CITY

AROUND THE CORNER

Strategic design interventions to alter the urban rhythm in the peri-urban areas of Rotterdam

MSc thesis

Juliette Brouwer
MSc Architecture, Urbansim and the Building Sciences
Delft University of Technology

Here it is...

This thesis is the result of a 10 month graduation trajectory in which I have obtained very valuable practical and academic experience. Therefore, I would like to take the opportunity to thank a few people that supported me in establishing this work.

Thank you,

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June 24, 2022

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Faculty of Architecture and the Built Environment
Msc Architecture, Urbanism and the Building Sciences
Track: Urbanism
Studio: Design of the Urban Fabric

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"In Berkeley [California], at the corner of Hearst and Euclid, there is a drug store, and outside the drug store is a traffic light. In the entrance to the drug store there is a newsrack where the day's papers are displayed. When the light is red, people who are waiting to cross the street stand idly by the light; and since they have nothing to do, they look at the papers displayed on the newsrack which they can see from where they stand. Some of them just read the headlines; others actually buy a paper while they wait.

This effect makes the newsrack and the traffic light interdependent; the newsrack, the newspapers on it, the money going from people's pockets to the dime slot, the people who stop at the light and read the papers, traffic light, the electric impulses which make the lights change, the sidewalk which they stand on form a system – they all work together.

From the designer's point of view, the physically unchanging part of this system is of special interest. The newsrack, the traffic light, and the sidewalk between them, related as they are, form the fixed part of the system. It is the unchanging receptacle in which the changing parts of the system – people, newspapers, money, and electrical impulses – can work together."

Christopher Alexander in '*A City is not a tree*.' (2017)

To me, this is Urbanism.

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INTRODUCTION

1.1 GUIDING THEME

The 15-minute City

The 15-minute City concept functions as a guiding theme for my research project. The concept, introduced by the French scientist Carlos Moreno in 2016, comprises a description of a city model that puts forward the importance of **vicinity** in the city. The 15-minute City is a city in which all urban facilities needed to live, learn and thrive are within a 15-minute reach by foot or bicycle from home.

Those urban facilities comprise work, housing, food, education, healthcare, culture and leisure, according to Moreno (2020a). The model forms a new narrative that criticises urban dysfunctionalities like long commutes, noisy streets and inactive spaces. The key concepts of the 15-minute city, being density, diversity, proximity and ubiquity, are at the root of **reconnecting people to their neighbourhoods and localising city life.** These qualities seem to redefine the typical concept of the neighbourhood. It puts the focus on strategically bringing functions to the residents. This is fundamentally different from models that have been developed before, which particularly focused on bringing housing to the functions (Moreno, Allam, Chabaud, Gall, & Pratlong, 2021; Pozoukidou & Chatziyiannaki, 2021).

In 2016, the concept was used in the policy of Paris, introduced by the mayor Anne Hidalgo, to emphasise proximity-based planning towards a more healthy city.

Motivation for the theme

To me, the 15-minute City is an appealing concept because:

- The criticism on urban dysfunctionality and the aim for minimisation of motorised mobility caught my **interest** and feeling of **urgency**.
- The logistic character of the concept makes it interesting to research. It asks for a **reinterpretation of the city structure and layering**. This puts focus on the relation between concept and case and means the success and necessity of the 15-minute City differ per case.
- The time element, the 15 minutes, that is captured in the name reflects a societal understanding of the **relation between time and happiness.**

Taking these first notions on the concept with us, it is time to further deepen the meaning of the concept. Although clear statements are made about the objective and the parameters of the concept, still much is left for imagination. For example, the stretch of the concept: is it solely about walking and cycling? or could it also include public transport? Could those 15 minutes also mean 10, depending on the neighbourhood size? What about the location of the neighbourhood in relation to the rest of the city? What amenities are included in this reach, is nature for example part of this? Or social life within the house?

From this first theoretical exploration, it could be concluded that the 15-minute City is a city model that puts focus on the meaning of the **neighbourhood**. Therefore, whe should not only speak of the 15-minute City, but also of the 15-minute neighbourhood. The uncertainties embedded within this meaning of 15 minutes must be explored in a **certain context** to achieve deeper understanding. That's why this concept is taken as starting point and functions in this thesis as a guiding theme for exploration, analysis and design.

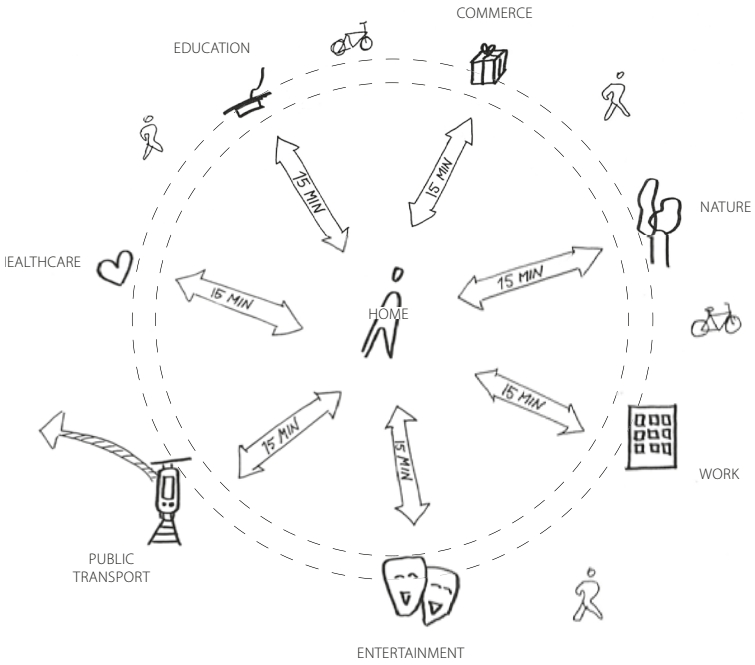


Figure 1: The 15-minute City

"La ville du quart d'heure [...] offre un autre rythme qui permet d'avoir du temps our soi, sa famille et ses voisings, de multipier les usages des lieux, de suscter de la fierté et de l'attachement. Nous voulons reprendre ce temps perdu, au profit de la créativité , du temps social et du temps intérieur. Le temps s'est envolé, laissant place à l'anonymat, à la course permanente et au stress. Notre défi, pour maintenir l'intensité sociale, est d'imaginer une ville vivable, quelle que soit sa taille."

- Carlos Moreno in '*Droit de cité*' (2020)

"The quarter-hour city [...] offers another rhythm that allows you to have time for yourself, your family and your neighbours, to multiply the uses of places, to arouse pride and attachment . We want to take back this lost time, for the benefit of creativity, social time and inner time. Time has flown away, giving way to anonymity, constant running and stress. Our challenge, to maintain social intensity, is to imagine a livable city, whatever its size."

A city model tradition

The 15-Minute City concept derives from a long tradition of attributing time-bound ideals to a city structure. In urban design, utopianism makes architects and urbanists imagine what could be the desired city in a spatial form. The strong **relation between urban design and utopia** finds its origins in the ambition of balancing nature and technology, or individual and collective, at a time when these seem to drift apart.

City models respond to different ways of distributing land, technology in urban design, spatial organisation and politics. Before starting my research on the 15-Minute City concept, a concise analysis is done of precedent city models to achieve a deeper understanding of the meaning of a city model for urban design and its evolvement over time. This analysis could be found in Appendix I. Several key characteristics are identified, showing the wide scope of the models:

- Developer and means (time-bound)
- Response to a trend (technology, industry)
- The concern of social groups (socio-economic)
- Relation with nature (environmental)

According to Picon (2013), contemporary city models need a different sort of relationship between image and practice. The transfer of utopian concepts to the public is heavily determined by the **means of communication**, for instance, press, film or digital media. However, contemporary city models currently seem to pass over this importance of media. Often those models, like the Compact City and the Doughnut City, are developed by researchers. The **objective**, therefore, differs from former developed city models, all developed by architects. For instance, the city models developed by Le Corbusier and Frank Lloyd Wright show clear ideals about the reform of society as a whole, intended to reach a wide audience and create a base for their future design. The communication goes via several media, like drawings, texts and plans.

Those models have shown clear influence on projects in practice, like the Garden Cities in England and the Bijlmer area in Amsterdam. Both examples have been criticised in later periods for their lack of liveability and flexibility.

Recent models have a more **specified audience**, like policy planners or professionals. The focus on the medium has become less of an interest to the developers. This explains the meagre, mainly textual elaboration of the 15-Minute City to the public. Nevertheless, the 15-Minute City fits perfectly in the list of ideal city models. This opens up the question: how is this model translated to projects in practice? And maybe even more important: how do we make sure that those projects are not only responding to the current needs but also respond to future demands, therewith, **perform flexibly** over time?

Figure 2: 'Ypenburg City' 1984. Zeefdruk by Willem Jan Neutelings. Property of Het Nieuwe Instituut Rotterdam.

1/15

'Ypenburg City'

Model or fashion?

In two years, the 15-minute City concept has evolved from a promising planning ideology to a sexy slogan among city developers. However, the self-explanatory the concept may seem, it is often **not properly understood** by developers and designers. The concept is interpreted in the light of (large scale) mobility transformations, therefore passing the significant focus on the neighbourhood.

Recently realised projects, see figure 3, show interpretations of the 15-minute City that are too easily made, based on wrong assumptions of the meaning of those 15 minutes. In this thesis, the 15-minute city is understood as a concept that aims to design for proximity. The concept promotes local life, accessibility and physical health. This means, proper design tools should be developed to create this 15-minute city of proximity, instead of a 15-minute city of overestimation.

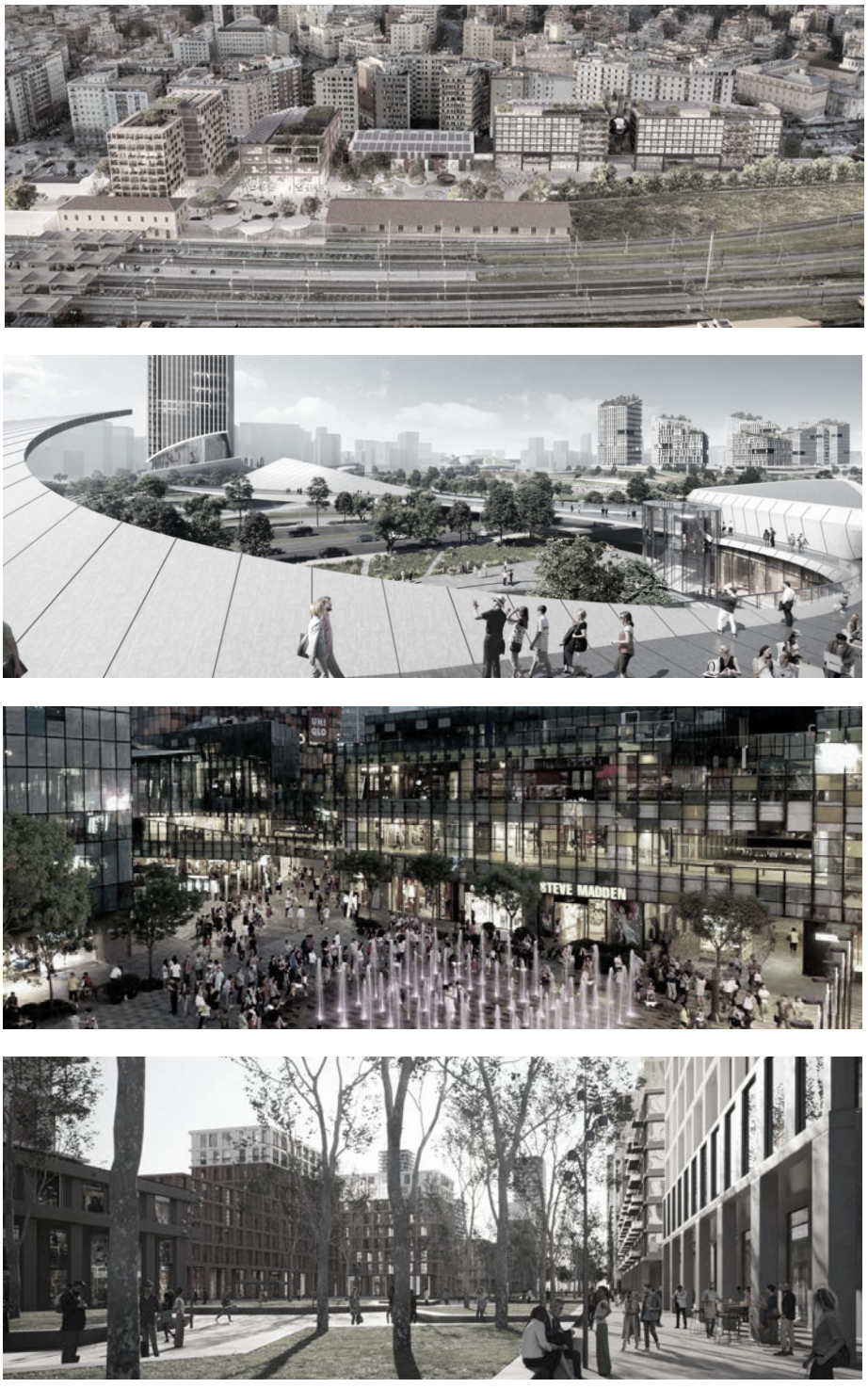


Figure 3: Recent projects that claim to develop a 15-minute City. From top to bottom: Campo Urbano (Rome) by Arney Fender Katsalidis, Qilong Innovation Park (Chengdu) by Chapman Taylor, The Point (Utah) by SOM, ZIL South (Moscow), by KCAP

1.2 PROBLEM DEFINITION

1.2.1 Drivers of change

My graduation research has evolved from a certain sense of urgency and responds to several global phenomena, the drivers of change:

Global warming and pollution

In the current era, the biggest global challenge is to prevent the planet from further global warming. According to IPCC (2021), human influence is causing irreversible damage to our human and natural systems because of greenhouse gas emissions. Increased emissions lead to heat retention in the air and on the surface. An increasing amount of (extreme) heatwaves, heavy precipitation, sea-level rise, acidification and drought result in the loss and relocation of local species, loss of productivity, the disappearance of ecosystems and yield reductions both on land and water.

Urbanisation

Globally, an emergent trend of migration to cities is observed. Cities are centres of innovation and economic growth and therefore perform as a big attractor for settlement. However, with urban growth comes a risk of overpopulation and incapability to manage the urban systems. Issues like urban poverty and inequality, pollution and environmental degradation appear in both developing and developed countries (UN-Habitat, 2018).

Digitalisation

The trend of digitalisation has a huge impact on the way that we use our cities. Take, for example, the rising amount of webshops and delivery services. These platforms reorganise many logistic systems in de cities. Selling points vanish, distribution points emerge. Digitalisation knows no distance, resulting in universal ideas about society and the city (Beigi, 2018). This means it must be taken into account that urban uses have digital manifestations which are not always visible in the physical environment.

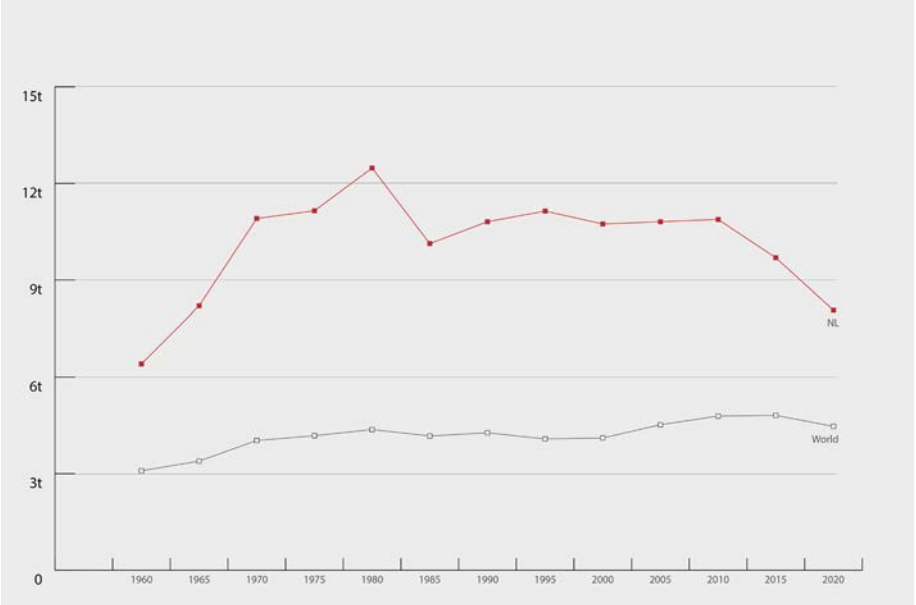


Figure 4: CO2 emmissions in tonnes per 1000 inhabitants. Based on data from ourworldindata.com (2021)

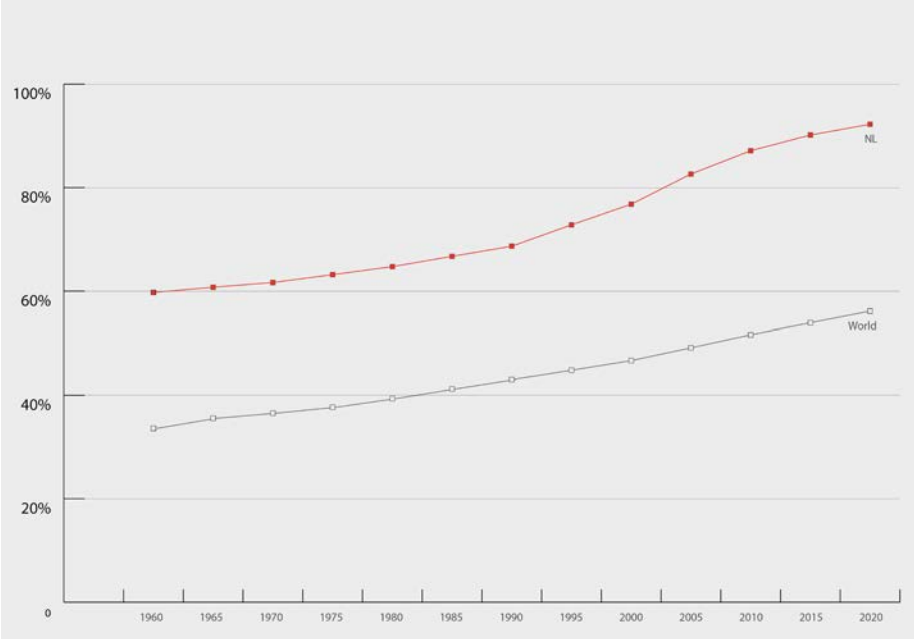


Figure 5: Percentage of urban population. Based on data from ourworldindata.com (2021)

1.2.2 Problem field

In the western world, those drivers of change make many urgencies and challenges apparent in the urbanised landscape. In this thesis, several problems are identified.

The problem of private motorised mobility

In the Netherlands, the mobility sector is responsible for 20,2% of the greenhouse emissions, therewith being the second biggest emitting sector (CBS, 2021). Those emissions account for bad air quality in the Netherlands. Another type of pollution that is observed, is noise. In the Netherlands, 70% of the households is located in the vicinity of a source of noise, being 50 decibels or more.

Besides, the deeply rooted habit of motorised private vehicle use accounts for the prioritisation of **speed and efficiency over recreational use** in public traffic space. According to Sheller and Urry (2000), mobility should bring freedom to the urban citizen to move around in the public, but simultaneously, mobility is interfering in public space. Since the emergence of private motorised traffic, extensive infrastructure and storage space has taken up valuable spaces in the city. Space that was once made for public and family life on the street now forces the urban resident to live a stretched life moving from one fragmented city district to the other. Also, by democratising this freedom of movement, meaning expanding the infrastructure for motorised mobility, it is normalised that car ownership is a common base.

Thus, it has become imperative to persevere change in our current mobility system. Problems like **noise, pollution and space scarcity** ask for a new system that includes clean efficient traffic. To move away from the dominant use of the car, we need attractive clean modalities and new transit points. Currently, the urban fabric is not facilitating this transition.

The problem of Dutch densification

In the Netherlands, a steady trend of urbanisation is observed within a context of limited land, water management challenges and economic growth. Since the 1960s, with the establishment of the National Policy documents of Spatial Planning, strict urbanisation strategies were adhered to resulting in compact urbanisation and the formation of buffer zones (green zones). However, Dutch urban planning, also known as **clustered dispersal**, received criticism as well. In the 1990´s large-scale suburban neighbourhoods, Vinex locations, were planned along public transport trajectories. This planning trend, together with economic growth, resulted in a **fragmented urban fringe** (Nabielek, Kronberger-Nabielek, & Hamers, 2014).

Currently, the Netherlands is facing a large **housing crisis**. The growing amount of households combined with a housing lack results in uncomfortable living circumstances and prices soaring sky-high. It is expected that the Dutch population will count 18,8 million by 2030. This means, between 2020 and 2030, 845000 extra homes are needed. Currently, the shortage counts 331000 (Rijksoverheid, 2020). Shortage of construction location and the nitrogen crisis limit the growth that is needed desperately. Cities and regions toil to balance the supply and demand of the housing stock. Therefore, **densification is urgent** and insurmountable. According to Koomen and Claassens (2018), more than half of the increase of Dutch homes took place within the existing urban fabric. Moreover, they say that there is substantial room for further intensification in the coming years.

Figure 6: News. source: AD (2020), architectenweb (2020), NRC (2020), NRC (2021), NRC (2022), Volkskrant (2021)

n van de Wiel | 20 maart 2018 | 2 Reacties

loe beteugel je de auto en boek je erreinwinst voor fietsers, voetgangers e iet openbaar vervoer? Elk stadsbestuur vorstelt met die vraag. Want pijnlijke euzes die soms op harde weerstand tuiten zijn onvermijdelijk. We nderzochten de situatie in Rotterdam, Utrecht en Den Bosch. "Ik had wel eens olitiebegeleiding nodig."

Ik woon aan een verkeersriool". Mathilde Toet

Woonhuizen langs de A13 in Rotterdam-Overschie
ANP XTRA

Vieste lucht in Rotterdam en Rijswijk: kijk hier hoe het zit ir ouw woonplaats

Rotterdam, Schiedam en Rijswijk zijn d meest vervuilde steden als het gaat om uitstoot door verkeer en industrie. De gemeenten Nederweert, Ede en Barneveld, Velsen en Beverwijk hebben de hoogste concentraties fijnstof.

latasja de Groot 08-01-20, 13:27
aatste update: 08-01-20, 14:22

eportage

Knallende uitlaten en onkende motoren: uitgaan voor de een, overlast voor de ander

laneren Gemeentes worstelen met luid ronkende auto's en motoren, die rondjes door de stad ijden en overlast veroorzaken.

Anne Corré 11 oktober 2021
Leestijd 6 minuten

Ministerie steunt 33 gemeenten om sneller woningen te bouwen

15 december 2021, 9:29

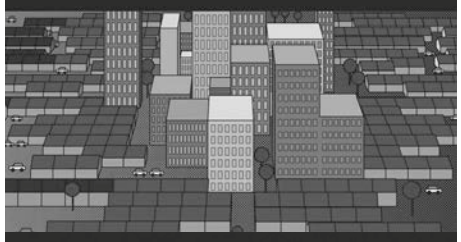
3

Het ministerie van Binnenlandse Zaken steunt 33 gemeenten met miljoen euro om sneller tienduizenden betaalbare woning te bouwen. Die woningen zijn bedoeld voor starters of mensen een middeninkomen.

Graag juist méér verdichting in Rotterdam

Verdere verdichting van Rotterdam s hard nodig om de verstedelijking n goede banen te leiden, stelt *Jaap van der Want*. Daarom is de kritiek op de gemeentelijke Omgevingsvisie, die breekt met het rampzalige verstedelijkingsbeleid, onterecht.

28 december 2021 Leestijd 2 minuten



TACOMMISSARIS

20.000 nieuwe huize epland in kwetsbare ebieden'

-- 7 december 2021
Leestijd 1 minuut

de één miljoen woningen die tot 203 ouwd moeten worden, staan er 820.0 ebieden die last kunnen krijgen van teroverlast, droogte, hitte of lemproblemen. Daarvoor waarschuwt tacommissaris Peter Glas in een advie de regering. Huizen moeten normaal proken zo'n vijftig tot honderd jaar egaan. Wetenschappers zeggen dat he t ondenkbaar is dat de zeespiegel doo naatverandering in die periode twee ter stijgt. In zijn advies aan de

Hoe keert 'afvoerputje' Feijenoord het geweld en de verloedering?

Kwetsbare wijk De dure nieuwbouw illustreert hoe de stad steeds verder oprukt op Rotterdam-Zuid. Op pad met twee wetenschappers en een wijkraadslid, na een zomer met schietpartijen. „Het is een freudiaans stukje stad."

Steven Verseput 9 september 2021
Leestijd 8 minuten

hollandsnieuwe. 4G 14:10 55 %

deVolkskrant

OPINIE

Opinie: Sloop goede woningen in de Tweebosbuurt is de bulldozerdemocratie ten top

Rotterdam kreeg, met andere grote steden, onder druk van bewoners eind vorige eeuw een sociaal stedenbouwkundig beleid dat segregatie en gettovorming voorkwam. Hou dat zo.

Tim Verlaan en Aimée Albers 30 juni 2021, 10:00

V Live | Editie | Best gelezen | Zoeken | Service

Ongelijkheid in gezondheid is een nationaal probleem

Coronaherstelplan Covid legde grote ongelijkheid bloot, rapporteerde het CBS deze week. Waar blijft het herstelplan voor achterstandswijken?, vragen *Lodewijk Asscher*, *Ron Meyer* en *Marco Pastors*.

1 april 2022 Leestijd 3 minuten

Densification of the existing urban fabric means not only intensification of housing, but also intensification of urban programme, like amenities, infrastructure, energy and green. The urban space must be designed in a way that it could facilitate a variety of intense urban processes. Alleviating this urbanisation pressure is a big challenge in the coming years and needs strategic design (Hamers et al., 2021).

The problem of Rotterdam

Although Rotterdam is a unique city with a diversity of potential, a lot of improvement is to be made. Statistics show that Rotterdam performs the worst of the 4 big Dutch cities (Amsterdam, Rotterdam, The Hague and Utrecht) in the field of economic and social well-being see figures 7-11.

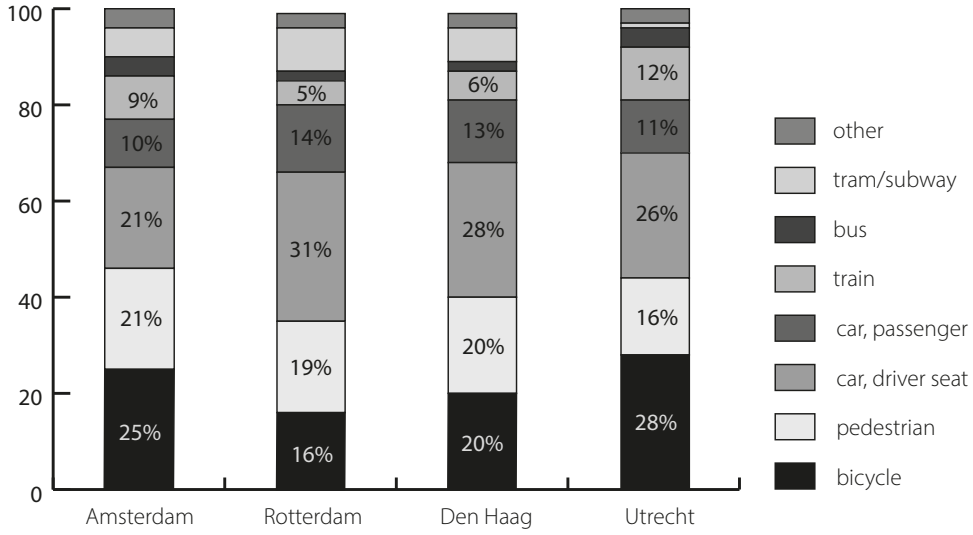


Figure 7: Model split in the four big Dutch cities. based on data from Mobiliteitsbeeld (2019)

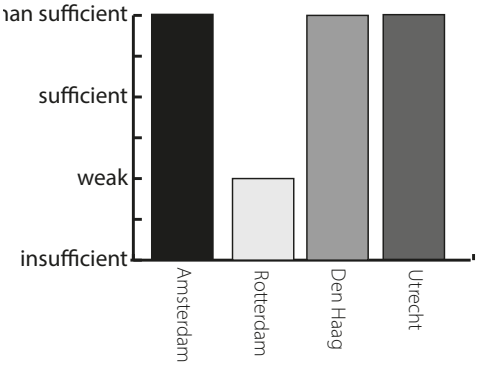


Figure 8: score Leefbarometer. based on data from Leefbarometer (2020)

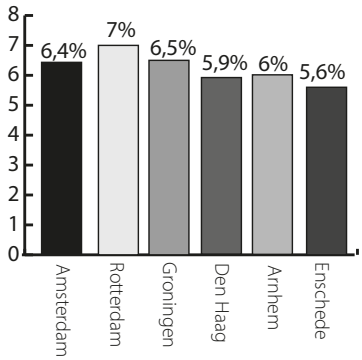


Figure 9: poverty on long-term. based on data from CBS (2020)

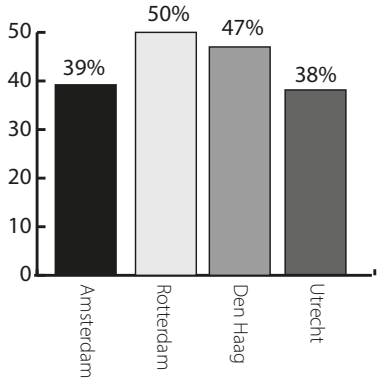


Figure 10: Overweight. based on data from CBS (2020)

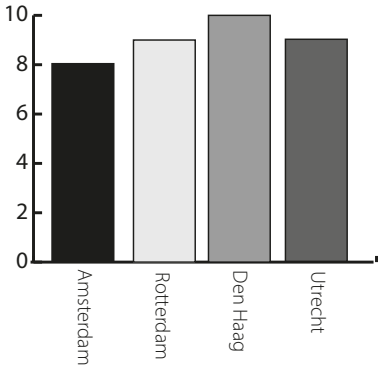


Figure 11: Disruption of public space. based on data from CBS(2020)

1.3 PROBLEM ANALYSIS

1.3.1 A city with two faces

On the 14th of May, the city centre was bombed. An area of 250 hectares was ruined. 80000 inhabitants lost their homes, which resulted in an extreme housing shortage. Therefore, cores near Rotterdam that survived the bombing, like IJsselmonde, Charlois and Hillegersberg underwent rapid growth. After the WOII, reconstruction started, a rough plan was designed that could take into account new traffic flows without any constraints formed by the past.

1940

The city is a breeding ground for architectural experimentation. In terms of development, open locations next to railways or highway junctions were 'filled' with commercial and industrial areas. A Rotterdam example is the expansion of the Alexandrium, the largest shopping centre of the city near the rail and highway. Those developments are characterised by a very functional design and a lack of basic urban or architectural quality.

1960

Rotterdam is the second city of Holland. Until 1900, city districts are built on the former polder structure of the landscape which is visible in the 'singelplantsoenen': long green traffic axes that define the city structure. Around 1900, the 'Sprong naar Zuid' moved port activity from the inner city to new establishments, like the Rijnhaven (1895) and the Maashaven (1903).

1900

Figure 12: Historic overview of the development of the city of Rotterdam. Images from van de Laar (2021)

Migrant workers moved to Rotterdam to work in the reconstruction of the city and new (port) industries. They settled in cheap rental houses. Also, the ring highway of Rotterdam (Rotterdamse Ruit) was constructed. This formed an impulse for the development of suburban residential neighbourhoods that could profit from the highway connectivity to commute to work. An example of those neighbourhoods is Prinsenland (1990).

2000

2020

Rotterdam is a city with two faces: on the one hand, it is the sky-line global city where culture and business activity is centred. On the other hand, it is a city dealing with a super diverse demographic, segregation and low liveability. Both identities come forth from the history shaped by harbour activity, which is still a big economic driver for the city. Currently, city harbours have lost their functions with open possibilities for regeneration of those areas.

1980

The post-war expansion continued following the 'wijkgedachte': the neighbourhood was taken as a building block for community living. The neighbourhood was seen as a residential base, for urban activity people could go to the inner city. The city was designed according to modernistic ideals: function separation and large spaces for traffic circulation defined the city.

Figure 13: Historic cores in the peri-urban areas of Rotterdam


1448 - 1900
1900 - 1920
1920 - 1940
1940 - 1960
1960 - 1980
1980 - 2000
2000 >
1 km
1960-1980
1980-2000
2000-2020
200000
250000
300000
350000

1.3.2 A city of cars

Because of the grand post-war reconstruction and expansion of the city, Rotterdam has many motorways crossing the (inner) city. **Air pollution** is at several locations a prominent issue. Some zones near high-intensive traffic roads do not meet the European norms for air quality (Rotterdam, 2020). The same areas prone to pollution, are also prone to traffic **noise**.

Next to car circulation, car storage is another concern that needs to be highlighted. Moving through the (peripheral) city is not possible without the observation of ubiquitous **parking**.

Rotterdam has well-connected car infrastructure on a local, city and regional scale. However, this has consequences for the network of bicycles and pedestrians, which lacks a clear and continuous structure that makes the network occur very **fragmented**. This impacts the accessibility of locations for work and public life.

Figure 14: The fast-traffic network of Rotterdam

Figure 15: Cars in Rotterdam (from left to right: Overschie, Hillegersberg, IJsselmonde, 's-Gravenland)

1.4 THEORETICAL FOUNDATIONS

To understand how to design with a certain concept in mind, the **theoretical background of the key themes** is indispensable. My research builds on three bodies of knowledge:

1. On centrality
2. On spatial compactness
3. On place identity

On centrality, why is it important?

In urban studies, centrality is recognised as an important measure for understanding complex relational networks. Spatial analysis on centrality gives a clear understanding of the hierarchy of the city structure and therewith gives an insight into our spatial cognition and dynamical behaviours. The more central a place, the more important it is for the city is commonly taken as truth. Therefore, urbanists need to look at the distribution of centrality as a shared resource of the urban community (Crucitti, Latora, & Porta, 2006). **In my research, knowledge about centrality will guide me in understanding how to design for proximity.**

In my project, street centrality appears not only important because of the potential for local activity, but also because Rotterdam has a very well-structured street network. This means central places will appear clearly in the analysis. However, those places are often designed for fast traffic. I presume in the case of Rotterdam, spatial quality, density and permeability are also determinant factors to understand the success of a central place for the local activity. It is evident that centrality should be assessed on base of scale and traffic type (fast or slow) to achieve the desired centre type.

On spatial compactness, a means or a goal?

Since the 1950s, growing welfare and innovation in infrastructure made it possible to work and consume on a long distance from home. This resulted in **urban sprawl**, which is characterised by spatial homogeneity, mono functionality, fragmented urban structures and loss of nature. By many scholars, these characteristics are conceived as the ingredients for a dysfunctional city (Alexander, 1968; Dantzig & Saaty, 1973; Gehl, 1987; Jacobs, 1961) The compact city movement advocates change in the trend of sprawl, celebrating the long Dutch tradition of compact building.

However, building compact cities is a planning paradigm that is discoursed rather **controversially** in the academic world. First of all, there is no clear universal conception of the compact city. This results in an academic debate with inconclusive and often contradictory evidence (Kain, Adelfio, Stenberg, & Thuvander, 2021). Often, by compact is meant dense and mixed. This is somewhat short-sighted since this reduces a complex structure (the city) to just one or two criteria. On top of that, Neuman (2005) explains that compact doesn't necessarily mean sustainable. Compact is a description of the urban form, which is not sustainable in itself. Compactness is a means to achieve sustainability and liveability, rather than a goal.

It is not said that compactness does not result in **sustainability**. Compact buildings are energy efficient and the proximity of compact districts leads to the ability of urban dwellers to walk or cycle to work or amenities. According to Berghauser Pont et al. (2019), building density (Floor Space Index as well as Ground Space Index) is an important driver for the intensity of pedestrian flow. The denser, the higher the intensity. The question remains if compactness also actively reduces automobile movements. Greenwald (2003) concludes in his study that

compact design generates greater support for walking and therefore they do induce more walking trips but does not affect automobile trip generation. Neuman (2005) also calls the link between higher densities and reduced automobile trips weak. However, a significant relation is identified by him, but only when it concerns the short trips to local activities.

The 15-minute City concept draws further on the idea of compactness. According to Moreno, in a 15-minute City, "all citizens can meet most or all of their needs within a short walk or bike ride from home. It is intended to function as a model of reconnecting people to their neighbourhoods and localising city life" (Pozoukidou & Chatziyiannaki, 2021). Special attention is given to the necessity of proximate urban functions. In this theory, urban activity comes to the resident, instead of bringing the resident to the urban activity. Taking this notion into account, compactness is not only about density but also about the **arrangement of functions** and the **quality of connections**.

Yet, due to a long tradition of compact planning policy in the Netherlands, there is a tendency to expand this to the peri-urban zones, because of proximity to the city and the potential for densification (Nabielek et al., 2014; Neuman, 2005). This brings up the question of to what extent this development is wished. Low-dense monofunctional areas are not bad in essence, a place must be examined carefully to understand the suitability for either high or low density.

On place identity, the meaning of suburban

It is essential to understand place identity to recognise how design lands in a specific place. Therefore some theoretical investigation in this theory has been done. My understanding of place identity aligns with the description of Groote and Haartsen (2016) which reads as follows:

1. **specific elements** and structures in these places and landscapes;
2. **physical and man-made processes** that influence the formation of places and landscapes;
3. the couleur locale, representations of, and **meanings and narratives** that are ascribed to the places and landscapes.

In line with the first description, Nogué and Vicente (2004) confirm that society is projected in the landscape. This projection is not only material but also spiritual, ideological and symbolic. In a way, identity is projected in the landscape, which in return strengthens the intensity of identity of place.

Specific elements and structures that influence place identity could refer to buildings, street symbols, names or landmarks. **The couleur locale**, mentioned in the third description, could be measured via several methods. One way is interviewing local inhabitants, to understand their opinion and feeling. A second method that is widely used is the extraction of meanings from texts, discourses and narratives about the region. Often it is found that different identities are put forward by different groups (Peng et al., 2020). Overall, I could conclude that place identity is a layered and complex construct of mixed realities.

The theory of place identity picks up on the idea of **the palimpsest**. This exposes the fact that a place is continuously overwritten. Historic layers form part of the place, but more important is the dynamic meaning of a place. The palimpsest reminds

designers that locality is always a dialogue between past and present and that a designer could have an active role in giving direction to place identity (Wang & Prominski, 2015).

This active role is coming to the front more and more, partly due to rising globalisation and sprawl development (Mehaffy et al., 2010; Pozoukidou & Chatziyiannaki, 2021; Wang & Prominski, 2015). Neighbourhoods are perceived as carriers of social activity. A special case in this field is the **suburban neighbourhood**. This neighbourhood type, defined by its geographical character, is conceived widely as a neighbourhood type that faces excessive presence of mono functionality, spatial homogeneity and social fragmentation. Simultaneously, suburban space is characterised by a strong couleur locale, often related to the diffuse patterns of settlement, which creates a unique type of urban living. As said by Vaughan (2015), 'exactly because they do not receive the close attention of the centre, suburbs have their own dynamic scope in which ideas, forms and practices can evolve and become part of new urban futures.'

In Rotterdam, many diverging identities are found in the peripheral area. Suburban neighbourhoods differ in background and spatial order. The in-between land, or 'Tussenland' in Dutch, is the inevitable blind spot of the periphery that carries any identity (Frijters et al., 2004). This makes the periphery undefinable, but also dynamic and full of potential.

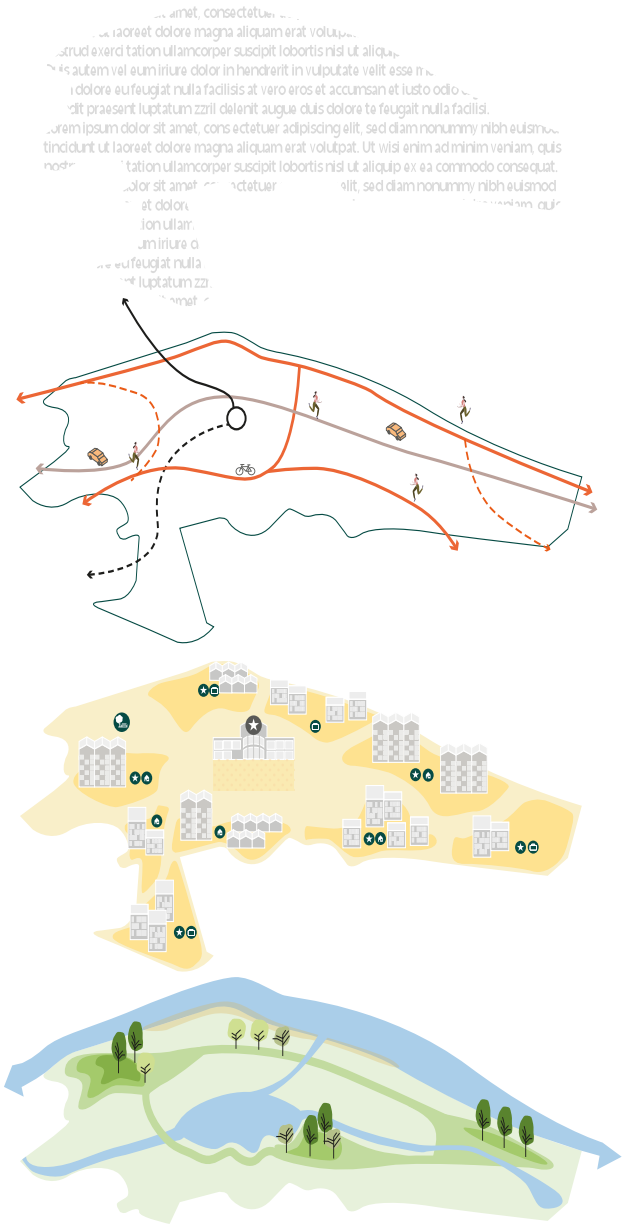


Figure 16: Three layers of identity

1.5 THE SPATIAL CONDITION

The spatial problems named above not only manifest themselves in urban areas. In the context of pollution, urbanisation and digitalisation in the Netherlands, peripheral zones are a **spatial typology of interest**. Where urban areas are characterised by concentration of settlement, infrastructure and economic activity, peripheral zones are considered as a more diverse spatial type, including industry and green as well.

Going deeper into the meaning of peripheral, it is observed that in the inhabited landscape a hierarchy in urbanity could be observed as a **gradient** from urban to rural, visualised in figure 17.

The urban core and inner urban area belong to the urban landscape, followed by the **suburban area**. According to Vaughan (2015), the meaning of 'suburb' is epistemologically weak although it is extensively researched in literature. Often, the suburbs are described as low-dense monofunctional areas attached to the urban core. Yet, the term suburb has diverging conceptions, be it from a geographical, cultural or sociological perspective. They are a subject of widespread significance when conceived as a 'dynamic, generative and principle in the historical differentiation of complex built environments' (Vaughan, 2015, p. 31).

The **urban fringe** is described as a scattered, heterogeneous and fragmented landscape. There is no regularity in scale or programme. Monofunctional areas like residential areas, commercial areas, business parks, retail centres, recreational zones and infrastructure in combination with rural land is characteristic of the urban fringe (Nabielek et al., 2014).

The **rural land** mainly consists of areas of nature conservation, food production or recreation.

Another way of ordering the inhabited landscape is classifying the landscape in either urban, rural or **in-between**, independently of the geographic relations of the location. In this case, in-between land is described as all types of settlements that are dispersed. This means this urbanity type is formed by a complex system of built and open spaces, a varied mix of land cover and a high influence of infrastructure on the way the area is connected and separated (A. Wandl & Hausleitner, 2021; D. I. A. Wandl, Nadin, Zonneveld, & Rooij, 2014). Often, these areas are typified as fragmented and poor, yet they carry much potential for spatial development.

In this research, the focus lies on the **periphery**, in other words, the suburban and fringe areas. This urbanity type appears highly interesting to me, because of the diverse programme and form, demographic differences and opportunities for development. In Europe, peri-urban zones have a higher projected growth rate than urban zones (Piorr, Ravetz, & Tosics, 2011). In many planning policies, attention is given to peripheral areas. Because of the diverse landscape, challenges and qualities are highly divergent. Some problems are most apparent in the peripheral areas, like car dominance, low accessibility, social segregation and the lack of spatial quality. Simultaneously, peripheral areas have the complex potential for sustainable development and densification, because of the relative large amount of open space.

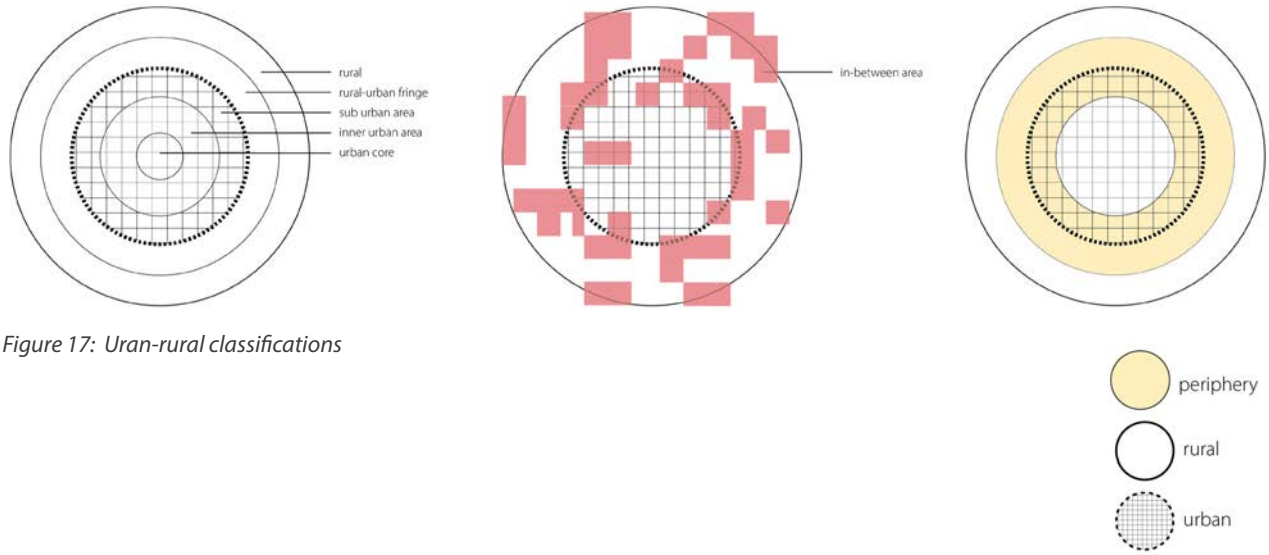
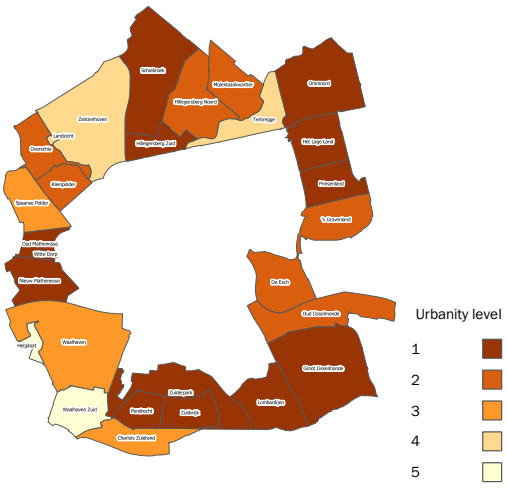
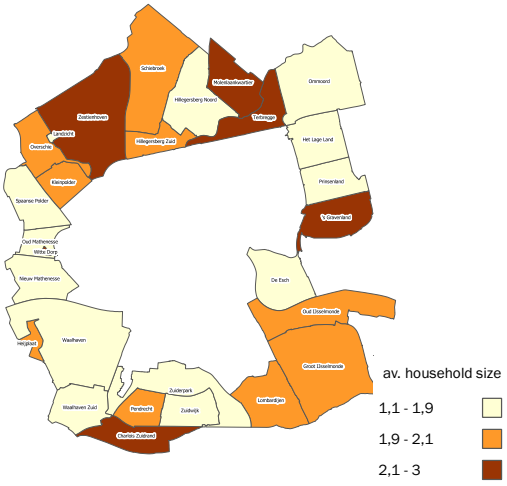


Figure 17: Uran-rural classifications

Because of the Dutch compact planning history, peripheral zones are not so stretched. In Rotterdam, a **narrow area** of approximately 1-3 km is defined as the peripheral zone of interest. Within this peripheral area, neighbourhoods and centres appear as spatial typologies of interest. In the light of growth and transition, the centre of the neighbourhood, a node of economic and social activity, is subject to **formal and functional change**.

Figure 18 shows some basic spatial statistics of the indivual peri-urban neighbourhoods. Remarkably, there is a great diversity in urbanity. In terms of house prices a clear distinction between North and South is observed, which gives an impression of the spatial quality and liveability of the neighbourhoods.





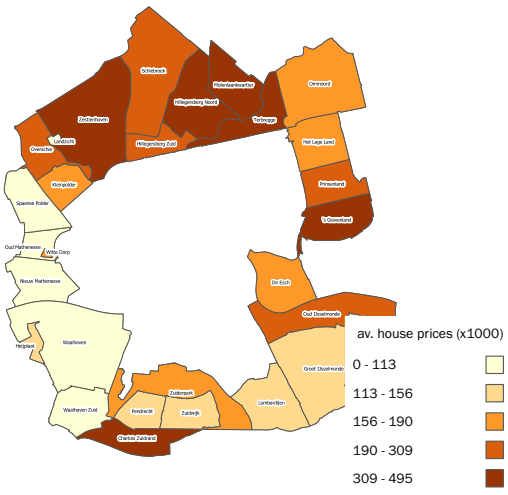


Figure 18: Spatial statistics of the peri-urban zones

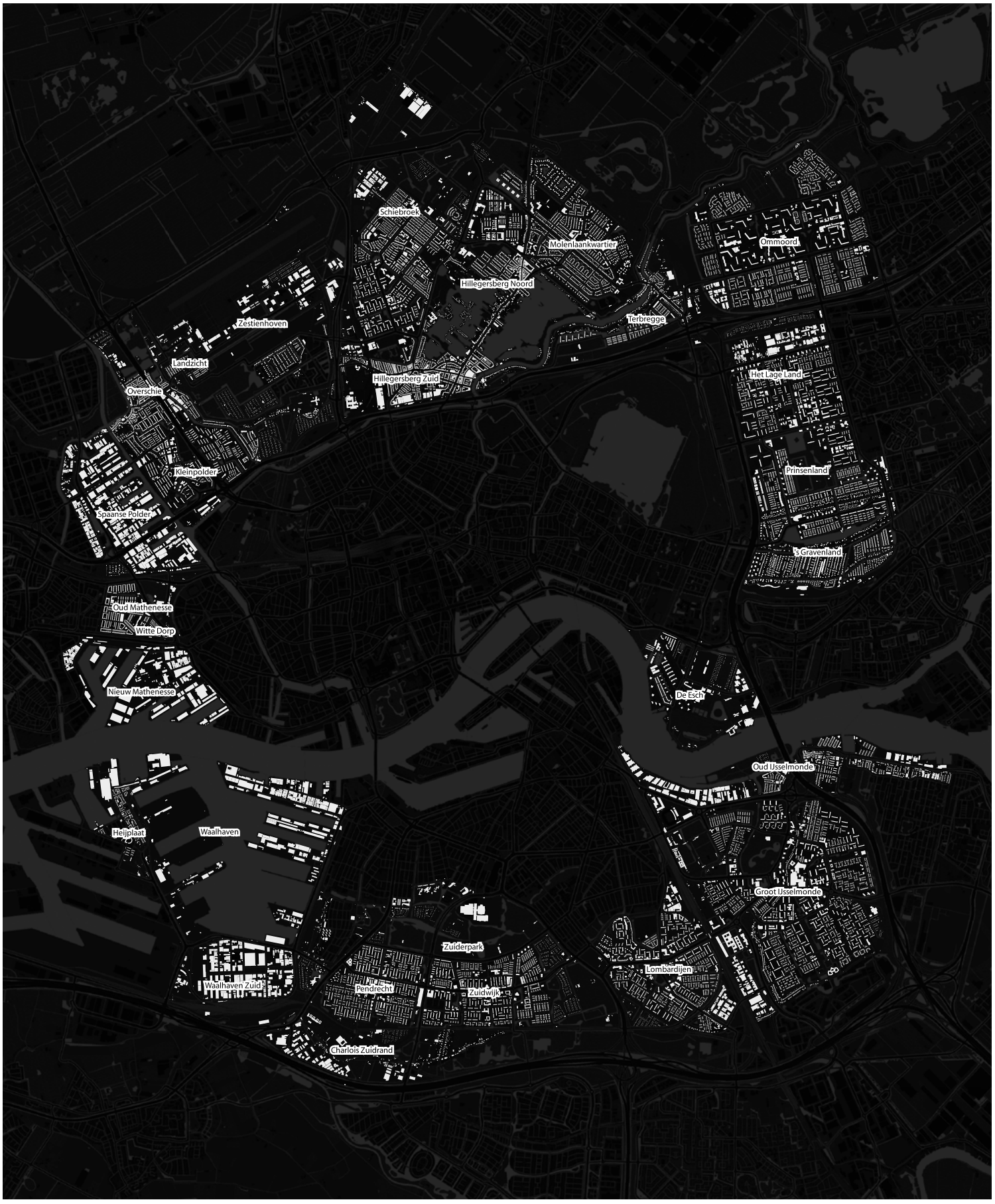


Figure 19: peri-urban zones of Rotterdam

1.6 RELEVANCE

Scientific relevance

The project will add to the body of literature on **the non-residential core in neighbourhoods**. In the existing body of literature, some attention is given to the identification of strategic locations for cores and the effects of the specific placements, but it is not very extensive. My graduation will draw further on the understanding of local cores and their characteristics.

This thesis provides a practical understanding of the 15-Minute City concept, in other words, designing for slow traffic and local activity in the neighbourhood. With application in urban design to a real case, conclusions could be drawn about the topic in **practice**, which will strengthen the scientific understanding of the concepts. The 15-Minute City is explored through a variety of methods, which will enrich the understanding of connection to density, proximity and diversity, something that is acknowledged by Moreno et al. (2021) to further research. Furthermore, the focus on suburban zones appears heavily valuable for the understanding of the 15-Minute City concept. Currently, this theory mainly comprises and celebrates historical centres (like Paris and Utrecht), a reasonable next step is looking into this theory in the **suburban context**.

Because of this practical application, theory on place identity is also assessed, to create a fundament for the design in place. Also in this field, empirical knowledge is needed to figure out practical solutions (Peng, Strijker, & Wu, 2020).
The topic of **transit-oriented development** is researched greatly in literature, nevertheless, the meaning of this trend on a local scale is still quite complex and underexposed. The 15-Minute City concept sets a base to better understand new habits of local mobility. Possibly, this research could enrich the theory on transit-oriented development to find a more healthy balance between the value of local and regional connectivity.

Societal relevance

The project strives to contribute to the creation of liveable peri-urban neighbourhoods in Rotterdam in the context of the current urbanisation trend and the problem of pollution.

By looking at the organisation of functions, density, centrality and urban form, a spatial organisation could be advised that diminishes car use. In this way, space is opened up for other urban functions or slow traffic. This contributes to a more **healthy neighbourhood** (in terms of people and environment), something that is identified as an objective by the Municipality of Rotterdam (Rotterdam, 2020).

Based on the research on local activity and identity, a design strategy specific for the neighbourhoods in question will be proposed. In this way, the research provides insights that are useful for the **development of those neighbourhoods** in practice.

Figure 20: around the corner, Overschie


DE GOEDKOOPSTE
SLIJTERIJ HIER
OM DE HOEK

02

METHODS

2.1 PROBLEM STATEMENT

It has become imperative to persevere change in the design of future urban rhythms. Our current mobility habits result in private vehicles taking up a voluminous amount of public space, manifested in the amount of high-speed roads and parking areas. Besides, the use of private motorised traffic makes the human **unhappy** and **unhealthy**. It has also a negative effect on the environment due to large emission amounts.

To move away from this mobility habit and to deal with urbanisation, new programmes and developments, one of them being Transit Oriented Development (TOD), are established by city councils to adapt the city to a new rhythm: travelling less, clean and efficient. Despite those strategy has the potential to fundamentally change mobility habits, achieving enhancement on the **scale of the neighbourhood is often overlooked.** New physical boundaries are created that reinforce seggregation, pressure on land and often low experience of the environmental quality.

Currently, some areas, mainly suburban, are underserved in their travel options. The urban form and arrangement of functions result in a lack of flexibility and proximity. This creates the unsustainable habit to travel far.

Suburban neighbourhoods do not only experience low connectivity, but also a l**ow local vitality**. This is because of a disempowering combination of low spatial quality, low density and low diversity, some qualities more apparent in one neighbourhood, others in the other.

Rotterdam is a city in which those problems reveal themselves clearly. In comparison with the rest of the country, the city has a high **car dominance**.

Some neighbourhoods are prone to traffic poverty. The peripheral area depends on the inner city to be able to live the urban life. This results in suburban residents spending much time on the road commuting, time that is then not spend to live a happy urban life near home.

THE URBAN RHYTHM NEEDS TO CHANGE.

from:

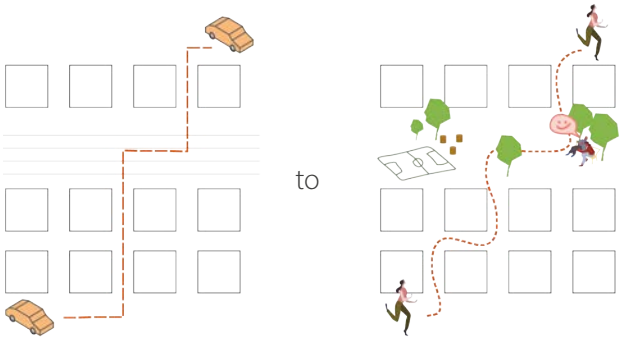


Figure 21: Visualisation of the changing urban rhythm

2.2 AIM

The proposed design project is intended to develop a design framework for achieving a higher level of local activity and a lower level of motorised private mobility in peri-urban neighbourhoods. In this way, design solutions are presented to tackle the current challenges apparent in the case area, Rotterdam. Although the city of Rotterdam is working on a lot of projects to connect the urban edge and to create vital urban centres, a critical understanding of the relation between those peripheral neighbourhoods and the success of interventions is lacking. In this research, the focus lies on **implementing certain future paths of the concept (the 15-minute neighbourhood) in various environments (the neighbourhoods), resulting in an understanding of the stretch of the concept and the meaning in practice.** By this research, it will be clarified how a balance between mobility and locality could be established and maintained. Special attention is given to developing the design with a strong sense of flexibility and proximity. Those design qualities are identified as being essential to deal with the need for densification together with the demands of the transition of mobility.

2.3 RESEARCH APPROACH

In my trajectory, designing will be the core of the research. This means designing is used as a tool to research the course. Following the definitions by Lenzholzer, Duchhart, and van den Brink (2016), design and research could have different relations, two of them being 'research for design' and 'research through design'. Research for design, also known to be evidence-based design, is being done by carrying out fieldwork or generation scientific data. Research through design covers all the research that actively employs designing. This research process yields new knowledge that is applicable in design practice and further research. By **combining evidence-based design and research through design**, an organic design process is achieved that will result in outcomes that lean on a varied scientific base.

2.4 CONCEPTUAL FRAMEWORK

In a rapidly urbanising world, the challenge is to better understand the relationship between the built environment and urban processes so as to guide urban processes in more sustainable trajectories.

Engaging with the narrative of Alexander (2017) that the physical, what we design, is just a **receptacle for the extremely complex set of events that happen in the city**, my conceptual framework gives a comprehension of how certain processes and challenges nestle in a certain place typology.

The concept, in my case the 15-minute neighbourhood, is comprehended as a **threefold ambition** for the urban fabric being 1. local activity and 2. human over car mobility and 3. multipurpose use. To work with these ambitions in the field of urban design, three **pillars** are acknowledged that guide the research and design: accessibility, density and diversity.

In my project, the concept influences the strategic design for the spatial type of interest: the peripheral neighbourhood. This is elaborated over **three scales**: the city scale (periphery), the neighbourhood scale and the block scale. Different scales ask for different approaches, varying from design-based to strategy-based.

In return, the (designed) space influences the concept. This draws back on the theory of Alexander: the potential of the peripheral space to be a receptor for the aimed local activity, human mobility and multipurpose use, gives insight into de **credibility and strength of the concept.**

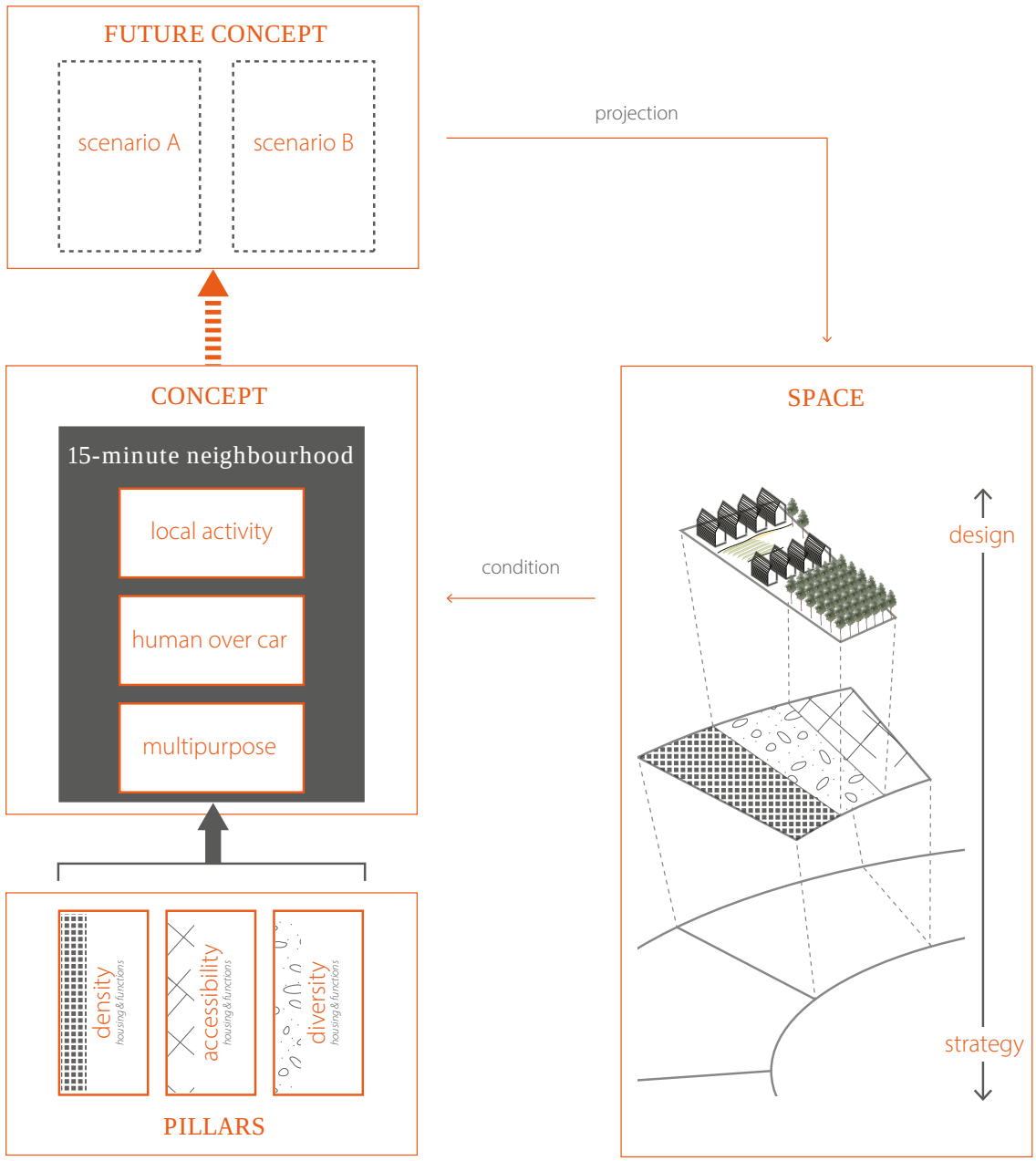


Figure 22: Conceptual framework

2.5 RESEARCH DESIGN

To answer the research question, a set of sub-questions is established that all lead to a certain outcome. Those intended outcomes build towards a response to the question. A design strategy based on scenario construction and design testing will be the end product. A set of methods are used to structurally reach the intended outcome. Those methods have either a theoretical, statistical or practical approach. Mixing those methods is a form of a concurrent triangulation research design, which means several methods are used in parallel to validate findings generated by several method types (Kroll & Neri, 2009).

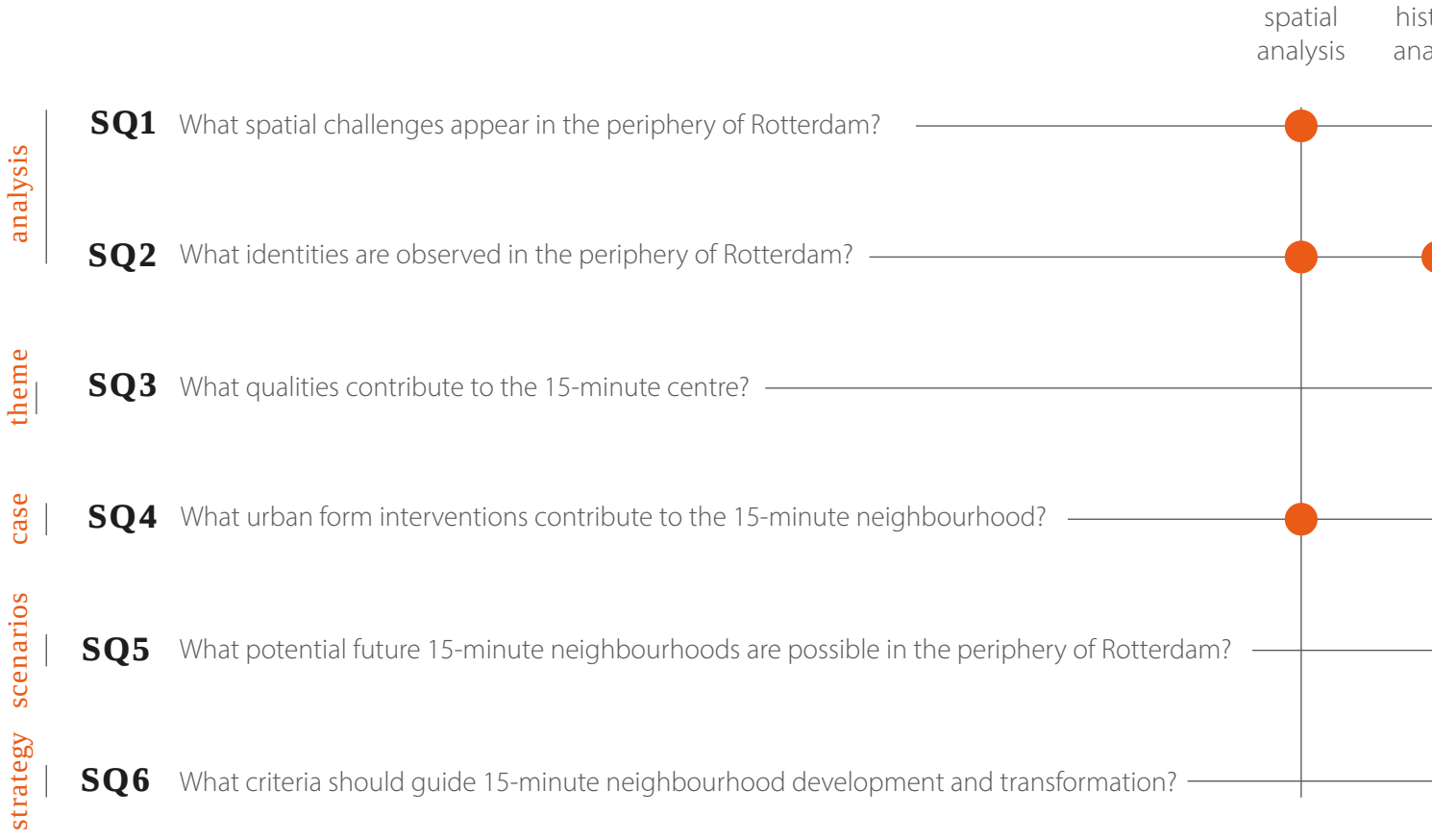
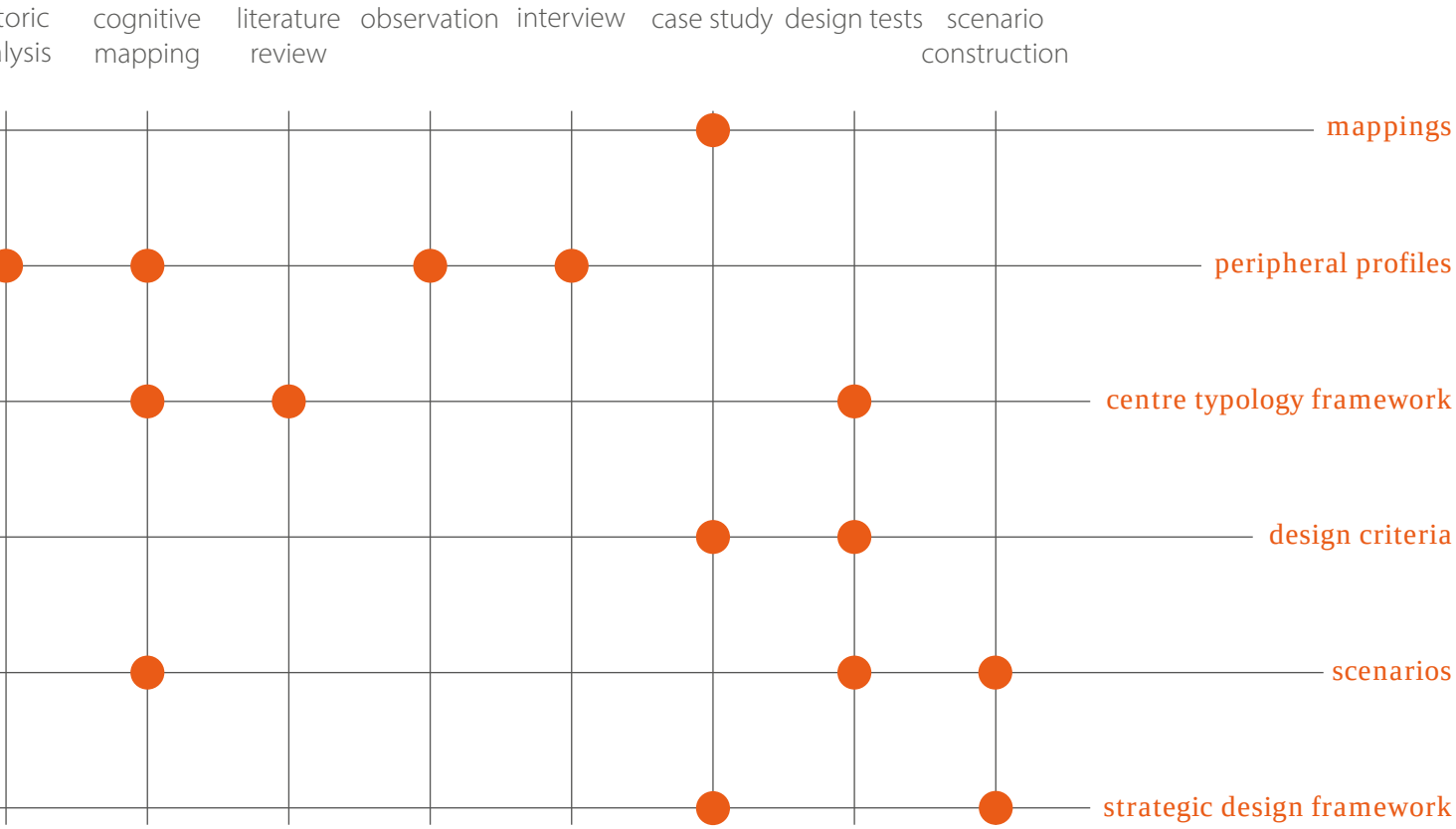


Figure 23: Research design

RQ: What strategic urban design contributes to the construction of 15-minute neighbourhoods in the periphery of Rotterdam?



2.6 ANALYTICAL FRAMEWORK

The methods that are used in the project could be divided into **three categories of approach:** a theoretical, a statistical and a practical approach. Together, they provide a mutual confirmation that makes the results credible and strong. Employing these deductive and inductive methods, a list of outcomes is produced. Those all build up to the final outcome: the design strategy. In the following paragraphs, the methods are explained more extensive.

Literature review

A critical examination of scholarly articles, books and (policy) reports to develop a theoretical understanding of the key concepts of the research. This method helps me to set a base of knowledge and understanding to work further from. This method informs the contextualisation of the theme, the problem statement, the formulation of the knowledge gap and the formation of design principles.

Historic analysis

This analysis is performed by organising spatial and factual information of the past, like fragments of historic maps and chronological narratives. In this way, a key understanding of the historic layer of the neighbourhoods of the Rotterdam periphery is set. Besides, this analysis provides insight into the planning history of Rotterdam that explains the spatial organisation of the city in the current state.

Spatial analysis

This method comprises a lot of analysis based on geodata. An extensive analysis on multiple scales is performed in order to understand the spatial order and phenomena happening through the scales. In the scope of the research, the scales are identified as the Municipality of Rotterdam at the city scale, the neighbourhoods of Rotterdam periphery at the neighbourhood scale and specific blocks and public space areas on the smallest scale. Types of spatial analysis performed in the research are network analysis and density analysis.

Observation

Observation is an essential method to ensure outcomes are suitable in the specific context of the project. This method comprises the gathering of empirical data on both space and people. The interesting part of observing space is that the unavoidable relation with time is taken into account. The interesting part of observing people is that the behaviour and movement of local inhabitants enrich the understanding of interaction, patterns and atmosphere.

Interviews

In this project, interviews are used as a qualitative means to confirm certain assumptions about the neighbourhoods.

Cognitive mapping

This mapping method is done in the field or on the table and forms a spatial translation and interpretation of certain structures or processes. The method is used to highlight key components in space that inform further steps in the research. This method is also used to support a clear presentation of findings and conclusions.

Design tests

Design tests are essential to bring the project to an innovative level. By generating options, whereafter conclusions and criteria are defined, the research is enriched with a design-based argumentation. Design testing includes quantifying

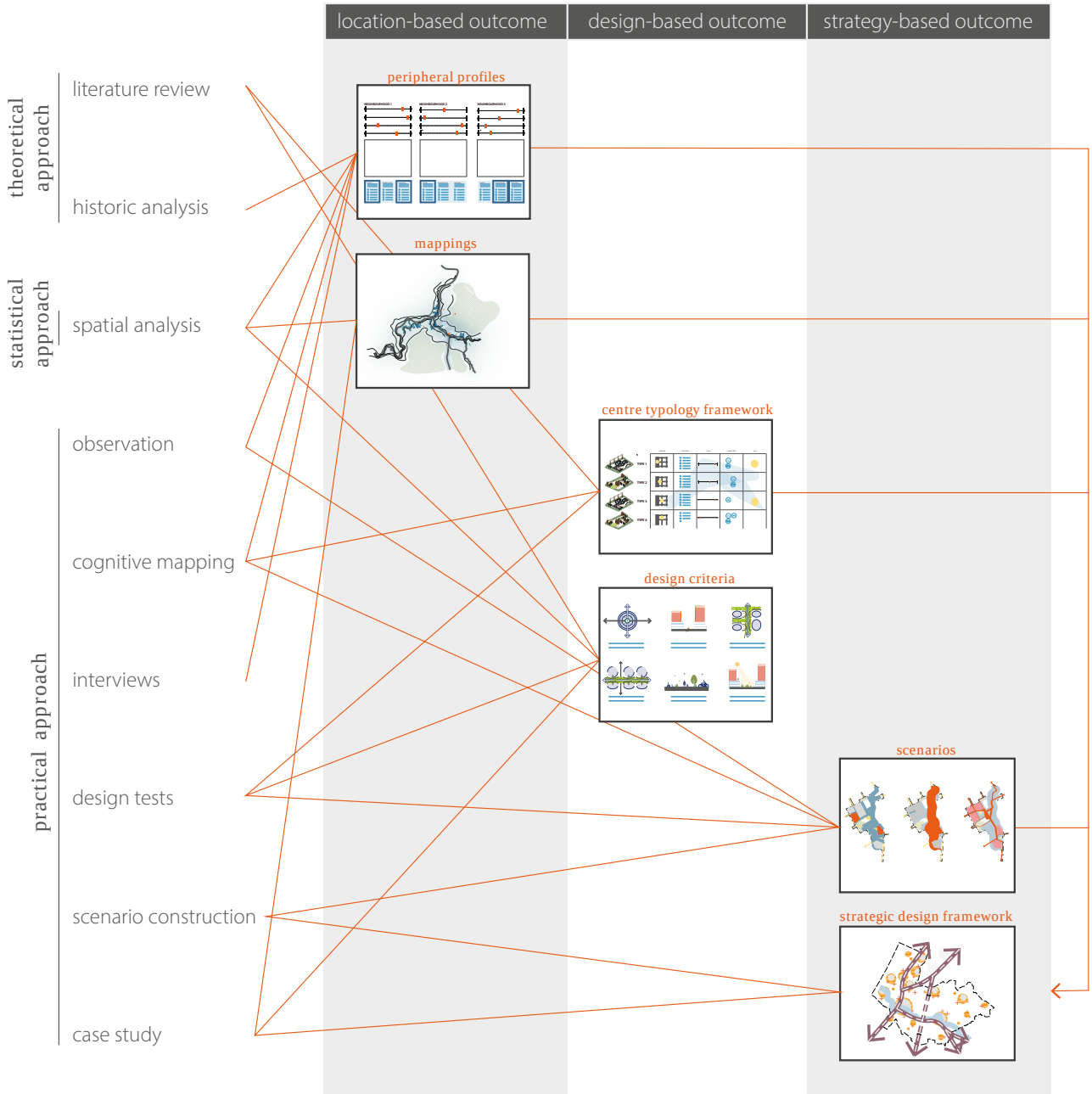


Figure 24: Analytical framework

the interventions in space and physical performance to make the intervention explicit. In this research, design tests explore the potential alterations in space that contribute to a more pedestrian-friendly environment that stimulates interaction and identity. Design tests could also be used as examples in the design strategy.

Scenario construction

Scenario construction involves the play with ongoing trends and their projection into the future. With speculation, possible and probable futures are explored. IN this thesis, 'explorative scenario planning' is applied, which is pointed out by Abou Jaoude, Mumm, and Carlow (2022) as the development of qualitative narratives that draw on systemic processes. Having identified several scenarios, statements about the possible design strategies appear.

Case study

A case study is performed to understand a certain process or principle in practice. This method is a way to assess a certain design statement. In this research, the case study is performed to understand the effectiveness of the scenarios that are constructed.

Interview

interviews are taken to enrich the perspective of the project. I will do two types of interviews: spontaneous and unplanned interviews with the residents of a neighbourhood and structured planned interviews with experts. In this way, a bottom-up and top-down perspective could be added to the project.

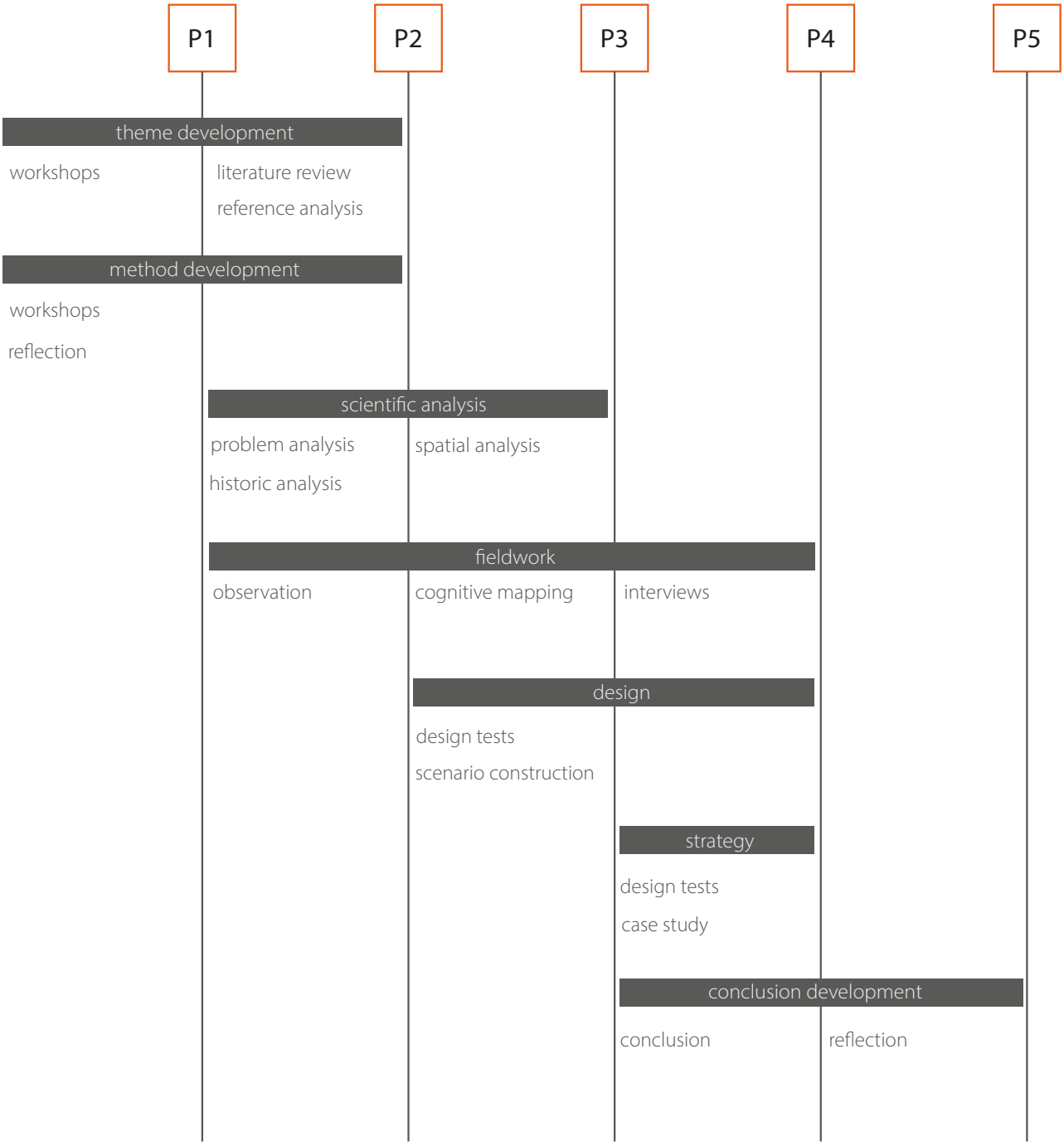


Figure 25: Graduation planning

03

DESIGN PILLARS

DESIGN PILLARS

As defined in the introductory chapter of this thesis, the 15-minute city builds on 4 concepts being density, diversity, proximity and ubiquity. Those concepts are bundled in three design pillars: accessibility, density and diversity. Those three pillars **structure the design strategies** that will be defined to achieve the 15-minute neighbourhood.

Accessibility

In this thesis, accessibility is approached as a concept that is **twofold**: on the one hand, it follows the meaning of Pozoukidou and Chatziyiannaki (2021), stating "application of 15-minute City implies a shift in the emphasis of planning from the accessibility of neighbourhood to urban functions to the **proximity of urban functions** within neighbourhoods." Implicitly, this statement demands a re-interpretation of what functions should be close by citizens and above that, a restructuring of the functional system. In the next chapter, a method is presented to assess the accessibility of places in a certain neighbourhood.

On the other hand, accessibility depends on the design of the network. The **connectivity of a certain place** is a base for discussion about vehicular and pedestrian flows, commerce vitality and human wayfinding. Thus, it is essential to understand network centrality when designing for pedestrian use. According to Hillier (2007), 'spatial configuration is itself the most powerful single determinant of urban movement, both pedestrian and vehicular'. He calls this **natural movement**. In terms of pedestrian movement, this means a combination of grid configuration and area building densities are decisive. In terms of vehicular movement, road width has a strong influence next to the grid configuration.

Knowing this, it could be further argued that the grid configuration gives an impression of the factual functionality of the city. Natural movement influences the distribution of land use and activity. The more likely a street is used, the more potential for encounters, the more attractive this street is for economic and residential activity. This phenomenon is called **movement economy.** This self-reinforcing cycle, arising from network centrality, gives life to the public spaces. This is confirmed by Mehaffy, Porta, Rofe, and Salingaros (2010), saying network centrality is the key driver for places to evolve into valued places and therefore an urban core needs to be attached to or located on well-connected lines.

Density

In the light of global urbanisation, densification is inextricably linked to urban development. Density is a descriptive or prescriptive quality of the urban form. This means it occurs as a way to measure the existing form, as well as a norm for designing. Therefore, in this thesis, density occurs as a quality of interest.

As pointed out in the Theoretical Foudations (p. 28), **accessibility and diversity of functions are higher in dense areas**. This synergy forms one in a list of reasons why densification, either infill or transformation, occurs as the key strategy of (peri-) urban development. One must be aware of the fact that there is a weak relation between density and urban type, meaning two neighbourhoods with the same density could look completely different in terms of building types or street profiles (Berghauser Pont & Haupt, 2021).

By densifying and diversifying peri-urban zones, an attempt to counteract segregation is regulated. However, a careful understanding of different

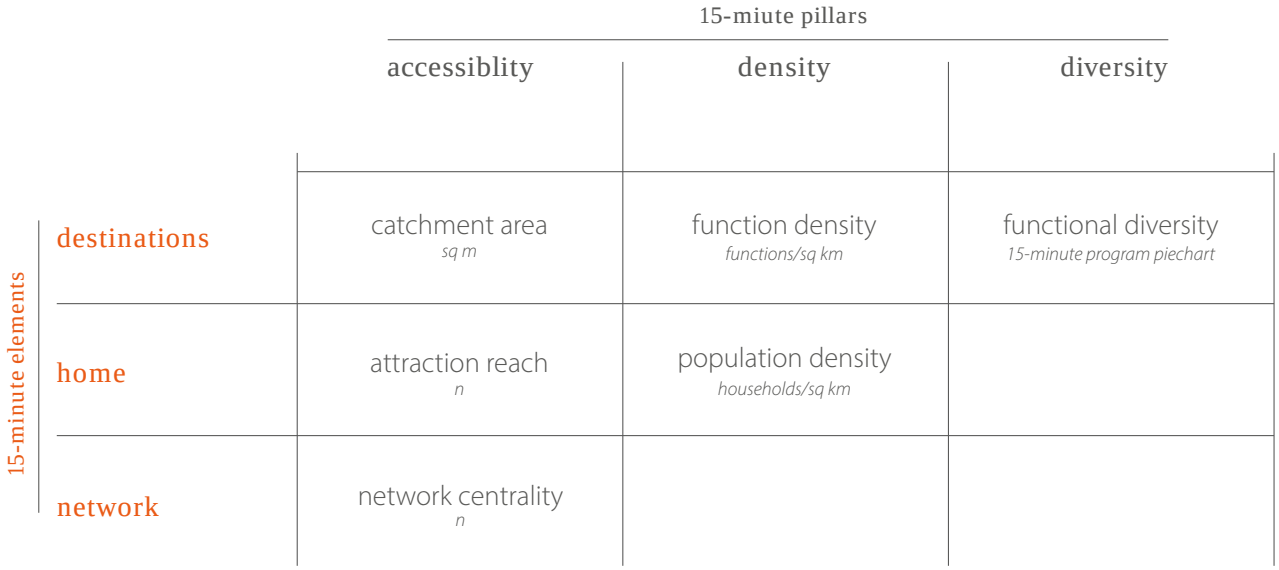


Figure 26: Measurements

morphological layouts in different parts of the city needs to be present to understand how densification could contribute to inclusion. **Typically, the spaces that accommodate everyday life appear as key spaces for the inclusive city** (Vaughan, 2015).

This means a **balance between densification and everyday living space is essential** to increase vitality in peri-urban zones. For instance, the interface between building plints and public paths could be intensified with homes, functions to increase the interaction on the public path.

Urban density is highly linked to the way people live. The number of households, amount of space per person as well as the number of shared household spaces are dependent variables for defining the change of density. Currently, a trend of **increasing density in cities** is observed. This means that either the space demand per person is increasing, or extra households are added. In the Netherlands, both is happening (CBS, 2021b; van Bockxmeer & de Korte, 2021). Currently, the space demand per person is increasing because of the increase of one-person households, which are the household types that demand the most space per person (CBS, 2019b).

New ways of living clearly influence the housing density of a city, and therefore an understanding of future ways of living is essential to design efficiently for housing. In the chapter 'Scenarios', these new ways of living are explored.

Diversity

The third and last design pillar is diversity. According to Moreno et al. (2021), the essence of diversity is understood in two ways, one being the need

for **mixed neighbourhoods**, in which a mix of housing, work and amenities are present, and the second being the need for a **diverse population**. In a local centre, a node of active life, this diversity is manifested. It is a place where diverse groups of inhabitants join together for their daily or weekly habits. This aligns with the definition of Vaughan (2015) who states a local centre is "...a core of suburban non-domestic activity, the living heart of the suburb".

In peri-urban areas, the need for diversity is assumed to be quite urgent, based on the argument that peri-urban areas are mostly mono-functional. However, Wandl and Hausleitner (2021) acknowledge that it is appropriate to speak of a state of **post-suburbia**, in which suburbs are observed to have a certain amount of functional mix. This emphasises the capacity of a place to develop according to its qualities. An equal statement is made by Vaughan (2015), who describes suburban zones as dynamic areas that have endured a variety of processes and trends.

To understand peri-urban diversity more deeply, it is worthwhile to understand the historic and future path of the suburb. Cities do not always grow from centre to edge. Often, in Europe, cities incapsulate older (workers)towns. Those older towns evolved around ways to the centre of the bigger city. These main streets, **highstreets**, play a key role in the manifestation of local life. It is often the centre of commercial and social activity. In a high street, the presence of people keeps the street dynamic and time-bound: buildings are transformed as new demands appear. (Griffiths, 2015).

Next to the highstreet, other type of places like local fringes or open spaces are essential for a **spatially diverse** neighbourhood, therewith facilitating a diverse programme. For instance, activities like shopping and interaction ask for different spatial environments than activities like a quiet walk in the morning. This means, diversity is achieved by creating complex spatial lay-outs on all scales.

Transit oriented development

Currently, transit-oriented development (TOD) appears as the main strategy in peri-urban areas for densification and enhancement of accessibility and diversity. TOD focuses on spatial concentration around a transit station to increase the amount of clean (work-home) trips by public transport. Nevertheless, in the reality of market-driven urbanism, this development needs strong land-use control and state ownership. Because it is often not the case that land surrounding transit points is state property, land costs turn out very high and limit the potential for mixed housing and small businesses. (Chapple & Loukaitou-Sideris, 2019).

Besides, local inhabitants often do not feel connected with new infrastructural development resulting in an NIMBY (not in my backyard) opposition. Economic and class segregation is not being diminished in compact development, since compact mixed-use environments have higher land value and thus are populated by middle and higher classes (Neuman, 2005).

Thus, although TOD is a good strategy to apply when increasing inner-city accessibility and clean commuter trips, neighbourhood diversification via TOD is challenging. Instead, the development of other types of places could serve as an opportune strategy for diversification. The high street or the neighbourhood street are spatial elements that stimulate peri-urban life and therefore could serve

as an accelerator for development. Besides, other types of places, for example, a semi-public garden, carry complementary qualities like tranquillity and neighbour interaction. It is essential to develop those different types of places in conjunction, in this way a diversity of places is ensured.

A 15 -

In this chapter, research on how to design a 15-minute neighbourhood is presented. A piechart-method has been developed to define the 15-minute desires explicitly for a certain place. Following this method, all destinations of the 15-minute city are defined and categorised. The result is a centrality framework. This framework forms the starting point of a 15-minute city design.

04

MINUTE CENTRE

4.1 A 15-MINUTE PROGRAMME

The pyramid of human needs

The first critical question that needs to be asked is: What specifically needs to be reachable in 15 minutes. According to Moreno (2020a), people should be able to "access work, housing, food, health, education, culture and leisure." However, this is not very defined. Is everything covered within those functions and if not, what should be?

The 15-minute City is clearly about home, a destination and the journey in between. This is a clear and important demarcation of the programme. Knowing this, the successive question reads as follows: For what reasons do humans leave their homes? What are their needs? This key question leads the first part of the design research.

The pyramid of Maslow gives a clear **hierarchy of human needs**, from basic to fulfilment. The first four levels of the pyramid represent deficiency needs. Motivation to meet those needs stems from the lack of something, for instance, of love. When the need is met, motivation will decrease and another level will be reached. In the upper level, self-actualisation, motivation to fulfil needs will not stem from a lack, but from a desire for growth (McLeod, 2007).

A need results in something physical, an action. This is where the urban designer comes into play, by designing the city in a way that those actions have space to be performed in. In other words: the **logic of the urban programme** is linked to the needs of the citizens of the area. This allows me to interpret the pyramid of Maslow for the sake of the city: a hierarchy of urban programme to meet the needs of the urban citizen.

The **15-minute programme framework** (elaborated in Appendix IV) is a tool to understand the organisation of the 15-minute city. The framework used in this project is constructed based on the city of Rotterdam. The framework is visualised using a piechart, divided into 8 categories, stemming from the pyramid of Maslow, being culture, leisure, education, interaction, health, work, protection and food. Within these categories, all essential urban functions are subdivided. This piechart is a tool to easily assess the status quo of a centre: it shows what functions are there.

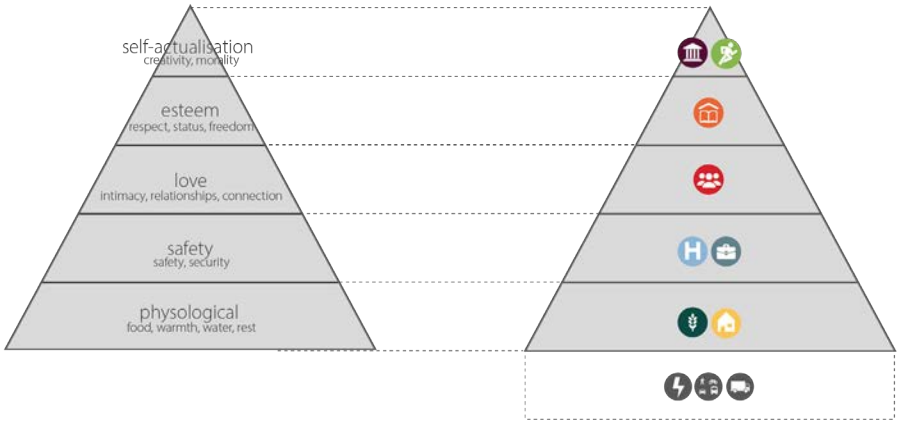


Figure 27: The pyramid of Maslow, translated into urban functions

Figure 28: The 15-minute pie chart

Functional centres in Rotterdam

In this map, it is visualised how the urban functions are currently spread over the main local centres in Rotterdam. In those centres, it is investigated whether a certain category (for example: health) is present. If there are one or more functions found, the part of the pie is filled with the corresponding colour.

Monofunctional clusters

The first conclusion that could be distilled from this investigation is the presence of centres based on **just one category**, for example, an educational centre (Erasmus University campus) or a cultural centre (Museumpark). In the peri-urban area, sport clusters are frequently found. Often, those centres are quite large areas with a large catchment area.

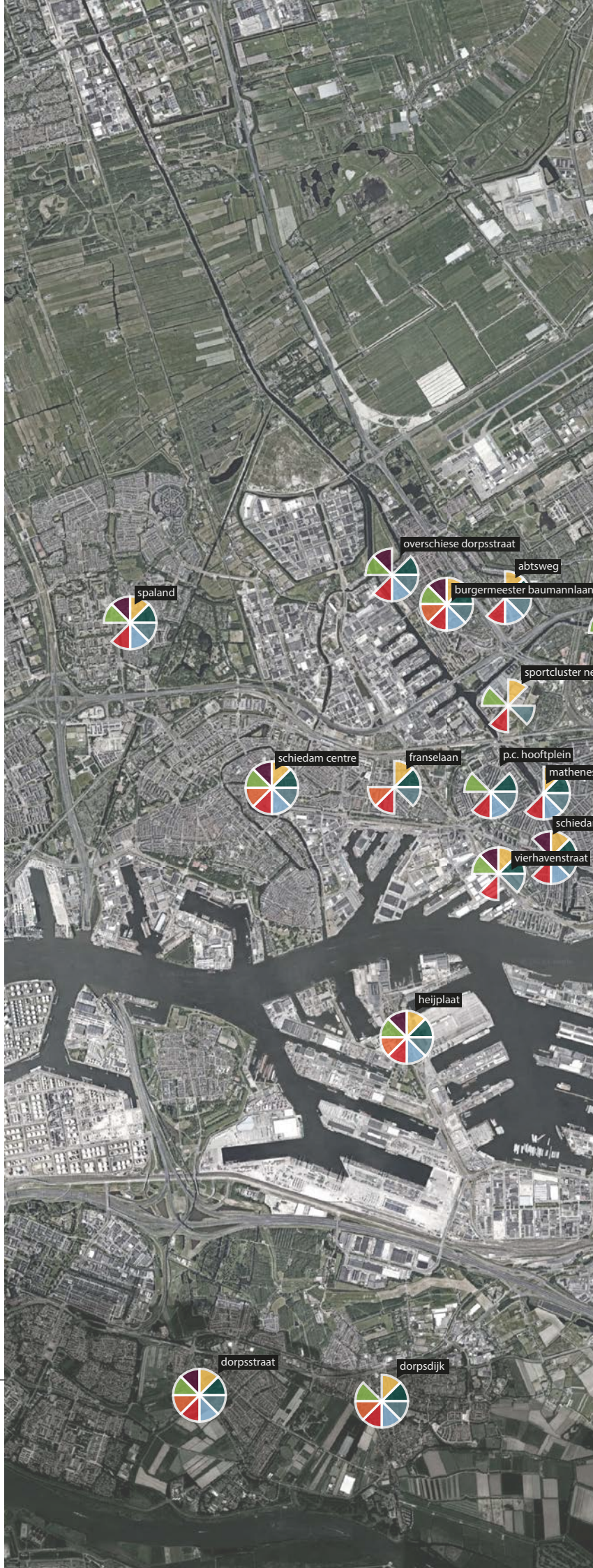


Figure 29: Functional centralities in Rotterdam

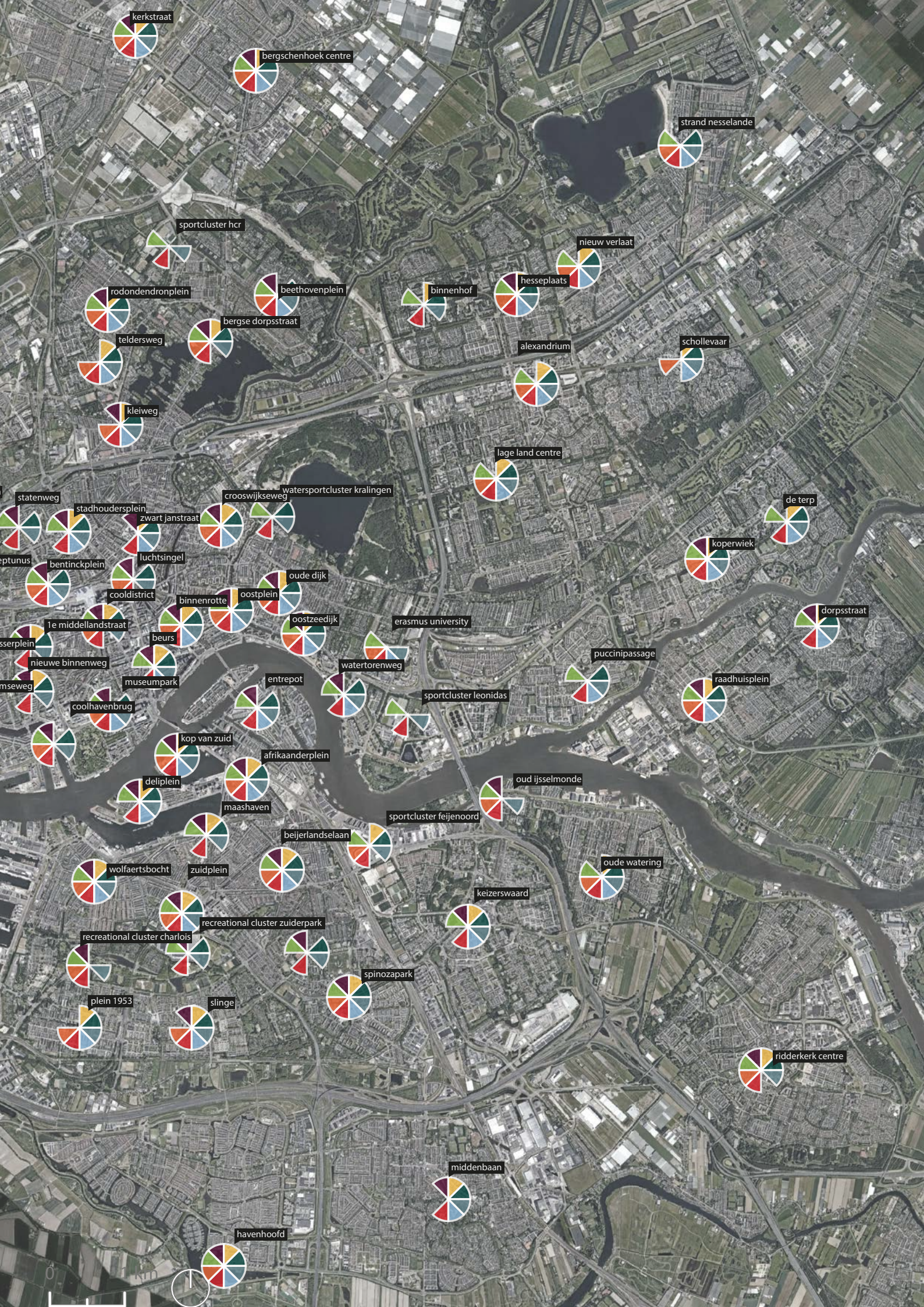

kerkstraat
bergschenhoek centre
strand nesselande
sportcluster hcr
nieuw verlaat
hesseplaats
binnenhof
beethovenplein
rodondendronplein
bergse dorpsstraat
teldersweg
alexandrium
schollevaar
kleiweg
lage land centre
statenweg
crooswijkseweg
watersportcluster kralingen
stadhoudersplein
zwart janstraat
de terp
koperwiek
luchtsingel
bentinckplein
oude dijk
cooldistrict
binnenrotte
oostplein
dorpsstraat
1e middellandstraat
oostzeedijk
erasmus university
beurs
nieuwe binnenweg
puccinipassage
watertorenweg
museumpark
entrepot
raadhuisplein
sportcluster leonidas
coolhavenbrug
kop van zuid
afrikaanderplein
deliplein
oud ijsselmonde
maashaven
sportcluster feijenoord
beijerlandselaan
wolfaertsbocht
zuidplein
oude watering
keizerswaard
recreational cluster zuiderpark
recreational cluster charlois
spinozapark
plein 1953
slinge
ridderkerk centre
middenbaan
havenhoofd

Figure 30: The 15-minute centres of Rotterdam, centres that contain all categories of urban functions (complete piechart)

Existing 15-minute centres

In figure 30, all centres that correspond with a complete piechart are highlighted. Remarkably, most centres that have a linear form, line centralities, correspond with a complete piechart (Burgermeester Baumannlaan, Wolfaertsbocht, Beijerlandselaan, Oude Dijk, Oostzeedijk).

Besides line centralities, village cores in the peri-urban area also have a diverse range of functions present. This could be explained by the earlier independence of these villages, meaning they basically functioned as a 15-minute village.

Weak centres

In figure 31, 'incomplete' centres are shown. These centres do have a local focus, but do not cover all the needs of the neighbourhood. Many of those centres are located in the peri-urban area. Those centres are the located in need for transformation.

The complete investigation of centres can be found in Appendix III.

Figure 31: The functional centres of Rotterdam, centres that contain mainly one category of urban function (incomplete piechart)


bergschenhoek centre
rodondendronplein
hesseplaats
burgermeester baumannlaan
crooswijkseweg
koperwiek
oude dijk
binnenrotte
oostplein
schiedam centre
oostzeedijk
raadhuisplein
kop van zuid
afrikaanderplein
heijplaat
beijerlandselaan
wolfaertsbocht
zuidplein
spinozapark
dorpsstraat
havenhoofd
beethovenplein
binnenhof
teldersweg
bergse dorpsstraat
kleiweg
overschiese dorpsstraat
abtsweg
lage land centre
franselaan
oud ijsselmonde
keizerswaard
plein 1953
slinge

4.2 TOWARDS A CENTRALITY FRAMEWORK

4.2.1 Centre types

On the base of the analysis in the previous chapter, a framework of centre types is made. This gives us the ability to contextualise a certain centre. The categorisation is based on functions. It becomes clear that those centre types have a diverging type of use.

Recreational centre

These centres are often large areas where sport clubs, event halls or arenas are located. Because of their size, they are often located in peri-urban areas.

- x 15-minute centre? no
- \+ active core of leisure
- – only active in peak hours
- – large land cover

Cultural centre

Cultural centres are clusters of galleries, museums, theatres, cinemas and everything in between. These centres form the core of urban activity.

- x 15-minute centre? no
- \+ active core of the city
- – low investments

Educational centre

These centres are clusters of schools, university buildings and facilities. They are often located in urban areas because of historic patterns and accessibility.

- x 15-minute centre? no
- \+ urban knowledge accelerator
- – only active by day on weekdays

Neighbourhood centre

These centres appear in the urban areas of cities. Often, these local centres are the vital core of everyday life, because they are located in dense areas with a diverse demographic profile.

- v 15-minute centre? yes
- \+ active core of everyday life
- – only daily needs, city dependency

Everyday street

These centre types appear as an odd one out because of their clear relation to form. This form allows this centre to cover several neighbourhoods. Like the neighbourhood centre, an everyday street is a core of daily life.

- v 15-minute centre? yes
- \+ active core of everyday life
- – conflict between activity and mobility

Peri-urban centre

The peri-urban centre is a local centre, characterised by peri-urban conditions. This core is often located in the middle of a large planned residential area. Therefore, it contains all daily functions.

- v 15-minute centre? yes
- \+ (potential for) active core
- – monotonous occurance
- – car based design

Village centre

These centres are often layered local cores. This means they often consist of a historic core in combination with modern functionalities. They have a catchment area that covers the complete village.

- v 15-minute centre? yes
- \+ active core of urban life
- – lack of diversity

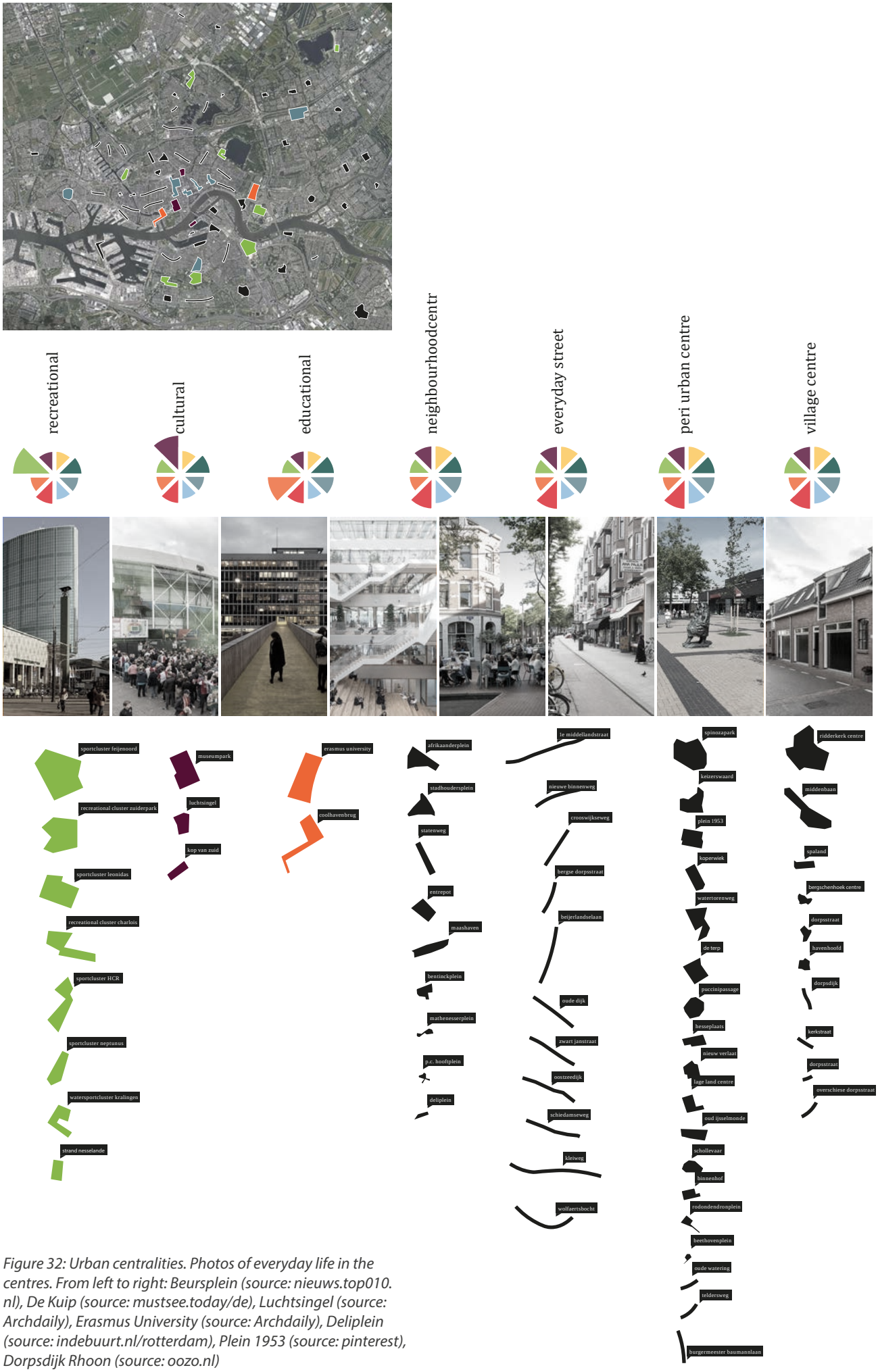


Figure 32: Urban centralities. Photos of everyday life in the centres. From left to right: Beursplein (source: nieuws.top010.nl), De Kuip (source: mustsee.today/de), Luchtsingel (source: Archdaily), Erasmus University (source: Archdaily), Deliplein (source: indebuurt.nl/rotterdam), Plein 1953 (source: pinterest), Dorpsdijk Rhoon (source: oozo.nl)

4.2.2 The 15-minute destination

The burning question that remains after the definition of functional centralities, is the reach of those centres. In other words: are those centres reachable in a 5-minute walk or a 20-minute bike ride? Obviously, some destinations are desired to be closer to home than others. Therefore, it is too easily said that just 'everything needs to be accessible in 15 minutes'. In figure 33, an example of this spectrum is visualised.

Reach

Growing further on this observation, destinations could roughly be divided over three **'reach categories',** defined based on the **size, need and frequency of use**. A large overview can be found in Appendix IV. Here, a compact explanation is given:

5-minute walk destination
- Small size
- Everyday needs that are not bound to a specific group of users (all round)
- Weekly visits
- example: vegetable grocer, public garden, primary school

15-minute walk destination
- Small/medium size
- Everyday needs that are not bound to a specific group of users (all round)
- Monthly visits
- example: gym, (coffee)bar, hairdresser

15-minute cycle destination
- Small/medium/large size
- Everyday needs that are bound to a specific group
- Monthly/seasonally visits
- example: bath house, youth centre, cinema

Evidently, not all everyday urban activity could be reachable in 15-minutes from all homes. This is due to several reasons that have to do with **land coverage**, the **public support** or **the specificity of the destination**. One reason is that for some destinations, the use of land is too much to make the 15-minute city possible, for example in the case of sport fields and golf courts. Smaller variants could be included in the 15-minute neighbourhood, but these functions will stay existing.

Another obvious reason is the centralisation of specific functions, like hospitals and universities. To ensure quality and feasibility, institutions are **centralised** and thus have a large catchment area. Other destinations with large catchment areas are ones with a very specific function, that serve just a few people spread over the region, like a ski slope or a private school. The last category of destinations that don't fit the 15-minute City model are destinations that ensure the maintenance of a non-15-minute city, like petrol stations and car dealers. All those functions are not further taken into account in this project.

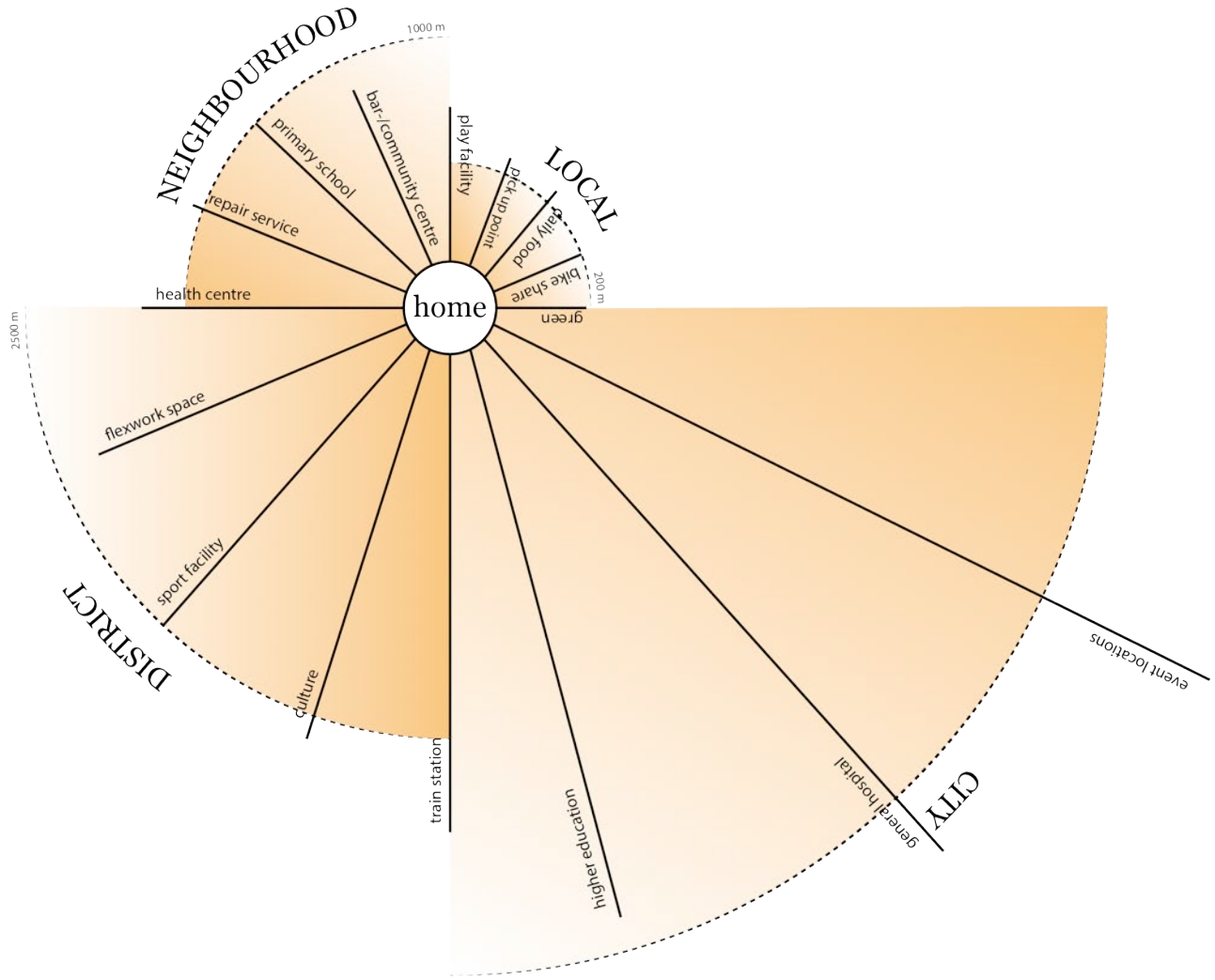


Figure 33: 15-Minute spiral

play facility, 5 minutes walk
local street

hairdresser, 15 minutes walk
neighbourhood street

specialised shop, 15 minutes cycle
city street

Figure 34: Functions from different reach categories and the suitable street type

Connectivity

The next topic of interest is the accessibility of these 15-minute destinations. The spatial circumstances vary according to the functionality of a place, for instance, a kiosk fits another spatial context than an urban sports field. In figure 34, these different places are visualised.

As visible in the images, the destinations are attached to **different types of streets**. Within the network, streets could be categorised according to the level of connectivity. Berghauser Pont, Stavroulaki, and Marcus (2019) give four types of streets: the city street, the neighbourhood street, the local street and the background street. As seen in figure 35, the city and neighbourhood streets have a high centrality, which means they function as a node in a variety of radii, thus they could carry different scales of movement. The local street shows a high centrality in radii under 500, meaning on the hyper-local scale, those streets perform as central places.

Streets that facilitate **both fast and slow traffic** are essential for the vitality of the neighbourhoods. Streets that are well connected to the city fabric are the primary elements for localisation and orientation. Peculiarly, those central cores are often located on the edge of (administrative) neighbourhoods. They form simultaneously a **centre for the area and a boundary for the neighbourhoods**. As long as those cores are within a reach of a 5-minute walk, this is a successful model, according to Mehaffy et al. (2010).

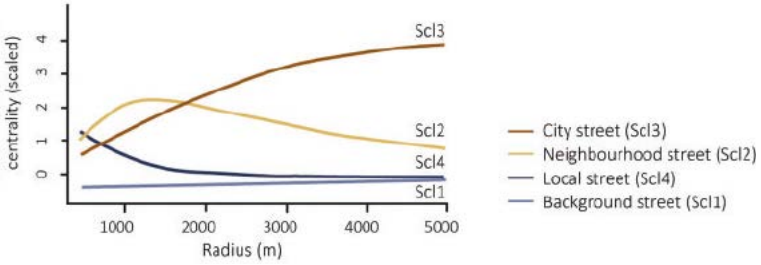


Figure 35: Street types. source: Berghauser Pont et. al. (2019)

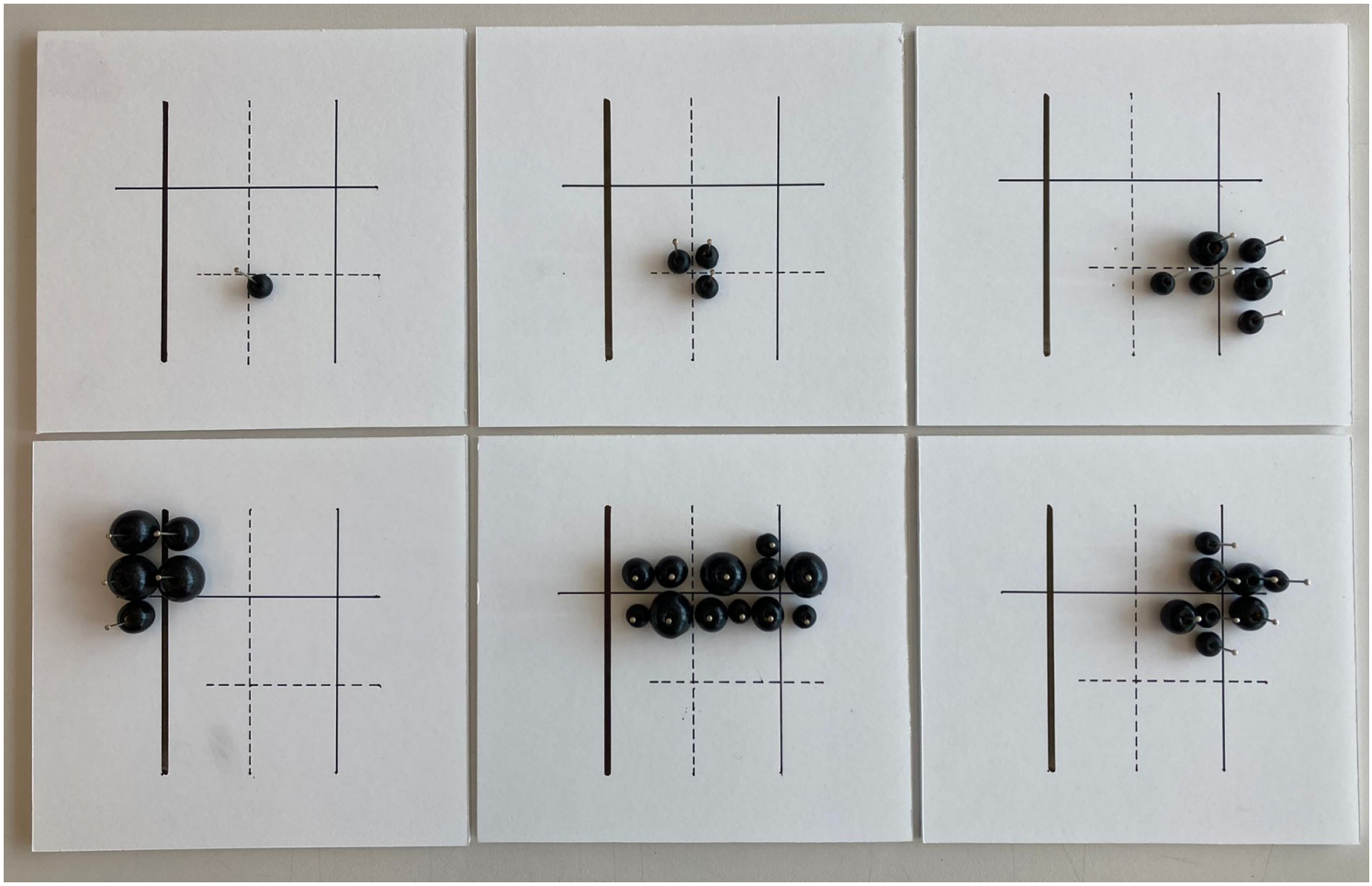
Spatial configurations

In figure 36, a range of different spatial configurantions is visualised conceptually. Here, the functitons, categorised according to the desired reach, are combined with the street types.

In reality, a f**ew combinations are feasible**, due to the scale of the area and settlement patterns based on economic advantages and land value.

At a first glance, it could be observed that the bigger the cluster (amount of destinations), the more diverse (types of reach combined). Secondly, it strikes that the biggest cluster (the lower middle one), is not necessarily located on the most integrated street. This means, a specific interest lies in this type of street, the neighbourhood street, that could carry different types of clusters.

Logically, the lower left cluster, attached to the city street, has a ciity-wide accessibility, therewith serving the neighbourhood less in terms of vitality. It could be considered if this centre is necessary in the future.



5-minute walk destination
15-minute walk destination
15-minute cycle destination
local street
neighbourhood street
city street

Figure 36: centre configuration options: combination of 5w/15w/15c functions and connectivity

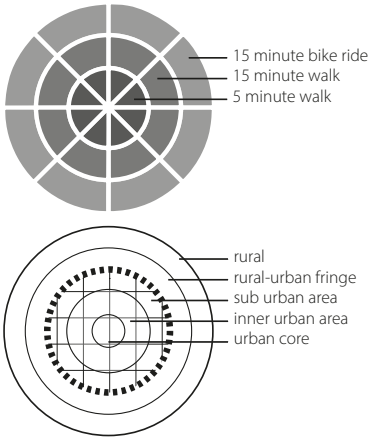
4.2.3 Peri-urban local centres

In the previous chapter, functionality, reach and connectivity of 15-minute destination have been researched. Together, they form the variables of a local centre type.

A centrality framework has been constructed to understand the success of the 15-minute city concept in a specific context, the periphery. Those centralities are defined by means of in-site research on existing peri-urban centralities.

A local centre is a node of active life. It is a place where diverse groups of inhabitants join together for their daily or weekly habits. This aligns with the definition of Vaughan (2015) who states a local centre is "...a core of suburban non-domestic activity, the living heart of the suburb".

These centre types form the 'ingredients' for vital peri-urban areas. Depending on the context, a combination of centre types fulfilles the specific needs of the area. In this way, a network of peri-urban centralities results in a peri-urban 15-minute City.



ATTRACTOR
XS

ATTRACTOR +
XS

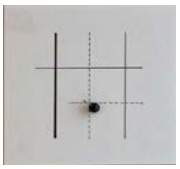
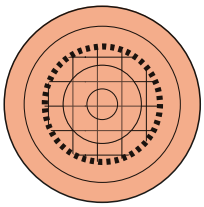
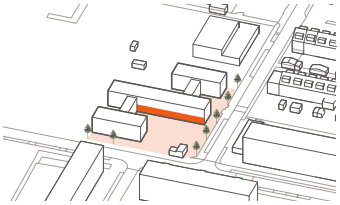
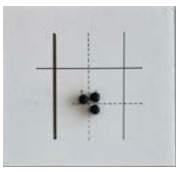
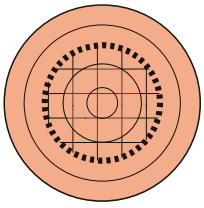
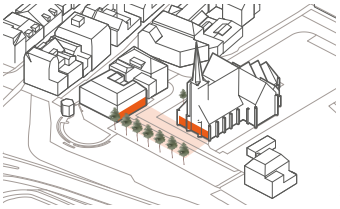
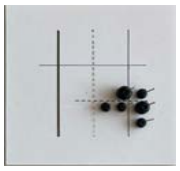
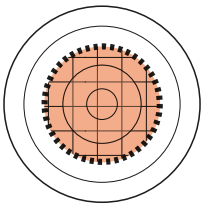
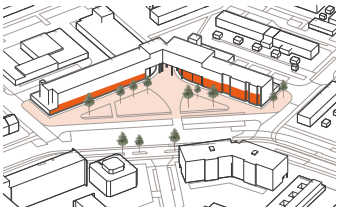
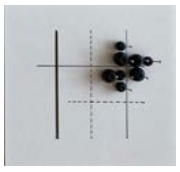
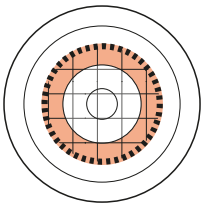
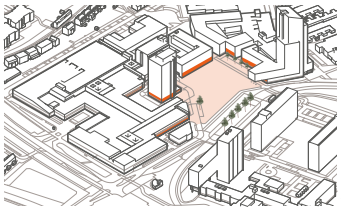
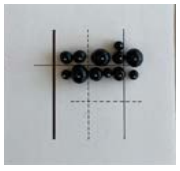
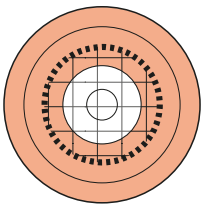
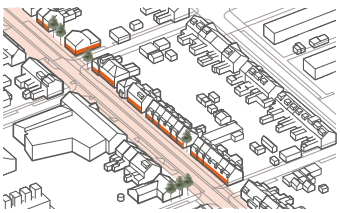
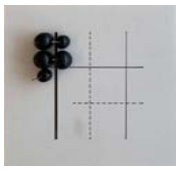
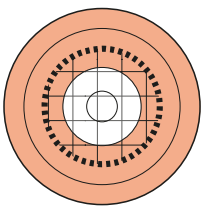
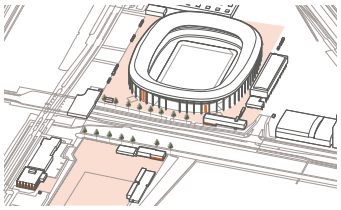
LOCAL CORE
S

PERI-URBAN CORE
M

VILLAGE CORE
L

FUNCTIONAL CORE
XL

Figure 37: The peri-urban centre framework

connectivity	functionality	location	form
			 school
			 church square
			 small square
			 shopping centre square
			 village street
			 arena

Those centre types could take shape in many different ways. This depends on several variables, the main one being the planning history of the urban context. In this framework, examples from the Rotterdam periphery are shown. This gives an impression of the variety of centralities that is found in the city.

ATTRACTOR
XS

ATTRACTOR +
XS

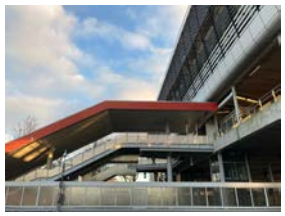
LOCAL CORE
S

PERI-URBAN CORE
M

VILLAGE CORE
L

FUNCTIONAL CORE
XL

Figure 38: Peri-urban centres from different

PRE - WAR	GARDEN CITY	POST - WAR	NEW
			
			
			
			
		x	x
			

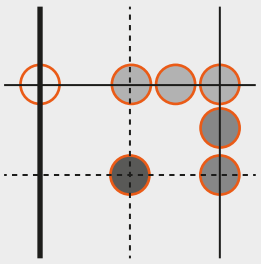
periods of time

4.3 CONCLUSIONS

When designing for a 15-minute City, one should look at centralities.

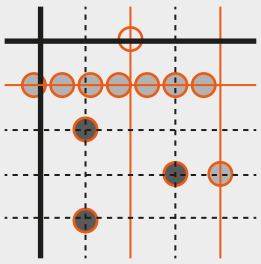
Functional centrality

From a functional perspective, centralities have different target groups and uses. Through this, some functions form synergies with others. Because of economic or societal necessities those functions cluster together. Those clusters of functions attract people to the places where they are situated: they are a reason of local human activity.



Connectivity

However, centrality is not only based on functions. The connectivity of a place is essential. The network integration impacts the publicness of a place. Therefore, the network builds a precondition of a functioning centre. Connectivity is an essential element in the design of successful 15-minute centres.



Composition of central places

When looking at district or city scale, different compositions of centralities are possible. It is place-dependent what composition suits best. The **frequency** of centres is dependent on the population density of a certain place. The **size of centres** is dependent on the needed land-cover for a certain activity. The **placement of the centres** is dependent on the complementary characters of other centres. Therefore, in the next chapter, specific cases will be assessed to understand suitable compositions of centralities.

Figure 39: Day-market, 's-Gravenland


Boon's
dagmarkt
supermarkt
supermarkt
Pakket
punt

SP

This chapter shows the performance of case from the perspective of the 15-minute City concept. Several analyses show the performance of the case. In the end, it is concluded which type of places and what interventions come forward to transform the case into a 15-minute neighbourhood.

05

ATIAL ANALYSIS

5.1 THE NEIGHBOURHOODS

5.1.1 The peripheral context

As discussed in the introduction, Rotterdam has a peripheral area that contains different types of neigbourhoods, from incapsulated villages to complete planned post-war areas. As could be seen in figure 41, the Rotterdamse ruit and railways form clear boundaries, at some points resulting in large infrastructural nodes (in the North West for example). This results in islolated neighbourhoods. In figure 42, the situation of the administrative neigbourhoods in relation to the main peri-urban centres is visualised. Here, we see that centres have different placements, thus they service different areas in terms of size and mix.
In figure 40, a combination of the main findings of the two other maps is visualised, in which we see a common ground of infrastructural barriers near, yet all centres show a different spatial relation to those barriers.

Figure 40: Cognitive mapping of the position of the main peripheral centres

Figure 41: Cognitive mapping of infrastructural barriers (highways, river and railways, in black) and crossings (tunnels and bridges, in orange)

Figure 42: Cognitive mapping of the relation of neighbrouhood boundaries, infrastructural barriers and local centres

Figure 44: 15-minute service areas of mixed-use centralities

5.1.2 Contrasting neighbourhoods

This map presents the service area analysis of the main mixed-use centres of Rotterdam. From the highlighted streets, the centre is reachable in a 15-minute walk. From this map, the following conclusions can be drawn:

1. The radius that could be associated with a 15-minute walk is 1 km. This is less than expected (with a walking speed of 5 km per hour, 1200 metres could be reached in 15 minutes). This is explained by the fact that streets are not as the crow flies, the route is never as efficient as the radius.

2. Many parts of the peripheral areas are not served within 15 minutes. Areas near the highways turn out most problematic.

3. The areas in the east of the Rotterdam periphery strike the attention. The service area of the eastern cores does not reach as far as the neighbourhoods do. This area is organised according to post-war ideals. Often a central place was planned in the middle of the neighbourhood. Here, large facilities like a shopping mall or a theatre are situated. In this way, the centre could serve quite a large urban area. The only drawback: These centres are only easily accessible for cars. . Therefore in this map, the areas appear as underserved.

4. Two contrasting places of interest appear: IJsselmonde as a post-war planned neighbourhood with a clear core, but a largely underserved area. Zestienhoven as a neighbourhood that lacks a multifunctional centre, while almost 4000 inhabitants are living here. It is assumed that in both places the configuration of centralities is not optimal here.

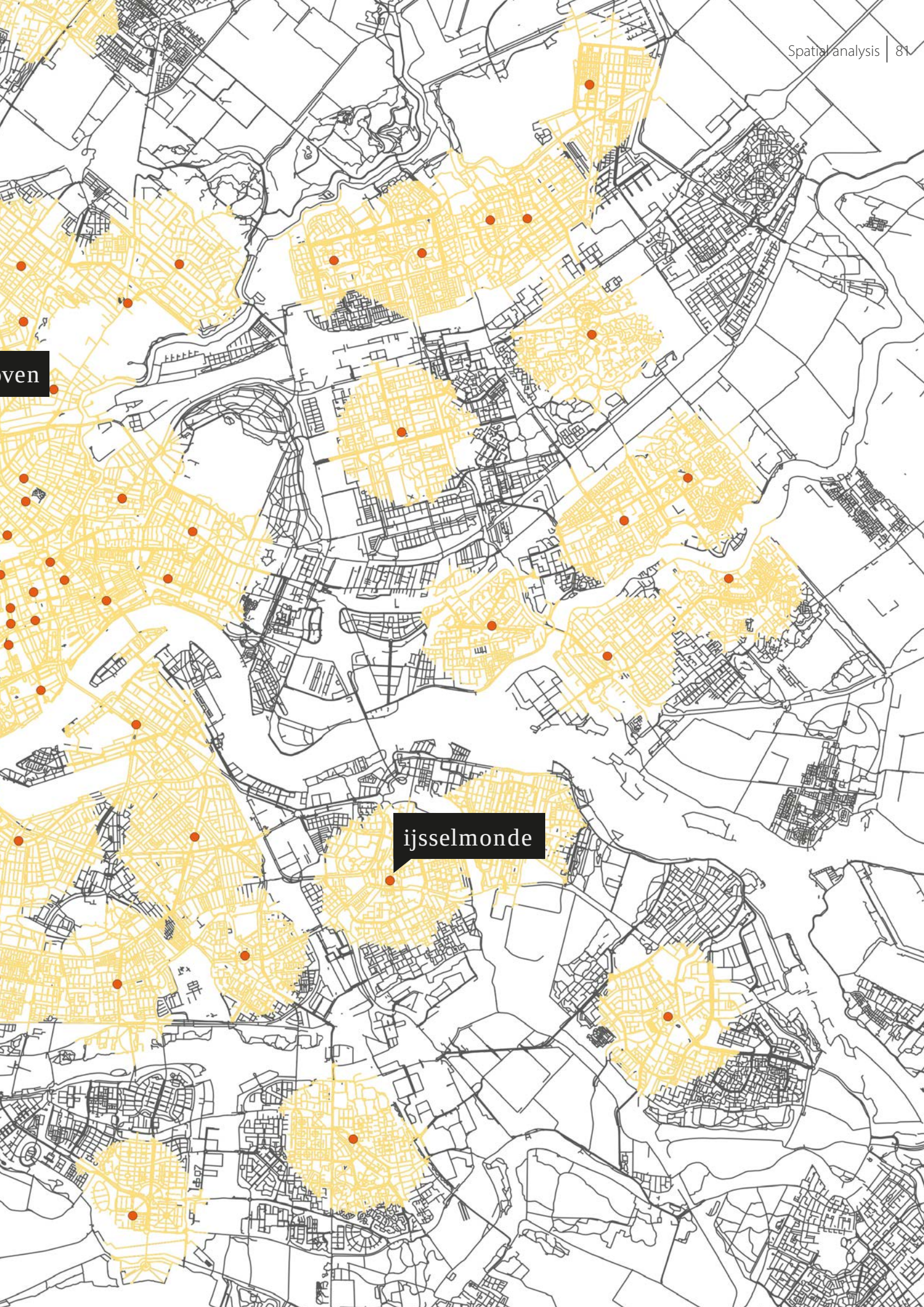

ven
ijsselmonde

Figure 45: Zestienhoven

Figure 46: Ijsselmonde

Figure 47: The everyday environment of IJsselmonde

5.2 CASE I: IJSSELMONDE

5.2.1 Neighbourhood profile

13845
HOUSEHOLDS

2725
HOUSEHOLDS/KM²

573
LAND HECTARES

0,48
FUNCTIONS/HECTARE

IJsselmonde is one of the four Southern garden cities of Rotterdam. In the centre of the neighbourhood lies the shopping centre Keizerswaard, next to the cultural centre Islemunda, named after the small settlement that was located there in the Middle Ages. The neighbourhood is planned in the late 1950s according to anthroposophical ideas about man and society.

Demographics

The area is known for a very devoted demographic, consisting largely of people aged 65 and over. Nevertheless, statistics show the neighbourhood is a demographic almost equal to the overall demographic of Rotterdam (AlleCijfers, 2022). This means different generations and backgrounds are found in IJsselmonde.

However, in terms of income, this area is quite monotonous, the housing stock contains mainly social housing and the population in IJsselmonde is relatively poor in comparison to the rest of the city.

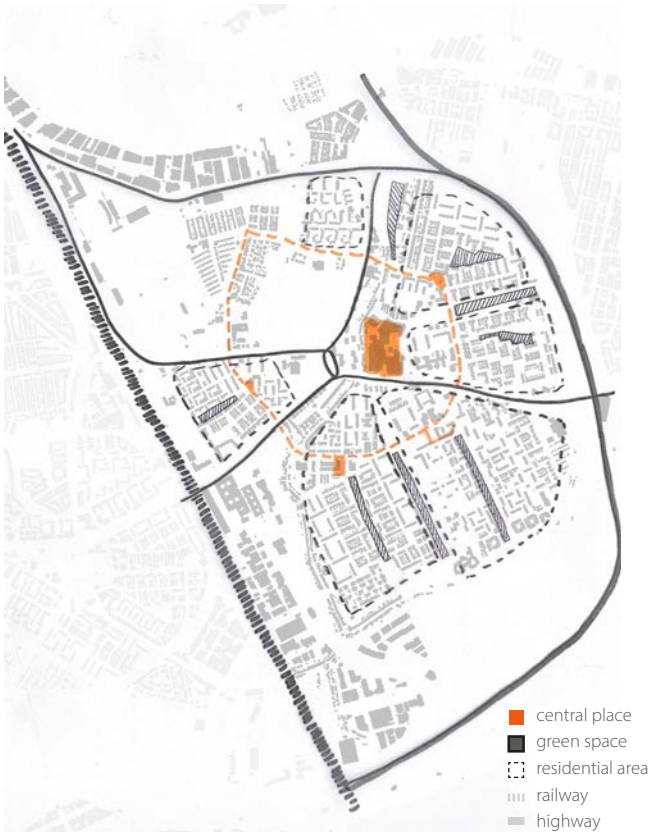


Figure 48: Design structure of IJsselmonde

Figure 51: FSI

Figure 49: Monofunctional areas

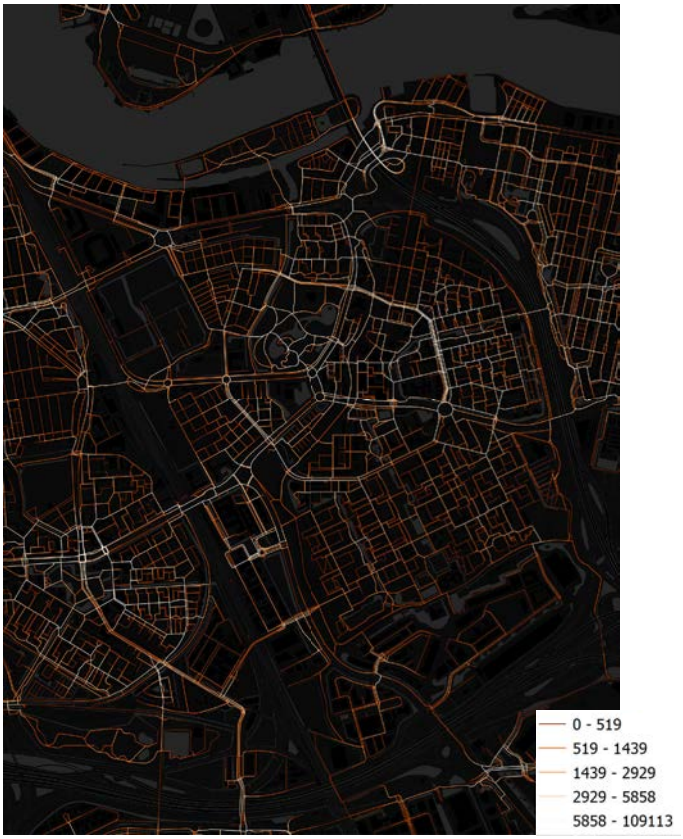


Figure 50: Angular Choice, 400 m walking

5.2.2 Spatial analysis

Spatial structure

As visualised in figure 48, IJsselmonde has a clear spatial structure. The neighbourhood is planned as a flower. In the heart, we found the public functions of the neighbourhood, like the shopping centre Keizerswaard. The border of the heart is shaped by a ring road that carries a tram line. Along this road, residential areas unfold themselves as flower leaves. At the edge of the neighbourhood, there are fringe areas like business parks and sport fields. IJsslemonde is enclosed by the river, highways and railway.

Density

As could be seen in figure 51, the neighbourhood has different density profiles. Areas of higher density (near the Kuip in the North West and in the heart of the neighbourhood) are the areas with the highest functional mix. Besides densities, also building types vary in the neighbourhood. High-rise, mid-rise and low-rise strips are found, clustered in small neighbourhood entities.

Accessibility

As discussed in the theory, the centrality of a place plays an important role in its popularity. To identify which locations are central in the city, a network analysis is performed. Through a network analysis, I'm able to make geometric centrality explicit.

The analysis is done by an Angular Choice analysis, which is a powerful method to predict pedestrian movement (Berghauser Pont, Stavroulaki, & Marcus, 2019). An angular choice analysis shows the likeliness that a street will be used to pass through. For a local centre, there should be a likeable pass-through street. In figure 50, a ring road appears as a central element which means this is a potential line for this pedestrian pass-through traffic.

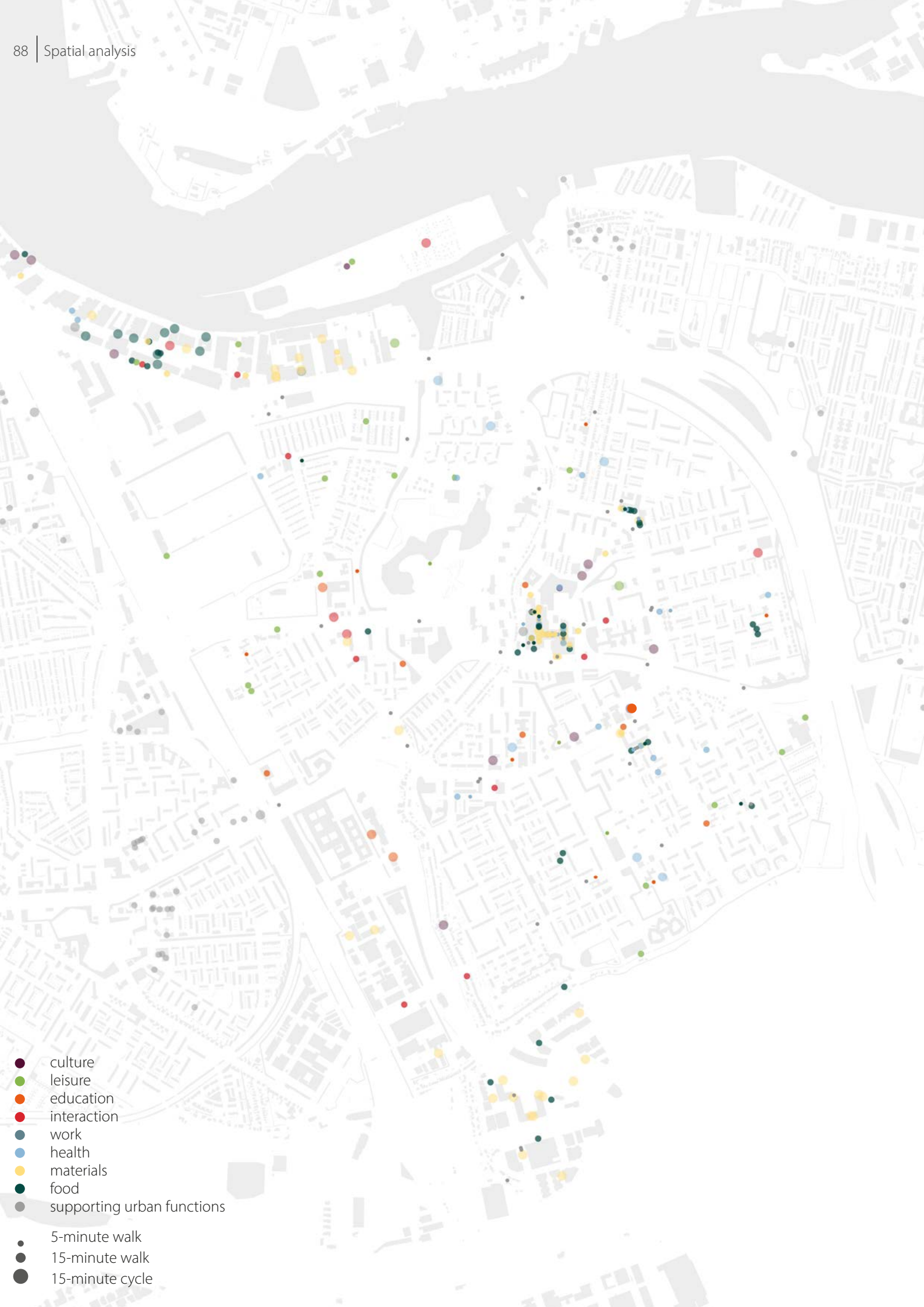

culture
leisure
education
interaction
work
health
materials
food
supporting urban functions
5-minute walk
15-minute walk
15-minute cycle

Figure 54: the current 15-minute functions in IJsselmonde

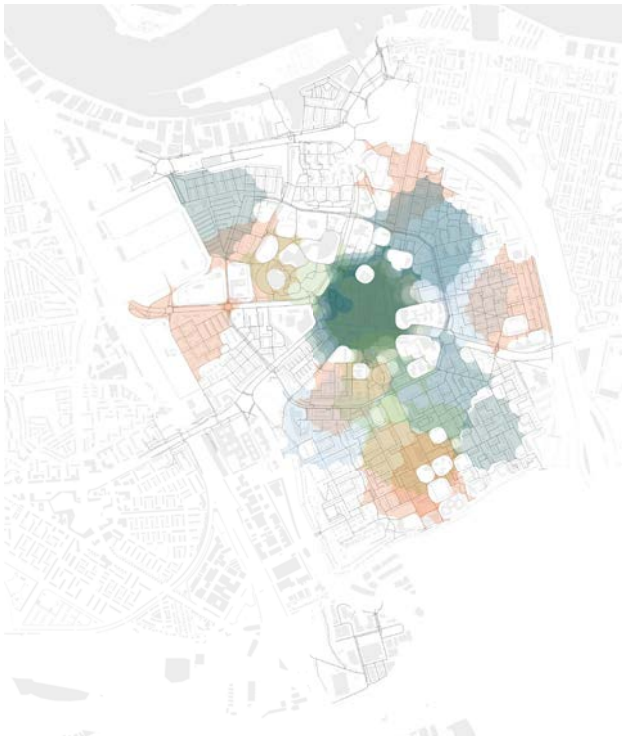


Figure 52: Heatmap of the reach of all 5-minute functions

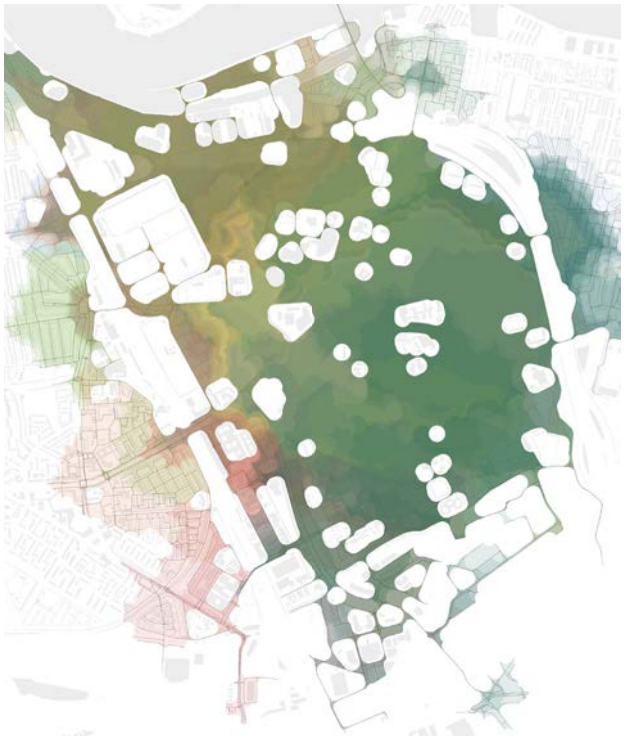


Figure 53: Heatmap of the reach of all 15-minute functions

Diversity

In figure 54, a functional investigation of the current situation is done. All destinations, from the drugstore to the Chinese takeaway restaurant, are visible on this map, categorised in the 15-minute categories. The clustering of functions gives an impression of the functional density, the colours give an impression of the functional diversity.

An observation that is not visible on the map, is that although some categories seem very present, within this category diversity is lacking. An example is the 'culture' category, which seems quite present and spread out, yet almost all dots represent a church. From this, the conclusion is made that although a category might be present, still a qualitative evaluation is necessary for the diversity within this category.

15-minute performance

In figures 52 and 53, the heatmaps of the distribution of functions for 5-minute walking and 15-minute walking are visualised. What strikes, is the clustering of 5-minute functions in the heart of IJsselmonde, supposedly because of economic motives, while these functions are more desired near or inside the residential zones. Regarding the 15-minute function heatmap, the area seems quite well-served, however, there is again a lack of diversity in 15-minute functions.

Figure 56: Service area of 'materials' functions

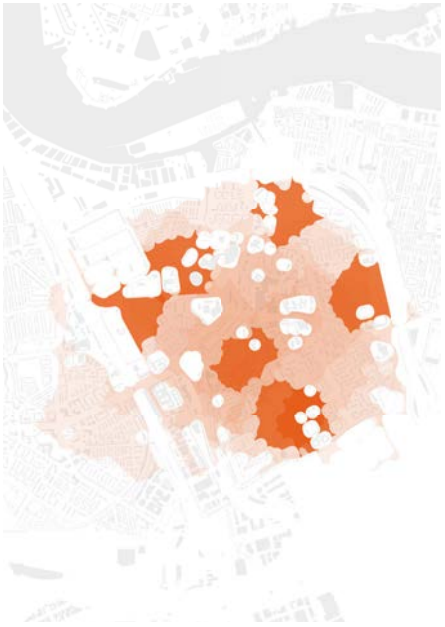


Figure 57: Service area of 'education' functions

Service areas

In these heatmaps, the service areas of the 15-minute categories are visualised separately. The category 'materials' and 'health' are mainly clustered in the heart of IJsselmonde, because of the Keizerswaard shopping centre. 'Education' is equally spread, because of the careful planning of the residential neighbourhoods, including one elementary school per 'flower leaf'. The category 'leisure' is randomly spread over the neighbourhood, with dark areas in the green spaces. 'Food' is also widely represented, however it is debatable if this is a satisfying outcome since most of the food facilities are snack bars.

Figure 58: Service area of 'health' functions

Figure 59: Service area of 'leisure' functions

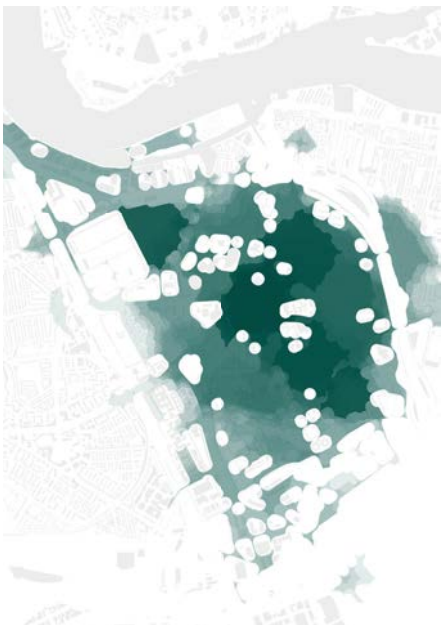


Figure 55: Service area of 'food' functions

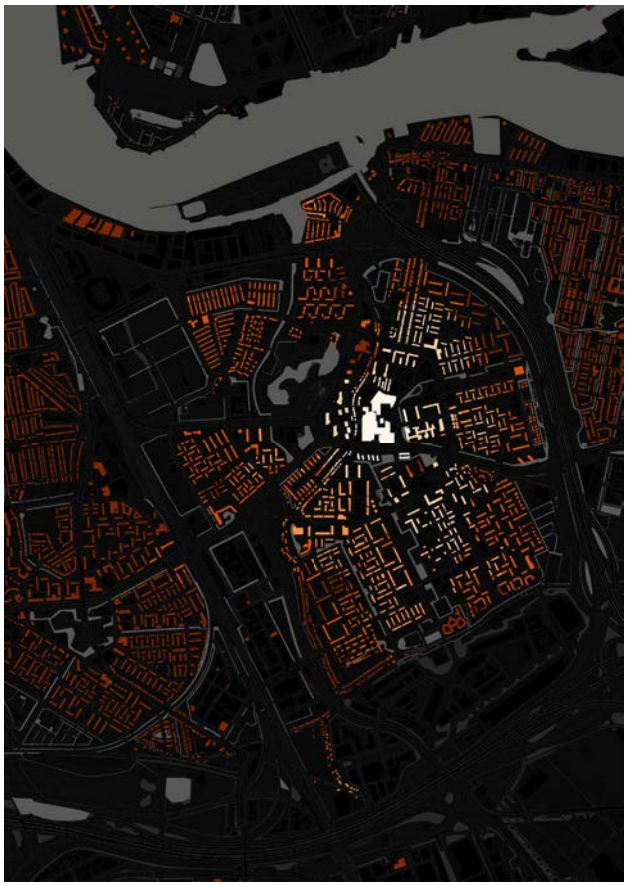


Figure 60: Attraction reach of 5-minute functions

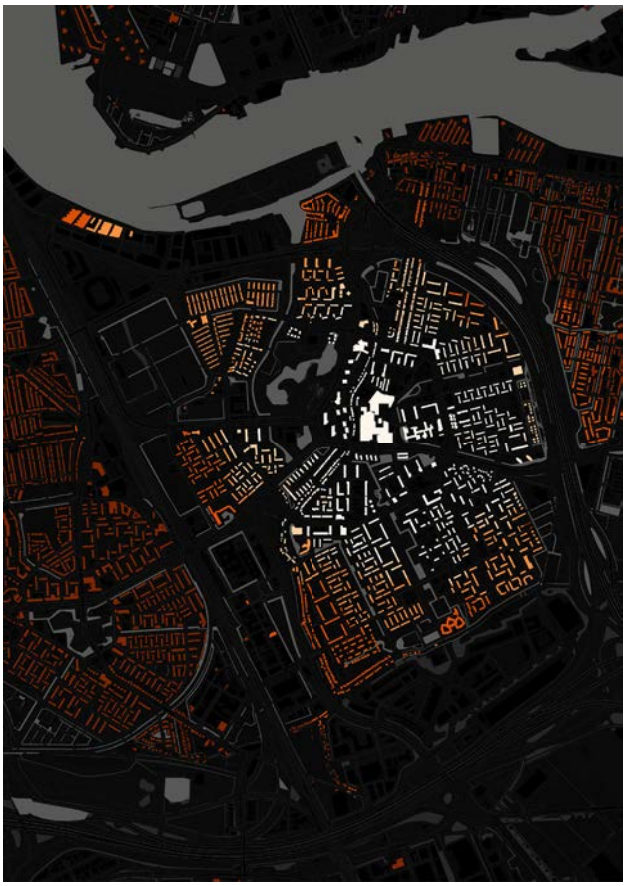


Figure 61: Attraction reach of 15-minute functions

Attraction reach

The maps in figures 60 and 61 show how many attractions can be reached from the residential buildings. The lighter, the more functions can be reached. These maps show important information about the performance of the 15-minute neighbourhood. It shows places and buildings that are well-served or underserved, resulting in the ability to identify weak zones in need of functional densification.

Although the 15-minute reach is higher in IJsselmonde, both maps show a clear centralisation in the heart of IJsselmonde, because of the mixed shopping centre. This observation is rather problematic, firstly because the edges of the residential areas are quite underserved. Secondly, although the heart is rich in functions, qualitative analysis has shown the spatial quality and liveability in this area is very low. The human scale is overlooked and spatial diversity is lacking. Thus, the heart must be included in a restructuring design of the area.

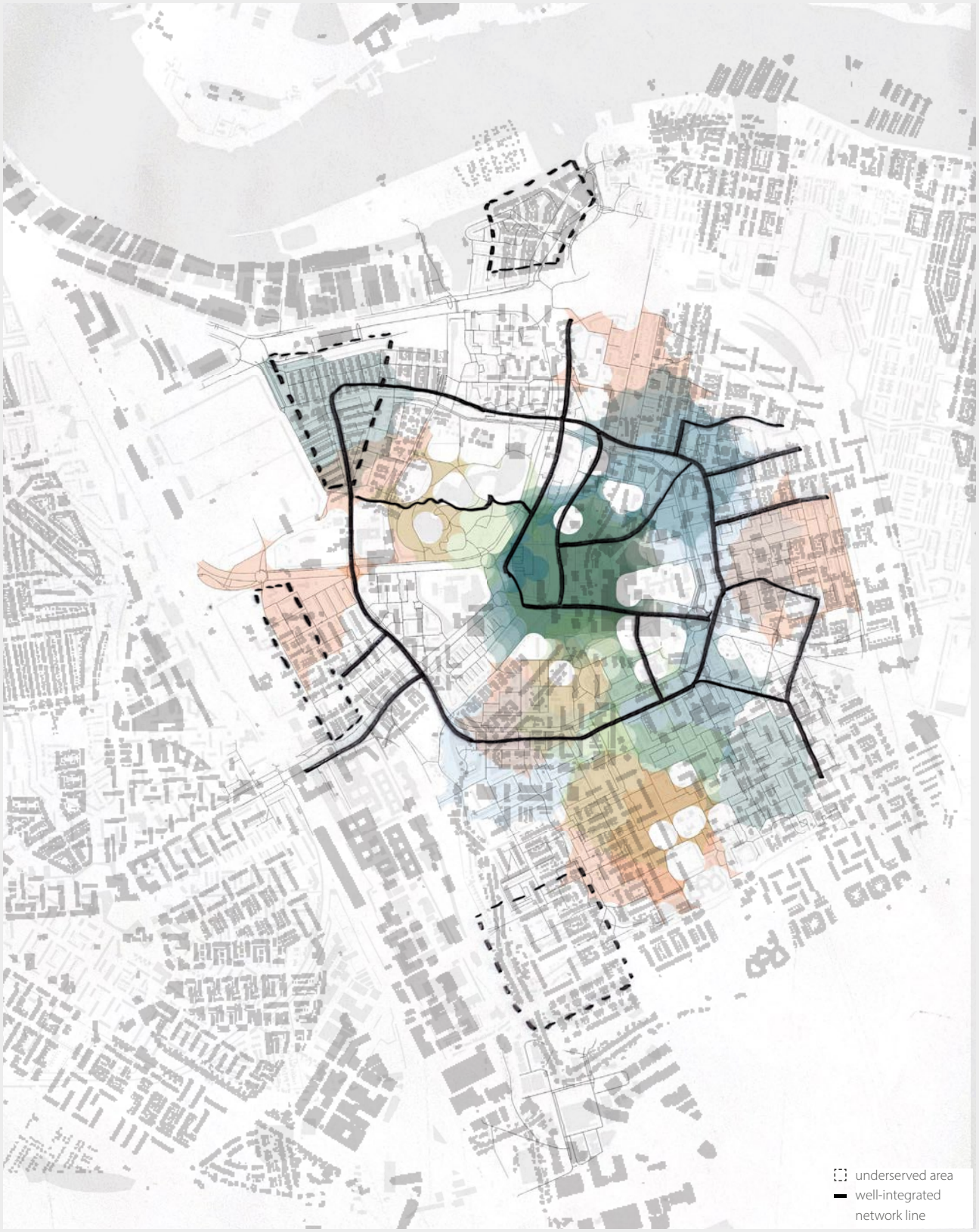


Figure 62: Conclusion map spatial analysis IJsselmonde

5.2.3 Conclusions

From the case study of IJsselmonde, a few interesting interpretations come forward:

Culture
Small-size cultural facilities are lacking (see calculations in Appendix IV). This means, that future densification must include small cultural facilities that fit the demographic cultural desires.

Clustering of 5-minute destinations
The functions that should be reachable in 5 minutes are mostly clustered due to economic advantages. However, this does not benefit the proximity of neighbourhood functions. Future plans must contain acupuncture of neighbourhood 5-minute functions.

Ring road
In line with the intentions of the original design, the ring road that surrounds the heart of IJsselmonde appears as the main structuring element for the slow traffic network. In reality, this is a low-quality thoroughfare that is used by the tram and cars. Here lies an opportunity in strengthening the ring as a pederstian route combined with place to stay.

A second ring?
The well-integrated network segments appear in a spider form. Currently, the spider legs are cul-de-sacs that end in small neighbourhoods. This means the neighbourhoods of IJsselmonde have a well-connected side (near the spider leg) and a less connected side (near the highway). Restructuring of the network could solve low connectivity. A second ring could be an answer to this.

New local cores
Currently, underserved areas are in need of amenities of everyday life within walking and cycling distance. Strategic places for centres are attached to the network and in close proximity to the underserved areas.

Figure 63: The everyday environment of Zestienhoven, source: Google streetview (2022)

5.3 CASE II: ZESTIENHOVEN

5.3.1 Neighbourhood profile

1200
HOUSEHOLDS

902
HOUSEHOLDS/KM²

561
LAND HECTARES

0,07
FUNCTIONS/HECTARE

Zestienhoven, a neighbourhood in the North-West of Rotterdam, is named after the 16 farms (in Dutch: 16 hoven) that were once located in the polder landscape. Currently, the neighbourhood is mainly known for being the neighbourhood near the controversial airport, which also used to carry the name Zestienhoven.

Demographics

Zestienhoven is one of the richest neighbourhoods of Rotterdam according to housing values and average income per inhabitant (AlleCijfers, 2021). Because of the meagre demographic diversity, a risk for social segregation is posed.

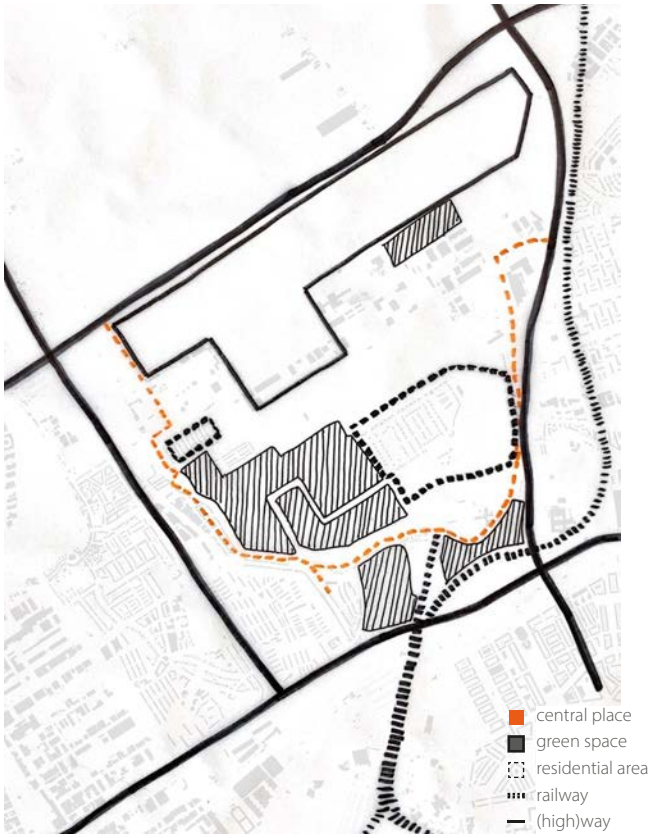


Figure 64: Design structure of IJsselmonde

Figure 65: FSI

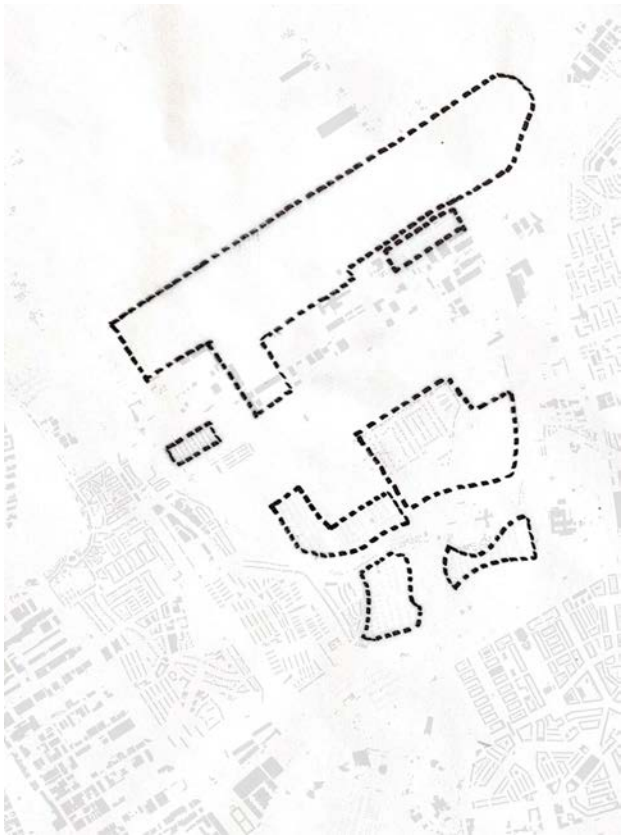


Figure 66: Monofunctional areas

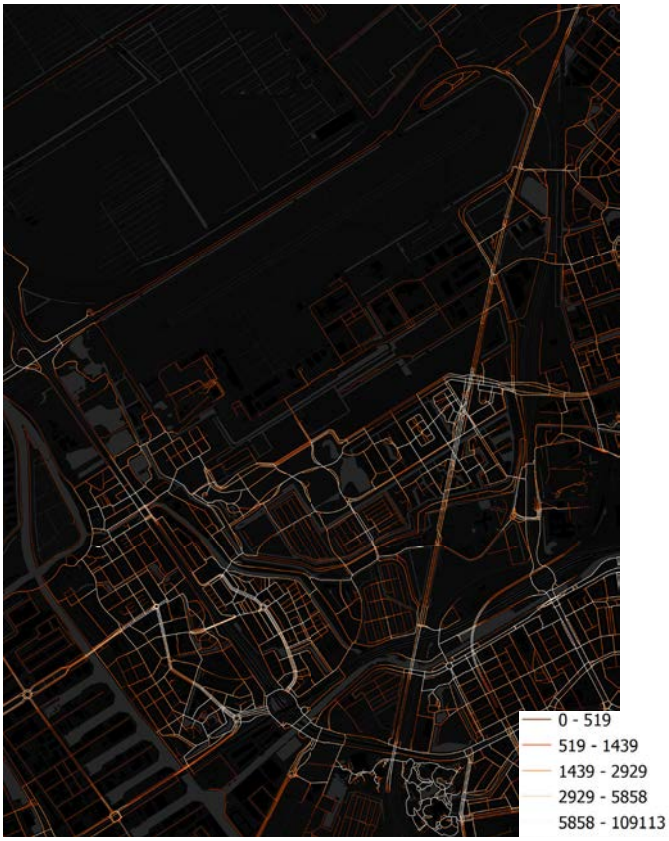


Figure 67: Angular Choice, 400 m walking

5.3.2 Spatial analysis

Spatial structure

As visualised in figure 64, Zestienhoven has a slippery spatial structure. On the Northern side, the neighbourhood is closed off by the Rotterdam The Hague Airport. Around this, a patchwork of land uses is found that are not sensitive to noise and/or pollution. Business parks and allotment gardens together take up one-fifth of the land of the neighbourhood.

Density

As could be seen in figure 65, Zestienhoven is a low-density neighbourhood. Two residential areas are scattered in the green environment like two rafts on the ocean. The low-density character of this neighbourhood poses the question of what densification strategy will suit the area. Residents might live in this area because of the lower density and associated tranquillity and space.

Accessibility

The main slow traffic thoroughfares are lines that reach from West to East. Currently, these lines are used as either recreational or functional routes to cross the area. Zestienhoven is not a destination, but a carrier of mobility.

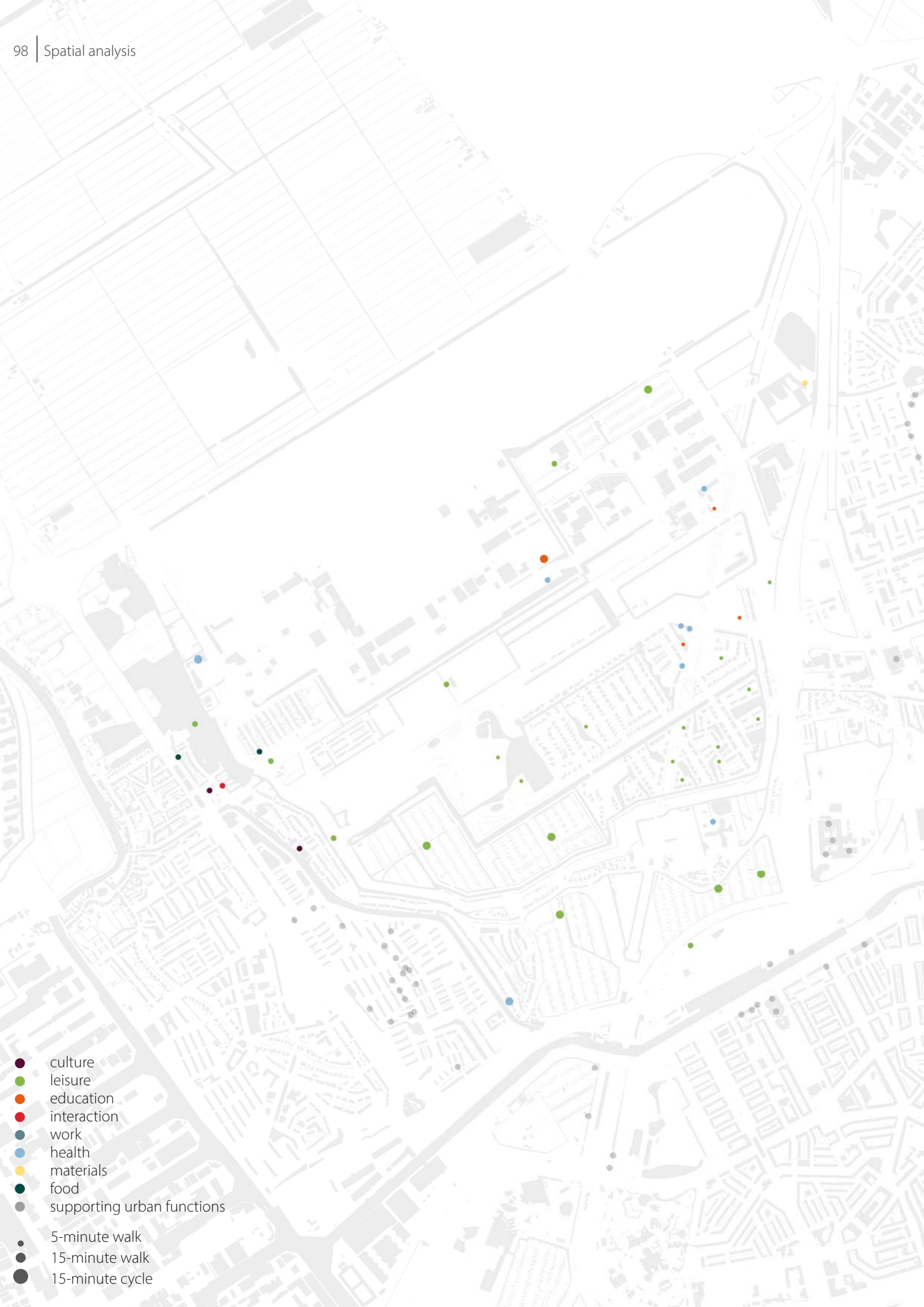

culture
leisure
education
interaction
work
health
materials
food
supporting urban functions
5-minute walk
15-minute walk
15-minute cycle

Figure 70: the current 15-minute functions in Zestienhoven

Figure 68: Heatmap of the reach of all 5-minute functions

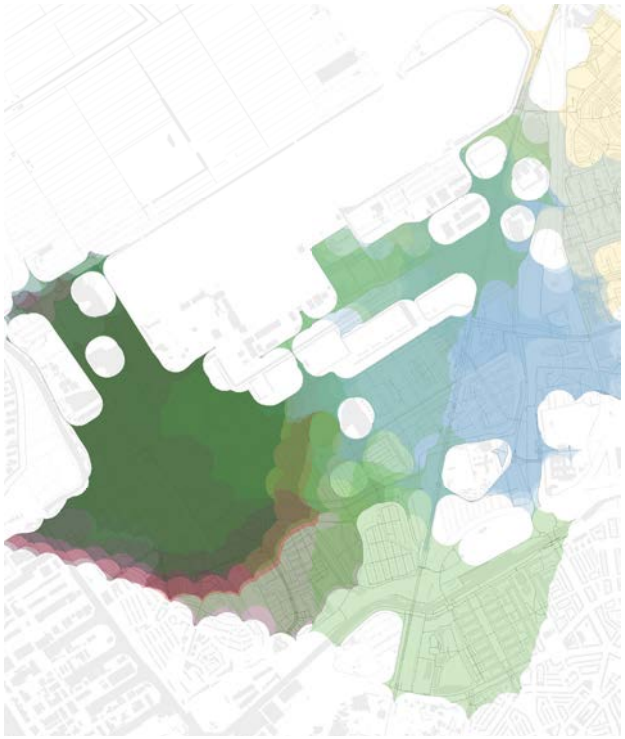


Figure 69: Heatmap of the reach of all 15-minute functions

Diversity

In figure 70, a functional investigation of the current Zestienhoven is visualised. There is no clear logic visbile. The functions are scattered over the neighbourhood. A practical reason for this is that the functions are visualised as points, while in reality, they cover large land areas, like the allotment complexes, visualised in green dots.

15-minute performance

In figures 68 and 69, the heatmaps of the distribution of functions for 5-minute walking and 15-minute walking are visualised. What strikes, is the clustering of 5-minute functions near the new residential area, meaning new functions are strategically arising near homes.

Regarding the 15-minute function heatmap, the Western area of Zestienhoven seems quite well-served, however, these functions are partly attached to the airport and thus have a specific target group other than the residents of the neighbourhood.

Figure 72: Service area of 'materials' functions

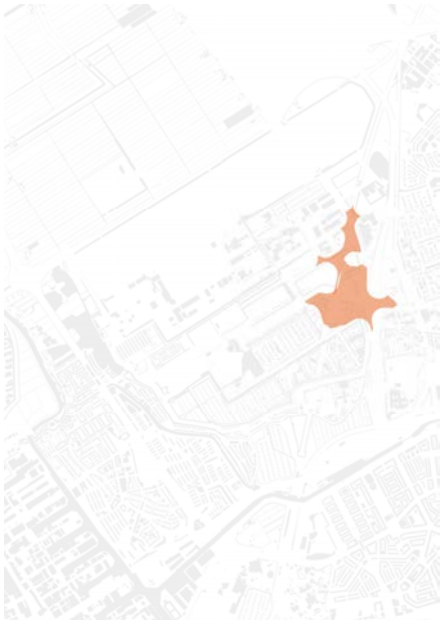


Figure 73: Service area of 'education' functions

Service areas

In these heatmaps, the service areas of the 15-minute categories are visualised separately. The categories 'materials', 'education' and 'health' are mainly clustered in the East of Zestienhoven, because of the emergence of a new residential area. The category 'leisure' is the most present category, due to the green and spacious character of the area. 'Food' is clustered in the West, some restaurants are located here, however, there is a noticeable lack of 5-minute 'food' functions, like markets or bakeries.

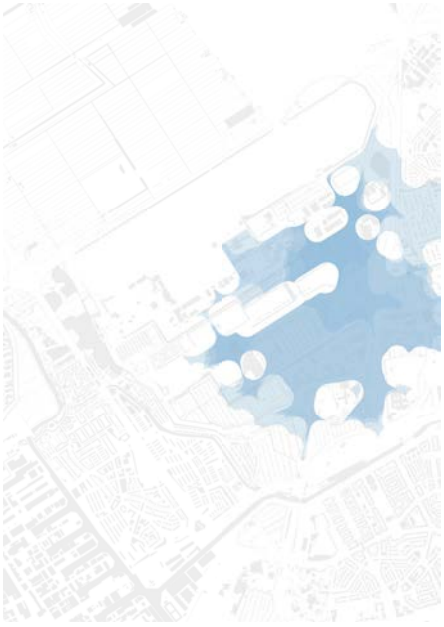


Figure 74: Service area of 'health' functions

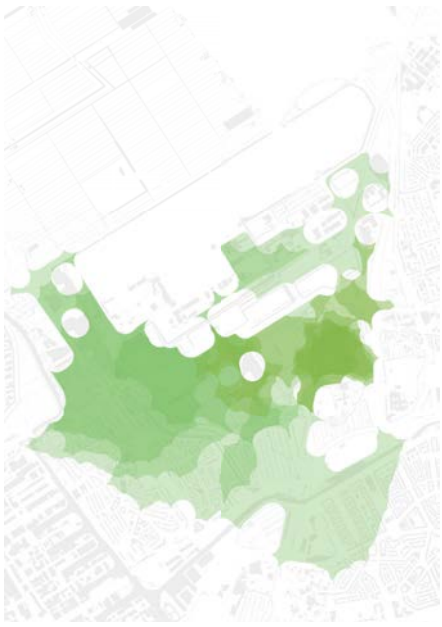


Figure 75: Service area of 'leisure' functions

Figure 71: Service area of 'food' functions

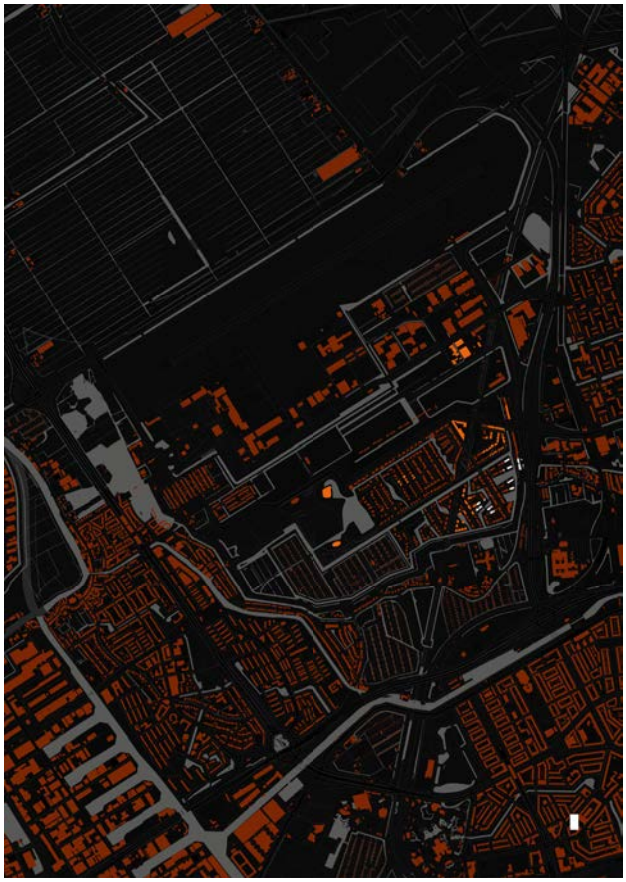


Figure 76: Attraction reach of 5-minute functions

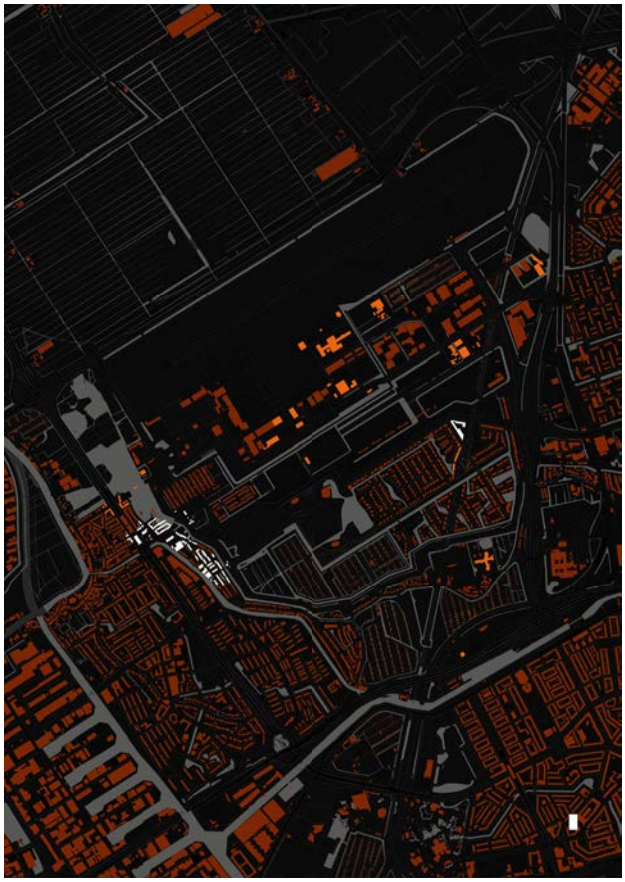


Figure 77: Attraction reach of 15-minute functions

Attraction reach

As visualised in the maps in figures 76 and 77, the accessibility of public functions is very problematic in Zestienhoven. In both maps, the amount of white buildings is minimal, meaning a large part of the homes is underserved.

This is mainly due to a lack of functions in the area. Overschie and Schiebroek, the bordering neighbourhoods, offer some relief. Both neighbourhoods have functional clusters on the side of Zestienhoven. However, this situation is far from the 15-minute neighbourhood situation.

Another reason for the low attraction reach is the fact that the area has a spacious layout with large monofunctional land covers. The area is not porous, meaning residents have to cover quite long distances to navigate around those lands and reach the point of destination.

Figure 78: Conclusion map spatial analysis Zestienhoven

5.3.3 Conclusions

From the case of Zestienhoven, a few interesting interpretations come forward:

Leisure

Zestienhoven is currently a playground for children and adults where they can walk, play, cycle and garden. This programme carries a high potential for creating active places. The challenge to realise this programme in space is twofold. First, overcome the current enormous plots that are currently drivers of segregation. Second, link these places of leisure to other destinations to create smart synergies.

Lack of functions

Currently, almost the whole neighbourhood is underserved. Residents are dependent on other neighbourhoods and need to cover long distances for their daily food. By creating spatial layouts that can facilitate clustering of everyday life functions, like new retail near leisure, the residents are able to use their daily environment more efficiently.

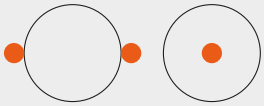
Recreational route

To create this phenomenon of natural movement, as explained in Chapter 3: 'Design Pillars', existing successful slow traffic thoroughfares appear as a spatial element of interest. The Overschiese Kleiweg, currently a popular recreational route that is quite well integrated into the network, could guide as a structuring element for densification.

New local cores

This area is in high need of more diverse human activity. It would be right to start densifying with small cores that facilitate everyday functions like a market or a bike share. After this, the area is in need of a more diverse housing mix. Densification of new urban blocks brings new types of urbanity to the neighbourhood. This gives the active life an impulse.

5.4 CONCLUSIONS



Role of the edge

Often, centralities do not allign with the centre of the administrative boundary.

Centralities at borders of neighbourhoods, which is the case in Zestienhoven, integrate two areas and are often characterised by a diversity of spaces and uses.

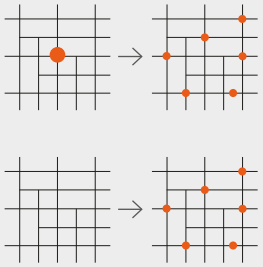
Centralities that do allign with the administrative centre, give the neighbourhood een inward focus, resulting in a centre that is not so flexible to open up to new uses.

Linear centrality

It is concluded that in both cases there is need for a new guiding element that leads people to everyday life.

Because of the layered and extended character, a line appears as the potential centrality form.

In the design assignment of the following chapter, this line appears as the core element that will restructure the neighbourhood towards a 15-minute centre. It is explored how this line manifests itself in a real spatial context and what design interventions are needed.



Local cores

In both cases, there is a need for more spread 5- and 15-minute destinations. This means, a network of hyper local cores needs to be established, which replaces the situation of just one core (IJsselmonde) or no core at all (Zestienhoven).

Figure 79: Closed playground, Zestienhoven

This chapter is the product of a sequence of paranoid thinking tests. Irrational thoughts or future images are translated into two plausible futures. For a detailed elaboration, see Appendix VIII. These futures are projected onto IJsselmonde, resulting in an understanding of the spaces of interest for design.

06

SCENARIOS

6.1 SHIFTING CENTRALITIES

6.1.2 Exploring future situations

The future 15-minute city could have divergent manifestations. This divergence depends on the shifting uses of the city. The digitalisation trend is considered the key driver of change. Digitalisation influences the way humans interact with each other as well as with the environment. The 15-minute city concept, brought into life with the objective of stimulating health and interaction, is logically influenced by this.

The impact of digitalisation on the way urban citizens live their life manifests itself in several domains. The emergence of platform services via apps enables the urban citizen to get food, and non-food delivered at home. This means people leave their homes less for everyday shopping. Since the COVID-19 pandemic, globally, experience has been undertaken in working remotely. In the current day, without pandemic restrictions, online meetings are still the norm. This allows people to plan their day more flexibly and efficiently. Another clear influence of digitalisation is observed in leisure activity, for example, the emerging popularity of online games and VR experiences.

Those trends show clearly that the future use of the city is different from now. In other words, in the future, citizens will leave their homes for other reasons than today. This means centralities will shift. To understand this shift, I have explored several 'future reasons to leave home', based on the emerging trend of digitalisation.

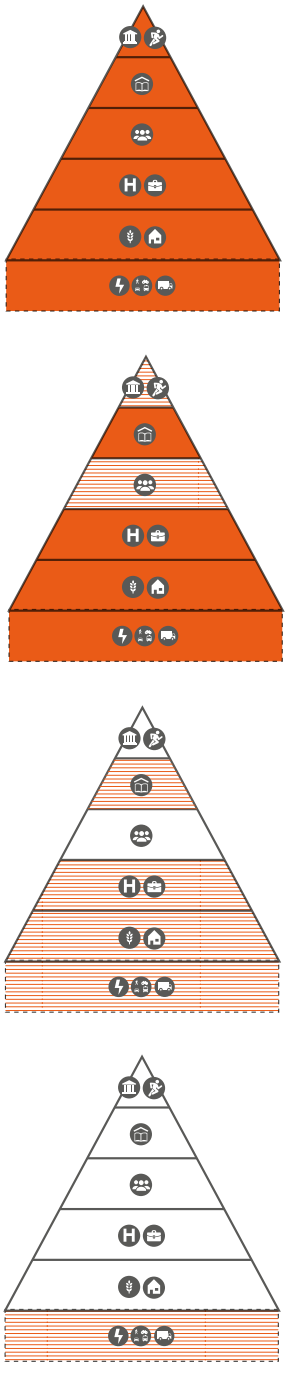


Figure 80: For what do people leave their home?

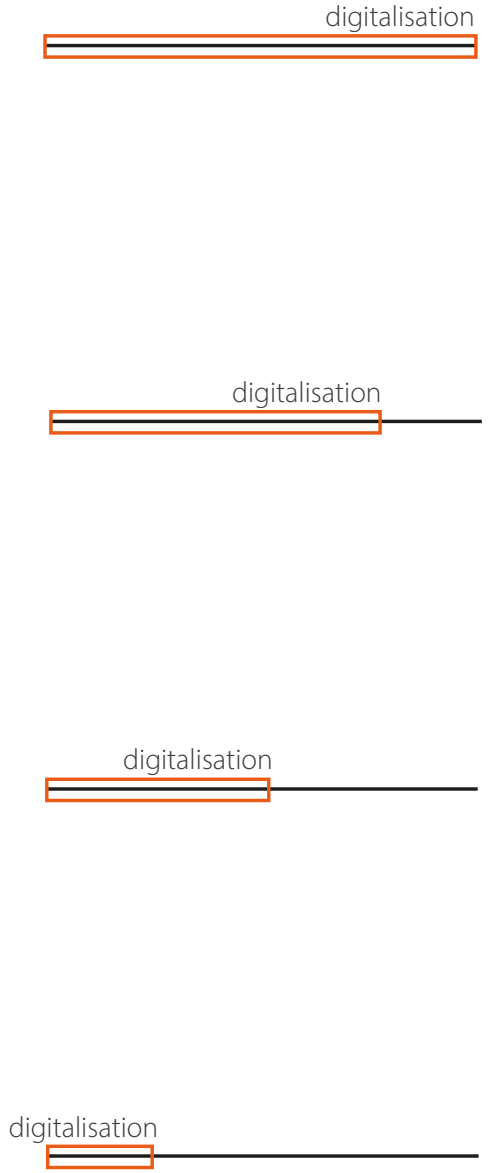


Figure 81: Level of digitalisation in future scenarios

UNDESIRED SITUATION

In this option, digital services form the base of the logic of urban life. The need to leave home has vanished. Through VR, the Internet of Things and apps, living at home has become the norm. This means the objective of the 15-minute concept (health and interaction between humans and the planet) is not met. Therefore, this scenario is undesired and will not be explored.

THE DYNAMIC PLAYGROUND

In this option, the use of digital services has increased to a point that city logistics provide the majority of the necessities. Centrality is defined by distribution. However, in contrast to the undesired situation, people do leave home for certain needs that could not be satisfied at home, like interaction, sense and physical health.

SITUATION ZERO

In this option, human activity is centralised in the city. People leave home for the majority of their necessities. However, due to the upswing of digital services, some functions have changed into distribution, meaning they don't form a reason to leave home anymore. This option represents situation zero.

THE PARADISE OF DEGROWTH

In this option, digital services are solely used in urban systems that support human necessities, like mobility and energy infrastructure. Since the trend of digitalisation will be pushed back, this option represents a scenario of degrowth. This means urban citizens leave home for almost all of their needs.

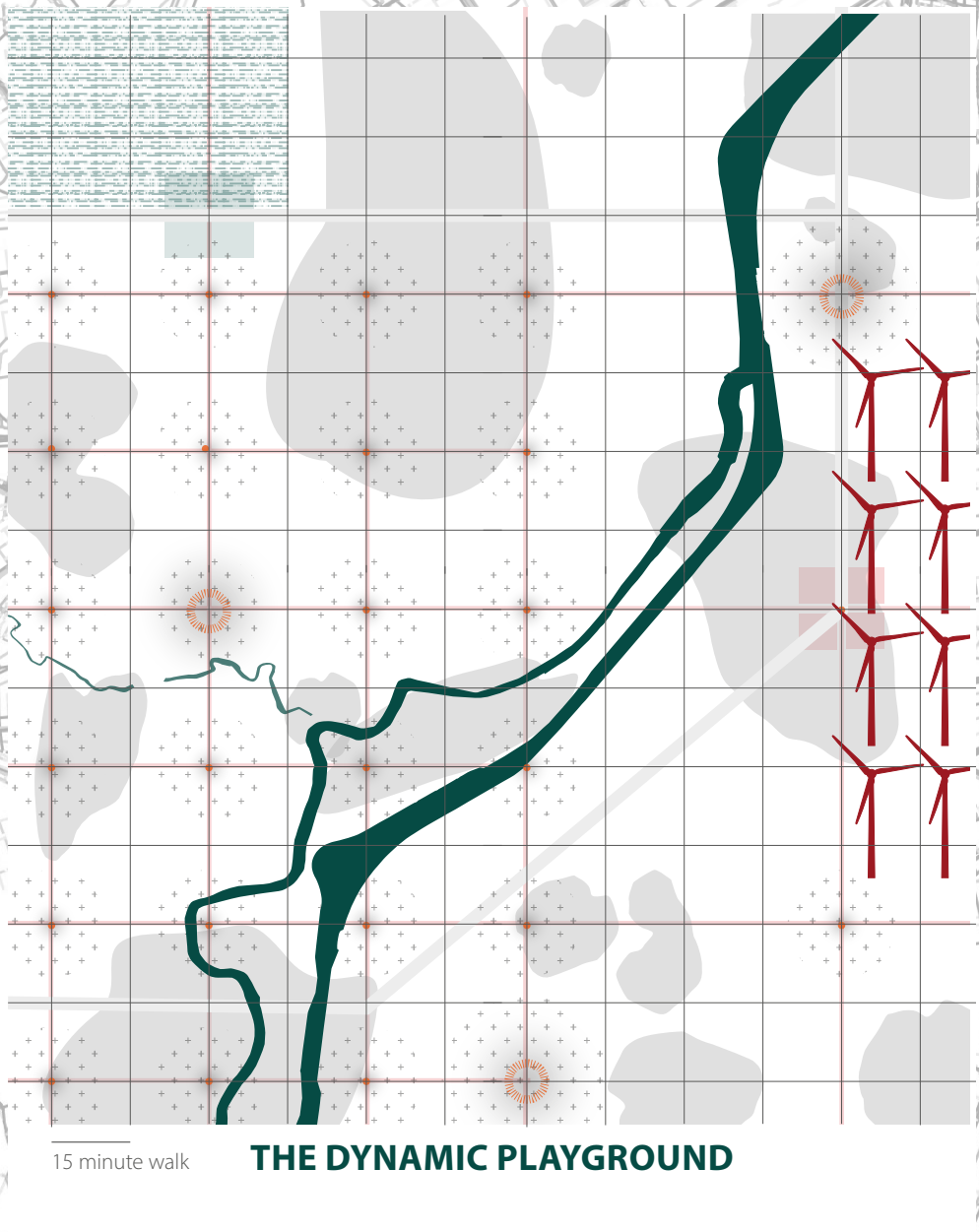


Figure 82: Conceptual visualisation of the urban landscape of the Dynamic Playground

6.1.2 Scenario A

A societal image

In this scenario, the future lies in digitalisation and innovation. According to OECD (2017), powerful innovations like data analytics, robots, synthetic biology, 3D printing and nanotechnology can significantly affect productivity, distribution, well-being and the environment. In this scenario, energy will be generated by ultra-efficient nuclear power plants, food is provided by genetically modified crops and the economy is dematerialised. The digital world is as important as the physical world. This means society relies on digital platforms, apps and systems. VR and AR play a significant role in the functionality of society.

The urban landscape

Urban functions follow each other rapidly because of fast innovation and dynamic lifestyles. This means there is a need for flexible space, able to accommodate different types of functions. Platforms make property less important, resulting in shared ownership and shared mobility. Priorities for settlement will switch. Because of dynamic use, spaces and networks must be designed in a way that they can easily be transformed or reused. Basic facilities like charging, 5G and pick-up points are indispensable near residential zones.

The 15-minute city

In ´the dynamic playground´, citizens leave home for just a small set of functions that stimulate the body and mind. This means two types of centrality emerge. The first one is attributed to the enabling of at-home services like remote working and delivery. This means that the flows of food and materials are structurally organised in the city. The distribution network determines the logic of the urban landscape. The second centrality type is less dominant in de landscape, but equally important, and concerns the human flows. Small places pop up that satisfy the human needs of sense and movement, needs that could not be satisfied at home. These centralities are small and dynamic because of rapidly changing lifestyles and desires. However, they need to be ubiquitous, to make sure the 15-minute limit is met.

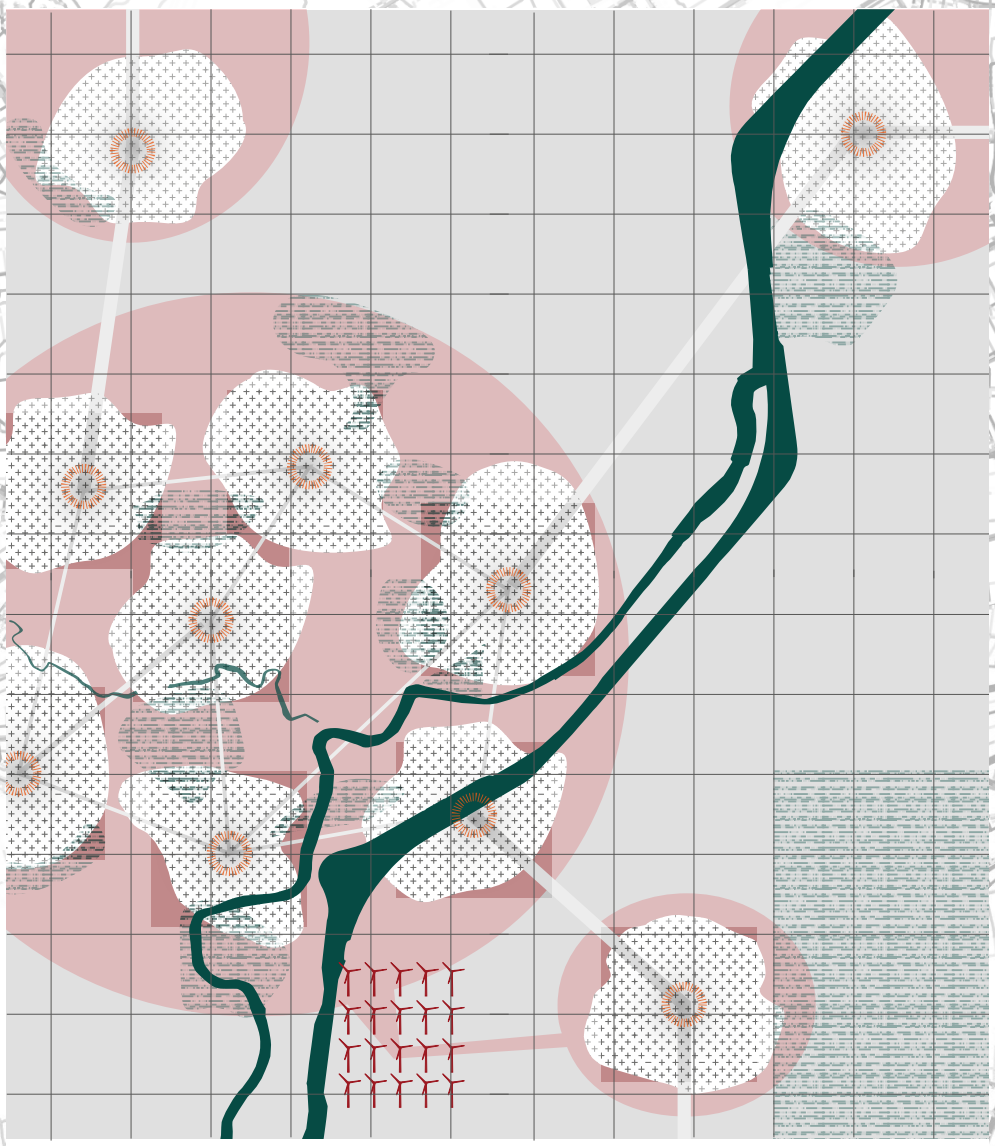


Figure 83: Conceptual visualisation of the urban landscape of the Paradise of Degrowth

6.1.3 Scenario B

A societal image

In this scenario, human development stays in the limits of the planet. This scenario follows the principles of Urban Ecology (Roseland, 1997) that form the base for a city "where people can move via foot, bicycles and mass transit and interact freely without fear of traffic and toxins." Urbanisation is nature inclusive. Public transport stations will guide growth in small- and mid-size cities. Food is provided by nature inclusive farming and urban farming, the diet mainly builds on vegetable proteins. Solar energy and local distribution are the norm. The agglomeration effect will increase due to differences in environmental advantages.

The urban landscape

Restructuring and transformation are the core of urban development. On a national level, functions will decentralise. On the level of the small city, a perfect level of mixed-use is necessary to ensure a modern society. In this scenario, property is not important. Resources and spaces are shared to ensure efficiency, which generates a strong connection with the community. Living space per capita decreases because of shared use.

The 15-minute city

In this scenario, the 15-minute city concept forms a base for the functionality of the city as a whole. Flows of people, food and materials are brought together and create the logic for centrality. Because of this local focus, there is no need to travel long distances. People live in communities, meaning their daily life is mainly close to home. The time that is not spent commuting is now invested in shared properties and events like community gardens or handyman jobs. Work often benefits communal success. Inner-city networks become very limited. Inter-city networks become less scale-consuming because private motorised vehicles are not used.

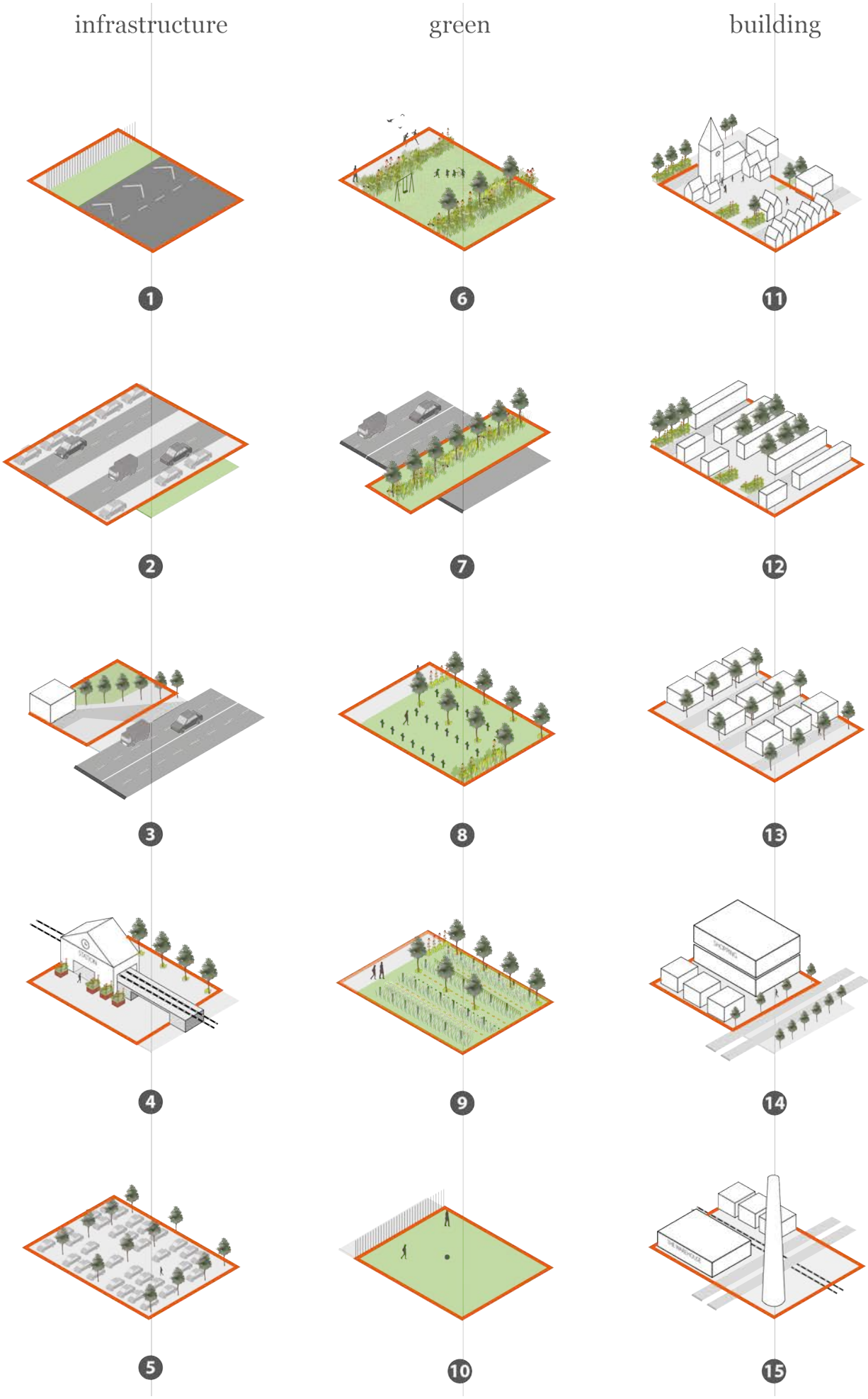


Figure 84: Peri-urban type of places

1 airport

2 linear infra

3 road facility

4 transit station

5 parking lot

6 park

7 linear buffer

8 cemetery

9 allotment garden

10 sport field

11 historic core

12 residential area

13 business park

14 shopping centre

15 industrial area

6.2 PLACES OF INTEREST

6.2.1 Peri-urban types of places

In this thesis, the two scenarios will be projected on the case of IJsselmonde. Therefore, types of places specific to peripheral areas are elaborated. Together, they form a base of existing spatial conditions in which the designer of the future could operate. Typical to peri-urban land are in-between spaces, in other words, spaces that are in a state of liminality, spaces that live in transition or resist new stability (Berger, 2006). Examples are parking lots (5) or industrial sites (15). Another characteristic of the peri-urban is functional segregation. Often, large lots are assigned to solely one function. Examples are business parks (13) shopping centres (14).

Relations between the types

Although these places are very typical to any peri-urban area, the relation between the monofunctional spaces and linear elements is quite diverging. This is demonstrated by the case study areas, see figure 85 and 86 on the next pages.

IJsselmonde

IJsselmonde is a textbook example of the configuration of planned peri-urban places. the residential zones (12) are clearly positioned around the 'heart' of IJsselmonde, that contains two public types of places: the park and the shopping centre. In the fringe of the neighbourhood, businessparks and sportfields are situated: typical border areas to buffer the infrastructural elements like the railway and the highway.

Zestienhoven

Zestienhoven presents itself more like a patchwork of places that were established in different periods. Many green areas like parks and allotments are scattered over the area to buffer the airport and highway. Two residential areas are situated here like they were air-dropped into this area. A spatial structure is lacking.

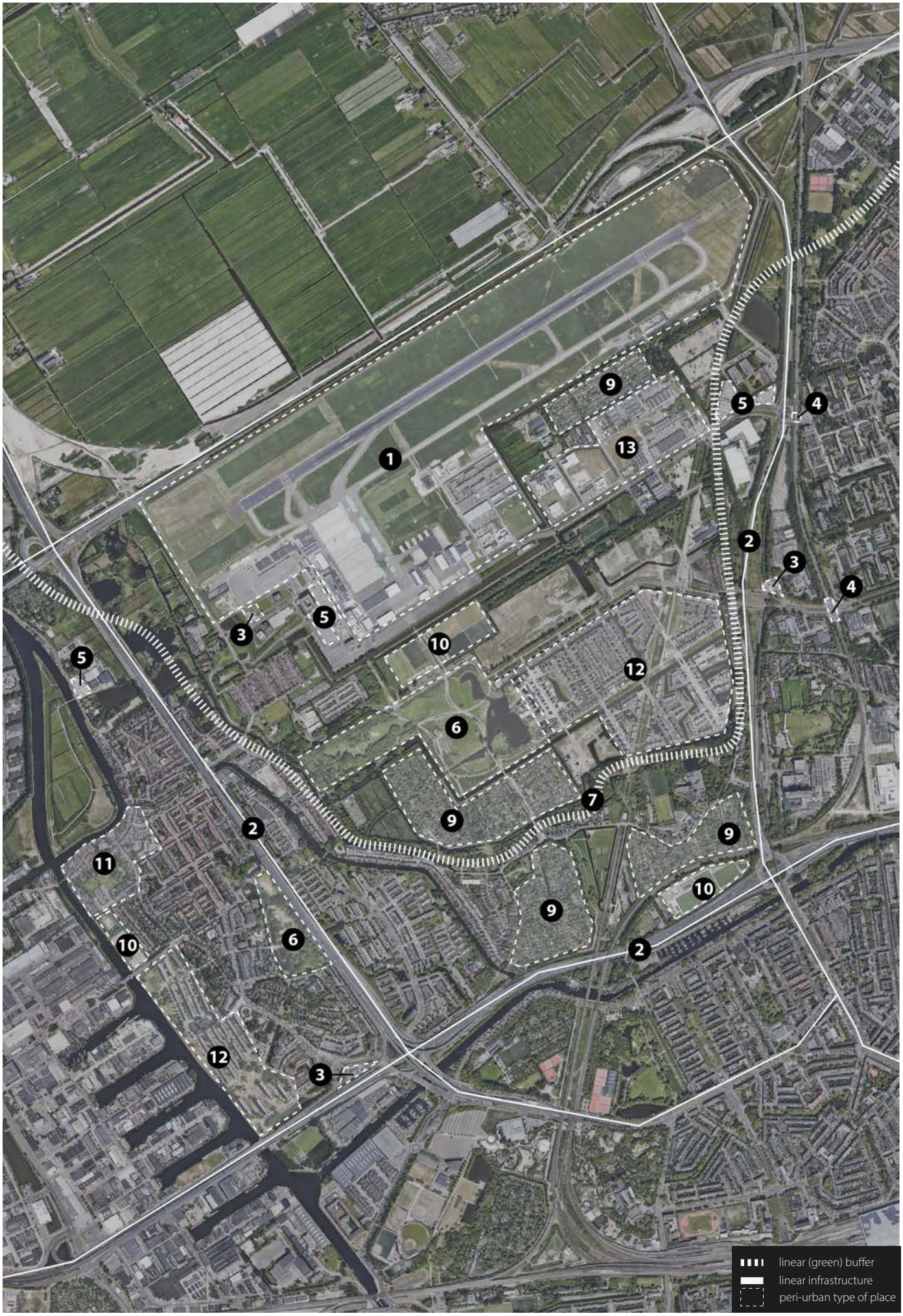


Figure 85: Peri-urban types in Zestienhoven

Figure 86: Peri-urban types in IJsselmonde

6.2.2 Focus areas for scenario ´The Dynamic Playground'

The configuration of the peri-urban types of places informs the decision-making process about where to intervene.

In figures 87 and 88, two complementary networks appear, one focused on fast traffic city logistics, the other focused on slow traffic and human activity. Together they facilitate the future path of the dynamic playground.

The distribution network is organised via multiple-lane roads that already exist in the neighbourhood. along these lines, transformation areas will be redeveloped into distribution centres or points.

The public space network is the structuring element of the diversification of recreational places. Along this network, public spaces are designed to offer the residents interaction possibilities near home.

Figure 87: Distribution structure

Figure 88: Public space network

Mainly on the edge of the neighbourhood, transformation areas appear. Large monofunctional business parks, with a high amount of car repair shops, currently exhibit unsustainable and unlivable circumstances. Those areas need spatial development and therewith create a potential to expand the urbanity of the neighbourhood.

In figure 90,, links between the potential public space network (figure 88) and the transformation areas (figure 89) are highlighted as new connectors. Currently, these lines go through small green parks, which gives them the perfect circumstance for the addition of leisure functions. In this way, these lines will be the slow traffic arteries of the neighbourhood.

Figure 89: Transformation areas

Figure 90: Potential links for function densification

6.2.3 Focus areas for scenario ´The Paradise of Degrowth'

In figure 91, open spaces are highlighted that have a good size and location to be transformed in to a space where shared uses and resources of the surrouning inhabitants are located.

The ring road of IJsselmonde (figure 92) carries high potential to be the structuring element of the diversification of recreational places. Along this network, economic and public spaces are designed to offer the residents interaction and work possibilities near home. Some clear links to other neighbourhoods will make sure that this ring is not an element in itself, but rather a roundabout in a network of rings.

Mainly on the edge of the neighbourhood, transformation areas appear. Large monofunctional business parks, with a high amount of car

Figure 91: Communual centralities

Figure 92: Linked centralities

repair shops, currently show unsustainable and unlivable circumstances. Those areas need spatial development and therewith create a potential to expand the urbanity of the neighbourhood. These transformation areas form the biggest opportunity to densify with new types of housing.

In figure 94, links between the potential public ring (figure 92) and the transformation areas (figure 93) are highlighted as new connectors. Currently, these lines go through (currently weakly connected) residential areas, which means the formation of accessible slow traffic connectors is necessary. The functional densification along these lines mainly consist of supportive functions for mobility, like bike share and parking, repair and places to have a break.

Figure 93: Potential areas for housing densification

Figure 94: Potential links for function densification

6.2.4 Mutual interest in linear space

Although there is a difference between some areas of interest, there is a clear structuring element that in both scenarios turns out to be highly important: the central ring that connects the local cores of IJsselmonde.

Centrality as a process

As pointed out in Chapter 5: 'Spatial Analysis', the neighbourhood of IJsselmonde was intentionally designed as a flower. The ring road in the centre of the neighbourhood should have functioned as an organising line of centralities. However, currently, this line is not more than an unfriendly and anonymous car thoroughfare, see figure 95. However, I identify this linear element as high potential for a design that reconnects the people to the open spaces of the neighbourhood. According to Vaughan, Griffiths, & Palaiologou (2022), diverse spaces that have developed over time, structured by a linear element, are the potential places to ensure long-term socio-economic sustainability.

This is sentence is confirmed by Hillier (2007) in his theory of centrality as a process. It is highlighted that historic endurance is essential for the success of a vital place. This means a place has developed in different periods, by different developers, on different scales, resulting in a layered and diverse entity.

The ring road in IJsselmonde has now a first planned layer. In the future, the potential of the line could be further exploited by taking it as a guiding element for housing and function densification.

Figure 95: The ringroad of IJsselmonde, source: Google streetview (2020)

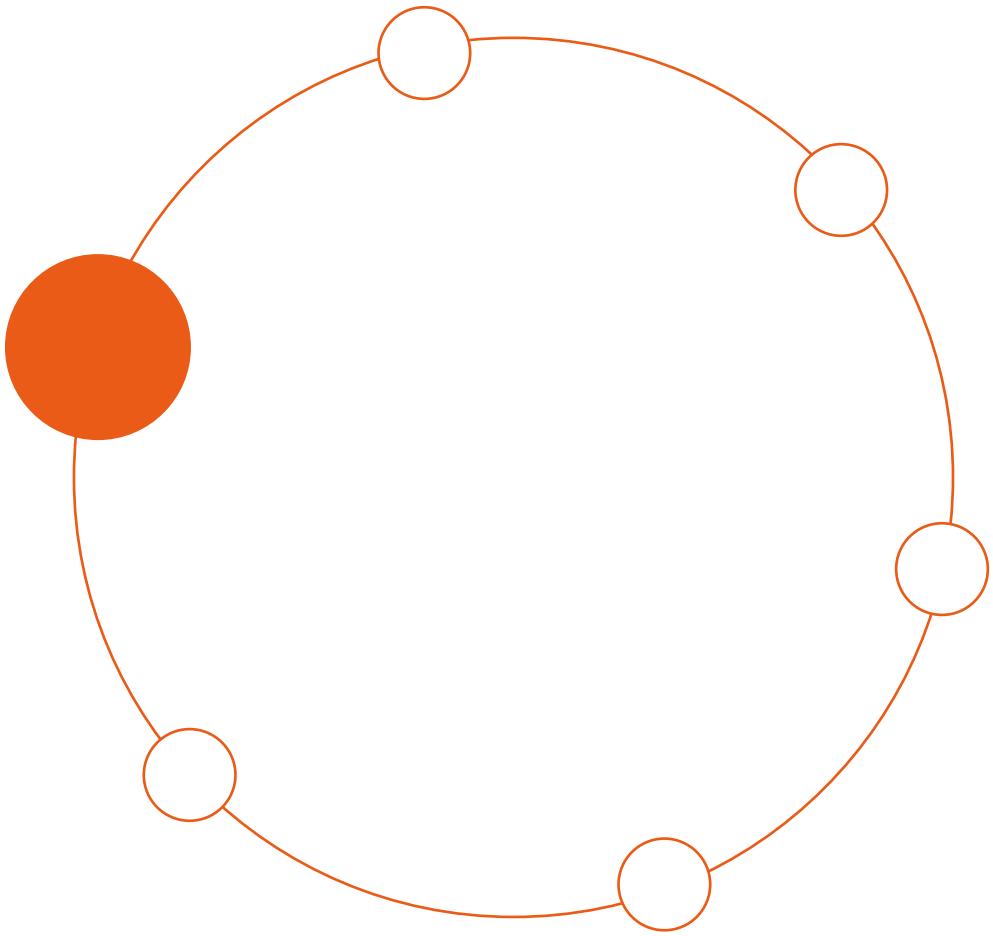


Figure 96: Abstract representation of the vision for the ring of IJsselmonde

Zoom area

One of the striking conclusions from the case study (p. 92) is the lack of a succesful central place in the west of IJsselmonde. This is the consequence of unconnected peripheral land fill. Basic needs and pleasant connections are lacking, the inhabitants have to travel longer than 5 minutes to reach their basic needs.

The Trainingscomplex 1908, located in West IJsselmonde, appears as a location in need for future transformation: the sport field take up a large amount of land for just one function, for just a few hours per day.

Besides, this area is attached to the potential ring road that will function as a guiding element for new centralities.

Figure 98: Current situation: sport fields and office building, source: Google streetview (2020)

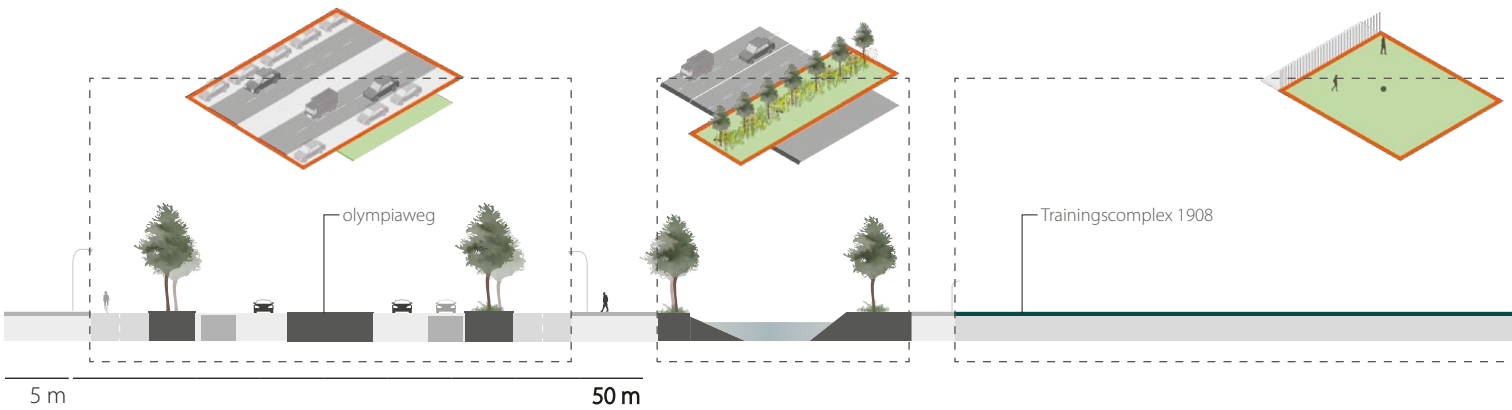


Figure 97: Section current situation

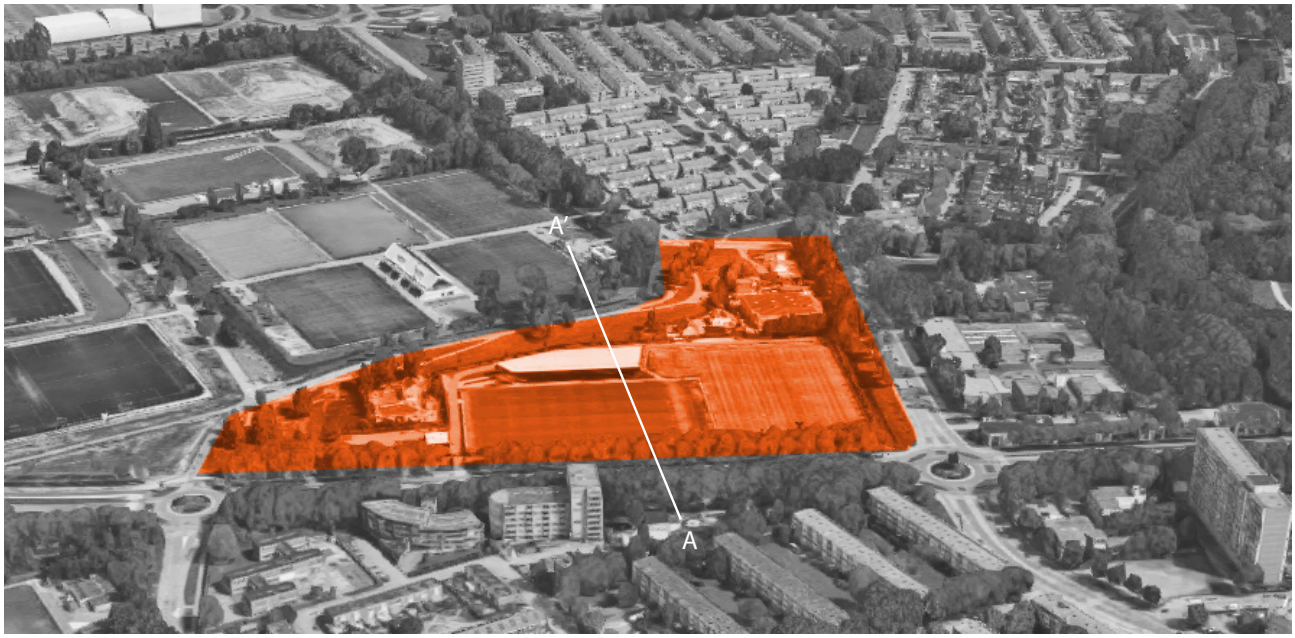
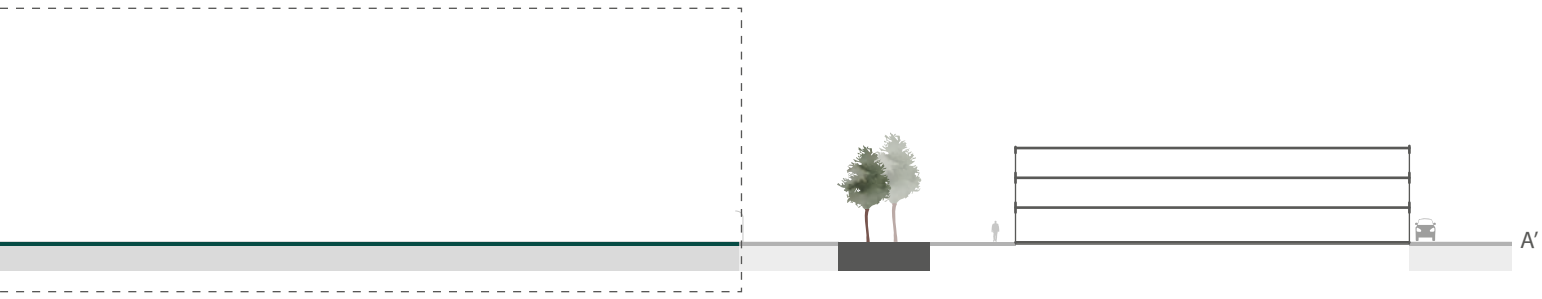


Figure 99: The location



6.3 SPATIAL FUNCTIONAL TRANSFORMATIONS

New urban lay-out

In the light of the defined scenarios, new urban functionalities are imagined.

In the case of the dynamic playground, it is obvious that more spaces are needed for distribution traffic, distribution centres, shared mobility points, recreational zones, cultural centres, co-working spaces and open access points to Wifi and electricity. In the case of the paradise of degrowth, efficient use of space is essential to make this scenario, since centralised flows like food and energy are split up and need space in the urbanised landscape. This means, spaces for food production, urban manufacturing, waste incineration and exchange, as well as co-working spaces and shared mobility points.

Those new types of urban programmes ask for new urban lay-outs. Spatial interventions must accommodate new functionalities, while simultaneously remaining flexible for future use.

Form follows function?

Thus, new urban forms are adapted to the intended new function. However, form does not necessarily follow function. This is illustrated by historic cores in cities like Amsterdam, where living, working and recreation alternate in the same type of buildings. To ensure flexibility, different strategies could be applied:

- Create a diversity of spaces. When proximate spaces differ in size, form and materialisation, it is plausible that future uses will find their way through.
- Create spaces that have an easily adaptable layout. This means spaces could easily be transformed, for example from office space to home.
- Create modular spaces. This is flexibility in the most literal sense, where spaces could be created and uncreated at places where they are needed.

Spatial interventions

To design for flexibility, different spatial interventions could be imagined. Typical peri-urban places of different sizes (S/M/L) are taken as a testing ground to imagine spatial transformations that fit both the scenarios. To better understand these interventions, in the following chapter, test designs are made for the case of IJsselmonde, Rotterdam, a typical peri-urban neighbourhood.

Figure 100: Transformed housing, IJsselmonde

DES

In this chapter, the two design strategies for IJsselmonde are elaborated, based on the normative scenarios from the previous chapter. These design tests inform the understanding of important spatial qualities for the future 15-minute city.

07

IGN STRATEGIES

7.1 THE DYNAMIC PLAYGROUND

7.1.1 The experience of space

Figure 101: Mixed media collage of the Dynamic Playground

de brug

ik haast de brug over
ik loop omhoog, gestaag vooruit
mijn voeten vlak boven
het stromende water
de diepte ervaar ik

het water
ik ruikt het, ik hoor het, ik proef het zelfs
even ervaar ik de rust, ik hoef het
even niet te zien

de gepixelde wereld
het ritme bepaald door algoritme
verstandig vertaald naar kunstmatig intelligent
een virtueel waanzin waarin je mag zijn wie je wil zijn
daar is waar je soms vergeet wie je bent

vandaar ben ik buiten
de fysieke ruitmte
daagt me uit
ik loop de brug af
ik ga vooruit

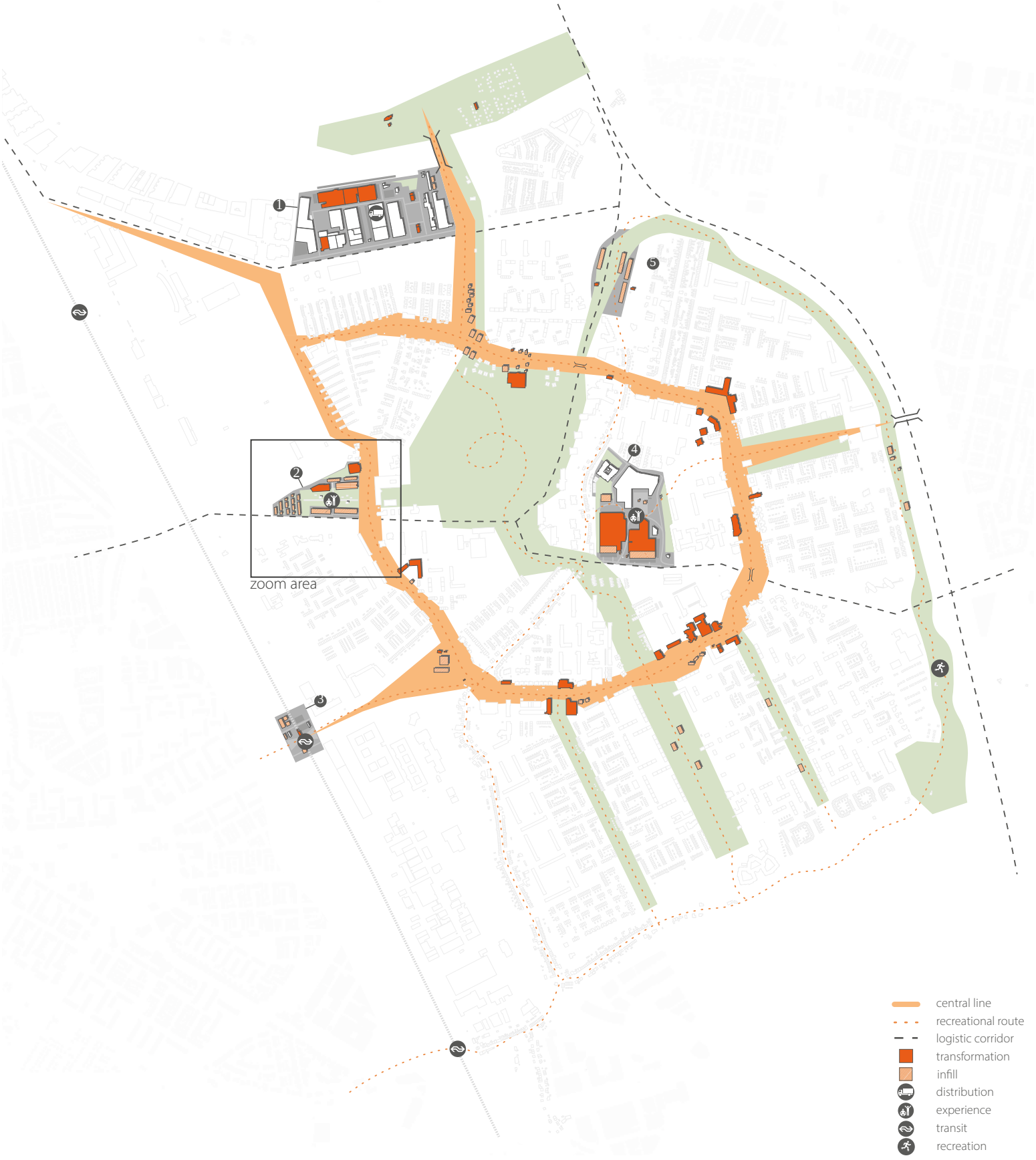
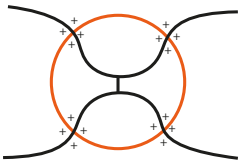


Figure 102: Overview map of IJsselmonde as a dynamic playground

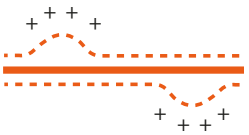
7.1.2 Scenario design: IJsselmonde X 'The Dynamic Playground'



Two networks

In this map, the logic of **two networks** becomes clear. The landscape is organised on the base of efficient high speed flows of food and materials. **Logistic corridors** are attached to a city wide network. Distribution centres are strategically located along the corridors.

This logistic organisation forms a driver of housing densification. In this scenario, logistic points like package pick up or charging need to be in a 5 minute range. Therefore fine grain distribution and densification form an essential synergy.



Linear public space

Flexible clusters of recreational functions form the main central places of activity in IJsselmonde. This means, a **secondary network of public spaces** is present that accommodates slow traffic and human interaction. This recreational network is structured along green (buffer) areas an historic routes.

The public space network creates an opportunity for densification of functions. Along those human-friendly lines, societal essential functions like education and community life are organised.

Transformation areas

The highlighted areas (1, 2, 3, 4, 5) are transformation areas. Because of a need for new urban functions and infrastructure, these areas (currently mostly monufunctional) will be transformed into mixed-use areas, all with a different character that suits the place.

Area 1, currently a businesspark, will be an urban distribution center. This area fits this new function perfectly because it is very well connected to the rest of the city via road and river.

Area 2, currently two sportfields and some scattererd buildings, will be a new, well-connected and mixed area where people go to for interaction and recreation. This area therefore facilitates the new residens, as well as the residents of Sportdorp, that are functionally underserved currently.

In area 3, the transit station forms a connection point on the recreational routes of the city.

Area 4 is located in the heart of IJsselmonde and therefore a central place for inhabitants. In this scenario, people leave their home for experience, senses and movement. Therefore, this area is a perfect place to establish an experience centre, a place where people can meet and play.

Area 5, currently a petrol station, will not be attached to the highway any longer and therefore this well connected place is suitable for new housing.

Network intersection

When zooming in on the place of interest, the integration of the two networks becomes explicit. Above this, the spatial qualities that fit the networks are visualised.

Integrating city logistics in urban life

Currently, city logistic are increasing at a high pace, but simultaneously spatially undesired. In this design, city logistics are integrated in the livable urban spaces. Urban citizens will leave their house to pick up their delivery at a near pick up point and they will find here the possibility to interact with all types of groups that inhabit the neighbourhood.

The former sportield is densified with one person households and multi-person households.

Area 1: compact mixed housing

homes added: 42
amenities added: 3
In area 1, ground-level homes are altered with appartments. These compact midrise strips have accessibility to a shared roof garden and the public park (area 2). Because there is no ground-level private nature, higher density is achievable. (Bicycle) parking is centralised on the edge of the pedestrian zone. A few amenities are realised, like the bike parking an a coffee corner.

Area 2: public playground

homes added: 16
amenities added: 18
In this area, compact mid-rise blocks arise as carriers of new public functions. In this way, the area undergoes a large functional diversification. The blocks contain small, medium and large size functions, from wifi points to sport rooms.

Area 3: quiet living

homes added: 75
amenities added: 7
In this area, focus lies on comfortable living near nature. The area is filled with mid rise strips and blocks, resulting in a mixed housing area with different sizes of open space. In this way, there is a gradiant between busy and quiet places, giving the residents the choice of ambiance that suits their recreational activity.

Spatial norms

De linear public space asks for 2 types of spatial lay-out to distinguish between public and private and control readability.

In the 'line extension', public functions concentrate in the buildings and open spaces. Therefore a more spatious lay-out is desired.

In the 'public space line' public functions and housing alternate, therefore different plot lay-outs appear. To emphasise the line, a continuity of buildings is desired, without in-between open spaces.

Densfication strategy

On the next page (p. 136), a phased densification strategy is visualised to ensure public support.

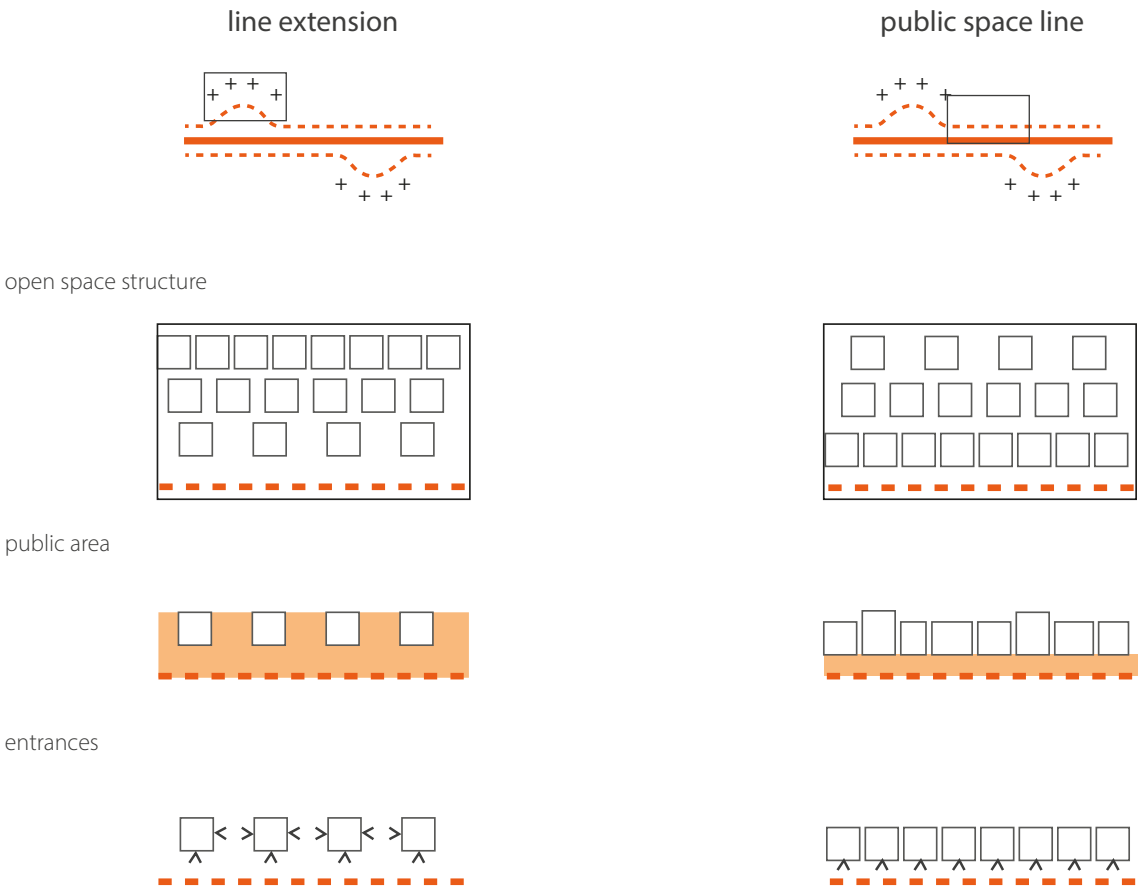


Figure 104: Spatial norms for the design of the linear public space

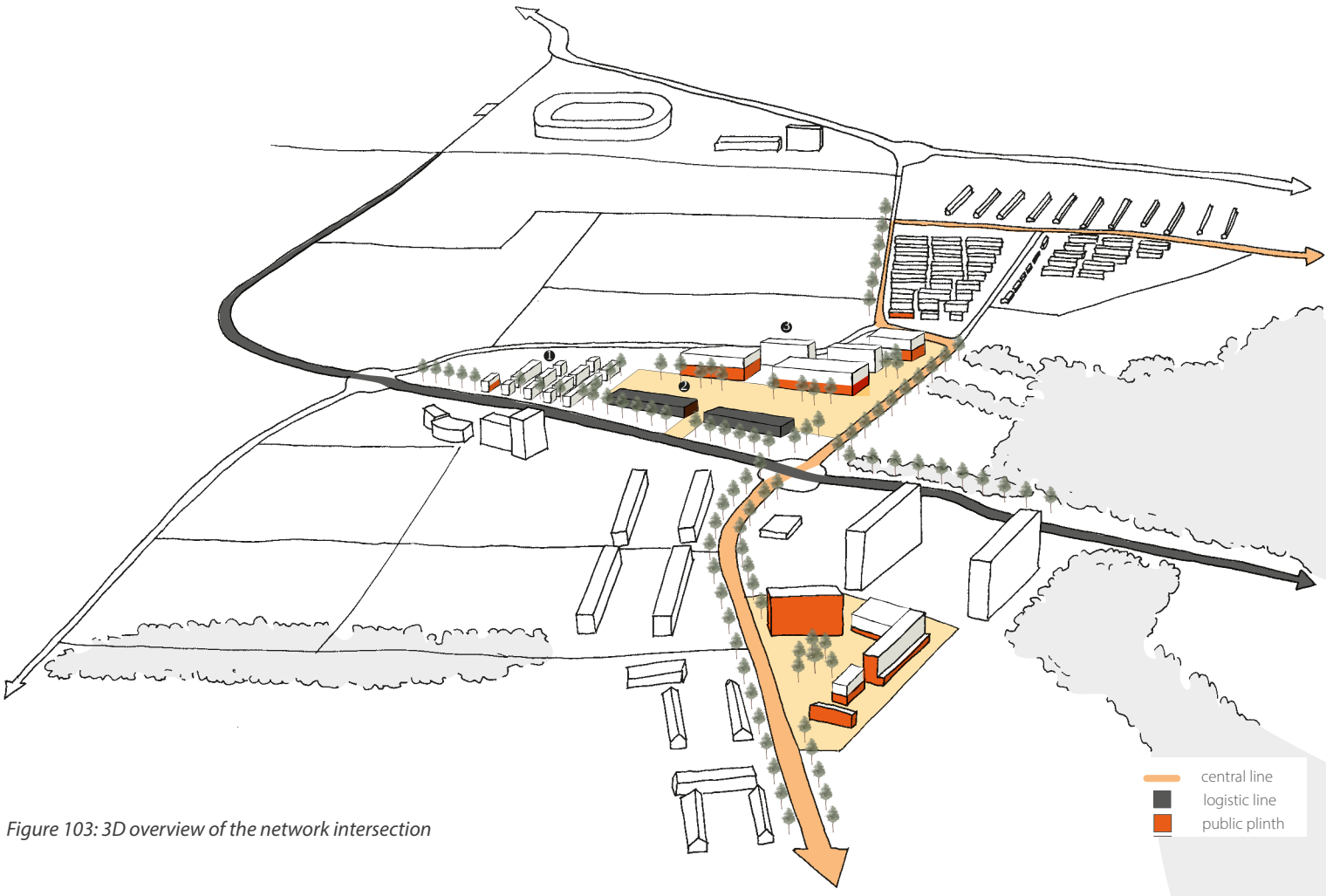
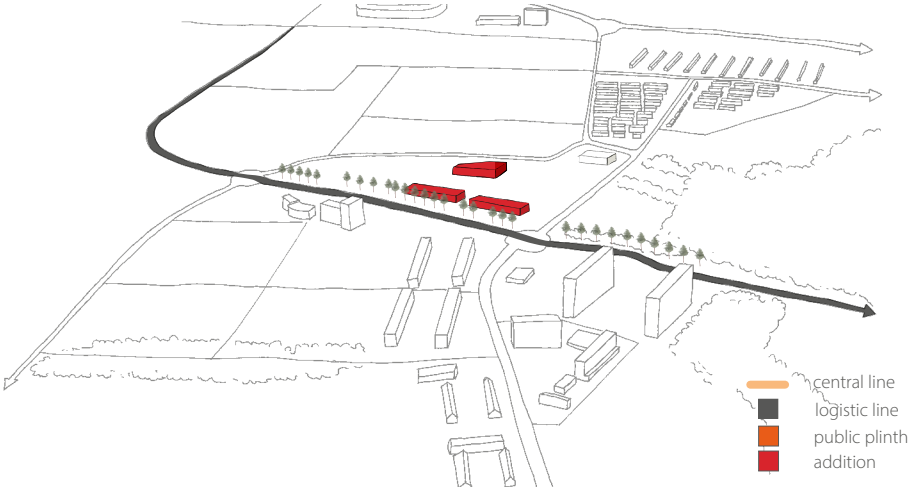
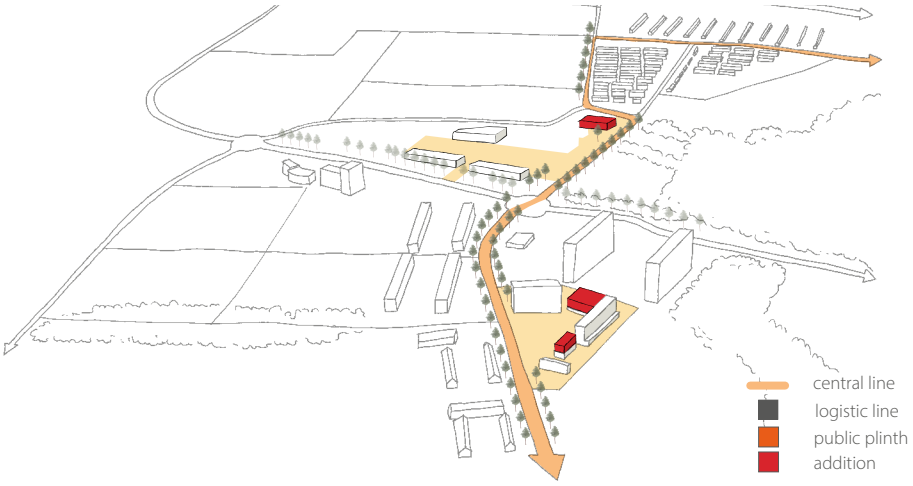


Figure 103: 3D overview of the network intersection



Phase 1

In this phase, response is given to an urgent need: place for city logistics. In this case, public attractors are established: pick up points. Besides, to arrange interactive spaces, the sports canteen is transformed into a public building.



Phase 2

In this phase, the emphasis is on the public space network. The line forms the structuring element of densification. Housing is added onto existing buildings.

Phase 3

New housing typologies appear. Midrise housing typologies in combination with local amenities like public meeting rooms, work spaces and outdoor seatings ensure a diverse enviroment

Figure 105: Densification strategy

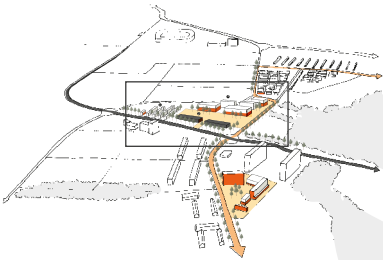
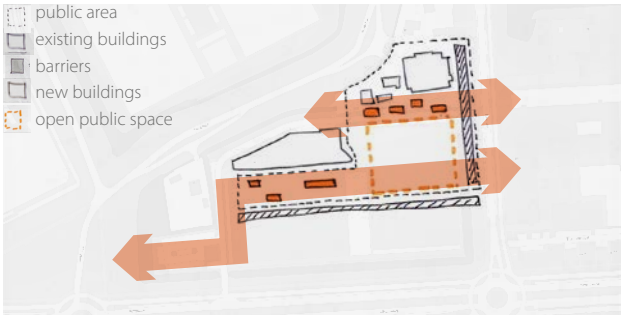
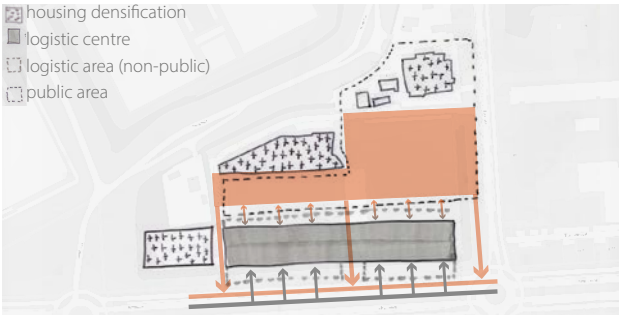


Figure 107: Zoom location: transformation of former sport fields



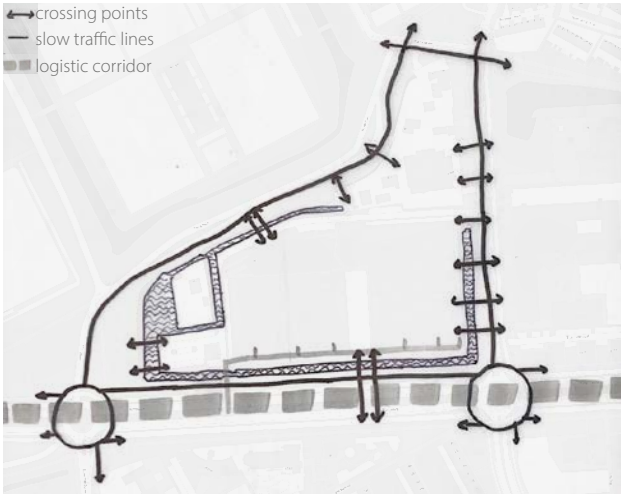
Fine grain public space network

Flexible public (outdoor) rooms are added. Open space is preserved to facilitate temporal markets. Two main public axes link the open spaces and buildings in a readable way.



Programme intersections

the place will be a crossing point of city logistics and city life. This means, the place is attached to both slow and logistic traffic. The distribution building is used as a smart buffer for the logistic traffic.



Connections

to increase pedestrian flows through the site, smart links to the existing network are established that cross the current barriers (water/buildings). The focus is on the east-west flow, since the sourthern edge is less porous.

Buildings

the location undergoes a mix of in-fill and transformation. This means, a mix of building types fill the place. Readbility is achieved by clear viewlines and continuous forms. Diversity is achieved by the different building types.

Figure 106: Design principles

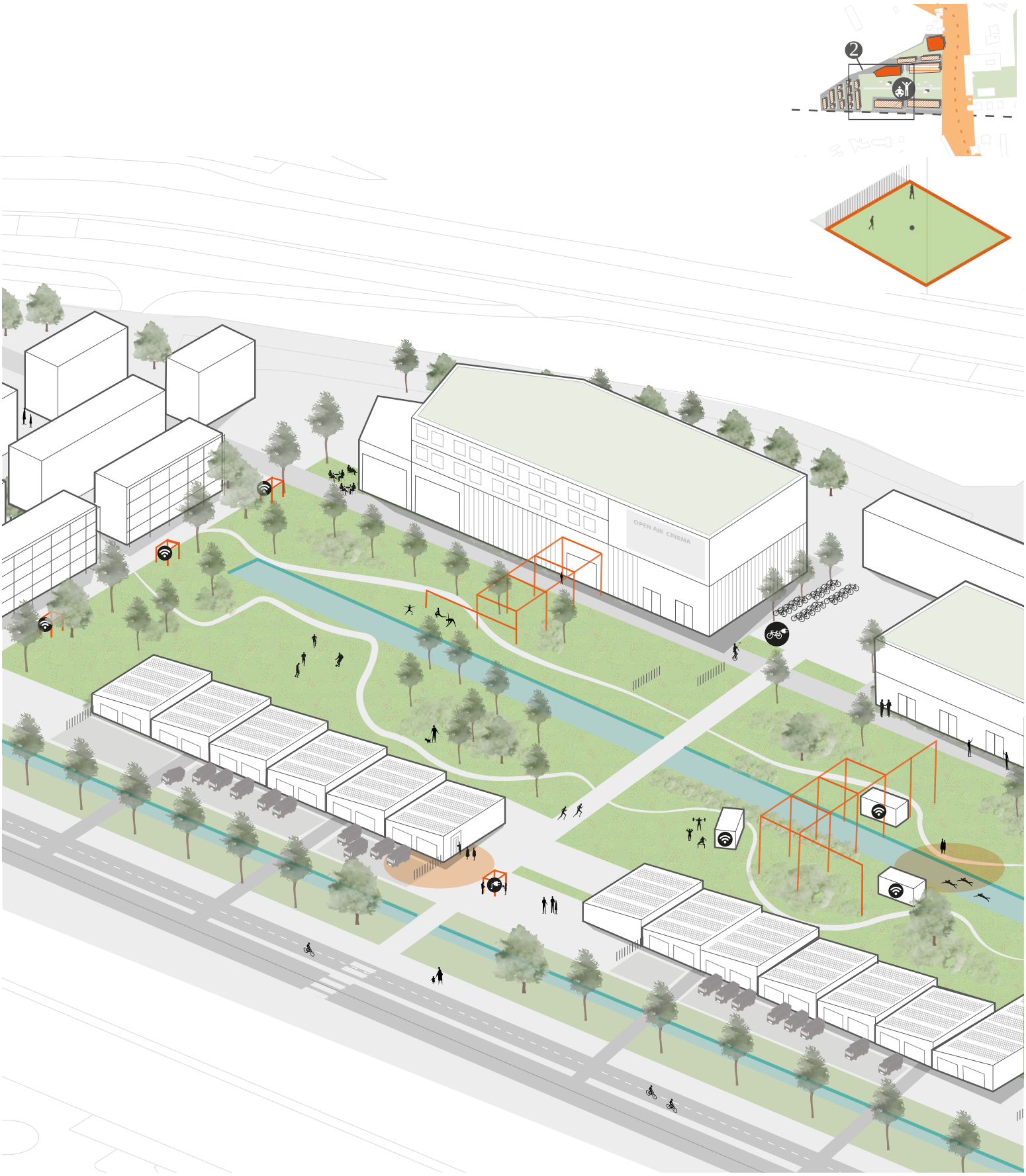


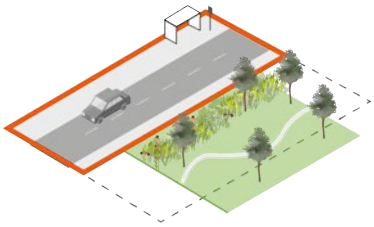
Figure 108: Spatial visualisation of the integration of logistic and public spaces in the zoom location

Playful public spaces

The Trainingscomplex 1908 is redesigned as a new local core, a place where a diverse range of people join together for their daily human needs. The land will be developed in an infill-way: housing and functions are added on the former sport fields.

The centre of the area is filled by a succession of different places for leisure: a small sport field, urban gym, a dog walking park and a natural linear swimmingpool. The field is filled by small modular buildings that provide Wifi, electricity and a private sheltered place.

The area is bounded by a logistic corridor on the southern side of the area. Along this line, a small urban distribution point is located. Here, food and materials are delivered and could be either picked up or brought to the homes. This overview clearly visualises how a certain distribution hub is integrated in the public domain.



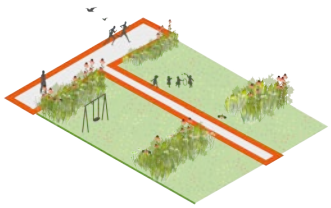
TRANSFORMATION A
narrowing car infrastructure

To discourage the use of private vehicles, 15-minute design contains a structural narrowing of private vehicle infrastructure. This means parking and double lanes make room for places for stay. To make sure people have still the ability to move car distances, the new infrastructure could include a public transport facilitation.

spatial quality
This intervention makes enough room for a green path. When a pedestrian path or interaction space is bordered on all sides by green, a calming and noise cancelling effect is achieved.

impact on the neighbourhood
+

impact on the city
+++



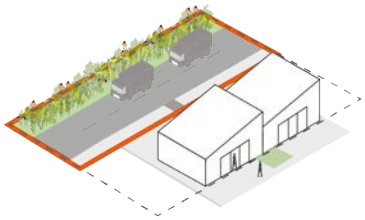
TRANSFORMATION B
intensify the pedestrian network

Addition of pedestrian paths is essential to improve pedestrian accessibility. With in the pedestrian network, a distinction could be made between recreational walking or directed walking, which cohers with different sizes of the walking path.

spatial quality
Intensification of the pedestrian network means a higher level of human scaled space is established. By distinguishing between **sizes**, a visual and spatial variation is realised.

impact on the neighbourhood
+++

impact on the city
+



TRANSFORMATION C
distribution infrastructure

On a city level, thoroughways will have an emerging logistic function. Therefore, some corridors could be identified as mainly logistic, witch attachment of fine grain distribution locations. These fine grain locations are essential in a 15-minute distribution.

spatial quality
To make these areas both functional and vital, the centres are connected to human paths. Part of the centres have an **interactive plint** with services, contributing to diversification of space.

impact on the neighbourhood
++

impact on the city
++

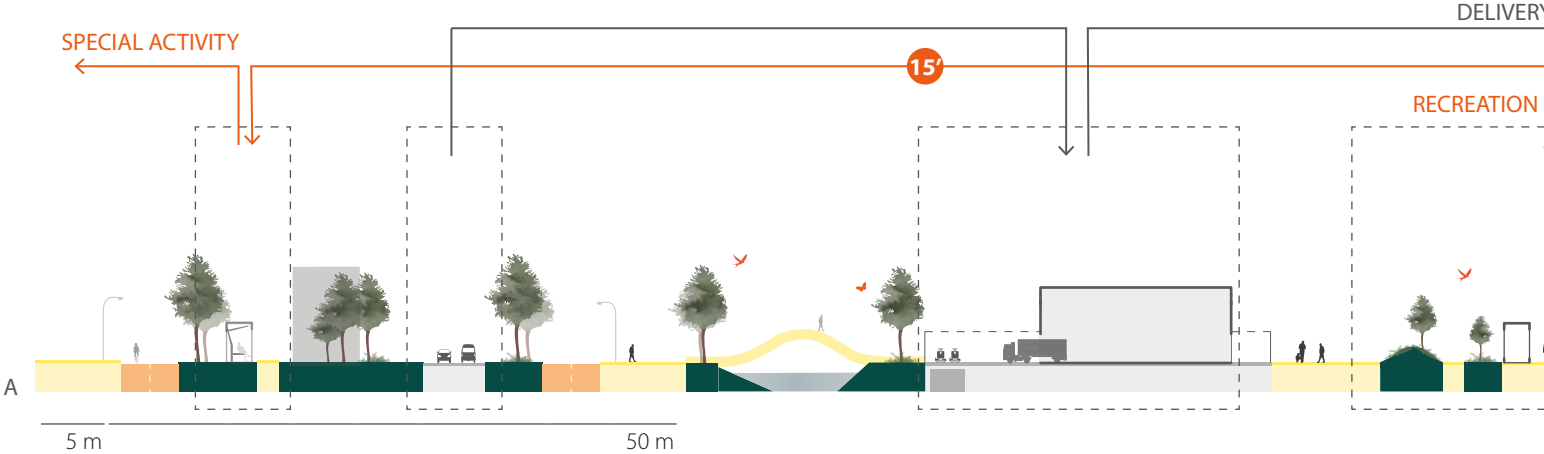


Figure 109: Section

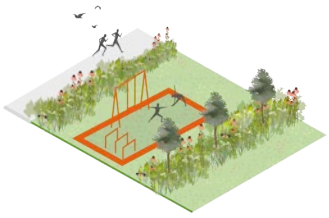
IMPACT RANKING

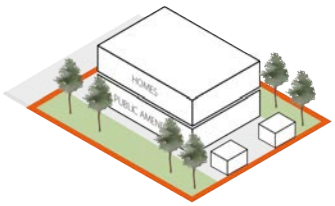
+++
The interventions influences accessibility, density and diversity

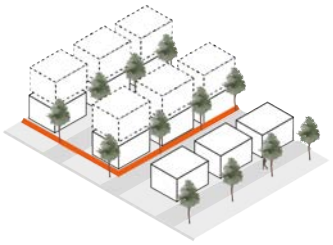
++
The interventions influences more than just one quality

+
The intervention influences either accessibility, density or diversity

when an intervention impacts neighbourhood as well as city, it means the intervention is part of a network of interventions.







TRANSFORMATION D
addition of adult play/sport facilities

There is an evident need for recrational open space that facilitates the residents. Places for interaction and excercise are needed to fulfill young and adult people with this need. Therefore, play facilities for all generations are designed in the open public space.

spatial quality
Addition of play facilities turns inaccessible green (kijkgroen) into **accessible green.** This stimulates interaction between human and natural environment.

impact on the neighbourhood
+++

impact on the city
-

TRANSFORMATION E
mixed use infill

On larger plots like a former sportsfield, a mixed use project is desired. Because there is a lack of meeting space in IJsselmonde, public functions have priority over housing and work in this design. In general the building needs to consist of flexible spaces that easily can house a new function.

spatial quality
Mixed use buildings attract different people and functions and therefore have a **range of entrance types**. By combining those playful and smart, an exciting plint is realised.

impact on the neighbourhood
+++

impact on the city
+

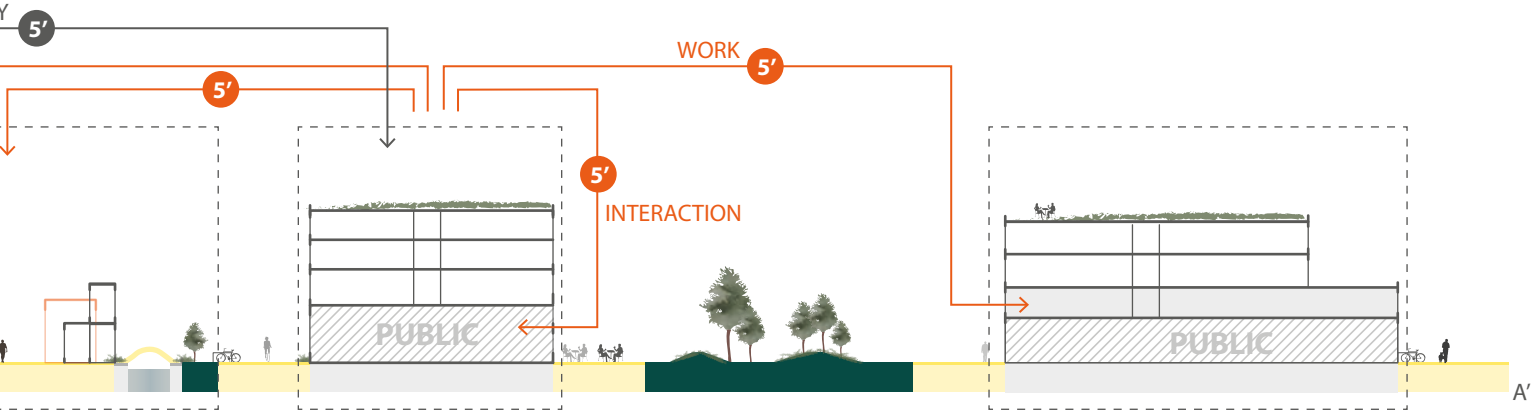
TRANSFORMATION F
housing topping

Transformation of office buildings is likely to be accompanied with housing addition. In this way, the new residents are located in proximity to other urban functions. In this design, an addition of 75 houses is realised.

spatial quality
Topping is a space-efficient strategy. Besides, it contributes to the **layering of the building** and therefore carries potential to create visually exciting architecture.

impact on the neighbourhood
++

impact on the city
+



RESIDENT II PASSPORT

name
Miranda

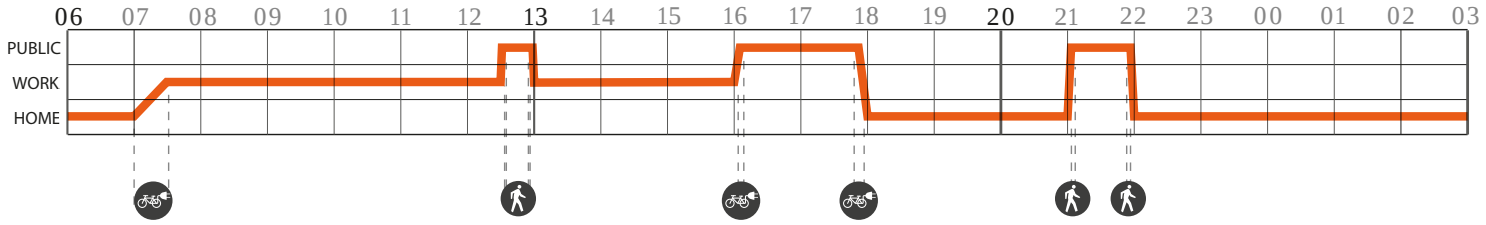
date of birth
10/03/1967

nationality
Dutch

place of birth
Ridderkerk

gender
V / F

length
1.70



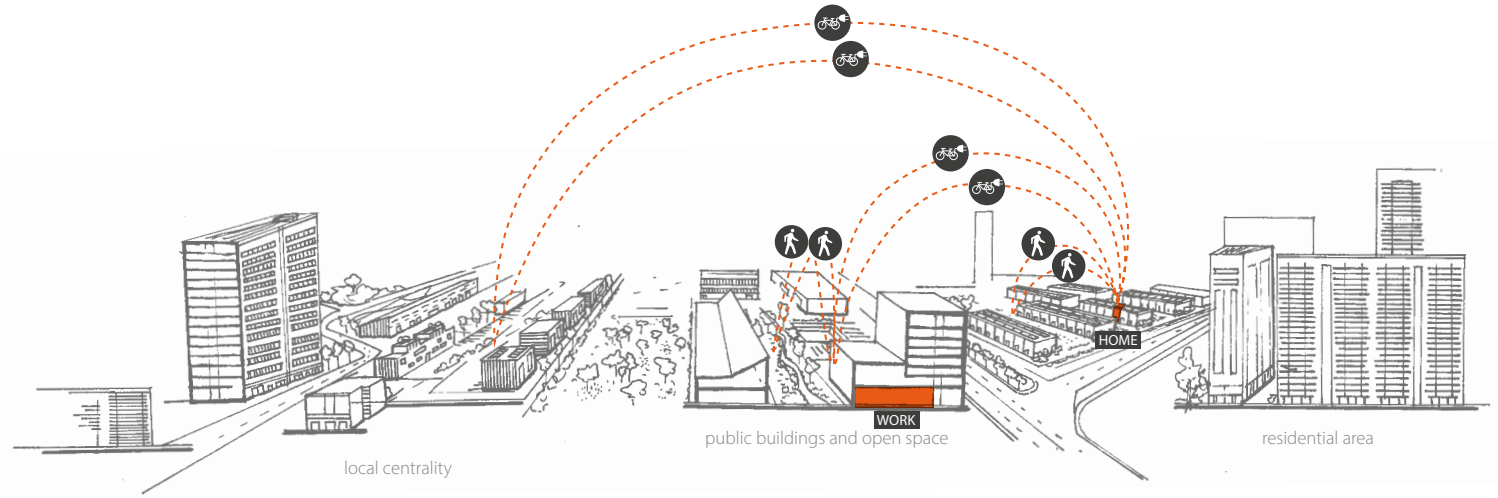


Figure 110: Living in the neighbourhood, how a typical IJsselmonde resident will move through the neighbourhood

7.1.3 Conclusions IJsselmonde X 'The Dynamic Playground'

Centralities

In the dynamic playground, 2 types of centralities will be dominant:

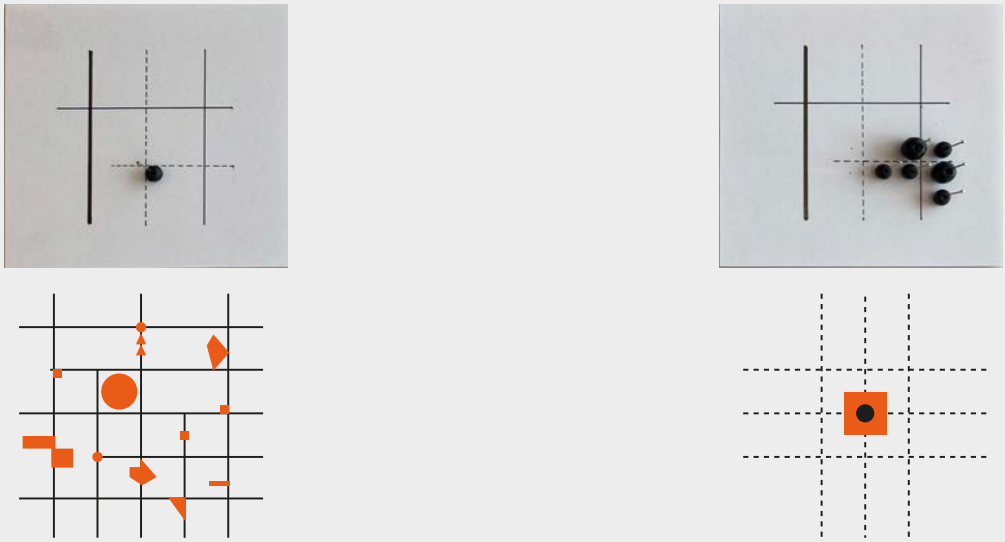


Figure 111: New centralities

Attractor

Because of rapidly changing lifestyles and dynamic uses of the neighbourhood, places will alternately pop up as a temporal centrality. This happens, for example, because certain apps are used that guide people to a specific place, because of high discounts, seductive advertisements or just the elusive algorithm. To accommodate this, it is essential that diversity of open spaces is arranged. In this way, the space is prepared for a variety of uses.

Local core

Small local cores will contain facilities for daily use. Besides, they have transitional character by facilitating the possibility to switch modalities. In this way, local cores are spatially stable but functionally diverse. These centres are strategically located on bicycle lanes or near the subway. They are, in a way, the gate to the neighbourhood, from where people walk their tiny last mile.

Spatial qualities

The following lessons have been learned about how spatial interventions achieve certain spatial qualities that are desired in The Dynamic Playground.
The proposed ***spatial interventions*** are based on examples of vital places in Rotterdam.

THE CENTRAL LINE

Readable linear axis for movement and (economic) activity

Low to no open space betwen buildings to guide people along the axis (although the building types are different)

Figure 112: Zaagmolenkade, source: versbeton.nl (2013)

High built density along line (to enhance pedestrian movement on the axis)

Addition of layers on top of existing buildings that border the central line

Figure 113: Hermes City Plaza source: vanwilsumvanloon.nl (2017)

Freedom of movement

No categorisation of traffic space for movement of pedestrians and cyclists

Figure 114: Binnenrotte, source: architectenweb.nl (2018)

Alternation with big openness to give people the opportunity to also move to more quiet places

Figure 115: De Nieuwe Plantage

GREEN SPACES

Readable linear axis for movement and (recreational) activity

The slow traffic thoroughways are continuously bordered with green

Figure 116: Plaszoom Kralingse Bos, source: wonderfulwanderings.com (2022)

Alternation of open spaces for recreation (in the sun)

Figure 117: Bootcamp Vroesenpark, source: yalp.nl (2022)

RESIDENTIAL AREA

Small scale accomodations for interaction

A frequent amount of parking-spot sized areas that have a different (soft) materialisation

Figure 118: Hoogstraat, image by MVRDV, source: architectenweb.nl (2020)

FRINGE

Alternation of building plot scales (to overcome fragmentation)

Cutting up large plots intro different pieces of different shapes

Figure 119: Weelde, source: Google streetview (2022)

7.2 THE PARADISE OF DEGROWTH

7.2.1 The experience of space

Figure 120: Mixed media collage of the Paradise of Degrowth

het vuur

Ik steek het water over
Ik kom aan in een kleurrijk veld
Vol van vreugde snel ik naar
Mijn werkplaats toe

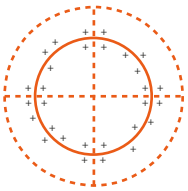
Het is nog vroeg maar
Dat doet me niets ik stal mijn fiets
Ik start mijn dag met frisse lucht
Ik stort me op mijn nieuwe klus
Vergeet de ruimte
Vergeet de tijd

En elk detail maakt onderscheid
In hoe het later verder rijkt
Ik strijd voor lange levensduur
Ik bouw mijn eigen vreugdevuur
Ontvlam in ruimte, ieder uur

En altijd blijft de tijdelijkheid
Een betere buur aan mijn zij
Dan een verre vriend op reis

Figure 121: Overview map of IJsselmonde as a paradise of degrowth

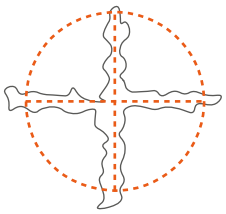
7.2.2 Scenario design: IJsselmonde X 'The Paradise of Degrowth'



Two rings

In this map, the design for the second scenario is presented. In the paradise of degrowth, focus lies on highly **efficient use of space**, to accomodate the need of alll urban functions in physical proximity.

Therefore, two rings are identified. The small ring is the **main organiser of human activity**. This ring is the structuring element for housing and function densification. The outer ring connection is established to improve the **connectivity** of the homes on the edges of to the centre or to bordering neighbourhoods.



Green hierarchy

Important in this design, is the creation of **hierarchy of green places**, linked to the function of the space. The big green elements have an ecological as well as a guiding value. They are green lanes that facilitate **readability** and vital slow traffic thoroughfares.

The small green elements are currently existing small fields, quite neglected and useless. These spaces, often located in the centre of a (semi) open block, carry great potential to be integrated as a **communual space**. Therefore, these spaces are purposely not connected to a central line, but are developed in an acupuncture way.

Transformation areas

Because of a need for new housing types and function densification, the highlighted areas (currently mostly monufunctional) will be transformed into mixed-use areas, all with a different character that suits the place.

Area 1, currently a businesspark, will be a new centre for urban manufacturing. This area fits this new function perfectly because of its link to the rest of the city via road and river.

Area 2 will be a new, well-connected and mixed area where communual acitivity is combined with public activity. This area therefore facilitates the new residens, as well as the residents of Sportdorp, that are functionally underserved currently.

In area 3, the transit station is a driver for housing densification. In this way, the amount of inhabitants that are connected to the city network increases.

Area 4 is a large businesspark, that will be transformed in stages into a centre for urban food production and consumption.

Area 5 is located in the heart of IJsselmonde and therefore a central place for inhabitants. In this scenarios, people leave their home to produce or exchange their daily needs. Therefore, this area is a perfect place to establish an exchange centre, to improve the circular performance of the neighbourhood.

Network intersection

When zooming in on the place of interest, the integration of the two networks becomes explicit. Above this, the spatial qualities that fit the networks are visualised.

Integrating food production in urban life

The former sportields are the ultimate location for implementation of new necessary field: small scale agriculture. This place will be a small scale test-ground for short-chain food production, resulting in a distinctive type of space. A synergy is found with the need for a food facility in this area: next to the fields a permanent market finds its place.

Area 1: Community life

homes added: 46
amenities added: 1
In the paradise of degrowth, shared living is normalised. Therefore, sustainable, modular community buildings arise. The ground floors are shared and an inner courtyard provides an intimate green space. In this way, many one-person households could be realised in less space.

Area 2: urban agriculture

homes added: 0
amenities added: 3
In this area, it is made concrete how local food production manifests itself in space, without becoming a monotonuous and isolated space.

Area 3: public market

homes added: 22
amenities added: 11
The public market is an example of a flexible public space, in which production and interaction join together. These markets are the new everyday centers of the neighbourhood.

Area 4: quiet living

homes added: 20
amenities added: 11
In this area, focus lies on comfortable living near nature. hared ground floor. The area is filled with mid rise strips and blocks, resulting in a mixed housing area with different sizes of open space. In this way, there is a gradiant between busy and quiet places, giving the residents the choice of ambiance that suits their recreational activity.

Area 5: linear centrality

homes added: 15
amenities added: 21
Linear buildings with public plinths are added to strenghten the public line. In these buildings, everyday functions like fresh food and bicycle parking are situatied.

Spatial norms

De linear public space asks for two types of spatial lay-out to distinguish between ' neighbourhood streets' and 'local streets'.

In the 'public space corner', public functions concentrate in the buildings and open spaces. Because of the change of direction, a small rectangular space for staying is created.

In the 'public space line' public functions and housing alternate, therefore different plot lay-outs appear. To emphasise the line, a continuity of buildings is desired, without in-between open spaces.

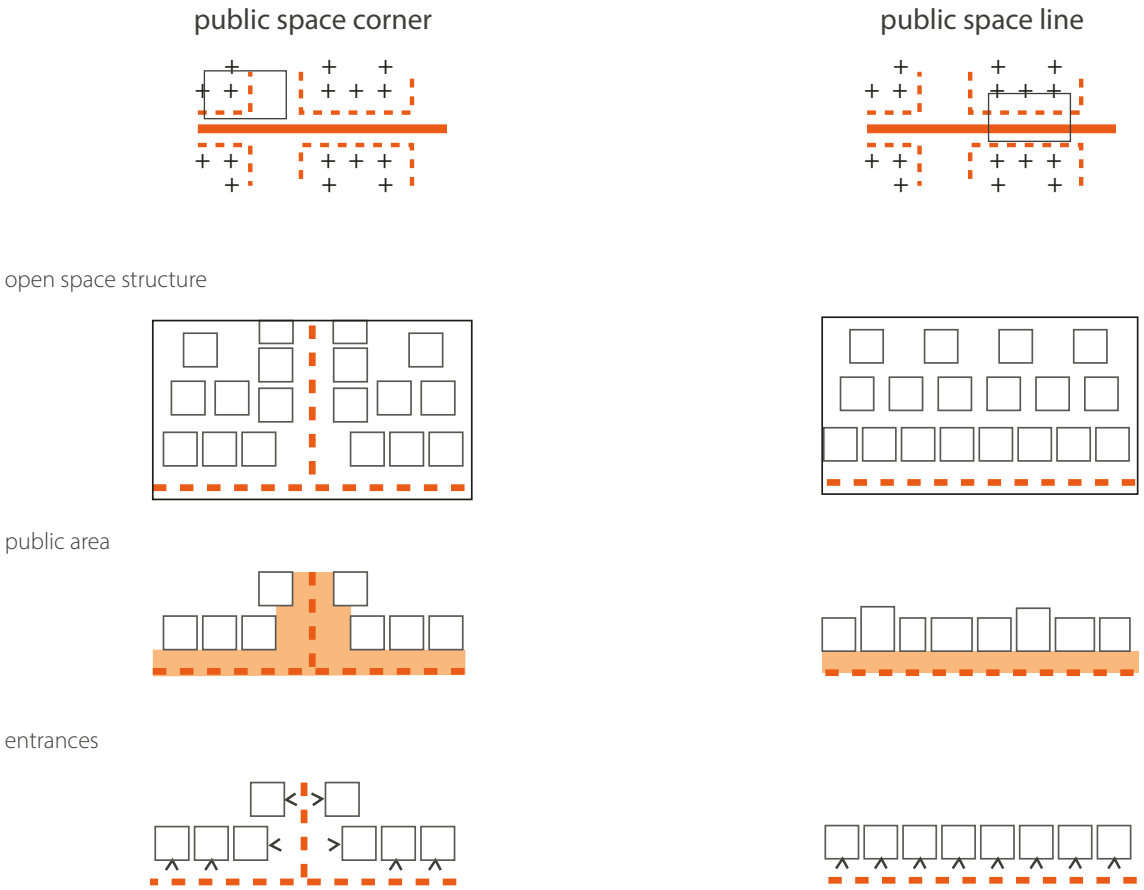


Figure 122: Spatial norms for the design of the linear public space

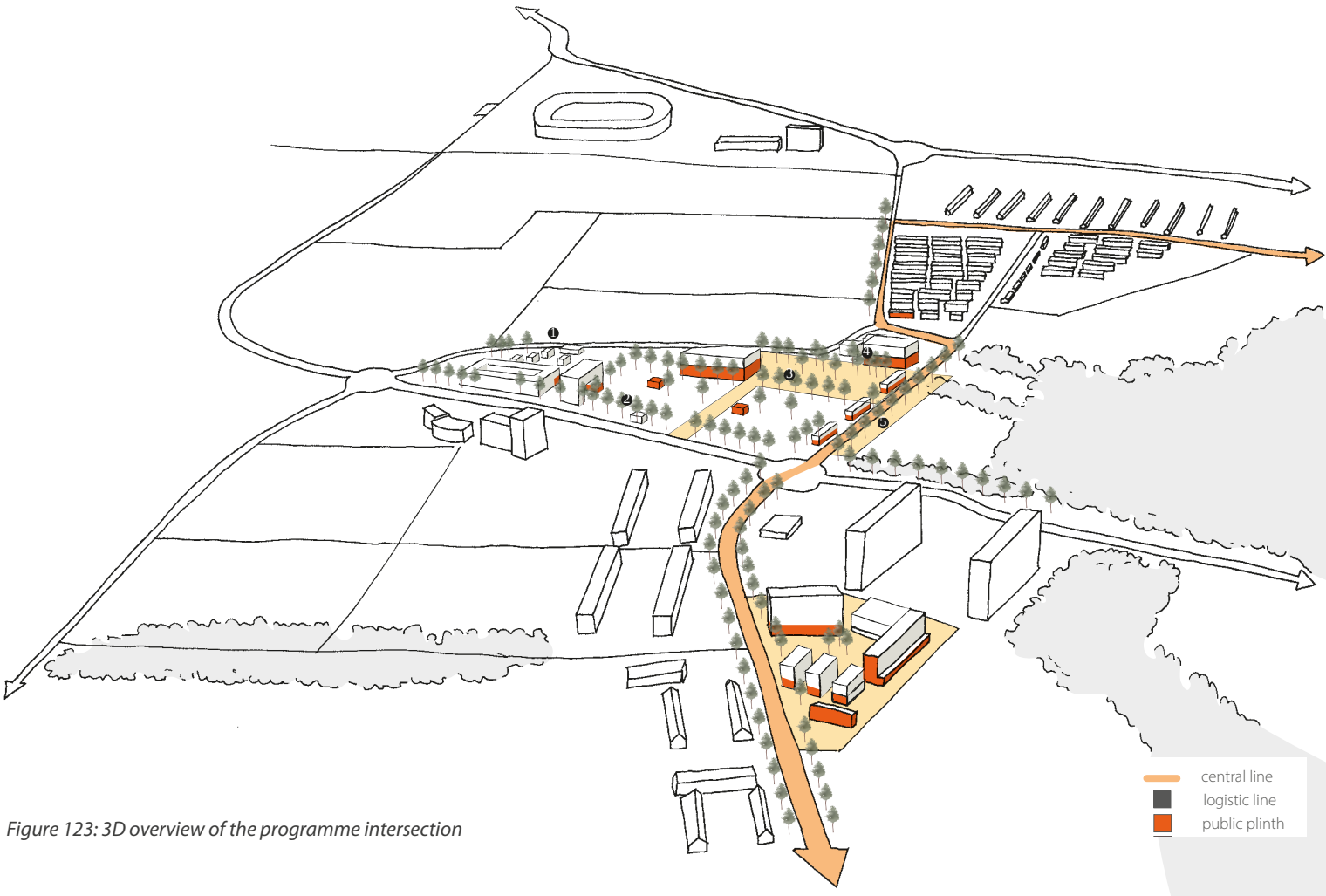


Figure 123: 3D overview of the programme intersection

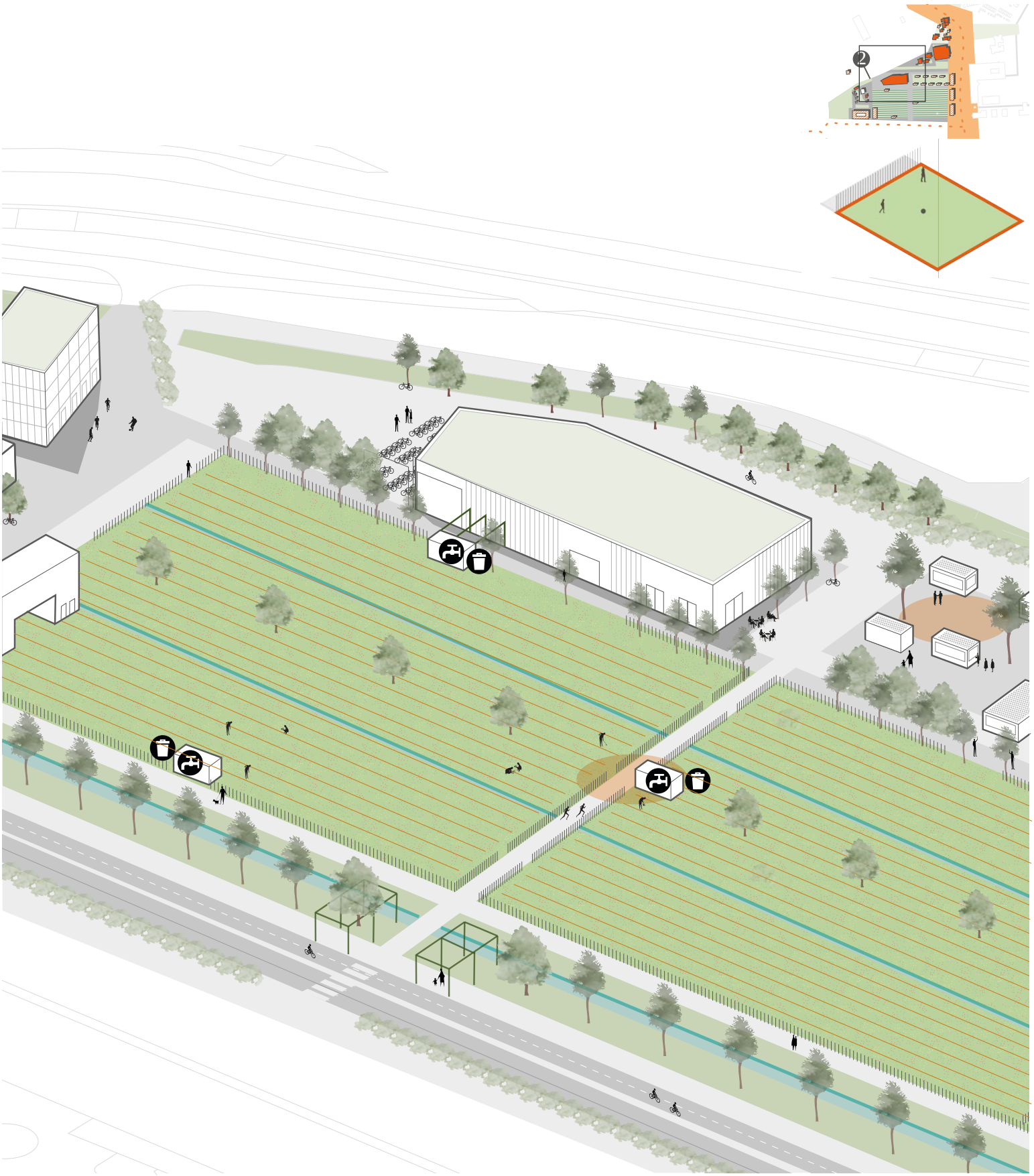
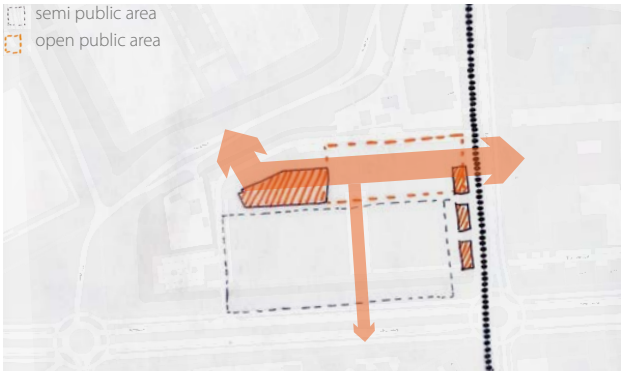


Figure 124: Spatial visualisation of the integration of logistic and public spaces in the zoom location

Figure 126: Zoom location: transformation of former sport fields

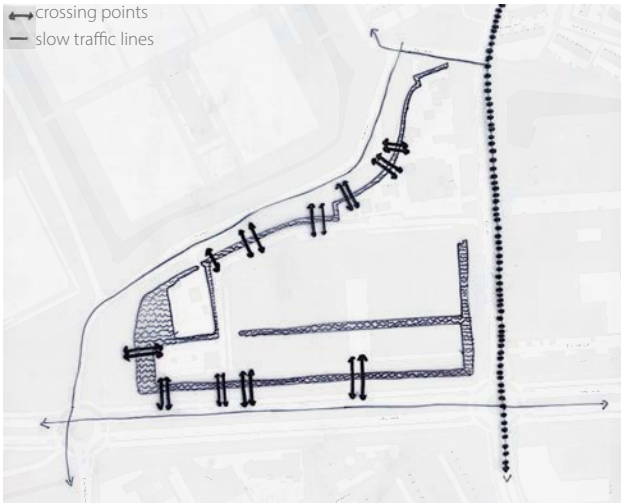


Fine grain public space network

Flexible public (outdoor) rooms are added. Open space is preserved to facilitate temporal markets. Two main public axes link the open spaces and buildings in a readable way.

Programme intersections

the place will be a crossing point of urban agriculture and city life. This means, the place is attached to both public and econcomic spaces. The market square in the centre brings this together.



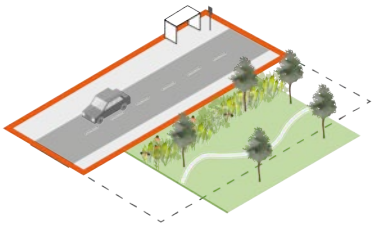
Connections

to increase pedestrian flows through the site, smart links to the existing network are established that cross the current barriers (water/buildings). The focus is on the east-west flow, since the sourthern edge is less porous.

Buildings

the location undergoes a mix of in-fill and transformation. This means, a mix of building types fill the place. Readbility is achieved by clear viewlines and continuous forms. Diversity is achieved by the different building types.

Figure 125: Design principles



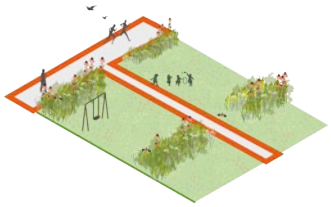
TRANSFORMATION
narrowing car infrastructure

To discourage the use of private vehicles, 15-minute design contains a structural narrowing of private vehicle infrastructure. This means parking and double lanes make room for places for stay. To make sure people have still the ability to move car distances, the new infrastructure could include a public transport facilitation.

spatial quality
This intervention makes enough room for a green path. When a pedestrian path or interaction space is **bordered on all sides by green,** a calming and noise cancelling effect is achieved.

impact on the neighbourhood
+

impact on the city
+++



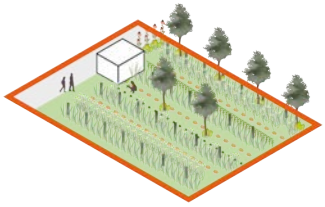
TRANSFORMATION
intensify the pedestrian network

Addition of pedestrian paths is essential to improve pedestrian accessibility. With in the pedestrian network, a distinction could be made between recreational walking or directed walking, which cohers with different sizes of the walking path.

spatial quality
Intensification of the pedestrian network means a higher level of human scaled space is established. By distinguishing between **sizes**, a visual and spatial variation is realised.

impact on the neighbourhood
+++

impact on the city
+



TRANSFORMATION
urban agriculture

urban agriculture fields are essential to provide the urban citizens with short-chain fresh food. It is a new type of place in the city, which means synergies with other urban activities are important. The agricultural activity could be combined with flexwork or (fresh food) retail.

spatial quality
Urban agriculture offerst the visual quality of a v**ariety of green element**s: plans, vegetables, etc. Besides, the possibility to **view over** those fields offers a sense of spaciousness.

impact on the neighbourhood
++

impact on the city
++

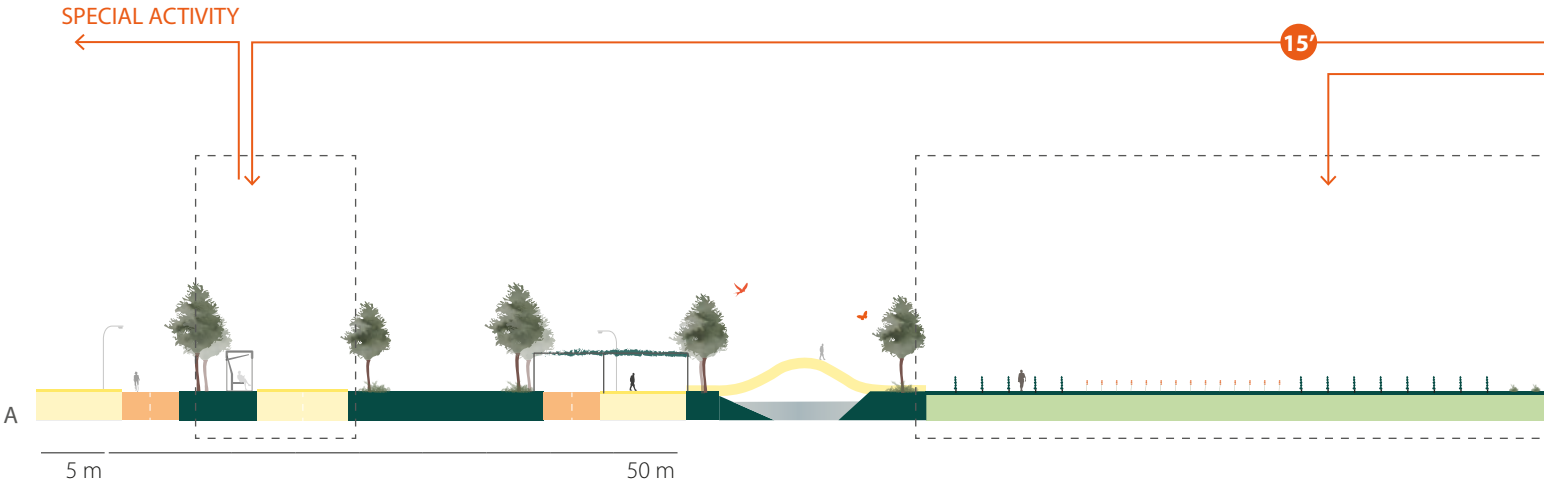


Figure 127: Section

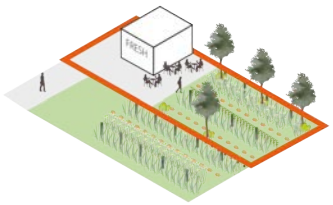
IMPACT RANKING

+++
The interventions influences accessibility, density and diversity

++
The interventions influences more than just one quality

+
The intervention influences either accessibility, density or diversity

when an intervention impacts neighbourhood as well as city, it means the intervention is part of a network of interventions.



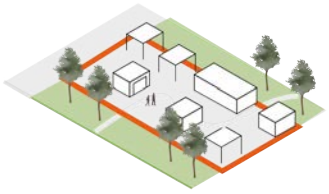
TRANSFORMATION
fresh food facility

To accomodate the food transition, fine-grain spaces are needed to make it work down to the smallest scale. What makes this transformation interesting is the flexible character: those facilities could easily be (re)moved.

spatial quality
The **openness** of the food facilities allows human interaction and visual activity in the street.

impact on the neighbourhood
+++

impact on the city
x



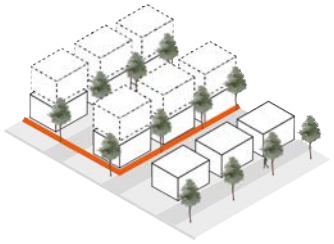
TRANSFORMATION
permanent open-air market

The open air market is a manifestation of the new type of commerce. It is more focused on local resources, this spatial layout allows local initiatiors to start a business in a small place.

spatial quality
This way of organising retails allows people to shop in **fresh air**. Besides, the variety in size and form of the stands creates a **triggering and exciting** environment.

impact on the neighbourhood
+++

impact on the city
+



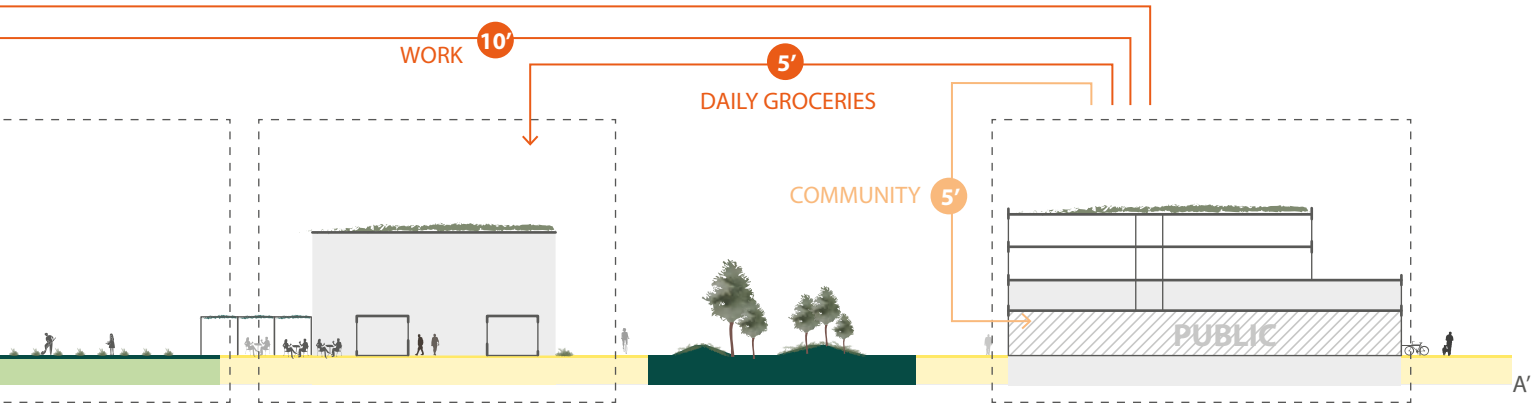
TRANSFORMATION
housing topping

Transformation of office buildings is likely to be accompanied with housing addition. In this way, the new residents are located in proximity to other urban functions. In this design, an addition of 20 homes is realised.

spatial quality
Topping is a space-efficient strategy. Besides, it contributes to the **layering of the building** and therefore carries potential to create visually exciting architecture.

impact on the neighbourhood
++

impact on the city
+



RESIDENT I PASSPORT

name
Enes

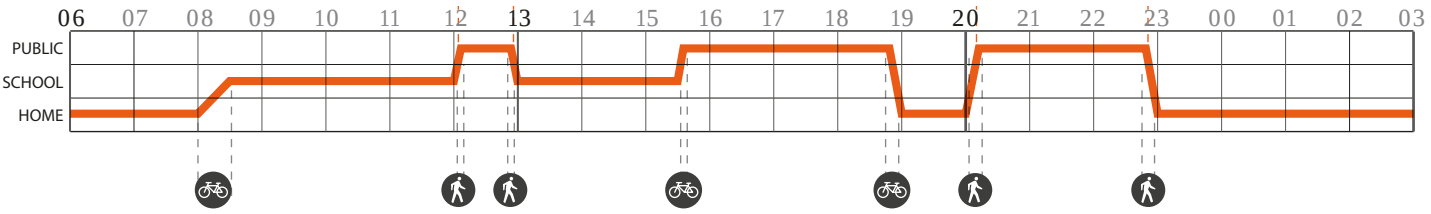
date of birth
12/02/2005

nationality
Dutch / Turkish

place of birth
Rotterdam

gender
M / M

length
1.67



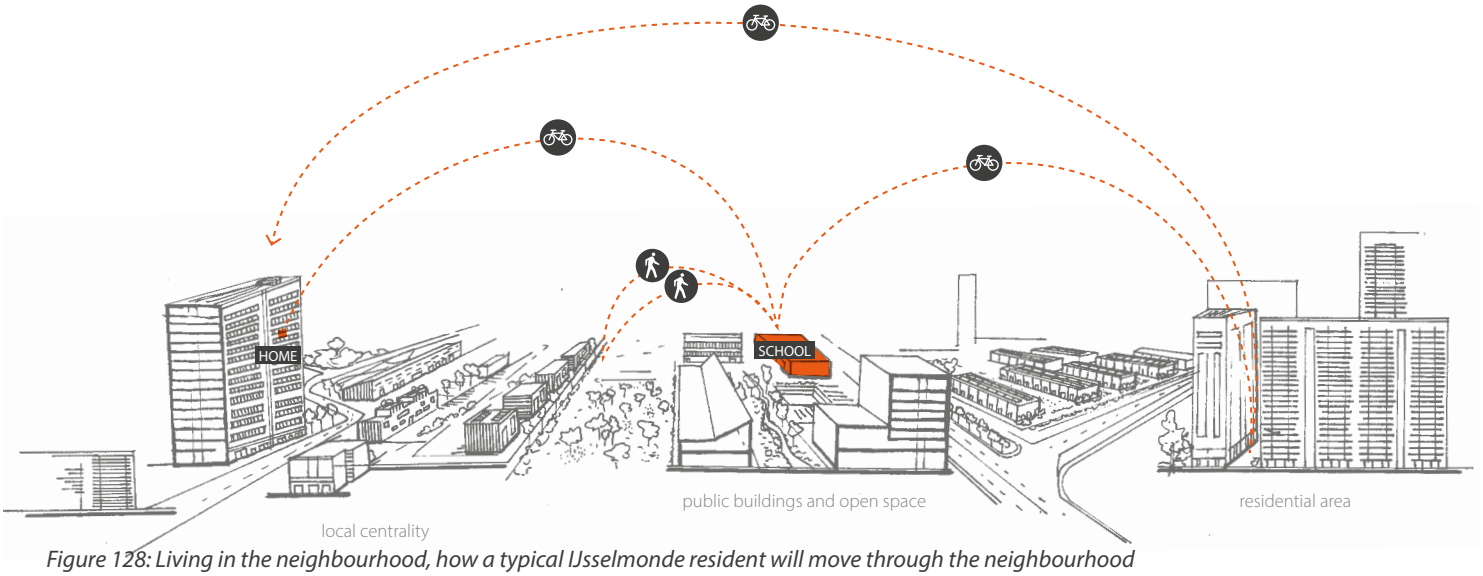


Figure 128: Living in the neighbourhood, how a typical IJsselmonde resident will move through the neighbourhood

7.2.3 Conclusions IJsselmonde X 'The Paradise of Degrowth'

In the paradise of degrowth, two types of local centres will be dominant, one of them, the linear peri-urban core, is new:

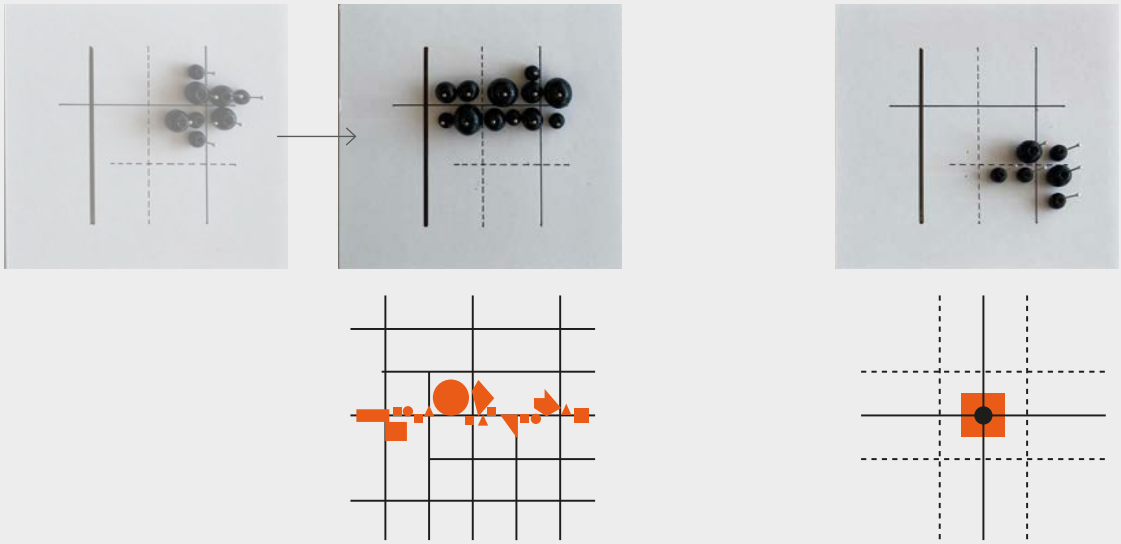


Figure 129: New centralities

The new peri-urban core

There is a need for a core that accommodates all functions that are needed in 15-minutes, think of food retail, material retail and repair, decentralised health practices, education rooms and small podia. However, the spatial organisation of this centre is rather extended than concentrated in one point. This means that lines of spatially diverse buildings and open spaces are needed to accommodate a variety of urban programmes over a large area, yet clearly structured and readable.

Local core

Besides, the local core appears essential for local life. Within a 5-minute radius, there need to be small-scale central points for stay and interaction. These are the intimate public spaces, often linked to a central thoroughfare, where daily public life is clustered. They are the open spaces where local people feel at home, share facilities, walk the dog or join for festivities.

Spatial qualities

The following lessons have been learned about how spatial interventions achieve certain spatial qualities that are desired in The Paradise of Degrowth.
The proposed ***spatial interventions*** are based on examples of vital places in Rotterdam.

THE CENTRAL LINE

Readable linear axis (for movement and economic activity)

Low to no open space betwen buildings to guide people along the axis (although the building types are different)

Figure 130: Zaagmolenkade, source: versbeton.nl (2013)

Visual heterogeneity in buildings at eye level (to trigger interaction or activity)

Open plinths

Figure 131: Zwaanshals, source: Rotterdamthroughmylens.nl (2015)

Pedestrian priority, space for all types of pedestrian movement (chitchat at the door, walking the dog, skating)

Broad sidewalk

Figure 132: Oudedijk

Corner points as a place to stay on the axis

Figure 133: Provenierssstraat, source: debuikvanrotterdam.nl (2019)

High density of entrances

Figure 134: Mathenesserweg, source: veilingnotaris.nl (2019)

LINEAR GREEN

Readable linear axis (for movement and recreational activity)

The slow traffic thoroughways (for movement from A to B) are continuously bordered with green

Figure 135: Plaszoom Kralingse Bos (source: wonderfulwanderings.com, 2022)

Variation in materialisation of pedestrian paths to emphasise adventurous spaces

Figure 137: Kralingse Bos, source: dewandeldate.nl (2014)

GREEN PATCHES

Hidden places (to facilitate a communal ambience)

Green spaces on plot size, pocket parks, as interruption of a residential urban block

Figure 138: Schat van Schoonderloo, source: coolhaveneiland.com (2021)

Narrow entrances leading to hidden public spaces

Figure 139: Achterhaven, source: architectenweb.nl (2011)

PUBLIC OPEN SPACE

Hierarchy in open space (to stimulate different types of activity)

Small height differences

Figure 136: Deliplein, source: rotterdamarchitectuurpijs.nl, 2010)

Seating on the edges of the space to accomodate seating with an (over) view

Figure 140: Heemraadspark, source: Google streetview (2022)

7.3 DESIGN CONCLUSIONS

In this chapter, lessons and interpretations of the proposals of the two strategic designs are discussed. This is done by answering the following design questions:

DQ1 What are the seeds for new 15-minute centres?

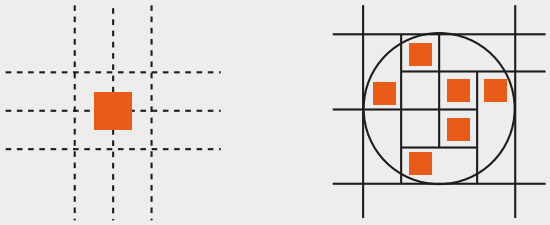
DQ2 What overlapping spatial qualities required for the design of the 15-minute neighbourhood come forward?

DQ3 What different spatial qualities required for the design of the 15-minute neighbourhood come forward?

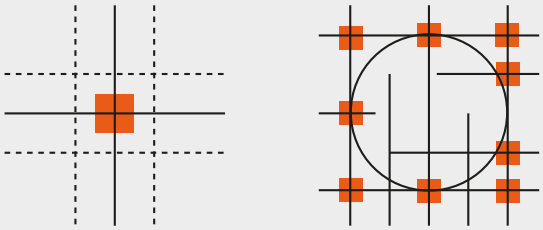
DQ1 What are the seeds for new 15-minute centres?

In both scenarios, the existence of a local core is stressed. These small-scale public areas are essential to stimulate neighbourhood life. However, the **spatial connectivity of this local core differs**. In the Paradise of Degrowth, these spaces pop up at a frequent pace, always attached or linked to the main thoroughfare in the neighbourhood. In the Dynamic Playground, these small public spaces do not necessarily have a link to the integrated city traffic network. However, these local fragments are tied together with an essential (future) need: shared mobility. This gives the residents the possibility to move freely.

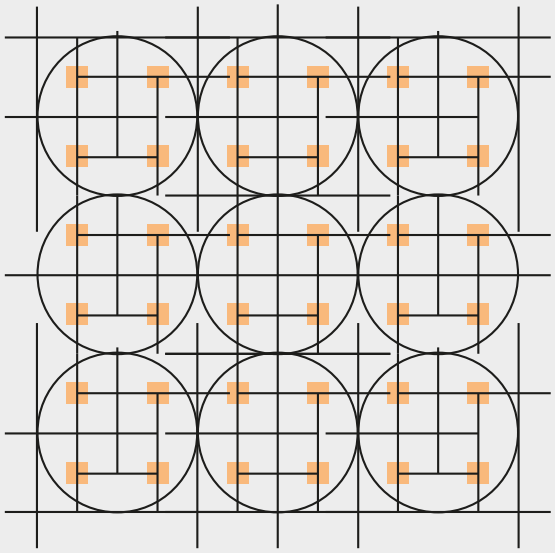
Thus, in the Dynamic Playground, a mobility trigger allows the residents to move, but the direction in which to move is rather vague and mysterious, maybe even unclear, but open, allowing the resident to make a personal decision or play with the route. In the Paradise of Degrowth, the movement of people is much more organised and local cores are strategically situated along them.



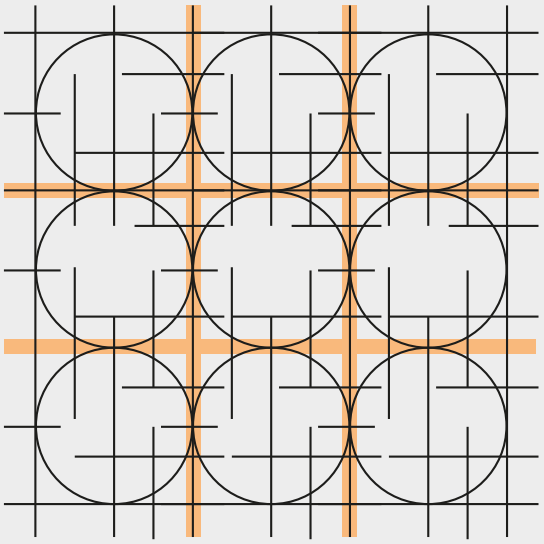
Attractors are located in low-connected places. movement is organised via digital services.



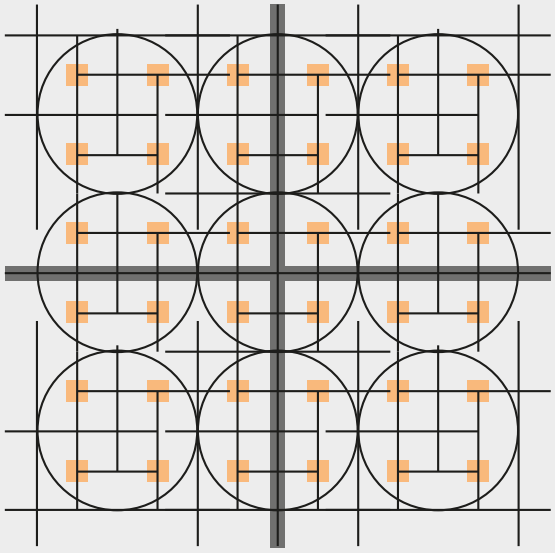
Attractors are located in well-connected places. movement is organised via physical readability.



This logic is duplicated into a network

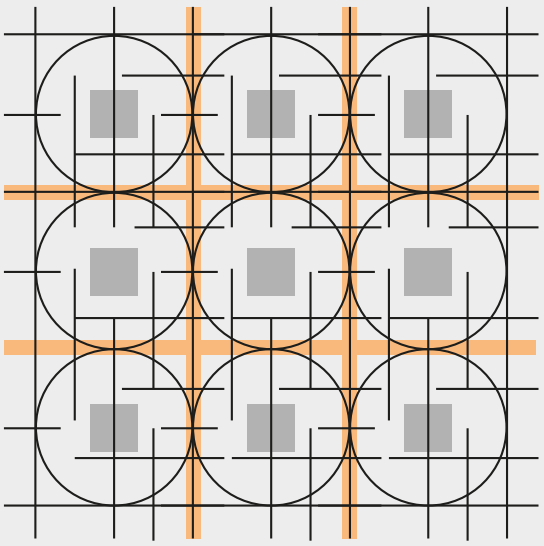


This logic is duplicated into a network



A centralised line of logistics goes through the centres of neighbourhoods

Figure 141: The Dynamic Playground: centrality organisation

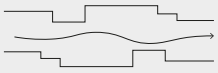


Inside neighbourhoods, hidden communal spaces emerge

Figure 142: The Paradise of Degrowth: centrality organisation

DQ2 What spatial qualities contribute to a 15-minute neighbourhood?

To accommodate this flexible and dynamic use of space, the following spatial qualities are identified as essential in both scenarios:

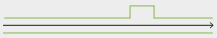


Human-scale lines to enhance the joy of walking

Pedestrianisation is either way an essential intervention. The benefit of pedestrianisation is not only that there will be more space for slow traffic, but the space itself has more potential: because of slow speeds, paths could have different widths and diverse materialisation. The boundaries of the path stimulate the human sense, whether it is flourishing nature or temporal street art.

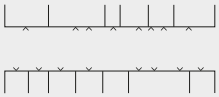
Continuity of contiguous buildings to emphasise the linear centrality and enhance wayfinding

In both design strateiges for the case of IJsselmonde, the ring road appears as a potential element for human activity. To spatially distinguish this line from the rest of the area, that is characterised by many open spaces, this line needs to be enclosed completely.



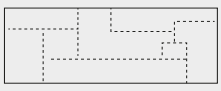
Green spaces as organisors of healthy routes

Both scenarios identify the green areas in IJsselmonde as currently underused spaces. The (entrances to the) paths that lead through the green are strenghtened by creating a clear linear green element, alternated by small open spaces that facilitate a range of human activities, from taking a calming break to doing excercise.



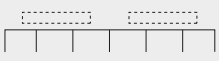
High density of entrances along the central line to enhance human interaction

Also, buildings could be 'pixelated': by arranging more building entrances, the built space becomes more approachable. This means the street spaces that buildings border offers the passer more options for movement. In fringe areas of the neighbourhood, this spatial quality is currenlty a big challenge.



Pixelisation to make fragments more approachable and diverse

Pixelisation of space is the embodiment of small-scale functionality. Fine-grain spaces accommodate fine-grain functions: there is a need for more small-scale open public spaces (examples are pocket parks and corner squares).



Small plots near housing for communal use

In both scenarios, although the reason is different, the sharing economy will play an emerging role in the city. This means small, detached spaces that accommodate a communal ambience, near housing, are essential. Here, shared facilities like storage and mobility could be organised. In-street parking lots appear as high potential areas for these changes.

DQ3 What different spatial qualities required for the design of the 15-minute neighbourhood come forward?

Although in both scenarios linear elements appear is important, there is a difference in the spatial elaboration of those:

Hierarchy of openness

The amount and size of open spaces play an essential role in the readability and experience of the public domain. The way in which thes size and amount is balanced differs per scenario.

In the Paradise of Degrowth, a clear hierarchy is needed to guide people to space. In a way, the size of the open space coheres logically with the 15-minute activity that they are looking for. Therefore, **a gradient of publicness** is translated to space: the more public, the more frequent small open spaces are needed. The more communal, the more hidden large open spaces are needed.

In the Dynamic Playground: Flexibility is the most important spatial quality. In this way, all types of activities could happen in the public domain, from a city treasure hunt to the ability to park your Segway. Although this means that a diversity of spaces should be arranged, as noted earlier, the level of openness of these spaces could be **equally high**. In this way, places for stay may differ, but places for movement are designed as free spaces: equal and multifunctional.

Quality of green

In the peripheral neighbourhood, green spaces are plentiful but often underused. This opportunity has been used in various ways in both scenarios.

In the Dynamic Playground, green spaces will be intensified with public programme. This means the green areas will be densified with buildings and public paths. They structure a new network of functional diversification. Therefore, the linear space needs interruptions in different sizes to arrange this variety of recreational programme. These different open spaces allows the recreational visitor to be able to choose at what point he/she wants to switch movement or activity.

In the Paradise of Degrowth, the potential of linear green is used for the expansion of the slow traffic network. The axial character in combination with the location, namely on the edge of the neighbourhood, gives the perfect circumstances for the establishment of a slow traffic thoroughfare here. The axis is strongly emphasised by linear green borders. Smaller green plots in residential areas are seeds for communal activities like outdoor dining or allotment gardens.

CONCL

08

8.1 Research Conclusion
8.2 Reflection

UDING REMARKS

8.1 RESEARCH CONCLUSION

This project has been executed to answer the burning question: "What strategic urban design contributes to the construction of a 15-minute neighbourhood?"

To answer this question, **imagination and evidence** have are iteratively used to construct arguments. The 15-Minute City, the concept of interest, is explored in contrasting environments, resulting in an understanding of the stretch of the concept and the meaning for the city. Site-specific (fieldwork and mappings resulting in the neighbourhood passports) and theme-specific (conceptual exploration and scenario construction resulting in test designs) research is combined to form proper design strategies.

Two normative scenarios have been developed as a means to inform design decisions on the level of the block, neighbourhood and city scale. These scenarios are constructed via 'explorative scenario planning', meaning external forces and uncertainties of the 15-minute City are understood in the functional and spatial context.

The 15-minute City as the embodiment of an urban healing process

It has become imperative to persevere change in the way we organise our cities. The city of today faces densification challenges in combination with increasing land values. Societal functions are under pressure. Our mobility system is polluting and space-consuming in a time of green ambitions and space scarcity. To move away from these conflicting realities, contrarian strategies appear. Most of them are still in their infancy. They don't have a clear form yet, the current duty of those strategies is to provide a visualisation of a different and better future.

The 15-minute City model fits this image perfectly. It expresses the ambition of smart spatial strategies to facilitate an efficient and healthy urban life. It puts forward a model for restructuring. The 15-minute concept is of particular value for this research because of the strong imaginative factor. The interesting guidelines that are given, for instance, to aim for local life and multipurpose, form a dignified base for design strategies.

The 15-minute City as a guiding theme for spatial design

As defined in the conceptual framework, the 15-minute neighbourhood is designed on the basis of three pillars: accessibility, density and diversity. **With these pillars, this thesis distinguishes itself from other research on the 15-minute City**: besides functional qualities, focus is given to the spatial qualities that are important. All three pillars need to be covered in the 15-minute spatial design intervention set.

Regarding accessibility, one must be aware that the network integration of a certain place is the most important determinant of natural movement. This means, that places that are well connected, are likely to carry concentrations of people and activity. This means **well-integrated urban streets are the seeds for new 15-minute centralities**.

Regarding density, strategies for densification are successful 'pedestrianisation' -strategies. The denser they are, the bigger the pedestrian flow. This means **pedestrian flows are stimulated by density**. Besides, densification means that an opportunity for diversification appears. When new houses and functions are added, new forms and types appear and give the neighbourhood a new layer of identity.

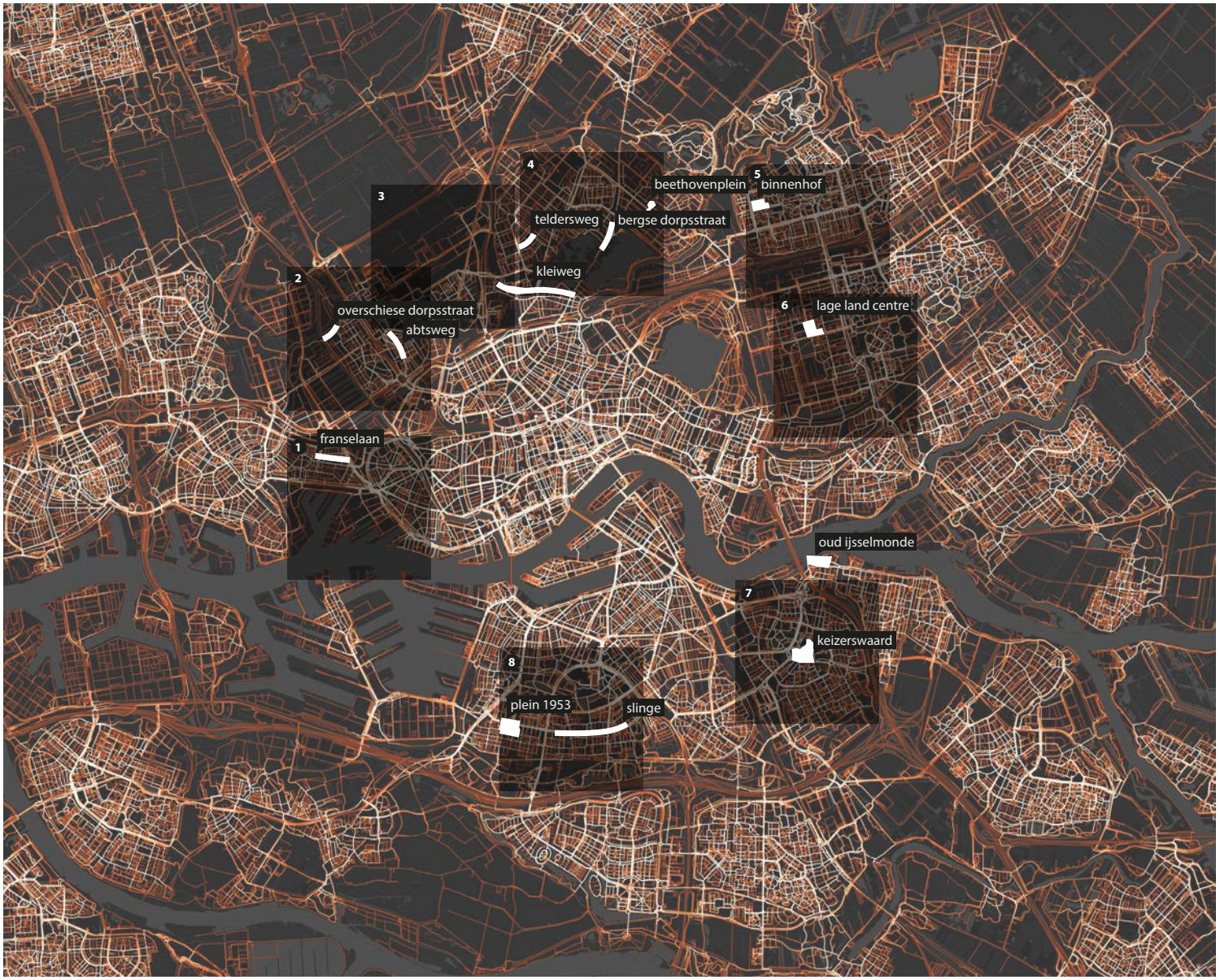


Figure 143: Peri-urban centres of Rotterdam to which the thesis is applicable

Peri-urban areas are anyway subject to density, because of their location, near the inner city, and often because of the spaciousness and therefore opportunities for infill.

Regarding diversity, the main takeaway is that diversity in spatial design could be achieved in three ways: The first and most obvious strategy is **creating a diversity of spaces.** The second one is creating spaces that have an easily adaptable layout. The third one, an emerging strategy, is creating modular and temporal spaces. Depending on the context and future path of a place, a suitable strategy is chosen.

On the basis of the obtained set of qualities, the following design decisions should be considered

- Accessibility: addition/ strengthening of connections
- Density: addition/relocation of housing and functions
- Diversity: addition/restructuring central places for spatial adaptivity

Transferability of the research to other 15-minute City ambitions

By means of two scenarios, it is investigated how spatial interventions contribute to new types of living locally. Together, the scenarios inform decision-making for flexible future paths.

The network integration of a place forms the main variable for determining what future path is suitable for the specific location. As has become clear in the case of IJsselmonde, the neighbourhood could be restructured by taking a new linear element (in this case, the ring road) as the base of design and development.

On the neighbourhood scale, different network patterns appear in the city. This means that some places will better suit the spatial interventions that are in line with the Dynamic Playground, others will better suit the Paradise of Degrowth.

In figure 145 (next page), the **current peri-urban centres of Rotterdam are explained in light of the best suitable scenario for their specific context**, based on their current network structure. One must acknowledge that the network structure is **not the single determinant** for the future path. Societal trends, local social values and mobility habits also play an important role in the success of a design strategy in a specific place. Besides, the future path of a neighbourhood will always involve interventions that suit **both scenarios**. In other words, the future city will be somewhere in the middle between the Dynamic Playground and the Paradise of Degrowth, therefore design interventions that lead to both should be done. It is therefore too easily said that one design strategy fits in a certain neighbourhood.

Thus, design strategies leading to the Dynamic Playground and Paradise of Degrowth can be transferred to other cases, however, the application needs to be adapted to specific societal and spatial preconditions. Some design interventions are more transferable than others.

When making design decisions in new cases, the scenarios of this thesis are not the only transferrable elements. The **centrality framework** that has been developed in Chapter 4: A 15-minute centre' is a general framework that could be used as a tool for understanding the current network of centralities that one will develop. This means the framework is rather a tool that is valuable prior to design.

Research recommendations

In future research, **more cases** of peri-urban neighbourhoods could be tested to understand the 15-minute City in new contexts. This will lead to a new set of spatial interventions of importance, therewith enriching the set of important spatial qualities of the 15-minute neighbourhood.

In line with this, it could be researched what specifically makes the peri-urban context ask for different spatial qualities than inner-urban areas. This could be done by setting up **comparative research** in which an urban and peri-urban context are researched.

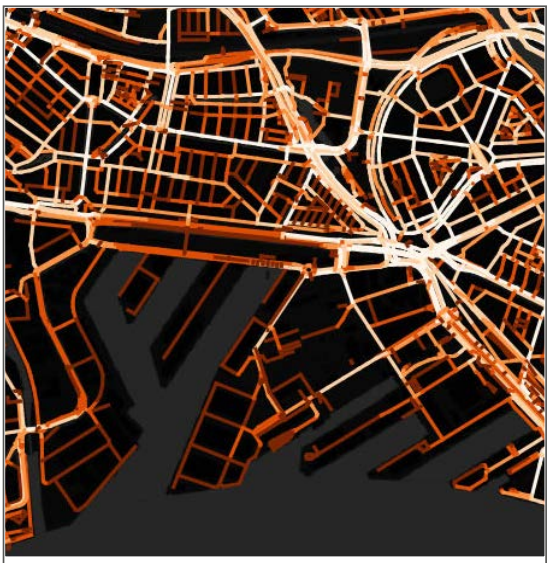
Besides, future research into the i**mpact on social structures and safety** will be very valuable for understanding new patterns of human vitality. In this, the current socio-spatial context could be assessed in light of both scenarios, resulting in an understanding of what design decisions influence these contexts.

In this thesis, not all variables indicated in figure 144 for designing a 15-minute neighbourhood are used. The measurements that are taken in the thesis form a good start. However, research and design could be more complete when some **extra variables** are taken into account. in further research, the new variables (household diversity, network density and modality diversity) could be used for a broader understanding.

When future research has a more **quantitative nature,** it could be valuable to assess the scenarios by means of the set variables in a GIS tool. With this, changes in the network become clear, which will form a strong tool for (design) decision-making processes.

15-minute elements	15-miute pillars: accessiblity	density	diversity
destinations	catchment area *sq m*	function density *functions/sq km*	functional diversity *15-minute program piechart*
home	attraction reach *n*	population density *households/sq km*	household diversity *building typologies*
network	network centrality *n*	network density *m / sq km*	modality diversity *mobility types*

Figure 144: further research variables for the 15-minute design



neighbourhood:
Nieuw Mathenesse/M4H

best fitting scenario, based on the integrated network structure:
The Dynamic Playground

1

neighbourhood:
Overschie

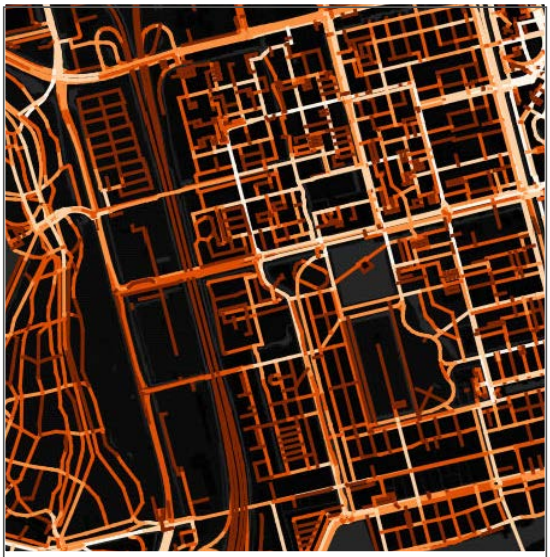
best fitting scenario, based on the integrated network structure:
The Dynamic Playground

2

neighbourhood:
Alexander

best fitting scenario, based on the integrated network structure:
The Paradise of Degrowth

5



neighbourhood:
Prinsenland

best fitting scenario, based on the integrated network structure:
The Paradise of Degrowth

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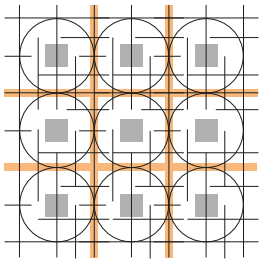
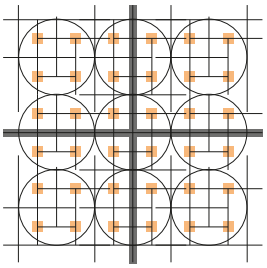
Figure 145: Transferibility to other peri-urban centres, based on network structure



neighbourhood:
Zestienhoven

best fitting scenario, based on the integrated network structure:
The Paradise of Degrowth

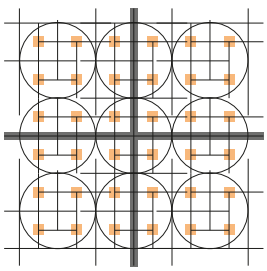
3



neighbourhood:
Hillegersberg/Schiebroek

best fitting scenario, based on the integrated network structure:
The Dynamic Playground

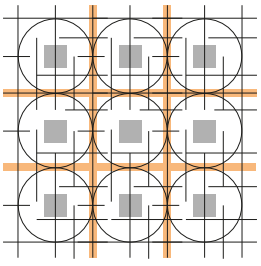
4



neighbourhood:
IJsselmonde

best fitting scenario, based on the integrated network structure:
The Dynamic Playground

7



neighbourhood:
Pendrecht/Zuidwijk

best fitting scenario, based on the integrated network structure:
The Paradise of Degrowth

8

8.2 REFLECTION

Practicing research by design

From the start, I have a firm belief in the effectiveness of research by design, a method defined by Lenzholzer et al. (2016). In this method, creativity unlocks innovation. The process of creativity, explained by Sadler-Smith (2015) as a 5-stage process, see figure 1, starts with 'preparation' (a conscious and regulated mode) followed by 'incubation (mental distraction and relaxation) resulting in an illumination (aha-moment). It is stated that 'posing the problem in conscious thought (preparation) as early as possible maximizes the amount of time for extending and enriching the mental operations of subconscious thought.' In other words: the earlier the 'preparation phase' is launched, the more time there is to facilitate a moment for illumination. My work attitude concerns the raising of several small topics simultaneously, in this way allowing a long 'incubation' period to facilitate this moment of illumination.

The method of research by design was chosen for one main reason: it allows the researcher to be innovative in the research. To me, this is highly valuable. It allowed me to develop a 15-minute design method that didn't exist before. By constantly asking questions, testing options and investigating the problems, a logic is constructed carefully. In the research, the piechart of human needs forms an example of this. The piechart is based on evidence, literature about human needs, that is translated to the urban field and used in a completely new context of urgency. Using the piechart, a new way of looking at the success of a city or neighbourhood is presented. Therefore, research by design allows the designer to create new methods specific to a certain topic.

However, while practicing research by design, I figured that a critical pitfall is the inability to conclude structurally: a way of assessing was previously missing. The 'design' in research by design was happening, but the 'research' was not as apparent in the process. I designed without always drawing clear conclusions. This means, in the last phase, attention is given to assessing and concluding on the design. By adding this essential step, I'm convinced the method of research by design will bring value to the project.

Reflection of the selected methods

At this point, I can not reflect completely on the selected methods, since the outcome is not complete yet. However, obviously, some clear reflective considerations are there.

Regarding the formation of a theoretical background via literature review, the importance of centrality for the 15-minute City is a critical conception that is strongly validated by this method. Without evidence of successful centralities, the research would have a shaky starting point. Besides, the literature review has an inspirational function. At any moment in the research process, new perspectives by scientists could bring new insights.

Regarding site-specific research, two methods have been used to understand the case location. The first one, geospatial mapping, enriched the research with a large amount of qualitative as well as quantitative data. Themes like density and connectivity are made explicit in a very detailed way by this method. This method allows the designer to make design decisions based on detailed information, presented in a clear way. However, the flip side of this method is the possibility of losing way in these large amounts of data. Careful interpretation is an essential step that needs to be taken to get a grip

on the meaning of the data. Besides, the desired geodata is not in every case available. Therefore, the success of the geospatial mapping method is dependent on external parties, which is not ultimate.

The second site-specific method, observation, is executed to elevate some of the flaws of geospatial mapping. During fieldwork I made myself several times the same mental note: visiting a place is the best way to apprehend the place. I can be clear about this, I will never make a design without having visited the place, this method is indispensable.

The last method I would like to reflect on before P4 is scenario construction. In my research, this method has fulfilled the role of 'glueing', in other words, through scenarios, the concept, local urgencies, future concepts and space come together. Scenarios deal with uncertainties, therefore, the flip side of this 'glueing role" is the risk of fallacies. Causes and reasons could be linked to wrong concepts or processes. By acknowledging this risk beforehand, I carefully drew in-between conclusions.
The topic in a broader context

In this thesis, a new model for the organisation of urban life is researched. City models are from all times and reflect a certain zeitgeist. Those models incorporate technological ambitions, political desires, infrastructural systems, social celebrations and, above all, strong visualisations of the future. While researching the 15-minute city, all those elements have passed by. As an urban designer, the main perspective from which models and futures are explored is space.

In the TU Delft graduation studio Design of the Urban Fabric, attention is given to themes such as liveability, density and functionality. The studio is close to pure urban design by putting design as the most prominent research method. Design is used as a tool to explore, elaborate and communicate. Existing concepts are tested and assessed through design. Besides, this studio work on different scales, varying from the scale of the city (or even region) to the architectural scale. Designing and testing through scales is highly important to understand how a concept such as the 15-minute city could work in a case like Rotterdam.

Scientific relevance

The project will add to the body of literature on the non-residential core in neighbourhoods. In the existing body of literature, some attendance is given to the identification of strategic configurations and locations for cores, but it is not very extensive. My graduation will draw further on the understanding of local cores and their characteristics.
My graduation project provides a practical understanding of the 15 Minute City concept, in other words, designing for slow traffic and local activity in the neighbourhood. With application in urban design to a real case, conclusions could be drawn about the topic in practice, which will strengthen the scientific understanding of the concepts.

The 15-minute City is explored through a variety of methods, which enriches the understanding of the link with accessibility, density and diversity, something that is acknowledged by Moreno (2020) to further research. By bringing a new design method forward in this thesis, the 15-minute city concept is enriched with explicit tools for spatial design.

Societal relevance

The project contributes to the creation of liveable peri-urban neighbourhoods in Rotterdam in the context of urbanisation, pollution and digitalisation.

By looking at the organisation of functions, density, centrality and urban form, different spatial configurations are developed. Those spatial configurations, in my thesis centrality types, allow the designer to solve complex design challenges using a simple design framework.
Urgencies make clear space needs to be opened up for a slow traffic network and flexible urban functions. Healthy neighbourhoods are one of the objectives for the city by the Municipality of Rotterdam. In the research, an extra layer of use and identity is added to the meaning of the 15-minute city. This addition stresses the importance of context and customisation.

By researching IJsselmonde, a neighbourhood with very clear planning principles is reviewed from a completely different perspective. This puts the original planning constructively into question. IJsselmonde is a large neighbourhood with relatively low rates of qualitative public amenities. The case study provides a detailed valuation of the functional and spatial organisation of centrality. Therefore, the case study does not only provide insights into the contextualisation of the 15-minute city, but it also has a reverse working: it unlocks new insights into possible improvements for the neighbourhood.

Ethical considerations

During the design process, many ethical dilemmas have appeared. Accessibility, being one of the design pillars, is a topic that carries a clear socio-spatial realm. This theme touches on the fact that not everybody can reach certain destinations or services, due to financial, cultural, physical or spatial reasons.
In IJsselmonde, this issue is very clear. Demographic rates show the vulnerability of certain groups that inhabit the neighbourhood. A detailed understanding of their flaws is essential to making strategic decisions.

In reality, a 15-minute program is user-specific. However, even when I've tried to empathise with all types of users, the program presented in this thesis is established by me, a 24-year-old Dutch woman that does not live in de case study areas.

Another ethical consideration of different nature comprises the justice of the voiceless. Designing a 15-minute city is all about people living urban life as comfortable as possible. Centralities mainly serve people. In design, it should be never forgotten to take the demands of nature into account. Some ecological structures might be affected design interventions.

Besides, the pressure on our climate brings risks for the coming generations. Urban designs could accelerate those risks. Climate adaptation and nature-based solutions must be taken into account.

09

REFERENCES

REFERENCES

all images are by the author, unless noted otherwise

Alexander, C. (2017). A city is not a tree: Sustasis Press/Off The Common Books.

AlleCijfers. (2021). Informatie buurt Zestienhoven. In (Vol. 2022): Alle Cijfers.

AlleCijfers. (2022). Informatie buurt Groot Ijsselmonde. In.

Beigi, S. (2018). An Essay on Globalisation, Urbanisation and Digitalisation (GUD) Age and its impacts on Cities' Sustainability and Resilience. In University of Oxford.

Berger, A. (2006). Drosscape: wasting land urban America: Princeton Architectural Press.

Berghauser Pont, M., & Haupt, P. (Eds.). (2021). Spacematrix, Space, Density and Urban Form, Revised Edition. Rotterdam: nai010 publishers / Marcel Witvoet.

Berghauser Pont, M., Stavroulaki, G., & Marcus, L. (2019). Development of urban types based on network centrality, built density and their impact on pedestrian movement. Environment Planning B: Urban analytics, city science, 46(8), 1549-1564.

CBS. (2019a). Bevolkingsgroei tussen 2018 en 2035 (prognose). In.

CBS. (2019b). Sterke groei in steden en randgemeenten verwacht. Retrieved from CBS website: https://www.cbs.nl/nl-nl/nieuws/2019/37/sterke-groei-in-steden-en-randgemeenten-verwacht

CBS. (2021a). Contribution of greenhouse gases by climate agreement sector, 2nd quarter 2021. In.

CBS. (2021b). Groei bevolking en huishoudens. In: CBS.

Chapple, K., & Loukaitou-Sideris, A. (2019). Transit-oriented displacement or community dividends? : understanding the effects of smarter growth on communities In. Cambridge, MA: The MIT Press.

Crucitti, P., Latora, V., & Porta, S. J. C. a. i. j. o. n. s. (2006). Centrality in networks of urban streets. 16(1), 015113.

Frijters, E., Hamers, D., Johann, R., Kürschner, J., Lörzing, H., Nabielek, K., . . . van der Wagt, M. (2004). Tussenland. Rotterdam: NAi Uitgevers.

Griffiths, S. J. S. u. (2015). The high street as a morphological event. 32-52.

Groote, P., & Haartsen, T. (2016). The communication of heritage: Creating place identities: Routledge.

Hamers, D., Kuiper, R., van der Wouden, R., van Dam, F., van Gaalen, F., van Hoorn, A., . . . Evers, D. (2021). Grote opgaven in een beperkte ruimte: Ruimtelijke keuzes voor een toekomstbestendige leefomgeving. Retrieved from Den Haag:

Hillier, B. (2007). Space is the machine: a configurational theory of architecture: Space Syntax.

IPCC. (2021). Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Retrieved from Cambridge: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf

Koomen, E., & Claassens, J. (2018). Spatial analysis of residential development processes: uncovering the Dutch densification potential. Paper presented at the Regional Studies Association Winter Conference November 2018.

Kroll, T., & Neri, M. (2009). Designs for Mixed Methods Research. In Mixed Methods Research for

Nursing and the Health Sciences. Hoboken: Wiley-Blackwell.
Lenzholzer, S., Duchhart, I., & van den Brink, A. (2016). The relationship between research and design. In Research in Landscape Architecture (pp. 54-64): Routledge.
Mann, C. C. (2018). The wizard and the prophet: Two remarkable scientists and their dueling visions to shape Tomorrow's world: Knopf.
McLeod, S. J. S. p. (2007). Maslow's hierarchy of needs. 1(1-18).
Mehaffy, M., Porta, S., Rofe, Y., & Salingaros, N. J. U. D. I. (2010). Urban nuclei and the geometry of streets: The 'emergent neighborhoods' model. 15(1), 22-46.
Moreno, C. (2020a). The 15-minute city [Video]: TED.
Moreno, C. (2020b). Droit de cité. Paris: Editions de l'Observatoire.
Moreno, C., Allam, Z., Chabaud, D., Gall, C., & Pratlong, F. J. S. C. (2021). Introducing the "15-Minute City": Sustainability, resilience and place identity in future post-pandemic cities. 4(1), 93-111.
Nabielek, K., Kronberger-Nabielek, P., & Hamers, D. J. S. (2014). The rural-urban fringe in the Netherlands: recent developments and future challenges. 1(1), 101-120.
Neuman, M. (2005). The compact city fallacy. Journal of planning, education & research, 25(1), 11-26.
Nogué, J., & Vicente, J. J. P. g. (2004). Landscape and national identity in Catalonia. 23(2), 113-132.
OECD. (2017). The next production revolution: implications for governments and business: Organisation for Economic Co-operation and Development OECD.
Peng, J., Strijker, D., & Wu, Q. J. F. i. p. (2020). Place identity: how far have we come in exploring its meanings? , 11, 294.
Picon, A. J. J. o. a. E. (2013). Learning from utopia: contemporary architecture and the quest for political and social relevance. 67(1), 17-23.
Piorr, A., Ravetz, J., & Tosics, I. (2011). Peri-urbanisation in Europe, towards European policies to Sustain Urban-Rural Futures. Retrieved from https://www.researchgate.net/publication/275349764_Peri-Urbanisation_in_Europe
Pozoukidou, G., & Chatziyiannaki, Z. (2021). 15-Minute City: Decomposing the New Urban Planning Eutopia. Sustainability, 13(2), 928.
Rijksoverheid. (2020). Staat van de woningmarkt 2020. Retrieved from https://www.rijksoverheid.nl/actueel/nieuws/2020/06/15/ staat-van-de-woningmarkt-2020
Roseland, M. J. C. (1997). Dimensions of the eco-city. 14(4), 197-202.
Rotterdam, G. (2020). Rotterdamse Mobiliteits Aanpak. Gemeente Rotterdam Retrieved from https://www.rotterdam.nl/wonen-leven/mobiliteitsaanpak/Rotterdamse-Mobiliteitsaanpak1.pdf
Sheller, M., & Urry, J. (2000). The city and the car. International journal of urban regional research, 24(4), 737-757.
UN-Habitat. (2018). Tracking Progress Towards Inclusive, Safe, Resilient and Sustainable Cities and Human Settlements, SDG 11 Synthesis Report. Retrieved from https://unhabitat.org/sites/default/files/2019/05/sdg_11_synthesis_report_web2_0.pdf
van Bockxmeer, J., & de Korte, L. (2021). Over deze oplossing voor de woningnood hoor je

nooit iemand. Retrieved from de Correspondent website: https://decorrespondent.nl/12375/over-deze-oplossing-voor-de-woningnood-hoor-je-nooit-iemand/2545901906625-48bfddfa

van de Laar, P. (2021). Een kleine geschiedenis van Rotterdam.

Vaughan, L. (2015). Suburban urbanities: UCL Press.

Vaughan, L., Griffiths, S., & Palaiologou, F. (2022). Tracing high street centralities through spatial-morphological continuities from the past: The case of Islington, London. Paper presented at the https://www. hvl.no/en/research/conference/13sss/.

Wandl, A., & Hausleitner, B. (2021). Investigating functional mix in Europe's dispersed urban areas. Environment and Planning: Urban Analytics City Science, 2399808320987849.

Wandl, D. I. A., Nadin, V., Zonneveld, W., & Rooij, R. (2014). Beyond urban–rural classifications: Characterising and mapping territories-in-between across Europe. Landscape and Urban Planning, 130, 50-63.

Wang, F., & Prominski, M. (2015). Urbanization and locality: strengthening identity and sustainability by site-specific planning and design: Springer.

10

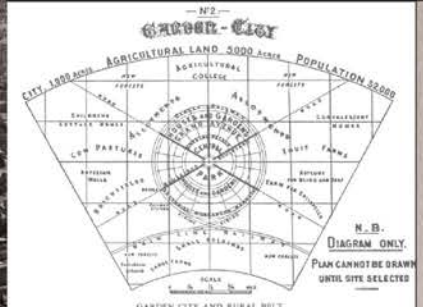
APPENDICES

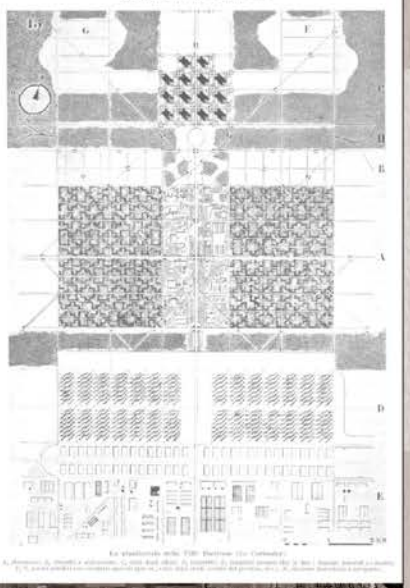
APPENDIX I

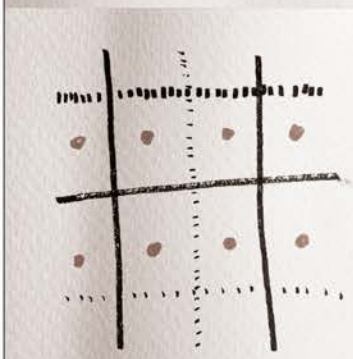
Preliminary city model research

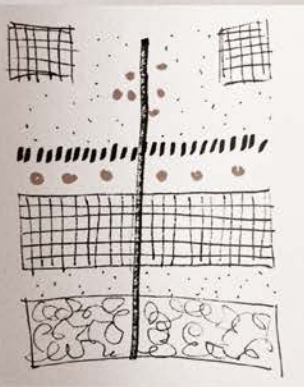
city model	year of origin	developer	media	key concepts	social group of interest	example from practice
Garden City	1898	Ebenezer Howard	text, urban plans	suburbanisation, relation with nature	working class	Welwyn Garden City, England
Radiant City	1930	Le Corbusier	text, urban plans, images	technification, liberation of movement	urban residents	Bijlmer, Amsterdam, The Netherlands
Broadacre City	1932	Frank Lloyd Wright	text, urban plans, images	suburbanisation, American dream	family household	Levittown, New York, USA
Compact City	1970	-	text	diversification, urbanity, densification	urban residents	Paris, France
Patchwork City	1989	Willem Jan Neutelings	text, urban plans	fragmentation, relation with nature	metropolitan residents	Metropoolregio Rotterdam - Den Haag, NL
Dougnut City	2017	Kate Raworth	text, diagrams	consumption, new economic model	urban residents	Amsterdam City Doughnut (policy making tool), NL

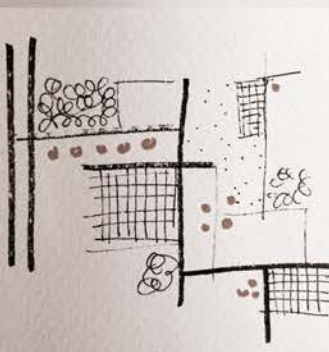
Table 1: City model investigation. source: author

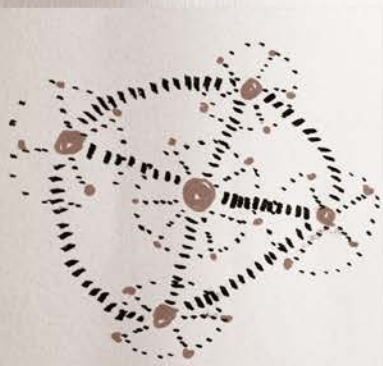

No 2
Garden-City
Agricultural Land 5000 Acres
Population 32000
City 1000 Acres
N. B.
Diagram only.
Plan cannot be drawn until site selected
Garden City and Rural Belt

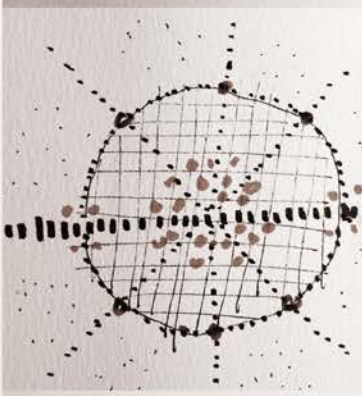


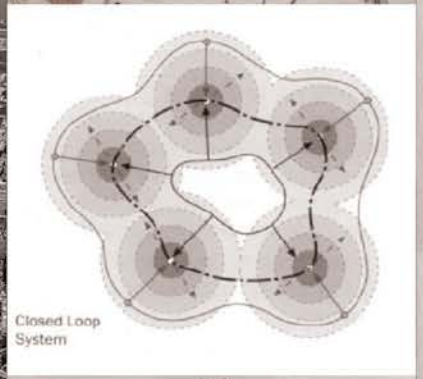


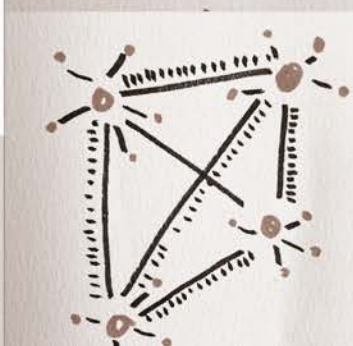


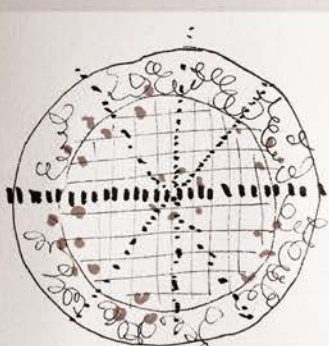







Closed Loop
System






climate change
ozone layer depletion
ocean acidification
ECOLOGICAL CEILING
the safe and just space for humanity
SOCIAL FOUNDATION
water
food
health
energy
air pollution
chemical pollution
education
housing
income & work

APPENDIX II

Preliminary understanding of the meaning of a local centre

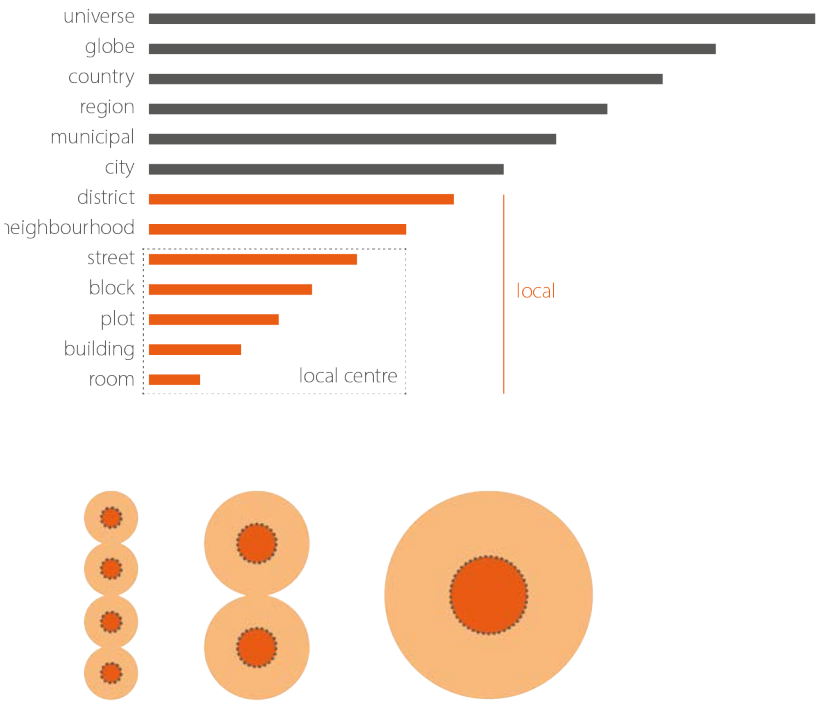


Figure 146: Sizes of a local centre

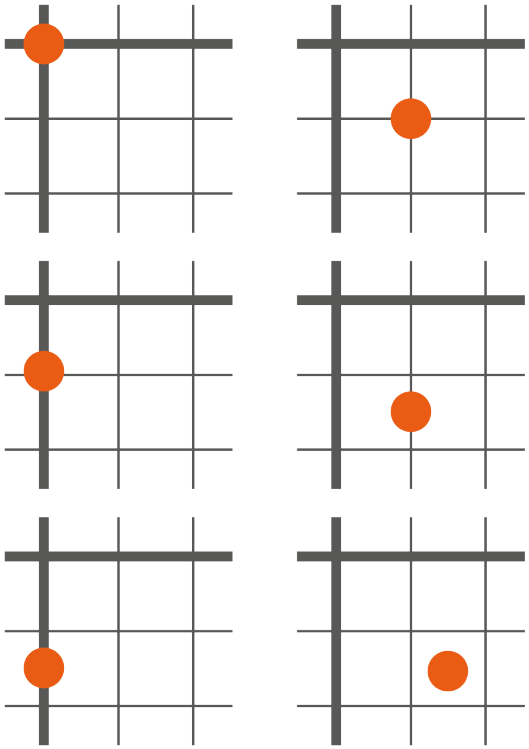


Figure 147: Network integration of a local centre

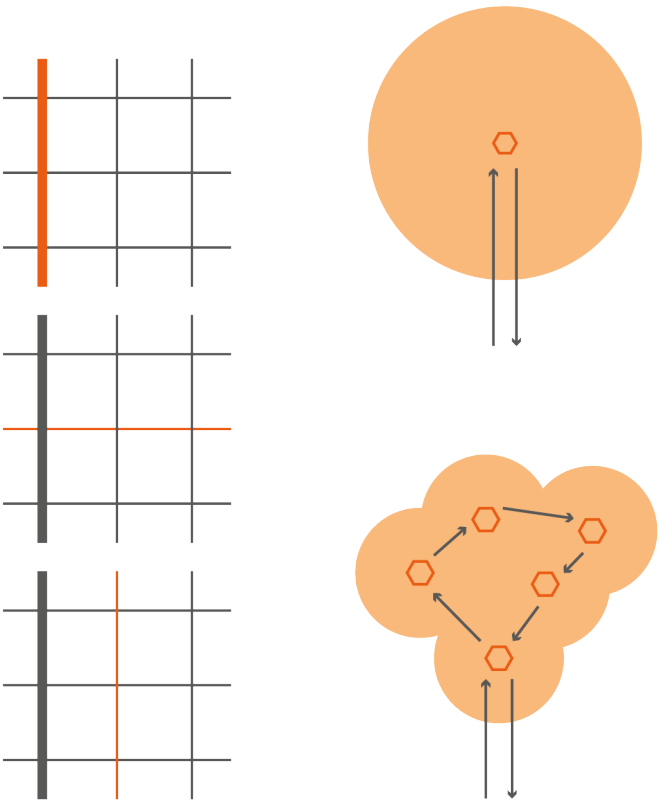


Figure 148: Attraction or chain?

Logistics
- Pick-up-point
- Lockers
- Storage facility
- Distribution centre for deliveries

Daily facilities
- Community center
- Retail
- Supermarket
- Bakery
- Day-care
- Care
- Sport facility / Gym
- Hotel / shortstay
- Bar / restaurant
- Entertainment (e.g. arcadehal)
- Culture (theater, cinema)
- ATM
- Gallery / exposition space
- local library
- Meeting facility
- Flexworking space
- Repair service

Energy, waste, water and food
- Food production
- Depot circulaire materialen
- Charging point

Internet
- WiFi
- 5G
- USB-chargers

Information
- Landmark
- VVV / tourist center
- Travel information
- Waiting room

Public space
- Play facility (climbing frame)
- Benches / seats
- Picknicktables
- Green / biodiversity
- Watertap
- Postbox
- Toilet
- Play facility with water
- Playground
- Rooftoppark
- Bee boxes
- Trashbins

Shared mobility
- Shared bicycle
- Shared scooters (electric)
- Shared steps (electric)
- Shared cars (electric)
- Rental

Public transport
- Bus stop
- Tram stop
- Metro station
- Train station
- Group transport point
- Taxi / shuttle point
- Watertaxi / waterbus point
- Ticket machine

Parking
- Regular bicycle parking
- Special bicycle parking
- Scooter parking
- Step parking
- Motor vehicle parking
- Car parking
- Carpool point
- Kiss and ride

Figure 149: Understanding of programme

APPENDIX III

Functional categorisation of centralities in Rotterdam

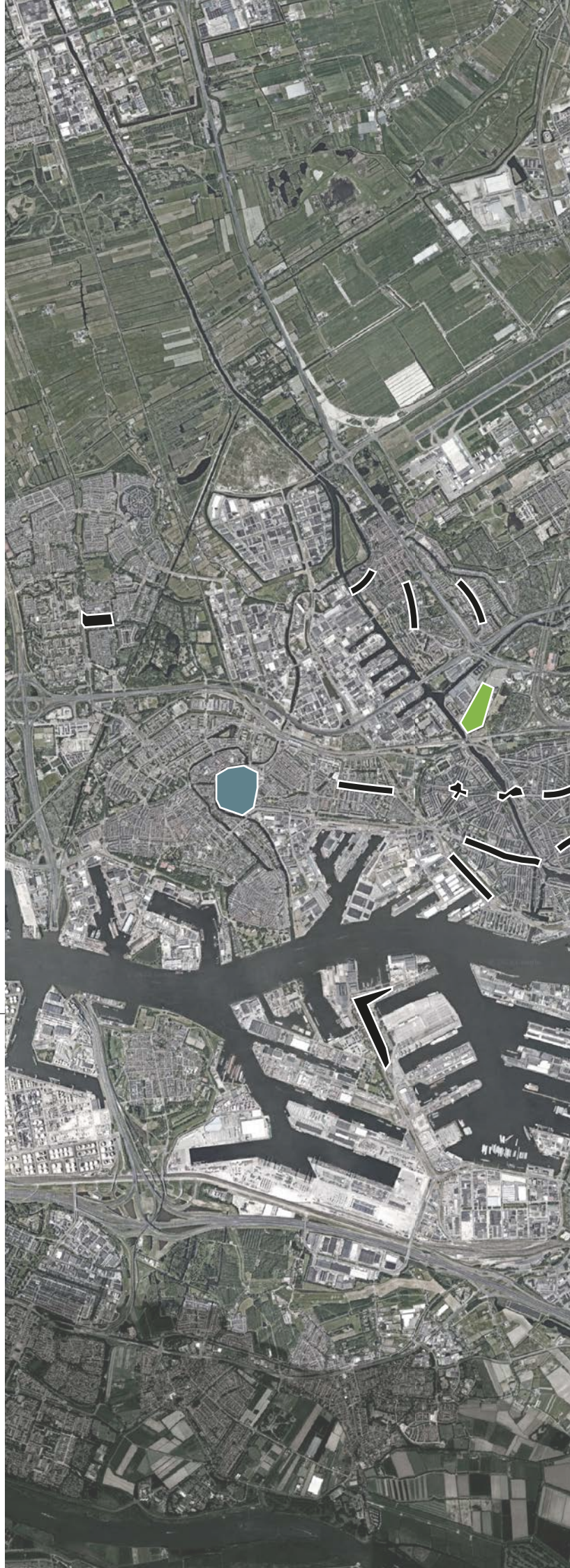


Figure 150: Functional centralities in Rotterdam

APPENDIX IV

The 15-minute programme framework

Table 2: The 15-minute programme

urban function	urban programme		5 min walk	15 min walk	15 min cycle	more
leisure	recreation		allotment garden	playground	petting zoo	entertainment park
			outdoor play facility	public garden	inner playground	zoo
			park/square		arcade hall	marina
					outdoor arena	
					bowling alleys	
					allotment complex	
	sports		urban gym	sports club	cycle route	golf course
			running lane/route	gym	riding route	sport fields
				urban sports field	specialised sports studio	
					outdoor swimming	
	tourism					historic site
						(urban) camp site
						touris office
						b&b/hotel
culture	visit		outdoor artwork/landmark	theatre	club/nightlife	concert hall
			urban library	cultural center (exposition, performa	cinema	museum
					local museum	specialised/traditional practice
					gallery	
	practice			music studio	religious building	
				atelier/IDIY	dance school	
					theatre school	
					arts and crafts school	
					music school	
					outdoor arena	
	preservation				funeral home	(municipal) archive
					cemetry/crematorium	depot
education	institution		primary school	secondary school	applied university	academic university
				special education pri/sec	school allotments	private school
	public			study spaces		
				workshop space		
				library		
interaction	intimacy					whorehouse
	connection			small event location	youth center	big event location
			(picknick)tables	community center	charity center	
			benches	(coffee) bar	bar specialised	
work	general		(co)working space		office space	businesspark
			work at home		coworking center	port
					workplace	industrial site
						laboratory
						call center
healthcare	primary care		farmacy	general practicioner		
				physiotherapist		
				oral/optic care		
	secondary care			daycare	reception location	(academic) hospital
					specialised health location	alternative care
				therapist	outpatient clinic	specialised health center
	personal care		drugstore	hairdresser	beauty salon	
			laundry service		bath house	
materials	goods		ATM	clothing shop	clothing specialised	charity store
			kiosk	fabric shop	pet shop	brand store
				shoe shop	variety store	fashion outlet
				thrift shop	interior store	bedstore
				hardware store	electronics store	furnishing store
				florist	construction market	marketplace
				book store	bike store	
					gift shop	other
					coffee shop	
					jewelry shop	
					electronics store	
					garden center	
					bag shop	
	service		DIY workplace	textile/shoe repair	(bulky) waste depot	car repair and maintenance
				electronics repair		
				print shop		
	real estate			bank office	estate agent	
				city council office		
food	fresh		bakery	dry fruit store		fresh produce wholesale
			butchery			
			cheesemonger			
			vegetable grocer			
			fish seller			
	speciality		tabac shop/grocer	liquor store		specialised ingredients
				deli		
	market		neighbourhood market	supermarket		wholesale
				temporary market	e-super	hypermarket
	prepared			snackbar	restaurant	specialised restaurant
				cafeteria		
				take-away restaurant		
	local			farmshop		
				short chain initiative		
supporting urban functions	logistics		pick up point	post office	warehouse	distribution center
					private storage	
			post box		materials/waste depot	waste incinerator
	water					desalination plant
						pump (house)
	mobility		shared bicycles		train station	high-speed train station
			bicycle parking	(shared) car parking		airport
			public transport stop	bicycle repair		lighthouse
						spaceport
						fuel station
						boathouse
	energy			charging point (device)	fuel station	energy plant
						converterhall
	data					data center
						transmission facility
	production				light manufacturing	agraric land
						heavy manufacturing
						greenhouses
	safety				police office	military base
					court	fire station
					bunker	embassy

Functional assessment Ijsselmonde

function per homes: general	rule	entity	/homes	needed in ijsselmonde	amount in Ijsselmonde
primary school	1	school	1149	12,0	9
secundary school	1	school	4100	3,4	5
schoolgarden complex	1	complex	50000	0,3	0
playgarden	1	complex	20000	0,7	3
farmacy	1	building	3000	4,6	4
indoor sports	1	hall	12000	1,15	2
community center	0,063	m2	1	872,2	2000
culture on nbh level	0,25	m2	1	3461,3	2800
field surface outdoor sports	9	m2	1	124605	140000

function per land: paradise	rule	entity	/land	needed in ijsselmonde (ha)	amount in Ijsselmonde
urban agricultural land	10	%	city	57	0

function per land: playground	rule	entity	/land	needed in ijsselmonde (ha)	amount in Ijsselmonde
city logistics	5	%	city	28,5	0

household amount Ijsselmonde	13845
hectares Ijsselmonde	573

Table 3: Calculations of the performance of IJsselmonde according to the norms of the big cities of the Netherlands

BVO (m2)	buitenruimte (m2)	norm based on/taken from
3770	1450	wet primair onderwijs
7180	2800	randvoorwaarden amsterdam
900	8000	randvoorwaarden amsterdam
120	3000	randvoorwaarden amsterdam
150		randvoorwaarden amsterdam
3000		Sportnorm als amendement opgenomen in Sportvisie 2025
		referentiekader Oost
		randvoorwaarden amsterdam
		Amsterdams gemiddelde, lessen van IJburg, thematische studie Sport en Bewegen

BVO (m2)	buitenruimte (m2)	norm based on/taken from
		Urban agriculture: a global analysis of the space constraint to meet urban vegetable

BVO (m2)	buitenruimte (m2)	norm based on/taken from
		https://civitas.eu/sites/default/files/civ_pol-an5_urban_web.pdf

APPENDIX V

Fieldwork Zestienhoven

Fieldwork IJsselmonde


Hooghagen


Elektrisch koken,
net zo lekker?

Fieldwork Hillegersberg (left) and Nieuw-Mathenesse (Right)


m.u.v. onmiddellijke
laden en lossen en
in- en uitstappen

Fieldwork ‘s-Gravenland (left) and Overschie (Right)


Dirk

APPENDIX VI

Maps Zestienhoven

Figure 151: Housing density

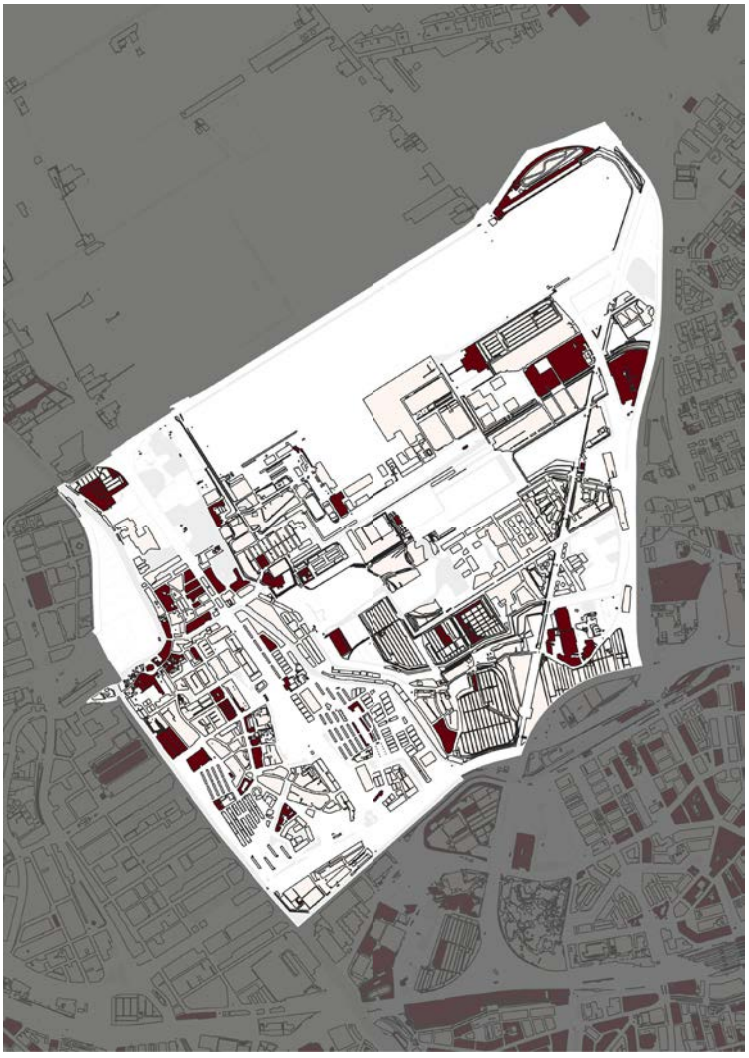


Figure 152: Meeting spaces density

Figure 153: MXI

Figure 154: FSI

Maps IJsselmonde

Figure 155: MXI

Figure 156: FSI

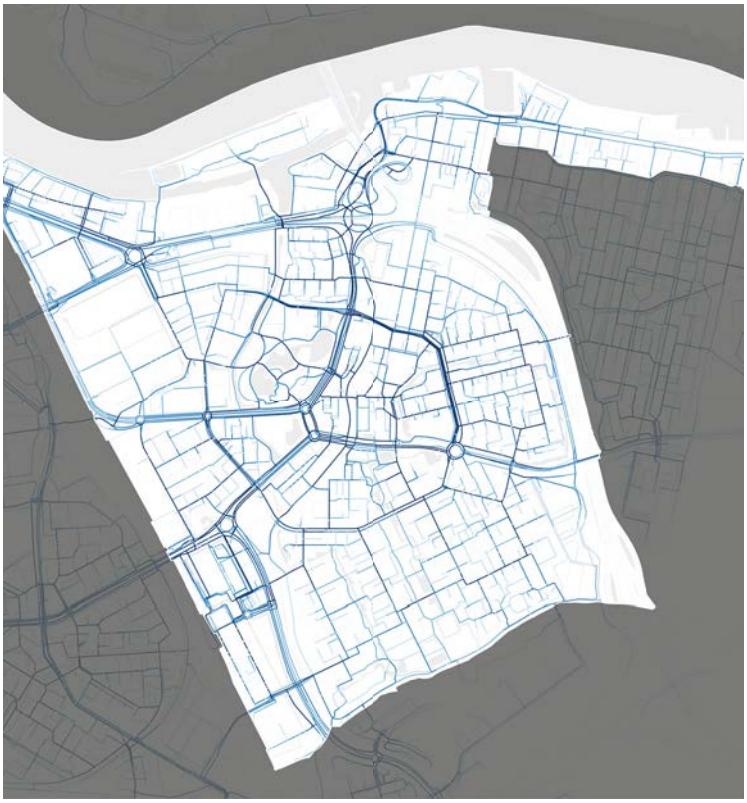


Figure 157: Network Integration

Figure 158: Housing density

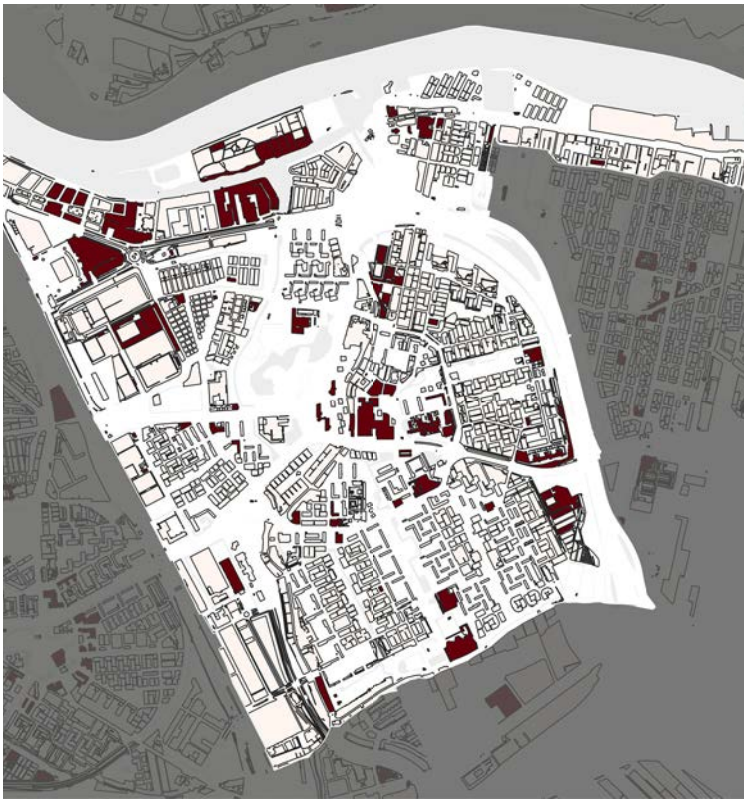


Figure 159: Meeting space density

Figure 160: Buidling ages

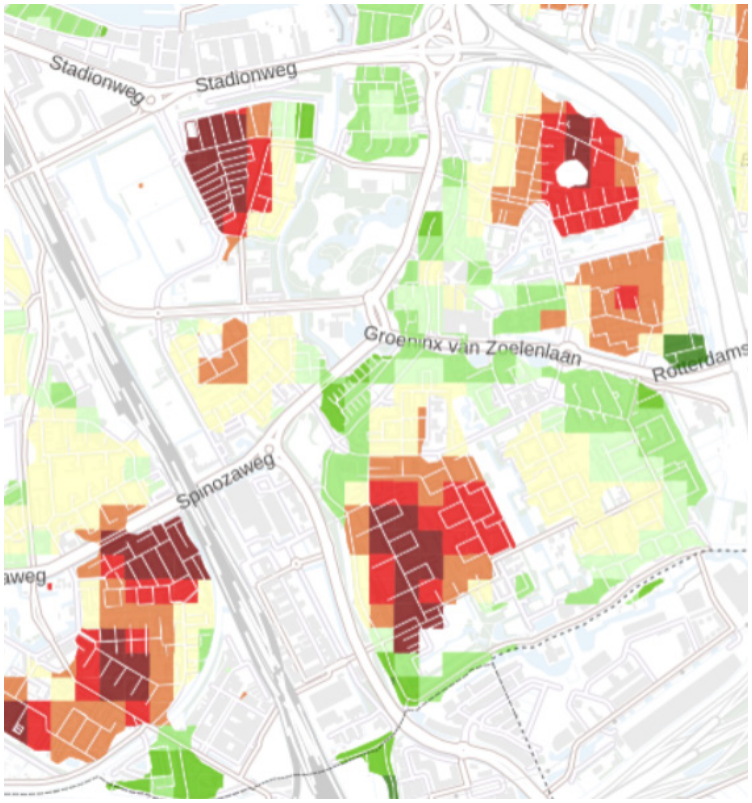


Figure 161: Leefbarometer

Maps density analysis Rotterdam

Figure 162: OSR

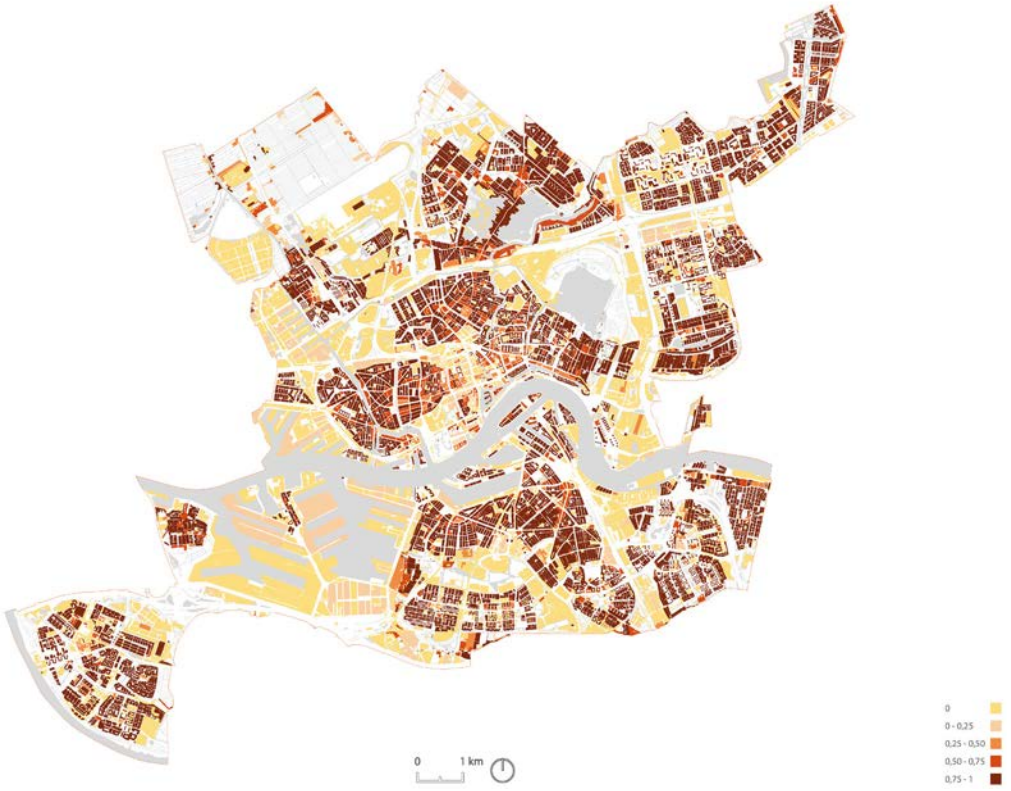


Figure 163: MXI

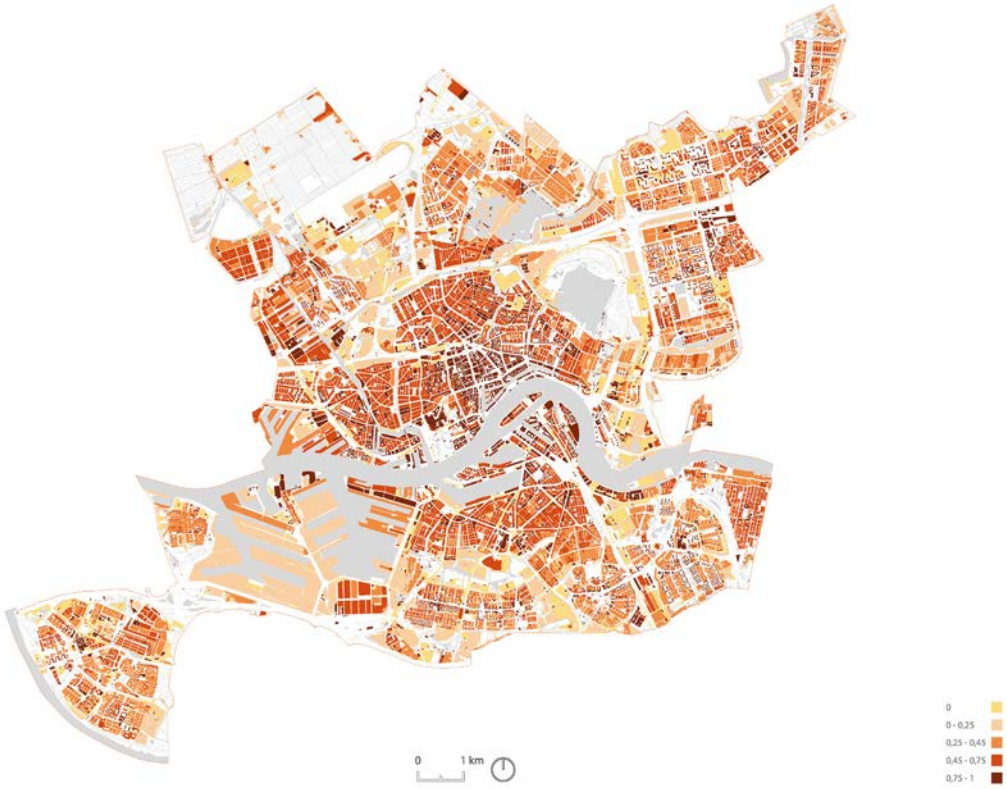


Figure 164: GSI

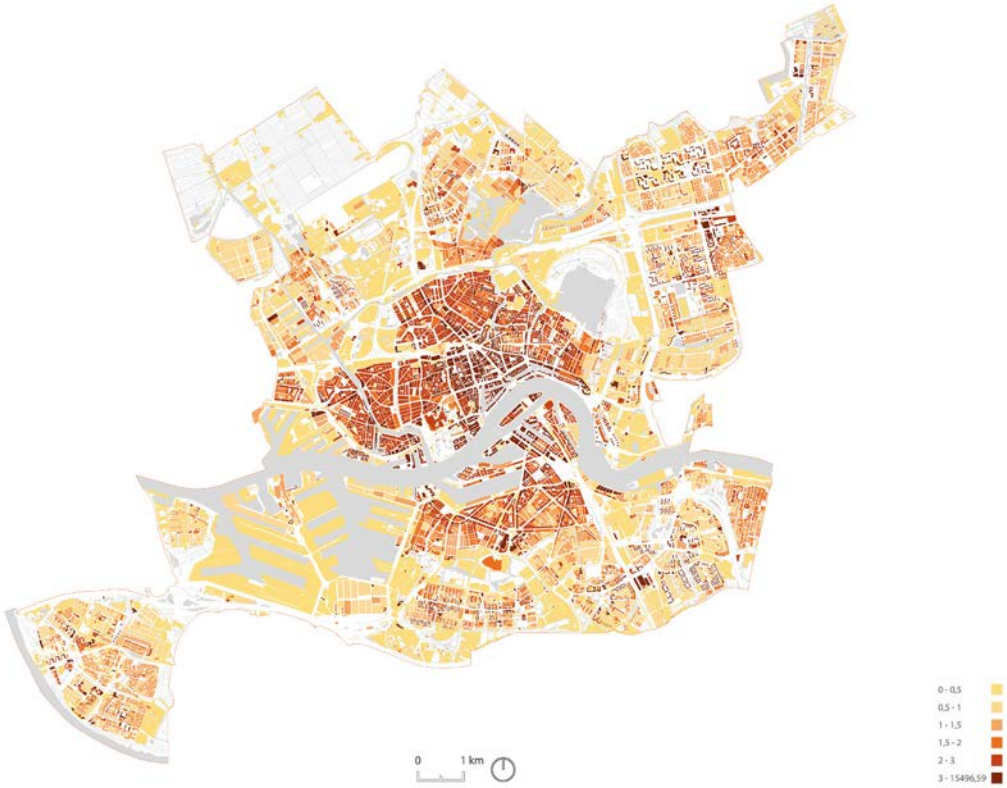


Figure 165: FSI

APPENDIX VII

Interview questions

INTERVIEWS on site

Setting:

Search for different ages, ask to record.

Requirement: the person has to live in the neighbourhood

Explain:

Graduation student, interested in how people look at their neighbourhood.

Intersed in how people use their neighbourhood

1 minute, 5 questions.

I. general

Age

Nationality

II. identity

Opening question: goal is to make the respondent start thing of what makes the neighbourhood unique.

Next to this place, what are locations that you visit often/with pleasure in the neighbourhood?

What elements here are most striking in the space, appear unique to you?

What elements here are most striking in the space, appear unique to you, because of a special feeling or memory??

Are there one or more elements which produce a particular sensation?

Is there any one element which brings to mind a moment that is important to you for any reason?

Are there any things which bother you?

If you could change anything, to make your neighbourhood better, what would you do?

What is missing in your neighbourhood?

Is this neighbourhood comparable to another area in Rotterdam or elsewhere?

Why?

What is THE symbol of -nbh- ?

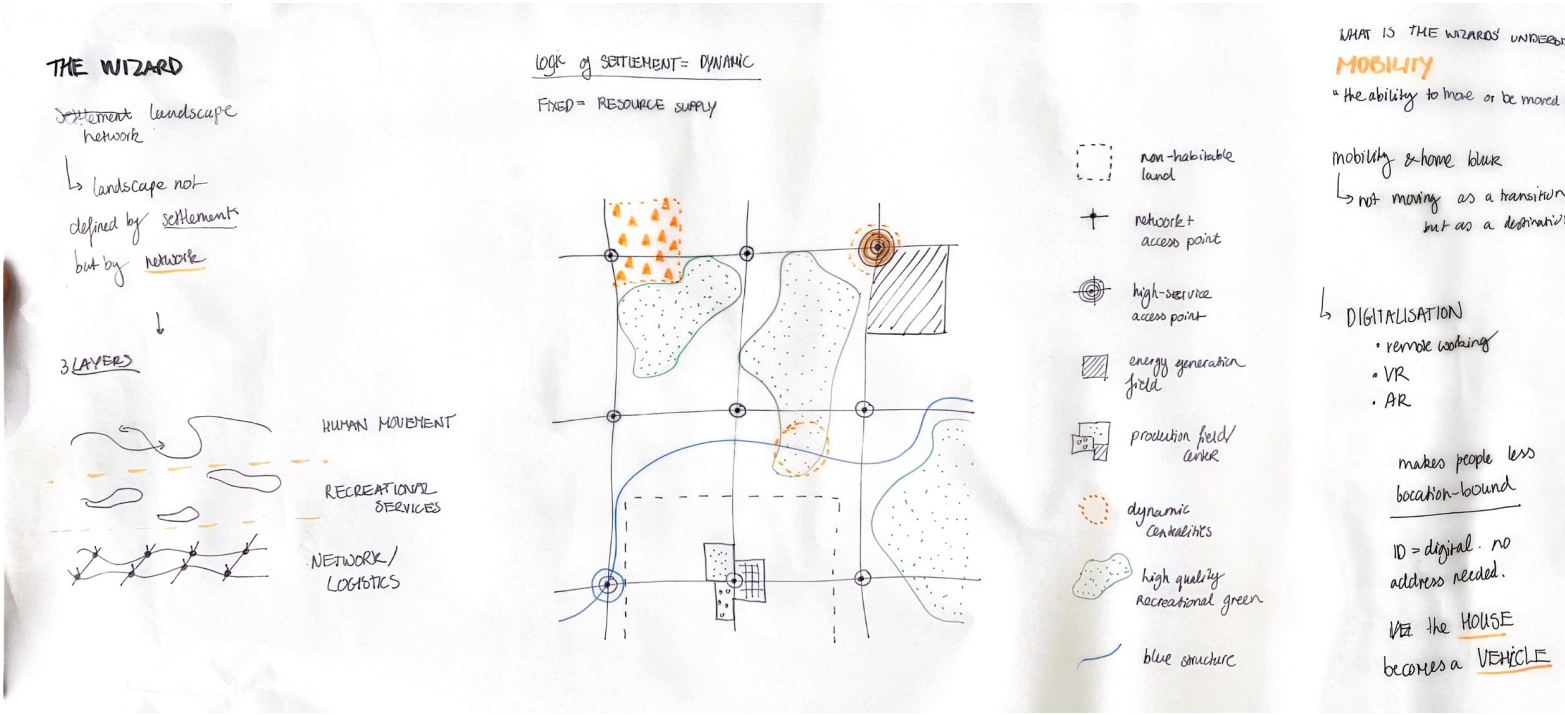
How many minutes do you like to walk to the supermarket? To a package point? To a bar?

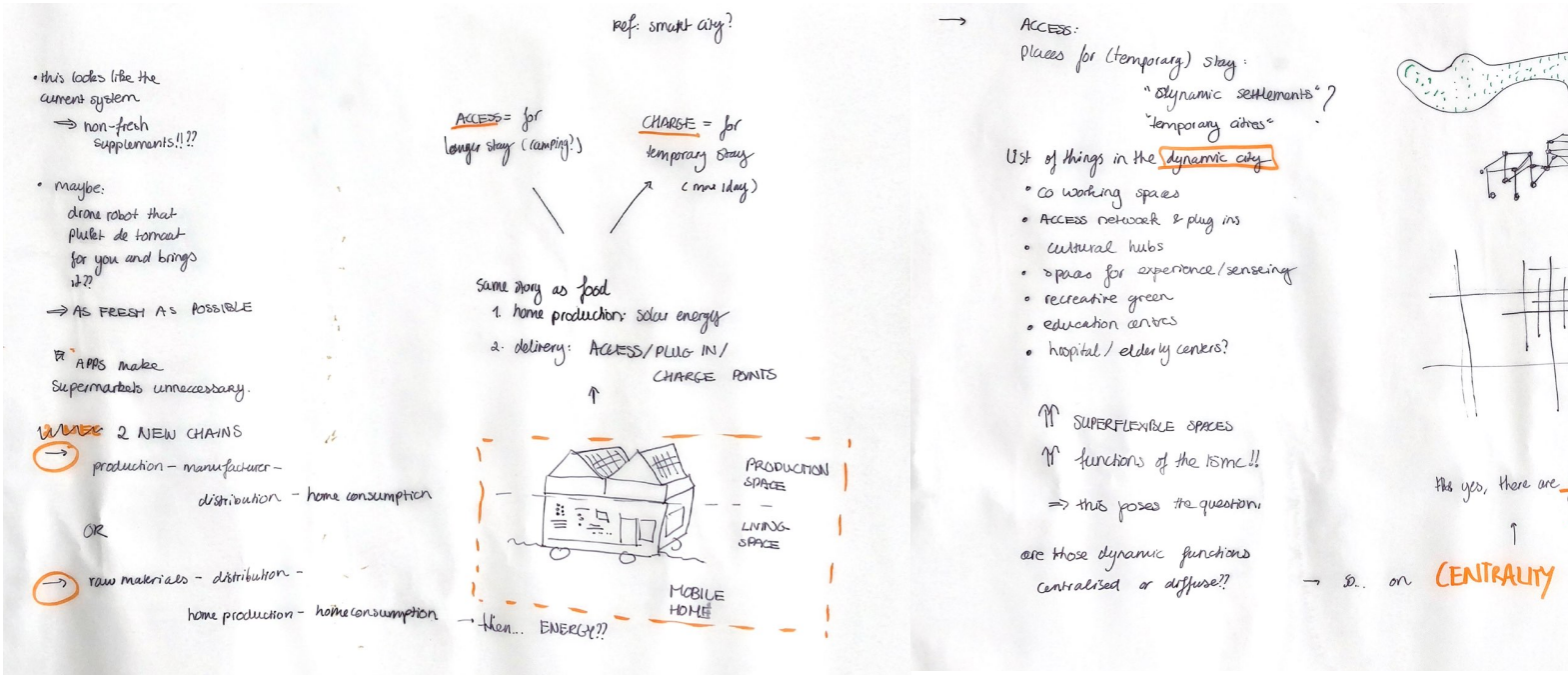
What facilities (think of: school, church, supermarket, health, sports, nail shop, package point, park) would you like to have near home?

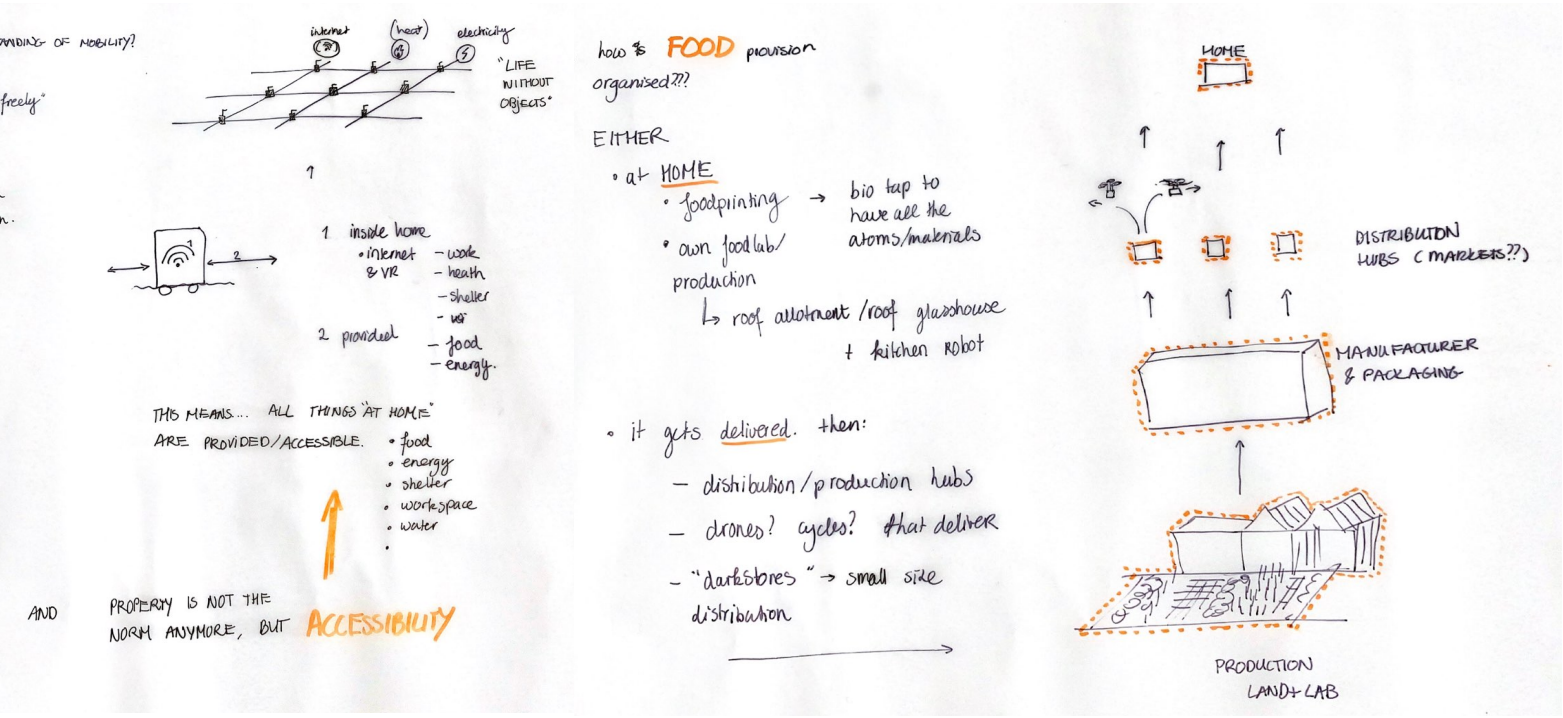
Could you describe a day of your life?

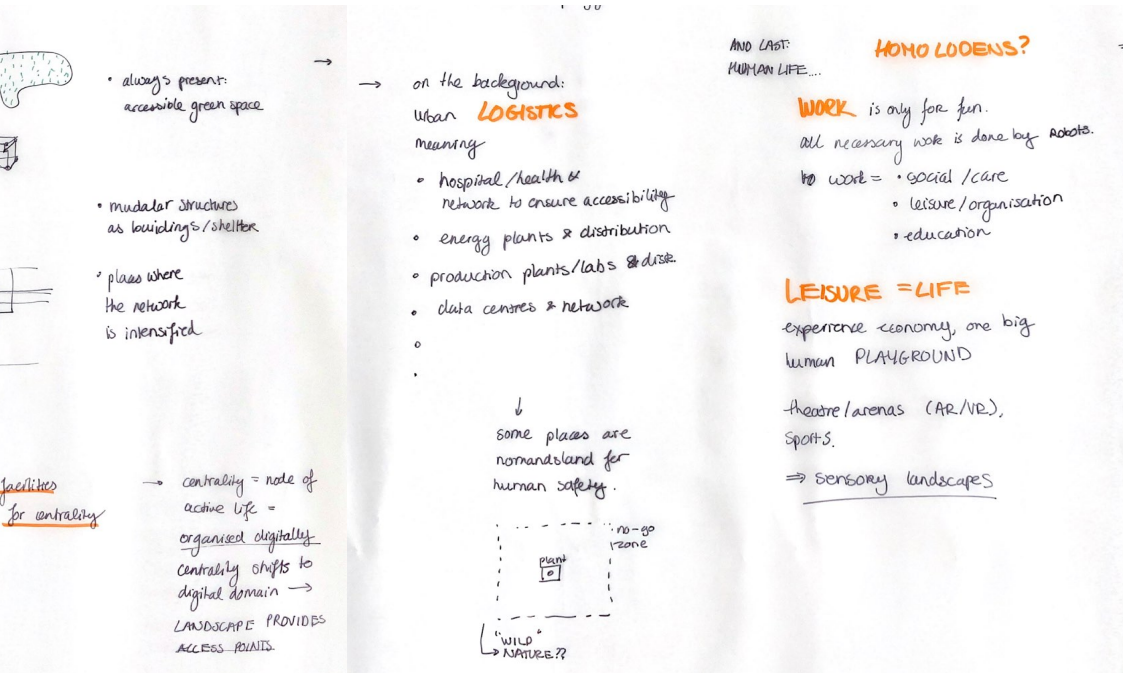
APPENDIX VIII

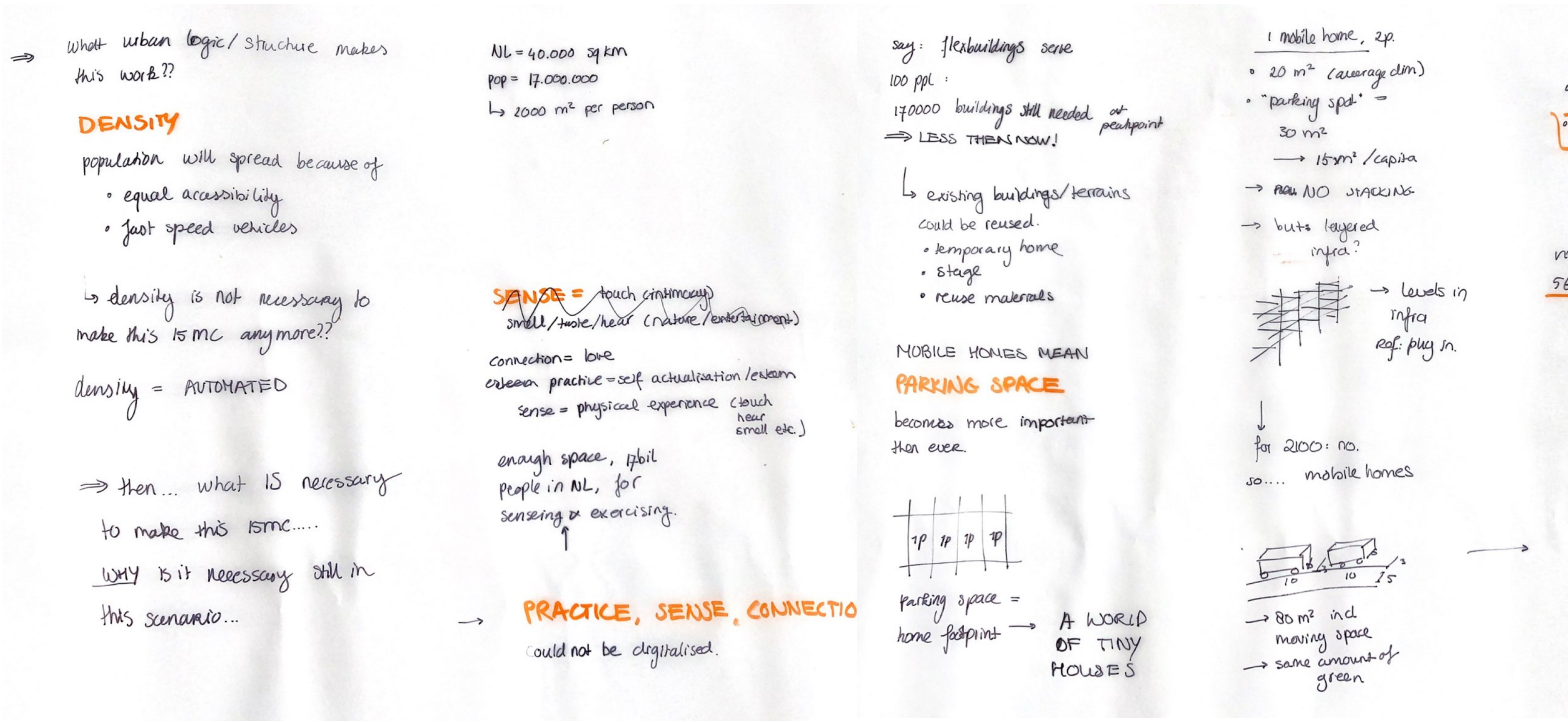
Scenario construction sketches "wizard": base of 'The Dynamic Playground' scenario

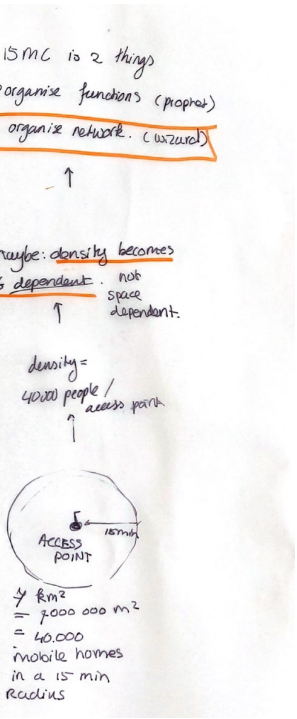




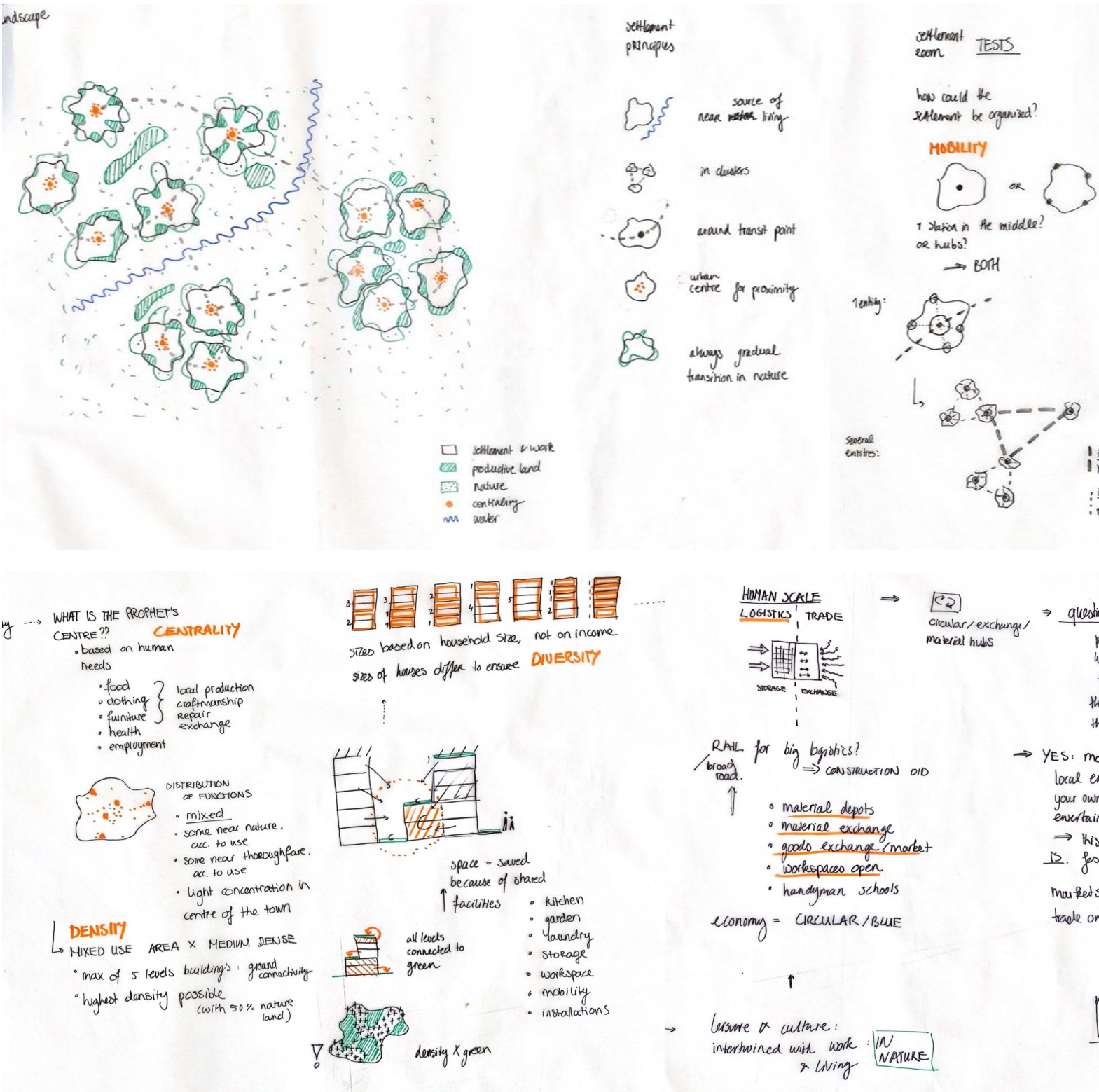

internet
(heat)
electricity
"LIFE WITHOUT OBJECTS"
1 inside home
• internet & VR
– work
– health
– shelter
– wi
2 provided
– food
– energy
THIS MEANS... ALL THINGS "AT HOME" ARE PROVIDED/ACCESSIBLE.
• food
• energy
• shelter
• workspace
• water
AND
PROPERTY IS NOT THE NORM ANYMORE, BUT ACCESSIBILITY
how is FOOD provision organised???
EITHER
• at HOME
• foodprinting → bio tap to have all the atoms/materials
• own foodlab/ production
↳ roof allotment / roof glasshouse + kitchen robot
• it gets delivered. then:
– distribution/production hubs
– drones? cycles? that deliver
– "darkstores" → small site distribution
HOME
DISTRIBUTION HUBS (MARKETS??)
MANUFACTURER & PACKAGING
PRODUCTION LAND+LAB

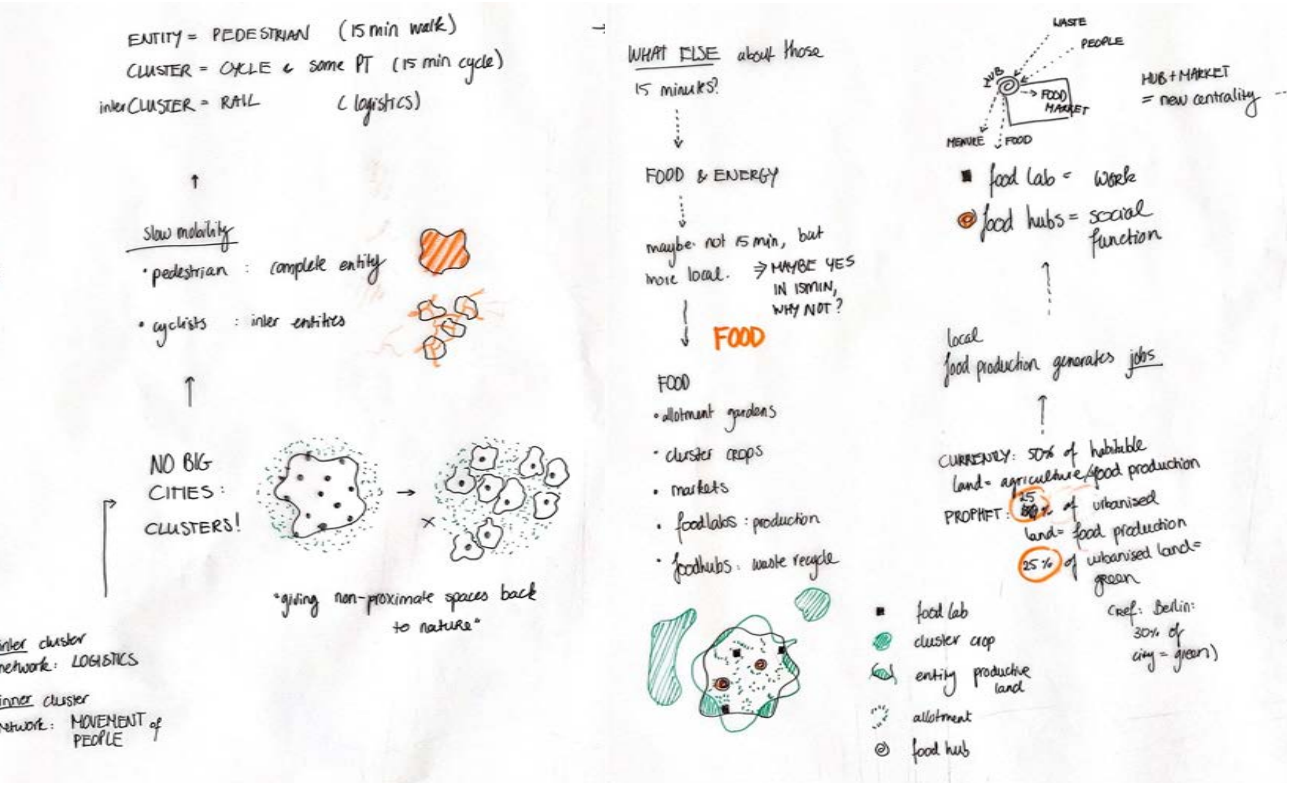

• always present: accessible green space
• modular structures as buildings/shelter
• places where the network is intensified
facilities for centrality
→ centrality = node of active life = organised digitally
centrality shifts to digital domain →
LANDSCAPE PROVIDES ACCESS POINTS
on the background:
urban LOGISTICS
meaning
• hospital/health & network to ensure accessibility
• energy plants & distribution
• production plants/labs & distr.
• data centres & network
some places are no-mans-land for human safety.
plant
no-go zone
"WILD" NATURE??
AND LAST: HUMAN LIFE...
HOMO LUDENS?
WORK is only for fun.
all necessary work is done by robots.
to work = • social/care
• leisure/organisation
• education
LEISURE = LIFE
experience economy, one big human PLAYGROUND
theatre/arenas (AR/VR), sports.
⇒ sensory landscapes

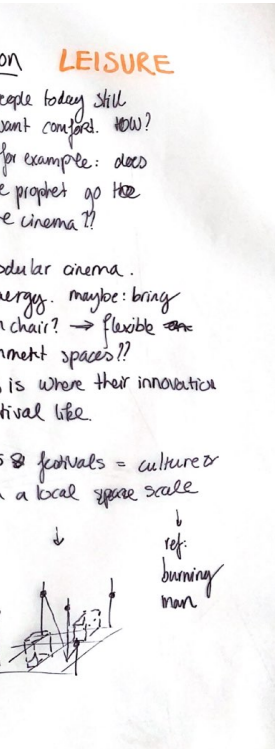

⇒ What urban logic / structure makes this work??
DENSITY
population will spread because of
• equal accessibility
• fast speed vehicles
↳ density is not necessary to make this ISMC anymore??
density = AUTOMATED
⇒ then... what IS necessary to make this ISMC.....
WHY is it necessary still in this scenario...
NL = 40.000 sq km
pop = 17.000.000
↳ 2000 m² per person
SENSE = touch (intimacy) smell / taste / hear (nature / entertainment)
connection = love
esteem practice = self actualization / esteem
sense = physical experience (touch hear smell etc.)
enough space, total people in NL, for sensing & exercising.
→ PRACTICE, SENSE, CONNECTIO
could not be digitalised.
say: flexbuildings serve
100 ppl :
170000 buildings still needed at peakpoint
⇒ LESS THEN NOW!
↳ existing buildings/terrains could be reused.
• temporary home
• stage
• reuse materials
MOBILE HOMES MEAN
PARKING SPACE
becomes more important than ever.
1p 1p 1p 1p
parking space = home footprint → A WORLD OF TINY HOUSES
1 mobile home, 2p.
• 20 m² (average dim)
• "parking spot" ⇒ 30 m²
→ 15 m² / capita
→ now NO STACKING
→ but: layered infra?
→ Levels in infra
Ref: plug in.
for 2100: no.
so.... mobile homes
10 10 5
→ 80 m² incl moving space
→ same amount of green


15mc is 2 things
organise functions (proprat)
organize network. (urzural)
maybe: density becomes dependant. not space dependant.
density =
40000 people / access point
ACCESS POINT
15min
1 km²
= 1.000 000 m²
= 40.000
mobile homes
in a 15 min
Radius

Scenario construction sketches "prophet": base for scenario 'The Paradise of Degrowth'




ENTITY = PEDESTRIAN (15 min walk)
CLUSTER = CYCLE & some PT (15 min cycle)
inter CLUSTER = RAIL (logistics)
Slow mobility
• pedestrian : complete entity
• cyclists : inter entities
NO BIG CITIES : CLUSTERS!
"giving non-proximate spaces back to nature"
inter cluster
network: LOGISTICS
inner cluster
network: MOVEMENT of PEOPLE
WHAT ELSE about those 15 minutes?
FOOD & ENERGY
maybe not 15 min, but more local. ⇒ MAYBE YES IN 15MIN, WHY NOT?
FOOD
FOOD
• allotment gardens
• cluster crops
• markets
• foodlabs : production
• foodhubs : waste recycle
food lab
cluster crop
entity productive land
allotment
food hub
WASTE
PEOPLE
HUB
FOOD MARKET
MANURE
FOOD
HUB + MARKET = new centrality
food lab = work
food hubs = social function
local food production generates jobs
CURRENTLY: 50% of habitable land = agriculture, food production
PROPHET: 15 80% of urbanised land = food production
25% of urbanised land = green
(ref: Berlin: 30% of city = green)


on LEISURE
eople today still
ant contrast. HOW?
for example: disco
e prophet go Hee
e cinema ??
odular cinema.
ergy. maybe: bring
chair? → flexible
nment spaces??
is where their innovation
tival like.
festivals = culture
a local space scale
ref: burning man

City around the Corner

Strategic design interventions to alter the urban rhythm in the peri-urban areas of Rotterdam

MSc thesis

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