



Walk your way to Joy

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A RADICAL REDESIGN OF THE
POSTWAR NEIGHBOURHOOD FOR A
JOYFUL FUTURE OF ITS RESIDENTS

I hope that this explorative graduation project can be an inspiration for urbanists and other city makers to rethink the status quo. How we design the city has a great impact on how people will use the city. So, if we want urban residents to be happy and healthy, I believe that our own imagination is our biggest asset.

WALK YOUR WAY TO JOY

A radical redesign of the postwar neighbourhood
for a joyful future of its residents

MSc. Graduation Report
Department of Urbanism

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Graduation Studio: Design of the Urban Fabric
Embracing plurality, growing porosity

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June, 2024
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Abstract

Postwar neighbourhoods, designed in the 1950s and '60s with the *wijkgedachte* in mind, have developed into unattractive environments. These areas are now defined by monotonous apartment blocks surrounded by vast stretches of grass and car-focused infrastructure. As a result, the quality of life has declined. This graduation project researches how a radical redesign of the postwar neighbourhood can lead to a joyful future for its residents. The research method combines exploratory design with supplementary theoretical and analytical studies.

The way to joy is found in walking, recognising its benefits for physical, social and mental wellbeing. The structure walking plan proposes of a close-knit walking network of lively and restorative routes, in combination with a variety of daily amenities spread over four small community centres and the neighbourhood's central core. Additionally, a detailed redesign is proposed to convert the large amounts of 'empty' public space into four allotment garden communities.

This approach integrates the design principles for walking with both the values of allotment gardening, and the hidden qualities of the postwar neighbourhood. As a result, the radical redesign of Pendrecht creates a lively and joyful environment where walking and gardening become a central and enjoyable part of daily life. In this way, the project aims to revitalise the *wijkgedachte*.

keywords

wellbeing
walkability
allotment garden
postwar neighbourhood
wijkgedachte
community building
Rotterdam

Prologue

I wake up to the singing of the birds sitting in the tree outside my window. They fly away quickly when I open the curtains. It is 8am on a chilly December day in 2033. I prepare my breakfast and sit down at the table facing the street. Now that the leaves have fallen from the trees, I have a good view from the second floor over a group of preschoolers. They are playfully making their way towards the primary school on the corner. I look down and wave to the 90-year-old neighbour who is cheerfully pushing his walker.

The sun gently peeks through the clouds. Time to put on my sturdy shoes. I walk across the gallery, down two flights of stairs, greet the lower neighbour and while whistling happily, I turn the corner. The street is bustling with activity. Children are gathering on their way to school, parents are walking to the office while chatting. I have an appointment with the province's spatial planner today, to extend the Joyful City principle regionally. We are meeting at the co-working spots at the City Maker Square, a twenty-minute walk from here.

I left well on time, so I pass by the community centre for a cup of coffee. Despite the low temperature, I take a seat at a table outside. Then I can enjoy people-watching. After an espresso

and five greetings with locals, I walk on. I wander through the urban forest and rethink my pitch. In the background, I can hear a blackbird sing. A heron stands guard beside the ditch.

On my way home, the sun has already set. It is five o'clock. I am taking the route via the high street. The Christmas lights over the street bring me in a nostalgic winter mood. I pass the local restaurant, where the tables are already full of couples chatting and laughing. I stop by the sewing shop. The zip on my coat is broken. '10 euros, 10 minutes,' the employee says with a big smile. While I am waiting, I take a look at the clothing swap. I see the dress I exchanged last week for a woollen hat.

A little later, with my warm coat back on, I walk into the courtyard of my building. Mister Ata is harvesting Brussel's sprouts in the vegetable garden. He hands me a tray full and says I should harvest my leeks soon too. I thank him and walk up the stairs. Arriving on the second floor, a warm, spicy smell reaches my nose. The neighbour is waving happily at me, with the wooden spoon still in her hand.



*The median of the road Blaak,
A hidden quality*

Personal motivation

In the spring semester one year ago, I was doing an internship at an office in Rotterdam. Luckily for me, the office was located in the hearth of Rotterdam, at walking distance from train station Blaak. So, every morning I took the train to Blaak, got out of the station, walked ten minutes and entered the office. An easy walk, you could say. Yet, it was not a pleasant one. Everywhere I walked, I was surrounded by large amounts of cars, driving fast through the wide roads. They were causing noise and stench, they made me wait long before I could cross the street and they were just taking up a lot of space. I started to wonder: what are all those cars doing here, in the middle of the city centre of Rotterdam? Should the city, and especially the centre, not be the territory of the people?

I realised that this is mainly a design question. This city of Rotterdam is designed to have large car roads running through the city, in combination with many parking garages in the centre. Rotterdam is therefore very inviting for car drivers: it is easy and comfortable for them to get around. In that sense, the car users are not to blame because they behave according to the city's design. This made me realise that it is possible to change unpleasant behaviour, by changing the design. All streets, neighbourhoods and cities can be beautiful, healthy and full of joy, but only if you dare to dream and dream big. That is what I see as the power of the urban designer. For me, this journey will start with walking.

CONTENTS		CHAPTER 4	80
		STRUCTURE WALKING PLAN	
CHAPTER 1	12	CHAPTER 5	96
INTRODUCTION		PENDRECHT AS ALLOTMENT GARDEN	
1.1 Problem field		5.1 The allotment garden	
1.2 Methodology		5.2 Allotment garden complex Pendrecht	
1.3 Conceptual framework		5.3 The garden community	
		5.4 The neighbourhood unit	
		5.5 A joyful walk through pendrecht	
		5.6 Strategy of execution	
		5.7 The wijkgedachte revitalised	
CHAPTER 2	32	CHAPTER 6	142
WALKING		CONCLUSION	
2.1 Mobility in Rotterdam		6.1 Conclusion	
2.2 Relation walking and joy		6.2 Discussion	
2.3 The utopia of the walkable city		6.3 Reflection	
2.4 What does the pedestrian need?			
CHAPTER 3	58		
THE POSTWAR NEIGHBOURHOOD			
3.1 The wijkgedachte			
3.2 The neighbourhood unit			
3.3 The status quo of pendrecht			
		Bibliography	
		Appendix	



A healthy environment for
human and planet?
Kampenlandsingel, Pendrecht

*'If the purpose of planning is not for
human and planetary health, then
what is it for?'*

Maria Neira,
Director at Department of Environment,
Climate Change and Health

(World Health Organization &
UN-Habitat, 2020: X)

Introducing joy

What is joy? And what is the meaning of this emotion? The definition of joy on Wikipedia is:

'The emotion evoked by well-being, success or good-fortune. Associated with feelings of intense long-lasting happiness'.

In his book **Happy City** Montgomery (2015) uses the Greek term **Eudaimonia**, which literally translated means 'Good Spirit'. He uses this term to describe a state of happiness and welfare. He cites the 'eudaimonia checklist' of psychologist Carol Ryff to get an understanding of how this feeling could be accomplished (Montgomery, 2015: 35):

- Self-acceptance
- Environmentally mastery: navigate and thrive in the world
- Positive relations with others
- Personal growth throughout life
- Sense of meaning and purpose
- Feeling of autonomy and independence

In their book about health in urban planning, Barton et al. (2009) make a distinction between planetary health and human health, in which human health is the result of physical, mental and social wellbeing. For the purpose of this project, the following definition will be used:

Joy

(noun)

The emotion evoked by the totality of physical, mental and social wellbeing.

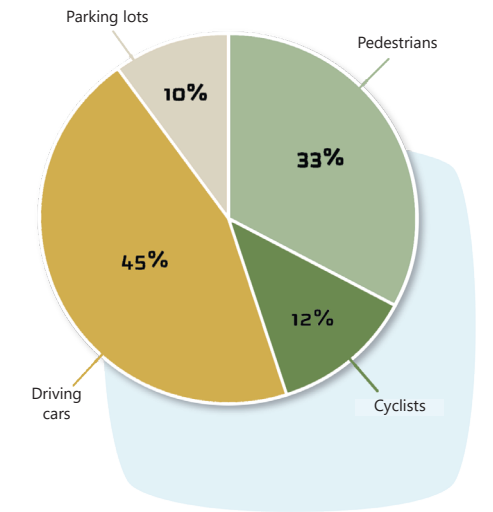
This chapter will explore the problem field, starting with the problematisation of car oriented design on the city scale of Rotterdam, zooming in to the problems of the postwar neighbourhood. Next, the methodology of this project is discussed, including methodology framework and conceptual framework.

1.1 PROBLEM FIELD

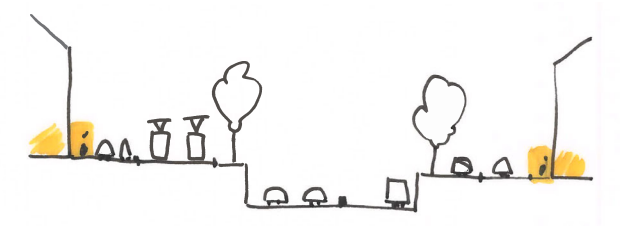
'Who is the city for?'

Montgomery (2015: 233) asks himself this justly. Research from Milieudefensie shows that 55% of the public space in the Netherlands is dedicated to cars, driving and standing still, see figure 1.1 (Van Liere et al., 2017). This is also visible in the city of Rotterdam, which has undergone a period of reconstruction after the bombardment in the second world war. Rotterdam used to be a very lively city, with small ports and canals, people walking and talking. An urban fabric that allowed for life to take place outside, on the streets.

However, with all the good help that the Marshall plan has brought for the reconstruction of the city, it has also brought the American idealism of car centric design (Verkade & Te Brömmelstroet, 2020). And thus, Rotterdam is now left with large city streets that function as pipelines to assure a constant flow of cars, as shown in figure 1.2 (Te Brömmelstroet, 2023). The human scale is lost in these streets, making them boring, uninteresting and not inviting for walking (Gehl, 2010). As Broekmans (2023) expressed it: 'If we design for cars, people will use cars'.



1.1 Distribution of public space by mode of transport (Van Liere et al., 2017: 5)



1.2 Little space for people on Rotterdam's city streets

Travel time constant

The benefit of a car centric city is that people can drive fast and comfortably from A to B, saving travel time and thus, according to the capitalist system, saving money. However, the time people are willing to spend on traveling has stayed the same over almost half a century, despite the increased velocity of mobility. This is what Hupkes and Zahavi call the *travel time constant* (Verkade, 2018). Since technology has made it possible to travel much faster, people travel now much further.

Traveling further

This effect has been strengthened by postwar city planning, in which areas for working and areas for living have been separated on purpose. Pleasant living environments could be build further away from busy cities, as a result of the rise of the private car (Kluiters, n.d.). A residential city like Spijkernisse provides an attractive living environment for people working in Rotterdam (Schipper, 2023), but at the same time it forces its residents to travel further to get to work and other destinations. So, technology and city planning together have been encouraging the use of private cars, resulting in a city serving for a constant flow of vehicles.

Mental, social and physical wellbeing

As the travel time constant implies, people seem to be willing to travel long and far, but it does not make them happy. On the contrary,

long commutes have led to mental health problems, such as depressions (Montgomery, 2015). Furthermore, this model of mobility encourages individualistic behaviour: one gets into their private vehicle and does not have social encounters with a diversity of other individuals who are also on their way (Te Brömmelstroet, 2023). This does not help with the increasing loneliness among society (CBS, 2022b); in 2022 only 13% of the Dutch population had daily contact with their neighbours (CBS, 2023). Car mobility also does not stimulate physical health, while around 50% of Dutch adults is overweight (CBS, 2022a). So, car centric city planning has a negative impact on the mental, social and physical wellbeing of people.

Traffic accidents

Moreover, car mobility has a lot of negative side effects, that seem to be taken for granted in our society. First of all, it leads to ‘manslaughter’ as people would call it during protests against cars in the 1970s (Montgomery, 2015; Urhahn, 2017). Worldwide, 400.000 people die in traffic accidents yearly. To put it in perspective, there are more deaths from cars than from wars (Montgomery, 2015).

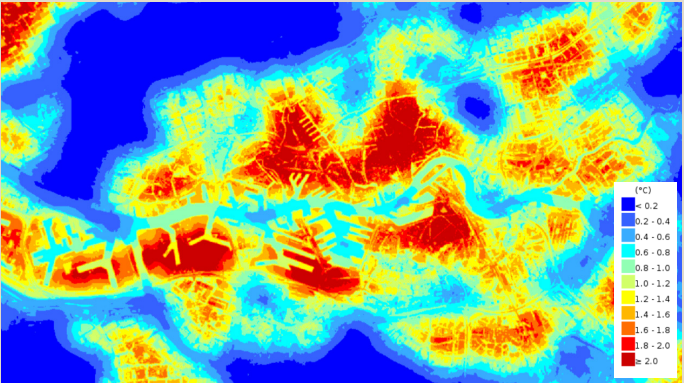
Environmental problems

Environmentally, cars also cause problems: noise and air pollution as a result of the particulate matter, leading to health problems (Milieu Centraal, n.d.). High amounts of asphalt

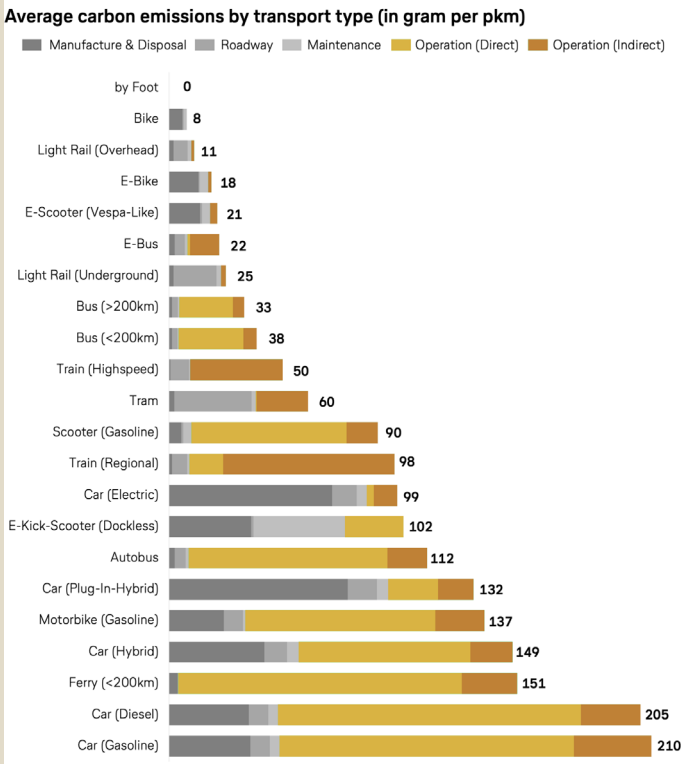
and pavement result in the Urban Heat Island effect, as visible for Rotterdam in figure 1.3. Furthermore, more space for asphalt means less space for greenery, leading to biodiversity loss (Oke et al., 2021). Next to the biodiversity crisis, the planet is dealing with two other large crises: climate change and the depletion of raw materials (Hemel, 2023). While over the past decades the travel time has been constant, the energy use for mobility has exploded (Hemel, 2023). Altogether, car mobility has a high carbon footprint, as shown in figure 1.4.

Technology

In the sustainable mobility strategy from the European Union, the focus still lies on new technologies as the solution– smart mobility, autonomous vehicles, electric vehicles (European Commission, 2020). New technologies will need new materials, energy for production and energy for the use of the vehicles. Moreover, these innovations will expectedly only strengthen the current mobility model of going fast and far, instead of solving the broader set of social, environmental and wellbeing issues caused by it.



1.3 Urban Heat Island Effect Rotterdam (RIVM, 2020)



1.4 Average carbon emissions by transport type (TNMT, 2021; adapted by author)

Change is on its way. The municipality of Rotterdam is working on the transition from prioritising car mobility to prioritising pedestrians, as shown in figure 1.5 (Gemeente Rotterdam, 2020). However, in the vision maps from e.g. the Omgevingsvisie, Rotterdamse Mobiliteitsaanpak and Rotterdam Loopt 2025, the focus always lies on the central areas of the city. The postwar neighbourhoods located around the urban core, such as Pendrecht, are often overlooked, while they might actually be most urgent. They deserve extra attention in urban planning and design. Therefore, this graduation project will shine a light on the postwar neighbourhoods of Rotterdam - and Pendrecht in particular.

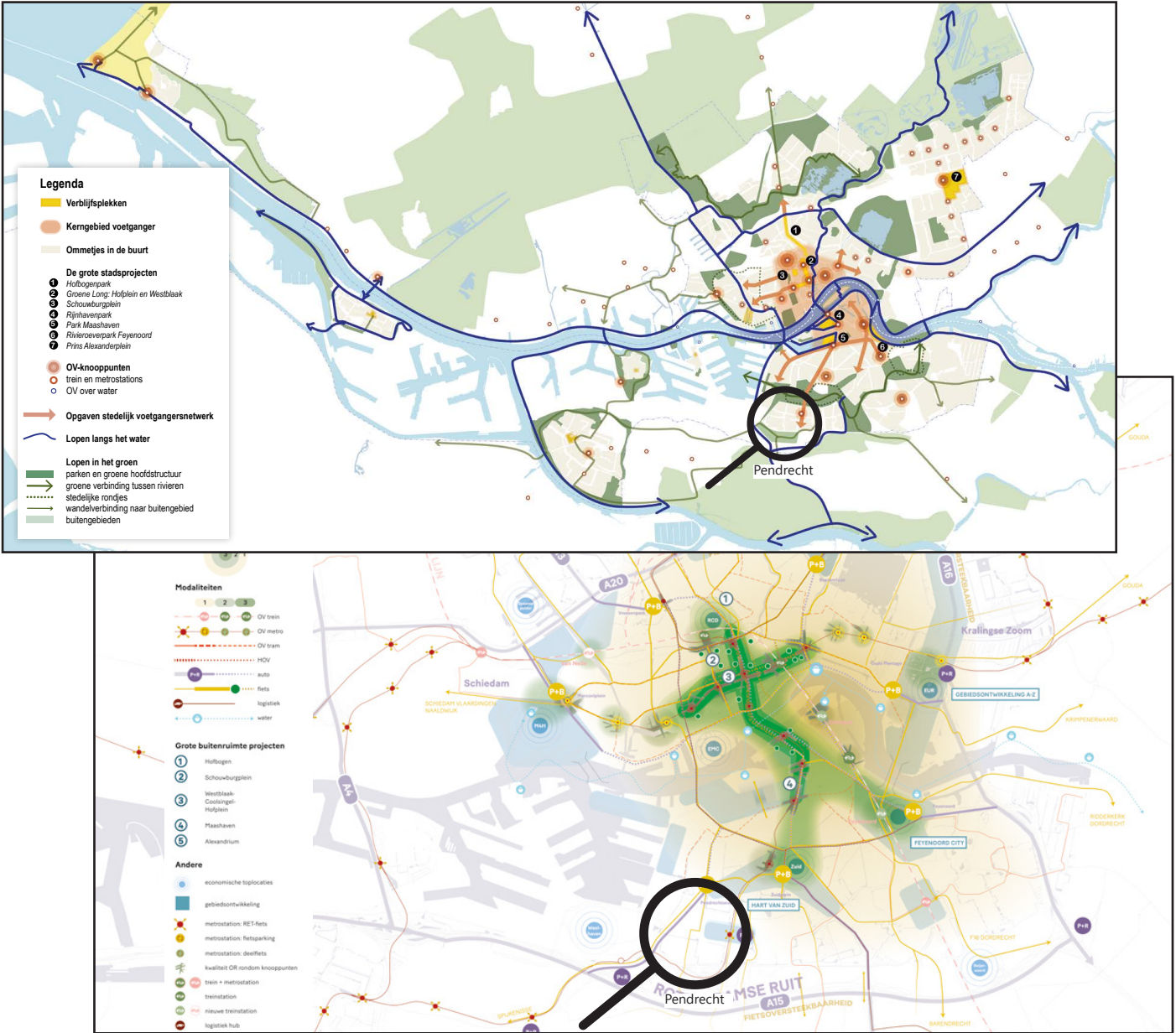


1.5 Shifting priorities in Rotterdam's mobility approach (Gemeente Rotterdam, 2020: 16)

1.6 >
Lack of attention for postwar neighbourhoods in visions from the municipality.

Above: Rotterdam Loopt 2025 (Gemeente Rotterdam, n.d.: 41; adapted by author)

Below: Rotterdamse Mobiliteitsaanpak (Gemeente Rotterdam, 2020: 22; adapted by author)





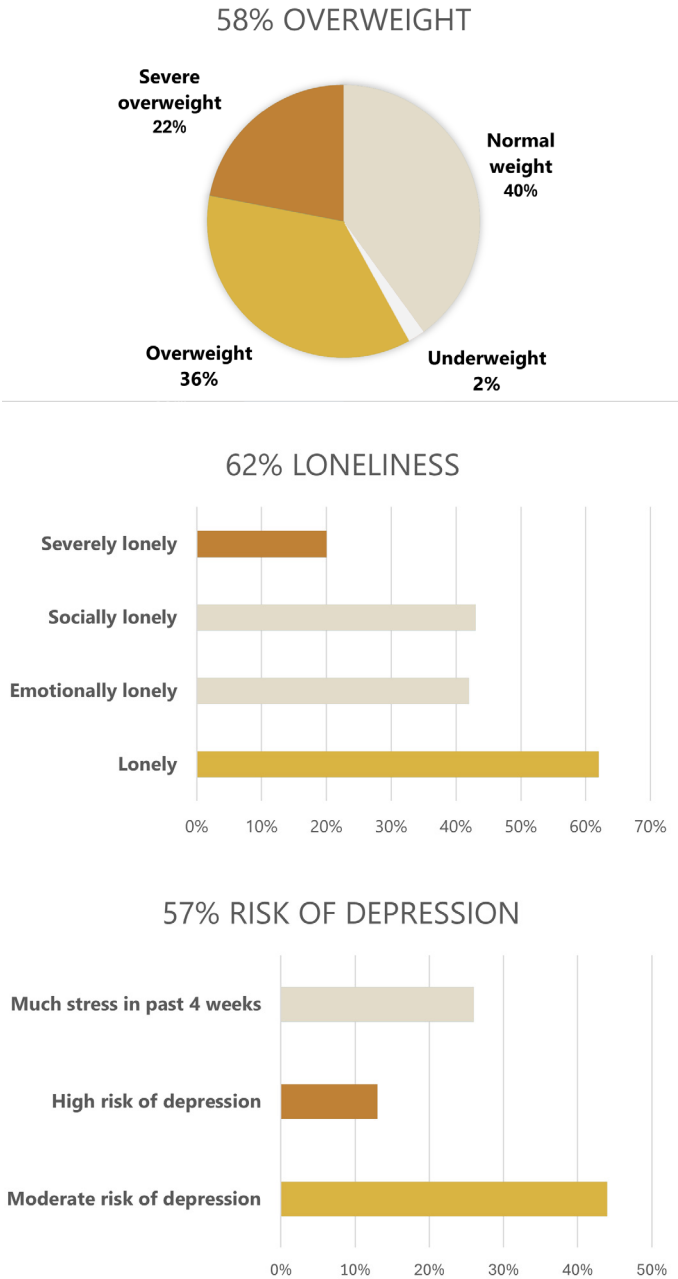
1.7 The status quo of postwar neighbourhood Pendrecht

The postwar neighbourhood

Postwar neighbourhoods are usually not seen as joyful places, rather as problematic areas. They often deal with social problems, anonymity and criminality as a result of their modernistic urban structure in combination with the low social-economic status of its residents (Bakker, 2021). Monotonous architecture is alternated with large plains of low quality green space – a nobody’s land, see figure 1.7. Moreover, the spacious, orthogonal set-up of the postwar neighbourhoods provides a lot of space for cars, which are dominating the streetscape.

While actually, postwar urban planning was very idealistic. After the second world war, urban designers were trying to create the perfect residential neighbourhood, using the principle of the *wijkgedachte*, as developed by group Bos (Bakker, 2021; Blom et al., 2004). In this way, postwar neighbourhoods were meant to achieve strong social communities and *joie de vivre* for their residents (Hage & Zweerink, 2005).

However, when looking at the postwar neighbourhood of Pendrecht, these original ideals of joy and collectivity are hard to find. As shown in figure 1.8, almost sixty percent of the residents are overweight, more than sixty percent is suffering from loneliness and more than half of the people living in Pendrecht have a moderate to high risk of a depression.



< 1.8
Indicators for physical, social and mental wellbeing of residents of Pendrecht
(By author, based on Allecijfers.nl, 2024)

THE OFTEN OVERLOOKED POSTWAR
NEIGHBOURHOODS, SUCH AS PENDRECHT, HAVE
DEVELOPED INTO CAR CENTRIC, LOW QUALITY LIVING
ENVIRONMENTS, RESULTING IN POOR PHYSICAL,
SOCIAL AND MENTAL WELLBEING OF THEIR RESIDENTS.

1.2 METHODOLOGY

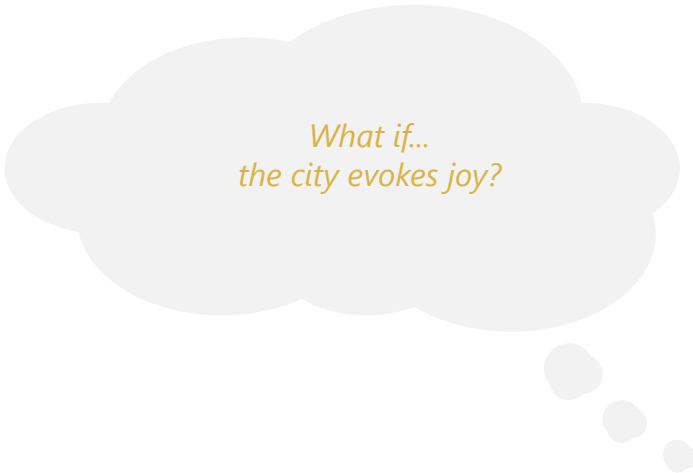
In this research, I will explore an extreme scenario, as an eyeopener, to rethink the status quo. The problems of the current situation are clear, but society does not seem willing to change.

Therefore, I am designing an utopia. One could see it as a continuation of the ideology that was present in the postwar urban design of the wijkgedachte. The utopia will answer to an 'what if' scenario, which means that the design might not be directly applicable to our cities at this moment. However, it might open a new way of thinking and it might happen in a couple of decades, but it is not happening automatically. I am designing for an ideal world, after all.

The project is design-driven with additional theoretical and analytical research conducted when needed. Research by design will be the main method.

Aim

The aim of this graduation project is to create a radical redesign for an exemplary postwar neighbourhood (Pendrecht) in which a joyful future for its residents is achieved.



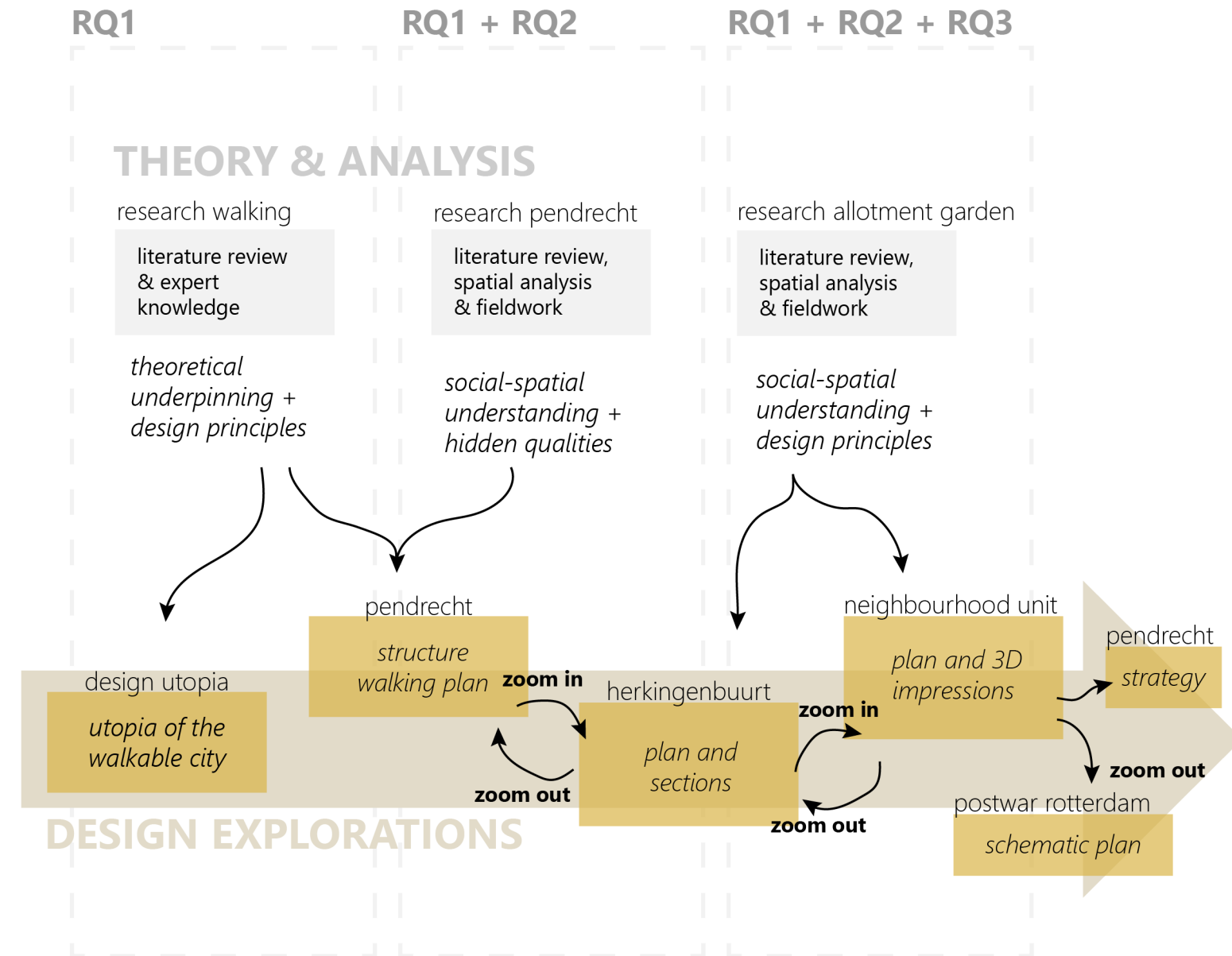
*What if...
the city evokes joy?*

HOW CAN THE RADICAL REDESIGN OF A POSTWAR NEIGHBOURHOOD LEAD TO A JOYFUL FUTURE FOR ITS RESIDENTS?

RQ1: In what way can the urban environment evoke joy?

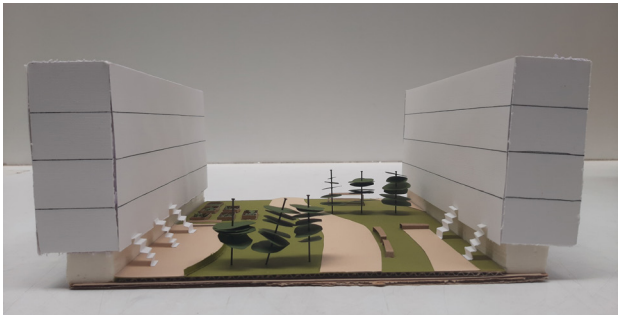
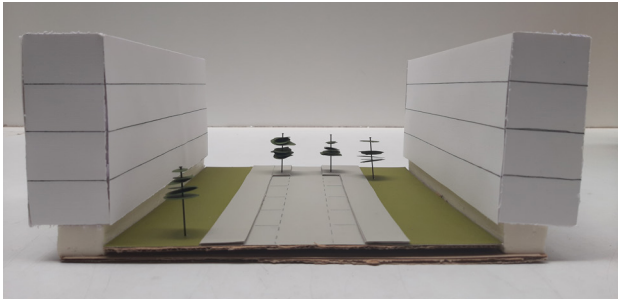
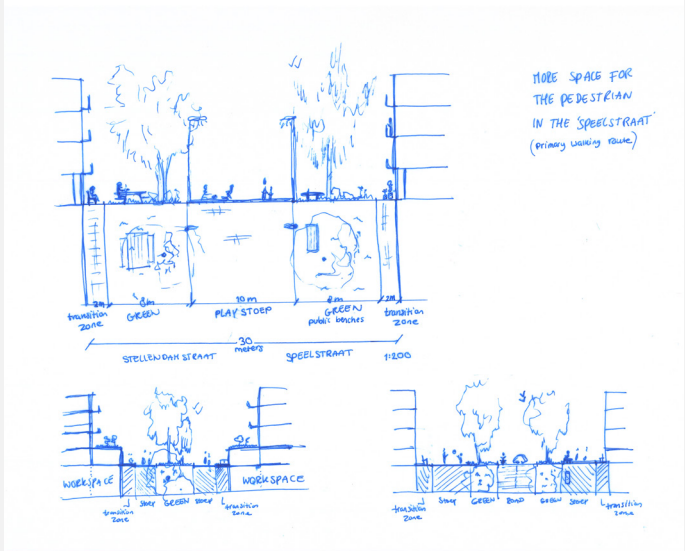
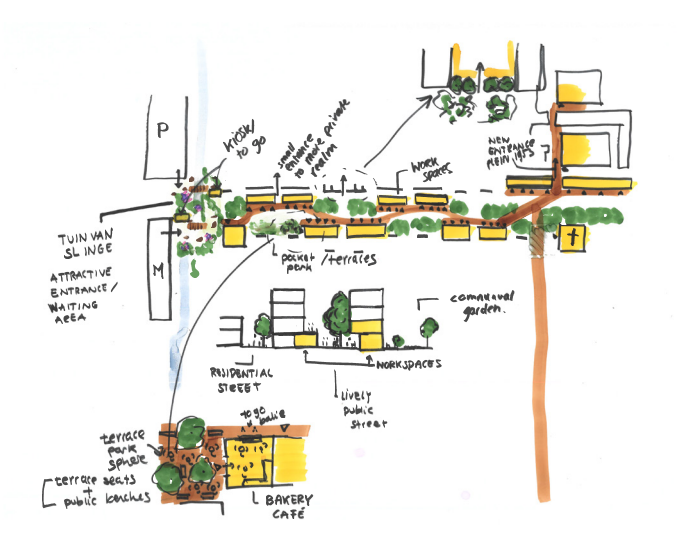
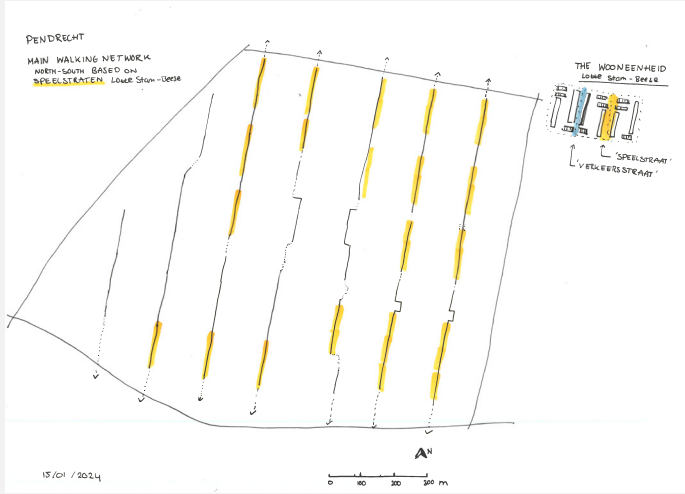
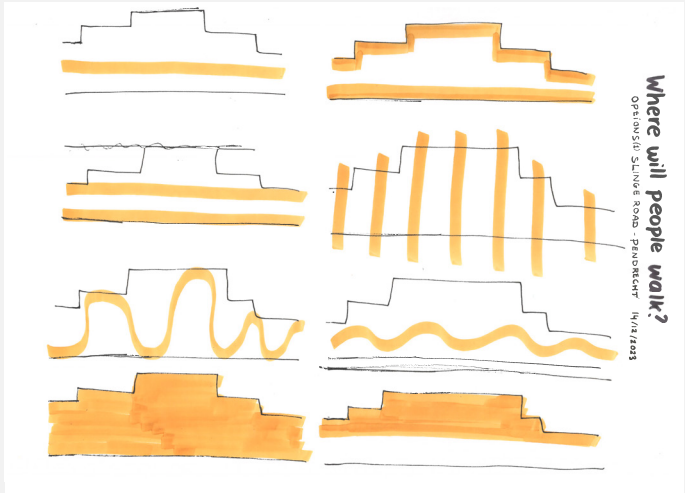
RQ2: What are the (hidden) qualities of a postwar neighbourhood?

RQ3: How to give the large amount of public space to the residents?

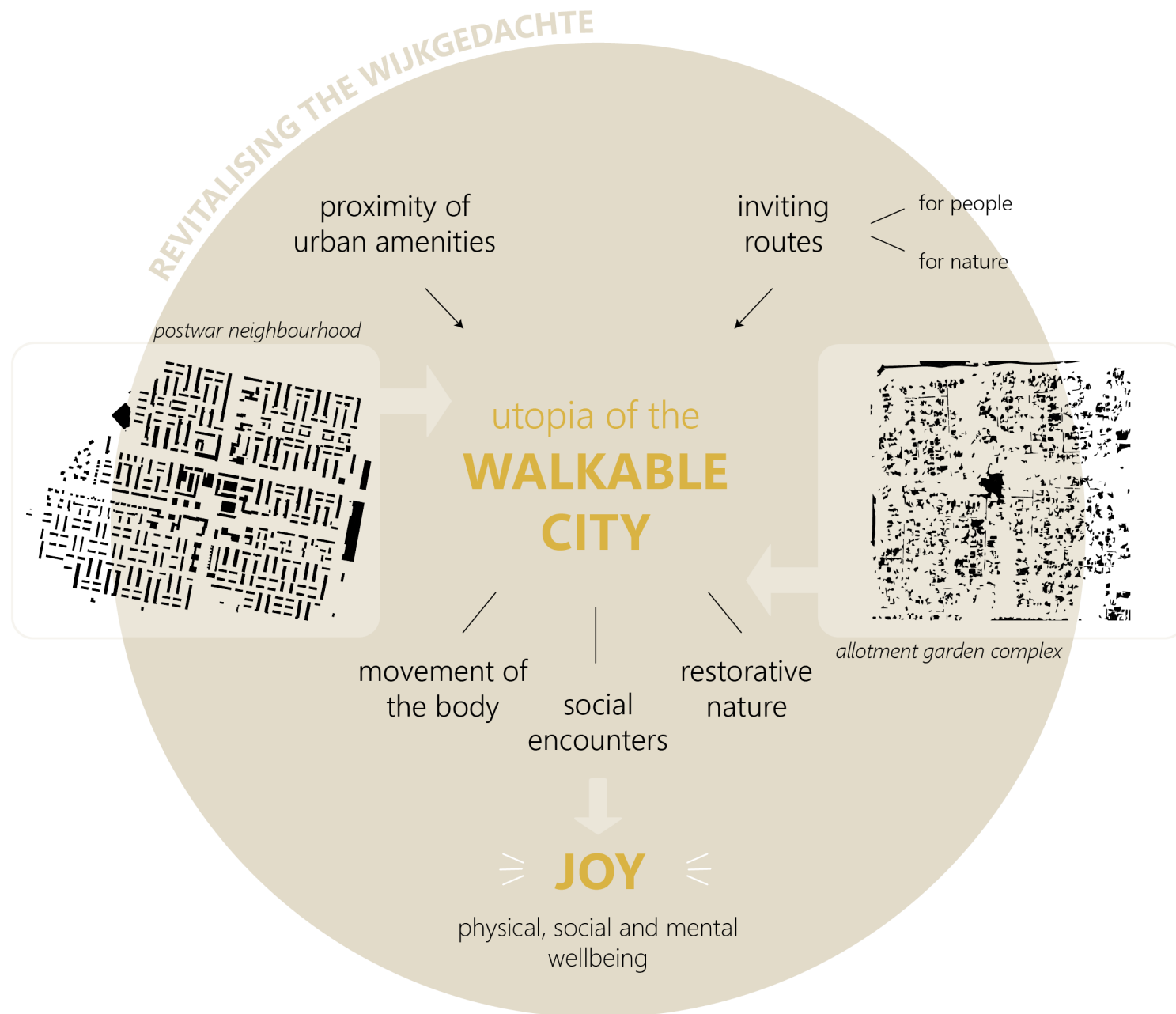


Research by design

The main method of this graduation project has been research by design, since the approach is very explorative. In practice, that means a lot of sketching, generating options, trying out principles and inevitability, rejecting most of the options. This page shows a handful of design explorations made during the process; a small selection after all. Next to sketching, model making is also used to study different design options, see figure 1.9.



1.9 Model making as a 'research by design' method



1.3 CONCEPTUAL FRAMEWORK

The concept of this project lies in the relation between walking and joy. The central notion is that a walkable city will result in a joyful future for its residents. To not be limited by the status quo and to explore the full potential of this relationship, the project will start with envisioning a utopian city, in which walking is the most normal thing to do.

Relation walking and joy

The positive effects of walking are widespread and are clustered in three main categories. First of all, walking is the primal movement of the human body. It is a physical exercise to stay fit and it has positive effects on the brain. Next to that, slowing down allows for social encounters to happen. It lets one feel the warmth of people around. Furthermore, walking in nature has a restorative effect on the mind. Nature, small or big, makes us feel good and brings out the good *in* us. Therefore, walking increases the social, mental and physical wellbeing of people. The combination of these three is defined as joy.

Needs of the pedestrian

The walkable city requires on the one hand proximity of amenities. Daily urban amenities should be available within walking distance. Therefore, the project focusses on the scale of the neighbourhood. On the other hand, the routes to and from these amenities have to be inviting, both for people and for nature.

Revitalising the wijkgedachte

This project will look into the postwar neighbourhood, an urban type that is often overlooked in urban planning for walking. While actually, this type of neighbourhoods was designed in an idealistic way, based on the *wijkgedachte*. After the war, urban designers were striving to build strong communities and achieve *joie de vivre* in their neighbourhood designs.

Simultaneously, the project will dive into the typology of the allotment garden complex. The system of close-knit paths along diverse green gardens naturally makes a pleasant walking environment. By overlaying the fabric of the postwar neighbourhood with the fabric of the allotment garden complex, this project aims to revitalise the *wijkgedachte*.



*'And what are our needs for happiness?
We need to walk,
just as birds need to fly.'*

Mayor Peñalosa,
in Montgomery (2015: 4)

'We were born to move.'

- Montgomery, 2015: 187

For four million years humankind has been walking to move from A to B (Montgomery, 2015). Therefore, Hemel (2023) describes walking as the primal movement of humans. Using walking to get around can feel very powerful, because you can just do it, all by yourself (Hemel, 2023). The act of walking is based on the physiology of the human body, on a slow pace, using all your senses (Gehl, 2010). While walking, you become part of the city or the landscape and you are in balance with the surrounding environment (Hemel, 2023; Urhahn, 2017).

Walking can also be seen as the most just transport mode. Everyone could do it, no matter the income, education level or cultural background. Walking makes everyone equal, as long as amenities and walking routes are equally spread over the city. Moreover, when walking, you open yourself up to others (Urhahn, 2017). Te Brömmelstroet (2023) describes this as the potential exposure to diversity. This means that walking is an in between phase, from the social bubble of your origin to the social

bubble of your destination. During the walk you can chat with a diversity of people from outside your bubble.

Intentionally slowing down, as Hemel (2023) calls it, is the most sustainable way of moving, using the power of your own body. So, in order to combat the complex, global crises of climate change, biodiversity loss and depletion of raw materials, we might not need any sustainable development (Hemel, 2023). Perhaps we need to take a step back and move around like humans already did millions of years ago.

This chapter introduces walking as the starting point of a joyful city. It will start with an understanding of how the city got to its current car centric mobility system. Next, the relationship between walking and joy will be explored, to consequently propose the utopia of the walkable city. The chapter ends with an overview of the needs of the pedestrian.

2.1 MOBILITY IN ROTTERDAM

A historical perspective

Frank Schipper (2023), a technology historian, points out that the development of mobility in Rotterdam has been shaped by three main factors: the presence of the port, the bombardment in the second world war and the river the Maas.

The port and the river

In the port area the focus of mobility still lies on trucks and motorways, whereas the city is slowly shifting the focus towards slow mobility. The city of Rotterdam was first settled only on the North side of the river. As the port expanded, working class neighbourhoods were constructed on the South bank. Crossing the river had to be done by ferry, until the first bridge was built in 1878. Now, three bridges and a tunnel connect both sides of the river. Still, the Maas is a large size barrier, that makes distances from the one side to the other rather long, see figure 2.1.

The city centre

The bombardment of the city centre in the second world war has left clear marks to the city of Rotterdam. During the reconstruction, the city has been build up in a car centric way, with a large scale road network, as shown

in figure 2.2. The vision for the centre was to be a business district and the residential neighbourhoods were planned around it, connected with large linear roads. The centre was set up with some 'pedestrian islands' that could be reached by car. One example is the Lijnbaan from the architects Van den Broek & Bakema, as shown in figure 2.2. This shopping street was designed to be for pedestrians only, with streets for logistics at the back. In the 1950s -60s, a pedestrian street was a revolutionary idea.

In 2008, the municipality came with the vision for the centre as a 'City Lounge', which means adding qualities to make the centre attractive to stay. An example of this municipal project is the Coolsingel. When constructed after the war, this road had six lanes and two parking rows in the middle. Now the Coolsingel is redesigned into a pedestrian friendly boulevard. Another example of an intervention is the Binnenrotte. As the name says, this used to be the river Rotte, flowing through the city. For the construction of the railway viaduct the waterway is muffled in the 1880s. A century later, since 1995, the Binnenrotte is free again, because of the rail tunnel. It is shaped completely as a pedestrian zone. Bit by bit extra housing is added now around the Binnenrotte, to make the city centre an area for living again.

The residential neighbourhoods

The prewar neighbourhoods around the centre, e.g. Oude Westen, have a small grain set up. They naturally have few space for cars and a close-knit pedestrian network. The postwar neighbourhoods in Rotterdam South, such as Pendrecht and Zuidwijk, have a completely different urban fabric. They were built in times of modernistic urbanism and have a lot of space between buildings. Large car roads cross these neighbourhoods and connect them to the city centre. In the 1980, *woonerven* formed a counter reaction to the car centric city planning. These neighbourhoods combine cars and pedestrians in one shared space. The wide availability of cars also resulted in the planning of cities purely for meant for living. People working in the city of Rotterdam, could be living in a residential city like Spijkernisse.



2.1 Pedestrians crossing the barrier of the large river
(Stadsarchief Rotterdam, 1920-30)

Trends in mobility

Schipper (2023) points out that there is still a growing number of cars in the Netherlands, but the amount of kilometres travelled is slowly decreasing, especially in cities. Shared mobility is upcoming, but it will -in Frank Schipper's estimation- not go very fast, since its success is depended on political willpower. The pedestrian congress, WALK21, that was organised in Rotterdam in 2021, shows an increased focus on pedestrians, at least in the centre of Rotterdam. At the same time, cars will be partially restricted in the city centre. As a result of the large set up that was made during the reconstruction period, there is a lot of space in the city where cars, bicycles and pedestrians can be combined. A complete restriction of cars in the city of Rotterdam is therefore unlikely.

Mobility behaviour

Schipper (2023) describes that mobility behaviour is based on routines and therefore will not change easily. You choose for a certain modality because that is what you always do. An experiment, which is limited in time and reversible, could break through these patterns. Experimenting with another way of movement can give people a 'mind expansion'. Afterwards, they can evaluate whether it feels better or not. Conducting an experiment might lead to a sustainable mobility change for the long term (Schipper, 2023).

Students and young urban professionals are already very sustainable in their mobility behaviour. However, Schipper (2023) explains that as soon as there will be children and groceries to transport, people feel like they need a car. This is what Schipper (2023) calls Consumer logistics. Consumers will not conduct an experiment to feel whether they really need a car or not. It is a psychology they have in their mind. The 15 minute city concept is also looking for an answer to this psychology. When urban design makes it easy to do small groceries multiple times a week, people might feel less in need of having a car.

Another aspect of mobility behaviour is comfort. From policy as well as from the consumer themselves, comfort is seen as the ideal (Kluiters, n.d.). Technological advances such as thuisbezorgd, a car and an escalator make things more comfortable. Kluiters (n.d.) describes that we will always look for the seemingly most comfortable way. Even though it is not the most healthy and sustainable way.

Schipper (2023) sees a role in urban design to create boundary conditions: what kind of behaviour will you facilitate for? Thaler & Sunstein (2008) state that design can nudge people to make choices that make them healthy and happy. Te Brömmelstroet (2023) stresses the importance of language to change mindsets and consequently change behaviour.



2.2 Left: Shopping street Lijnbaan as a 'pedestrian island' in the car centric city (Fototechnische Dienst Rotterdam, 1953)
Right: Crossing Blaak and Coolsingel (Fototechnische Dienst Rotterdam, 1961)

2.2 RELATION WALKING AND JOY

The relation between walking and joy is manifold. Walking has many positive effects that boost the physical, social and mental wellbeing, as summarised in figure 2.3.

Physical activity and the brain

First of all, walking is a physical exercise and is therefore directly related to physical wellbeing (Urhahn, 2017). Next to that, active movement stimulates the brain and when taking a walk for a minimum of twenty minutes, it has proven positive effects on the brain. That is what the Hersenstichting (n.d.) is promoting with their app *Ommetje*. Neuropsychologist Eric Scherder explains that physical exercise results in being more productive and creative, having more energy and sleeping better, having a better memory and being in a better mood with less stress (Hersenstichting, n.d.). These positive effects of walking relate to the mental wellbeing.

Social encounters

Walking more also means using the public outdoor space more. Sharing space with fellow citizens, when moving on a human pace, will make social encounters possible (Te Brömmelstroet, 2023). This effect can be strengthened by *triangulation*, as urbanist and sociologist William Whyte calls it. Triangulation means placing street furniture like benches

close enough to each other, to encourage the users to have a chat (Montgomery, 2015). Social encounters, made possible by walking, increase social safety, social cohesion and the feeling of belonging and thus result in social wellbeing (Kluiters, n.d.). Actively using the public outdoor space is also important for the social wellbeing of children. For them having space to play outside provides a scene to have social contact with other children (Kluiters, n.d.).

Inclusivity and equality

Enrique Peñalosa, former mayor of Bogotá, describes walking as a means to an inclusive and equal city (Montgomery, 2015). Not everybody can afford to drive a car, but walking does not require much more than your own body. It can therefore give everyone the feeling of being free and capable, which leads to mental wellbeing (Montgomery, 2015). Walking is also an exposure to people from outside your social bubble. The public outdoor space provides a scene to walk and talk with people that have very different backgrounds than yourself. This is what sociologists call a potential exposure to diversity (Te Brömmelstroet, 2023). As a result, not only the social wellbeing will be boosted, but the warmth of people will also be beneficial for the mental health (Montgomery, 2015).

Contact with nature

Apart from the social benefits, walking also has a healing effect. Philosopher Søren Kierkegaard even states that walking works like a drug (Montgomery, 2015). When walking in nature, a calming and restorative effect is reinforced. Montgomery (2015) describes that contact with nature is not only good for us, but it also brings out the good *in* us. So, the healing touch of nature, makes walking beneficial for our mental wellbeing. Moreover, the fact that nature can make us friendlier and more helpful, also results in a boost of our social wellbeing.

'We can literally walk ourselves into a state of well-being.'

- Montgomery, 2015: 188

Intentionally slowing down

When talking about walking Hemel (2023) uses the term 'intentionally slowing down'. He describes that walking is not only slowing down the way of movement, but it also brings more rest and peace in the rest of your life. Your agenda will get less busy and it allows you to have more meaningful experiences (Hemel, 2023). In a society where everybody always seems to be hasting from one activity into the other, on a fast pace, not wanting to lose any time in traffic, intentionally slowing down can truly improve the mental wellbeing.

The walking experience

When walking, you use all your senses to experience the urban landscape (Urhahn, 2017).

You can do so, because you are walking on a slow pace, a pace based on the human body (Gehl, 2010). Walking brings you in balance with your surroundings (Hemel, 2023) and seeing the beauty of the surroundings is one of the ways to happiness, according to Peñalosa (Montgomery, 2015). Therefore, Gehl (2010) advocates for '5 km/h architecture', where a rich variety of things is happening within the vision field. This also means bringing back the human scale in the urban landscape. So, public spaces should be rather small to be pleasant and lively (Gehl, 2010). Experiencing rich and beautiful surroundings during a walk will contribute to the mental wellbeing.

A healthy urban environment

Lastly, walking does not have negative side effects for the environment. There will be no air pollution or noise pollution, as with car mobility. A clean and quiet urban environment will be beneficial for the physical wellbeing, but it will also encourage social encounters. Urban designer Donald Appleyard has shown that social interactions are more likely to happen on streets with light traffic than on streets with heavy traffic (Montgomery, 2015). So, the absence of car mobility, as a result of more walking, also relates to social wellbeing.

To conclude:

'Walking has so many benefits that you wish everybody did it more often.'

- Urhahn, 2017: 64

Walking

<2.3
The relation between
walking and joy as
found in literature



Joy

2.3 THE UTOPIA OF THE WALKABLE CITY

I am designing a utopian future for the city in which walking is the most natural thing to do. The walkable city will be designed with people's happiness and quality of life as the central focus. Urban design prioritises human-scale environments, mixed-use development and attractive green public spaces. Together, the urban environment will promote social interaction, physical activity and mental wellbeing. In other words, it will be designed to evoke joy.

In the utopia of walking, people will live more locally, in close proximity to their destinations. The starting point is therefore the scale of the neighbourhood, in which all daily amenities will be available. Walking will not only be the preferred mode of transportation, but also a delightful experience. The walking routes will be pleasant, lively and green. Social cohesion will be strong in the neighbourhood. So, the walkable neighbourhood will be a harmonious urban environment where people can live, work, play, meet and relax, while simultaneously nature can thrive.

Residents of the walkable city deliberately choose for a walking lifestyle, because of the benefits it brings for the physical, social and mental wellbeing. As societal values will be evolved towards sustainability, health

consciousness, and urban liveability, walking will become increasingly embraced as a cultural norm. This will go hand in hand with a changing economic system. The walkable city will have a post-growth economy. The focus will shift from endless consumption towards wellbeing for people and planet. As such, the walkable neighbourhoods will have amenities that promote wellbeing, such as access to nature, local food production, community spaces, share- and repair cafés and educational programmes for the walking lifestyle.

Furthermore, in the utopia of walking time will get a different meaning. Walking is slow, so it takes time. The wellbeing economy will result in time affluence, the feeling of having sufficient time for joyful activities. When haste and hurry do not exist, walking is a perfect, calm way to get around.

Since the utopia is built around the concept of walkability, cycling will play a secondary role in the neighbourhood and will mainly be used to occasionally cover longer distances. Therefore, cyclist will be a guest in the walkable neighbourhood. Likewise, shared cars will behave as a guest and will mostly keep to the edge of the neighbourhood, where they can park in mobility hubs. The public transportation system will complement walking. Bus stops

and metro stations will be strategically located withing walking distance in the neighbourhood, reducing reliance on private cars for transportation in the city.

In conclusion, the utopia of the walkable city will bring a joyful future for its residents. When the neighbourhood is designed for walking, people will have a more healthy lifestyle, neighbours will have more heartwarming social encounters and people will feel more calm and relaxed. By prioritising walking, shifting towards a local, wellbeing economy and creating social-ecological networks, cities will be able to create more resilient, liveable and joyful urban environments for generations to come. The following pages elaborate on the elements that have to be present in the walkable city.



Elements of the walkable city

Walkability

Walkability is the starting point of the utopia: creating an environment where walking is not only the preferred mode of transportation but also a delightful experience.



Public space for people

Activate the public space and give the public space to the people, because people come where people are. A critical density of human life is required for a lively neighbourhood.



Proximity of amenities

Provide a diversity of daily amenities at walking distance (15 minutes).

Connection to nature

Create connections to diverse nature for restorative and recreative walks. This will simultaneously boost the biodiversity.



Community building

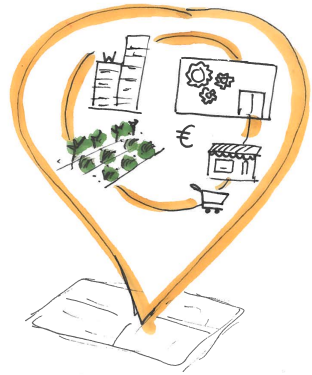
Strengthen the social cohesion, for example by providing a social living room and community gardening.



Social encounters

A key element in the utopia is having social interactions with a diversity of people from the neighbourhood.





Local economy

e.g. local food production, local businesses, neighbourhood stores, social services, co-workplaces, arts and culture.



Post-growth economy

The walkable city has a wellbeing economy (post-growth), meaning that the focus shifts from consuming to shared resources, repair hubs and education for sustainability.

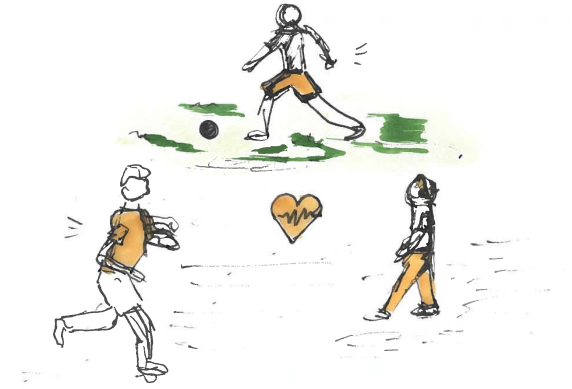


Time affluence

Time affluence is the feeling of having sufficient time for joyful activities. This can be achieved by shorter working days or shorter working weeks.

Physical exercise

Stimulate physical health through urban sports, playing outside and recreative walks.



Accessibility for all

Prioritise walking, in symbiosis with public transport. Provide parking hubs at the edges of each neighbourhood. Accessibility for vehicles in case of emergency is guaranteed.



Attractive surroundings

Create rich walking environments, with lively plinths, street furniture, natural paths (unpaved), pleasant signposts (in minutes of walking) and sufficient street lighting.



2.4 WHAT DOES THE PEDESTRIAN NEED?

In their book *Loop!*, Molster & Schuit (2020) propose a set principles to design a walk friendly environment, as shown on this page. They can be clustered into three groups: proximity of urban amenities; inviting routes for people and nature; and more space for walking, less space for driving. These design principles will function as a starting point for the structure walking plan in chapter 4.

'Neighbourhoods cannot be - and should not attempt to be- self-sufficient in work and services. But there is tremendous value in increasing the proportion of daily and weekly needs that can be satisfied locally.'

- Barton et al., 2009: 89

Proximity of urban amenities

02

Many and different destinations within walking distance

10

Rich facades, lively plinths

03

Symbiosis between public transport and walking

Inviting routes for people and nature

01

A complete and coherent network of walking routes

06

Findable and accessible

08

Walking comfort

09

The senses of the walking human

More space for walking, less space for driving

04

Less cars, low velocity

05

Crossings are for pedestrians

07

More space for pedestrians

The economy of urban amenities

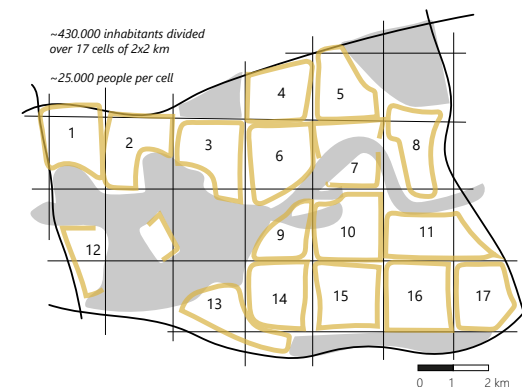
In order to provide proximity of urban amenities, as the design principles on the previous page suggest, it is important to understand how the economy of urban amenities works. Not all types of amenities can be available within an acceptable walking distance.

Moreno et al. (2021) describe that the essential urban social functions that should be available in a 15 minute city are living, working, commerce, healthcare, education and entertainment. Rotterdam has a variety of amenities to offer, but not all of them can be available within a neighbourhood. There is a critical mass of people needed to support certain urban functions.

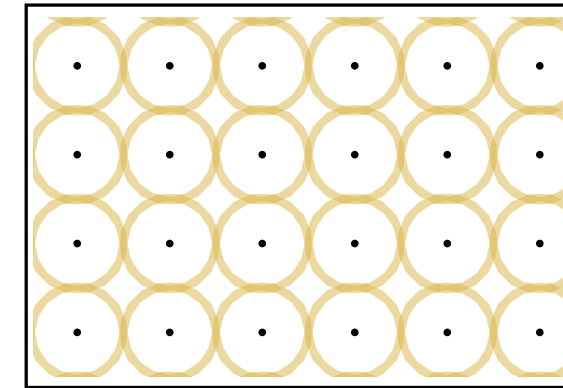
Inside the ring road, Rotterdam has approximately 430.000 inhabitants. If you divide this area (excluding port and large green-blue structures) into cells with a radius of 15 minute walking, the mass per unit comes down to an average of 25.000 people, see figure 2.4. To give an example, a pharmacy will need a critical mass of 6.600 inhabitants, while a swimming pool needs 77.500 residents, according to the reference norms for urban amenities from Gemeente Den Haag (2021). So, each walkable unit could be provided with multiple pharmacies, but a swimming pool could only

be available for a service area of three units together.

A combined analysis of the reference norms of Gemeente Den Haag (2021), Gemeente Rotterdam (2021) and CBS (2021) has been conducted to get a better understanding of the economy of urban amenities, see appendix A. The conclusion is that there is a hierarchy of urban amenities, as shown in figure 2.5. The first set of amenities is available in every neighbourhood and can thus be reached within a 15 minute walk. These are mainly daily facilities. At district level, more functions become available: the weekly amenities, that can be reached within a 15 minute bike ride or a 45 minute walk. On the highest scale level, at 5 to 10 kilometres distance, are mainly functions in the category of entertainment, that will not have to be reached on a regular basis.



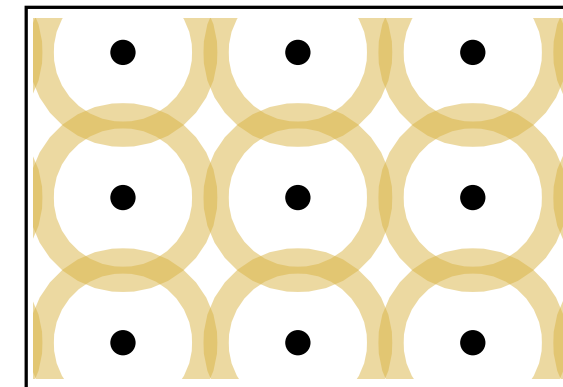
2.4 'Mass' of people per 15 minute unit



DAILY NEIGHBOURHOOD

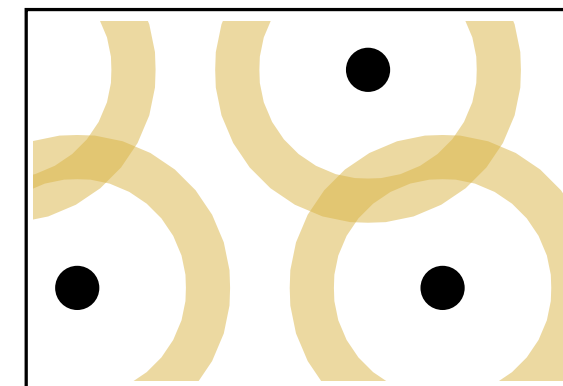
e.g. primary school, general practitioner, playgrounds, supermarket, café, metro station

<2.5
Hierarchy of urban amenities,
based on the critical mass of
inhabitants needed to support
them



WEEKLY DISTRICT

e.g. library, cultural centre, sport hall, allotment gardens, warehouse, trainstation



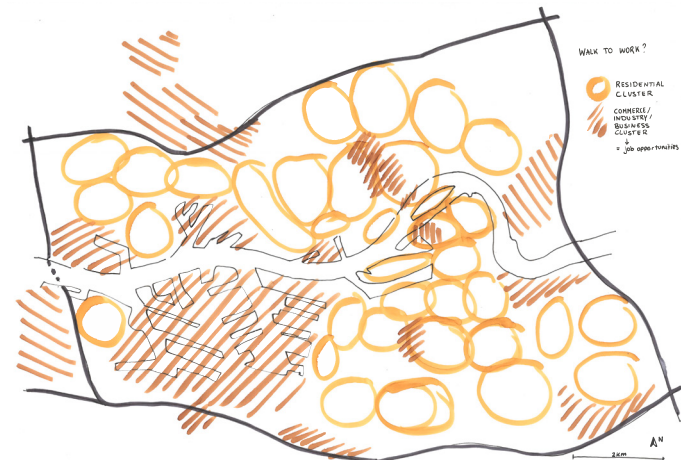
MONTHLY RIVER BANK

e.g. secondary school, poppodium, cinema, nature park, transfer trainstation

Job opportunities

One of the essential urban functions that Moreno et al. (2021) point out is missing in the reference norms mentioned above, namely working. Work is a crucial daily destination and should therefore not be forgotten in the analysis of walkable neighbourhoods. One of the concepts that Moreno et al. (2021) recall is the 20-minute city, which states that job opportunities should be available within a 20 minute walk, bike ride or public transit.

The city of Rotterdam has a wide range of jobs to offer. Figure 2.6 shows the job opportunities in Rotterdam, defined as the clusters of commerce, industry and offices, in relation to the residential clusters. To map the potential to walk to work, an offset is made of 1 kilometre from the perimeter of the work areas. As shown in figure 2.7, almost all residential clusters within the ring road of Rotterdam are within walking distance of job opportunities, if direct and attractive routes will be available.



12/12/2023
2.6 Job opportunities: clusters of commerce, industry and offices

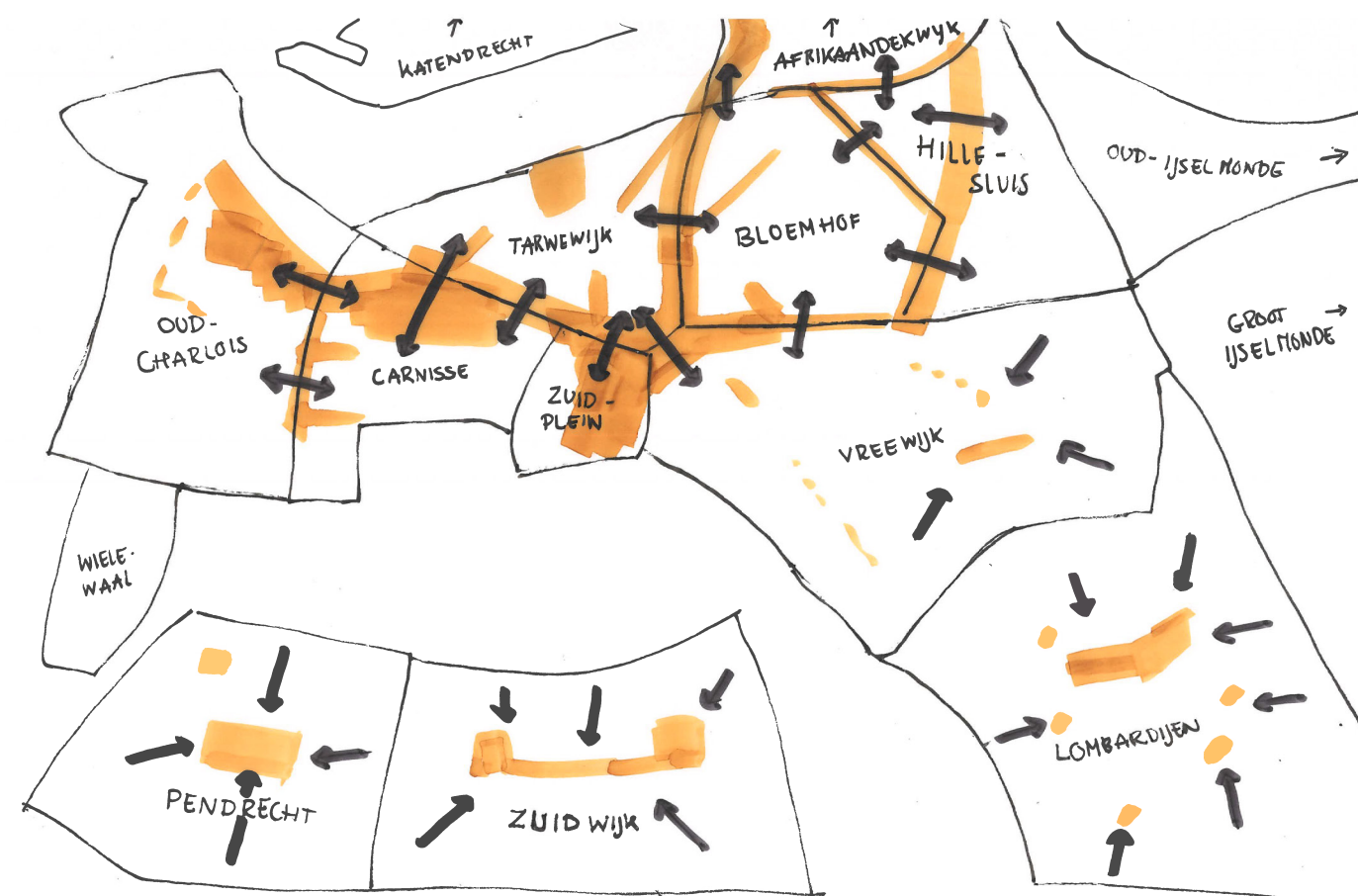


12/12/2023
2.7 Residential areas within walking distance of job opportunities

Distribution patterns

For the analysis of the walkable neighbourhood, the focus lies on the availability of the daily amenities. How the amenities are distributed, differs per neighbourhood type and function type. As visualised in figure 2.8, commercial amenities are generally more spread around in prewar neighbourhoods, with a shop on

every corner. This increases the number of destinations within walking distance and stimulates liveliness around the clock (Molster & Schuit, 2020). Postwar neighbourhoods usually have a central cluster of amenities, facing inward, leaving the rest of the neighbourhood monotonously residential.



2.8 Distribution patterns of commercial functions in the South of Rotterdam

CENTRE, INWARD, CLOSED
EDGES, OUTWARD, OPEN
CURRENT PATTERNS
RETAIL

Defining the walkable neighbourhood

What is walkable?

To reach the daily amenities the following is defined as walkable:

- 15 minutes is the maximum
- 1 kilometre from A to B
- an average speed of 4 km/h

2 x 2 kilometre unit

- If concentric structure:
the radius is 1 km ~ 15 min. walking
- Max. distance in unit (diagonally):
2,75 km ~ 40 min. walking
That is too much for the daily amenities.

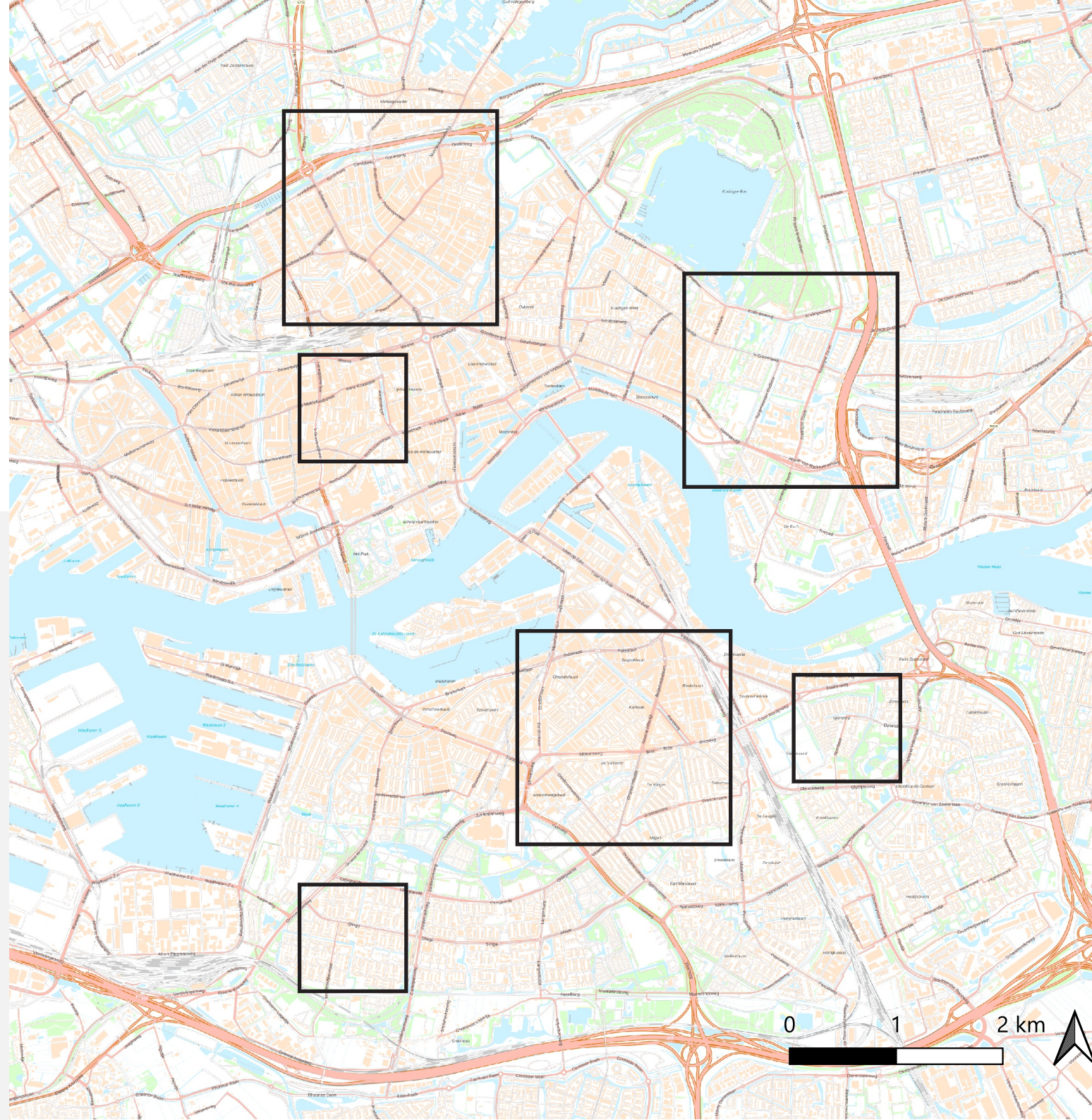
- The district
- ~25.000 inhabitants
(based on the average density of Rotterdam)

The compact city model encourages a certain density to stimulate walkability (Gehl, 2010).

How much extra density would be desirable?

For example + 25%

- ~ 31.250 inhabitants



< 2.9

Examples of the 2 x 2 km unit and
the 1 x 1 km unit on a map of
Rotterdam

Two different sizes of walkable units are compared in figure 2.9. The 1 x 1 kilometre unit is more desirable for the proximity of daily amenities. In the continuation of this project, the walkable neighbourhood is therefore defined as the unit of 1 x 1 kilometre, as described below.

1 x 1 kilometre unit

- If concentric structure:
the radius is 0,5 km ~ 7,5 min. walking
- Max. distance in unit (diagonally):
1,4 km ~ 21 min. walking
That is doable for the daily amenities.

- The neighbourhood
- ~6.250 inhabitants
(based on the average density of Rotterdam)

How much extra density would be desirable?

For example + 25%

- ~ 7.810 inhabitants



'Community building is the norm for a dignified existence.'

Blom et al., 2004: 17
(translated by author)

Introducing the postwar zeitgeist

Pendrecht is built in the early 1950's, when the postwar need for housing required a fast and efficient building process, resulting in monotonous architecture (Bakker, 2021). Pendrecht had to provide housing for the working-class of the fast growing port of Rotterdam. The neighbourhood is therefore very monofunctional, consisting of pure residential areas, with some daily amenities for the residents. The transport of the dock workers was provided by shuttle buses from the port companies, because in the beginning of the 1950's only few people owned a private car, especially in a working-class neighbourhood like Pendrecht (Bosch, n.d.). A lot of the transport within the neighbourhood was therefore naturally done by walking.

In the design of the postwar neighbourhoods, modernism was the guiding theme, as visible in figure 3.1. Urban designers, led by Le Corbusier, were in search of light, air and space, in combination with ample greenery. Fresh air and green were seen as means to cure common illnesses such as tuberculosis. The prewar typology of the closed building block was redeemed for the half open building block, consisting of strips of housing oriented towards the sun (Bakker, 2021;

Hage & Zweerink, 2005). Few private gardens were added, because the working-class were thought not to be able to garden. Only the houses for seniors had a private backyard, since they would have time for gardening. As a result, there is a lot of open space between the buildings. Pavement was expensive, so paved areas were minimalised in the design, leaving a lot of space for greenery. However, planting and trees were also expensive, both in purchase and in maintenance. The public space is therefore poorly designed, with plains of grass and few trees. Low hedges were placed to hold and hide the litter.

This chapter will dive deeper into the postwar neighbourhood, and specifically the neighbourhood Pendrecht. It will start off with the theory of the *wijkgedachte* and its spatial translation. Consequently, the original urban design of Pendrecht by Lotte Stam-Beese will be analysed. This chapter will end with the analysis of the current state of the neighbourhood.



< 3.1
Pendrecht, a modernist
neighbourhood in search of
light, air and space

3.1 THE WIJKGEDACHTE

In post-war urban planning, the philosophy of de wijkgedachte was predominant (Bakker, 2021). The idea was that the neighbourhood would function as the basis for stable, social communities, to prevent the urban society from anonymity and individualisation (Van der Lans, 2021). Community building was already envisioned by Ebenezer Howard in his Garden City model, and in the idea of the 'neighbourhood-unit', developed by American sociologist Clarence Perry. In the Netherlands, the study group led by Ir. A. Bos, director of the Rotterdamse Dienst Volkshuisvesting, has further developed the concept of the wijkgedachte (Blom et al., 2004).

After the devastating second world war, urban designers were looking for a way to bring people together again and to build strong communities (Hage & Zweerink, 2005). The ideal neighbourhood had to be an independent unit of about 6.000 dwellings which could house around 20.000 residents. All daily amenities would be available in a shopping centre in the middle. The neighbourhood would be divided into smaller sub-neighbourhoods with 2.000 to 4.000 residents. The sub-neighbourhoods would have their own cluster of small stores. A variety of housing types would give space for different family sizes and people with different

social-economic backgrounds to live together in the neighbourhood (Bakker, 2021; Hage & Zweerink, 2005). As shown in figure 3.2, the set up of the neighbourhood Pendrecht is based on the principles of the wijkgedachte.

the ideal neighbourhood

6.000 dwellings
20.000 residents
~3,3 people per household

Enough people to sustain a variety of social-cultural, health care, youth and elderly amenities.

pendrecht nowadays

5.700 dwellings
12.770 residents
~2,24 people per household

Smaller households, not enough people to sustain a wide variety of urban amenities.



< 3.2
Pendrecht is designed as one independent neighbourhood with a commercial core (top)

The neighbourhood is divided into four communities with their own shopping street (bottom)

The community stores

Lotte Stam-Beese found that people had to be able to do their daily groceries close to home. Therefore, she designed a small centre for every quarter, see figure 3.3. These centres provided the *buurtwinkels*: bakery, butcher, vegetable store, etc. at walking distance. These small stores would not have to compete with the commercial centre at Plein 1953, which provided different types of stores (Bosch, n.d.). Only the community centre at Zijpe still remains today, see figure 3.4. The arrival of the supermarket, centrally located, has caused the variety of smaller food stores to disappear (Bosch, n.d.).



3.3
The original small shopping streets at each sub-neighbourhood. Only Zijpe has remained.



3.4
Above: Zijpe, 1958
(Fototechnische Dienst
Rotterdam, 1958)

Below: Zijpe, 2024



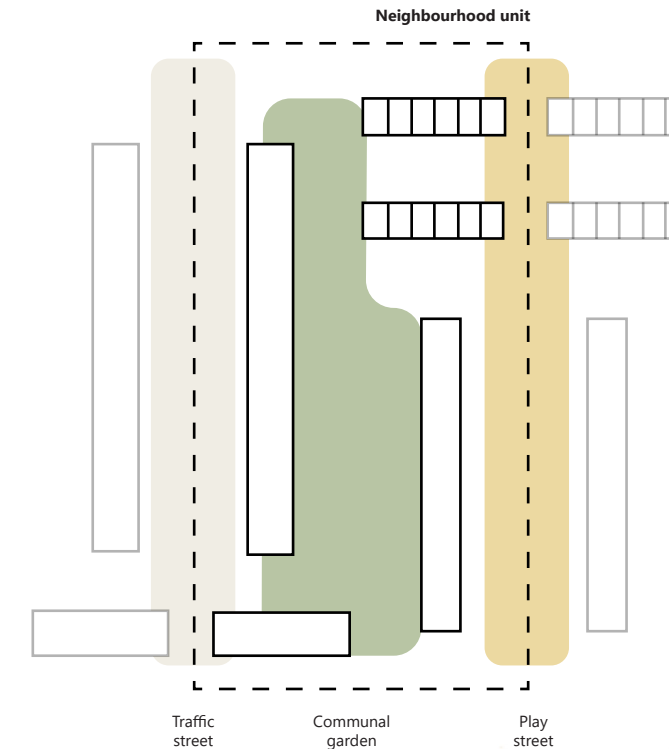
3.2 THE NEIGHBOURHOOD UNIT

The early post-war neighbourhood Pendrecht is an example of the realisation of the *wijkgedachte*. The ideals of Lotte Stam-Beese in the design for Pendrecht were community spirit and *joie de vivre* (i.e. joy). The spatial translation of these ideals was the neighbourhood unit, a building block that has been 'opened up', consisting of ninety houses of diverse types, see figure 3.5. Each block has got two strips of apartments in north-south direction and row houses in the other direction. The idea of Stam-Beese was that a diversity of housing types per unit would evenly spread and mix different groups of residents over the neighbourhood (Oosterhof, 2018).

In the middle of the neighbourhood unit, Lotte designed a communal garden, primarily for the recreation of the residents of the block. Lotte's idea was that the gardens would provide a diversity of greenery, seating and play elements. From the dwellings, there are eyes on the garden, to ensure social safety (Hage & Zweerink, 2005).

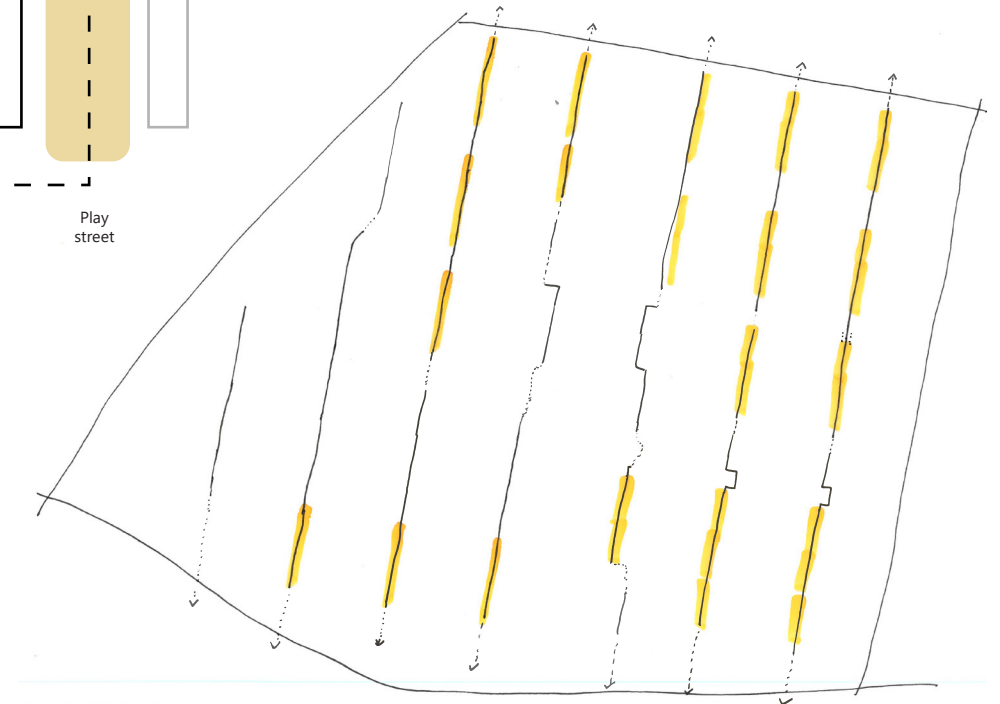
By mirroring the neighbourhood units next to each other, Stam-Beese has created a system of different street types, that stitches the units together, as visualised in figure 3.5. The space in between the apartment blocks with four layers was designed as a traffic street. On the other side, in between the three layer blocks, Stam-Beese designed play streets, with space for playgrounds and car parking, see figure 3.6 and 3.8. She introduced walking paths, to connect the houses and streets with the communal garden, partially through underpasses through the apartment strips, as shown in figure 3.7 (Oosterhof, 2018).

The way that Lotte Stam-Beese has designed Pendrecht, consisting of a repetition of the neighbourhood unit, has resulted in an extensive network of pedestrian zones, see figure 3.9.



< 3.5
The neighbourhood unit, consisting of 90 dwellings, as designed by Lotte Stam-Beese

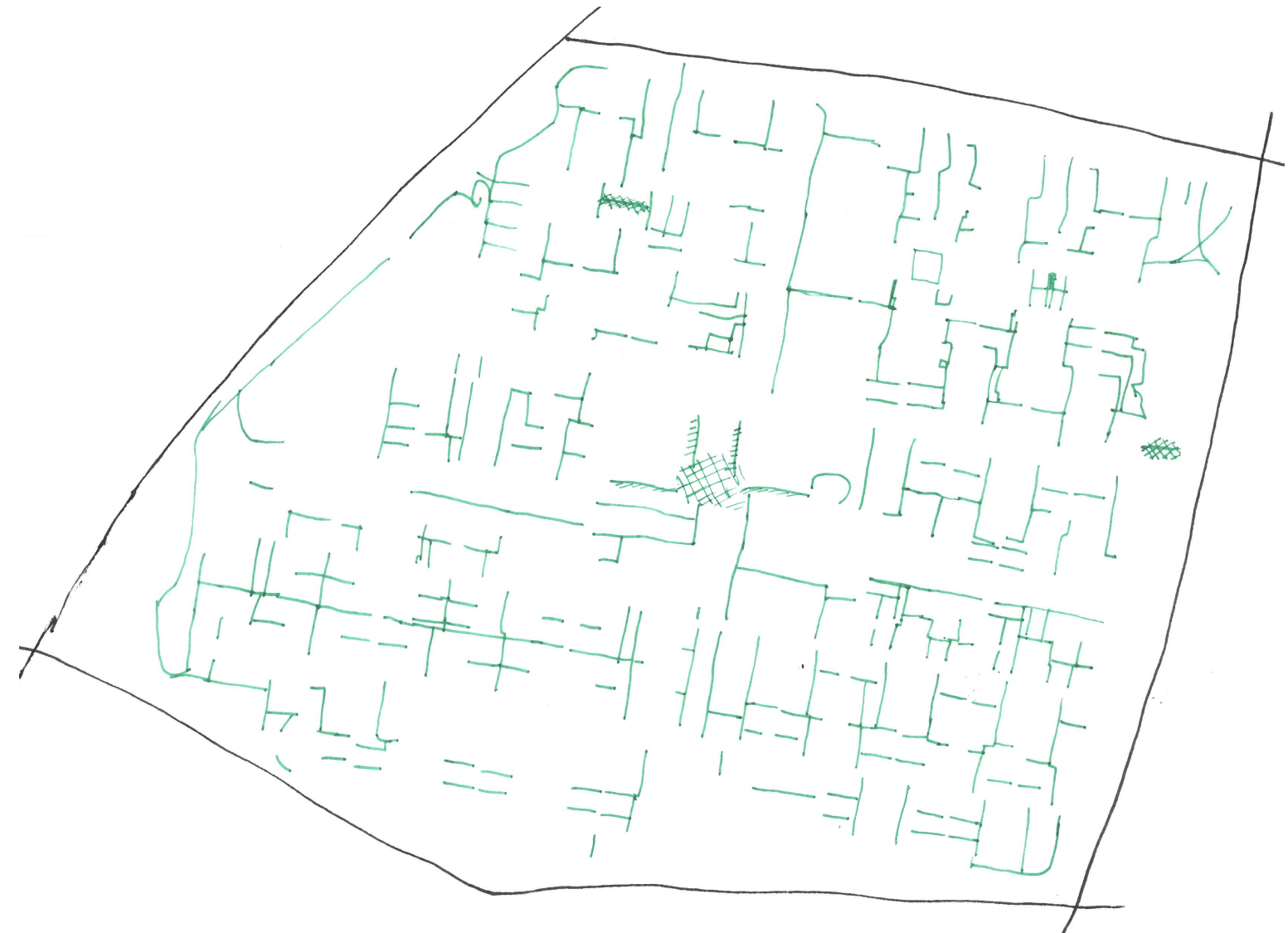
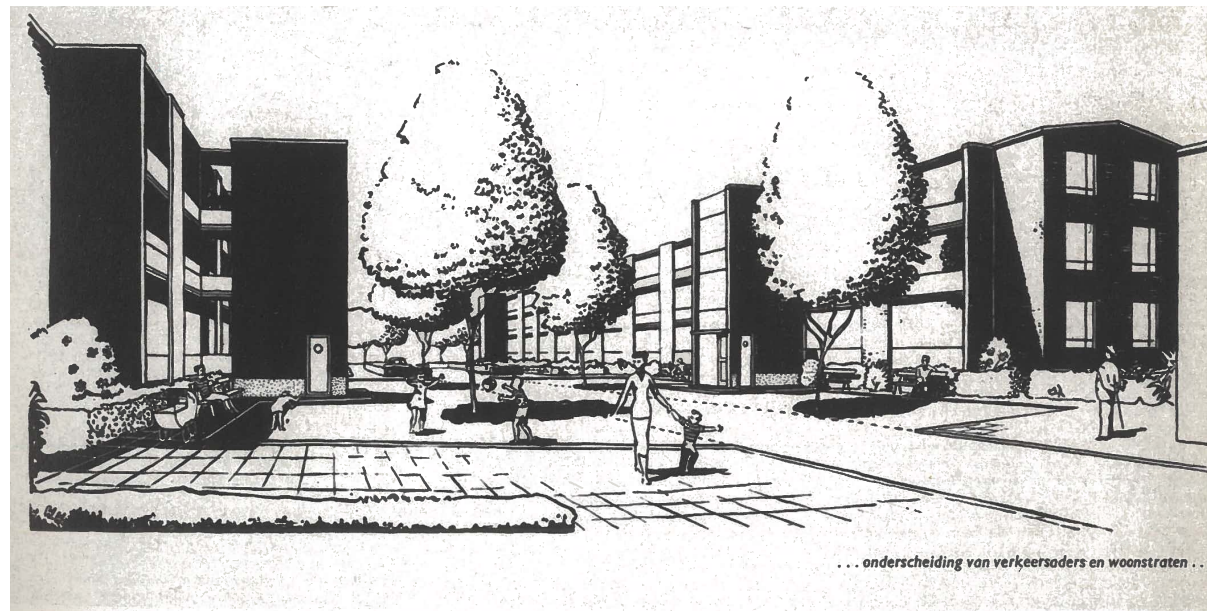
3.6 >
Distribution of play streets over Pendrecht



3.7 >
Underpass through apartment
building connects 'woonpaden'
(Hage & Zweerink, 2005: 158)



3.8 The play street as
designed by Lotte Stam-Beese
(Hage & Zweerink, 2005:159)



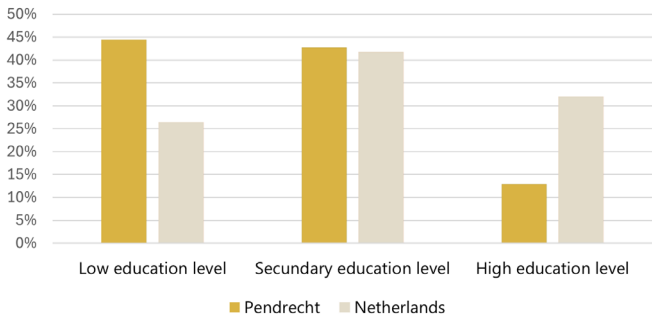
3.9
Network of existing pedestrian only zones:
streets, paths and squares



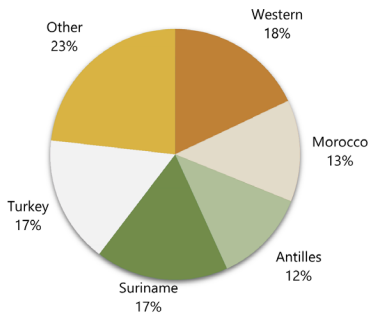
3.3 THE STATUS QUO OF PENDRECHT

Pendrecht is a relatively poor neighbourhood with an average income of €22.000 per inhabitant (AlleCijfers.nl, 2024). The education level is relatively low, as shown in figure 3.10. More than 70 percent of the people living in Pendrecht has a migration background and the variety of backgrounds is large, as shown in figure 3.11. The low social-economic status of Pendrecht has resulted in social problems such as criminality and anonymity (Bakker, 2021).

In order to improve the liveability in the neighbourhood, there has been a period of urban renewal, starting in the 2000s. A lot of the apartment blocks have either been renovated or demolished and replaced by row houses, see figure 3.12 (Bakker, 2021). Still, 72% of the dwellings is housed in an apartment block and more than half of the dwellings is social housing (AlleCijfers.nl, 2024). Residents' organisation Vitaal Pendrecht is also active in improving the liveability by bringing residents from different backgrounds together in the activities they organise (Vitaal Pendrecht, 2023).



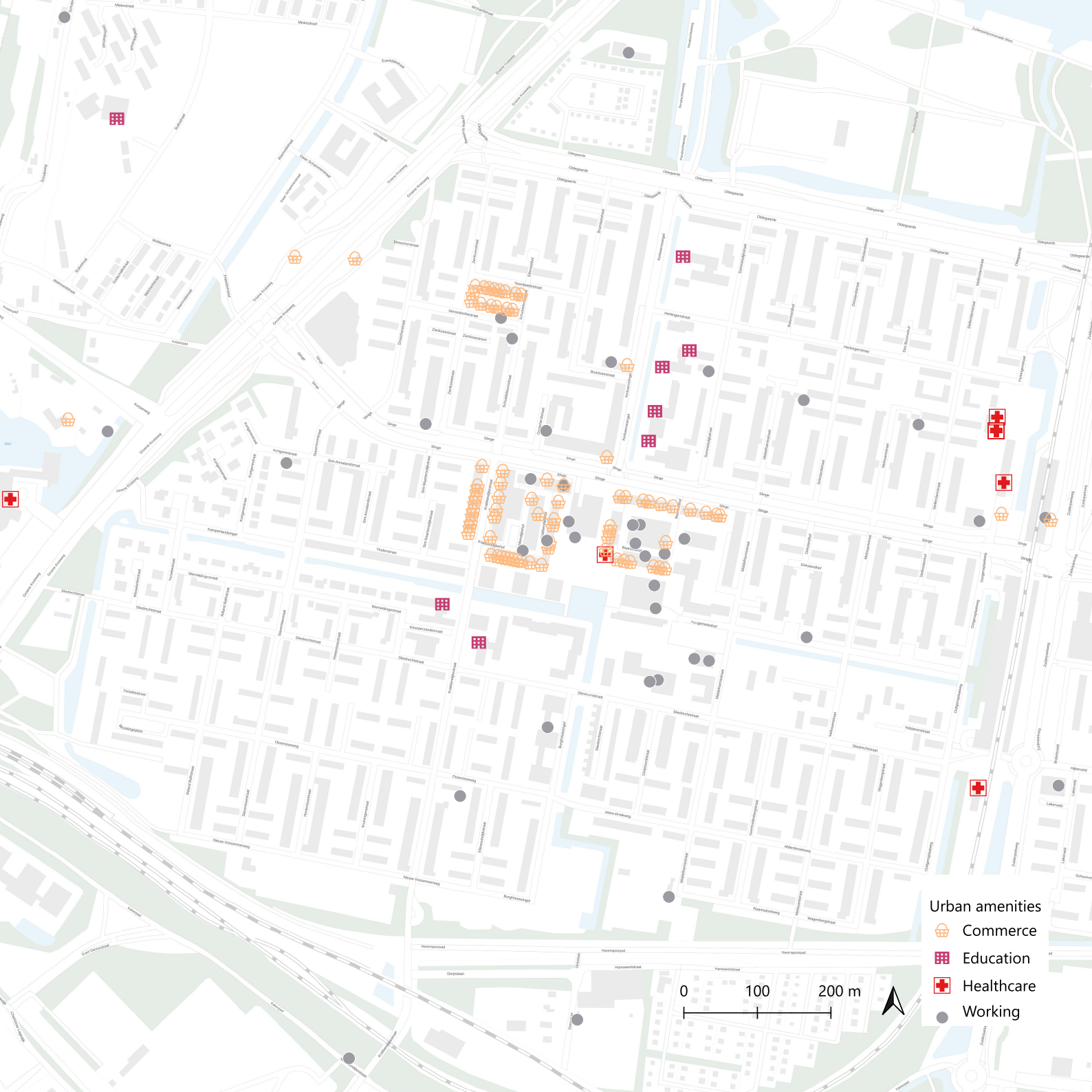
3.10 Relatively low education level in Pendrecht
(By author, based on Allecijfers.nl, 2024)



3.11 Variety of migration backgrounds among residents of Pendrecht
(By author, based on Allecijfers.nl, 2024)



3.12 >
A period of urban renewal
starting in the 2000s



Urban amenities

Most of the daily amenities are already present in the postwar neighbourhood of Pendrecht, as visualised in figure 3.13. As designed by Lotte Stam-Beese, Pendrecht has a cluster of commercial functions located around a central square, Plein 1953, see figure 3.14. However, the small commercial centres that she designed for each sub-neighbourhood have not survived. Only Zijpe, at the northwest quarter, still exists,

as clearly visible in figure 3.13. Primary schools and daycare are present in two clusters close to the commercial core. Healthcare is mostly situated on the edge, close to the metro station. Functions in the category of entertainment are only present in the form of shared gardens and playgrounds spread across the neighbourhood. Job opportunities are scarcely available in Pendrecht.

< 3.13
Distribution of urban amenities in Pendrecht

3.14 >
The neighbourhood centre at Plein 1953

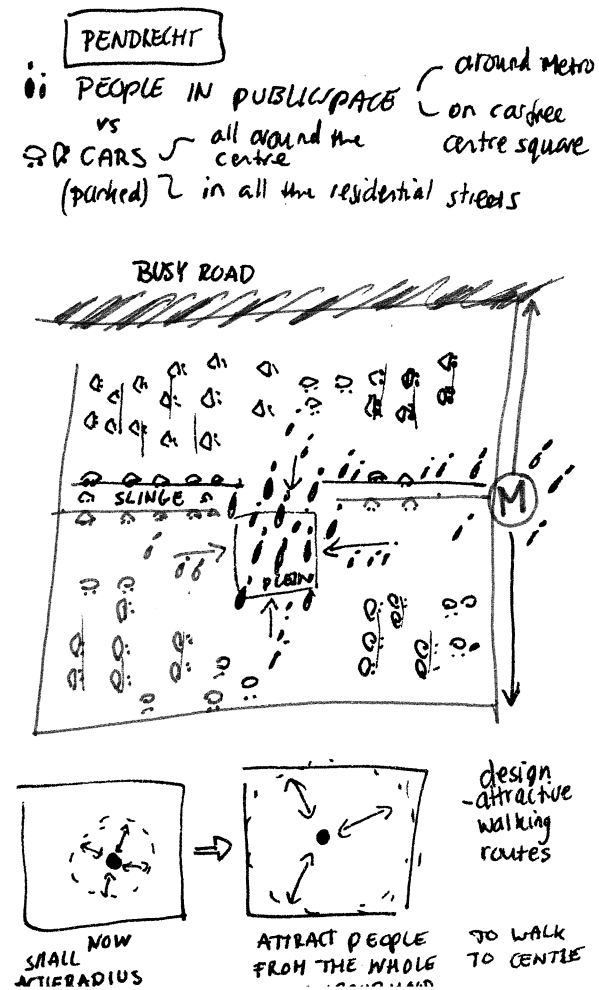


Walking experience

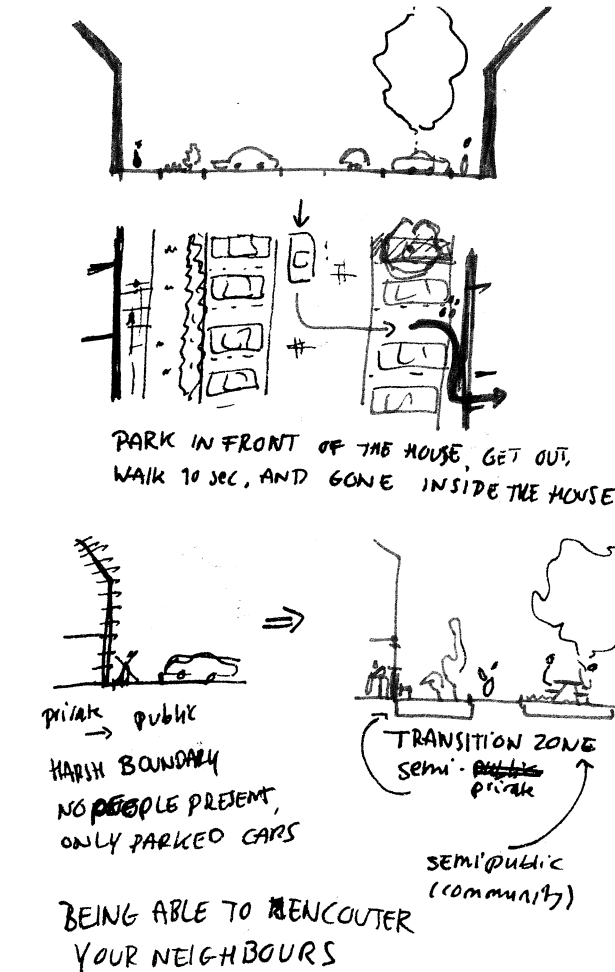
Walking through Pendrecht felt quite pleasant. There is enough space to walk, sidewalks are wide and crossings are clear. Still, few people were walking through the neighbourhood. Only around the metro station and on the central square, people were using the public space, see figure 3.15. Most movement through the neighbourhood seemed to happen by car and large parts of the public space around the centre and in the residential streets is used for car parking.

When I was walking in one of the *play streets*, a quiet street with a row of family houses at both sides, a car approached and parked in front of one of the houses. The people got out, walked a couple of seconds and they were gone inside the house, see figure 3.16. No other people were walking in this residential street, no social encounters happened.

All good intentions urban designer Lotte Stam-Beese had for walking in Pendrecht, do not seem to win from the car. In the meantime, the play streets are mostly used for car parking, leaving few space for children to play safely, as shown in 3.17. The centre – although it is a pedestrian only square – is surrounded by car parking, because the design of the neighbourhood is making it quick and easy to move by car.



3.15 Mapping people in public space in Pendrecht



3.16 Parked cars dominate the 'play street' Zierikzeestraat, Pendrecht



3.17 The current state of the Play Street, Stellendamstraat (Google Earth, 2024)

At the same time quality is lacking in the pedestrian infrastructure, as captured in the images of figure 3.18. Walking paths are paved with the same boring 30 by 30 centimetres tiles. The green surroundings are poorly designed and poorly maintained. More effort is needed to attract people to walk.



3.18 >
Photo series: Lacking quality in
pedestrian infrastructure



The contemporary play street
Rilland Bathstraat, Pendrecht

*'The city is a means to a way of life. It
can be a reflection of all our best selves.
It can be whatever we want it to be. It
can change, and change dramatically.'*

Mayor Peñalosa
in Montgomery (2015: 6)

Introducing the structure walking plan

A masterplan for the walkable postwar neighbourhood of Pendrecht is designed to accommodate the shift towards a joyful, walking lifestyle, see figure 4.1. A prerequisite of the walking lifestyle is to rethink the position of the private car in the living environment: the neighbourhood is for walking and cars will stay at the edges. The existing (hidden) qualities for walking present in the neighbourhood are taken as the basis of the design. The *wijkgedachte*, the community centres and the neighbourhood unit designed by Lotte Stam-Beese, as analysed in the previous chapter, play an important role. Furthermore, the structure walking plan provides a combination of a variety of destinations on walking distance and a fine-grained network of inviting routes for people and nature. The walking network consists of two types of routes that complement each other. The lively and social routes connect all the different destinations in the neighbourhood, while the green routes form a network for restorative and recreative wandering.

The structure walking plan is a conclusion of a series of design explorations based on the design principles derived from the literature in chapter 2. In this chapter, the masterplan will be unravelled in a series of principle schemes.



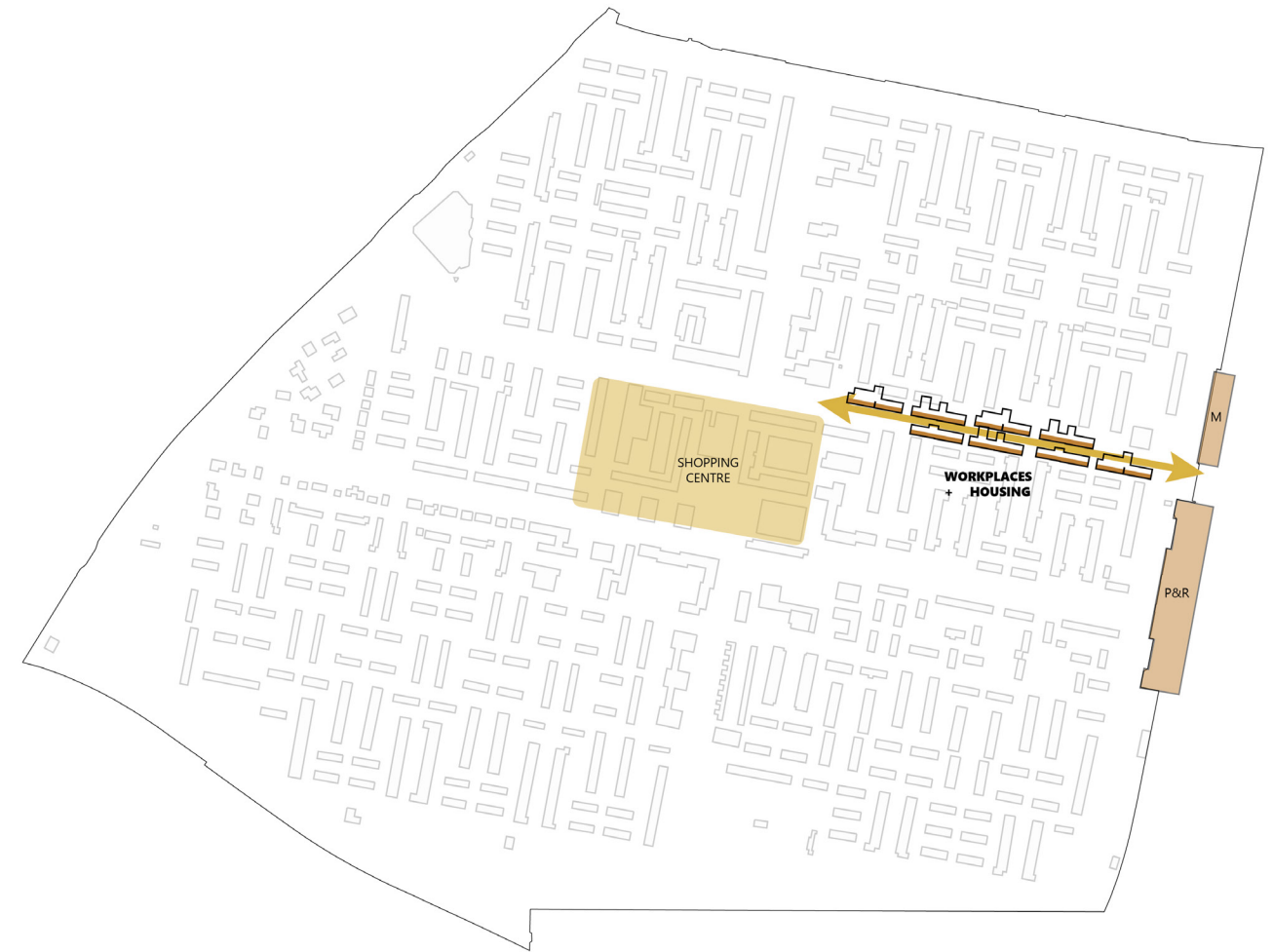
Design principles

4.2 Sources and destinations



The first step in the structure walking plan is to define the sources and destinations for pedestrian movement in the neighbourhood. The existing source points in Pendrecht are the metro station and the park and ride facility. Crucial destinations are the commercial centre of Plein 1953, the primary schools and the health care centre. The most direct connection between those, currently a busy car road (Slinge), will be an important link in the walking network.

4.3 Densify Slinge



In the transition towards a walkable neighbourhood, the large car road Slinge offers a lot of space for redesign. Since Slinge forms the direct connection between the sources and destinations (fig. 4.2), it carries potential to densify along this corridor. Workspaces, which are currently lacking in Pendrecht, will be added in the plinths of new housing blocks. They will offer a variety of maker spaces, office spaces and co-work places.



The community stores, that were present in the original design from Lotte Stam-Beese, will be revived. Each quarter will get a small centre with social and commercial functions at the original locations. More destinations on walking distance will make walking more attractive. At the same time, a walking lifestyle will also support the availability of the community amenities. Moreover, strengthening the feeling of community is an important step towards joy.



That is why parking hubs will also be created per community. In order to create a walkable Pendrecht, car parking will happen at the edge of the neighbourhood. So, motorised vehicles do not have to drive through the living environment. From there, people can walk towards their destinations – and probably encounter their neighbours on their way. It is possible for vehicles to occasionally drive through the pedestrian streets, but they have to adapt their speed firmly.

4.6 Ecological route



Walking in nature is especially effective for the mental wellbeing aspect of joy. The existing patches of green and blue at the edges of Pendrecht are connected into an ecological route. The vegetation will be densified and varied to create a forest atmosphere. This route combines active outdoor recreation with calm and natural walking paths. The whole ecological route is approximately 4 kilometres long. The existing singels provide short cuts of circa 1 kilometre long.

4.7 Public park Slinge



As Pendrecht is a repetition of the neighbourhood unit with its communal garden, the neighbourhood has few public green spaces. The part of Slinge adjacent to the centre of Pendrecht will therefore be redesigned into a public park. Moving towards the west of Slinge, the park will slowly transition into a publicly accessible urban farm. The farm will be a showcase of local food production in a biodiverse and joyful way.

4.8 Long lines in the urban landscape



The streets that run from the one side of Pendrecht all the way to the opposite side and beyond, to the surroundings, are defined as the 'long lines'. These paths form the main network for walking, where pedestrians can cluster and meet each other. As it turns out, these long lines connect all sources and destinations in Pendrecht: metro station, parking hubs, commercial centre, community centres, schools, health care and workplaces, see figure 4.1.

4.9 Close-knit walking network



All walking paths together form a complete and coherent walking network, in which people can deliberately choose how to walk. The fine grain creates a pleasant environment to wander or the quickly reach a destination. The network has a mesh width of 30 to 40 metres for north-south paths and 70-110 metres for east-west paths. Altogether, the close-knit walking network has a length of 45 kilometres.

Amenities of the walkable neighbourhood

Proximity of urban amenities is a prerequisite for a walking lifestyle. The list below shows the amenities envisioned to be available at the neighbourhood level. The next page enlists the amenities that will have to be present in the community centres. The urban amenities that are already available in Pendrecht are marked in yellow.

Urban amenities of the neighbourhood

Pendrecht

- Primary schools
 - General Practitioner
 - Dentists
 - Pharmacy
 - Neighbourhood centre
Vitaal Pendrecht / Kinderfaculteit
 - Library
 - Park
 - Sports hall
 - Sport fields
 - Supermarket
 - Some retail
Clothing store (2nd hand)
Drugstore: Kruitvat
Bookstore: Primera
2nd hand store
Electronics store
- Hairdresser*
 - Shoe store & repair*
 - Blokker*
 - Other...*
 - Urban farm
 - Farmers market (outdoor)
 - Cafés + terrace square
 - Restaurant + terrace square
 - Snack bars
 - Arts & culture centre
 - Metro station
 - Work spaces:
Offices
Maker space
car repair / print shop

Urban amenities of the community

Zierikzeebuurt / Herkingenbuurt / Ossensissebuurt /
Tiengemetebuurt

- Daycare
- Community centre
- Pocket park / plaza
- Sport in public space
- Playgrounds
- Vegetable market
- Bakery
- Small retail
- Repair café
- Tiny library
- Share hub
- Coffeehouse
- Bus stop
- Mobility hub:
car-sharing, package pick-up point
- Co-work spaces



Appropriation of the public space
Stavenissestraat, Pendrecht

*'Especially in urban environments,
where many people do not have a
garden at home, the allotment garden
meets a great need for space, peace
and recreation in the outdoors.'*

Obsurv, 2020
(translated by author)

Introducing the allotment garden

An allotment garden is a private garden that is not connected to one's house (Obsurv, 2020). Instead, it is part of an allotment garden complex with a garden organisation and community.

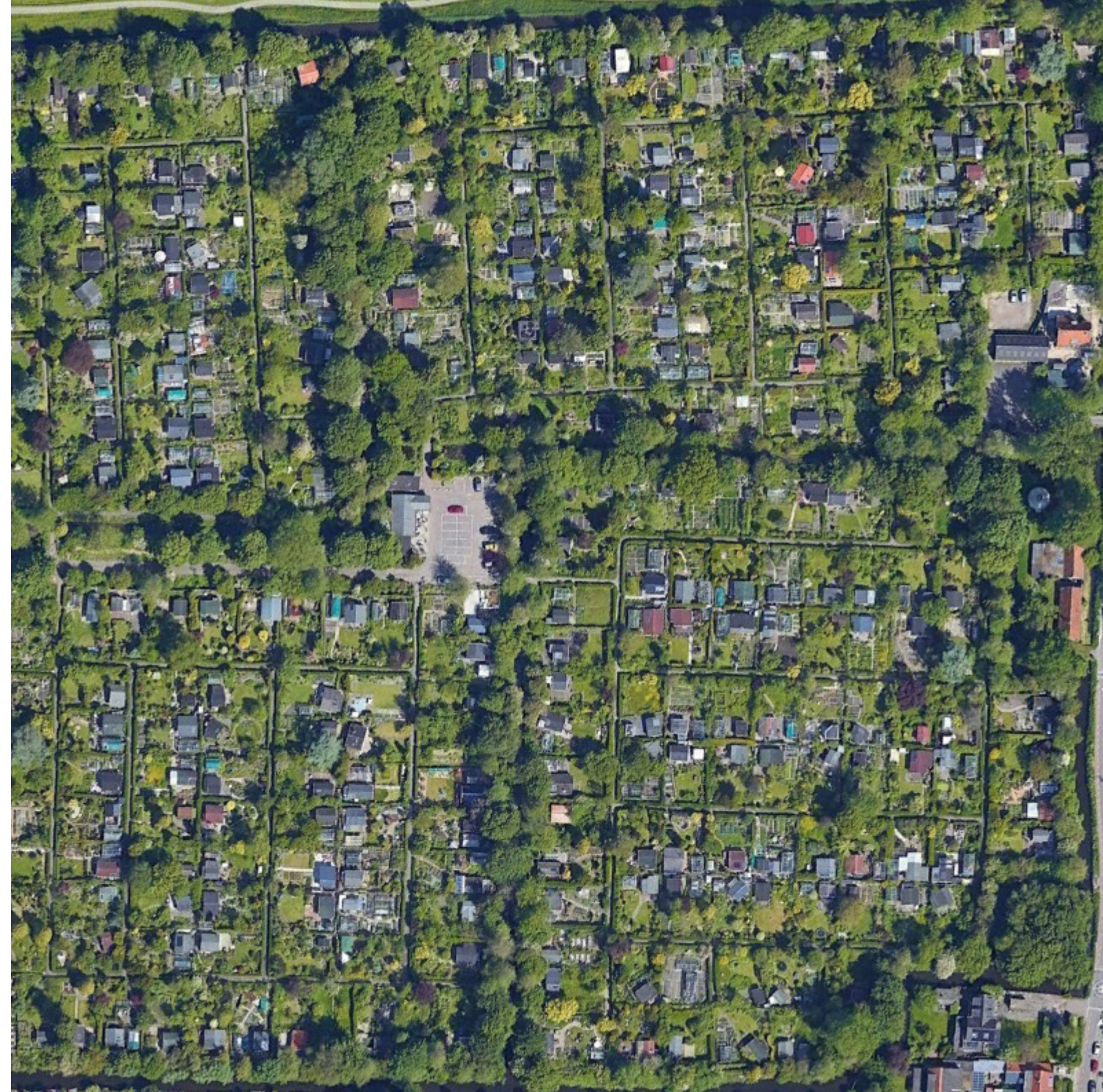
Allotment gardens have a long history in Dutch cities. In the 18th century, societal organisations were trying to improve the general public happiness for the urban working class. Providing the workers with a private vegetable garden was one of their remedies (Lenshoek, 2009). During the first and second world war, allotment gardens played an important role in the common food supply (Gemeente Amsterdam, 2021; Lenshoek, 2009). Since the 1950s, the gardens are more and more used for recreational purposes and less for food production. Municipalities start to acknowledge the importance of the natural environments of garden complexes to escape from the busy city life and start to record them in their zoning plans (Lenshoek, 2009).

5.1 >
Allotment garden complex Delftse Hout
(Google Earth, 2024)

'The Wageningen Agricultural University has even discovered that gardening is more effective against stress than reading a book.'

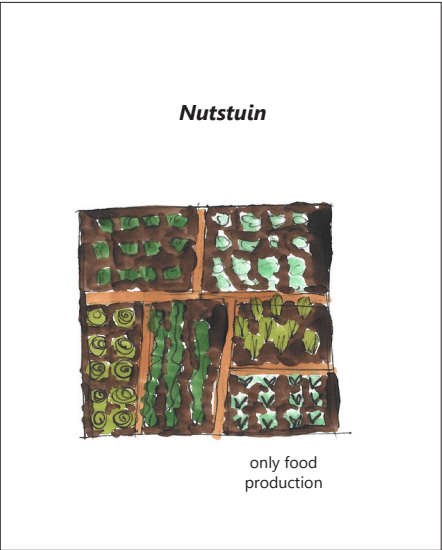
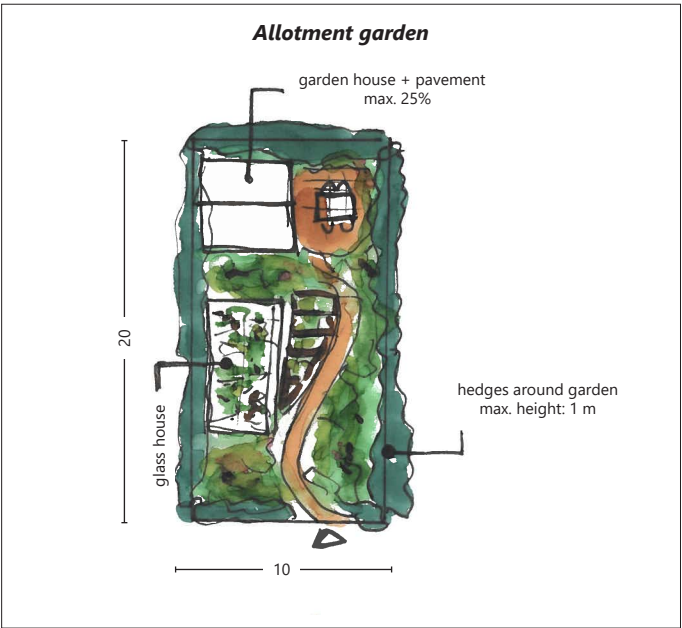
– Lenshoek, 2009: 13
(translated by author)

In this chapter, the allotment garden complex is explored as a design solution for the large amounts of low quality public space in the postwar neighbourhood. First, the systematic of the allotment garden is analysed, followed by a proposal for Pendrecht as an allotment garden complex, including rules for the garden communities. The radical redesign of Pendrecht is elaborated on different scales: the neighbourhood, the community and the neighbourhood unit. The chapter will conclude with a strategy of execution for Pendrecht, and finally envisions a revitalisation of the *wijkgedachte* on the scale of Rotterdam.



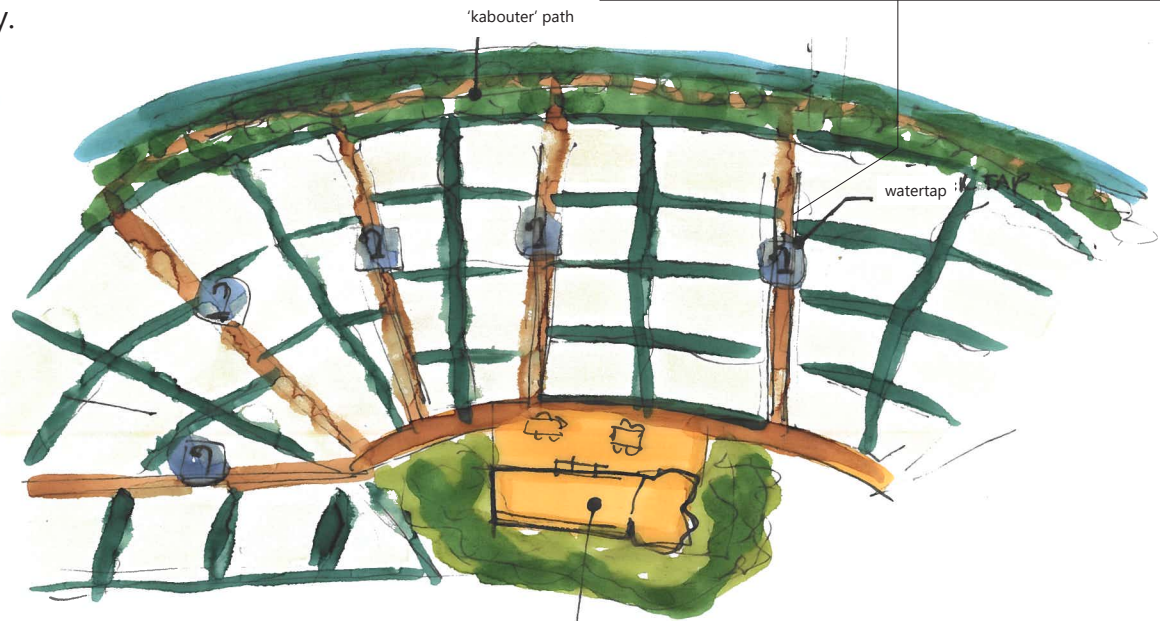
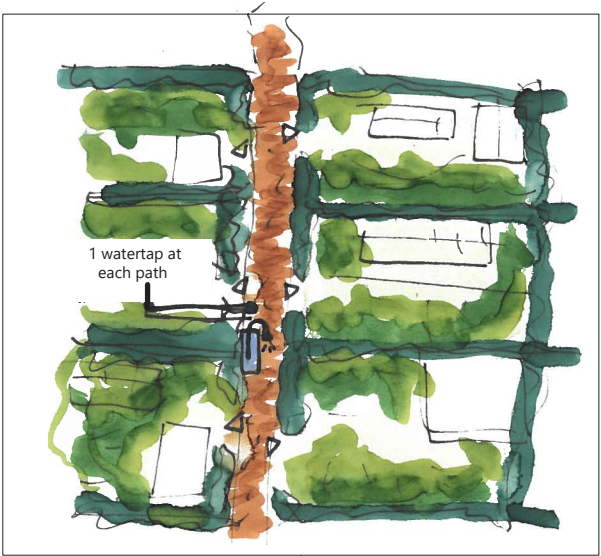
5.1 THE ALLOTMENT GARDEN

Three different types of allotment gardens appear in cities, with functions varying from food production to recreation, see figure 5.2 (Obsurv, 2020). The first type originates from the historical need for food supply. The *nutstuin* is a somewhat smaller allotment garden which is purely in use as a vegetable garden and thus does not have a recreational house (Gemeente Amsterdam, 2021). The typical allotment garden is often an combination of a vegetable garden, a decorative garden and a recreational garden. It often features a garden house for recreational stay. Lastly, the community garden consist of a tiny *nutstuin* for every gardener in combination with a communal area for relaxation and social interaction.



Systematic of the garden complex

The allotment garden complex is naturally a car free area with a close-knit system of (unpaved) walking paths, see figure 5.3. The complex is divided into a number of individual garden plots surrounded by hedges. Centrally located is a communal building with a plaza where the gardeners can get together. In the middle of every path, there is a tap where the gardeners can get water for their garden. The allotment garden complex has a strong organisation with memberships to make sure everything runs smoothly.



communal building
- kitchen/bar
- seating area
- toilets
- terrace
- shared tools

5.2
Types of allotment gardens

5.3
The systematic of the allotment garden



5.2 ALLOTMENT GARDEN COMPLEX PENDRECHT

In redesigning the neighbourhood to evoke joy for its residents, gardening fits in well. Gardening can be seen as a joyful activity that benefits both physical, social and mental wellbeing. First of all, working in the garden is a good physical activity that will keep the body moving. Gardening is also proven to be relaxing for the mind (Montgomery, 2015). Lastly, the allotment garden also has an important social dimension. Gardening together in a garden community, coming together every once in a while and having occasional encounters with neighbours will improve the social wellbeing of the residents of Pendrecht.

Most of all, redesigning Pendrecht as an allotment garden will give a purpose to the large amount of currently poorly designed public space. The people can maintain their gardens themselves and together with the community they can maintain the common green spaces. This will boost the biodiversity

in the neighbourhood and will give meaning to the public space. Moreover, it can provide a positive contribution to ongoing environmental problems, such as urban heat and rain water floodings. The vegetable gardens will advance a local economy in the neighbourhood, with locally produced food.

For the allotment garden complex of Pendrecht, a set of rules is developed to ensure a joyful outcome, shown on the next pages. These include spatial guidelines for the set-up of the allotment gardens and non-spatial rules related to the performance of the garden community. The residents of the neighbourhood are expected to respect these rules. The implementation of the spatial rules is visualised in the design in figure 5.6 and further on in this chapter.



< 5.6

Envisioning Pendrecht as an allotment
garden complex

THE GARDEN COMMUNITY

Pendrecht will be divided into 4 garden communities

Each will have a garden council, a group of wise citizens chosen by the whole community. The council is responsible for the organisation and decision-making concerning the allotment garden complex.

Each garden community will have a community centre in the middle: a social meeting place with collective gardening tools and other daily amenities.

Residents of Pendrecht have to opportunity to rent an allotment garden in the community where they live. There will be gardens available for circa 35% of the households in the neighbourhood.

Allotment gardens are not located at the gardener's house. They will be assigned at the opposite side of the community centre, to keep stimulating a walking lifestyle. The walking distance will be maximum 10 minutes.

THE GARDEN

Three different sizes of allotment gardens will be available, to provide for different gardening desires of the residents.

- S: 10 x 7 meters 70m²
- M: 12 x12 meters 144 m²
- L: 10 x 20 meters 200 m²

The allotment gardens are surrounded by evergreen hedges with a maximum height of 1 meter, to stimulate social interaction and create pleasant, open walking routes through the neighbourhood.

At the intersection of the garden environment and the main walking route, the hedge will be replaced by a year-round flowery bush mix, to be maintained by the owner of the garden.

Maximum 25% of the allotment garden may be paved, including an optional shed.

The gardener is responsible for weeding of their garden to ensure a neat appearance.

All garden activities must happen in an organic way.

At the start, each gardener can receive a subsidy from the municipality to build up a pleasant, biodiverse and healthy garden.

THE PUBLIC SPACE

Each walking path will have a water tap, combined with a meeting place with picnic tables.

The existing fully-grown trees will be conserved. Gardeners are not allowed to remove the trees from their garden.

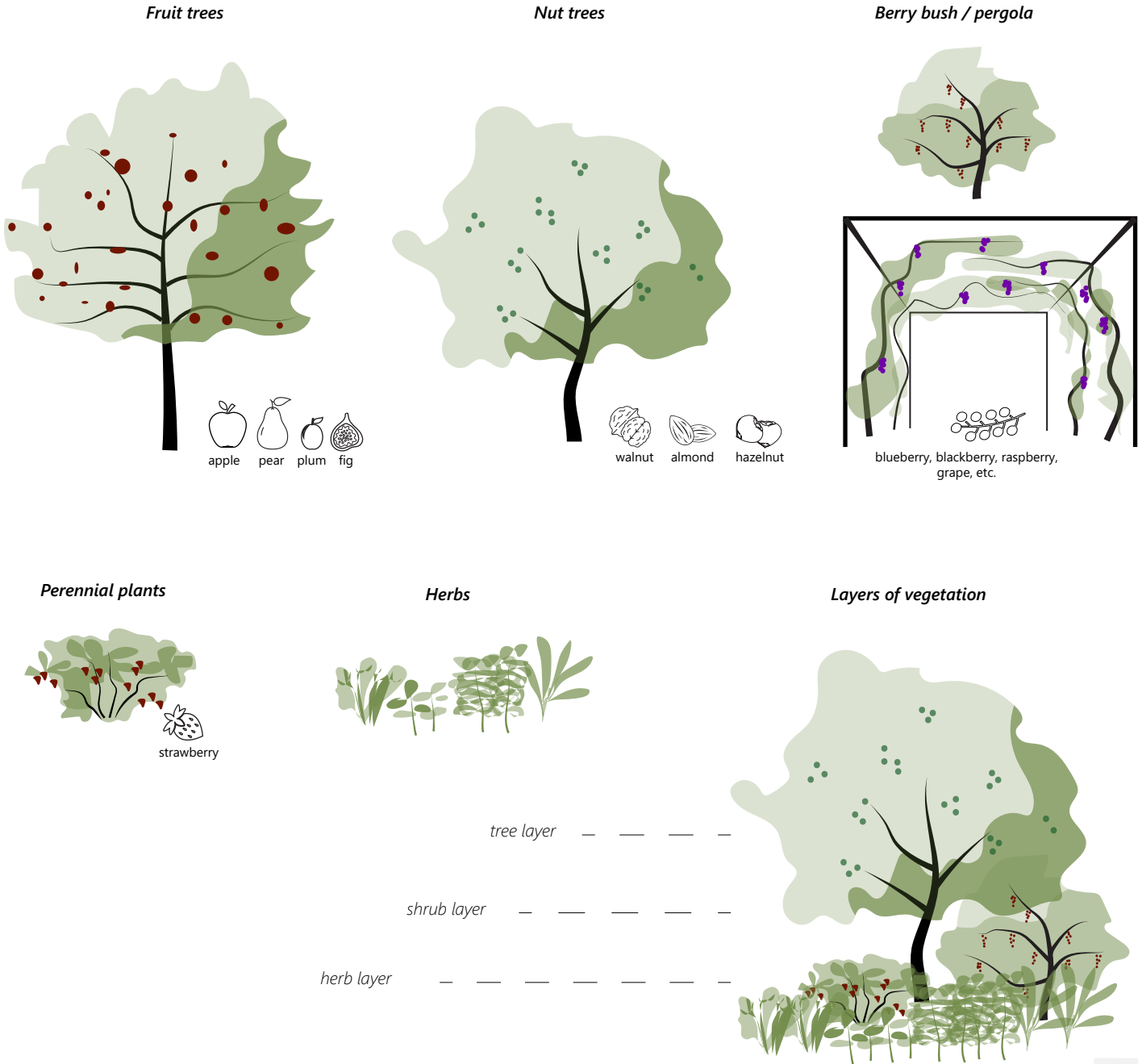
Gardens directly adjacent to windows or balconies from houses will be provided with a strip of fruit trees at the back of the garden as a buffer zone. The gardener is responsible for the maintenance of the trees and may harvest the fruits.

As shown in figure 5.7, edible vegetation will be planted in the public green spaces, such as:

- Fruit trees
- Nut trees
- Berry bushes
- Strawberry plants
- Herbs

All gardeners are expected to help with the maintenance of collective green spaces on regular basis, as decided by the chosen garden council.

All users of the public space are allowed to pick the fruits, nuts and herbs in a respectful manner. Sharing the food with the whole community is crucial.

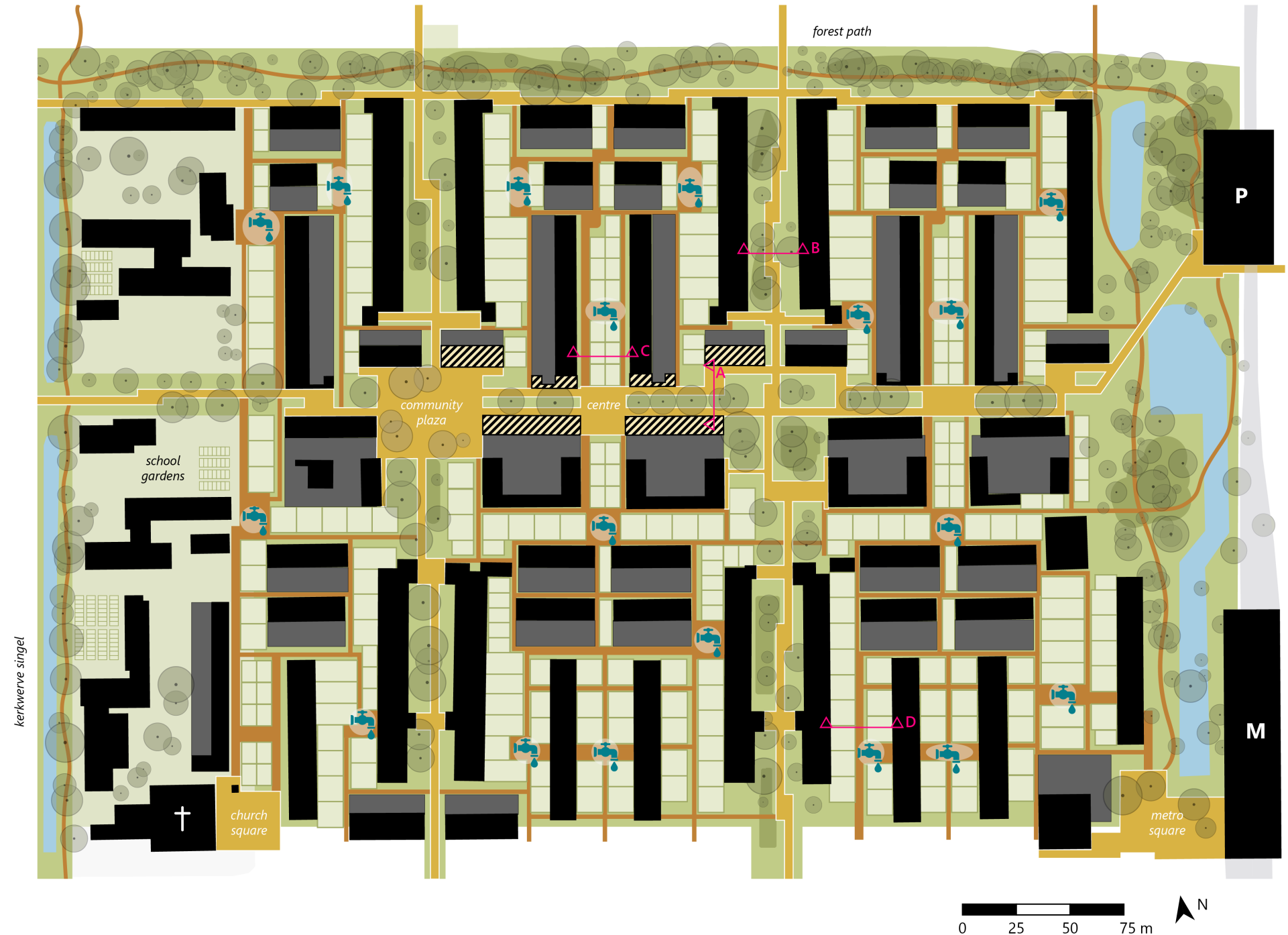


5.3 THE GARDEN COMMUNITY

The allotment garden complex of Pendrecht will be divided into four garden communities, based on the four sub-neighbourhoods from the original design of Lotte Stam-Beese. This section will show the redesign of the Herkingenbuurt into a garden community, see figure 5.8. The aim of the design is to revitalise a strong community feeling, as was envisioned by Lotte Stam-Beese, in combination with an improvement of the mental and physical wellbeing of the residents.

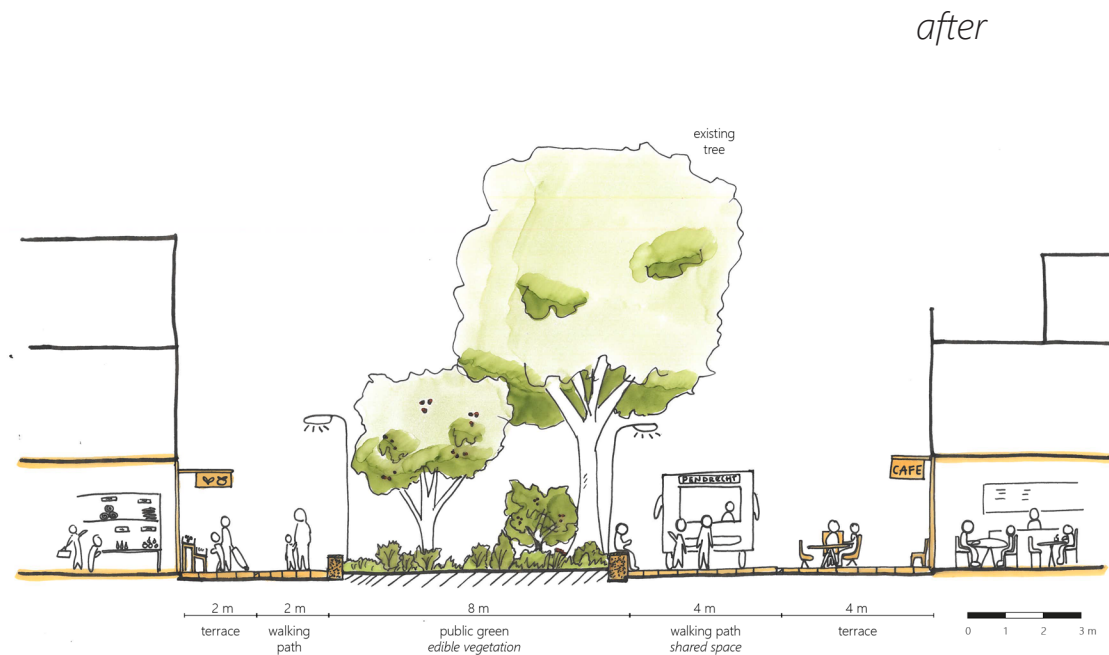
Residents can walk along the beautiful gardens, get together at the main walking routes, where they can relax in the park. They can do their daily groceries in the local stores while also drinking coffee with their neighbours in the community centre. They can continue their walk to their garden to sow the flowers they have just bought. At the water tap, the residents can encounter each other and drink some tea while sharing some fruit from their gardens. On the way home, they can pick up their children from school. While walking home via the main walking path, the children can play in the herbal-rich grass and the parents can sit in the sun together, waiting for their partner to walk home from the metro station.

Design garden comr
Herkingen



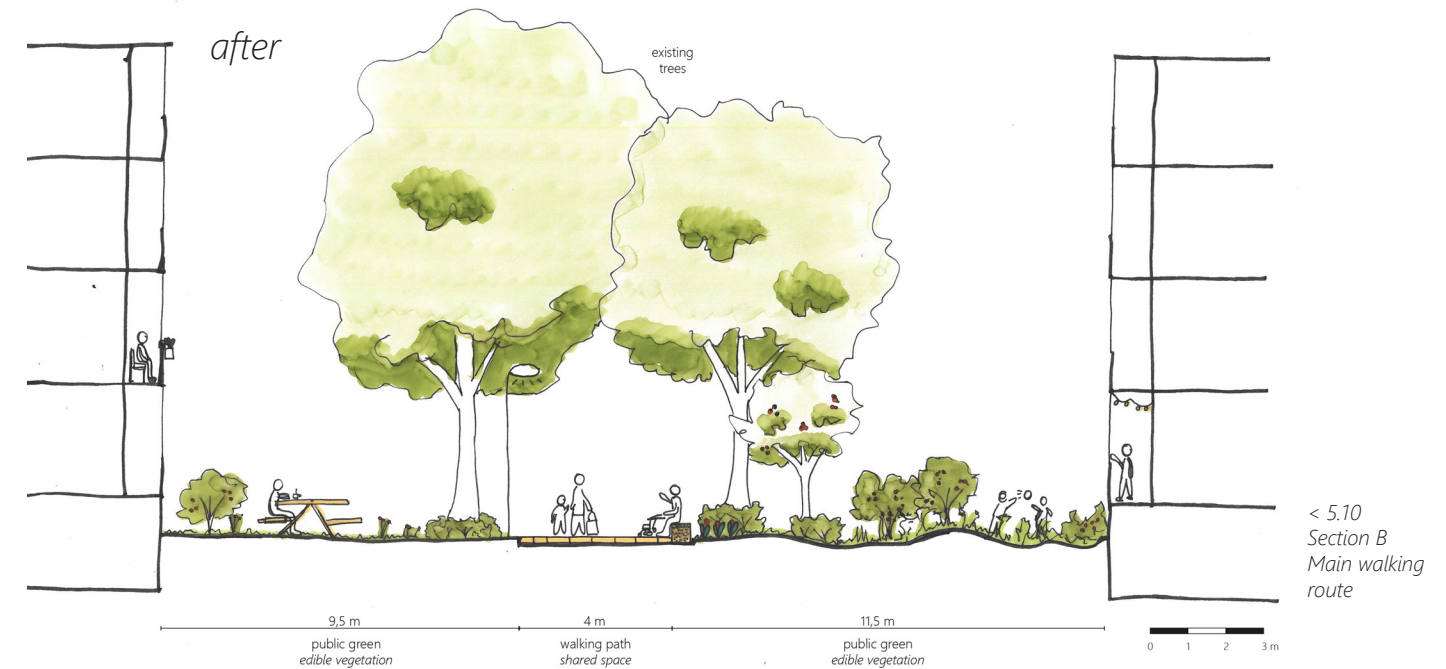
Community centre

Central in the community, at its original location, a small shopping street is brought back, see figure 5.9. The public plinth will provide daily stores, share and repair facilities and a community building (see the full list of amenities at the previous chapter). Adjacent to the public street lies a community plaza, where social activities can be organised by the residents.



5.9 >
Section A
Community centre

before



Main walking route

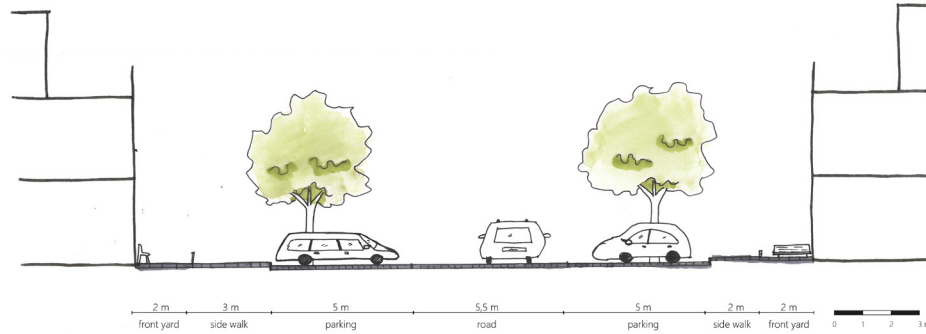
The lively atmosphere continues in the main walking routes connecting to the important destinations in the neighbourhood and beyond, such as the primary schools and the parking hub. The paved walking paths of the main streets are surrounded by parklike public green spaces with edible vegetation, as shown in figure 5.10.

< 5.10
Section B
Main walking route

Garden route

The lively and social safe routes are complemented by the garden routes, see figure 5.11 and 5.12. All left-over spaces between the buildings are designed with allotment gardens that residents of the community can rent. The garden paths have a half-paved surface and are characterised by a calm and diverse green surrounding.

before

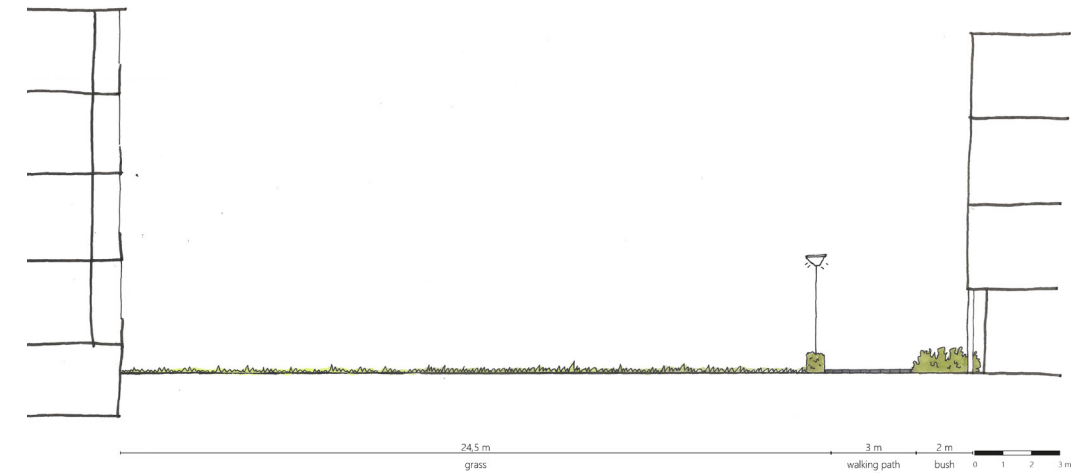


after

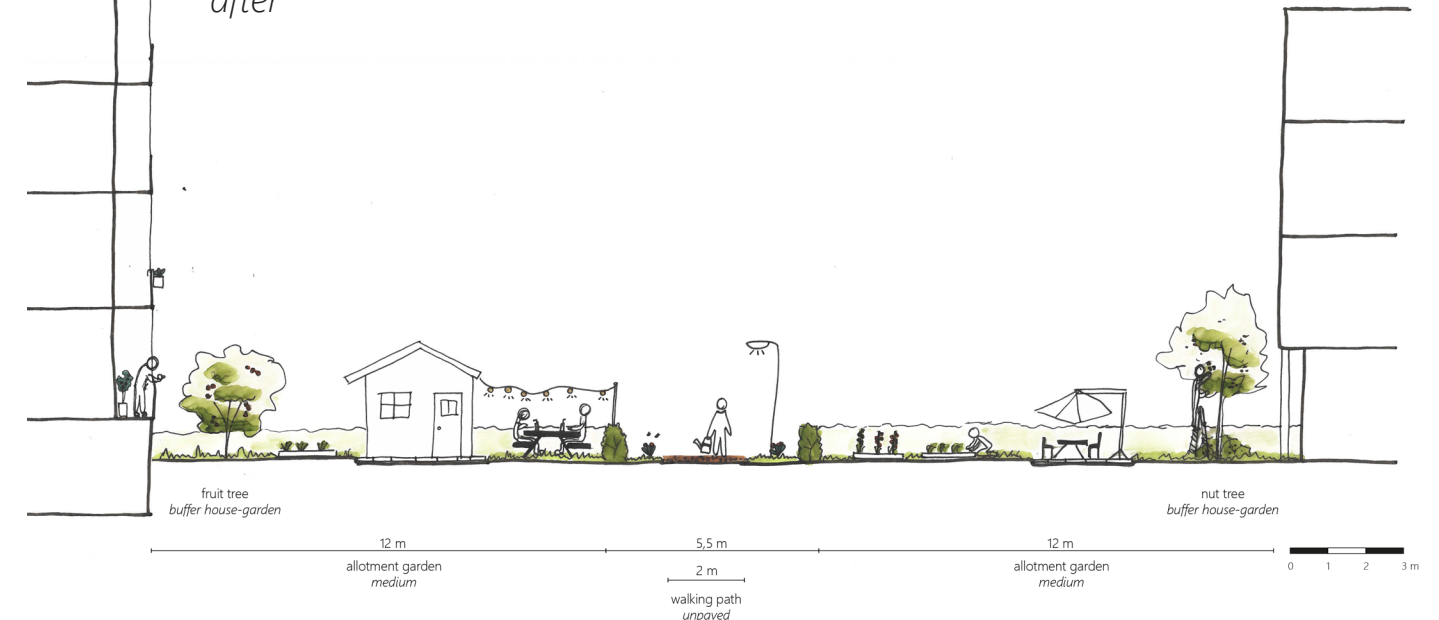


5.11 >
Section C
Garden street

before



after



Each garden path has meeting place with a water tap and picnic tables. As a result of the strict rules, as described in section 5.2, the gardens have a neat appearance, with hedges lower than 1 metre, ensuring a pleasant walking route.

5.12
Section D
Garden environment

5.4 THE NEIGHBOURHOOD UNIT

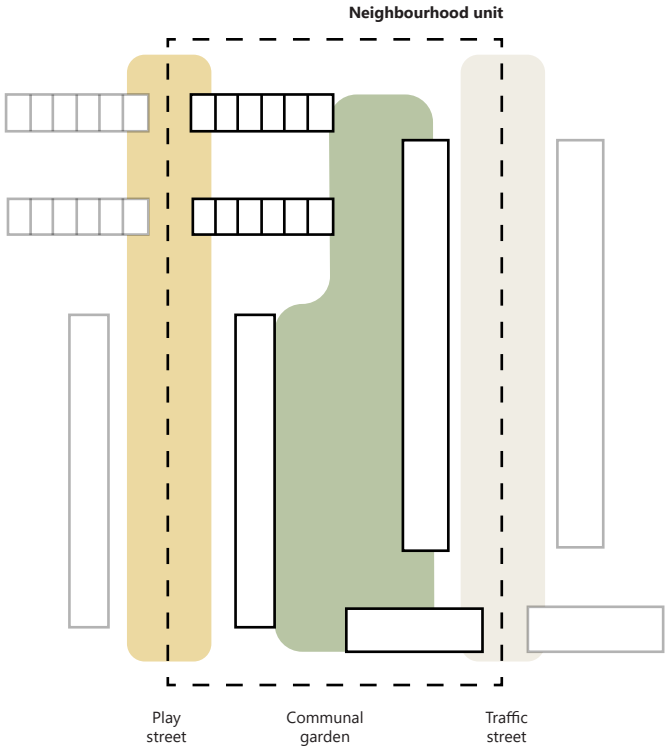
In the redesign of the neighbourhood unit, as visualised in figure 5.13, the original structure from Lotte Stam-Beese's neighbourhood unit design will be preserved, see figure 5.14. However, the public space is radically redesigned.

Main walking route

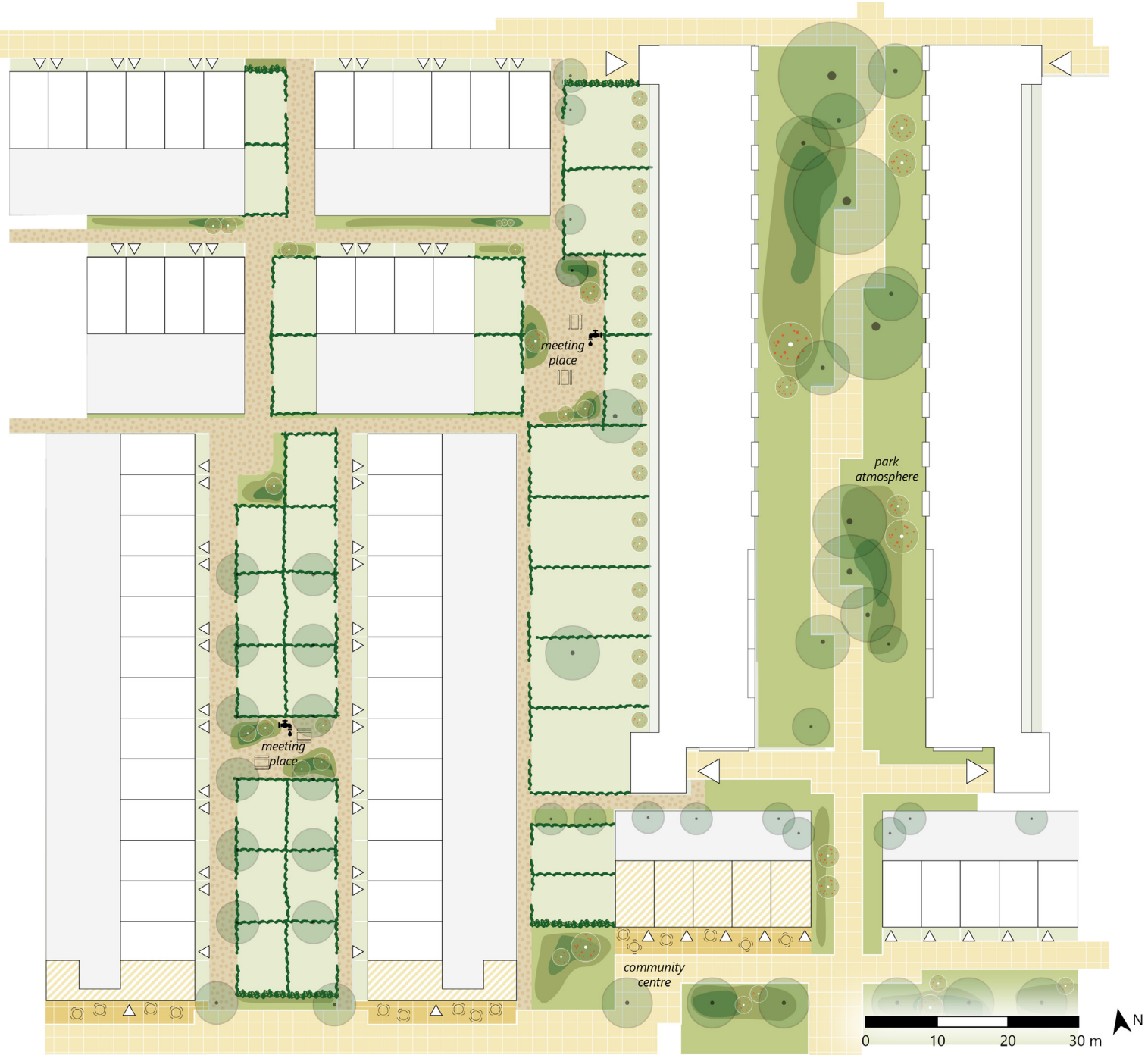
Since the traffic street is a continuous line through the neighbourhood in Lotte's design, the traffic street will be redesigned as the main walking route. This main street will be designed as a public park. The route has a paved path of four metres width, with some wider parts with seating to meet or for occasional vehicles to pass. The existing trees form the base of the park design, since their full grown size is a good quality. This will be amplified with edible vegetation in different layers: herbs, bushes and trees.

Garden street

The play street from Lotte's neighbourhood unit will be redesign as a garden street, with a sequence of small allotment gardens (size 7x10 metres), surrounded by low, evergreen hedges. Half-paved walking paths run along the allotment gardens and the front gardens of the family houses at the side of the street.



5.14 The neighbourhood unit from Lotte Stam-Beese



5.13 >
Redesign of the neighbourhood unit

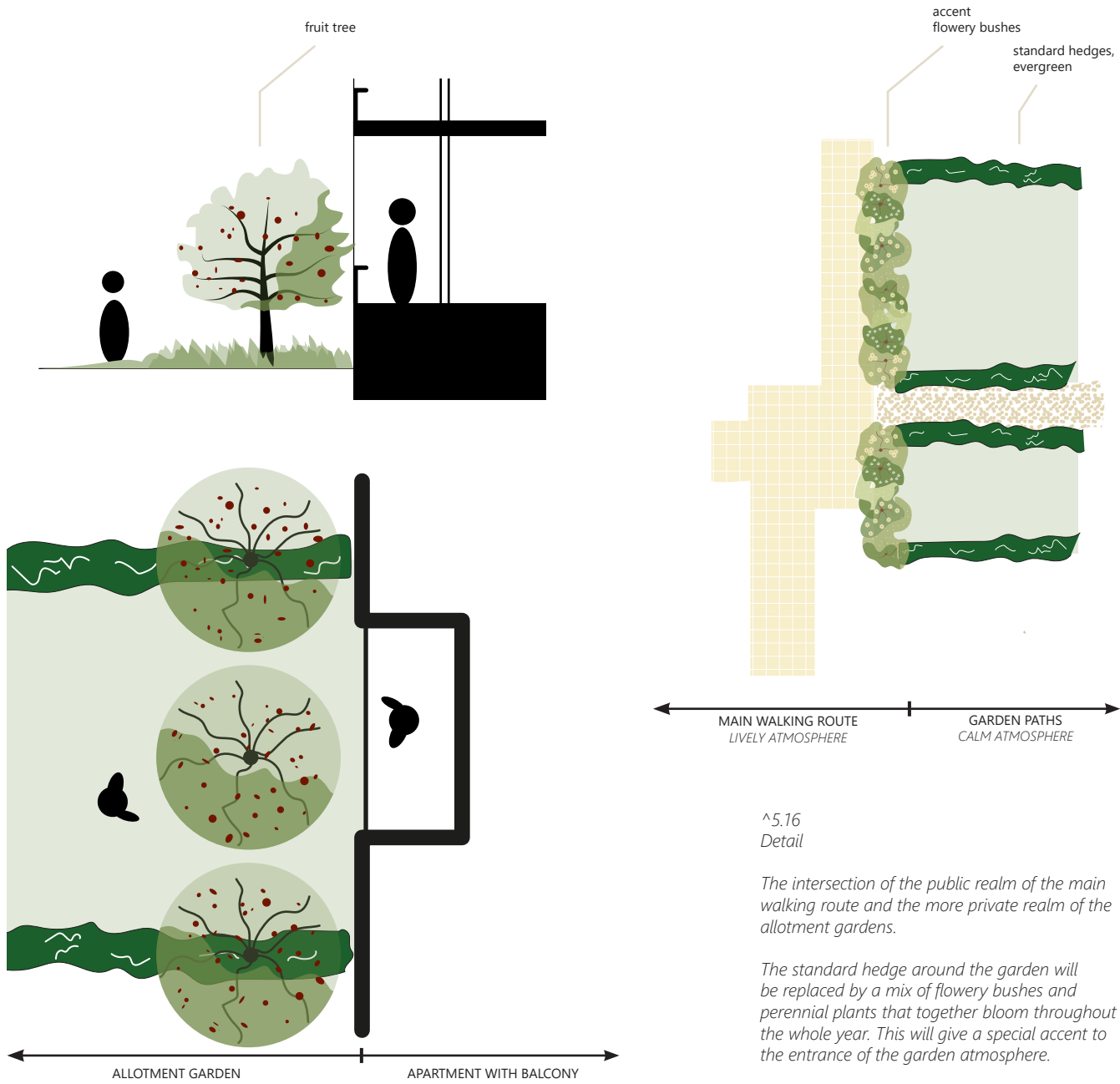
A path width of four metres at one side of the street profile ensures accessibility for vehicles in special occasions. A meeting space for the gardeners and residents is located in the middle of the street. This features a water tap, picnic tables and communal fruit trees and bushes.

A garden of gardens

The communal garden from the original neighbourhood unit, will be redesigned with a similar atmosphere as the garden street. It will provide allotment gardens in small (7x10 m), medium (12x12 m) and large (10x20 m) size. Since accessibility for vehicles is not needed, the half-paved paths along the gardens can be narrow. Just like the garden street, there will be a meeting place in the middle of the gardens. A row of fruit trees at the back of the allotment garden will function as a buffer between the gardens and the adjacent houses, see figure 5.15.

Community centre

The community shopping street, south of the neighbourhood unit shown in figure 5.13, is designed in a varied and lively way. The public plinths will be provided with a terraces zone, to attract people to stay in the public space. Pavement is complemented by greenery, made up of the existing trees and new edible herbs, shrubs and trees. The edges of the green spaces will function as public benches. Where the public atmosphere and the garden atmosphere meet, the hedge around the garden is replaced by a flowery bush to highlight the transition, see figure 5.16.



5.15>
Detail

Potential conflict between the home-owner and the adjacent gardener.

A strip of fruit trees at the back of the allotment garden will form a soft, green buffer between the garden and the adjacent apartment.

^5.16
Detail

The intersection of the public realm of the main walking route and the more private realm of the allotment gardens.

The standard hedge around the garden will be replaced by a mix of flowery bushes and perennial plants that together bloom throughout the whole year. This will give a special accent to the entrance of the garden atmosphere.

The garden street



5.17
The garden street
Model, scale 1:100



Materialisation: reuse existing pavement

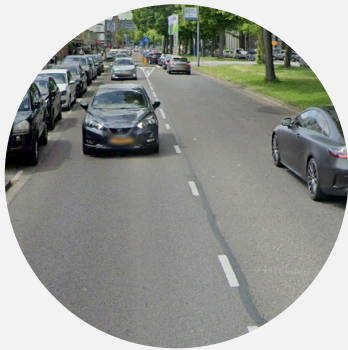
Existing materials



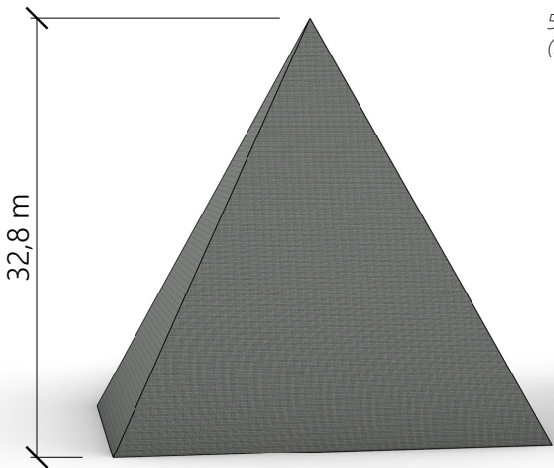
Street bricks
at streets and parking spots
20x10x7 cm



Tiles
at side walks and walking paths
30x30x4 cm

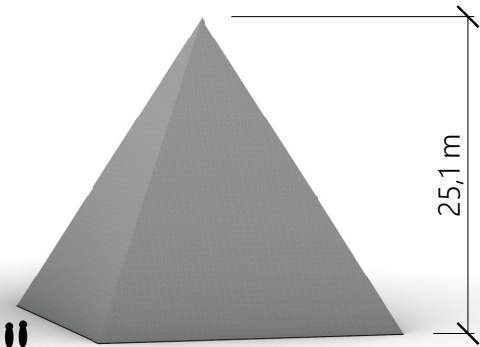


Asphalt
only at main roads Slinge and
Kerkewervesingel
(Google Earth, 2024)



8,4 million
Street bricks

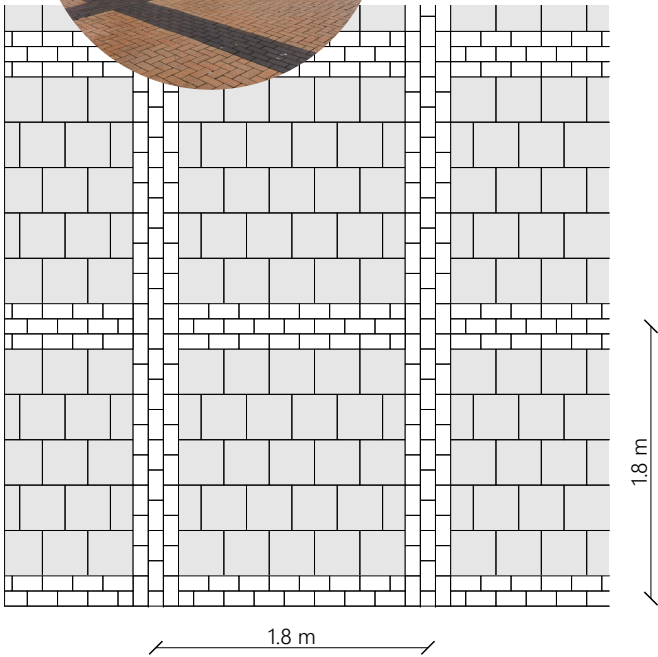
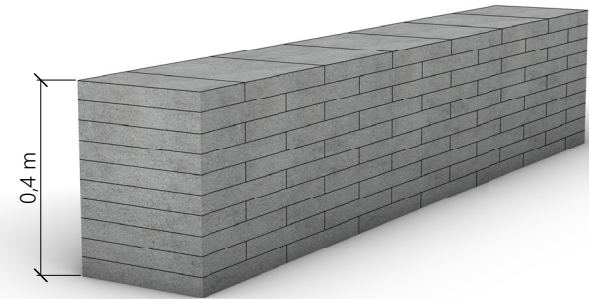
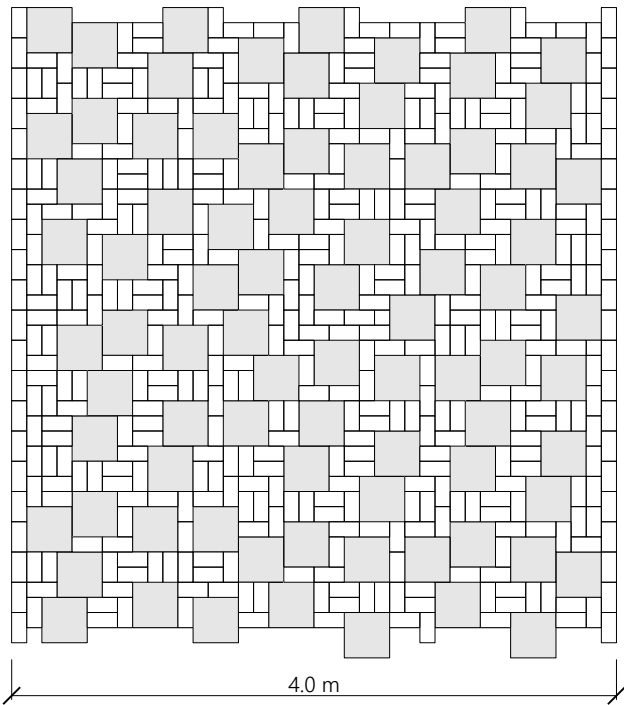
5.18 Amounts of existing pavement material in Pendrecht
(see also: appendix B)



1,5 million
Tiles

Main walking paths

The main walking paths will be paved in a wild pattern that combines the street bricks and the tiles. Along the path, seating elements will be masoned from the old tiles.

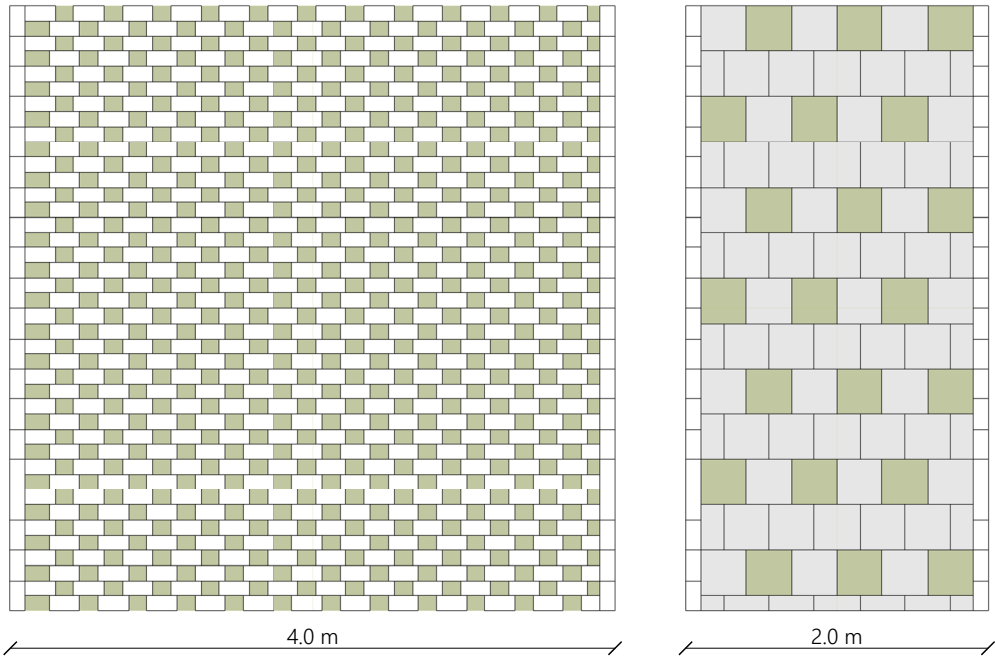


Community plazas

The small plazas in the centres of the four communities will be paved in a special way. Inspired by the pavement of Plein 1953, a pattern of squares will be made, with street bricks as outlines and tiles as infill.

Garden paths

For a more natural experience, the garden paths will get a half-paved pattern, allowing grass and wild flowers to grow in between. For more stability for occasional vehicles, the streets will be paved with a street brick pattern (left). The paths through the former communal gardens, which are only accessible by foot, will be half-paved with tiles (right).



Community sculptures

The left-over pavement materials can be used for literal community building. Each community will receive a stack of street bricks and tiles, as shown in figure 5.23, to build a sculpture for their community plaza.

The references in figure 5.20-5.22 show a range of possibilities. Building together with neighbours will strengthen the social cohesion and the feeling of belonging in the four parts of Pendrecht.

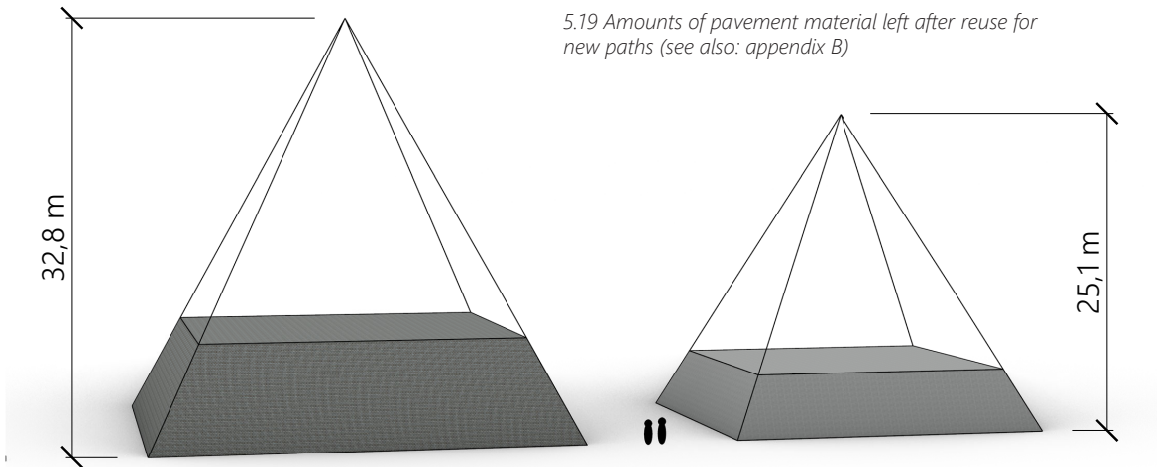


5.20 Ecokathedraal Mildam (Vondeling, n.d.)

5.21 Amphitheatre (Ecologisch Adviesbureau Mulder, n.d.)

5.22 Jardín Agua Zarca (Borrell, 2021)

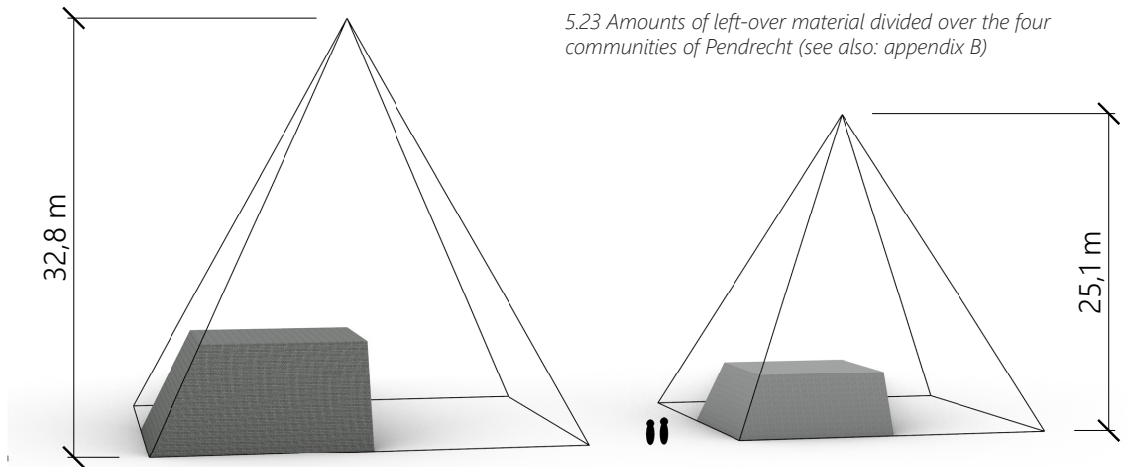
5.19 Amounts of pavement material left after reuse for new paths (see also: appendix B)



4,7 million
Street bricks
56% left

0,68 million
Tiles
46% left

5.23 Amounts of left-over material divided over the four communities of Pendrecht (see also: appendix B)



1,2 million
Street bricks
per community

170 thousand
Tiles
per community

5.5 A JOYFUL WALK THROUGH PENDRECHT

Looking out of the window. A neighbour walks by on her way to her office at Slinge. My garden-neighbour, an early bird, is already at her garden to water her lettuce and potato plants, before she will walk to the metro to go to work.



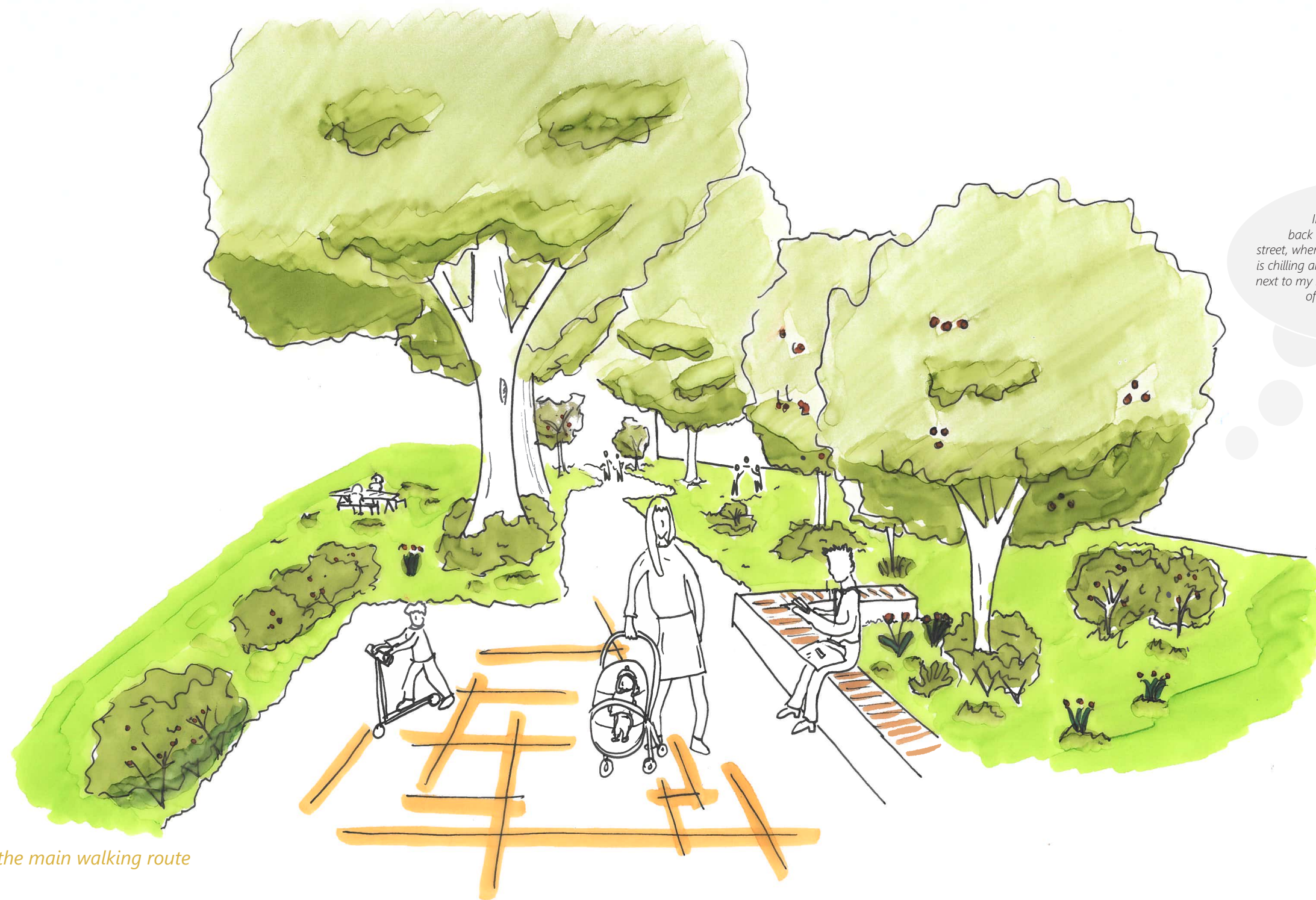
the garden street



the community centre



the forest path



*In the afternoon, I walk
back towards home via the park
street, where children are playing, the youth
is chilling and adults are chatting. I sit down
next to my neighbours and enjoy the beauty
of my living environment.*

the main walking route

5.6 STRATEGY OF EXECUTION

This graduation project has explored the implementation of the utopia of the walkable city for the postwar neighbourhood of Pendrecht. The design may therefore be interpreted as a fairy tale. However, Rotterdam is a city of doing and making it happen: *'Geen woorden, maar daden'*. Therefore, this section gives an overview of the strategy of execution, to showcase how the utopian design could become reality. The strategy consists of two parts: the order of execution and the mechanisms and stakeholders that play a role in the transition.

For the execution of this radical redesign, it is necessary to rethink the traditional business models. On the long term, the redesign of Pendrecht will have significant benefits for people and planet. However, the focus in urban developments currently lies too much on direct economic returns. Including the societal value and the long-term gains in the social cost-benefit analysis, will make the investment in the realisation of the utopian design possible and profitable.

Consecution

Imagine: in a year's time, it will begin. The first community will be transformed into a joyful, healthy living environment. It will start with the opening of the neighbourhood parking garage, where every resident can park their car for free or at a reduced rate, unlike the paid street parking.

During the voluntary change in parking behaviour, the communal gardens can already be redeveloped into allotment gardens with associated meeting places. This will cover about half of the allotments envisioned for Pendrecht. Enthusiastic residents can be pioneers in starting an allotment garden.

The establishment of a community building for gardeners can act as a catalyst for the revitalisation of the community centres. Combined with place-making for and by the residents, other small-scale social and commercial functions can be attracted.

Once on street parking is relocated to the community parking garage, the comprehensive redesign of the streets can begin. The first step will be to roll out the main walking network through Pendrecht, ensuring that residents have direct and pleasant pedestrian connections to all destinations in the neighbourhood.

Residents can be involved in the design of the public park in their streets and in the planting of edible vegetation.

Subsequently, the other streets can also be redesigned with allotment gardens and meeting places. The materials from the car infrastructure and pavements can be collected at the edge of each community. The street bricks and tiles will be reused in a mixed pattern for the pedestrian streets and in a semi-paved pattern for the paths in the garden environment.

Finally, a recreational, ecological walking route will be created around the neighbourhood by connecting existing green areas and diversifying the greenery. At the same time, the main road Slinge can be transformed into an urban farm and public park (west side) and densified by adding workplaces and housing (east side).

In preparation for the complete transformation of Slinge, a 'cut' can already be made in the car road, to make space for a public park adjacent to Plein 1953. To preserve to bus connections through Pendrecht, a six metre wide bus lane on Slinge will be available at all times. This two directions lane can also be used by emergency vehicles.

Flexibility of parking garages

For the Tiengemetebuurt, the existing Park & Ride (P&R) facility will be utilised and expanded. The P&R currently has 880 parking spaces. The Herkingenbuurt, Zierikzeebuurt, and Ossenisebuurt will get a new parking garage at the edge of each community. To meet current parking demand, these garages will need to be large, but the number of private cars is expected to decrease significantly in the future. Therefore, the garages have to be designed in a modular way, so that they can be dismantled in phases. For example, every time the parking demand has dropped with 10 percent, a part of the garage can be demounted and rebuild in a following neighbourhood that is in transition. Furthermore, shared use of the parking facility is possible. The parking garages in the north of Pendrecht can be shared with the sports clubs in Zuiderpark and with Ahoy.

For the current parking demand, an average of one car per household is taken, resulting in a need for 5500 parking places. Divided over four communities, this means 1375 places per parking garage. When the garages are designed with 5 layers, the ground surface will be around 6000 m² (0,6 ha), see figure 5.17.

Investment in allotment gardens

A significant improvement in the quality of public space will increase property values in Pendrecht. A large part of the property belongs to housing corporations De Nieuwe Unie and Woonstad Rotterdam (van Ostaaijen, 2012). However, raising rent prices is not desirable and, to certain extent, also not allowed. Therefore, the value will increase only on paper, until rental homes are sold in the future. Nonetheless, Woonstad Rotterdam (n.d.) states in its mission that it wants to contribute to a pleasant neighbourhood to live in, by also supporting social developments. Thus, the housing corporation can be an interesting stakeholder for investment in the redesign of Pendrecht.

For the Municipality of Rotterdam, the development of allotment gardens in Pendrecht is also a worthwhile investment. The city's maintenance department incurs costs for maintaining public spaces. The allotments will relieve the municipality of these maintenance tasks and associated costs, as the public space will be maintained by residents and gardeners under the principle of self-management. Hence, it is a one-time investment for the municipality, after which it will be free of maintenance costs.



5.17 The ground surface (0,6 ha) needed for the parking garages at each corner of Pendrecht (Google Earth, 2024, adapted by author)

'[...] an allotment garden is a haven for biodiversity where the municipality doesn't need to manage anything!'

- Willemien Alberts, former chair of allotment association Leeuwenbergh in The Hague (Obsurv, 2020, translated by author)

The residents' organisation Vitaal Pendrecht can play a crucial role in setting up the garden communities. The organisation already offers valuable programmes by and for residents. This can be expanded in the Pendrecht Allotment Garden Complex. The Vitaal Pendrecht location on Plein 1953 can be supplemented with four smaller community buildings in the centre of each community.

Integrated approach to sewer replacement

Pendrecht is now about seventy years old, the 'depreciation period' of the neighbourhood is reached. In the meantime, little major maintenance has been done to the public space. In the coming years, Pendrecht and other post-war neighbourhoods are therefore scheduled for sewer replacement (Stadsbeheer Rotterdam, 2020). Sewer replacement is a significant investment for the municipality and offers opportunities to link with the redesign of the outdoor space. Stadsbeheer Rotterdam (2020) also describes the benefits of an integrated approach to sewer replacement: it is efficient, sustainable, and cheaper.

Educational programme

In the cultural shift towards a lifestyle centred around walking and gardening, re-education is crucial. Children can learn from a young age about the benefits of walking and natural gardening. Primary schools in Pendrecht are key stakeholders for delivering an educational programme combined with school gardens. This principle can be modelled after the Municipality of Amsterdam, which has a system of school gardens and nature education for primary school students since 1920 (Gemeente Amsterdam, n.d.). In Pendrecht, there are two other resident-driven parties that can play a role in nature education: Pendrecht University and the neighbourhood garden Arboretum. Pendrecht University, part of the Vitaal Pendrecht foundation, offers a variety of programmes for residents of all ages (Vitaal Pendrecht, 2023). A collaboration between these three stakeholders can be sought to establish an educational programme for a joyful lifestyle in Pendrecht.

Healthcare

Healthcare is a significant social cost in the Netherlands, and given the poor mental and physical health in Pendrecht, it will be no different there. As found in the literature review in chapters 2 and 5, walking and gardening are powerful means for preventive care, for physical, mental, and social wellbeing. This means that investing in the design of a healthy neighbourhood can drastically reduce

healthcare costs. Again, an example can be taken from Amsterdam, where the relation between neighbourhood design and the health of its residents is researched, in collaboration with VU Medical Centre (den Hertog et al., 2006). In Rotterdam, Erasmus MC could play a key role in monitoring resident's health. On a smaller scale, Pendrecht's health centre is a strategic stakeholder for promoting a healthy lifestyle. Moreover, insurance companies could provide significant incentives for healthy lifestyles by reducing the insurance premium for residents of healthy neighbourhoods.

The garden is my pride

Pendrecht's residents are now very attached to their cars. The car is a status symbol, their pride. Although the car is not banned in this redesign for Pendrecht, it is given a third-class position at the edge of the residential area. This risks taking away the pride and self-esteem of the residents. Conversely, this redesign can give people a garden, and not just any garden. A spacious, green, sunny garden with enough room to garden, relax, and invite friends and family. For a district where over seventy percent of people live in flats (AlleCijfers.nl, 2024), this will be a welcome surprise. Therefore: the request for a beloved Rotterdam folk singer to release the following song: 'De tuin is mijn trots' (The Garden is my Pride).

Conclusion

Investing in the transformation of Pendrecht now will evoke significant savings in the long run. Property values will rise. The maintenance costs for public spaces will disappear. Healthcare costs will drop significantly. By linking the redesign to the planned sewer maintenance, an efficient investment can be made. Early involvement of Pendrecht's residents, through organisations like Vitaal Pendrecht and the primary schools, will increase the chances of success for the realisation of the 'utopia'. In the long term, the radical redesign of Pendrecht will yield much more than it costs. Sookha & Hoornstra (2022) from The Positive Lab, therefore, emphasise the importance of bringing the money from the expected savings forward to make the investment possible. Thus, the recommendation for the aforementioned stakeholders is to dare to think differently, letting the future benefits and savings lead, rather than the costs of the one-time investment.

5.7 THE WIJKGEDACHTE REVITALISED

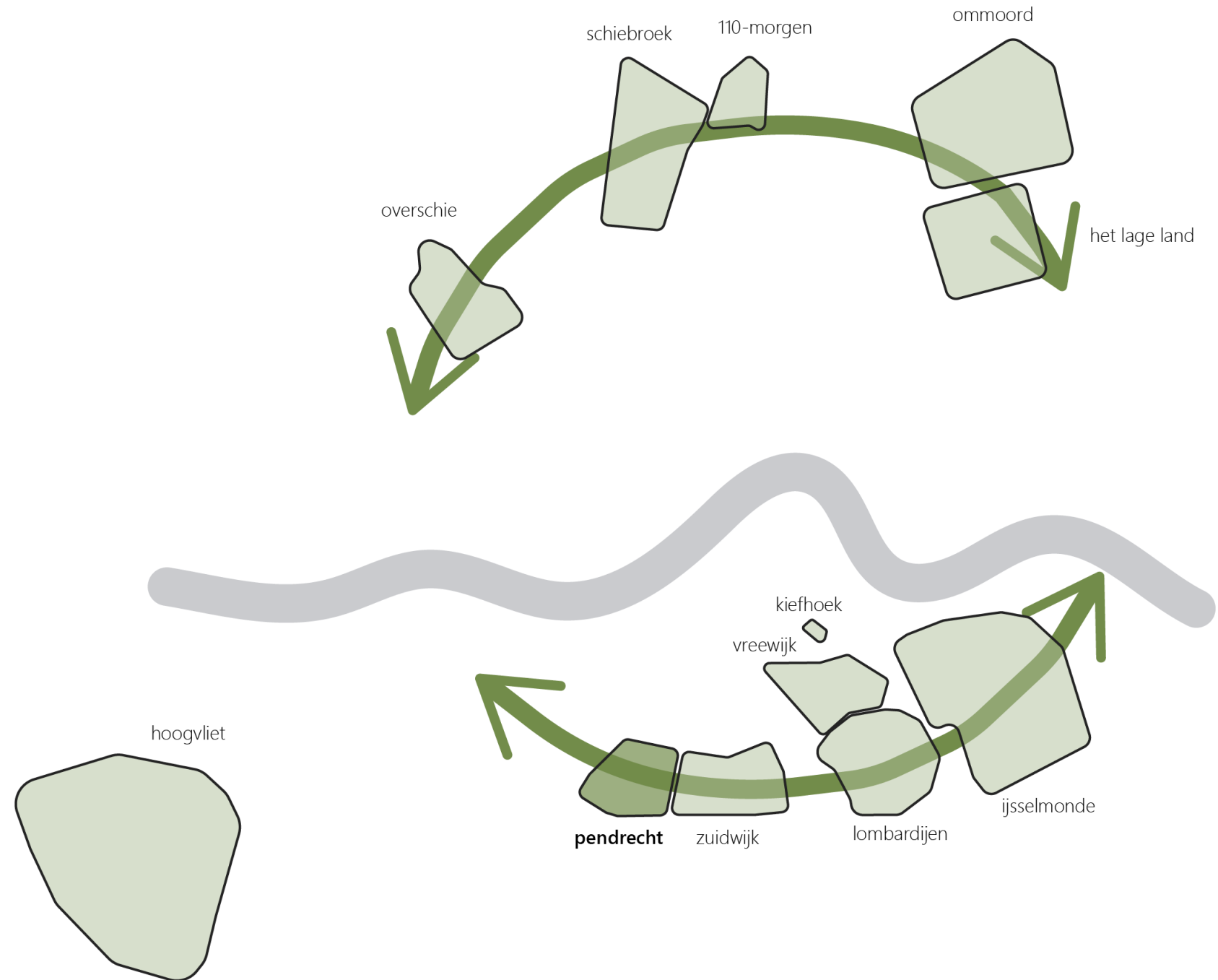
The 'recipe' for the joyful walkable allotment garden neighbourhood, as designed for the postwar neighbourhood of Pendrecht, could function as an inspiring example to be implemented on the scale of the city. During the 20th century, a series of neighbourhoods is designed in Rotterdam, in which the idea of community building and the *wijkgedachte* is applied in an experimental manner.

Vreewijk (1919) is an example of a neighbourhood based on the concept of the Garden City from Ebenezer Howard and Raymond Unwin. At the base of Howard's Garden City is the creation of cooperative communities, which Unwin translated into the design of liveable, social environments for the working class (Blom et al., 2004). Hoogvliet is developed as a 'new town', functioning as a satellite city of Rotterdam. The idea was that it would function as a complete, urban community, as envisioned in Howard's model (Blom et al., 2004). Zuidwijk is the first spatial translation of the *wijkgedachte*, as published by group Bos. In the urban design, the neighbourhood is seen as the most important element for community building (Blom et al., 2004).

When radically redesigning these types of neighbourhoods in Rotterdam, in line with the utopia of the walkable city in combination with the allotment garden concept, the *wijkgedachte* could be revitalised. As a result, a garden ring of Rotterdam will be created, visualised in figure 5.18. The often forgotten postwar neighbourhoods at the edge of the city will be put on a pedestal. Consequently, Rotterdam's energy will proverbially shift from the centre towards the joyful ring of garden neighbourhoods. The city of Rotterdam could be a pioneer in showing how to radically redesign the postwar neighbourhood for a joyful future of its residents, just like Rotterdam's urban designers used to be pioneers in applying the *wijkgedachte* in the postwar period.

5.18 >

*The garden ring of Rotterdam
The wijkgedachte revitalised*





*A joyful environment, at first glance
Communal garden, Pendrecht
(Google Earth, 2023)*

6.1 CONCLUSION

Postwar neighbourhoods have not been developing into pleasant living environments since their idealistic urban plans in the 1950s and '60s. On the contrary, these types of neighbourhoods often consist of repetitive apartment blocks surrounded by large plains of grass and car infrastructure, resulting in a low quality of life. This graduation project has looked into the case of postwar neighbourhood Pendrecht in Rotterdam. Statistics show high percentages of overweight, loneliness and risk of depression for this neighbourhood. In other words, the urgency for improvement of the living environment, and as a result more healthy behaviour, is large.

Therefore, the main research question of this graduation project is:

How can the radical redesign of a postwar neighbourhood lead to a joyful future for its residents?

Before responding to the main question, three sub questions will subsequently be answered.

In what way can the urban environment evoke joy?

For this study joy is defined as the totality of physical, social and mental wellbeing. Walking is found to be strongly related to all three types of wellbeing. Walking is a healthy physical activity, it stimulates social encounters with neighbours and intentionally slowing down, especially in nature, relaxes the mind.

Therefore, walkability was taken as the starting point of the radical redesign of the postwar neighbourhood. Since it is a radical redesign, this graduation project has explored a utopia. In conclusion, the utopia of the walkable city will bring a joyful future for its residents. When the neighbourhood is designed for walking, its residents will have a more healthy lifestyle, neighbours will have more heartwarming social encounters and people will feel more calm and relaxed. By prioritising walking, shifting towards a local, wellbeing economy and creating social-ecological networks, cities will be able to create more resilient, liveable and joyful urban environments for generations to come.

In the redesign for walking, it is important to understand the needs and desires of the pedestrian. Ten design principles have been found in literature, divided in three categories: proximity of urban amenities; inviting routes for people and nature; and more space for walking, less space for driving. A short study on the economy of urban amenities has shown

that only a certain amount of services can be available within walking distance, defined as maximum 15 minutes. That is because of the critical mass of users required for an amenity to function. Within a walkable unit of 1 by 1 kilometre, i.e. the neighbourhood, daily amenities should be available, such as primary school, general practitioner, playgrounds, supermarket, café and metro station.

What are the (hidden) qualities of a postwar neighbourhood?

For implementation of the utopia of the walkable city on the postwar neighbourhood, the qualities of the original plans for the postwar neighbourhood have been unravelled. Postwar neighbourhoods, such as Pendrecht, have been planned with the *wijkgedachte* from study group Bos as the guiding principle. After the war, urban designers were searching for a way to bring society back together again. The 'ideal neighbourhood' was envisioned to build strong, social communities and achieve *joie de vivre* for its residents.

In the plan for Pendrecht, Lotte Stam-Beese took this idealistic approach to an even smaller scale. She found the best size for socialising in the neighbourhood unit, an half open building block for ninety families divided over different housing types. On one side of each block, she designed actual play streets, where children could play and cars could be parked.

She connected the houses and the streets to the communal gardens in the middle of the block through a network of walking paths. By mirroring the neighbourhood units, Lotte Stam-Beese built up the design for the whole neighbourhood. In the middle of Pendrecht, she designed a commercial centre, so that the neighbourhood could function independently, while still being part of the city of Rotterdam. Four singels divide Pendrecht into four smaller communities, which all had their own centre for daily groceries.

With this design, Lotte Stam-Beese was aiming for a strong community feeling and a healthy and pleasant life for the residents of Pendrecht. However, these original ideals have seemed to get lost in time. The explosive growth of the private car and the resulting upscaling of amenities have drastically changed the behaviour patterns of the neighbourhood. Three of the community centres have disappeared and cars have dominated the (play) streets. The extensive network of walking paths and communal gardens is still present. However, the lack of quality resulting from the low economic resources in the postwar period does not make them attract many users. Few people are walking in Pendrecht and few residents are using the overload of public space.

Structure walking plan

The design principles for walking, found in the first sub question, have been combined with the hidden qualities of the postwar neighbourhood of Pendrecht in the design of a structure walking plan for the neighbourhood. An important decision at the base of the design is that the neighbourhood is primarily meant for walking and motorised traffic can drive around and park at the corners of the four communities. The *wijkgedachte* of the original design will be revitalised by bringing back the community centres at each quarter, which will provide daily social and commercial amenities. The wide car road connecting the metro station with the neighbourhood centre is an important link in the walking network and will therefore be densified with apartment blocks with work spaces in the plinth. The long lines in the urban landscape will be redesigned as the main walking routes, as they connect all important destinations in Pendrecht. For the purpose of restorative walks, the green spaces at the edges of the neighbourhood will be connected into a 'forest' walking path.

How to give the excess of public space to the residents?

As concluded from the second sub question, there is a lot of public space between the buildings in Pendrecht. On the one hand this concerns the plains of grass in the communal gardens and on the other hand the drosscapes

of car infrastructure that will lose their function in the design of a walkable neighbourhood. To give meaning and quality to the public space, this project has looked into the systematic of the allotment garden complex. Allotment gardens are car free areas with a close-knit network of walking paths along beautiful, biodiverse gardens. The garden association has a good organisation and a strong feeling of community.

Designing the public space of Pendrecht as an allotment garden complex is a fitting solution for a joyful future of the residents which connects well to the design of a pleasant walkable environment. Gardening relates positively to joy, since it benefits the physical, social and mental wellbeing of the gardener. The social aspect of the garden association will strengthen the revitalisation of the four communities, as described in the structure walking plan. The quality of the public space will be grandly improved by the implementation of diversely green allotment gardens, which will be maintained by the residents themselves.

Garden community

For this study, a zoomed in design is developed for the Herkingenbuurt, one of the communities in Pendrecht. At the heart of the area, the community centre is located, as was also present in the original design of Lotte Stam-Beese. The commercial and social amenities provide indoor and outdoor space for the

community to get together and carry out their daily activities. The main walking routes leading to and from the centre are designed as a public park with edible vegetation. The other streets and communal gardens are redesigned with allotment gardens in different sizes. Half-paved walking paths create a calm and natural walking experience along the low hedges of the gardens. Each garden path has a communal meeting place with a water tap. Approximately 35% of the households of Pendrecht can have an allotment garden. To stimulate walking, the residents can rent a garden on the opposite side of their community centre.

Answering the main question

How can the radical redesign of a postwar neighbourhood lead to a joyful future for its residents?

The first important notion is that walking leads to joy, since it improves the physical, social and mental wellbeing of people. So, the base of the radical redesign has been to develop an utopian city in which walking is the most normal thing to do. The utopian ideas have been implemented in a structure walking plan for the postwar neighbourhood of Pendrecht. Design principles for walking are combined with the hidden qualities of the original design of Pendrecht by Lotte Stam-Beese. The public space of the neighbourhood is redesigned as an allotment garden complex, to improve the quality of the green spaces,

strengthen the feeling of community and create a walking environment that is both attractive and restorative. The garden atmosphere is alternated with a lively public park atmosphere at the main walking routes. The main routes, connecting the community centres with the neighbourhood centre, schools, metro station and parking hubs, will cluster the pedestrian flows to strengthen the social aspect of walking. As a result, radically redesigning the postwar neighbourhood as an allotment garden complex, in which walking is central, can lead to a joyful future of its residents.

6.2 DISCUSSION

Reality versus utopia

This research and design project is very valuable on a conceptual level. It showcases the positive outcome of rethinking the city and the neighbourhood and shifting the focus from fast mobility and economic development towards people-centred design in balance with the natural environment. However, since the basis of this graduation project is the design of a utopia, it is still far away from the current situation. Therefore, the design cannot directly be implemented. Further research should be done on the phasing from the reality to the utopia, and the cultural shift required for this transition. This is beyond the scope of this project.

Scope and transferability

During this graduation project, the focus has shifted from the scale of the whole city of Rotterdam inside the ring road, towards a single neighbourhood: Pendrecht. So, the large ambition has been elaborated on a detailed level for an exemplary neighbourhood. A postwar neighbourhood, to be specific. The

urgency for improvement of the postwar neighbourhood is high, but so is the potential of those wijkgedachte-inspired areas. The radical redesign of Pendrecht can be transferred to other postwar neighbourhoods in Rotterdam, the Netherlands, and beyond, because of the similarities in the urban fabric and the original design ideology. However, the transferability of the 'recipe' for a joyful Pendrecht to other types of neighbourhoods is less likely. A large part of the redesign is based on the specific urban fabric of modernist urbanism, with large spaces between buildings and central clusters of amenities. So, for a joyful, walkable future of the whole city of Rotterdam, further research is recommended on the other neighbourhood types in the city.

What evokes joy?

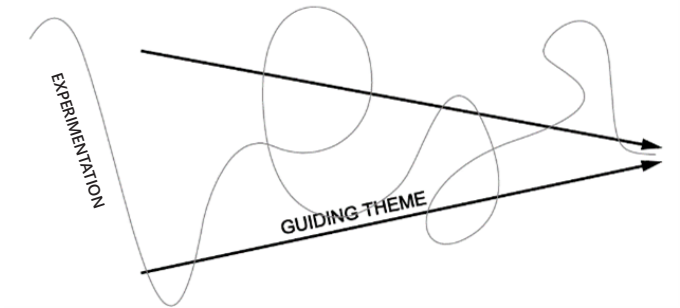
The first sub question of this project was: In what way can the urban environment evoke joy? During the literature review, a strong relationship has been found between walking and joy. This theory has formed the basis for the urban design. Later in the project, walking is complemented with gardening, as a joyful activity. However, there is an endless amount of other activities that could lead to joy, because the experience of an emotion is very personal and differs per individual (Desmet & Fokkinga, 2020). In other words, the design result could have been very different, when another answer would have been found to the first sub question.

6.3 REFLECTION

In this reflective paper I will assess the value of the approach and topic of my graduation project in the broader scientific and societal context. I will start with an introduction of the guiding theme of my project. Then, I will elaborate on the relation between the topic and the graduation studio, the master programme, and the master track. Next, I will reflect on the relation between research and design and the value of the approach. The relevance and transferability will subsequently be valued. I will conclude the reflection with my personal growth. Literature will be used to underpin the process of my graduation project.

Introduction

The development of my guiding theme started with asking myself: what frustrates me in the urban landscape? The answer was: cars, in Rotterdam. So, I started the project with the idea of a car free city. During the first half year, I have been experimenting with new methods, extreme scenarios and imaginative designs and I have been reading literature related to the topic. As shown in figure 6.1, this has resulted in the development, and convergence, of my guiding theme. From car free city, to living local, to joyful city, to walking. So, my point of view towards the topic has reversed, from a 'negative' approach (forbidding cars) to a 'positive' approach (encouraging walking).



6.1 Development of the guiding theme, through experimentation.
Adapted from: Van Dooren (2013: 9)

Relation to academic programme

The graduation studio Design of the Urban Fabric is seeking for answers to the following challenges in the urban realm:

1. How will we live together?
2. Rethinking city and landscape
3. How we move in cities
4. New forms of living and working

The topic of my graduation, walking, is clearly linked to the third challenge 'how we move in cities'. I have explored walking as an answer to the challenge, because of its wide range of benefits. A feeling of community, that walking could arise, is linked to the first studio topic 'how will we live together?'. Moreover, a shift from fast mobility to walking will open up a lot of space in the city, which I propose to redesign into allotment gardens. This is linked to the studio challenge about 'rethinking city and landscape'. The fourth studio topic 'new forms of living and working' is also relevant in the

walkable city, since a diversity of destinations should be available primarily at walking distance.

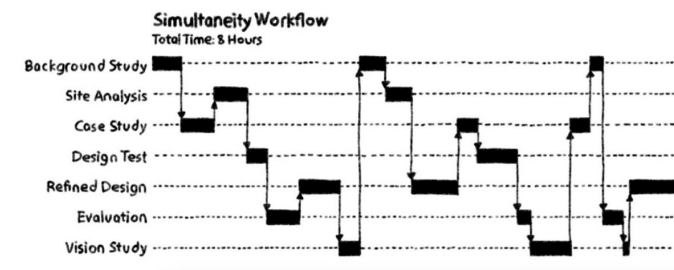
The relation between my graduation project and the master AUBS programme can be found in the approach of the topic. The topic of walking in the built environment is addressed in an integrated design project, touching upon multiple angles, as described above. More specifically, the topic of walking is related to the Urbanism track, because it seeks answers to local and global trends such as the climate crisis, the need for housing, individualism and increasing amounts of obesity. The topic is explored through multiple scale levels. Introducing the topic of walking is a result of a critical analysis of the status quo and it provides a solution for a sustainable and liveable urban environment.

Design-driven approach

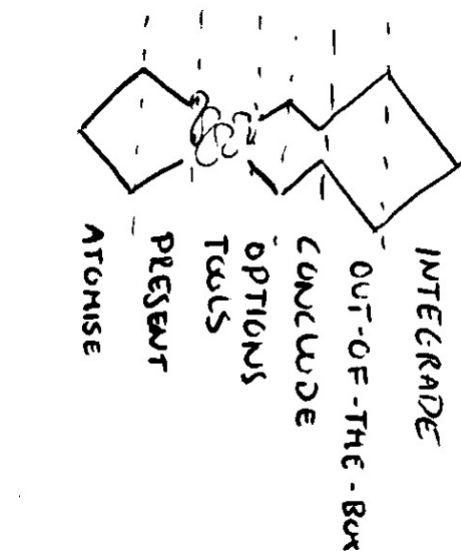
Drastic change is necessary to solve the complexity of the current crises. My graduation project is therefore imaginative and explores a what if scenario. The methodology is design driven. Design explorations have been alternated continuously with research, when additional literature or analysis was needed, see figure 6.2.

The benefit of a design-driven approach is its ability to think in possibilities, rather than be limited by the current way of thinking.

The Elements of the Delft Approach, as have been taught to me in the focus intensive, provide methods to systematically work in an explorative way, see figure 6.3. Generating options and thinking out of the box are especially helpful in escaping the status quo.



6.2 Analysis, Design and Presentation in a simultaneous workflow.
From lecture slides by Dijkstra & Muñoz Sanz (2023)



6.3 The Elements of the Delft Approach:
A sequence of diverging and converging

I am convinced that a design-driven approach is valuable, because it allows to explore a completely different way to shape and use the urban space. It takes courage to step away from the current system, because people tend to be reluctant to significant changes in their daily lives (Thaler & Sunstein, 2008). As an urban designer, I can show an alternative way to move in the city, a joyful way.

Ambition towards design

I started the graduation year with a large ambition, to solve the challenge for the whole of Rotterdam inside the ring road. However, I found it hard to get grip on the design on such a large scale. I have experienced that designing went best for me when I could actually imagine walking through it and seeing it from the eye-level perspective. That is why I decided to zoom in to the neighbourhood scale. I started with the postwar neighbourhood of Pendrecht and I found it quite an interesting case. Therefore, I have chosen to dive deeper into this particular neighbourhood, rather than designing less in dept for multiple types of neighbourhoods.

Relevance

Scientific relevance

For science it is relevant to provide a completely different perspective for the future of mobility in relation to the design of cities.

'To minimise the machine and optimise society.'

- Marco te Brömmelstroet, 2023

In other words, create a future city model in which the happiness of people is central, instead of the accommodation of a constant flow of cars going fast and far. Space is scarce in the city, so it is relevant to explore ways to get more quality for the people in the public space.

Next to that, for social sciences it will be relevant to explore how the city can be designed to stimulate social interactions and build a sense of togetherness, instead of continuing individualism in society.

Societal relevance

The current mobility model is not socially oriented. To make a transition to social mobility is of high societal relevance. Rethinking mobility will give more space for healthy behaviour and for pleasant living environments within cities. This is highly relevant, because growing numbers of people are living in cities worldwide (Montgomery, 2015).

A walkability approach will also be able to change time 'lost' in traffic: not having to go further and faster but staying close. While walking, using the time for joyful city life: i.e. social encounters, re-energising in nature, spending time with relatives. In an era of innovation and digitalisation, going back to the basics of joy is something people need – even though they might not know this urgency themselves yet.

Transferability

I have explored the utopia of the walkable city for the postwar neighbourhood of Pendrecht. In Rotterdam, the Netherlands, and beyond, there are many neighbourhoods built with the same characteristics that are now dealing with the same social problems. The 'recipe' that I have designed for a joyful future of Pendrecht could be transferred to other postwar neighbourhoods, to revitalise the wijkgedachte. However, at the base of the design are the existing (hidden) qualities of the neighbourhood's original design. Therefore, no design solutions can directly be applied

to other locations. It is crucial to first unravel the historical intentions and the remaining structures for walking and community building that are present in a certain neighbourhood.

Personal growth

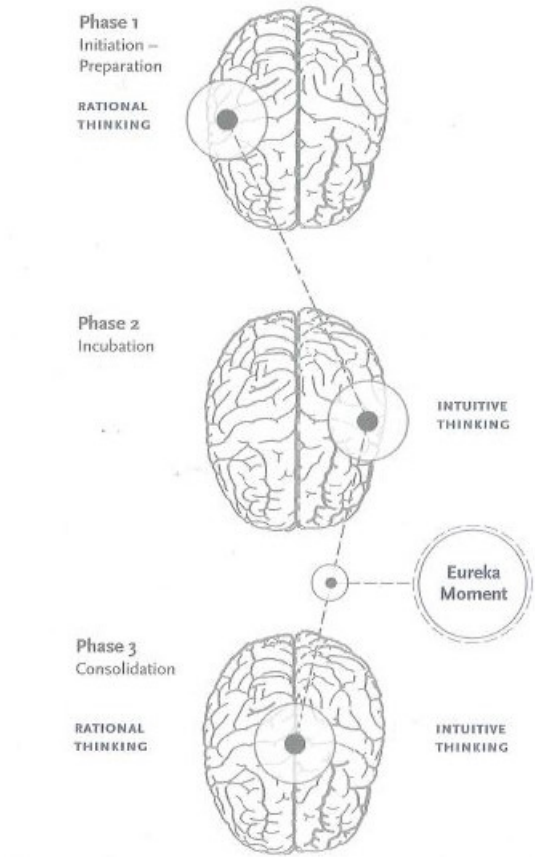
I have taken the graduation year as an opportunity to explore how I, as an urban designer, could enable change. I have developed my personal skills mainly in the category 'acting' from the Inner Development Goals, see figure 6.4. I have combined creativity and optimism to design an utopia, and this required quite some courage.



6.4 Inner Development Goals Framework (Jordan, 2021)

This has brought me a complex design project, in which it was challenging to stay close to my ambition. I have been finding my way between the two quite different approaches of my mentors. Zef has been advising me to start from walking and hiking paths, nudging people without drastic interventions. On the other hand, Rients asked me every week what I was going to do with the cars. It was important to clarify my position.

While reflecting back on the process, I recognise that I have also developed my personal goals of 'being', as shown in figure 6.4. To be self-aware and present when faced with complexity is something I have settled through walking. I have started walking a lot, through Pendrecht and in my own living environment. Taking a step back during the design process, by making a walk, has helped me to both stay calm and let new thoughts flow. This is what Foqué (2010) calls the incubation phase, see figure 6.5. To conclude, walking has been important for the development of my project, but also for the development of my personal goals.



6.5 The creative proces over time (Foqué, 2010: 39)

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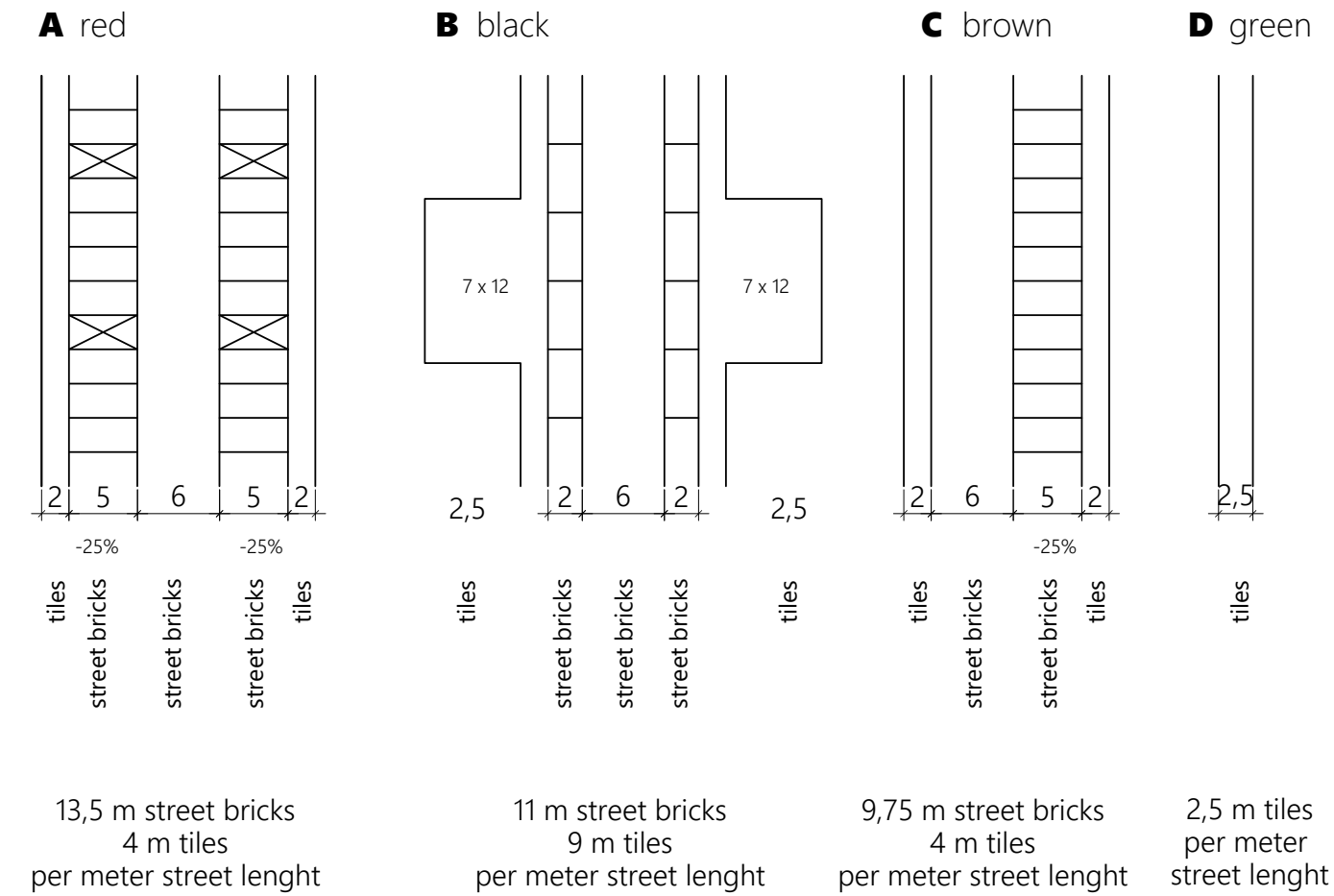
APPENDIX A: REFERENCE NORMS URBAN AMENITIES

	Source: Gemeente Den Haag (2021)				Source: Gemeente Rotterdam (2021)	Source: CBS (2021)				
	INHABITANTS	CENTRUM	GEMENGD	GROEN_		SERVICE	PROXIMITY	DISTANCE	Amount <1 km	Amount <5 km
		STEDELIJK	STEDELIJK	BLAUW		AREA				
		1 per amount of dwellings:	1 per amount of dwellings:	1 per amount of dwellings:						
EDUCATION										
Primary school		2.100	2.320	1.165	Buurt/wijk	< 1 km	0,5 km	4,2		
Secondary school		5.100	5.100	3.660	Stadsdeel	< 10 km	1,1 km			21,5
Daycare						< 1 km	0,5 km	4,8		
HEALTH & WELLBEING										
General practitioner	2.095				Buurt	< 5 km	0,6 km	3,9		
Dentist	2.000				Buurt					
Pharmacy	6.600				Buurt/wijk	< 1 km	0,6 km			3,4
Physiotherapist	1.075				Buurt		0,5 km	3,6		
Obstetrician	2.000 women in fertile age				Buurt					
Hospital							2,2 km			
Centrum Jeugd en Gezin					Stadsdeel	< 3 km				
Buurthuis					Buurt					
Wijkcentrum					Wijk	< 3 km				
ART & CULTURE										
Cultuuranker					Stadsdeel	< 3 km				
Library	30.000				Wijk		1,2 km			
Podium arts							2,7 km			7
Pop podium							4,8 km			
Cinema							4,3 km			2,1
Sauna							3,7 km			
Attractie (theme park?)							3,6 km			
SPORT										
Sport hall	22.000				Wijk	< 3 km				
Swimming pool	77.500				Stadsdeel	< 5 km	1,6 km			
Scouting						< 3 km				
Outdoor sport fields					Stadsdeel	< 3 km	0,9 km			
Play sport fields					Stadsdeel					
Sport in public space					Buurt (<1 km)					

	Source: Gemeente Den Haag (2021)						Source: CBS (2021)		
	INHABITANTS	CENTRUM STEDELIJK 1 per amount of dwellings:	GEMENGD STEDELIJK 1 per amount of dwellings:	GROEN_ BLAUW 1 per amount of dwellings:	SERVICE AREA	PROXIMITY	DISTANCE	Amount <1 km	Amount <5 km
PUBLIC GREEN & PLAY									
Playgrounds						0,2 - 0,3 km			
0-6 y/o	50 children	265	275	200	Buurt / blok				
7-12 y/o	75 children	525	530	275	Buurt / blok				
13-18 y/o	100 children	675	785	350	Buurt / blok				
Public green		8.000 m2 per 1.000 dwellings	16.000 m2 per 1.000 dwellings	24.000 m2 per 1.000 dwellings	Buurt		0,4 km		
Park or platsoen							0,4 km		
Day recreation terrain							2,4 km		
Forrest							2,3 km		
Nature terrain							4,6 km		
Semi-public green									
Allotment gardens							1,5 km		
Verblijfsrecreatief terrein							5,4 km		
Cementary							2,3 km		
Recreatief binnenwater							1,8 km		
RETAIL									
Large supermarket							0,5 km	3,4	
Other daily supply							0,4 km	26,4	
Warehouse							1,5 km		6,4
HORECA									
Café							0,6 km	16	
Cafetaria							0,4 km	13,5	
Restaurant							0,4 km	15,6	
Hotel							1,6 km		27,9
PUBLIC TRANSPORT									
Trainstation							2,9 km		
Important trainstation for transfers							6,1 km		
Well connected:									
Metro / lightrail						< 0,25 km			
Trainstation						< 0,5 km			
IC-trainstation						<0,75 km			

APPENDIX B: AMOUNT OF PAVEMENT MATERIALS

Series of standard street profiles as found in Pendrecht now:



E garden ~950 m² tiles
per communal garden

Lenght of streets per profile type



