MSc THESES OVERVIEW LANDSCAPE ARCHITECTURE GROUP

September 2022 - August 2023

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Content

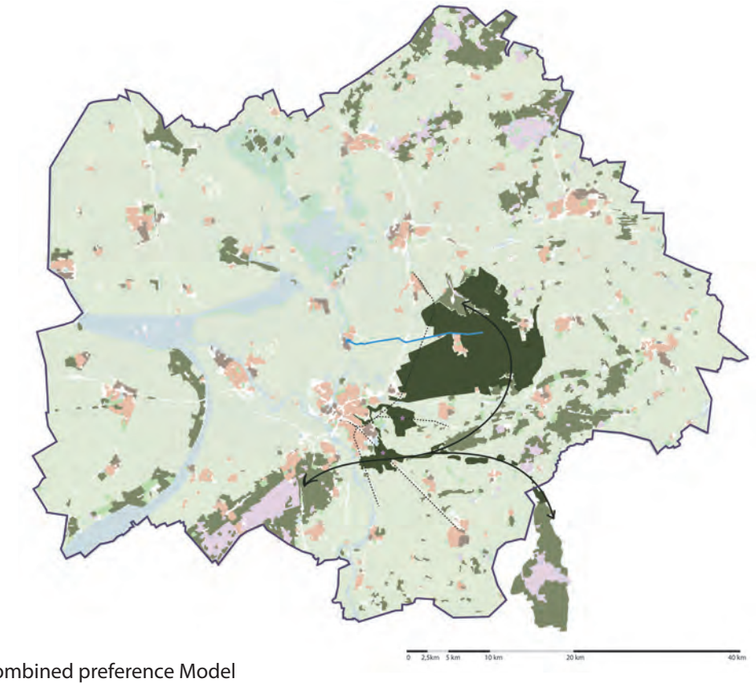
Young wet heathland
reclamation landscape

'Zwollewoud'

NNN forest

Canal forest

'Sprinterbos'



Combined preference Model

Forestation; Sprinter train station for accessible forests

Entrance to the wind turbine district, celebrated by an interactive land mark

Restored and redesigned Dedemsvaart canal
for the transportation of quality wood products

Robin Veldstra
Name supervisor:
Prof. Ir. A (Adriaan) Geuze

The Pioneering Forest

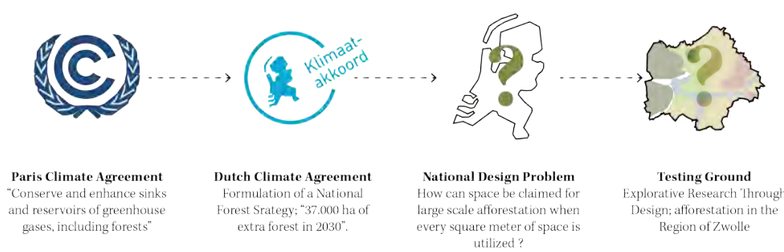
An explorative design research into large scale afforestation in the Region of Zwolle, the Netherlands.

Abstract

To realize the goals of the Paris Climate Agreement, forest cover in the Netherlands should be expanded with 10% by 2030. However, forests have a vulnerable position in the context of economic competition for claiming space, and many other spatial claims are exerting pressure on the disappearance of the remaining cultural landscape inside the highly urbanized Dutch landscape. Strategies for the implementation of forest have been proposed, but a concrete translation into landscape design is often missing. This explorative design research aims to find insights on how to claim space for large scale afforestation, so that it contributes to enhancing spatial quality.

The diverse cultural landscape of the Region of Zwolle serves as a testing ground for systemic regional design that explores in which way large scale afforestation could be implemented and articulated. The research consisted of 4 steps. By conducting Research for Design and a landscape analysis, a knowledge base was created on forest systems and factors that contribute to afforestation. This base was used as input for the second step, a model study. This model study aimed to find suitable configurations, locations and strategies in the region, that were evaluated using criteria. After evaluation, additional models helped combining the found strategies on location. Eventually a synthesis was designed and elaborated.

To articulate large scale afforestation while enhancing spatial quality, the multifunctional character of forest is used to integrate functions and programming inside the forest, while combining these functions with a broad range of landscape experiences. This interweaves the forest design with the fabric of the underlying landscape. The forest acts as an attraction factor to the region, and a structure of voids creates possibilities for flexibility, providing a varied recreational experience while maintaining ecological connectivity.



Paris Climate Agreement
"Conserve and enhance sinks and reservoirs of greenhouse gases, including forests"

Dutch Climate Agreement
Formulation of a National Forest Strategy; "37.000 ha of extra forest in 2030".

National Design Problem
How can space be claimed for large scale afforestation when every square meter of space is utilized ?

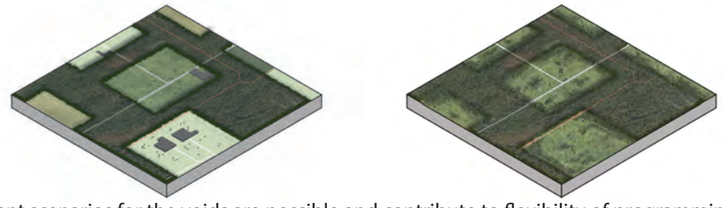
Testing Ground
Explorative Research Through Design; afforestation in the Region of Zwolle

Sequence of the afforestation brief

Regional Masterplan 1:5000

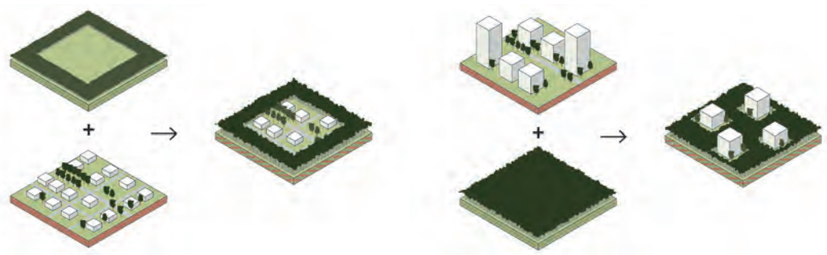
Housing development inside the voids for the expansion of south east Zwolle, where qualitative forested borders are prioritized to serve as recreational and ecological veining

Orchards that produce local cider, an example of a possibility for the inside of a void



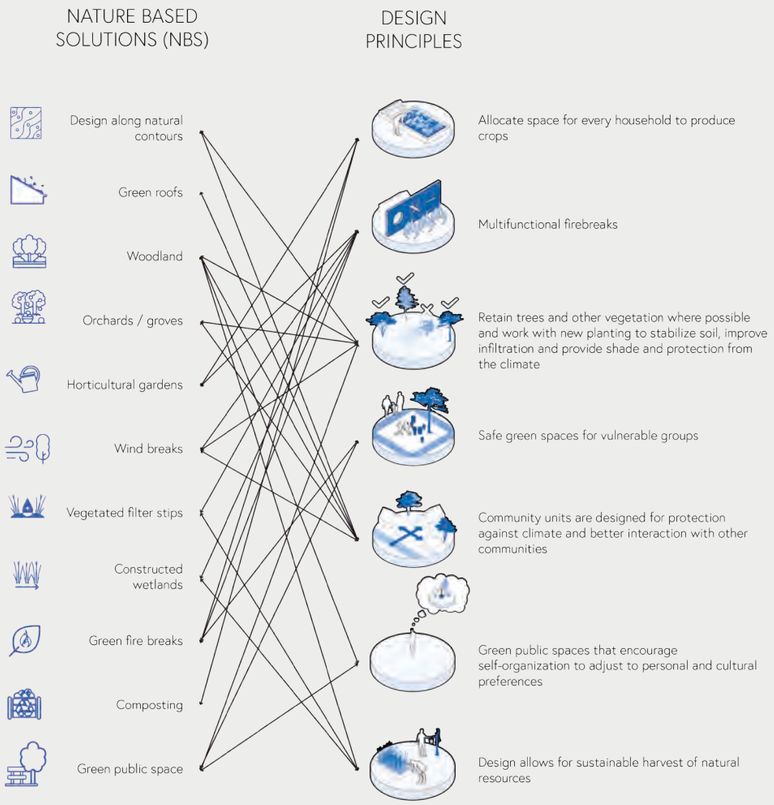
Different scenarios for the voids are possible and contribute to flexibility of programming

Medium rise buildings inside forest create a minimal loss of forest cover, and a fully immersive experience of the natural surroundings



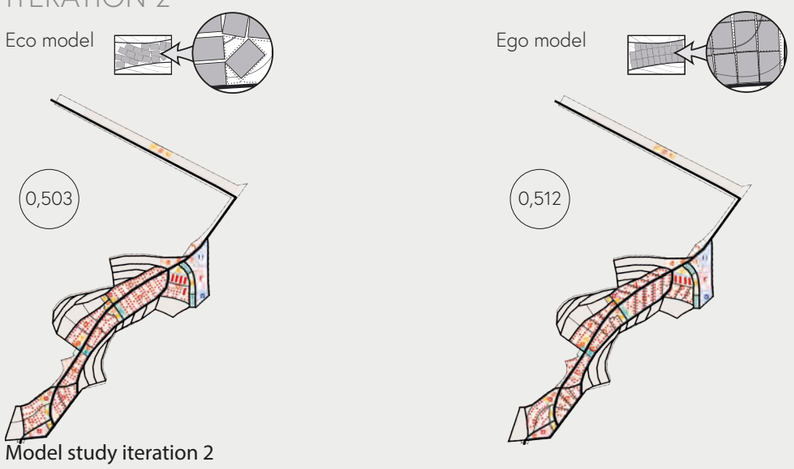
Two types of housing development, inside the structure of voids (see left) and medium rise buildings inside forest (see above)

Location zoom in



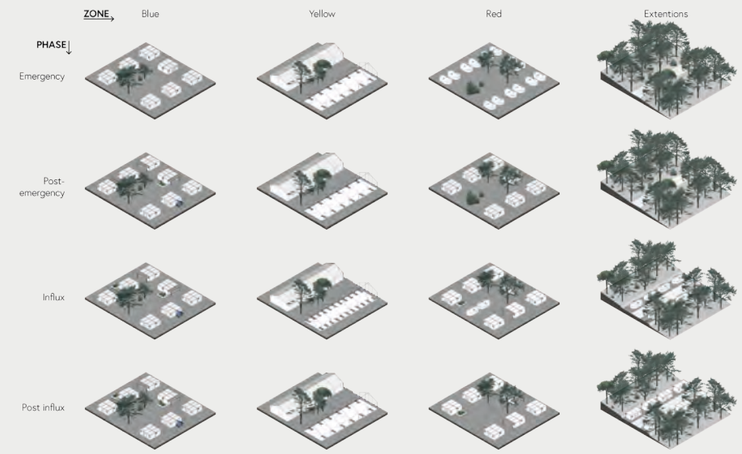
NBS-DP nexuses

ITERATION 2



Model study iteration 2

Master plan



Design strategy communities

Section community

Tim den Duijf
Supervisor: Agnès Patuano

Dignified Displacement

Enhancing liveability of planned refugee settlements through designing with ecosystem services on Lesvos, Greece.

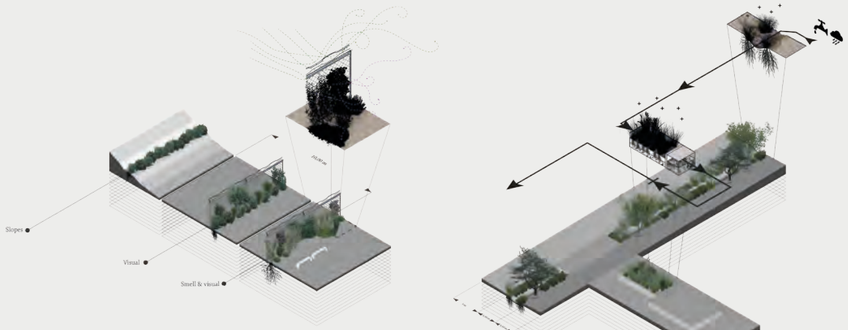
Abstract

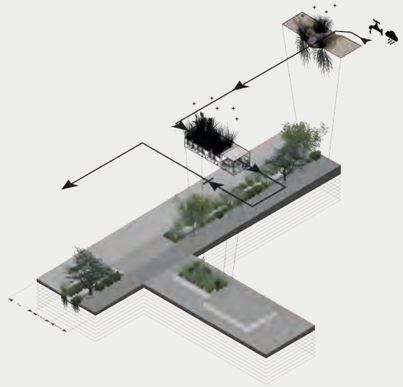
Planned refugee camps form places with a unique form of rapid urbanization that need to be better understood, considering rising trends in migration flows. The premises of this thesis is that for a refugee settlement to be more liveable, the natural and biological characteristics of the environment should be incorporated into the design considerations, while respecting the needs of the population. To attain this goal, this thesis aims to find out how more liveable planned refugee camps can be designed using the goods and services that are derived from natural and biological systems: ecosystem services. Using the framework of nature-based solutions, these ecosystem services can be bundled into applicable spatial elements.

With a history of overcrowding, fire outbreaks and both mental and physical health issues, Greek refugee camps have clear steps to take to improve their liveability. Therefore, as a case study an alternative design is proposed for a new Reception and Identification Centre currently being developed on Lesvos, Greece: Vastria.

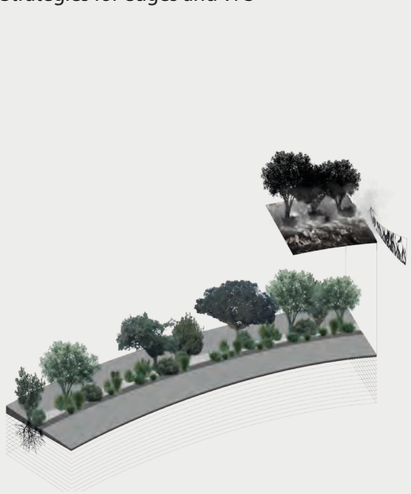
Using a Research Through Design approach, multiple models were designed for the Vastria site, with design principles grounded in theory and applied with the help of a systemic site analysis. The models were tested using an adapted version of the Liveability Spatial Assessment Model. The models were tested for their quantitative features in two design iterations. The outputs of this testing were liveability scores for both iterations, and a list of design remarks from additional expert review during the final iteration.

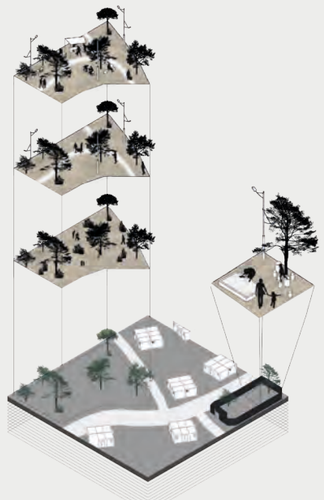
Built on the outcomes of the 2 design iterations, this thesis also presents a final design as a case proposition for the Vastria site, with design recommendations that could possibly be applied in similar contexts. While aware of the limitations of design as a solution to these complex political landscapes, this thesis provides practitioners with a relevant new approach to the design of planned refugee camps.





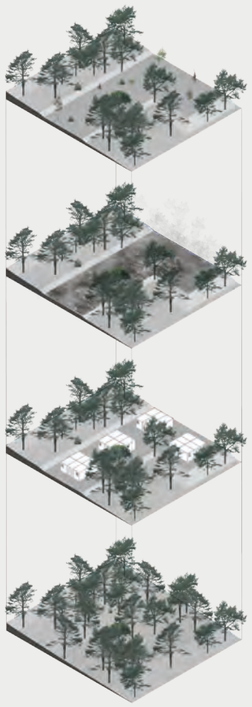
Strategies for edges and VFS





Strategies for Green fire breaks and public space

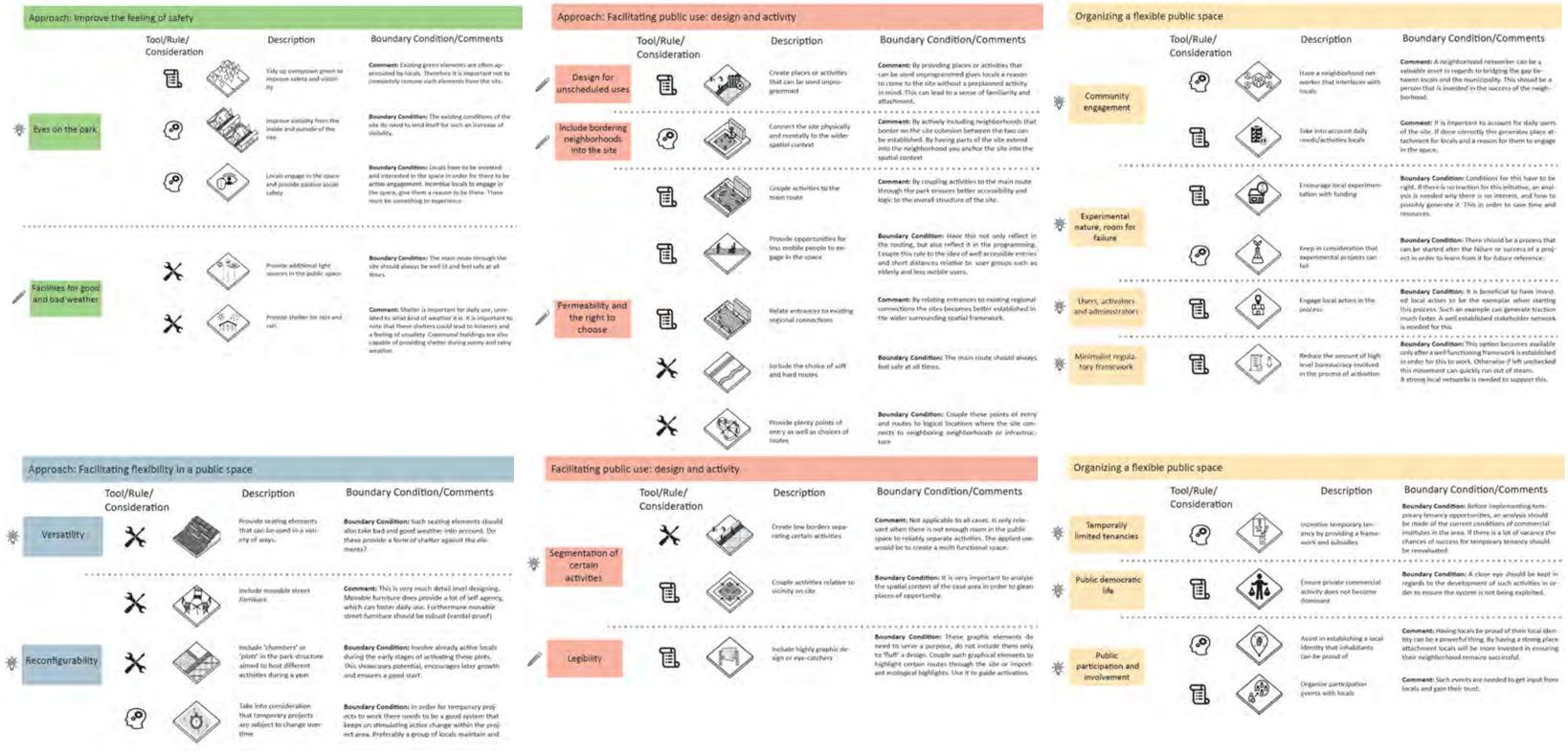
Render of main boulevard with VFS and communities



Strategy for ecological disturbance

Detailed design

Render of plots

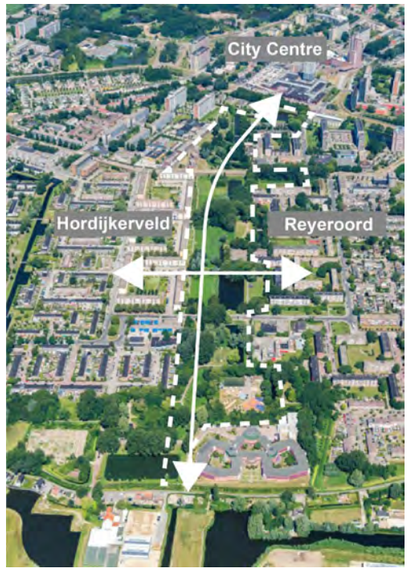


Generated toolbox for activating public green spaces through flexible design.

Concept 1: Active Plinth & Neighbourhood Connections

Concept 2: Waterside Activation

Concept models created to test initial toolbox



Chosen site in IJsselmonde

Jaap Wiedemeijer
Name supervisors:
dr. ir. Marlies Brinkhuijsen
Reviewer: dr. ir. Christian Nolf

Designing for flexibility in public green spaces:
Activating the green wedges of IJsselmonde
IJsselmonde, Rotterdam, Netherlands

Abstract

This thesis arises from the awareness that there are opportunities for the implementation of flexible design in the process of activating public green spaces. Flexible design and the configuration of public green spaces in cities are increasingly important as urban areas and their human population continue to expand. Coupled with growing uncertainty regarding income, housing and work, humans should adapt to a flexible lifestyle in order to cope with these conditions. Public green spaces, especially in *'garden cities'* are meant to offer an escape from the busy urban life and provide a space of excitement as well as relaxation. When such spaces become neglected and suffer from degradation, bad maintenance and a general lack of programming, opportunities arise for new ways of activating such spaces. During an initial literature review, it was established that there appears to be a rise in popularity regarding the topic of flexible design and temporary urbanism, however, it was also noted that there is still a gap between theory and application. That is why this thesis was conducted, to bridge this gap and provide the first replicable toolbox for activating public green spaces through flexible design. Through an extensive literature review and learning from three cases in a best practice study, an initial toolbox was created. This initial toolbox formed the foundation for rules and tools for the flexible design and activation of public green spaces. The toolbox was tested on the public green space Hordijkerveld-Reyeroord, located in IJsselmonde, Rotterdam. This site was chosen as it represents a neglected and struggling public green space, coupled with difficult conditions regarding activation. Through a design process that involved concept model development and expert judgement-workshops the toolbox was refined. Combined with the conditions that were identified through a (spatial) analysis of the chosen site and the refined toolbox, the main design was made for the green wedge Hordijkerveld-Reyeroord. This design demonstrates that the toolbox can be used to activate public green spaces through flexible design and therefore provides a starting point for future research on this topic.

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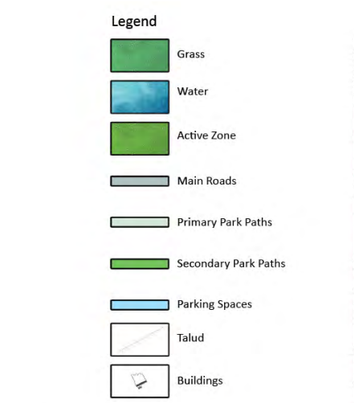
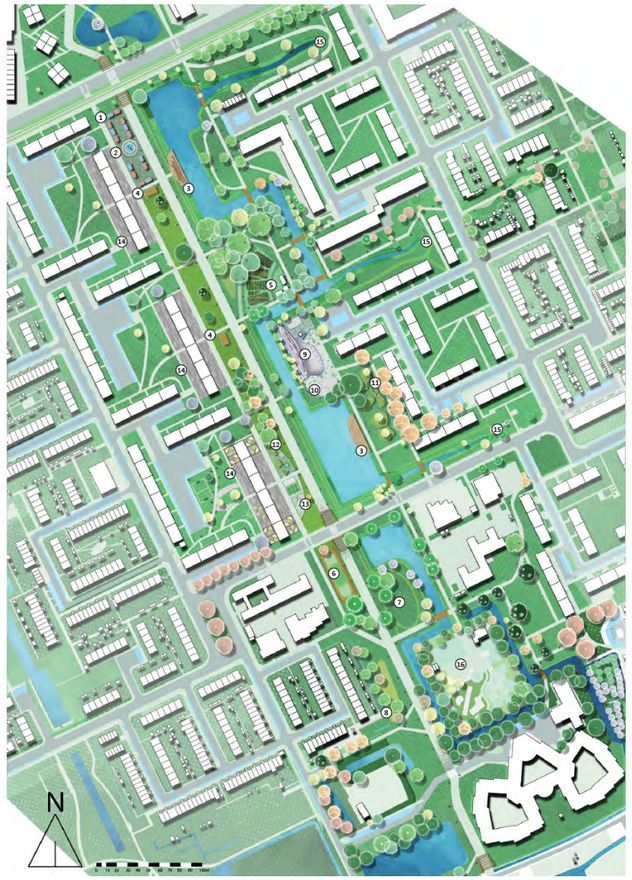
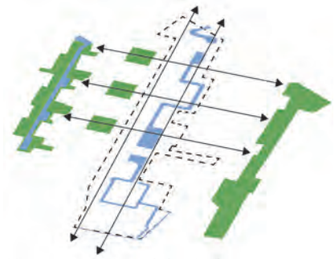
Main design for activating the greenwedge Hordijkerveld-Reyeroord through flexible design

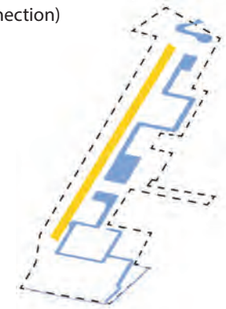




3 Core design ideas



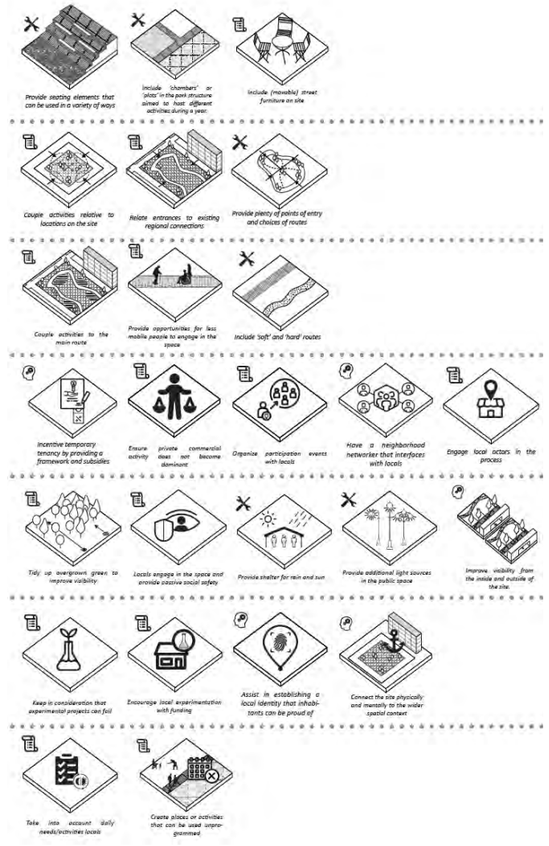
1: New connections (physical connection)



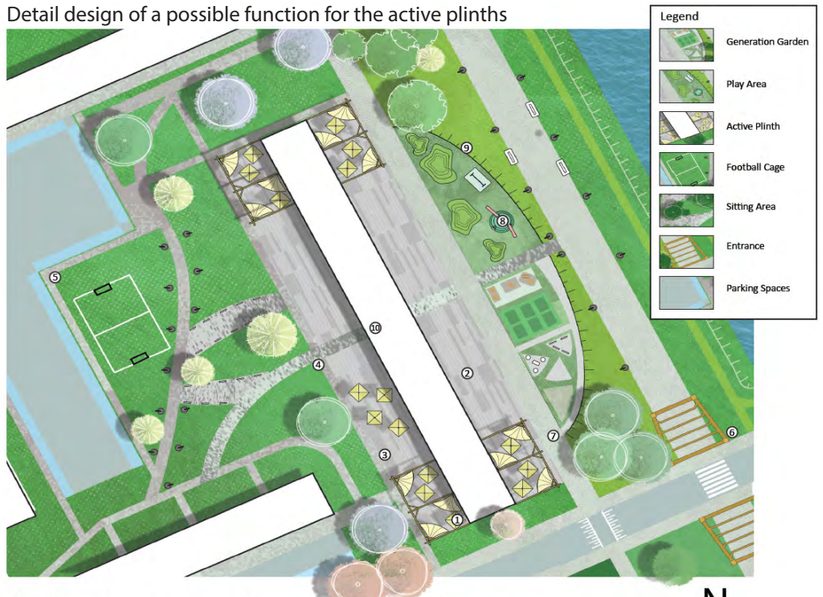
2: Central active zone

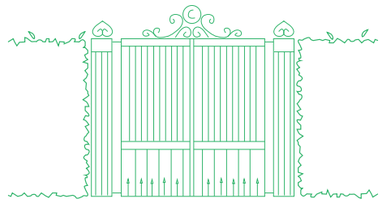
3: Active plinths (mental connection)

Used elements of the toolbox for the main design



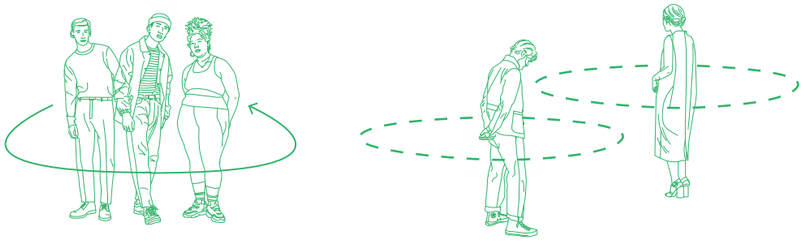
Detail design of a possible function for the active plinths





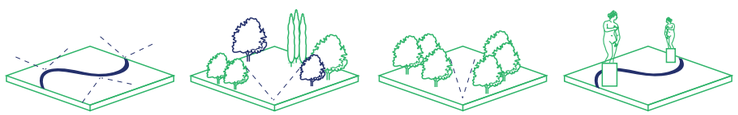
This thesis derives from the notion that death is underrepresented in daily life.

Death has a two-sided effect, since it affects both the deceased as well as the bereaved; who both require space.

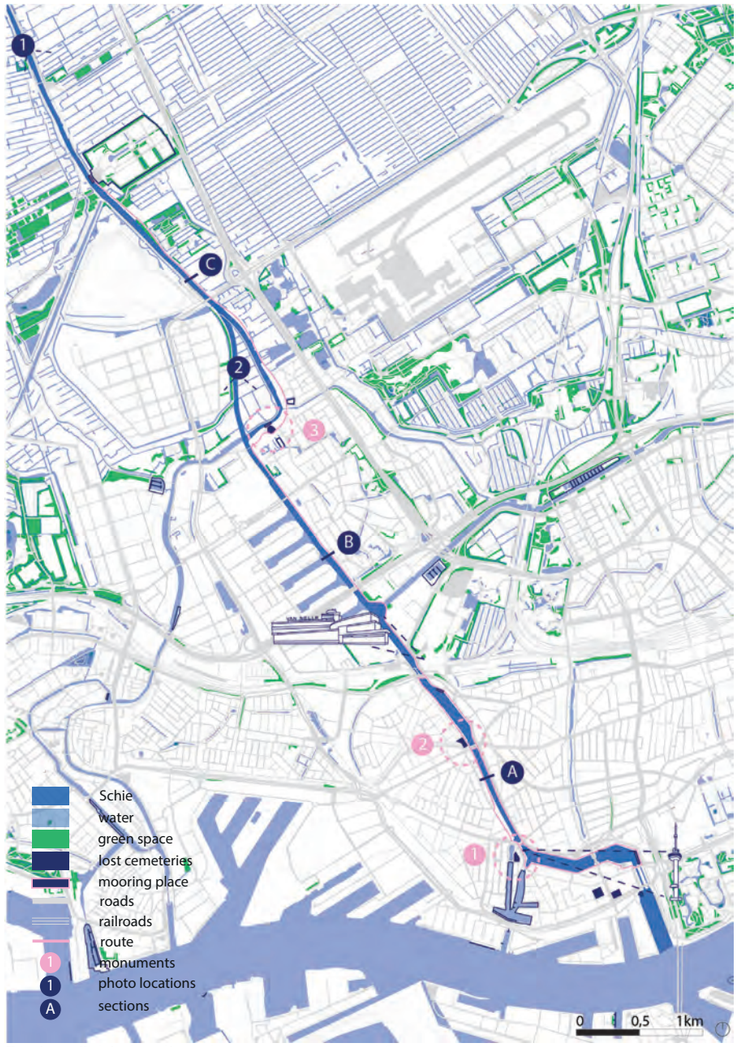


Death happens to us all, and grief is a highly individual process. In this context, design of funerary places fall short.

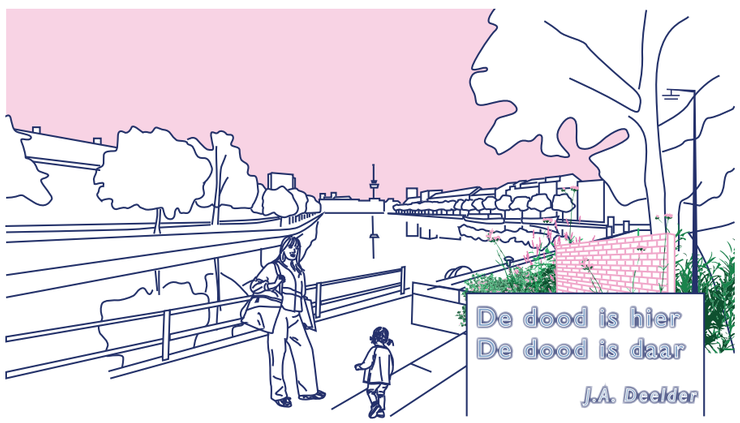
A reappreciation of the landscape style can help us to refocus on the sensory experience regarding death and grief. A route can be a means to lead people to the cemetery, connecting daily life to funerary places. Furthermore, a route through alternating scenery can give a cemetery a leisure function, and invite people to contemplation.



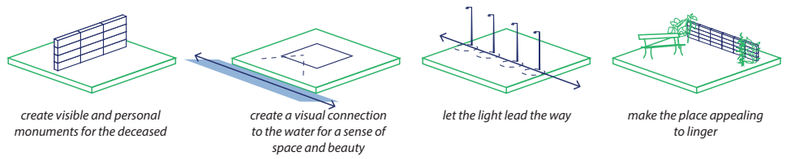
a curved path creates scenes | *setting a scene with vegetation* | *views to the countryside* | *art was used to tell a story*



Design: Schie leading the way; connected funerary places.



Monuments along the route, connected through a campaign and the Schie.



create visible and personal monuments for the deceased | *create a visual connection to the water for a sense of space and beauty* | *let the light lead the way* | *make the place appealing to linger*

Josselin Snoek
Supervisors: Ir. Gabrielle Bartelse, Dr. Ir. Marlies Brinkhuijsen

Landscape lifting grief

Reappreciation of the landscape style for urban funerary places to give death and grief a place in daily life
Case study: Hofwijk, Rotterdam - The Netherlands

Abstract

This thesis investigates what design interventions for urban funerary places, such as Hofwijk cemetery, can give death and grief a place in daily life. Death and grief are part of human life, but it is underrepresented in daily urban life. Funerary places have the potential to be both a place for undertaking the deceased, as well as provide space for the bereaved. In regard to providing space for the bereaved, landschape architects fall short in their designs.

This research focussed on what changes in funerary practices led to the contemporary urban funerary conditions. Moreover, it regards the position and spatial aspect of death and grief in daily urban life. The methods used in this research were excursions, landscape analysis, literature study, conversations with experts, photo analysis, and drawings.

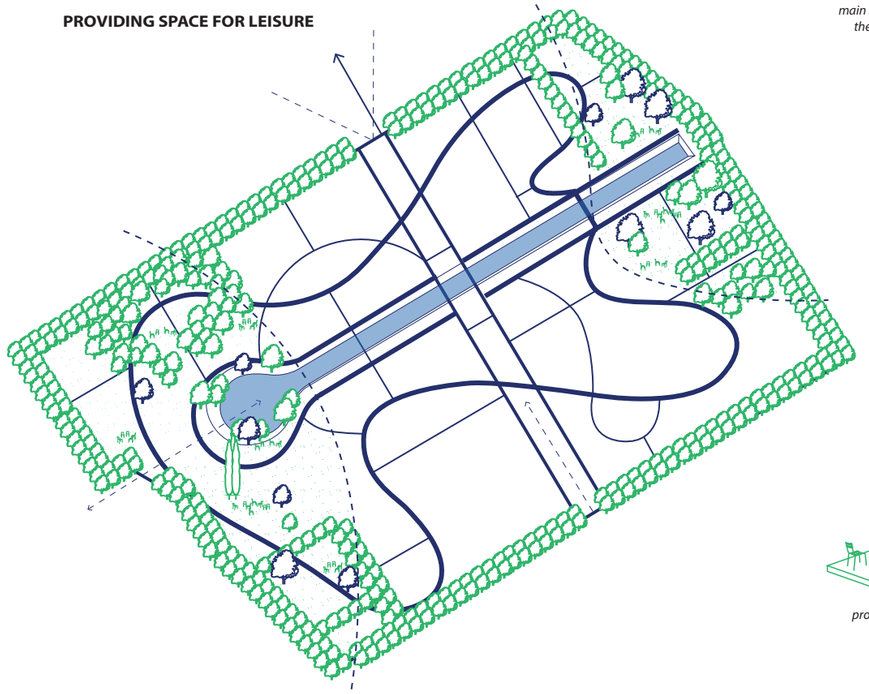
The key results of the research were spatialised into design interventions. The most important guideline of these interventions being the reappreciation of the landscape style. The interventions were tested in a design for the case study: Commemorative Park Hofwijk.

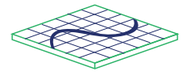
The results of this thesis show that death and grief can have a place in daily life. This is achieved by connecting the funerary places in the city, and providing space for both the deceased as well as the bereaved on the cemetery. The design interventions presented in this thesis, can function as reference guide for landscape architects who work on the design of funerary places, as they offer possible interpretations of guidelines to represent death and grief in daily life.

Key words:
urban funerary places, grief, landscape style,
commemorative park, visibility, route

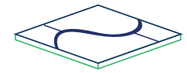
PARK ROUTE

PROVIDING SPACE FOR LEISURE

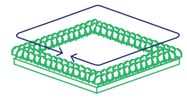




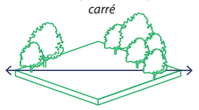
main route breaks through the existing structure



secondary routes connect the main routes to the carré

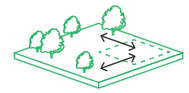


walking path through carré



alternate open and closed spaces

provide an abundance of chairs



connection to larger area of Midden-Delfland

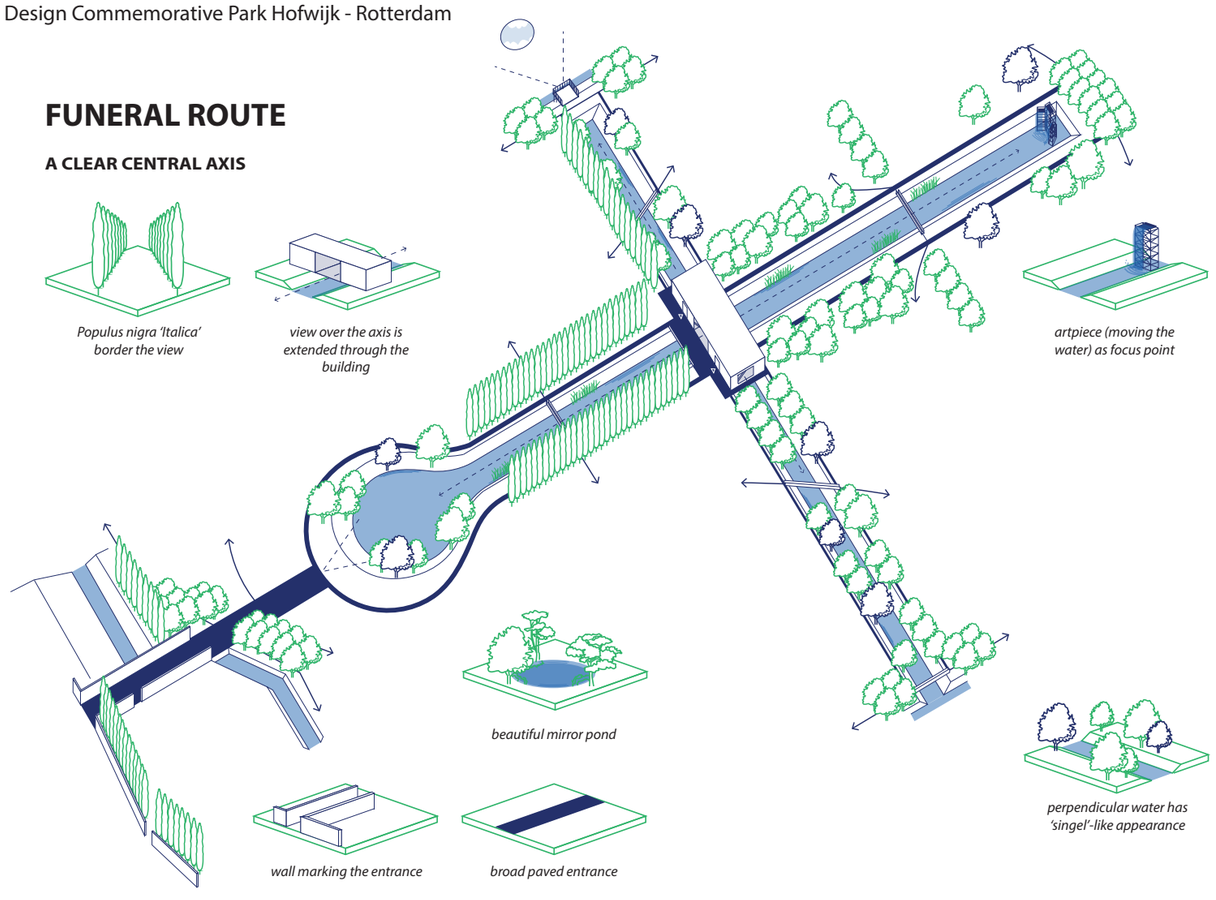
Design Commemorative Park Hofwijk - Rotterdam

FUNERAL ROUTE

A CLEAR CENTRAL AXIS

Populus nigra 'Italica' border the view

view over the axis is extended through the building



artpiece (moving the water) as focus point

beautiful mirror pond

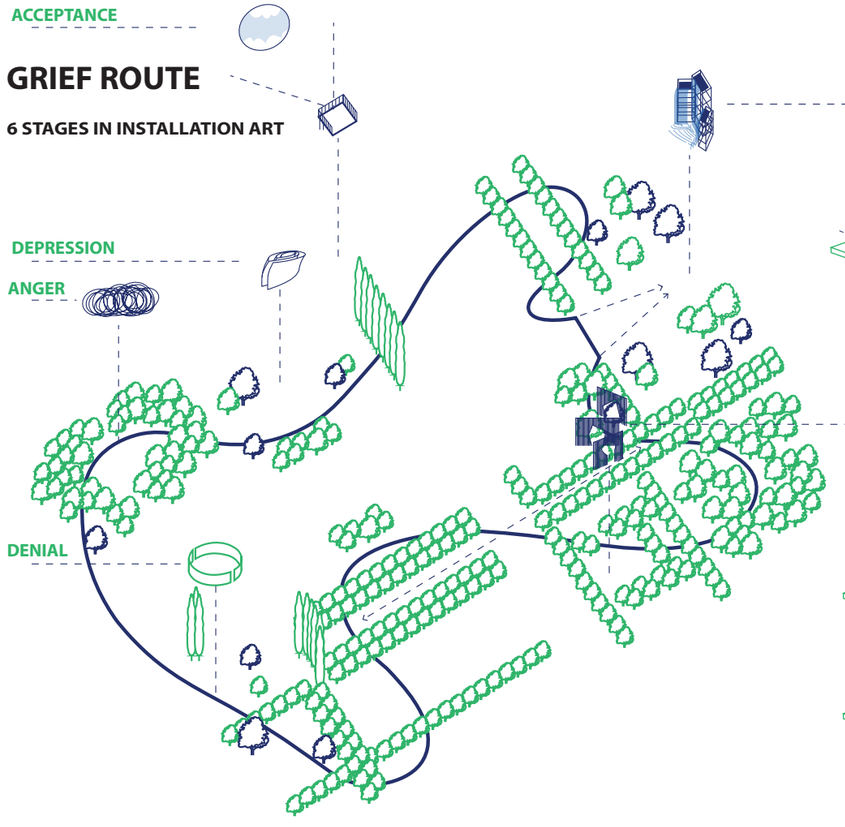
perpendicular water has 'singel'-like appearance

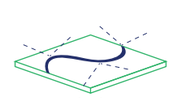
wall marking the entrance

broad paved entrance

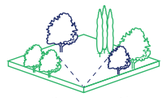
GRIEF ROUTE

6 STAGES IN INSTALLATION ART

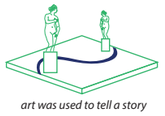




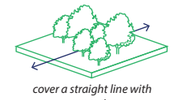
a curved path creates scenes



setting a scene with vegetation

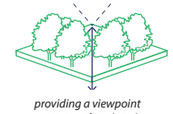


art was used to tell a story

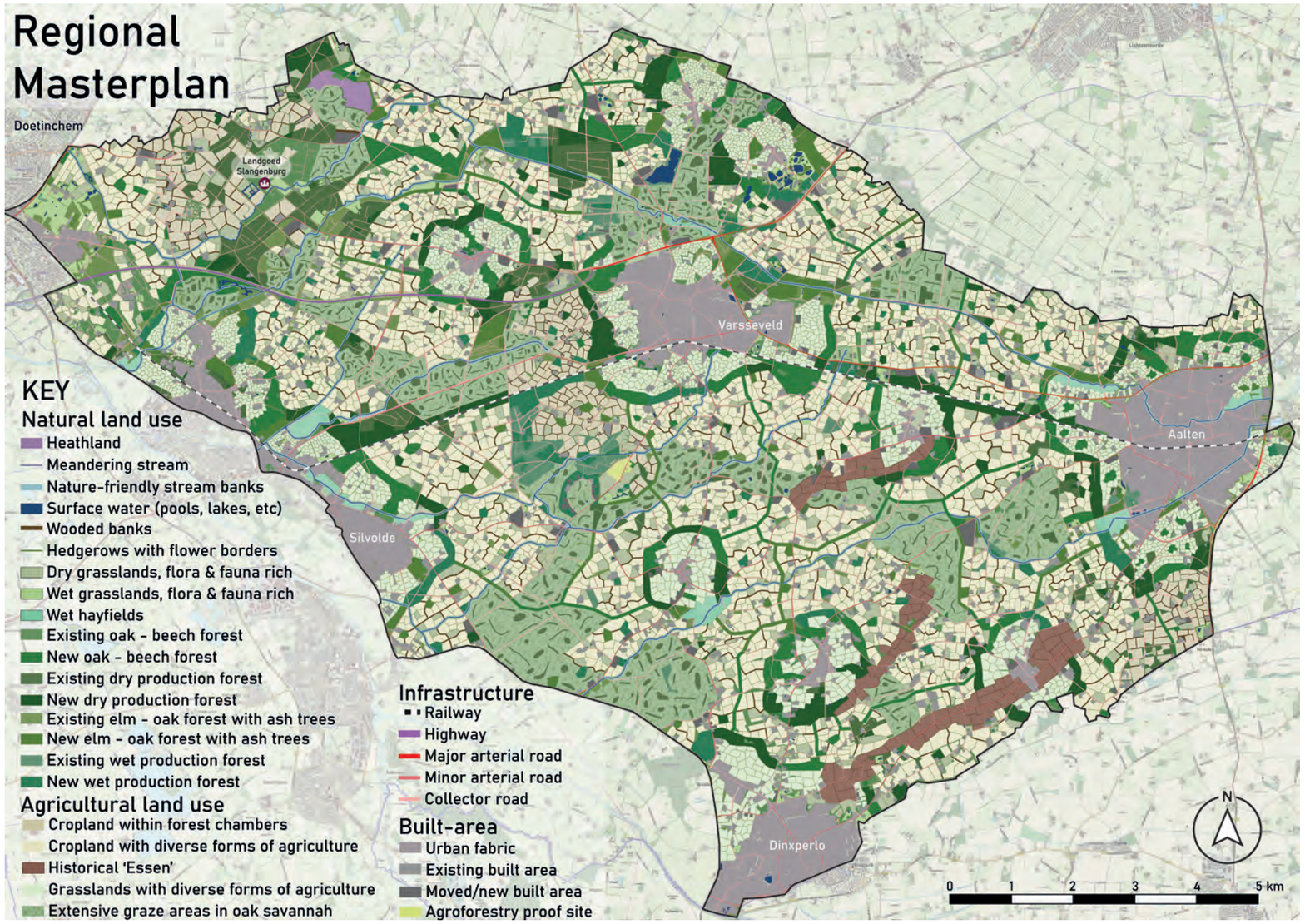


cover a straight line with vegetation

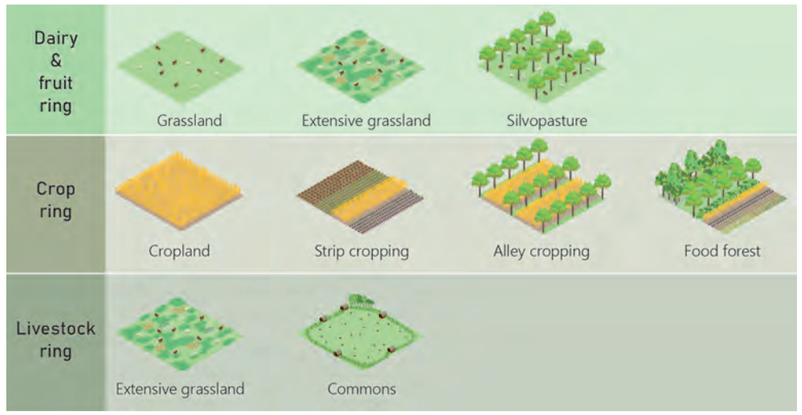
installation art connected to the main park route



providing a viewpoint or space after closed vegetation



Regional masterplan for the Doetinchem - Dinxperlo region, creating a series of land use rings with a patchwork of forests and ecological grasslands, interconnected with a variation of corridors to improve the overall ecological integrity. The rings allow for a more direct focus on specific forms of agriculture and help tackle transition easier through cooperation. The corridors, ranging from hedgerows to forests, offer a wide variety of mobility options throughout the landscape for species migration.



The rings introduce a variety of agroforestry forms within the different rings to help diversify the produce and help improve abiotic conditions and ecological integrity.

Landscape corridors for both human and animals that connect the cities and forests.

Koen van den End
Name supervisors: Seth Wilberding MLA LEED-AP

Connecting Rural Horizons

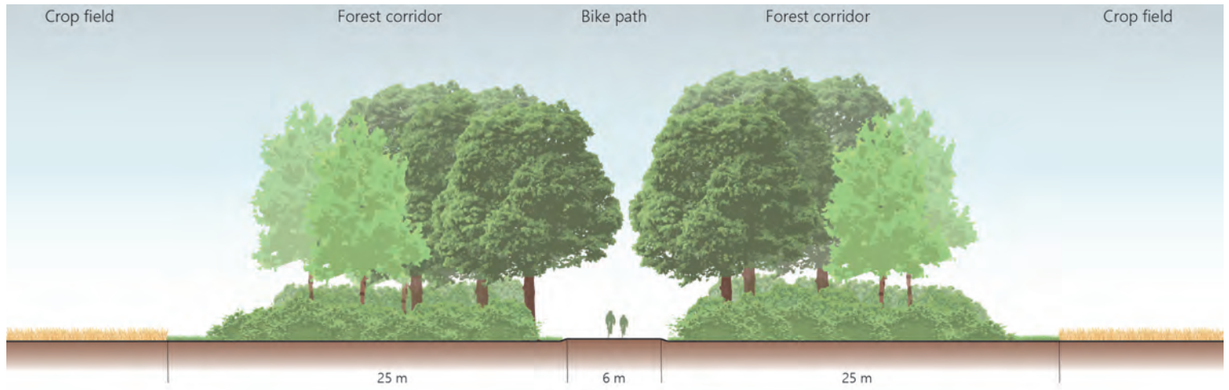
Developing ecological integrity principles supported by landscape preference for Dutch sandy soil agricultural landscapes. Case: Doetinchem - Dinxperlo, Netherlands.

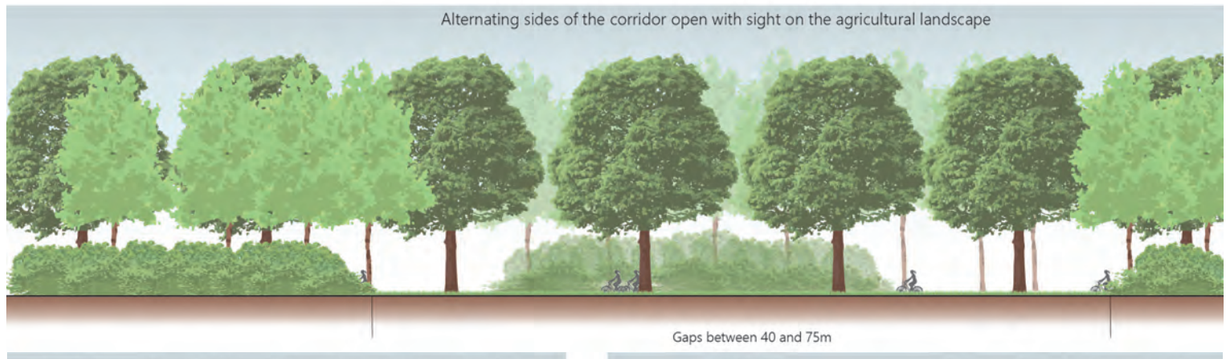
Abstract

Globally, ecosystems are declining, leading to a sixty percent loss in flora and fauna species, with the largest losses found in areas with agricultural intensification. In the Netherlands, this decline in ecosystems is visible within sandy soil agricultural landscapes. Unfortunately, the literature is sparse on the topic, with many applications of ecological systems in agricultural landscapes focused on the effects on production, not the ecological or spatial qualities. Instead, this thesis uses the metric of ecological integrity, which evaluates the ability of an ecological system to support and maintain different communities of organisms with species diversity and composition. The resulting integrity illustrates the ability of the landscape to withstand natural environmental dynamics, such as droughts, and human disruptions.

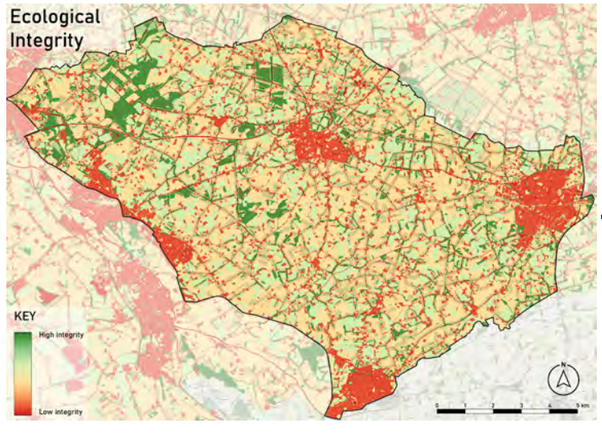
Based on this metric, this study identifies spatial principles for improving the ecological integrity of Dutch sandy soil landscapes. These principles are combined with landscape preference, a metric that looks and the general response of humans to certain landscape elements and their arrangements, to inform the application within the agricultural landscape. First, the researcher reviewed landscape preference and ecological integrity literature to develop assessment criteria and find broadly used ecological integrity principles. The principles were then applied to a case study area in the Achterhoek, a sandy soil agricultural landscape in the eastern part of the Netherlands. Through an interview and GIS-based research through design process, a series of iterations refined and evaluated the design and the spatial principles. The results of the process yielded a set of fifteen design principles for improving the ecological integrity in Dutch sandy soil agricultural landscapes grounded in academic landscape preference literature. The thesis also produced a secondary outcome, which is a masterplan for the region between Doetinchem and Dinxperlo.

Recreational paths between the fields with more ecological landscape elements.

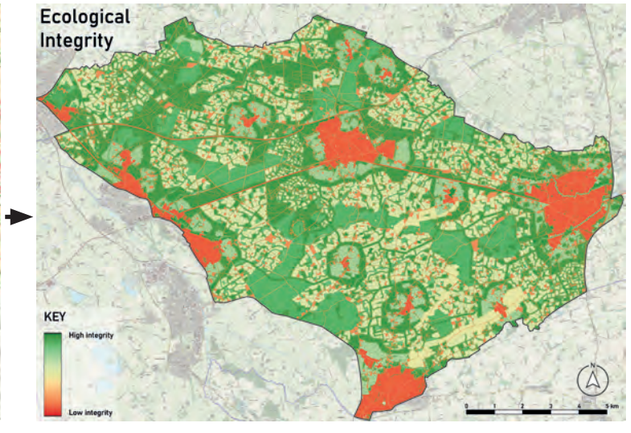




Sections illustrating the corridors and the new recreational network found throughout the entire region. Both combine both human and animal movements, to create controlled mobility throughout the region with a variety of options.



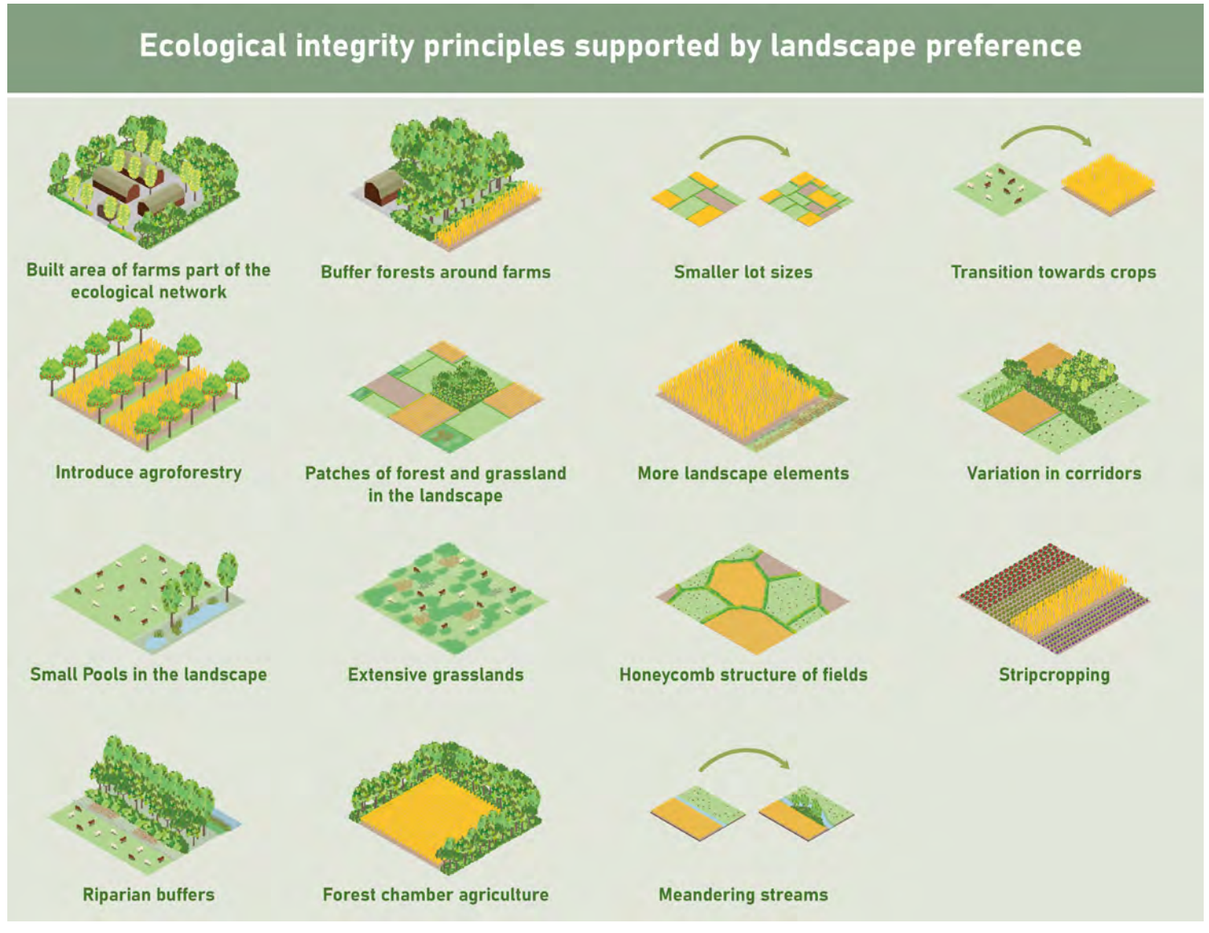
Current ecological integrity of the landscape is low as a result of the agricultural intensification over the last century.



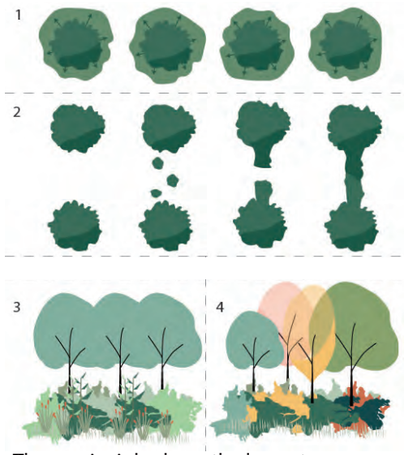
Implementation of the principles greatly improves the ecological integrity and creates a more ecologically grounded landscape.

Extensive grasslands that are used as commons within the furthest ring, creating the best ecological equilibrium for the target species and the agricultural landscape by focussing on abiotic qualities and half open landscape characteristics.

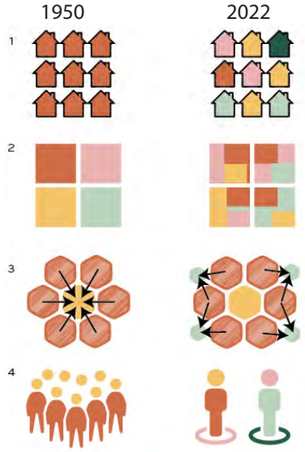
Ecological integrity principles supported by landscape preference



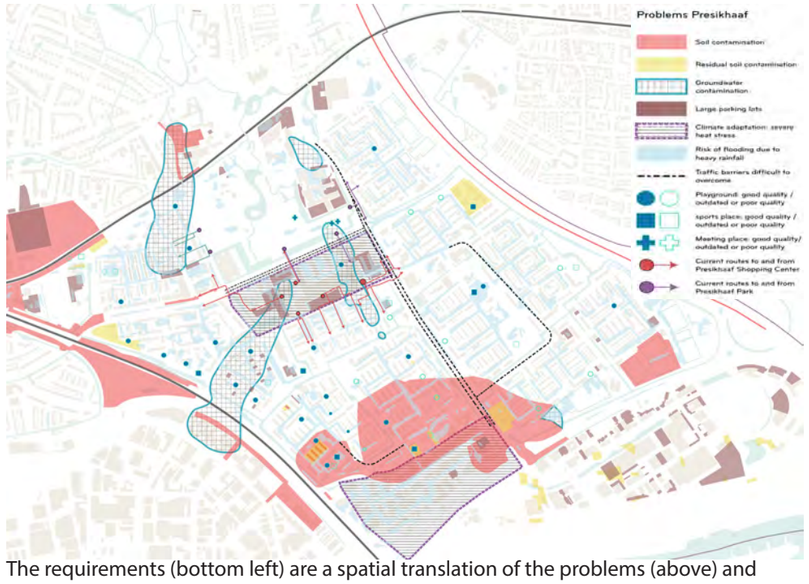
The final results of the thesis are 15 ecological integrity principles. Each improves the overall ecological integrity by focussing on the ecological landscape, while also fostering landscape preference through improved complexity, coherence and naturalness.



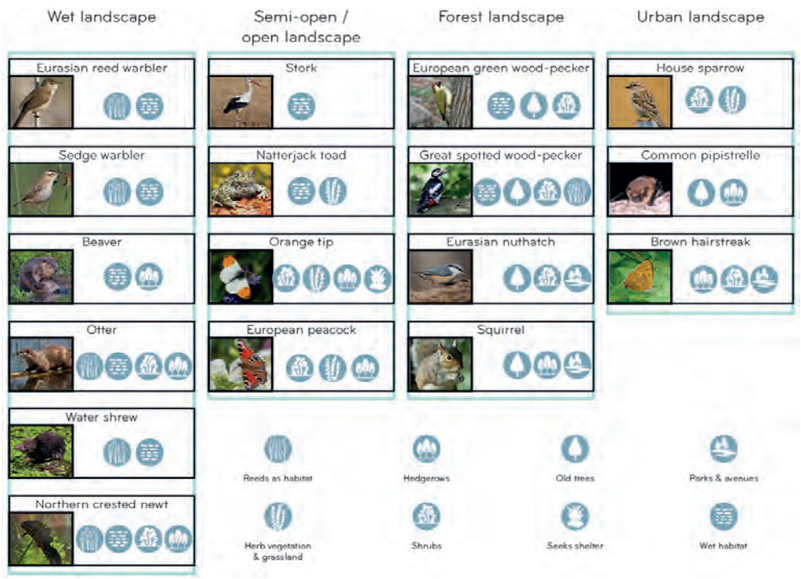
These principles have the largest impact on biodiversity: (1) habitat patch enlargement, (2) connectivity, (3) habitat structure & (4) floristic composition



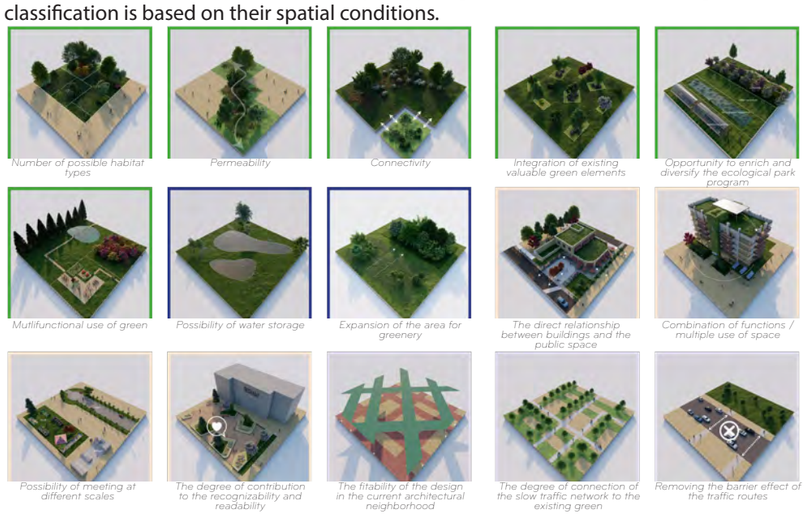
Difference between vision between 1950 and 2022: different type of housing, seperation of functions, recreation on the city edges and focus on individuals.

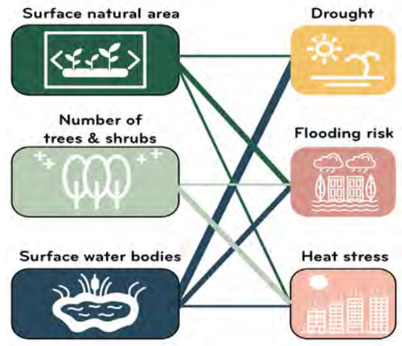


The requirements (bottom left) are a spatial translation of the problems (above) and opportunities that occur in Presikhaaf.



By investigating what spatial conditions each animal imposes on its habitat, the target species can be divided into four landscapes typologies as can be seen in the figure. This classification is based on their spatial conditions.





Relationship between environmental factors that can influence biodiversity (left) and climate risks (right).

A 10-Minutes Neighborhood means that all neighborhood facilities must be reachable within ten minutes by bike or foot. To make this possible we need to improve the 3 D's. Diversity means that a person can find all the various facilities at a short distance. Multifunctional buildings are therefore important. Densifying can help combat housing shortages and ensure proximity to functions. Design is about practicality. Attractive slow-traffic routes are used more often than unattractive ones.

Introducing layering in the vegetation improves biodiversity.

The basis of the mobility development strategy is the introduction of a slow traffic network and sustainable mobility. This is accompanied by changing the road profile, reducing parking facilities and introducing shared mobility systems.

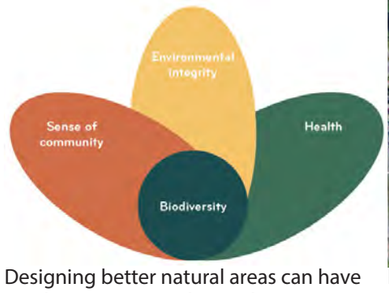
Ahmed Esmail
Supervisors:
Dr. Ir. Marlies Brinkhuijsen
Homero Marconi Penteado

Biodivercity in Presikhaaf

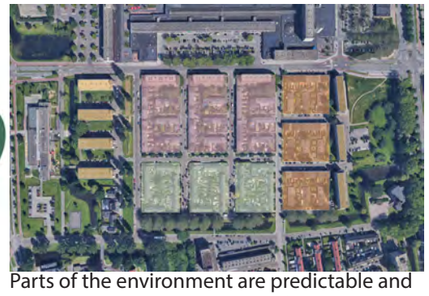
Contributing to the improvement of biodiversity in the post-war neighborhood of Presikhaaf by an integral landscape design. (Arnhem, The Netherlands)

Abstract

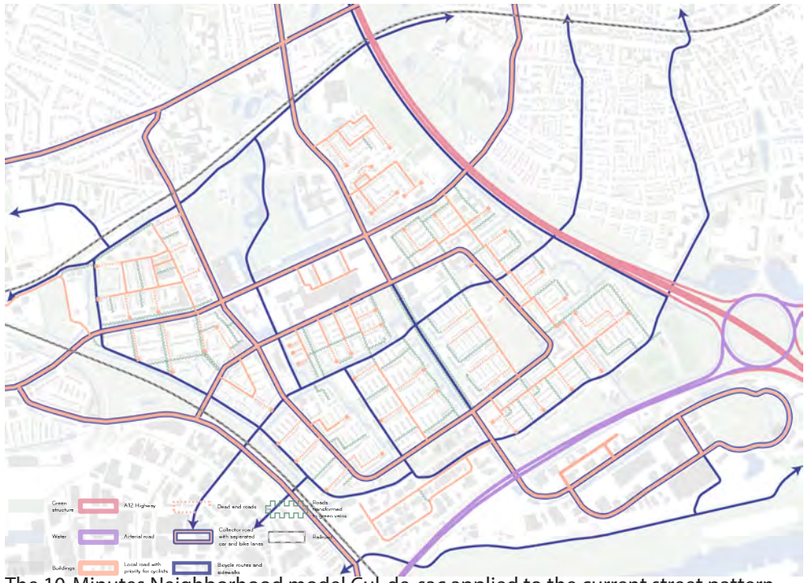
Today, the decline of our biodiversity along with climate change are among the greatest crises. This thesis aims to contribute to the knowledge about improving biodiversity in Dutch post-war residential areas.
Both local and landscape factors influence biodiversity. Local factors can be described as the factors that influence the quality of a habitat while landscape factors say something about the connection of a habitat to its environment so that species can easily reach a habitat. The choice of flora and fauna is accurately substantiated with the aid of a step-by-step plan based on an extensive analysis of the biotic and abiotic factors of Presikhaaf. Improving natural areas does not only affect biodiversity, but can also give an impulse to social aspects and health. The problems occurring in Presikhaaf are largely the result of the vision used at the time of the construction of the neighborhood. Solutions to the problems are approached from the development strategies '10-Minutes Neighborhood' and 'Climate Adaptive City' because this approach offers solutions for several problems in the neighborhood. During the design process, trade-offs and combinations were made between design objectives. Principles for designing for biodiversity were identified after several models were tested and assessed. The results show that improving biodiversity requires a multi-thematic and multi-scale approach in which biodiversity management also plays a role. This thesis shows that biodiversity can be improved in many ways, but serious results can only be achieved when major interventions are taken.



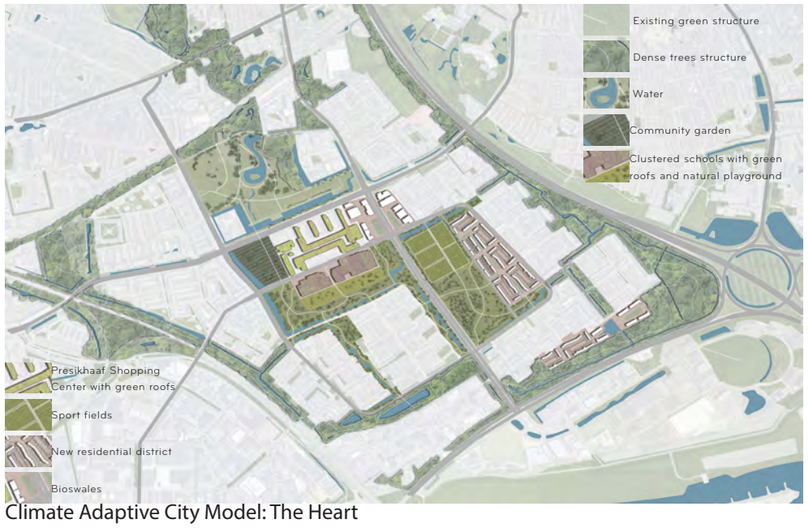
Designing better natural areas can have much more impact than only improving the biodiversity.



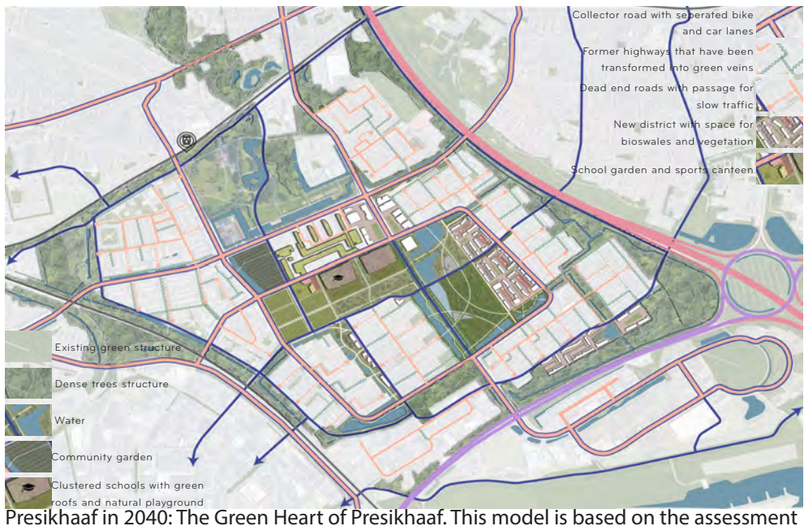
Parts of the environment are predictable and lack any visual surprise or satisfaction due to the urban repetition.



The 10-Minutes Neighborhood model Cul-de-sac applied to the current street pattern layout of Presikhaaf.



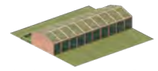
Climate Adaptive City Model: The Heart



Presikhaaf in 2040: The Green Heart of Presikhaaf. This model is based on the assessment and the best combination between the Cul-de-Sac and 'The Heart' models.

Building on top of existing flat housing

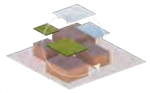
The 3 D's mentioned above, can be translated into interventions. Due to drastic measures in the housing stock in Presikhaaf, up to 5147 additional homes can be built in the optimal scenario. Freed up space can be used to add more natural space.



Implementing green roofs and facades

The principle of the Climate Adaptive City is to make urban areas more robust and resilient to increasingly extreme weather conditions. Designing for climate adaptation, just like designing for biodiversity, requires a multi-thematic and multi-scale approach.

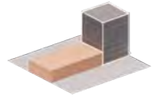
Splitting of existing buildings



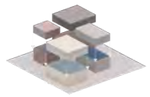
Multifunctional use of space

Greening public space by applying parking solutions

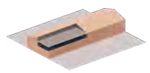
Providing enough shaded spots



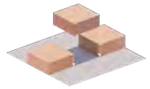
After demolition, building more compact and higher



Function transformation and mixing functions



Filling (empty) structures



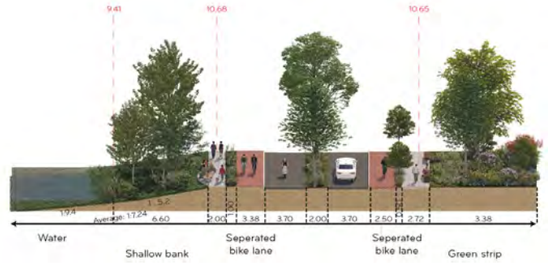
Building in residual space

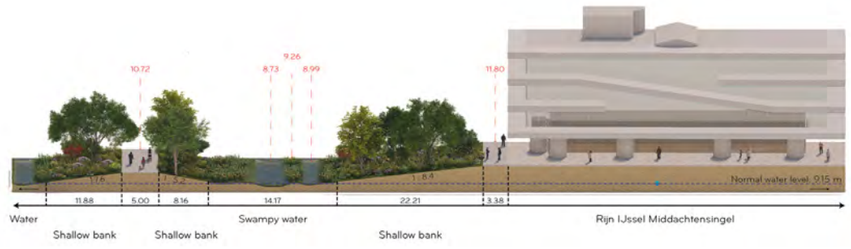
Combining climate adaptation with ecological interventions

Adding more vegetation to private gardens

Addition of natural playgrounds and other cool spots

Adding more surface water





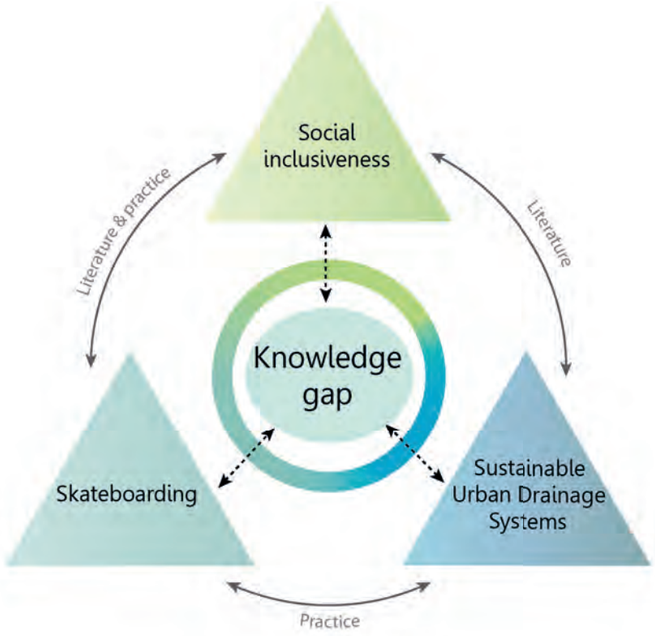
Detail design of Kinderkamp where the new green residential area meets the existing residential area.

Visualization of the transformed green environment around Kamphuizenlaan.

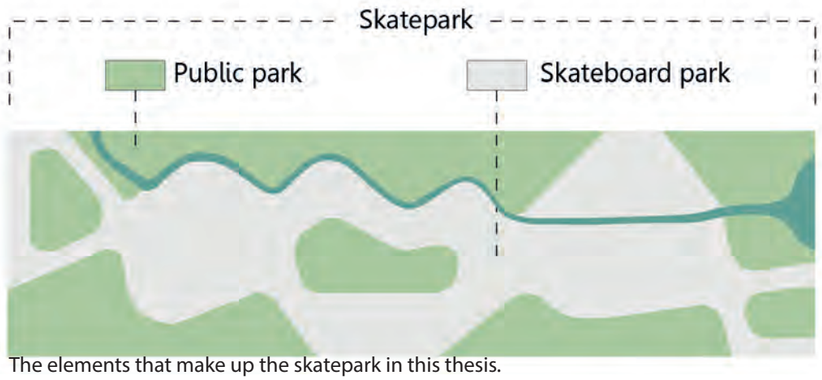
Jesper Kuipers

Supervisor: Dr. Y (Yuting) Tai
Reviewer: JP (João) Antunes Granadeiro Cortesão PhD

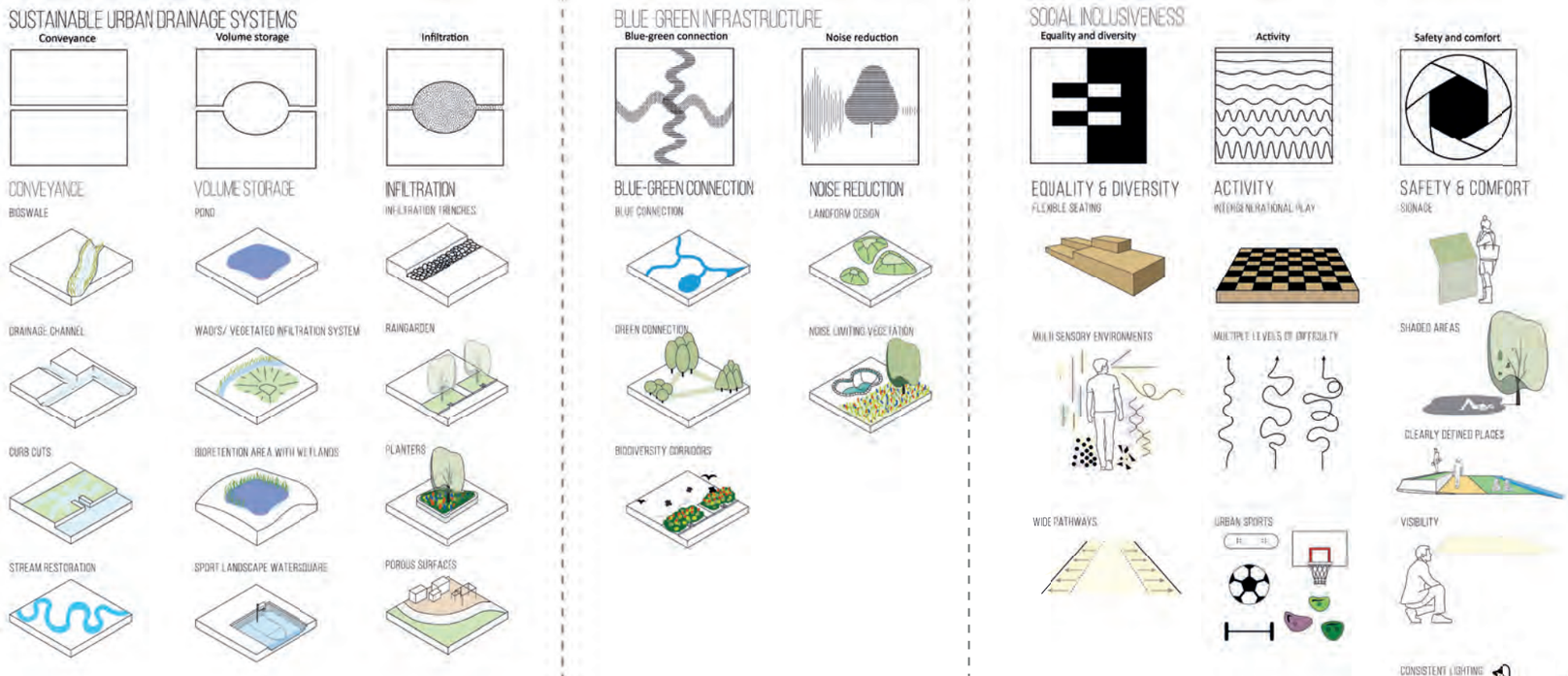
Flow
(Subtitle thesis + location and country)



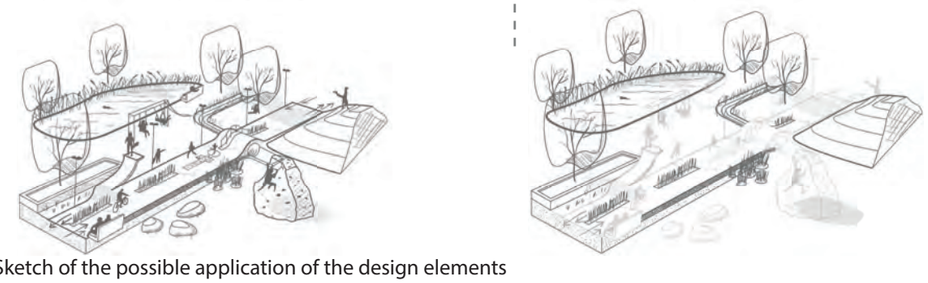
The key concepts of this thesis and their relation. The knowledge gap is highlighted in the middle, where all concepts converge.



The elements that make up the skatepark in this thesis.



Design principles and corresponding design elements



Sketch of the possible application of the design elements

Abstract
Due to climate change, global weather extremes are becoming more severe, with stormwater flooding becoming more frequent and intense due to heavier rainfall. In addition, the growing social pressure on urban areas presents challenges for social cohesion and quality of life. To find solutions to these challenges, this thesis introduces skateparks as multifunctional public places that integrate the concepts of skatepark design, sustainable urban drainage systems, and social inclusiveness. This integration is studied through a comprehensive literature study, reference study, and case study that resulted in design principles, design elements, and integrated design guidelines. These were applied to showcase the applicability, functionality, and aesthetics in a case study of the Geitenkamp neighbourhood in Arnhem, which was selected for its geographical location, history of stormwater flooding, suboptimal social context, and lack of skateparks. This design serves as a suggestion and inspiration for future researchers on how to solve challenges related to stormwater flooding and social inclusiveness through skatepark design. As a conclusion, this thesis shows that skateparks can be enrichments of the blue-green infrastructure and increase the quality and quantity of multifunctional public places that improve hydrology, biodiversity, while mitigating one-in-ten-year stormwater flooding events.

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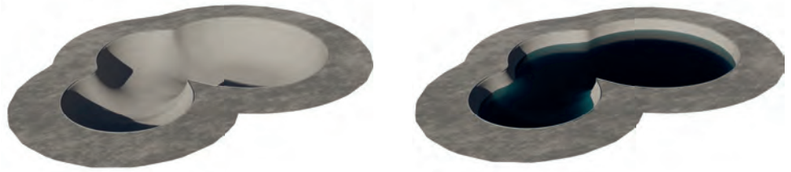
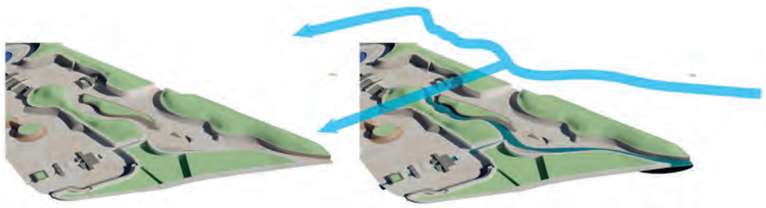
Site analysis maps

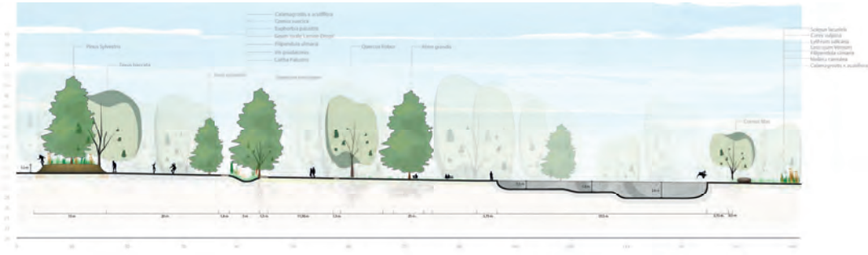
The masterplan



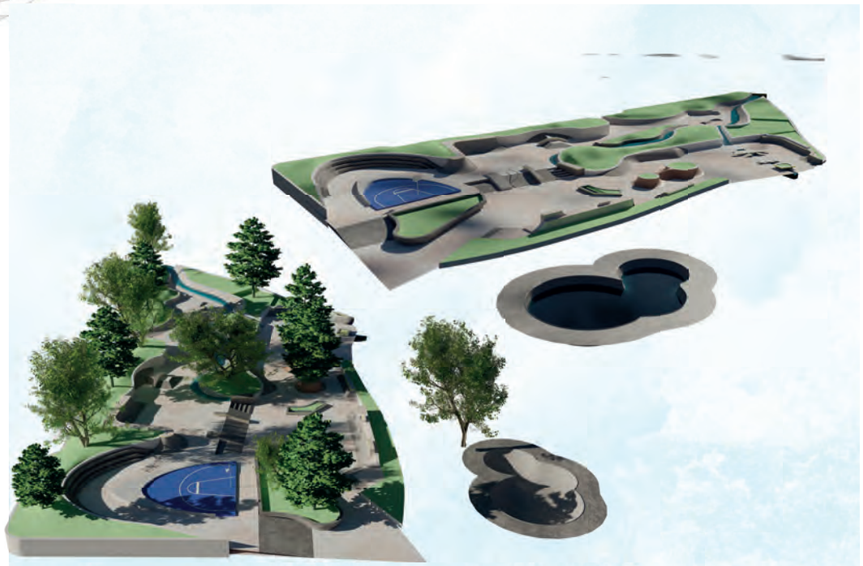
Skateboard bowl during normal situation and during heavy rainfall events



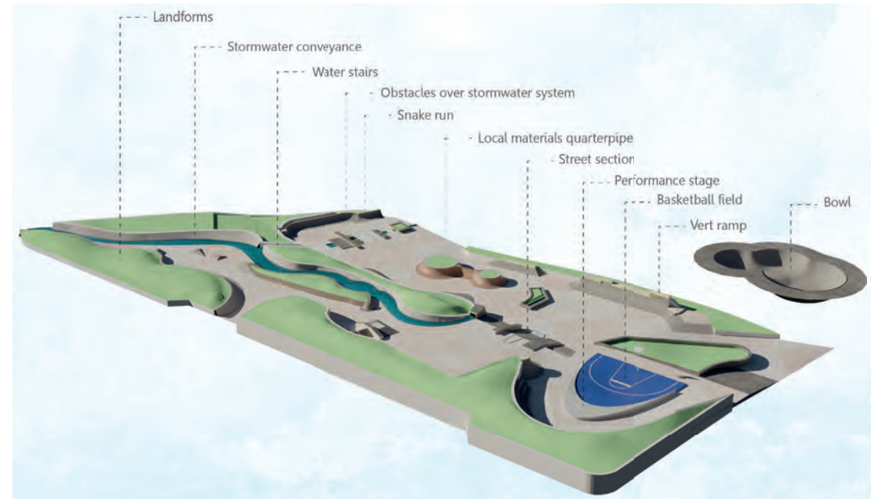
Stormwater flow through the skatepark



Site design sections

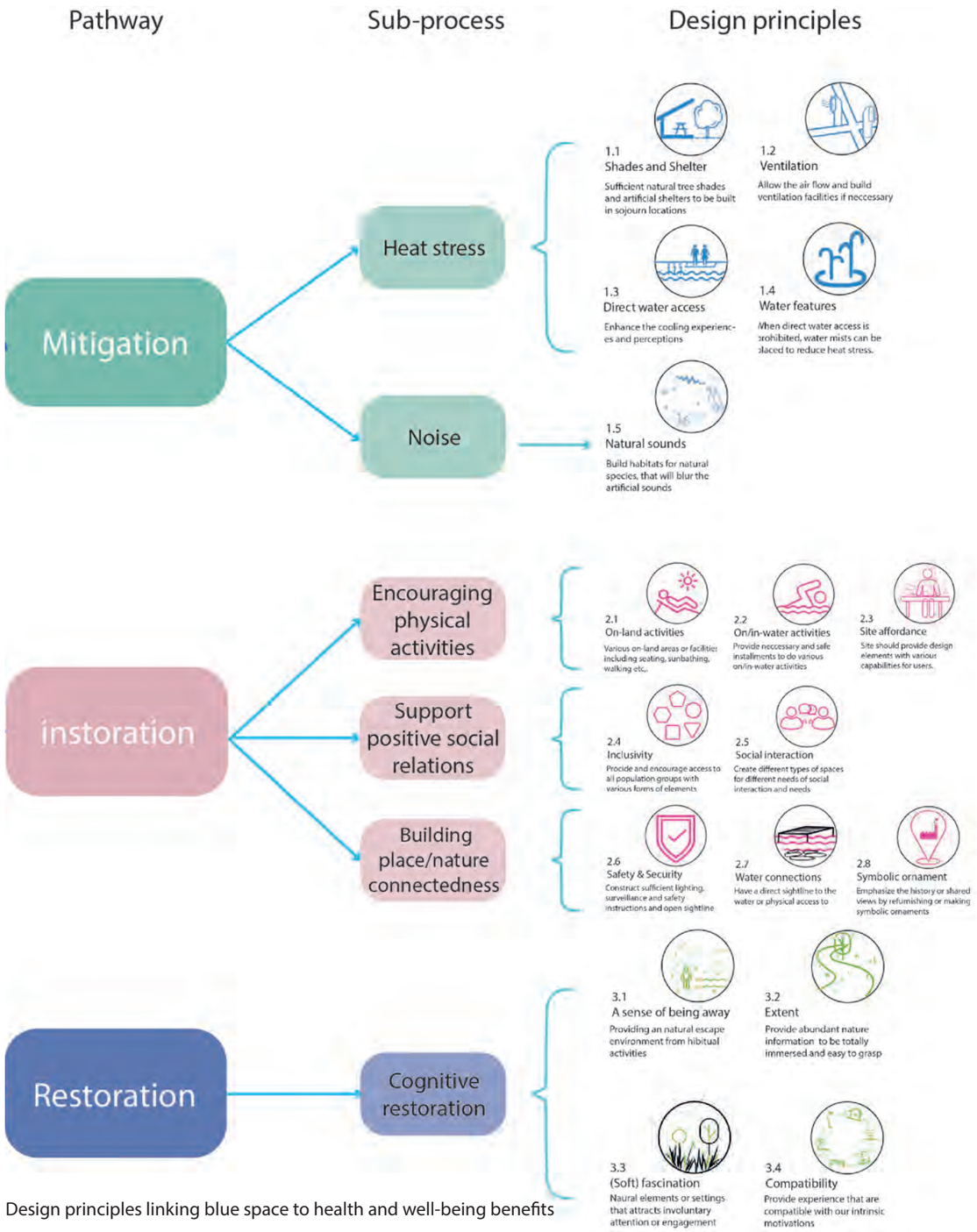


Skatepark 3D model



Different design choices depicted within the skatepark

The site design



Design principles linking blue space to health and well-being benefits

River height in days per year of Wageningen floodplain, grouped in several key height-threshold categories

Artistic impression of elevated main entrance

Artistic impression of winter canoe on the floodplain

Artistic impression of open cinema

Yawei Wang
Supervisors: dr.ir. A (Agnès) Patuano
Reviewer: prof.dr. S (Sanda) Lenzholzer

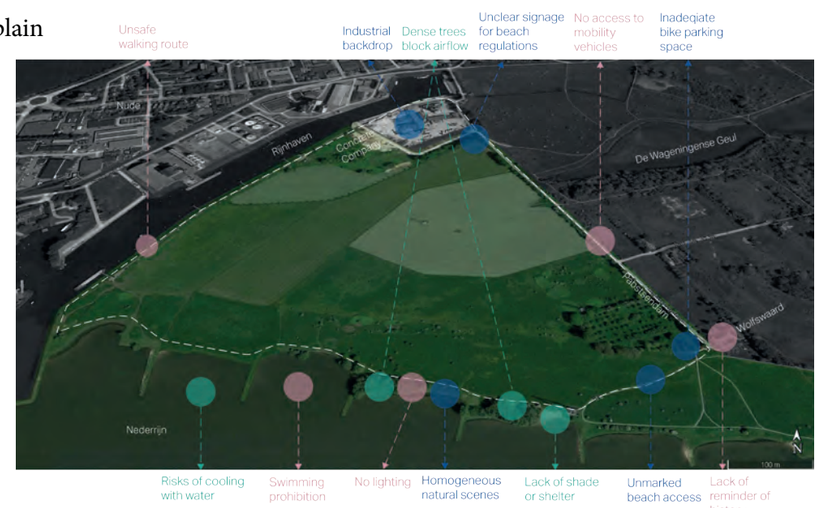
UNLOCKING THE POTENTIALS OF RIVERSIDE BLUE SPACE

Designing a floodplain that aims to improve the residents' health and well-being
Wageningen, the Netherlands

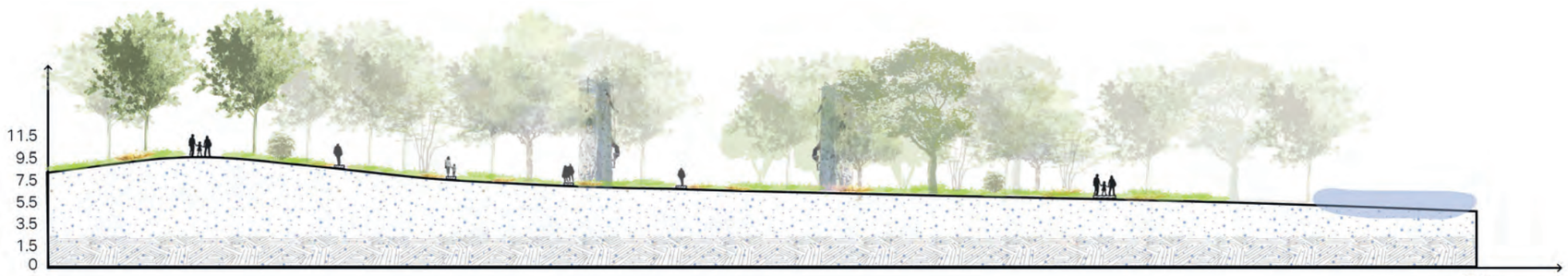
Abstract

This research was motivated by the BlueHealth research and aimed to further develop the BlueHealth outcome for the application in landscape architecture discipline. The research started with an adaption of theoretical framework linking blue spaces with health benefits, resulting in an extensive set of design principles. They were one of the research outcomes and deemed generalizable for various types of blue space design. However, the design principles extracted from theories remained a high-level of abstractness and were later translated into detailed design guidelines. The research adopted "Research Through Design" methodology and Wageningen floodplain was used as a testbed. Two design alternatives embedding multiple design guidelines were developed and tested by the assessment criteria. The outcomes of the assessments were used to develop final design and to formulate final design guidelines. The conclusion argued a limited applicability of final design guidelines and called for further research.

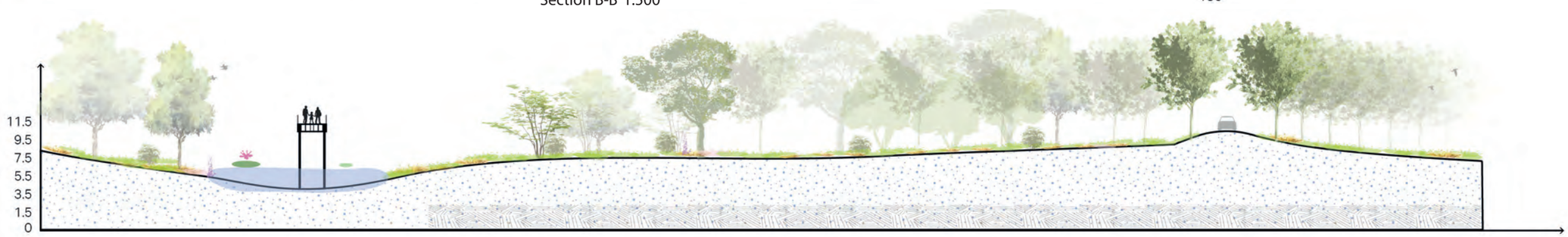
Site challenges analyzed and potentially solvable by the mitigation, instoration and restoration pathway



Master plan of the final design

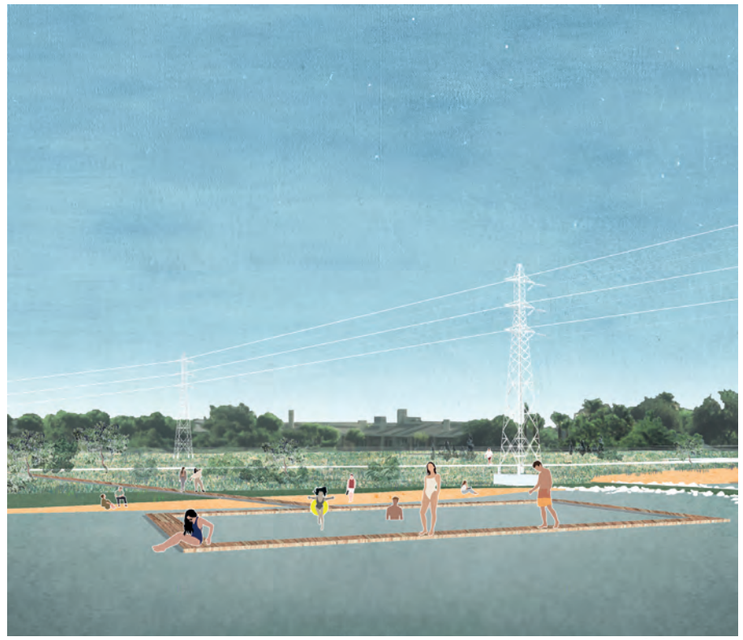


Section B-B' 1:500



Section A-A' 1:500

Artistic impression of the cafe on the deck



Artistic impression of the floating pool

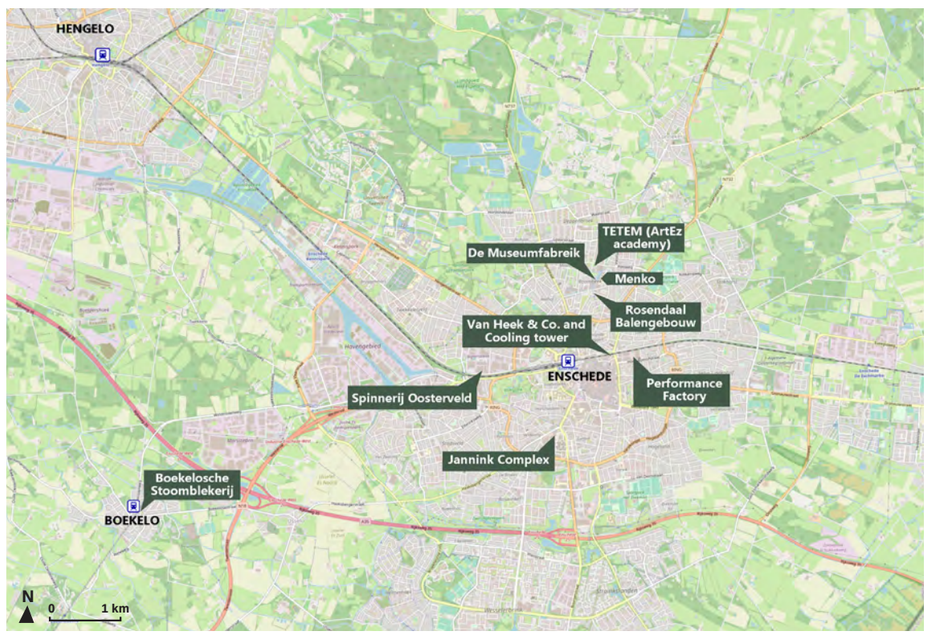
	Rosendaal Balengebouw	Museumfa-briek	TETEM	Jannink Complex	Performance factory	Boekelosche Stoomblekerij	Van Heek Complex & cooling tower	Spinnerij Oosterveld
Land-use diversity	4	3	3	2	4	3	1	1
Flow pattern and intensity	3	4	4	1	4	3	2	1
Flexibility of space	3	4	4	1	4	3	1	1
Range of activity	3	4	4	1	4	2	1	1
Sensory experience	2	4	4	1	3	2	1	2
Knowledgebility	2	3	3	2	4	4	1	1
Interpretation of historical narrative	3	3	3	3	4	4	3	2
Legibility	4	4	4	2	3	4	1	1
Diversity in age of setting	4	4	4	1	4	4	2	2
Human scale	3	4	4	2	4	3	2	2
Permiability	3	4	4	1	4	3	2	1
Landmarks	4	4	4	4	4	4	3	3
Natural and built form balance	3	4	4	2	3	3	1	1
Total score	41	49	49	23	49	42	21	19

Abundant spatial elements present to support the principle

Element present to support the principle, but not obvious at first glance

Hardly any elements present. When present, it is not used correctly

Spatial elements not preset to satisfy the assessment principle



Industrial heritage monuments visited at Enchede region

ACTIVITY

Land use diversity

Flow pattern and intensity

Flexibility of space

Range of activity

IMAGE

Sensory experience

Knowledgeability

Legibility

Diversity in age of setting

Interpretation of historical narratives

IMAGE

Human scale

Permeability

Landmarks

Natural and built form balance

Principles of place

Aishwarya Muralidharan
First Supervisor: dr. H (Homero) Marconi Penteado
Second supervisor: Ana Aceska PhD

Connecting heritage and cities
Designing a connected heritage narrative in the city of Enschede, The Netherlands

Abstract
Cultural heritage is an important facet of any landscape and contributes to the identity, tourism, and economy of different locations. In the case of urban landscapes, the role of cultural heritage is larger as it contributes to expressing the character of places, becomes a part of the urban society, and plays a role in the everyday life of people. Despite this, heritage conservation predominantly revolves around the restoration of the monument or artefact of their value alone. This forms the main context of this thesis, where locations of cultural heritage in urban landscapes are assessed to understand the value of these heritage sites as places in society. The concept of place is used to examine cultural heritage to understand the role of heritage as places that are experienced in everyday life, and the level of interaction with heritage in urban landscapes. Industrial heritage in the city of Enschede is selected as a case to investigate the current situation and test guidelines through landscape design. Consequently, principles guidelines of place are derived, and the industrial heritage monuments at Enschede are assessed based on the principles. The sites of Spinnerij Oosterveld and Van Heek & Co Noorderhagen are chosen as sites to test design guidelines in the research through design process. Expert evaluation of this process results in the final products that demonstrate the use of the design guidelines to achieve better places around locations of heritage. The findings of this thesis also reveal the significance of landscape design in connecting different factors such as cultural heritage and place.

Van Heek & Co. Noorderhagen

Masterplan of Van Heek & Co. Norderhagen

Vizualization of the central space of Van Heek & Co. residential complex

Vizualiation of the central plaza of the Cooling tower park

Spinnerij Oosterveld

Masterplan of Spinnerij Oosterveld

Visualization of the central plaza at Spinnerij Oosterveld

Visualization of the cafe at Spinnerij Oosterveld

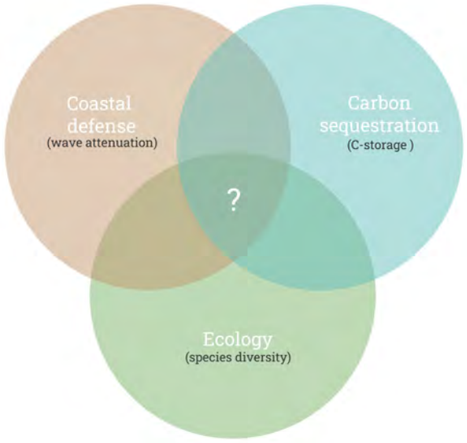
Max van Gaalen
Supervisors: Dr. Ir. Christian Nolf & Dr. Ir. Jantsje van Loon-Steensma (Environmental Systems Analysis).

Designing Salt Marshes for Carbon Sequestration, Coastal Defense & Ecology

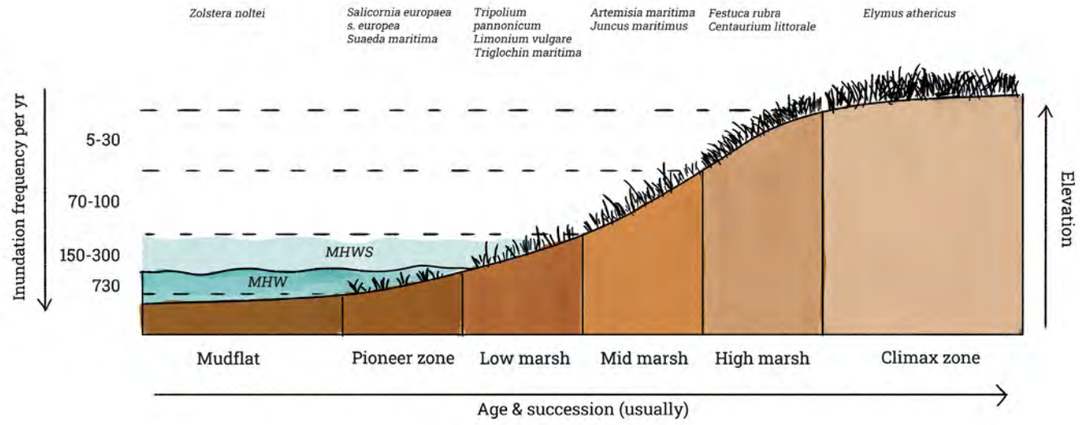
Depoldering the Hedwgie-Prosperpolder, Zeeland (the Netherlands) & Oost-Vlaanderen (Belgium)

Abstract

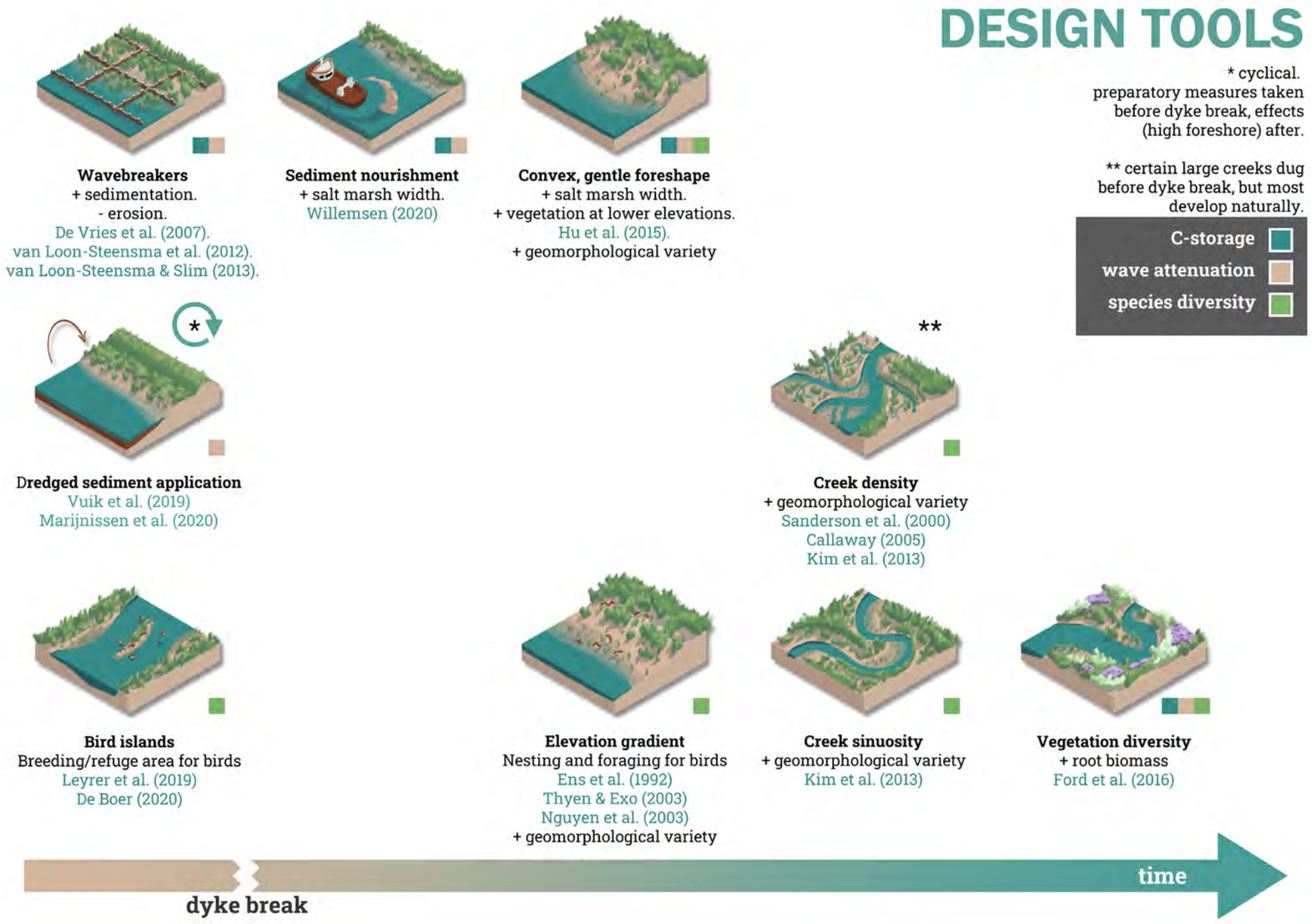
Climate change and ecological degradation are two major challenges of the 21st century. We need measures for climate change mitigation and adaptation, as well as for the restoration or preservation of natural ecosystems. Salt marshes can contribute to climate change mitigation through storing more carbon than various forest ecosystems, and to climate change adaptation by improving coastal defence through wave attenuation. Finally, they can combat ecological degradation by providing habitats for various flora and fauna. However, there has been little research on the spatial needs and possibilities when trying to optimally combine all three of these functions in a salt marsh. This thesis identifies potential spatial design tools for increasing ecological value of, carbon sequestration in, and coastal defence with salt marshes, as well as their synergies, trade-offs, and uncertainties. By implementing these in a design, this thesis provides a first landscape architectural step towards combining these functions in salt marshes.



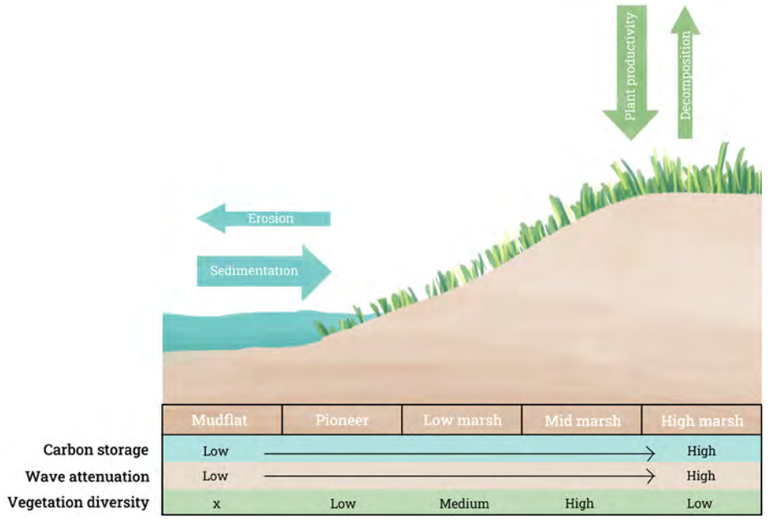
Knowledge gap: how can design stimulate all three functions in salt marshes?



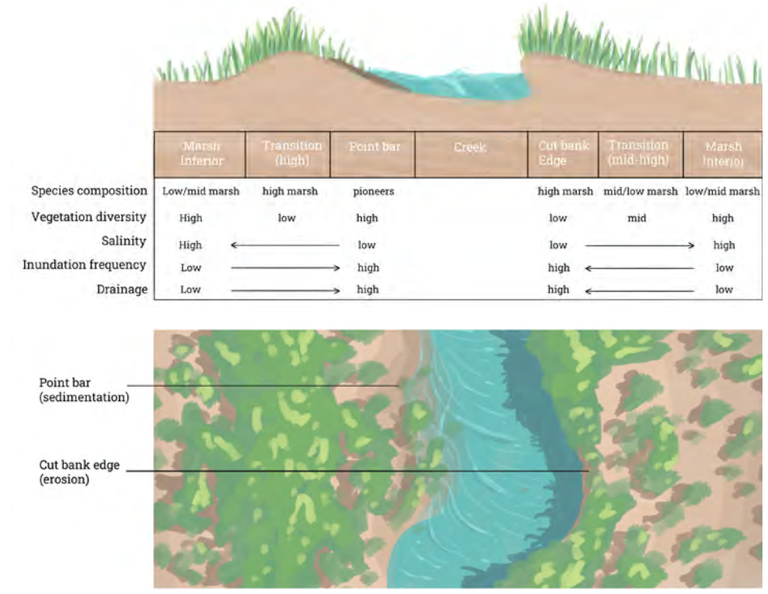
Basic principles of salt marshes: vegetation zones determined by tidal inundation intensity and frequency, which depend i.a. on the height of the marsh and distance from the adjacent saline water body.



Design tools for carbon storage, wave attenuation and species diversity in salt marshes. A distinction is made between tools that should be applied before dykes are breached (in case of depoldering) and those that can be used after. Construction of the former is easier when the land is not submerged.

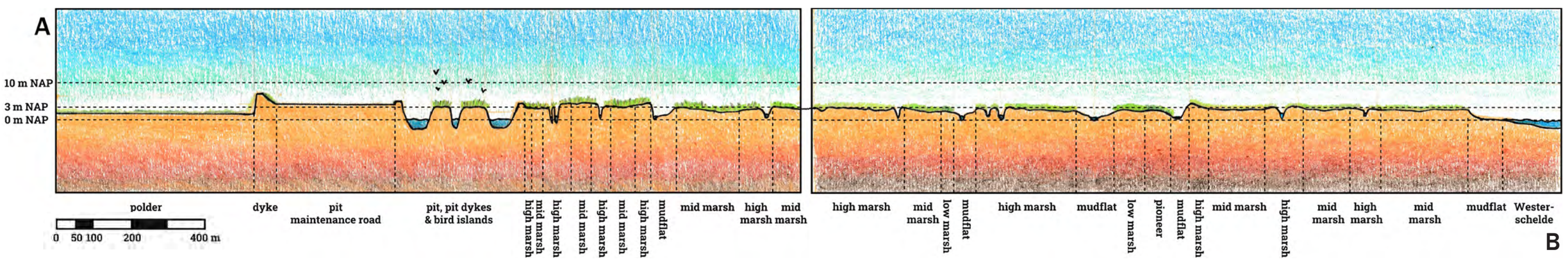


Conceptual section showing how carbon storage, wave attenuation, and vegetation diversity vary throughout the marsh.

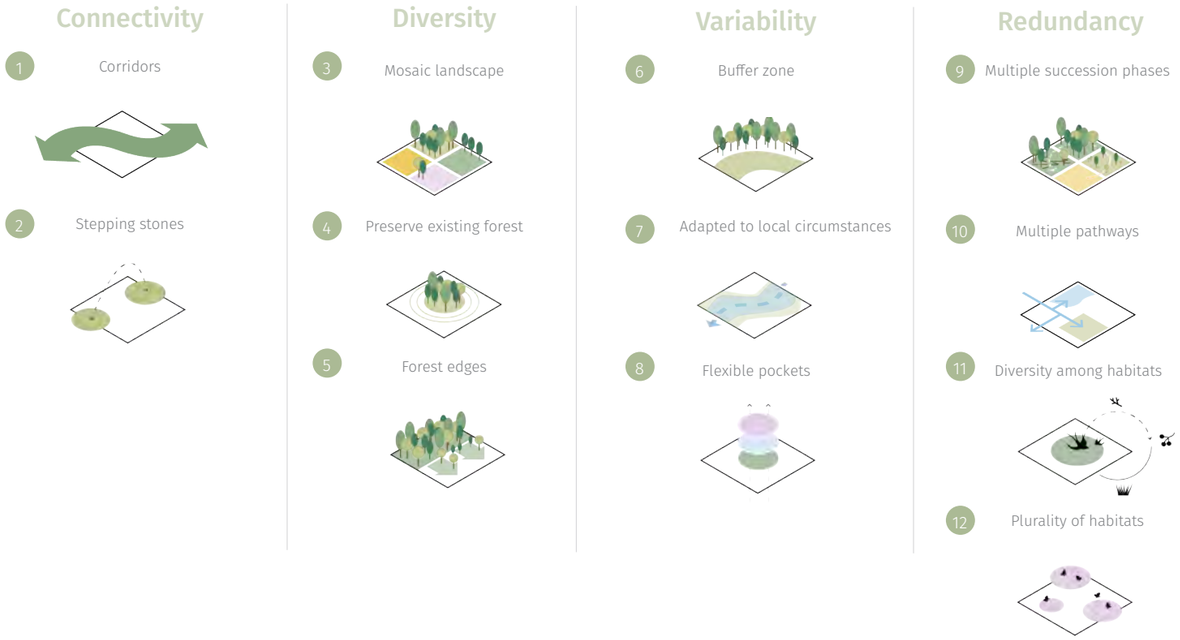


Creeks are important features of the marsh landscape. Inner and outer bends create different geomorphological settings, allowing different vegetation types to establish.

Masterplan: the Hedwige Prosper Marsh. It mostly resembles a natural marsh. An important difference is the high foreshore seawards of the dyke to improve coastal defense. The high foreshore keeps up with sea level rise by sediment supplies cyclically (ca. every twenty years) excavated from several pits. Within these pits, bird islands are present.

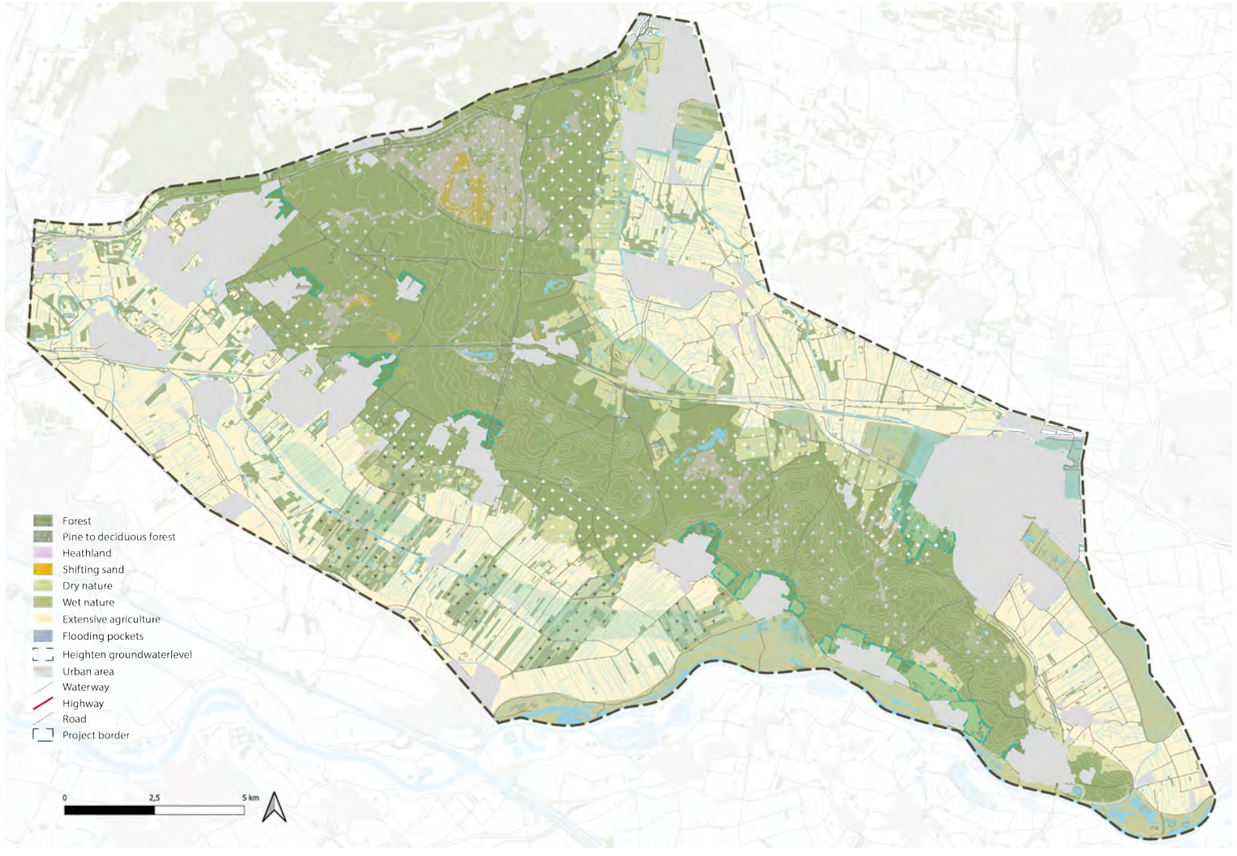


Section from a polder to the Westerschelde. The marsh is clearly higher than the polder. The high foreshore seawards of the dyke is slightly higher than the rest of the marsh. The pits are deep to allow for rapid accumulation of sediment and lower the chance of ground predators reaching the bird islands. Creeks are important sources of geomorphological variety in the rest of the marsh. The height is exaggerated ten times to better show elevation differences. See the thesis for the location of the section.



The four attributes of resilience with corresponding spatial principles. Based upon these spatial principles preliminary design guidelines were developed for the design alternatives.

The final design is a result of the three design alternatives and expert feedback



The three design alternatives from the top down.
Hydrological zones:
Infiltration and water retention
Ecological network:
Diversity and connectivity
Mosaic landscape:
Small scale diversity and adapted to the local landscape

Esther van der Meer
Supervisor: dr. H. Marconi Penteado

Designing drought resilient forests

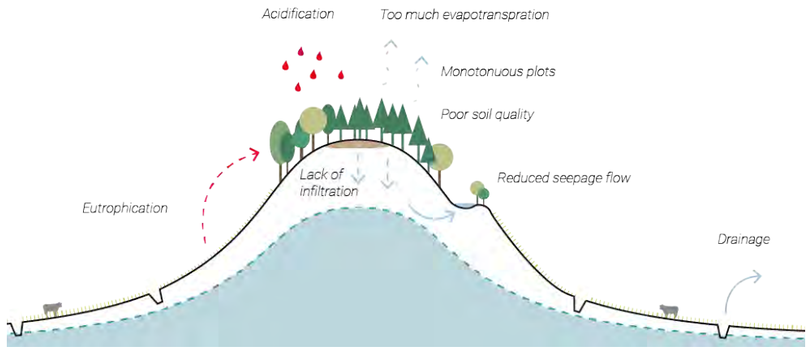
An explorative design approach for drought resilient forests at high sandy soils.
Utrechtse Heuvelrug, The Netherlands

Abstract

The Netherlands has experienced long periods of drought in the past years due to climate change. During the dry summers, it became clear that the Dutch forests will be more vulnerable due to the prolonged periods of drought. Especially forests at high sandy soils are suffering due to their dependency on precipitation. The vulnerability is reinforced by the characteristics of the Dutch forests; monotonous plot structure, poor soil quality, and little biodiversity. The effects of climate change, combined with the current forest characteristics, will lead to increased diseases and tree death. Meanwhile, the Dutch forests have an important ecological and social position.
The concept of resilience considers the landscape as a system that can absorb disturbances. Currently, the forest has difficulties to absorb the longer periods of droughts. Hydrological interventions will be insufficient because forests at high sandy soils rely on precipitation. Therefore, the all-encompassing system approach of resilience will help to consider the complexity of the forest landscape. This thesis applies the concept of resilience to the forest landscape at high sandy soils, resulting in design guidelines that improve drought resilience of forests at high sandy soils.

Four attributes of resilience were formulated, on which twelve design principles were developed. Based on the design principles, design guidelines were developed which were tested on three design alternatives. The design alternatives and design guidelines were evaluated in an expert meeting. The outcome of the expert evaluation resulted in revised design guidelines which were implemented into a final design.

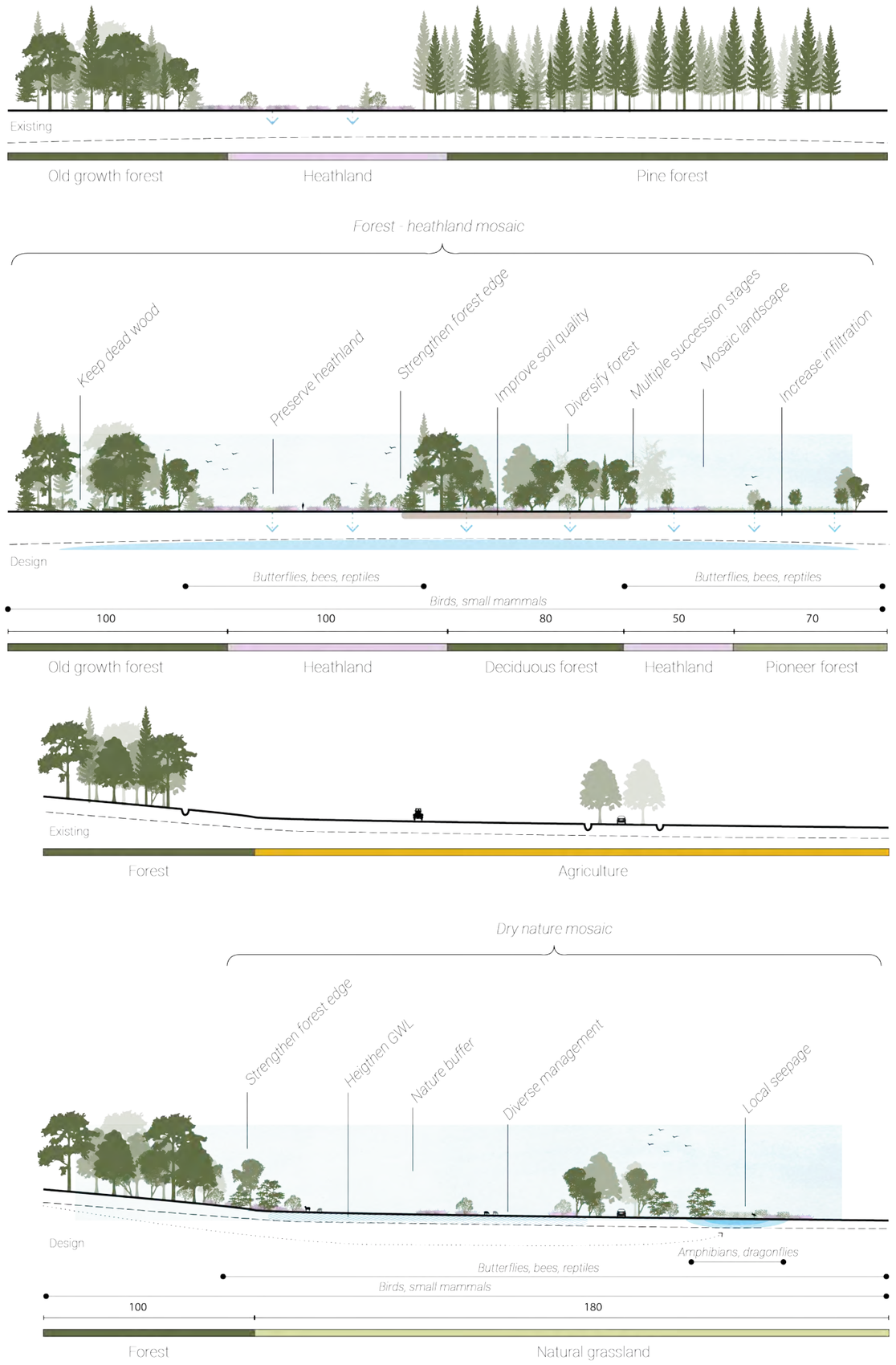
This research integrates the concept of resilience into design guidelines, resulting in a drought resilient landscape design for forests at high sandy soils. The design guidelines illustrated the spatial application of resilience. This drought resilient forest design absorbs disturbances by improving forest quality based on diversity, connectivity, variability, and redundancy.

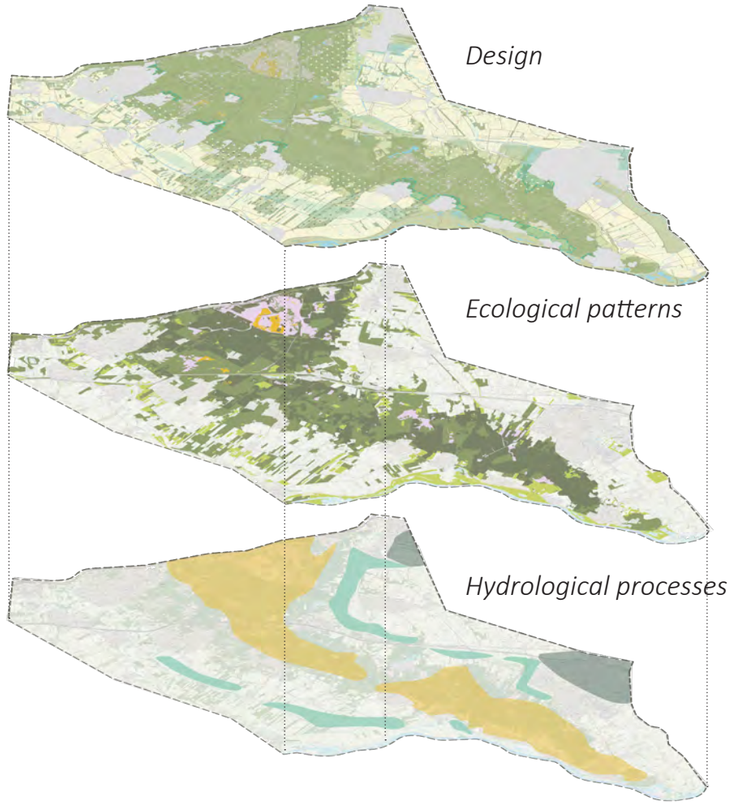


Section of the problems forests at high sandy soils are facing

Visualisation of the nature buffer close to the forest edge

In the final design the design guidelines are revised based on the design alternatives. This section shows the implementation of the design guidleines for the forest at the plateau. Water infiltration, soil improvement, and increased diversity improve resilience.

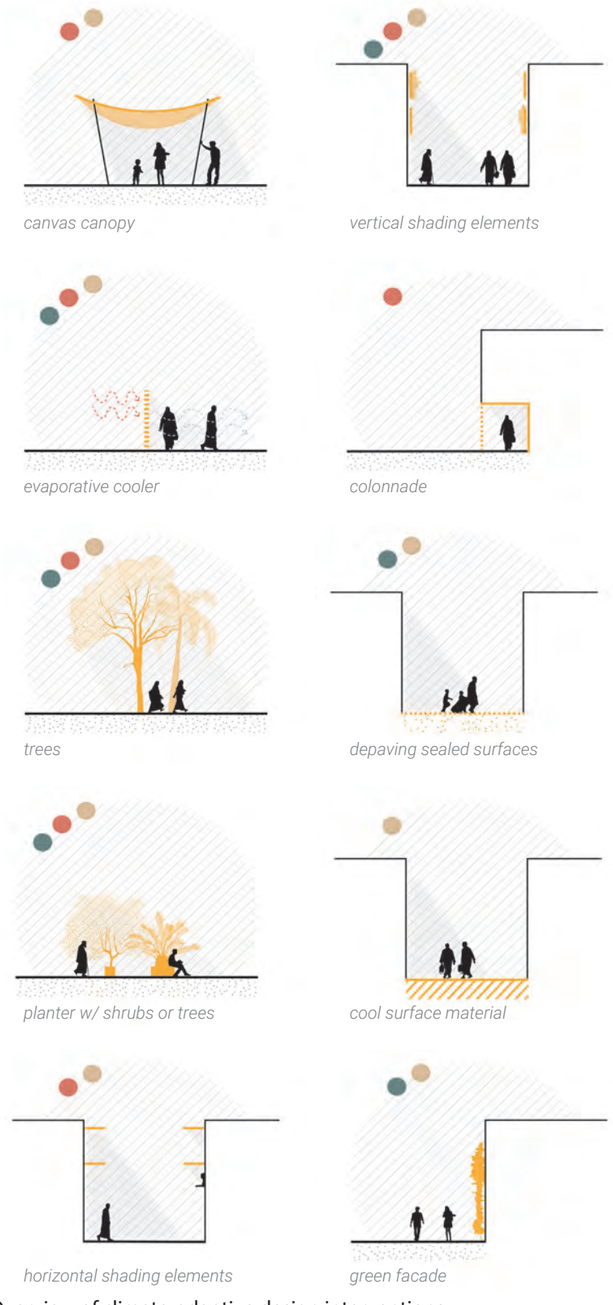




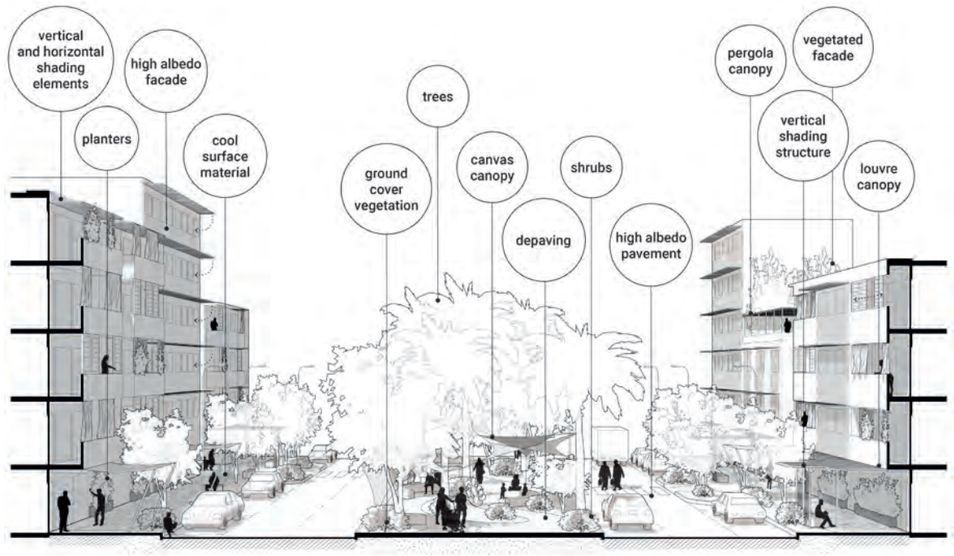
Hydrological processes and ecological patterns are the fundament upon which the design is based.

This section shows the nature buffer surrounding the forest. It improves the water system by retaining seepage. Furthermore it protects the forest from the negative influences of agriculture. Finally, it increases natural diversity and connectivity.

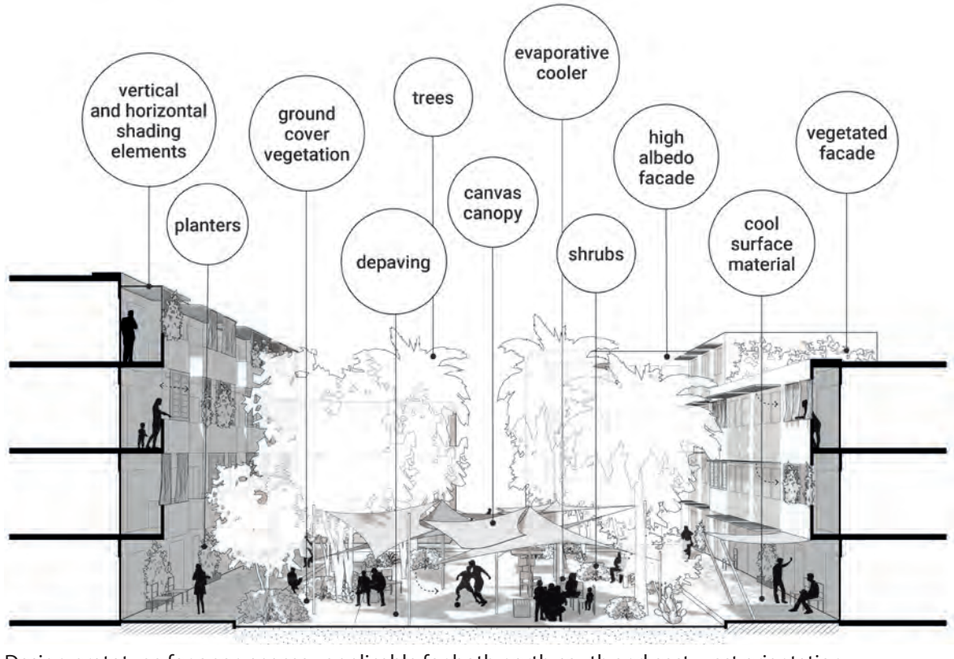
Overview of the four street typologies.



Overview of climate-adaptive design interventions.



Design prototype for wide street typology - applicable for both north-south and east-west orientation.



Design prototype for open spaces - applicable for both north-south and east-west orientation.

Hestia Zinsmeister
Supervisors: João Cortesão, Gert-Jan Steeneveld (department of Meteorology and Air Quality)

Cooling the streets of Cairo

Designing climate-adaptive streetscapes in unplanned urban areas in arid climates
Cairo, Egypt

Abstract

Urban Heat Islands (UHI) and the resulting heat stress poses a serious threat to the livelihood of urban populations. This issue affects many residents of unplanned urban areas in arid climates and will be intensified by rising global temperatures. Yet only few research projects focus on measures to regulate microclimates in these neighborhoods. This research therefore aims to explore the potential of the implementation of climate-adaptive interventions within the Shubra district in Cairo. To do so, a toolbox containing effective and feasible climate-adaptive design interventions is developed. The feasibility and effectiveness of these interventions are tested within representative street typologies, resulting in different design prototypes. To test the applicability of the prototypes within the study area, a site-specific design is developed.

The 16 climate adaptive interventions selected for the toolbox affect the urban microclimate through one of the three identified cooling strategies: adaptation of urban materials, implementation of shade, increasing evaporative cooling. The application of these interventions within the identified street typologies showed, that within narrow street profiles the number and scale of interventions is limited due to limited space. Additionally, non-flexible interventions and vegetation can lead to heat trapping and reduce ventilation. In the other typologies (medium and wide streets, open spaces) the implementation of interventions is primarily limited by their functionalities (e.g., mobility, economic activity). The design introduces pocket parks with a high cooling potential in the most frequented areas, connected by a network of cool streets. Interventions are designed as flexible as possible to reduce potential heat trapping and locally adapted plant species are chosen to reduce irrigation requirements. This explorative study describes the potential of climate adaptive interventions to reduce heat stress in unplanned areas. Further research will though be needed to quantify these cooling effects and further evaluate feasibility together with residents.

Site-design for the first detailed area, applying different climate-adaptive interventions according to prototypes 1a, 1b, 3 and 4.

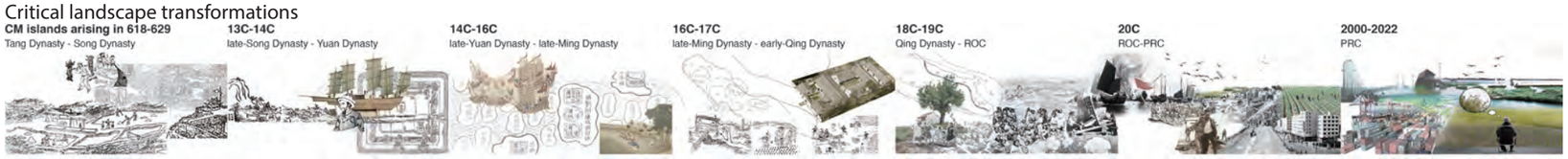
Artist impression of a narrow street profile within the residential area of the study site.

Section of site-design, illustrating the planting beds with varying vegetation, evaporative wall, and louvres with canvas canopies.

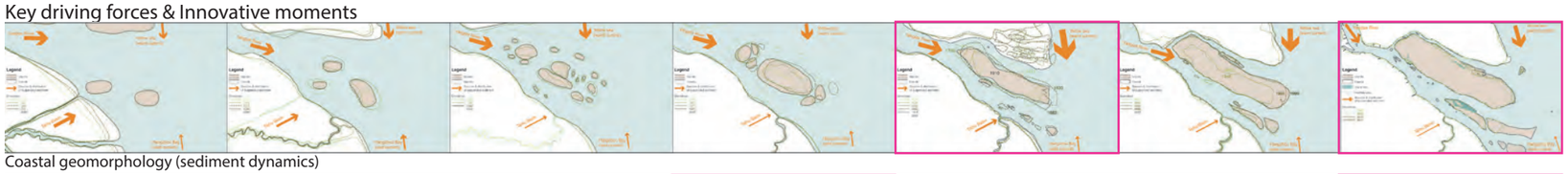
UNDERSTAND LANDSCAPE SYSTEM AND LEARN FROM THE PAST: integrating temporal and physical landscape with a transformative perspective.

Landscape units analysis

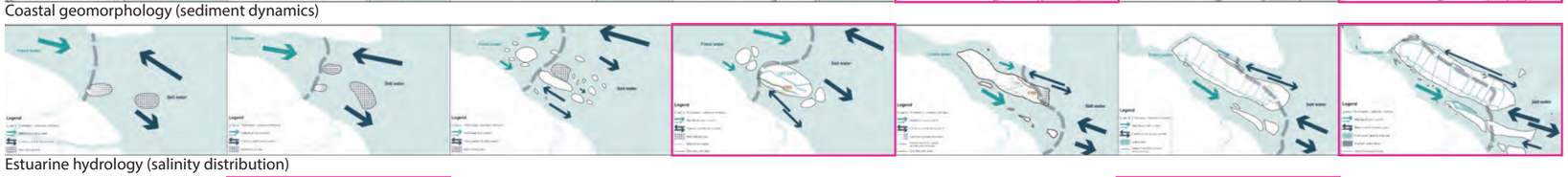
Critical landscape transformations



Key driving forces & Innovative moments

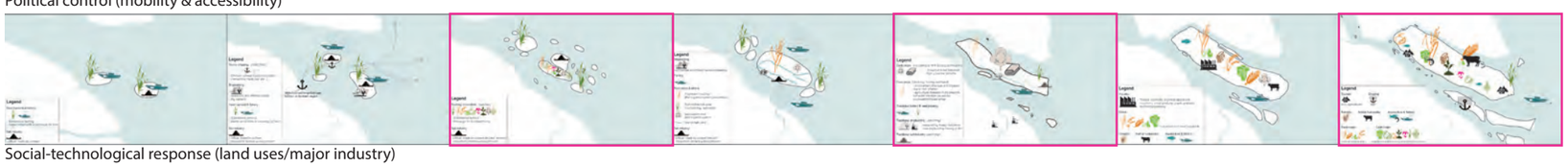


Coastal geomorphology (sediment dynamics)



Estuarine hydrology (salinity distribution)

Political control (mobility & accessibility)



Social-technological response (land uses/major industry)

Yanran Luo
Supervisors: dr.ir. Ingrid Duchhart
Co-supervisor: dr. Agnès Patuano
Second reviewer: dr. Yuting Tai

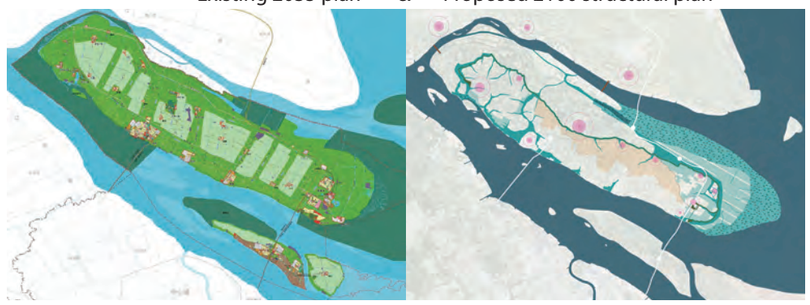
Introducing landscape eco-cultural consciousness to rural planners & local communities

Enriching the production-urban-ecological spaces (three spaces) approach with eco-cultural landscape-based design approach through a case study of Chongming Island, China

Abstract

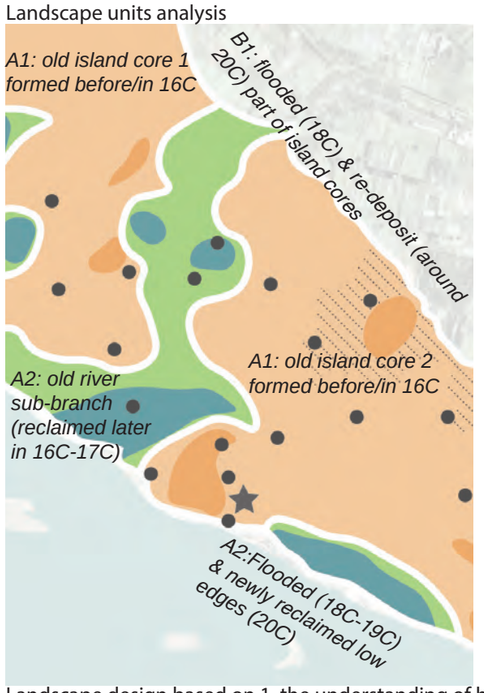
Through the analysis of three perspectives (top-down, bottom-up, and landscape architecture perspectives), the study pointed out that the Chongming master plan 2017–2035, guided by the production-urban-ecological spaces (three spaces) approach, lacks integrative and systemic thinking in its planning methods and design outcomes. An eco-cultural landscape-based design approach was proposed to fill this gap and enrich the related spatial planning approach. Moreover, Chongming Island as case study area was analysed by integrating temporal and physical landscape with a transformative perspective, while eco-cultural landscape consciousness was desired as a final design goal of the example design vision. This research first used the 'Research for Design' method to find out the key driving forces of Chongming's landscape system through the lens of critical landscape transformations. Based on a spatial interpretation of past technical responses to the key driving forces, landscape units map was developed as a foundation for design. Three scales' designs (island, boundary between main landscape units A&B, and detail) were integratively made and tested to discover the possible design principles and guidelines for applying the analytical knowledge and achieving eco-cultural consciousness. Altogether, these through scales design processes contribute to the landscape structure plan of Chongming Island. Compared to existing 2035 plan, the proposed structural plan on the basis of key driving forces and landscape units map has more richness and potentials on the development with culture and ecology.

Existing 2035 plan & Proposed 2100 structural plan

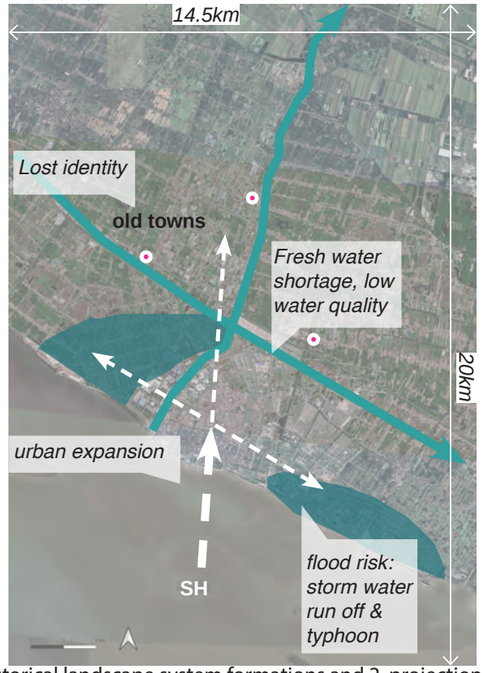


DETAIL DESIGN: REVITALIZING THE 'DISAPPEARED RIVER SUB-BRANCH'

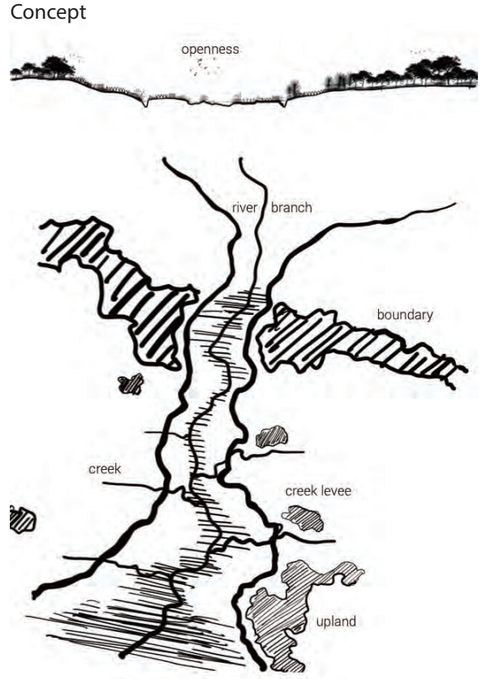
Landscape units analysis



Problems

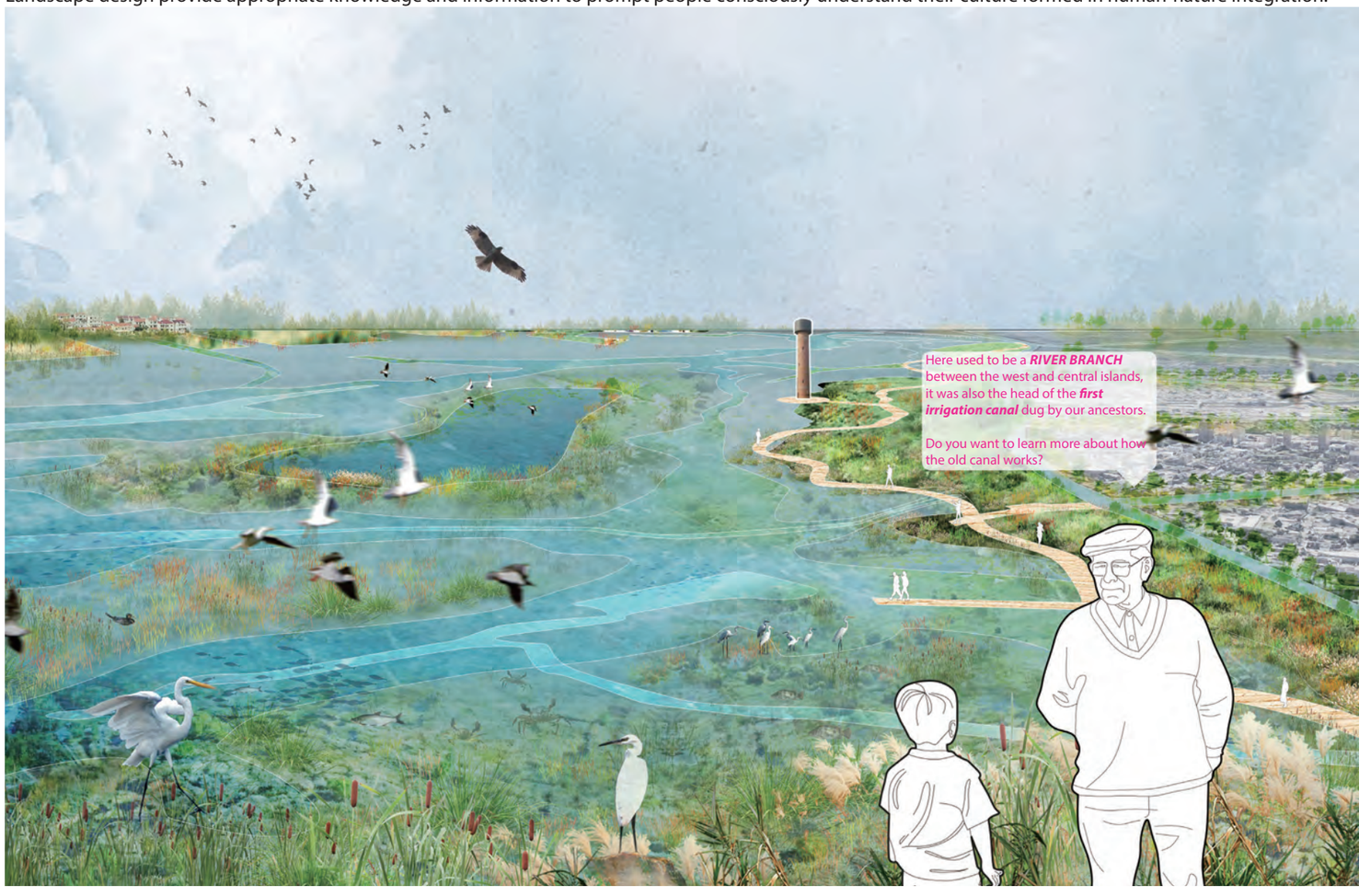


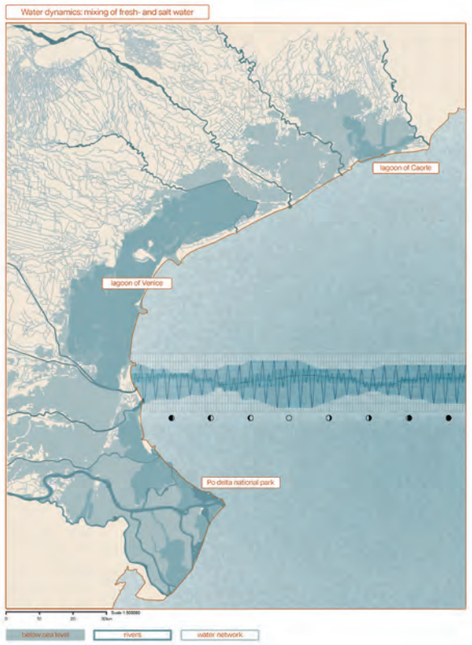
Concept

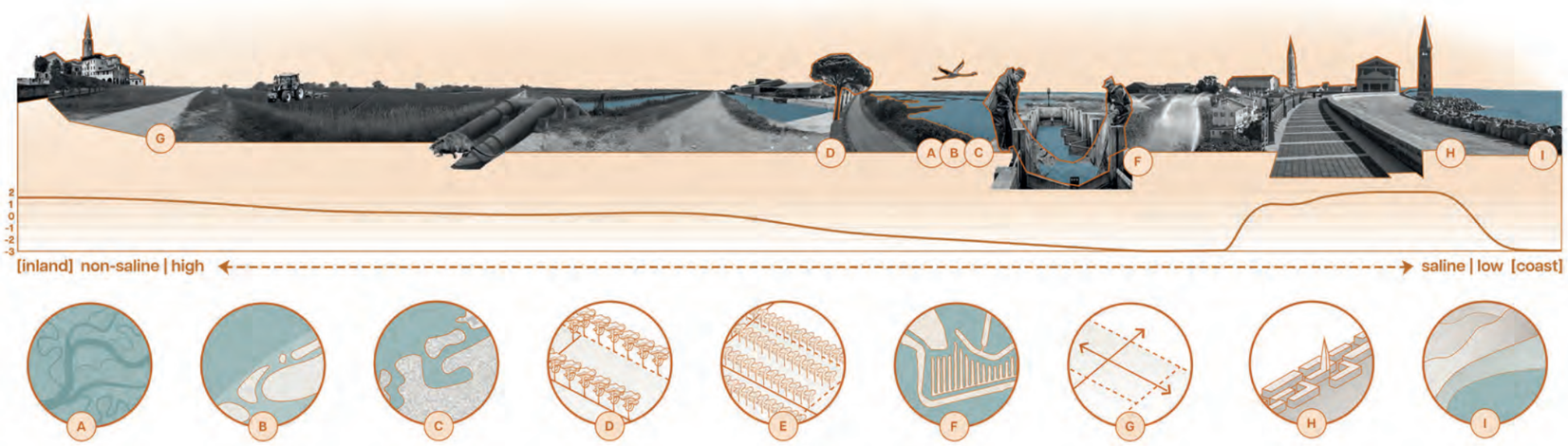


Landscape design based on 1. the understanding of historical landscape system formations and 2. projection on the changes of key driving forces.

Landscape design provide appropriate knowledge and information to prompt people consciously understand their culture formed in human-nature integration.







Inge van Wijk
Name supervisors: Lisanne Struckman
Reviewer: Yuting Tai

Landscape-inclusive agriculture and drowning deltas

improving food security and flood control
north-eastern Italian coast

Abstract

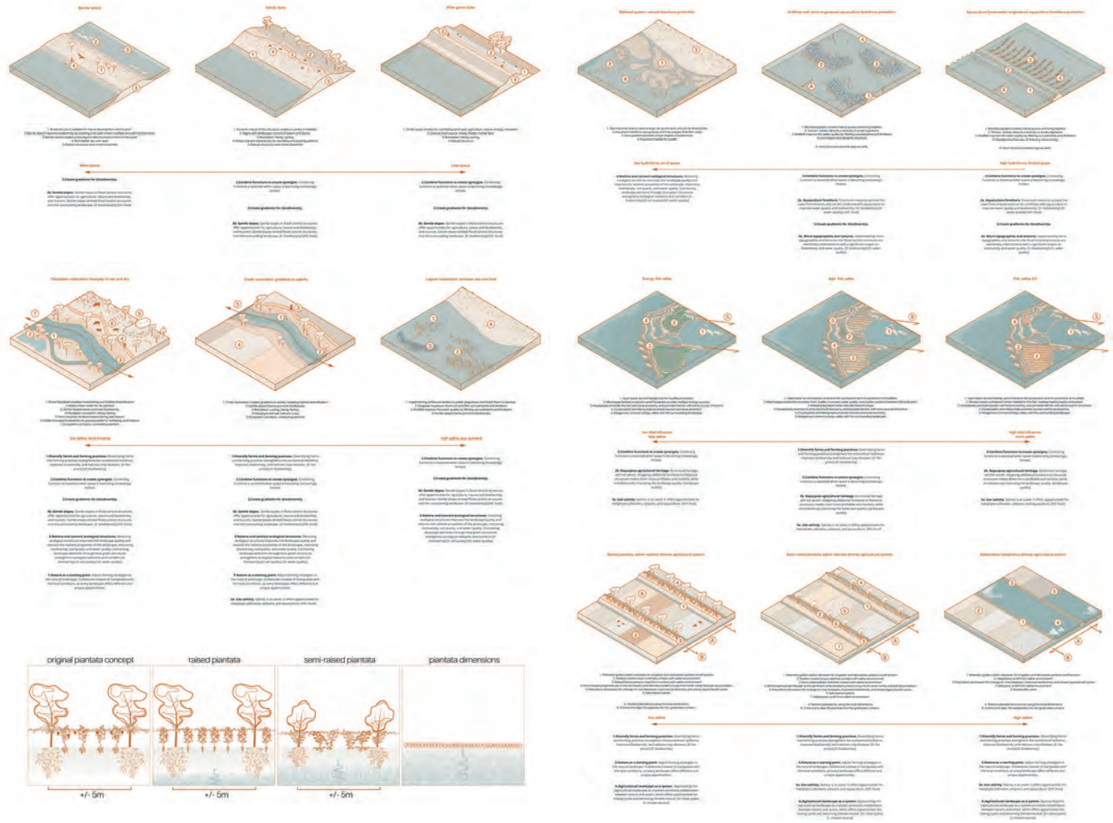
Climate change is projected to cause widespread disruptions to global food systems. Additionally, the UN projects a significant increase in the world population by 2100, putting additional pressure on food systems that are already struggling to keep pace with growing demand. At the same time, available arable land is declining due to sea level rise and ground subsidence, causing deltas to drown. The challenges to the foodscape are complex and interrelated and will require innovative and integrated solutions.

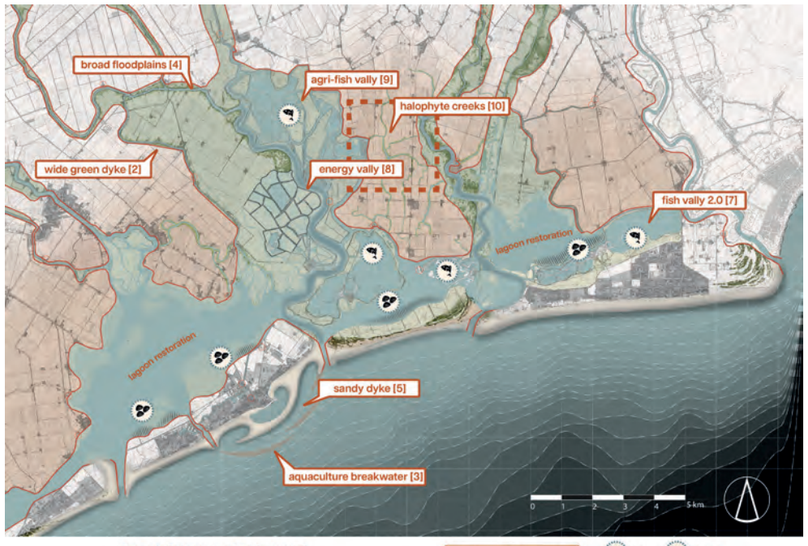
Drowning deltas (DDs) need an integral approach for both food security and flood control. Landscape-inclusive agriculture (LIA) is an approach to farming that takes into account the diverse ecological, social and economic components of a region, and integrates these elements into farming practices to improve both food production and ecosystem health. In this approach collaboration between actors and sectors is underlined to create sustainable agriculture systems that benefit both people and the environment.

With this thesis, the objective is to create new knowledge on how to employ landscape-inclusive agriculture and thereby improve the food security and flood control of drowning deltas. The focus areas is the north-eastern Italian coast, a low lying agricultural coast with high rates of ground subsidence. For this landscape, principles have been developed to guide the landscape towards a resilient, future proof agricultural system, that accounts for both food security and flood control, using the integral approach of LIA.

Scenario 1: Protect [unchanged]

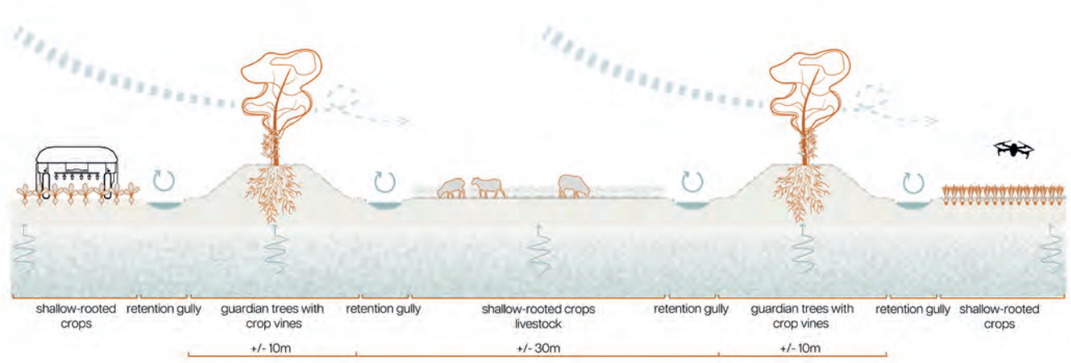
Use



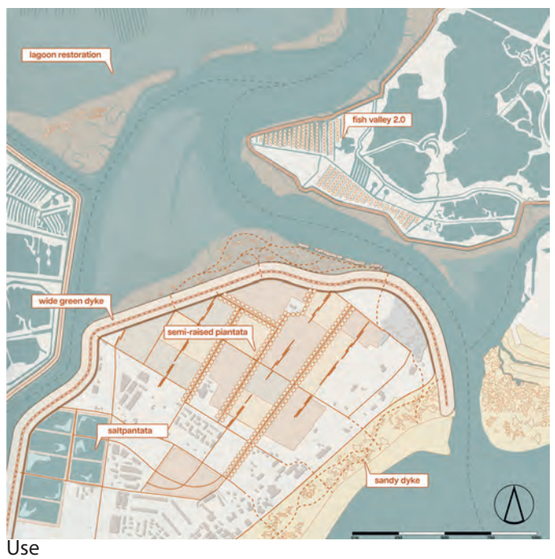


Scenario 2: Accommodate [improved]

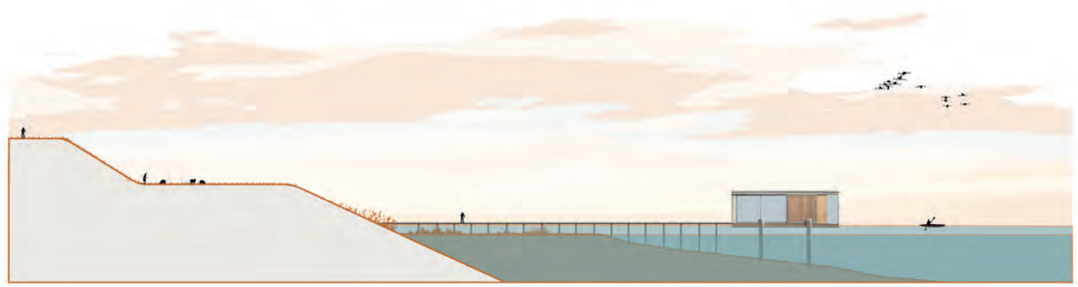
Use

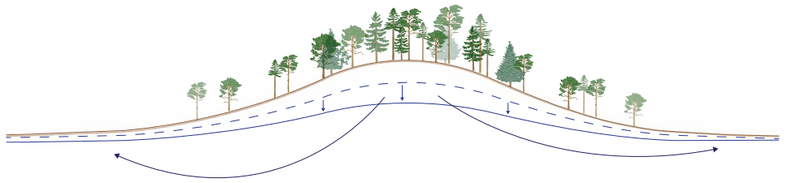


Scenario 3: Retreat [improved]

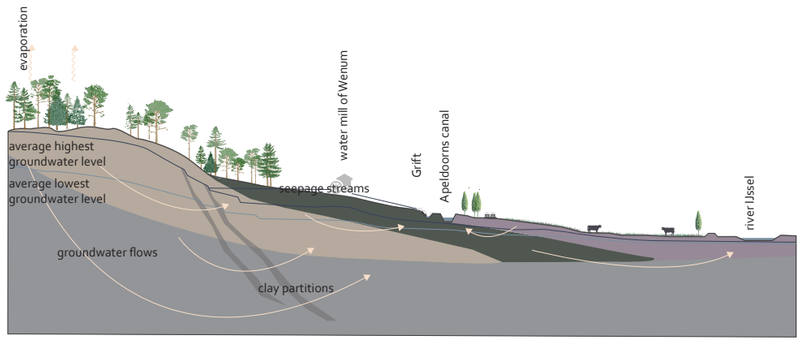


Use

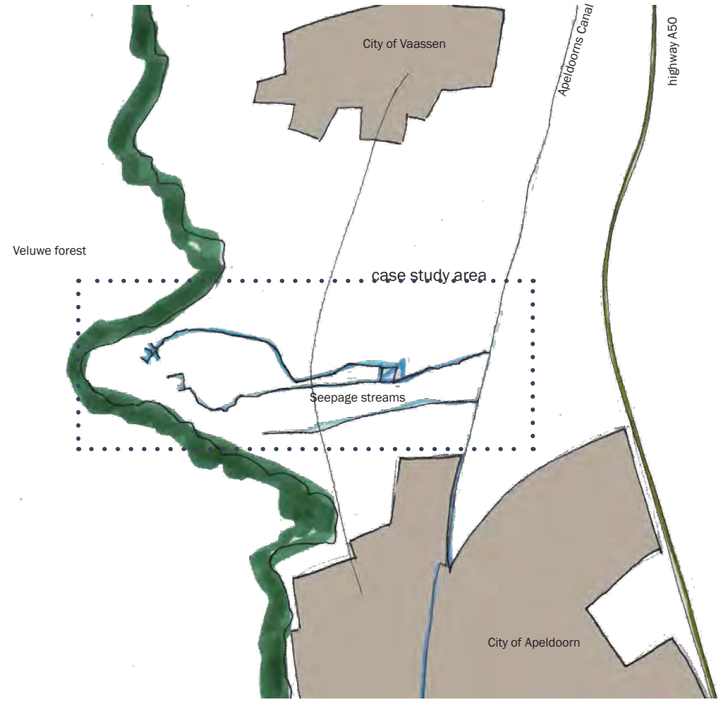




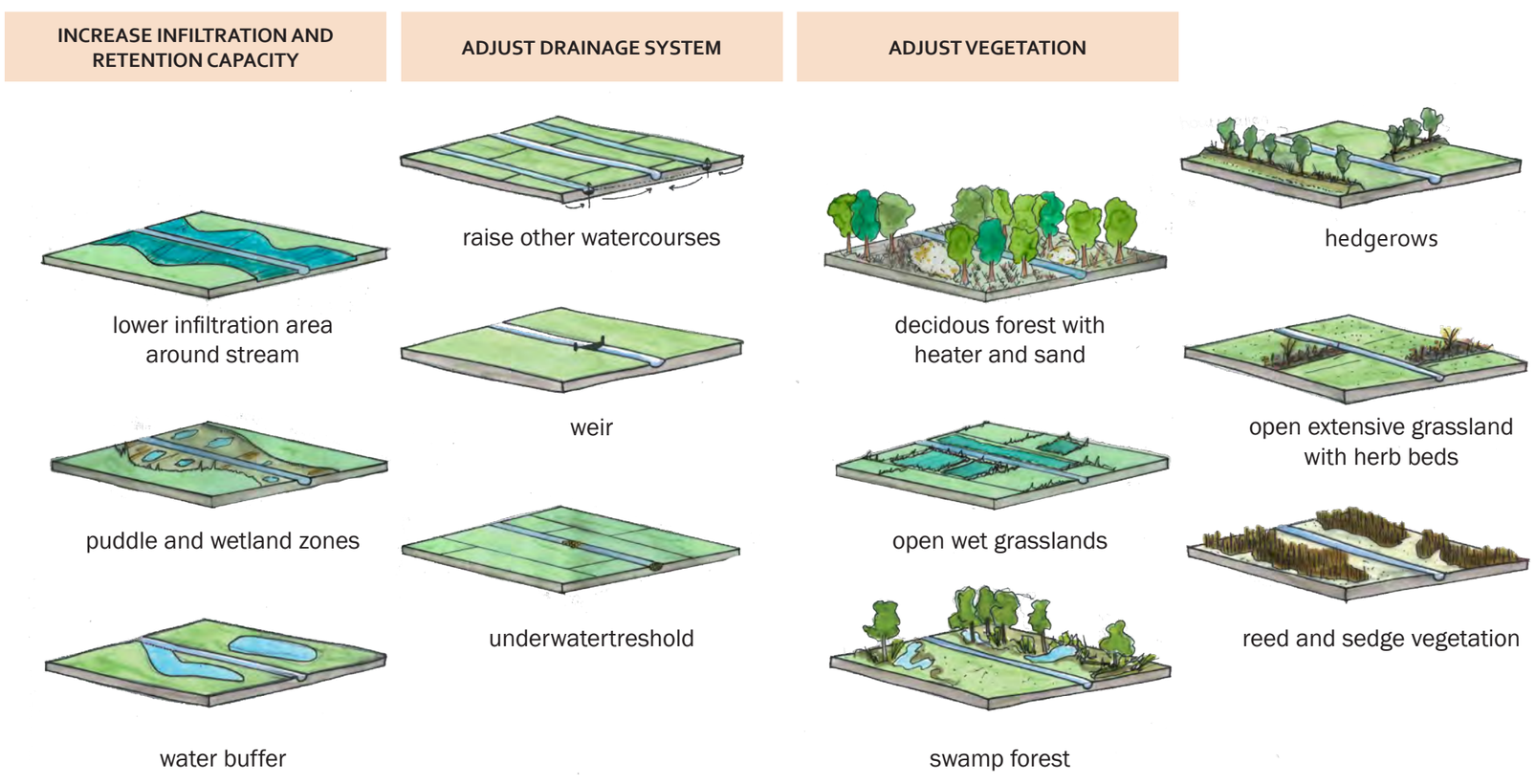
Section that illustrates the hydrology on the Veluwe. This section is used to answer the first sub-research question (author)



Section that shows the division of the Eastflank of the Veluwe. This section is used to answer the first sub-research question (author)



Location of the case study area used in this master thesis (author)



Design guidelines that answer sub-research question 2. They are formed by reviewing three reference projects (author)

Femke Nijhof

Supervisors: Christian Nolf, Elyze Storms-Smeets
Examiner: Homero Marconi Penteado

Coping with extreme weather events in cultural landscapes in dry valleys
Case study area of Wenum Wiesel

Abstract
Extreme weather events are a result of climate change and substantially impact the landscape. Therefore, the landscape must be adapted to cope with the speed at which extreme weather events will increasingly occur. A better understanding of the historic processes of adaptation and transformation of the cultural landscape in terms of systems helps to increase the acceptance and feasibility of extreme weather event measures. The objective of this master's thesis is to explore design guidelines for coping with extreme weather events in cultural landscapes in dry valleys.

First, research for design was used to collect data regarding the cultural landscape in dry valleys. The case study area used in this research is the dry valley landscape of Wenum Wiesel. Second, research on design reviewed three reference projects to extract examples of design guidelines for drought and peak rainfall in the cultural landscape.

In the last phase of this research, the design guidelines are tested in the case study area of Wenum Wiesel. This research-based design seeks solutions in the cultural landscape for coping with drought and peak rainfall. This research has two main outcomes. The first outcome is the intangible and tangible landscape elements that are considered most important in the cultural landscape of dry valleys by stakeholders. The second outcome is the set of design guidelines that were tested in the case study area.

Research questions:

GRQ: What are design guidelines for coping with extreme weather events in the cultural landscape of dry valleys?

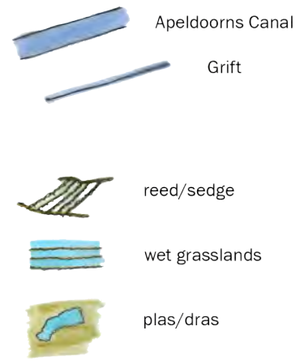
SRQ1: What defines the cultural landscape of dry valley landscapes?

SRQ2: What design principles can be created to cope with extreme weather events in cultural landscapes?

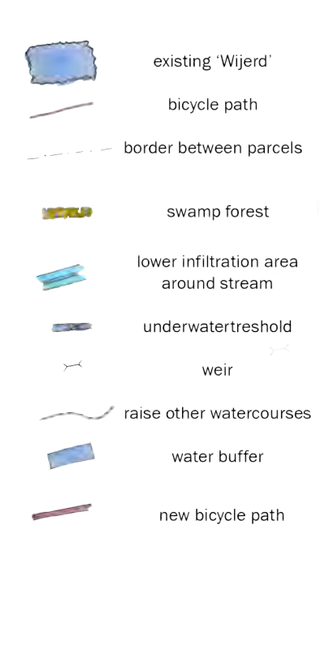
SRQ3: How can design principles for coping with extreme weather events in cultural landscapes be applied in the dry valley landscape of Wenum Wiesel?

The Design Phase of this master thesis, where the design guidelines from sub-research question 2 were implemented on the three locations found in sub-research question 1. This research based design is sub-research question 3 and together they answer the general research question.

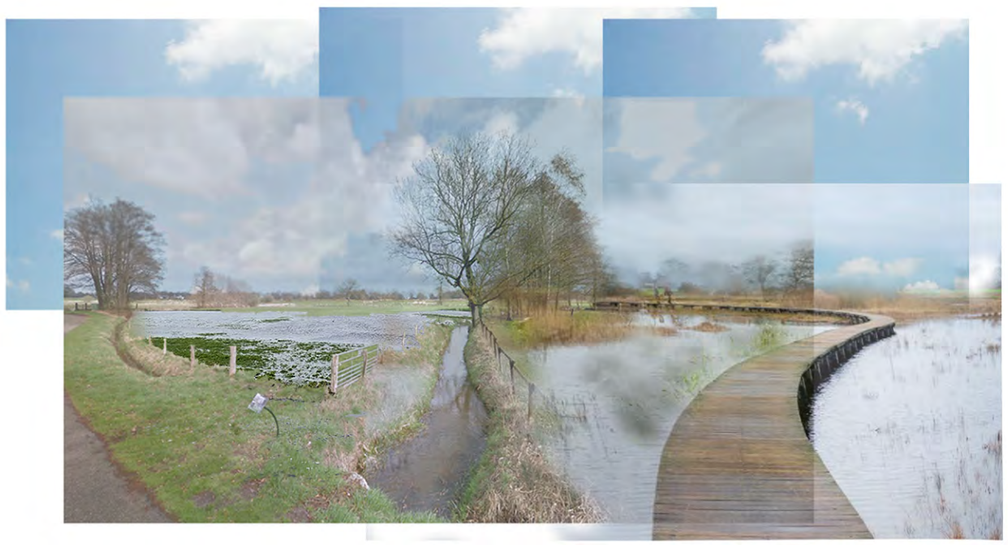
The design for location 1 after the design guidelines were applied (author)



The design for location 3 after the design guidelines were applied (author)



The design for location 2 after the design guidelines were applied (author)



Visualisation of design location 3 after the design guidelines were implemented (author)

Alison Galea
Dr Homero Marconi Penteado
Dr Lysanne Snijders (Behavioural Ecology)

Spatial Concepts for Pond Bat Habitats with New Housing Developments

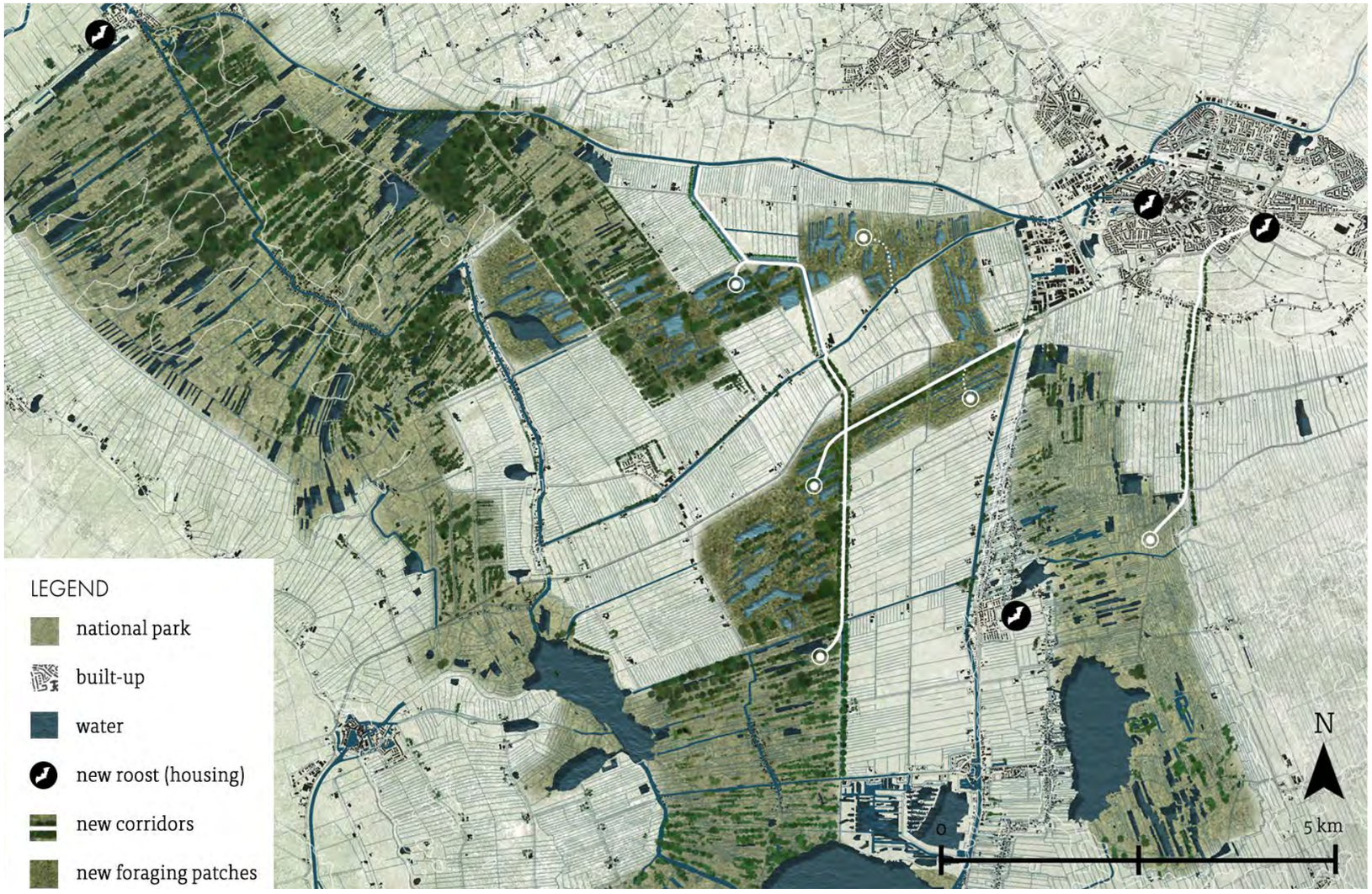
Overijssel, Netherlands

Abstract

The growing demand for housing is causing landscape fragmentation and habitat loss, but urban areas present opportunities for habitat creation. This study focuses on integrating pond bat conservation with human settlements. By understanding the bat's life history, habitat needs, and landscape preferences, spatial concepts were developed for open spaces and housing that can support the species. The research examined the regional scale, identifying roosts, foraging areas, and corridors in Overijssel. A specific site was then selected to develop urban-scale spatial concepts.

Using a research through design approach, the spatial concepts were assessed based on established criteria. At the regional scale, the concept for roosting patches involved dispersed, low-density housing development to create new roosting locations. For foraging patches, diverse patches integrated into an open space system were optimal, with separate water areas for humans and pond bats. To enhance connectivity, alternative corridor loops were proposed to address bottlenecks while preserving established corridors. At the urban scale, the optimal spatial concept for housing was a u-shaped pattern with space-efficient dwellings, maximizing open space and maintaining a connected habitat network.

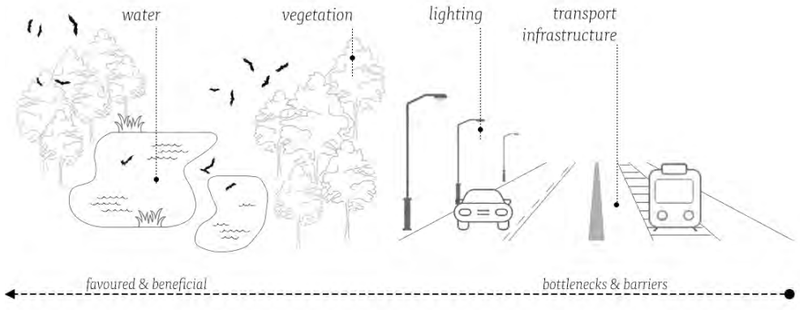
This research demonstrates the translation of species theory into practical spatial concepts and their successful application. Designers can utilize these tools to support bat species while emphasizing the importance of fauna conservation in future plans. This interdisciplinary approach combines design principles with theory from other disciplines, contributing to existing bat conservation efforts and highlighting the need to protect ecologically significant species and their habitats. Recognizing the value of all species and ecosystems not only benefits nature but also enhances our living environment.



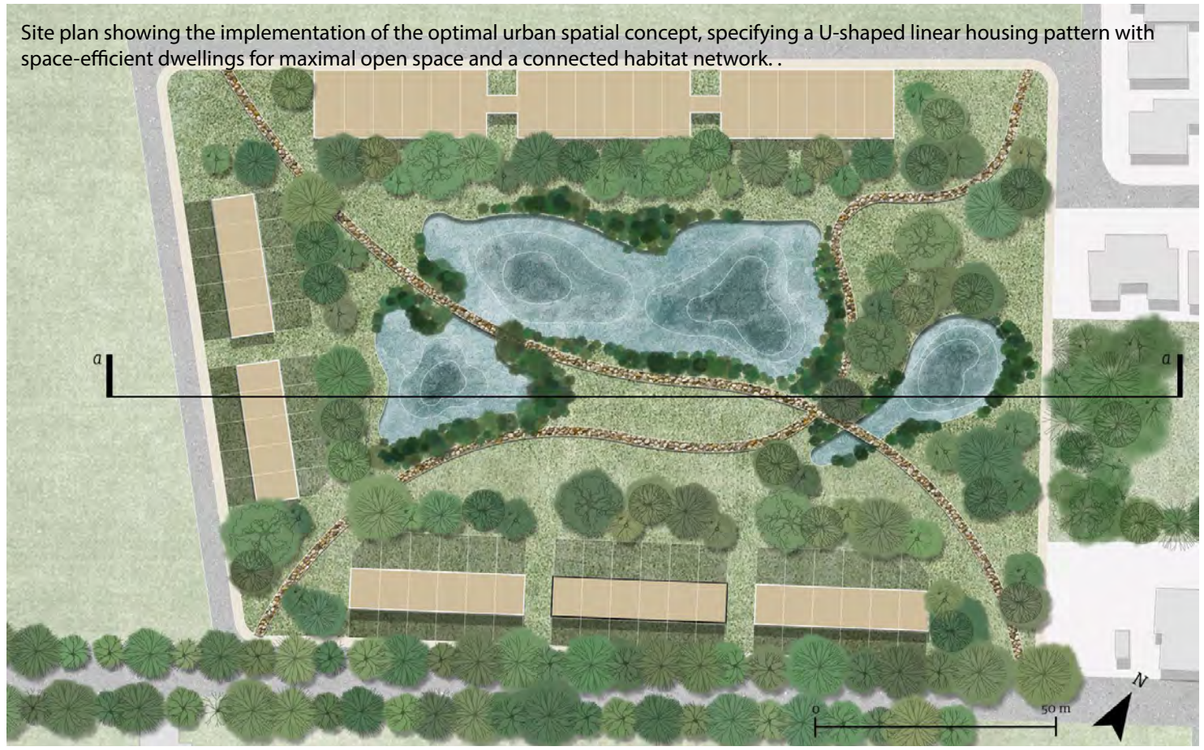
Masterplan showing the northern part of the study area in and around De Wieden, with new foraging sites and corridors forming the habitat network. The foraging sites extend the nature area towards the city of Steenwijk. The corridors punctuate the landscape with tree rows and water channels to create routes for pond bats.

The 3 final regional spatial concepts for pond bat habitats with housing settlements, for roosting, foraging and navigation.

Images of the pond bat species (*Myotis dasycneme*).
Source: Unknown, batslife.eu.



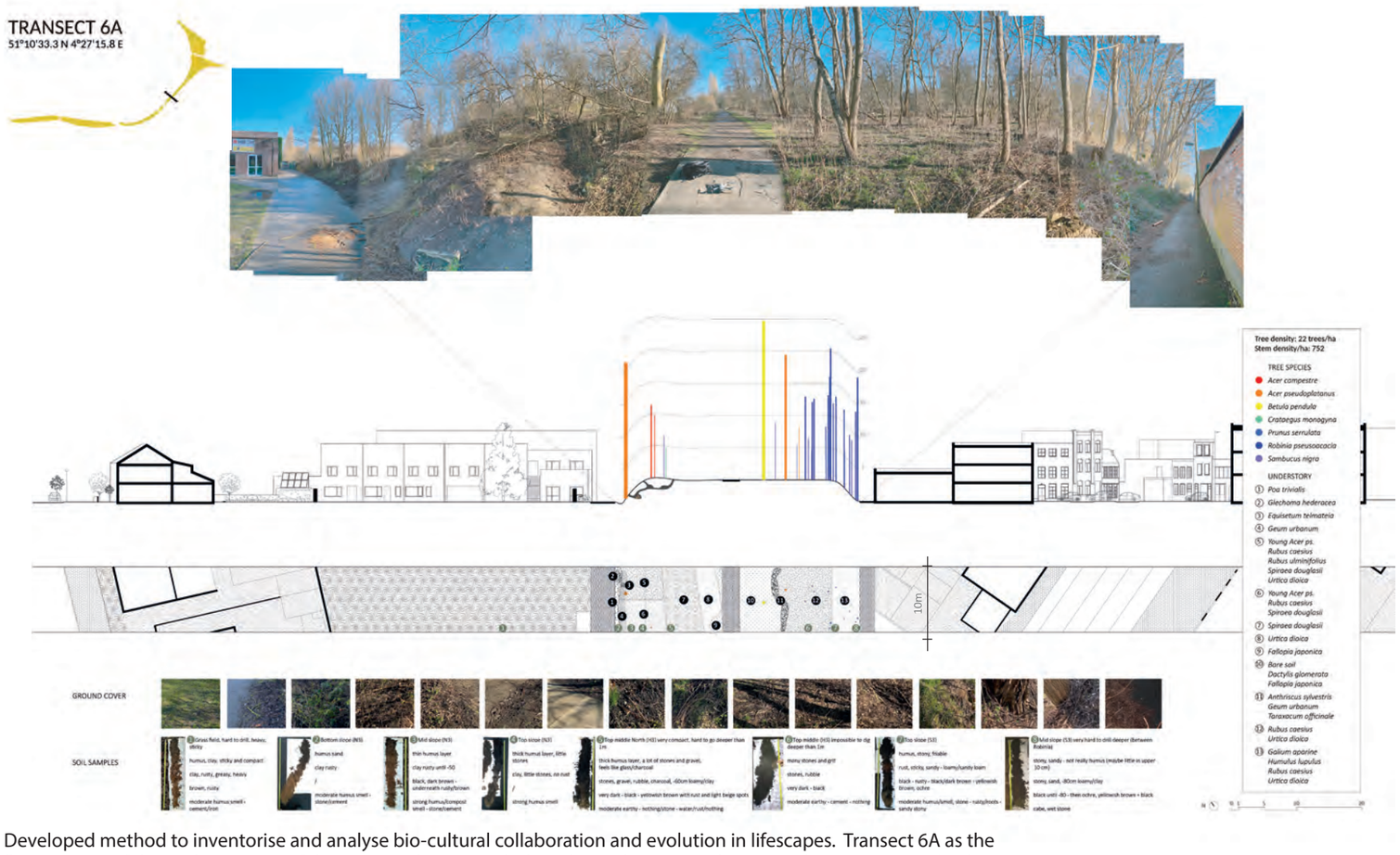
Collage showing water corridors within the proposed foraging patches, with sensitively intersecting paths to increase species and nature awareness.



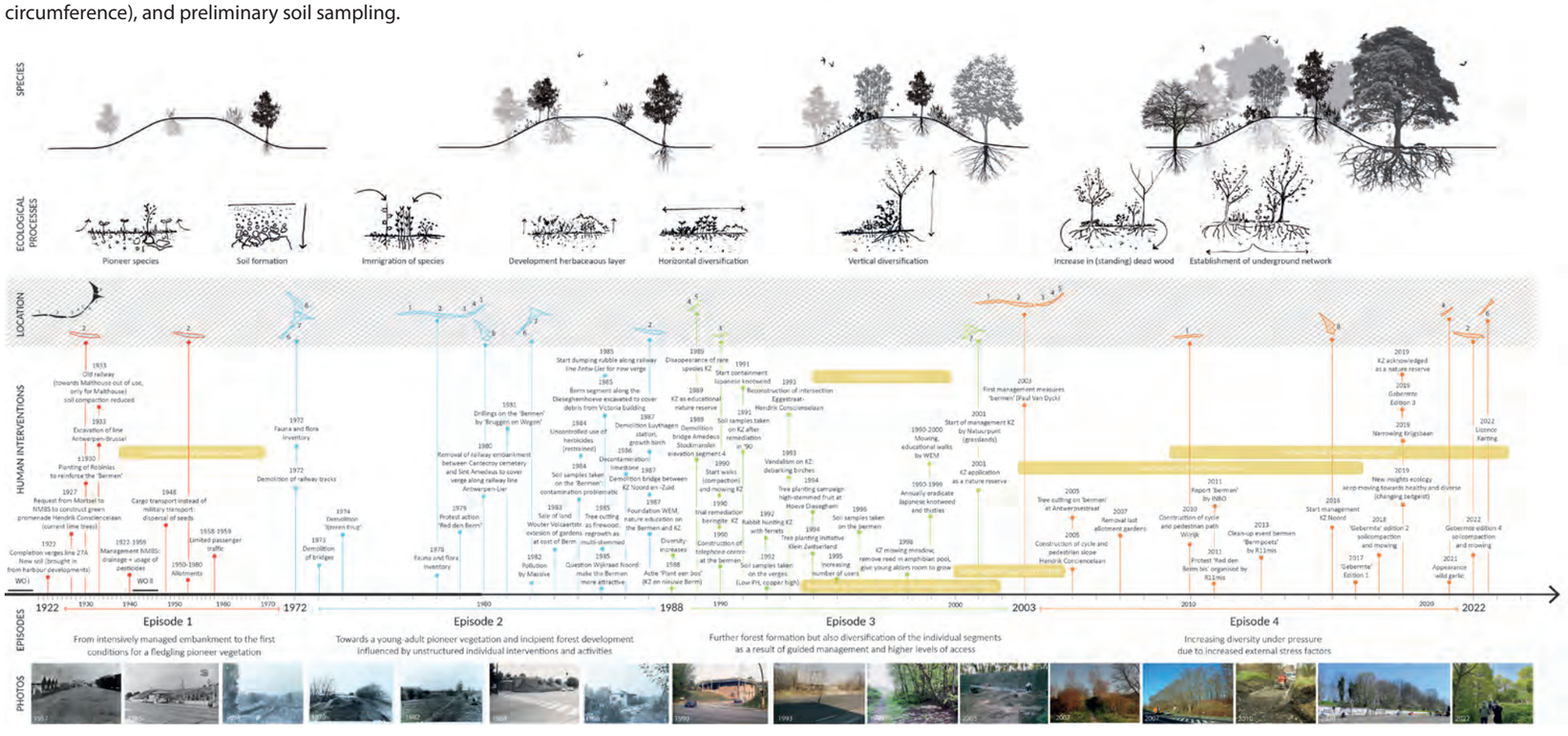
Site plan showing the implementation of the optimal urban spatial concept, specifying a U-shaped linear housing pattern with space-efficient dwellings for maximal open space and a connected habitat network. .

Collages showing the open space within the new housing development site in the day and night.

Site section a-a showing the proposed housing development site with the central open space.



Developed method to inventorise and analyse bio-cultural collaboration and evolution in lifescapes. Transect 6A as the first transect of the sixth segment of the case-study area, including the understory, soil cover and tree inventory (with its circumference), and preliminary soil sampling.



Bio-cultural analysis through time of the Bermen. This timeline illustrates and interpretes the evolution of the Bermen. It specifically explores the nature of the bio-cultural community, how all kinds of interactions have led to its unique development, how various species interact within it, and how we can contribute to the conservation and further development of such community through design.

Hannah Van den Broeck
Supervisor: Homero Marconi Penteado

Lifescapes

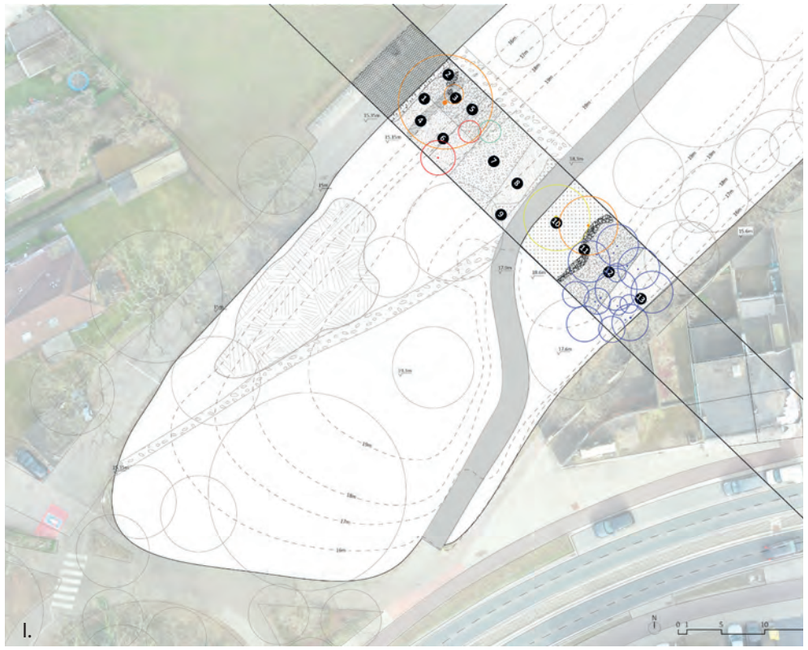
Designing with/for landscapes of spontaneous urban nature as living communities - Mortsel, Belgium

Abstract

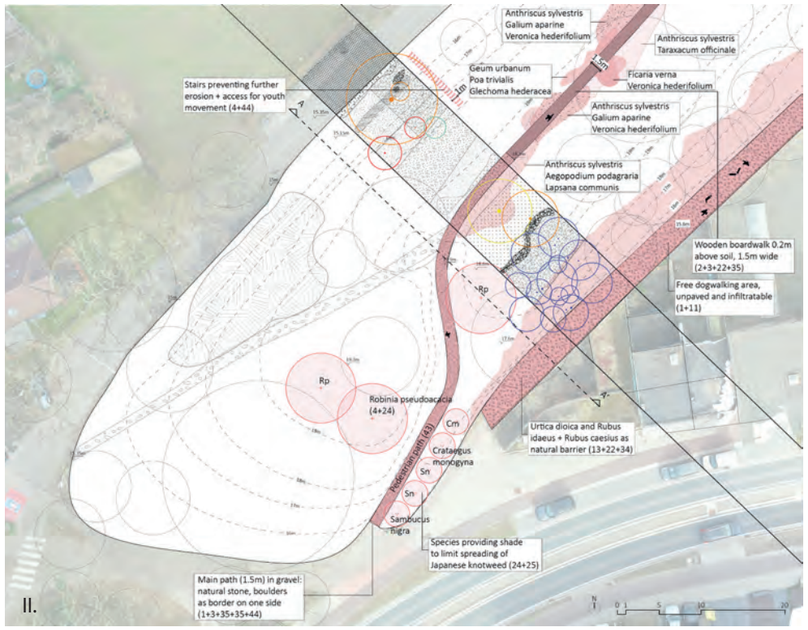
Biodiversity is declining in both urban and rural areas and biodiversity-friendly design guidelines in landscape architecture are still rare. A deeper understanding of biodiversity dynamics in landscapes is necessary to consider the needs of nature in design processes. This research therefore aims to explore how landscape architects can see landscapes as living systems in their designs, in other words as 'lifescapes'. To do so, a research for design approach is applied to iteratively develop and apply design principles and guidelines that allow for the realization of the full potential of biodiversity as living communities in landscapes of spontaneous urban nature. The study focuses on the former railway embankment 'the Bermen' in Mortsel and Wilrijk in Antwerp as a case study.

The methodology involves data collection and analysis methods, with an emphasis on an iterative process of engagement with local stakeholders. The theoretical framework draws on literature related to nature-inclusive design, biophilic design, urban nature evolution, bio-cultural interactions, and ecological theory. Five key concepts are developed, leading to the formulation of five design principles and 24 design guidelines, including vital soil, cross-species collaboration, urban ecological evolution, bio-cultural communities, and the voice of nature. The subsequent chapters explore the case study of the Bermen in detail, including a landscape analysis using 12 transects through the Bermen, a bio-cultural analysis through an interpretative timeline, and the application of design principles and guidelines in detailed designs and collages. The main findings highlight the importance of recognizing landscapes as lifescapes and the need for new methods to analyse and design bio-cultural collaboration and evolution.

The research emphasizes the potential of viewing landscapes as living systems and provides insights into how landscape design can support and promote biodiversity in urban environments. It offers design principles and guidelines to guide future landscape architecture practices.



I.



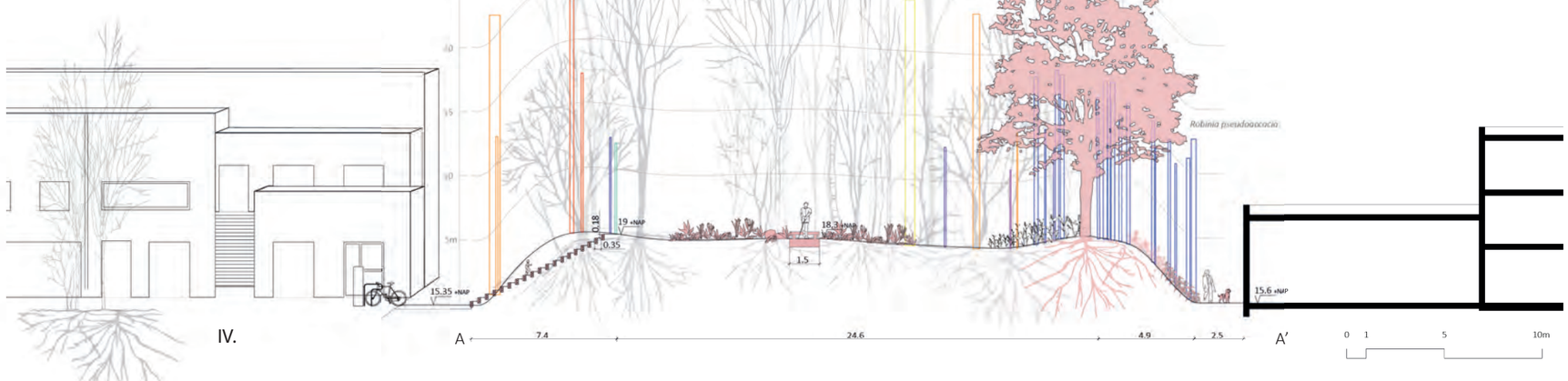
II.

III.

I. Existing situation, including transect 6A.
II. Detailed design at the location of transect 6A, for the design concept 'accessibility for the non-visible'.
III. Impression of the interventions, according to the design concept 'Accessibility for the non-visible', applied at the Bermen. It represents an imaginary section, put together with existing areas of the Bermen.
IV. Section AA' taken along transect 6A, including the existing trees and understory. Degradable interventions allow for living communities to develop and evolve: wooden boardwalk, unboardered paths, shading exotic species, etc.

- *Acer campestre*
- *Acer pseudoplatanus*
- *Betula pendula*
- *Crataegus monogyna*
- *Prunus serrulata*
- *Robinia pseudoaccacia*
- *Sambucus nigra*

1. *Poa trivialis*
2. *Glechoma hederacea*
3. *Equisetum telmateia*
4. *Geum urbanum*
5. *Young Acer sp.*
   Rubus caesius
   Rubus ulminifolius
   Spiraea douglasii
   Urtica dioica
6. *Young Acer sp.*
   Rubus caesius
   Spiraea douglasii
7. *Spiraea douglasii*
8. *Urtica dioica*
9. *Fallopia japonica*
10. *Bare soil*
    Dactylis glomerata
    Fallopia japonica
11. *Anthriscus sylvestris*
    Geum urbanum
    Taraxacum officinale
12. *Rubus caesius*
    Urtica dioica
13. *Galium aparine*
    Humulus lupulus
    Rubus caesius
    Urtica dioica



IV.

Stijn Doelman
First Supervisor: João Cortesão
Second Supervisor: Sjoerd Brandsma
Reviewer: Agnès Patuano

Stone Cold
Cooling urban microclimates without the use of vegetation.
Maastricht, The Netherlands

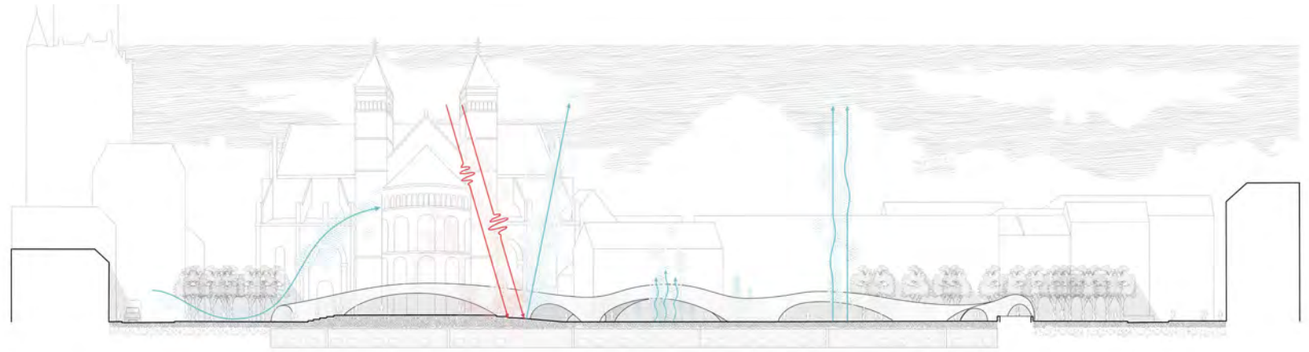
Abstract

The rapid expansion and densification of the urban fabric, combined with the effects of climate change, presents a significant threat to thermal comfort. Historically, this problem has predominantly been associated with the prevalence of paved surfaces within the urban fabric, and is most commonly mitigated through the integration of green infrastructure. Yet, paved surfaces play a crucial role in enabling essential functions within the city, such as trade, logistics and mobility – and can therefore never be fully replaced by climate-adaptive solutions such as green infrastructure. While this thesis acknowledges green infrastructure to be the most successful method of diminishing microclimatic concerns, it equally recognizes that planting is not always possible and that, in that event, urban- pavements and furniture are an alternative worth investigating.

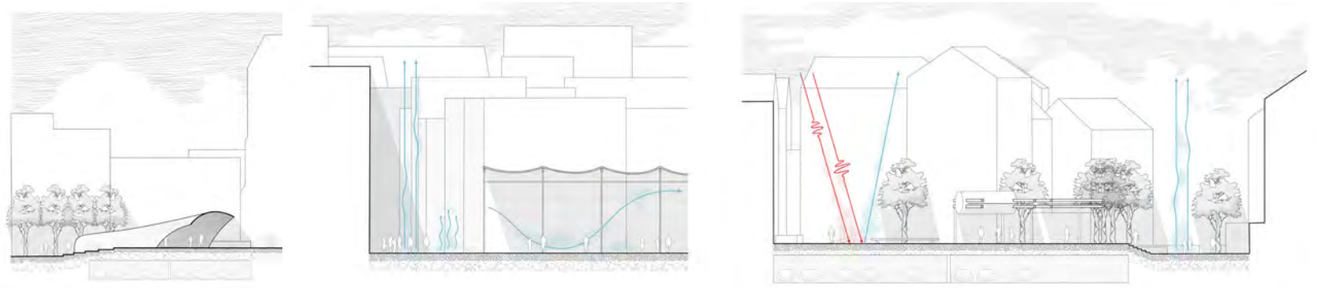
This research analyses the relevant thermophysical properties of pavements (albedo, emissivity & permeability) and the contextual conditions of the site (convection & shading) to form informed decisions on materials and interventions. On the basis of an extensive material toolbox, three sites were redesigned using urban- pavements and furniture to enhance cooling. The results of this process were distilled into design guidelines for cooling the urban microclimate by solely utilizing urban- pavements and furniture.

A view of the redesigned Vrijthof, a large square in the heart of Maastricht

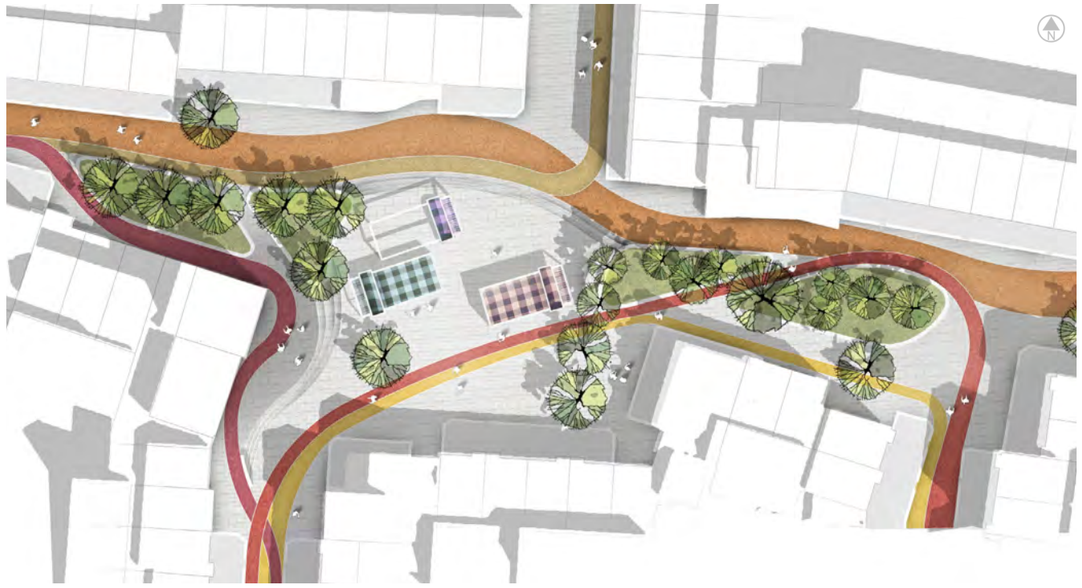
The final design for the large square (Vrijthof, Maastricht) combining various cooling techniques with new programming.



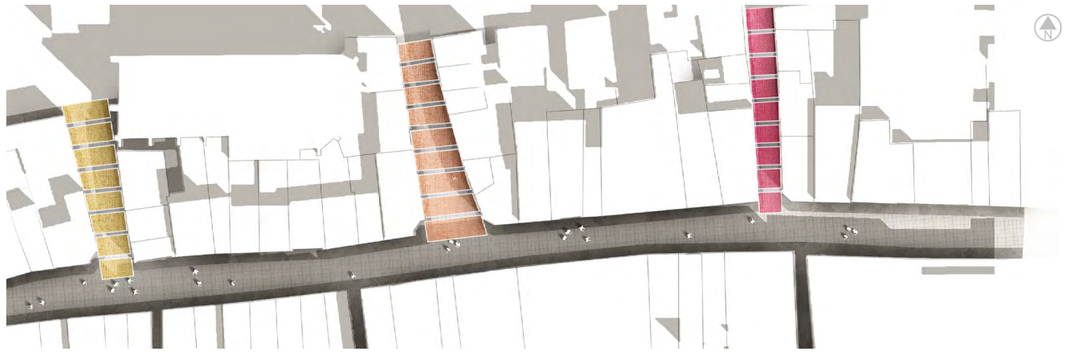
Section of the large square, showcasing how the shading installation interacts with the square.



From left to right: the large square (Vrijthof), the street (Grote Staat), the small square (Lakenweversplein)

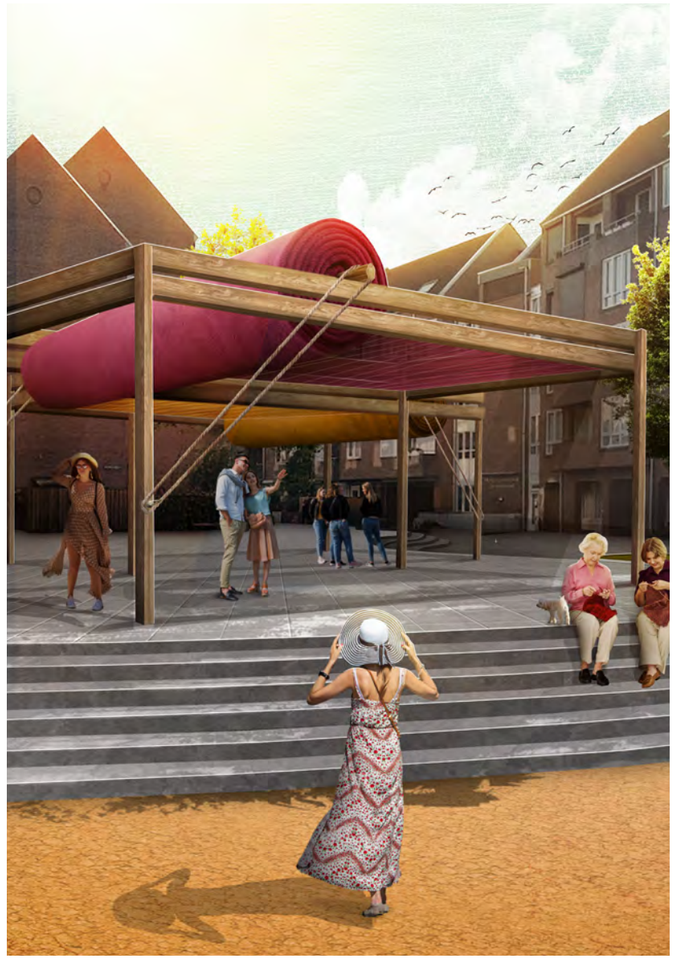


The final design for the small square (Lakenweversplein, Maastricht) combining various cooling techniques.

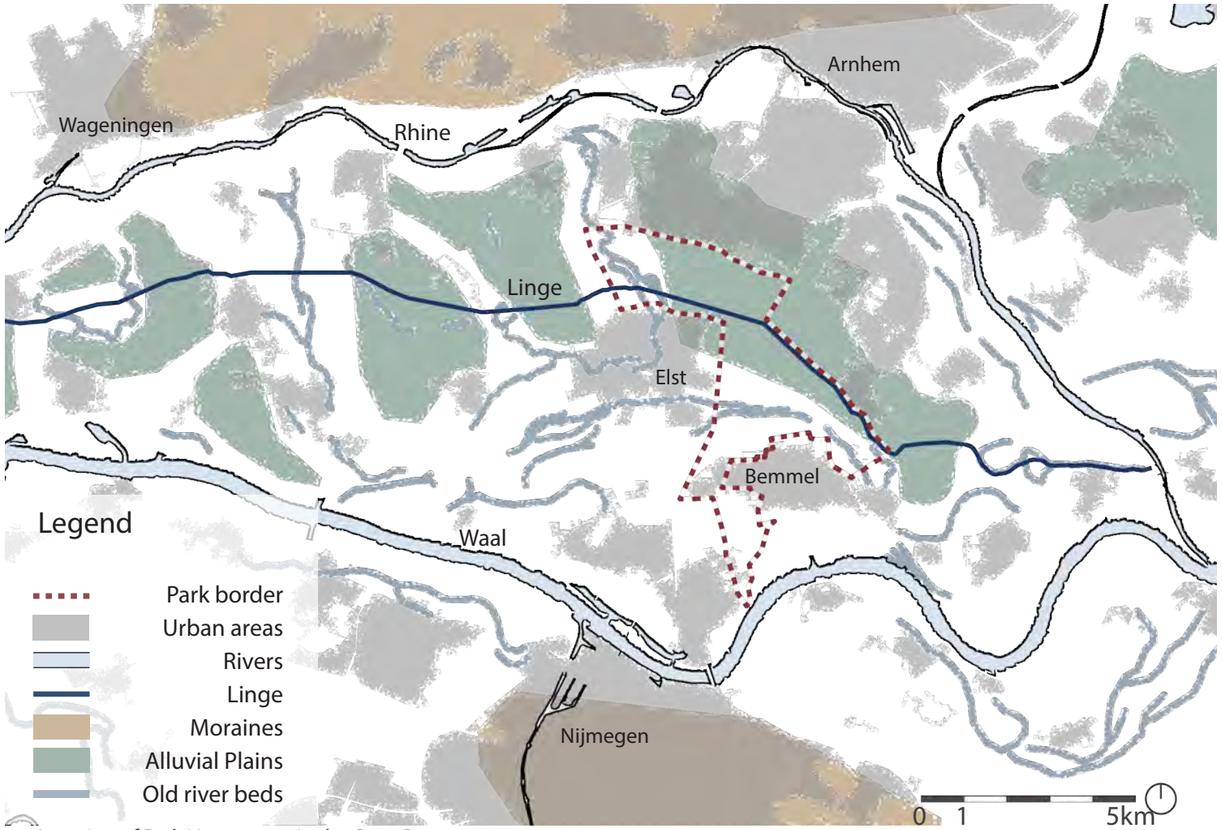


The final design for the street (Grote Staat, Maastricht) combining a permeability with shading.

A view inside the street (Grote Staat)



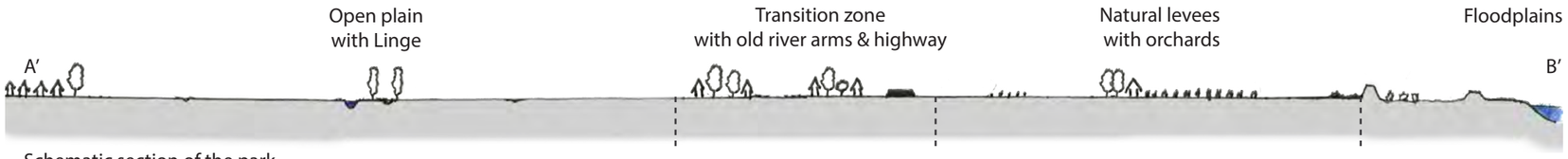
A view of the small square (Lakenweversplein)



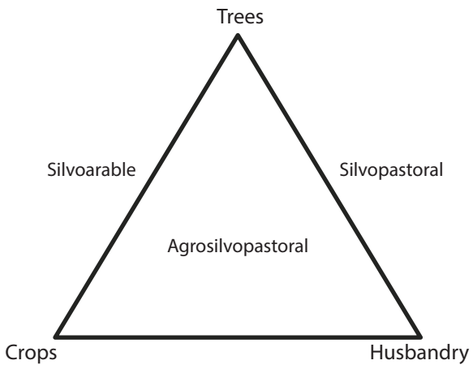
Location of Park Lingezegen in the Over-Betuwe

Regional Park Lingezegen

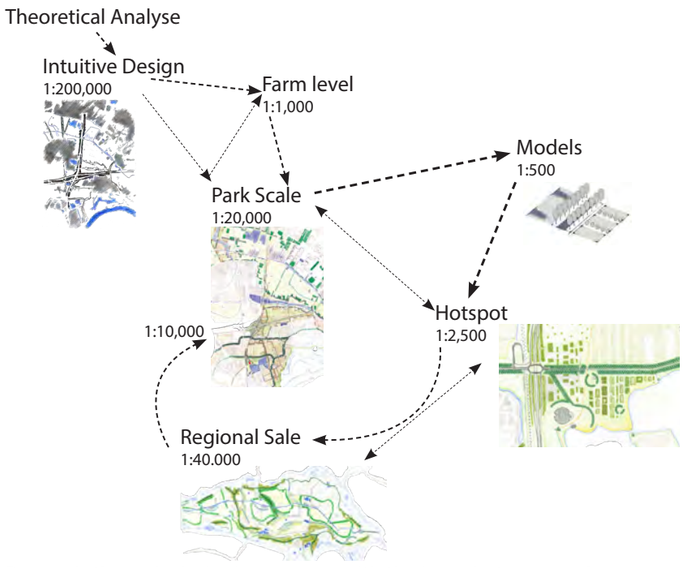
(ProjectbureauParkLingezegen, 2020)



Schematic section of the park



Agroforestry as combination of land-uses



Research-through-designing process with the jump between scales chronological ordered

Broadened old river arms with slow recreation through the fields

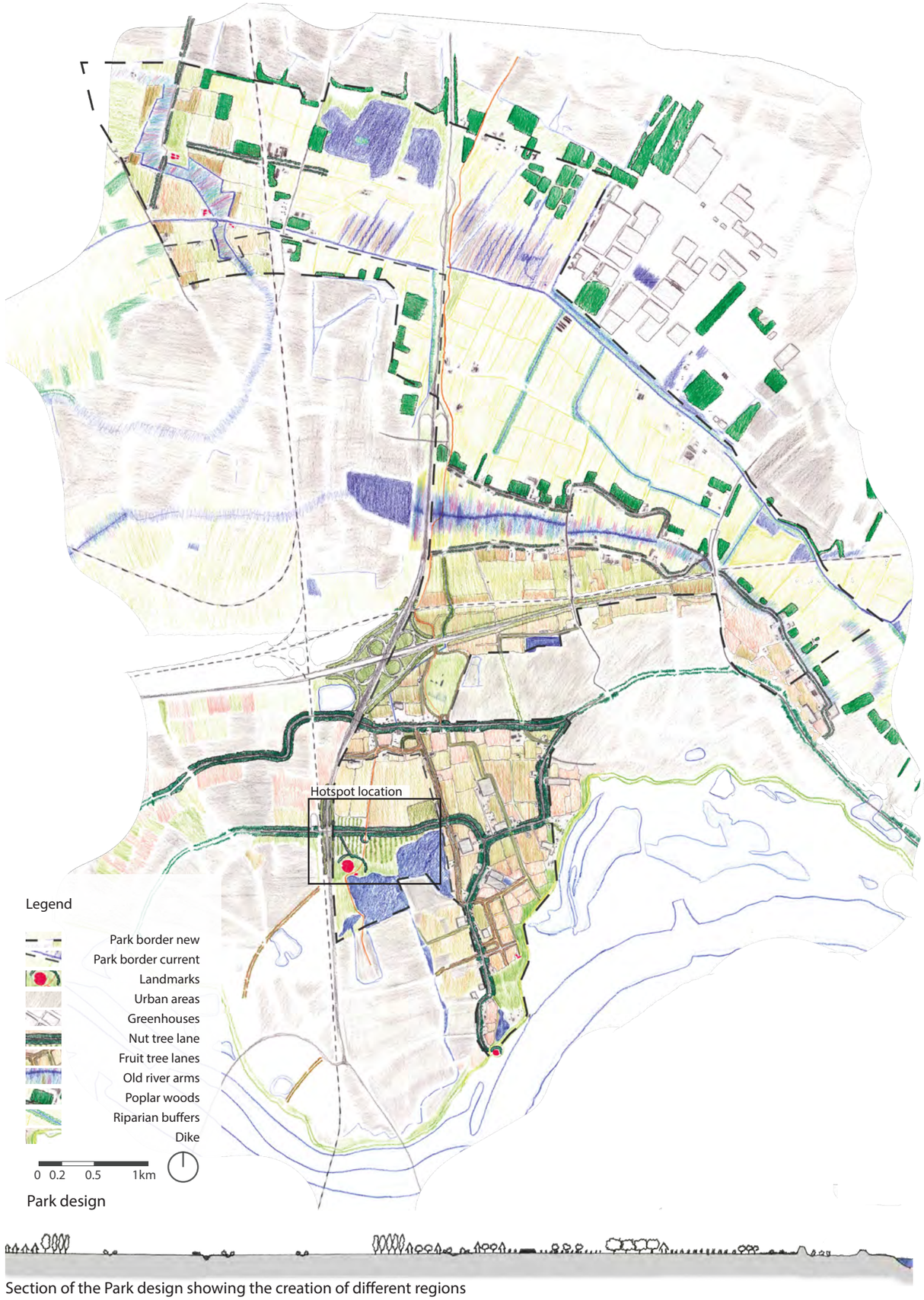
Ellen Schallmayer
Supervisor & examiner: dr. ir. Ingrid Duchhart
Second supervisor & examiner: dr.ir. Rudi van Etteger MA
Examiner: dr.ir. Agnès Patuano

(Re-)considering Agroforestry and its potential as a part of a city regional food system

The case of Park Lingezegen, The Netherlands

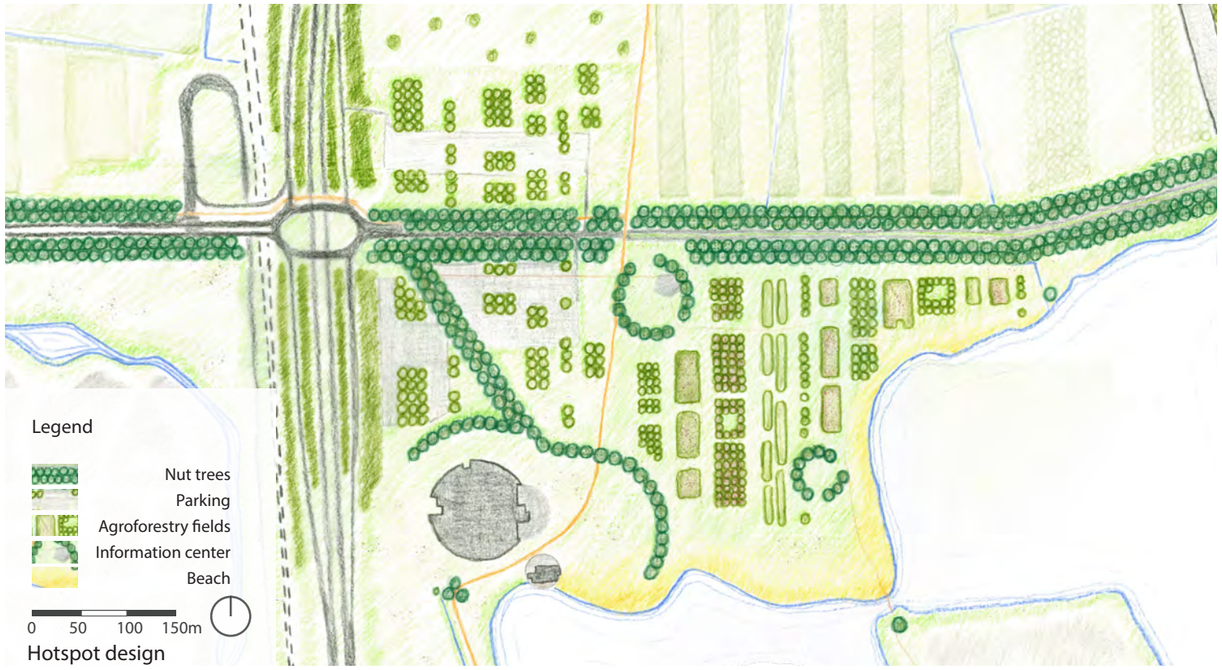
Abstract

Globalisation, upscaling, and monoculture of agriculture over the course of history increased the production of agricultural goods in the industrialized world. This came at a prize: environmental issues such as soil and water contamination and decline in biodiversity have risen to unacceptable levels, while the disconnection between consumer and producer increases. To address these challenges two notions are explored in Park Lingezegen, striving for a more resilient, sustainable, and social food system: 1) the potential of agroforestry, a multifunctional approach by introducing woody perennials, to counteract environmental problems of food production and, 2) City Regional Food Systems (CRFS) between Arnhem and Nijmegen, an approach of local food production focusing on the relationship between city and land. Park Lingezegen is used as a case study as it wants to promote alternative food systems. The suitability of agroforestry in the Park is investigated by means of a landscape analysis, as well as taking into account the willingness of the actors in Park Lingezegen for creating an agroforestry system. By research-through-designing, a framework of agroforestry along recreational lines and parcel boundaries is developed using spatial guidelines, providing flexibility on the plot level, and increasing the readability of the landscape and the food system. A new entry point is proposed functioning as a meeting and information point for farmers and visitors. In conclusion, agroforestry strengthens Park Lingezegen, especially regarding biodiversity and water management, as well as the CRFS by increased perception of the food system.



Park design

Section of the Park design showing the creation of different regions



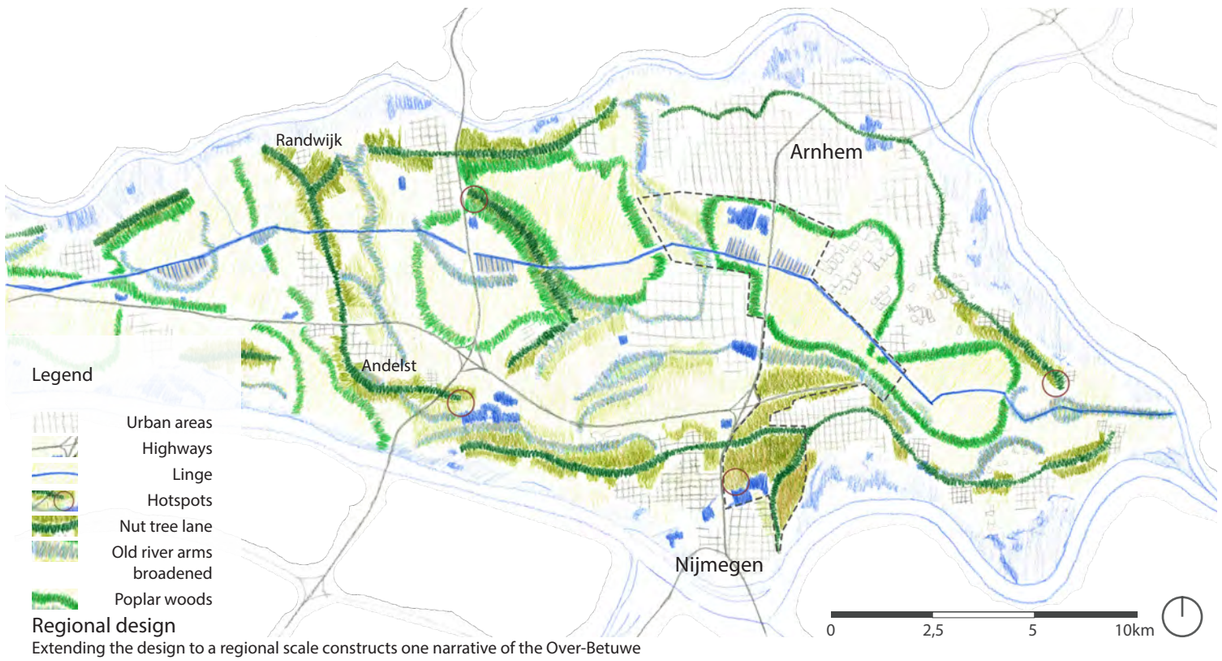
Hotspot design

Nut tree lane with market

Leading along streets connecting the historical cities of the Over-Betuwe

Cinema with orchards, beach, and various recreational activities

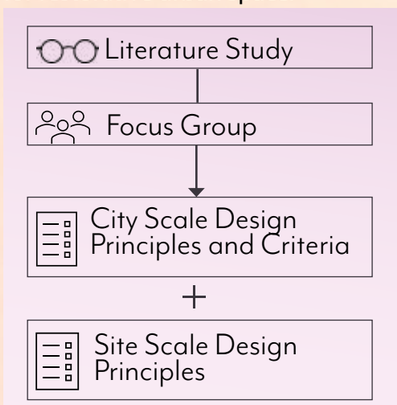
Working as starting points for agroforestry by combining meeting points and info centres



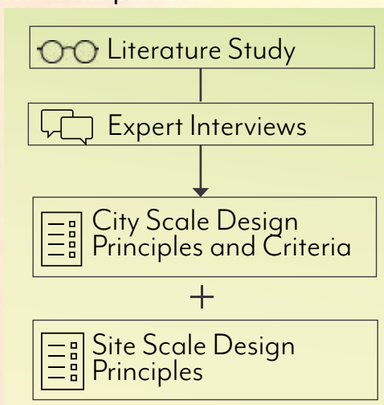
Regional design

Extending the design to a regional scale constructs one narrative of the Over-Betuwe

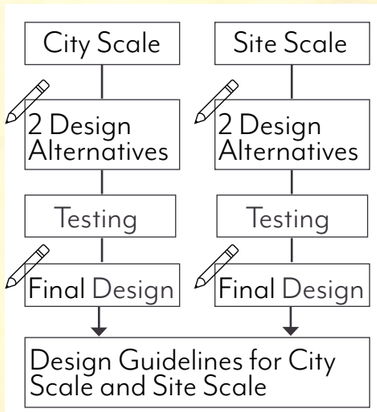
Research Question 1
Design principles and design criteria for restorative urban space.

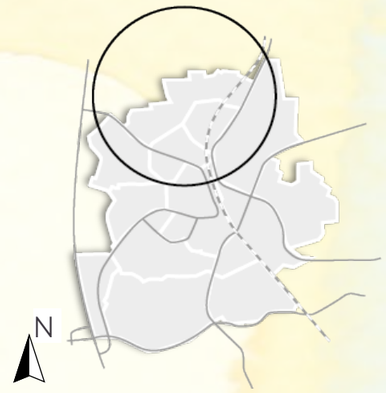


Research Question 2
Design principles and design criteria for nectar provision



Research Question 3
Integration into one hangout design.





A focus area within Barneveld, selected based on participant's preferences.

Landscape characteristics for Restorative PUOS

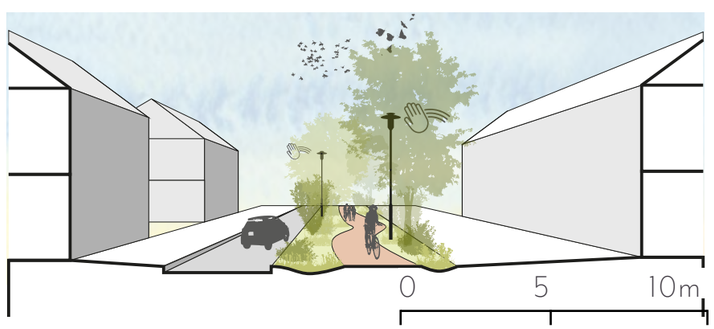
- Accessibility
- Inclusivity
- Safety
- Activity
- Sociability
- Escape
- Autonomy
- Identity
- Naturalness
- Sensory Experience

Characteristics of Nectar Providing Landscapes

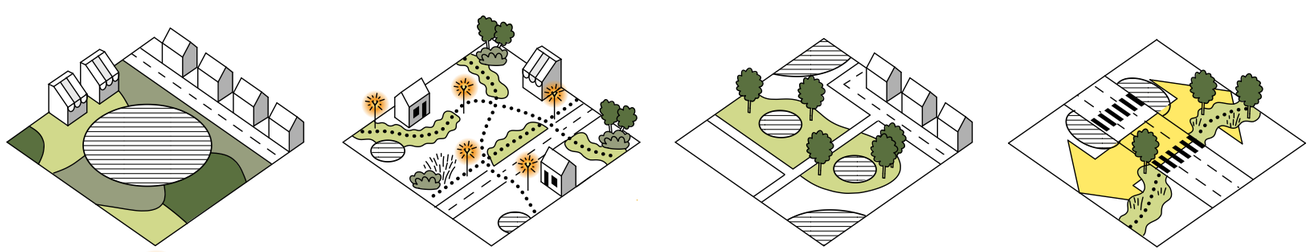
- Habitat Availability
- Habitat Connectivity
- Habitat Quality
- Patch Size
- Landscape Permeability
- Barriers

Legend
Hangouts
Corridors
Recreational routes
Nesting Habitats

Final city scale design. Hangout 1 is selected for the site scale as this hangout features the largest potential to support restoration and nectar provision



Principle section of the recreational routes in the final city scale design, highlighting how aesthetic corridorss and amber colored lights benefit both pollinators and adolescents.



City Scale Design guidelines with the following titles (from left to right): Large Hangouts, Connections, Small Hangouts and Crossings.

Karel van Dompseler
Agnès Patuano, Jana Verboom-Vasiljev (ESA), Homero Marconi Penteado

Buzzing Hangouts
Designing Pollinator Friendly Hangouts to Support Adolescent's Restoration, Barneveld, Netherlands

Abstract
Dutch adolescents experience a major increase of attentional fatigue, highlighting the need for public urban outdoor spaces (PUOS) that provide opportunities to restore cognitive abilities. According to the Attention Restoration Theory (ART), some natural environments contain characteristics that provide opportunities for cognitive restoration. Using this theory, "hangouts" can be designed for adolescents to recover from attentional fatigue. Besides that, urban natural environments are decreasing, and so is urban biodiversity. This can be observed through the lack of nectar provision for pollinators, which are important indicators of biodiversity.

Designing hangouts as natural environments could provide for both restorative PUOS for adolescents, and support urban biodiversity by providing nectar to pollinators. Yet adolescent's preferences show conflicts with urban biodiversity and with pollinators in particular. The aim of this thesis is to solve these conflicts. This thesis generates design guidelines to create hangouts with opportunities for cognitive restoration of 11- to 16-year-old adolescents by designing to enhance nectar provision for pollinators.

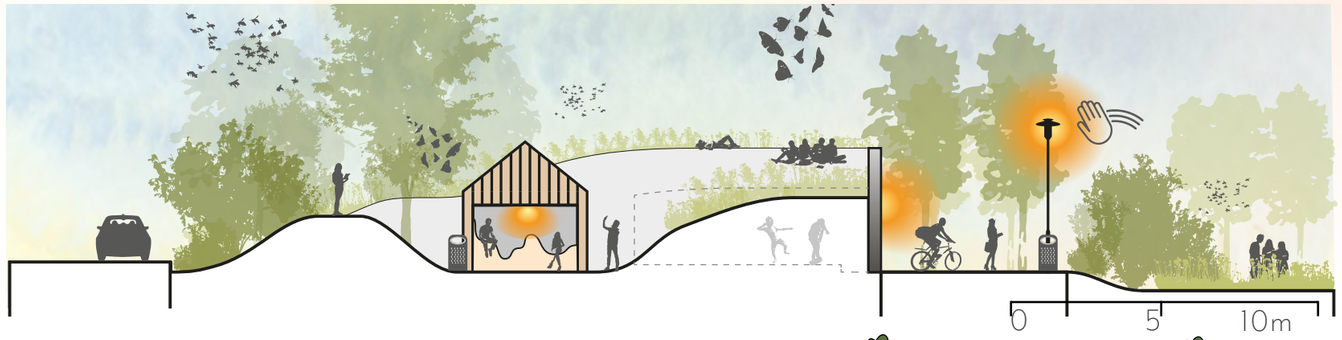
Using research through design and based on ART and on Metapopulation Theory, two sets of design principles were generated and tested in two design stages at a city scale and site scale in a case study. Fed by qualitative and quantitative data collected through focus groups with adolescents and interviews with an ecologist, each design stage featured two design alternatives. Each alternatives was assessed for their expected performance on restoration and nectar provision. This thesis provides design guidelines to direct future hangout designs for PUOS that promote cognitive restoration for adolescent's mental health and nectar provision for sustaining urban biodiversity.

Visualisation of the Enclosed park design, which is the design on which the final site scale design is based, highlighting fixed seating and enclosed hangouts.

Impression of the final site scale design, highlighting challenging paths, comfortable seating, structured activities, opportunities for lighting fires, and a pavilion for shelter.

Above: Design map of the final site scale design, resulting from assessments of previous site scale design alternatives.

On the right: Section A-A' in the final site scale design, highlighting how height differences are used as noise/light barrier and provide hidden hangouts.



Site Scale Design guidelines with the following titles (from left to right): Lights, Group Hangouts, Retreat, Exploration, Main Routes, Vibrant Squares, Activities and Shelter.

Karsten Blok
Supervisors: Seth Wilberding, Fons van der Plas (PEN)

Urban Infranature

Design principles and guidelines for habitat-inclusive linear urban green infrastructures

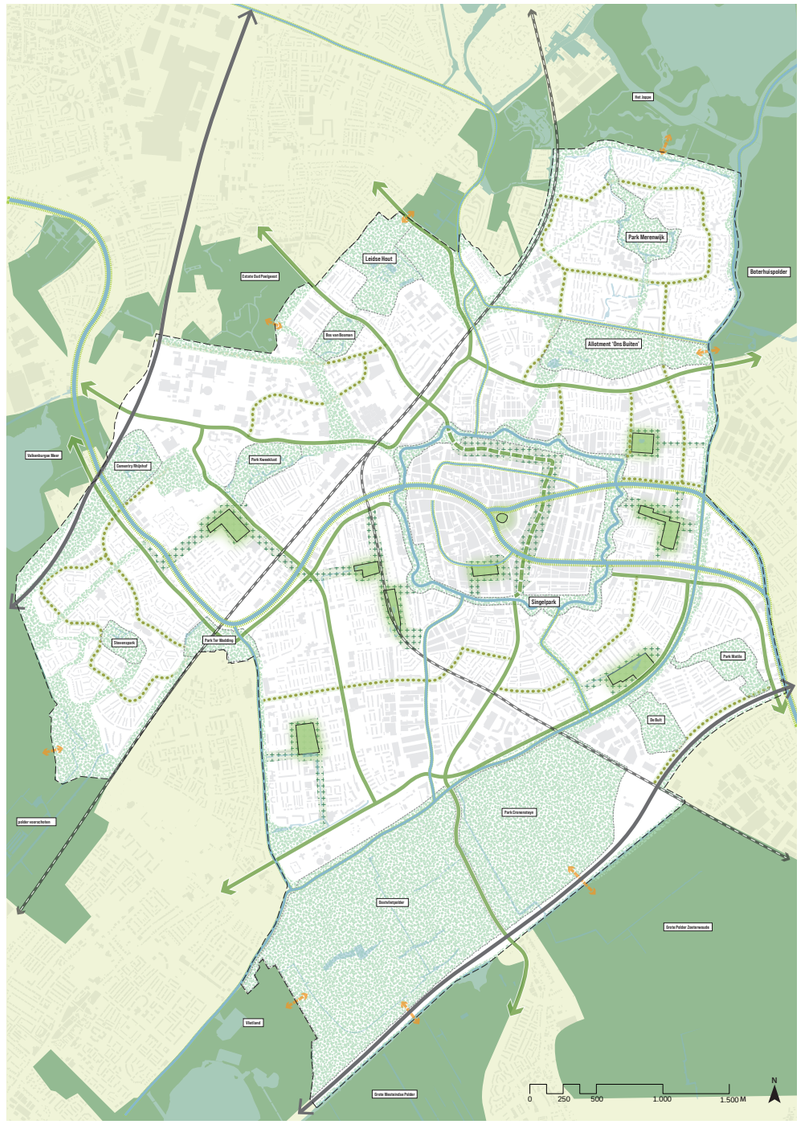
Abstract

Global biodiversity loss, driven by urban expansion and habitat deterioration, necessitates the expansion and improvement of habitats to support urban biodiversity. This thesis explores how a (L-)UGI design approach, guided by principles and guidelines, can enhance habitats in Leiden's UGI network.

Three habitats (shrub and border vegetation, herbaceous grassland, water and riparian areas) were targeted, each associated with an indicator species. An 11-principle framework for L-UGI design in Western-European cities was developed through a literature study. Analyzing the municipality's habitat policies provided insights for Leiden's specific needs.

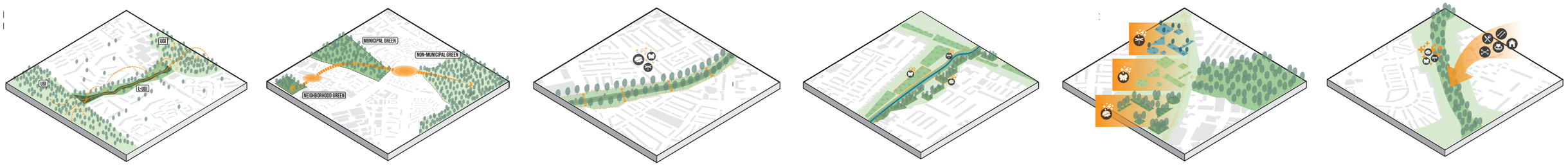
Blending principles and policy insights yielded a customized L-UGI design for Leiden, refined through expert input. This resulted in both urban-scale UGI and site-scale L-UGI plans, implementing eight design principles and 14 guidelines.

In summary, this thesis underscores the importance of a (L-) UGI design approach in mitigating habitat loss and urban biodiversity decline. It demonstrates its effectiveness in enhancing urban habitats like Leiden, particularly during times of dwindling suitable habitats



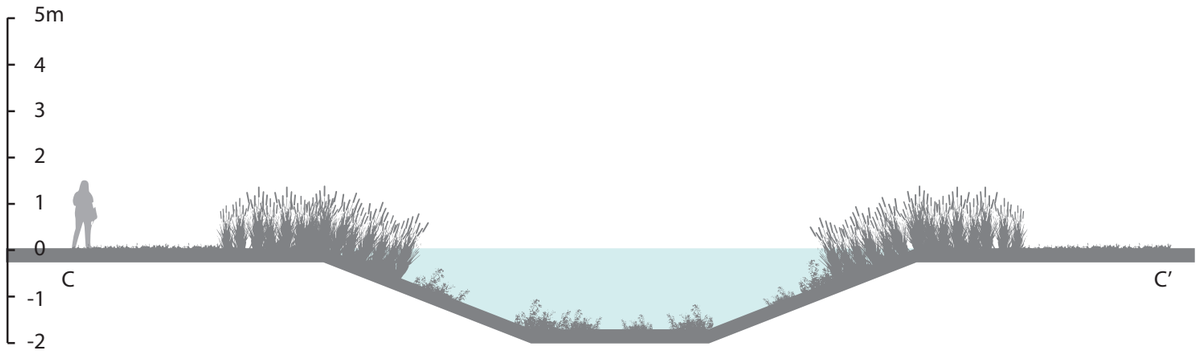
Final urban-scale design: Urban Green Infrastructure Plan for the municipality of Leiden.

Final site-scale design: Linear Urban Green Infrastructure Plan: Valkenpad Connection.



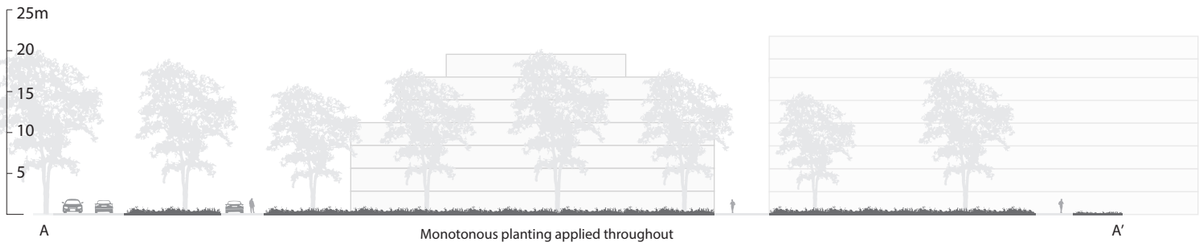
Design principles, from left to right: connectivity, multiscale, green-gray integration, multifunctionality, diversity and habitat quality.

Current situation section C



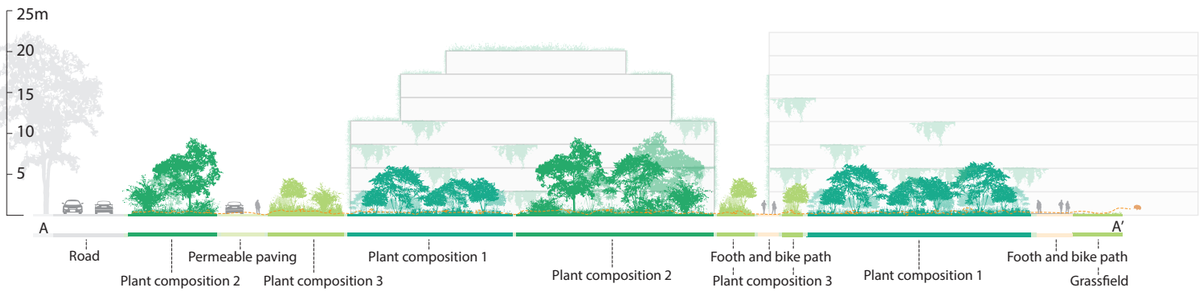
Little diversity and unfavorable slope

Current situation Section A



Monotonous planting applied throughout

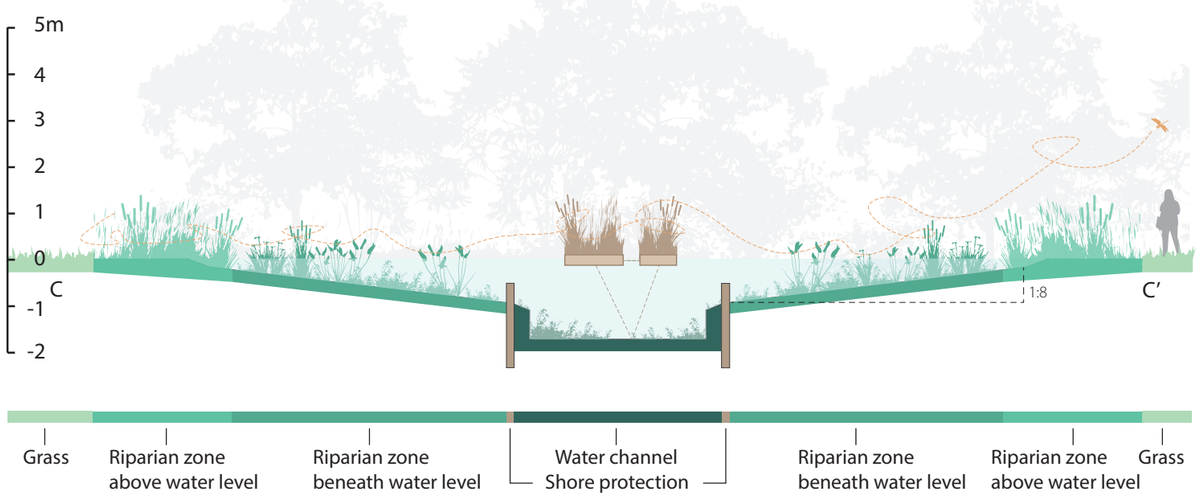
Proposed situation section A



Proposed situation section A: implementation of design principles and guidelines

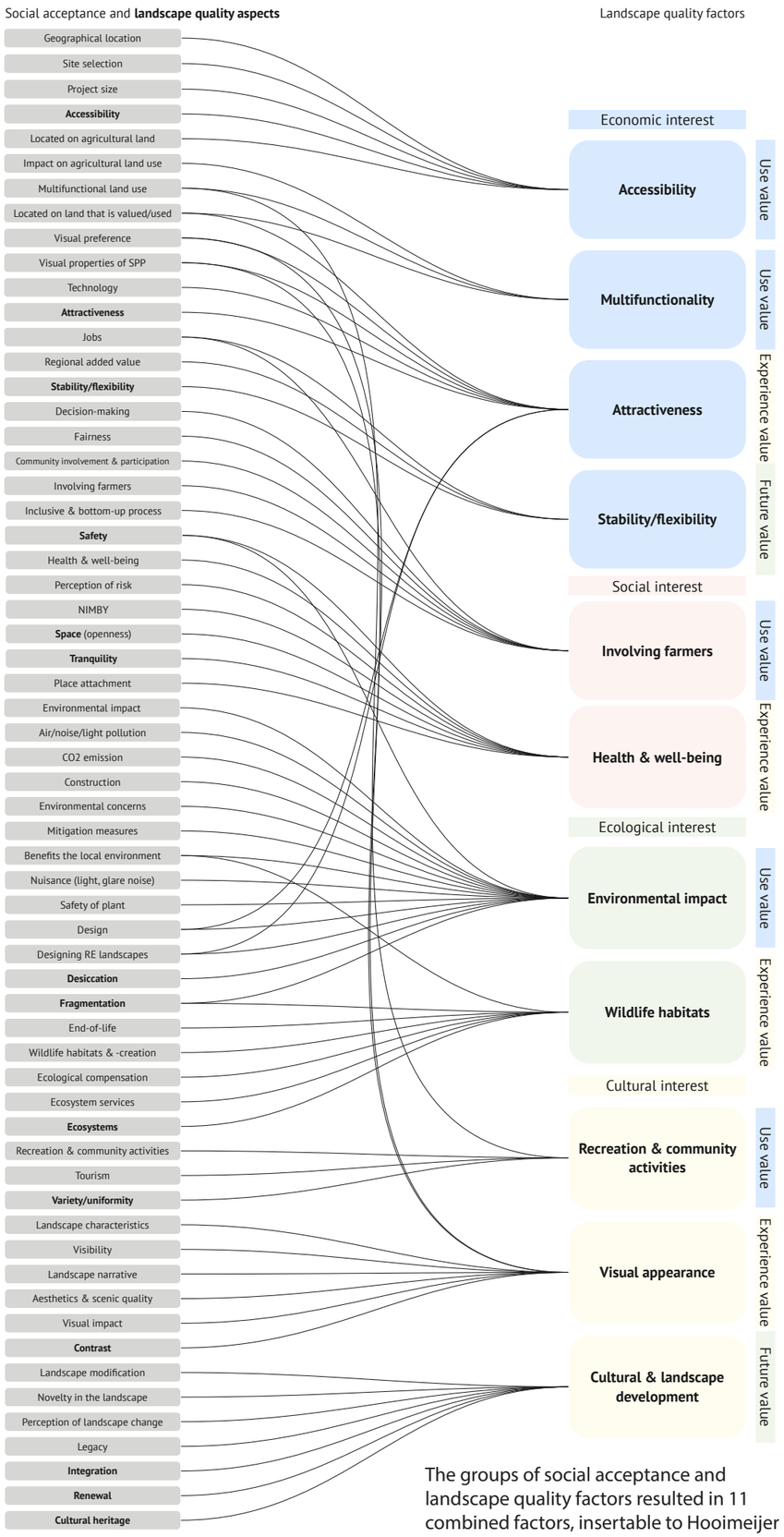
Shrub and woodland habitat for indicator species Hedgehog

Proposed situation section C

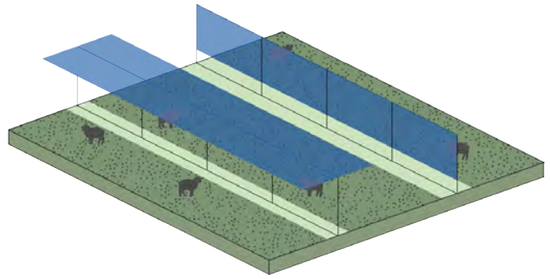


Proposed situation Section B: implementation of design principles and guidelines

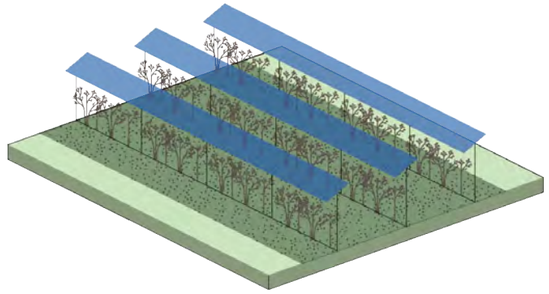
Riparian habitat for indicator species Hairy dragonfly



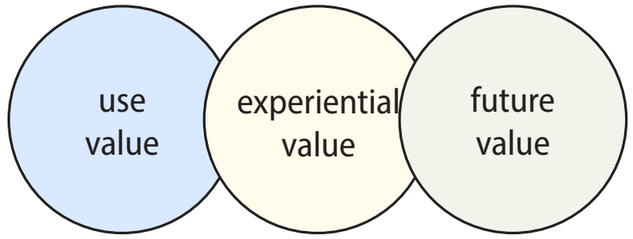
The groups of social acceptance and landscape quality factors resulted in 11 combined factors, insertable to Hooimeijer et al.'s (2001) analytical framework



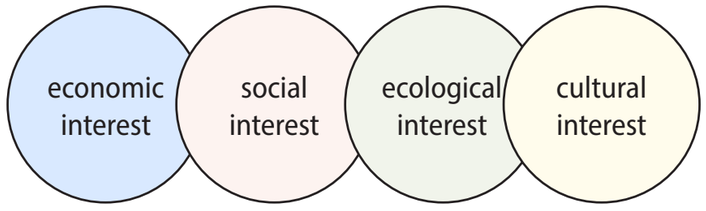
Interspace AV system, single-axis tracking or fixed vertical bifacial modules



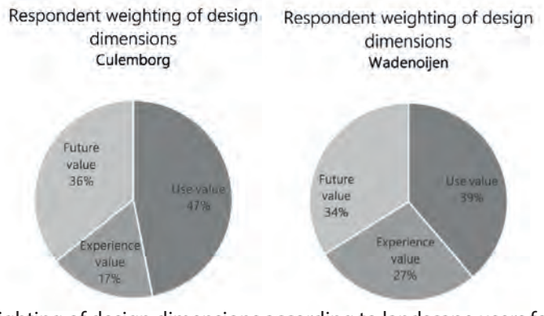
Overhead AV system with single-axis tracking modules



Three design dimensions of multifunctional landscapes according to Hooimeijer et al. (2001)



Four societal interests of multifunctional landscapes according to Hooimeijer et al. (2001)



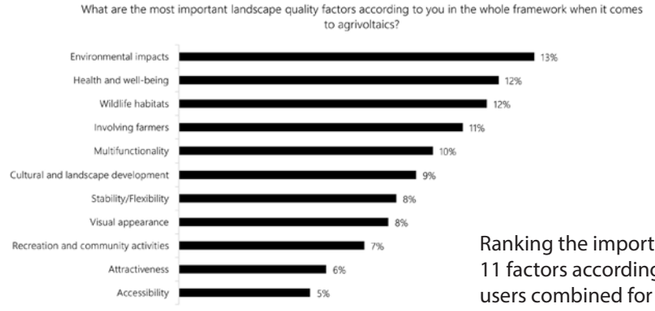
The weighting of design dimensions according to landscape users for both cases

Kitti Biró-Varga
Name supervisors:
dr. ing. S. (Sven) Stremke MA
I (Igor) Sirnik PhD MSc

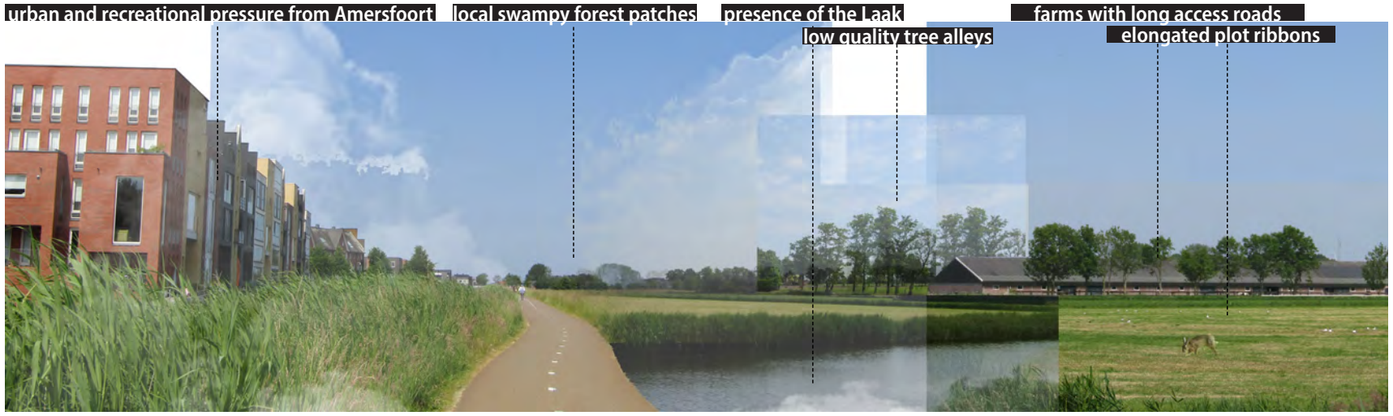
Experiencing agrivoltaics:
research and design through a landscape and social lens
Gelderland, NL

Abstract

As renewable energy adoption accelerates, solar power plants rapidly occupy farmlands. Agrivoltaic (AV) systems, combining crop cultivation and electricity production, offer a solution to the competing land use demands of energy generation and food production. Yet, the implementation of agrivoltaic power plants (AVPPs) may impact landscape quality, and concern residents and landscape users. The research examines how two AV system types affect landscape quality and how people perceive these transformed landscapes. Landscape quality is assessed in a survey with landscape users from Culemborg and Wadenoijen, Netherlands, to compare their landscape experience before and after the construction of AVPPs.
The design thesis aims to develop guidelines for vertical interspace AVPPs in Gelderland's peat reclamation landscapes to enhance landscape quality. Survey results indicate decreased experiential value of landscapes after the introduction of AVPPs. Although respondents support farmers' involvement in the energy transition and the multifunctionality of agrivoltaics, they express concerns about the impacts on wildlife and landscape attractiveness. These perceptions guide the development of landscape and site scale design considerations. To translate considerations into guidelines, photorealistic visualisations of sites with potential vertical interspace AV systems are assessed by peers and professionals from diverse fields. A landscape design in Nijkerk further informs final design guidelines for landscape-inclusive vertical interspace AVPPs in peat reclamations.

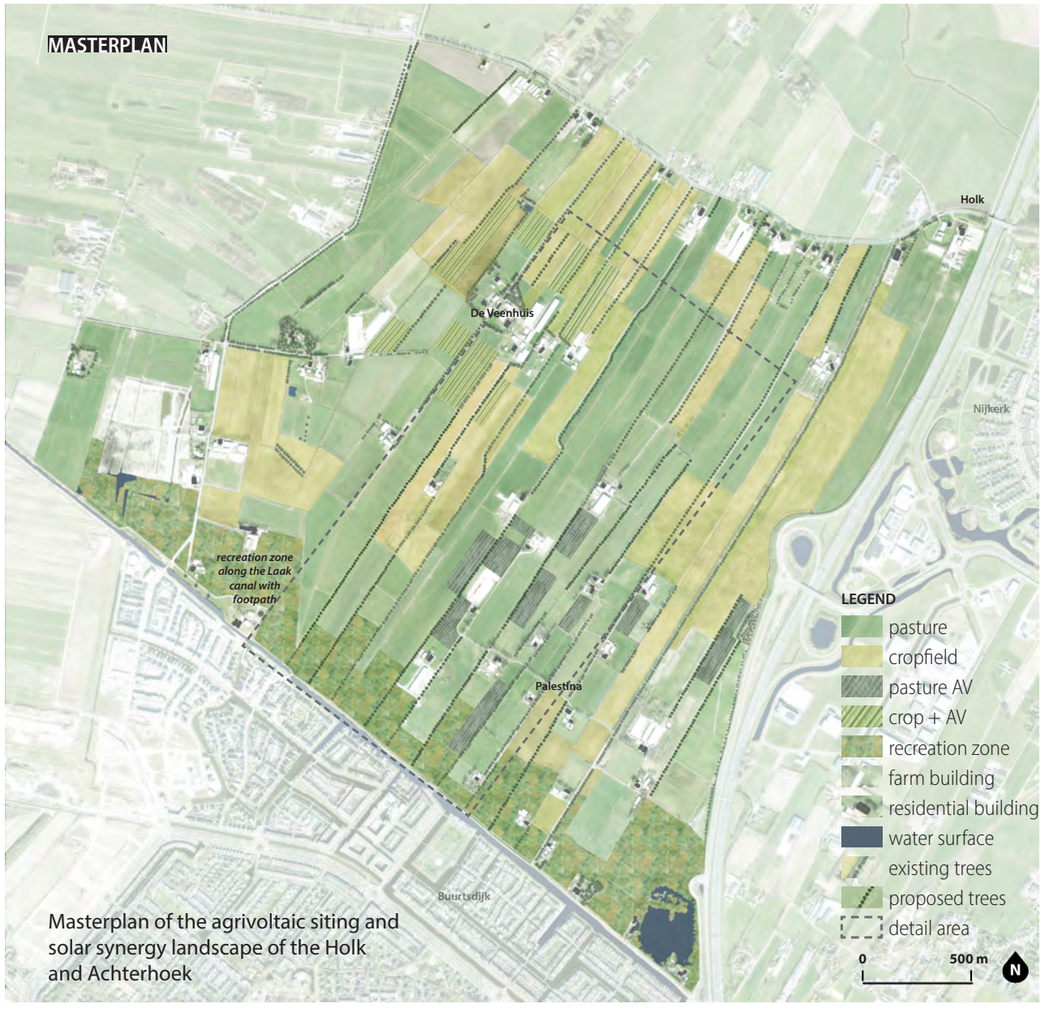


Ranking the importance of the 11 factors according to landscape users combined for both cases (n=62)

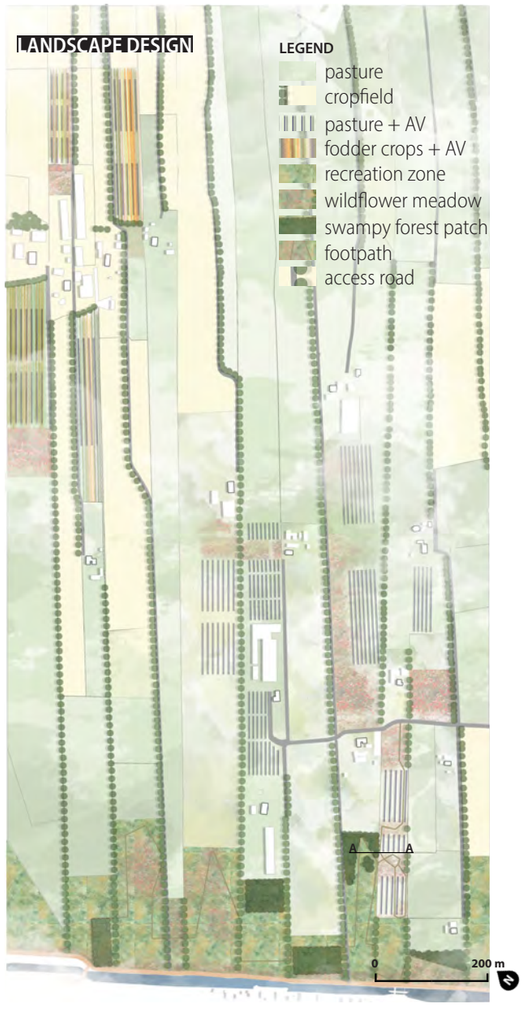


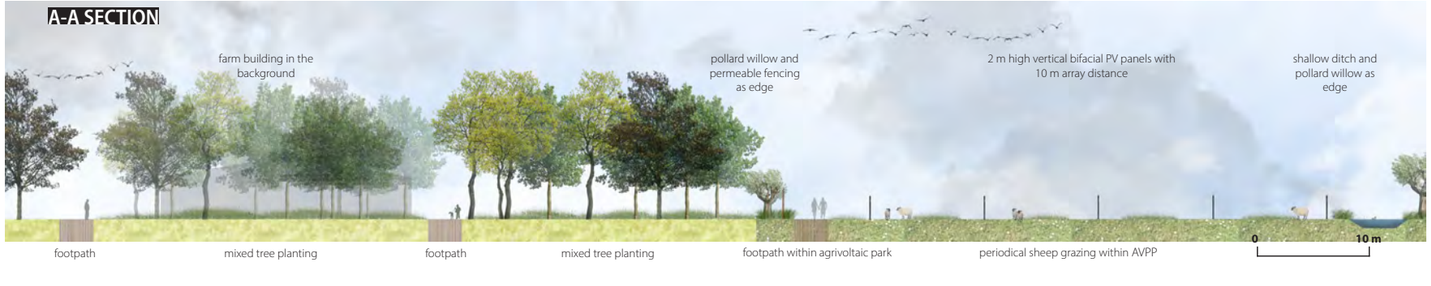
Impression of landscape elements and landscape quality in the peat reclamation landscape of Achterhoek (Nijkerk municipality)

Landscape design illustrating both types of agrivoltaic combinations and the recreational zone along the Laak canal



Masterplan of the agrivoltaic siting and solar synergy landscape of the Holk and Achterhoek

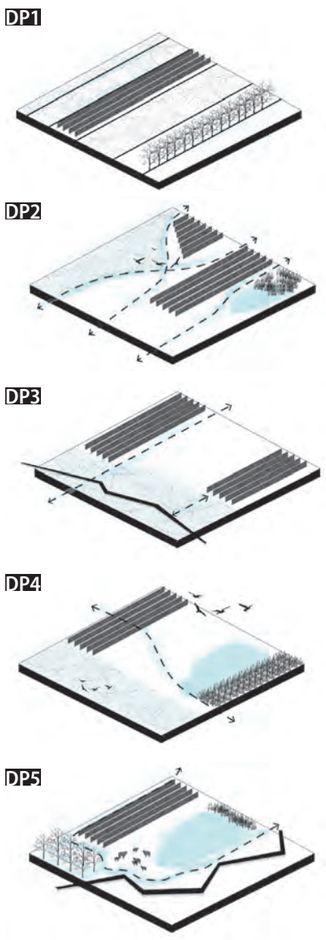




The connection between the planted recreation zone and the accessible vertical AVPP.

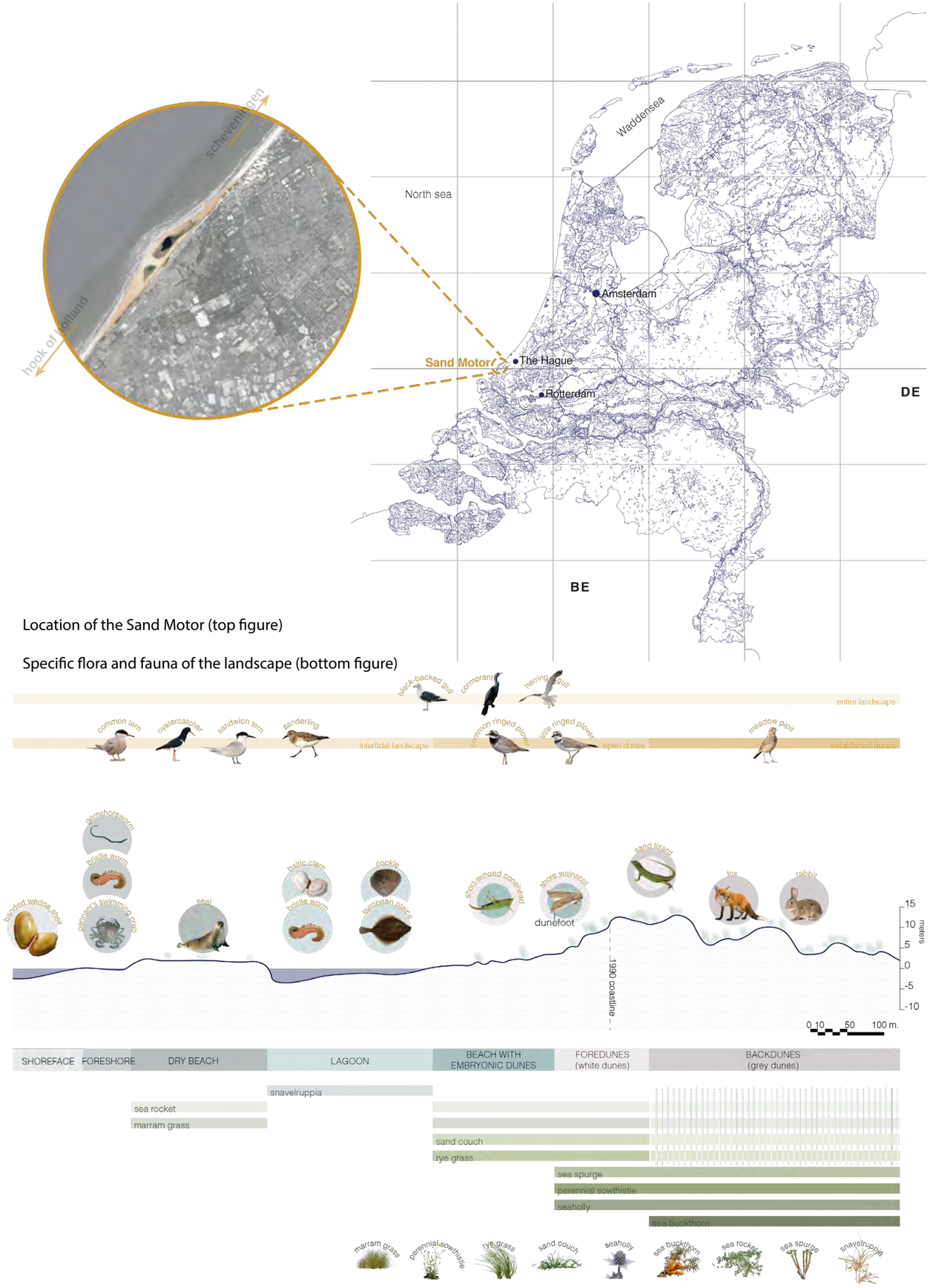
Visualisations of the site-specific design guidelines, that effectively improved landscape quality according to the online assessment:

1 - From the front side of the PV panels, plant tree alleys or hedges to shield
2 - From the lateral side of the AVPP, shielding is possible by framing watercourses with wet and flower-rich grasslands
3 - Design the edges of the AVPP so as to provide habitats for local flora and fauna
4 - From the lateral side of the AVPP, create ecological zones to increase biodiversity
5 - Avoid solid fences and promote accessibility and park-like functions of AVPP



Final design principles for vertical interspace AVPP in peat reclamation landscapes in Gelderland:

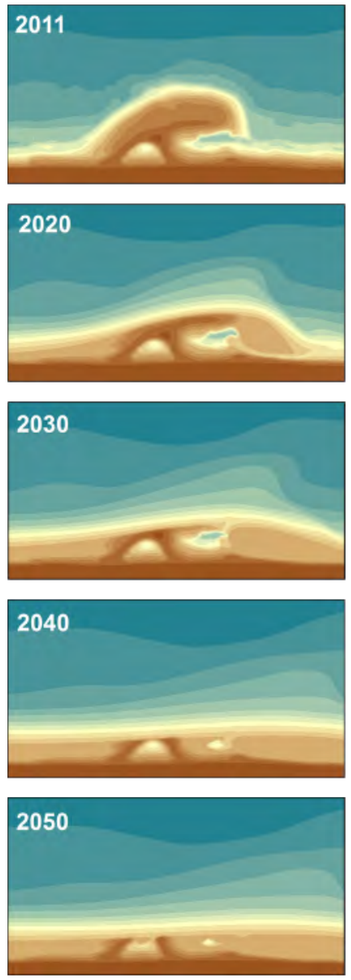
DP1 - Preserve, restore and improve landscape qualities, such as historic or valuable landscape structures both surrounding and within the parcel.
DP2 - Improve the experiential value of landscapes with AVPPs, especially aspects such as attractiveness, health and well-being, wildlife habitats and visual appearance.
DP3 - Aim for sufficient physical distance between the landscape users and the AVPP to preserve sight lines and the openness of the landscape.
DP4 - Promote pollination and provide habitat for local fauna. Create space for ecological areas and wildlife habitats.
DP5 - Make the AVPP accessible and experienceable. Alternatively, allow views over the AVPP.



Location of the Sand Motor (top figure)

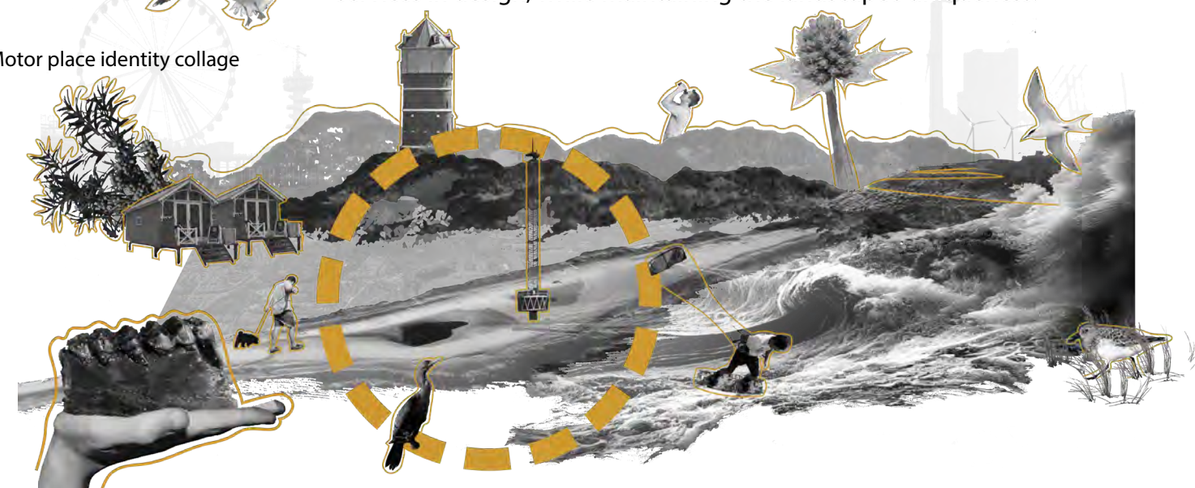
Specific flora and fauna of the landscape (bottom figure)

Morphological change of the Sand Motor



Morphological change of the Sand Motor (figure above)

Sand Motor place identity collage

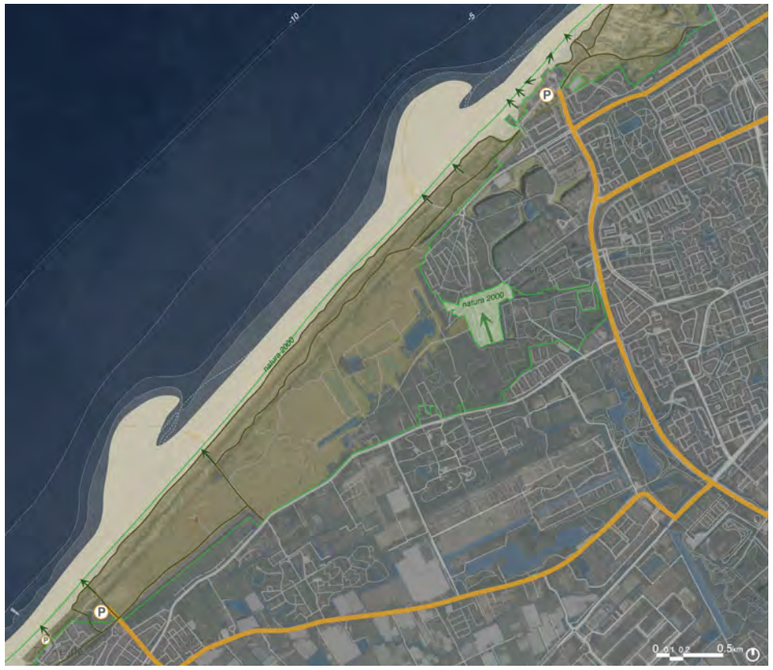


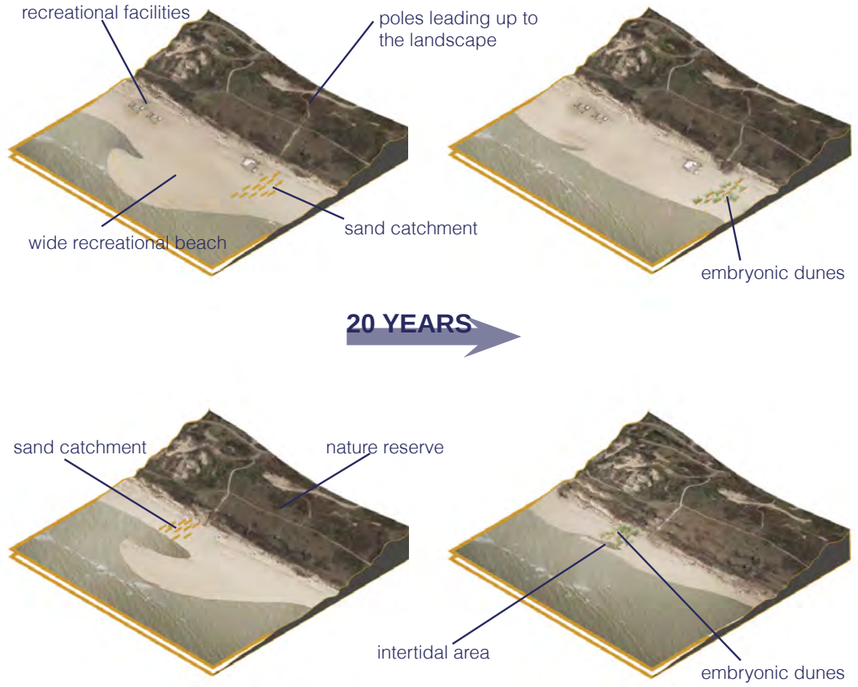
Sarah van Kooten
Name supervisor: dr. Yuting Tai

Reinforcement
A discovery of the Sand Motor's place identity

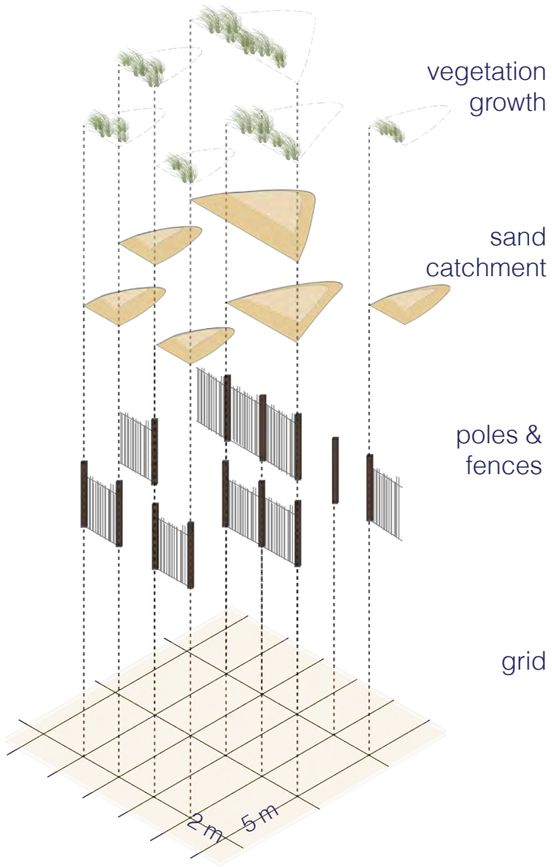
The Sand Motor, NL

Abstract
Dutch coastal landscapes are subject to increasing environmental and societal pressure. On the seaside the landscape is subject to climate change: rising sea levels and coastal erosion. On the landward site the landscape is subject to recreational pressure, and the demands of mass tourism that result in a loss of identity. The dunes that provide a natural sea defence system demand continuous measures to maintain its defensive properties, usually achieved through small sand nourishment. Challenging the status quo of coastal management resulted in the nature-based solution of the Sand Motor. The project is a mega-nourishment and characterized by its ecosystem services of flood safety, nature development and creation of recreational opportunities. While reinforcing the coast, the nature-based character of the project offers the opportunity to tackle the loss of identity as a consequence of mass tourism. Given that the landscape's morphology is shaped by wind, tides and waves.
The objective of this thesis is to discover the current place identity of the Sand Motor as experienced by its users and to express that spatially. Furthermore, this thesis aims to explore what the future of the Sand Motor's coastline could look like, thereby challenging the idea of holding on to the current coastal policy to keep the coastline in its 1990 position. For this, design guidelines are developed that target place identity, nature development and coastal defence. These guidelines are used to develop different coastal alternatives that bring out spatial interventions as an expression of these guidelines. Consequently, incorporating the guidelines and the interventions creates a landscape that accounts for place identity, nature development and recreational opportunities while proposing a new design for coastal defence. Thereby presenting place identity as a tool that shows how to incorporate different ecosystem services in design, while maintaining the landscape's uniqueness.





Redesign of the Sand Motor with two peninsulas focussing on recreation (north) and nature development (south) that enclose a quiet natural beach landscape through zoning with dunes. This is achieved through a modular fence system (figures below) that accelerates embryonic dune development and functions as a border between the different landscape zones.



Morphological change of the different peninsulas and the embryonic dune development (top figures). The fence structure functions as a direct zoning border, and creates indirect zoning by attracting visitors as landart structure. The poles that reach across the peninsulas create reference points to record the landscape changes and increase visitor awareness.

The bird watching platform (figure below) creates an additional landscape experience from a new perspective besides facilitating the many wildlife observers in the landscape.