



Density in Historic Centres

A case study of the Hanseatic cities



Acknowledgements

Coming from a small city in the east of the Netherlands and now living in the large city of Rotterdam, this thesis is an elaboration of my fascination for the combination of density and cities with a unique historic identity.

I want to thank my family and friends who have supported me throughout the entire process of this thesis. This would not have been possible without you. I am grateful for your support and motivation to keep me going. To my parents, thank you for believing in me, for your constant curiosity in my thesis, and for going on site visits with me. To my friends and roommates, thank you for helping me study by bringing chocolates and words of encouragement. A special thanks to my sister and friend who helped me brainstorm for ideas and input in the final phase of my design.

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Colophon

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Density in Historic Centres
A case study of Hanseatic cities

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Abstract

Within the rising national housing demand, national policies are shifting their focus in urban development strategies towards regional cities, including the historic Hanseatic cities. These cities are unique in identity and character and have many qualities that can inspire future developments in these areas. This thesis aims to find a balance between the preservation of the cultural-historical identity of these cities and accommodating urban growth.

This thesis proposes a catalogue for implementing various densification methods in sensitive areas with a strong, unique historic identity. The densification methods focus on small-scale interventions, including infill development, splitting buildings and plots, and roof stacking. These densification methods are combined with the target groups, the starters and the elderly. Using Elburg and Doesburg as case studies allows for testing and evaluating different design interventions. Both cities have three similar sub-areas that differ in identity and qualities. The three sub-areas are: 1) the historic centre, 2) the neighbourhood expansion, and 3) the port or industrial area. By integrating the spatial characteristics with the cultural and social characteristics in the design evaluation criteria of the sub-areas, the design interventions are tested and evaluated. Even though the evaluation criteria are site-specific, the approach to these areas can be translated to similar sensitive historic centres. The design outcome discusses how densifying these historic centres can contribute to reducing the pressure on the national housing demand.

Preface

As someone who is born and raised in a city with a rich history, the Hanseatic city Deventer has strongly shaped my perception of urban environments and their historical value. Growing up surrounded by cultural and architectural heritage has made me aware of the importance of history in shaping the identity of cities. Now living in the large and rapidly developing city of Rotterdam, I am daily confronted with a contrasting urban reality. Rotterdam's fast growth and post-war reconstruction have led to the disappearance of many historical layers, resulting in a cityscape that differs from the preserved character of smaller historic cities.

This contrast has become a key source of inspiration for my thesis. Cities such as Delft demonstrate that growth and historical preservation do not have to be mutually exclusive. Delft's ability to maintain its historic core while remaining a vibrant and functional city highlights the potential of historic centres to adapt to contemporary needs. Preserving a city's history while accommodating growth is a complex challenge. This tension forms the starting point of my research.

Within the context of the rising housing demand in the Netherlands, national urban development strategies are shifting towards regional and medium-sized cities (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 2025). This makes it especially relevant to explore how historic city centres can contribute to future urban development rather than being treated solely as areas to protect. I have always valued the historic scenery of cities such as Deventer and Delft, where walking through the streets evokes a strong and intimate feeling of a small-town community that is often missing in larger cities.

Through this thesis, I aim to research and understand historic centres not only as fragile environments in need of preservation, but also as valuable assets that can play an active role in future urban development.



Figure 1: Deventer Skyline (Wikimedia Commons, 2012)

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01

Contextualisation

- ☐ 1. Introduction
- ☐ 2. National Housing Demand
- ☐ 3. Target Group
- ☐ 4. The Hanseatic Network
- ☐ 5. Problem
- ☐ 6. Research Aim
- ☐ 7. Research Question and Sub-research Questions

1.1 Introduction

The rising housing demand in the Netherlands has become one of the most urgent spatial and societal challenges of recent decades. With a current national demand of 396 thousand homes, there is a large need for new housing developments (Volkshuisvesting Nederland, 2026). In addition to population growth and a housing shortage, the country also faces spatial constraints (Ministerie van Algemene Zaken, 2023). Limited building land makes expansion strategies more difficult, leading to the introduction of sustainable development.

Because of the limited building land, national policies are shifting urban growth strategies towards regional cities (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 2025), including the Hanseatic cities. During the Middle Ages, the cities of Amsterdam and Rotterdam were still relatively small. The Hanseatic cities in the eastern part of the Netherlands, such as Kampen, Zwolle, and Deventer, had already developed into powerful trade centres. The Hanseatic Network relied on trade routes through their water network. When these trade routes shifted from inland ports to national seaports, new urban developments were increasingly focused on Amsterdam and Rotterdam, leading to the development of the Randstad (Visit Hanzesteden, n.d.). Today, the Hanseatic cities are known for their shared historical identity, strong connection to water, and unique geographical characteristics. They see their heritage not merely as something to preserve but as a source of inspiration for future developments. Building on the idea of preserving the unique character of these cities, this thesis investigates the complex challenge of urban growth in historic cities, which serves as a foundation for preserving their unique character.



Figure 2: Westerwalstraat, Elburg (2026)

1.2 National Housing Demand

The Netherlands currently consists of 8.462 million households and 8.27 million dwellings, leading to a demand of 396 thousand homes (Volkshuisvesting Nederland, 2026). The CBS indicates a growing total of dwellings but an even faster-growing demand. The number of housing developments cannot keep up with the growing and ageing population and the shrinking size of households. This persistent shortage places enormous pressure on the housing market, leading to rising prices and an increase in social inequality (Centraal Bureau voor Statistiek, n.d.).

Several structural factors contribute to the increasing demand. Population growth remains a key driver, caused by longer life expectancy, ongoing immigration, and a strong increase in single-person households. This demand is particularly concentrated in cities where the housing supply has not been able to keep pace with the rapid increase in the number of households. As a result, the housing demand is strongest in urban areas, as shown in figure 3. At the same time, the Netherlands faces significant spatial constraints. Limited building land makes large-scale expansion increasingly difficult, together with long planning procedures and strict regulations slowing down new developments and increasing construction costs. Rising prices in the construction sector (driven by inflation), higher interest rates, labour shortages, and material scarcity further reduce the number of feasible housing projects. Additionally, the nitrogen crisis has halted or delayed many developments, as new projects struggle to obtain permits due to emission limits (Ministerie van Algemene Zaken, 2023).

These pressures impact society. In October 2025, the prices of existing properties were on average 6.6% higher than in 2024 (Centraal Bureau voor Statistiek, 2025). This is a main driver of the increasing number of adults unable to leave their family homes. In 2024, 26% of young adults living with their family indicated they wanted to move but could not find suitable housing. In general, 1.4 million people are unable to move despite wanting to (Centraal Bureau voor Statistiek, 2025a).

In response to limited building land and a stronger housing demand in large urban areas, housing strategies are shifting toward expansion and densification in regional cities. Focusing on compact, sustainable urban growth can reduce pressure on these urban areas, where environmental and public health risks are already high. Densifying smaller cities, while maintaining their local identity, offers an opportunity to create sustainable housing developments that strengthen urban character rather than erasing it.

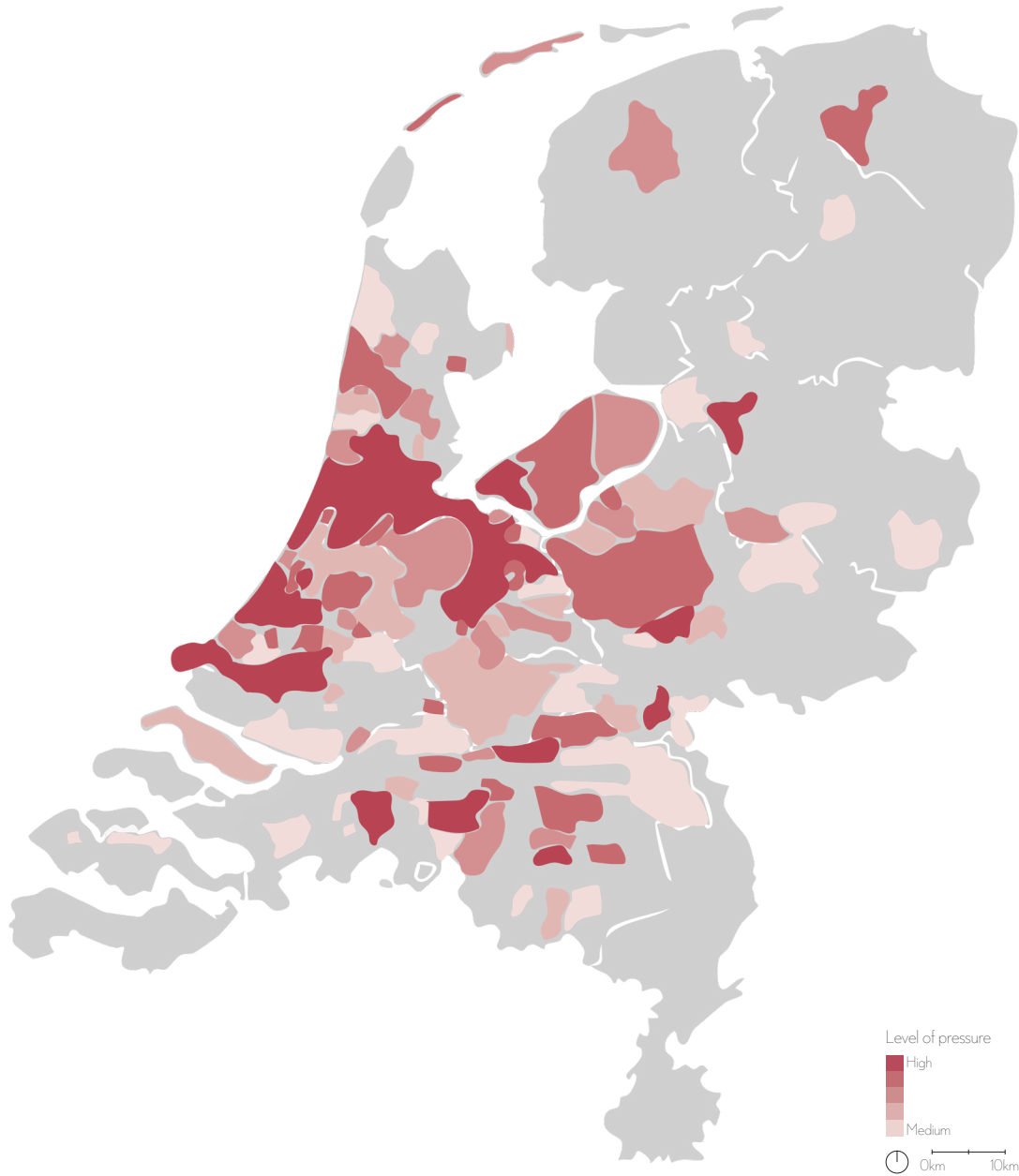


Figure 3: Levels of pressure in national housing demand.
Hittekaart Woningmarkt 2025 (BPD, n.d.)

1.3 Target Group

1.3.1 Current housing market

The Netherlands currently faces a housing demand of 396 thousand homes, according to Volkshuisvesting Nederland (2026). There is a mismatch between the types of housing available and the demands of the different target groups due to shifting demographics, such as population growth, an ageing population and individualisation. The Dutch Housing Survey 2024 (WoonOnderzoek 2024) assesses the highly pressured housing market. It researches homeowners’ and tenants’ living circumstances, as well as their moving intentions and patterns (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 2025). The results indicate that while the number of actual migrations has decreased, the number of households seeking to move has increased. Around 3.6 million households are expected to move in the coming years, and nearly 1.8 million independent households are actively searching for new housing (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 2025).

The ageing population is a significant demographic development. Although the number of senior homeowners is growing, they are less likely to move. Because they prefer to remain in their comfortable surroundings, many elderly continue living in relatively large homes. As a result, there are fewer housing options for families and fewer housing movements (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 2025; Planbureau voor de Leefomgeving, 2020). At the same time, the need for housing has also increased due to the rise in single-person households, reaching about 40% (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 2025). Additionally, this research highlights

that more households are searching for rental options, in particular apartments and family homes. Tenants moving within the rental market form the largest group of house seekers. First-time buyers are also facing more challenges, since the number of active starters has increased by over 30% since the survey of 2021, reaching over half a million. According to research from the Centraal Bureau voor de Statistiek (2024), the number of young adults in the 25-29 age group living with their parents is rising. Furthermore, about two-thirds of these young adults wish to move out of their homes (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 2025).

Multiple groups are affected by housing challenges, according to research from the Planbureau voor de Leefomgeving (2020), including low-income households facing affordability issues and middle-income households, who earn too much for social housing but too little for homeownership or private rental options. First-time buyers have trouble getting mortgages and are therefore purchasing their first homes at older ages. The current housing market also challenges those who are in urgent need of housing. In the meanwhile, housing expenses are still rising, especially as a result of rising rent (Centraal Bureau voor de Statistiek, 2024).

Even though the housing supply is growing, it is not keeping up with the rising demand. As a result, the housing market is under more pressure, especially in urban regions where real estate prices are rising and home construction is lagging behind (TU Delft, n.d.). Due to limited turnover, more individuals want to move, while fewer homes become available

(Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 2025). A potential solution could include building smaller, suitable homes for the elderly to encourage them to move out of their homes and free up larger properties for families. Subdividing existing homes and improving the efficient use of space can be another solution. In addition, initiatives are increasingly focusing on first-time buyers, urgent seekers, and older people wishing to downsize (Delft Matters, 2023). These developments are necessary to restore balance to the housing market and better address the changing housing demands of different demographic groups.

This results in a focus on two different groups, the starters and the elderly. One of the largest problems is the current blockage of the housing market flow. The lack of available homes prevents people from

relocating, which puts additional pressure on the housing demand. By developing homes for the movers, their homes will become available to other movers, reviving the flow on the housing market. With the lack of smaller homes that are suitable for them, the elderly are staying in homes that are too big. They are able to move when suitable homes are built for this target group, and their current homes will become available to other movers, including families. This group of movers will then determine the availability of the housing supply. More starters are looking for homes as well, but because they do not own a home, they increase the demand for more housing. Developing new houses for this group will relieve this pressure.

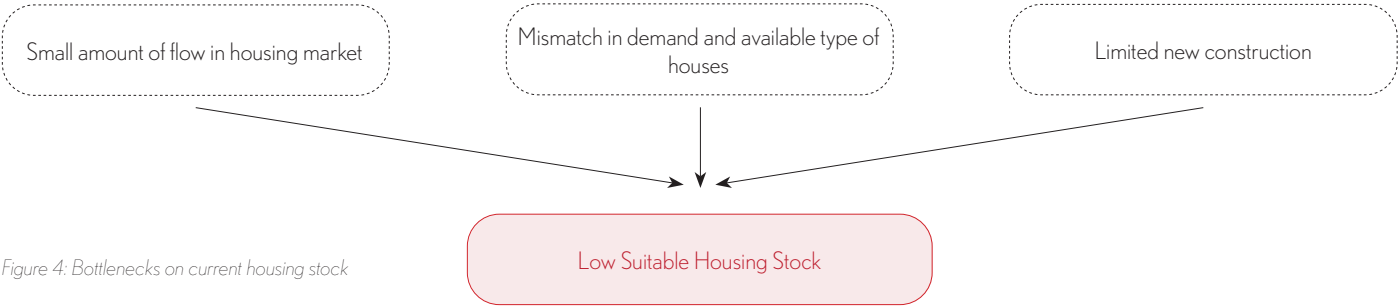


Figure 4: Bottlenecks on current housing stock

Target groups

	Details	What is the problem?	Effect on housing market	Solution
Starters	Age of 20-35	No suitable homes	Adding new demand to current demand	New small, affordable homes
Youth living with their parents	Age of 25-29	No suitable homes	Hidden demand	New small, affordable homes
Movers	Have a house, but want to move	No available homes	Determine available housing supply	Moving into the homes where elderly are currently living in
Middle-income	In between low-income and high-income classes	Income too high for social housing, but too low to buy	Affordability problem	Affordable homes for their income
Urgent housing seekers	Divorced people, other urgencies	No available homes	Direct pressure on housing stock	New available housing
Elderly	Age of 65+ Currently living in housing that is larger than needed	No available homes that are smaller and suitable	Blocking the housing flow	New smaller, future-proof homes

1.3.2 Housing market flows

This diagram shows the challenges in the housing market and the groups most affected. The first target group is elderly people who are not able to move to smaller homes, resulting in them occupying larger family-sized housing. Together with the elderly, starters are also not able to find suitable housing. A large part of this target group does not own a home, as they live with family or in shared households where others are not moving out. This means that there is no extra housing available when this target group can move, therefore adding more pressure to the existing housing demand.

The other groups are young people wanting to leave their parental home, middle- or low-income households and a group in urgent need of a new house. The new development of smaller households means that there is a current mismatch between the housing demand of these groups and the housing types that are available. With a focus on new housing for the starters and the elderly, a large part of the national housing demand will be addressed. For this thesis there will be a focus on the elderly and starters. The starter group places considerable pressure on the housing stock due to both current and additional demand. The elderly also place significant pressure on the housing supply, as many want to downsize, which in turn affects housing market dynamics when they move.

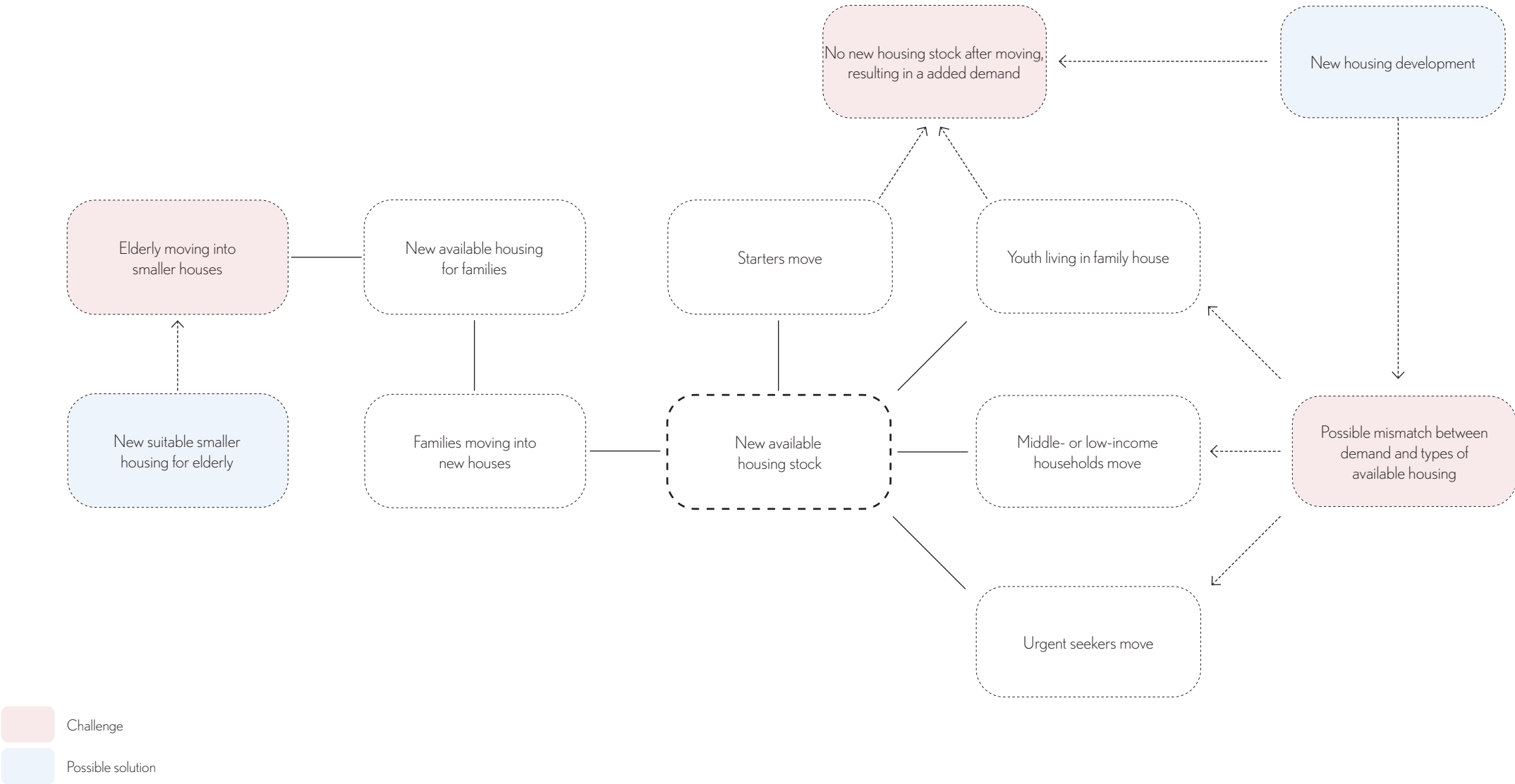


Figure 5: Flows on housing market with current challenges

1.4 The Hanseatic Network

1.4.1 What is the ‘Hanze’?

The Hanseatic Network and History

The origins of the Hanseatic Network date back to between 1100 and 1200, when representatives of various cities formed a voluntary cooperation between cities and their merchants. There was no central authority governing the network; instead, collaboration was based on shared interests and mutual benefit. Meetings were occasionally held in Lübeck (Germany), which functioned as an informal centre of the network. At that time, while Amsterdam and Rotterdam were still relatively small settlements, the Hanseatic cities in the eastern part of the Netherlands had already developed into powerful, thriving trade centres. In its prime time, the network consisted of nearly two hundred cities, primarily located in Germany and the Netherlands, but also extending to Scandinavia, Poland, Belgium, and even other parts of Southern Europe, including Spain and Portugal. This extensive network formed the foundation for long-distance trade and economic growth. Historically, the Netherlands has a total of 22 Hanseatic cities. Today, the nine cities well known for their Hanseatic heritage still cooperate in the field of tourism (Visit Hanzesteden, n.d.). The map in figure 6 shows the historic Hanseatic cities, with the nine cities in red that still form a cooperation.

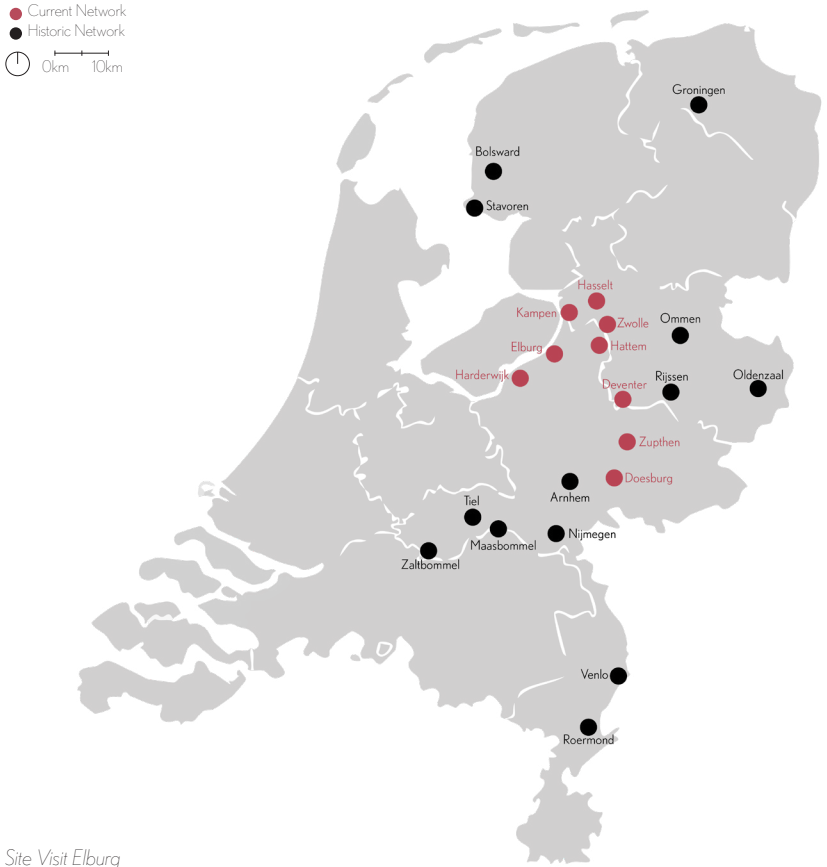
Trade, Economy, and Culture

The Hanseatic Network enabled cities and merchants to collectively negotiate trade privileges. The exchange of knowledge, skills, and information was an important product of this cooperation. Major trade goods included salt, fish, grains, wood, beer, wine, cloth, beeswax, and furs. Waterways played a crucial role in this trade system, as every city was strategically located along a river or at the sea. Kampen flourished due to its position at the mouth of the IJssel River, while Zwolle, historically located at the sea, gained prominence through its access to regional and international trade routes. Elburg also used to be situated at the seacoast, the Zuiderzee, which influenced its famous character as a fishing village. The site visit of Elburg shows that the historic port is still visible and remains in its function. The development of the Cog (Kogge), the dominant merchant ship until the 15th century, further strengthened maritime trade (Mirre & Mirre, 2024).

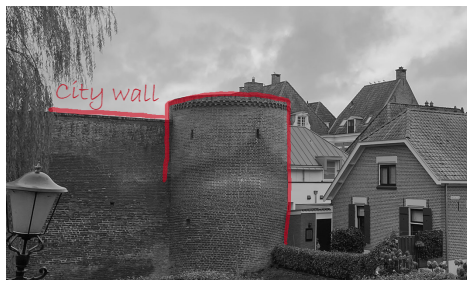
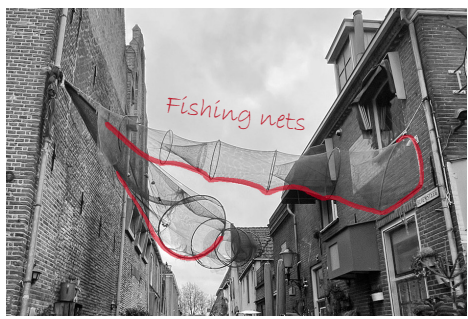
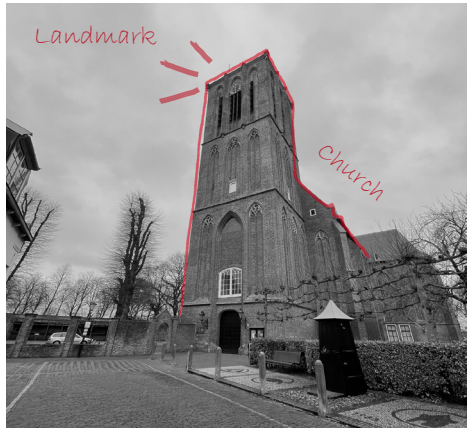
Economic prosperity resulted in significant urban and architectural development. Imposing merchant houses, trading offices, city walls, and gates were constructed, many of which still define the historic cityscapes. In Elburg, the city wall, gate, and church function as historic landmarks in the city centre. These structures are characteristic of the Hanseatic Gothic architecture. Several cities, including Kampen, Elburg, and Deventer, retain protected historic centres, and others, such as Hattem, strongly cherish their monumental character. Beyond architecture, wealth stimulated a flourishing cultural environment. Artists, architects, poets, and philosophers settled in these cities, contributing to a period often described as the Golden Age. A shared value that emerged from this history is the entrepreneurial spirit, often referred to as the “Hanseatic mentality”, characterised by creativity, innovation, and collaboration (Visit Hanzesteden, n.d.).

The Hanseatic cities are distinguished from other Dutch cities by their shared historical identity, strong connection to water, and unique geographical characteristics. To build upon the Hanseatic mentality, their heritage should not only be something to protect and preserve but could serve as a driving force and source of inspiration for modern policies and future-orientated developments.

Figure 6: The Dutch Hanseatic Cities



Site Visit Elburg



1.4.2 Housing Demand in Hanseatic Cities

Research from BPD (n.d.) on the current housing supply shows that the highest-pressure zones are situated in the larger urban areas in the western part of the Netherlands. But the housing demand is also growing in the Hanseatic cities, located in the east. When overlaying the 'BPD Hittekaart 2025' with the Hanseatic cities, it reveals that the cities with the highest demand for housing are located near high-pressure areas. The larger Hanseatic cities, Groningen, Zwolle and Deventer, experience more pressure than the smaller cities, Elburg, Doesburg and Oldenzaal.

The high pressure on the housing markets in Deventer and Zwolle is a result of a mix in national shifts and local limitations. The cities are well-connected to larger urban areas and provide attractive living environments. The housing demand continues to grow as many young people are staying in the region. The municipality of Deventer prefers urban densification over expansion to maintain the green spaces, which limits new large-scale housing developments (Woningtekortnederland.nl, 2025).

The cities Kampen, Rijssen, Zutphen, and Maasbommel experience less pressure for new housing developments. These four cities are located near larger Hanseatic cities that deal with a higher demand. The smaller Hanseatic cities experience less pressure on new housing developments.



Figure 7: Housing Demand pressure in Hanseatic cities
Hittekaart Woningmarkt 2025 (BPD, n.d.)

1.4.3 Current Policies

In the context of national housing strategies shifting towards regional cities, and given that larger Hanseatic cities are already addressing housing demand, it is important to investigate current housing development policies in these cities. Each Hanseatic city is rich in history, and nine of these cities continue to work together for tourism purposes. Every city has a future-orientated vision, 'Omgevingsvisie', that addresses the increasing demand for housing in the city and its surroundings. Appendix 1 provides a policy analysis of two main themes and their relation. The first theme is about the vision for new housing developments. The second theme is about the municipality's approach to the preservation of the city's history.

There is more research on new housing development plans in larger Hanseatic cities than in smaller Hanseatic cities. Although the policy analysis shows that the city envisions similar methods for urban densification and preservation of history.

The policy analysis reveals that each city wants to achieve growth by urban densification, with a focus on infill development rather than expansion. Other methods discussed in the policies are the repurposing of monuments and other historic buildings and the construction of new high-rise buildings. New high-rise developments are welcome, but they should be carefully integrated into their surroundings.

All the policies emphasise the preservation of their cultural-historic identity. Every city expresses the intention to protect and preserve its heritage. Some cities envision the adaptive reuse of historic sites to keep them liveable and relevant in future contexts. They all explain that historic street patterns and monuments should remain intact. For example, Deventer and Zwolle want to use their history as a source of inspiration for future development. New developments should be matched in scale and historical appearance, with the main goal to not disrupt the historical skyline.

The Hanseatic cities recognise the importance of finding a balance between heritage and innovation, and they envision combining their historical identity with future urban growth. While some of these urban densification strategies can conflict with the preservation of specific historic sites, others encourage a synergy between the two. Figure 8 shows the possible conflicts and synergies between the three main urban densification methods and the four main statements regarding historic preservation. These conflicts and synergies strengthen the tension between the sensitive historic centres and the need for urban growth.

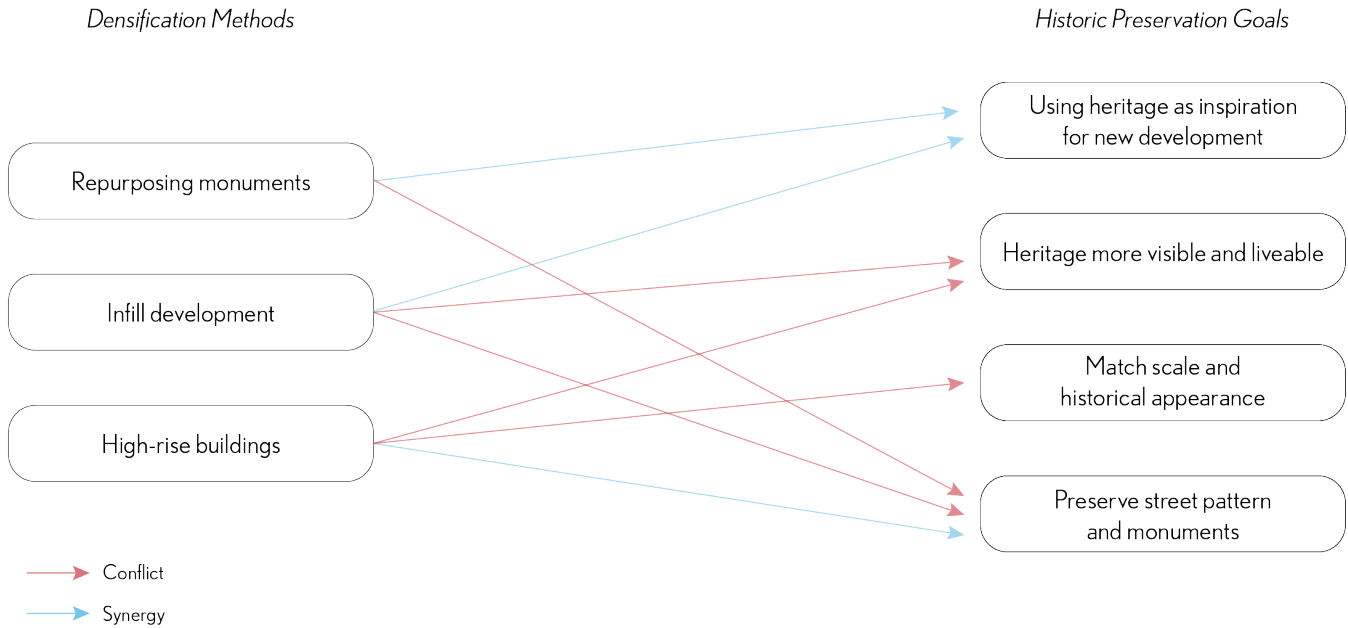


Figure 8: Densification methods and historic preservation
See Appendix 1 for the detailed policy analysis

1.4.4 Four Dutch Hanseatic Cities

To identify suitable case studies, part of the approach for this thesis is presented in Figure 9, with the remainder explained on page 58. Four Dutch Hanseatic cities are analysed for urban densification possibilities. Three sub-areas are studied in each city: [1] the historic centre, [2] the expansion zone around the historic centre, and [3] the industrial or business district. These areas are analysed for their urban densification

potential, focusing on (A) infill development and (B) high-rise potential. The results are evaluated per city and compared across all four. This comparison shows that three cities are broadly similar, while one city differs significantly, resulting in two final case studies.

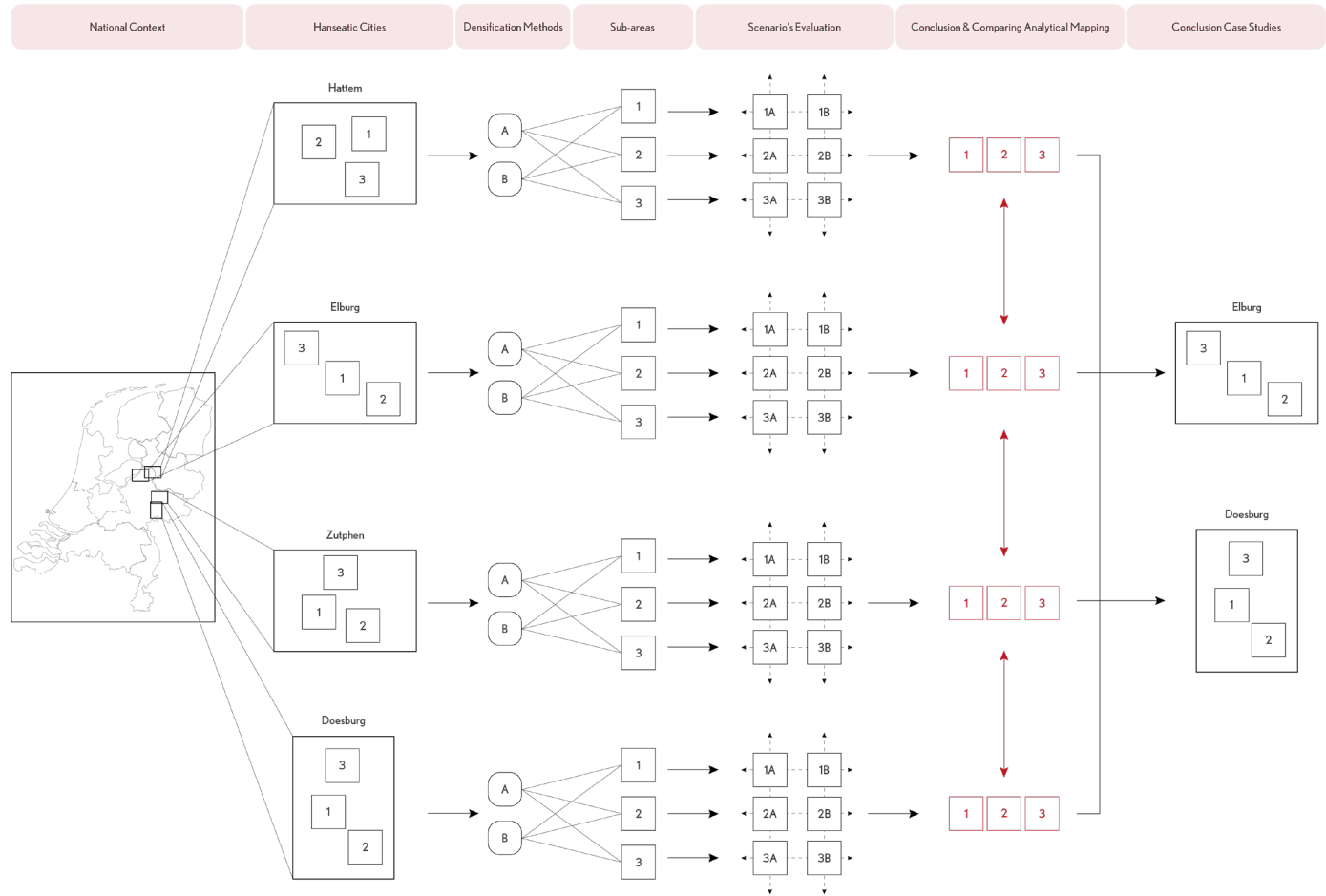


Figure 9: First part of the approach, see page 58 for the entire approach

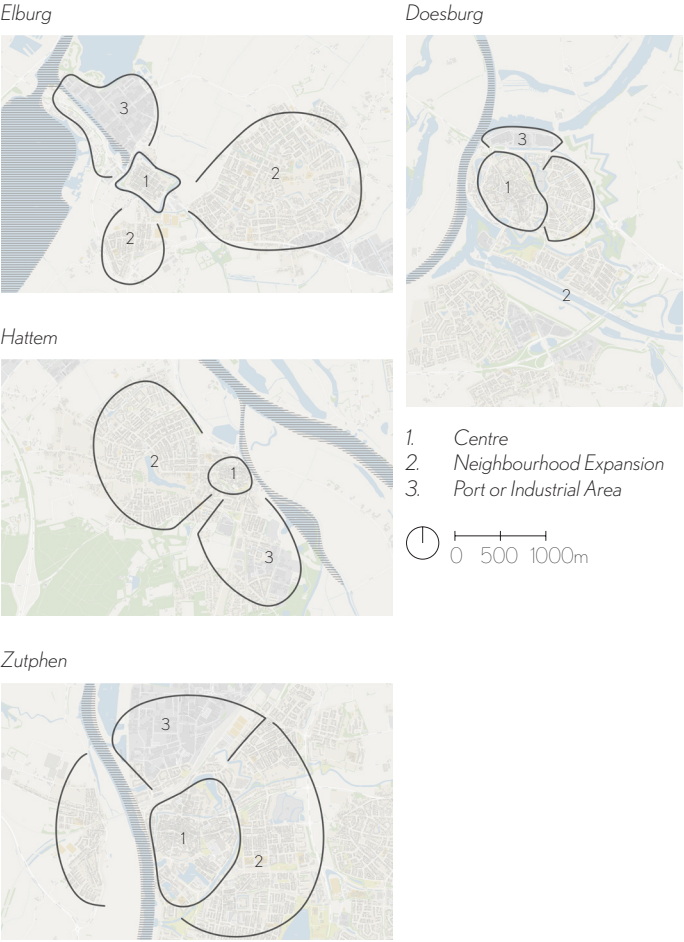
Case Study Analysis

The policy analysis of the Dutch Hanseatic cities shows that the smallest cities are less researched in urban development strategies than larger Hanseatic cities. While densification is included in their vision plans, some smaller cities lack detailed strategies for balancing urban growth and historic preservation. Larger cities such as Deventer, Zwolle and Groningen have been more extensively studied in relation to urban expansion, whereas smaller cities such as Elburg and Doesburg have received less attention. Given the national housing demand and current policies encouraging growth in regional cities, this thesis focuses on smaller, less-studied Hanseatic cities as case studies for urban growth.

Based on their scale and population size, Doesburg, Elburg and Hattum are identified as small cities. All three experience low housing demand pressure. However, they are located close to high-pressure regions or other Hanseatic cities with higher levels of demand. The study and comparison of the three sub-areas in each city reveal that Doesburg and Hattum are similar in structure, so a fourth and larger city is analysed to find differences. The fourth city is Zutphen, which is larger in size and population but still is one of the smaller Hanseatic cities. The three areas within these four cities are researched for their urban development potential through sketching the maximum densification; see Appendix 2 for the sketches and conclusions for each city.

Findings are evaluated for each city individually and then compared across all four Hanseatic cities. The comparison illustrates that Hattum, Zutphen and Doesburg are broadly similar in structure and therefore have the same changes when densifying. In contrast, Elburg has a different structure, leading to different outcomes when densifying, which makes this city an interesting case study for this thesis. Since Zutphen is the largest and most studied of the four cities, this city is less interesting in comparison to Elburg. Comparing Hattum with Doesburg, the municipality of Hattum has a more detailed vision for urban densification and heritage preservation, which makes Doesburg more interesting for further research. Therefore, the two case studies that will be researched and compared with each other for this thesis are Elburg and Doesburg.

Four Hanseatic cities and their three sub-areas.



1.4.5 Case Studies

Across the Netherlands, the growing national demand for housing is leading to a shift in urban development strategies towards expansion and densification in regional and historic cities. Limited building land encourages compact and sustainable urban growth. Densifying regional cities while respecting and reinforcing their historic identity offers an opportunity to alleviate the housing demand pressure on larger urban areas. The regional cities can play a vital role in addressing the national housing demand in a balanced and future-orientated way. Within this context, the Dutch Hanseatic cities form a part of the regional cities that will be densified.

The origins of the Hanseatic cities date back to the period between 1100 and 1200, when representatives of various cities formed a voluntary alliance to protect shared economic interests. Beyond trade, the exchange of knowledge, skills, and information became a defining feature of the network. Today, Hanseatic cities are characterised by a strong shared historical identity, close relationships with water, and unique geographical characteristics. Their heritage is not only seen as something to be preserved but also as a source of inspiration for future spatial development.

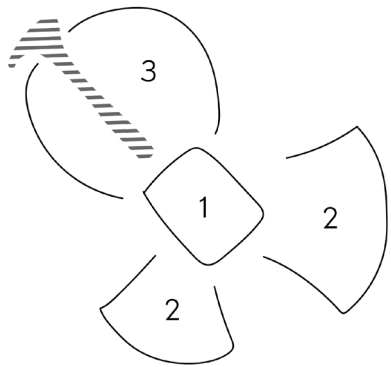
Policies in Hanseatic cities recognise this national shift and see the potential of regional and medium-sized cities in meeting housing needs. This makes it important to view historic city centres not only as areas requiring protection, but also as active contributors to future urban development. Many policies include the construction of new high-rise buildings, infill development, and the repurposing of historic buildings as methods for urban densification while also envisioning a future in which the local and historic identities remain.

The levels of pressure in housing demand within Hanseatic cities vary. In the two case studies, Elburg and Doesburg, the housing demand levels are currently relatively low. However, both cities are situated near high-pressure zones and close to larger Hanseatic cities experiencing a much higher demand. This positioning makes them relevant within the wider regional housing context.

Elburg seeks to densify through the introduction of new high-rise buildings while ensuring that its heritage remains both liveable and visible. As a protected cityscape, new developments must fit in the existing environment, preserving the characteristic street pattern and historic monuments. Doesburg focuses on densification through infill development, reuse, redevelopment, and repurposing existing structures. At the same time, it aims to strengthen connections between neighbourhoods while restoring and reinforcing historical values.

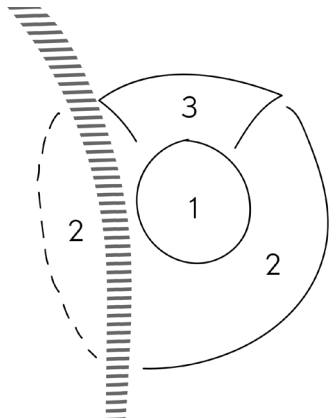
The two case studies are different in structure. Doesburg has a similar structure to other Hanseatic cities, like Hattem and Zutphen, while Elburg has a different structure. Although the cities are structured differently, they have two main similarities: their connection with the water and the three sub-areas, as described in the image. Like many other Hanseatic cities, the historic centre of Doesburg is situated along a river and has an expansion zone of neighbourhoods at the edges of the centre. Elburg used to be positioned by the sea and has a canal that stops at the edge of the historic centre, forming the port area. The city expanded by building new neighbourhoods that relate to the historic centre, but the historic centre is mostly surrounded by agricultural land.

Structure of Elburg



- 1. **Core, the historic centre**
This is the oldest part of the city and the main core. The historic centre is situated at the edge of a waterway, in this case a canal that used to lead to the sea.
- 2. **Neighbourhood expansion**
New neighbourhoods connecting with the historic centre.
- 3. **Port area**
This is where the larger industrial buildings are situated. This area is positioned along the water, which is a historic trade route.

Structure of Doesburg



- 1. **Core, the historic centre**
This is the oldest part of the city and the main core. The historic centre is situated along a waterway, in this case a river.
- 2. **Neighbourhood expansion**
This is the first expansion of the inner core. New neighbourhoods surrounding the historic centre. In larger cities the expansion also reaches to the other side of the river.
- 3. **Industrial or business district**
This is where the larger industrial buildings are situated. In most cities it is at the north or south side of the historic centre, also close to the water.

1.5 Problem

According to the BPD (n.d.), the national housing demand has reached a critical point, with the Randstad, Lelystad, and parts of Gelderland experiencing the highest pressure. This pressure is a result of a combination of population growth, changing household compositions, limited available building land, rising housing prices, and growing construction costs (Ministerie van Algemene Zaken, 2023). Historically, spatial and economic development in the Netherlands has been strongly centralised. The Randstad became the national economic core starting from the nineteenth century. In the meantime, the Hanseatic cities, which used to be the thriving centres of the Netherlands, gradually lost their economic position as international trade routes shifted towards the seaports because their inland location limited direct access to global trade (Visit Hanzesteden, n.d.).

Post-war spatial planning and national housing policies further strengthened growth within and around the Randstad. As a result, the housing demand and urban pressure increased rapidly in this region, leading to high environmental stress, infrastructure congestion, and reduced housing accessibility (Planbureau voor de Leefomgeving, 2011). More recent spatial planning strategies, for instance, the Ontwerp-Nota Ruimte (2025), envision regional growth as a strategy to relieve this pressure on the large urban areas (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 2025). This would mean that the focus of urban development shifts back to the historic Hanseatic cities.

The Hanseatic cities have potential to accommodate regional growth. They are well connected by a water network, lie within commuting distance of major economic centres, and have strong historic identities that contribute to urban quality. However, these cities also face the challenge of accommodating new housing developments without compromising their historic character. The problem addressed in this thesis is therefore how historic Hanseatic cities can grow into larger economic centres within their local character.

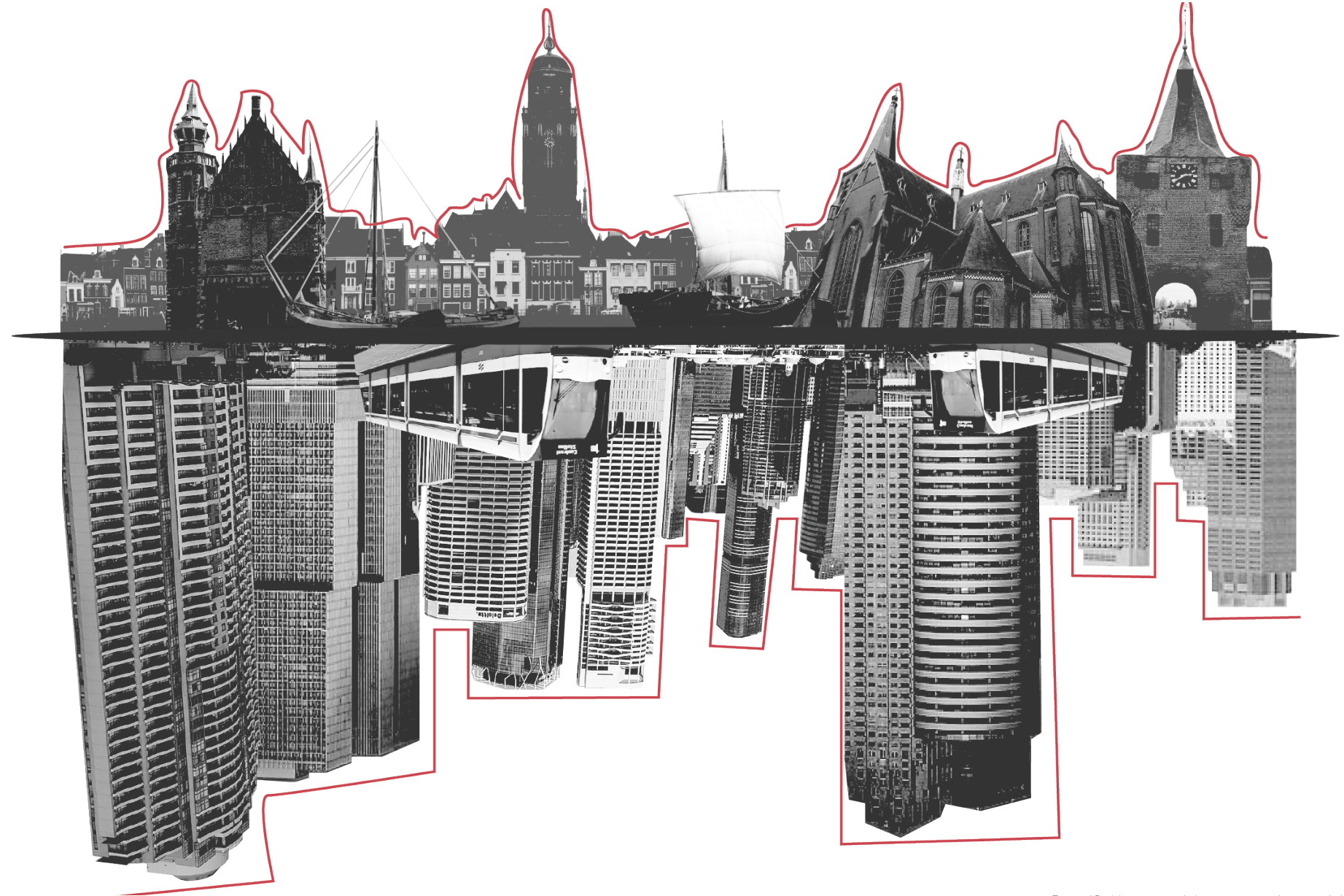


Figure 10: Historic city skyline versus modern city skyline

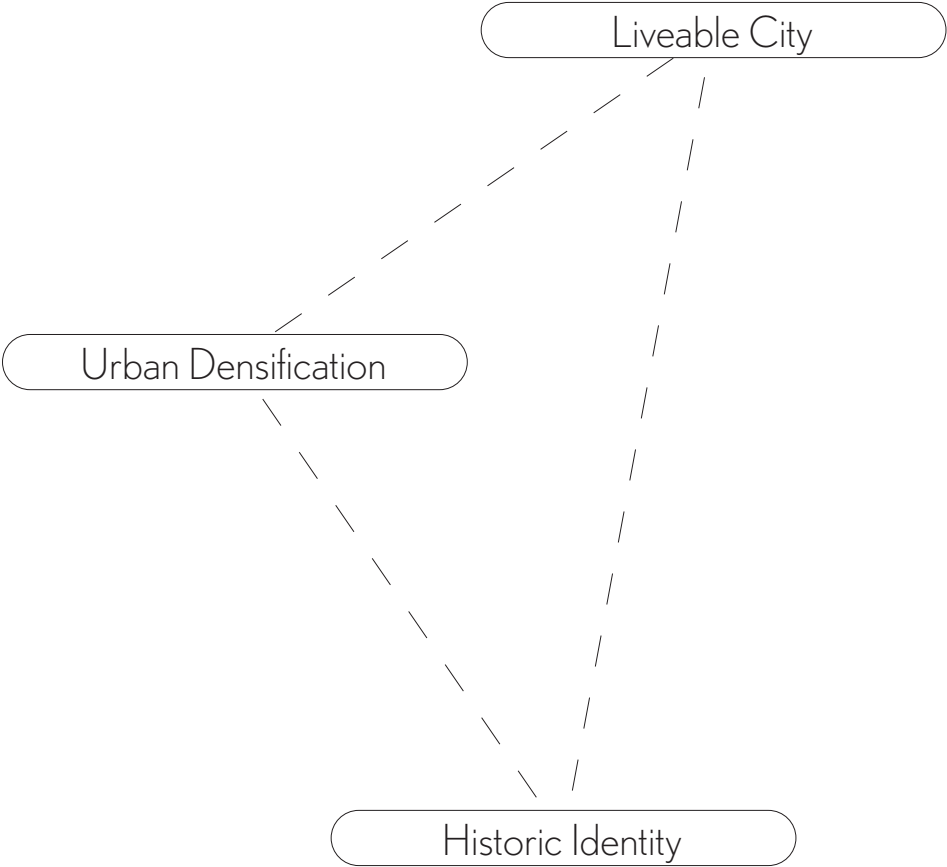
1.6 Research Aim

To understand the possibilities of urban densification in historic cities, this thesis uses the research of two Hanseatic cities as case studies. The research begins with a layered analysis of the historic cities, combining fieldwork and the mapping of environmental, social, and economic structures. This approach provides insight into the complex relationship between the cultural history, the liveability, and the spatial development.

The design-orientated research aims to propose healthier and more inclusive development strategies for these sensitive cities. It explores ways to integrate historical identity and spatial quality with the current needs for urban growth and sustainability, without one aspect overruling the other. As the figure shows, this thesis aims for a balance between these three dimensions.

Through a research-by-design approach, design interventions are developed and evaluated for different sub-areas within the Hanseatic cities Elburg and Doesburg. This process includes identifying both challenging and potential areas and developing scenario-based strategies at multiple scales: the regional scale, the city scale, and the local scale. Each design intervention is evaluated in relation to the preservation of historic identity, the qualities of the area and urban liveability. The criteria for a liveable historic city centre are based on research from fieldwork and mapping.

The outcome of this research is an integrated design proposal that combines historical elements with modern densification methods, offering a future-orientated vision for a sustainable and liveable development of historic cities.



1.7 Research Question and Sub-Research Questions

How can historic cities, using the Hanseatic cities Elburg and Doesburg as case studies, be sustainably densified with the site-specific qualities and unique local identity as a driver for urban growth?

- Sub-Research Question 1

How can spatial elements affect urban **liveability**?
- Sub-Research Question 2

What is **sustainable densification** in the context of historic centres?
- Sub-Research Question 3

What are the key historical, architectural, and cultural **characteristics that define the identity of the Hanseatic cities** Elburg and Doesburg?
- Sub-Research Question 4

Which characteristics are **most vulnerable to change** when new housing developments are introduced?
- Sub-Research Question 5

Which design interventions can be implemented to densify the city while contributing to the quality and cultural-historical **identity** of a Hanseatic city?

02

Methodology

- ☐ 1. Methodological Framework
- ☐ 2. Theoretical Framework
- ☐ 3. Conceptual Framework
- ☐ 4. Scales
- ☐ 5. Approach

2.1 Methodological Framework

2.1.1 Framework

To develop the vision and design, a comprehensive multi-method research approach is applied, structured into four phases: orientation, research, design, and evaluation. Thematic focus, literature review, and contextualisation form the basis for formulating the problem statement. The research and design phases are conducted iteratively, shifting between the overarching vision and specific design interventions. A conceptual framework is developed to understand the main problem and objective of this thesis: sustainable densification in historic city centres. This framework structures the research questions and outlines the required analyses, which are further specified in the sub-research questions.

The main research question addressed in this thesis is, "How can historic cities, using the Hanseatic cities Elburg and Doesburg as case studies, be sustainably densified with the site-specific qualities and unique local identity as a driver for urban growth?" To answer this question, the research first examines how spatial elements influence urban liveability. A literature review explores theories and concepts on sustainable development, urban densification, the carrying capacity of cities, and historic preservation, forming the theoretical foundation for the first three sub-research questions and informing the overall theoretical framework.

To further address the third sub-research question, "What are the key historical, architectural and cultural characteristics that define the identity of the Hanseatic cities?" a research-by-design approach is applied. This design-based exploration also informs the fourth sub-research question, which examines which of these characteristics are most vulnerable to change when new housing developments are introduced. Throughout the research phase, a variety of methods are applied, including analytical and data-based mapping, fieldwork, policy analysis and a historical analysis. Scientific literature complements the spatial and empirical analyses, deepening the understanding of the key themes explored in the thesis.

The design is further developed through two case studies, Elburg and Doesburg, which synthesise the findings from the previous sub-research questions. These case studies explore the final sub-research question: "Which design interventions can be implemented to densify the city while contributing to the quality and cultural-historical identity of a Hanseatic city?" The outcomes of this design exploration serve as a guide for urban development strategies in similar historic cities. The thesis concludes with a reflection on the main research question and a synthesis of all sub-research questions, presented in the last chapter.

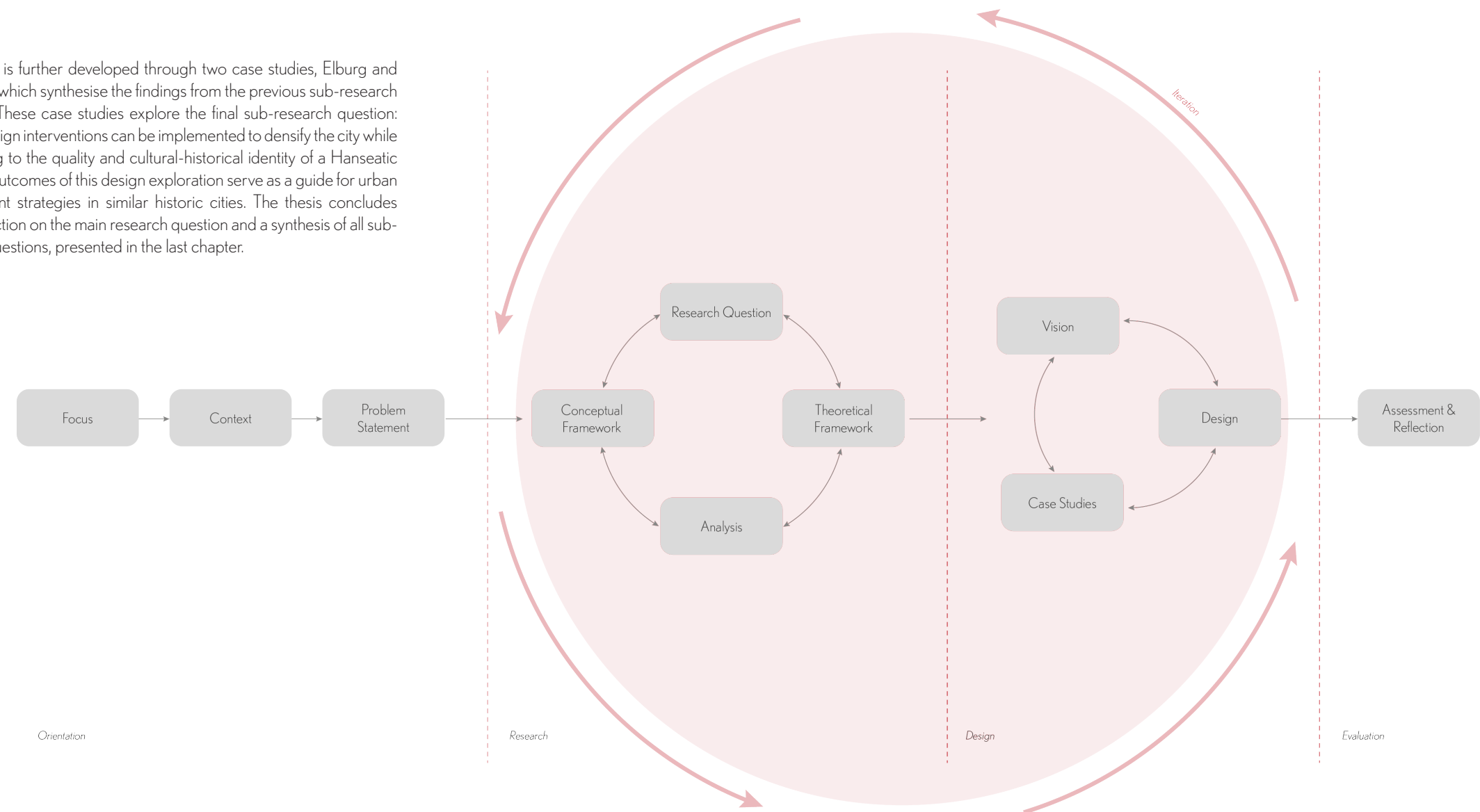


Figure 11: Methodological Framework

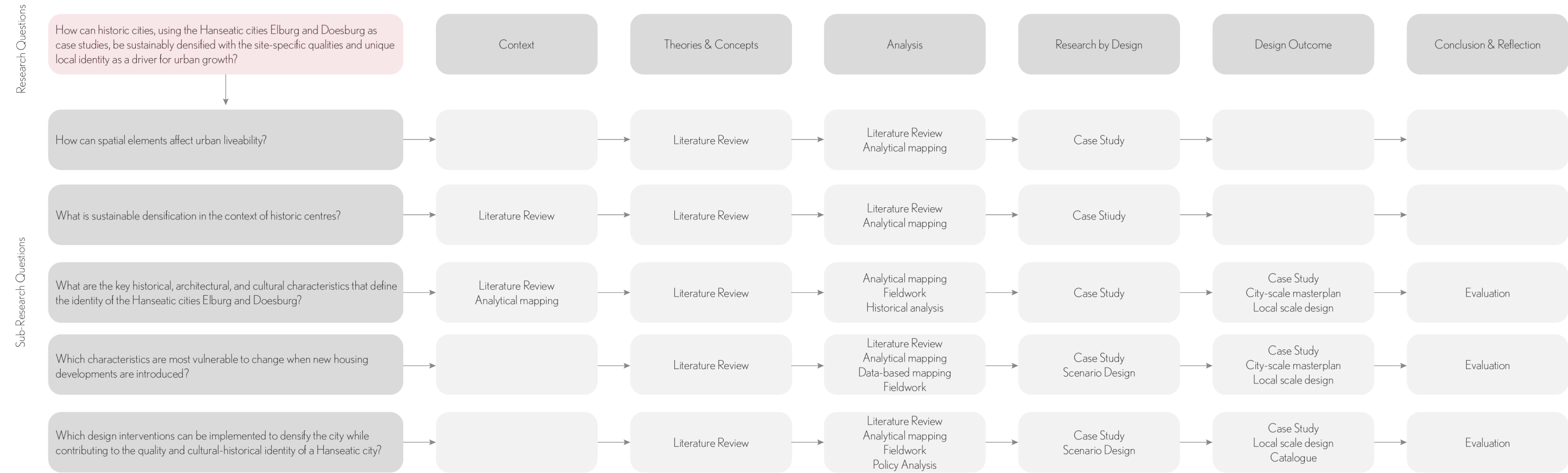


Figure 12: Methods per Sub-Research Question

21.2 Methods

The methods in figure 12 are used to answer the research question of this thesis. This chapter explains how each method is applied during the research and design process.

Literature Review

Various theories and concepts will be analysed to establish the theoretical framework of the thesis. The literature review will involve the collection and critical evaluation of relevant academic sources, policy documents, and planning strategies. Combined with analytical mapping, this process will support the identification of suitable case studies and provide a solid critical foundation for conducting research by design.

Analytical Mapping

To further research the selected case studies, mapping will be used as an analytical tool to examine different spatial, social, and environmental layers. The findings of the mapping exercises will be compared to draw conclusions and gain deeper insights into the vulnerabilities and potentials of the case studies. This comparative approach will help identify spatial patterns, challenges and opportunities related to urban densification.

Data-based Mapping

Data-based mapping will be used to visualise and analyse quantitative information, including demographic trends, land use, building density, mobility patterns, and environmental indicators. This method will support an evidence-based understanding of the urban context.

Fieldwork

Fieldwork is required to gain a deeper understanding of the key characteristics of the selected case studies. This will include on-site observations, field notes, and photographic documentation, which contribute to a more detailed and contextual analysis of the urban environment. The findings from fieldwork complement the analytical and data-based mapping by providing qualitative insights into everyday spatial conditions.

Historic Analysis

To understand the spatial, social, and morphological development of the selected areas over time, a historical analysis will be used as a research tool. This analysis will identify key historical layers, transformation processes and heritage values that have shaped current urban structures. Understanding these historic conditions is essential for developing sensitive and context-specific densification strategies in historic city centres.

Policy Analysis

Policy documents will be analysed to understand current planning frameworks, regulations, and strategies related to urban growth and housing development. This will include a review of local, regional, and national planning policies to identify challenges, opportunities and gaps that influence densification processes in historic urban areas.

Case Study

Two case studies will be used to test the proposed design ideas and tools through research by design. Within each case study, different areas will be compared, and the two case studies will also be evaluated in relation to one another to identify similarities, differences, and transferable insights. This comparative approach will support the development of adaptable design strategies.

Scenario Design

Scenario design will be applied to explore alternative futures for the selected case studies. Based on the analytical findings, different densification scenarios will be developed and tested to assess their spatial, social, and environmental implications. This method enables the evaluation of design choices and supports informed decision-making throughout the design process.

Final Outcome

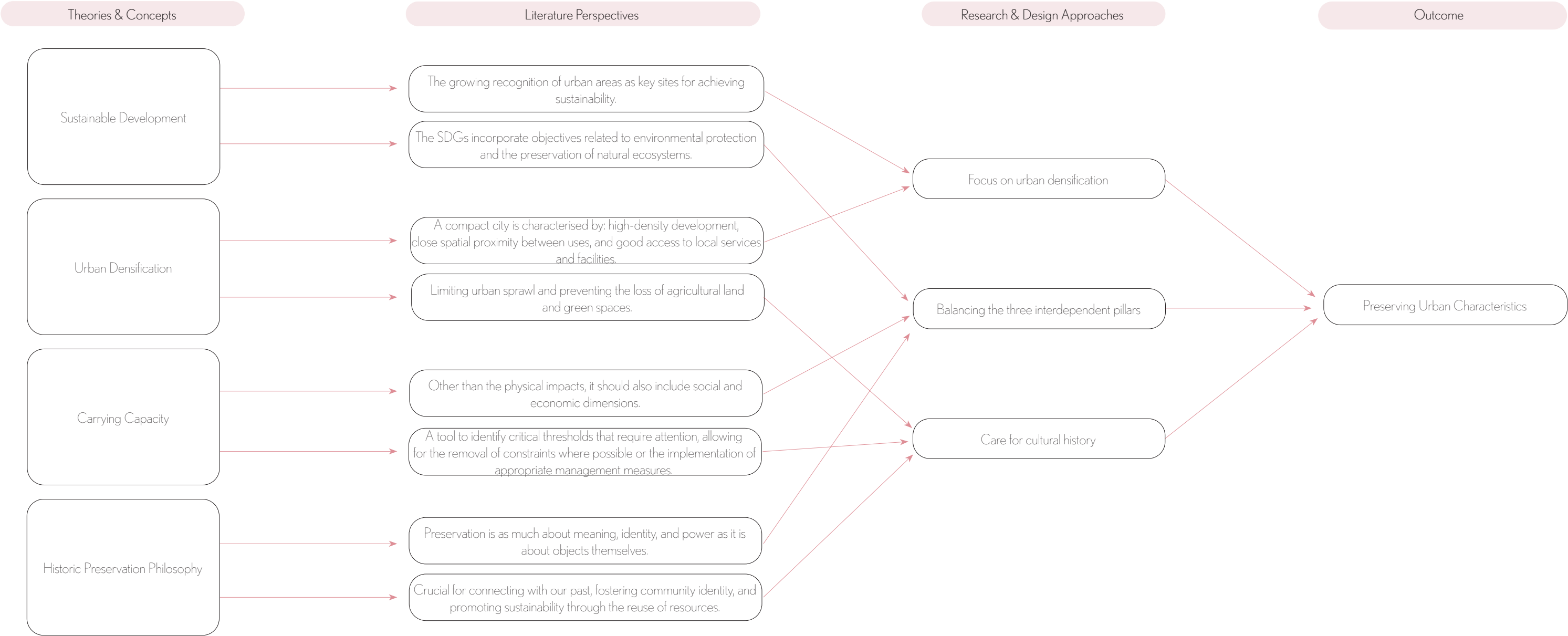
Through the application of these methods, the research questions will be addressed, leading to a synthesis that forms the final outcome of the thesis. These outcomes will include:

- A city-scale masterplan with urban densification strategies.
- A catalogue of design interventions for each sub-area.
- A local-scale design proposal with detailed sections.

The catalogue will be a collection of design tools and strategies for urban densification, each focusing on preserving the characteristics and qualities that contribute to the identity of the Hanseatic city. It can serve as a guide for future planning strategies in historic-sensitive areas with similar characteristics and qualities.

2.2 Theoretical Framework

2.2.1 Framework



2.2.2 Theories and Concepts

Sustainable Development

Sustainable development refers to development that meets the needs of the present without compromising the ability of future generations to meet their own needs, a definition most widely recognised following the World Commission on Environment and Development (1987). Sustainable development seeks to balance economic growth, social equity and environmental protection, ensuring that development can be maintained over the long term. This approach is traditionally understood through these three interdependent pillars. However, in 2012, governance was introduced as a fourth pillar, recognising the essential role of effective institutions and decision-making processes in achieving sustainability (Shi et al., 2019). Although concerns on using sustainable resources emerged before 1972, sustainable development evolved into a global action framework, resulting in the 17 Sustainable Development Goals (SDGs) in 2015 as part of the United Nations' 2030 Agenda. The SDGs provide a universal framework to address global challenges such as poverty, inequality and climate change.

Goal 11 of the SDGs explicitly focuses on sustainable cities and communities, highlighting the growing recognition of urban areas as key sites for achieving sustainability. One of the targets within this SDG is the development of safe and affordable housing. Another target is to protect the world's cultural and natural heritage by strengthening efforts to protect and safeguard the heritage (United Nations, 2021). These targets align with the research aim of this project. Therefore, sustainable densification in the context of historic centres and the rising national housing demand focuses on developing affordable housing and protecting the natural and cultural heritage of the site.

Urban Densification

Urban densification can be described as a concept of compact city planning and is applied as an international planning approach (Jenks and Colin, 2010). A compact city is characterised by three key features: high-density development, close spatial proximity between uses, and high access to local services and facilities (OECD, 2012). The aim of urban densification is to accommodate population growth in large cities and suburban areas while limiting urban sprawl and preventing the loss of agricultural land and green spaces.

Urban densification can be implemented through a variety of approaches. One approach, known as infill development, focuses on building on vacant plots and closing gaps between existing structures within the urban fabric. This method involves developing the rear spaces or 'backyards' of existing buildings, leading to horizontal expansion (Marique & Reiter, 2014). A second approach is the subdivision of houses, which can also be referred to as soft densification. This method enhances housing capacity on already developed land by increasing the number of dwelling units within existing buildings (Dunning et al., 2020). The third method, roof stacking, involves adding extra storeys to existing buildings to increase residential capacity (Amer et al., 2017). The fourth method leads to a growing city, with urban expansion instead of densifying within existing structures. This method can be applied when the other methods are not desirable or possible (Pelczynski, J., & Tomkiewicz, B., 2019).

An elaboration of each densification approach and its possibilities is provided on page 50.

Carrying Capacity

According to Mathieson & Wall (1982), the carrying capacity refers to the maximum number of people who can use a site without causing unacceptable changes to the physical environment or a significant reduction in the visitors' experience. This definition primarily emphasises physical impacts, while O'Reilly (1986) expands the concept by arguing that carrying capacity also includes social and economic dimensions. Each of these three subsystems, the physical, social and economic, addresses different aspects of capacity.

Physical carrying capacity concerns the limits of a historic building or site and is often assessed through the long-term environmental damage it may experience. Within this dimension, perceptual capacity focuses on behavioural factors related to the quality of experiences. It represents the lowest level of enjoyment visitors are willing to tolerate before choosing alternative sites. Social carrying capacity refers to the level of crowding that existing residents are willing to accept from visitors. Economic carrying capacity describes a location's ability to accommodate new functions or activities without displacing valuable local economic practices. The carrying capacity of these three subsystems is influenced by two main factors: the characteristics of future residents and the characteristics of the site and its existing population. Key factors related to new residents include their socioeconomic profile and intensity of site usage. Characteristics of the site and current population include environmental conditions, economic structure and development, social organisation, and political governance (O'Reilly, 1986).

These theories are applied for the study of the maximum carrying capacity of tourism. However, this theory can also be applied for the maximum density of population in a city. It would translate into measuring the maximum amount of population growth a historic site can reach within the carrying capacities of three subsystems. Ultimately, carrying capacity depends on the specific objectives set for each development. It can be used as a tool to identify critical thresholds in these historic centres that require attention, allowing for the removal of constraints where possible or the implementation of appropriate management measures.

Historic Preservation Philosophy

The philosophy of historic preservation focuses on valuing and safeguarding both tangible and intangible heritage, including buildings, objects, landscapes, and traditions, as resources for understanding the past and inspiring the present and future. It emphasises authenticity, sustainability, and the storytelling of a site through minimal intervention and adaptive reuse. Historic preservation is not only the protection of artefacts, but it is an ongoing dialogue with history, seeking continuity by preserving the craftsmanship, cultural values, and narratives that these places represent (Matthes, 2016).

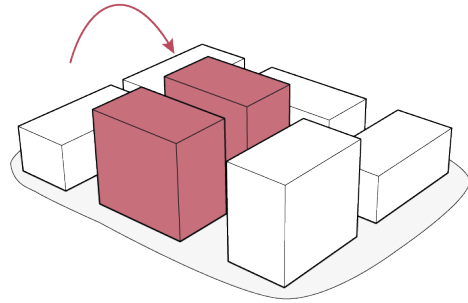
Several theories support the importance of historic preservation. The theory of enlightenment historicism observes the past as valuable and worthy of study and protection as a record of human progress (Liebel, 1971). Historic preservation, from this perspective, honours historical continuity rather than only facilitating the reuse of old structures. From the theory of romanticism, the emotional, symbolic, and aesthetic meanings of ruins and historic sites are emphasised. Within this context, historic preservation serves as a moral and emotional responsibility rather than only a scientific one (Schönle, 2012). At last, the Cultural Heritage Theory, supported by UNESCO (2021), considers heritage as socially constructed, explaining that preservation is as much about meaning, identity, and power as it is about the physical objects themselves.

Historic preservation is a philosophical concept supported by several theories. Cities and cultures should protect their built heritage, as it is essential for connecting with our past, giving the community identity, and promoting sustainability through the efficient reuse of resources. In this project, the historic centres of Doesburg and Elburg are analysed. To identify the characteristics that define urban identity and quality, this project examines both the physical and empirical elements of different sites.

2.2.3 Building Blocks

These four densification approaches represent different strategies for accommodating urban growth and increasing housing capacity. Each method offers different opportunities and challenges regarding land use, infrastructure, environmental impacts, and the preservation of existing urban structures.

Infill Development

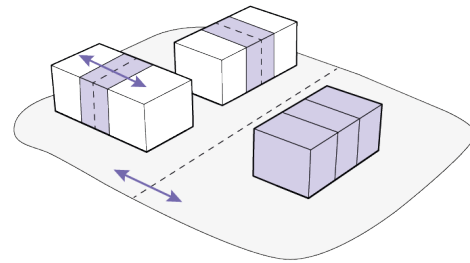


Infill development refers to the construction of new buildings on vacant lots, gaps between buildings, underutilised land or built-up areas currently used for other purposes.

This method offers several advantages, including reusing abandoned or underutilised areas and the efficient use of existing infrastructure. This helps preserve the urban fabric and its characteristics. When adding space to the same property, the overarching urban character can be maintained, and large-scale alterations in the urban environment can be avoided. However, this method also has less positive outcomes. New developments may occupy current spaces for vegetation or spaces with the potential for recreational functions. This intensification of land use can result in a reduction of green areas and, therefore, the increase of the urban heat island effect. Because of a higher number of residents with the same destination, infill developments often require adjustments to transport infrastructure, mobility strategies, and urban services to accommodate this increased demand (Amer et al., 2017).

When mapping possibilities for infill development, the focus should be on open or vacant spaces that are unused or underutilised and sites located near existing infrastructure, as these areas offer the best potential for development with minimal disruption.

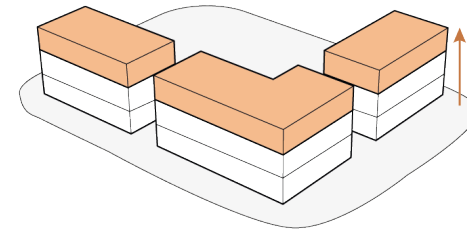
House and Plot Splitting



The splitting of housing and plots involves increasing units within existing buildings and adding new housing on existing plots.

In the method of splitting houses, current buildings are divided into multiple dwellings. The main advantage is that this approach uses already built-up land and therefore avoids new extensive developments and additional land use. This results in a more efficient use of existing urban space while limiting further spatial expansion. The success of this approach heavily relies on supportive local regulations and the ability to overcome potential market and planning barriers. Local and neighbourhood oppositions may also affect the possibility of this development (Amer et al., 2017). Another disadvantage could be the limitations due to the characteristics of the site, including dwelling sizes and monumental buildings. According to Volkshuisvesting Nederland (2025), the minimum permitted dwelling size varies by municipality, ranging from 45 to 85 m². When the subdivision of a building is difficult, another approach can be applied where the plot is split for new housing. For example, subdividing monumental buildings into multiple dwellings is permitted, but under strict conditions, and it requires approval from both the municipality and the Rijksdienst voor het Cultureel Erfgoed.

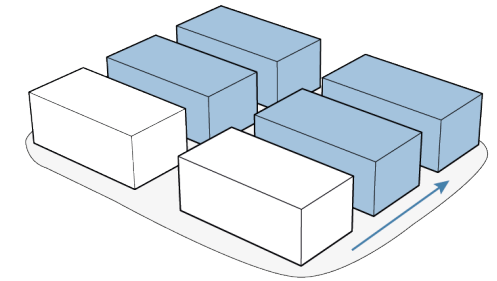
Roof Stacking



Roof stacking involves adding new structures over the rooftop of an existing building to create one or more stories of living spaces.

Together with the approach of housing division planning, the method of roof stacking also does not occupy additional urban space. It preserves the existing urban landscape, including existing infrastructure. Roof stacking is therefore a relatively simple and rapid solution for already urbanised areas and makes it a suitable planning approach for dense urban environments with limited building land. However, the potential to increase density is often limited, and vertical extensions alter the city skyline and urban morphology. Adding floors to existing buildings requires careful assessments of structural capacity, including the strength of the building and its foundations. In addition, the growing number of residents on a site leads to necessary adjustments of the mobility systems and the addition of urban services (Amer et al., 2017). There is also a possibility in constraints related to heritage buildings. Roof stacking is rarely permitted on monumental buildings and requires a special authorisation (Volkshuisvesting Nederland, 2025).

Urban Expansion



Urban expansion describes the outward extension of built-up areas into surrounding rural land.

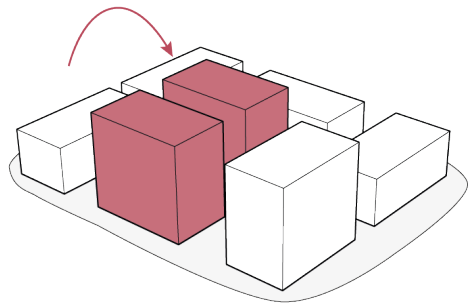
The final method, urban expansion, refers to the physical extension of cities into the surrounding land. This method is often a result of population growth and economic development and is facilitated by the increasing housing demand and limitations of building land within urban structures. As cities expand outward, development may take the form of fragmented, low-density urban sprawl or more compact infill patterns, depending on governance structures, existing or new infrastructure, and natural constraints.

The main advantage of urban expansion is that it results in minimal disruption of existing urban spaces and structures, as development occurs beyond the established city. However, this approach also presents significant disadvantages. Urban expansion often leads to the loss of agricultural land and green spaces and the disruption of ecosystems. In addition, it increases commuting distances, infrastructure costs, and energy consumption. These impacts can reduce overall energy efficiency and raise long-term environmental and economic challenges (Pelczynski & Tomkowicz, 2019).

2.2.3 Building Blocks

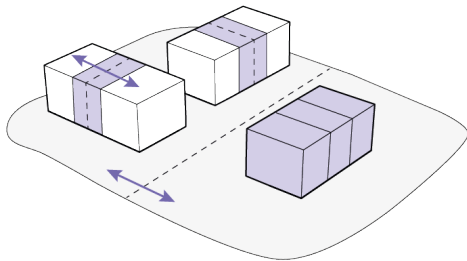
The four densification approaches are divided into multiple methods that can be applied in the sub-areas of the cities. The different approaches are matched with the three sub-areas of the two cities. The methods are tested in design interventions and evaluated with the criteria of the sub-area that is based on the quality and identity of the site.

Infill Development



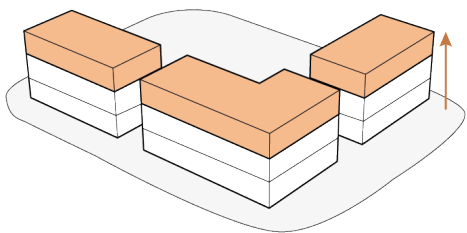
- Parking lots
Adding buildings on current parking lots.
- Empty corners
Adding buildings on non-built corners of streets.
- Vacant plots
Adding buildings on vacant lots and gaps between buildings.
- Along main roads
Adding buildings in public space along main axes/roads.

House and Plot Splitting



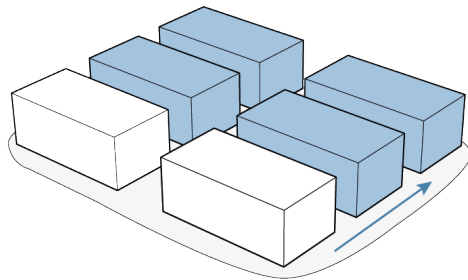
- Splitting houses
Divide a building into multiple dwellings.
- Splitting plots
Divide plots into multiple plots for new housing.
- Adding buildings on one plot
Building houses on the same plot, leading to two houses on a shared plot.
- Rental agreement
Renting a room to someone else and sharing living space.
- Transformation
Repurpose shops, companies, others or parking lots into housing.

Roof Stacking



- Adding meters
Adding extra metres on the top floor, to make a house more liveable, bigger and suitable for families.
- Adding floors
Adding more floors to an existing building, leading to more housing.

Urban Expansion



- Urban Expansion
Creating a new urban grid at the edges of current urban fabric.

2.3 Conceptual Framework

The conceptual framework in figure 13 focuses on the integration of historic cities within modern developments, addressing the complex socio-economic challenges of urban densification in Hanseatic cities. It integrates three core dimensions, society, economy, and ecology, with the aim of preserving historic identities while accommodating urban growth. This objective is supported by design interventions at the local scale.

The economical dimension seeks to strengthen and stimulate local economies, with the overarching goal of reducing housing demand pressures. It explores the carrying capacity of local economies and how they can adapt to growing cities while maintaining their regional and local character.

The social dimension focuses on preserving the city's historic narrative and identity. It aims to enhance residents' sense of ownership and promote inclusivity in the densification process, focusing on the social aspects of urban liveability. The city's identity and characteristics are used as a source of inspiration for design interventions.

The ecological dimension addresses the environmental challenges associated with urban densification. It examines the ecological factors, including the urban heat island effect and the amount of public green spaces, aiming to mitigate environmental risks and maintain a balanced and sustainable urban environment.

Together, these three dimensions form a synergetic framework that integrates social, economic, and ecological aspects, advocating for a liveable and resilient future for historic city centres, with the case studies of Elburg and Doesburg.

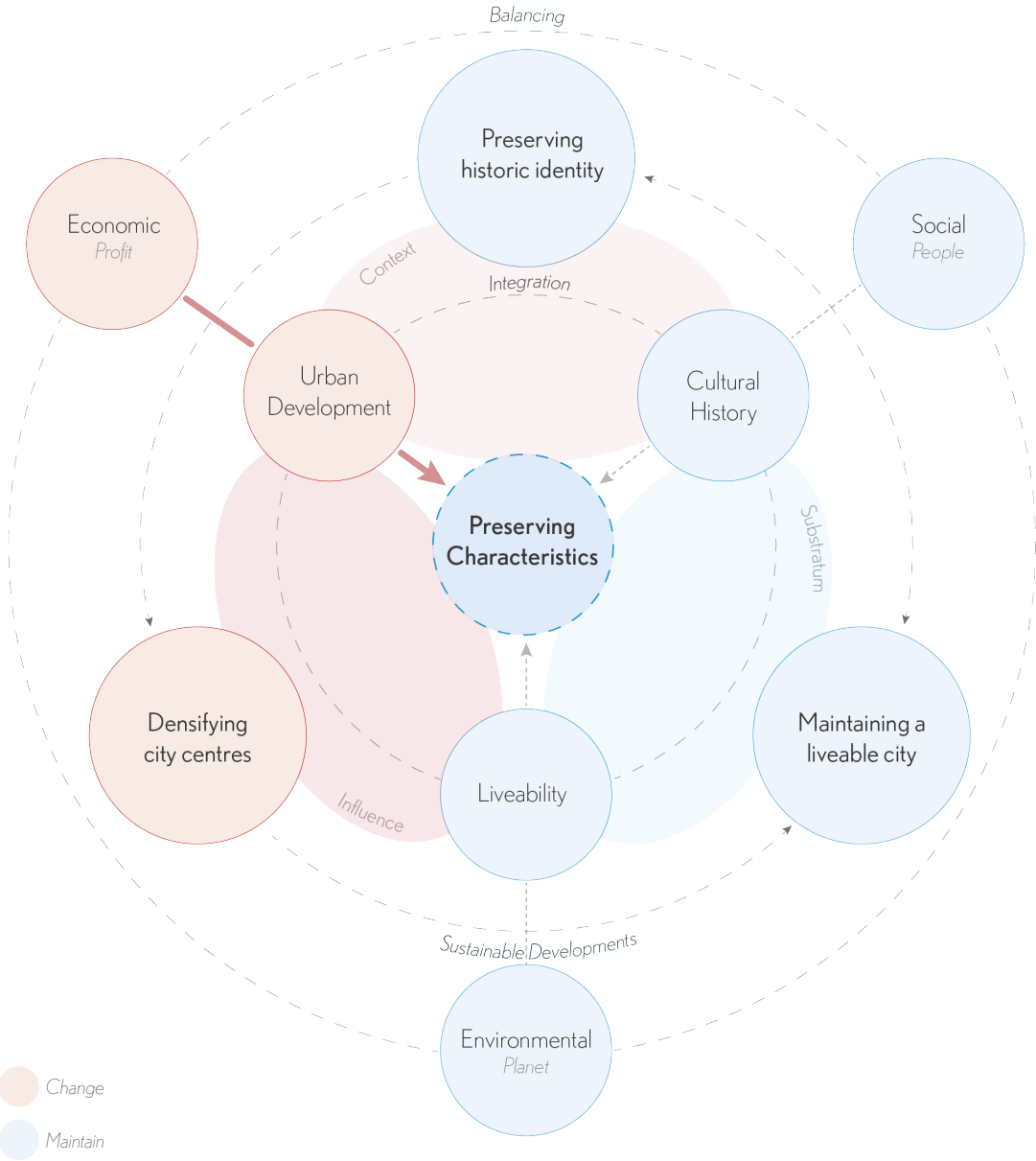
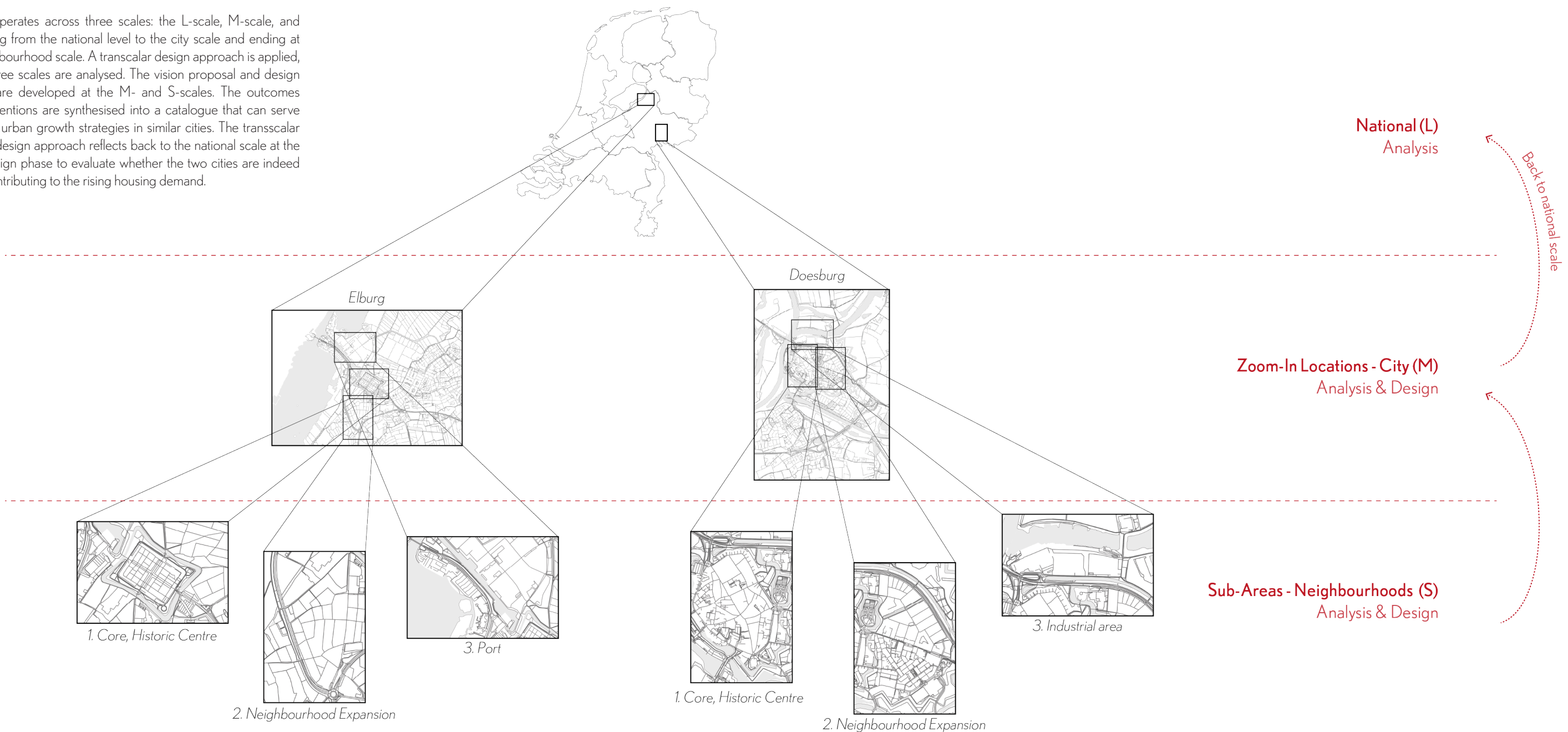


Figure 13: Conceptual Framework

2.4 Scales

This project operates across three scales: the L-scale, M-scale, and S-scale, starting from the national level to the city scale and ending at the local neighbourhood scale. A transcalar design approach is applied, in which all three scales are analysed. The vision proposal and design interventions are developed at the M- and S-scales. The outcomes of these interventions are synthesised into a catalogue that can serve as a guide for urban growth strategies in similar cities. The transscalar research and design approach reflects back to the national scale at the end of the design phase to evaluate whether the two cities are indeed suitable for contributing to the rising housing demand.

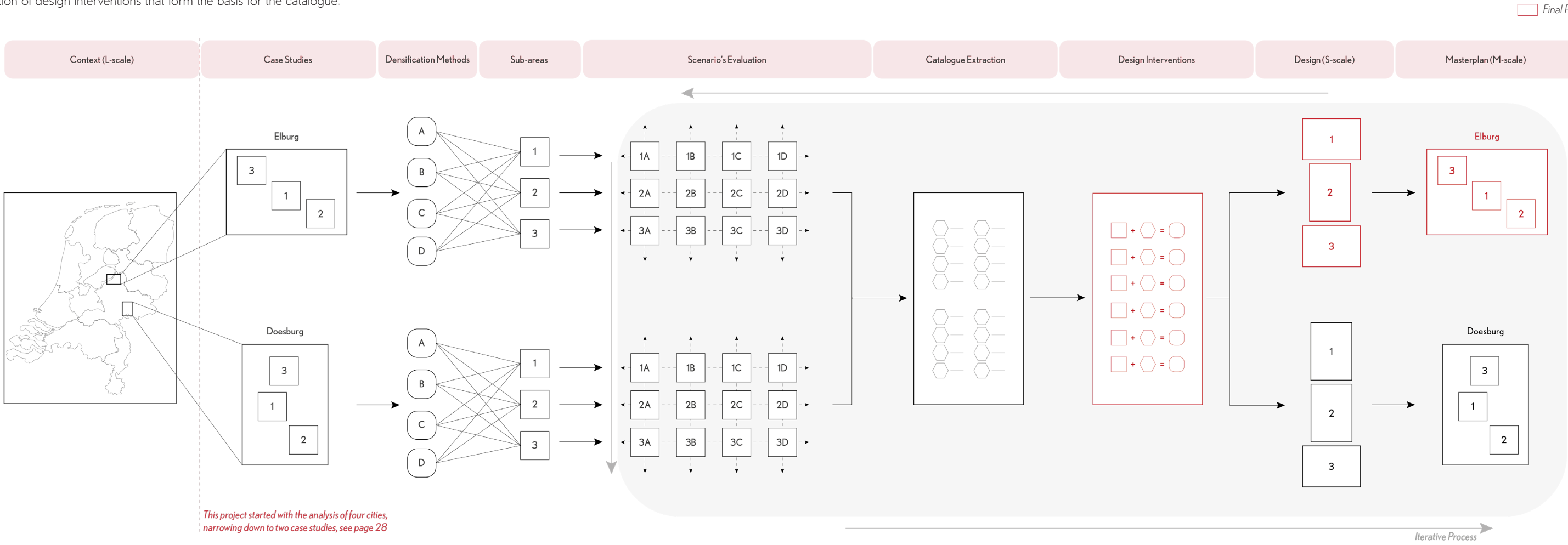


2.5 Approach

The introduction of this thesis presents a small part of the research approach, including the method for selecting two suitable case studies; see page 28. This chapter outlines the approach for the entire research of the two case studies, Elburg and Doesburg.

The research begins with an analysis of the different densification methods applied within the sub-areas of the case studies, Elburg and Doesburg. These methods are evaluated and compared in terms of their maximum carrying capacities. The findings of this analysis lead to the extraction of design interventions that form the basis for the catalogue.

These design interventions, aimed at preserving the city's identity, are researched and tested. The design is further detailed on the local scale, which then leads to the masterplan on the city scale. The catalogue can be applied in the design of the sub-areas of the case studies, and it can also serve as a guide for housing developments in other cities with similar characteristics. Because of the research-by-design approach, the last part of the study is conducted iteratively, in which each step is evaluated. In the final products, this thesis focuses on Elburg. This is further explained after the analysis of the two cities on page 154.



03

Analysis

- ☐ 1. Elburg
- ☐ 2. Doesburg
- ☐ 3. Elburg and Doesburg

3.1 Elburg

Elburg is a small, historic city in the province of Gelderland in the Netherlands and is known for its well-preserved medieval structure. The city was officially granted city rights in 1233, and in the late fourteenth century it was rebuilt in a rectangular layout after being relocated due to flooding. This unique grid pattern is still clearly visible today, giving Elburg a unique historical character.

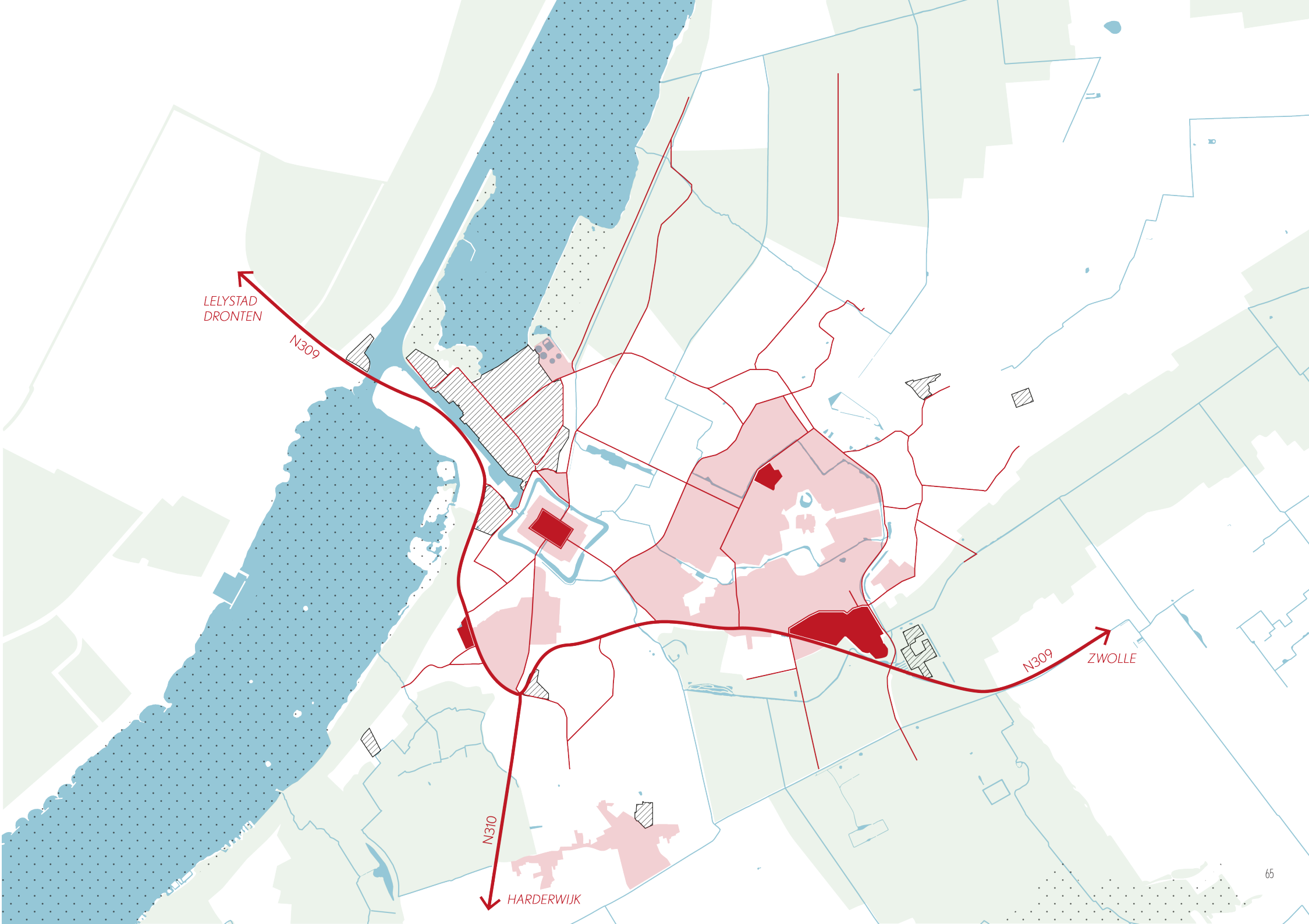
The old city centre is surrounded by medieval walls and fortifications to historically protect its inhabitants. Visitors can enter through the gate, the Vischpoort, which is a reminder of Elburg's rich trading past. During the Middle Ages, Elburg was an important member of the Hanseatic network, benefiting from its strategic location near the Zuiderzee, now known as the Veluwemeer. Today, Elburg attracts tourists with its cobbled streets, traditional merchant houses, small museums, and a harbour filled with historic fishing boats.



Figure 14: Elburg Haven (Flickr, Bert Knottenbeld, 2010)

31.1 Structure

The structure of Elburg has a main focus point, which is the historic centre and its fortifications. The city consists of three distinct areas, the historic centre, the two expansion neighbourhoods, and the port and industrial area. The large neighbourhood expansion in the east has its own centre. With the two neighbourhoods, the city mainly functions as a residential area. Elburg has one main road that connects the city with the province of Gelderland and Flevoland, connecting Elburg with larger cities such as Zwolle, Lelystad, Dronten, and Harderwijk. The city is surrounded by nature-protected sites, EHS and Natura 2000. The Veluwemeer is a part of Natura 2000.



Functions

- Water
- Centre
- Residential
- Industrial
- EHS
- Natura2000
- Primary roads
- Secondary roads



3.1.2 Historic Development

Through the years Elburg has historically developed from a small, compact settlement surrounded by nature into a larger and connected urban area. In 1815, Elburg was a fortified place near the Zuiderzee with only a few roads connecting the city to the surroundings. Gradually, more connections with nearby villages arise, and the city starts to expand beyond its original boundaries. More buildings appear along important roads, and the infrastructure network improves. Over time, new neighbourhoods are built around the historic centre, increasing both the size and population of the city. Eventually, the city spreads further into the surrounding landscape. The following densification methods are applied over the years:

- Infill development
Empty spaces within the original city walls and later between buildings are gradually filled with new houses.
- Edge expansion
The city grows outward from the historic centre, adding new neighbourhoods around it.
- Linear development along roads
Buildings spread along main roads connecting the city to nearby villages, increasing density along these routes.
- Densification of the historic centre
The old core becomes more compact as more buildings are added within the same area.



1815
A small fortified settlement at the coast with only a few surrounding roads.



1900
The town remains compact but begins to connect to nearby villages through simple road networks.



1940
The city is expanding beyond its original walls, with more buildings appearing along the main roads.



1960
Infrastructure improves and the city grows outward, especially toward inland agricultural areas.



1980
New neighbourhoods develop along the main roads and around the historic centre, increasing the urban area. A new connection with Flevoland adds to the main roads and emphasises the industrial area.



2000
The city continues to spread along roads and into surrounding land, forming a more complex and connected urban landscape.



Source: Topotijdreis.nl

3.1.3 Urban Profile

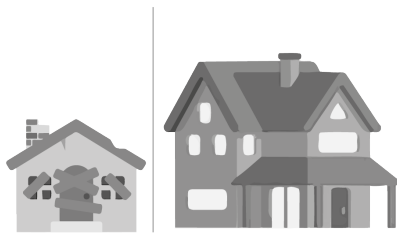
The social-spatial structure of Elburg is described through the indicators of age distribution, household composition, housing typologies, mobility patterns, economic activity and the current housing supply. This research adds to a deeper understanding of the current inhabitants and will help with identifying the needs of future residents when new housing developments are introduced.



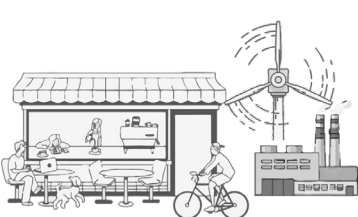
Age
The largest group, with 26.3%, are 45-65 years old, and the second and third groups following are 65+ and 25-45 years old. This suggests that the city is an attractive place for families and retirees.



Households
Elburg consists of 83% single-family homes and 17% multi-family homes. This small number of multi-family households can restrict rental options and challenge affordability for one-person households, young professionals, or other smaller households.



Occupancy
The city shows a very high level of building occupancy, with only 2% of the buildings uninhabited. This low vacancy rate indicates a healthy housing market and steady demand for living in Elburg.



Businesses
In Elburg, most businesses are in trade and hospitality, followed by industry and energy. This highlights a service-orientated local economy with a strong focus on tourism and commerce. The industrial and energy sectors provide jobs and economic diversity, supporting both residents and regional development opportunities.



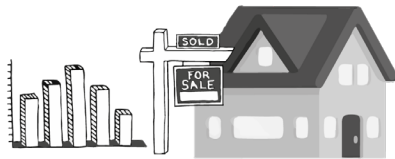
Owners versus renters
61% of homes are owner-occupied; a small portion is private rental, and the remainder belongs to housing associations. This indicates a stable, long-term residential environment, moderate rental options, and a reliance on social housing to support affordability and community diversity.



Housing typologies
Housing is dominated by 42.4% terraced houses, followed by 20% end-terrace houses and 16% apartments, while detached and semi-detached homes form the smallest share. This mix also emphasises family-orientated housing and supports moderate density.



Car use
With 1.28 cars per household, the city shows high car dependency, reflecting suburban living and limited public transport use. This impacts traffic, parking demand, and challenges sustainable urban development and environmental goals.



Housing supply
The city has a housing stock of 5,326 units, indicating a relatively small residential market. This affects supply, affordability, and growth potential, shaping development strategies.

Source: Woonplaats Elburg in Cijfers en Grafieken. AlleCijfers.nl, 2026

3.1.4 Commuting City

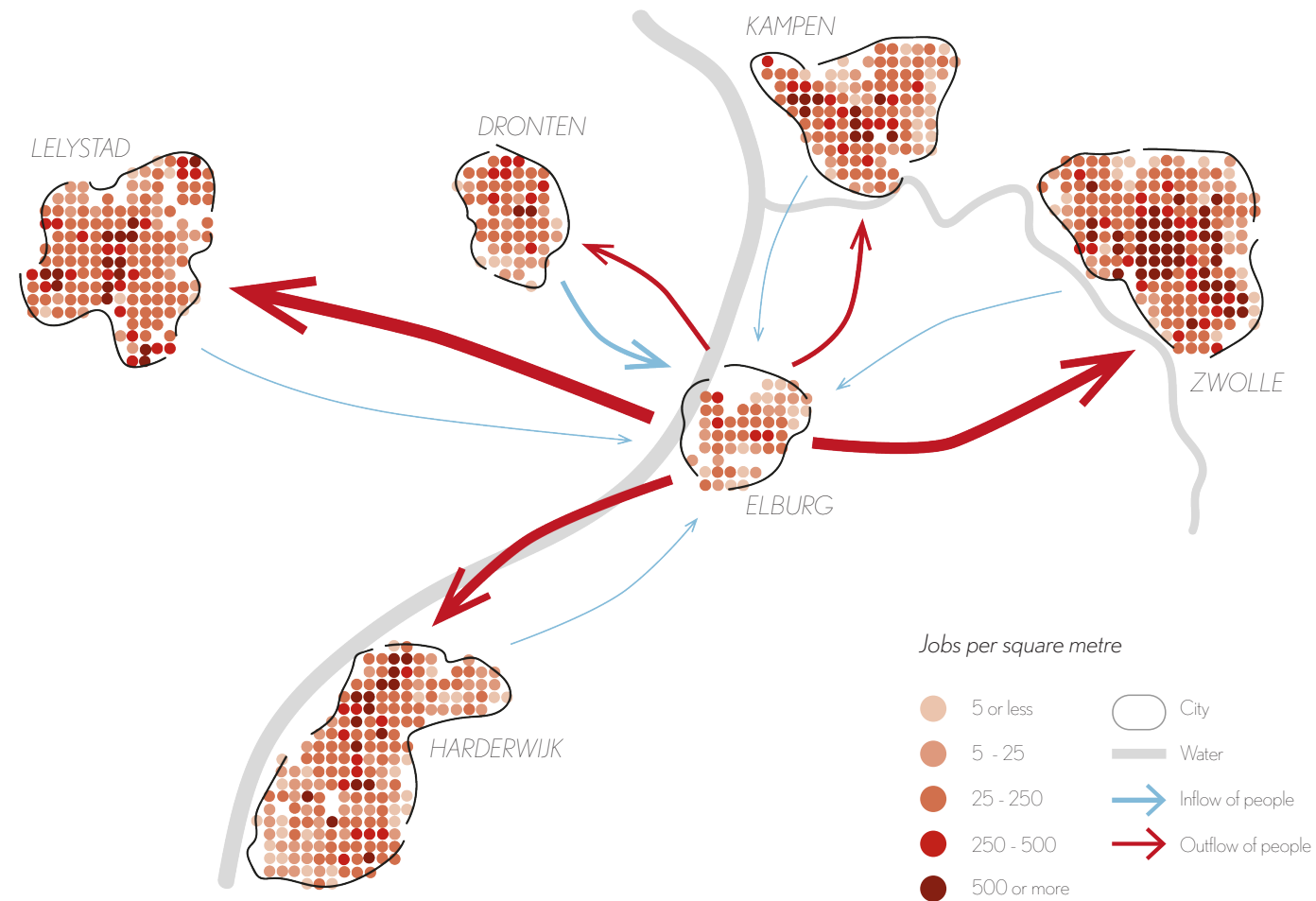
Jobs per square metre
In the analysis of the amount of jobs per square metre, Elburg has a significantly lower number of jobs in comparison to surrounding cities. Lelystad and Zwolle both have a higher density of jobs per square metre. As a result, Elburg has a bigger daily outflow of people than inflow. This outflow means that many residents leave the city every day to work elsewhere.

Cities with this pattern are often referred to as ‘sleeping cities’. Their primary function is residential rather than economic. This results in less activity during the daytime because a large portion of the working population is employed in other cities. Another aspect of a primarily residential function is increased commuter traffic. Many residents depend on cars or public transport to reach workplaces in nearby cities. This can lead to busy roads and traffic congestion during morning and evening rush hours. Economically, such cities are less dynamic and often rely heavily on the surrounding regional economy. At the same time, dormitory towns can be very attractive places to live. They usually offer a quiet and safe living environment, strong local communities, and relatively low vacancy rates. These qualities make them particularly appealing for families and elderly residents.

What does this mean for Elburg?
Elburg is a clear example of a city where living and tourism play a major role in the local economy. Due to its historical structure and limited space, there is less room for modern working environments or larger businesses. As a result, many residents commute to nearby cities such as Harderwijk, Zwolle, and Kampen for employment.

This commuting pattern increases dependence on the regional road network and contributes to traffic congestion, particularly during peak hours. During weekdays the city has a quiet environment, while weekends bring more activity due to tourism. Elburg is known for its strong social structure. Local communities and churches play an important role in daily life, creating a close-knit social network. The city is therefore particularly attractive for families and elderly residents. However, it can be less attractive for young people and starters because of the limited job opportunities and housing options aimed at them.

Future Development
Before new housing developments are introduced, it is important to first strengthen local economies. Creating more job opportunities, especially for young people and starters, would contribute to making the city more balanced and sustainable in the long term. Future developments should therefore not only focus on expanding residential areas but also on creating a stronger work-life environment. By combining housing with new economic activities, Elburg could become a place with more job opportunities, which reduces commuting and regional dependence and improves local economic vitality.



3.1.5 Analysis M-scale

Years of Construction

The centre of Elburg is the oldest part of the city. This area dates back to the Hanseatic period, with buildings built before 1850. The neighbourhood in the south is the first expansion of the city, and the neighbourhood in the east is the second expansion.

Highly Residential

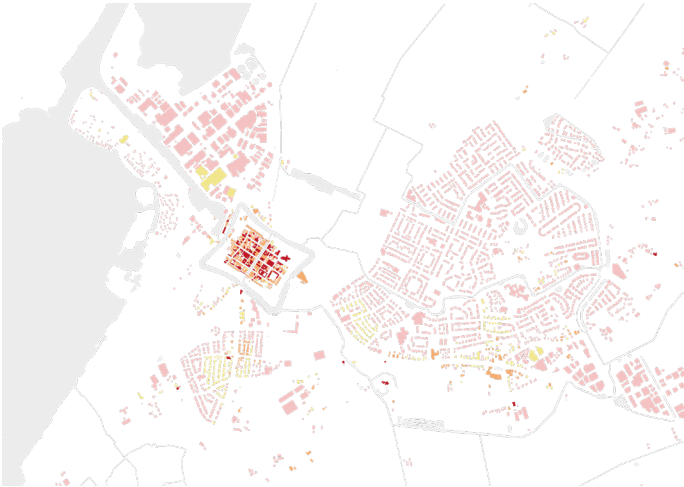
Elburg is primarily focused on a residential function. The city is surrounded by agricultural land. A large number of community facilities are situated in the neighbourhood expansion in the east. The industrial area in the north is situated next to protected nature.

Car Dominance

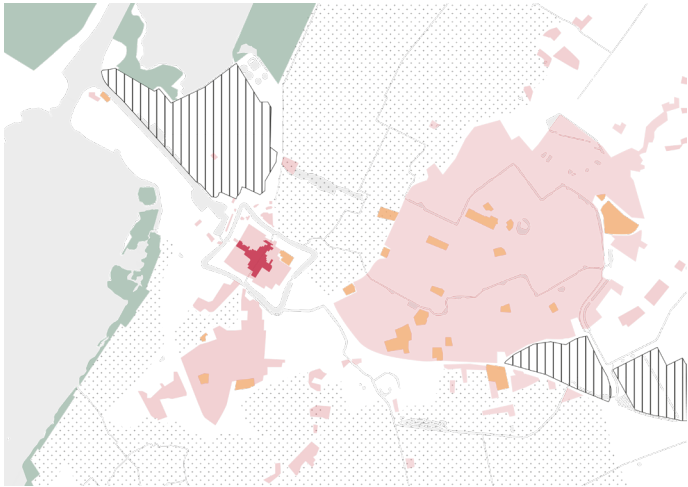
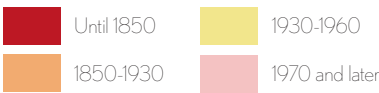
Elburg has one main entrance by car and bus. The main routes are at the edges of the neighbourhoods, connecting to larger surrounding cities. The neighbourhoods and the city centre are accessible by bus, but the port area is not. Because of its surrounding nature and its historic centre, the city is part of a larger cycling and walking network.

Green Map

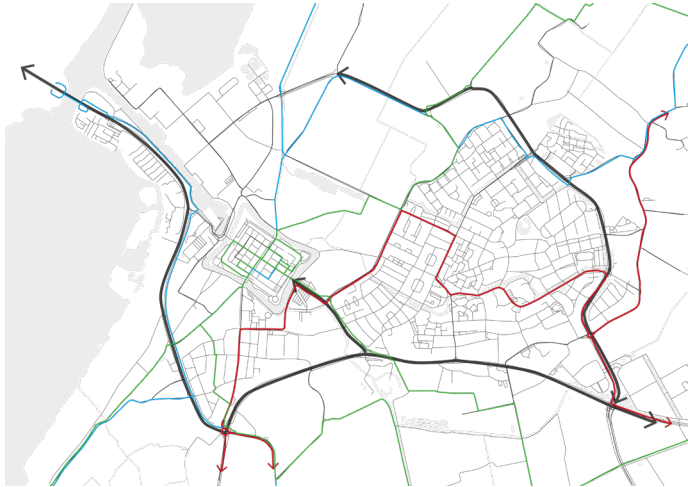
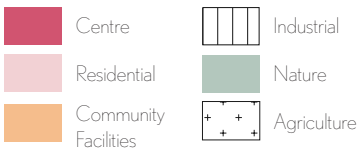
A large amount of Elburg consists of agricultural land. The historic centre is completely surrounded and enclosed by fortifications.



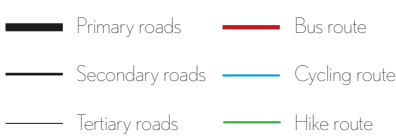
Construction Years



Land Use



Road Types



Types of Green

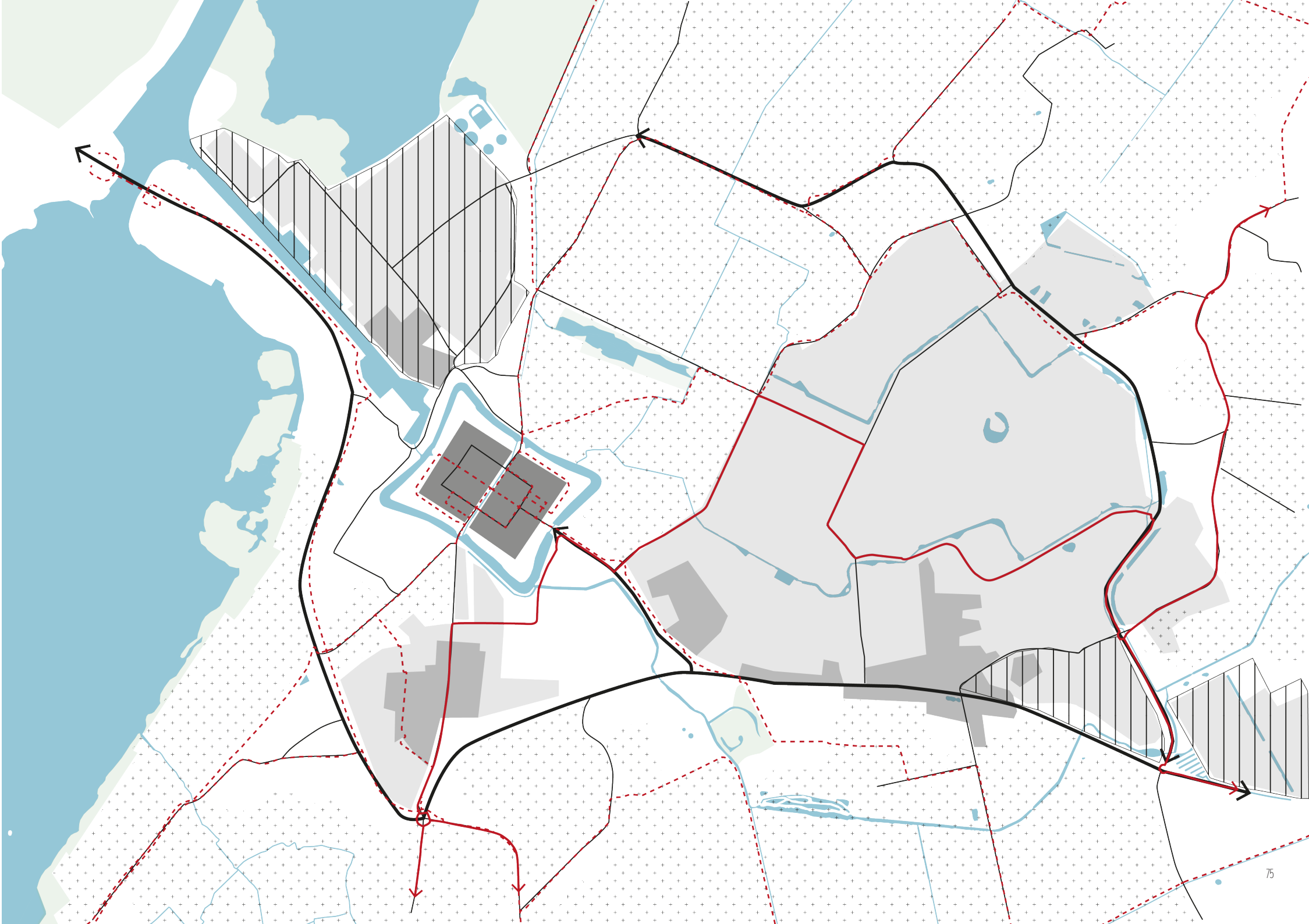
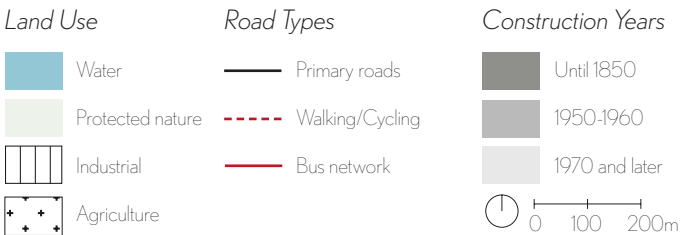


3.1.6 Synthesis

The historic city centre forms the oldest part of the city and dates back to the Hanseatic period. This area is characterised by its compact structure and its unique position completely surrounded by water. The historical core still plays an important role in the identity and structure of the city. The first neighbourhood expansion is situated in the south, followed by a second expansion to the east. These neighbourhoods reflect the gradual growth of the city and show how Elburg developed from a compact historic settlement into a larger residential area.

A network of green spaces surrounds the built-up areas, forming a transition zone between the urban environment and the agricultural landscape. The green structures define a strong physical boundary between the city and the countryside. The historic centre, with its narrow streets and fortifications, forms a distinct spatial core, while the newer neighbourhoods connect to the wider road network that links Elburg to the region. The centre and the neighbourhoods are accessible by bus, but the port and industrial area are only accessible by car.

Elburg has a clear historical core, structured urban expansions, a strong residential character, and a close connection to the surrounding agricultural landscape. The combination of historic heritage, residential neighbourhoods, and green transition zones shapes the spatial identity of the city.



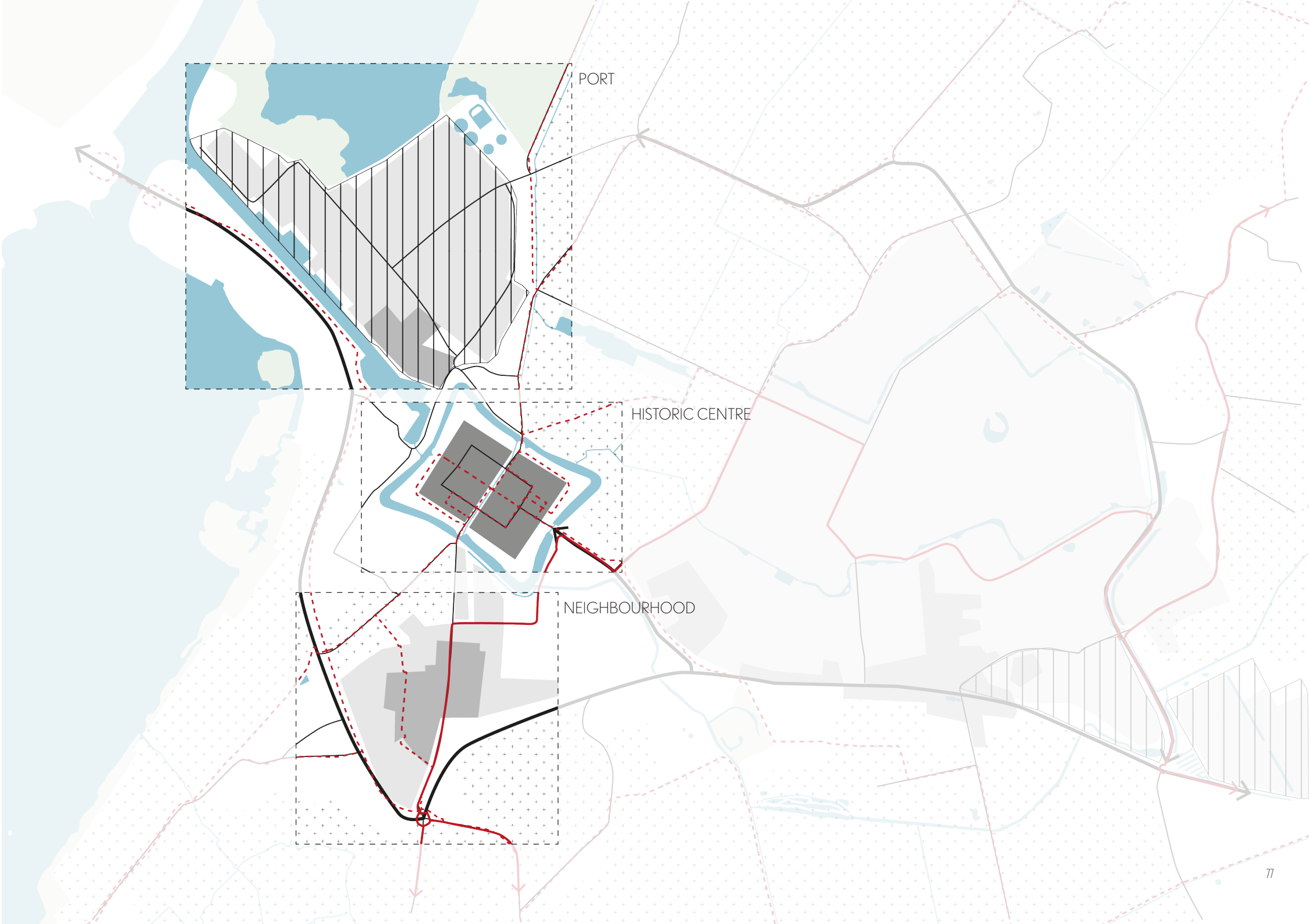
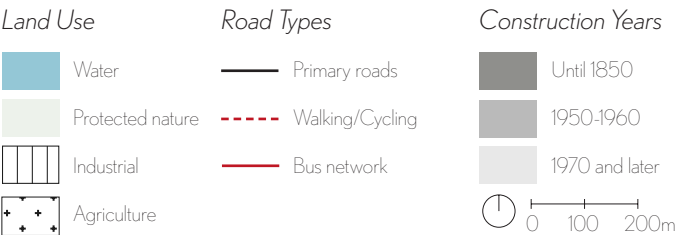
3.1.6 Sub-areas Synthesis

The three sub-areas have their individual spatial characteristics that contribute to the identity and quality of the sub-area.

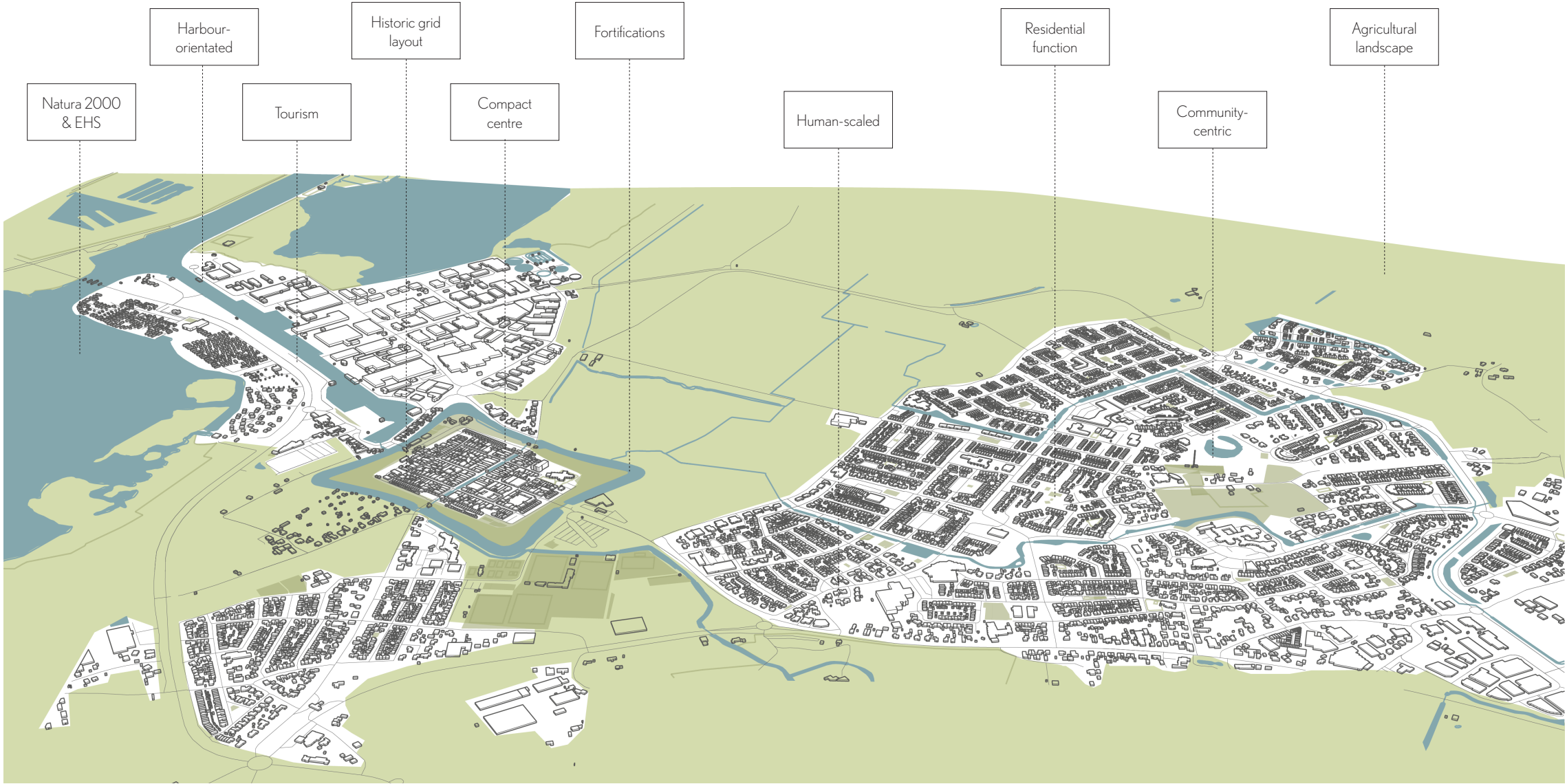
Historic Centre
The historic centre forms the heart of the city with the oldest buildings and the historic fortifications isolating the city from its surroundings. Moving patterns are dominated by foot or bicycle, while cars and buses stop at the entrance.

Neighbourhood Expansion
The neighbourhood lies beyond the historic city walls and landscape of the centre. The neighbourhood in the south is developed along and in between main roads that provide good regional connections by car and bus. The buildings date from different periods. This area is surrounded by agricultural land, contributing to an open and green character.

Port
The port and industrial zone is located in the north of the city, next to protected nature. The area is surrounded by water and agricultural land and is primarily accessible by car. The port area has the most recent buildings of the city.



3.1.7 What is Elburg's Identity?



Cultural history
The identity of Elburg is strongly shaped by its cultural-historical heritage, including its relationship with water and its origins as a fishing village and trading town situated at the former Zuiderzee. Fishing and maritime trade played a central role in Elburg, embedding a strong maritime culture within the town. In the late 14th century, the city was rebuilt as a fortified settlement, resulting in its distinctive rectangular grid layout with linear streets. This urban structure still defines the spatial experience of the historic centre. The city walls and fortifications form a physical boundary from the surrounding landscape, which reinforces its identity as a compact and medieval town. The harbour preserved the traditional boats, and with the water-orientated views, the water maintains a symbolic and spatial connection to its maritime history. Elburg emphasises its historic character with its connection to the water and its functions as a fishing village.

Qualities of the city
Elburg is characterised by small-scale, human-centred qualities. The city has many narrow streets, small plots, and mostly low-rise buildings, shaping an intimate and cohesive environment. The historic materials contribute to a strong sense of historic atmosphere. These materials are reflected in the cobblestone streets, the architecture, the church, and the small public and private gardens. The compact built environment contrasts sharply with the surrounding open agricultural landscape. Other contrasts appear between different land uses, such as the harbour and industrial areas situated next to natural landscapes. Today, Elburg functions primarily as a residential town with a strong focus on tourism, attracting visitors to its historic centre, museums, and harbour. While it maintains its traditional character, it is also economically connected to surrounding cities, relying on the wider region for employment and activity.

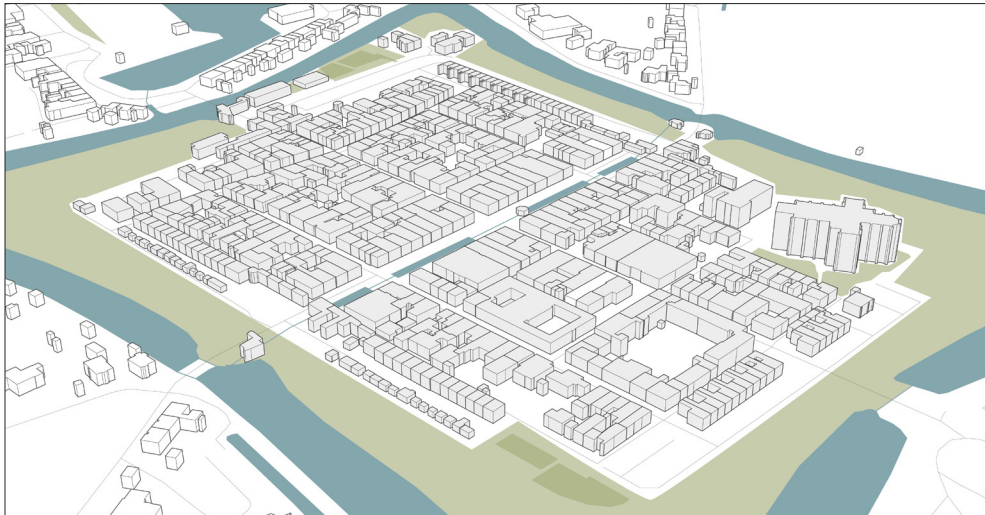
Identity
Elburg's identity and characteristics are closely linked, with everyday life and historic context coexisting. Its cultural-historical foundations, including the medieval architecture, maritime trade, and its relationship with water, are not only preserved as cultural heritage but also actively influence how people experience the city today. This is further reinforced by its intimate atmosphere and compact, human-scaled urban form. In addition, the surrounding landscapes and functional connections to the region ensure that Elburg remains a residential city. Elburg integrates its past and present as a thriving residential and tourism town as well as a well-preserved historic environment.

3.1.8 Three Identities

To get a deeper understanding of the identity of Elburg, the three distinct areas are described with their individual identities. The three areas are interconnected, but each sub-area represents a different historic era and a different purpose.

1. Historic Centre - The Heart of the City

The historic centre can be characterised as heritage-driven, pedestrian-orientated, and culturally symbolic. This is the heart of the city, famous for its rectangular grid layout and its fortifications. The historic centre is defined by preservation and historical pride since it is the ‘face’ shown to the world.



2. Neighbourhood Expansion - Family Environment

The areas outside the walls represent the post-war growth of Elburg, where the town transitioned from a secluded fortress to a regional residential hub. The neighbourhood is defined as a peaceful, family-orientated environment. The identity emphasises comfort, safety, green spaces, and community.



3. Port - The Workhouse

The port and industrial area highlights Elburg’s transition from a Zuiderzee fishing town to a modern maritime and commercial hub. This is the workhouse of the city. It represents the economic side of the city.



3.1.9 Historic Centre

Identity

The Heart of the City

The historic centre of Elburg is defined by its fortified structure and highly preserved urban fabric. The town follows a rectangular grid pattern from the 14th century, originally designed for defensive purposes. Narrow streets, brick houses, small courtyards, and historic gates create a compact and intimate spatial experience. The identity of the historic centre is strongly tied to heritage, tourism, and small-scale commerce.

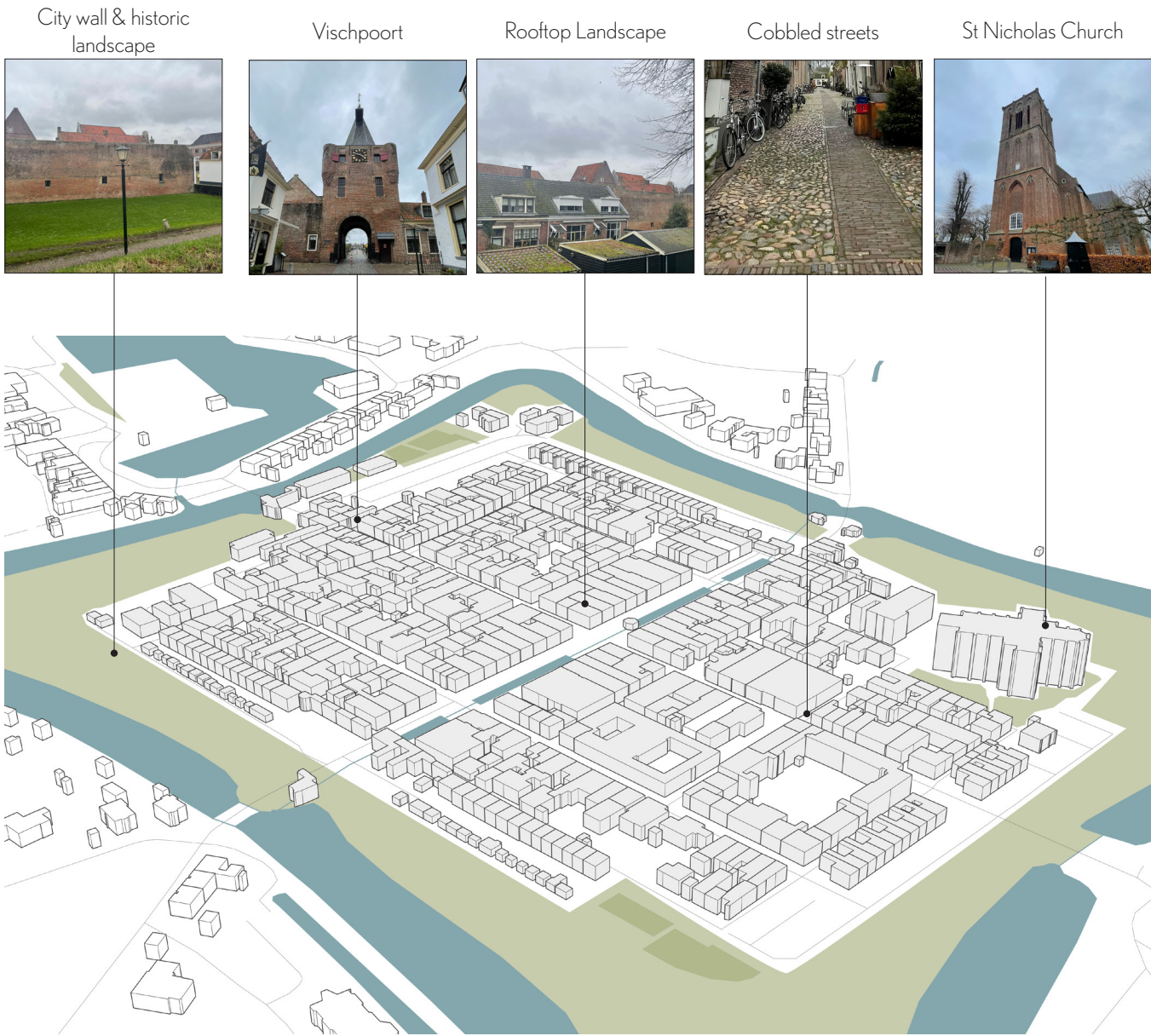
Characteristics of the historic centre:

- St Nicholas Church: a dominant landmark whose truncated tower defines the skyline.
- Rooftop landscape: the centre has a unique rooftop landscape.
- Individual façades: the buildings are very small and have individual façades.
- Mobility: walking and cycling are dominant.
- City walls and fortifications: the centre is enclosed by defensive walls and fortifications, creating a strong physical boundary between the oldest area of the city and the newer parts.
- Vischpoort: the iconic gateway that serves as the symbol of the town's connection to the water.

Many buildings host local shops, galleries, cafés, and museums, which reinforce the historical atmosphere. Public spaces are human-scaled, pedestrian-orientated, and visually cohesive due to consistent use of materials and architectural styles. The historic centre of Elburg is the 'face' shown to the world.

Spatial elements of the historic centre:

- Grid layout: linear, rectangular plan.
- Isolated: closed off from surroundings because of physical borders.
- Cobble streets: The unique pavement is a signature visual element.
- Compactness: small plots and narrow streets with a high density.
- Program: Highly residential and mixed-use
- Building heights: low-rise buildings with two or three floors
- Tourism area: museums about the city's history.
- Mobility: three main parking spaces at the edges of the centre and a bus stop at the entrance.

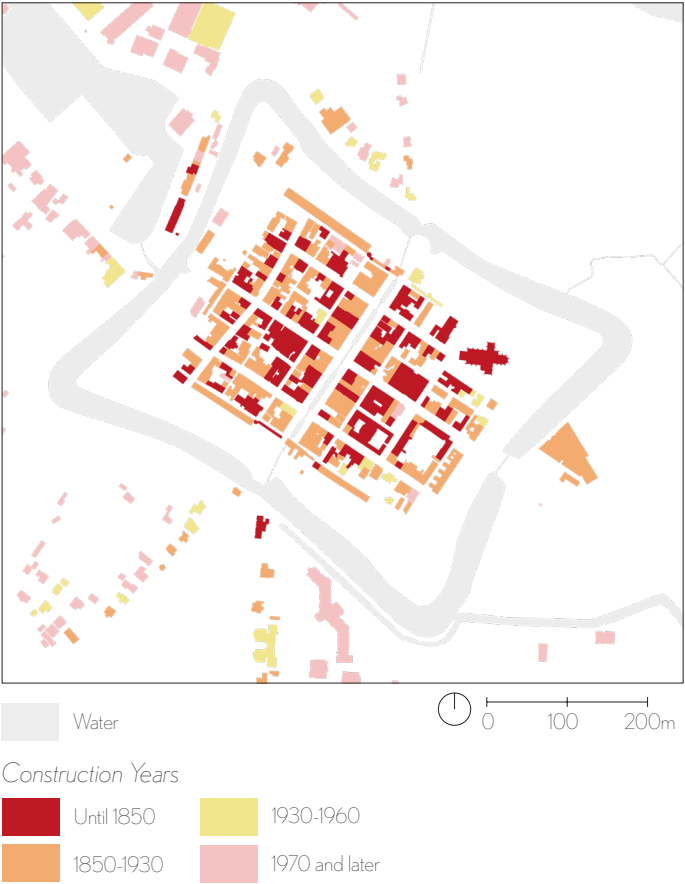


3.19 Historic Centre

Analysis S-scale

The analysis of the historic centre explores the years of construction in the historic centre, together with the functions and programmes of the buildings and the building heights. The main conclusions of this analysis are used for defining the evaluation criteria of the historic centre.

Years of Construction
The historic centre has the oldest buildings. Some are built before 1850, but most of the buildings date back to 1850-1930.



Mix of Functions
The programme shows that the buildings surrounding the centre point are mixed-use and that towards the edges more housing is built.



Low-rise Centre
Almost every building has a height of between 6 m and 12 m, which is 2 to 3 floors. The church is much higher, with 20 m.



3.19 Historic Centre

Target Group Match

From the identity and characteristics and the spatial analysis, the historic centre can be described as a compact and intimate space with lively and vibrant streets. It is human-scaled, pedestrian-orientated and surrounded by landscape.

Starters

The city centre offers small, compact homes in a vibrant living environment. The area supports cultural heritage and offers opportunities in tourism, hospitality, or local services. However, residents must be prepared to adapt to specific requirements, such as the preservation rules for monumental buildings. Additionally, the mixed-use programme of the area, with living above shops, brings its challenges, but the map of the centre shows that daily needs are within a 5-minute walk from home.

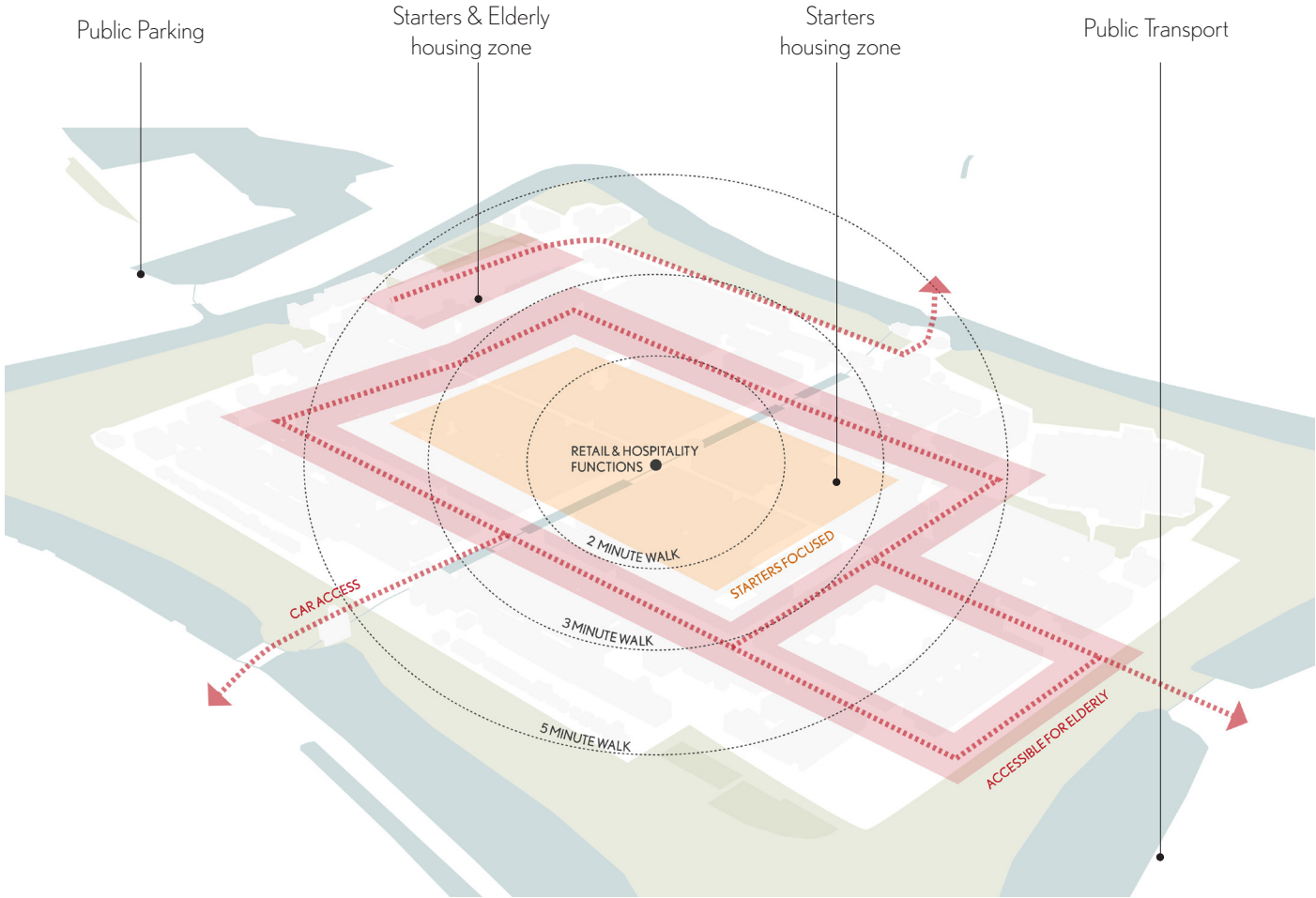
Elderly

The city centre is ideal for the elderly who are active in culture or tourism, as well as long-time residents of Elburg. Ground-floor homes or buildings with elevator access provide high accessibility. However, the pedestrian-focused environment and limited parking options may create mobility challenges for some. Additionally, the noise of a centre with hospitality and tourism can be overwhelming, and maintaining monumental buildings may present difficulties. The map shows the streets that are accessible by car and therefore are suitable for the elderly.

Target group types matched with the historic centre

TYPE OF STARTERS	NEEDS	WHY THE HISTORIC CENTRE?
One-person household	Compact, social interaction, accessibility	Lively area, close to amenities
Two-person household	Shared space, flexible interior, green surroundings	Historic environment and small community
Living in family house	Independent living, high access to amenities	Personal space, but close to amenities
Career-focused	Close to work, networking	Tourism, hospitality business, culture
Returning to region	Familiar, affordability, local	Strong local identity
Remote working	Home office, connected, close to green	Lively environment

TYPE OF ELDERLY	NEEDS	WHY THE HISTORIC CENTRE?
Staying	Familiar surroundings, social connection, community	Close to familiar area
One-person household	Compact, accessibility, social connection	Active streets, opportunities for social interaction
Collective living	Shared space, community, helping each other	Meeting other elderly
Active	Social interaction, close to activities, green surroundings	Cultural-historic surroundings and close to surrounding nature

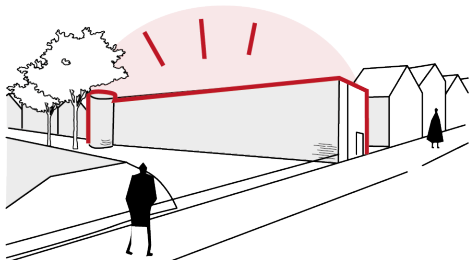


3.19 Historic Centre

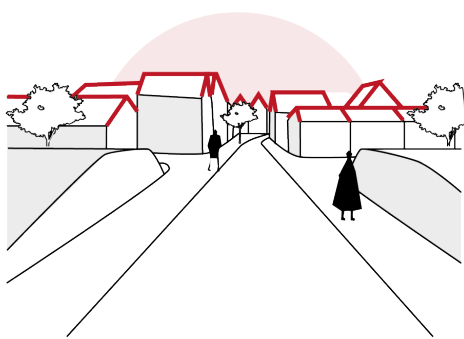
Evaluation Criteria

The characteristics and spatial elements of the historic centre, together with the target group analysis, lead to these six criteria that are important to preserve in future developments.

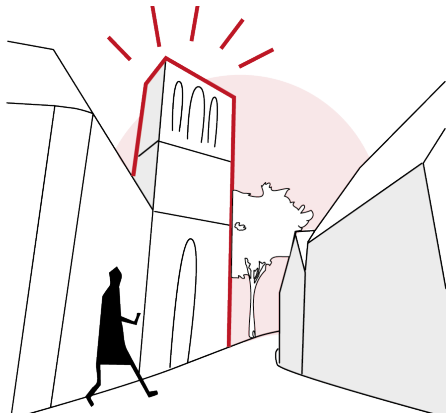
The city wall needs to remain visible



The rooftops need to remain visible



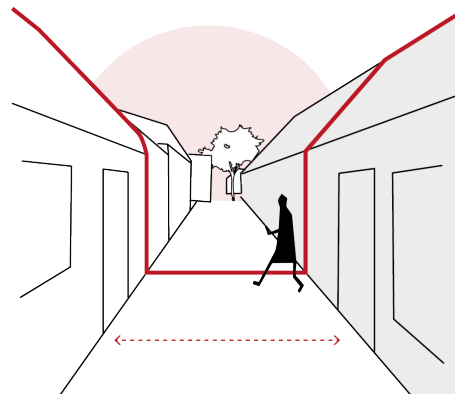
The church needs to be recognisable from the entire city centre



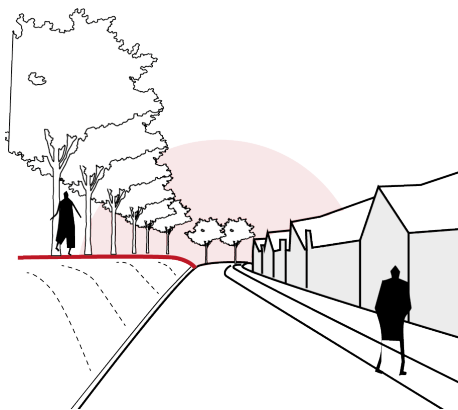
Preserving the individual façades



Keep it high-density and compact with small plots



The historic landscape needs to remain intact



3.1.10 Neighbourhood Expansion

Identity

Family Environment

The expansion neighbourhoods surrounding the historic centre reflect post-war and late 20th-century suburban development. These areas were primarily designed to accommodate population growth and provide modern housing. The urban structure is less rigid and more spacious compared to the historic centre. Street profiles are wider, with more green spaces, parking areas, and open spaces between residential blocks. Housing typologies include terraced houses, semi-detached

homes, and small apartment blocks. Functionally, this area is primarily residential, with local facilities such as schools, supermarkets, and sports areas. The identity is therefore defined by everyday living, community life, and practicality, rather than historical significance. The neighbourhood expansion forms a family environment and is identified as a residential hub.

Characteristics of the neighbourhood expansion:

- Family-orientated housing: residential function, larger housing with private gardens.
- Community-centric: high proximity to local facilities and public spaces for social interaction.
- Child-friendly: slow traffic, playgrounds in the neighbourhood, being surrounded by nature, and high proximity to elementary school.

Spatial elements of the neighbourhood expansion:

- Car dominance.
- Connectivity: well connected with the region by car and bus.
- Surrounded by nature: agricultural land and close to the Veluwe.
- Green space: private gardens.
- Building heights: low-rise buildings with two or three floors.
- Facilities: Many local facilities and a health-care institution.
- Connection to the historic centre: clear road and entrance to the historic centre.

For Elburg, being community-centric and child-friendly is a defining characteristic of the city. A community-centric city describes a place where residents know each other, interact regularly, and have their daily needs, including schools, shops, and healthcare, close to home. Public spaces support interaction, walking, and social activities, with green areas, calm streets, and shared places that strengthen local involvement. A child-friendly city complements this through safe, low-traffic streets, accessible play areas, and clear walking and cycling routes. Children can independently reach nearby schools and activities in a safe and green environment.

Community-centric



Family-orientated housing



Car-dominant



Private gardens



3.1.10 Neighbourhood Expansion

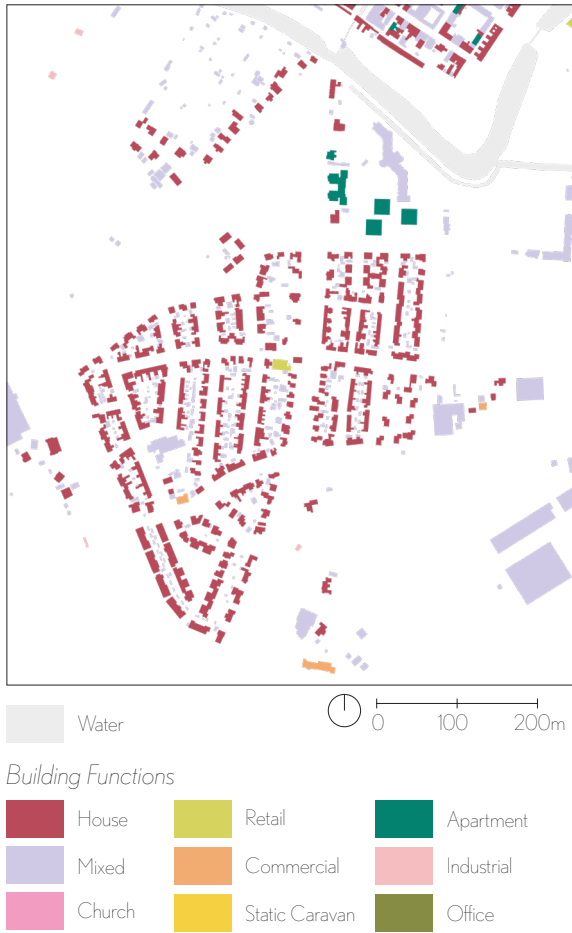
Analysis S-scale

The analysis of the neighbourhood expansion explores the years of construction in the neighbourhood, together with the functions and programmes of the buildings and the building heights. The main conclusions of this analysis are used for defining the criteria of the neighbourhood expansion.

Years of Construction
The construction of the neighbourhood dates back to different years. Buildings were built from 1850 to 1960, with the most recent buildings built in 1970 and later.



Highly Residential
The programme shows that the neighbourhood has a residential function, with some apartment blocks in the north.



Low-rise Buildings
Almost every building has a height of between 6 m and 12 m, which is 2 to 3 floors. Some buildings are 3 m high; these are mainly situated in the south.



3.1.10 Neighbourhood Expansion

Target Group Match

The neighbourhood expansion can be identified as a community-focused area with spacious streets and private gardens. It is car- and cycle dominant and close to both the city centre and the landscape surroundings.

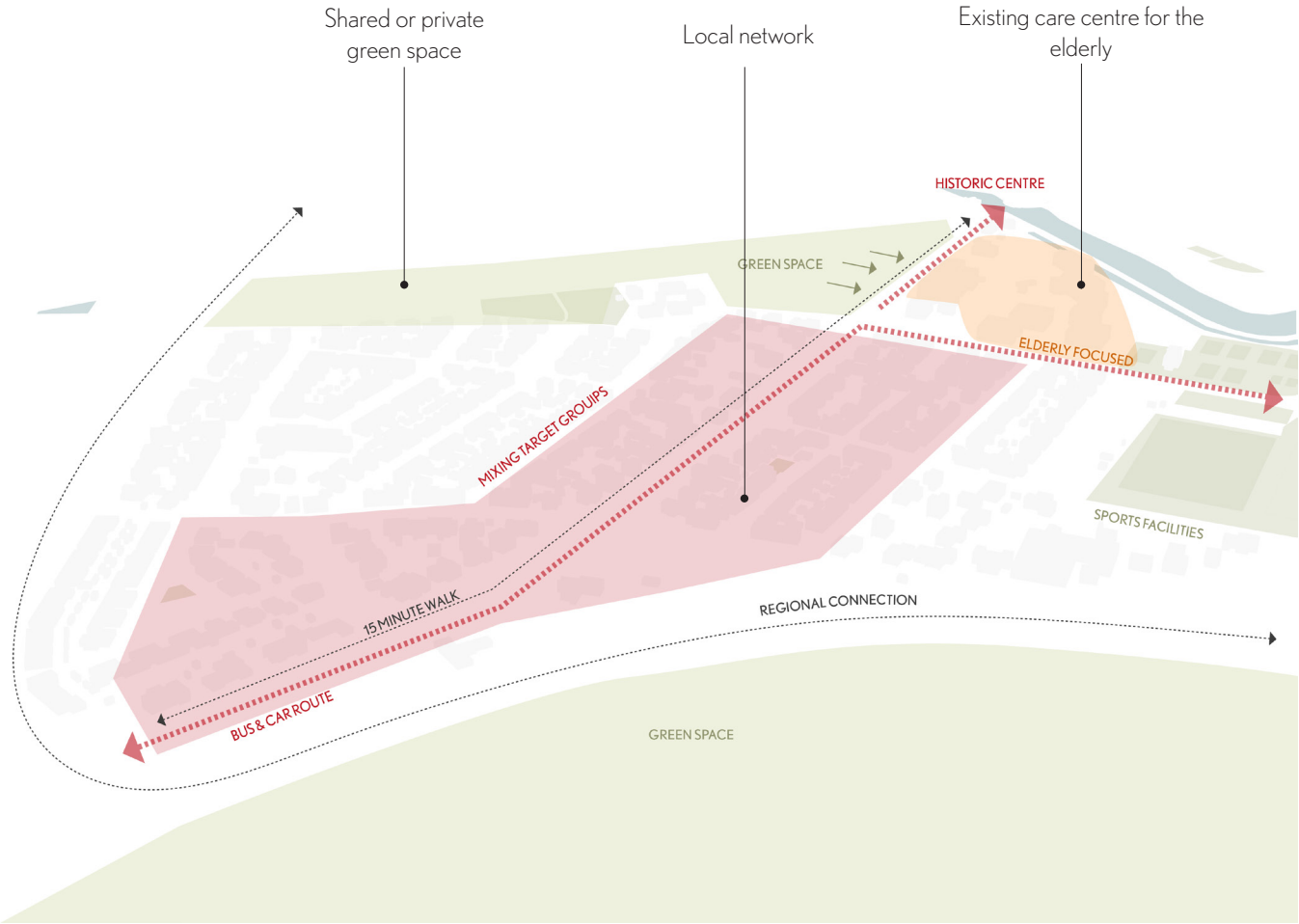
Starters
This area is family-orientated, focusing primarily on households with children. Resulting in good surroundings for two-person-household starters to settle here for the long term. It offers spacious homes with gardens, a strong sense of community, good accessibility, and a green environment. For one-person households this area offers a lot of possibilities to meet neighbours and creates a good balance between the vibrant centre and the rural landscape. With a car network the neighbourhood is well-connected with the region, making it highly accessible for commuters.

Target group types matched with the neighbourhood expansion

TYPE OF STARTERS	NEEDS	WHY THE NEIGHBOURHOOD?
Two-person household	Shared space, flexible interior, green surroundings	Space, garden, community
Living in family house	Independent living, personal space	Current family house can be divided into multiple units
Returning to region	Familiar, affordability, local network	Community, neighbours
Remote working	Home office, connected, close to green	Close to centre and close to nature and activities

Elderly
For the elderly, this area fosters a strong sense of community and offers space for adapted housing, meaning zero-step apartments. The safe and child-friendly environment, including safe routes and clear layouts, also benefits the elderly. The area is well-connected by car and public transport, has functional amenities within walking distance, and provides tranquillity, space, and green surroundings. The area closest to the historic centre, in orange on the map, includes an existing care centre for the elderly that also has a community centre.

TYPE OF ELDERLY	NEEDS	WHY THE NEIGHBOURHOOD?
Staying	Familiar surroundings, social connection, community	Familiar area and close to friends and family
One-person household	Compact, accessibility, social connection	Community, private and shared spaces
Collective living	Shared space, community, helping each other	Living with like-minded, shared amenities
Active	Social interaction, sports, culture and green in surroundings	Active community participation, high proximity to amenities
Comfort seekers	Luxury, space, privacy, green	Spacious environment, accessible by car and bus, green surroundings
Care prepares	Zero steps apartment, close to amenities and care	Future-proof living near amenities

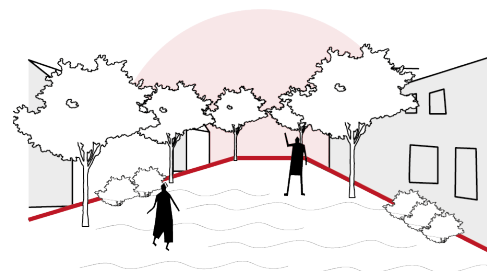


3.1.10 Neighbourhood Expansion

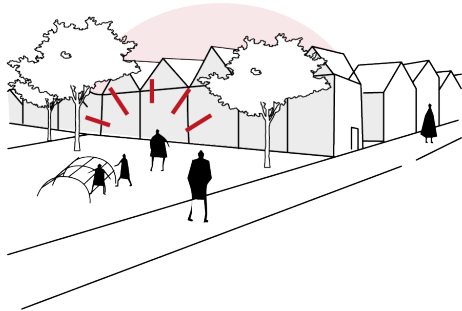
Evaluation Criteria

The characteristics and spatial elements of the neighbourhood, together with the target group analysis, lead to these five criteria that are important to preserve in future developments.

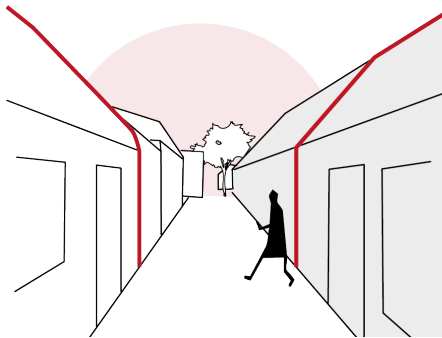
Every home needs to have a private or shared garden



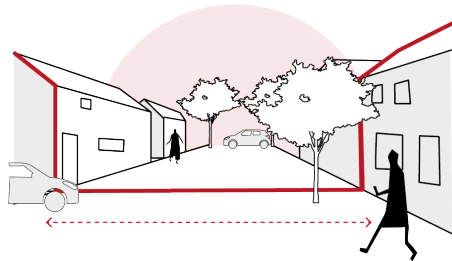
Remain the surroundings child-friendly by ensuring safe routing through the neighbourhood



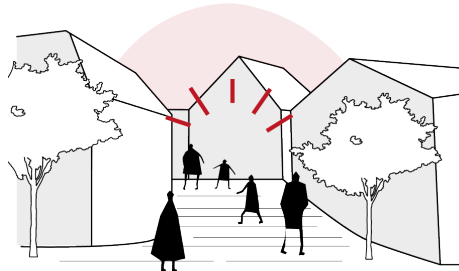
Human-scaled environment needs to be preserved



Keep the housing and surroundings family-orientated



Remain focused on community by maintaining the same amount or more spaces for social interaction



3.1.1 Port

Identity

The Workhouse

The old harbour area represents Elburg’s historical relationship with water, trade, and fishing. Before the reclamation of the Zuiderzee, Elburg functioned as a fishing and maritime town, and the harbour was a central economic space. Today, the harbour has partly transitioned into a recreational marina and tourism area, while nearby zones still reflect traces of industrial and logistical activity. The spatial character differs from the historic centre and the neighbourhood expansion. It has

a more open and spacious environment, is infrastructure-focused, and is orientated toward the water. The identity of the district can therefore be described as maritime, transitional, and functional, a place where Elburg’s historical economy, modern recreation, and industrial elements integrate. This is the workhouse of the city with the main focus on businesses and industrial activity.

Characteristics of the port area:

- Maritime heritage: the harbour transitioned from fishing to recreational boating and historical preservation (the Bidders).
- Proximity to nature: water-related and close to protected nature.
- Work hub: the programme is focused on industrial buildings and offices.

Spatial elements of the port area:

- Grid layout: wide and spacious, large plots.
- Building typologies: low-rise, large-scale warehouses, closed façades and flat roofs.
- Green space: surrounding the main roads
- Car dominance: not connected with the bus network
- Work- and business-orientated.

Maritime heritage and a strong relationship with water are important characteristics that define the identity and spatial structure of Elburg. The maritime heritage is visible in the historic harbour area, where traditional fishing boats and preserved vessels reflect the town’s history. This heritage is especially recognisable in parts of the dock area where old boats are showcased, and the layout still follows its original function. The connection to water is further expressed through water-related uses, such as harbours, boat storage, and maintenance facilities. These functions are not only practical but also culturally significant and should be preserved.

Building typologies



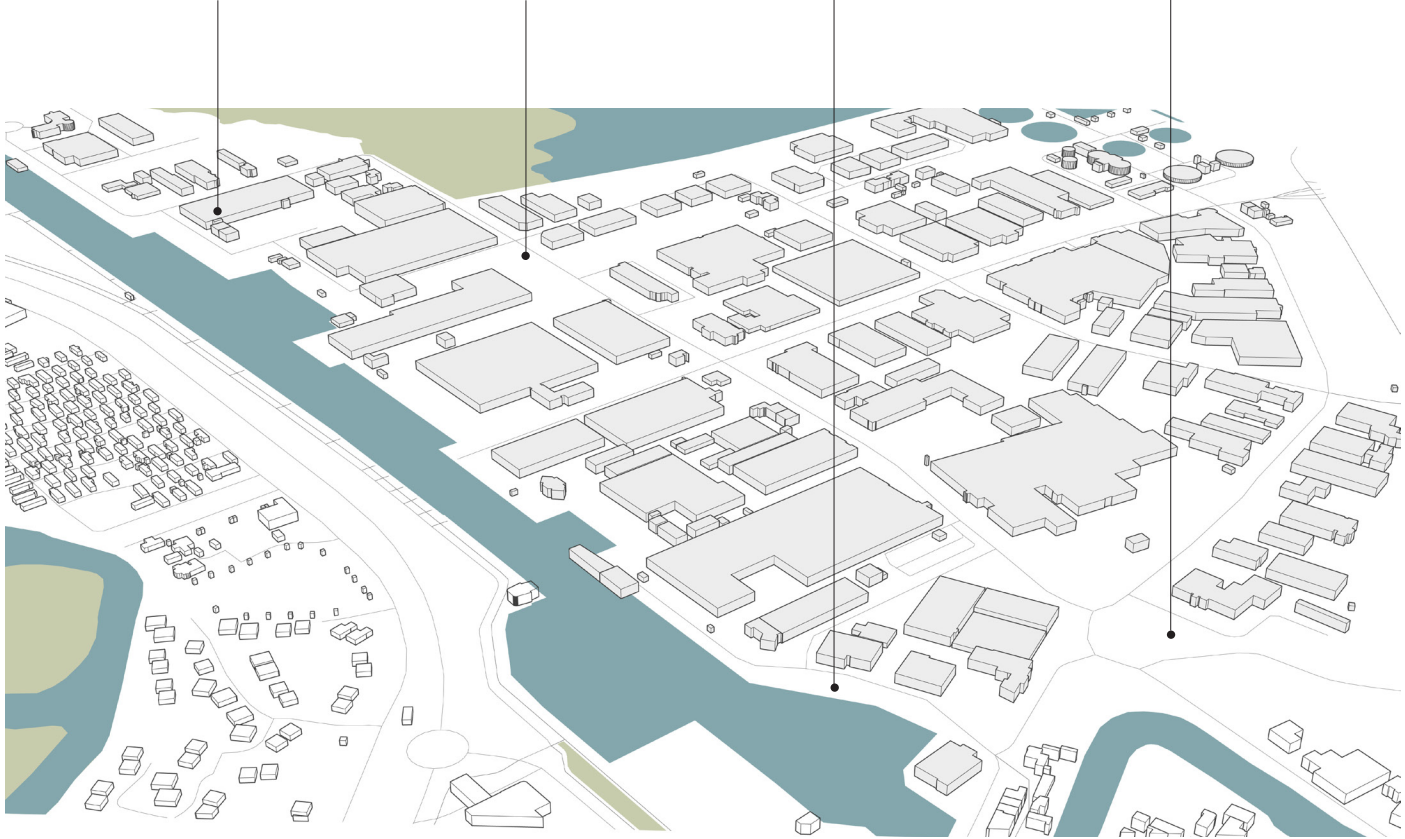
Wide and spacious grid



Maritime heritage



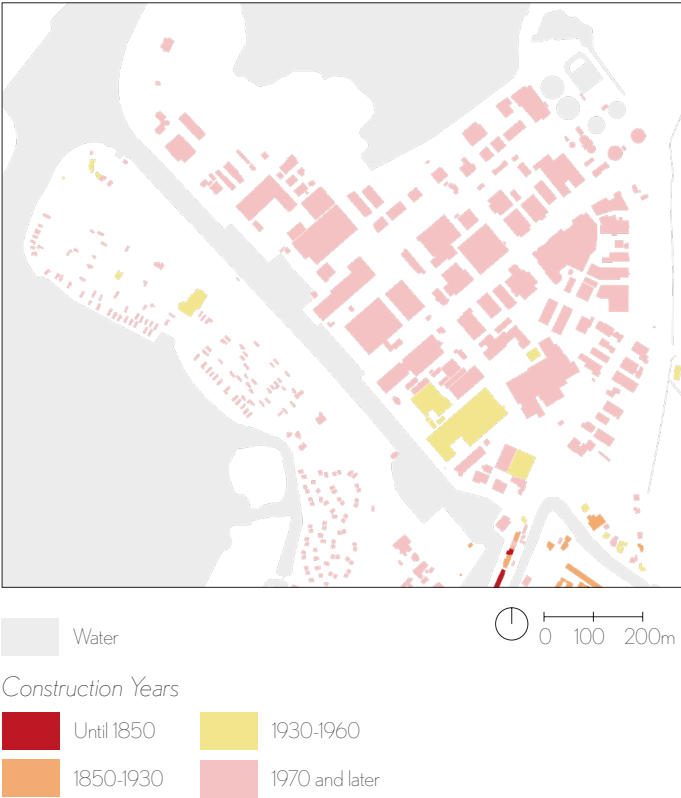
Proximity to nature



Analysis S-scale

The analysis of the port area explores the years of construction in the port, together with the functions and programmes of the buildings and the building heights. The main conclusions of this analysis are used for defining the criteria of the port area.

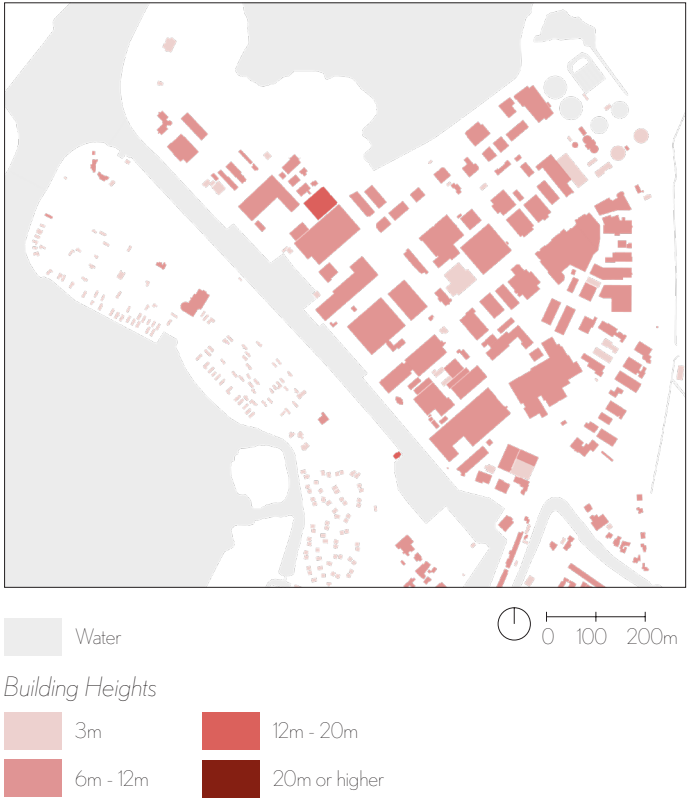
Years of Construction
These are the most recent buildings of the city, built in 1970 or later.



Highly Industrial
The programme shows that there is a high focus on industrial functions and mixed-use functions; many of these are offices mixed with commercial functions or industrial functions.



Low-rise Buildings
Almost every building has a height of between 6 m and 12 m, which is 2 to 3 floors.



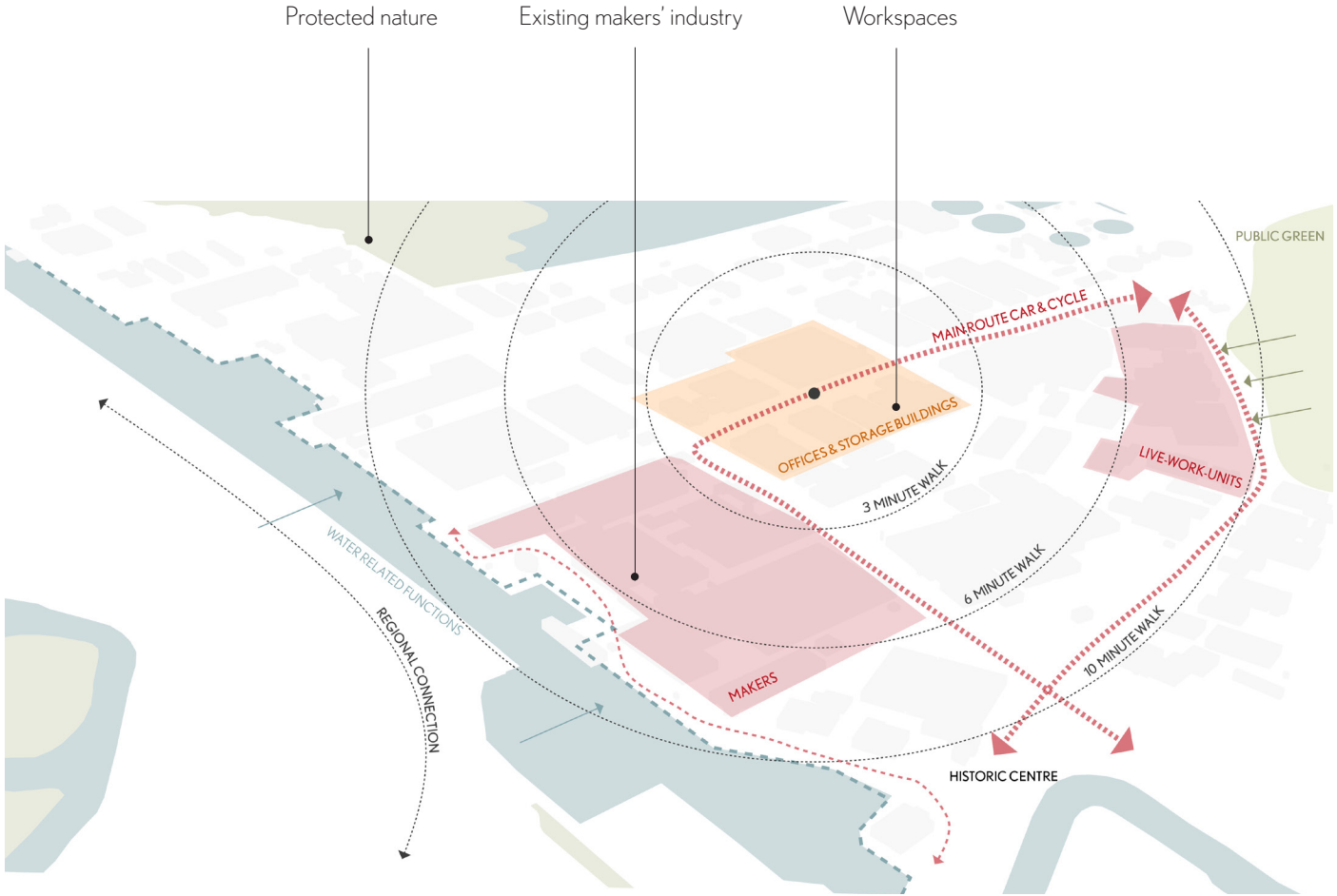
Target Group Match

The port area can be described as a highly work- and business-orientated hub with a wide and spacious grid. The area is surrounded by nature and well-connected with the historic centre and the region.

Starters
With a focus on economic activity, the port area matches with career-focused starters. Its maritime heritage and connection to water-related sectors provide unique opportunities. The spacious, low-rise buildings and open infrastructure offer room for new business activities, while future-orientated developments and sustainable initiatives are encouraged. The area is car-dominated, and public transport connections are poor, resulting in the focus on starters working in or near the area.

Target group types matched with the port area

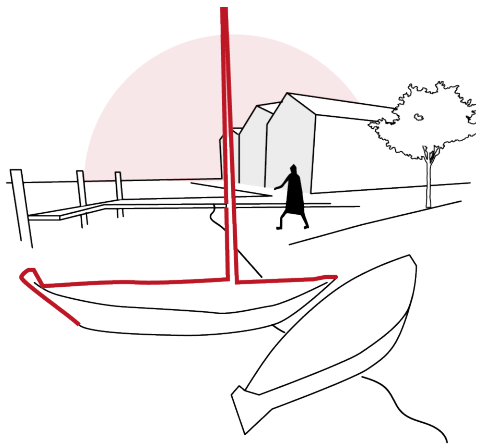
TYPE OF STARTERS	NEEDS	WHY THE PORT?
Career-focused	Close to work, networking	Surrounded by businesses
Sustainability-focused	Close to nature, space for innovative ideas	Future smart energy hub, space for new experiments
Mover	High accessibility, close to centre, space for growth	Temporary housing solutions
International	Close to work, international amenities	International companies, water-related functions
Entrepreneur	Workspace, flexible apartment	Workspaces and warehouses
Remote working	Home office, connected, close to green	Workspaces and offices in surroundings, working environment



Evaluation Criteria

The characteristics and spatial elements of the port area, together with the target group analysis, lead to these four criteria that are important to preserve in future developments.

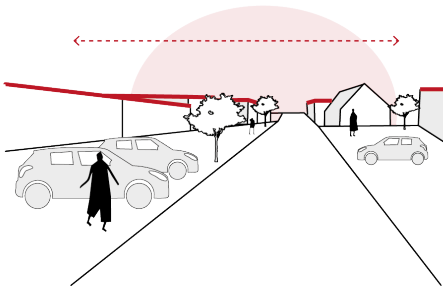
Maritime heritage needs to remain visible



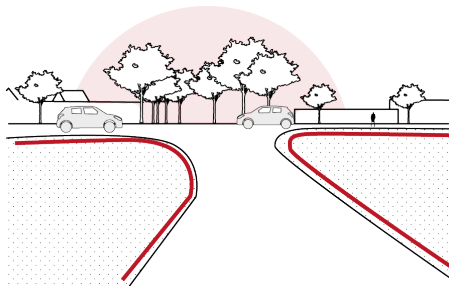
Relation with water needs to be preserved



Wide grid needs to remain, maintaining a spacious environment



Public green spaces need to remain



3.112 Conclusion

1. Historic Centre - The Heart of the City

The historic centre forms the symbolic and spatial heart of the city, defined by its fortified layout and rare rectangular medieval grid. Most buildings date from 1850 to 1930, with some older structures, and are predominantly low-rise buildings. The centre has a consistent human scale, contrasted by the high church. The centre is enclosed by fortifications and is largely pedestrian-orientated. Its strong emphasis on preservation, cohesive architecture, and cultural heritage reflects the city's history, civic pride, and its image to the outside world.

The evaluation criteria:

- The city wall needs to remain visible.
- The rooftops need to remain visible.
- The church needs to be recognisable from the entire city centre.
- Preserving the individual façades.
- Keep it high-density and compact with small plots.
- The historic landscape needs to remain intact.

2. Neighbourhood Expansion - Family Environment

The neighbourhood reflects Elburg's expansion from the late 19th century through the post-war period to the 1970s and later. Buildings are primarily residential, with a mix of low-rise houses and some apartment blocks, creating consistent scale through the neighbourhood. The area is more spacious and less rigid than the historic centre, with wider streets, greenery, and a high proximity to agricultural land. This area is well-connected by main roads and public transport; it supports everyday living with local facilities. Its identity is defined by safety, functionality, and community, embodying a family-orientated environment.

The evaluation criteria:

- Every home needs to have a private or shared garden.
- Remain the surroundings child-friendly by ensuring safe routing through the neighbourhood.
- Human-scaled environment needs to be preserved.
- Keep the housing and surroundings family-orientated.
- Remain focused on community by maintaining the same amount or more spaces for social interaction.

3. Port - The Workhouse

The harbour area represents the newest phase of Elburg's development, with buildings constructed from 1970 or later. It is characterised by a strong focus on industrial and mixed-use functions, including offices combined with commercial and industrial activities. Buildings are generally large-scale and low-rise with flat roofs. Located near a protected natural area and orientated toward the water. It has an open infrastructural character and is primarily accessible by car. Historically rooted in fishing and trade, the area has evolved into a maritime and working hub.

The evaluation criteria:

- Maritime heritage needs to remain visible.
- Relation with water needs to be preserved.
- Wide grid needs to be remained, maintaining a spacious environment.
- Public green spaces need to remain.

3.2 Doesburg

For Doesburg, a similar study is done. Page 154 presents a comparison of the analysis of the two cities and discusses their similarities and differences. All grey pages include Doesburg's study.

Doesburg is a historic city in the eastern part of the Netherlands, located in the province of Gelderland at the confluence of the rivers IJssel and Oude IJssel. The city received its official city rights in 1237, making it one of the oldest cities in the country and nearly as old as Elburg. Because of its strategic position along the river, Doesburg developed into an important trading centre during the Middle Ages and later became a fortified town.

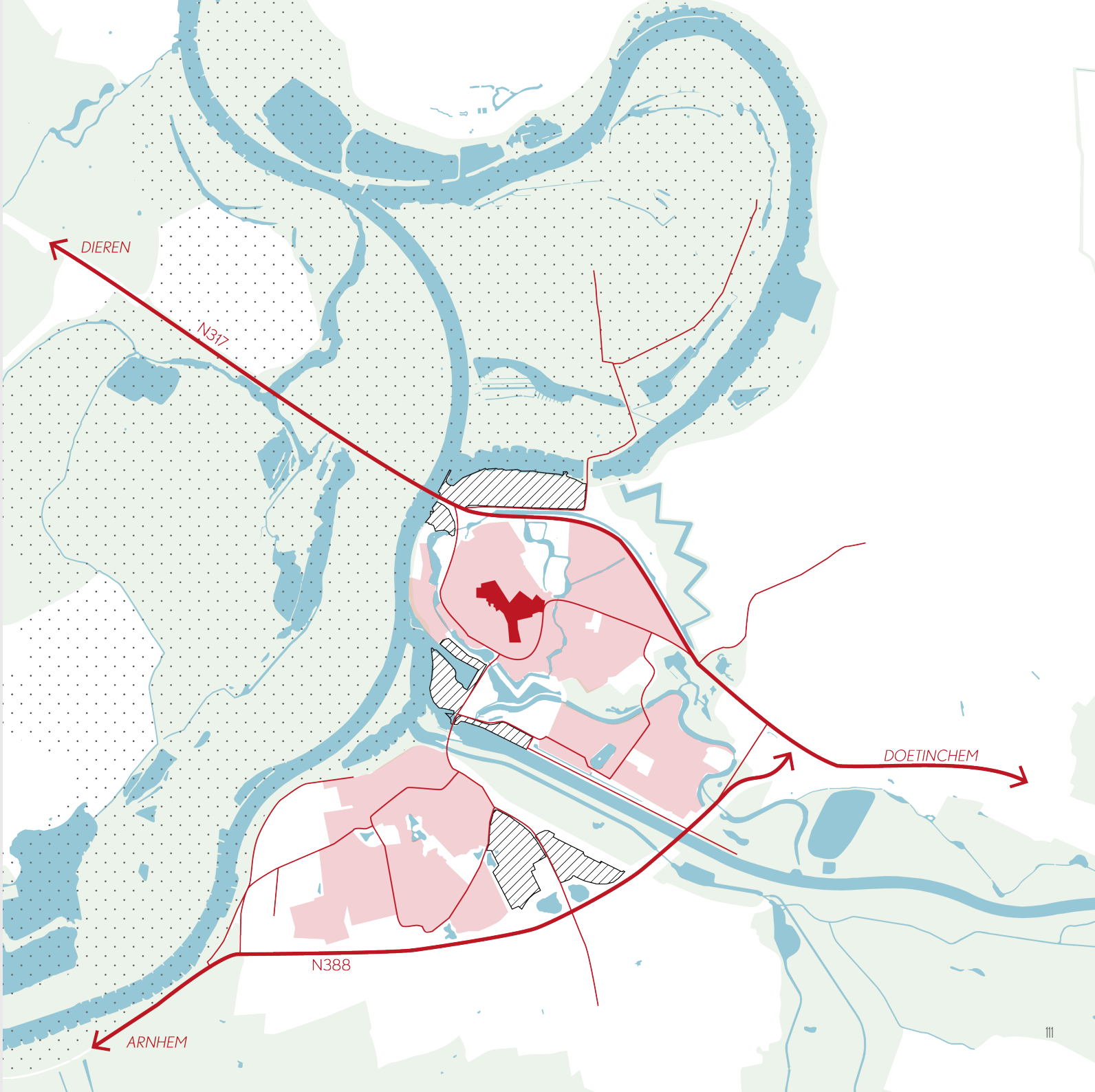
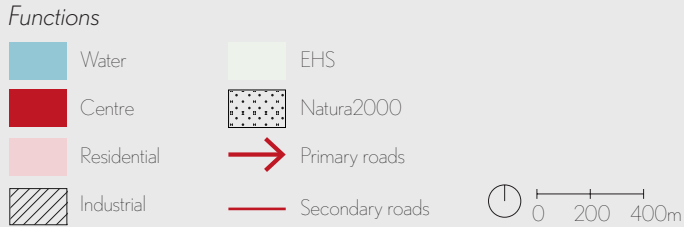
Today, Doesburg is known for its well-preserved historic centre, filled with narrow streets, charming squares, and monumental buildings. The impressive Martini Church, with its bell tower, dominates the skyline. The city's defensive past can still be seen in its remaining fortifications and historical layout. Doesburg also has a lively cultural scene, with galleries, small museums, and traditional shops. It is famously associated with mustard production. Doesburg mustard has been made here for centuries and remains a local speciality.



Figure 15. Doesburg (Flickr, Sander Sloots, 2021)

3.2.1 Structure

Doesburg is completely surrounded by a water network and a large part of protected nature, the EHS. The city mainly consists of residential areas, but it also has some industrial areas at the edges of the city and along the waterways. Doesburg has two main roads that connect the city with the region, including the cities of Arnhem, Doetinchem, and Dieren. The city is also connected with a bus network.



3.2.2 Historic Development

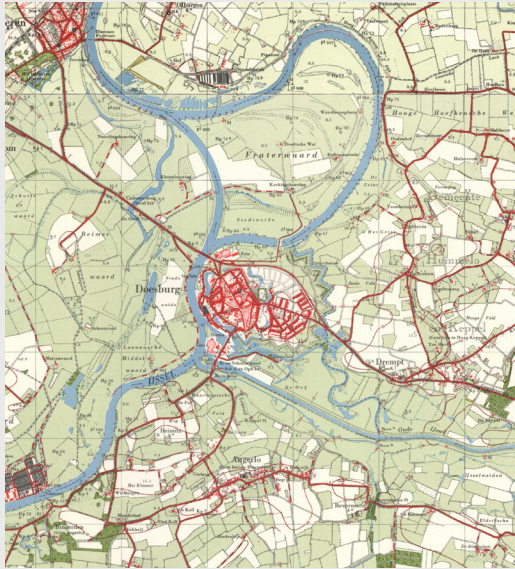
Doesburg historically develops from a small, fortified settlement into a larger connected area surrounded by its historical water network. In the beginning the city concentrated new developments within the defensive walls, shaped by the surrounding rivers. Over time, the city expands beyond these boundaries, first along roads and river crossings, and later through more structured growth patterns. New neighbourhoods emerge, linking the historic core with nearby settlements. As infrastructure improves, expansion along these infrastructure axes grows and becomes more planned. In the more recent years, the city fully integrates into its regional surroundings with widespread suburban development. The following densification methods are applied over the years:

- Infill development
Empty spaces within and just outside the historic centre are gradually filled with new buildings.
- Edge expansion:
The city grows outward from its edges, making the built-up area denser around the core.
- Linear development along infrastructure:
Buildings concentrate along roads, bridges, and river crossings, increasing density in these corridors.
- Redevelopment of existing areas:
Older or less-used spaces near the centre are reused and built up more intensively.
- Suburban densification:
New residential neighbourhoods are added with more compact layouts.

0 500 1000m
Source: Topotijdreis.nl



1815
The city begins as a small, compact fortified settlement surrounded by defensive walls and rivers.



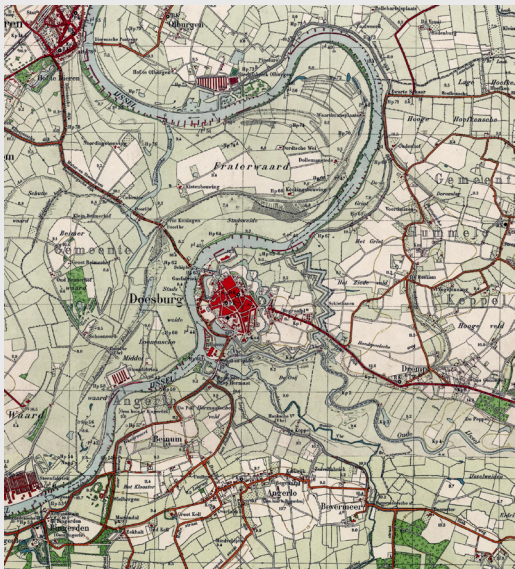
1960
The city spreads further outward, forming new neighbourhoods and connecting with nearby villages.



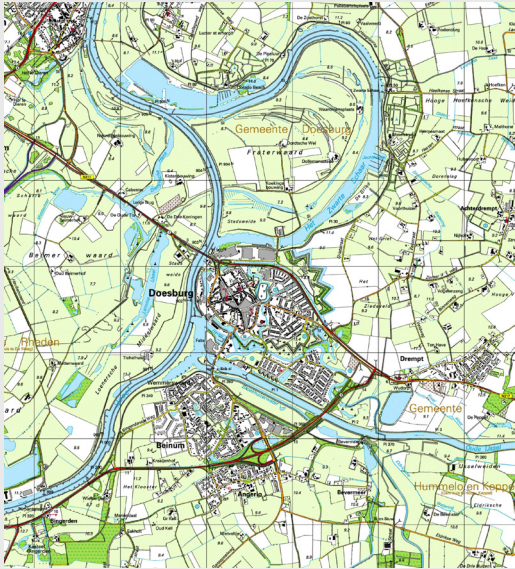
1900
The urban area slightly expands beyond the original fortifications, following nearby roads and river crossings.



1980
Urban expansion accelerates with planned residential areas and improved transport networks shaping the outskirts.



1940
Growth continues along main roads and infrastructure, with more buildings appearing outside the historic core.



2000
The city becomes more dispersed and integrated into the surrounding region, with extensive suburban development and infrastructure.

3.2.3 Urban Profile

The social-spatial structure of Doesburg is described through the indicators of age distribution, household composition, housing typologies, mobility patterns, economic activity and the current housing supply. This research adds to a deeper understanding of the current residents and helps with identifying the needs of future residents when new housing developments are introduced.



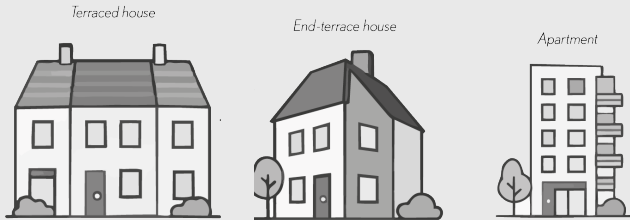
Age
The largest group, with 30.2%, is 45-65 years old, and the second and third groups following are 65+ and 25-45 years old. This age distribution suggests a community with many long-term residents and a significant number of retirees.



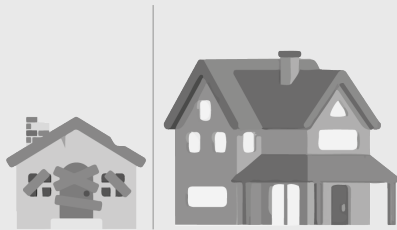
Owners versus renters
54% of the buildings are owner-occupied, a small portion are private rentals, and the remainder belong to housing associations. This indicates a stable, long-term residential environment, moderate rental options, and a reliance on social housing to support affordability and community diversity.



Households
Doesburg consists of 77% single-family homes and 23% multi-family homes. This small number of multi-family households can restrict rental options and challenge affordability for one-person households, young professionals, or other smaller households.



Housing typologies
Housing is dominated by 39.2% terraced houses, followed by 20.7% end-terrace houses and 22.8% apartments, while detached and semi-detached homes form the smallest share. This mix of dwelling types creates a varied residential structure, offering both ground-orientated homes and more compact living options.



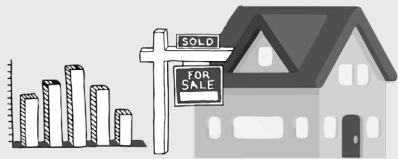
Occupancy
The city shows a very high level of building occupancy, with only 3% of buildings uninhabited. This low vacancy rate indicates a healthy housing market and steady demand for living in Doesburg.



Car use
With 1.16 cars per household, the city shows high car dependency, reflecting suburban living and limited public transport use. This impacts traffic, parking demand, and challenges sustainable urban development and environmental goals.



Businesses
In Doesburg, the economy has a high focus on business services, followed by trade and hospitality. This highlights a service-driven local economy with a strong emphasis on professional and commercial activities. The trade and hospitality sectors contribute to tourism and local commerce, while the prominence of business services supports employment, innovation, and broader regional economic development.



Housing supply
The city has a housing stock of 5,456 units, indicating a relatively small residential market. This affects supply, affordability, and growth potential, shaping development strategies.

Source: Woonplaats Doesburg in Cijfers en Grafieken. AlleCijfers.nl, 2026

3.2.4 City for Commuters

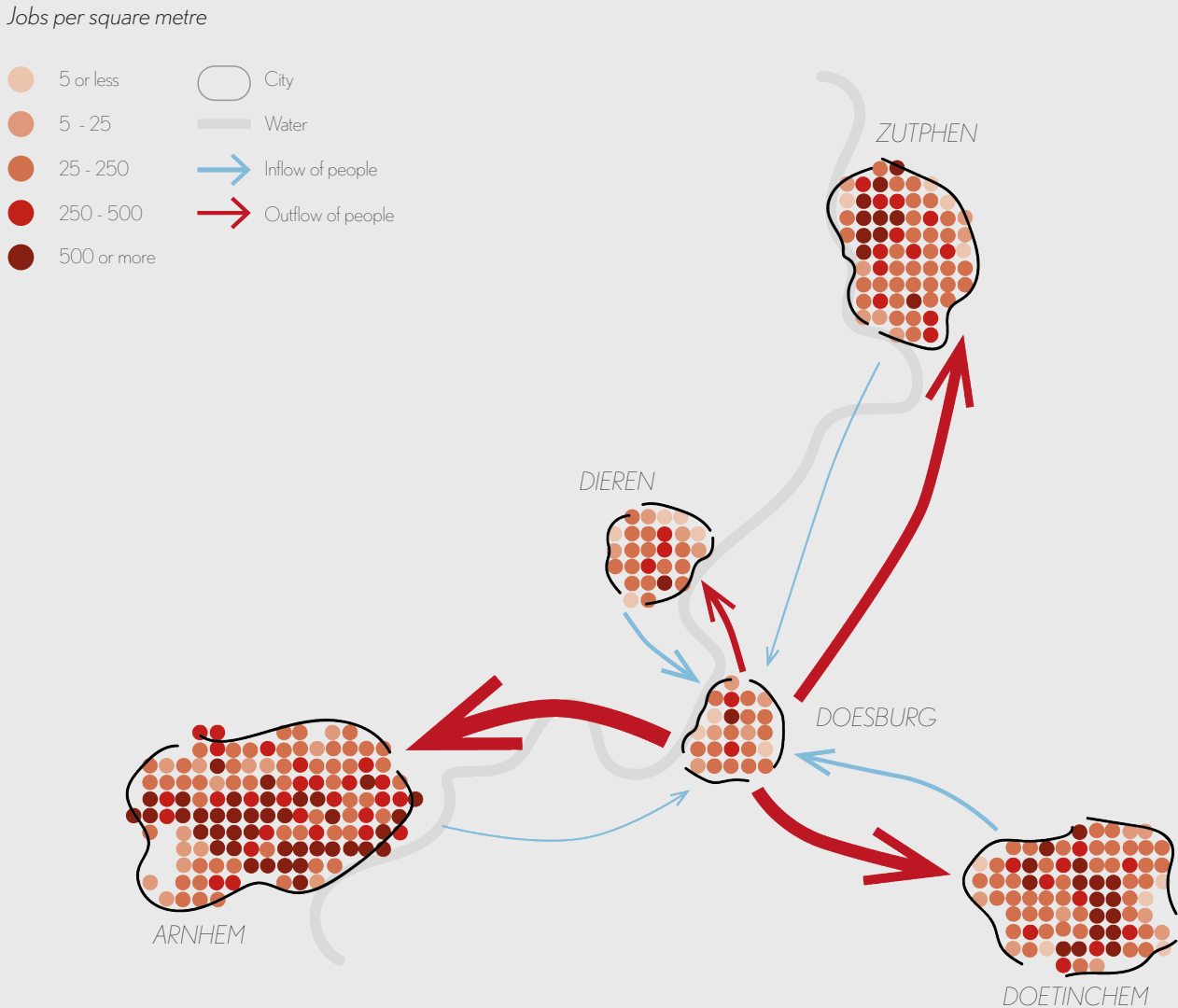
Jobs per square metre
The map shows the number of jobs per square metre in the city of Doesburg and the surrounding cities. Compared to larger nearby cities such as Arnhem and Doetinchem, Doesburg has a lower number of jobs per square metre. This leads to a daily pattern in which more people leave the city for work than enter it. Many residents commute to surrounding cities for employment, which reflects the fact that Doesburg mainly consists of residential areas.

This suggests that Doesburg functions largely as a dormitory town, where the city primarily serves as a place to live and employment opportunities are concentrated in nearby urban centres. Local economic activity is therefore mostly focused on small-scale businesses. In the city centre, functions are largely related to retail, cafés, and restaurants rather than office spaces or larger employment hubs.

What does this mean for Doesburg?
The daily rhythm of the city is influenced by this commuting pattern. During daytime, especially outside the tourist season, the city has a relatively quiet environment because many residents are working elsewhere. Social activity mainly takes place during evenings and weekends, when people return home. The suburban expansions of the city mainly function as ‘sleeping neighbourhoods’, reinforcing the residential character of Doesburg. Mobility in the city is also influenced by this structure. Many residents depend on cars to travel to work, making the mobility system car-dominant. Because of the limited job opportunities within the city itself, young people often leave Doesburg for education or work in larger cities, leading to a smaller regional network and a stronger dependence on surrounding cities, such as Arnhem and Doetinchem.

At the same time, the calm and quiet character of the city makes Doesburg an attractive place to live, particularly for elderly residents and people looking for a peaceful environment. The city also has a strong community structure, where social life and local networks play an important role.

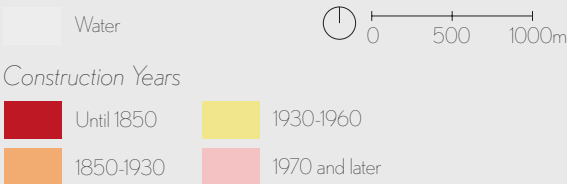
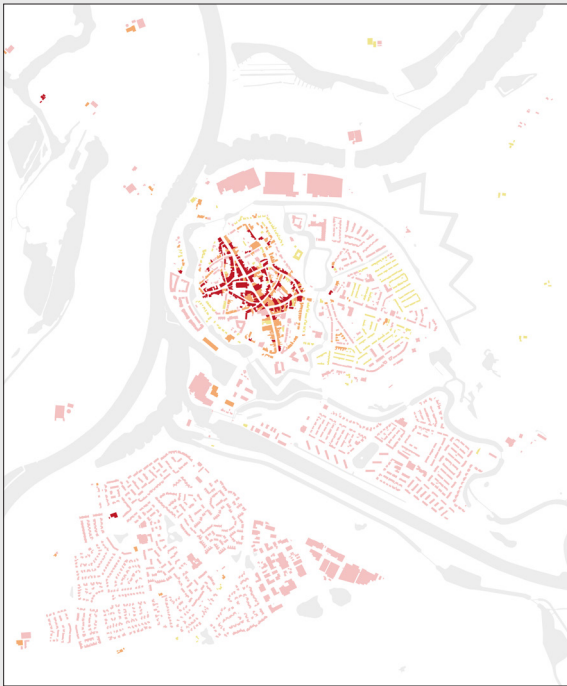
Future Developments
Currently, Doesburg is economically dependent on the surrounding region. There are limited opportunities for young professionals and starters, and there is little space for innovation or new economic activities. This contributes to low social and economic activity during the daytime. For future development, the economic resilience of the city needs to strengthen by creating more job opportunities within Doesburg. This reduces commuter dependency and attracts younger residents. Supporting local businesses, encouraging innovation, and developing spaces where living and working can coexist help transform the city from a primarily residential environment into a more balanced work-living environment.



3.2.5 Analysis M-scale

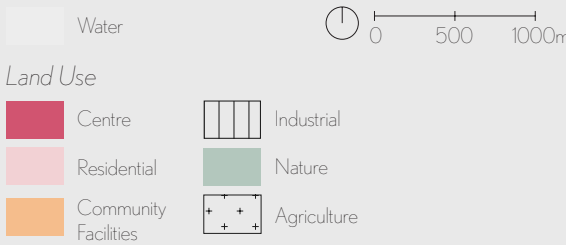
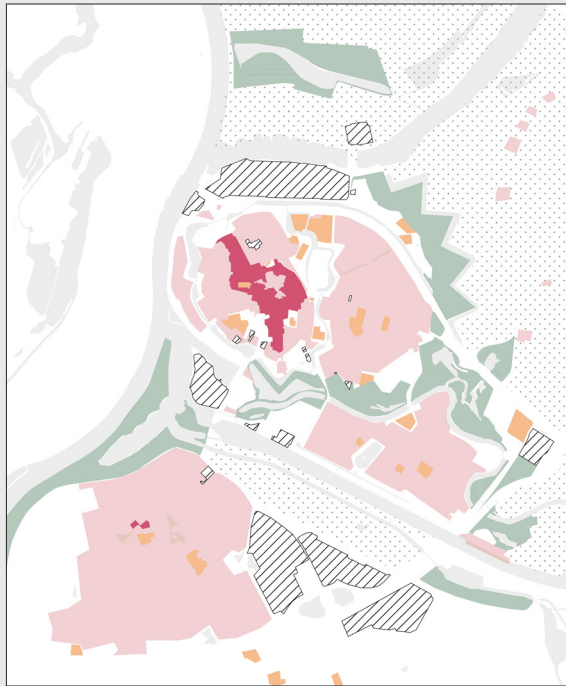
Years of Construction

This map gives a clear overview of the oldest part of the city, the historic centre, with the neighbourhood in the east as a first expansion of the city.



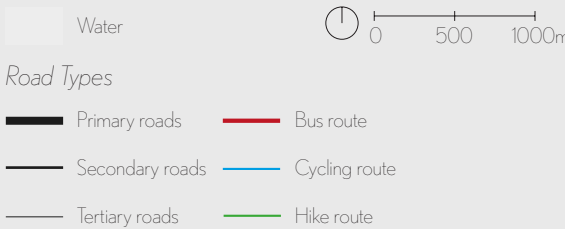
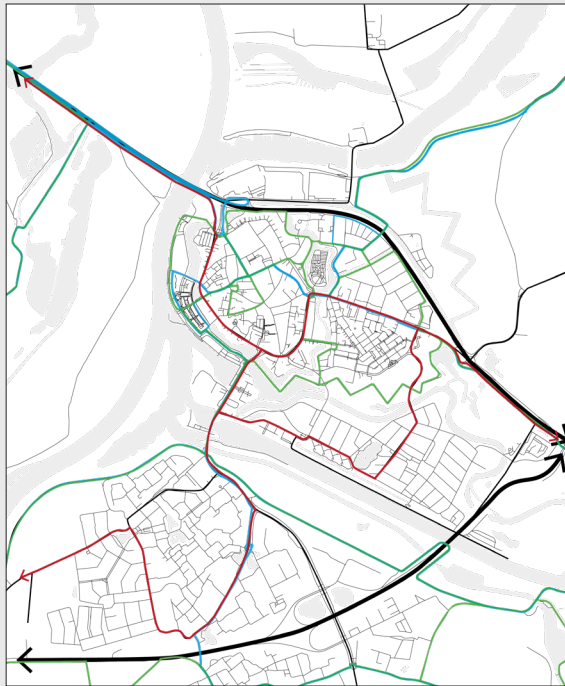
Highly Residential

The residential area is the largest part of the city. Doesburg is surrounded by a network of green that forms a transition zone between the city and the agricultural land.



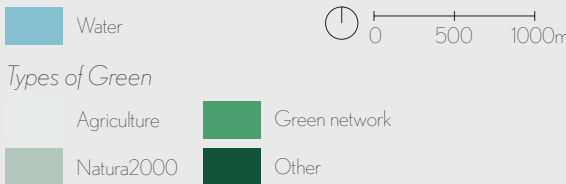
Mobility Network

Doesburg is connected with larger surrounding cities by two main roads. The city is accessible by car and a bus network. Because of the historic centre and the protected nature surrounding the city, the site is part of a national cycling and walking network. This results in possibilities for tourism.



Green Map

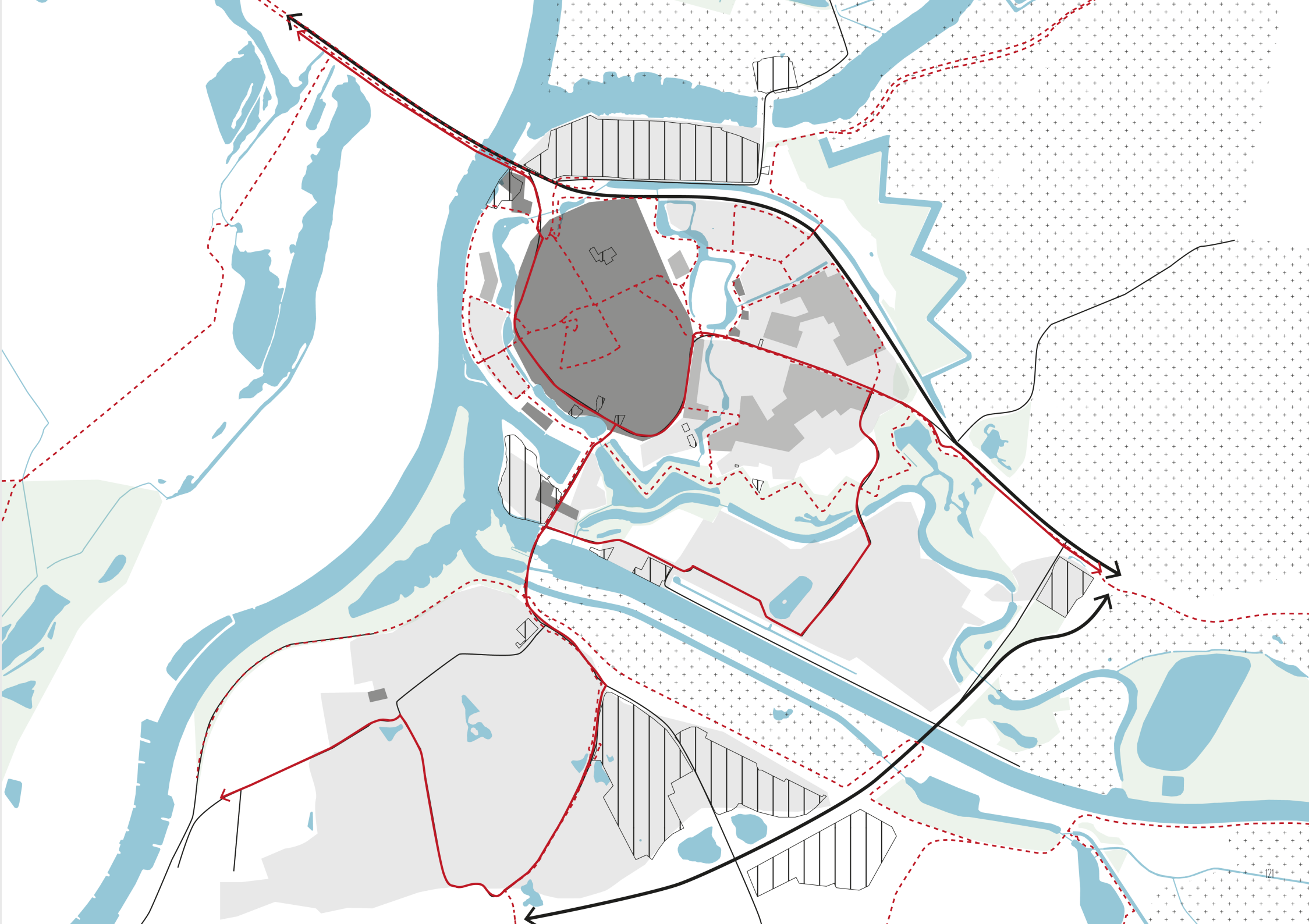
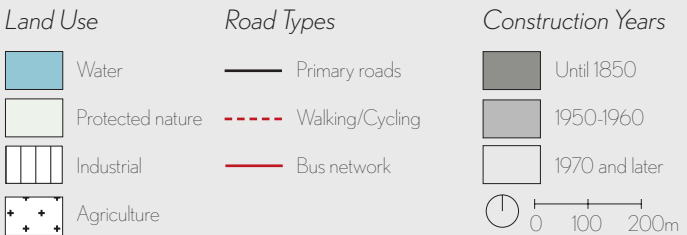
The core of the city is surrounded by a historical landscape of fortifications. The north-west side is part of the Natura2000 network, and the south-east side mainly shows green in between the neighbourhoods and agricultural land.



3.2.6 Synthesis

The years of construction highlight the strong historical character of the city. The historic centre is clearly visible through the concentration of older buildings. Surrounding this core are newer expansion areas, which show how the city gradually grew outward from its historical centre. Residential areas form the largest part of the city. In addition to housing, several buildings serve as community facilities that support local involvement. Around the built-up areas, a network of green spaces creates a transition zone between the city and the surrounding agricultural landscape. This green structure strengthens the connection between the urban area and the agricultural land. Doesburg is connected to larger surrounding cities through two main roads. Although the city does not have a train station, it is accessible by bus, which provides regional public transport connections. The presence of the historic centre and the protected landscapes around the city also places Doesburg within a national cycling and walking network. This creates opportunities for tourism and recreational activities.

The historic core is surrounded by a landscape of former fortifications, which contributes to the historical identity of Doesburg. On the north-west side, the area is part of the Natura2000 network, indicating protected natural landscapes with ecological value. On the south-east side, the green structure mainly consists of smaller green spaces within neighbourhoods combined with surrounding agricultural land. Doesburg is a historically structured city with a clear historic core, newer residential expansions, strong connections to surrounding landscapes, and a spatial structure that combines residential living with cultural heritage, nature, and tourism opportunities.



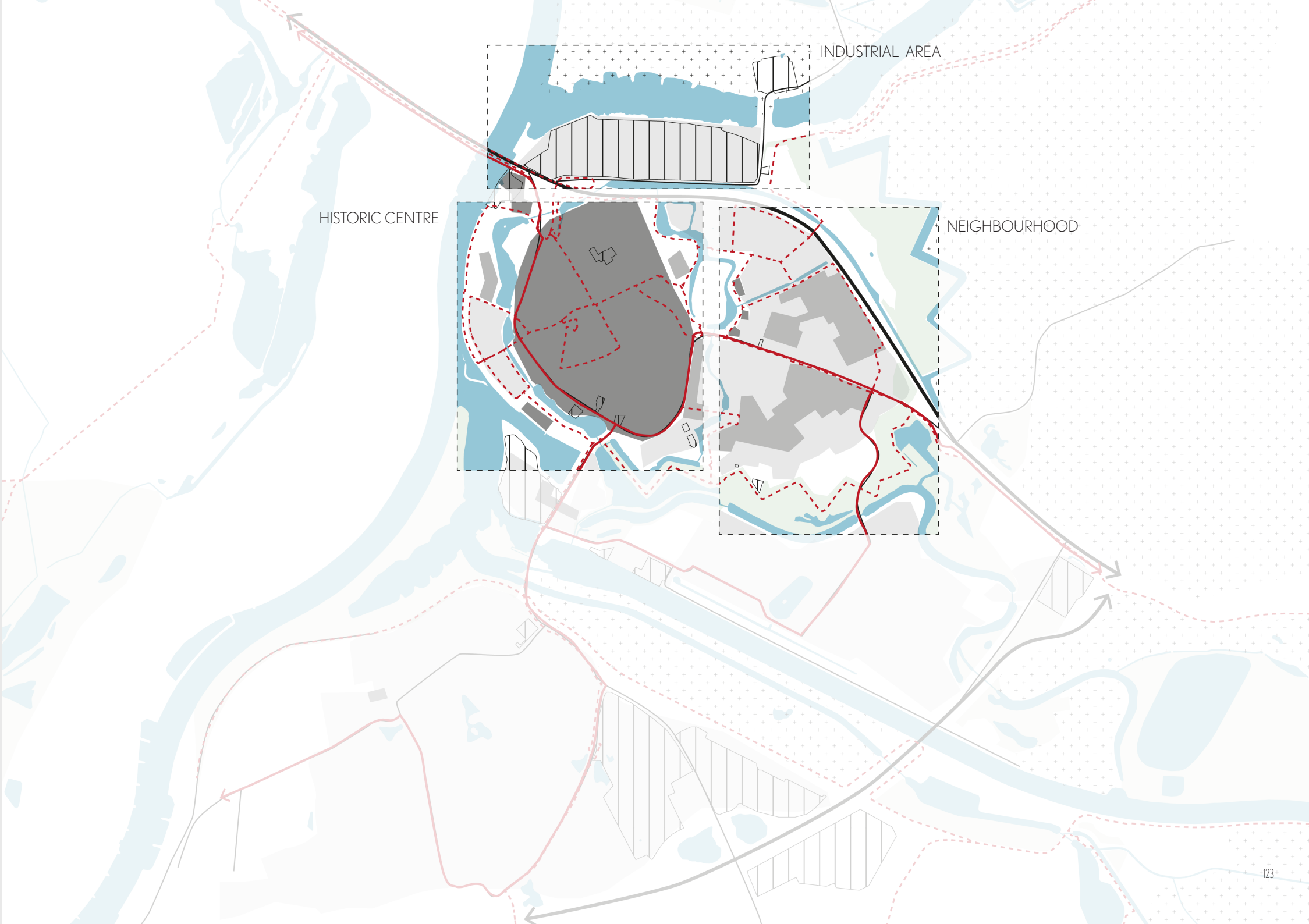
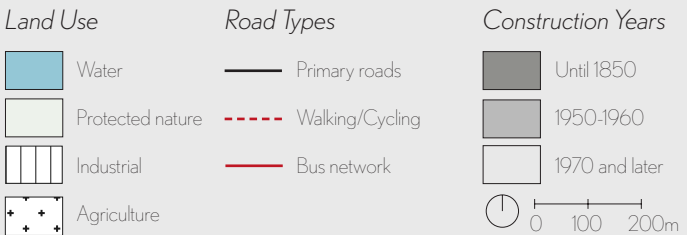
3.2.6 Synthesis sub-areas

The three sub-areas have their individual characteristics that contribute to the identity and quality of the sub-area.

Historic centre
The historic centre contains the oldest buildings and is set within a historic landscape surrounded by water. Walking and cycling are the dominant modes of mobility, while bus and car routes run along the edges, keeping the centre largely free from traffic.

Neighbourhood expansion
The neighbourhood lies adjacent to the centre and is structured around a bus route that runs through its middle. The buildings originate from two different periods, and the area is easily accessible by both bus and car. It is enclosed by a historic landscape, creating a physical boundary between the historic centre and the neighbourhood expansion.

Industrial area
The industrial area is characterised by its views over the agricultural landscapes and its connection to the water. It is primarily accessible by car and is separated from the other two areas by a main road.



3.2.7 What is Doesburg's identity?



Cultural History
The identity of Doesburg is strongly shaped by its strategic location along historic waterways and its development as a fortified trading town. Its position at the confluence of the rivers IJssel and Oude IJssel established Doesburg as an intersection for commerce, defence, and regional connectivity. The fortifications define the spatial and cultural identity

of Doesburg, as they serve as a strong physical and visual boundary between the historic centre and newer expansion areas. This elevated edge reinforces the perception of the city as a contained and historically layered environment. Within these boundaries, the medieval urban fabric remains readable through narrow streets, irregular plots, and preserved individual façades. The historic sightline toward the church's bell tower is a key orienting element, symbolically anchoring the city's identity.

Qualities of the city
Doesburg is characterised by a strong contrast between its compact historic core and the more spacious, functionally differentiated expansion zones. The city centre is defined by narrow streets, small-scale plots, and low-rise buildings with two to three floors, resulting in an intimate and enclosed urban atmosphere. Many streets retain these historic façades. Public and private spaces are closely intertwined, often with minimal transitions between the street and building fronts, which enhances the human scale of the environment. In some of the newer streets within the centre, this relationship is reinterpreted through mirrored street profiles, where small front gardens create a transition zone between private and public space. The buildings in the historic centre are all facing towards the public spaces, but at the edges of the centre, the façades facing the historic landscape are often closed, which strengthens the perception of the landscape as a boundary. The historic landscape functions as a buffer zone between the low-rise, dense core and the larger-scale, higher-rise developments in the expansion areas. The industrial area is characterised by wide and spacious profiles, where water and landscape elements also form a strong physical boundary between the historic centre and the industrial area.

Identity
Doesburg's identity emerges from the interaction between the historic structure, with the fortifications, and its transition zones to the surrounding landscape. The historic landscape, sightlines, and compact street network create a coherent and recognisable core, while the buffer zones and expansion areas introduce contrasting landscapes. This gives Doesburg a clear and structured identity, where historical continuity is not only preserved but also accentuated through spatial contrasts. As a result, the city can be understood as a place defined by edges and transitions.

3.2.8 Three identities

To get a deeper understanding of the identity of Doesburg, the three distinct areas are described with their individual identity. The three areas are interconnected, but each sub-area represents a different historic era and a different purpose.

1. Historic Centre

The historic centre of Doesburg is characterised by its architectural heritage and historical landscape that largely consists of a water network. Its narrow streets and human-scale environment prioritise walking and cycling. The area’s strength lies in its historical continuity, spatial cohesion, and strong relationship between built form, landscape, and cultural identity.



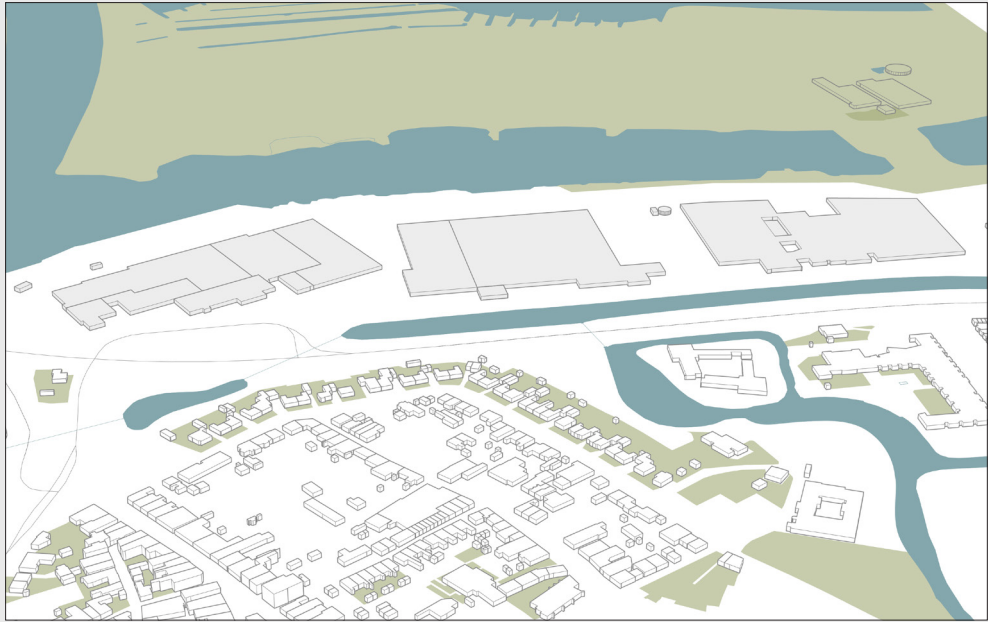
2. Neighbourhood Expansion

Developed over time, the area reflects layered urban growth through varied architecture and layouts. A central bus route structures accessibility and connectivity while supporting car use. More open than the historic centre, it offers a residential character, with clear boundaries that create order, comfort, and a transitional role within the city.



3. Industrial Area

The industrial area of Doesburg is defined by functionality, accessibility, and its edge location near open landscape and water. Separated by a main road, it operates independently from other areas. Its strength lies in efficient organisation, clear purpose, and strategic positioning, offering scale, exposure, and a strong contrast to human-centred urban environments.



3.2.9 Historic Centre

Identity

Historic centre

The historic centre of Doesburg is defined by its architectural heritage and its unique setting within a water-bound landscape. Narrow streets and historic buildings create an intimate, human-scale environment where walking and cycling are dominated. By keeping bus and car traffic at the edges, the area maintains a low-traffic character that enhances its cultural value and liveability. Its quality lies in the integration of history, spatial cohesion, and accessibility for slow mobility. The historic centre

of Doesburg represents the cultural and spatial heart of the city, where centuries of urban development are still clearly visible in the built fabric and street patterns. The quality of this area lies in its strong sense of place, historical continuity, and the harmonious relationship between built form and landscape.

Characteristics of the historic centre:

- High concentration of historic buildings and monuments.
- Human-scale streets and public spaces.
- Dominance of walking and cycling.
- Limited car access and low traffic intensity.
- Strong cultural and tourism value.
- Clear spatial cohesion and identity.

Spatial elements of the historic centre:

- Compactness: narrow streets, small squares, and small plots
- Historic façades.
- Water structures: Canals, rivers, and fortifications.
- Green edges: historic landscape
- Central public spaces and landmarks
- Transition zones at the edges for traffic circulation

Water structures



Historic façades



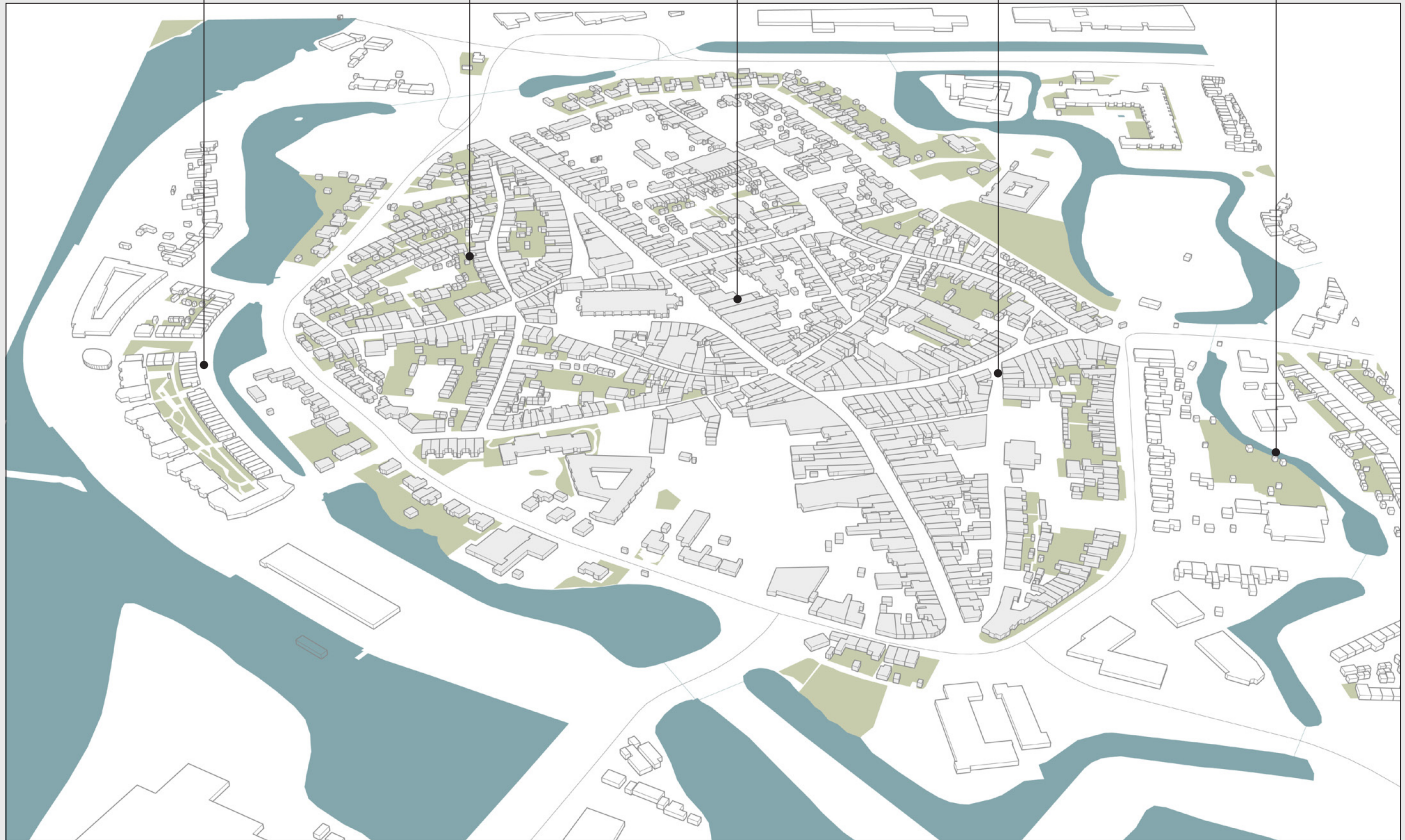
Church



Narrow streets



Historic landscape

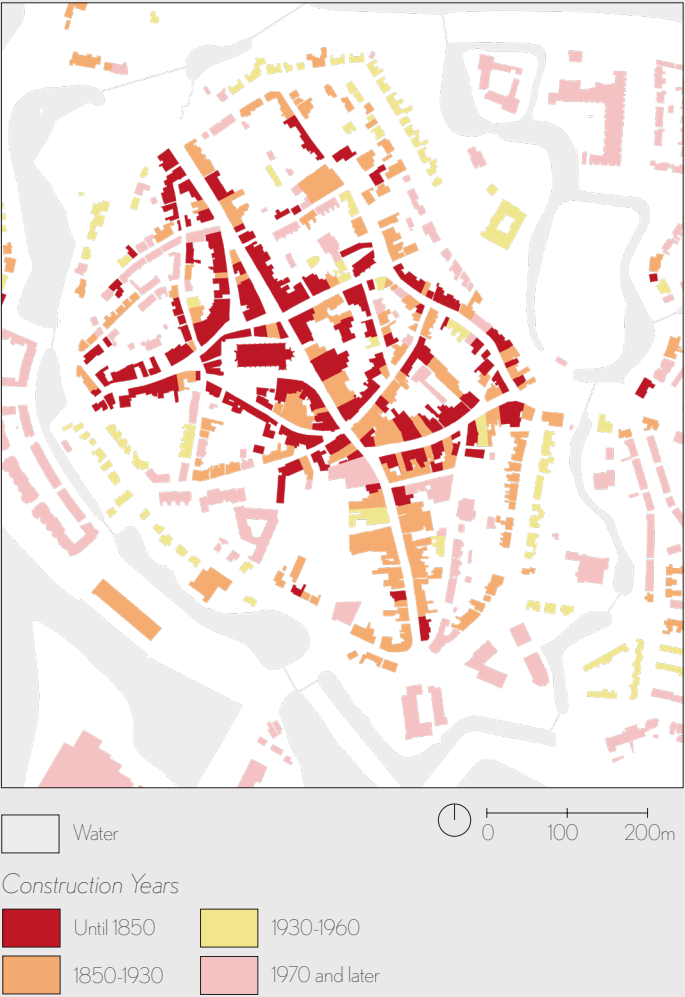


3.2.9 Historic Centre

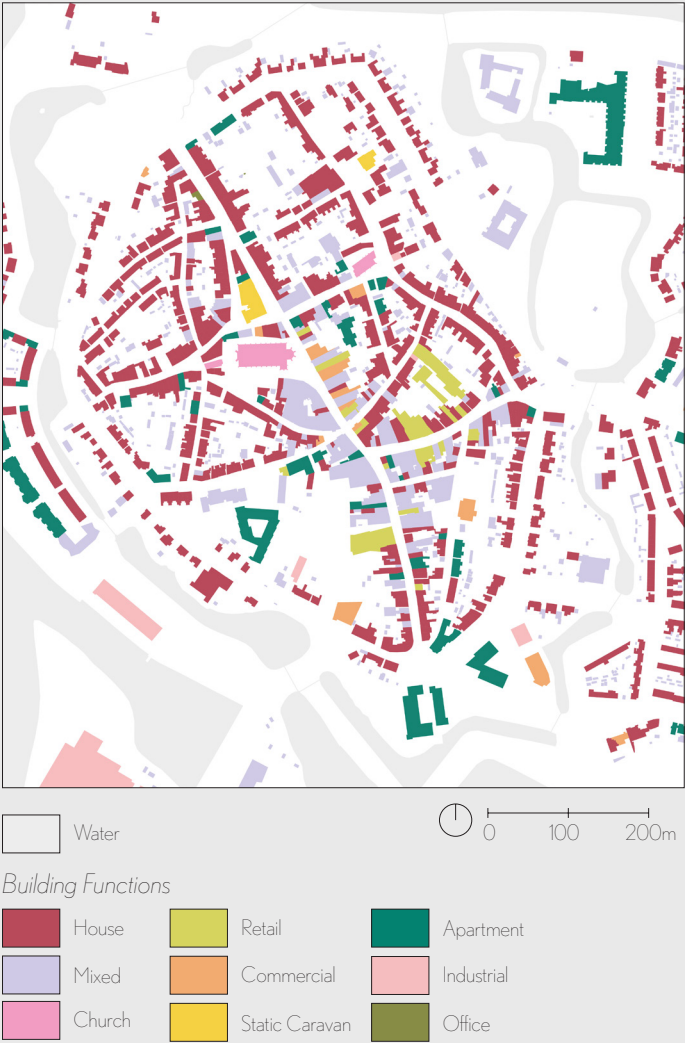
Analysis S-scale

The analysis of the historic centre explores the years of construction in the historic centre, together with the functions and programmes of the buildings and the heights of the buildings. The main conclusions of this analysis are used for defining the criteria of the historic centre.

Years of Construction
The historic centre has the oldest buildings. Some are built before 1850, but most of the buildings date back to 1850-1930.



Mix of Functions
The majority of the buildings in the historic centre are mixed-use and residential buildings.



Low-rise Centre
The city centre only has two buildings that are higher than the other buildings, including the bell tower of the church, which is higher than 60 m. The rest of the historic centre is between 3 m and 20 m.



3.2.9 Historic Centre

Target Group Match

From the identity and characteristics and the spatial analysis, the historic centre can be described as a compact and intimate space where walking and cycling is prioritised. The area has strong architectural heritage and green edges.

Starters

The city centre offers small, compact homes in an active environment. The centre highlights the architectural heritage of the city, which offers opportunities in tourism, hospitality, or local services. However, residents must be prepared to adapt to specific requirements, such as the preservation rules for monumental buildings. The centre is mainly residential, but the core has more of a mixed-use function. The green edges make it possible for starters living in the centre to stay close to green areas while being within an 8-minute walk of their daily needs.

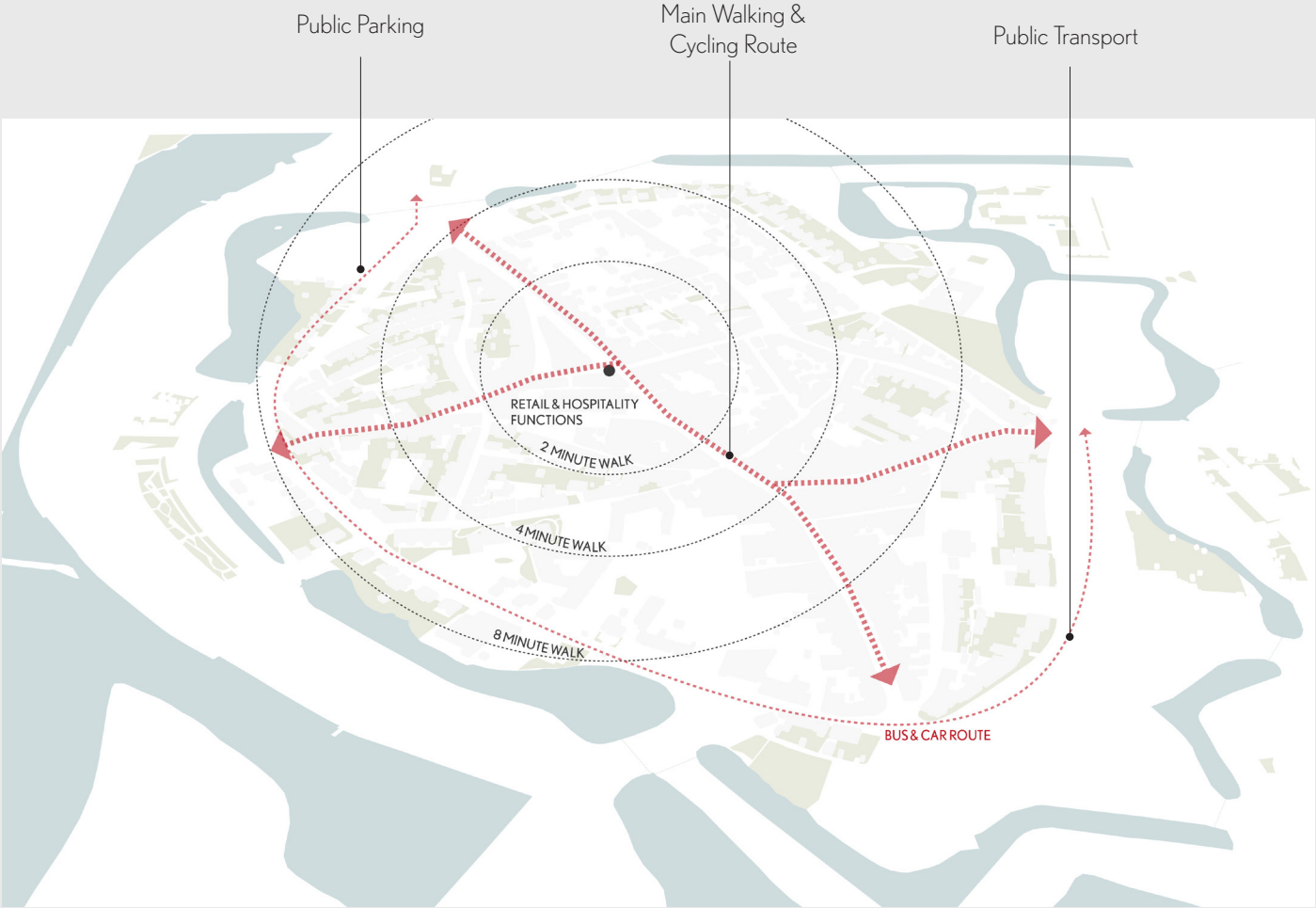
Target group types matched with the historic centre

TYPE OF STARTERS	NEEDS	WHY THE HISTORIC CENTRE?
1-person household	Compact, social interaction, accessibility	Lively area, close to amenities
2-person household	Shared space, flexible interior, green surroundings	Historic environment and small community
Living in family house	Independent living, high access to amenities	Personal space, but close to amenities
Career-focused	Close to work, networking	Tourism, hospitality business, culture
Returning to region	Familiar, affordability, local	Strong local identity
Remote working	Home office, connected, close to green	Lively environment

Elderly

The city centre is ideal for the elderly who are active in culture or tourism, as well as long-time residents of Doesburg who want to live closer to amenities. Ground-floor homes or buildings with elevator access provide convenience and accessibility. Even though the centre is pedestrian-orientated, almost every street is accessible by car, making it suitable for the elderly to live here. Parking options are limited, but there are larger parking spaces at the edges. The main benefit of living in the city centre is that green areas, retail and hospitality functions are all within an 8-minute walk.

TYPE OF ELDERLY	NEEDS	WHY THE HISTORIC CENTRE?
Staying	Familiar surroundings, social connection, community	Close to familiar area
1-person household	Compact, accessibility, social connection	Active streets, opportunities for social interaction
Collective living	Shared space, community, helping each other	Meeting other elderly
Active	Social interaction, close to activities, green surroundings	Cultural-historic surroundings and close to surrounding nature



3.2.9 Historic Centre

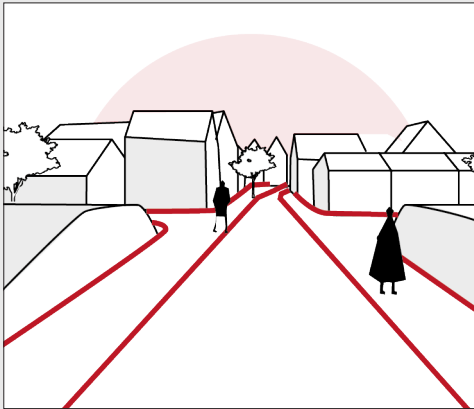
Evaluation criteria

The characteristics and spatial elements of the historic centre, together with the target group analysis, lead to these six criteria that are important to preserve in future developments.

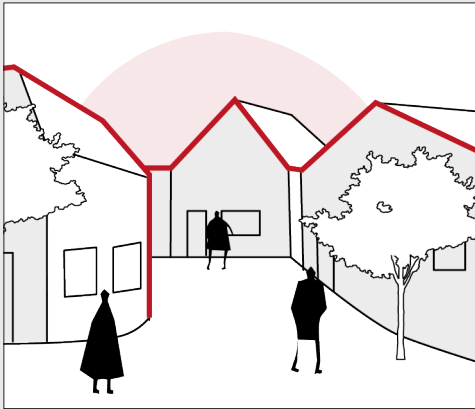
The individual façades need to remain



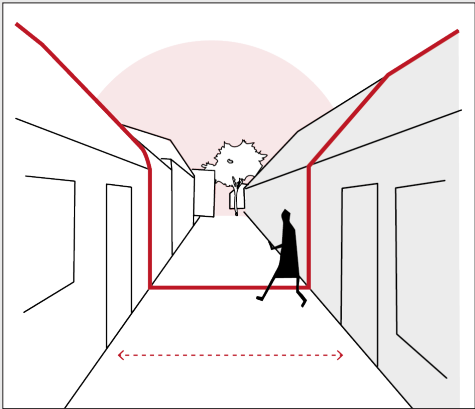
The historic street patterns need to remain



The buildings face public space to keep the streets active



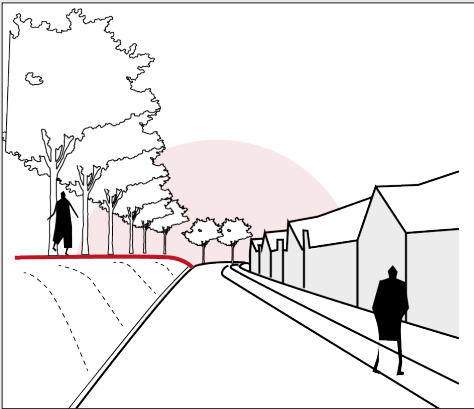
Preserve the plot rhythm with narrow plots and their rhythm along streets



The church needs to remain visible



The historic landscape needs to remain visible



3.2.10 Neighbourhood Expansion

Identity

Neighbourhood Expansion

This neighbourhood forms a transitional zone between the historic centre and the surrounding landscape. Its structure is shaped by a central bus route, ensuring strong public transport accessibility while also accommodating car use. The mix of building periods adds diversity to the urban fabric, reflecting the growth of the city. The area is clearly defined

by the enclosing historic landscape and benefits from a strong spatial boundary and a balanced, well-connected residential environment. The neighbourhood expansion area acts as a spatial and functional bridge between the historic centre and the more peripheral zones of Doesburg.

Characteristics of the neighbourhood expansion:

- Mixed architectural styles: different development periods.
- Strong accessibility: public transport and cars.
- Program: primarily residential function.
- Grid layout: spacious and less dense than the historic centre.
- Clear physical boundary defined by the surrounding landscape.
- Balanced and structured urban layout.

Spatial elements of the neighbourhood expansion:

- Residential streets with varying widths and profiles.
- A central bus corridor acting as a structuring axis.
- Green spaces: private and public gardens and local parks.
- Building typologies: apartment blocks and terraced housing from different periods of time.
- Clear edges formed by landscape or infrastructure.
- Local amenities integrated within the neighbourhood.

Connectivity



Residential environment



Local amenities



Gardens

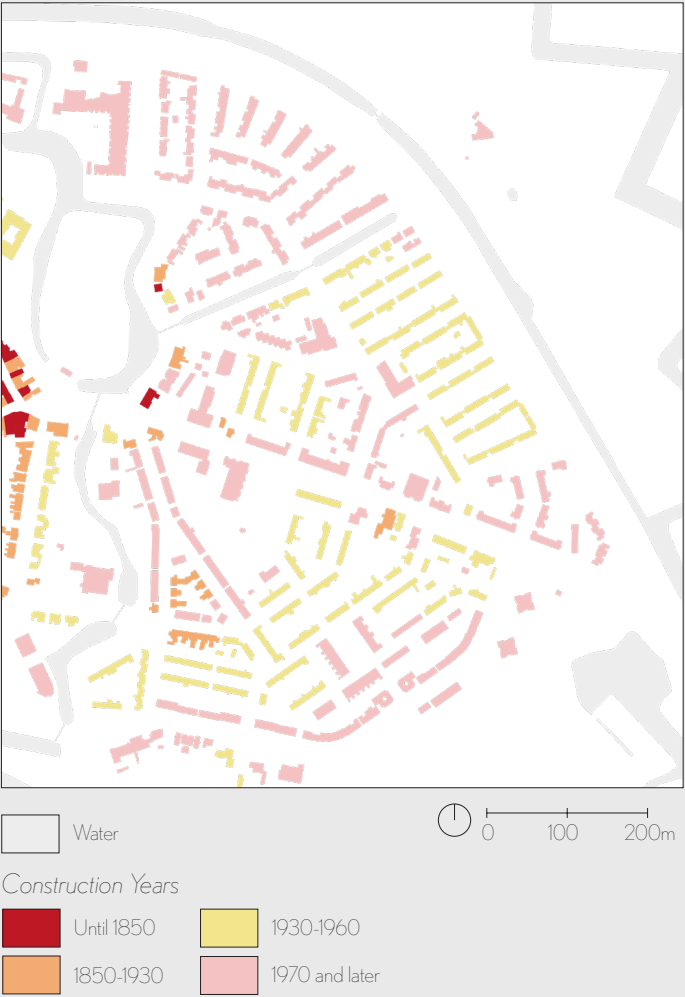


3.2.10 Neighbourhood Expansion

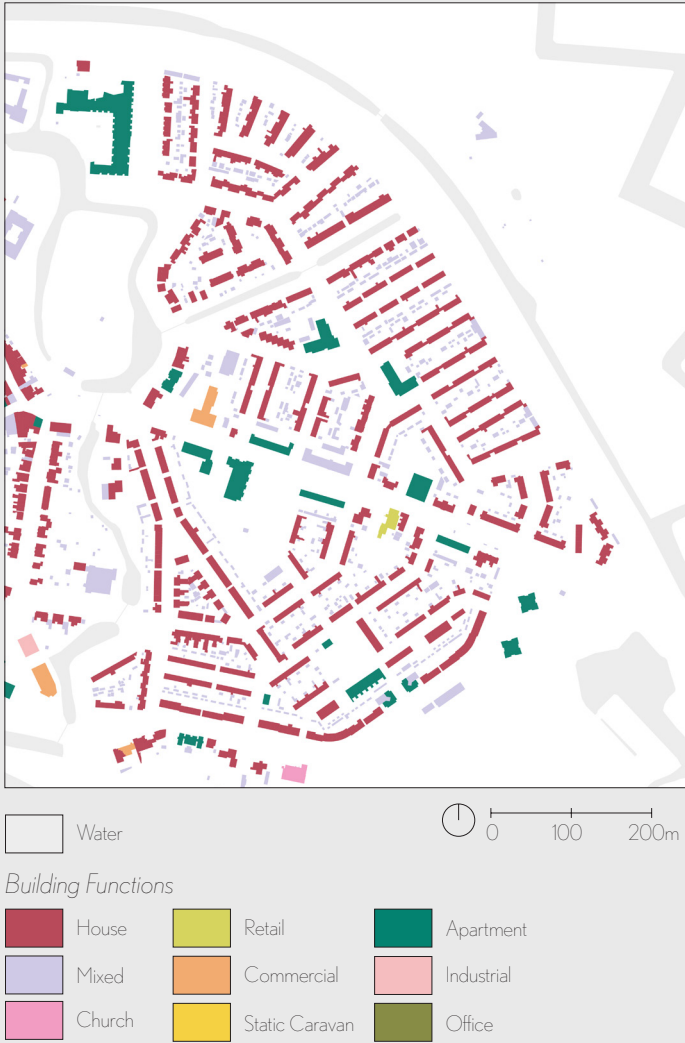
Analysis S-scale

The analysis of the neighbourhood expansion explores the years of construction in the neighbourhood, together with the functions and programmes of the buildings and the building heights. The main conclusions of this analysis are used for defining the criteria of the neighbourhood expansion.

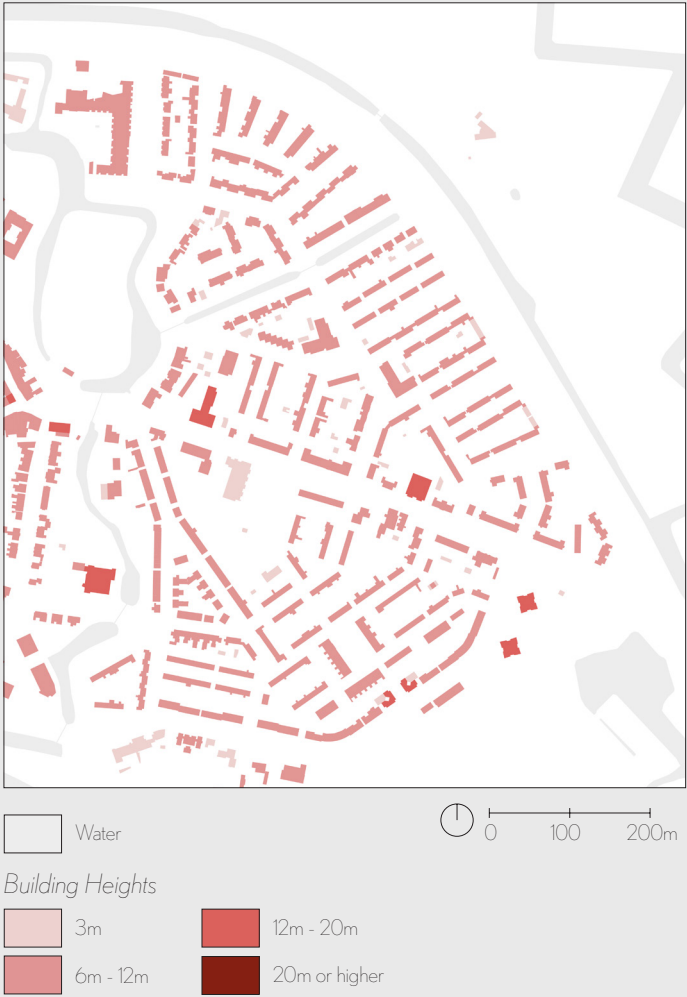
Years of Construction
The neighbourhood expansion is built in different periods of time, with buildings from 1930 to 1960 and 1970 or later.



Highly residential
The majority of the buildings in the neighbourhood are residential, with some mixed-use functions and a few apartment blocks.



Low-rise Buildings
The larger number of buildings in the neighbourhood expansion have a building height of 6 m to 12 m.



3.2.10 Neighbourhood Expansion

Target Group Match

The neighbourhood expansion can be identified as an active area with spacious streets and private gardens. The area has many local amenities, including different shops and sport facilities. It has a mixed architectural style because of the different construction years, creating multiple possibilities for new housing developments.

Starters

The area is highly residential and has a more spacious grid than the historic centre, resulting in private and shared gardens and wider street profiles. The area offers opportunities for starters with a big need for green outdoor space and possibilities for future growing households. For 1-person households, the neighbourhood is a good balance between the green surroundings and the lively historic centre.

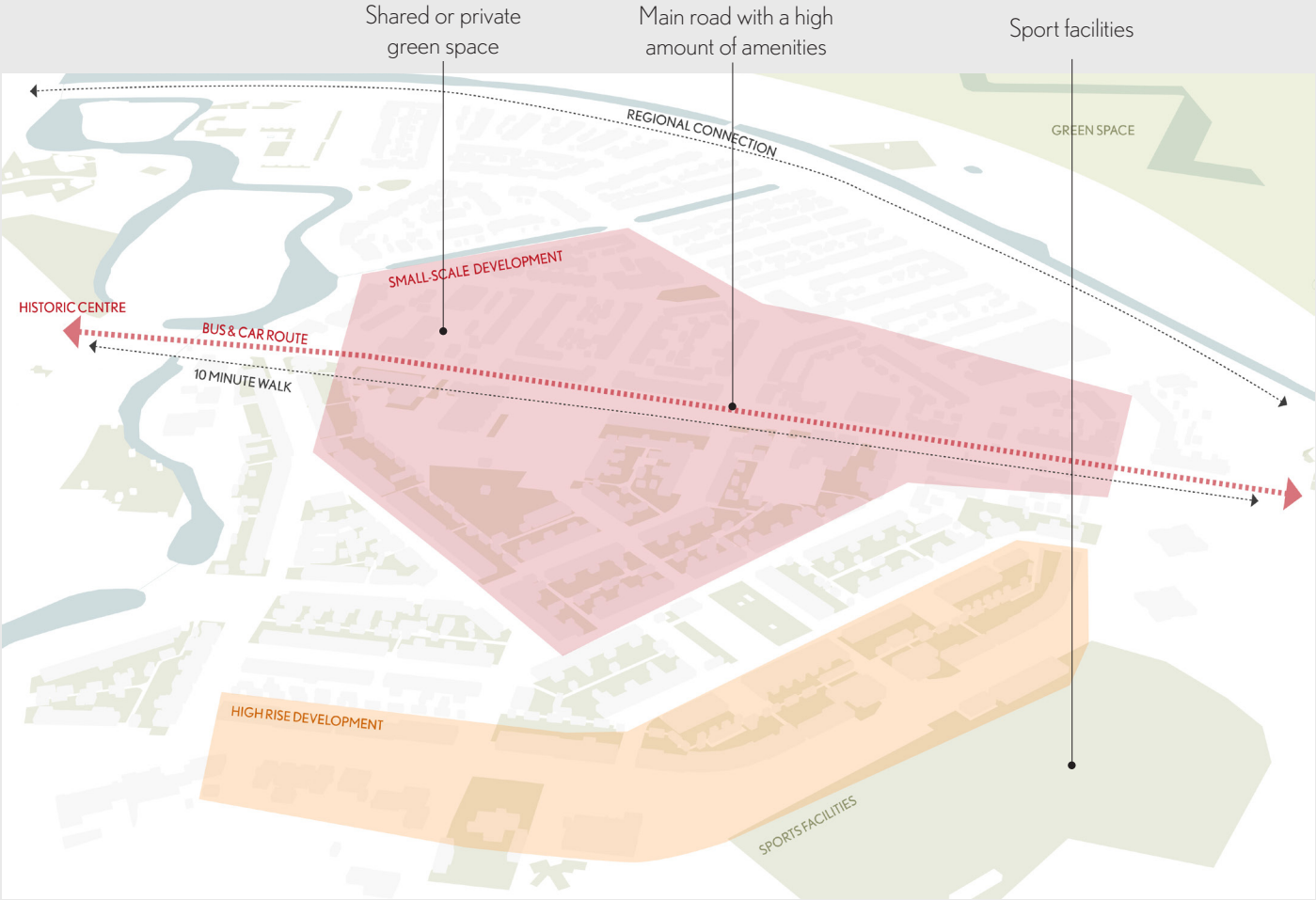
Target group types matched with the neighbourhood expansion

TYPE OF STARTERS	NEEDS	WHY THE HISTORIC CENTRE?
1-person household	Compact, social interaction, accessibility	Lively area, close to amenities
2-person household	Shared space, flexible interior, green surroundings	Historic environment and small community
Living in family house	Independent living, high access to amenities	Personal space, but close to amenities
Career-focused	Close to work, networking	Tourism, hospitality business, culture
Returning to region	Familiar, affordability, local	Strong local identity
Remote working	Home office, connected, close to green	Lively environment

Elderly

For the elderly, the neighbourhood offers housing where all daily needs are within a 10-minute walk, making it easier to live independently. Because of the more spacious grid, the streets are safe and easy to navigate. The proximity to the green surroundings and the space for private gardens also improves the liveability in this area.

TYPE OF ELDERLY	NEEDS	WHY THE HISTORIC CENTRE?
Staying	Familiar surroundings, social connection, community	Close to familiar area
1-person household	Compact, accessibility, social connection	Active streets, opportunities for social interaction
Collective living	Shared space, community, helping each other	Meeting other elderly
Active	Social interaction, close to activities, green surroundings	Cultural-historic surroundings and close to surrounding nature

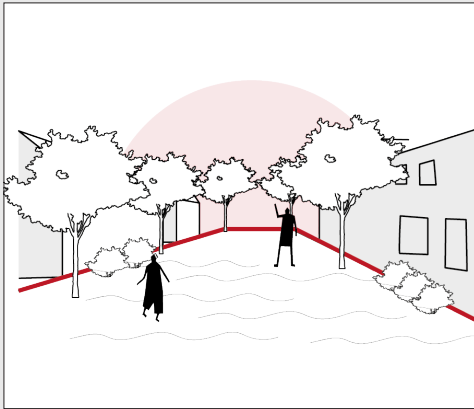


3.2.10 Neighbourhood Expansion

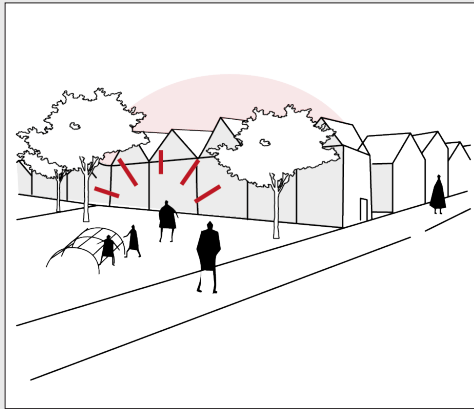
Evaluation criteria

The characteristics and spatial elements of the neighbourhood expansion, together with the target group analysis, lead to these five criteria that are important to preserve in future developments.

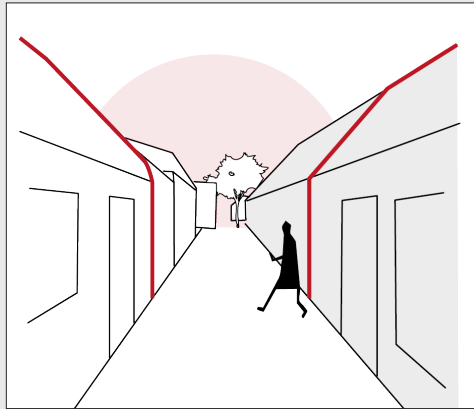
Every home needs to have a private or shared garden



Remain the surroundings child & family-friendly through safe routing



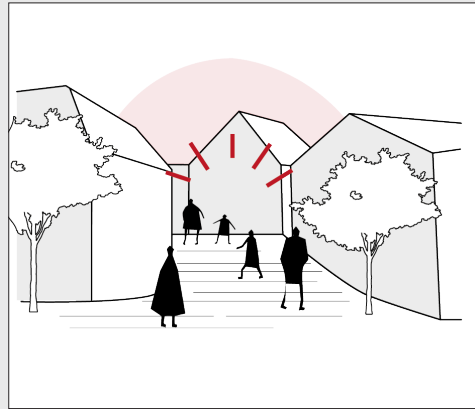
Human-scaled environment needs to be preserved



Local amenities need to remain accessible for every resident



Outdoor public spaces need to remain for social interaction



3.2.11 Industrial Area

Identity

Industrial Area

The industrial area is characterised by its spacious layout and the relationship with the surrounding agricultural landscape and water. This area is primarily designed for car accessibility. It operates independently from the other parts of Doesburg, which is reinforced by its separation through a main road and landscape elements. Its open views contribute to its character and identity, with quality found in its efficiency, spatial

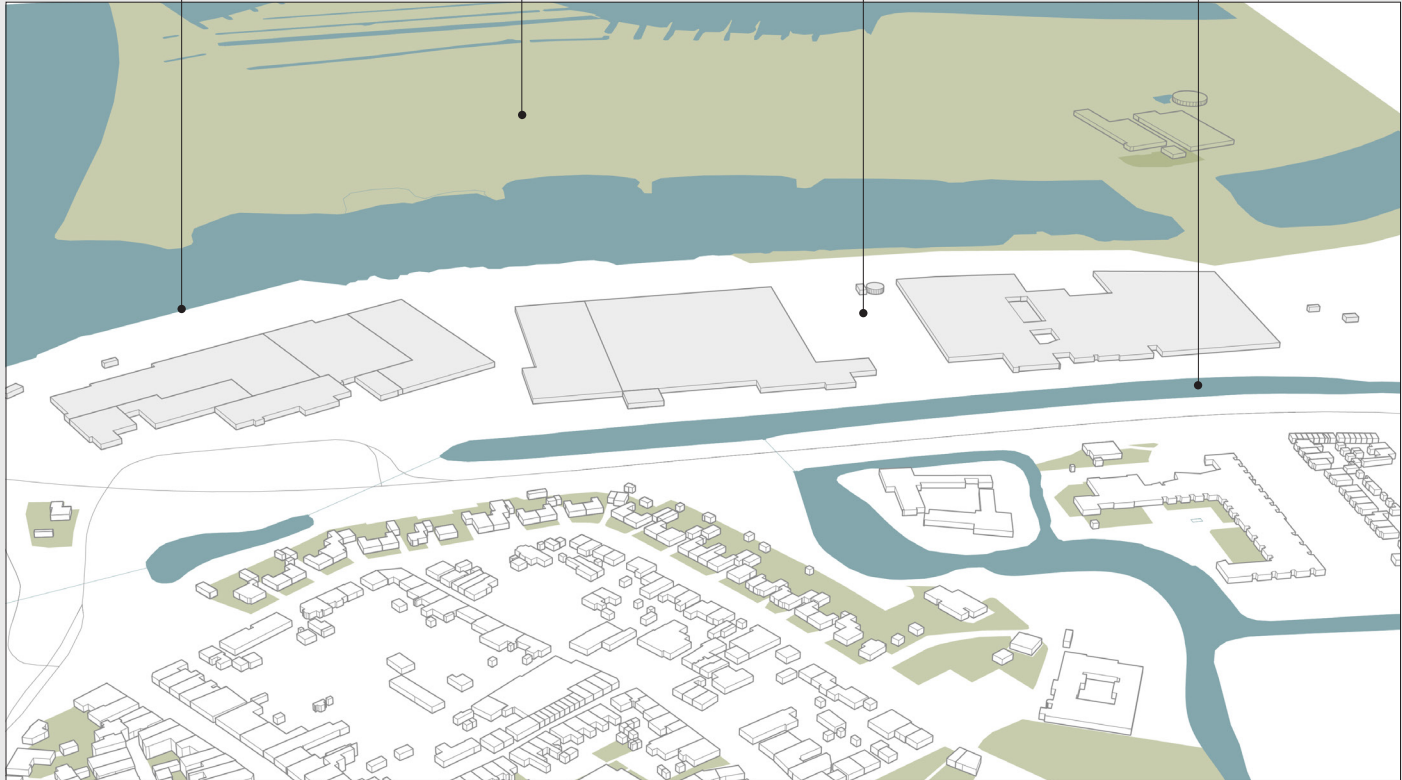
clarity, and its distinct position at the interface between industry and landscape. The industrial area of Doesburg is defined by its functional character and its position at the edge of the urban structure, where it meets the open agricultural landscape and water systems.

Characteristics of the industrial area:

- Program: strongly functional and production-orientated.
- High accessibility by car.
- Spatial and functional separation from other urban areas.
- Direct relationship with surrounding agricultural land.
- Lower density of public or social functions.
- Emphasis on efficiency and logistics.

Spatial elements of the industrial area:

- Large-scale industrial buildings and warehouses.
- Infrastructural: Wide roads and transport infrastructure.
- Grid layout: Open plots and storage areas.
- Visual connections to agricultural land and open landscape.
- High proximity to water.
- Boundary: physical border of road and landscape elements .

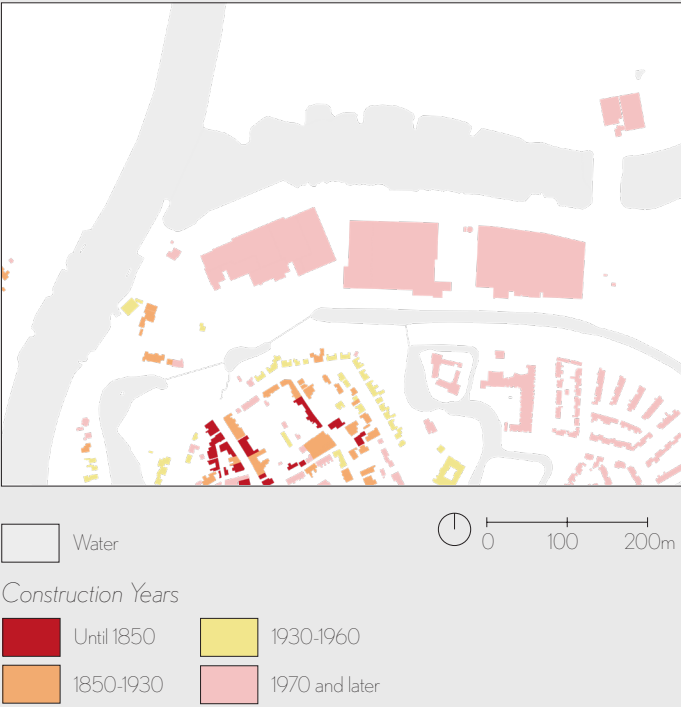


3.2.11 Industrial Area

Analysis S-scale

The analysis of the industrial area explores the years of construction in the area, together with the functions and programmes of the buildings and the building heights. The main conclusions of this analysis are used for defining the criteria of the industrial area.

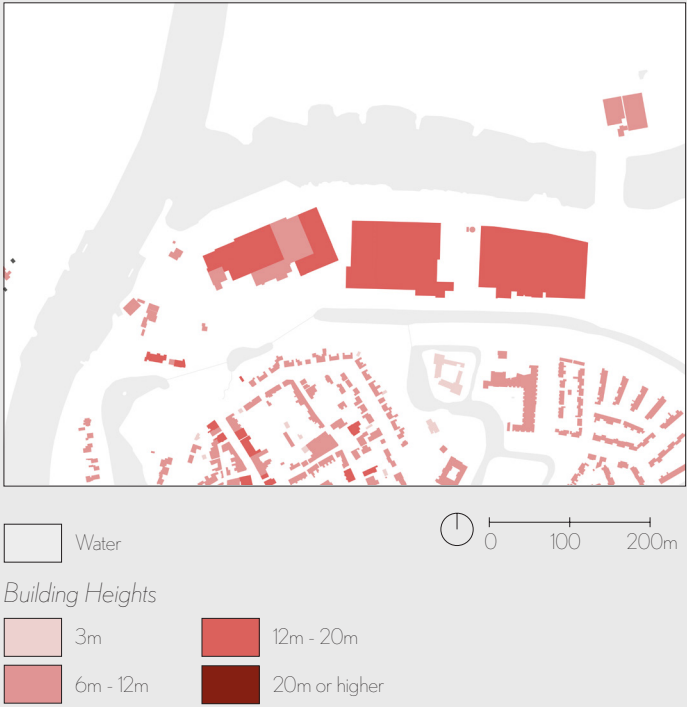
Years of Construction
The industrial area was built in 1970 or later.



Highly Industrial
The majority of the buildings have an industrial function. Only one building has a mixed function.



Building Heights
The industrial buildings have a building height of between 12 m and 20 m. These buildings are taller than most of those in the other two areas.



3.2.11 Industrial Area

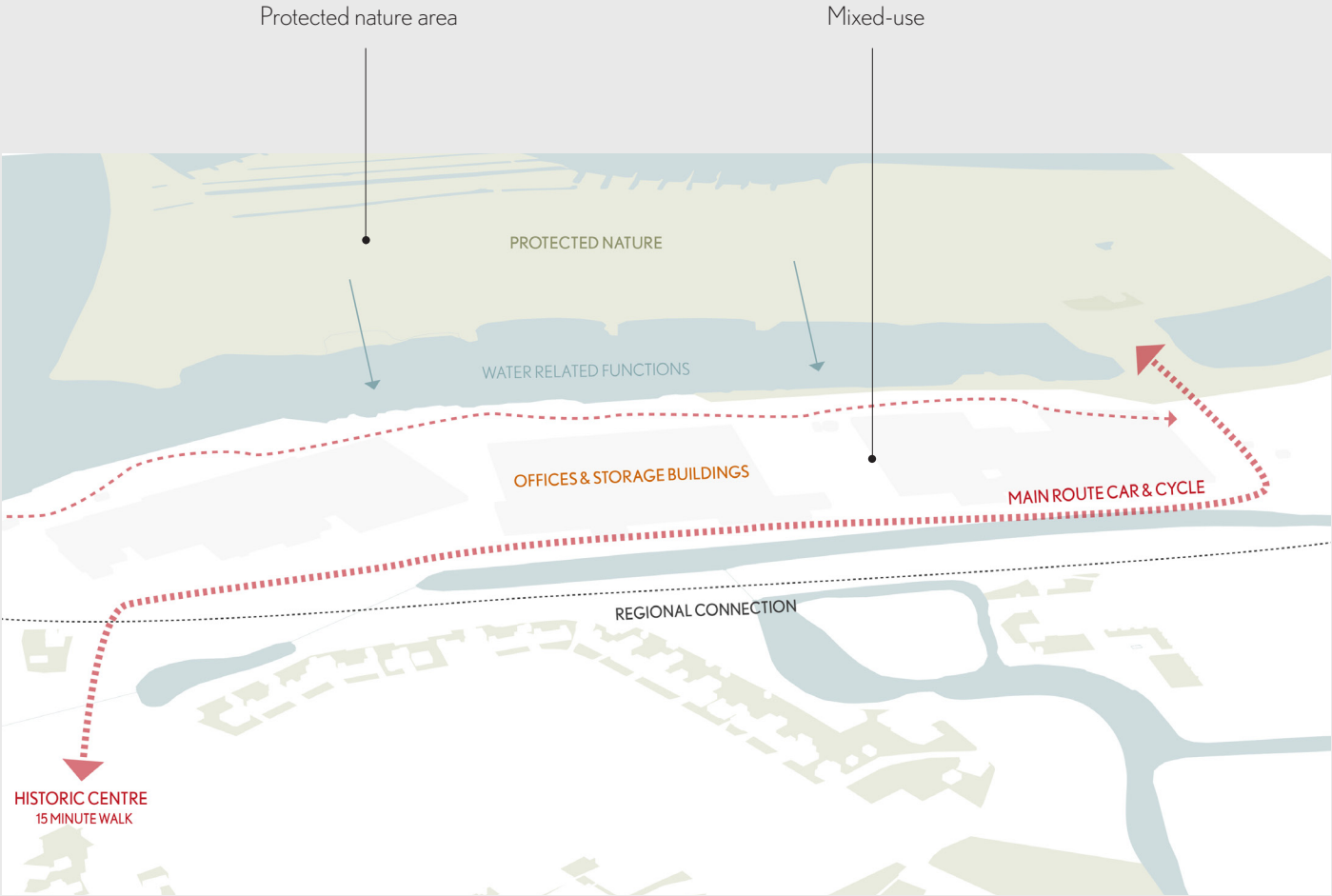
Target Group Match

The industrial area offers a lot of space, has a view on the surrounding landscape, and is well-connected with the historic centre. Combining the current functions of the buildings with new residential functions will transform the area into a live-work combination.

Starters
With a focus on economic activity, the industrial area matches with career-focused and remote working starters. Its relation to the water and the surrounding landscape adds to the liveability of the area. The historic centre lies within a 15-minute walk radius, and the area is also well-connected with the region through a car network. With the industrial functions on the ground floor and the focus on economy, the area focuses on housing for starters.

Target group types matched with the industrial area

TYPE OF STARTERS	NEEDS	WHY THE INDUSTRIAL AREA?
Career-focused	Close to work, networking	Surrounded by businesses
Mover	High accessibility, close to centre, space for growth	Temporary housing solutions
Remote working	Home office, connected, close to green	Offices in surroundings, working environment

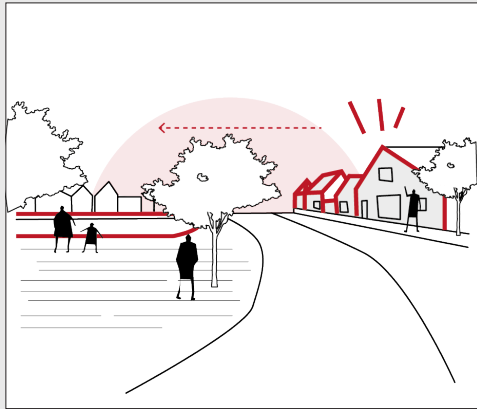


3.2.11 Industrial Area

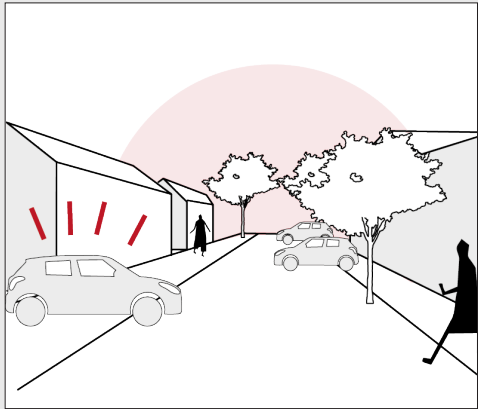
Evaluation criteria

The characteristics and spatial elements of the industrial area, together with the target group analysis, lead to these four criteria that are important to preserve in future developments.

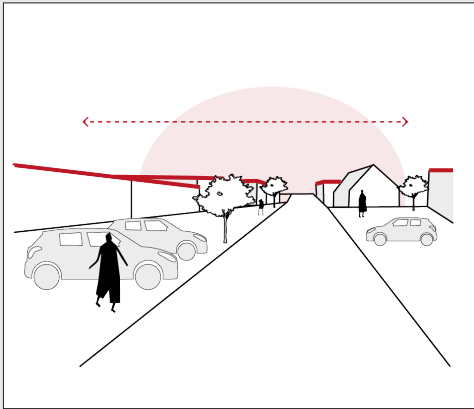
Relation with water and nature needs to be preserved



The area needs to remain accessible by car



Wide grid needs to remain, maintaining a spacious environment



The area needs to remain mixed-function



3.2.12 Conclusion

1. Historic Centre

The historic centre of Doesburg is the cultural and spatial core, where heritage, water, and urban form are closely intertwined. Its human-scale streets and low-traffic character support walkability and enhance liveability. The area's qualities and identity are defined by the architecture and public spaces that show the historical layers of the centre. The careful balance between preservation, accessibility, and spatial cohesion ensures that the centre remains both vibrant and historically grounded.

The evaluation criteria:

- The individual façades need to remain.
- The historic street patterns need to remain.
- The buildings face public space to keep the streets active.
- Preserve the plot rhythm with narrow plots and their rhythm along streets.
- The church needs to remain visible.
- The historic landscape needs to remain visible.

2. Neighbourhood Expansion

The residential area of Doesburg reflects a layered development shaped by different planning periods. It is more openly structured and a central bus route provides accessibility and regional connectivity. Its identity can be described as a comfortable living environment. The area is defined by clear boundaries and a strong relationship with the surrounding landscape; it functions as a transitional zone. Its quality lies in balancing connectivity, residential liveability, and spatial clarity within the broader urban structure.

The evaluation criteria:

- Every home needs to have a private or shared garden.
- Remain the surroundings child & family friendly through safe routing.
- Human-scaled environment needs to be preserved.
- Local amenities need to remain accessible for every resident.
- Outdoor public spaces need to remain for social interaction.

3. Industrial Area

The industrial area of Doesburg forms a distinct and functional edge to the city. Focused on efficiency, logistics, and accessibility, it operates independently from residential and historic areas. Its large scale and open surroundings emphasise its role in economic activity. While less socially orientated, its clarity of function and strategic location create a strong contrast, completing the city's diverse spatial and functional composition.

The evaluation criteria:

- Relation with water and nature needs to be preserved.
- The area needs to remain accessible by car.
- Wide grid needs to remain, maintaining a spacious environment.
- The area needs to remain mixed-function.

3.3 Elburg and Doesburg

Similarities and differences

The comparison of Elburg and Doesburg reveals similarities and differences across the spatial, historical, and functional dimensions. This comparison discusses spatial elements, identity and characteristics, and the target groups to inform the focus of the design exploration.

Spatial

The spatial analysis shows that Elburg and Doesburg share some structural and functional parallels. Both cities are well-connected with the region through a car and bus network, making it easy for car owners to commute to work. However, the lack of train connections with larger cities makes it less accessible for people without a car. In both cities the historic centre is surrounded by a historic landscape of water and green, and both cities are entirely surrounded by agricultural landscape, creating a sharp contrast between the built and non-built environments. From a functional analysis, the three sub-areas in each city align with each other. The historic centres combine residential, retail and hospitality uses; the neighbourhoods area is primarily residential; and the port and industrial areas are mainly industrial. A difference between the two industrial areas is the size, where Elburg's port area is much larger than the one in Doesburg. This can result in a difference in the amount of densification possibilities for this sub-area. Another difference is the urban grid layout. Elburg is defined by a rectangular grid, while Doesburg has a more irregular, organic grid. Additionally, Elburg has a stronger contrast between its compact historic centre and the more spacious expansion areas, where Doesburg's transitions are more gradual. Both neighbourhoods are divided by a main road that connects the area with the centre and surrounding landscape.

Identity and characteristics

The identities of both cities are deeply rooted in their Hanseatic heritage and medieval origins. This results in a high amount of monumental buildings and façades dating back to the Middle Ages. Both cities have narrow streets, small plots, and low-rise buildings, creating a human-scale atmosphere. The centres are characterised by the materials of cobblestone streets, brick façades, traditional architecture and churches. The centres both have a strong focus on tourism, drawing visitors to the museums and their waterfronts. The cultural histories are different, where Elburg's identity is shaped by its origins as a fishing village at the former

Zuiderzee, with a preserved historic harbour with traditional boats. Doesburg's identity is shaped by its strategic location at the River IJssel, making it an important city for trade and defence. The fortifications define the city's physical boundaries but also create a spatial experience where the historic core is elevated above the surrounding landscape. The urban fabric is characterised by narrow, irregular streets, while the edges of the centre often feature closed façades facing the historic landscape. Elburg has hard boundaries between the built and non-built zones, while Doesburg has more transition zones, where the built areas gradually flow into the non-built areas.

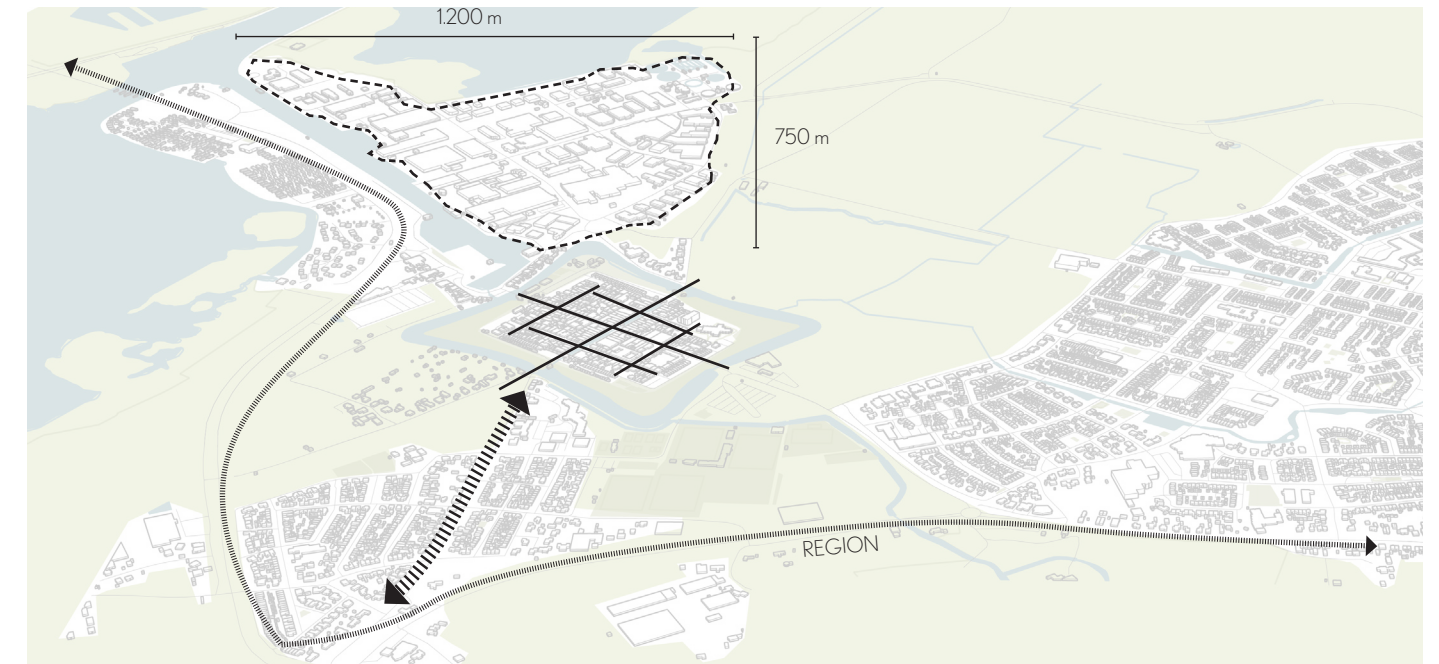
Target group

Both cities focus on new housing developments for starters and the elderly, as a conclusion from the national housing demand. This focus is a result of the similar spatial surroundings and characteristics that are suitable for both target groups. The historic centres and the neighbourhood have the same target group types, while the industrial areas differ in types of starters. Because of the larger size of Elburg's industrial area, this area has more space for new business ideas and start-ups, resulting in the possibility for a new programme of combining living and working. Doesburg's industrial area has little space for new business ideas, so the focus in this industrial area is solely on new housing on top of existing businesses, attracting a different type of starter.

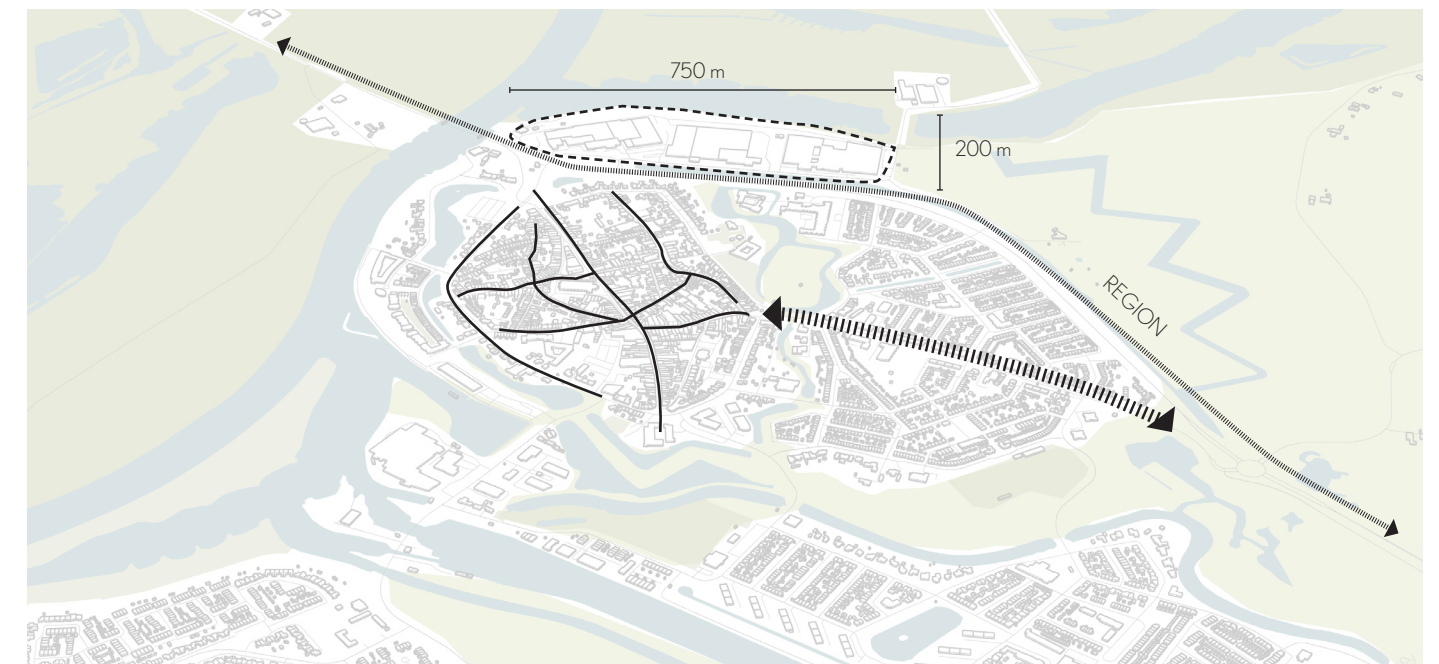
Design exploration

Given the strong similarities between Elburg and Doesburg, this thesis will continue the research and design process with a focus on Elburg. The similarities between the cities suggest that design outcomes can be similar. However, the two cities have some differences in spatial structure, identity and characteristics and target group matches, leading to different evaluation criteria of the areas. After the design exploration for Elburg a hypothesis for Doesburg's densification will be discussed, followed by a comparative analysis of the two design outcomes. Finally, the outcomes will be scaled up to the national level, reflecting back to the national housing demand and evaluating the transferability of the densification strategies to other cities. The next chapters dive into the design exploration of Elburg.

ELBURG



DOESBURG



04

Catalogue Elburg

- ☐ 1. Historic Centre
- ☐ 2. Neighbourhood Expansion
- ☐ 3. Port
- ☐ 4. Catalogue

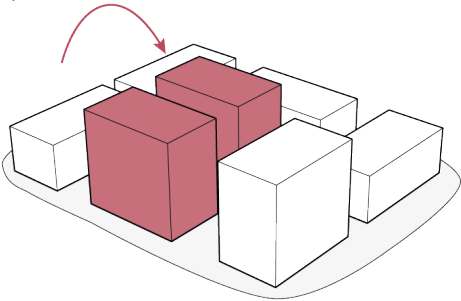
4.1 Historic centre

4.1.1 Densification methods

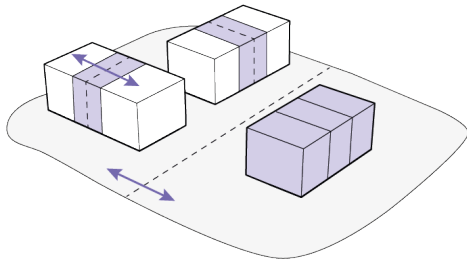
These densification methods are matched with the historic centre of Elburg. This is based on the spatial elements of the area, where empty plots and building types are analysed to conclude whether this densification method is possible. The next pages elaborate on the possibilities of these methods in this area.

Densification method suitable for this sub-area

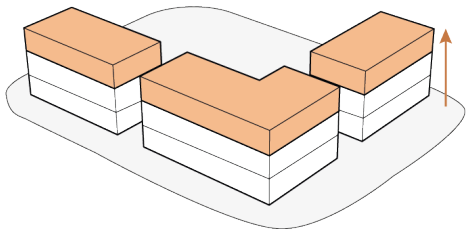
Infill Development



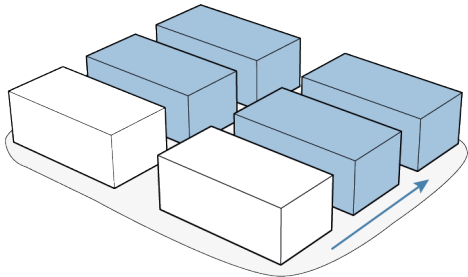
House and Plot Splitting



Roof Stacking



Urban Expansion



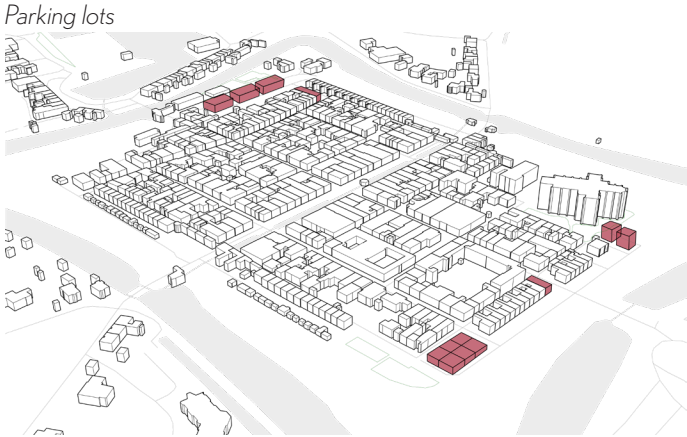
- **Parking lots**
Adding buildings on current parking lots.
- **Empty corners**
Adding buildings on non-built corners of streets.
- **Vacant plots**
Adding buildings on vacant lots and gaps between buildings.

- **Splitting houses**
Divide a building into multiple dwellings.
- **Splitting plots**
Divide plots into multiple plots for new housing.
- **Adding buildings on one plot**
Building houses on the same plot, leading to two houses on a shared plot.
- **Rental agreement**
Renting a room to someone else and sharing living space.
- **Transformation**
Repurpose shops, companies, others or parking lots into housing.

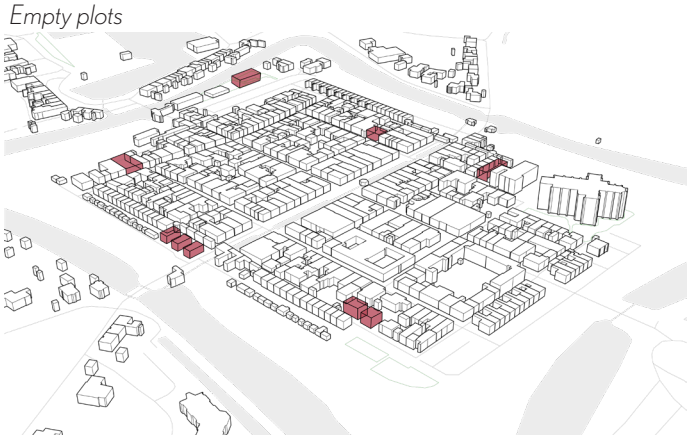
- **Adding meters**
Adding extra metres on the top floor, to make a house more liveable, bigger and suitable for families.
- **Adding floors**
Adding more floors to an existing building, leading to more housing.

- **Urban Expansion**
Creating a new urban grid at the edges of current urban fabric.

4.1.2 Infill development



Infill development on parking lots can introduce compact housing, or mixed-use buildings, without expanding the urban footprint. It benefits cities by reducing car dominance and increasing density. This parking lot is used by residents with a permit from the municipality. In the transformation to new housing a solution for parking space for the current and future residents needs to be included. The entire historic centre has a special parking zone, where different rules apply. Visitors of the city can park their cars outside the historic centre.



The historic centre of Elburg has few plots without buildings. These plots currently function as private or public gardens. Filling the plots with new housing makes efficient use of already serviced land, reducing the need for expansion into surrounding landscapes. By filling gaps in the streetscape, it restores urban continuity and strengthens the visual and spatial coherence of the area. The public garden in the image below suggests infill development, where a new building is built in between two existing buildings. A disadvantage in this situation would be erasing public green space.



4. Parking lot (Parcels Map)



2. Public garden and street (Parcels Map)



Design possibilities
According to the parcels map, these plots are registered without an address. Some of these have a green space function, while others are currently used for parking.

1. Parking lot
Surface: 1186 m2, 554 m2 & 150 m2



2. Public garden and street
Surface: 754 m2



3. Green space city wall
Surface: 563 m2



4. Private gardens
Surface: 225 m2 & 254 m2.



5. Parking lot
Surface: 992 m2



6. Parking lot
Surface: 1275 m2



4.1.3 Splitting

Splitting buildings in the historic centre of Elburg works well due to the structure and scale of its buildings. Many homes are already small but large enough to divide into apartments of 50 m². Based on the surfaces, the map shows every building that can be split into two or more apartments. In addition, many pre-war buildings have their structural walls on the exterior, which makes internal restructuring easier. Their wooden floor structures also simplify adjustments, making it more practical to create separate units. The layout of these buildings, often with multiple floors and clear internal divisions, supports both horizontal and vertical splitting. Vertical splitting creates separate units on the same level, while horizontal splitting divides the building into stacked apartments.



Schiedamseweg, Delfshaven, Rotterdam

When dividing a monumental building into multiple apartments, a special permit from the municipality is needed. The exteriors of the buildings can remain unchanged while the interiors are adapted. Similar to Elburg, Rotterdam also has monumental buildings that are divided into multiple dwellings. The examples at the Schiedamseweg in Delfshaven include horizontal and vertical splitting with shared and private entrances. The main difference between the two cities is the number of floors, where the buildings in Rotterdam are higher than in Elburg. Splitting buildings in the centre of Elburg is possible, but it has a smaller scale and is sensitive due to its historic character.

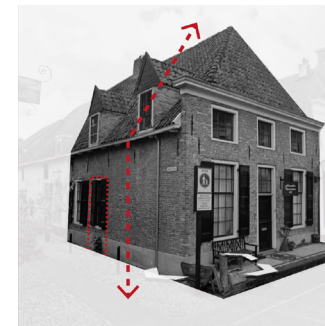
Rotterdam Schiedamseweg, Delfshaven

1. Horizontal: Living above a shop with a private entrance for residents.
2. Horizontal & vertical: One building divided into six apartments and having a shared entrance.
3. Horizontal: One building divided into two apartments, each with a private entrance.

1. Vertical splitting of an end-of-terraced building with an extra entrance. This is a monument, so a permit is needed. 100 m², splitting into two apartments of 50 m².



Noorderkerkstraat 7, Elburg



2. Horizontal splitting of an end-of-terraced building with an extra entrance. This is a monument, so a permit is needed. 100 m², splitting into two stacked apartments of 50 m².



Noorderkerkstraat 7, Elburg



3. Horizontal splitting of a terraced house with a shared entrance. This is a monument, so a permit is needed. 318 m², splitting into three stacked apartments.



Beekstraat 46, Elburg



4. Horizontal splitting of a terraced house with an extra entrance. This is not a monument, but the extra entrance changes the street view. 128 m², splitting into two stacked apartments.



Ellestraat 19, Elburg



5. Horizontal splitting with living above a shop with a private entrance. This is not a monument and already has two entrances. 135 m², splitting into an apartment and a shop.



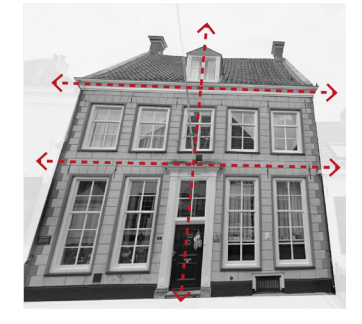
Bloemstraat 12, Elburg



6. Horizontal and vertical splitting with a shared entrance. This is a monument, so a permit is needed. 344 m², splitting into six apartments of 50 m² or bigger.



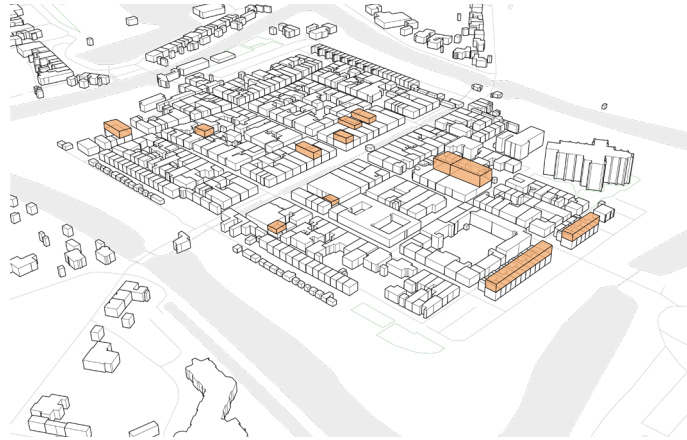
Noorderkerkstraat 11, Elburg



4.1.4 Roof stacking

Roof stacking in the historic centre of Elburg offers opportunities to add space while respecting the existing urban fabric. However, it requires careful consideration of heritage, visibility, and regulations. According to the local zoning plan of Elburg, adding volume is only allowed on the rear roof surface. This means that interventions must not be visible from the public space, preserving the historic streetscape. Additionally, roof stacking is not permitted on listed monuments or provisionally protected monuments.

There are different ways to approach roof stacking. For sloped roofs, adding a dormer on the rear roof surface is a common solution. For flat roofs, an additional full floor can be created. Another option is maintaining the existing façade and adding a setback extension, so the original façade remains intact. Another approach includes increasing usable space within the block, such as creating a raised inner courtyard by building within the block. These approaches allow densification while maintaining the historical character of Elburg's centre. The map shows the buildings in Elburg that have a flat roof.



Examples

1. Adding extra meters with a dormer roof extension.
2. Rotterdam, extra floor with a setback, making it less visible.



1. Unknown



2. Rotterdam

Elburg

1. Flat roofs allow for roof stacking.
2. Above storage box.



1. Bloemstraat 12, Elburg

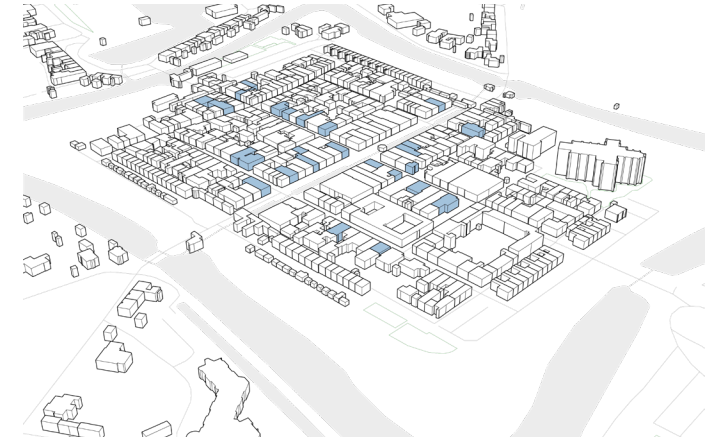


2. Smeesteeg 1, Elburg

4.1.5 Transformation

Transforming buildings from retail to residential use is a relevant strategy in the historic centre of Elburg. This process changes the function of a building while often keeping its physical structure largely intact. In practice, this involves adapting former shops into housing, which can respond to changing demands, such as decreasing retail activity and increasing need for housing.

In Elburg, this approach fits well due to the compact urban structure and the relatively small scale of many fronts. Former shops often have direct street access, generous ground-floor spaces, and upper floors that are already used or suited for living. This makes the transition to residential use easier. However, transforming functions also raises questions about zoning and regulations. The local rules determine where residential use is allowed and whether mixed-use functions should be preserved to maintain liveliness in the centre. Especially in a historic context, it is important to balance housing with remaining commercial and social functions. This map shows all the shops in the historic centre.



This example in Rotterdam shows that the ground floor is transformed from a shop into a house, where the large display windows refer to the previous function. The upper floors were already used as residential units.



Abraham Kuyperlaan 99B, Rotterdam (2022 - 2024)

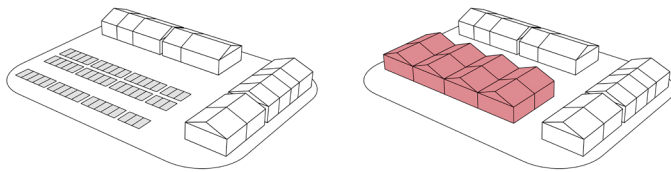


Jufferenstraat 27 & 25, Elburg

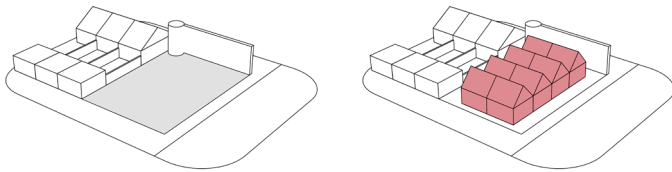
4.1.6 Design Interventions

The design interventions in Elburg show the current situation and the new situation after the design intervention. Each intervention will then be evaluated with the criteria for the historic centre.

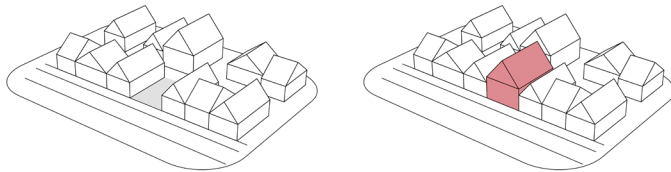
1. Infill development of parking lots



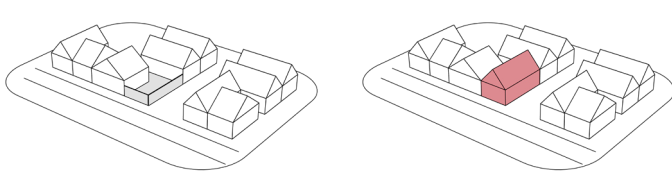
2. Infill development of an empty plot, public space



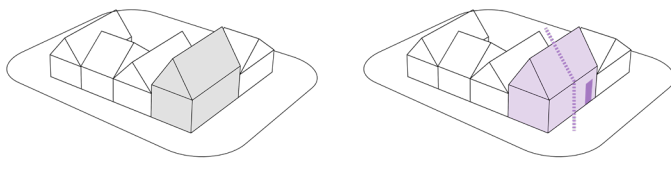
3. Infill development of an empty plot in between buildings



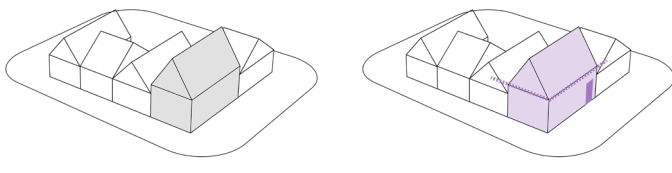
4. Infill development of an empty plot, private garden



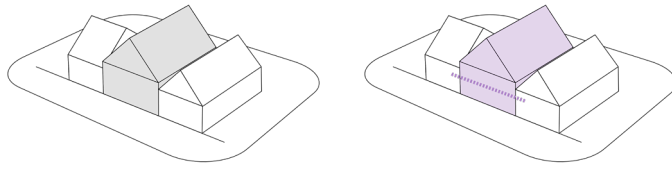
5. Vertical splitting of corner building, extra entrance



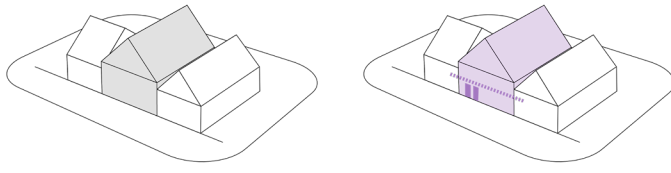
6. Horizontal splitting of corner building, extra entrance



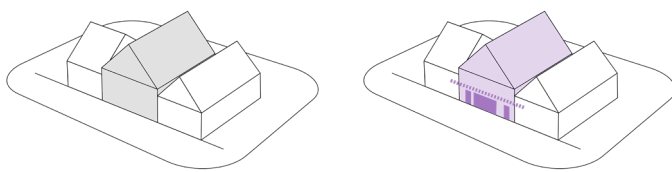
7. Horizontal splitting of a terraced house, shared entrance



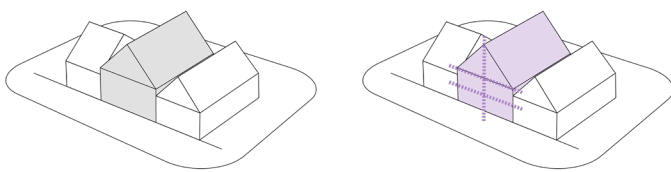
8. Horizontal splitting of a terraced house, extra entrance



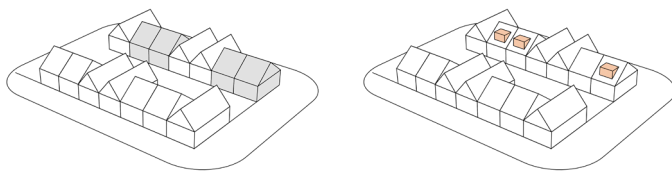
9. Horizontal splitting with living above shop, private entrance



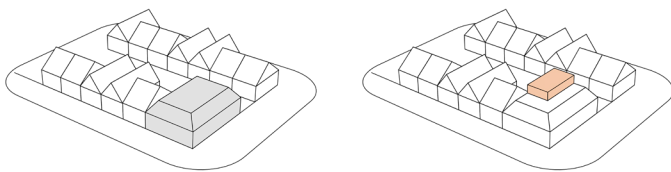
10. Horizontal and vertical splitting with shared entrance



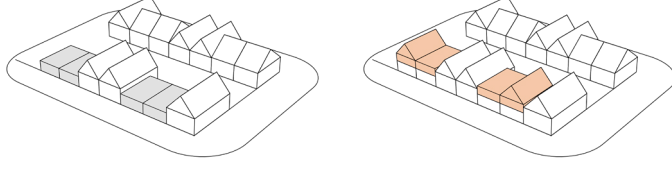
11. Roof stacking with extra meters



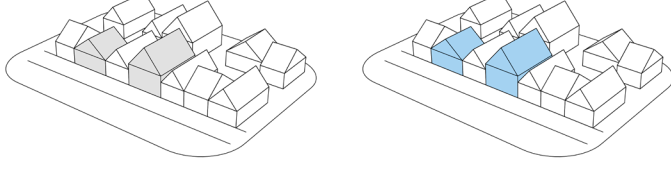
12. Roof stacking with extra floor



13. Roof stacking, extra floor above storage box



14. Transformation to residential function



4.1.7 Evaluation

The evaluation scheme shows how the design interventions score on each criteria that is formed based on the qualities and identity of the historic centre. As a result, the design interventions 1, 3, 4, 7, 10, and 14 have the highest score. These design interventions will be implemented in the design of the historic centre.

1.

Infill development of parking lots
2.

Infill development of an empty plot, public space
3.

Infill development of an empty plot in between buildings
4.

Infill development of an empty plot, private garden
5.

Vertical splitting of corner building, adding an entrance
6.

Horizontal splitting of corner building, adding an entrance
7.

Horizontal splitting of a terraced house
8.

Horizontal splitting of a terraced house, adding an entrance
9.

Horizontal splitting with living above shop, private entrance
10.

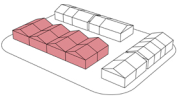
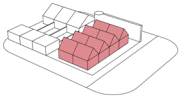
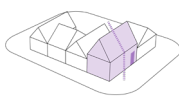
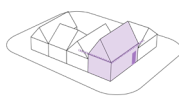
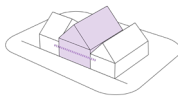
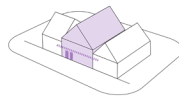
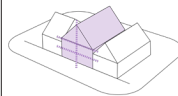
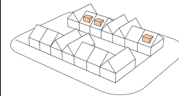
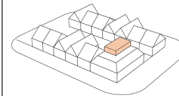
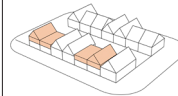
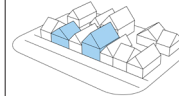
Horizontal and vertical splitting
11.

Roof stacking with extra meters
12.

Roof stacking with extra floors
13.

Roof stacking with extra floors above storage boxes
14.

Transformation of function, from retail to residential

	1. 	2. 	3. 	4. 	5. 	6. 	7. 	8. 	9. 	10. 	11. 	12. 	13. 	14. 
The city wall needs to remain visible	●	○	●	●	●	●	●	●	●	●	●	●	●	●
The rooftops need to remain visible	●	●	●	●	●	●	●	●	●	●	○	○	●	●
The church needs to be recognisable from the entire city centre	●	●	●	●	●	●	●	●	●	●	●	○	○	●
Preserving the individual façades	●	●	●	●	○	○	●	○	○	●	●	●	●	●
Keep it high-density and compact with small plots	●	●	●	●	●	●	●	●	●	●	●	●	●	●
The historic landscape remains intact	●	○	●	●	●	●	●	●	●	●	●	●	●	●

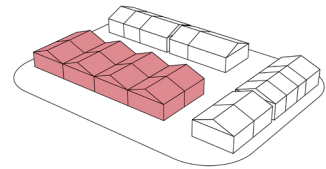
4.1.8 Toolbox

From the evaluation of the criteria, these design interventions comply with the established requirements. The map illustrates all locations where these interventions can be applied within the historic centre.

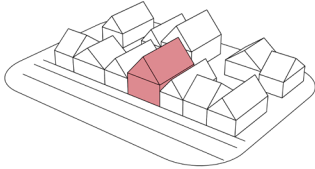
However, certain considerations remain important. Roof stacking is not included as a feasible intervention in this context due to regulatory and heritage constraints. Additionally, combining the splitting of buildings with new developments on existing parking lots may create pressure on available parking space, potentially leading to conflicts in accessibility and use.

Transformation, particularly the change from retail to residential functions, also has a noticeable impact on the surrounding environment in the historic centre. It can influence the balance between living, commerce, and public activity and should therefore be applied carefully to maintain the overall character and vitality of the area.

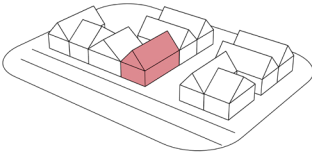
1. Infill development of parking lots



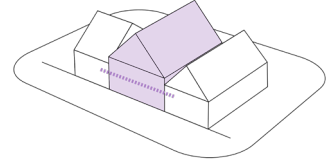
2. Infill development of an empty plot in between buildings



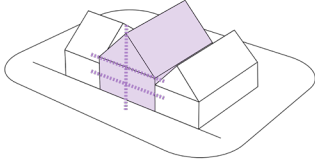
3. Infill development of an empty plot, private garden



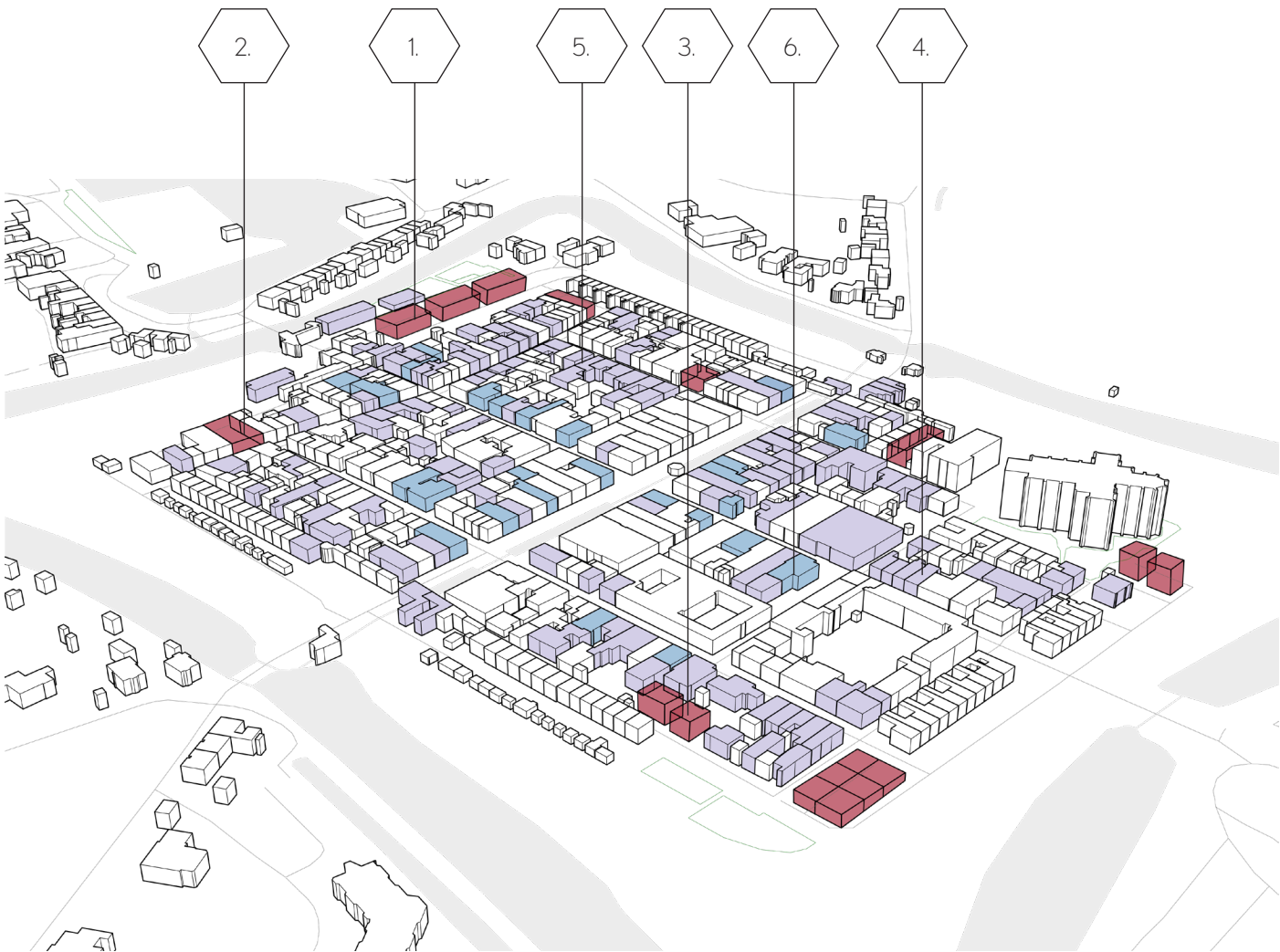
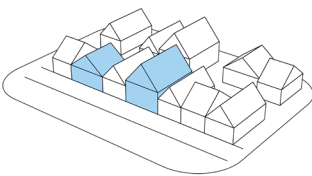
4. Horizontal splitting of a terraced house



5. Horizontal and vertical splitting



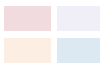
6. Transformation of function, from retail to residential



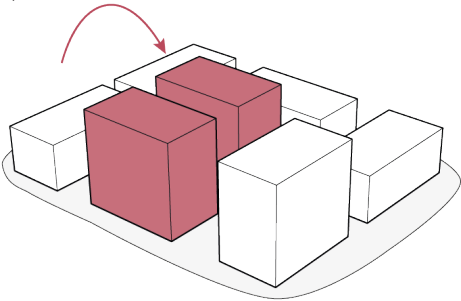
4.2 Neighbourhood Expansion

4.2.1 Densification methods

These densification methods are matched with the neighbourhood expansion of Elburg. This is based on the spatial elements of the area, where empty plots and building types are analysed to conclude whether this densification method is possible. The next pages elaborate on the possibilities of these methods in this area.

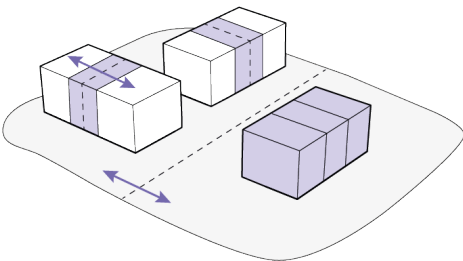
 Densification method suitable for this sub-area

Infill Development



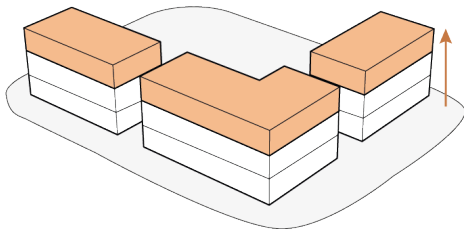
- Parking lots
Adding buildings on current parking lots.
- Empty corners
Adding buildings on non-built corners of streets.
- Vacant plots
Adding buildings on vacant lots and gaps between buildings.
- Along main roads
Adding buildings in public space along main axes/roads.

House and Plot Splitting



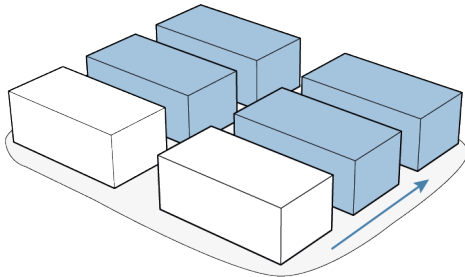
- Splitting houses
Divide a building into multiple dwellings.
- Splitting plots
Divide plots into multiple plots for new housing.
- Adding buildings on one plot
Building houses on the same plot, leading to two houses on a shared plot.
- Rental agreement
Renting a room to someone else and sharing living space.
- Transformation
Repurpose shops, companies, others or parking lots into housing.

Roof Stacking



- Adding meters
Adding extra metres on the top floor, to make a house more liveable, bigger and suitable for families.
- Adding floors
Adding more floors to an existing building, leading to more housing.

Urban Expansion



- Urban Expansion
Creating a new urban grid at the edges of current urban fabric.

4.2.2 Infill development

Empty plots and corners



Infill development on empty plots in neighbourhoods offers opportunities for terraced houses, small apartment buildings, semi-detached houses, or mixed-use end-terrace buildings. These options fit well because they respect existing scale, street rhythm, and density. Suitable types are those that align with the surrounding height, parcel width, and character. In contrast, large monofunctional blocks, high-rise towers, or car-orientated developments are often unsuitable, as they disrupt the neighbourhood fabric, overshadow existing homes, and weaken the human scale and social cohesion of the area.

Along roads



Infill development along main roads or urban axes in neighbourhoods is particularly suitable due to higher accessibility, visibility, and capacity for increased density. These locations can accommodate mixed-use buildings, mid-rise apartments, and ground-floor commercial functions, creating active street fronts and serving both residents and visitors. Benefits include better use of infrastructure, support for public transport, and a more active neighbourhood. However, doubts may arise around noise, traffic pressure, and the transition to quieter residential streets. Another doubt for infill development is erasing the current functions of the empty plots, which can be green spaces or other public spaces. Careful design is needed to balance intensity with liveability.

Design Possibilities

These parcels are registered without an address and therefore seen as empty plots. They are currently used for green space, a playground, private gardens or a parking lot.

1. Parking lot & private garden
1.859 m² & 1.634 m²



2. Green space
597 m²



3. Playground
482 m²



4. Green space & garden
1.326 m², 462 m² & 550 m²



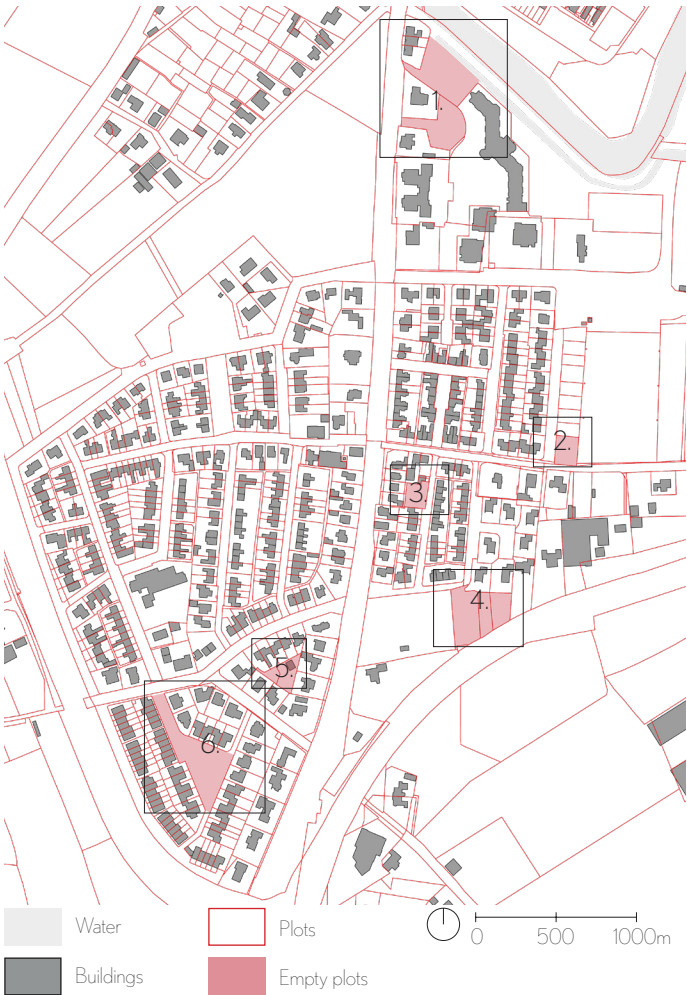
5. Private gardens
524 m² & 158 m²



6. Parking lot & private garden
2.490 m²



Parcels



4.2.3 Splitting

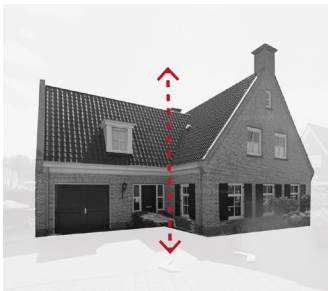
Buildings

The buildings in the neighbourhood are larger than the historic centre. These homes are more family-orientated and have a larger surface. Two different methods of splitting can be implemented, including horizontal splitting and vertical splitting. Horizontal splitting a building results in stacked apartments that either have the same entrance or a private entrance. Vertical splitting a building results in multiple units on the same level. The building typologies for splitting buildings in the neighbourhood are focused on detached houses. This building typology often has a larger surface and results in a semi-detached house that suits the environment of the neighbourhood. The average surface area for a single-family household in the Netherlands is in between 100 and 150 m² (Centraal Bureau voor de Statistiek, 2013). This map shows all buildings with a surface area of 200 m² or larger to ensure that all buildings are still family-orientated after dividing it into more units.

1. Vertical splitting of detached house into a semi-detached house 272 m², splitting into two houses with a minimum of 100 m².



Noertcamplaan 3, Elburg



2. Horizontal splitting of detached house 425 m², splitting into two stacked houses with a minimum of 200 m².



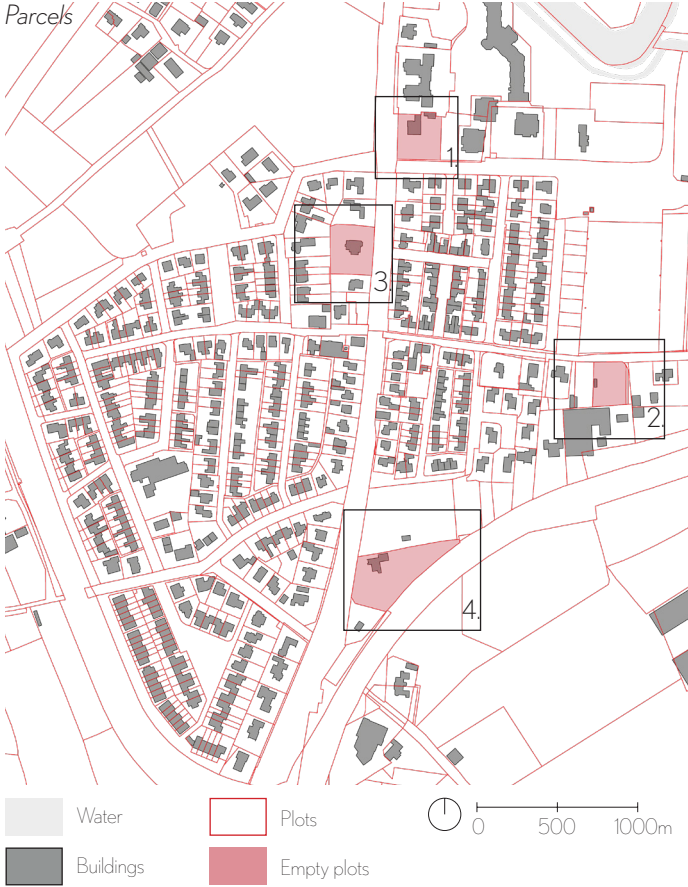
Nunspeterweg 17, Elburg



Plots

Larger plots can be split into two, resulting in a new empty plot that is suitable for new housing developments. The rules regarding the splitting of a plot are that the maximum area of accessory buildings depends on plot size: Up to 100 m² allows 50% coverage; up to 300 m² allows 50 m² plus 20% of the excess; above 300 m² allows 90 m² plus 10%, capped at 150 m². Front yard construction usually requires a permit, while rear yard building is often allowed. The rear yard typically begins one metre behind the front façade. This map highlights plots of 300 m² or larger.

Parcels



1. Plot is 1,881 m² & building is 425 m²



2. Plot is 1,435 m² & building is unknown m²



3. Plot is 1,999 m² & building is 355 m²



4. Plot is 3,640 m² & building is 286 m²



4.2.4 Roof stacking

Roof stacking in the neighbourhood provides opportunities to increase usable space while maintaining the character of the area. Careful attention must be paid to visibility, building regulations, and the impact on surrounding streets and buildings. The first method is adding floors at a residential care centre for the elderly in the north of the neighbourhood. This creates extra rooms or facilities, improving care capacity and services. Doubts include potential disturbance to residents and the need for structural reinforcement. Next to the care centre are apartment blocks with flat roofs. Adding floors here can cause concerns involving potential shadowing and impact on neighbouring views. Another option is adding floors to a school in the east of the neighbourhood. This provides new housing or extra classrooms or activity spaces for the school. This asks for logistic design where the school entrance is separate from the private entrance to the new housing floors. The last option is adding floors to a house with a flat roof. This results in additional living space, which can contribute to creating more family-orientated housing. Each method can contribute to densification and improved functionality while requiring careful planning to balance benefits with potential doubts.

Examples

- 1. Utrecht, adding an extra floor on top of the house.
- 2. Amsterdam, a school with apartments on top.



1. Turkooislaan 3, Utrecht



2. Meimorgenstraat 2, Amsterdam



3. Schipluidenstraat 23, Elburg



4. Noertcamplaan 1, Elburg



Elburg

- 1. Adding floors at a residential care centre for the elderly.
- 2. Adding floors to an apartment block.
- 3. Adding floors on top of a school.
- 4. Adding floors to a house with a flat roof.



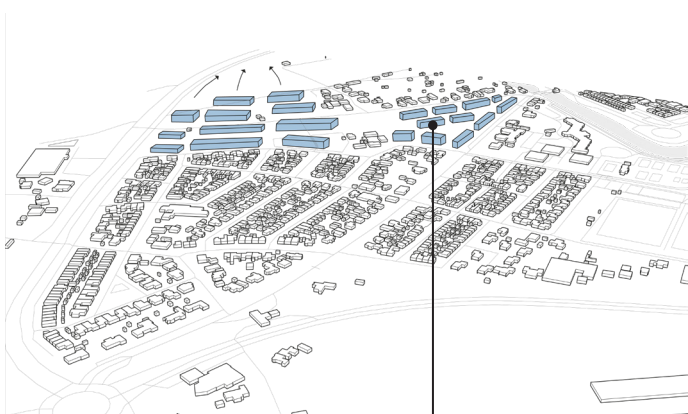
1. Nuns peterweg 7, Elburg



2. Nuns peterweg 7, Elburg

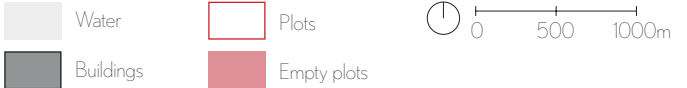
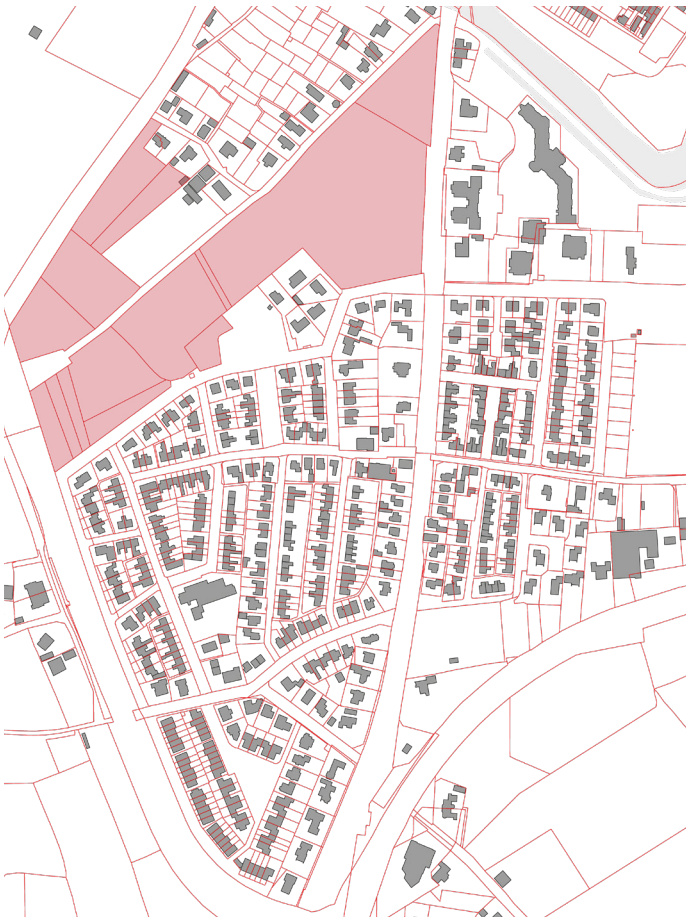
4.2.5 Urban expansion

Urban expansion offers opportunities to accommodate growth, providing more housing, and can improve local infrastructure. By thoughtfully extending the streets, adding green spaces, and creating mixed-use developments, the neighbourhood can become more vibrant and sustainable. New construction allows for modern, energy-efficient buildings and better connectivity. However, expansion also raises concerns. Increased density may strain existing services, change the character of the area, and reduce open spaces. Traffic and noise can rise, and social cohesion may be affected.



4. Noertcamplaan 1, Elburg

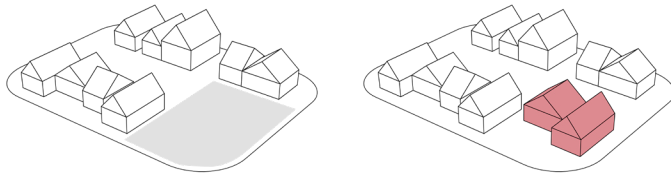
Parcels



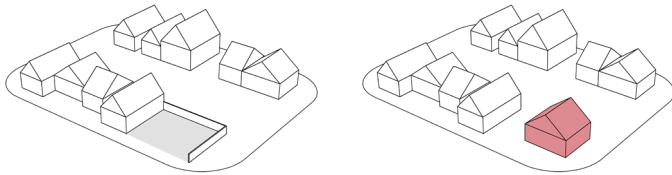
4.2.6 Design Interventions

The design interventions in Elburg show the current situation and the new situation after the design intervention. Each intervention will then be evaluated with the criteria for the neighbourhood.

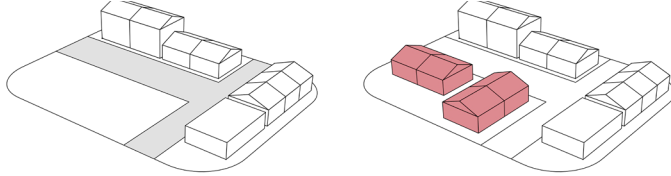
1. Infill development of an empty plot, public space



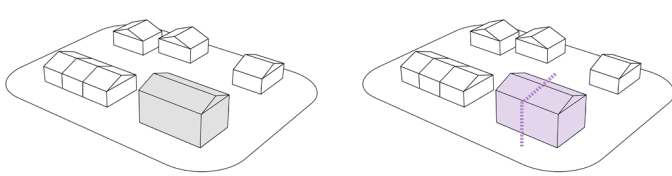
2. Infill development of an empty plot, private space



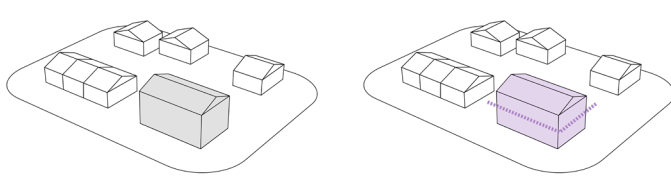
3. Infill development along main roads



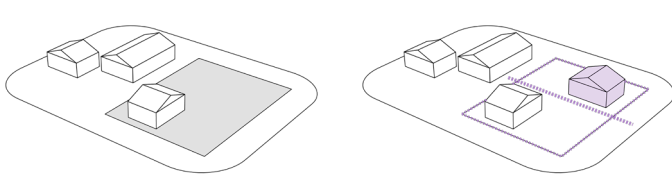
4. Vertical splitting of a detached house into a semi-detached house



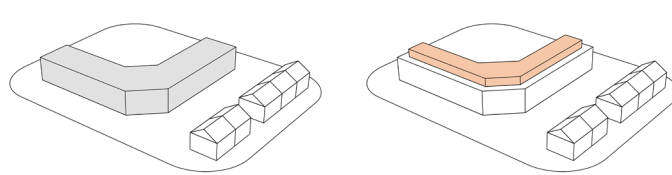
5. Horizontal splitting of a detached house



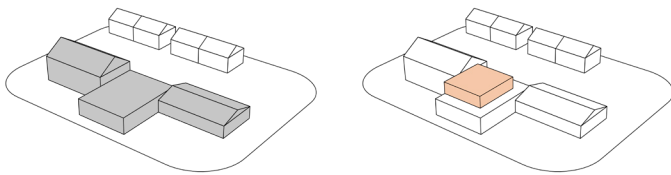
6. Splitting plots and adding a house



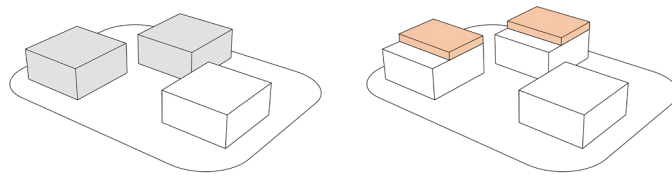
7. Adding floors to a residential care centre



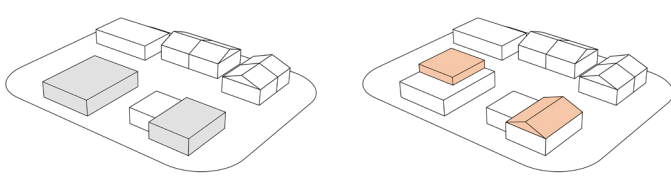
8. Adding floors to a school



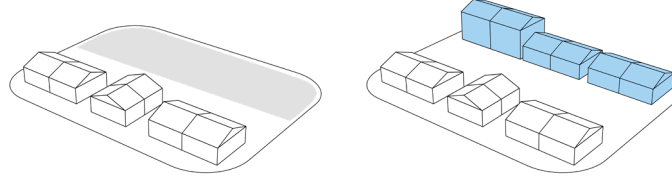
9. Adding floors to an apartment block



10. Adding floors to a house

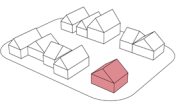
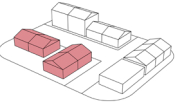
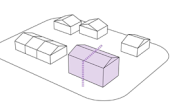
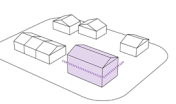
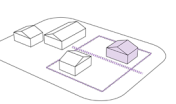
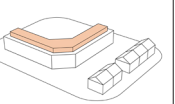
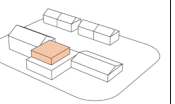
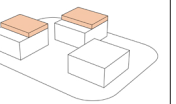
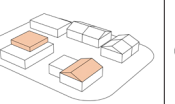
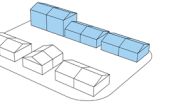


11. Urban Expansion



4.2.7 Evaluation

The evaluation scheme shows how the design interventions score on each criteria that is formed from the qualities and identity of the neighbourhood expansion. As a result, the design interventions 3, 4, 6, 9, and 10 have the highest score, leading to the design of the neighbourhood.

	1. 	2. 	3. 	4. 	5. 	6. 	7. 	8. 	9. 	10. 	11. 
Every home needs to have a private or shared garden	●	○	●	●	●	●	●	●	●	●	●
Remain the surroundings child-friendly by ensuring safe routing through the neighbourhood	○	●	●	●	●	●	●	○	●	●	●
Human-scaled environment needs to be preserved	●	●	●	●	●	●	○	●	●	●	●
Keep the housing and surroundings family-orientated	●	●	●	●	○	●	○	●	●	●	●
Remain community-centric by maintaining spaces for social interaction	○	●	●	●	●	●	●	●	●	●	○

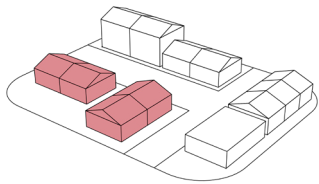
- 1. Infill development of an empty plot, public space
- 2. Infill development of an empty plot, private space
- 3. Infill development along main roads
- 4. Vertical splitting of a detached house into semi-detached houses
- 5. Horizontal splitting of a detached house
- 6. Splitting plots and adding a house
- 7. Adding floors to a residential care centre
- 8. Adding floors to a school
- 9. Adding floors to an apartment block
- 10. Adding floors to a house
- 11. Urban expansion

4.2.8 Toolbox

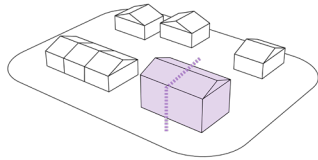
From the evaluation of the criteria, these design interventions comply with the established criteria. The map illustrates all locations where these interventions can be applied within the neighbourhood.

However, certain considerations remain important. Infill development can erase existing public and green spaces, and adding floors to existing apartment blocks or houses can cause concerns about potential shadowing and the impact on neighbouring views.

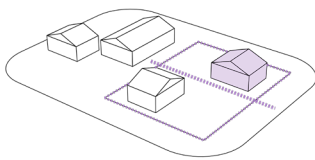
1. Infill development along main roads



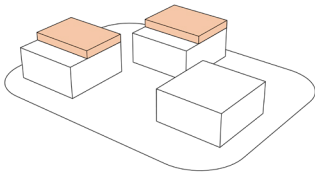
2. Vertical splitting of a detached house into semi-detached houses



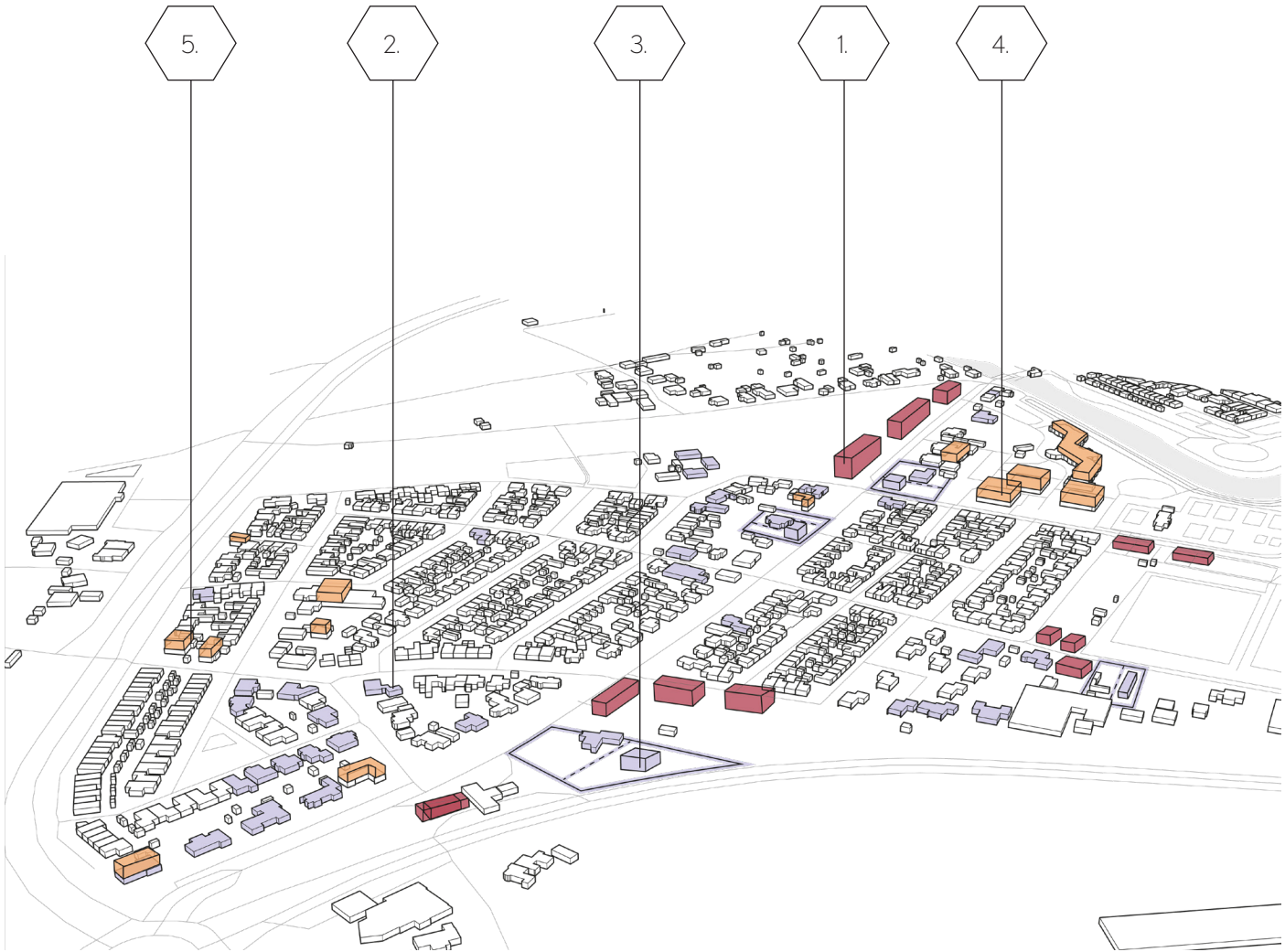
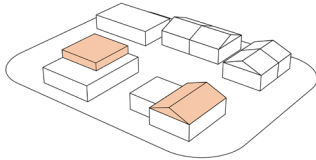
3. Splitting plots and adding a house



4. Adding floors to an apartment block



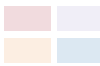
5. Adding floors to a house



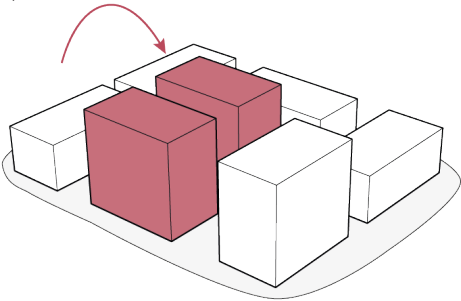
4.3 Port

4.3.1 Densification methods

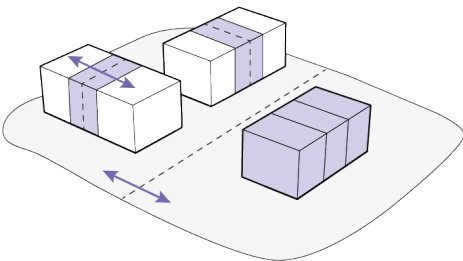
These densification methods are matched with the port of Elburg. This is based on the spatial elements of the area, where empty plots and building types are analysed to conclude whether this densification method is possible. The next pages elaborate on the possibilities of these methods in this area.

 Densification method suitable for this sub-area

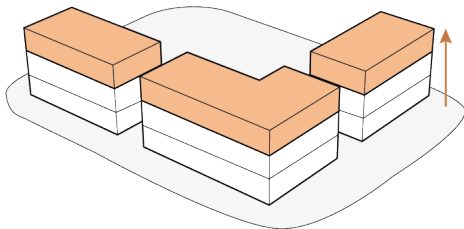
Infill Development



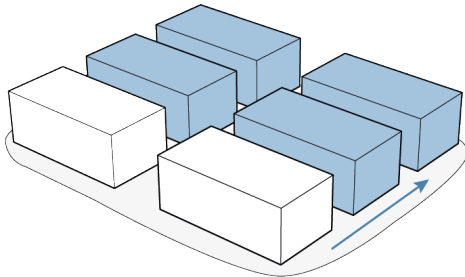
House and Plot Splitting



Roof Stacking



Urban Expansion



- **Parking lots**
Adding buildings on current parking lots.
- **Empty corners**
Adding buildings on non-built corners of streets.
- **Vacant plots**
Adding buildings on vacant lots and gaps between buildings.
- **Along main roads**
Adding buildings in public space along main axes/roads.

- **Splitting houses**
Divide a building into multiple dwellings.
- **Splitting plots**
Divide plots into multiple plots for new housing.
- **Adding buildings on one plot**
Building houses on the same plot, leading to two houses on a shared plot.
- **Rental agreement**
Renting a room to someone else and sharing living space.
- **Transformation**
Repurpose shops, companies, others or parking lots into housing.

- **Adding meters**
Adding extra metres on the top floor, to make a house more liveable, bigger and suitable for families.
- **Adding floors**
Adding more floors to an existing building, leading to more housing.

- **Urban Expansion**
Creating a new urban grid at the edges of current urban fabric.

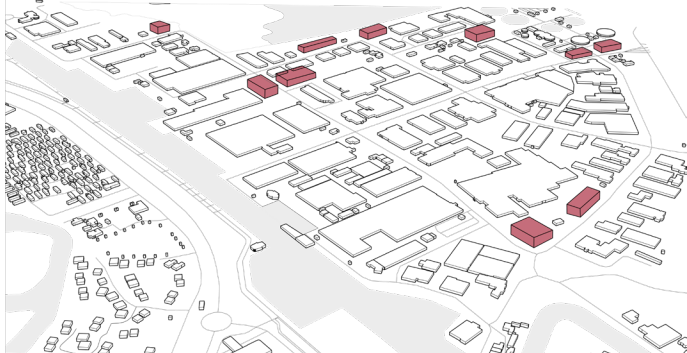
4.3.2 Infill development

Parking lot



Infill development of a parking lot transforms underused asphalt into productive urban space, introducing mixed-use buildings, greenery, and pedestrian connections. It improves land efficiency and supports local businesses while maintaining necessary parking through structured or shared solutions integrated within a more compact, sustainable industrial district overall.

Along infrastructure



Infill development along infrastructure influences roads, rail lines, and utilities to introduce linear growth in industrial zones. Buildings align with transport corridors, improving logistics efficiency and transit access. This approach intensifies land use, reduces sprawl, and creates coherent edges that integrate movement, production, and services within a resilient, urban framework.

Empty plots and corners



Infill development of empty plots and corners activates underused spaces within industrial areas, turning gaps into functional sites for housing purposes, offices, or community uses. The main challenge of infill development in the industrial area is the safety for new residents. The new housing developments, therefore, need to be zoned in spaces that already have a few buildings with a residential function, or design interventions are needed that ensure the safety of the surroundings.



4. Green space (Google Streetview)



6. Parking lot (Google Streetview)

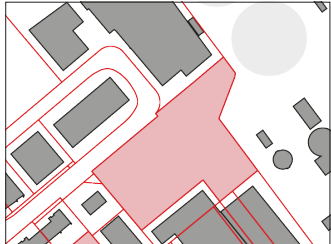
Design possibilities

These parcels are registered without an address and therefore seen as empty plots. They are currently used for green space, a playground, private gardens or a parking lot.

1. Storage space
2927 m²



2. Green space
4.857 m²



3. Storage space
670 m², 750 m² & 365 m²



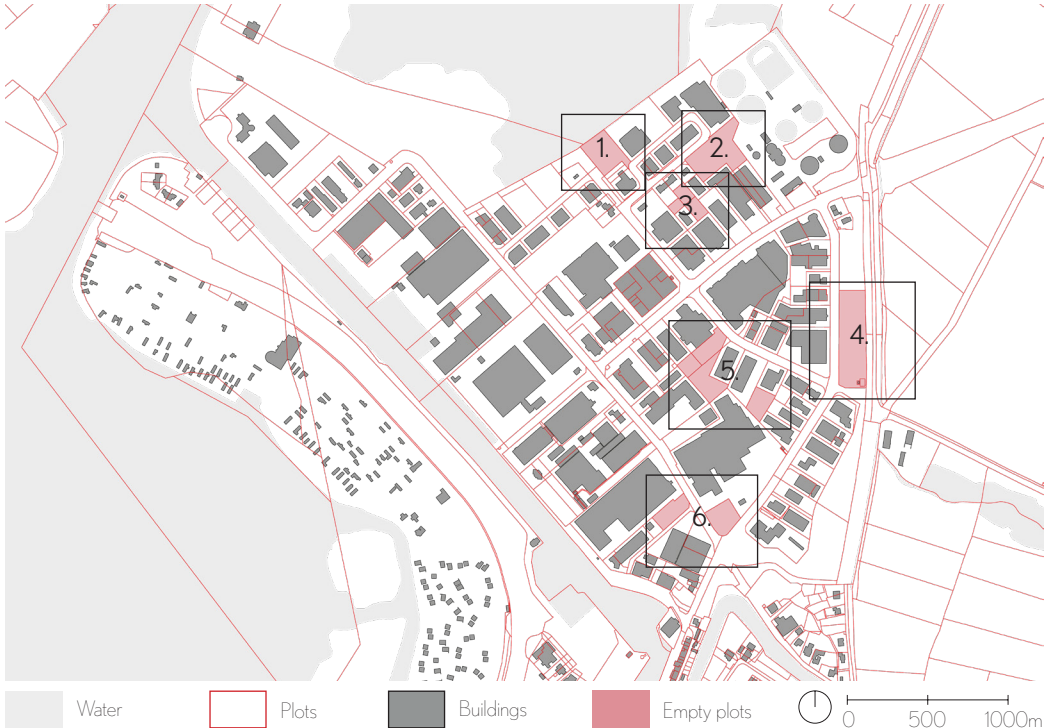
4. Green space
6.794 m²



5. Storage and green spaces
1.555 m², 810 m², 2.221 m² & 1.435 m²



6. Parking lot and green space
1.647 m² & 2.000 m²



4.3.3 Splitting

Buildings

Transforming industrial buildings into residential spaces is an increasingly popular strategy in urban development. This process, often referred to as adaptive reuse, offers opportunities to preserve heritage while addressing housing shortages. However, it requires careful planning, technical expertise, and a strong understanding of both architectural and social dynamics. One of the main advantages is sustainability. Reusing existing structures reduces demolition waste and lowers the demand for new construction materials. Additionally, industrial buildings often have generous ceiling heights, large windows, and open floor plans, which can create unique and desirable living environments.

However, there are also challenges when splitting industrial buildings. Industrial buildings may contain contaminants such as asbestos or soil pollution, requiring costly remediation. Structural limitations, outdated infrastructure, and zoning restrictions can complicate the conversion process. Furthermore, achieving good thermal insulation and acoustic comfort in these buildings can be difficult.



This map shows all buildings with a surface area of 160 m² or larger.

Plots



Dividing an industrial plot and introducing new housing creates opportunities for mixed-use development and more efficient land use. It requires careful zoning adjustments, buffering between functions, and infrastructure upgrades. This approach can increase urban density, improve liveability, and gradually transform mono-functional industrial zones into more diverse and resilient neighbourhoods.

Adding houses to same plot

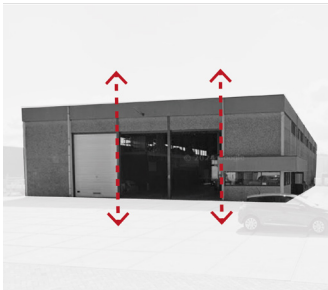


Placing a house on an existing industrial plot allows for a compact, flexible use of space, often combining living and working. It demands attention to safety, noise, and environmental conditions. Proper design strategies, such as spatial separation, can ensure a comfortable living environment within an active industrial context.

1. Vertical splitting
1.063 m², splitting into multiple units.



Industriestraat 8, Elburg



2. Horizontal splitting
1.358 m², splitting into two stacked houses.



Robbertsmatenstraat 15, Elburg



Plot of 19.070 m².
The plot is divided into green space and built-up space. The building functions as offices.



J.P. Broekhovenstraat 16, Elburg

Plot of 21.127 m² with a building of 14.049 m².
The building has an industrial function.

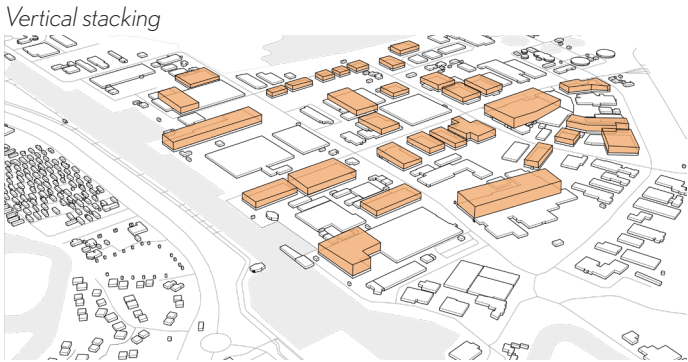


J.P. Broekhovenstraat 6, Elburg

4.3.4 Roof stacking

Roof stacking is a strategy to densify industrial areas without expanding the area. It introduces new uses, such as housing, offices, or community uses. There are two main approaches, including vertical and horizontal stacking. Vertical roof stacking adds extra floors on top of industrial buildings. This increases density efficiently and reuses existing structures. However, not all buildings can support extra weight, so structural safety, fire regulations, and access must be carefully addressed. Horizontal stacking extends buildings toward the street and replaces closed façades with more open, active ones. Industrial areas often have blank walls and fenced plots, creating quiet streets. By adding entrances, windows, or mixed-use functions, the street becomes livelier and safer through increased activity.

Fences can be adapted rather than removed entirely. Transparent or lower boundaries can maintain security while improving visibility and connection to the street. In some cases, secure areas are relocated behind the building. Densification through roof stacking changes the streetscape by increasing activity, social interaction, and safety but may also bring more noise and traffic. Overall, roof stacking can make industrial areas more sustainable and vibrant if carefully designed.



Example
Hamburg, Hafencit - this area is transformed into a living and working area with many residential buildings on top of old industrial buildings.



1. HafenCity, Hamburg

Elburg
1. Vertical stacking, adding floors to an industrial building with a flat roof.
2. Horizontal stacking, extending the building by adding a new façade in front of the current façade.



1. J.P. Broekhovenstraat 15, Elburg



2. A. Vogelstraat 16, Elburg

4.3.5 Transformation

Transforming industrial storage boxes into residential units is a relevant strategy in industrial areas. This process involves changing the function of often underused structures into housing while retaining much of their original form. In practice, this means adapting former storage or workshop spaces into liveable dwellings, responding to shifting needs such as the growing demand for housing and the declining use of small-scale industrial facilities. Storage boxes typically have simple, modular constructions, which can offer flexibility for redevelopment. Their ground-level access, open floor plans, and repetitive layout make them suitable for conversion into compact housing units or studios. However, their original design often lacks essential qualities for residential use, such as sufficient natural light, insulation, ventilation, and access to private or shared outdoor space. As a result, careful architectural intervention is required to ensure comfort and compliance with modern living standards.

This type of transformation also raises important questions regarding zoning, ownership structures, and building regulations. Industrial areas are not always designated for residential use, and adjustments to planning policies may be necessary. Additionally, considerations around safety, infrastructure, and integration into the surrounding urban fabric play a key role. When done thoughtfully, converting storage boxes into housing can contribute to more efficient land use, activate underutilised spaces, and support the creation of diverse and affordable living environments.



This example in Haarlem shows that the storage box can be transformed into an apartment.



Hodsonstraat 30, Haarlem (2023 - 2024)



The industrial area has a lot of storage boxes that can be transformed into apartments; these are shown on the map.



Industriestraat 17, Elburg

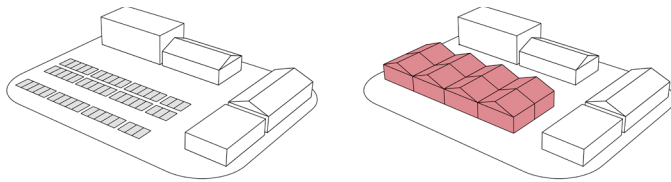


A. Vogelstraat 5, Elburg

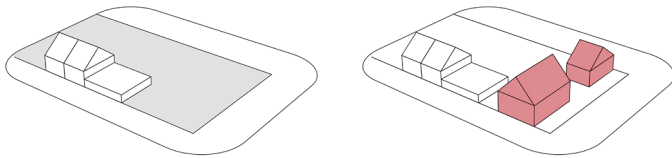
4.3.6 Design Interventions

The design interventions in Elburg show the current situation and the new situation after the design intervention. Each intervention will then be evaluated with the criteria for the port area.

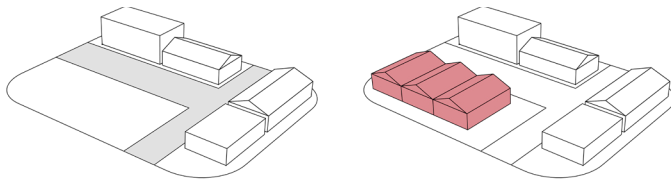
1. Infill development of parking lots



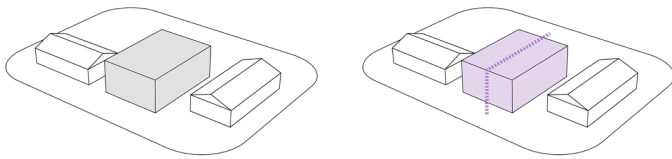
2. Infill development of an empty plot, public space



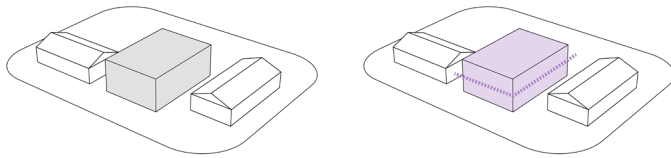
3. Infill development along infrastructure



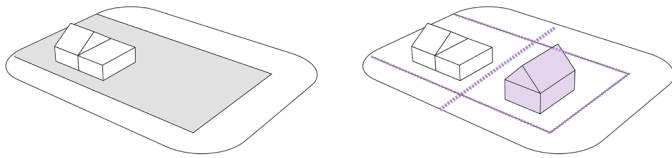
4. Vertical splitting of a building



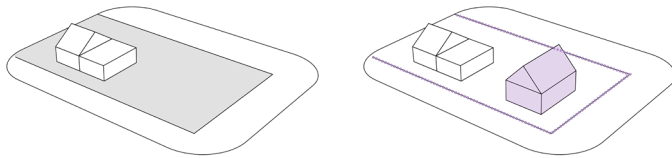
5. Horizontal splitting of a building



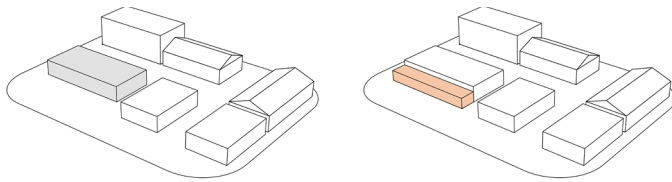
6. Splitting a plot and adding a house to the new plot



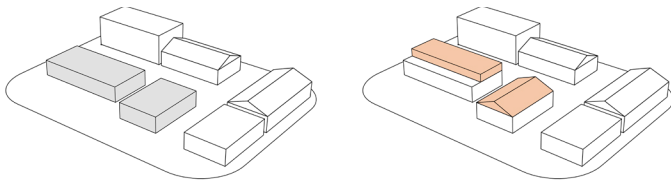
7. Adding a second house to the same plot



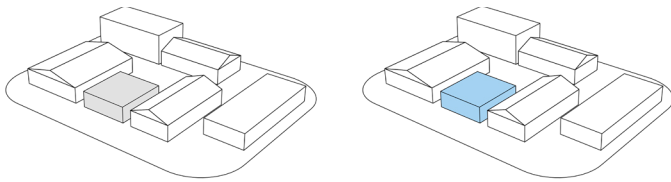
9. Horizontal stacking, adding extra façade or block



8. Vertical stacking, adding extra floors to a building

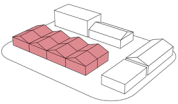
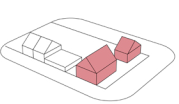
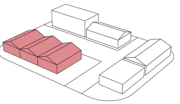
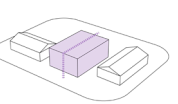
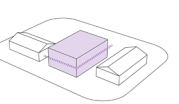
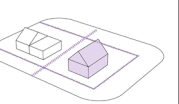
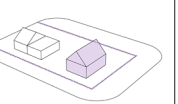
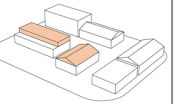
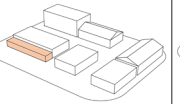
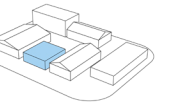


10. Transformation of a storage box to a residential unit



4.3.7 Evaluation

The evaluation scheme shows how the design interventions score on each criteria that is formed from the qualities and identity of the historic centre. As a result, the design interventions 1, 4, 5, 8, 9, and 10 have the highest score. These design interventions will be implemented in the design of the port area.

	1. 	2. 	3. 	4. 	5. 	6. 	7. 	8. 	9. 	10. 
Maritime heritage needs to remain visible	●	○	●	●	●	●	●	●	●	●
The view & orientation towards the water needs to remain	●	●	●	●	●	●	●	●	●	●
The large, wide scale needs to remain	●	●	●	●	●	○	○	●	●	●
The amount of green space needs to remain the same	●	○	○	●	●	●	○	●	●	●

- 1. Infill development of parking lots
- 2. Infill development of an empty plot, public space
- 3. Infill development along infrastructure
- 4. Vertical splitting of a building
- 5. Horizontal splitting of a building
- 6. Splitting a plot and adding a house to the new plot
- 7. Adding a second house to the same plot
- 8. Vertical stacking, adding extra floors to a building
- 9. Horizontal stacking, adding extra façade or block
- 10. Transformation of a storage box to a residential unit

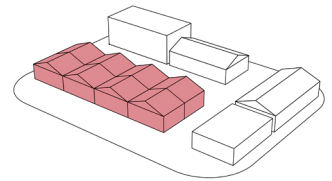
4.3.8 Toolbox

From the evaluation of the criteria, these design interventions complement the established criteria of the area. The map illustrates all locations where these interventions can be applied within the port area.

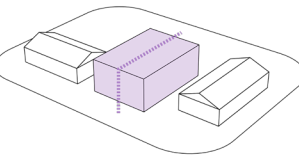
Densifying the port area through infill development, adaptive reuse, roof stacking, and transformation offers opportunities for mixed-use development, housing, and improved urban life. However, these strategies face multiple challenges. Safety is a primary concern, especially when introducing residential uses in active industrial zones. Structural limitations, contamination, and outdated infrastructure complicate

conversions of industrial buildings. Increased density can generate traffic, noise, and conflicts between industrial and residential functions. Zoning adjustments, buffering, and careful design are needed to mitigate these issues.

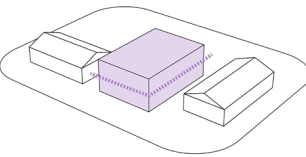
1. Infill development of parking lots



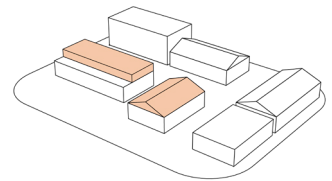
2. Vertical splitting of a building



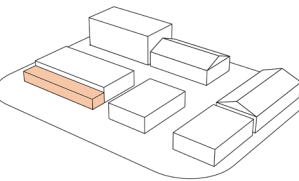
3. Horizontal splitting of a building



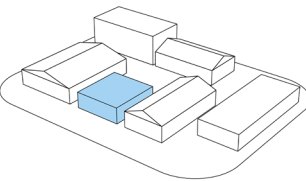
4. Vertical stacking, adding extra floors to building



5. Horizontal stacking, adding extra façade or block



6. Transformation of a storage box to a residential unit

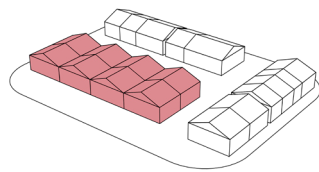


4.4 Catalogue

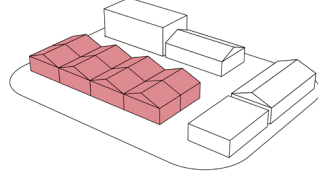
Infill Development

The main focus of infill development is situated in the historic centre of Elburg. The challenge of infill development in the other two sub-areas is the exchange of green and public spaces for new housing.

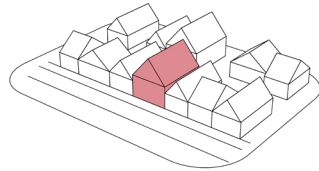
Infill development of parking lots
Historic Centre



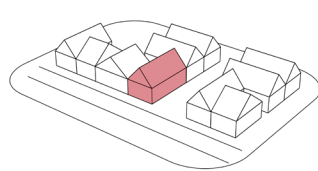
Infill development of parking lots
Port area



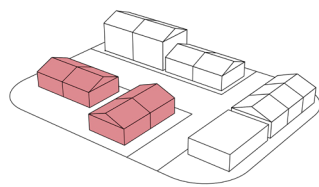
Infill development of an empty plot in between buildings
Historic Centre



Infill development of an empty plot, private garden
Historic Centre



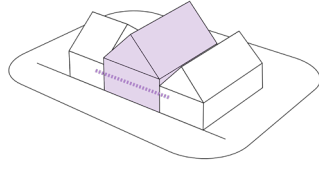
Infill development along main roads
Neighbourhood Expansion



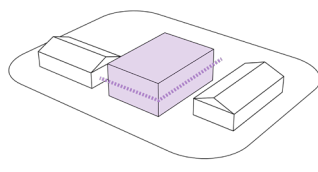
Splitting

This is the most suitable method for Elburg. In each sub-area two options for splitting are possible, including horizontally or vertically splitting a building or dividing a large plot, resulting in a new empty plot for housing developments.

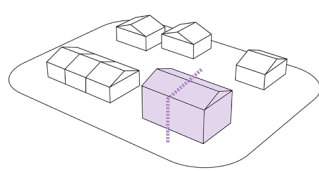
Horizontal splitting of a terraced house
Historic Centre



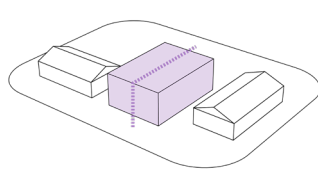
Horizontal splitting of a building
Port area



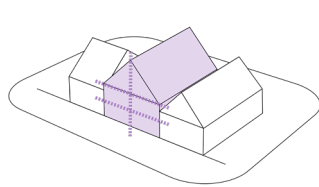
Vertical splitting of a detached house into semi-detached houses
Neighbourhood Expansion



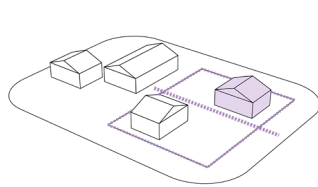
Vertical splitting of a building
Port area



Horizontal and vertical splitting
Historic Centre



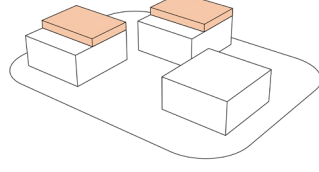
Splitting plots and adding a house
Neighbourhood Expansion



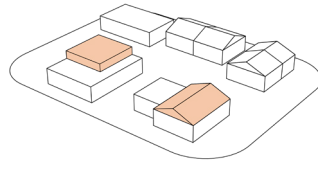
Roof stacking

As a conclusion from the evaluation criteria, roof stacking is not suitable for the historic centre because of maintaining the roof landscape. The method can be implemented in the other two areas.

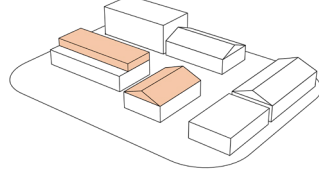
Adding floors at an apartment block
Neighbourhood Expansion



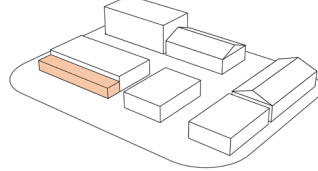
Adding floors at a house
Neighbourhood Expansion



Vertical stacking, adding extra floors on building
Port area



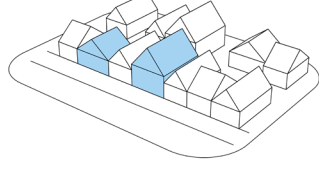
Horizontal stacking, adding extra façade or block
Port area



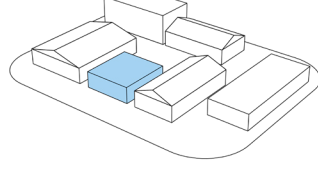
Transformation

The transformation of the functions of the buildings in the historic centre and the port area is possible, but it is important to keep a good balance between a residential function and other functions.

Transformation of function, from retail to residential
Historic Centre



Transformation of storage box to residential unit
Port area



05

Design

- ☐ 1. Historic Centre
- ☐ 2. Neighbourhood Expansion
- ☐ 3. Port
- ☐ 4. City scale

5.1 Historic Centre

5.1.1 Existing context

This map shows the existing land uses of the historic centre, including the blue-green network, inner courtyards, the buildings and the roads.



5.1.2 Design Proposal

The masterplan for the historic centre focuses on developing new housing for starters and the elderly. New housing developments include infill development and the division of existing buildings into multiple apartments or studios. The historic centre has an active environment and is pedestrian-orientated. Different design interventions are highlighted

on the following pages, elaborating how the target group lives here. The two personas describe what types of starters and elderly the historic centre focuses on, which densification methods suit them, and which spatial elements are most important.



STARTER

Age: 25-29
Types of starters: back to region, living with family, career-focused, remote working
Household size: one or two persons

Housing
Densification method: 1, 2, 3, 4, 5
Type: apartments & studios

Surroundings
Active environment with a strong local identity. Compact living with daily needs within a 5-minute walk.



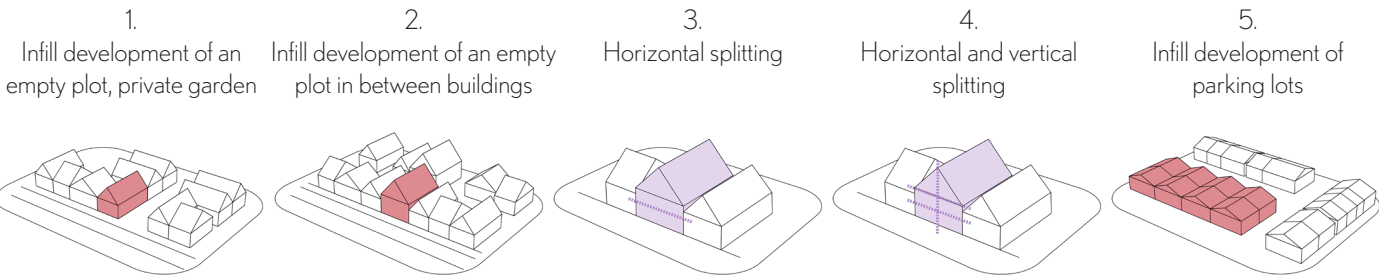
ELDERLY

Age: 65+
Types of elderly: independent or collective living, active elderly, familiar surroundings.
Household size: one or two persons

Housing
Densification method: 1, 2, 3, 4, 5
Type: zero-step apartments, mainly at ground-floor level.

Surroundings
Small apartments and easy to meet neighbours. Daily needs are within a 5-minute walk, and the apartment is accessible by car if needed.

Densification methods applied



5.1.3 Details

1. Infill development of an empty plot in between buildings

A new building is placed between two existing buildings, creating four new apartments for starters and the elderly. Both the starter and the elderly have an apartment with a shared garden.



ONE-PERSON HOUSEHOLD STARTER

- Helping elderly when needed
- Small community
- Shared entrance
- Shared garden
- New building divided into multiple apartments
- Accessible by car, bicycle, and on foot



COLLECTIVE LIVING ELDERLY

- Independent living with help from neighbours
- Small community
- Private entrance
- Shared garden
- New building, zero-step apartment
- Accessible by car, bicycle, and on foot



2. Horizontal splitting of buildings

This design intervention shows how two end-of-terraced buildings are horizontally divided into two apartments. Both apartments have a private front door because the buildings are located at the corner of the street. The apartments also have a small, shared outdoor space in front of their door.



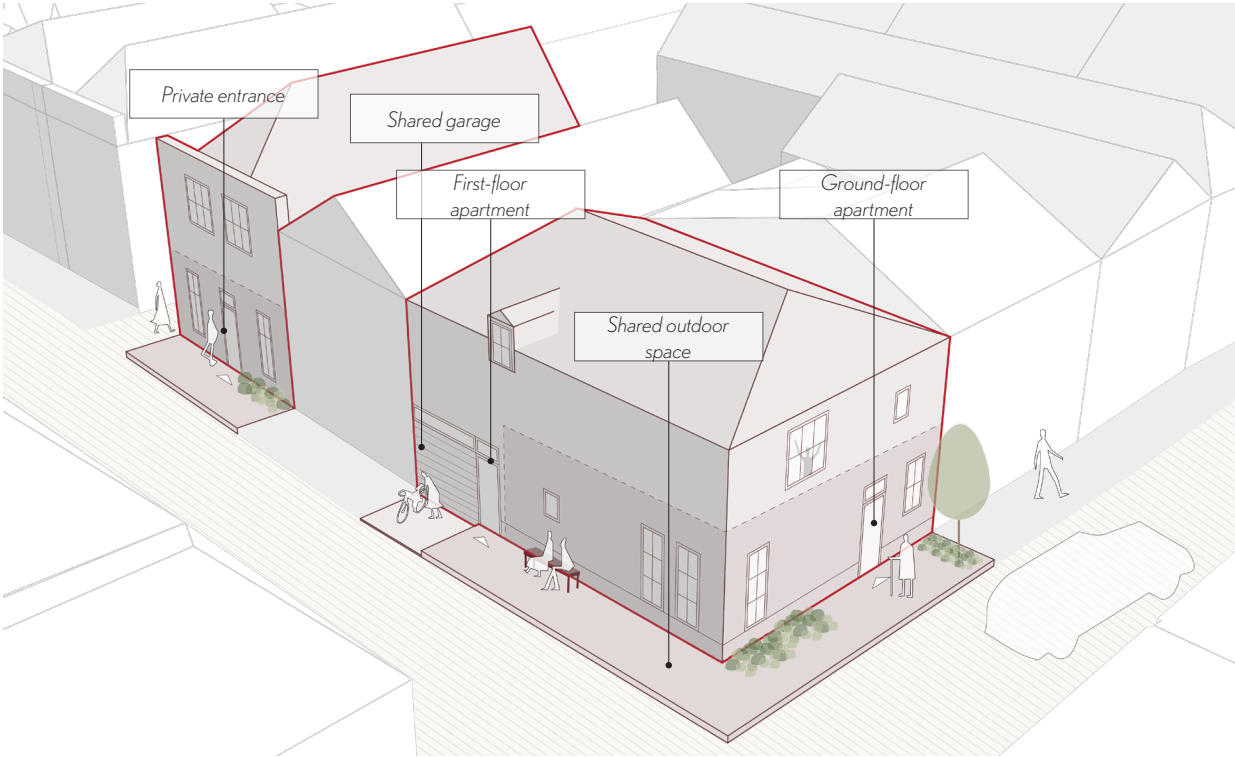
BACK TO REGION STARTER

- Moves back to hometown
- Living in the centre of the city
- Shared & private entrance
- Shared outdoor space
- First-floor apartment
- Accessible by car, bicycle, and on foot



FROM ELBURG ELDERLY

- Independent living and is from Elburg
- Familiar surroundings
- Private entrance
- Shared outdoor space
- Ground-floor apartment
- Accessible by car, bicycle, and on foot



5.1.3 Details

3. Vertical and horizontal splitting of buildings

These three buildings are only accessible by bicycle and on foot, resulting in a focus on starters. The courtyards allow for both a vertical and a horizontal division, giving the apartments not facing the public street also daylight. The shared entrance on the ground floor has space for bicycle parking.



CAREER-FOCUSED STARTER

- Apartments in the middle of the city centre
- Starters who also work in the centre
- Shared entrance
- No outdoor space
- Existing building divided into multiple apartments
- Accessible by bicycle and on foot



4. Vertical and horizontal splitting of monument

This monument is divided into multiple apartments, where the exterior remains unchanged to preserve the streetscape. The building is accessible by car, resulting in ground-floor apartments for elderly and first-floor apartments for starters.



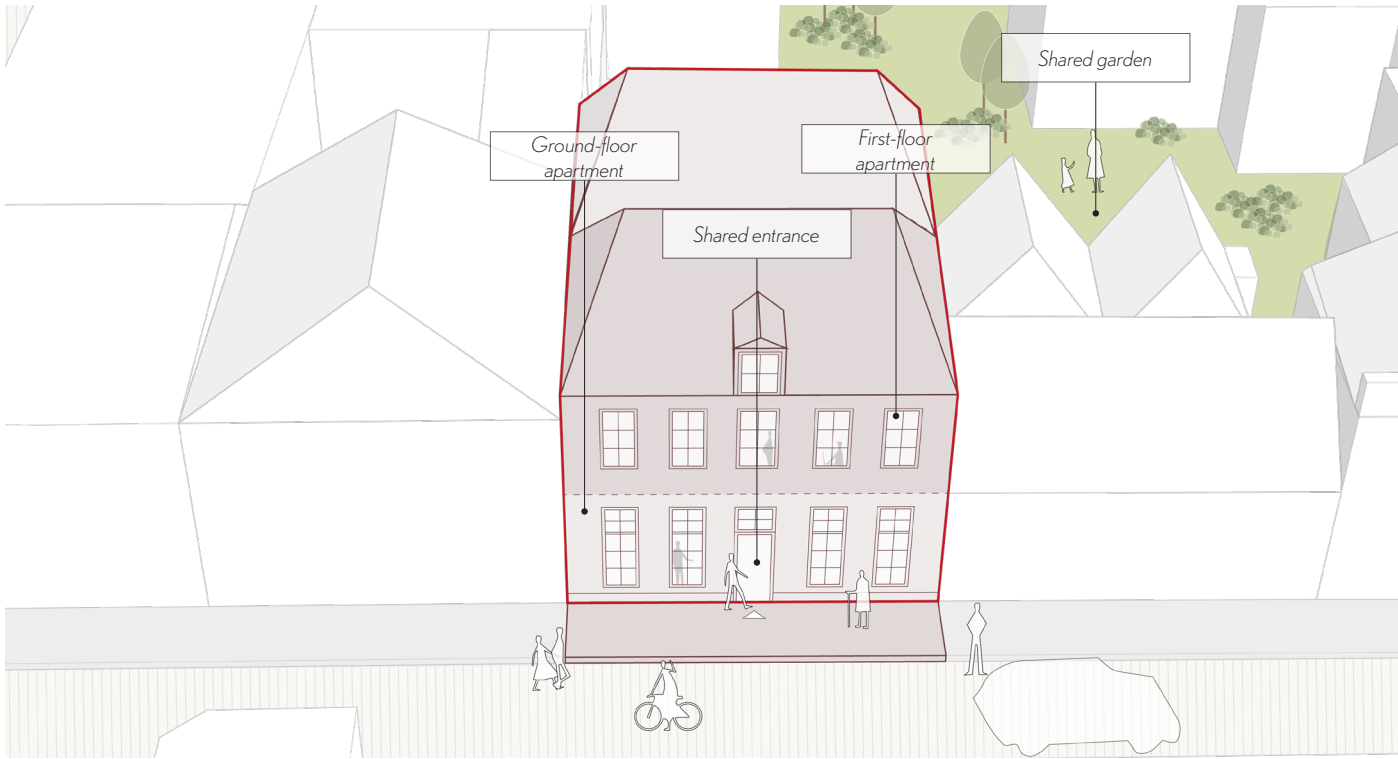
LIVING WITH FAMILY STARTER

- Moving out of the family house
- Apartment in the city centre
- Shared entrance
- Shared garden
- Existing building divided into multiple apartments
- Accessible by car, bicycle, and on foot



ACTIVE ELDERLY

- Living in the vibrant part of the centre
- High amount of interaction with neighbours
- Shared entrance
- Shared garden
- Zero-step apartment
- Accessible by car, bicycle, and on foot



5.14 Section

1. Infill development on parking lot

Existing parking lots are transformed into new housing developments. Current parking and future parking are moved towards the larger parking lots outside of the centre, which is a 5-minute walk. Starters and elderly are combined in one building. The elderly live on the ground floor and have a private entrance facing the street with a small green space. The starters access the building through a shared entrance at street level.

On the first floor, they arrive at a courtyard shared with other starters, from which they reach the entrance to their apartment. The two-floor apartments provide a separate space that can be used for work or other uses, offering flexibility for residents working from home.



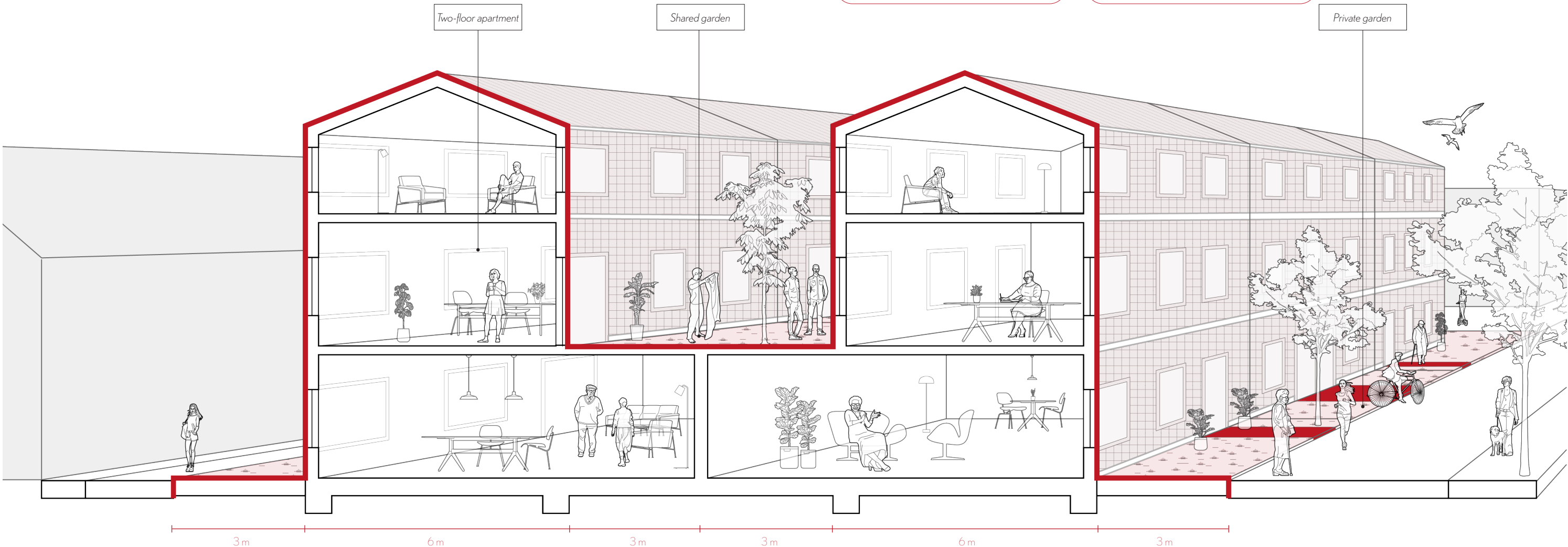
REMOTE WORKING STARTER

- High amount of social interaction in the courtyard
- Next to public green and close to amenities
- Shared & private entrance
- Shared garden
- New building, two-floor apartments
- Accessible by car, bicycle, and on foot



ONE-PERSON HOUSEHOLD ELDERLY

- Independent living
- Next to public green and close to amenities
- Private entrance
- Private garden
- New building, zero-step apartment
- Accessible by car, bicycle, and on foot



5.14 Section

2. Horizontal splitting buildings

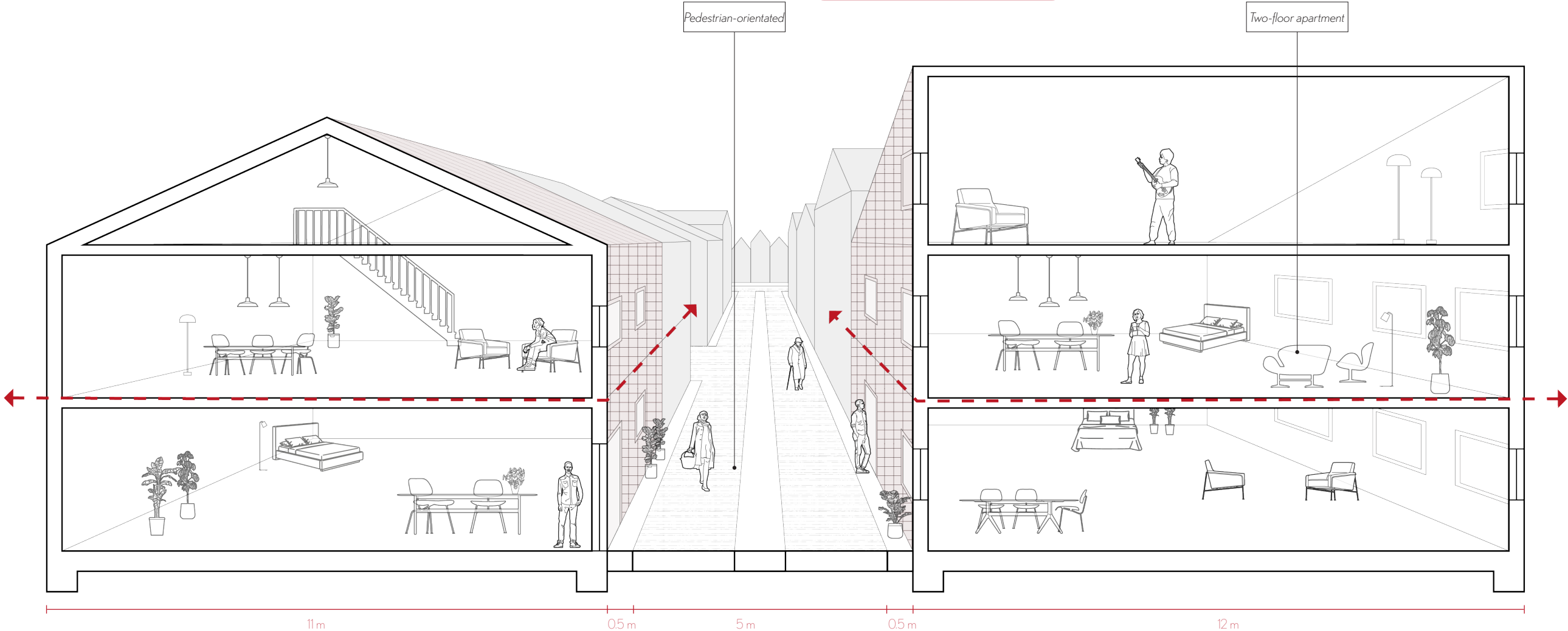
Two buildings in the centre of Elburg are divided into two apartments. The buildings are accessible by bicycle and on foot, making it suitable for starters. Different types of starters are matched with this site-specific densification method. The buildings show a division of a one-floor and a two-floor apartment, allowing for both one-person- and two-person households to live here. The lively streets and the proximity of retail

and hospitality functions compliment compact living in the centre. The narrow streets are focused on slow traffic, allowing for social interaction with neighbours on the street.



ONE/TWO-PERSON HOUSEHOLD STARTER

- Living in the middle of the centre
- Compact living
- Shared stairwell
- No outdoor space
- Small apartments or studios
- Accessible by bicycle and on foot



5.1.5 Collage

Using brick façades in new developments contributes to the preservation of the existing character of the centre. Because of monumental protection, the exterior of buildings remains the same. The narrow streets are used as public spaces for interaction between neighbours with a main focus on slow traffic.



5.2 Neighbourhood Expansion

5.2.1 Existing context

This map shows the existing land uses of the neighbourhood expansion, including the blue-green network, private and shared gardens, the buildings and the roads.



5.2.2 Design proposal

The neighbourhood allows for roof stacking, infill development and the division of buildings and plots. This creates opportunities for community-orientated living and for suitable houses for the target groups. For elderly there is a focus on zero-step apartments with a private garden. For starters it is an apartment with a shared or private garden, which

is well connected by bicycle and car. Different design interventions are highlighted on the following pages, showing an example of how the target group lives here. The two personas describe what types of starters and elderly the neighbourhood focuses on, which densification methods suit them, and which spatial elements are most important.



STARTER

Age: 25-29
Types of starters: back to region, still living with family, remote working.
Household size: one or two persons

Housing
Densification method: 1, 3, 4, 5
Type: apartments & studios

Surroundings
Close to the centre, but with more space and a private or shared garden. High accessibility by car, cycle & public transport.



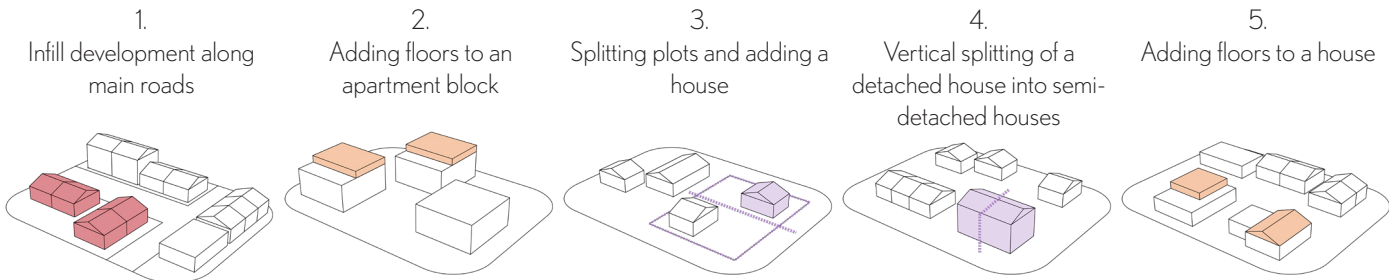
ELDERLY

Age: 65+
Types of elderly: independent or collective living, active elderly, from surroundings, comfort seeker, care preparer.
Household size: one or two persons

Housing
Densification method: 1, 2, 3, 4
Type: zero-step apartments

Surroundings
Close to the centre and close to nature. Close to care centre when needed. High accessibility by car and public transport.

Densification methods applied



5.2.3 Details

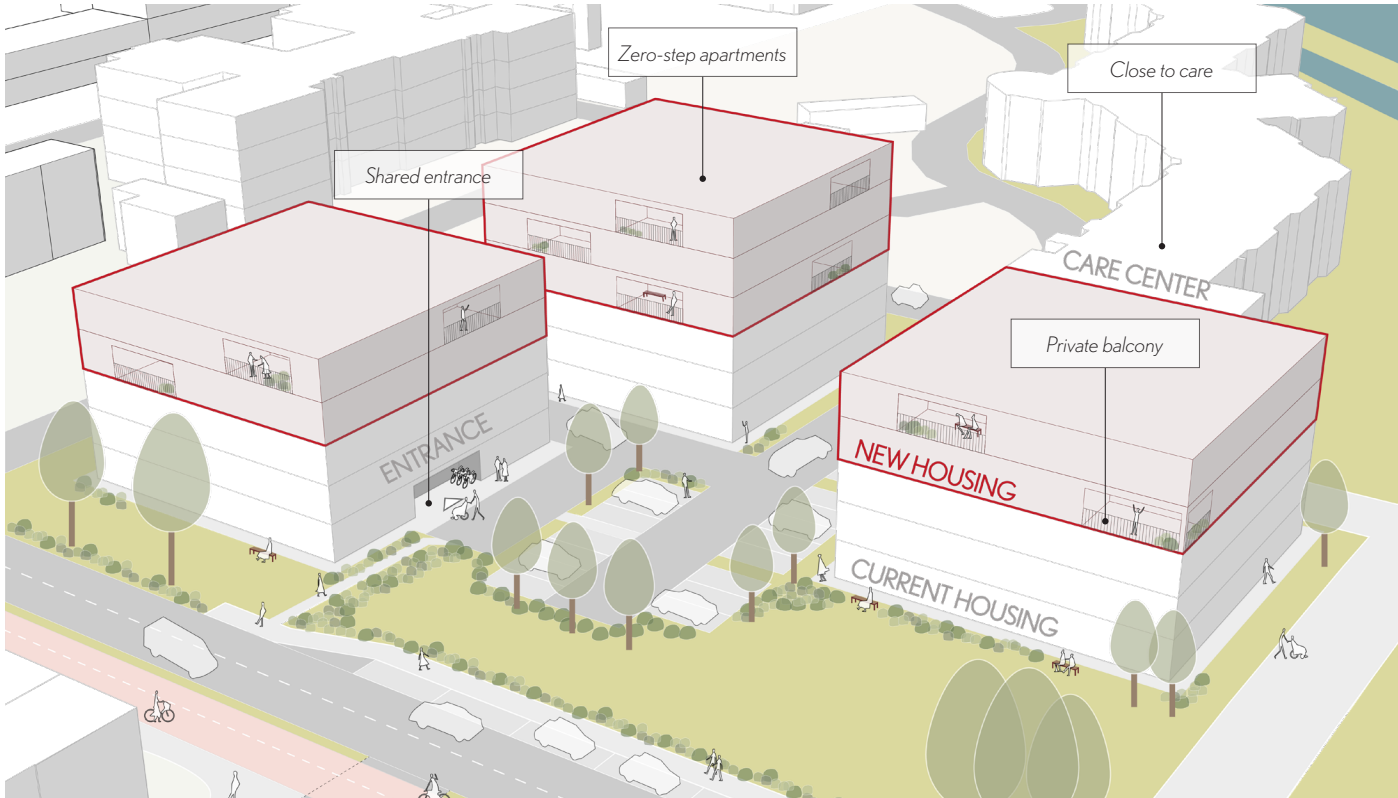
1. Roof stacking

These three apartment blocks currently have senior apartments and are located next to a care centre for elderly. This apartment block allows for roof stacking with more senior apartments. The apartments have zero steps and a private balcony.



COMFORT SEEKING ELDERLY

- Independent living
- Close to care
- Shared hall, private door
- Private balcony
- Elevator in building, zero-step apartment
- Accessible by car, bus, bicycle, and on foot



2. Splitting building & adding buildings on one plot

This intervention shows how adding a new building to the same plot creates a collective living environment where everybody has their own apartment but shares the outdoor space.



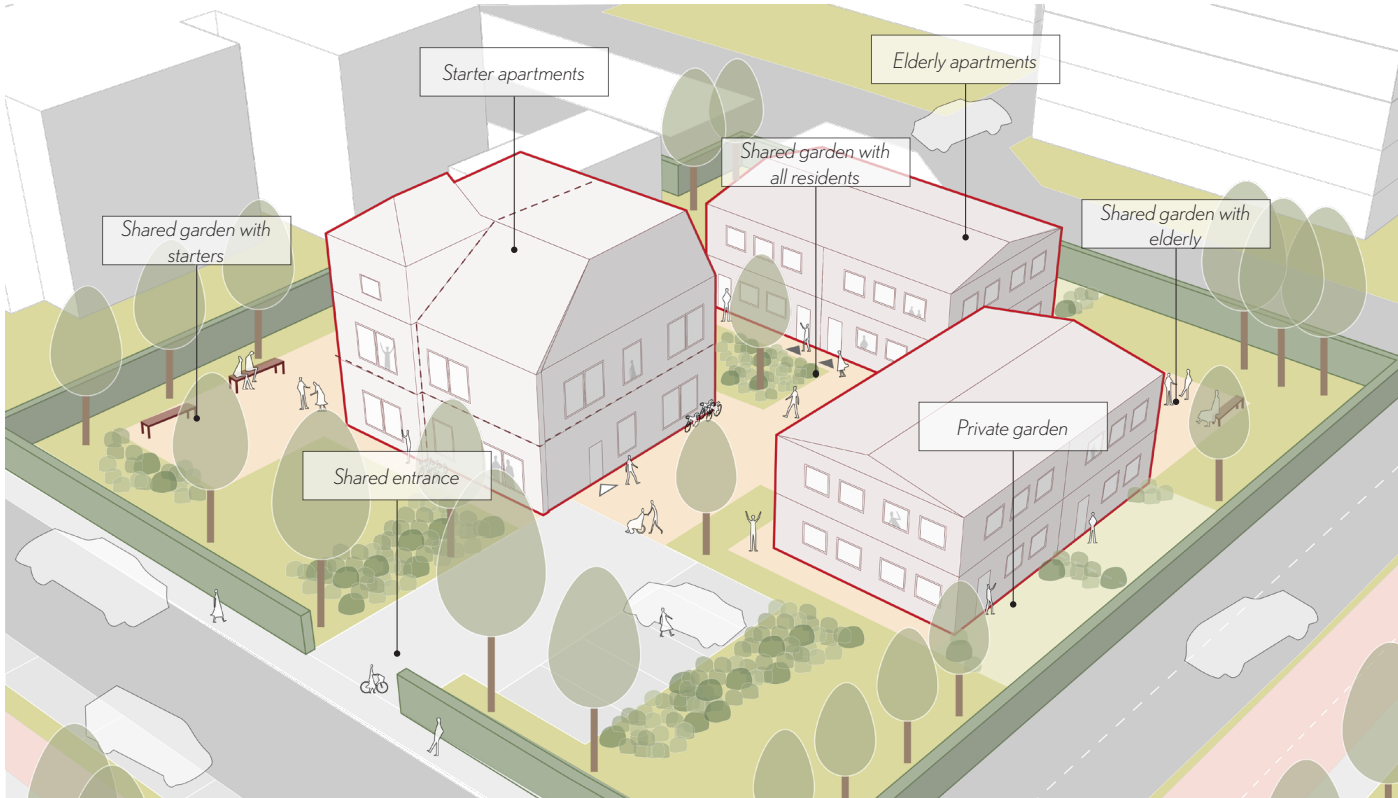
BACK TO REGION STARTER

- Helping elderly when needed
- Small community
- Shared & private entrance
- Shared garden
- Existing building divided into multiple apartments
- Accessible by car, bus, bicycle, and on foot



ACTIVE ELDERLY

- Independent living
- Small community
- Private entrance
- Private & shared garden
- New building, zero-step apartment
- Accessible by car, bus, bicycle, and on foot



5.2.3 Details

3. Splitting buildings & roof stacking

These existing houses are large enough to be divided into two houses. This is perfect for elderly who want to live close to family or for starters who live in their parental home but want their own place. The roof-stacking apartment is for starters, but the other houses are possible for both groups. The elderly are close to care, and the starters have their personal space.



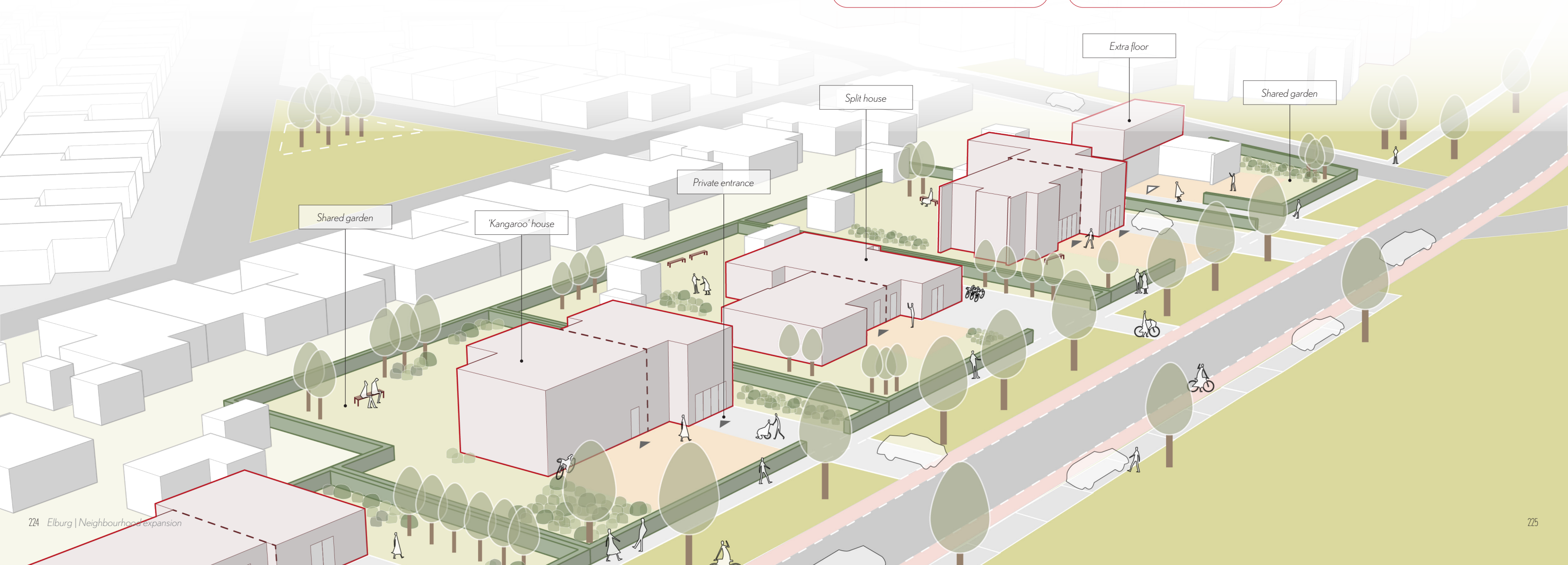
LIVING WITH FAMILY STARTER

- Helping elderly when needed
- Small community
- Private entrance
- Shared garden
- 'Kangaroo' house
- Accessible by car, bus, bicycle, and on foot



CARE PREPARER ELDERLY

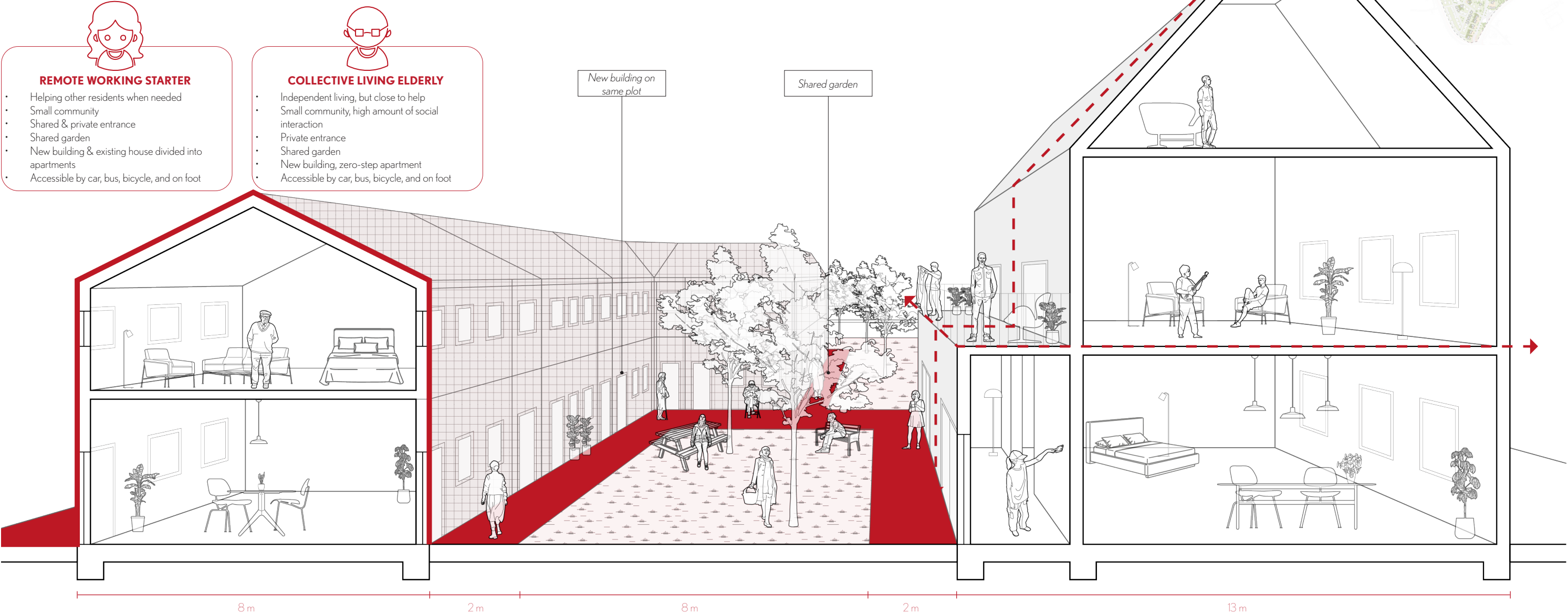
- Private apartment
- Care of family or others next door
- Private entrance
- Shared garden
- 'Kangaroo' house
- Accessible by car, bus, bicycle, and on foot



5.2.4 Section

Splitting and adding a house on one plot
Adding a new building to the same plot creates a collective living environment where everybody has their own apartment but shares the outdoor space. The two target groups also have a shared space with

their equals. This contributes to the community-focused environment of the neighbourhood. Everybody has a private front door facing the courtyard. The ground floor apartments are for the elderly and the first floor apartments are for the starters.



5.2.5 Collage

The neighbourhood focuses on community-orientated living, where the splitting of plots and buildings results in shared courtyards where the target groups, starters and elderly, can meet each other. New housing developments match current housing in scale and materials. Each house has a private or shared green space.



5.3 Port Area

5.3.1 Existing context

This map shows the existing land uses of the port area, including the blue-green network, the buildings and the roads.



5.3.2 Design Proposal

The masterplan for the port area focuses on roof stacking. New housing is placed with a setback to keep the spacious and wide grid layout from the street-level perspective. The grid also allows for new functions on the street, with new green areas and public squares. This includes workplaces and experimental areas. Because of new housing developments, the street profile of the main route through the area is improved with a wider path for pedestrians and a broader cycle lane. A new route along the waterfront creates a better connection between the port area and the historic harbour. Changing the functions of the

ground floor levels of existing buildings to new public functions, such as a library, a coffee bar, or a brewery, attracts people to visit. Different design interventions are highlighted on the following pages, where an example of how starters live is shown. The persona describes which type of starter the port focuses on, which densification methods suit them, and which spatial elements are most important.



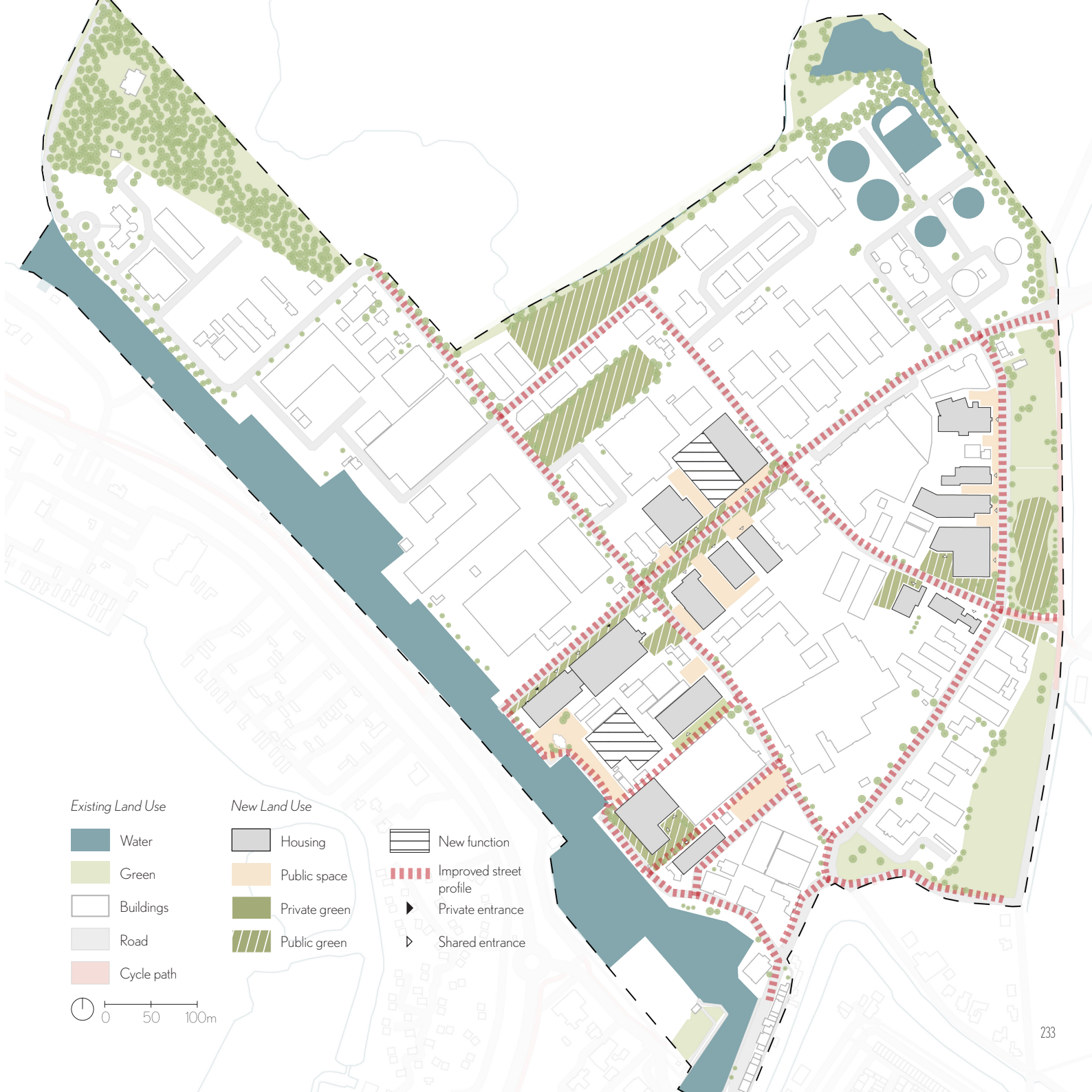
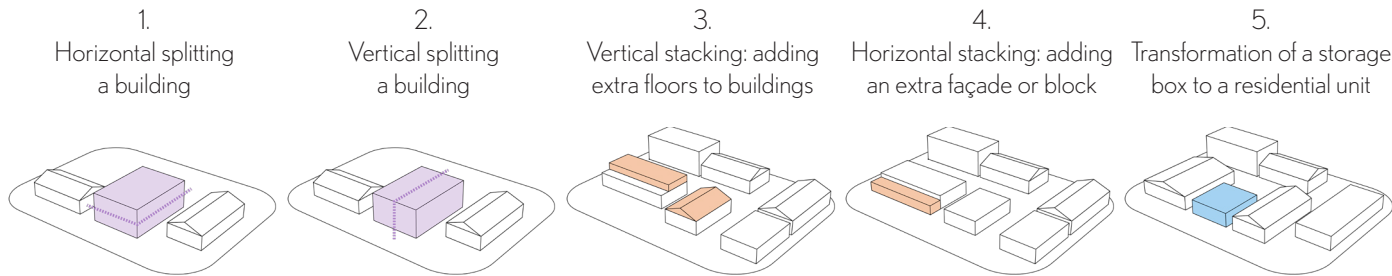
STARTER

Age: 25-29
Types of starters: career-focused, creative, mover, international, entrepreneur, and remote working.
Household size: one or two persons

Housing
Densification method: 1, 2, 3, 4, 5
Outcome: apartments, studios, workspaces combined with living, and tiny houses.

Surroundings
Spacious surroundings, but close to the centre, with a private or shared garden. High accessibility by car, cycle & public transport, space for creativity and innovation.

Densification methods applied



5.3.3 Details

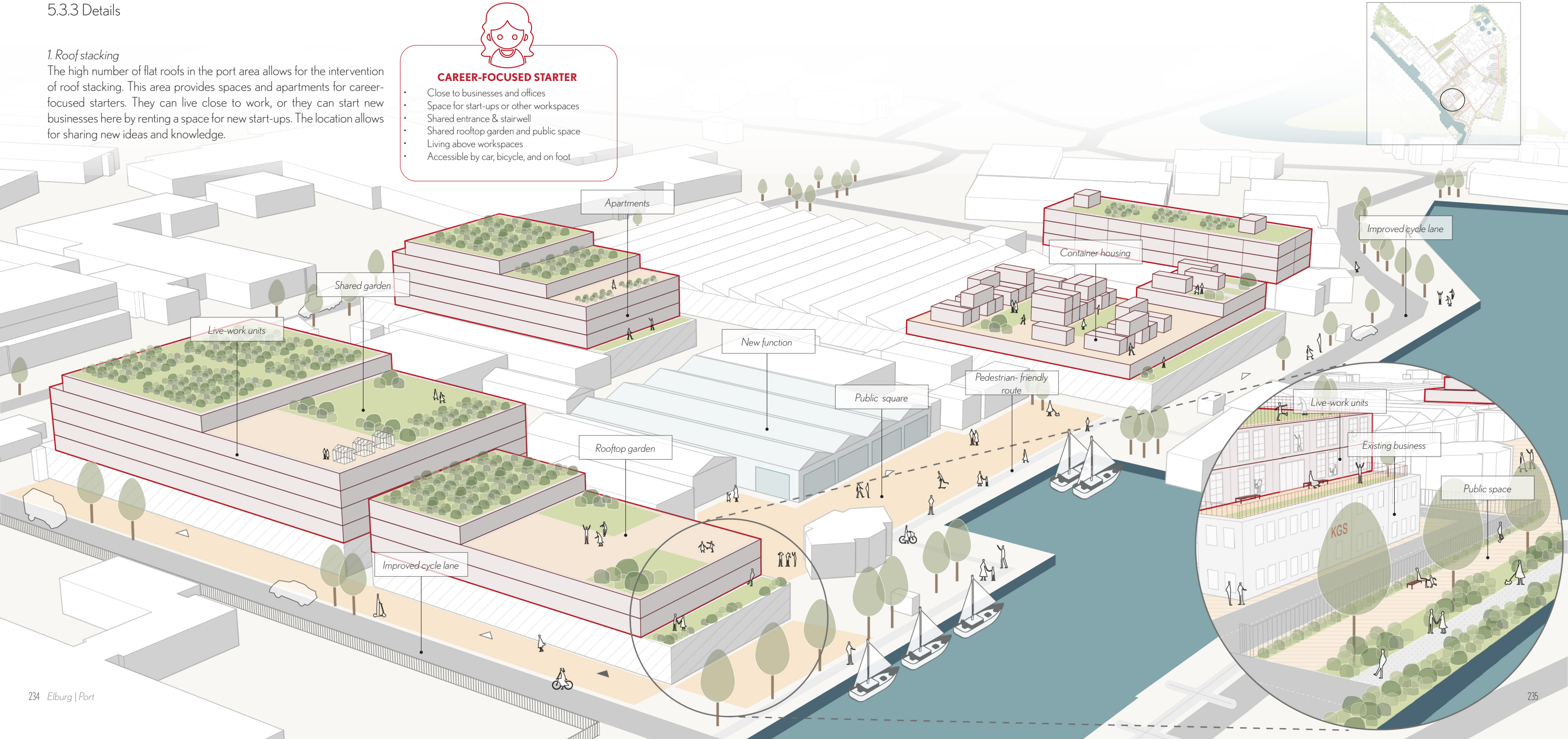
1. Roof stacking

The high number of flat roofs in the port area allows for the intervention of roof stacking. This area provides spaces and apartments for career-focused starters. They can live close to work, or they can start new businesses here by renting a space for new start-ups. The location allows for sharing new ideas and knowledge.



CAREER-FOCUSED STARTER

- Close to businesses and offices
- Space for start-ups or other workspaces
- Shared entrance & stairwell
- Shared rooftop garden and public space
- Living above workspaces
- Accessible by car, bicycle, and on foot



5.3.3 Details

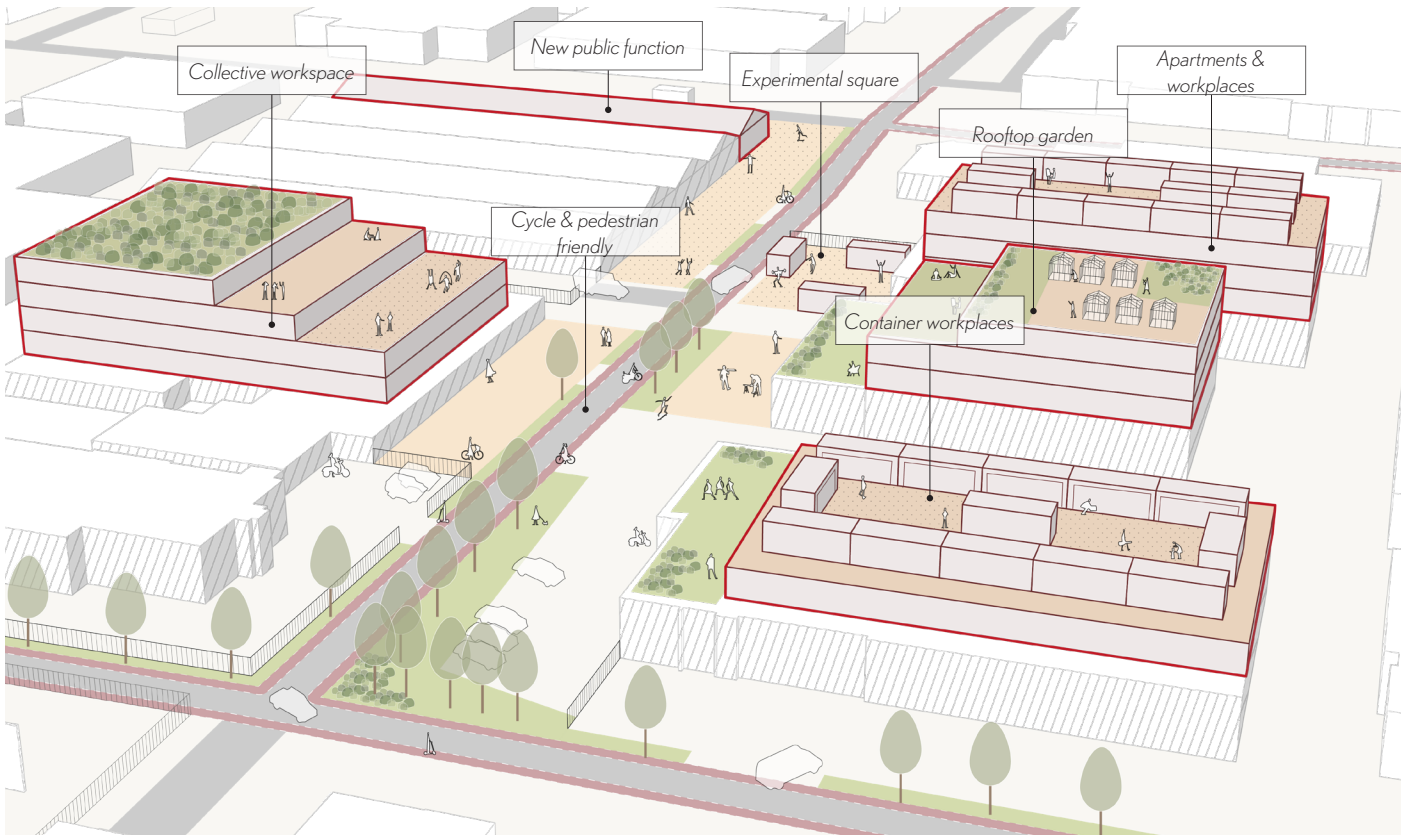
2. Roof stacking & transformation

With the transformation of ground floor functions and roof stacking, starters are able to live above their workspace and share knowledge with each other.



INTERNATIONAL STARTER

- Living close to work
- International businesses
- Shared entrance
- Shared rooftop garden and public squares
- New apartments on top of workspaces
- Accessible by car, bicycle, and on foot



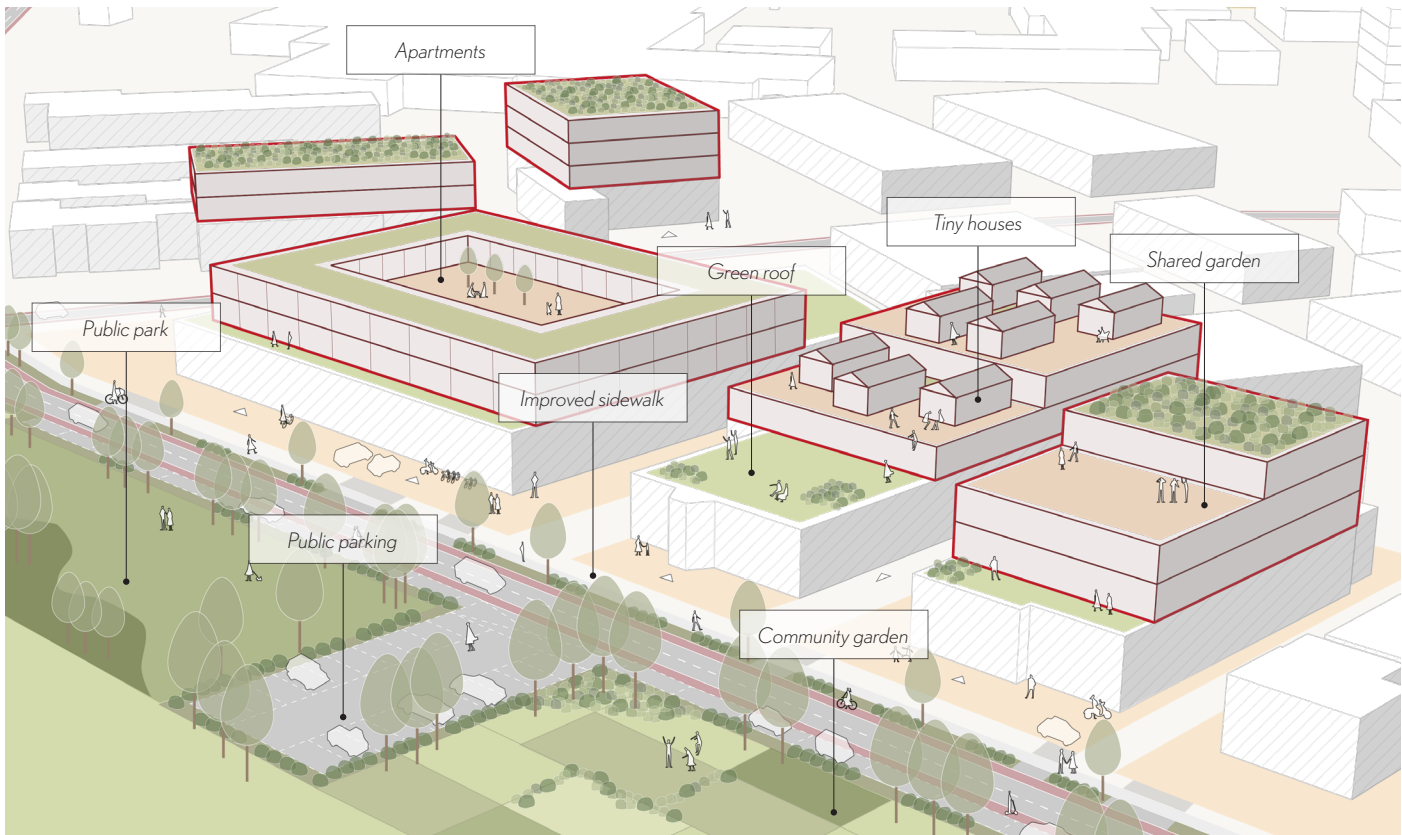
3. Roof stacking

Different types of roof stacking are possible, such as adding apartments, tiny houses, studios, and artist lofts. These types of housing make remote working possible.



REMOTE WORKING STARTER

- Collective workspaces
- Close to green areas and active during the day
- Shared entrance
- Shared rooftop garden and public squares
- Apartments with workspaces or close to collective workspaces, tiny houses
- Accessible by car, bicycle, and on foot



5.3.4 Section

1. Roof stacking & transformation of functions
The buildings in the port area allow for roof stacking. A new program in the area asks for new functions in the existing buildings. The ground floor of an existing warehouse is transformed into multiple spaces that can be used as collective workspaces or can be rented for small businesses,

such as a gym, art galleries or other public functions. On top of this building, new apartments are built, allowing for people to live close to work or their business. The street profile is improved with more focus on a pedestrian- and cyclist-friendly environment. This building offers a great opportunity for entrepreneurial starters to live here and be able to

work with new business ideas, starting their start-up or networking with larger existing companies.



ENTREPRENEURIAL STARTER

- Workspaces and experimental spaces
- Networking with other businesses
- Shared entrance
- Shared rooftop and public squares
- New apartments on top of existing buildings
- Accessible by car, bicycle, and on foot

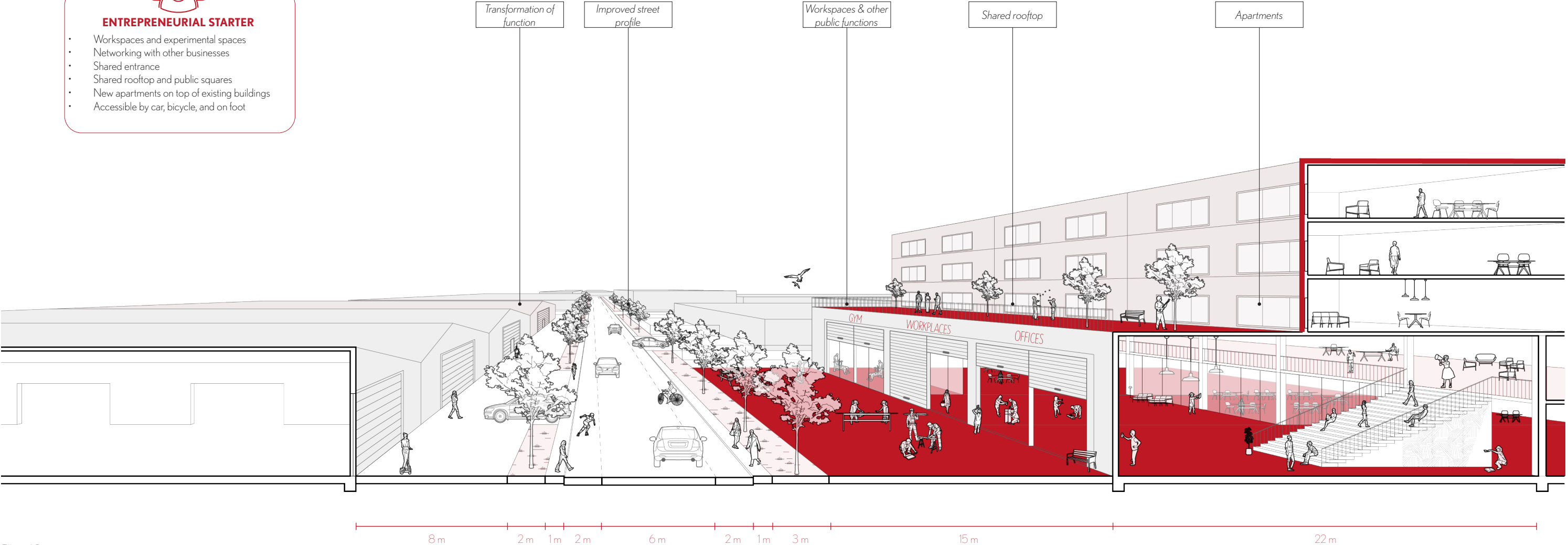
Transformation of
function

Improved street
profile

Workspaces & other
public functions

Shared rooftop

Apartments

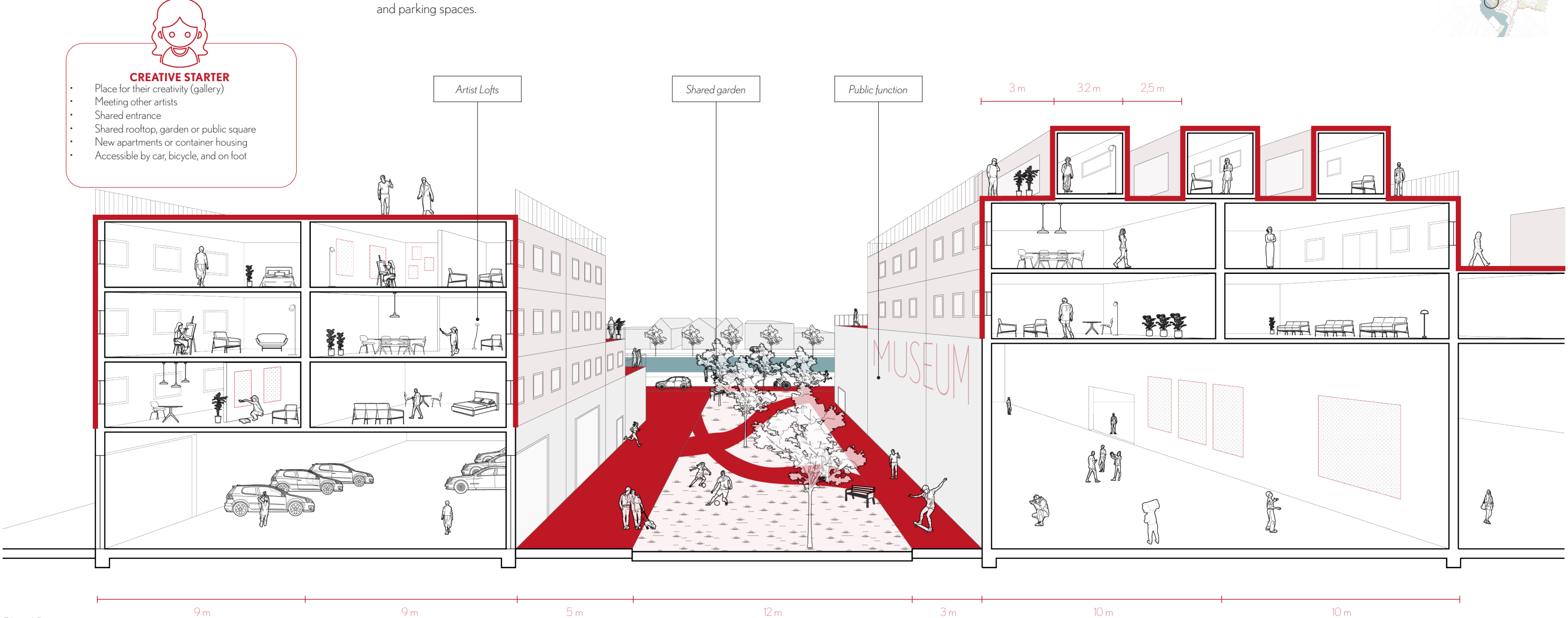


5.3.4 Section

2. Roofstacking

This design intervention transforms the area from solely a business place to a space where creativity and artists can share their work with one another. The existing museum offers new collaborations with artists,

exhibiting their work and attracting other artists. The use of container housing along the waterfront contributes to the maritime history of the city and also allows a creative starter to build their own house within this container. Current warehouses can be transformed into entrance halls and parking spaces.



5.3.5 Collage

The port area is identified as a new live-work hub with open ground-floor façades inviting people in to exhibit local activities and new businesses. Buildings transform in public functions, such as gyms, coffee bars or art galleries. New housing developments are built with a setback to keep the perception of the wide grid. The tiny houses in the containers refer back to the city and its trade history.



5.4 City scale

5.4.1 Connecting the three areas

Historic Centre
The historic centre implements small-scale interventions primarily within the interiors of existing buildings. The streetscape and the exteriors remain almost the same. A few empty plots are filled with new buildings that follow the same architectural style as the existing buildings. The historic landscape functions as a border for development and remains the same.

Neighbourhood Expansion
The neighbourhood expansion is known for the amount of green space that includes private and shared gardens. The area is known for its community-orientated environment, forming the base for new developments, where plots are divided into multiple plots or new buildings are added on plots with existing housing.

Port
The port area focuses mainly on roof stacking and, compared to the other three areas, implements the highest amount of densification interventions. Roof stacking complements the evaluation criteria of preserving the wide and spacious grid of the area. This wide grid creates

opportunities for new public spaces, such as experimental squares and green areas. With an improved street profile that also focuses on walking and cycling, the area becomes more attractive for slow traffic. A new route along the waterfront and new buildings with water-related businesses contribute to the maritime heritage.

The three areas
When connecting the three sub-areas with each other, it is clear the port area changes the most. This is because this area allows for the most change because its identity is something that can change, while the historic centre has a strong protected environment. In addition, the historic centre is more dense than the port area. The neighbourhood has a more traditional way of housing developments where new houses are built with private gardens. On the contrary, the port area offers space for experimentation, temporary housing and the combination of working and living.

Evaluation criteria of the three sub-areas

Historic Centre	Neighbourhood Expansion	Port
• The city wall needs to remain visible. • The rooftops need to remain visible. • The church needs to be recognisable from the entire city centre. • Preserving the individual façades. • Keep it high-density and compact with small plots. • The historic landscape needs to remain intact.	• Every home needs to have a private or shared garden. • Remain the surroundings child-friendly by ensuring safe routing through the neighbourhood. • Human-scaled environment needs to be preserved. • Keep the housing and surroundings family-orientated. • Remain focused on community by maintaining the same amount or more spaces for social interaction.	• Maritime heritage needs to remain visible. • Relation with water needs to be preserved. • Wide grid needs to remain, maintaining a spacious environment. • Public green spaces need to remain.



5.4.2 Different identities

The port has a new identity where old characteristics are integrated with new ideas, transforming it into a live-work hub. The existing closed façades transform into open façades where the buildings reveal new functions and businesses, bringing new activities to the area. The improved main route makes the area better accessible for slow traffic.



PORT & INDUSTRIAL AREA

The historic centre preserves its cultural-historic identity by using the architectural style and materials. New buildings are matched in scale and have the same rooftops as existing buildings. The church bell tower is still visible after new developments, and the historic landscape remains the same.



HISTORIC CENTRE

The neighbourhood focuses on new housing ideas that contribute to the community environment of the area by adding shared courtyards and new public spaces for social interaction. Integrating private and shared green spaces contributes to the liveability of the area and functions as transition zones between the dense historic centre and the open agricultural landscapes.



NEIGHBOURHOOD EXPANSION



06

Scaling up

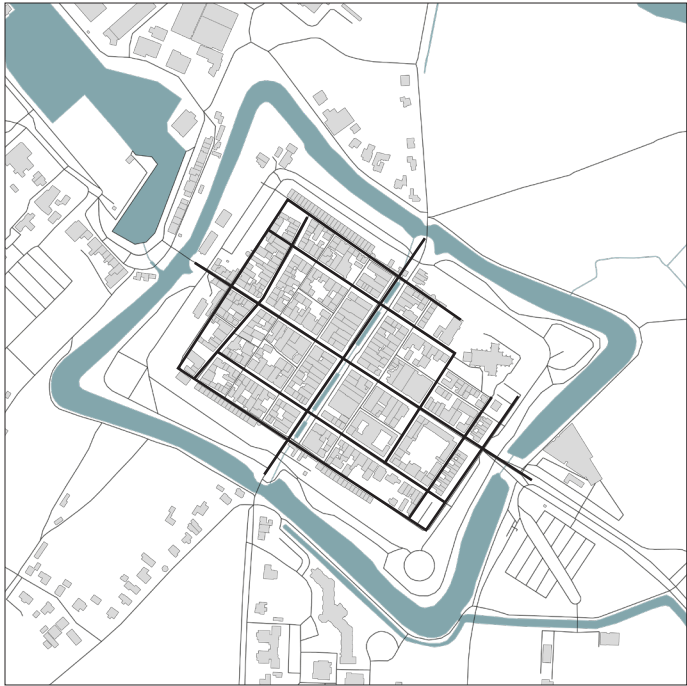
- ☐ 1. Elburg and Doesburg
- ☐ 2. Hanseatic Cities
- ☐ 3. National Scale

6.1 Elburg and Doesburg

Comparing Elburg and Doesburg

The sub-areas of the two cities are compared with each other to determine similarities and differences in possible design interventions.

1.ELBURG



1.DOESBURG

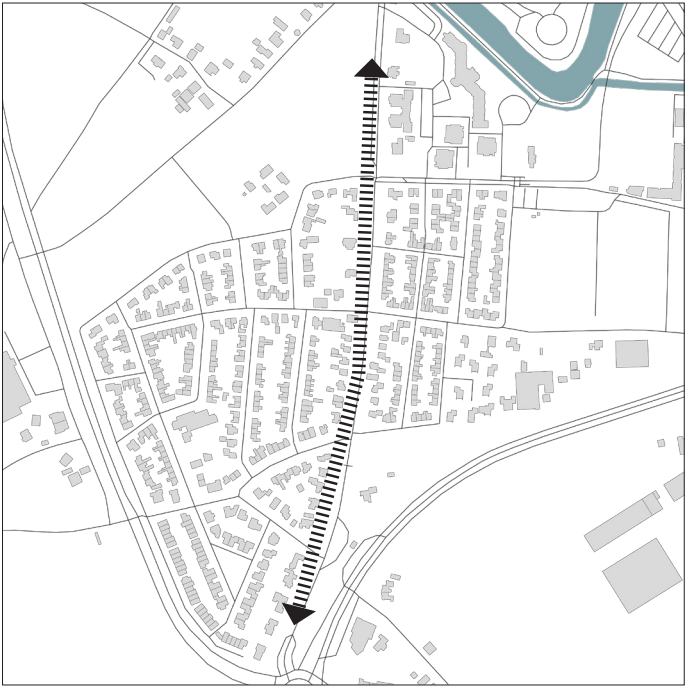


1. Core, the historic centre

The design interventions possible in the historic centre of Elburg are infill developments on empty plots and parking lots and the division of existing buildings into multiple apartments. Both cities have an isolated historic landscape, which is completely enclosed by a blue-green network, forcing new housing developments to stay inside the physical boundaries of this area. Comparing the two cities shows that Doesburg has more empty plots, larger parking lots and more gardens or courtyards, allowing for more infill development spaces. Where Elburg has more between-buildings infill development and parking-lot infill development, Doesburg has more backyard infill development possibilities. This could

result in a combination of splitting plots and infill development on the new empty plot. The identity of both cities is very similar in this area, where there is a strong cultural-historical heritage. New developments in both scenarios need to match in scale and architectural size, where the rooftop landscape remains the same and specific historic landmarks remain visible.

2. ELBURG



2.DOESBURG



2. Neighbourhood Expansion

In both cities there is a clear spatial division between the historic centre and the neighbourhood expansion as a result of the historic landscape. Both neighbourhoods are family-orientated, where a large part of the housing has a private garden. These similarities result in the same possible design interventions. The neighbourhood allows for all densification methods, roof stacking, infill development and the division of buildings and plots. New developments should be designed to match their surroundings in terms of scale and architectural style. However, these requirements are less strict than in the historic centre due to the existing variety of architectural styles, which reflects different

periods of development. New developments can follow up on that story. The area also functions as a transition zone between the centre and the surrounding landscape, which is why building sizes need to be in scale with the skyline. The large amount of green space requires design interventions that integrate existing green areas into new housing developments. This can be achieved through shared courtyards, private gardens, community gardens, and public parks.

3. ELBURG



3. Port or industrial area

These industrial areas are both situated along large waterbodies. The main difference between the two cities is the size of the industrial zone, where Elburg's is much larger than Doesburg's industrial area. In Elburg there is more space for experimentation and the mixing of functions. This is also possible in Doesburg, but on a smaller scale. Roof stacking makes sure that there is enough space left for new public functions, and with the transformation of ground floor levels, the area transforms into a live-work environment. Both cities can strengthen water-related uses, referring back to their origins as trade centres. Because of the scale, Elburg can go higher in roof stacking without it taking over the entire

3. DOESBURG

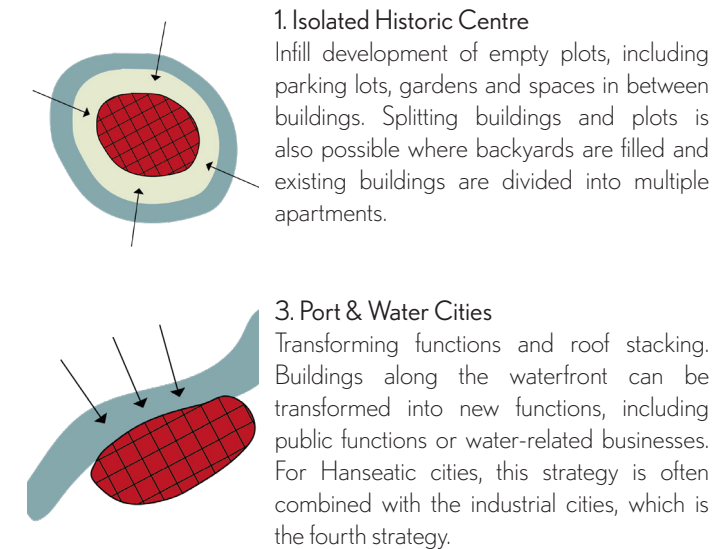


skyline of the city. In Doesburg, the industrial area is located close to the historic centre. If new developments are too tall, the industrial area could become the dominant feature of the city skyline, which is currently defined by the historic centre. Careful design is required in order to maintain the attention on the historic centre instead of the industrial area. A new route along the waterfront of these areas adds to the characteristics and the identity of the area, making the industrial area not only accessible by car but also pedestrian- and cyclist-friendly.

Conclusion

Elburg shows how different densification methods and interventions are possible in different areas. The design interventions in the three sub-areas can be very similar. However, the two cities' areas are evaluated with different criteria, which means that the design outcome of the possibilities can still differ. The neighbourhood expansions have the most similarities, while the historic centres and the industrial areas have big differences. In the historic centre, the grid layout is very different, resulting in other possibilities for design interventions; however, the evaluation criteria are similar, which leads back to applying the same design interventions. The industrial areas are different in size but have the same identity and same characteristics. This results in different scales of design interventions even though they are the same. Also, Doesburg is more restricted in high-rise buildings in this area because the area borders the historic centre and landscape.

Strategies



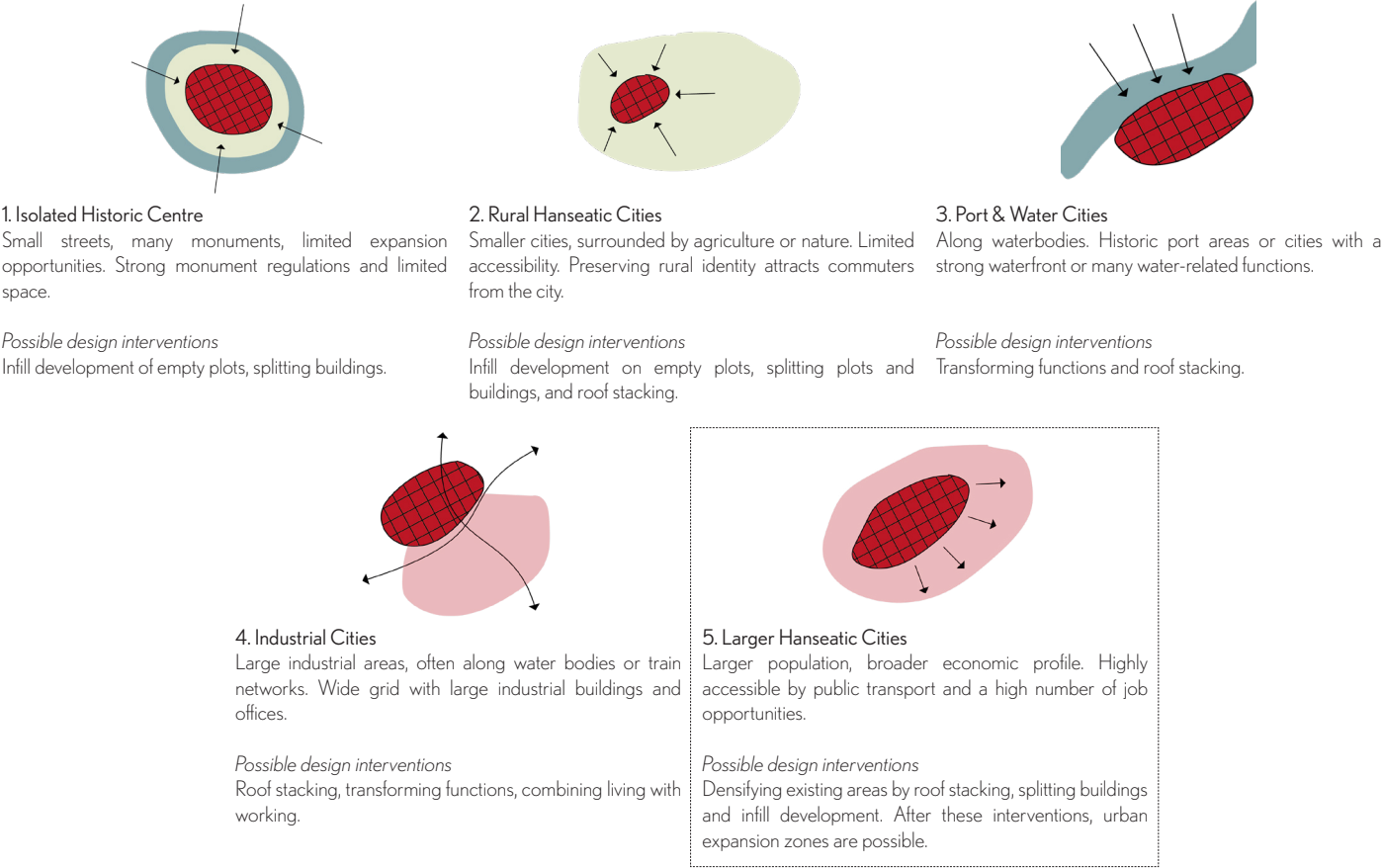
The sub-areas are very similar, and the differences are minor. From these sub-areas different strategies can be excluded, which translates into which design interventions can be applied in areas with the same spatial and historic characteristics. The first strategy is based on the historic centre, which is completely isolated with its historic fortifications. The second strategy is based on the neighbourhoods of Elburg and Doesburg and is described as rural Hanseatic cities, where the surrounding landscape plays a major role in the identity of the area. The third and fourth strategies are based on the port and industrial area, where the waterfront and the industrial environment describe the possibilities in design interventions.

6.2 Hanseatic Cities

Applicable in other Hanseatic cities

The small-scale densification of Elburg can function as an inspiring example for other cities, but it is not directly transferable to all cities. Each city has unique challenges that require a sensitive approach. Spatially, the Hanseatic cities show big differences. Isolated cores like Deventer, Zwolle, or Kampen are ideal for infill projects: repurposing vacant buildings, creating upper-floor apartments, or transforming backyards. Cities with more open structures, such as Zutphen or Hattem, offer space for expansion at the edges, for example, by redeveloping industrial sites. River cities like Nijmegen or Arnhem can explore densification along the waterfront. Tourist cities like Elburg must ensure densification

is subtle to preserve their character, while more industrial cities can promote mixed-use developments (living and working), while university cities, such as Groningen or Deventer, benefit from affordable rental housing by, for example, converting offices. Cities with strict heritage policies require careful integration of new developments in the existing context. The four strategies that are excluded from the comparison of Elburg and Doesburg are applied to the other Hanseatic cities, as shown on the map. A fifth strategy is added that includes larger Hanseatic cities, which have larger expansion zones and where larger-scale densification is possible.



Types of Hanseatic Cities

- 1. Isolated Historic Centres
- 2. Rural Hanseatic Cities
- 3. Port & Water Cities
- 4. Industrial Cities
- 5. Larger Hanseatic Cities
- Elburg & Doesburg



Figure 16: Strategies applicable in other Hanseatic cities

6.3 National Scale

The National Housing Demand

The densification of the Hanseatic cities can contribute to addressing the national housing demand. New housing developments strengthen their economic position together with their cultural position. New housing developments in the Hanseatic cities will result in reduced pressure on the housing demand in the Randstad. Housing developments are nationally distributed, stimulating new living and working environments in smaller cities.

Preserving historical identity

Small-scaled densification strategies allow for growth in sensitive cities. With site-specific criteria, new developments can be implemented while preserving the unique identities of the cities. The preservation of the identity and characteristics of these sensitive areas also strengthens tourism and local liveability. The unique identity of these cities functions as an important factor in their attractiveness for residents and visitors.

Economic stimulation

New developments also stimulate local economies. Transforming areas and redeveloping, for example, industrial areas can increase job opportunities in these cities, making it more attractive for starters and entrepreneurs to live and work here. The regional cities transform from commuting towns to living and working cities. At the same time, their historic centre strengthens business opportunities in tourism, which also contributes to the economic growth. The cities have stronger economic positions within the region by creating more job opportunities.

Encouraging social diversity

With the focus on the starters and elderly, new affordable housing helps maintain a socially diverse population. Starters can return to the regional cities, and the elderly can remain in their familiar surroundings. Design interventions that stimulate collective living with shared courtyards, preventing demographic imbalance, resulting in more inclusive and resilient cities.

Strengthening connections

Stimulating this growth and economic development in the Hanseatic cities will result in new and stronger connections between the Hanseatic cities themselves but also between the Hanseatic region and the Randstad. These connections are shown on the map. With improved public transport infrastructure and regional economic networks, knowledge exchange and cooperation between cities are improved. The Hanseatic cities return as a strong interconnected network that complements the existing network of the Randstad.

Challenges

This possible growth and new connections also brings its challenges. Strengthening these connections is only possible by investing in public transport and infrastructure to support better mobility between the cities and to attract commuters. Another challenge addresses that small-scale densification is often more complex than large-scale suburban development. Current residents of these historic cities can offer resistance or concerns about changes in their environment, which makes it very important to carefully integrate new developments in the existing context.

Network



Figure 17: Strategies applicable in other Hanseatic cities

07

Conclusion and Reflection

- ☐ 1. Conclusion
- ☐ 2. Reflection

7.1 Conclusion

This thesis started off with a personal fascination for historic centres and their potential for future housing developments. This fascination turned into a question on how history-sensitive cities can be densified while retaining their unique identity. In the context of the housing demand, this thesis explored how site-specific qualities and identities can be a source of inspiration for new housing developments.

Combining small-scale densification methods together with design interventions that align with the needs of the target groups, the research supports both the technical and social elements of the design. In order to evaluate if the design interventions complement the identity and characteristics of the area, important spatial and historical characteristics are analysed to form evaluation criteria that represent this identity. These criteria are site-specific, but because of the same structures and similar characteristics of the Hanseatic cities, design interventions or ideas are transferable. Each city, however, does need their site-specific evaluation criteria to test whether these design interventions complement their unique identity.

The characteristics that are most vulnerable to change when new housing developments are introduced are also site-specific. In the case of the historic cities, the characteristics that are most likely to change are characteristics and elements that shape the famous streetscapes and skyline. The historic centre of the city has the strongest historic identity and is often the face shown to the world, which results in the area with the most limitations for new developments. The neighbourhood and industrial areas are more flexible because their existing identity allows for more change and new identities. Their identity is more focused on function instead of the historical layers. It is, however, important that design interventions in these areas do not take the focus away from the historic centre, meaning that the environment and identities of the three areas all need to complement the identity on the city-scale level.

Throughout this process, I have also been confronted with the limits of what design can do. Putting ideas on paper and making decisions on what works best have been difficult because one intervention may benefit one person but will challenge another or challenge the identity of the area or city. This means that there is no perfect solution that works

for everyone. A good balance between which elements need to be preserved and which elements are more flexible for growth reflects back to the maximum carrying capacity of the city. The limits of the scale of design interventions are tested and evaluated with the evaluation criteria, finding a balance between preserving and growing.

The research and design process contributed to getting a better understanding of the possibilities of small-scale developments in these sensitive areas and how these areas should be approached, while balancing preservation and growth. This research and design exploration taught me that some of the most meaningful decision-making was in deciding and finding out what the identity of the area is and what it could be after the design implementations. The limitations of the research are mainly focused on deciding on what I thought was important to preserve and what could possibly be changed. This reflects on how the perception of space is different for other people. A recommendation for future research would be to integrate stakeholders more into the evaluation criteria by discussing with them if these criteria align with what their needs are.

Two different types of design interventions can be implemented in the Hanseatic cities. The first ones are the densification methods that focus on the technical aspects of new housing. Secondly, spatial and architectural elements can be implemented to strengthen or complement the existing or new identity of the area. These elements shape the technical interventions into design ideas that complement the needs of the target groups. The research reveals that historic cities can be sustainably densified with site-specific qualities and unique local identity as a driver for urban growth. It is important to analyse the areas on a deep level to get a good understanding of which characteristics and spatial elements form the identity and qualities of the city and which elements can be used in new developments that complement the unique identity of the city.



Figure 18: Traditional boats in the harbour of Elburg

7.2 Reflection

1. What is the relation between your graduation project topic, your master track (A, U, BT, LA, MBE), and your master programme (MSc AUBS)?

‘Density in historic centres’ is orientated from a personal fascination for historic centres and their cultural environment. I always romanticised the historic architecture and cultural heritage of the Hanseatic cities. From these personal experiences my graduation research question formed. The research and design of this thesis reflect the essence of the Urbanism track and MSc AUBS programme, translated into working across scales with a focus on different perspectives, including the economic, the social and the ecological dimensions of design. A dimension that this research adds to that is the cultural-historic layering of the city, which can be seen as a sub-dimension of the social dimension. This design and research aims to balance these pillars using spatial tools and criteria that form the boundaries for the social and ecological dimensions. The design is seen as a tool to show the dynamic between decision-making and the impacts of these decisions on a small scale and how these decisions can eventually have an impact on a much larger scale.

2. How did your research influence your design/recommendations, and how did the design/recommendations influence your research?

Starting with a first research question that focused a lot on preserving the historic centre made me aware of all the things that I could not change in new design ideas. This resulted in a tunnel vision of keeping everything as it is instead of trying to find a balance between preserving and growing, which is the goal of the thesis. After adjusting my research question, I changed my perspective on the amount of preservation in the historic cities, and I changed my perspective on the effect of urban densification on cities. This research has been an iterative process, where constant negotiation between research and design was necessary to better understand the site of Elburg and to better understand how these systems work. As I mentioned, at the beginning my focus was more on preserving, but throughout the process I shifted my focus more towards the possibilities for growth. Finding the balance between growing and preserving asked for constant negotiation and evaluation. The shift in focus on possibilities for growth began with researching in a very

technical way if and how these densification methods can be applied in the three sub-areas. Instead of starting with analysing what the target groups’ needs are, I started exploring densification possibilities from a technical perspective. This resulted in first testing the possible methods in the areas and then matching these possibilities to the target groups.

The iterative process of this thesis was also reflected in the methodology and the approach. At first I was interested in testing the research and design on two case studies. However, during my analysis I realised that the process was repetitive for the two cities, which brought me to focus on one case study in the design exploration. The analysis on both cities is used to compare the cities and make a hypothesis on how design ideas can be transferred to the second case study, Doesburg.

During the final design process, I constantly questioned why this intervention is suitable for the site-specific surroundings and how it would affect its identity. How does it change the identity or characteristics of the area? In the introduction chapter the approach explains how I first wanted to create a vision for each sub-area and the city and then zoom in on the design on the local scale. However, during the final decision-making for the design, I concluded that the vision was too abstract and broad for the current phase that I was working in. I decided that I first focused on the design on the local scale and then reflected it back to the city scale and decided whether a vision was needed to explain my design better. This resulted in making a masterplan instead of a vision.

I started writing with the focus on a liveable city and sustainable developments, but during my research I first focused on the possibilities of densification and the effects of it. After this research I started to integrate the needs of the target groups. This is where I started to think about the liveability of the area, moving towards more sustainable developments. Having a brainstorm with my sister and friends really helped me with getting ideas and input from people without a designer’s perspective but more from a resident’s perspective. They were really envisioning what the benefits of living in this area would be while discussing how a day would look if they were to live here themselves. This brainstorm made it clear for me to prioritise different spatial elements that needed more attention in the final design, which included design interventions that were added next to the densification interventions. Going back and forth between my approach and methodology, my research and the final design helped

me ground my research process and made me constantly aware of how the choices that I made at that point would reflect back on the research question and research aim of the thesis. This required adjustments of the research question and the approach after finding out something did not work or did not align with the research aim of the thesis.

3. How do you assess the value of your way of working (your approach, your used methods, and your used methodology)?

The approach that I used for this project helped me guide myself through the different steps of the process that led me to the end goal of the thesis. At the start of the thesis, I began researching with a biased opinion on historic cities and with a negative perspective towards urban densification and larger cities. I was unaware of the prejudgement I had towards larger, bigger cities because comparing the larger cities with the smaller cities always made me aware of how I believed the smaller cities were better and more liveable than the larger ones. However, I have been living in Rotterdam for the last years, and I believe that my surroundings are also liveable, while the identity of the environment is very different from smaller, regional cities. So the first thing that I needed to do was change my personal perspective to a more objective perspective, allowing me to see the cities differently. By comparing densification methods of Rotterdam with possible design ideas in Elburg, I concluded that interventions can be the same but have a different outcome because of different surroundings. This does not mean that the outcome is perceived in a negative way. It made me shift my focus from completely preserving a site towards exploring areas that are open for change and new perspectives. I used a lot of sketching for the sub-areas, where I tested the different densification approaches without limitations in height, sizes and dimensions. After this task I evaluated all the sketches with the criteria based on the analysis on the different layers of the city. This exercise let me see the possibilities of urban growth without compromising specific qualities of the area. This exercise also made it very important to decide which criteria shape the identities of the city the best. Finally, it was crucial to visualise how the people really lived in these areas after the design interventions. This was the final part of the research that I needed to answer the research question and to be able to scale the design back to the national scale and housing demand.

4. How do you assess the academic and societal value, scope and implication of your graduation project, including ethical aspects?

The academic and societal value, scope and implication of this graduation project are assessed with the evaluation criteria that include the needs of the current and future residents while also focusing on the site-specific elements. From an academic perspective, this thesis contributes to how smaller site-sensitive areas can be approached in new housing developments, including showing possible design ideas for these areas. From a social perspective, the thesis reflects back on how people’s lives are influenced when making these decisions. In this step of the process, the thesis recognises that in future developments, decisions can not only be made with top-down interventions. Discussing the needs and opinions of current and future residents allows for a balance between top-down decision-making and bottom-up design ideas. In these small-scale interventions the residents play a major role, where current buildings and plots are divided into multiple units, asking for the cooperation of current residents.

In terms of scope and implication, this thesis offers a view on how these cities can be used for future developments and how they should be approached. This is not a definite way of approaching but a single method that is tested. There are still other ways to test this as well, but the main goal of this approach is to create awareness of the importance of current surroundings in an area and how these identities can be used as a source of inspiration for future developments. The awareness itself is an important aspect for the current and future residents since the areas have a strong, unique identity that contributes to the liveability of the area. The project offers methods to test and evaluate new developments within the boundaries and needs of the site and the target group.

From an ethical perspective, the thesis constantly challenged my own beliefs on urban developments and densification. My personal connection to the historic cities sometimes interfered with my decision-making. I was constantly trying to balance my design ideas between the top-down and bottom-up perspectives. Sometimes I had the idea that I was changing a lot of things in the area, while on the other hand I focused on not changing anything so it would result in very few changes in the

design areas. It was difficult to find a balance between these two ways of approaching. Adding to that, the design process could dive more into the bottom-up approach by interviewing current residents and discussing what their perspective is on the identity of their surroundings. This would be an important step in the process and offers interesting perspectives for new developments, where co-creation with the residents allows for feedback on design ideas and helps get a deeper understanding of the sensitive area. A lot of the decisions were made based on rules made by the municipality that were discussed in the vision documents for the sites. One of these rules includes preserving the streetscapes of the historic centre when dividing the building into multiple units.

5. How do you assess the value of the transferability of your project results?

The transferability of my project can be tested through different scales. This started with translating the design ideas of the sub-areas in Elburg to the sub-areas of Doesburg. This comparison led to the conclusion about which design ideas can be transferred to cities with similar characteristics. That brought me to translating it to other Hanseatic cities, where I analysed the main structure of the cities and matched it with one of the three sub-areas of the cities of Elburg and Doesburg. The main aspect that makes this project transferable for other cities is the site-sensitive context and the small-scale densification approach. The research works with sensitive areas, monumental buildings, protected sites, a commuter's environment, and cultural-historic perspectives, which are elements found in many other cities. The transferability for this project is more focused on the approach than on the design interventions. Every city has its own identity and characteristics that can lead to different design outcomes. The method of testing and evaluating can be applied in new developments in other cities. Some of the spatial elements of the two case studies are similar to other cities, primarily other Hanseatic cities, which allows for some of the design outcomes to be translated to these cities. However, they still need to be evaluated with their site-specific criteria.

The transferability to other cities should also be more focused on the process of engagement than solely on replicating design ideas. In this case, the engagement of the identity and characteristics of the site and the needs of the target groups form the base for the evaluation criteria. It is important that the approach needs to be open for adaptation, where the process of iteration is possible throughout the entire research and design process. This thesis offers possible design interventions for cities with similar characteristics and identities, but more importantly, it offers a framework and approach on how these cities and stakeholders can be engaged in the process of new developments.

08

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- ☐ 2. References for Images & Collages
- ☐ 3. References Appendix

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Appendix

Appendix 1: Policy analysis Hanseatic cities

City	Development	History preservation
Groningen	Urban densification through new high-rise buildings (Gemeente Groningen, n.d.)	Using heritage as the foundation and inspiration for new developments (Gemeente Groningen, n.d.)
Bolsward	- Urban densification - Preference for infill development instead of expansion, but there is too little space so expansion is also needed - Repurposing monumental buildings (Gemeente Súdwest-Fryslân, 2021)	Cultural-historical values serving as the foundation and source of inspiration for new developments (Gemeente Súdwest-Fryslân, 2021)
Stavoren	- Urban densification - Preference for infill development instead of expansion (Gemeente Súdwest-Fryslân, 2021)	Access to the water needs to be preserved (Gemeente Súdwest-Fryslân, 2021)
Hasselt	- Accommodating the growth of Zwolle - Phased development (Gemeente Zwartewaterland, 2025)	Hanze & Bedevaart: a project in which Hasselt's historic city centre makes its religious heritage more visible and liveable. (Gemeente Zwartewaterland, 2025)
Kampen	- Urban densification - Repurposing/further development of monuments (Gemeente Kampen, n.d.)	- New buildings must match the scale and cultural-historical appearance - New development areas need to achieve a balance between heritage and innovation (Gemeente Kampen, n.d.)
Elburg	Urban densification through new high-rise buildings (Elburg, 2025)	- Heritage must be preserved, but also needs to be liveable and visible - A protected cityscape. New initiatives must comply with the 'afwegingsmatric nieuwe initiatieven' - Preserve the characteristic street pattern and monuments (Elburg, 2025)
Harderwijk	- Urban densification through new high-rise buildings - Preference for infill development instead of expansion (Gemeente Harderwijk, 2025)	Preserving the monuments and the fishing history (Gemeente Harderwijk, 2025)
Zwolle	- Urban densification through new high-rise buildings - Neighbourhood reinforcement - Repurposing cultural-historical buildings is preferred (Gemeente Zwolle, n.d.)	- Heritage is a source of inspiration. It must be preserved, protected, and enhanced. - Architectural requirements, use of traditional materials (brick and wood) (Gemeente Zwolle, n.d.)
Hattern	Urban densification through new high-rise buildings if they fit in with the environment (Gemeente Hattern, 2021)	- New developments must align with the historic Hanseatic character. - Protecting monuments and preserving Hanseatic heritage. (Gemeente Hattern, 2021)
Ommen	- Urban densification - Repurposing cultural-historical buildings (Gemeente Ommen, n.d.)	New developments are integrated while retaining characteristic environmental quality (Gemeente Ommen, n.d.)
Deventer	Urban densification (Gemeente Deventer, 2025)	- Historical layers as a source of inspiration for future developments - Fortifications as a buffer zone that brings together cultural history, nature, recreation and climate adaptation - Preserving historic streets and avenues (Gemeente Deventer, 2025)

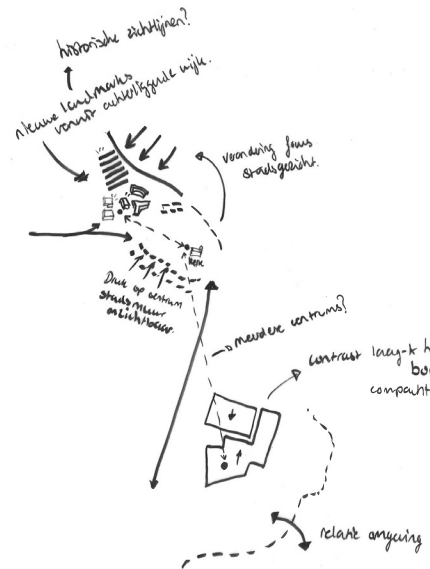
City	Development	History preservation
Rijssen	- Urban densification and transformation - Infill development - Focus on local growth (Gemeente Rijssen-Holten, n.d.)	New developments need to be in balance with the green spaces (Gemeente Rijssen-Holten, n.d.)
Oldenzaal	- Urban densification through infill development and new high-rise buildings - Transformation and repurposing of existing buildings (Gemeente Oldenzaal, n.d.)	- New developments need to be based on the historical structure - Surrounding landscape is a boundary (Gemeente Oldenzaal, n.d.)
Zutphen	- Urban densification through new high-rise buildings - New towers that will be integrated into the historic surroundings. (Zutphen, 2025)	Show the old fortress of the city better, it is now a green area with historical buildings (Zutphen, 2025b)
Doesburg	- Urban densification through infill development, reuse, redevelopment and repurposing - Connections between neighbourhoods (Gemeente Doesburg, 2023)	Restoring historical values (Gemeente Doesburg, 2023)
Arnhem	- Urban densification - New developments concentrated around public transport hubs - New high-rise buildings - Repurposing of existing buildings (Gemeente Arnhem, 2025)	- Using the cultural history as a foundation - Cultural history is used to increase the attractiveness of the city - A framework for new developments to ensure the coherence between densification and cultural-historical values. (Gemeente Arnhem, 2025)
Nijmegen	- Urban densification concentrated around public transport hubs - New-high rise buildings, but not in and around protected cityscapes. - Transformation of buildings and the division of homes (Gemeente Nijmegen, 2025)	- The unique identity of the city is a starting point for spatial development - Not only protect heritage, but make it visible and liveable. (Gemeente Nijmegen, 2025)
Tiel	- Urban densification - Restructuring and repurposing monuments (Gemeente Tiel, n.d.)	Making the history visible and liveable (Gemeente Tiel, n.d.)
Maasbommel	- Urban densification through infill development - Only urban expansion where necessary - Repurposing heritage (Omgevingsloket, n.d.)	- Growing from identity - Cultural history as a guiding principle for growth - Using heritage for new developments (Omgevingsloket, n.d.)
Zaltbommel	- Urban densification through infill development - New high-rise buildings (Omgevingsvisie Bommelerwaard, n.d.)	- Preserving cultural-historical identity - Cultural history as a framework - New high-rise buildings need to fit in historical silhouette (Omgevingsvisie Bommelerwaard, n.d.)
Venlo	- Urban densification - Infill development, transformation, restructuring, splitting houses and roof stacking (Gemeente Venlo, n.d.)	- Historical layering as a foundation - Making history visible, recognizable, and liveable for residents and visitors - New developments should follow the densification principles and guidelines to ensure they fit within the skyline (Gemeente Venlo, n.d.)
Roermond	- Urban densification - Repurposing of vacant buildings (Gemeente Roermond, n.d.)	- Densification with respect for the city's history - History as a source of inspiration (Gemeente Roermond, n.d.)

Appendix 2: Hanseatic cities sketches

Hattem

Main conclusions:

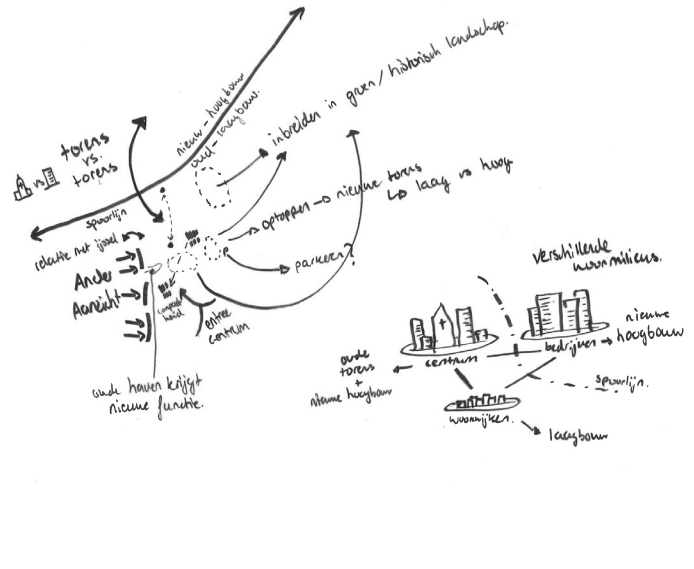
- High-rise buildings can disrupt the historic skyline,
- High-rise buildings in surrounding neighbourhood can shift focus away from historic landmark (church),
- In business district there is a potential for roof stacking, but that leads to a high contrast between high-rise & low-rise buildings,
- Historic centre surrounded by a large expansion zone of neighbourhoods.



Zutphen

Main conclusions:

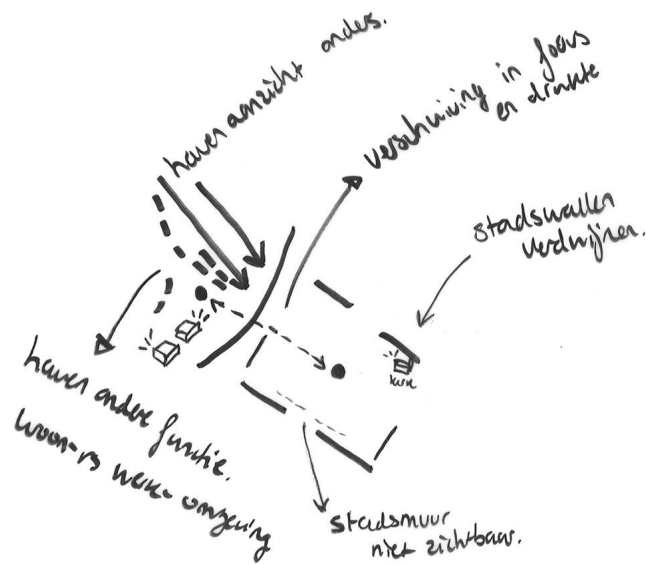
- High-rise buildings can disrupt the historic skyline,
- High-rise buildings in surrounding neighbourhood can shift focus away from historic landmark (church towers),
- In business district there is a potential for roof stacking, but that leads to a high contrast between high-rise & low-rise buildings,
- Infill developments can disrupt the historic landscape (fortifications),
- Historic centre surrounded by water and neighbourhoods.



Elburg

Main conclusions:

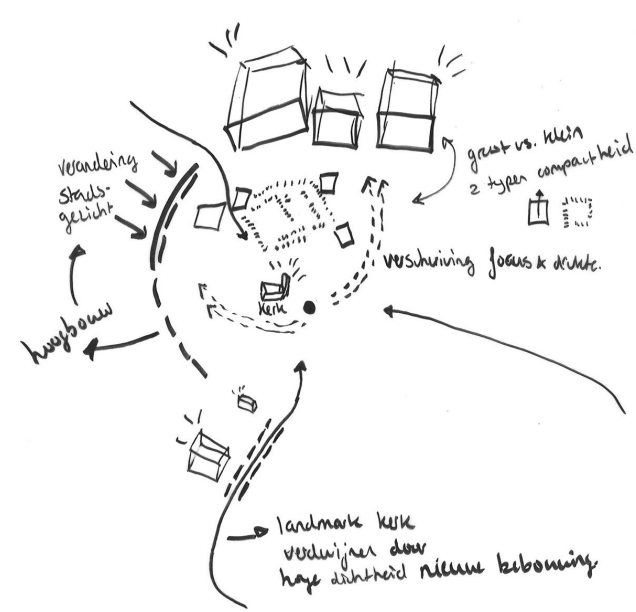
- High-rise buildings in surrounding neighbourhood can shift focus away from historic landmark (church),
- Infill developments can disrupt the historic landscape (city walls disappear),
- The port area can change in function,
- Surrounded by agricultural landscape.



Doesburg

Main conclusions:

- High-rise buildings can disrupt the historic skyline,
- High-rise buildings in surrounding neighbourhood can shift focus away from historic landmark (church),
- In business district there is a potential for roof stacking, but that leads to a high contrast between high-rise & low-rise buildings,
- Historic centre surrounded by water and neighbourhoods.



Density in Historic Centres

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