

# TRANSFORMATION AS A REFLECTION OF TIME

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A study of building transformations in Bräcke småstugeområde

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Master's Thesis

Spring 2023

Chalmers University of Technology

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Examiner: Anna Braide

Supervisor: Kaj Granath

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Thank you!

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Housing Direction  
MPDSD

## **ABSTRACT**

In 1934, the first small cottage area known as “Bräcke småstugeområde” was constructed in Gothenburg, consisting of 234 households with two different types of floor plans both strictly functionalist and standardized in terms of appearance, content and construction method.

Over time, each of these buildings have been expanded, refined and reshaped by their occupants according to their needs, resulting in a diverse range of spatial configurations.

This thesis aims to examine the spatial configuration and the use of spaces in each of the original floor plans and to determine and categorize the spatial changes made to each type of the buildings during the time by utilizing three different methods, time-series analysis, qualitative analysis and comparative analysis. By using a multi-method longitudinal approach, the study seeks to gain a comprehensive understanding of the transformations that have occurred in the buildings and their impact on spatial qualities. The study explores what spaces and functions were added or removed, why these changes were made, and how they influenced the spatial qualities of the living spaces. Furthermore, the study explores the implications of these findings for future housing design to be more responsive and sustainable.

## **KEYWORDS**

User-initiated transformation, Post-occupancy alteration, Plan typology, Space syntax analysis, Visibility graph analysis (VGA), Isovist analysis



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## 01 | INTRODUCTION

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## EDUCATION

Politecnico di Torino, Italy.....2018-2021  
Architecture, Bachelor's degree

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Architecture and planning beyond sustainability

## STUDIOS:

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## AIM

User-initiated housing transformation is a common practice in Sweden, where residents modify their homes according to their changing needs over time. The Bräcke småstugeområde project, which began in 1934, is an example of this phenomenon. The project was designed to provide functional small sized buildings, with two different types of floor plans, Type A and Type B.

Over the years, the residents have reshaped, refined, and expanded their homes according to their evolving needs, resulting in a wide range of unique spatial configurations. This research aims to study these transformations, compare them with the other type of building and to understand how these changes have improved the spatial qualities of the living spaces.

The primary objective of this research is to examine and categorize the changes made to the original floor plans of both building types over time through different kind of methods, including time-series analysis, qualitative analysis, and comparative analysis.

Furthermore, the study explores the implications of these findings by proposing some guidelines for future housing design, particularly for small-sized private houses. Undoubtedly, designing homes that are more responsive to the needs and preferences of residents would lead to more sustainable living environments. By analysing the spatial requirements of the residents and their reasons for making changes to their homes, this research aims to provide insights and recommendations for the architects in future housing design.

## RESEARCH QUESTIONS

-What types of spatial changes have the residents made? Why?

-How have the alterations to the original floor plans influenced the spatial qualities of the living spaces?

-What are the implications of this study to the future housing?

## BACKGROUND

Housing is a critical component of a sustainable society, and it is essential to design living spaces that meet the needs of occupants. However, the actual use of these spaces can differ significantly from the intended use, as residents' needs and preferences change over time, leading to modifications to better suit their requirements. The process of post-occupancy transformation has been studied, as it provides valuable insights into how users interact with their living spaces and how these spaces can be improved.

While many studies have focused on buildings designs before their construction, post-occupancy phase has been relatively understudied in the field of architecture and building design. Studying how buildings perform and how they are used by their occupants over time, typically after a building has been in use for some year is also crucial. This approach can help identify areas where the original design may have fallen short of user needs or expectations, and can inform the design of future buildings to better meet the needs of their occupants.

This thesis aims to investigate the post-occupancy transformation by residents in two types of buildings located in Bräcke, Gothenburg, and answer key questions, such as the types of spatial changes made by residents and the reasons behind these changes. The study also aims to explore how alterations to the original floor plans have impacted the spatial qualities of the living spaces and their implications for future housing design.

By examining these questions, this study contributes to a better understanding of how users' needs and preferences can inform the design of future housing to create more long-lasting and functional spaces. The findings highlight the importance of understanding the needs and preferences of residents and how they modify their living spaces. This understanding can inform future housing design to better respond to user needs, resulting in a longer lifespan for buildings and reduced need for frequent and extensive alterations, which can contribute to more sustainable living environments.

## METHODOLOGY

This study aims to investigate the spatial transformations made by residents in the Bräcke småstugeområde to understand how these changes have improved the spatial qualities of the living spaces. To achieve this goal, a multi-method longitudinal approach was used, which included: Time-series analysis, Qualitative analysis, and Comparative analysis.

This approach, combines both qualitative and quantitative research methods and involves collecting and analysing both numerical data and non-numerical data.

The primary method is time-series analysis. In the first step, the floor plan of all 234 buildings (132 Type A and 102 Type B) was obtained and collected from the Gothenburg municipality website. Each building had several documents pertaining to different years, and all folders were carefully examined to ensure no alterations to the original building were missed. Subsequently, the transformed buildings were gathered into separate spreadsheets for Type A and Type B. Categories were defined, and each floor plan was reviewed to identify what kind of changes were made and in which year they occurred. The data collected from this analysis was then used to create a detailed timeline of the spatial transformations made to each building, highlighting the frequency and patterns of changes made over time.

Qualitative analysis was another method used in this study, which involved conducting interviews with the residents of both types of buildings. This method aimed to gain a better understanding of why and how the residents made these changes, as well as the impact of these changes on their lives.

Finally, The Comparative Analysis method, utilizing Space syntax analysis, was used in this study to compare the original floor plans of Type A and B buildings. Subsequently, the most changed spaces and functions in both types were chosen for further analysis. By using the space syntax analysis method, these spaces were compared with the original ones to understand how the alterations have influenced the spatial qualities of the living spaces.

## SPACE SYNTAX ANALYSIS

Space syntax analysis is a theory and method to examine the spatial configurations and their effects on human behaviour and interaction. This method was developed by Bill Hillier, Julienne Hanson, and others in the late 1970s and early 1980s. (Hillier & Hanson, 1984, Hillier, 1996).

The analysis can be used to understand the spatial layout of buildings and how changes in layout can impact the movement and interaction of people within those spaces. (Dursun & Saglamer, 2003)

Space syntax analysis includes various methods and techniques for analysing spatial configurations and in this paper two methods have been chosen.

-Visibility Graph Analysis (VGA)

-Isovist Analysis

The reason for selecting these two methods is their capability to present the spatial configurations in visual representations, which can facilitate a better understanding and interpretation of the analysis outcomes.

### -VISIBILITY GRAPH ANALYSIS (VGA)



Visibility Graph Analysis (VGA) is a type of space syntax analysis method which explores the properties of a visibility graph obtained from a spatial environment. (Turner et al. 2001) This analysis can assess the level of preference of one point compared to its nearby neighbours. (Turner et al. 2001)

The term Visibility Graph Analysis (VGA) refers to a method of analysing the degree of connection or separation of a space from the overall system. When a space is well-connected with other spaces ( Red cells), it shows a higher level of integration. (Kamalipour et al, 2012)

### -ISOVIST ANALYSIS

Isovist analysis is another space syntax method utilized in this study, which involves the set of all visible points from a particular location in space. The size and shape of an isovist can vary depending on the viewpoint. This method is useful in describing how users interact with, perceive, and move through a given space. (Benedikt, 1979)

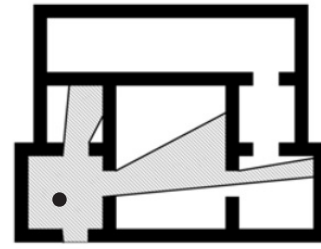


Figure 1.1 The Gray area is the isovist visual field that can be seen from the red circle  
(© Ostwald, M. J., & Dawes, M. 2013)

### -DepthmapX

In both of the methods the UCL DepthmapX software (depthmapX development team. (2017). have been used.

DepthmapX is a visual and spatial network analysis software which is an open-source software that enables analysis in various scales. (de Arruda Campos and Fong, 2003)



## DELIMITATIONS

There are a number of restrictions on the study that have been taken into account. The research is limited to all type A and type B buildings in Bräcke, Gothenburg, which is not the typical of the overall buildings in Gothenburg. Furthermore, it ignores factors that would have affected the types and scope of improvements made, such as the socioeconomic status of occupants, their demographic situation, or the length of time they lived in the buildings before alterations were made. Additionally, it disregards the state of the condition of the buildings at the time the alterations were made.

This study is based only on submitted documents to the municipality of Gothenburg, which may not include all the modifications made to the buildings. There may be alterations that were made by residents without the permission or submission in the municipality that are not reflected in this study.

It should be mentioned that this research does not consider any alterations made to the basements of the type A buildings, as none were found in the submitted documents to the municipality. Therefore, the analysis is limited to alterations made to the above-ground parts of the buildings.

Furthermore, This thesis only considers alterations made to the interior spaces of the buildings, and did not consider any changes made to the exterior facade or surrounding area.

## GLOSSARY

**Spatial analysis:** A method of analysing the spatial relationships between different elements in a network.

**Socio-economic factors:** Such as income, education, and occupation that can impact an individual's social and economic status.

**Time-series analysis:** A method of analysing data over time to identify patterns and trends.

**Isovist:** A geometric analysis method used to measure visual access

**Post-occupancy transformation:** The modifications or changes made to a building after its initial occupation.

**Space syntax analysis:** A method of analysing the spatial configuration of buildings

**VGA:** It is a spatial analysis method that uses graph theory to measure the visual connectivity between different points in a space.

## READING INSTRUCTIONS

Thank you for taking the time to read my thesis. The following instructions are provided to guide you through the document and facilitate your reading experience.

1. Theory: Provides the theoretical framework and background, necessary for understanding the subsequent chapters.
2. Analysis: Includes a time-series, qualitative, and comparative analysis of the transformations.
3. Guidelines: This chapter proposes some guidelines for future housing design.
4. Design proposal: It evaluates two recently built buildings based on the results of the analysis and proposed design proposals.
5. Discussion: Reflects on the outcomes of the research and how they relate to the research questions.

## 02 | THEORY

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## BRÄCKE

Bräcke is a district in western Hisingen in Gothenburg.

In the past, up until at least 1621, it was known as Bräckö, which the meaning is derived from the old Swedish Braekko, “wide slope, hill,” (“Bräcke, Göteborg,” 2023). The area considered as a countryside and the majority of the area was farmland, most of which were either leased out or mortgaged. In 1907, the property was bought by the city of Gothenburg. (Lönnroth, 1999)

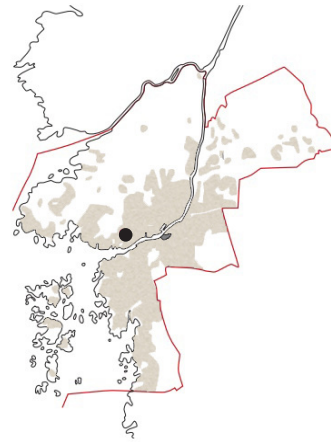


Figure 2.1  
Bräcke, Göteborg  
(© Göteborgs stadsmuseum, 1999)

In 1934, a town plan was established for the development of private homes (The Egnahem) south of Bräcke farm and in 1934–39 the area was built up with small uniformly designed wooden houses in 2 floors which was called Småstugeförening and was Gothenburg’s first small cottage area which were built by Egnahem’s company. (Svensson, 2018)



Figure 2.2 Bräcke, 1852  
(© Det Gamla Göteborg, 2018)

## EGNAHEMSBOLAGET

Egnahemsbolaget (Göteborgs Egnahems AB), which was then called Småstugebyrån, was born in 1933 out of the home ownership movement which was started in poor Sweden in 1860s. Even though the movement had a variety of intentions and objectives in mind, but it was united by the vision of providing good homes for ordinary people. (Brink & Mayer, 2022)

The ambition of the company was to making it possible for more Gothenburgers to own their own home and making single-family homes available to a wider public. Egnahemsbolaget's first project was villas in Bräcke. It has since continued with, over 10,000 homes and the ambition is still the same: to build homes that more people can afford to buy and own. Egnahemsbolaget is part of the Framtiden Group, wholly owned by the City of Gothenburg. (Egnahemsbolaget, 2022)



Figure 2.3 Egnahemsbolaget logo  
(© Egnahemsbolaget)

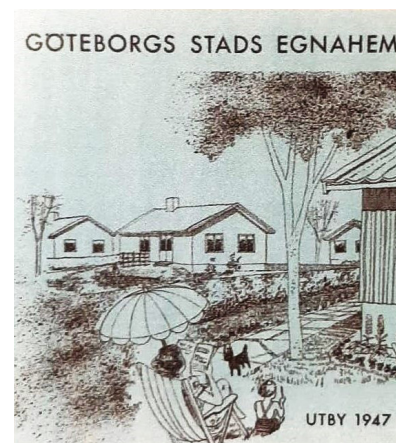


Figure 2.4 Sales brochure-Utby1947  
(©10000 egna hem, 2022)

## BRÄCKE SMÅSTUGEOMRÅDE

Gothenburg's politicians became more aware of the modern ownership movement as a result of the success of the small house agency in Stockholm. The small cottage agency was started in Göteborg, and the concept of assisting the city's residents to fulfill their dream of owning a modern home quickly became a success.

Malte Jacobsson submitted the motion to the city council in the autumn of 1931, and on June 15, 1933, the council decided that the first private homes, the "small cottages," would be constructed over the summer of 1934, and Bräcke became the first owner-occupied home area.

Although this business had broad support, there were also some criticism about it.

Some believed that workers who built their own houses were taking over bourgeois ideals and entering a debt trap. Others condemned it as old-fashioned action. Some said it does not fit into modern urban construction and the houses take up too much space compared to apartments.

In Bräcke, 230 small cottages were planned to be built and the goal was to make private homes available to the general public, primarily the group of workers. An engineer was hired to handle private household matters and Eric Ericsson, the manager of the Stockholm project was hired on November 1, 1933. (Brink & Mayer, 2022)



Figure 2.5  
Småstugeområde, Stockholm, 1927  
(© Stockholms stads småstugebyrå, 1927 )



Figure 2.6  
Bräcke Småstugeområde, 1940  
( Bräcke småstugeförening, 1940 )

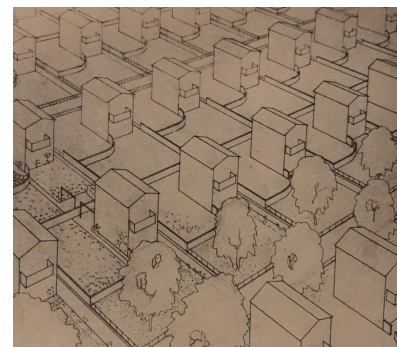


Figure 2.7  
First sketches  
(© 10000 egna hem, 2022 )



Figure 2.8  
Bräcke, Gothenburg  
(Bräcke småstugeförening, 1937 )



## BRÄCKE SMÅSTUGEOMRÅDE



Figure 2.9  
Newspaper advertisement  
(© Egnahemsbolagets historia, 2021)

Daily newspaper advertisements with descriptions, plans, and price ranges about building small cottages were published. “A smastuga is a real home, lived in exclusively by the owner, fully winterized and modern with central heating, gas, water, drainage, electric light, bath, etc.,”



Figure 2.10  
Excavation process (© Schaktning pågår i småstugeområde, 1935)

The first person to register for a plot was the shoemaker Axelsson in Bräcke’s Schacktmästaren neighborhood. He and his three sons solved the self-build. They were engaged in excavation, bricklaying, wall construction, carpentry, and painting. The entire family started working as builders.



Figure 2.11  
Self-build concept  
(© Husbygge i Tallkrogens småstugeområde, 1933)

The prefabricated house components were delivered and put together quickly. They were built, and because of their functionalist modern architecture and all-white exteriors, they were called “sugar boxes.” Everything designed to be functional. The kitchen had to be small; nothing else was to be done in this space other than prepare food.



Figure 2.12  
Facade of building type A  
(Bräcke småstugeförening, 1934)

Bräcke had three different types of homes. Costs were kept low by mass production. The Type I house was the most basic, having just one floor and a basement. At first, the standard was straightforward. The toilet and bathtub were both located in the basement’s laundry room. The various house types were based on various family sizes. (Brink & Mayer, 2022)



## SUGAR BOXES

Small cottage building which were called sugar boxes came to be characterized by the meeting between the traditional and the rational. Starting point was to have your own cabin in a traditional design.

Implementation was made possible through standardization and mass production. This could keep costs down as well as make it possible for non-specialists to build. The shutters are removed, the window linings likewise, the decorative details disappear. One asymmetrical facade division is becoming more and more common and the walls get an increasingly cleaner surface.

The facades of the houses were on traditional view of wood with standing lid panel.

The windows were connected double-hung windows that were placed in facade life without lining strips. The facades were painted in light colors with the window frames in a stronger color - the strongest decorative effect. The balcony, as well as a new feature, received an asymmetrical placement.

The houses were free of decorations and expressed its simplicity and matter-of-factness that characterized functionalism. The living room was designed as a briefing room and bedrooms were minimized in size. The kitchen was designed entirely based on functioning as a work space.

The purpose was also to prevent the kitchen from being used as sleeping area, taking into account the new hygiene rules that arose.

(Informationsmaterial Stadsbyggnadskontoret, 2021)



Figure 2.13  
The physical model of sugar boxes  
(© Egnahemsbolaget, 1934)



Figure 2.14  
The windows shape  
(© GhmD\_16984, 1940)



Figure 2.15.  
Bräcke småstugeområde  
(© Landby, C. 1966)



Figure 2.16  
Type A buildings  
(© GMA:9980:33. 1934)

## BUILDING TYPES

Overall 234 buildings have been planned and constructed in the area of Bräcke. Buildings were designed in two different types to meet the needs of families in various sizes.

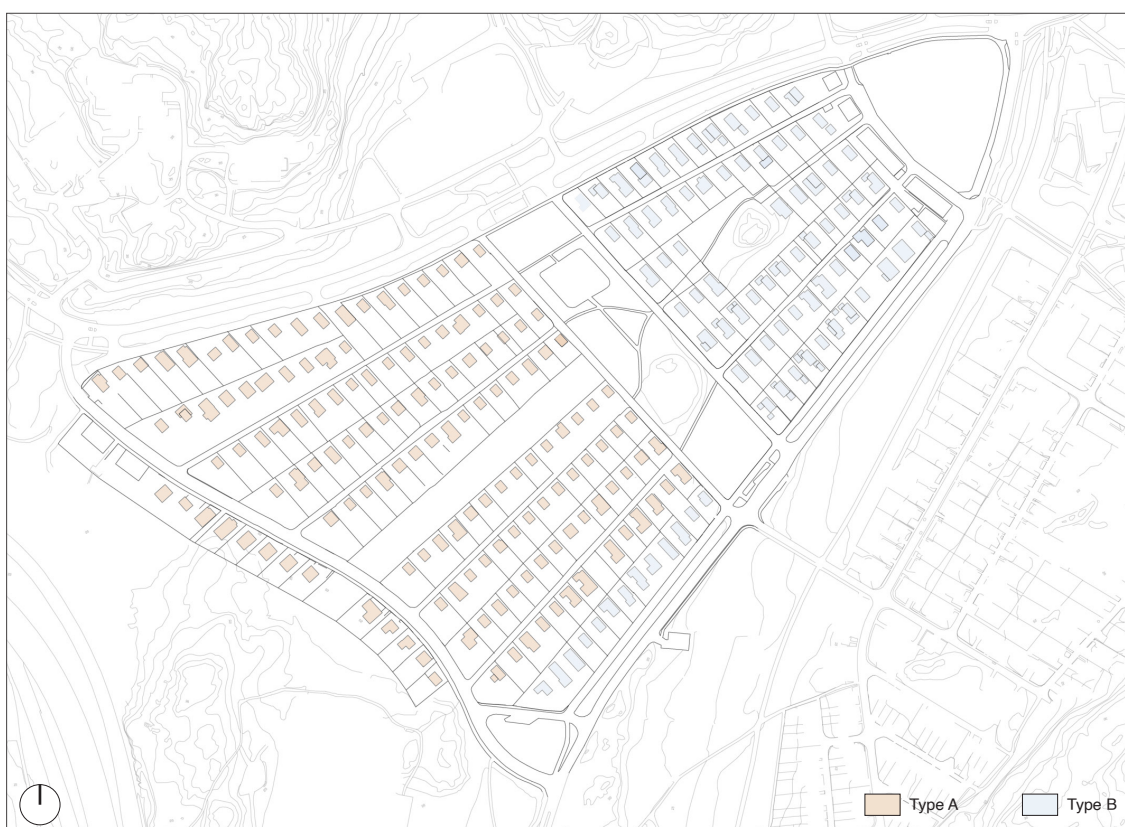
There are 132 type A buildings and 102 type B.

Both of the types have been planned and designed to be functional and simple. None of the buildings have extra decoration or detail and simplicity is the main character of them.

Building of type A has a basement, two floors, and a 34 m<sup>2</sup> floor area. This layout features a modest balcony on the building and a rectangular-shaped floor plan. There have been bathrooms, boiler, laundry, and drying rooms in the basement.

Living room and the kitchen in the ground floor and three bedrooms in the first floor.

The floor area of a building of type B is 46 m<sup>2</sup>, and it has two floors without a basement. It doesn't have a balcony. The ground floor is where the storage area, laundry room, and drying room are located and the first level serves as the kitchen, living room, and two bedrooms. (Informationsmaterial Stadsbyggnadskontoret, 2021)



Building types



Figure 2.17  
The view of the area of Bräcke småstugeområde  
(© Göteborgs Konstförlag, 1938)

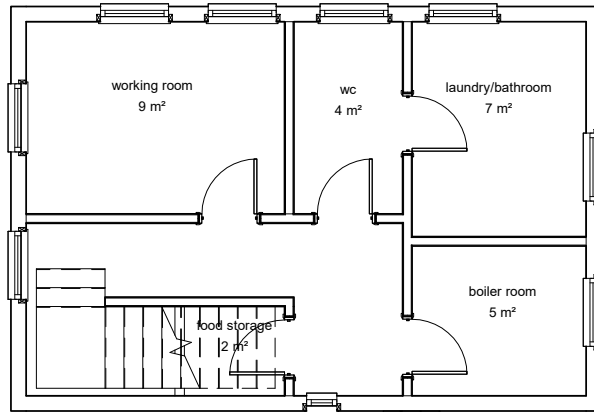
## TYPE A

This type of building, also known as “the sugar box,” is a tall, narrow volume with a basement that provides many square meters without taking up an excessive amount of space on the property. The footprint of this type is 34m<sup>2</sup> and the building is a fine example of the ideas of modernism regarding how a house should be placed lightly on the ground and allow the garden to grow in order to provide light and air between, and consequently inside, the building.

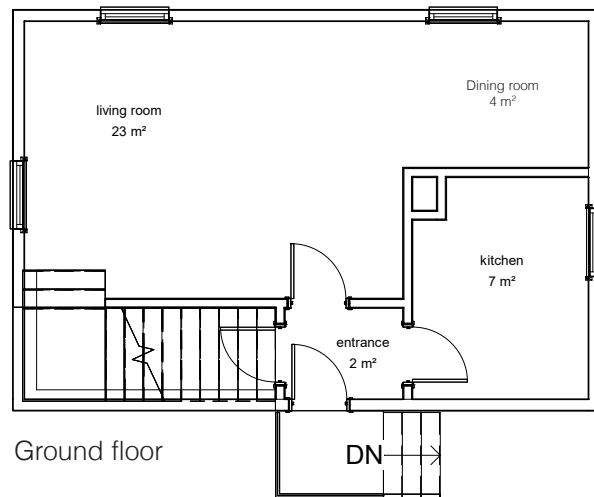
It was assumed during the planning phase that type A houses would have a minimum of three rooms and a kitchen, with a housing cost not exceeding SEK 65 to 70 per month. The original design included a bathtub, laundry room and WC located in the basement, no hot water, no refrigerator. The total construction cost was approximately SEK 11,280, with land cost at SEK 3,000. (Tengberg, 2020)



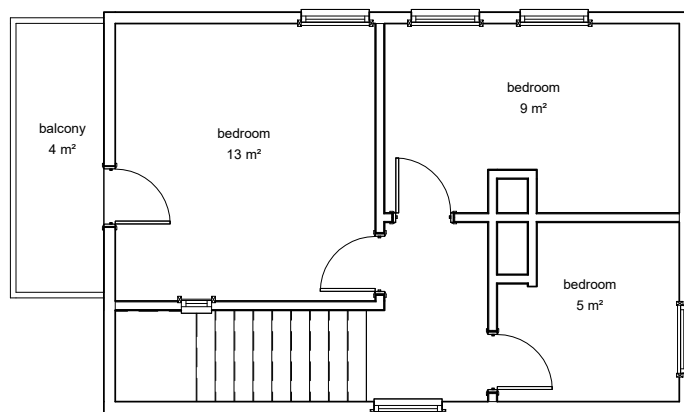
Figure 2.18 Type A building  
(© Thulin, O. 1937)



Basement  
Scale 1.100



Ground floor



First floor

## TYPE B

The number of building type B were less than the other type and has been design for smaller families. The footprint of this type is 46 m<sup>2</sup>.

There is no additional decoration on the long, rectangular structure. Similar to other buildings, the basement has a large storage space, a boiler room, a work area, restrooms, and laundry facilities.

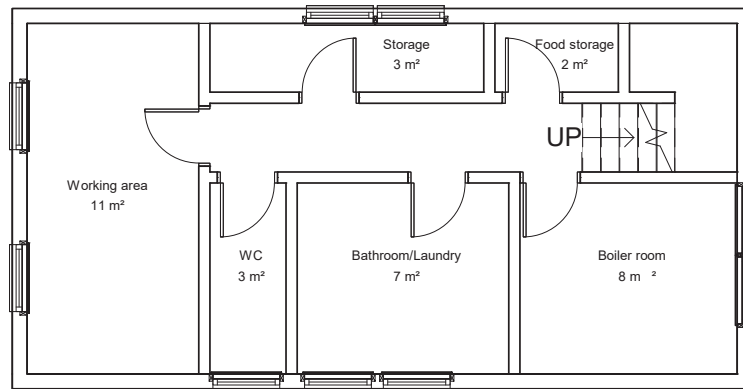
The ground floor is more of a gathering spot and where everyday activities take place. The Type B building has two bedrooms but no balcony in contrast to the other type where the bedrooms were in a different floor plan and had no direct access to the living room, this type has a direct connection between the living room and the bedrooms.

The construction cost was around 9.560sek and the land cost was 3,000sek. (Tengberg, 2020)

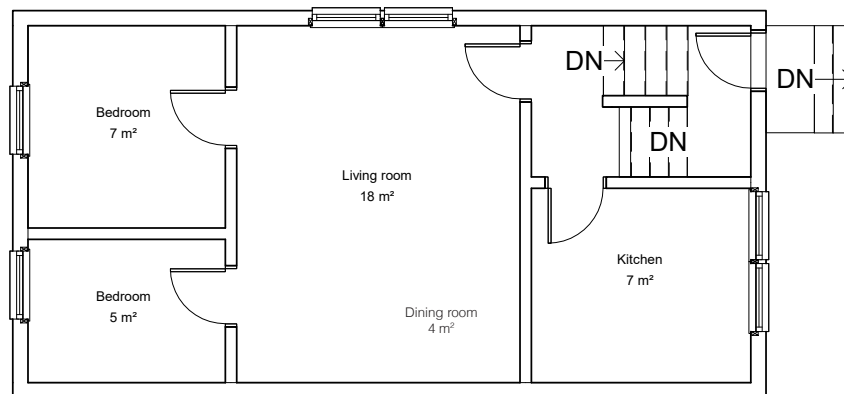


Figure 2.19 Type B building  
(© Thulin, O. 1937)

TYPE B FLOOR PLAN



Basement  
Scale 1.100



Ground floor



## DETAIL PLAN

The detail plan is a document which regulates development in a certain area in a city and provides the framework for examination of building permit.

In the following, we have the detail plan of the neighbourhood of bräcke.

- The Permitted building height is 7 m.
- Maximum number of floors is 2.
- Windows for living rooms may not be built on facade less than 4.5 meters from the border with neighboring property.
- In case of the extension the minimum distance between the building and the neighbours should always remain 9 meters.
- Depends on the position of the original buildings, there should always be a distance to the side borders of the site. (Informationsmaterial Stadsbyggnadskontoret, 2021)

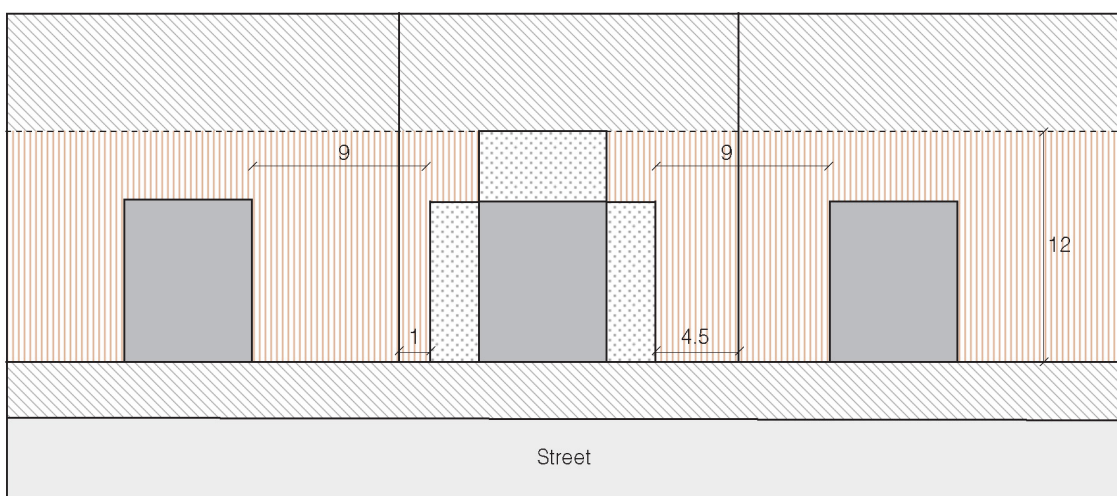


Figure 2.20 Detail plan of the neighbourhood of Bräcke  
( © Bräcke, Sävenäs och Utby, 2021)

- |  |   |
|--|---|
|  Existing building  |  Possible extension  |
|  Construction right |  May not be built on |



## GUIDELINES

The overall impression of the area is one of the most crucial considerations, and each individual building has a significant effect on the street space. Therefore, it is important to carry out the transformations while maintaining the original silhouette against the street. It is best to avoid having extensions that deviate from the norm because doing so would ruin the unity and destroy the original image of Bräcke.

The original shape of the building must still be clearly distinguishable after extension, as this is a great quality not only for the specific property but also for the area's overall perception.

Extensions should be added towards the garden and not with facade which is facing the street to maintain the character of the street.

The choice of facade material, color, and roof design must be coordinated with the design of the area and the whole neighbourhood. The overall impression depends on the coloring, which should keep the same saturation level, or brightness level, as the original house. Light gray and light yellow are suitable hues, while a dark color like black severely violates the area's character. (Informationsmaterial Stadsbyggnadskontoret, 2021)



Figure 2.21  
Formminnesvägen, preserved street space (Google, 2023)



Figure 2.22  
Extension from the sides  
(© Bräcke, Sävenäs och Utby, 2021)



Figure 2.23  
Allowed colours and materials  
(© Bräcke, Sävenäs och Utby, 2021)

## SWEDISH HOUSING DEVELOPMENT

The buildings, which were constructed in 1933, have undergone changes over time. Therefore, it is important to understand the housing types and patterns in Sweden from 1933 to the present to comprehend the reasons behind these adjustments.

### 1930-1940 (Functionalism)

During this period, the housing standard in Sweden was one of the lowest in Europe, leading to the emergence of the concept of “housing for all.” The primary objective was to construct homes in a cost-effective manner, making homeownership accessible to more individuals. As of the early 1930s, the availability of bathtubs and showers was limited to only 30% of households, and nearly 40% of housing units lacked central heating. (Nylander, 2018)

### Characteristic

- Symmetrical positioning of living room and kitchen on either side of a central area.
- The buildings are divided into three parts, work in the form of a kitchen, living room for socializing and the private parts in the form of a bedroom
- Lack of decorations and ornamentation
- Small sized buildings with thick walls and had narrow floor plans
- The core and central part of the buildings were dark
- The kitchen and dining room were located in separate spaces (Nylander, 2018)

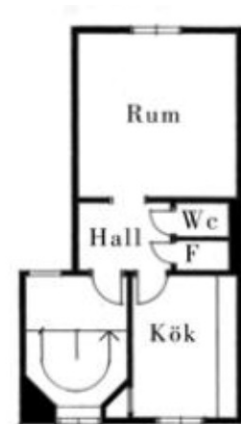


Figure 2.24  
Kungsladugård,  
Gothenburg,  
Area 40 m<sup>2</sup>  
(© Nylander. O. 2002)

### 1945-1960 (The people's home)

The architecture of the people's home (Folkhemmet) is characterized by a simple and small-scale design, with an emphasis on the idea of community in urban planning. The People's Home represents a significant era in Swedish architectural history and Folkhemmet is a term that refers to the premium concept of this period. (Rudberg, 1992).

The Gothenburg exhibition "Live better - Bo bättre" in 1945 facilitated a new standard for room sizes, connections, shape, and features in housing design. (Caldenby et al., 2019).

### Characteristic

- Not so many buildings had central heating, bathroom and shower

- Narrow housing was designed to have qualities such as visibility.

- Windows became smaller and had playful shapes like hexagonal, octagonal, or round.

- The entrance was more functional by changing it from a long and boring corridor to a square shape.

(Nylander, 2018)

- New rules were adopted, including requirements for relationships between rooms and social investigations for housing. (Lindquist et al., 1980)

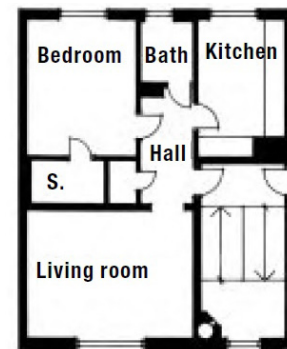


Figure 2.25  
1 bedroom apartment,  
55m<sup>2</sup>, Södra Guldheden,  
Gothenburg,  
1953.  
(© Nylander. O. 2002)

### 1965-1975 (The million programme)

The so-called Million Programme was introduced in Sweden in 1965. A total of one million homes were constructed over a ten-year period. There has been a lot of criticism of the facade designs and the surroundings of the buildings during this highly debated period in Swedish architectural history but these buildings had good and functional floor plans. (Nylander, 2018)

### Characteristic

- From 1960, apartments typically had more than three rooms, a kitchen, and an extra toilet.

- The buildings were spacious, well-equipped, and often had their own laundry facilities.

- There was an open and unobstructed view between the kitchen and the living room.

- The bedrooms were located in a separate area of the building with more privacy.

- The living room was often square and spacious, providing a variety of options for furniture placement.

- Good storage options

-During this time period, the function of the living room shifted to become a space where families gathered to watch television.

(Nylander, 2018)

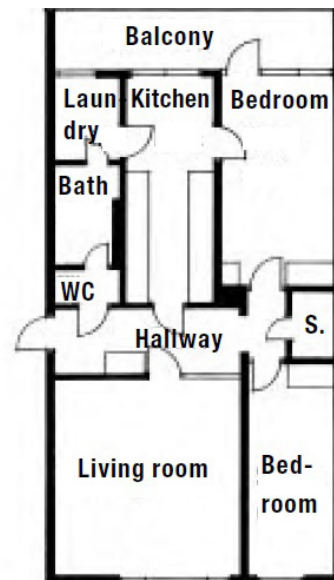


Figure 2.26  
Million Program apartment,  
2BR, 88 m<sup>2</sup>, 1968  
(© Nylander. O. 2002)

### 1976-1998 (After the Million Program)

The shutdown of the housing committee and department in the 1980s and early 1990s marked a significant setback for Swedish housing politics. With the excuse that “everything can be sold anyway,” furnishability and immeasurable values have suffered the greatest loss. (Caldenby et al., 2019).

#### Characteristic

- The layout of apartments did not change
  - It became more common to have an open plan between the living room and kitchen.
  - A significant amount of natural light is incorporated into the buildings.
  - The houses started to have wide balconies
- (Nylander, 2018)

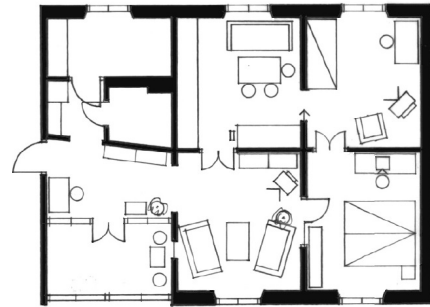


Figure 2.27  
Post Million Program apartment,  
1980  
(© Nylander. O. 2002)

### 2000-2023 (Contemporary)

Housing design in 2000 and later differs significantly from the designs in the 1980s and previously. The size of accommodations has dropped with so-called “petite apartments” the majority of which are under 55 m<sup>2</sup> — being the most popular kind of housing. (Nylander, 2018)

#### Characteristic

- Emphasis on practicality and efficiency in the use of space.
  - Taller buildings
  - Integration of outdoor spaces, such as rooftop gardens
  - Prioritizing flow and circulation throughout the space
  - Open floor plans that maximize natural light and promote a sense of spaciousness
- (Nylander, 2018)

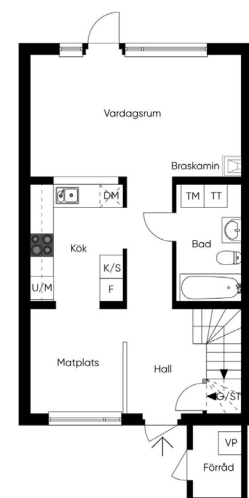


Figure 2.28  
Modern building, 2020  
(©Hemnet AB, 2023)

### 03 | ANALYSIS

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## TIME-SERIES ANALYSIS

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The primary method which has been used in this thesis to analyse the transformed floor plans is Time-series Analysis.

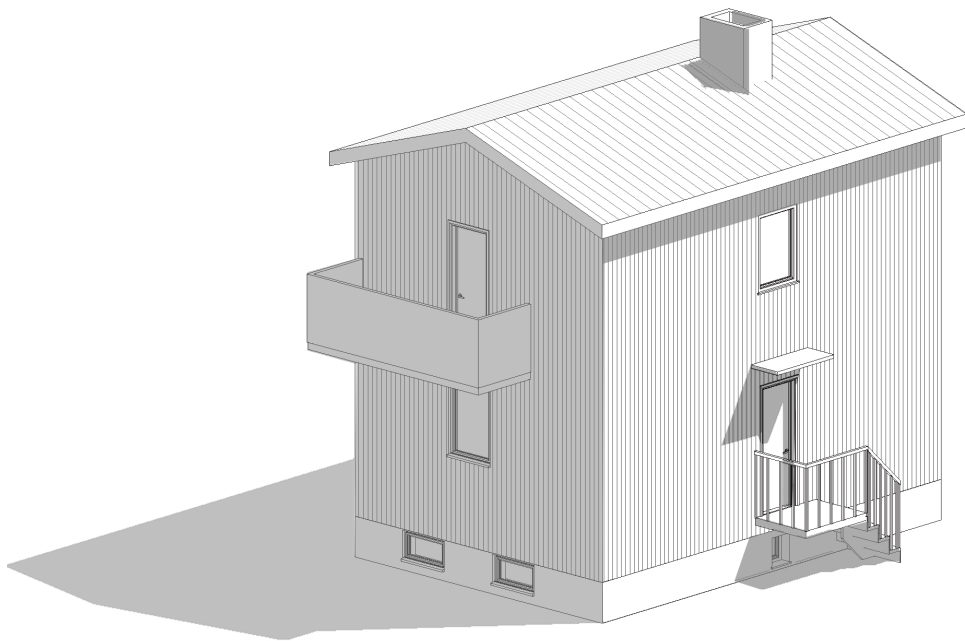
The modifications that were made to the buildings' original floor plan have been categorized using a spreadsheet. Each building had its changes assessed, then they were noted in distinct rows with the appropriate year of change.

This process let us for a thorough and organized analysis of the transformations in each building over time, as well as the ability to identify patterns and trends in the types of changes that were made over time.

-The spreadsheets have been attached in the appendix for further reference..

“TYPE A” BUILDING

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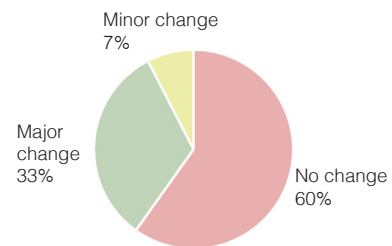




## EXAMINING TYPE A

In the Bräcke neighbourhood, 230 buildings have been designed and constructed, with 132 of them being type A building. Among 132 buildings, 79 of them (60%) haven't changed, 43 of them (33%) had major alterations and 10 of them (7%) had minor changes, which we can say overall 40% of the buildings type A undergone the changes.

No change	79
Major change	43
Minor change	10
	132



## CATEGORY TYPE A

All building records were thoroughly examined, and both minor and major alterations underwent a second assessment to realize the amount of alterations made by users over time. To better arrange the results, some different categories have been created.

Merging two rooms into one					Moving functions										Enlargement									
W+H	DR+K		K+LR		Kitchen	Livingroom	Bedroom	Balcony	WC		Bathroom	Laundry	Entrance	Direction of stairs	Dining room	Living room	bedroom	outdoor		kitchen	garage	WC/bathroom	storage	Entrance hall
	door	no wall	door	no wall					gf	1st								balcony	seating					

### Merging two rooms into one

-WC & Bathroom

-Dining room & Kitchen (connecting with a door or merging them by removing the wall)

-Kitchen & Living room (connecting with a door or merging them by removing the wall)

### Moving functions

-Kitchen

-Bathroom

-Living room

-Laundry

-Bedroom

-Entrance door

-Balcony

-Direction of stairs (staircase from GF to 1st floor)

-WC (to the ground floor or to the first floor)

-Dining room

### Enlargement

-Living room

-Garage

-Bedroom

-WC and bathroom

-Outdoor spaces (Balcony, outdoor seating)

-Storage

-Kitchen

-Entrance hall

## AIM OF MODIFICATIONS

Each of the changes have been occurred due to a reason that can be categorized into the following categories and this category have been used for both building types A & B.

**-Practicality:** Refers to changes made for functional reasons and specific needs

**-Lifestyle:** Refers to changes made for personal preference reasons

**-Reorganization:** Refers to changes made for better organization and flow of space

MAIN CATEGORY	SUBCATEGORY	PRACTICALITY	LIFESTYLE	RE-ORGANIZATION
Merging two rooms into one	WC & Bathroom	×		
	Dining room & Kitchen		×	
	Kitchen & Living room		×	
Moving functions	Kitchen			×
	Living room			×
	Bedroom			×
	Balcony			×
	WC	×		
	Bathroom	×		
	Laundry			×
	Entrance door			×
	Direction of stairs			×
	Dining room			×
Enlargement	Living room		×	
	Bedroom		×	
	Outdoor spaces		×	
	Kitchen	×		
	Garage	×		
	WC and bathroom	×		
	Storage	×		
	Entrance hall	×		

## ANALYSING RESULTS

Overall 53 buildings of type A have been analysed and by categorizing the changes according to the year the chart has given a broad information regarding the spatial changes.

### -INITIATION OF ALTERATIONS

#### When did the initial transformations occur? What was it? why?

The first changes have been happened around 12 years after the construction in 1947. Four buildings have had started to be changed in 1947 and all the four have started to alter quite similar spaces.

1947	Bräcke 12:8	Entrance direction	Adding storage	Entrance hall	Connect DR+K	Merge K+LV	Adding balcony
	Bräcke 7:9	Entrance direction	Adding storage	Entrance hall	Connect DR+K	-	-
	Bräcke 10:12	Entrance direction	Adding storage	Entrance hall	-	-	-
	Bräcke 7:4	Entrance direction	-	-	Connect DR+K	Merge K+LV	Adding balcony

The first common changed elements are:

- Changing the direction of entrance door
- Enlarging the entrance hall
- Adding storage
- Connecting the dining room with the kitchen by adding a door

There are two potential reasons for the start of alterations in 1947.

1. Economic situation: The post-World War II period was a time of significant economic growth in Sweden. Therefore residents were able to afford and make improvements to their homes.

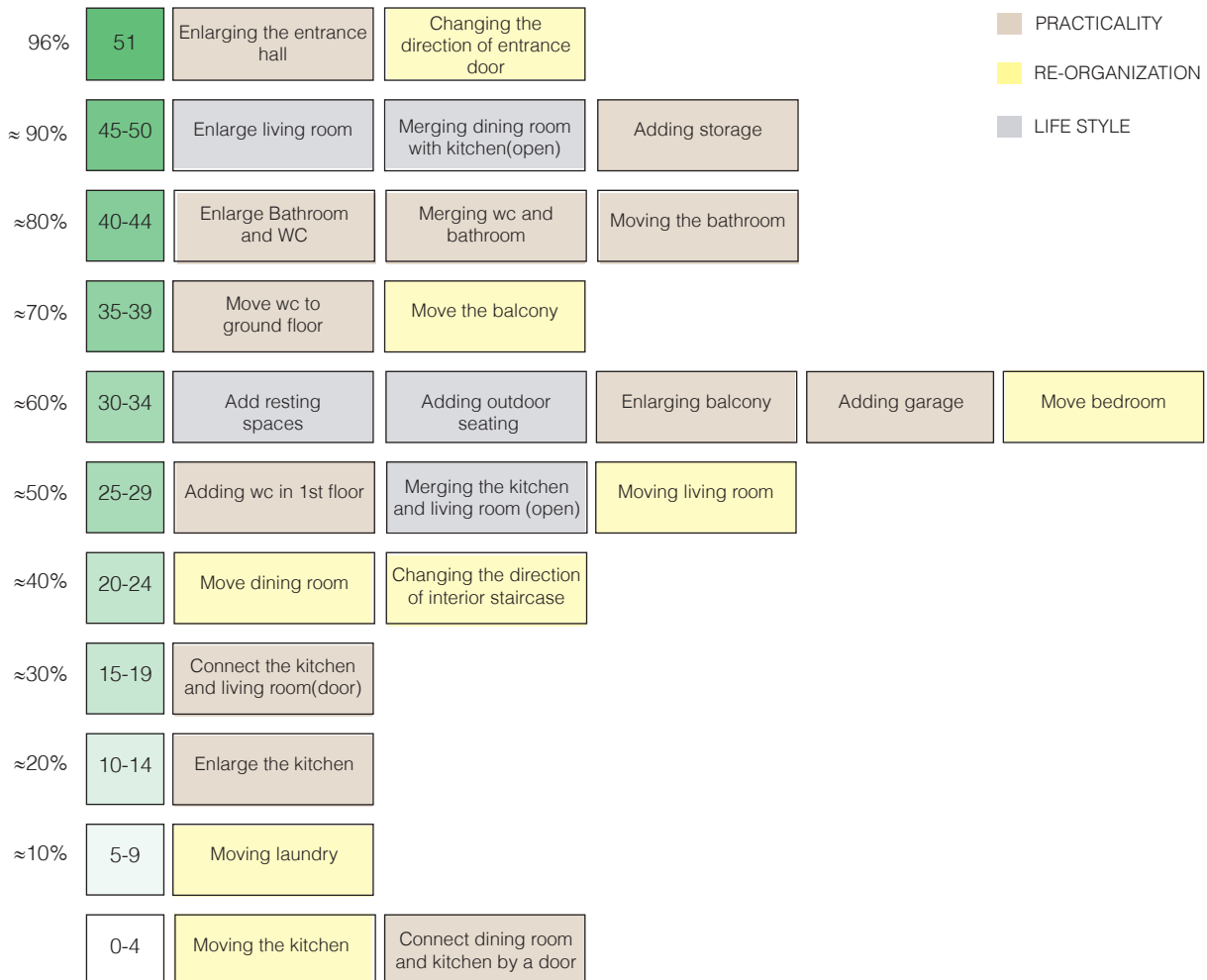
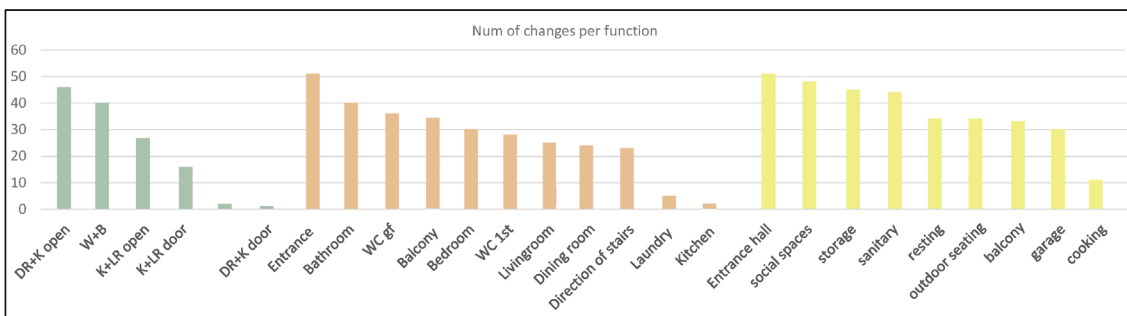
2. Social changes: The late 1940s and early 1950s were a time of significant social changes in Sweden, including the growth of the middle class. Therefore the residents were influenced by social trends and wanted to make their homes more comfortable and functional.

## NUMBER OF CHANGES PER FUNCTION

What has undergone the most noticeable alterations among all the others?

Among all the changes some of the functions have undergone more alterations among the others.

Merging two rooms into one					Moving functions										Enlargement									
W+B	DR+K		K+LR		Kitchen	Livingroom	Bedroom	Balcony	WC		Bathroom	Laundry	Entrance	Direction of stairs	Dining room	Living room	bedroom	outdoor		kitchen	garage	WC/bathroom	storage	Entrance hall
	door	no wall	door	no wall					gf	1st								balcony	seating					
40	1	46	18	27	2	25	30	35	36	28	40	5	51	23	24	48	34	33	34	11	30	44	45	51



**REFLECTION:**

The analysis shows that residents of these buildings were actively involved in adapting their homes to meet their evolving needs and preferences over the time.

It shows that the most changes are related to these categories:

Changing the direction of entrance door (96%) : Re-organization

Enlarging the entrance hall (96%) : Practicality

Enlarging the living room (90%) :Lifestyle

Merge the kitchen with the dining room (87%) : Life style

Adding storage (84%) : Practicality

The fact that the majority of residents (96%) changed the direction of entrance door and also enlarged the existing entrance hall indicates the presence of practical considerations and changing the life styles such as the desire for increased privacy.

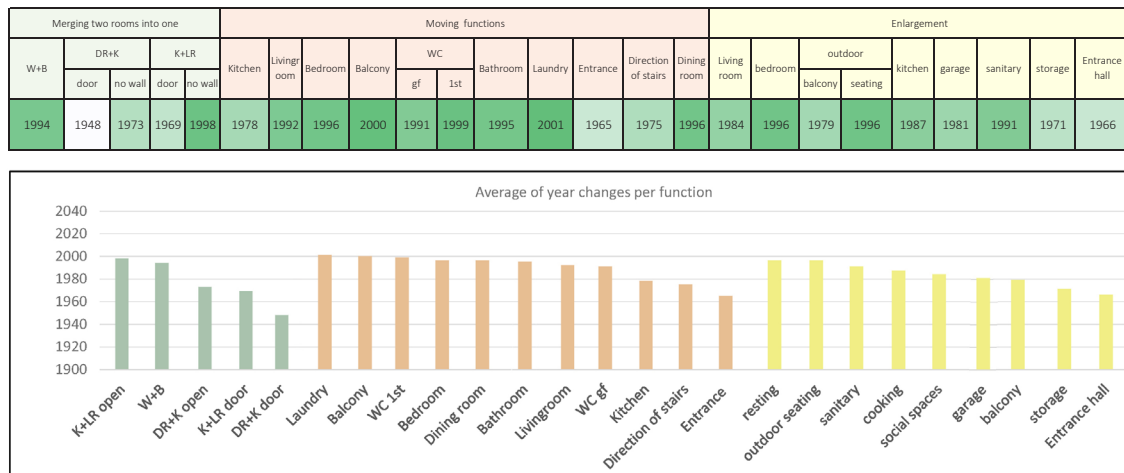
Similarly, the enlargement made to the living room and the merging of the dining room with the kitchen shows that changes in family dynamics or social norms.

The changes made to the bathroom and toilet, and the addition of a sanitary space, reflect improvements in sanitation and hygiene standards over the time.

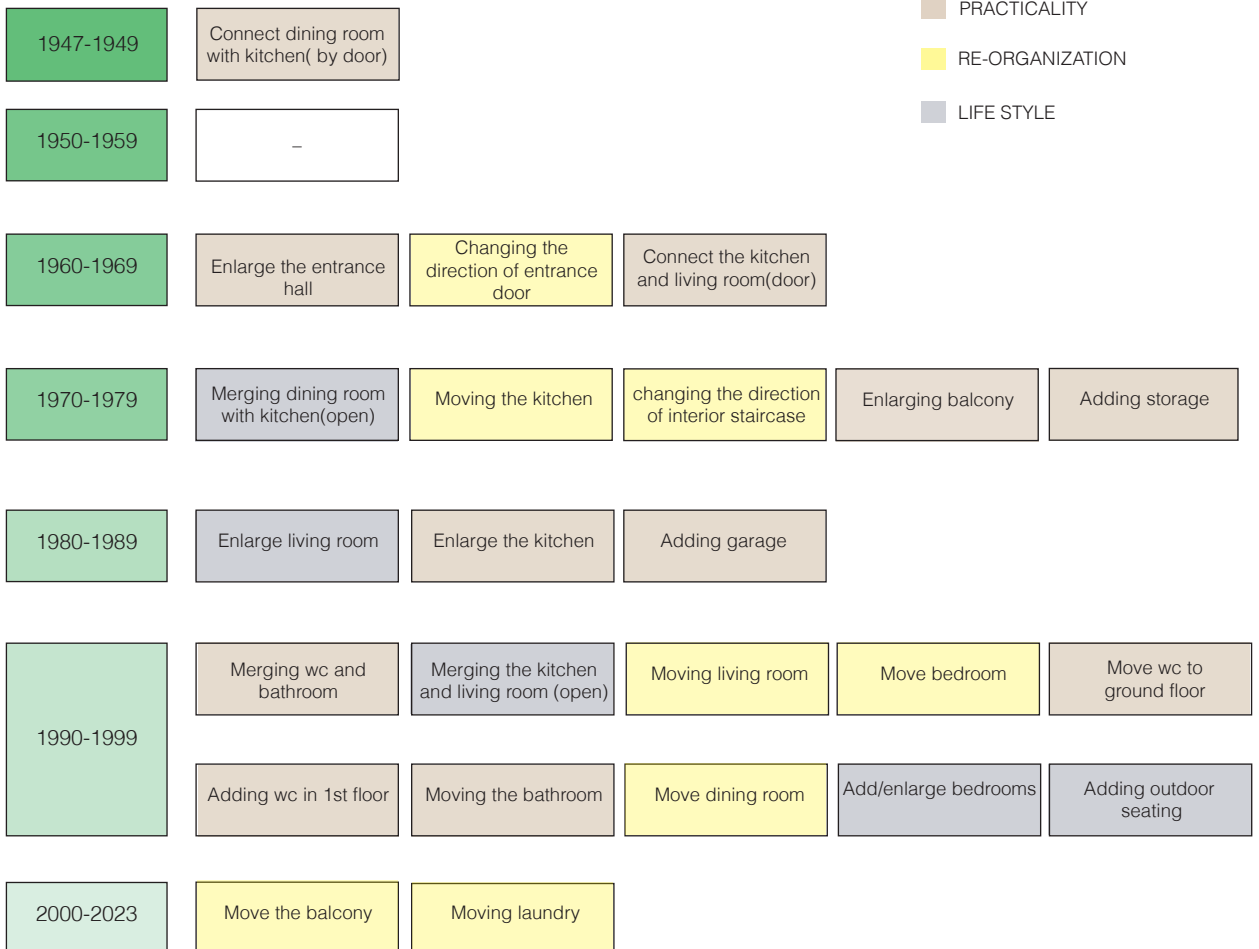
## THE AVERAGE YEAR PER EACH FUNCTION

What is the average year of alteration per each function?

The data has been sorted to determine the average year of transformation for each section.



Average year



**REFLECTION:**

The analysis of the average year of alteration per each space provides useful information about the timing and nature of changes made to the buildings.

The data shows that in the early years, the majority of changes were made with the goal of improving practicality and functionality. As time went on, however, the focus shifted towards changes that reflect people's lifestyles and the desire for better organization and flow of space.

During the earliest period (1947-1950), the most common change made by residents was merging the dining room and kitchen by opening a door. This suggests that residents prioritized practicality, as this change made the space more accessible and easier to use.

The changes made between 1960-1970, such as enlarging the entrance hall and changing the direction of entrance door indicate that residents were seeking to enhance the privacy and functionality of their living spaces.

The high frequency of changes made between 1990-2000, such as merging the toilet and bathroom, creating an open concept between the living room and kitchen, and adding outdoor seating, indicates that residents' lifestyles had shifted during this period and they were seeking to create more adaptable and functional spaces that better suited their evolving needs. On the other hand, this period coincided with significant economic growth in Sweden, which could have provided residents with more resources to invest in home alteration and improvements. Additionally, changes in family structures and lifestyles during this period may have prompted residents to modify their homes to better accommodate their evolving needs and preferences.

## CONCLUSION

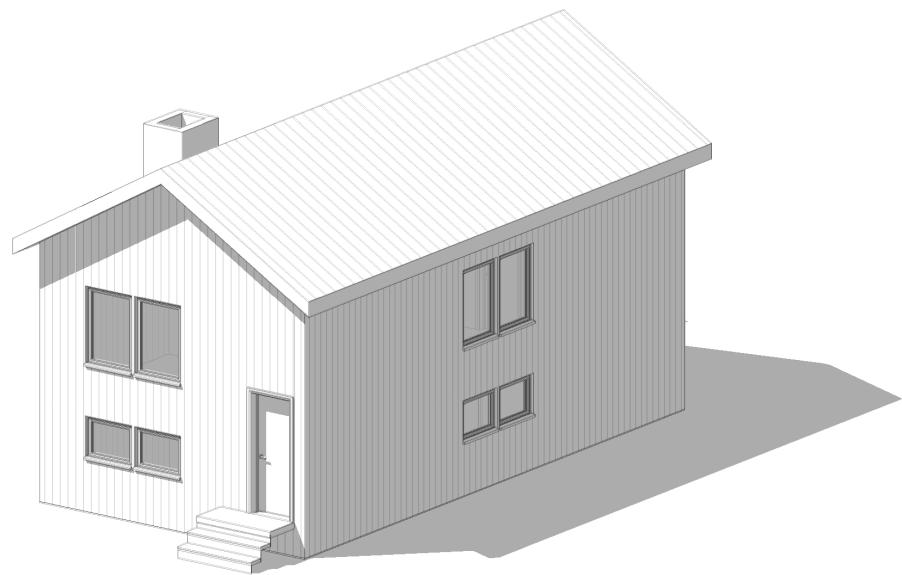
In conclusion, the analysis of Type A buildings shows the evolution of residents' needs and preferences over time. The changes made to the buildings, such as enlarging the entrance hall, changing the direction of entrance door, merging the dining room and kitchen, and adding storage, reflect practical considerations and changing lifestyles. The changes made were primarily driven by practical considerations, such as the need for increased privacy and functionality, particularly in the early years. However, over time, the focus shifted towards changes that reflect people's lifestyles and desire for better organization and flow of space.

This was particularly evident in the high frequency of changes made between 1990-2000, which were related to creating more adaptable and functional spaces that better suited residents' evolving needs. The findings also suggest that changes in family structures and lifestyles, as well as economic growth, have played a role in prompting residents to change their homes.



## “TYPE B” BUILDING

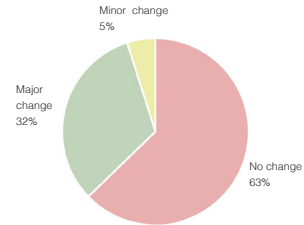
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### EXAMINING TYPE B

Compare to building type A, the number of building type B are less and is 102. 64 of them (63%) have not changed, 33 of them (32%) have major transformation and 2 of them (5%) had minor changes. Overall the number of changes in this type of the building is lower than the other one.

No change	67
Major change	33
Minor change	2
	102



### CATEGORY TYPE B

Different categories have been established in order to organize the results in a better way.

Merging two rooms into one			Moving functions								Enlargement							
W+B	K+LR (by door)	K+LR (no wall)	Kitchen	Livingroom	Bedroom	Bathroom	Laundry	Entrance	Dining room	Living room	Bedroom	balcony	Kitchen	garage	WC/ Bathroom	storage	Entrance hall	

Three main categories and more subcategories have been set. Merging two rooms into one is the first, moving functions is the second, and enlargement is the last.

#### Merging two rooms into one

- WC & Bathroom
- Kitchen and Living room(connecting with a door)
- Kitchen & Living room (merging in open concept and no walls)

#### Moving functions

- Kitchen
- Living room
- Bedroom
- Balcony
- Bathroom
- Laundry
- Entrance
- Dining room

#### Enlargement

- Living room
- Bedroom
- Balcony\*
- Kitchen
- Garage
- WC and bathroom
- Storage
- Entrance hall

\*Balcony, terraces or any kind of outdoor seating

## ANALYSING RESULTS

Overall 35 buildings have been analysed and by categorizing the changes according to the year the chart has given a broad information regarding the spatial changes. The data obtained from the chart are summarized here.

### When did the initial transformations occur? What was It? Why?

The chart is organized by transformation year to establish when the initial transition occurred. The first changes have been happened around 22 years after the construction in 1957.

One building has had started to be changed in 1957 and the changes were:



### REFLECTION:

The fact that the first changes occurred in 1957, more than 22 years after the building was constructed, shows that the original design of the building may have been sufficient for the initial occupants, but as new generations moved in, they had different needs and expectations.

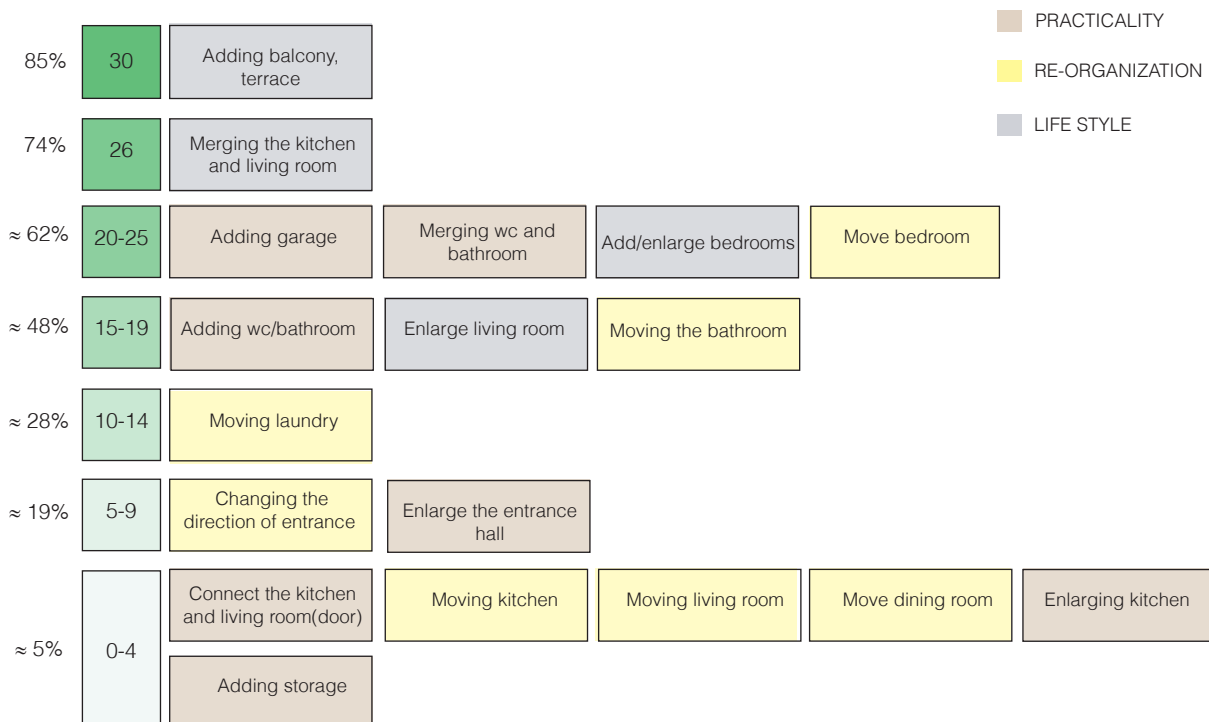
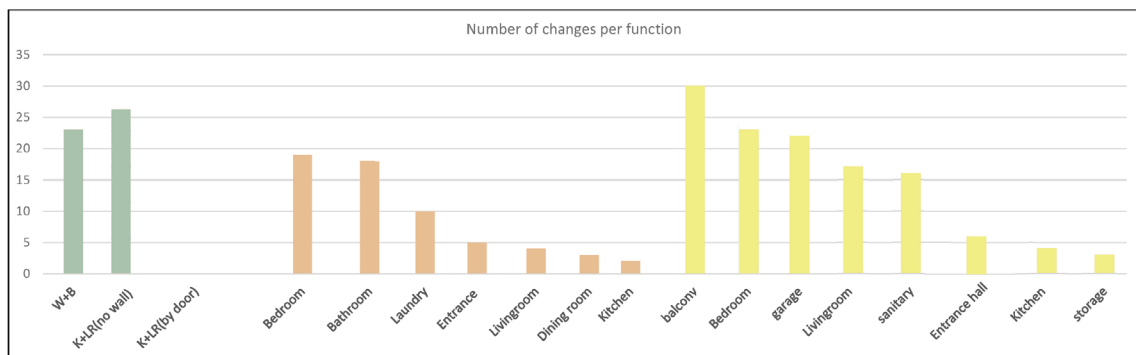
On the other hand, In 1950s, Sweden was going through a period of modernization in architecture. The country was rebuilding and expanding its cities after the destruction of World War II, and there was a strong emphasis on functionalism and efficiency in building design. (Nylander, 2018)

## NUMBER OF CHANGES PER FUNCTION

What has undergone the most noticeable alterations among all the others?

Among all the changes some of the functions have undergone more alterations.

Merging two rooms into one			Moving functions							Enlargement							
W+B	K+LR (by door)	K+LR (no wall)	Kitchen	Livingroom	Bedroom	Bathroom	Laundry	Entrance	Dining room	living room	bedroom	balcony	kitchen	garage	wc/ bathroom	storage	Entrance hall
23	0	26	2	4	22	18	10	5	3	17	23	30	4	22	16	3	7



**REFLECTION:**

After analysing the data, it became clear that adding a balcony or a terrace was the most common change made (85%). This finding indicates that residents highly valued having an outdoor space as the original design did not include a balcony.

The second high frequency of changes is merging the living room with the kitchen which was also a most changed in type A. The reason can be similar and would be the desire of having more accessibility and flow between these two spaces. It can also create a sense of spaciousness and make the home feel more inviting.

Merging the bathroom and WC, as well as adding bedrooms and changing the location of bedrooms, shows changes in family size and the life styles during the time.

The least changes are related to changing the direction of entrance which shows there were not that need and it presents that the original floor plan have been designed carefully regarding the entrance.

The addition of storage was among the lowest frequency of changes and this can be attributed to the fact that the original floor plan already included some storage spaces in the ground floor, thus reducing the need for additional storage modifications.

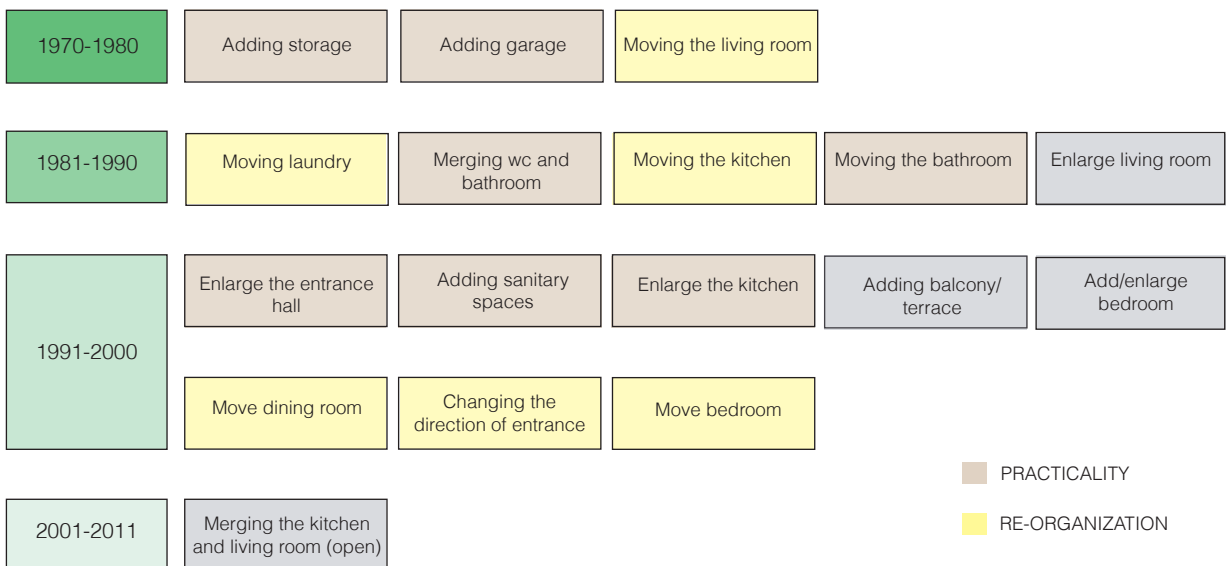
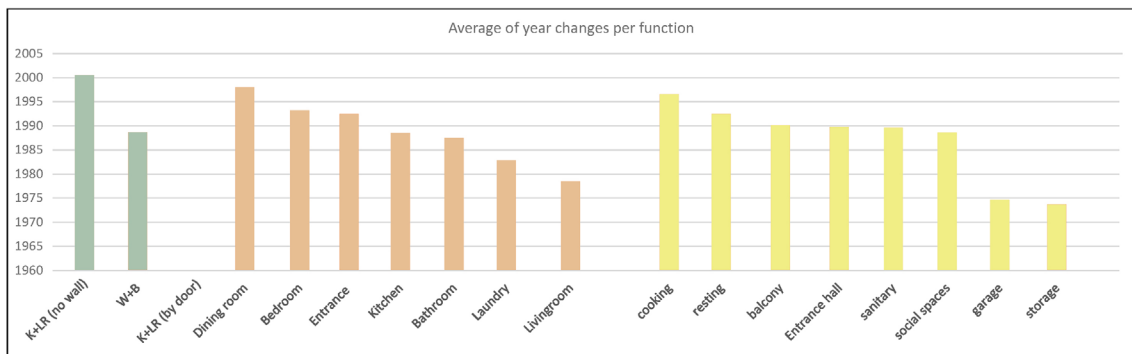
Overall, The most frequent changes are related to chaging the life style and then the practicality.

## NUMBER OF CHANGES PER FUNCTION

What is the average year of alteration per each space?

The data has been sorted out to realize what kind of alterations do we have per each period.

Merging two rooms into one			Moving functions								Enlargement							
W+B	K+LR (by door)	K+LR (no wall)	Kitchen	Livingroom	Bedroom	Bathroom	Laundry	Entrance	Dining room	social spaces	resting	balcony	cooking	garage	sanitary	storage	Entrance hall	
1989	-	2001	1989	1979	1993	1988	1983	1992	1998	1989	1992	1990	1997	1975	1990	1974	1990	



**REFLECTION:**

Similar to type A, according to the data, in the initial years, most of the changes were aimed at enhancing practicality and functionality. As time passed, the focus changed towards alterations that reflected people's lifestyles and their desire for improved organization and flow of space.

The first alterations which are the addition of storage, garage, and moving the living room were popular changes in the 1970s and 1980s, and it reflects the need for more space and modern conveniences. (Nylander, 2018)

The merging of the kitchen and living room became popular in the 2000s, as it aimed to create a more inviting space with better flow and it reflects a desire for more social and communal spaces. (Nylander, 2018)

The majority of changes, such as enlarging the entrance hall and adding balconies and outdoor spaces, occurred in the 1990s and 2000s since there was a growing trend towards more open and functional living spaces. (Nylander, 2018)

## CONCLUSION

In conclusion, the analysis of type B transformations shows that the number of buildings analysed is lower than type A, with only 35 out of 102 buildings having transformations. The first changes occurred around 22 years after the construction of the building, indicating that the original design may have been sufficient for the initial occupants.

Adding a balcony or a terrace was the most common change made (85%), followed by merging the living room with the kitchen, indicating a desire for outdoor space and more accessible, spacious living areas.



## QUALITATIVE ANALYSIS

---

The second methodology that have been used to analyse the post-occupancy alterations in residential buildings is qualitative analysis by having an interview with the residents of both building types.

This section involves reviewing online sources, including a Face book group and a blog, to gather insights from residents.

The questionnaire was developed and shared in both Swedish and English to reach a wider audience and a total of 27 people completed the questionnaire.

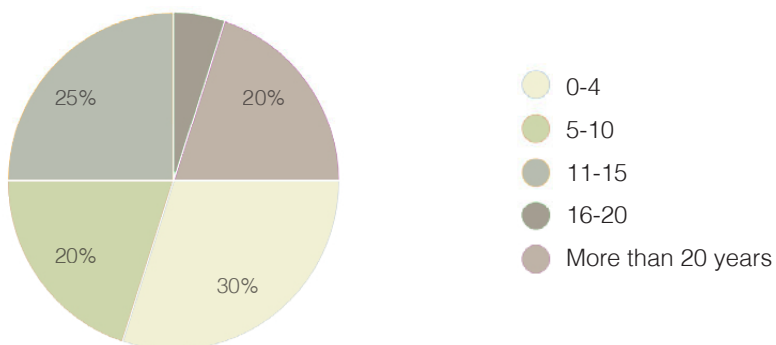
The results providing valuable insights into their experiences living in these buildings and the alterations they made to their living spaces.

It also provided additional context and insights into the motivations behind alterations as well as their satisfaction with the results.

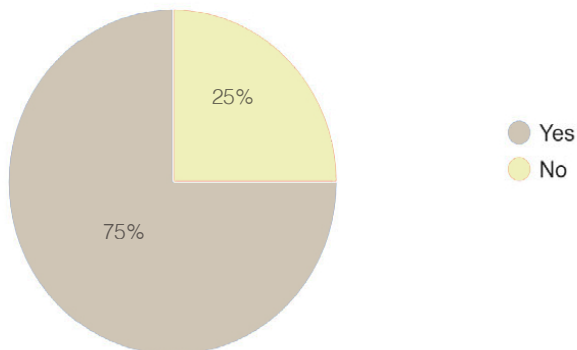
### INTERVIEW - TYPE A RESIDENTS

Overall, 20 interviews have been received with the residents of type A and the summary of the results have been shown here as diagrams.

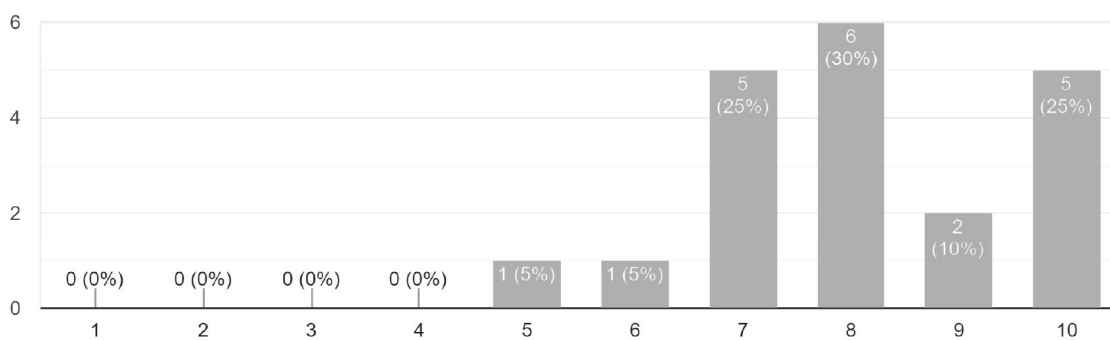
-How long have you been living here?



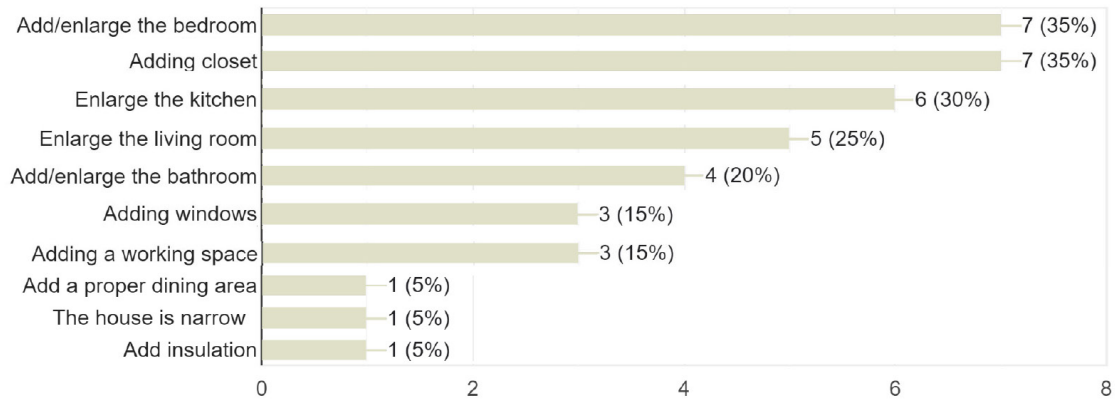
-Have you changed the floor plan since you moved here?



-How much are you satisfied with where you are living now?



-Are there any particular aspects of your current house that you would like to change?



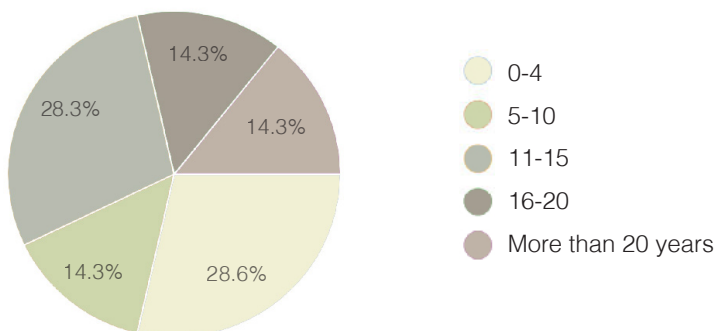
-Which part of the building did you change or you are planning to change?



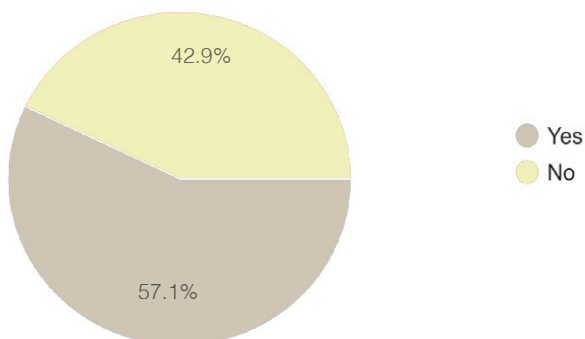
### INTERVIEW - RESIDENTS OF TYPE B

7 interviews have been received by the residents of type B building and the summary of the results have been shown here as diagrams.

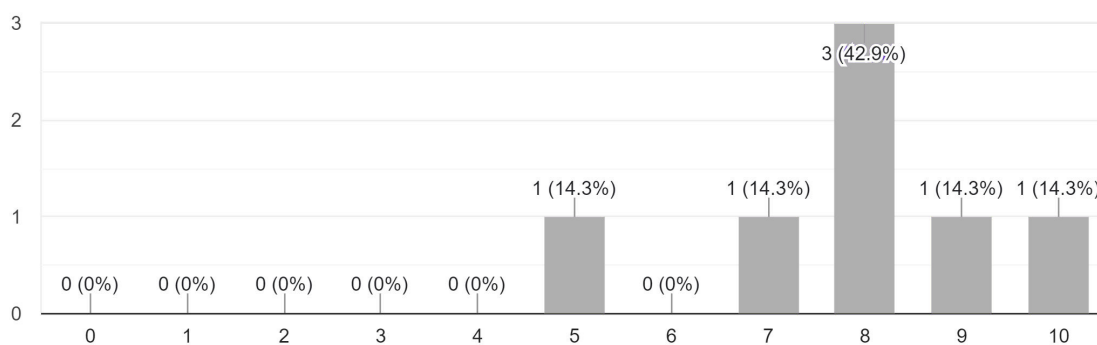
-How long have you been living here?



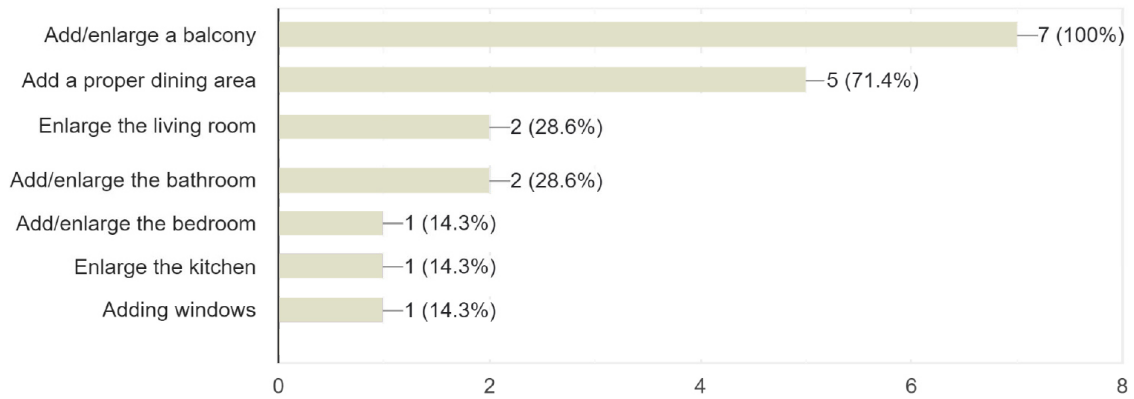
-Have you changed the floor plan since you moved here?



-How much are you satisfied with where you are living now?



-Are there any particular aspects of your current house that you would like to change?



-Which part of the building did you change or you are planning to change?

We like to remove the kitchen wall and make it open

We really like to have an outdoor space

Adding a balcony

We need more storage

We separated the laundry from the bathroom

We merged the living room and kitchen!

The original floor plan is still nice!

We needed more bedroom!

We added a hall for the bedrooms to have more privacy

## COMPARATIVE ANALYSIS

---

The third method which has been used is comparative analysis by the use of space syntax analysis method which helps to realize the spatial configurations of each type of floor plan. For this analysis, Visual integration (HH) and Isovist analysis as a visual tool used in Space Syntax analysis have been used to visualize connectivity and accessibility of different areas within each layout.

By using these tools, the aim is to identify any potential spatial strengths and weaknesses of each floor plan, which could impact the quality of life of the occupants. ((Hillier & Hanson, 1984)

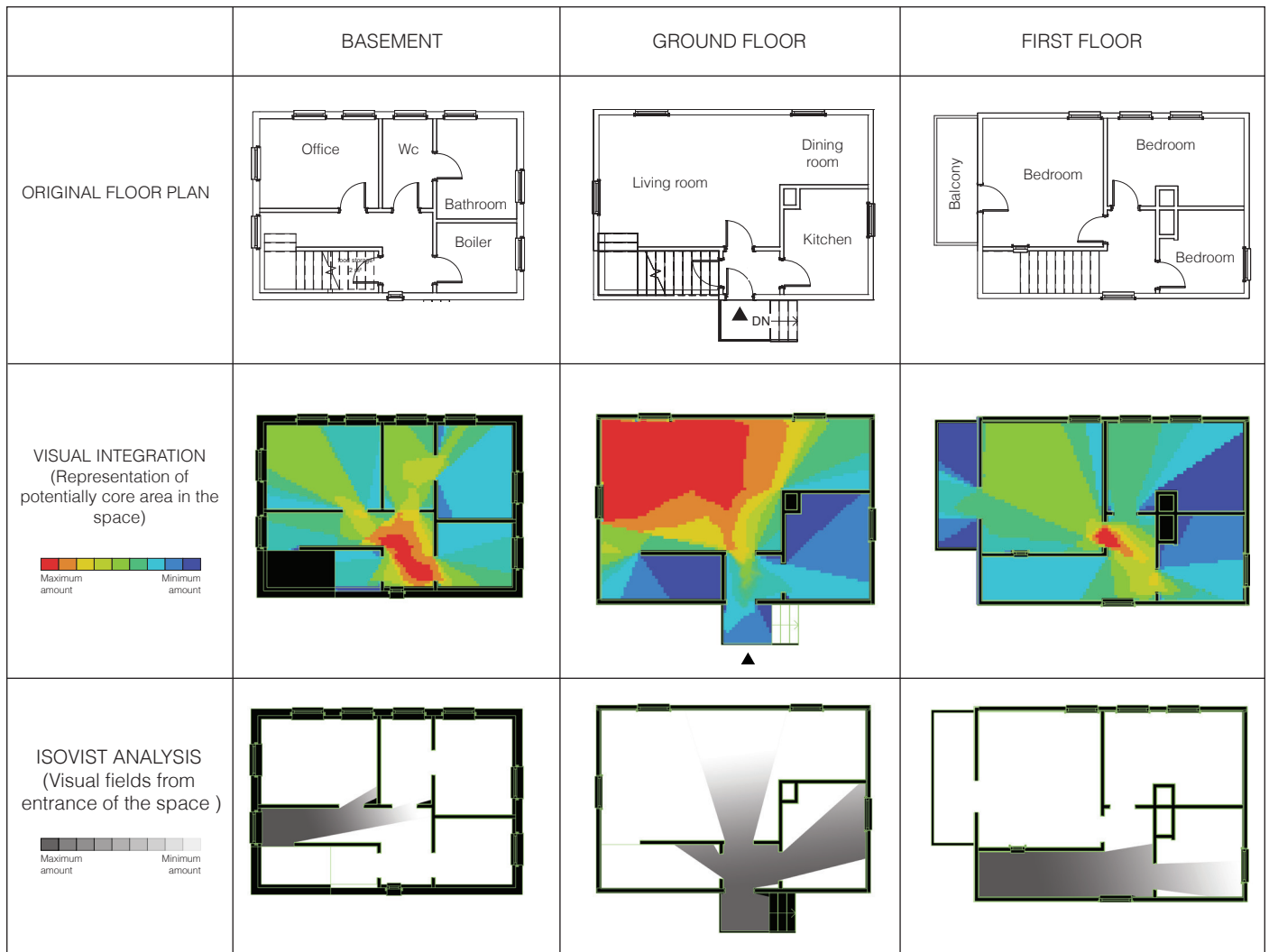
### **-VISUAL INTEGRATION (HH)**

It establishes the visibility level throughout all areas. A space with a higher visual integration value is more visible and reachable than the rest of the spaces and its privacy level is also lower. (Kamalipour et al, 2012)

### **-ISOVIST ANALYSIS**

Isovist analysis is a method that is used to study the visual properties of a space from a particular position. (Benedikt, 1979)

## ORIGINAL BUILDING TYPE A



## REFLECTION

The analysis shows that the living room has the highest integration value, indicating its significance as a core space and the transition point to other areas of the house. On the other hand, the bedrooms located on the first floor have lower integration value, which is desirable for privacy. However, the balcony has a low integration value as well, which limits access to the outdoor space and reduces overall functionality. The bathroom located in the basement also has a low integration value, as it is far from the living spaces. The isovist analysis shows that the visual field from the entrance door is directed towards the living room and the kitchen, which potentially reducing privacy in these areas.

ORIGINAL BUILDING TYPE B

	GROUND FLOOR	FIRST FLOOR
ORIGINAL FLOOR PLAN		
VISUAL INTEGRATION (Representation of potentially core area in the space) 		
ISOVIST ANALYSIS (Visual fields from entrance of the space) 		

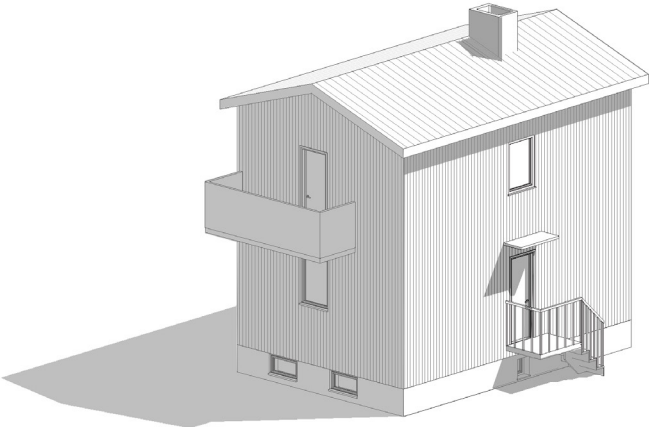
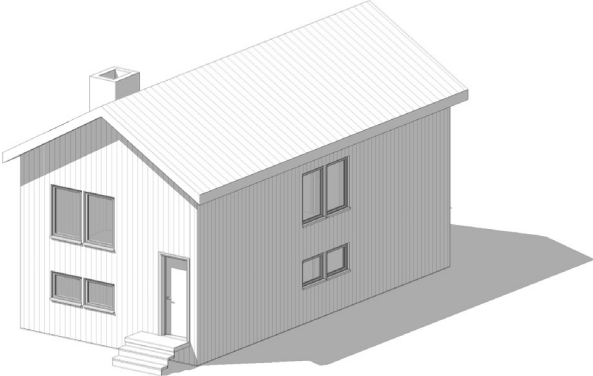
REFLECTION

According to the analysis, the kitchen, entrance and the bathroom have been identified as the relatively isolated and less integrated spaces in the building, as they have the minimum amount of visual integration values. The living room and the bedrooms have the high value, which for the bedroom is a concern as it suggests that the bedroom is too connected to other spaces in the house, potentially compromising the privacy of the occupants. Since the entrance is located on a half-floor, it has a limited visual field and low integration value. This segregation of the entrance area provides increased privacy for the living spaces.



TYPE A & TYPE B

---



## COMPARING TYPE A & B

This comparison is based on all the three methodologies (Time series analysis, Text analysis and space syntax analysis) that have been used previously.

**Original building size:** Type A has a smaller footprint of 34m<sup>2</sup> while Type B has a larger footprint of 46m<sup>2</sup>, resulting in a bigger basement and more storage space and other functions, which may reduce the need for modifications. Also, Type A was originally designed for larger households, leading to more changes over time as their needs evolved and changed, explaining the differences in transformation between the two building types.

**Frequency of changes:** Type A buildings had a higher proportion of modifications compared to type B, with 40% of buildings undergoing alterations compared to 34% in type B. This suggests that residents of type A buildings were more likely to identify issues with the original floor plans and make changes.

**Types of changes:** In type A buildings, the enlargement of an entrance hall and adjustments to the entrance's direction were the most common changes made, which indicates a focus on improving the privacy and functionality of the entrance area while in type B the entrance did not undergo a lot of changes and adding a balcony was most frequent to increase outdoor living space. Although the living room was the most integrated and central space in both building types but both building types seem to struggle with integrating the kitchen, dining room, and living room spaces.

The low amount of visual integration value in the bedrooms of type A buildings indicates that they are more isolated and disconnected from other parts of the building. This explains why there were fewer changes made to the bedrooms. On the other hand, more changes have been made in the bedrooms in type B to add a corridor to not be in a direct connection with the living room.

**Time of First Alteration:** The first modifications to Type A buildings were made in 1947, whereas Type B buildings occurred much later, in 1957. This shows that the original design of the Type B building have been sufficient for the initial occupants

## COMPARATIVE ANALYSIS OF ALTERATIONS

Having identified the types of changes made to both building types A and B, the subsequent step is to evaluate how these alterations have improved the spatial qualities of the living spaces. The aim of this chapter is to address the second research question: “How have the changes to the original floor plans enhanced the spatial qualities of the living spaces?”

To answer this question, some frequently modified spaces in both building types have been selected, including:

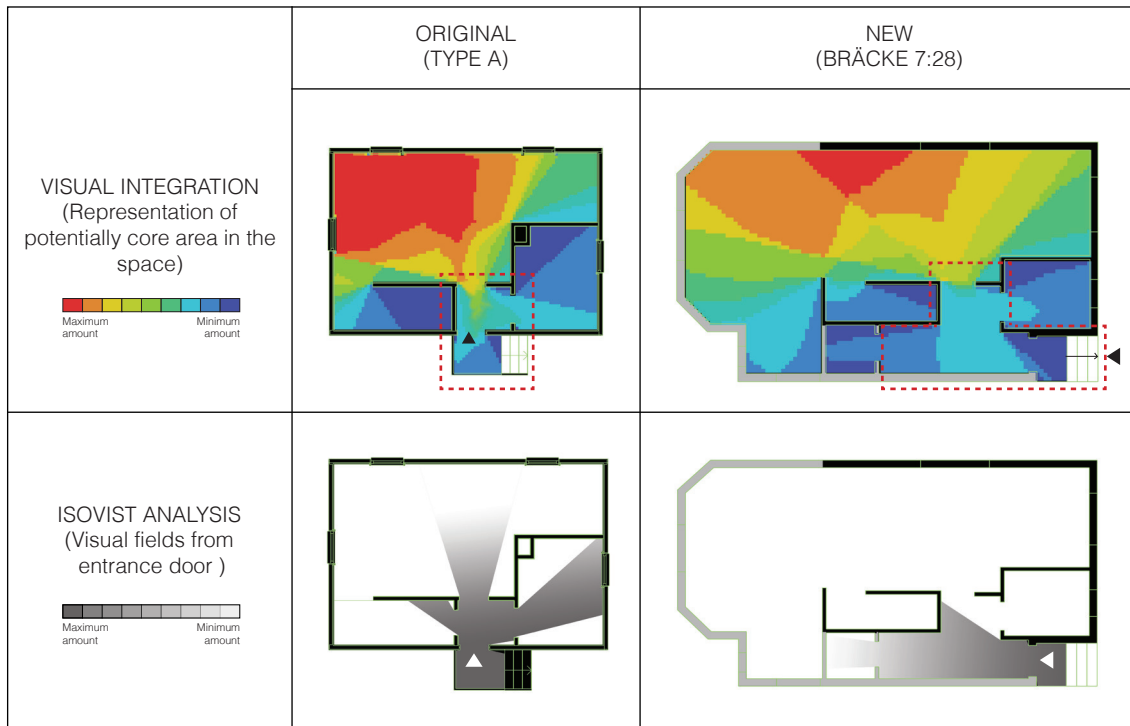
- Direction of entrance door (Type A)
- Merging kitchen with the living room (type B)
- Move the bedroom (type B)
- Move the balcony (Type A)

-The floor plans of these buildings are available in appendix.

The analysis has been conducted by choosing one building per each part, and the selection of buildings was made with great care to ensure that they had few other changes aside from the specific alteration being studied.

To compare the altered buildings with the original ones, a qualitative analysis of space syntax was conducted. To facilitate visual comparison, two spatial analyses were utilized: Visual Integration (HH) and individual Isovist analysis for relevant spaces. The reason for selecting these two methods is that they present the results more graphically, making it easier to compare them visually rather than through numbers. (Turner et al. 2001)

## DIRECTION OF ENTRANCE DOOR

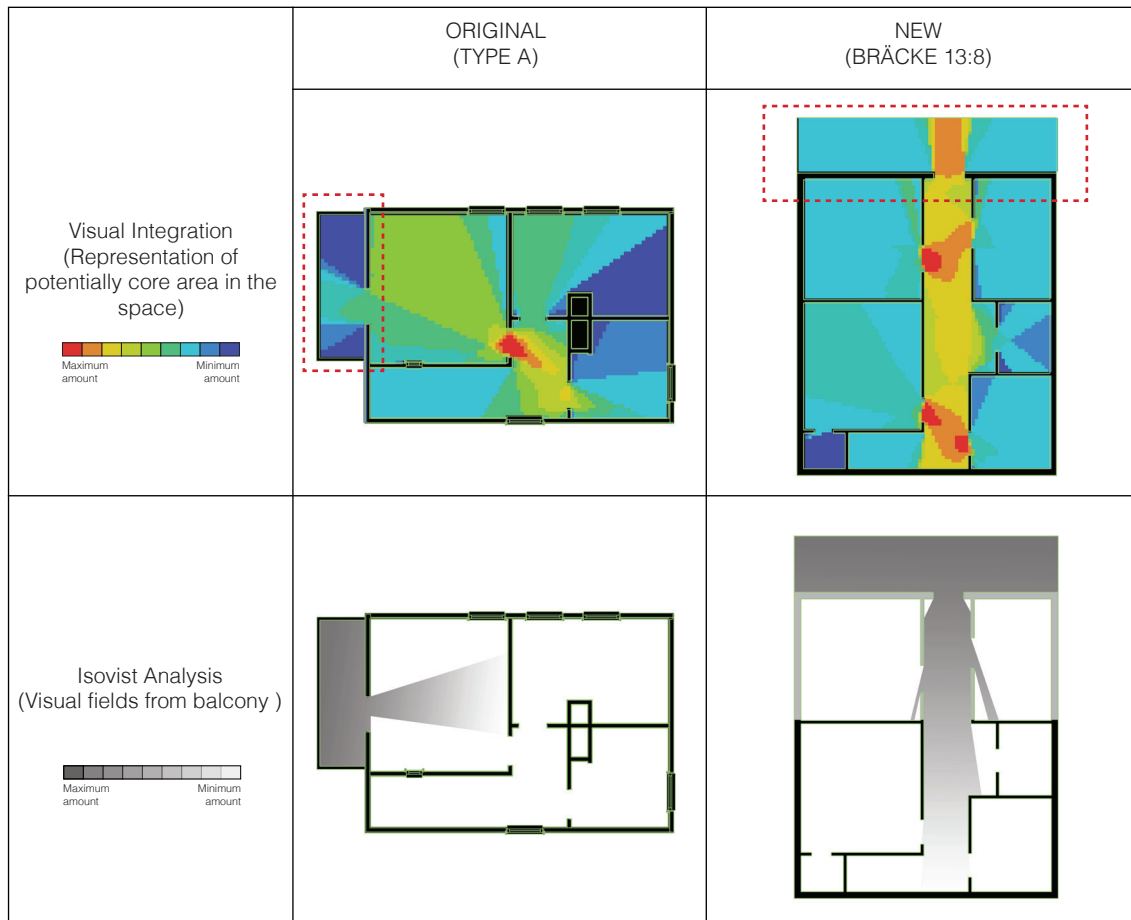


## REFLECTION:

Based on the comparison between the original floor plan and the altered one, it is evident that changing the direction of the entrance door has decreased the level of visual integration in the space.

The isovist analysis also showed that the altered floor plan resulted in a visual field that only included the entrance hall and not the living spaces. It demonstrates a preference for a private entrance with an entrance hall, rather than an exposed entrance to the living spaces. This design choice not only creates a sense of transition between the entrance and the living spaces, but it also increases the privacy of the living areas. Overall, the comparison between the original and altered floor plan shows how changing the direction of the entrance door can impact the spatial configuration and spatial qualities of the living spaces.

## MOVE THE BALCONY

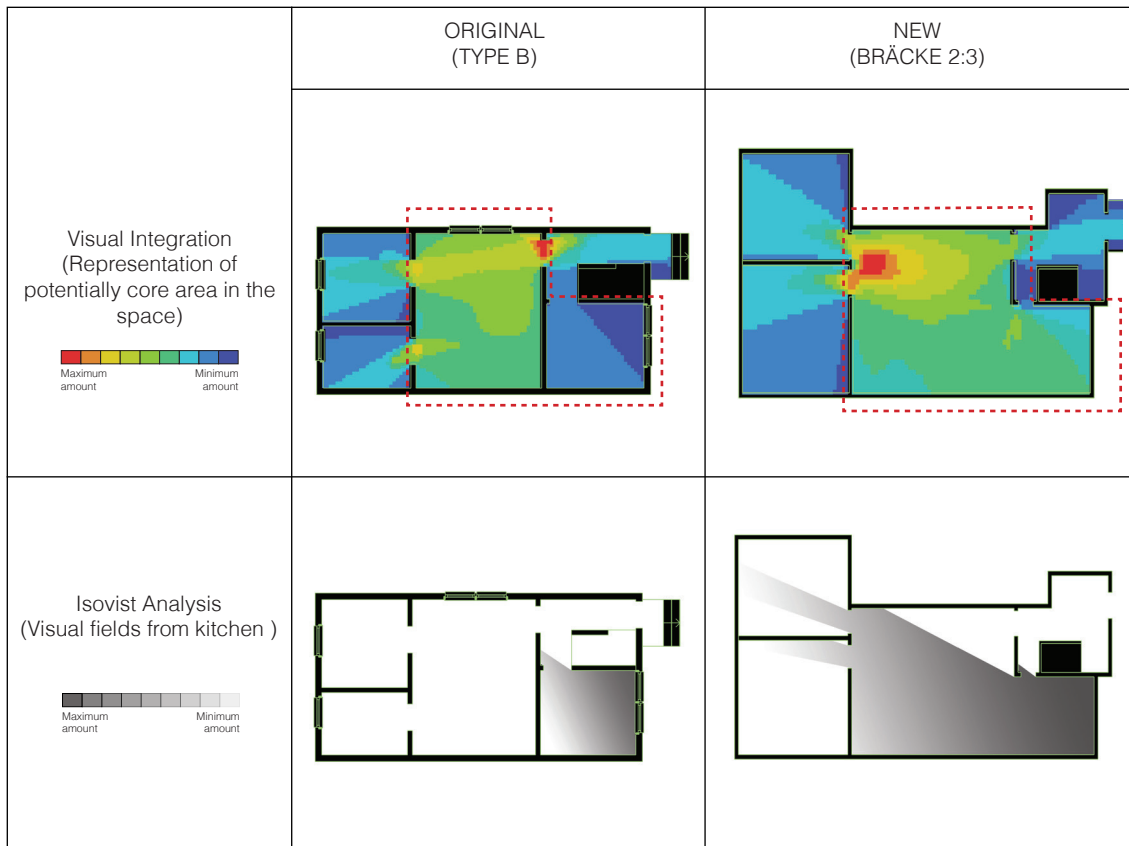


## REFLECTION:

Changing the balcony position to a location accessible from all other rooms significantly impacted the spatial configuration. The original floor plan had poor visual integration of the balcony as it was only accessible from one bedroom. However, in the altered plan, the balcony's visual integration and accessibility increased significantly as it is now accessible from multiple rooms.

Isovist analysis also shows that the visual field from the balcony in the original floor plan was limited to only one of the bedrooms, while in the altered version, it is much wider and covers almost all the rooms and the whole corridor. This indicates that residents preferred to have a balcony that is more accessible from other spaces, which in turn increases their willingness to use it more frequently.

## MERGING KITCHEN WITH THE LIVING ROOM

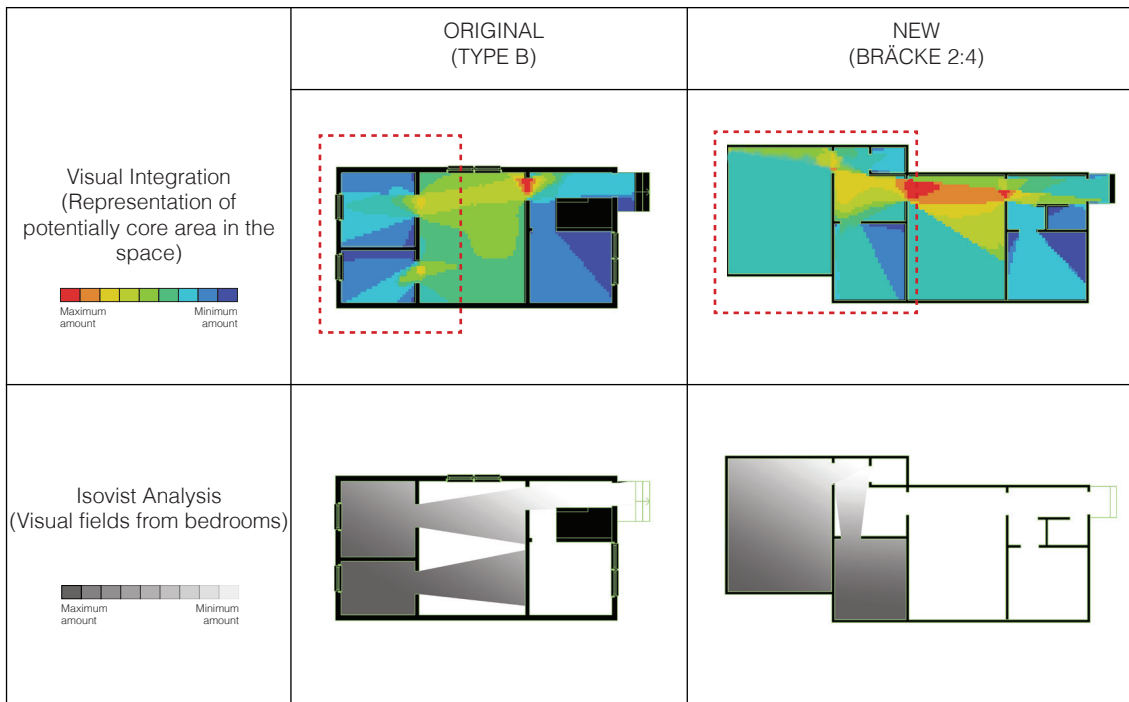


## REFLECTION:

In the original floor plan, the living room and dining room were separate from the kitchen, resulting in a low level of visual integration in the kitchen. However, in the altered floor plan, the wall was removed, and resulting in increased accessibility and visual integration in the kitchen.

The isovist analysis also shows that in the original floor plan, the visual field of the kitchen was limited only to the kitchen itself, and it had no visual connection to the other spaces. However, in the altered one, the visual field expanded to the living room, dining room, and the whole social spaces. This indicates that users preferred to increase the social interaction and to create a sense of openness. Therefore, merging the kitchen and living room can enhance the overall living experience for the residents.

## MOVE THE BEDROOM



## Reflection:

The bedrooms in Type B's original floor plan were directly connected to the living room, resulting in high visual integration between the spaces. However, the altered floor plan includes a hallway and the bedrooms are not directly connected to the living room, resulting in a significant decrease in visual integration. Isovist analysis also revealed that the visual fields from the bedrooms in the original floor plan included the living room and dining room, whereas in the altered floor plan, they were limited to the hallway, and the bedrooms were no longer exposed to the living spaces. The changes in the floor plan shows that the residents valued the function of the bedroom as a private space, and by adding a hallway, they created a clear separation between the house's public and private areas. It also provides the occupants with a sense of seclusion and calm, which may improve their overall well-being.

## 04 | GUIDELINES

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## AIM

After analysing all of the buildings and comparing building types A and B, I discovered that buildings with more efficient floor plans will better suit the needs of their residents, resulting in fewer changes over time. This can not only save time and money for residents, but it can also promote sustainability and reduce waste in the construction industry.

Therefore, by understanding the demands of the people and the primary causes of all the changes in type A and B buildings, architects and designers may use this knowledge to produce future home designs that are more liveable and sustainable.

The aim of using research and analysis to derive guidelines for future housing can have a number of advantages, such as:

-By providing architects and designers with guidelines, they may make living environments that are more efficient and useful, better serving the needs of the inhabitants and raising their standard of living.

-Buildings that are designed to suit occupant needs are less likely to require alterations, resulting in a more sustainable use of resources.

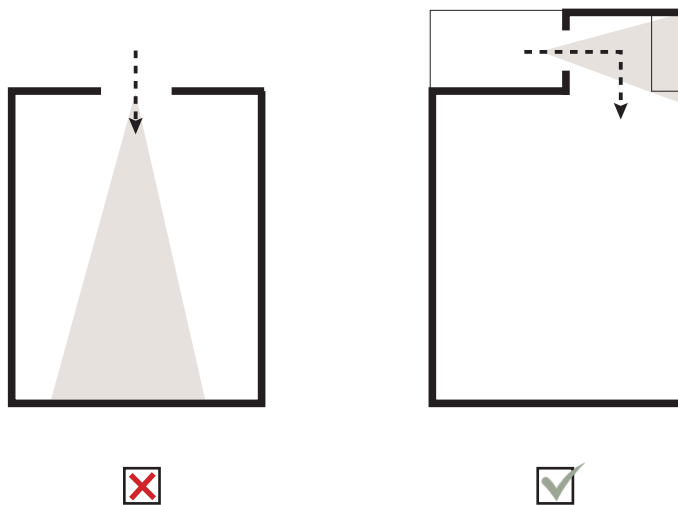
-Future costly alterations can be avoided by taking the demands of the occupants into account during the planning process.

-Guidelines can assist encourage better communication between architects, designers, and residents.

A checklist-style guideline has been created for architects and designers to consider when designing housing in order to meet the needs of residents which minimize the need for future changes.

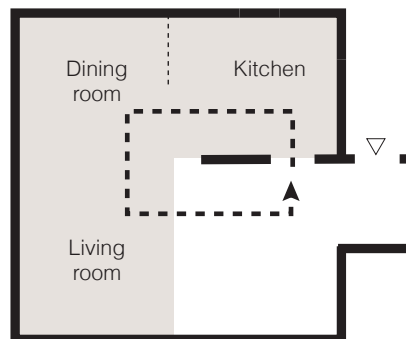
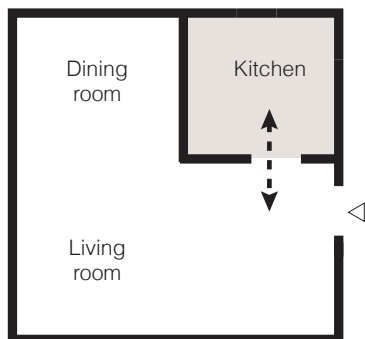
**ENTRANCE:**

- Provide an entrance hallway with enough space for coat storage, shoe racks, and other items that residents may need to store upon entering.
- The entrance and the hallway should be spacious enough to accommodate multiple people and allow for easy movement.
- It should be designed as a transition space with easy access to other parts of the house.
- The direction of the entrance should be carefully designed to not expose the interior that much to provide privacy and security for the residents.



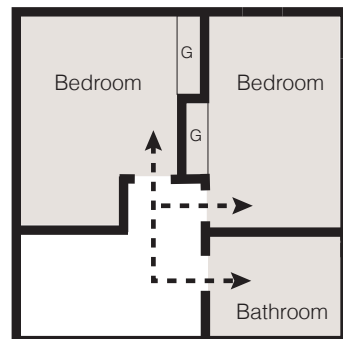
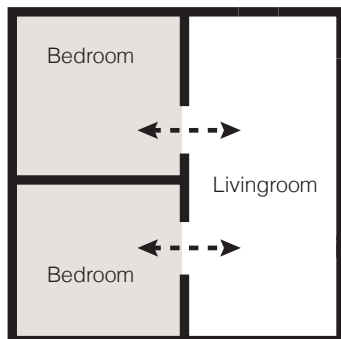
**KITCHEN / LIVING SPACES:**

- The kitchen should be nearby and connected to the dining room
- The living room should not be a passageway to other parts of the house.
- There should be enough storage space in the kitchen and dining room.
- Use a flexible, open floor plan that allows for easy movement between the kitchen and dining area.



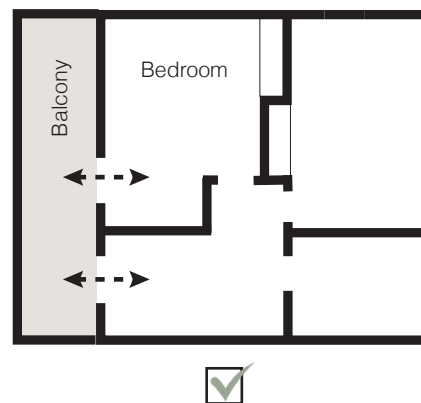
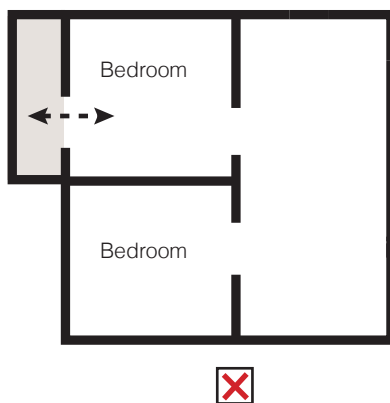
**BEDROOM:**

- It should be located in a way to be in relation with the bathroom.
- The bedroom should be isolated from the noisy areas of the house.
- The bedroom layout should allow for flexibility to accommodate changing needs and preferences of the residents.
- Built-in wardrobes or storage should be provided in the bedrooms to maximize space and functionality.
- It should be designed in a way to have a short hallway leading to the bedrooms, rather than having the doors open directly to a main living area.



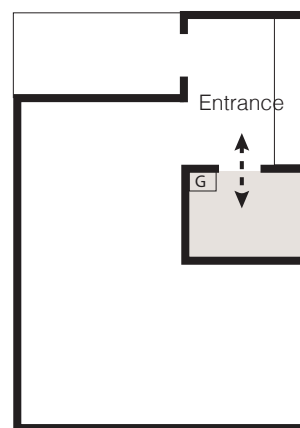
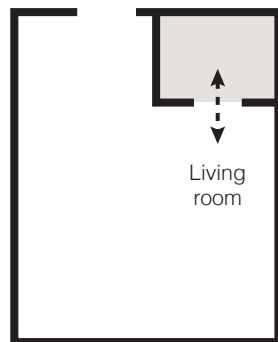
**BALCONY / TERRACE:**

- To promote socializing and outdoor life, balcony should be reachable from the living room and simple to use.
- The privacy of the user from adjacent properties should be considered.
- It should be large enough to provide adequate space for outdoor furniture.
- It should be easily accessible from multiple rooms in the house to maximize its usage and make it more functional for the residents.



**WC / BATHROOM:**

- Bathrooms and toilets should be close to the living areas and easily accessible from there.
- Combine the toilet and bathroom in one place to maximize space and improve the effectiveness of the entire floor plan.
- It should be big enough to accommodate the movement inside.
- For keeping toiletries and other bathroom accessories, enough storage space must be offered.
- The bathroom door should not directly face the entrance or any common areas of the house.



## 05 | DESIGN PROPOSAL

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The final chapter aims to show some newly built terraced villas (Radhus) in Sweden and identify the potential design flaws. The findings are based on the result of the research conducted on building type A and B, and the modifications made by the residents to their living spaces.

The purpose of presenting these case studies is to demonstrate that while significant improvements have been made in current housing design, there are still areas where modifications may be necessary in the future.

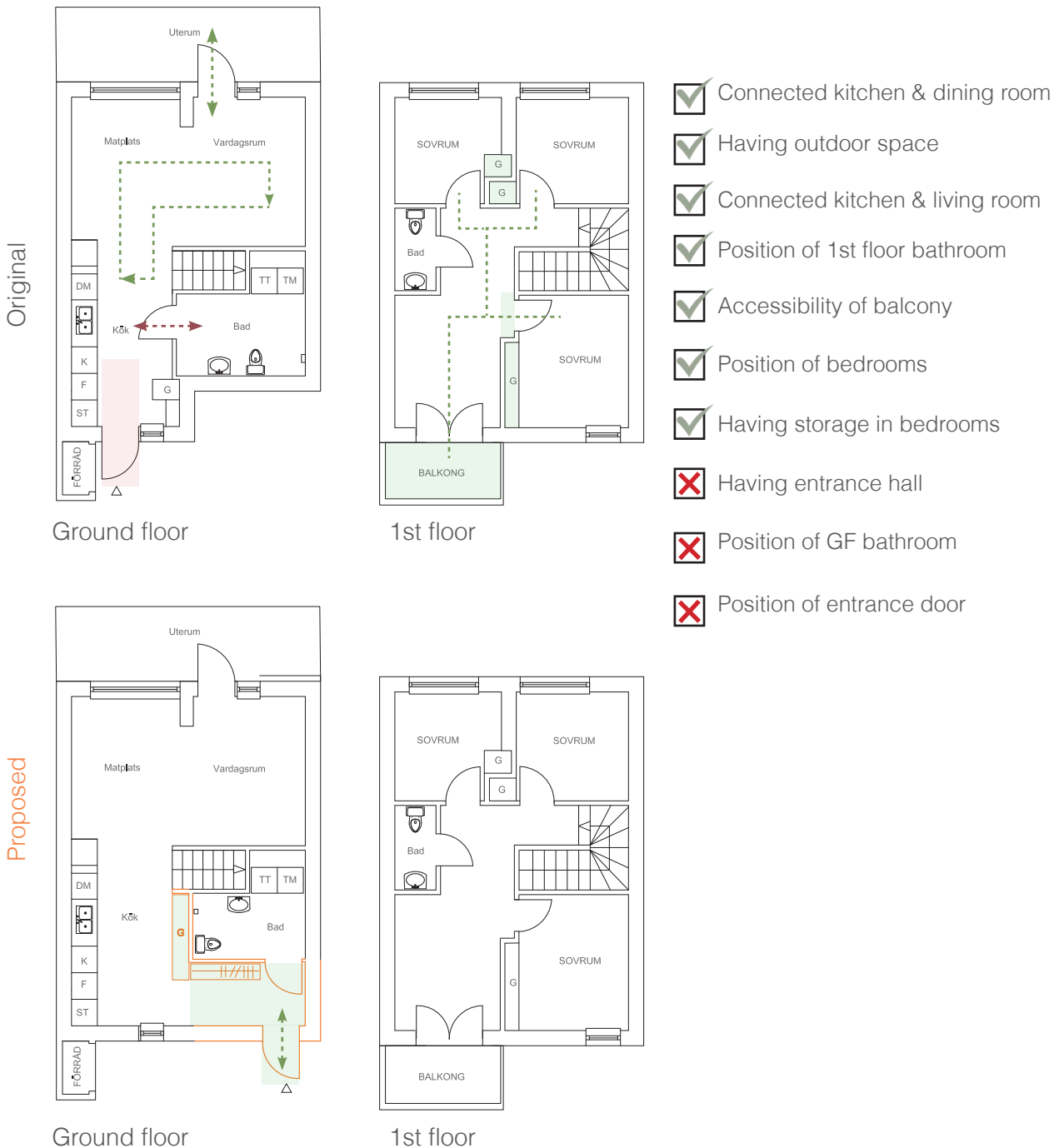
These insights can be used as a design proposal for architects who want to create housing that better meets the needs of residents and requires less modifications in the future.

“Hemnet” website has been used to find the terraced villas in Sweden.

Snapphanevägen 53  
 Jakobsberg, Järfälla municipality  
 Housing type: Terraced house  
 Rooms: 4 rooms  
 Year of construction: 2021  
 Living area: 80 m<sup>2</sup>



Figure 6.1 Snapphanevägen 53 (© Hemnet AB, 2023)





Ingaredsgatan 39B

Stockholm, Vallentuna

Housing type: Terraced house

Rooms: 5, of which 3 bedrooms

Year of construction: 2018

Living area: 105 m<sup>2</sup>



Figure 6.2 Ingaredsgatan 39B (© Hemnet AB, 2023)



## 06 | DISCUSSION

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## DISCUSSION

This thesis studied the post occupancy transformation by residents in two types of buildings, located in Bräcke, Gothenburg. The research aimed to answer some key questions such as the types of spatial changes made by the residents and the reasons behind these changes. Additionally, the study aimed to explore how alterations to the original floor plans have impacted the spatial qualities of the living spaces. Finally, it investigated the implications of the study to future housing, particularly in terms of how architects can learn from residents' alterations to improve the design of future housing to be more sustainable. By examining these questions, this study contributes to a better understanding of how users' needs and preferences can inform the design of future housing to create more liveable and functional spaces.

Based on the analysis, we found that while both types of buildings underwent alterations, Type A buildings had a higher proportion of changes, with the entrance area being the most frequently modified space. On the other hand, type B buildings underwent fewer modifications, with the addition of a balcony being the most change. According to the space syntax analysis, the living room was found to be the most central and integrated space in both types of buildings. However, it was observed that residents in both building types frequently made alterations to merge the kitchen with the living room and dining room in order to increase accessibility and promote sociability within the living spaces.

Another notable difference between the transformations made in Type A and Type B buildings was in relation to the bedrooms. In Type A buildings, the bedrooms were more isolated and disconnected from the living spaces, resulting in fewer changes made to these areas. On the other hand, in Type B they were more exposed towards the social spaces, and as a result, underwent more changes to increase their privacy. This finding highlights the importance of considering the spatial relationships between different areas of the home when designing floor plans to enhance the overall functionality of the space.

I also found that the original design of the buildings had an impact on the post occupancy transformations. Type A buildings were originally designed for larger households and the footprint of the building was smaller which have contributed to the need for more changes over time as their needs evolved.

Type B buildings, on the other hand, had a larger footprint and more space for storage and different functions, potentially reducing the need for modifications.

The study has valuable implications for future housing design. Firstly, it highlights the importance of understanding the needs and preferences of residents and how they modify their living spaces. By understanding this, future housing design can be informed to better respond to user needs. This approach can result in longer lifespan for buildings and reduce the need for frequent and extensive alterations, which can contribute to more sustainable living environments.

The other implication of this study is the importance of incorporating flexibility into the design of living spaces. The ability to modify or adapt living spaces to changing needs and preferences over time ensures that the housing remains relevant and desirable to residents. This flexibility and adaptable spaces increase the longevity of the building and reduce the need for alterations.

Further research could investigate how cultural and socioeconomic factors affect the changes made to buildings in diverse regions and contexts. Additionally, a larger sample size could be considered to enhance the generalizability of the results. Moreover, a comparison of the modifications made to different types of buildings such as apartments could be conducted to identify potential differences in spatial transformation patterns.

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-Figure 2.28 © Hemnet AB. (2023). Sök bostad. <https://www.hemnet.se/>

-Figure 6.1 © Hemnet AB. (2023). Sök bostad. <https://www.hemnet.se/>

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## APPENDIX

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## “TYPE A” SPREADSHEET OF ALL THE BUILDINGS

	Property designation	Street address	
1	BRÄCKE 14:4	Utmarksgatan 40	A
2	BRÄCKE 14:5	Utmarksgatan 38	A
3	BRÄCKE 7:1	Sommersgatan 5	A
4	BRÄCKE 7:2	Stamrotsvägen 3	A
5	BRÄCKE 7:3	Stamrotsvägen 5	A
6	BRÄCKE 7:4	Stamrotsvägen 7	A
7	BRÄCKE 7:5	Stamrotsvägen 9	A
8	BRÄCKE 7:6	Stamrotsvägen 11	A
9	BRÄCKE 7:7	Stamrotsvägen 13	A
10	BRÄCKE 7:8	Stamrotsvägen 15	A
11	BRÄCKE 7:9	Stamrotsvägen 17	A
12	BRÄCKE 7:10	Stamrotsvägen 19	A
13	BRÄCKE 7:11	Stamrotsvägen 21	A
14	BRÄCKE 7:12	Stamrotsvägen 23	A
15	BRÄCKE 7:13	Stamrotsvägen 25	A
16	BRÄCKE 7:14	Utmarksgatan 39	A
17	BRÄCKE 7:15	Fornminnesvägen 28	A
18	BRÄCKE 7:16	Fornminnesvägen 26	A
19	BRÄCKE 7:17	Fornminnesvägen 24	A
20	BRÄCKE 7:18	Fornminnesvägen 22	A

	Property designation	Street address	
21	BRÄCKE 7:19	Fornminnesvägen 20	A
22	BRÄCKE 7:20	Fornminnesvägen 18	A
23	BRÄCKE 7:21	Fornminnesvägen 16	A
24	BRÄCKE 7:22	Fornminnesvägen 14	A
25	BRÄCKE 7:23	Fornminnesvägen 12	A
26	BRÄCKE 7:24	Fornminnesvägen 10	A
27	BRÄCKE 7:25	Fornminnesvägen 8	A
28	BRÄCKE 7:26	Fornminnesvägen 6	A
29	BRÄCKE 7:27	Fornminnesvägen 4	A
30	BRÄCKE 7:28	Sommersgatan 6	A
31	BRÄCKE 8:1	Sommersgatan 7	A
32	BRÄCKE 8:2	Fornminnesvägen 3	A
33	BRÄCKE 8:3	Fornminnesvägen 5	A
34	BRÄCKE 8:4	Fornminnesvägen 7	A
35	BRÄCKE 8:5	Fornminnesvägen 9	A
36	BRÄCKE 8:6	Fornminnesvägen 11	A
37	BRÄCKE 8:7	Fornminnesvägen 13	A
38	BRÄCKE 8:8	Fornminnesvägen 15	A
39	BRÄCKE 8:9	Fornminnesvägen 17	A
40	BRÄCKE 8:10	Fornminnesvägen 19	A




	Property designation	Street address	
41	BRÄCKE 8:11	Fornminnesvägen 21	A
42	BRÄCKE 8:12	Fornminnesvägen 23	A
43	BRÄCKE 8:13	Fornminnesvägen 25	A
44	BRÄCKE 8:14	Utmarksgatan 43	A
45	BRÄCKE 9:1	Sommersgatan 8	A
46	BRÄCKE 9:2	Stenåldersvägen 4	A
47	BRÄCKE 9:3	Stenåldersvägen 6	A
48	BRÄCKE 9:4	Stenåldersvägen 8	A
49	BRÄCKE 9:5	Stenåldersvägen 10	A
50	BRÄCKE 9:6	Stenåldersvägen 12	A
51	BRÄCKE 9:7	Stenåldersvägen 14	A
52	BRÄCKE 9:8	Stenåldersvägen 16	A
53	BRÄCKE 9:9	Stenåldersvägen 18	A
54	BRÄCKE 9:10	Stenåldersvägen 20	A
55	BRÄCKE 9:11	Stenåldersvägen 22	A
56	BRÄCKE 9:12	Stenåldersvägen 24	A
57	BRÄCKE 9:13	Stenåldersvägen 26	A
58	BRÄCKE 9:14	Stenåldersvägen 28	A
59	BRÄCKE 9:15	Stenåldersvägen 30	A
60	BRÄCKE 10:1	Stenåldersvägen 17	A

	Property designation	Street address	
61	BRÄCKE 10:2	Stenåldersvägen 19	A
62	BRÄCKE 10:3	Stenåldersvägen 21	A
63	BRÄCKE 10:4	Stenåldersvägen 23	A
64	BRÄCKE 10:5	Stenåldersvägen 25	A
65	BRÄCKE 10:6	Stenåldersvägen 27	A
66	BRÄCKE 10:7	Stenåldersvägen 29	A
67	BRÄCKE 10:8	Stenåldersvägen 31	A
68	BRÄCKE 10:9	Slånbärsvägen 34	A
69	BRÄCKE 10:10	Slånbärsvägen 32	A
70	BRÄCKE 10:11	Slånbärsvägen 30	A
71	BRÄCKE 10:12	Slånbärsvägen 28	A
72	BRÄCKE 10:13	Slånbärsvägen 26	A
73	BRÄCKE 10:14	Slånbärsvägen 24	A
74	BRÄCKE 10:15	Slånbärsvägen 22	A
75	BRÄCKE 10:16	Slånbärsvägen 20	A
76	BRÄCKE 10:17	Slånbärsvägen 18	A
77	BRÄCKE 11:1	Sommersgatan 9	A
78	BRÄCKE 11:2	Stenåldersvägen 3	A
79	BRÄCKE 11:3	Stenåldersvägen 5	A
80	BRÄCKE 11:4	Stenåldersvägen 7	A

	Property designation	Street address	
81	BRÄCKE 11:5	Stenåldersvägen 9	A
82	BRÄCKE 11:6	Stenåldersvägen 11	A
83	BRÄCKE 11:7	Stenåldersvägen 13	A
84	BRÄCKE 11:8	Stenåldersvägen 15	A
85	BRÄCKE 11:9	Slånbärsvägen 16	A
86	BRÄCKE 11:10	Slånbärsvägen 14	A
87	BRÄCKE 11:11	Slånbärsvägen 12	A
88	BRÄCKE 11:12	Slånbärsvägen 10	A
89	BRÄCKE 11:13	Slånbärsvägen 8	A
90	BRÄCKE 11:14	Slånbärsvägen 6	A
91	BRÄCKE 11:15	Slånbärsvägen 4	A
92	BRÄCKE 11:16	Sommersgatan 10	A
93	BRÄCKE 12:1	Sommersgatan 11	A
94	BRÄCKE 12:2	Bräckevägen 98	A
95	BRÄCKE 12:3	Bräckevägen 100	A
96	BRÄCKE 12:4	Bräckevägen 102	A
97	BRÄCKE 12:5	Bräckevägen 104	A
98	BRÄCKE 12:6	Bräckevägen 106	A
99	BRÄCKE 12:7	Bräckevägen 108	A
100	BRÄCKE 12:8	Bräckevägen 110	A

	Property designation	Street address	
101	BRÄCKE 12:9	Slånbärsvägen 17	A
102	BRÄCKE 12:10	Slånbärsvägen 19	A
103	BRÄCKE 12:11	Slånbärsvägen 21	A
104	BRÄCKE 12:12	Slånbärsvägen 23	A
105	BRÄCKE 12:13	Slånbärsvägen 25	A
106	BRÄCKE 12:14	Slånbärsvägen 27	A
107	BRÄCKE 12:15	Slånbärsvägen 29	A
108	BRÄCKE 12:16	Slånbärsvägen 31	A
109	BRÄCKE 12:17	Slånbärsvägen 33	A
110	BRÄCKE 12:18	Utmarksgatan 51	A
111	BRÄCKE 12:20	Bräckevägen 130	A
112	BRÄCKE 12:21	Bräckevägen 128	A
113	BRÄCKE 12:22	Bräckevägen 126	A
114	BRÄCKE 12:23	Bräckevägen 124	A
115	BRÄCKE 12:24	Bräckevägen 122	A
116	BRÄCKE 12:25	Bräckevägen 120	A
117	BRÄCKE 12:26	Bräckevägen 118	A
118	BRÄCKE 12:27	Bräckevägen 116	A
119	BRÄCKE 12:28	Bräckevägen 114	A
120	BRÄCKE 12:29	Bräckevägen 112	A

	Property designation	Street address	
121	BRÄCKE 12:30	Bräckevägen 132	A
122	BRÄCKE 13:6	Utmarksgatan 62	A
123	BRÄCKE 13:7	Utmarksgatan 60	A
124	BRÄCKE 13:8	Utmarksgatan 58	A
125	BRÄCKE 13:9	Utmarksgatan 56	A
126	BRÄCKE 13:10	Utmarksgatan 54	A
127	BRÄCKE 13:11	Utmarksgatan 52	A
128	BRÄCKE 13:12	Utmarksgatan 50	A
129	BRÄCKE 13:13	Utmarksgatan 48	A
130	BRÄCKE 14:1	Utmarksgatan 46	A
131	BRÄCKE 14:2	Utmarksgatan 44	A
132	BRÄCKE 14:3	Utmarksgatan 42	A

	No change
	Major change
	Minor change

“TYPE B” SPREADSHEET OF ALL THE BUILDINGS

	Property designation	street address	
1	BRÄCKE 1:1	Bräckevägen 94	B
2	BRÄCKE 1:2	Bräckevägen 92	B
3	BRÄCKE 1:3	Bräckevägen 90	B
4	BRÄCKE 1:4	Bräckevägen 88	B
5	BRÄCKE 1:5	Bräckevägen 86	B
6	BRÄCKE 1:6	Bräckevägen 84	B
7	BRÄCKE 1:7	Bräckevägen 82	B
8	BRÄCKE 1:8	Bräckevägen 80	B
9	BRÄCKE 1:9	Bräckevägen 78	B
10	BRÄCKE 1:10	Bräckevägen 76	B
11	BRÄCKE 1:11	Bräckevägen 74	B
12	BRÄCKE 1:12	Bräckevägen 72	B
13	BRÄCKE 1:13	Bräckevägen 70	B
14	BRÄCKE 2:1	Visthusgatan 26	B
15	BRÄCKE 2:2	Visthusgatan 24	B
16	BRÄCKE 2:3	Visthusgatan 22	B
17	BRÄCKE 2:4	Visthusgatan 20	B
18	BRÄCKE 2:5	Visthusgatan 18	B
19	BRÄCKE 2:6	Visthusgatan 16	B
20	BRÄCKE 2:7	Visthusgatan 14	B

	Property designation	street address	
21	BRÄCKE 2:8	Visthusgatan 12	B
22	BRÄCKE 2:9	Visthusgatan 10	B
23	BRÄCKE 2:10	Visthusgatan 8	B
24	BRÄCKE 2:11	Visthusgatan 6	B
25	BRÄCKE 2:12	Visthusgatan 4	B
26	BRÄCKE 2:13	Visthusgatan 2	B
27	BRÄCKE 2:14	Diakonissgatan 7	B
28	BRÄCKE 2:15	Särlagången 4	B
29	BRÄCKE 2:16	Särlagången 6	B
30	BRÄCKE 3:1	Arlagången 12	B
31	BRÄCKE 3:2	Arlagången 10	B
32	BRÄCKE 3:3	Arlagången 8	B
33	BRÄCKE 3:4	Arlagången 6	B
34	BRÄCKE 3:5	Arlagången 4	B
35	BRÄCKE 3:6	Arlagången 2	B
36	BRÄCKE 3:7	Södra Värvindsgatan 10	B
37	BRÄCKE 3:8	Kaprifolievägen 3	B
38	BRÄCKE 3:9	Kaprifolievägen 5	B
39	BRÄCKE 3:10	Kaprifolievägen 7	B
40	BRÄCKE 3:11	Kaprifolievägen 9	B

	Property designation	street address	
41	BRÄCKE 3:12	Kaprifolievägen 11	B
42	BRÄCKE 3:13	Kaprifolievägen 13	B
43	BRÄCKE 3:14	Kaprifolievägen 15	B
44	BRÄCKE 3:15	Kaprifolievägen 17	B
45	BRÄCKE 3:16	Kaprifolievägen 19	B
46	BRÄCKE 3:17	Kaprifolievägen 21	B
47	BRÄCKE 3:18	Kaprifolievägen 23	B
48	BRÄCKE 3:19	Diakonissgatan 5	B
49	BRÄCKE 3:20	Diakonissgatan 6	B
50	BRÄCKE 3:21	Särlagången 3	B
51	BRÄCKE 3:22	Särlagången 5	B
52	BRÄCKE 4:1	Kaprifolievägen 26	B
53	BRÄCKE 4:2	Kaprifolievägen 24	B
54	BRÄCKE 4:3	Kaprifolievägen 22	B
55	BRÄCKE 4:4	Kaprifolievägen 20	B
56	BRÄCKE 4:5	Kaprifolievägen 18	B
57	BRÄCKE 4:6	Kaprifolievägen 16	B
58	BRÄCKE 4:7	Kaprifolievägen 14	B
59	BRÄCKE 4:8	Kaprifolievägen 12	B
60	BRÄCKE 4:9	Kaprifolievägen 10	B

	Property designation	street address	
61	BRÄCKE 4:10	Kaprifolievägen 8	B
62	BRÄCKE 4:11	Kaprifolievägen 6	B
63	BRÄCKE 4:12	Kaprifolievägen 4	B
64	BRÄCKE 4:15	Dysiksgatan 3	B
65	BRÄCKE 4:28	Dysiksgatan 5	B
66	BRÄCKE 4:29	Dysiksgatan 7	B
67	BRÄCKE 4:18	Dysiksgatan 9	B
68	BRÄCKE 4:19	Dysiksgatan 11	B
69	BRÄCKE 4:20	Dysiksgatan 13	B
70	BRÄCKE 4:21	Dysiksgatan 15	B
71	BRÄCKE 4:22	Dysiksgatan 17	B
72	BRÄCKE 4:23	Dysiksgatan 19	B
73	BRÄCKE 4:24	Dysiksgatan 21	B
74	BRÄCKE 4:25	Dysiksgatan 23	B
75	BRÄCKE 4:26	Dysiksgatan 25	B
76	BRÄCKE 6:1	Dysiksgatan 27	B
77	BRÄCKE 6:2	Dysiksgatan 29	B
78	BRÄCKE 6:3	Dysiksgatan 31	B
79	BRÄCKE 6:4	Dysiksgatan 33	B
80	BRÄCKE 6:5	Dysiksgatan 35	B

	Property designation	street address	
81	BRÄCKE 6:6	Dysiksgatan 37	B
82	BRÄCKE 6:7	Dysiksgatan 39	B
83	BRÄCKE 6:8	Dysiksgatan 41	B
84	BRÄCKE 6:9	Dysiksgatan 43	B
85	BRÄCKE 6:10	Dysiksgatan 45	B
86	BRÄCKE 6:11	Dysiksgatan 47	B
87	BRÄCKE 6:12	Dysiksgatan 49	B
88	BRÄCKE 6:13	Dysiksgatan 51	B
89	BRÄCKE 6:14	Stamrotsvägen 2	B
90	BRÄCKE 6:15	Stamrotsvägen 4	B
91	BRÄCKE 6:16	Stamrotsvägen 6	B
92	BRÄCKE 6:17	Stamrotsvägen 8	B
93	BRÄCKE 6:18	Stamrotsvägen 10	B
94	BRÄCKE 6:19	Stamrotsvägen 12	B
95	BRÄCKE 6:20	Stamrotsvägen 14	B
96	BRÄCKE 6:21	Stamrotsvägen 16	B
97	BRÄCKE 6:22	Stamrotsvägen 18	B
98	BRÄCKE 6:23	Stamrotsvägen 20	B
99	BRÄCKE 6:24	Stamrotsvägen 22	B
100	BRÄCKE 6:25	Stamrotsvägen 24	B

	Property designation	Street address	
101	BRÄCKE 6:26	Stamrotsvägen 26	B
102	BRÄCKE 6:27	Stamrotsvägen 28	B

- No change
- Major change
- Minor change

“TYPE A” SPREADSHEET OF ALTERED BUILDINGS

num	building type	Property designation	Street address	Changes made after construction																							Year of transformation	num of changes per year	num of changes	first transformation	year of most changes								
				Year of transformation	Merging two rooms into one					Moving functions							Enlargement																						
					WB	Ditrk		Käll		Kitchen	Livingroom	Bedroom	Balcony	WC		Bathroom	Laundry	Entrance	Direction of stairs	Dining room	social spaces	resting	outdoor		cooking	garage						sanitary	storage	Entrance hall					
						door	no wall	door	no wall					gf	1st								balcony	seating															
1	A	BRÄCKE 12:26	Bräckevägen 118	1954											1954	1954											1954	3	3	1954	1954								
2	A	BRÄCKE 12:22	Bräckevägen 126	1954											1954	1954	1954										1954	5	7	1954	1954								
				1968																												1							
				1975							1975									1975														2					
3	A	BRÄCKE 10:1	Stenåldersvägen 17	1949		1949									1949												1949	4	8	1949	1949								
				1954																												1							
				2018				2018			2018							2018	2018															4					
4	A	BRÄCKE 12:8	Bräckevägen 110	1947		1947	1947								1947											1947	1947	7	8	1947	1947								
				2017								2017																2017				2							
5	A	BRÄCKE 8:10	Formminnesvägen 19	1966		1966	1966								1966	1966										1966	1966	6	8	1966	1966								
				1972																1972													1						
6	A	BRÄCKE 10:4	Stenåldersvägen 23	1983		1983	1983								1983												1983	1983	6	9	1983	1983							
				2016																													3						
7	A	BRÄCKE 11:7	Stenåldersvägen 13	1964		1964									1964												1964	1964	8	9	1964	1964							
				1986								1983																	1986				2						
8	A	BRÄCKE 12:5	Bräckevägen 104	1958		1958									1958												1958	1958	4	9	1958	2015							
				2015						2015																							4						
9	A	BRÄCKE 12:9	Slånbärsvägen 17	1966	1966		1966								1966											1966	1966	1966	10	9	1966	1966							
10	A	BRÄCKE 13:7	Utmarksgatan 60	1963	1963																						1963	1963	1963	8	9	1963	1963						
				2000																									2000	1									
11	A	BRÄCKE 12:15	Slånbärsvägen 29	1982			1982									1982	1982										1982	1982	1982	9	11	1982	1982						
				1984																			1984											1					
				1987							1987																								2				
12	A	BRÄCKE 7:27	Formminnesvägen 4	1954											1954												1954	1954	3	11	1954	2002							
				2002	2002		2002	2002			2002	2002	2002																2002				8						
13	A	BRÄCKE 7:11	Stamrotsvägen 21	2000	2000		2000	2000							2000												2000	2000	2000	10	12	2000	2000						
				2014																										2014				3					
14	A	BRÄCKE 12:25	Bräckevägen 120	1953			1953									1953	1953										1953	1953	4	12	1953	1953							
				1963																									1963				1963	6					
				1994																														1994	2				
15	A	BRÄCKE 11:13	Slånbärsvägen 8	1948			1948	1948								1948												1948	1948	7	12	1948	1948						
				1966																										1966				1					
				1975																																2			
				2000																														2000	2				
16	A	BRÄCKE 10:9	Slånbärsvägen 34	1968			1968	1968								1968	1968	1968	1968								1968	1968	1968	1968	14	13	1968	1968					
				1965																															4				
17	A	BRÄCKE 9:11	Stenåldersvägen 22	1979																										1	13	1965	1984						
				1984	1984		1984	1984																											8				
				2001																															1				
18	A	BRÄCKE 12:24	Bräckevägen 122	2005	2005		2005	2005							2005													2005	12	13	2001	2005							
				1948																																6			
19	A	BRÄCKE 7:14	Utmarksgatan 39	1988												1948													1948	1948	6	13	1948	1948					
				1998	1998																															1			
				1998	1998																															6			
20	A	BRÄCKE 12:16	Slånbärsvägen 31	1964																										1	14	1964	1979						
				1979	1979																															13			
21	A	BRÄCKE 7:25	Formminnesvägen 8	1954												1954														3	14	1954	2008						
				2008	2008																														11				
22	A	BRÄCKE 10:10	Slånbärsvägen 32	1964			1964	1964																					1964	4	14	1964	1975						
				1975	1975																														10				
23	A	BRÄCKE 12:23	Bräckevägen 124	1967			1967									1967													1967	1967	5	14	1967	1998					
				1998																																9			
24	A	BRÄCKE 7:12	Stamrotsvägen 23	1970			1970									1970	1970											1970	1970	7	14	1970	1970						
				2002																																1			
				2005	2005																																6		
25	A	BRÄCKE 10:15	Slånbärsvägen 22	1950			1950	1950								1950													1950	1950	5	14	1950	1950					
				1964																																2			
				1974																																2			
				2017	2017																															5			

num	Building type	Property designation	Street address	Changes made after construction																				Year of transformation	num of changes	first transformation	year of most changes						
				Year of transformation	Merging two rooms into one					Moving functions							Enlargement																
					W+B	Ditrk		Källr		kitchen	Livingroom	Bedroom	Balcony	WC		Bathroom	Laundry	Entrance	Direction of stairs	Dining room	social spaces	resting	outdoor					cooking	garage	sanitary	storage	Entrance hall	
						door	no wall	door	no wall					gf	1st								balcony										seating
26	A	BRÄCKE 12:3	Bräckevägen 100	1968			1968	1968							1968	1968									1968	1968	6	15	1968	2015			
				2015	2015				2015			2015	2015														9						
27	A	BRÄCKE 8:11	Formminnesvägen 21	1964																	1964				1964	3	15	1964	2007				
				2007			2007	2007		2007							2007								2007	6							
				2009	2009						2009	2009															4						
				2012					2012	2012								2012									3						
28	A	BRÄCKE 12:4	Bräckevägen 102	1968	1968		1968	1968		1968		1968		1968	1968									1968	1968	1968	14	15	1968	1968			
				1985																			1985				1						
29	A	BRÄCKE 14:1	Utmarksgatan 46	1957											1957										1957	1957	3	15	1957	1969			
				1959																			1959				1						
				1969	1969	1969			1969	1969		1969	1969		1969	1969		1969	1969		1969			1969			11						
30	A	BRÄCKE 8:4	Formminnesvägen 7	1973	1973		1973	1973						1973	1973										1973	1973	7	15	1973	1997			
				1997					1997	1997		1997	1997			1997	1997	1997							1997		9						
31	A	BRÄCKE 13:12	Utmarksgatan 50	1964																						1964	1	15	1964	1967			
				1967		1967	1967								1967	1967										1967	5						
				1986	1986			1986				1986	1986													1986	5						
				1996					1996							1996	1996										3						
				2017							2017																2						
32	A	BRÄCKE 7:19	Formminnesvägen 20	1977	1977		1977	1977		1977	1977	1977	1977		1977	1977									1977	1977	17	16	1977	1977			
33	A	BRÄCKE 7:22	Formminnesvägen 14	1971		1971	1971																			1971	3	16	1971	2007			
				2007	2007			2007	2007	2007		2007	2007		2007	2007	2007	2007								2007	13						
34	A	BRÄCKE 9:8	Stenåldersvägen 16	1948		1948	1948								1948												1948	4	16	1948	2013		
				1966																			1966				1						
				2013	2013				2013	2013	2013	2013	2013			2013	2013	2013								2013	12						
35	A	BRÄCKE 7:1	Sommersgatan 5	1948		1948									1948												1948	3	16	1948	1970		
				1970	1970					1970	1970	1970	1970			1970	1970	1970	1970	1970						1970	1970	13					
				1965																			1965				1						
36	A	BRÄCKE 9:10	Stenåldersvägen 20	1987	1987		1987			1987	1987	1987		1987			1987	1987							1987	1987	10	16	1965	1987			
				1988				1988		1988	1988														1988		5						
				1965																						1965	2						
37	A	BRÄCKE 11:11	Slånärsvägen 12	2015	2015		2015	2015																		2015	2015	12	16	1965	2015		
				2016																							2						
38	A	BRÄCKE 8:12	Formminnesvägen 23	1950											1950											1950	1950	6	16	1950	2007		
				2007	2007		2007	2007																			2007	10					
39	A	BRÄCKE 14:2	Utmarksgatan 44	1959		1959				1959	1959						1959	1959	1959							1959		7	17	1959	1959		
				1961	1961																					1961	4						
				1964																						1964	1						
				1966			1966				1966	1966						1966	1966								5						
40	A	BRÄCKE 10:16	Slånärsvägen 20	1955		1955									1955											1955	1955	4	17	1955	2015		
				1962						1962								1962	1962								3						
				1966																			1966				1						
				2011																							1						
				2015	2015				2015	2015		2015	2015													2015	8						
41	A	BRÄCKE 7:4	Stamrotsvägen 7	1947		1947	1947																				1947	4	17	1947	2012		
				2000																							2000	2					
				2012	2012			2012																			2012	11					
42	A	BRÄCKE 13:8	Utmarksgatan 58	1998	1998					1998	1998	1998	1998		1998	1998	1998	1998	1998							1998	1998	15	17	1998	1998		
				2003							2003																2003	2					
43	A	BRÄCKE 7:20	Formminnesvägen 18	1959		1959	1959								1959	1959											1959	5	17	1959	2013		
				2013	2013																						2013	12					
44	A	BRÄCKE 7:9	Stamrotsvägen 17	1947		1947																					1947	5	17	1947	2015		
				1965																							1965	1					
				2015	2015			2015																			2015	11					
45	A	BRÄCKE 7:28	Sommersgatan 6	1948																							1948	3	17	1948	2013		
				2013	2013					2013	2013	2013	2013	2013													2013	14					
46	A	BRÄCKE 13:10	Utmarksgatan 54	1982	1982					1982	1982	1982	1982	1982	1982	1982	1982	1982	1982	1982	1982	1982	1982	1982	1982	1982	1982	18	18	1982	1982		
47	A	BRÄCKE 9:12	Stenåldersvägen 24	1957																							1957	2	18	1957	2009		



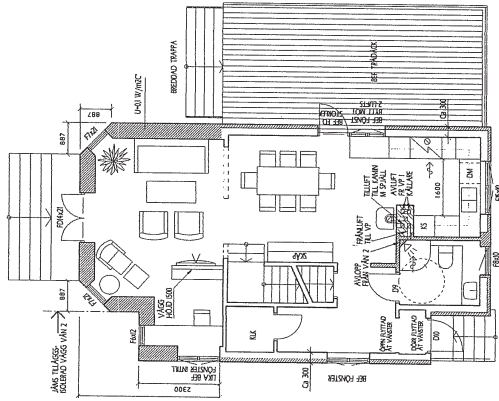


“TYPE B’ SPREADSHEET OF ALTERED BUILDINGS

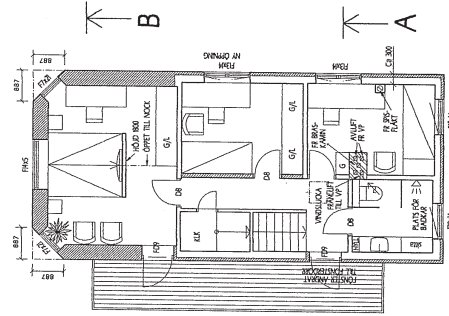
Changes made after construction																																			
Building type	Property designation	street address	Year of transformation	Merging two rooms into one			Moving functions							Enlargement							num of changes per year	num of changes	first transformation	year of most changes											
				W+B	X+LR (by door)	K+LR (no wall)	Kitchen	Livingroom	Bedroom	Bathroom	Laundry	Entrance	Dining room	living room	bedroom	balcony	kitchen	garage	wc/ bathroom	storage					Entrance hall										
1	B	BRÄCKE 3:4	Arlagången 6	1978																		2	2	1978	1978										
2	B	BRÄCKE 2:12	Visthusgatan 4	1978																			2	3	1978	1978									
3	B	BRÄCKE 1:12	Bräckevägen 72	1998																			3	3	1998	1998									
4	B	BRÄCKE 1:11	Bräckevägen 74	1969																			2	4	1969	1969									
				2008			2008			2008															3										
5	B	BRÄCKE 4:8	Kaprifollevägen 12	1982																			3	4	1982	1982									
6	B	BRÄCKE 3:1	Arlagången 12	1963																				1	5	1963	1973								
				1973	1973					1973		1973														4									
7	B	BRÄCKE 2:4	Visthusgatan 20	1964																				3	5	1964	1964								
				1974																						2									
8	B	BRÄCKE 3:2	Arlagången 10	2003																				3	5	2003	2003								
				2011																						1									
9	B	BRÄCKE 4:20	Dysiksgatan 13	2013																				3	5	2013	2013								
				2016																						2									
10	B	BRÄCKE 6:19	Stamrotsvägen 12	1994	1994																			5	5	1994	1994								
11	B	BRÄCKE 6:23	Stamrotsvägen 20	1999	1999																				3	5	1999	1999							
				2006																							2								
12	B	BRÄCKE 6:4	Dysiksgatan 33	1960																					0	6	1960	1979							
				1968																							1								
				1979	1979																							6							
13	B	BRÄCKE 2:2	Visthusgatan 24	1965	1965																				6	6	1965	1965							
14	B	BRÄCKE 2:3	Visthusgatan 22	1983																						5	6	1983	1983						
15	B	BRÄCKE 1:9	Bräckevägen 78	2018																						6	7	2018	2018						
16	B	BRÄCKE 2:14	Diakonissgatan 7	1958																							1	7	1958	1987					
				1987	1987																								6						
17	B	BRÄCKE 2:9	Visthusgatan 10	1952	1958																							5	7	1958	1973				
				2005																										2					
18	B	BRÄCKE 3:8	Kaprifollevägen 3	1973	1973																								4	7	1973	1973			
				2011																											4				
19	B	BRÄCKE 3:14	Kaprifollevägen 15	2012	2012																							7	7	2012	2012				
20	B	BRÄCKE 3:17	Kaprifollevägen 21	1990	1990																									5	7	1990	1990		
				2011																											1				
21	B	BRÄCKE 3:18	Kaprifollevägen 23	1993	1993																								7	7	1993	1993			
22	B	BRÄCKE 3:19	Diakonissgatan 5	1977																										2	7	1977	2007		
				2007	2007																										5				
23	B	BRÄCKE 3:22	Särlagången 5	1977																									7	7	1977	1977			
24	B	BRÄCKE 4:6	Kaprifollevägen 16	1957																										3	7	1957	1982		
				1982	1982																										4				
25	B	BRÄCKE 6:6	Dysiksgatan 37	1960																										3	7	1960	2000		
				2000	2000																										5				
26	B	BRÄCKE 1:3	Bräckevägen 90	1991																									8	8	1991	1991			
27	B	BRÄCKE 1:8	Bräckevägen 80	1958																											1	8	1958	2011	
				1961																												1			
				2011	2011																											6			
28	B	BRÄCKE 1:6	Bräckevägen 84	1975	1975																									9	8	1975	1975		
29	B	BRÄCKE 6:21	Stamrotsvägen 16	2008	2008																									8	9	2008	2008		
30	B	BRÄCKE 6:11	Dysiksgatan 47	1963	1963																										6	10	1963	1963	
				1965																												4			
31	B	BRÄCKE 6:12	Dysiksgatan 49	1963	1963																										7	10	1963	1963	
				1981																												3			
32	B	BRÄCKE 4:25	Dysiksgatan 23	1966																											1	11	1966	2016	
				1974																												1			
				2016	2016																										9				

Changes made after construction																											
Building type	Property designation	street address	Year of transformation	Merging two rooms into one			Moving functions							Enlargement							num of changes per year	num of changes	first transformation	year of most changes			
				W+B	K+LR (by door)	K+LR (no wall)	Kitchen	Livingroom	Bedroom	Bathroom	Laundry	Entrance	Dining room	living room	bedroom	balcony	kitchen	garage	wc/ bathroom	storage					Entrance hall		
33	B	BRÄCKE 2:6	Visthusgatan 16	1964																	1						
				2013	2013		2013			2013	2013			2013	2013	2013	2013			2013			9	11	1964	2013	
34	B	BRÄCKE 6:2	Dysiksgatan 29	2014	2014		2014	2014	2014	2014				2014	2014	2014	2014		2014				11	11	2014	2014	
35	B	BRÄCKE 6:3	Dysiksgatan 31	1963	1963		1963	1963	1963	1963	1963			1963	1963	1963			1963	1963				12	12	1963	1963
num of changes per function				23	0	26	2	4	22	18	10	5	3	17	23	30	4	22	16	3	7			-	-		
average year				1989		2001	1989	1979	1993	1988	1983	1992	1998	1989	1992	1990	1997	1975	1990	1974	1990			7	1979.6	1988.8	
Min year				1958		1958	1963	1960	1960	1963	1958	1965	1963	1957	1963	1957	1981	1957	1963	1963	1977			2	1957	-	

Bräcke 7:28  
Transformed building-Type A

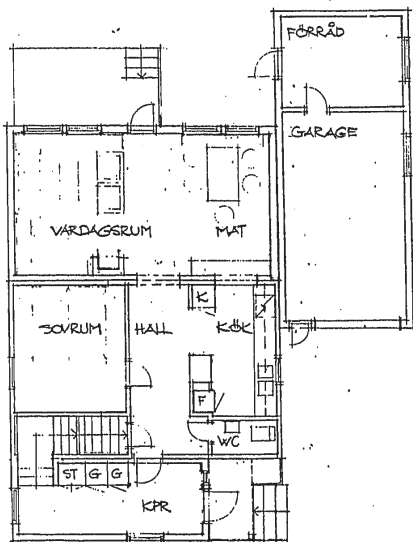


Ground floor

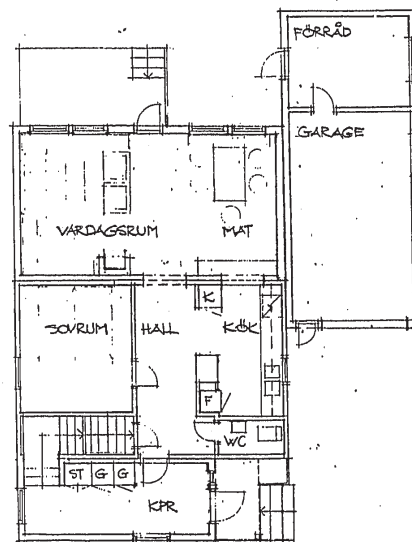


First floor

Bräcke 13:8  
Transformed building-Type A

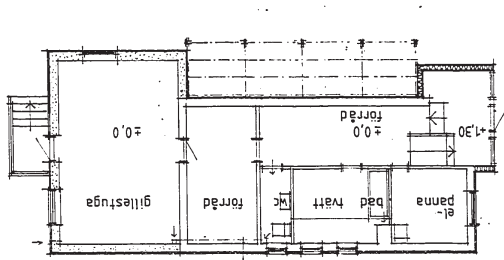


Ground floor

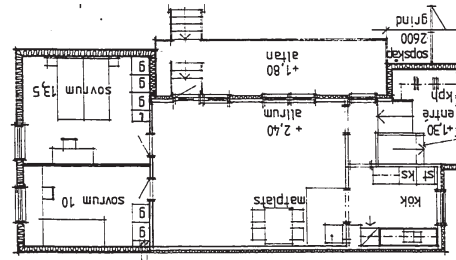


First floor

Bräcke 2:3  
Transformed building-Type B

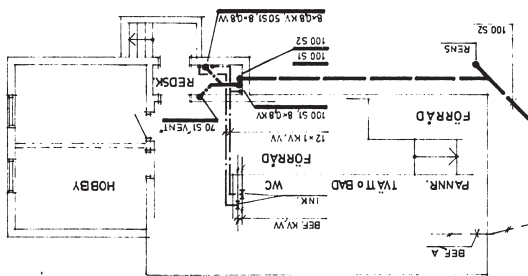


Basement

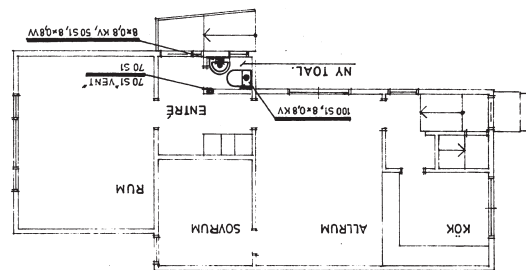


First floor

Bräcke 2:4  
Transformed building-Type B



Ground floor



First floor