ECOBLOCK

Transforming a large scale housing block into an urban ecovillage.

Julia Malm
Master Thesis 2020
Chalmers University of Technology
Department of Architecture and Civil Engineering
Building Design for Sustainability
Examiner: Paula Femenias
Supervisor: Walter Unterrainer

ABSTRACT

In Gothenburg there is a current lack in housing that needs to be resolved through a production of more homes. At the same time the building industry causes more than one fifth of the total greenhouse emissions in Sweden which must be considered when proposing new development (Boverket, 2017). Another cause of greenhouse emission is household consumption, which the city of Gothenburg has a goal of reducing. This too needs consideration. To tackle these issues this thesis proposes that we need to look at development with a holistic solution concerning housing such as (urban) ecovillages. This typology of housing community can provide a framework which can help to ensure that the final project considers all aspects of sustainability; social, cultural, ecological and economical. The aim of this thesis was to develop a proposal for such a housing community.

Site, program and design of the proposed development have been concluded through an investigation and evaluation process. Each choice of solution is presented and argued for in respect to negative and positive impact. The resulting proposal is to add an urban ecovillage containing housing and communal program to the roof of an existing building while, at the same time improving the housing situation for the current residents of said building. This strategy of development could help densify the city, lower costs of housing and lower emissions in connection with construction. A program of communal spaces that offer the possibility to share resources could also lower emissions in connection with household consumption. This thesis concludes that the proposed transformation is a feasible way of sustainable development with positive impact socially, economically and ecologically. New forms of housing should improve the situation for all people in society so that eco living is not just for an elite group.

Keywords :
urban ecovillage, housing, sharing economy, community, low impact

ECOBLOCK

Julia Malm

Master Thesis 2020

Chalmers University of Technology
Department of Architecture and Civil Engineering
MPARC, Architecture and Urban Design
Building Design for Sustainability

Examiner: Paula Femenias
Supervisor: Walter Unterrainer

CHALMERS
UNIVERSITY OF TECHNOLOGY

TABLE OF CONTENTS

STUDENT BACKGROUND

PERSONAL MOTIVATION

I grew up in a single-family house, but since moving from my parental homehave lived only in rental apartments.

It has many perks such as lower living costs, help with maintenance, space efficiency and closeness to neighbours. For me they have also been closer to food markets, public transport, shops and other services.

What I've found lacking are spaces to interact with the community. Many times, all that you share with your neighbours are the staircase, trash room, washing room and storage facilities. Sometimes you also share a courtyard, but it's not a guarantee that you can use it as you wish. The typical single-family house does not provide any more shared spaces than apartments. What it does offer is the possibility to catch your neighbour in their garden and have a small chat. This casual interaction cannot be translated into waiting for the elevator together for five minutes.

By working with a combination of urban housing and the ecovillage typology I have had the chance to include things that I lack in my current housing situation; communal spaces and urban gardening. This project has given me the chance to vision how I would like apartment living to be and can hopefully act as a personal reference in my future work life.

WHAT, WHY, FOR WHOM

LACK OF HOUSING

Gothenburg has almost six hundred thousand inhabitants, and approximately one million live in the whole region (Göteborgs Stad, 2020). The problem is that there are not enough homes for these inhabitants. An inquiry done by Boverket in 2019 showed that all thirteen municipalities of the Gothenburg region reported a housing deficit (Boverket, 2019).

The lack of housing has resulted in a growing number of homeless. These are people without any other social issues except lacking a home (Kruse, 2018). This group now accounts for half of the city's five thousand homeless (SVT, 2020). At the same time there are also around 28 000 young adults who are not able to move to their own home or who are living in uncertain and sometimes very expensive sublet situations. Less than half of adults between the ages 20-27 own their own home or have a first-hand lease (Hyresgästföreningen, 2019).

The most common forms of housing in Sweden are privately owned single-family houses, row houses, duplexes, rental apartments and tenant-owned apartments (SCB, 2020). One way of getting a home would be to get a contract for a rental apartment. The housing agency Boplats provides a queue for rental apartments in Gothenburg. The site used to be an online marketplace where both private and municipal housing companies advertised. In the fall of 2019, the agency changed their policy and became a strict housing queue causing many private companies to abandon the site and advertise elsewhere (Soxbo, 2020). The current queue system only follows amounted queue days which eliminates discrimination of applicants. In 2019 the average queue time were almost six years and the largest portion (61%) of rental contracts were given to people with between four and eight years of queue time. You can become a member from the day you turn 17 (Boplats, 2019). The majority who start queuing at this age will still not get an apartment until the age 21-25.

Another way of getting a home would be to buy a house or a tenant-owned apartment. The average price for a single-family house in Gothenburg is currently five million swedish kronor and three million for a tenant-owned apartment. The price of a tenant-owned apartments has increased by the double since 2008 (Sund, 2019). These costs of housing are not only affecting groups who are economically disadvantaged, but also households with average income (Stevik, 2019).

Since not everyone has the means to save enough money to buy a house or an apartment, the fastest way of supplying the most amount of people with homes would be to build rental units to shorten the queue time on Boplats.

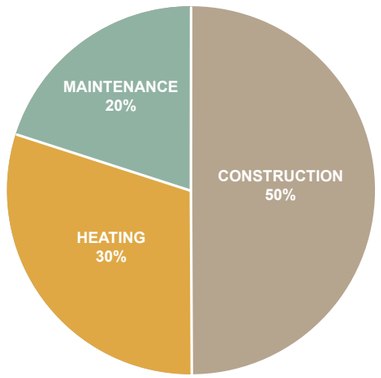


FIGURE 1 *Sweden's building indstry emissions per area in 2017. Illustration based on statistics from Boverket (Boverket, 2017).*

BUILDING INDUSTRY

To reduce the housing deficit there is a need to produce more homes, but construction and buildings require a lot of energy and result in high levels of emissions. In Sweden the building industry annually emits around 12 million tonnes of CO_2 eqvivalent emissions domestically and another 6 million tonnes by imported goods. This constitutes around 20% of the total annual emissions. Within the building industry half of the total emissions can be accounted to construction, a third to heating and the rest to maintenance.Since the 90s emissions due to heating has been reduced, while emissions due to construction has not shown any major change (Boverket, 2017). Going forward the focus have to shift towards also reducing emissions related to construction (Boverket, 2018).

HOUSEHOLD CONSUMPTION

When constructing new homes, we also need to look at how to reduce the consumption of the households within. In 2017 the measured total consumption (including housing, food, travel, investments, public services and other) resulted in circa 9 tonnes greenhouse gas emissions per capita in Sweden (Naturvårdsverket, 2020).
The goal of the city of Gothenburg is that by 2035 this will be reduced to below 3,5 tonnes per capita (Göteborgs Stad, 2014).

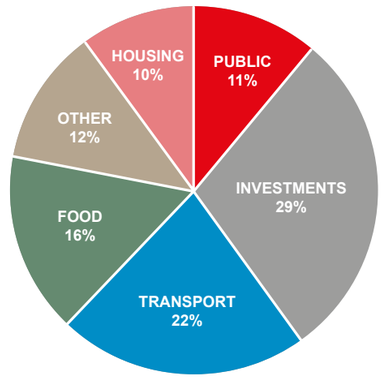


FIGURE 2 *Sweden's consumption-based emissions per area in 2017. Illustration based on statistics from Naturvårdsverket (Naturvårdsverket, 2020).*

Within households food and transport answers for the larger part of the total emissions. In household transport the majority (70%) of emissions are from domestic travel while for emissions related to food 60% are related to imported goods (Naturvårdsverket, 2020).

Therefore, to reduce household consumption we can start by reducing emissions in connection to imported food and domestic travel. For example, by travelling less, using transport methods with lower CO_2 emissions, sharing the transports, and to change both the consumption and production of our food. The consumption of other goods (clothes, toys, appliances, tools etc) can be reduced by consuming less, use renewable resources and to share instead of individual ownership.

ECOVILLAGES AS A MODEL

So how do we produce housing at a higher rate while reducing the negative impact of construction and our household consumption? As this problem spans over many areas this thesis proposes that we need to look at solutions with a holistic approach. Such a typology of housing that works with holistic solutions are ecovillages.

Ecovillages are communities that are defined with the aim to be sustainable on all four levels; cultural, social, ecological and economical (Global Ecovillage Network, 2020). These communities use different strategies to try to reduce their environmental impact and energy consumption as well as help its residents adopt environmentally sustainable behavior.

Some strategies are for example using materials from renewable resources, reusing and recycling materials and components, different variations of sharing economy and communal spaces, and to have part of the food being locally produced with ecological and circular farming methods. Applying the concept of the ecovillage while designing new housing could provide solutions for reducing emissions related to consumption as well as construction.

THE COST OF HOUSING

With a solution to build rental apartments to lessen queue time there is a need to adress the economy of the project. Newly built rental apartments in Sweden are reported to be up to 70% more expensive than the existing housing stock (Fastighetskontoret, 2018). This is worrying since the large price difference can lead to social groupings based on income level where the low-income household have problems competing on the housing market. The risk is that in the long run this will result in a large group in society that can't afford the cost of any type of housing.

The challenge is then to keep costs down to provide affordable housing, without this being the cause of higher emissions in consumption or construction.

HOW

GOAL AND AIM

The goal with this thesis was to design an urban housing block in the city of Gothenburg that follows the ecovillage definition as well as incorporate some functions found in ecovillages.During the process it developed into an addition to and transformation of an existing housing block, as opposed to a completely new development.

The overall aim was to explore concepts such as sharing, urban farming and low impact living in relation to urban housing. By translating this originally rather rural movement in an urban environment the hope was to develop a project that could lessen its environmental footprint while at the same time give opportunities for its inhabitants to be more social within their community.

The personal aim was that through the process of investigation and design this thesis could be a way for the author to gain deeper knowledge of low impact living and alternative housing. With the hope that skills and knowledge learned can be useful in continued architectural work.

RESEARCH QUESTIONS

What program, spaces and qualities are needed for an urban ecovillage?

How can a focus on lowering the negative impact of construction and household consumption affect the design of an urban housing project?

How can communal spaces be designed to function both for a smaller community and the public in an urban context?

METHOD

The emphasis of the thesis has been to develop a design proposal for an urban ecovillage. Researching and evaluating existing urban ecovillages and other urban communities have been made in order to guide the design process. Definitions are quite open in their statement of what an ecovillage is, which leads to there being many different types of ecovillages in the world. Research on ecovillages have been made to create a kind of personal definitionto be used as a frame for the project.

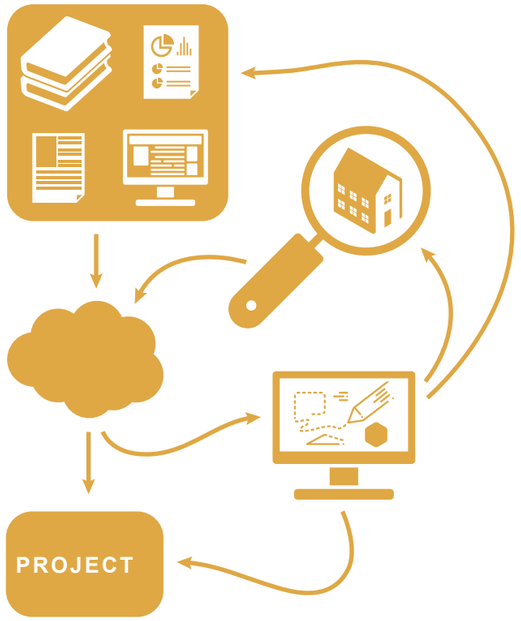


FIGURE 3 *Illustration of how research methods have been used.*

This has helped with choosing criteria for an appropriate site, program and the resulting design. This research have mainly been done on Swedish ecovillages, both rural and urban. It has been conducted through literature references, scholarly articles, reports and case studies. Three books have been used as the main source of information on Swedish ecovillages and general guidelines;

Ekobyboken: frihetsdrömmar, skaparglädje och vägar till ett hållbart samhälle (Atlestam et al, 2015)*, Ecovillages: A practical guide to sustainable communities* (Bang, 2005) *and Living Dreams: Om ekobyggande - en hållbar livsstil* (Berg, Cras-Saar & Saar, 2002).

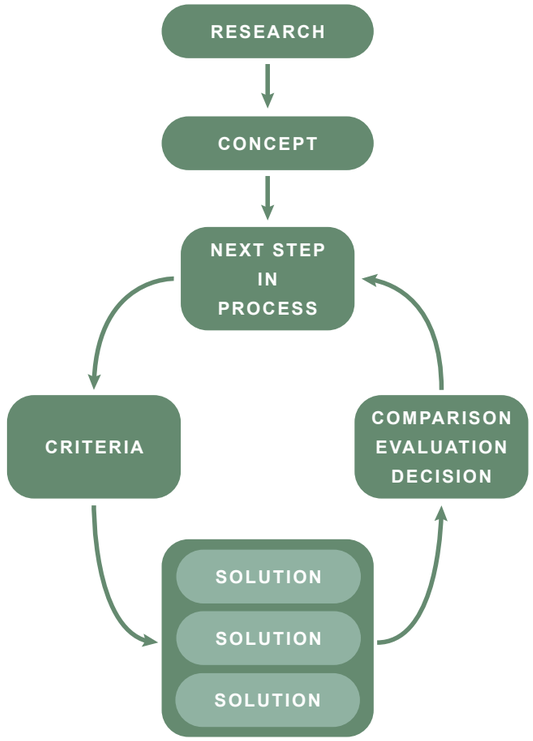


FIGURE 4 *Illustration of the process of design.*

PROCESS

In addition to create an urban ecovillage, this thesis had a goal to reduce negative impact of the proposed development. In order to achieve this goal a comparative process have been used. Every step involved a definition of criteria, a production of solutions, an evaluation of these solutions and then an argument for the selected choice. By displaying this process, the hope is to aid readers in understanding the resulting design.

Mapping, hand sketching, digital sketching and models have been used to develop a design. The models have been both for simple space investigations, program investigations as well as detailed design sketches.

DELIMITATIONS

Choosing Gothenburg as the base for the project is of personal interest of the author. Due to this the thesis have not investigated other cities as possible locations for an urban ecovillage.

This thesis focuses on how to relieve the housing deficit in a city, while working towards lowering emissions and costs. It will not discuss how to make rural communities thrive as an alternative to urbanization. Neither does it question if living in cities is sustainable or not.

Even though technical systems, such as those for waste and water management, are an important part of ecovillages this thesis have not worked with them actively. Instead the thesis has looked at the farming and communal aspects of ecovillages and how to apply these to the urban setting.

During the process the project evolved from being a design proposal for a new development into a transformation of an existing building. The state of the construction of the transformed building have not been investigated and have been assumed to withstand an additional floor.

READING INSTRUCTIONS

The thesis is divided into five parts; Background, Context, Proposal, Process and Discussion.

The chapter Background contains a description of ecovillages and how their program has been translated into an urban context. It showcases case studies that have been relevant, and it presents the process of the site selection. Together these parts have shaped the context of this thesis. In the chapter Context the selected site and its surroundings are described through text, photographs and illustrations. The chapter Proposal explain the suggested program and design of this thesis project. How this design has been developed is shown in the chapter Process.

The thesis concludes with the chapter Discussion where the project and process are discussed and reflected upon.

BACKGROUND

DEFINITIONS
ECOVILLAGE
URBAN TRANSLATION
CASE STUDIES
SITE SELECTION

DEFINITIONS

There are many variations of definitions for the concepts listed below. This thesis has chosen ones that are commonly used.

ECOVILLAGE
An intentional, traditional; rural or urban community that is consciously designed through locally owned, participatory processes in all four dimensions of sustainability (ecological, social, cultural, and economical) to regenerate their social and natural environments (Global Ecovillage Network, 2020).

COMMUNITY
A group of people who identify with each other. The association could be based on geography, history, vision, purpose, philosophy, or common social, economic, or political interests (Merriam-Webster, 2020).

INTENTIONAL COMMUNITY
A community designed and planned around a social ideal or collective values and interests, often involving shared resources and responsibilities (Dictionary, 2020).

SUSTAINABLE ARCHITECTURE
It is not a style; it is the product of an attitude - with respect to one's own work, with respect to the people for whom we build and with respect to the world in which we realise our buildings (Drexler & El khouli, 2012).

SUSTAINABLE DEVELOPMENT

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it the concept of 'needs', in particular the essential needs, to which overriding priority should be given. Sustainable development requires meeting the basic needs of all and extending to all the opportunity to satisfy their aspirations for a better life (World Comission on Environment and Development, 1987).

SOCIAL SUSTAINABILITY
A process of creating sustainable, successful places that promote wellbeing, by understanding what people need from the places they live and work. Social sustainability combines design of the physical realm with design of the social world to support social and cultural life (Social Life, 2011).

CULTURAL SUSTAINABILITY
The integrated pattern of human knowledge, beliefs, and behaviour that depends upon the capacity for learning and transmitting this knowledge to future generations (Merriam-Webster, 2020).

ECOLOGICAL SUSTAINABILITY
Ecological sustainability includes everything that relates to the earth's ecosystems. Amongst other things, this includes the stability of climate systems, the quality of air, land and water, land use and soil erosion, biodiversity (of both species and habitats), and ecosystem services (e.g. pollination and photosynthesis). Production of goods and services must not compromise the carrying capacity of ecosystems, i.e. nature must be able to regenerate utilised resources (KTH Sustainability Office, 2020).

ECONOMIC SUSTAINABILITY
First definition is economic development that does not have a negative impact on ecological, cultural or social sustainability. In the second definition, economic sustainability is equated with economic growth, which is considered sustainable as long as the total amount of capital increases (KTH Sustainability Office, 2020). As the project uses ecovillages as a model for sustainable housing development the first definition has been most relevant to this thesis.

ECOVILLAGES

According to the organization Global Ecovillage Network (2020) an ecovillage can be defined as

" an intentional, traditional; rural or urban community that is consciously designed through locally owned, participatory processes in all four dimensions of sustainability (ecological, social, cultural, and economical) to regenerate their social and natural environments "

Ecovillages in Sweden are usually found in rural settings or in the outskirts of cities (Atlestam et al, 2015). For the most part ecovillages are planned, designed and constructed by the inhabitants of the community. Common housing typology are single-family houses in various sizes, but there are also examples of row houses, apartments and collective households. Ownership are by housing cooperatives, housing companies or private.

In addition to housing the ecovillages in many cases have a communal space such as a kitchen, meeting room, living room or other. They also contain some form of farming such as farming fields, agroforestry, permaculture, greenhouses and kitchen gardens. The communities have different levels of communal activities such as farming festivals, labour days, sharing tools, sharing knowledge, communal cooking etc.

Construction often consist of regenerative materials, such as straw, wood, earth and clay, or reused construction parts. An important part of ecovillages is the use of circular or local systems in relation to water, waste and energy. These systems include the collection of rainwater, local treatment of grey- and blackwater, composting, recycling, natural ventilation, solar heating, solar panels, and photovoltaic cells (Bang, 2005) (Atlestam et al, 2015) (Berg, Cras-Saar & Saar, 2002).

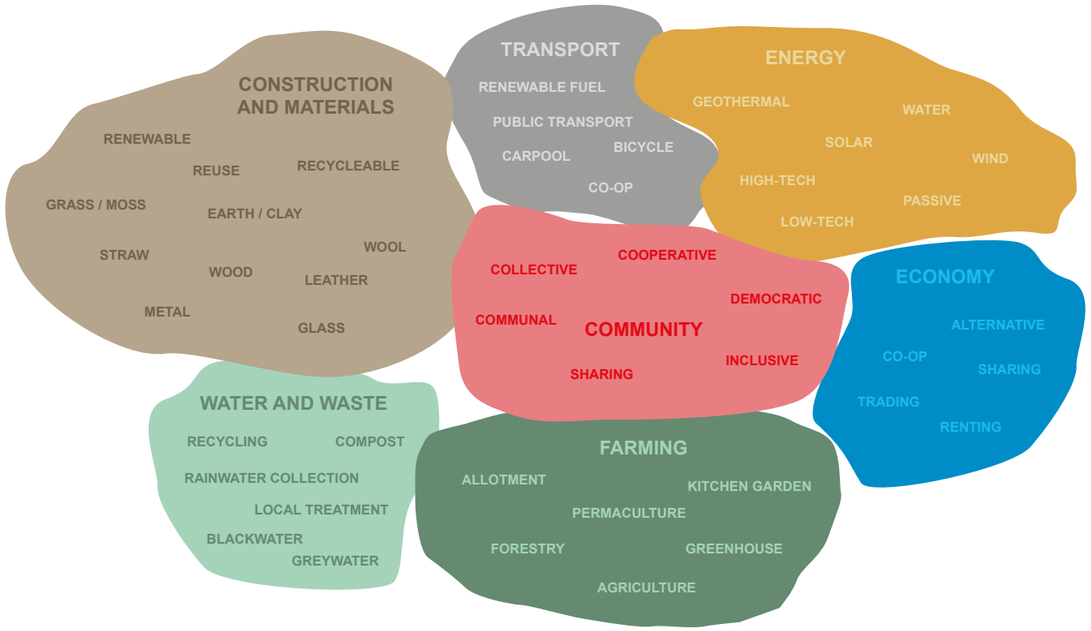


FIGURE 5 *Features of an ecovillage, glossaray by the author.*

THE MOTIVATION

According to Per Berg (as cited in Atlestam et al, 2015) who is a professor at SLU and living in the Håga ecovillage one dream for people moving to an ecovillage is to be able to live healthy, environmentally friendly and with a low impact on earth. The other dream is to be able to live in a local community or neighbourhood where you know your neighbours. It is also to be able to live a more independent and self-administrative life, in somecases even to be self-sustaining.

In the example of Urbana Villor the project started with a couple of families that gathered around a dream of an urban villa. Pontus Åqvist, one of the residents, says (as cited in Atlestam et al, 2015)

" We were all around 35, some had kids, and we wanted to create that safety and greenery that is connected to living in a one-family house, but still keep the closeness with the city. Not having to drive a car, be more open for social connections and still have sustainable living. "

The dreams and visions for each ecovillage are as diverse as the communities that live there. Even though there is much resemblance between them there is also a large variation of what an ecovillage can be. In some cases, it's a small urban apartment house and in other cases it's a permaculture farm.

MAKING IT WORK

Moving to an ecovillage can require a lot of change in the usual day to day life. This can be a challenge. If it takes too much time to buy environmentally friendly products or to sort the waste many won't do it. If it's too much work, expensive or uncomfortable to travel by train and buses, many chose the car. If it is also more expensive it can become an impossible life (Berg, Cras-Saar & Saar, 2002).

Another challenge can be managing the social aspects of the ecovillages such as how to solve disputes, how to divide land, how to organise communal labour and how to take care for communal spaces etc. These issues require work with decision processes and communication.

Social aspects of communal life are not just limited to relationships, it concerns physical space as well. To be able to live in a shared environment people also need room to be by themselves. There is a need for a balance between public and private spaces. Per Berg (as cited in Atlestam et al, 2015) argues that for ecovillages to function well they need spaces in four different zones: private, semi-private, semi-public and public zones.

The private zone is the home, a protected environment where no one can enter that hasn't been invited. Together the private zones should form smaller groups of around 4-6 units that share a semi-private zone. This area can either be fenced off to mark its more private nature or be in the form of a communal room that is accessed by the group. Semi-public zones can be roads, squares and green areas. They are spaces where guests and visitors are welcome to stay for some time, but not permanently. The public zone is open for all including visitors and can be a larger square, parks, roads or a public building.

A lack of private and semi-private zones can create stress since there is no space where inhabitants can rest from social activities. Lacking semi-private zones reduces connection with neighbours which can cause conflicts. Without semi-public and public zones, the ecovillage is closed off from society and has a risk of becoming a gated community. Working with these zones is therefore important when designing an ecovillage (Atlestam et al, 2015).

TO FARM OR NOT

During development most ecovillages have plans for some type of communal or private farming, or to keep animals. At the same time experience from many of the older ecovillages show that it can be hard to keep the ambition and interest alive. Per Berg says (as cited in Atlestam et al, 2015)

> ” *When dreams of a self-sustaining life comes into battle with a need to work for money and pay living costs, farming is usually on the losing side.* ”

In Åkesta ecovillage the inhabitants started farming with enthusiasm and joy, but then found the work too much for many of them. Nisse Arvidsson, one of the residents says (as cited in Atlestam et al, 2015) he didn’t have time for anything after work. He even had to stop other leisure activities, such as singing in a choir, to have time to take care of the plants. After a few years the pier pressure wore off and some stopped taking care of their farming lots, making it more ok for the people who kept going to take it easier. With this knowledge in hand he says (as cited in Atlestam et al, 2015) that they could have lessened the size of their farming plots instead of having to stress and push eachother so hard.

This realisation has also happened in other ecovillages. Ylva Varvik, from the village Skogsnäs says (as cited in Atlestam et al, 2015) that she in the beginning participated in the large communal growing plots, but that it became too dull to clear hundred meters of carrots after a while. Instead they started having a smaller garden in connection with their house where they could grow onions and beans for household needs. They also became part of a shared greenhouse. The amounted crop doesn’t last all year, but the effort to keep the plants growing is manageable.

These experiences are important to keep in mind before planning a new ecovillage, so that some mistakes hopefully can be avoided.

REFLECTION

As stated earlier the dream of living in an ecovillage is to live healthy and environmentally friendly with a low negative impact. It is also to live in a community and to share your life with the people around you. These wants are not exclusive for those who choose to live in an ecovillage, but not all who want these things have the possibility to realise their dreams. One thing that can stand in the way is not being able to, or wanting to, live in a place where you might have to commute to work everyday. It can also be difficult if you do not have the money, or the time needed, to invest in producing your own home.

The idea of using the ecovillage framework in an urban setting for rental housing is not only to lower construction emissions and household consumption, it is also to bring this alternative housing to a group that might not be able to live this way otherwise. This also means careful consideration is needed for the site, program and design so that people can live without too much extra work or costs.

The spaces that the project in this thesis have worked with are those for housing, community activities and urban farming. Technical systems, such as those for water and waste are equally important in an ecovillage. How to add them properly to a housing development could be a thesis on its own, and did not fit in this one.

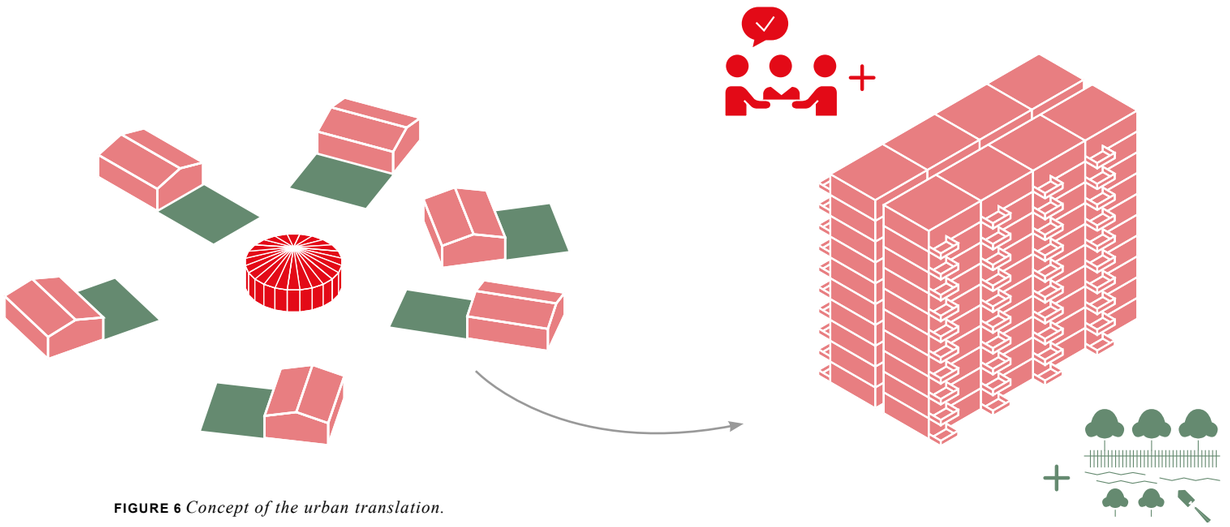


FIGURE 6 *Concept of the urban translation.*

URBAN TRANSLATION

HOUSING

The houses in ecovillages are in most cases designed and built entirely by the residents. This would probably not be the case when translating the typology to urban housing with rental units. More likely it would be designed and built by a contractor. To still let the residents shape their home, part of the program for the ecovillage should be developed through participatory processes with the inhabitants as well as people who live close to the chosen site. Not only is this a replacement of the self-design and self-build, it could also strengthen the bond between them and their care for the spaces they would share.

As described before ecovillages not only have single-family housing. It is also common to share a home in different ways. It can be a collective household, friends sharing, subletting rooms etc. Since the plan in rental units might not be designed by the inhabitants, it should at least offer the possibility for them to live in the way they chose. Rooms and layout could in the design make it possible for different types of living situations. For example by having several rooms in the same size which makes them more flexible for the users to decide which room is used for what.

COMMUNITY

To carefully plan spaces also become important when looking at private and public areas within the ecovillage. For an urban ecovillage this can be extra sensitive since surrounding neighbours are usually much closer than in rural settings. As described by Per Berg (Atlestam et al, 2015) the ecovillage need a gradient of zones where different kinds of interaction can happen. The design of these zones would in some cases need to be different depending on what the site allows, the context, the level of urbanity etc. The overall structure of having zones defined as private, semi-private, semi-public and public should still be kept.

The strength of the urban ecovillage is that its community have more access to public spaces than in rural villages. Because of this, the ecovillage need not answer to all the needs of its community. Some things can be found in the surrounding city as well instead.

URBAN FARMING

Another difference between urban and rural areas is the availability of land. This availability affects the cost of land and leads to higher densification in urban areas. For ecovillages it affects the program of the design. Rural ecovillages have access to larger size of land and can therefore afford larger scale of farming than their urban counterparts. Farming in urban ecovillages will either have to be smaller in size, or find new solutions to cover this loss of land.

Larger farming fields can be translated to a shared greenhouse, roof top farming, communal garden or vertical farming for example. Urban ecovillages that consists of row houses such as Understenshöjden (Berg, Cras-Saar & Saar, 2002) can still have a kitchen garden that look the same as it does in a rural ecovillage, but when the community is placed in an apartment block some translation is needed. A larger balcony can for example provide the possibility to keep a smaller herb garden close to the home as in the example of Urbana Villor (Atlestam et al, 2015).

CASE STUDIES: URBAN COMMUNITIES

FIGURE 7 *Illustration of Understenshöjden.*

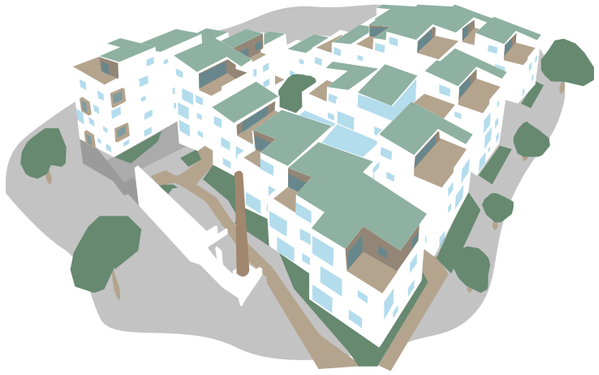


FIGURE 8 *Illustration of Vindmøllebakken.*

FIGURE 9 *Illustration of Urbana villor.*

UNDERSTENSHÖJDEN

Bengt Bilén and HSB
Stockholm, Sweden7
Built 1996
Row houses

Understenshöjden is an urban ecovillage located in Björkhagen in Stockholm. It was built during 1994 - 1996. Planning of the project was done in cooperation with the inhabitants which ensured that many of their wants for their housing was met. The area consists of 44 apartments in both two and one floor houses, a community house that also contain a laundry room and heater, and a kindergarten. The subway station is at five minutes of walking which means that the inhabitants have good access to public transport and other infrastructure.

The ecovillage works with the different zones discussed by Per Berg. The houses are divided into five smaller housing units that are placed in such a way as to create more private areas shared by only the people within the unit, the semi-private zone. Parking is done outside to divide the public street and the semi-public housing streets (Berg, Cras-Saar & Saar, 2002).

VINDMØLLEBAKKEN

Helen & Hard
Stavanger, Norway
Built 2019
Apartments and row houses

The project is the first to be realised within the Gaining by Sharing model initiated by Helen & Hard and Indigo Vekst. It is a model for communal living that works within a commercial housing market. The goal is to create social, environmental, economical and architectonical advantages through community and sharing (Gaining by sharing, 2020).

Vindmøllebakken consists of 54 housing units, with 40 of them being a part of a co-living community. Each unit consits of a private apartment with all necessary functions, while at the same time benefitting from the multiple shared spaces. These are a communal area with kitchen, guest apartment, roof terrace, amphitheater, laundry room, library, garden room, greenhouse, carpool and playground. They are distributed in different locations throughout the whole housing unit. The intention with the project is to reduce carbon footprint while increasing life quality (Helen & Hard, 2020).

URBANA VILLOR

Hauschield + Siegel
Malmö, Sweden
Built 2008
Apartments

Urbana villor was created from the vision of an urban house. The dream was to be able to enjoy both the city life and the villa life. By placing several of these houses on top of each other the costs of each unit was lowered and affordable for the inhabitants. The project consists of seven apartments, five in the building towards the street and two in a smaller house in the courtyard (Hauschild & Siegel, 2020).

To minimize communication spaces the staircase was placed on the facade of the building and the elevator opens directly into each apartment. The balconies towards the yard are designed to be the garden of each apartment. They are large and have a thicker slate to accommodate a deep soil layer necessary for larger plants. The staircase on the facade was designed to act as the vertical street that connects the villas. The residents share the yard, a greenhouse and a roof terrace (Atlestam et al, 2015).

RELEVANCE TO THESIS

The case studies were chosen as they all in some way work with housing a community, in different scales.

Understenshöjden acted as a reference both to an urban community as well as an urban ecovillage, which has informed the proposal and the research on ecovillages. The project was an inspiration for the thesis proposal in its way of working with levels of private and public. The way the housing is placed in smaller groupings and thereby creating smaller communities within the large community has been translated to a vertical counterpart in the proposal.

Urbana villor has been used as reference for such a smaller community unit. The inspiration resulted in the vertically placed housing units that will be shown in the proposal.

Vindmöllebakken gave examples of shared spaces and their program. It showcased that shared spaces can be placed in different locations within the structure and not needed to be placed together. The project also acted as a reminder to not just have program that is needed, but also, to add program that makes living more enjoyable. To add spaces where the residents can relax such as the roof terraces and garden room.

CASE STUDIES: TRANSFORMATION

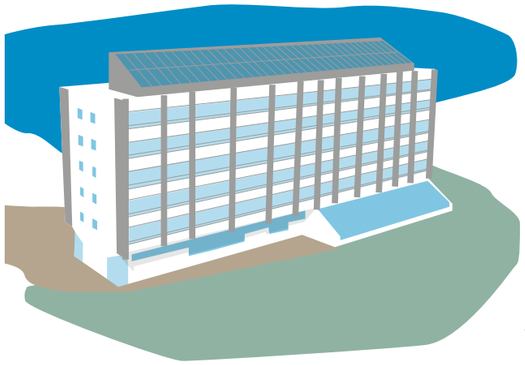


FIGURE 10 *Illustration of Solar House Gårdsten.*

FIGURE 11 *Illustration of Grand Parc.*

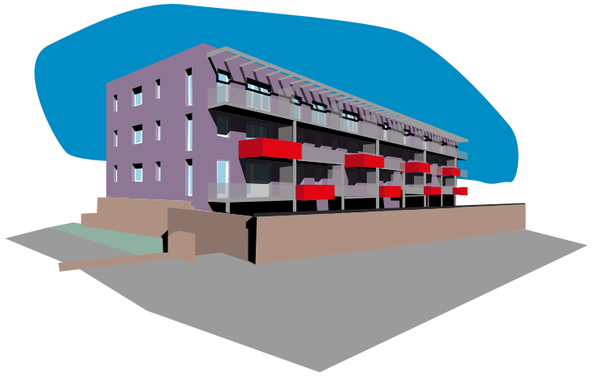


FIGURE 12 *Illustration of Haus 03.*

SOLAR HOUSE GÅRDSTEN

Christer Nordström Arkitekter
Gothenburg, Sweden
Built 2000
Transformation of apartments

Gårdsten was built in the late 60s as part of the Swedish Miljonprogrammet. From an early age it was characterized by high unemployment, alienation, insecurity and poor maintenance. The design of the houses was brutal, raw and grey. Space outside was described as a no-mans-land. In 1996 a process of social and physical restoration of Gårdsten was started with this project being the first to be carried out. The Solar House project is a restoration of 155 apartments in 10 buildings (World Habitat, 2020). The balconies were converted to glazed balconies, the buildings got added insulation to lower energy consumption and solar cells was installed on the roof for heating warmwater.

On the ground floor the previous open structure was enclosed. A communal greenhouse was added which connects to both laundry rooms and a playroom.This provides a communal space and an activity, as well as the possibility to produce some food for the household (Nordström, 1999).

GRAND PARC

Lacaton & Vassal, Fréderic Druot and Christophe Hutin architects
Bordeaux, France
Built 2016
Transformation of apartments

The project consists of the transformation of three social housing buildings in Bordeaux which together contain over 500 apartments. The original structure was built in the 60s and in need of renovation before transformation. By changing the facade, converting part of the apartment to a winter garden and adding a balcony the apartments were given a major rise in quality. With the winter garden a room was added to each apartment which provides a more temperate indoor climate. Removing the old facade with small openings and installing floor to ceiling windows provide more natural light, giving higher wellbeing and reduces the need for artificial lighting.

The economy of the project is based on conserving the existing building without making important interventions in the structure, the stairs or the floors. The architectonical changes have afforded the building's construction a longer life (Lacaton & Vassal, 2020).

HAUS 01 - 07

Stefan Forster Architekten
Leinefelde, Germany
Built 2002
Transformation of partments

Contradictory to the other case study projects, this transformation reduced the number of apartments. The buildings are located in the former East Germany. During the DDR period high amounts of housing was constructed for workers within the industrial sector. Large scale prefabricated housing constructions. These buildings are now in many places empty due to people moving to more economically stable areas or just moving to other housing types.

Instead of demolishing the buildings this project worked with transforming them to better fit todays standard of housing. This was done by removing the top floors to give the area a more human scale. In some buildings roof terraces were created. In all buildings the facades were renovated with larger windows, new finish and added balconies. Instead of the typical "building in park" houses they were before the bottom floor apartment got an added patio and the buildings were given new entrances (Stefan Forster Architekten, 2020).

RELEVANCE TO THESIS

As the title suggest, the proposal for the thesis is the transformation of an urban housing block. These case studies were chosen as references on how a transformation might be done.

In all of the projects the resulting design gives proof of caring for the inhabitants and their living environment which has been inspirational for this thesis.This care is both in how the projects have dealt with the renovation of the apartments and in the renovation of the facades. Prior to the transformations these structures were seen as ugly, badly maintaned or neglected. Instead of demolishing such structures the projects have all worked with updating them and transforming them into something with greater value. By doing this the houses which contain loved homes for its inhabitants reflect these homes in a positive way and act as a justification for the people who live there.

SITE SELECTION

IMPORTANCE OF THE SITE

In order for the ecovillage to benefit from being in an urban setting the site need to provide some basic functions such as social infrastructure, public transport and greenery. Without functions such as these in the vicinity the inhabitants of the ecovillage would either be isolated or need to commute. Therefore, finding the right site for this project was viewed as highly important.

The whole process of finding, evaluating and selecting a site took about two weeks in total. As a start a design statement was written, and a general program was selected which in combination with the research on ecovillages gave the base for the criteria.

DESIGN STATEMENTS

"The project should provide accessibility both physically and socially as well as be affordable for a larger group."

This statement can be viewed in the general program in the form of affordable rental apartments and a mix in sizes of apartments which would make it more accessible for a larger group.It can also be viewed in the site criteria that the location should be in an area which is not within the more urban, dense and developed parts of the city to lower potential costs for the plot.

"It should provide for basic needs as well as have added values that make living more enjoyable."

The is seen in the general program as the addition of communal facilities to make living more enjoyable and sociable. It is also the base for the site criteria for varied social infrastructure and closeness to varied public transport and bicycle lanes.

"Inspiration for specific program should be found both in the context of the site as well as in ecovillages and other urban communities."

This statement became more relevant for the final program of the proposal.

GENERAL PROGRAM

Affordable rental apartments
As described in the introduction there is a need for rental apartments in Gothenburg. To achieve this the location of the site should be in a part of the city that is less urban, dense and developed. It can also be achieved by a highly densifiedconstruction which would provide the economic base for a new development.

Mix in sizes of apartments within development
To provide housing for different types of inhabitants and creating connections between these different family units. Mixing sizes of apartments also make it possible to move within the neighbourhood which can strengthen social structures and create motion on the housing market.

As stated in *What, Why, For whom* the housing deficit is making it harder for young adults to enter the housing market. Therefore, some of the apartments should be for smaller households.

Communal facilities
Communal spaces and functions can aid towards sustainability in different ways. Sharing can help the social environment, increase likelihood of cultural activities, help save money and reduce consumption in goods. Examples are shared laundry room, sewing room, workshop, free-shop, recycling room, guest apartment, greenhouse, roof terrace, communal kitchen, playroom, café, etc.

Private enterprises
Some spaces could be made available for private enterprises such as a café, bakery, hairdresser, or other smaller buisinesses.

The resulting image of the design statement and the general program was a dense housing block with communal spaces that had good access to public transport and other infrastructure. This image was then used to select the site criterias.

SITE CRITERIAS

Brownfield land / Parking lot
This is to avoid construction on greenfield land in the city which can be better used for greenery, recreation or urban farming. It should be noted that brownfield land and parking lots can have a lot of pollution. Treating soil pollution either costs a lot of money or takes time. Evaluating which measures would be necessary and what the impact of those would be is a thesis on its own and will not be discussed here. It was assumed that these measures would not have a major impact on this thesis' design development.

Less expensive location
Finding a site in an area that is not within the more urban, dense and developed parts of the city could lower costs for the plot. This in turn would translate to lower total project costs.

Size
The minimum size for plots were set to 70m x 70m. This is roughly the size of a square housing block with a green courtyard that can be found in various areas in Gothenburg, such as in Kålltorp (Fig 13). This type of housing block was used in the beginning of the process as a visual reference of how the resulting ecovillage could look like.

Without obstacles for construction
Obstacles could be physical such as wires or abstract such as restrictions on construction due to various reasons.

The remaining criteria were seen as more qualitative than quantitative and was used to compare the sites between each other.

Close to varied public transport & bicycle lanes connected to city centre
Living near diverse public transport and bicycle lanes give a stronger incentive to use alternative travelling methods and reduce the use of cars.

Reasonable travel-time to city centre
For people to see alternatives to car travel as a viable option in their everyday life the travel-time with these alternatives also must be considered.

Close to varied social infrastructure
This can be translated to being close to social services such as healthcare, education, transportation and other public facilities. To these services was also added being close to a food store, restaurants, other shops and exercise facilities. Housing areas situated close to these could reduce car travel as well as create an area active during more hours of the day.

Connected with nature
Since the goal of this project was to design an urban ecovillage, a connection with nature and recreation areas was seen as necessary to replace the natural setting that usually surrounds rural ecovillages. It could also aid urban farming outside of the housing block.

FIGURE 13 *Photo of housing block used as temporary reference. Kålltorp, Gothenburg (Google Maps, 2020a).*

PROCESS

As described before, the process of finding, evaluating and choosing a site took around two weeks in total. Gothenburg is divided into ten city areas. These in turn are divided into several smaller sub-areas. Using Google Maps an extensive and systematic search within these areas yielded 116 potential sites for the project (Fig 14). Most of them were parking lots, with few the exceptions that were industrial land The sites found were catalogued according to area and given a site name.

The area Centrum is where the centre of Gothenburg lies and was considered too dense and developed. The areas in connection with Centrum that had few potential plots were also deemed too dense and developed. This removed 28 sites (Fig 16).The remaining 88 sites were measured one by one which removed all but 18 sites (Fig 18). These were checked for potential obstacles which left 6 potential sites to be further researched (Fig 20).

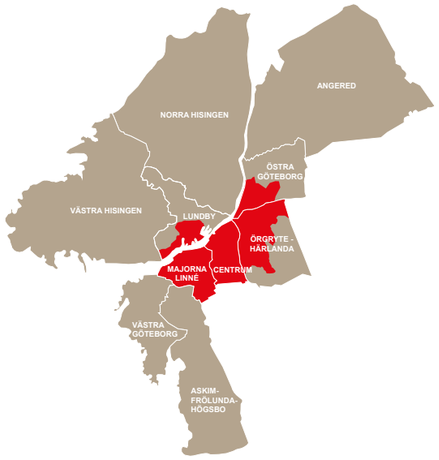


FIGURE 15 *Illustration of too dense areas.*

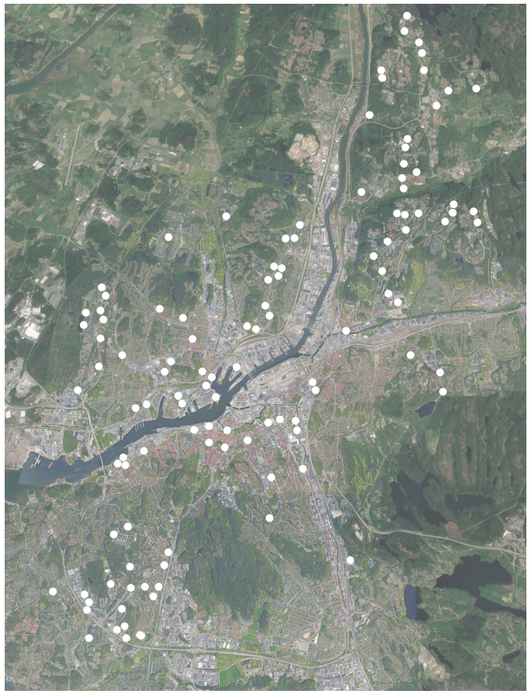


FIGURE 14 *The starting sites (Google Maps, 2020b).*

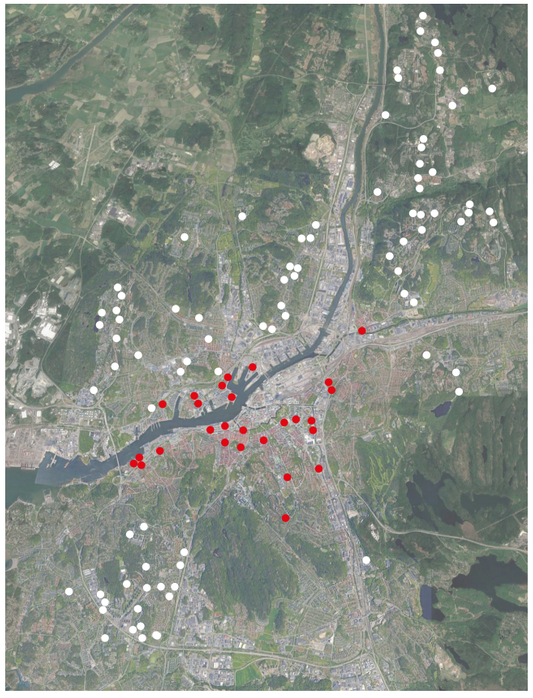


FIGURE 16 *Sites in urban and dense areas removed (Google Maps, 2020b).*

FIGURE 17 *Site in Högsbotorp (Google Maps, 2020c).*

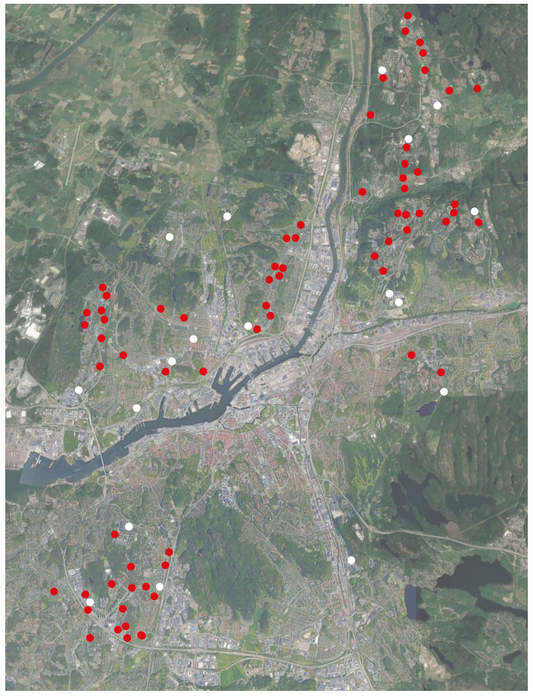


FIGURE 18 *Sites smaller than desired site removed (Google Maps, 2020b).*

FIGURE 19 *Site in Kortedala (Google Maps, 2020d).*

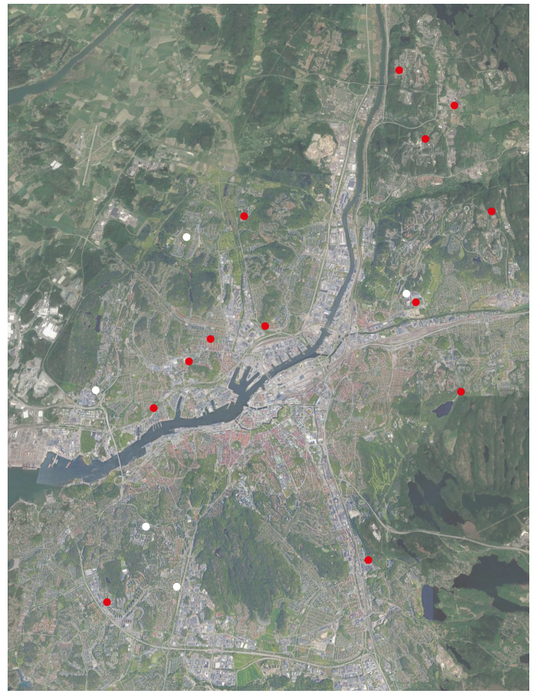


FIGURE 20 *Sites with obstacles removed (Google Maps, 2020b).*

VISITS

The six plots that remained were in the areas of Tuve, Norra Biskopsgården, Södra Biskopsgården, Kviberg, Högsbotorp and Högsbohöjd. All six sites were researched according to the criteria public transport, bicycle lanes, travel time to centre, social infrastructure, and closeness to nature and recreation area.

Although Tuve fulfilled many of the criteria on the list it lacked in a variation of public transport and travel time to the city centre. This could result in a higher reliance on car travel. As transport is one of the highest causes of emissions in household consumption this site was removed from the selection process.

The site in Högsbotorp has good access to public transport and relative short travel-time to the city centre, but lacked in social infrastructure and was therefore also removed.

The four final sites were visited and evaluated.

KVIBERG

The first site visited was revealed to be a military protection area, which means that it is prohibited to photograph, describe or measure it without a certain permit. This was added to the group of sites with obstacles for construction.

FIGURE 21 *Photo from the site in Kviberg.*

FIGURE 22 *Site in Norra Biskopsgården (Google Maps, 2020e).*

FIGURE 23 *Site location (Google Maps, 2020b).*

FIGURES 24 & 25 *Photos of the site and the nearby centre.*

NORRA BISKOPSGÅRDEN

The site was a parking lot in a large apartment housing area right next to a forest and recreation ground called Svarte Mossen. Due to the protected location there was almost no noise pollution. The location is between two tram stations with good access to infrastructure such as food stores, restaurants, kiosks, some shops and schools. A larger selection of shops, restaurants, library and gym is 10 minutes by tram away.

It took 10 minutes of walking to get to both nearby tram stations. The number of cars in the neighbourhood suggested that this is a popular mode of transport for those who live there. To get to the centre of Gothenburg took 20 minutes by tram and it would take 40 min to go by bicycle. There were few other facilities except housing and smaller food kiosk in the immediate surroundings.

FIGURE 26 *Site in Södra Biskopsgården (Google Maps, 2020f).*

FIGURE 27 *Site location (Google Maps, 2020b).*

FIGURES 28 & 29 *Photos of the site and the nearby centre.*

SÖDRA BISKOPSGÅRDEN

The site was a combination of parking lot, grass field and industrial land located between a housing area and a smaller industrial site. Just south of the site is the highly trafficked road Lundbyleden which caused sound pollution. The industrial site also caused weak smells of chemicals. The recreation ground Svarte Mossen is a short walk from the location. There were no other facilities except housing and industry in the immediate surroundings.

It took 5 minutes of walking to get to the tram and bus station and the local square of Vårväderstorget. The square has relatively good infrastructure in the form of food market, library, gym, small kiosks and restaurants. A larger selection of shops and restaurants is 5 minutes by tram. To get to the centre of Gothenburg took 15 minutes by tram and would take 30 minutes by bicycle.

FIGURE 30 *Site in Högsbohöjd (Google Maps, 2020g).*

FIGURE 31 *Site location (Google Maps, 2020b).*

FIGURES 32, 33, 34 *Photos of the site, the local centre and nearby centre.*

HÖGSBOHÖJD

The site was a parking lot surrounded by a large housing complex. Just north of the site lies the highly trafficked road Högsboleden which caused sound pollution. Two recreation and nature grounds are within walking distance from the location, Västra Kyrkogården and Ruddalen. Just next to the site there was a small kiosk. It took two minutes of walking to get to the small centre of Högsbohöjd with food store, fast food kiosk and bus stop. The area also contain a school, preschools, elderly home and a mosque. Walking less than 10 minutes a local square with a larger selection of food store, library, gym, shops, restaurants, café and tram station can be reached.

It took 15 minutes by public transport to get to the centre of Gothenburg. It would take 25 minutes by bicycle.

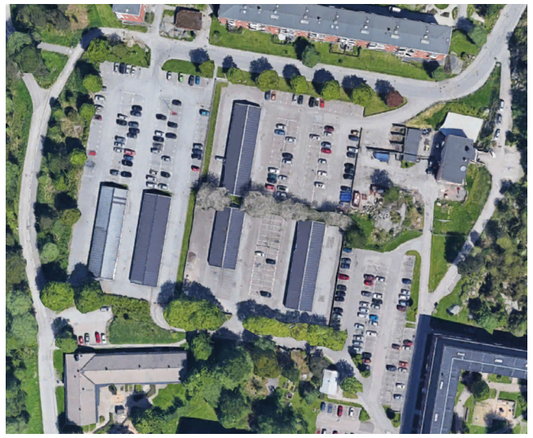


FIGURE 35 *Site in Norra Biskopsgården (Google Maps, 2020e).*

FIGURE 36 *Site in Södra Biskopsgården (Google Maps, 2020f).*

FIGURE 37 *Site in Högsbohöjd (Google Maps, 2020g).*

EVALUATION AND CONCLUSION

After visiting all sites the positive aspects of the site in Norra Biskopsgården (Fig 35) with it's closeness to green areas and large green courtyards did not outweigh the lack of social infrastructure and extended travel time to other parts of the city. It was therefore removed from the site selection process.

The sites of Södra Biskopsgården (Fig 36) and Högsbohöjd (Fig 37) were found to have almost equal strengths that would suit an ecoblock and equal weakness in their closeness to highly trafficked roads and sound pollution. The site in Södra Biskopsgården had the additional weakness of having the road south of the site, which would mean that to block the noise would also cause shade. The smells of the industry nearby was again a negative factor. For the site in Högsbohöjd the road was north of the plot which meant that any sound blocking construction would not be shading the rest of the plot.

When comparing closeness to nature and recreation grounds the site of Högsbohöjd had the advantage as the area Västra Kyrkogården and the area Ruddalen lies within short walking distance.

Considering social infrastructure the site in Södra Biskopsgården was closer to a local square with just two minutes of walking. The area of Högsbohöjd had very few facilities except housing, but was just ten minutes walking from another local square that had a larger selection than that of Biskopsgården.

Viewing the different factors of infrastructure, closeness to nature, transport and surroundings together the site in Högsbohöjd seemed the most appropriate for the project.

CHOSEN SITE

As was described before the selected plot is a parking lot. It belongs to the housing area of Pennygången. Both parking lot and housing area are owned by the housing company Stena Fastigheter (Göteborgs Stad Stadsbyggnadskontoret, 2015). Originally the idea was to design an urban ecovillage in the form of a new development on an empty plot as is in shown white (Fig 40). This idea was conceived before there was a site. Having the physical form of the plot as well as its context gave the idea that other types of development could be possible. In order to not exclude any ideas, the site for the project was extended to the area shown in red (Fig 40).

FIGURE 40 *The selected and expanded site (Google Maps, 2020g).*

FIGURE 38 *Photo of the selected site.*

FIGURE 41 *Photo of the selected site.*

FIGURE 39 *Photo of the selected site.*

FIGURE 42 *Photo of the selected site.*

CONTEXT

HÖGSBOHÖJD
PENNYGÅNGEN
FUTURE DEVELOPMENT

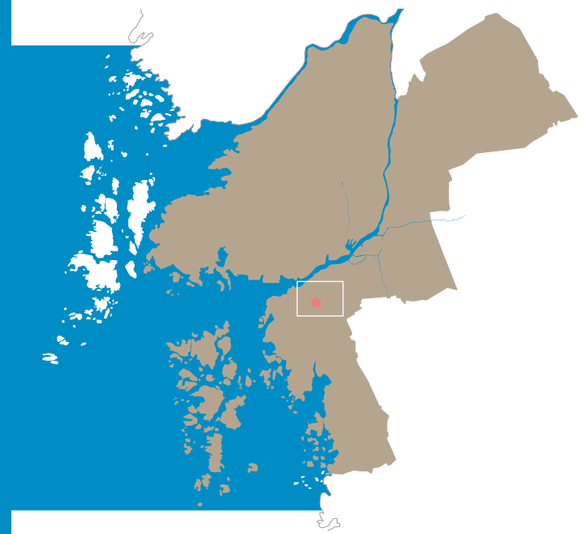


FIGURE 43 *Placement of Högsbohöjd in Gothenburg.*

HÖGSBOHÖJD

The site for the project is a part of Pennygången which lies within Högsbohöjd in west Gothenburg.

Högsbohöjd is surrounded by and in the vicinity of large green areas. Within walking distance lies the park area of Västra Kyrkogården and the park and recreation area of Ruddalen. Ten to fifteen minutes on a bicycle or by public transport one can reach the urban park of Slottskogen and the forest Änggårdsbergen.

Large green areas close to the site was one of the criteria during site selection, and a factor in chosing this area for an urban ecovillage.

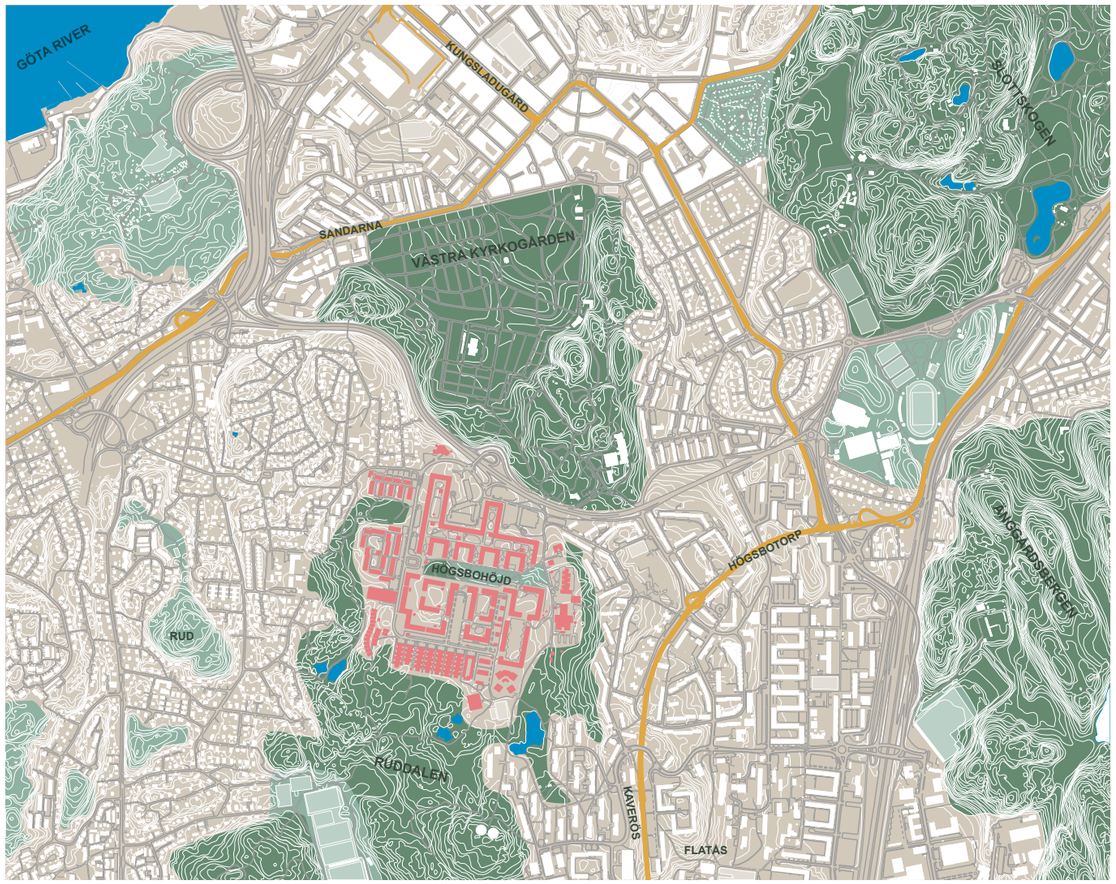


FIGURE 44 *Map showing Högsbohöjd and it's surroundings.*

HISTORY

Most of the houses that are here today was built in the 50s and 60s. In the beginning of the 20th century several cottages where built south of Västra Kyrkogården to alleviate housing shortage in Gothenburg (Lindholm Restaurering AB, 2014). After the Second World War the city needed to expand further. At this time Högsbo was mostly farming country which had to give way for the new construction. In the 50s the cottages in Högsbohöjd were torn down and new development took its place. Due to its distance to the tram it was considered most appropriate to plan for families with cars. Originally the idea was to build only row houses. Since the terrain did not fit this kind of construction in serial production in all places planning was changed to mostly multi-family housing instead. During the years 1959 - 1962 around 2000 homes were built in the forms of apartments, row houses and atrium houses (Göteborgs Stad Stadsbyggnadskontoret, 2015).

In the beginning of the 90s the houses south of Fyrkparken underwent a larger transformation. In connection with this the courtyards were renamed after women who had lived in the cottages in Högsbohöjd such as Amanda, Elin and Juliana (Poseidon, 2020).

In 2014 - 2015 the housing stock of Högsbohöjd got an addition of rowhouses to the southwest and four tower blocks to the southeast (Framtiden, 2020) (Poseidon, 2020).

INFRASTRUCTURE

The whole area can roughly be divided into four smaller parts; Pennygången to the north, the row houses west of Växelmyntsgatan, the apartment houses south of Fyrkparken and the atrium houses south of Växelmyntsgatan. The square Fyrktorget and the park Fyrkparken are in the centre of Högsbohöjd. Fyrktorget has a bus stop where the bus 16 stop. Here also lies a food market (Hemköp) and a small fast food kiosk.

To the east lies Västerhedsskolan which is a primary school, and two kindergartens, Annas Gård and Sjupundsgatan 8.

To the north is the Nasir mosque, a hairdresser and a smaller convenience shop (Pennygången Livs).

In the south lies a retirement home, a tennis club, a playground and outdoor gym area. Ruddalen and Fyrkparken gives good access to open outdoor spaces and a variation of outdoor activities. There is a lack of hard surfaces for activities such as basketball and skateboarding. There are no apparent suitable spaces for events such as markets (Göteborgs Stad Stadsbyggnadskontoret, 2015).

By car Högsbohöjd is entered from the expressway Högsboleden. Public transport consists of the bus 16 which has Fyrktorget as its final station, and the bus 45 which stops at the station Sjupundsgatan on Högsboleden. Bus 16 connects Högsbohöjd with the city centre of Gothenburg, bypassing larger stations from which several different tram- and bus lines depart with Marklandsgatan being the closest. Bus 45 connects the area with the business and education area Lindholmen and central Hisingen in one direction, and Marklandsgatan in the other. From Marklandsgatan travelers can continue with tram or bus to the city centre or further west, for example to Frölunda Torg (Västtrafik, 2020). Pedestrians and bicyclers can enter by few public lanes connecting the area with the rest of the city. Several of these are not easily accessible (Göteborgs Stad Stadsbyggnadskontoret, 2015).

Walking distance from Högsbohöjd is the square and tram station Axel Dahlströms Torg. Högsbohöjd is connected with the square as well as the rest of Högsbotorp through the street Riksdalersgatan which is the only accessible street with street lightings. It is perceived to be the safest path to the square by the inhabitants. Axel Dahlströms torg is a smaller centre and contains a food market (ICA), library, pharmacy, church, banking service, retirement home, gym, bicycle shop, some restaurants, hairdressers and some other small shops. At the station several tram lines depart that goes to both the city centre and towards Frölunda (Göteborgs Stad Stadsbyggnadskontoret, 2015).

COMMUNITY

In 2013 the number of inhabitants were close to 3700 people. Even though housing stock haven't changed much since it was first constructed, the inhabitants have become fewer (Göteborgs Stad Stadsbyggnadskontoret, 2015).

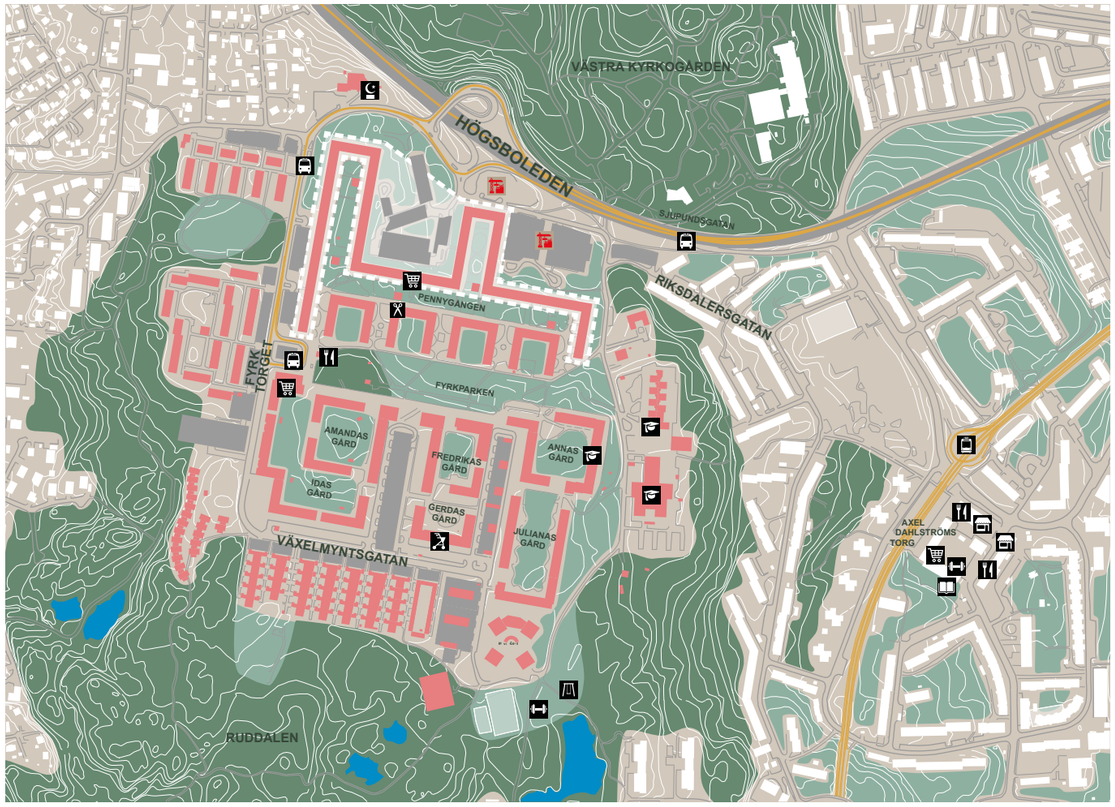


FIGURE 45 *Map of Högsbohöjd..*

The percentage of people between the ages 20 and 40, as well as the ages 1 to 5, is larger than for the whole city. Statistics indicate that there are relatively many students in the area (Göteborgs Stad Stadsbyggnadskontoret, 2015). This correlates to some extent to the fact that 63 apartments in Pennygången is rented by the company SGS Studentbostäder as student housing (SGS Studentbostäder, 2020).

Population in the ages +65 is unevenly dispersed within Högsbohöjd. Less than one hundred people +65 are living in Pennygången, while at the same time over three hundred are living in the apartment houses south of Fyrkparken. This could be due to the lack of elevators in Pennygången, but it could also be due to the retirement home (Göteborgs Stad Stadsbyggnadskontoret, 2015).

Unemployment is at the same level as the rest of the city, education is somewhat higher (Göteborgs Stad Stadsbyggnadskontoret, 2017) and the income is somewhat lower (Göteborgs Stad Statistikdatabas, 2017).

Since Högsbohöjd has no through traffic, there is no flow of passers-by. Neither are there any obvious target points that would attract visitors from other parts of the city. This means that mostly residents, their visitors and people with a specific errand move about in the area. There is an expressed lack of social places for adults, teenagers and children (Göteborgs Stad Stadsbyggnadskontoret, 2017). Young adults in Högsbohöjd feel that there is nothing to do at night here (Göteborgs Stad Stadsbyggnadskontoret, 2015). The height differences that stems from the topography of the site, as well as the expressway Högsboleden, is considered a barriere to the rest of the city by the inhabitants and is contributing to the isolated character (Göteborgs Stad Stadsbyggnadskontoret, 2017).

CONCLUSION

Högsbohöjd has good access to public transport and walking distance to restaurants, shops and other social infrastructure. The current residents have expressed a low interest in the use of cars (Göteborgs Stad Stadsbyggnadskontoret, 2015). This could show that everyday life is managable with other forms of transport. By placing housing in areas where urban living is already functioning without relying on the car as a method of transport the goal to reduce emissions from household transport is greater. An urban life without car dependency is within the interest of a potential urban ecovillage which again makes this site suitable for the suggested program.

The area is dependent on outside access to social infrastructure and lacks in terms of facilities besides basic needs such as transport and food. The area would benefit from having a public forum where the residents could meet. This could be in the form of a community house where the residents themselves can be a part in designing the program and the building so that it reflects the diverse population that lives here. When proposing new development some part of the program should be public so that the addition not only benefits the site of Pennygången, but also the rest of Högsbohöjd.

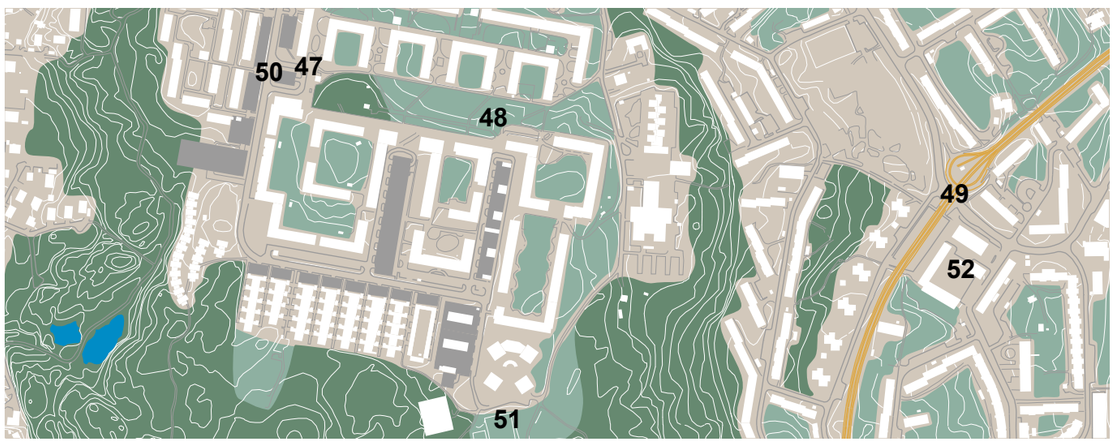


FIGURE 46 *Map showing photolocations of Fig 47-52*

FIGURE 47 *Photo of the small centre in Högsbohöjd.*

FIGURE 48 *Photo of Fyrkparken.*

FIGURE 49 *Photo of the tram station Axel Dahlströms Torg.*

FIGURE 50 *Photo of the small centre in Högsbohöjd.*

FIGURE 51 *Photo of the recreation area in the south of Högsbohöjd.*

FIGURE 52 *Photo of the local centre Axel Dahlströms torg.*

PENNYGÅNGEN

The proposal of this thesis has worked with a part of Pennygången as shown in Fig 54. The site was chosen through a selection process which is explained in the chapter Background.

Pennygången was built in the years 1959-1962 by Göteborgsbostäder AB. The plan was designed by Rune Falk and Nils Sunnerholm of White Architects. The development of the prefabricated concrete system used was led by Inge Hjertén, head of Göteborgsbostäder AB 1954-1969. It is one of the first examples of an application of the system in this scale. When constructed it contained 761 apartments which was an unusually large development for its time.

Due to its visibility from the rest of the city the aim was to create a low wall-shaped building which can act as a front to the area. This made it possible to keep the view of the city while at the same time give courtyards shelter from the wind. Pennygången consists of one long building to the north and four U-shaped buildings courtyards to the south.

The location and the height differences within the site had a great impact on the design of the long building. The design follows the natural and topographical features of the site in order for the surrounding rocks to be kept unharmed.

Overall Pennygången is four levels high. The topography resulted in sections of the building being placed in different heights in relation to eachother.

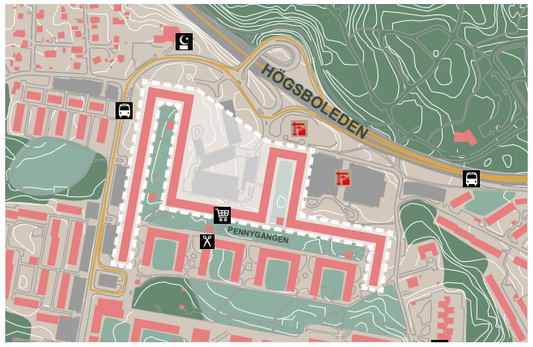


FIGURE 54 *Map showing the project site of Pennygången.*

To give the impression of a wall an unbroken roofline was used which is made possible through sloping roofs over the parts where the construction differ in height. The image of a wall also had an impact on the placement of functions and their design within the housing blocks. Recreation areas, green spaces and entrances are placed inwards to the courtyard, while parking is placed on the outside. The impression of smooth facades is enhanced by an abscence of balconies and withdrawn entrances. Axcess through the long building is done through several porticos.

Pennygången has a striking horizontal expression. This is due to rows of windows alternated with concrete ribbons.

FIGURE 53 *Photo of a part of the large courtyard of Pennygången.*

FIGURE 55 *Photo of a part of the large courtyard of Pennygången.*

FIGURE 56 *Aerial photo of Pennygången (Google Maps, 2020h).*

The repetitiveness of the facades is a result of the prefab building system and the repeating apartment plans within. Most of the apartments in Pennygången are four rooms and a kitchen. There are also some with three rooms, some studio apartments and some special solutions of apartment in the corners (Lindholm Restaurering AB, 2014). All of the apartments are rental units. 63 of the smaller ones are rented to students through SGS studentbostäder (SGS Studentbostäder, 2020).

In connection with one of the larger porticos there is a small shop called Pennygången Livs. This is seen as an official entrance from the north by the inhabitants. There is also a hairdresser in one of the buildings, and some of the inhabitants have started a small free shop (Göteborgs Stad Stadsbyggnadskontoret, 2015).

FIGURE 57 *Photo of Pennygången Livs and one of the porticos.*

FIGURE 58 *Photo of a street facade of Pennygången.*

CONCLUSION

Pennygången is a large low-rise development with low diversity in apartment sizes. It lacks elevators and have no balconies despite the large apartments. The buildings mostly consist of housing. To provide housing for wider range of family types, apartments of more sizes should be added to the site. Elevators, balconies and program other than housing could also be added to make the existing housing more attractive, accesible and enjoyable. While transforming the existing structure the design features of Pennygången should be respected and cared for. For this a list has been compiled of important design features to keep and possibly strengthen.

Open inwards, closed outwards
Inner intimacy and rooms
Unbroken, monumental character
Box shaped
Horizontal effect

FUTURE DEVELOPMENT

WHAT IS PLANNED

The two parking lots north of Pennygången are already planned for development by Stena Fastigheter, as well as a third site shown in the illustration below (Fig 59). In total the design scheme will add two courtyard buildings with tower blocks and a separate building of between 4-8 stories high to these sites. The program contains around 700 apartments, some commercial facilities and a kindergarten. The existing parking is to be replaced with parking garages below the new development with more parking lots than is recommended. To make room for the parking garages the trees that are there today as well as most of the bare rock will be taken away.

The construction shades itself in some areas with the result that a third of the new apartments will not get the recommended 5 hours of daylight (Göteborgs Stad Stadsbyggnadskontor, 2017).

Adding a construction of this size will shade parts of Pennygången as well.

The new development is also placed quite close to the existing buildings which might create some discomfort and invasion of former private facades. In some of the street facades noise levels will be up to 62dBA. The plan proposes to place one-sided smaller apartments in many of these areas where sunlight is not enough, or noise levels are high (Göteborgs Stad Stadsbyggnadskontor, 2017).

The project of this thesis has not been developed as a direct opposition or a complete replacement to the development planned by Stena Fastigheter. It does however question this development as the only way to densify the area. Other solutions should be investigated where the scheme also includes the preservation of the natural features of the site and proposes to add qualities for the current residents of Pennygången as well.

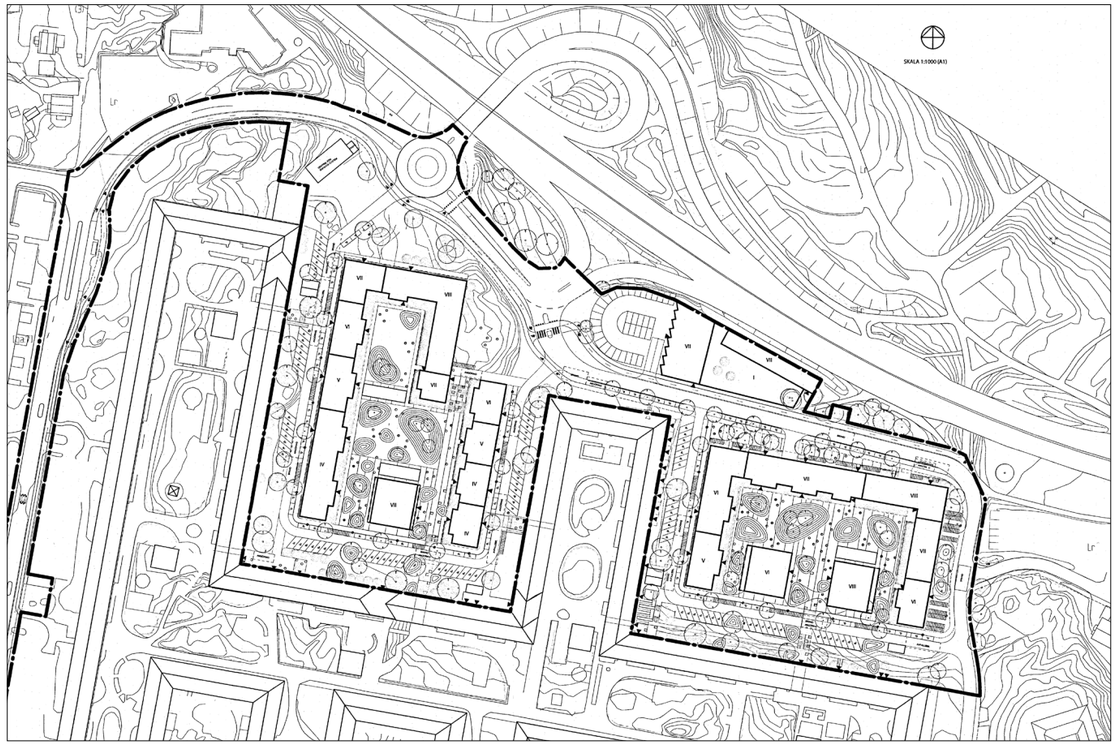


FIGURE 59 *Plan for future development of the site (Göteborgs Stad Stadsbyggnadskontor, 2017, Illustrationskarta)*

WISHES FROM THE COMMUNITY

During the development of the zoning plan for the parking lots of Pennygången the city of Gothenburg conducted two citizen dialogues with the residents of Högsbohöjd. The first dialogue was aimed at understanding how the area of Högsbohöjd was viewed before development. The result of this dialogue was an inventory map of the qualities, important features and weaknesses of Högsbohöjd. The second dialogue was to discuss how the residents saw future development and what they would want it to be. The result from this dialogue was a three-dimensional map of the two parking lots north of Pennygången with important features to keep and develop, as well as possible additions. During the discussion it was expressed by the residents that they welcomed a high degree of development on the two sites. At the same time they wanted to save the green spaces and rock areas in the area.

They thought that it should be a mix of higher and lower construction, coupled with gardens and green roofs. The development should create courtyards and act as a protection from noise pollution. If parking would be necessary the construction could be in souterrain with elevated yards, to protect existing natural features. They were also open for carpooling as a way to have less cars and parking spaces. They expressed concern that a new development would lead to gentrification. The fear was that this would lead to higher rents in the area and that some residents might be forced to move (Göteborgs Stad Stadsbyggnadskontoret, 2014).

The illustration below is based on the two resulting maps as well as the summary notes from these dialogues. This information has also been used as a guide during the development of the design for the proposal.

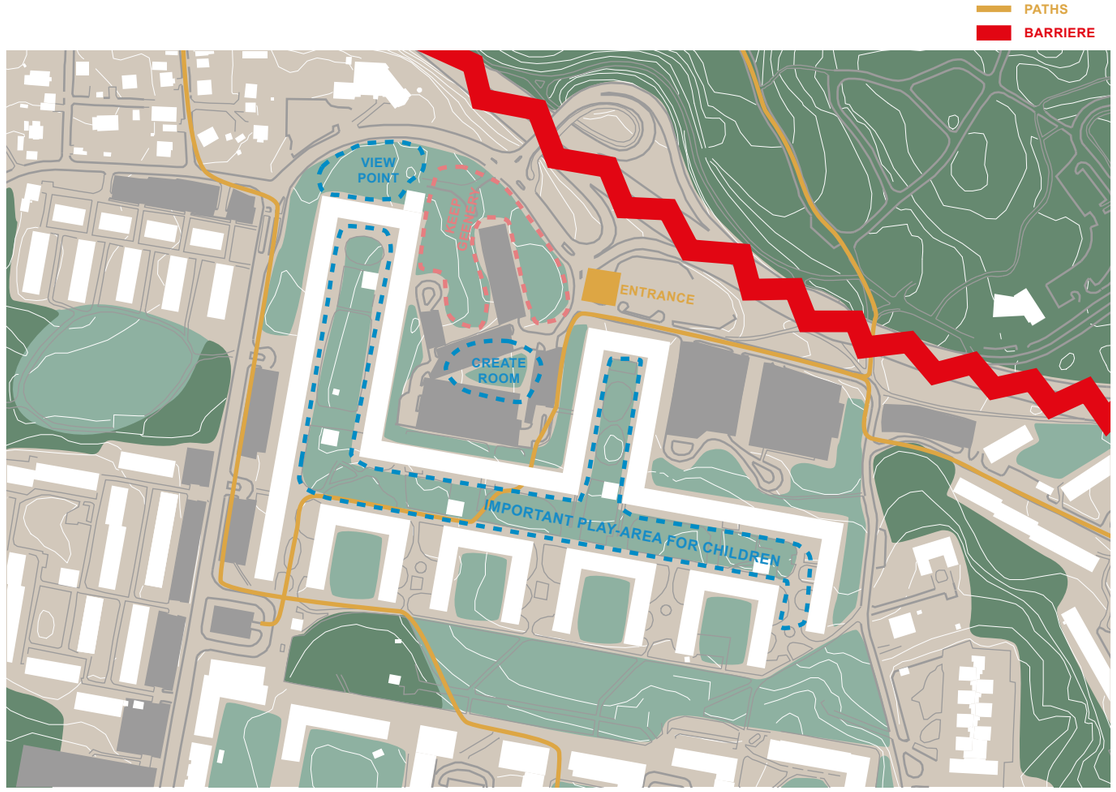


FIGURE 60 *Illustration based on the result of the citizen dialogue conducted by Göteborgs Stad Stadsbyggnadskontoret in 2014.*

PROPOSAL

ECOBLOCK PENNYGÅNGEN
CONCEPT DEVELOPMENT
PRIVATE TO PUBLIC
TRANSFORMATION

ECOBLOCK PENNYGÅNGEN

This thesis proposes that housing in the chosen site could be in the form of an added level instead of a separate construction. This strategy would lower the total costs of the project since no site has to be bought, no groundwork would be needed, and infrastructure such as plumbing and electricity already exists. With this type of construction, the aim is to also lower the consumption of materials and energy during construction.

The added housing can help finance the addition of elevators and balconies which would upgrade the apartments for the current inhabitants of Pennygången and make the whole building accessible for people of all age groups. In this way both parties are mutually beneficial from the development.

Beside housing this thesis proposes that the added level also contain some shared spaces for the community. As it is quite large the shared spaces are divided into different levels of private to public so that smaller groups can be created within the large community.

Adding apartments on the existing building leaves the marked site open for other development. The inhabitants of Högsbohöjd has expressed a need for more social spaces for all ages. This site could be a possible location for a community house that would be public and accessible for all of Högsbohöjd.

balconies
elevators
apartments
semi-private
semi-public
greenhouses
community house plot

FIGURE 61 *Aerial render of the proposed transformation of, and added construction to, Pennygången.*

PROGRAM

The suggested program consists mainly of housing as there is a deficit in Gothenburg. This comes in the form of 140 new apartments in different sizes. Six of these are suggested to be guest apartments for the community. In addition to elevators, each staircase receives a shared room called a semi-private room. Greenhouses are added as rooms for urban farming for the ecovillage. Spaces to be social and relaxed is offered in the form of roof terraces and saunas.

In addition, the program contain a vista room and study rooms. North of Pennygången the program proposes the possible placement of a community house. Due to time restrictions neither design nor specific program of this has been developed. The proposed added spaces are shown in detail on pages 47 - 59.

balconies
elevators
apartments
semi-private
semi-public
greenhouses
community house plot

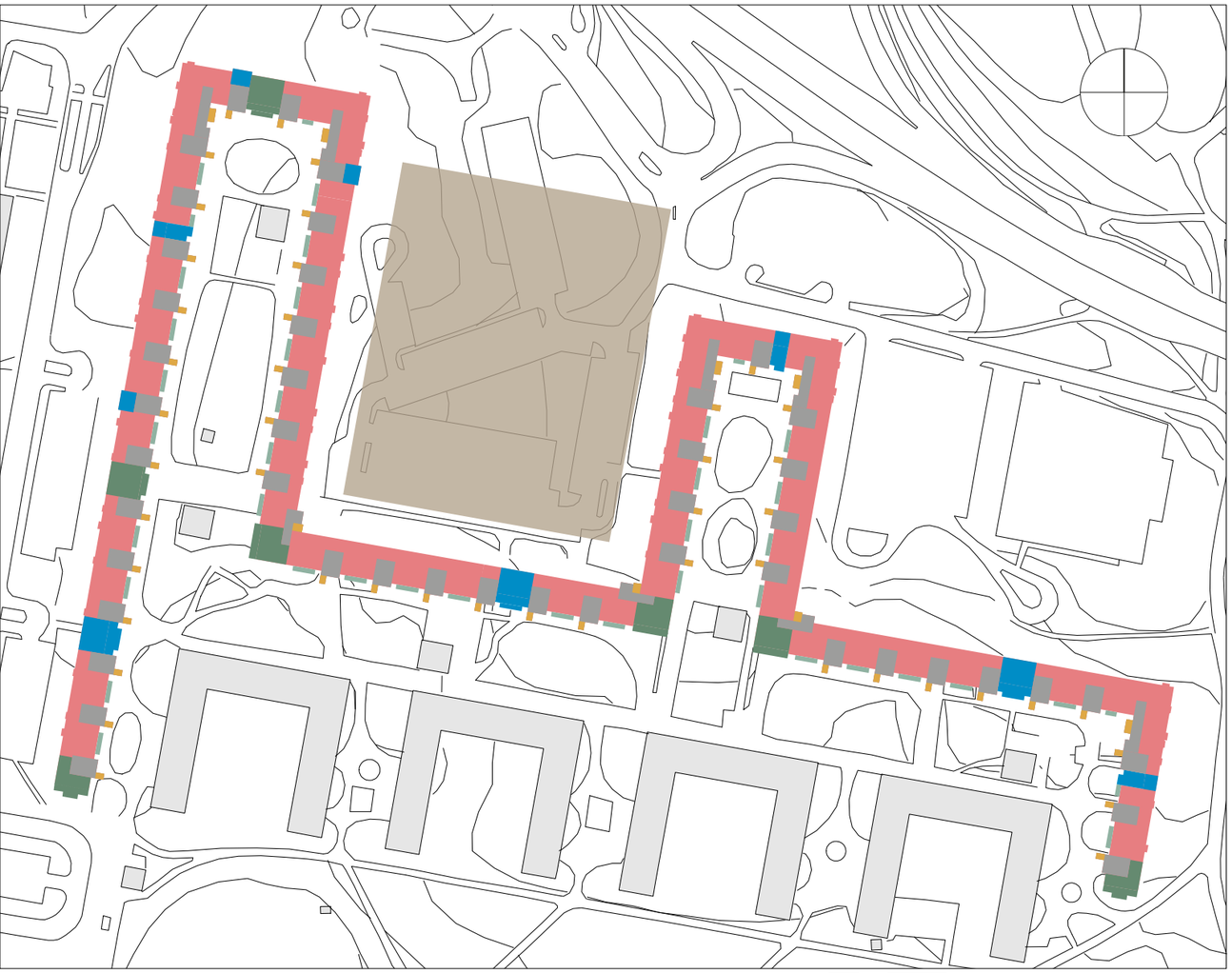


FIGURE 62 *Illustration plan 1:2000*

CONCEPT DEVELOPMENT

The concept of the design began by proposing that housing could be added on the roof of the existing block. The building of Pennygången is only three to four levels high and very long. With one floor added a large amount of housing can be produced without disturbing the proportions of the spaces in the area too much. This was also a way to both save the natural features of the previous chosen site and make it possible to add qualities to the housing of the current residents.

The added floor would be the urban ecovillage that this project aimed to develop. The semi-private and semi-public communal spaces for the ecovillage were placed on the same floor as the proposed added housing. To make the building accessible for all residents elevators were added that could also function as a vertical street that connect the ecovillage with Pennygången. After this came the addition of balconies so that all residents would have the same qualities of housing.

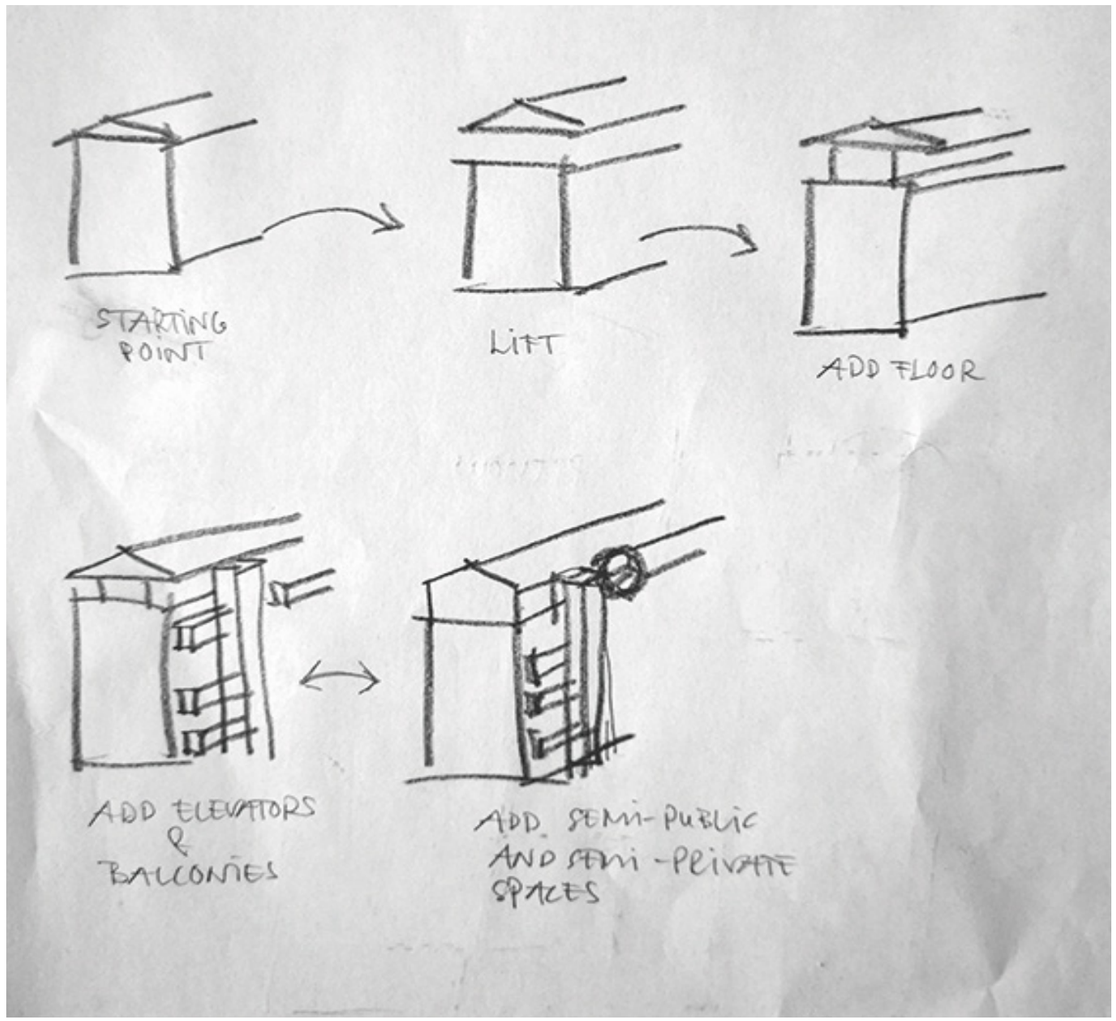


FIGURE 63 *Drawing of the concept development.*

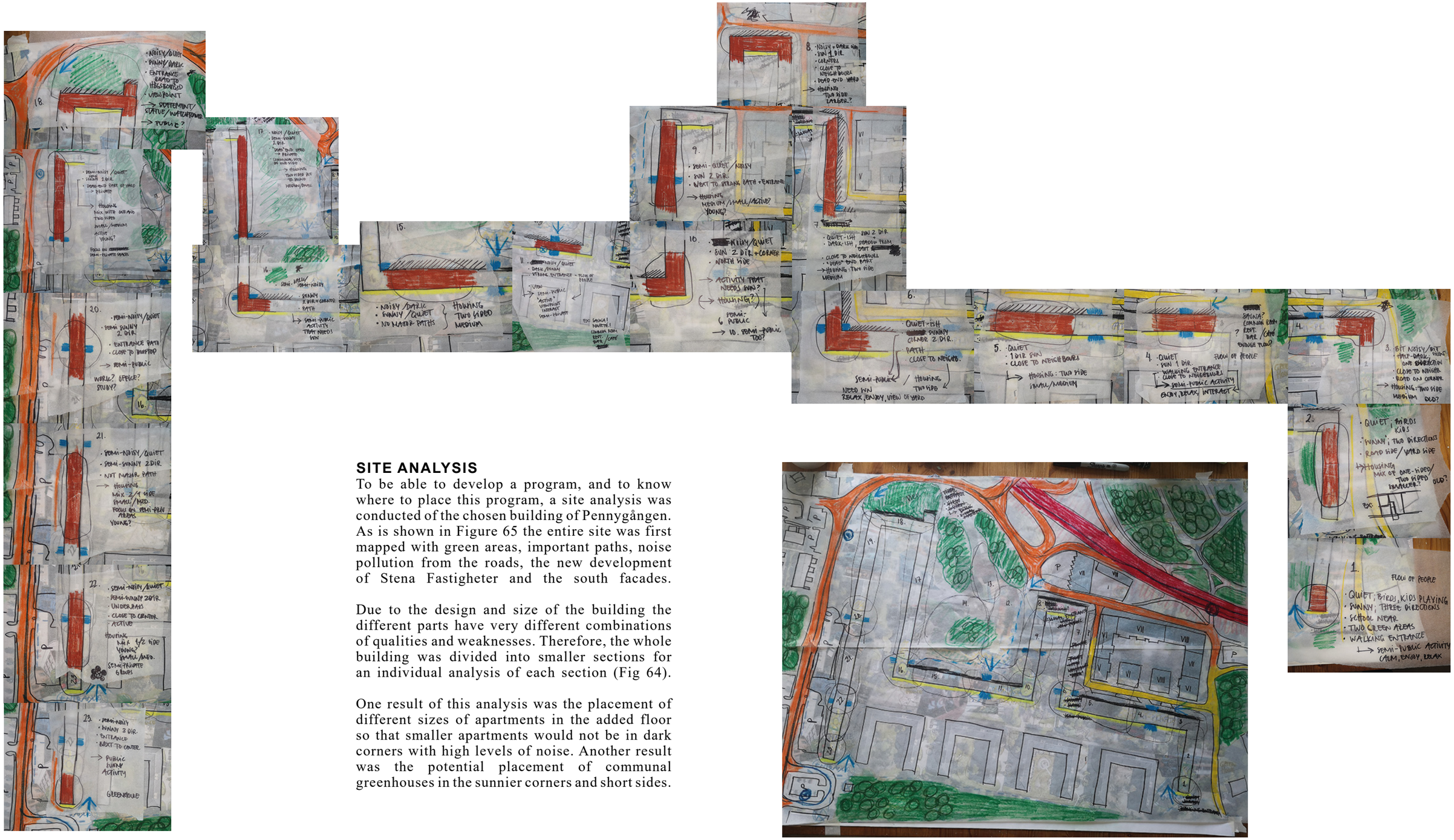


FIGURE 64 *Detailed site analysis of Pennygången, done in sections.*

SITE ANALYSIS

To be able to develop a program, and to know where to place this program, a site analysis was conducted of the chosen building of Pennygången. As is shown in Figure 65 the entire site was first mapped with green areas, important paths, noise pollution from the roads, the new development of Stena Fastigheter and the south facades.

Due to the design and size of the building the different parts have very different combinations of qualities and weaknesses. Therefore, the whole building was divided into smaller sections for an individual analysis of each section (Fig 64).

One result of this analysis was the placement of different sizes of apartments in the added floor so that smaller apartments would not be in dark corners with high levels of noise. Another result was the potential placement of communal greenhouses in the sunnier corners and short sides.

FIGURE 65 *Site analysis of Pennygången with locations of sections.*

COLLAGE

To develop a program one day was spent with producing an inspirational collage together with the site analysis. The starting map (Fig 67) was a collection of conclusions from the site analysis, important features that could influence the program and wishes from the community (as shown in Fig 60). The inspiration for the potential program was gathered from urban communities, ecovillages, public communal facilities and other. It included features such as watch towers, gardening, saunas, roof terraces, patios, skateboard parks, balconies, farming fields, outdoor cinema, mindfulness, open facades, closed facades and different types of designs for added floors. This collage laid the foundation for the continued programmatic sketches.

FIGURE 67 *Inspirational collage first image.*

FIGURE 66 *Inspirational collage final image.*

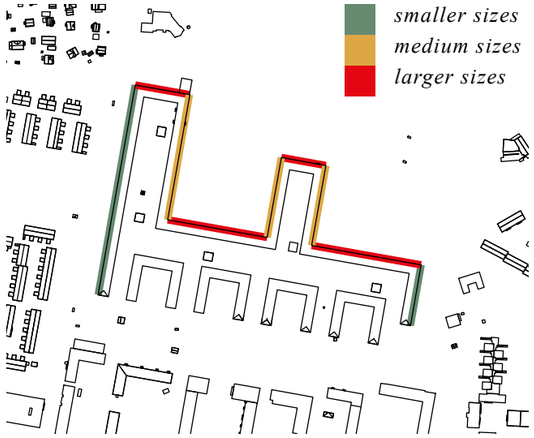


FIGURE 68 *Illustration of how to place the added apartments.*

PROGRAMMATIC SKETCHES

A conceptual illustration (Fig 68) of the placement of apartments was derived from the site analysis (Fig 64 and 65). The illustration shows how apartments of larger sizes that stretches from one side of the building to the other should be placed in facades facing north that are exposed to high noise levels. Due to their size these apartments can still enjoy a quiet side, something that can be harder to achieve with smaller apartments. A sketch of the program of the communal spaces and their placement was also derived from the site analysis and inspirational collage. The program in this sketch was later developed, but many of the features and their placement stayed the same in the final program.

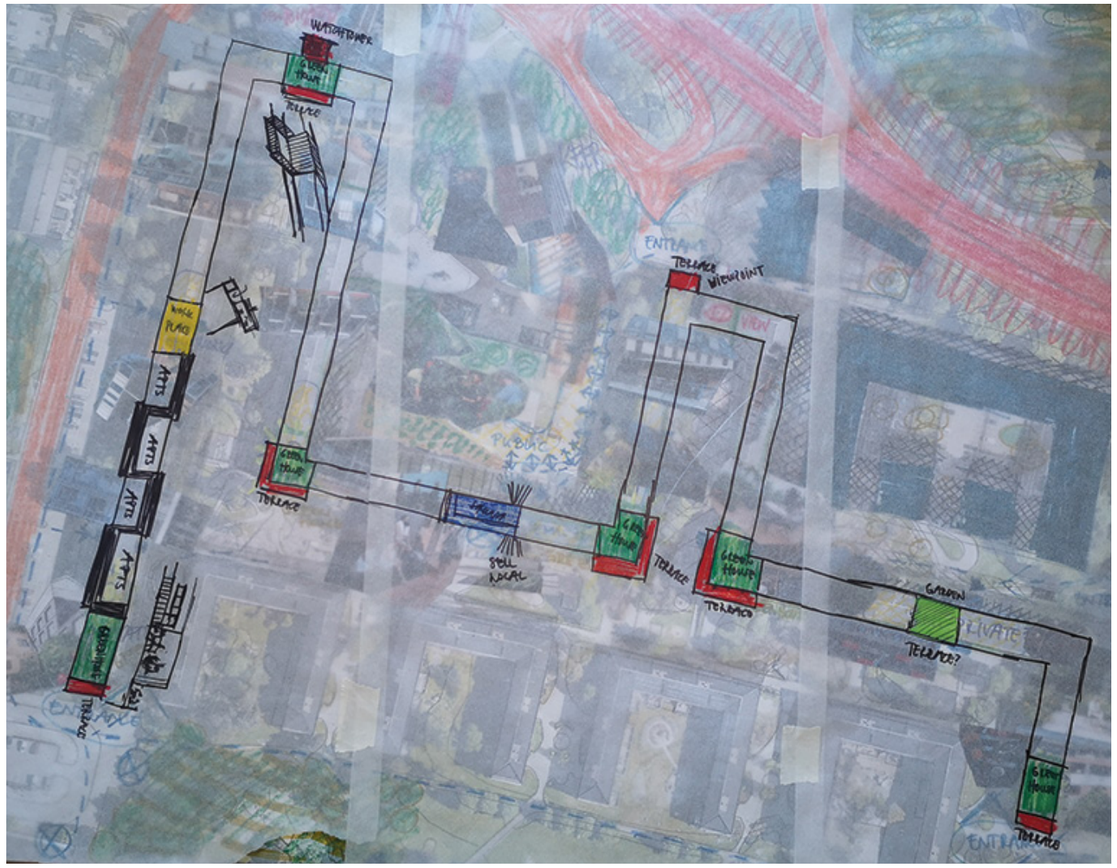


FIGURE 69 *Sketch of the placement of communal spaces in the added floor.*

PRIVATE TO PUBLIC

These are the program and different spaces that resultet from the concept development.

As described in the chapter Background page 13, in housing communities there is a need for a balance between public and private spaces. This was described by Per Berg (as cited in Atlestam et al, 2015) as the need for different zones; a private-, semi-private-, semi-public- and public zone.

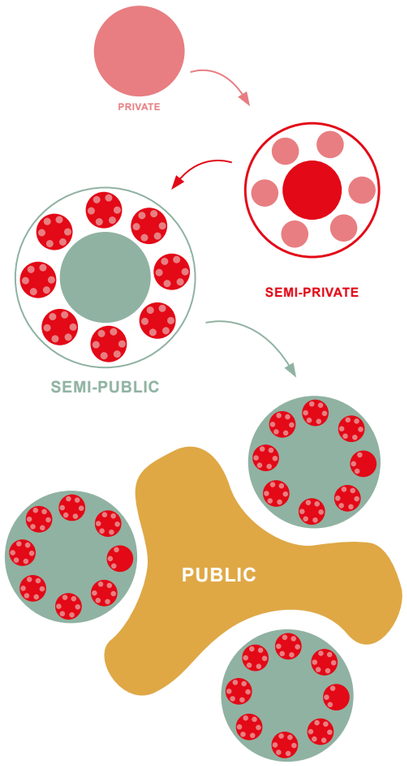


FIGURE 70 *Diagrammatic illustration of the different spaces.*

In his description the private zone is the home. This is the space where the inhabitants of a community can retire from social life and rest.

Several homes create a housing unit. This unit should share some form of space that becomes a semi-private zone. Within the community the inhabitants need to form different kinds of relationships between other members. The semi-private zone is necessary so that there is a possibility to form stronger relationships with the closest neighbours. This connection can reduce conflicts and grudges. The semi-public zones in Per Berg's description can be roads, squares and green areas. These are the areas where guests are welcome to stay for a while. The public zone is open for all and can be a larger square, park, road or public building. Without these areas the ecovillage is closed off and in risk of becoming a gated community.

The proposal of this thesis has tried to translate the same structure of spaces into examples that can work within this apartment building.

For the private space no translation was necessary since this is the home, as it is in the example. The only difference is that the home is an apartment instead of a house. The housing units created by several apartments in this proposal is joined not by a horizontal street but a vertical, a staircase and an elevator. In connection with the vertical street there is the semi-private room that this housing unit shares. The semi-public spaces are translated from roads, squares and green spaces to shared social areas and greenhouses. This is where the inhabitant can form relationships with other members of the community outside of the smaller housing unit. The final space, the public space, is in this proposal translated into a community house for everyone in Högsbohöjd. It could also be in parts or in whole open for the general public.

The design of these different spaces in the proposal are described and shown in the following pages.

PRIVATE - APARTMENTS

The plan proposes 140 apartments, six of them guest apartments. The sizes range from studio to four rooms. In the locations where the construction overlaps itself three larger two floor apartments are suggested. The variation of sizes is so that the addition can act as a complement to the current housing stock. The program contains a lot of smaller apartments which is important since many young adults are struggling to find their own home. Apartments with more than one room is designed to have equally sized rooms to acommodate different housing groups.

Placement of the apartments have been done in consideration with sunlight, shadows and noise. The aim has been to avoid apartments that lack exposure to the sun or are too exposed to high levels of noise. The guest apartments are in the north corners closest to the road as these are the least suitable for permanent living.

The layout of the added floorplan has been based on the current plans of Pennygången.

FIGURE 73 *Proposed added apartments 1:5000*

studio apt.
1 room apt.
2 room apt.
3 room apt.
4 room apt.
two floor apt.
guest apt.

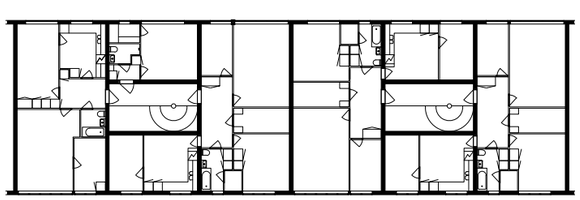


FIGURE 71 *Original normal plan of Pennygången 1:400*

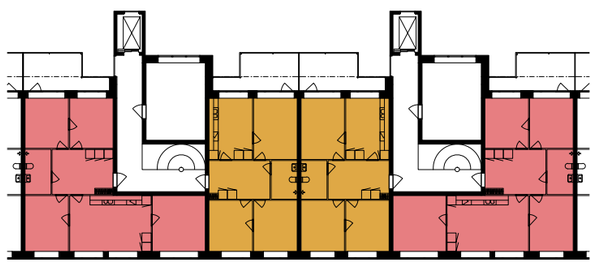


FIGURE 72 *Proposed added apartments 1:400*
Plans by author

SEMI-PRIVATE

In connection with every staircase and elevator there is a semi-private room. For the standard plan this room is 20sqm. The corners require some special solutions in the layout, but the room size is around 20sqm in these locations as well.

With this solution each staircase becomes a smaller housing unit of around 8-15 households. These households can use this space as their own communal area. Each unit decides for themselves what they want their communal area to be. The plan shows some examples of different program that can fit in the rooms.

If the community feel that the greenhouses and roof terraces are not enough space for planting and growing, some housing units could convert their semi-private room into a planting room. If the guest apartments are not enough for the visitors of Pennygången, or if some housing units have visits more often, the room can be converted into a bedroom with a bathroom as well.

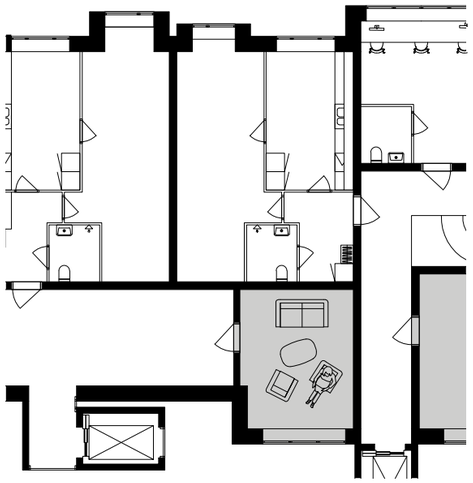


FIGURE 75 *Proposed added semi-private space 1:200*
Plan by author

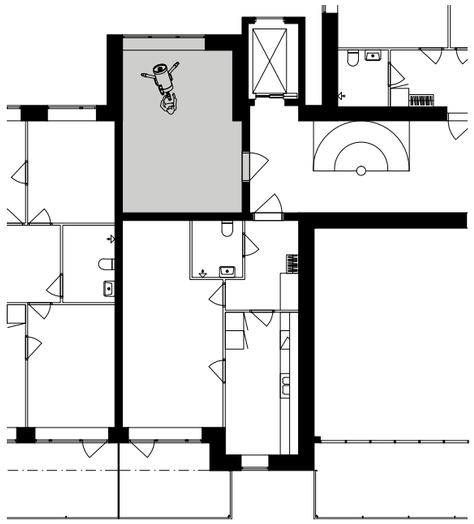


FIGURE 76 *Proposed added semi-private space 1:200*
Plan by author

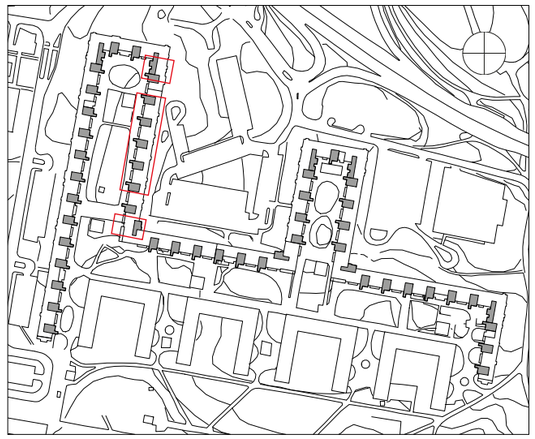


FIGURE 77 *Proposed added semi-private spaces 1:5000*

semi-public spaces

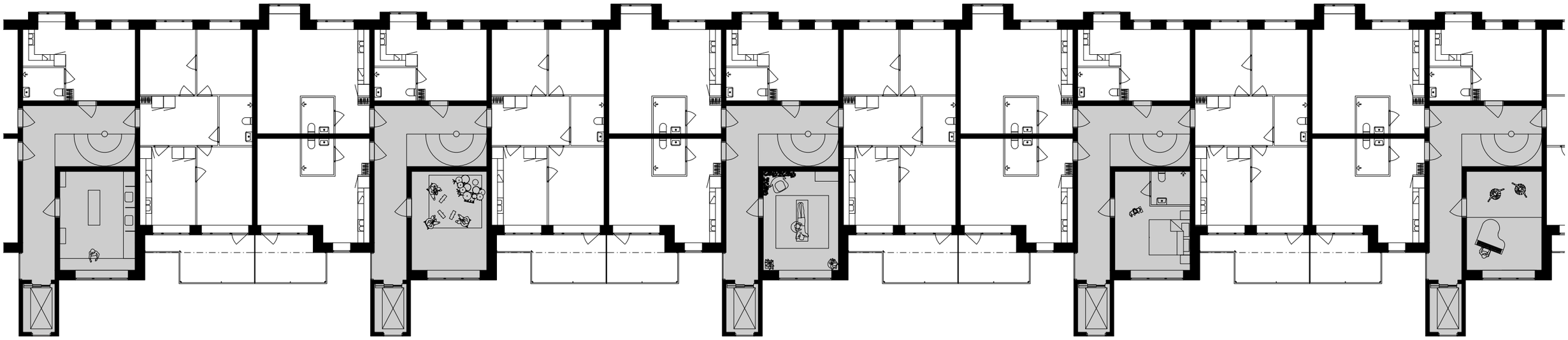


FIGURE 74 *Proposed added semi-private spaces in standard plan 1:200*
Plan by author

SEMI-PUBLIC

The next step in the communal areas are the semi-public spaces. The proposed program contains rooms for both urban farming as well as social activities.

For the urban farming the program contains seven larger roof greenhouses. The greenhouses are placed evenly throughout the ecovillage in the sunnier locations. This is done so that all have a greenhouse near their home. Which greenhouse each apartment use will depend on the interest in farming in the community. Farming space in the greenhouses should be divided so that each has an equal amount of users. If the interest is high a vertical system of planting might be needed. Each greenhouse also has a balcony which can be used for additional planting.

FIGURE 79 *Proposed added roof greenhouses 1:5000*

greenhouses

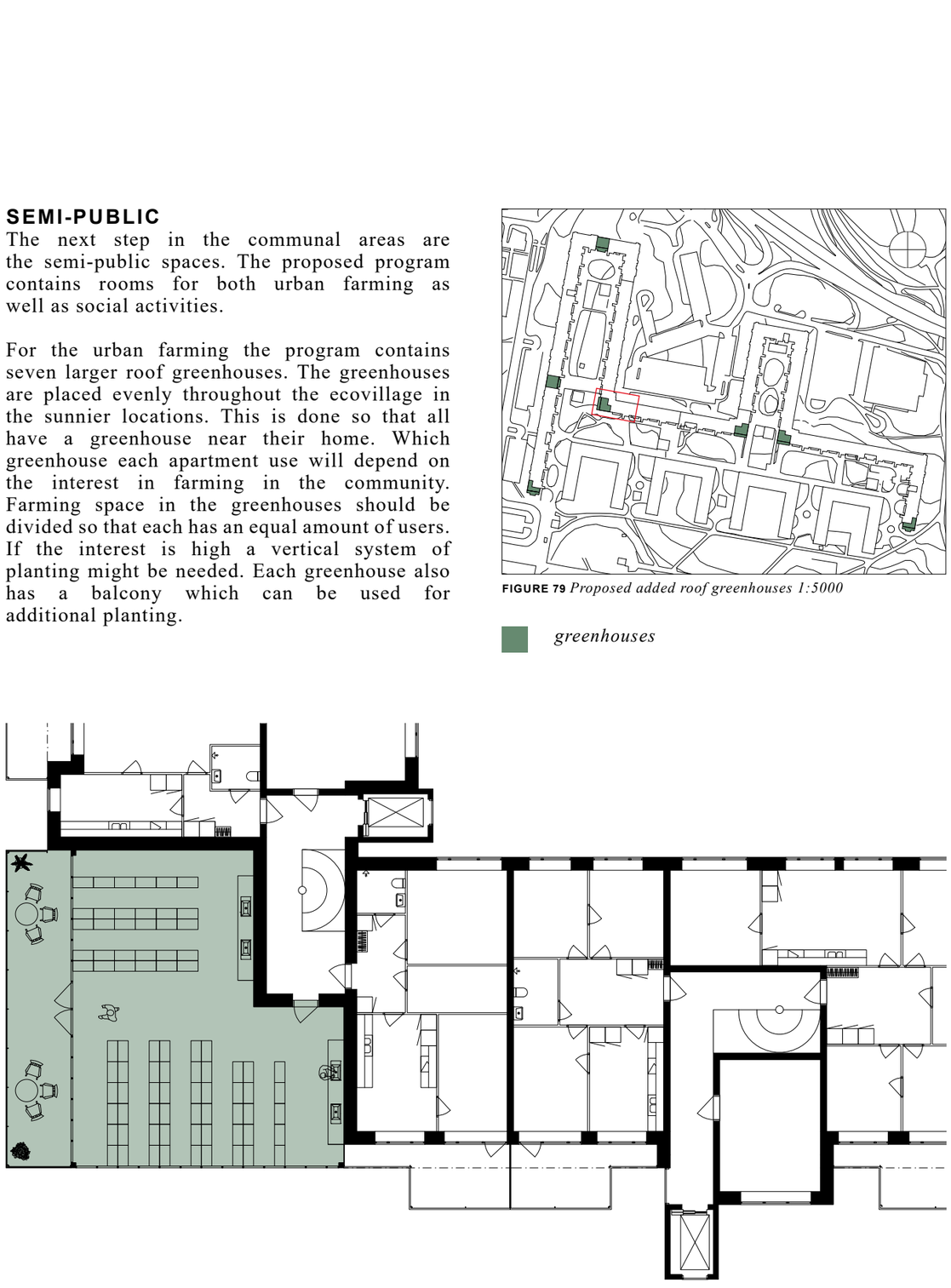


FIGURE 78 *Plan of one of the proposed added greenhouses 1:200*
Plan by author

Social activities of the semi-public spaces are given rooms through saunas, roof terraces, study rooms and vista room. These are meant to be open for all of Pennygången. Since access to each space is provided through the regular staircases and elevators, there might be a need for some sort of booking system with digital keys.

The program contains three saunas. These are designed to be closed to the outside and open to the inside of Pennygången. Each sauna has a terrace to the courtyard where the users can blow off steam. Pennygången is placed at an altitude with good views of the surroundings. Therefore, the saunas have large windows to the outside so that the users can relax to a panoramic view.

FIGURE 81 *Placement of proposed added saunas 1:5000*

saunas

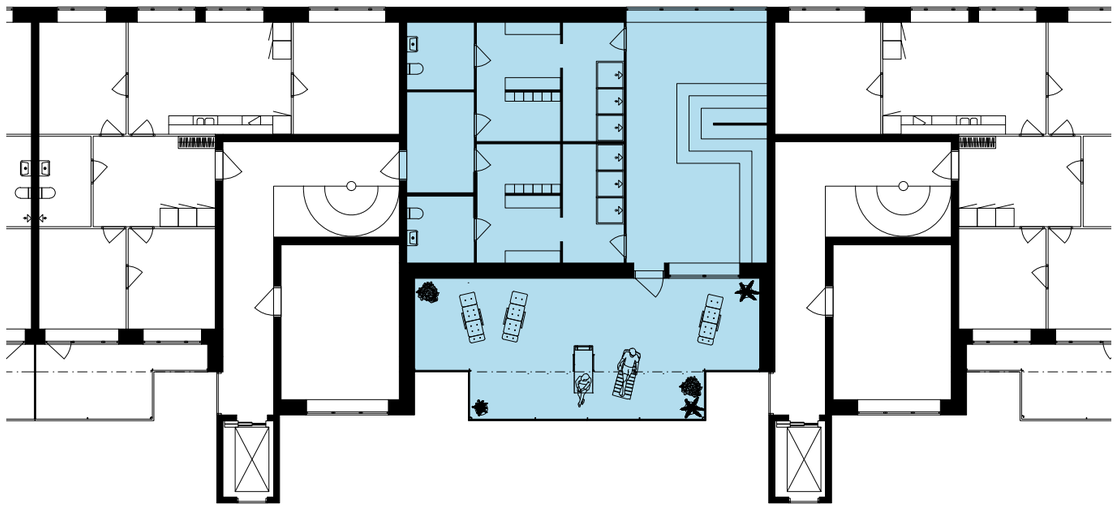


FIGURE 80 *Plan of one of the proposed added saunas 1:200*
Plan by author

In the sunnier locations of the proposed added floor,
communal greenhouses with an outside terrace are added.
The roofs of the greenhouses are a bit higher than
the surrounding structures to allow for proper ventilation.
Balconies for the existing floors are hanged by wires from the new floor.

FIGURE 82 *Render showing the courtyard facade, corner greenhouses and a roof terrace. Cutout people (Skalgubbar, 2020).*

Facade materials could be corrugated metal and wood panel as is shown in these renders.
Placed horizontally they would enhance the expression of Pennygången.
The wood panel is placed in connection with balconies and terraces
to break the otherwise repetitive expression.

FIGURE 83 *Render showing the courtyard facade and one of the saunas. Cutout people (Skalgubbar, 2020).*

Some of the apartments in Pennygången are already student housing. Since this proposal suggests to add more smaller apartments aimed at young adults the amount of students would probably increase. These smaller apartments are between 20 and 35sqm. To give these inhabitants somewhere to study in instead of using their own limited space for a desk, the program contains two study rooms. These are placed near where most of the smaller apartments are added.

The inhabitants of Högsbohöjd pointed out the northwest part of Pennygången as a place with a good view (Fig 60). Therefore, at this location in the added level there is a vista room. This is meant to be a quiet place for reflection and relaxation. To give a nice view the outside wall is covered in glass windows from floor to ceiling.

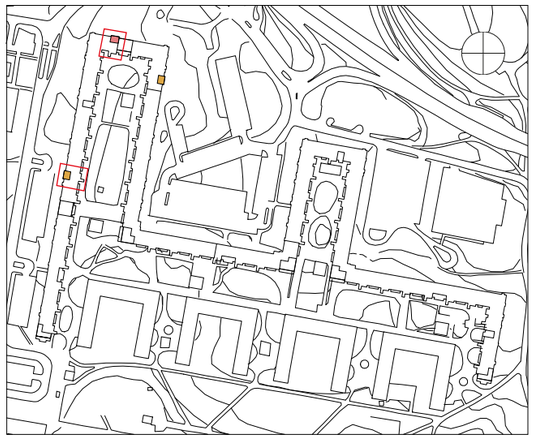


FIGURE 85 *Proposed added study rooms and vista room 1:5000*

study rooms
vista room

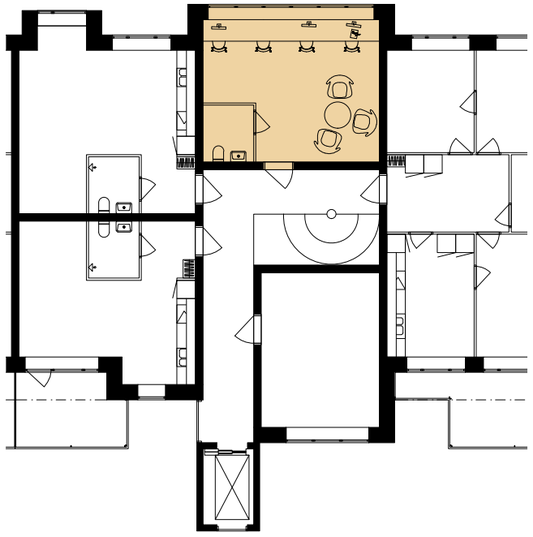


FIGURE 84 *Plan of one of the proposed added study rooms 1:200*
Plan by author

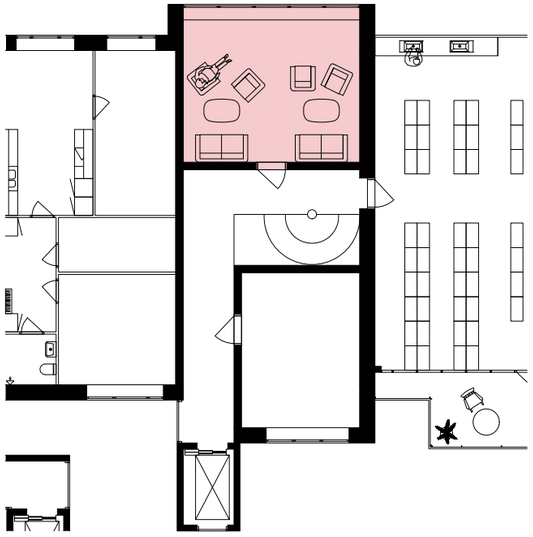


FIGURE 86 *Plan of the proposed added vista room 1:200*
Plan by author

The saunas are provided to offer a relaxing activity which can be used all year but might be more relevant during the colder months. To complement this, roof terraces are added which could be used during the warmer period. They are designed to be closed to the outside and open to the inside, much like the saunas. Therefore, storage is placed towards the outside, and in some cases north, facade. This storage can be used for furniture, pots and tools that are only used for a limited period.

The roof terraces can simply be a hangout spot, or it can also be used as an added planting space if the inhabitants wish so or if the greenhouses are not sufficient during the summer. Sinks are added so that they can easily be used for both planting and leisure depending on the community.

FIGURE 88 *Proposed added roof terraces 1:5000*

roof terraces

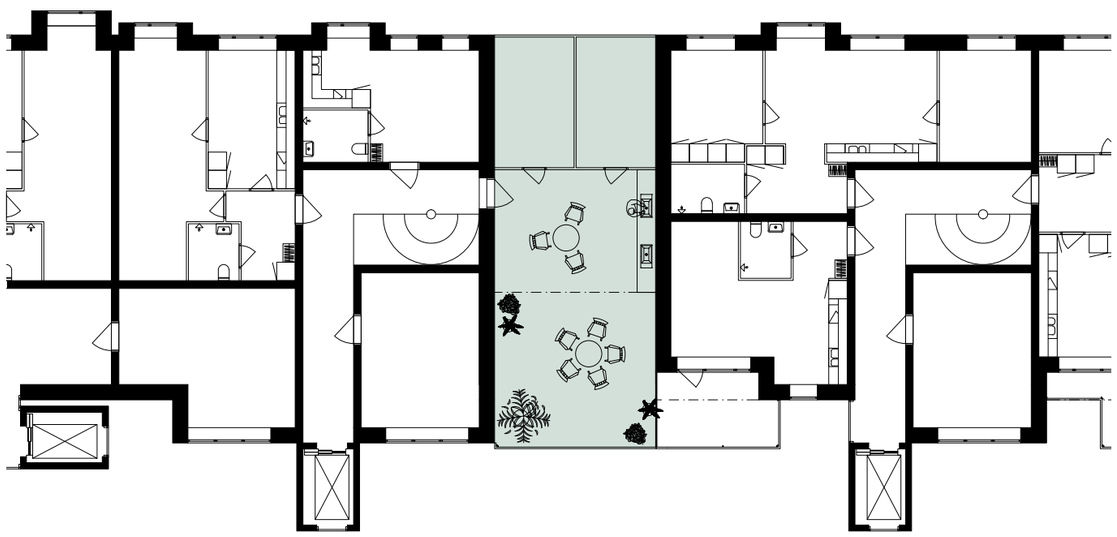


FIGURE 87 *Plan of one of the proposed added roof terraces 1:200*
Plan by author

PUBLIC

The public space is proposed to be a community house that would benefit the entire community of Högsbohöjd and outside visitors. This could contain a program that is not included in the urban ecovillage of Pennygången. For example, there could be a community kitchen; workshop and sewing room for building, mending and fixing; bicycle repair room; game rooms; community kindergarten; library; youth center or other. Neither a specific program nor a design has been developed.

Firstly this is due to the choice to focus on the housing block for this thesis. Second the author consider that the design and development of the community house should be the result of a participatory design process. This process is not possible to conduct within a thesis and the building was therefore left uninvestigated.

FIGURE 90 *Potential plot for community house 1:5000*

community house

FIGURE 89 *Ideas for a community house developed during the collage (Fig 66).*

TRANSFORMATION

These figures are simple plans on how an addition of an elevator could be solved in the typical floor plan of Pennygången. Adding elevators to the corners would require some special solutions, which have not been properly investigated and solved. Plans of this are therefore not included in this thesis. The design proposes that the elevator is added as an external structure to lessen the impact on the construction. This causes one apartment on each floor to lose a bedroom. As a solution a relocation of inhabitants might be needed, either to another apartment within Pennygången or to the proposed added floor. The loss of the bedroom is otherwise compensated with the access to an elevator and the addition of a balcony.

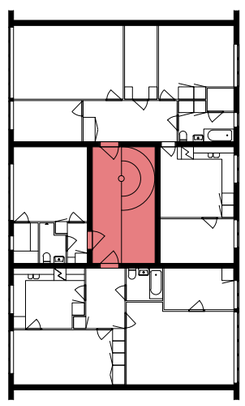


FIGURE 91 *Original normal floor 1:300*

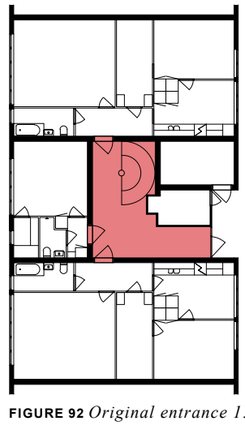


FIGURE 92 *Original entrance 1:300*

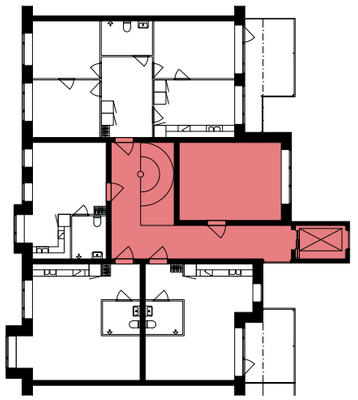


FIGURE 93 *Proposed added floor 1:300*
Plan by author

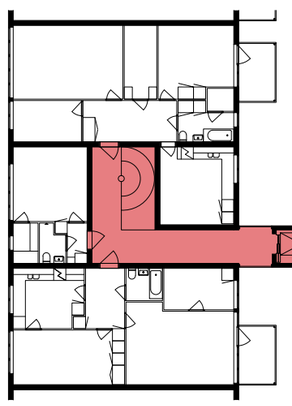


FIGURE 94 *Proposed changes to the normal floor 1:300*
Plan by author

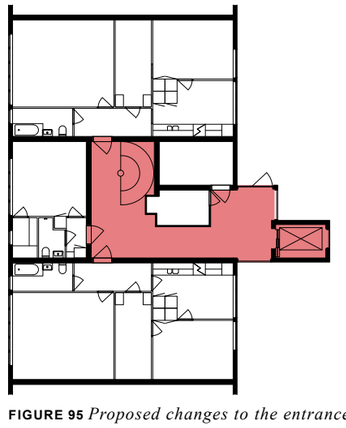


FIGURE 95 *Proposed changes to the entrance 1:300*
Plan by author

The added floor stands out from the current facades with the choice of material, window sizes and bay windows, while at the same time respecting the existing expression of a closed facade and horizontal lines.

FIGURE 96 *Render showing the outside facade and one of the study rooms. Cutout people (Skalgubbar, 2020)*

PROCESS

CONCEPT EVOLUTION
PLACEMENT
DESIGN SKETCHES

ECOVILLAGE EVOLUTION

In the beginning of the process of this thesis the urban ecovillage was viewed as a solitary building where shared spaces were kept private within the block and not accessible for the public. This image later evolved into something more open, but still solitary (Fig 97). The decision with the largest impact on the final design was the choice to place the ecovillage on top of an existing building (Fig 98). By doing this the ecovillage can be fully integrated with its surrounding which lessen the risk of becoming a gated community for a select few. This can create a symbiotic relationship between the added structure and the existing with both parties benefiting from the other (Fig 98).

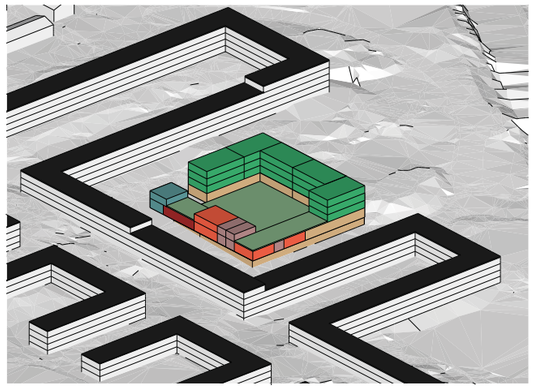


FIGURE 97 *Image showing an initial idea of the ecovillage*

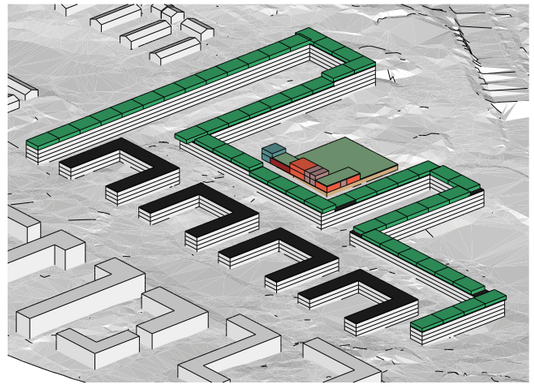


FIGURE 99 *Image showing the transformed ide of the ecovillage*

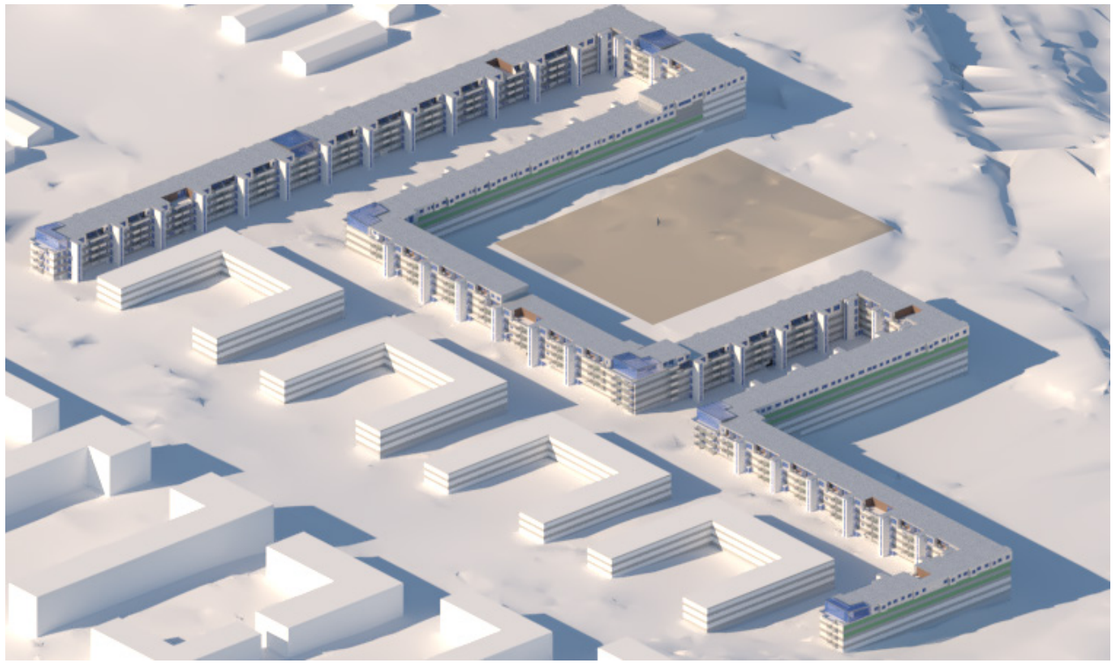


FIGURE 98 *Render showing the ecovillage at the end of the process*

PLACEMENT

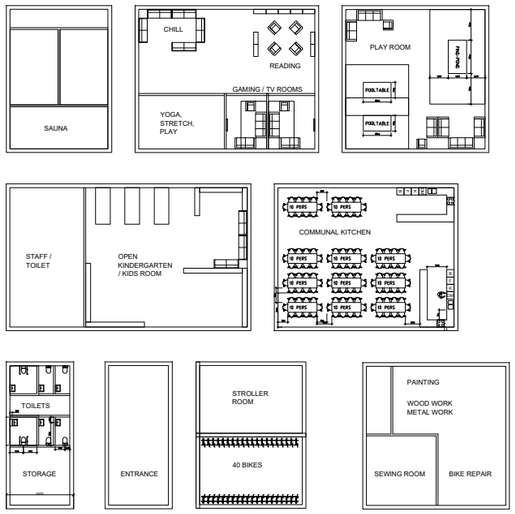


FIGURE 100 *Schematic plans of communal spaces.*

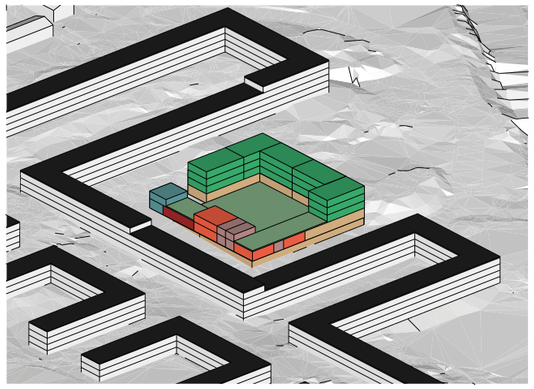


FIGURE 101 *Schemtic investigation of a free-standing development.*

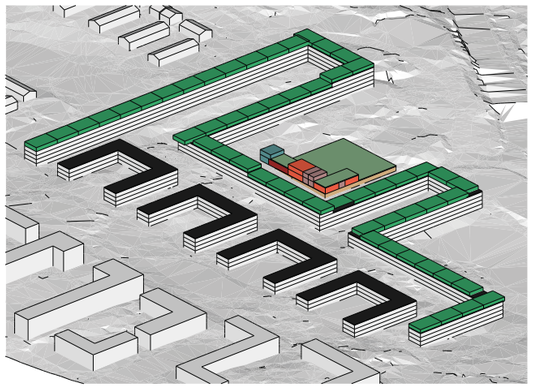


FIGURE 102 *Schemtic investigation of an integrated development.*

apartments
open preschool
communal areas
entrance, toilet & storage
laundry & sauna
roof terrace & garden
storage & waste

apartments
open preschool
communal areas
entrance, toilet & storage
laundry & sauna
roof terrace & garden
storage & waste

After the selection of a site the process continued with investigating options of placement for the project. For this investigation some spatial requirements were needed. Schematic plans were drawn up for potential communal spaces. These were a sauna, communal living room, playroom, communal kindergarten, communalkitchen, toilets, storage, entrances, bicycle rooms, a workshop and repair activities.

The plans were used to get approximate square meter needed for each activity and should not be viewed as actual suggested plans and layouts for the spaces. A minimum need for communal areas with this program were around 2000 sqm. These schematic spaces were then used when working with suggestions of how housing and communal areas could be placed within the chosen site. It's important to note that these volumes are not an architectural proposal but are just a schematic investigation.

FREE-STANDING DEVELOPMENT

The first schematic investigation proposed that all new construction be placed on the parking lot. This proposal had around 50 apartments and close to 2000sqm communal facilities in one structure. To not exceed the height of Pennygången the development was suggested to be between 2 - 5 floors.

Half of the courtyard would then consist of the housing block and half of the communal areas. By this placement the communal areas could also be open for the rest of Högsbohöjd.

Existing parking was here proposed to be replaced by an underground garage. Part of the garage could be used for a car pool as was suggested by the residents of Högsbohöjd (page 37).

INTEGRATED DEVELOPMENT

The second schematic investigation proposed that Pennygången would be the host of the urban ecovillage. New apartments were placed on the existing structure which resulted in around 160 housing units.

With this proposal the suggested communal plot could be less developed and the communal spaces could be bigger. Since no apartments were placed on the communal plot the space could belong to everyone of Högsbohöjd.

The added construction could amplify the horizontal expression of Pennygången. It could copy features, use same structural lines or add something new. Building new apartments could also fund elevators and balconies for the current residents which would upgrade their housing situation.

REFLECTION AND CONCLUSION

The first investigation is a common way to look at new development. To find a site, place a program and develop a form. It's the result of zooming in on the site and causes a limitation of the scope for further investigation. The second proposal uses a broader scope, takes in the context and then finds an alternative for development. The two suggestions are also two different views on what ecovillages are and can be for the urban context. The first is a sheltered neighbourhood where all ideals and wishes are met within and doesn't invite others to take part. The second is instead a refurbishment of existing housing and a way for an existing community to become something new or other.

The first investigation, which is the idea of a green island was felt to uninclusive and was therefore abandoned in favour of the integrated development.

DESIGN SKETCHES

STAIRCASES

When the decision had been made to place the ecovillage on top of Pennygången there was a need to look at how the vertical communication would be solved. The logical choice would be to place new communication in connection with the existing entrances and staircases. Since all entrances of Pennygången are placed towards the courtyard only one side of the plan was used during sketching.

To not disturb the construction of the building all added communication was placed on the outside of the building. This resulted in the need to open up the facade to gain access to each floor.The original plan of Pennygången showed that the apartments had a kitchen and a bedroom between the staircase and the facade. Since kitchens have fixed plumbing that would be difficult and costly to move, the bedroom was proposed to be converted into a hallway instead.

Different versions of staircases and elevators were tested during a sketch phase. One option was to add both new staircases and elevators, the other was to add only elevators. Moving the staircase to the facade would give room for a storage unit in each floor that could be given to the apartment which lost a bedroom. The size of the combined communication seemed to take up too much space in the facades and courtyard. The added room did not seem to properly outweigh these negative aspects. Therefore, the choice was made to keep the original staircase and only add an elevator (Fig 103).

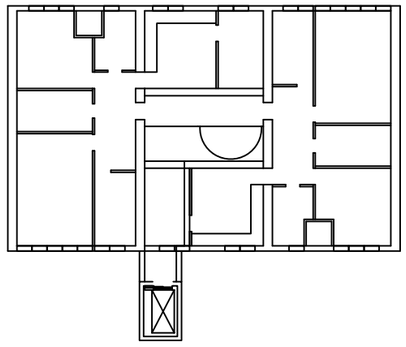


FIGURE 103 *Sketched plan of added elevator.*

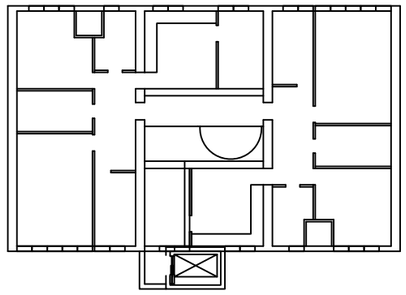


FIGURE 105 *Sketched plan of added elevator.*

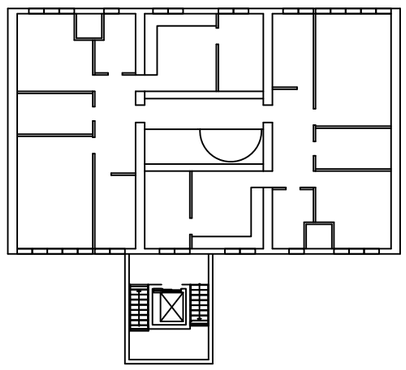


FIGURE 104 *Sketched plan of added elevator and staircase.*

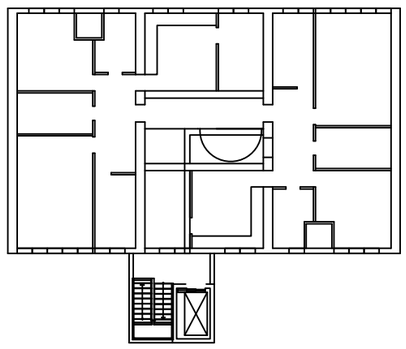


FIGURE 106 *Sketched plan of added elevator and staircase.*

BALCONIES

As a compensation for the lost bedroom and as a possibility to upgrade the housing situation for the residents of Pennygången the idea came to add balconies. In the original sketches for the balconies (fig 107) the concept was to have large balconies with a part as a small greenhouse. When the program was set for larger communal greenhouses this idea was abandoned. The final design (Fig 108) instead proposes to give all apartments an equal size of balcony, without the glazed part. The size of the balconies and the terraces on the added floor were adapted to eachother. Due to this the added balconies could hang by wires from the new construction. The idea was that this solution would have lesser impact on the existing structure.

FIGURE 108 *Proposed design of added balconies.*

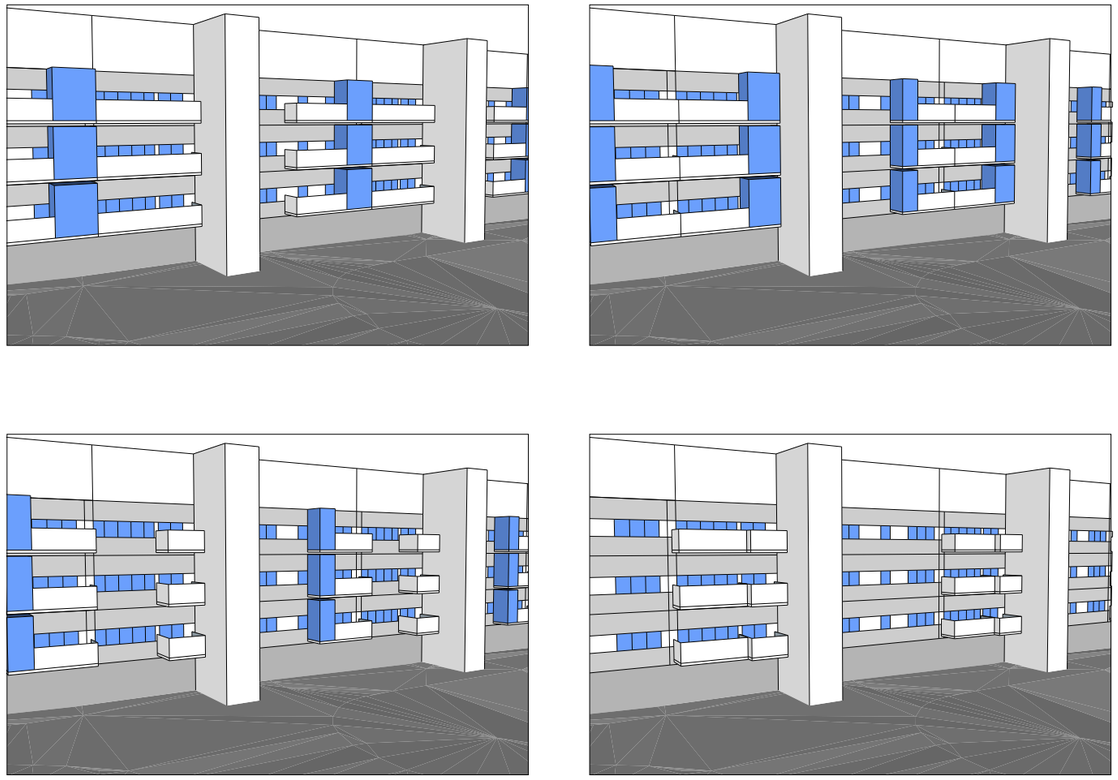
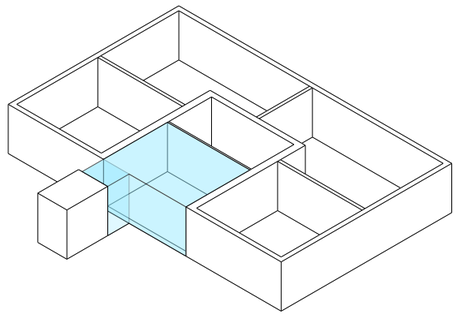
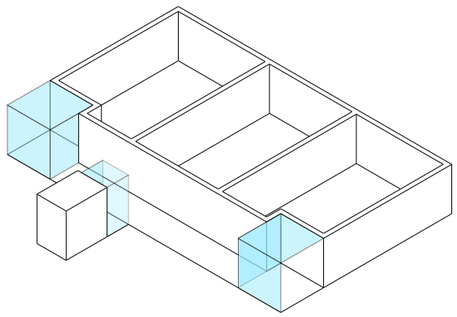


FIGURE 107 *Sketchmodels of different added balconies.*





APARTMENTS & SEMI-PRIVATE SPACES

For structural reasons the floor plan of Pennygången was used as a base for developing the added apartments and communal program. Different solutions on how to relate the apartments with the semi-private rooms were tried through digital sketch models (Fig 109). The sketches show intentions of separating the semi-private and privat spaces by creating an inner hallway and to offer all apartments two facades by using an exterior corridor. These investigations were abandoned after the choice was made to keep the original staircase and only add an elevator. The semi-public space could then be placed in connection with the elevator as communication and hallways can also be classified as a type of shared space. The size of the semi-private space and how it should look from the outside was then tested (Fig 110). The last image shows the design that was used in the final proposal. The room is visible from the outside and is in line with the new entrance.

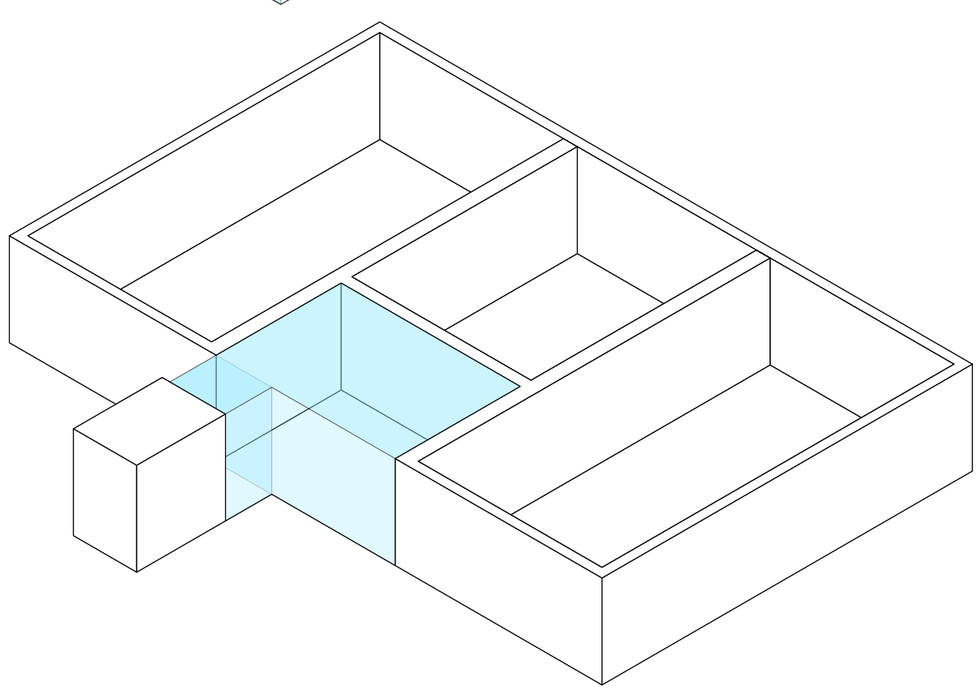
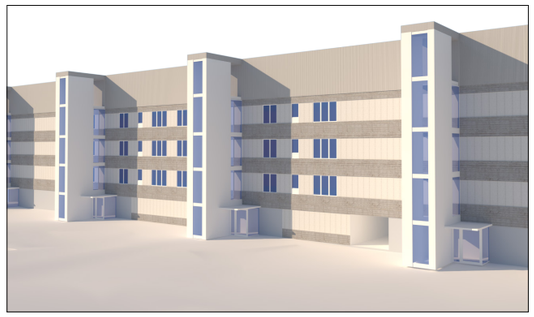
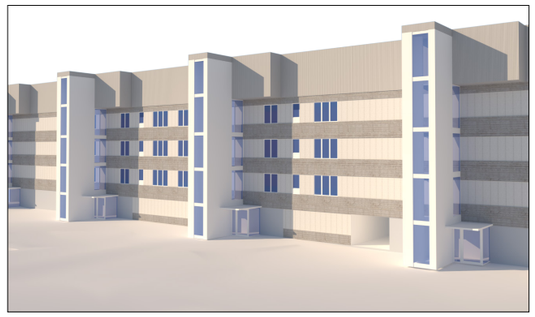


FIGURE 109 *Sketches of added apartments and semi-private spaces.*





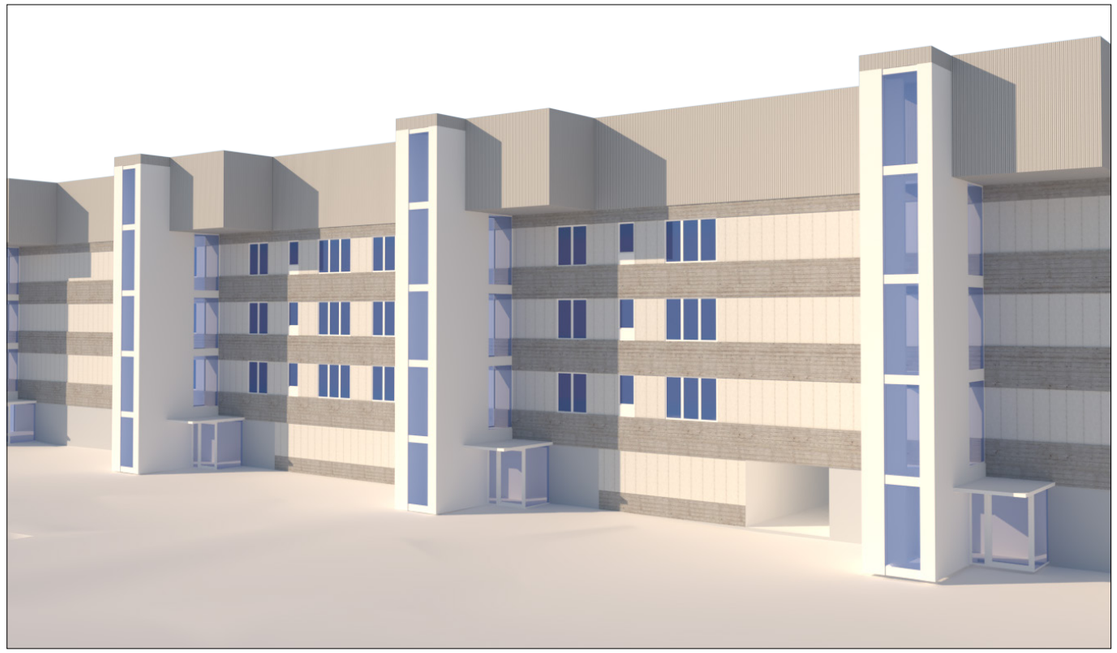


FIGURE 110 *Sketches of the elevators and semi-private spaces.*

DISCUSSION

Within ecovillages there are concepts of sharing, reusing and circularity. Concepts that I've been interested in before and felt compelled to learn more about. In these communities these concepts are combined with housing which has been an interest since before I started architecture school.Therefore, investigating an urban ecovillage where both these fields are combined felt appealing as a subject for a thesis. Since I've lived in Gothenburg almost all my life it was also interesting to try to implement this type of project on a site in the city.

During the project my view of what ecovillages can be have been changed. The original idea of a new development where shared spaces are aimed at the people within it now seem elitist. This type of development does not help or improve its surroundings. It can also be harder to finance such a development without raising housing costs, something that should be avoided.

Instead the proposal became a combination of an ecovillage and a transformation project. Because of the change in development some of the criteria for the site became irrelevant. If the concept of transformation had been part of the project from the beginning, other criteria would most likely have been chosen which might have led to a different site and also a different design.

But since the same type of construction used for the transformation can be found in other places, a similar design could probably also be applied somewhere else. This strategy to use the ecovillage to help finance the upgrading of existing housing seem to be an appropriate answer when working with housing that aims towards sustainability. The social, ecological and economic impact of the ecovillage can then be greater than it would if it had been developed on its own.

For the urban ecovillage in this thesis to be finalized the community house still needs to be developed. This should, as stated earlier, be done through a participatory design process which cannot be covered by a thesis.

The proposed transformation is a feasible way of sustainable development with positive impact socially, economically and ecologically. New forms of housing should improve the situation for all, while at the same time work with densifying. It is important to include all groups in society so that eco living is not just for an elite group of ”green” people.

REFERENCES

ARTICLES

Kruse. F. (2018, 3 december). Bostadsbristen slår mot alla. Göteborgs-Posten. Retrieved from www.gp.se

Stevik. L. (2019, 1 december). Göteborg fortsätter att bygga – men allt fler grupper står utan bostad. Göteborgs-Posten. Retrieved from www.gp.se

Soxbo. S. (2020, 17 march). Kraftigt ökade kötider på sajten Boplats Göteborg. Expressen. Retrieved from www.expressen.se

Sund. J. (2019, 6 may.) Bostadspriserna i Göteborg har fördubblats på 10 år. SVT Nyheter. Retrieved from www.svt.se

BOOKS

Atlestam, G., Bremertz, M., Haglind Ahnstedt, C., Havström, M., Hedberg, M., Hultén, E. & Höglund, C.M. (2015). *Ekobyboken: frihetsdrömmar, skaparglädje och vägar till ett hållbart samhälle* (1st edition). Karlstad: Votum & Gullers förlag

Bang, J.M. (2005). *Ecovillages: A practical guide to sustainable communities* (1st edition). Edinburgh: Floris Books.

Berg, P.G., Cras-Saar, M. & Saar, M. (2002). *Living Dreams: Om ekobyggande - en hållbar livsstil* (1st edition). Nyköping: Scapa Förlags AB.

Drexler, H El khouli, S. (2012). *Holistic Housing* (1st edition). Germany: Kessler Druck + Medien, Bobingen.

Nordström, C. (1999). *Möjligheter för miljonprogrammet* (1st edition). Stockholm: Svensk byggstjänst.

REPORTS

Boverket. (2019). *Bostadsmarknadsenkäten 2019*. Retrieved 2020-03-12 from https://www.boverket.se/contentassets/44b828c304f24b46ba69a1f293c24a97/bostadsmarknadsenkaten-2019.pdf

Boverket. (2018). *Hållbart byggande med minskad klimatpåverkan*. Retrieved 2020-03-13 from https://www.boverket.se/globalassets/publikationer/dokument/2018/hallbart-byggande-med-minskad-klimatpaverkan.pdf

Fastighetskontoret. (2018). *Bostadsförsörjning i Göteborg - Lägesrapport 2018*. Retrieved 2020-03-13 from https://goteborg.se/wps/wcm/connect/9c081eb3-6518-4357-bfda-200c96edd37a/Bostadsf%C3%B6rs%C3%B6rjning-i-G%C3%B6teborg-l%C3%A4gesrapport-2018.pdf?MOD=AJPERES

Göteborgs Stad. (2014). *Klimatstrategisktprogram för Göteborg*. Retrieved 2020-03-13 from https://goteborg.se/wps/wcm/connect/36fb4599-a2c4-4e46-8621-0c71ceece4c5/Klimatstrategiskt+program+f%C3%B6r+G%C3%B6teborg.pdf?MOD=AJPERES

Göteborgs Stad Stadsbyggnadskontoret. (2017). *Detaljplan för bostäder i Högsbohöjd, inom stadsdelen Järnbrott i Göteborg, en del av BoStad2021.* Retrieved 2020-03-16 from https://www5.goteborg.se/prod/fastighetskontoret/etjanst/planobygg.nsf/vyFiler/J%C3%A4rnbrott%20-%20%20Bost%C3%A4der%20i%20H%C3%B6gsboh%C3%B6jd%20(BoStad2021)-Plan%20ut%C3%B6kat%20f%C3%B6rfarande%20-%20granskning-Planbeskrivning/$File/Planbeskrivning.pdf?OpenElement

Göteborgs Stad Stadsbyggnadskontoret. (2015). *Program för Högsbohöjd.* Retrieved 2020-04-19 from http://www5.goteborg.se/prod/fastighetskontoret/etjanst/planobygg.nsf/vyFiler/H%C3%B6gsbo%20-%20Program%20f%C3%B6r%20H%C3%B6gsboh%C3%B6jd-Program%20-%20samr%C3%A5d-Program%20med%20underlag%20och%20f%C3%B6rdjupning/$File/01_Program_Hogsbohojd_underlag_o_fordjupning.pdf?OpenElement

Göteborgs Stad Stadsbyggnadskontoret. (2014). *Dialogsammanställning - Program för Högsbohöjd.* Retrieved 2020-02-10 from https://www5.goteborg.se/prod/fastighetskontoret/etjanst/planobygg.nsf/vyFiler/H%C3%B6gsbo%20-%20Program%20f%C3%B6r%20H%C3%B6gsboh%C3%B6jd-Inf%C3%B6r%20program-Sammanst%C3%A4llning%20Dialog/$File/SammanstallningDialog.pdf?OpenElement

Lindholm Restaurering AB. (2014). *Pennygången, Högsbohöjd. Kulturhistorisk dokumentation och analys*. Retrieved 2020-04-19 from http://www5.goteborg.se/prod/fastighetskontoret/etjanst/planobygg.nsf/vyFiler/H%C3%B6gsbo%20-%20Program%20f%C3%B6r%20H%C3%B6gsboh%C3%B6jd-Program%20-%20samr%C3%A5d-Kulturmilj%C3%B6utredning/$File/05_Kulturmiljoutredning_Pennygangen.pdf?OpenElement

Social Life. (2011). *Design for Social Sustainability*. Retrieved 2020-03-15 from http://www.social-life.co/media/files/DESIGN_FOR_SOCIAL_SUSTAINABILITY_3.pdf

World Comission on Environment and Development. (1987). *Our common future*. Oxford, Oxford University Press. Retrieved 2020-03-15 from https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf

WEBSITES

Boplats. (2019). Boplats i siffror. Retrieved 2020-03-13 from https://nya.boplats.se/om/statistik

Boverket. (2017). Utsläpp av växthusgaser från bygg- och fastighetssektorn. Retrieved 2020-03-13 from https://www.boverket.se/sv/byggande/hallbart-byggande-och-forvaltning/miljoindikatorer---aktuell-status/vaxthusgaser/

Dictionary. (2020). Intentional community. Retrieved 2020-03-17 from https://www.dictionary.com/browse/intentional-community

Framtiden. (2020). Hett med småhus i Högsbohöjd. Retrieved 2020-04-19 from https://framtiden.se/hett-med-smahus-i-hogsbohojd/

Gaining by Sharing. (2020). Modellen. Retrieved 2020-05-01 from http://www.gainingbysharing.no/modellen/

Global Ecovillage Network. (2020). What is an ecovillage? Retrieved 2020-03-13 from https://ecovillage.org/about/about-gen/

Göteborgs Stad. (2020). Kort kommunfakta. Retrieved 2020-03-12 from https://goteborg.se/wps/portal/start/kommun-o-politik/kommunfakta/kort-kommunfakta/!ut/p/z1/hY-5BC4IwHMU_jdf9p6Vu3dbBSC0NAm2X-UFkqOCdzNejTZ8eg6N0e7_d4DziUwMf-q0beV6dVYDYu_8OCau_GJbF2Gsx2N8P-6c5NExSbPw4EPxD-BLjH-IYYiB97VEt-pEII8_zQ-IRSkm4JjSg4XufjfWKtMC1u-AktNLrr5VZnzDRvHOxgay1qlWoHgRol-Hfyt0qnZQPlJwiTLZyoK9gKnvNjF/dz/d5/L2dBISEvZ0FBIS9nQSEh/

Göteborgs Stad Statistikdatabas. (2017). Förvärvsinkomst 2011 - 2017. Retrieved 2020-03-16 from http://statistikdatabas.goteborg.se/pxweb/sv/1.%20G%c3%b6teborg%20och%20dess%20delomr%c3%a5den/1.%20G%c3%b6teborg%20och%20dess%20delomr%c3%a5den__Prim%c3%a4romr%c3%a5den__Inkomst%20och%20utbildning__Inkomster/10_Inkomster_PRI.px/table/tableViewLayout1/

Hauschild & Siegel. (2020). Urbana villor. Retrieved 2020-05-01 from https://www.hauschild-siegel.com/se-1/uv-se/

Helen & Hard. (2020). Vindmøllebakken. Retrieved 2020-05-01 from http://www.helenhard.no/projects/vindmllebakken

Hyresgästföreningen. (2019). Allt fler unga vuxna tvingas bli mambos. Retrieved 2020-03-13 from https://hurvibor.se/lanssidor/goteborgsregionen/bostader/unga-vuxna/

KTH Sustainability Office. (2020). Ecological sustainability. Retrieved 2020-03-15 from https://www.kth.se/en/om/miljo-hallbar-utveckling/utbildning-miljo-hallbar-utveckling/verktygslada/sustainable-development/ekologisk-hallbarhet-1.432074

KTH Sustainability Office. (2020). Economic sustainability. Retrieved 2020-03-15 from https://www.kth.se/en/om/miljo-hallbar-utveckling/utbildning-miljo-hallbar-utveckling/verktygslada/sustainable-development/ekonomisk-hallbarhet-1.431976

Lacaton & Vassal. (2020). Transformation of 530 dwellings, block G, H, I. Retrieved 2020-05-01 from https://www.lacatonvassal.com/index.php?idp=80#

Merriam-Webster. (2020). Community. Retrieved 2020-03-17 from https://www.merriam-webster.com/dictionary/community

Merriam-Webster. (2020). Culture. Retrieved 2020-03-15 from https://www.merriam-webster.com/dictionary/culture

Naturvårdsverket. (2020). Konsumtionsbaserade växthusgasutsläpp per person och år. Retrieved 2020-03-13 from https://www.naturvardsverket.se/Sa-mar-miljon/Statistik-A-O/Vaxthusgaser-konsumtionsbaserade-utslapp-per-person/?visuallyDisabledSeries=856dd58bc92c4e14

Poseidon. (2020). Högsbohöjd. Retrieved 2020-04-19 from https://poseidon.goteborg.se/sok-ledigt/vara-bostadsomraden/hogsbohojd/

SCB. (2020). Sverige i siffror. Retrieved 2020-04-30 from https://www.scb.se/hitta-statistik/sverige-i-siffror/manniskorna-i-sverige/boende-i-sverige/

SGS Studentbostäder. (2020). Pennygången. Retrieved 2020-04-19 from https://www.sgs-studentbostader.se/sv-se/v%C3%A5ra-bost%C3%A4der/v%C3%A5ra-omr%C3%A5den/v%C3%A4ster/pennyg%C3%A5ngen

Stefan Forster Architekten. (2020). Haus 03. Retrieved 2020-05-01 from https://www.sfa.de/projects/haus-03-en

SVT. (2020). Bostadsbristen gör dem hemlösa i Göteborg. Retrieved 2020-03-13 from https://www.svt.se/nyheter/granskning/ug/de-tillhorden-vaxande-gruppen-hemlosa-blir-allt-fler-i-storstaderna-1

Västtrafik. (2020). Tidtabeller. Retrieved 2020-03-16 from https://www.vasttrafik.se/reseplanering/tidtabeller/

World Habitat. (2020). Solar Housing Renovation, Gårdsten, Sweden. Retrieved 2020-05-01 from https://www.world-habitat.org/world-habitat-awards/winners-and-finalists/solar-housing-renovation-gardsten-sweden/

IMAGE REFERENCES

If nothing else stated images and photos are produced by the author. These figures will not be listed below.

Figure 13. Page 21. Google Maps. (2020a). Kålltorp [satellite photograph]. Available from https://goo.gl/maps/8H8YJaHe865QMyMt8

Figure 14. Page 22. Google Maps. (2020b). Gothenburg [satellite photo]. Available from https://goo.gl/maps/LVrqUkEAiQaJPk4z8

Figure 16. Page 22. Google Maps. (2020b). Gothenburg [satellite photo]. Available from https://goo.gl/maps/LVrqUkEAiQaJPk4z8

Figure 17. Page 23. Google Maps. (2020c). Högsbotorp [satellite photo]. Available from https://goo.gl/maps/TsoAC9ysMBTQkHY1A

Figure 18. Page 23. Google Maps. (2020b). Gothenburg [satellite photo]. Available from https://goo.gl/maps/LVrqUkEAiQaJPk4z8

Figure 19. Page 23. Google Maps. (2020d). Kortedala [photograph]. Available from https://www.google.com/maps/@57.7533302,12.0295714,3a,75y,221.18h,98.2t/data=!3m6!1e1!3m4!1sO5Ia_REqpF4iZMJzQb-P4og!2e0!7i16384!8i8192

Figure 20. Page 23. Google Maps. (2020b). Gothenburg [satellite photo]. Available from https://goo.gl/maps/LVrqUkEAiQaJPk4z8

Figure 22. Page 24. Google Maps. (2020e). Norra Biskopsgården [satellite photo]. Available from https://goo.gl/maps/4PfhSNjm6sSZTXLP8

Figure 23. Page 24. Google Maps. (2020b). Gothenburg [satellite photo]. Available from https://goo.gl/maps/LVrqUkEAiQaJPk4z8

Figure 26. Page 25. Google Maps. (2020f). Södra Biskopsgården [satellite photo]. Available from https://goo.gl/maps/cwz3BB34mk7fcU589

Figure 27. Page 25. Google Maps. (2020b). Gothenburg [satellite photo]. Available from https://goo.gl/maps/LVrqUkEAiQaJPk4z8

Figure 30. Page 25. Google Maps. (2020g). Högsbohöjd [satellite photo]. Available from https://goo.gl/maps/nVH5xkDcRxPX8a518

Figure 31. Page 25. Google Maps. (2020b). Gothenburg [satellite photo]. Available from https://goo.gl/maps/LVrqUkEAiQaJPk4z8

Figure 35. Page 26. Google Maps. (2020e). Norra Biskopsgården [satellite photo]. Available from https://goo.gl/maps/4PfhSNjm6sSZTXLP8

Figure 36. Page 26. Google Maps. (2020f). Södra Biskopsgården [satellite photo]. Available from https://goo.gl/maps/cwz3BB34mk7fcU589

Figure 37. Page 26. Google Maps. (2020g). Högsbohöjd [satellite photo]. Available from https://goo.gl/maps/nVH5xkDcRxPX8a518

Figure 40. Page 27. Google Maps. (2020g). Högsbohöjd [satellite photo]. Available from https://goo.gl/maps/nVH5xkDcRxPX8a518

Figure 56. Page 35. Google Maps. (2020h). Pennygången [satellite photo]. Available from https://goo.gl/maps/RFYRw7zXXrqPvQDw8

Figure 59. Page 36. Göteborgs Stad Stadsbyggnadskontoret. (2017). Illustrationsplan. [digital plan drawing]. Available from from https://www5.goteborg.se/prod/fastighetskontoret/etjanst/planobygg.nsf/vyFiler/J%C3%A4rnbrott%20-%20%20Bost%C3%A4der%20i%20H%C3%B6gsboh%C3%B6jd%20(BoStad2021)-Plan%20ut%C3%B6kat%20f%C3%B6rfarande%20-%20granskning-Planbeskrivning/$File/Planbeskrivning.pdf?OpenElement

Figure 82. Page 52. Skalgubbar. 2020. Cutouts. [digital image]. Available from www.skalgubbar.se

Figure 83. Page 54. Skalgubbar. 2020. Cutouts. [digital image]. Available from www.skalgubbar.se

Figure 96. Page 60. Skalgubbar. 2020. Cutouts. [digital image]. Available from www.skalgubbar.se