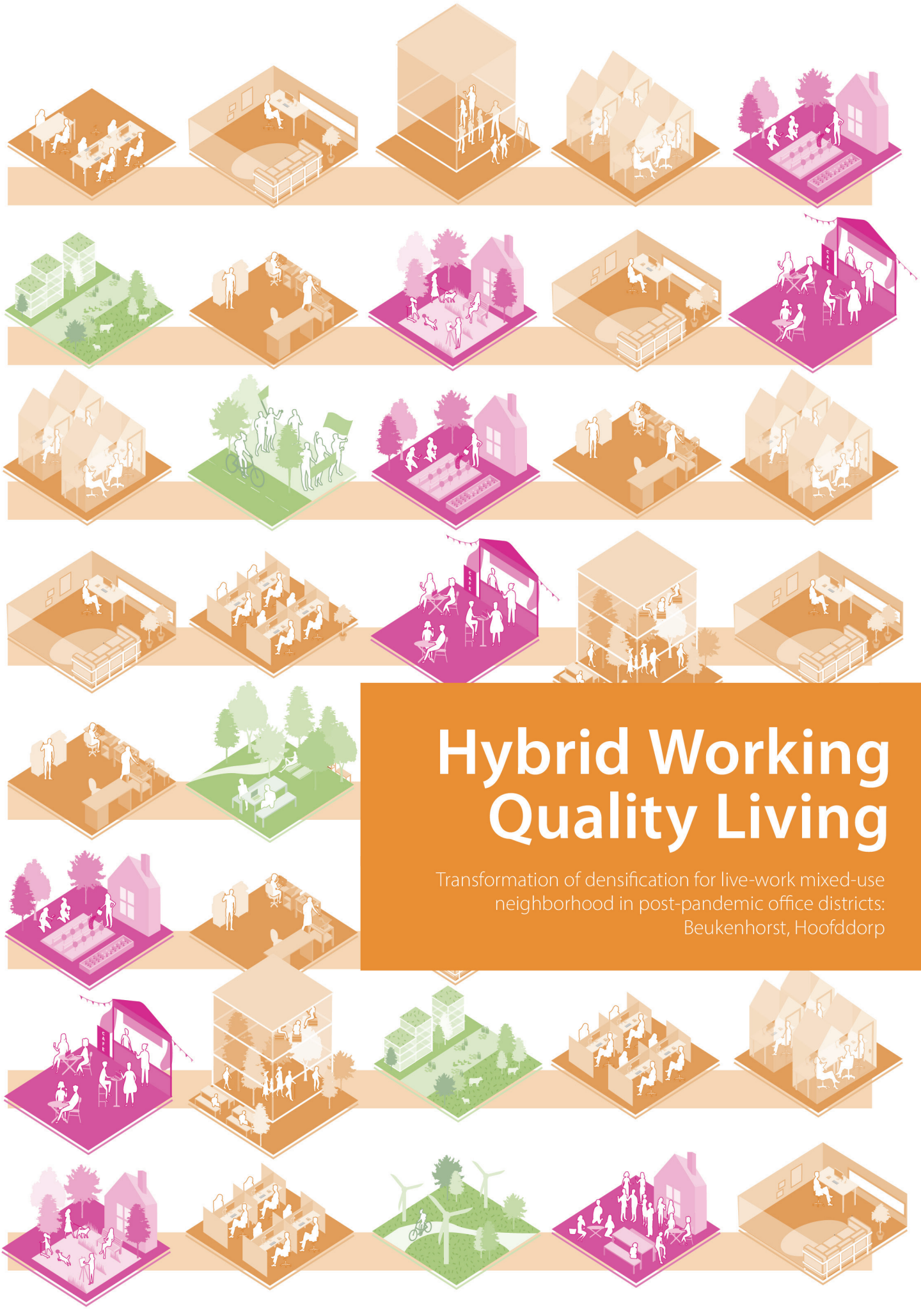

Hybrid Working Quality Living

Transformation of densification for live-work mixed-use neighborhood in post-pandemic office districts: Beukenhorst, Hoofddorp

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P5 Thesis Report

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Delft, The Netherlands
January, 2023

Abstract

"Hybrid Working, Quality Living" seizes the opportunity of the surging hybrid remote working trend to promote work style and lifestyle changes in office districts and beyond. Remote working has been developing but has never been applied on such a global scale before. Since the end of 2019, it has brought our attention back to several long-discussed urban problems, for instance, the housing crisis, commuting behaviors, urban life quality, and so on, by shedding light on neglected connections among them.

The project takes the Randstad as the research area to analyze and explain how the problems interrelate with each other. Looking fifty years into the future, "Hybrid Working, Quality Living" applies the urban foresight method to respond to the urban challenges, exploring a radical future with flexible schedules, all-day-round inhabited neighborhoods, closely collaborative communities, increased housing affordability, and greater gender equality, all through the transformation of office districts. Starting from understanding the future residents' lives, a set of aspirations and design options are listed out and then applied to the design of Beukenhorst, a concentrated office district in Hoofddorp, Haarlemmermeer.

Based on foresight methods, "Hybrid Working, Quality Living" tests the design with a set of scenarios to explore its responses to the changing conditions and summarize the influential factors under different circumstances. Driven by each of the major drivers of change, the scenarios and the tests identify the possible futures as well as emphasize the importance of dynamically monitoring and adjusting the design strategies.

Keywords:
Office transformation; Live-work neighborhood; Hybrid working;
Urban foresight; Hoofddorp

Contents .

Figure 0.1 Mountain goats roam the streets of Llandudno, Wales, in March 2020. *Christopher Furlong/Getty Images.*
https://www.theguardian.com/world/gallery/2020/apr/22/animals-roaming-streets-coronavirus-lockdown-photos/

Acknowledgment

First of all, I would like to express my thanks to the community of the Faculty of Architecture and the Built Environment at TU Delft. Although I started and finished my Master's studies during the difficult time of the pandemic, the faculty as a platform provided me with support and opportunities I had never experienced before, allowing me to reinvent myself both professionally and in life during these two and a half years.

Secondly, I would like to thank my mentors, Dr. Rodrigo Viseu Cardoso and Ir. Rients Dijkstra, for their support and enthusiasm during the whole year, for the interesting ideas and methods of design they had been sharing, and for the encouragement and guidance they never failed to provide when I fell into self-doubt and hesitation. I would like to thank Rients specifically for the hands-on explanations of how to build the frameworks of design and the interesting conversations about the experience from design practice.

This work would not have been completed like it is without the constant support of my family and friends. I thank my mum for supporting my studies in the Netherlands, financially and emotionally. I thank Ruowen and Rui for helping me stay positive during the tough times. I thank Yuehan and Penn Chan for the warm conversations. Finally and specially, I would like to acknowledge my net pals: Gala, Nori, Karen, Mietti, Takeshi, Zoe and more. Although scattered all over the world, they have been great sources of inspiration and my companions through those long nights.

Motivation

Starting my master programme in 2020, the impacts of the COVID-19 pandemic have been continuing throughout my entire master's. The pandemic is so influential around the globe that not only the healthcare system, the supply chain, and the housing market, but even the way we work and live will change ever after, let alone the cities. The temptation to research on such a topic is hard to resist—it will affect our imagination and hence our future.

During my internships I had the opportunities to experience hybrid working and appointment-based flexible workplaces. The appointment system turns fixed offices into WeWork branches—you always don't know where you will sit and which computer you will be using. Yet, I had to travel two times a day back and forth Delft and Rotterdam, sometimes Deventer. On the contrary, the days at home allowed me to freely organize my activities besides work. The depression of having to set out at 7am and spend 2 hours on train led to me questioning: why do we need central business districts, and what's the meaning of commuting two times a day between a business center and a suburban home?

A discussion with colleagues on future office space and the call for "one million homes" provided me a new perspective to look at the question. With the trend of hybrid working persisting, the terms of working space and office will both be redefined. When the tele-communication technologies make it possible to work nearly anywhere, why do people come to the office? Where can people work and live comfortably, and what does that mean to the housing market? What about the workers in service industries like horeca, who are not able to work remotely?

With these very first questions I started my journey on the project "Hybrid Working, Quality Living". The impact of the pandemic on cities is such a complicated topic, but the concept of remote (hybrid) working is a needle and thread connecting the systems of built environment, social-economics, and even sustainability issues. The project is dedicated to depicting the radical yet desirable future where the hybrid working trend can lead us to.

Figure 0.2 Smart working with cats. *Getty Images*.

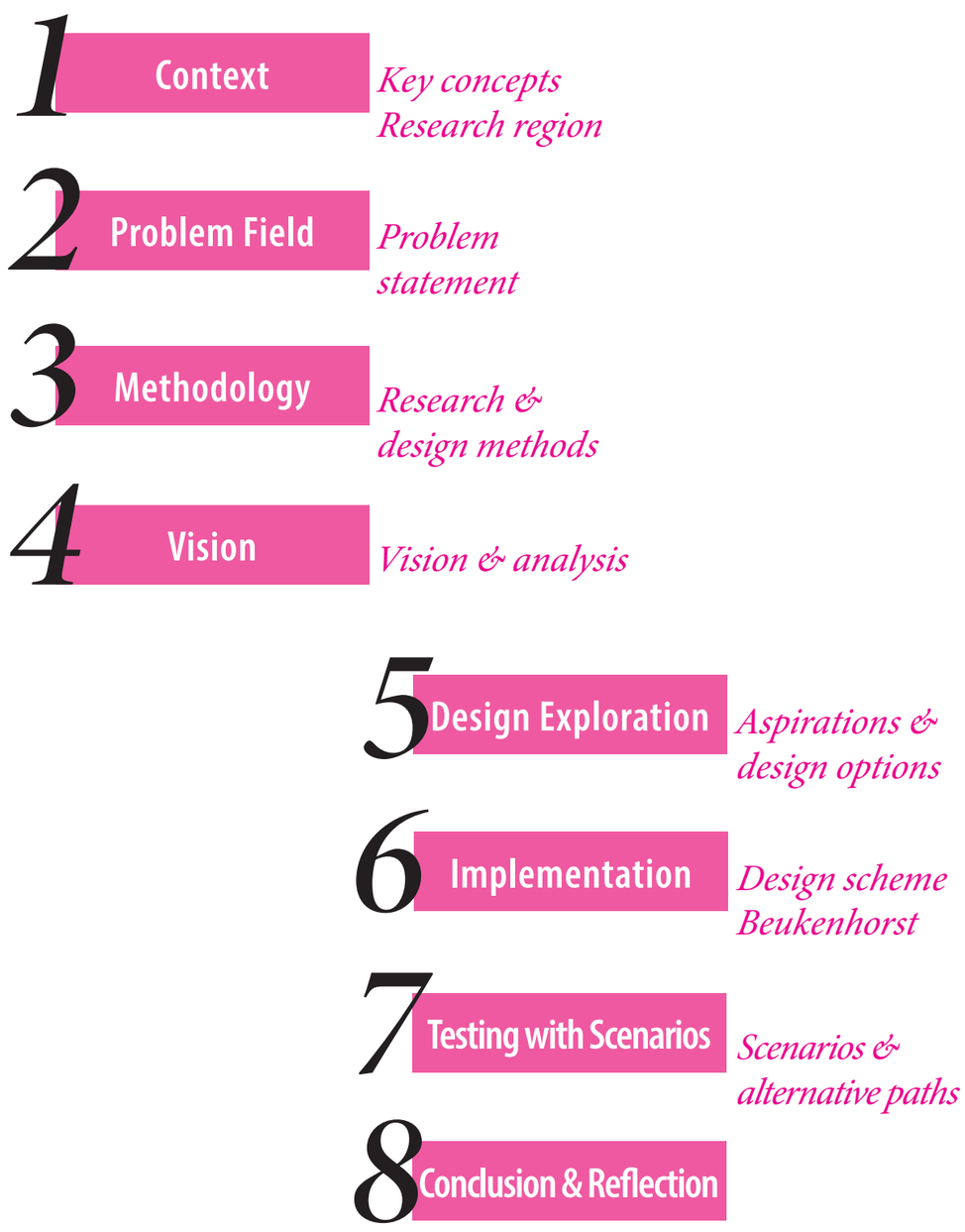


Figure 0.3 The structure of the report. *By author.*

Roadmap

This project "Hybrid Working, Quality Living" consists of eight chapters.

At the beginning of the project, I will explain the background of the project - the boom of remote working, the important concepts associated with it, and the area for regional analysis.

In the second part, the significance of the project will be demonstrated by the analyses of the challenges facing the Randstad area, revealing the potential of the hybrid/remote working trend for introducing new lifestyles for people and new structures for cities.

In the methodological section, the urban foresight approach adopted in this report will be explained. Chapter 4 and 5 will follow the methodology to explore the future of hybrid work in the timeframe of fifty years, set the vision and develop innovative options for design intervention.

In Chapter 6, the design aspirations and options will be applied to a monofunctional office area of Hoofddorp: beukenhorst, followed by a chapter to test the design in multiple scenarios. At the end of the report, there is a chapter for conclusion and reflections on this project.

1

Context

1.1 The New Working Trend

The Pandemic, and Our Ever Changing Work Pattern

Since the end of 2019, we have been confronting the COVID-19 pandemic for more than two years, still not seeing an end to the journey. The pandemic quickly swept the globe, soon spawning new variants with greater contagiousness. While posting threats to human health and the environment, the COVID pandemic also challenges the capability and efficiency of fundamental systems, such as the health, energy, water, and waste system, as well as the day-to-day routines we have taken for granted for so long. In order to prevent the virus from further spreading, governments imposed social distancing orders and later lockdowns. With flights cancelled, shops, restaurants, and other facilities closed, the European economy came to a standstill. Before long, a large number of workers had to telework, transforming their homes into "offices".

The remote working trend challenges infrastructure systems, such as power and water supply, and internet connection. However, after two years of adaptation, the new work pattern has been widely accepted as one of the new normal during the pandemic. In 2019, the Office for National Statistics (ONS) in the UK found less than 6 percent of the population work remotely. During the lockdown, the number grew to over 48% (Phillips, 2020).

Now it is predictable that the trend of working remotely will continue even after the pandemic, with the hybrid work approach being almost inevitable (Phillips,

2020). In August 2020, the consultant firm McKinsey conducted a survey of 278 executives, with 72% of the respondents saying they had already started adopting permanent hybrid working models (Lund et al., 2021). In April 2022, the famous travel service company Airbnb announced that the "vast majority" of staff would be able to continue remote working permanently from wherever they want with no pay cut (Airbnb, 2022). Such decisions are understandable considering the benefits of working from home are increasingly recognized during the pandemic. Although having no choice but to stay at home, both employers and employees gradually started to enjoy its merits — the flexible work hours, the time saved from commuting, the improved work-life balance, and the reductions in expenses on office equipment (Kylili et al., 2020), just to name a few. It is no exaggeration to say that the remote working pattern has the potential to reshape our expectations towards life and cities in the long term.

Figure 1.1 A COVID-19 testing site in New York. *Getty Images.*
https://www.usnews.com/news/health-news/articles/2022-03-10/2-years-later-where-does-the-covid-19-pandemic-stand

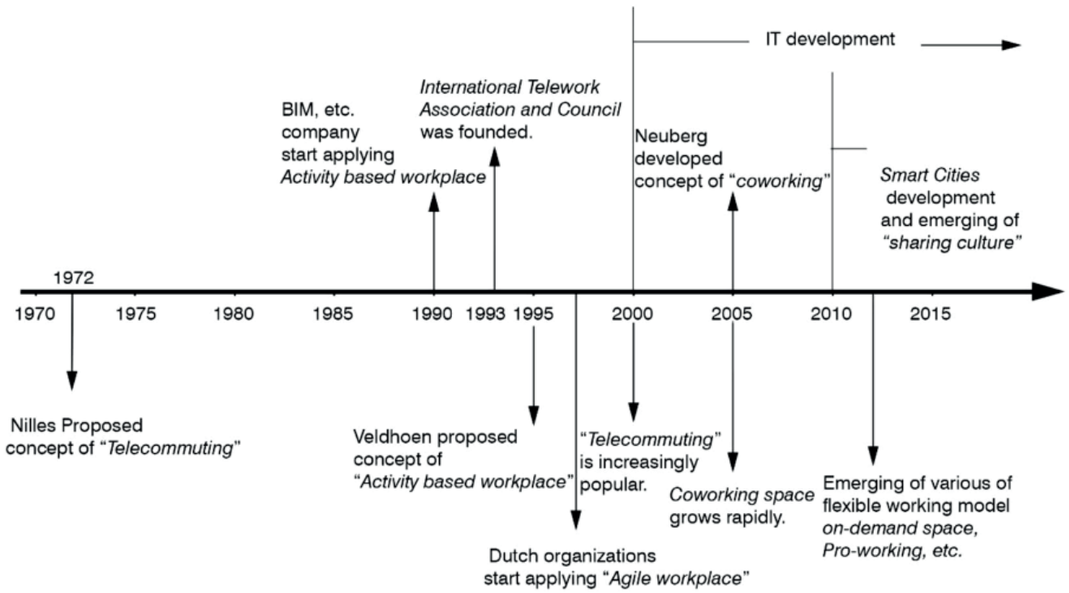


Figure 1.2 The historical development of the remote working concept
By (Yu et al., 2019).

Figure 1.3 Types of remote working, based on workplace. *By author.*

What Is Remote Working?

Remote working has been interpreted with various descriptions. One of the most popular ones is: "any activity that involves the processing of information and its delivery via a telecommunications link that is carried out away mainly or partly from the main premises of an organization" (Felstead & Henseke, 2017). Albeit widely perceived as an alternative working method to prevent the spread of COVID-19, the concept of remote working is nothing new. Dated back to 1973, Nilles already introduced the words ***"teleworking"*** and ***"telecommuting"*** to refer to the work-related substitutions of telecommunications and the use of information technologies to replace the need of travel (Nilles, 1988). Later on, various terms were used to describe the emerging work pattern, such as remote work, flexible workplace, e-working, etc.. In 1995, Veldhoen put forward the concept of ***"activity-based workplace"***, promoting flexible workplaces based on work-related activities rather than single designated workplace (Veldhoen, 1995). At the end of 20th century, shared workspaces had been adopted by several international companies and organizations, such as ***Steelcase, IBM, Johnson Controls,*** and so on (Yu et al., 2019).

Entering the 21st century, with the wide adoption of personal computers and the internet, the model of flexible working was presented with broader opportunities. However, employee motivations, management issues, workers' right issues were among the major doubts, which hindered its further promotion (Felstead & Henseke, 2017). It is not until the COVID-19 pandemic that the method of remote working became vastly applied around the globe. With accumulation of studies on working experience during the pandemic, it is proved that working remotely not only will not hamper efficiency, but also increases motivation, productivity, and job satisfaction (Kylili et al., 2020).

Types of Remote Working

The patterns of working remotely can be roughly classified into two major categories: teleworking and co-working(Kylili et al., 2020; Yu et al., 2019). Based on the space for the activities, they can be furthered divided into:

- home office working;
- café/shop working;
- outdoor working;
- shared office working;
- on-demand office working (see figure 1.3).

Teleworking in indicates working away from the offices with no personal contact with coworkers (Yu et al., 2019), which is the common situation witnessed during the pandemic, while coworking refers to working in a shared office, either designated and shared by companies, or booked and used by the employees.

The Influential Work Pattern

The prolonged trend of remote working will not only reshape our imagination of work and life but also influence the (spatial) structure of infrastructure and the cities. Back in 2003, Adams already called for attention and investigation of the impact of telework on labor markets, housing, and the transportation system (Adams, 2003). With the edge between "work" and "home" blurring and the opportunity to revalue their choices about living, individuals are now more likely to consider less importance the proximity to the workplace, in many cases, the business districts. On contrary, access to amenities and cultural, recreational, and green spaces are placed more emphasis on, with residential rents observed to have fallen across large cities in Europe (Lund et al., 2021). The changing needs will place new demands on the **housing market**. With the current shortage of housing, the preference for proximity to amenities and nature is likely to further push up housing prices and exacerbate the housing crisis. Moreover, the **extra requirements** for residential space to be transformed into home offices also challenge the quality of housing the markets have to offer. While some of the populations are allowed to further enjoy their life, others may fall into a deeper crisis, further deteriorating the divisions.

On the other hand, remote working reduces the need for office space and equipment, which exerts an implication for the business district and particularly urban centers (CBDs). In advanced economies like the Netherlands, 20-25% of workers could work remotely 3-5 days a week. Although the percentage is not that significant, the occupations are mainly computer-based and higher-paid positions such as financial, executive, and technological related jobs (Lund et al., 2021), which tend to cluster in the (central) business districts. Therefore, the reducing need for offices has a crucial spatial and economic effect on the business districts and city centers. **Office vacancy** rates increased dramatically during the pandemic—45% in Edinburgh, 32% in London, and 27% in Berlin. And yet, it is still increasing. With a survey of 278 executives, McKinsey found that there was an average planned **reduction in office space** of 30 percent, even after the pandemic (Lund et al., 2021).

The reduction of commuting needs would have a profound impact on **transportation** and **consumer behaviors**. According to Dutch Railways (NS), only 37% of commuters are willing to return to their previous traveling routines before the pandemic, with 2.2 days per week estimated for the average commuters to work from home. Around one of four surveyed have preferences for working from home and driving (NS, 2021). The good news is that less commuting can contribute to the enhancement of sustainability and congestion conditions. Based on case research in

> *The impact of the pandemic on work, the workforce, and the workplace will persist ever after. The disruptions of work will be larger for the lower-paid, less-educated, and vulnerable workers.*
>
> -- The future of work after COVID-19. *McKinsey.* (Lund et al., 2021)

Cyprus, researchers found that at least 4,0 L of fuel and 7,4 kg of carbon dioxide can be saved with 100 people choosing to work remotely for an hour (Kylili et al., 2020). However, at the same time, the commuting pattern shifts could be a disaster for the **service businesses** catering to office workers, for instance, restaurants, bars, shops, and so on.

To add on top of the other influences, the new work pattern may also change the **labor markets** permanently. Although not directly connected to the pattern of remote working, the technologies enabling teleworking as well promoted virtual interactions and the deployment of automation and AI, and the trend was accelerated by the need to avoid personal contact during the pandemic. According to McKinsey's research, the jobs with higher levels of proximity tend to be faced with greater transformation and heavier decreased employment, among which food service, customer service and sales, and office support are the industries to suffer the most. On the opposite, there will be an increased demand for STEM professionals, community services, and especially transportation services (Lund et al., 2021).

Limitations

As discussed above, although remote working has positive effects both on companies and individuals in terms of costs, spatial and temporal flexibility, work-life balance, and so on, the emerging work pattern also impacts our lives from housing demand and consumer behaviour to economies and urban development. Studies found more drawbacks of remote working, for instance, social isolation, distraction, and the blurred edge between work and family (Kylili et al., 2020).

Furthermore, the merits and even the feasibility of remote working are not guaranteed. The availability of working remotely is not entitled to everyone, but rather limited to a group of people who are well-educated and highly paid, mainly to work in professional, executive, or technological realms (Sullivan, 2012; Lund et al., 2021). The limitation is even harming the chances of getting employed for the ones who cannot, as McKinsey points out, job growth concentrates more on high-wage, remote working-friendly jobs while middle-and low-wage jobs decline (Lund et al., 2021). The workers in the service industries (food service, customer service, etc.) with a lower level of education are not only being paid low but being placed in more vulnerable conditions. Moreover, while some state that remote working can improve gender diversity by better-allowing women to develop their careers (Kylili et al., 2020), the work pattern may reinforce the traditional gendered patterns of paid and domestic work, therefore not necessarily beneficial for gender equity, unless the structure of the division of labour is challenged (Sullivan, 2012).

Nevertheless, it is undeniable that the emerging remote working brings us a huge potential for rethinking and reorganizing not only our lives, but our cities, and the intrinsic structure they are based on. At the same time, the spatial and infrastructural impacts of remote working call for the intervention of spatial planning and urban design. In order to maximize and consolidate the positive effects of the work pattern, more supportive policies, management methods, as well as planning strategies, are required to be put forward.

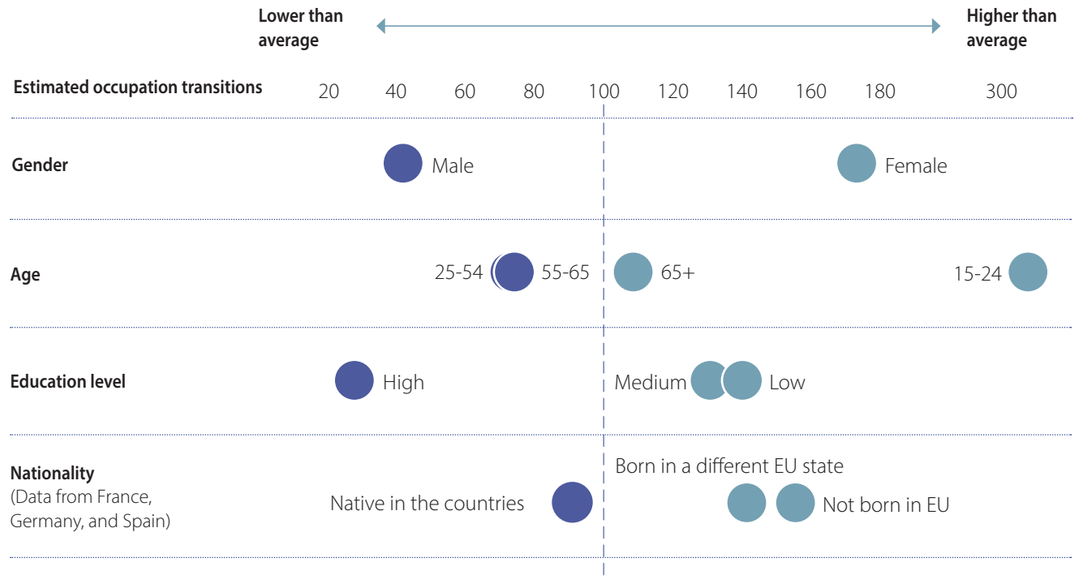


Figure 1.4 Estimated percentage increase of occupation transitions pre-and post-COVID-19 *By author.* Interpreted from (Lund et al., 2021).

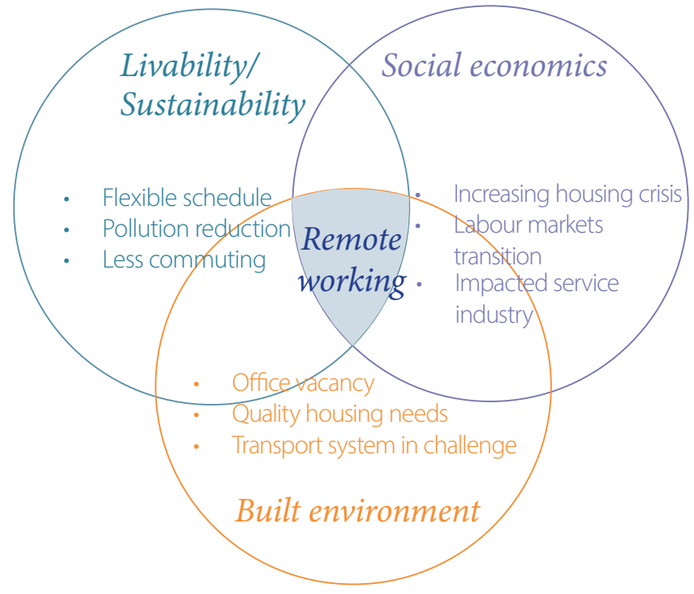


Figure 1.5 Influences of the remote working pattern on different systems. *By author.*

1.2 Why the Randstad?

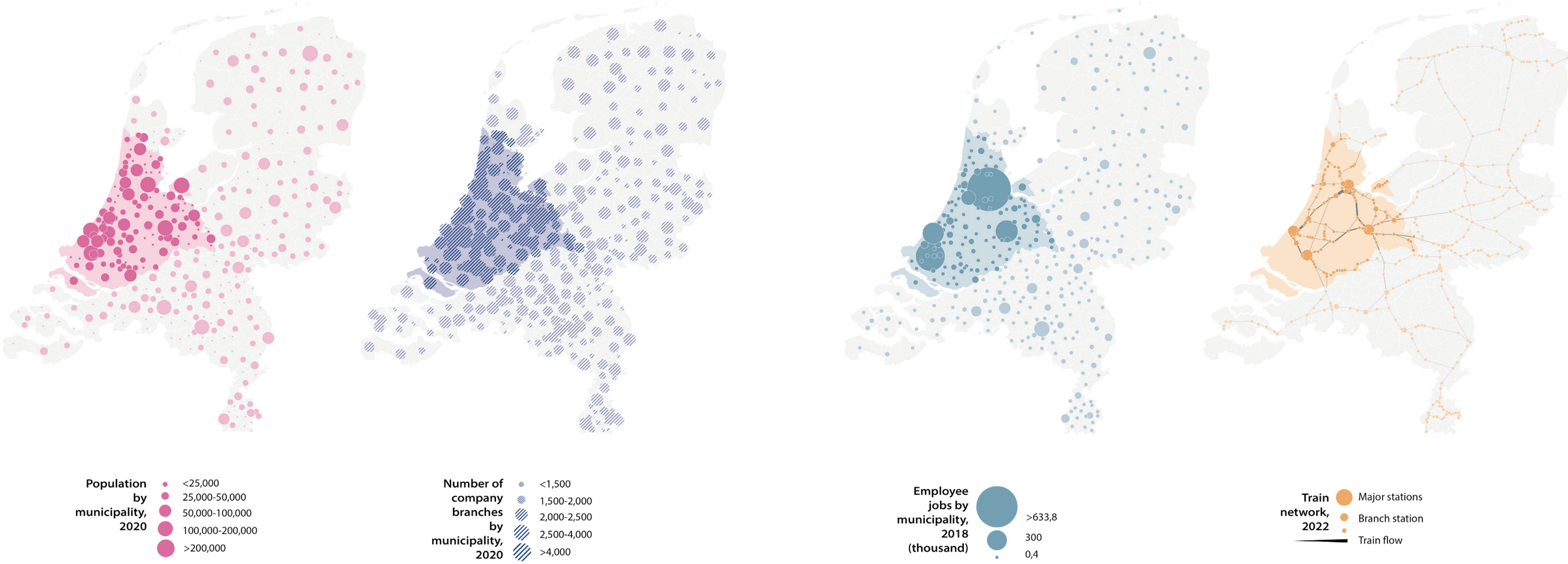


Figure 1.6 Analyses of the Randstad region: demographic, economic & infrastructural.
By author. Data: CBS

The Randstad is an urban concentration or conurbation located in the west of the Netherlands. The Randstad does not have a clear geographical boundary and is often defined as the loose row of cities and suburbs surrounding the Green Heart (Groene Hart), a less built-up meadow area. Roughly speaking, the scope of the Randstad can be assumed within the edges of the four "Randstad provinces": Noord-Holland, Zuid-Holland, Utrecht, and Flevoland (Regio Randstad, 2019), which includes the four largest urban agglomerations in the country: Amsterdam, Rotterdam, The Hague, and Utrecht. What makes it special is that the Randstad is not an administrative concept, but rather a gathering based on various partnerships, administrative networks, and joint ventures. With over 8,3 million inhabitants, the area is one of the largest agglomerations in Europe.

Population -- Housing Needs

As figure 1.6 shows, the Randstad is the most significant population agglomeration in the Netherlands, although not as a continuous urban area but rather scattered into several clusters. The number and density of the population of the Randstad will not cease to increase in the future. Therefore, the availability of housing, both in number and in price, is a major challenge, particularly impacting the region. As Zonneveld and Nadin put it, due to tourism and Airbnb, the four main Randstad cities are increasingly hard places for lower and middle-income groups to find a home, especially for a decent price (Zonneveld & Nadin, 2021). The housing problem is nothing new, though. The recurrence of such a crisis known as "one million homes" has been witnessed every decade since the 1950s (Zonneveld & Nadin, 2021). However, with the requirements for housing quality raised during the COVID pandemic, the housing supply is more under pressure than ever. Given the fact that the inner-city locations are more difficult to (re)develop, The Green Heart is more and more viewed as an attractive housing location. While one of the goals of planning the Randstad is to prevent unrestricted urban sprawl and preserve the essence of the Dutch landscape, there is growing pressure placed on the debates between the market and spatial planners (Priemus, 2017).

Thus, it is crucial for us spatial planners and designers to seize the chance provided by the pandemic and new work pattern to emphasize the re-use of existing commercial urban areas and the resilience of smaller cities and towns, especially in the Randstad region.

The Economic Motor

For many years, the Randstad has been the economic motor of the Netherlands (Jobse and Needham, 1988). As seen on the figure 1.6, circles representing a large number of corporations nearly cover the area, and the icons showing the significant number of jobs offered in Amsterdam, Utrecht, Rotterdam, and The Hague are too evident to be overlooked. In 2018, more than half of the Netherlands' GDP was generated in the Randstad. Not only does the region offer direct connections to other parts of the world with the Port of Rotterdam and Amsterdam Schiphol Airport, but it also adds to other business factors, such as knowledge and innovation,

with clusters of leading universities (Regio Randstad, 2019).

With an employment rate of 78.1% (age group 20-64), the Randstad region provided over 3.9 million positions in the labour market in 2018 (CBS, 2019). The employees in the region are recognized as innovated, skilled, and highly educated. Under the pandemic scenario, the growth of these kinds of positions is predictable, thus the spatial impact of remote working on the Randstad is inevitable and considerable. At the same time, the challenge that may be faced by the service industries catering to office workers should also be taken notice of.

Challenged Transportation Network and Commuter Flow

As part of the polycentric strategy, an advanced transportation network, mainly a train network, is established in the Randstad to make sure that people can work in one city while living in another. As the figure of the train network shows, the four biggest major stations are located in the four major cities of the Randstad, the lines between them being the highest-traffic lines. On the national scale, the Randstad has the densest network of train lines. However, the transportation network in the region is facing challenges.

On the one hand, although more connected compared to other regions in the Netherlands, the lack of "high-quality public transport" is challenging the Randstad being a polycentric urban region as planned. Zonneveld and Nadin point out that even when the Dutch Railways (Nederlandse Spoorwegen, NS) are gradually becoming the metropolitan system connecting regional and local public transport systems, the integration between spatial planning and public transport planning has been lacking (Zonneveld & Nadin, 2021).

On the other hand, a consequential reduction of passengers resulted from the pandemic and the remote working pattern is especially predictable in the Randstad region. As figure 1.7 shows, according to NS, commuters who just take up 10% of all the passengers contribute to over 30% of the total traffic volume in the Netherlands. As workers stay at home, the decrease in the use of public transport such as trains is inevitable. Figure 1.8 shows that although have been gradually increasing since the end of 2020, the decrease is significant compared to before the pandemic. In January 2022, the number of passengers on public transport increased 50% compared to 2021, but still at a 54% reduction compared to 2020. As the largest agglomeration of highly-educated labor resources in the Netherlands, the Randstad region is the perfect case to research the impact of the reduction of commuting needs.

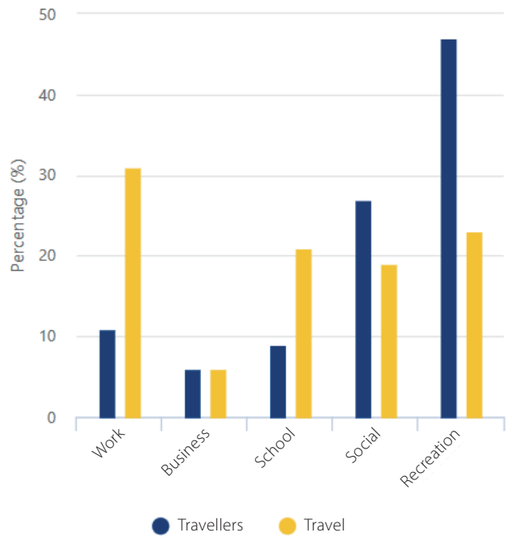


Figure 1.7 Commuters are the main contributer of traffic volume. *By NS.*

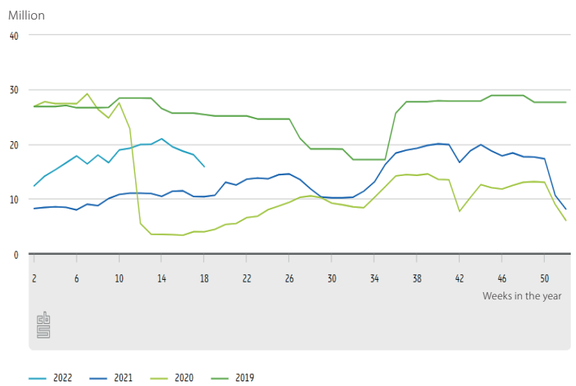


Figure 1.8 Traffics on the train in the past 4 years. *By NS.*

1.3 Summary

How can we maximize the benefits of the trend?

The chapter introduction explained the **key concept** of the research—the emerging pattern of remote working, and the reasons to select the metropolitan region Randstad as the research area. While the remote work pattern has the potential to reshape our imagination in terms of the use of space and stir changes in various aspects of our lives, it comes with **pros and cons**. Although the work pattern provides people with the **flexibility to reorganize** their working and non-working-related activities,

Considering its status as one of the largest agglomerations in Europe, **the Randstad** is an ideal study area for the research. At the scale of the Randstad, we can gain a more holistic and intuitive understanding of the trends regarding population, economics, and transportation, all influenced under the remote working scenario.

In the upcoming chapters there will be elaboration of the **five main problems**:

Cons

- It places extra requirements on the housing market;
- It results in office vacancies in many big cities;
- It reduces the need for commuting and thus reduces the use of public transport;
- It changes consumer behaviors, bringing service business new challenges;
- It influences the labor markets, putting certain groups of people at risk;
- It has limited benefits for gender equity;
- Its merits of work-life balance can only be achieved with further management, regulations, and policies.

Problems

- The double housing crises;
- Excessive vacant office space;
- Unsustainable commuting patterns and lifestyles;
- Urban sprawl;
- Quality & diversity of metropolitan life.

2

Problem field

1 Problem elaboration
2 Related theories
3 Problem statement

2.1 The Double Housing Crises

Shortage of Housing

The Netherlands has witnessed the recurrence of the housing crisis known as "one million homes" during the last decades (Zonneveld & Nadin, 2021), but under the impact of the pandemic, the housing shortage is becoming more urgent than ever before. In 2020, the serious lack of (new) property caused the strongest price hikes in 20 years, with housing prices climbing to the amount of €365,000 (NVM, 2020). As seen in figure 2.3, the Randstad region is especially home to high-priced clusters. According to RaboResearch, the market is still far from cooling down. Commissioned by the government, ABF Research expected a population growth of 849,000 households by 2035, which will lead to a need for approximately 1,160,000 dwellings. Their report also predicts the peak of housing shortage in 2024, that is, 316,700 homes, countering for 3.9% of the stock, as shown in figure 2.1 (ABF Research, 2021).

Remote Working & Housing Quality Requirements

As the quantity housing crisis worsens due to increasing shortage, the remote working pattern requires more space and the ability to transform spatial usage, adding to the quality aspect, structuring the "double housing crises". By studying the pre-pandemic conditions, Harvard researchers point out that the expenditure share on housing for remote households is more than 7% higher than others in the same zone, with a 5%-7% increase in space(Stanton & Tiwari, 2021). In addition, more people are willing to divert the expense of commuting into housing, further intensifying competition in the housing market and pushing the price to rise even more (Doling & Arundel, 2022).

On Productivity & Social Inequality

Housing is central to the reproduction of social inequalities especially in the remote work scenario since the unequal distribution of housing conditions harms not only productivity but also career opportunities among workers (Armillei et al., 2021; Hochstenbach & Arundel, 2019). As figure 2.2 shows, while most Dutch households live in dwellings between 100 and 150 square meters, the housing situation of single-person families, who are likely to be starters or migrants, is poorer, especially in major cities like Amsterdam. The substantial increases in property values exclude younger "outsiders" from housing market entry (Hochstenbach & Arundel, 2019), further impairing their ability to perform better in the remote working scenario.

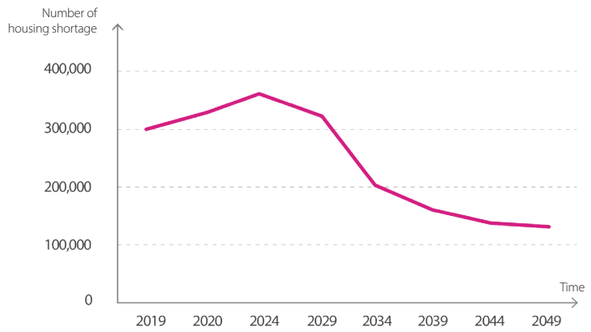


Figure 2.1 Expected housing shortage by 2050
By author. Adapted from (ABF Research, 2021)

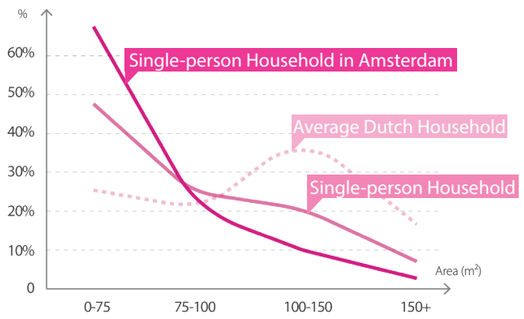


Figure 2.2 Distribution of residential area by household type, 2017
By author. Data: CBS

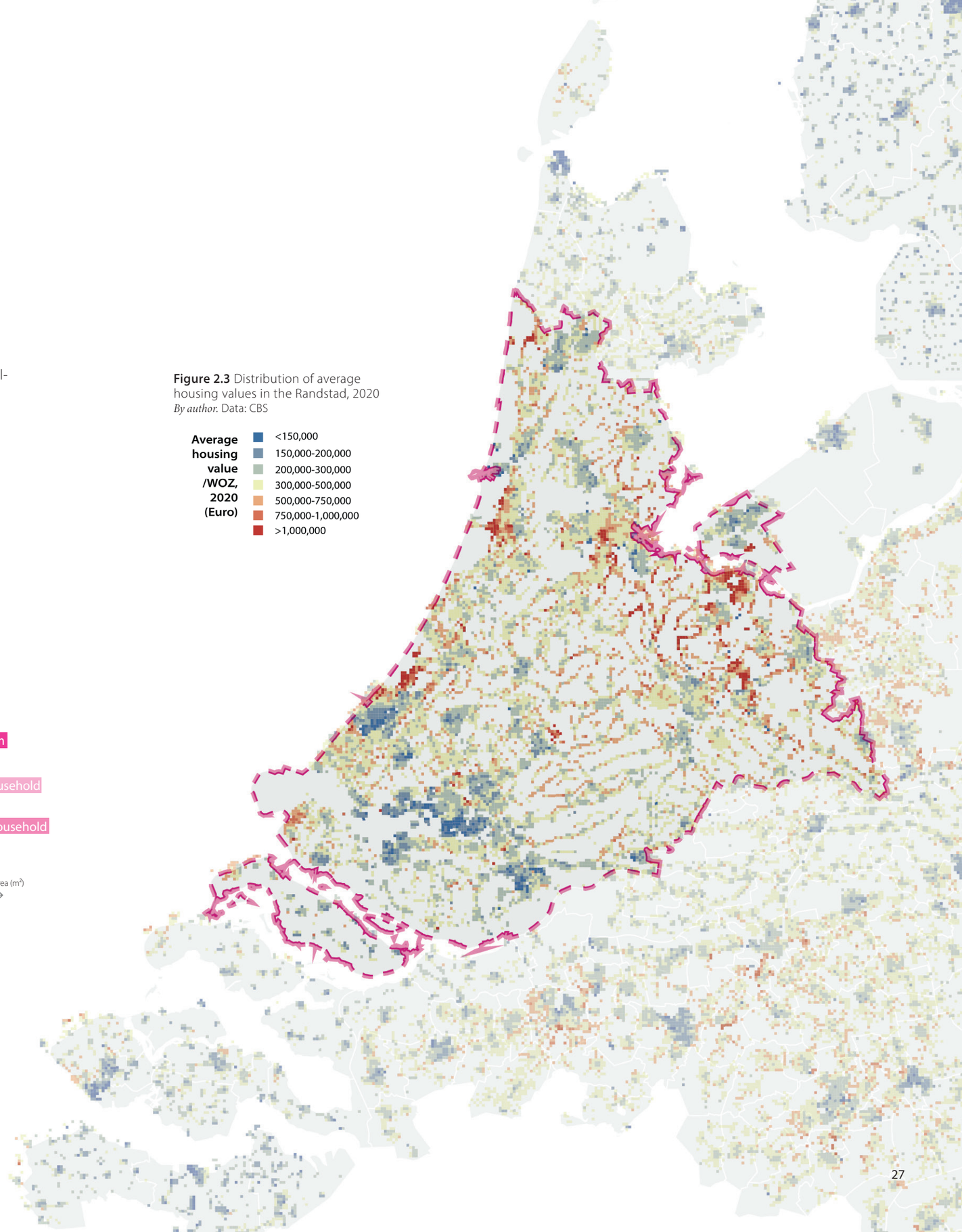


Figure 2.3 Distribution of average housing values in the Randstad, 2020
By author. Data: CBS

1,160,000 *dwellings to be added in the Netherlands by 2035*

2.2 Excessive Vacant Office Space

Vacant offices

While the housing crisis is worsening both in terms of quantity and quality, a huge number of offices are becoming vacant properties. Moreover, the offices are structurally empty—at the beginning of 2021, 74% of the vacant offices have been empty for more than one year (CBS, 2021b). The office vacancy originates from the unbalanced demand and supply due to overheated investment in the commercial real estate sector and had been existing before the pandemic (PBL, 2015). In 2019, more than 3.3 million square meters of offices were administratively vacant, meaning without being registered. The vacancy rate was already higher in offices and shops than in any other type of non-residential property (CBS, 2019b).

Hidden Vacancy

With the widespread introduction of working from home, more offices are being unoccupied, even though they have been rented out and therefore registered. Researchers at Colliers regard this as "hidden vacancy", which counters for 6% of all office space. According to Colliers, there are 3.3 million square meters of offices that fall into the hidden vacancy situation, with another 4.3 million square meters being officially vacant. Together, they add up to a total of 7.6 million m2, 13% of the stock (NOS, 2022). As shown in Figures 2.5 and 2.6, most vacant offices can be found in the four major cities in the Randstad, but through the share of vacant offices in the market, we can conclude that the municipalities around the major cities bear higher risks in this problem.

Office Transformation

The transformation of office space has been going on in the Netherlands for a while. In 2020, transformed offices made the largest contribution to the number of residential transformations, which can also be found in figure 2.4 (CBS, 2021a). However, this is ultimately a lagging mending. Apart from office transformation and adjustments to the demand-supply balance, more spatial policies can be applied to avoid structural vacancy from happening. For instance, besides transforming office buildings into multifunctional areas, the planning department in Brussels sets up regulations to make sure all office space should be transformable into housing in the future (Uyttebrouck, 2020). Such policies and regulations can help alleviate the odd parallel between office vacancy and the increasing housing crisis.

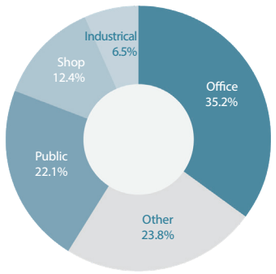


Figure 2.4 Previous functions of residential transformations, 2020 (%)
By author. Data: CBS

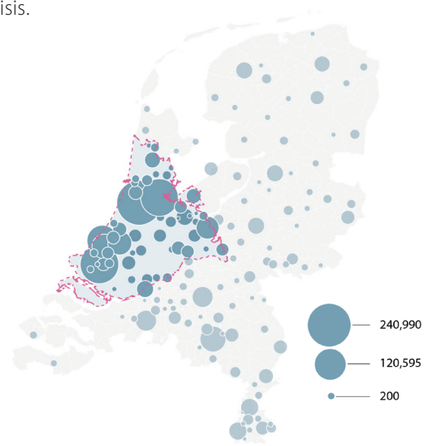


Figure 2.5 Office area vacant for more than 1 year, per municipality, 2021 (m^2)
By author. Data: CBS

7,600,000m² *Offical and hidden vacant office area in NL*

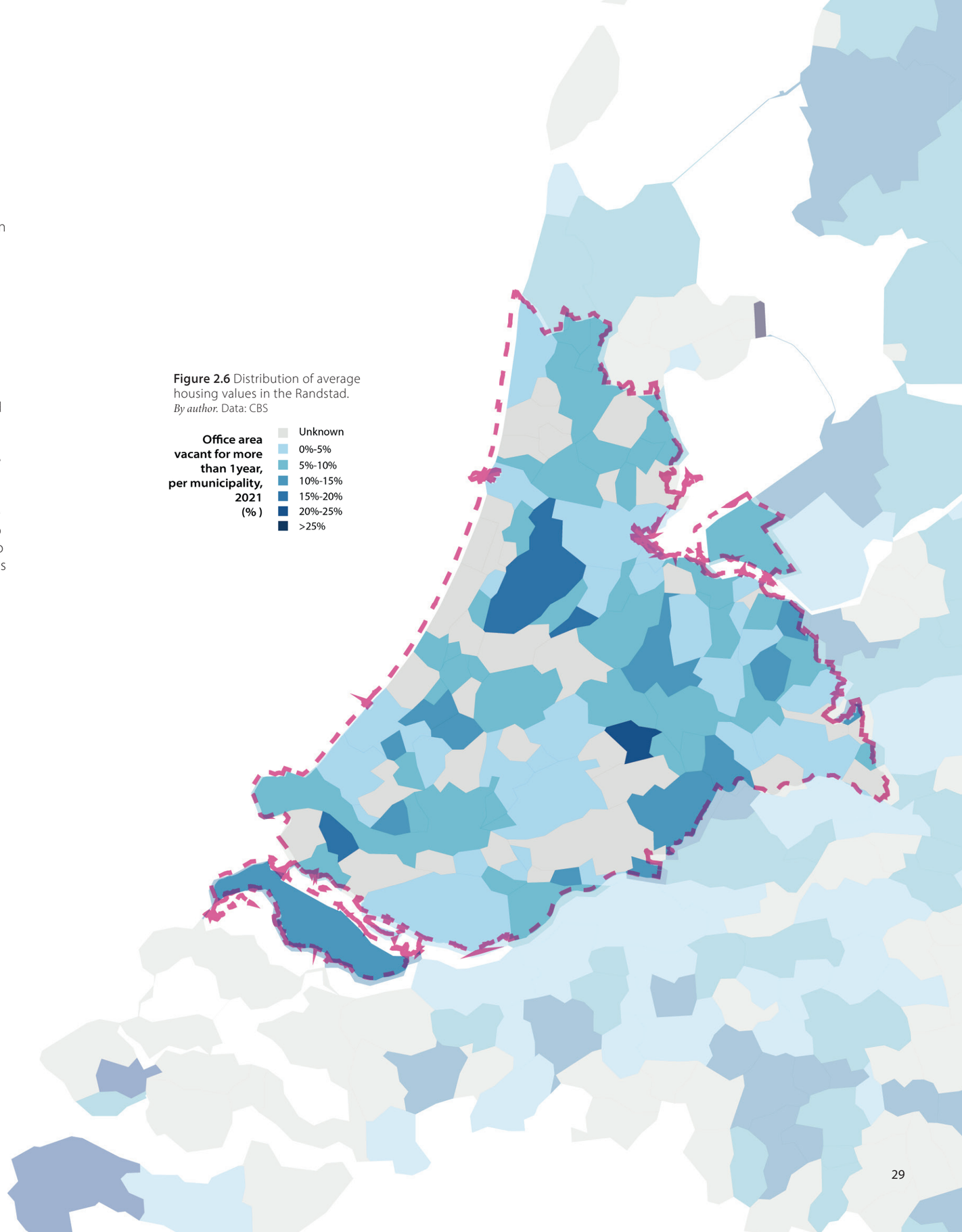


Figure 2.6 Distribution of average housing values in the Randstad.
By author. Data: CBS

2.3 Unsustainable Commuting Patterns and Lifestyles

Commuters across the Randstad

As the largest economic agglomeration in the Netherlands, Randstad offers jobs to people from all over the country. Therefore, it is no surprise to see the dense lines in Figure 2.9—before the COVID pandemic, over a million train trips were happening every day across the Netherlands (NS,2021), the majority of which were attributed to the need for travelling back and forth the region, not to mention the trips on cars. Over the decades, commuting distances and travel times have been increasing, to the extent that 1 in 3 workers now find it necessary to travel between cities or regions for work. According to PBL, the average commuting distance has increased by 30% compared to that in 1995, and the percentage of workers by 22% (PBL, 2020). More and more people commute from further places to the Randstad, for instance, North Brabant and Gelderland.

Sustainability impacts of commutes

While the availability to work in another region allows individuals more freedom when choosing better jobs, the increased commute has caused urban and environmental impacts such as traffic congestion, energy consumption, and CO2 emissions. The transport sector is one of the biggest and fastest growing consumers of energy as well as producers of CO2 in the Netherlands. According to earlier research, transport-originated CO2 emissions are increasing at 2% per year(Susilo & Stead, 2007). In 2019, the transport sector accounted for 31.28 million tons of CO2 equivalent, and passenger transport made up more than half of it (Our World in Data, 2019). The lockdowns and home-office measures during the COVID pandemic halted this trend and brought it to a dive down. However, with the gradual recovery from the pandemic, the pressures are again becoming too evident to be overlooked.

Commuting, happiness and communities

Aside from sustainability issues, long-distance commute also exerts influences on individual happiness, social satisfaction, and community building. Several studies have confirmed the association between commuting and lower happiness, especially with the use of public transportation (Lancée et al., 2017, 2018). A study in Vienna, Austria concludes that those with one-way commutes of 30 minutes or longer have lower levels of social satisfaction and that longer commute goes hand in hand with less time spent on formal social activities and with family members (Delmelle et al., 2013). As social animals, quality social activities are necessary for our well-being. Moreover, participation and social interactions are crucial in building socially sustainable communities. In this way, commuting not only takes up personal time and deprives individuals of the pleasures of life, but also has an impact on the culture of society.

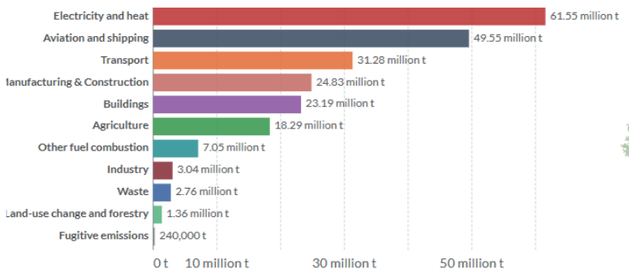


Figure 2.7 Greenhouse gas emissions by industry in the Nether, 2019 (%) *By Our World in Data.*

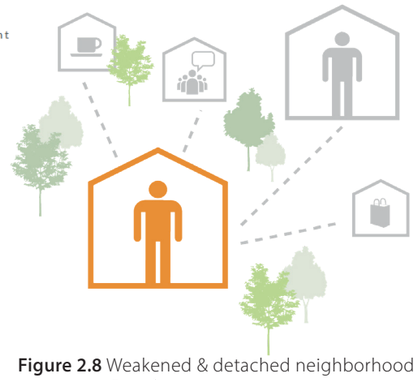


Figure 2.8 Weakened & detached neighborhood *By author.*

1,348,213 *Number of trips per day in the Netherlands (2019)*

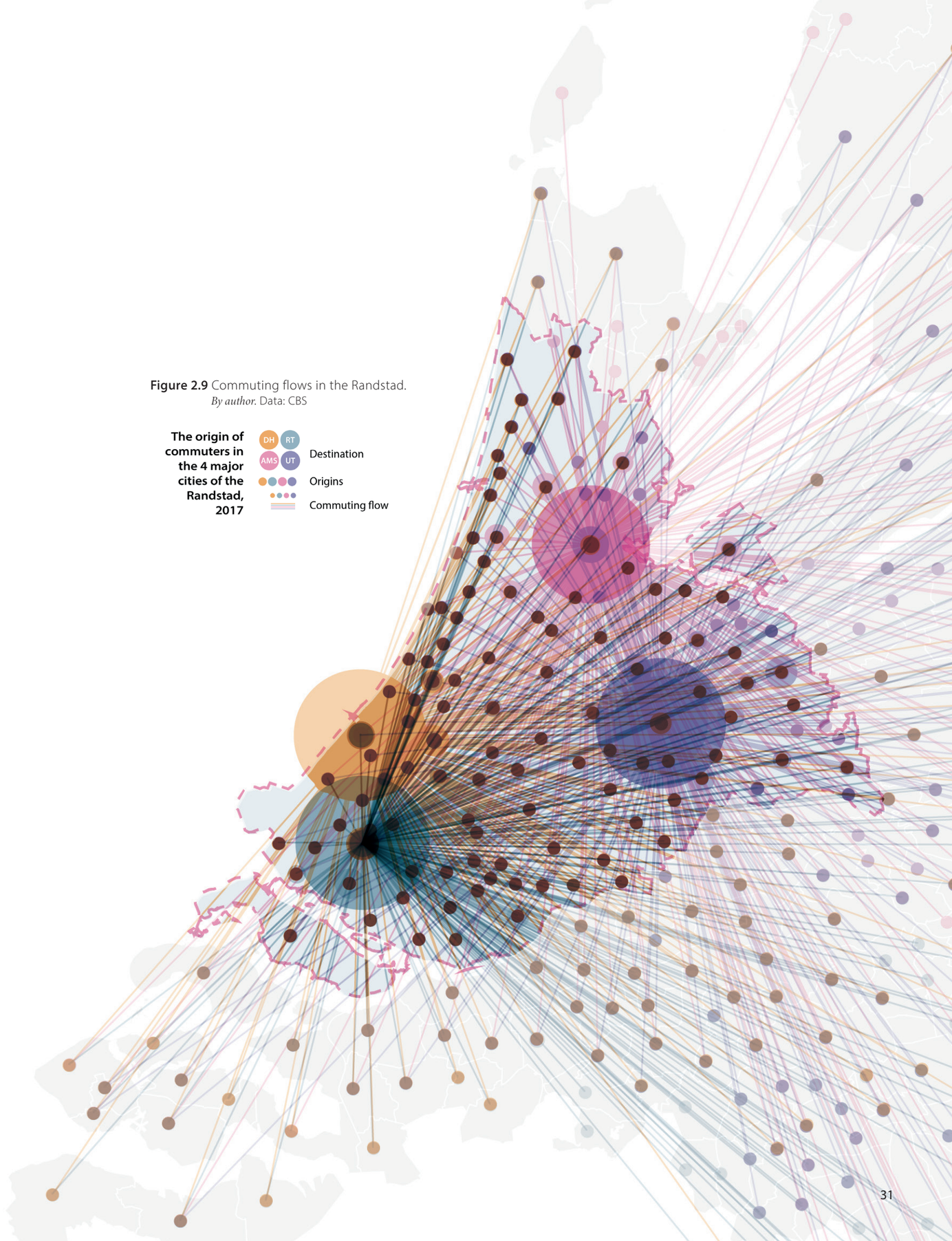


Figure 2.9 Commuting flows in the Randstad. *By author.* Data: CBS

2.4 Urban Sprawl

Growing urbanization

As massive housing production took place under the approval by the planning system, the reputation of Dutch national spatial planning of effectively containing urban sprawl is becoming suspicious, according to Zonneveld and Nadin. The national spatial planning was set up to prevent the Randstad from becoming a contiguous megalopolis, invading the conventional Dutch polderscape (Zonneveld & Nadin, 2021). However, housing projects are allowed to happen in the towns at the edge of the Green Heart, making them the fastest growing housing stocks (See Figure 2.10). At the same time, urban developments at the rural-urban fringe have been connecting the cities together, especially in the Randstad region (See Figure 2.12). Since the availability to work from home decreases the importance of metropolitan locations, more people are moving out of the Randstad in search of higher quality of living, adding to the trend (See Figure 2.11).

Dutch "urban sprawl" in a European perspective

Since 2000, about 1 million ha of land has been converted to urban use in the Netherlands, which is roughly one third of the size of the country. Most of the developments take place close to city edges due to urban compaction policies. According to the calculation from the ESPON SUPER project, the Netherlands experienced the 4th highest growth in built-up areas in Europe. With the country's size taken into consideration, the Netherlands got described "the European champion for urban sprawl" (Evers & van Schie, 2019), though Dutch researchers don't share agreements on that (Nabielek et al., 2013; Pols et al., 2018).

New opportunities, new policies

The rural-urban fringes have been expanding over the past decades, for which the improved transportation links and global economic forces are two of the reasons. From setting buffer zones, building compact cities to advocating liberalization and decentralization, the national spatial policies are believed to have largely prevented urban sprawl in the Netherlands, at a cost of monofunctional large-scale outskirts residential (Vinex) neighborhoods (Nabielek et al., 2013; Pols et al., 2018). As the pressure of urbanization on urban peripheries will remain and increase in the future, urbanization strategies are required to be more regional, beyond municipal boundaries. Taking the remote working trend as an opportunity, more emphasis needs to be placed on rural-urban fringes, for instance, residential agglomerations and business parks.

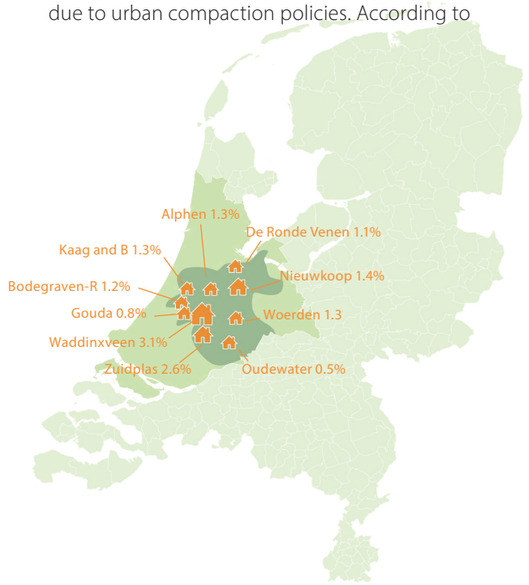


Figure 2.10 Ten out of ten fastest growing housing stocks are within the Green Heart area, 2020
By author. Data: CBS

Figure 2.11 More people are moving out of the Randstad
By author. Data: CBS

Figure 2.12 The urbanization progress in the Randstad, 2000-2040
By author. Data: CBS

2.5 Quality & Diversity of Metropolitan Life

Urban islands,
and the fragmentation of life

As the society becomes more and more specialized through the division of labour, everyday living, especially in the metropolitan areas, is increasingly divided and separated into **spatial and temporal "islands"** with specialized functions, which are linked with each other through various traffic methods. The massive outskirts residential projects make worse the situation. As Thomas Sieverts pointed out in the book ***Zwischenstadt***, the old unity of spatial proximity, activity and events is lost in the big cities due to the specialized facilities, leading to the fragmentation of living space and living time (Sieverts, 2003). The detachment between life and places results in what Hartmut and Helga Zeiher described as "**the insulation of personal life**", as each person exists in a different "action space", as urban sociologist Rainer Mackensen put it (Sieverts, 2003). It is such a normal situation of living in a metropolitan environment that one doesn't know any of his or her neighbors. The pace and content of our lives are not out of our will anymore, but rather bent on functional mobility needs, for which we sacrifice not only the freedom of choice, but also a large percentage of our time. People are deprived of possibilities to develop personal, perceptual links with the cities, with reduced quality of social relations (Ghoomi et al., 2015). This situation, like what we discussed about commuting, is impairing our **well-being** and **quality of life**.

Urban environment,
and quality of life

The concept of quality of life is dynamic, context-dependent, and sometimes personal. Generally speaking, it is related to the terms of happiness and well-being, individually and collectively (Cabrera-Barona & Merschdorf, 2018). An urban environment is a **place** consisting of 3 dimensions: **form, activities, and imagination** (Ghoomi et al ., 2015). By influencing the sense of place through influencing activities and interactions, the urban environment exerts an effect on the individual and collective perceptions and experiences, thus affecting the urban quality of life. As the streets and blocks get more and more specialized and functionalized, the richness of activities and encounters is lost. The **dissolution of social relations and everyday life** from the place undermines the quality and diversity of the urban environment, and the urban sense of place (Sieverts, 2003).

The case of the Randstad

With the aim to avoid such urban problems, the Randstad has been shaped as a metropolitan region unlike any of its European peers. With the unique scattered layout, the Randstad brands itself with the easy access to nature and the traditional Dutch landscapes. The comprehensive system of bicycle paths, which serves as a practical intermediate form between private and public transport, also helps to combat the insulation and fragmentation of life brought by the needs for travelling (Sieverts, 2003). Nevertheless, from ***Groeikern*** (Growth core) to ***Vinex*** (the 4th Memorandum on Extra Spatial Planning), decades of large-scale construction activity have resulted in a large number of monofunctional satellite towns and suburbs. ***"Vinexwijk"*** (Vinex district) develops the connotation of "boring neighborhood, neighborhood with little variety and diversity", while cities such as Purmerend and Almere are still regarded as typical ***sleep cities (Slaapsteden)***. The biggest victims of the mono-functionality of the urban environment in these cities and districts are again, young families, starters and migrants, who struggle between the urban islands to piece together their daily lives.

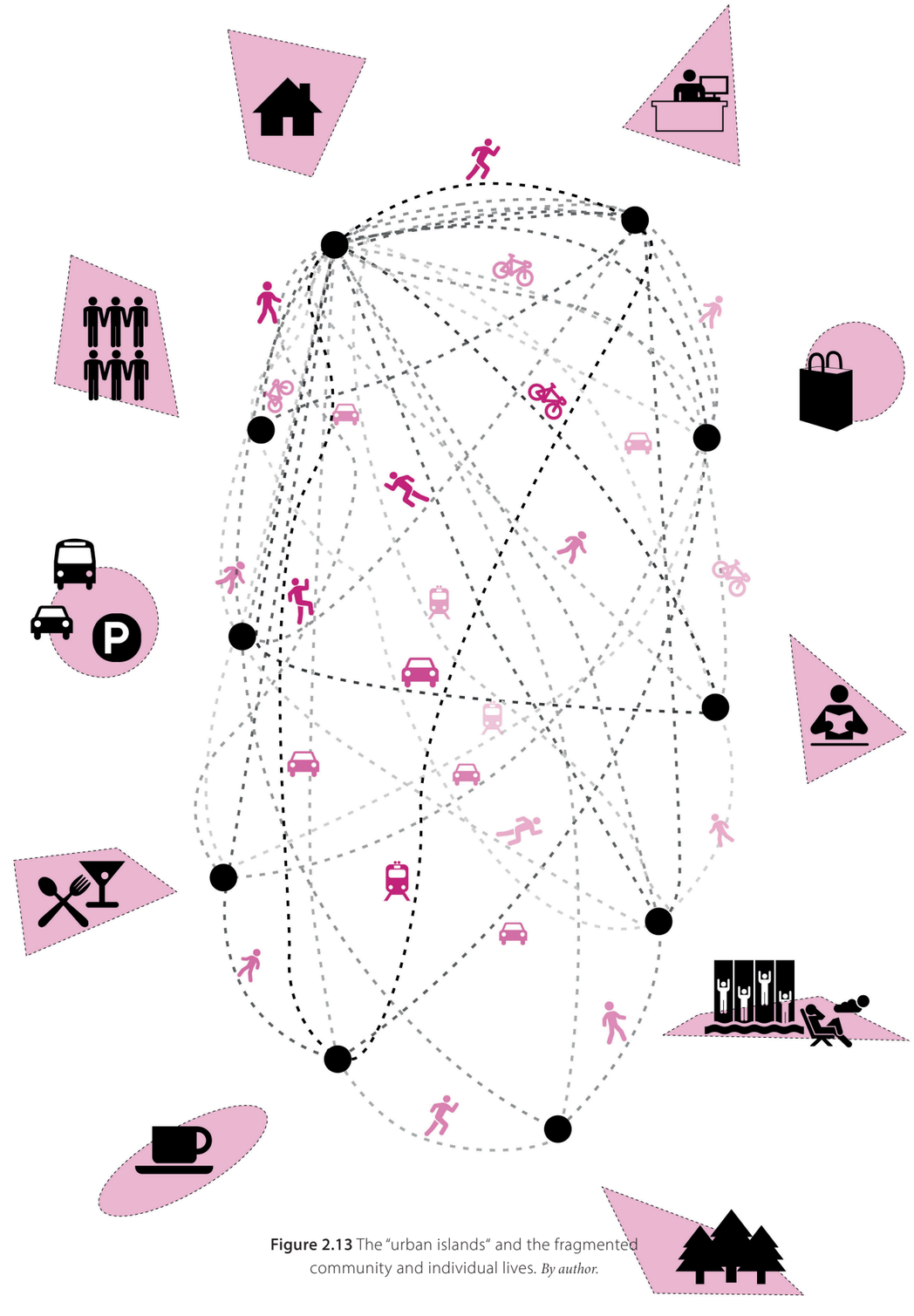


Figure 2.13 The "urban islands" and the fragmented community and individual lives. *By author.*

2.6 Problem Statement

Remote working raises requirements for residential space, adding to the quantity shortage of housing. The deepened **housing crisis** together with the **vacant offices** will persist even after the pandemic. Increasing needs lead to **expansive development** in metropolitan areas, further worsening **commuting patterns**, **quality of life** and **happiness in urban areas**, which is **neither livable nor sustainable**. We must seize the chance provided by the shifting working paradigm to reconsider the current work-ing-living environment and the way cities and neighborhoods function.

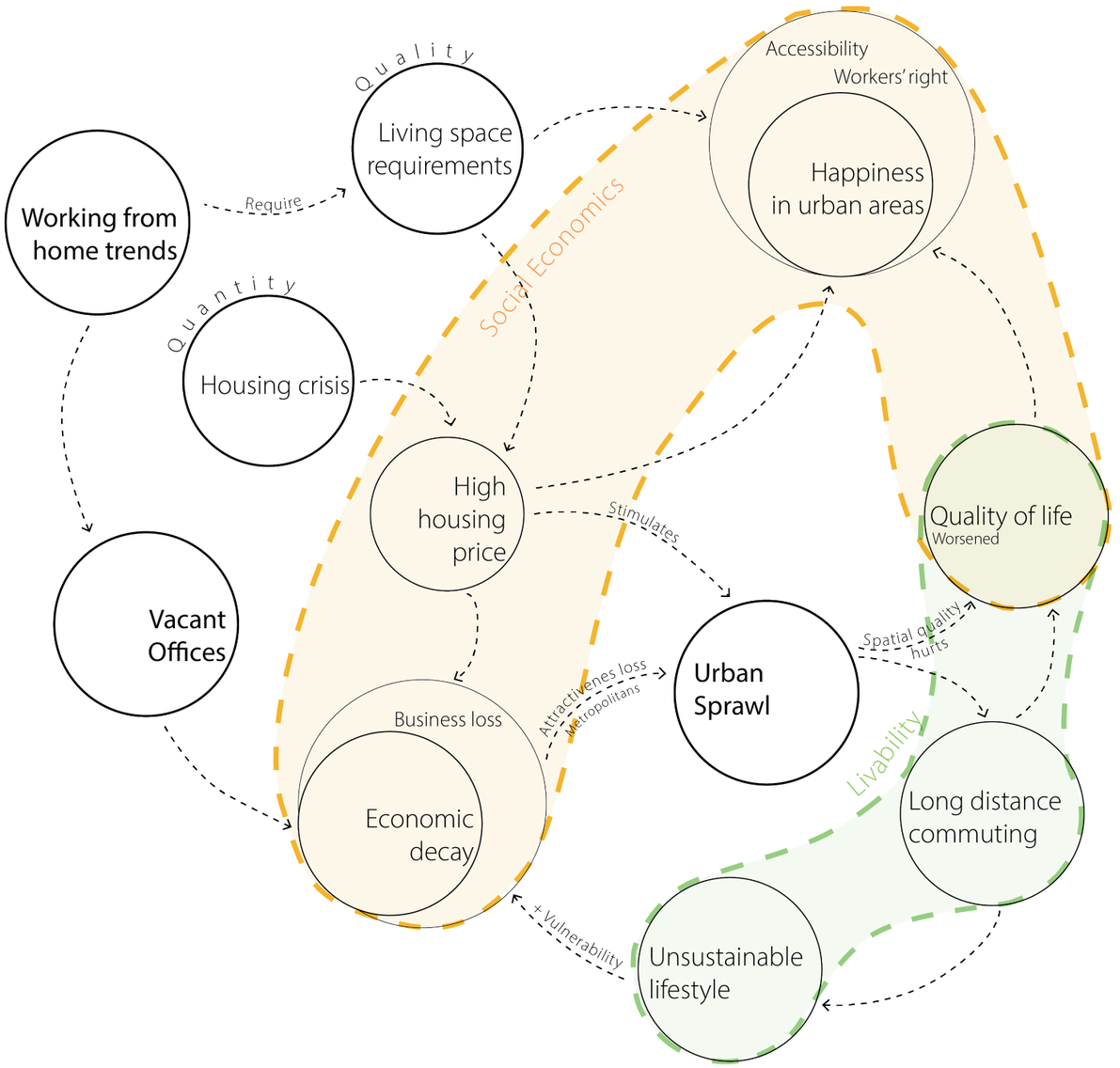


Figure 2.14 Links between problems. *By author.*

3

Methodology

3.1 Research Aim

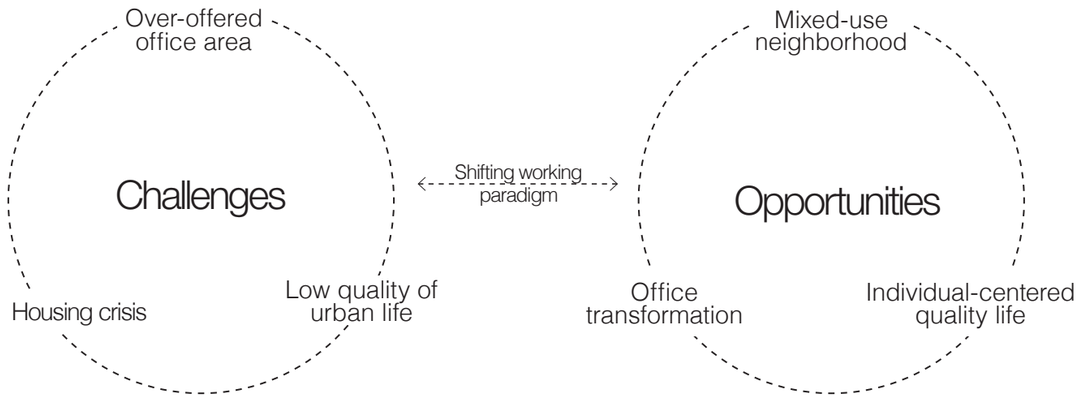


Figure 3.1 Illustration of the research aim. *By author.*

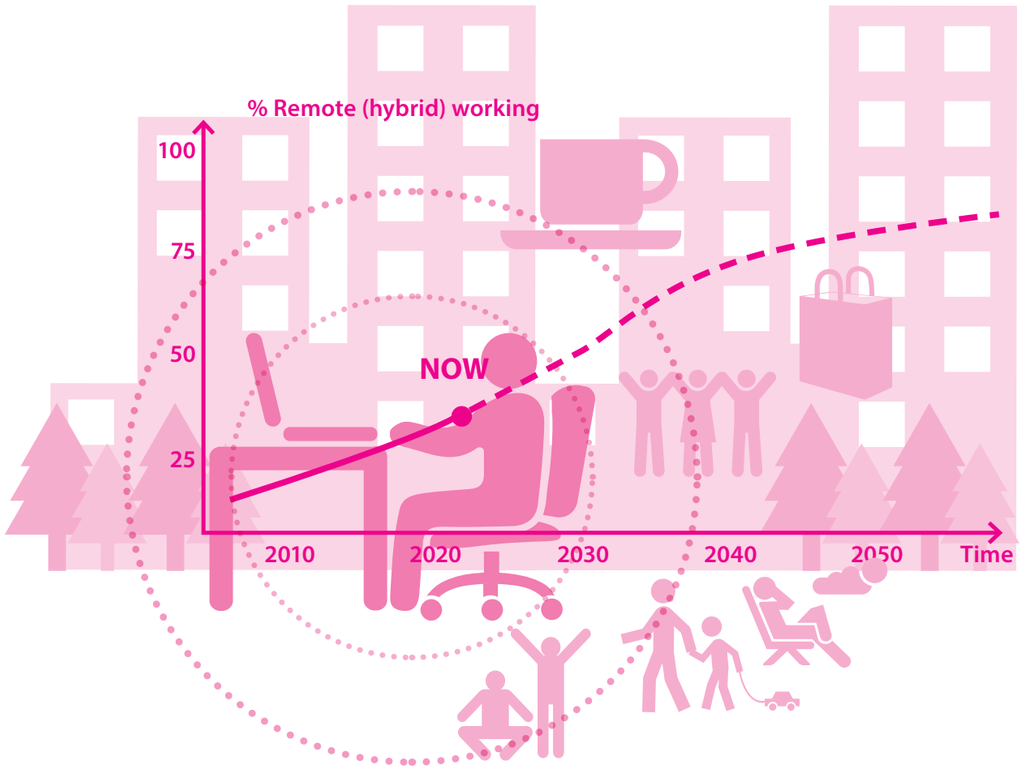


Figure 3.2 The goal--a diverse life made possible by hybrid working. *By author.*

With the shifting working paradigm as a lens, this research project attempts to turn **urban challenges** into **unique opportunities**. It finds potential in vacant office districts for mixed-use densification, which provides a chance to **alleviate the current** quantity and quality **housing crises** as well as make possible the **live-work** lifestyle.

The goal of the project is to articulate the vision of a more flexible lifestyle and closer-knit community, within a time frame of **50 years**. By **maxing out** the transition to **hybrid working**, the time spent on transportation can be reduced, which will bring changes to neighborhood design, as well as planning systems, which are required to prioritize **individuals' experiences**. The research tries to explore the spatial design that can facilitate the transition.

3.2 Research Questions

“

How can we take advantage of the new working patterns to transform monofunctional business districts into multifunctional and human-centred urban areas, therefore improve the quality and diversity of urban life in metropolitan areas of the Randstad?

In this process, the transition can contribute to responding to the two groups of urban challenges:

- Housing crisis & vacant office space;
- Unsustainable commuting patterns & urban sprawl.

Analysis

Sub-question 1
What are the spatial, social-economic, and environmental impacts of the current work-life pattern that might change in the future with hybrid work?

Exploration

Sub-question 2
What design options can help maximize the benefits of hybrid work to facilitate a human-centered, live-work neighborhood?

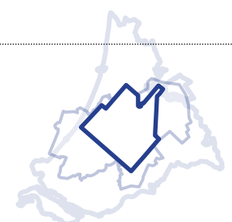
Implementation

Sub-question 3
How to apply the options and transform a business district as an example in Hoofddorp?

Reflection

Sub-question 4
How does the transition respond to the changing external conditions and what are the factors to consider?

3.3 Research Methods

	Methods	Outcomes	Scales
Sub-question 1 What are the spatial, social-economic, and environmental impacts of remote working on the Randstad region?	***Literature Review*** Studies of literature and documents regarding the definition, forms and influences of remote working. ***Foresight:** Analyzing* Elaboration of the impacts facing the Randstad region.	***Conceptual Framework*** The connections between the research aim and the key concepts. ***Regional Analysis*** Multi-layer analysis on the necessity of setting the research area in the Randstad, from the aspects of housing, commuting, urban sprawl and social-economics.	 *Randstad*
Sub-question 2 What design options can help maximize the benefits of remote working to facilitate a human-centered, live-work neighborhood?	***Foresight:** Visioning* Setting the goals for the future of hybrid work lifestyle. ***Foresight:** Design Exploration* Exploration of needed charateristics of the future live-work neighborhood and the possible interventions.	***Map of Aspirations*** A map showing the relationships between specific goals and principles to identify the priorities and synergies of the project. ***Scenario Building*** Building the framework of describing and assessing the scenarios. ***Menu of Options*** A set of design options for the establishment of the live-work neighborhood and possible solutions to the urban issues.	 *Global case studies* -- *Hoofddorp*
Sub-question 3 How to apply the options and transform a business district as an example in Hoofddorp?	***Site Analysis*** Spatial analysis of the chosen test site, such as functional analysis and proximity analysis, carried out by fieldwork and mappings. ***Foresight:** Design Implementation* Applying the selected design options on the site to provide a view of the possible future. ***Foresight:** Backcasting* Comparing the current conditions with the desirable future to figure out the required actions.	***Design Scheme*** Drawings such as plans and sections to explain the result of design implementation on site. ***Roadmap*** A framework for actions to connect the vision with development plans and options of interventions.	 *Hoofddorp*
Sub-question 4 How does the transition respond to the changing external conditions and what are the factors to consider?	***Foresight:** Testing* Reflections on the risks in future decision-making and the possibility of changes for the design options.	***Scenarios*** A set of ossible futures under the impacts of one of the drivers of change. ***Alternative Paths*** Exploring design responses to external conditions in different scenarios.	 *Hoofddorp--* *Regional*

3.4 Methodology
Urban Foresight

Long-term planning
to cope with uncertainties

The need for long-term planning is increasingly highlighted by the various **crises and challenges** facing today's ever-changing society. With the climate change risks, gas crisis, and the prolonged Covid-19 pandemic impact, the socio-economic **uncertainties** inevitably exert an effect on spatial development and the way we look at it. The future is not certain but **a wide range of possibilities** (Figure 3.3). Due to economic and political reasons, the futures beyond 25 years are seldomly considered for planning, and the non-probable, non-business-as-usual possibilities are often omitted. The common, relatively short-term urban planning (15-20 years) fails to provide cities with the understanding, plans and visions for their long-term futures, which also affects the local authorities and organizations on their actions. In the past decades, more and more cities have started the development of formal vision processes, described as **"urban foresight"**.

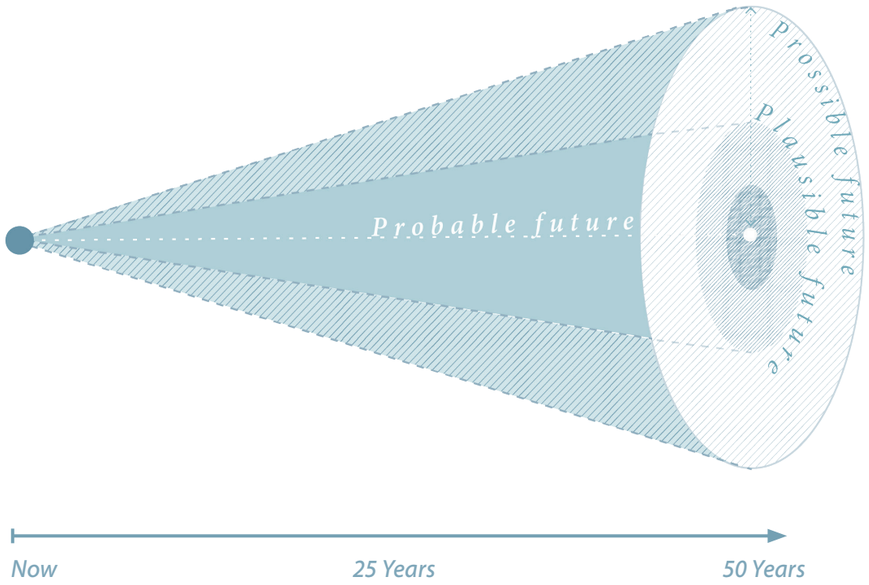


Figure 3.3 The range of futures. *By author.*
Interpreted from (Government Office for Science, 2016)

Definition & origin

The term **"foresight"** originated from US military planning studies during the 1940s and 1950s, which later developed into a method to analyze the forces that drive transformative change in technology and society. It is both a conceptual framework and a process of forward-looking analysis and decision-making, with its emphasis on the use of methods, such as visioning, that encourage public participation (T. Dixon et al., 2018).

Urban foresight, sometimes referred to as "city foresight" in the UK, is a series of formal foresight techniques specifically applied to create a **city vision** or a **desirable future** for an urban area. A primary example of this is the Foresight Future of Cities Programme by the UK Government Office (T. J. Dixon et al., 2022). According to the UK government, the techniques are exercised to uncover new ideas, challenge existing assumptions about the possible futures, and explore the interactions between future trends and the forces driving change. By thinking about the long-term future, **assets and potential roles of a city** can be creatively explored, giving valuable articulations of future aspirations for the urban environment beyond vague words such as "livability" and "competitiveness" (Government Office for Science, 2016).

Forms, methods & techniques

There are two main forms of urban foresight study: **generic studies** on urban development issues with technology-based foresight, and **urban foresight** on specific cities and urban areas. The methods and techniques can be quantitative, for instance, forecasting and modeling, or qualitative, such as visioning and backcasting (T. Dixon et al., 2018). The common types of techniques cover a wide range including future studies, scenario-planning, horizon-scanning, transition management, community-visioning, anticipatory policy intelligence, road-mapping, and so on (T. J. Dixon et al., 2022). Among the methods and techniques, **"backcasting"** is regarded as the most distinguishable and significant process when it comes to urban foresight. Applied to look backwards from the desirable future to strategize and plan the road to future achievements. In this way, the method of visioning can also be included as a first stage of the backcasting process, providing a picture of a desirable future.

The different needs for insights for forecasting and futurescaping result in different types of thinking involved in the urban foresight process, which can be broadly concluded as the following: **visioning, analyzing, designing, testing,** and **assembling** (implementation and evaluation) (Government Office for Science, 2016). During the process, the modes of thinking can be engaged iteratively, providing feedback to each other (Figure 3.4).

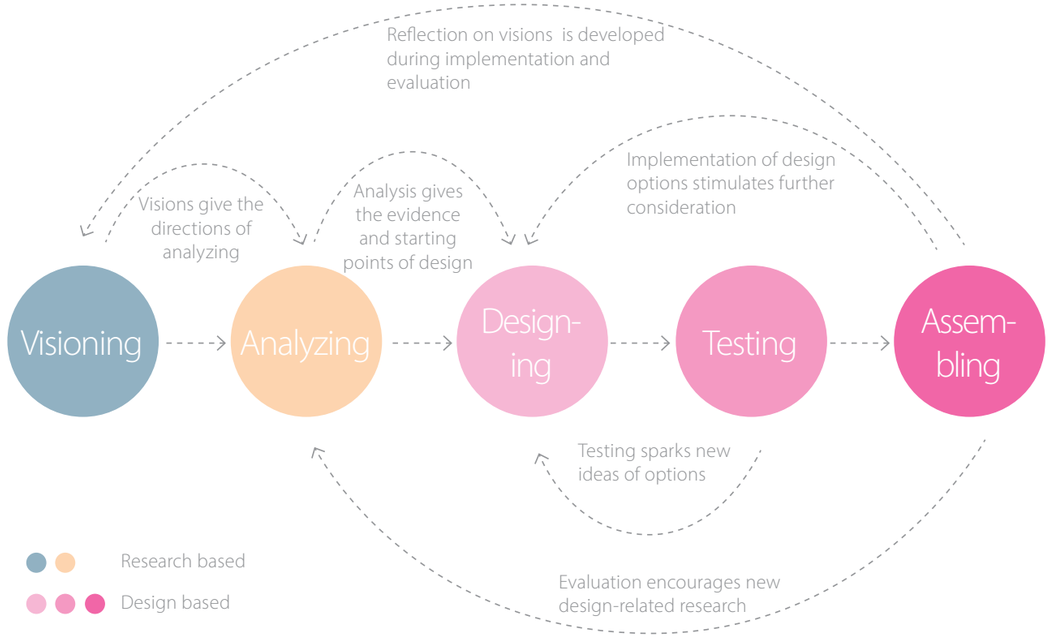


Figure 3.4 Types of thinking involved for the urban foresight process.
By author. Interpreted from (Government Office for Science, 2016)

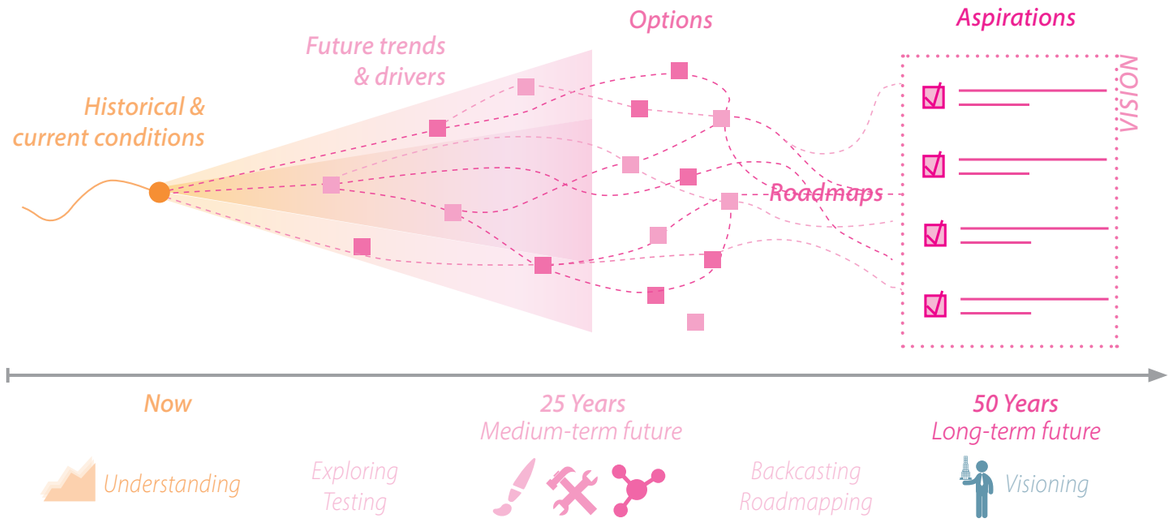


Figure 3.5 The journey of urban foresight. *By author.*
Interpreted from (Government Office for Science, 2016)

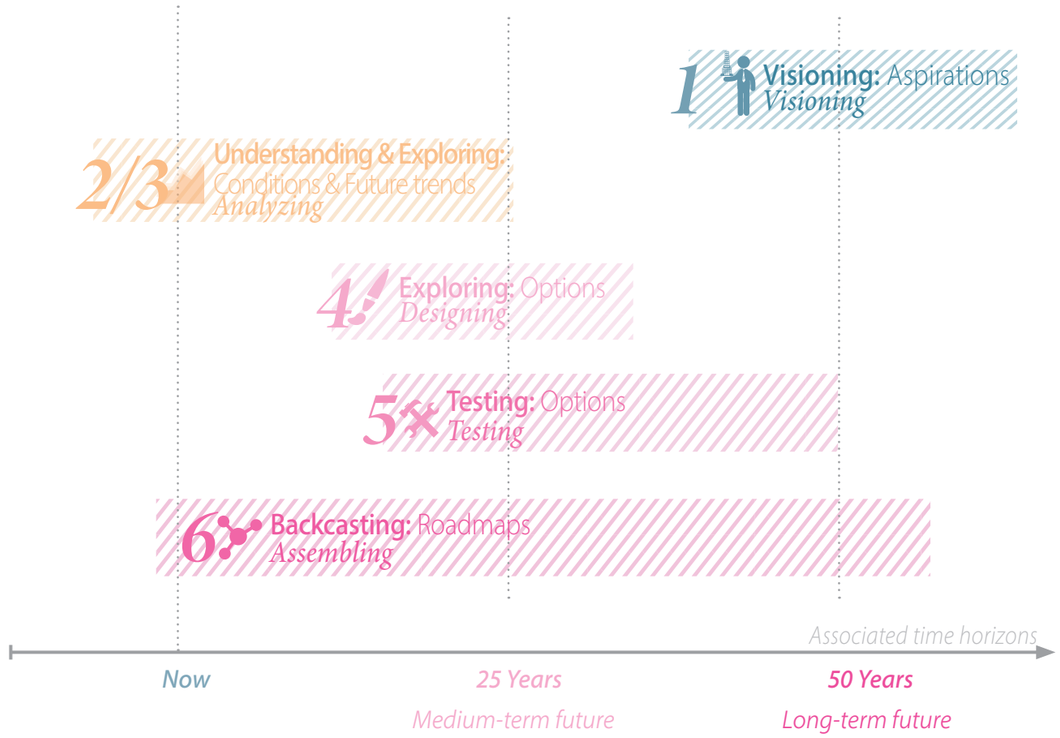


Figure 3.6 The sequence and the type of thinking applied in the process. *By author.*
Interpreted from (Government Office for Science, 2016)

The Sequence

Although different modes of thinking are engaged iteratively, there is a sequence of stages recommended for exploring and planning the road to the desirable futures. According to Foresight and the UK Government Office for Science, the sequence should start with the visioning of the distant future, followed by the exploration of possibilities and roadmapping (Government Office for Science, 2016).

1. Visioning

When thinking about our future life and society in 25 years or more, we cannot depend on our observation of the current normal, the start with aspirations and visions is thus very useful. Exploring and imagining the elements of the applausive futures makes the very first steps towards them. This research will focus on visioning the future life in 50 years, when there is little need for offices, the need for commuting is cancelled and most activities can be freely arranged around one's home and community.

2. Understanding

The current state and context of the urban area needs to be considered with the visions in the head. By comparing imagination and reality, the first ideas of actions are naturally generated. The understanding of the current trend and urban characteristics also makes clear the more possible roads to the future. For this hybrid work project, the trend of remote work and the urban issues that may get alleviated from the trend are described and explained in the previous chapters. The analysis of the testing site(s) will follow together with the design principles.

3. Exploring

The exploration of the future includes consideration of both future trends and options. Though projection of existing trends tends to feel increasingly vague and problematic when it goes beyond the 15-20 years' time scheme, it is becoming more and more feasible. According to Danny Dorling in his book Slowdown, technological and structural progress is slowing down all over the world, therefore changes are more unlikely to happen rapidly nowadays (Dorling, 2020). As the project sets out to provide a vision of future lifestyle, the related social concepts such as happiness, commuting paradigm and daily routines, are more difficult to change significantly in a short time. Thus, the project chooses a time scheme of 50 years to explore plausible interventions.

4. Testing

Things may not always work as we want, especially when talking about a 50 years time frame, there are plenty of uncertainties and risks that need to be taken into account. The stage of testing explores the possibilities with a range of wider future outcomes and tries to find out how the driving forces may affect the options of interventions and the future. In the case of remote/hybrid work, population, economic trends, and concerns about the environment and energy may act among the key drivers.

5. Backcasting & Roadmapping

Finally, it's time to create a roadmap linking the status quo to future aspirations. Backcasting requires working backwards from the goals and visions to identify the needed actions and interventions, which help generate the roadmap as a staged framework.

In all, Figure 3.5 summarizes the journey of urban foresight. The analysis and understanding of current conditions and the exploration of trends and options for the medium-term future (+25 years) all contribute to achieving the goals and desires in the longer term. Throughout the process, the five modes of thinking are applied at different phases. Figure 3.6 shows the sequence and the type of thinking applied in each stage, and the time horizons they are associated with.

Foresight Techniques

Research based

Design based

Not applied in this project

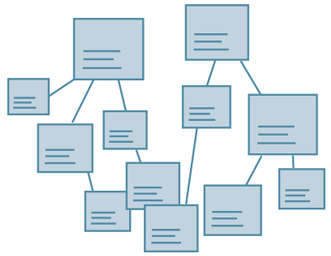
Each of the five types of thinking derives several methods to be used in the foresight process. In this project, only those approaches that are conducive to specific topics and do not require additional resources were selected, leaving out approaches that require special skills and collaborative workshop arrangements, and approaches that are too broad to focus on the hybrid-work topic.

Figure 3.7 Foresight techniques. *By author.* Interpreted from (Government Office for Science, 2016)

Visioning

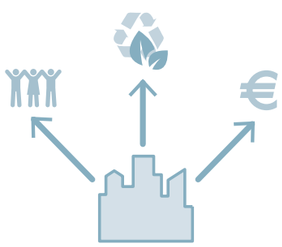
Creative Visioning

Generating elements of visions for the future. This can be more about being creative than rational, just for widening the range of consideration.



Aspiration Mapping

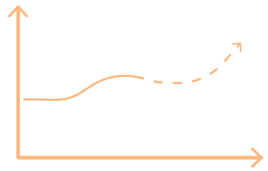
Making a list of desired future elements, and exploring their mutual relationships.



Scenarios

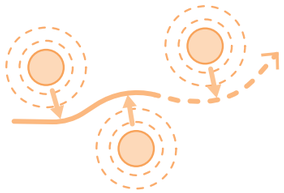
Making guess in themes about the future based on the trend, drivers and possible big events. What if this happens, and what if that...?

Analyzing



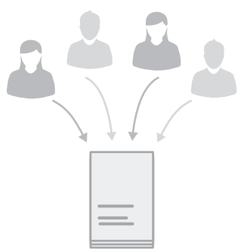
Trends & Projections

Exploring and projecting the future developments based on the current trend.



Drivers of Change

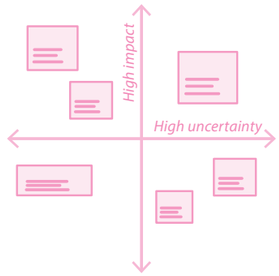
Reviewing the factors that are able to drive and shape the change.



Delphi Panel

Delphi is an iterative consultation process between experts to reach consensus on future events and trends.

Designing

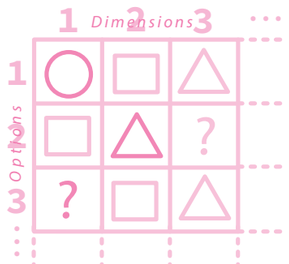


Uncertainty Analysis

Analizing the impacts and certainties of the influencial drivers.

Group Discussion

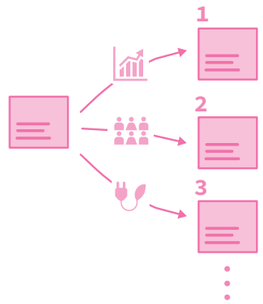
A group discussion session is for raising awareness and adding to the participation of the public.



Menu of Options

Exploring possible options of interventions based on different aspects / themes.

Testing

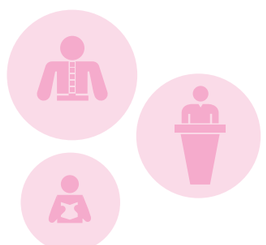


Alternative Paths

Testing the design based on scenarios of external conditions, and considering alternative interventions.

Quantitative Assessment

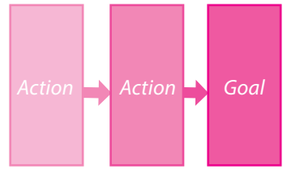
Using quantitative and mapping technologies to test and evaluate the possible result of proposed options.



User Persona

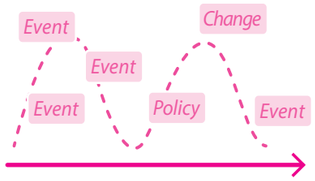
Testing the pros and cons and feasibility of the measures by thinking in the created characters in different life situations. Also as "future roleplaying" from the original technique (Government Office for Science, 2016).

Assembling



Backcasting

Looking backwards to see what is lacked to achieve the aspiration.



Roadmapping

Creating a staged timeline to connect the future goals to solid actions.

Case study

Learning from existing / proposed cases to extract the transplantable elements.

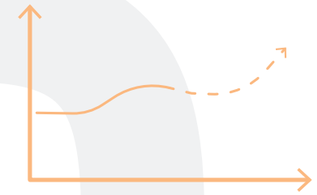
The journey of foresight in this project

Research based

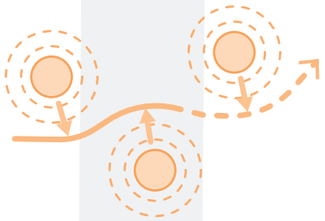
Design based

Since the regional analysis is done before methodology, the foresight process will start with visioning in this project. After the visioning phase, there are analyses of existing trends and drivers of change, concluded with the uncertainty analysis. In the design phase, the visioning and designing methods are intertwined. After arriving at the design solution, the alternative path technique is used to test the viability of the design in different scenarios.

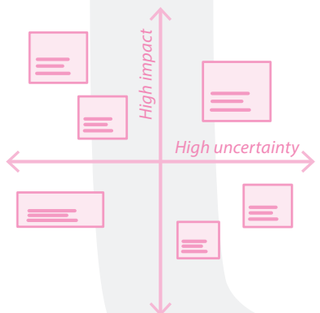
Creative Visioning



Trends & Projections

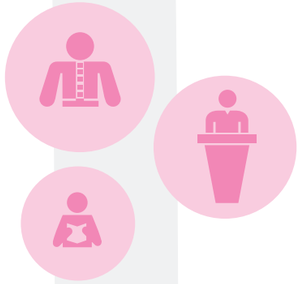


Drivers of Change

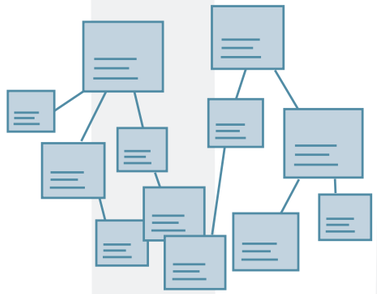


Uncertainty Analysis

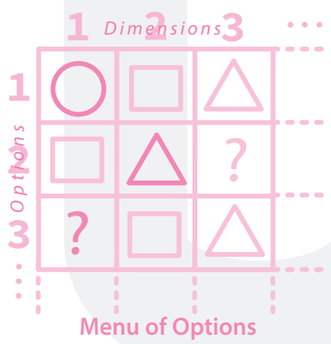
Scenarios



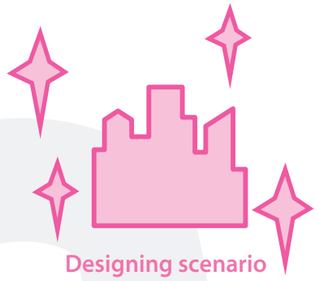
User Persona



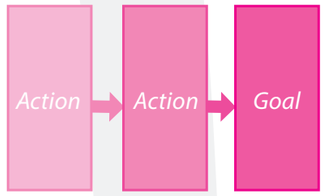
Aspiration Mapping



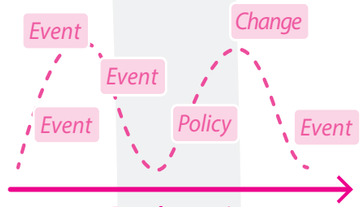
Menu of Options



Designing scenario



Backcasting



Roadmapping

Alternative Paths

Figure 3.8 Foresight techniques applied in the project. *By author.*

3.5 Conceptual Framework

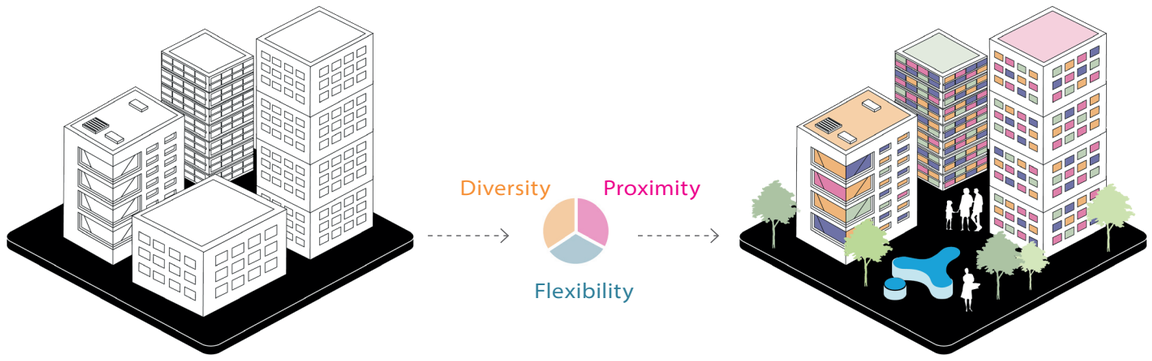


Figure 3.9 Conceptual framework. *By author.*

This project provides a desirable vision for the time frame of **50 years**, when hybrid working is widely adopted as a normal, and the neighborhood design as well as planning systems are adapted to prioritize individuals' flexible activities. The research tries to explore the **spatial design** that can **facilitate the transition**, by transforming monofunctional business districts into live-work, mixed-use neighborhoods. **Proximity**, **diversity** and **flexibility** are the key concepts guiding the process.

Proximity

Proximity is a rather variable concept. In one way, it emphasizes transportation and land-use integration; in another way, the concept can also be about the local community, highlighting the social context. There is even an individual perspective at detailed scale level (Solá & Vilhelmson, 2019). It is important not to be limited by the efficiency of mobility and neglecting the daily needs and activities of the residents. This project translates proximity into the need to build **compact**, **diverse**, and **pedestrian-oriented neighborhood**.

Diversity

The diversity of a neighborhood indicates neighborhood structure and spatial pattern, influencing the functioning and livability of the neighborhood environment (Saeidi & Oktay, 2012). According to Jane Jacobs in her book *The Death and Life of Great American Cities*, the key to diversity a rich **mixture of functions and activities**, which can be extended to the richness in varieties of **functions, (spatial) forms and residents** (Jacobs, 1993).

Flexibility

Flexibility emphasizes the **versatility**, **convertibility**, and **expansibility** of space, thereby laying the foundation for a wide variety of people, spatial functions, and activities. The concept is both temporal and spatial. In order to improve flexibility in urban space, more attention needs to be paid on **positive outdoor spaces**, **multimodal behavioral patterns**, **multiuse buildings**, and **the diversity of amenities** (Esteghlal et al., 2016).

3.6 Conceptual comparisons

Figure 3.10 15-minute city. *MoveBuddha.*
https://www.movebuddha.com/blog/15-minute-cities/

• The concept of 15-minute city aims at the access to various functions within 15 minutes, therefore it may fall into the trap of one-sided pursuit of transportation efficiency. The live-work mixed use neighborhood not only not only emphasizes on the pure accessibility of the facilities, but also on the richness and reasonable configuration of the facilities.

• Usually, because of the consideration of efficiency and feasibility, the 15-minute city concept is applied on highly urbanized areas such as city centers, which are already rather compact multifunctional, and walkable. Differently, this project focuses on the "unprepared" areas for transformation, which are monofunctional business districts and office areas, often at the outskirts of big cities.

• In recent years, the 15-minute city has been a favored achievement for the governments of big cities. The short implementation time and small interventions have limited the depth of the project and made it difficult to reach the scale of neighborhood (/ city) structure. This project applies the methodology of urban foresight to bring fundamental changes to the target areas from the beginning of planning.

Figure 3.11 The live-work-play concept. *Archdaily.*
https://www.archdaily.com/515091/live-work-play-an-exhibition-of-local-award-winning-architecture-from-south-england/539872c0c07a80569e000684-live-work-play-an-exhibition-of-local-award-winning-architecture-from-south-england-image

• The concept of live-work-play is closely related to the concept of 15-minute city, describing the standard of mixed use development required to support the goal. Discussions on this concept have focused on the mixed use of the building and the architectural design. This project focuses on the neighborhood level, not only on the mix of building functions, but also on the flexibility of the space over time.

• Live-work-play development is being pursued by developers for new large residential complexes and residential towers. Like the 15-minute city, those projects are more likely to be found in downtown and well-developed areas. This project hopes to provide inspiration for the transformation of monofunctional areas, so that the transformation is based on more sustainable building reuse.

• Under the influence of developers, the development of live-work-play has become more capital-oriented. Those residential projects are more often branded as upscale, fancy, luxurious, in highly urbanized areas where everything is within reach. This branding makes them part of the gentrification. In this project I tried to include different people and create a more diverse community.

3.7 Theoretical Underpinning

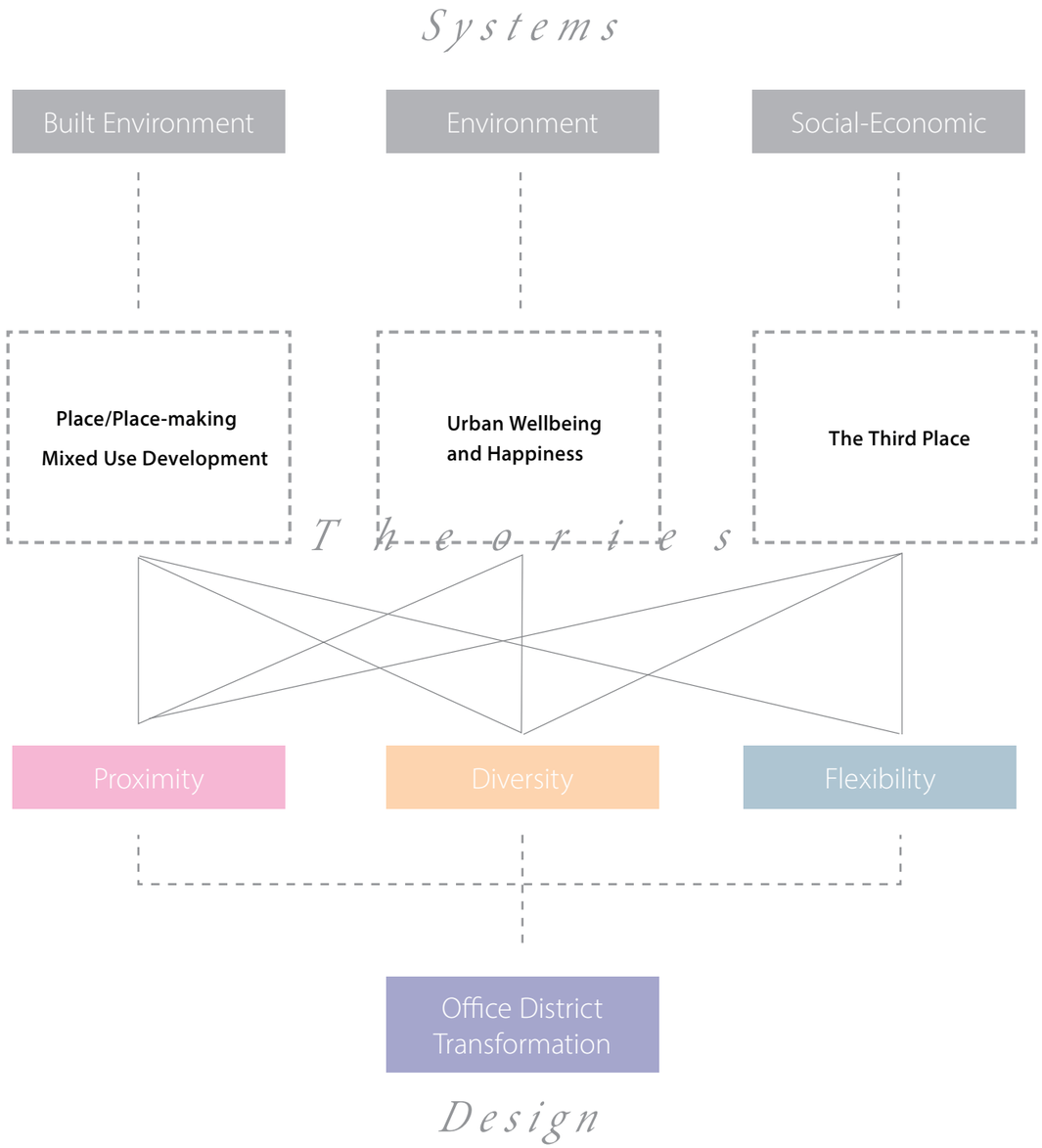


Figure 3.12 Systems, Concepts and Theories. *By author.*

Place and Placemaking

As Ghoomi et al stated, place means ***"being"*** and ***"room"***, which can be interpreted as the physical existence of space itself and the carrier of activity. A place arises from the interaction between the three elements: form, activity, and imagination (Ghoomi et al., 2015). The nature of space is fluid, changing every day as different activities and interactions take place. Therefore, the vitality of a place is ultimately determined by the people who use and perceive it. As Friedmann put it, a place should be (1) a small, **pedestrian scale** urban space, (2) with reiterative **social practices** happening, and (3) shows the quality of being **inclusive, performable, and dynamic,** therefore (4) has **a special meaning** to be cherished and valued by its residents (Friedmann, 2010).

The affections and understanding regarding the place the activities happening there, is then the **sense of place**. This sense is what makes the definition of a place so subjective and uncertain. Only when people connect a place to their spiritual world does a ***place*** come into being. Figure 3.13 lists out some criteria of the sense of place from a spatial perspective (Ghoomi et al., 2015).

With this being said, it is important in the placemaking process to **create spaces for encounter and gathering**, forming one or more hotspots or centers. Since a place is defined by the experiences of individuals, it is essential to have the residents engaged.

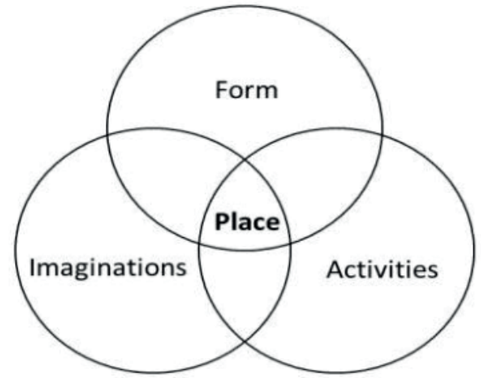


Figure 3.13 The three components of a place.
From (Ghoomi et al., 2015).

Criteria	Sub-criteria
Typology	Moods
	Perception and Understanding of the Environment
	Dialog and Discussion
	Being with others
Topology	Landscape (natural entities)
	Built Complexes (natural entities)
Morphology	Space and Character

Figure 3.14 The criteria of sense of place.
From (Ghoomi et al., 2015).

Mixed Use Development

Because of the potential of mixed-use development in sustainable transportation, reducing urban sprawl, promoting economic development, and improving quality of life, this concept is sought after by many urban planners and real estate developers. However, the resulting abuse of this concept has led to its clarity being compromised. Herndon and Drummond pointed it out in their report, "Developers view the concept from the project level and often consider any development which contains **more than one use** as a mixed-use project. Planners typically have a larger frame of reference, but seem to care less about the details of the definition and more about **the intent behind** the concept." (Herndon & Drummond, 2011) Therefore, it is important to consider different aspects of this concept and to achieve a balance in practice.

Comparing several academic definitions, a mixed-use project should (1) consist of **multiple uses** that are integrated and are able to **attract respective users**, (2) on the basis of **pedestrian-oriented, intensive development**. On top of these, the **integrity** and **coherence** of the project cannot be omitted and largely determines the quality of the development (Herndon & Drummond, 2011).

From a conceptual point of view, the components of mixed-use development are function, dimension, scale, spatial type, and sociological and demographic factors. Figure 3.14 explains the mixed-use model in various dimensions. When translated into design, the standards are mainly reflected in design interventions regarding **parking spaces, public spaces**, and **streetscapes**, especially emphasizing the importance of **connectivity, placemaking and pedestrian experience**.

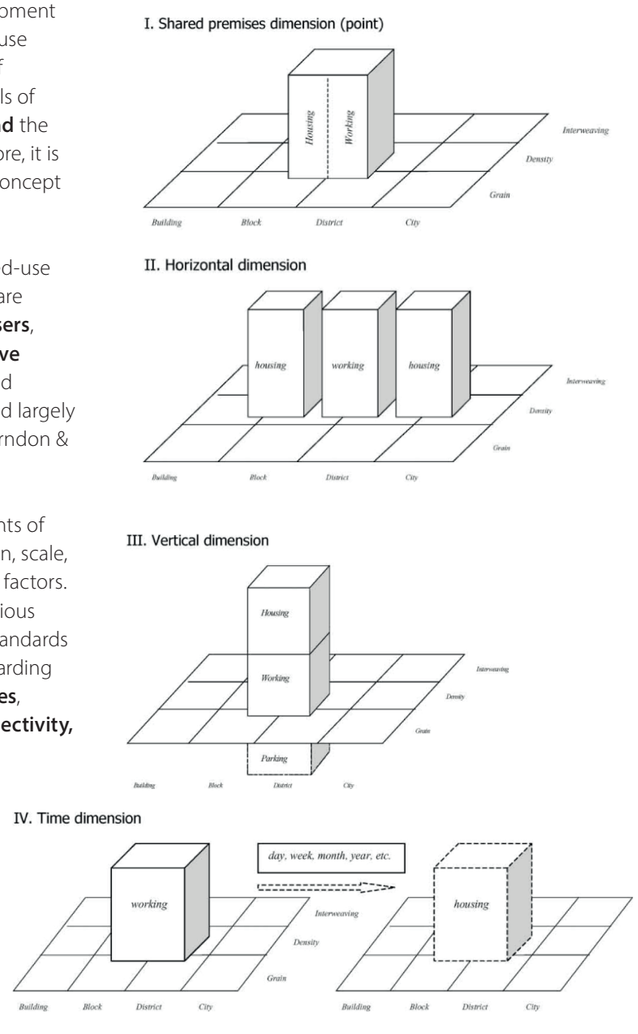


Figure 3.15 The mixed-use model in different dimensions. *From (Herndon & Drummond, 2011).*

Urban well-being and happiness

Wellbeing and happiness are difficult concepts to quantify, since they are defined as positive emotions and moods. Nevertheless, the organizations behind the ***World Happiness Report*** use public opinion surveys to study the differences in wellbeing and happiness between urban and rural residents, and analyzes the factors that influence wellbeing through relevant geospatial and social information. According to the report published by the organization in 2020, the rural population in the Netherlands has a significantly higher life evaluation than the urban population, ranking the third in the world. The dominant reasons, according to the report, are that rural populations have access to good infrastructure, are more attached to their communities, have more affordable housing, and tend not to be single and thus do not feel lonely (Burger et al., 2020).

The report divides the factors influencing happiness into two categories, which they call ***"people factors"*** and ***"place factors"***. For the design of this project, the influence of place on wellbeing is more interesting. The factors can be divided into these categories:

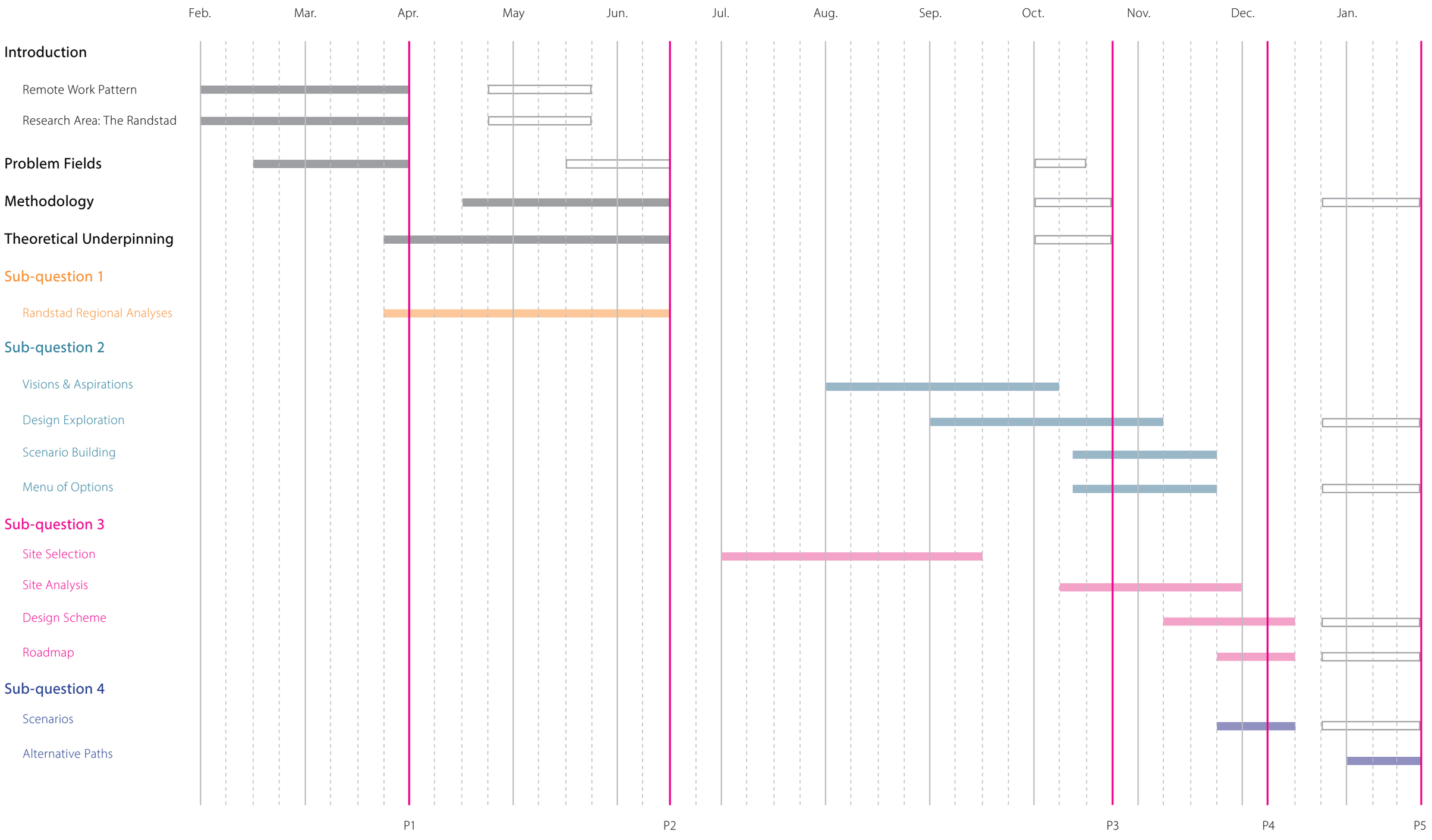
The Third Place

The term "the third place" was coined by sociologist Ray Oldenburg to refer to the place **where people spend time between home (first place) and work (second place)**. Also known as "the living room of the society", it is the place where we communicate, spend our leisure time, and build relationships, which is why urban planners believe that the third place plays an important role in **strengthening the sense of community** (Butler & Diaz, 2016).

While a third place can also be a virtual space such as an online chat room, the communication that occurs in a physical space is even more valuable. After all, it is the physical places where people can easily arrive and meet and talk with each other on a regular basis, that are, the necessary elements to build a true community. The creation of a third place is similar to placemaking - it simply requires the right space for people to gather and move around, and regular activities will result in a third place. To achieve this effect, these spaces should be **permeable, accessible to everyone, have an interesting atmosphere,** and **ideally be connected to public spaces** (Jeffres et al., 2009). These spaces require simple **amenities**, such as WIFI or tables and chairs. It is also possible to **use space that already exists** - cafes, parks, pubs and even McDonald's are good examples.

Third places play a key role in the redevelopment of monofunctional areas, as the sharing of space and activities helps to **facilitate communication** between residents from different backgrounds, regardless of age, class, occupation and education level, which is important to **reduce social isolation**. This project attempts to create third places to the community by adding shared spaces that are multi-functional both at the temporal and spatial levels.

3.8 Research Schedule



4

Visioning the future

1 The vision
2 The elements
3 The Trends& Scenario building

4.1 The vision

The future is a world where hybrid working frees people from the demands of commuting and fixed schedules, allowing them to **build close collaborative relationships in their communities**. Neighborhoods are a mix of living, working and other functions, that are **all-day-round inhabited**. **Housing affordability** increases as a result of office transformations. Flexible schedule shakes up gender stereotypes especially in terms of chores and childcare, offering hope for **improving gender equality**.

4.2 The elements

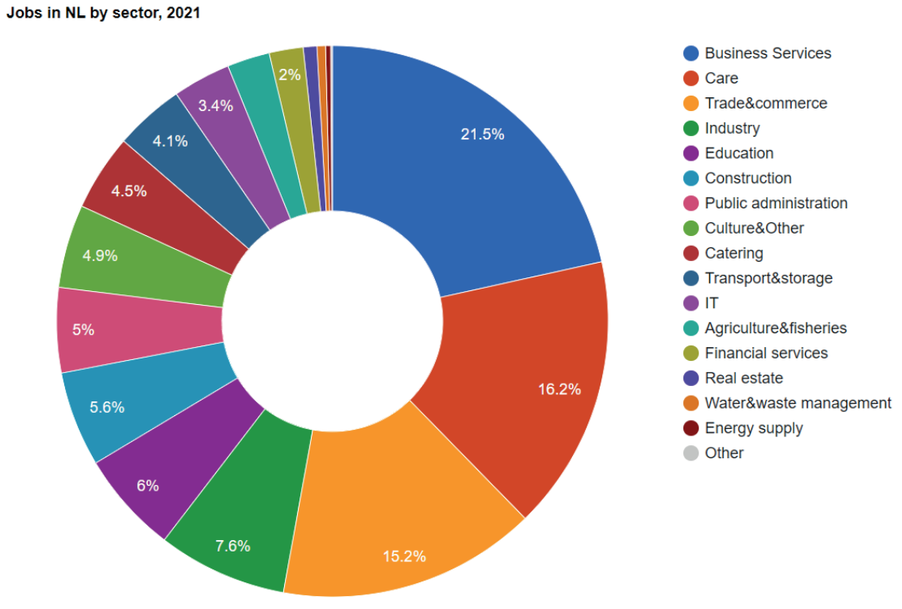
Such a desirable future is made possible through the **transformation of office districts** with the three prerequisites:

- **80% remote hybrid working**
- **New concepts of working space**: combination of office, home and third places
- **Hybrid-working supportive live-work neighborhood**, built on proximity, flexibility and diversity.

Figure 4.1 The life with hybrid work.
Conexus Studio. ***https://www.conexus.sg/hybrid-office***

4.3 Is 80% WFH a dream?

Although it may sound unbelievable, hybrid working with 80% WFH (work from home) is more than a dream. Before the COVID-19 pandemic, less than 20% of the Dutch population worked remotely on a regular basis. **By the end of 2020, that figure was 48%.** Although this trend seems to have reached its peak, the distribution of the Dutch labor market indicates that **no more than 34%** of all workers are completely not able to work remotely, mostly in the catering, construction and care industry, and industries that need adjustments to better support hybrid work make up the rest **66%**. If we take into account the decreasing industries such as industrial and agricultural sectors, then **there is still room for this figure to rise**.



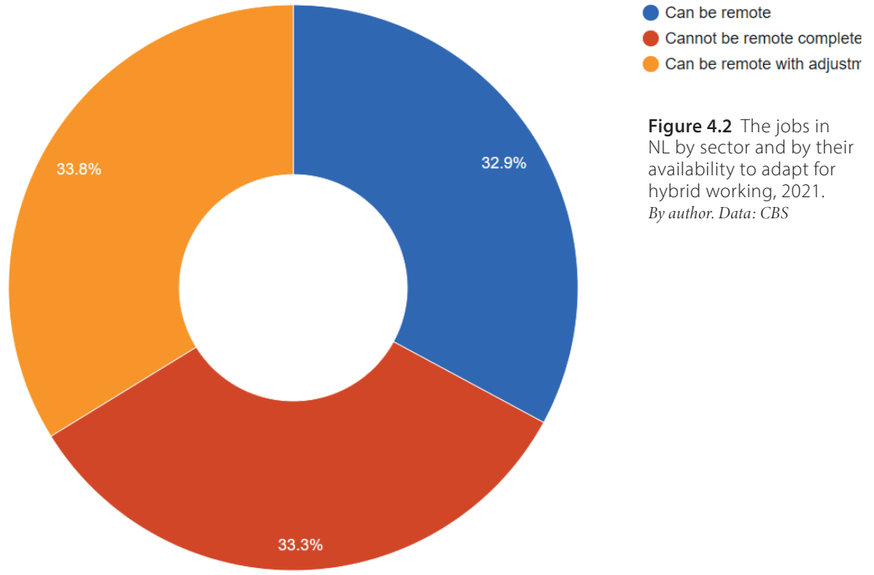


Figure 4.2 The jobs in NL by sector and by their availability to adapt for hybrid working, 2021. *By author. Data: CBS*

4.4 The future of hybrid working

According to the 2022 report ***Technology and innovation in the hybrid age*** by JLL global research, the future of hybrid working is that no one will be working in one fixed location (JLL Global Research, 2022). **Offices** will need to find its **new value** beyond a "work location", and many believe that lies in its being a meeting place for **collaboration, discussion and brain-storming**. In addition to the most common **home-office** and **working on site**, **working at a third place** will increasingly become a trend. In this process, a range of **hardware**, **software applications** and **business management techniques** are needed to make this future a reality.

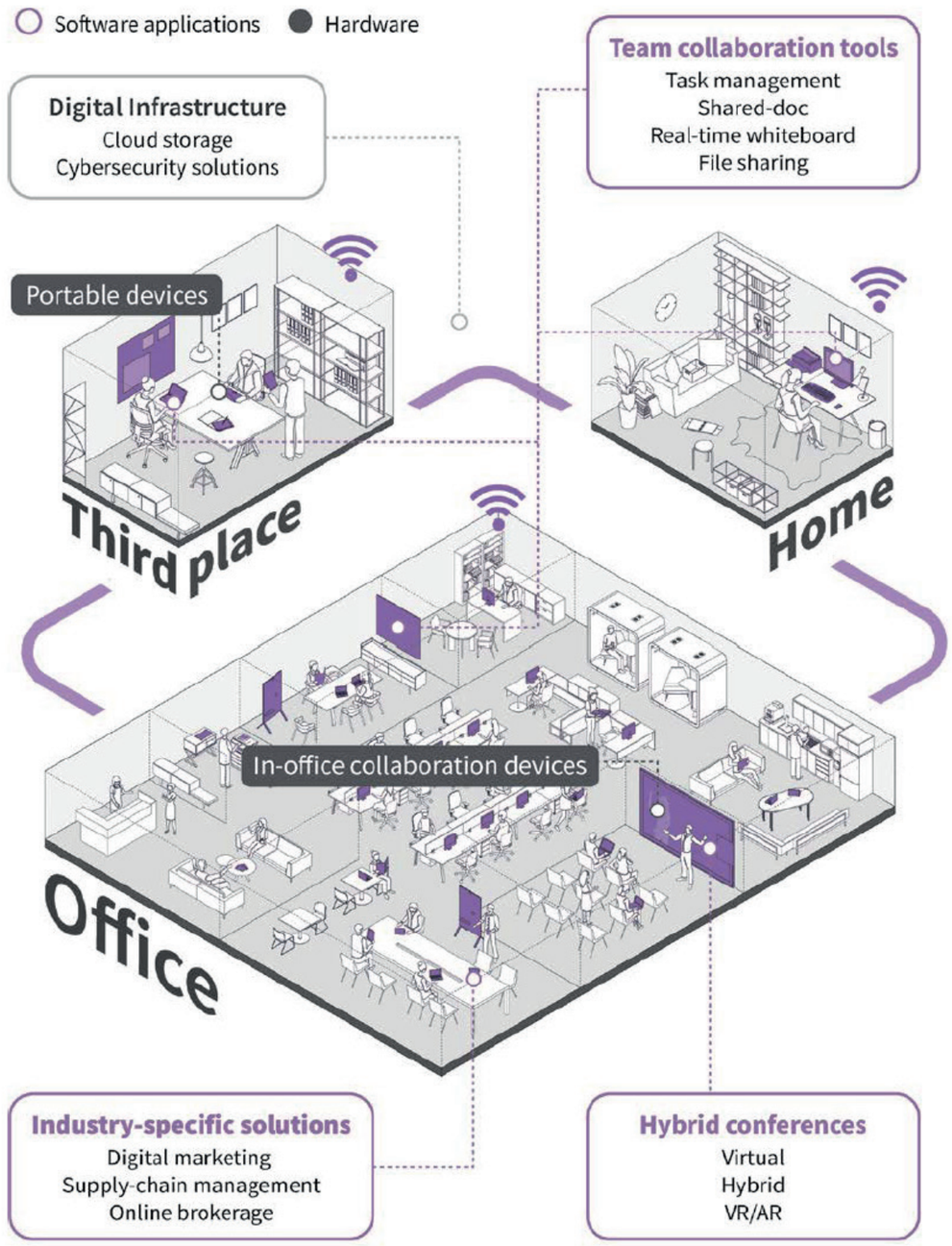


Figure 4.3 The future of hybrid-work. *JLL (JLL Global Research, 2022).*

4.5 The future of live-work neighborhood

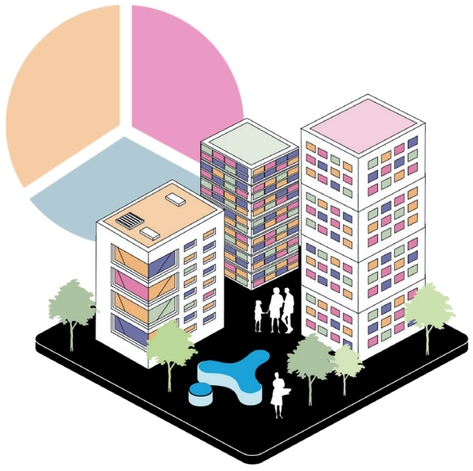
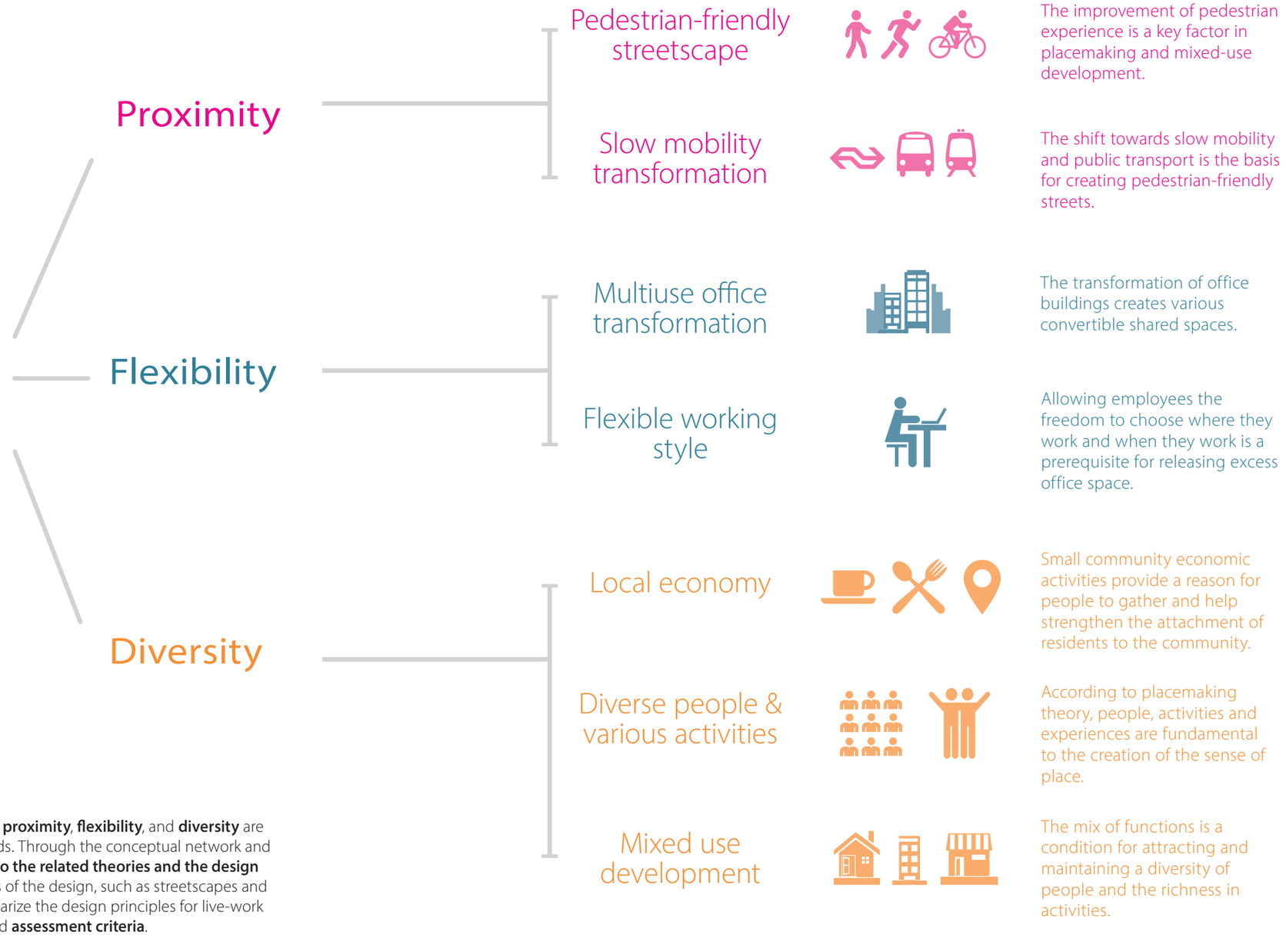


Figure 4.4 Live-work mixed-use neighborhood.
By author.



According to the description in the methodology chapter, **proximity**, **flexibility**, and **diversity** are the key concepts for transforming live-work neighborhoods. Through the conceptual network and theoretical underpinning, these concepts are **connected to the related theories and the design goals**, thus can be implemented into the specific avspects of the design, such as streetscapes and the third places. As a result, the three concepts well summarize the design principles for live-work neighborhoods, and are suitable for **design guidelines** and **assessment criteria**.

4.6 Trend & drivers of change

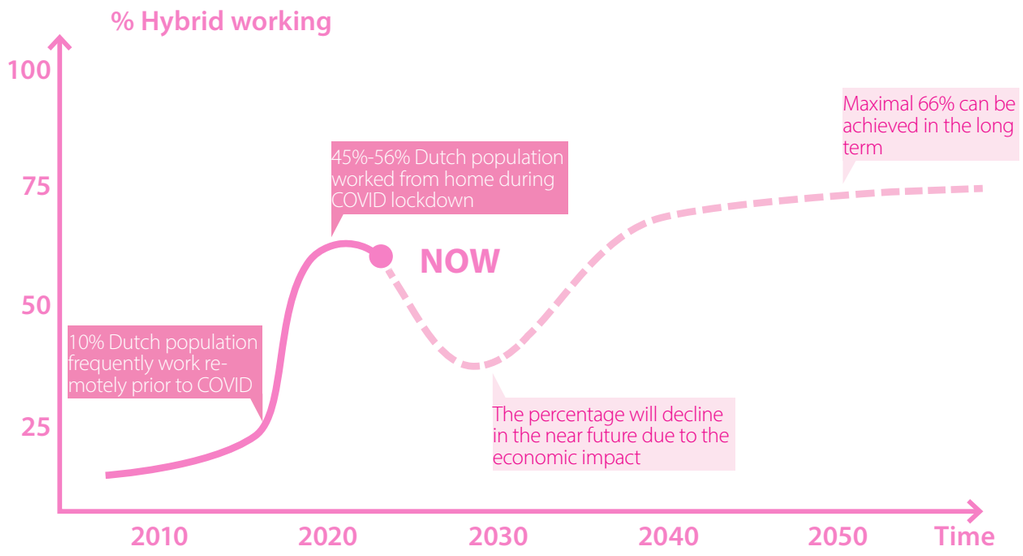


Figure 4.5 The current and future trend of hybrid work. *By author.* Interpreted from (Ton et al., 2022).

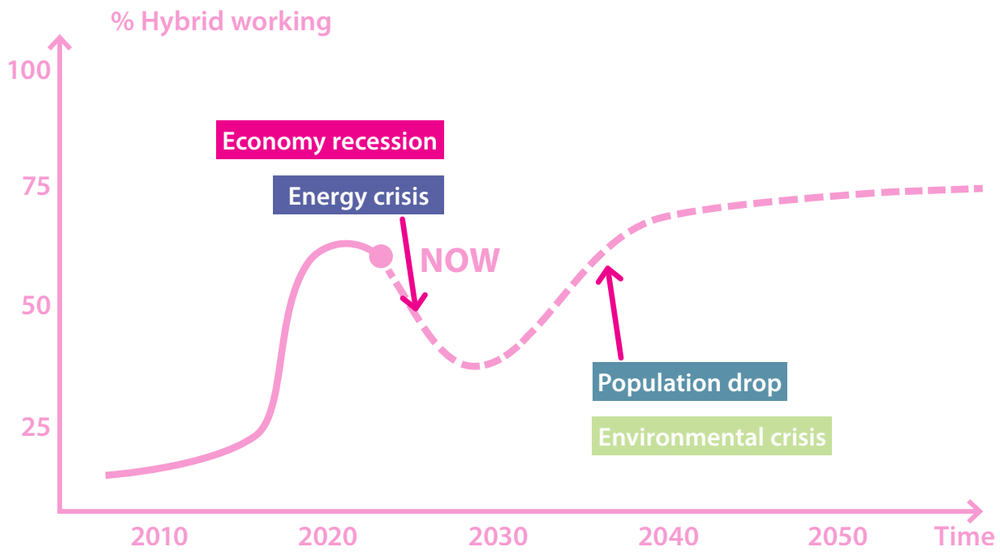


Figure 4.6 The drivers of change and how they shape the trend. *By author.*

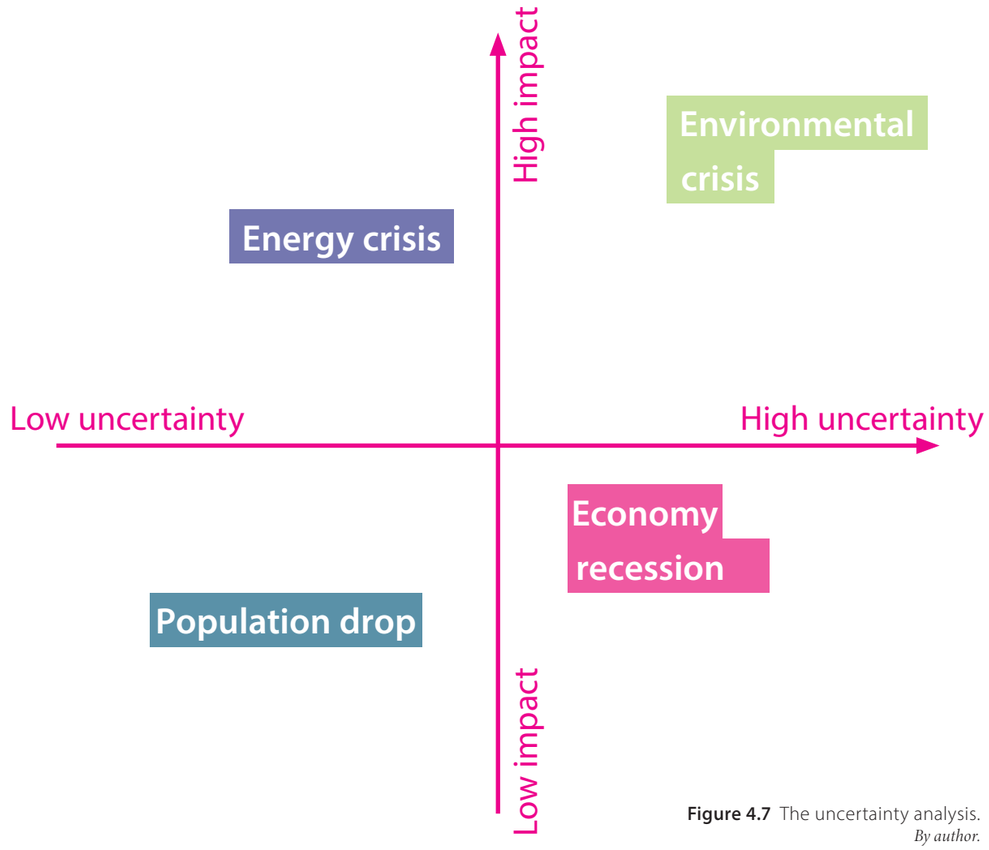


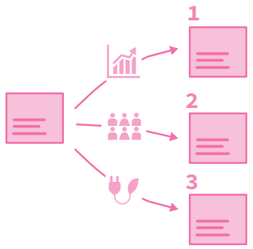
Figure 4.7 The uncertainty analysis. *By author.*

The future is difficult to predict, especially the more distant future. For the near future, we can predict changes in workstyle by looking at current socio-economic conditions and existing trends, but when we look at 50 years from now, we need to consider drivers of change that are highly uncertain and highly influential.

In this project, I have listed four major crises we are likely to be faced with as drivers of great influence, but on the one hand, it is inevitable that the consideration of these drivers is influenced by current conditions; on the other hand, these crises will bring about very complex and interrelated changes, not only affecting one aspect of society, the economy or the environment. In a way, the four crises themselves are interrelated, when one of them occur, the situation will be more or less a combination of the four. In assuming the impact of each crisis on hybrid working, only the most likely consequences are considered (i.e., excluding the impact of various policies and other interventions).

4.7 Building scenarios

Scenarios



Alternative Paths

In the face of such complex interactions of drivers and future uncertainties, scenario building is a significant foresight tool to seek answers to the **"what if"** questions. Based on the analysis of current trends and drivers of change, it is a storytelling description of possible future situations. A set of scenarios with different influential key drivers help to identify the impacts of the elements (uncertainties) and predict possible pathways towards a vision of the future.

In the UK government's report about the urban foresight methodology, the thinking of alternative futures appears twice when it comes to foresight techniques. First, the scenario thinking is applied at the phase of visioning to explore "aspirational extremes" with only one of the drivers prioritised. Later, the thinking is used again to test in a "wind tunnelling" way the robustness and viability of policy interventions under different external conditions (Government Office for Science, 2016).

This report borrows this idea of scenario building to explore the range of possible futures and test the designs. The techniques are intuitively named "Scenarios" and "Alternative paths" in the visioning phase and testing phase. The elements of the three key concepts of live-work neighborhood (proximity, flexibility and diversity) are used to develop the **scenario sliders** for the exploration and assessment of the future scenarios.

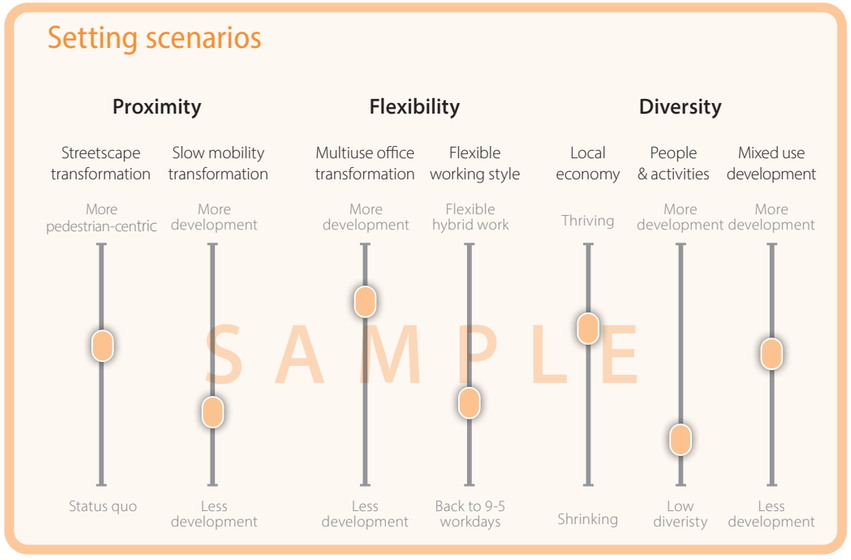
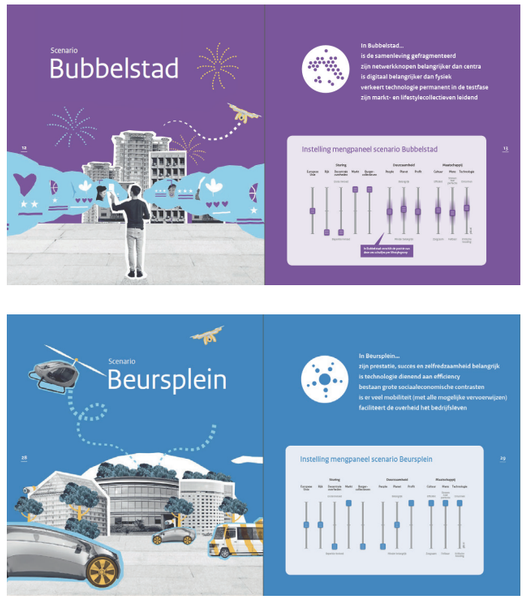


Figure 4.8 Scenario sliders. *By author. Reference: (PBL, 2019)*



In 2019, the Dutch Environmental Assessment Agency (Planbureau voor de Leefomgeving, PBL) published the report ***Oefenen met de Toekomst (Practicing with the Future)*** to demonstrate the exploration of scenarios for urban development, infrastructrue and mobility in the Netherlands, 2049 (PBL, 2019). This is a 30-year span scenario building on the basis of expert interviews, literature review, media analysis, and conversations and workshops with stakeholders. In this project, the layout of the scenario descriptions takes reference from the PBL report. Differently, in order to better explain the design and keep the flow of the report, I will jump the descriptions for now and **start directly with the ideal scenario** - the Scenario Live-work City.

Figure 4.9 Reference for this project's scenario layout: PBL's report. *(PBL, 2019)*

Live-work City

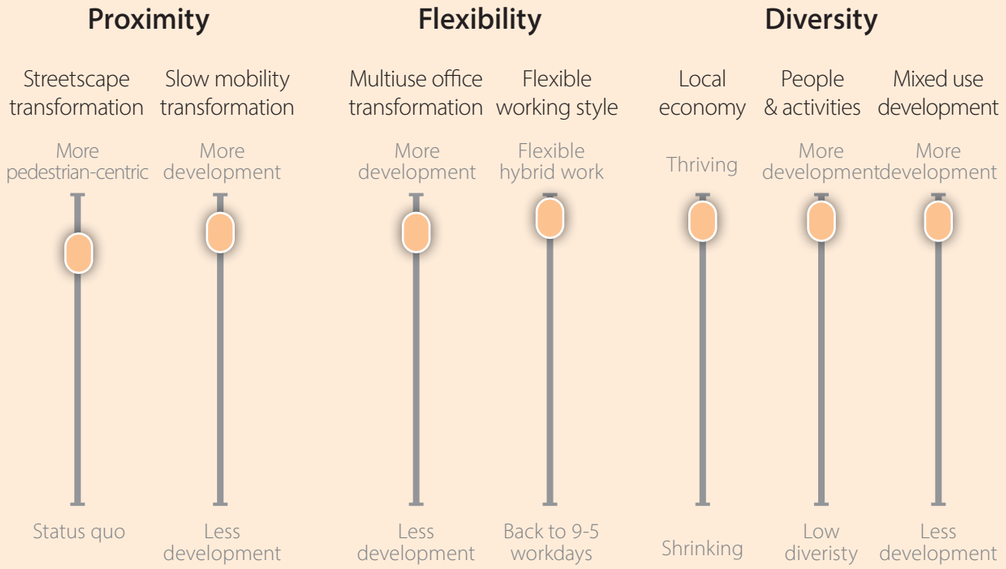
Ideal scenario
Stable economy & no major crisis

3XN/GXN Architects & ArchDaily. https://www.archdaily.com/976579/3xn-gxn-architects-gehl-and-conam-envision-a-regenerative-15-minute-community-for-san-diego

In Live-work City...

The economy remains stable, so that although there is an aging trend, immigrants are filling the population gap. Recognizing the urgency of the environmental crisis, people are actively promoting the development of sustainable cities and slow mobility, but in general, no major crisis has occurred. Hybrid work has become the norm, and monofunctional office areas have become green, diverse, and vibrant urban areas.

Setting scenario Live-work City



(PBL, 2019) is referenced for the layout & illustration .

5

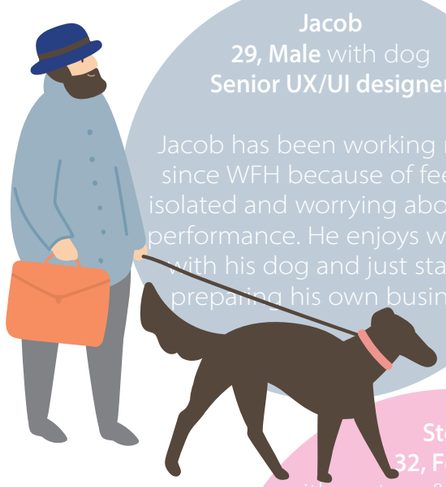
Designing the Live-work City

1 Personas
2 Challenge & needs
3 Map of aspirations
4 Map of options

**All images in this chapter that are not specifically labeled are produced by the author .*

5.1 Resident personas

How do residents in mixed-use live-work neighborhoods spend their days? What are their feelings and needs during their remote or non-remote work?



Jacob
29, Male with dog
Senior UX/UI designer

Jacob has been working more since WFH because of feeling isolated and worrying about his performance. He enjoys walking with his dog and just started preparing his own business.

Maruko
26, Female alone
Architect

Maruko just moved from Japan to kick off her new career. She finds it hard to work at home, especially when making models. Sometimes she feels lonely, confused and lacking inspiration. As a night-owl, she really misses the late-night cafes and restaurants back in Japan.

Stella
32, Female
with partner & 3 yro daughter
Marketing Consultant

Stella cherishes the freedom to organize her time brought by the opportunity to work from home, but even so she is struggling between work and parenting. It's hard for her to enjoy some personal time, which she has been desiring for.

Anne
24, Female
with boyfriend
Waitress

Anne entered the service industry since her graduation from MBO. She doesn't like her major but also lack the incentives to start a different career. She works at two cafes during the week at different shifts.

Hendrik
70, Male with partner adult children, and a dog
Retired; Home owner

Now that Hendrik's children have their own lives, Hendrik and his partner rented out their house in Amsterdam and moved to this neighborhood. They love to take a walk and are passionate about community activities.

The (hypothetical) resident personas allow planners to put them in the residents' shoes to consider the necessities and spatial characteristics of the neighborhood.

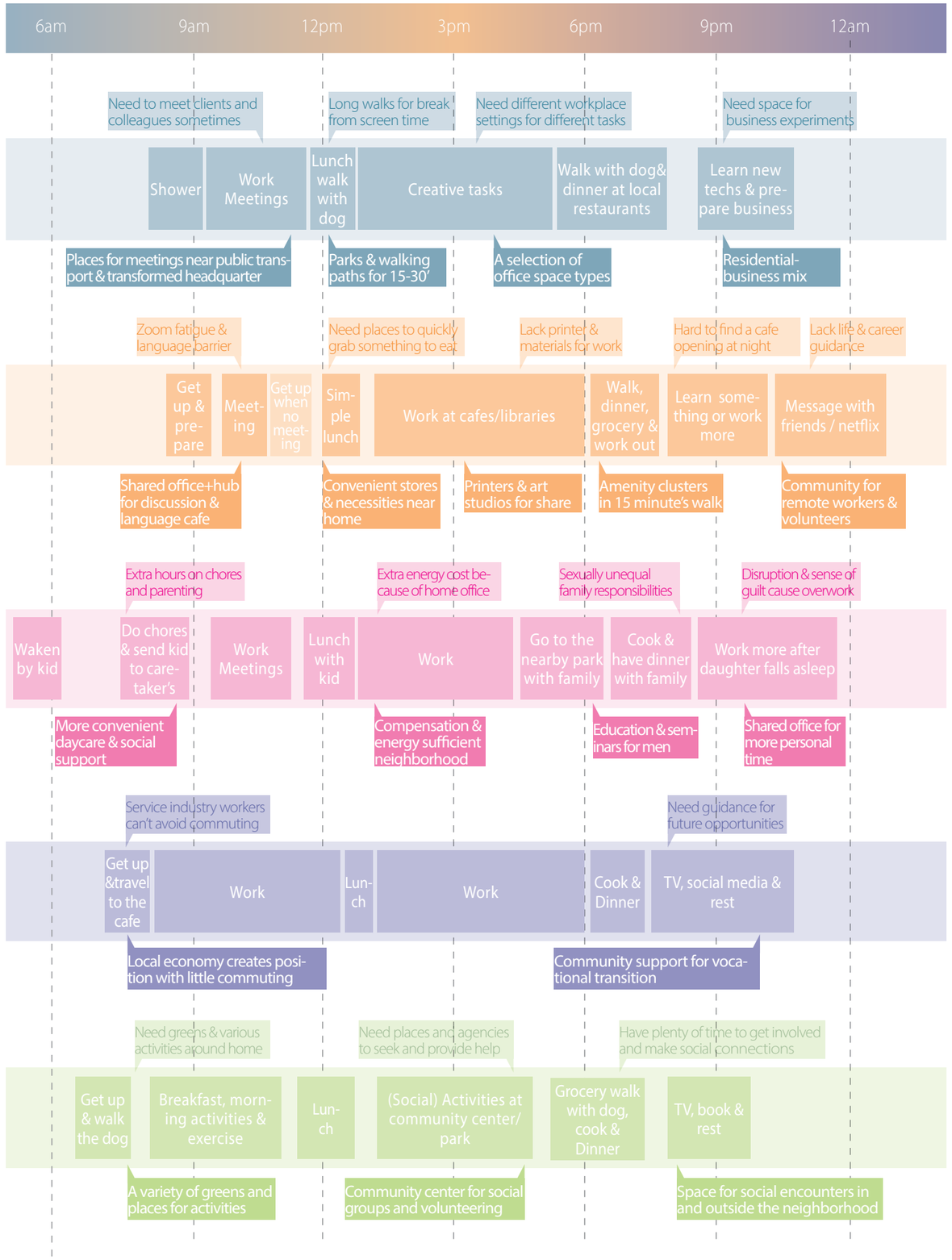


Figure 5.1 Resident personas and one day in their lives. *By author.*

The data used to form the personas are from WeWorkRemotely: Day in the Life of a Remote Worker. ***https://weworkremotely.com/blog-categories/day-in-the-life-of-a-remote-worker***

5.2 The challenges of 80% remote hybrid working

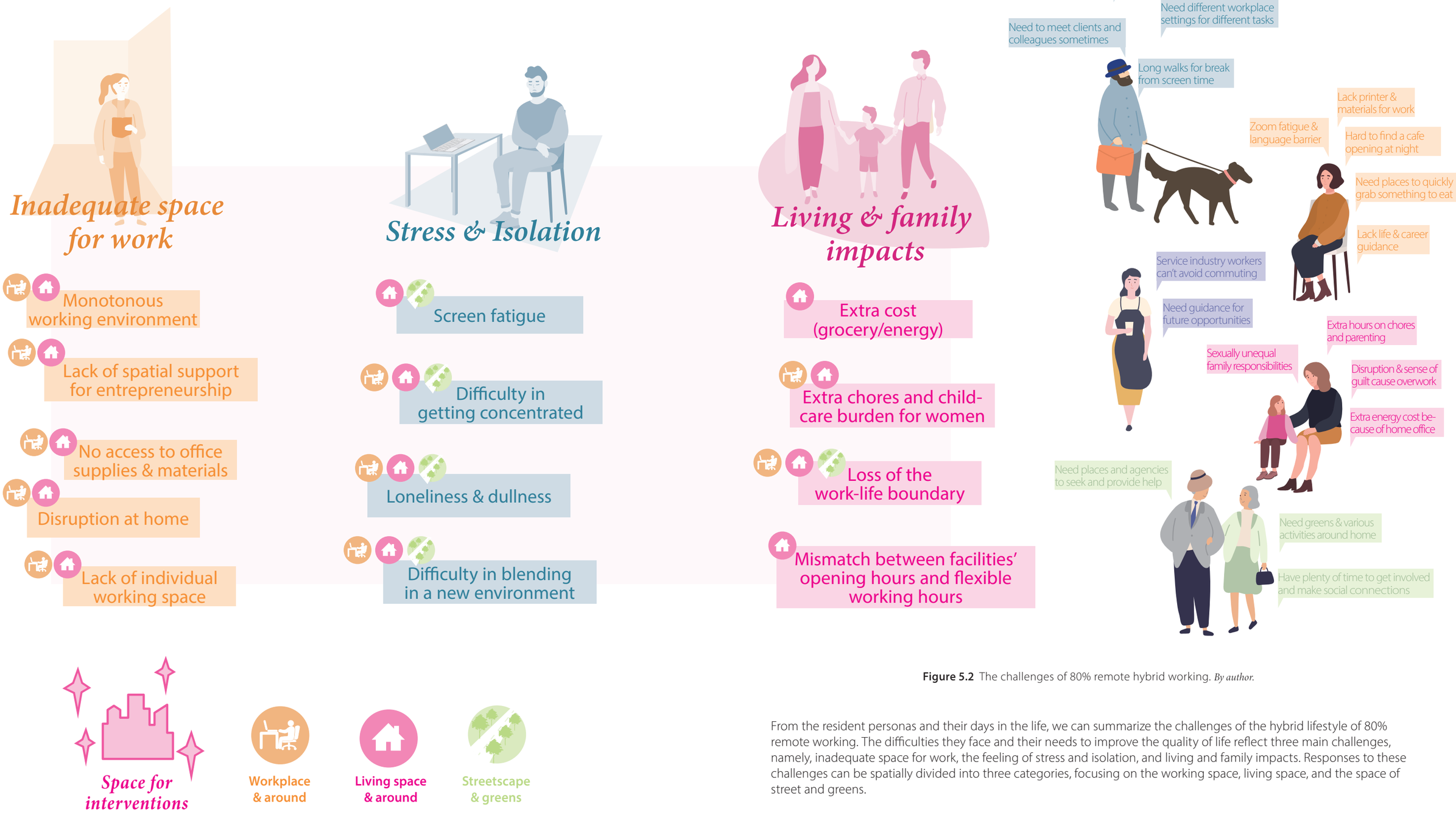


Figure 5.2 The challenges of 80% remote hybrid working. *By author.*

From the resident personas and their days in the life, we can summarize the challenges of the hybrid lifestyle of 80% remote working. The difficulties they face and their needs to improve the quality of life reflect three main challenges, namely, inadequate space for work, the feeling of stress and isolation, and living and family impacts. Responses to these challenges can be spatially divided into three categories, focusing on the working space, living space, and the space of street and greens.

5.3 What should a hybrid live-work neighborhood offer?

A wide selection of office space

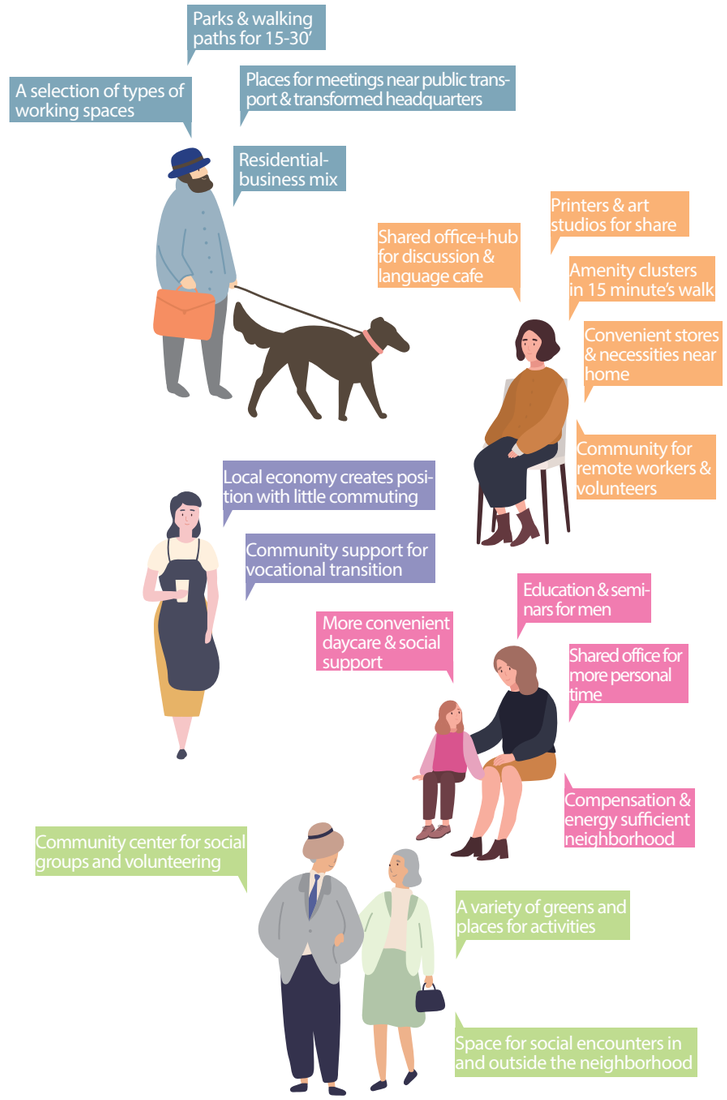
- Multiple types of shared office space
- Third place as workplace
- Neighborhood office supply
- Residential-mixed business space
- Public transport mixed meeting space

Fostering social connections

- Shared office: Space for social service & community engagement
- Neighborhood space for leisure & social encounters
- Green space supporting social encounters
- Public space in the clusters with amenities

Healthy & flexible lifestyle

- Necessities within 5 minutes' walk
- Amenities and leisure within 15 minutes' walk
- Promotion of slow mobility
- Space for various communities
- Energy productive neighborhood



Space for interventions

Workplace & around

Living space & around

Streetscape & greens

Figure 5.3 The qualities needed for a hybrid live-work neighborhood. *By author.*

In order to support the hybrid lifestyle of 80% remote working and improve the quality of life of the residents, a hybrid live-work neighborhood should respond to the challenges regarding the working and living environment in three major aspects, which are: (1) providing a wide selection of office space; (2) fostering social connections via spatial interventions; and (3) supporting healthy and flexible lifestyle. The design interventions can be divided into three categories, focusing on the working space, living space, and the space of street and greens.

5.4 Map of aspirations

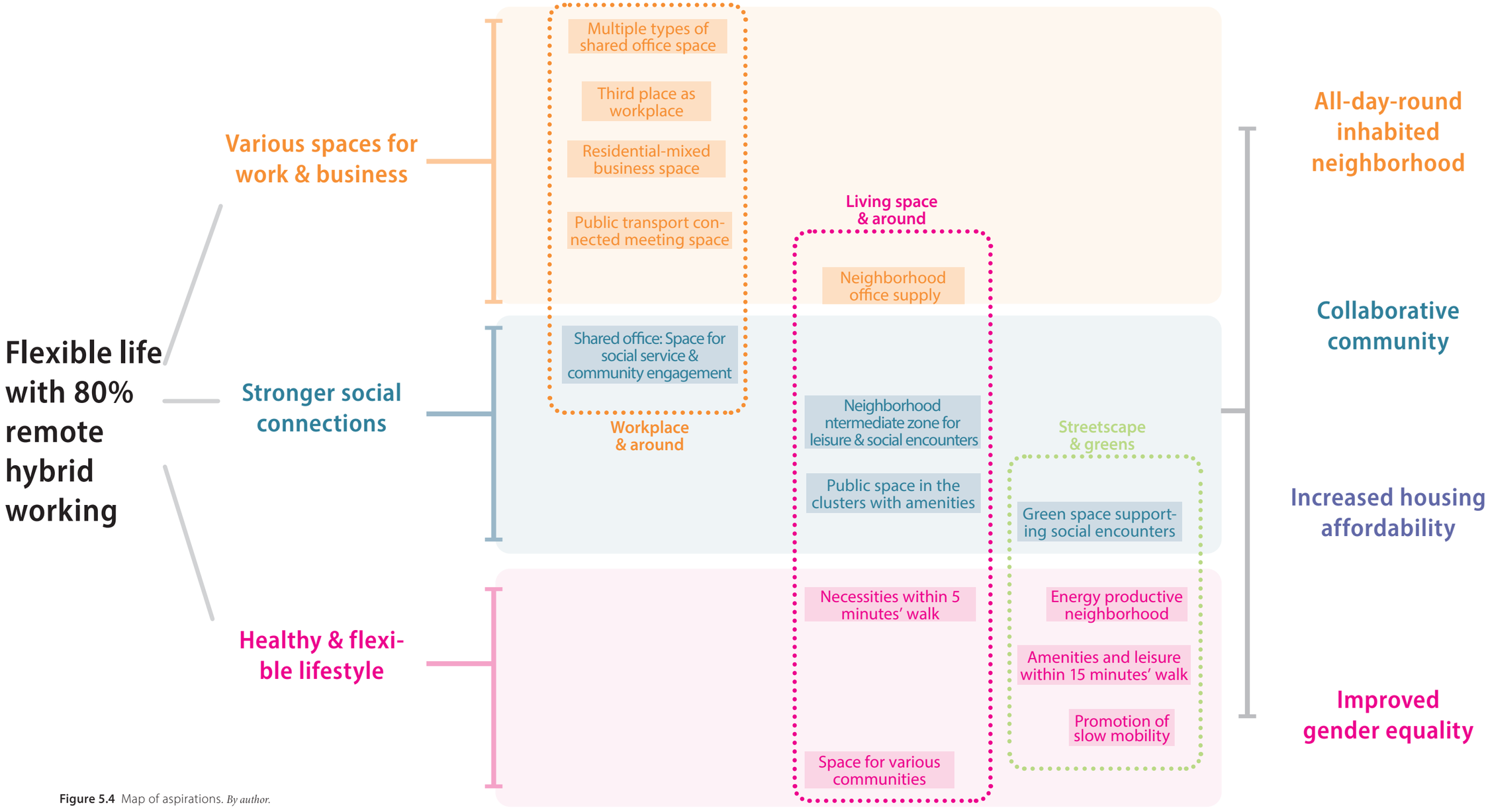


Figure 5.4 Map of aspirations. *By author.*

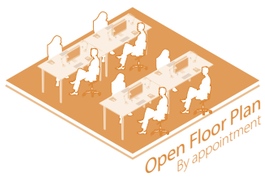
In conclusion, in order to realize the vision of living a flexible life with 80% remote hybrid working, the neighborhood design needs to meet the following targets: **(1) providing various spaces for work & business; (2) building stronger social connections; (3) supporting healthy and flexible lifestyle.** Various requirements for the spatial interventions derive from the targets, and can be divided into three categories, focusing on the **working space**, **living space**, and **the space of street and greens**. Through the development of hybrid live-work neighborhoods, the advanced spatial qualities can bring about far-reaching changes in the society, of which the four most significant points are: **(1) the emergence of all-day-round inhabited neighborhood; (2) the awareness of building collaborative communities; (3) increased housing affordability through office transformations; and (4) improved gender equality**.

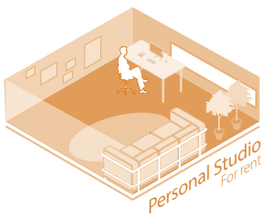
5.5 Map of options

Space for work

Variety of shared office space

Various types of office space with different spatial characteristics are created to meet the different needs of people in various industries.

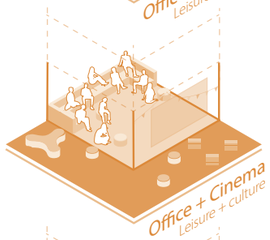




Office build-ings

Social hub "Shared office +"

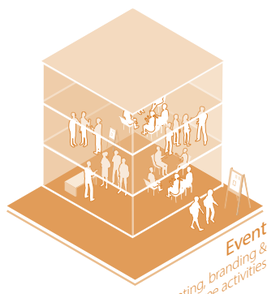
Shared office spaces can be combined with other functions to provide a variety of services for the people who gather there. With transformation to support communication, they can serve as platforms for community support and enhanced interaction within communities.



Special buid-ings

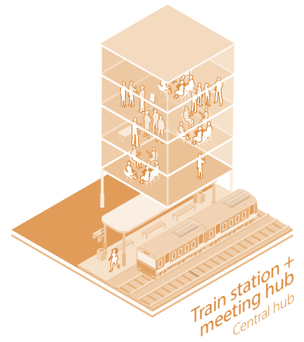
Head-quarters

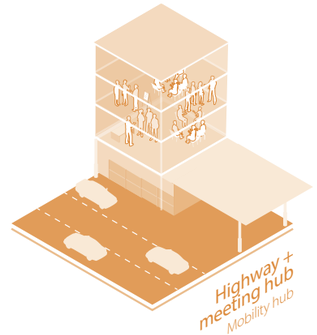
As the demand for office space decreases, large companies will be happy to renovate, lease or sell their headquarters (or at least parts of them) as they cut back on expenses. These headquarters have the potential to become public spaces, which can also be a part of the companies' brand marketing tools.

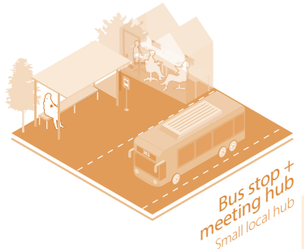


Mobility + meeting hub

There is no substitute for efficient communication of offline meetings. Meeting hubs connected to public transport can maximize the convenience and sustainability of this inevitable commuting.







Work-place and Around

Space for living

Amenities

In the 80% remote working lifestyle, the hierarchy of amenities is reconsidered. Convenience together with leisure and social activities are all important elements for the new system.

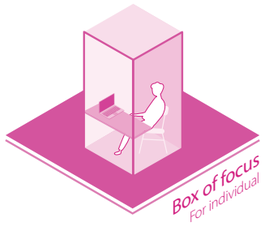
Social encounters near home

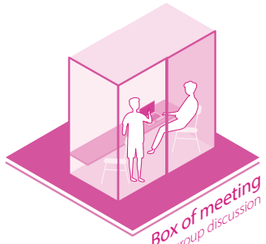
The motor lane right in front your home will never return. The space around the house has a more important leisure, social and public function, providing space for people who want to relax from their work.

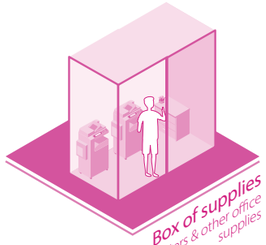
Live-work space

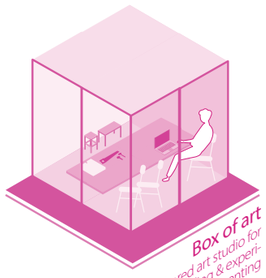
Neighbor-hood office supply

Some industries have specific requirements for office space and materials. There are also people who just have a hard time getting focused. Or maybe your co-worker is your neighbor and you need to meet and discuss. These little boxes offer more possibilities for working from home.









Third place as workplace

Cafes are a popular alternative to offices.

Living space + business

Living + extension

The flexible use of residential space and its extensions can create ideal conditions for the local economy and entrepreneurs. It also has the potential of breaking the limits of business hours and openning up a 24/7 economy for supporting lives with flexible working hours.

Space& Around

Living

Street-scape

Streets for slow mobility

Freeing the streets from the dominance of motor vehicles is not only significant for saving energy and reducing emissions, but also lays the foundation for the transformation towards healthy lifestyle. The new mobility model will serve as a smarter service by appointment.

Street for encounters

The street space is an important public space. Hybrid worker's habits of walking and exercising place a demand on the social function of the streets, and the spaces released from the motor lanes present many possibilities for transformation.

Access to nature

Variety of greens

From buildings, to neighborhoods, to regional scales, residents need to have plenty of options to enjoy green from near to far. Characteristic natural features, such as canals, must be protected and revitalized.

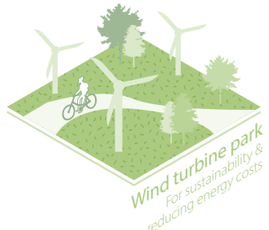
Greens for encounters

People need interactions with green spaces and water bodies. These natural spaces can be vibrant places for socializing, recreation and various activities.

Green for more

Energy sufficiency

Setting up energy-generating facilities in the neighborhood is beneficial for both of the environment and the residents' budgets.



Noise abatement

Planting specific types of trees to form a forest is an effective means of reducing noise.

Third place as workplace

Streets and natural spaces can also be third places. By conveniently setting up installations such as tables, chairs and free WiFi, these places can become great places for work.

Streets and greens

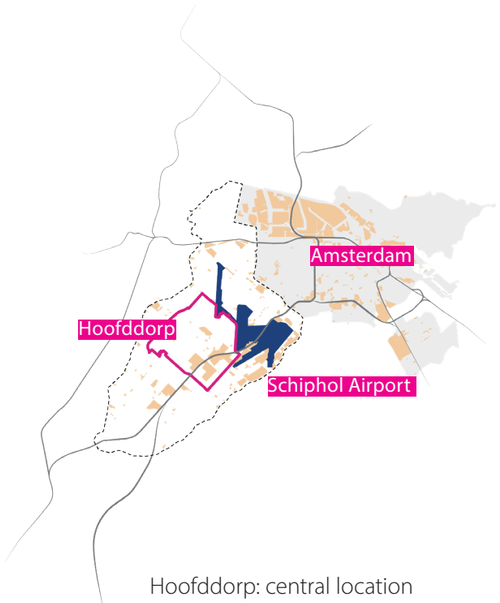
6

Implementing Beukenhorst 2073

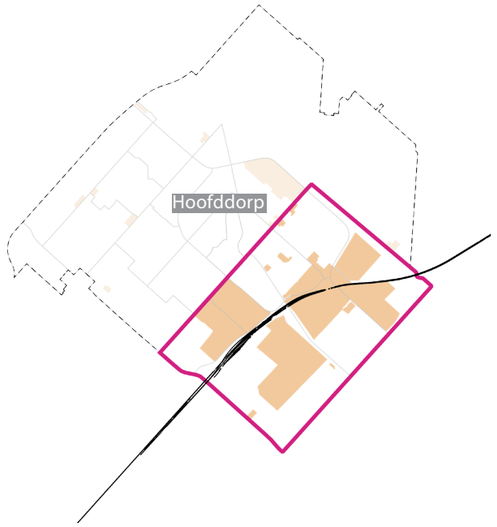
**All images in this chapter that are not specifically labeled are produced by the author .*

6.1 Beukenhorst, Hoofddorp

Business clusters (Office, warehouse, industrial land included)

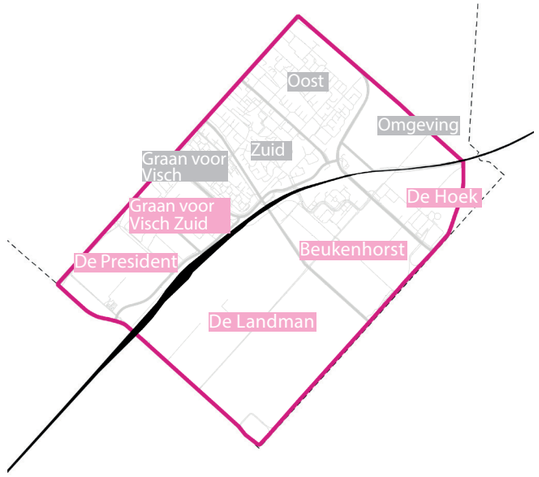


Hoofddorp: central location



Business agglomeration in the east of Hoofddorp

Business parks



Business agglomeration in the east of Hoofddorp

Beukenhorst

Figure 6.1 Site location. *By author.* Data: CBS, PDOK

Hoofddorp is located next to the Schiphol Airport, centrally located in the Metropolitan Region Amsterdam. As can be seen in Figure 6.1, the residential area of Hoofddorp is located on the west side, while the business areas are concentrated on the east side near the Hoofddorp train station. Among the several business parks in Hoofddorp, the most prominent one is Beukenhorst. It is the most concentrated office district in Hoofddorp and even the municipality of Haarlemmermeer, where Hoofddorp belongs to. At the same time, it is home to the majority of the vacant offices.

As Figure 6.2 shows, in 2018, Beukenhorst had 2 to over 5 times more office space than other office areas in the Haarlemmermeer municipality, with over 10 hectares of office space lying fallow. In such a situation, there are new office projects under construction nevertheless. This situation will further deteriorate after the COVID-19 pandemic. On the other hand, functional transformations of office spaces has been underway in Beukenhorst since 2005 (Figure 6.3), with almost 6 hectares transformed by 2018. For the development of hybrid-working-supportive neighborhoods and office transformation, Beukenhorst is an ideal testing site.

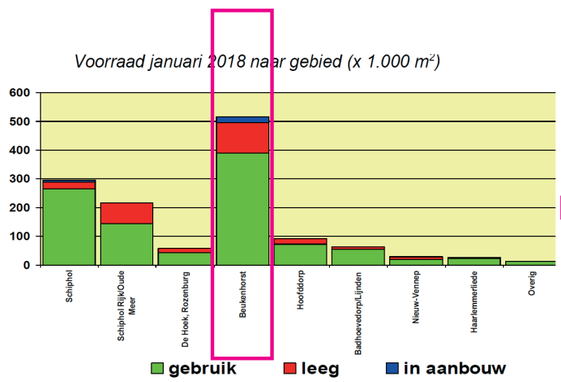


Figure 6.2 The state of the buildings in Beukenhorst, 2018. *From (Gemeente Haarlemmermeer, 2019)*

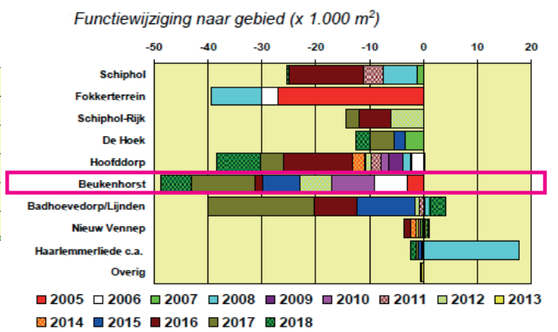
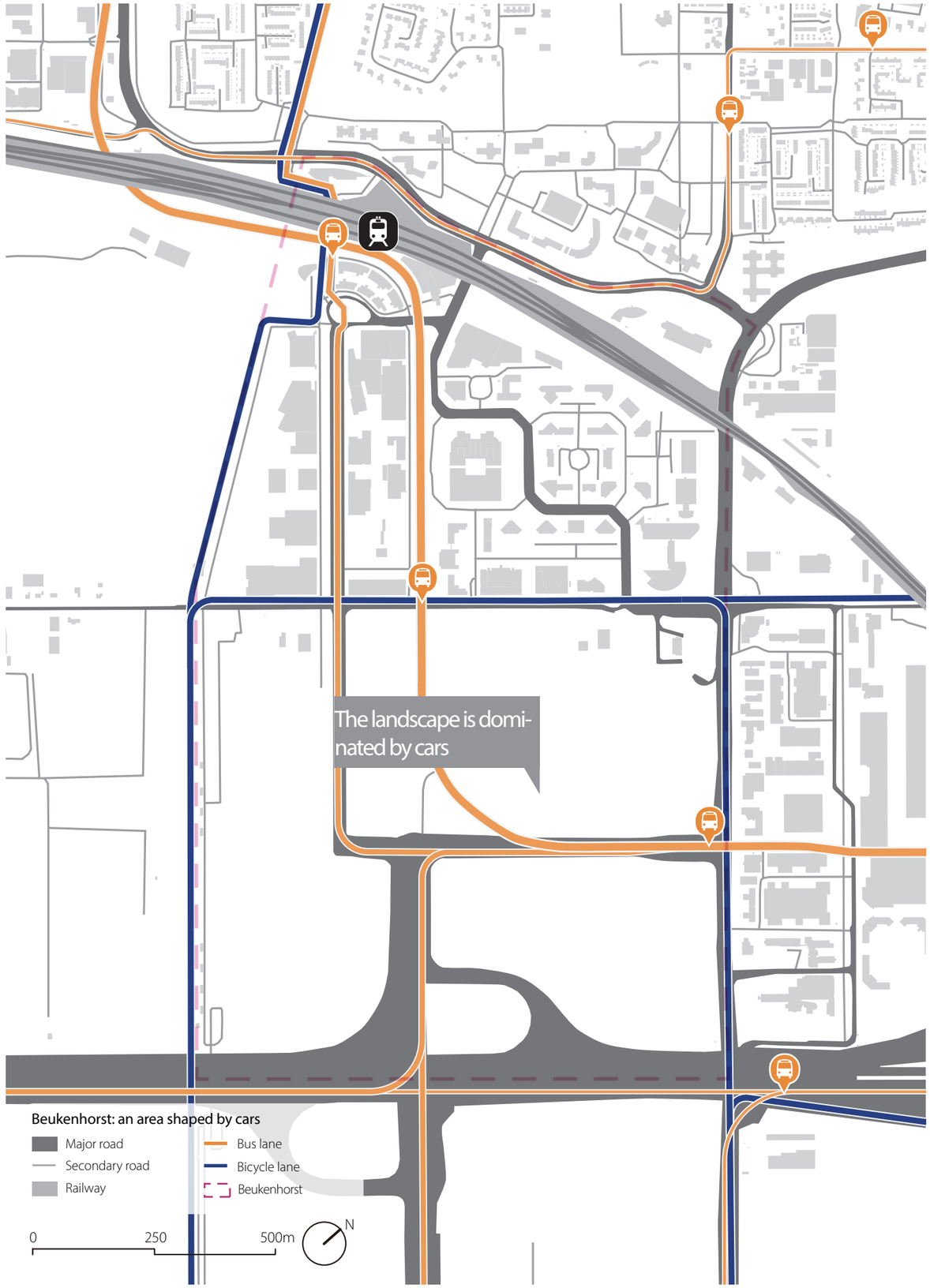


Figure 6.3 Change of function of office buildings in Beukenhorst by year. *From (Gemeente Haarlemmermeer, 2019)*

6.2 Site analysis

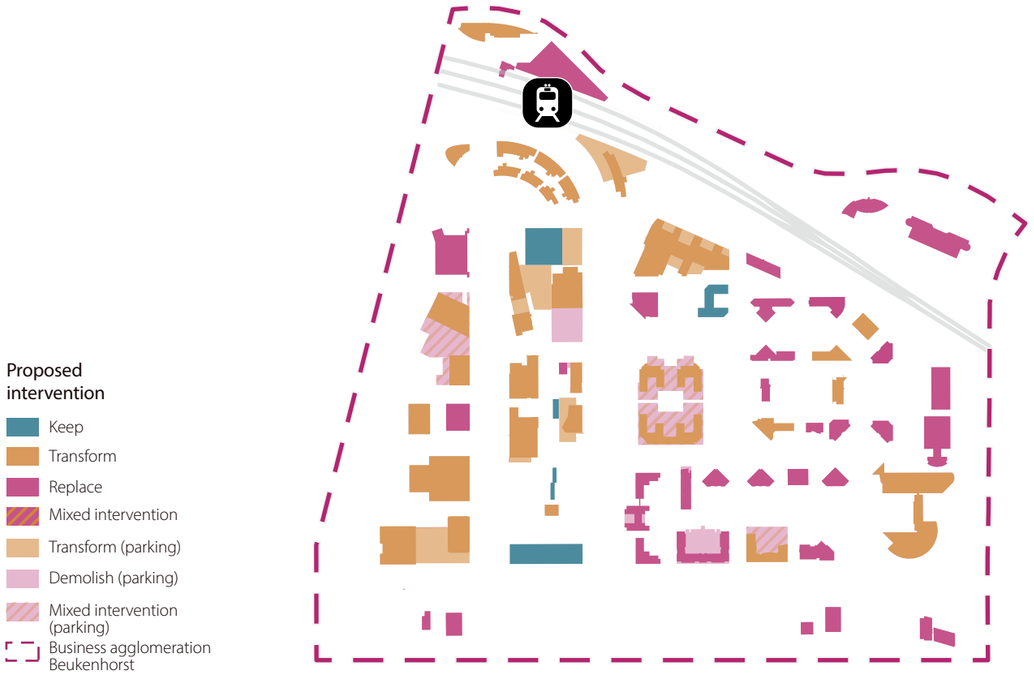



Greens and waterbodies are used as passive barriers
Beukenhorst: a landscape that lacks vitality
Farmland
Bushes & grass
Forest
waterbody
Beukenhorst
0
250
500m
N


The area suffers from severe noise pollution from the highways and the airport.
60 dB
65 dB
70 dB
Beukenhorst: severe noise pollution
95 dB
50 dB
Beukenhorst
0
250
500m
N

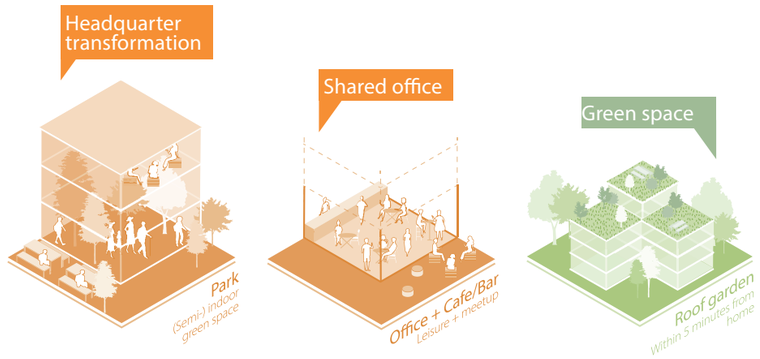
6.3 Existing buildings

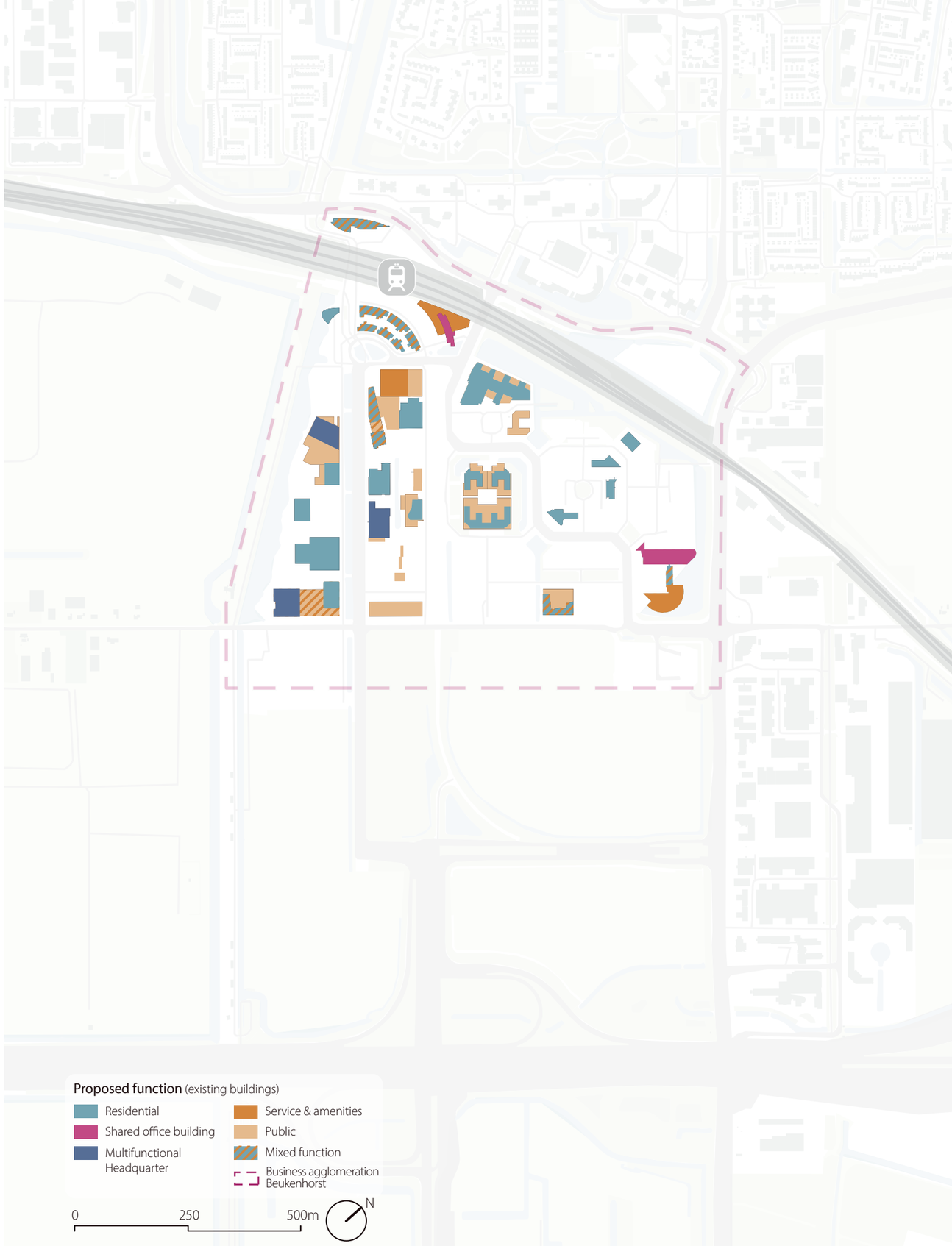
The current built-up area of hoofddorp is almost exclusively composed of office buildings with (semi-) underground parking. These office buildings are subdivided into several categories, and whether they will be kept, renovated, replaced or demolished is determined by their function and conditions.



6.4 Transformation and reuse of office buildings

The kept multi-company office buildings and headquarters are transformed into multifunctional complexes of shared office, residential and service space.





Densification and transformation

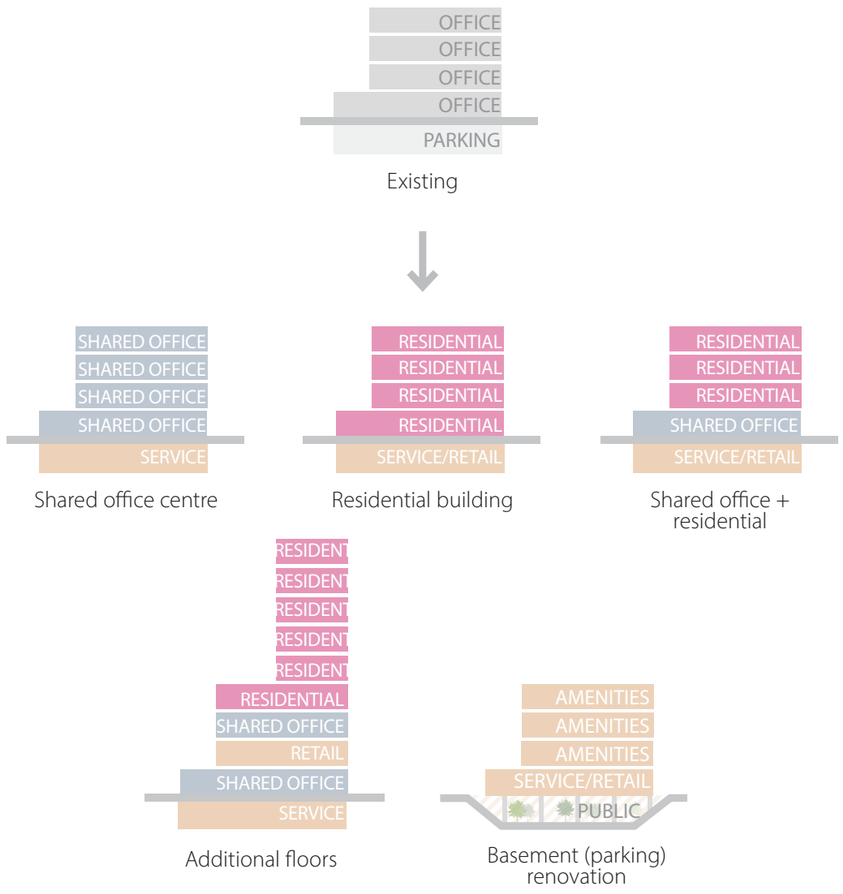


Figure 6.4 Transformation options for current office buildings. ***By author.***

In order to alleviate the housing crisis, further densification is needed in Beukenhorst. The target density is 100 households/ha, which, at an average household size of 2 people, means a population density of 20,000 people/km^2. This is nearly twice the density of the central area of Amsterdam, on its way to catching up with Manhattan district in New York. In the process of transforming the office, the construction of amenities and whether to add on to the existing roof needs to be taken into account. There is also huge potential for the transformation of basement parking and parking buildings.

Figure 6.5 Transformation of office building to apartments by MOATTI-RIVIERE. *Photo by Michel Denancé.*
https://www.archdaily.com/969821/the-transformation-of-offices-into-residential-projects-tackling-vacancies-and-housing-shortage?utm-medium=email&utm-source=ArchDaily+List&kth=4%2C569%2C151

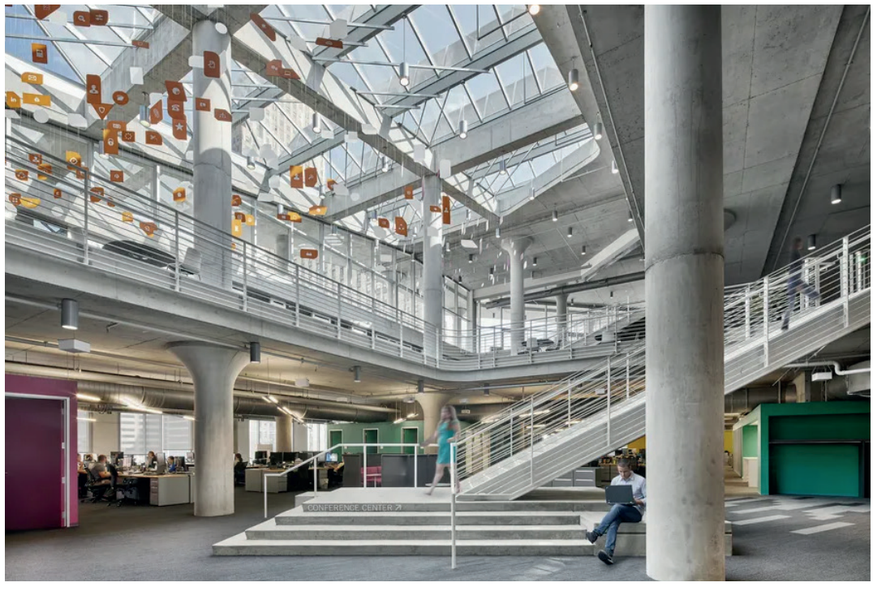
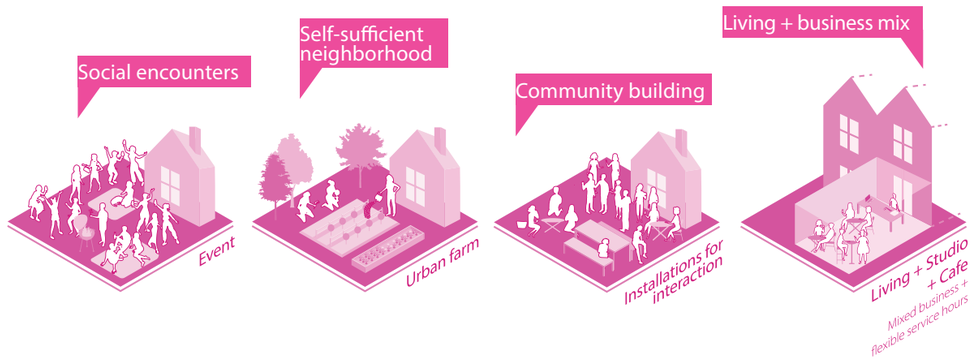
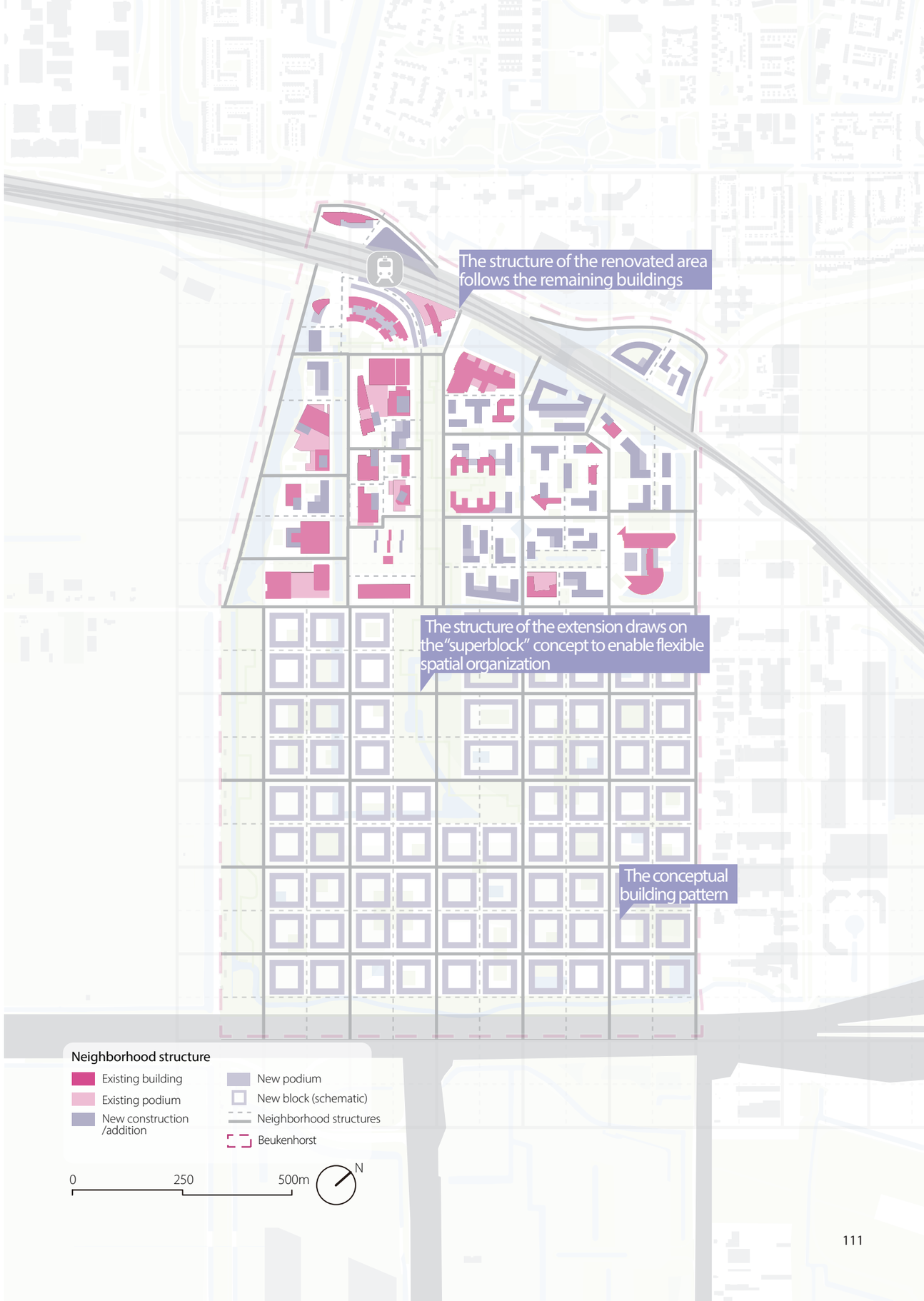


Figure 6.6 (Basement) Parking garages can be reclaimed as civic/public space. *Garret Rowland via Gensler.*
https://archive.curbed.com/2017/4/26/15421594/parking-garages-driverless-cars-gensler

6.5 Neighborhood structure for intermediate zones

Blocks in Beukenhorst are occupied by large volumes of individual buildings, which are separated by greenery and parking areas and do not form a neighborhood structure. The development starts with the establishment of the structure, following the buildings in the transformation area and drawing on Barcelona's "superblock" concept for the extension. Combining four original blocks into one, the new structure aims to replace the streets with more flexible spaces--"intermediate zones".





Intermediate zone and block configuration

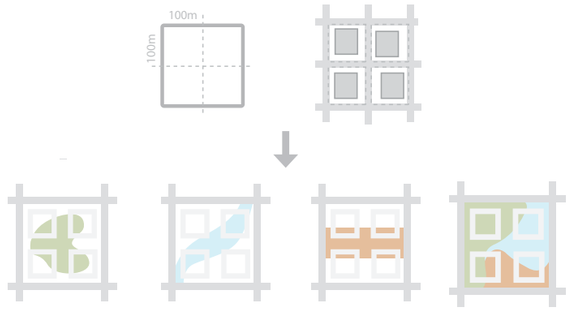


Figure 6.7 The concept of intermediate zone. ***By author.***

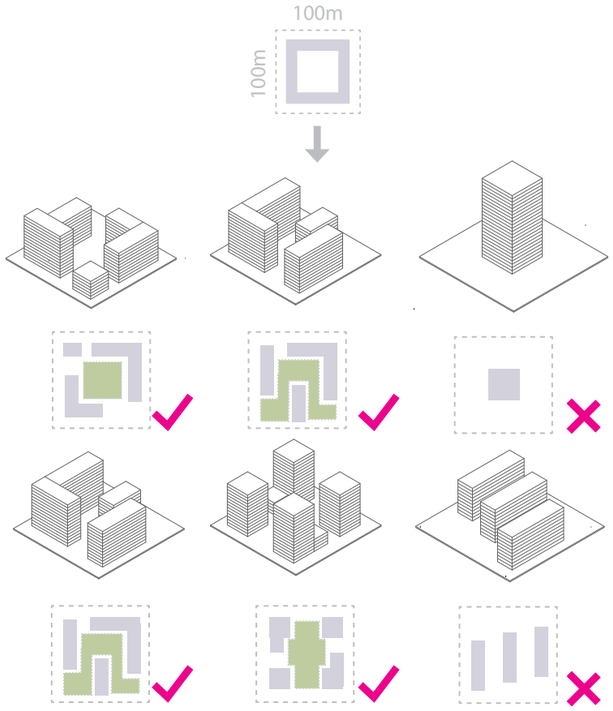


Figure 6.8 Configuration of the blocks. ***By author.***

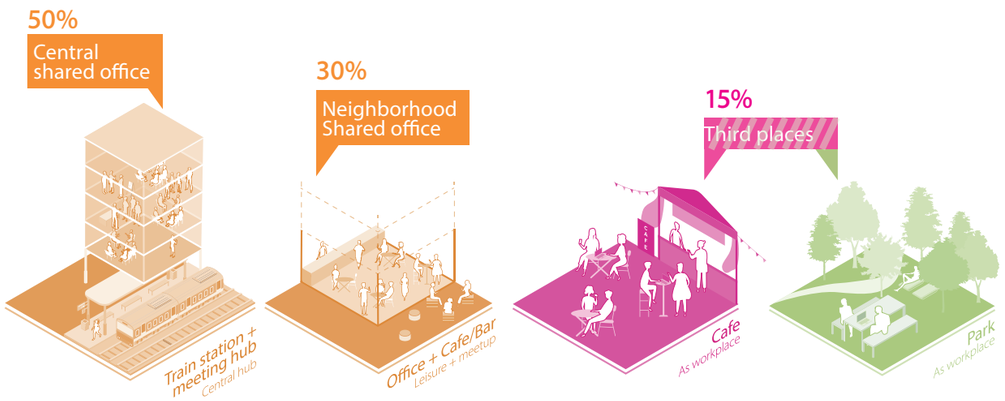
The intermediate zone is a buffer between the blocks and the streets, which can be a combination of green spaces, water bodies, amenities and community public spaces. It focuses on pedestrian space and frees people's living environment from the over-emphasized mobility need, allowing people to communicate with others, engage with nature, and access services close to home. The four building groups that make up a "superblock" share a intermediate zone, and each of their configuration requires an extent of enclosure so as to create space for gathering rather than walkways.

Figure 6.9 A pedestrian street in a "superblock", Barcelona. *Photo by Filipe Frazao.*
https://www.planetizen.com/node/86881/barcelona-superblocks-aim-cut-down-cars

Figure 6.10 The enclosure of the buildings forms the public space of the block. Neighborhood Next. *3XN / ArchDaily.*
https://www.archdaily.com/981969/how-mixed-use-neighborhoods-can-reduce-crime-rates

6.6 Clustered and scattered flexible office options

Beukenhorst 2073 provides various options of working spaces for individuals' needs and their flexible schedules, which can be classified into 3 categories: shared offices, third places (in the natural and built environment), and home-office supplements (home-office support boxes--WFH boxes). From residential buildings to the regional office centre, the options form a multi-scale hybrid working support network.



Home-office supplements

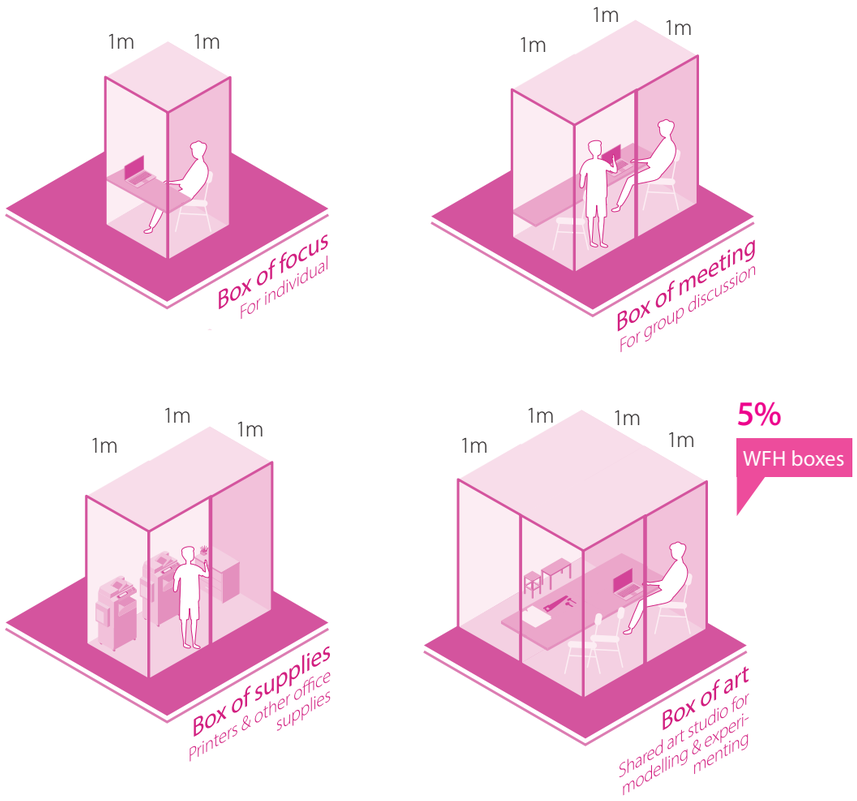


Figure 6.11 The types of WFH boxes. *By author.*

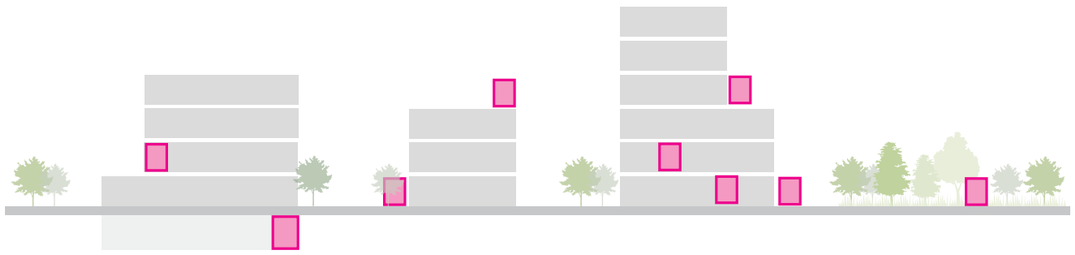


Figure 6.12 The possible locations for application. *By author.*

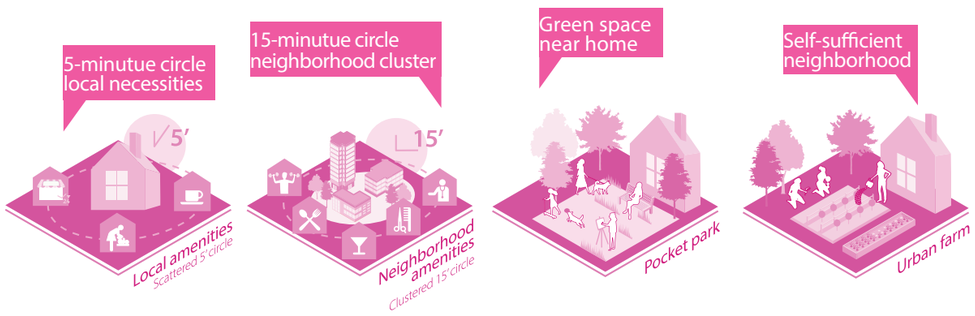
The WFH boxes are designed to meet the needs of remote workers for meeting and discussion space, privacy and office equipment. The modularization and insertion of desired spaces into existing spaces has begun to be realized in the two years of the pandemic - for example, acoustic office & meeting pods for vitual-meeting participants. These boxes can be flexibly moved and built in environments inside and outside of buildings - corridors, roofs, streets, green spaces - as long as there is energy supply.

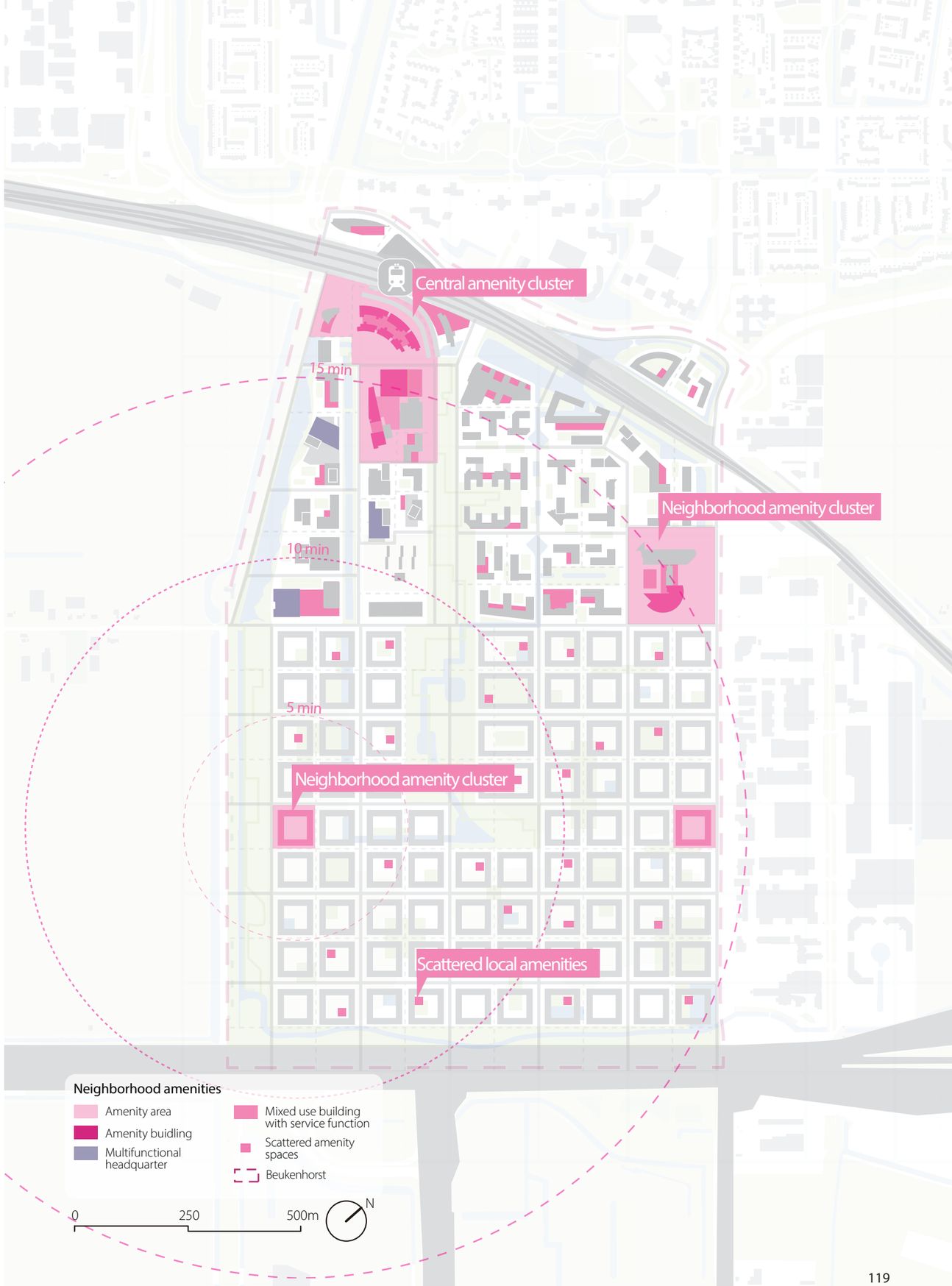
Figure 6.13 Shared office space. *ThisWork.Space.*
https://thiswork.space/post/why-are-shared-office-spaces-so-popular

Figure 6.14 Acoustic Office & Meeting Pods. *Urban Office.*
https://www.urban-office.com/office-pods.html

6.7 Convenient access to amenities

Many remote workers use walking (c.a. 15-30 minutes) as a way to keep refreshed, while others prefer quick access to necessities. The new amenity structure of the live-work community is designed to meet the different needs. The large center next to the train station, community service centers, and ground floor retails scattered throughout the neighborhoods provide different services.





Connecting life and work with amenities

Figure 6.15 Amenities for leisure life. *By author.*

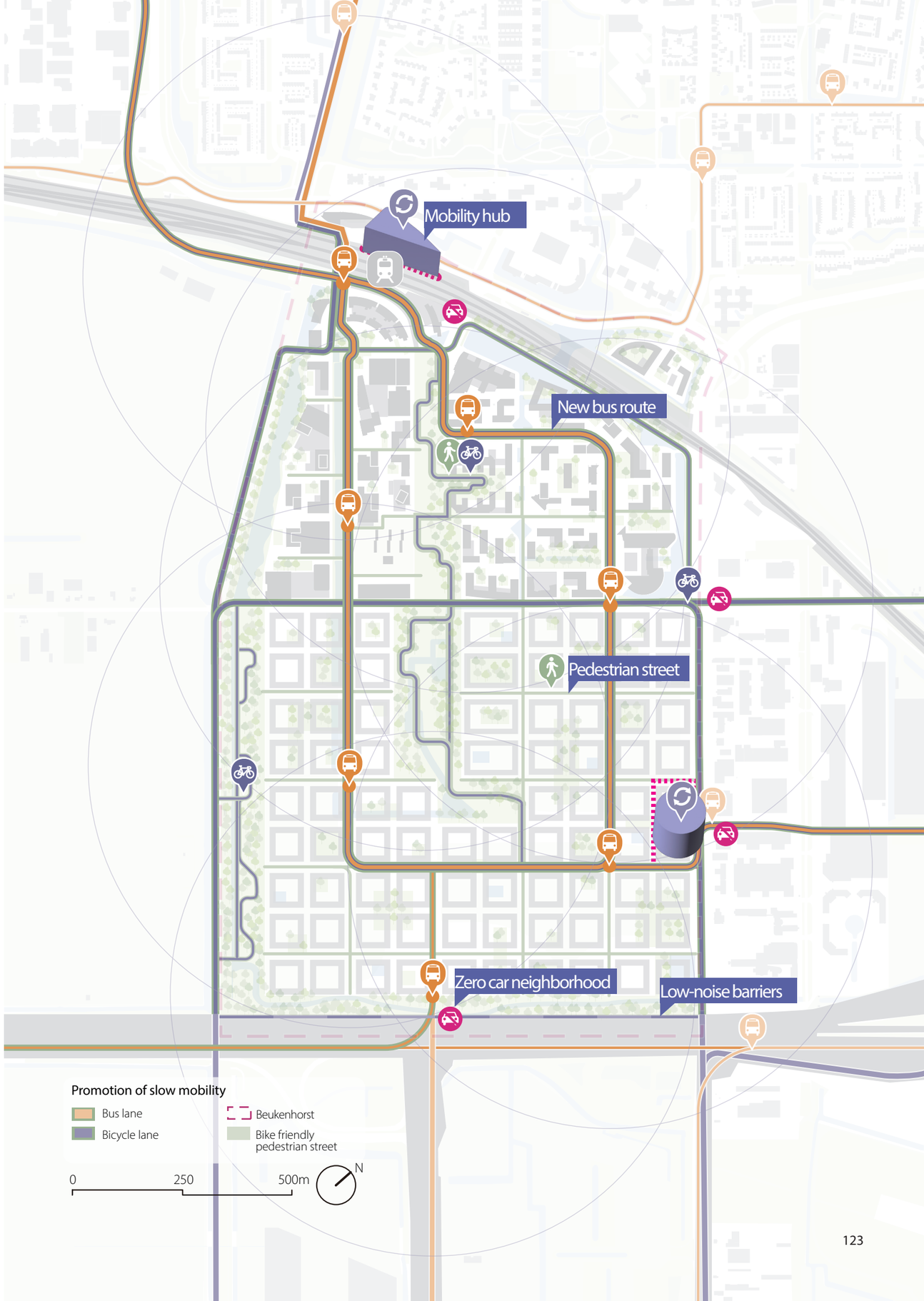
In Beukenhorst 2073, residents buy the groceries they need when they walk their dogs, and then stop by the nearby park to chat with neighbors they happen to meet after buying a cup of coffee, without having to plan these trips. Amenities are not a reason to run around, not an emergency on the agenda, but a part of leisure life. It may be a reason to get out of the house, it may be a passing thought on a walk, but it's more of a buffer between work and life, allowing remote workers to organize their lives more casually rather than living to schedules.

Figure 6.16 A neighborhood center. *Jones The Planner.*
http://www.jonestheplanner.co.uk/2017/12/is-leeds-really-up-for-jan-gehl.html

Figure 6.17 Leeds Future Demographics. *12 King Street.*
https://www.12kingstreet.co.uk/leeds-future-demographics/

6.8 Promotion of slow mobility

Transfers from cars to active mobility/public transport will take place on the boundaries of the Beukenhorst; these mobility hubs are themselves part of the mixed-used service area. The streets within Beukenhorst will be completely pedestri-an-driven. The new stops and the new loop will allow each resident to be within a six-minute-walk' distance from public transport.



Street transformations

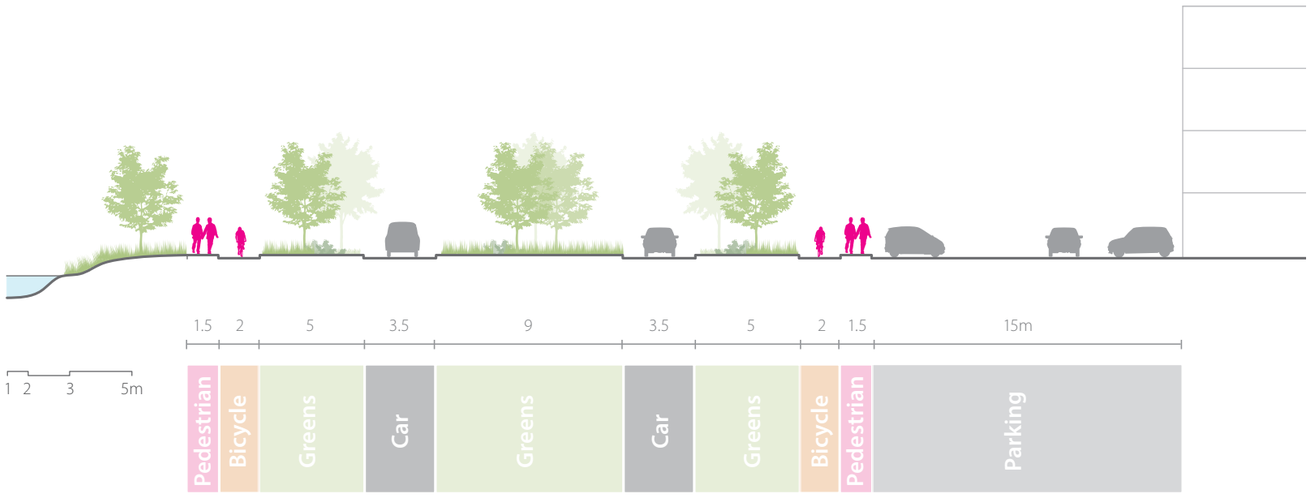


Figure 6.18 The current **Polarisavenue**. *By author.*

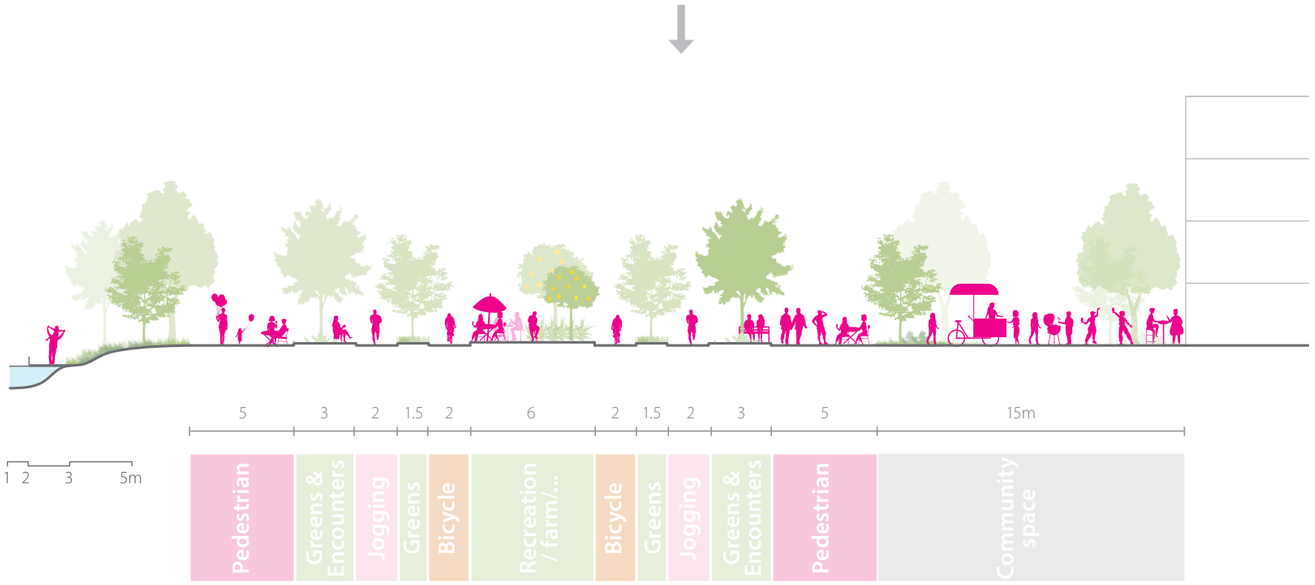


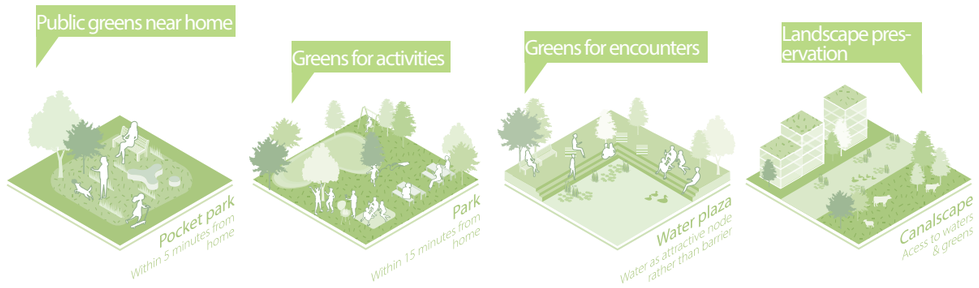
Figure 6.19 The **Polarisavenue 2073**. *By author.*

Figure 6.20 Mobility hub and slow-mobility-oriented streets. *PosadMaxwan.*
https://posadmaxwan.nl/en/news/30/community-hubs-for-an-accessible-and-liveable-strandeiland

Figure 6.21 The street as a vibrant public space. *Mobycon.*
https://mobycon.com/updates/how-to-make-streets-into-great-public-spaces/

6.9 Accessible blue-green infrastructure

Beukenhorst enjoys abundance in greenery and water bodies, but they are mostly passive barriers, such as road and parking partitions. By reconnecting the water network and greenland through the transformation of the central park and the streets, this area will become a vibrant, lively green cluster of neighborhoods.



Central park transformation

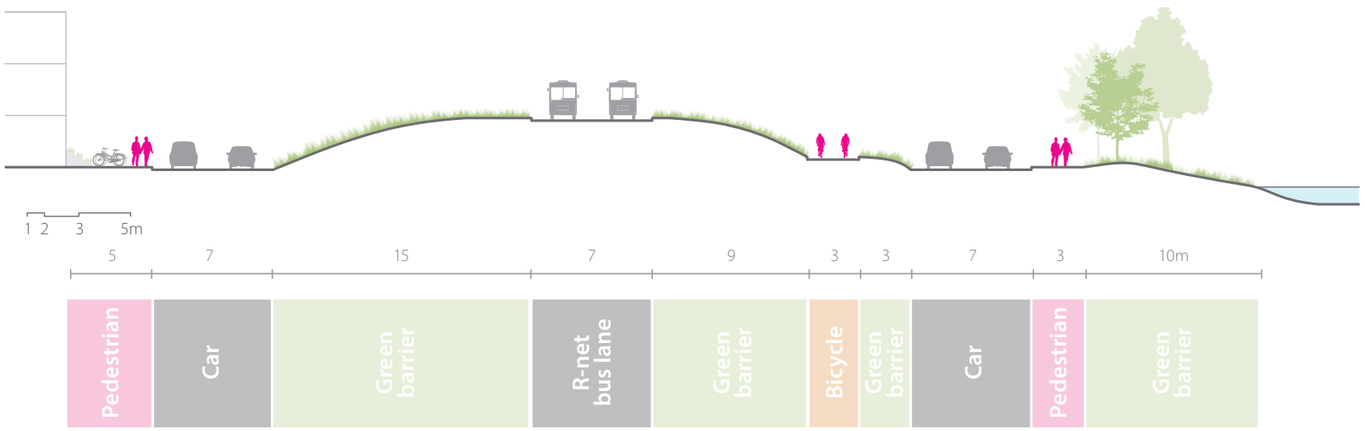


Figure 6.22 The current **Scorpius-Spicalaan**. *By author.*

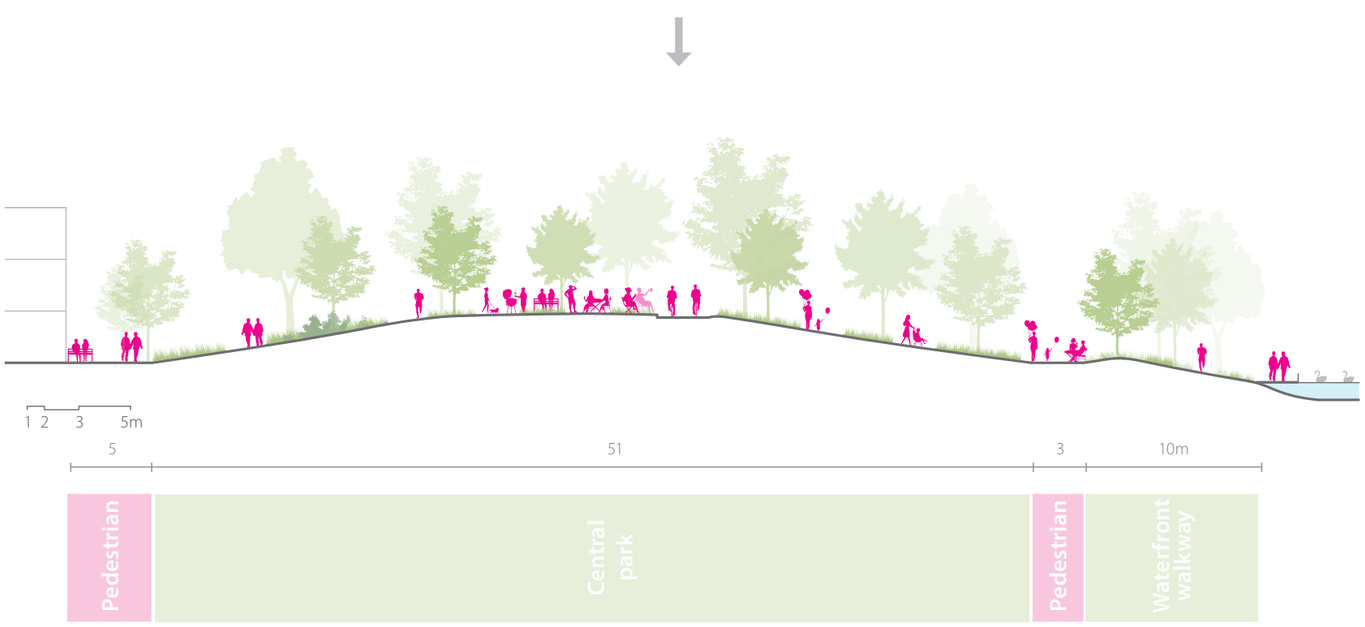


Figure 6.23 The **Scorpius-Spicalaan 2073**. *By author.*

Figure 6.24 A park on a slope: Family Park. *Boza Arquitectos / Archdaily.*
https://www.archdaily.com/794810/padre-renato-poblete-river-park-boza-arquitectos?ad-medium=gallery

Figure 6.25 Waterfront public space. Avon River Park Terraces + City Promenade. *LandLAB / Landezine.*
https://landezine-award.com/avon-river-park-terraces-city-promenade/

6.10 **Beukenhorst 2073**

By 2073, the 80% remote hybrid working trend will have enabled the transformation of Beukenhorst from an office district in decay to a live-work, mixed-use neighborhood, marking its status at the forefront of embracing the new flexible lifestyles. The spatial transformation of artificial and non-artificial infrastructures in Beukenhorst is able to make **all-day-round inhabited** neighborhoods that foster the transition, promoting flexibility, sustainability and stronger social ties. In this way, the transformation has more far-reaching impacts on society--especially in the realm of **collaborative community**, **housing crisis** and **gender equality**.

Flexible working locations

Rich amenities & social interactions

Supportive of sustainable, healthy lifestyle

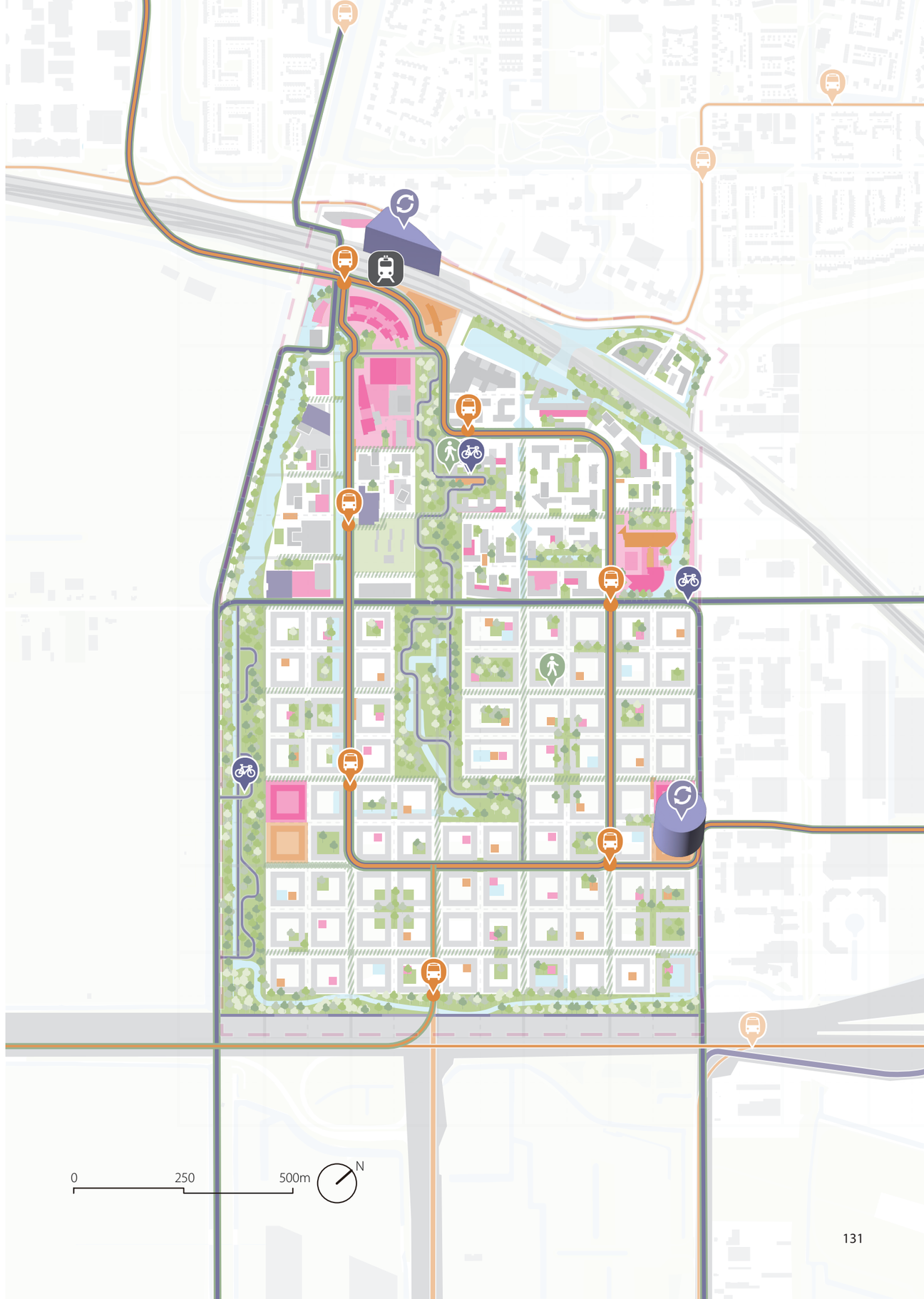


Image of the mobility hub: PosadMaxwan.
https://posadmaxwan.nl/en/news/30/community-hubs-for-an-accessible-and-liveable-strandeiland

All-day-round inhabited Beukenhorst

Beukenhorst is no longer a ghost town during non-working hours. People work and enjoy their lives wherever they want - in their apartments transformed from vacant offices, on pedestrian-friendly streets, and around various amenities. Everyone's life is on their own schedule, so there is no silence in this place.

Collaborative community

A Time Bank is a service exchange system, where you can trade your time (service) for others', for instance, your neighbors'. The development of the local economy and the design of the public space also help to foster collaborative communities in Beukenhorst, which gives the residents a real sense of "living here", an important element of sense of place. In Beukenhorst 2073, people can feel a sense of connectedness that is increas-ingly being lost in the modern society.

Affordable housing & diverse neighborhood

In the midst of a housing crisis, the transformation of vacant offices can quickly provide affordable housing options to the market. In addition, Beukenhorst's densification target of 100 households per hectare is planned to ensure that the area is not built to a suburban pattern, thereby providing more housing. In order to avoid segregation, a fixed percentage of housing is reserved for the social housing sector. People with different culture backgrounds and educational levels can live here - the community economy allows them to work close to home.

Gender equality: less burden, more opportunities

Hybrid working allows more women to work - not only because it gives them the flexibility to schedule their hours and work while running their households, but also because it takes many women away from office environments that ignore their needs and are even toxic. Beukenhorst 2073 can do more than that. Shared offices not only enable remote workers to share career experiences with each other, but also serve as a venue for advocacy and promotion of male involvement in parenting. From here on out, change the patriarchal culture, change the future of the next generation.

6.11 The timeline

Immediate actions

Consultation
with the public and experts about visions and transitions such as mobility/energy transition and street transformation

Proposal
of plans such as blue-green preservation, public transport enhancement and new neighborhood structures

Renovation
such as enhancement of green spaces and energy-sufficient buildings

Medium-to long-term actions

Legislation
regarding changes such as allowing other functions on residential land

Community building
engage residents and use events to stimulate communications

Implementation
of transformation plans such as street transformation

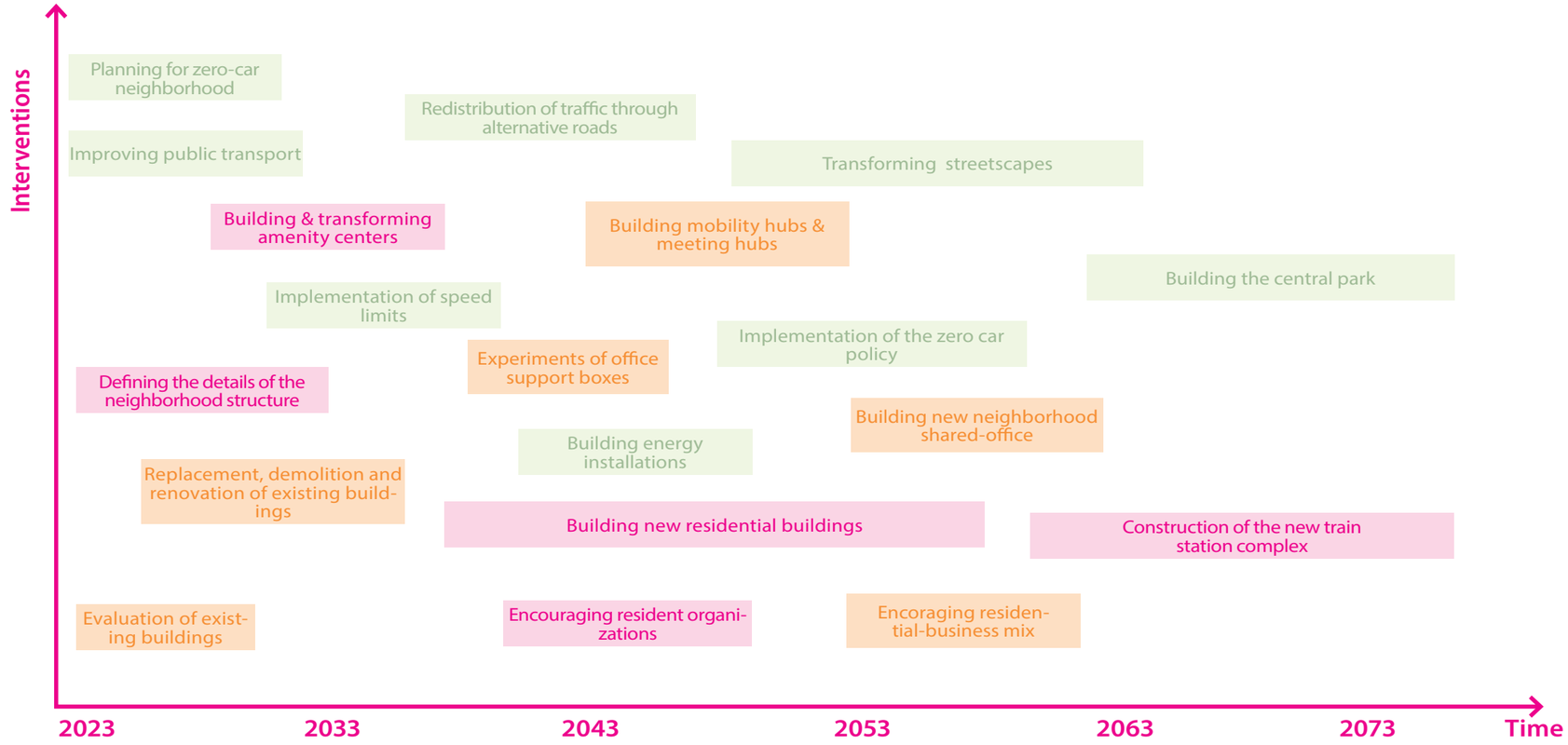
Vision 2073

Completion
of transition and transformation plans

Monitoring
of external conditions, status of completed projects and longer-term plans

Backcasting identifies the steps needed to achieve the desired vision present by comparing the current conditions with the desired future. In this project, the actions throughout the entire process of the office district transformation are divided into three general categories: immediate actions, medium-to long-term actions, and vision 2073. Immediate actions are those that are confirmed and can be undertaken immediately, such as energy-saving renovation of buildings and the improvement of streetscape quality. At this stage, it is more important to determine the direction of the transformation, so it is crucial to propose the exact plans and consult with the public and the experts. The mid-to long-term phase is the most important implementation phase of the program, therefore it is inevitable to address the fundamental barriers to further transition, such as clarifying the norms and laws for the Zero Car Policy, and allowing a flexible mix of functions on residential land. After 50 years, these transformations should be completed, but the monitoring and maintenance of them may never stop.

Figure 6.26 Steps and the timeline towards Beukenhorst 2073. *By author.*



7

Testing with Scenarios

1 Scenarios
2 Alternative paths

**All images in this chapter that are not specifically labeled are produced by the author .*

7.1 Various Possible Futures

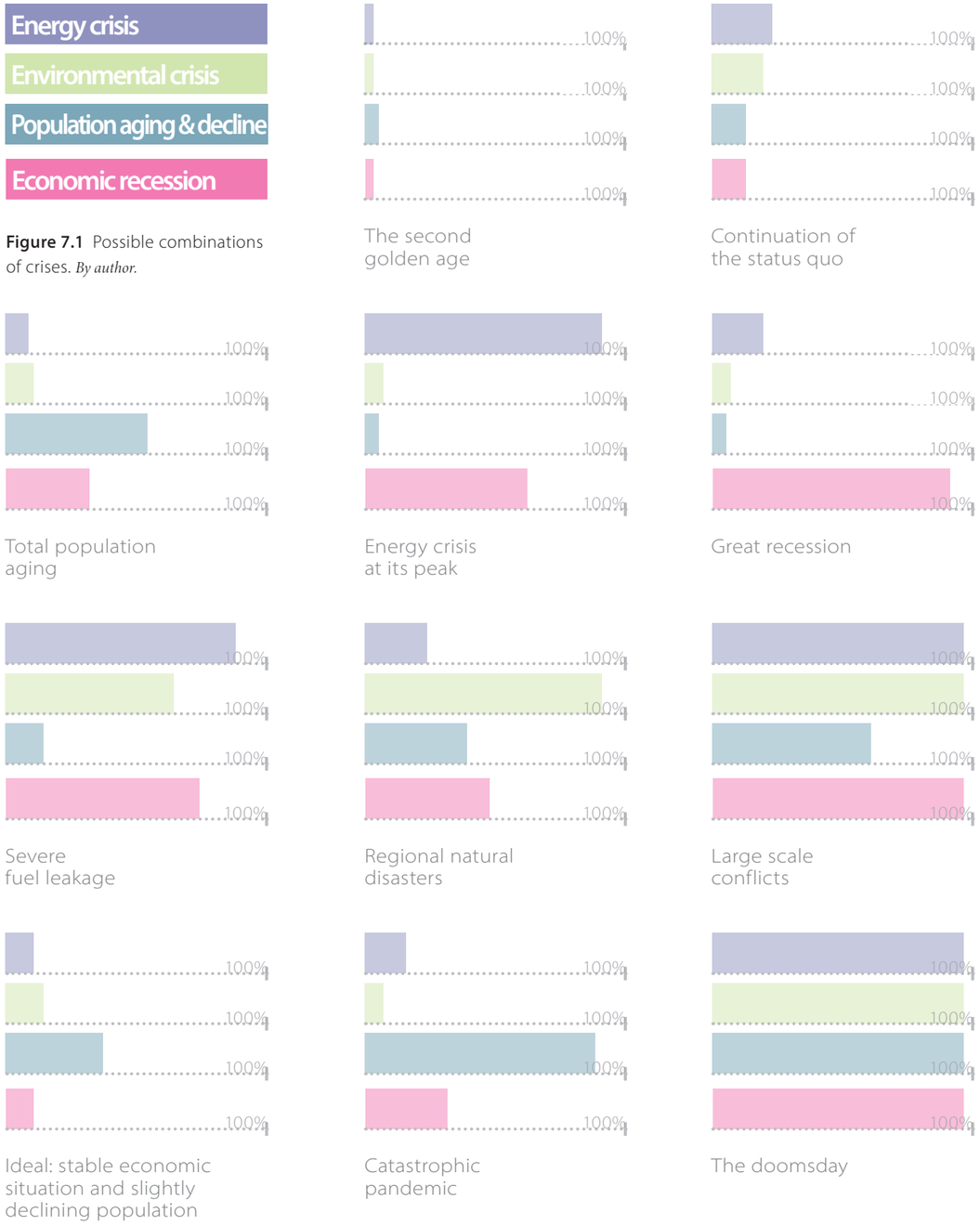


Figure 7.1 Possible combinations of crises. *By author.*

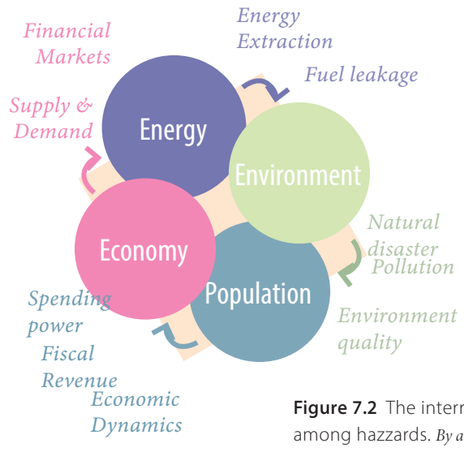


Figure 7.2 The interrelation among hazzards. *By author.*

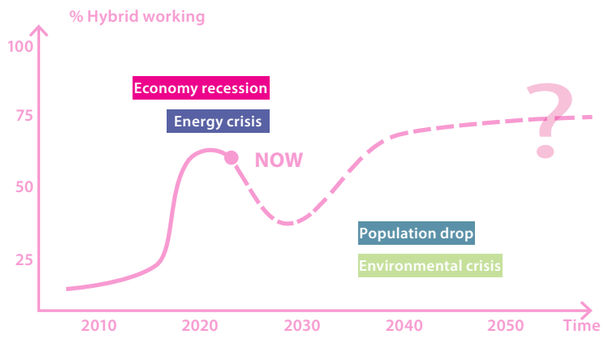


Figure 7.3 The future is by no means certain. *By author.*

How can the design respond to the various futures?

The uncertainty of the distant future lies in the fact that each crisis has a cascading effect. The aspects of energy, environment, population, and economy are interlinked (Figure 7.2), and changes in any one of them will lead to changes in at least one of the others. Last but not least, these crises and changes are themselves unpredictable events. The future can take on many faces in different situations. Figure 7.1 showed some of the possibilities, whether they are positive or catastrophic.

As introduced in P.78, this project uses the scenarios to describe the futures and develop the visions and design based on them. After going through the design of the ideal scenario (the ***Live-work City Beukenhorst***), it is as such important, if not more, to test the design with other possible futures to see how can the design of Beukenhorst be adjusted to respond to the different conditions of the scenarios, and what are to be focused under different circumstances. Similarly, the inferences derived from these scenarios are based on the changes triggered by the prevailing impacts of a certain crisis in the coming decades, independent of its specific duration.

Frugal City

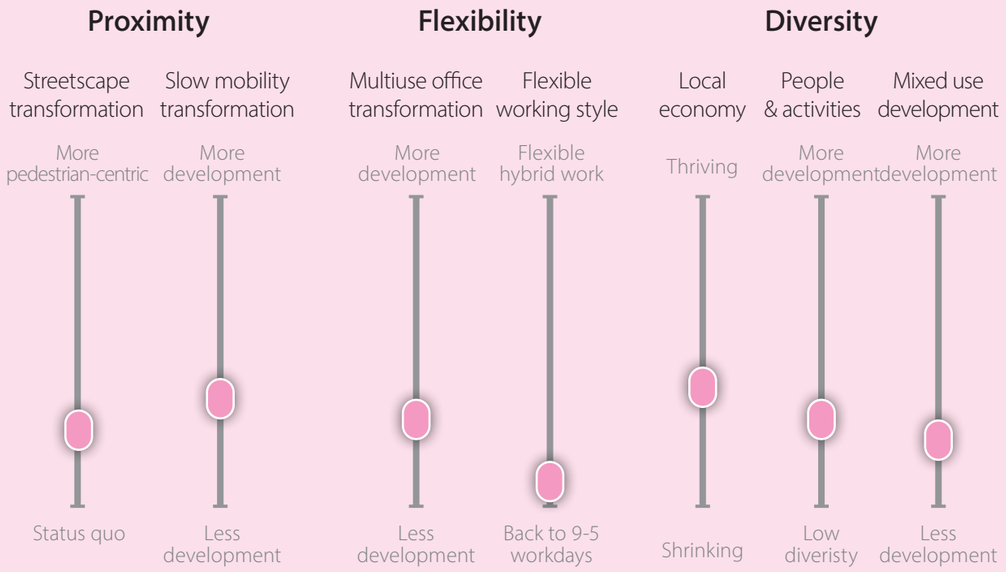
Scenario
Economic recession

Open Access News. **https://www.openaccessgovernment.org/office-workers-sitting-down/71612/**

In Frugal City...

The economy enters a downward spiral, employment opportunities and personal wealth for most people are declining, with lifestyle reforms stagnating. The employees lose more and more of their voice in the job market. The freedom of work style brought about by the pandemic gradually disappears and life returns to the old 9 to 5 routine.

Setting scenario Frugal City



(PBL, 2019) is referenced for the layout & illustration .

Scenario: Frugal City

Economic recession

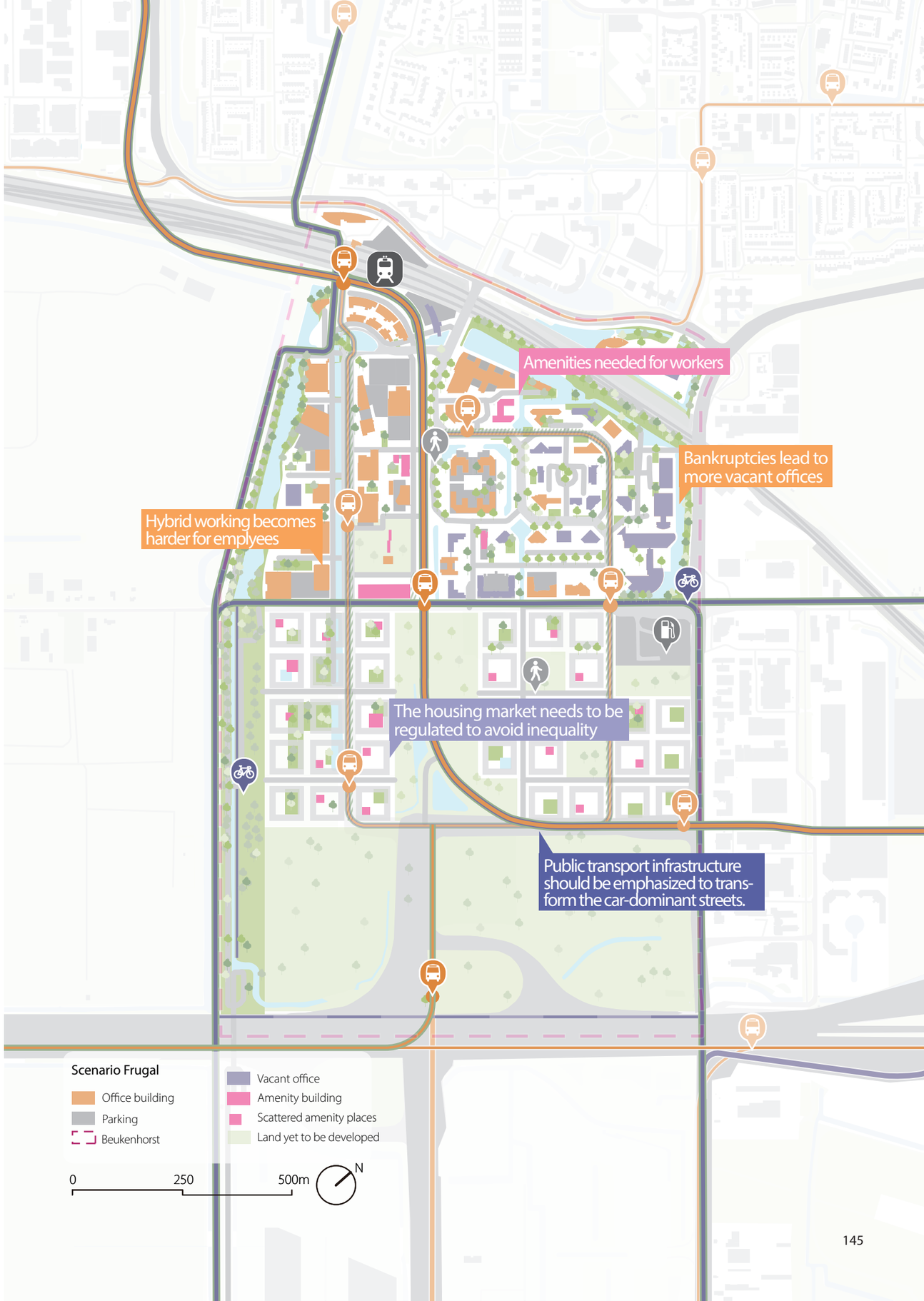
- Decline of jobs
- Bankruptcies of companies
- Weak investment and consumer motivation
- The wealthy class is less affected, increasing the inequality of the housing market

Risks & Challenges

- Transformation of the office district is stopped, although vacant offices are increasing
- The mobility transition lacks funding
- Investors' preference for single-family homes weakens housing affordability

Focuses

- Amenities for employees can be the first step for the mixed-use transformation.
- The development of public transport infrastructure can be part of the economic stimulus measures, kickstarting the mobility transition.
- The housing market needs to be regulated to maintain the diversity of residents.



Energy-saving City

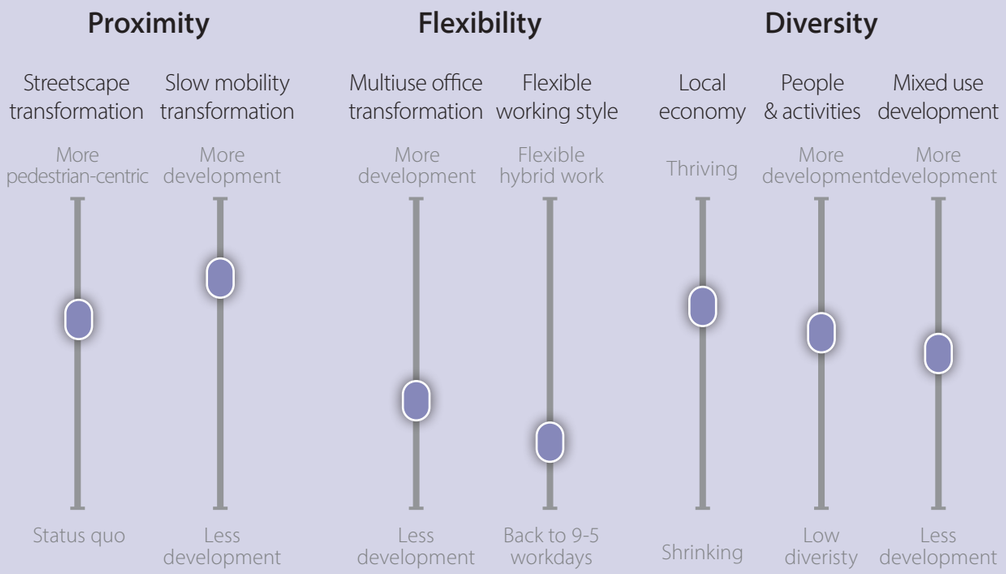
Scenario
Energy crisis

Netzerocities. https://netzerocities.eu/2022/08/02/the-ec-publishes-the-factsheet-saving-energy-for-a-safe-winter/

In Energy-saving City...

Reducing fossil fuel consumption becomes a priority, with slow mobility and public transport being strongly promoted. People are spending more of their free time in their neighborhood, bicycle or pedestrian-friendly living areas. In order to reduce personal and household energy costs, people are more likely to return to the offices.

Setting scenario Energy-saving City



(PBL, 2019) is referenced for the layout & illustration .

Scenario: Energy-saving City

Energy crisis

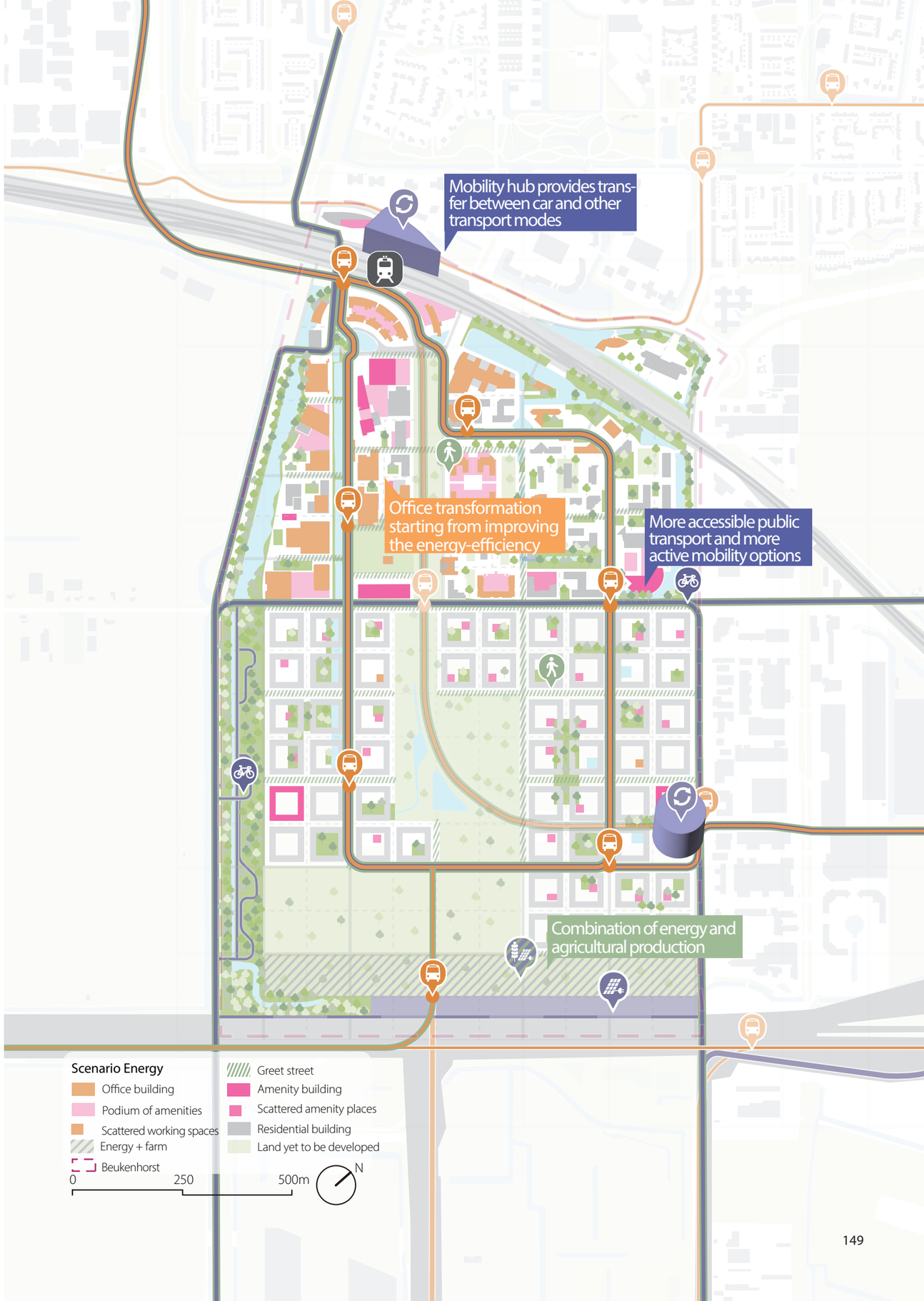
- Rapidly rising energy prices and energy costs for all industries
- Inflation
- Increased awareness of reducing the use of fossil fuels and the development of new sustainable energy

Risks & Challenges

- The trend of hybrid working slows down due to rising energy costs at home
- Rising construction costs stall the progress of office transformation and mixed-use development
- Lower consumer and investor confidence

Focuses

- The development of mobility hubs and the improvement of public transport infrastructure can serve as measures to reduce fossil fuel dependence.
- Energy-efficient renovation and the inclusion of amenities in office buildings is the first step of office transformation following the mixed-use principle.
- Experiments combining green energy and agricultural production can take place on the surrounding agricultural land.



Eco City

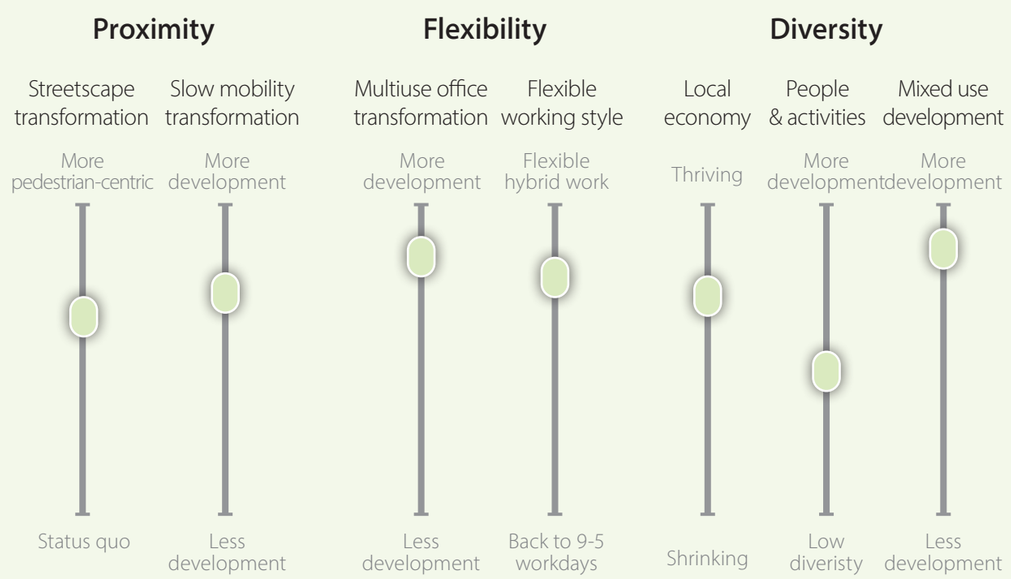
Scenario
Environmental crisis

ArchDaily. https://www.archdaily.com/937475/white-arkitekter-plus-re-gen-villages-create-first-circular-self-sufficient-communities-for-sweden

In Eco City...

Environmental crisis increases the desire to develop flexible and environmentally friendly lifestyles. Hybrid work is largely accepted, and the government is actively promoting the repurposing of office buildings and the establishment of sustainable transportation systems. With local economy reducing the need for logistics, people build closer ties in their communities.

Setting scenario Eco City



(PBL, 2019) is referenced for the layout & illustration .

Scenario: Eco City

Environmental crisis

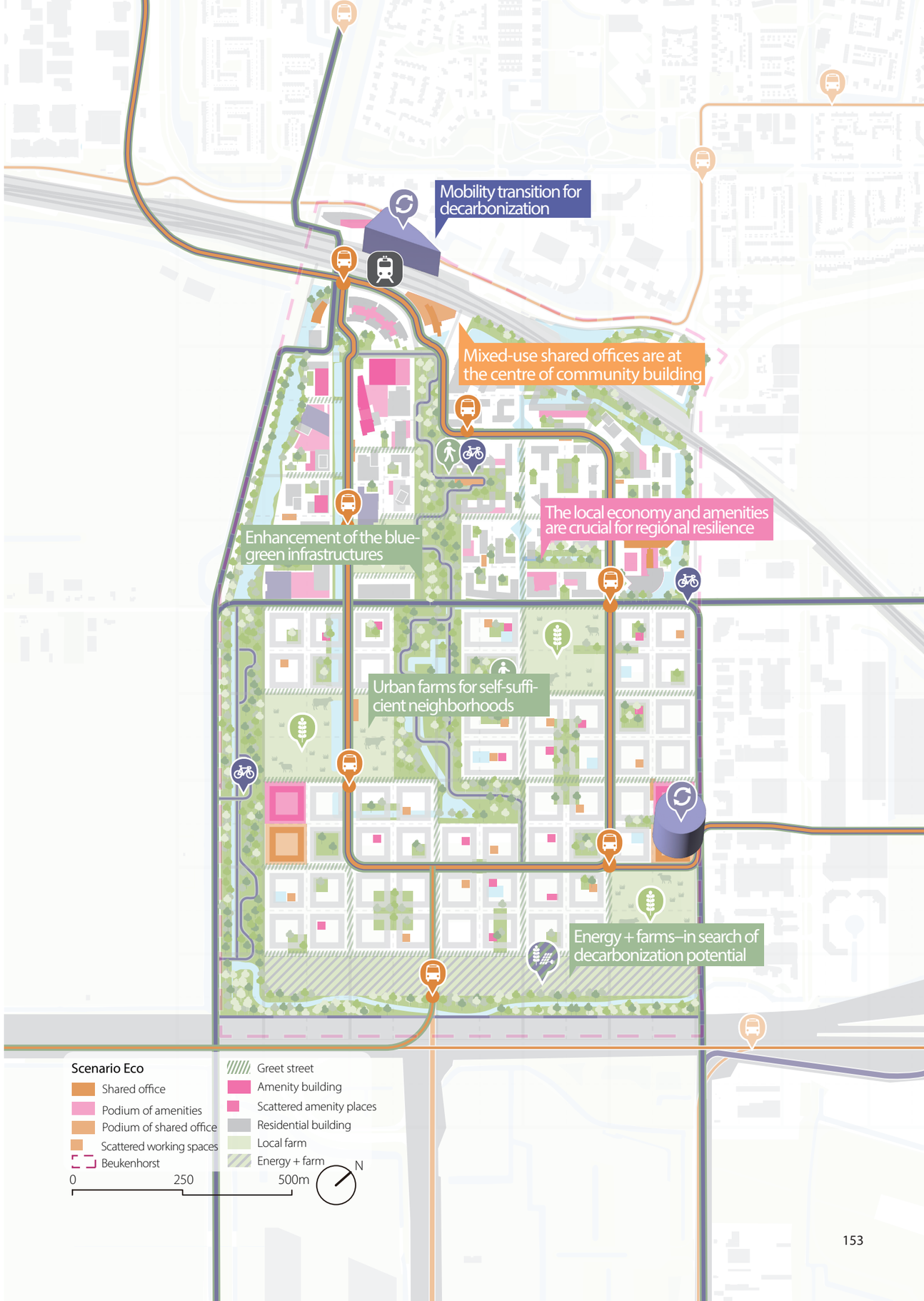
- Population decline
(depending on the extent of the crisis)
- Extreme climate events raise the pressure for decarbonization
- Broad acceptance of hybrid working and emphasis on communities

Risks & Challenges

- Declined attractiveness and economic interests of the region
- Over-emphasis on the lifestyle of being local weakens the vitality and diversity of the neighborhoods
- Technical constraints on decarbonization at an industrial scale

Focuses

- Environmental crisis provides strong motivation for building self-sufficient communities
- The emphasis on the natural environment promotes the preservation and enhancement of the blue-green infrastructures.
- The concepts of collaborative community and local economy gain the importance as part of regional resilience.



Care City

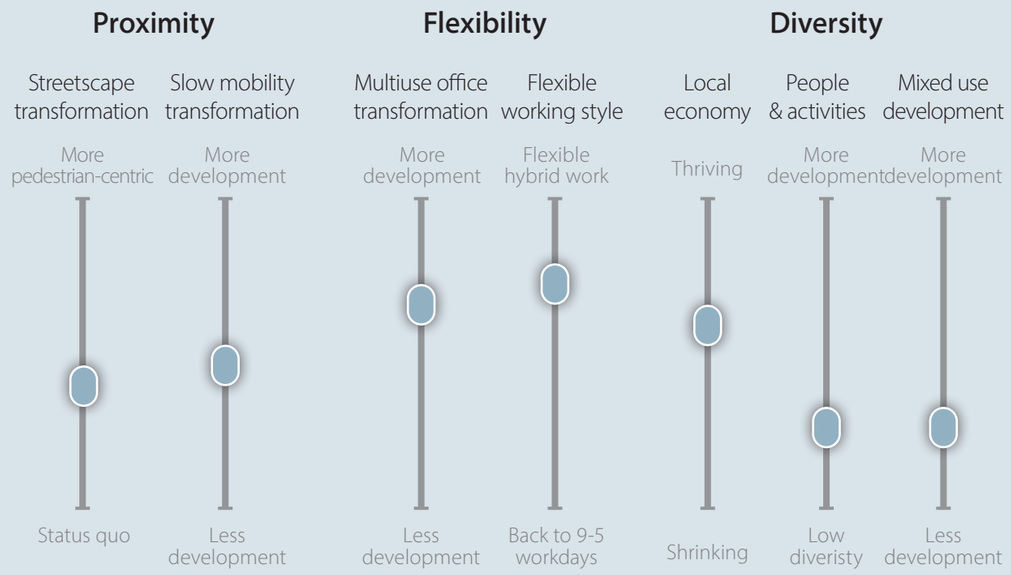
Scenario
Population decline and aging

The Star. https://www.thestar.com.my/business/business-news/2022/01/29/revitalising-an-ageing-nation

In Care City...

The aging population has a negative impact on both economic dynamics and urban development. With the declining residents and tax revenues, various types of transformations are being slowed or eliminated. However, the difficulty in recruiting gives more voice to the working population and has led to the spread of hybrid work. In order to care for each other, people have become closer together in the community and the local economy flourishes thus.

Setting scenario Care City



(PBL, 2019) is referenced for the layout & illustration .

Scenario: Care City

Population decline & aging

- Decline in economic vitality and tax revenues
- The housing market cools down with fewer consumer needs and investment motives
- The quality of life of each citizen is more emphasized

Risks & Challenges

- Decreasing government capacity to provide management and various services
- The importance of density and sustainability gets overlooked as space and resources seem sufficient
- Increasing demand for caregiving services and declining population

Focuses

- The quality of life of the residents can be improved through the enhancement of flexible working space, blue-green infrastructures and streets.
- Close community relations need to be formed through creating public space and platforms like “time bank”, encouraging residents to help each other, and to achieve bottom-up management.
- The government needs to review the construction projects to make sure that the mixed-use transformation and sustainability improvements are taking place.

8

Conclusion & Reflection

8.1 Conclusion

The Sars-Covid2 pandemic over the past two years has made clearer the severity of the urban issues such as housing crisis, urban sprawl, and the quality of urban life. At the same time, opportunities of new living and working paradigms are provided, among which is the emerging trend of hybrid working.

It is proved that much of computer-based work can be completed outside of the office and hybrid working will persist after the pandemic, which has a specific impact on the office districts in the urban areas. When work becomes temporally and spatially flexible, the life pattern organized following the mobility needs is also challenged, bringing new requirements of both the housing and urban environment. The transition inevitably involves the consideration of social justice and gender equality since the chance to work remotely differs among types of jobs, and women's extra burden in terms of chores and childcare.

On the basis of the conditions, I takes the Randstad as the research area to analyze and explain how the urban problems interrelate and interact with each other, since the impacts of the work pattern are better observed at a regional scale. Based on the analysis comes the main research question: How can we take advantage of the new working patterns to transform monofunctional business districts into multifunctional and human-centred urban areas, therefore improve the quality and diversity of urban life in metropolitan areas of the Randstad? The question derive four sub-questions reflecting the aspects of the project from the perspectives of analysis, design, and testing/reflection.

In an attempt to answer the questions, the project adopted the methodology of urban foresight to explore the future of hybrid working in a 50 year's timeframe.

Starting from resident personas, the project aims to promote a hybrid-working based flexible lifestyle that helps to build all-day-round inhabited neighborhoods, form closely collaborative communities, increase housing affordability, and allow greater gender equality. To achieve this goal, the map of aspirations and the map of design options are developed in the project for live-work neighborhood transformations, which can also be transfered to other future practices. As an example / pilot project, Beukenhorst, a concentrated office district in Hoofddorp, is chosen to demonstrate the implementation of design options in the report.

Last but not least, the design is tested with a set of scenarios to answer the "what if" questions. In all, the project articulates the vision of a more flexible lifestyle and closer-knit community, within a time frame of 50 years. The research tries to explore the spatial design that can facilitate the transition.

8.2 Reflection

"Hybrid Working, Quality Living" focus on the new live-work pattern and its impacts made possible by the emergence of massive remote working during and beyond the COVID-19 pandemic. The project takes the Randstad as the research area to analyze and explain how the problems interrelate and interact with each other during and after the pandemic era.

Based on foresight methods, the project develops a set of scenarios and options for design intervention for the realization of "live-work city". The design principles and options are then implemented in Beukenhorst, the office area in Hoofddorp, as an example.

The methodology of urban foresight is chosen for the project, as this project is about the distant future, and there are so many factors that affect the way people work and live, any one of them could reshape future trends. By identifying the main influences and the way they affect the hybrid work lifestyle using the foresight method, I constructed several scenarios and selected one of them for the design. I think urban foresight is more convincing and comprehensive for this project than the method of morphological analysis or pattern language, which I considered before.

The process of exploring methodology and design ideas has not been easy for me. At P2, I over-abstracted the concept and included complicated theories. Rodrigo helped me to streamline the theories and introduced me to the urban foresight methodology. On the design side, it was a tougher road; by P3, I was still revisiting the direction of the design with Rients - he was still not satisfied with the innovation of the design.

I'm glad I didn't choose the easy way out and follow the mediocre way on. After getting their feedbacks, I tried my best to identify the key elements with them and apply them in the project. Now, the urban foresight methodology has created a logical framework for this future-oriented project, and starting with the resident's experience, the human-centered narrative brings a lot of exciting ideas to the design.

During working on this project, I experienced the whole process from topic selection, project planning to design and graphics production, and gained a deeper understanding of the time planning and challenges involved in the project. In the past, I always tend to finish one part thoroughly before starting the next part, and such a mindset led me to spend too much time on research and exploration during this process, and finally started the design phase very late. In terms of the management of project progres, I finally learned to accept that it is not a step-by-step process, but is rather iterative. It is better to start doing it directly than to "wait until you are ready to start", and only then will more ideas emerge.

In the final part of the graduation, I will spend my time refining the design narrative and discussing the economic and social factors that support the vision and implementation of the design.

The master programme of MSc AUBS emphasizes a multi-disciplinary way with students working on solutions for the built environment. The Urbanism track, especially, place more significance on the integration of social, cultural, economic, and political perspectives of the site in order to shape and plan for more sustainable development. The project embodies the characteristics of the study programme and urbanism track by setting out from the multidisciplinary, multi-layer topic of remote working to seek improvement of the urban and suburban environment.

Research and design are complementary to each other in the progress of the project. I gain a grasp of current trends and challenges from the research and construct a framework for the design. In the design process, I often find a different perspective from the research, and the change of narrative will put new demands on the research.

The urban foresight method I use has only been revalued by European governments in recent years. It is a valuable approach to medium and long term future planning, especially now when the world is facing more and more challenges. The methodology explores possible and preferable futures in a creative way, and combines them with rational analysis to list the factors that bring about uncertainty. Due to lack of time and my poor Dutch, I was not able to practice the methodology in its entirety in this project, and it would be meaningful to apply this method in terms of engaging public participation.

In terms of scientific aspects, the project looks at the impact of shifting working paradigm on commuting pattern, which will also affect the current conditions of mobility and sustainability. While in terms of societal issues, the project aims to elaborate the connections among the remote working pattern, labor markets, housing markets, and social inequity. With the transformation of post-pandemic business districts as a lens, "Hybrid Working, Quality Living" looks at promoting diversity and the life quality of (previous) commuters, especially starters, who are disadvantaged in the housing market.

Although there are quite a few projects and studies emphasizing office transformation and proximity-oriented neighborhood such as "15-minute city", the combination of the persisting remote work pattern and business district transformation is less discussed. In this way, the research may also contribute to filling a gap in the discussion in the professional field.

In terms of transferability value, first of all, the design option of live-work neighborhood proposed in this project can be a reference for any project that emphasizes mixed -use planning and compact city, and is not limited to the design of neighborhoods under hybrid work lifestyle. In addition, the urban foresight methodology is increasingly significant nowadays, when long-term planning is becoming more and more important. Last but not least, the human-centered narrative with the resident persona method is very effective in inspiring design. I will try applying it to my future projects.

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P5 Thesis Report

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