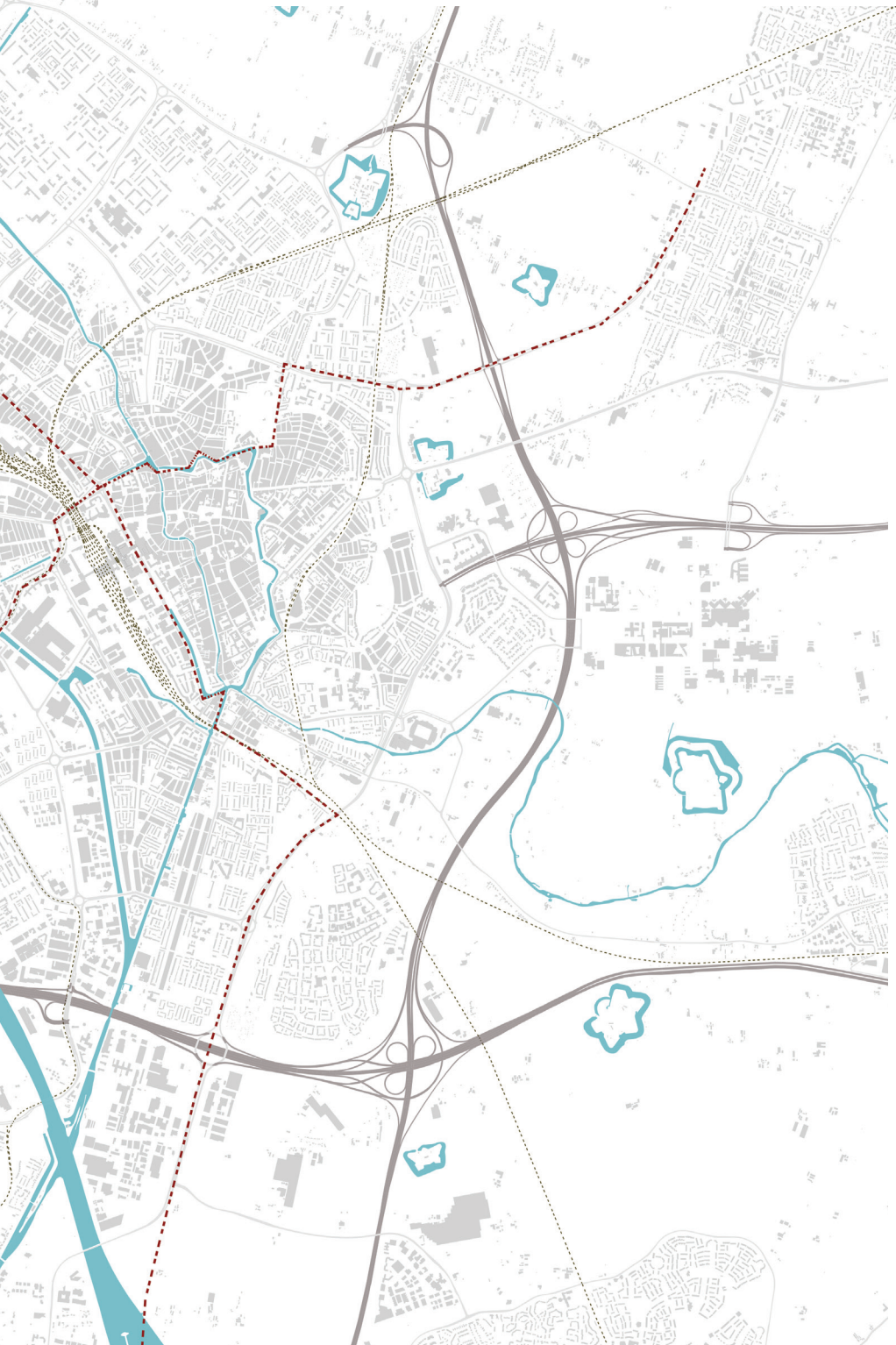
GREEN-BLUE INFRASTRUCTURE FOR A RESILIENT AND HEALTHY CITY



WAGENINGEN UNIVERSITY

ATELIER 2014 - UTRECHT

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GREEN-BLUE INFRASTRUCTURE FOR A RESILIENT AND HEALTHY CITY

CITY OF UTRECHT, THE NETHERLANDS

Edited by Rosanne Schrijver
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Wageningen University

FOREWORD

BY INGEBORG THORAL ADVISOR FOR SPATIAL QUALITY TO THE PROVINCE OF UTRECHT

This publication offers a perspective on sensible use and optimisation of the green-blue structures in the City of Utrecht. It has the ambition to develop the city into a healthier and more resilient structure. You will find in this book an account of the atelier and experiments that have been conducted at Wageningen University (WUR), which have been initiated by me in 2013-2014 as advisor on spatial quality for the province of Utrecht.

My aim in effectuating this project was to research the opportunities and values of green-blue structures and then to bring these to the fore in my activities for the province of Utrecht. This student-atelier offers us a large body of research and visual material, that is not just of interests for those involved in this temporary cooperation, but also for others involved in the maintenance and development of spatial quality in this region.

The city of Utrecht also cooperated in this planning and design-oriented research, which has increased the sense of reality, without limiting the creative freedom of the students. I offer you with pleasure the results of the atelier, that offer diverse planning instruments for the creation of a climate proof and resilient urban environment. I hope it helps to create awareness for the value of green-blue interventions in our lifeworld.

This publication is topical and relevant as these green-blue structures offer a great potential for exchanges between city and surrounding countryside, for plants, animals and for the city-dwellers. In the densely built-up area of the province of Utrecht it is indispensable to forge a coherent network of green-blue connections and to connect local initiatives with ambitions on an urban and regional level.

In doing so we will build cities that are liveable and sustainable, that will be attractive to the next generation as well.

Deze publicatie biedt een perspectief op het zinvol benutten en optimaliseren van de blauw-groene structuren in de stad Utrecht, met als ambitie om te transformeren naar een meer veerkrachtige en gezonde stad voor de toekomst. U treft in dit boekwerk een weerslag van het atelier en de experimenten die binnen de Universiteit Wageningen (WUR) zijn uitgevoerd en die ik in de periode 2013-2014 als adviseur ruimtelijke kwaliteit van de provincie Utrecht heb geïnitieerd.

Mijn doel bij het tot stand brengen van dit project was om de mogelijkheden en waarden van groen-blauwe structuren op regionaal en stedelijk niveau te laten onderzoeken en vervolgens binnen mijn activiteiten voor de provincie Utrecht een positie te geven en onder de aandacht te brengen.

Dit studentenatelier biedt daartoe een grote hoeveelheid aan onderzoeks- en beeldmateriaal, die niet alleen voor de betrokken van ons tijdelijke samenwerkingsverband, maar ook voor anderen die zich bezig houden met behoud en ontwikkeling van ruimtelijke kwaliteit interessant zijn.

Bij dit ontwerpend onderzoek was ook de gemeente Utrecht als partner betrokken, wat de realiteitswaarde van de plannen verhoogde, zonder beperkend te zijn voor de creatieve vrijheid van de studenten. Ik toon u dan ook met plezier de uitkomsten van dit atelier, die diverse planningsinstrumenten biedt voor een klimaatbestendige en veerkrachtige leefomgeving. En helpen om bewustzijn te creëren voor de waarde van groen-blauwe interventies in ons leefdomein.

Deze publicatie is uitermate actueel en relevant aangezien groen-blauwe structuren een groot potentieel in het faciliteren van stad-land uitwisselingen hebben, zowel voor plant, dier als mens.

In de sterk verdichte omgeving van de provincie Utrecht is het noodzakelijk om de groen-blauwe verbindingslijnen tot een samenhangend netwerk te smeden en om lokale initiatieven met een groen/blauwe en recreatieve component, te verbinden met de ambities op stedelijk en landschappelijk niveau.

Hiermee bouwen we aan leefbare en duurzame steden, die ook voor de volgende generatie nog aantrekkelijk zijn.

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INTRODUCTION BY RUDI VAN ETTEGER

The atelier landscape architecture and planning is a joint project in which all 4th year students of the Master in landscape architecture and planning at Wageningen University cooperate. The topic and location for research, planning and design in the Atelier changes every year. This year the topic was the improvement of the green-blue infrastructure in and around the city of Utrecht and its contribution to the ecological, recreational, hydrological and microclimatic functioning of the city.

A permanent characteristic of the atelier is the fact that every year there is a real-world commissioner that asks us to research and develop the project. This year that commissioner is the Spatial Quality advisor of the province of Utrecht. In 2013, the province of Utrecht has appointed ing. I. Thoral, landscape architect and urban designer, as its advisor on matters of spatial quality. The 'spatial quality advisor' has an independent position, which means that she can give her advice either on the request of the provincial authorities or on her own initiative. The province Utrecht and city of the same name are located in the centre of the Netherlands. The province is the smallest of all 12 Dutch provinces. It belongs to the densely populated Randstad, in the West of the Netherlands. The capital of the province is the city of Utrecht. With 330,000 inhabitants, Utrecht is the fourth largest city in the Netherlands. It has a central position in the national network of rails and roads. The green-blue infrastructure connects the city of Utrecht and the surrounding countryside of the province of Utrecht and provides a vehicle for the advisor to develop a closer cooperation between the city and the province.

The atelier takes places within Wageningen University, thus wider academic goals also need to be served by the project, in terms of its role in the education framework and as a catalyst for research. Positioned within this context, it is clear that the project is of a strategic, rather than an operational nature. Planning and design proposals are provided to open a conversation between parties. It is not necessary that the proposals will immediately be implemented. The intention is to stretch the imaginations and expand the space for thinking of urban and provincial professionals and practitioners, including non-government stakeholders. The research, and the planning and design proposals address the scale of the city and its environment, which is mainly dealt with in the group phase in the first 8 weeks of the project. But the proof of any pudding in planning and design is in activating changes on a smaller scale in peoples life-world, their immediate surroundings, for landscape architecture students this level has been addressed in the individual phase in the last 4 weeks of the project.

For the planning and social-spatial analysis students the level of research depends on the chosen topics. To complicate matters a little more for the students, the project has also simulated post-modern planning conditions, in which the role of governments and citizens in bringing about changes

in the environment are critically examined. Each group has developed a “top-down”and “bottom-up” approach. However it must be clear that no project in the city can be done without involving both parties.

This year, the thematic framework that forms the umbrella for the development of various sub-themes to be studied in a regional context, can be summarized as “green-blue infrastructure.” This topic is approached from a landscape architectural and planning perspective and is specifically applied to the territory of the city of Utrecht. The choice for green-blue infrastructure is motivated by the fact that it contributes significantly to a resilient and healthy city in the context of climate adaptation. In meetings prior to the Atelier, researchers and teachers of WUR and the commissioner advising the Province of Utrecht have negotiated the exact content of the task at hand. For the advisor to the Province of Utrecht, the focus is on the green-blue infrastructure. She sees various benefits of improving this infrastructure, including the cities’ micro-climate. She needs the atelier to underpin an advice which will encourage the Provincial Board to cooperate with the city on improving the vitality of the green-blue infrastructure.
The city of Utrecht was willing to cooperate in the project and to be the object of study. They have shared with us their own policies and pre-occupations for our consideration. For the WUR, the chair-group of landscape architecture this year has the lead in developing the theme for the atelier. Within the research program of the group the study of urban micro-climates represents a topic, that they wish to place higher on urban agendas. Internationally, the WUR is building a profile with respect to this topic. There is awareness at WUR that green-blue infrastructure play an important role for the improvement of microclimates. This is the complex ‘playing field’, reflecting the complexities of real-world assignments, that this year’s ‘creative minds’ of the Atelier have operated in.

From an academic point of view the emphasis in the project was on issues of urban thermal comfort. Like in other cities with moderate climates, the urban climate in the Netherlands is likely to change as a consequence of urbanisation and global climate change. Cities will increasingly have to deal with urban heat problems as well as consequences of drought and extreme precipitation. Climate projections in The Netherlands suggest that by 2050, the number of heat waves will be significantly increased. The number of warm summer days with air temperatures above 25 Celsius will be tripled.

Urban heat, often called the urban heat island effect, negatively affects human well-being and the thermal comfort of cities’ inhabitants. Internationally, heat waves have been correlated with rises in urban mortality. During the heat wave in 2003, the excess mortality in France was 15.000. In the Netherlands in the summer of 2003, 1400-2200 deaths have been associated with heat. Elderly people, people with lung disorders and with cardiovascular diseases and young children are the most vulnerable groups. Urban heat also reduces

inhabitants' quality of sleep, work productivity and the ability to concentrate.

Thermal comfort is defined as peoples' satisfaction with their thermal environment, either indoors or outdoors. In contrast to people indoors, pedestrians' outdoors are directly exposed to solar radiation, wind, humidity and the ambient air temperature. Outdoors, the built environment is the most important factor affecting peoples' thermal comfort. People seek the shade of trees or buildings on hot summer days; they might seek a breeze in some open spaces or look for a place to have a swim and cool down. In contrast, in winter time, one might look for hedges or walls to find protection against cold winter winds and catch a glimpse of sun. Urban designers and landscape architects, therefore, should take microclimatic conditions in the seasonal and diurnal cycle into account, when designing outdoor urban spaces in the built environment. Well-designed green-blue infrastructure can play an important role in mitigating urban heat and improving inhabitants' well-being and thermal comfort.

Green infrastructure has the ability to effectively reduce urban heat and improve environmental comfort at various scale levels. Urban greenery, such as street trees, green front gardens, parks or urban forests, ameliorates real and perceived thermal conditions for pedestrians outdoors and indirectly indoors. In summertime, shading and evapotranspiration are the dominant processes of greenery that improve the urban microclimate. In wintertime, however, tree canopies can cause reduced radiation in outdoor spaces and nearby facades of buildings. On the other hand tree canopies can give rise to the so-called 'tunnel effect' in main traffic roads, meaning that wind circulation of car-polluted and fresh air is limited. Blue infrastructure consisting of various bodies of water in the urban environment is generally considered as another element of cooling during warm summer days, such as sparkling fountains or swimming pools, which attract citizens seeking comfortable outdoor places. However, water bodies may also be sources of heat within the built environment, as they have a relatively large heat capacity compared to their surroundings. Those few examples demonstrate that designing climate responsive green-blue infrastructure is a challenge. Moreover, various other spatial-temporal variables need to be taken into account. Designing climate responsive green-blue infrastructure is not an urban challenge on its own. It can easily be integrated in ongoing (re)-design projects in the urban environment. This process of integrating climate adaptation measures into other policy areas or projects is often called mainstreaming. The mainstreaming of climate adaptation measures into on-going renewal or re-design projects is an efficient way of starting transforming our cities into resilient cities for the future. A key challenge in this Atelier is to develop a vision that combines improving the spatial, recreational and ecological qualities of the green-blue infrastructure of the city of Utrecht and its surroundings, with improving the urban microclimate conditions at various scale levels.

The atelier students have investigated the characteristics of the green-blue infrastructure of the city of Utrecht, explored its problems, identified opportunities for improvement and found solutions to strengthen the relationship between the built environment and the surrounding countryside. For practical reasons, the city has been divided into four

geographical areas, each defined by the presence of waterways that cross the city (see map 0.1.).

Several people have contributed to teaching of the atelier this year. The General Coordinator of the atelier was Ir. R. van Etteger MA, whom together with Dipl. Ing. W. Klemm also coordinated the theme. Dipl. Ing. W. Klemm and Ir. L. Kleerekoper (TU Delft) contributed as microclimate experts. Different academics from WUR, TU-Delft and UU have contributed through lectures. As landscape research planning and design experts / tutors of the groups the following people contributed Ir. R. van Etteger MA (LAR) ; Dr. H.J. de Haan (GEO) ; Dr. M. Buizer (LUP) and Dr. S. Stremke (LAR).

1. Vecht (with branches like the Klopvaart in Overvecht)
2. Kromme Rijn (with branches like the water along Lunetten, de Singel en Nieuwegracht)
3. Amsterdam-Rhine Canal, Northern part (with Merwedekanaal and Leidse Rhine)
4. Amsterdam-Rhine Canal, Southern part (with Merwedekanaal, Vaartsche Rhine and Kruisvaart)

fig. 0.1. The city of Utecht is devided into four geographical areas, each defined by the presence of waterway that cross the city. This maps shows the four quarters

The following students have participated in the atelier:

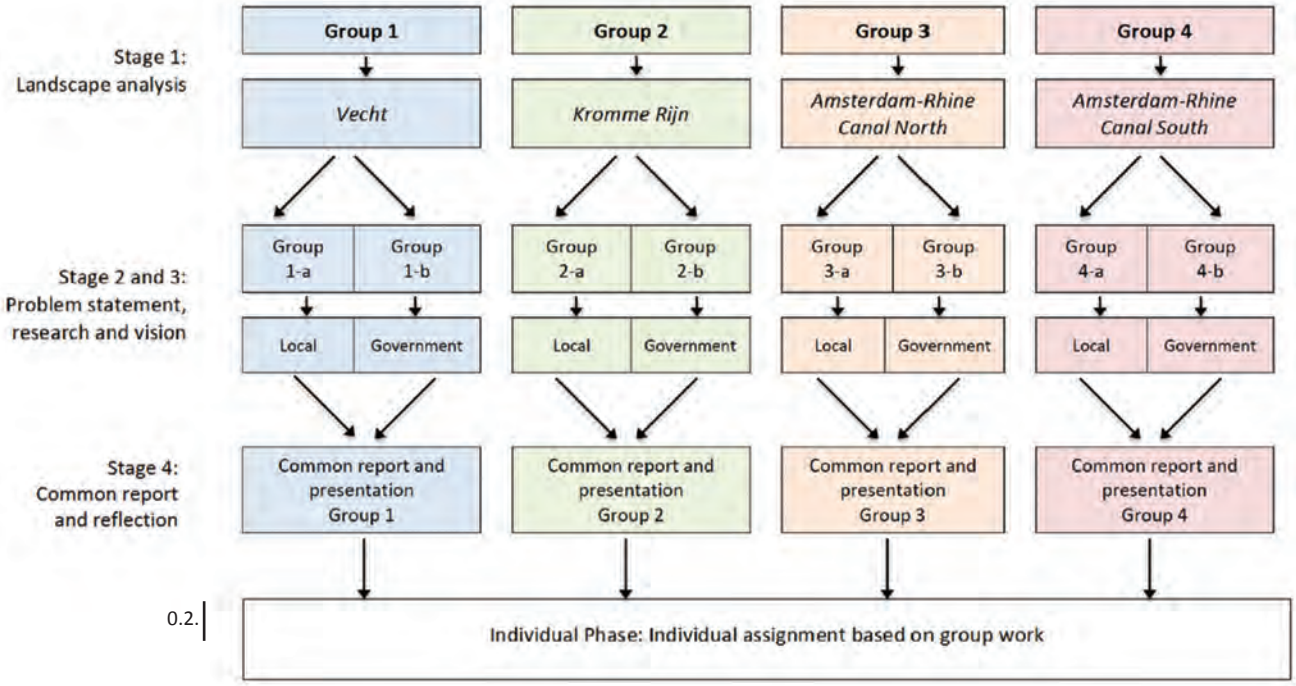
Baardewijk, Matthijs; Lund, Martha Andrea; Merzel, Michal; Neefjes, Jules; Park, Yesol; Hu, Weiye; Choi, Changsoon; Saetre, Dina Fonn; Takeda, Miyo; Heeswijk, Tom van; Oravec, Roman; Szumilas, Hanna; Peters, Vincent; Barna, Theodor; Reijn, Mariska van; Yang, Xiao; Cockx, Iris; Dings, Ludo; Heijden, Gilles van der; Dijkman, Haryt; Gorissen, Frank; Gao, Zhonglin; Hauglin, Sigrid; Marchese, Leonardo; Kucerova, Lenka; Zuiden, Marieke van; Knevels, Kevin; Noest, Marit; Liu, Yuche; Wouw, Roel van der; Tasyara, Fisqa; Schrijver, Rosanne; Smits, Sander; Hollemans, Daniel; Hetem, Vera; Staals, Koen; Pristiwati, Garika Ujianik; Lia, Federico; Dijk, Katie; Sauren, Arjan.

The result of the group phase are visions for the planning and design of a strong green-blue infrastructure, including strategies and tools. Individually all students have chosen a clear design project, a planning issue and/or a research topic within one of the green-blue infrastructures through which they develop a concrete contribution for the green-blue city of Utrecht.
For each larger group of 10 students, there were two subgroups with each a different orientation: one subgroup taking local, private and community initiatives to improve the local environment as a starting point, the other subgroup taking government plans and initiatives as a starting point. This does not mean that you are going to implement these plans and initiatives, but you use them as a source in your roles as, respectively a planner/ designer who is adopting a 'bottom up perspective, or a planner/designer who is adopting a more centralist approach. fig. 0.2.

ENDRESULT

The commissioner will use the results of the Atelier in her communications with the Provincial authorities and to the general public. The end result of the atelier is this book which gathers all the groupwork and selected individual projects. Hopefully, the outcomes of the Atelier will contribute to sustainable and resilient solutions for the city of Utrecht. We wish you pleasant reading.

fig. 0.2. The work process can be represented in the following figure


Stage 1:
Landscape analysis
Stage 2 and 3:
Problem statement,
research and vision
Stage 4:
Common report
and reflection
Group 1
Group 2
Group 3
Group 4
Vecht
Kromme Rijn
Amsterdam-Rhine
Canal North
Amsterdam-Rhine
Canal South
Group
1-a
Group
1-b
Group
2-a
Group
2-b
Group
3-a
Group
3-b
Group
4-a
Group
4-b
Local
Government
Common report and
presentation
Group 1
Common report and
presentation
Group 2
Common report and
presentation
Group 3
Common report and
presentation
Group 4
Individual Phase: Individual assignment based on group work

0.2.

1. ESSAYS

fig. 1.1. Impression of water in the centre of Utrecht regarding its importance towards the development along water

CENTRAL PLANNING OR FACILITATING BOTTOM UP PROCESSES IN RELATION TO URBAN MICROCLIMATE AND CLIMATE CHANGE

RUDI VAN ETTEGER, LANDSCAPE ARCHITECT, WAGENINGEN UNIVERSITY

In the recent history of planning, designing and maintaining green in the city of Utrecht there has been a shift in balance from centralized planning by the municipality towards a decentralized system. In this system the municipality facilitates the execution of ideas as proposed by citizens in the wijkgroenplannen (plans for public green for an urban quarter). Though relatively small in the context of the full urban green program, this system is applauded as it involves the public in the planning and design and management of public green. It invigorates the 'public' in public green. It constitutes a shift away from 'municipal' green that the public does not care for. It is also a good way to connect local politics with the needs and wishes of the citizen-voters. The question for this essay is how this shift interacts with the adaptation to increased temperatures in urban areas and the adaptation to climate change.

Over the past 20 years there have been major changes to the urban fabric of Utrecht. The building of the Leidsche Rijn quarter has nearly doubled the size of the build-up area. Internal changes have densified the existing urban fabric. Measurements of temperatures in the city show a difference of 6 degrees between temperatures outside of the city and in the city core, the Urban Heat Island Effect (Klemm, forthcoming). Beyond these changes in the fabric of Utrecht, changes are expected in global climate. In the recent KNMI'14 scenarios the exact change differs per scenario, but in all scenarios the summers do get hotter. This will increase the numbers of days where temperatures in the city, fortified by the Urban Heat Island effect, will turn uncomfortable for many and will affect the health of vulnerable groups like the young and the elderly. If we want to adapt our cities in a way that they become more resilient to deal with these extreme temperatures, we will have to start now. The trees that we will need to cast their shade in the future, need the coming years to grow and be ready by that time. The Wilhelminapark, which is a refuge on hot days for urban dwellers, was planted over 100 years ago.

The change of climate is very slow and sometimes hard to distinguish within the natural variations of everyday weather. For the majority of citizens in the city it is not yet their main concern. But if we do not make the changes to the city to prepare, the response of the citizens will be a consumer's choice. When the heat waves come, they will buy an air conditioner and add to the problem by increased energy use and dumping inside heat in the outside spaces. Measures have to be taken to promote a healthier response, which includes the greening of the city to dampen the urban heat island effect, the greening of facades in dense urban fabric and to promote connections to the cooler green environment around the city. These measures are not yet purposefully included by citizens in the wijkgroenplannen, as for them the sense of urgency is lacking. And yet some of the measures that are part of the wijkgroenplannen can add to urban resilience. Having pocket-parks can provide shade outside and shelter houses from the worst of the summer heat. On the other hand plans that ameliorate the urban climate actually

do have an instant appeal to the general public as they typically involve the greening of their lifeworld. For the municipality it is a matter of selecting and promoting those parts of the proposed plans that do add to urban resilience and awarding those plans with the funds for execution. Further encouragement of building connections across the different urban quarters can also be arranged by making it an explicit criterion for assigning funds to particular projects.

The proposals by Yesol Park for the neighborhood next to the Pieter Baan Centre show how urban greening can add to the building of a community, even in areas where people feel isolated between their neighbors. The plans of Changsoon Choi proposes developments to reinforce the community of Leidsche Rijn. But in some places where public participation is lower and "ownership" of public space is not in the forefront of people's concerns, the municipality can also take the lead in projects as shown in the proposal by Federico Lia.

For the municipality that part of the money which is devoted to developing the green structure plans can also first be devoted to those parts that add to urban resilience. It is mainly line elements that need the touch of the municipality. The Vecht and the Kromme Rijn are obvious candidates. An example of another line is shown in the plans of Mariska van Reijn for the Leidsche Rijn. But also the abandoned track of the Oosterspoorbaan has potential as a green connecting element as shown in the plan by Miyo Takeda. Developments along the Amsterdam-Rijnkanaal are visualized in the project by Rosanne Schrijver.

Another way to cope with urban heat is to find a cool place to have a swim in the water. The Maarseveense Plassen provide an excellent opportunity for that. Cool and clear designated cycle routes for instance along the Vecht to reach them should be promoted. But also closer to the heart of the city there are opportunities to swim. With the dredging of the Vecht and the improvements of water quality over the past and coming years the Vecht could also itself provide swimming opportunities. The changes in the Zandpad area further opens perspectives for the development of ecological improvements of the Vecht as proposed in the plan by Sigrid Hauglin, but also for opportunities for an urban swimming facility. The plan by Vera Hetem shows a more urban treatment of the start of the river Vecht close to the city center.

The changes in climate will not just affect the temperatures. Changes in the pattern of precipitation are also predicted. The project of Tom van Heeswijk proposes a change in the urban fabric to deal with the expected heavy rain events that accompany the increased heat. The monumental As van Berlage in the quarter of Ondiep is changed into a situation which can deal with major rain-events and yet thoughtful of its present qualities. The design will add more variation to the existing structure, thus turning it into an even more attractive space.

Specifically in the Centre of Utrecht the room for changes in the urban fabric to improve urban

resilience is small as space is limited, commercial interests are high and the monumentality of many buildings limits changes. The project of Vincent Peters therefore proposes an experimental approach using the technically innovative idea of the solar chimney on the market square of the Vredenburg. The project of Kati Dijk plays into another sensitive commercial area the heart of Leidsche Rijn where due to the financial crisis valuable ground has been lying bare for nearly 20 years. Stimulating temporary use could turn this area over to use for the citizens rather than just accumulate speculative profit.

The project of Ludo Dings deals with the inheritance of functionalist planning of the last century. The separation of functions of work, living, recreation etc. has positioned the industrial area of Lage Weide, which once was at the edge of the city, into a more central position. As a mono-functional area it is now blocking through traffic. Furthermore work processes that are interesting for a certain part of the public are hidden from sight. The project offers a way to make the area accessible and attractive.

A specific problem for the city of Utrecht, caused by its central position in the infrastructure networks of the Netherlands is the stranglehold of the city within all manner of infrastructure lines. The unattractiveness of many crossing points between green-blue connections between city and surroundings discourages healthy responses to climate change, which includes visits to cooler areas surrounding the city. To promote these healthy responses the connections between the inner city and the surroundings must be improved. Opportunities like the moving of the Pieter Baan Centrum must be used to improve the bottlenecks in the existing route along the Kromme Rijn. But on a larger scale the municipality should be helped by the provincial Board and even National government to improve connections across major infrastructure. As the interests of good infrastructure around Utrecht go above municipal affairs, so the adverse effects of the infrastructure should be dealt with on higher scale levels. For in all directions, as visible in the groupwork visions for the quarters of Utrecht, there are major infrastructural barriers that must be crossed. This should be changed in a manner that not just allows for passage, but actively invites a trip to the surrounding countryside.

The different projects on the group level as presented in this book show a nuanced look at the role of the different parties involved in planning, designing and maintaining public green and its role in ameliorating the effects of urban heat and climate change. Some of the major constraints caused the infrastructural stranglehold of Utrecht will need to be dealt with by the municipality, in cooperation with the province and the national government. Also the through-going green blue connections within the urban fabric will need the attention of the municipality. But a large part of the land within the city is privately owned and if the owners of this land can be activated through wijkgroenplannen to contribute to the improvement of urban resilience, than that could really make a difference.

ATMOSPHERIC GEO-ENGINEERING: MEDIUM AS IMMATERIAL ARCHITECTURE

HENK DE HAAN, CULTURAL GEOGRAPHY GROUP, WAGENINGEN UNIVERSITY

> *Climate in architecture is enlisted not only for protection from severe weather and to reduce the need for energy but also to reduce the distance between people and their surroundings. In this way, climate can be seen, felt and experienced in architectural spaces. It stimulates peoples' senses - the cooling effect of the wind, the warmth of the sun, the silence and coolness of the underground or the smell of algae at low tide. Sensory experiences typical of the outdoors are key to this idea. These experiences in particular are those that enable that make architecture to stimulate and surprise, as well as to become a source of unprecedented depth.*
> *(Krautheim et al. 2014, p. 7)*

This year's theme of Wageningen University's Atelier Landscape Architecture and Planning was green-blue infrastructures in the city of Utrecht. Green-blue infrastructures are considered as multifunctional landscape assets, significant for biodiversity, hydrology, recreation and microclimate. The research and design and planning proposals presented in this book show the rich potential for improving the existing urban landscape from this perspective. The students have mobilized almost all available planning and design tools to contribute to Utrecht's future as a more resilient and healthy city, where is it pleasant to live and work. The results presented in this book show that the students' imaginations are especially captured by cooling and shading the built environment on the one hand, and by recreational access and the use of green structures and waterfronts on the other. The way in which students approach green infrastructures in their projects shows a strong inclination towards human-centered design and planning approaches, in which an ecological and hydrological understanding of the landscape is never neglected. People's thermal comfort and recreational needs are central, but the methods and visions are characterized by an integrated landscape approach.

What follows in this essay are some thoughts provoked by working in this project as a supervisor. I quickly began to realize that designing with natural elements such as the climate, trees, water and vegetation could be even more promising than what we have achieved during the short duration of the atelier. What if we could broaden our perspective even more, and incorporate the human senses and the natural world to an even fuller extent?

In this short contribution I will raise some phenomenological and ephemeral aspects of urban atmospheres. I am particularly interested in the question of how the design and planning of urban microclimates can be positioned in broader architectural and landscape debates. Modifying outdoor atmospheric conditions, I will argue, implies much more than looking at thermal comfort and green spaces. First of all, the atmosphere in a meteorological sense goes beyond wind, temperature and sunlight. It may be useful to think about the outdoor conditions in the wider context of weather, seasonality, and daily rhythms. Secondly, the focus on how people cope with microclimates

is often framed in terms of escaping undesirable physical effects on the body, thus ignoring a broader architectural paradigm, which views atmosphere as the multisensory surroundings, affecting people's emotions, sense of delight, mood, and comfort. It may therefore be interesting to explore in a concise way how the two meanings of atmosphere may be connected, and how this may result in a more-than-representational approach to human outdoor comfort. This essay is just intended to stimulate the search for the boundaries of urban climate design, and raises therefore more questions than providing answers.

Architecture is basically about building shelter. Human beings are capable of adapting to a wide variety of physical and climate conditions exactly because they possess the skills of constructing microenvironments that protect them from the weather and other outdoor conditions. Enclosing space by simply using the fundamental architectural components of walls, roofs, floors and openings, creates the necessary boundaries between inside and outside. The inside temperature, light, airflows, humidity, smells and sounds can be controlled. Enclosing a void by using natural or transformed raw materials is the essence of dwelling. Although indoor spaces have a much broader function than just shelter, it is important to stress that the micro-atmospheric condition inside the dwelling is the most important objective of architecture. We often think about architecture as the activity and result of using solid building materials and surfaces. Most popular and professional discourses about architecture are about the attractiveness of facades, the beautiful shapes, functionality, or ingenious construction technologies. Architecture as such is strongly associated with visual, haptic and functional qualities. But what architecture actually creates is an enclosed void, a micro-atmosphere. In vernacular architecture and throughout the history of architecture as a profession this has been widely acknowledged and is part and parcel of both implicit and practical knowledge (Weber & Yannas 2013; Heath 2009). According to Oliver (2006), vernacular architecture is based on "the inherited knowledge of the natural environment of climate, topography, seasonal variation, natural hazard, suitability of site" (p. 210).

From indoor atmospheric control as designing the void, it is a small step to designing outdoor climate conditions. This has long been recognized as a crucial element in vernacular architecture and settlement planning. Depending on the local climatic and natural conditions, people have always used street layout principles, natural canopies and screens, walls and water effects to create bearable conditions in outdoor spaces surrounding the dwellings (Moll & Ebenreck, 1989; Oliver 2006). Outdoor climate design is in this sense an extension of dwelling strategies. According to Stasinopoulos (2013, p. 12), for instance, the vernacular settlements of Santorini (a Greek Island) highlight "From minute building details to entire neighbourhoods, from man-made structures to natural formations . . . not only the power of nature but also the traditional response to natural conditions." Recent concepts such as eco-cities and green urbanism are based on such reinvented traditions, and now form the core of many urban planning and design principles (Becker & Schmal 2010).

Climate adaptation and microclimate design are by now well-known ways of modifying the effects

of climate change through human intervention. The interaction between climate, the built and natural environment and the human body results in urban microclimates and differential experiences of thermal comfort. Climate change, causing increasingly serious problems with heat islands, has become a topic of research and intervention among a variety of disciplines, with urban planning and design, and landscape architecture at the forefront. While the indoor microclimate of buildings has long been a major theme among architects, the control of outdoor climatic conditions is only recently an imminent topic, however (Brown & Gillepsie, 1995; Littlefair et al., 2000; Gartland, 2008; Brown, 2010; Errell et al. 2011; Brophy & Lewis, 2011; Almusaed, 2010; Lenzholzer, 2013; DeKay & Brown, 2014; Garcia-German 2014).

While climate and local weather conditions are traditionally prominently present as environmental variables to be taken into account in landscape architecture, the effects of climate change on ecosystems and built environments, and how blue-green infrastructures may contribute to moderating these effects have been virtually absent until recently. Microclimate as a programmatic ambition for site design rather than an environmental condition has until recently been a neglected area of the landscape design literature and practice. In his recent introduction to landscape architecture, Ian Thompson (2014), for instance, only mentions climate once in relation to increased risks of flooding. Even in his chapter on landscape and urbanism, the urban climate is not mentioned. While other recent introductions to landscape architecture (e.g. Starke & Simonds, 2013) do mention climate change and global warming, the focus is mainly on planning and designing for sea-level change, the inundation of coastal wetlands and flooding of urban areas. There is very limited attention to climate adaptation and design guidelines from the perspective of outdoor thermal comfort.

Landscape architecture has been quite slow in acknowledging climate change and its role in climate adaptation (Murphy, 2005; Waterman 2009). In 2007 Karl Ganser asked the provocative question “Is the current discussion about climate change causing a climate change in landscape architecture?” (p. 52). Waterman (2009, p. 8) was perhaps the first landscape architect explicitly to draw attention to designing microclimates: “Design can do little to change climate, but microclimates may be manipulated very effectively on the smallest of sites. Extremes can be moderated by the provision of windbreaks or by channeling cooling breezes. Water in any form can have a cooling effect in an urban space. Plants also have a strong influence on microclimates, providing shade, moisture and protection from wind. Every place has a different mix and the manipulation of microclimates makes for stimulating design work”.

Landscape architecture promises to lead the way in addressing current ecological problems. According to Fajardo (2014, p. 182), “landscape solutions to the issues of waste, urbanization, mass transit, devastated cities and disaster relief all offer tremendous promise for a sustainable urban environment.” In the trendsetting volume Becoming a landscape architect, Koepke (2009, p. 229) claims that the biggest problem facing the world is climate change, and that “landscape architects play a huge role in trying to mitigate and make adaptations to

climate change, based on how we impact people's movement, and depending on how we do design and planning" (p. 229). In his recent book, Brown (2010) asserts that the most important responsibility of a landscape architect is "to design environments that will create microclimates that are within people's range of tolerance so that people using the space will be thermally comfortable or will be close enough to being comfortable" (p. 13). Microclimate, he argues, is the most important issue in designing outdoor spaces – more important than visual aesthetics or the ecological function of a landscape.

Having arrived at this point, and with Brown's statement in mind, it is perhaps time critically to consider the outdoor climate design paradigm. Some of these critical points are raised in debates on how people experience temperature, which may invite us to think beyond thermal comfort and towards atmospheric experience. In 1995 Brown and Gillepsie argued that "conditions that are thermally comfortable for one person are likely to be thermally comfortable for most other people" (p. 40). The microclimate has the same effect on people, independent from spatial or personal variations. In a 2007 study Nikolopoulou, shows that physical parameters in open space do strongly influence thermal comfort. However, these parameters account for only 50 percent of actual thermal sensation. She argues therefore that psychological adaptation seems to be as important in people's thermodynamic interaction with the environment: "It is clear that it is inadequate to design open spaces with regard to thermal comfort solely on the basis of a physical model" (p. 117). Based on her research, and others who apply a more adaptive approach, one may conclude that thermal sensation is but one of the many ways in which people may react to atmospheric conditions, and to their environmental surroundings in general. Indeed, experienced temperature may be influenced to a greater or lesser extent by aesthetics, sociability, activities, and location. When outdoors people are in touch with the environment in multisensory ways. The body is more than a metabolism reacting to temperature, wind, sun and humidity. It is exposed to a multitude of constantly changing material and immaterial stimuli that together contribute to fluctuating body/mind levels of comfort and delight. Thermal conditions are important but how people feel and act can only be understood by broadening the narrow meteorological concept of atmosphere to a phenomenological, ephemeral concept. This implies a shift from microclimate design to weather-atmospheric-experiential design.

What, then, is this 'other' meaning of atmosphere? Atmosphere has two different meanings. On the one hand it concerns the layer of air that surrounds the earth. In that sense we most immediately experience it as the air we breathe and as the outdoor weather conditions. Wind, humidity, light, temperature, clouds, mist are atmospheric conditions that surround us when we are outside. For human beings this atmospheric layer is also the medium that affords movement and perception: "it allows us to move about – to do things, make things and touch things. It also transmits radiant energy and mechanical vibration, so that we can see and hear. And it allows us to smell, since the molecules that excite our olfactory receptors are diffused in it." (Ingold 2011, p. 22). On the other hand, atmosphere is a concept that refers to ambience, mood or character of a setting or a landscape. According to

Pallasmaa (2014), the environment is not merely characterized by visual quality. It is ". . . . a complex fusion of countless factors that are immediately and synthetically grasped as an overall atmosphere, feeling, mood, or ambience. Atmosphere is the overarching perceptual, sensory, and emotive impression of a space, setting, or social situation. It provides the unifying coherence and character for a room, space, place, and landscape, or a social encounter. It is 'the common denominator', 'the colouring' or 'the feel' of the experiential situation" (pp. 20-21).

It is that mythical feeling that is aroused by seasonality, the time of the day, the weather, the cover of the earth's surface, including the built environment, vegetation, water and so on. This 'landscape beyond land' (Árnason et al. 2012), the assemblage of clouds, visibility, the reflection of light on trees and architectural objects create an ever-changing sphere has a strong effect on people's emotions, mood and environmental comfort. Especially while walking, people feel the ephemeral landscape: "The character of the walk is such that it is thoroughly mediated through the effects of the weather and the qualities of the light on perception. The landscape alters according to the time of the day, the day of the week or the months and seasons of the year, whether the rain falls, the sun shines or the wind howls, whether it is misty or clear. All these affect how I sense and relate to the qualities of the landscape" (Tilley 2012, p.16-17). When people enter a street, a park, or view a landscape panorama, they sense the atmosphere in a split second. This atmosphere, like local climate conditions, is not entirely 'natural', especially not in the urban context. It is the result of conscious or unconscious design and can be subject to impressive modification, especially with respect to nightscapes. Atmospheres are by definition co-produced by human and non-human forces.

In practice architects and landscape architects do not seem to be very conscious of the atmospheric impact of their design. Landscape architects seem to ignore a landscape concept that takes atmospheres seriously. My content analysis of dozens of landscape architecture books reveals that the word 'atmosphere' is frequently used to describe a landscape, a garden or a natural setting. Beyond such a descriptive notion, it lacks any analytical or conceptual quality. What it would mean to design atmospheres, or how people feel an atmosphere, is not at all part of the landscape architectural discourse. Atmosphere seems to be more or less the same as character or spirit or sometimes identity. It refers to something that we know (homely), a style (baroque, formal), a mood (relaxed, mysterious, peaceful), or aesthetics.

Weather in landscape design is seen as an atmospheric condition that has an effect on plants, soils and materials. It is a factor to take into account in engineering a site, in planting design, and other practical design questions. The question of how to integrate weather in all its fascinating manifestations into landscape design is a non-issue. There is little about how to design with light and shade, the sounds of the wind and water, the smells and colors of plants and earth, the reflection of light on materials, or the rhythm of the days and the seasons. Apart from some scanty literature about lighting design in parks and gardens (Moyer 2013) there is only occasional discussion of how

to create an outdoor atmosphere with natural ethereal materials, especially using design tools that enable people to fully experience the weather as something to enjoy. Margolis & Robinson (2007), for instance, seem to be far ahead of current landscape architectural discourses in writing about the 'volatile'. The volatile, they argue, considers the immateriality of atmospheric phenomena: how substances without form can be constructed and choreographed. "Momentary, daily and seasonal cycles of ephemeral forces such as wind, rain, fog, clouds, light, sound, and temperature animate the landscape with a vast array of experiential conditions. These atmospheric phenomena define our immersed experience of a site; yet do so without occupying architectonic space" (Margolis & Robinson, 2007, p. 134).

One other mentionable example is Krautman et al's (2014) book on climate as an architectural instrument. In this book the authors argue that architecture is not just a means of protecting us against the climate (the classical view of architecture as shelter), but also as a way of bringing us back to it. The authors distinguish between 'hard' and 'soft' factors in climate design. The hard factors are associated with engineering and technical applications for cooling, shading, ventilating and so on, while soft factors concern the sensory experience, including "experience of space in relation to climate experience, atmosphere, incidence of light, wind, temperature, solar radiation, precipitation, air quality, taste, smell, sight, touch, hearing" (p. 11). An integrated approach to designing with climate "means striking a balance between technical issues (optimization) and emotional experience (realization), between hard-factors and soft-factors" (p. 12). Their book is mainly focusing on wind – one of the most unpredictable weather variables.

While extensive discussion of the recent literature on immaterial architecture and atmospheric design is beyond the scope of this paper, it is nonetheless important to draw attention to a number of authors. These include Hill (2006, 2012) on immaterial architecture and weather architecture; Zumthor (2006) and Borch et al. (2014) on architectural atmospheres; Schranz (2014) and Bohn (2012, 2013) on urban scenography; Ingold (2011) on medium as space and the weather; Boia (2005), Strauss & Orlove (2004), Fleming 2010 and Saito (2007, 2005), on weather aesthetic and culture; (Gumbrecht, 2012), Lehnert (2011) and McKim (2013) on the weather in literature and cinema; and many others (Hahn, 2012; Karandinou, 2013; Griffero, 2014; Pallasmaa, 2012). These authors might inspire landscape architects and planners to pay more attention to the fundamental role they play in designing urban atmospheres, thereby placing thermal comfort in a wider atmospheric context. According to Borch (2014, p 7) "One of the most significant recent trends is a turn towards (or perhaps a return to) atmospheric qualities in debates on architecture and urban space, as well as in practical architectural work." Hopefully, we will soon see something in landscape architecture and planning of what is already happening in architecture and urban design.

To conclude my contribution, which is actually confident about the capacities of landscape architects and planners to design atmospheres (without becoming a geo-engineer), here is a sobering (?) thought from Loidl and Bernard (2014)

for all designers: " . . . .in fact whatever designers dream up and realize, affects the formal perception of landscape architecture objects only to a limited extent: a number of other parameters, situative variables that the designer can scarcely influence, have their own very definite parts to play. These include the weather (rain, sun, dark clouds, broken cloud, heat, cold, storm, light breezes etc.), the seasons, the time of day (the incredible interplay of colors at sunrise, hard shadows at midday, the softness of twilight etc.) . . . . This list could be continued ad infinitum. All these parameters are 'simply there', are permanent and more or less simultaneously effective, but just in different forms, relating to each other at different force levels. Objects in landscape architecture simply have to let these parameters 'go over their heads', 'put up with them', sometimes 'suffer them'. But often it is precisely these unpredictable elements that can create moments of intense harmony in their interplay with a designed landscape" (Loidl & Bernard 2014, p 8-9).

CRITICAL SELF-REFLECTIONS ON OUR ROLE AS EDUCATORS AND COACHES IN THE ATELIER

BY MARLEEN BUIZER, WAGENINGEN UNIVERSITY

THE ATELIER – LEARNING FOR REAL

The Atelier is an approach to teaching asking MSc students to work together among the specializations of landscape architecture, land use planning and socio-spatial analysis. In the Atelier, students explore and address a 'real-world' issue. In 2014, the province of Utrecht acted as the commissioner for the Atelier students, asking them to elaborate a vision for the planning and design of the network of urban water and green spaces of the municipality of Utrecht, stretching across the city borders into its peri-urban surroundings, and with a view to improve the urban region's resilience. The university added to the assignment the task of improving the urban microclimate. This topic has recently gained some traction in the study of landscape architecture at Wageningen University. Combining these two tasks did not seem to be a too long shot, as there is an obvious relationship between urban land-use on the one hand and the microclimate on the other.

In this paper I will also talk about global climate change. Global climate change and the urban microclimate are referring to different phenomena and their relationship is contested among scientists. In 2007, the International Panel for Climate Change (IPCC) acknowledged that climate projections have not included urbanization (Christensen et al., 2007). Global climate change and changes in the urban micro-climate meet in these debates, and importantly, also through the measures addressing both of them. I will clarify further in this essay how this is the case.

FRAMING AND KNOWLEDGE CLAIMS

Framing reflects the idea that how societies view the environment is not simply given by nature (Miller 2000). Authors in the fields of policy analysis or social sciences generally use the concept of framing to point out that the definition of environmental problems is dependent on worldviews or the 'lenses' through which one looks at the world (Hajer 1995, Rein and Schön 1996).

How scientists/educators and their students frame problems and the knowledge claims that they make to put these problems on agendas, as well as how this is potentially problematic, are the topics of my contribution to this book. Science generally has it's own way of framing phenomena like climate change. With exceptions, it tries to formulate objective truths about the phenomenon, often by means of quantitative data. These truth statements about a phenomenon can be considered as one level at which knowledge claims are made. At another level, knowledge claims can be made about the effects of the phenomenon, that are implying that certain interventions are desirable. This is where truth and value often become entangled. In relation to the microclimate, we have seen elsewhere in this book the example of the number of premature deaths if the temperature in cities rises by a certain degree (Klemm, this book). The term that is often used to refer to changes in the microclimate, namely the "urban heat island effect" itself may also serve as an example of such a value-laden representation. Without having to repeat the measurements supporting it, the concept is intended to remind us of the microclimatic problems that cities have, and particularly to the urgency of interventions required. In principle, there is

nothing wrong with these processes of framing as they make the world that we live in "legible" (term by Scott, 1998). However, elucidating these processes of framing is useful because it may unveil ambiguities, or disclose alternative options for behavior, or explicate the moral dilemmas involved with a particular way of framing an environmental problem. This way, it is more likely that potential conflicts can become the subject of debate. After all, people may actually like to have more warm days and this may also provide for new opportunities for ecology or urban farming, for example.

In my contribution to this book, I am reflecting on the ways in which urban microclimate problems were framed in the Atelier, and I ask how the Atelier has articulated the microclimate as a problem that requires a firm integration into other policy domains and peoples' life worlds, that justifies the development of designs and plans focused on this problem. What are the implicit or explicit knowledge claims featuring centrally in some of the education and in several of the contributions in this book? Why should we remain critical towards these claims, and what does this potentially mean for how we try to facilitate these students' learning into the future, for them to be able to engage critically and effectively with the world's most urgent problems, with an eye for local contexts and global developments? What are the elements that, in my view, require more attention in the Ateliers to come?

First I will put these questions about the knowledge claims about the urgency of interventions in response to microclimatic changes into the broader perspective of urban environmental problems including climate change. I will focus particularly on the debate about climate change adaptation and mitigation. I do so because of the above mentioned relationship with urbanization, and because that is a debate that I know best. Next, I place the attention for the microclimate as it has been brought forward in the Atelier and this book in the context of this debate. I conclude with a discussion of what these reflections might mean for future Ateliers.

FRAMING THE URBAN MICROCLIMATE

Populations of cities across the globe are still growing and without measures to green their economies and rigorously adjust lifestyles, their environmental footprint will increase, perhaps more so beyond the cities' borders than within the cities themselves. At the same time, for people living in cities the effects of compounding environmental problems including climate change may become tangible in the form of air, water and soil pollution, floods, storms, drought and heat. Clearly, the seriousness by which environmental problems become manifest in cities is different in different parts of the world. Generally, the poorer people avail of fewer opportunities to confront extremes. However, it is not all doom and gloom. In response to common imageries of cities as enemies of nature, today we start to see cities being presented as urban landscapes harboring significant natural values constituting a source of potential solutions for several of the worlds environmental problems and a 'human habitat'. The International Architectural Biennale in Rotterdam is one excellent example of this optimistic approach (www.iabr.nl): it presents cities as a source for environmental solutions, with plenty of positive

examples where cities and their people and natures have become harmonious hybrids. This goes to show that the governing of climate change does not only take place at the global level but is also, and critically, an urban issue. In their study of urban climate policies, Bulkeley and Bettsil observed a shift from multiple small scale municipal voluntaristic climate mitigation oriented actions, towards a complex mix of 'municipal voluntarism' and networked forms of strategic action in which different types of actors collaborate (Bulkeley and Bettsil, 2013). Most of these actions, they note, focus on mitigation.

The alter ego of mitigation is adaptation, defined here roughly as the measures taken to cope with the effects of climatic changes. These efforts, according to Bulkeley and Bettsil in their evaluation of urban approaches to climate change, have mostly focused on the Global South. For quite some time, attention for adaptation was a taboo, as it was seen as taking attention away from the urgency of mitigation, and from the moral obligation of developing countries to take responsibility for their historical and present role in driving climatic changes. However, halfway the first decade of this century, different stakeholders including some scientists started to militate against this taboo. They argued that most developing countries were already suffering from the disastrous consequences of climate change, such as destructive drought and rising sea levels, and that developed countries, in addition to reducing their greenhouse gas emissions, needed to take responsibility to help developing nations to adapt to climate change so that its effects would not be so disastrous (Pielke et al., 2007).

This tells us that framing climate change mainly as a challenge for mitigation missed out on the other (painful) side of the story, namely that climate related problems in some of the cities in the Global South would become ever more threatening if the taboo on adaptation would not be broken.

The Atelier's framing of microclimatic problems in Utrecht needs to be considered in this light. The knowledge claims about the urban microclimate featuring in the preparatory course guide of the Atelier and in part of this book - namely that there is a causal relationship between changes in the microclimate, a decrease of thermal comfort and an increase of premature deaths of vulnerable people which is legitimizing significant interventions - have inadvertently lead to a concentration on adaptation. The potential of some of these adaptive measures to play a role in reducing greenhouse gas emissions (mitigation) might have found a wider agreement about the existence of a (multi-dimensional) "problem" and about the necessity of interventions and the allocation of resources for them.
Jasanoff emphasizes that knowledge becomes detached from meaning and there are "tensions [arising] when the impersonal, apolitical and universal imaginary of climate change projected by science comes into conflict with the subjective, situated and normative imaginations of human actors engaging with nature" (2010: 233). We can see these tensions in relation to the knowledge claims made in the Atelier, for citizens interviewed sharing their subjective and situated experiences with the Atelier students, hardly referred to changes in the micro-climate or the associated thermal comfort as problematic.

The main interventions proposed in this book to deal with microclimatic changes involve the promotion of different types of vegetation in the city, on roofs, along

facades or to 'soften' the heat-radiating hard surfaces of the city elsewhere. To take the task of improving the urban microclimate seriously, the students also proposed shelters for shade, edible bus-stops or green tramways, movable mini-gardens, but also more expensive measures such as the building of heat-chimneys to create a draught in one of the central market places of the city on hot summer days, or the redesign of a sewage and water system in one of Utrecht's wide tree-lined grassy avenues. Several of the students have interpreted their double assignment broadly, and tried to address more than one problem at the same time in their plans or designs. This is to be lauded, particularly when students did not simply displace problems to elsewhere in the city but confronted them in their own plan or design.

We could probably have encouraged this broad, integrated way of thinking further, so that the students' visions would also have considered what they could have achieved through their designs for global mitigation or other objectives reaching further than the local. That this did not happen has much to do with how the microclimate was framed as a problem for thermal comfort for urban inhabitants. This way, the individualistic local interests obtained priority over global responsibilities, in a context where local people hardly recognized the "problem" in the first place. In this context it is even more important to look critically into the knowledge claims circulating in the Atelier.

Moreover, the vegetative measures proposed in the Atelier tended to be framed as measures to improve thermal comfort of the urban inhabitants. This framing missed out on the other possible roles of vegetative measures, such as a) CO2 absorption by trees, b) green roofs or facades as energy-saving forms of insulation, c) the role that vegetation plays for urban biodiversity, d) the potential of growing edible trees and plants that reduces dependency on the (polluting) import of food into the city, e) the role of networks of green spaces to counterbalance motorized traffic networks and to support more sustainable forms of transportation.

Accentuating the mitigation potential of these measures, makes it clear how adaptation and mitigation are not a dichotomy but may complement each other (cf Biesbroek et al. 2009, Buizer and Lawrence 2014), so that thermal comfort locally (if perceived as problematic at all) can also contribute to fulfilling a mitigation responsibility globally.

CONCLUSION

In this essay I have reflected critically on the role of framing and knowledge claims in the Atelier. It is to be lauded that students have interpreted their double assignment broadly, and tried to address more than one problem at the same time in their plans or designs. However, by framing the urban heat island effect and interventions in the green and blue spaces of the urban region of Utrecht chiefly in terms of their role for thermal comfort, and by putting up-front certain knowledge claims about the urgency of interventions in the city of Utrecht, we have missed opportunities to encourage the formulation of proposals that would explicitly and more pronouncedly have combined locally beneficial measures with taking global responsibility. Claims about the number of people suffering from changes in the microclimate, or dying prematurely in a city like Utrecht, needs to be put into the context of climate-associated problems in the Global South. I see this mainly as a task for us as educators, as we need to make a stronger case for such contextualization. In its slipstream, such an appeal can encourage critical thinking about how a local design or a plan is hardly ever entirely local but may be intendedly 'glocal' in its consequences.

GREEN-BLUE INFRASTRUCTURE FOR A RESILIENT AND HEALTHY CITY - THE 'BIGGER' PICTURE

WIEBKE KLEMM , LANDSCAPE ARCHITECT, WAGENINGEN UNIVERSITY

The key challenge in the atelier 'Green-blue infrastructure for a resilient and healthy city' was to develop an integral spatial visions and specific site designs that combine recreational, ecological and microclimatic qualities of the green-blue network of Utrecht. The second part of the objective - to contribute to improved microclimate conditions and thermal comfort- was introduced from the academic perspective of the Landscape Architecture Group, WUR. Landscape architect Wiebke Klemm initiated the topic from the background of her PhD-research 'Green infrastructure for climate-proof cities'; which is part of the national research consortium 'Knowledge for Climate'. This consortium generates knowledge on how Dutch cities can become more sustainable and resilient in the context of a changing climate.

The aim of the PhD research 'Green infrastructure for climate-proof cities' is to develop easy applicable design guidelines for climate-responsive urban green. For that purpose, a two phase approach was applied. In the first phase, Wiebke investigated the physical and psychological effect of urban green on urban climate conditions. For that she conducted novel micrometeorological measurements and interviews with pedestrians in the field in Utrecht, Rotterdam and Arnhem. Results clearly demonstrate the positive effects of urban green: Parks are on average 1 □C cooler than the built city centre . Tree shade significantly lowers mean radiant temperature by 4 □C and improves thermal comfort for pedestrians. And if asked pedestrians, they clearly prefer streets with green elements to streets without greenery as they experience less heat there . In a second phase, she translated the empirical results into design guidelines and tested them in real site designs together with students and professional designers in order to adjust the guidelines and enhance their applicability and feasibility.

The atelier 'Green-blue infrastructure for a resilient and healthy city' was one of the real site-design studios which is part of Wiebke' s PhD research. The students, were asked to integrate microclimate improvement in their visions and designs for a resilient and healthy city of Utrecht, in particular by implementing the empirical based design guidelines. Here, it should be noted, that designing urban microclimates and improving thermal comfort outdoors is a rather new challenge in both, the professional field of landscape architecture and landscape architecture education . In the atelier, the students were put on their way by introduction lectures and academic literature references related to microclimate designing and were supported during the design process by external microclimate experts.

In the course of the atelier, the topic of urban microclimate design certainly was a challenging one. In the beginning, students were struggling with the necessity of improving outdoor thermal comfort. Later students faced the problem of limited specific microclimatic data, like wind circulation in the complex configuration of the built environment. However, they worked hard on e.g. developing a

climatop map which was not yet available for Utrecht or testing and applying microclimatic analyses for sun and shade to specific urban areas.
When looking at the final results of the landscape architecture and land use planning students, microclimate was included in almost all group and individual projects. Considering the design guidelines, some of them were widely implemented, like creating a diversity of sun and shade places to allow people to find their own thermally comfortable spot outdoors or increasing green surfaces in order to reduce heat storage. The site-design projects show that microclimate can indeed combined with other urban challenges like developing resilient and healthy recreation, connectivity, social cohesion, living environments urban farming and business areas. More than that, the projects show how through taking microclimate into consideration during designing innovative, attractive and user friendly climate responsive outdoor urban spaces were created.

Further research on the process and results of atelier will give more insights in how implementing the design guidelines was experienced and especially, how the guidelines should be improved in order to develop easy applicable design guidelines for climate-responsive urban green.

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2. UTRECHT EXPLAINED

This chapter starts by sketching the broad outlines of the history and genesis of the city of Utrecht. The part about the history and genesis of Utrecht elaborates on the relation between the development of Utrecht and the physical substratum. Additionally, the development of Utrecht is related to the network of line structures that connect Utrecht to the rest of the Netherlands. After elaborating on the history and genesis of Utrecht, the chapter continues by elucidating the network of cultural/ recreational magnets and the networks connecting those magnets. The chapter concludes by providing a climatope and vulnerability map of Utrecht. The climatope map provides an indication of the distinctly different microclimate characteristics different parts of the city have. The vulnerability map provides an overview of microclimate related risks which might affect different groups of people or people carrying out specific activities. The texts and maps in this chapter are based on an analysis of data about the topics mentioned above. The chapter and the inherent contents have been made by four students, Ludo Dings, Daniël Hollemans, Frederico Lia and Sander Smits. These students carried out this task of analysing data, making maps and creating this chapter in addition to the assignment of formulating a vision on the different parts of Utrecht.

fig. 2.1. Impression of water in the centre of Utrecht regarding its importance towards the development along water

2.1. CHRONOLOGICAL DEVELOPMENT OF UTRECHT

2.1.1. INTRODUCTION

A couple of developments in the cultural history of Utrecht have been of great importance for its current form and appearance. The role of the city as a military and religious centre had a great impact on its development. In this development the soil condition dictated for a long time the shape and form of the city. Also the surrounding landscape and its strategic location on the intersection of different networks have determined the development of the city. These networks consisted of waterways and roads, later on also railroads and highways became part of these networks. These nodes and networks formed the bases alongside which the city expanded (Gemeente Utrecht 2004).

2.1.2. ORIGIN OF UTRECHT

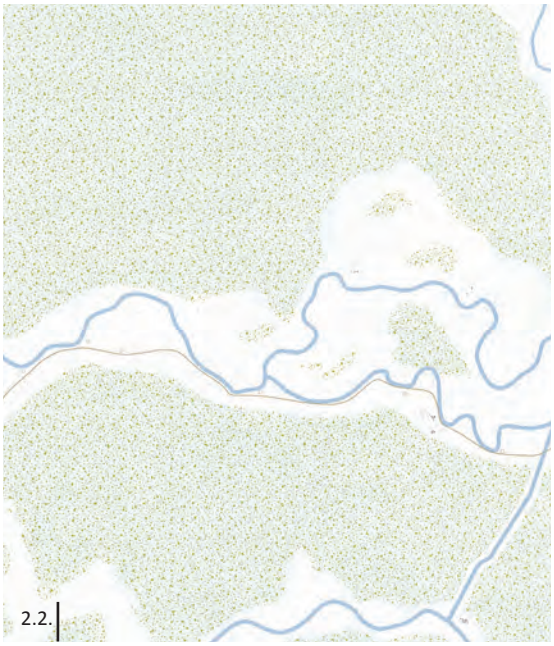
The city of Utrecht was founded on the point where the river Kromme Rijn splits into the Leidsche Rijn and Vecht (Fig. 2.2). This area was suitable for building because it consisted of higher and sandy riverbanks. In 47 B.C. Utrecht became part of the Northern border of the Roman Empire, called the Limes. On the higher riverbanks a large roman fortress called Castellum was founded (Colenbrander 2005). The name of the Castellum was Rheno Traiectum, which means passable place in the Rijn River. Afterwards the name became Ultra Trajectum, which means passable place downstream the river, the name Utrecht is derived from this former Latin name. After the fall of the Roman Empire, Utrecht developed slowly into an important trade city due to its strategic location near the river (Het Utrechts Archief n.d.).

2.1.3. MEDIEVAL PERIOD

In 1122 A.D. Utrecht, as one of the first cities in the Netherlands, obtained each of the rights and privileges of a city. This resulted in the building of the city wall (Het Utrechts Archief n.d.). Around the 1000 A.D. the northern part of Oude Gracht was dug, presumably because the city became less accessible over water. This was due to the silting of the Kromme Rijn in this period. The Oude Gracht formed a new connection between the Rijn and Vecht River. The southern part of the Oude Gracht was presumably dug in 1122 when the bishop of Utrecht dammed the Kromme Rijn at Wijk bij Duurstede. This was due to the fact that the Kromme Rijn was becoming increasingly sandy. Damming the Kromme Rijn also helped in preventing the Bishop's land from being flooded. However, in order to maintain the shipping connection between Utrecht and the main stream of the Rhine river, one of the oldest canals, the Vaartsche Rijn, was dug (Bruynel 2001, p.18). With these new connections between these rivers, the city positioned itself as a node on a very important trade route. This initiated the flourishing and growth of the city, making Utrecht one of the wealthiest cities in the Netherlands during that period (Het Utrechts Archief n.d.).

Around 1500 most of the build area within the city walls consisted of church property or civil occupations (Fig. 2.3). Outside the city walls a radial pattern of waterways and trade roads

fig. 2.2. Development Utrecht 200
fig. 2.3. Development Utrecht 1650



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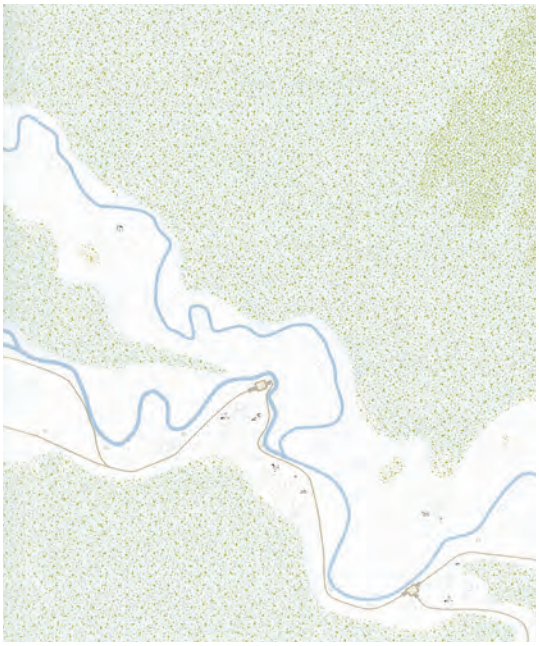


2.3.

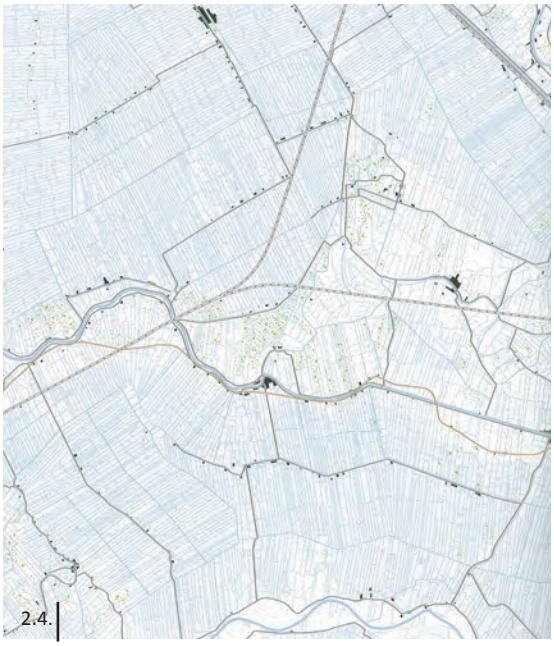
was to be found. This radial pattern of roads and waterways was of great of importance to the further development of the city. It formed the base for expanding the building-occupation (Gemeente Utrecht 2004).

2.1.4. 19TH CENTURY

The 19th century is characterised as the century of the rapid development of infrastructural networks and urbanisation both inside and outside the city walls (Fig. 2.4.). Especially alongside the eastern part of the city, this urbanisation occurred alongside the waterways, roads and parcel boundaries. Around 1800 the development of the traffic over land gets a new impulse by the construction the Amsterdamsestraatweg. After 1800, there is a balance between the transport over water and the transport over land. This balance lasted until the railroad system was build, then this balance changed. Another important change in the landscape surrounding Utrecht occurred around 1810. Around that year, Utrecht became part of the large new Dutch defence system, the Nieuwe Hollandsche Waterlinie, a series of fortresses outside the city. As a result of this, Utrecht could get rid of its old defence walls and the city could start to expand beyond its former boundaries (Gemeente Utrecht 2004).
In 1848 the first parts of the railroad system were constructed this made Utrecht the most important node for rail traffic in the Netherlands. During this time the freight over water was still gradually developing, however the importance of the Catharijnesingel and the Vaartsche Rijn decreased due to the new railroad system. To maintain the city's strong position in the transport over water, the Merwedekanaal was constructed in 1892. This stimulated the housing of large industries alongside the canal and lead to the development of the neighbourhood Zuilen (Gemeente Utrecht 2004).

The construction of new the neighbourhoods Pijlsweerd, Ondiep and Lombok outside the old defence works changed the shape of the city even further. The former defence works on the east- west side of the city were changed into urban parks (the Zocherpark). The north side of the former defence works were changed into quays. In this way, the parks and quays at the Catharijnensingel, Tolsteegsingel, Maliesingel, Wittevrouwensingel, Weerdsingel, de Oosterkade en Westerkade where developed. To keep the densifying city lively, new urban parks where constructed and the large new industries where located outside the city (Gemeente Utrecht 2004).

fig. 2.4. Development Utrecht 1900
fig. 2.5. Development Utrecht 2000



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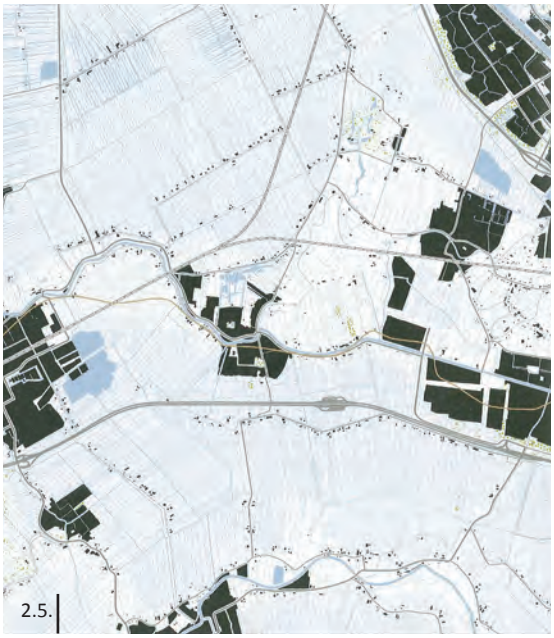


2.5.

2.1.5. 20TH CENTURY

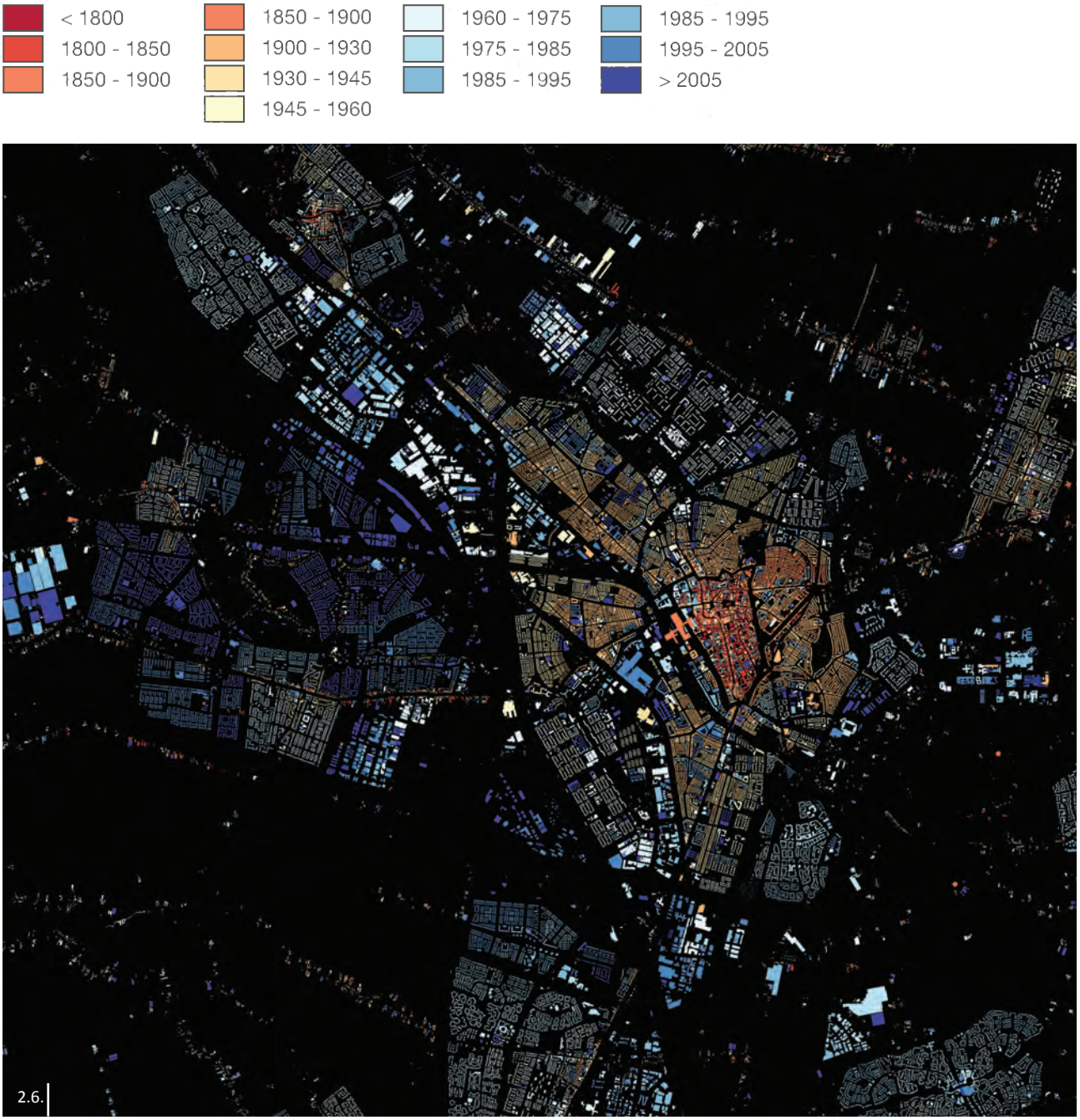
The extensive urbanisation on the east side of Utrecht reached its maximum around 1920. Expanding the city further at that moment in time was banished due to the defence system of the Nieuwe Hollandsche Waterlinie. As a result of this, the focus for new urban expansions shifted from the east- to the north-, west- and south side of the city (Fig.2.5.). On the west side of the Merwedekanaal the neighbourhood Oog in Al was build in conjunction with the first parts of the Industrial area of Lage Weide. In 1942 the city reached its full size constrained by the existing borders at that moment. Then the scope shifted to filling the leftover spaces in the city (Gemeente Utrecht 2004).

After 1954, when Utrecht obtained large territories of the surrounding municipalities, a new wave of extensive urbanisation started. In 1952 the Amsterdam-Rijnkanaal was built as a replacement of the Merwedekanaal. To answer the increased demands for housing afer the Second World War, Nieuw-Hoograven, Kanaleneiland (1957) and Overvecht (1959) were build. These neighbourhoods where meant to sustain 90.000 households and consisted of high rise buildings with a strong separation of functions, thus expressing the modernistic principles characteristic to that time (Gemeente Utrecht 2004).

To date, this leap in scale is still visible in the form and appearance of the city. Broad ways form the connections between neighbourhoods and the city center (Fig.2.6.). Large industrial sites are situated alongside the Amsterdam-Rijnkanaal. On the eastside of the city the University, De Uithof emerged in 1962. In 1973 a part of the old city centre near the central station was demolished in order to create space for the construction of Hoog Catharijne and the Jaarbeurs. During the 1970's just as many buildings were built as demolished. The 1980's were characterised by an emphasis on urban renewal of the 19th and early 20th century neighbourhoods. Also around Utrecht there emerged large build areas like Nieuwegein (1971) and Leidsche Rijn (supposed to be completed in 2025). The idea behind these neighbourhoods was to build as close to the city as possible so as to preserve the open landscape (Gemeente Utrecht 2004, p.100).

As from the 1990's and the 2000's the scope of the urban development became targeted towards redevelopment of the post-war neighbourhoods. In 2002, the redevelopment of the central station area started as part of the larger city redevelopment plan Utrecht 2030 (Gemeente Utrecht 2004).

fig. 2.6. Urban development of Utrecht, subdivided per 50 years


< 1800
1800 - 1850
1850 - 1900
1850 - 1900
1900 - 1930
1930 - 1945
1945 - 1960
1960 - 1975
1975 - 1985
1985 - 1995
1985 - 1995
1995 - 2005
> 2005

2.6.

2.2. RECREATIONAL NETWORKS & BARRIERS

The routes that are most intensively used by recreational traffic are the routes that broadly follow the green wedges permeating the city. Examples of such wedges are the Vecht, the Kromme Rijn and the Maximapark. The map (fig. 2.7.) shows that there are limited possibilities to cross the (high) ways and enter the surrounding countryside. This indicates that the (high)ways surrounding Utrecht are relatively harsh boundaries for the recreationist.

2.2.1. WEST SIDE OF UTRECHT

Considering the fact that the residential area of Leidsche Rijn (in the west of Utrecht) is still under development and thus growing, an increased demand for recreational facilities is expectable, thus expending the recreational pressure on this area (Kenniscentrum Recreatie 2011). The number of connections between Leidsche Rijn and the north west of Utrecht is small, which could mean that the highway A2 acts as a barrier.

2.2.2. NORTHERN PART OF UTRECHT

The highway A27 and the ring road around Utrecht act as a barrier for people who want to recreate in the nearby countryside (Kenniscentrum Recreatie 2011). Near the centre of Utrecht, there is only one possibility to cross the Amsterdam-Rijnkanaal. The blocking character of this element is thus relatively strong. As a result of the blocking effect of the Amsterdam-Rijnkanaal, the people living in/near the city centre of Utrecht will seek their possibilities to recreate in the (north) west part of Utrecht (Kenniscentrum Recreatie 2011). This combined with the limited amount of crossings over the highway, leads to a relatively large recreational pressure on those areas.

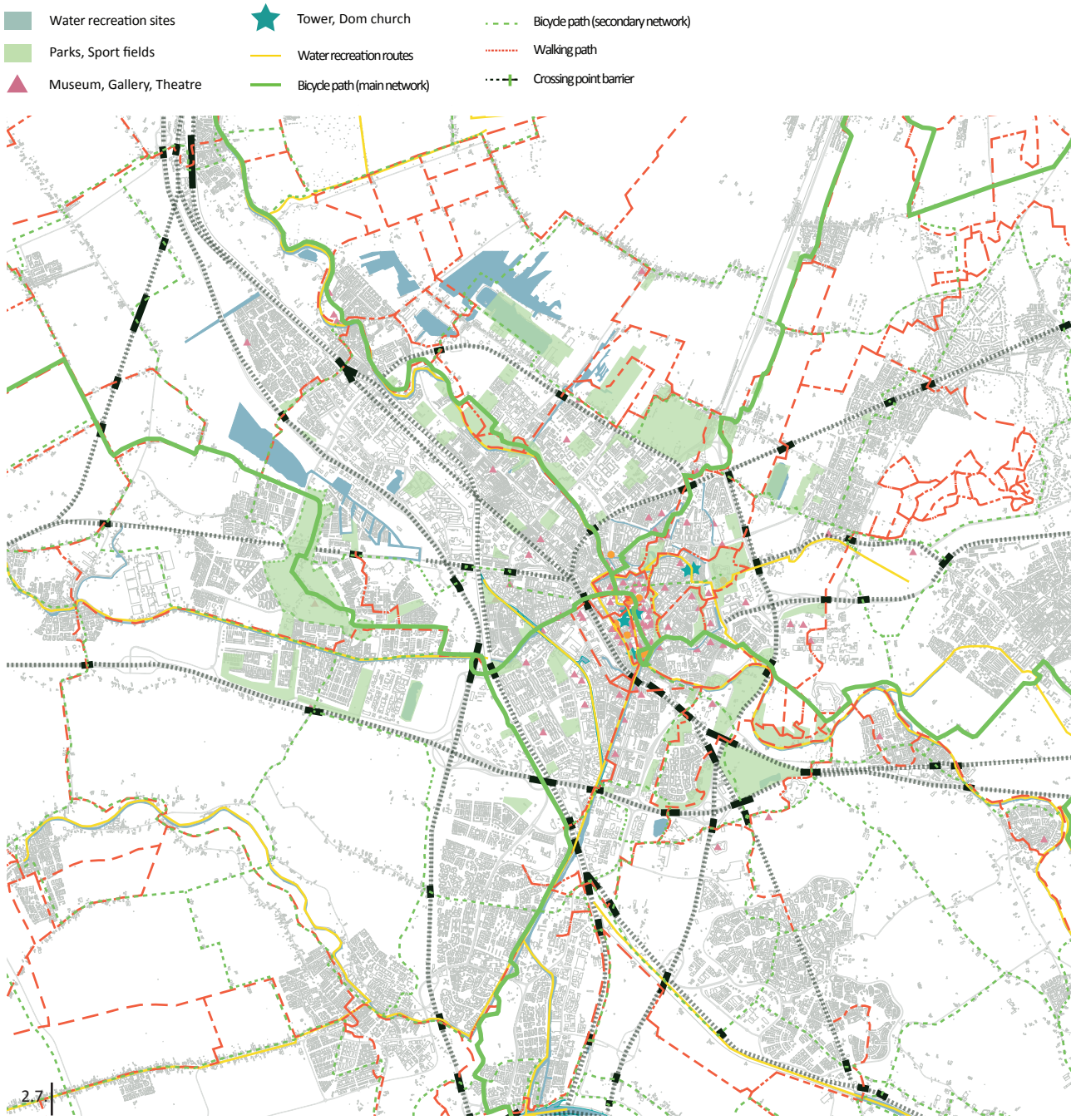
2.2.3. EASTERN PART OF UTRECHT

Again the highway A27 is a dominant boundary. Another important boundary is the Amsterdam-Rijnkanaal, which can only be crossed on two spots. This part of Utrecht is adjacent to Nieuwegein and Houten, the inhabitants of those places also recreate in the area (Kenniscentrum Recreatie 2011). Therefore, the recreational pressure on this part of Utrecht is again relatively high.

2.2.4. SOUTH SIDE OF UTRECHT

The south west side of Utrecht is demarcated by the Amsterdam-Rijnkanaal, the highway A12 and the highway A2. That is, the area is basically encapsulated by large bodies of infrastructure that can only be crossed on two places. That means that, for the inhabitants of this part of Utrecht, the countryside and other recreational facilities are not easily accessible.

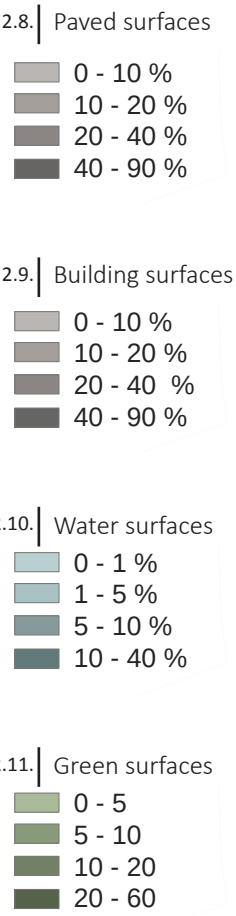
fig. 2.7. Map with recreational and cultural magnets and routes towards those magnets

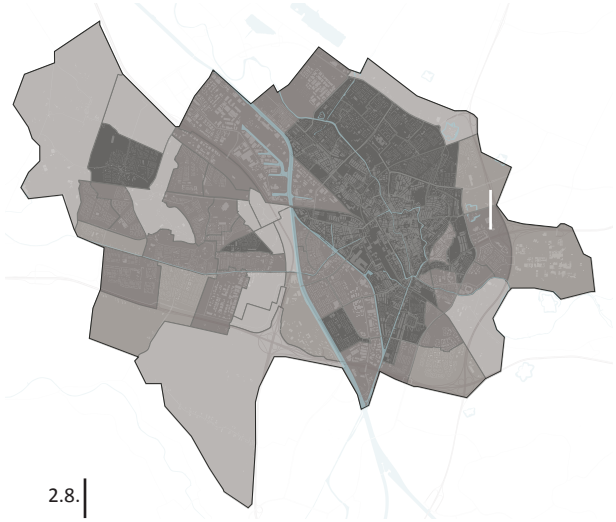

Water recreation sites
Parks, Sport fields
Museum, Gallery, Theatre
Tower, Dom church
Water recreation routes
Bicycle path (main network)
Bicycle path (secondary network)
Walking path
Crossing point barrier
2.7

2.3. SPATIAL ANALYSIS

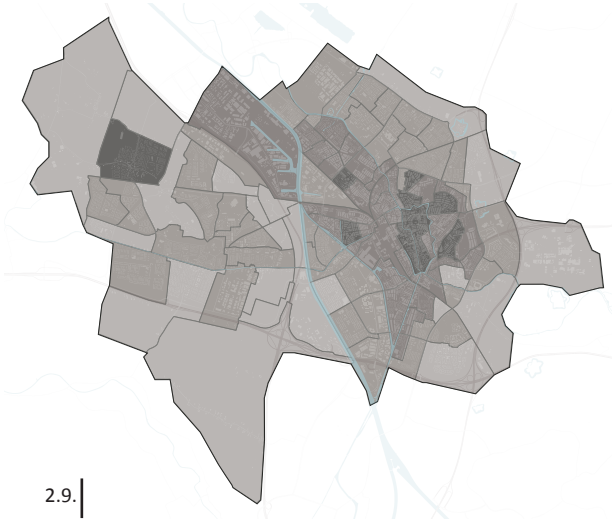
One of the factors that influence the microclimate is the physical surface of the city. The maps (Fig. 2.8-2.11) on the right show the main layers in which the main information about the spatial analysis have been summarized: the permeable and impermeable surfaces and the permeable surface. The first one include the public paved surface (data about the private backyards are not available) and the built area while the second layer includes green and water surface (also in this case the data collected refer to the public spaces and do not include the private gardens surface). The data about the surface derived from GIS maps and in part from municipality database, have been firstly collected in a table to have an inventory of the information for each neighbourhood (surface of the neighbourhood, water surface, visible green surface, public paved surface and buildings surface).

After this the data has been translated in percentage referred to the city level. In this way have been possible to create an overview of all the city but in particular compare the neighbourhoods and see for example which neighbourhood is more problematic in terms of waterproof surface and thereby lack of green and water surface. This has been an important tool to build up the climatope and the vulnerability map: the quantity of the waterproof surface can in fact have a big influence on the climate of a neighbourhood while big green surface can cool down the temperature. From the maps on the right it is immediately clear how the inner city and its surroundings are the most paved area of the city and how the permeable surface increase going towards the countryside, in the newest neighbourhoods.

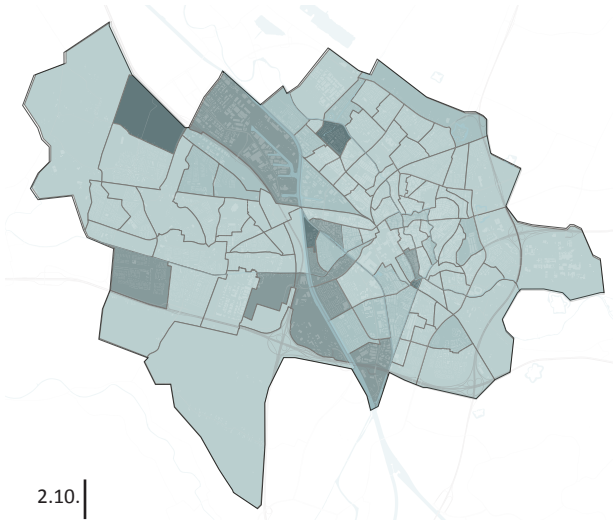




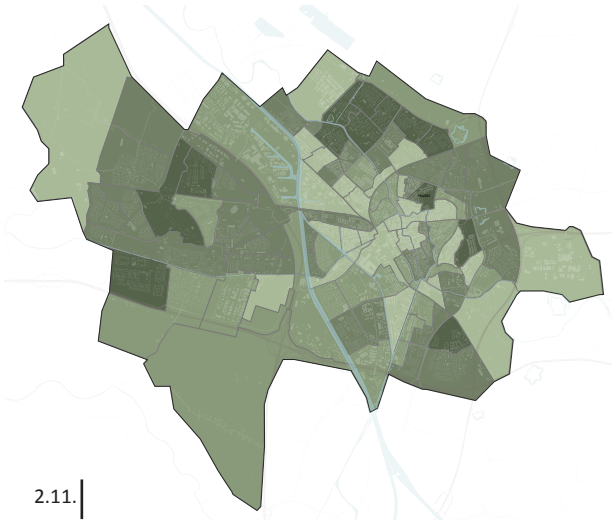
2.8.



2.9.



2.10.

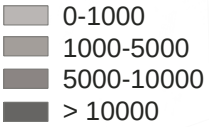


2.11.

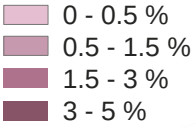
2.4. DEMOGRAPHIC ANALYSIS

In addition to the spatial analysis, the demography has been investigated too. In this case, the demographical analysis has been an important tool for the vulnerability map in which the most problematic neighbourhoods have been pointed out fig. 2.12., taking into account the combination of people and their environment. Also in this case, all the data (derived from WistUData) has been collected in a table that summarised the population, people density and two age ranges (0-11 and 55+ years old), that are the most vulnerable people with regard to the climate conditions fig. 2.13-2.14.). The maps on the right summarise the results of the main demographical layers: the people density map (number of people per m^2 distribution. The first one shows the neighbourhoods with the highest amount of people and thereby their needs special attention in terms of climate and spatial quality. The second in order with shows the distribution of children from 0 to 11 and people over 55 years old, in other words the distribution of people that can have more problems in relation to the quality and temperature of the air and the microclimate in general. Also in this case, the percentage of each neighbourhood has been calculated in relation to the city level. This provides the possibility to immediately see in which neighbourhood the highest amount of vulnerable people live this, in turn, provides an overview of the entire city.

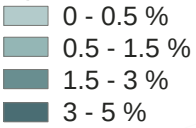
2.12. People density

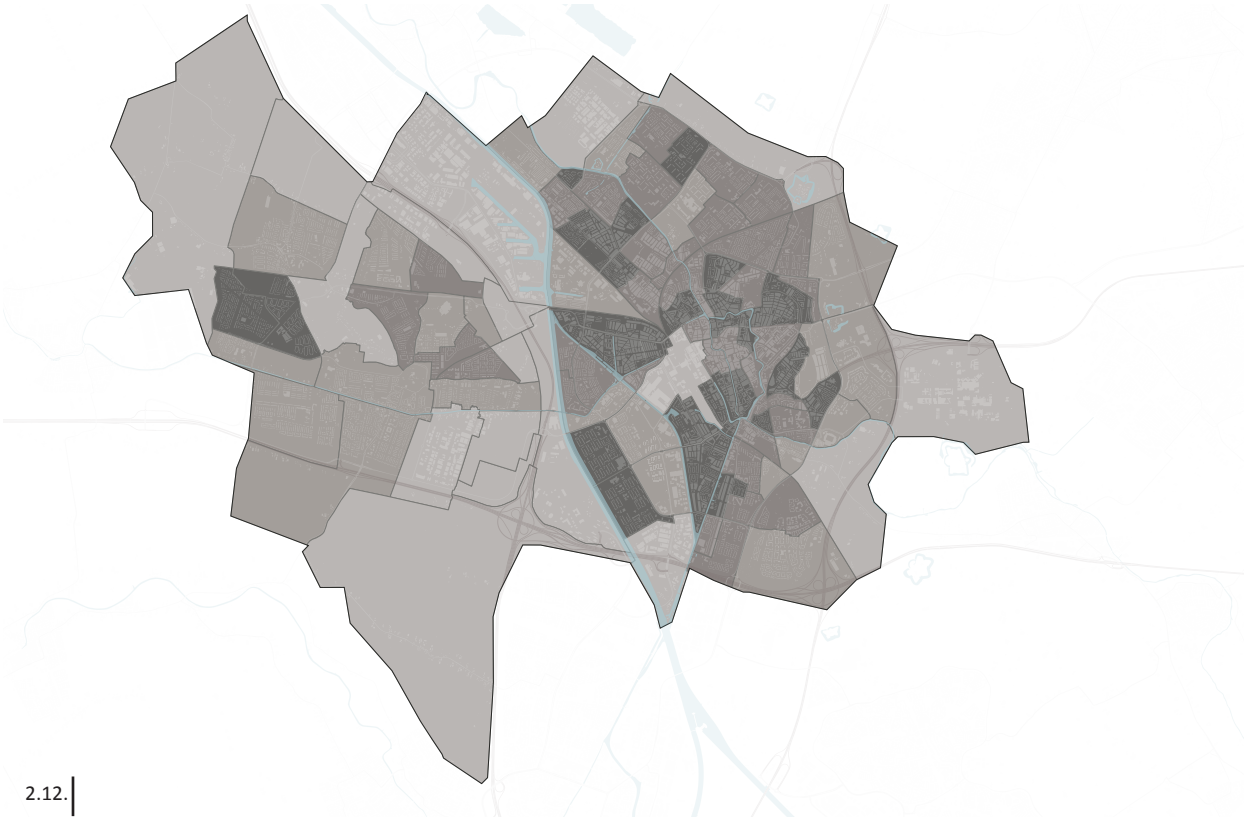


2.13. Vulnerable group 0-11 years

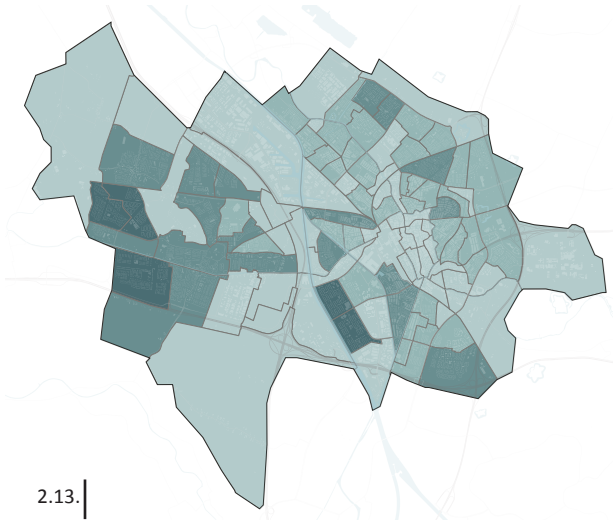


2.14. Vulnerable group 55+ years

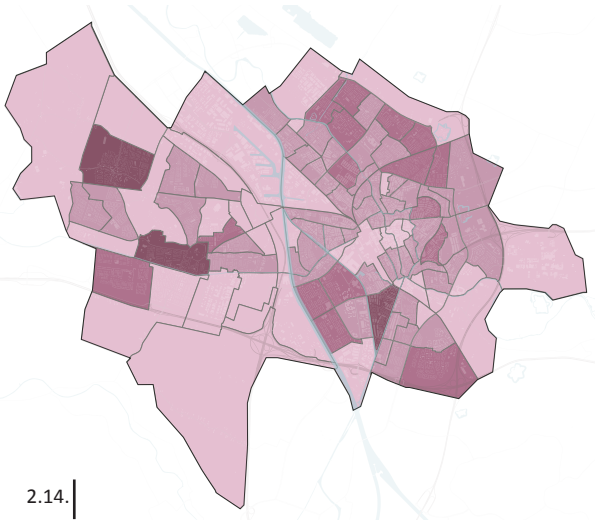




2.12.



2.13.

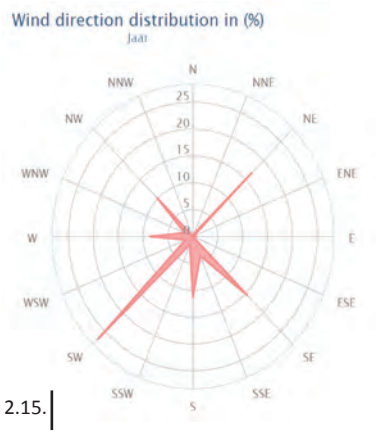


2.14.

2.5. WIND & TEMPERATURE ANALYSIS

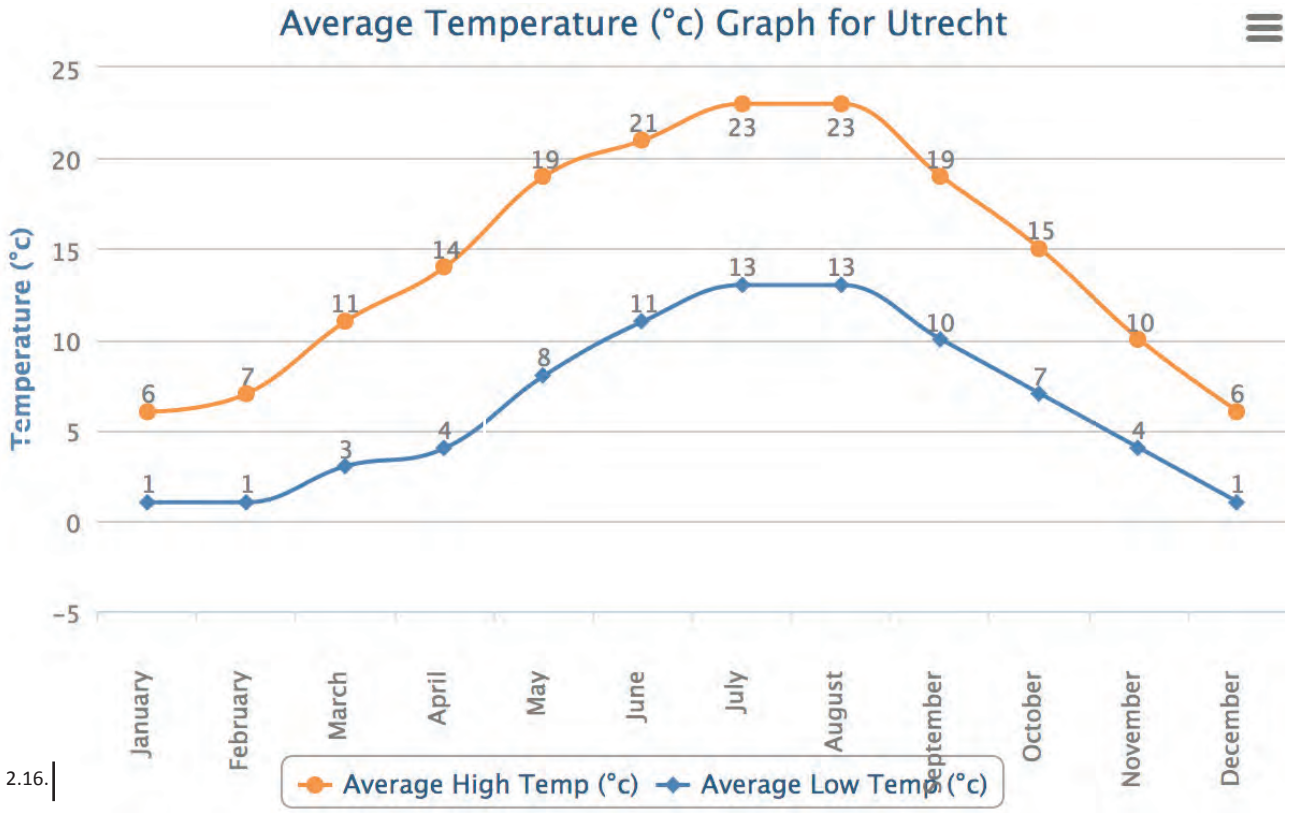
We can define two different windpatterns which represent the most important wind related situations: heat-wave situations and average temperature situations (Fig.2.15.). In the latter situation, the prevailing winds come from the South or West. This especially applies to the cooler times of the year. The wind speed of the southern or western wind is generally high enough to create uncomfortably cold conditions. In the former situation, the wind generally comes from the East or the Northeast. The flow rate of these winds is much lower than those of the southern and western winds (Lenzholzer 2013). These different wind patterns are the result of high and low pressure areas. Low pressure areas are typically characterised by moderate temperatures. High pressure areas are characterised by higher temperatures. On the northern hemisphere, the air in and around low pressure areas flows counterclockwise and therefore creates the southern or western winds that are typical to the Dutch climate. High pressure areas flow clockwise and thus create the winds coming from the North/Northeast that are characteristic to warm days (Lamb 1995).

Utrecht represents about the average temperatures, precipitation, wind directions and wind intensity of the Netherlands (Fig. 2.16.-2.17.) (KNMI 2014). The city is pleasantly warm and humid during summer with an average high temperature of 22 degrees Celcius. The average rain days are almost the same throughout the entire year, with a lower amount in summer and higher amount in winter. The amount of rainfall varies between 93mm in September and 51mm in April. The winter is quite chilly and unpleasant with an average high temperature of 4 degrees (world weather online & KNMI 2014). The dominant wind direction is South-West and during the first half of the year often combined with strong North-Eastern winds. The wind intensity changes between 5knots during summer and 8knots during spring, which are illustrated as gentle breeze (Windfinder 2014).

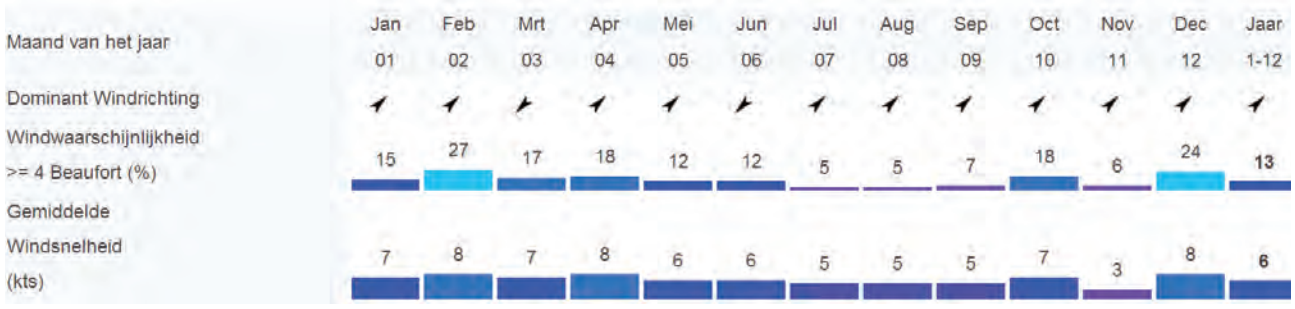


2.15.

fig. 2.15. Average winddirection distribution per year in % (Windfinder 2014)
fig. 2.2.16. Average temperature graph for Utrecht (World Weather Online 2014)
fig. 2.17. Average climatic conditions for Utrecht (KNMI 2014)


Average Temperature (°c) Graph for Utrecht
Temperature (°c)
25
20
15
10
5
0
-5
6
7
11
14
19
21
23
23
19
15
10
6
1
1
3
4
8
11
13
13
10
7
4
1
January
February
March
April
May
June
July
August
September
October
November
December
Average High Temp (°c)
Average Low Temp (°c)

2.16.


Maand van het jaar
Jan 01
Feb 02
Mrt 03
Apr 04
Mei 05
Jun 06
Jul 07
Aug 08
Sep 09
Oct 10
Nov 11
Dec 12
Jaar 1-12
Dominant Windrichting
Windwaarschijnlijkheid >= 4 Beaufort (%)
15 27 17 18 12 12 5 5 7 18 6 24 13
Gemiddelde Windsnelheid (kts)
7 8 7 8 6 6 5 5 5 7 3 8 6

2.17.

2.6. CLIMATOPE MAP

A climatope map provides an indication about the climatic characteristics of the urban environment. fig. 2.18.- 2.19. The concept of climatopes means that different types of areas and neighbourhoods have specific microclimatic characteristics. For example the microclimate characteristics are determined by building structures, vegetation, paved areas and water bodies (Lenzholzer 2013).

2.6.1. CITY CENTRE CLIMATOPE

The city centre climatope is characterised by a high building density with massive and partly high-rise building volumes. In these areas there is little presence of green elements throughout the neighbourhoods and the cooling effect of evaporation is strongly diminished. During daytime the city centre climatope heats up rapidly and at night it cannot cool down easily due to the massive heat storage in the buildings and paved surfaces.

2.6.2. CITY CLIMATOPE

The city climatope is characterised by enclosed buildings up to multiple floors. The amount of vegetation is relatively low which causes little cooling effect due to evapotranspiration. This green consists mostly of small gardens and tree lanes. During daytime the area heats up due to the high number of paved and built surfaces and hardly cools down at night. This can create an urban heat-island effect, which is prominently present during night-time.

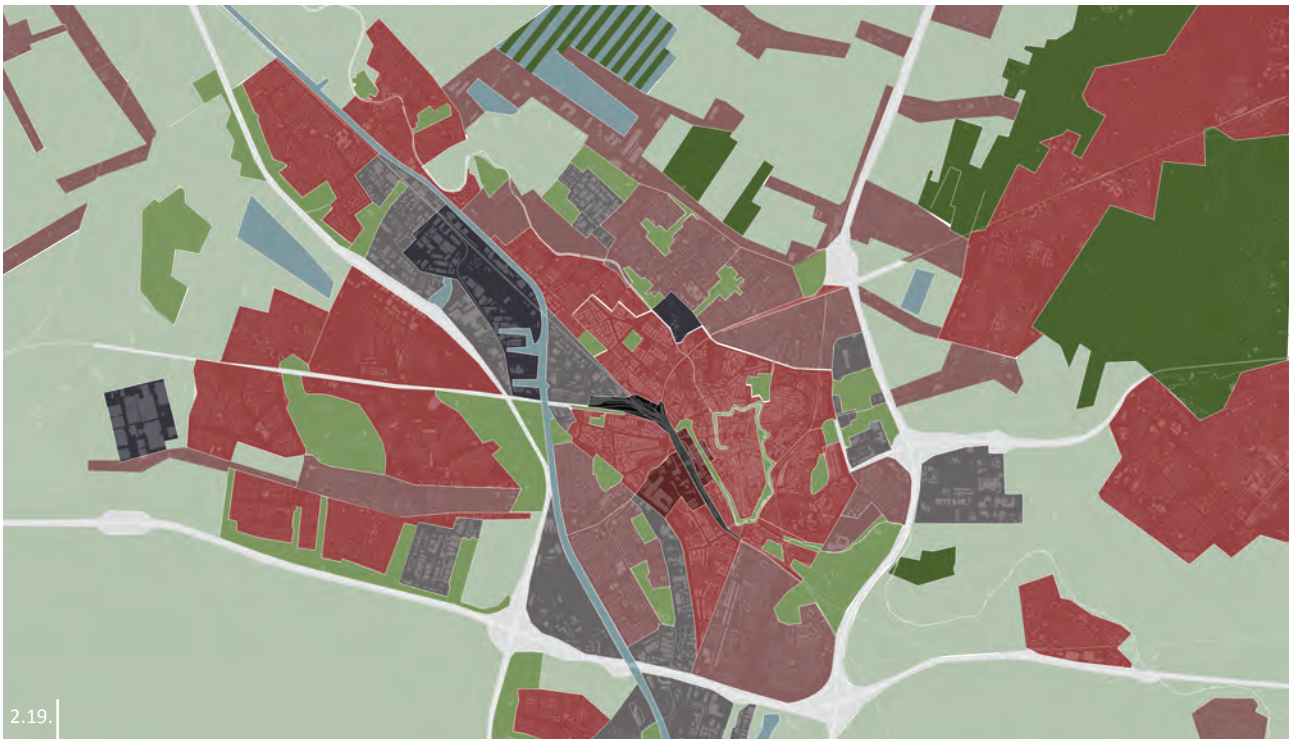
Garden city climatope

The garden city climatope is characterised by semi-detached buildings with a maximum of three building layers. They contain spacious gardens and a high coverage of public green areas. Low density neighbourhoods with villa's and building typologies from the 1950's and 1960's are typical for this category. There are only minor fluctuations in temperatures during daytime, but there is strong decrease in temperature during night-time. This is due to the large amount of open- and green-blue surfaces which improve ventilation.

LEGEND

- City centre climatope
- Average city climatope
- Garden city climatope
- Rural landscape climatope
- Forest climatope
- Park climatope
- Open landscape climatope
- Railroad emplacement climatope
- Business park climatope
- Industry climatope
- Open water climatope
- Infrastructure climatope

2.18.



2.19.

Rural landscape climatope

The rural landscape climatope is being characterised by a multitude of different buildings, varying from small to large with different orientations, in a green and open landscape. The buildings slow strong wind flows in the open landscape down, but they provide room for the wind flow to continue. Next to the large buildings there are often relatively large pavements, especially at farms. These buildings and pavements heat up during daytime, but he buildings are often surrounded by trees which slow the wind down and cool the area due to evapotranspiration. These places are hotter than their direct open surroundings. Their primary effect is that they block ongoing wind flows. In the case of Utrecht they occur primarily as ribbon developments.

Forest climatope

Forest and large scale bushes in parks have a lower temperature fluctuation and a relatively constant humidity. This is due to the shading and evaporation of water during daytime and the heat that is stored in the tree trunks is slowly being emitted during night-time because of the dense green roof of the forest. This results in higher temperatures in the forest during night-time, relative to the open landscape.

Park climatope

Urban parks and gardens have a more extreme temperature shift than the built-up areas.

Due to their larger sky view factor (openness towards the sky), they can easily emit their stored heat at night, this creates a cool air flow. Urban parks with scattered tree plantings have a slightly lower temperature during daytime due to their ability to create shade and evapotranspiration. This makes the urban park an important producer of lower air temperature, with a potential to cool its surroundings. These open green areas can also enhance the ventilation in the city.

Open landscape climatope

During the day an open landscape climatope is characterised by a strong fluctuation in temperature. The landscape can freely emit the heat into the night sky because of its openness. This creates a cool air flow rather quickly. The windspeed can easily increase because there are hardly any obstacles present in these open areas. Therefore this climatope is an important producer of cool air flows.

Railroad emplacement climatope

A railroad emplacement climatope covers a large open area which consists primarily out of gravel, steel and other hard surfaces The gravel heats up rapidly during daytime and it cools down rapidly during night-time due to the openness of the area and the large sky-view factor. The openness of the area creates the potential for the wind speed to increase, which provides a potential for ventilation in the surrounding areas. These paved open areas are still much warmer relative to unpaved open areas.

Business park climatope

The business park climatope is characterised by

massive buildings with large pavements for parking and such. There is hardly any cooling by evaporation because there is only little amount of green areas. However, the often metal roofs of these massive buildings decrease in temperature at night due to the conduction of the metal. The paved areas remain warm at night due to heat stored in the stone.

Industry climatope

The industry climatope consist primarily out of large buildings and raw materials. The heat storage is more intensive than the business park climatope. During daytime these areas warm up by the sun but also by anthropogenic heat generated by the production processes. If the production process is continuous, it can also have an impact on the temperature during night-time. Metal roofs can cool down easily but streets, parking lots and logistic areas remains warm.

Open water climatope

Open water climatope has got a tempering effect on the air temperature due to that fact
that water slowly warms-up and cools down. This results in relatively little and slow fluctuations in temperature. During day time water is evaporated and the air temperature is lower than in the surroundings. At night-time the air temperature is higher than its surroundings due to the slow emission of stored heat. You can consider these large open water climatopes as batteries, that are charged with heat during daytime and emitting this heat during night-time. Wind also can flow easily over these open water bodies. If these water bodies are large enough they could generate small land-sea wind systems.

2.6.12. INFRASTRUCTURE CLIMATOPE

The infrastructure climatope is characterised by the presence of large areas covered with asphalt and concrete. These paved areas heat-up quickly during daytime because of their colour and materialization. During night-time they release this heat slowly due to the high sky view factor. Moreover heating they also produce anthropogenic heat from cars, together with hazardous fumes.

Information and methods from the book: Het weer in de stad, hoe ontwerp het stadsklimaat bepaalt by Sanda Lenzholzer (2013).

2.7. VULNERABILITY MAP

The Vulnerability map fig.2.20. comes from the combination of the layer described in the previous pages: spatial analysis maps, demographic data and recreational facilities maps. The aim of the map, based on neighbourhoods division, is to show which are the most problematic parts of the city considering demographical data and physical features.

All the data collected at the beginning in tables have been translated in maps. These maps show the situation of each neighbourhood in the context of the city and in relation with the other neighbourhoods (in this way it is possible to see for example which neighbourhood is more paved than others).

The combination and overlapping of the different layers brought to the vulnerability map: a scale of colours from green (not critical neighbourhood) to red (critical neighbourhood) shows which neighbourhood, according to the previous maps, presents the most critical situation in terms of physical structure, vulnerable population and facilities and people density. This has been possible overlapping different layers (demographical analysis layers, spatial analysis layers and enterprises distribution) and see in which neighbourhood there is the highest amount of problematic factors.

The main goal of the map is not to show which areas are the most problematic in terms of microclimate but to analyse the combination of the population data and the spatial environment in which they live.

2.20. Vulnerability layers

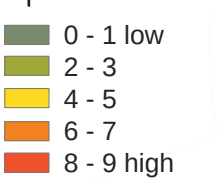
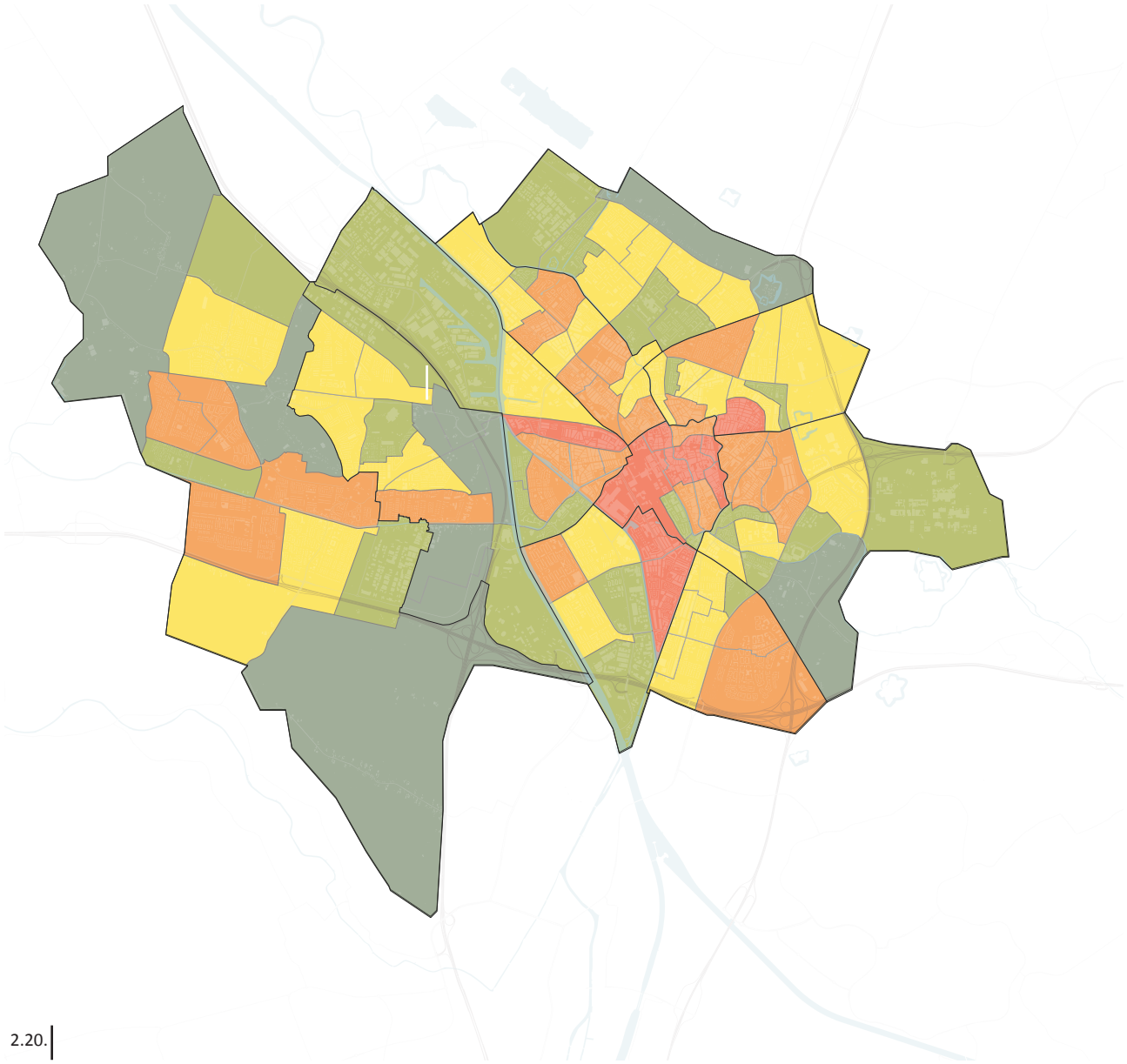


fig. 2.20. Representation of multiple vulnerability layers on top of each other show vulnerable areas



2.20.

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- [accessed 18 April 2014].

3. VECHT

By literature study and desktop research we focus mostly on analysing the project area, its past and future and the external influences that come together in our area. “Broadly, in this mode, we pay attention to what is transforming our innovation context including society, environment, industry, technology, business, culture, politics and economics.” (Kumar, 2012).

By doing this and comparing and framing the resulting maps, we want to understand what type of influences and forces the project area is subject to. This will give us a broad overview of our starting situation needed before we can intervene.

fig. 3.1. Impression of the Vecht which flows tot the city centre of Utrecht

3.1. INTRODUCTION

Dear reader,

Welcome in the surroundings of the river Vecht, containing of the neighborhoods Noordwest, Noordoost and Overvecht. fig. 3.2. In the coming chapter we will explain our interpretation of the assignment and which implementations we fitted the Vecht with to make it a resillient and healthy part of Utrecht.

WHO

An inspiring group of 9 international landscape-architects and planners. Some with a considerable amount of working experience.

WHAT

Provide knowledge and tools to open the discussion for a new approach for the Green-Blue Network.

WHY

To serve inspiration and scientific knowledge to create a city with urban resiliency and microclimate adaptation.

In current strategies, the latter is missing and is insufficiently used in current planning and implementations

OUR GOAL

Combine existing knowledge to shape a strategy that makes Utrecht a resillient and healthy city, towards its (yet unknown) future.

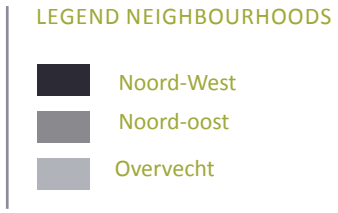


fig. 3.2. All the group members who worked on this part of Utrecht, the Vecht group

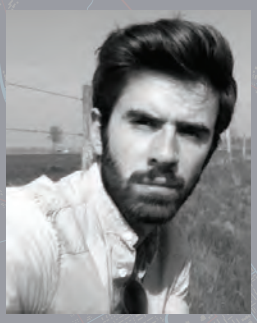
W. HU
CHINA

T. VAN HEESWIJK
THE NETHERLANDS

S. HAUGLIN
NORWAY

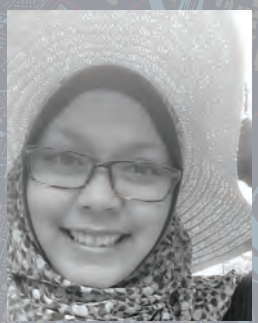
V. HETEM THE
NETHERLANDS

K. KNEVELS
BELGIUM

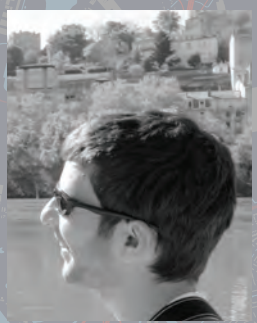


F. LIA
ITALY

M.A. LUND
NORWAY



F. TASYARA
INDONESIA



T. BARNA
ROMANIA

3.2. METHODOLOGY

STEP 1: ASSESMENT OF THE CURRENT SITUATION

The wijkgroenplannen are living proof that there is a lot of interest in improving the outdoor spaces in neighborhoods. However towards the future, this should be improved even more. By looking at existing programs and topographic layers like the Hydrology, ecology, building typology, and infrastructure we got a deep look into the structure of the urban fabric.

STEP 2: EXPLORATIVE STUDY ON MICROCLIMATE ADAPTATION

We all know what climate change is and that is has consequences for our living environment. However, the implementation in the field of this (Yet unknown) future in our cities and lives is standing in its research phase. Experts related to Wageningen University like Wiebke Klemm and Sanda Ienzholzer provided guidance and knowledge to integrate climate adaptation in our visions.

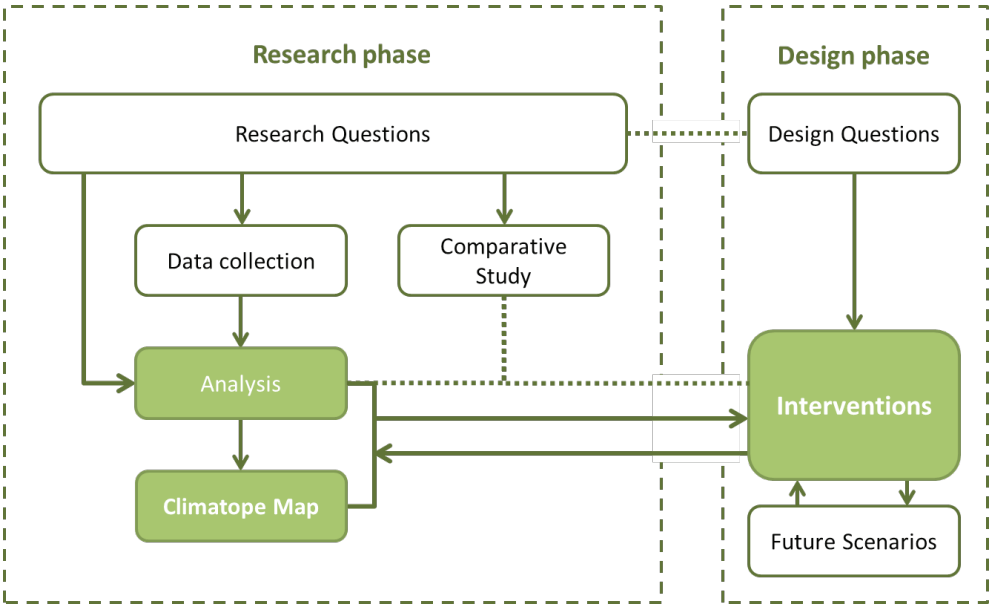
STEP 3: SOCIAL STUDY

Inhabitants have an important role in current, and future changes of the urban fabric. It are these peoples who experience thermal comfort, care about a place, and give it identity. fig. 3.3.
we combined results from interviews on the streets, with GIS-calculations of demographic data fig. 3.4. with each other to get an understanding of the dynamics that play fig. 3.5. in the different neighborhood to provide implementors like the Municipality, and the province with a social profile to base implimentations upon.

INTERVIEWS
- 9 students
- min. 1 interviewee per sub-neigborhood
- total of 63 persons interviewed

OUTCOMES:
- great satisfaction about communication with the government.
- River Vecht has low recreational value
- climate adaptation is tempting initiative.

fig. 3.3. a social study with inhabitants done by making use of questi onairs.
fig. 3.4. the scheme with explained the used methods during the research
fig. 3.5. this document is used to analyse the neighbourhoods



3.4.

Gemeente Utrecht

WijkWijzer 2013

De tien Utrechtse wijken in cijfers

3.5.

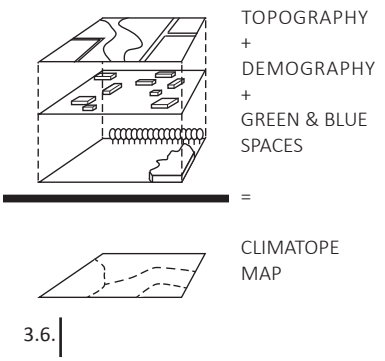
3.3. ANALYSIS AND CLIMATOPE MAP

The findings of the 3 steps(previous page), are combined in one map; the climatope map.
The aspects of building typology, social demands, and climate sensitive surfaces (pavement, facades, roofs fig. 3.9.) are closely related and state which areas are sensitive and need improvement on different levels. We also looked to additional aspects like existing projects, participatory ideas, and infrastructural problems. (fig. 3.8.) All the implimentations serve a solution in multiple aspects. So the used space is more intensively used, can contain more people, is efficient and cuts down maintenance costs and creates a stage for participatorial processes. All the findings are gathered and identities are established; called climatopes. These are areas that show resemblance through each layer a can be hand as similar in the vision chapter. The explenations of the climatopes can be found in the Booklet and form the basic for the development of the visions.

The strenght of this approach is the stacking of the layers fig. 3.6., supported by scientifi Data and maps, collected form GIS datafiles.
gives a good starting point for a divisoin into Bottom-up and Top-down perspectives by serving as common ground on which every party can relate to. This makes the communication between the two perspectives more easy and secures the implimentation of the climate adaptation, that has effect on a much larger scale and improves livibility in the whole city.

SCENARIO'S

the climatope map only states the relationship between the diffenent layers and shows the problems. How to solve these problems and how heavy the level of implimentations have to be, is researched by scenarios. Scenarios serve to give extreme situations on important variables (Urbanization and climate change fig. 3.7.), divided on two axes, and are used as inspiration source to widen our view on the topic and come up with innovating visions.



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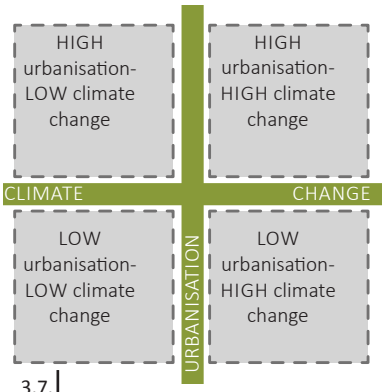
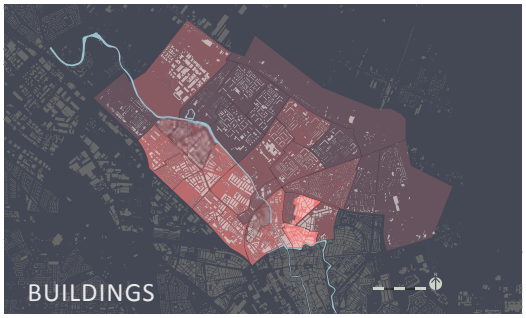
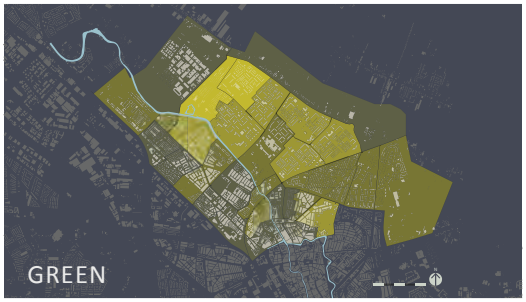
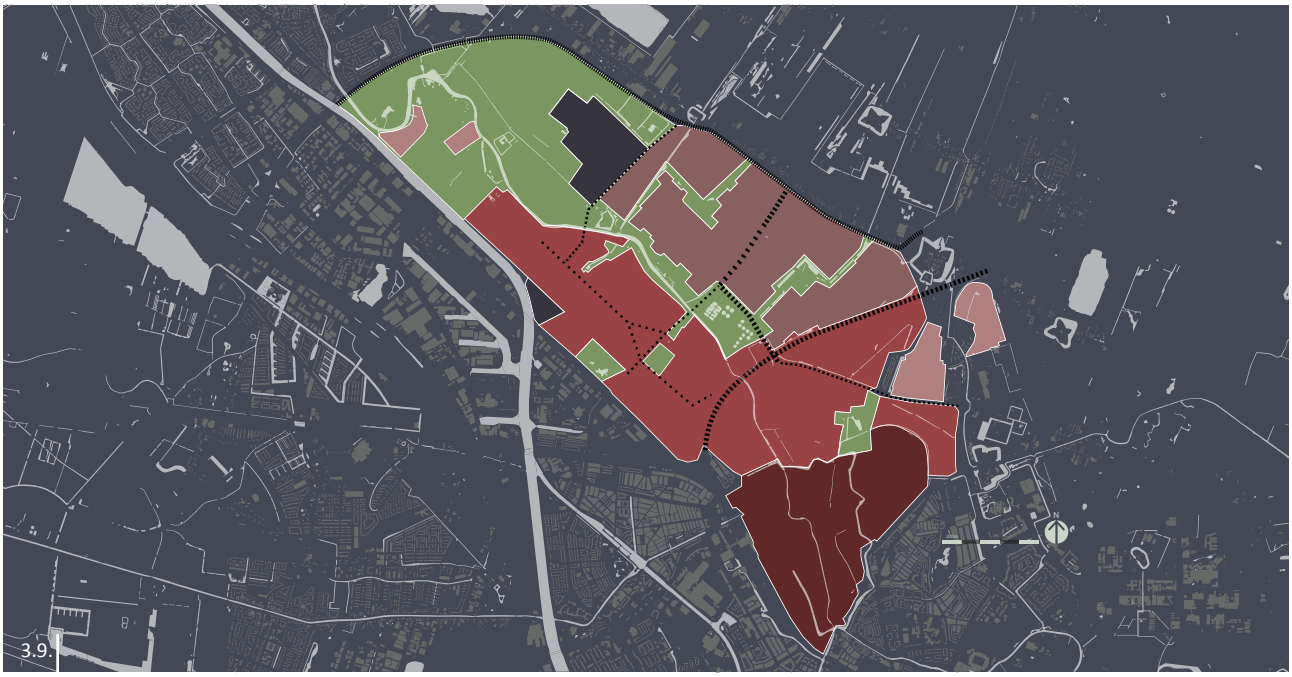


3.7.

fig. 3.6. the layer approach
fig. 3.7. scenario sketching
fig. 3.8. analysis of the area
fig. 3.9 climatope map of the area







Climatope map

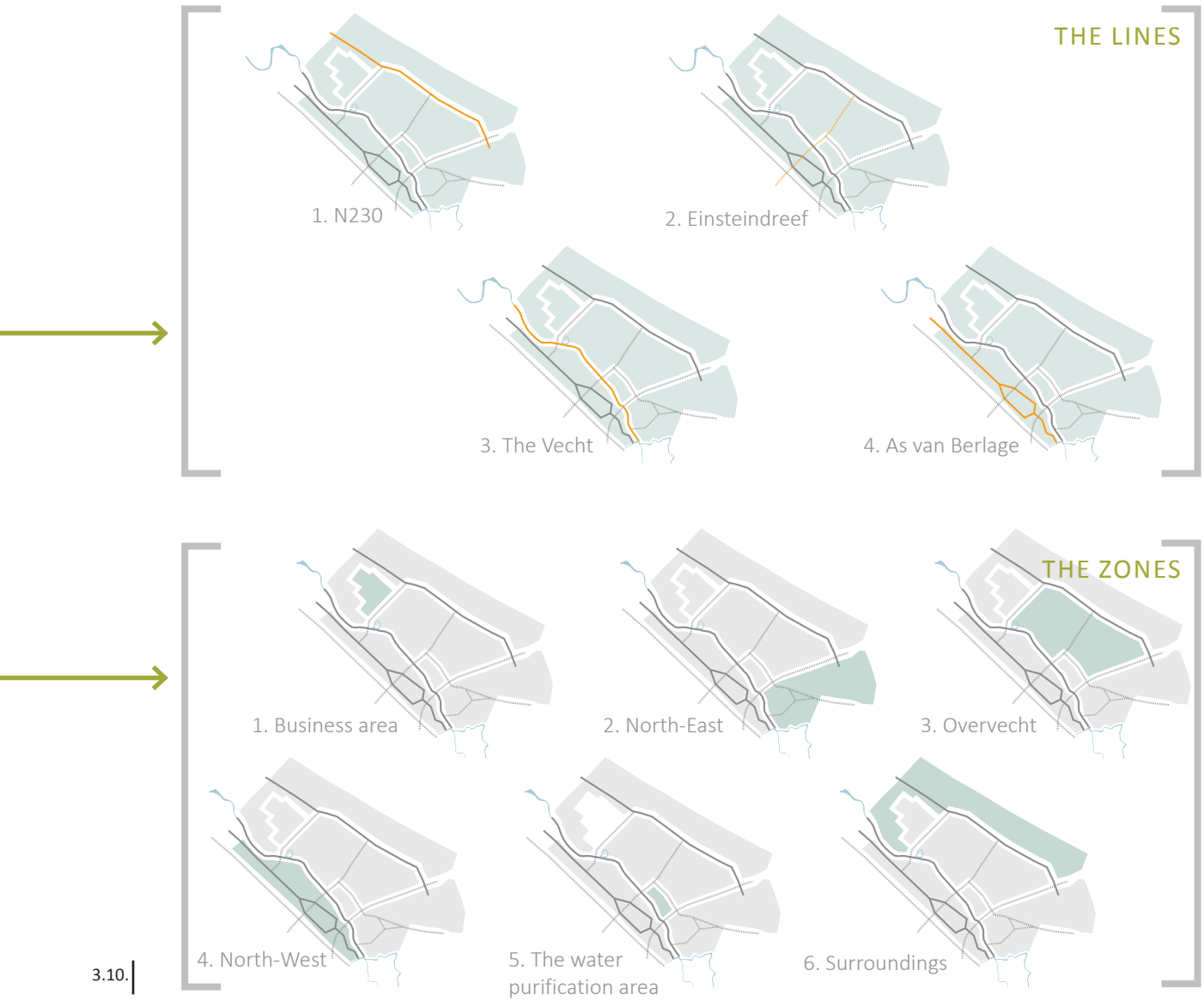
3.4. VISION STRATEGY

GAME PLAN

develop a strategy that forms a synergy between topdown and bottomup appraoches, with the eye on implementing the microclimate adaptations goals fig. 3.10.

To cope with climate change, some big infrastructural changes in the city layout have to be made, which will benefit also the areas with a higher particicipatory level, like the zones in between the lines.
From a top-down perspective, it is important that the involvement of the inhabitants gets a good position in the city development, to assure quality of outdoor spaces and provide enough freedom to intervene in the shaping of this quality. As starting point we looked for a good strategy to divide the levels of involvement (according to the participation ladder), in combination with the sensitivity of an intervention.
As a result of this challenge we came up with the division of the project area into two components; The lines and zones that give an all covering plan.

fig. 3.10. the strategy explained in a scheme to illustrate upon which aspects the game plan is based



3.10.

THE LINES

The line structures implement big structural (linear) changes to provide solutions for climate adaptation. The involvement of participation is at a minimum here, due to the complexity, economical and ecological values. The solutions have to be made as one big project and a split up into smaller subprojects would lead to a degeneration of the functionality of the intervention. Also the interventions have an effect on the meso-climate, far outside the borders of the neighbourhood.

ZONES

For the zones the leading structures (parks, waterbodies) are not designed specifically, but more preserved and protected by providing guidelines that participants need to take into account before any project can be realized. Here the role of the top-down shifts from an implementer role to an advisory role. Outside the leading structures, the freedom for participation increases and specific demands can be integrated. The zones form the base for the bottom-up structure.

3.5. TOP-DOWN VISION

INTRODUCTION

Resilient and healthy city concept that we convey here is the ability of an area to withstand climate change effect and improve the health of its citizens in the course of changing climate condition. The future climate change can have big impact on the city and therefore we have to adapt to that and think of solutions that solve the increasing Urban Heat Island effect.

The Vecht has strong structures and high availability of both green and blue components in the landscape that would benefit the area. These potentials need to be utilized in a coherent connection to achieve the sustainability goal of the concept. We approach the vision in a practical manner by dividing it into line and zone typologies with specific interventions that interrelate and support each other. This approach helps us to give an all-covering plan. fig. 3.11.

To cope with climate change, some big infrastructural changes in the city layout have to be made which will benefit also the areas with a higher participatory level. The line interventions implement big structural changes to provide solutions for climate adaptation. The solutions only provide minimum participation opportunity by the citizen because they have to be made as one big project since division would lead to a degeneration of the functionality of the intervention. The interventions also have an effect on a large scale, outside the borders of the neighbourhood of where it is implemented.

The zonal interventions provide and expect more space for citizen participation. The actions act more as a guidance of green development in the area and would be the bridge between top-down with bottom-up interventions.

The implementation of these lines and zonal interventions will not only make the Vecht area a machine to improve the quality of the environment and of the living quality of the citizen there, but would also benefit the whole city fig. 3.12. The interventions can also be replicated in other areas in Utrecht to create a coherent city.

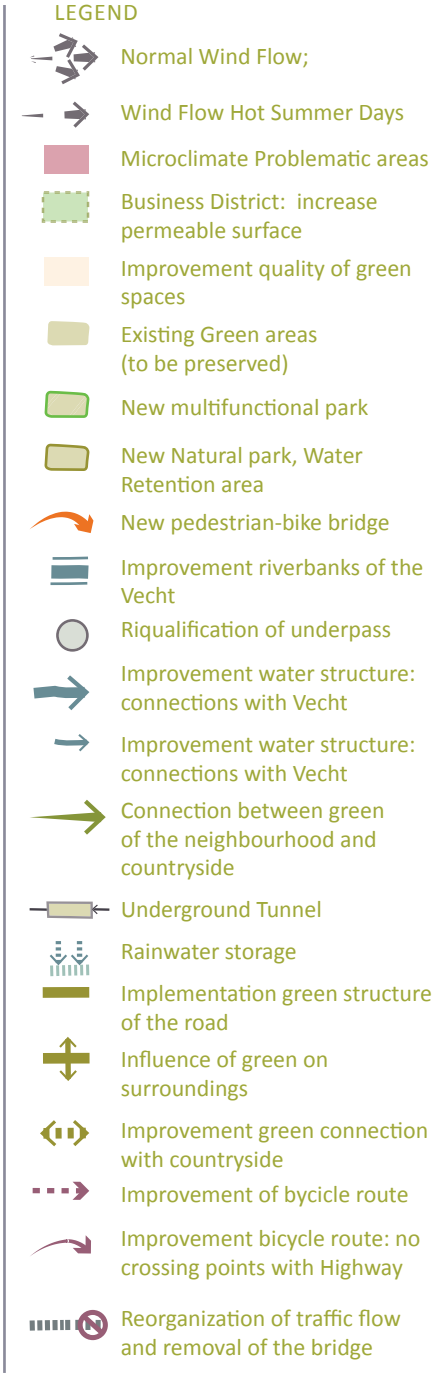
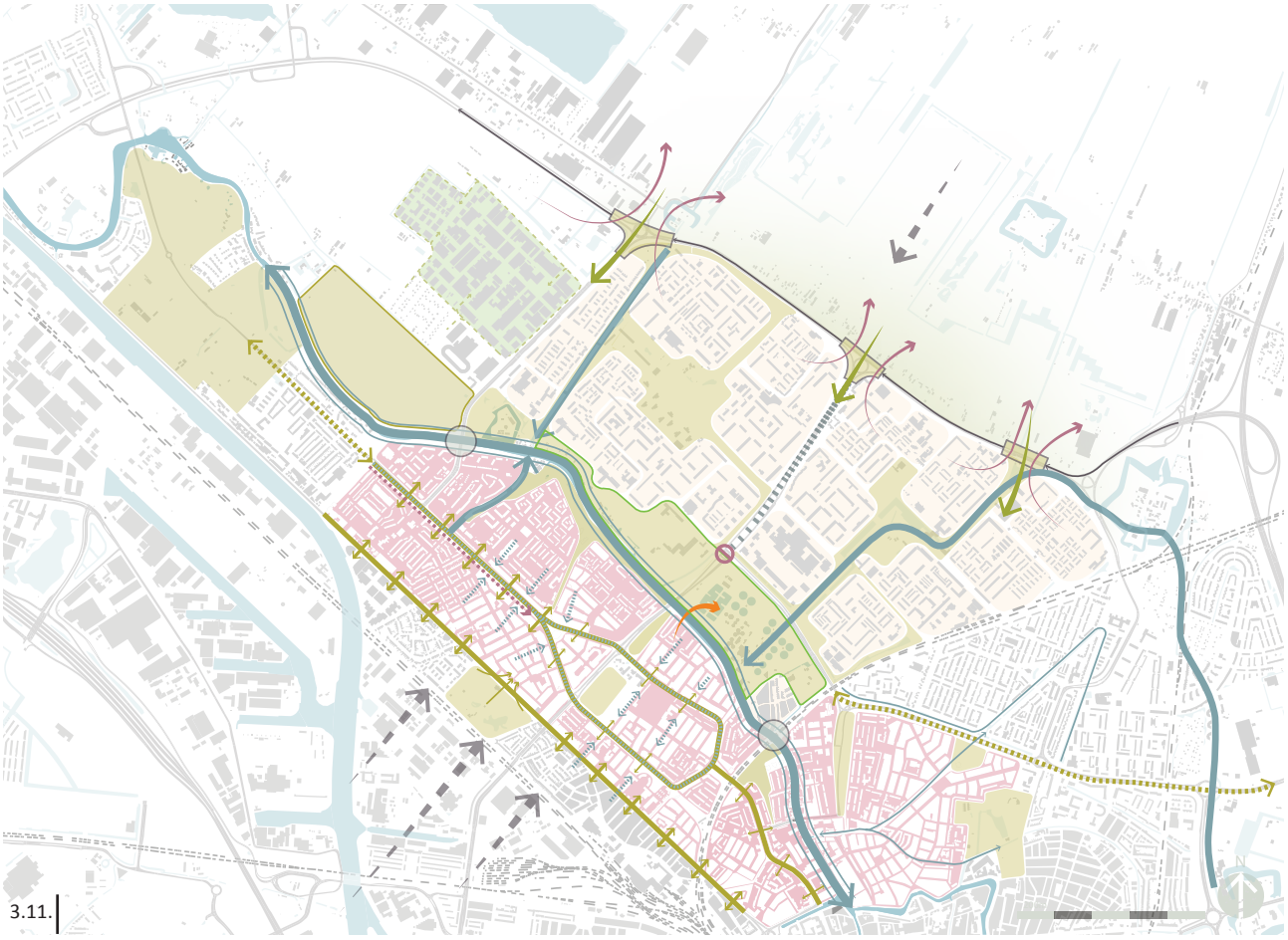


fig. 3.12. Bird view of the Vecht area, with the green structures visible along the lines



3.11.

3.12.

3.5.1. LINE 1 - AS VAN BERLAGE

PROBLEM

As van Berlage fig. 3.13. was first developed with high function as water retention, now the history is not visible anymore, the street has a busy street with high noise pollution. The greeneries along the road is not used optimally and it has no assigned path for pedestrian or bicycle. The missing water retention area also caused a surface water problem in the area.

VISION

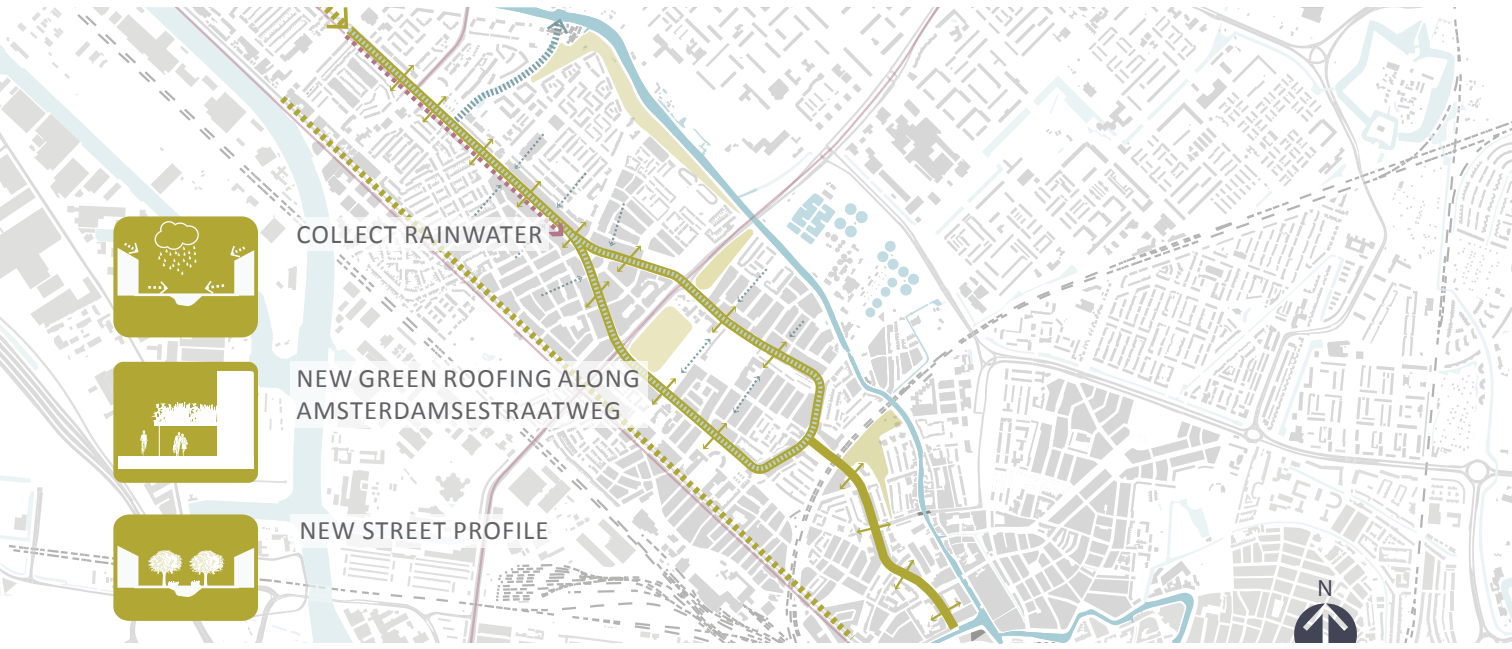
The 'As van Berlage' could function as a water infiltration system fig. 3.14., which would also return the history of the water back into the area. This can be combined with a recreational route for pedestrians under trees and this could serve the improvement of the microclimatic conditions.

3.13.

3.14.

LEGEND

- Existingmain bycicle routes
- Improving bicycle route
- Improvement green connection
- Implementation green structure of the road
- Rainwater storage
- Influence green on surroundings
- Connection with the water
- Existing green area's



3.5.2. LINE 2 - N230


3.15.


3.16.

PROBLEM

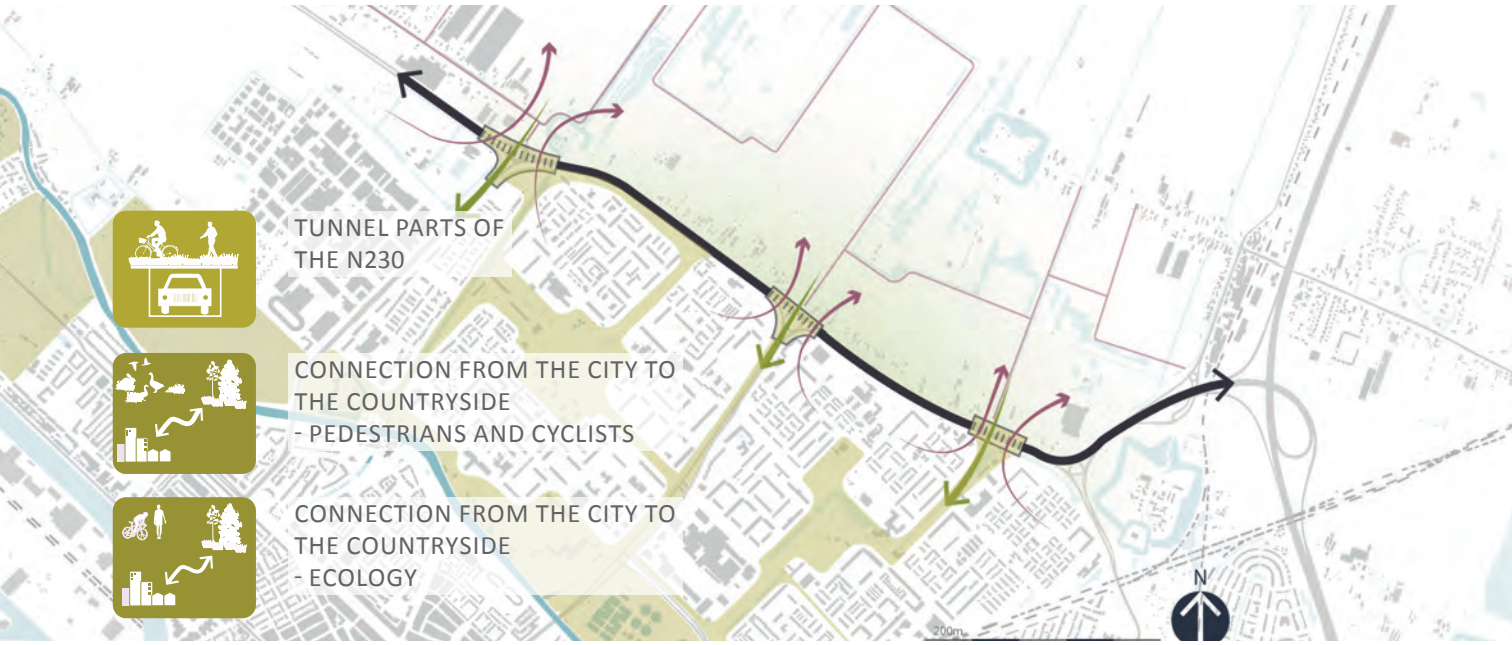
N230 is experiencing various problems induced by the high traffic volume fig. 3.15. there. The roundabouts are experiencing high traffic pressure that is followed by high air and noise pollution. The high volume also reduced the safety of the crossings for pedestrians and cyclist. The ecological value of the area is also low with the road creating an ecological barrier between the Vecht area with its surrounding.

VISION

This line consists of three main interventions: create a connection to the countryside to give easy access to the water areas around Utrecht for summer recreation, create wind tunnels to guide the wind towards Ondiep and reduce sound problems, traffic congestion and pollution by creating tunnels for theN230. fig. 3.16.

LEGEND

- Existingmain bycicle route
- Ecological connection
- Underground tunnel
- Highway
- Improvement connection bycicle routes



3.5.3. LINE 3 - EINSTEINDREEF

PROBLEM

Einsteindreef accommodates high volume of traffic that create high pressure before the bridge and the triangle of As van Berlage. This condition create a problem not only to the line but also to Oendip from the pollution, heat, and sound. The planned development of the new park on what is now water purification plant will also face a problem because of this line. The bridge of Einsteindreef fig. 3.17. will create an ecological barrier, separating the park with the green space on the north.

VISION

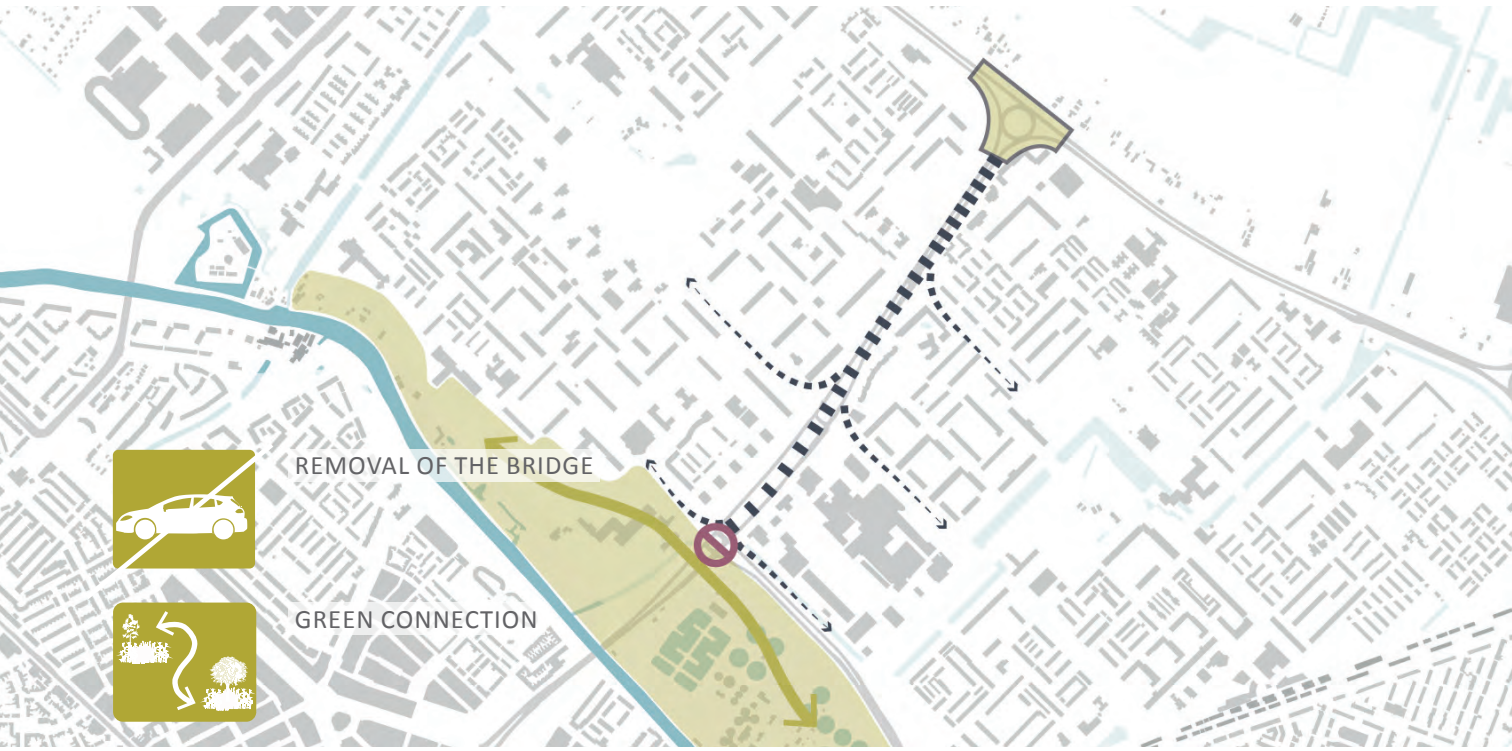
The vision is to give the road a smaller function, not as a connection trough Utrecht anymore, but only for traffic towards the surrounding neighbourhoods. fig. 3.18. Ideally, the bridge over the Vecht will be removed for a better green structure along the Vecht without barriers.

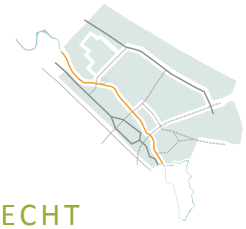
3.17.

3.18.

LEGEND

- Reorganization traffic
- Connection of green areas on the sides of the road
- Urban multifunctional park
- Removal of the bridge





3.5.4. LINE 4 - VECHT


3.19.

PROBLEM

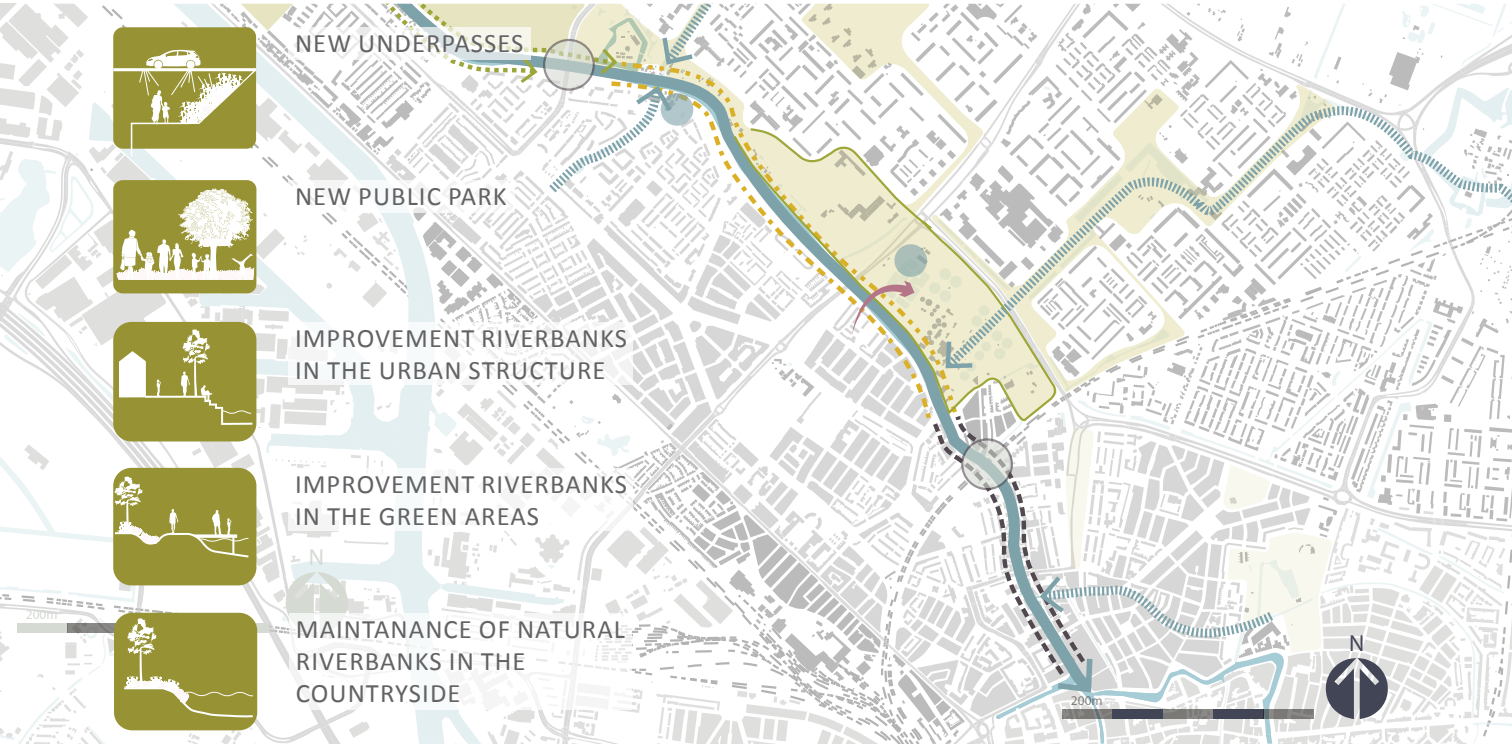
The current physical and biological condition of the stream and banks are not conducive to explore the missed potential of the Vecht. The stream has low water quality, the west banks are always exposed to the sun, there is no direct connection between the surrounding areas to the water, no recreational paths along the river, and very minimum amount of seating areas. The stream also has many barriers created by the major bridges along the transport infrastructure, parking spaces, and prostitution area.

VISION

The main idea is to improve the connection from the city centre to the countryside, both for recreation fig. 3.19. and for ecology. This connection can be created with coherent river edges and profiles. We have defined three types of edges for the Vecht, to create a good connection with possible park at the location of the water purification area.

LEGEND

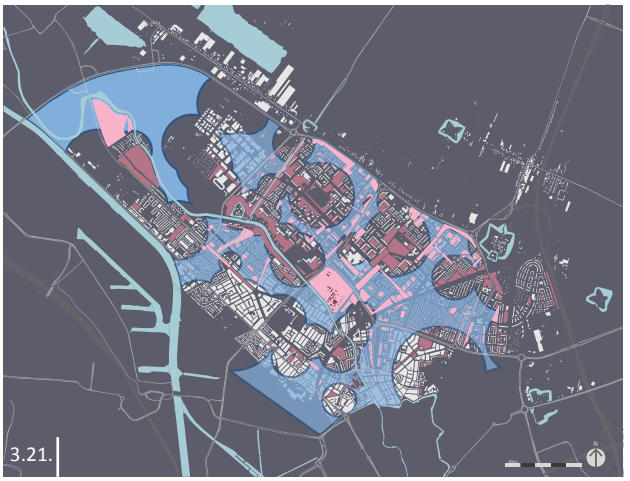
- Existing bycicle routes
- Water connection with Vecht
- New Harbour
- New pedestrian-bike bridge
- Improvement riverbanks in the urban structure
- Improvement riverbanks in the green areas
- Maintanance of natural river-banks in the countryside
- Riqualification of underpass
- Improvement existing green



3.6. BOTTOM-UP APPROACH

LOOKING FROM THE PERSPECTIVE OF LOCAL INITIATIVES

3.20. Existing projects



3.21. Emphasized spaces for new initiatives

With the dense population and high urbanization (CBS, 2013) fig. 3.20., the municipality of Utrecht is formulating the ambitions to promote the spatial qualities by implementing a robust green-blue structure for the city. fig. 3.21.

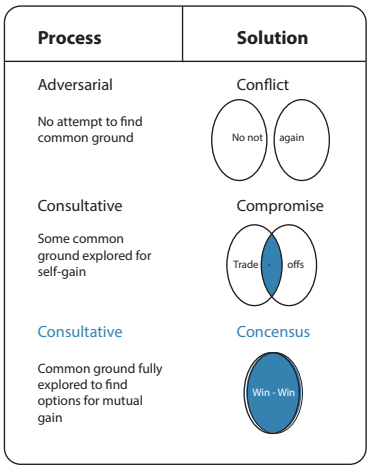
For this research goal two different explorations have been defined: a classical top-down approach and an upcoming bottom-up strategy. fig. 3.22. For the bottom-up approach, citizens get more influence in changing their public surroundings. Furthermore, citizens are becoming more and more willing to participate in the planning procedure but also in the 'self-governance' pattern. As a result, the importance of participation of citizens is emphasized and taken more and more into attention.

Analysing the history of community projects, an increase in attention and activity for community projects is observed in the last ten years as a strong global trend.

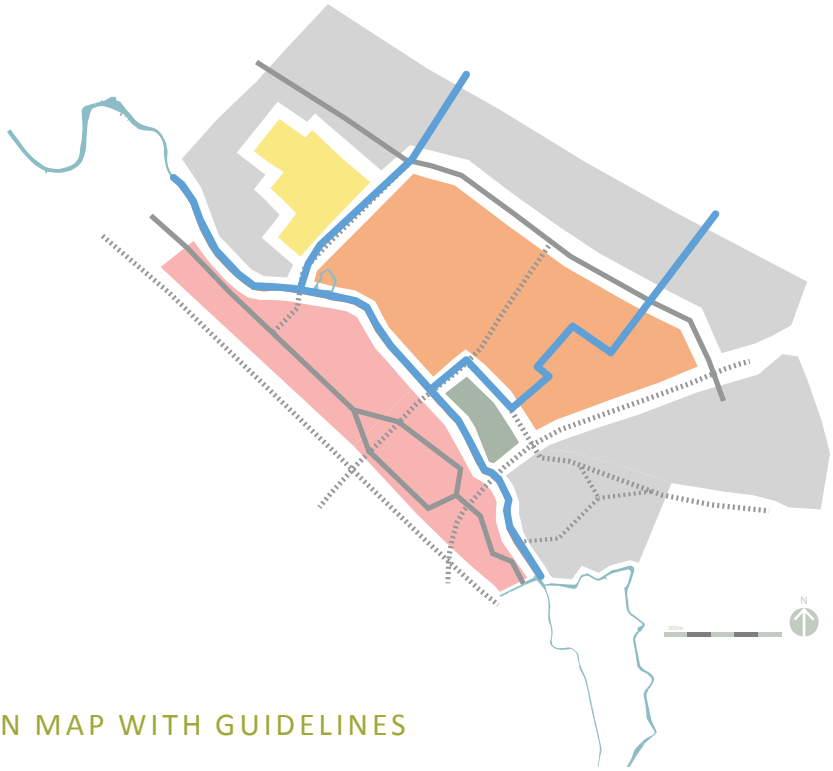
Evolution of cities has always been a result of the planning practices at different scales conducted either by city planners (top-down approach) or local initiatives and communities (bottom-up approach).

Existing projects
- bottom-up projects
- library
- park
- sports field
- radiation

Emphasized spaces for new initiatives
- abandoned buildings
- other potential spaces
- emphasized spaces
- empty spaces



3.21. Concensus: motivation for a bottom-up approach



3.23.

3.6.1. VISION MAP WITH GUIDELINES

From public to private

Allotment gardens

Water activities

Activities beside water

Activities in water

Green roofs in business area

Hang out

Lunch place

Local involment

Cultural meeting point

Animal farm

Playground

Green park

Educational gardens

Hang out place

Sports field

From gray to green

Animal farm

Playground

Cultural meeting point

Sports field

Park

Allotment garden

Container zone

Vegetation strip

Climbing vegetation

Green wall

Espaliers

THE BENEFITS OF A BOTTOM-UP APPROACH

The conventional top-down planning methods often result in conflicts between the experts regarded as planners, architects, ecologists and the communities affected. One common result of this clash is called NIMBY (not in my backyard). The professional performance of this experts can influence how a community is objecting to new developments.

The benefit of bottom-up strategies is beginning to be recognized by all kinds of structures dealing with administrative and planning sectors. fig. 3.23. The economic conditions favour in current times this.

approach due to several benefits:

• A phased approach towards long term change increases the safety in terms of investment
• Low risk investments
• Input of local ideas towards
• Creating a local identity
• Creation of social capital between people
• The space for experimentation

Hence there is a need to introduce the interventions not only from top-down but also from bottom-up.

DESIGN PRINCIPLES

According to the guidelines, some design principles relevant with micro-climate have to be considered in each neighbourhood. These design principles are based on top-down guidelines, main microclimate problems, and the profiles of neighbourhoods. fig. 3.24.

General principles

General principles for all the three neighbourhoods exist of: variety in sun/shade, high biodiversity, heat reflecting materials and controlled rainwater gathering with quick discharge.

Noordwest

Noordwests' typology exists of relatively high building density, quite narrow- and fully paved streets. There are many paved back gardens.
The main problem here is lack of amount of green.

Noordoost

Typology exists of a relatively higher amount of green than Noordwest formed by urban trees, but still a lot of streets carry the same typology as Noordwest. The main problem is a lack of the amount of green (especially on street level).

Specific design principles for Noordwest and Noordoost: it is mainly important to add green for shade, evapotranspiration and absorption of solar radiation. Currently the main microclimate problem for Noordwest will be a decrease of thermal comfort by:
- Reflection and stored radiation of heat radiation from paved materials and houses;
- Lack of shade;
- Lack of evapotranspiration for the cooling effect.

Overvecht

Typology of Overvecht exists for the biggest part of large green areas between high apartment blocks (more than 20 meters), aging from 1960-1970.
The main microclimate problem here is wind nuisance.

Specific design principles for Overvecht: new trees next to apartment blocks to decrease downwash winds (Lenzholzer, 2013). Dwelling activities like sitting and meeting other people should not be planned on narrowing spaces between apartment blocks. Each new initiative, one should always respond to the general design principles on the next page.

Main microclimate problem for each neighbourhood

1 Noordwest: expected temperature problems

2 Overvecht: wind nuisance

3 Noordoost: expected temperature problems

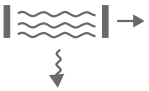
General design principles for each neighbourhood

Variety of sun- and shade (neither full shade, nor full sun)

High extend of native species for trees and shrubs: biodiversity

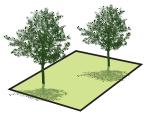
Materials: high albedo to reflect heat

Controlled gathering and discharge of rainwater and/or quick infiltration



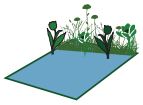
General principles

Add green on open spaces: fields (grass and vegetation). Depave paved surfaces if possible.
- Evapotranspiration
- Absorption of solar radiation

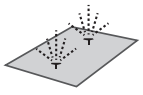


Add green on open spaces: trees and shrubs. Depave paved surfaces if possible.
- Evapotranspiration (cooling)
- Absorption of solar radiation (cooling)
- Creating shade (cooling)
- Urban air quality

Optional principles if water is used

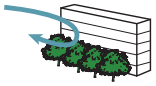


Ponds with green water banks:
- Purification improves water quality
- Evapotranspiration (cooling)
- Biodiversity
- Water buffering
- Irrigation of plant in dry periods



Water mist installations:
- Evapotranspiration (cooling)
- Irrigation of plants in dry periods

Specific principles for Overvecht

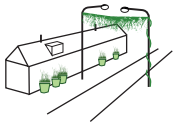


Trees or sheds on appartment borders to decrease downwash winds

Keep ventilation in order to preserve available cooling

Keep narrowing spaces between appartment blocks free from dwelling activities because of increasing wind speeds in these areas

Specific principle for Noordoost



Add green on existing elements in streets, when there is no space for green surfaces:
- Evapotranspiration (cooling)
- Absorption of solar radiation
- Urban air quality
- (Creating shade, depending on type of intervention)

3.24.

3.6.2. COMMUNICATION BETWEEN INHABITANTS AND THE MUNICIPALITY

In bottom-up initiatives, roughly four important groups are involved to make an initiative to a succes: the local authority formed by the municipality of Utrecht, investors and providers, community groups formed by the neighbourhood councils (wijkraden) fig. 3.25. 3.27. and finally the local inhabitants themselves. The outline of a bottom-up process will take the following steps to come to an agreed implementation whereas the four mentioned groups are involved:

- Taking an initiative
- Defining a shared vision
- Understanding the locality
- Developing ideas
- Agreeing a co-ordinated programme
- Taking action
- Learning lessons

Control of prospective community initiatives requires a clear communication between the four groups. Currently the neighbourhoods Noordwest, Overvecht and Noordoost have their own neighbourhood

3.25.

Possible outcome, small scale initiative

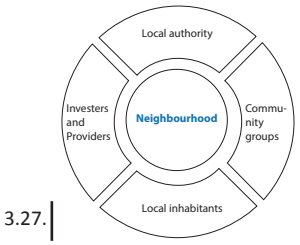
Wijkraad Noordwest

wijkraad overvecht
Betrokken bewoners in de wijk

3.26.

WIJKRAAD NOORD OOST
WIJKRAAD UTRECHT NOORDOOST

Logos of the three neighbourhood councils



3.27.

Four groups according to Shaping Neighbourhoods (2003)

3.28.

Current situation

Example of a flyer that can be handed out to the inhabitants.

council. Each neighbourhood council can serve as a central platform to organize initiative communication, whereas the neighbourhood councils form the medium between local inhabitants and the municipality of Utrecht. fig. 3.25. 3.28. 3.30. - 3.33.

Local inhabitants can be stimulated to take initiatives by spreading out a message. Inhabitants can be approached by mail, e-mail, website, social media and outdoor announcements. In any of those methods, the message should be coherent and attractive to take action. On this page there is an example of how people can be approached. fig. 3.29.

3.29.

3.30.

Current situation

3.31.

Possible outcome

3.32.

Current situation

3.33.

Possible situation

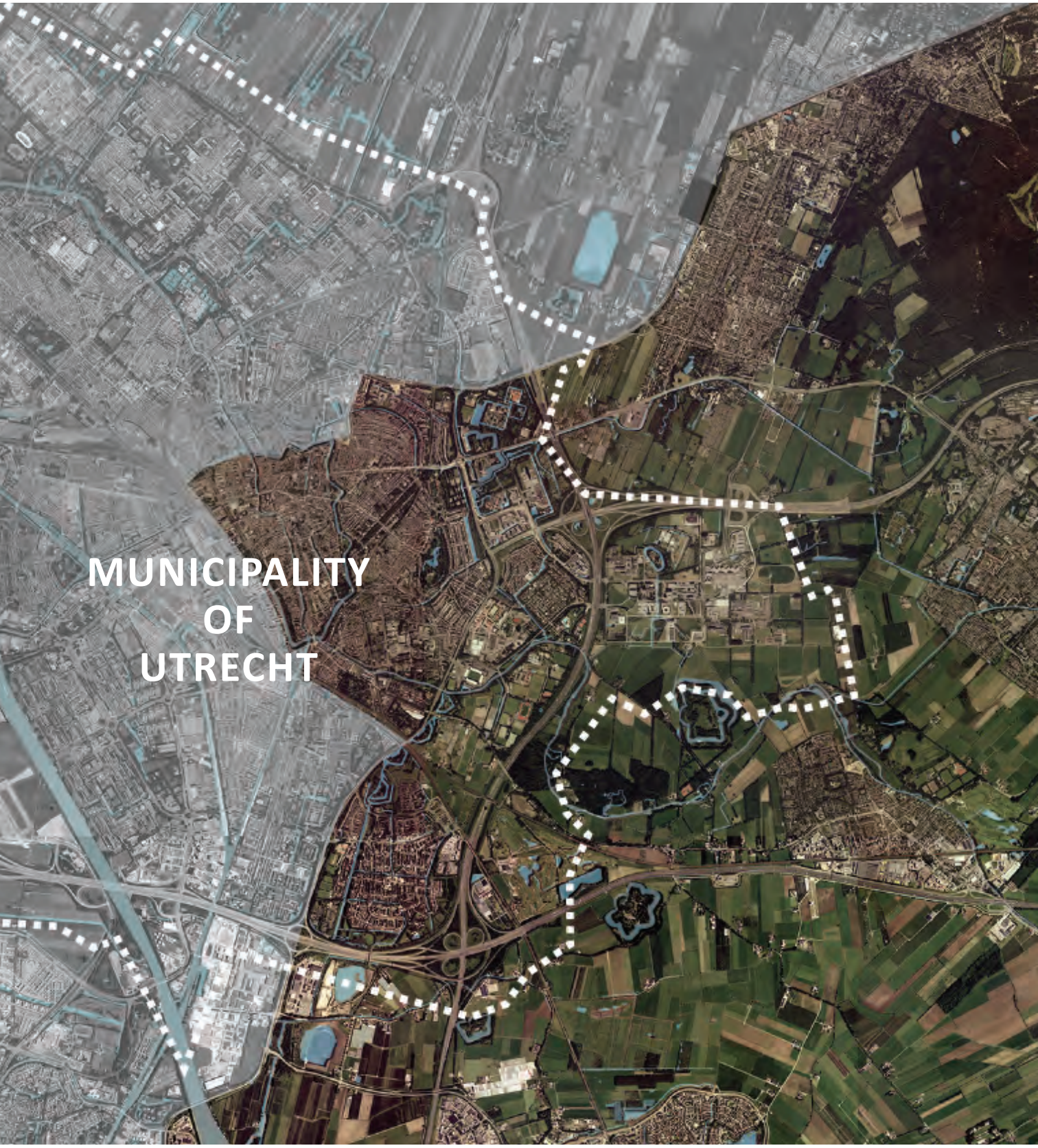
4. KROMME RIJN

INTRODUCTION

The Kromme Rijn quarter of Utrecht contains a diverse combination of land use typologies. The historic inner city is contained by singels (city moats), with garden city residential sprawl expanding outward from the urban centre toward the countryside which is increasingly feeling the pressure of development.

The Kromme Rijn itself in a river that runs from the rural area of Nederrijn by Wijk bij Duurstede toward the inner city of Utrecht. Until about 70 years ago, the river was used by "trekschuit," fig. 4.2. a kind of tugboat transportation system whereby boats stocked with goods from the countryside were pulled by a horse on the land towards the city where the goods could be sold along the canals and at market. Although the use of the Kromme Rijn as a transportation system has practically ceased, it still can be seen as a connecting element between the countryside and the city. Presently, it is used primarily as a walking path toward Amelisweerd, a historic site on which estate homes, forts, cafés and a museum can be found nestles between farms and the forest. The experience of walking along this transect is interrupted by barriers created by highway infrastructure, forcing pedestrians to use tunnels that are uncomfortably dark and narrow. One feels that the river and its surrounding area has, in a sense, been treated like leftover space by major infrastructure. Under the Municipality of Utrecht's

fig. 4.1 The part the Kromme Rijn group worked on in the city of Utrecht


MUNICIPALITY
OF
UTRECHT

4.1. APPROACH

Groenstructuurplan (green structure plan), effort is being made to correct the disconnection caused by grey infrastructure by placing more importance on improving the city's green-blue infrastructure.

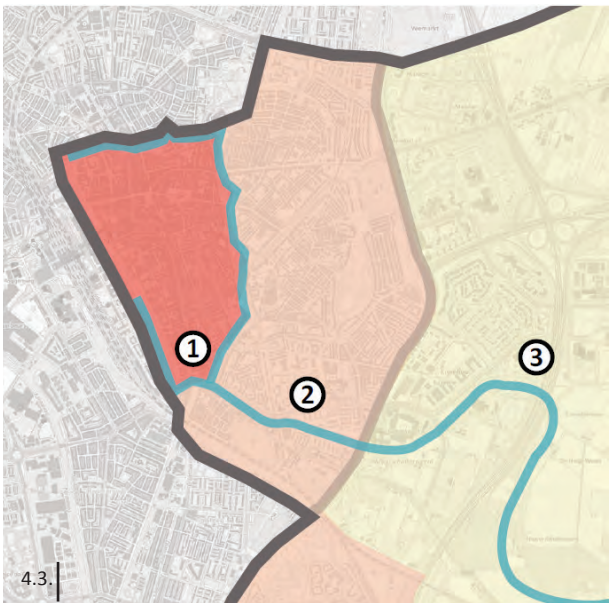
We determined that the Kromme Rijn area can be divided into 3 different typological zones, with the Kromme Rijn as the interconnective element running between the three other zones. fig. 4.3.

Zone 1 is the historic inner city, with landmarks such as the Dom Tower characteristically Dutch architecture. The boundary of this zone is the singel, which was constructed in the middle ages, and together with the inner city canals, they make up zone 1's blue infrastructure. Zocher park also follows the singel, however the green infrastructure of this zone is comparatively lacking due to a high proportion of paved ground surfaces and high density. Zone 2 is a residential expansion area of the innercity. The larger part of this zone is designed around the garden city concept, which is concerned with a balanced ratio of green space in residential areas. Zone 3 is defined by its green and recreational aspects. This zone also includes the University of Utrecht De Uithof campus, and the popular recreational destination Amelisweerd. Infrastructure plays a big role in both servicing and dividing this area, the highway A27 and a provincial road create hard borders that define zone 3.

fig. 4.2. Boccar, Hore's painting, ' Trekschuit naar Volendam' presents the history of the Kromme Rijn
fig. 4.3. Zone division based on different characteristics

Each of these zones comes with unique functions, opportunities, and constraints. The overarching goal of our research is to consider the existing green-blue network, and imagine ways in which we can make improvements. We concluded that improving the connectivity of the existing green-blue network will simultaneously improve its multi-functionality. Four main categories of functionality are considered (ecosystem, social, microclimate management, and hydrological functions) in our definition of multifunctionality. When multiple, complementary functions are present in a green-blue network, the network can be viewed as a resilient system. What follows are our strategies that approach multifunctionality in the Kromme Rijn area from both a grassroots bottom-up and traditional top-down approach.

4.2.



4.3.

4.2. BOTTOM-UP

4.2.1. BOTTOM-UP ANALYSIS

There are several local initiatives active in this part of Utrecht. From our interviews and content analysis we learned their focus, ideas about, and plans for the green-blue network in the Kromme Rijn area. These local actors have a lot of tacit knowledge about the area. They draw upon their own experience with the neighbourhood (Rojas Blanco 2006). From a governmental perspective there are several benefits of community involvement. Bailey (2010) identifies five core objectives:

- To provide information and to enable people to express opinions about policies which will affect them;
- To improve the quality of local decision-making by drawing on tacit knowledge;
- To improve the quality and responsiveness of local services by engaging users in management decisions;
- To re-engage local people with local democratic processes and renew civic society;
- To transfer to residents and recipients direct or indirect powers to manage assets or deliver services for themselves.

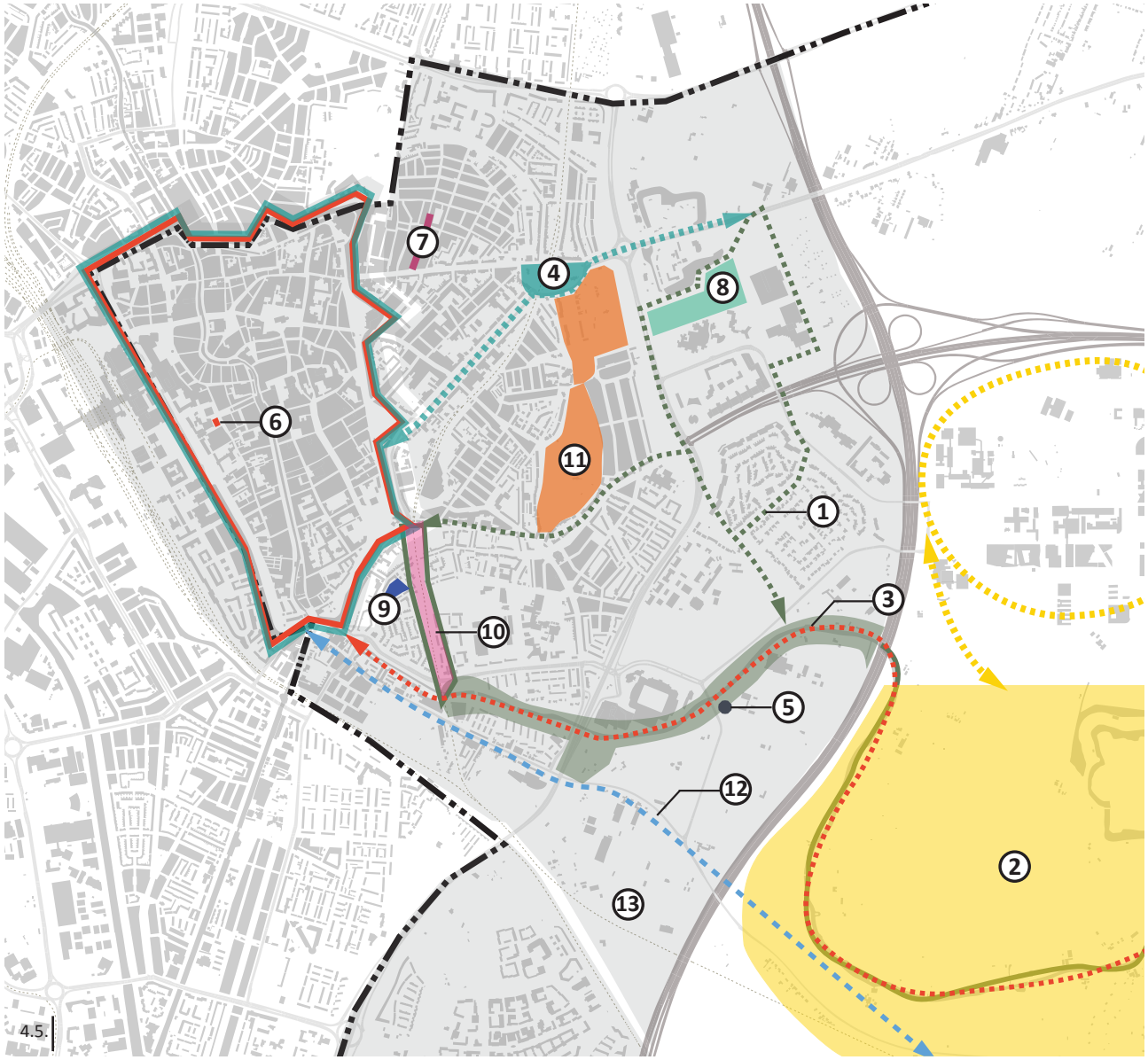
We mapped the active local initiatives in this part of Utrecht to identify the influence they can have on the green-blue network. Their working, or focus areas are represented in fig. 4.5. These local initiatives mostly have plans and ideas about preservation and improvement of the green-blue network. For example Stichting Krommerijnpark wants to preserve the green embankments of the Kromme Rijn river. They also made designs for improvement of the embankments of the Kromme Rijn and how the river could be connected with other water bodies in the Kromme Rijn area. In this way they want to create a network for both recreation on and along the water, as well as for ecological functions.

As mentioned before the multifunctional aspect of the green-blue network is important. Therefore we identified the function(s) each local initiative focusses on. We assessed their plans for each function of the green-blue network and represented this information in fig. 4.4., 4.6.-

Legend

- **1** Krommerijn park
- **2** Vrienden van amelisweerd
- **3** Utrechts Landschap
- **4** Singelgebied
- **5** De Moestuin
- **6** Pandhof Sinte marie
- **7** De Bikkershof
- **8** Park Bloeyendaal
- **9** Dierenweide Abstede
- **10** Stichting Oosterspoorbaan Utrecht
- **11** Stichting Wilhelminapark
- **12** Stichting het Boompje
- **13** Wijkraad

From top to bottom
fig. 4.4. Microclimate functions
fig. 4.5. Hydrological functions
fig. 4.6. Social functions
fig. 4.7. Ecosystem functions
fig. 4.8. Map of the focus areas of the different local initiative in the Kromme Rijn area



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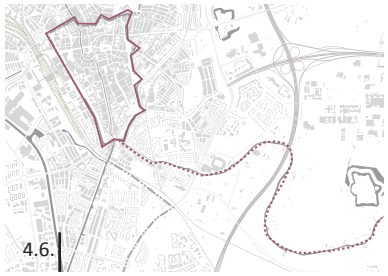

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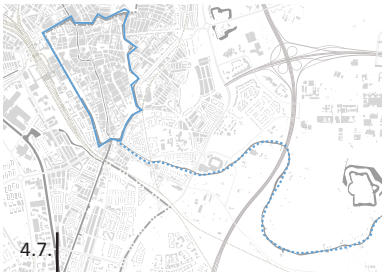

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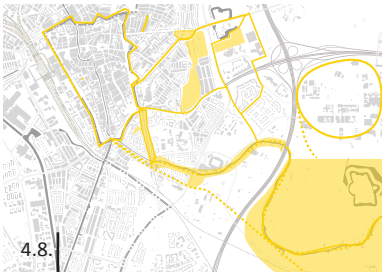


4.8.

4.8. Most of the plans and ideas of the local initiatives focus on only one or two functions, as can be seen in fig. 4.9. The two functions that are most present in the plans and ideas of the local initiatives are ecological functions and social functions, like recreation and cultural heritage. Just one local initiative took other functions like hydrology and microclimate management into account in their ideas.

For the city of Utrecht, and especially our project area that includes the city centre, it is important to keep microclimate management and hydrological functions in mind. From the climatope map it shows that there are vulnerable areas in our area where the urban heat island effect can have negative impacts on the liveability of the city. From our analysis it also evident that local initiatives are not focussed on the potential microclimate management functions that the green-blue network can provide.

Most of these ideas and plans are however not realised. On the map the local initiatives seem to form a connected green-blue network, but the reality is different because of unimplemented ideas and plans. These maps therefore do not show the current situation but are more an illustration of the potential that is there when it comes to working together with local initiatives more.

To conclude, local initiatives are making a lot of plans and ideas, but multifunctionality and connectivity are sometimes lacking. Especially hydrological functions and microclimate management functions are missing in their plans. Furthermore, some local initiatives have the same goals but they do not always work together to reach these goals. In the Kromme Rijn area there are not really big problems, but the things mentioned in this conclusion are challenges for the Kromme Rijn area to make the area even better.

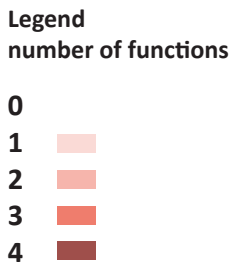
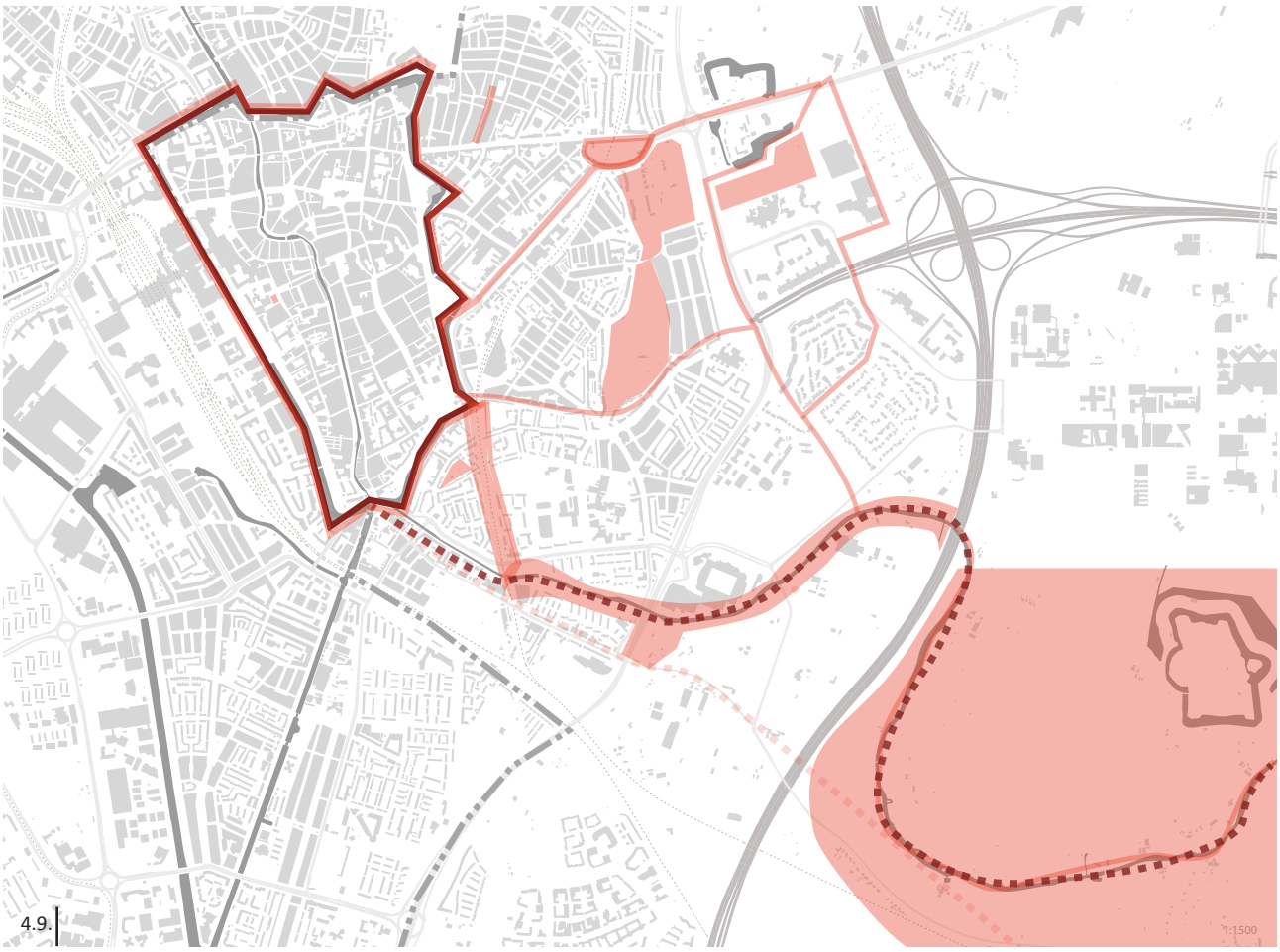


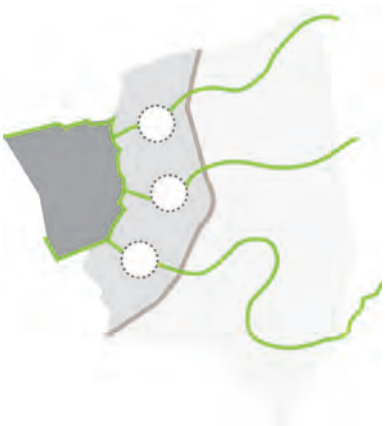
fig. 4.9. map of the multi-functionality of the ideas and plans for the focus areas of the local initiatives
fig. 4.10. Green roundabout concept



4.9.

4.2.2. BOTTOM-UP VISION

As we identified in the analysis we can roughly divide this part of Utrecht into three distinct zones with each a different typology. The inner-city is the highest risk zone in terms of thermal discomfort and heat stress. A high quality green-blue connection can provide acces to functions for this area that are not present in this area. Therefore good connections with the green-blue elements in zone 2 and zone 3 are necessary. The green-blue belt around the inner-city can function like a green-blue roundabout with exits to radians which extend out of the city to the country side fig. 4.10. On these radians the green-blue elements of zone 2 are located as stepping stones. The roundabout in zone 1, the steppingstones in zone 2 and the radians going to zone 3 can be used to leave the inner-city on hot summer days. This network also can be used the other way around to enter the city and to recreate in the inner-city.



4.10.

At this moment, the activities of local initiatives are almost spatially laid out to form this green-blue roundabout with exiting radians. There are however some gaps in the network and the connections between the focus area of the initiatives are also lacking. Therefore the focus areas of the local initiatives should be stitched together, like little pieces of fabric are stitched together into one big patchwork. In figure 11 we propose special points of interest in the Kromme Rijn area where the stitching should be done. Potential areas, as well as implemented and future plans of the local initiatives are touching each other on these points of interest. In this way all the focus areas of the local initiatives together can form a good multifunctional green-blue network in the whole Kromme Rijn area. To complete the metaphor of the patchwork, someone should do the stitching. In fig. 4.11. we also identified the areas that could contribute to the green-blue network but are not represented by local initiatives.

4.2.3. BOTTOM-UP STRATEGY

In order to stitch the focus areas of the local initiatives together, we advise the government to initiate and facilitate an active platform. fig.4.12. In this platform the key persons of the local initiatives can meet each other on a regular basis. The local initiatives can learn from each other's strategies and ways of working. They can use each other's network of contacts, such as scientific experts, designers and entrepreneurs. The government can provide information to these local initiatives about legislation, procedures and co-production. One of the most important advantages of this platform is that the government keeps the bigger picture in mind. The government should stimulate multifunctionality and connectivity in the ideas and plans of the local initiatives. By bringing the local initiatives and the government together they can talk about their interests in the area and think of win-win solutions. The government should be aware of their role in this platform. They should not dictate to the local initiatives what they must do, they should leave room for the local initiatives to create their own ideas and plans for the area.

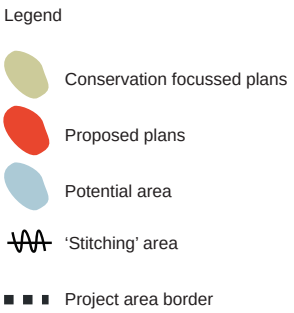
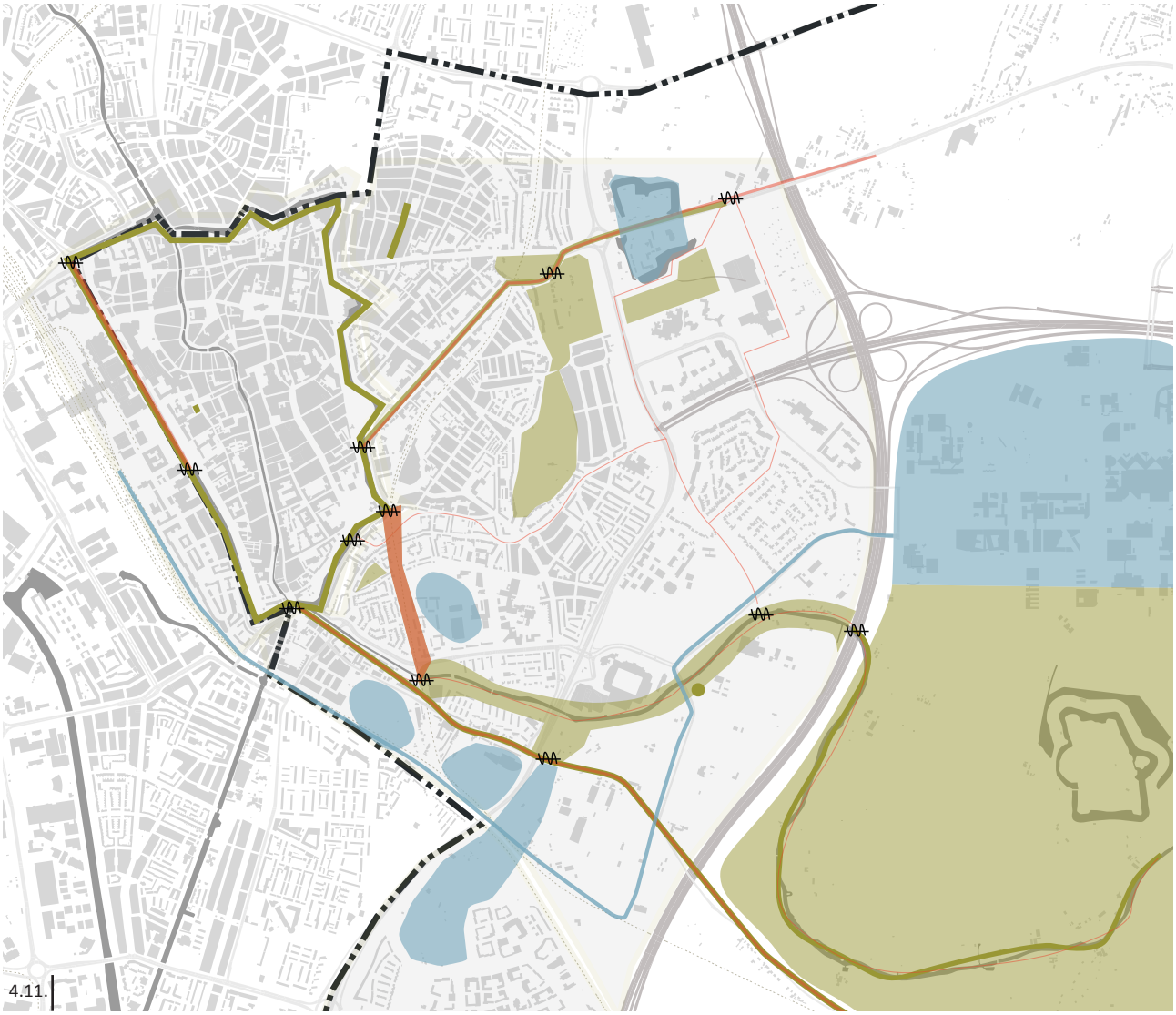
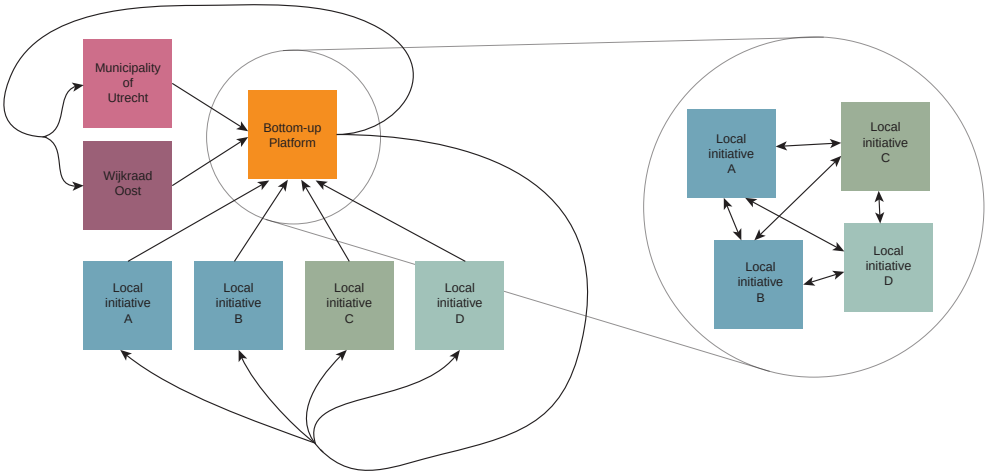


fig. 4.11. Vision map
fig. 4.12. Organogram of local initiative platform



4.11.


Municipality of Utrecht
Wijkraad Oost
Bottom-up Platform
Local initiative A
Local initiative B
Local initiative C
Local initiative D
Local initiative A
Local initiative C
Local initiative B
Local initiative D

4.12.

4.3. TOP-DOWN

4.3.1. INTRODUCTION

A range of planning plans with implications for the Kromme Rijn area have been made by different tiers of government (national, provincial and municipal). In order to create a comprehensive and overarching vision, we assessed the governmental plans and policies. Not only does our vision consist of elements and concepts we developed ourselves, our vision also consists of the elements and concepts of governmental visions we deemed most strong. To address urgent planning issues, we propose using the green-blue network to create a sense of coherence and priority.

4.3.2. CARRIERS FOR THE VISION

Our vision is carried by two elements, De Uithof with the highway A27 and the Kromme Rijn. The sections below gives a brief overview of the characteristics of these carriers.

From the analysis mentioned above it became clear that a vision addressing a top-down perspective on the future development of the east side of the city of Utrecht requires more consideration on how to further develop De Uithof and the highway A27. In order to formulate a vision that focuses on enhancing the synergy between different functions and locations, our vision will focus strongly on De Uithof and the highway A27 as a catalyst for enhancing the entire east side of Utrecht in order to create mutual gains situations.

The Kromme Rijn is one of the few slow-streaming rivers in the west of the Netherlands. That trait makes the river interesting from both an ecological and a landscape point of view (Gemeente Utrecht 2009). But the Kromme Rijn also creates a special atmosphere, it is a meandering and tranquil structure in an (semi-)urban environment characterised by evocations of pragmatism and dynamism. We want to preserve this special character and spread it to other areas in or near the city, that is why we use the Kromme Rijn landscape as one of the carriers for our vision.

4.3.3. STRATEGIC PERSPECTIVE ON MULTIFUNCTIONALITY

In the strategic perspective, the ambition is expressed to make Utrecht an even more attractive place to live by creating more green in the city. Creating more green spaces and optimising the possibilities to use the parks in the city should enhance the possibilities for recreation and experiencing nature in the city.

There is an increasing pressure on nature, especially at the urban fringe. Green spaces need to permeate the city, and the landscapes of the surrounding countryside should act as a structuring principle for the expansion of the city. The Kromme Rijn has the role to act as a green wedge that goes deep into the city. The urban fringe should have a strong relation with the quality and appearance of the landscape as well (Provincie Utrecht 2010).

With regard to ecology, it should be noted that the ecological value of green-blue networks (especially the Kromme Rijn) can be enhanced and combined with other functions (Bestuur Regio Utrecht 2011; Gemeente Utrecht 2004; Provincie Utrecht 2013).

Another topic that is important is the improvement of the quality of the urban fringe by the realisation of pleasant accommodation options, good connections from the city to the countryside and an appealing transition from rural to urban. Though, such elements have to fit into the typology of the area.

The study area accommodates relatively many elements that are of cultural-historical value. The quality and identity of cultural-historical features and the extent to which these features are used as a structuring principle in guiding further development of the area is in need of optimisation. It is important to preserve the unique existing urban quality with attention for cultural history, identity and supply of facilities. (Bestuur Regio Utrecht 2011; Gemeente Utrecht 2004; Gemeente Utrecht 2007; Provincie Utrecht 2010B)

Utrecht, being a densely built city, the importance of the countryside as a place to reside increases. The highway A27 is perceived as a barrier that makes De Uithof a remote place, which is not attached to the city of Utrecht. It is furthermore expressed that the place where the Kromme Rijn crosses the highway A27, is a bottleneck for recreation.

It is our ambition to relate the vision on the Kromme Rijn itself to the plans focusing on De Uithof in order to create spatial- functional unity between De Uithof and the Kromme Rijn. We, in turn, focus more strongly on enhancing the qualities of the Kromme Rijn and use De Uithof as an asset to improve other functions.

In spite of the fact that the government does not explicitly mention multifunctionality and especially the multifunctionality of green-blue networks as an important topic, our vision can add a fresh perspective on multifunctionality. That can be of perceived value when developing new plans.

4.3.4. CHARACTER OF THE VISION

The vision is basically a dovetail joint of the governmental perspective on the current multifunctionality of the green-blue networks in the project area and the local community's perspective on the same green-blue networks. The vision combines these two perspectives in order to give an impression that is based on the commonalities and differences in perspectives.

De Uithof will become the carrier of the development of the Kromme Rijn area, it provides new possibilities to improve the Kromme Rijn area and the accompanying green-blue network, microclimate and recreational structures.

Our vision contributes to diminishing the obstructing character of the highway A27 by placing the highway, between the junctions Lunetten and Rijnsweerd in a tunnel shaft. Lowering the highway A27 will mitigate the extent to which the highway is perceived as a barrier between Utrecht and the surrounding countryside, allowing the city of Utrecht to feel as one entity again. Moreover, bridging the highway with the "Recroduct" and the aqueduct will make the connections even better. fig. 4.15.- 4.17.

An attractive route towards that countryside is of core importance. So as to weave the recreational structures of the countryside into the city, our vision emphasises the importance of creating more connections between the city and the countryside. The recreational structure alongside the Kromme Rijn should be able to accommodate different recreational activities.

4.3.5. CONNECTING GREEN BLUE NETWORK

In order to enhance the number of connections between different green-blue networks, we propose to use the Oosterspoorbaan (former railway line) to connect the Zocherpark with the recreational structure running alongside the Kromme Rijn. By doing so, a more intermeshed

4.13.

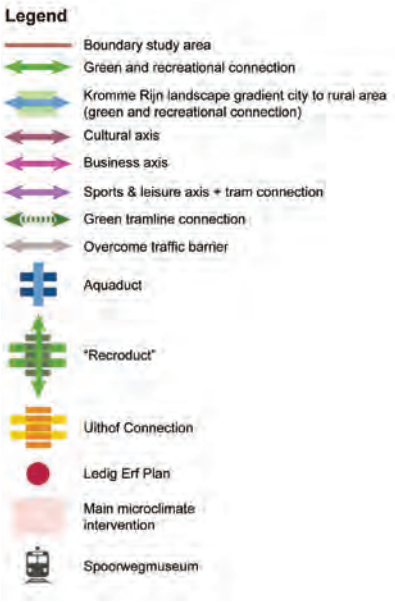
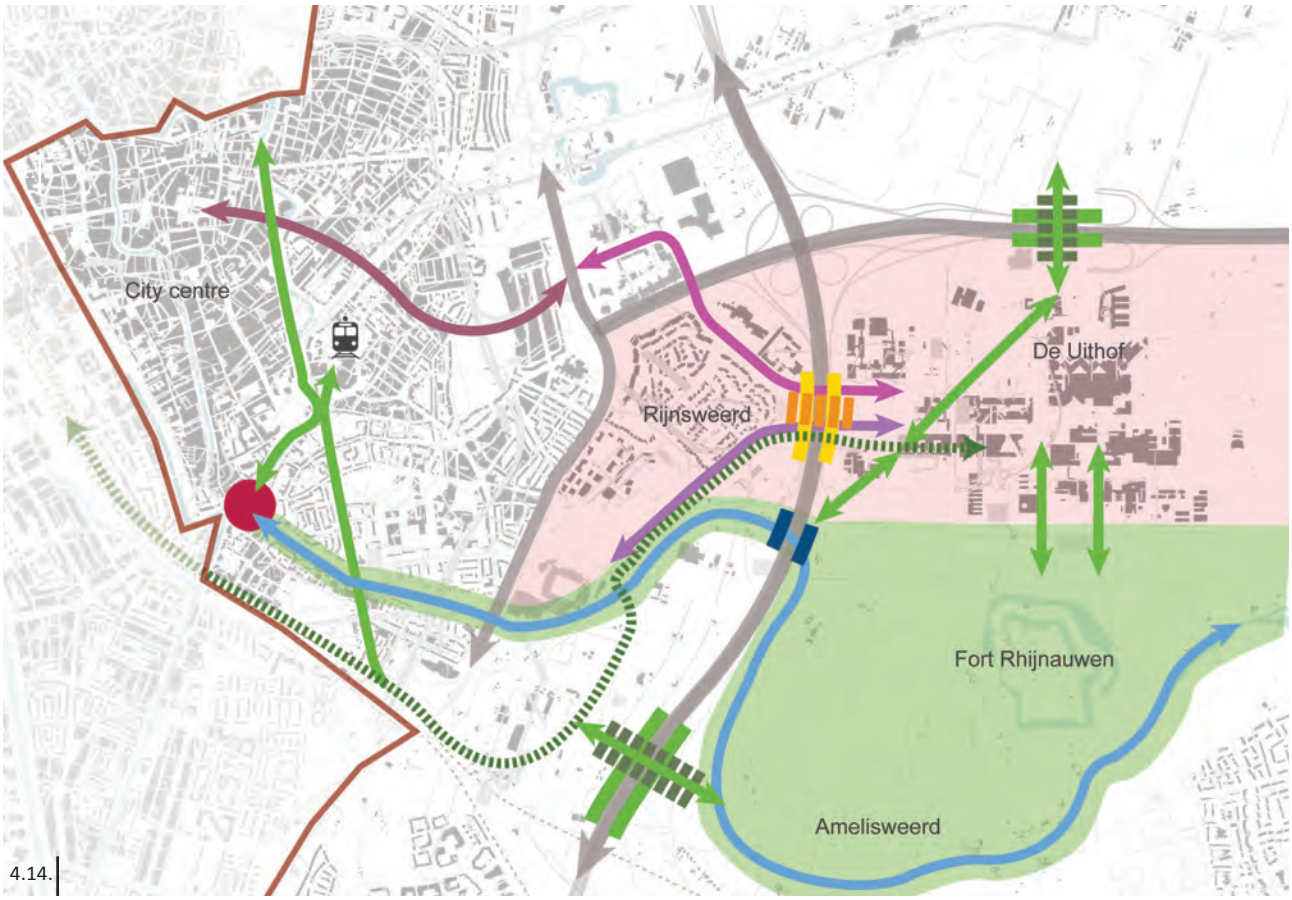


fig. 4.13. Logo USP²: Utrecht Science Park as Unique Selling Point
fig. 4.14. Vision map

green structure emerges. From this it follows that turning the Oosterspoorbaan into a (recreational) green structure will not only enhances the green-blue networks in Utrecht but also creates an additional thoroughfare connection between the city centre and De Uithof.

The cultural-historical value of the Kromme Rijn will be made more explicit by using the characteristic Kromme Rijn landscape as a structuring principle in further developing the green-blue networks around the Kromme Rijn. This can also be applied to the neighbourhood green spaces in neighbourhoods adjacent to the Kromme Rijn.

Our vision on the Ledig Erf also focuses on giving the Ledig Erf a more recognisable appearance by emphasising the point where the Kromme Rijn meets the canal surrounding the city centre. To mitigate the busy traffic on Ledig Erf, a traffic plan is made.



4.14.

Providing the traffic with a detour around the Ledig Erf and therefore mitigating the traffic volume. That means that there will be more space for green elements and make this place impressive and recognisable.

While contemplating our vision, we became aware of the fact that our vision accommodates two different types of functions, highly dynamic functions like De Uithof and low dynamic functions like nature. This division in dynamism finds concordance with a framework for dynamics as developed by Sijmons (2006). We propose to use Sijmons' framework as the steering principle, the strategy to implement the vision.

Low dynamic functions are functions that are characterised by long to very long development processes. Examples of such functions are nature, forestry and potable water in relation with microclimate.

Applying Sijmons' framework to our vision means that the elements in our vision will be divided in highly dynamic and low dynamic perspective. With regard to the latter point, the low dynamic functions in our vision are:

- Nature areas like Amelisweerd and the vegetation that is used to embed De Uithof into the Kromme Rijn landscape;
- The historical city centre, since this centre is preserved and protected and therefore the lay-out of the centre and the looks of the buildings cannot be changed.

If the pace of the market forces (mainly applicable to De Uithof and the more urbanised parts of Utrecht) would dictate the pace of the development in the countryside surrounding the city of Utrecht, then low dynamic functions like nature in the countryside will be disregarded. Therefore, it is important to dedicate attention to the long term developments that facilitate or enhance the more short term highly dynamic functions. In order to do so the following rules are proposed (Sijmons 2006):

4.15.

4.16.

Top to bottom:
fig. 4.15. Aqueduct
fig. 4.16. Recroduct with seperate corridors for ecology and recreation
fig. 4.17.Recroduct

- Combine low dynamic functions and unite them in a separate framework;
- Safeguard the development of low dynamic functions by appointing locations in which these functions are (and will) not be negatively affected by other functions;
- Provide highly dynamic functions with the possibility to develop without being slowed down. In this context, flexibility is of core importance, because developments are only predictable to a limited extent and are subject to quick changes.

If our vision consists of a patchwork of different functions, than these functions are the various patches. The strategy here is the thread that keeps all these patches together in order to form a resilient and unique area in which green-blue networks and multifunctionality can thrive.

The interventions will affect a large constellation of stakeholders and will require a large amount of (economic) resources. However, these interventions are also possible solutions to problems with relatively large-scale and far-reaching consequences (like the connectivity and resilience that are in need of enhancement). From this it follows that it is not realistic to presume that such problems can be solved locally. In order to adequately solve these far-reaching and local scale transcending problems, coordination, facilitation and stimulation by (among others) the provincial government are required.

4.17.

4.4. CONCLUSIONS

4.4.1. THE POWER OF WORKING TOGETHER

Between the two visions and strategies are both differences and overlapping elements. The two plans complement each other by addressing each others gaps, as well as by focusing on different scales. By examining the visions and strategies of both approaches, one coherent plan can be created for the total Kromme Rijn area. This makes the plan stronger than using separated plans. An overview of the overlapping elements, as well as the differences can be found in fig. 4.18.

But why is the combination so powerful? The strength is in the dialogue between and combination of the two visions and strategies. The different approaches have their own strengths, and by working in combination they can becomes even stronger. An important example is filling the gaps. Gaps can be seen as themes that are not taken into account. The focus on different themes creates gaps in the plans of the local initiatives and the government. By combining the plans, all themes are taken into account, and ideally the gaps can be filled. This is the same for the issue of scale. The different organisations are focusing on different scales; at the small scale the bottom-up actions are more powerful. These organisations know what is important in the area and they can set goals that they feel connected with and responsible for. On a larger scale, the government is more powerful.

In the interest of serving its citizens, the government should be the catalyst that fills the gaps and stitches all ideas and plans together into one coherent plan, which attempting to keep their own priorities and qualities, as well as those of others into account. The themes of the local initiatives are close to home: the ideas they feel connected with. The government, with a responsible to public health and safety, must keep an overview of the projects in the total area. Through cooperation between the government and stakeholders, the power differences can be found and the gaps can be filled. Let's work together and make the Kromme Rijn area a green-blue landmark for the city of Utrecht.

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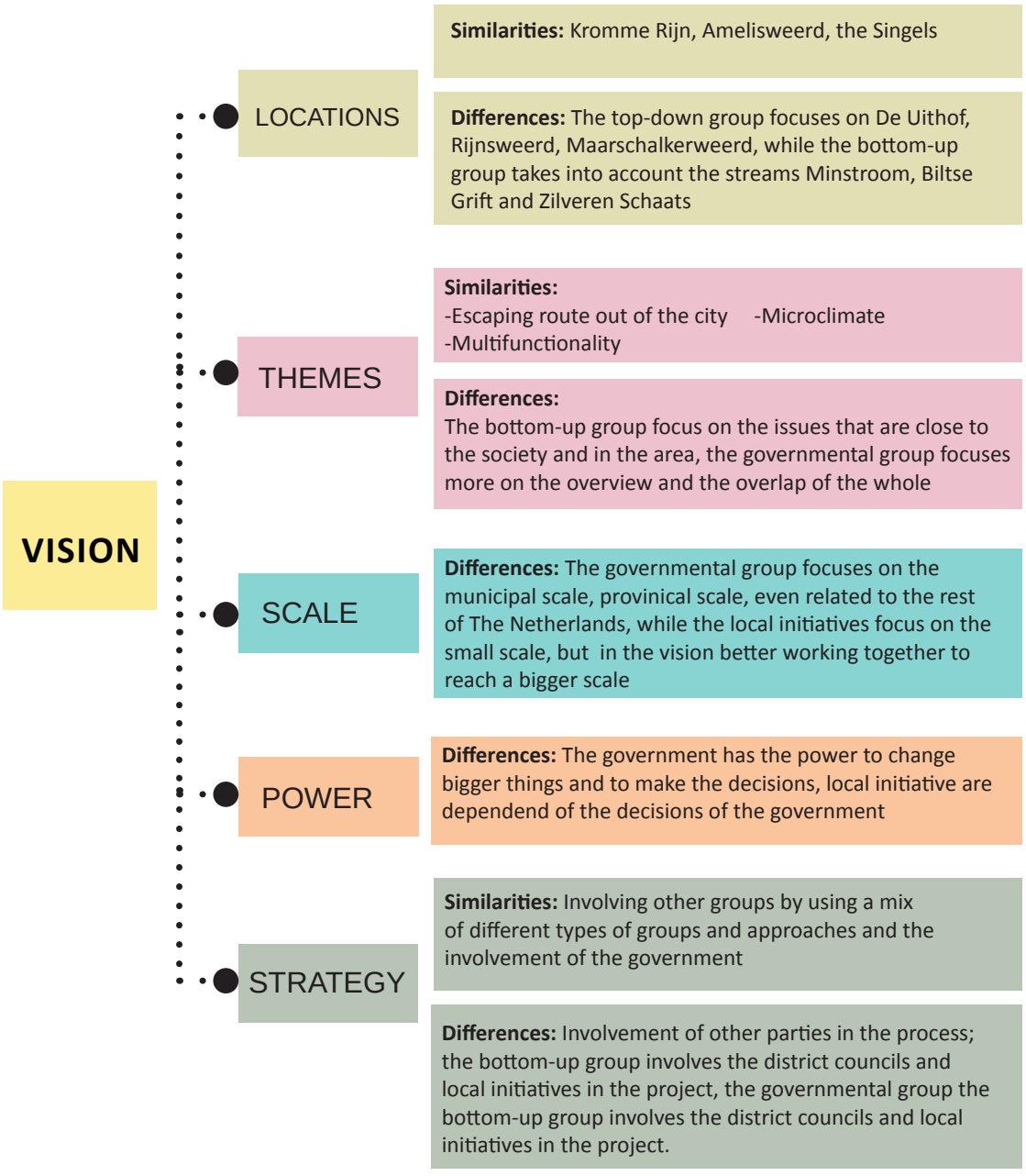


fig. 4.18. Overview of the comparison between the two visions

4.18.

5. AMSTERDAM-RIJNKANAAL NORTH

The Kromme Rijn quarter of Utrecht contains a diverse combination of land use typologies. The historic inner city is contained by singels (city moats), with garden city residential sprawl expanding outward from the urban centre toward the countryside which is increasingly feeling the pressure of development.

The Kromme Rijn itself in a river that runs from the rural area of Nederrijn by Wijk bij Duurstede toward the inner city of Utrecht. Until about 70 years ago, the river was used by "trekschuit," a kind of tugboat transportation system whereby boats stocked with goods from the countryside were pulled by a horse on the land towards the city where the goods could be sold along the canals and at market. Although the use of the Kromme Rijn as a transportation system has practically ceased, it still can be seen as a connecting element between the countryside and the city. Presently, it is used primarily as a walking path toward Amelisweerd, a historic site on which estate homes, forts, cafés and a museum can be found nestles between farms and the forest. The experience of walking along this transect is interrupted by barriers created by highway infrastructure, forcing pedestrians to use tunnels that are uncomfortably dark and narrow. One feels that the river and its surrounding area has, in a sense, been treated like leftover space by major infrastructure.

fig. 5.1 View on the Prins Claus bridge: one of the landmarks over the Amsterdam-Rijnkanaal to reach the district Leidsche Rijn

5.1. INTRODUCTION

In the following chapter, two visions developed by group FUN (Flow Utrecht North) are elaborated. One vision is developed in a top-down approach: Green Roots, created by Kati Dijk, Leonardo Marchese, Marit Noest, Rosanne Schrijver and Koen Staals. The other vision is developed in a bottom-up approach: Communicative Landscape, created by Changsoon Choi, Haryt Dijkman, Ludo Dings, Michal Merzel, Roman Oravec and Mariska van Reijn. fig. 5.2.

Since the city of Utrecht is divided into four different project areas, the focus of these visions will be on the North-Western part of the city. Zooming into this particular project area makes clear that North West Utrecht consists of two main areas, the district of Leidsche Rijn and the industrial area of Lage Weide. There is also a clear linear element in the form of the Amsterdam-Rijnkanaal on which large barges cross the city or unload at the heavily industrialized harbour. Originally the canal was located at the border of the city-centre, but during the 90's the city expanded with a so-called Vinex-district named Leidsche Rijn. This expansion is located at the other side (west-side) of the canal, resulting in a central location of the canal in the city of Utrecht. These aspects characterize the study area of the north-west of Utrecht compared to other (mainly the eastern) study areas: relatively new developments like the industrial area and Vinex-districts are located in the study area. The city of Utrecht is highly dense in all kinds of activities and the green and blue areas in the city, such as the large Máximapark in Leidsche Rijn, form an ecological and recreational network connected with the areas surrounding the city which offer beautiful landscapes for the citizens and their recreational needs. All these different transportation routes and different activities make the north-west side of the city of Utrecht an interesting location for development and adaptation towards a sustainable future, where people will live in a healthy and attractive environment.

This chapter the top-down vision is first introduced, followed by the bottom-up vision. Subsequently both visions are compared and discussed. Finally conclusions are drawn.

fig. 5.2. Location of study area Utrecht north-west.

Top-left to bottom-right Michal Merzel, Changsoon Choi, Leonardo Marchese, Roman Oravec, Ludo Dings, Koen Staals, Mariska van Reijn, Kati Dijk, Haryt Dijkman, Rosanne Schrijver and Marit Noest

5.2.











5.2. CHALLENGES AND OPPORTUNITIES

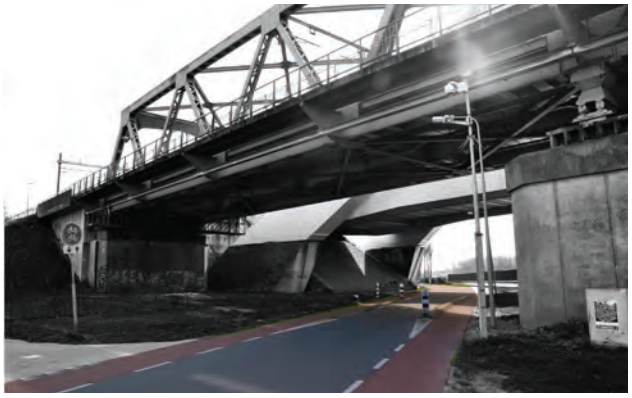
5.3.

5.3.

The pictures above are taken on our visits to the Utrecht and form part of the first impression of the study area. fig. 5.3.- 5.4. From these pictures,several initial problems related to the green-blue infrastructure within the study area emerge. The first problems relate to the large size and industrial character of the Amsterdam-Rijnkanaal (ARK) and the surrounding area. Through the sheer size of the canal and its hard and straight borders the canal seems to be a barrier between the east and west sides of Utrecht. In addition, the open character of the ARK makes the area a very windy place. This might for example lead to a decreasing comfort in the direct surroundings of the ARK or indirectly cause storm damages. Green along the ARK seems to be scattered through the adjacent industry and the maintenance quality of the green really differs. Next to a separation by industry large roads and railroad infrastructure also seem to provide big barriers and to scatter the area in distinct parts. The unfinished character of large part of the Lage Weide causes a desolated and empty feeling when walking through the area and also provides for an extra separation with Utrecht.

fig. 5.3. Impressions of the area Utrecht north-west

fig. 5.4. Impressions of the area Utrecht north-west



5.4.

5.3. THE BOTTOM-UP APPROACH

5.3.1. THE COMMUNICATIVE LANDSCAPE: NON-GOVERMENTAL STAKEHOLDER ANALYSIS

According to the bottom-up analysis the Amsterdam-Rijnkanaal is not perceived as a barrier by the inhabitants of Utrecht. However, at the same time it does create ecological, recreational, social and infrastructural challenges. Such challenges are already taken up by many individual initiatives but their effects are limited by a lack of communication between them. fig. 5.5.

Current bottom-up governmental policy concerning green is developed within administrative districts. This division in administrative districts seems to limit the communication between individual initiatives from different administrative districts. fig. 5.6. As well as local initiatives who are thinking in green networks that transcends neighbourhoods and even districts rather than in administrative boundaries. For example fig. 5.7., Utrecht West can facilitate recreational, ecological and green-blue networks throughout the study area as this is widely supported by local initiatives within West. Connections to Lage Weide can very well be achieved by creation of a recreational route through the industry towards Leidsche Rijn and the surrounding rural area. It is advisable to develop plans that facilitate such trends and mobilize the existing social energy. Even more so in times when citizen participation and active responsibility among inhabitants is increasing. High willingness for active participation in Leidsche Rijn creates for example, a willingness to realize and strengthen a green-blue network.

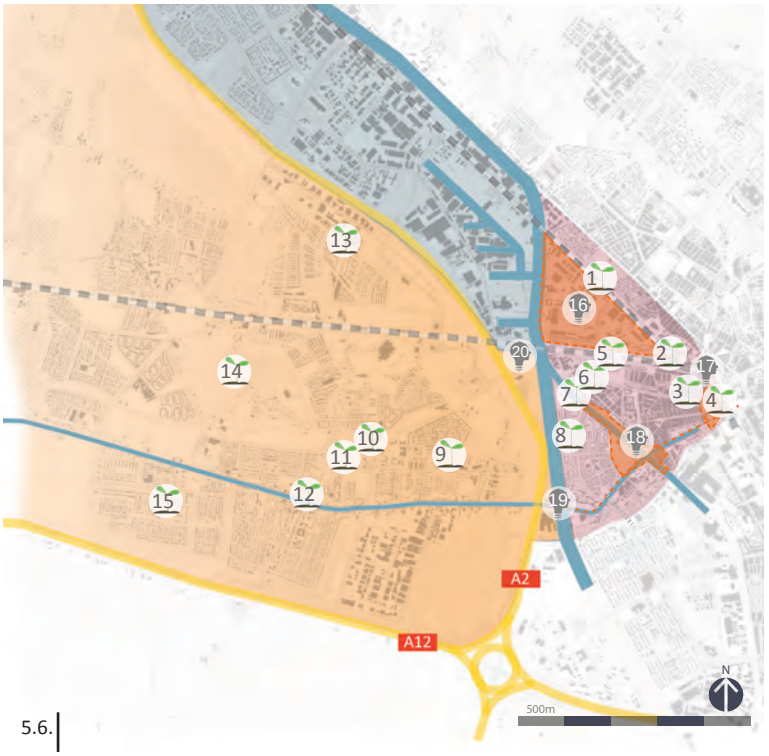
Furthermore, ecological, recreational and social connections between urban and rural areas are not well developed due to their scattered nature. It is the municipality's main goal to improve such connections. Providing people the means to communicate among each other can facilitate this. As many individual initiatives already work on these topics and several initiatives aspire to achieve district overarching goals, providing better communication can realize a coherent green structure and increase social cohesion between currently separated districts.

Communication between inhabitants, local initiatives and the government needs to be more efficient and effective in order to achieve the above mentioned objectives.

1. Vlampijpzone, Werkspoorkwartier, Cartesius Garten
2. Cremertuin
3. Balistraat Groen
4. Halte Westplein, Mobiele tuinen
5. De Wilgenhof
6. Spinoza Presenteert: eetbare ontmoetingstuin
7. Educative garden Kanaalweg
8. Permacultuur leertuin
9. Langerakbaan naar Langeraklaan
10. De Kersentuin
11. Vegetable garden Castellum
12. De Meern dorpstuin
13. Speelnatuur Terwijde
14. De Vlinderhof
15. Pantaplein
16. Vlampijpzone, Werkspoortkwartier, Playground Cartesius
17. Westplein; Lombok Centraal, Kop van Lombok
18. Muntsluis area: Manifest Muntpark, Open oog, Park Oog in al
19. Bevaarbare Leidsche Rijn
20. Stadserf Root/Noot
21.. Vrienden van een groen Haarzuilens
22. Wijkraad West
23. Oranje- en wijkvereniging Oog in Al
24. Lombox
25. Wijkraad Leidsche Rijn
26. Leidsche Rijn connectie
27. Doenja Dienstverlening
28. Buren van Lage Weide
29. Milieu groep Zuilen
30. Fietsersbond Utrecht
31. NMC
32. Kracht van Utrecht

fig. 5.5. Interviewing inhabitants
fig. 5.6. and 5.7. Local initiatives and stakeholders

5.5.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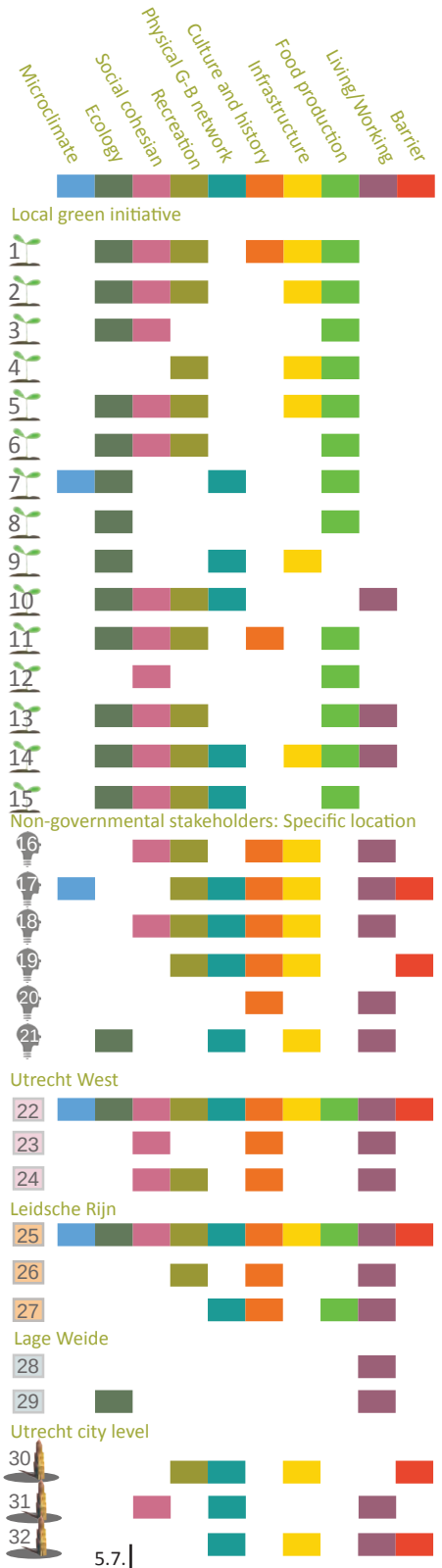
Microclimate
Ecology
Social cohesian
Recreation
Physical G-B network
Culture and history
Infrastructure
Food production
Living/Working
Barrier
Local green initiative
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Non-governmental stakeholders: Specific location
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Utrecht West
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Leidsche Rijn
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Lage Weide
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Utrecht city level
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5.7.

5.3.2.VISION - THE COMMUNICATIVE LANDSCAPE

Communicative landscape

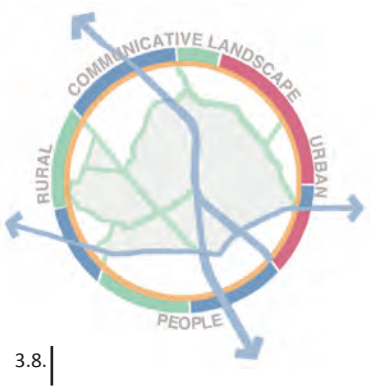
Lack of communication between local initiatives and the government, lack of communication regarding physical ecological- and recreational routes between urban and rural and communication between people regarding social cohesion form the primary challenges of the 'communicative landscape'. It aims to increase quality, effectiveness and efficiency through multiple green-blue networks which are integrated into an overarching network called 'the landscape loop' (fig. 3.8.). This can only be achieved by working together and communicating with one another in a physical and social sense.

A missed opportunity

Bottom-up research has shown that multiple local initiatives share similar values and interests while coexisting inside the same area without incorporating common interests. Local initiatives are limited to the implementation of green within the administrative unit of the district in which they reside, while aspiring larger goals. This lack of communication between non-governmental stakeholders is considered to be a missed opportunity. Combining multiple initiatives together in an efficient and effective way will drastically increase the impact of these initiatives. fig. 3.9. Different values positively influence each other to create multifunctional landscapes. One of the municipality' main goals is to create "a robust urban green structure where city and country are connected for humans, plants and animals"(Gemeente Utrecht 2014c). To achieve this it is important to think in networks and communicate, instead of developing singular scattered initiatives.

Friends of the landscape

Offering non-governmental stakeholders opportunities to collaborate in a more efficient and effective manner can drastically increase their socio-spatial impact on a green-blue network. fig. 3.10. To be able to achieve this, communication between individuals, local initiatives and the municipality becomes a matter of operating in networks. 'Friends of the Landscape' functions as a platform in which different initiatives can



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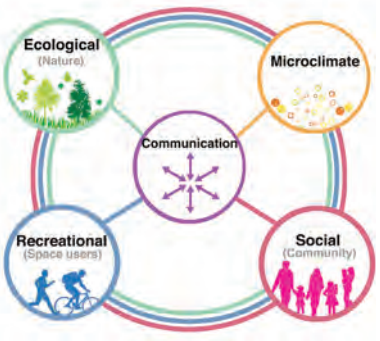
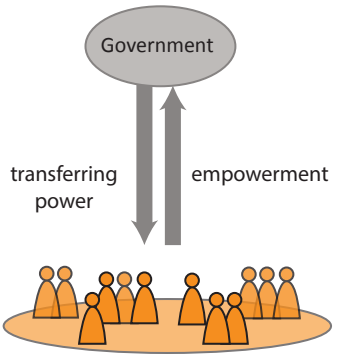


3.9.

fig. 3.8. Logo The Communicative Landscape
Integrating the four objectives by using the concept of communication

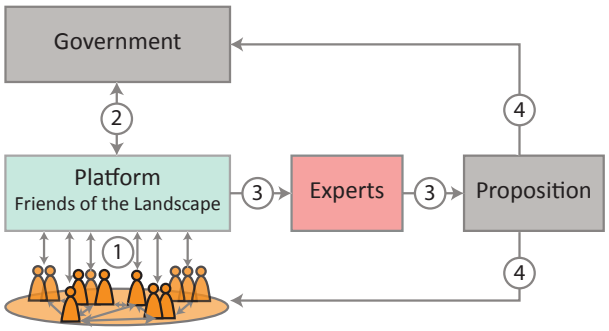
fig. 3.9. The platform empowers non-governmental stakeholders by making the municipality an equal stakeholder in plans related to green in the city.
fig. 3.10. and 3.11. Operation of the platform

be incorporated through a bottom-up approach to facilitate efficient and effective communication between individuals, local initiatives and government bodies in order to achieve larger goals and improve quality. The main functions of the platform are therefore to stimulate, advice, mediate, facilitate and manage existing and future plans concerning the integration of social, ecological, microclimatic and recreational values, which are reflected on a larger green-blue network. fig. 3.11. In this way people determine what is important, the effort from bottom-up initiatives and government are being combined by the platform and quality of the final outcome is being optimized by creating an overarching network from which the entire community benefits.



3.10.

Operation Platform



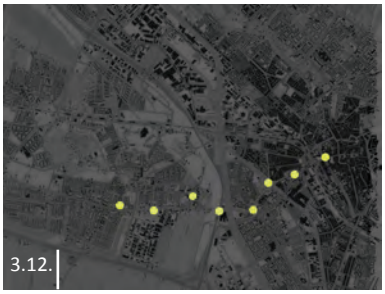
1. Initiatives/Inhabitants/Other stakeholders report idea to the platform
2. The platform checks for possibilities at government, local initiatives and individuals
3. The platform formulates an proposition using expert knowledge
4. Communicating back to procede with the idea
5. Process starts all over again

3.11.

5.3.3. STRATEGY

´Friends of the landscape´ establishes the 'Landscape Loop', a green-blue network, by implementing several feasible ´components´. The components are also considered results in themselves and are shaped by connecting different initiatives and establishing links between the city and the rural area. Each component is developed by using existing local initiatives and governmental plans. Strenghening each component and its connection to the other components is facilitated by future initiatives and new types of financing such as the ´green-blue network budget'.

- The first component (fig. 3.12.) combines the local initiatives 'West plein', the 'Muntsluis' area, the new bicycle bridge, multiple community gardens and 'Bevaarbare Leidsche Rijn' to create a green-blue connection between the city centre and the rural landscape.
- The second component combines existing governmental plans such as 'rondje stadseiland', future redevelopments of the Schepenbuurt and local initiatives to form a second green-blue network on the eastern side of the Amsterdam-Rijnkanaal. fig. 3.13.
- The third component includes the green-blue structure of the river Vecht, providing a third major (boating) connection to the rural landscape. fig. 3.14.
- The fourth component connects all components to create 'the landscape loop' by incorporating the Maximapark and a connection through Lage Weide.
- The final component adds an inner-network to the loop, connecting existing green areas, and providing sub-loops to improve its accessibility.
- Further steps aim to create a meshed high quality green-blue network which incorporates ecological, recreational, social and microclimatic values. fig. 3.17.



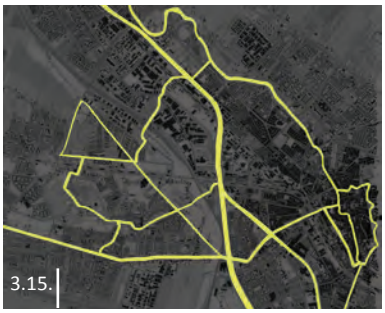


fig. 3.12. Existing local initiatives along the Leidsche Rijn
fig. 3.13. Connecting initiatives to create a urban-rural connection
fig. 3.14. Forming the 'landscape loop', a green-blue network on a city scale
fig. 3.15. Extending landscape loop over all the neighbourhoods and rural landscape

3.17.

3.18.

fig. 3.17. Site plan and detailled example image of Landscape Loop
Visual of recreation on the Landscape loop. Route indicated with application
fig. 3.18. left beneath: Visual of improved biodiversity on the Landscape Loop

5.4. THE TOP-DOWN APPROACH

5.4.1. INTRODUCTION

The debate about the future of Utrecht is livelier than ever. The Municipality wants to expand the city, but also develop natural qualities and we want to adapt urban areas to climate change.
With this proposal, we develop a vision that acts as a catalyst for those aspects using the green-blue network. For elaborating this vision, we analyse the city of Utrecht considering pollution, wind rose, future developments, land occupation and stakeholders. We generate a concept vision at first, that we confront with scenarios in order to strengthen our awareness on future opportunities and with those we create a multilayer vision.

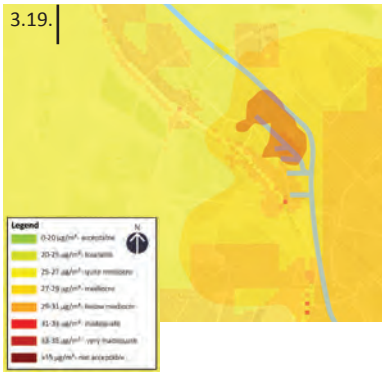
5.4.2. ANALYSIS

In order to identify the strengths and weaknesses of the project area, an area and a stakeholder analysis is performed. The analysis shows that the dominant wind direction blows polluted air from the industrial area to the district of Leidsche Rijn (fig. 3.19.). In winter, the wind comes from the opposite direction and blows the polluted air into the rural area in the North-East. Fig. 3.20. shows the open and vacant spaces in Leidsche Rijn that can partially be used for temporary destinations.

5.4.3. STAKEHOLDERS

Four different stakeholders fig. 3.21. have been interviewed: the municipality, the water board, the industrial association and the district council of Leidsche Rijn. They have been selected according to their relevance to the topic of green-blue network and their power in the area. With the help of the interviews the objectives and interests of the stakeholders were derived and used to develop a concept vision. There exist a lot of green initiatives in Leidsche Rijn and the inhabitants are eager to develop more green. For Lage Weide the main interest for more green was the opportunity to lower costs and make the area more attractive. The municipality is willing to facilitate green initiatives but cannot always finance such developments.

3.19.



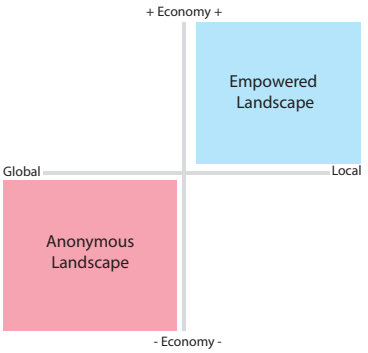
3.20.

3.21.

fig. 3.19. Map of pollution sources in project area (RIVM 2010)
fig. 3.20. Map of development plans in Leidsche Rijn
fig. 3.21. Overview of the interviewed stakeholder

5.4.4. POSSIBLE FUTURES

To support our vision, we explored possible future scenarios fig. 3.22. considering the eventual fluctuations about economy and orientation of society towards global or local. We made a selection of the possible scenarios and we selected two that address opposite aspects: the "Empowered landscape" fig. 3.23. (increased economy, local) and the "Anonymous landscape" (decreased economy, global). Those scenarios fig. 3.24. are further elaborated and confronted with the concept vision, in order to adapt the vision to the possible future. In this way, the vision will be aware not only of the current situations, but also of future trends, resulting in a more conscious and sustainable proposal towards the future.



3.22.

3.23.

Visualization of scenario 'Empowered Landscape'

3.24.

Visualization of scenario 'Anonymous Landscape'

5.5. VISION

5.5.1. CONCEPT

The concept vision focusses on three areas: the Amsterdam-Rijnkanaal and its surroundings, the district of Leidsche Rijn and the industrial area of Lage Weide. fig. 3.27.
In the vision, a recreational bicycle network improves connectivity between different zones. In Leidsche Rijn, the emphasize lies on developing an educational network in the different parks and green connections in order to give the people the possibility to implement their local green initiatives. The area of Lage Weide is more focussed on linking the green-blue network to the economic priorities of the area. By doing so, a sustainable image should be developed. On the Eastern bank of the Amsterdam-Rijnkanaal, a diversity in green zones will be developed, related to the characteristics of the adjacent neighbourhoods.

5.5.2 VISION: GREEN ROOTS

With Green Roots fig. 3.25., an improved green-blue network is rooted in the area and in its people. The interventions form a breeding ground to develop the area even further.
In the vision fig. 3.26. the green-blue network has a strong relationship with the spatial developments related to recreation, ecology and microclimate. The recreational bicycle route crosses the Máximapark, connecting the inner-city with the district of Leidsche Rijn mainly for recreational purposes and it connects the industrial area with the district of Leidsche Rijn for transportation of employees. Measures related to microclimate are planned in the form of green filters. Concerning Leidsche Rijn, each area has specific strategies that improve the spatial situation and address the different objectives of the green-blue network. Undeveloped plots throughout the district can also be used to expand the green-blue network by creating temporary green patches. In Lage Weide, green roofs and facades can provide ecosystem services such as energy saving and improving the social security. The attractive green image creates the possibility to fulfil recreational purposes. The currently abandoned spaces can be transformed to recreational facilities and can be incorporated in the green-blue network.

fig. 3.25. logo Green Roots
fig. 3.26. Map of Vision showing an overview of the proposed interentions
fig. 3.27. Concept vision showing the main themes of the interventions

GREEN ROOTS

3.25.

3.26.

3.27.

5.5.2. VISION LAYERS

The final vision consists of different layers that further elaborate on the specific interventions. These layers are a connections layer, a microclimate layer and three layers for each zone in the project area.

The microclimate fig. 3.28. will be improved because of the wind-tunnel effect: the Maximapark and the rural area in the north-west of Lage Weide will be left open to direct the wind flow and mitigate the air pollution. Green linear elements in Lage Weide will intercept the dust particles and filter the polluted air in order to improve the air quality in the district of Leidsche Rijn.
The main intervention in the connections layer fig. 3.29. is the expansion of the recreational network in order to create a stronger living-working connection between the city centre and Leidsche Rijn and between Leidsche Rijn and Lage Weide.
For the Amsterdam Rijn-kanaal fig. 3.30., the vision improves the relation between the canal and her surrounding areas by creating recreational facilities next to the bank that relate to the character of the area. The cohesion between the different patches alongside the eastern bank will also be improved by developing a recreational path alongside the canal. With this interventions, the riverscape will be improved.
In Lage Weide fig. 3.31., ecology and economy will work together to lower productions costs and develop a sustainable green image for the industrial area by making use of ecosystem services. Such services can be energy saving by using green facades and roofs, or developing recreational green in order to improve social security in the area.
The district of Leidsche Rijn fig. 3.32. will have more diverse and educational green and will be the node of recreational and intercultural activities. The vision provides possibilities for local green initiatives on spaces that are currently not developed by project developers.
Together fig. 3.33., the layers address the four commissioner's objectives and contribute to a stronger cohesion between the areas.

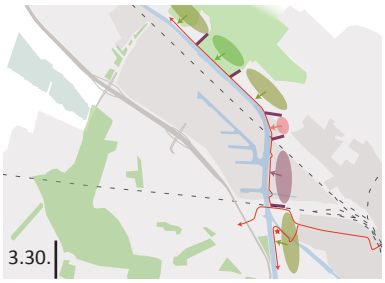


fig. 3.28. Layer of microclimate
fig. 3.29. Layer of connections
fig. 3.30. Layer of Amsterdam-Rijnkanaal
fig. 3.31. Layer of Lage Weide
fig. 3.32. Layer of Leidsche Rijn
fig. 3.33 Visualizations and metaphors for all the layers of the vision

3.33.

5.6. DISCUSSION

After an inventory of local initiatives and 67 interviews with local people it became clear that both problems, concerning the microclimate and the barrier effect of the Amsterdam-Rijnkanaal, are not perceived as real problems among local people. People seem to reason from the existing situation and environment and are more reactive: they act upon opportunities and threats which are worthwhile committing to.

With regards to the four objectives of the project, the two approaches show differences and similarities in the resulting visions. Both approaches resulted in a strategic vision concerning the north-west area of Utrecht. The strategic nature of the visions implies that a top-down and a bottom-up approach are able to facilitate flexibility with regards to the objectives while promoting specific spatial outcomes. This is due to the fact that both approaches worked towards a green-blue design of the studied area. Whether we wish to achieve pre-set objectives or facilitate local wishes, design projects need to relate to the existing physical urban fabric to accomplish socio-spatial improvements and therefore offer a physical framework in which the objectives are realized. In this sense, the top-down and bottom-up visions are both spatially result-oriented.

With the same objective of improving the green-blue networks, both approaches complement each other at physical aspects. For example, green-blue nods and recreational route along the Amsterdam-Rijnkanaal suggested in top-down vision aligns with the concept of landscape loop in bottom-up vision. However, both visions conflict in administrative aspect due to the possibilities for available financial means. In contrast to the bottom-up vision incorporating a transfer of resources for non-governmental stakeholders, top-down approach leans on the same governmental resources for green-blue plans in Utrecht.

5.7. CONCLUSION

By developing and expanding the green-blue network in the project area it is possible to contribute to a better recreational network, a better ecological network and a better microclimate of the city. Besides, the green and blue elements also contribute to a stronger connection or even a better sense of belonging for the inhabitants of the area. Many stakeholders, both inhabitants and organisations, see opportunities in improving the quality of their green surroundings and are willing to contribute to this idea.

By developing a platform such initiatives can be organised and structured in order to apply them in a constructive way. This is where top-down and bottom-up approaches meet. The expert perspective safeguards the longer term vision but leaves enough room for the local initiatives as becomes clear by comparing both visions. Green is a hot topic and governments need a system to incorporate local projects in their plans. However, challenges and opportunities identified by a top-down perspective do not always coincide. The bottom-up approach clearly explained that the Amsterdam-Rijnkanaal was not perceived as a barrier by the inhabitants of the surrounding districts. The top-down approach did however provide a plan to increase the connectivity between the different areas and therefore create more cohesion between the areas. Besides, it attempts to develop a stronger relation between the canal and the surrounding areas.

6. AMSTERDAM-RIJNKANAAL SOUTH

The project area covers a big part of the south-west of Utrecht. Originally this area consisted of wetlands that where cultivated by making use of canals. The Amsterdam-Rijnkanaal was the largest addition in this network of canals. Small scaled settlements were the first forms of permanent inhabitation. After the Second World War, the area was the sight of rapid urban expansion to provide living areas for the growing population of Utrecht. The A2 and A12 highways frame the project area in the south and west. The railroad and the central train station of Utrecht form the eastern border. the Amsterdam-Rijnkanaal, Merwedekanaal, Kruisvaart, Leidsche Rijn and Vaartsche Rijn cut through the area. These canals create a very distinct and returning appearance of long lines and banks in the entire region.

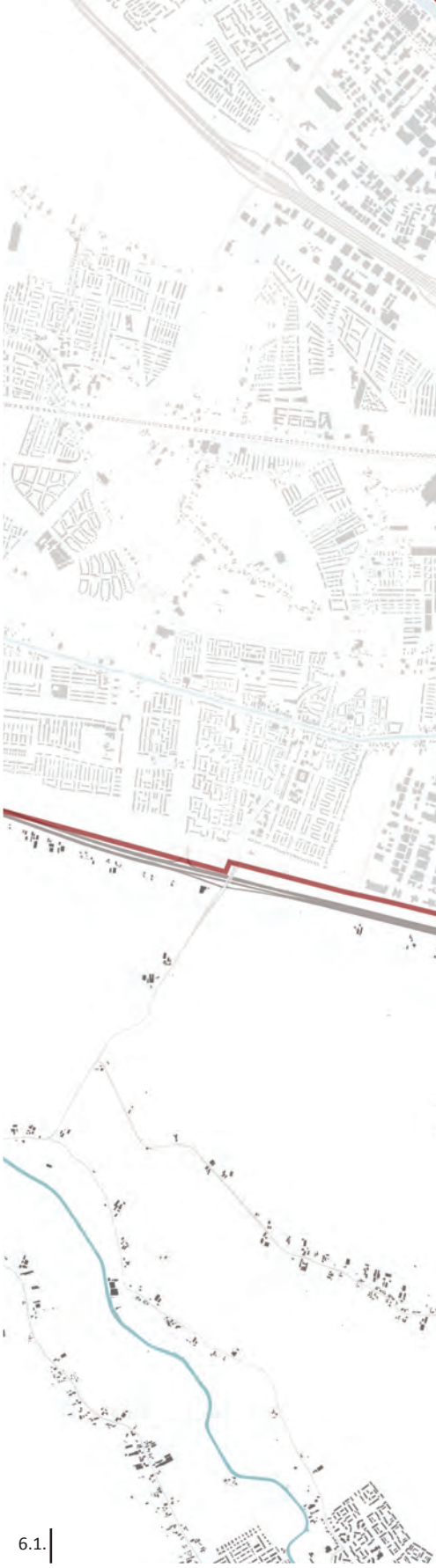


fig. 6.1 Map of sub part Amsterdam-Rijnkanaal South

6.1.

6.1. INTRODUCTION

6.1.1. THE PROJECT AREA AMSTERDAM RIJN-KANAAL SOUTH

In this area there are different neighbourhoods. fig. 6.2. Densely build areas such as Rivierenwijk are separated from the high-rise, but relatively open Kanaleneiland, the modern business park of Papendorp and greener neighbourhoods like Oog in Al. An older and stony business area containing the central station, the Jaarbeurs, and the business areas Kanaleneiland and Laagraven-Liesbosch, is located in a long strip through the area along the Merwedekanaal. The Transwijk and Oog in Al parks are the only larger green elements. Smaller green patches, playgrounds and private gardens form the green structure. A larger rural landscape is located to the southwest on the opposite sides of the A2 and A12. This region is complete open except a few farms and tree lines. De Strijkviertelplas is a recreation pond on the west of the A2. The city of Nieuwegein is located to the south of the area on the opposite side of the A12. fig. 6.3- 6.5.

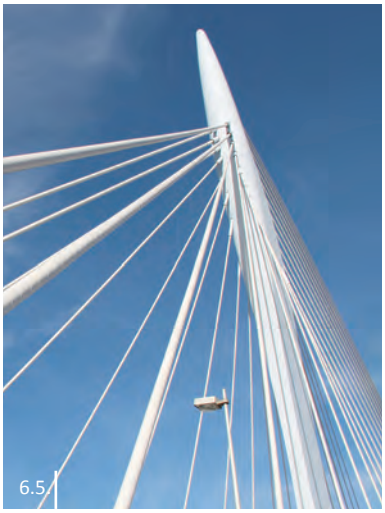
LEGEND

1. Central station district
2. Dichterswijk
3. Rivierenwijk
4. Halve Maan
5. Oog in Al
6. Welgelegen
7. Transwijk Noord
8. Transwijk Zuid
9. Kanalen-eiland Noord
10. Kanalen-eiland Zuid
11. Commercial area Kanaleneiland
12. Tolsteeg
13. Oud-Hoograven
14. Bokkenbuurt
15. Nieuw-Hoograven
16. Laagraven
17. Business park Papendorp

6.2.

6.3.

6.4.



6.5.

6.1.2. FROM INVENTORY TO PROBLEM MAPS

The inventory maps are based on different functions of the green-blue network. These are: ecosystems, social, microclimate and hydrological. To draw any conclusions about these different functions, a set of criteria is developed. These criteria are based on literature. With the combination of the inventory maps and criteria, it is possible to draw conclusions.

The conclusions of the inventory can be categorised in four problem maps. These four maps are:

- Accessibility to green and risk groups;
- Water quality and accessibility;
- Potential heat islands and risk group (heat stress);
- Connectivity and barriers for cyclist.

There are neighbourhoods with a high number of people of ages 0-14 years and 65 and older, the risk group. In half of the neighbourhoods the amount of public green is not sufficient for the high density of risk group individuals in the area. fig. 6.6.

The water quality in het Merwedekanaal and Vaartsche Rijn is good enough for ecology, however the soil of the canals is polluted. fig. 6.7. The accessibility of the water at the Merwedekanaal an Vaartsche Rijn limited by the houseboats, car traffic and a densely built industrial side.

The city centre of Utrecht and the business parks are a potential heat island due to the densely built areas, with a lot of hard paved surface and the lack of green. This is a problem for the risk group living in this heat-islan and the bordering neighbourhoods in the warm wind direction. fig. 6.8.

The big roads in Kanaleneiland and especially the large intersections form barriers for the cyclists and pedestrians to move between the neighbourhoods and to the rural landscape. fig. 6.9.

LEGEND

Rural landscape

Water ways

Open rural landscape [produces cool air flows]

Top left: Accessibility to green and risk groups

Amount of green (m^2) per household

Number of risk group individuals per hectare

Insufficient green for risk group

Minimum 75 m^2 green per household

Area with bad accessibility to green

Top right: Water quality and accessibility

Good

Soil polluted

Shared space, cars and people

Non access underpass

Houseboats

LEGEND

Bottom left: Potential heat-islands

Inner city [high potential heat-island]

City [medium potential heat-island]

Business parks [medium potential heat-island]

Risk group [heat-stress]

Warm airflow

Cool airflow

Bottom right: Connectivity and barriers for cyclists

Industry

Roundabouts

Crossing point barriers

Infrastructure barriers

Bicycle path


CITY CENTER
RURAL

6.6.


CITY CENTER
NATURE

6.7.


CITY CENTER
RURAL

6.8.


CITY CENTER
NATURE

6.9.

6.2. TOP - DOWN

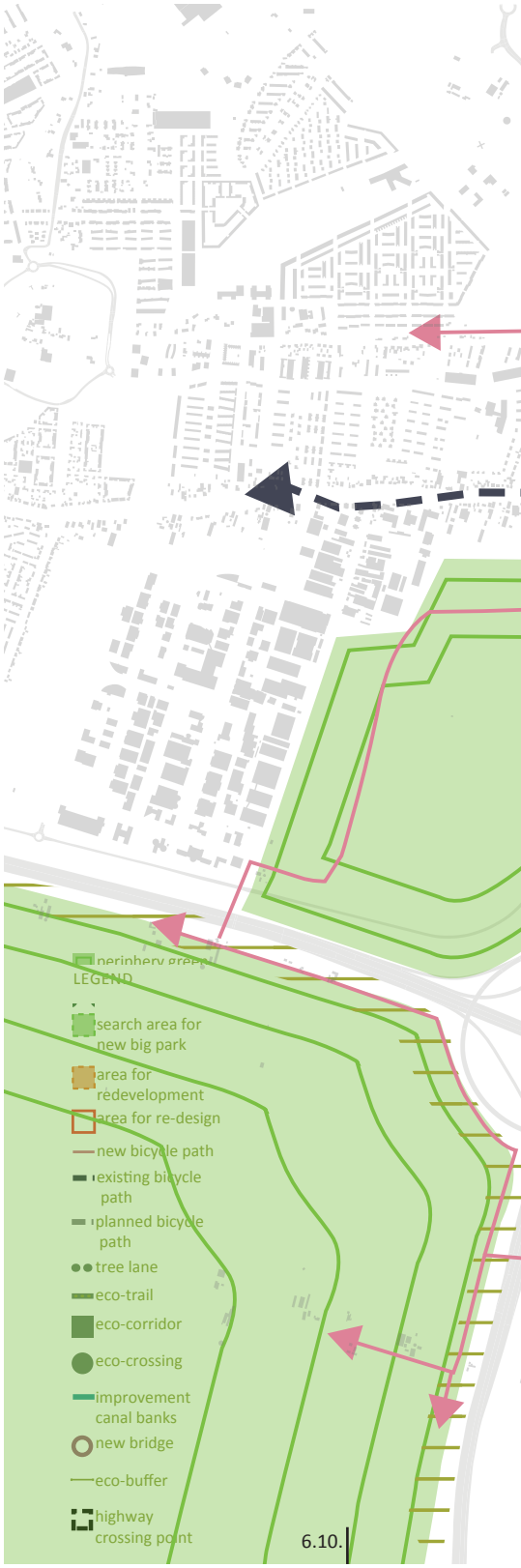
6.2.1. INTRODUCTION

This vision propose a complete green-blue network, covering the most parts of researched area and creating diverse, rich and high quality environment that provide joy, health and well-being to inhabitants and visitors. It is regenerative and sustainable for the future of city of Utrecht itself.

The future can be achieved by returning power to municipality and propagating big projects that change this area to a place where everyone wants to live and stay. This vision propose significant changes, that can be used in short term but at the same time the future based on long-term run is considered in proposed solutions. The vision of the area of Utrecht is not only a comfortable place to stay with nice microclimate, but also connecting the city and periphery, its inhabitants and green spaces.

The top-down subgroup will not only take into account the experts' point of view, but also follow the policies from the municipality, the province and the water board of Utrecht and In this case, that means that information will be gathered through interviews, literature and policy search from the municipality of Utrecht, the province of Utrecht and De Stichtse Rijnlanden - the water board of Utrecht. They provide problems and possible solutions for these problems to deal with the four functions of ecological, social, microclimate management and hydrology. Also the experts have their own inventory of the problems in the project area. Also other stakeholders and their interests are listed.

At the end of the top-down subpart, a vision for the green-blue network will be presented. This vision gives an desired image of the project area and the actions which will have to take place. A toolbox with useful suggestions for the four functions - social, ecoservices, hydrological and microclimate- will be given and solutions to deal with the research questions will be produced. In this toolbox the actions will be elaborated in depth and possible locations for these actions will pointed out. The end result is a map in which all of these actions is implemented.



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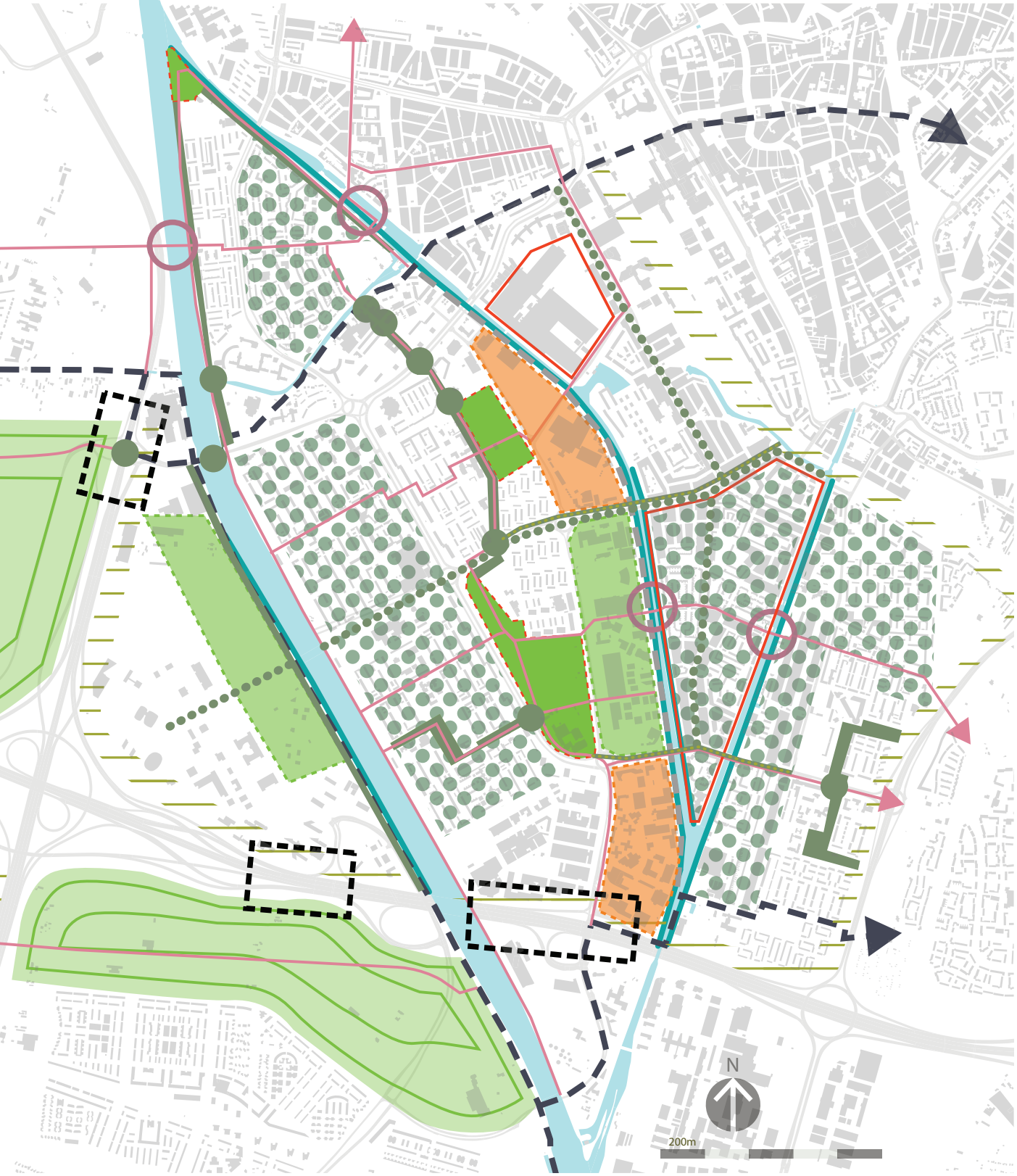
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6.2.2. VISION

In order to explain the effects of the proposed vision and toolbox, a possible result map is presented (fig. 6.10., on previous page). There can be several variations of a result map based upon the choice of individual tools and their combinations. This map shows consensus of the top-down subgroup in terms of best location for actions proposed in toolbox. Nevertheless the choice that has to be made in individual phase can lead to really different settings.

This specific result vision for Utrecht operates with redesigning and changing of significant area of Amsterdam-Rijnkanaal Zuid. At first place current industrial area should be redeveloped - half of it should be developed into new residential area with proportional part left to services and shops, the other half should be redeveloped to new green areas that provide recreational, sport, culture and community use not only for surrounded neighborhoods, because this new project should also be attractive to all inhabitants of Utrecht and any other visitors. This new green area offer opportunity to connect current Park Transwijk with the Merwedekanaal and together with redesigning existing parks it will improve the green-blue network attractiveness. In order to emphasize water elements of the green-blue network, canal waterfront will be enhanced to increase its accessibility. Also ecosystem functions will be zoned along other use of this area.
Another opportunity to add more of green and blue to the researched area should be new recreational green area / park in Papendorp and use of periphery green in the same way. As a benefit, periphery areas will bring cool winds to decrease the air temperature of the city of Utrecht, and planned green belts along the highways also decrease air, noise and light pollution.
Also potential areas of heat islands will undergo transformation to prevent negative effects of urban climate changes. In scale of neighbourhood more patches of green and blue will be added, and among others benefits it provides cooling places for vulnerable groups.

6.10. possible results (previous page)- show one of possible variation of Utrechts future and it is based on proposed toolbox

6.11. is vision map (top) in the vision, and later in the toolbox, options are proposed to solve or lower negative impact of problems that arise from research and are formulated in research question. These solutions diverse in scale, point of view and time needed for implementation and other aspects. As a basic framework, the solutions adopt a good green-blue network to deliver multifunctional uses.

6.12. is SWOT analysis this SWOT- analysis was based on general problems as objectively analysed in the common part. A set of criteria and functions of green-blue network in combination with the result of content analysis for government policies and several case studies were used to help judging whether a certain area or a condition was a strength, weakness, opportunity or threat for green-blue network in the whole researched area.

LEGEND

- long connections
- short connections
- ecological connections
- park for redesign
- new big park
- redevelopment area
- ecological buffer
- canals banks for improvement
- open rural periphery

6.11.

LEGEND

- strengths
- weaknesses
- opportunities
- threats

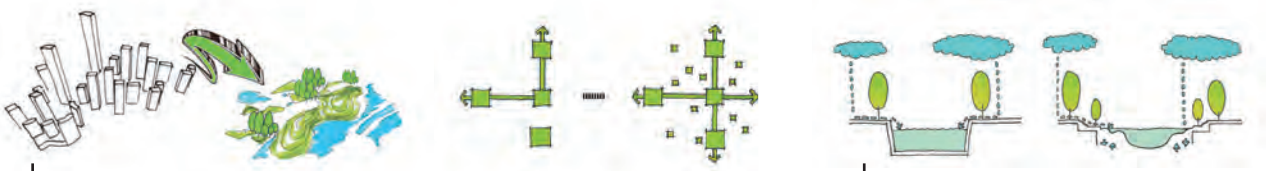
STRENGTHS (S)
S1 Park Transwijk as big green area
S2 Open green spaces in Rijnenberg
S3 Green and blue elements in Park Transwijk
S4 A long green area in Julianaweg
S5 Park Oog in Al as one good quality of green area
S6 Stijkviertelplasas big water area
S7 The monumental bridge Prins Clausbrug

WEAKNESSES (W)
W1 No good connection from city to green spaces
W2 No good recreation lines in east-west direction
W3 Bad quality of industrial area in Laagraven
W4 Highways as barrier for green-blue network
W5 Railway as barrier for green blue network
W6 Rivierenwijk- stoney area and has low accessibility
W7 Non-accessible water in some areas

OPPORTUNITIES (O)
O1 Papendorp may attract more recreation
O2 Development opportunity around the harbour
O3 Redevelopment industrial areas along Merwedekanal
O4 Redesigning Polder Galecop as a green area
O5 Improvement opportunity in the north of Oog in Al
O6 Opportunity to improve connection between Centre-Station-Rijnenburg
O7 Opportunity for water connection across Transwijk and Kanaleneinland Noord
O8 Improve connection between Beatrix park and project area

THREATS (T)
T1 Highways are threat for recreational opportunities
T2 Air pollution and heat produced by highways
T3 Noise pollution caused by highways
T4 Hot winds from northeast direction (city centre)
T5 Jaarbeurs is considered as bad microclimate area
T6 Areas with risk groups and lack of green
T7 Wind along Amsterdam-Rijnkanaal

6.12.



6.13.

6.13.

fig. 6.13. Selection of Core principles that are used in proposed vision
fig. 6.14. vizualization of this vision in practice show principles that are derived from proposed toolbox (not included in the book, see the full report)

When answering questions of accessibility several aspects are taken into consideration. Apart from improving the green-blue network as a whole for a more permeable and connected city, recreational accessibility and connectivity will be improved by densifying cycle paths, especially in center - periphery direction, where these facilities are largely absent. A boulevard is proposed in the same direction and its effect on smaller and larger scale should be distinctive.

In terms of eco connectivity, eco-corridors and trails are promoted. The eco-trail is the street which has the potential ecosystem function use in the future and can be used as eco-corridor for some of species. In the case of eco connection attention to eco-crossing is really important and proposed connecting points should be planned with a lot of thoughtfulness.

Real connectivity to other parts of city and to rural landscape will be achieved by building new bridges (preferably land bridges that allow use as eco-corridors) and mindful designing and planning of highway crossing.

6.2.3. REFLECTION

In past years top-down approach is often put aside and popular bottom-up perspective is promoted instead. Bottom-up approach has its advantages of uncovering true wishes and needs from inhabitants that most of time stayed in the background. From this point of view, participation with people is needed. But, in case of such complex and huge entity like city of Utrecht, the strengths of top-down approach are irreplaceable.

6.14.

6.3. BOTTOM-UP: UTRECHT, FOR AND BY

A CITY FOR AND BY THE PEOPLE, A CITY THAT IS LIVEABLE, ENJOYABLE AND CLIMATE PROOF.

This is what the people dream of, and something that they want to work on. A move from government to governance is necessary for them to be able to contribute to this future city. This transition from top-down to bottom-up planning gives the power back to the people and lowers pressure on the municipality. This transition will not occur overnight. A transfer of recourses, knowledge and power is necessary to create a setting in which people are empowered enough and have the tools to actively change their environment.

This chapter presents ways in which the different bottom-groups could improve the different functions of the green-blue network. These post stamp interventions, gathered in toolboxes, can be considered as an acupuncture treatment. Individually just small pinpricks, but together they can have a large impact on the green-blue network and the urban tissue. The cohesion between actions, possible locations and the role of the expert and the government are all covered in this vision for south-west Utrecht.

6.3.1. THE COHESION BETWEEN ACTIONS

It is important to mention that many possible actions contribute to more factors then for instance social cohesion. fig. 6.15. A community garden brings people together, gets them out of their houses, and contributes to the local microclimate and ecology. People work and design for a small set of factors that are important for them, but also actively influence others. One difficult factor is microclimate. People are aware that certain environments are more 'comfortable' then others, and move through an environment by making use of the most pleasant locations. To them it is often not clear which exact factors influence their experience of the climate, and thus bottom-up actions do not directly focus on improving the microclimate.

Together, all these small projects contribute to improving the larger, Utrecht-wide, green-blue network. The most important thing to keep in mind is that bottom-up initiatives should be initiated to serve the wishes of the people.

6.15.

fig. 6.15. Overlap between functions
fig. 6.15. Guerilla movement, Neighbourhood organisation, Cooperator, Participatory planning
fig. 6.16. Proccess of the bottom-up movement. What to do? -> Inspiration from the web-> Gathering the people-> Gathering resources-> Success

THE PEOPLE

6.3.2. THE BOTTOM-UP GROUPS

Bottom-up initiatives cannot be placed under a single classification. The amount of people, power and resources is so diverse that their projects are very different in scale and impact. To make a better distinction between initiatives, bottom-up groups will be divided in four groups. These are the 'Guerrilla movement', 'Neighbourhood organisations', 'Co-operation' and 'Participatory planning'. The definitions that are used for the distinction in types of bottom-up initiatives are derived from theory and several encountered examples in practice. These definitions are an own interpretations of scientific and practical knowledge.

GUERRILLA MOVEMENT

CREATE YOUR CITY

The Guerrilla movement is characterized by actions of individuals or small groups that are somewhat 'illegal': "Guerrilla gardening is the act of gardening on public or private land without permission" (Lydon & Garcia 2014a). Guerrilla actions have a small spatial impact, but can create consciousness about a certain societal topic. This because they are aimed at making a strong statement. This vision is endorsed by Lydon, as he states the following: "Possible effect of guerrilla gardening, unsanctioned short-term actions creates sanctioned long-term change" (Lydon & Garcia 2014b).

NEIGHBOURHOOD ORGANISATION

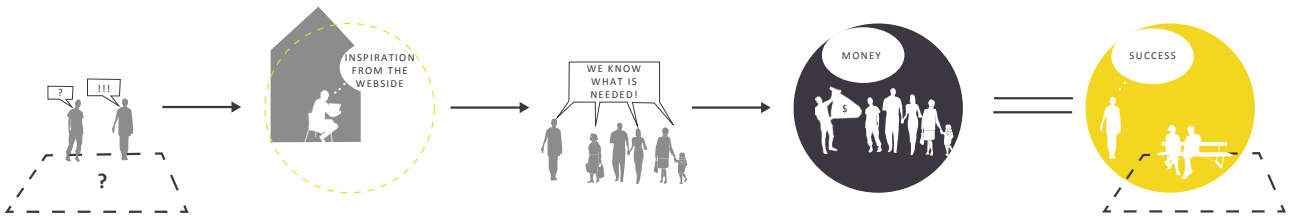
CHANGE YOUR CITY

"Neighbourhood organisations can be thought of as groups of residents and organisers dedicated to addressing one or a range of issues, including social, political, economic, and quality-of-life concerns at the neighbour- hood level" (Martin 2003). The principle of organisation is derived from several examples found online. For example The Better Block project, where people organise themselves in a group, possibly together with local property-owners or other local businesses. The municipality is not involved here and the organisation of the initiative happens purely from the bottom-up. The initiatives are aimed at transforming public space on a larger scale than Guerrilla initiatives.

CO-OPERATOR

DREAM YOUR CITY

The definition of a co-operation is inspired on the well-known citizen initiative, but taken a little broader. Neighbourhood organisations that start working together with governments or larger companies fall within the co-operation classification. In the



6.16.

case of a co-operation, the initiatives could be handed in by citizens or organisations. fig. 6.17. They approach these larger organisations with their own ideas and request a form of help or cooperation. In the case that they approve the initiative, they start to cooperate with the inhabitants. The way the municipality cooperates could do this, varies from a steering to a facilitating role. This defines how much freedom the citizens really have and want to have (Duckers & Propper 2011). If governments or companies do not wish to cooperate, people can continue in the form of a neighbourhood organisation.

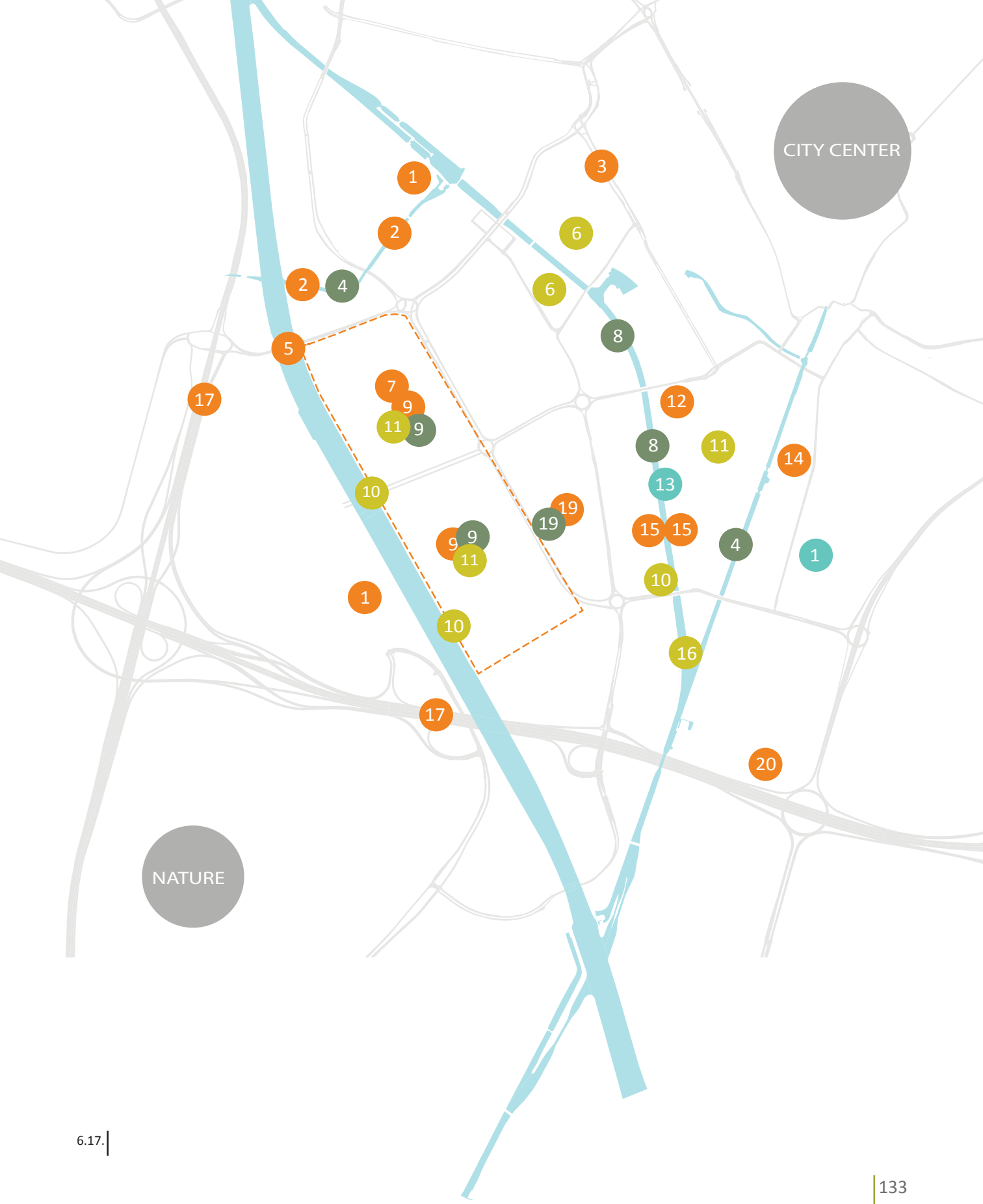
PARTICIPATORY PLANNING

GET INVOLVED IN YOUR CITY

Participatory planning fig. 6.16. is about involving citizens in spatial interventions, initiated by a government. This is to overcome any resistance by taking the wishes and local, spatial knowledge of the citizens into account. Planning is very often presented as an act in the interest of the public. However, if the public does not agree to a certain act of planning, this argument becomes invalid. “This justification becomes meaningless to a community when planning proposals are advanced over the resistance of that community. Without the participation of the members of a community, the intervention of centralized planning in the community is a case of power and not authority” (Smith 1973).

fig. 6.17 Wishes of the people, based on interviews

1. Low accessibility-places for wealthy people
2. Low accesibility to the water because of the houseboats
3. Bus stop is in dangerous place what causes the accidents
4. Rare bird species which should be proteted
5. Traffic problem; no pedestrian paths
6. Problems with the heat and wind turbulences
7. Kanswijk
8. Lack of nature
9. No accessibility to nature and water
10. Wind turbulences
11. Heat problem
12. “Young profesionals” make a distance from other inhabitants
13. Water pollution
14. Low accesibility of the water
15. Criminality
16. Strong wind on the cold days
17. Highway causes problems with accessibility to nature areas
18. Problem with infiltration
19. Lack of community gardens
20. Problem with noise.


CITY CENTER
NATURE
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20

6.17.

6.3.3. THE ONLINE IMPLEMENTATION

But then how to communicate this to the people? Over the years many attempts, both successful and unsuccessful, have been made in the Netherlands to provide the inhabitants with more power and resources. In a time of social media, fast pace communication and a decrease of free time, the medium needs to be easily accessible, understandable and highly attractive. Under the idea of ***'Let your neighbourhood go viral!'*** people should be provided with an online, interactive medium. fig. 3.18. It provides them with an overview of information and inspiration on how to start their own bottom-up initiatives. On the other side it also provides the municipality with a 'consult group'. People can place their ideas, wishes and issues here, providing the municipality with a cheap, and easily accessible source of feedback from the inhabitants.

This website could contain the different inspiration projects that are mentioned in the vision, show how the municipality can help the people and provide a meeting forum for people. Another interactive feature would be an idea map. People can pin their ideas on a map and provide a description of their wishes. Both the municipality and bottom-up initiatives can use these ideas as inspiration for new projects.

Eiland8 already makes use of an online platform in the project area. This small platform is very active and shows that social media is a fast and easy way to approach the people in the neighbourhoods.

The picture illustrates how these results would work in real life. People want to change something, to find inspiration they can go online. The website will provide them with information on how to organise themselves, find resources and fulfill their wishes.

fig. 6.18. Possible webpage layout that can function as a meeting place for people and the government, and a location for inspiration

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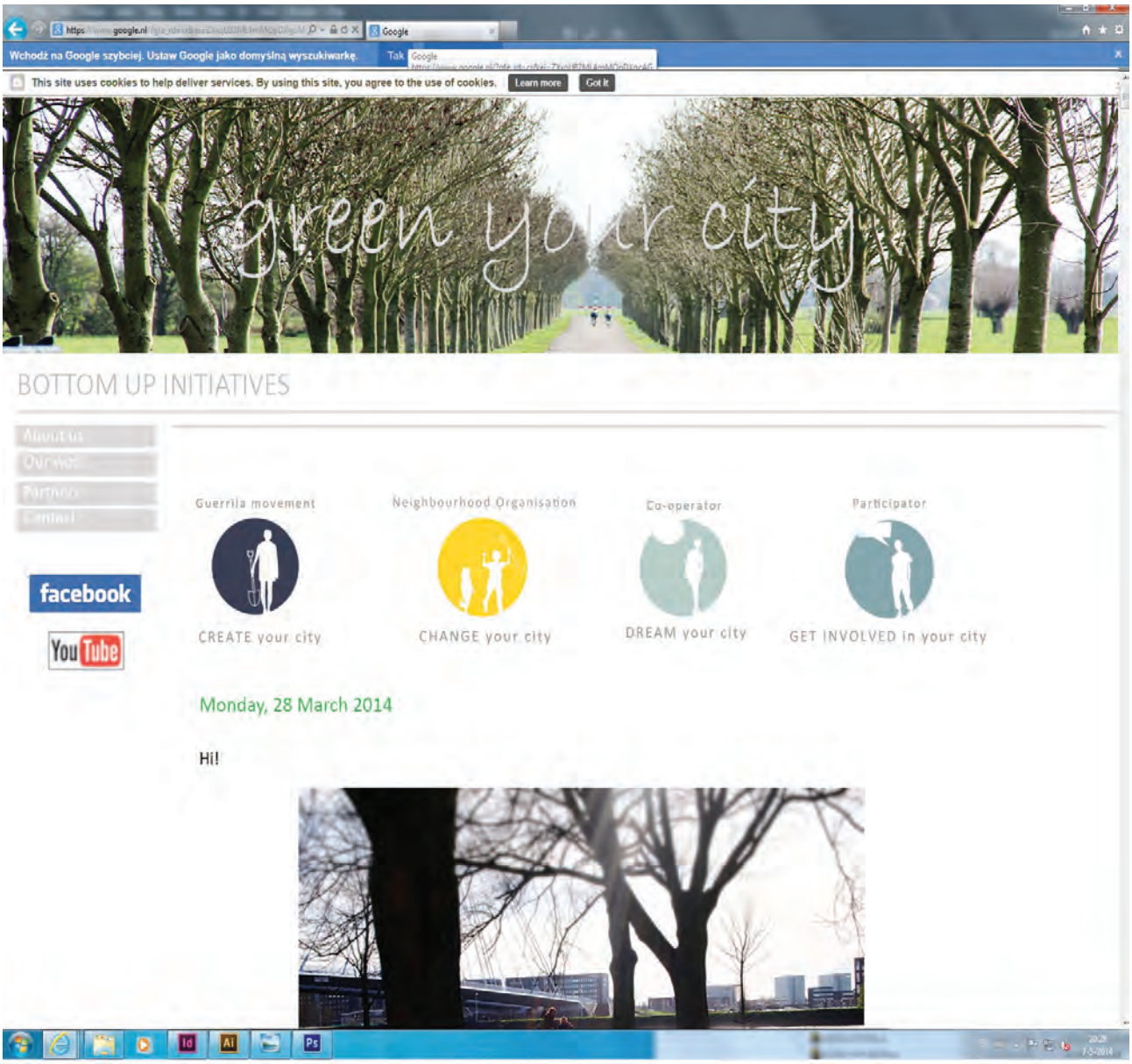
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Learn more
Got it
green your city
BOTTOM UP INITIATIVES
About us
Our work
Partners
Contact
facebook
YouTube
Guerrila movement
CREATE your city
Neighbourhood Organisation
CHANGE your city
Co-operator
DREAM your city
Participator
GET INVOLVED in your city
Monday, 28 March 2014
Hi!

6.18.

7. INDIVIDUAL PROJECTS

In this chapter some of the individual projects are given. These are only 13 projects of the total of 41 people. The projects are spread over the areas of Utrecht.

KROMME RIJN

Vredenburgsquare - *Vincent Peters*

Grow your own infrastructure- *Yesol Park*

Oosterspoorbaan park- *Miyo Augusta Takeda*

VECHT

Water [a]way at 'as van berlage'- *Tom van Heeswijk*

Overvecht- *Federico Lia*

The edge effect- *Sigrid Hauglin*

A new waterfront for a climateproof Vecht- *Vera Hetem*

AMSTERDAM RHINE CANAL NORTH

Leidsche Rijn- *Changsoon Cho*i

Experiencing the Leidsche Rijn- *Mariska van Reijn*

Lage Weide revealed- *Ludo Dings*

Green services in Lage Weide - *Koen Staals*

Flexible area planninng- *Kati Dijk*

Leeuwesteyn Noord- *Rosanne Schrijver*

fig. 7.1 an impression of an ecological edge created by Sigrid Hauglin

7.1. VREDENBURGSQUARE

[VINCENT PETERS]

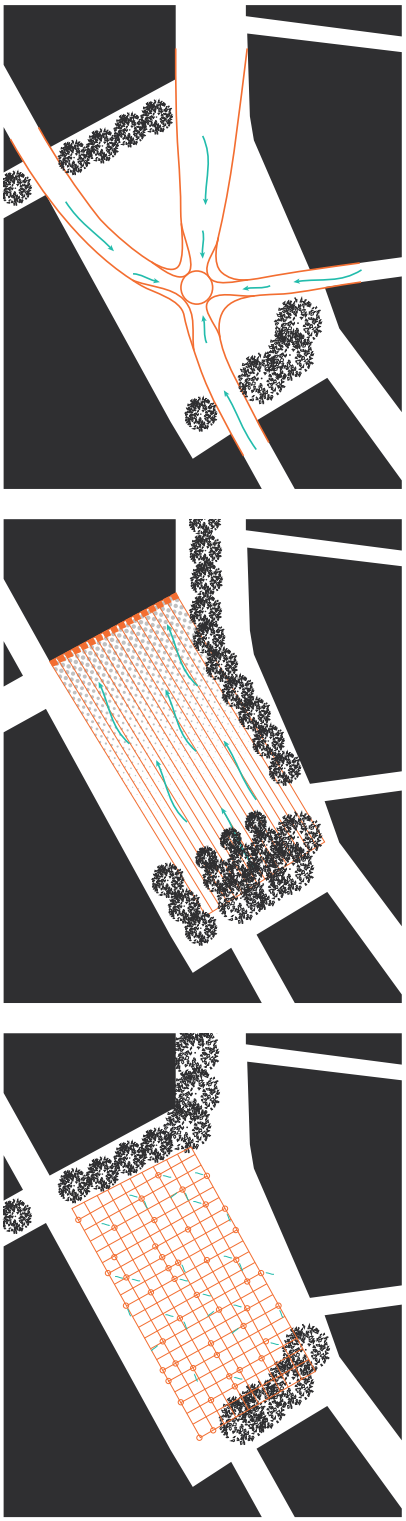
PASSIVE VENTILATION

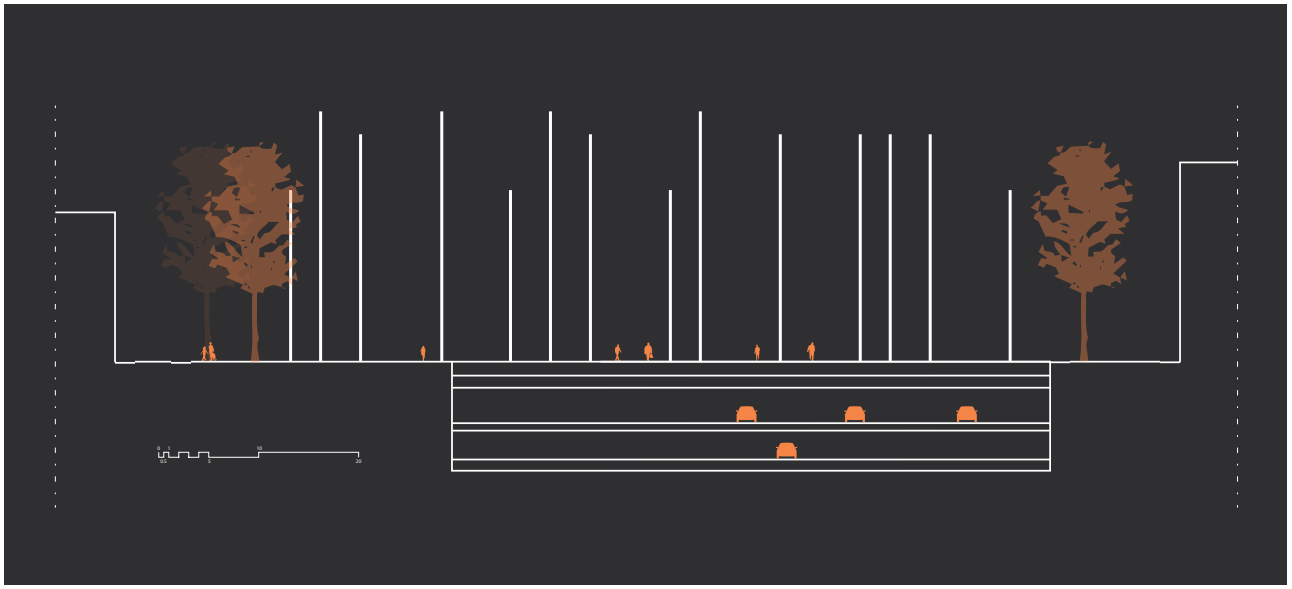
The Vredenburgplein is the first thing a lot of visitors see when they visit Utrecht by train. It is the main exit of the (current and new) Hoog Catharijne shopping passerelle. It is the connection between the old inner city and the station area. It therefore needs to be an attractive space that deserves a high quality of detail.
The Vredenburgplein is also known for is the market on Wednesday Friday and Saturday. This means that it is not an ordinary city square but has a function of a market square. This adds limitations to the design of the square if the market function needs to be maintained. Because the square is also the roof of a parking garage design interventions are limited.

Passive cooling plays an important role in providing thermally suitable environment for human comfort. In architecture, passive cooling systems have been used long since. Solar chimneys are being aplied in architecture to provide ventilation for buildings. For outdoor space this concept has never been used however. This design applies the solar chimney concept to the vredenburgsquare to provide this square with a way to generate passive ventilation on hot windless days.

The three models on the right of this page show three different ways of implementing the solar chimney concept on the square. The first moderl (top) consists of one big chimney to generate as much ventilation as possible. The second model (middle) consists of a solar chimney fitten on the southface of a facade in order to draw air in one direction over the square. The third model (bottom) consists of a grid of smaller poles. The grid is dimensioned to market size dimensions.

The third model is elaborated into a desing that can be seen on the next page. It is favourable over the other two models because it can be used as an experimental site to test this untested concept.

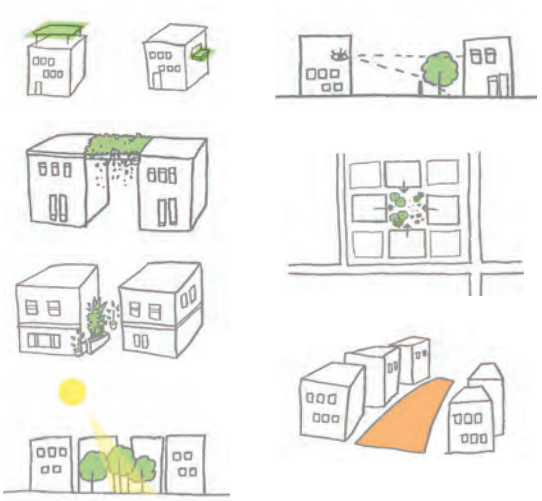




[YESOL PARK]

7.2. GROW YOUR OWN INFRASTRUCTURE

LANDSCAPE SOLUTIONS BETWEEN BUILDINGS



Strategic planting scheme diagrams

The observation on the site showed that public spaces in the neighbourhood Watervolguelbuurt is not actively used by local people. The possibilities for outdoor activities near the dwelling areas has a relationship with local people's life style and its quality. Therefore, I aimed to improve the outdoor urban environment and to promote more use by local people.

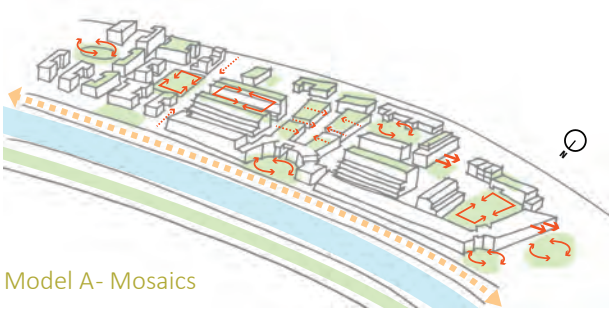
How can the green-blue infrastructure in the neighbourhood, Watervolguelbuurt, contribute to enhance living quality of local people?

CONCEPT

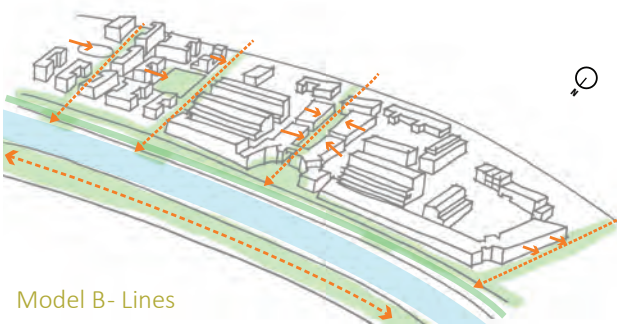
This project has been conducted by above research questions. For starting point, urban agriculture was brought into the concept with awareness of its great benefits to local social environment. As a designer and a landscape architect, I gave an effort to approach to the problem with landscape solutions. For example, the idea of growing food in the public spaces within the residential areas is combined with strategic planting schemes by reasoning. Thermal comfort in outdoor public spaces have been importantly considered with landscape design elements and interventions.

MODELS

Two models are designed to test what ways of implementing urban agriculture would be more suitable on the situation of Watervolguelbuurt.
Model A emphasis social cohesion but Model B more focus on connection to Kromme Rijn.

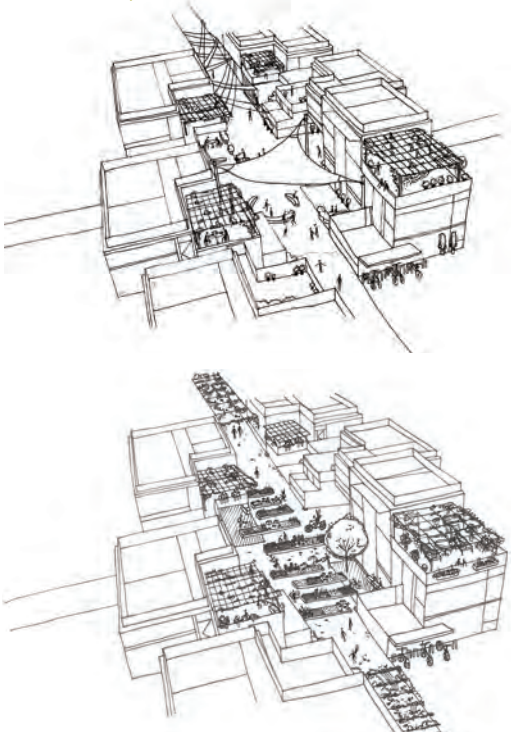


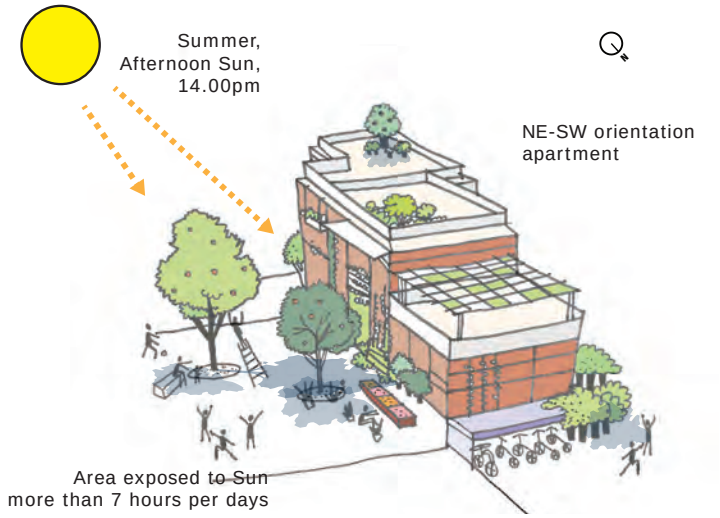
Model A- Mosaics



Model B- Lines

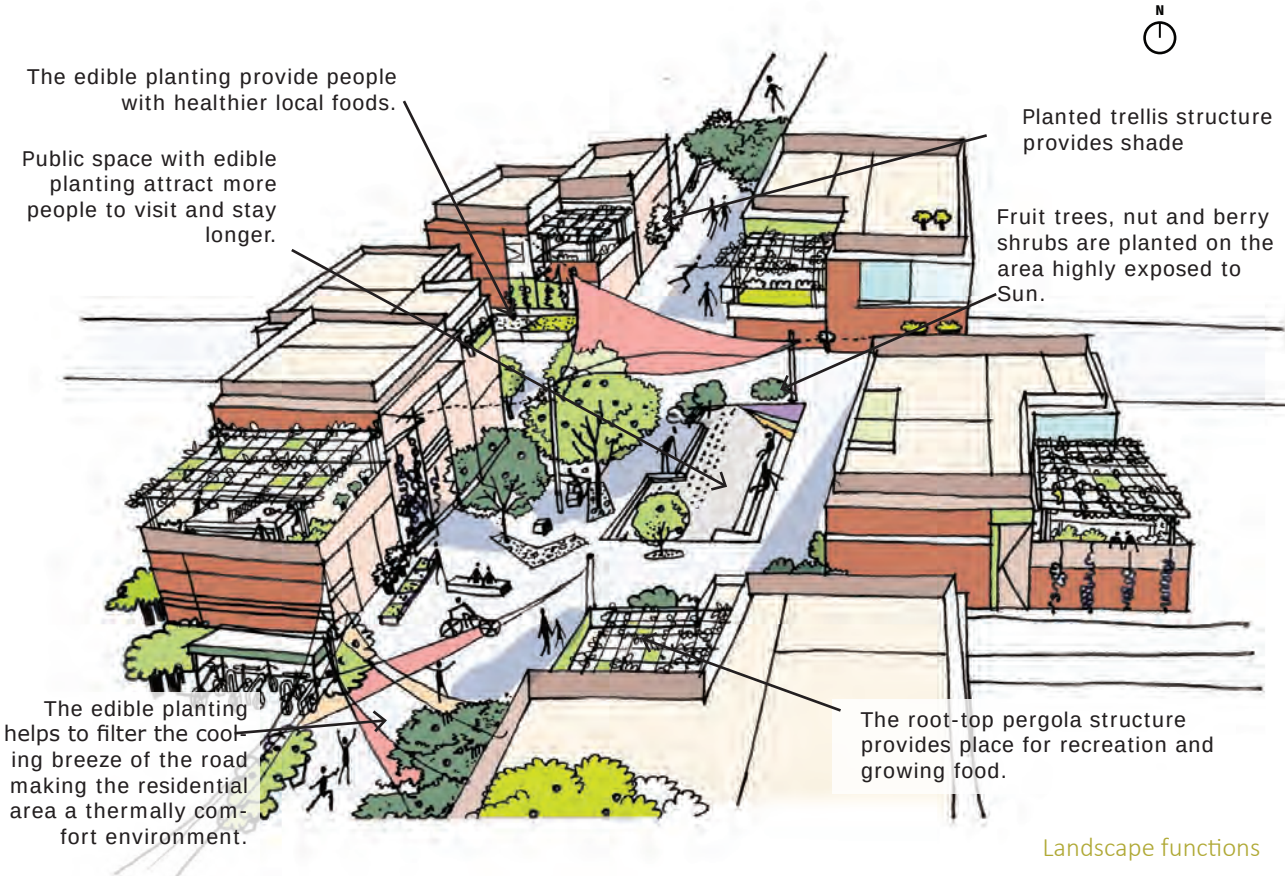
Sketch study for realization





SCIENTIFIC DATA FOR IMPLEMENTATION

To implement green structures on the site, appropriate points were chosen based on scientific data. Study on shadow patterns guided design. It also helps test and estimate the effect of the landscape elements for adopting local micro-climate in reality.



Landscape functions

7.3. OOSTERSPOORBAAN PARK [MIYO TAKEDA]

A GREEN CONNECTION FOR UTRECHT

The Oosterspoorbaan is a 1.5km stretch of disused railway that the surrounding community would like to see developed as a public park, as well as a car-free connection from the centre of Utrecht toward the east side of the city. The Oosterspoorbaan Park proposal features a series of programmatic nodes along pedestrian and bicycles paths located where the railway once ran. The nodes add ecosystem services to recreational programming. Vegetation growing between existing rails unique sense of place while creating options for thermal comfort.

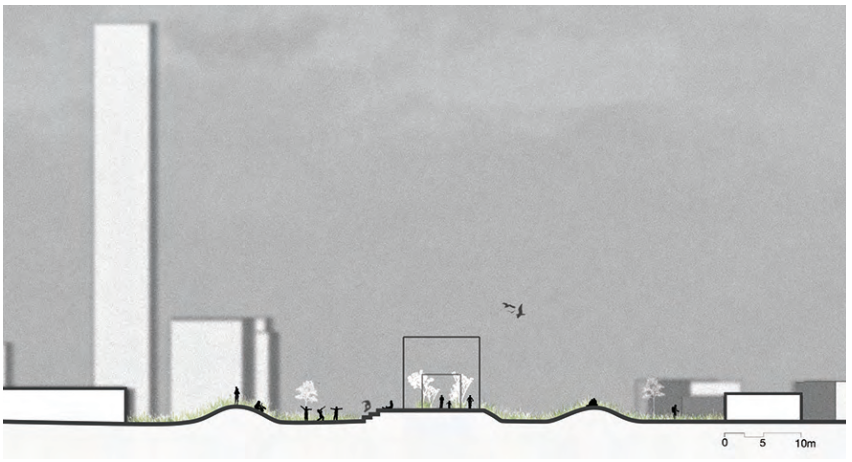
fig. 1 The deciduous forest nodes adds beneficial ecosystem services to the site.

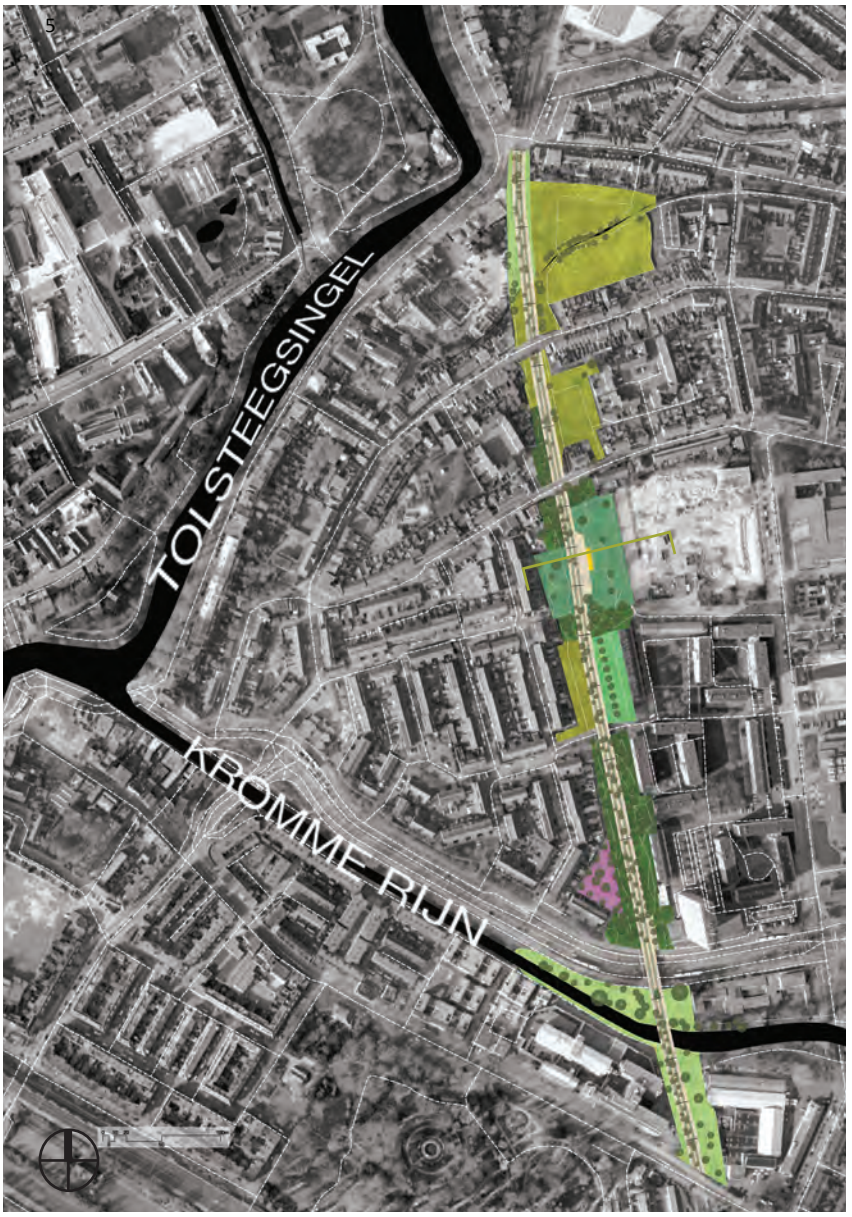
fig. 2 Cyclist crossing the Kromme Rijn on their daily commute. A new footbridge allows access to the Oosterspoorbaan's existing infrastructure

fig. 3 A sunny outdoor social space with hills and a seating edge create a place to pause away from the speed of the cyclists

fig. 4 Section showing the flexible social space: hills create a sense of connectivity between both sides of the train tracks

fig. 5 Master plan of the Oosterspoorbaan shows different program nodes, and the varied tree canopy which creates micro-climate diversity along the path.





[TOM VAN HEESWIJK]

7.4. WATER [A]WAY AT 'AS VAN BERLAGE'

AS VAN BERLAGE WILL HAVE A NEW, MODERN LOOK WITH RESPECT TOWARDS ITS HISTORY AND EXISTING ELM TREES. RAINWATER INFILTRATION WILL BE SITUATED IN THE GREEN VERGE, BECAUSE PROSPECTIVE RAINSHOWERS WILL GET HEAVIER IN LESS TIME...

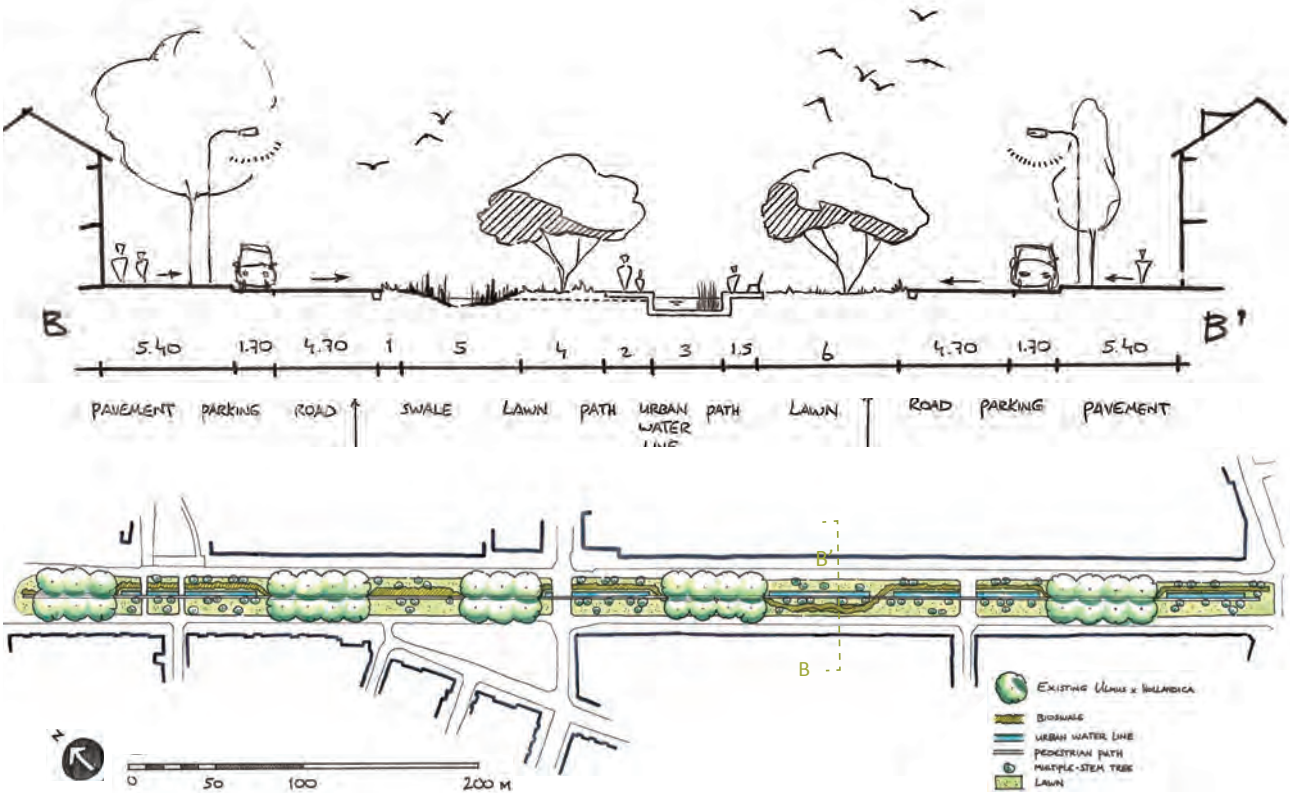
According to Wijkwaterplan Noordwest, the sewer system at As van Berlage is mixed: rainwater and effluent is gathered in the same sewers. This gives increasing flooding trouble in the future whereas rainshowers will become heavier in shorter time periods (KNMI, 2006). Core of the problem is rainwater that runs *too quick* towards the sewers. In case the water purification plant cannot handle heavy amounts of rainwater, this excessive water is discharged through eight outflows: one on the Amsterdam-Rijnkanaal and seven on the river Vecht. Both national- and provincial environment policy desire to strongly reduce these pollutant outflows.

This problem brings a desire to separate rainwater catchment from effluent catchment. As van Berlage is one of the street profiles that needs separated rainwater discharge. The idea is to implement a rainwater infiltration system: provided by a bioswale (wadi). A bioswale slowly allows water to infiltrate, whereas its toplayer absorbs polluting particles. Sewers for rainwater will not be needed anymore. All rainwater flows towards the bioswale.

New water retention is designed while it partly preserves the impressive elm-lane, and the bioswale adapts to narrow and wide spaces giving it a more dynamic look. The straight pedestrian path leads through the axis and offers a line for social activity. Shallow urban waterlines are simultaneously reminding to the history of the place: a wide canal profile used to be here till the 1950s. These urban waterlines also create subtle variations in the axis. Integrating all these elements tends to bring a balanced design that takes existing treestructure, rainwater catchment and history into account.

A bioswale for separated rainwater catchment will take care of a new look, but with respect towards existing valuable trees: monumental Ulmus x hollandica trees.

Above: visualization of profile B-B'. A central path for pedestrians leads through a world of bioswales and urban waterlines. Below: profile B-B' of the new situation. Excessive water in the urban waterline flows through tubes towards the closeby bioswale.



7.5. OVERVECHT

[FEDERICO LIA]

A NEW DESIGN FOR THE COURTYARD, A NEW COURTYARD FOR PEOPLE

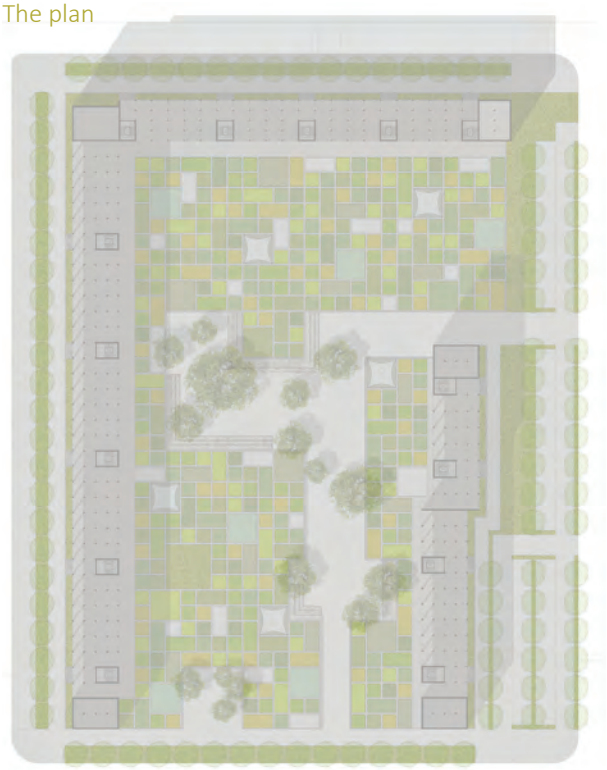
The design of the plan is based on a grid that takes in account the premade structure of the building (the width of square is the same of the distance between the wall of the structure visible on the facade). The project is based on the concept of "personalization" and identity: each square is adressed to an household of the building (for those that want an individual garden) but can be combined with other squares to define bigger space (for people that want to share activities such as gardening). The plan takes also in account the existing trees of the courtyard: those can be kept and the grid is adapted on their location just removing part of the squares. The new courtyard will result as a patchwork of different styles, colours and pattern, will give identity to the place and will let the people of the buildings to have a space to work on and personalize.

The location

The problem

The concept: the personalization of space

The plan



Nowadays the courtyard is a semi-public mono-functional space that can be defined as “no-man’s land”. Now contact between in- and outside is kept, but puts the semi-public space on a different level from the semi-private gardens (accessible only for the residents of the building). In this way, the people work in their gardens can keep their privacy at the same time (if they want) can interact with people in the lower level. This is possible by taking advantage of the basement of the building that raises the ground floor on a upper level (1.10 m). Apartments on the ground floor will be removed, keeping the columns of the structure for two main reasons: the impact of the flat on the people below is lower and the building is not perceived as a wall, but influences the microclimate, because the wind will be able to pass through, cooling the area and creating a ventilated place where to stay when is hot.

Cross section of the courtyard and its access

7.6. THE EDGE EFFECT

[SIGRID HAUGLIN]

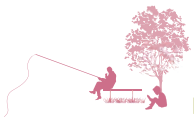
REMAKING THE ZANDPAD AREA ALONG THE VECHT FOR HUMAN AND WILDLIFE

This project is an extension of the final group report together with the vision made from group 2 for the `Vecht` area.
The Vecht is a Rhine branch that crosses the northern part of the city Utrecht. The Vecht is born in the city centre and flows northward. During the group work we discovered that the Vecht is an important connection from the city to the rural surroundings. Moreover, the river and the riverbanks have a lot of potential for improving aspect such as ecology, hydrology, climate change adaption and recreational areas. The location for this project is the Zandpad area, most known as the abandoned prostitute area.
The Zandpad area is currently under development, so this is the time for making a sustainable redesign of the riverbank that can serve the city of Utrecht on the way to a resilient and healthy city.

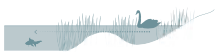
This design shows have the Zandpad area could look like with a combination of wetland and a public park. In this design the wetland work as a ribbon (riparian zone) along the river. Behind the wetland is the public park located. The main area for the park is in the place where Einsteindreef used to be. This approach should be able to achieve all the objectives for the site.

OBJECTIVES

Coherent pathway that connects the city and the rural landscape



Recreation areas

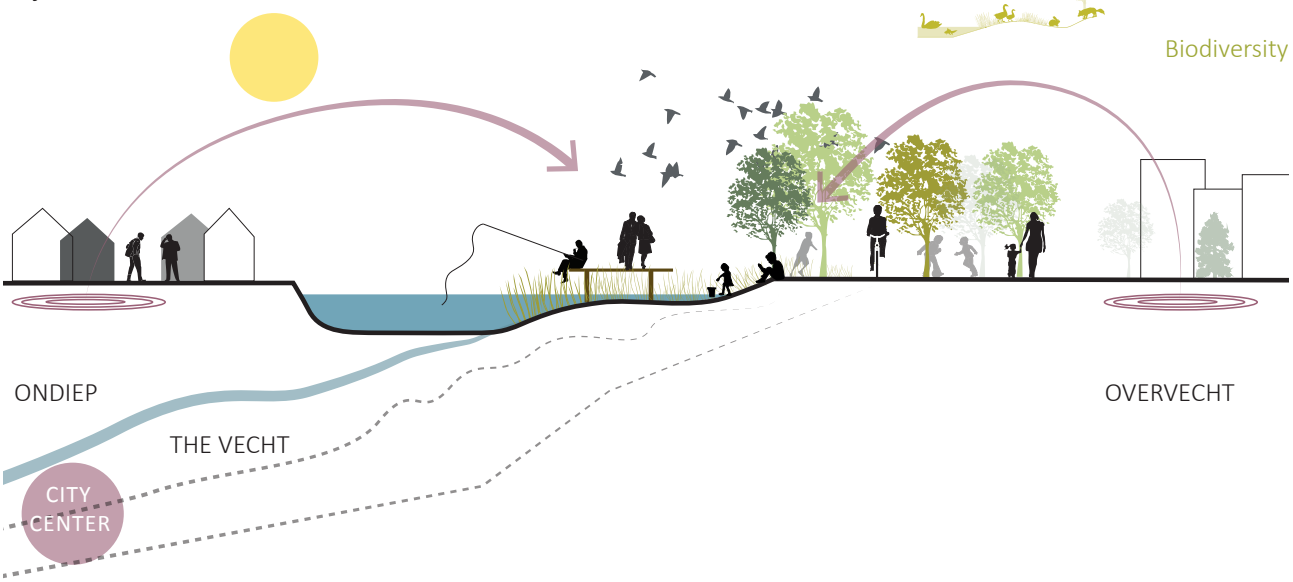


Water quality improvement

Having positive impact on people's health and well- being (Good thermal comfort)

Flood risk reduction

Biodiversity



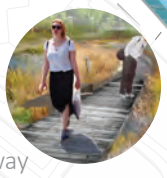
Outdoor stage for music festivals, outdoor cinema etc. The stage is located in the direction so the stairs on the bridge can be used as an amphiteater.

Kayak rent. This point is the end/ start of the wooden pathway

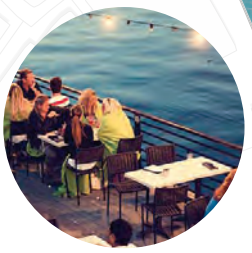
Big public park for recreation and places to meet friends

Along the wooden pathway is it possible to find different spots for recreation such as fishing

Pathway for bikers through the area



Wooden pathway



Outdoor restaurant.
This point is the end/ start of the wooden pathway.

1:5000 (A4)

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7.7. A NEW WATERFRONT
FOR A CLIMATEPROOF VECHT AREA

[VERA HETEM]

Utrecht is lacking a modern waterfront, where people can stay for a longer period, with good microclimatic conditions.
The design based on the analysis of microclimate, recreation and green. A result of the analysis are the models. The first model consists of a new connecting route from city centre to countryside on the west bank of the Vecht, the second one consists of a new place to stay on the east side of the Vecht, with a new waterfront.

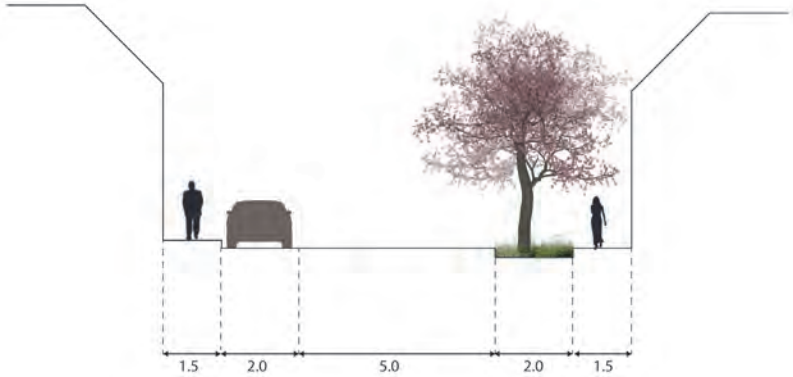
The streets get a new profile, with a higher amount of green, better facilities for pedestrians and cyclists and better microclimatic conditions. Also retention areas for heavy rainfall are part of this street profile.
The waterfront consists of stairs that offer people the possibility to recreate for a longer time in the area. They have movable benches that make people able to choose their own place to sit with the microclimate that they prefer. Together this forms a new start of the Vecht that will be climateproof in the future.

The existing green structure

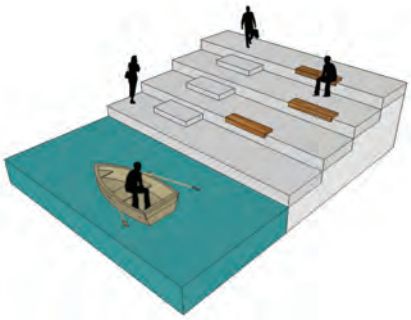
Reference of stairs with benches (Hamburg)

The sluice (Weerdsluis) of the Vecht

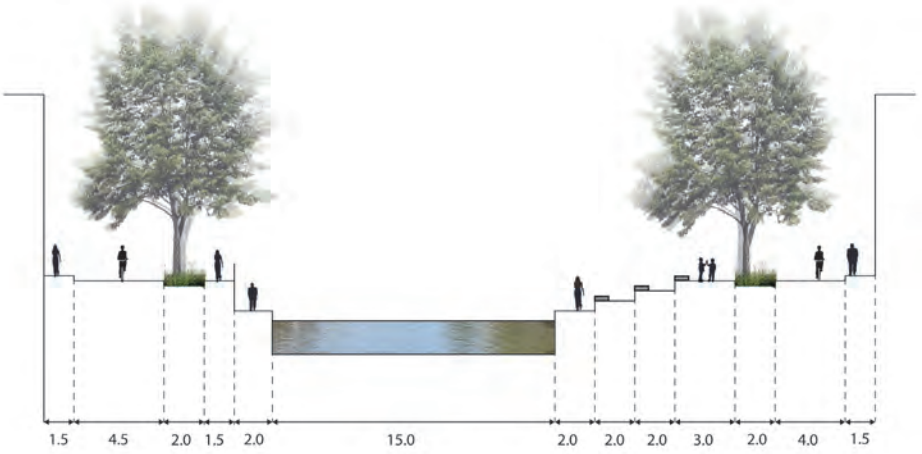
The start of the Vecht as it is now



Section of Lauwerecht (the problem street for microclimate)



Impression of the stairs



Section of the Vecht with the new riverbanks

Plan for the new waterfront

7.8. A PRODUCTIVE LANDSCAPE [CHANGSOON CHOI]

LEIDSCHE RIJN

The main objective of the design it to explore what design strategies of urban agriculture, so-called productive landscape, can contribute to making a multifunctional green infrastructure for the Leidsche Rijn district. To be specific, the research goal is explored with three specific objectives: (1) Improving physical green-blue infrastructure with ecological and recreational values, (2) Improving social cohesion and community of Leidsche Rijn, and (3) Providing comfortable microclimatic spaces.

The main suggestion of this project is an urban agricultural landscape network as a new green-blue infrastructure of Leidsche Rijn(Fig.1 & 3). This suggestion is achieved with the concept of the 'ancient future', which is a methapor of Roman agricultural remain beneath the Princess Amalia Park (Fig.2). Nowadays, agriculture is, more or less, considered as a declining primary industry. However, in the past, it was the place where human and nature can meet as well as the matrix of local community. This productive landscape can provide Leidsche Rijn with a livable and village-like identity with improved community through the urban agricultural activities implenented on various types of urban farm gardens in the park. It will engage not only urban farm and park users, but also others who want buy the fresh food produced through the farmer's market.

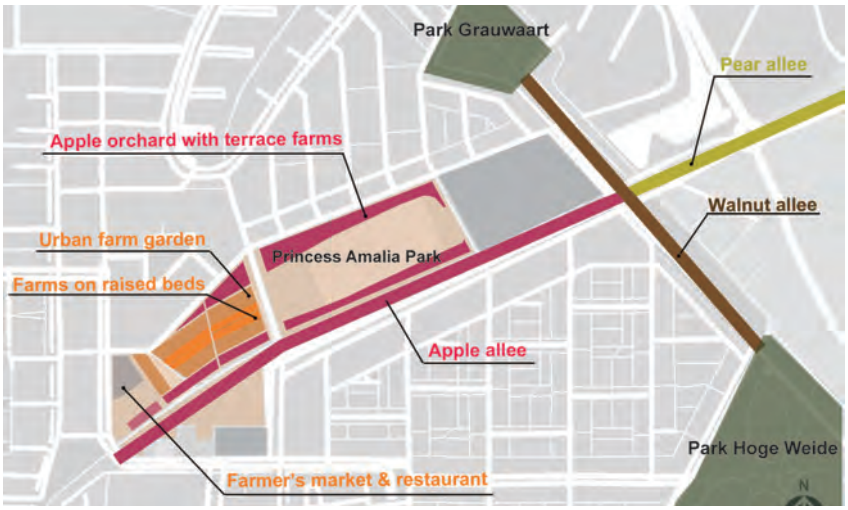


fig. 1 Urban agricultural landscape network

The urban agricultural landscape network consists of an urban agricultural park, currently the princess Amalia Park(Fig.4), and productive landscape corridors including apple, walnut, and pear allees (Fig.5). This corridors will improve the connectivity of the new Leidsche Rijn center to inner neghborhoods and Maxima Park, while linking existing and new parks.

Fig 2. Conceptual image of ancien future

fig. 3 Site plan

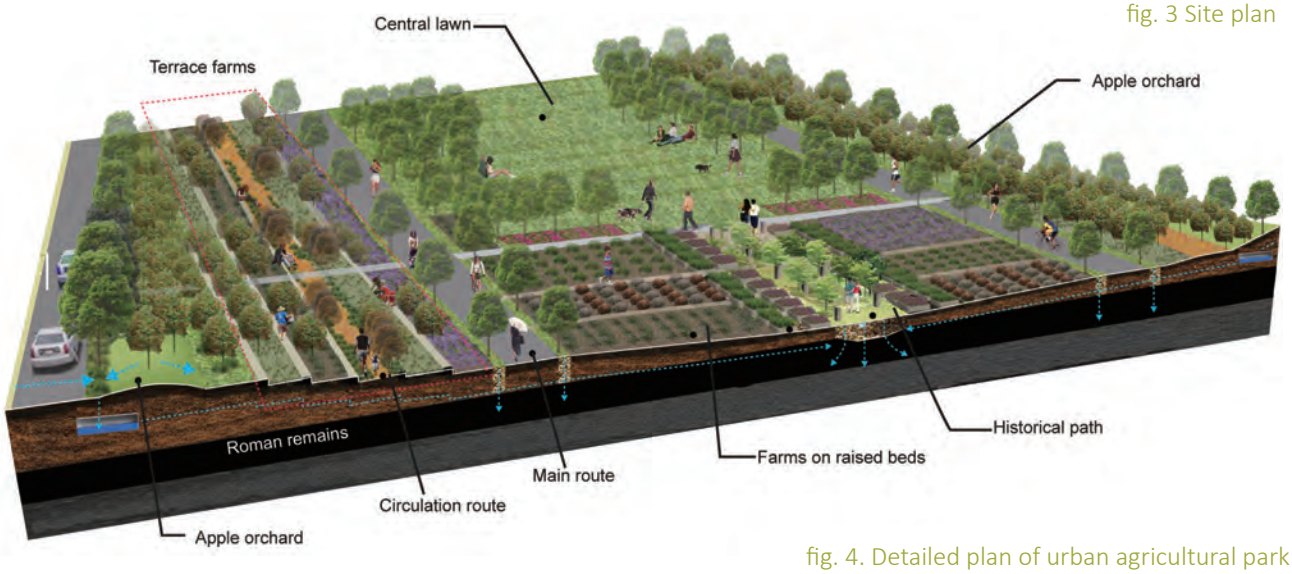


fig. 4. Detailed plan of urban agricultural park

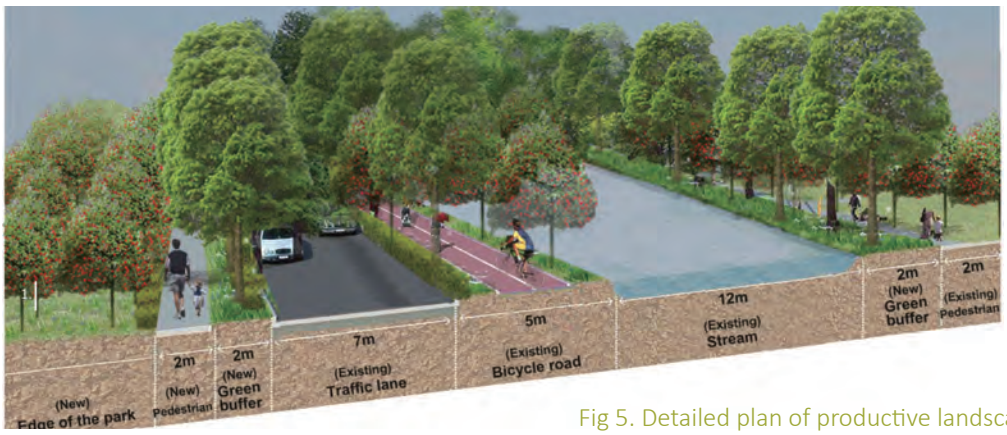


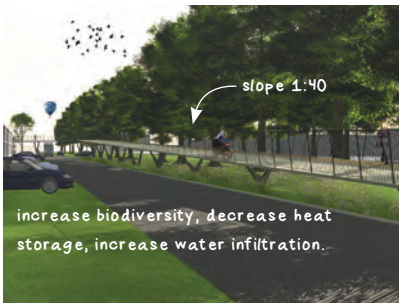
Fig 5. Detailed plan of productive landscape corridors

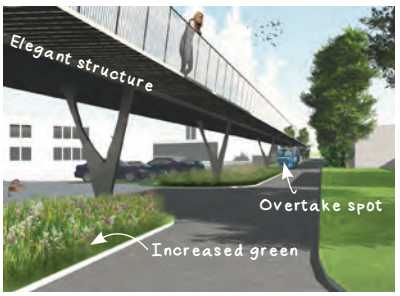
7.9. LAGE WEIDE REVEALED

[LUDO DINGS]

ELEVATED THROUGH THE INDUSTRY

The industrial area Lage Weide experiences problems such as: ecological scattering, unable to experience the industry because of fences and buildings and an uncomfortable microclimate due to full exposure.





This is being improved by introducing an elevated connection which cuts straight through the industrial area and cleverly uses limited available space by a multifunctional, elegant and beneficial design. This creates the opportunity to fully experience the industry from a safe position and it improves ecology by an enriched quality and diversity of flora and fauna. An comfortable microclimate is achieved by strategically placed vegetation for the protection against wind and sun, together with an appropriate materialization. Differences in type of industry, exposure to wind and sun and visual perspective, together with nodes, such as a robust industrial pocket park, creates an interesting and diverse experience along the route. The route will transform the area into an interesting, safe, green, resilient and beautiful environment, which can be used by recreationists, employees, neighbouring residents and commuters and benefits existing plans and objectives.


Experience the industry
Derelict industrial silo is being transformed into an observation deck
Appropriate materials


Pocket park
Robust industrial atmosphere
Reused materials
Reclaimed wooden deck to access the water side


N 0 25 50m.
Mesonweg
Diverse experience
Industrial pocket park
Green corridor

[MARISKA VAN REIJN]

7.10. EXPERIENCING THE LEIDSCHE RIJN

THE DESIGN OF A RECREATIONAL ROUTE FROM CITY CENTRE TO RURAL LANDSCAPE ALONG CANAL THE LEIDSCHE RIJN

Experiencing The Leidsche Rijn is an elaboration of bottom-up vision 'The Communicative Landscape'. The vision proposes a new green-blue connection from city centre to the rural landscape along canal The Leidsche Rijn. This connection has been designed on a smaller scale.

The objective was to create an attractive recreational connection along the Leidsche Rijn for cyclists, pedestrians and boats which connects and combines several local initiatives while also improving thermal comfort for the residents and recreationists. Initiatives like 'Bevaarbare Leidsche Rijn' and 'Breng de Muntsluis tot leven' are connected with for example the municipality plans Lombokplein, the Greenstructure plan and the reconstruction of the Catharijnesingel. These combinations create win-win situations in terms of spatial quality.

From the analysis several challenges occurred such as the houseboats blocking the view and access to the water, uncrossable barriers for boats and the presence of thermally uncomfortable places. Three spatial models have been created to reach the objective and tackle the challenges. The model with a side channel (fig. 2) came out best and is elaborated into a masterplan, which is represented as a simplified route with several interesting points (fig.1) These points are local initiatives, municipality plans (executed or not yet executed) or current spatial qualities. The model is adapted to the current spatial characteristics of the banks. Two cross sections are shown to indicate two different adaptations of the model. (fig. 3 and fig. 4)

Spatial model

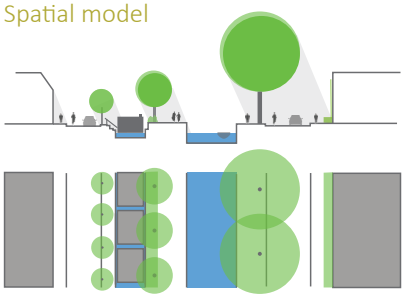


fig. 2. left: spatial model with a side channel for houseboats and an inbetween quay for pedestrians. The side channel will have natural banks at places where this there are at current natural banks

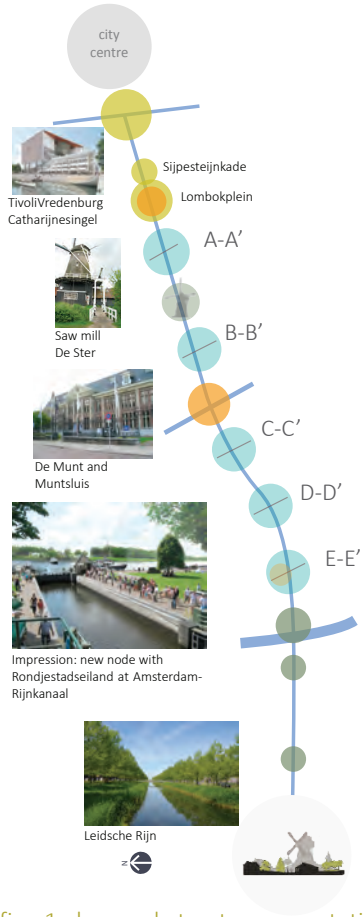
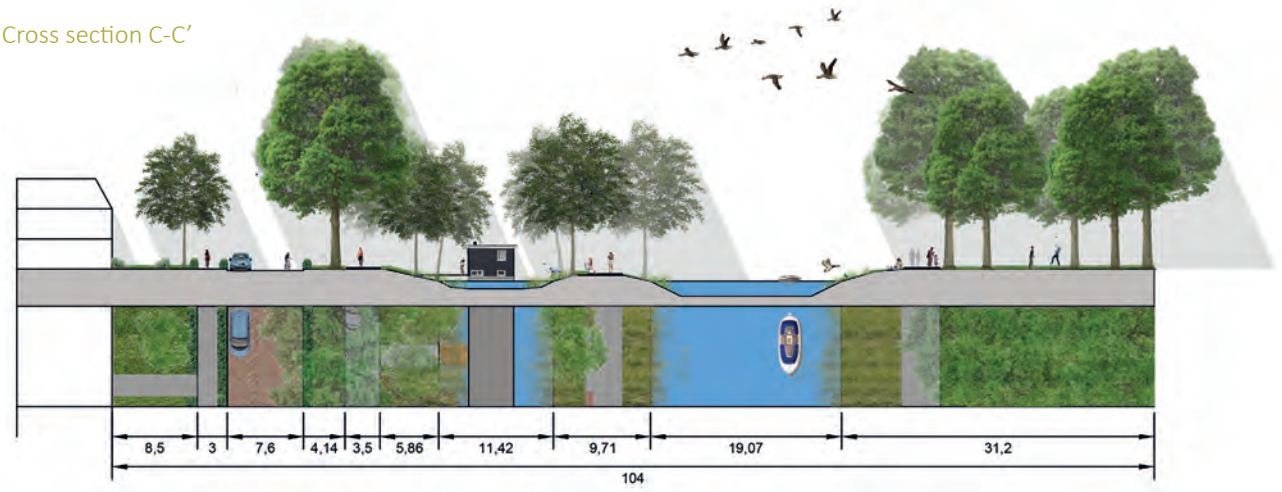


fig. 1 above: abstract representation of the recreational route . Source picture TivoliVredenburg: Studio HH http://www.cu2030.nl/page/tivolivredenburg
fig. 3. right top: cross section B-B', located in district Lombok. The side channel has a more stony character
fig. 4. right below: cross section C-C' which is at the spot where the Leidsche Rijn runs along park Oog in Al. Here the side channel has been given a more natural implementation.

The design shows that spatially connecting and combining singular plans and ideas, from the municipality as well as local inhabitants, can result into a great spatial quality and therefore contribute to a more liveable city.

Cross section B-B'

Cross section C-C'



7.11. GREEN SERVICES IN LAGE WEIDE

THE IMPLEMENTATION OF ECOSYSTEM SERVICES IN AN INDUSTRIAL AREA

[KOEN STAALS - SPATIAL PLANNER]

This research attempts to address the problems in the industrial area of Lage Weide regarding the many abandoned offices and the related criminality (see figure 1 and 2). By expanding the green structure in the area and implementing ecosystem services to these abandoned spaces, the provided collaborative plan tries to solve this problem.

In order to come to this plan, the report first identifies several characteristics of the area related to the abandoned spaces and the existing industrial activities. These characteristics are used to base upon a selection of ecosystem services which are provided by the classification of De Groot et al. (2002) (see table 1). The benefits and monetary value of these selected services are indicated in order to show the economic opportunities of such green measures.

The report advises a collaborative planning approach to implement these ecosystem services. The main reason for this choice is the fact that the majority of the property rights in Lage Weide is owned by the private sector. This means that the expansion of green can only be done with cooperation of the private companies. This collaborative structure leads to the establishment of a foundation which consists of representatives of the different stakeholders and a spatial planner who was a role as mediator and expert. The main task of this foundation is to regulate the implementation of green services in the area. This is done by actively purchasing abandoned buildings, implementing green services to these buildings and selling them to green minded companies.

However, such a task depends on the availability of financial resources which should mainly come from the participating stakeholders since they economically benefit. The division of public and private property and goods/services makes a complex financial situation. Therefore, the advice incorporates a financial structure in which each stakeholder contributes to the foundation (see figure 3).

Lastly, the collaborative structure is reflected within the context of the surrounding area and existing policies. The main consideration that results from this is the need for a better connection from the neighboring district to the industrial area in order to stimulate the functionality of the structure.

Figure 1. Abandoned and deprived building in Lage Weide

Figure 2. Allocation of abandoned buildings in Lage Weide

Finally, it is concluded that the implementation of ecosystem services to the abandoned buildings provides a proper solution for the problem. Although the advice is quite generic and only provides indications of the economic benefits, it does give a proper fundament for further elaboration of a collaborative approach in order to implement green services in an economically driven area.

Ecosystem Service	Monetary value (€/ha year)	Benefits
1. **Maintenance of favourable climate**	**64 – 163**	▪ Lower energy demand ▪ Health of employees ▪ Aesthetic value ▪ Biodiversity
2. **Pollution control/detoxification**	**42 – 4.888**	▪ Lower costs on soil remediation
3. **Filtering of dust particles**	**42 – 4.888**	▪ Health of employees and neighbouring inhabitants ▪ Aesthetic value ▪ Biodiversity
4. **Production of raw materials**	**4 – 740**	▪ Biomass products ▪ Aesthetic value
5. **Enjoyment of scenery**	**5 – 1.285**	▪ Increased value of real estate ▪ Health of employees ▪ Aesthetic value ▪ Biodiversity
6. **Recreational green**	**1 – 4.380**	▪ Health of employees and neighbouring inhabitants ▪ Aesthetic value ▪ Biodiversity

Table 1. Selected ecosystem including monetary value and benefits

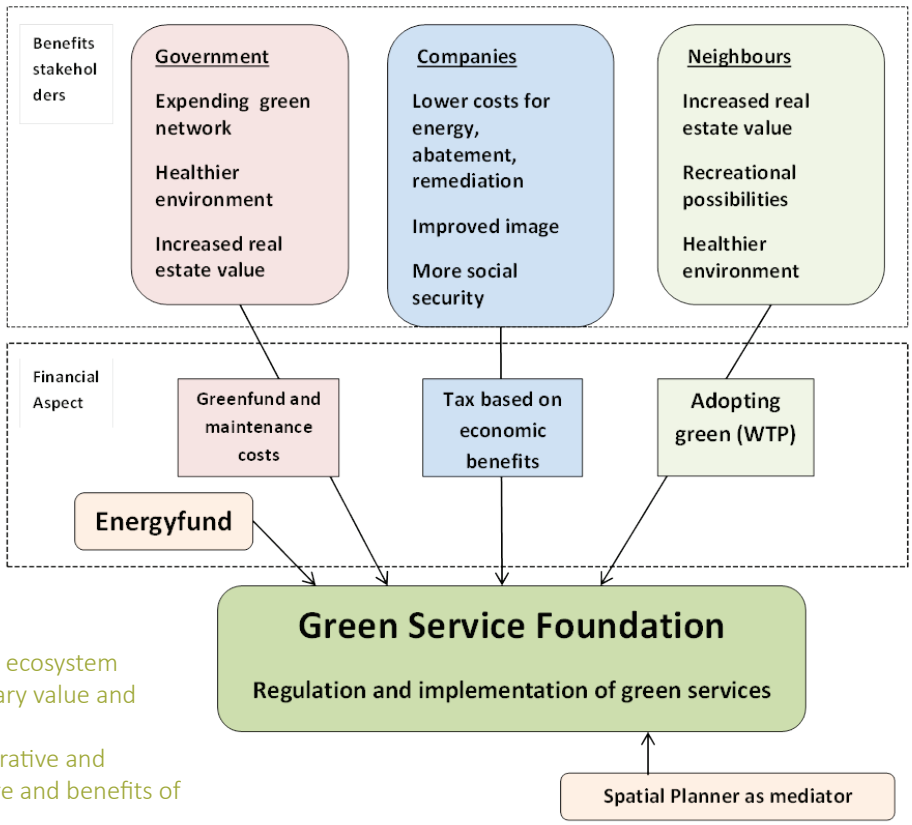


Figure 3. Collaborative and financial structure and benefits of stakeholders

[KATI DIJK - SPATIAL PLANNER]

7.12. FLEXIBLE AREA PLANNING

GREEN INTERVENTIONS IN LEIDSCHE RIJN CENTRE

In Leidsche Rijn Centre, centrally situated in Utrecht a large shopping and leisure area is planned. Due to the economic crisis and increase of internet shopping, developers are afraid of failure and do not want to take large risks by building on speculations. What is left is a large empty building lot, which makes this central place not look very attractive. A possibility to develop the area on the short term might be by introducing the concept of flexible area planning. Flexible area planning is focused on local conditions, the actual users of the area and the planning takes place step-by-step. In that way flexible area planning is able to relatively easily adapt to needs and circumstances of that time, without bringing large risks.

Reference 1: Blijburg Amsterdam


Reference 2: Prinzesinnengarten Berlin


Reference 3: Re:START Christchurch


Reference 4: SAIL Amsterdam

The aim of this research is to explore how flexible area planning could be applied in the not-built area of Leidsche Rijn Centre, aiming at a more attractive green place which better connects Utrecht city-centre with district Leidsche Rijn and attract people already to the place so future visit will be more likely. Local conditions, local needs and an inventory of the possibilities of applying green in flexible area planning are used to develop interventions. Local conditions and needs can be summarized by the following objectives, concerning the interventions that should:

- bring no or little risks;
- connect the different city parts of Utrecht;
- leave room for high urban developments
- provide enough facilities like shops, restaurants, etc.;
- contribute to development of a cultural hotspot;
- contribute to diversity in space and use of the area.

An inventory is made of green fitting in flexible area planning:

- conserving existing green elements
- communal green
- temporary green
- (re)movable green
- green facades and roofs
- planning the green structure of the 'final' plan

With the previous mentioned information about local conditions, stakeholder input and possibilities of green applications in flexible area planning, four interventions are proposed.

1. Cultural park

Artists can be matched to the area to perform, which attracts people. This contributes to connecting both city parts of Utrecht and realises a cultural hotspot. Pop-up stands and stages and temporal and (re)movable green can be used to keep the intervention flexible.

2. Communal gardens and play grounds

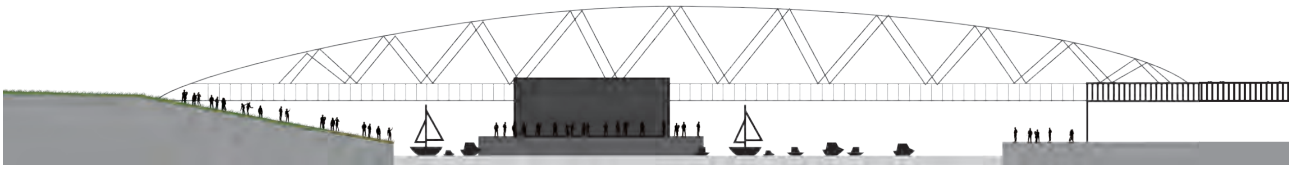
Local energy can be used to develop temporary communal gardens and play grounds. Use of (re)movable pots and devices makes the communal green very flexible.

3. Flexible stores

Pop-up stores could be placed in Leidsche Rijn Centre to provide enough facilities, attract people and encourage further developments. Users should play a bigger role in the process because they know best what is needed. The pop-up stores could be more attractive and diverse by green facades and roofs.

4. Water event on Amsterdam-Rijnkanaal

The recurring event puts the Amsterdam-Rijnkanaal in a central position and attracts people. This might promote long term developments on both water banks and contributes to the connection of different city parts and developing a cultural hotspot. For this application temporary green probably fits best.



A smooth planning process is necessary to make proper decisions. Involving more parties – at least users of the area – might bring more insights in what is needed, so developments will fit these needs and chances of failure are lowered. Besides that, the foundation for the plan increases because more parties are involved. Another aspect which might contribute to a smooth planning process is to make it more transparent by exposing the decision making power.

7.13. LEEUWESTEYN NOORD

[ROSANNE SCHRIJVER]

THE CONNECTOR BETWEEN DIFFERENT TIME FRAMES

With the development of Leidsche Rijn, the city Utrecht took the step to cross the Amsterdam-Rijnkanaal. This district is expected to be completed in 2025 and will approximately contain 80,000 inhabitants. Due to the economic crisis, areas are not further developed. This rises the question where to start strategic development.

By analysing the vacant spaces and compare them with the 'Parken en stedelijke ontwikkelingen van 2012 en verder - Leidsche Rijn, onderdeel van de stad Utrecht', this project concluded that from several perspectives the area of Leeuwesteyn Noord has priority for development (fig. 1). The design for this neighbourhood takes into account microclimate, housing, recreation and the narrative of the place as front lines. In the urban plan is room for about 1.100 houses in all ranges of price and there will be a clear link to the Willem-Alexander roof park (fig. 3). Moreover, the location along the Amsterdam-Rijnkanaal is a present to this plan, since there will be a eye catching boulevard for pedestrians, cyclists and sportsmen to create a connection between this district and the inner city of Utrecht (fig. 2).

fig. 1. top: analysis of the vacant spots which need to be developed

fig. 2. down: impression of the boulevard along the Amsterdam-Rijnkanaal

fig. 3. masterplan Leeuwesteyn Noord

CURRENT

2015

2020

2025

fig. 4. planning over the years to develop the neighbourhood

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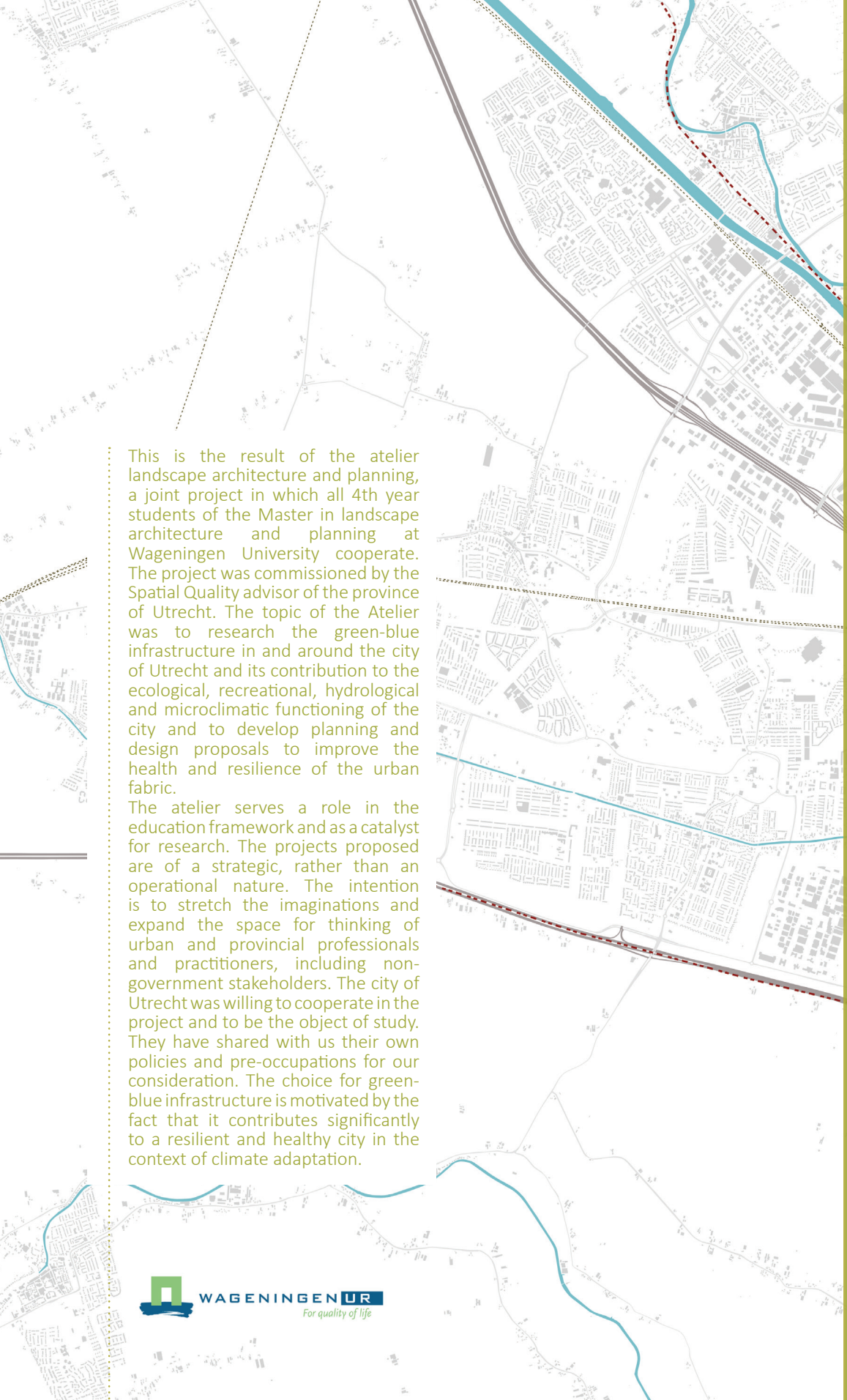
For quality of life

Gemeente Utrecht



This is the result of the atelier landscape architecture and planning, a joint project in which all 4th year students of the Master in landscape architecture and planning at Wageningen University cooperate. The project was commissioned by the Spatial Quality advisor of the province of Utrecht. The topic of the Atelier was to research the green-blue infrastructure in and around the city of Utrecht and its contribution to the ecological, recreational, hydrological and microclimatic functioning of the city and to develop planning and design proposals to improve the health and resilience of the urban fabric.

The atelier serves a role in the education framework and as a catalyst for research. The projects proposed are of a strategic, rather than an operational nature. The intention is to stretch the imaginations and expand the space for thinking of urban and provincial professionals and practitioners, including non-government stakeholders. The city of Utrecht was willing to cooperate in the project and to be the object of study. They have shared with us their own policies and pre-occupations for our consideration. The choice for green-blue infrastructure is motivated by the fact that it contributes significantly to a resilient and healthy city in the context of climate adaptation.

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