants of different height and density. Create places in where persons can be in solitude, but also places in where people can interact with others while gardening. The collective garden should be enriched with many fruit and vegetable plants that can be eaten for people to have a collectively shared goal of gardening.

XVII. Activities outside the collective home.



The collective home should not become an introverted community, isolated from its surroundings.

Although the collective space of the residential building affords many divergent home activities this doesn't mean life within the building is isolated from the rest of the home environment. Many more activities are performed in the environment surrounding the collective home. These settings allow the residents to meet and interact with friends and strangers outside the collective home, and make the home environment a lively place.

Because home-activities mostly need to afford a particular setting or facilities, the resi-

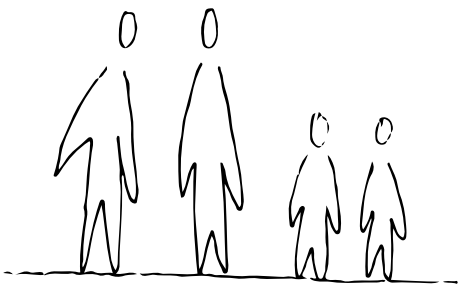
dential environment needs to have a high variety of settings and places. People need to be offered a choice for different settings that afford similar activities. In these settings, similar as in the private domain and the collective domain of a building, the desired level of privacy should be taken into account and afforded. This language won't further elaborate on these settings, besides stating the activities that people perform in the residential environment, according to mentioned activities in the research of Meesters (2009, pp. 206-207).

These activities are: daily errands; recreation in the form of walking, biking, walking the dog, children playing outside and being outside; sports; going out in the form of going to a restaurant, café, theatre, cinema, concert, museum and festival; visiting friends; commuting; (fun) shopping; going to a club; bringing the children to school and work. The settings for these activities need to be within acceptable and comfortable walking and biking distance for persons to go to them, instead of them staying at home.

Where many activities are performed outside the collective home, the collective home should be connected to the surrounding environment of the public, both visually and physically. The public street and the collective interior should interact in their activities, being spectator and spectated of collective activity. It is important that this is done through collective activities and settings in the building that allow for a high level of interaction with the public street, such as the workshops and communal eating and cooking.

Although the collective home can afford many of daily activities on small scale, public life should not be excluded. Many divergent activities should be afforded within comfortable distance of the collective home. The collective home should also be visually and physically connected with its surroundings through activities and settings that afford a high level of social interaction and that are inviting for public life, in the form of a publicly used café or coffeehouse.

XVIII. Being together with the nuclear family.



Only when there is a balance of privacy and communality people can live collectively. Every family in a communal environment needs a private domain to where they can retreat to, according to their need for privacy; a place of their own.

The many examples in the book Commitment and Community (Kanter 1972) show the strong emphasis on everyone being forced in collective living continuously. The possibilities of persons being alone or alone together are minimized to an uncomfortable level. Within these communities privacy is not taken seriously or it is seen as something negative that needs to be avoided. Russian socialist examples show a similar tendency. Where the collective is seen as the highest good, people don't get any opportunity to

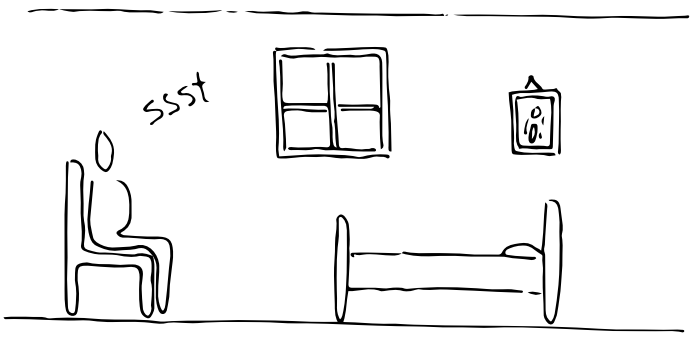
be private or privately together. This causes annoyances and friction between members that sometimes need to be alone or intimate with their partner and don't want to be disturbed by others. The only way people allow being in a community is when they have a private basis to start from.

In contemporary housing the private environment of families is mostly formed by the dwelling. This is the private realm to where people can retreat to, and for families to separate themselves from others. The dwelling, therefore, needs to afford families a high level of privacy. It has to be enclosed enough for families not to be seen; heard; smelled or disturbed. More than any other setting, the dwelling needs persons to afford controlling the level of privacy with their surroundings. This is particularly the case in a collective building in where the daily activities within the dwelling are minimized. The dwelling becomes a strong private domain; a place of secrets (Avermaete, Haviks, Teerds 2009, p. 43).

This demands the dwelling to afford three distinct areas: a couple's area; a children's area; and a common area where common activities take place and that connects both areas. Because the building probably won't allow for families with children, I won't elaborate further on the family dwelling. The dwellings only need to afford private realms for individuals and couples. Particularly couples need a private domain, in where they can be intimate with their partner: A place to relax; to talk privately; and make love. This domain is distinct from the common and collective areas. Central to these places is the bed.

Thus, the dwelling needs to afford the individual or the couple a high level of privacy from its surroundings; it needs to be a domain of the private with strong territorial boundaries, enclosed from the collective spaces. The dwelling needs to afford intimacy with the partner: A place to relax; to talk privately together; and make love. The bed needs to be a central element.

XIX. Being alone.



People need to have the opportunity for solitude and privacy: A place to be alone.

Similar as the dwelling is a private domain for the family, the dwelling also needs to afford privacy for its individual members. Each person should have the opportunity to be alone, without others having the feeling that they are secluded; isolated; or left out. These places should allow a person the opportunity for solitude and privacy. Therefore, besides common areas where persons can be together, the dwelling needs places for individual members to be private and alone.

If the dwelling stands in a larger collective, the need for privacy of one member of the family still affords the other its need for social interaction. He or she simply can enter the collective surrounding. But, both members should be able to be away from the

community similarly, without them being together. A dwelling for a couple, therefore, needs to have at least two spaces. These spaces can be small, although spacious enough to afford the divergent activities the individual member needs to perform in private, such as reading; working; or talking privately on the phone.

Dwellings are almost never made for only one person. Although in contemporary Western society many persons live alone, they don't have a dwelling that only affords the space they need. They live in (adjusted) dwellings made for families or couple's and that are mostly to big for them to afford financially. Or they share the dwelling with multiple persons and only have one room for themselves. Although the last situation already is more efficient where it facilitates and allows people to use common space more efficiently, their private domain mostly doesn't afford the individual user in their need for privacy. These private domains mostly don't have any transition space from the common territory to their private and intimate territory other then a simple interior door. Besides, the partitions and doors mostly don't afford a high level of acoustical privacy from others.

A dwelling (or space) for one person, besides affording a high level of (acoustical) privacy, should be very practical in its layout. The dwelling most of all needs to support a person in his or her direct needs and wants, facilitating according to functional necessity. One person needs to have only one room that affords only what is needed. Small alcoves around the central space form small spaces so that it affords different activities within the same room.

Every person needs to have a space where he or she can be alone. Thus a dwelling for one person only needs to have one room, a dwelling for a couple two. These rooms need to support and facilitate according to functional necessity, and afford a high level of privacy, both from outside and the room inside; and both acoustically and visually. Small alcoves form different spaces, surrounding the central space of the room.

XX. Entertaining guests.

The collective space needs to facilitate different settings of social interaction and meeting. These settings need different levels of privacy, comfort and enclosure according to the type of entertaining.

While elaborating on all the divergent activities that take place in the dwelling and home environment there has been developed a range of settings that facilitate persons in their activities and in the level of privacy they need. Through their diversity, these main settings and their sub-settings form the places that afford persons to invite others for social interaction, both from inside the building as outside. The sitting spaces within collective space allow for different levels of privacy and, therefore, offer different ways for people to meet and interact with others. The dwelling affords highly private and

intimate conversations; workplaces formal meetings; relaxing areas informal; and communal cooking and eating areas a lot of social interaction and big groups.

Although these settings itself signal different levels of privacy, within these settings a variety of privacy and intimacy should also be afforded. The settings need to facilitate different sitting spaces that afford a variety of ways in which persons can entertain others and interact with them, varying in degree of privacy and comfort. Creating sitting spaces that have a varying degree of protection from the paths and movement within the collective space, through their enclosure and positioning can achieve this. The specific type of setting in which persons want to entertain guests can be chosen accordingly. Formal meetings need full enclosure, informal meetings can be partly enclosed and separated and partly connected with the larger space.

Besides a variation in enclosure, these settings need to vary in size as well, to afford bigger and smaller groups to be entertained by the residents. When bigger groups need to be facilitated the common areas afford this; enclosed areas within the collective space afford private conversations of smaller groups; two persons can even retreat to a person's dwelling.

The residents should be able to facilitate interaction and meeting with others: A meal with friends; a birthday with the family; and a meeting with clients. As is stated more often already, the collective space needs a variety of settings that vary in their degree of enclosure and size. The collective space needs to afford both a variety of activity-settings and sitting spaces for meeting and entertaining.

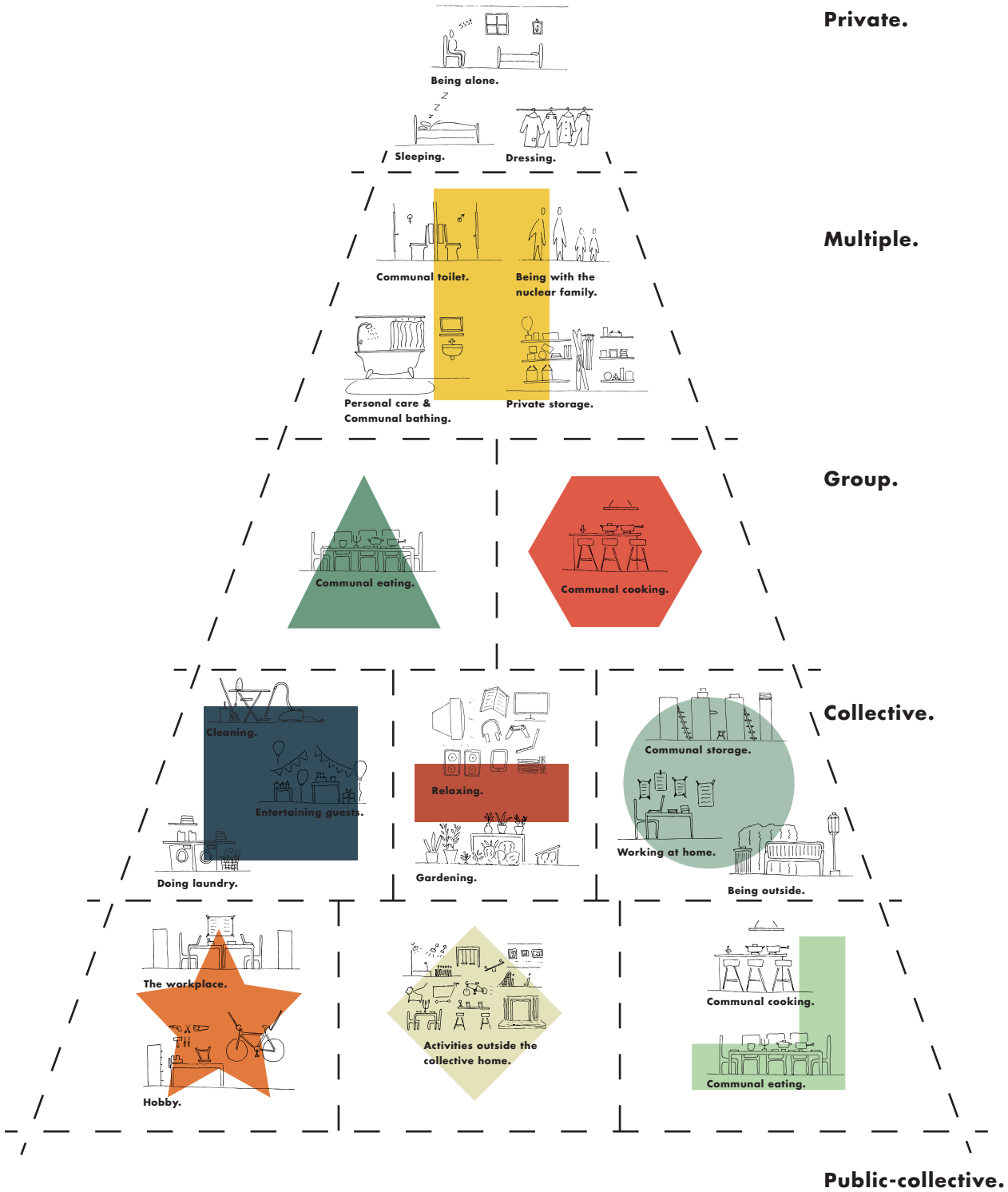


Figure 3.2 Home activities & domains

PART 3 - Boundary elements.

This chapter answers the third sub-question: *Which physical elements of the built environment contribute to a satisfactory condition of privacy?* It describes the use of physical elements in the built environment to create (physical) boundaries for people, so that they can achieve their desired level of privacy. Similar to part 2, the boundary elements are discussed through a pattern language, which is described in paragraph 1.4.1. Every pattern begins with a statement and concludes with guidelines for the design of the residential building.

4. Boundary element patterns.

Many divers and divergent physical elements define the built environment. These elements are used because of their form and function. A wall defines space and supports the roof. A window gives people a view to outside and lets daylight enter the interior space. But not only do these physical elements have a strong influence on the appearance and functionality of the built environment, they are also very much influential in people's behavior. The theory of affordances shows that the built environment affords certain behavior to take place and the perception of a space influences how people make use of the space and whether they feel comfortable.

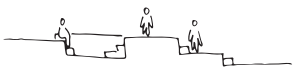
Part 1 shows that in the design of the built environment foremost two guidelines need to be followed for people to achieve their desired level of privacy. The built environment needs to have a high variety, flexibility and multiplicity of spaces to afford people to choose their setting, according to their privacy need. And people need to be able to control their environment by the possibility to communicate the desired level of privacy to others, thus defining the boundaries they need. Physical and architectural elements are therefore very important elements for people's privacy behavior.

Physical and architectural elements in the built environment can be researched according to their influence on people's privacy behavior and the way they demarcate the boundaries of privacy. To do this each element is researched in a design pattern. Every design pattern gives guidelines for the optimal use of the physical or architectural element in the built environment for a space to be used comfortably by an individual user. The built environment shows numerous architectural and physical elements that can be investigated on their influence on privacy behavior. However, for this research the design patterns are obtained according to the probability that the chosen elements are

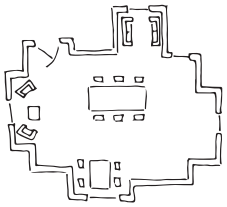
used in the design. Still many architectural and physical elements that are used in the design are not investigated in this research, as a result of a limited amount of time.

The result of the research on boundary elements is a pattern language for the design of the built environment. The patterns show how physical and architectural elements signal the boundaries that they afford and how people perceive these boundaries. Some boundaries are highly controllable by people, others only define a certain privacy level. The balanced use and combination of the boundary elements creates a built environment that achieves the desired level of privacy of people and thus creates a built environment that is comfortable for every individual user.

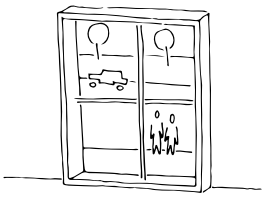
The chapter does not result in a specific conclusion, it is limited to the guidelines of each pattern. Figure 4.1 shows the nineteen boundary patterns that are distinguished in this research.



Floor variety.

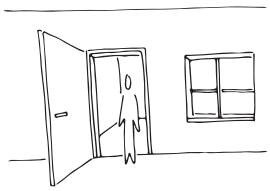


Alcoves.

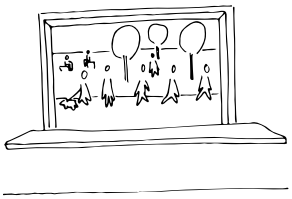


The window on street level.

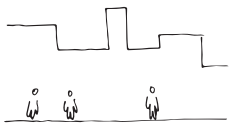
The podium.



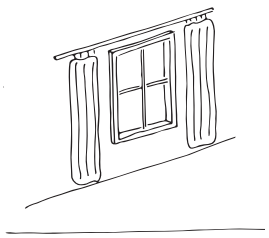
The door.



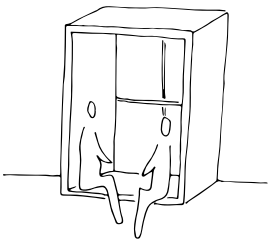
Windows overlooking collective life.



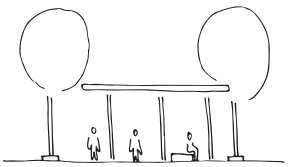
Ceiling variety.



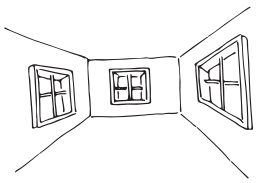
Curtains.



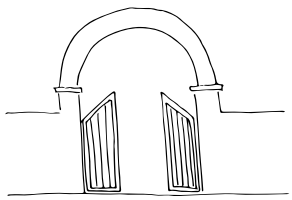
Window sill.



Ceiling in open space.

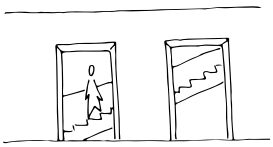


The interior-window.

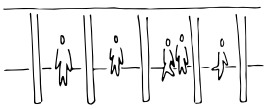


Physical openings to the street.

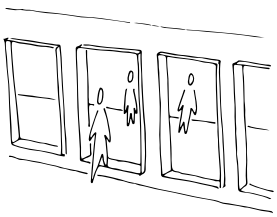
Figure 4.1 Nineteen architectural boundary elements.



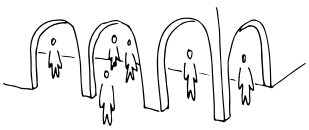
The half-open wall.



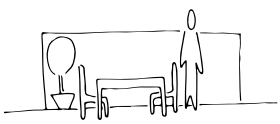
Columns.



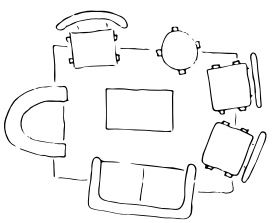
The wall opening.



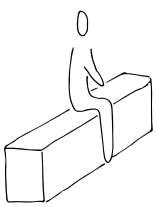
Arcades.



The eye-height wall.

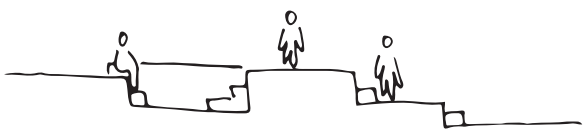


Furniture.



The sit-able wall.

I. Floor variety.



A blend and open floor plan doesn't signal that space to be used differently and therefore doesn't afford divergent activities to take place, without the use of many other boundary elements.

These interventions, however, come with a higher cost in energy and money. It would be easier and more efficient to let the floor signal its separation of space to afford divergent activities to be performed. Through small interventions the floor can be arranged and divided in sub-settings, distinguishing different sub-settings, without interfering in the connectedness of that space.

Think, for example, on the use of marks and lines that divide a wider road in multiple

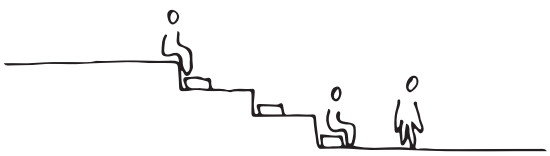
lanes; the use of a red color to separate the bike lane from the main car lane; the small staging of a sidewalk; the use of different pavement materials; or a different texture of pavement; cars are parked in the right parking place, marked through a rectangular square.

Through the use of color; markers; texture and small height differences, the street affords different activity to take place in an efficient way. High cost interventions are not necessary. Not only roads make use of floor differences to distinguish activity, also others settings can be exemplary. A gymnasium, for example, uses different colored lines to let the space facilitates divergent sports, without continuously adjusting the setting. A football game only needs two goals; basketball two baskets; and badminton a net. The use of colored lines makes one setting simply adjustable to the performed activity.

Many buildings don't make use of these small floor differentiations. Textures, color and materials are mostly used for creating unity, not separation. However, examples from traffic show an efficient use of simple floor differences, which have a strong effect. By creating sub-settings within space, people are able to define their territory within this space and are able to signal the boundaries of this territory, without a high cost of adjustment.

Therefore, distinguish different sub-settings within a certain space to let divergent activities to occur, by creating floor differences. Make use of markers; colors; textures; materials; and floor-height differences.

II. The podium.



People like to be spectators of public life. They like to watch others passing by, and being seen by them as well. At busy places in public or collective life, settings should be created that facilitate this participatory interaction with others.

When seated, a person can see a lot less than he does standing. For a person still to have visual interaction with others, not only seeing them, but at the same time being seen as well, he or she needs to be elevated above the ground while seated. The elevations should differ according to the level of interaction a person wants to have with the persons he spectates, through the distance he or she has with them. This asks not only

to create a vertical elevation, but as well a horizontal distance of the spectated. Being further away from the spectacle means less interaction with them, and therefore more privacy, while still being visually present.

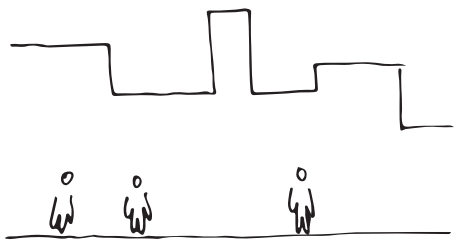
A podium brings this setting. A person, when sitting on a podium, is part of the spectacle of social interaction, both spectating as being spectated; seen and being seen; perceiving as being perceived. The podium only functions when there is something to see. Therefore, it should be positioned on the places that facilitate most social interaction such as shared entranceways or settings with much collective activity. A person that is viewed by the persons on the podium should not feel visually intruded by them. Therefore the activities performed in these settings should allow for a high level of social interaction (café) and/or act for a short period of time (passing by).

The podium not only is an element that facilitates visual interaction with others, it also forms a vertical boundary between them. When used properly it facilitates persons in front and back to sit much more closer together, without interfering another in their view; personal space; or territory. The vertical staging forms a clearly signaled boundary between the different steps. Because persons like to keep more distance behind and in front of them, this object forms an important boundary element.

The dimensions of the podium should be well defined for people to sit, and enter it without interfering others. However, the horizontal distance between the steps shouldn't be that much that it fails in forming physical enclosure in their back. Steps with a horizontal distance of 900mm and height of 450mm feel comfortable.

Creating podium-seats make public or collective life a theater performance of the visual. People passing by are seen by the persons on the podium, and they as well can see them. The podium should look out over a setting where there is much collective activity and should be accessed from this setting.

III. Ceiling variety.



Spaces that differ in height are experienced differently.

The four distances of Hall define not only in two-dimensional direction the distance in which people comfortably interact with each other; it also reaches in vertical direction. Hall, however, doesn't elaborate on this vertical distance further, because this distance is mostly less influential when by people interact, and mere a consequence of the built environment. Only on a public stair or raised floor people will have a vertical distance from each other that is controllable, but here the horizontal distance between them still is more influential. Because persons cannot control their privacy in vertical direction, this assumes that the difference in height of a ceiling doesn't influence the privacy of persons. Still there tends to be causality between the height-level of a space and the

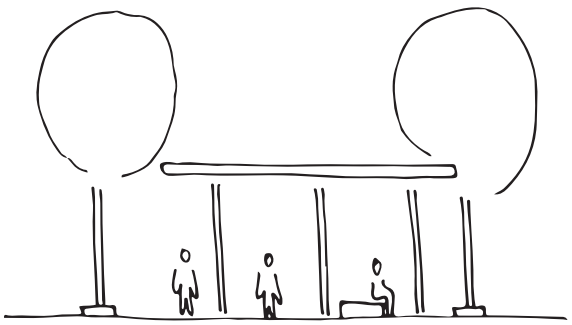
level of intimacy or privacy of that space.

Alexander states this causality to be more complex (Alexander 1977, pp. 876-882). Rooms with lower ceilings are not directly more intimate, and vice versa, but it is the variety of height between different spaces that creates the person to choose according to his or her level of intimacy. This variety makes people to move from space to space, according to the intimacy and privacy they perceive the space affords. The variety in ceiling height, therefore, is a matter of the perception of its user. A space with a high ceiling can be a very intimate space; a low ceiling can still afford a lot of social interaction. So there is no absolute height for a certain level of privacy, but the height relative to other spaces is important for persons to perceive the space according to their desired privacy.

In a building with multiple stories, the use of different ceiling heights can give problems for the layout of the floors above. Where the ceilings underneath vary in height, the floors above should be more or less flat. This problem can be solved in multiple ways. For instance, by partially implementing multiple floors within one space; the use of raised floors in the spaces above; combining floor and ceiling variety; and the use of stairs; and a lowered ceiling can finish air ducts or storage rooms that are needed in most spaces.

Thus, by creating spaces with different ceiling heights, the possibility to choose between different ceiling heights affords a person's level of privacy and intimacy. The variety of height between different spaces makes a person able to choose, according to his or her desired level of intimacy.

IV. Ceiling in open space.



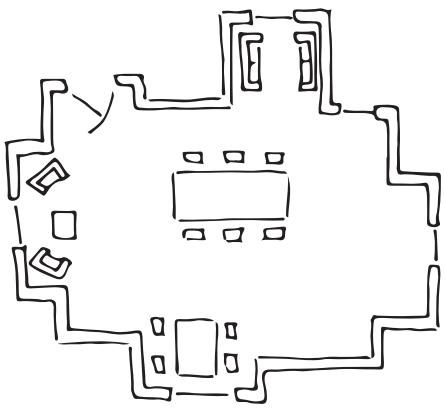
Not only should there be a differentiation of spaces through a variety height of ceilings, also within a setting a certain space can be accentuated in use, through the use of a lowered ceiling.

These spaces accentuate certain activity within that space and are particularly useful as a place for meeting and interaction. People from around feel attracted to the space.

In public spaces, for instance, trees, parasols or party-tents form particular attracting elements for people to sit under. They not only protect from rain or sun, but also create a feeling of intimacy and protection within this space.

These elements define the space they cover as being different from the wide-open space surrounding it, thus creating variety, intimacy and accentuation of that space.

V. Alcoves.



When no distinction of spaces is formulated within a bigger setting, persons are not able to perform their divergent activities, and therefore need to move to other spaces.

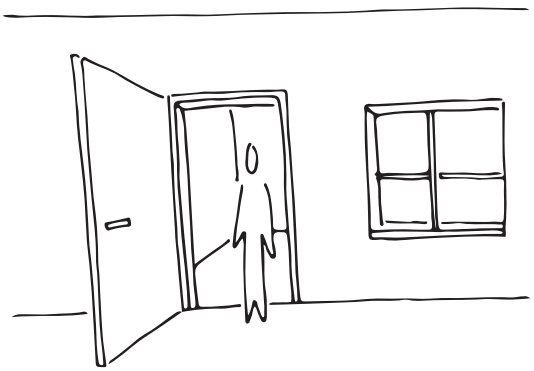
A common setting, for example, is the living room. It is the central setting of a house and needs to afford divergent activities of different persons within the family. One of the family members likes to read a book, while the other wants to watch television. Because these activities are divergent they have different desired levels of privacy that should all be afforded, without family members moving to other spaces. Persons, therefore, need to have the choice between spaces within the common setting.

Most living rooms or other common settings don't afford this choice for its users. They focus strongly on the togetherness of the family, without giving its members the opportunity to withdraw and be secluded. The spaces within the living room are based on commonality rather than variety and although furniture is used to distinguish different areas, they mostly don't afford clear defined boundaries around a person.

It therefore is needed to differentiate spaces within a bigger setting, through alcoves or smaller spaces. These spaces need to be connected with each other, while at the same time enclosing the space, so that it signals a clear boundary. These alcoves should be different from each other, varying in floor height; ceiling height; and/or size. The spaces need to clearly signal that the space is different from the main space is separates itself from, without being completely secluded from this space. Alcoves need to be big enough to afford two people to be seated and have a conversation or performing the activity they can't perform comfortably in the main space.

Spaces should afford divergent activities to take place, with their desired levels of privacy; separated from others, while still being connected with them. Thus, create multiple alcoves on the edges of the main space that have clear boundaries and enough space to afford these activities.

VI. The door.



Many spaces in the house and the office are directly connected with each other, lacking a boundary element in between them. This prevents persons from controlling and signaling their desired level of privacy, when they are in a certain room.

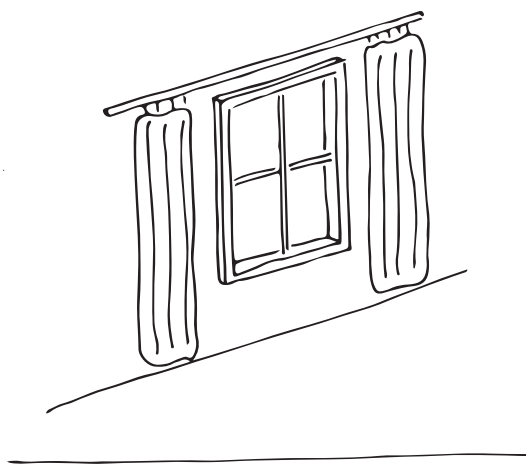
Sommer states the door to be one of the most important controlling boundary objects for individuals or groups between others. It is at the same time both a physical barrier, as a barrier of sound, hearing and olfaction. But more importantly, the door makes people able to clearly signal their desired level of interaction with others, and the position and gesture of the door is clearly perceived by others (within a certain culture). (1) A closed-door means people don't want to be intruded. Persons are working concentrated

or need to be alone. (2) A closed door without being locked, however, already is much more inviting. Person's need to work without much interaction from outside, but don't mind being intruded. The boundary-threshold for others to intrude is a lot less. (3) A half open door mostly only forms a visual barrier, combined with the arrangement of furniture in the space. A person doesn't want to be participating in the social interaction on the other side of the door, but hears what is happening. (4) An open door connects the spaces on both sides of the door, extending the social interaction of one space to the other. A person in one space is participating in the social interaction of the other. An open door also signals a person's need for interaction, even more than when no door is present.

The (partly) glazed door still gives some sense of visual connection with the other spaces, while creating an acoustical insulation and physical barrier. You can see through the door, but you cannot hear or walk through it. Thus persons feel being connected with the rest of the building and still can have their privacy; they can visually interact without being acoustically disturbed.

A door should be often used in collective spaces where divergent individuals perform divergent activities, thus having divergent needs for privacy, such as in the office and home-environment. Doors clearly signal the desired level of privacy of a person through its position.

VII. Curtains.



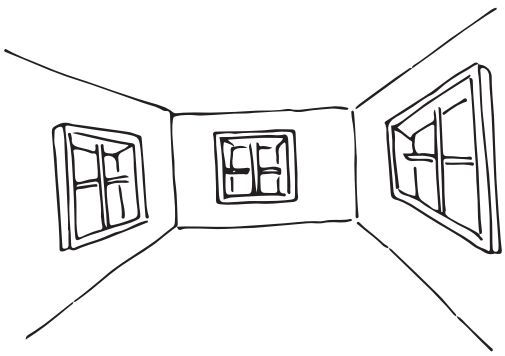
During some activities a person or persons need to be visually separated from others, while still having the possibility to converse with them.

Where these situations are mostly within a particular duration, the need for visual privacy demands certain flexibility. Think, for example, the need to change outfits in a fashion store. Curtains prevent a person's intimacy when being undressed, while he or she can still talk to others and hear what they have to say. By simply opening or closing a curtain a person can change the visual separation from others, without high cost in time and energy.

A curtain, therefore, is an interesting boundary element used to change the level of visual and social interaction with others.

A curtain is much used in combination with a window or glass door, which makes it possible for person's to control both visual and acoustical privacy.

VIII. The interior-window.



The window controls a person's interaction with others through acoustical and physical boundary, while remaining people's visual connection with the surroundings. A window not only lets in natural light while at the same time protecting from other weather conditions, it also is an important element for visibility; for seeing and being seen.

The interior window doesn't have to cope with weather conditions; within buildings mainly important as a visual connecting element. Places that don't have windows looking out upon feel deserted and uncomfortable. People are able to visually control another space through an interior window. They can keep an eye on others, without being

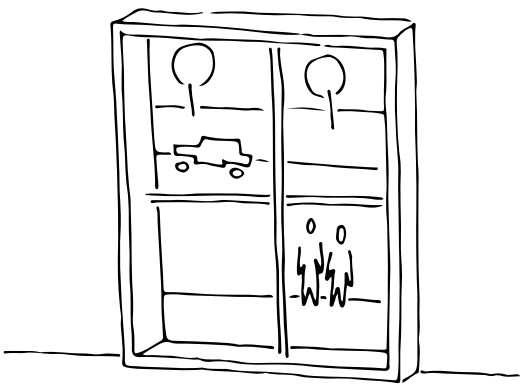
interfered by them or being part of the interaction.

Similarly, a space that doesn't have any windows feels isolated and dull. Windows make rooms livelier and more connected with others. Through an interior window a person within a room can be seen. This makes others to feel being secluded within a room, without them being isolated from the surroundings.

The size and the position of a window define the level of privacy a window affords individuals. A window that is small doesn't afford people a lot to see. A window that is positioned on eye height while standing affords a different sight than a window that can only be looked through while seated. The position of the window makes persons to control their privacy while shifting their position according to the window. The windows in the *Coffee Company* in Delft along the long table and the windows in the architecture-library of the Delft University afford a different level of sight and intimacy. Where the windows in the coffeehouse run till quite low, they make persons be able to see clearly what happens on the street, even directly beneath the window, while still sitting one story above the street. However, where a person can clearly see what happens on the street, people passing by can also clearly see the person. This makes people feel less private, being at the same time a spectator as well as spectated. The windows in the architecture-library are much higher positioned according to the floor. Although this allows for more privacy it also doesn't afford a person to see what happens on the public square below the library. The positioning of windows and its resulting (distorted) sight is a much occurring problem, for example, in elderly homes.

Make windows between interior spaces that lack natural light or feel dull and uncomfortable. Define their size and position, according to the activities performed in the spaces that are connected by the window; and the needed level of privacy of these activities.

IX. The window on street level.



Many windows overlooking and directly adjacent to the public street do not give any visual connection between inside and outside, because curtains or other visual barriers block their view.

Many windows cannot obtain the desired levels of privacy of the users of the spaces inside the building, while they are performing certain activities. People feel being looked at by pedestrians passing by and do not want to get continuous visual input or distraction from outside. This undesired situation mainly occurs in territories in where persons need a high level of privacy, like in many office and home environments. Where the window cannot obtain privacy from others, curtains will be closed. The feeling of being seen by others exceeds the need to see them.

The intensity in which the street is used majorly influences this situation. The visual interaction with others is less in poorly used streets, where only a small amount of people passes the window than in a very busy street. In busier street the tendency to block the visual connection and information between inside and outside is higher than in less used streets.

Another factor is the relation between the persons and the way both interpret the interchanging information. Persons inside feel a lot more being looked at by the neighbor passing when they have the feeling that the neighbor keeps track of their actions and behavior than with a randomly passing stranger. When the neighbor, however, is a good friend, it is interpreted as a lot less intruding.

A third factor is again the size and the positioning of the window with reference to the collective life on the street. When there is no physical boundary between window and people passing by, the distance in which people can visually intrude in someone's privacy is much closer, and therefore more intruding. As Hall clearly shows when explaining the different privacy distances between others, he emphasizes that others can perceive more information at close distance than at a further distance. Although this sounds very logical, in the layout of a building and the placement of windows, this principle is, interestingly, not very much looked at. Windows facing the street are many times directly adjacent to the street where public life occurs, without any physical distance between this public life and the private life inside.

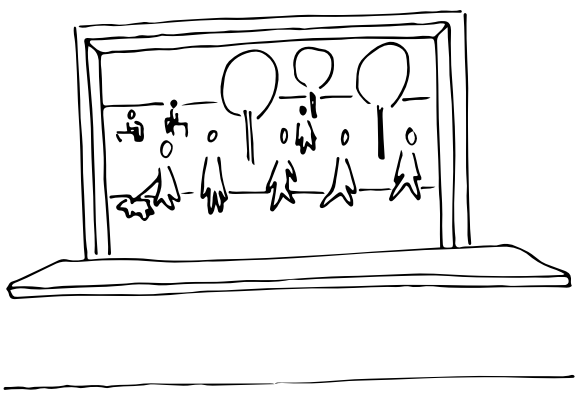
Not only the horizontal distancing, but also the vertical positioning of the window is influential. I noticed this situation when I changed the position and orientation of my desk to get more sunlight when studying. It is now directly adjacent to the window, and I sit directly next to the window as well. Having my room on the first floor, this not only makes me see a lot of what is happening on the street, but I am also seen by people using the street. Because the window already starts at knee level, also they see much of me, which even more reduces my level of privacy. With a lot of people passing the

street this situation becomes undesired when doing certain activities, like studying concentrated. Although I am not looking at the window, in the corner of my eye I still get a lot of visual information from the street and I feel being looked at. Therefore, I placed one of my bench cushions in front of the window blocking the lower part of the glass pane. I noticed this majorly increased my level of privacy.

Last, the setting and activity performed in a certain setting of space influences the need for privacy. Cooking doesn't need a high level of privacy, but sleeping, or being intimate with another does. Where the window doesn't afford visual privacy from others it doesn't afford to achieve a desired level of privacy when doing certain activities that need not being seen by others. Other privacy elements of sub-settings are needed.

To prevent people from completely block the visual connection between inside and outside through a curtain, (1) the layout of a space; (2) the activity afforded in that space; (3) the arrangement and position of furniture; (4) and the horizontal distance between people outside through physical barriers (like, for example, a front yard or a wide windowsill) can achieve the desired level of privacy.

X. Windows overlooking collective life.



People like to watch others without being seen by them. But as is stated in the pattern 'the window on street level', they need to be able to control the amount of information and interaction they get from that same street.

Therefore, being on the same horizontal level as the persons you are watching, doesn't afford much privacy for the person inside. The best way to offer visual privacy is to create vertical distance from them. People simply do not look up or down continuously. Another advantage is that people are only able to see a limited amount of the interior

space a person is in, depending on the degree of view. This makes persons inside this space able to control the level of visual privacy they have, by simply positioning themselves accordingly.

Vertical distancing can go in both directions, creating spaces that are both below or above the public street. Although both situations afford people to control the level of interaction they have with the public street, the spaces below street-level feel less private than the spaces above. This is caused by two conditions: (1) when a person looks outside from below, he mainly sees the lower part of persons outside. Thus, he is able to perceive the number of persons passing by and therefore perceives a lot of information from the public street, but there is no visual interaction with them. (2) Persons outside can quite easily change their position, and thus reduce the angle of view. They are then able to see a lot more inside, which reduces the level of privacy of persons inside. Their line of view forms the lower part of the visual angle, being able to see people inside more easily.

Spaces that are visually connected with the persons outside give more liveliness to the street. People passing by have more visual interaction with what happens behind the walls of a building. It therefore is recommended to open the building to street level, at places that afford activities that allow a certain level of visual interaction with outside. A pub allows more visual connection with outside than a study hall in a library.

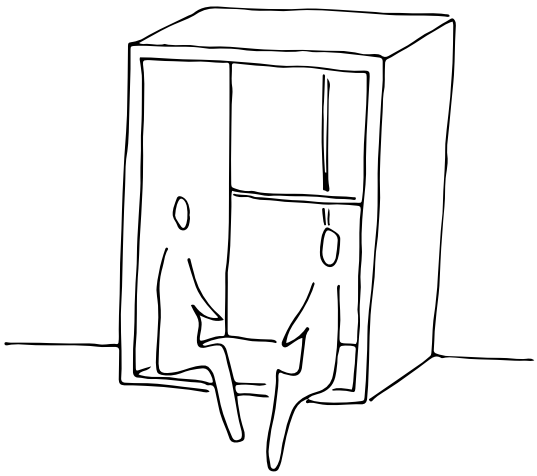
Thus, lowered spaces in relation to the street level are disadvantage privacy-wise. The spaces on a lower level than the street, should therefore mainly afford activities that allow more interaction with public life. The spaces on a higher level afford more privacy, and therefore should facilitate settings that desire more privacy.

A person should be able to control the level of social interaction with persons on the street by repositioning himself accordingly. Thus a building needs windows facing the street that affords certain privacy,

according to the position of the person inside. Activities that allow more interaction with the street should be facilitated on or below street level. Activities that need more privacy need to be facilitated above street level.

This also is the case with outside spaces such as balconies. A completely open balustrade doesn't afford people to control the visual interaction with people on the street; they are continuously on public display. A balustrade therefore needs to afford enough visual boundary with public life on the street. The higher up in the building, the less this visual privacy is a problem.

XI. Window sill.



The window makes persons inside being able to connect with outside, visually interacting with others or only looking at them. But a window is not only an element to look out from or to bring light in; it also forms an attractive setting for persons to be in.

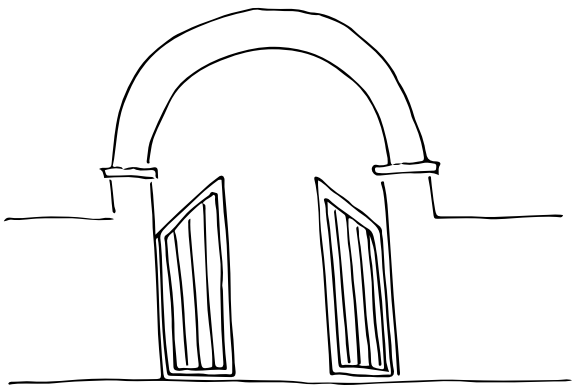
The size and the height of the window determine the level of interaction the window affords persons to have with the outside. The lower the windowsill, the more interaction a person can have with persons in public space. For a person to control the level of

interaction he has with the outside, he simply positions himself closer or further away from the window.

Through the addition of simple physical elements, the window can become a place on its own. A wider windowsill makes people to sit at the window, creating a difference in setting within the bigger space. These windowsills can be more intimate, when the windowsill is framed on all sides.

When a windowsill is big enough to afford people to sit it defines a new sub-setting. It becomes an intimate place within a larger setting.

XII. Physical openings to the street.



Not only should persons inside a building and outside a building have visual interaction. Passersby and people participating in public life on the street should also feel invited to enter the building, without the collective group of a building feel intruded by this public life.

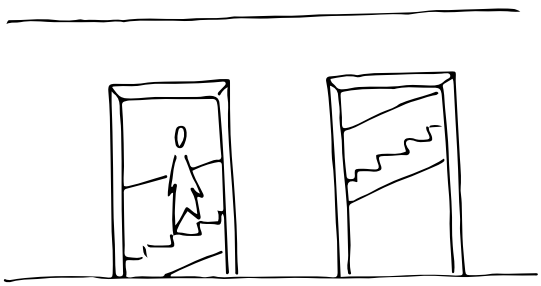
A residential building doesn't need to afford any interaction to occur with its surroundings. These buildings, however, are no improvement of public street-life and, more importantly, don't afford any collective living other than of the inhabitants of that building. A collective used building is much more interesting when it connects with public life outside on the streets.

Windows create visual connection with a street. People on the public street are able to perceive the activities that are performed inside the building. This perception can lead to visual interaction, when the activities become part of the public life of the street and are interesting activities to look at: A workshop space in where persons are working; a hall in where persons are practicing; or a pub in where people are conversing. When the activities are very much attractive to that person he will stop and look when passing by. The activity within a certain setting, however, can also invite people to come in, and become active participators of the activity.

Outsiders, therefore, should not only be able see but also to enter the building, so that interaction between public and collective living can occur. It is therefore important to use architectural elements that are invitational. Wide stairs with small slopes are commonly used architectural elements with an invitational character.

Thus, position spaces with that afford high level of interaction along public areas, such as workshop, communal dining areas and day care, so that people can perceive the activities that are performed inside the building. Make use of architectural elements that are very much inviting, such as wide stairs with small slopes.

XIII. The half-open wall.



Spaces that are too much closed don't afford these spaces and the people within these spaces to be connected with the spaces and people surrounding it. An open floor plan, on the other hand, doesn't afford divergent activities to occur.

Spaces that have four walls around them can afford divergent activities to occur. An activity in one room can be completely different than the activity in another room. The closed-space setting also creates a high level of privacy between others outside these spaces. The possibility for social interaction to occur with others outside of these spaces, however, is almost completely blocked. Thus a person is not able to control the level

of social interaction he or she wants to have with persons outside these spaces, and therefore no smooth transition of someone's social interaction within a bigger setting.

Opposite to the private room spaces can have no walls around them at all. These spaces are entirely open to other spaces surrounding and lack to afford a person's privacy. The setting is defined clearly and forces people to adapt to the setting. People feel exposed and vulnerable and cannot separate themselves from others, which retains them in the activities that they perform in these open spaces.

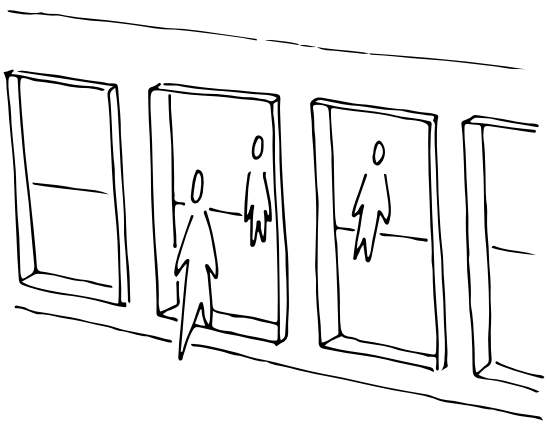
To afford persons' divergent activities within a setting of spaces, these spaces both need to be connected with each other, while also being enclosed from them. Thus a space should not be a room in itself, or flow into each other. The wall, as the most important horizontal boundary element of a space, therefore needs a balance between open and closed.

"The right balance will always lie between these extremes: no one room entirely enclosed; and no space totally connected to another" (Alexander 1977, p.894).

Alexander states the importance of combining half-open wall elements that help the balance of enclosure and exposure – like columns, wall openings, balustrades or half high walls.

To be able to control privacy while still affording social interaction, spaces need to be at the same time connected as well as separated, which demands balancing openness and closeness of walls enclosing these spaces. This demands a combination of physical boundary elements.

XIV. The wall opening.

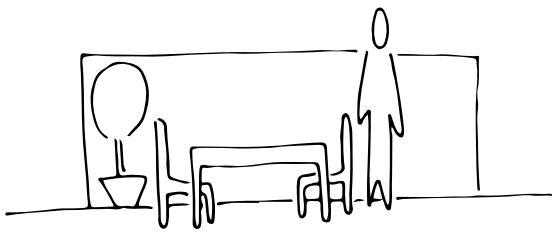


An opening in a wall doesn't obtain any boundaries between others, not physically, visually, acoustically or olfactory.

Still, a person, going from one space to another through a wall opening, feels like entering another setting and therefore feels the need to change his or her behavior accordingly.

Thus create wall openings where a variety of spaces need to be afforded. These spaces should mainly afford similar activities, because the wall opening doesn't afford any level of privacy.

XV. The eye-height wall.



When a wall has a certain height that still affords a person to look over the wall, it doesn't form any separation from others, other than physically.

The height of a wall defines the visual boundary of a space and therefore defines the privacy within that place. A wall on eye level affords a different visual privacy than a wall on knee level.

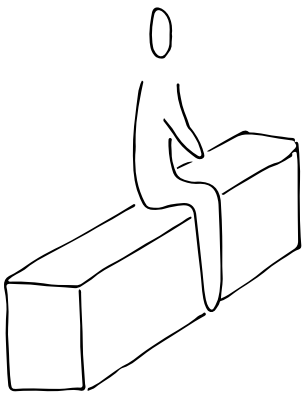
Dependent on the height of the wall a person can control his or her privacy. Sitting closely next to it a person can hide from others; having the wall in the back creates a feeling of safety, having the wall directly next to him creates a feeling of intimacy. Thus

the way a person positions himself toward the wall, signals the privacy he needs.

The wall besides that defines sub-settings within a bigger space, without forming a visual and acoustical boundary. It therefore is a common used boundary element in open-office settings. These walls are not only formed through structural elements, but also by interior objects such as shelves; plant container; or benches with a high backrest.

Thus, half high walls distinguish different sub-settings within spaces, without people losing their visual connectivity with the whole space and with others within that space. The height of the wall should not exceed eye level of persons while standing (max. 150cm) and should give enough privacy when people sit.

XVI. The sit-able wall.



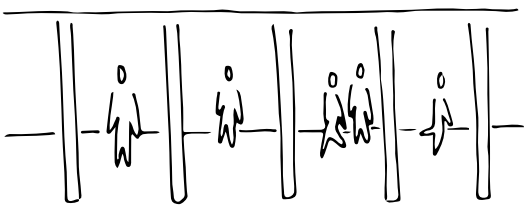
Where the half high wall forms a controllable visual boundary, when needed, a wall that is lower in height only signals a physical distinction between spaces, without being a clear boundary element. The width of these walls, therefore, becomes more important for signaling boundaries.

When a wall has the qualities that it can afford sitting, people are able to position themself according to the level of interaction they feel most comfortable. A half high wall overlooking a busy street, for example, can be used differently. People can face the interaction of others overlooking the street; they can position themselves parallel to the street, not being blocked of from the interaction, but also not completely part of it; or

they can position themselves with their back to the crowd, which results in more privacy. Most benches also afford this choice in seating arrangement, although the use of a backrest already defines the way in which people have to position themselves towards the social interaction.

A wall that has the qualities that afford sitting, can form both a subtle distinction between two spaces; and can afford positioning according to the needed privacy. Sit-able walls, therefore, should be used for delimiting spaces that facilitate different activities.

XVII. Columns.



Through steel and even reinforced concrete, it is possible to make slender columns. These columns became even so slender that they are not any more merely part in defining a space. Within architecture columns are only seen as a structural element. This approach lacks seeing the possibility of a column as a boundary element for social organization and social interaction.

Columns not only structure a building in its constructive layout, without interfering in space; it also brings a certain order to space. However, important is to look at columns as a boundary element that can be used by persons to control their privacy. They can form a demarcation of spaces within a bigger space setting, through their repetition;

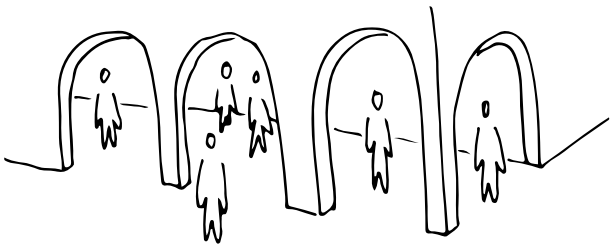
arrangement; and the definition of the column.

When defining a column as a boundary object, the size and the appearance of the column are important. A thicker column forms a stronger barrier than a smaller one, and therefore signals a stronger physical and visual boundary in space. Where people need to be protected at their back when conversing or simply watching others, the thickness of the column should be thought of accordingly. Alexander holds a column should have the width of a person (50-60cm) to function as a boundary element.

When more than two columns are used, columns can form a horizontal edge of a space. How the users of a certain space perceive this edge is strongly depended on the repetition and arrangement of the columns. Columns more closely to each other are more easily defined as a boundary element than a row of columns that are more separated. People perceive a clear arrangement as such and they perceive a repetitive row of columns as an edge in space, which allows defining multiple spaces within one space setting. This, for example, happens through the use of arcades, porches or covered walkways.

Thus, the width of the column and the distance between columns define their function as a boundary element.

XVIII. Arcades.



Many buildings are lacking a zone between the more private territory inside a building and the undefined and divergently used public territory outside. These zones are needed to form a smooth transition between territories that need to afford different levels of privacy.

An arcade is a boundary element that forms such a transition zone, being both outside and inside. People entering these covered walkways feel the need to change their behavior according to the activities inside the building, while still being outside in public space.

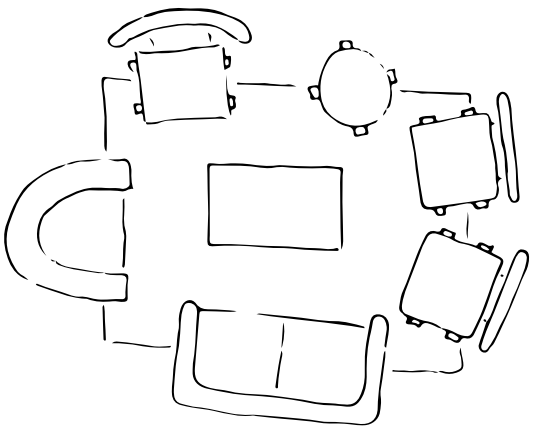
An arcade should, therefore, be defined differently than the two places or territories

that it connects. It should be easily accessible and give persons approaching from public space the feeling that they enter a space that they are allowed to enter, thus signaling openness towards public life. On the other hand, it should form an enclosure for the persons inside the building, so that they don't feel publicly exposed and out in the open.

The feeling of intimacy and privacy within the arcade should be defined by the (1) height of the ceiling; (2) the arrangement and size of the columns supporting the roof; (3) and the openness of the space between the columns. Sit-able walls between the columns or a lowered wall height signal a stronger edge of the arcade, and therefore make the arcade more intimate and more private.

An arcade forms a smooth transition between inside and outside the building; between more private territories and more public territories. Therefore it needs balancing of signaled openness and closeness of the arcade, which defines the perceived intimacy and privacy behavior of the users entering from public space. This is done through the height of the arcade; the arrangement and size of the columns; and the way the space between the columns is defined.

XIX. Furniture.



Every space in the building is a potential sitting space. But each sitting space needs a different level of privacy from its environment. Similarly, every seat and table needs to afford people to sit in different ways.

One of the conclusions of part 1 was the need for a hierarchy of spaces according to varying degrees of privacy, ranging form the most public areas to the most private areas. Within the building this thus forms spaces that facilitate different levels of comfort and enclosure. The use of furniture is the most useful and controllable of the boundary elements to obtain the desired level of privacy of people.

In many dwellings only the living room afford comfortable and enclosed sitting. But, activities occur throughout the dwelling and the residential building and it is therefore important to create sitting spaces in every area of the building, in where people could sit or hang around. These sitting spaces need a certain level of enclosure according to their position in the building. Sitting spaces should range from highly formal and enclosed to loose and open. People need to easily pass the sitting space, instead of cutting through it.

The sitting spaces that are in the common areas of the residential building need to be loosely arranged so that people can move their chair or table so that they can take up a position that fits their desired level of privacy. These spaces need to be positioned so that when people pass them they can stop and talk to the people that already sit in the space, so that people outside the conversation can easily join the conversation, sit down, get up and leave again.

The research of Sommer on table arrangements that was explained in part 1 shows that people will position themselves differently towards other people depending on the activity that they perform and the level of privacy they desire for that activity. Also their mood and personality makes people sit in different ways as well. It is, therefore, important not only to create a high variety of spaces, but to use a high variety of furniture as well. People thus can choose between seats and tables. The use of different furniture strengthens the variety of spaces and places in the residential building and improves the experience of the spaces.

Thus create a sequence of sitting spaces throughout the building that have different levels of enclosure and privacy. Place each sitting space in a position so that it is protected from paths and movements and use a high variety of chairs and tables to strengthen the variety of the spaces and the experience of the spaces.

PART 4 - Research and design.

The last part of the research concludes the research and connects the research with the design. Chapter five describes the conclusion of the research, followed by a discussion and a paragraph on recommendations for follow-up research. Chapter six discusses the way the research is implemented in the design and the design process with the aim of successfully achieving the design goal: *Designing a residential building wherein most of the domestic and daily activities of the inhabitants are facilitated in the collective space of the residential building, minimizing the activities facilitated by the private house.* The chapter begins with a short introduction in the context of the design. Then it describes the development of the concept that guided the design, following with an explanation of the design steps that are taken throughout the design process to translate the research to the design. Chapter seven reflects on the research and design process. The first paragraph describes the relationship between the project and the wider social context. In the second paragraph the relationship between the research and the design is described and the concluding paragraph of chapter seven describes the research and design process.

5. Research conclusion and discussion.

The research concludes with answering the main research question: *How can the private and collective space of a residential building afford daily activity to take place that achieves the desired level of privacy of the individual?* After the conclusion the discussion addresses three points of discussion following the research. The paragraph 'follow-up research' discusses what other researches should be done and taken into account in the design to make the design of the collectively organized residential model a success.

5.1 Conclusion.

Part one of this research gives a basic understanding of people's privacy behavior. It shows how each individual achieves his desired level of privacy and emphasizes the strong relation between privacy behavior and the environment, both the social and the physical environment, according to the theory of affordances. The behavior of people defines and demands certain needs and desires from the built environment and the built environment strongly influences whether people achieve their privacy needs.

The research defines three statements about privacy that answer the main research question and define guidelines for the design of the residential building from the perspective of privacy behavior. The first statement states that privacy is a matter of choice. People choose and change their environment according to (changing) privacy needs. The ability to choose asks for a built environment that is both flexible and various, which results in a multiplicity of spaces and places.

The second statement states that privacy is a matter of boundaries. Physical and architectural elements demarcate spaces and places and communicate the level of privacy

that people need. Only when these boundaries are well defined, the divers and divergent spaces are used most efficiently and create the most comfortable environment for each individual user.

The third statement states that every performed activity in daily life has a desired level of privacy. Not only should the private and collective spaces be highly various and flexible, but also defined according to the privacy need of each activity that they facilitate. According to similar privacy needs, daily activities in the dwelling and residential environment can be grouped. This results in a hierarchy of spaces that range from the most intimately private domain to the most communally collective domain.

Thus, the residential building needs to have a multiplicity of spaces that are clearly demarcated by physical and architectural boundaries and range from the most intimately private domain to the most communally collective domain.

Through the use of design patterns guidelines are formulated on achieving the desired level of privacy of each individual inhabitant in the design of the private and collective spaces of the residential building. Part two discusses the most common daily activities in the domestic and residential environment and their desired level of privacy. Part 3 discusses the use of physical and architectural boundary elements in the residential environment and the privacy levels that they afford.

5.2 Discussion.

Three points of discussion need to be addressed here following the research. The first point of discussion addresses the importance of understanding human behavior while designing the built environment. The second point of discussion address the importance of designing spaces according to the activities that they facilitate, not only according to a functional setting. The third point questions the validity of the design patterns that are formulated in part two and three of this research.

1. There are many examples that show inefficient or conflicting use of the built environment. Maier and Fadel address the mistaken use of the door handle and Sommer notes the inefficient defensive position at a table, and chairs that are unused cafés because coats are hanged on empty chairs to function as a territorial marker. The research on privacy behavior shows that when designing the built environment the emphasis should not only be on form and function, human behavior is as important to take into account. This does not mean that privacy behavior should be directly translated in the design. The complexity of behavior and the presence of many different individual behavioral needs make human behavior very difficult to translate to the physical design. However, the design of the built environment already gains a lot when designers understand behavior in the context of the physical environment. It is therefore that the last phrase of Sommer's book *Personal space: the behavioral basis of design* needs to be read with a bit of irony. "Good design becomes a meaningless tautology if we consider that man will be reshaped to fit whatever environment he creates. The long-range question is not so much what sort of environment we want, but what sort of man we want" (Sommer 1969, p. 172).

2. Spaces should not only be designed as a fixed and functional setting. The activities that the setting facilitates should also be taken into account. For example, the research of Meesters shows that the living room facilitates many divers and divergent activities. It is a place to eat, to work at home, to do nothing, to be with the family, to play music, to watch television, to read, to be at the computer, to do handcrafts and for children to play, to name a few. It is important that the living room has different sub-settings to facilitate these activities, so that a member of the family can retreat to a sub-setting to perform his activity without disturbing others or being disturbed by them. This thus first of all demands understanding of each activity that is performed in a setting of the built environment. A bedroom is not only a place to sleep and a kitchen is not only a place to cook.

3. Most of the design patterns that are formulated in part two and three of the research

need to be used critically. Although the patterns are based on privacy research in the field of environmental psychology and are deduced from the pattern language of Christopher Alexander, most of the patterns are not based on specific scientific research that supports their validity. As Christopher Alexander mentions in his book, the patterns of this research need to prove themselves in the design of the residential environment and it is possible that the design patterns need to be adjusted and updated.

At the same time the given patterns do not encompass a complete framework for the generic design of a residential building. The design patterns are chosen, because of the probability of use in the design. However, in the design of a different residential building other design patterns need to be investigated. For example, the stair is an important boundary element. But the stair is in this research not discussed in a design pattern.

Although the investigated design patterns are chosen according to the specific context of the design goal, the design patterns itself are kept generic. They can be used in different residential environments. The design patterns give a high level of freedom in interpreting their outcome. They form guidelines for the design process and should not be directly translated into the physical design. Every contextual situation is different.

5.3 Follow-up research.

The research focused on investigating privacy behavior in the built environment. Although the research gives many answers about privacy behavior that are needed to succeed the design goal, many more questions need to be answered in follow-up researches. Among other things researches on co-housing models are of great help, because of the similarities and the extensive research that is already done on these models.

Management & finance: How do you organize the community? The residents need to make decisions about costly purchases and conflicts between neighbors need to be sorted out. The residential building needs to be maintained, cleaned and adjusted. Peo-

ple feel less responsible for the collective space than their private space, so how do you manage the collective space? Household compositions will change and the residential building needs to be able to adjust to this. Committees are needed to organize and control daily routine and rules, both juridical and social, need to be defined about the use of the residential building. Not all the residents will get along well and conflicts between the residents will occur. When conflicts are running that high that a resident cannot live in the residential building anymore a solution is also needed.

Financial feasibility: Although collectively organizing facilities, stuff and space will safe a lot of money, the addition of spaces, facilities and services will also cost a fair amount of money. How do you reduce the cost of every individual household, while extending and improving the possible facilities in the residential building?

Media & technology: Collectively organizing and sharing spaces and facilities need a smooth organization and clear control. New technologies and media could have major advantages for the residential building. For example, online reservations can be made for a particular tool, a dinner or a certain space and a simple check online will show whether a laundry machine is available. With online media and technologies there are many more and more efficient possibilities to organize things collectively, but it is important to investigate what will suit best.

Building & neighborhood: A residential building is part of a neighborhood and contributes to that neighborhood. The collective space of the residential building will take over a major part of the surrounding public space of the surrounding environment, diminishing public life on the street. Research is needed on how the residential building will have a positive influence on the neighborhood, without losing its collective organizational model. Defining the transition from collective to public, both functionally and physically, is very important.

Safety and control: How do you prevent unwanted people from intruding the collective

space of the residential building? The social control of others will be less, because many people will live in the residential building. Therefore it is important to control the access to the collective space of the residential building and to control the people that can enter the residential building, without diminishing the connection with the neighborhood.

The amount of inhabitants: Researches on cohousing make different statements on what is the best amount of people to house in a residential environment that is collectively used. Some speak of twenty households, others of two hundred. Social cohesion, communal identity and social control will be much higher when the amount of residents is limited. However, it is not entirely clear whether larger amounts of people can live together, when specific measures are taken. For example, grouping residents into smaller domains will already lead to more cohesion within groups. Another interesting question that needs to be researched is: Can you create a community that is not bound on social improvements through cohesiveness and communality, but only improves living in an instrumental and materialistic way, by only sharing things and space together?

User participation: How much influence do you give the future residents in the design process? In cohousing projects the future residents participate strongly in the design process. They have a big influence on the design and can adjust the design to their individual needs. The problem is that with a project with many different users it is a very difficult and time-consuming process to take all the individual needs into account. At the same time it turns out that when the residents finally start using the building their needs are different then they expected. In many cohousing projects, for example, the future residents emphasized on the need for a reasonable sized private kitchen, which turned out to be unused when they started to live in the project. They only ate in the communal kitchen. People approach a new design according to the living conditions that they know of. To change the residential environment from a highly private dwelling to a highly communal collective residential building is thus for most people difficult to grasp. Therefore, research should be done on the level of user participation and the advantages and disadvantages in the design process.

Thus, as is shown above, much research is still needed to make the collectively organized residential model a success. The research on privacy behavior is only a small part of that research, but certainly a very important one.

6. Design brief and concept.

Rotterdam has many pre-war residential building blocks formerly built for workers. Although these buildings already exist for many decades and the dwellings within are mostly very small, they are often in very good technical and structural condition. Most building blocks show great potential for future residential living. The municipality, however, wants to get rid of them to make way for new buildings.

The master plan of Bergpolder-Zuid, a residential area North of the city centre of Rotterdam, is exemplary for this tendency of demolishing and renewal. Residential blocks replace existing social housing blocks, without recognizing the potential of what already exists. Central to the master plan of Bergpolder-Zuid is the transformation of the former railway-line 'Hofplein', that runs on a viaduct on the East-side of Bergpolder-Zuid. This viaduct will be transformed into a walk and bicycle route, connecting the northern areas of Rotterdam with the city centre. The transformation of the viaduct will have a major positive influence on the development of Bergpolder-Zuid.

Two residential buildings, called the PWS-blocks, are located at the crossing of the viaduct and the Bergselaan. A street separates both buildings from each other. The residential buildings, built for workers in 1934, consist of dwellings of around 40m2, surrounding an inner courtyard. The brick wall construction of the building blocks strongly influences the layout of each dwelling. The dwellings are accessed via porticos. Every portico connects six or eight dwellings, depending on the building height. The basement is half a floor below street level and contains the storage units of the dwellings.

Although both buildings are structurally in good condition, there are some problematic technical issues. The dwellings are poorly insulated, both acoustical and thermal. The

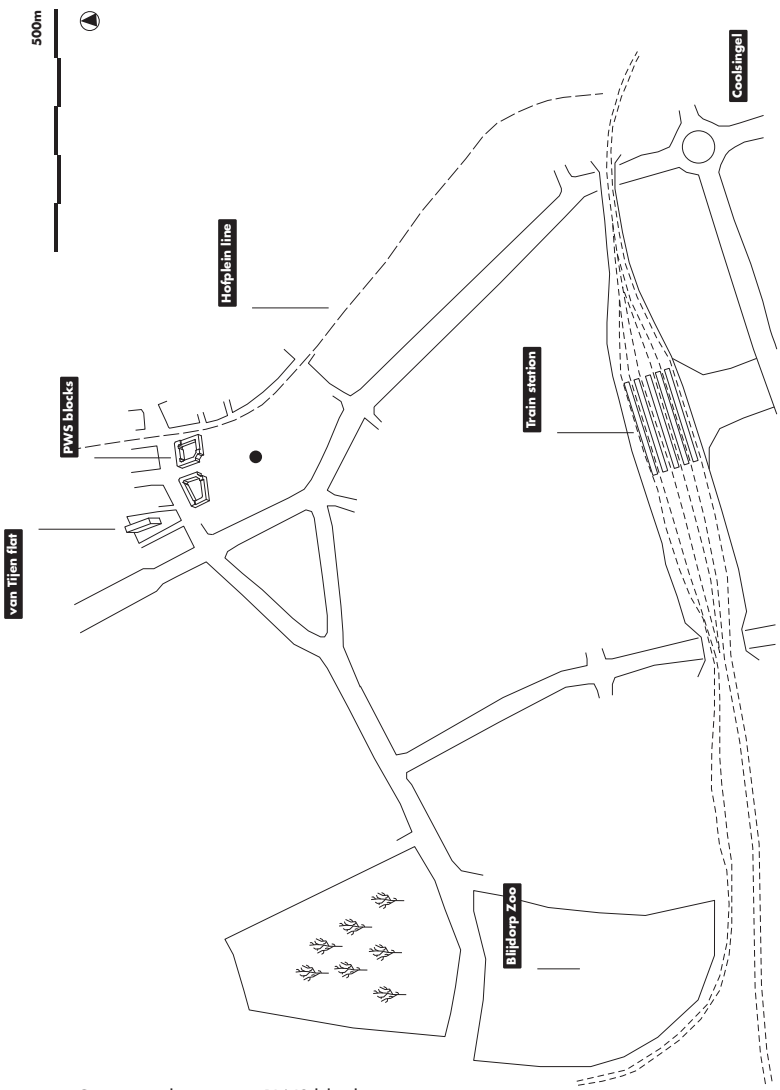


Figure 6.1 Contextual situation PWS-blocks

floors still consist of the original wooden floors. The outer walls are barely insulated and the plastic window frames that replaced the original window frames make the building blocks' appearance not really nice.

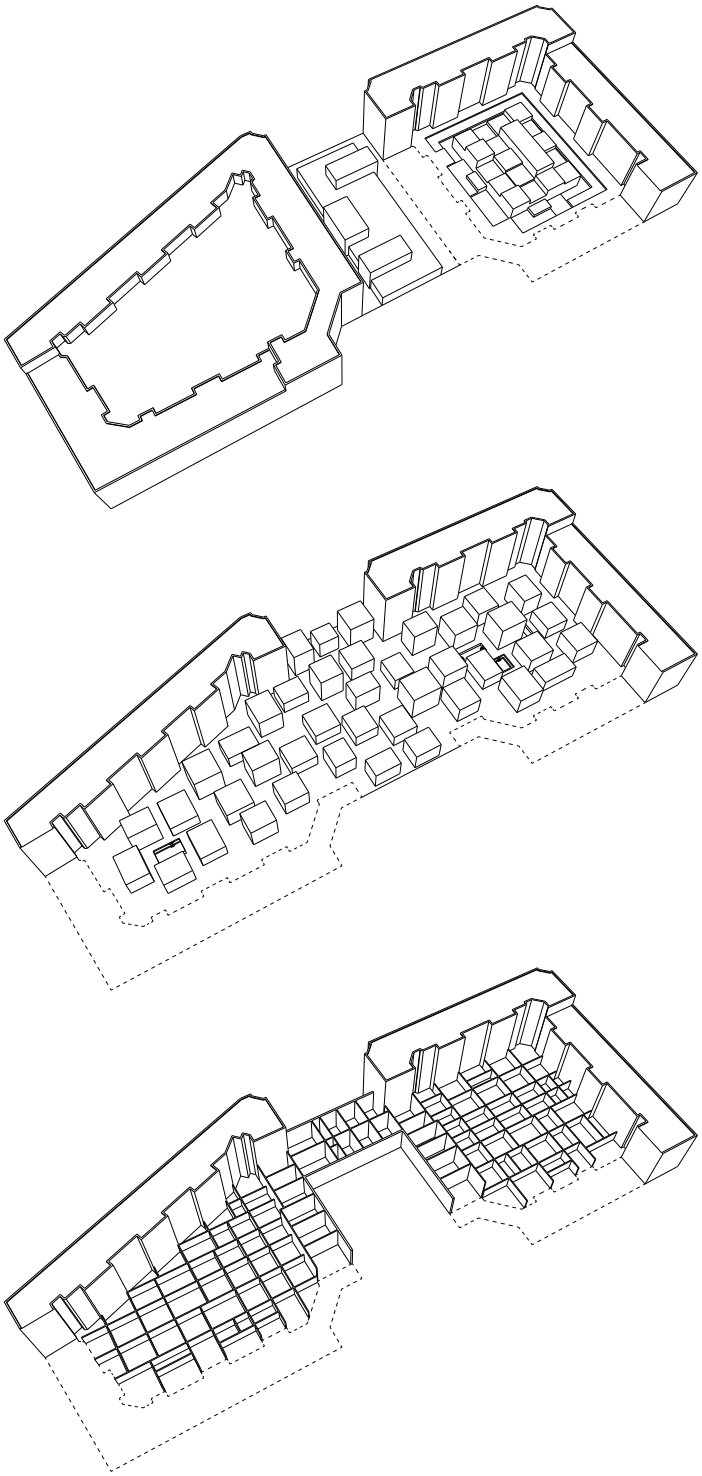
Although their technical limitations, the small dwellings are perfectly suitable for dwellings wherein domestic activities are minimized. The storage space, half below ground floor can facilitate many domestic and daily activities of the residents and the courtyard shows great potential for a collectively used space. Therefore, the PWS-blocks were my starting point for the design.

6.1 Residents.

In the research little has been said about the inhabitants that eventually will live in the residential building. This was done on purpose. I am convinced that collective living isn't limited to people of one particular generation or with one particular lifestyle. The beauty about communities is that people with divergent interests and habits live in close proximity of each other and can positively influence each other. Collective life has many advantages.

Still, collective living is not a done deal. Many examples show the difficulties people have while living together. Where the presence of divergent interests and habits can be very positive, it also brings many disadvantages with it. The ways Dutch housing is organized shows that people, therefore, embrace a very high level of privacy in their direct residential environment, visually and physically blocking the territory of their house and garden. However, the fact that people still collectively participate in the community of cities and villages and go to places to interact with others shows that people still enjoy and need the presence of other people.

Collectively living with many others asks much of people. It requires a certain attitude and a high level of solidarity. For many people collective living is not an option. One



1. First guiding concept - block

structural	**-**
spatial	**+/-**
organizational	**+**

2. Second guiding concept - blocks

structural	**+/-**
spatial	**+**
organizational	**-**

3. Third guiding concept - grid

structural	**+**
spatial	**+**
organizational	**+**

Figure 6.2 Development of the guiding concept throughout the design process.

of the project motivations was the growing tendency of people to live with likeminded others. People find a higher level of comfort and quality of domestic life, when living with others who have shared interests and similar lifestyles. The design, therefore, focuses on a particular group of people. The members of this group have an education and just graduated or are in their final years of graduation. They work at companies in the city or do freelance work at home. Some of them live alone; some live together; and some already have young children or are thinking of having children in the near future. The people in this group have a wide social network and need many facilities and services nearby their dwelling. They make use of many cultural and social activities of the neighborhood and the city.

6.2 Guiding concept.

During the design process the privacy patterns that were investigated in the research acted as a bridge between research and design. By approaching the design in more manageable design problems solutions could be found for each individual design problem by the use of the privacy patterns. The patterns were, therefore, of major help for the design.

But although the patterns gave solutions on particular design problems, they left many design problems unsolved or unanswered. The biggest limitation of the formulated privacy patterns was their scale. The Pattern Language of Christopher Alexander (1977) orders the patterns from the large scale to the small scale. The pattern language begins with patterns on the level of regions and towns and then works down to finally come to the details of construction. The privacy patterns that were formulated in the research are bound to the scale of the building and building elements. As previously mentioned in the discussion the privacy patterns thus do not form an all-encompassing privacy language. Because the design goal was clearly formulated and the context of the design was already known at the beginning of the design process, the larger scale patterns didn't need to be defined, which partially diminished the problem. However, still many

privacy patterns that were needed for the design were not investigated in the research. Other sources, such as the Pattern Language (1977) were needed.

The research also lacked a guiding concept for the physical layout of the building. The three guiding statements that were formulated in the research defined the underlying principle of the building, but they didn't give guidelines for the physical starting point of the design. This format of the statements had an essential purpose. The statements can be used in different contexts and can be interpreted and modified, without losing their essence. However, the consequence of the format meant that a guiding concept was necessary about the physical structure of the design. Particularly a solution was needed for the first statement, that stated that the building needed a high multiplicity of spaces and places that were both various and flexible.

Thus, with the particular contextual situation and design goal known, a guiding concept was needed that would be the physical starting point of the design. During the design process I found that the guiding concept needed to create a balance between the structural, spatial and organizational layout of the design.

The first concept was to create one block in the inner courtyard that would house the collective activities. The multiplicity of spaces and places was found by means of a variety in floor heights, thus creating one open communal 'living room' existing of many different spaces. Both blocks would be roofed at the top of the building. In the street between the two blocks a similar idea would be incorporated by the addition of a block that would house the public-collective activities.

The first concept turned out to be very limited in its structural and spatial layout. The difference in floor height did not give a highly various environment of different places and spaces. The spaces were too much of the same. The roof garden would be positioned on a very high level, which would not have been an attractive and interesting place and the roof would give many structural issues. Looking at the organizational

layout the first concept still offered some interesting and positive insights. The idea to use the porticos to house the domain of the group, the courtyard to house the domain of the collective and the mid-area to house the public-collective domain created a clear hierarchical organization.

The second concept took the idea of the organizational layout, but created a much more interesting and positive environment spatially. The idea of one block was transformed to a concept of many blocks. Each block would house a certain activity. The blocks that were positioned in-between the two residential buildings would house the public-collective activities, the blocks that were positioned in the courtyard would house the collective activities. The organization of the walls of each block created an all-connected in-between space in where collective life would be facilitated. Sitting pits in the floor would create a more various ground floor. By lowering the roof the collective space got a more human scale and it gave the opportunity to create a big roof terrace that could be connected to the porticos and to the spaces that housed the activities of the domain of the group.

Spatially the second concept was very interesting. The individual spaces and places in the building would be demarcated by the walls of each block, while at the same time be connected to each surrounding space, creating one big collective space. The roof terrace would be more closely connected to the ground floor, which lowered the threshold to enter the roof terrace. While the existing building would enclose the space, the roof terrace would become a comfortable place for each inhabitant.

However, the second concept had some major limitations. The structural layout was very difficult to solve. The roof needed at the same time to support many people, bring light in and afford the strong variety of spaces of the ground floor by large spans of the roof structure. Without diminishing the spatial layout of the plan, detailing the roof would become impossible. Besides many problems with the structural layout, the organizational layout of the plan was an issue as well. Because the space in-between

the block was one big all-connected space there was no clear boundary between the public-collective domain and the collective domain. This meant that the level of privacy of the inhabitants could not be regulated, which would create very uncomfortable situations. Many adjustments would need to have been made to solve this organizational issue, which would have delimited the spatial layout of the plan.

Apart from their limitations the first and second concept defined interesting solutions for the layout of the plan. However, both concepts did not create a good balance between the structural, spatial and organizational layout of the design. For the third concept the positive elements of both concepts were incorporated: the organizational layout of the first concept and the spatial layout of the second concept. The second concept also showed the interesting approach of the use of walls and wall-openings to demarcate spaces and places.

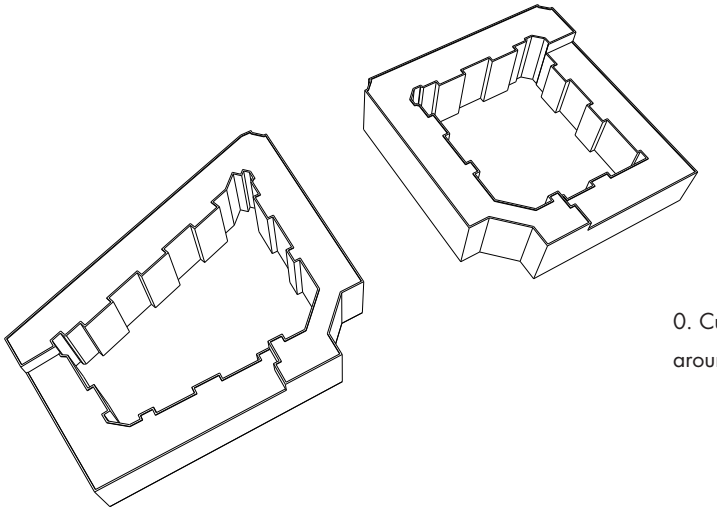
Combining the three elements resulted in a grid-structure that was based on the structure of the existing building. The walls demarcate each space, while the wall-openings and other boundary elements connect each space with the surrounding spaces, both visually and physically. This creates the spatial layout of one connected collective space comprising of a multiplicity of spaces and places. Although every space is connected, the use of walls and particular wall-openings make it possible to control the people that are entering the spaces. In this way the public-collective domain in the u-shaped block is easily separated from the collective domains in each courtyard. The group domain is housed on the ground floor of the existing building and is both visually and physically connected to the collective spaces. Lowering the roof gave the opportunity to house dwellings on the first floor and to easily connect the domain of the group with the roof terrace so as to limit the threshold of entering the roof terrace. The grid creates a clear structure of walls that holds the roof and the roof terrace. The use of unfinished Lenotec walls and ceilings keep the thickness of the walls and the roof to a minimum, creating a free internal height of three meters and walls of only twenty centimeters thick.

6.3 Research to design.

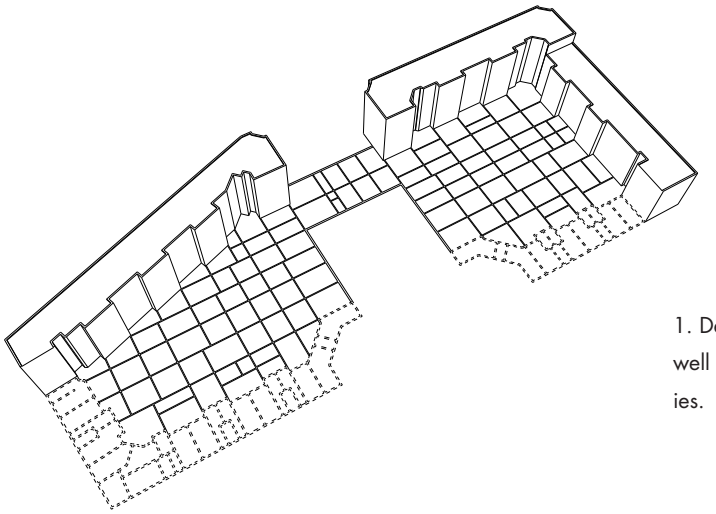
While the guiding concept was clear the research could be translated to the design of the building. Concluding the research three statements were formulated that define the design of the residential building from the perspective of privacy behavior. Summarized, *the residential building needs to have a multiplicity of spaces that are clearly demarcated by physical and architectural boundaries and range from the most intimately private domain to the most communally collective domain.* During the design process the three statements were translated to the context by means of five design steps. These steps are shown below. The five design steps are implemented in a non-chronological order. During the design process all three guidelines were used multiple times to improve the spatial layout, the structural layout and the organizational layout, in a continuous process of adjustment and improvement.

1. The first step was to create a structure in the courtyard that sub-divides the collective space of both courtyards in smaller and more divers spaces and places. These spaces would encompass many domestic and daily activities and needed to be flexible to be able to adapt and adjust to changing needs for particular facilities and services. The structure is organized based on the brick wall structure of the existing building. The new structural layout merges into the structural layout of the existing brick wall structure, which results in a maze of walls that enclose all the divers spaces and places. Both courtyards are connected by a building block in between both residential blocks to create one communal space so that each facility and service is easily reached from each private dwelling in the building. The final result is a collective space comprised of a multiplicity of spaces that are both highly various and flexible.

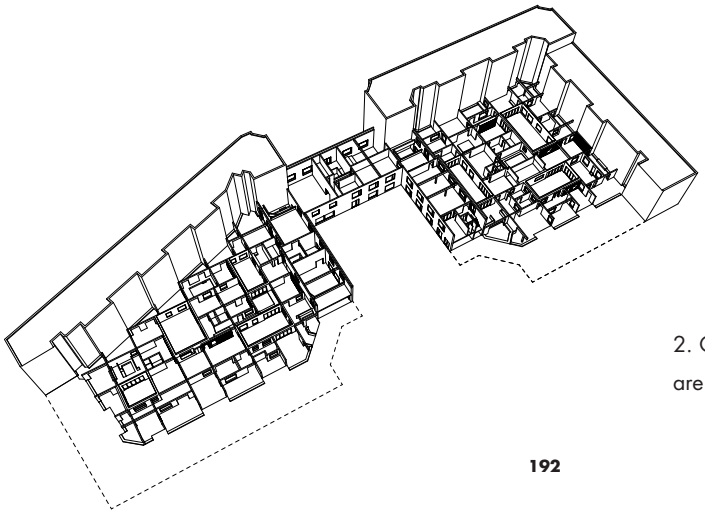
2. The second step was to define the spaces and places according to the desired level of privacy of each of the spaces. Through the use of the nineteen boundary patterns that were defined in the research each space could be demarcated, according to the level of privacy it needed to afford each inhabitant and according to the activities that these



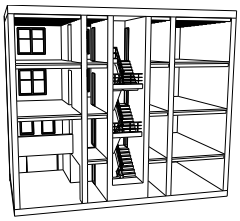
0. Current situation PWS-blocks: Private dwellings around a courtyard.

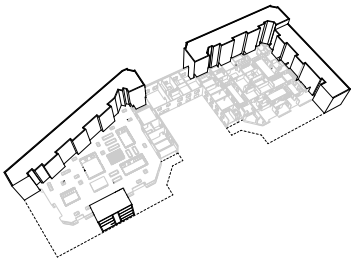


1. Demarcating the spaces and places through well defined physical and architectural boundaries.

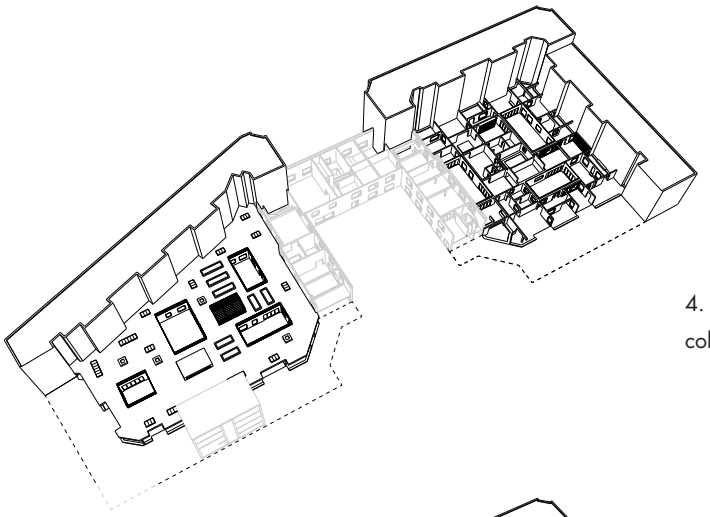


2. Creating a multiplicity of spaces and places that are both various and flexible, in the inner courtyard.

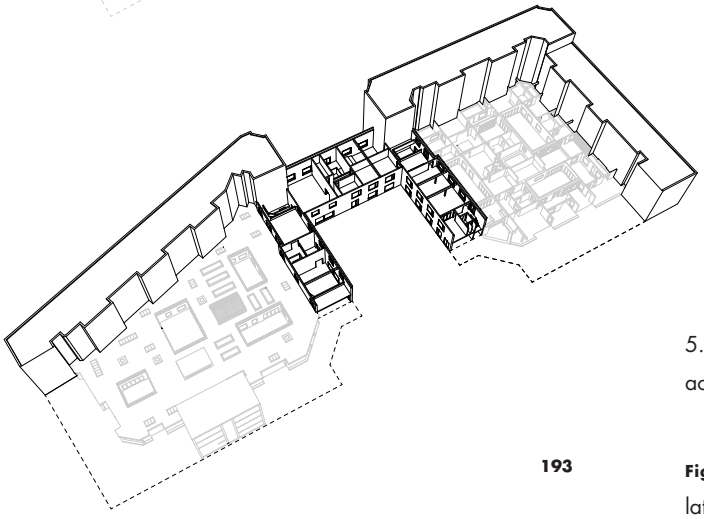




3. Clustering domestic and daily activities according to their desired level of privacy, resulting in a hierarchy of spaces. The spaces around the existing porticos facilitate the domain of private, multiple and group.



4. The inner courtyard facilitates the activities of the collective domain.

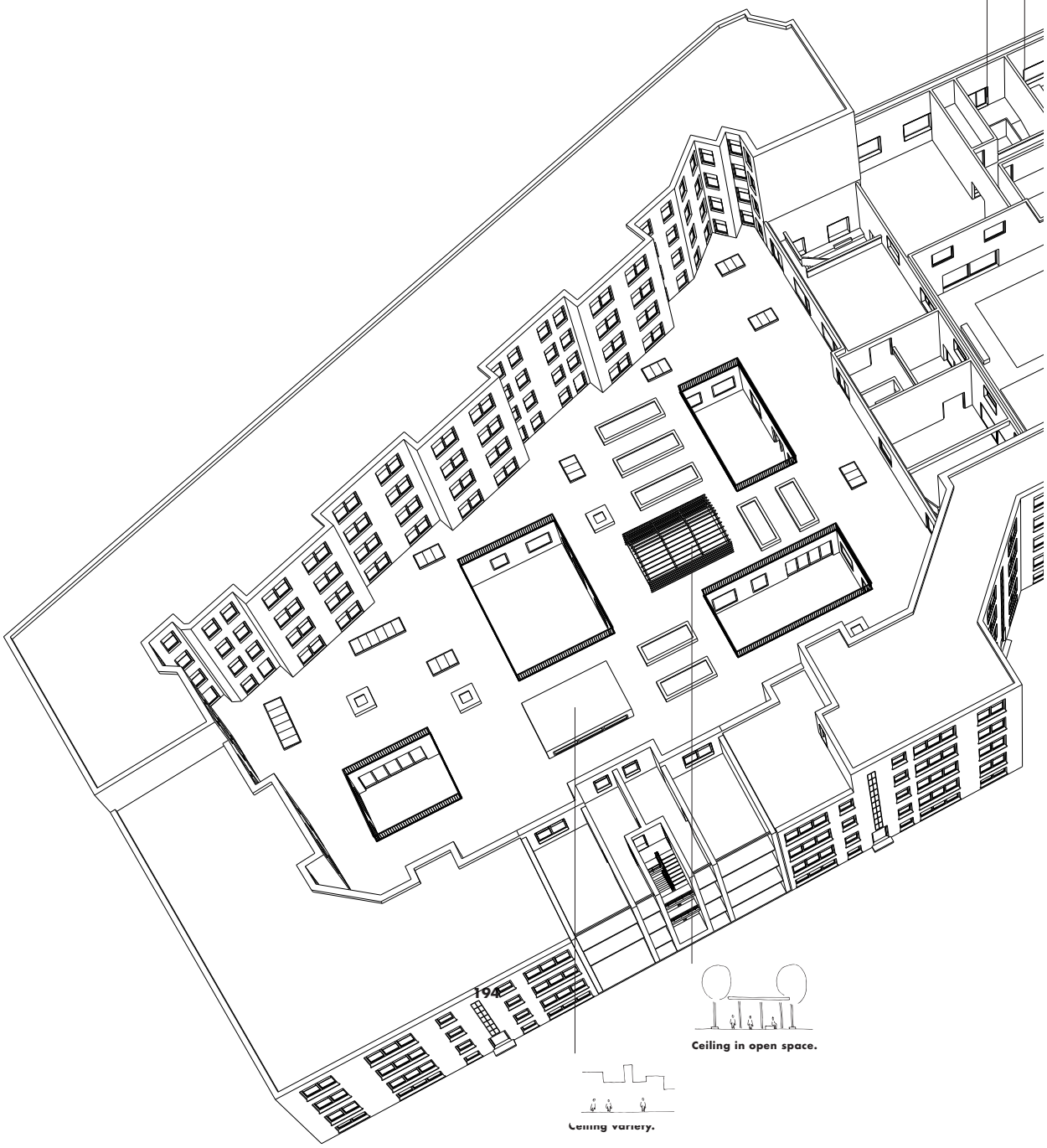


5. The U-shaped building block facilitates the activities of the public-collective domain.

Figure 6.3 Five design steps translating the research to the design.

The window on street level.

Physical openings to the street.



Ceiling in open space.

Ceiling variety.

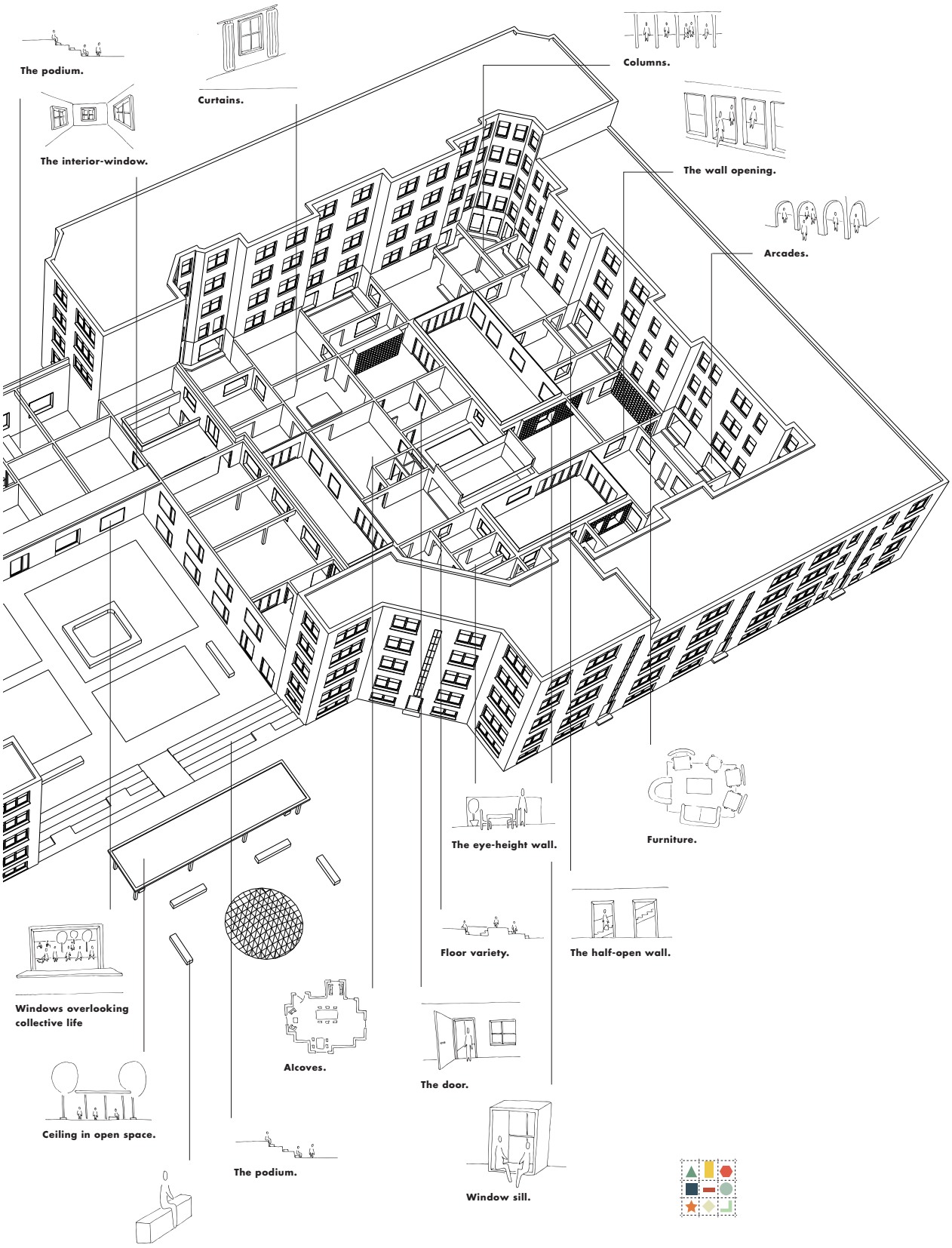


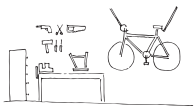
Figure 6.4 Step 3 - Boundary elements

Sleeping.

Being alone.

Being outside.

Dressing.



Hobby.

Communal cooking.

Communal eating.

Communal eating.

Communal toilet.

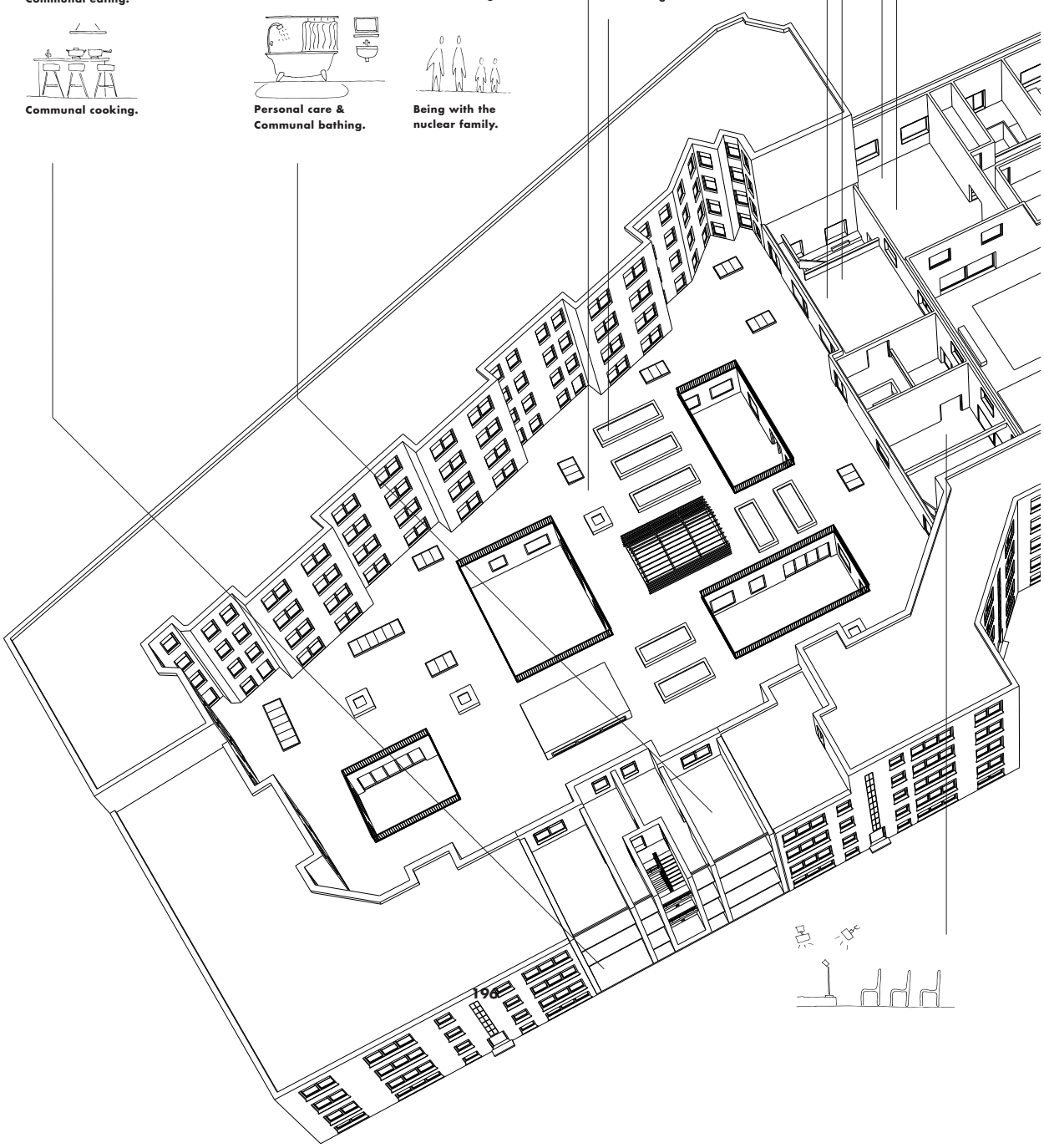
Private storage.

Gardening.

Communal cooking.

Personal care &
Communal bathing.

Being with the
nuclear family.



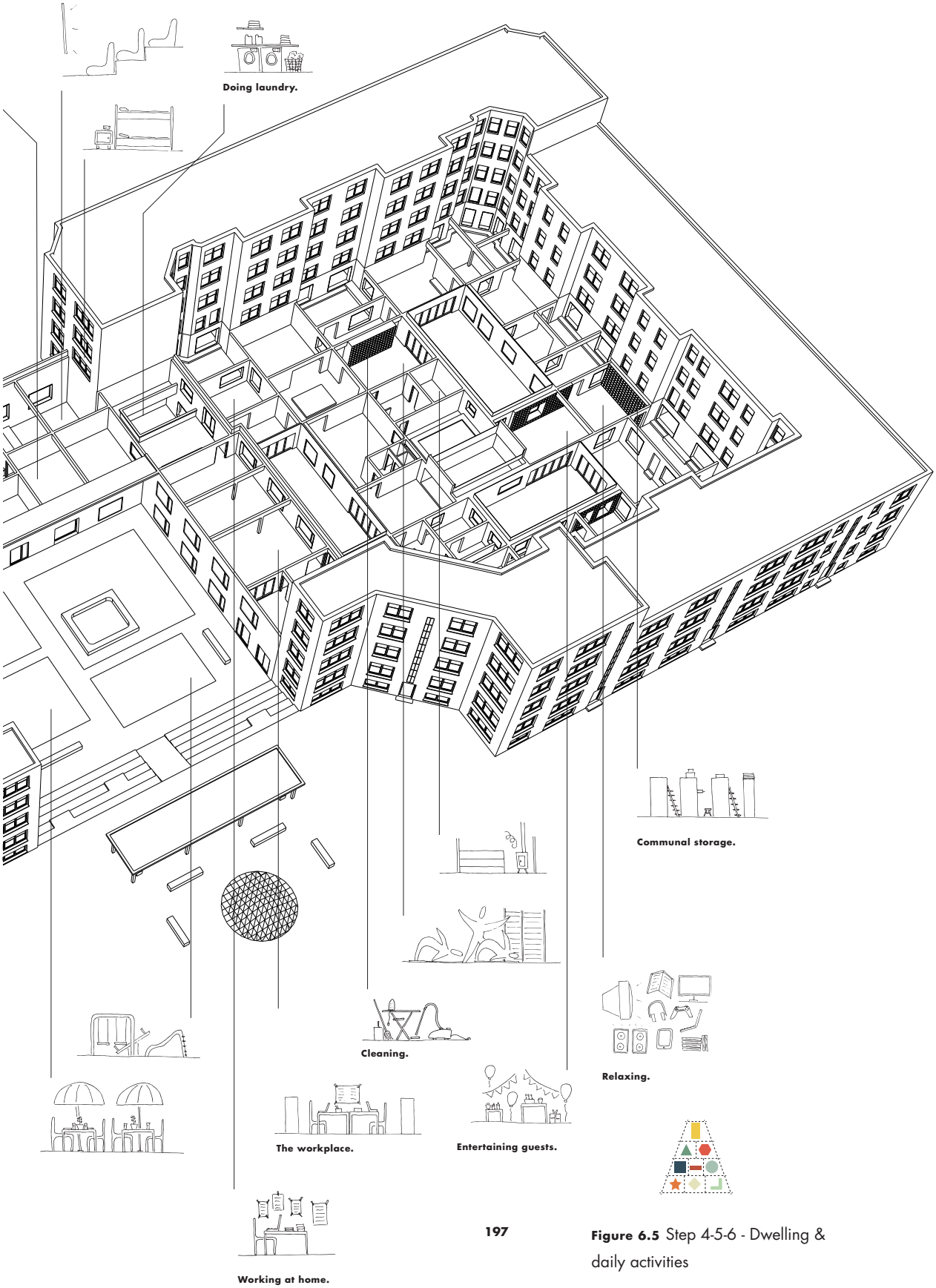


Figure 6.5 Step 4-5-6 - Dwelling & daily activities

spaces would facilitate. This results in the implementation of a cluster of physical and architectural boundaries for each space in the residential building.

The third, fourth and fifth step all follow from the statement of 'hierarchy & domain'. Similar as in step two the domestic and daily activities that were distinguished in the research are clustered, according to the desired level of privacy that the inhabitants need while performing the activities. Concluding chapter two of the research five domains were formulated: private, multiple, group, collective and public-collective. These domains all contain a cluster of activities. Step three encompasses the domain of private, multiple and group. Step four is the domain of collective and step five is the domain of public-collective. Clustering the spaces that afford the particular domestic and daily activities finally results in a hierarchy of spaces that range from the most intimately private domain to the most communally collective domain.

3. The spaces around each portico in the existing building form the domain of the group. One side of the former basement facilitates the kitchen and dining area of this group. The members of the group that live in the dwellings around the portico use this area. The former basement also houses a communal storage area in where the members of the group can store their bikes and stuff that is used by multiple members. The floor above the kitchen and dining area is also a group area and is reached via the portico. This space is directly connected to the roof terrace and can be used by the members as a small living room. A vide connects this space to the kitchen and dining area below.

The rest of the spaces around the portico facilitate the dwellings. Some of the former dwellings are re-designed so that they can house multiple households that share facilities that form the domain of multiple. The households share the toilet, the bathroom, storage space and a kitchenette and have a private room for themselves that forms the domain of the private. This is the room where the inhabitants dress and sleep and it is the place where they can be alone. Other former dwellings house one or multiple households individually. These dwellings contain both the domain of private and mul-

tiple. The dwellings have a different size and layout to facilitate the divergent needs and desires of each inhabitant or household. The layout of the dwellings is also defined in such a way that it is flexible to changing needs in the future. For instance, a dwelling unit that is shared by multiple households can become a dwelling for one nuclear family if a couple decides to have children. Similarly the children rooms are organized so that those spaces can become the dwelling for another household, when the children move out of the house.

4. The inner courtyard facilitates the activities of the collective domain. These spaces are mostly spaces to relax, read, watch television, listen to music, being at the computer and to work. Simply said the collective domain replaces the private living room of the dwelling. The common area in the heart of the former courtyard is the biggest 'living room' of the collective domain. In here people can have dinner and entertain their guests. The common heart is connected to the multiple patios that are placed in such a way that they are connected to as many surrounding inner spaces as possible and bring in as many light as possible.

The collective domain functions as one big collectively used 'living room' comprised of small spaces. At the same time multiple facilities and services are added in this collective domain to improve the comfort and usability of these spaces. Among other things, there are small libraries with shared books, a cinema, an exercise room, a sauna and a small pool, and there are craft rooms to do handcrafts. Guests of the inhabitants can stay in two dwelling units that can house multiple people for the night. The roof of the collective domain contains a big roof terrace where the inhabitants can be outside and relax or can garden their fruits and vegetables in the vegetable gardens.

5. The last domain, the domain of public-collective is facilitated in the u-shaped block that connects both residential buildings with each other. This area facilitates activities that have a more public character and can be used by both the inhabitants and non-inhabitants. The east part of the block contains a day care that is directly connected to the

outside children play area. Above the day care is a big space for workplaces in where the inhabitants also can have work meetings. The middle part contains a big multipurpose room with a small extendable tribune. This room can be used for performances, lecture and exhibition, watching a movie or as a dance area. Adjoining this space is a play area. Above the play area are a small and a large music room. In here people could practice their music instruments. On the west side of the middle part is a big communal dining and kitchen area. In here people can cook and eat together with larger groups. The west part of the public-collective building block includes two workshop spaces. In the workshop space on the ground floor heavy machines can be used. The workshop space on the first floor can be used for doing handcrafts or other hobbies. In the west part is also a theatre that also functions as a multipurpose room when it is needed for other activities.

The u-shaped block encloses a half-open square that is connected to the neighborhood by a slow-sloping stair and a canopy. Although the public can enter the square, the square has a more private character so that the inhabitants of the building feel comfortable using the space. Each space on the ground floor of the u-shaped block is visually or physically connected to this square.

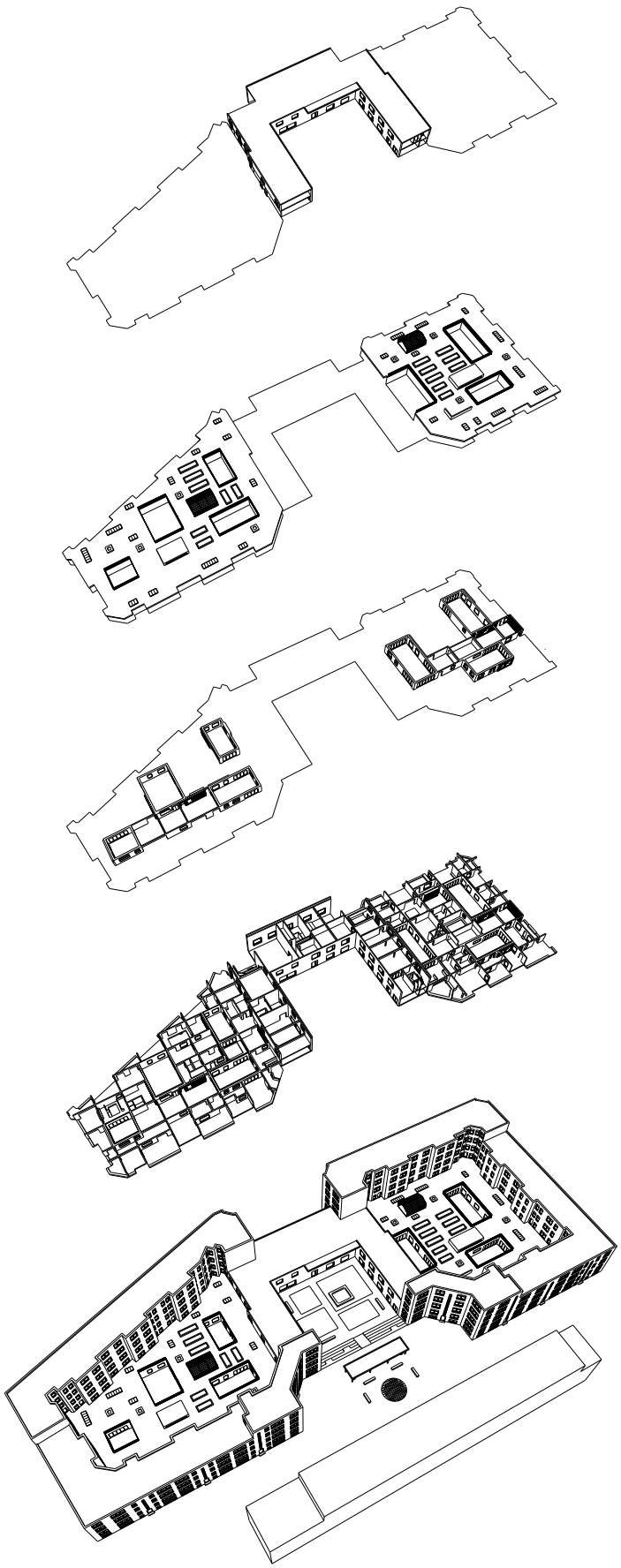


Figure 6.6 Exploded view of the design with the most important design elements.

7. Design.

Research - Patterns of privacy

Domestic & daily activities

private - multiple - group

collective

public-collective

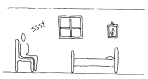
Sleeping.

Dressing.

Being with the nuclear family.

Communal toilet.

Communal eating.



Being alone.

Private storage.

Personal care & Communal bathing.

Communal cooking.

Being outside.

Cleaning.

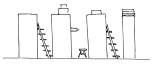
Relaxing.

Working at home.

Gardening.

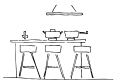
Doing laundry.

Entertaining guests.

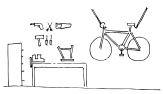


Communal storage.

Communal eating.



Communal cooking.



Hobby.

The workplace.

Activities outside the collective home.

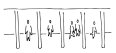
Boundary elements

Floor variety.

Alcoves.

The window on street level.

The half-open wall.



Columns.

The podium.

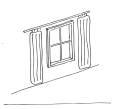
The door.

Windows overlooking collective life

The wall opening.

Arcades.

Ceiling variety.



Curtains.

Window sill.

The eye-height wall.

Furniture.

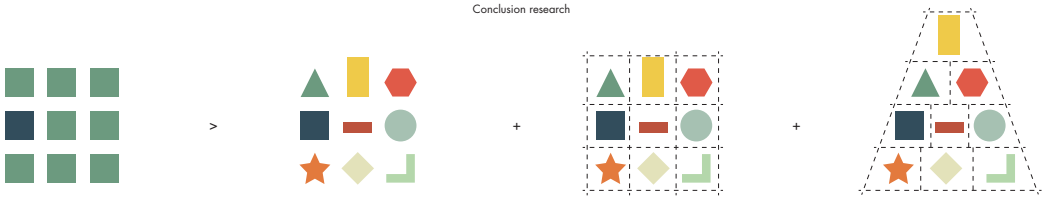
Ceiling in open space.

The interior-window.

Physical openings to the street.

The sit-able wall.

Conclusion research



Private & Collective

Choice & Multiplicity

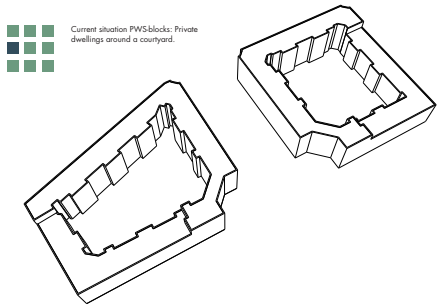
Control & Demarcation

Hierarchy & Domain

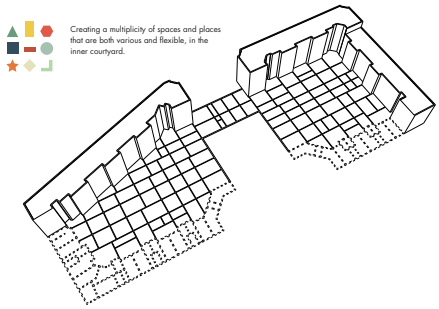
private - multiple - group - collective - public-collective

"Thus, the residential bulding needs to have a multiplicity of spaces that are clearly demarcated by physical and architectural boundaries and range from the most intimately private domain to the most communally collective domain."

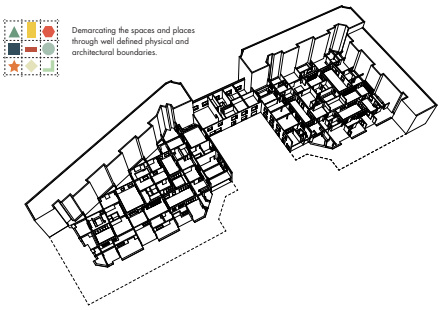
Research to design



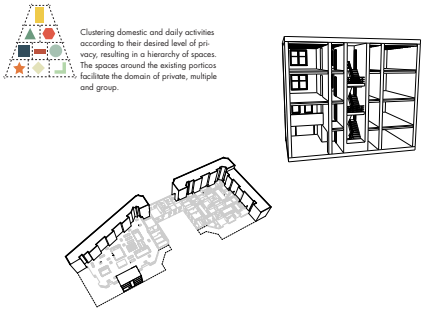
Current situation PWS-blocks: Private dwellings around a courtyard.



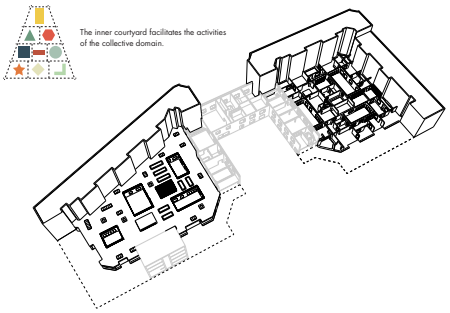
Creating a multiplicity of spaces and places that are both various and flexible, in the inner courtyard.



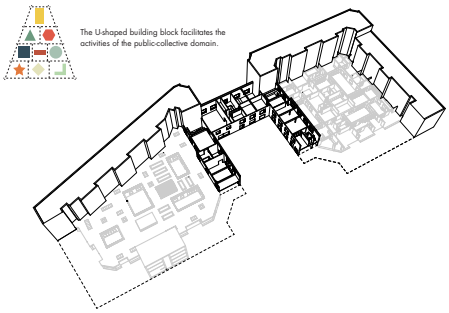
Demarcating the spaces and places through well defined physical and architectural boundaries.



Clustering domestic and daily activities according to their desired level of privacy, resulting in a hierarchy of spaces. The spaces around the existing porticos facilitate the domain of private, multiple and group.

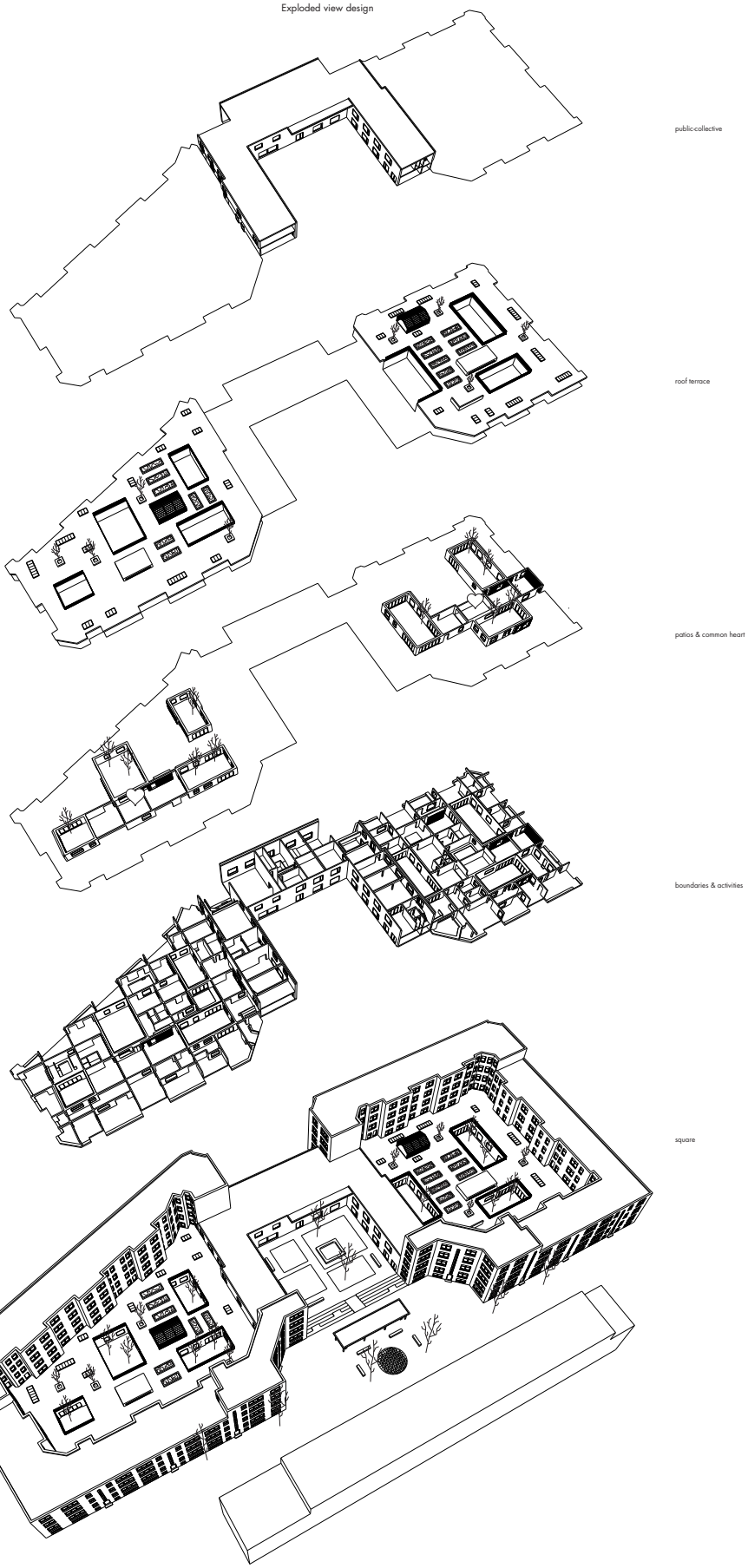


The inner courtyard facilitates the activities of the collective domain.



The U-shaped building block facilitates the activities of the public-collective domain.

Exploded view design



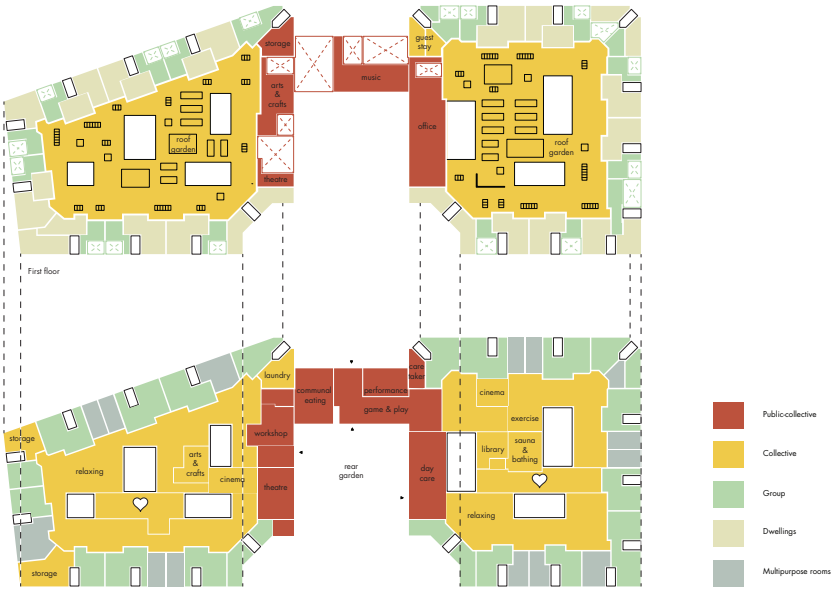
public-collective

roof terrace

patios & common heart

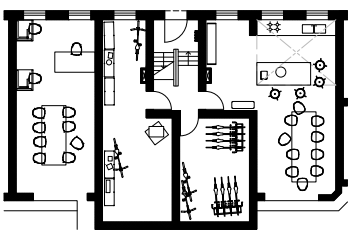
boundaries & activities

square

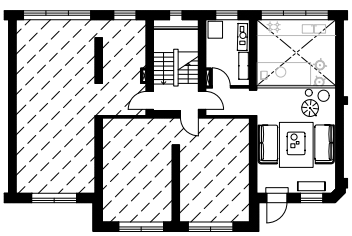


Programmatic scheme

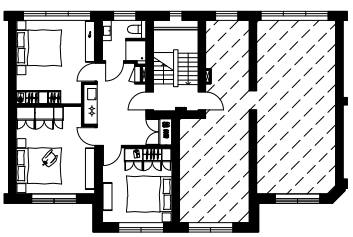
Plan dwelling



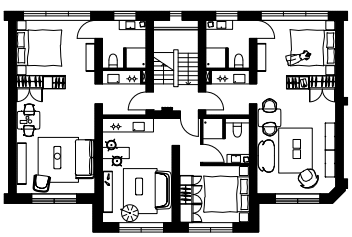
0 multipurpose space + group unit



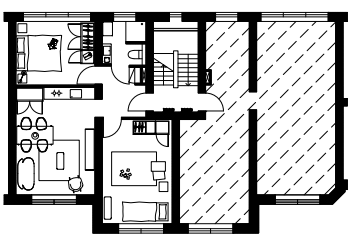
+1 group unit



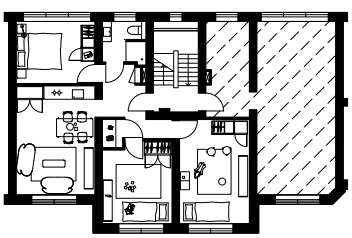
+1/2/3/4 dwelling type A



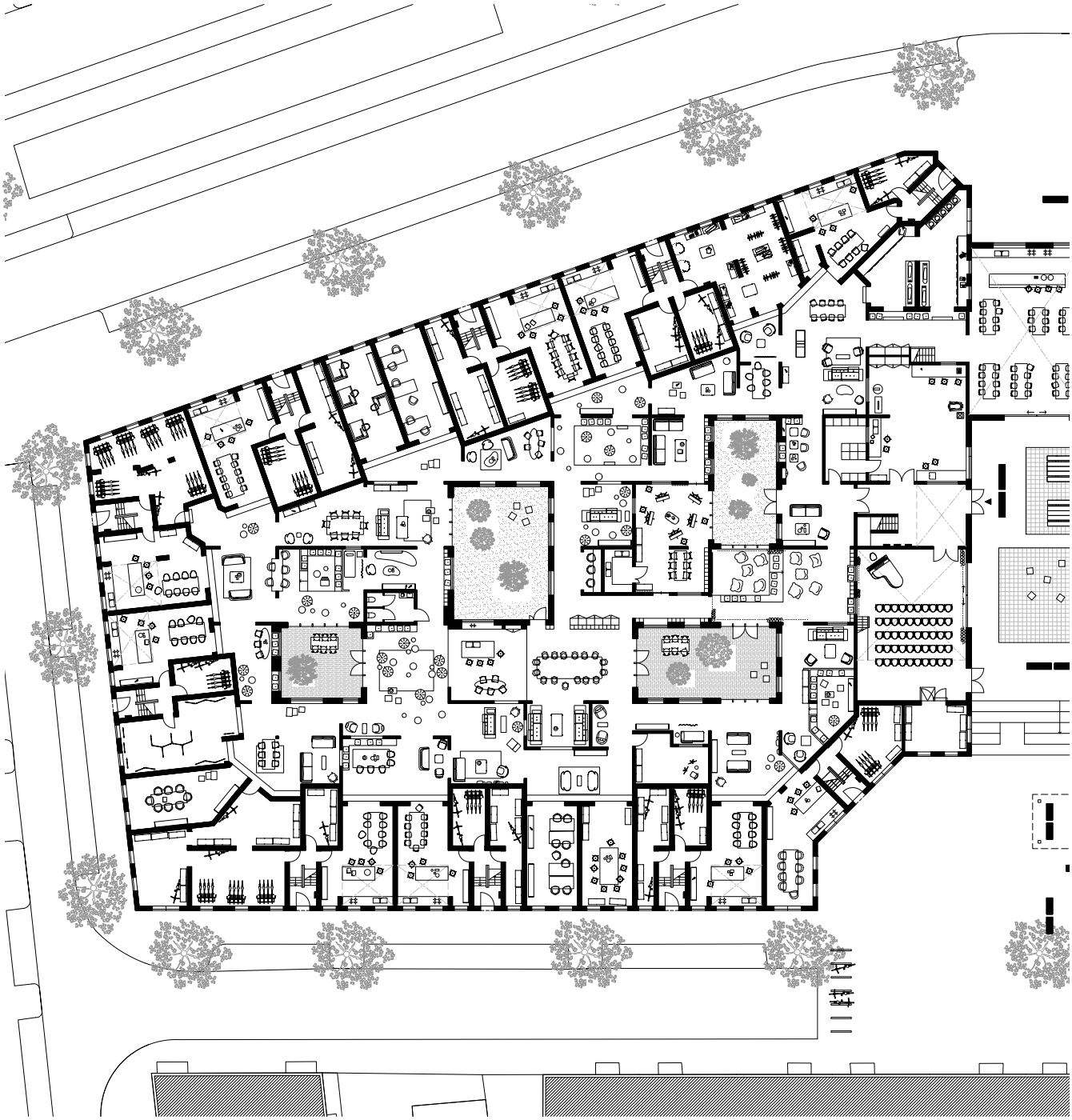
+1/2/3/4 dwelling type B + C dwelling

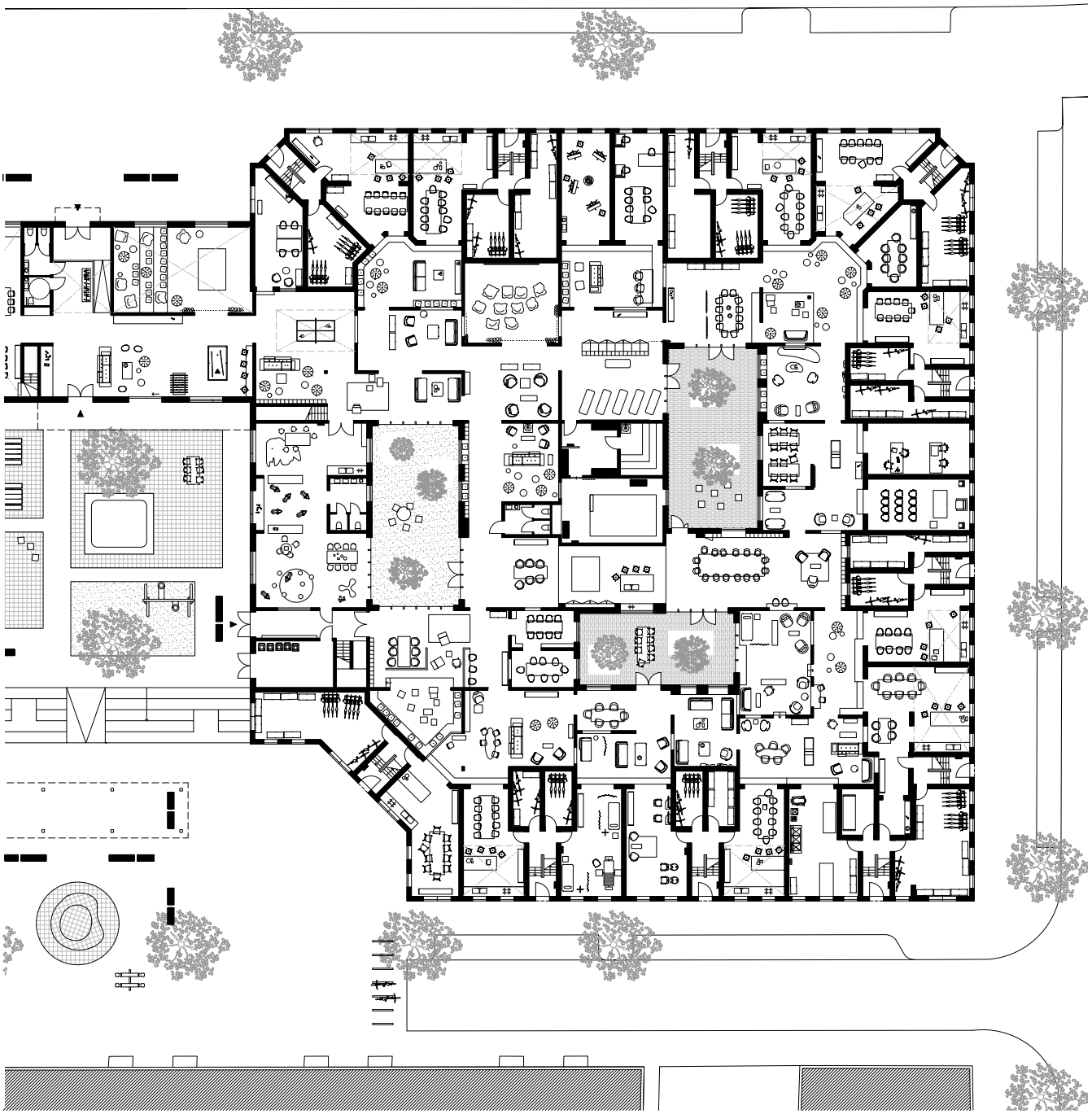


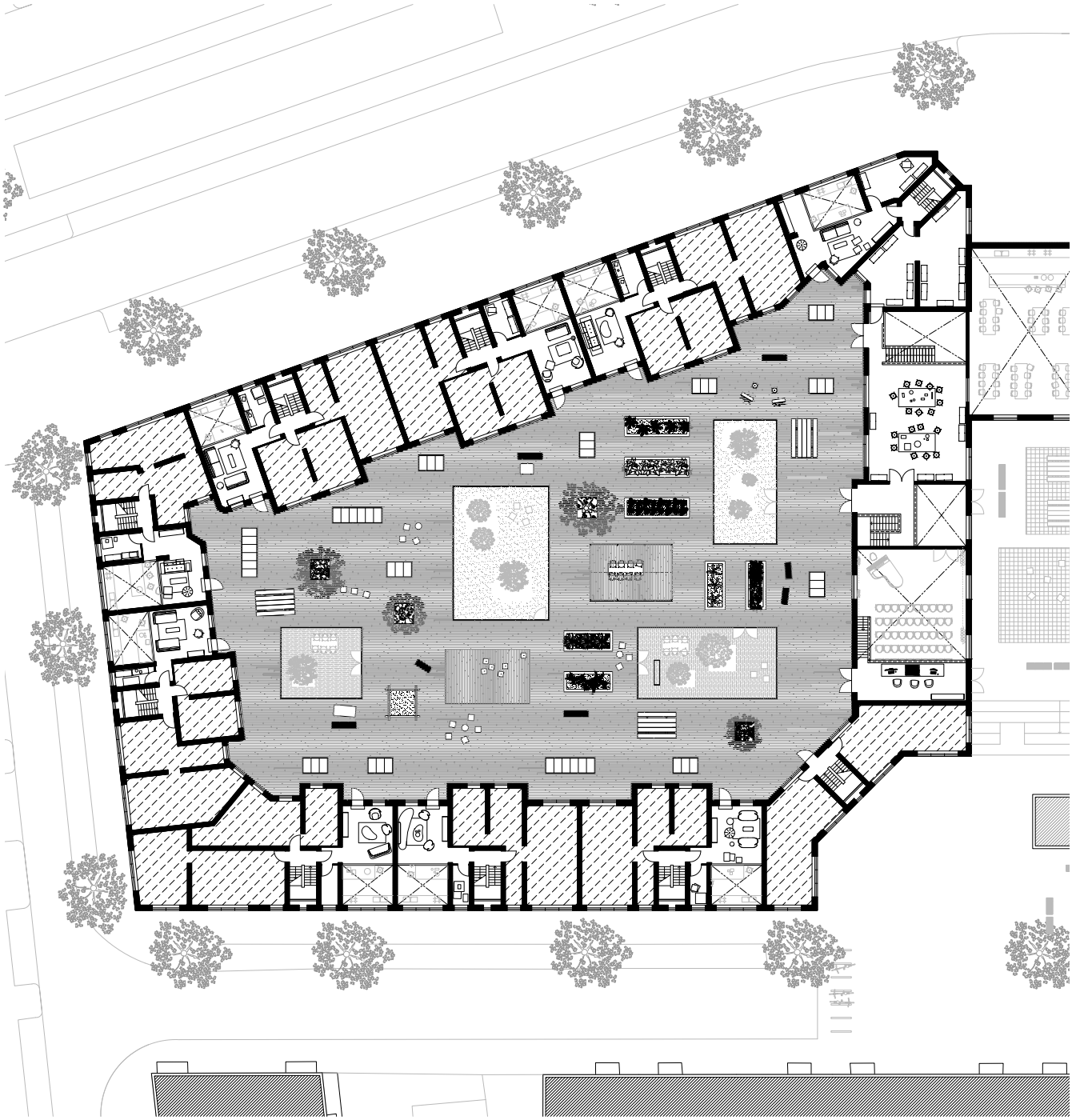
+1/2/3/4 dwelling type D

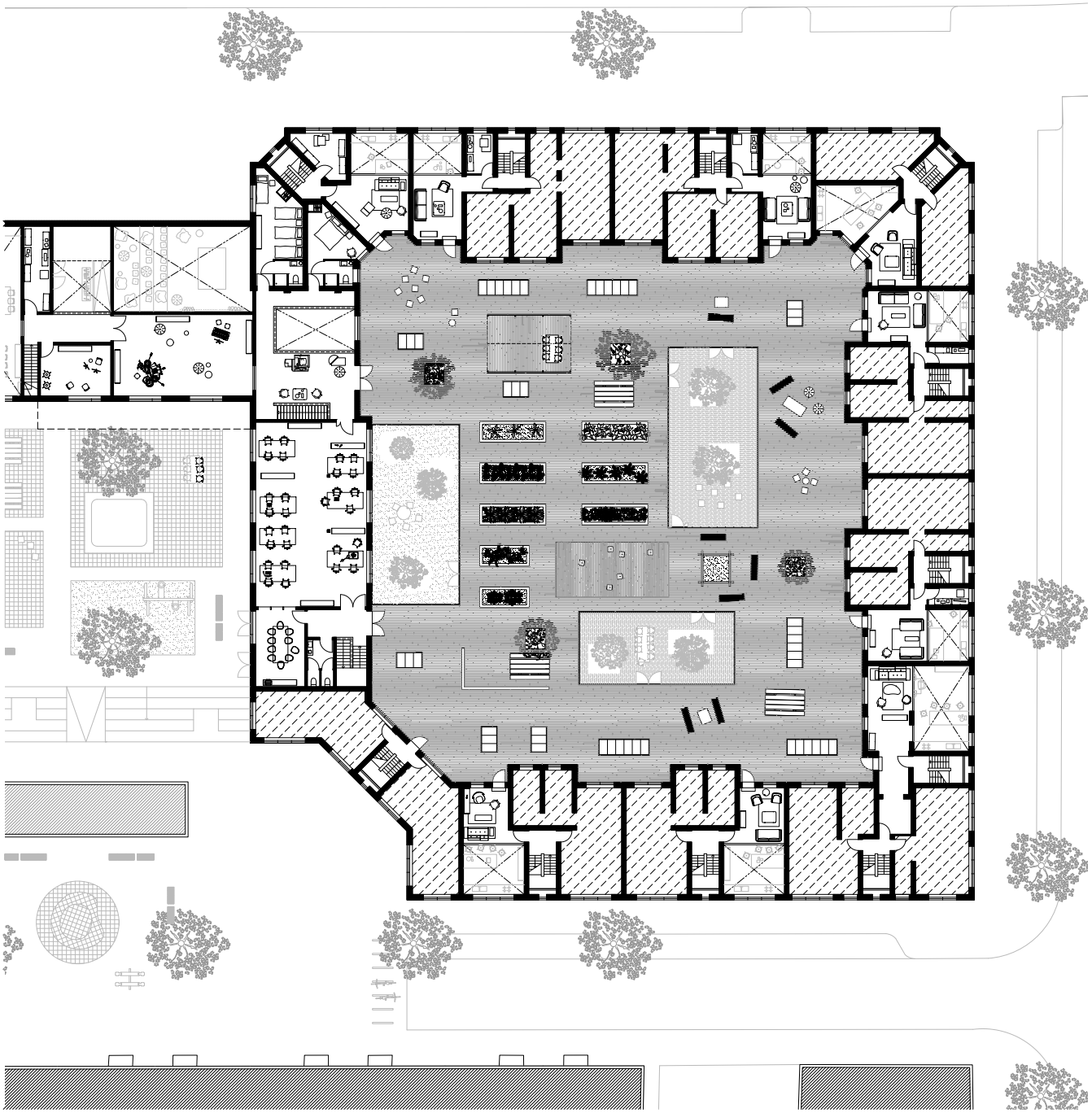


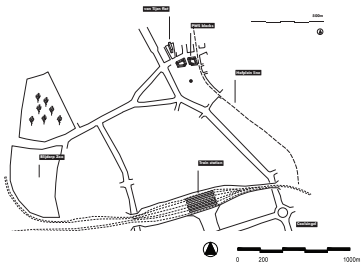
+1/2/3/4 dwelling type E

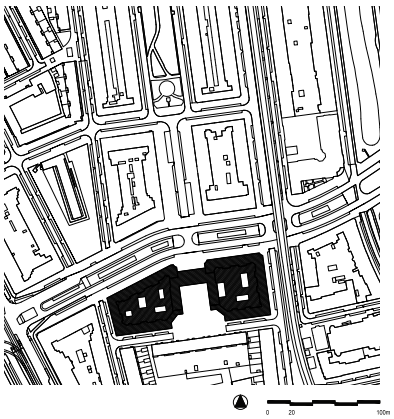


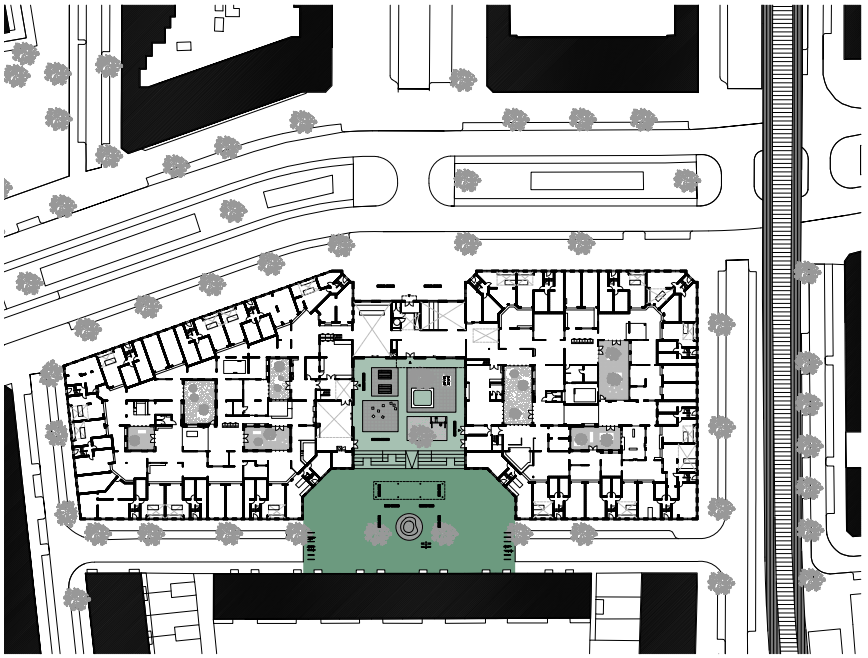




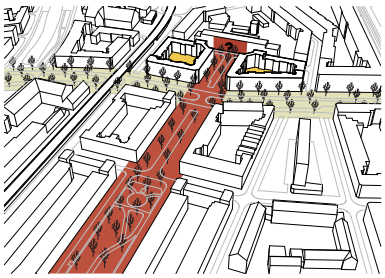








Urban context



Current situation

Connecting collective space of both buildings

Monumental street axis Sav. Lohmanlaan

Bergselaan - main street

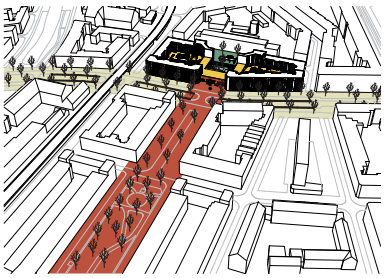
? > !

Clear ending and demarcation of axis Sav. Lohmanlaan at Bergselaan.

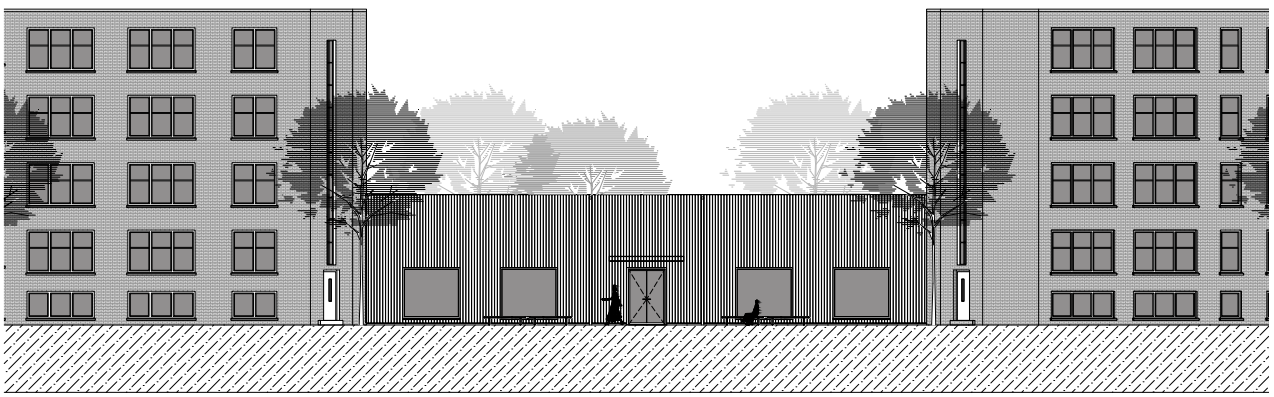
Informal enclosed square - public

Informal rear square - public-collective: transition between neighborhood and building

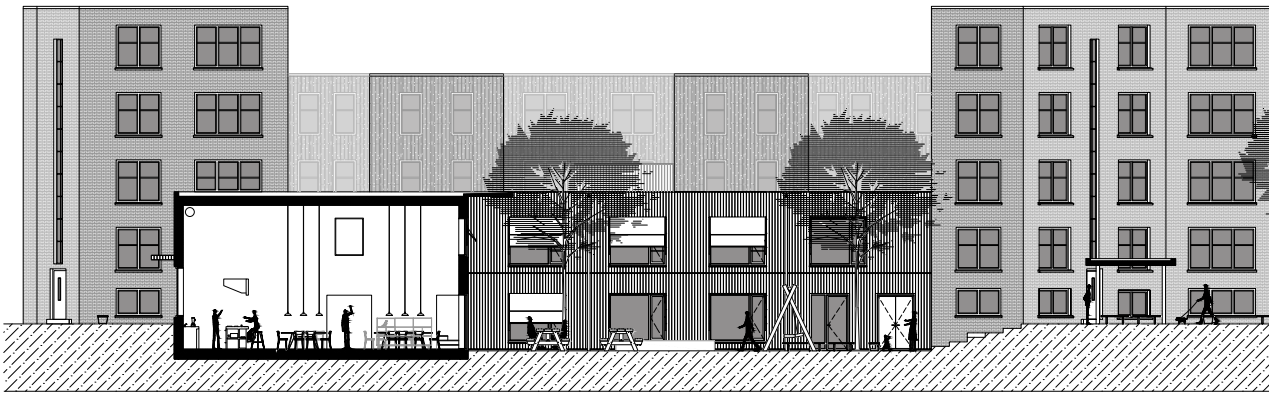
Additional parking areas



New situation

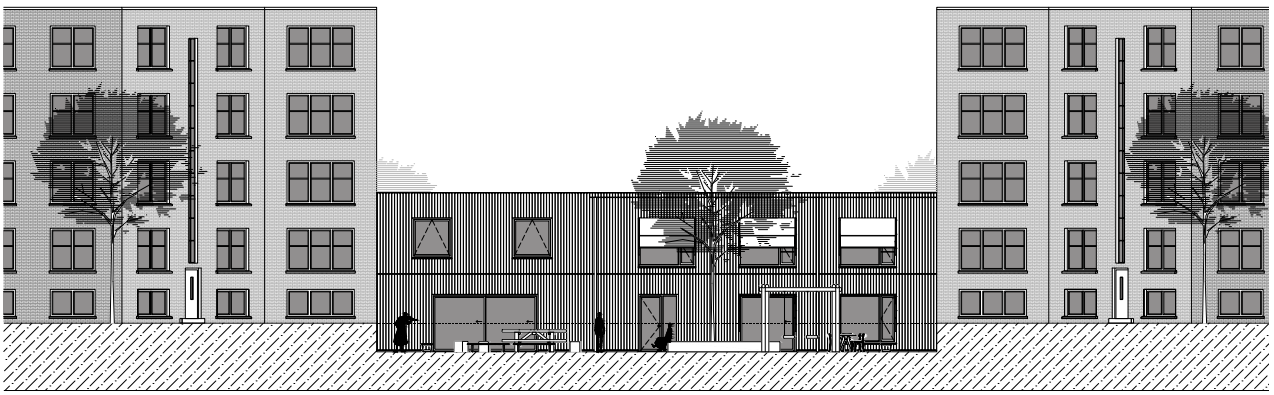


Main entrance - facade north

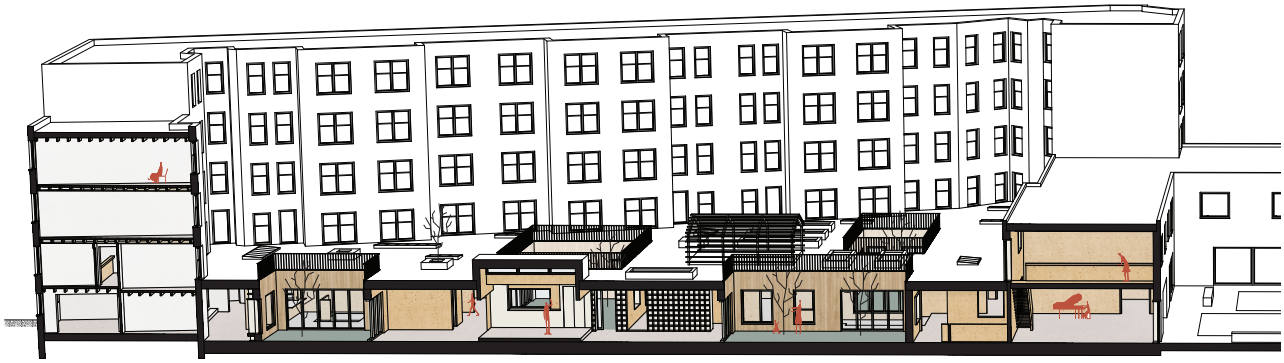


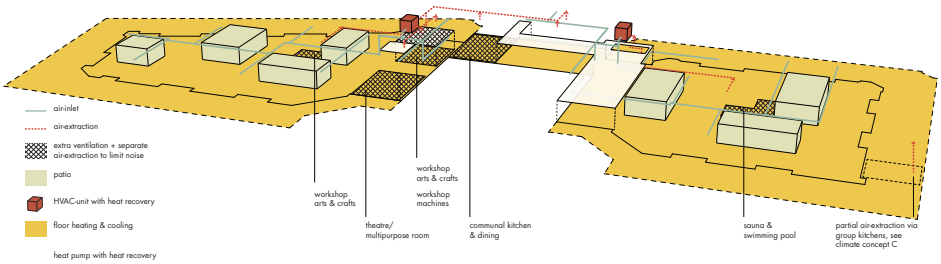
Rear square - facade east

Rear square - facade west

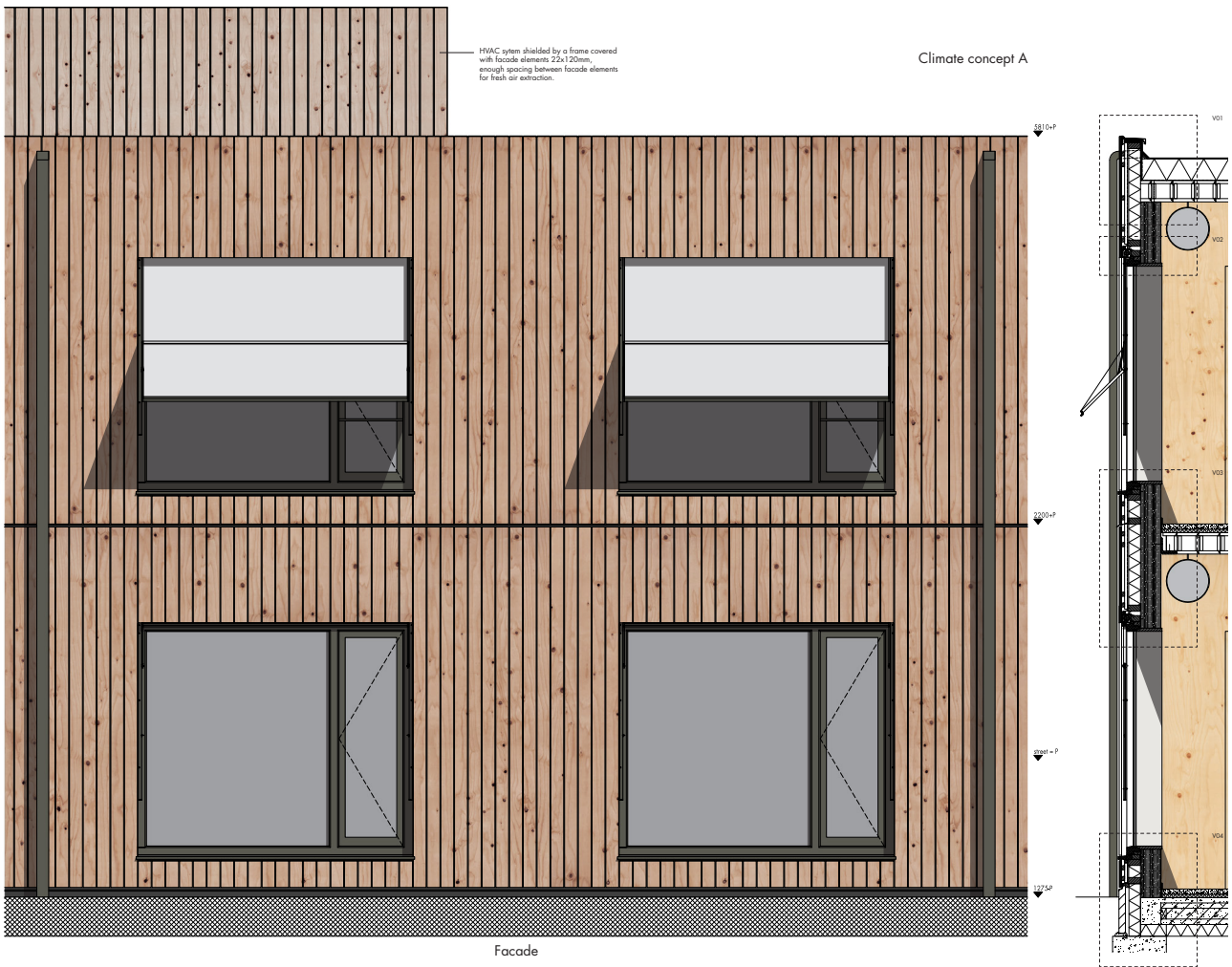


Rear square - facade south

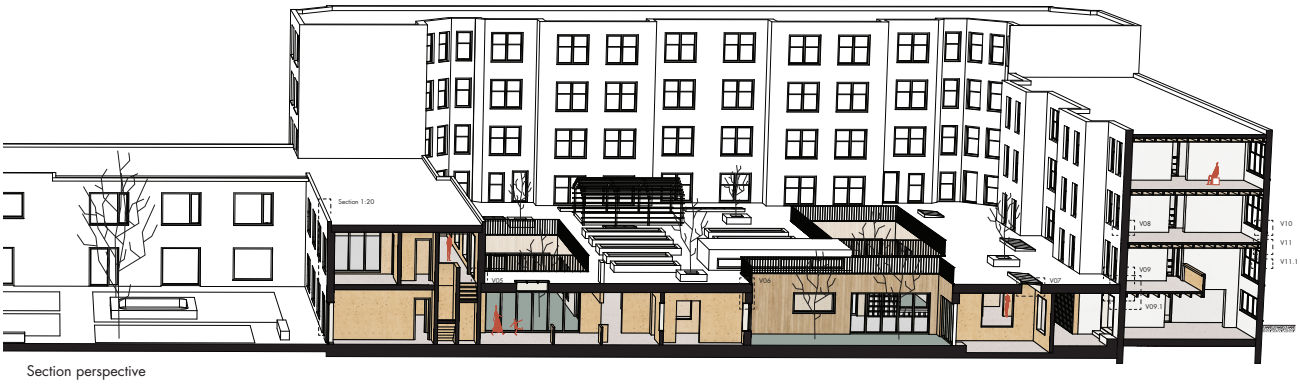




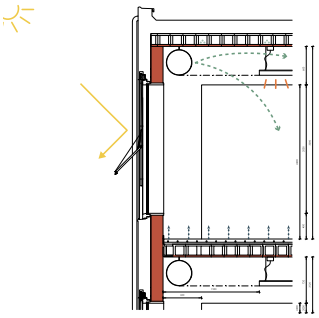
Climate concept A



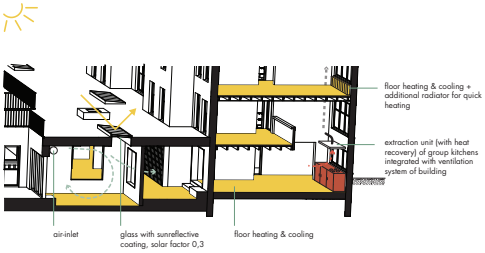
Facade



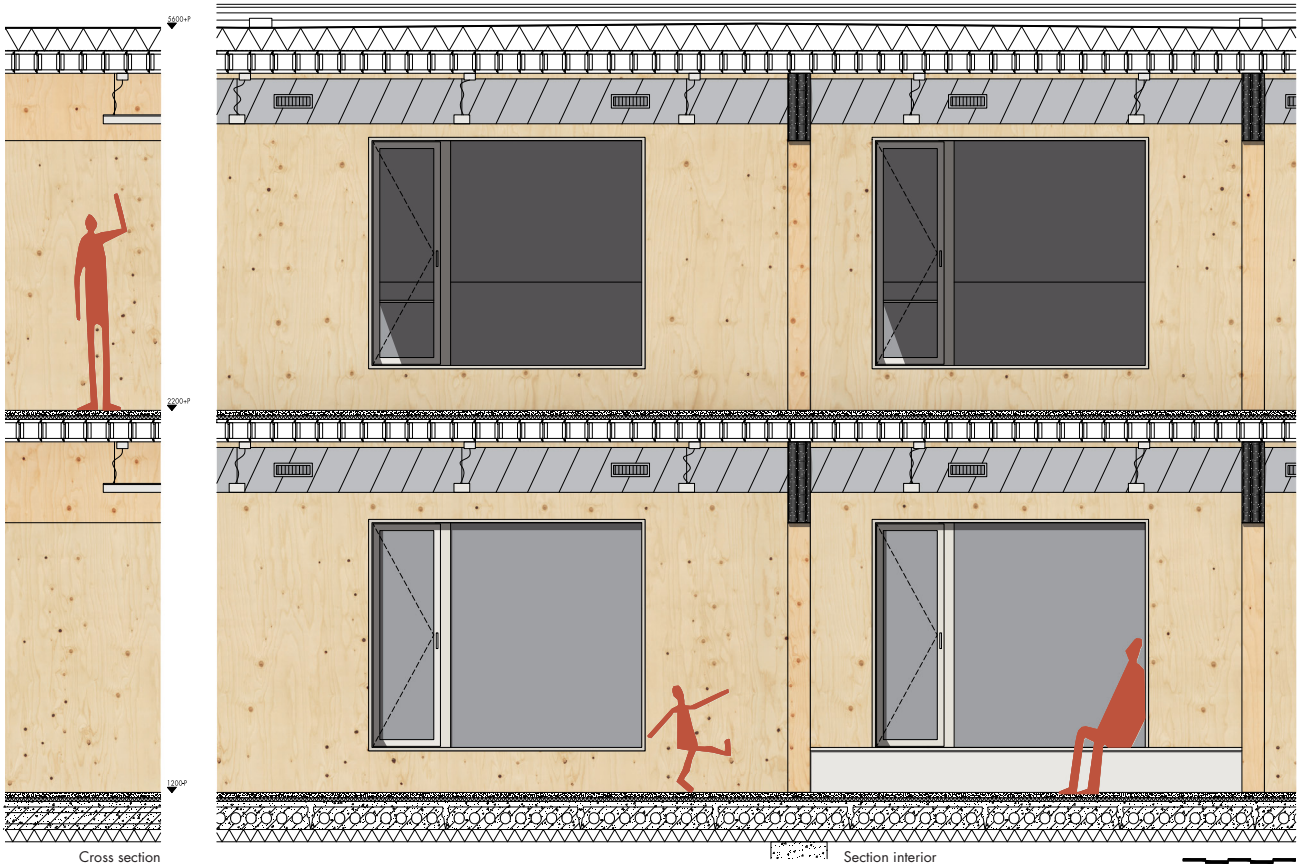
Section perspective



Climate concept B



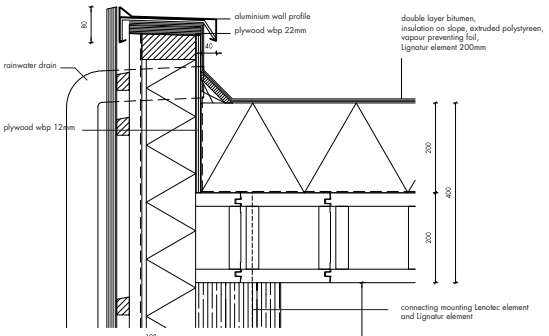
Climate concept C

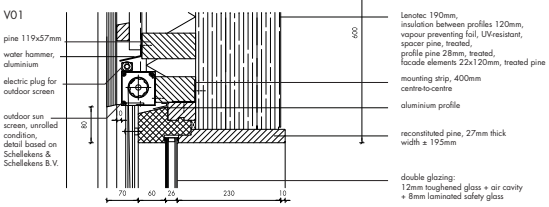


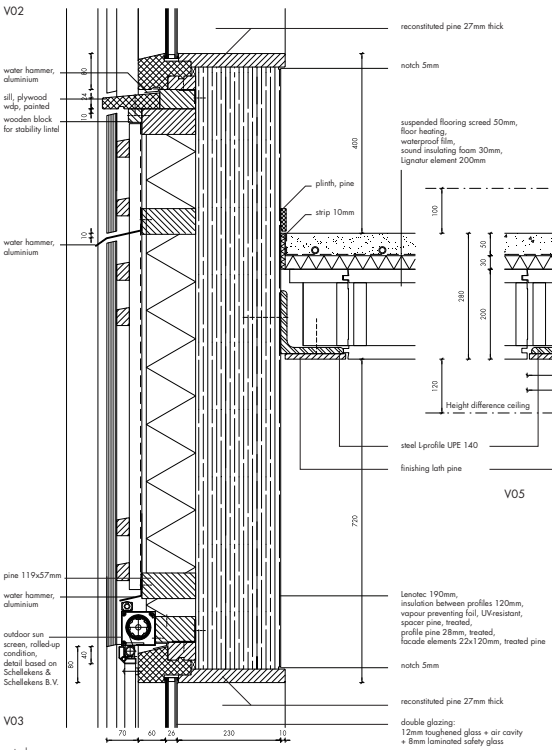
Cross section

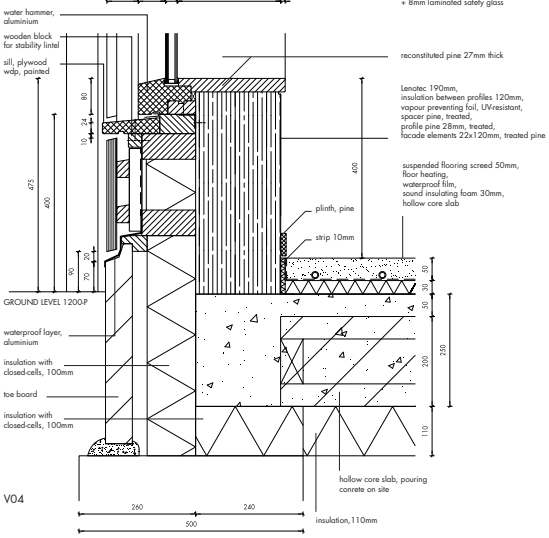
Section interior

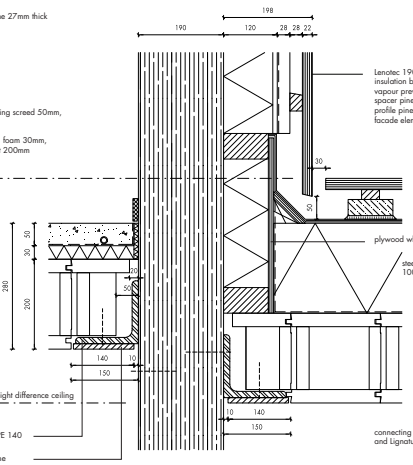
Details 1:5

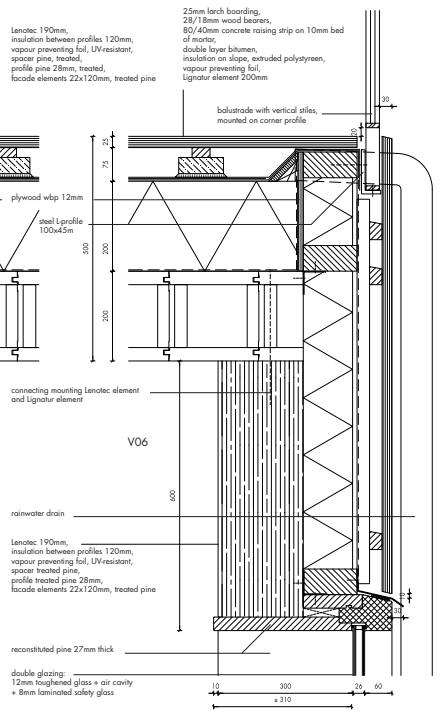

aluminium wall profile
plywood wbp 22mm
double layer bitumen,
insulation on slope, extruded polystyreen,
vapour preventing foil,
Lignatur element 200mm
rainwater drain
plywood wbp 12mm
connecting mounting Lenotec element
and Lignatur element

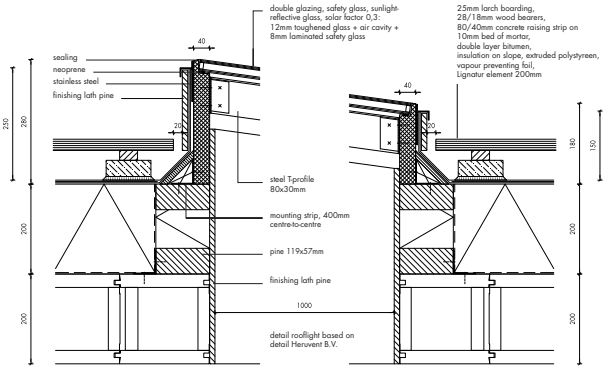

V01
pine 119x57mm
water hammer,
aluminium
electric plug for
outdoor screen
outdoor sun
screen, unrolled
condition,
detail based on
Schellekens &
Schellekens B.V.
Lenotec 190mm,
insulation between profiles 120mm,
vapour preventing foil, UV-resistant,
spacer pine, treated,
profile pine 28mm, treated,
facade elements 22x120mm, treated pine
mounting strip, 400mm
centre-to-centre
aluminium profile
reconstituted pine, 27mm thick
width ± 195mm
double glazing:
12mm toughened glass + air cavity
+ 8mm laminated safety glass


V02
water hammer,
aluminium
sill, plywood
wdp, painted
wooden block
for stability lintel
reconstituted pine 27mm thick
notch 5mm
suspended flooring screed 50mm,
floor heating,
waterproof film,
sound insulating foam 30mm,
Lignatur element 200mm
plinth, pine
strip 10mm
water hammer,
aluminium
pine 119x57mm
water hammer,
aluminium
outdoor sun
screen, rolled-up
condition,
detail based on
Schellekens &
Schellekens B.V.
Lenotec 190mm,
insulation between profiles 120mm,
vapour preventing foil, UV-resistant,
spacer pine, treated,
profile pine 28mm, treated,
facade elements 22x120mm, treated pine
notch 5mm
reconstituted pine 27mm thick
double glazing:
12mm toughened glass + air cavity
+ 8mm laminated safety glass

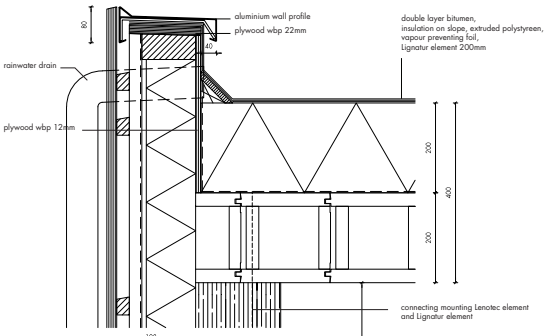

V03
water hammer,
aluminium
wooden block
for stability lintel
sill, plywood
wdp, painted
reconstituted pine 27mm thick
Lenotec 190mm,
insulation between profiles 120mm,
vapour preventing foil, UV-resistant,
spacer pine, treated,
profile pine 28mm, treated,
facade elements 22x120mm, treated pine
suspended flooring screed 50mm,
floor heating,
waterproof film,
sound insulating foam 30mm,
hollow core slab
plinth, pine
strip 10mm
GROUND LEVEL 1200-P
waterproof layer,
aluminium
insulation with
closed-cells, 100mm
toe board
insulation with
closed-cells, 100mm
hollow core slab, pouring
concrete on site
V04
insulation, 110mm


Lenotec 190mm,
insulation between profiles 120mm,
vapour preventing foil, UV-resistant,
spacer pine, treated,
profile pine 28mm, treated,
facade elements 22x120mm, treated pine
plywood wbp 12mm
steel L-profile
100x45m
Height difference ceiling
steel L-profile UPE 140
finishing lath pine
V05


25mm larch boarding,
28/18mm wood bearers,
80/40mm concrete raising strip on 10mm bed
of mortar,
double layer bitumen,
insulation on slope, extruded polystyreen,
vapour preventing foil,
Lignatur element 200mm
balustrade with vertical stiles,
mounted on corner profile
connecting mounting Lenotec element
and Lignatur element
rainwater drain
Lenotec 190mm,
insulation between profiles 120mm,
vapour preventing foil, UV-resistant,
spacer treated pine,
profile treated pine 28mm,
facade elements 22x120mm, treated pine
reconstituted pine 27mm thick
double glazing:
12mm toughened glass + air cavity
+ 8mm laminated safety glass
V06


double glazing, safety glass, sunlight
reflective glass, solar factor 0,3:
12mm toughened glass + air cavity +
8mm laminated safety glass
sealing
neoprene
stainless steel
finishing lath pine
steel T-profile
80x30mm
mounting strip, 400mm
centre-to-centre
pine 119x57mm
finishing lath pine
1000
detail rooflight based on
detail Heruvent B.V.
25mm larch boarding,
28/18mm wood bearers,
80/40mm concrete raising strip on
10mm bed of mortar,
double layer bitumen,
insulation on slope, extruded polystyreen,
vapour preventing foil,
Lignatur element 200mm
V07

Details 1:5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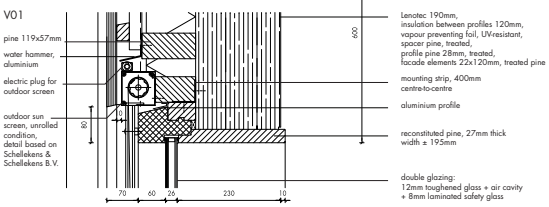
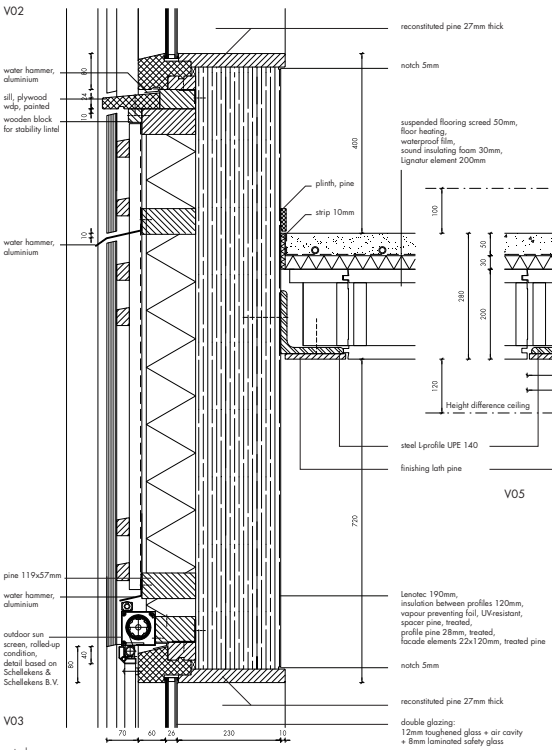
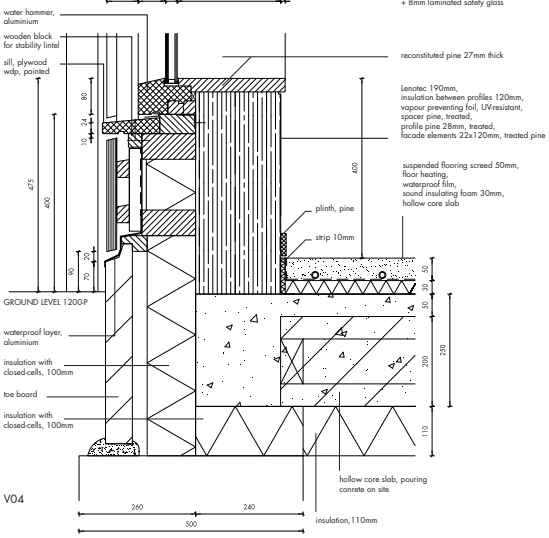
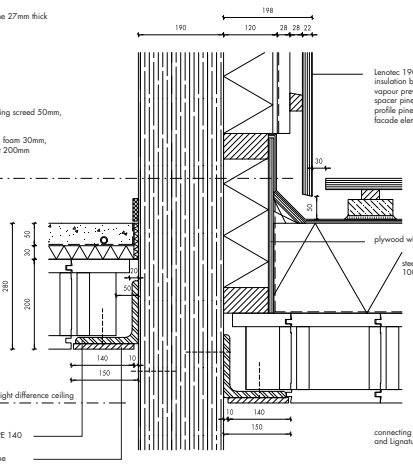
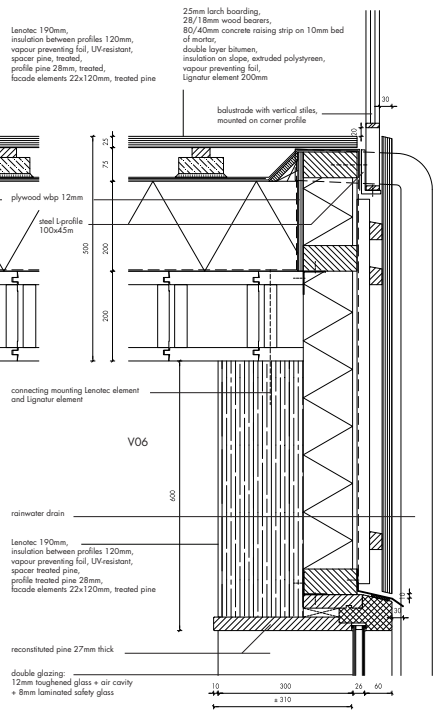
plywood wbp 22mm
double layer bitumen,
insulation on slope, extruded polystyreen,
vapour preventing foil,
Lignatur element 200mm
rainwater drain
plywood wbp 12mm
connecting mounting Lenotec element
and Lignatur element

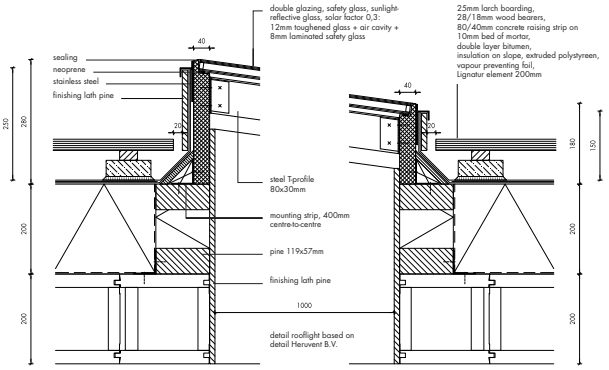

V01
pine 119x57mm
water hammer,
aluminium
electric plug for
outdoor screen
outdoor sun
screen, unrolled
condition,
detail based on
Schellekens &
Schellekens B.V.
Lenotec 190mm,
insulation between profiles 120mm,
vapour preventing foil, UV-resistant,
spacer pine, treated,
profile pine 28mm, treated,
facade elements 22x120mm, treated pine
mounting strip, 400mm
centre-to-centre
aluminium profile
reconstituted pine, 27mm thick
width ± 195mm
double glazing:
12mm toughened glass + air cavity
+ 8mm laminated safety glass


V02
water hammer,
aluminium
sill, plywood
wdp, painted
wooden block
for stability lintel
reconstituted pine 27mm thick
notch 5mm
suspended flooring screed 50mm,
floor heating,
waterproof film,
sound insulating foam 30mm,
Lignatur element 200mm
plinth, pine
strip 10mm
water hammer,
aluminium
pine 119x57mm
water hammer,
aluminium
outdoor sun
screen, rolled-up
condition,
detail based on
Schellekens &
Schellekens B.V.
Lenotec 190mm,
insulation between profiles 120mm,
vapour preventing foil, UV-resistant,
spacer pine, treated,
profile pine 28mm, treated,
facade elements 22x120mm, treated pine
notch 5mm
reconstituted pine 27mm thick
double glazing:
12mm toughened glass + air cavity
+ 8mm laminated safety glass


V03
water hammer,
aluminium
wooden block
for stability lintel
sill, plywood
wdp, painted
reconstituted pine 27mm thick
Lenotec 190mm,
insulation between profiles 120mm,
vapour preventing foil, UV-resistant,
spacer pine, treated,
profile pine 28mm, treated,
facade elements 22x120mm, treated pine
suspended flooring screed 50mm,
floor heating,
waterproof film,
sound insulating foam 30mm,
hollow core slab
plinth, pine
strip 10mm
GROUND LEVEL 1200-P
waterproof layer,
aluminium
insulation with
closed-cells, 100mm
toe board
insulation with
closed-cells, 100mm
hollow core slab, pouring
concrete on site
V04
insulation, 110mm


Lenotec 190mm,
insulation between profiles 120mm,
vapour preventing foil, UV-resistant,
spacer pine, treated,
profile pine 28mm, treated,
facade elements 22x120mm, treated pine
plywood wbp 12mm
steel L-profile
100x45m
Height difference ceiling
steel L-profile UPE 140
finishing lath pine
V05


25mm larch boarding,
28/18mm wood bearers,
80/40mm concrete raising strip on 10mm bed
of mortar,
double layer bitumen,
insulation on slope, extruded polystyreen,
vapour preventing foil,
Lignatur element 200mm
balustrade with vertical stiles,
mounted on corner profile
connecting mounting Lenotec element
and Lignatur element
rainwater drain
Lenotec 190mm,
insulation between profiles 120mm,
vapour preventing foil, UV-resistant,
spacer treated pine,
profile treated pine 28mm,
facade elements 22x120mm, treated pine
reconstituted pine 27mm thick
double glazing:
12mm toughened glass + air cavity
+ 8mm laminated safety glass
V06


double glazing, safety glass, sunlight
reflective glass, solar factor 0,3:
12mm toughened glass + air cavity +
8mm laminated safety glass
sealing
neoprene
stainless steel
finishing lath pine
steel T-profile
80x30mm
mounting strip, 400mm
centre-to-centre
pine 119x57mm
finishing lath pine
1000
detail rooflight based on
detail Heruvent B.V.
25mm larch boarding,
28/18mm wood bearers,
80/40mm concrete raising strip on
10mm bed of mortar,
double layer bitumen,
insulation on slope, extruded polystyreen,
vapour preventing foil,
Lignatur element 200mm
V07

spaces & places

openings & lines of sight

common heart

floor height difference

shelves & window sills

patios

relaxing

alcoves & openings

front facade

common dining room

workshop

roof garden

roof garden

day care

night view patio

rear square

8. Reflection & evaluation.

This chapter reflects on the graduation project 'The private house & the collective home: In search of privacy in dwelling'. It evaluates the research and design process and describes the main choices that were made in the research and in the design and argues their reasons. The first paragraph relates the project to the wider social context. It explains the motivation for the graduation project and shows the advantages of collective housing and the importance for widening the scope to collective living in housing. Also the design goal of the project is stated. The second paragraph describes the relation between design and research. It discusses the choice for focusing on the perspective of environmental psychology in the research. The first and second paragraphs are based on the introductory chapter and concluding chapter of this research. The third paragraph describes the research and design process. It shows the different steps that were taken and explains the arguments for these steps and the decisions that were made.

8.1 Relating project with wider context.

In 2009 a study of the Dutch 'Council for housing, Spatial planning and the Environment', named Living in space and time, defined new tendencies in residential living in the Netherlands. The study emphasized the need for a home environment that transcends to what the home environment currently has to offer (VROM 2009). In their report the council notes that people have a growing need to live with like-minded others. The reasons for this tendency are twofold. First, the council notes a strong decrease of the average household composition. Currently single households already inhabit 35 percent of Dutch housing (VROM 2009, p.29). In cities this number is even higher. Almost all Dutch housing is not set up for single households. As a result, many single

households live in transformed family dwellings. The second reason is the development of social networks that spread over long distances. Consequential people try to restore a residential community they feel more identifiable with by living with people with a similar lifestyle.

While the average household composition decreased, the average size of a dwelling increased. Dwellings became multi-functional. The house not only needs to facilitate in people's living, it also becomes a place to work and recreate. Both tendencies show a changing need from the current housing composition: Dwellings need to be highly multi-functional and house only one or two persons. With housing in the Netherlands mainly focusing on the private dwelling, the changing needs of housing cannot be afforded for.

A solution for the imbalance between supply and demand in housing can be found in (partially) organizing living with multiple people. Certain dwelling and daily activities are organized collectively. Multiple households share things together to afford the needs of each individual household. A collectively organized residential environment will create many advantages: 1) Sharing stuff, services and facilities makes the use of stuff, services and facilities much more efficient. 2) The space of each inhabitant increases, while at the same time the total amount of (costly) space is reduced. 3) By sharing stuff, space, services and facilities the cost of living can be enormously reduced. 4) Individual life is strongly improved through a high level of social cohesion and communal identity of the collective. 5) Living collectively enables numerous new divers and divergent possibilities for each individual. Together people can accomplish much more than by themselves.

While the need for housing for small or single households in cities increases, many cities do not know how to cope with a part of their current housing. Former social housing blocks that were built before WWII became too small, because of the need for bigger dwellings. Many cities, therefore, decide to demolish these social housing buildings to

make way for new buildings, without recognizing the potential of what already exists.

Both problems can be solved when existing residential buildings are transformed in more collectively organized residential buildings. A collectively organized residential building would minimize the need of the private dwelling, which makes it possible to transform the existing dwellings into new dwellings. The graduation project focused on this potential. It stated the following design goal: Designing a residential building wherein most of the domestic and daily activities of the inhabitants are facilitated in the collective space of the residential building, minimizing the activities facilitated by the private house.

8.2 Relating design and research.

In the project a residential building can be designed in where certain domestic and daily activities are organized collectively. The design goal of this graduation, however, tried to go a step beyond that approach. It intentionally questioned how far can be gone in collectivizing domestic activities, without diminishing the comfortable and controlled environment of every individual inhabitant. To succeed in this design goal it is most important to understand how individuals behave in the private and collectively shared spaces of the design. The research, therefore, focused on individual behavior in relation to the environment. The relation between people and environment is the field of study of environmental psychology. "The environment is here both the social environment (other people) and the physical environment (built environment and natural environment)" (Dorst 2005, p. 24).

Although communally shared facilities, space and services would create a higher level of communal identity of the residents than in an average residential environment, the inhabitants of the building still do not form one social network. Therefore, the research focused on the relation between the individual inhabitants. The field of environmental psychology emphasizes the relation between behavior and the (built) environment. Both

environment and behavior cannot be seen separately. The design of the built environment influences how people behave in the built environment. Similarly, the behavior of people influences the design of the built environment. The interaction between the environment and behavior shows that common behavior can define rules for the design of the built environment.

The most central process of people's individual and social behavior is people's privacy behavior. It defines the social interaction individuals have with others. When creating a collectively used space it is thus very important to understand the privacy needs of the individuals using that space and the way in which the individuals control their desired levels of social interaction with others. Therefore this research focused on people's privacy behavior. This defined the project goal: Designing a residential building wherein most of the domestic and daily activities of the inhabitants are facilitated in the collective space of the residential building, minimizing the activities facilitated by the private house, wherein the private and collective space and places of the residential building can afford control of the desired level of privacy of individuals to achieve their desired level of privacy.

The project goal implied a common understanding of the behavior of individuals in the environment. Part 1 of the research investigated privacy behavior based on literature in the field of environmental psychology. The literature research showed that control of the desired level of privacy of individuals has much to do with the boundaries that the built environment affords people. Therefore, part three investigates the physical and architectural elements that could be used in the design to afford the desired level of privacy of the inhabitants. The project goal also demanded to investigate the dwelling and daily activities that people perform in the residential environment. According to a research of Meesters (2009) the main dwelling and daily activities were distinguished and investigated in part two of the research.

To challenge the many design problems during the design process, the design was

decomposed into single problems. Every single problem was solved looking at the relation between privacy behavior and the built environment in a particular context. The solution was built up as an instruction and did not need to be followed one to one, but served as an important guideline to solve the problems in the design. Every single problem-solution entry forms a design pattern. To compose the research framework in a useful and organized way for the design, the outcomes of the second and third part of the research are written in a pattern language.

The concluding chapter relates the research on privacy behavior to the design of the residential building and shows how privacy behavior should be taken into account to succeed in designing a residential building in where most of domestic living is collectively organized. Three statements were formulated that define the design of the residential building from the perspective of privacy behavior. Summarized, the residential building needs to have a multiplicity of spaces that are clearly demarcated by physical and architectural boundaries and range from the most intimately private domain to the most communally collective domain. During the design process the three statements were translated to the physical context of the existing building by means of five design steps. The five design steps were implemented in a non-chronological order. During the design process all three guidelines were used multiple times to improve the spatial layout, the structural layout and the organizational layout, in a continuous process of adjustment and improvement.

8.3 Design process.

In this paragraph I explain the process of the research and the design of my graduation project. It was a process of many struggles. I think it is very important to state these struggles and show the different steps and difficulties I faced during the process.

The graduation project started in the first week of September 2014. Although I thought my design goal was quite clear, it took the whole first period to frame the research and

the design. The choice for the building originated from flyers that were hanging behind windows in the neighborhood of a friend of mine, which were protesting against a proposed demolition of the building. The decision to do a transformation project was already earlier made. My first intention was to make a redesign of the former Noordsingel prison in Rotterdam, but after consultation I decided to move my focal point to existing social housing projects. With the contextual situation known, it was easier to define the boundaries of the research, although the goals of my research remained way to ambitious the first couple of weeks. I rewrote my proposal four times, which helped me a lot to pinpoint the research and design goal of the project. During the midst of the first period I was pointed to a lecture of Machiel van Dorst about environmental psychology that was part of a lecture series of Explorelab. This lecture series inspired me and made me enthusiastic about the field of environmental psychology. After reading multiple articles I was able to draw a more framed research that I proposed to Machiel van Dorst. He directed me to Egbert Stolk. After an interesting first meeting I decided to focus my research on privacy behavior in the built environment and would create a design in relation to privacy behavior, by creating a useful research framework for the design of the residential building. I read multiple books in the field of environmental psychology. Particular the books of Hall (1966), Sommer (1969) and Altman (1975) were of major help to the research.

Although a collectively organized residential building fascinated me for a long time, I found it difficult to state the design goal clearly. In a very helpful meeting Henny Cooleen of OTB (Onderzoek voor de gebouwde omgeving) showed me the theory of affordances. He gave me the research of his former PhD, who had done research on the meaning of activities in the dwelling and residential environment. This research showed me the importance of the connection between behavior and built environment. Already early on in my studies it had bothered me that the design mainly originated from the program of requirements, which focused on the functions within the built environment, while ignoring how these functions would be used by people and would influence the behavior of people. For instance, the requirements of a common dwelling were a bed-

room, a living room, and a kitchen etcetera. These spaces had to have certain minimal physical requirements, but nothing was said about how people would use the particular spaces. The research on the meaning of activities and the theory of affordances gave me this link and broadened the fixed perspective on functions to a more informed perspective of affordances in dwelling. I decided to approach the design goal from out of the perspective of the domestic and daily activities that are performed in the dwelling and residential environment. To give the project a more experimental character I proposed to go as far as possible in collectivizing the activities performed in the dwelling, thus defining the design goal.

The domestic and daily activities could be drawn out of the research of Meesters (2009). I wanted to connect these activities with the research on privacy behavior. Egbert Stolk showed me that a very good way to do this was by the use of patterns. By creating a framework of patterns the research could give solutions for each design problem that would be faced in the design, which would strongly connect the research with the design. At the same time the use of patterns would structure the main parts of the research.

As previously mentioned, the theory of affordances showed me the strong connection between behavior and built environment. One part of the research would approach the design from the perspective of privacy behavior and dwelling and daily activities defining the built environment. But I also wanted to approach the design from the perspective of elements of the built environment that influence privacy behavior. During my studies the focal point of architecture had always been on the structural and esthetical properties and qualities of architectural elements. The research on privacy behavior, however, showed me the importance of people to be in control of their privacy through, among other things, controlling the use of physical and architectural elements in the built environment. For this research I thought it would be very interesting to look at physical and architectural elements from the perspective of privacy behavior. I draw up a list of elements that would probably be used in the design. This resulted in the

framework of patterns that defines part two of the research.

Until the P2-presentation I was mainly occupied with literature research on environmental psychology, because I did not know anything about privacy behavior. I wrote the main part of the patterns that would form part two and three of the research. This was an enormous amount of work, because there were quite many patterns that needed to be defined. Therefore, I had to compromise in validating the patterns scientifically. Although the patterns are formulated around the research on privacy behavior they are mainly based on assumptions. The choice for this approach was intentional. From the start of the project I wanted the research to strengthen the final design of the building. The research, therefore, needed to give as many solutions for the potential design problems as possible. Limiting to scientifically validating the patterns would mean that much less patterns could be dealt with, so that a lot less solutions could be found.

For the P2-presentation I created the first guiding concept and defined ideas about the design. It took me a long while to translate my ideas about the collectively organized residential building to an actual design in an existing building. Besides that, the existing building turned out to have many limitations in itself. Particularly the façades surrounding the courtyards and the basements of the dwellings gave major problems and technical difficulties. Besides, I wanted to create as many (private) dwellings as possible, while still creating a nice collective environment. Off course, these goals contrasted each other. For the P2-presentation I designed a concept that I was fairly pleased with. It was, therefore, a bit of a disappointment to get the feedback of Robert Nottrot, my design mentor, that the design did not feel right to him and lacked the ambitions that I wanted to pursue. Two weeks after the P2-presentation I finally understood his critique and created a different design concept, based on many studies I did on Japanese housing projects. I created a concept of blocks that would seemingly random fill the former courtyards.

I was enthusiastic about the concept at first. It created interesting spaces and was more

related to the research on privacy behavior. However, without a clear structure the concept was difficult to grasp in a translation to the actual design. For weeks I remained moving the blocks around, without having a clear idea of how to solve the particular design problems that arose from the concept. With the weeks passing my enthusiasm for the concept diminished every day. Just before the P3-presentation I had lost my enthusiasm for the concept and for the project in general. I presented the concept, but it was unconvincing. After the P3-presentation I could not find much motivation for the project. I was totally not convinced of the design, but I did not know how to tackle the problem. I forced myself to continue working, having the idea that spending enough time on the project would eventually lead to a good design. This was a major miscalculation. At a certain point half way to the P4-presentation I was completely blocked and felt horrible. I didn't sleep well, avoided the architecture school, and couldn't motivate myself for anything; even relaxing became tiresome. I finally stepped back from the project, took some days of and talked a lot with my friends and my family. This helped a lot. Releasing the pressure of the project gave me new insights about the design again and I eventually made the decision to change the design concept completely. I started again with new ideas.

The first weeks after this period were difficult. Every idea I had I immediately rejected again. The whole situation had made me extremely insecure about my capabilities. I stayed at my sister's place for two weeks. She and my mother and father pushed me to continue working on the project and cope with my struggles. This helped me a lot and I am very grateful to them. I finally created a concept that I was pleased about and within a short period of time I designed the collective spaces of the building. Each part that I designed successfully gained me confidence and enthusiasm in the project. I managed to finish the main parts of the design before the summer holiday.

The whole situation taught me a lot. One of the main lessons for me was to relax more. I started to cycle a lot and consciously take brakes or stop working in the evenings. At least one day of the weekend I didn't work on the project at all. The second lesson was

the importance and usefulness of the help of other people. During the project I kept most of the project to myself, not discussing the design or research problems with others. After my P3-presentation I became a lot more receptive for critique from others and the threshold is much lower to ask others for help.

Because I changed my concept I was quite far behind on schedule. I worked on the design until the beginning of the summer holiday, but still much had to be done on the design and I hadn't finish the research. I decided to continue working during the whole summer holidays and retain a strict weekly schedule on when to work and when to be free of work. This turned out great. The first month I worked on the research. It still lacked a coherent storyline; I had only completed part 1 and part 2 and the main part of part 3. Early on in the project I had chosen to alternate between the research and the design, so to exchange between the design problems and solutions from the research. This didn't turn out to be very optimal. The design took up much of the time between the P2 and P4 period, so I was not able to do research on new patterns. At the same time, the unfinished research kept following me during the process, not finding the time to finish it. The conclusions of the research I eventually wrote in the summer holiday after finishing almost the whole design. These conclusions made clear what was lacking in the first and the second concept of the design. It is always difficult to reflect on the improvements of a process, but I think it would have been better if I had drawn up the conclusions of the research earlier. This would have made the translation from research to design a lot easier and probably would have given more guiding structure to the design process.

The last meeting before the summer holiday Egbert Stolk helped me a lot to frame the final parts of the research. He pointed me to the structure of the PhD research of Machiel van Dorst, which helped me a lot to write and organize the introductory and concluding chapters of the research. In a meeting in August Egbert Stolk convinced me to write a fourth part of the research that would connect the research with the design. Although the limited amount of time became a problem I am very glad to have written

that part.

Altogether, I can state that I had many struggles during the research and design process. However, I am very pleased with the outcomes of both the research and the design.

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Appendix 1 - Learning from cohousing.

When I first started researching about the possibilities of a collective residential building, I was very much opposed to looking at the cohousing models formed in Europe and the United States. In my perception these models were created on the idea of an all-encompassing communality that transcended the way the average inhabitant would want to live. I related these projects directly to the intentional communities I had read about in the book Communities and Commitment (Kanter 1972) showing communities that were escaping from society to live in a desolated rural area. My thoughts about cohousing turned out to be a prejudice. Other than I had expected to, cohousing, an abbreviation of collaborative housing, turned out to be a great inspiration for defining a new way of domestic living that would incorporate multiple household in a single community.

The idea of the first cohousing project was initiated in the sixties, when a group of friends shared their frustration about their isolating way of living in the neighborhood. The (suburban) dwelling did not allow for any interaction with the surroundings and the urban dwelling was too small to facilitate the divergent needs of the family. They realized what kind of advantages they would have when they would live in a community in where they could share certain domestic facilities that already needed to be incorporated in every private dwelling. In 1972 the first cohousing project was initiated in Denmark. From then on many cohousing projects would follow, and not only in Denmark. Its popularity spread through the European countries and was also embraced by groups in the United States after McCamant and Durrett had written a well-researched book about it (1988). Especially in the Netherlands the cohousing projects from Denmark became a strong inspiration for many projects that followed from the seventies onward, and were defined as 'collectief wonen'.

The cohousing projects are bound on the idea of increasing the amount of social interaction in the home environment. All the households of the community share common facilities. The common areas encompass a kitchen, playing areas, a dining area and a laundry room and may also contain workshops, a guest room, a library and a small recreation room. Although social interaction is emphasized, every household has its own private dwelling, in where the domestic family life takes place. These dwellings are mostly of more limited size than the average dwelling, but still facilitates in all domestic activities. By both emphasizing on the common area and the private area, residents of cohousing projects can choose the amount of communality they have with their neighbors.

Analyzing the founding of new cohousing projects shows the skepticism people have anticipatory to the projects initiation about them sharing functions. Although many facilities were defined for common use, cohousing projects keep the possibility for privately organizing these activities. When the residents eventually take up residents in the community they denote their surprise about the little amount of times they would need their own privacy. Many projects show for example that their residents would only eat their meals in the communal kitchen, although a private kitchen is facilitated for.

The amount and divergence of existing cohousing projects would encompass an interesting, but very time-consuming case study research aside of this research. Where I will continue to focus on the spatial organization of the residential building there are certain things that can be learned from cohousing and that need to be thought of when designing the collective residential building. Housing touches on people's most intimate domain of the built environment and therefore its inhabitants need to have a high level of control over it, much higher than in any other building where collective or public life takes place. For everyone to live comfortably in a residential community divergent desires need to be met and incorporated. Residents value things differently and put more emphasis on what they think is important. Most importantly, to create a residential environment in where a person feels at home, the person needs to feel safe and identifiable

with the environment he or she is living in.

Although most cohousing projects in Denmark and The Netherlands turned out to be a great success, they show the struggles and downfalls of creating a collective community and the difficulties of living in one. There are a couple of aspects that need to have more attention, when designing a collective residential building.

This first is the negative association people have with collectivity. When I explained the idea of a collectively used residential building to others, what struck me were the negative associations people have with collective living. Every time I needed to convince people of the fact that the idea of a collectively used home environment had many advantages and the collective environment would not surpass the private dwelling. The residents of the cohousing projects were similarly confronted with suspicious reactions from the municipality, planning commissions and surrounding neighbors. People were anxious that strange and peculiar people would take up residence in the environment. They feared this would negatively affect the neighborhood and would cause housing prices to drop.

At the same time people are very suspicious of collectively sharing activities of their domestic life. Although in the city they continuously spend their time among others, privacy has the exclusive right in the dwelling and home environment. People retain to the convention that everything needs to be privately owned and controlled within the dwelling. The members of the cohousing projects feared collective organization would cause them to be forced into communality, thus dismissing their need to be alone. At the same time people have many false assumptions about the trustworthiness of others, which makes them skeptical about sharing their space, facilities and services without imposing strict rules.

Participation and management.

Other than intentional communities or communes, in cohousing there is no hierarchical organization formed around a charismatic leader that holds the group together. There are no ideological beliefs underlying the origin of these communities, other than a strong belief in a more communal home environment. Their participation is defined on a high democratic level. Residents initiate and implement the cohousing projects themselves. They start the project based on enthusiastic ideas that finally results in its execution, followed by the initiators taking up residents. Although there are some examples known wherein Housing Corporations participated in the initiation process, still the residents take the lead in its implementation. The realization of cohousing projects takes up a lot of time and energy of its future residents. They are bound to each other from the first phase onward and beyond the moment they start to live in their new home environment. Research on certain cohousing projects shows a difficult and time-consuming process, in where all the divergent needs, desires and interests of the participators need to be met.

In this way the design can be accustomed to the desires and interests of the residents. But not all desires can be met. During the initiation process some early adaptors will step out because of disagreements and others will enter. The different projects show a distinction in the way they are initiated and worked out, ranging from more emphasis on the private to a high level of communality and collectivity.

Occasional meetings define the progress and developments of the community. Disputes and problems are discussed and solutions are found through democratic vote. These decisions need to be acknowledged by everyone, including to those who are opposed. Individuals or committees are responsible for particular aspects that need to be taken care of, such as maintenance and finance of the community. There is a common budget to which every household pays his share. The residents of the community need to take responsibility for the continuation of the residential environment. When buildings need

maintenance, the residents have to pay for the repairs themselves and activities need to be well organized or else they cannot be advantageous to anyone. The cohousing projects show the need for clear rules about its management. Residents need to compromise and work together.

Responsibility, ownership and conflict.

When space and facilities are shared collectively, the responsibility about these spaces needs to be defined. Many cohousing projects determine the responsibilities of their members through agreements, which are signed by all individual households. But it is difficult to force people into certain responsibilities such as monthly meetings or common cooking. Some cohousing projects reduce the monthly fee of members that participate more in the work that needs to be done in the community, but these examples are not common. Most cohousing projects simply accept a lower level of participation of certain members. Residents can choose not to participate.

Even when rules about responsibility are well defined, still residents feel that they do more than their share and others do less. An example from Canadian cohousing shows a member who became frustrated about certain members that didn't maintain the garden as they were supposed to do. This resulted in frustrations between the members and finally in him taking up all the work (Rodman & Cooper 1996). Situations such as these cannot be prevented. The problem of people lacking or overcompensating in their responsibility always occurs when dealing with a group. But many frictional situations can be prevented when on forehand restrictions are drawn up for every individual member. "Everyone has the desire for a lot of personal freedom, but somehow it's got to be balanced within the context of the group being strong." (Fromm 1991, p. 251).

But not only conflicts about individual responsibility are likely to occur. A more communal and intimate relation between residents will potentially lead to more conflicts among members. Such as their members, the conflicts in cohousing projects are very

much divergent. They range from problems through miscommunication, ownership, personality and values. At the same time members will have different expectations on the community. Some demand a high level of communality, while others want to remain more on their own.

The collective space of the residential environment is seen as an extension of the members' own private space. For many members the demarcation between both is vague and not very much well defined. Although these spaces belong to everyone, people feel more ownership and responsibility to certain spaces, especially the spaces close to their own dwelling. The cohousing projects therefore include a hierarchy of spaces and uses. Not only is the environment divided in a private space and a common space, but also there are in-between spaces that are used by smaller groups, and form a transition between the private and the common.

Because divergent members live in a cohousing project, the community has to do with many divergent personalities and values. For example, some members will be more outspoken than others. This becomes a problem in the meetings, in where some members will feel being overruled by verbally powerful and more decisive others. Cohousing projects tackle this problem through the formation of smaller committees, in where people feel more at ease to have their say. Still, for a community to function for every member, it is important for all the individual members to speak up. A member of a community in the United States stated this in a most particular but clear way: "It is always hard to tell your friend he has a bad breath, but if you keep it to yourself you will begin to hate him and wish he would go away... We began to criticize each other... This brought us closer together" (Kanter 1972, p. 38). People will have different feelings on their level of participation within the community. Some members find the every member needs to spend a lot of time and energy in the community and others will feel more involved in the day-to-day requirements. The community cannot become one big family and it is important not to tend towards such a kind of community. Different participatory levels should be tolerated. Still members' commitment for the community is an important

aspect of every cohousing project. Without any, the cohousing project will slowly disappear.

Conflicting values most often occur about the level of rules and restrictions that the community imposes. Some find these restrictions too much and others find them to limited. Within cohousing projects especially value conflicts occur about children. Parents raise their children differently. Some parent favor strict rules, where others are strongly opposed rules and restrictions. While children grow up their behavior remains a continuous problem, which are difficult to resolve. Similar value conflicts occur about cleaning. What some find clean enough, others will find dirty and messy.

Although many conflicts will occur in a collectively used residential environment, they finally have to find a solution. But this does not mean that every member has to become a friend. Members will draw more to some members and will feel having less to do with others. All cohousing projects show that when people get to know each other better, the number of conflicts will reduce. Common activities therefore are important to overcome differences and misunderstandings. Living in cohousing needs a high level of tolerance of its members and needs its members to compromise. Still some members will continue to be in disagreement or won't get along. With many people living in the community, this turns out to be acceptable in cohousing projects.

Intentional design of the built environment.

The emphasis on group communality make cohousing projects more secluded from the surroundings than common housing. The collective domain takes over the public domain of the neighborhood's streets and squares. Although cohousing projects are not physically isolated from the public domain, as is the case in gated communities, the collective domain can feel very much inaccessible for outsiders, through the use of corridors, bridges and green. But also without any use of physical elements outsiders can feel a threshold for entering the domain. The inhabitants more easily feel their co-

housing environment as being their territory, which not only is unconsciously signaled to outsiders, as well being perceived by them.

It cannot be prevented that the collective domain of cohousing projects takes over a major part of the public domain. These projects mainly focus towards the group through the presence of common areas and facilities. However, certain design decisions can limit this situation, by bringing in the public domain into collective space, thus blurring the boundaries between public and collective. For example, one cohousing project created a path through the cohousing area that connected a local residential neighborhood with the nearby primary school, so that the children and their parents passed through the cohousing community. Through the use of a simple path social interaction and gathering started between members and neighbors. When opening the collective domain of the cohousing project it is, however, important to maintain the domain of the collective group, so that the residents do not feel that outsiders are intruding 'their' space. Therefore, a more effective way to bring in the public domain in the residential environment is by creating specific facilities that can be shared by the collective group and the public. This will blend members from the collective group with residents from the surrounding neighborhood, thus not only benefiting the group, but the whole neighborhood. The Vrijburcht building in Amsterdam-IJburg, designed by Hilde de Haan emphasizes on this idea. Among others, a day care facility, a restaurant/coffeehouse and a theatre are included that are used by both residents of the building and inhabitants of the surrounding neighborhood. In this way the community of Vrijburcht becomes connected to the neighboring community.

The common area is the heart of the cohousing community. Here, space and facilities are collectively used, which benefit the residents both practically and socially. A workshop, for example, replaces the need for space and tools in the dwelling. Through the reasonable sized space divergent hobbies can be performed. Residents can maintain and clean private and collective stuff, fix their furniture or work on their bicycles and cars. Expensive tools and machines can be afforded for, because cost of purchasing can be

divided over multiple households. Residents not only can enjoy the use of common tools and facilities, they also enjoy the company of others that are using the workshop or just passing by. The common house is always visually connected to the main circulation area. In this way residents can see whether others are present Residents have to pass the common house during their daily activities and when entering and leaving the community. Because they have to pass the common house on their way to or from the dwelling, it becomes a daily routine to visit it.

"Physical design is critically important in facilitating a social atmosphere. Whether it succeeds depends largely on the architect's and the organizing group's understanding of how design factors affect community life. Without thoughtful consideration, many opportunities can be easily missed" (McCamant & Durett 1988, p. 38).

The presence of common areas and facilities creates a high level of communality and social interaction. Meetings are much more likely to occur here. It is therefore very important to design these spaces related to the common circulation areas of the community. Cohousing projects are designed to increase the possibility of social interaction among the residents and encourage a sense of communality. The private dwellings face a street or courtyard that is collectively used. These streets and courtyards promote social encounter. Residents of many cohousing communities often complain about the decrease of social interaction during the winter or cold periods. In these periods people cannot sit outside and having to put on their shoes and coats to be social is too much of a threshold, thus greatly reducing the use of the common house in periods of bad weather. Some cohousing projects have taken away this problem by implementing a covered interior-street, which makes social life possible around the year. Here children play and people drink their coffee or have a talk.

The way the areas between the private dwelling and common areas are treated is as important or even more important than the dwellings and common buildings. Well functioning cohousing projects contain a hierarchy of spaces that run from the private

domain of the dwelling to the communal domain of the common areas. Transitional zones form a sequential variation, starting from the private dwelling, to the semiprivate front area, to the semipublic street, courtyard and common house, finally ending in the public domain. When these transitions are not clearly defined the use of the collective space becomes ambiguous, thus not allowing for divergent activities and relationships. The transitional spaces are formed by physical demarcation, although these can be as subtle as a difference in floor height or materialization. When residents have direct access to the common areas, its use increases significantly. People will 'flow' more easily between inside and outside and between private and common areas.

Within the collective space of cohousing projects there is a variety of spaces to meet and gather. Through the difference in intimacy different groups will make use of them, which increases the amount of communality. Many residents are anxious that the presence of local gathering spaces would create cliques within the community. However, these local spaces turn out to benefit the whole community, because they bring in residents into the common domain. At the same time it is only logical that residents will know their direct neighbor more. Besides local gathering places there is a common area for larger gatherings, which people need to pass when coming from or going to their dwelling.

Although cohousing projects emphasize on a high level of communality and collectivity, people still want to spend a big part of their time in private. The best thing that can be learned from cohousing projects is that they search (and find) a balance between privacy and communality. A resident of one cohousing project formulates the importance of this balance most clearly:

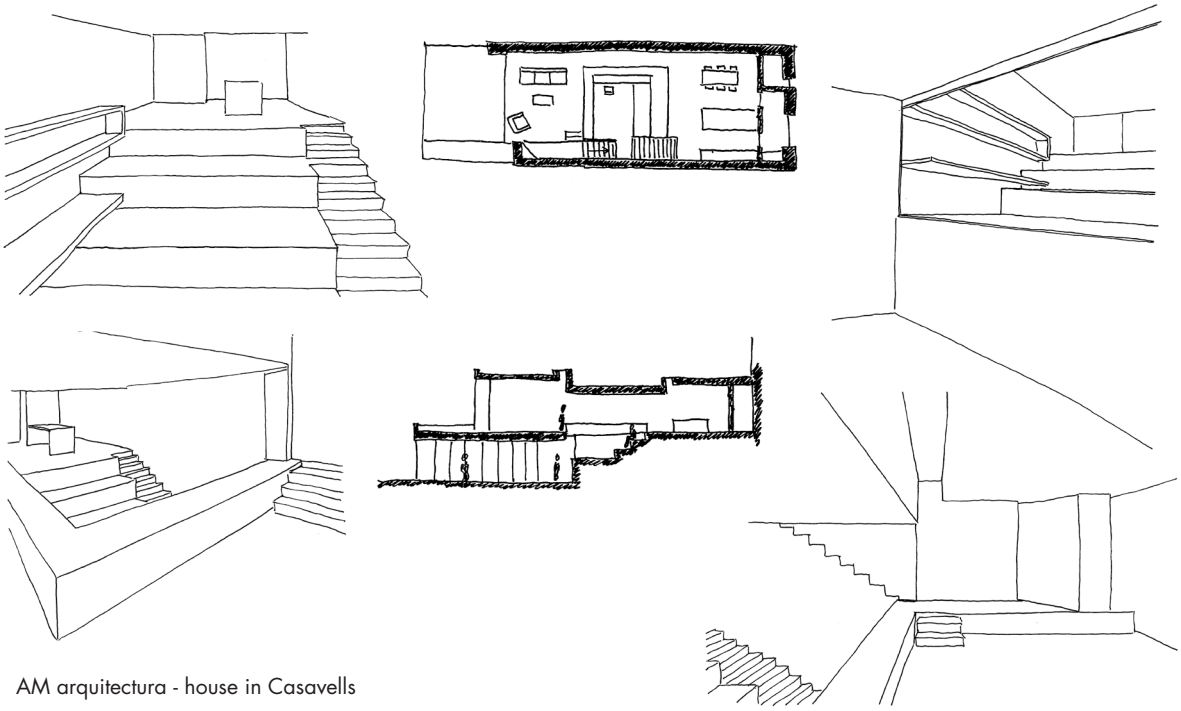
"The beauty of cohousing is that you have a private life and a community life, but only as much of each as you want" (McCamant & Durett 1988, p. 187).

Cohousing projects thus learn that only when both social interaction and privacy are

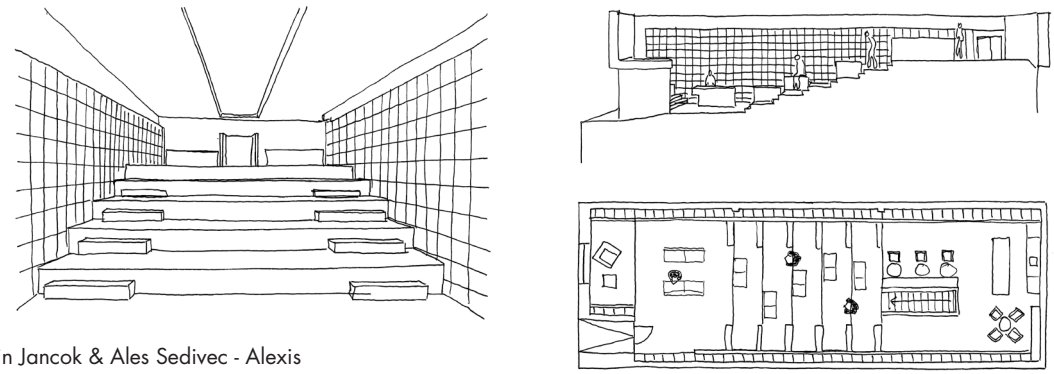
facilitated for, the residential building can be advantageous for future living:

"A large share of man's activities are social, but they ultimately, however practical and outgoing, have their source in privacy" (Chermayeff & Alexander 1963, p. 16).

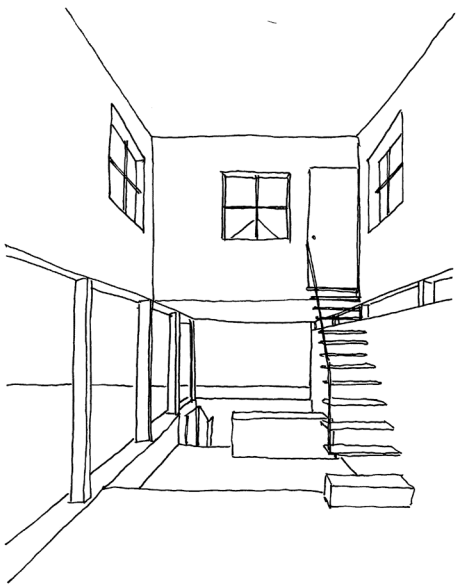
Appendix 2 - Studies



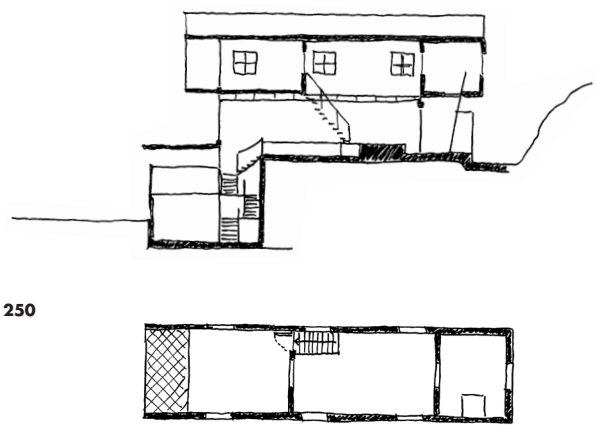
AM arquitectura - house in Casavells

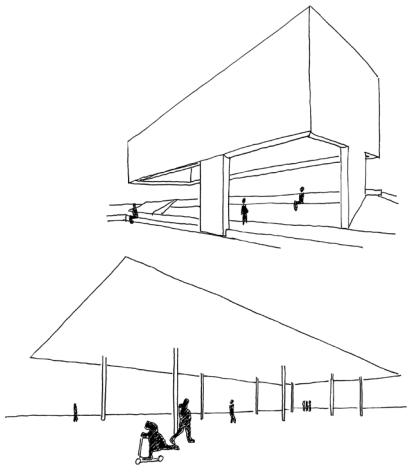


Martin Jancok & Ales Sedivec - Alexis



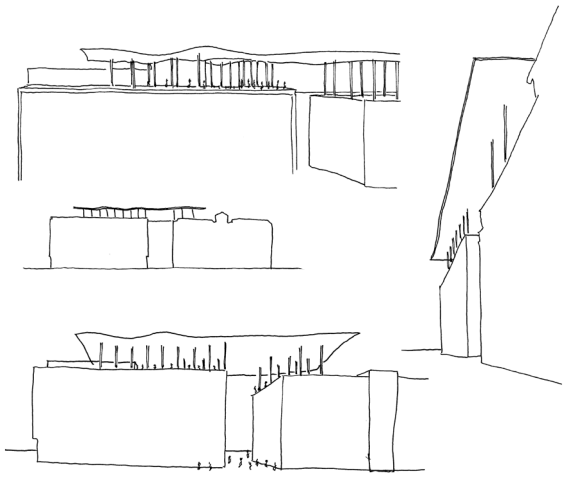
Tato architects - House in Ishikiri





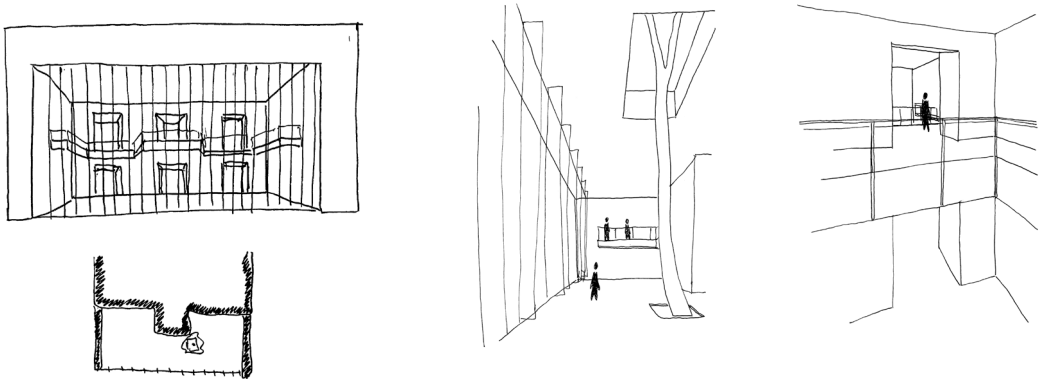
Cooper Joseph - Webb Chapel park pavilion

Foster + Partners - Vieux port pavilion



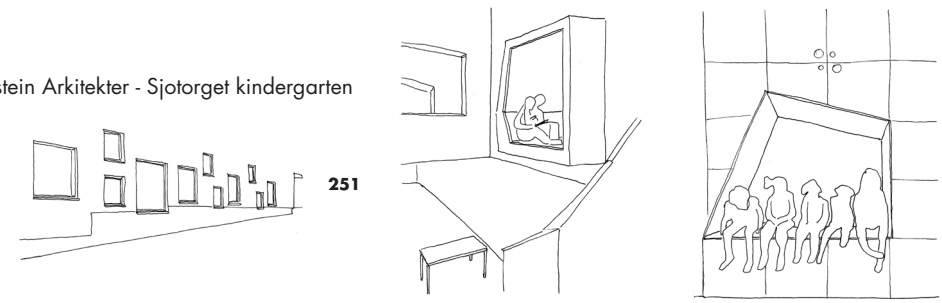
Jacobsen Arquitetura - Museu de Arte do Rio

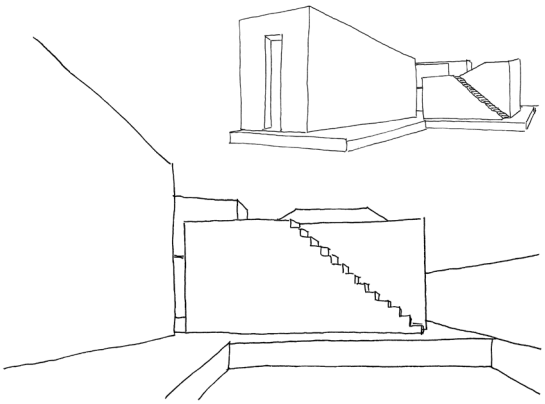
ON Design - House with empty lot



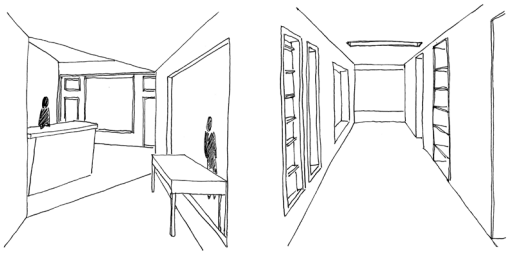
Fernanda Canales - Elena Garro cultural centre

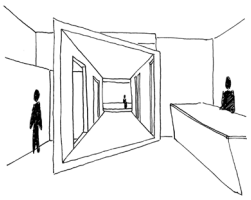
Rotstein Arkitekter - Sjotorget kindergarten





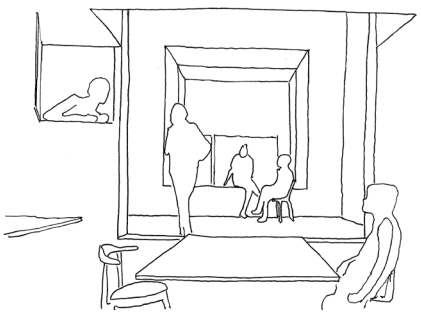
OAB - house Two

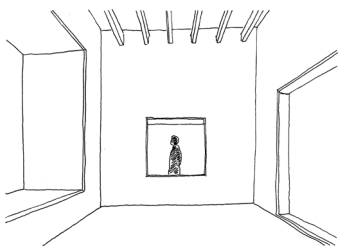


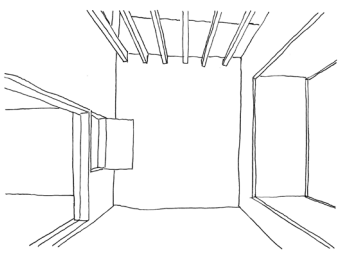


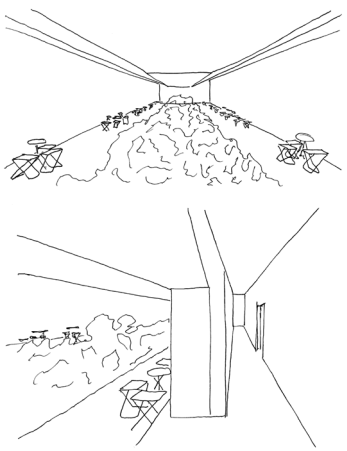
Freeks frea architects - Heliocosm

Maio - studio renovation

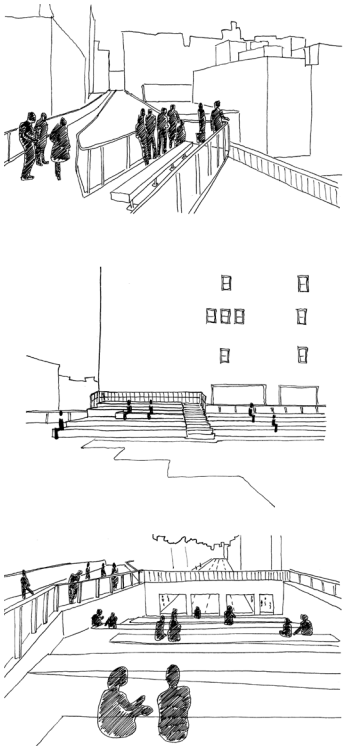






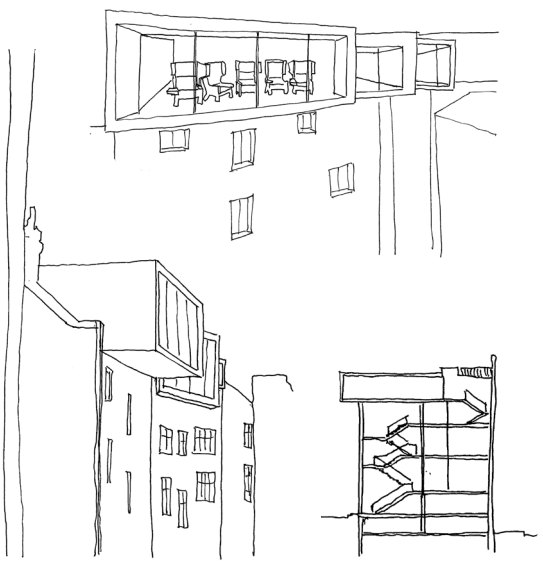


Zumthor - Serpentine pavilion



Diller Scofido + Renfro - High-line park

Exploration architecture - Passage de la Brie



McCullough Mulvin Architects - Dublin