

An architectural rendering of a modern, biophilic multifamily house. The building features a complex, organic form with multiple levels, terraces, and balconies. It is surrounded by lush greenery, including trees and grass. The design emphasizes integration with nature, with large windows and outdoor spaces. The text is overlaid on the central part of the image.

HEALTH-PROMOTING MULTIFAMILY HOUSE

A new biophilic house design in Gothenburg

A master thesis by Dragana Stefanovska

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Gothenburg, Sweden 2019*



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Abstract

The technological progress we have seen in the last years and all the things that we regard as normal today are of relatively recent origin and our brains are not ready for that. Now more than 50% of human population live in the cities, which was never like that before. The rapid urbanization contributed to an increasing disconnect between people and nature in the built environment. The consequence is mental disorders that affect one in four people. ("How The City Affects Mental Health," n.d.) Mental health illnesses are a big issue not only globally but in the Nordic countries as well.

At the same time, architects became more aware of the positive effect nature can have on our health and well-being if integrated in the designs. There are few theories that discuss the healing aspects of nature. According to Roger Ulrich (1991) in the Stress Reduction Theory, nature has qualities that are lacking in the built environment and can decrease stress, improve productivity and creativity and avoid the risk of sickness and disease. Parallely, it seems that building design can provide opportunities to promote health and well-being but it is mostly used in healthcare settings. Therefore, it is of great importance that we take this knowledge into consideration when designing spaces for living and working.

This master thesis aims to propose a new standard multi-story housing, which will promote good mental-health and well-being inspired by the tools of biophilic design and health-promotion principles. Health-promotion principles are interpreted through nature exposure where accessibility to green spaces is the focus.

The house design and the layout are flexible in order to adapt to the changing needs of the tenants. The target groups are different generation groups, which creates good social environment and a vibrant city.

The main objective in the thesis is to raise a discussion about how housing design can promote good mental health and well-being. There is a need for further research on how good housing architecture can be enriching and how it can provide attractive and calm environments.

Keywords: mental health, health-promotion, biophilic design, housing

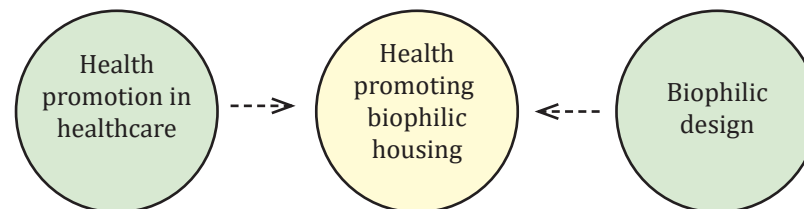


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Aim of the design concept: To create environments that encourage healthy behaviours, promote health equality and reduce stress among different target groups.

Source: <https://blog.interface.com/what-is-biophilia/>



Building plot for the
design proposal



Fig.1 Carlandesplatsen area

INTRODUCTION

INTRODUCTION

Health-promoting multi family house

The starting point in the project was my personal interest in health-promotion and nature influenced design. Additionally the issue of growing number of mental health illnesses made me think about what I as an architect can do something about it. I believe that most of the time we focus only on the illness (pathogenic approach) and we do not think a lot about what makes us healthy (salutogenic approach which includes health promotion). My theory is that well-designed house can promote good mental health and have lower impact on the environment. This master thesis aims to work with architectural qualities that can contribute to better health of the residents.

Access to nature (visual and physical)

One of the focuses in the project was access to nature. The aim was to develop the floor plans based on access to nature. The sloping landscape provides opportunities for open views. Different context, urban in front of the site and the natural environment in the back allowed to have different housing typologies which makes the housing design more attractive.

Target group

Since the main theory in the project focuses on what makes us healthy (salutogenic approach) instead of what causes the illnesses (pathogenic approach), there are different target groups in the project. Different target groups can benefit from living and interacting with each other. It is also good for social sustainability.

Method

After analyzing the concepts of health-promotion and biophilic design through studying literature and reference projects. four design guidelines were created: natural light and orientation, visual access to nature, social spaces and relation to context.

Since buildings contribute to the environment pollution, it is important to think about the future of the house. Additionally the green site requires careful investigation of the site. This led to careful site investigation and construction choice. Because of this, the typology of two buildings with shorter facades towards Carlandersplatsen was chosen so the site feels still open for everyone and have efficient footprint. For the construction, a timber skelet system is planned which is a lightweight construction. Glass facades allows for best lighting conditions where every room in all apartments get enough natural light.

Delimitations

The municipality is planning to build two houses on this site and this is the main reason why it was chosen. The focus was not to choose an appropriate site for the concept but rather to investigate already planned development. The central location and the greenary nearby makes the site charming.

Nature-human connection

Today we can see an increasing disconnection from nature in the built environment. Rapid urbanisation and the technological progress change the way we live, work and rest. This led to stressed city life and increased mental health illnesses.

Few theories such as the Attention Restoration Theory (Kaplan 1987; Kaplan and Kaplan 1989) and psychoevolutionary theory (Ulrich, 1983; Ulrich et al., 1991) suggest that the healing properties of nature can improve health and create health-promoting environments. Nature provides settings where an individual can restore the ability to concentrate and allow him/her to recover from stress (Kaplan, 1987).

If nature can improve health, how architects can make nature-human connection stronger?

This is an important question because it is obvious that there is a need for architects and landscape designers to take this knowledge into consideration when designing. With our work, we affect the health of city dwellers. If we take into consideration human needs, we can create less stressful and more restorative environments. There are many tools we can use to integrate nature into the built environment and biophilic design is one of them.

It is a design based on the hypothesis that humans and nature have biological bond and exposing people to nature environments can bring health benefits to them. Biophilic design and health promoting principles will be investigated further in an urban context in Gothenburg.

Carlandersplatsen-an attractive city area

An interest for developing Carlandersplatsen and Renströmsparken was shown by Gothenburg University in order to provide more suitable premises for the university and also better accessibility. They have also shown an interest to possibly being able to provide student housing next to the university. The real estate office wishes to develop more housing in the same detail plan as the one for the university. This is where the master thesis proposal is planned, next to the university. The municipality also has a priority to build more housing and densify the city. At the same time, Gothenburg municipality mentions that access to parks and nature areas is of great importance for the future city developments.

Access to parks and nature areas is an important focus in the thesis proposal. According to a case study done in nine Swedish cities by Patrik Grahn and Ulrika A. Stigsdotter in 2003 accessibility is one of the most important factors for people to visit more often urban open green spaces. If we design green spaces within the built environment or close by, people will use them more. Implementing green spaces in housing has many benefits for the tenants and the main benefit is that people will have more opportunities and will be encouraged to physically and emotionally restore on daily basis which will lead to decreased stressed levels.

In this thesis proposal, access to parks and nature areas is implemented through indoor and outdoor nature exposure. On the last level on both houses there is public roof park which consists of public kitchen with an open terrace and urban farm which will be a space for cooking, urban farming and social interaction between the tenants and other people.

Role of this master thesis

Today there is a growing research on nature benefits and health promotion but only in the healthcare area. This is a reason why I chose to work with the issue of growing mental illnesses within housing setting. There is a need for further research on how housing where we spend lot of time can help us cope with the daily stress.

If we look at history, stress used to be part of everyday life of people but they used to live in balance with natural environments. On the other side, we as architects are aware that we need new housing typologies. This is because we tend to design universal housing designs which not always fit someones different needs and because we do not know how people will live in the future.

This master thesis proposal aims to raise the discussion about the role housing design can have in health promotion and suggest a new housing typology where humans and nature are in balance.

Definitions

Health, health promotion and biophilic design are used often in the thesis proposal. They are defined as:

'Health is the ability of an individual to achieve her/his potential and to respond positively to the challenges of daily life. (Lawrence,2004)

'Health Promotion is the process of enabling people to take control over their own health' (WHO,1984)

Biophilia is the inherent human inclination to affiliate with nature that even in the modern world continues to be critical to people's physical and mental health and wellbeing (Willson 1986, Kellert and Willson 1993, Kellert 1997,2012)

Main questions

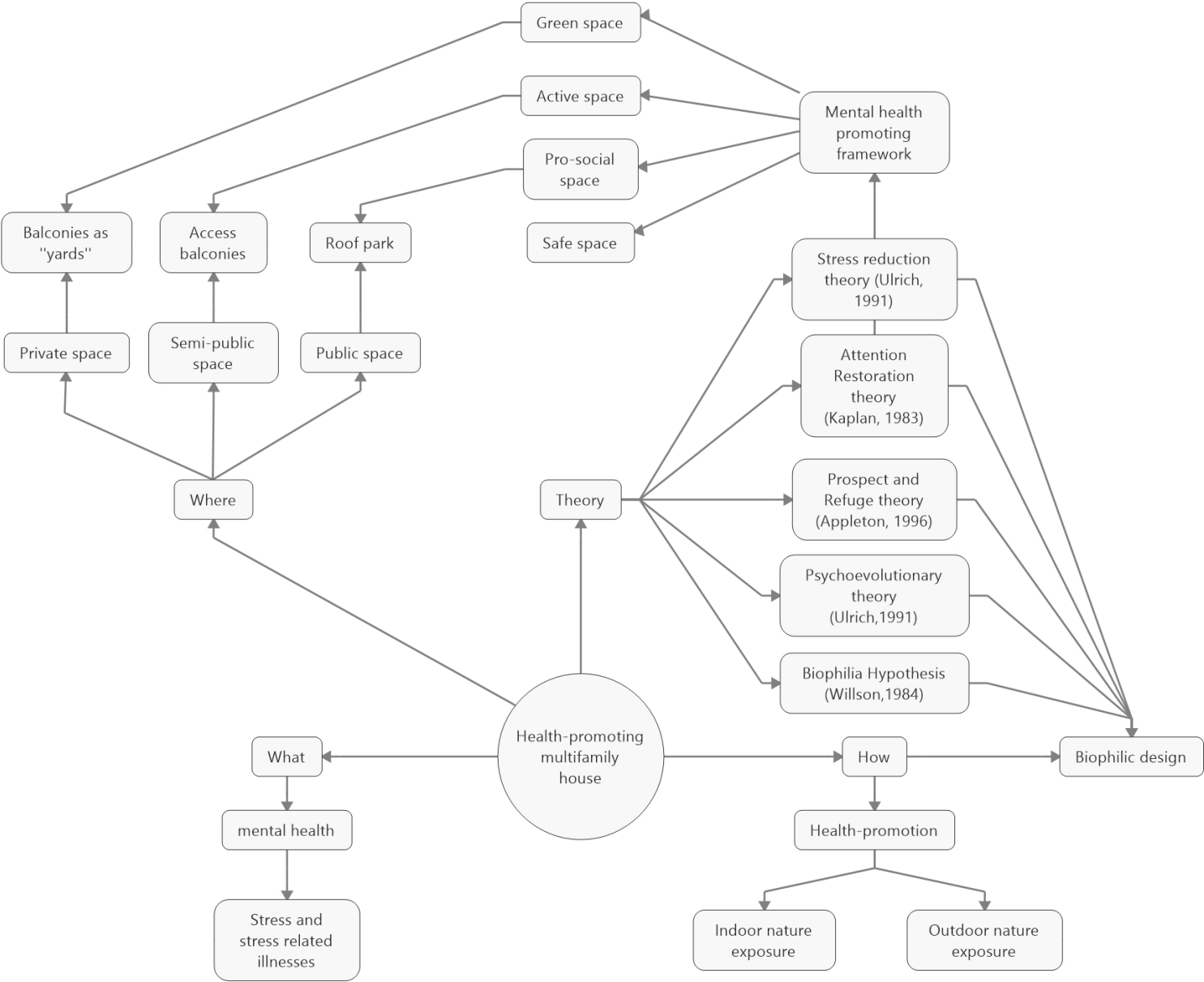
How housing design can promote good mental health and well-being? How we as architects can contribute to healthier living environments?

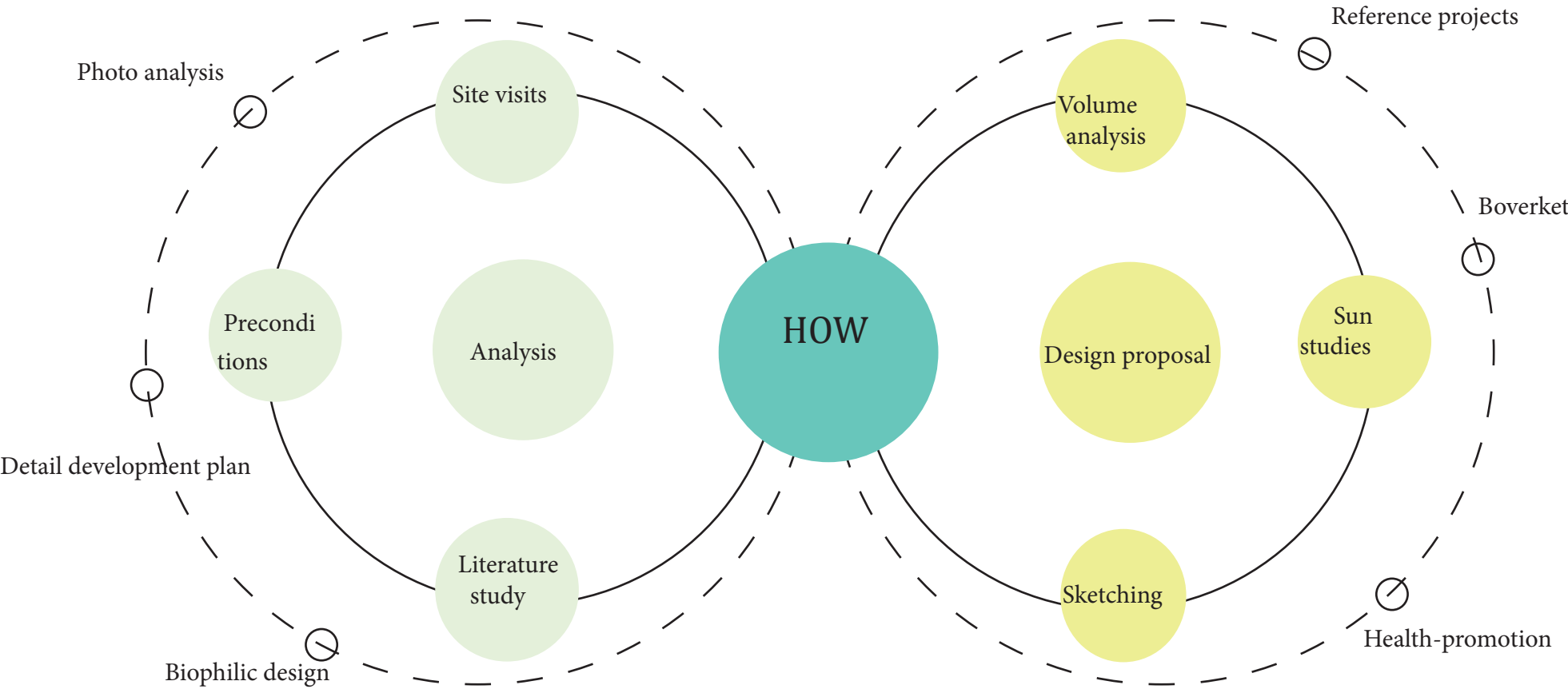
Other questions

How we can increase the density on Carlandersplatsen and provide more common areas for the tenants? How it will benefit the tenants and the surroundings?



Biophilic design

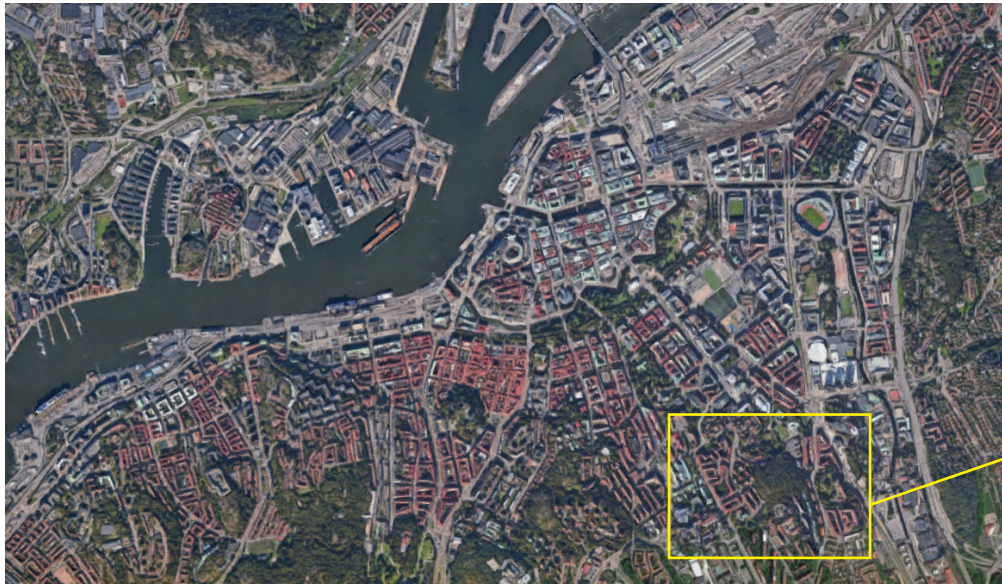




THE SITE

SITE

Johanneberg is a neighbourhood in southern part of Gothenburg, built mainly during 1960 and 1970. Its central location makes it attractive for various functions. It is an area where you live centrally but still quiet. There are lot of green areas and cafes. Lower Johanneberg is dominated by closed residential areas while Upper Johanneberg is a distinctive functional area with independent house lenghts.



The site is located on the border between upper Johanneberg and lower Johanneberg. It is surrounded by Carlanderska Hospital and Carlander-sparken on the east, apartment houses on the south, university premises on the north and a park on the west. Placed on a hilly landscape and being surrounded by wild nature makes the site even more attractive. It can be also seen as a connection hub because of the few pathways passing by.



Fig.2 Carlandesplatsen area

SITE

CONTEXT



SITE

SITE ANALYSIS



Regularity & good quality
of detail and design



Dominating functionalistic
housing



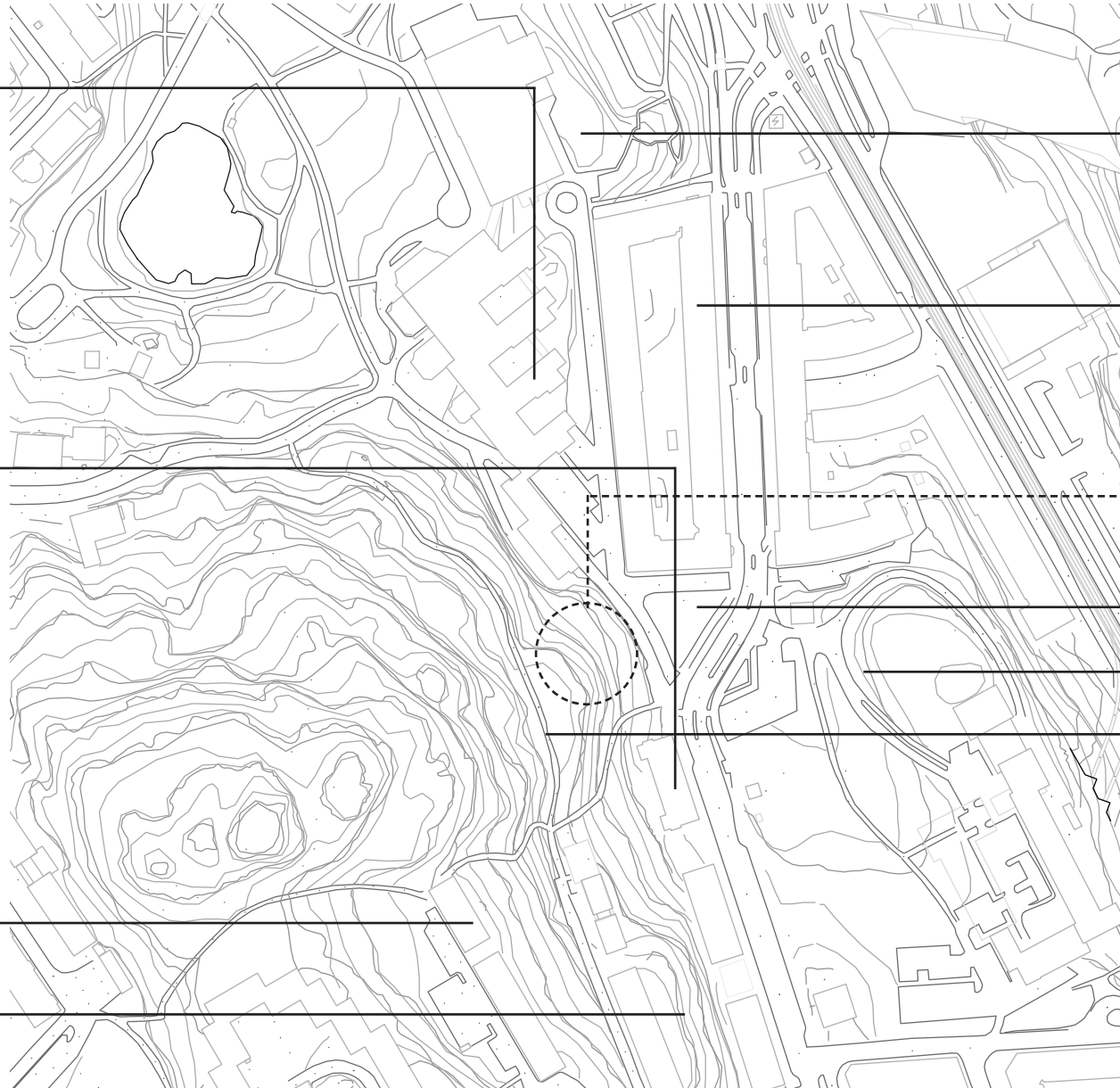
Park



Urban scale



Nature in between



Terrain landscape



Dominating massive brick
housing



SITE



Unclear connection between
Carlandersplatsen and
Carlandersparken



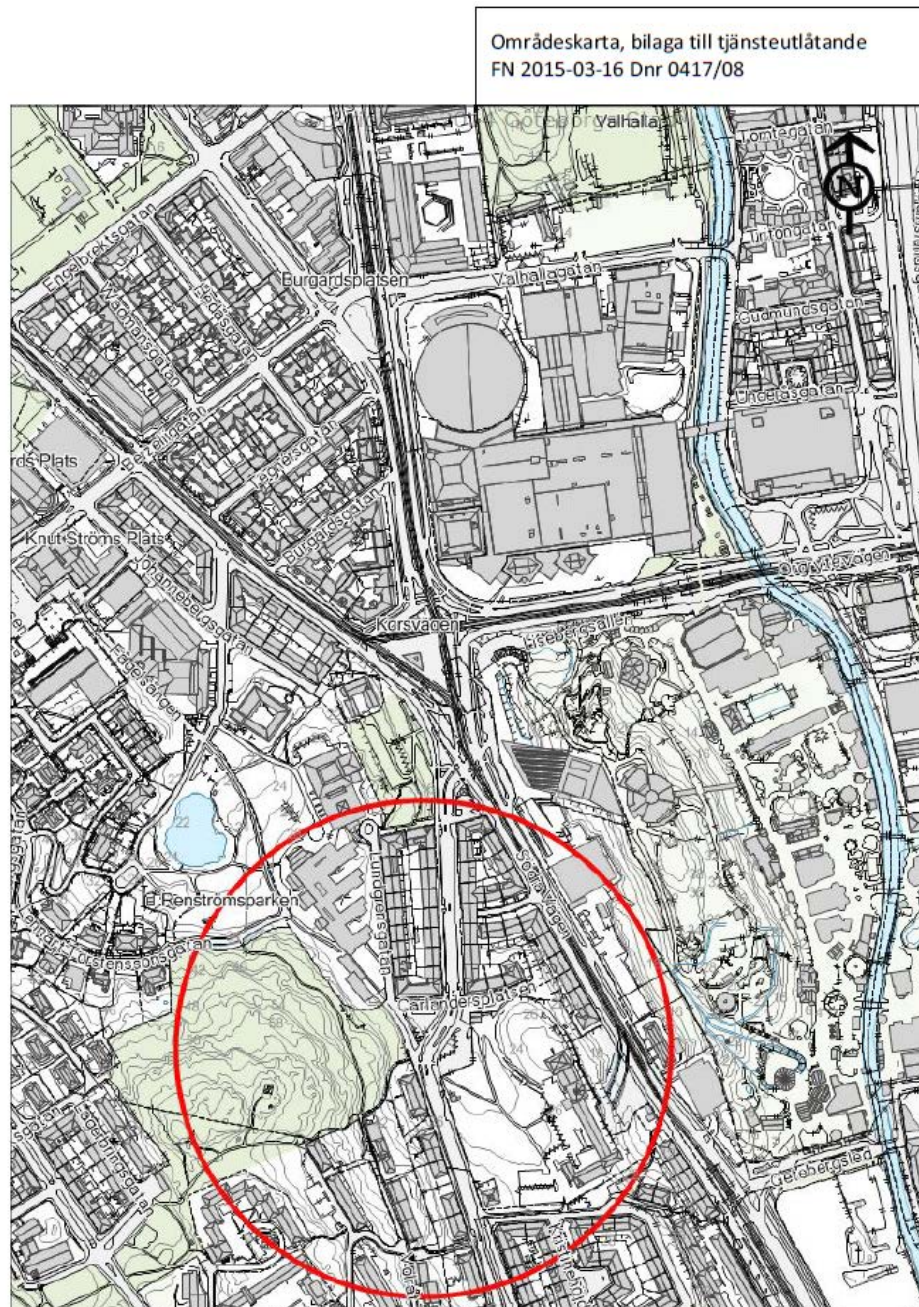
Carlandersparken



Connection hub

Map provided by Geodatabaser through Chalmers studentportal

SITE



FUTURE PLANS FOR CARLANDERSPLATSEN

City of Gothenburg started working on the detail development plan for Carlandersplatsen in 2012 and the work was stopped in anticipation on the geographical location of the West link's working tunnel and also because of discussions with Carlanderska hospital about invasion of public space in the hospital park. Because of the delay, the new detail plan was done in 2015. The land within the planning area is owned by the municipality, Akademiska Hus AB and Wallenstam AB. The plan also includes the rebuilding of the Carlanders site, where Carlanderska hospital is affected by public land. The property is granted with leasehold rights to the Foundation Carlanderska The nursing home. In the southern part of the area, at Volrat Thamsgratan, new housing is proposed in Wallenstam's land what is today a smaller parking garage.

On the slope towards Carlandersplatsen, Wallenstam refers to erect two buildings with an intermediate elevated courtyard with around 44 apartments (condominium) and public functions in the ground floor closest to the square and about 80 apartments in the upper house. Akademiska Hus Väst AB intends to build the university building Humanist.



Drawings provided from official website of City of Gothenburg

BIOPHILIC DESIGN

There are few theories that discuss that nature is important for our health and well-being. Biophilia hypothesis is one of them.

The idea of biophilia is related to the human evolution where humans have been always exposed to natural environments.

The evolution is shown below where we can see that 99% of all species we developed in natural non-artificial or human created forces. The diagram shows also when the city was invented. Our body, mind and senses evolved in non-natural and invented world and there has been little genetic adaptation.

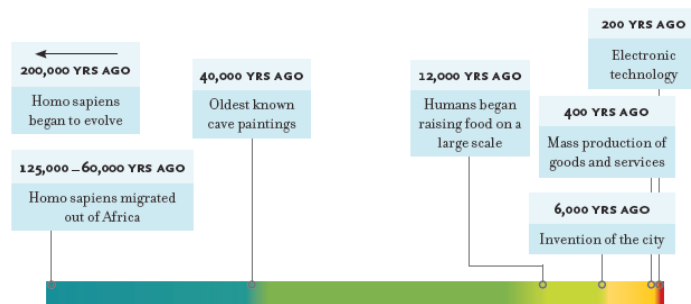


Fig.3 Evolution

In the thesis framework, biophilic design is related to few other theories that discuss the biological bond humans-nature and restorative power of this bond. They are listed and described briefly for a better understanding of the complexity of the theoretical part of the thesis.

-Biophilia Hypothesis says that people have an affinity for humans and other life forms and interaction with humans and other life forms result in higher satisfaction. (Wilson, 1984)

-Stress Reduction Theory claims that natural environments reduce

physiological stress and aversive emotion. (Ulrich,1991)

-Attention Restoration Theory discuss that restorative settings remove an individual from their daily tasks, contain features that hold their attention with little effort and restores their ability to concentrate, allowing them to recover from stress. (Kaplan, 1987)

-Prospect and Refuge theory states that human seeks a balance between complexity and access to information in the natural environment and a sense of security. (Appleton,1996)

-Psychoevolutionary Theory claims that our bodies create physiological reactions when presented with stressful environments that threaten our health (i.e. urban areas). Recovery from stress can occur in environments that are pleasant, calm and moderately interesting. (Ulrich,1991)

Benefits

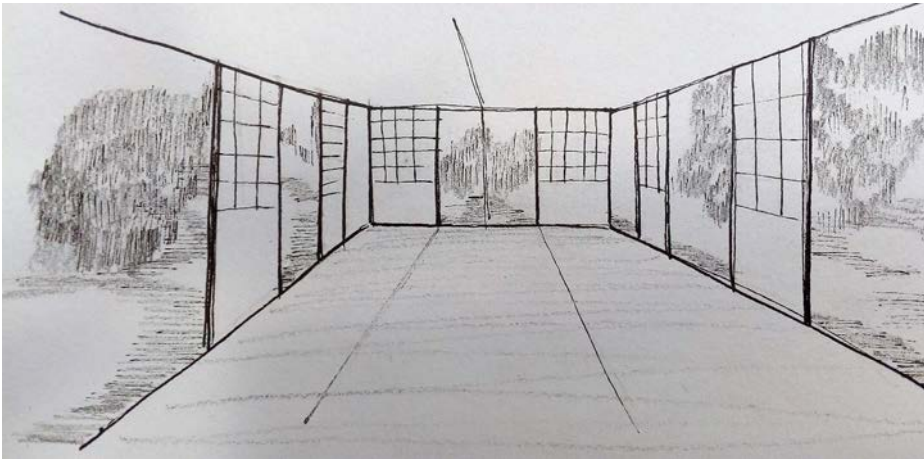
The successful application of biophilic design should also result in a wide spectrum of physical, mental and behavioral benefits. Physical outcomes include enhanced physical fitness, lower blood pressure, increased comfort and satisfaction, fewer illness symptoms, and improved health. Mental benefits range from increased satisfaction and motivation, less stress and anxiety, to improved problem solving and creativity. Positive behavioral change includes better coping and mastery skills, enhanced attention and concentration, improved social interaction, and less hostility and aggression. (Kellert, S. and Calabrese, E. 2015)

Biophilic design is a new design tool that inspire architects and designers around the world. There is a lot of discussion and research around it but how it can be applied in a design? The article 14 patterns of biophilic design. Improving health & well-being in the built environment by Browning, W.D., Ryan, C.O., Clancy, J.O. from 2014 moves from research on biophilic responses to design applications as a way how architects can use them in the designs to effectively enhance health and well-being for individuals and society.

According to the article, there are three groups of patterns: Nature in the space, Natural analogues and Nature of the space.

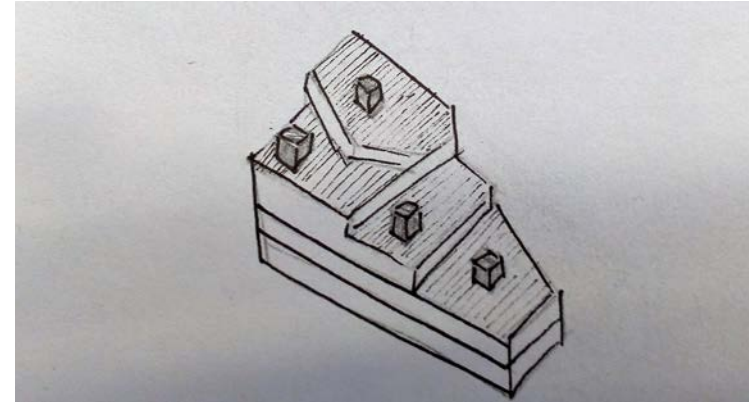
They have been analyzed in relation to the thesis concept and resulted in design reflections to support the design process.

1. Visual connection with nature-is a view to elements of nature, living systems and natural processes.



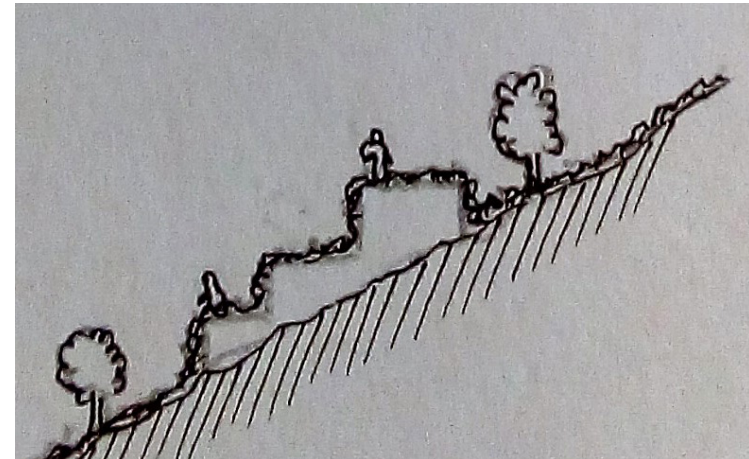
Design reflection: Work with physical and visual connection to green areas through balconies, entrance hall, roof park and nearby parks.

2. Non-visual connection with nature: auditory, haptic, olfactory, or gustatory stimuli that engender a deliberate and positive reference to nature, living systems or natural processes



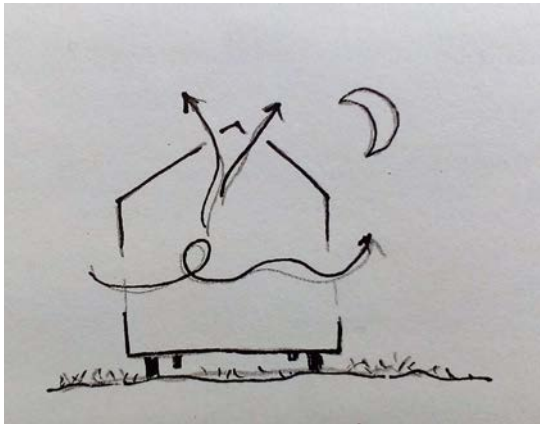
Design reflection: Work with natural ventilation, horticulture/gardening on the roofs

3. Non-rhythmic sensory stimuli



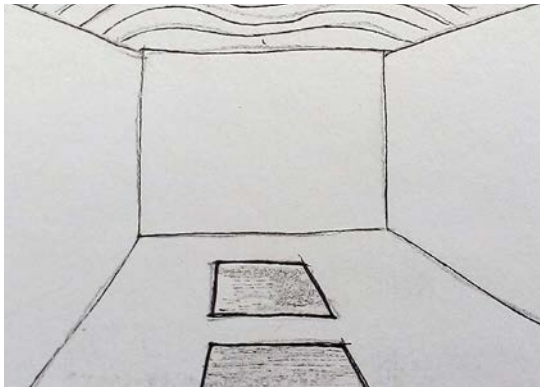
Design reflection: Work with habitat restoration, rainwater management.

4. Thermal & airflow variability-research shows that people like moderate levels of sensory variability in the environment, including variation in light, sound and temperature (e.g., Heerwagen, 2006)



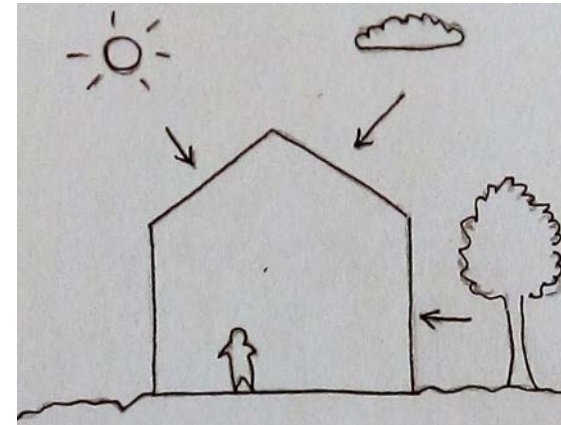
Design reflection: Work with variation in light and temperature in the entrance hall

5. Presence of water-it is a condition that enhances the experience of a place through the seeing, hearing or touching of water



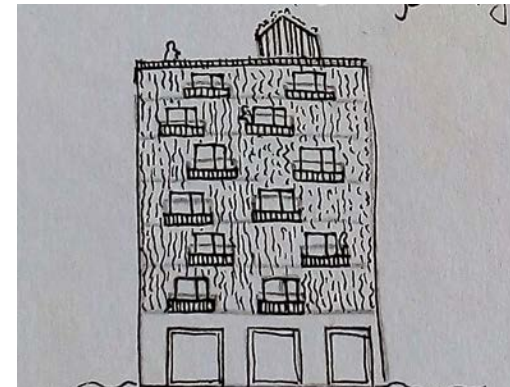
Design reflection: Work with water on the roof park

6. Dynamic & Diffuse light-varying intensities of light and shadow that change over time to create conditions that occur in nature



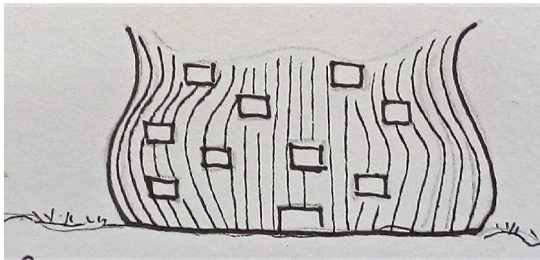
Design reflection: Provide daylight from multiple angles

7. Connection with natural systems-awareness of natural processes, especially seasonal and temporal changes characteristic of a healthy ecosystem



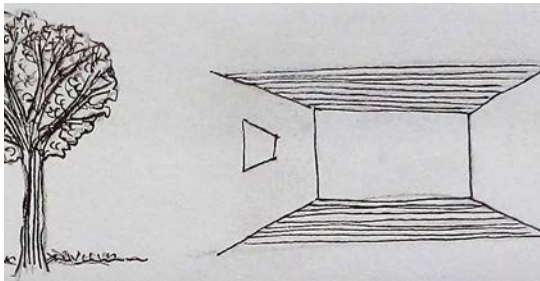
Design reflection: Design urban gardens at balconies and urban farm on the roof park

8. Biomorphic forms & patterns-symbolic references to contoured, patterned, textured or numerical arrangements that persist in nature.



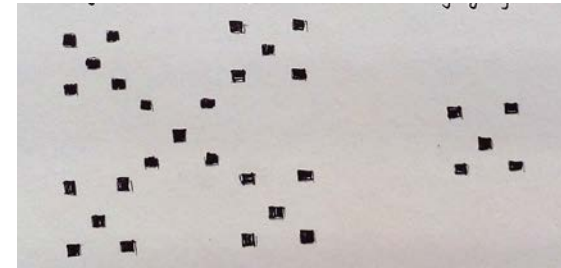
Design reflection: Apply biomorphic forms & patterns in the structural or functional design.

9. Material connection with nature-material and elements from nature that through minimal processing, reflect the local ecology or geology to create a distinct sense of space



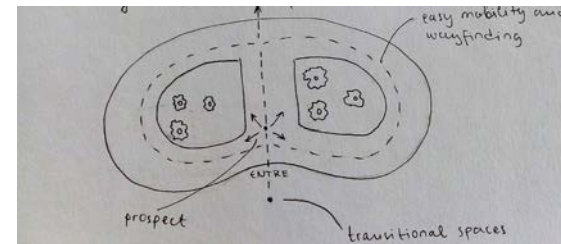
Design reflection: Use natural materials

10. Complexity & order-rich sensory information that adheres to a spatial hierarchy similar to those encountered in nature



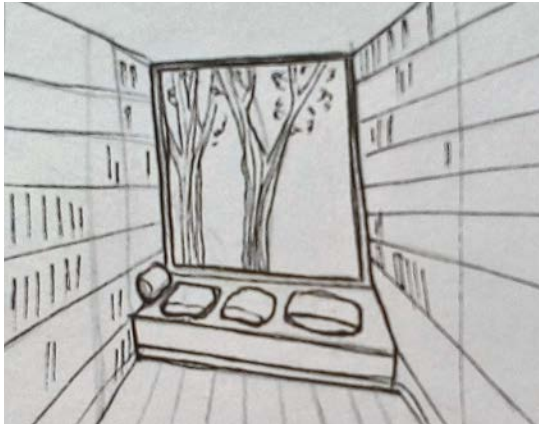
Design reflection: Prioritize concepts that reveal fractal geometries and hierarchies

11. Prospect-unimpeded view over a distance for surveillance and planning



Design reflection: Provide maximum visual access to the nature

12. Refuge-place for withdrawal from environmental conditions or the main flow of activity, in which the individual is protected from behind and overhead



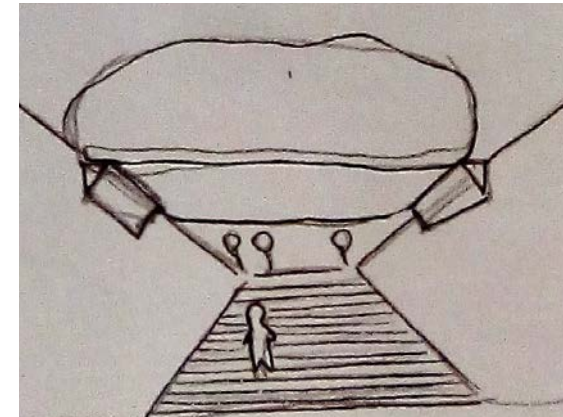
Design reflection: Design apartments with accessible and protective environments, limit visual access into the “refuge” spaces.

13. Mystery-promise of more information through partially obscured views or other sensory devices that entice the individuals to travel deeper into the environments



Design reflection: Use the roof park as a space to be revealed

14. Risk/Peril=identifiable threat coupled with a reliable safeguard



BIOPHILIC DESIGN

To reflect better on the concept of biophilic design, few projects will be presented. They all have worked with some of biophilic principles and all together give a clearer idea of what biophilic design is.

Östra Hospital

Architects: White Architects

Location: Gothenburg, Sweden

Area: 18 000 m²

Project year: 2006

Östra Hospital is a psychiatric facility that was designed for people with different mental illnesses. The main idea of the project was to treat the design as part of the patient care. In the design, four biophilic principles were used: complexity and order, visual connection to nature, dynamic and diffuse light and refuge. (Terrapin Bright Green Ilc 2017)

This project was used as a reference because of the idea that architecture can contribute to the healing process. It is also in line with the thesis theory that we need to focus on what keeps us healthy and create more general solutions instead of focusing on the illness.



Fig.4 Östra Hospital

REFERENCE PROJECTS

The Interlace

Architects: OMA/Ole Scheeren

Location: Singapore

Area: 8 HA/19.8 AC

Project year: 2003

Ole Scheeren's design generates an extensive network of private and shared social spaces in a radical reinterpretation of contemporary life in a community. Instead of following the default typology of housing in dense urban environments – clusters of isolated towers – the design turns vertical isolation into horizontal connectivity and reinstates the notion of community as a central issue in today's society. (Buro Ole Scheeren, n.d.)

This house was inspirational reference because of the social spaces that are created between the buildings that can strengthen the community spirit and create more attractive outdoor spaces for the residents.

In the thesis project, there is also a clear division between private and public spaces where tenants can choose if they need more private or they want to be "in public".



Fig.5 The Interlace

BIOPHILIC DESIGN

Hedge House

Architects: White Architects

Location: London, UK

Project year: 2018

Hedge House enables affordable densification, new active street frontage and creates a sense of ownership of existing green urban spaces, with no demolition and by building at the human scale. The green facades and shared roof terraces promote wellbeing and a sense of community. (Hedge house creates affordable housing for Londoners, 6 December 2018)

Hedge house is an inspiration for the thesis projects because of its transparent facades, construction system and the shared roof terrace. North and south oriented balconies made it logical to use transparent glass so every apartment can get enough daylight. Light was one of the most important parameters in the project because studies show that lack of daylight increases depression



Fig.6 Hedge House

REFERENCE PROJECTS

Parisian housing block

Architects: MAD

Location: Paris, France

Project year: 2016

Called UNIC, the 50-metre-tall block will feature floorplates with undulating edges and glazed walls to give residents views of the Paris skyline.

The terraces will be planted with trees in an attempt to extend the adjacent park vertically, and balconies on the uppermost floors of the 13-level-block will boast views of the Eiffel Tower. (Jessica Mairs, 20 May 2016)

This glass tall block was used as a reference project in the thesis project because of its idea to create balconies with open views. The hilly terrain and the central location makes it possible to have open view towards the city and the park behind the site.



Fig.7 Parisian housing block

HEALTH-PROMOTION PRINCIPLES

Health and housing

Like housing, health is also multidimensional. They need to be considered in terms of the multiple factors that influence them both and the interrelations between them. New innovative approaches are needed because of the complexity of the field of health and housing.

This master thesis focuses on the tool of biophilic design and health promotion principles. Health promotion is interpreted as healthy lifestyle and stress reduction tool which can be encouraged in residential architecture. From a perspective of health promotion, health is not an abstract condition but rather an ability of an individual to achieve her/his potential and to respond positively to the challenges of daily life. This means that health is an asset or a resource for everyday life and not a standard or a goal that is aimed to be achieved. (Lawrence, 2004)

Health promotion

There is a growing understanding of what enhances our health today. People are more aware that their lifestyle impacts directly how they feel. Health Promotion is a new concept which is based on the process of enabling people to take control over their own health. (WHO,1984) According to Antonovsky while prevention is mostly focused on specific diseases or risk groups and increasing negative behaviour, health promotion is less specific, more general and more focused on the positive and less culture bound. (1996)

Indoor nature exposure

People are functioning most of the time within built spaces, despite their physiological and psychological functions evolving from nature. Data now suggest that this rapid change and nature deficit is linked to the growing mortality and morbidity rates associated with chronic stress and poor mental health (Garling and Golledge, 1993; Maller et al.,2005, Louv.2008,Selhub and Logan,2012).

If we consider the potentially healing properties of nature, exposing the residents to indoor natural settings may be a tool for creating a health-promoting environments and improving health.

Indoor nature exposure promotes health when individuals are presented with nature based stimuli that they perceive as attracting, pleasing and pleasant to all their senss. (J. McSweeney et al. 2014)

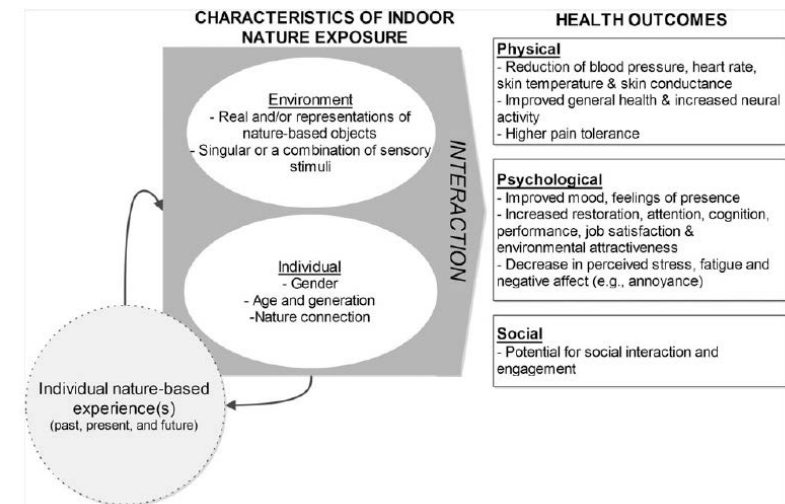


Fig.6 Indoor nature exposure

Outdoor nature exposure

In the background chapter, the case study about landscape planning and stress was mentioned. In this part, it is analyzed from a perspective of outdoor nature exposure and the findings who influenced the final concept design.

That is a paper which focuses on relationship between the use of outdoor environments and people's stress-related depression and burn-out syndrome. It involved almost 1000 randomly chosen individuals in 9 different cities in Sweden. The study found out that:

- the more often a person visit urban open green space, the less he or she will report stress-related illnesses
- the distance is important
- people do not compensate for lack of green areas in their residential area with more visits to public parks

Laying out more green spaces close to apartment houses and making them more accessible could contribute for health promoting environments.

The park behind the site and Carlandersparken are important existing qualities of the site. The conclusion after the research study on health promotion principles is to work with physical and visual access to green areas placed inside and outside the site.

Cause	Number Indicating yes & no	LS mean	Significance
Lack of time	541 yes 341 no	111.50 65.23	$p < 0.0001$
Distance	80 yes 802 no	150.31 87.96	$p < 0.005$

Fig.7 Biggest obstacles of using open green urban spaces

Mental health promoting framework

According to the Centre for Urban Design and Mental Health, there are important relationships between accessible green spaces and mental health and well-being. Access to natural settings in neighbourhoods and in the course of people's daily routines is likely to improve and maintain mental health and well-being. (How Urban Design can impact mental health,n.d.)

They have created a mental health promoting framework which architects and designers can use in their designs.

The framework is called GAPS: green space, active space, pro-social and safe space.

Green space-it should be easy to access and visible so it becomes part of everyday life of the tenants.

Active space-providing indoor and outdoor activity spaces will encourage residents to become more physically active. This will lead to improved mood and well-being.

Pro-social space-creating interesting,flexible spaces will attract residents to visit them more and interact more with their neighbours.

Safe space-a sense of safety and security is crucial for having a good mental health. Residents should have action opportunities and feel safe.



Fig.8 Promoting good mental health

HEALTH-PROMOTION

The following reference projects reflect some of health promotion principles.

Saltholmsgade
Architects: We Architecture
Location: Aarhus, Denmark
Area: 3 500 m²
Project year: 2016

Today's migration towards the larger cities of Denmark represents an increasing challenge in relation to obtaining qualitative exterior spaces. We are more people sharing less space. This proposal on placing a new building on Saltholmsgade seeks to restore the lost green space from the footprint of the building by placing a roof park on the top of the settlement. (Saltholmsgade, n.d.)

This Danish project was an inspirational reference in the thesis project because of the idea to restore the lost green space. The thesis project created a public roof park which gives back the green space and introduces new health-promotion activities which can improve the health of the residents and other people.



Fig.9 Saltholmsgade

REFERENCE PROJECTS

Student housing
Architects: C.F. Møller
Location: Odense, Denmark
Area: 13 700 m²
Project year: 2015

The design of the new student housing at the University of Southern Denmark in Odense is based on a strong community spirit. The 250 student residences are located in three buildings with 15 floors connected to each other. This means that the establishment does not have a front or rear side, but is attractive from 360 degrees. The distinctive shape of the building will make it easily recognizable on campus, and will clearly announce its residential content. (Student housing, C.F. Møller, 21 April 2016)

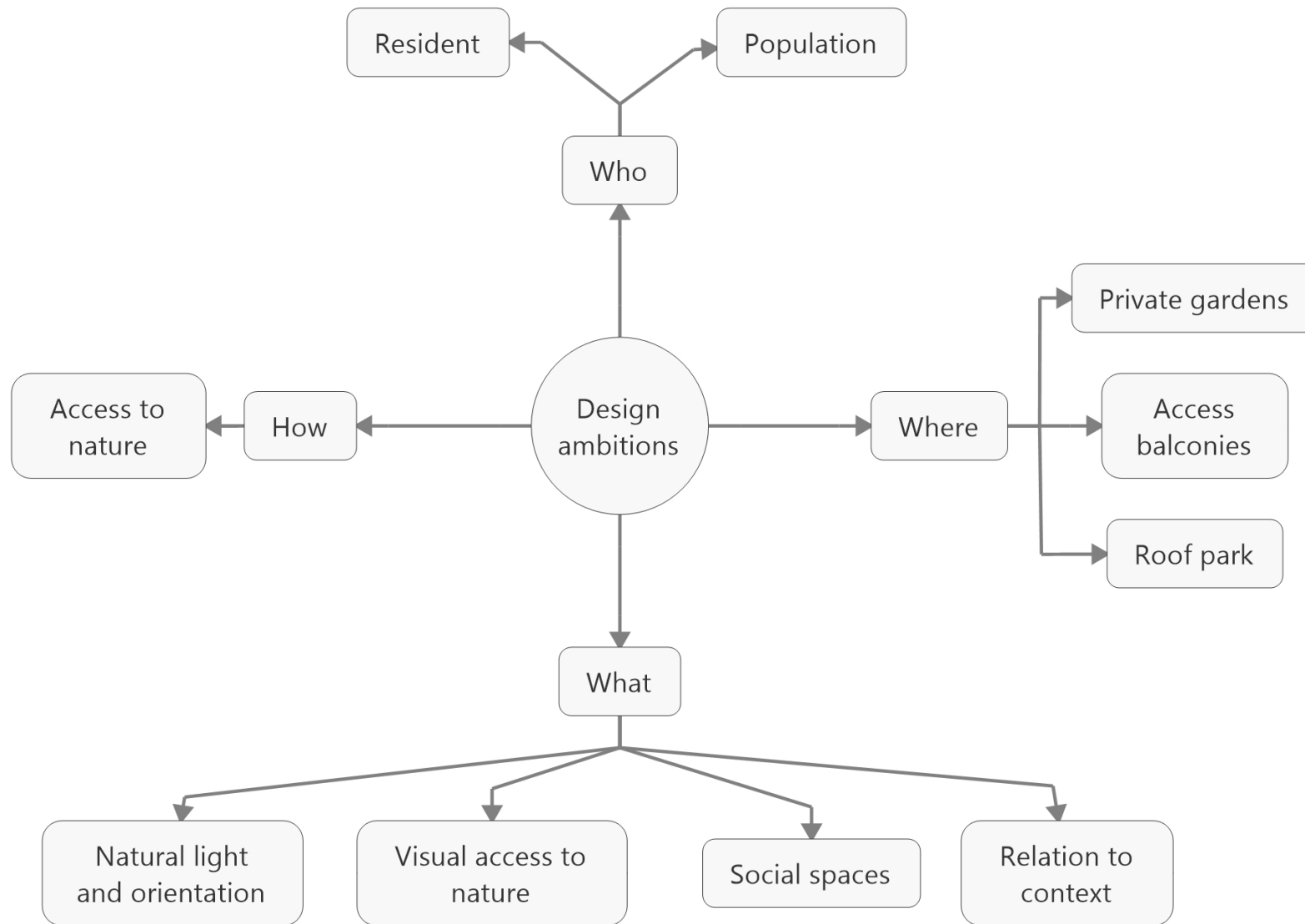
This student dormitory was used as a reference in the thesis project because of the common spaces that are created on every floor and apartments oriented towards multiple sides. In the thesis project, all common spaces are lifted up on the roof level. All apartments are oriented towards two sides so they can get maximum daylight.

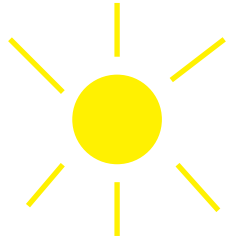


Fig.10 Student housing

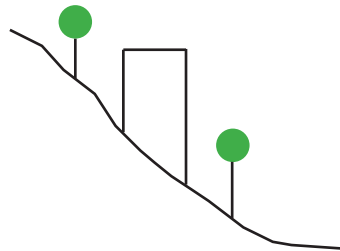
DESIGN PROPOSAL







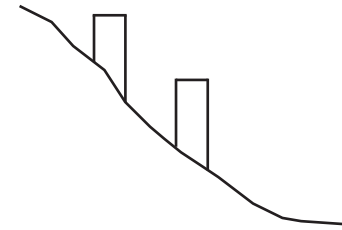
MAXIMIZE DAYLIGHT
AND PROVIDE GOOD
ORIENTATION



PHYSICAL AND VISU-
AL ACCESS TO NA-
TURE



HEALTH-PROMOTING
SPACES

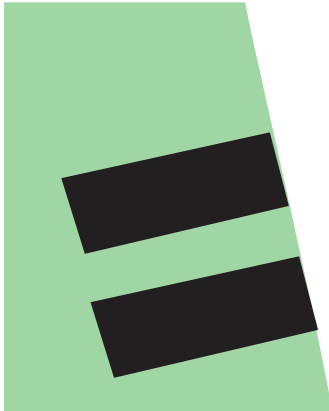


ADAPT AND STAND
OUT IN THE CONTEXT

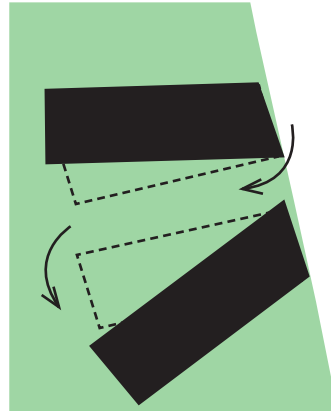
The main parameters in the design process were maximum natural light and good orientation, physical and visual access to nature, health-promoting spaces that encourage healthy behaviours and socialization between the residents and other people and adapt and stand out in relation to context. It was important to consider the site as a complex because of the identified no relation to the context within the surroundings and lack of common social spaces. Access to nature and nature views is an existing quality of the site which is important for the design.



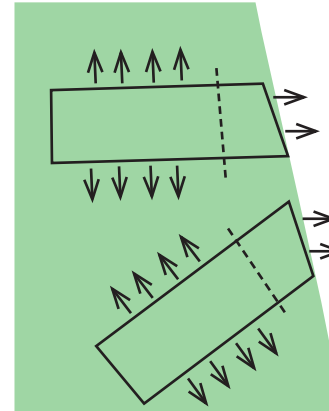




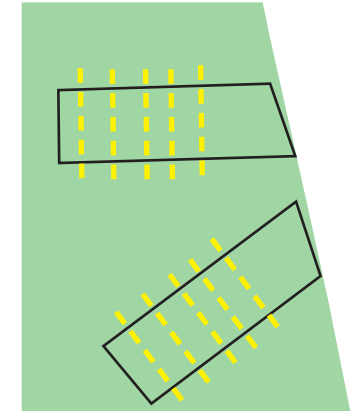
Apartments are clustered into two building blocks to get better connection with surrounding nature, have lower impact on the site and follow the terrain



Building blocks are rotated to maximize nature views and open up towards the park



Building blocks relate towards the surroundings (urban and natural context) and two different typologies are created



Transparent facades and buildings orientation allows for best lighting conditions where all apartments have private balconies and visual access to nature and nature views

PROPOSAL

QUALITIES BROUGHT INTO THE PROJECT

Common typologies at Carlandersplatsen are house blocks with closed courtyard or house blocks with nature in between. Access balconies on the north and private balconies as urban gardens facing south are brought into the project which provides better connection with surrounding nature. Common kitchen on the roof park and urban farm provides more common social spaces for the population and residents in the two buildings. Building blocks with nature in between are not related to the surroundings which is a quality in the thesis. This relation together with the terraced landscape allows access to nature and nature views.



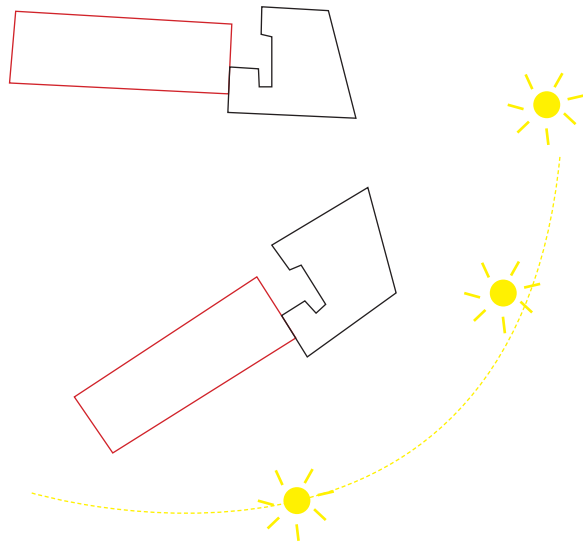
Fig.11 Closed courtyard



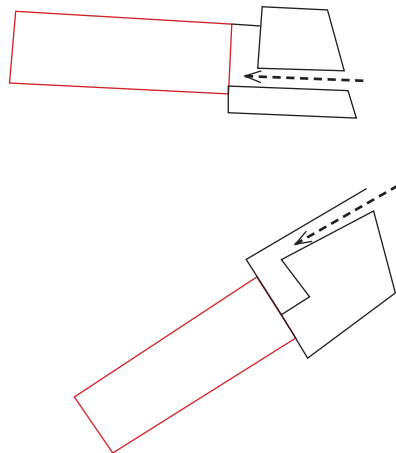
Fig.12 Nature in between



Fig.13 Nature views



The project has set up a daylight criteria that the apartments need to have windows on two different sides. In addition different context (urban context on Carlandersplatsen and natural context) required different housing typologies: maisonnettes and single storey apartments.



The staircase and the elevator are placed in the ground floor on street level so it is equally accessible for everyone.

Reference project using maisonnettes and single storey apartments

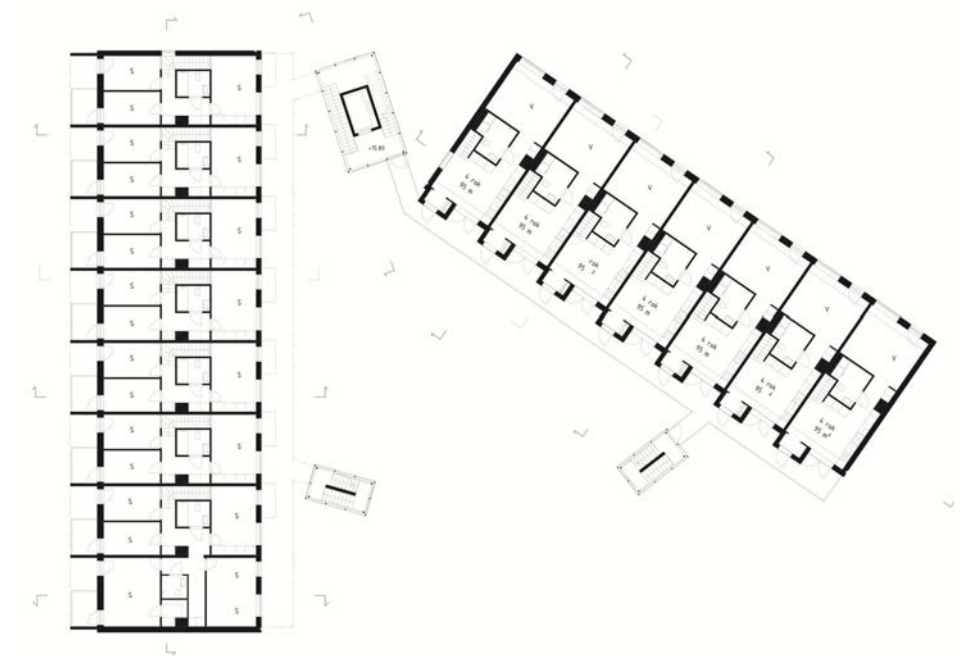
Tappen

Architects: Joliark

Location: Stockholm, Sweden

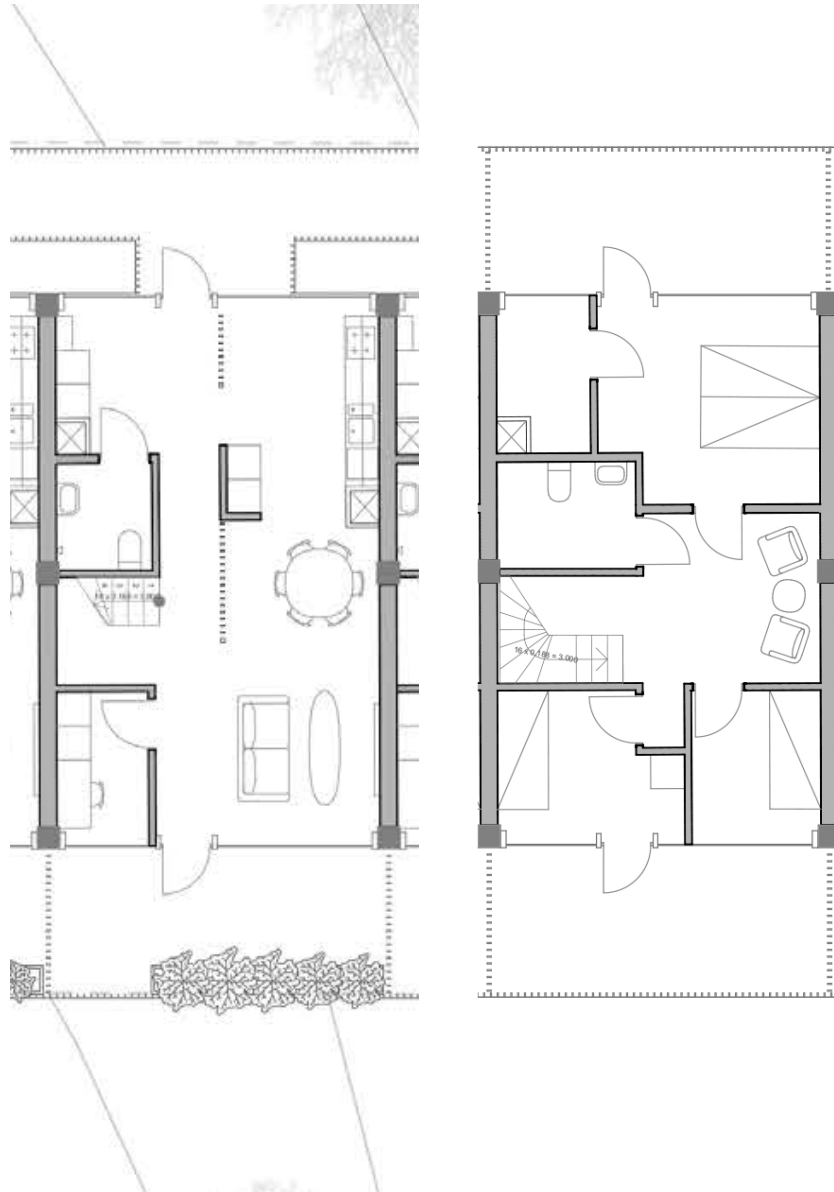
Area: 5750.0 sqm

Project year: 2015

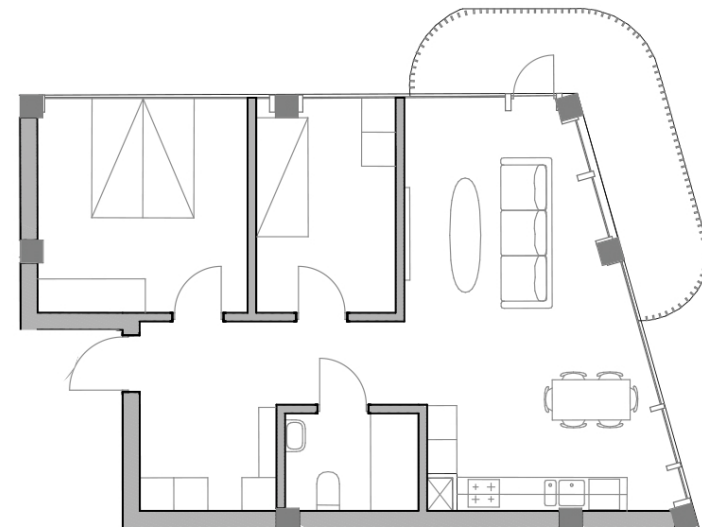


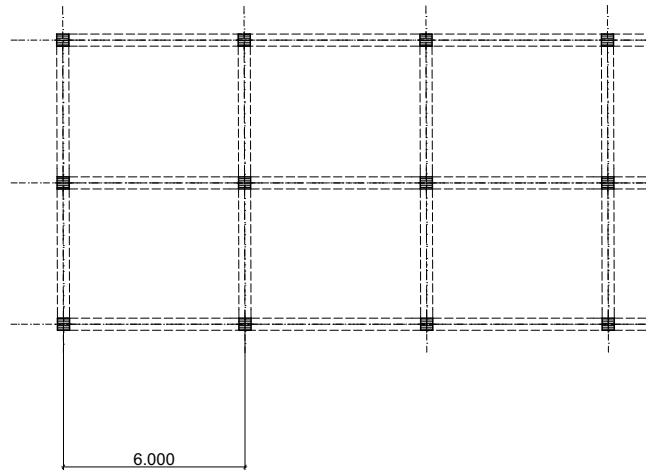
The longer building has only maisonnettes in two floors and the shorter building has a mix of maisonnettes and single floor apartments. They are connected with a glazed circulation tower where the residents access their balconies and then their apartments.

Maisonette in two floors 100m²



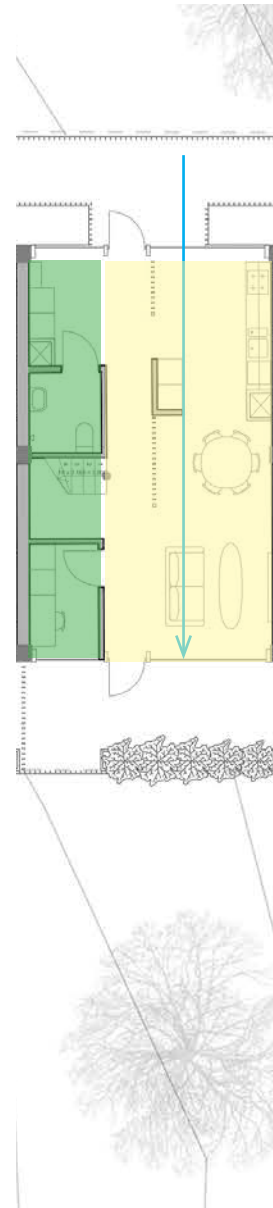
Single floor large apartment 69m²





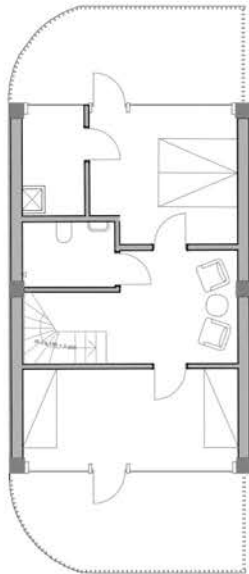
General grid with pillars and beams made of solid wood makes it possible to do changes in the floorplan or even add floors if there is a need.

All apartment get daylight from two different sizes and have one or two private balconies depending on the size of the apartment. All apartments have a clear sightline which connects outside-in-side. South balconies at maisonettes can be used as “yards” where urban garden possibilities occur. There is a clear division between public and private zones which is reflected in different floors in maisonettes.

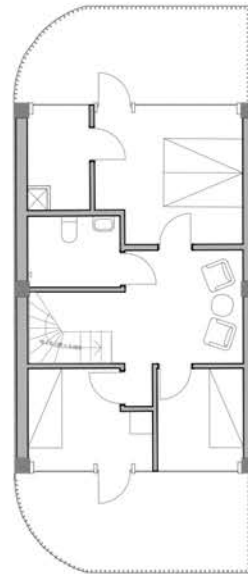


- *Direct access to nature
- *Balconies on two sides
- *Future proof
- *Flexibility
- *Sightlines
- *Public-private zones
- *South orientation of “yard”
- *Urban gardening possibilities
- *Access to roof park

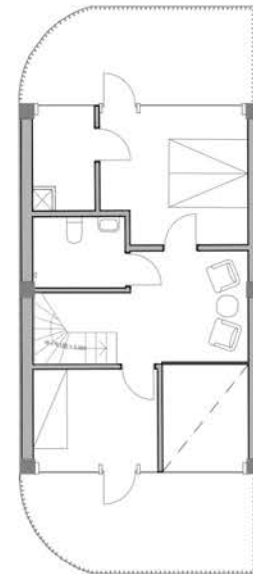
Two adults and two small children

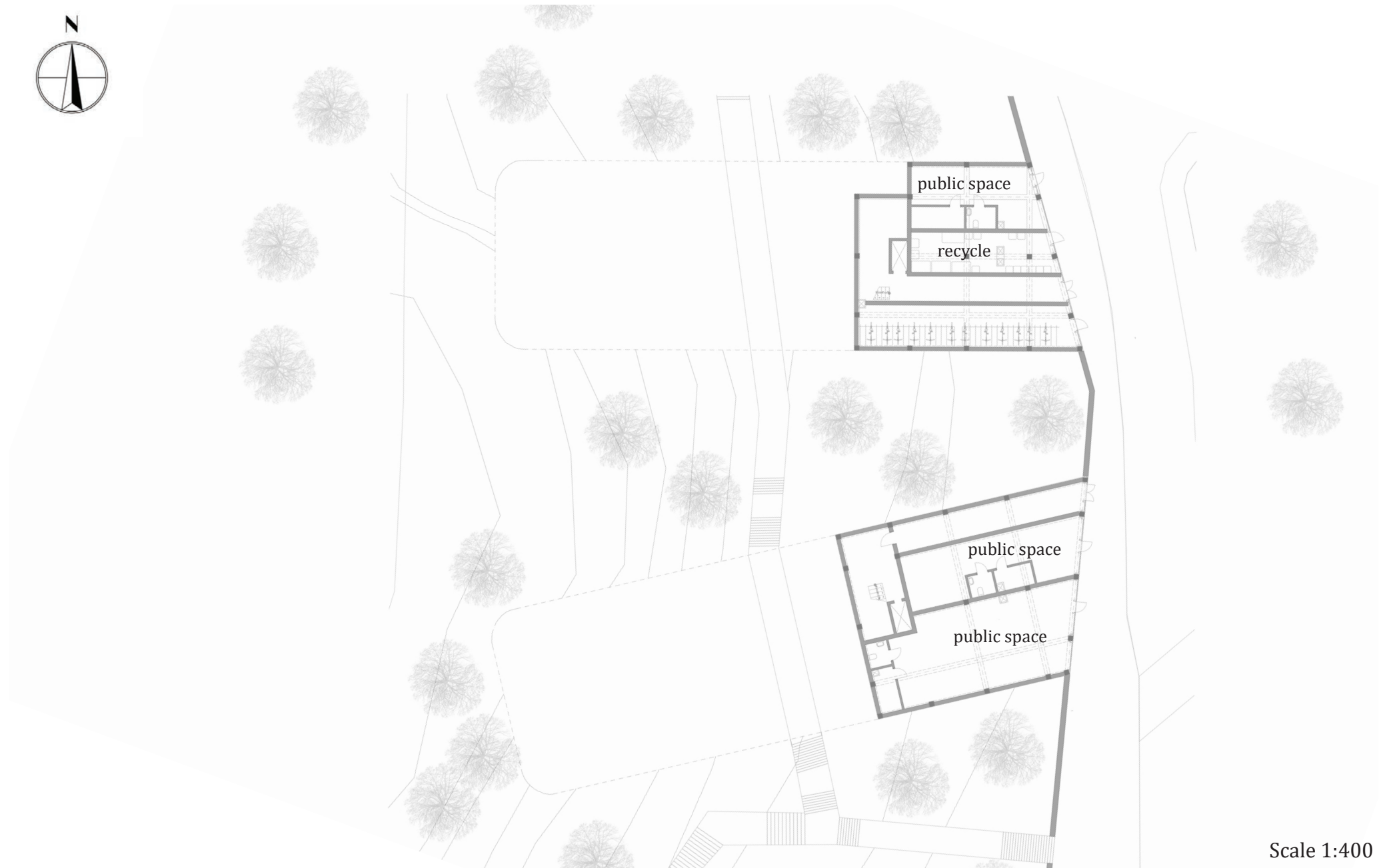


Two adults and two teenagers renting out a room



Two adults with one bedroom,quest room and double ceiling living room

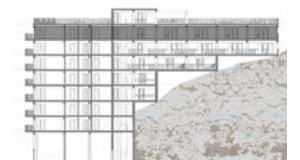
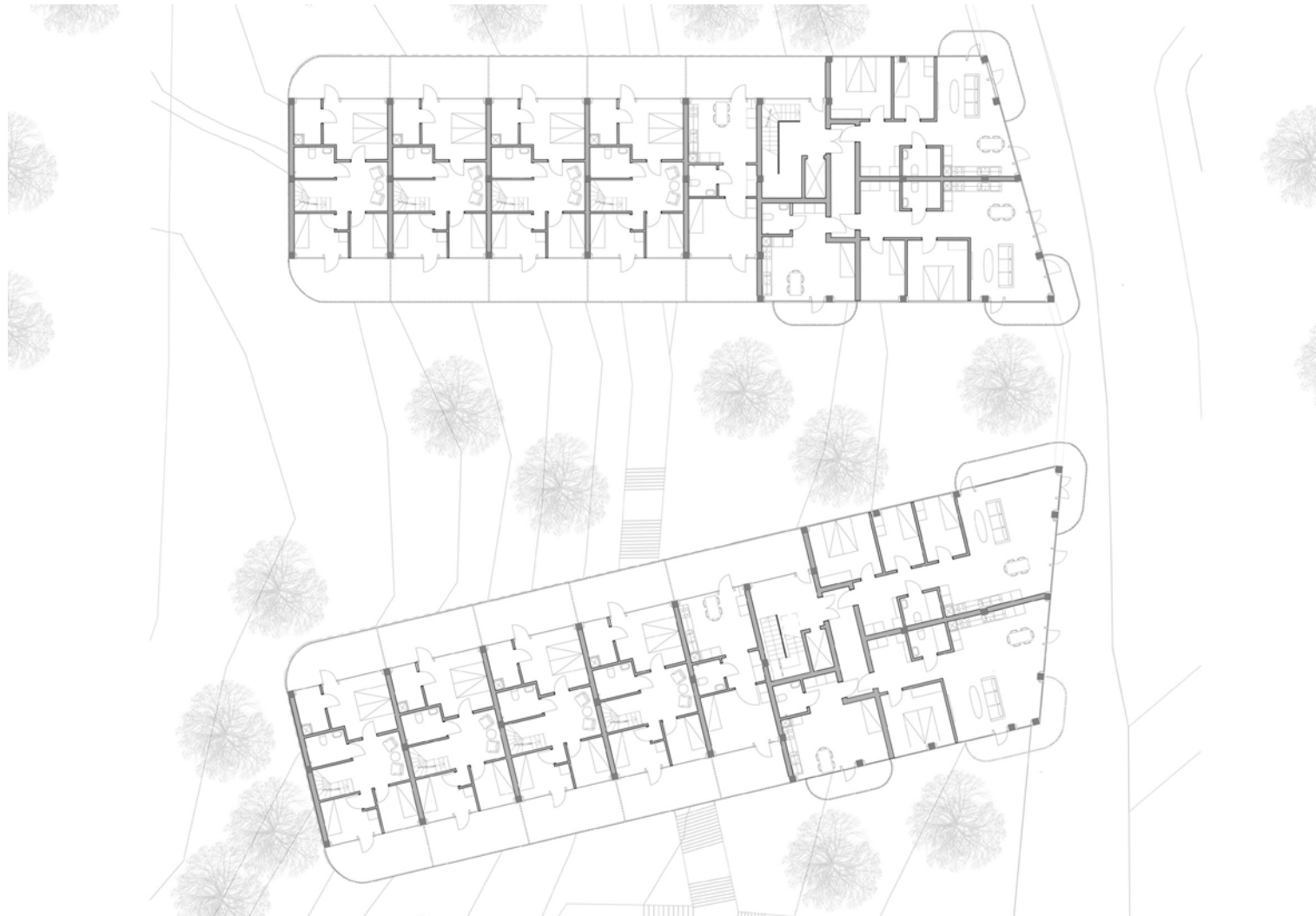




Scale 1:400



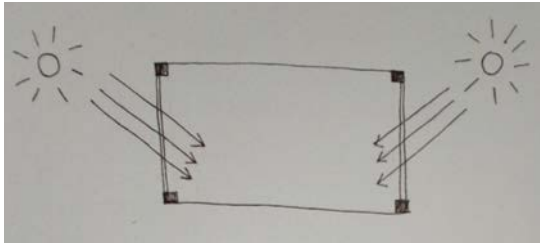
Scale 1:400



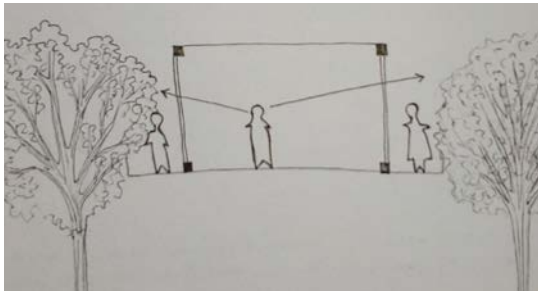
Scale 1:400

PROPOSAL

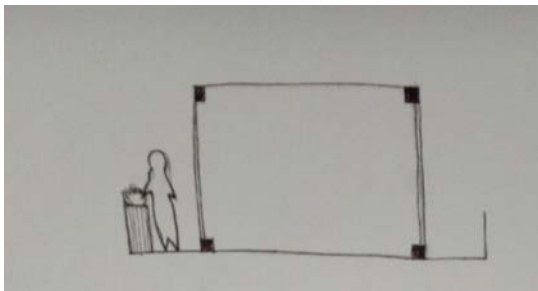
6. Dynamic & Diffuse light-all apartments get daylight from different angles. Therefore light and shadow change during the day and create “natural” conditions



1. Visual connection with nature-transparent facades makes it possible to stay visually connected with natural environments while being inside the apartment

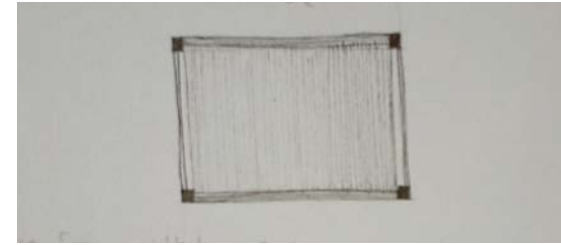


7. Connection with natural systems-south “yards” can be used as urban ardens and urban farm on the roof can be a place to grow your own food and socialize with your neighbours

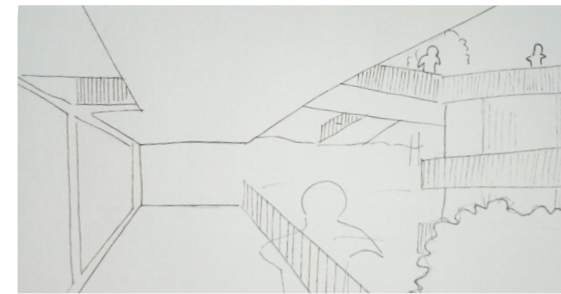


APPLICATION OF BIOPHILIC DESIGN PRINCIPLES

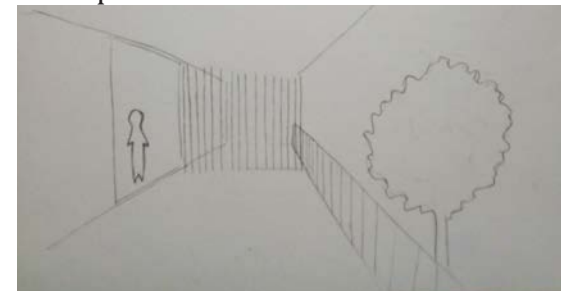
9. Material connection to nature-wooden walls and floor made of natural wood make stronger the connection with natural environments and create a sense of space

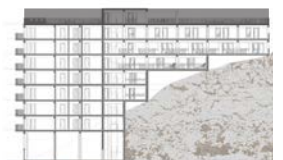


13. Mystery-promise of more information through partially obscured view-roof park as a space to be revealed, it is partly visible from the street and apartments level



12. Refuge place for withdrawal from environmental conditions or the main flow of activity-apartments as “refuge places” where residents can choose if they want to be on their own or they want to be part of an informal group on the roof park





Scale 1:400



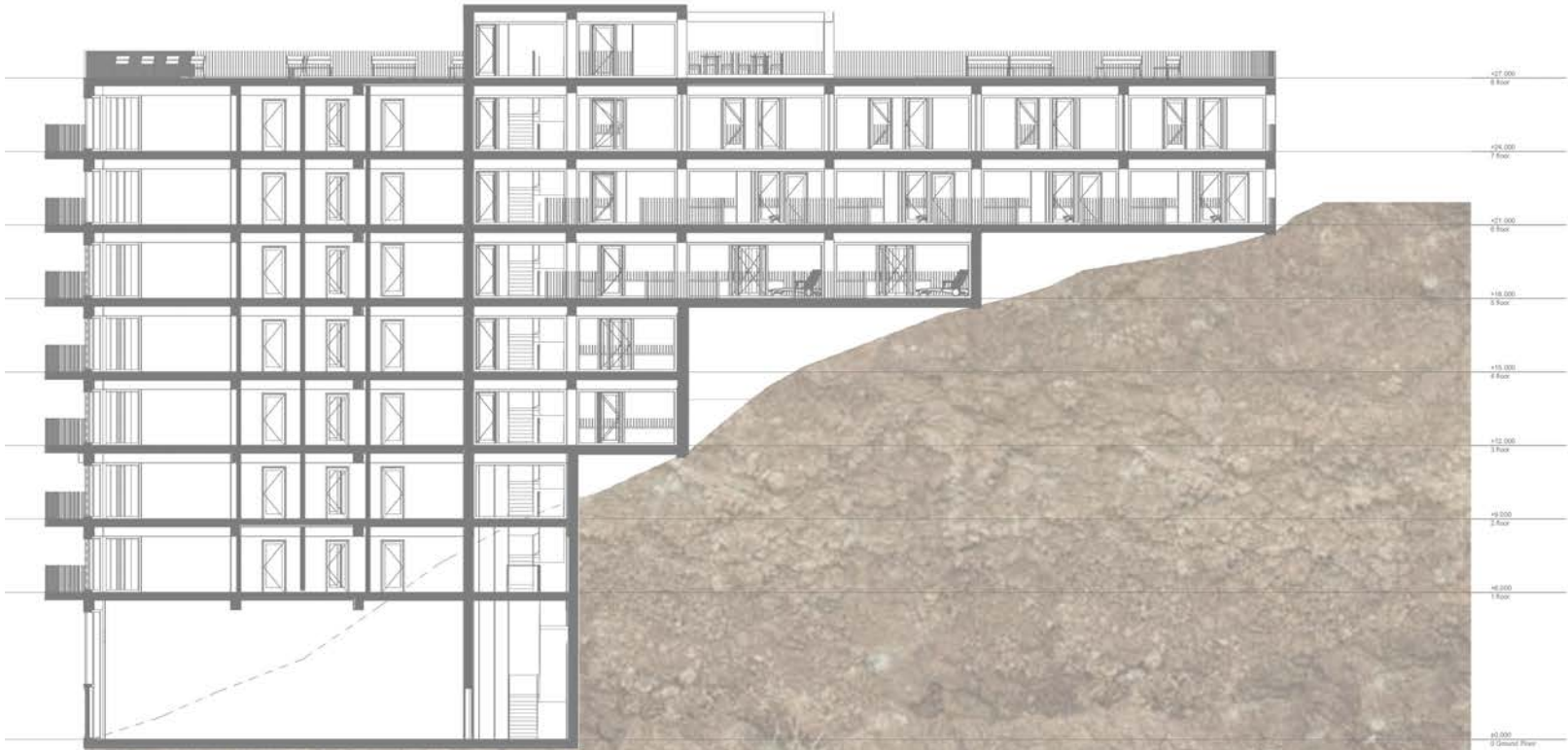
Urban farming can be a platform for growing food and can be organised by residents or the potential cafe on the ground level. It promotes healthy lifestyle and can create even new jobs.

The public roof park consists of kitchen with open terrace and urban farm. Cooking and urban farming are health-promoting activities which creates more attractive outdoor environments and promote good mental and physical health

Buildings are placed between natural environments in order to make stronger the connection built-natural environments and provide good visual and physical access to nature

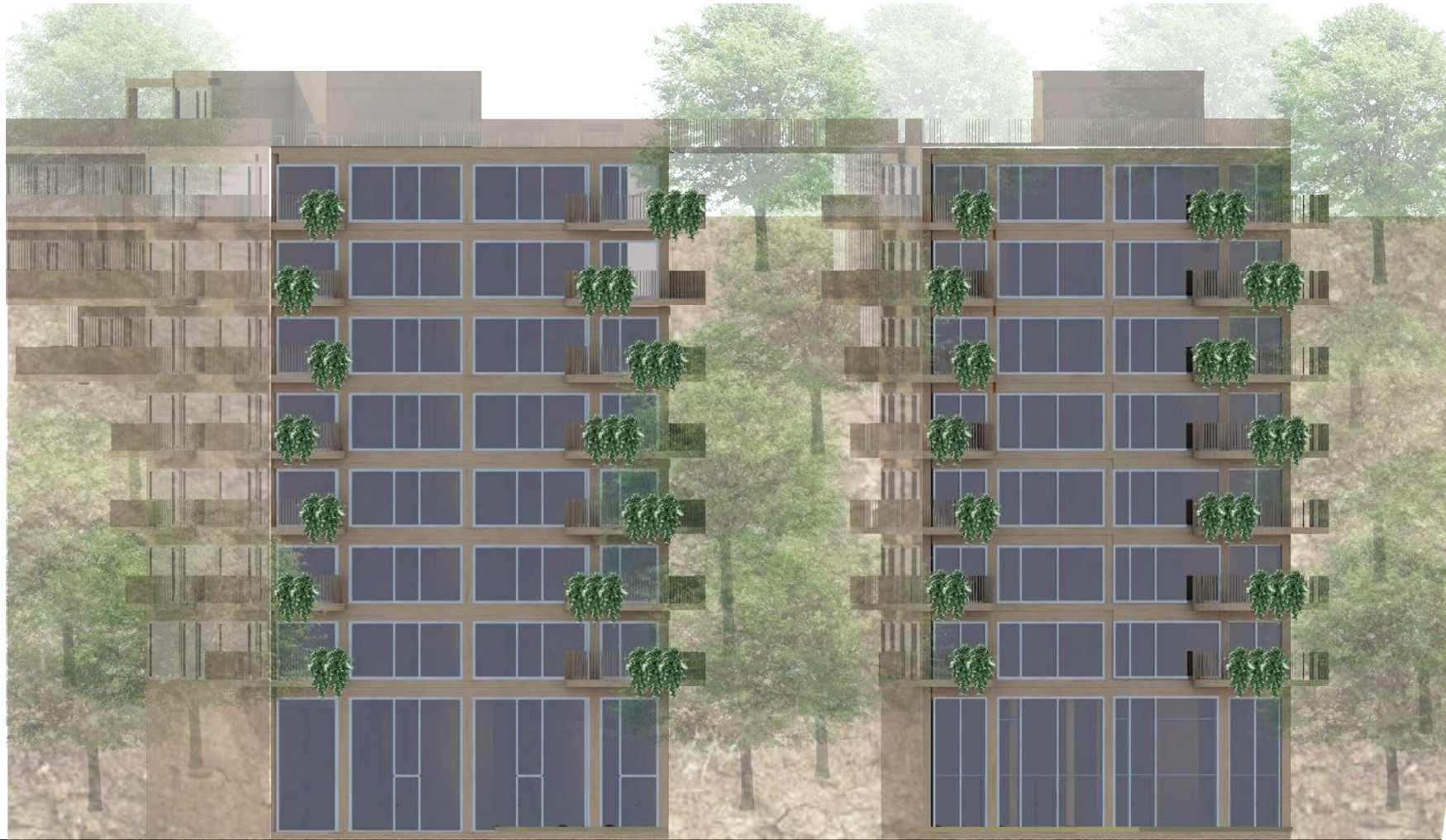
By following the terrain landscape and the height of the neighbouring buildings, the new house adapts to the site conditions

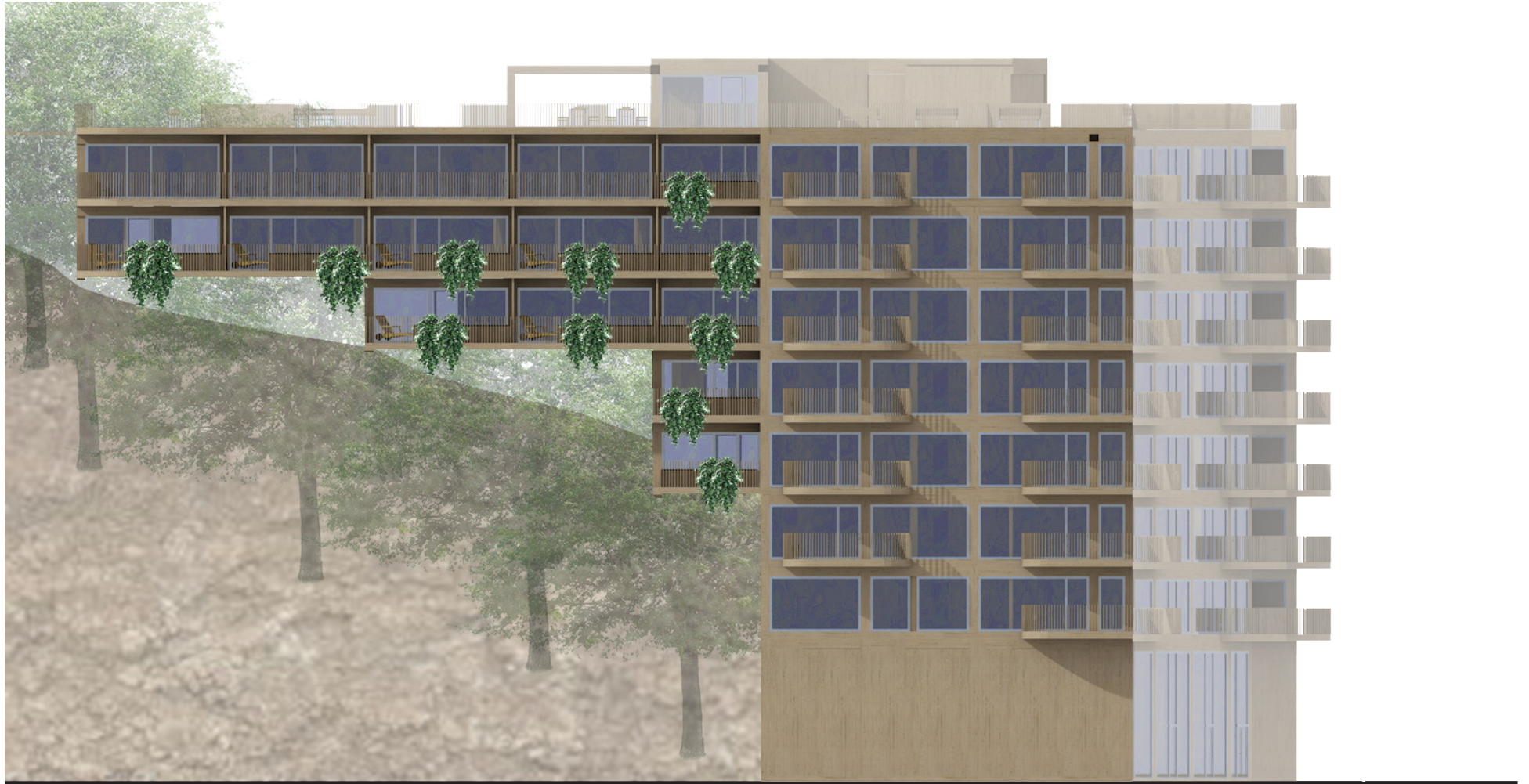
Introducing a new path through the building and connecting the roof park with the park behind increases the walkability of the area

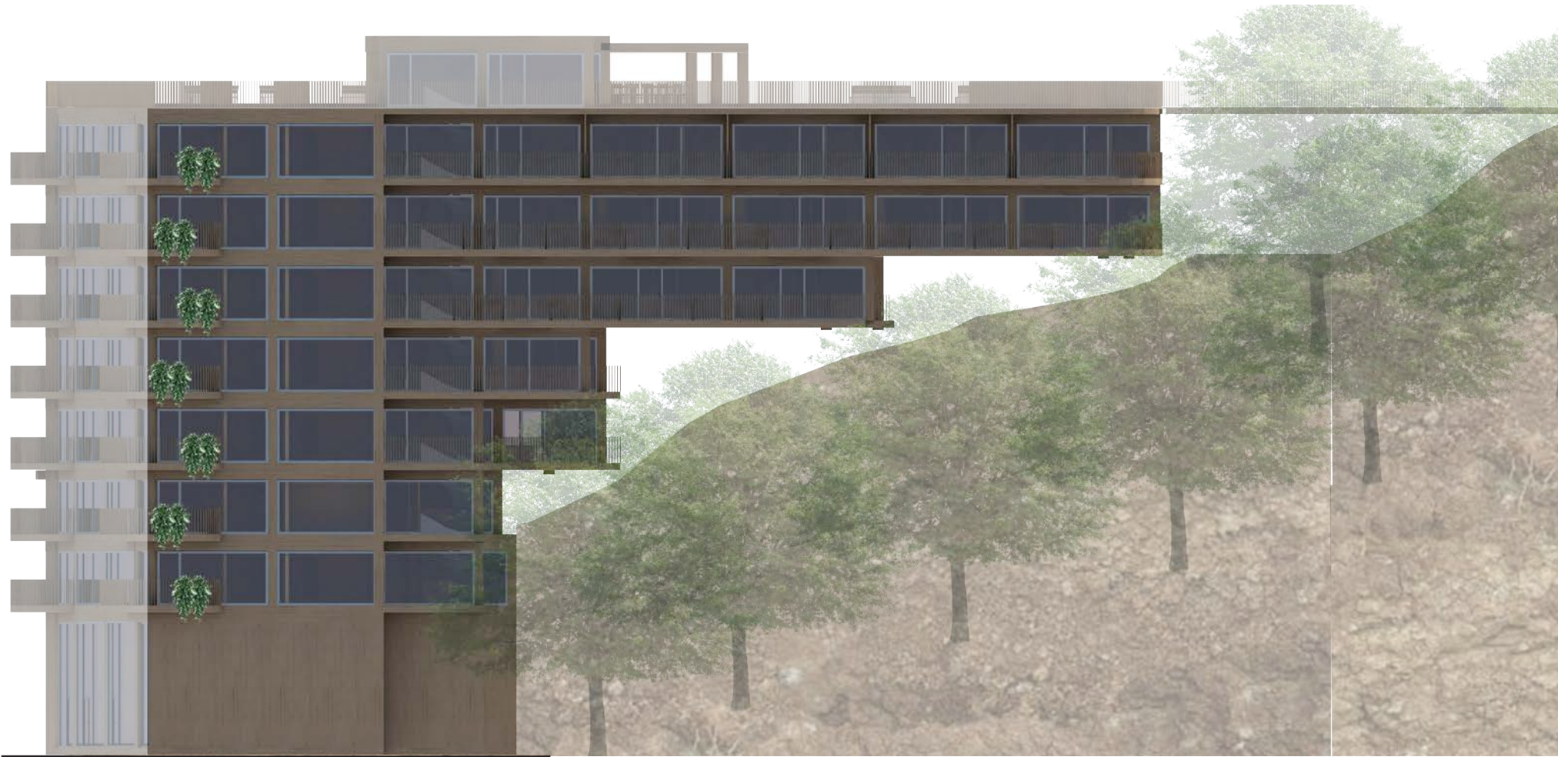




Scale 1:300

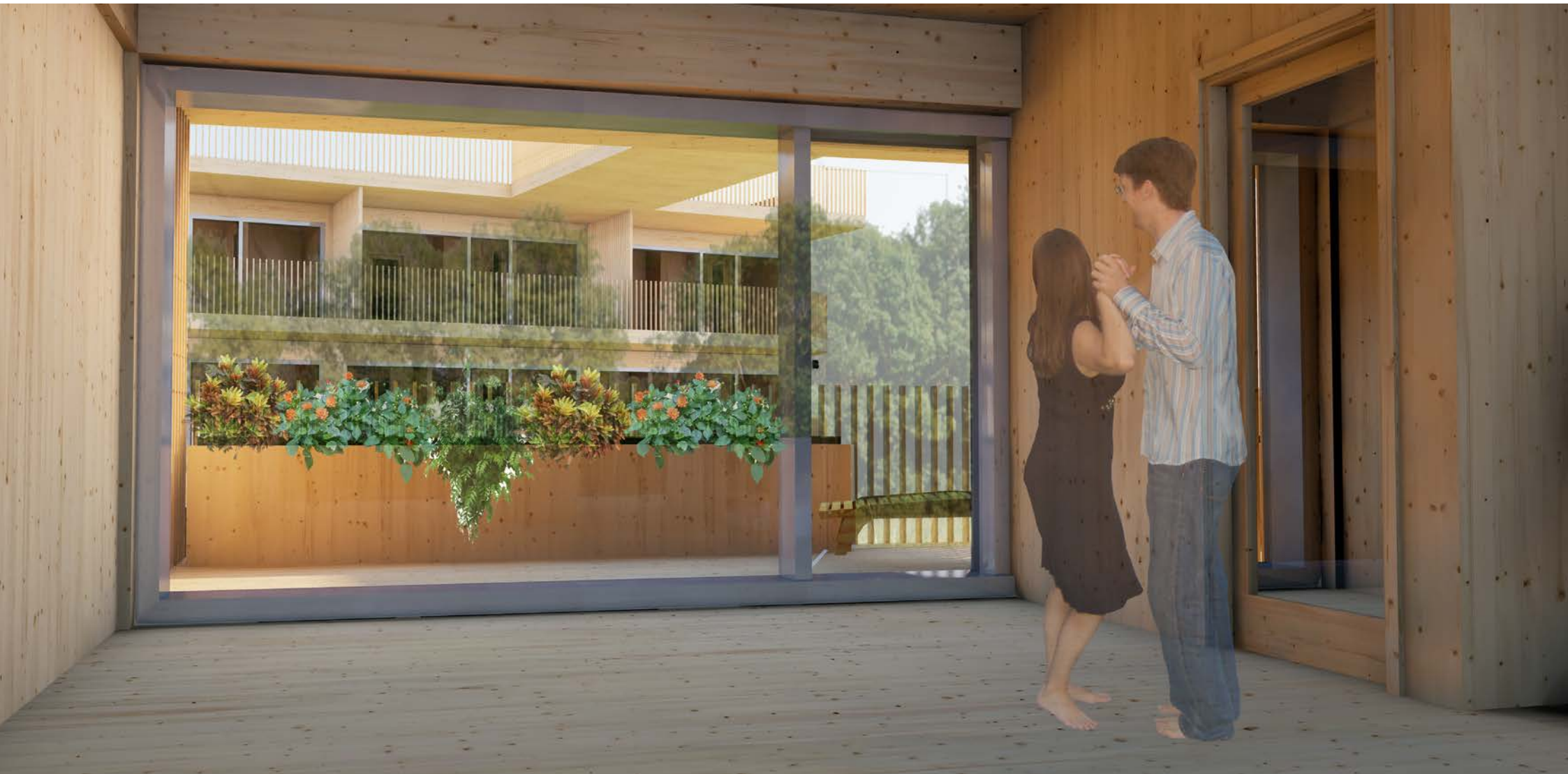














DISCUSSION

HEALTH-PROMOTING MULTIFAMILY HOUSE

In the research part, it was difficult to find references on health-promoting housing because most of the references are from healthcare architecture and they cannot be applied to housing context. It was also difficult to find references on biophilic design in multistorey housing because there is a lot of research which proves that biophilic design can enhance residents' physical and mental health but there is so little evidence. It would be better if health-promotion and biophilic design could be better defined and there would be more reference projects to look at. Today everyone seems to know that health-promotion is useful and that we need it in different areas but there are almost no architects who base their designs on this concept. My interpretation of health-promotion is healthy behaviour, health equality and stress reduction.

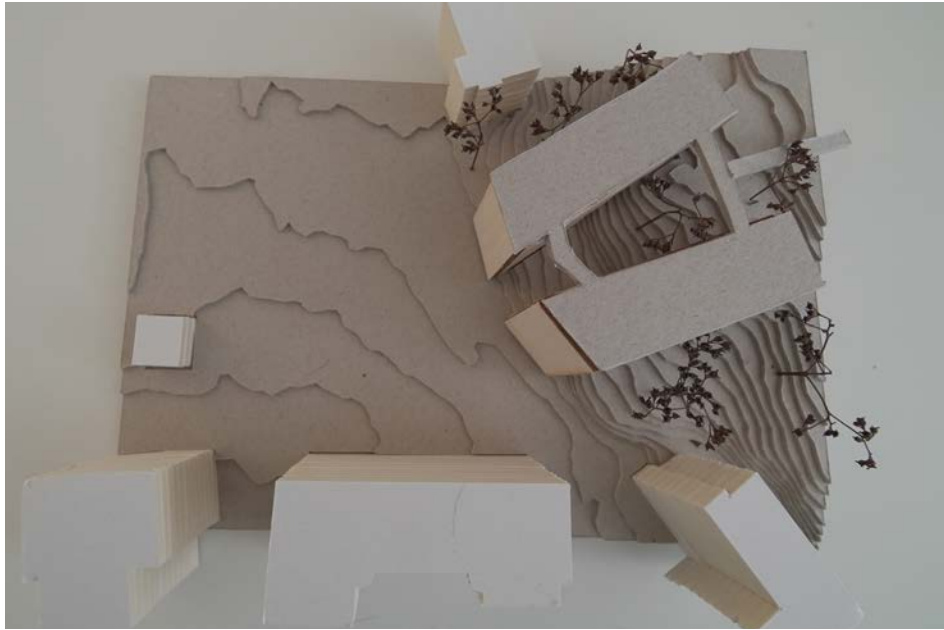
In the second part of the project, four design criteria were set: maximum daylight and good orientation, physical and visual access to nature, health-promoting spaces and adapt and stand out in the context which helped to develop the concept design. They were decided after the research and context analysis.

In the process, it was chosen potential site which is planned for a new development and that was a big challenge for the concept design. The big height difference made it harder to work with health-promoting principles. It could be better maybe if the site was chosen because of site parameters that work good with health-promotion. Working with access to nature and taking away part of nature where the buildings will be built can be problematic. This contributed to creating a public roof park which will "give back" the greenery and give something extra to the residents and other people. It was decided to work not only with the residents but also with other people who could benefit from the new design. Therefore, the roof park consists of public kitchen with open terrace and urban farm which are opened for everyone.

CONCLUSION

Health-promotion and biophilic design can be applied within every housing context. They can add and strengthen few architectural qualities such as daylight which influence directly residents' mental health. They can also make more attractive and calm environments where residents will enjoy living at and encourage better relations between people and nature. Nevertheless, there is a need for more research on health-promoting environments and how architects can put this knowledge into practice. Working with experts from different areas such as healthcare can provide architects with more knowledge about users' needs and make them more aware how they influence residents' health.

THE PROCESS



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