# URBAN FLOW

"Designing the link between city and dwelling"

# Urban flow

**Advanced Housing** AR3AD100

**MSC Graduation studio 2024-2025**

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# 1

# Introduction

## Context

Since the Industrial Revolution, the number of people living in urban environments has grown significantly. Technological advancements and the need to house workers led to the fast and large-scale expansion of cities. While only 10% of the world's population lived in cities around 1800, today that number is approximately 50% and continues to grow (Ritchie et al., 2024). This also means that the demand for housing in cities keeps increasing, often resulting in housing shortages. In the Netherlands, the number of people living in urban areas is also rising; nearly 75% of the country's population growth is concentrated in large and medium-sized cities (Planbureau voor de Leefomgeving, 2019).

We are facing a housing crisis. In 2024, the housing shortage in the Netherlands has increased to over 400,000 homes (Ministerie van VRO, 2024). In response, the government has set a construction target: by 2030, a total of 900,000 new homes must be built (Ministerie van Algemene Zaken, 2023). The vast majority of these homes need to be constructed in urban areas, with a particular focus on the Randstad region, where over 330,000 new homes are planned. This sets a challenge for urban planners and architects to add housing within the built environment of the city; **Densification**.

# Problem statement

Parallel to the urban developments that led to housing shortages, dwelling design has undergone significant changes. It became increasingly important to use land more efficiently in order to build as many homes as possible on as little ground as possible. Combined with new construction techniques emerging from industrialization, increasingly large-scale and taller residential buildings were developed. In the last decades, modernists shifted their focus from creating the city and urban spaces to developing individual buildings (Gehl, 2013).

**"Modern life demands, and is waiting for, a new kind of plan, both for the house and the city."**
**- Le Corbusier (1924).**

They developed a new way of urban planning and vision for the city of the future (Williams, 1989) that meant the construction of large bordered conglomerations of dwellings (Dogan et al, 2020). Paradoxically their increasing size and ability to provide more homes for inhabitants showed their success as housing developments, however their resulting scale often created an unhealthy living environment for inhabitants (Harris & Ullman, 1945). The problem is that these closed off housing structures don't make healthy cities. The lack of "proximity" creates bleak and lifeless cities with empty public space (Hulsman, 2021).

Amsterdam is a prime example of a city where this problem materializes. The municipality chooses densifying with large scale housing structures as its strategy to solve the housing shortage. And while people come to the city to live in a highly urban environment that encapsulates the identity of Amsterdam, they end up living in these new, ever growing, generic dwelling blocks that turn their back on the city. So even though Le Corbusier's statement above comes from a different era and context of urban development, its essence is (ironically) still very relevant today.

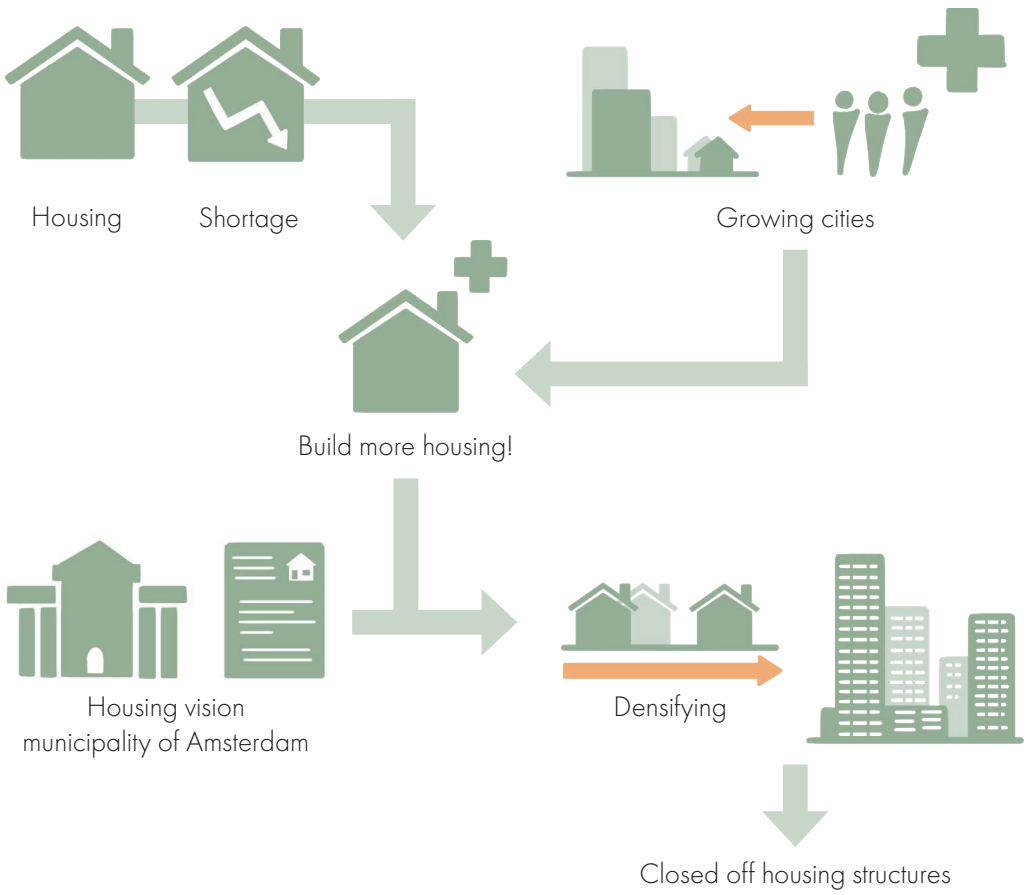



**Figure 1.1** Schematic overview of problemstatement (own work)

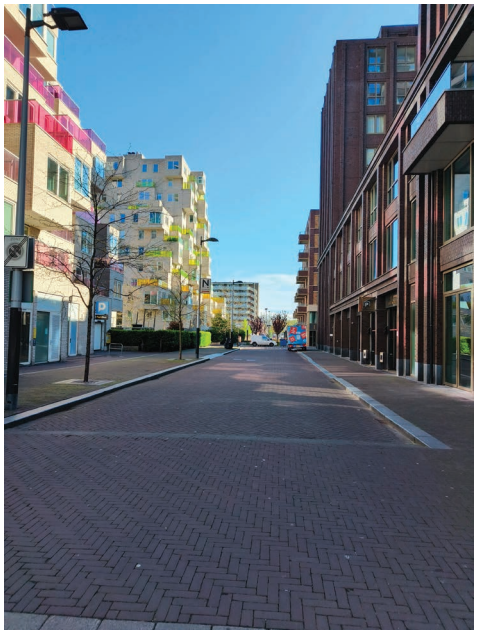
# Framework

Architects and urban planners face the challenge of designing cities that maintain the qualities of urban concentration while creating solutions for the problems that come with increasing scale and density. Therefore we need to move away from the current trend of large-scale, enclosed housing structures.

Architect Jan Gehl even states that high-rise residential towers are "the lazy architects' answer to population density" (Hulsman, 2021). He argues that an abundance of high-rise development leads to inhospitable cities. A good example of this is Amsterdam's Zuidas, where large glass facades with a few hidden entrances give the streets an eerily barren feel. Similarly, architect Rudy Uytenhaak states in his book Cities full of space (2008) that residential towers represent "dumb urban planning." He attributes this mainly to the lack of what he calls "proximity," where people are separated from everything the city has to offer.

The solution is complex, but in his book Building and Dwelling, Richard Sennett (2018) outlines a possible path toward better cities. He, too, believes we must move away from enclosed residential domains. He explores the idea of porous urban structures, where the spaces between buildings form a dynamic urban environment of both public and private spaces.

But could this idea also be applied at the building level? Are there ways to make large-scale housing structures more permeable, thereby strengthening the connection between living spaces and the city? These questions form the central theme of this research.



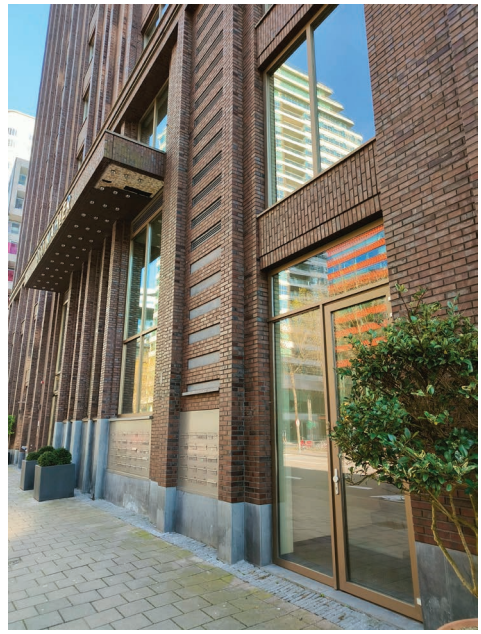


**Figure 1.2 - 1.3** Pictures taken at the Zuid-as in Amsterdam. Where the aim is to create a high density urban environment, closed of dwelling structures with a single entrance (right) create an empty city (left) where no interaction or urban flow takes place(own work).

# Research question and methodology

To research the integration of city and dwelling in Amsterdam, methodology, consisting of research questions and methods, is set up. The final aim of this research is to provide guidelines, reference and a contextual framework for designing a conceptual housing structure. The design proposal will address the issues created by large scale "closed off" housing structures and experiment with making these buildings more porous and permeable. The research question at the center of the research is:

**"How can porosity be applied on a building scale to create more permeable large scale housing structures to reconnect the dwelling to the city in Amsterdam?"**

To unravel this question, a methodology has been set up to organize and strategize the research. The methodology will consist of four components:

**Group research** , consisting of historical and morphological research, is done to create a contextual framework of Amsterdam. Historical research into urban and architectural development of the city will help to determine relevancy of all research in relation to the research themes and the context of Amsterdam.

Morphological research will help to understand the existing cityscape and suggest interesting case studies.

**A literature study** in the fields of architecture and urbanism establishes a theoretical framework. Through analyzing articles, books, and reports in the fields of architecture and urbanism the concept of urban flow will be framed in relation to the city of Amsterdam. It will explore the connection between city and dwelling through themes like, access, scale, space, movement and porosity.

Then several **case studies** into existing housing structures or housing concepts will analyze how the urban flows and design principles found in the literature have been, and are currently being, applied.

From literature and case studies a set of **design principles and concepts** will be formulated as a conclusion to the research. Positive qualities found in case study projects or through literature review will be combined in a database that will form the basis of the program of requirement for the design proposal. It will also serve as reference and check during the design process.

# 2

# Urban flow

## Introduction

In order to visualize and shape the future of urban living in Amsterdam, it is important to examine the value people place on living in a dense urban environment. What is the appeal of living in large cities, how is this reflected in Amsterdam, and what impact does it have on how we develop our cities?

The first cities were a consequence of a social and cultural change around 3000 B.C., when smaller agricultural communities started expanding into larger state-like societies. They could consist of thousands of people and were often controlled by a small elite that held political and military power. The state often had a central settlement where the economy, religion and organization of government were concentrated; the first cities (Smith, 2002).

Since then urbanization has been a central theme in human exploitation of land. Cities have become increasingly large and have drawn more and more people into urban environments. Historically there were several reasons why people wanted to live in cities (Childe, 1950);

- Trade and work opportunity
- Facilities and amenities
- Social organization and governance
- Safety and defence
- Religion and community

This chapter will explore these reasons in relation to the history of Amsterdam creating a better understanding of the appeal of urban dwelling and its impact on the development of Amsterdam.

# Trade and work opportunity

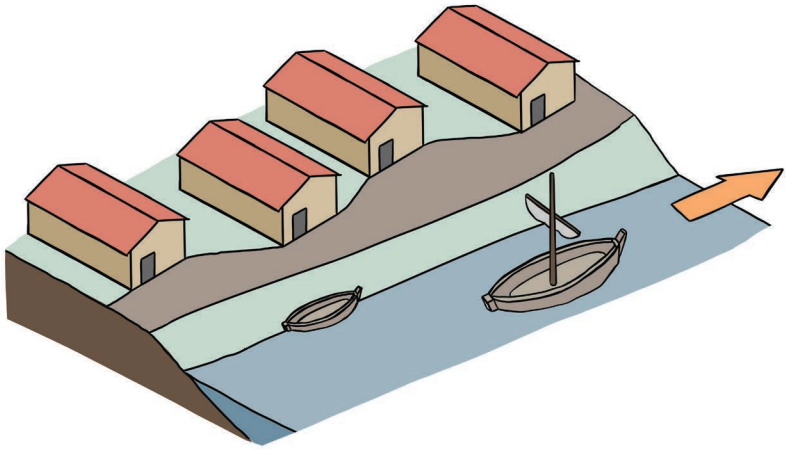


**Figure 2.1** Sketch of the trading potential of early Amsterdam (own work)

The development of Amsterdam as a settlement began shortly before 1200. A collection of houses arose on artificial mounds on both sides of the Amstel, where it flowed into what is now the "IJ". Archaeological findings indicate that the settlement was founded for the trade, production, and transport of goods (Gawronski, 2017).

At that time, the IJ was still directly connected to the Zuiderzee, providing Amsterdam with excellent access to the trade network of that time period. This connection provided a marketplace for local and foreign goods, which not only boosted the local economy but also facilitated cultural exchanges and the sharing of ideas and technologies. The concentration of trade activities in cities also led to the development of infrastructure such as roads, ports, and markets, which further reinforced the appeal of living in an urban environment (Mark, 2024).

Trading opportunities made the city into an economic hub, offering a concentration of jobs and providing opportunity for work across diverse industries. From entry-level positions to specialized careers, in for example a guild, urban areas such as Amsterdam presented more employment opportunities than rural areas.

Amsterdam has a long history of workers migrating to the city, both national and international (Kuijpers, 2005). Additionally the city hosted a variety of educational opportunities, which attracted people who wanted to learn a new craft or receive specialized training for a job. The opportunities for work and educational advancement made, and still make, the city an attractive place to live for many people.

**People don't come to cities for housing, they come for jobs which is why they are willing to sleep on the road.**
**– Charles Correa (Gehi, 2013)**

Housing of workers was also a major driver of urban expansion. In the 17th century districts like the Jordaan and the continuation of the canal belts were developed to house those who labored in the city (Borger et al, 2013). At the start of the 20th century urban plans like "Plan Zuid" by Berlage and "Het Algemeen Uitbreidingsplan (AUP)" by Scheffer, Van Lohuizen and Van Eesteren, were developed to provide better housing for the working class. The industrial revolution, after all, came with a variety of social injustices that drove architects and urbanism to re envision housing for the lower classes (Arcam, 2021).

# Facilities and amenities

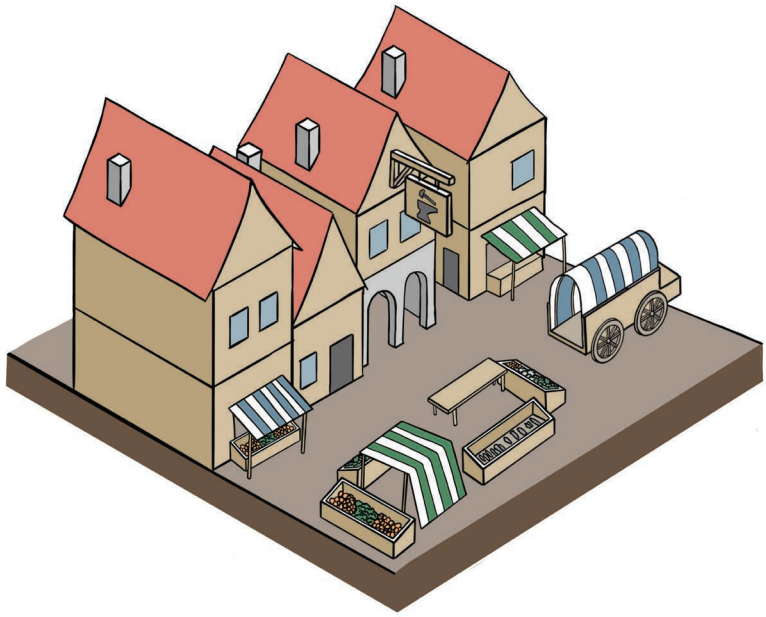


**Figure 2.2** Sketch of facilities and amenities (own work)

A city environment allowed for a shift from subsistence living to specialized labor. Before people agglomerated in cities, small(er) communities would often produce just enough resources, such as food, clothing, and shelter, to meet their basic needs without surplus for trade or sale. They typically did this through farming, hunting and gathering. The primary focus for people was on survival and day-to-day living rather than generating wealth or accumulating goods (Roberts, 1982).

Because many people lived close together in Amsterdam, not everyone needed to be occupied with these basic needs. Additionally, Amsterdam's trade provided a great variety and quantity of available resources (Lesger, 2001). This meant that people could start specializing in other tasks.

Craftsmen and artisans began to expand on their skills, producing goods like pottery, textiles, and metalwork, which could be traded for other necessities or luxuries.

People could focus on developing and managing infrastructure such as roads or public sanitation.

This great variety of specialized products and services drew people from the surrounding areas. This creates a continuous loop of growth: The more people came to the city, the greater the possibility for further specialization, and the more facilities were established in the city, attracting even more people (Jacobs, 1969). This growth also had a positive impact on the job opportunities and the trading capacities mentioned in the last sub-chapter.

Specialization also allowed for more efficient production and innovation, as people could develop and refine skills in their chosen professions. Artisans could experiment with new techniques, merchants could explore new trade routes, and scholars could advance and exchange knowledge in various fields, driving advancements in technology, arts, and sciences.

The concentration of diverse talents and resources in the city not only enhanced the quality of life for their inhabitants but also contributed to the broader progress of human civilization (Roberts, 1982).

Nowadays the city still offers a wide range of services that enhance the quality of life, such as public transportation, healthcare facilities, entertainment venues, and recreational spaces. Public transportation systems, like buses, subways, and trains, provide convenient and efficient travel options, reducing the need for personal vehicles and the associated costs. Additionally, the city is a cultural melting pot, offering diverse dining options, museums, theaters, and sports events, which contribute to a vibrant and dynamic lifestyle. But most important is the proximity. In the city all these facilities and amenities are near each other and close to the dwelling which makes them accessible (Allam et al, 2023).

The concept of proximity is also one of the reasons the municipality of Amsterdam envisions a city with multiple city centers. Currently the city is unbalanced with a lot of facilities and amenities located in the old city center. Due to its explosive growth the size of the city is now so large, the city center is not within proximity for a lot of the outer urban housing districts. The solution? Develop more smaller city centers throughout the city, providing everyone access and proximity to facilities and amenities (Gemeente Amsterdam, 2021).

# Social organization and governance

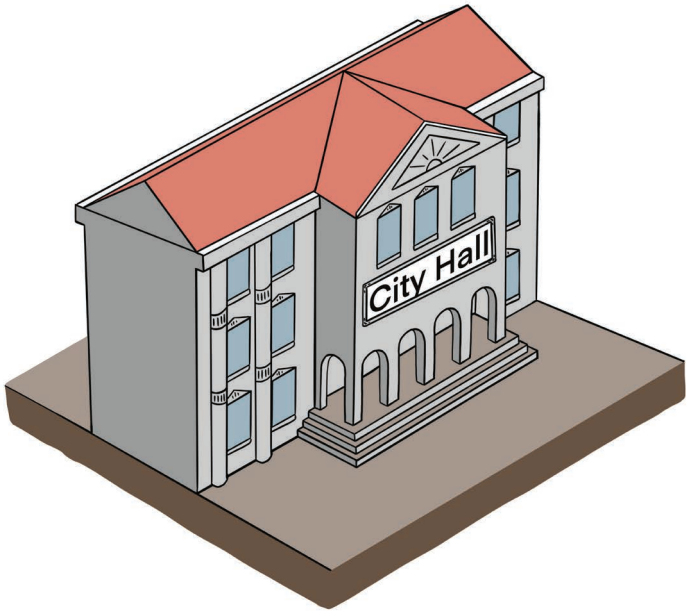



**Figure 2.3** Sketch of social organization and governance (own work)

In the early history of urban expansion there emerged a need for administrators and government to manage the growing complexity of urban living. They had to maintain public order, oversee trade regulations, infrastructure projects and urban development. The concentration of people facilitated the establishment of political institutions, legal systems, and administrative mechanisms. This centralization of power and administrative functions drew people involved in governance, law, and military functions to urban areas (Encyclopaedia Britannica, 2024). It also allowed for a more efficient administration and the implementation of policies that could sustain larger populations.

Amsterdam started off as an independent city state, self-governed by a Vroedschap. A council of prominent citizens and merchants. responsible for making laws, collecting taxes, and administering justice. The the Vroedschap was not elected but appointed

from the circle of the cities elite, resulting in an oligarchic governance. The Vroedschap also selected the mayors and aldermen (judges) of the city (Gawronski, 2017).

This form of governance also had its downsides. In the 19th century urban expansion in Amsterdam had come to a standstill. The sanitary facilities were in a poor state due to poor governance with unhealthy living conditions as a result. During this time the Reveil movement took place in Europe. One of the core values of the movement was to address the social problems of the day, such as lower class housing, poor living conditions, education, and care for the vulnerable. This led to the founding of charitable organizations, housing associations, and other philanthropic initiatives (Historama, 2019). In 1852 the first non-profit housing association in the Netherlands was established. Iit was founded by private individuals and was named "Association for the Benefit of the Working Class in Amsterdam" (V.A.K.).

The idea was that poor housing conditions and overcrowding led workers to the streets and into taverns, where they would turn to alcohol and potentially fall into immoral behavior.

By providing better housing, they hoped to encourage family life and proper behavior. However, they did not aim to build large-scale working-class neighborhoods. Instead, they wanted to keep workers separated to avoid negative influences on each other. As a result, there were no communal facilities like workshops, kitchens, or dining halls, which were common in low-cost housing at the time (Historama, 2019).

At the end of the 19th century the municipality started contributing to social housing, and in 1901 the new "woningwet" went into action. This law set standards for the construction and maintenance of homes ensuring they met basic health and safety requirements. The law also allowed municipalities to develop public housing projects (Taverne, 1981). These social movements and legislations improved the living quality for lower class citizens in Amsterdam making the city a more attractive living environment.

In 1975 Amsterdam lost its privileges and was subjected to the central government in the Hague. The history of self-governance and ownership is nevertheless still very tangible as the municipality holds a lot of influence in urban administration and development.

# Safety and defence

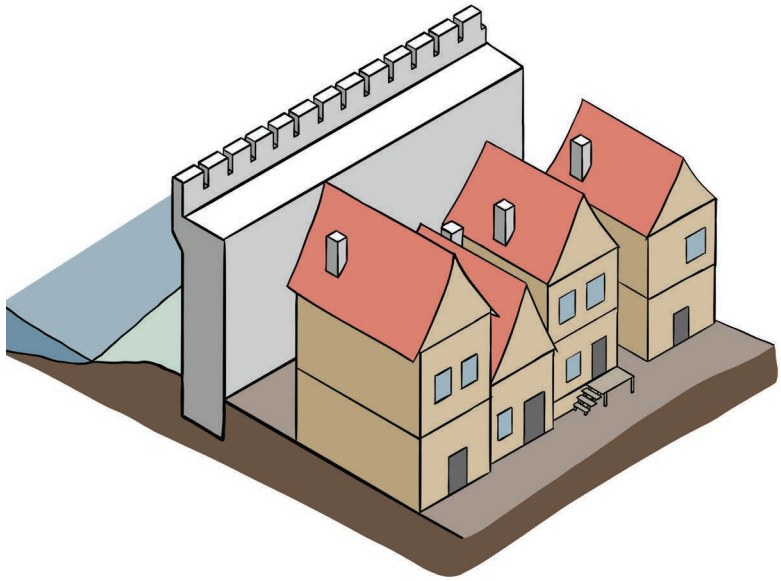


**Figure 2.4** Sketch of a city wall and moat, providing safety (own work)

A very early and practical reason for people to live in the city was that they provided safety, as they were often fortified with walls and other defensive structures to protect inhabitants from invasions and raids. The concentration of population within a protected area allowed for more efficient defense and coordination against external threats. As cities grew, they often became administrative and military centers, to maintain control over their surrounding territories (Mark, 2024). As the city was also an administrative center law enforcement and maintenance social order were much more prevalent, providing safety for inhabitants.

The first fortifications of Amsterdam date back to the 13th century when the city was just a small trading settlement. These early defenses were simple earthen walls and wooden palisades designed to protect against local threats. As Amsterdam grew in wealth and importance, particularly in the 16th and 17th centuries during the Dutch Golden Age, its fortifications were significantly expanded and improved. The city constructed a series of bastions and ramparts, along with extensive canals that served both as transportation routes and defensive moats.

The development of fortifications often went hand in hand with expansion of the city, for example the creation of the Canal Rings (Borger et al, 2013).

Nowadays the feeling of safety mostly consists of social control. With a high concentration of people in public spaces "a lot of eyes on the street" creates a feeling of security. Additionally, urban areas often provide quick access to emergency services like hospitals, fire stations, and police, which enhances the feeling of safety (Blokland, 2008).

# Religion and community

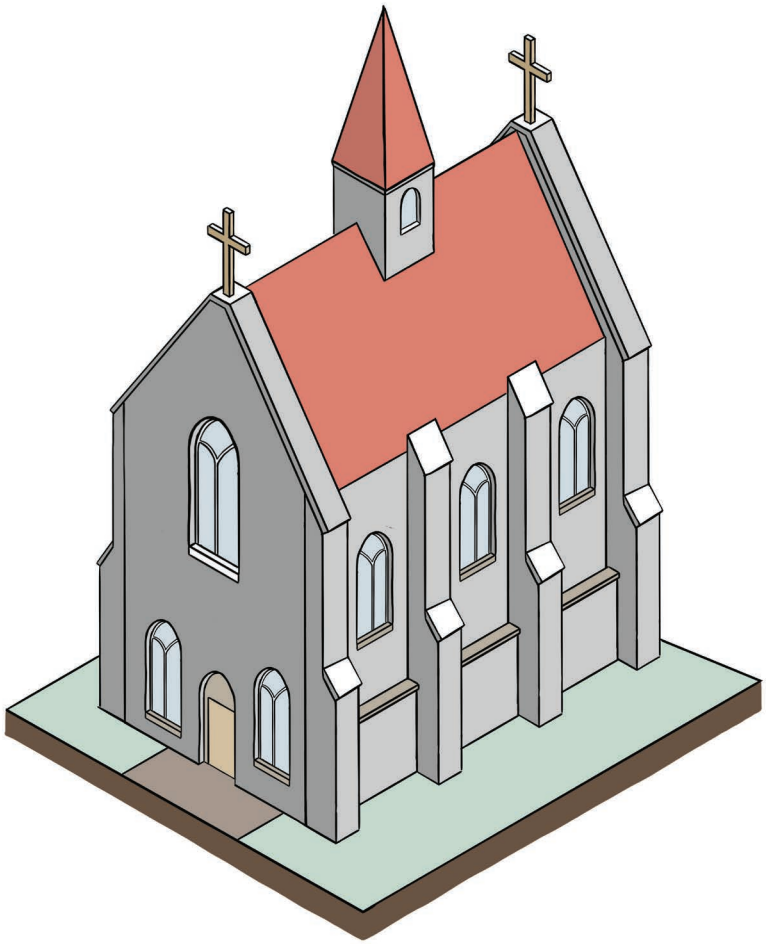


**Figure 2.5** Sketch of a stone church inspired by the "Oude Kerk" (own work)

Many ancient cities were built around religious temples, shrines, or other sacred sites. They were an important reason for people to visit and live in the city (Taylor, 2018). The larger the city, the larger and more diverse the religious congregations, providing more opportunities for communal worship and religious education.

The presence of religious institutions also played a role in political and social life. For many people living in a city meant joining a like-minded religious or cultural community, fostering a sense of belonging and mutual support, which could be harder to find in rural areas. This sense of community also helped newcomers settle in and integrate into urban life more easily.

Urban areas also had more resources and financial capacity to build religious facilities such as churches. In 1295 one of the first stone buildings in Amsterdam was constructed; the Old Church.

Nowadays Amsterdam is home to around 265 buildings where people come together for a religious purpose (Gemeente Amsterdam, 2014). A wide variety of churches, mosques, synagogues, temples provide inhabitants with a place of worship and a place to congregate with their community.

Amsterdam has developed a reputation for religious tolerance giving everyone the opportunity to take part in religious communities. Because of the large number and diversity of inhabitants the city also houses a lot of non religious communities. People living together based on their interests, values, profession or life phase (for example students or elderly people) creates a sense of belonging and draws people to the city.

# Urban flow

## Conclusion

It is clear the city has a lot to offer to its inhabitants in the form of jobs, amenities, social organization, community and safety. A dynamic lifestyle interaction, liveliness and opportunity, that appeals to people and draws them to urban environments. A certain density of people is needed to bring all these elements together in a city. This also means that there must be housing to accommodate all these people.

In the 20th century, modernism led to an increased separation of functions in urban development. This often manifested in large suburbs where the primary function was residential, while the elements that shape the urban flow of the city were typically located in its core(s).

As a result, housing became disconnected from the urban flow, making living a private affair separated from the bustling urban life. Integrating housing into the urban flow of the city remains a key challenge in the development of residential areas in Amsterdam. How does housing blend with work, facilities, community, social organization, and safety to create a dynamic urban life within Amsterdam's urban flow?

“Cities have the capability of providing something for everybody”
- Jane Jacobs (1961)

# 3

# Access and scale

## Introduction

An important part of the integration of dwellings into the Urban Flow of Amsterdam is access. How do people transition from the city into their home, how do different access typologies affect this, and what role does the ever increasing scale of residential buildings play?

To gain a better understanding different access typologies throughout the history of Amsterdam were analysed:

- Street
- Courtyard
- Portico
- Gallery
- Corridor
- Elevator

For each acces typology the following themes will be explored:

- Historical context
- Spatial construction and functionality
- Social impact
- (Interesting example projects if deemed relevant)

While the order of typologies is not completely chronological, it does follow the history of Amsterdam, displaying the increasing scale of access typologies over time. The research is oriented towards Dutch housing design, but examples from other places might be used to illustrate functionality etc.

The chapter will conclude with a look into two subjects that are currently relevant:
The impact of public plinths, used in large scale residential buildings, on dwelling access and the potential future of scale and access.

# Access by Street

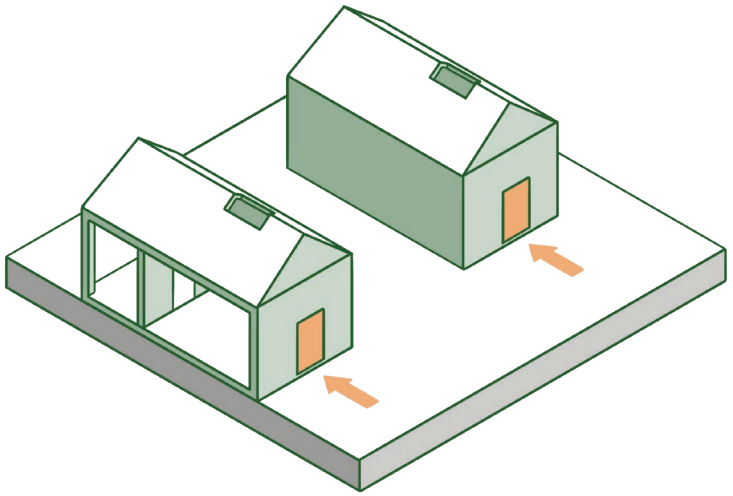


**Figure 3.1** Schematic analyses of the first houses in Amsterdam (own work)

**Historical context:**

The first houses in Amsterdam were built on mounds that flanked the river banks of the Amstel. As the settlement grew, it expanded along the river. Houses were connected to a road that was built on dikes that were constructed besides the river. The houses often consisted of a single room where all living activities took place; living, eating, sleeping, etc. Some houses had a secondary room that functioned as a workshop. As Amsterdam was a trading settlement the production and processing of goods provided people with their livelihood (Gawronski, 2017).

City expansion led to a larger network of streets, connected to the city center at the Dam. Technical advancements such as the invention of chimneys and a new way of making foundations, so called "sliet fundering" enabled the construction of larger multi story houses (gemeente Amsterdam, 2022). It also meant houses could be built directly next to each other and share a wall and foundation (gemeente Amsterdam, 2023).

As houses grew the floorplan changed with different configurations and a larger variety of rooms. To have a front door with street access remained a very popular typology in Amsterdam throughout the 19th and 20th century. Ground-based homes were built in many shapes and sizes, for example: Row-houses that were accessible directly from the street or separated by a small front garden which can be found in many large residential areas and urban developments.

During the industrialization of Amsterdam the quest for space efficiency in housing construction led to the development of stacked upper and lower dwellings. In this typology the bottom dwelling is accessible via the street through a front door. The upper dwelling is stacked on top and accessible through a front door with a staircase behind it that covers one or more floors. It creates an interesting view from the street, where four or sometimes even six front doors were directly next to each other on the ground level (van Es & Voerman, 2019).

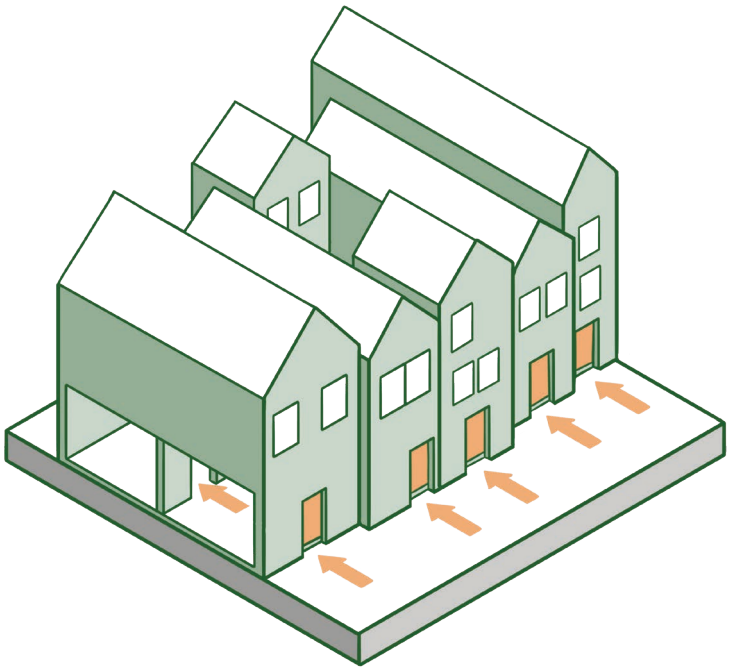


**Figure 3.2** Schematic analyses of the front and back house (own work)

**Spatial construction and functionality:**

With different times came different scales of housing and different floorplans. The single room dwelling evolved into a two room configuration where a front room and a backroom separated the house in a public and private part. This typology was seen in many houses in medieval Amsterdam, even the famous "grachtenpand" typology is derived from this principle.

The front room bordered directly on the street and was very accessible with people simply being able to walk in. It was seen as a part of the street and was thus used for the reception of guests or used to keep a store or workshop (Pierik, 2023). The backroom was used for more private functions like sleeping (see figure 3.3).

When new building materials and construction techniques allowed for larger and multistory dwellings to be constructed, more and more functions were separated in the floorplan. The front room was split into an entrance hallway, often containing a staircase to the upper floors, and a living room. The back room could be divided into a kitchen, dining room, private lliving room etc. while bedrooms moved to the upper floors for more privacy (van Elburg, 2022).

**Figure 3.3** *(Stadsarchief Amsterdam, 1834)*
Drawing of the front house of a canal house at the Prinsengracht.

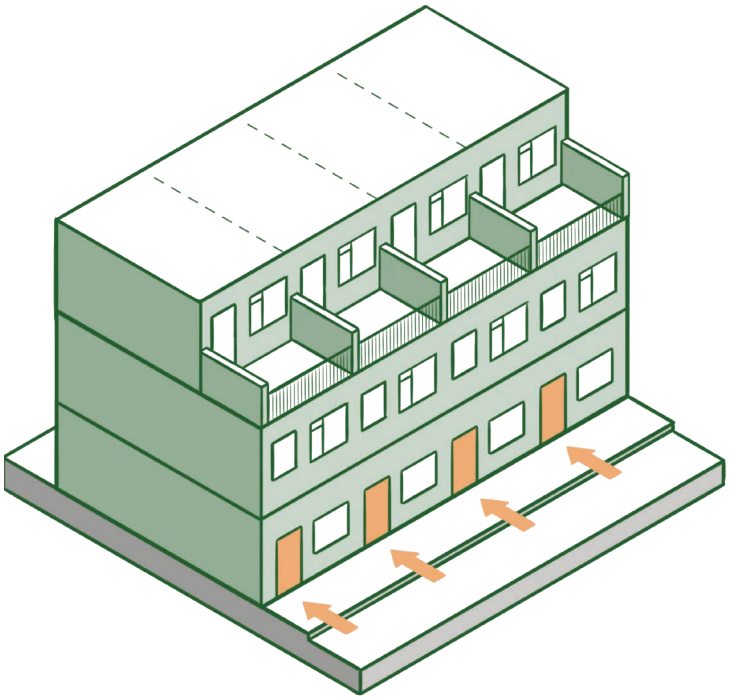


**Figure 3.4** Schematic analyses row house with direct street access (own work)

In the "grachtenpand" typology this separation was sometimes so extreme that the front house and backhouse could be completely separated by an outdoor patio. This also allowed for more light to enter the dwelling. These buildings often also had a rear access in the back of the house that connected to smaller alleys that divided the building blocks. It was a more private way to access the back rooms.

In the 19th and 20th century many floorplan configurations and typologies with street access were developed, but the basic concept remained the same. An entrance hallway provided access to the living spaces on the ground floor and bedrooms and bathrooms on the upper floors, a clear cut separation based on privacy.

**Social impact:**

Accessing the dwelling by street remains one of the most common access typologies. From the first medieval houses in Amsterdam, the canal houses in the 17th century, the row houses in the late 19th and early 20th century, the "bloemkoolwijken" in the 70's

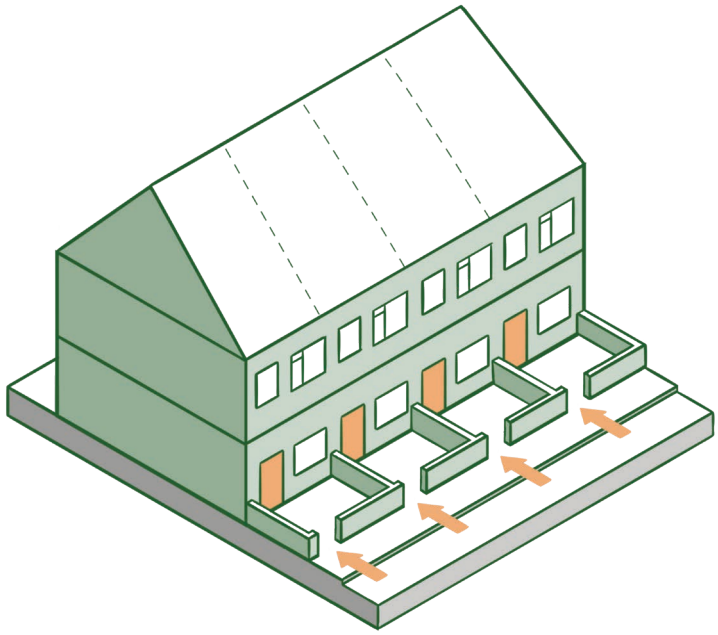


**Figure 3.5** Schematic analyses row house with front garden access (own work)

and 80's of the 20th century, to the duplex dwellings in vinex neighbourhoods, access by street has remained a fundamental typology in Dutch housing development (see figure 3.4 & 3.5). This shows the cultural importance Dutch people place on having a front door with direct street access. Over time street access had become more and more privatized.

Where in medieval Amsterdam the front house primarily had a social function where people could meet and interact with the street, contemporary ground-level homes are often separated from the street by a small front garden. If the house is directly adjacent to the street, this is often accompanied by frosted windows or closed curtains. The entrance of the house is also a separate hall that serves as a buffer zone between the public street and the private home, and often functions as a climate buffer to prevent drafts.This trend shows a certain inclination to live a more private and secluded life in the dwelling.

# Access by Courtyard

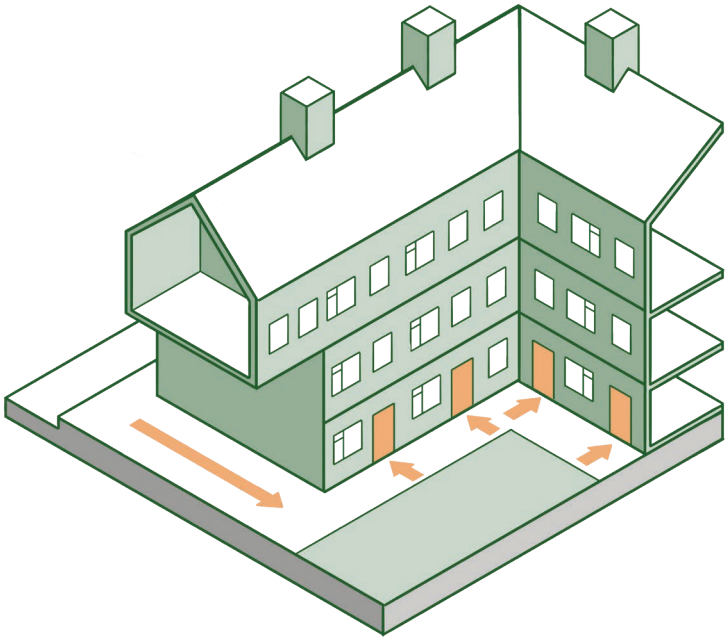


**Figure 3.6** Schematic analyses of gallery access (own work)

**Historical context:**

The courtyard as an access typology has its origins in ancient times, mostly in warmer climates, where it served a climatic function as well as a social space. The courtyard was used a lot in antique Greek and Roman architecture, both in residential and public buildings.

The courtyard typology had a resurgence in Islamic culture (Taleghani, 2015), where the dwelling was considered a very private space, the courtyard served as an outdoor space within the private confines of the house. A safe space, shielding residents from the city, making it a popular housing typology (Edwards, 2006). During the renaissance the courtyard also regained popularity in western Europe. In denser urban areas, with larger building blocks, a shared courtyard could provide multiple dwellings or larger building complexes with an outdoor space that maintained privacy from the city.

In the early history of Amsterdam the courtyard, or "hofje" typology, was rare due to small building plots and spaces between buildings that were too narrow or completely built shut. Yet, in the 17th century, the courtyard emerged as a housing typology for poor single elderly people (see figure 3.7). They could live together and often received care and food (Gemeente Amsterdam, 2019). In the 19th and early 20th centuries the city was expanded in response to the urbanization and industrialization of Amsterdam. Overcrowding and poor living conditions caused architects to explore new housing solutions. Inspired by the English garden city movement and earlier courtyard designs in other Dutch cities , new courtyard variants were developed to provide affordable, healthy living environments for the working class while fostering a sense of community and privacy (Wilms Floet, 2014) .

**Figure 3.7** *(Gemeente Amsterdam, 2019)*
Picture the Sint Andries courtyard in Amsterdam, originally constructed in 1614.

**Spatial construction and functionality:**

Courtyards were also an increase in scale from individual dwelling development. Instead of creating individual housing that connected to the street, a larger arrangement of dwellings was constructed around the courtyard. The courtyard is often a central point of circulation in a residential complex, connecting multiple homes. The courtyard connects to the street via a gate or passage. This creates a buffer and provides a more calm outdoor environment between the house and the street. While it is a very sheltered way of living it also causes houses to turn away from the street creating building blocks that are very internally oriented and don't have much interaction with the street besides the courtyard entrance (see figure 3.8).

**Figure 3.8** *(Stadsarchief Amsterdam, 2009)*
Pictures of street facade, courtyard entrance and courtyard interior with dwelling access. Concordia north courtyard in Amsterdam in the Jordaan neighbourhood.

The layout around the courtyard and the design of the courtyard itself are often flexible, depending on the intended use and function of the space. In addition to serving as a circulation area, the courtyard is often a community-oriented space. Residents can gather there and use the outdoor space individually or collectively, for example, by placing furniture, sharing gardens, or bicycle storage. In a densely built environment, the courtyard can also contribute to natural light, fresh air, and ventilation for the surrounding homes.

**Social impact:**

The courtyard is an inherently socially oriented access typology, originally meant for people that were deemed vulnerable at the time; elderly people or single women etc. The living quality it provided for inhabitants has made it a popular typology for a broader population.

The courtyard shelters people from the busy city and creates a transitional space between public urban life and the privacy of home. It supports social cohesion by enabling inhabitants to meet and share functionality of the space.

# Access by Portico

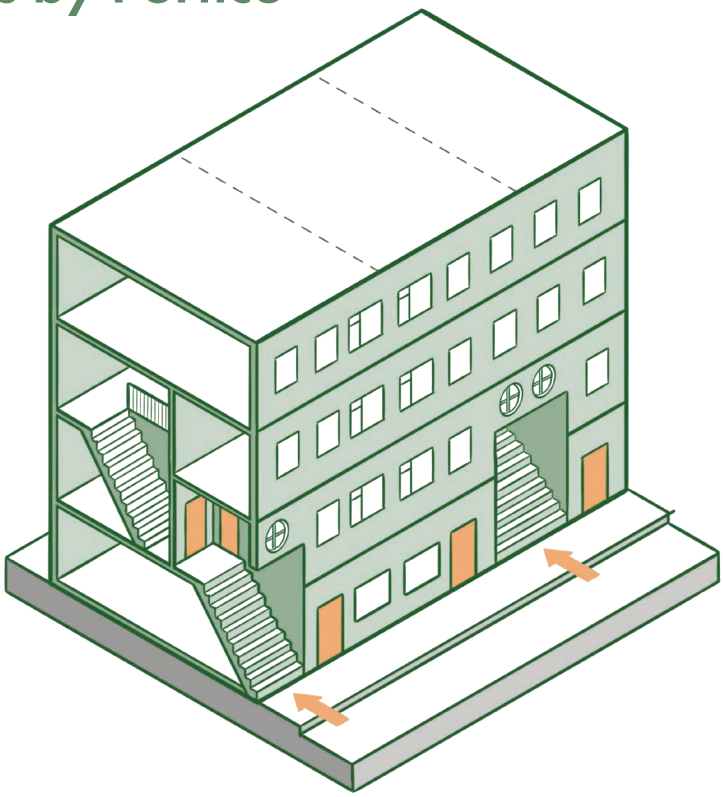


**Figure 3.9** Schematic analyses of the "Haags portiek" access (own work)

**Historical context:**

The first portico dwellings were constructed in the late 19th and early 20th century. Around that time, technical advancements led to the development of new building typologies with stacked housing, especially in large scale workers' housing, as this allowed for more homes to be built on a smaller footprint. The portico emerged from the necessity to provide space-efficient and safe access to these stacked homes.

It offered a practical solution to connect multiple dwellings to a central street accces. Which in turn had minimal impact on public space.In combination with standardization in building systems and floor plans, especially the portico enabled a typologie that was used to create a lot of housing using less space. This was very useful in the post war period during the reconstruction (Oorschot, 2021).

**Spatial construction and functionality:**

There are different types of Portico access, this subchapter discusses both the "Haags portiek" and the portico as an internal entrance hall with a vertical core containing a staircase and/or elevator.

*"Het Haagse portiek":*
One of the most well-known forms of portico housing is the "Haags portiek" (see image 3.10). Architects and urban planners in The Hague were looking for new ways to provide access to serial residential buildings with stacked apartments. Residential buildings in cities like Amsterdam and Rotterdam had shown that the use of internal stairs for shared access posed fire hazards and was considered unsafe. An external stone staircase proved to be the solution and was also more efficient in terms of its impact on the apartment layout. Additionally, the municipality of The Hague decided in the 1920 building regulations that each apartment must have access to the street (van der Pennen, 2020).

The spatial configuration of the "Haags portiek" consisted of a stairway leading to an external landing. Four apartments could be accessed from the landing (see figure 3.9). On both sides of the landing, apartments on the first floor were accessible. At the end of the landing, two front doors led to internal staircases that provided access to apartments on the second floor.

**Figure 3.10** *(van Zeijst, 2024)*
Photo of a "Haags portiek" with the corresponding house numbers next to the stairs.

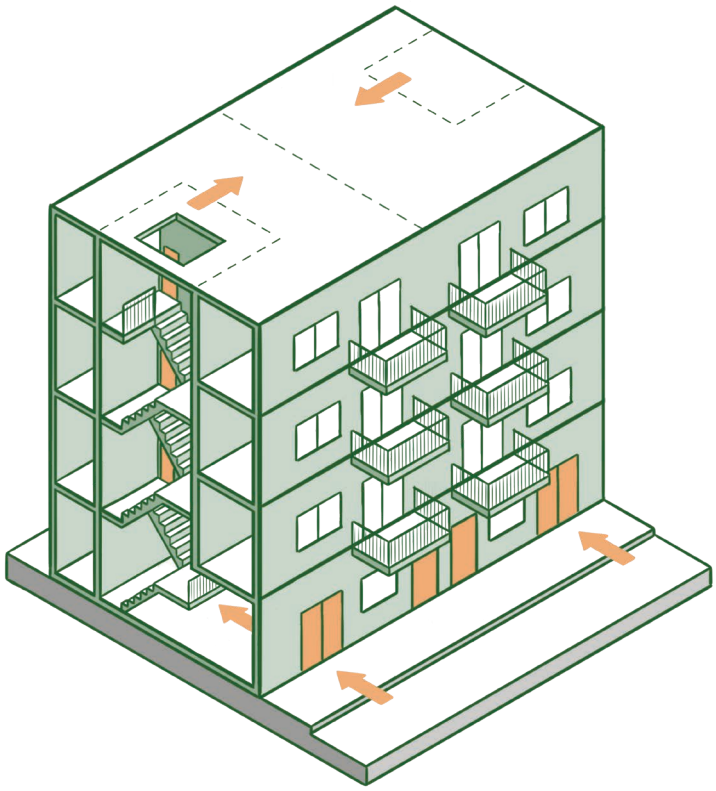


**Figure 3.11** Schematic analyses of vertical portico access (own work)

*Vertical internal porticos*

In Amsterdam, stacked apartments were often accessed internally. This was done either for each apartment via a front door on the street with internal stairs (see subsection "Access by street"), or clustered through an internal portico, which consisted of a hallway and a central staircase serving multiple apartments (see figure 3.11). Where the "Haags portiek" could only provide access up to three story buildings, the central internal portico could reach up to five floors, increasing the amount of dwellings that could be accessed.

The primary function of the portico was, of course, access, but it also served as a transitional space between the city/street and the home. In this way, the portico could act as a communal buffer zone, offering residents a certain degree of privacy. In larger complexes, the portico could also become a meeting space, although it was often a passive area without active social functions.

**Figure 3.12** *(van de Ridder, n.d.)*
Photos of the portico entrance hall with staircase and the front door of the dwelling connected to the portico staircase.

**Social impact:**

The portico provides a space for residents to meet each other without fully intruding into each other's private lives. This can help create a sense of community among people living in the same portico. However, the standard morphology of the portico offers little space for shared activities in the stairwell, and the hallway between the staircase and the street is often too small to truly serve a communal function. At the same time, a poorly designed or poorly maintained portico can create a sense of anonymity and insecurity, especially if the space is too dark or impersonal.

# Access by Gallery

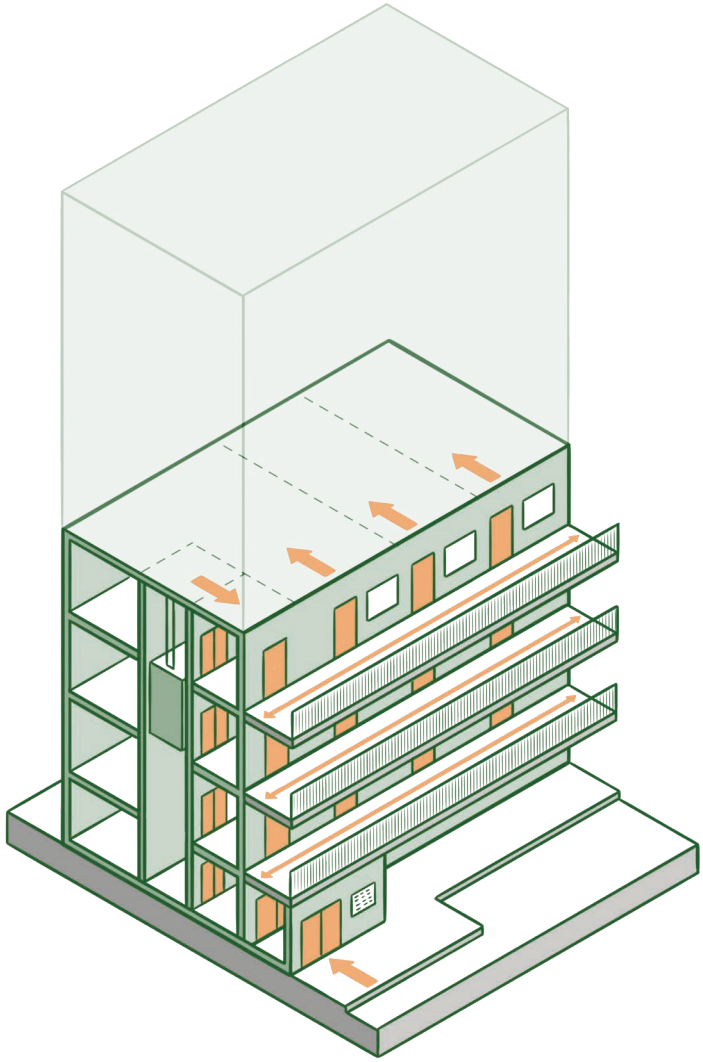


**Figure 3.12** Schematic analyses of gallery access (own work)

**Historical context:**

The gallery as a circulation type emerged in the late 19th and early 20th century, particularly in social housing projects and modernist architecture. The idea behind the gallery was to create an efficient and cost-effective way of providing access. The vertical portico could provide access to a limited amount of dwellings per floor, and by adding a connected horizontal route more dwellings could be integrated with minimal internal circulation space.

One of the first examples in the Netherlands of a gallery access was constructed at the Diergaardesingel in Rotterdam. From the street a stairwell led to a short outdoor gallery to which two dwellings were connected. (Rotterdam Woont, 2023).

The new typology meant a possibility increase in density, especially when the elevator became more standard and increased the range of vertical access. In the reconstruction after the Second World War large scale gallery flats offered a solution to the housing shortage, as they were an easy and cheap way to realize a large amount of dwellings in a short time.

**Figure 3.13** *(Rotterdam woont, 2023)*
Picture of gallery appartments on the Diergaardesingel in Rotterdam, 1964

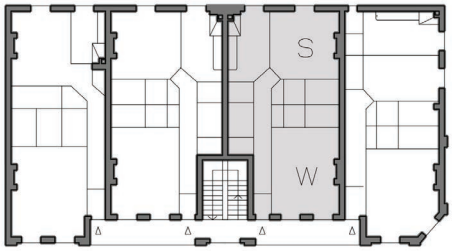



**Figure 3.14** *(Rotterdam woont, 2023)*
Floorplan of gallery access. Central portico with stairs connects to the gallery, which provides access to four dwellings.

**Spatial construction and functionality:**

The gallery often has an elongated shape that not only defines the way circulation occurs in the building but also influences the building's morphological design. These elongated blocks, in turn, affect how the buildings integrate into the urban fabric. Galleries are often seen in urban plans that apply "strokenbouw" (lineair blocks), as seen in projects such as the Bijlmermeer in Amsterdam or the Ommoord district in Rotterdam (see figure 3.15 & 3.16).

The primary function of the gallery is access, typically through a narrow, continuous route that connects the various apartments with a central core. In "strokenbouw", galleries are often located on the exterior of the building. However, it is also possible for the gallery to be situated within a facade or a semi-open facade. A notable example of this is the renovation of the Overtoomsehof in Amsterdam (see figure 3.17).

In the case of a closed building block, the gallery is often located on the inside of the block, facing the courtyard, as in the AMST building, completed in 2023 next to Amsterdam Amstel Station (see figure 3.18).

**Figure 3.15** *(Bijlmermuseum, 2015)*
Picture of the construction of the linear blocks in the Bijlmermeer.

**Figure 3.16** *(Stadsarchief Rotterdam, 1968)*
Picture of linear gallery flats in the Ommoord district in Rotterdam

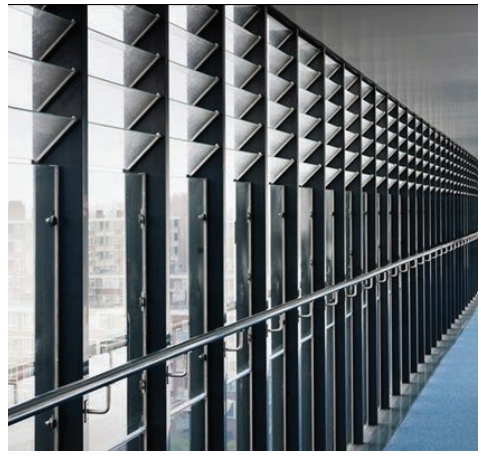


**Figure 3.17** *(Architectenweb, 2012)*
Exterior and interior view of the new gallery facade in the Overtoomshof by Hooyschuur Architecten.

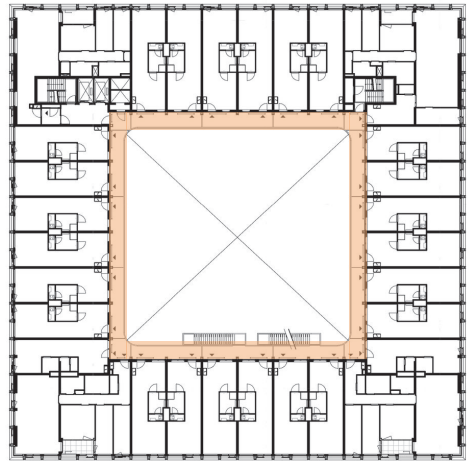


**Figure 3.18** *(Archello, 2023)*
Picture (van Duivenbode, 2023) and floorplan (VenhoevenCS architecture + urbanism, 2023) of gallery position within the building block of the AMST project highlighted in orange.

**Social impact:**

The gallery not only provides access to the apartments but can also serve as an important social element within the building. It can be used for communal and personal activities, such as meeting the neighbours, placing furniture, plants, bicycles, etc. In some cases, this is even intentionally designed, for example by combining the gallery with a balcony function for the adjacent apartments. Two examples of this are the Anapolis city garden project in Rotterdam (see figure 3.19) and Het Buro in Gouda (see figure 3.20).

The open structure of the gallery has both advantages and disadvantages. Advantages include the direct connection of the apartment to the outside air for ventilation and light intake. It also offers possibilities for easy social interaction between residents, providing space for spontaneous encounters that can create a sense of community. The main disadvantage can be a loss of privacy. Privacy is a key concern in gallery flats because residents often walk directly past the apartment and are able to view the interior adjacent to the gallery. This can result in inhabitants having their blinds or curtains permanently closed to preserve privacy, which in turn can cause a certain anonymity (see figure 3.21).

**Figure 3.19** *(Schaatsbergen, 2020)*
Picture of gallery with an integrated personal balcony in Anapolis city garden by HRH Architecten

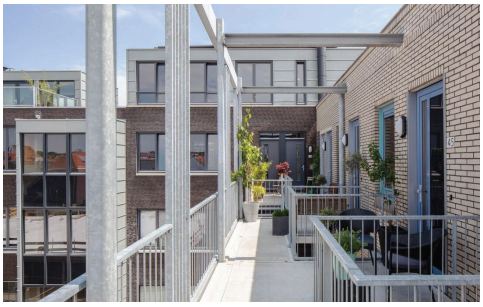


**Figure 3.20** *(Schaatsbergen, 2020)*
Picture of gallery in the Buro flat in Gouda by Kokon architectuur & stedenbouw.

Additionally, the gallery can contribute to a sense of social control over the adjacent public space. The visibility of the galleries and the people using them, as well as the ability for residents to observe the public space from the gallery, contribute to this.

**Figure 3.21** *(Niessen, 2019)*
Picture of the gallery of the L-flat in Zeist. It shows how a gallery can also be a anonymous and uncomfortable space.

It also demonstrates how small dimensions force people to walk directly next to the dwellings and being able to look inside.

**Interesting example project(s).**

In the Justus van Effen block in Rotterdam, the gallery has been designed and constructed with extra width. This creates, in a way, an elevated street to which the apartments are connected. In the Justus van Effen block, there is only one gallery on the second floor, but the idea of considering multiple galleries as a stacked series of streets along the building could provide interesting possibilities for designing access.

**Figure 3.22** *(Stadsarchief Rotterdam, 1950)*
Picture of the extra wide gallery in the Justus van Effen block. It was possible for the milkman to bring his cart on the gallery.

# Access by Corridor

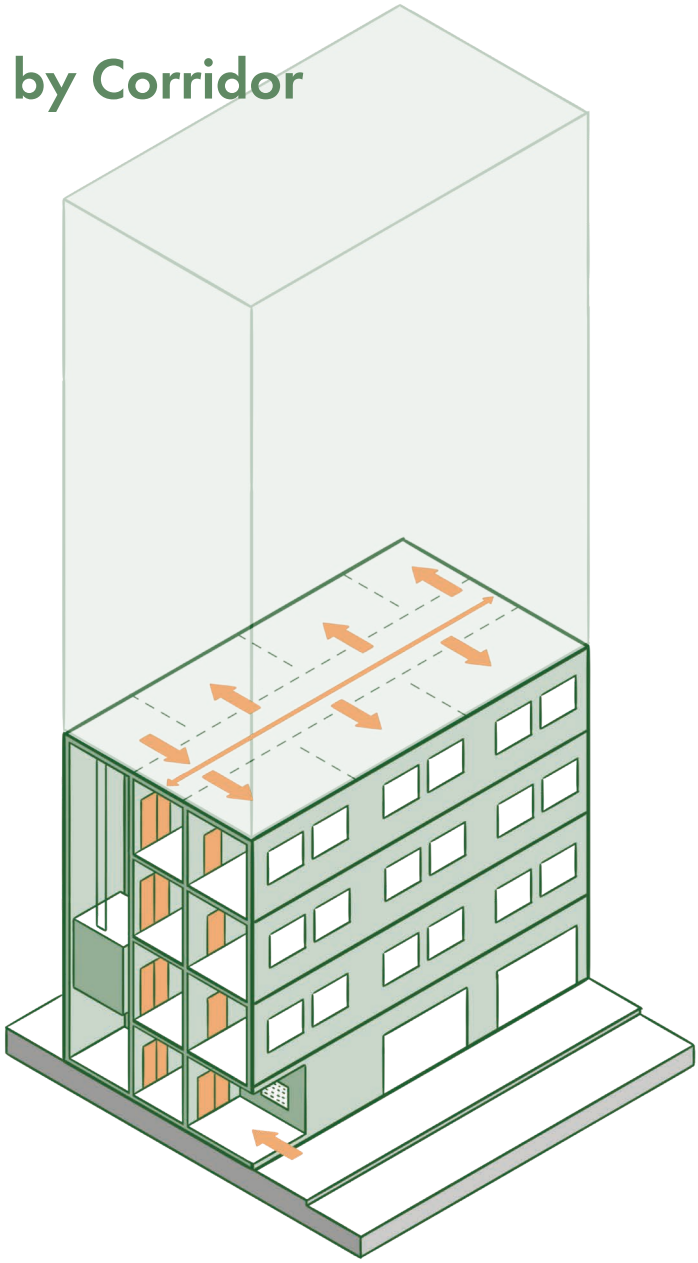


**Figure 3.23** Schematic analyses of large scale corridor access (own work)

**Historical context:**

The corridor finds its origins in early temple and castle architecture, where long passageways were constructed within buildings to connect different rooms. In temples, corridor structures were often used symbolically as a walkable path related to faith or worship, with a good example being the labyrinth in classical antiquity. In castles, the corridor often had a defensive function as it created a bottleneck between different spaces (Luckhurst, 2019).

From the 17th century onwards, corridors became popular in large country houses in England to create a separation between residents and staff. While houses were often designed with rooms connected directly to one another, the staff areas were linked by corridors, allowing them to move through the building out of sight of residents and guests. In the 19th and 20th centuries, corridors became increasingly used in residential architecture (Jarzombek, 2010). They were often employed to create a separation between private and public spaces. Today, in large apartment buildings, corridors are commonly used to provide access to individual housing units.

In the 20th century, with the rise of modernist architecture, corridors were often regarded as necessary but secondary spaces, primarily designed for efficiency rather than aesthetics (figure 3.24). Recently, there has been growing attention to the spatial quality of these transitional spaces.

**Figure 3.24** *(Volpez, 2022)*
Picture of the corridor in Le Corbusiers Unité d'Habitation.

**Spatial construction and functionality:**

The corridor is characterized by a linear layout, with multiple housing units arranged along a central hallway. The typology can vary in form (figure 3.25): from double-loaded corridors, where rooms line both sides, to single-loaded corridors, which typically have rooms on one side and windows or an open facade on the other. The former means dwellings will only have one open facade, but more dwellings are made accessible by the corridor, creating higher density. The latter provides better natural light and ventilation but at the expense of density. In high-rise residential buildings, especially after the introduction of elevators, double-loaded corridors became more common as they offered compact and cost-efficient solutions.

Functionally, the corridor offers several advantages. It maximizes the usable space in a building by providing efficient access to multiple housing units within a compact structure. Additionally, it can contribute to clear circulation within the building, with potential for communal spaces or meeting points along the hallway. At the same time, this typology presents challenges, such as limited privacy for residents and the need for adequate natural light and ventilation to ensure a comfortable living environment.

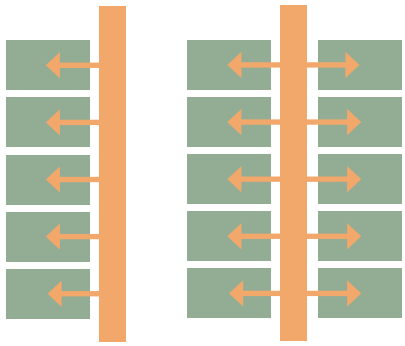



**Figure 3.25** Schematic view of single and double loaded corridor (own work)

**Social impact**

The social impact of the corridor depends on its spatial configuration and design. In large-scale residential complexes, a poorly designed corridor can lead to monotonous, impersonal spaces and long, windowless hallways can feel unwelcoming. The corridor has been criticized for its potential to create anonymity and social isolation, as residents have little interaction and there are no natural places for encounters.

Recently, architecture has increasingly considered the social dimension of the corridor. Designs featuring wider hallways or incorporating communal spaces, such as seating areas or gardens, promote social interaction and a sense of community where corridors are not only passageways but also have a social function.

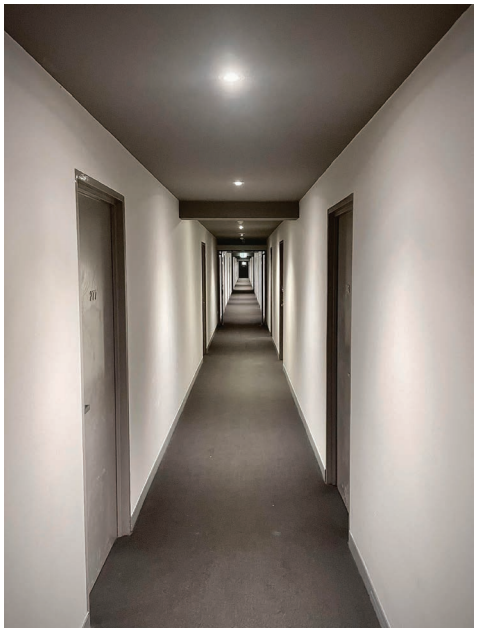


**Figure 3.26** *(Hallway photo, n.d.)*
Picture of a hallway in an appartment complex illustrating the anonimity and barren feeling a corridor can create

# Elevator and plinth

**Elevator:**

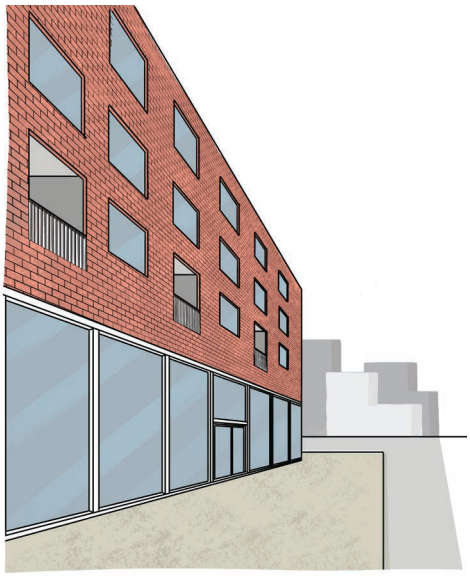
In the 20th century yet another industrial invention changed the course of accessibility; the elevator. Before elevators were common, housing was largely limited to low-rise buildings, typically no higher than four or five stories, due to the impracticality of climbing multiple flights of stairs. With elevators, it became possible to construct taller residential buildings that were easily accessible. This meant the development of new housing typologies using the elevator, as more dwellings could be constructed on less ground space (Bergeijk, 2018).

More verticality also meant more distance between the dwelling and the street. The ground floor and at every level above the elevator needed a landing, spaces that connected to the street, corridors or galleries. To get to the dwelling all these spaces had to be traversed, but their architecture was often very functional. It was designed for people moving through them, not for people staying in them. This creates a big buffer of low quality uninhabitable space between the dwelling and the city.

**Plinth:**

The public plinth with open functions as we know it today was not always like this. Until the 19th century, there were hardly any dedicated shopping streets and work and trade primarily took place in or in front of the home. In the 19th and 20th centuries, the streetscape of cities changed. The development of public transport and the rise of the automobile led to new street profiles (Glaser, 2021). In the early 20th century, modernism gained a foothold in urban planning and architecture, and the public plinth in residential buildings was brought to life by architects and urban planners such as Garnier and Le Corbusier (Garnier, 1917).

Today, the idea is that a public plinth contributes to a lively streetscape and a vibrant city and as building blocks become increasingly larger, public plinths also expand. However, these large, long, hard, glass surfaces often fail to have a positive impact. Instead of creating a vibrant public space, they result in a bleak and sanitized streetscape (Muller, 2021). Modern plinths often lack a human scale, and combined with the large footprint of buildings, pedestrian accessibility is compromised.



Research on the Zuidas (Bouw Woon Leef, 2022) shows that people mainly focus on areas where they expect to see other people, such as entrances, balconies, and gathering spaces. This essential information is lost in large reflective glass plinths, which often create discomfort rather than inviting interaction.

The solution lies in transparent plinths designed on a human scale. This includes small shops, residential entrances, and communal living spaces. The built environment should become more permeable to foster a lively streetscape (Muller, 2012).

**Figure 3.27** Impression of an entrance hidden in a glass plinth (own work)

# The future of scale and access

**Bigness by Rem Koolhaas:**

But what does the future of access in housing structures look like? Will buildings become increasingly larger, and how does this affect the way we move from the city into the building and how we access our dwellings? A concept that explores this theme is "Bigness" by Rem Koolhaas.

Koolhaas defines "Bigness" as a paradigm shift in architecture that sets a larger scale as a defining characteristic of modern urbanism. When buildings reach a certain size and scale they transcend their context and become a context of their own. On such a scale a building can not be defined by one way of architecture. However all different parts of architecture should always serve the building as a whole (Koolhaas, 2014).

In his book "Delirious New York", Koolhaas also states that the invention of the elevator as a way to access and traverse buildings makes a lot of the classical architectural elements obsolete. This goes hand in hand with the idea that at a certain size a building and its interior becomes illegible from the outside. Only the first layer of the building can be understood through a facade.

This creates a hard separation between the outside and the inside of the building, further reinforcing the idea that buildings in Bigness do not care about their surrounding context. "Its subtext is fuck context ..." (Koolhaas et al, 1995).

In this context a future is envisioned where the dwelling will no longer be connected to the city. It will connect to the building as the building is the entire context. It begs the question if this provides a human environment, or creates a dystopian city where the building is central instead of its users?

**Figure 3.28** Schematic visual of the continuing increase in scale (own work)

# Access and scale

## Conclusion

Research into access typologies reveals a clear relationship between the scale of a residential building and the degree to which the home is connected to the city. The separation between housing and the urban environment appears to be growing stronger. Whereas in the past, people could step directly from the front of their home onto the street, there are now multiple barriers between the city and the home. A shared entrance, often hidden within an endless glass plinth filled with public functions. An empty, impersonal lobby leading to an elevator or a dark staircase. Finally, a bare hallway where even doormats are often prohibited due to fire safety regulations. The final destination is a home that, apart from a possible view, has no real connection to the city or its fellow residents. The circulation spaces within the building do not invite people to linger or engage, as they are often not designed for that purpose.

However, the studied typologies also have their strengths—if well designed. They can have a significant social impact on how residents and visitors experience and move through the building. They can create opportunities for social interaction and encounters or serve other functional purposes.

More attention should be given to this grey area between the home and the city. It should be a transition space, where the city flows into the building. A continuity of scale and space. A zone where public and private areas are in balance. This presents an interesting challenge in designing large-scale residential buildings.

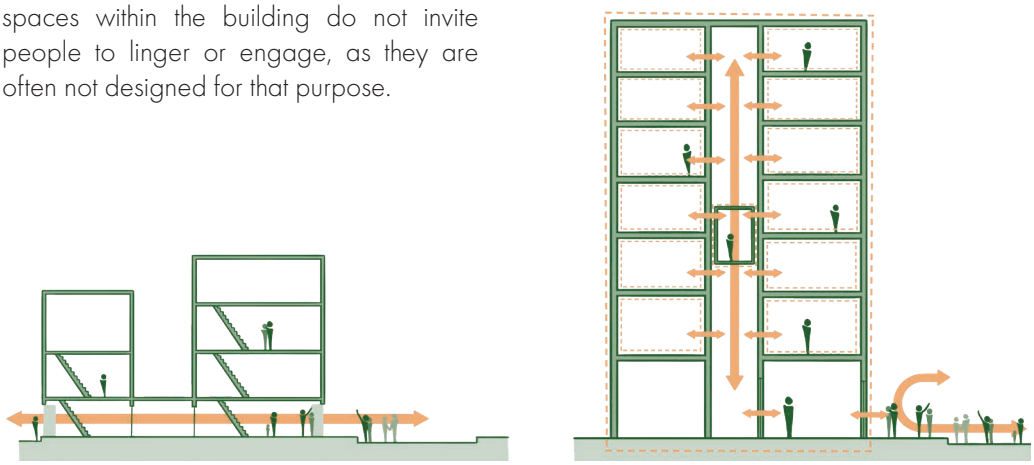


**Figure 3.29** Schematic visual of housing structures becoming closed off (own work)

“Think big but always remember to make the places where people are to be, small.”
- Jan Gehl

# 4

# Porosity and space

## Introduction

The connection between city and dwelling has a lot to do with movement. To oppose the idea of closed off housing structures means looking for a way to make them more permeable. Creating structures that allow people to not only move around them, but move through them. This chapter will explore the theories and concepts from architects and urbanists about how people perceive space and move through it. The following themes will be discussed:

- Small blocks theory
- College versus Campus
- Continuation of space
- From space to space
- Routing and wayfinding

# Small blocks theory - Jane Jacobs

In "The Death and Life of Great American Cities" urbanist Jane Jacobs envisions a more porous urban fabric. Urban porosity refers to the openness and accessibility of urban spaces. The way to achieve this would be to use smaller, interconnected blocks as a fundamental component of urban design. Smaller blocks create a more small grained network of streets, alleys, and pathways. This network allows for varied routes, encouraging people to explore and engage with their environment, enabling residents and visitors to traverse the city easily (Jacobs, 1961).

The small blocks theory creates social interaction by providing spaces that encourage encounters among residents. With a higher density of intersections and shorter distances between points of interest, community members are more likely to meet and engage with one another. Mixed-use developments within the small blocks like residential, commercial, and public spaces, creates multifunctional areas that draw diverse groups of people. The presence of local businesses, cafes, and parks within close proximity encourages foot traffic and interaction, which Jacobs deemed essential for vibrant urban life (Jacobs, 1961).

Increased urban porosity, facilitated by small blocks, also enhances safety through natural surveillance. A diverse and active street life promotes a sense of security, as more people are present to observe their surroundings. This aligns with Jacobs' idea of "eyes on the street," where active engagement and visibility contribute to safer public spaces.

The interconnectivity provided by small blocks allows cities to adapt to changing needs and circumstances. As urban areas evolve, the porous layout supports the introduction of new businesses, housing types, and public spaces.

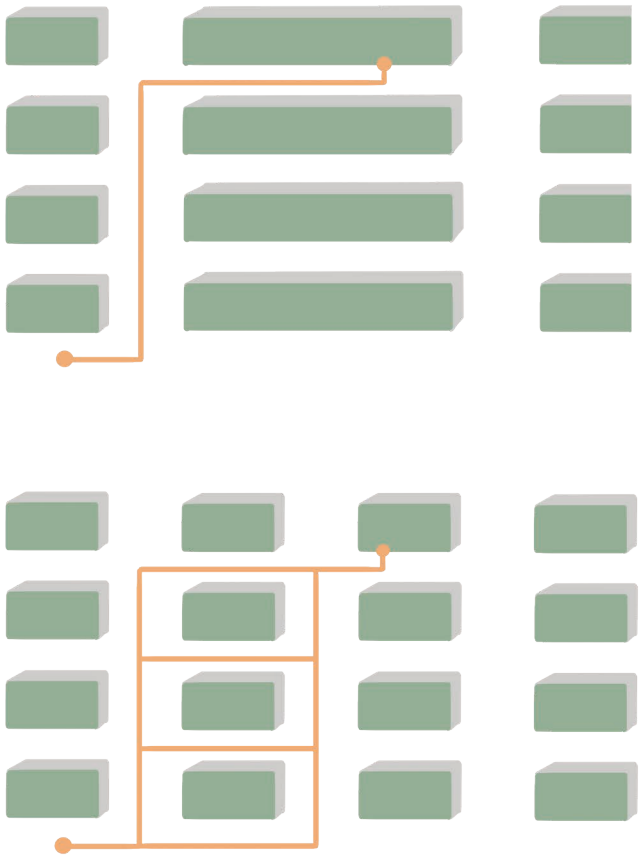


**Figure 4.1** Schematic visual of the impact of smaller blocks (own work)

# College vs Campus - DASH

College versus Campus researches the spatial constructs that belong to the terms "College" and "Campus". The relevance for porosity is that both spatial configurations provide a different way of users moving through them (van Gameren, 2018).

The college typologie was originally constructed to house students and scholars related to a university. It consists of a series of introverted, courtyard-centered spaces. The design prioritizes internal communal spaces over outward-facing public areas. It emphasizes a closed-off space, with entrances and gateways connecting these courtyards to each other and to the outside world, creating a very layered network of movement. Morphologically the open spaces in a college can be seen as a negative picture. The courtyards and passages are carved out of a solid mass of building.

The campus-typology functions completely opposite. It departs from a completely empty plane where freestanding buildings are constructed, usually surrounding large green spaces. The configuration is characterized by its lack of rigid boundaries. Instead of enclosed courtyards, campuses are open, often merging into the city or countryside. This encourages permeability where buildings are meant to be "in the round" instead of turning their backs on the surrounding area, reflecting a more modernist ideal of an interconnected landscape.

Both models have their respected qualities regarding movement and the connection between building and city. A big difference is the perception of space when walking through these constructs. In the college typology the open spaces in between buildings are much smaller, which means they often scale relatively well with the buildings surrounding them. The transition from outside to inside spaces can be achieved quite seamlessly. In the college typology on the other hand, the open space is an infinite plane on which the buildings are placed. The scale difference between the surrounding environment and the interior spaces in buildings is extreme.

Continuity of scale could help with improving the connection of the dwelling and housing structure (interior spaces) with the surrounding cityscape (exterior spaces).

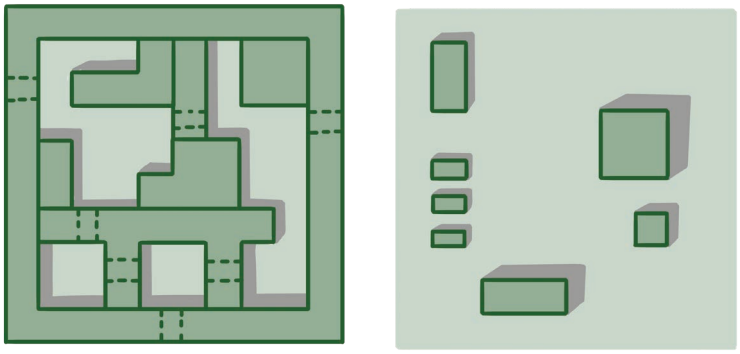



**Figure 4.2** Schematic comparison of the morphology of college and campus (own work)

# Continuation of space - John Soane

In the early 19th century architect John Soane designed and redesigned several extensions and the existing structure of the bank of London. The final product was a large building block with an extremely intricate internal sequence of spaces, as can be seen in figure 4.3. It envisions an infinite sequence of spaces continuing throughout the building.

This concept of sequencing space provides a seamless transition and connection between different areas within a building, as well as between the building and its environment. It emphasizes flow, openness, and interaction in a carefully orchestrated sequence of spaces that guide the user through the building and encourages movement and exploration (Fabrizi, 2018).

One of Soane's architectural strategies was his use of light to create a sense of continuity. Large windows and skylights allowed natural light to permeate the interior spaces, illuminating and highlighting certain spaces, like the main halls. It also created a dynamic effect throughout the day. This way light is used to influence the spatial experience, blurring the boundaries between different areas and connecting them visually (Fabrizi, 2018).

What was also important was the variety of spatial experiences, from the grand scale of the entrance hall to the more intimate proportions of the offices. Architectural elements such as columns, arches, and vaults were used to define these spaces while maintaining a cohesive aesthetic.

The theme of continuation of space will be very relevant in designing a porous housing structure. The challenge will be to connect the spaces of the urban environment with the spaces in the building.

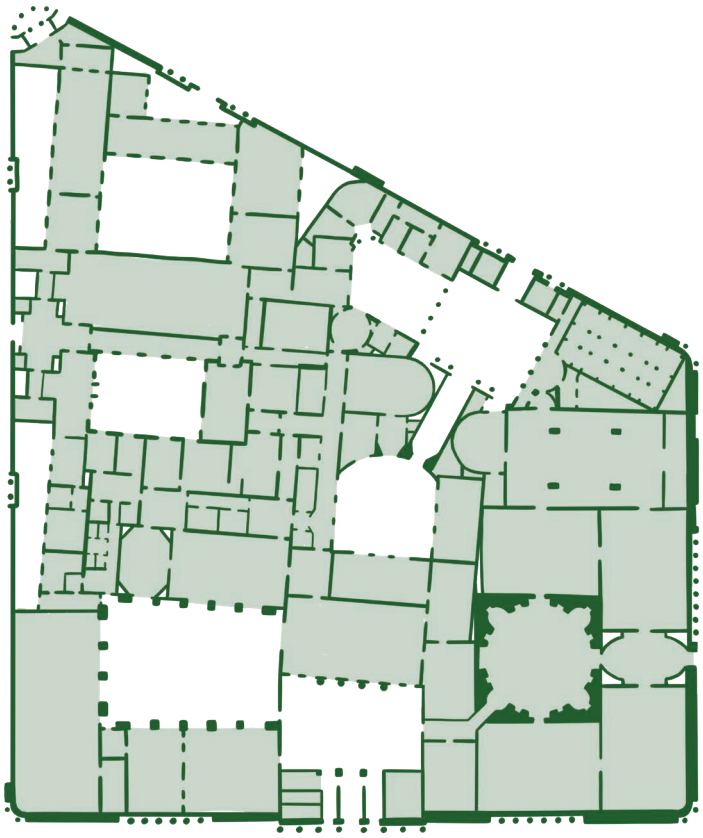


**Figure 4.3** Schematic floorplan of how a composition of rooms can create an infinite sequence of spaces (own work)

# From space to space - Richard Sennett

Another interesting theory is the idea of spatial continuity from urbanist Richard Sennett. It focuses on the transitions and pathways that individuals traverse in urban settings and how people move from space, through space, to space. This movement is not just physical but also social and emotional, influencing how people perceive and interact with their environment. For example creating a space where people can sit down instead of just moving through. Sennett refers to this as the open city (Sennett, 2017).

To achieve this it is important to have diverse spatial experiences. By incorporating different types of spaces like public squares, narrow alleyways, and green areas an environment can be created that caters to different activities or (social) interactions. The premise of these spaces is that they are interconnected and encourage exploration and use of the space. This means minimizing barriers and promoting flow are essential to the success of such a space. (Sennett, 2018).

This way of configuring space also allows for a certain flexibility. The spaces can evolve with the needs of their users, making the city more adaptable. Adaptability also ensures that spaces continue to be useful as they are responsive to their environments and dynamics of the city.

# Routing and wayfinding - Kevin Lynch

To better understand how people perceive space and choose their route through the city or a building the principal of wayfinding will be explored through the work of urbanist Kevin Lynch. In "The image of the city" (Lynch, 1984) he explains the methods and strategies individuals use to navigate their environments effectively. How people perceive and organize their spatial experience provides essential principles for creating legible and user-friendly urban and architectural spaces.

Lynch identifies five key elements that contribute to successful wayfinding:

**Paths:** These are the routes that people move along, such as streets, sidewalks, and etc. A clear and well-defined path helps users navigate effectively.

**Edges:** Edges are boundaries that delineate spaces, such as rivers, walls, or large roads or public transport lines. They can serve as important reference points that aid in orientation.

**Districts:** These are recognizable areas with a distinct character or function. They help users categorize their surroundings and provide a mental framework for navigation.

**Nodes:** Nodes are focal points or gathering places, such as squares, intersections, or transit hubs. They serve as landmarks that draw people in and can be used to orient oneself within the city.

**Landmarks:** These are prominent features or structures that stand out and can be easily identified from a distance. Landmarks provide visual cues that assist in navigation and enhance the city's identity.

In designing a porous housing structure these five elements can be incorporated to create efficient and/or legible routing through the building. It could also provide insights on how to connect these different elements between the city, the building and the dwelling.

# Porosity and space

## Conclusion

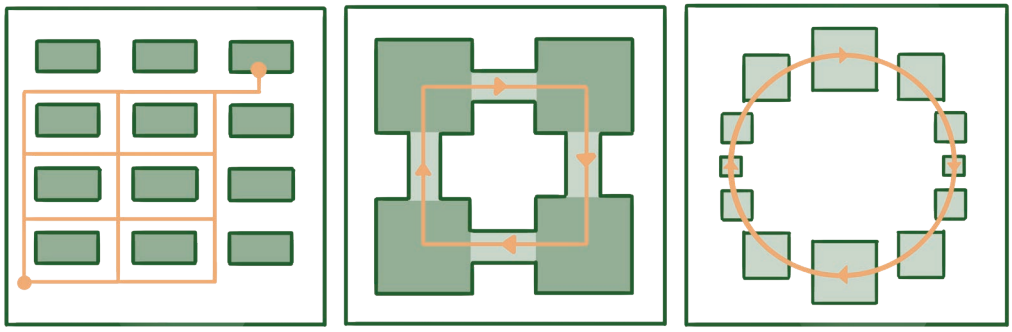
Research into various theories highlights the importance of movement and the experience of space in creating a vibrant urban landscape. It has also provided greater insight into how these elements can be used to design a better connection and transition from the urban environment to the dwelling.

In the current situation, the city often comes to a halt against the hard glass public plinths of residential blocks with massive footprints. This forms a boundary (Lynch) between the city and the home. By making these blocks more porous and dividing them into smaller segments with routes running through them (Jacobs), buildings at ground level can become much more permeable.

This allows space to flow from the city into the building (Soane). It is crucial to maintain a continuity of scale (College vs Campus) so that the scale of the surrounding city extends into the building and towards the home. The focus for both urban planning and architectural design should remain on the human scale.

Finally, there must always be a variety of spaces. This creates a sense that a person is moving from one space to another (Sennett), which can help improve the transition from the city, through the building, to the home—and vice versa. For example the use of different access typologies or different ways of moving through the housing structure.

## Design principles



**Small blocks** **Continuation of space** **Continuation of scale**

The tragedy of contemporary urban planning is that there is not enough experimentation with complexity.
- Richard Sennett

# 5

# Case studies

## Introduction

For the casestudies four projects have been chosen that incorporate innovative or unconventional ways of accessing the dwelling.

- Odhams Walk
- Belapur Housing
- Habitat 67
- Barbican Estate

Each project has its own approach to connect the dwelling to the city. Either through building morphology, the configuration of dwellings or smart usage of spaces and routes within the project. The exploration of the case studies on the following themes:

- Morphology and space
- Access and routing
- Dwelling configuration

From each project design principles that are deemed useful in designing a porous housing structure, will be distilled. They will form the bases of the design process and provide handholds in creating new ways to connect the dwelling and the city.

# Odhams Walk

**Project details:**

| | |
|---|---|
| Project date: | *1979* |
| Project location: | *London, UK* |
| Architect / Designer: | *Donald Ball & Mat O'Connor* |

**Introduction:**

Odhams Walk is a residential complex in Covent Garden, London, completed in 1979 by the Greater London Council (GLC) under the leadership of architects Donald Ball and Mat O'Connor. The project was developed on the former site of the Odhams Press printing works and comprises 102 homes above a base of commercial spaces and parking facilities. At the time, the design was praised for its progressive approach to urban housing and received a Housing Design Award in 1982.

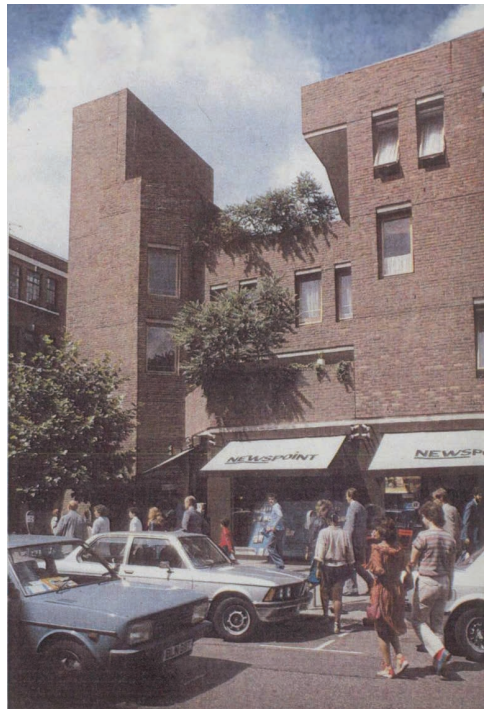



**Figure 5.1** *Sánchez–Moliní (2019)* Old photo of the brick exterior and commercial plinth

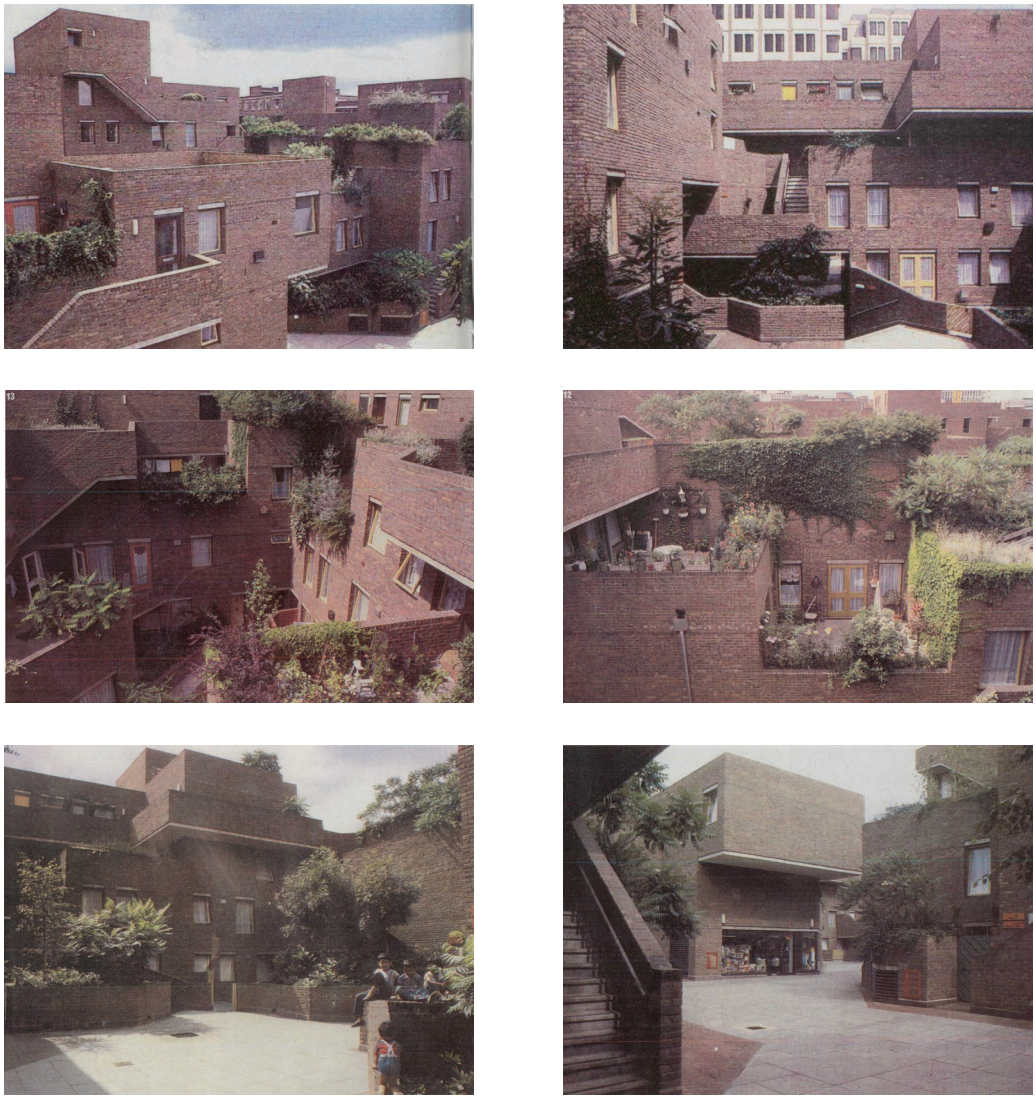


**Figure 5.2-5.7** *Sánchez–Moliní (2019)* Interior photos of routes, courtyards and patios

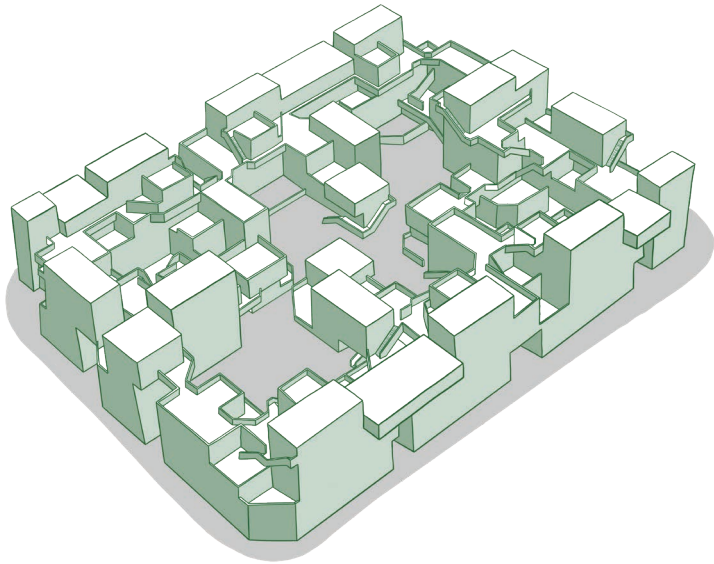


**Figure 5.8** Schematic analyses of the building block morphology (own work)

**Morphology and space:**

The exterior of Odhams Walk is characterized by its robust, sculptural design in red brick. There is a contrast between the lighter construction of the commercial spaces on the ground floor and the solid design of the upper structure. The interior, however, has a completely different atmosphere.

With its complex geometry of staggered volumes, communal courtyards, and private terraces, it creates a more human scale and a village-like feel. This combination of spaces results in a varied and dynamic living environment that ensures both a sense of security and community.


**Figure 5.9** Schematic analyses of the block in top view (own work)

**Figure 5.10** Schematic analyses; axo view of all routes, stairs and patios (own work)

**Access and routing:**

The complex was designed with a strong emphasis on accessibility and integration with the surrounding urban context. A diagonally placed public pedestrian route connects the streets around the block to the internal central courtyard and other smaller entrances (figure 5.9).

This route is accessed through two gateway-like entrances that serve as transition zones between the busy streets of Covent Garden and the quiet inner space of the complex. It also provides a place for residents to meet and enjoy a quiet outdoor space in the busy city.


**Figure 5.11** Schematic analyses of the routing and public spaces in top view (own work)

Within Odhams Walk, a network of elevated walkways and platforms provides access to the various residential units along a central route (figure 5.10). The lower two floors contain 73 apartments, grouped around communal courtyards and open galleries. These galleries connect to a third level, where an additional 29 homes are located. The layout encourages both interaction among residents and a clear distinction between public and private spaces (figure 5.12). The public pathways and shared outdoor areas also serve to incorporate greenery into the complex.

**Dwelling configuration:**

The dwellings within Odhams Walk vary in size and layout, ranging from one to three bedrooms, with a mix of square and L-shaped floor plans (figure 5.13). Each residence has its own private outdoor space, such as a terrace or balcony, which is visually connected to the surrounding homes (figure 5.12). This design reinforces a sense of community and promotes natural social surveillance, aligning with Jane Jacobs' principle of "eyes on the street." Odhams Walk serves as an example of how thoughtful architecture and urban planning can create livable integrated urban communities.

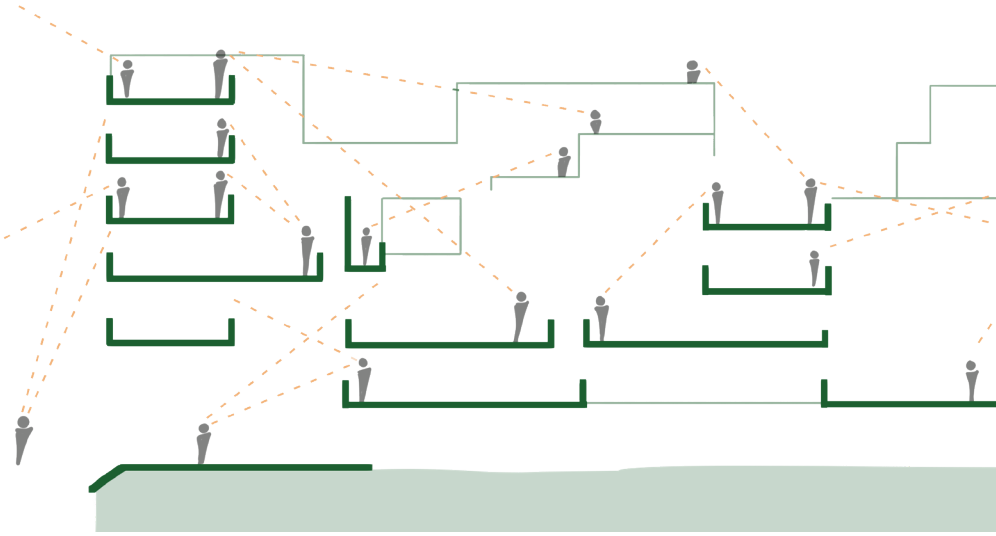


**Figure 5.12** Schematic analyse, section that shows interaction and sightlines (own work)

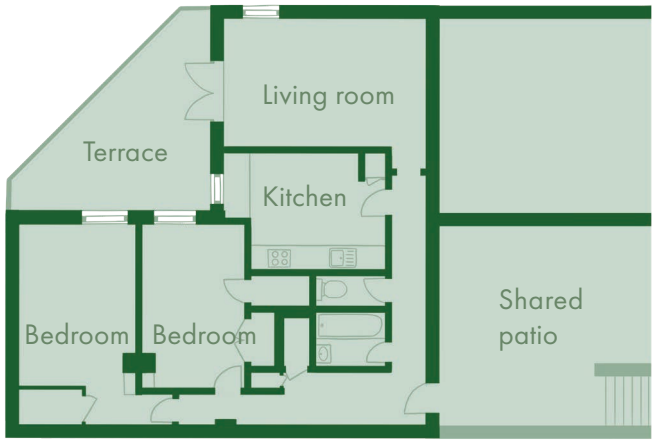
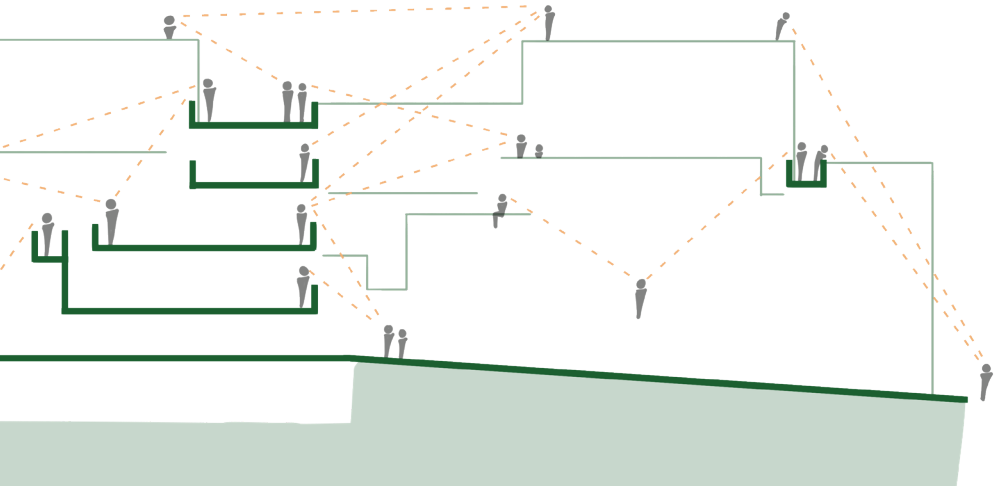
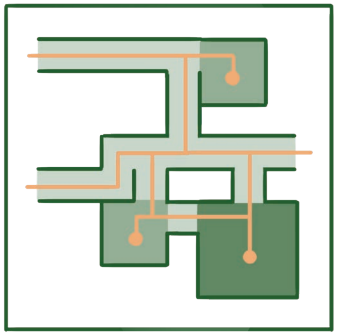



**Figure 5.13** Schematic floorplan of L-shaped dwelling, patio and terrace (own work)

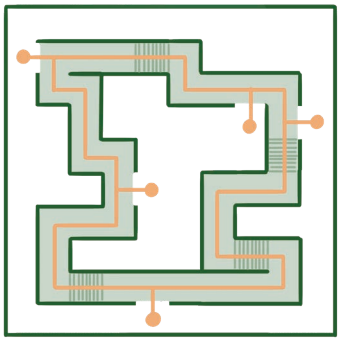


# Design principles



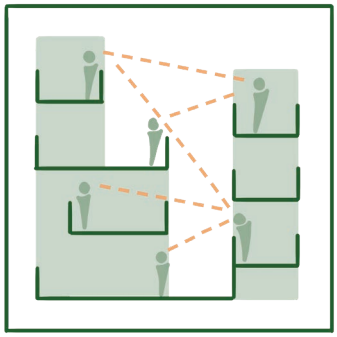
**Variation in space:**

The use of public courtyards, shared patios and outdoor walkways provide a very dynamic spatial experience that encourages moving through the project. It also provides an interesting approach to the transition from public to more private outdoor spaces.



**Central route:**

The central circular route causes interaction between inhabitants and visitors that move through the public courtyards on the lower level. The use of shared spaces in the form of patios or playgrounds ensures that these spaces are used and cared for by inhabitants, creating a sense of ownership.



**Interaction:**

The use of different vertical levels of movement create a lot of sightlines accross the different walkways, patios and dwellings. It also provides a sense of social security through the principle of eyes on the street.

# Belapur housing

**Project details:**

| | |
|---|---|
| Project date: | *1983* |
| Project location: | *Navi Mumbai, India* |
| Architect / Designer: | *Charles Correa* |

**Introduction:**

The Belapur Housing Project is a project by architect Charles Correa, realized between 1983 and 1986. The project explored the possibilities of incremental growth in housing developments—forms of living that could, in principle, be infinitely expanded. The project covers an area of approximately 6 hectares and was intended to provide affordable housing for around 550 families, with a density of 475 people per hectare. Correa's design philosophy focused on achieving high-density living through low-rise buildings with courtyards, constructed using simple, local materials on a human scale.

**Figure 5.14** *Hidden architecture (n.d.)* Picture of courtyard one of the dwelling types

**Figure 5.15-5.17** *Hidden architecture (n.d.)* Pictures of courtyards and dwellings

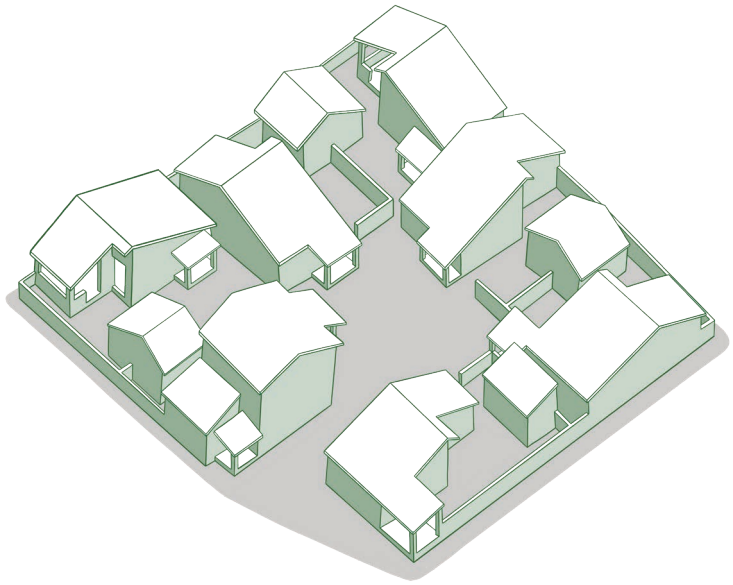


**Figure 5.18** Schematic overview of housing units around a shared courtyard (own work)

**Morphology and space:**

The morphology of Belapur Housing is characterized by a modular and flexible design that allows for adaptability and growth. The houses are grouped in clusters around shared courtyards (figure 5.18). Residents can choose a basic housing configuration, which they can expand over time based on their needs and financial capacity. The idea was that this would foster a sense of ownership and community, as residents could identify with their living environment and adapt it according to their preferences.

The difficulty with the shared courtyards was that the inhabitants did not take ownership. Since it was a communal space without a specific function, it was not maintained and gradually fell into disrepair. This led to the project slowly deteriorating. Nowadays, many of the original houses have disappeared and have been replaced by concrete slums and houses.

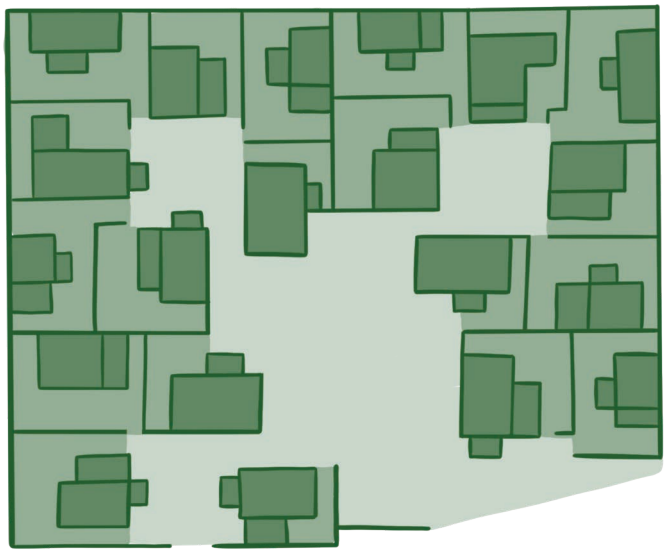


**Figure 5.19** Schematic of the sequence of outdoor spaces and courtyards (own work)

**Access and routing:**

The circulation system of Belapur Housing is based on a hierarchy of spaces that promote both private and communal interaction. Each house has its own courtyard, serving as a private outdoor space for daily activities. Groups of seven houses are arranged around a shared courtyard of approximately 8 by 8 meters, intended to encourage social interaction among residents. Three of these clusters together form a module of 21 houses (figure 5.19), creating a network of semi-public spaces that shape a community.

The project is designed with a network of pathways and roads that connect the different clusters and communal spaces. The internal roads are narrow and intended for pedestrians, contributing to a safe and inviting environment for residents. The layout ensures easy access to each home and facilitates both planned and spontaneous encounters between neighbors.

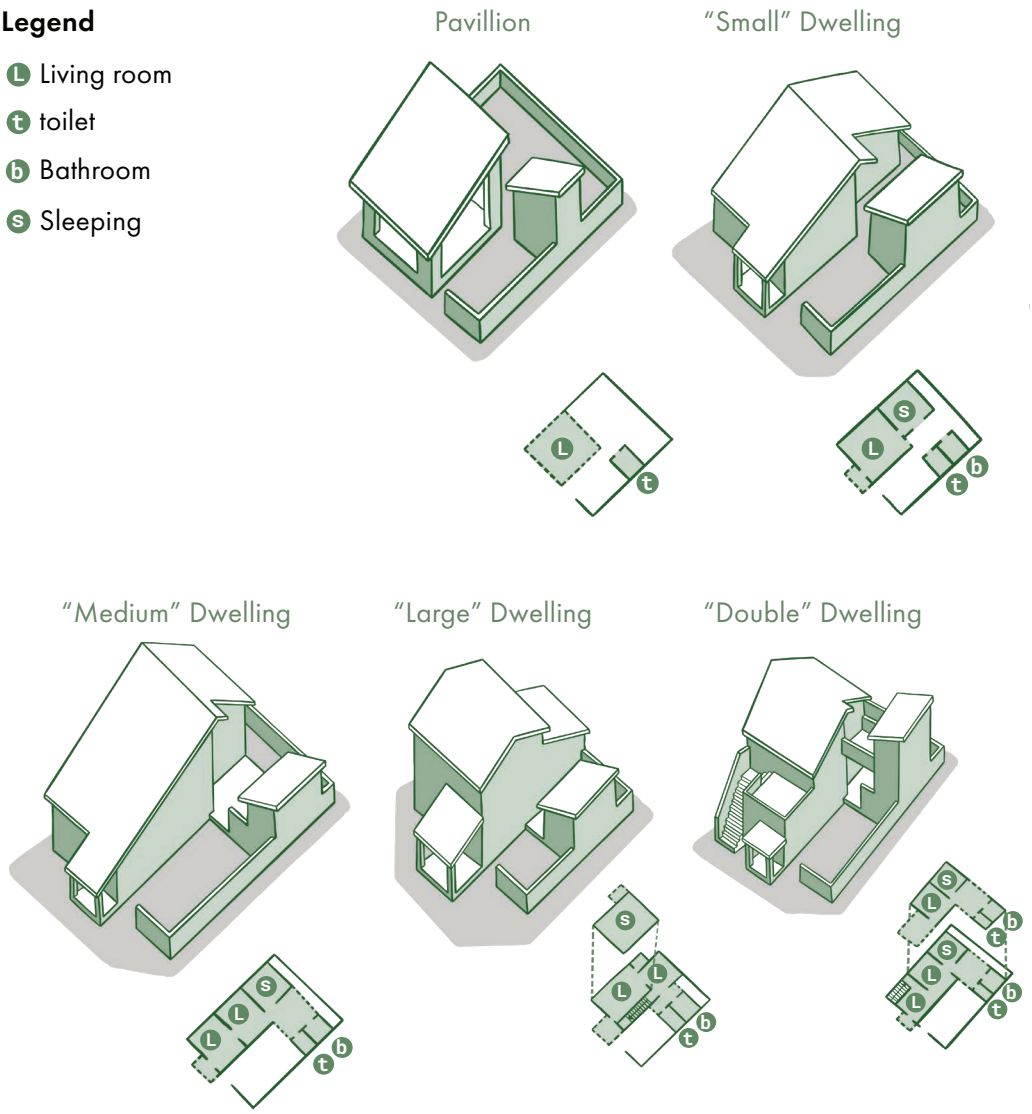


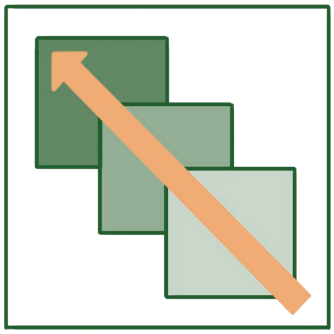

**Figure 5.20** Schematic overview of different dwelling configurations (own work)

**Dwelling configuration:**

The houses in Belapur Housing range in size from approximately 45 m² to 70 m² and are designed with flexibility and expandability in mind (figure xxx). Each home has its own private courtyard and is positioned to maximize natural ventilation and daylight. The units are freestanding and do not share common walls, giving residents the freedom to expand or modify their homes according to their needs.

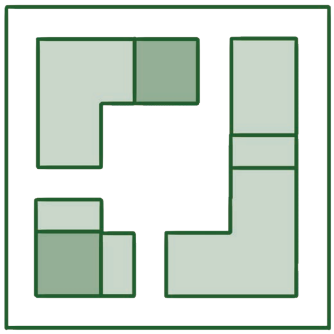
This approach allows families to incrementally increase their living space as their resources and needs evolve, contributing to the long-term sustainability and viability of the community. However, as previously mentioned, this also led to the issue of deterioration, as people built extensions as cheaply as possible, often resulting in poor-quality additions.

# Design principles



**Public - collective - private:**

The sequence of outdoor spaces creates a gradient from the public domain to communities that share a large courtyard to smaller private courtyards for residential use. This provides shelter and a feeling of ownership for inhabitants, even in dense urban environments.



**Different dwelling types:**

The variety in dwelling types can provide housing for different target groups. It also ensures that inhabitants can choose a dwelling that is complementary to their lifestyle or household composition, resulting in a mixed community.

# Habitat 67

**Project details:**

| | |
|---|---|
| Project date: | *1967* |
| Project location: | *Montreal, Canada* |
| Architect / Designer: | *Moshe Safdie* |

**Introduction:**

Habitat 67, designed by Moshe Safdie for the International and Universal Exposition is a experimental housing structure in Canada, . The project was developed as an innovative solution for urban housing, combining the benefits of low-rise living—such as privacy, outdoor spaces, and natural light, and human scale—with the efficiency and density of high-rise construction.

The complex consists of 354 prefabricated concrete modules, stacked in various configurations to form 158 residences. Habitat 67 introduced a groundbreaking approach to modular architecture, where individual housing units were combined into a dynamic, village-like residential community. Despite its experimental nature, the complex is still inhabited today.

**Figure 5.21** *Hawkins (2018)* Picture showing Habitat 67's complex brutalist composition

**Figure 5.15-5.16** *Merin (2023)* Pictures of the inside routes, walkways and stairs

**Figure 5.17** *Burnett (2023)* Pictures external walkways for horizontal movement

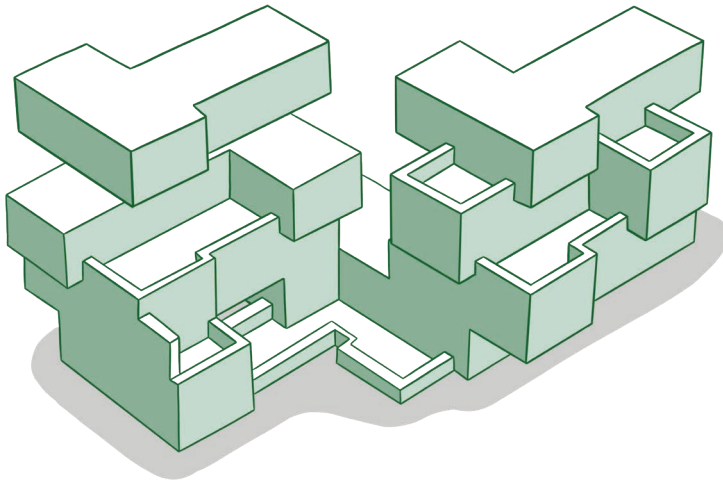


**Figure 5.21** Schematic view of how modules stack to create composition (own work)

**Morphology and space:**

The morphology of Habitat 67 is characterized by a geometric, modular design, where the stacked concrete units form a dynamic and sculptural building. The modules are not stacked in a uniform grid but in a staggered configuration, creating a complex and organic composition. Safdie's use of modular construction was revolutionary for its time, demonstrating a vision for affordable, flexible, and sustainable urban housing.

This staggered arrangement has the advantage of providing each residence with a private terrace, without direct visibility from neighbors. The Brutalist design language and use of concrete enhances the building's robust and futuristic character. It also creates a lot of sightlines through the complex, giving it a more porous and accessible feeling.

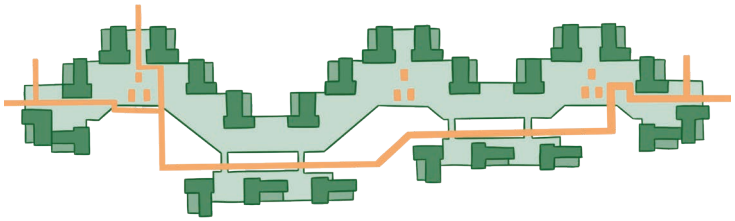


**Figure 5.21** Schematic analyses of vertical and horizontal routes (own work)

**Access and routing:**

The circulation structure of Habitat 67 uniquely combines horizontal and vertical access. Unlike conventional residential towers with internal corridors, Habitat 67 features a network of elevated walkways and staircases that connect the various modules. While the exterior appears largely solid due to the concrete modules, the interior is much more open and porous (figure 5.21).

Residents move vertically via elevators and staircases, while horizontal access is provided through walkways between the modules (figures 5.21 en 5.22). This system ensures that each residence is directly accessible from the outside, contributing to the village-like atmosphere and the more human scale of the complex.

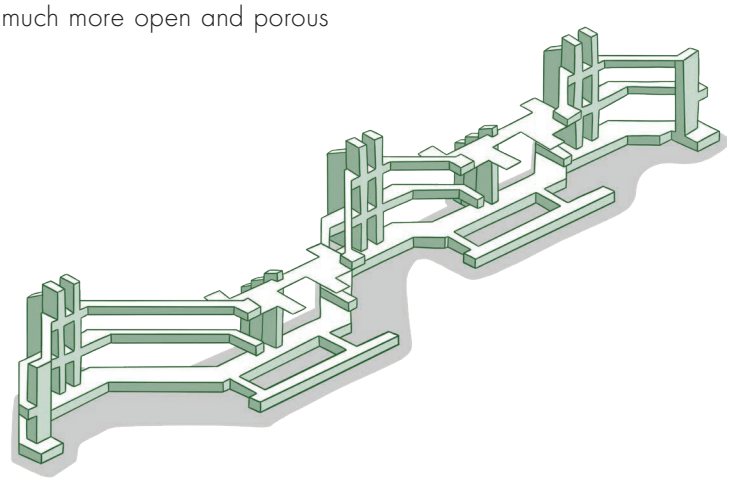


**Figure 5.22** Schematic overview of all vertical and horizontal routes (own work)

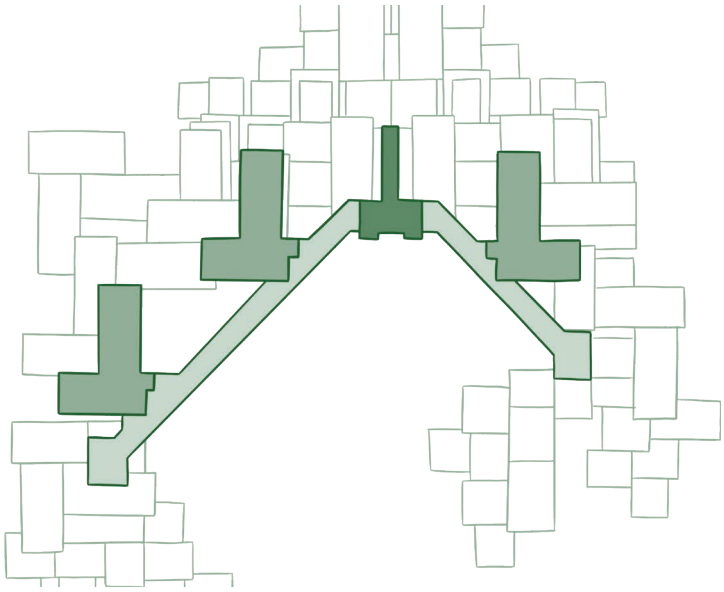


**Figure 5.23** Schematic analyses of how dwellings access to the gallery (own work)

**Dwelling configuration:**

The residences within Habitat 67 vary in size and composition, depending on the number of connected modules. The smallest units consist of a single module, while larger apartments can include up to four modules. Each residence features large windows and a private terrace, which, thanks to the staggered stacking, receives ample daylight and offers unobstructed views.

The modular design allows for flexible combinations and adaptations of apartments to meet the needs of the residents. Inside, the spaces are open and adaptable, with a strong emphasis on natural light and ventilation.

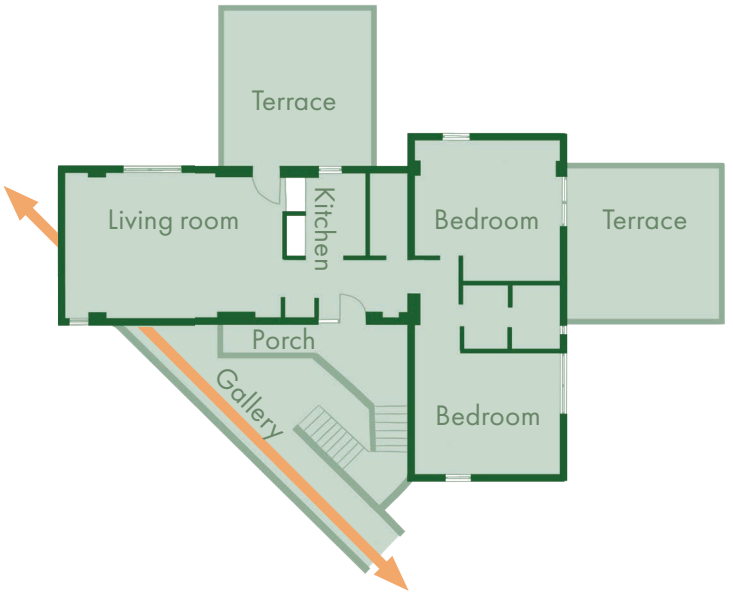
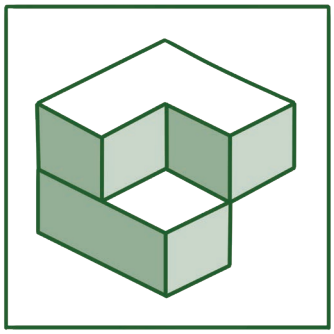



**Figure 5.24** Schematic floorplan of a dwelling configurations (own work)

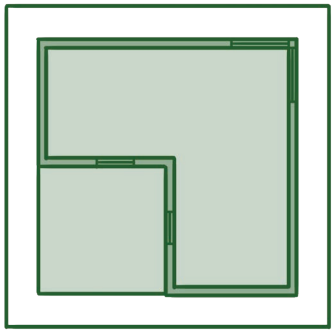
**Figure 5.21** *St-Yves (2021)* Picture showing a terrace and view from the dwelling

# Design principles



**Stacking prefab modules:**

The use of prefab models and the possibilities of stacking them in different compositions provide opportunities to create a dynamic composition with different sheltered spaces. It also balances affordability with more experimental and complex housing structures.



**L-shaped dwellings:**

The L-shaped dwelling with a courtyard makes a lot of different floorplan configurations possible. The courtyard or patio can even provide a buffer zone between public spaces and the dwelling. It also helps with bringing light into the house.

# Barbican

**Project details:**

| | |
|---|---|
| Project date: | *1982* |
| Project location: | *London, UK* |
| Architect / Designer: | *Chamberlin, Powell and Bon* |

**Introduction:**

The Barbican Estate is a good example of Brutalist architecture in the heart of London. Designed by the architectural firm Chamberlin, Powell and Bon, the complex was built between 1965 and 1976 on a site of approximately 14 hectares. The project was part of the post-World War II reconstruction, aiming to create a high-quality residential environment for city dwellers. The Barbican Estate comprises 2,014 homes, distributed across various towers and low-rise blocks, accommodating around 4,000 residents. In addition to its residential functions, the complex also houses the Barbican Centre, a large cultural venue.

**Figure 5.25** *Chapman (2021)* Picture of walkways and public spaces

**Figure 5.26** *Williams (2023)* Picture of the elevated pedestrian routes

**Figure 5.27** *Williams (2023)* Picture of the inner courtyard an walkways

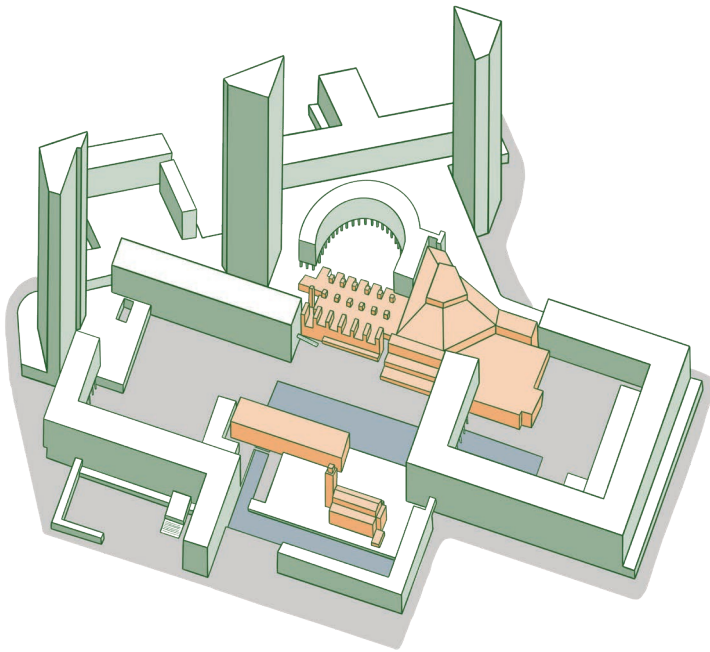


**Figure 5.28** Schematic analyses of central open spaces and amenitues (own work)

**Morphology and space:**

The morphology of the Barbican Estate is characterized by a combination of high-rise towers and low-rise blocks, arranged around communal gardens and water features. These central open spaces also accommodate shared amenities, such as the cultural center, a church and a school (figure 5.28). As a result, these areas have a clear functional purpose, ensuring good maintenance and a high-quality environment for people to stay. They are not only used by the residents of the complex but also by people from the surrounding neighborhoods.

The use of concrete as the dominant building material gives the complex its distinctive Brutalist aesthetic. The architectural scale of the design unfolds in three stages: from the modest and intimate spaces at ground level, through the larger terraces that give the feeling of urban squares, to the contrasting vertical dimension of the housing towers. This creates a very layered spatial experience for those moving through the complex.

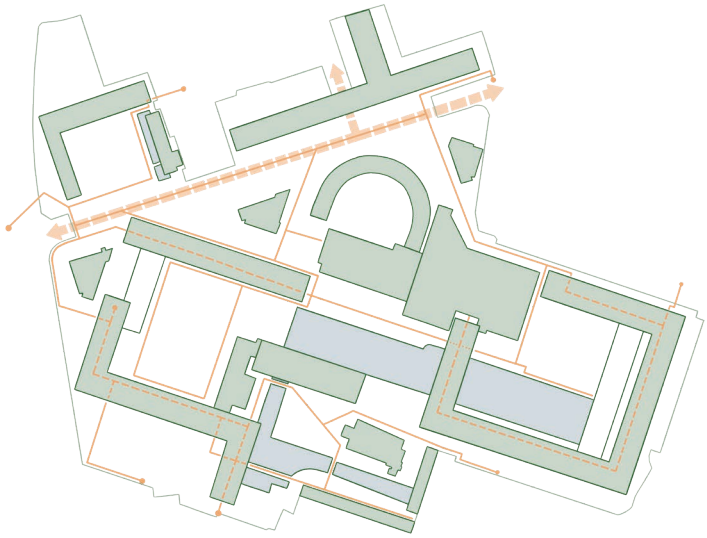


**Figure 5.29** Schematic plan view of pedestrian walkways through the complex (own work)

**Access and routing:**

Routing and access in the Barbican is based on a separation of pedestrians and vehicles. The complex utilizes elevated walkways, known as 'highwalks', which allow for pedestrian circulation separate from vehicular traffic at street level. These highwalks connect the different parts of the complex and provide access to both residential units and communal facilities. The main entrances to the complex are located at these elevated levels, contributing to a car-free and safe living environment for residents.

Vehicular traffic runs via a major road through a tunnel beneath the north side of the complex (Figure 5.29). Within the complex, pedestrian routes are strategically planned to ensure frequent interaction with and direct access to the central green spaces. Dwellings are accessed via internal corridors and vertical cores that connect to the pedestrian routes.

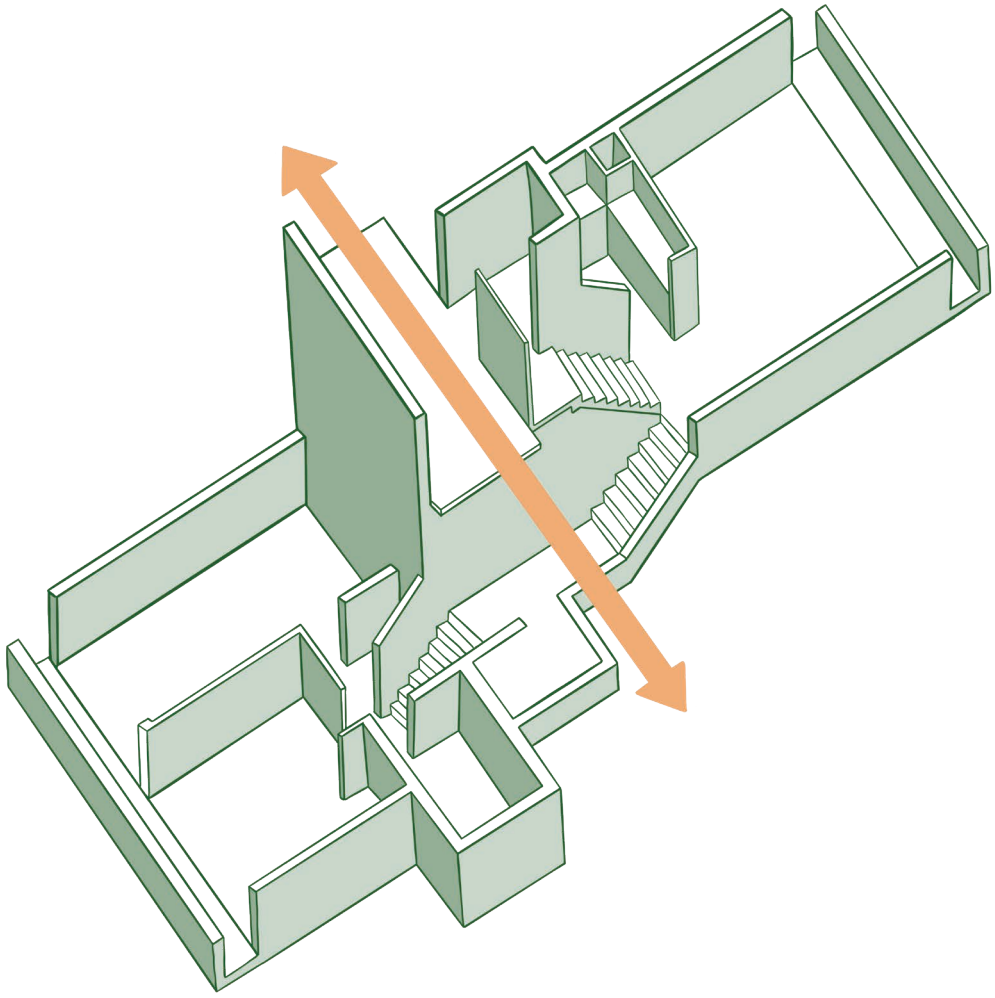


**Figure 5.30** Schematic analyses of dwellings access to the internal corridor (own work)

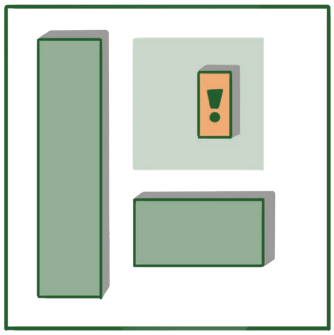
**Dwelling configuration:**

The homes within the Barbican Estate vary in size and layout, from compact apartments to spacious maisonettes. Each unit is designed with attention to natural light and ventilation, and many units feature their own outdoor space, often used to bring greenery into the complex (figure 5.31).

An interesting housing configuration are the homes that are accessed via an internal corridor and are situated around the corridor itself. This creates a staggered housing layout with a dynamic interior (figure 5.30). As a result, all living spaces are located on the exterior of the block, allowing them to receive plenty of daylight.

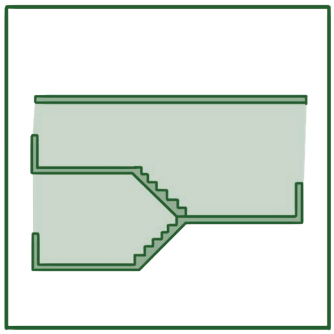
**Figure 5.31** Photo of use of greenery on balconies (own work)

# Design principles



**Function in public space:**

Having clear designated functions in public space ensures for more use and maintenance of the space. This creates a more comfortable, cozy and populated public space that invites actual use from residents and visitors.



**Staggered housing layout:**

The staggered dwelling provides an interesting way of dealing with corridor access. Dwellings still have daylight access at both facades, something that often lacks in modern corridors housing structures. It also creates a dynamic layout of spaces within the dwelling.

6

# Research conclusion

It is clear that the construction of large, enclosed residential buildings disrupts the connection between the city and the home. They create a boundary between the urban flow of the city and its residents, while also generating a harsh public space around the building. Large glass plinths, empty streets, and entrances that are meant to facilitate many homes, but are hidden away, create a streetscape that is illegible for people and doesn't function well on a human scale. And yet, we continue to build the same residential towers under the guise of densification and housing shortages. The results of research show that there is another way.

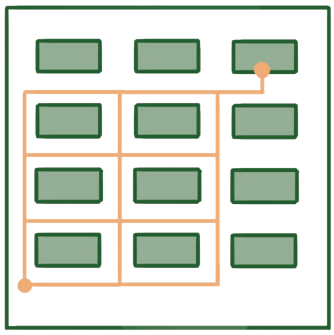
It's about continuing space and scale. In large-scale urban housing, the link between the city and the home is the residential building itself. The building must function as a transition zone between public space and the private domain of the home. This means facilitating movement rather than creating barriers. The residential building must become more porous. Different access typologies can be used to draw routes through the building.

It starts with making the building permeable at the plinth. Instead of long, impenetrable plinths, smaller footprints at ground level can create a wide variety of routes and options for pedestrians and other slow-moving traffic to move through the city. This also means that space flows from the city into the building. It's important to maintain a human scale here, ensuring a pleasant transition zone. The choice of access typology is crucial in this regard. Different situations obviously call for different applications, but the core is a continuation of scale and space.

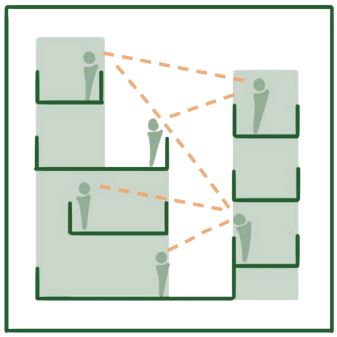
When multiple public or semi-public routes run through the building, questions about privacy inevitably arise. To soften the zone between the route and the building, a small, soft buffer, such as a patio or garden in front of the house, can be used. In this way, residents first enter a private intermediate space before entering their home.
We need a new way of designing when it comes to large-scale residential buildings. A way that reflects a high-density urban environment; complex, dynamic, vibrant, and lively.

**We must design for urban flow.**

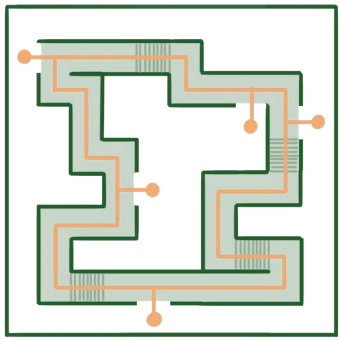
# Conclusion diagram



Small blocks



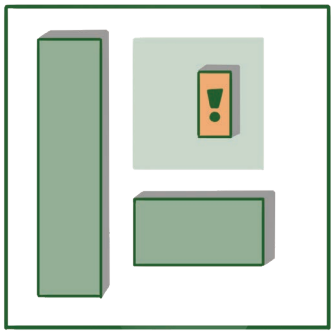
Interaction:



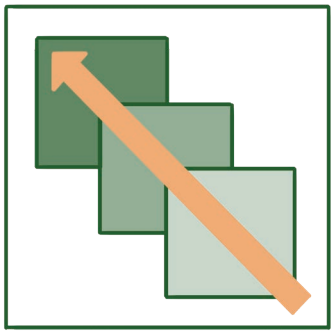
Central route:

## City

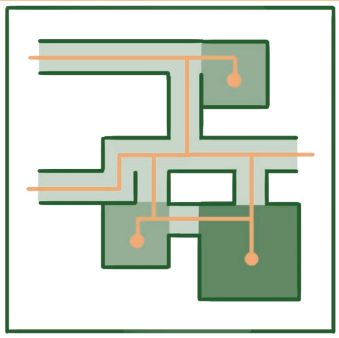
## Building block



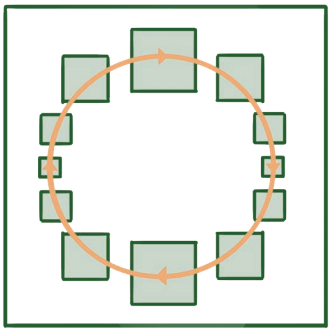
Function in public space:



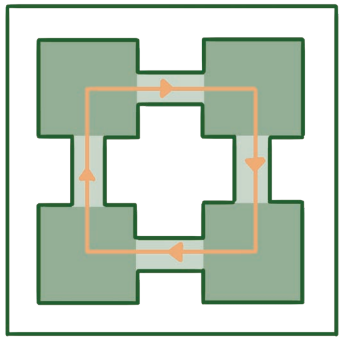
Public - collective - private:



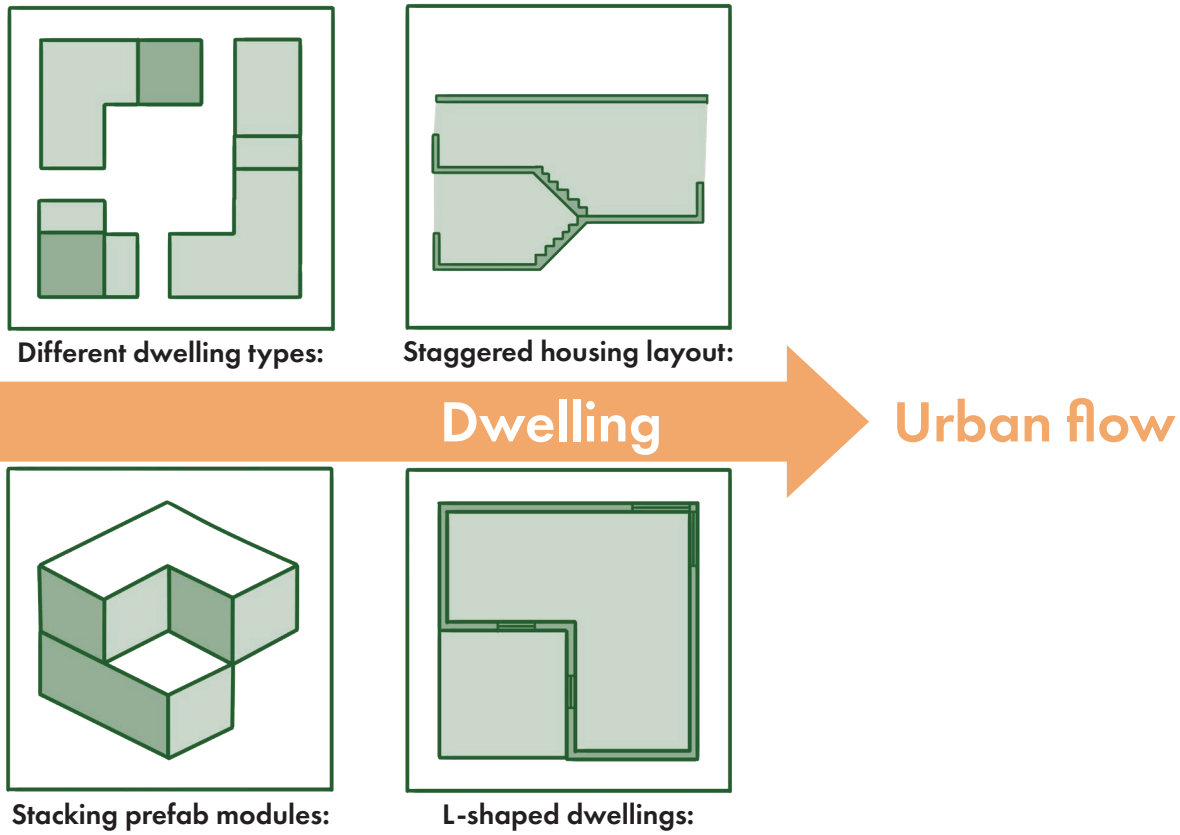
Variation in space:



Continuation of scale



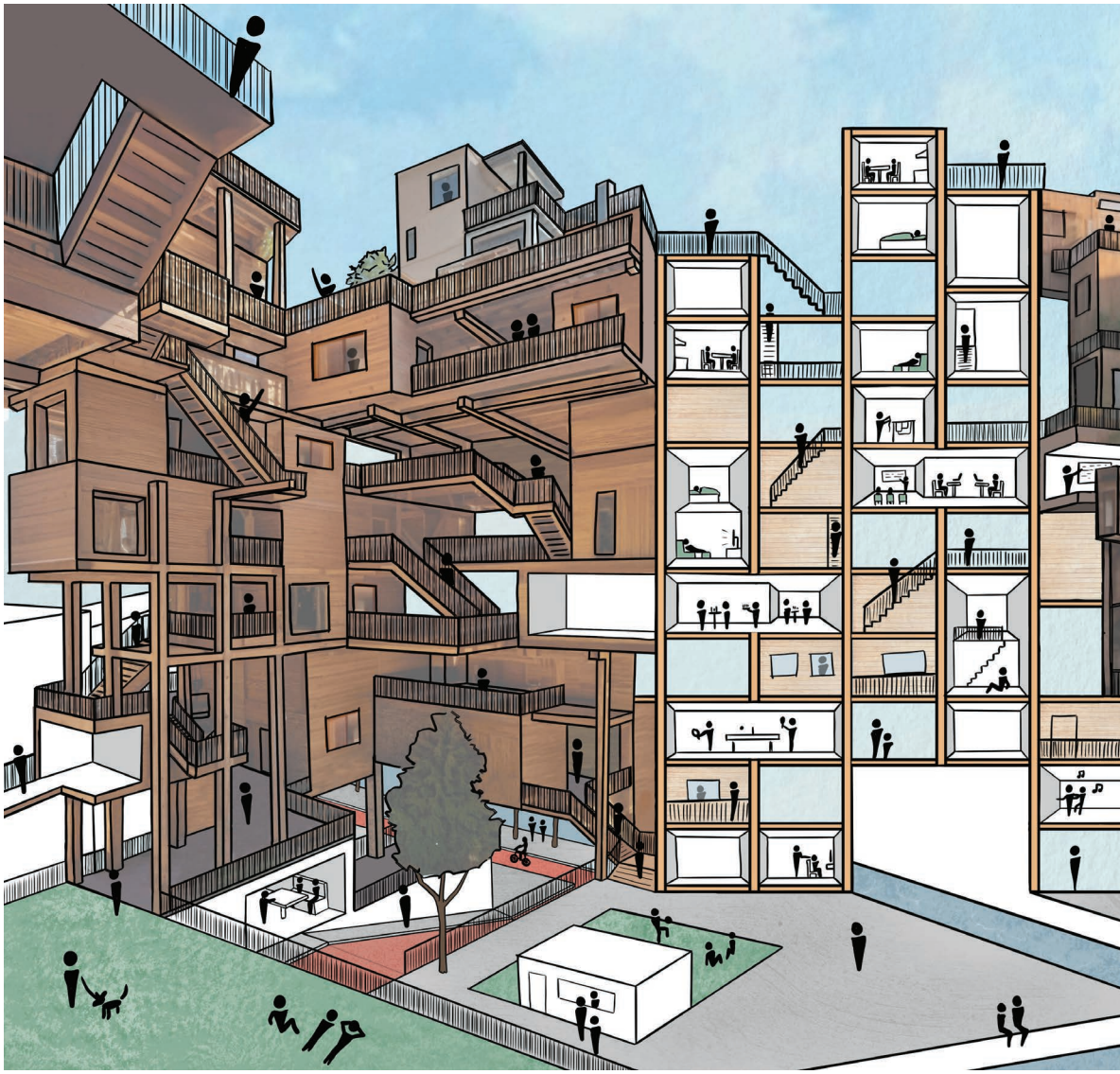
Continuation of space:




Schematic organisation of design principles based on applicable scale in the design process. During the design process the relevance and usability wil be evaluated to decide if they will be applied in the building design.

**Figure 6.2** Experimental housing vision focussed on dwelling access (own work)

# Conclusion visualisation



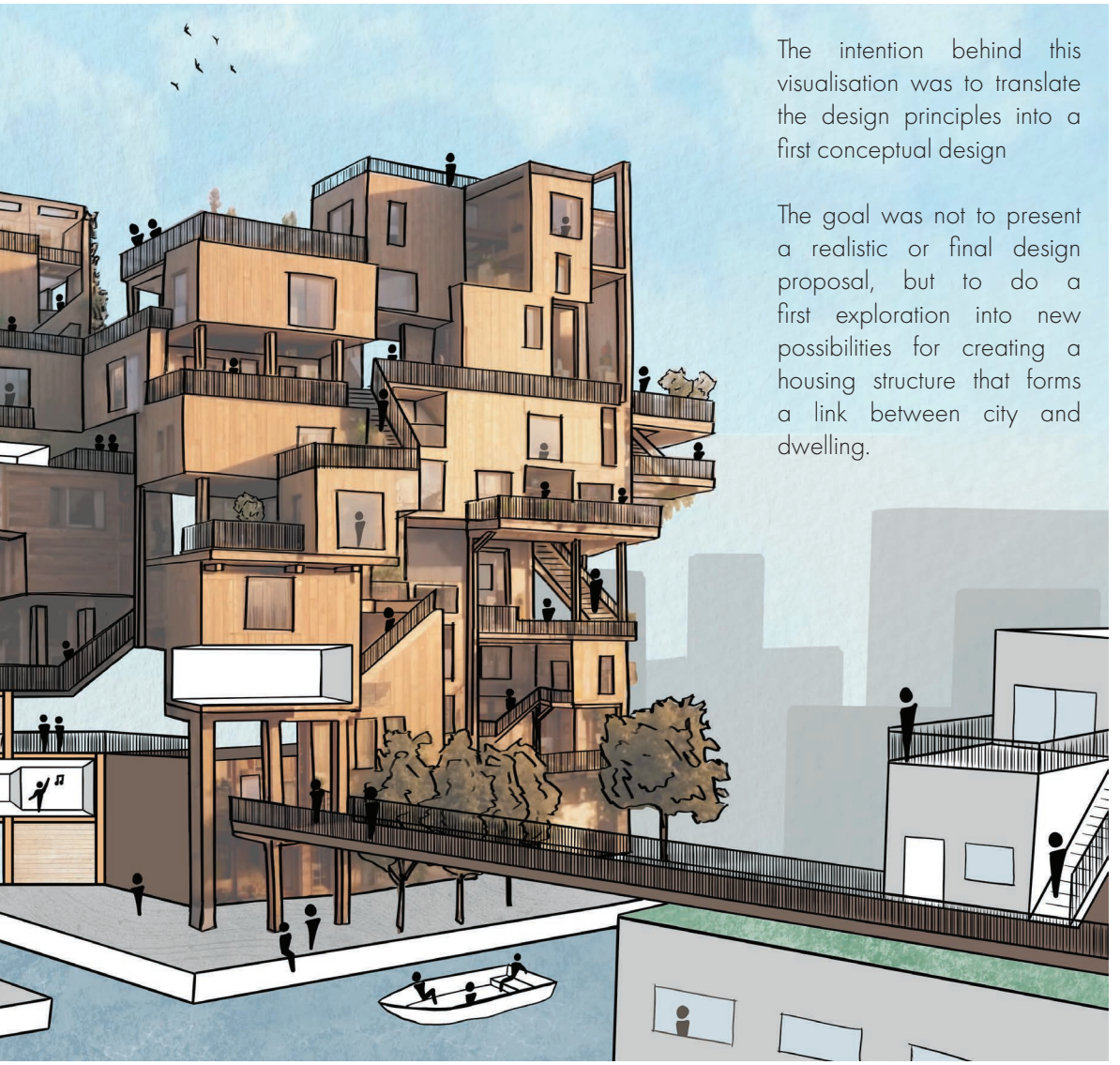



**Figure 6.2** Experimental housing vision focussed on dwelling access (own work)

# 7 Reflection

The research and design for my graduation project center around the theme of Urban flow. A concept that is used in many different ways, sometimes literally to describe the flow of people, goods or information in an urban setting. In my research it almost got an emotional or perceptual meaning. When writing my research proposal I was looking for a term to describe the feeling a highly urban environment can instill in people, the feeling of the city being alive, or being able to experience the identity of the city through the interaction of people with the built environment. Urban flow was the result. I was particularly fascinated by the role of the dwelling within this concept of urban flow, as it is, in my opinion, often left out when talking about urban flow. The focus is on public space and function, creating lively plinths and busy streets. But to realize this a certain density of people is needed. People that are within proximity to use this public domain. People that dwell in the city.

The central theme of my graduation studio, dwelling and densification, specifically in the context of Amsterdam, led me to this subject. The municipality of Amsterdam aims to build a lot of new housing in response to the national housing shortage.

On an excursion with our studio I noticed that most of the newly built housing in Amsterdam consisted of large scale bordered conglomerations of dwellings. Apartment buildings that are sat on a glass plinth with public functions, for example the NDSM wharf or the "Zuidas". The aim of these projects is to create dense and highly urban environments, to create urban flow. However the streets in between the buildings are often bleak, lifeless and empty. This mismatch in vision and reality is what drove me to my research. Finding out why the current design strategy does not work, and how the architecture of large scale housing structures can impact the urban flow.
My research consisted of four steps, not exactly in order, but part of a parallel research process:

Researching why people want to live in the city, trying to encapsulate the term urban flow into reasons why people are attracted to urban environments. This brought me a better understanding of what people need to dwell in an urban environment, and possibilities of how to integrate when designing a housing structure.

Next I wanted to explore the history of how people accessed their house throughout history (in the context of Amsterdam). I did research into different typologies of access and noticed a clear relation between scale and connection of the house and the city. As housing structures got larger, the physical distance between city and dwelling also became larger. From access directly onto the street, to access via a small entrance in an endless glass plinth, into a lobby, leading to an elevator, into a bleak anonymous hallway, to finally enter your dwelling. This realization had a large influence on my design process, as one of the main themes in designing became to maintain a smaller human scale, even within a large scale building.

I also wanted to look into urbanists and architects that also oppose the idea of a closed off housing domain. This brought me to research Jane Jacons, Richard Sennet, John Soane, Jan Gehl and Kevin Lynch. From this I gathered another central theme in my graduation project; porosity. The term was mostly applied on an urban scale but I wondered if it would be possible to use it on a building scale.

Could a more porous housing structure connect the house and the city. When designing my project the first steps I took were toward a more porous footprint, instead of a closed mass, something that in the end I think defines my project.

I also wanted to see if there were housing projects that had a different approach to access and the connection between dwelling and city. For this I chose four projects as case studies; Odhams walk, Belapur housing, Habitat 67 and the Barbican. From each project I derived certain design principles that I thought had a positive impact on how inhabitants moved from the city, through the building, to their home. These design principles later served in my design as handholds and inspiration, both morphologically as functionally.

Throughout the process the guidance of my mentors has been very valuable. Talking with them about my thought process helped me develop the storyline of my research and my design. They often suggested reference projects and concepts that could further deepen my research.

The main take-away from my research is that the urban environment and urban flow are very complex, something that is not always reflected by modern day architecture, especially when it comes to housing structures. The large scale projects I find successful in terms of connecting dwelling and city often contain this complexity as they are intertwined with an intricate context.

In the end I think my design reflects my research. It is not a ready-made solution that should be applied everywhere, but rather an exploration of using my research themes of urban flow, porosity, access, scale, routing to create a complex housing structure. It shows possibilities but also risks. How to deal with privacy and safety if people can just move through the building as they want. How does complexity influence wayfinding within the building? How do inhabitants take ownership of shared and public spaces for maintenance? Not every question has an answer yet, but the project represents a (personal) step that can be made in the future of housing design.

8

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