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Urban sustainability strategies for the heritage environment of Stavanger Trehusbyen

Annika Hagen

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Sammendrag

Masteroppgaven tar for seg bærekraftig utvikling i urbane kulturmiljø, spesifikt Trehusbyen i Stavanger. Hensikten med oppgaven var å finne en fremgangsmåte for hvordan et kulturmiljø som Trehusbyen kan forenes med nye standarder for bærekraftig utvikling. Det teoretiske grunnlaget er basert på bærekraftig utvikling i eksisterende urbane områder, og hensynet til kulturmiljø, med relevant litteratur og referanse prosjekter. Analysen er basert på eksisterende situasjon og status i Trehusbyen, med kvalitative aspekter fra eksperter i fagmiljøet for planlegging- og utviklingsprosesser relatert til Trehusbyen.

Historisk sett har Trehusbyen hatt kvaliteter og egenskaper knyttet til moderne standarder for bærekraft. Fleksibiliteten i designet ga muligheter for å blande funksjoner og redusere reiseavstanden for hverdagslige gjøremål. Den menneskelige skalaen bidrar til attraktivitet i områdene, særlig egnet for myk mobilitet. Bygningene og gatenettet viste seg å være svært tilpasningsdyktige, men varierende forhold og avklaringer knyttet til kulturmiljøet gjorde det nødvendig med detaljerte avklaringer for å finne utviklingsmuligheter som ivaretok de eksisterende kvalitetene.

Innenfor kulturmiljøets rammer fantes det rom for utvikling som ivaretok kulturmiljøets kvaliteter, men dette var et komplekst problem. det var nødvendig med utdypninger av de stedsspesifikke kulturmiljøkvalitetene og hvordan potensialet for bærekraftig utvikling kunne forenes med dette. Mens fortetting har vært den generelle strategien for å styrke bærekraftigheten i eksisterende byområder, var ikke dette det eneste alternativet for å øke de bærekraftige kvalitetene i Trehusbyen. Oppgaven inneholder et rammeverk med prinsipper for design og muligheter for hvordan bærekraftig utvikling i Trehusbyen gjennomføres og samtidig ivareta hensynet til kulturmiljøet. Den underliggende tanken bak rammeverket var basert på å behandle kulturmiljøet som en ressurs i bærekraftig byutvikling, og verdien og viktigheten av kulturmiljø la rammene for mulig utvikling.

Abstract

This master thesis presents research on cultural heritage environments in urban settings. The setting is the wooden house city of Stavanger, known as Trehusbyen, with historical buildings surrounding the city centre. The aim was to find an approach to how a heritage environment like Trehusbyen in Stavanger could cope with new standards for sustainable city development.

The theoretical framework is based on sustainable development and cultural heritage in existing urban environments, with relevant literature and reference cases. The analysis is based on the existing situation of the wooden house city of Stavanger, and qualitative aspects from experts involved in planning- and development processes related to Trehusbyen. Historically, Trehusbyen possess some of the qualities and abilities associated with modern standards for sustainability. The flexibility and design give a possibility to mix functions and reduce travel distances for everyday purposes, while the human scale contribute to making the areas more attractive for soft mobility. The buildings and streets were found to be capable of adapting to changes, but varying aspects of cultural heritage called for detailed clarifications to find adaptations that preserved these qualities.

It was found that within the cultural heritage there is room for development that preserves the existing values, but this is a complex issue. There was a need for further detailing of the specific heritage values to be considered and what potential for sustainable urban development could be conciliated with these. This thesis presents a design framework for how Stavanger Trehusbyen can cope with sustainability standards by defining the specific potential within a building, block, and neighborhood radius. The foundation of the framework was based on the cultural heritage to be used as a resource in sustainable city planning, and the value and importance of cultural heritage set the base for the potentials for development. This also includes possible interventions for enhancing new standards for sustainability. While densification is the general strategy for enhancing urban sustainability standards, this was not the only ideal measure to increase sustainability standards of Trehusbyen.

1. Introduction

The trend in many cities has been to grow by expanding toward the periphery. After the personal car was introduced in cities and everyday life, the infrastructure and layout have been adapted with larger homes and fewer people per unit area. The current state of the art in planning is largely concerned with making cities more sustainable and resilient. According to numerous academic studies, the rapid incorporation of rural into new urban uses is deemed detrimental to sustainability. The shift has turned towards densification, reusing, and rehabilitating existing buildings and urban areas. The hope is that by making cities more compact, and housing people and their activities tighter, it is possible to gain efficiency in the use of space, the maintenance and operation of buildings and infrastructure, and reduce the need for car-based transport. In this way, cities will demand less space, energy, and raw materials per head, decreasing their environmental impacts. This enhanced efficiency increases connectivity and economic opportunities. And well-designed compact urban environments also foster social interaction and opportunities for self-fulfilment.

Post-industrial cities, such as Stavanger, face the challenge of slow population growth or even stagnation. And despite a clear urban development agenda toward densification by redeveloping well-located vacant industrial areas, many new developments still occur in newly urbanized peripheral areas. This contradiction to the official planning strategy is costly for the municipal budget creating the need to extend and operate elongated infrastructure and services. It can be argued that the existing urban areas have not yet reached their potential considering densification. These areas have existing infrastructure in place and are often attractive, considering their closeness to the city core and other functions. Stavanger also has the largest continuous area of wooden houses in Europe, consisting of around 8000 buildings in the city's districts. It is known as "Trehusbyen" in the Norwegian language, translating to "the wooden city". This area is acknowledged as a cultural heritage area and has specific plans and regulations that steer its protection and further development.

Historically, city development and preservation of cultural heritage environments have been antagonistic because city development was made by replacing old buildings and historic neighbourhoods. New buildings and infrastructures, especially in the second half of the 1900s, were considered better than existing built environments. In consequence, entire old districts would be torn down to make room for new planning strategies relevant to the time, such as expanding infrastructure to a car-based transport and high-rise buildings. Today, however, many of these areas are considered of high value because of their aesthetic qualities and historical connotation and contribution to the city's identity and devel-

Figure 2: Picture of Stavanger Trehusbyen (Stavanger kommune, 2017)

opment. Therefore, areas with such qualities have been declared by local and national authorities as cultural heritage. However, many pressures on these historical buildings remain. Especially because conflicts with new trends of consumption of space and infrastructure, higher demands for energy efficiency, climate changes and more extreme weather (Riksantikvaren, 2021a).

Several measures are implemented by national, regional, and municipal governments to encourage sustainability in the planning and development of cities. They are strongly inspired by the goals for sustainability set by United Nations. Many are concerned with reducing climate gas emissions from the transport and building sector. While cities should be more sustainable and resilient, they also need to be good places for people to live, work and stay.

Densification has been one of the dominant urban planning strategies to implement the sustainability agenda. Accordingly, Stavanger's municipal plans aim at accommodating most of the new needs for space within the existing urbanised areas. Putting these ideas into practice has many barriers. One of them is the existence of a large cultural heritage environment that constitutes most of the city centre. There is an ongoing debate on what values must be preserved and what can be changed to adapt the area to the new social demands. On one side, some development in these areas can contribute to better care and use of buildings even though that means somewhat changing parts of the historical design. On the other, new developments can imply permanent damage to heritage values.

This thesis aims to explore possibilities to balance the preservation of the heritage value in Stavanger Trehusbyen while implementing densification principles to cope with sustainability goals.

1.1 Problem description

Stavanger has a protected urban heritage environment called trehusbyen, which forms much of the city's central area, especially the areas developed until the 1930s. This area houses a rich mix of institutional, commercial, and residential functions and numerous representative buildings of several architectural styles and epochs. Trehusbyen is perhaps the best-served area of the city in terms of accessibility to public transport and physical proximity to everyday facilities. Moreover, the area with its unique architectural and urban setting constitutes a fundamental part of Stavanger's identity and evolution through at least two centuries. Unlike most historic European cities, Trehusbyen has a moderate built density.

This thesis research assumption is that there is a potential for densification without damaging the values that have made the area a protected cultural heritage zone. In this context, it is fundamental to consider densification together with enhancing other sustainability standards. For example, upgrading energy efficiency in buildings, improving resilience against extreme climate events, encouraging soft mobility and a reduced car use through the redesign of streets and public spaces. Henceforth, the research question of this thesis is:

How can the heritage environment of Trehusbyen in Stavanger cope with new urban sustainability standards while protection the heritage values?

- What standards for urban sustainability are attainable in a cultural heritage environment?
- How can cultural heritage be conciliated with new standards for sustainable development?

1.2 Methodology

The complexity of the research question has made it necessary to divide it into two sub-questions. The figure methodology shows how each sub-question has two aims responding to the methods necessary for finding an approach to the research question.

Finding what standards for urban sustainability are attainable in a cultural heritage environment has two aims. By an integrative literature review it is possible to identify strategies and key concepts for existing urban areas. The literature review also involves studying reference cases and other projects to find concepts for how similar challenges has been faced in different contexts. With the opportunities found in literature and references, it is necessary to find the potentialities specifically in the wooden-house city. The potential for sustainability in urban heritage environments are related to reference cases of similar issues and the analysis of quantitative and qualitative aspects.

To answer how Trehusbyen can cope with new standards for urban sustainability while protecting the heritage values, it is necessary with a second sub-question to elaborate: how can cultural heritage be conciliated with new standards for sustainable development? A deeper understanding of what aspects of cultural heritage are to be considered in a development process is needed and can be found through both quantitative and qualitative aspects from the analysis. This is then related to how urban heritage environments are managed which is researched through planning documents and reference cases in the theoretical framework, with aspects from the qualitative analysis.

The aim of the methodology is to assess and synthesize the perspectives found from the theoretical framework and analysis to enable a specified framework adapted to this thesis' problem description and setting of Stavanger Trehusbyen.

Theoretical framework

The first method is defining the theoretical framework by an integrative review of different perspectives from relevant literature, documents, and cases. The theoretical framework will be combined of literature and perspectives on sustainability strategies and cultural heritage in urban settings.

- Theoretical framework
    - An integrative review of relevant literature
    - Planning documents
    - References to design approaches and planning practices

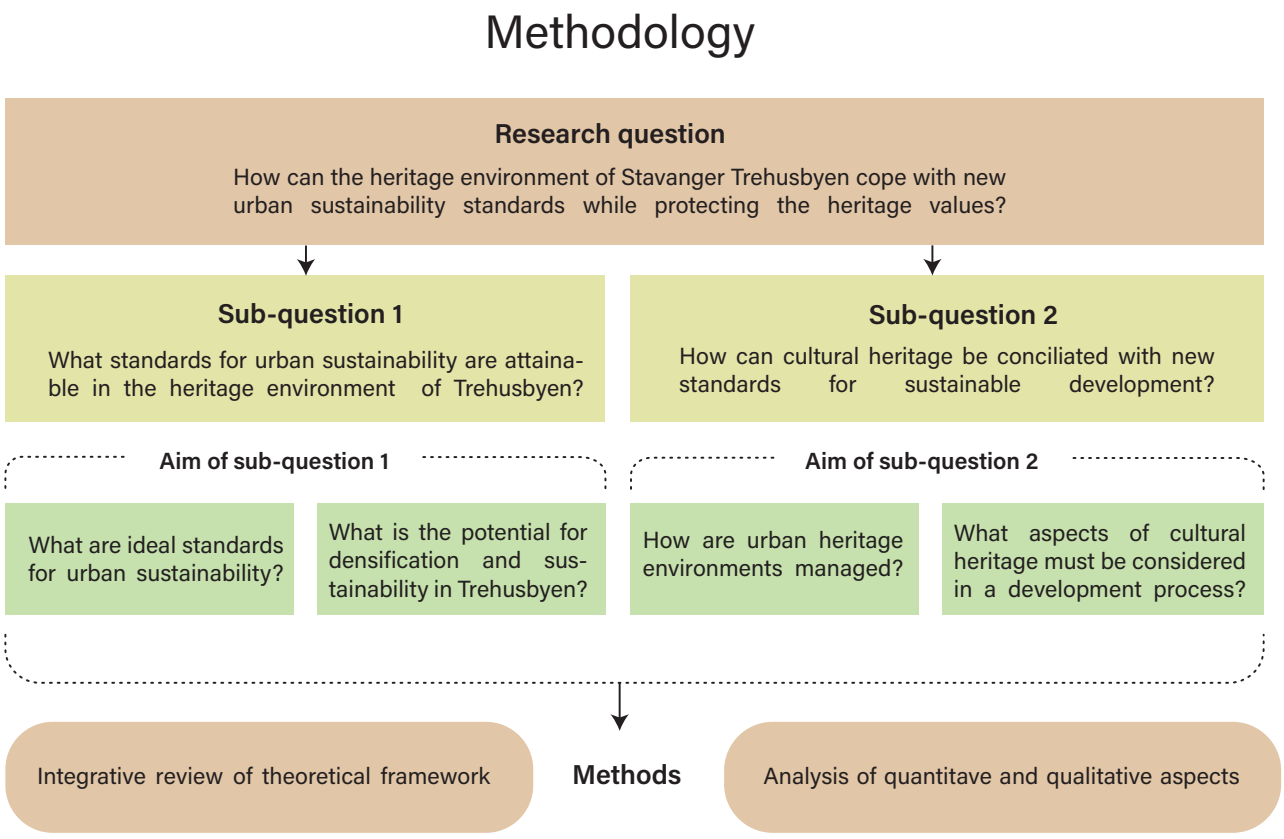


Figure 3: Methodology

The purpose of the literature review is to find relevant densification and planning strategies that can be applied in an existing urbanized area. It will ideally lead to the proper insight on how development processes should be carried out without damaging important qualities of an area, and how social needs can be accommodated with densification in an existing area. Reference projects can help identify similar projects' challenges and how they were solved, to find possible accommodations for this thesis. Studying existing theory on the subjects linked to urban sustainability strategies and development in protected heritage environments sets a baseline for how to proceed with the research question. There will also be a need for defining the relevant terms to ensure they are understood in this context and aligned with the intention of this thesis. Planning documents relevant to cultural heritage management is important for understanding the context of heritage management in Norway.

Analysis

The analysis consists of the following parts:

1. The existing situation in Stavanger Trehusbyen
    a. Spatial planning and heritage protection
    b. History and identity
    c. Spatial aspects
2. Qualitative aspects from experts on development in Trehusbyen
    a. Planning practices
    b. Densification potential in Trehusbyen

The purpose of the analysis is to get a better understanding of Stavanger Trehusbyen's history and importance in the city, which is the background to what has made this area a cultural heritage environment. The main challenges of the area considering development and improving sustainability will be identified. The analysis will also highlight the potential for sustainability and what standards for are attainable in Trehusbyen.

Qualitative aspects relevant to this problem will be taken from interviews of people in relevant positions to densification- and development projects of Trehusbyen. Interviewing people involved in the municipal planning processes and urban planners gives insight into how densification is faced today and how planning documents are affecting this work.

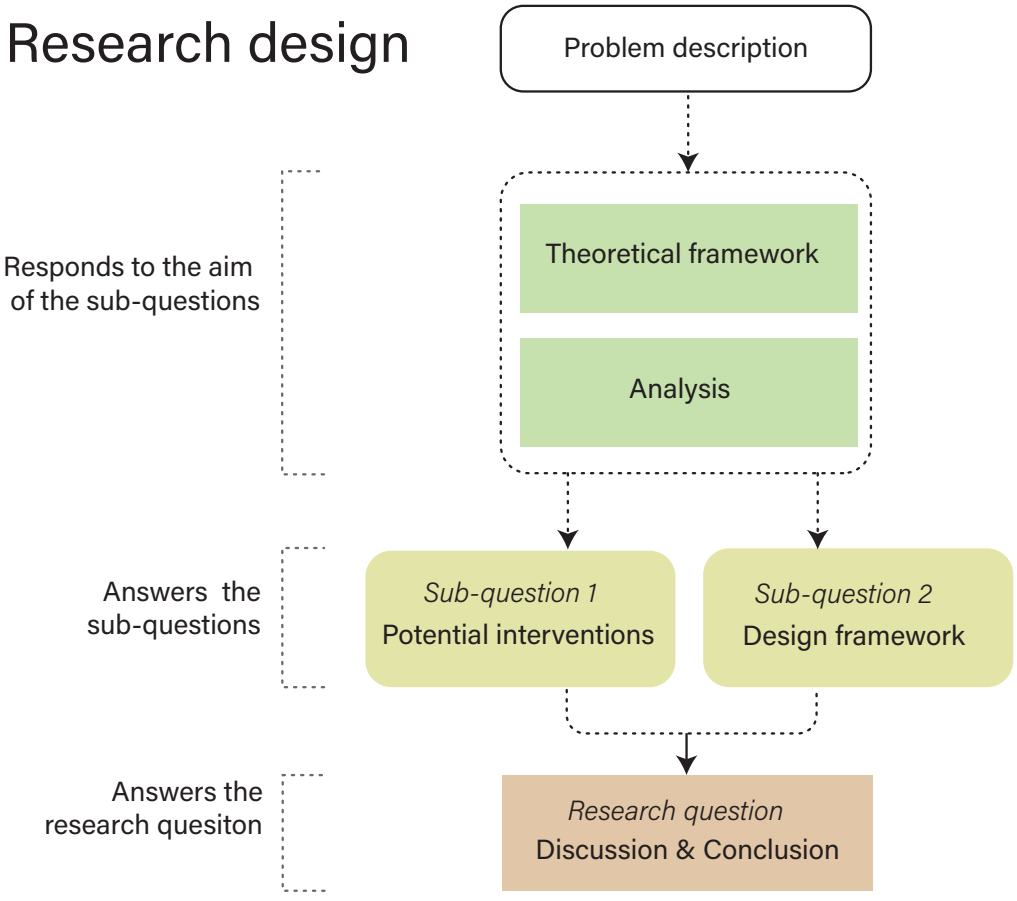


Figure 4: Research design

2. Theoretical framework

2.1 Definition of terms

Cultural heritage

A *cultural heritage element* is a trace of human activity in our physical environment, that can be connected to historical events, religion, or traditions. A *cultural heritage environment* is then areas of which cultural heritage elements are part of a greater whole or context. (Riksantikvaren, 2021a) Another important aspect of cultural heritage is the intangible part of it, such as the distinctive craftmanship and tradition behind what made the heritage elements in their respective time. This is often harder to upkeep in the modern day, as many traditions are passed down generations but not necessarily written in specifics or taught. Such traditions may then only exist in specific elements of cultural and historic heritage. This is part of what makes cultural heritage important to preserve, as it often speaks for several aspects distinctive to its time and place. The term *built heritage* is a general term to describe a built environment with cultural significance. (Sjöholm, 2016)

Urban densification

Urban densification is a *process* of concentrating activities, functions, and infrastructure within existing urban areas. The process of densification can be represented by different figures of density for a given state to measure the change and process over time. The aim of densification is not to increase the number of functions or buildings in an area just because it is physically possible. The aim is to utilize unfulfilled potential into new opportunities, such as housing, functions, green structure, and more. It should also be considered that densification processes should not lead to an area losing its existing qualities. Then again, this is often a result of development, and in the case where this is the result, this must be compensated in a reasonable way. This relates to both social values and physical qualities. Densification is a balance to be found in each context and place.

Urban density

Urban density is not the same as urban densification; urban density represents the state of a specific urban area in a particular moment in time. It is measurable and contains information about the number of people living in an urbanized area. *Built density* can represent the relation between the built area of a defined space and population, or the relation between the built area of a space and the amount that

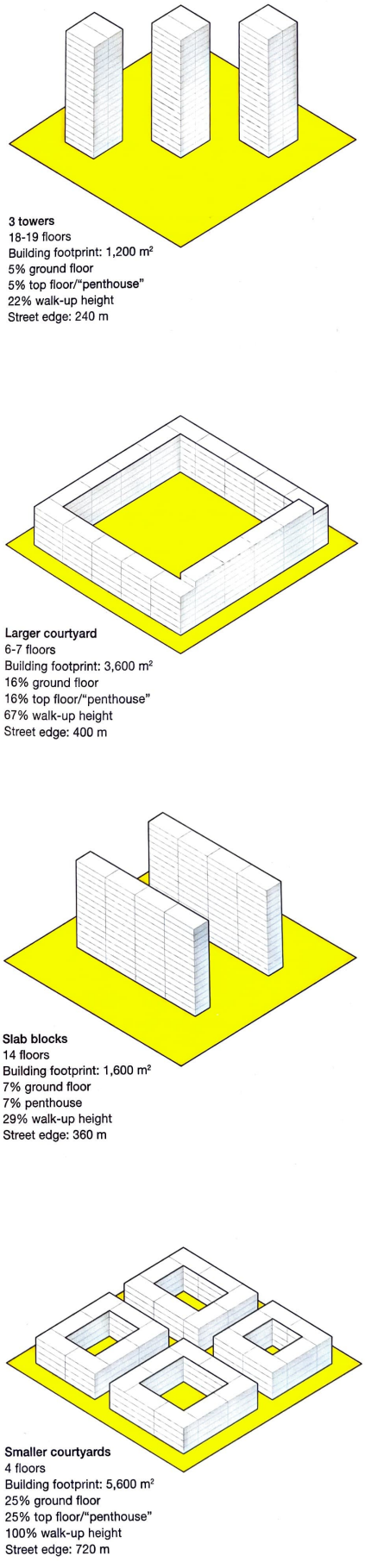


Figure 5: Different built form delivering the same density (Sim, 2019) p. 21

is unbuilt or used as other purposes. *Dwelling density* says something about the number of dwellings in an area per a given unit and does not consider the people living in the respected dwellings. A building's footprint, or *floor area ratio* (FAR), represents the relationship between the lot size and how much of it the building makes up. It does not give any information about the height or shape of the building.

The figures presented contain information that is difficult to interpret without the full context and should be represented along with other relevant findings in an area. Two cities can have the same urban density but a different dwelling density, or as illustrated in figure 5, an area can have the same density but have strong variations in shapes and volumes.

Urban sprawl

Sprawl can be defined as the expansion of an urban area into areas of countryside that surrounds it. In "The Limitless City: A Primer on the Urban Sprawl Debate" by Oliver Gilham urban sprawl is described with different characteristics, such as leapfrog or scattered development, and low density with few tall buildings separated by one another by large roadways and parking. These characteristics are what makes sprawl land-consuming and auto dependent. Another characteristic is the poor accessibility, because of low-density development combined with segregated land uses, lack of mixed-use development outside the city core, and the lack of public open space. (Gillham, 2002)

Soft mobility and urban accessibility

Congestion and high amounts of traffic is not only an unattractive setting for pedestrians but causes distress and feeling unsafe. By reducing speed and traffic, spaces can be more attractive to pedestrians. The optimal scenario is streets where all vehicles have restricted access. Soft mobility is using your own steam to get around, like walking or biking. Specific measures in pedestrian pathways can help stimulate soft mobility, like variations in surface material, scenery, furniture, and lighting. Casual places to sit and stay is beneficial for elderly or mobility restricted people, while encouraging social interactions that again acts as stimulating for pedestrians. (Hillnhütter, 2018)

The physical qualities of a great street are liveability, a minimum density, and integration of uses, buildings that define space, many rather than fewer buildings, and public streets. (Jacobs, 1993). Walkability refers to the smallest, but perhaps most important, movements that people make every day. Walkability is important for reducing car use, and in cities, streets are generally the paths possible to take when walking, therefore walkable streets are key. Urban accessibility can be seen as what links land use and transportation, and good accessibility leads to more mixed-use of the public space. Measuring accessibility has many approaches, but one is seeing it as the *ease of reaching destinations.* (Duranton & Guerra, 2016).

Human scale

David Sim defines human scale in his book "Soft City":

"Human scale in general terms means dimensions rooted in the human senses and behaviours, resulting in smaller built components and lower heights. It means designing with attention to the experience at eye level, including appealing to sensory stimuli, and using dimensions that relate to the human body." (Sim, 2019)

Cities that are built in human scale tend to be more attractive for walking, staying, and attracting more people.

10-minute-city

The 10-minute city is a concept where as many people as possible have access to their daily activities and necessary functions within a 10-minute walking distance from their home.

2.2 Literature

"Soft City", David Sim

In the early 1900s, city planning was influenced by modernism and functionalism, where the city's different functions, such as housing and commercial use, had to be separated. In the later part of the 1900s, this practice was being questioned, and planners began transitioning into focusing on the people that lived in the city, and how the different functions should rather be combined. The book "Soft City" is concerned with how urban density can contribute to good housing and good city environments for people. The book is constructed as a guide on designing a dense built environment with the human scale in focus. With rapid urbanization and resources being scarce, increasing density by making use of the space already occupied is ideal. The author specifies that higher density alone will not result in higher quality of life or solve any real issues besides being more space efficient, but that "true urban quality comes from accommodating density and diversity of building types and uses in the same place", (Sim, 2019) p. 17.

Blocks

The first chapter of Soft City by David Sim, "building blocks: living locally in an urbanizing world", presents different principles for the urban pattern. Enclosure between buildings give the space a clearer potential for purpose, as opposed to the buildings being placed randomly and the left-over spaces then lack important qualities like privacy and security. Enclosing space has 4 steps, according to Sim, illustrated in figure 6; 1) building to the outer edge of the property, 2) different buildings joined-up and juxtaposed, 3) enclosure creates controllable private outdoor space, and 4) repeated pattern of blocks defines public realm of streets and squares. Enclosure of blocks naturally creates the space between the blocks of streets and public spaces, defined by the edges of the buildings.

The blocks and city patterns Sim discuss have high density in human scale and are strongly adaptable to the changes in a city while also being efficient in terms of space, material use, energy consumption, and more. Sim argues that these qualities are what makes this urban pattern of blocks resilient. "The urban pattern of enclosed blocks with independent, joined-up, and layered buildings can accommodate density and a diversity of uses while maintaining the human scale." (Sim, 2019) p. 86. The combination of density and diversity increases proximity, as Sim describes in his first chapter, and proximity being "the likelihood or the possibility of useful things, places, and people being closer to you." (Sim, 2019) p. 12.

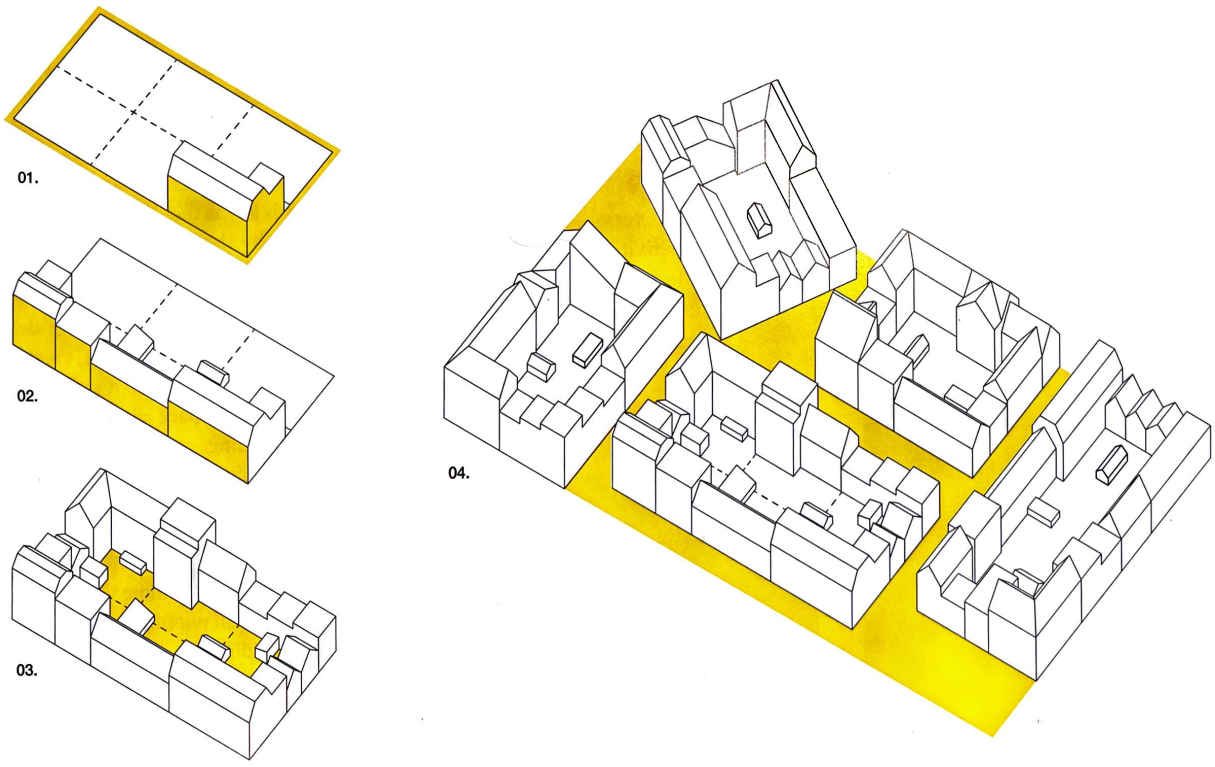


Figure 6: Enclosure (Sim, 2019) p. 12

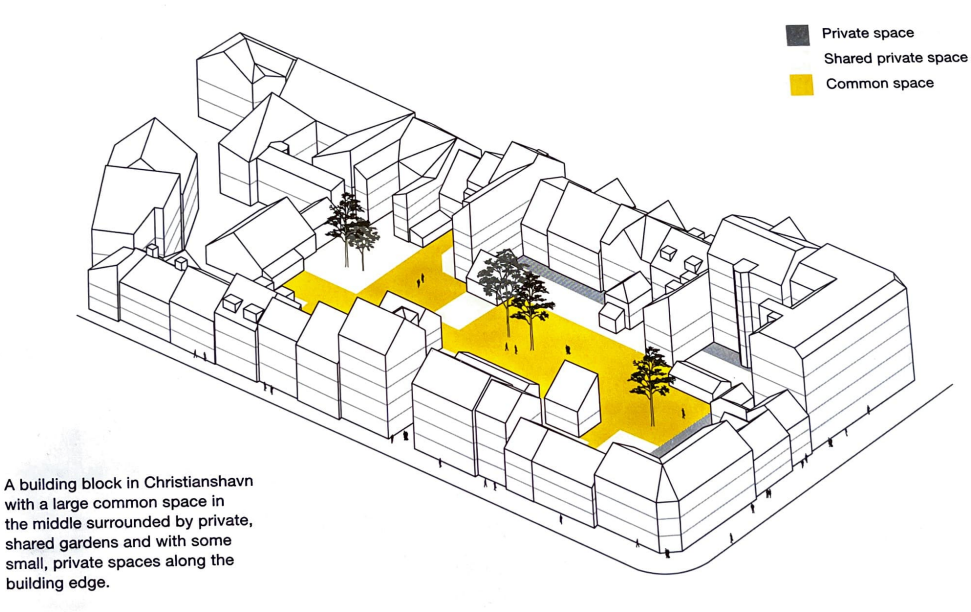


Figure 7: Outdoor spaces (Sim, 2019) p. 29

This important combination, or fusion as the author refers to it, of density and diversity is what makes everyday life easier for people living in the city.

Proximity

In our everyday lives, most have an idea of the value of time. Proximity is here a key concept, where your everyday functions and needs are close to you and your home, as it plays a large role in the spent traveling each day. With the separation of these everyday function having long been a main strategy in planning, using personal cars for travel have not only become common, but necessary. Proximity can be seen as ideal, as it is not realistic to have all our everyday needs in walking distance of each other, which is when Sim describes the importance of making the necessary travels happen along pleasant and more enjoyable paths. The "in-between times" and "in-between places" might turn commuting into quality time with the family, or a nice walk through the park.

The sprawled city with its separated functions not only creates a large transportation need, but it also separates society and builds social challenges because the different groups of people have so few places to meet naturally. In the second chapter of "getting about and getting on in a congested and segregated world", the author describes: "Urban mobility is also about social mobility. The business of getting about connects you not just where you are going, but also to the places you pass and the people you meet on the way." (Sim, 2019) p. 95.

Climate and microclimate

"Living with the weather in a time of climate change" is the title of the third chapter in Soft City. Sim states the importance of being able to spend time outside for health reasons and mental well-being, and that everyone needs access to outdoor spaces. The value of being outdoors is that it seems to give us a better understanding of the nature, weather, and climate around us, and possibly giving good reasons to take care of it. Accommodating cities for spending time outside and uphold everyday activities regardless the weather and season can be beneficial both for the citizens and the environment. Bringing the outside inside also give positive effects for our health and the indoor climate. Windows that bring in light and possibilities for natural ventilation has become a requirement in homes for a reason.

Sim concludes with 9 criteria for *livable urban density*. **Diversity of built form** is about different activities coexisting with each other, and this calls for different buildings, dimensions, typologies, and thinking new when it comes to ownership and division of plots.

Diversity of outdoor spaces is crucial for people to enjoy the outdoors, and they need to be easy to access and have different purposes. To accommodate this ideal, there need to be a variation in both private and public spaces, and something in between, with connections to each other and other functions so they may be useful for mobility.

Flexibility as a possibility in the urban pattern, the built form, outdoor spaces, and infrastructure is what makes a place resilient and therefore capable of responding to change over time. Spaces that can have many purposes and great proportions of built volume on the ground floor make it easier to continuously develop a place.

Human scale helps us recognize people and their needs in urban spaces, and smaller dimensions, spaces, and building heights where one can experience the surroundings with several senses are important topics.

Walkability is about the everyday small movements and is about access between ones lives and close surroundings, like the neighborhood. This access should be quick and easy, but also convenient while encouraging participation. Buildings that can be walked into, walked through, or walked up can accommodate walkability. Ground floors and visual connection between inside and outside are also convenient.

A sense of control and identity comes from distinguishable places that can be told apart, remembered, or linked to its location. The control is about citizens being able to help influence a place, even in small scales. Identifiable elements of the city help the visitor feel in control, and it is related to how we read the place and therefore also navigate in it.

A pleasant microclimate can facilitate more time spent outdoors, and activities like bicycling or walking to destinations can be more attractive. In public spaces, it is beneficial to have a somewhat consistent microclimate, and both protection from the weather and ways to enjoy the weather is important.

The built form should strive for a **smaller carbon footprint**, and the layout, size, and shape of a building all play into its' energy use, pollution and use of natural resources. Having fewer exposed facades, smaller dimensions to allow light and natural ventilation, simpler constructions, and a layout that promotes active mobility help reducing the strain on the environment.

Facilitating our urban spaces for **greater biodiversity** is beneficial for all and can be accommodated through multiplicity of smaller green spaces, protected spaces and edges, smaller dimensions of buildings allowing green walls and roofs to thrive, water management in smaller scales and in many places, and soft landscaping where possible. (Sim, 2019)

Sim present ideal principles for accommodating densification in existing urban environments with respect to the people living in it with the intent of creating sustainable and livable urban areas. The connection between these concepts is important for understanding not only what to prioritize in densification processes, but also who. The people and their habits are the key to reducing cities' carbon footprint.

Figure 8: 9 criteria for livable urban density, (Sim, 2019) p. 213

"Heritagisation, Re-Heritagisation and De-Heritagisation of Built Environments", Jennie Sjöholm

Jennie Sjöholm's doctoral thesis presents research aimed to contribute to the understanding of heritagization in built environments and how heritagization interacts with structural changes to an environment. The framework of the research was based on heritagization defined as the process through which objects, places and practices are turned into cultural heritage. The Swedish town of Kiruna was the object of a case study because of its heritage environment and urban transformation.

Kiruna is a mining town, with the company LKAB's iron-ore mining being its largest economic resource. The mining company started a settlement together with the industry in 1900, and the town was further developed together with the ups and downs of the mining industry's fluctuations. The town expanded as well as the industry, and it was in the early 2000's discovered that the town was located on iron deposits necessary for the future industry. In 2004, it was therefore decided that to sustain the mining industry, the town of Kiruna would have to be relocated. There are several buildings in Kiruna that has been recognized as official heritage. Many houses from the original settlement were still preserved, as well as a town hall and church. It was decided between the city council and the mining company LKAB that the buildings of heritage value should be moved to the new town centre. Thus started the process of figuring out what buildings should be relocated, to where, how it should be done, and what to do with the buildings that were not moved. (Sjöholm, 2016)

Sjöholm research how the built heritage was managed during the urban planning process, in a period between 2004 and 2015, and how the built heritage was conceptualized over this time within urban planning practises. The author investigates the stakeholders' role in the process, in this case the local authorities of Kiruna, the mining company LKAB, and residents. Her findings from researching conservation approaches were that even though the heritage environment was acknowledged as important and recognized with many qualities by the different stakeholders involved, the values that should be preserved and how varied not only over time, but also between the stakeholders. Heritage values had been addressed in reports and municipal plans, but only in vague terms, leading to varied perceptions and prioritizations. There was also a lack of impact assessments for how different urban redevelopment strategies would affect the heritage environment. In a strategic document and analysis by the local authority, assessments of the cultural heritage value were made, but these did not lead to concrete demands or suggestions for how to manage the town's historic buildings.

Figure 9: Workers housing, Kiruna, Sweden (Sjöholm, 2016), p. 44

Sjöholm found through the case study of Kiruna that the cultural heritage had been through stages of heritagization, re-heritagization, and de-heritagization, all in some way. The heritagization of Kiruna's cultural heritage happened when it was officially recognized in the 1980's, and then the re-heritagization process occurred in the start of the urban transformation process as the cultural heritage once again was recognized as important and of significant heritage value, while also some new buildings were recognized as important. There were then traces of de-heritagization as parts of the buildings of the cultural heritage was relocated and lost some of their cultural significance as they were no longer in the original site. There were also buildings that were removed in the process. (Sjöholm, 2016)

The author studied the conceptualization of heritagization, and how these may change and vary over time in an urban transformation process. Shifting ideals and perceptions had an impact on the result. Missing specifications of how heritage was defined, and varying perceptions of what values were important also contributed to the same discussions and debates occurring several times.

"Playing with density", Anita Grams

Switzerland has one of their main strategies in urban development to practice inward development before outward development, with the intentions to reduce the non-sustainable land usage. The central purpose of inward development is to increase the number of residential units, workplaces, and infrastructure in the already largely built-up area, while maintaining or increasing the quality of the existing living environment. "Playing with density" is a PhD dissertation by Anita Grams, who is exploring the concept and strategy of inward development in Switzerland. (Grams, 2018)

The author describes how densification must include the aspect of quality and sense of proportion and finding solutions specific to the location. As planners, we may use predictions and forecasting as a way of understanding how the daily life in cities will look like in the future to plan for it sooner rather than later. There is a clear consensus among planners that the current rate of constantly obtaining more land for new development is highly destructive in the environmental perspective. In a response to this, Grams' intentions are to clarify the inward development strategy and communicate this to planners and decision makers in a way that it can be practiced as a densification strategy. To communicate this, Grams also discuss the common arguments and perceptions on densification, and how to overcome these. The author speaks of creating new thinking patterns for inwards development, and how both the public and many decision-makers and planners lack these, and the proper tools needed. Inward development requires specialists and a deeper knowledge of the issue, and in combination of more costly projects and time-consuming bureaucratic processes, it is unattractive for landowners.

Many are experiencing the consequences of the surface-intensive development, such as mobility issues caused by the transportation upgrading cannot keep up with the sprawl, but they may not consider this to be a direct consequence of the constant land consumption. This is also leading to less recreational space and farmlands for food production. The people want new developments outside the city with more spacious units to move to when they have families, as living in high building densities is not a preferred option and are for many considered temporarily. Inward development is considered more costly, conflictual, and protracted, and is often met with several other challenges like regulatory and political, than outward development.

Figure 10 shows the authors' representation of inward and outward development.

In her research, Grams describes that inward development in the main areas of Switzerland is possible, but the attention must be focused on small- and medium sized communes, and informal procedures should be invested in. Clarification at an early stage is necessary for successful inward development and turn the parties towards acceptance. Making landowners aware of the potential and available space on their sites and giving a timeline for transformation is beneficial, while also exploring their concerns and negativities.

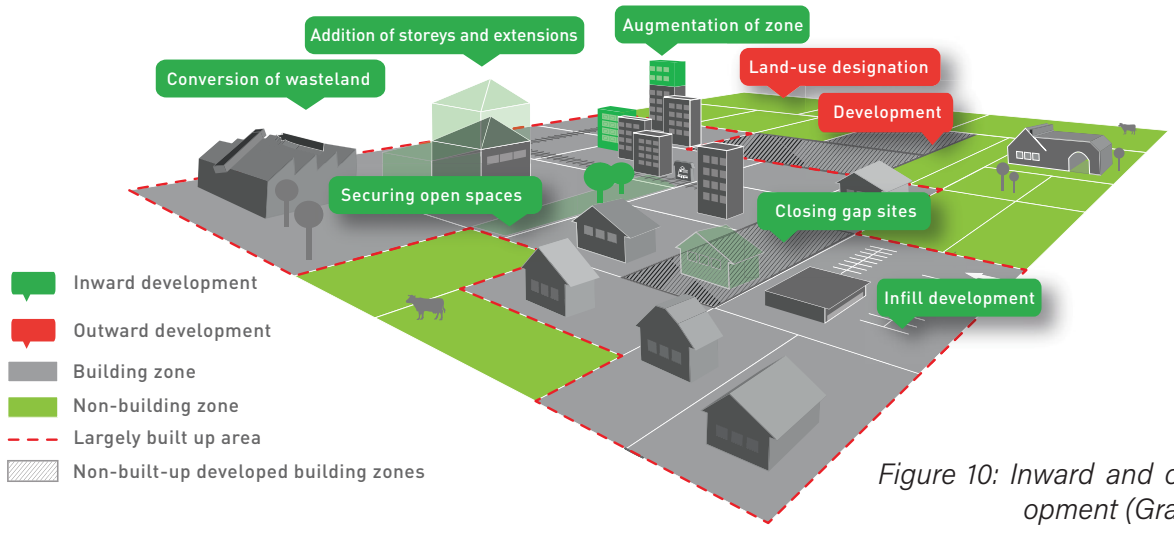


Figure 10: Inward and outward development (Grams, 2018) p. 13

The discussion of density must also become a discussion of typologies. It is not a question of what building density is most favorable, but what typologies are compatible and acceptable. Then the planning instruments must be adapted to the answer to this question. Inward development is the concept of little in many places rather than too much in few places. "Density is the result of a bottom-up clarification process, based on specific local circumstances and is initiated jointly by communes and landowners." (Grams, 2018) p. 134.

"Rotterdam – People make the inner city"

The paper "Rotterdam – People make the inner city" is centered around the direction of future development in Rotterdam and the inner city, and how it can make the city more sustainable in the process of densification. The city of Rotterdam and cooperative organisations funded an exploration of inner-city design that are based on existing strategies and projects implemented in the city. The hypothesis is that with sufficient densification in pleasant, green surroundings, the quality of life in the inner city will improve. The paper presents 7 densification strategies with the motto "densification + greenification = sustainable city". The goal, however, is not to add as many dwellings as possible, but rather improve existing houses and increase the number of what is considered attractive houses. This will contribute to the overall quality of the inner city and will give great improvements to the city's liveability and microclimate. The concept of smart density is introduced as adding dwellings in the right place to ensure a mix of functions, or it can be to repair or strengthen a part of the city's identity. Ensuring that the densification process does not happen on behalf of the quality of the space it is taking is the essence. (Tillie et al., 2012)

The principles of the densification strategy are presented in figure 11. *Ground-based dwellings* explains how access from the houses to streets makes it attractive for the liveability in the neighborhood, while ground-access to garden spaces make it particularly attractive for families. Identifying potential areas in the city that can be repurposed is necessary, and some of these areas are located by the water, which makes the next principle *water dwellings*. These areas benefit from less traffic in their surroundings and have many possibilities for types of dwellings and new living qualities. Famous of the Rotterdam skyline is *high-rise buildings*, and this is a potential where regulations allow it, and the ground conditions are sufficient. These belong only in the most urban areas, typical high-rise zones, and have a great view of city. *Transformation* is about identifying vacancies or other buildings with a potential for upgrades and repurposing. Many are found in former commercial and business areas that have relocated and rezoning as housing makes them less sensitive to economic conditions as well as giving new opportunities when mixing functions. *Skyborn* dwellings is a form of "topping-up" existing

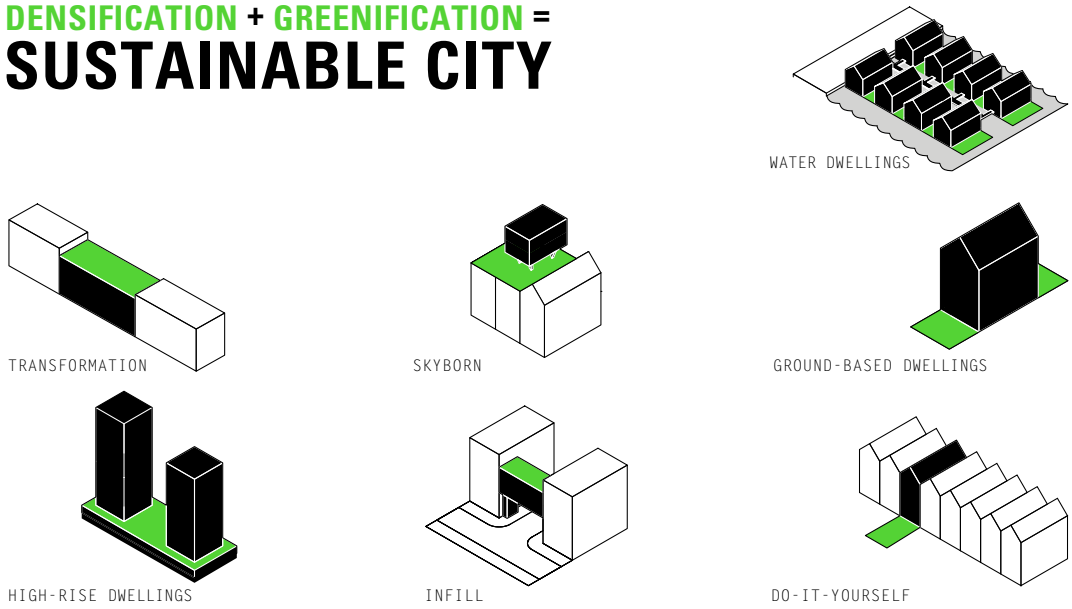


Figure 11: Densification strategy (Tillie et al., 2012) p. 16

buildings with another unit on the floor and gives opportunities like roof villages with a communal character, individual penthouses, or building-block-on-block. *Infill* housing can settle gaps in between buildings or on undeveloped plots, complementing the area in a natural way. There are many ways to adapt these infills to the surroundings, like making it above ground and opening the space underneath for passage. Or, for example, making it shorter than the neighboring building and taking advantage of the roof as addition outdoor space. This is in small scales, and considered block-by-block, and access, daylight, and privacy must be solved. The last principle is *do it yourself* and appeals to the older parts of the buildings in the city that have historic values but are of poorer conditions. Many of these buildings are priced more attractively for younger- or first-time buyers and gives opportunities for people to enter the housing market. This principle does not necessarily relate to densification in terms of square meters, but the adaptation of the buildings to house more inhabitants. These principles were the *densification* of the equation of "densification + greenification = sustainable city". The *greenification* part of the equation is shown below. (Tillie et al., 2012)

Trees and greenery are important for biodiversity and planting on roadsides and along tram tracks make these places much more attractive and improve the microclimate. The greenery also captures fine particles, absorbs CO2, tempers heat in summertime, and restricts wind. *Boulevards* that have green qualities and are seen as beautiful form a green network that can connect squares, parks, and green areas of different parts in and outside the city. The strategy is to define such axes of throughfares and plant more greenery, to make them more attractive for walking and bicycling, and inviting to stay. *Quays* along the old harbor of the rivers used to flourish with industry and shipping, but many are no longer in use. This strategy aims at transforming these quays into attractive, connected, and green recreational areas, to use the rivers as an urban recreational landscape. *Squares* are "the living rooms of the city" (Tillie et al., 2012), p. 54, and identifying larger and smaller squares of the city that have a potential of becoming features in the city and giving them identifiable characters by linking them to a specific function, like a restaurant or café, a church, or a museum. Green elements play an important role in providing the spaces a comfortable and pleasant atmosphere. *Parks* are to be accessible for everyone and be within a walking distance, and they are crucial for city life and recreational purposes. Parks are also a great way of increasing green in parts of the city, and places where there are no room for establishing grand park areas, many smaller and good spaces are important. Children are the future of the city, and *playgrounds* are a part of child friendly outdoor spaces essential for attractive and complete living qualities in a city. Planning for child-friendliness in cities is not about making some playgrounds with a few activities around, it is also broader sidewalks and slow traffic accommodating safe play and stay. It is important to consider all groups, not only the smallest children. *Green roofs and facades* provide extra ecological qualities and provide green scenery seen from streets and above. They have a positive

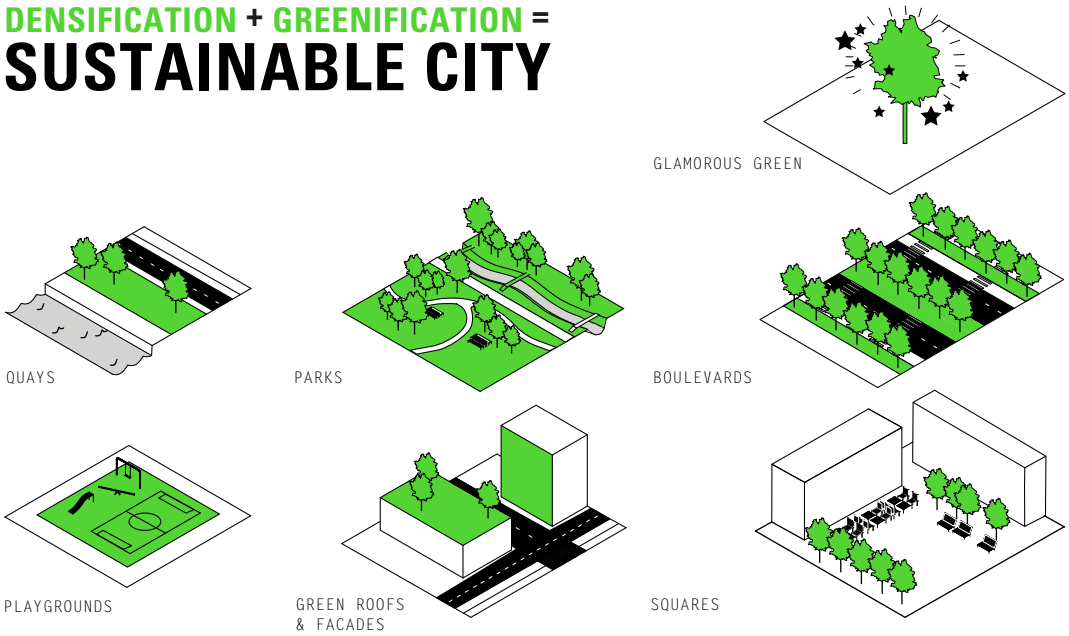


Figure 12: Greenification strategy (Tillie et al., 2012) p. 44

effect on the denser inner-city climate and functions for handling water and can facilitate urban agriculture. The last principle, *glamorous green,* is about creating outdoor spaces of excellent quality, needed for the most busy and characteristic spaces, to attract the people. Having a grand attraction creates identity and a sense of belonging. (Tillie et al., 2012)

The paper presents senseful principles for densification in existing urban areas, with focus on sustainability by including green principles that complement the built environment. It also specifies the purpose of densification not only to increase the number of dwellings or people but increase the quality and variety of dwellings for people to live in, with ensuring existing qualities are kept and adding new ones where needed. These are important aspects to consider in any densification process.

2.3 Planning documents

To understand how urban heritage environments are managed, it is necessary to analyze the planning documents directing the path for future development and protection. The planning documents by the Norwegian government lay the base for municipal plans and regulations which plays the largest role in managing the development in Trehusbyen. The county- and municipal planning documents are investigated in the analysis, while this section is directed towards the planning documents from the government. There was a political shift in the Norwegian government in 2021. The planning documents studied in this thesis is therefore mainly affected by the previous governments visions and strategies for city planning and heritage management. The sitting government has per now made a planning document of their main political areas and priorities. It was presented as a report called Hurdalsplattformen. As this document does not contain any specific political agenda toward future heritage management, it is unclear how or if the subject will be prioritized. (Regjeringen AP og SP, 2021)

The common denominator in planning and strategic documents is that sustainable city development reduces the carbon footprint by reducing the transport need, urban sprawl, and energy consumption. There are many levels in the hierarchy that is Norwegian spatial planning, and in some way, they all affect city development. The Norwegian government's strategies concerning the global issues of our time are influenced by and based on the United Nations' 17 goals for sustainable development. In the subject of city planning, goal 11 points to making cities inclusive, safe, resilient, and sustainable. Rapid urbanization leads to numerous challenges for cities' resources, sewage and infrastructure needs, the living environment, and the public's health. Half of humanity live in cities today, and one aim is to enhance inclusive and sustainable urbanization. Goal 12 is about ensuring sustainable consumption and production and is centered around the massive use of resources. The aim is to increase resource efficiency by doing more and better with less. Households consume 29% of global energy and contribute to 21% of CO^2 emissions. Measures that can contribute to reducing the energy consumption in households are crucial. (UN, n.d.)

The government sets the course of what political topics should be prioritized and why, then the departments create more detailed planning documents on the respective topic, and a strategy toward reaching the goals on a general basis. These then affect the counties and municipalities' own planning documents and how they implement the superior strategies to their given context. The conclusion in the superior planning documents is that cultural heritage is best preserved through use and activity. New development within urban heritage environments should adapt to the existing environment, both in design and scale. One of the main challenges presented for cultural heritage environments is the pressure from development, and possibilities for densification is not discouraged, but presented as an opportunity that can be pursued in line with ideals of conservation. To meet climate goals and reduce emissions, the importance of reusing and renovating our existing building mass is continuously mentioned. However, combining cultural heritage preservation and reducing emissions is challenging.

New goals for Norway's cultural environment policy

Stortingsmelding 16 2019-2020 is a white paper from the previous sitting Norwegian government. The report presents three national goals for cultural environment politics concerned around involvement, sustainability, and diversity. A national goal is that cultural heritage environments should contribute to sustainable development through planning.

It speaks of a shift in cultural heritage environment management. Previously the attention and purpose has been protection of the individual cultural heritage elements. Now the focus is on the people and the cultural heritage's meaning for society in the long term. Facilitating recycling and restoration of the cultural heritage elements and environments is beneficial for climate, consumption of resources, and the economy. Recycling of the existing building

mass is an important contribution to reducing climate gas emissions. (Ministry of Climate and Environment, 2020)

Message to the Storting 16 and the new goals for cultural environments are also related to the climate plan for 2021-2030 from Message to the Storting 13. The climate plan's aim is to reduce climate gas emissions, and what measures will be necessary to reach the climate goals. The plan includes recommendations for reuse and renovation of the existing building mass, with climate friendly materials such as wood. It promotes densification where possible in existing urban areas before new areas are prioritized if there is potential. An expectation for densification in existing areas is that architecture, public spaces, heritage environments, green structure, and other environmental values are considered. (Ministry of Climate and Environment, 2021)

The Directorate for Cultural Heritage

The directorate for cultural heritage is the government's authority in management of cultural heritage, cultural environments, and cultural landscape of historic importance. It is also a part of the environmental management in Norway as the advisor to the ministry of climate and environment. The directorate has an overall planning strategy for city development considering cultural heritage, as well as a climate strategy with in-depth goals and measures regarding climate issues and challenges for cultural heritage management.

Climate Strategy

The directorate has made a climate strategy for cultural heritage and environments from 2021-2025 with two main areas:

1. The cultural heritage field's contribution to reducing climate gas emissions
2. The cultural heritage field's handling of unwanted consequences from climate changes

The strategy's goal for reducing emissions is to preserve and reuse existing buildings and improve energy efficiency. Strategic investments are directed towards increasing knowledge on restoring buildings of heritage value, and specific measures to increase energy efficiency. Existing knowledge must be communicated to both public and private actors, as well as the society in general. Examples of climate or energy efficiency measures from different building categories that can be applied to heritage buildings are needed. To further facilitate increased restoration of buildings and building parts there is a need to simplify and adapt the existing rules and regulations, since these are largely based on new buildings. Continuous development of measures and incentives can contribute to the use and reuse of buildings and building parts. A special competence for improving energy efficiency is needed to preserve heritage values and not cause damage to buildings. Describing realistic goals for energy performance takes knowledge of the condition and specific potential of different buildings.

When dealing with unwanted consequences from climate change, the goal is to prevent and reduce potential damage, and build competence in the field. This area also requires increased knowledge and competence on adaptation of heritage environments to handle new climate challenges. Risk reducing measures are the most efficient to meet the increased risk of climate related loss of cultural heritage values. This subject has gotten increased focus lately, but there is still a need to further develop the managing process. To best communicate the problems and possible solutions, information and guidance must be easily accessible.

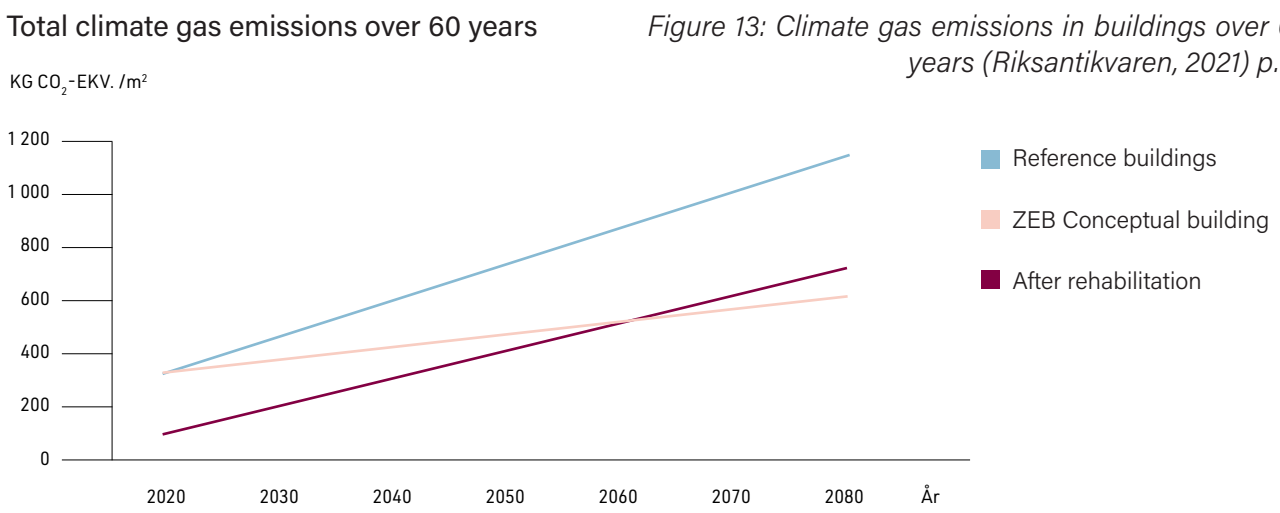


Figure 13: Climate gas emissions in buildings over 60 years (Riksantikvaren, 2021) p. 17

SINTEF was engaged to carry out a report on several case studies and investigating life cycle analyses from Norway and internationally. The report concludes that the most environmentally friendly building is the one already built. The study points out how rehabilitating is a better option than demolishing in a 30-year horizon towards 2050. It can take up to 80 years before a new building equalizes the climate gas emissions from the building process. Therefore, the conclusion is that rehabilitating existing buildings will be environmentally beneficial in short and medium-long terms. (Riksantikvaren, 2021b)

In broad terms, the climate strategy is describing the current state of cultural heritage management and climate challenges as a field that needs more detailed knowledge and specific measures to meet these goals. Case studies are the main source of this detailed information and creating a database of potentials for different buildings takes time. Developing climate mitigating and energy efficiency measures that are adapted to heritage environments is complex and requires cooperation of several professional and academic fields.

City strategy

The directorate for cultural heritage's overall planning strategy for cultural heritage management in cities is centered around the heritage environment's contribution to creating places people want to live, visit, and work. Preserving cultural heritage have a clearer place in today's city planning and development but are still facing challenges. The conflict between heritage environments and demand for new buildings and spaces close to the city centre is a challenging balance to find. The city strategy points to seven main challenges of cultural heritage in urban areas. (Riksantikvaren, 2021a)

City growth, climate, and the environment

A clear signal from the UN and Norwegian government is to prioritize new development in existing urban areas, to increase transport efficiency and reducing distance between different functions while simultaneously reducing consumption of space that is important for other purposes. At the same time, we are facing new climate challenges and more extreme weather that are threatening cities and cultural heritage. Compact city development can be efficient for reducing transportation need but can also pressure into consumption of cultural heritage space. If the compact city is to become sustainable, a perquisite is that the city remains attractive with good living conditions.

New buildings versus restoring and reuse existing buildings

The Norwegian planning and building act have been prone to facilitate new buildings and criteria for these, also because these were considered better investments. The issue with renovating older buildings has also been related to the lack of historic knowledge of craftmanship to properly restore older buildings. The shift in heritage- and city development strategies are to further promote renovating the existing building mass as an active measure to reduce climate gas emissions, but there is a clear need for more knowledge and specific measures on how to adapt older buildings of heritage value to be more energy efficient. It is essential that the municipalities have clear planning strategies for how development should be conducted within their cultural heritage areas.

City planning and development

The current state of the art in planning is that new housing projects mainly are initiated by private real estate developers, and the municipality is the planning authority that guides and set the demands for the process. To fulfill this job, the municipalities are dependent on superior planning documents such as a municipal plan, regional plans, or governmental strategies. These are legally binding and can give the needed authority to set demands for new development projects. A condition for these plans is then that they provide the necessary criteria for steering development in the desired direction, and that planning documents of different ranks are directed toward the same ideal.

Stagnating city growth, relocations, and empty premises

Sprawl have also shown to be a threat to urban heritage environments. As many are in city centres where typically shopping and businesses have been relocated to larger suburban areas and have become car dependent, new housing development projects also tend to follow to the outer parts of the city. With fewer services and weakened workplaces in the city centre, and new housing alternatives that are more modern, cheaper, and spacious, it threatens the attractiveness and liveability of the city.

Transport and mobility

Cultural heritage is often connected to other historical elements or objects, such as old infrastructure that may to this day hold a central purpose for transport and mobility. With the increased use of

personal cars, the infrastructure has consumed more and more space. To try and reverse and reduce the car use, a trend is to redesign streets to accommodate pedestrians and cyclists, as well as increasing public transport alternatives. The challenge is to plan infrastructure without compromising the cultural heritage.

The city landscape, skyscrapers, and the urban form

Skyscrapers are not native to the historic city landscape in Norway and is something that has become more usual in modern architecture as a form of contrast and signal building. In the historical hierarchy of the city, higher buildings represented public and important functions. Challenging the historical city landscape by skyscrapers and other massive buildings can threaten the identity and affect qualities like sightlines and character negatively.

The architecture, character, and identity of the city

New buildings in heritage environments have typically not continued the character, style, or volume of its surroundings. Mass-production of non-adapted buildings within heritage environments results in little variation and diversity of the built form and a weakened position and importance for the heritage environment. This again affects the experience and perception of local heritage environments, weakening the city's attractiveness and liveability.

Vision and goals

Cultural heritage environments make cities with a distinctive character and identity. The aims of the city strategy are to are distinguished by 8 goals connected to 8 recommendations to meet the presented challenges cultural heritage is facing. The vision of cultural heritage in cities to be managed in a long-term perspective and be used as a resource and common good in sustainable city planning.

1. Cultural heritage environments are used as a resource in sustainable city and societal planning
2. The value and importance of cultural heritage sets the base for protection and the potentials for development
3. The cities' diversity and historical distinctiveness are preserved and continued in new developments
4. Historical city landscapes are preserved in new plans and developments
5. Heritage management in cities and smaller towns are known to be knowledge-based and long-term planning with satisfying participation processes
6. Heritage environments are the base for developing livable and attractive cities and places
7. Managing heritage environments in cities and small towns contribute to reducing climate gas emissions
8. Heritage environments and elements are protected

The 8 strategic goals each come with some recommendations on how to achieve these. For example, when considering new buildings, changing existing buildings, and what should be preserved, an individual assessment of the specific potential within the heritage environment should be made. This potential should be detailed and describe what is worthy of preservation and what must be done to maintain its value in the future. This way, densification and development can be conducted with respect and consideration for the cultural heritage. The chosen method for preservation and development should be seen in the light of long-term benefits for society. In homogenous and continuous heritage environments new additions and development should be arranged by the existing built environment and continue the historic character and identity. Long-term regional and municipal plans with clear signals for how future development and management is to be conducted are important, and plans should clarify the potential for development and densification. The climatic advantages of densification must be weighed against possible impacts for the cultural heritage and the impacts for cities' attractiveness and liveability. The need for sufficient planning documents that ensure this balance is therefore essential. (Riksantikvaren, 2021a)

The directorate for cultural heritage's city strategy gives general recommendations for how cultural heritage should be managed and what is important to consider in future development processes to ensure the heritage values are best preserved. It has increased focus on why it is important to reuse and restore the existing building mass, and that adapting new buildings to the existing character of an area. There is a balance that must be found in densification and development processes within heritage environments, and finding this balance is challenging.

2.4 Reference projects

Oslo municipal plan for smaller houses

Oslo municipality is recently in a process of updating their municipal zoning plan for small-house areas in the outer perimeter of the city and has proposed a new set of regulations that are available for the public to give comments. In awaiting final decisions of this plan, a temporarily restriction of no new building or development acts. (Skarra, 2022). The plan includes about 28 000 properties, and the intention is to maintain and strengthen the small-house areas' qualities of green structure, esthetics, and cultural heritage. The plan is only including areas of residential zoning and extends to several different residential areas in Oslo municipality as seen in the map above. Only businesses that are deemed necessary or servicing the area are allowed in these areas, that excludes the already regulated or established local centers that are not covered by the small-house plan. The typology, volumes, and street layout of the areas included in the small-house plan are similar to Stavanger Trehusbyen. The small houses of Oslo have perhaps a more diverse building history and are foremost of more recent time periods. The extent is also much larger and not as coherent as Trehusbyen. Although these areas are in the perimeter of Oslo's city center, it is a much larger city both in area and population. Instead of all these small-house areas to be connected to the city's center like in Stavanger, they have their own local centers.

The plan states that only single-, double-, and triple-housing are allowed, and for single house-residences one secondary apartment can be allowed. There are also regulations for lot sizes to be a minimum of 600 m^2, and buildings must have 8 meters between them. The maximum footprint of the building is reduced from 24% to 16%, some areas 12%. Surface parking are also to be included in the built area percentage. Minimum 60% of the lot must be green structure, and the property must also satisfy the municipality's demands for blue-green factor. Large trees are to be preserved, and not cut. For single home residencies there must be a minimum of 200 m^2 outdoor recreational area, 150 m^2 for double- and triple home residencies, and additional 50 m^2 for secondary apartments. (Oslo kommune, 2022)

As the plan affects many residents and buildings in Oslo, it has naturally received a lot attention in the news and on social media. While many agree that it is necessary to set limitations for development to ensure the character and identity of the areas and the many qualities it holds, the plan has also received criticism for being too rigid and not allowing the area to develop further. A main concern is that the plan could only contribute to further gentrification of these areas where only the wealthiest can afford to live in such spacious homes. The current plan has given opportunities to section houses and plots that has been favorable to sell, and it has been possible to build extensions to the house for example when the family grows. The new plan is drastically reducing these possibilities. Those who agree with the newly proposed regulations are arguing that the plan sets necessary rules for preserving the area's identity and cultural heritage, and that regulations are crucial to ensuring these large existing green structures are upkept. (Lundgaard, 2022)

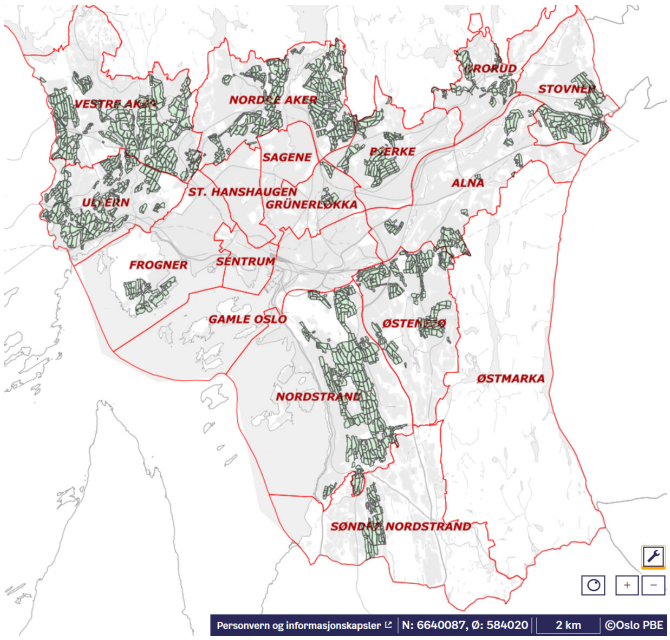


Figure 14: Oslo small-house areas (Oslo kommune, 2022)

Figure 15: Example from the small-house areas, Nordre Aker (Google, 2022)

Egersund trehusby

Stavanger is not the only city with a cultural heritage environment known as a wooden house city. In fact, similar environments with many concentrated wooden houses in styles like the ones found in Stavanger are common other places in Rogaland as well, like Sandnes, Egersund, and Sokndal. Egersund is a city in the southern part of Rogaland County and has its own "Trehusby" that take up a lot of the city core. Even though it is much smaller in range than Trehusbyen in Stavanger, many of the houses are some of the best-preserved wooden houses in Rogaland.

Egersund is focusing the main development in underdeveloped areas of the city centre, such as repurposing surface parking and transforming former industrial areas. The reason for this is to relieve the pressure on the existing cultural heritage environment, specifically from new housing projects and centralizing new workplaces in the city core. The strategy of developing such areas that are in the city centre is considered smart. (Eigersund kommune, 2019). Seen as Egersund is a smaller city with slow population growth, and few new workplaces established, larger urban redevelopment projects have not been financially attractive lately.

To further increase the attractiveness and strengthen the historical heritage environment, a project called "Okka Farger" (Our Colours) was funded by different parties from Eigersund municipality and private actors in city to make a colour guide for the built heritage environment in the city. The project investigated and promoted historical building colours of many buildings in the city centre, to encourage the owners to repaint their houses back to its original. It involves a colour guide dedicated to different styles and what colours were typically used on the panelling or around windows. Many engaged in repainting their buildings, giving the streets a much more colourful and distinctive character, while engaging residents to partake in the cultural heritage conservation. This project was a great success in increasing awareness of the cultural heritage. Present day's monotone colours were not reflecting the historic expression of the city's facades, but the original colours could contribute to a more vibrant and harmonic city image. (Eigersund kommune, 2018)

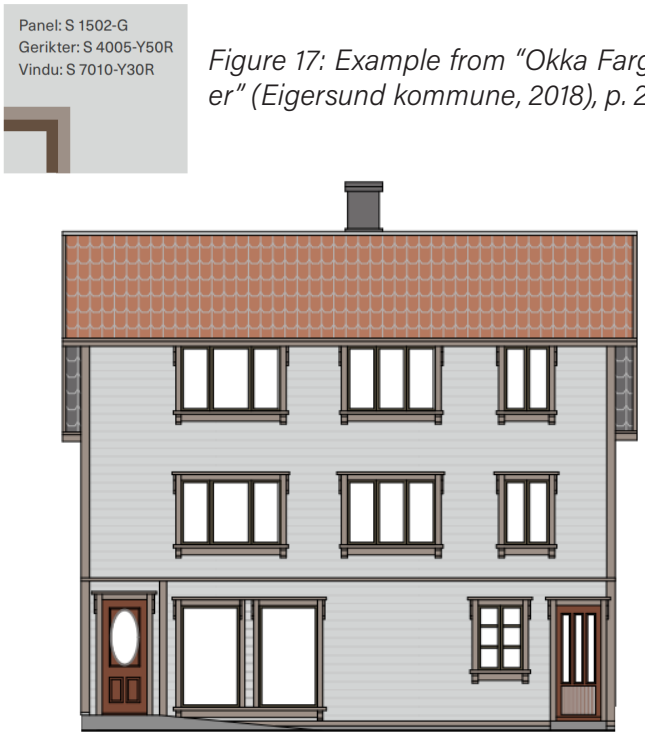


Figure 17: Example from "Okka Farger" (Eigersund kommune, 2018), p. 23

Figure 16: Egersund Trehusby (Hagen, 2022)

Improving energy efficiency in historical buildings

Innlandet County contracted a Norwegian consulting firm to do an extensive scenario study of climate gas emissions using 24 buildings as case studies. The aim of the report was to investigate if and how emission goals can be aligned with preserving buildings of cultural heritage importance, and if such preservation can be a useful mean to reducing climate gas emissions. It was expected that gentle upgrades, carefully chosen energy measures, and guidance in energy saving behavior, would be efficient climate measures for older buildings. (Asplan Viak, 2021)

The upgrades were formed on the building's premises, with a key concept being to preserve the cultural heritage. It was important to use and reuse as much of the original building parts as possible, and elements that needed replacement were to be made as copies of the original. Since many of the historical buildings has the same construction and craftmanship that made it, it was possible to make general solutions for isolation, sealing, and windows. In addition, it was also necessary to create more specific solution adapted to the building. The goal behind upgrading energy efficiency of private houses was the desire of more comfort, reduced energy costs, and maintaining the constructions' qualities to extend its lifetime. Heating of private households is the largest cause of energy consumption nation-wide, and especially in older buildings there is a large potential for reducing this. However, improving the heat loss in these buildings required proficient technical solutions to ensure other problems do not occur, like moisture in constructions. (Asplan Viak, 2021)

Another challenge of upgrading and reconstructing older buildings is finding the right expertise. There is a need of knowledge regarding the technical solutions and adapting these to the specific building. Then the knowledge of the historical craftmanship that made the building is necessary, and how to preserve and work with this in the given setting, as this is also a part of the cultural heritage's value. The buildings possessed craftmanship of a different quality than what is typically found today, with materials, heights, and volumes executed with an understanding of esthetical values that were meant to last a long time. (Asplan Viak, 2021)

The case studies resulted in 19 buildings having reduced emissions after the upgrades, and in total these buildings saved 10 300 tons of CO^2. On average, the buildings energy consumption was reduced by 41%. The findings from the case studies made it possible to make some general approaches for reducing energy consumption, but it was still necessary to use specific measures in each case to ensure optimal results. (Asplan Viak, 2021)

The measures that contributed to reduce the energy consumption in the buildings from the case study were mainly internal and aimed at improving the building's existing abilities that reduces heat loss. External solutions to improve energy efficiency, such as energy producing solutions like solar panels, have been debated in the cultural heritage discussion. To take solar panels as an example, with the available solutions that exist today it has been difficult to justify. The current design is considered to unreasonably compromise the cultural heritage, and even though the possibility of produced electricity is good it can be argued that such facilities can be placed on roofs where cultural heritage will not be compromised, like industrial or office buildings. Potential external energy savings must be considered closely before the cultural heritage's character is challenged. (Røstvik, 2021)

The current situation with electricity in Norway and record-high prices are creating an even greater pressure on private installments for electricity production. A clearer stand towards how cultural heritage should meet these challenges could help steer the development of this issue towards a positive gain for cultural heritage. For example, a recurring debate is solar panels on roofs of cultural heritage buildings. It has been concluded that the existing design of the solar panels on the market are not compatible with the historical importance of the roofs and is therefore not allowed many places. What is repeated through the directorates' strategies is finding modern solutions that can be adapted to cultural heritage without damaging its values. If the general idea is to not allow something, then the market will likely not adapt either. Solar panels may not be a solution that should be conciliated with cultural heritage but specifying such guidelines for which solutions could be relevant would perhaps engage the market to find acceptable ones.

Cities4PED – Instruments for renovation of the built environment

Although Norway is not a member of the European Commission, the EEA agreement gives the Norwegian business sector EU rights and obligations and Norwegian citizens the right to work, study and live in EEA countries. EU also influence and inspires activities and actions in Norway. In the work of tackling new climate changes and environmental challenges, Norway will face many of the same challenges as neighboring countries. The European green deal is a part EU's goal of striving to become the first climate-neutral continent. The idea is to make European cities more resource-efficient and have a competitive economy that can ensure no net emissions of greenhouse gases by 2050 and economic growth decupled from resource use. (European Commission, 2021)

The EU has several projects and research in progress of achieving this with relevance for Norwegian city planning. One of the projects funded by EU is Energy Cities, a European learning community for cities involved in "future proofing" their approach to sustainability. One project is called Cities4PED, which are to investigate solutions towards Positive Energy Districts (PEDs). A topic discussed in this project has been instruments for renovation of the built environment. The energy performance of the existing built environment has been identified as the biggest challenge regarding positive energy districts as many European cities have larger amounts of older building masses, especially in cities. (Energy Cities, 2022)

In Brussel, the capital of Belgium, they have set an ambitious goal that all buildings must improve their energy character, ideally to a B or higher. As large parts of the city consist of older and historical building mass, this requires a lot of work. The other challenge is the dispersed spatial and ownership context, and how to impact the renovation rate in this context. Collective renovation support systems and projects were investigated and tested. One initiative provided neighbourhood housing scans to find what opportunities there were for energy efficiency upgrading. They were then able to offer tailored advice for renovations and guidance for what possible subsidies the residents could apply for. Another initiative was a citizen cooperative, where renovation advisors made housing scans. They then served as a single point of contact for contractors for renovations and needed supplies, as well as helping neighbors investing in joint purchasing of contractors and supplies to reduce costs. The last initiative was an organization giving out loans for people to invest in upgrading their houses to meet both energy and liveability targets. (Energy Cities, 2022). These initiatives were mainly directed towards residents with the means to invest in these upgrades, inspiring engagement, and cooperation across property boundaries.

In Vienna, the capital of Switzerland, they engaged in a project of block renewal, called WieNeu. The aim was to encourage upgrades across property boundaries, while ensuring sustainable development in the neighbourhood without causing gentrification by rent control and no displacing of inhabitants. The measures prioritized was improving insulation and replacing heating sources to more energy efficient and cleaner ones. (Energy Cities, 2022)

The initiatives studied from EnergyCities' sprawled from the government setting demands and goals for more sustainable cities and inspired active measures targeted to groups of people and residents rather than single individuals.

Urban transformation projects in Stavanger – Haga og Grov Architects

The architects Haga and Grov have designed a new project in Våland in Stavanger called Vålandstun. It is markeded mainly towards seniors because of its location close to the city and Vålandsskogen, design solutions friendly to people with mobility issues, and larger common areas designed for the residents to connect with eachother. (INEO Eiendom, n.d.). This project has different characteristics other typical housing projects of newbuild apartments in the region. The buildings' volume and style are adapted to the surrounding characteristics found in Trehusbyen, therefore several medium-small buildings with multiple units rather than the classic apartment block. This project can be considered as a modern approach to the classic block-structure that has been praised by the professional environment, the municipality, and buyers.

The concept shows a modern approach to the classic smaller houses of Trehusbyen, with larger bodies and roof adaptations to the typical gabled roofs. The squared block-structure is the same, but the space in-between is a communal area both for outdoor recreation on the roof and indoor areas on the first floor. The residents also have their own private outdoor areas. The car parking is solved below ground. The owner-structure here is arranged as a housing association, in contrast to the typical blocks of Trehusbyen with single plots and owners, facilitating for the upkeep of the large common area.

Figure 18: Pictures of Vålandstun (Pictures: F. Revheim in Stavanger Aftenblad, 2021)

A previous project by the same architects in Stavanger has also been highly credited, is also an urban redevelopment accommodated to Trehusbyen in Stavanger. The project is called Holmegenes, and was finished in 2015 in Eiganes. The architects won two architecture awards for the project. (Langvad, 2019). Holmegenes is quite distinctively different in style than Vålandstunet. The facade has brick and stone materials, with matching shades of red on the roof. There are large windows with a thick frame presenting a modern look. The gabled roof is rounded and asymmetrical, but even with the modern approach it gives associations to buildings of Art Nouveau design. The typology is like the classic block structure found in Trehusbyen, with single-standing houses of similar volumes, and gardens in the middle.

The projects by Haga and Grow architects are new developments but represents some principles for developments in a setting where an urban heritage environment has been taken into consideration. It clearly shows that is the typology that has been continued in these projects, rather than specific architecture styles or craftmanship. The gardens and green structures in the middle of the blocks has been acknowledged as a significant quality and is therefore in these projects available to all residents of the block. Still the residents have their own private outdoor spaces in addition.

Figure 19: Pictures of Holmegenes (Langvad, 2019)

The Hustvedt quarter, Stavanger city centre

An interesting example of a development project in the city centre that includes a building of cultural heritage is the Hustvedt quarter, Østervåg 19. In January 2021, the owners of the quarter applied for a building permit to remodel, renovate, and demolish parts of the building. Demolition in zones of cultural heritage demands a separate dispensation as Stavanger Municipality has set a regulation that prohibits all demolition. Before this, the developer had engaged the office of heritage management in Stavanger municipality to receive an early statement of their plans for the quarter, also leading to an inspection of the premises and collecting historic documents. All documents quoted are public documents retreived Stavanger Municipality's website. (Stavanger kommune, 2021)

The municipality sent the application from January back to the developers on terms of lacking assessments and descriptions. The specific elements and parts of the buildings that were to be preserved and what were to be demolished had to be measured and mapped. The parts that potentially were to be demolished, needed a more detailed assessment of why these were to be demolished, and why it was not possible to preserve them.

After further assessments were made by the developers, the municipality sent a new answer to the application, dated May 10th, 2021. In this, the office of heritage management describes the history of the quarter. It was established in 1876 and consist of two townhouses in log-built construction and two sea-houses in form of storage buildings, made in half-timbered constructions. The townhouses and sea-houses are connected by smaller wings and in-between buildings, with passage through all buildings. The quarter has a long history of businesses in the premises and different forms of use. In 1900, there was a fire in the building, leading to rehabilitations and rebuilds. The construction of one of the sea-houses was likely modernized in this process. Until 1970, there were little changes to the quarter. This is when the facades appear to have been altered to a more modern look (of its time) that it holds today.

In broad terms, the sea-houses were planned demolished. One issue was that the sea-houses' construction and floor-levels were too short for modern indoor standards. However, the head of the office of heritage management had suggested they work around the existing construction, for example by removing some levels to gain the necessary heights. The construction was also in a lesser standard for the developers' planned use in this part of the quarter, arguing that the physical standards set too many limitations for future remodelling. The proposed solution was then to transform the quarter into one building, with the four historic facades, and all levels joined. This called for the sea-houses to be demolished and replaced with a steel construction and matching the levels of the remaining townhouses. The developers had intentions of repurposing the materials of the sea-houses' construction for decorative uses in the new building.

Figure 20: The Hustvedt quarter (F. Revheim in Stavanger Aftenblad, 2021)

In the document from the office of heritage management dated May 10th, 2021, they describe the buildings of the quarter as run-down, but in a relatively good technical standard. The buildings possess a high degree of authenticity and cultural-historic value. Although the developers' suggested proposal was not deemed the ideal solution considering protection of cultural heritage, the other alternatives had been presented as unacceptable for the developers, and this would therefore lead to the project's dismissal in full. The office of heritage management therefore valued that the compromise was acceptable because it led to the quarter gaining new life and could be repurposed, rather than withering away. The argument "preservation through use" was fundamental in their statement, and the office of heritage management could not see any other reasonable possibility than to approve the application from the developers. Their response also included several detailed descriptions of how to best preserve the cultural heritage values with the proposed alternative.

Awaiting final processing by Stavanger municipality, the application was sent to Rogaland County, section of cultural heritage, for a statement. In their statement dated June 28th, 2021, Rogaland County points to the positive aspects of the facades being repurposed and restored to ensure new attractions in the area. However, they did not recommend that Stavanger Municipality approved the planned demolition of the sea-houses and build the alternative from the application. The County brought up how the sea-houses had historically changed use and purposes many times, and that the construction was highly flexible for modernizations. The criteria for allowing demolition in the zones under cultural heritage protection is that the condition of the building is in such poor state that there are highly unreasonable costs or work related to its restoration. This would have to be assessed in a report by professionals, and such report had not been presented. Professionals in construction and fire had assessed that the most reasonable solution would be the proposal from the developers. They had however not deemed other solutions that preserved the construction as *impossible*. Hence, Rogaland County strongly advised against approving the developer's application. They also argued that approving an application like the one of the Hustvedt character would create a significantly stronger pressure on allowing further demolition of buildings of cultural heritage.

Stavanger Municipality's response to the developer's building application was dated July 8th, 2021, stating that the application was denied on the same grounds from the statement from Rogaland County, that the necessary criteria for allowing demolition were not met. August 11th, 2021, the developers appealed against the denial of their application, demanding a new assessment based on the arguments that they had not found any other reasonable outcome for future development. The office of heritage management agreed that the application should be re-assessed, and the case was therefore presented to the Municipal political committee, the section of city- and community development, who in their decision dated September 30th, 2021, remade the denial of the application to approved. They evaluated that the consequences for cultural heritage was acceptable considering the expected benefits the project would give to the city otherwise.

Rogaland County's councillor and the section of cultural heritage appealed against the approval from the Municipal political committee to Rogaland county's political committee, dated October 28th, 2021. On November 30th, 2021, Rogaland county's political committee voted against sustaining the complaint, describing the developer's proposal as positive for city development, and not unreasonably compromising for cultural heritage. However, the Directorate of Cultural Heritage were also sent the complaint from Rogaland County's councillor and section of cultural heritage, for an independent assessment.

Figure 21: Painting of Østervåg (Gjemre, 1887)

Figure 22: Planned new buildings of the Hustvedt quarters, (ak2-sivilarkitekt and Sivilarkitekt Jonny Johansen AS, 2021)

In the Directorate of Cultural Heritage's statement dated January 19th, 2022, they too appealed against the Municipal political committee's decision from September 30th, 2021, that had approved demolition of the historic sea-houses. They did not agree that the criteria for granting dispensation from the regulations for allowing demolition were met. In their response, it is described that demolishing the sea-houses and using the original elements as decoration inside the new building cannot be considered a form of preserving the cultural heritage. The construction of older sea-houses is described as

some of the most important elements to preserve in these types of buildings and demands from developers were not enough to justify the consequences it would be for the cultural heritage. The proposed alternative would cause the buildings to lose their bearing function and consistency and would therefore appear out of proportions. The building heights in the proposal were also considered conflicting to the existing environment and neighbouring buildings and sea-houses.

The appeal from the Directorate of Cultural Heritage would then have to be re-evaluated by the Municipal political committee, the section of city- and community development, and in their decision dated February 24th, 2022, they voted to send the appeal to the County Governor of Rogaland for the final decision. In their decision dated March 22nd, 2022, the County Governor decided to sustain the complaint from Rogaland County and the Directorate of Cultural Heritage, and therefore remade the decision from the Municipal political committee, denying the developers application of demolition. This decision cannot be appealed against, and it is therefore final.

The future of the Hustvedt quarter is currently unknown. Whether the developers will start from scratch to create a new proposal within the parameters given in the statements from the official departments and public organs, or scratch the project entirely is yet to be revealed. Regardless, the case is an interesting example displaying the complexity of development processes in urban heritage environments. It also portrays the background for having multiple public organs having the ability to influence these decisions, to ensure the cultural heritage is preserved in an acceptable way. It is however undesirably time-consuming and may yet end with the building remaining out of use and purpose.

The future of the building is an interesting aspect of the case. The desired outcome is the same, all parties wish to see the building restored and gain new forms of use and life. But the idea of how this must be done with respect to cultural heritage and how the values are preserved through use, is not agreed upon. The developers argue that reusing original materials as visual decoration is a form of appraisal to the cultural heritage of the building, but official governmental organs argue that this is not the way to preserve the cultural heritage because it is separated from its original function, and it can then be considered a form of recycling materials. The cultural heritage was not entirely seen as a resource but rather a hinder for the developer's own desired outcome. The facades and expression had been seen as qualities that were ideal to continue, but the construction's cultural heritage value was more difficult to value.

Mixed-use in residential areas

An example of an area in Trehusbyen where mixed functions caused residents to act up, is Lervig local pub in Eiganes. After the pub opened on the first floor of an apartment complex, residents have complained of excessive noise late in the evenings. The bar serves alcohol until 1:30 and closes at 2:00, while the standard time for quiet in residential areas is 23:00. The residents appealed to Stavanger municipality in hopes that the bar could stop serving alcohol at 22:30 and rather close at 23:00, which they argued would be more reasonable considering noise pollution. The residents were otherwise very positive to the local pub in the building, and many use it actively. The pub argued that it would be detrimental for the business if they were to close that early. (Jupskås, 2020)

The zoning map of the building is residential but, in the regulations, it is stated that the first floor of the old canning school is to be used as forms of serving. It also states that the business is to have opening hours that are not to unreasonably bother the areas' residences. The Municipal administration has stated that the current use is in line with the zoned forms of use and regulations, and potential complaints to the zoning plan would needed to have been done in the planning process (Jupskås, 2020).

The Municipal political committee decided against changing alcohol serving times, allowing the pub to continue its opening hours until 2:00. The argument was that the consequences of such a change in serving times would affect local pubs in other districts in the city as well, and the issue is left to the building managers to potentially change such opening hours. The residents are frustrated and are met with the conclusion that the current form of use was zoned and regulated when they bought their homes, indicating that they should have been aware of the potential consequences. The noise levels were evaluated to not be above health-recommendations, and therefore considered as noise that had to be expected when living close to the city core. These events took place in 2020, and in 2021, the municipality approved an application of expanding the pub's outdoor serving area, despite excessive complaints from the residents and statements on annoying noise levels from police and the municipal health department. (Tanche-Larsen, 2021)

The residents have now summoned the developer of the building to court, demanding mitigating measures to lower noise pollution and/or reduced price for their homes. They are arguing that they could not possibly have known what the consequences of the potential functions in the building would become when they bought it, as this was only vaguely specified (Birkemo, 2022).

This is an example illustrating why regulations of other functions mixed with residential exist, to lower potential conflicts. Yet it is proven that such regulations can still be too vague to properly manage conflicts like the one in Eiganes. The conflict is difficult for both sides, but it is difficult to find fair compromises after everything is established as it limits the possibilities of making changes.

Figure 23: Lervig local pub in the first floors of the canning-quarter at Eiganes (A. Minge in Stavanger Aftenblad, 2020)

3. Analysis

The analysis includes Stavanger Trehusbyen's history and importance in the city, the existing situation, and heritage management. Among the findings are a general potential for development in Trehusbyen and what standards for sustainability are attainable. These findings are from both quantitative and qualitative aspects.

3.1 Local planning documents

3.1.1 Regional planning documents

The county has decision-making authority in planning as well as the regional development authority. Rogaland county is responsible for the regional planning strategy and approved the new regional plan for Jæren and the southern Ryfylke in 2020. The aim of the plan is to ensure a coherent and long-term living-, land-, and transport planning of the region. The plan is the base for the county's planning recommendations and decisions towards the municipalities. The vision is a sustainable region capable of adapting to changes, and this will be followed up with principles of easier every-day life, livable city centers, lasting natural resources, and regional cooperation. An easier every-day life encourages the activities and chores we have in our everyday life through good and green mobility. Livable city centers are attractive for people and creates a sense of identity and contributing to economic growth.

The regional infrastructure is important for further development in the municipalities and contributes to coordination of land-uses and work-places. The regional plan prioritizes the public transport axis between Stavanger and Sandnes and is facilitating for green transportation of people from the other larger municipal centers, concentrated along the train line south towards Bryne. Together with the strategy for greener infrastructure, the land use acquisition should be based on the principle of "inside and out", prioritizing local centers and development within these first and centralizing functions and businesses. (Rogaland fylkeskommune, 2020)

Figure 25: Prioritized development areas of the region (Rogaland fylkeskommune, 2020)

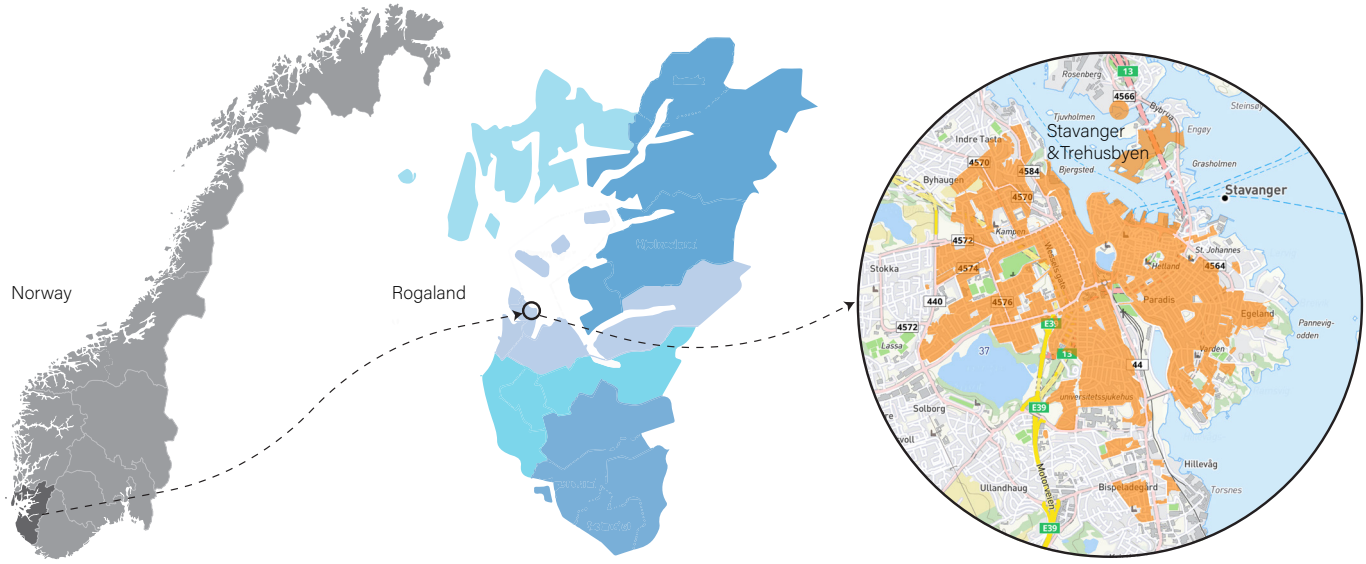


Figure 24: Location (Map-source: kommunekart, Norkart)

3.1.2 Municipal planning documents

The municipalities' role in cultural heritage management is to ensure the heritage is preserved through planning- and building work. They operate through the planning and building act, as well as their own municipal plans.

Muncipal Plan for Stavanger

The Municipal plan is divided into two parts. One is strategies and goal for the development of the Municipality, and the other is a zoning plan for land-management connected to how the areas will develop to reach the strategic goals. The strategic goals for planning and development were approved in 2020. Stavanger Municipality is in the process of updating their Municipal zoning plan and it is expected to be pre-approved by the municipal council in their meeting June 20th, 2022. The strategic areas in the Municipal plan involves Stavanger as the "regional motor" of Rogaland, quality in every-day life, and that the Municipality is a "green spearhead" in sustainable city development. Figure 26 illustrates the Municipal land-development strategy, focused on building the city starting from within and moving out, and an increased development focus around the new Bus Rapid Transit system (BRT). In figure 27, large parts of Trehusbyen are within zone A, the prioritized centre for development

The residence and the surrounding environment are the key factor in quality of every-day life, which can contribute to social qualities, safety, and stability. The foundation for future planning is therefore oriented towards adapting to and taking the surrounding environment into consideration. The plan is therefore proposing a new strategy for architecture and the urban form. Transport is identified as one of the main sources of local climate gas emissions. Facilitating green mobility is key to reducing every-day travel needs, and densification in existing urban areas is the main strategy for reaching this goal. In new development and densification processes, preserving green elements and areas are efficient means to increase sustainability and managing climate challenges. (Stavanger kommune, 2022)

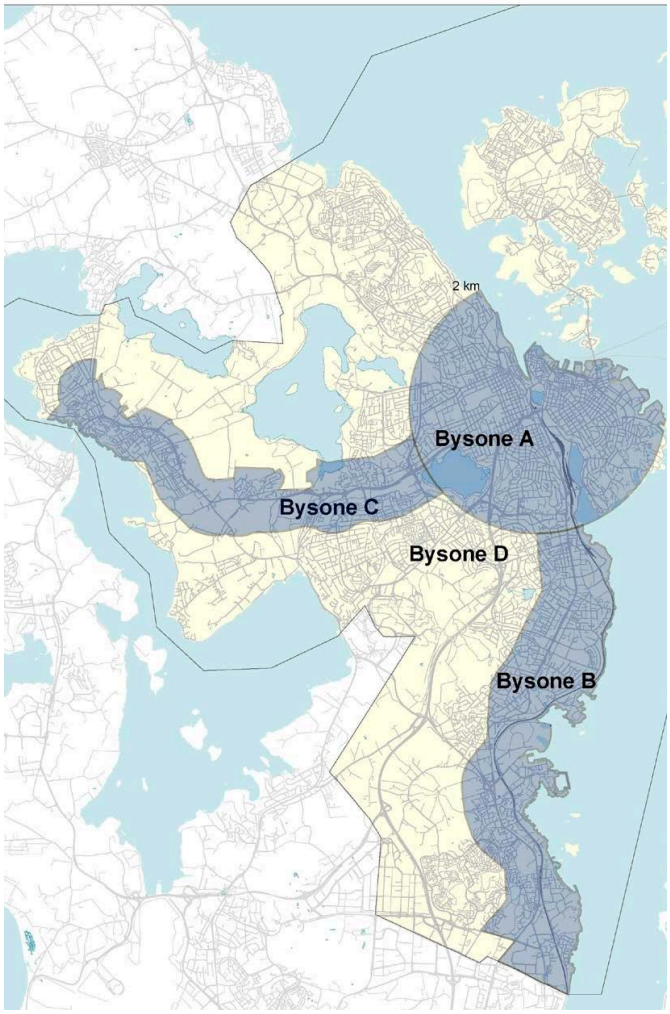


Figure 27: City zones (Stavanger kommune, 2019)

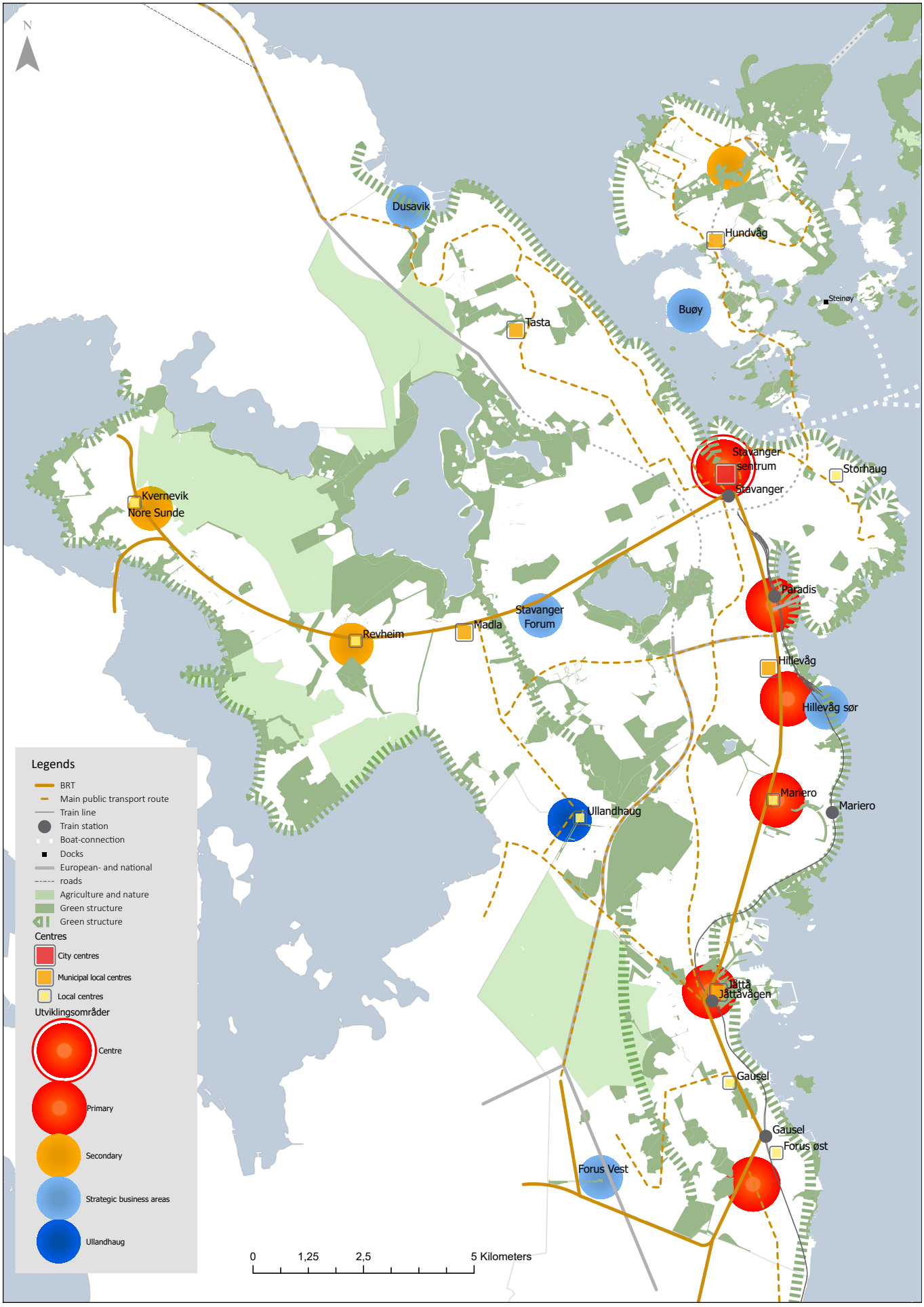


Figure 26: Municipal development strategy (Stavanger kommune, 2021)

The future climate is expected to have more intense and powerful rainfall, and powerful wind. There will be higher risk of flooding and storm surges. The Municipality has a requirement for blue-green factor in planning projects, a measure to ensure blue and green qualities in new development both for visual-, ecological-, environmental-, and water management purposes. The criteria is based on different surfaces giving points for their contribution to the blue-green factor. Asphalt, for example, is 0 points, and grass is 1 point. (Åstebøl, 2014)

The foundation of the land-management strategy is to increase use, quality, and function in the green networks that connects the built areas. To ensure these qualities can be preserved and strengthened in planning processes, Stavanger has set a demand for creating spatial analyses in all zoning plans. This is continued in the new Municipal plan with a strategy for enhancing the use of spatial analyses. The purpose of the analysis is to communicate important expectations of the project, and this should be built on the Municipality's recommendations of public spaces, heights, volumes, land-use, and infrastructure. The chapters that should be included must elaborate on existing situation and planning status, the landscape and environment, historic development and cultural heritage, buildings and public spaces, mobility, living- and city community, multi-purpose use, and recommendations. (Stavanger kommune, 2022)

The Municipality is not specifically focusing active development within Trehusbyen, and while encouraging densification of existing urban areas, there are still other regulations that guide the management and development of Trehusbyen, such as the Municipal Cultural heritage plan, and detailed zoning plans.

Figure 28: Water management (Hagen, 2022)

Municipal Cultural heritage plan 2010-2025

The office of heritage management is dependent on evaluating cases of cultural heritage individually, as there is a need for detail in identifying what heritage values are to be preserved and why. The municipality has ensured they have this opportunity by setting necessary demands in their plans, as well as demanding a spatial analysis to be done in relation to the planning initiative at the very start.

Stavanger's current municipal plan for cultural heritage from 2010 is in the works of being renewed as it is valid until 2025. The purpose of the plan is to steer planning and management of cultural heritage in Stavanger in a direction that ensures its identity as a wooden house city, and to present knowledge of cultural heritage. (Stavanger municipality, 2011)

The first municipal plan for cultural heritage in Stavanger was adopted as early as 1989, with a background of the conservation of Stavanger's old town being a heated topic in media. It was then established that there were many parts of Stavanger's wooden houses that also possessed cultural and historic value and should also be preserved. Already had many of the older buildings and blocks been replaced by modern buildings of different volumes and design, and the importance of cultural heritage began to engage architects, planners, and residents. The engagement led to the start of the conservation plans, and a project that unveiled around 8000 historical wooden houses in the city that were preserved. The name Trehusbyen is also an important part of the identity in itself, and Stavanger has adopted this term to their specific wooden house city.

The parts of Trehusbyen that is of cultural and historical heritage value is divided into two themes with respective elements:

City-wide

- the number of buildings and the identity as a wooden house city
- the pattern and typology, and the characteristic structure of streets, gardens, buildings, and more

Buildings

- the building and wooden construction
- original building parts
- the building's aesthetics; the style and detail

These principles for what elements are considered a part of Trehusbyen's historical heritage state what is important to preserve. However, these principles do not apply for all buildings or parts of Trehusbyen. There is a variety of quality of the built heritage and what is worthy to preserve. Not everything can or should be preserved, but clearly stated elements like these make it easier to evaluate for potential development or restoration. It also sets the premise for what new development should adapt to. The municipal plan has a strengthened focus towards returning buildings of Trehusbyen to their historical form, such as windows and doors or facade - and roof materials, but also the relationship to the surroundings of the lot and neighborhood, such as keeping the green spaces between the buildings. It is believed that this enhances the buildings' qualities, and that districts and neighborhoods will be more attractive.

A goal of the municipal cultural heritage plan for Trehusbyen is to continue the wooden house tradition in our own time and adapting development to fit the built heritage's principles. Authentic areas and buildings should be preserved, while gardens are kept green and open spaces and courtyards.

The local politicians have decided on a set of guidelines for the conservation zone of trehusbyen and are determined in the municipal plan for 2014-2029. The eight main guidelines set the standard for how the area will be managed regarding development and future protection.

Figure 29: Aerial view of Stavanger, Trehusbyen marked in orange (Norkart AS, 2022)

1. The buildings of cultural and historical value are to be preserved and the distinctive atmosphere and environment of the areas shall be maintained and developed.

2. The structure and layout of the streets, parks, gardens, and valuable trees is to be preserved.

3. Any building works that affects the appearance of a building, including the roof, is subject to approval. The application should outline the necessity of the measures to be taken, along with a description of the alteration relative to the buildings' original style and appearance. The relationship to neighbouring buildings should be detailed on a location plan ('situasjonsplan' – this is provided by the municipality) and an outline of the facade.

4. Original building elements such as windows, doors, mouldings (including door and window surrounds), facade cladding and roofing materials, are to be replaced only when they no longer satisfy reasonable technical requirements or are damaged to the extent that repairing them is not an option.

5. If it is necessary to replace building elements, they should be adapted to the house's original building style and materials. This applies particularly to windows, front doors, moulding and other facade elements, facade cladding and roofing materials.

6. Extensions must be adapted to, and be smaller than, the existing building. Extensions may have a modern design. The same applies to new buildings.

7. A new balcony or veranda should only be built where they are a natural element of the historic style of the house. Outdoor spaces should primarily be developed at ground level.

8. The design and choice of materials for walls, fences, gateposts, outdoor lighting and exterior fixtures should be in line with the original or dominant style of the area.

Although some residents may find these guidelines strict and perceive them as a hinder for development, the municipality of Stavanger describes further that the reason you cannot do whatever you see fit to the outside of your own house is because the facade does not only belong to you, but it also belongs to the neighborhood and the city's historical identity.

The guidelines describes that the distinctive environment of the buildings and the surroundings are to be preserved, yet they are also to be further developed. Possible extensions must be adapted to the building and be smaller in size. It is preferred that the extension matches the building in style and implementation.

Climate- and environmental plan

Towards 2030, the municipality's city council has decided that Stavanger will reduce climate gas emissions by 80%. The climate- and environmental plan is an action-based plan that describes the challenges we are facing and how the municipality, local businesses, and citizens must work together to reduce climate issues. The municipality lists the main sources behind climate gas emissions as transportation on roads and on the sea, and energy consumption in buildings. (Stavanger municipality, 2018)

The first goal of the climate plan is to reduce amounts of transport and change travel patterns. As a mean to reduce transport needs the plan is to decrease the travel distance between everyday habits. One of the ways to achieve this is to aim for 80-90% of new residences to be built as a part of densification in either existing built areas or in areas that are repurposed as residential areas. The municipality also facilitates for reducing car use, by investing in public transport, creating more and efficient bike routes, and making it attractive to walk. (Stavanger municipality, 2018)

The second main goal is related to energy consumption and use of materials in buildings and facilities. The goal is that direct emissions of climate gases from buildings and building sites are reduced with 80%. One of the initiatives behind this is to map the municipality's existing energy consumption and uses and investigate possibilities of public and private cooperation on mutual energy- and heating solutions to increase efficiency. (Stavanger municipality, 2018)

Zoning plans

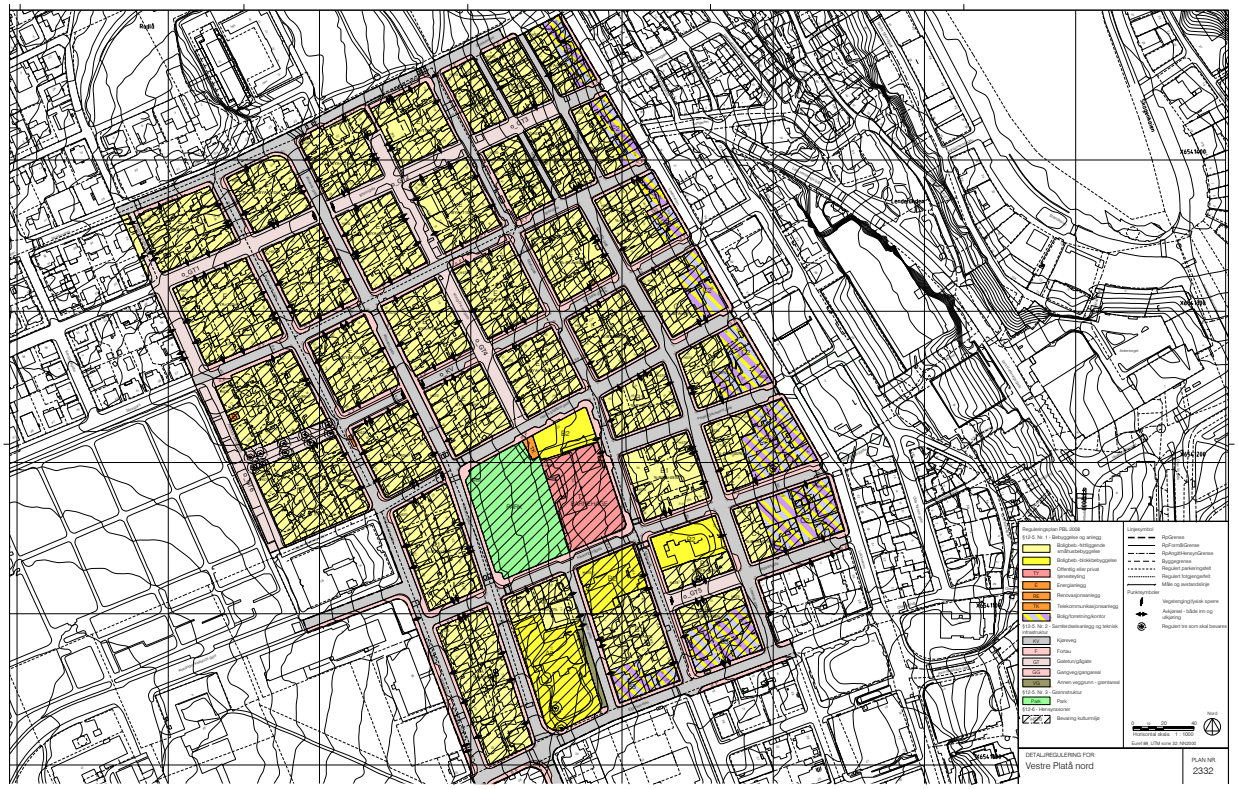
In many of the older detailed zoning plans for Trehusbyen it states that businesses are not allowed unless they can be deemed as special or necessary for the local area, and this must be approved by the municipality.

One of the Municipality's recent detailed zoning plans for an area of Vestre Platå, between Løkkeveien and Theodor Dahls gate, and includes several buildings in Trehubsyen with regulations for use and heritage areas. The parts of Løkkeveien have buildings zoned as mixed use of residential, business, and commercial. Buildings that are not mixed-use can be allowed for other purposes, but only if they do not cause unnecessary noise-, smoke-, smell-, or dust pollution. All additions to the building must be given a suitable placement and design, with respect to volume, heights, shape, material, detailing, colors, and surfaces that are in harmony with the existing built heritage environment in the area. The zoning plan limit dwellings to maximum 2 units per plot, with exceptions to buildings already sectioned otherwise. Maximum built area in m^2 or % of the plots is listed for each block but is generally not to override 80%. Some of the areas have regulations that preserves the existing situation, and some must be returned to historically accurate design. When returning, restoring, or rebuilding historical buildings to previous design and state, original building parts must be reused or repurposed as much as possible (Stavanger kommune, 2018b).

For outdoor recreational areas, a minimum of 16 m^2 common per dwelling must be established for new development, or by improving/building public spaces nearby. Public spaces require a blue-green factor of min. 0,4. The zoning plan also states which streets can allow parking, either on one side or both, and where street parking is not allowed. (Stavanger kommune, 2018b). The zoning plan gives detailed regulations and guidelines for future zoning management and development in the area, and for most potential development, the municipality must be consulted and approve.

Figure 30: Aerial view of Vestre Platå, zoning plan border in red (Norkart AS, 2022)

Figure 31: Detailed zoning plan of Vestre Platå (Stavanger kommune, 2018b)



3.1.3 Incentives

There are mainly public incentives and subsidies for maintaining and restoring buildings of cultural heritage value, although some privately funded projects have also been carried out. A few of these relevant to Stavanger and Trehusbyen are considered below. The municipality offers help and guidance considering the styles and qualifications needed for potential upgrades, but these are on a general basis. When seeking information on how to upgrade ones' home to improve energy efficiency for instance, private persons must cover the cost on their own for a professional inspector to give such knowledge. In cultural heritage environments like Trehusbyen you would also need guidance from someone who knows what upgrading measures can be allowed and how to conciliate these with the requirements of the Municipality.

Kulturminnefondet – the cultural heritage fund, is a public grant for privately owned cultural heritage elements and environments that gives funding for rehabilitating and maintenance. They have no deadline for applying and are continuously granting funding. Their vision is protection through active use. (Kulturminnefondet, n.d.)

In some counties they have established centers for preservation of buildings and other guidance services, which have proven to be of great significance for the practical maintenance and rehabilitating. They work as an easily available service to both owners and craftsmen and are important to secure access to knowledge in traditional craftsmanship. In counties where such services are available, the applications are of higher quality and projects have better outcomes. The government have considered giving funding to establishing more of these services, and they can be established by different models such as the municipal management cooperating with museums and other actors to meet local needs and regional adaptations. (Ministry of Climate and Environment, 2020)

Build- and preserve is a cooperative incentive between the Ministry of Climate and Environment and the building sector's national union. It is an online portal with available knowledge of craftmanship, restoration, and maintenance of older buildings, and is available to the public. The cooperation with the building sector ensures the craftsmen work and knowledge is connected to projects concerning cultural heritage. (Bygg og Bevar, n.d.)

Rogaland County can in some cases give out subsidies for the additional costs with maintenance and repair for buildings of national, regional, or local value that are officially classified as worthy of preservation. Enova gives subsidies to improve energy efficiency in buildings to more environmentally friendly solutions. (Stavanger kommune, 2017a)

Each year Stavanger Municipality and the memory-of-the-past association in Stavanger awards a building based on restoration and preservation of the cultural heritage. The award comes with a prize of 50 000 NOK and inspires owners of heritage buildings to restore and preserve them to the original state. The award has been given out since 1999 and includes detailed information of different restoration projects of 3 nominees each year, also contributing to increasing the detailed knowledge involving cultural heritage. (Stavanger kommune, 2018a)

3.1.4 Technical requirements

TEK17 is the official regulation of technical demands for buildings in Norway, and sets demands for the minimum requirements a construction must fulfill to be built legally. (Direktoratet for byggkvalitet, 2017) The planning and building act directs land management and -uses. The law applies to all kinds of activities and business connected to properties. The law is combined of a section for planning and a section for building-case processing. (Lovdata, 2019)

In cases where the upgrades needed to fulfill the requirements is on the expense of important heritage values, it is possible to deviate from the regulations. It is also possible to deviate from requirements if they become unreasonably costly, for example because of adaptations to cultural heritage. Especially fire protection is an important topic in densification processes. Trehusbyen has suffered city fires previously, and with wood being flammable it is an important aspect that must be addressed in detail in development projects. There have been great advancements in the field to ensure fires spread much slower and that emergency vehicles are alerted quicker, like connected alarm-systems and heat-seeking cameras to survey a larger area.

3.2 History

Stavanger is known as a medieval town, famous for its cathedral dated 1125 that to this day is a clear landmark of the city centre. But beside this and a few other remains, there is very little that remains of the medieval town. Then the city spread out mainly on the city center peninsula, in an organic grid with smaller alleyways that still exist today. From 1350-1600 Stavanger was one of few dioceses in Norway. From figure 32 it shows how the city of Stavanger has expanded from the city core around Vågen. Most of Trehusbyen is Stavanger's buildings up until World War 2, with buildings also from after this time.

The fjord and sea were the most important accessway to Stavanger, and the sea has historically been a crucial economic resource for the city. In the 1500's, Stavanger was establishing as a trade- and shipping node through herring- and wood export. The shipping industry affected the development, and both buildings and the typology were adapted to the industry. The characteristic sea-houses came in the later half of the 1700's and was established along the former shoreline. They are typical to the era, where they used to have access directly from the sea and were built in the traditional crafts of "laft" (log). Today's city has largely developed over the last 200 years. After the main economic resources being herring export and shipping between 1600-1900, and canning from 1870-1982 came the oil industry in the 1960's. It was in this period and up until today the city had its most rapid growth in population and land use (Stavanger kommune, 2013). Today, Stavanger has been rebranded from Norway's oil capital to the energy capital.

The central areas of Stavanger with buildings from before 1955 is what is referred to as Trehusbyen. The wooden houses are spread out in the city and in the surrounding areas. The older buildings in the city core are placed densely besides one another, and the spaces between them are the streets of the city. They are surrounded by the historical sea houses that make out where the shoreline used to be. The hills around the city core and Vågen are known as Storhaug, Våland, and Eiganes. The buildings in these areas are not commonly placed as densely as in the city core, but rather stand-alone buildings with single plots, and in a clearly defined grid. The typical buildings here are made of wood and sectioned horizontally, but there are also many single-home houses and villas. Building houses in wood was cheaper than other structures, which is why this practice continued in the post-war era. Many of the wooden houses were mass produced, allowing people to purchase cheaper and mostly finished building parts for assembly. Adaptations were still made to suit the building to the plot's topography (Stavanger municipality, 2011). Still, the buildings were built to last and withstand the climatic and weather challenges found in the region.

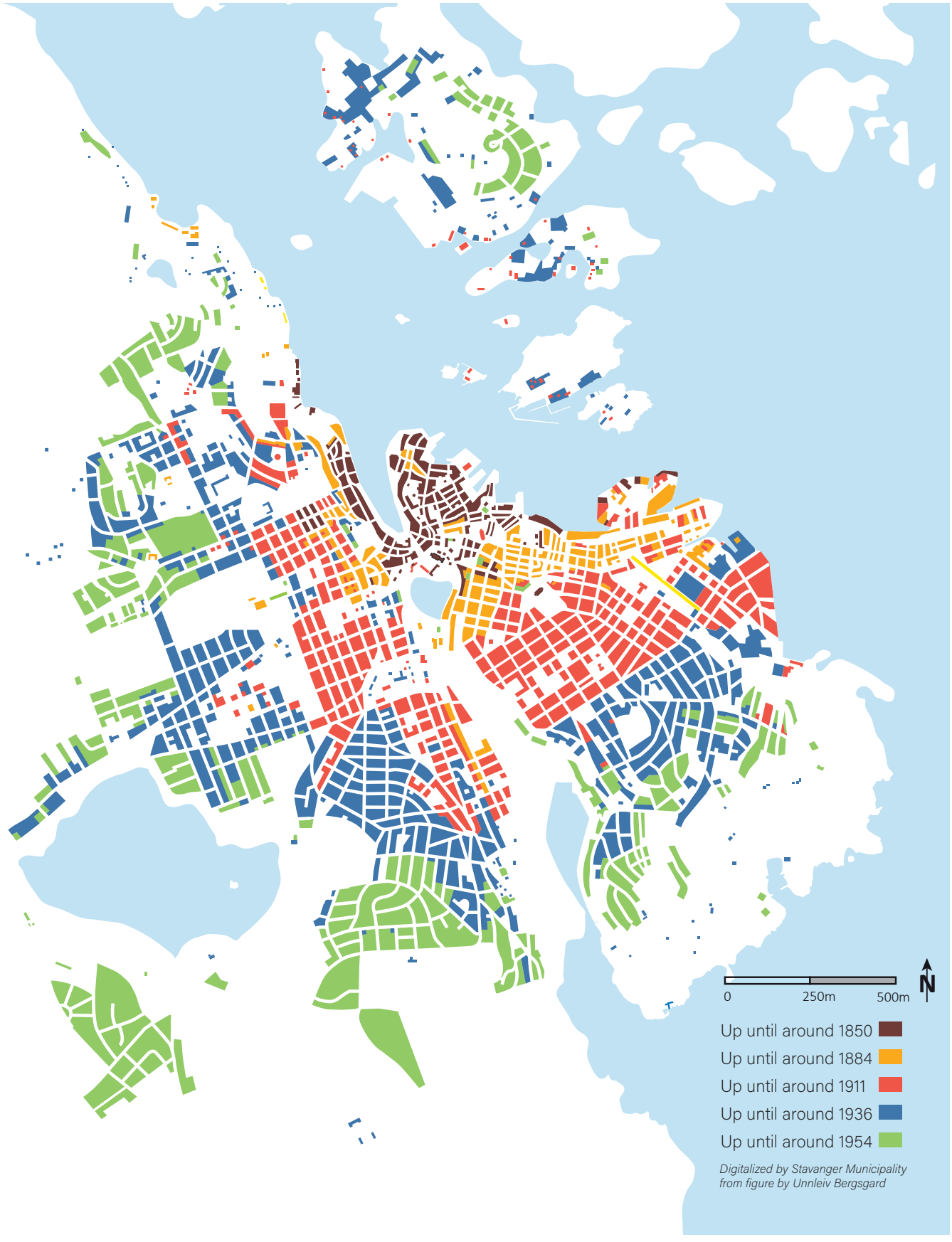


Figure 32: Historic expansion of Stavanger city (Stavanger kommune, 2017a)

3.3 Density

Between 2015 and 2017, and again in 2021, Stavanger had negative growth in new residents. The density in Stavanger is 559 people per square kilometer, and the average household is 2,2 persons per household. (Statistics Norway, 2022). Looking at the density in Stavanger city centre in figure 33, it is highest around Storhaug close to Breiavatnet. The city centre has low density and looking at the map of land-use in figure 34, there is mostly businesses and public services. The surrounding districts of the city has moderately high density and decreasing further from the city centre.

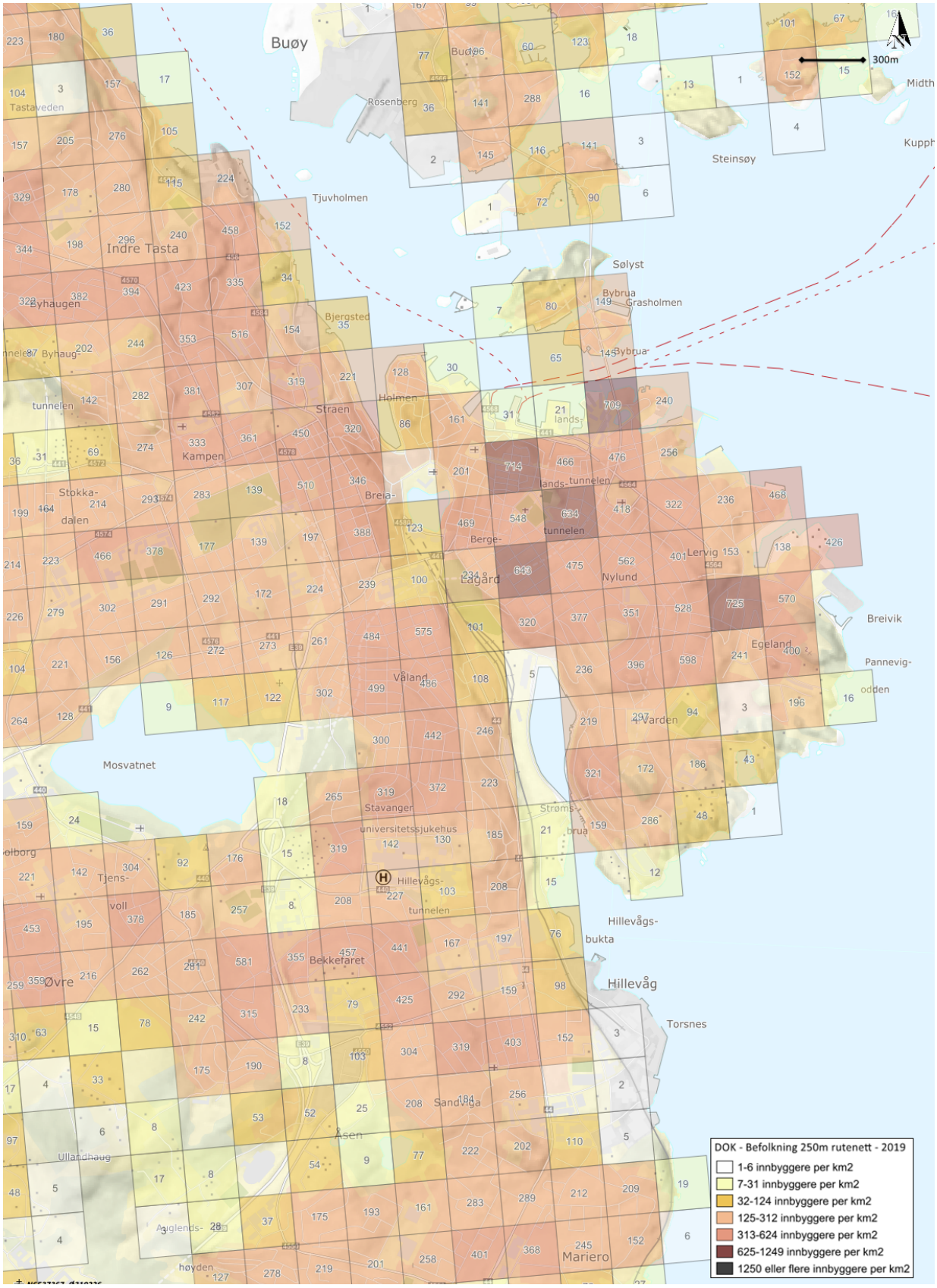


Figure 33: Density – population (Rogaland fylkeskommune, 2022)

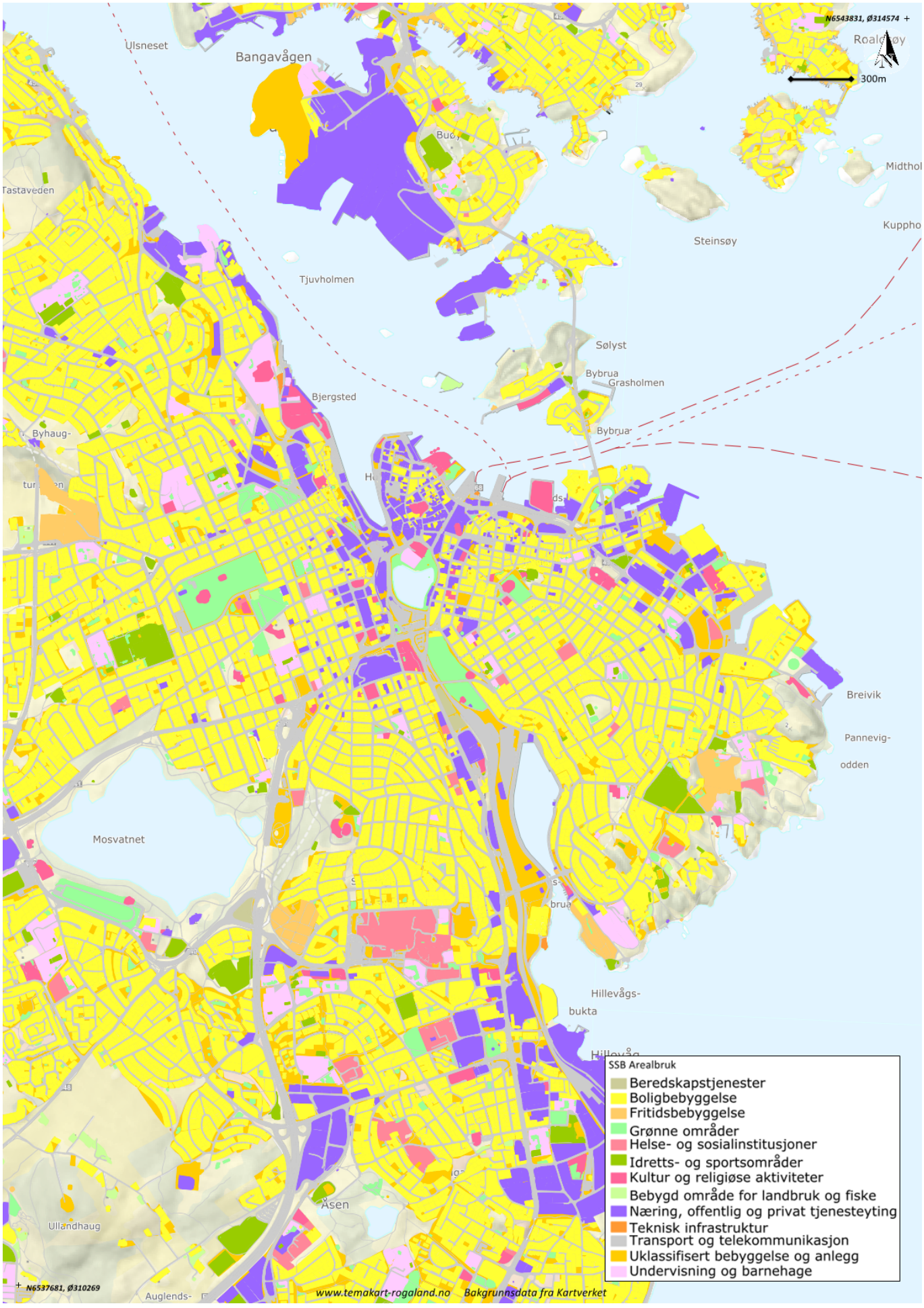


Figure 34: Land-use based on main functions (Rogaland fylkeskommune, 2022)

Density calculations

To reveal the spatial potentials for increasing built density, it is interesting to look at a few examples of varying dwelling- and built densities in Trehusbyen. The findings also show the differences of the typology. The calculations are based on the buildings' footprint and building information from Stavanger's municipal maps. (Norkart AS, 2022) Although these are few examples considering the number of blocks that are included in Trehusbyen, they give an idea of what densities exist and are meant to portray the detailed variety of the built form.

Figure 35: Stavanger city Trehusbyen. Map source: (Norkart AS, 2022)

The first example is a block in Pedersgata. It is close to the city centre and has a high built density as well as dwelling density. The block is technically three smaller blocks with access-roads in between, and streets surrounding it. There are several smaller buildings standing closely together and some are combined. There are also three commercial buildings in the block. Plane photo-view makes it possible to see what the spaces in-between the buildings is used for. In this case, there is little space left and few visible green spaces. The hard surfaces appear to be used for parking.

Figure 36: Pedersgata. Map source: (Norkart AS, 2022)

The second example is from Våland, closer to Paradis. It is a longer block and has significantly lower densities than Pedersgata, both in dwellings and the built density. The block consists of several smaller buildings on clearly defined plots in an organized order parallel to the surrounding streets. Most have green gardens in the back, and some in the front. The sizes of the plots also appear to be similar in size. Most appear to have surface parking on the lot. There are also various additions and extensions to the buildings. Based on the roofs it appears that groups of buildings are similar in styles, as some roofs have similar shapes and materials.

Figure 37: Våland. Map source: (Norkart AS, 2022)

The last example is three blocks from Storhaug, with very similar density measures yet some variety in the typology. It is interesting to look at three neighbouring blocks to study what variations may appear even within a neighbourhood. The organization of the buildings within the blocks and size of the blocks are similar. The two on the left are perhaps most alike, with several buildings of similar style places closely together aligned with the distance from the streets. These also have some scattered smaller buildings in the centre, typical garages or utility sheds. The block on the right has some larger buildings, and it appears that some buildings have significantly larger plot sizes. Some of the buildings may have been "filled" in over time. Especially the three buildings in the bottom-left corner have the classic front-garden facing the street and a smaller driveway into the house.

Figure 38: Storhaug. Map source: (Norkart AS, 2022)

Figure 39 show that the main building types in Stavanger is single-home residences. Second is apartment block, then dual-home residences, and last multiple-home residences. In typical Trehusby-districts, like Eiganes/Våland, single-home residences are most common, and second is dual-home residences. In Storhaug, blocks and dual-home residences are more common, but these numbers must be considered with the district's distribution for the numbers, as this area includes the city centre as well.

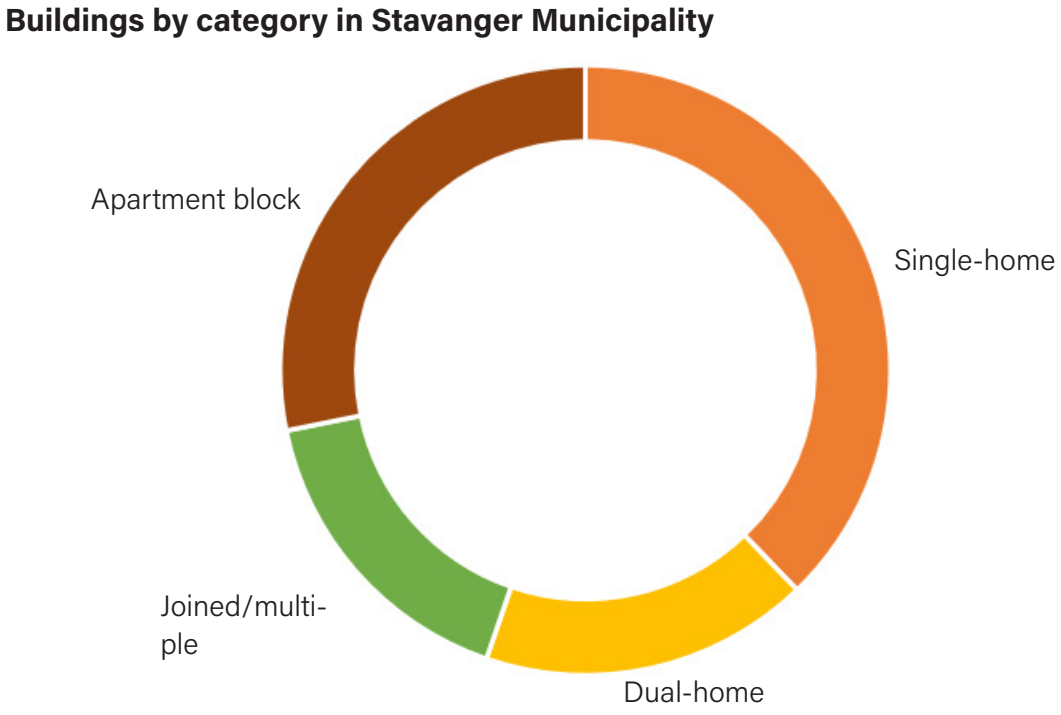


Figure 39: Buildings in Stavanger (Statistics Norway, 2022)

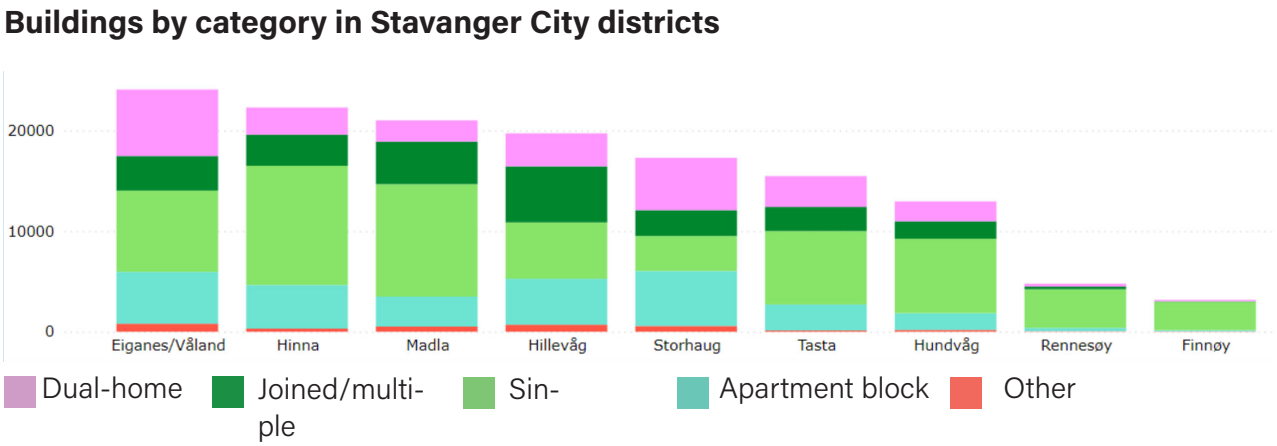


Figure 40: Buildings by category in the city districts (Stavanger kommune, 2021)

3.4 The buildings of Trehusbyen

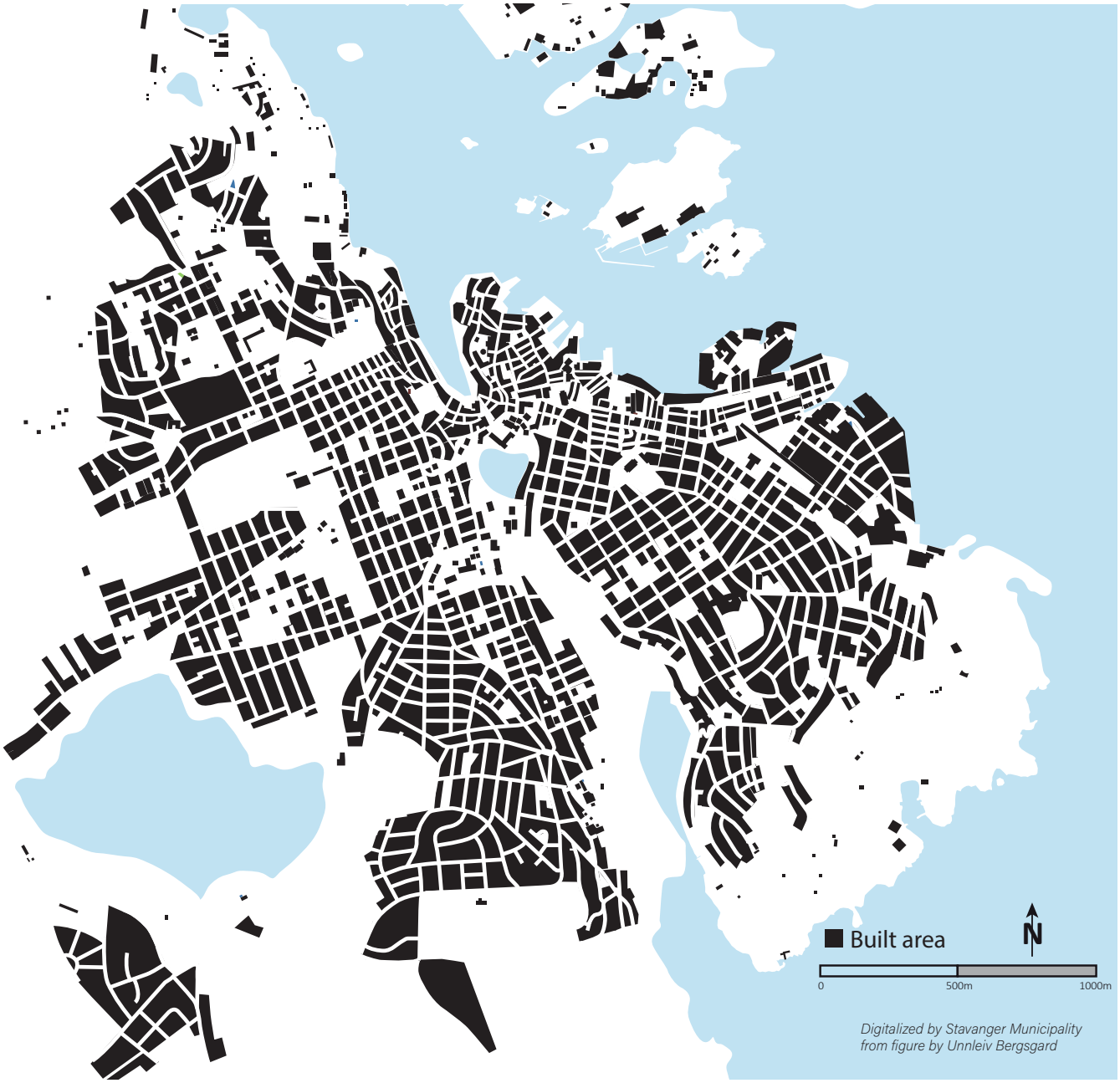
The architecture in the city reflects their respective eras and characteristics, for example what was the main source of economic growth.

The houses in Trehusbyen are similar in size and volume but vary in architectural styles. Most of the houses are from the late 1800's to the first half of the 1900's and have been upkept and renovated differently. Trehusbyen is a large part of Stavanger city's identity, history, and cultural importance in the city landscape for both citizens and tourists. Of course, there are also buildings within trehusbyen that are not the classic wooden houses, but are larger apartment buildings, schools, offices, shops and much more that contribute to a diverse built form. The typology of the city is a vast, organic grid of blocks, many places made up of smaller buildings.

The architectural styles of Trehusbyen all have their characteristics and specific traits. Some appear very similar, but the details may still be different. The placement of the panes in the window, or the framework around them, to the shape of the roof and its material are part of the built heritage of Stavanger Trehusbyen. The existing heritage in buildings are therefore varying, as many have been modernised and changed several times over the years. Historical records are therefore useful in uncovering what remains of the original building.

Most buildings in Trehusbyen are from the last 200 years but also holds the historic craftmanship of wooden house building that had been developed in the region over thousands of years. The craftman-

Figure 41: Typology (Stavanger kommune, 2017a)



ship is an important part of the intangible heritage in Trehusbyen and gives the opportunity to investigate how things were made in a certain time or place. Some of these traditions are no longer part of the modern standard, and the knowledge is therefore becoming increasingly difficult to sustain and teach for new generations. The buildings that remain with original construction are therefore crucial to preserving this knowledge.

Traditional log-building is a building style likely introduced in Norway around the Viking era and it involves adding timber logs on top of each other horizontally to a dense wall. When built properly these constructions protected well from the wind and weather and held heat. Until the second world war log-building was the most common form of building houses. Most of the houses in Trehusbyen are built in this style. Buildings of half-timbering are typically traditional sea-houses, and the style began in Norway around the 1700's. The design was ideal for having a simpler construction and well ventilated. (Schjelderup & Skogland, 2008)

Figure 42: Classicism. Picture: (Stavanger kommune, 2017b)

Figure 43: Classicism, illustration.

Architecture

The buildings in Trehusbyen reflect Stavanger's historic development, from medieval ages to present day. The design of the buildings and plots portrays the way people lived in that time. It also reflects the city's economic history and development, what sustained the city through different times. This is another aspect of the intangible heritage, where the buildings are portraying a side of the history that is not seen without its context.

Classicism, 1790-1875

These buildings are typically found in the city centre and are often smaller in size. The buildings are symmetrical, with the front door in the middle. Decorative objects are often inspired by Greek or Roman architecture, and the windows are divided by panes. The style has two directions, Louis Seize and Empire, whereas Louis Seize is simpler and elegant, while Empire is stricter. (Stavanger kommune, 2017b)

Swiss Chalet, 1865-1910

As the name indicates, this style was inspired by the common buildings in the lands of alps. The buildings often have a cross-shaped floorplan and gabled roofs. The windows also have typical cross-shaped panes. The detailing and carvings around windows and roof-edges were often painted a different color than the rest of the building, to make it stand out. (Stavanger kommune, 2017b)

Nedre Dalgate has 5 several similar buildings of Swiss chalet style where people used the semi-finished building parts for their house, yet there are still variations. These buildings were also nominated for the Municipalities' preservation award. The owners of number 77 initiated the restoration process, as their house was in very bad condition, and the windows and details of the house was not in the original design. They also inspired their neighbours to restore their houses to its historically accurate design and better condition. (Stavanger kommune, 2018a)

Figure 44: Swiss chalet, picture. (Hagen, 2022)

Figure 46: Nedre Dalgate. Picture: (Stavanger kommune, 2018a)

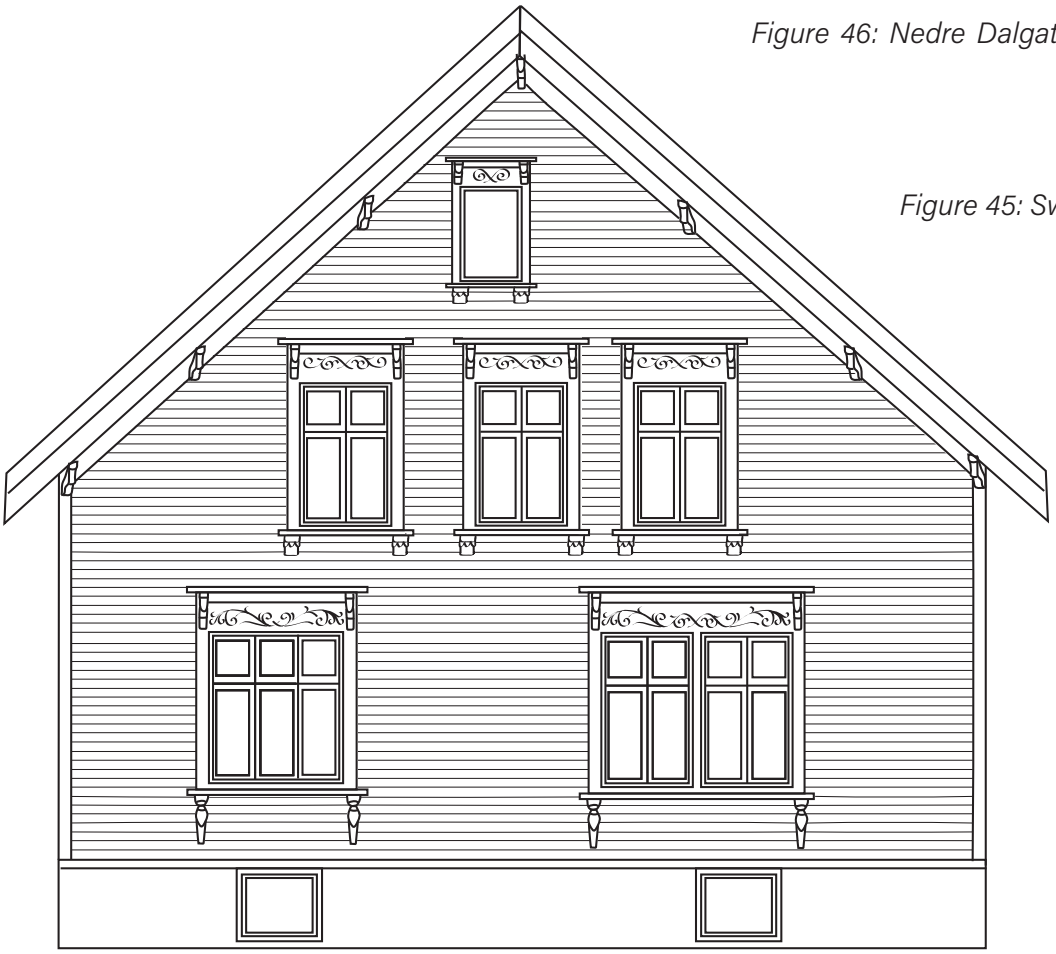


Figure 45: Swiss chalet, illustration.

Swiss Nouveau 1905-1920

The Swiss nouveau style is a mix between the Swiss chalet and Art nouveau, and it is typical to Stavanger. The floorplan and shape are similar to the Swiss chalet, but traits like bended gables of the roof and more detailed and decorative windows. Smaller additions to the building and roof are also common. (Stavanger kommune, 2017b)

Art Nouveau 1905-1925

The intention of the Art nouveau style was simplifications, and withdrawal from the excessive ornaments. The shape of the rood is softer than Swiss chalet's firm and straight lines, and the house shape is compact. The windows have smaller squared panes and are not necessarily placed symmetrical or in a line. This period has resulted in many brick houses of Art Nouveau style, because of the national law of only building in brick after a city-wide fire in Ålesund. (Stavanger kommune, 2017b)

Figure 47: Swiss Nouveau, picture. (Hagen, 2022)

Figure 49: Art Nouveau, picture. (Hagen, 2022)

Figure 48: Swiss Nouveau, illustration.

Figure 50: Art Nouveau, illustration.

Neoclassicism 1920-1940

Architects "re-discovered" the building styles from classicism and the simple and symmetrical houses was reinstated, yet they were larger in size and had more decorative elements. The windows have many small panes, and the roofs are often gabled or hip roof. (Stavanger kommune, 2017b)

Functionalism 1930-1950

Straight and geometric shapes, with clean lines and surfaces, together with flat roofs are the characteristics of the functionalistic house. The windows could often be joined in the corners. (Stavanger kommune, 2017b)

Post-war modernism 1945-1975

The buildings of post-war modernism are characteristics of the start of the modern Norway. The buildings' shape was decided based on what was placed inside and has therefore a house broken into several parts. (Stavanger kommune, 2017b)

Present day modernism

Modern day architecture from the later half of the 1900's and to present day has influenced some areas in Trehusbyen. The goal has long been to create contrasts between new and old. The focus has since then shifted to better adapt to the existing styles and design. The contrast-approach has created some unfortunate outcomes within Trehusbyen. The results create disturbances in the existing environment and compromises the preservation of cultural heritage.

Figure 51: Neoclassicism (Stavanger kommune, 2017b)

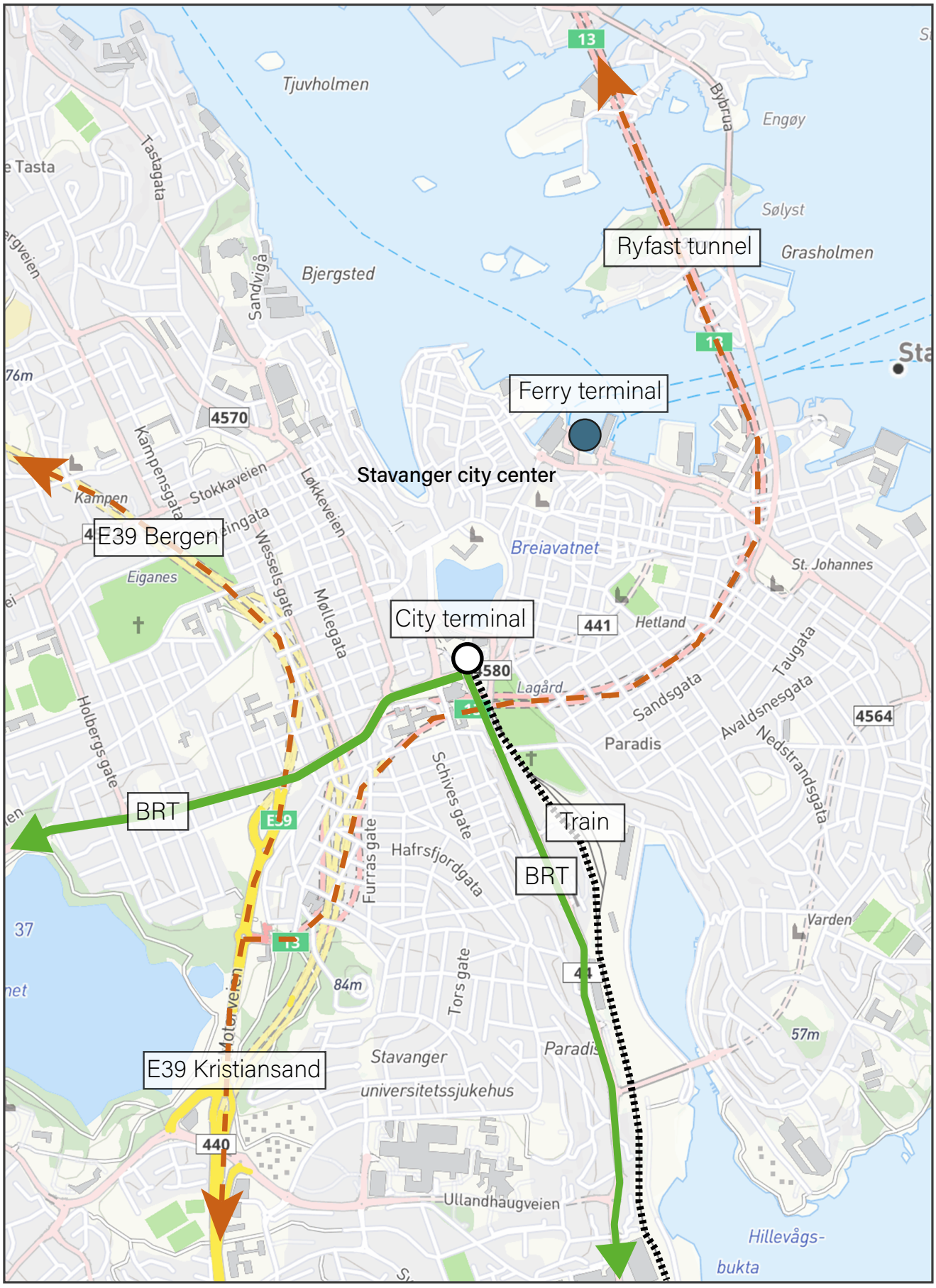
Figure 52: Functionalism (Stavanger kommune, 2017b)

Figure 54. Present day modernism (Hagen, 2022)

Figure 53: Post-war modernism (Stavanger kommune, 2017b)

3.5 Infrastructure

Figure 55: Regional infrastructure. Map source: (Rogaland fylkeskommune, 2022)



In Stavanger, the primary development strategy is revolved around "Bybåndet", between Stavanger city center and Sandnes where a new transport corridor is under construction, more specifically a bus rapid transit system. The regional transport connections are shown in figure 55. The BRT follows the direction of the train tracks towards Sandnes from the city terminal. The tunnels below the city centre were recently opened, with the traffic north towards Bergen follows E39 and the traffic that previously passed through Storhaug and Bybroa is no led in the tunnel known as Ryfast. After Ryfast, there were less need in the ferry transport.

Typical streets in Trehusbyen can vary, some are wide and therefore prioritized for vehicles, while some are smaller with little room for dividing transport modes. Some of these smaller ones have been re-designed to accommodate pedestrians, such as this famous example from Møllegata where the street is painted red, and bicyclist have the priority.

The current parking situation in Stavanger varies within the city but are generally related to the residences and streets. Some residences have parking on their lot, either surface parking or in a garage, whereas some have access to street parking, and some have no designated parking space. There are also several parking garages in the city centre and areas around.

Data from modes of transport for daily trips in Stavanger municipality showed that in 2019, 24% walked, 9% used a bicycle, 11% used public transport, 46% drove a car and 9% were passengers in a car. For work-related trips, 12% walked, 17% used a bicycle, 17% used public transport, 49% drove a car and 3% were passengers in a car. This indicates that although walking, bicycling, and public transport is popular, the majority still uses the personal car to get around. (Urbanet analyse, 2019) As part of increasing the use of soft mobility, Stavanger is largely investing in creating an attractive bicycle network around the city to facilitate for more people using a bike as their main form of transportation. Recently, the bike-highway to Forus was opened, going along the E39 route.

Figure 56: Streets in Trehusbyen. (Hagen, 2022)

Figure 58: Public spaces (Hagen, 2022)

Figure 57: Møllegata (Hagen, 2018)

3.6 Qualitative aspects

One of the aims of the second sub-question "how can cultural heritage be conciliated with new standards for sustainable development" was to research how urban heritage environments are managed. Part of this research was found in planning documents and reference cases from the theoretical framework. More specifically to how Trehusbyen is managed was found in the analysis of regional and municipal planning documents. The practical side of this aim is however difficult to conclude from theoretical research. To further investigate and understand different perspectives of urban heritage management, one solution was interviewing some experts in the field of city planning and cultural heritage with connections to Stavanger Trehusbyen. The interviews are also aligned with one of the aims of the first sub-question, which seeks to find the potential for development and sustainability in Trehusbyen, by finding the experts' perspective on this.

The experts are from the private sector and the municipality. The questions they were asked intended to uncover their own experiences and perceptions of development in Trehusbyen, with attention to how the processes handled cultural heritage. The questions were altered towards whether they worked in the municipality or the private sector.

Interviews

Elin Vileus Henricson

Elin is 39 years old and works as a landscape architect in the architect firm MAD in Stavanger. She has a broad experience with urban design and developing detailed zoning plans as a consultant.

What do you consider as Trehusbyen's most important qualities?

What is special about Stavanger and Trehusbyen is the historic identity it represents. The distinctiveness of the area is its widespread presence in the city and the scale of the buildings. The streets are a finely meshed network developed in a unique and organic structure over time, expressing how the city has been built from the core out based on the population- and city growth.

What opportunities for densification and sustainable development exist in Trehusbyen?

Stavanger municipality's city centre plan clearly prioritizes some areas for further development and densification, primarily the areas closest to the city core, the waterfront, and Pedersgata. We are developing new thinking patterns in city planning and there is an increased focus on sustainable development. Especially re-use and restoration are important themes, together preserving the existing qualities. Densification in existing urban areas is linked with many benefits considering reducing our carbon footprint, but densification must also be considered together with social health and enhancing our human identity together with the historic identity of our city. Densification must be done with respect, and with a careful consideration of potential advantages and consequences.

The potential in sustainable development and densification of Trehusbyen is perhaps in a concept similar to generational housing where people live their whole life and develop their home the way they develop their family, to prioritize the living community. Thinking new of the ways we live could be beneficial. Densification has long been a one-eyed strategy of political agendas, only deemed possible by building high and in smaller units. Stavanger east is an interesting example where urbanization has combined densification of an existing environment that holds heritage values with new buildings and functions. Otherwise, parking spaces could hold a potential for densification if this is compensated with a sufficient mobility solution.

What are the common aspects considered in a typical upgrading- or development process within cultural heritage?

Cultural heritage is not my usual era of expertise as a landscape architect but in projects related to Trehusbyen we work in teams of different experts and perspectives. We value investigating the potential for reuse and restoration of materials, especially in projects related to cultural heritage. This can also lead to great savings in both cost and energy consumption. Taking care of existing structures is beneficial for many reasons but not everything can be preserved, and this must therefore be considered in a greater context. Preserving something should be related to what qualities this gives, for example elements that can be a part of a new project such as facade materials or parts of the construction. Preserving green elements is also a great benefit, both as it is a part of the blue-green structure and climate mitigation, and it is important for biodiversity.

An important part of the job as a landscape architect is seeing the connections between the elements you are working with, and this also includes what is outside the perimeter or the project area. For example, we are looking at how one would orientate and

move about in the area and what qualities are related to this. You must see the pocket park in context with other parks and public spaces, and what potentials for variety can be created. Every square meter counts! It is about what your project can give back to the city and how it complements the area. Existing qualities must be appreciated and enhanced.

In your opinion, do the current regulations for Trehusbyen give opportunities for considering densification together with other potential upgrades of the buildings, streets, or public and private spaces?

I was involved in a project of St. Olav's quarter, where they were building a tall new building of apartments and therefore obliged to upgrade a public park in the area. The municipality set demands for what must be considered in these projects, and the outdoor recreational areas, both private and common areas, was an important aspect. In development projects there are requirements for ensuring qualities set by the municipality, and it is crucial that the municipality sets these demands.

Have you faced challenges in a building- or planning project with the current regulations for development in Trehusbyen, and if so, what kind?

In projects with cultural heritage, the easiest is to start a dialogue with the municipality from the start. They have great knowledge and sets demands necessary for preserving the cultural heritage values but are not unreasonable when it comes to preservation. A good dialogue does not always mean both parties agree, but finding compromises is possible.

The zoning regulations and planning documents are important for the project's outcome. Pedersgata is an interesting project as it is a part of the municipal city centre plan and there have been several studies and visions linked to the development of this area. It will be a pedestrianized main axis between Stavanger city centre and Stavanger east, and this should be enhanced. Several measures have been done to strengthen this area, such as active functions on the first floor of the buildings. It is great that someone invests in upgrading the area, but these investors often have their own agenda and want do see a return on their investment. Therefore, the street can now feel somewhat staged, as the area's character and identity has been weakened. Pedersgata previously had an identifiable characteristic with the many take-away places of different cultures, and more functions related to every-day activities. The question is therefore whether the area *needed* to be developed like this? "Strøget" in Copenhagen is an example where the area went through a larger development process leading to the street becoming an attractive area for residents and tourists, yet the every-day related functions and activities for the people living there where kept. Some of these functions and activities directed towards the residents of Pedersgata have been lost in the process, and something to take from this in future projects is to consider functions that naturally belong in an area, and not promote development just because we can.

How are regulations and planning documents affecting the outcome of building or development projects in Trehusbyen?

Perhaps the municipality could utilize their vision for the city and future development more in their planning documents and being bolder when setting their demands. They have done this in the past, for example when introducing the blue-green factor. Even though it faced a lot of resistance from developers, it is now a natural part of the planning process.

The challenge with zoning plans is that many are old and somewhat outdated. And then there is the ownership structure in Trehusbyen that makes development complicated. An example of a challenge with zoning plans was a typical area in Trehusbyen with built heritage and the typical block structure. There was a smaller access road to a few of the houses, mostly used as a pedestrianized walkway. But since this was zoned as a regular road for driving there were other criteria that did not necessarily fit. For example, it was necessary to use large streetlights, even though it could have been more beneficial to use lights more attractive for a walkway. In this case, bureaucracy hindered development that was best adapted to the area.

It is not just about the project area; it is part of a larger ecosystem, and this is where many of the challenges with zoning and regulations arise because it is easy to lose sight of the larger picture. And then there are cases where regulations limit new thinking, for example when solar panels or green elements on roofs of Trehusbyen are restricted, even though they could contribute to increasing energy efficiency or managing surface water. The volumes in Trehusbyen are important, but it needs to be possible to upgrade and develop what we have. Especially considering how we build with wood today and take this into the development. The waterfront and routes across the sea is also part of Trehusbyen and its material character.

What are the effects of separating functions like

housing and commercial in Trehusbyen?

The separated functions could be a result from expanding the city outwards and interpreting the regulations and planning documents too rigid, rather than seeing the potential in the existing areas. It is probably smart to focus on concentrating the functions in the city core, but we should also think of the network of good living-functions in the surrounding neighbourhoods. We need accessibility in our nearest surroundings, with common areas functional for the neighbourhood while also functioning as edges between private and public. And then there has been a shift after the pandemic when everyone was working from home. Suddenly the local grocery store became where we bought our lunch, and the home was now a mixed residence between housing and office.

It is of course important to be strategic in what functions should be allowed, and it is therefore beneficial that the municipality considers these in the respective context. At the same time, it could be shed more light on potential functions for the neighbourhood and focusing on the community rather than the commercial opportunities. For example, in Våland where there are several functions specific for the area, like the museum and other smaller businesses, and different recreational possibilities. The area then has its own points of attraction, separate from the city centre, but there needs to be a balance in this setting.

It is those who have resources that have the potential to develop, and many of these are home-owners in Trehusbyen. The city centre is an important place because it is meant for everyone, and therefore functions and public spaces are concentrated here. Trehusbyen on the other hand, is vast and provides a feeling of every-day life. The public space is important, and good meeting places must also exist outside the city centre. These public spaces and meeting places should be independent of socioeconomic status and for everyone to enjoy. City planning for *all* people is key, where we consider all ages and groups of people.

Anne Merethe Skogland

Anne Merethe is 56 years old and a civil architect and university lecturer. She is currently working as a senior advisor of recreational areas and environments in Stavanger municipality. Between 2005 and 2012 she was the head of the heritage management office in Stavanger and was a part of developing the current municipal plan for cultural heritage. She has also been the head of architecture, landscape, and planning in the firm Rambøll between 2013 and 2019.

What do you consider as Trehusbyen's most important qualities?

Trehusbyen as a part of the city has a unique atmosphere created by the historical buildings and details, the materials and scale, the structure of the streets and the spaces in-between. It is an experience of human scale of buildings and spaces, and it is a good place to stay and a good city to live in. And then there is the storytelling dimension of Trehusbyen, with a building mass covering multiple eras of the city's history. This building mass also reflects the economic development and main livelihood over the years, as well as the standard of living, and the political and religious part of the history. Trehusbyen is a crucial part of Stavanger's identity and soul.

How can development and densification in Trehusbyen contribute to new qualities in the city?

To begin with, Trehusbyen must be acknowledged as a quality and resource for sustainable cities – both in the environmental aspects, social, and economic. To achieve this, Trehusbyen must be recognized for its heritage as a value that should be protected with a potential for development within new forms of use. The human scale is crucial in understanding what creates an attractive atmosphere. From an environmental perspective, Trehusbyen has a positive carbon footprint, and it is built in wood. It is also an important environmental- and economic factor that it is already built. A development that acknowledges these values are necessary for finding the potential for densification. To find the potential for densification, the existing density should be mapped, the structure of the streets must be considered, and the parking situation and other courtyards could hold a potential for densification in the form of infill. The densification potential must coincide with the existing scale of the city. It is then possible to continue the identity through the character and craftmanship, creating a completer and more sustainable city development. Trehusbyen could

set the terms for new buildings and architecture in Stavanger, and this must be seen as a resource and opportunity, not an issue.

What are some of the challenges to be faced when working with today's regulations for development in Trehusbyen?

Stavanger and Trehusbyen have had a long history with city planning and strategic measures. The planning and building act have been an important measure to regulate the protection of built heritage. Several generations of cultural heritage plans, and aesthetic guidelines have had a great impact. Aesthetic criteria were made legally binding in the former paragraph 74 of the planning and building act. The paragraph was meant to guide rehabilitation and maintenance of the built heritage, but also potential additions and extensions to the buildings.

The aim of regulating built heritage is to protect the buildings from demolition, in addition to setting the framework for potential restoration, new buildings, and managing neighbouring areas and public spaces. In the end, it is the politicians who make the final decisions in new projects and plans that concern Trehusbyen, while the municipality as the planning authority set the guidelines. In a compact city with many parties of interest there will always be opposites that affect the solutions. A private developer's intention is to ensure an acceptable return on their investment. Investing in and developing an area with many heritage values will then have colliding interests. Cultural heritage is a non-renewable resource and must be managed as such. Existing plans and regulations have a defined area of flexibility that gives room for potential development, but this requires a lot from architects to adjust and adapt the necessary solutions in an acceptable manner.

What are the common aspects considered in a typical upgrading- or development process within Trehusbyen and cultural heritage?

In my own experience as the former head of the heritage management office in Stavanger municipality, when it comes to restoration and densification it has been important to recognize the topography that has created the expression of Trehusbyen and seeing the single wooden houses with their belonging elements as an important part of the city image. The plot must be acknowledged as it is and we must consider re-using and repurposing materials, the scale, and the relationship between the private and public space, and how this can be brought on. To best adapt, one must see the details like where the entrance and stairs have been, if there were gardens in the front, or reinforcements of the foundation, and so on, and then continue these specific qualities. Then, the historic use and design of the plot and building can be investigated. For example, many of the wooden buildings formerly had active first floors where the residents typically had a shop below and lived on the second floor. These are qualities known to contribute to a vibrant and attractive city. It is also necessary to understand what does not belong, for example parking in the first floors or partly in basements. These are implementations destructive to the qualities of the built environment in Trehusbyen. Consequently, bringing architects and planners into dialogue of what works and what does not work early in the project is the best practice.

What are the effects of separating functions like housing and commercial in Trehusbyen?

The municipal plan for the city steers mixed functions towards the city centre, and most of the plateaus around the city core like Våland, Storhaug, and Eiganes has a typical residential character today. Historically, however, these had more functions specifically directed toward the neighbourhood and people's everyday life and chores. We often speak of the 10-minute city in city planning. The areas of Trehusbyen were 10-minute-cities back in the day, with active first floors and mixed functions. Then the use of the buildings changed, and they were sectioned into apartments or repurposed to single-home residencies. Many of these traits from development has therefore changed the character of the city's areas.

How are regulations and planning documents affecting the outcome of building or development projects in Trehusbyen?

For heritage protection, existing planning documents have a sustainable profile. The attention is directed towards preserving what we have and acting with care in maintenance and management of the built heritage. Recycling is not new. What we today refer to as circular economy has been the motive in the urbanization of Stavanger as well as other cities. There is a great potential for learning to understand this part of the cultural history. This approach fits in well with the future of city planning to reach UN's goals for sustainability, and especially number 11 that concern living and attractive city environments. Here are all elements of cultural heritage important to create a sense of belonging and identity. It is the municipal plan that set this framework, then it is the heritage management's responsibility to maintain it. The practical side of this management still has a

long way to go. In a democracy, it is the elected representatives who make the final decisions on protection and redevelopment. They are naturally affected by the public opinion, and they are also experiencing pressure from developers. It is demanding for the local planning authority and the heritage management office to stand their ground in the crossing pressure between such processes. In experience, it is often the economic interests of the developers that "wins" the fight on land areas and the direction of city planning.

What background and resources do the municipality have to contribute the citizens of Trehusbyen in the process towards densification and upgrading energy efficiency in buildings?

The municipality's resources are mainly in the ability to guide and aid residents and developers in this process. It certainly sends a strong signal how the municipality manages their own buildings within Trehusbyen, and the municipality should lead the way as a good example. Then there are different grants and subsidies, but proper heritage management and aesthetically good solutions are dependent on proper advisement from both architects and craftsmen with knowledge and experience. This is however not the deciding matter on what projects are engaged from private developers. In new development and densification projects there is a lot of responsibility placed on the developers' architects, and the developers' will to see a project through, to find a combination between old and new.

The early stages of the planning process of a zoning plan are important, and very often representatives from the heritage management office are involved in the start-up meeting. This is where a lot of premises are decided for the future development, such as choice of concept, framework of the building process, and regulations. Although, a reoccurring issue is that many of these decisions and good ideas set early in the planning process are lost when they move further into other municipal offices.

The municipality must have an active position towards protection and development of Trehusbyen in a city planning perspective. It is crucial for a city's identity to ensure continuous protection and proper management of the built heritage. This requires the proper education in history, design, planning, and written and oral communication abilities as it is the professional environment in the administration that presents cases to the elected representatives who in the next step make the decisions.

Liv Færing

Liv is 38 years old and an architect currently working as an advisor in the office of heritage management in Stavanger. She has previously worked as an advisor in the planning department of Stavanger municipality. With this background, Liv has a profound knowledge in heritage protection and municipal planning.

What do you consider as Trehusbyen's most important qualities?

It is difficult just to point out one or two. I think what is most important is the structure of the buildings, and the social aspect of that way of living. It is modernism, but in different forms. It is about the space, light, and ground contact for everyone who uses Trehusbyen. And then there is the history its narrating, with rich details and materials.

How can development and densification in Trehusbyen contribute to new qualities in the city?

I am waiting for others to show me how this can be done. I have not seen many clearly good examples where densification in Trehusbyen has not been at the expense of other qualities. This is the reason for preserving Trehusbyen, not because all development in Trehusbyen is considered negative, but the development must be done on Trehusbyen's terms. Potential densification must be done in the same structure and scale as the existing environment. The human scale is one of Trehusbyen's most important qualities. And then there is the question of what degree of density. What are the expectations? There is a difference of filling in all gaps of a block or filling in the gaps of one property where there is space for it. This is a persistent pressure. Adding space to the building in Trehusbyen has been done since they were built originally, it is in the spirit of Trehusbyen. The aim, however, must be to build in a design and materiality that connects to Trehusbyen as a whole.

What opportunities for development and densification exist in Trehusbyen?

There are possibilities for adding space to and adapt existing buildings to accommodate present needs. Trehusbyen has a very flexible structure and buildings, with rooms that also hold an important quality. The buildings can serve those who live alone and those with families, and there is a large diversity of opportunities. The houses are not static, a dual-home residence can become a single-home or more apartments. It is not necessarily the houses that are limiting development, rather what fills the

space between the houses. Often cars are limiting, and the expectations of private outdoor areas on ground level cannot be fulfilled for everyone.

What challenges are you facing with today's regulations for Trehusbyen?

It is a repeating challenge with the high expectations for more dwellings in a building than what is reasonable. Especially around the city centre this is an issue, and the result is a "hyblification" (dividing residencies into as many smaller dwelling units as possible). And then there are expectations of parking your car on your own lot. This has been the idea in municipal planning for a long time, that cars should be parked on private ground rather than in the streets. However, this has shown to threaten the typical front gardens of Trehusbyen and the spaces in-between the houses. It has also become a necessity for many to be able to charge their electrical car almost right by their front door, needing additional installations on the facades that do not belong.

What are the common aspects considered in a typical upgrading- or development process within cultural heritage?

There is typically a difference for considering an area or a building. In an area, I fear a higher density alone is the main goal, to have as many usable square meters in the plot as possible. It is crucial to use the area efficiently, and if it is a larger area that is considered it could be sensible to have ambitions. For a house, however, people can often feel as if they have very limited options when it is expected that the building is treated as an object and memory of its time. They may have an expectation of what options they have before they consider that the building is in Trehusbyen, and then they realize the options is less varied. But there are few cases where the municipality is advising on a building project in Trehusbyen, and people end up disappointed. When we present the options based on the building's original design and expression, they realize that this is what suits their house best and that it is something to feel proud of and hold onto. There are still possibilities for development, the buildings are adaptable.

What are the effects of separating functions like housing and commercial in Trehusbyen?

I do not agree that this is a common practice. Looking at the municipal plan I can understand why it may be interpreted this way, but in the spirit of Trehusbyen there were shops and workshops scattered around and in between the rest. This is a part of the structure in Trehusbyen that the municipal office of heritage protection wishes to sustain, granted there is a customer demand that can make it possible. If there is room for it, it will be decided by the market and demand. There are certain courtyards that used to be connected to businesses or commercial use and has since been used for residential purposes. These aspects have changed and often been privatized over time more than it has been sustained. It is not a goal for the municipality and the heritage office to separate residential and commercial use, quite the opposite. The finely meshed network that Trehusbyen used to be historically, is today's goal of a 10-minute-ctiy.

In every zoning plan it is considered what purpose the buildings are suitable for and if there are premises or important walkways that could hold a potential for more than just residential use. It is in the detailed levels of a zoning plan we can detect these opportunities. It is possible to allow other functions within residential areas, if this does not compromise other necessary qualities in a residential area such as noise, dust, or smell. In the municipality's own zoning plans of existing areas, we consider what the premises have been traditionally. An example is the area of Vestre Platå where we investigated what buildings used to have mixed functions and if they were suited for this today. This resulted in some buildings on Eiganesveien and Klinkenberggata where it was facilitated for mixed functions in the form of active first floors and activities directed towards the public. It is desirable to continue these traditions.

How are regulations and planning documents affecting the outcome of building or development projects in Trehusbyen?

Superior planning documents affect how we form our own municipal plans and strategies. For example, in the new municipal plan for cultural heritage we are suggesting that plans should strive to preserve the existing character of a place, and that new development must coincide with what is already there. We set guidelines that are undertaken into detailed zoning levels, and it is therefore important to maintain the good ideas in these processes as well.

How do you experience that the good ideas set in superior planning documents are continued into further detailed plans?

In theory this works well because there is a lot of cooperation and dialogue between the different departments in the municipality. But when facing reality, it becomes challenging if there are developers

or owners that have a completely different intentions for their property than the planning documents. When facing colliding demands and desires it is often a compromise that must be found. There are politics and other factors that must be considered and weighed as well.

What background and resources do the municipality have to contribute the citizens of Trehusbyen in the process towards densification and upgrading energy efficiency in buildings?

In Trehusbyen it is the house owners that approach us [the office of heritage management] and then we give concrete advise and guidance, whether it is an extension of the building or improving energy efficiency. For example, we advise on improving insulation or what kind of windows are acceptable if they consider replacing them. The advice is based on each building's character but on an overall level. We have the opportunity to see the potential development or upgrade connected to the existing environment. It is beneficial that those who contact us for advice have a plan in order for us to give the most concise advice, but in cases where they do not, we can guide them in the direction where they can find more information. There are also measures in laws and planning documents to make it easier to choose greener solutions. Such incentives are brought on in all cases where it does not conflict with other necessary demands. In Trehusbyen it is useful to have a dialogue before implementing measures, to ensure it does not compromise the cultural heritage.

Findings from interviews

All experts brought up that the important qualities of Trehusbyen were the historic identity it represented, the structure of the streets and typology, the human scale, and that it was a good environment to live and stay in. There was also a common agreement that potential sustainable development would need to adapt to the existing environment. A way of doing this could be by actively using the heritage values as new qualities and a resource for sustainable development. In the process of densification, it will also be necessary to manage the expectations of the parties involved. There is a balance between deciding what is the desirable outcome of a densification process, and what is possible within the terms of preserving the heritage values. The desirable outcome should also reflect on the specific location and existing situation.

Everyone identified parking spaces as a specific potential for densification of the built environment. The buildings of Trehusbyen have flexible bodies that have existing potentials for adaptations and changes of use. Both Anne Merethe and Liv, who has detailed experience with advising on projects of heritage buildings in Trehusbyen, mentioned this flexibility of use and shape as a quality that should set the terms of expanding and altering the built environment. Elin described the way of living as a potential for new thinking patterns in the debate of densification, such as developing our home with the stages of life. The neighbourhood qualities and functions are also an important part for finding the potential, and it is therefore necessary to also think outside the project's boundaries, to find the connections to the surrounding environment.

The most common aspects in development within cultural heritage was how to use an area as efficiently as possible without compromising living qualities damaging heritage values. Having plans that set the necessary boundaries to ensure protection is crucial, but difficult to set specific regulations without limiting the possibility of development. Both Liv and Anne Merethe brought up how Trehusbyen's history holds a potential for how present-day needs can be accommodated. The best example is how the areas of Trehusbyen used to be 10-minute-cities, a goal in modern day city planning. An important aspect for successful 10-minute cities is mixed functions, and the layout of the streets and the flexibility of the buildings in Trehusbyen still possess these abilities. There is no need to re-invent the city when the base is already there.

3.7 Main challenges

Planning documents

With fewer services and workplaces relocating from the city centre, and new housing alternatives that are more modern, cheaper, and spacious, it threatens the attractiveness and liveability of the city. The buildings of Trehusbyen are attractive and highly priced, causing many to move out of the city in the need of more space. If the compact city is to become sustainable, a perquisite is that the city remains attractive with good living conditions and a variety in housing alternatives to ensure diversity. Shaping planning documents to accommodate these challenges are difficult with respect to the cultural heritage.

Trehusbyen has existing regulations on how future development can be conducted. The different areas also have separate zoning plans and general regulations for protection. All development and changes to buildings in Trehusbyen must be approved and processed by the municipality. The municipality is striving to guide and help residents in these processes, to find the most desirable solution fitting to the regulations. These rules are made to protect the identity and historic value of Trehusbyen. As this is important to ensure they remain for future generations as well, they can be challenging in development processes.

Knowledge and financing

Navigating development projects with the amounts of regulations and rules there are today can be considered complicated, and within a heritage area this can be conflictual. The need for expertise is therefore high, but the specific knowledge needed when dealing with development in urban heritage environments is not always easy to find. There is general guidance and help to find more knowledge and contractors, but this is reliant on the owners reaching out. The processes may also be expensive, as more unique, and specific solutions are required. There are grants to apply for, but not all are eligible, and they do not cover everything.

Technical requirements and obstacles

Since the buildings in Trehusbyen was built, there has been a comprehensive advancement in technical qualities for buildings regarding insulation, air quality, heating, construction, and more. This has led to stricter requirements for new building's technical quality, and for renovating older houses. Although these requirements make projects more costly, they come with great benefits such as less energy consumption for heating, better indoor environments, and longer lasting houses. But the added expenses when renovating elderly houses in a cultural heritage environment may cause the project to be discontinued. The technical requirements are also based on new buildings, and therefore complicated to adapt to older buildings with a different building style and technical abilities. As findings from the scenario study from Innlandet County and interviews with experts suggested, there were possibilities for general measures towards improving energy efficiency in older buildings, but there was also a need for specifically adapted measures to ensure the heritage values.

Existing use of space

One of the main challenges concerned with densification in a cultural heritage environment is the conflict with existing use of space. The lots are often small, and most of the space is taken up by the building. The remaining could consist of garden space or private outdoor recreational area, parking space or garages. Within the building there may be larger areas that are not for residential use, such as basements or storage rooms. Gardens and outdoor living space are important for living quality, but parking spaces and indoor spaces have a potential for new use and can be repurposed. There is challenge with repurposing these spaces because of the many smaller plots within a particular block, and this makes it difficult to coordinate a general approach.

Expectations

In an urban redevelopment project involving existing built areas, there are several parties of interest with different expectations. The planning authority sets the general framework for the development but are reliant on developers to plan the details and complete the projects. While the planning authority is concerned with creating good areas that meets the necessary requirements for a plan, the developers main concern is an acceptable return on their investment. Residents and homeowners are interested in their own lot and house having most of the desired qualities, and that these are not affected by the development. Successful urban re-development processes are then dependent on finding a compromise between these parties. This compromise is rarely equally beneficial to all parties. This requires well-coordinated processes where the necessary parties are involved and kept informed.

Future needs and wants

There is always the challenge in planning to plan for future needs and want, the concept is often referred to as forecasting. Forecasting is usually based on data and existing knowledge and the plan is influenced by planning strategies from governing levels. The general strategy in city planning has been rebranded to a more sustainable focus, with development directed toward existing built areas. After the pandemic, the norms of every-day were changed. The ability to do almost any work from home, as well as new hobbies and activities taking place in the space of our own home appeared. There were many cases where people moved out of the urban cities to rural areas with more space and nature around. After the restrictions of public activities and gatherings lifted, and the city life awakened, the streets were packed with people wanting to experience life again. Society tends to bounce back to normal rather quickly, but some of the changes in our everyday lives had come to stay, such as working from home.

Transport needs are another aspect related to planning for more sustainable cities, as the desire is to reduce car use and have more people using soft mobility as their main mode of transport. The general strategy in Stavanger is to invest in efficient public transport along main axes and focus new housing development around these. The regional transport systems are a cooperation between the county and municipalities. Planning for more public transport and facilitating for soft mobility within the existing districts of Trehusbyen is challenging, as infrastructure often is land-consuming and is currently best adapted for cars. To try and reverse and reduce the car use, a trend is to redesign streets to accommodate pedestrians and cyclists, as well as increasing public transport alternatives. The challenge is to plan infrastructure without compromising the cultural heritage.

4. Design framework and potential interventions

The framework is based on the goals from the directorate of cultural heritage and the findings from interviews with experts. Existing planning documents and practices do not show in detail how development to increase sustainability of Trehusbyen should be done, as it is not directly considering it. The following goals is the foundation for Trehusbyen can cope with new standards for urban sustainability without damaging the heritage values.

- Cultural heritage environments are used as a resource in sustainable city planning and the value and importance of cultural heritage sets the base for protection and the potentials for development
- Managing heritage environments contribute to reducing climate gas emissions by facilitating potential development continuing and preserving the city's diversity and historical distinctiveness

It was identified that one of the main challenges for cultural heritage environments is the pressure from new development. Possibilities for densification are not discouraged but presented as an opportunity that can be pursued in line with ideals of conservation. Future needs and pressure from developers and politicians will likely sustain, possibly with a focus on what opportunities exist for densification in Trehusbyen's districts around the city center. Further detailing of the issue was needed.

The newly proposed plan for smaller house-areas in Oslo is an example where development is strictly regulated to preserve the character and qualities of the area. Although regulating areas to set demands that ensure future development is crucial, especially near city centres and highly populated areas, the small house plan may be a challenge by restricting the area's ability to adapt to future changes. Official planning documents like the small house plan is a time- and resource consuming process for the municipality. Approving a plan of such extend that can be considered in partial conflict with governing ideals for future sustainable city planning may result in the plan draining resources for the municipality far more in the future. Planning documents should encourage densification in cultural heritage environments but in a sense that ensures the heritage is continued. The potential for development in cultural heritage environments is aligned with the ideal "preservation through use". It is a necessary concept to ensure the future of cultural heritage and reflects both the concept of preservation and adapting for how it can be used.

Findings show that there is existing room for development in Trehusbyen, but this is currently based on the single plots and will of the homeowner. Existing plans ensures the cultural heritage of Trehusbyen is preserved in development cases, but with bigger projects that concerns densification, further clarifications would be beneficial. There is a need for a more specific framework if sustainable development is to enhance new standards for sustainability without damaging the heritage values. A framework that considers the important aspects of a development process and includes recommendations, design principles, and possible interventions for densification and improvements of sustainability in Trehusbyen. The framework is meant to guide a densification process and development in Trehusbyen with respect to the built heritage.

The design framework and potential interventions are based on an initial definition of the specific potential for sustainable development and improving standards for sustainability. The design framework then includes principles for how the cultural heritage values of Trehusbyen can be conciliated with new standards for sustainable development. The potential interventions give recommendations for how to attain the presented standards for urban sustainability.

4.1 Defining the potential

4.1.1 The neighbourhood and blocks

A general agreement found both in planning documents and in the interviews, is that the value and importance of cultural heritage must set the base for protection and the potentials for future development. Trehusbyen is a continuous heritage environment with many similarities and general traits, yet there are great variations in the existing situation and what is part of the cultural heritage. The block structure and typology are found in many variations, and specific principles that fits all is therefore not realistic. The idea behind the framework is to highlight what traits are generally found in Trehusbyen and what aspects must be considered in a sustainable development process related to these.

In "Playing with density", author Anita Grams described clarifications of planned outcomes at an early stage as crucial for inward development to be successful. This was the best practise for turning the different parties involved towards acceptance. Grams was referring to the acceptance of citizens and local authorities, but such clarifications will be crucial also for managing developers' expectations. The clarifications necessary at the start of a project may not be easily defined. Jennie Sjöholm's case study of Kiruna showed how lacking assessments of the impact the potential development would cause the built heritage. Varying perceptions of what values were important to preserve in the process lead to miscommunications affecting the outcome negatively.

The best start of any development process is an analysis that reveals the place specific aspects and existing qualities, as well as what typical challenges the area faces. In the context of Trehusbyen as a heritage environment, it is also interesting to look at what the historic qualities or functions may have been. Stavanger Municipality is thinking ahead with having a strategy for aiding and promoting the use of spatial analysis in the beginning of the planning process. This analysis' purpose is to uncover what general aspects are to be considered further in the process. However, a more detailed analysis for finding the place specific potential for sustainable development in Trehusbyen is necessary. A successful development process in Trehusbyen strengthen spatial and cultural qualities while potential space has been repurposed and utilized. Taken into consideration the spatial and historical variations found in Trehusbyen and within a block, there is a need for a coherent analysis for the full potential to be uncovered.

Figure 59 is a model for what considerations should be made using a block-by-block approach, including the surrounding neighbourhood and important connections.

Figure 59: Defining the potential – The neighbourhood and blocks. Conceptual map, not to scale.

4.1.2 Buildings, plots, and the built environment

Stating that cultural heritage should be used as a resource in new development is one thing, but this is challenging to do, both for technical requirements and design. It is an issue that require profound architectural competence and is dependent on the developer's willingness to see it through. The Hustvedt quarter is an example where the developer's desired outcome was not entirely aligned with the cultural heritage's existing room for development, even though this was a possibility.

The findings from the case studies of Innlandet County made it possible to make some general approaches for reducing energy consumption, but it was still necessary to use specific measures in each case to ensure optimal results. The same must be done to find the optimal approach for sustainable development. To find the detailed potential for improving sustainability within the blocks, it is necessary to go further into detail to reveal the potential of the buildings within the terms of cultural heritage. Studying the individual buildings and their plot will create a more comprehensive understanding of the historic use and qualities, contributing to a broader selection of possibilities that are aligned with the cultural heritage.

Expansions or additions to the building must be done in respect to existing built environment and the buildings design. An important step for being able to move forward with sustainable development in a built heritage is to decide upon what should be preserved and how. Ensuring the character and typology is the first step and adapting to these is adapting the development to the built heritage. Examples of how new urban development projects can be adapted to a heritage environment showed that a main factor considered was the typology and volume. Like in the paper "Rotterdam – People make the inner city", the types of buildings that belonged in specific areas were defined. That is a necessary

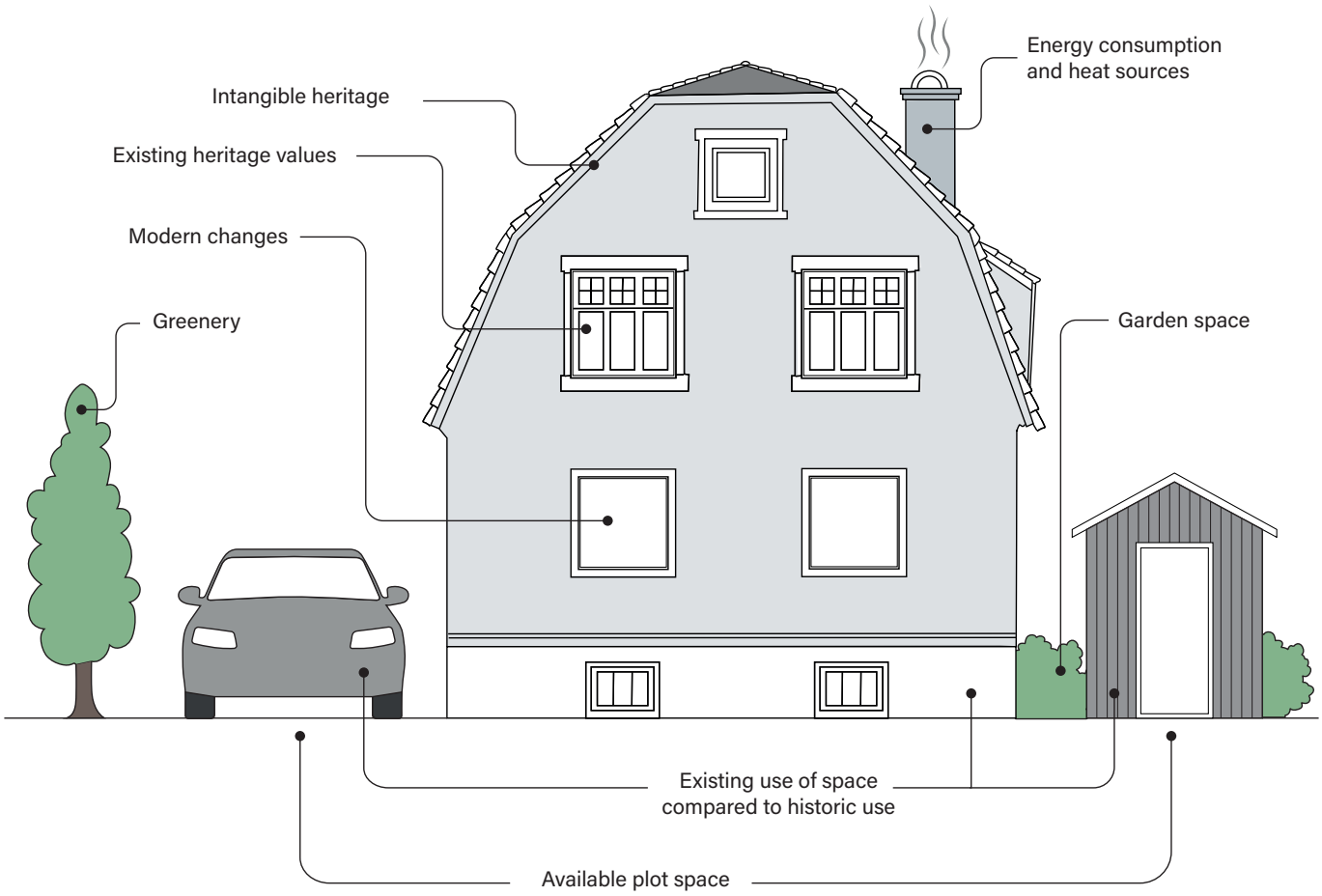


Figure 60: Defining the potential – Buildings, plots, and the built environment. Conceptual map, not to scale.

clarification for Trehusbyen as well – the character needs to be continued.

The figure illustrates what aspects should be considered in the process. It is necessary to define the available plot space and what this space is used for today. The same must be done for all indoor space. Defining what exist of the original building, and if there has been changes from this over the years. The intangible heritage should also be considered. Then mapping the existing heat sources and the building's energy consumption is useful, and if there have been measures to improve this previously. The existing greenery and gardens are important and should be continued.

4.2 Design framework

4.2.1 Buildings and the built environment

David Sim describes in "Soft City" that the combination of density and diversity increases proximity (Sim, 2019). The buildings in Trehusbyen were found to be flexible and adaptable to change, coinciding with Sim's third criteria for livable urban density. This is the underlying idea for the presented potential for buildings. For example, many of the buildings have basements or floors that are not for regular residential use, and these could therefore be used more efficiently. Basing new development on the existing character and design of the building ensures it is adapted to the cultural heritage. Returning other modernizations to the original expressions will improve the heritages' expression. Defining early what exists of the original heritage can contribute to ensuring the planned outcomes are fitting with the historic identity. This also requires a plan for how the heritage is to be preserved or changed. Looking into the historic use of the building can reveal new possibilities that had not initially been considered, such as mixed-use.

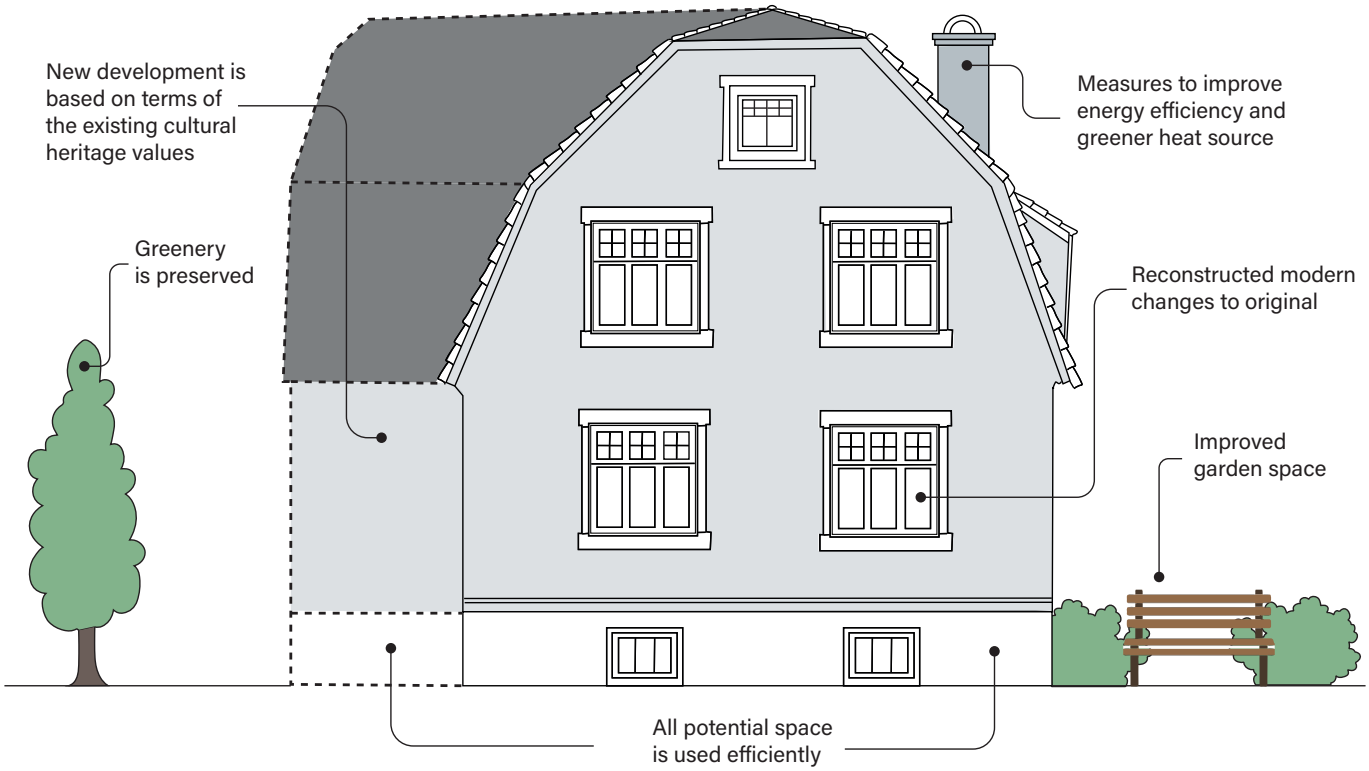


Figure 61: Potential – Buildings and plot . Conceptual map, not to scale.

Figure 62 shows the potential alternatives for densification of the built environment with the respect to the existing typology and human scale. **Expansion** involves expanding the existing building by continuing the style and shape. It can also involve sectioning the building into more dwelling units, either vertically or horizontally. **Multiply** involves building a new building by multiplying the existing unit to ensure uniformity. By **infill** of potential space between buildings it can be possible to create either new dwellings or extending existing buildings for more space. **Transformation** of an existing underdeveloped plot can create a new building that fits the surrounding environment. **Utilization** of the existing space in the buildings, such as basements, can add available space for the existing home or a new one. **Extensions** are useful when the original building could use more indoor space, for example an extra bedroom or office. **Gardens** and **greenery** are important for outdoor recreational activities, water management, and biodiversity, and these should be preserved.

To increase the diversity of the built form, an option is thinking new when it comes to ownership and division of plots. The principles are general examples of the potentials within Trehusbyen, but these will vary in the specific design and must be based on findings from analyses to form the optimal designs. The principles are based on the existing guidelines for Trehusbyen by Stavanger municipality, the densification + greenification strategy from "People make the inner city", and Grams' schematic diagram of inward and outward development.

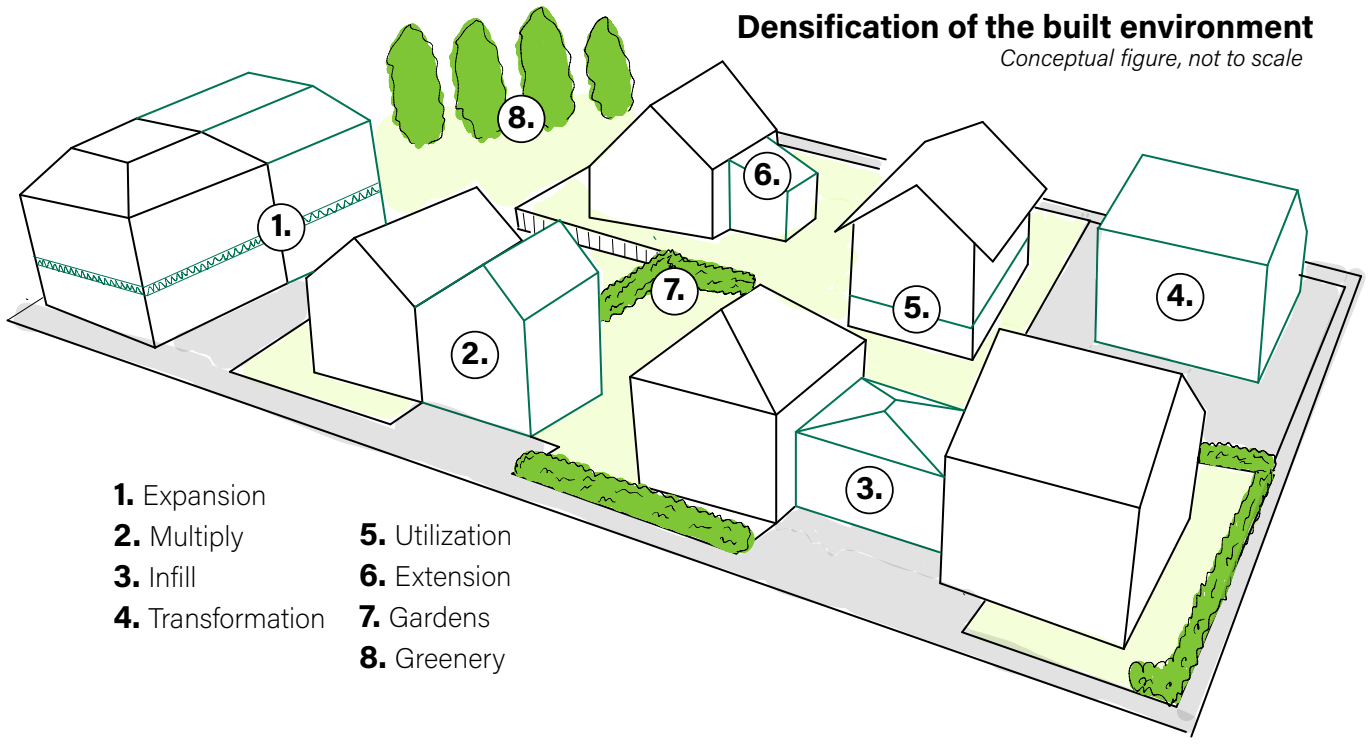


Figure 62: Potential – The built environment. Conceptual map, not to scale.

4.2.2 Private and semi-private spaces

David Sim describes in "Soft City" how enclosure of blocks naturally creates a space between the blocks, leaving streets and public spaces, and they are defined by the edges of the buildings. Enclosure creates controllable private outdoor space. Being able to spend time outside is important for health reasons and mental well-being. Everyone needs access to outdoor spaces, but not everyone has ground-access to private outdoor spaces.

Many of the buildings in Trehusbyen have large, green gardens, with good sun conditions and protection from the weather. However, these only belong to the building on the plot. If the building has been sectioned, it is often only one of the units that have garden access. As an alternative to the separated backyards of the blocks, there is a possibility of creating a shared courtyard, where the area is joined and available for all residents of the block. Buildings would still have private outdoor recreational areas but would have access to larger and more attractive areas as well.

Families tend to move out of the city rather than to live in apartments for access to larger gardens and more indoor space. But families are smaller these days. A fair division of the available garden space in the blocks of Trehusbyen could allow more people to live in sectioned buildings and still have ground-access to semi-private outdoor spaces and the needed space indoors. Communal semi-private outdoor spaces can contribute to new social possibilities in the neighbourhood. Diverse outdoor spaces are necessary for livable urban density in "Soft City", and these must be easy to access and have different purposes. (Sim, 2019). Rethinking private outdoor spaces in Trehusbyen can contribute to this.

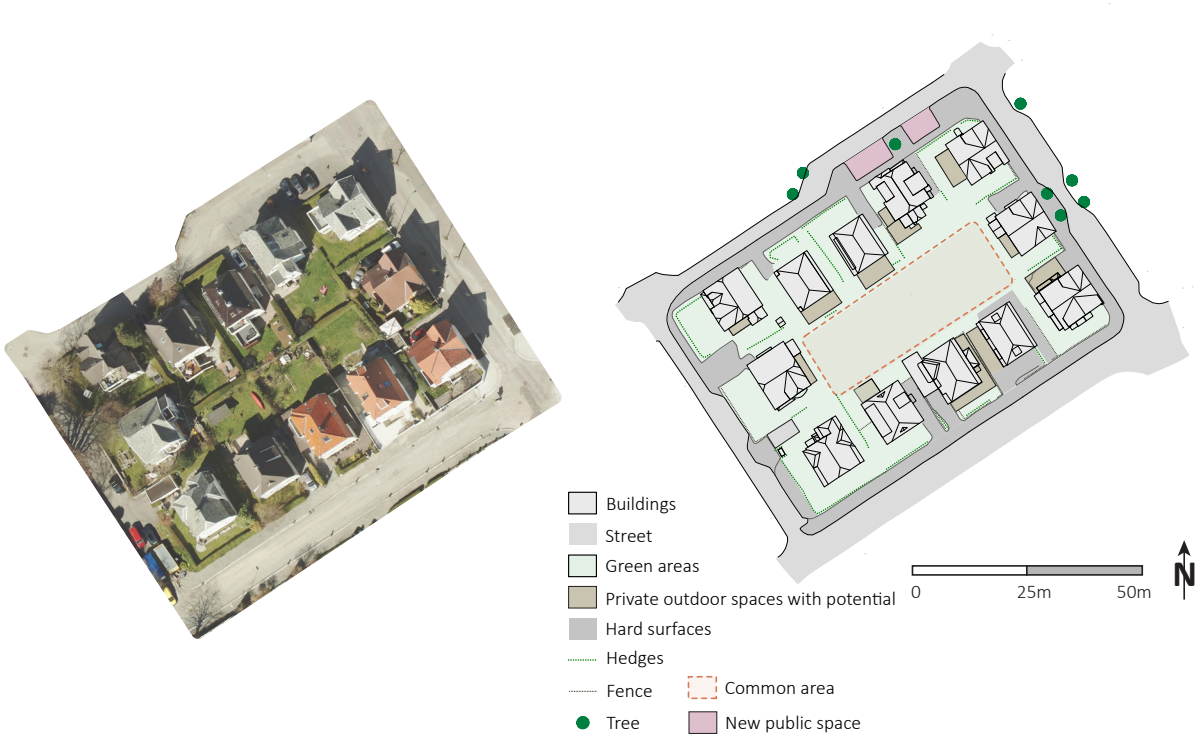


Figure 63: Potential – Private and semi-private spaces. Map source: (Norkart AS, 2022)

4.2.3 Streets and public spaces

As described in "Soft City", mobility is not just about the destination, but how you get there and what is on the path. (Sim, 2019). Walking a distance in an area gives different experiences depending on the surrounding environment, even if the distance is the same. The surroundings, the layout of the street, and the other users of the street will impact the experience of walking in the area. A quality connected with walkability is human scale, which Trehusbyen has. The layout will impact what users have most influence in the street, and the case is often that the street is facilitated for vehicles. Designated areas for pedestrians increase the feeling of safety and allows for efficient throughfare.

With reducing access for cars in the streets they will be more attractive for pedestrians. Use of greenery in streets was also shown to have benefits for attractiveness, as well as climatic management and protection, and biodiversity. Safer streets with fewer cars are also beneficial for children and playing. Planning for child-friendliness is more than a few playgrounds around, it is also broader sidewalks, and slow traffic accommodates safe play and stay. (Tillie et al., 2012). Reducing access for a popular mode of transport is most successful when there are other options that can fulfill the transport need. The districts of Trehusbyen have various options for public transport in the nearest area but are generally not far from collective routes. Reducing access for cars is composed of reducing mobility in the streets, and access to parking. A lot of the area on the plots of Trehusbyen that hold a potential for increasing the built area will be surface parking. The potential for densification within the blocks is connected to the potential of the streets.

The figure shows the concept of how to organize the local infrastructure. By defining some collection routes for vehicles and public transport that have connections to important areas of the city, such as transport nodes, larger public spaces, or workplaces it is possible to prioritize other streets for pedestrians. These collection routes can be attractive for mixed-use purposes and can serve as an extension of the city centre. The block structure of Trehusbyen is flexible to adapt to such changes in the transport network. The connecting streets have reduced mobility for cars but attractive for walking.

When concentrating more people in an area there also needs to be capacity for the necessary functions, such as public spaces. Taking advantage of the street and smaller unused pockets of space can contribute to more diverse public spaces in the neighbourhood. Ensuring good connectivity otherwise to larger recreational areas is also important, such as parks or playgrounds. Connecting public spaces to specific functions can also create more livable spaces, for example smaller plazas connected to a business.

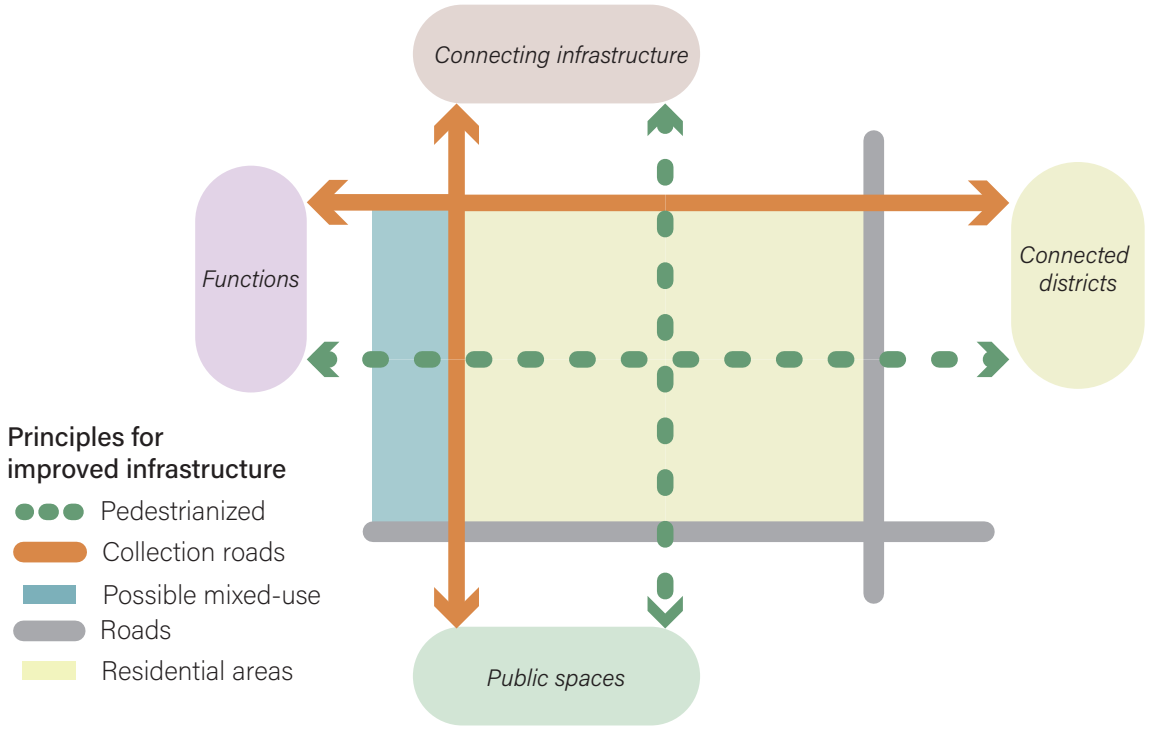


Figure 64: Potential – infrastructure network

4.3 Recommendations

4.3.1 Strategic areas

For future development the Municipal plan have prioritized the city centre, established local centres, and larger axes along the public transport routes. A similar strategy should be applied to the city districts, but more locally focused. By prioritizing certain areas, blocks, and streets based on existing density, connections between the area and other functions, public spaces, and pedestrian or public transport routes, there would be a sensible place to start new processes from and attract either developers or encourage residents. Some strategic areas can also ensure a coherent local infrastructure network, with connected pedestrianized walkways across districts. To find possible strategic areas, using digital tools for mapping the existing situation could be useful. Pointing out more small neighbourhood centres, for example based on historical information, where it is easier to establish new businesses or activities could be considered attractive.

Figure 65: Local strategic areas

4.3.2 Mixed-use

The current plans open for allowing other functions inside residential areas in Trehusbyen, but this will require an application to the municipality. This may be perceived as a barrier for opening new businesses, and as the current plans are mostly regulated for residential, it may be difficult to see that this is even a possibility. On the other hand, it is beneficial that the Municipality as the planning authority can express their thoughts in these matters. The case of Lervig local pub is an example where the Municipality approved a business in a residential building. It was evaluated that this would not unnecessary bother for the residents around. When mixing uses in what has been residential areas for a long time, it is not surprising the neighbours may find that unacceptable and are worried about noise or other consequences. Having the municipality as a third-party that can make assessments to ensure the residents' worries are heard and have evaluated these, can reduce future conflict. The issue for the residents with Lervig local pub seems to be mostly rooted in the residents not knowing that this was an option for their new neighbour, and they could not be expected to know based on the existing zoning plan as this is not something the public have detailed knowledge of. There is a need for clarifications in an early stage considering mixed-use in residential areas, with assessments for how it will affect the area. It is then beneficial that it is the planning authority's responsibility to evaluate if the benefits outweigh the consequences. However, having some strategic, local areas where this is recommended can help encourage potential business owners.

Figure 66: Pictures, mixed -use. (Hagen, 2022) Top-right: Mixed-use in Våland with flower shop in the first floor. Bottom-right: Active first floor, Stavanger city centre. Bottom-left: Shop facade in Stavanger city centre.

4.3.3 Incentives

After having the necessary clarifications from what the potential for sustainable development is and could look like based on the framework, it is easier to present the knowledge to involved parties. Including residents from this point could make them more invested and onboard with decisions. The current development process in Trehusbyen is that a developer or owner initiates the process, and then carries it through. In an area like Trehusbyen where most is already built, there will not be many cases where private developers initiate an urban transformation process of an entire block. There are numerous challenges that will deem such a project as not worth the risks, like the cultural heritage and the many owners.

It may therefore require a more active reaching-out to potential residents, for example where there is a need for upgrading the buildings or improving energy efficiency. Other cities in Europe have planning strategies where development and renovations of the existing building mass is promoted, and have initiatives directed towards its residents to achieve their goals. They are actively including the population. Activities like these would also be easier to engage in if there were more potential subsidies to apply for, directed towards blocks. Many of the residents owning their homes in Trehusbyen are people with means, and it can therefore be assumed that many are interested in improving their building that would reduce costs in the long term. Considering the blocks for energy efficiency could then be an opening for discussing other improvements to increase sustainability.

Starting with upgrading Trehusbyen buildings like the energy efficiency or returning the building to more historically correct facades and elements is a good start for the dialogue between the municipality and residents to begin. The current procedure of these events is initiated by the residents establishing a need and seeking guidance from the municipality. Having more standardized guides for rehabilitating typical buildings in Trehusbyen to newer standards based on style and build (recommendations for windows, insulation, heating, materials, etc..). could make it easier for residents to know what to expect beforehand, and even reach out to neighbours with similar settings.

Egersund has a similar situation to Stavanger, but in a smaller scale. The town engaged in a project to uncover original colours of the buildings of cultural heritage, which helped encourage the owners to investigate their building's heritage. While the focus was on the buildings in the city centre's shopping street, there were also standardizations of what colours commonly belonged to the specific architecture styles typically found in the wooden house town of Egersund. Similar information and guides distributed to residents keep them informed and may inspire new activities. Stavanger Municipality has sent out flyers of information about development in Trehusbyen to its residents before, and there could be new with more detailed information for example about energy efficiency or potentials for mixed-use. Information and guidance must be easily accessible and make the public aware of new possibilities for improving sustainability. Existing knowledge must be communicated to both public and private actors. If a block were to engage in the potentials of the framework it should not necessarily be demanded that they increase the built density, but be encouraged to facilitate for this, for example by removing surface parking and creating semi-private spaces common for the block.

5. Discussion

The goal in this thesis has been to find an approach to how Trehusbyen can cope with new standards for urban sustainability. This resulted in a design framework and potential interventions. The principles were based on general assumptions from findings in research of ideal standards for sustainability in existing urban areas and adapted to cope with cultural heritage. While incorporating the principles from the framework considering densification will not stop urban sprawl, it is based on one of the principles from the theoretical framework: "little in many places" (Grams, 2018). Protecting an important cultural heritage area like Trehusbyen must be prioritized over new development, but there are compromises that needs to be made on both ends.

An option in managing heritage environments is to entirely protect the area from practically any changes. Especially when there are already many existing areas around the city that hold potential for densification and are not affected by cultural heritage values. However, Trehusbyen covers almost all the nearest surrounding areas of the city centre and is a crucial part of the city life. To ensure the continued use and attractiveness of these areas, it is depending on someone living and taking care of the buildings. The framework consists of potential improvements that can make the areas more attractive for a larger group of people, with more diverse homes and outdoor spaces and potentials for having more every-day activities and functions in the nearest surroundings.

Aspects that could have improved this thesis and contribute to a more detailed framework could have been further mapping of densities in the different districts, and clarifications of what the existing space is used as – both outside and inside the buildings. Interviews that involved other parties of interest in the matter, such as politicians, developers, and residents, is another aspect that could have contributed to more knowledge in the field and how to include these in the process for ensuring optimal outcomes.

The initial idea of this thesis was to implement a densification strategy to a specific area of Trehusbyen. However, this proved difficult to do in line with preservation without the proper tools. Also, findings from interviews indicated that specific cases where areas of trehusbyen had undergone densification, and had properly preserved heritage values, was rare. It therefore made sense to make a framework with principles based on the findings and synthesized from available knowledge. There was also a larger focus on the planning process related to urban heritage in this thesis, as it was unclear how it affected densification and in what way. From existing planning documents, it was found that increasing standards for sustainability and densification in existing areas were a recurring theme and was promoted also for heritage environments. However, they did not sufficiently facilitate for the possibility within the terms of cultural heritage preservation and potential.

6. Conclusion

Historically, Trehusbyen possessed some of the qualities and abilities associated with modern standards for sustainability. The flexibility and design of the buildings and plot give the possibility to mix functions and reduce travel distances for everyday purposes. The human scale and architectural design contribute to making the areas more attractive for soft mobility, with a street network that can be organised to facilitate different modes of transport. There are also possibilities to adapt parts of the plots to new forms of use, either to accommodate more space in the building or outdoor areas, which can contribute to greater diversity of outdoor spaces. The building mass has potentials for increased energy efficiency and through preservation Trehusbyen contributes to promote restoration and reuse of existing buildings. Trehusbyen is a green city with many gardens and trees, contributing both to greater biodiversity and for managing climate challenges.

The standards for urban sustainability that are attainable in Trehusbyen are increased density and accessibility, more diverse outdoor spaces, and a smaller carbon footprint. Parts of Trehusbyen currently holds these qualities, and it is therefore necessary to make a thoughtful consideration to which sustainability standards can be enhanced in a specific area. This will ensure a *livable* urban density, by building on existing qualities, new sustainability standards could be attained. To conciliate densification and sustainability standards with the cultural heritage values in Trehusbyen, a design framework for dealing with the specific aspects in an area was necessary. The framework was based on using the cultural heritage as a resource in the planning process. It was the value and importance of the cultural heritage that set the base for the potentials for development. Managing heritage environments contribute to reducing climate gas emissions, and the potential interventions therefore facilitates potential development by continuing and preserving the city's diversity and historical distinctiveness.

The current planning documents concerning development in Trehusbyen is restricting to ensure its protection, and the possibility for development must be considered in individual cases. By incorporating principles for development that are aligned with the potential of the cultural heritage, development processes can facilitate for continuing and preserving the city's diversity and historical distinctiveness. While densification is the general strategy for enhancing urban sustainability standards, this was not the only ideal measure to increase sustainability standards of Trehusbyen. Combining the potential for densification with increased energy efficiency, improving resilience against climate events, encouraging soft mobility, and a reduced car use through the redesign of streets and public spaces is the ideals that development in Trehusbyen can enhance. For Trehusbyen to be able to cope with new urban sustainability standards without damaging the heritage values, the cultural heritage must be seen as the starting point for reducing the carbon footprint and ensuring living communities in cities of high quality.

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43. Classicism, illustration. Self-made.

44. Swiss chalet, picture. A. Hagen (2022)

45. Swiss chalet, illustration. Self-made.

46. Nedre Dalgate. Picture: Stavanger kommune. (2018a, October 22). Verneprisen til jugendhus på vestre platå. Retrieved 12 June 2022, from https://www.stavanger.kommune.no/bolig-og-bygg/byantikvaren/wesselsgate/

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48. Swiss Nouveau, illustration. Self-made.

49. Art Nouveau, picture. A. Hagen (2022)

50. Art Nouveau, illustration. Self-made.

51. Neoclassicism. Picture: Stavanger kommune. (2017b, August 15). Hvilken stil er mitt hus? Retrieved 12 June 2022, from https://www.stavanger.kommune.no/bolig-og-bygg/byantikvaren/hvilken-stil-er-mitt-hus/

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57. Møllegata. A. Hagen (2022)

58. Public spaces. A. Hagen (2022)

59. Defining the potential – The neighbourhood and blocks. Self-made.

60. Defining the potential – Buildings, plots, and the built environment. Self-made.

61. Potential – Buildings and plot. Self-made.

62. Potential – The built environment. Self-made.

63. Potential – Private and semi-private spaces. Self-made. Map source: (Norkart AS, 2022)

64. Potential – infrastructure network. Self-made.

65. Local strategic areas. Self-made.

66. Pictures, mixed-use. A. Hagen (2022)

Appendix

Attachment 1

Density calculations

Pedersgata	m2	daa
Built area	2176.23	
Plot area	3289.45	3.28945
Built density	66%	
Buildings		
Commercial	3	
Dwellings	37	
Dwelling density	11.2	dwellings/dekar

Våland	m2	daa
Built area	2231.24	
Plot area	6434.07	6.43407
Built density	35%	
Buildings		
Commercial		
Dwellings	29	
Dwelling density	4.5	dwellings/dekar

Storhaug middle	m2	daa
Built area	1688	
Plot area	4916.644	4.916644
Built density	0.343324	
Buildings		
Commercial		
Dwellings	21	
Dwelling density	4.3	dwellings/dekar

Storhaug left	m2	daa
Built area	1566.168	
Plot area	4672.416	4.672416
Built density	0.335195	
Buildings		
Commercial		
Dwellings	22.5	
Dwelling density	4.8	dwellings/dekar

Storhaug right	m2	daa
Built area	1396.284	
Plot area	5050.99	5.05099
Built density	0.276438	
Buildings		
Commercial		
Dwellings	15	
Dwelling density	3.0	dwellings/dekar

Vurdering

Referansenummer
449010

Prosjekttittel
Masteroppgave i by- og regionalplanlegging

Behandlingsansvarlig institusjon
Universitetet i Stavanger / Det teknisk- naturvitenskapelige fakultet / Institutt for sikkerheit, økonomi og planlegging

Prosjektansvarlig
Fabio Alberto Hernandez Palacio

Student
Annika Hagen

Prosjektperiode
27.04.2022 - 16.05.2022

Meldeskjema

Dato
28.04.2022

Type
Standard

Kommentar
Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet med vedlegg, og eventuelt i meldingsdialogen mellom innmelder og Personverntjenester.
Behandlingen kan starte.

TYPE OPPLYSNINGER OG VARIGHET
Prosjektet vil behandle alminnelige kategorier av personopplysninger frem til den datoen som er oppgitt i meldeskjemaet.

LOVLIG GRUNNLAG
Prosjektet vil innhente samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 og 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse som kan dokumenteres, og som den registrerte kan trekke tilbake.

Lovlig grunnlag for behandlingen vil dermed være den registrertes samtykke, jf. personvernforordningen art. 6 nr. 1 bokstav a.

PERSONVERNPRINSIPPER
-Personverntjenester vurderer at den planlagte behandlingen av personopplysninger vil følge prinsippene i personvernforordningen om

-lovlighet, rettferdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om og samtykker til behandlingen
-formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte og berettigede formål, og ikke behandles til nye, uforenlige formål
-dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante og nødvendige for formålet med prosjektet
-lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lengre enn nødvendig for å oppfylle formålet

DE REGISTRERTES RETTIGHETER
Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18), og dataportabilitet (art. 20).

Personverntjenester vurderer at informasjonen om behandlingen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art. 12.1 og art. 13.

Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.

FØLG DIN INSTITUSJONS RETNINGSLINJER
Personverntjenester legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og

konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

Ved bruk av databehandler (spørreskjemaleverandør, skylagring eller videosamtale) må behandlingen oppfylle kravene til bruk av databehandler, jf. art 28 og 29. Bruk leverandører som din institusjon har avtale med.

For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og/eller rådføre dere med behandlingsansvarlig institusjon.

MELD VESENTLIGE ENDRINGER
Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til oss ved å oppdatere meldeskjemaet. Før du melder inn en endring, oppfordrer vi deg til å lese om hvilke type endringer det er nødvendig å melde: https://www.nsd.no/personverntjenester/fylle-ut-meldeskjema-for-personopplysninger/melde-endringer-i-meldeskjema

Du må vente på svar fra oss før endringen gjennomføres.

OPPFØLGING AV PROSJEKTET
Personverntjenester vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet.

Lykke til med prosjektet!