

**MSc THESES
OVERVIEW
LANDSCAPE
ARCHITECTURE
GROUP**



September 2016 - August 2017

MSc THESES
OVERVIEW
LANDSCAPE
ARCHITECTURE
GROUP

see a list of all MSc theses projects online
[www.wur.nl / lar](http://www.wur.nl/lar)
> Education > MSc Theses titles

September 2016 - August 2017

- Vera Hetem
- Xiaoya Ye
- Vincent Peters
- Michelle Leemkuil
- Rosanne Schrijver
- Ties Blauw
- Anna-Jet Leijenaar
- Jolanda de Jong
- Veronika Kunclova
- David Huijben
- Rosanne Weijers
- Yu Rujia
- Carlo Leonardi
- Xiao Chen
- Zhonglin Gao
- Antonia Cangosz
- Changsoon Choi
- Federico Lia
- Melvin Creemers
- Xiangjun Chen
- Thijs Broers
- Luc Jenniskens
- Josje Hoefsloot
- Xiaowan Zhang
- Katarzyna Starzycka
- Rachel Backbier
- Arjen venema
- Yunjie Yang
- Linde Elsinga
- Frederik Gotemans
- **MISSING**
- Ruben Isarin
- Strijp-S revived. A landscape design for public green space that integrates wastewater treatment.
- Refugee Meets Local. Enhancing a sense of belonging in public space by ubicomp techniques.
- Recycle energy landscape. The natural gas production landscape of Groningen.
- Culture as base for landscape design. The case of an earthquake-safe community centre for the Nepali mountain village Ashapuri, Nepal
- Future of the place. Place of the future. The niche of the landscape architect within transformations of industrial heritage sites in times of uncertainties.
- Visualizing energy flows in urban microclimates.
- Embankments 2.0 as part of the transition to a robust watersystem. Perspective for the Frisian Peat Area.
- Physical modelling in Landscape Architecture. Exploring a design tool for the explorative phases in dynamic landscape design.
- Reconnecting with nature through multi-sensuous experiences in national parks. Designing a multi-sensory nature experience trail in the national park Utrechtse Heuvelrug.
- Transform Weather for Cycling. Solutions for thermally comfortable cycling.
- Finding Elusive Quietness. Building tranquil communities in the outskirts of Frankfurt am Main, Germany.
- Childhood and Wildness. Exploring the way to combine wildness with playfulness for children in their immediate living environment.
- Experiencing the post-mining wonder. Reclaiming a new purpose for post-mining landscapes in the Quadrilatero Ferrifero (MG), Brazil.
- Water Machine Networking. Designing a future-proof water network for integral urban development in Sint_Oedenrode, the Netherlands.
- Truly Cooling Water Bodies. Lowering Urban Heat-Stress.
- Heat Strikes on Tourism. A thermally comfortable tourist route in Thessaloniki, Greece.
- The Blue Heart. A seascape approach to synergetic integration of climate actions in the North Sea.
- Performance and Appearance of business sites through the ecosystem services. A design in the Italian Alps.
- Zonnegroeve Mourik. Designing a socially supported sustainable solar energy landscape in Brunssum, Parkstad Limburg.
- Urban Energy Landscape. Design approach and implementation for urban sustainable energy landscapes (SEL) of the middle port area in Amsterdam municipality.
- On That Bicycle. Developing Aesthetic Cycling Infrastructure to improve cycling experience.
- Beyond Ecotourism. Designing a synergy of tourism development and ecological reinforcement in Lac, Bonaire.
- A Landscape framework for informal settlements to facilitate urban metabolism in Tete, Mozambique.
- Adapt Green-Blue Space. Implementing the Sustainable urban Drainage System in Rotterdam city context.
- Thermally comfortable running routes in Amsterdam.
- Experiencing Aachen's hidden streams. A research and design(ing) into the visual experiences of three valleys in and around Aachen, Germany.
- Designing slow motion woodlands. Making flood reducing woodlands more culturally adopted by incorporating productive values and experiential qualities in the Upper Calder Valley, UK.
- From hollowing area to livable rural area. Developing agritourism from a perspective of landscape design as a catalyst for sustainable rural development. Shenyang, China.
- Seducing the Urban Visitor. A design study into behavior and preferences of tourists in Amsterdam.
- Bingham Canyon National Park. Reclaiming the Bingham Canyon Mine by transforming it into a new generation of National Park.
- The Essence of the Grebbedijk. A phenomenological approach to designing delta-dikes.



Problem 1: decreasing quality and quantity of public green spaces



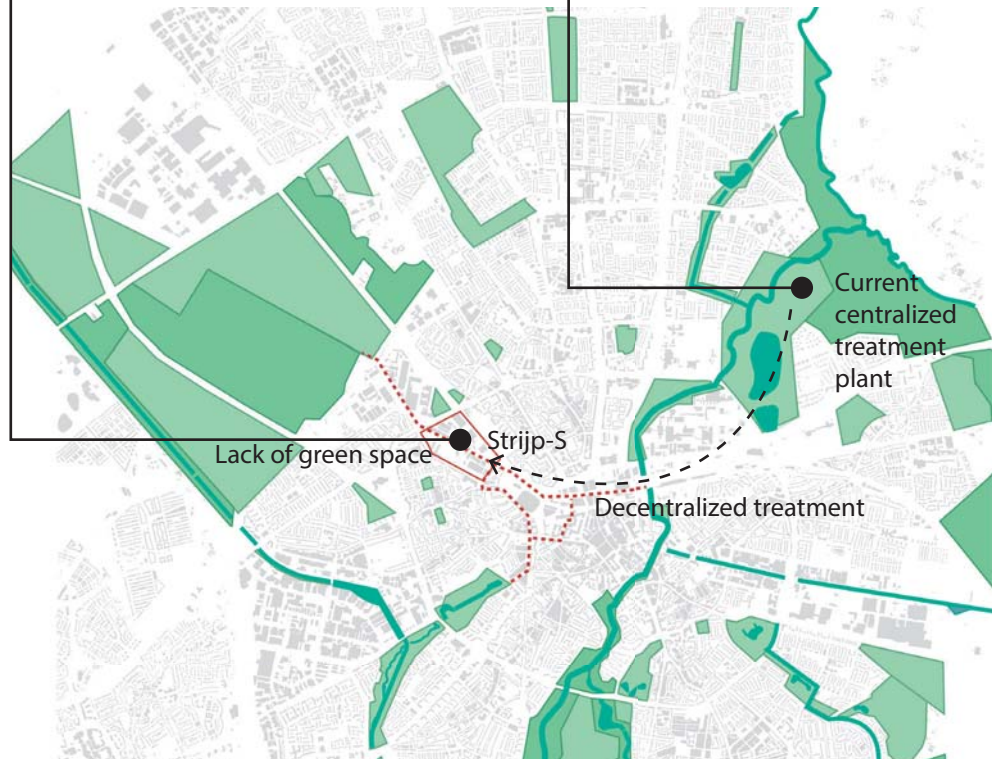
Problem 2: large unsustainable centralized wastewater treatment plants



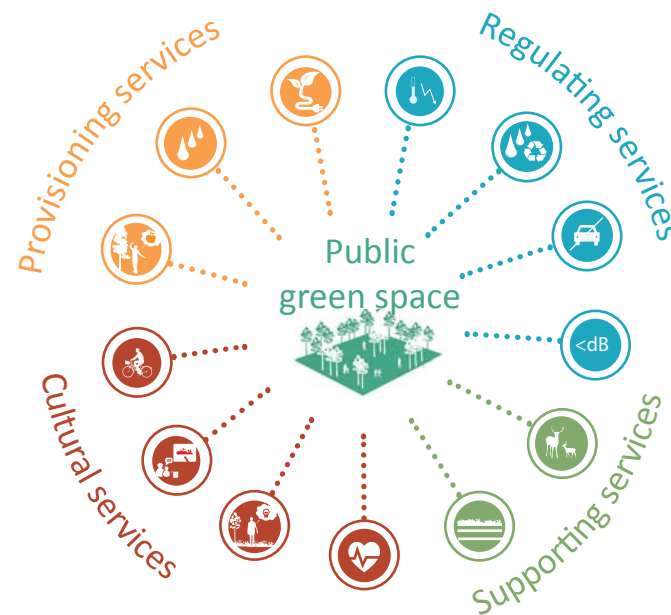
Objective: integrating a decentralized wastewater treatment plant in public green space



Approach: transdisciplinary approach with stakeholders

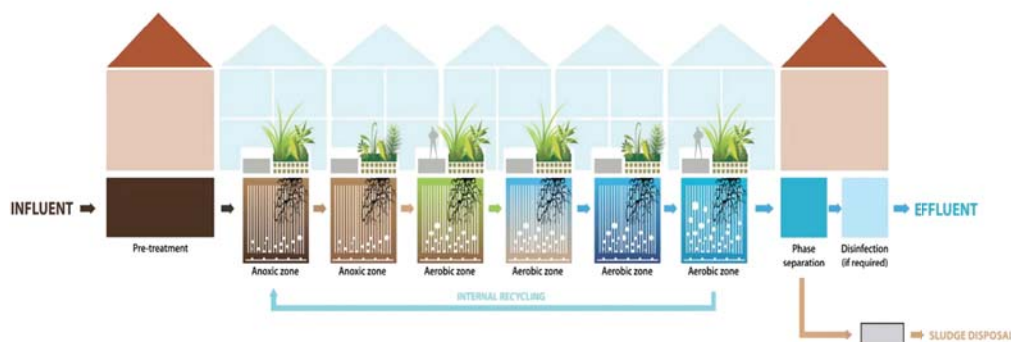


This figure shows Eindhoven including Strijp-S. Currently this area lacks green space but this could be enhanced with the integration of a decentralized treatment plant.



In order to develop high quality green spaces, ecosystem services should be enhanced in public green space. This is a selection of the relevant ones for the urban context.

Concept



The most suitable treatment type is the Biomakery treatment plant. This technique uses tropical plants to purify the water and has a small footprint suitable for the urban context.



The Biomakery wastewater treatment plant has the character of a botanical garden or greenhouse, which could attract visitors and recreants.

Vera Hetem

Wiebke Klemm, Katarzyna Kujawa (Environmental Technology, WUR)

Strijp-S revived

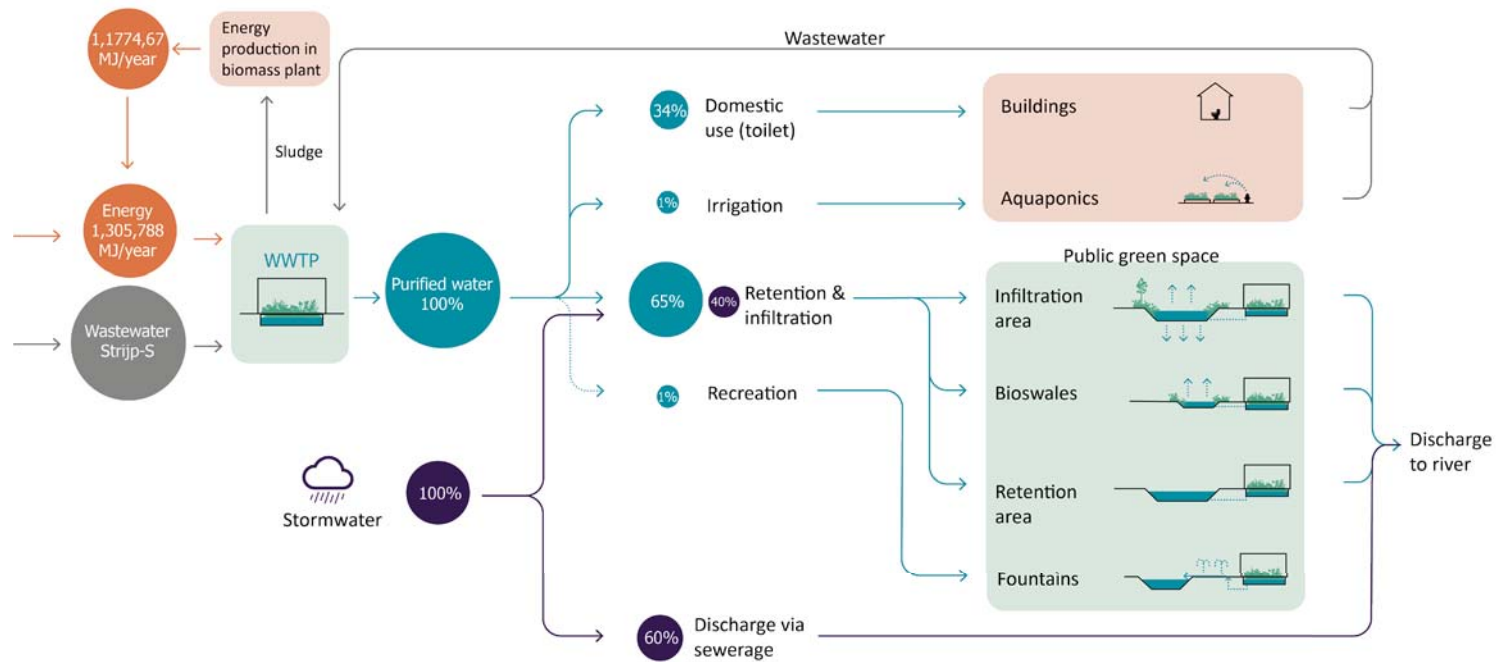
A landscape design for public green space that integrates wastewater treatment

Abstract

Urbanization causes two problems that are addressed in this study. On the one hand it results in a reduction of public green spaces in cities although the demand for public green spaces keeps increasing and cities depend on green spaces to maintain long-term conditions for life. On the other hand urbanization results in an unsustainable wastewater infrastructure in the city. Generally wastewater is treated in centralized wastewater treatment plants, yet there are alternative sustainable decentralized treatment solutions available that could increase the sustainability of the wastewater infrastructure in the city. This research aims on addressing both problems by finding a design solution for the integration of a decentralized wastewater treatment plant in public green space.

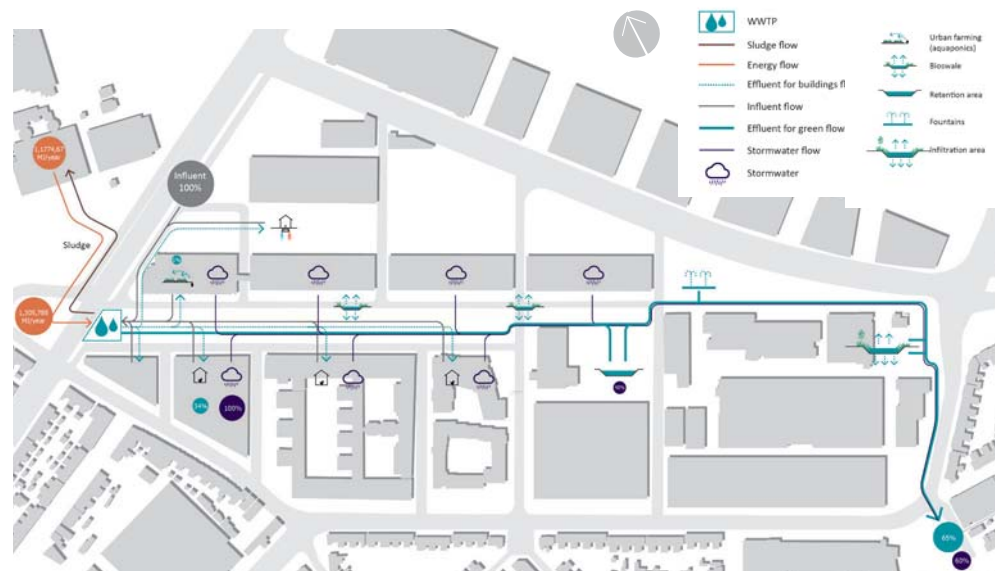
A model study for the research area Strijp-S in Eindhoven resulted in different design options for the integration of a wastewater treatment plant in public green space. Three different treatment types are tested in models to find the most suitable treatment technique to be integrated in public green space. These models are evaluated according to their ability to enhance the benefits of public green space, also known as ecosystem services. For a comprehensive evaluation, a group of stakeholders with expert knowledge were asked to fill in a survey on the most suitable wastewater treatment type. Moreover they were asked to evaluate the enhancement of ecosystem services during a workshop with a participatory approach.

The result is a stakeholder supported landscape design for Strijp-S that integrates a wastewater treatment plant in public green space. The main finding is that ecosystem services can be enhanced by reusing the purified water in bioswales, retention areas, infiltration areas and fountains.

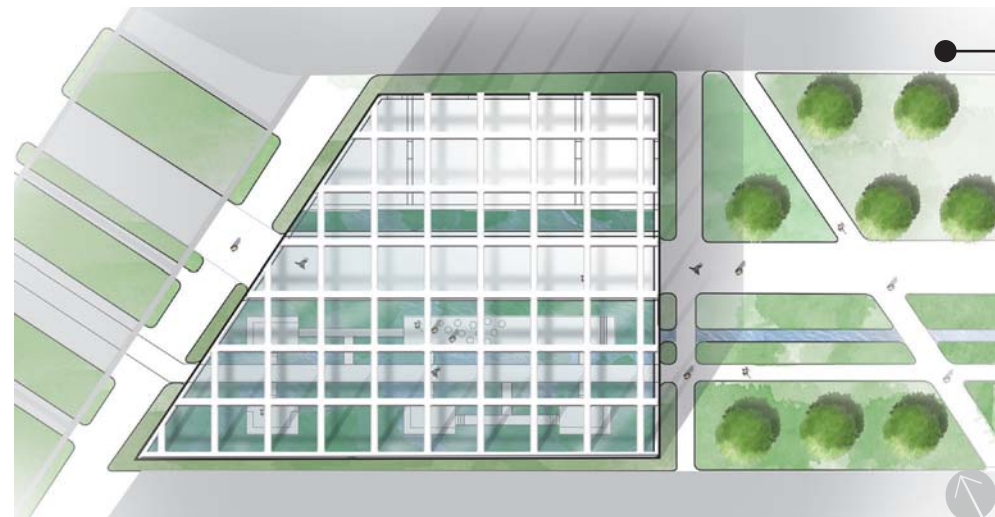
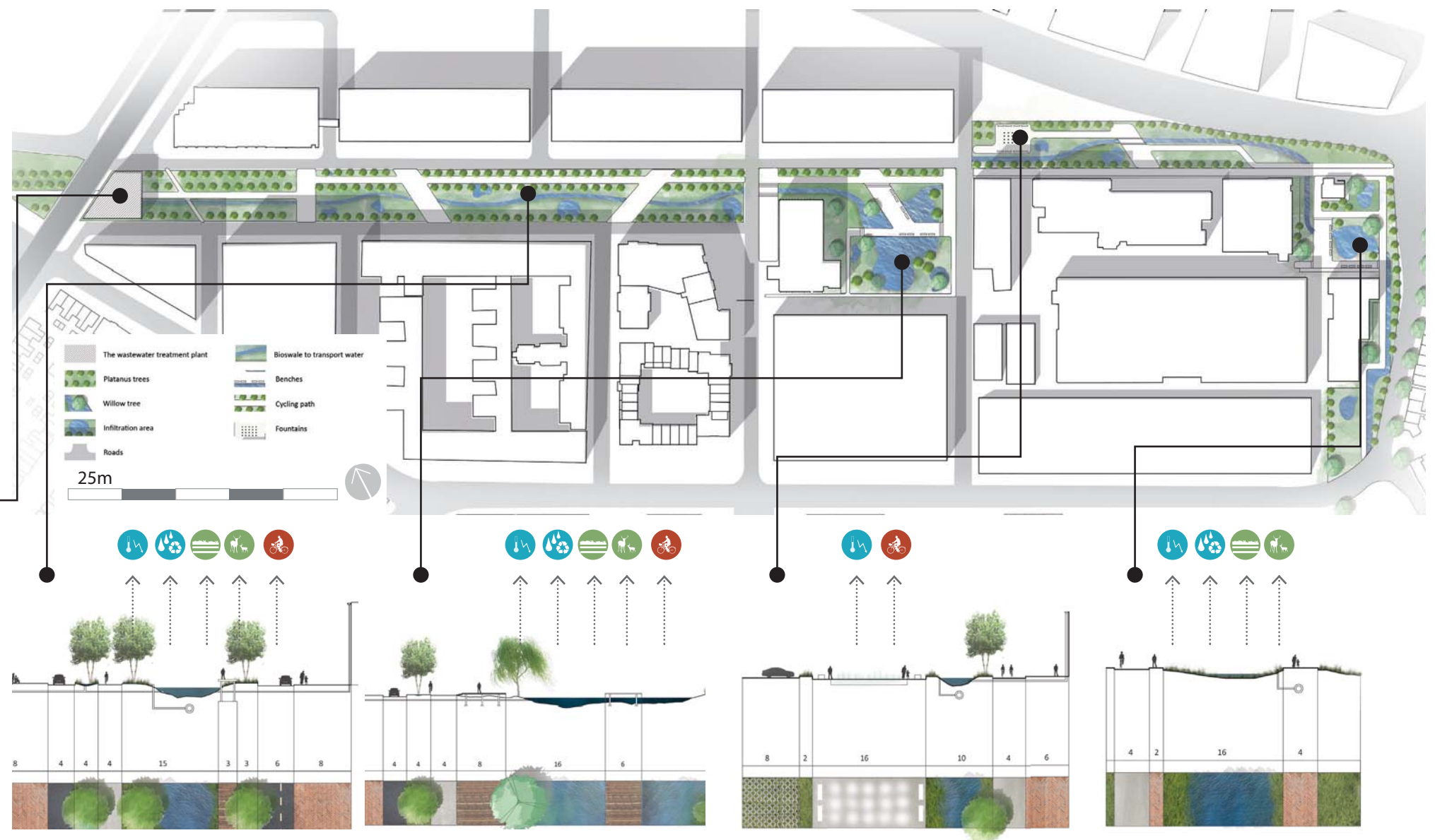


Purified water can be reused in public green space. This figure indicates the percentages of the resources and their reuse purposes.

Impression of the bioswale on Strijp-S, supplied with purified water from the wastewater treatment plant



The design is based on reusing the purified water in public green space. This figure shows in which ways it can be reused and on which location.



The wastewater treatment plant in the design is a transparent building that is accessible for visitors. It contains a private and a public area, and is divided by a cycling path.

Four principles to reuse the purified water are the result of this study. These are: a bioswale, retention area, fountains and infiltration area. All of them enhance ecosystem services in public green space.

Conclusion map:
This map indicates the conclusion of landscape analysis. The most important characteristics are written in biggest font sizes.



Programming map:
This map is the design justification based on the conclusion map. These important aspects in conclusion map are carefully translated into design languages.



Name student: Xiaoya Ye
Name supervisor: Ir. Paul Roncken

Title thesis project
REFUGEE MEETS LOCAL
--- Enhancing a sense of belonging in public space by ubicomp techniques

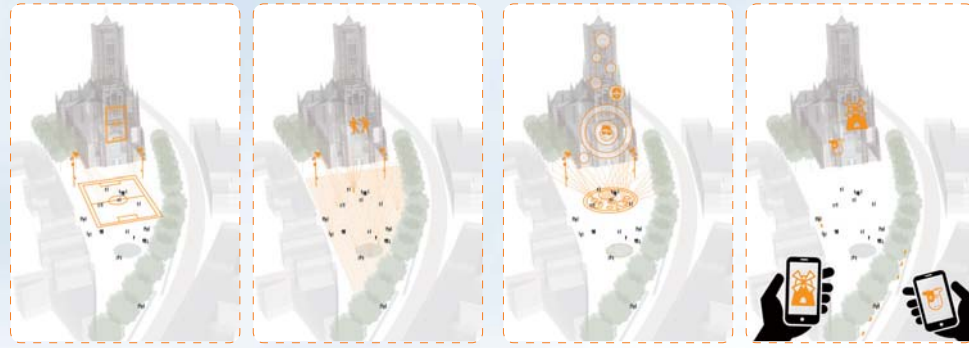
Abstract
Recently, the exceptionally big influx of refugees increases social tension between the host society and newly-arrived refugees. In the Netherlands, Dutch people are deeply concerned about the coming of refugees, whereas refugees feel nothing but boredom and desire to belong. Attempting to confront this social issue, the topic of this research is to explore how a refugee-friendly outdoor environment promote belongingness and how to create such an environment with the help of ubicomp. This is because ubiquitous computing(ubicomp) is effective in increasing the interactional opportunities among citizens regardless of ethnicity. The purpose is, with relative simple means, to enhance existing public space to promote belongingness of refugees, to build trust and bonds with local residents, to gain social support from host society, and to further contribute to the well-being of the local community. The finding is tested in the area of refugee reception center in the city of Arnhem. The research has three parts, a theoretical understanding of the aspects that contributes to refugee' belongingness, a general understanding of where both refugees and locals go and what activities they both do there, and an overview of ubicomp development in urban context in theory and in practice. Literature review, reference study, questionnaire and field study are four main methods used to conduct the research. Three types of activities enhanced by ubicomp intervention in three different ways are concluded. A toolkit aims at a wider context application is provided for further discussion.

Key words: refugee's belongingness, refugee-friendly outdoor environment, ubicomp, technology-mediated interaction

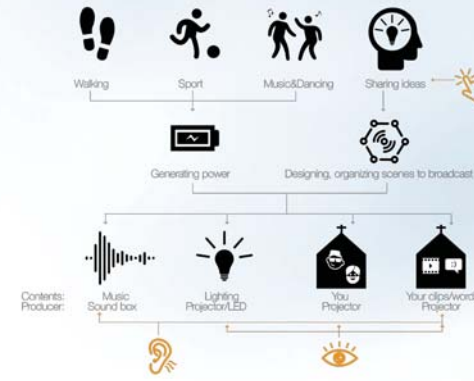


Design for normal days

Design concept



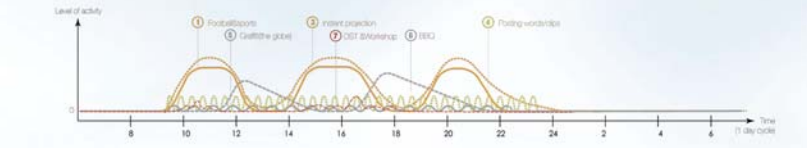
Technique design



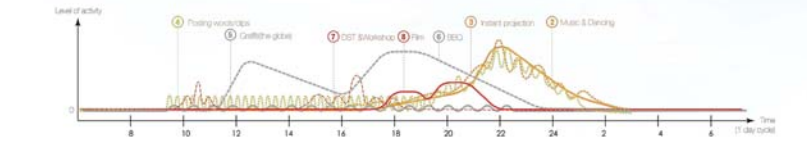
Impact



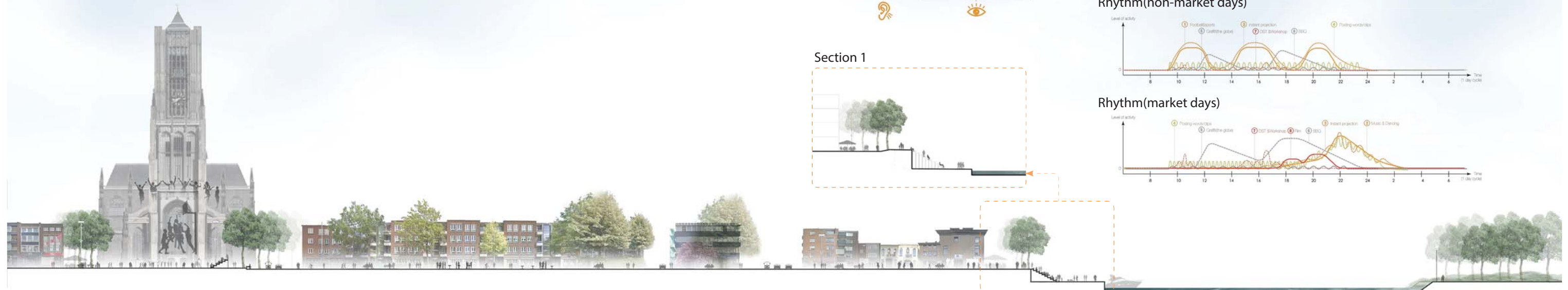
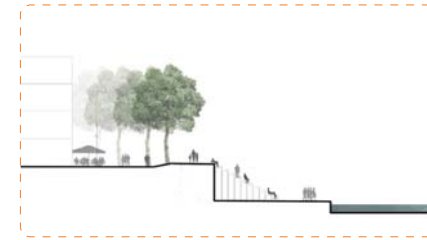
Rhythm(non-market days)



Rhythm(market days)



Section 1



Design for event days

Design concept



Technique design



Impact



Rhythm



Technique detail



Section 2



Collage



Vincent Peters

Name supervisors: S. Stremke

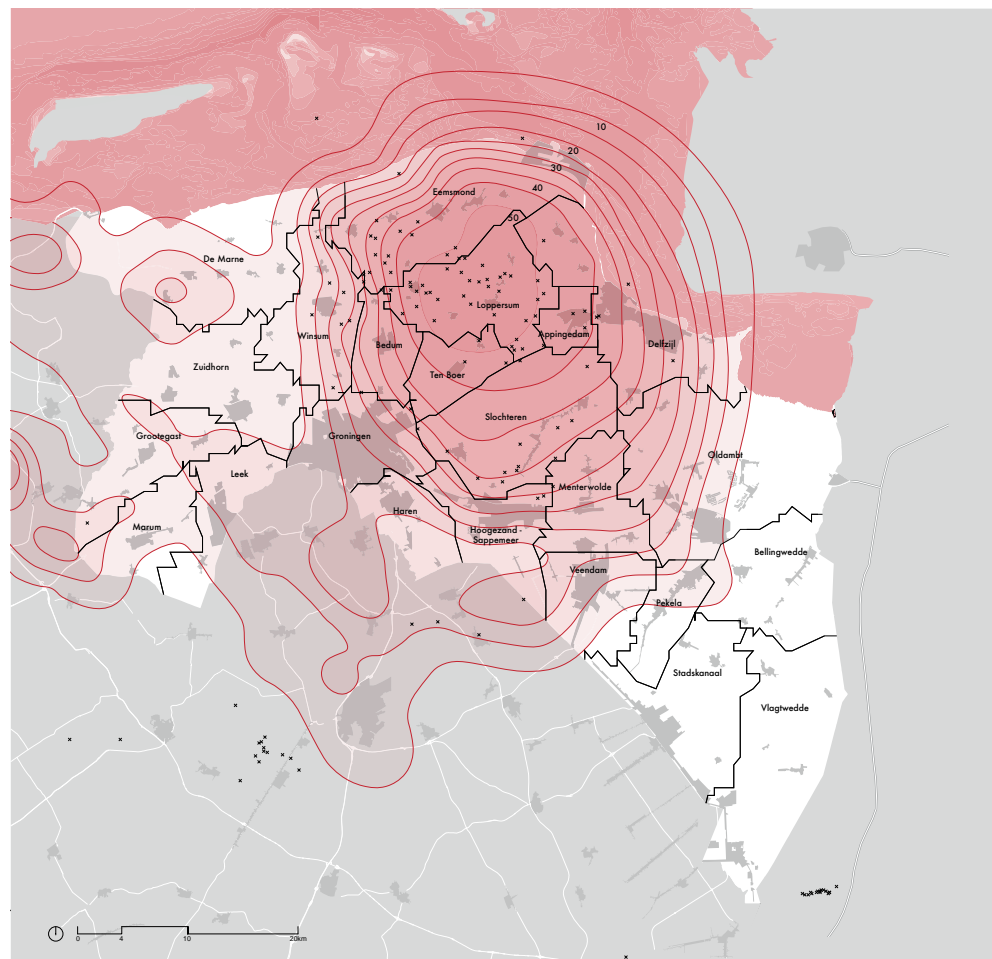
Recycle Energy Landscape

The natural gas production landscape of Groningen

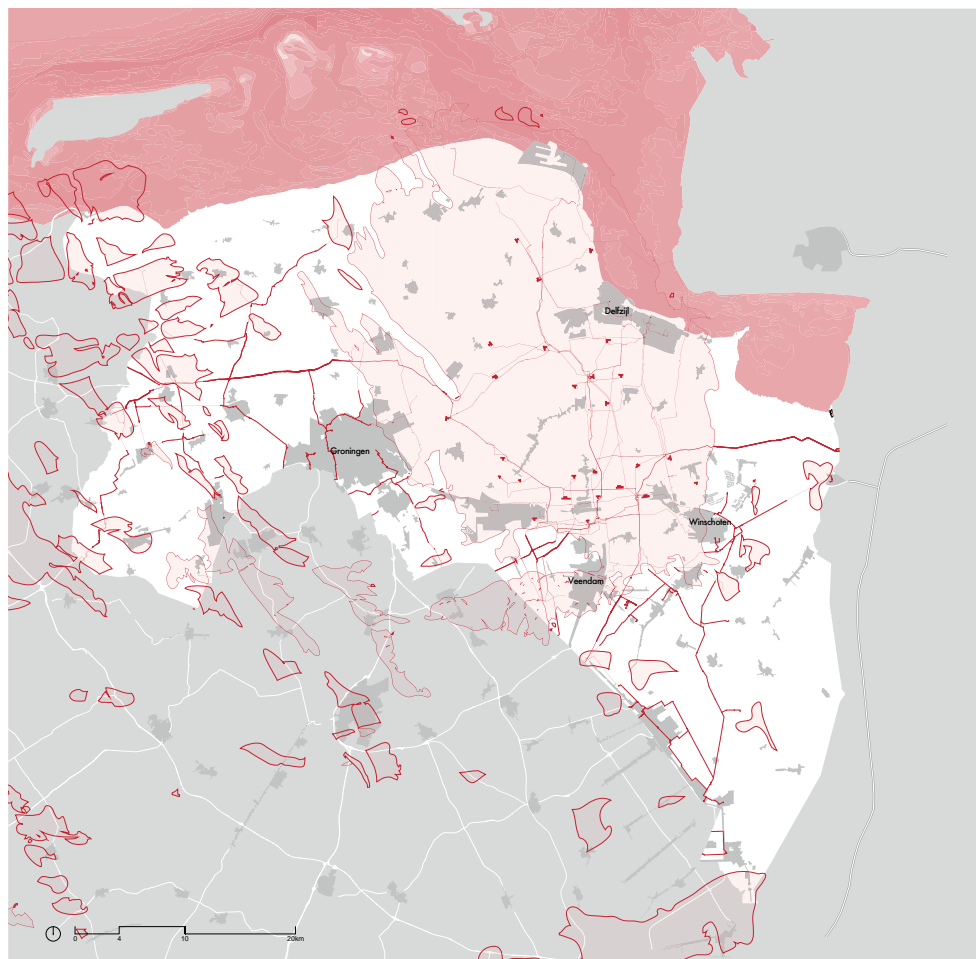
Abstract

The discovery of a large natural gas field in 1959 has made the Netherlands highly dependent on natural gas as an energy source. The extraction of natural gas does however cause soil subsidence and earthquakes, mostly in the province of Groningen. Furthermore, the consumption of natural gas contributes to climate change. This shows there is a need for a transition towards more sustainable energy sources. The reliance on a depleting fossil fuel also makes a change inevitable. A transition like this will be reflected in the landscape, as the provision of renewable energy is expected to occupy a substantial part of the physical environment. Energy transitions have happened before and have often been linear developments, ending in disrupted and abandoned landscapes. This thesis tends to find out how a transition towards renewable energy sources can be made while preventing the origination of abandoned landscapes.

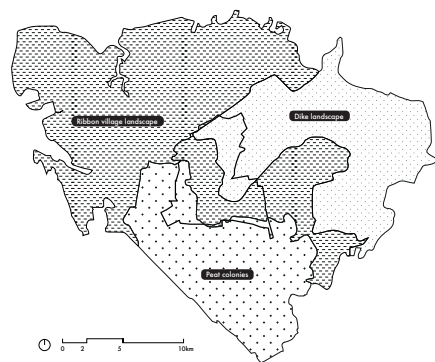
The main research question "How can the current natural gas production dominated energy landscape be recycled when production of natural gas diminishes in the near future?" is addressed in three parts. First a content analysis on the social and political aspects of the natural gas extraction was conducted along with a physical analysis. A deep understanding of the life-cycle of the natural gas production landscape was derived from this. Second, the municipality of Menterwolde was analysed. Future developments and trends were identified. Furthermore, the future energy demand was estimated and the potentials for renewable energy were mapped. This resulted in designs for sustainable energy landscapes based on landscape types identified. Third, a design for a natural gas extraction facility was made. The concept of recycling was applied in order to capture the history of the site. Artefacts of the natural gas extraction proved to have cultural value in the design.



Soil subsidence and earthquakes with a magnitude higher than 2.0 on the Richter scale

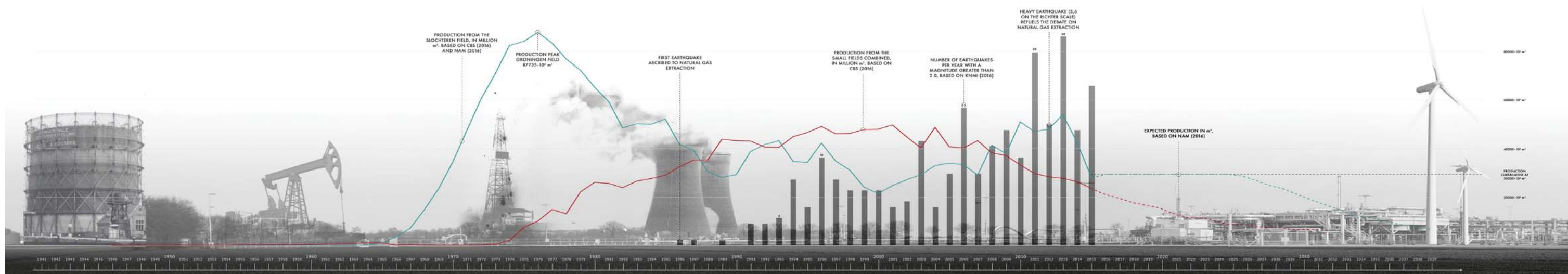
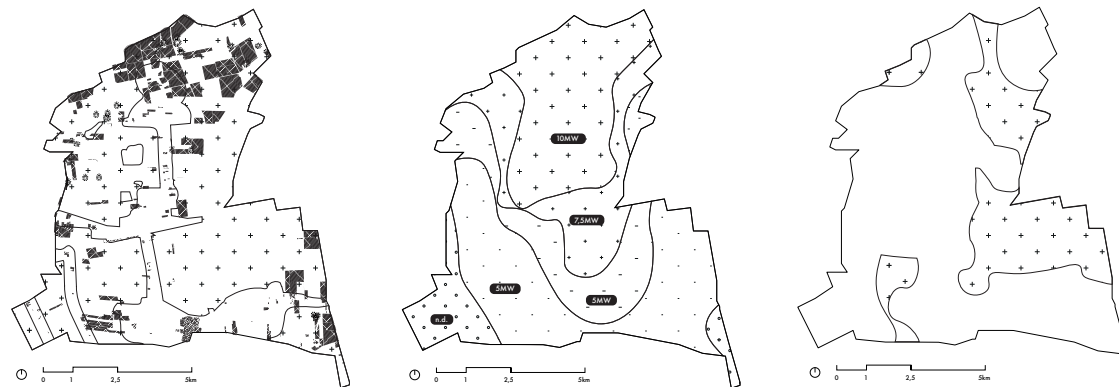


Natural gas fields and the infrastructure for extraction and distribution

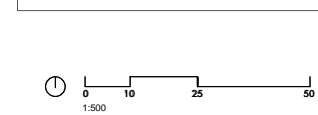
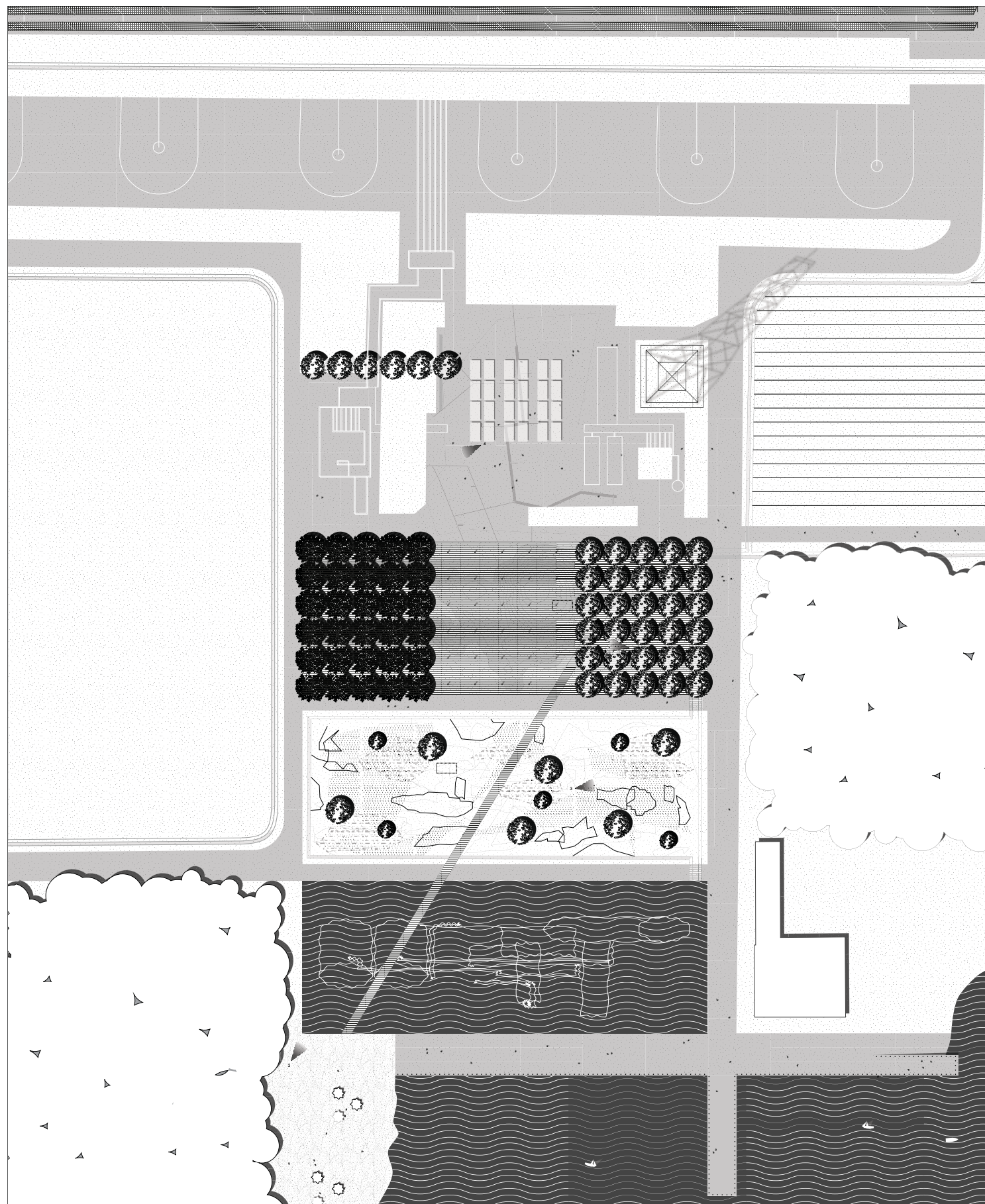


Left: The municipality of Menterwolde can be divided into three landscape types based on soil types and cultivation history.

Right: Potentials for renewable energy were mapped. Among others: biomass, wind energy, and geothermal potential.



Visual representation of the life-cycle of the natural gas energy landscape



- Arable field
- Forest / coppice
- Beach
- Beach
- Meadow
- Water
- Tree
- Visualization

Plan drawing of the energy park on an old natural gas extraction site, where it is possible to experience the production of renewable energy and experience the history and consequences of the production of natural gas.



Plaza with the subsidence monument. The vertical pipelines offer an impressive experience. They are taken out of their context and placed in juxtaposition with the grid of trees in order to stimulate contemplation.



Remnants from decommissioned extraction sites are sunk to the bottom of a contained diving pool. This creates a unique underwater experience for divers. The diagonal axis cuts straight through the different areas of the park.



The constructed wetland filters the run-of water from the square and plaza before it reaches the lake.



Flexible programmable event square with a graphic representation of the renewable energy system



Interviewing people of Ashapuri for local knowledge about culture



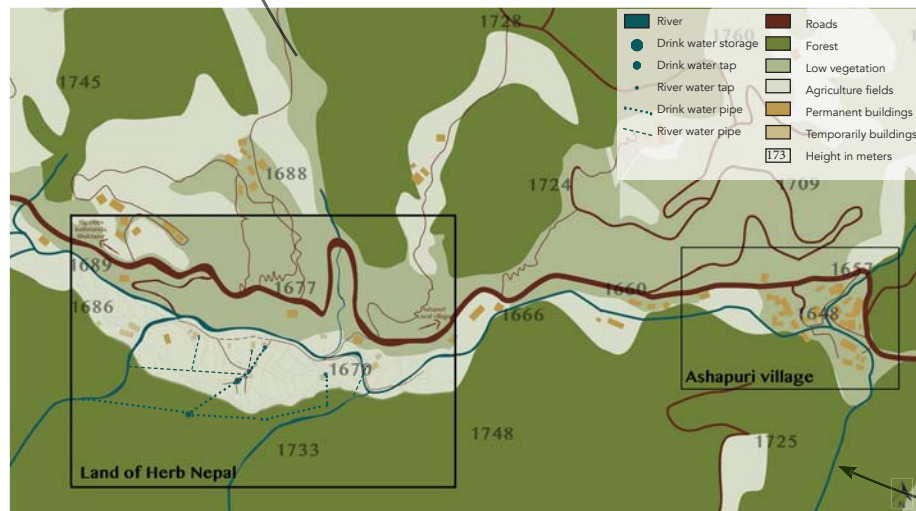
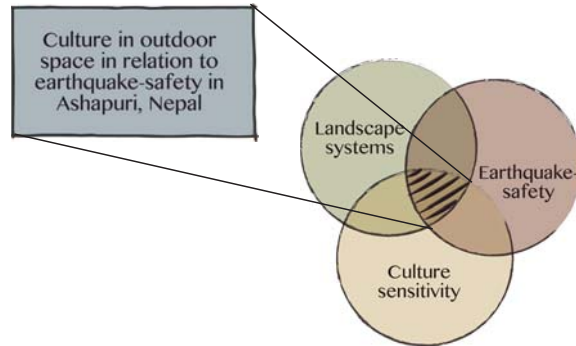
Workshops with people of Ashapuri for local knowledge about the design for a community centre based on their culture



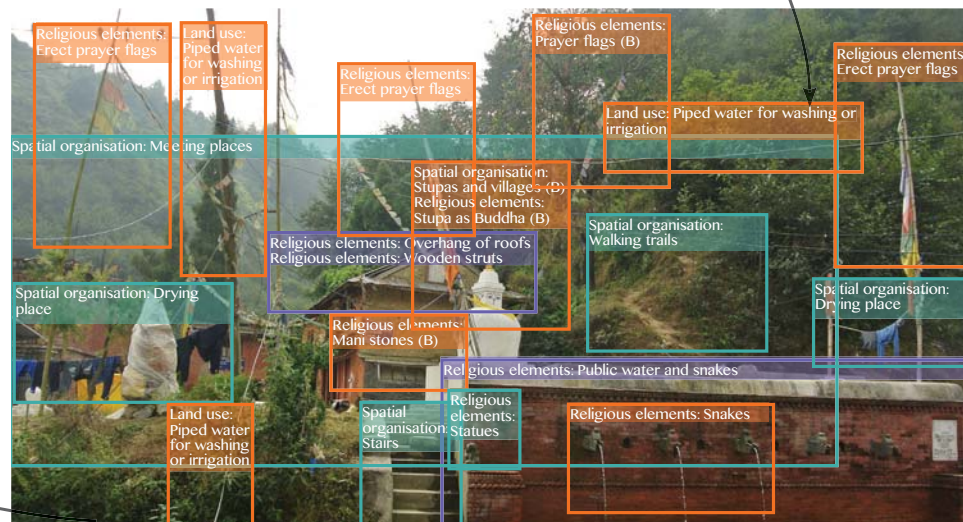
Visualisation survey about community centre with people of Ashapuri for local knowledge



Discussing field design with commissioner



Landscape elements map with land of Herb Nepal and Ashapuri



Example of visual content analysis with coding method
Orange = based on Tamang literature, Purple = based on Newari literature, Blue = based on local knowledge.

Michelle Leemkuil

Dr. Ir. Ingrid Duchhart (WUR)

Dr. Ir Pieter W. Germeraad (Landscape architect)

Culture as base for landscape design

The case of an earthquake-safe community centre for the Nepali mountain village Ashapuri

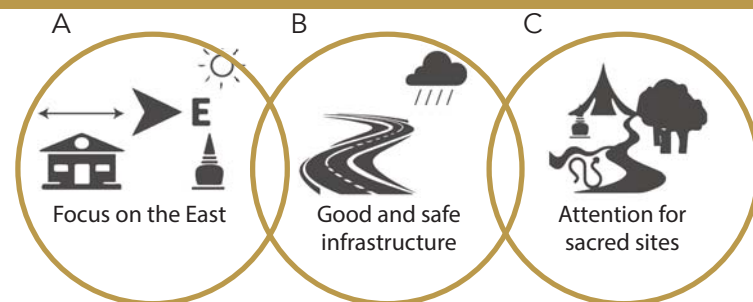
Abstract

To create a valuable space and a better environment for communities, culture needs to be incorporated. Using culture in place shaping ensures that people can identify with a place, trust a place, and will move on intuition when an emergency happens. In Ashapuri, Nepal, are people living from the ethnic group Tamang with a mixed religion of Hinduism and Buddhism. By using culture in the design of a community centre, the place will be more sustainable and therefore it fits in the Buddhist and Hindu view of the Tamang.

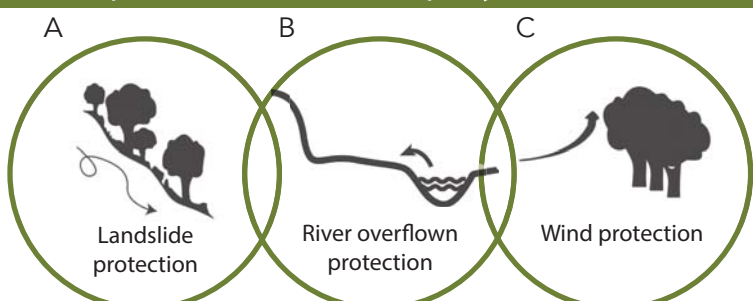
Interviews, workshops and surveys are used to acquire local knowledge from the people in Ashapuri, Nepal. In addition, systematic photographs are made in the village and hills around Ashapuri for the visual content analysis in the Netherlands of the cultural manifestations in Ashapuri. The local knowledge and visual content analysis are the basis of the coding clusters about culture, that form the cultural preconditions about orientation, connectivity, sacred sites, entrances, places of worship, development in agriculture, climate protection, the living space and the community space. The final design for a community outdoor space for Herb Nepal is gained by combining the program of Herb Nepal together with the preconditions of culture, landscape systems and earthquake-safety.

There can be designed with culture on landscape scale, such as the orientation of buildings and places, in connection with places and on elements in the landscape. But overall culture takes place on a very detailed scale. It is visible in the facades of houses, in the form of matras, sutras and the details in pillars. These details are not in the field of landscape architecture, and only culturally authorised people can design this. So it is important to be careful when designing with culture. Only the material(s) and the shape(s) can be designed, not the symbolism.

Main preconditions Culture sensitivity

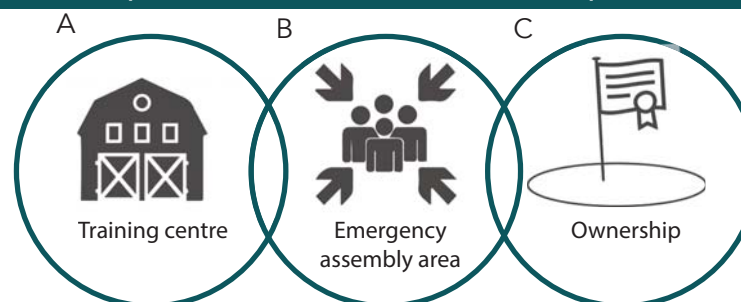


Main preconditions Landscape systems

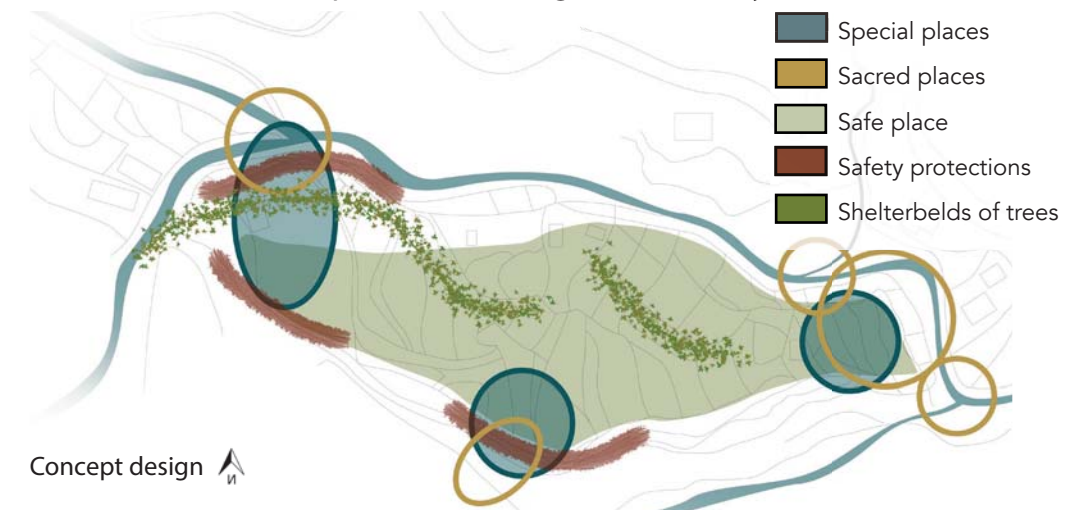
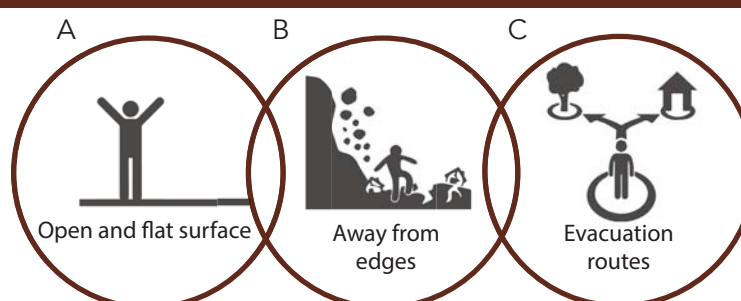


Program and preconditions for the design

Main spatial needs and wished Herb Nepal



Main preconditions Earthquake-safety



Concept design



Design for Herb Nepal with an optimal cultural translation



Visualisation 4: Forest path to sacred snake



Visualisation 1: Entrance road to community centre



Visualisation 2: Testing fields near the training centre



Visualisation 3: Place of worship

FUTURE OF THE PLACE

place of the future

Industrial heritage



Rosanne Schrijver

Ir. R. van Etteger MA

Ir. P. Roncken

FUTURE OF THE PLACE, place of the future

The niche of the landscape architect within transformations of industrial heritage sites in times of uncertainties

case: Sugar Factory Groningen

Abstract

Key-words: identity, flexibility, unforeseen developments, industrial heritage

In the past few years the interest for industrial heritage grew (Nijhof, 2000; Bayer, 2015; Janssen, 2012). Studies have been done in order to get a better insight in the role of transformation, but the role of the landscape architect within transformation is lacking. Dealing with the neglected terrain of the former FrieschGroningsche sugar factory in Groningen where landscape structures remain as characteristics of the industrial past, the main question can be asked: In what way can the design by a landscape architect challenge unforeseen developments while preserving landscape identity of industrial heritage in the case of the Friesch-Groningsche sugar factory in Groningen?

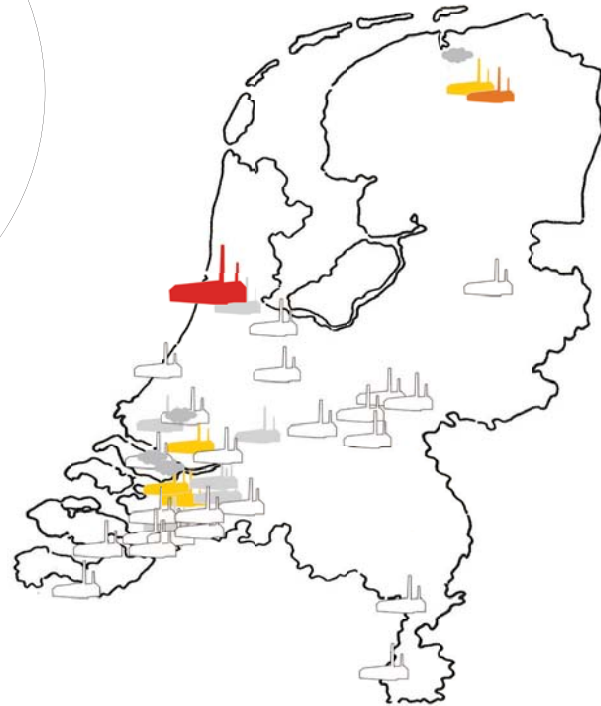
The results of a questionnaire, mental mapping approach, photo analysis and map studies on five case studies by research on design showed that the landscape architect can use a set of design tools, in order to help to provide the identity of former industrial sites experienced through the eyes of the public. It became clear that the landscape architect can influence the physical (non-aesthetic) structures by using a set of design tools, in order to influence the substantive aesthetic properties of the user, resulting in evaluative aesthetic properties affected (Zangwill, 2007; van der Jagt, 2014).

Based on the results, it can be concluded that the most effective way to deal with unforeseen developments within transformation of industrial heritage, is by making use of casco-approach (Kerkstra, 1991), while preserving landscape identity by using the set of design tools resulting from the research. Research-through-designing on the design case helped to implement the design tools into a process plan by making use of a scale model (Lenzholzer, 2013).

It seems reasonable to assume that the landscape architect could deal with unforeseen developments in time, money and owner on a long period. The most important advice given is not to design in future images, but in process based interventions on short and long term by using a powerful framework fitting with the landscape characteristics of an industrial heritage site. There is an opportunity for the landscape architect to be seen as the artist who can influence the experience of the user on an industrial heritage site, while providing space for unforeseen developments.



sugar factories in the Netherlands: 1930



sugar factories in the Netherlands: 2016

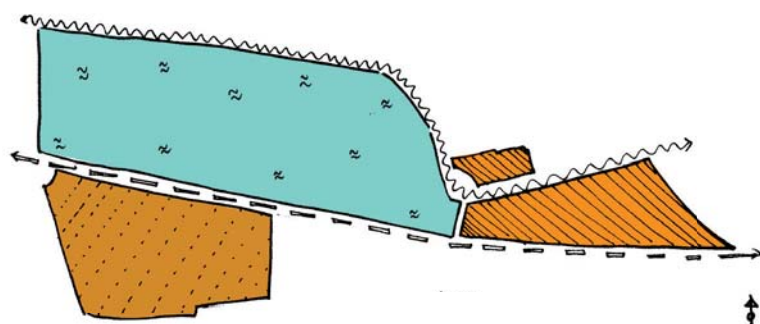


potential case studies in the Netherlands and Germany

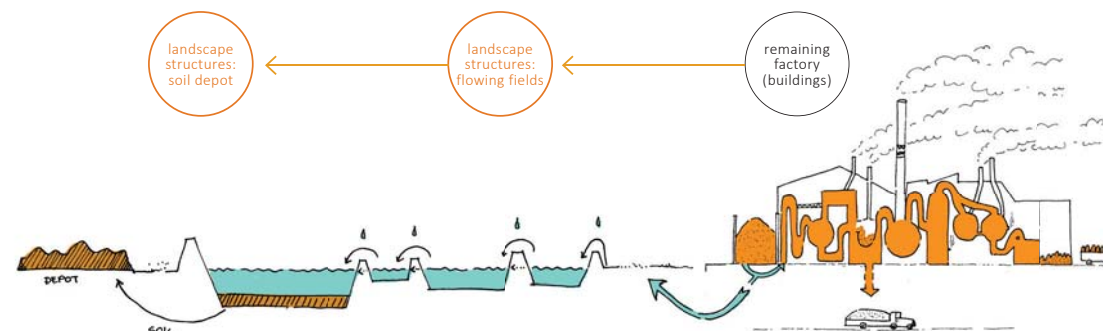
- radius where transported sugar beets come from
- Friesch-Groningsche Cooperative sugar factory
- current sugar factories in the Netherlands - by the Sugar Union
- former sugar beet factories in the Netherlands
- active sugar factories owned by the Sugar Union
- Transformed sugar factory Sugar City Halfweg
- Former sugar factories in the Netherlands
- Comparable industrial heritage sites to the sugar factory in Groningen
- Five case studies in the Netherlands and Germany
- Friesch-Groningsche Cooperative sugar factory (design case)

The design case: former sugar factory in Groningen

Production process of sugar



three main districts within the research area separated from each other, connected by their historical link



stages in the process of producing sugar in a sugar factory effecting the spatial structure

FUTURE OF THE PLACE - place of the future

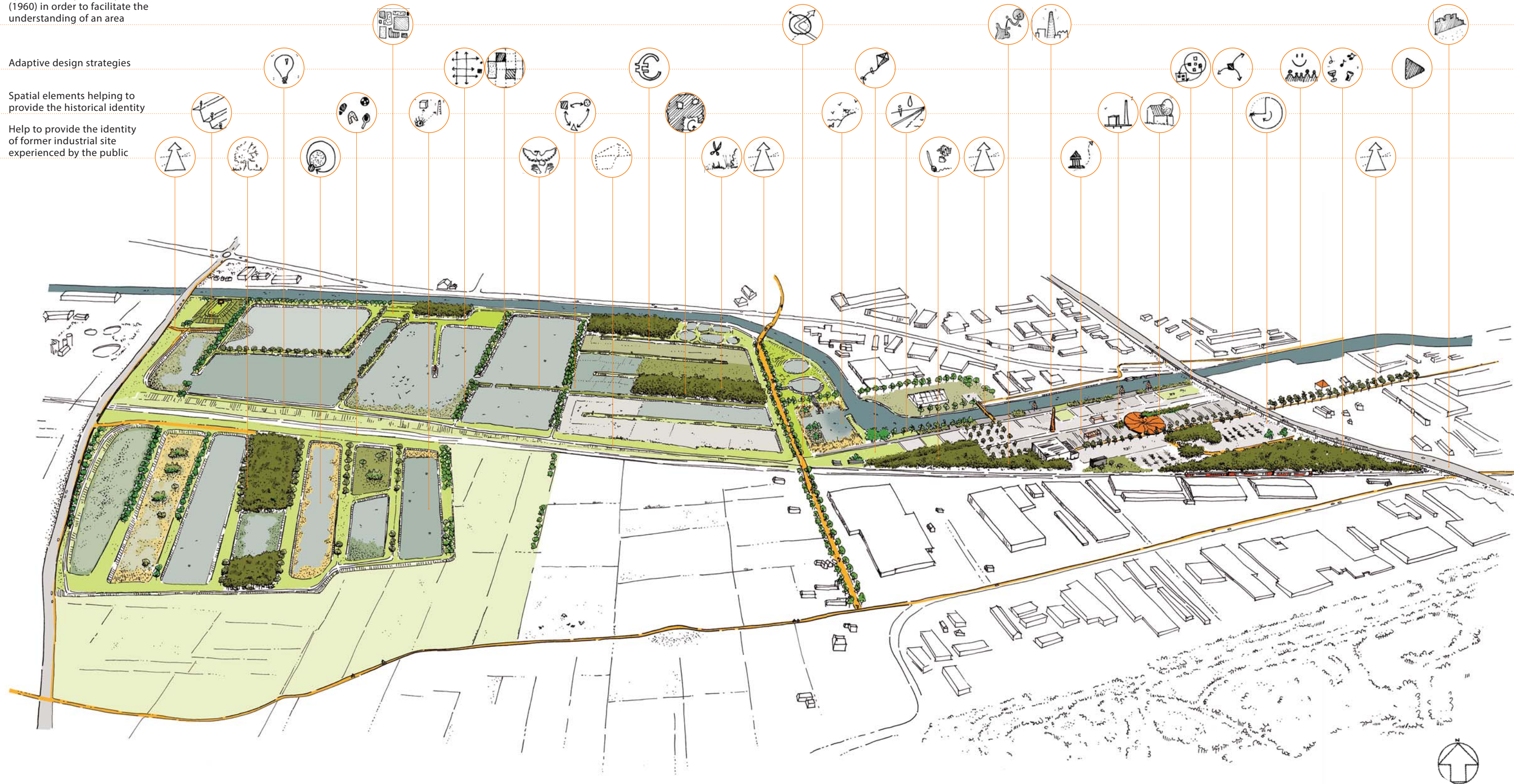
case: Sugar Factory Groningen

Spatial tools by Kevin Lynch (1960) in order to facilitate the understanding of an area

Adaptive design strategies

Spatial elements helping to provide the historical identity

Help to provide the identity of former industrial site experienced by the public



Set of design tools, design principles.

The outcomes are based on a research-on-design approach within five case studies in the Netherlands and Germany. Data is gathered through questionnaires and a mind-mapping technique which are translated in a set of design tools. This in turn makes them useful for the landscape architect challenging unforeseen developments, while preserving landscape identity of industrial heritage (RQ).

The design principles are sorted on:

- Spatial tools based on the theories of Kevin Lynch (1960);
- Adaptive design strategies;
- Spatial elements helping to provide the historical identity;
- Tools helping to provide the identity of former industrial sites experienced by the public.

Process plan. Transformations of industrial heritage often take a long time (Bayer, 2015; Janssen, 2012). As well as the case of the former sugar factory in Groningen. The power of the creative thinking and designing process of the landscape architect can be described as working with processes (Dooren, 2015) and long term planning processes can be overseen by this discipline (Zeeuw, 2011). This research design therefore does not result in a master plan where the end result is

already decided and established. A process plan in the form of a framework is flexible enough to give opportunities for ideas and initiatives on short and long term, in line with the unforeseen future due to unpredictable investments, owner and needs (Kerkstra, 1991; Sijmons, 2002). Step by step, from the regional scale level to place specific interventions can be executed depending on the financial, social and political situation at that moment.

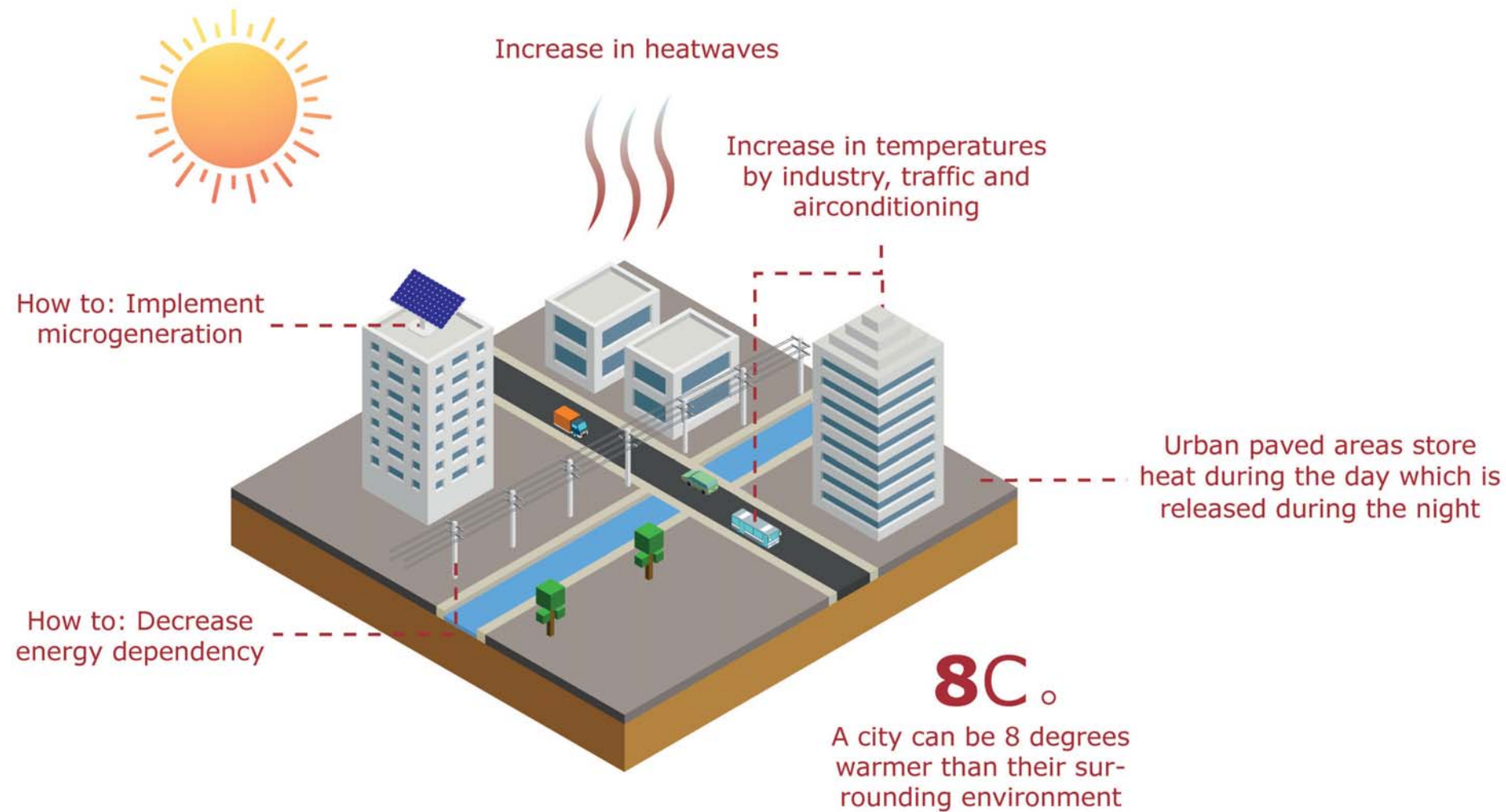


Fig.1: Current and future challenges concerning heat and energy in urban environments

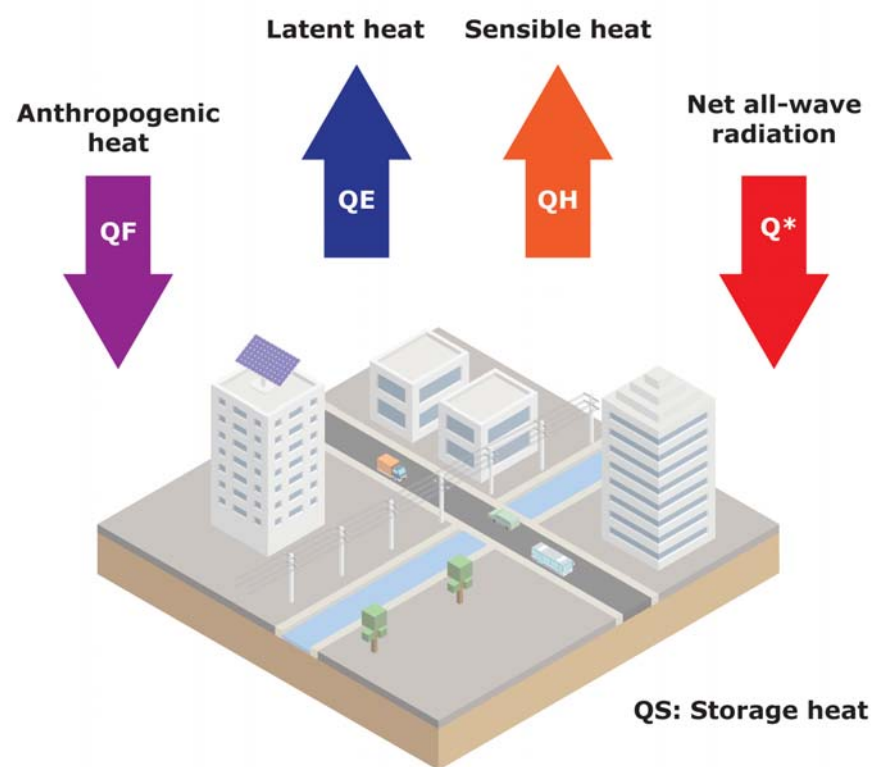


Fig.2: Energy flows of the urban energy balance

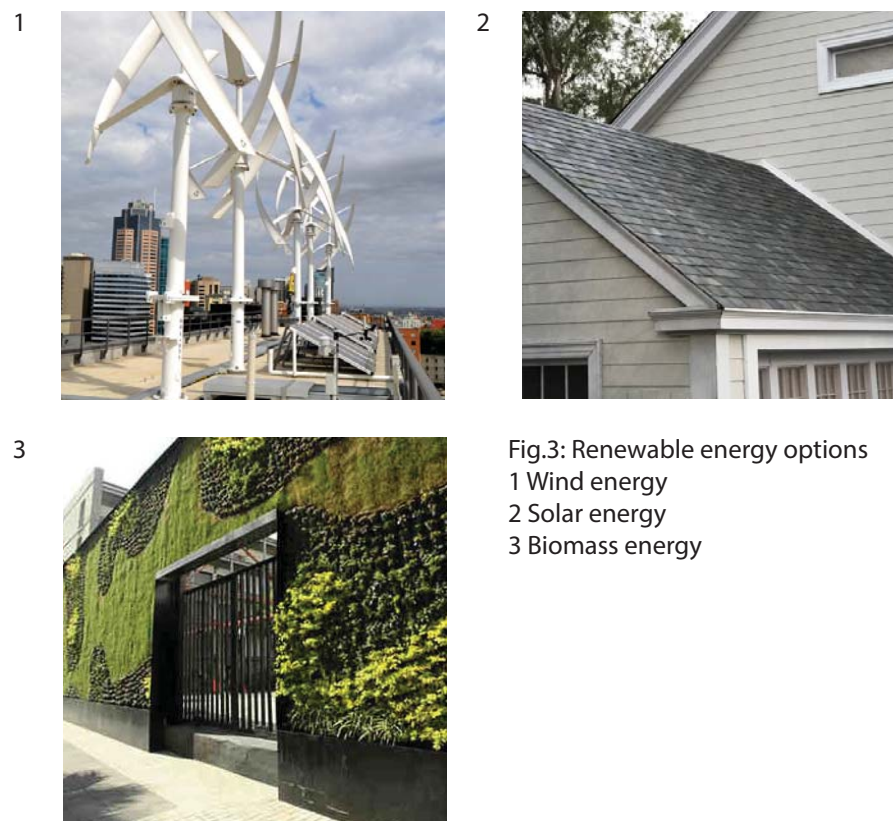


Fig.3: Renewable energy options
1 Wind energy
2 Solar energy
3 Biomass energy

Ties Blaauw

Name supervisor: S. Lenzholzer

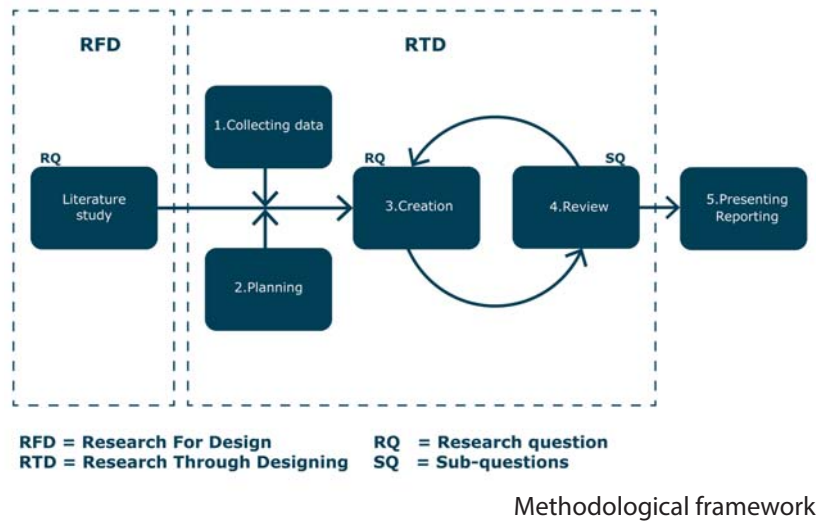
Visualizing energy flows in urban microclimates

Abstract

In the next decades (urban) designers and planners will face major challenges concerning urban climate and energy supply. There will be an increase in urban heat caused by human activities and the demand for energy will be ever growing. Climate-responsive planning and design can have beneficial effects on the urban climate by contributing to a reduction of urban heat and helping to reduce the energy demand of buildings and public space. In order to achieve these beneficial effects, an understanding of the characteristics in urban (micro)climates, their thermodynamic system and potentials to generate renewable energy is crucial.

Currently urban planners and designers are not able to comprehend the urban environment in terms of energy flows. They tend to value urban environments as fixed three-dimensional objects and do not consider the manifold dynamic flows present in this environment. The goal of this research was to make urban (renewable) energy flows intelligible for planners and designers, which was achieved by the development of a new visualization method. A thorough literature study on urban climatology, urban renewable energy potentials and visualization, informed the new visualization method. The visualization method was mainly developed by research through designing, which included the planning, data collection, creation and review of the new visualizations.

Animated 3D visualizations, with the use of particle systems, appeared to be the most adequate technique in representing dynamic urban energy flows. A student survey revealed that by using animated 3D visualizations, (urban) planners and designers were able to comprehend the urban environment in terms of (renewable) energy flows. With the new method, (urban) planners and designers will be able to understand the complex interactions of energy in urban environments and how these interactions could benefit the environmental performance of the urban landscape.



1. Collecting data

The results of a variety of previous measurement studies were the main input for the new visualizations. These measurement studies ranged from city centres to urban parks.

2. Planning

Applying the appropriate software to develop the visualizations was essential. The software program Blender (3D) was selected, because of its accessibility and versatility.

3. Creation

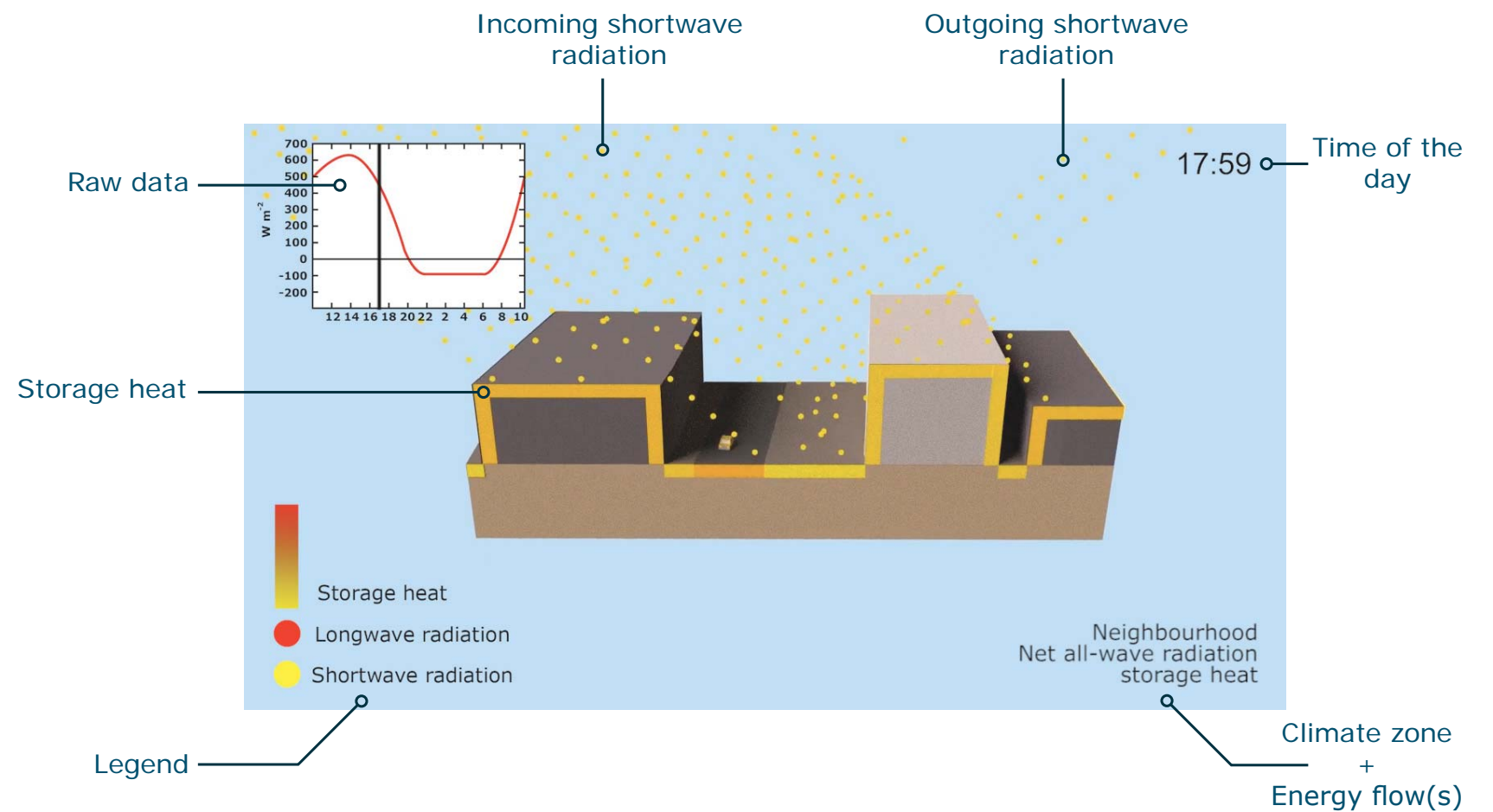
The visualization variables (level of realism, dimension etc.) and the particle characteristics (speed, size, etc.) were experimented with to represent energy flows in a concise and comprehensive manner.

4. Review

Community input was included to review the visualizations. The visualizations were reviewed by an expert group and a digital survey.

5. Presenting

When animation is involved, specific presentation techniques are required. Different presentation modes were used, including power-point presentations and web-based formats.



Individual visualizations

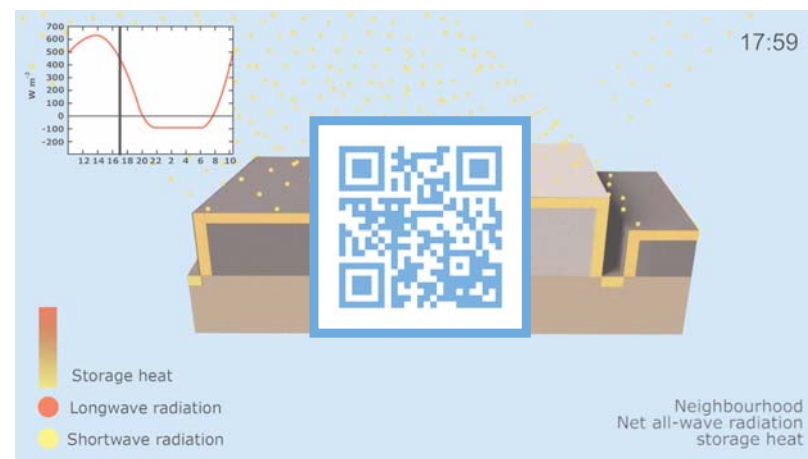


Figure 9: City centre shortwave radiation individual

Compared visualizations



Figure 10: Comparison shortwave radiation

9.1 Sensible heat:



9.2 Anthropogenic heat:



9.3 Mixed flows:



10.1 Sensible heat:



10.2 Anthropogenic heat:



10.3 Latent heat:



10.4 Mixed flows:



10.5 Windflow:



10.6 Wind energy:



10.7 Solar energy:



10.8 Biomass energy:



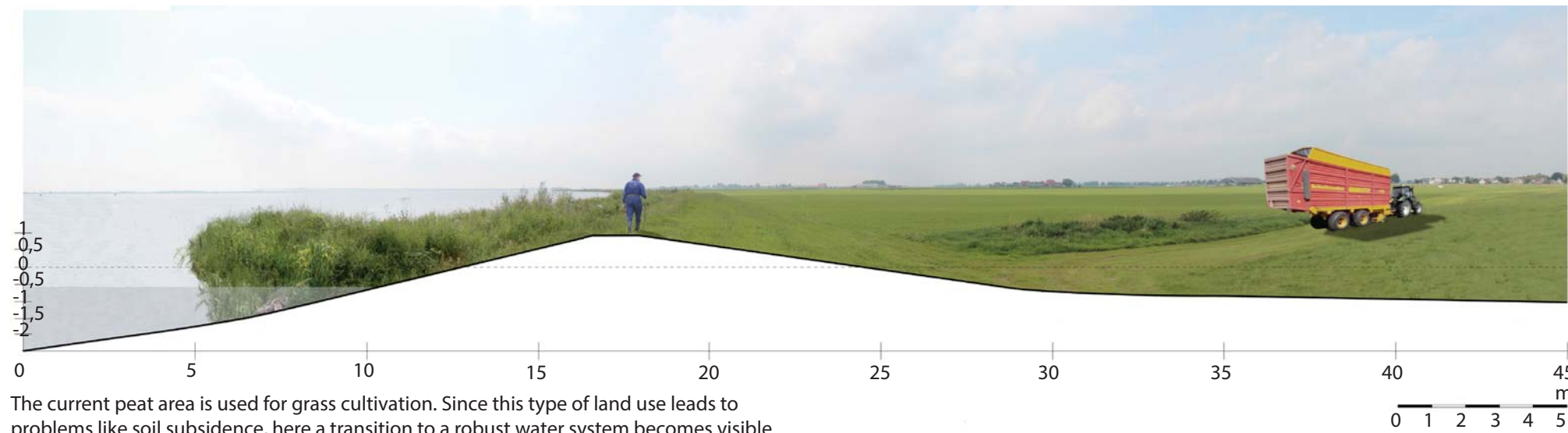
Anna-Jet Leijenaar
Dr. Ir. Ingrid Duchhart

Embankments 2.0 as part of the transition to a robust water system

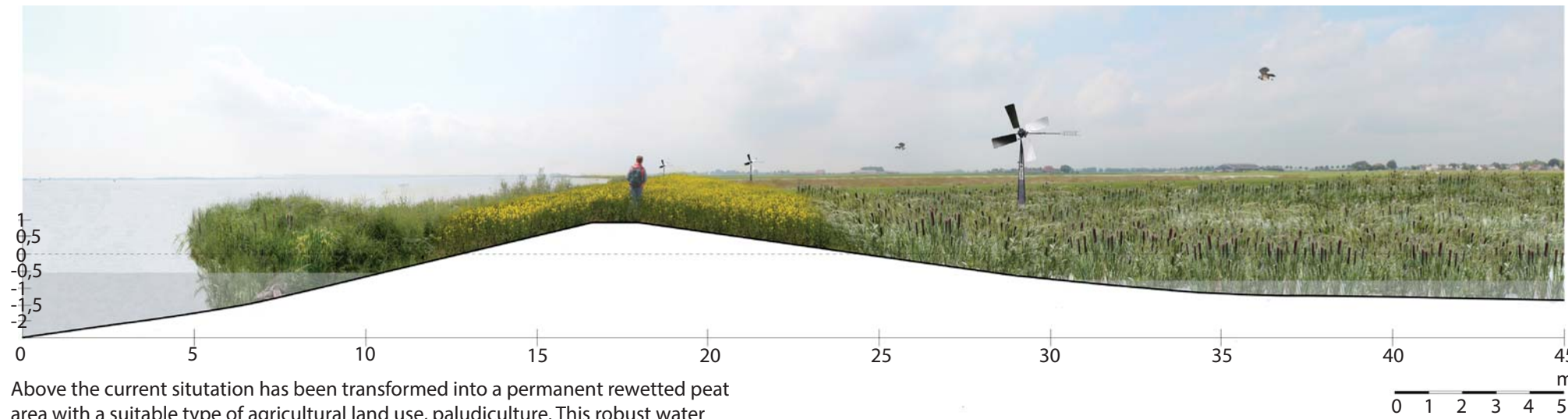
Perspective for the Frisian peat area

Abstract

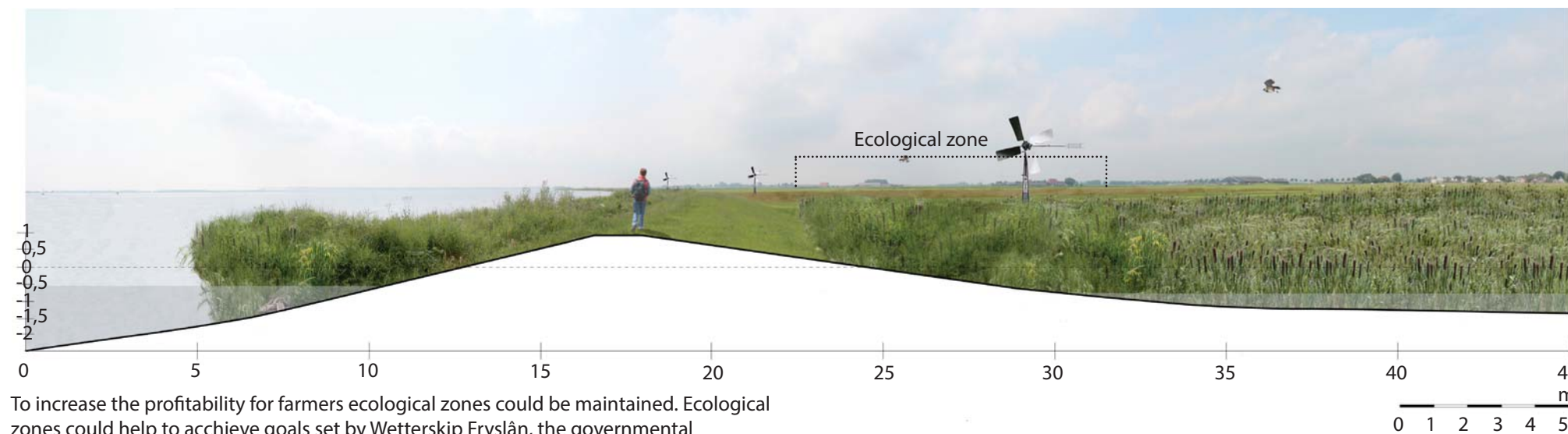
The aim of this thesis is to investigate which measures could be taken to let regional embankments be part of a robust water system at the Frisian peat area. In the first part, current and future problems related to the water management, have been analysed. This problem analysis shows that the current agricultural type of land use leads to problems like soil subsidence, CO₂ emission and increasing costs for the water management. For this reason it has been researched how a transition to a more adaptive type of agricultural land use could be realised. Therefore the regional as the local scale have been analysed and local and regional visions were conducted which show how the current system can be transformed into a sustainable, adaptive and robust water system. Within this system, not only regional embankments secure the water safety, the whole system which includes an adaptive type of agricultural land use contributes to the water safety, improves the quality of the surface water and contributes to the functionality of the Frisian peat area in the long term.



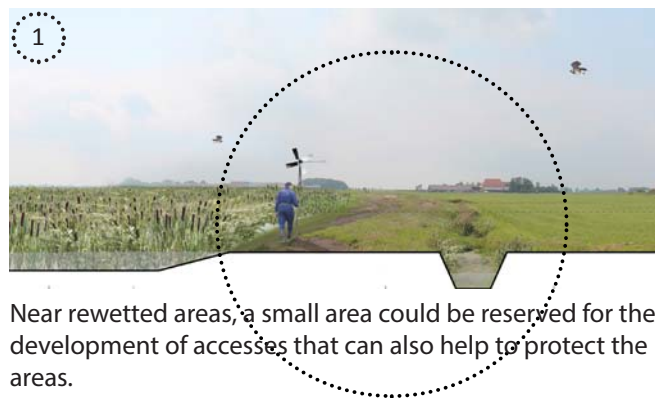
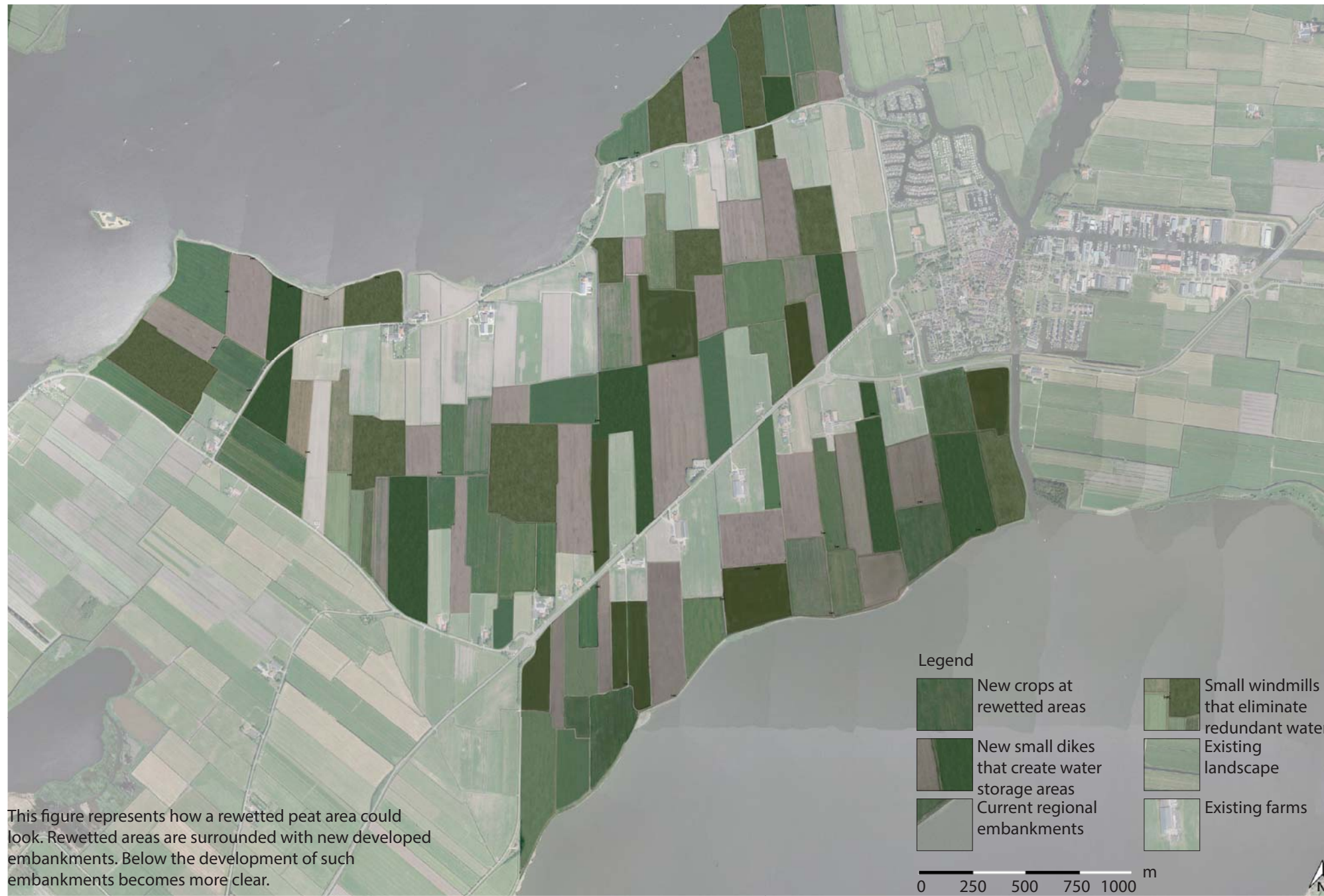
The current peat area is used for grass cultivation. Since this type of land use leads to problems like soil subsidence, here a transition to a robust water system becomes visible. Above a regional embankment is visible which plays a crucial role in the current water system since it protects the low lying peat areas from flooding.



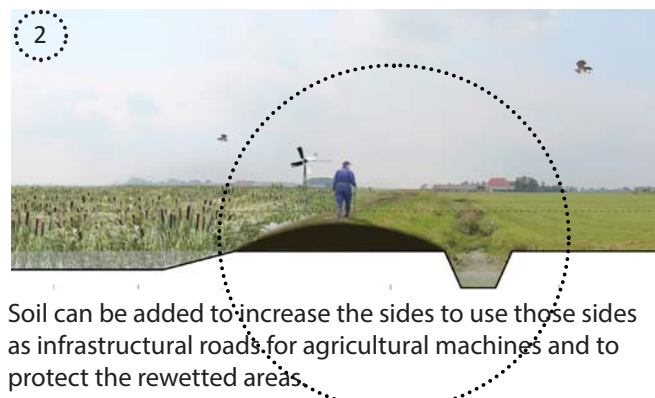
Above the current situation has been transformed into a permanent rewetted peat area with a suitable type of agricultural land use, paludiculture. This robust water system would be the desired situation for 2050, since it reduces the problems like soil subsidence, tillage problems as a result of intense precipitation events and high costs for the water management. The embankments could be used for the production of other crops like rapeseed, since these areas are higher than the rewetted peat areas.



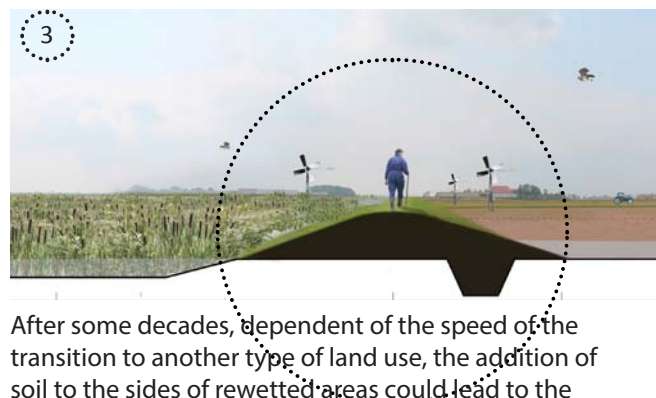
To increase the profitability for farmers ecological zones could be maintained. Ecological zones could help to achieve goals set by Wetterskip Fryslân, the governmental organisation for the Frisian water management, like an improved quality of the surface water. In return Wetterskip Fryslân could give a farmer a specific amount of money as a form of subsidizing.



Near rewetted areas, a small area could be reserved for the development of accesses that can also help to protect the areas.



Soil can be added to increase the sides to use those sides as infrastructural roads for agricultural machines and to protect the rewetted areas.

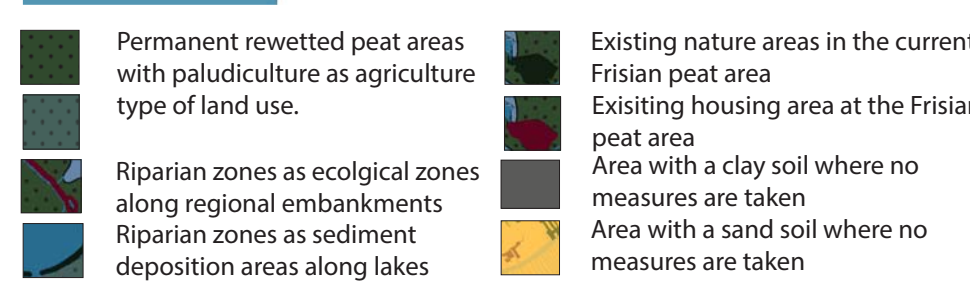
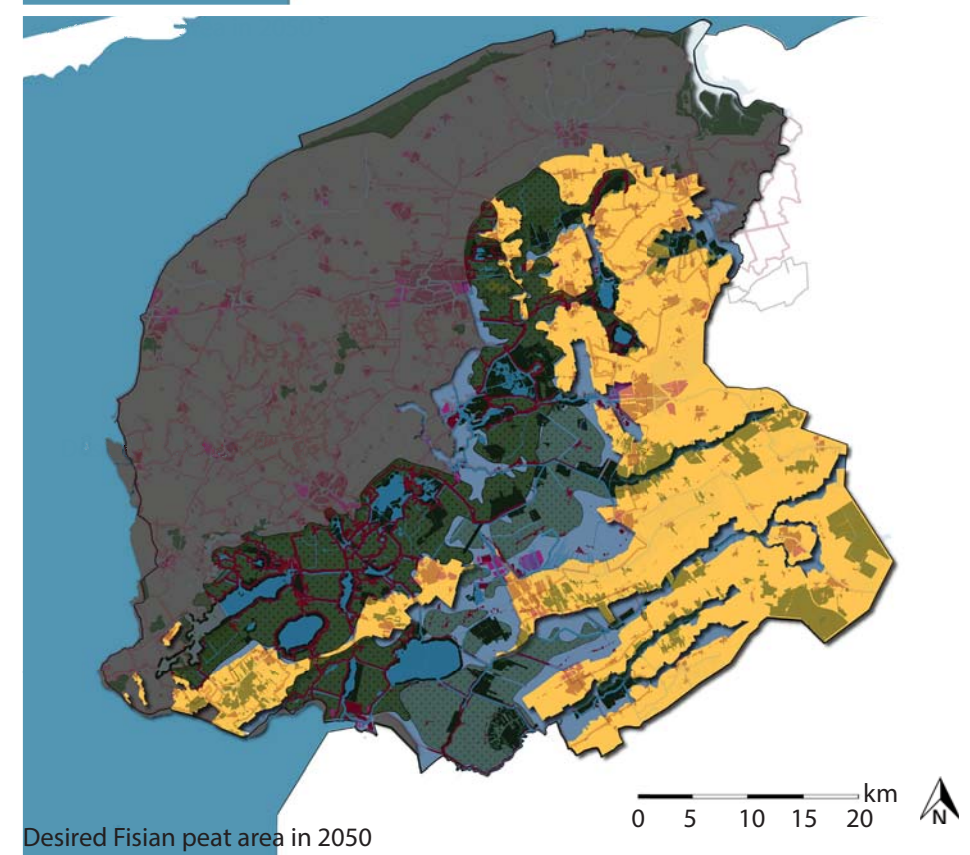
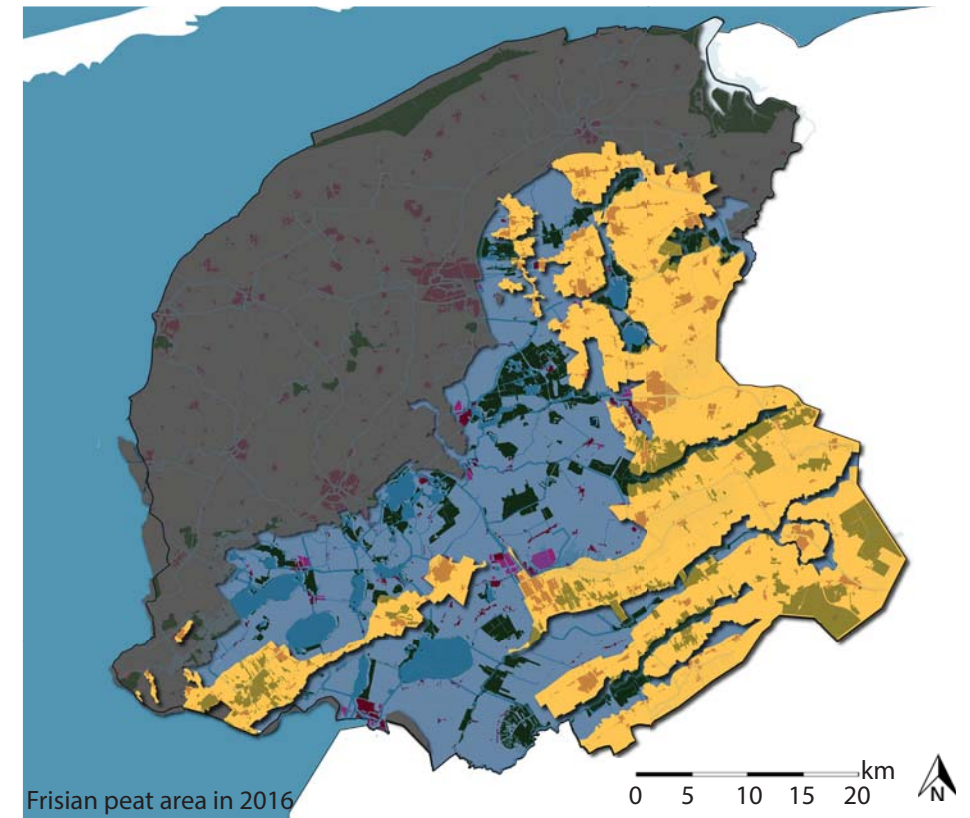


After some decades, dependent of the speed of the transition to another type of land use, the addition of soil to the sides of rewetted areas could lead to the development of new regional embankments. This could cause a reduction of the amount of kilometers of regional embankments.

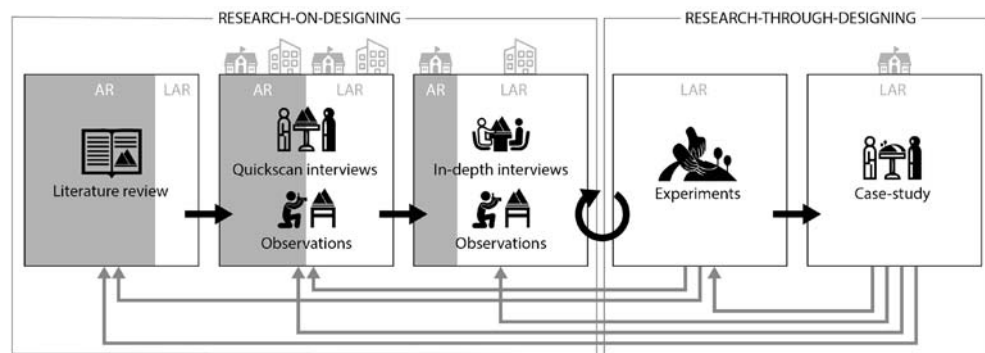


In the end, the robust water system which includes a suitable type of agricultural land use, leads to a system in which not only the current regional embankments secure the

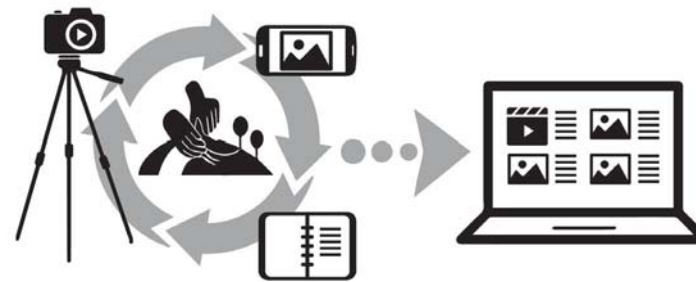
water safety, but in which the whole rewetted peat area helps to secure the water safety, to improve the water quality and to reduce the process of soil subsidence.



The transition of the current peat area into a rewetted peat area as part of a robust water system leads to the image of the desired Frisian peat area in 2050. Local measures to develop a robust water system have been extrapolated into the regional scale. As a result new structures are established that lead to new possibilities for the Frisian peat area.



LAR landscape architecture AR architecture studies offices
 Strategy: iterative process combining research-on-designing and research-through-designing; preliminary conclusions grow and develop till end result. As I was physically involved myself in the research process, important was to keep track of the process >



Making notes while experimenting, making photos of the main steps, taking movieshots, writing my first thoughts directly after the experiments

J.A. (Jolanda) de Jong
 Supervisor: ir. P.A. (Paul) Roncken
 Deputy/Second supervisor: dr. ir. R. (Rudi) van Etteger

Physical Modelling in Landscape Architecture
 Exploring a design tool for the explorative phases in dynamic landscape design

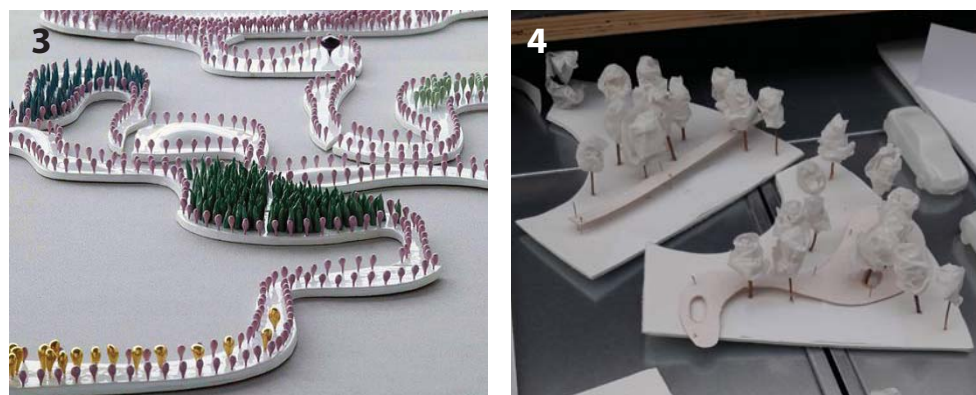
Abstract
 Physical models are valuable design tools in (landscape) architecture in many ways, but it is not the landscape architect's habit to use this tool for dynamic landscape design. This thesis shows a way in which physical models can contribute to the explorative phases of (the) dynamic landscape design (process). A physical model helps a designer to understand, think, test and communicate design (ideas). On the one hand it is an effective, but on the other hand an explosive design tool. The design, design process and designer(s) depend whether or not to model and how; relating to abstraction and reduction, materials, techniques and scale/size.

In this thesis a way is explored to use the physical model as a design tool for the explorative phases of dynamic landscape design, focussed on flowing water and growing vegetation for a specific phenomenological design process (and its design outcome). An iterative process is carried out in which an explorative search and in-depth study in literature and practice are supplemented with experiments and a case-study. Preliminary conclusions grow and develop till final conclusion.

Although saturation was closely reached in the in-depth study, the results might have been influenced by the author's preconceptions or expectations. The experiments carried out were not exhaustive and led by trial and error. The case-study offers one example for one design process. However, the whole process is extensively described and transcribed, which makes it a starting point for further research. Aim is to inspire designers to start modelling, to experience and apply this way of physical modelling, to develop knowledge, skills and experience. Sharing and applying the know-how this thesis creates, as well in study as in practice, hopefully leads to better design processes, ending up in better design solutions. Together we can identify, recognize and widen the habit of the landscape architect.



Value of physical models: a physical model is more than a design tool: A physical model is more than a design tool: it is a thing that becomes part of daily life; it inspires, more than only for the design project itself (left picture: Ganz Landschaftsarchitekten, right: karres+brands)



Value of physical models: a physical model bridges thinking and making by using it in a lot of different ways: to understand (1), to think (2), to test (3) and to communicate (4) (up left: WUR-student, up right: HOSPER (photo via Ronald Bron), down left: Anouk Vogel (photo via Jan Peter Wingender), down right: Bureau B+B)

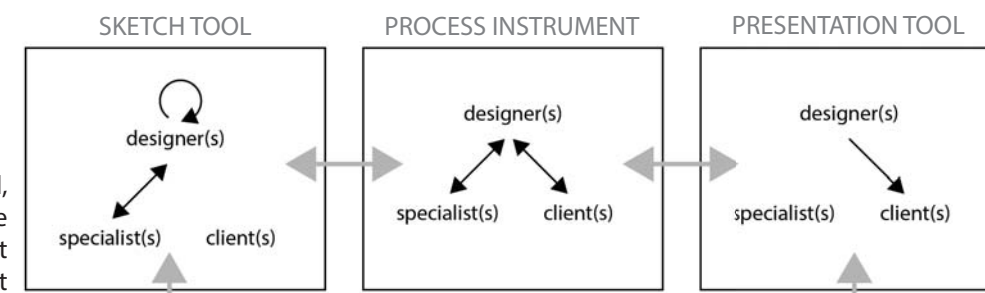


Making of physical models: a physical model is a composition of the designed reality and needs to be simple and plain (left: WUR-student, right: H+N+S)



<< Making of physical models: to reach abstraction and reduction one should make choices in materials, techniques and scale/size to gain the desired physical model. Ganz Landschaftsarchitekten developed their own model making technique which they apply on almost every project (left picture). Materials can have different meanings on different scales (right upper scheme). Size (thus scale) steers transportability and ability to talk about it (right down scheme).>>

Making of physical models: in general, physical models can be divided into three main types, however one object can shift meaning, which makes it an effective but explosive design tool >>

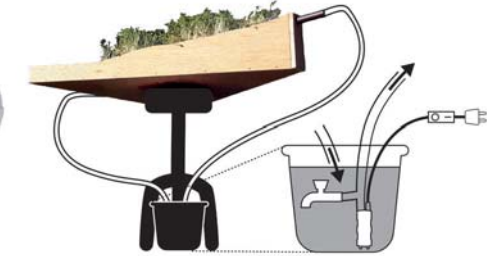
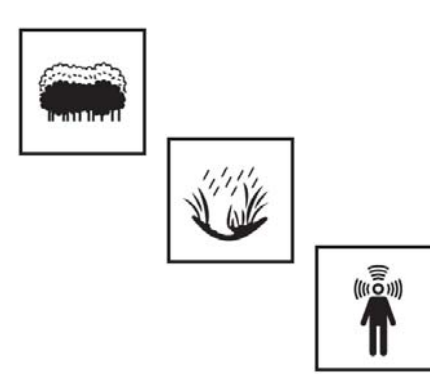




Experiments are carried out to explore suitable materials and techniques that fit a physical dynamic landscape model, focussed on flowing water and growing vegetation. Importance lies on adjustable, cheap, adaptive and surprising materials and techniques.

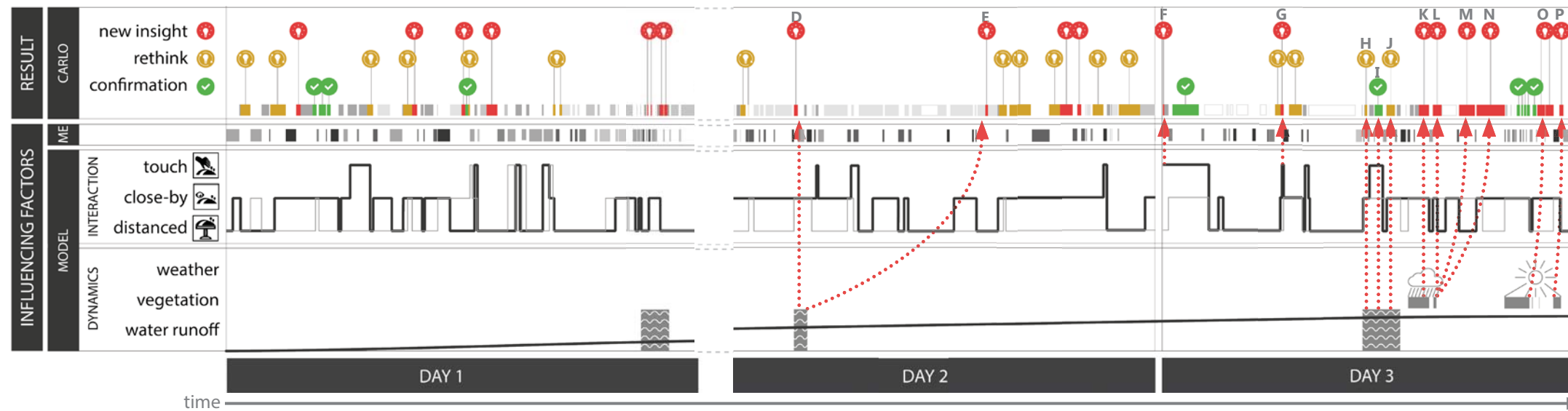


A case-study is carried out to test a physical dynamic landscape model for the specific explorative design process of Carlo Leonardi, master thesis student at Wageningen University in landscape architecture. Picture: visual by Carlo.

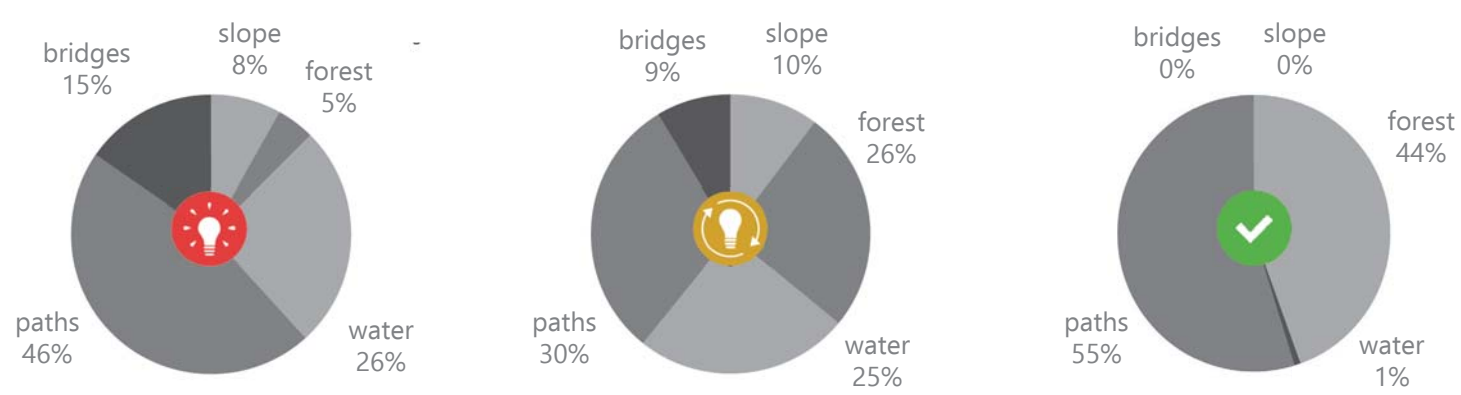


Carlo had to deal with forestation, rainwater runoff and soil erosion in a phenomenological design process. The dynamic landscape model made for this thesis offered Carlo the ability to reflect on these aspects for his design.

I made the model and tested and reflected on and with it with Carlo. Model construction, testing and reflecting is captured in movies, notes and photos. A continuous closed water system was made to be able to simulate rainwater runoff in the model. In addition, tropical rainfall and sunshine was simulated by using a spray bottle of water and a flashlight.



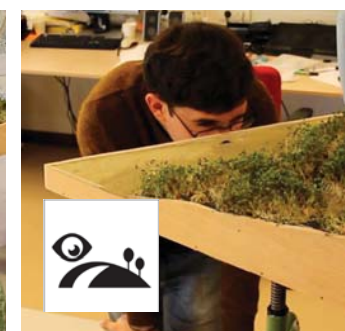
- Additional legend**
- CARLO**
- new insight
 - reconsideration
 - confirming expectation
 - understanding model
 - about modelling
 - explaining design
 - reminds of reference
- ME**
- question
 - subquestion
 - confirming question
 - explaining model
 - about modelling
- Carlo seeing the model at first sight:**
- A "less steep is nice in a different way"
 - B "lowest path needs to be higher"
 - C "water should also flow into the forest"
- Carlo seeing the model's rain water runoff:**
- D "a slope is needed on the lowest part to steer the water"
 - E "be careful with making slope steeper for water runoff"
- Carlo seeing the model has much grown:**
- F "it gets creepy in the forest"
 - G "intentional closing vegetation on the paths"
- Carlo seeing the model highly dynamically active:**
- H "part near lowest bridge can be a problem"
 - I "seeing vegetation patterns caused by water flow"
 - J "steepness is ok, but we don't know relation to soil type"
 - K "maybe add rain or even rainbow to my visual"
 - L "materials of paths should maintain as easy to walk on"
 - M "paths and water system should stay for quite some time"
 - N "water distribution in relation to other parts of the plan"
 - O "rain makes path reflecting, is a cool contrast with dark forest"
 - P "paths should be robust, not slippery, but still reflecting"



Carlo's thoughts: three types of reflection during the case-study (new insights (left), reconsiderations (middle) and confirmations (right) on five topics: the relative amount of words spoken by Carlo



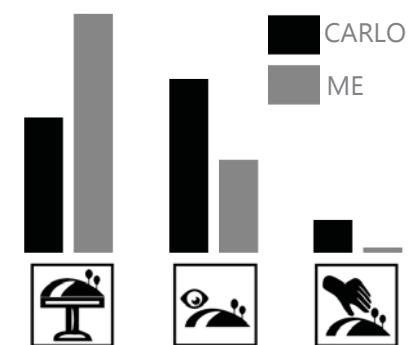
TOUCH



CLOSE-BY

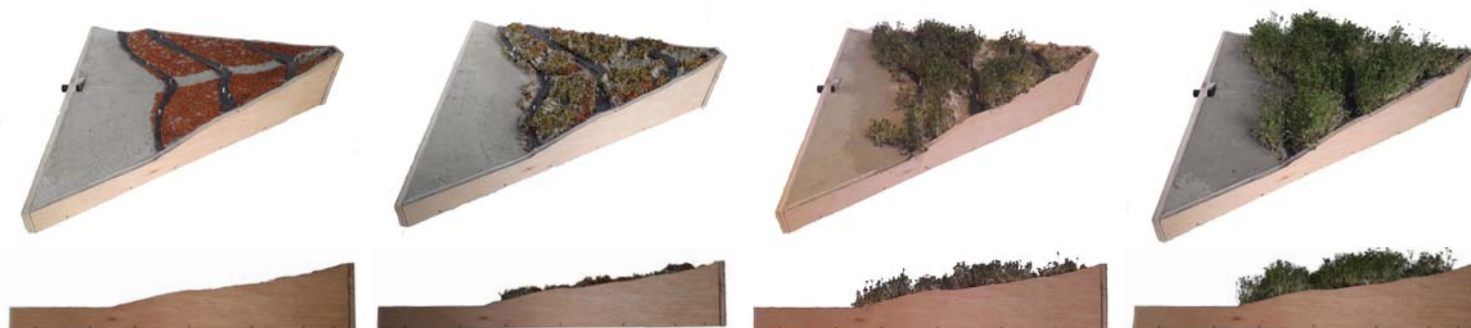


DISTANCED



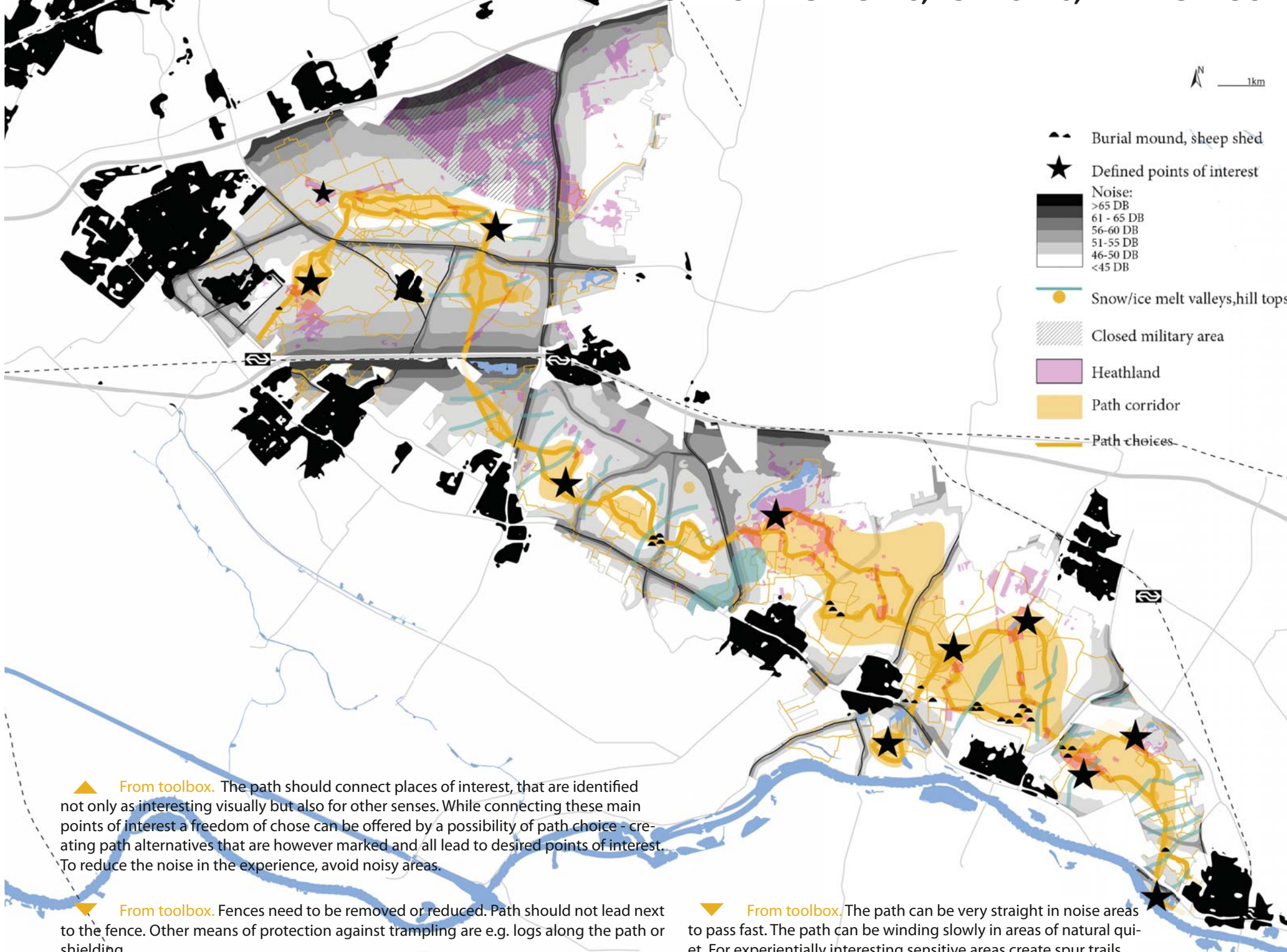
Model interaction: three types of model interaction (touching, being close-by/looking on eye-height and being distanced).

Model interaction, relative during the case-study.



Model growth is captured in a series of pictures: 7 points of view, 7 days





Veronika Kunclová
Name supervisor: R. van Etteger

Reconnecting with nature through multi-sensuous experiences in national parks

Designing a multi-sensory nature experience trail in the national park Utrechtse Heuvelrug

Abstract

This thesis explores how western people today experience wild nature and how can we use this knowledge in designing structures that frame our experience – paths. I focus on path design in national parks – the environments where we can come in contact the most with what might be called wild nature in today’s western countries.

The case study is the national park Utrechtse Heuvelrug, since the aesthetic experience of nature is limited here; mainly by (1) fenced and restricted nature areas and abundance of fencing next to the paths, (2) pragmatically designed straight paths that do not take into account the multi-sensory aesthetic experience of nature, and (3) highways and roads cutting through the national park. The general problem is that the design of trails is predominantly ocularcentric, which is limiting since the experience of nature is not only visual but it is a multi-sensory experience of an environment.

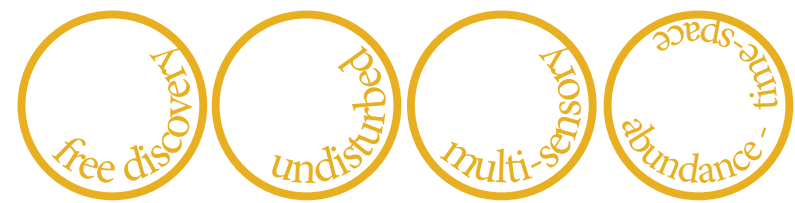
The aim of this thesis is to find out how to design a trail enhancing the multi-sensory experience of nature using the knowledge on nature experience produced by other disciplines, thus linking the theories to the practice of landscape architecture. A literature study of nature experience in the context of the 21st century in Western culture is presented resulting in the definition of natural experience of nature: the undisturbed free discovery of the multi-sensory abundance of nature’s time-space. This definition is further used both as a source of guidelines for designing and at the same time evaluation criteria for designs.

Furthermore, existing approaches to provide nature experience in national parks of North-Western Europe are studied, described and evaluated through the theoretical guidelines/criteria, and further used as a source of inspiration in the design process. A design strategy and three examples of design interventions for a hiking trail in the national park Utrechtse Heuvelrug enhancing the multi-sensory and natural experience of nature are provided as well as a toolbox for designing multi-sensory trails for natural experience of nature in national parks.

▲ **From toolbox.** The path should connect places of interest, that are identified not only as interesting visually but also for other senses. While connecting these main points of interest a freedom of chose can be offered by a possibility of path choice - creating path alternatives that are however marked and all lead to desired points of interest. To reduce the noise in the experience, avoid noisy areas.

▼ **From toolbox.** Fences need to be removed or reduced. Path should not lead next to the fence. Other means of protection against trampling are e.g. logs along the path or shielding.

▼ **From toolbox.** The path can be very straight in noise areas to pass fast. The path can be winding slowly in areas of natural quiet. For experientially interesting sensitive areas create spur trails.



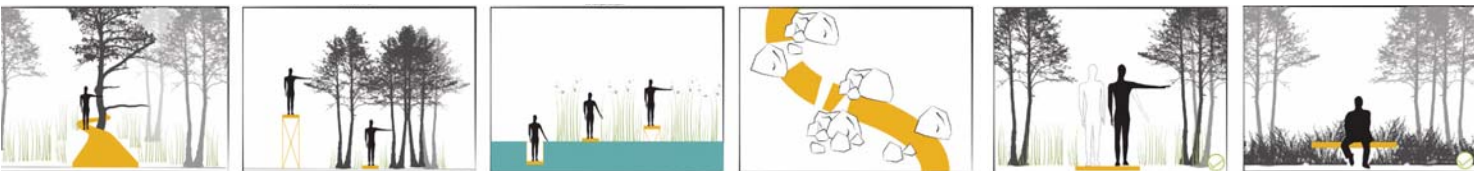
◀ **Create quiet places** along the path to escape crowding, get into the environment and experience the undisturbed natural quiet and be alone with nature. Loungers under the whispering birch trees in the heath draws our attention to the sound and to the sky and meditation platform in the heather, swing in the forest or resting picnic decks in the reed.



▲ **The floodplains intervention.** All environments of the floodplains are made accessible in order to experience nature's abundance - get lost in the reed, enjoy the water, smell the mint growing in the marshes, get inside the flooding forest.



▲ **The Treetop walk and viewing tower on Amerongse Berg intervention.** Experience the different storeys of the forest as well as the phenomenon of the sky and the view of the whole national park. The path is a very light construction attached directly to tree trunks and using natural and reflective materials to allow an undisturbed naturalness of the experience.



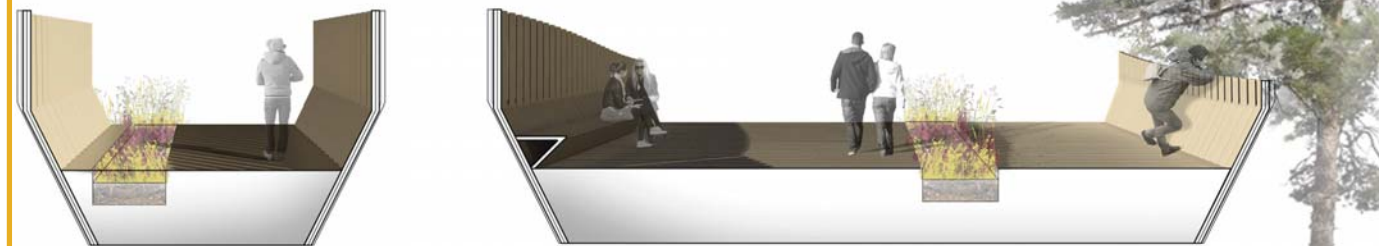
▲ **From toolbox.** Bring nature closer to people and people closer to nature, also by changing height level. The linearity of the path is suppressed. The materials used for the path should be as natural as possible, creating a soft edge between the path and the environment, creating a better sense of freedom. Minimize the width of the path to allow people get into the environment. Create resting places inside the environment to provide a multi-sensory experience



▲ **From toolbox.** Draw attention to views, detail, sky, or animals by different width and shape (routing) of the path. Straight and large paths direct attention to the distance and are thus suitable for distant views. Narrow winding paths draw attention to natural detail and allow to discover new views getting into the environment



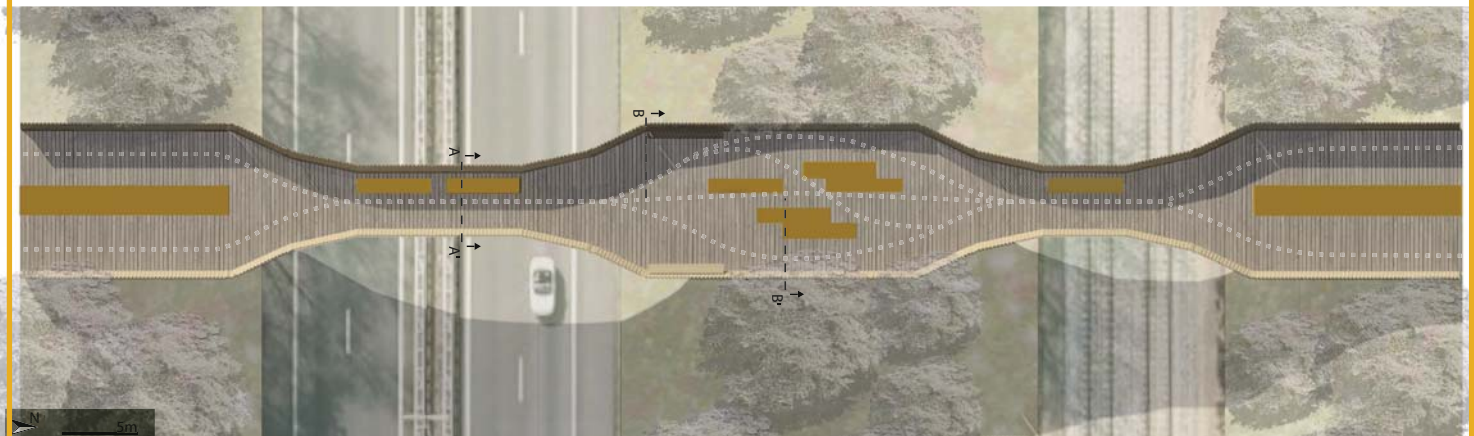
▲ **Pedestrian bridge over A12 intervention**
The aim is to provide a solution for both a broader view on nature and other multi-sensory stimuli, and for hiding the negative phenomenon of the highway. The proposed solution is the concept of the semi-transparent fencing - from certain angles a transparent fence, from others a solid wall blocking the view - to create a visual barrier towards the highway but allowing a broad view on the natural environment. This alone does not eliminate the noise, however a rich experience can reduce the negative effect of the noise on the experience.



▲ **Bridge sections**



▲ **Side view from the West.** In terms of multi-sensory experience, stimuli are created by placing birch trees on the entrances of the bridge that whisper in the wind, selecting interesting plants in terms of touch and smell for the flowerbeds and by allowing the fence to lower in the central part bringing the visitor to the tree tops and to the smell of pine trees, see on picture.



▲ **Top view.** Two narrowing of the bridge were designed to hide the traffic and allow the view of natural environment as much as possible. The choices of walking possibilities are indicated by the white dashed line.

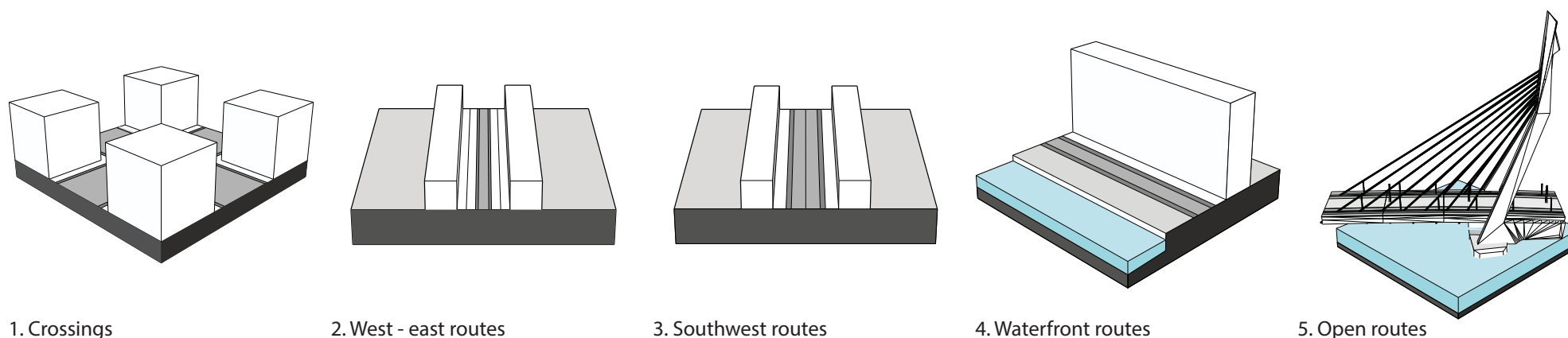


David Huijben
Sanda Lenzholzer
João Cortesão

Transform Weather for Cycle
Solutions for thermally comfortable cycling

Abstract

Nowadays many people suffer from diseases worldwide, in Europe the Non-Communicable Diseases (NCDs) are the leading cause of death and disability. They have an increasing strain on health systems and well-being. Active modes of transportation could be the solution for this unhealthy lifestyle. Especially the Netherlands provides the opportunity to improve people's health and lifestyle, because 28% of the people already use the bicycle regularly. However, people tend not to use the bicycle during uncomfortable weather conditions such as too warm weather (temperatures higher than 24 C°), too cold weather (temperatures under 15 C°) and precipitation. Thereby does climate change worsen the already existing problem of less people using the bike during uncomfortable weather conditions. This thesis searches for solutions which can improve the thermal perception of cyclists during uncomfortable weather situations, for the city of Rotterdam. Separate solutions for wind, shortwave radiation and precipitation are synthesized for generalized test beds. The separate solutions of wind, shortwave radiation and precipitation are combined into integrated solutions, which form the second iteration of the RTD method. The best scoring (integrated) solutions improve the thermal perception of cyclists during uncomfortable weather situations for every test bed. These solutions are flexible in use and able to transform their appearance according to the weather situation at that time. The designs are implemented in existing situations of Rotterdam in order to further detail the solutions.



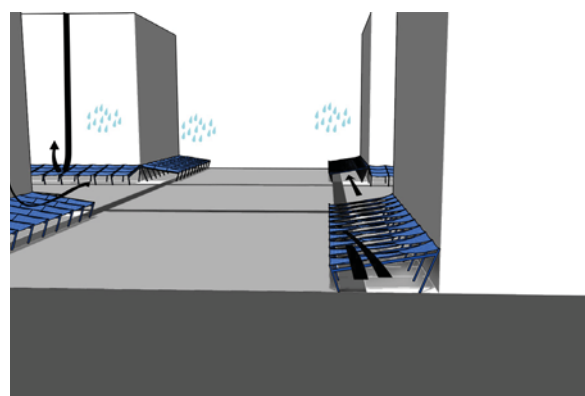
1. Crossings

2. West - east routes

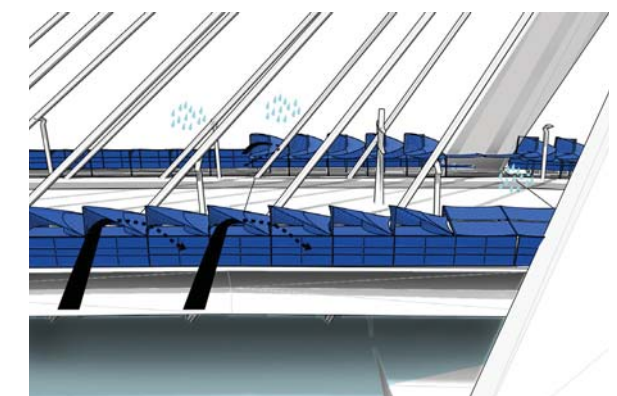
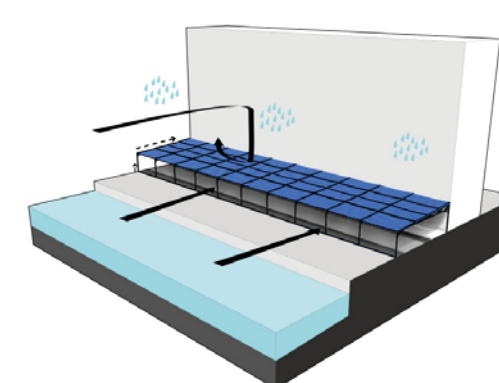
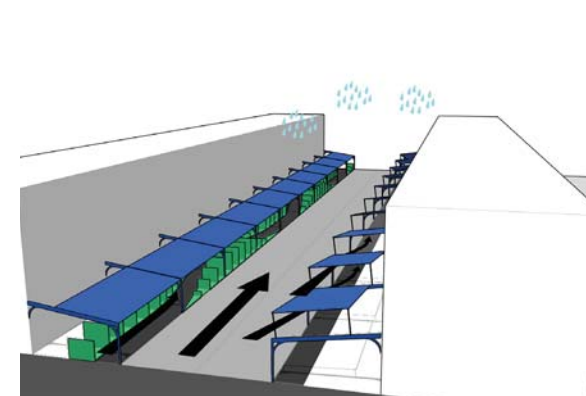
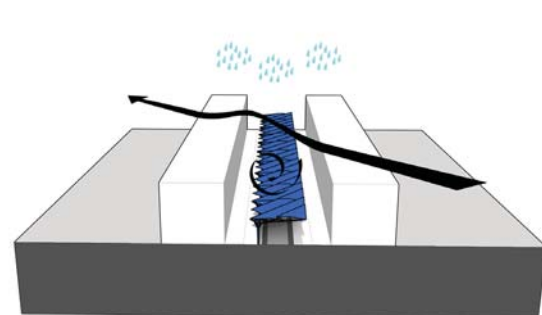
3. Southwest routes

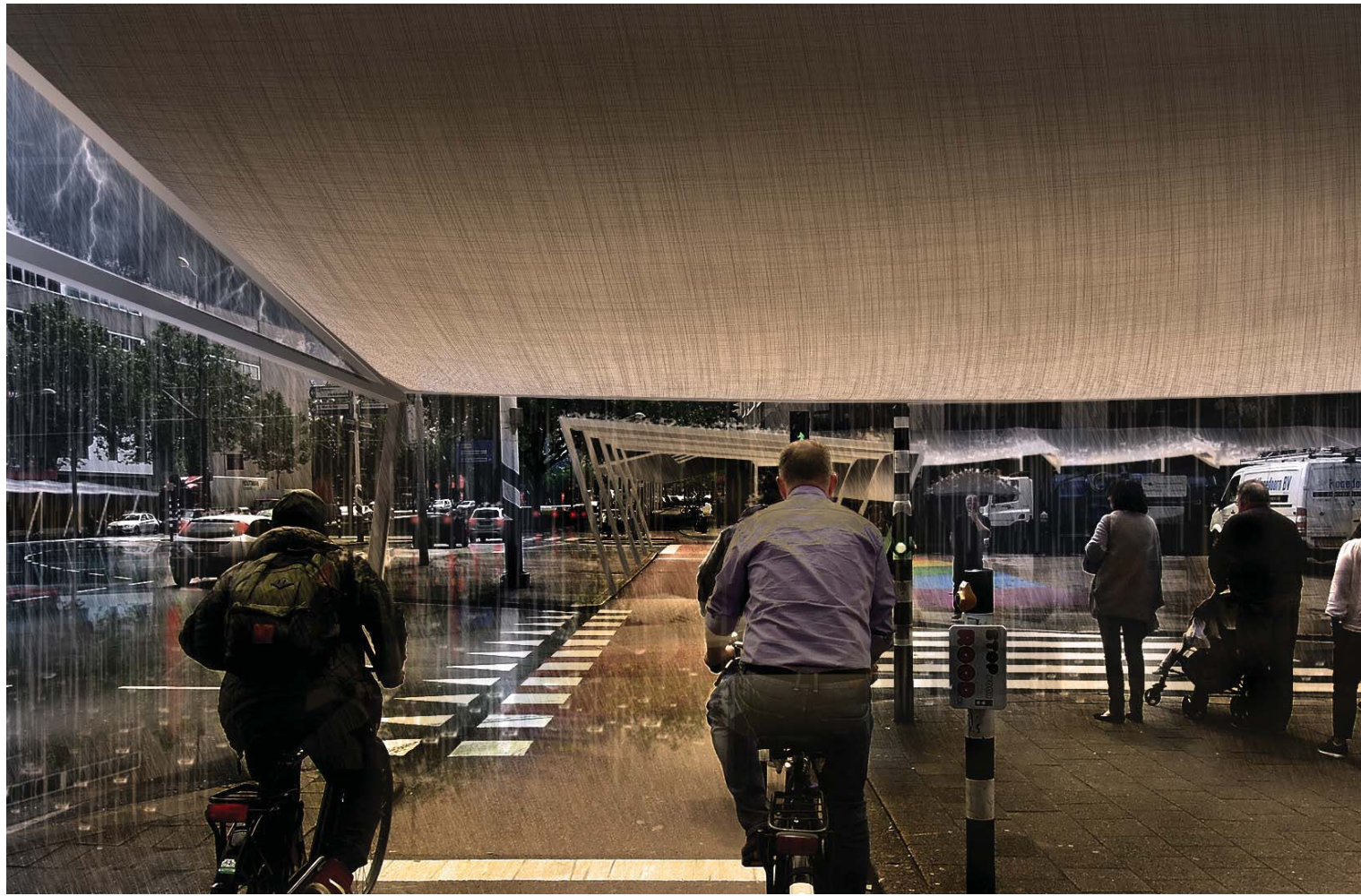
4. Waterfront routes

5. Open routes



Integrated solutions for the 5 test beds





Solution for crossings



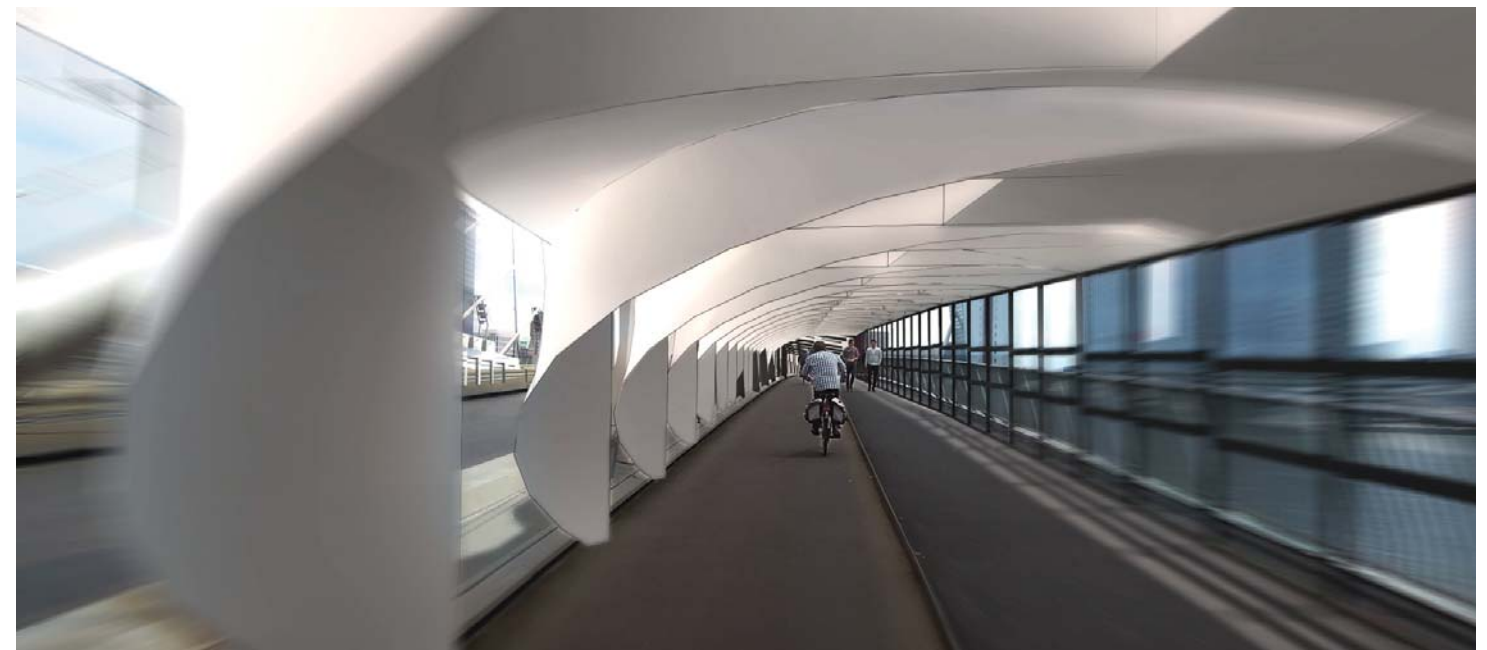
Solution for southwest routes



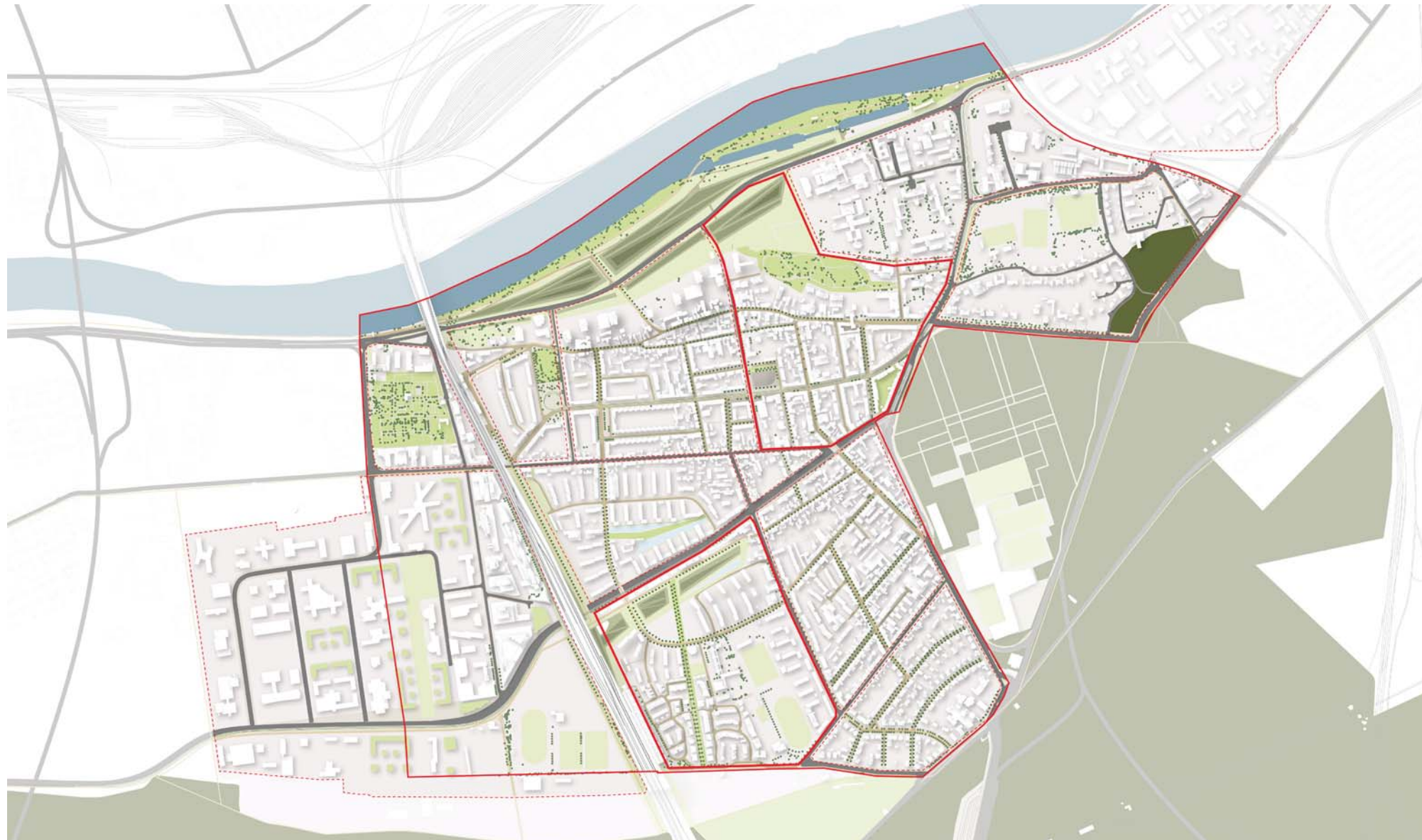
Solution for west - east routes



Solution for waterfront routes



Solution open routes/bridges



- | | | |
|---------------|-----------|------------------------|
| river | asphalt | bicycle path |
| pond/fountain | pavers | sport field |
| groen (veld) | squares | planborder |
| groen (veld) | trottoir | playground (0-6 year) |
| shrubs | plots | playground (6-12 year) |
| meadows | buildings | parking garage |
| woods | garden | tram/train stop |
| allotments | hedges | picknick/tarrace |

Rosanne Weijers

Name supervisors: R. (Rudi) van Etteger and S. (Sven) Stremke)

Finding elusive quietness

Building tranquil communities in the outskirts of Frankfurt am Main, Germany

Abstract

The noise from traffic in cities is increasing, while the extension of quiet areas is decreasing. As a result, comfortable sound environments have become elusive, which represents a severe health risk. Despite this, little is known about what constitutes a pleasant sound environment and what it affords people. In addition, designing an acoustically comfortable public space is still a challenge for urban planners and designers, as no sound-responsive strategies are available on how to optimally design a comfortable acoustic environment. The objective of the study for this thesis then was to conduct sound-responsive strategies for the creation of an acoustically comfortable public space and larger public space networks on the outskirts of Frankfurt am Main. The impact of seasonal acoustic conditions on overt user activities was determined and tested for a multiple-case design in a suburban district of this German agglomeration. For this, sound measurements (including decibel and spectral measurements), intercept surveys, observations (including behaviour maps, and photo surveys) were conducted in winter (February 2016), spring (May 2016), summer (July 2015) and autumn (October 2015). The research findings failed to indicate that people appraise lively (pleasant foreground) and boring (unpleasant background) orchestrations as calm environments (pleasant background) –undisturbed by traffic noise. People dispraise chaotic orchestration (unpleasant foreground), as they strongly affect their state of mind. Remarkable was the limited impact of acoustic orchestrations on user activities (behaviour) in the public space over the seasons. The fact that people only dispraise chaotic environments suggests that acoustic comfort can be afforded under various acoustic conditions. One way to escape or to solve the urban noise problem, in part, is through a sound-responsive design proposal that affords various acoustic orchestrations. This way people have access to tranquil spaces undisturbed by traffic noise, as well as opportunities to choose between environments different in character. Keywords: noise pollution, acoustic comfort, public space, sound-responsive design.

Illustrative plan of the master planning framework for building tranquil communities according to defensive, offensive and inventive design strategies in Niederrad.



Design elaboration on Kelsterbacherstrasse as bicycle street with indication of the design section and visualisation.



Design section on Kelsterbacherstrasse as bicycle street with representation of the current situation above.



Visualisation of Kelsterbacherstrasse with water element and biotope restoration in spring.



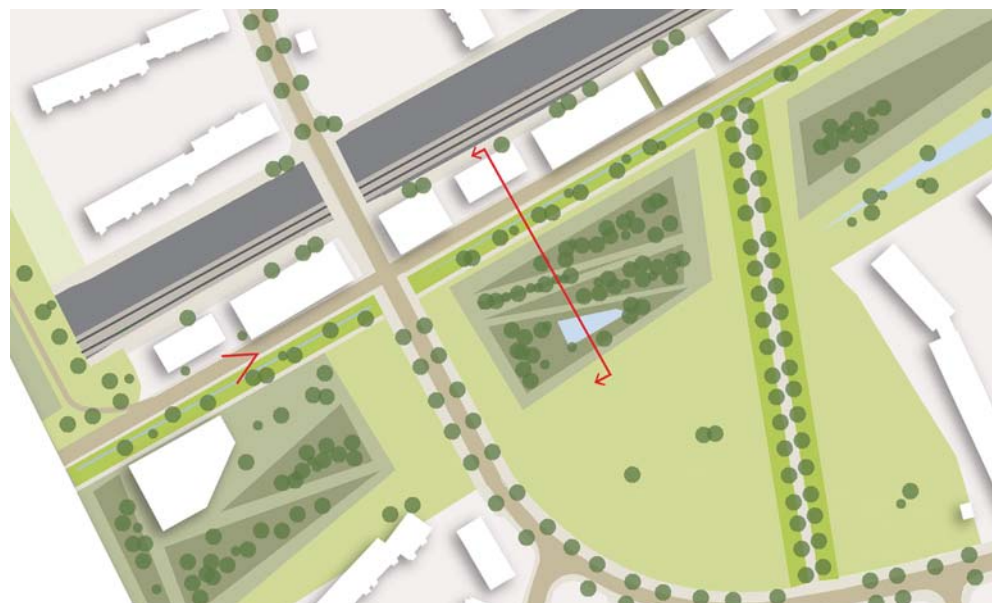
Design elaboration on Bruckfeldstrasse as pedestrian street with indication of the design section and visualisation.



Design section on Bruckfeldstrasse as pedestrian street with representation of the current situation above.



Visualisation of Bruckfeldstrasse with sunken square used as ice rink during christmas market in winter.



Design elaboration on Adolf-Miersch-Strasse with additional bicycle street with indication of the design section and visualisation.



Design section on Adolf-Miersch-Strasse with additional bicycle street with representation of the current situation above.

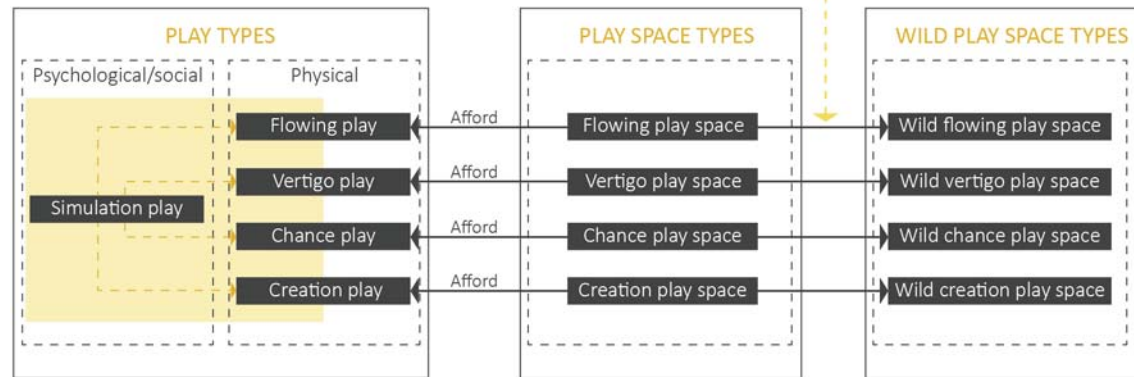


Visualisation of Adolf-Miersch Siedlung with replaced train station and bicycle route in summer.

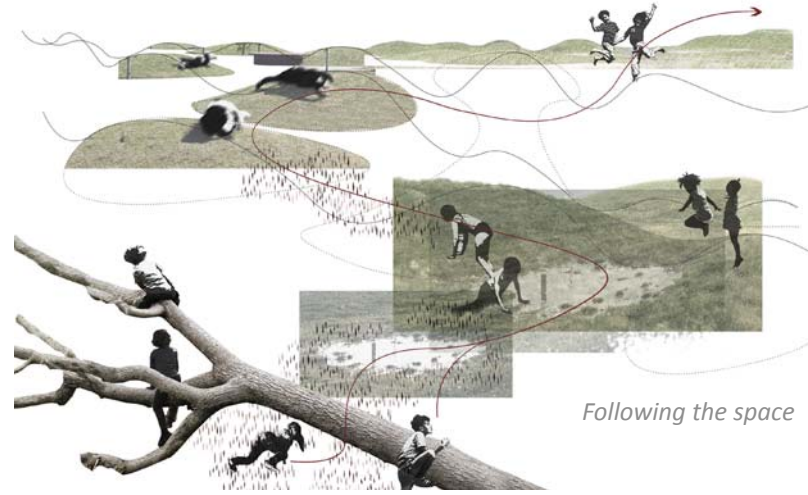


- Qualitative elements of play/playfulness
- *Freedom and open-endedness/
 - *Secrecy and demystifying/
 - *Surprise and unexpectedness/
 - *Transgression and risks/
 - *Fantasy/
 - *Multi-senses

Relationship between play types, play space types and wild play space types



Flowing play space



Vertigo play space



Chance play space



Creation play space



A typology of wild play space prototypes derived from research

Rujia Yu
ir. R (Rudi) van Etteger

Childhood and wildness

Exploring the way to combine wildness with playfulness for children in their immediate living environment, the case Dukenburg, Nijmegen.

Abstract

Children are ought to be wild.

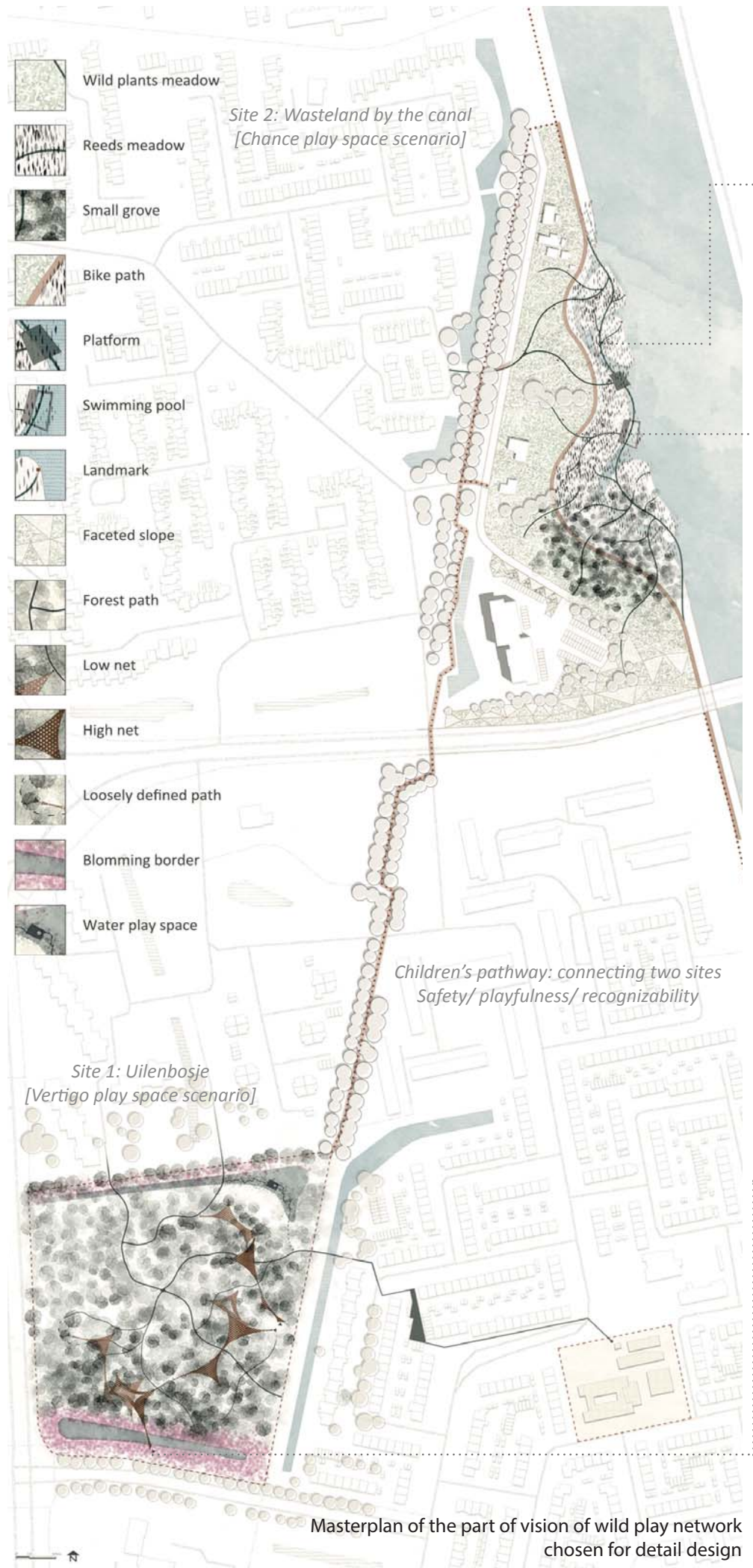
However, nowadays children's play spaces are highly standard and similar in different neighbourhoods, even in different cities, consisting of play equipments chosen from perhaps the same catalogue. There are continuous appeals for nature play in academic research field, but nature is a relatively vague and broad term. On the one hand, the real nature environment is rare in urban or suburban realm. On the other hand, the vulnerability of nature actually against children's transforming or disordering play activities. At the same time, the common managed nature environment is relatively monotonous for children and again prevents or at least discourages any kind of disordering. In this regard, instead of play in nature, play in wildness could be a solution. And the truth is wildness brings a further dimension of "natural environment".

This study therefore aims to look for the wild and instinct relationship between children and the natural world and explore the way to combine wildness with playful qualities to facilitate children's play in their immediate environment.

The purpose of this study is achieved by research and design process. The research consists of two parts. By understanding the notion of play, qualitative elements of playfulness are extracted and a typology of play space types are generated. At the same time, the understanding of wildness together with reference studies offers many implications about designing wild play space. The research result is tested in Dukenburg, Nijmegen. As one of the representative post-war district planned by functionalism concept, the result of this study is also applicable for other comparable residential areas. In the end, a vision plan of play is generated and detailed design of two selected sub-sites offer two main ways to facilitate children's play with wildness.



Vision plan of wild play network proposed in Dukenburg



Children follow the exploration path and immerse themselves in grassy sea



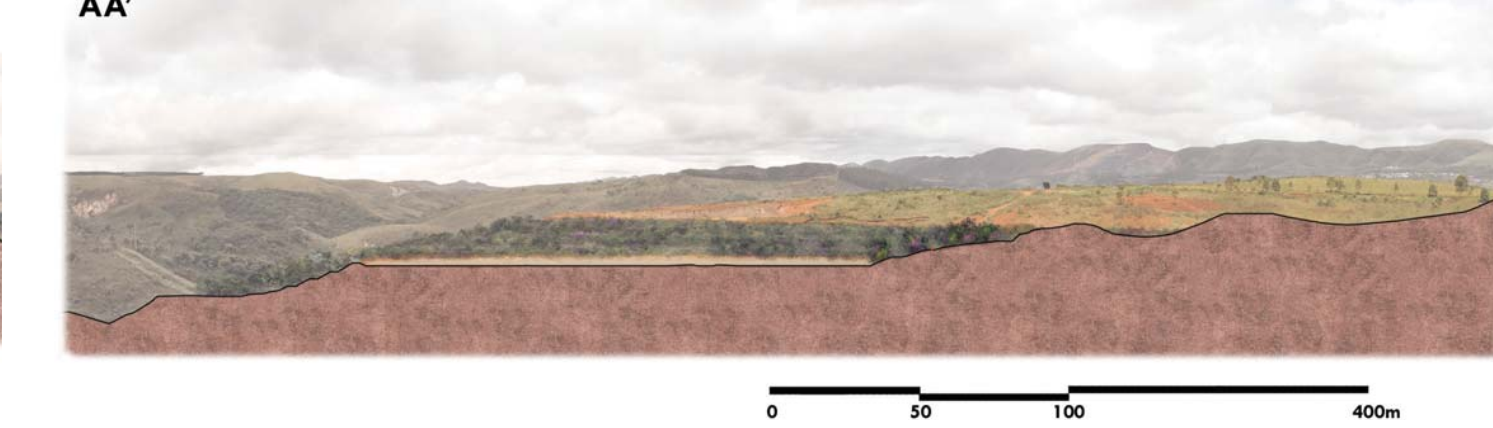
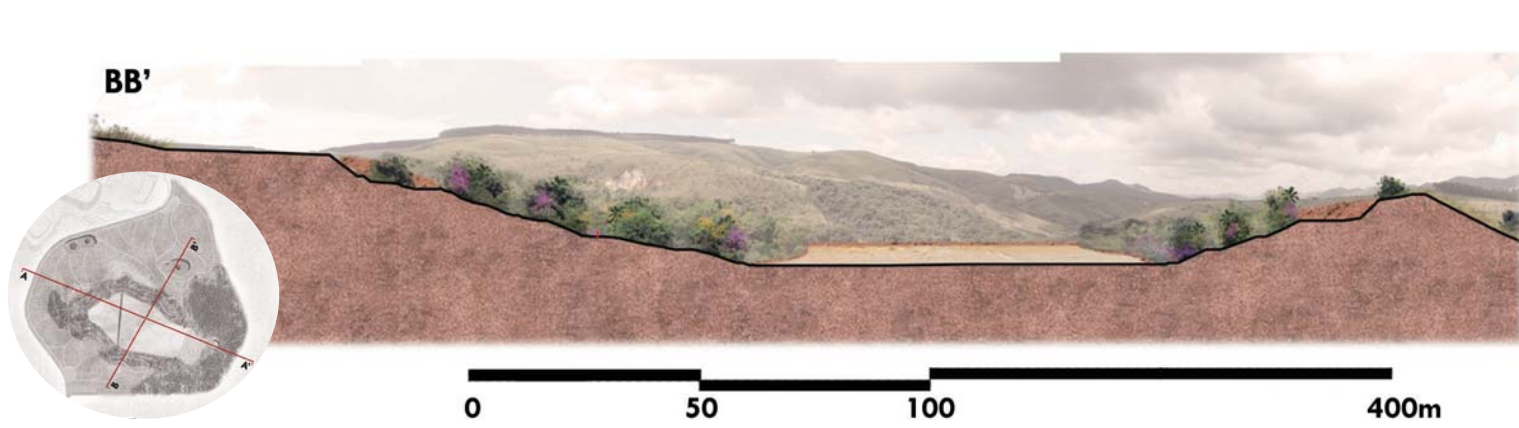
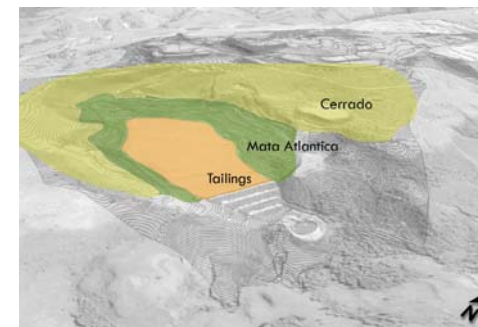
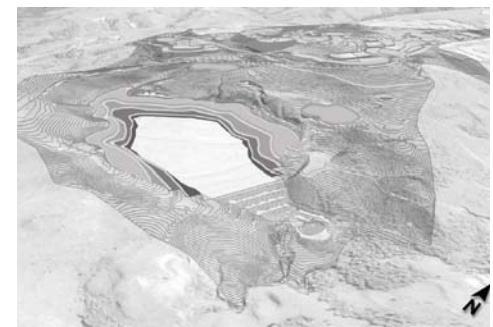
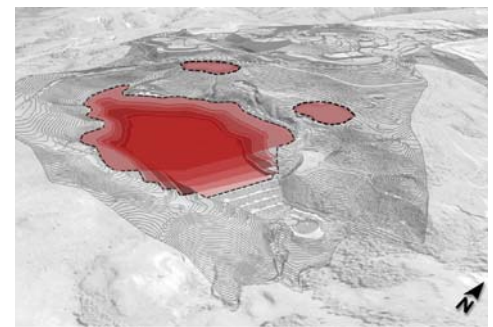
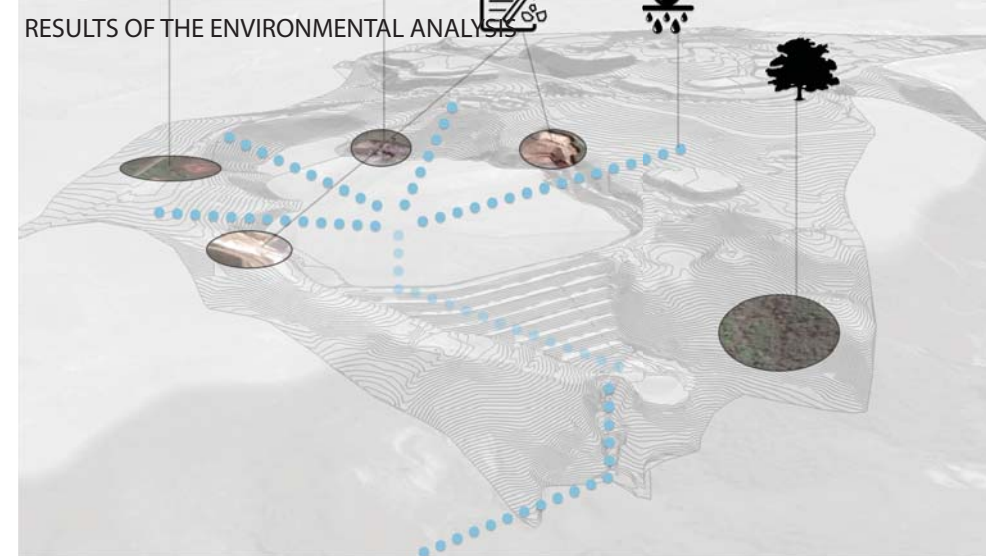
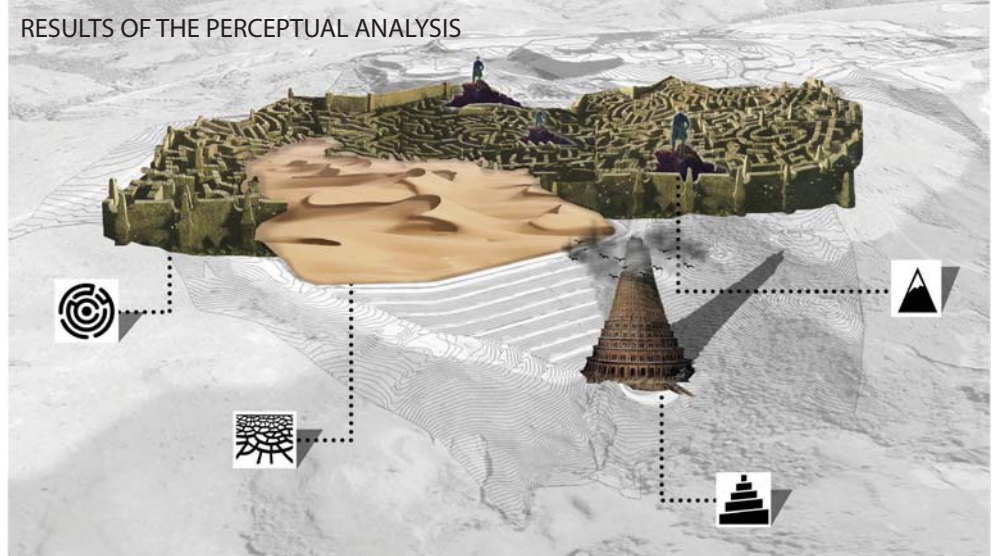
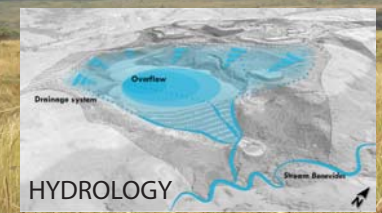
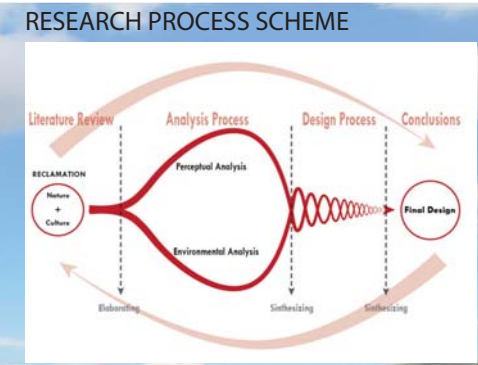
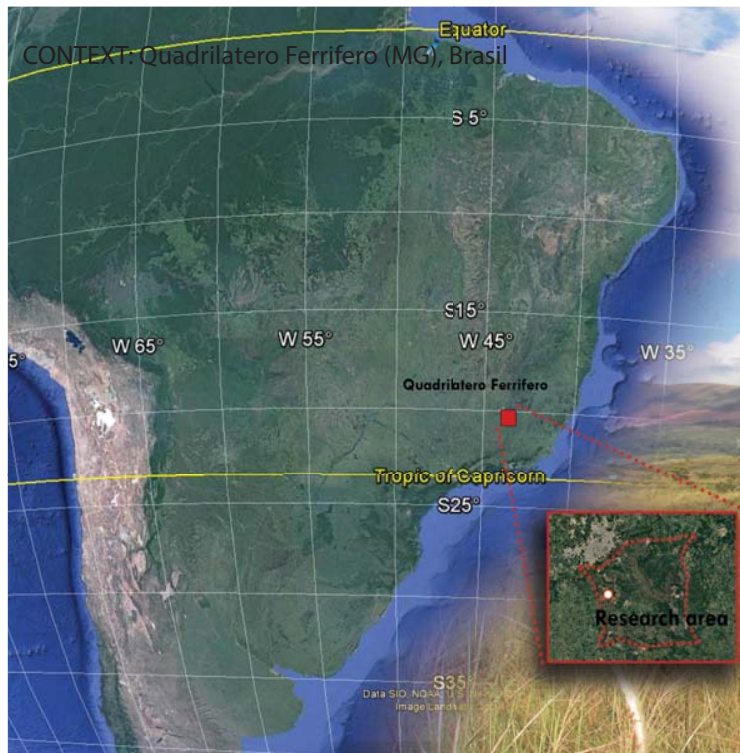
Panorama of intersection of bike lane and play path



South border (looking from outside to inside)



Impression of vertigo forest play space



Carlo Leonardi

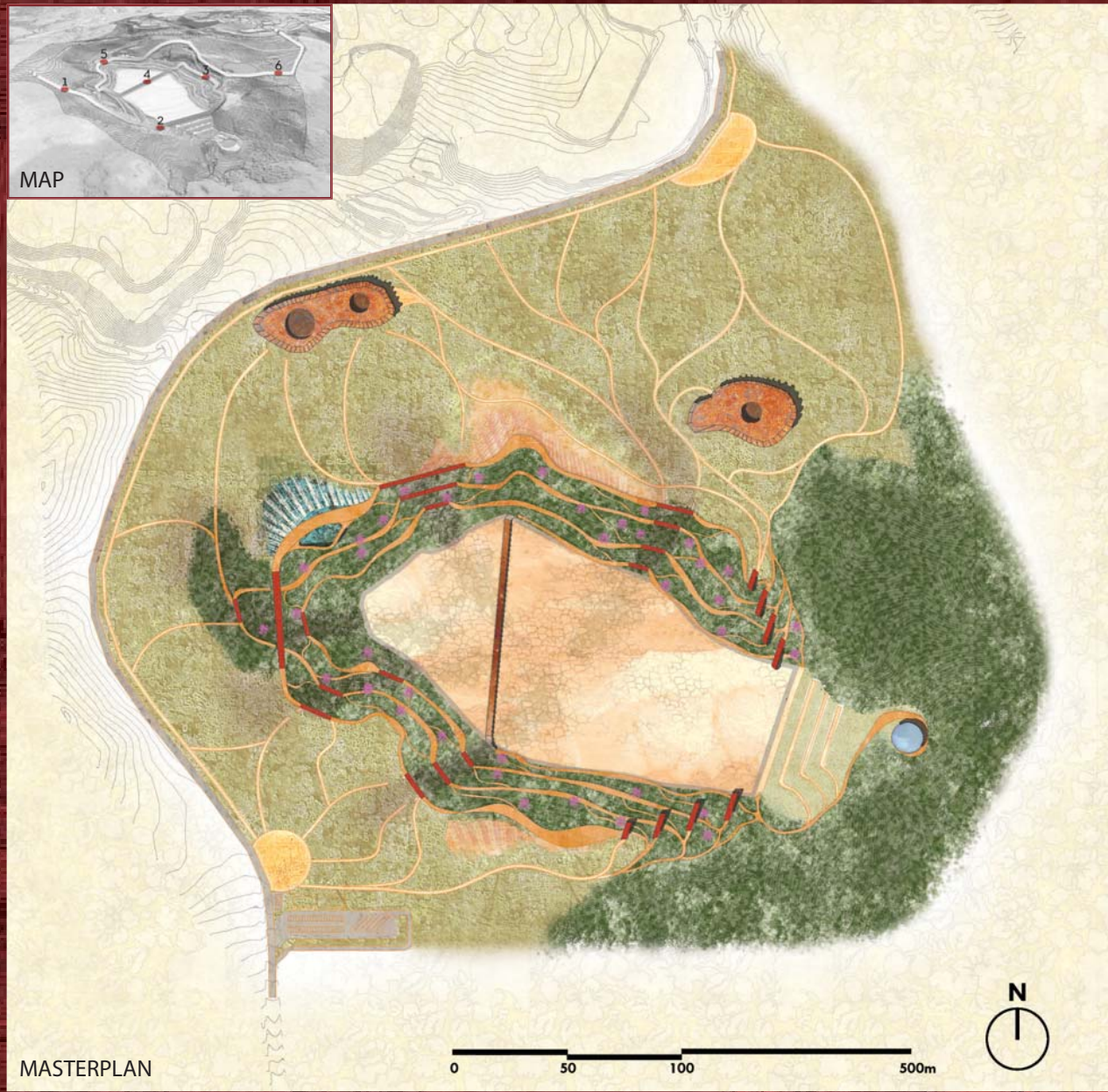
Paul Roncken, Assistant Professor Landscape Architecture Wageningen University
 Dr. José Eustáquio Machado de Paiva, Professor at Federal University of Minas Gerais

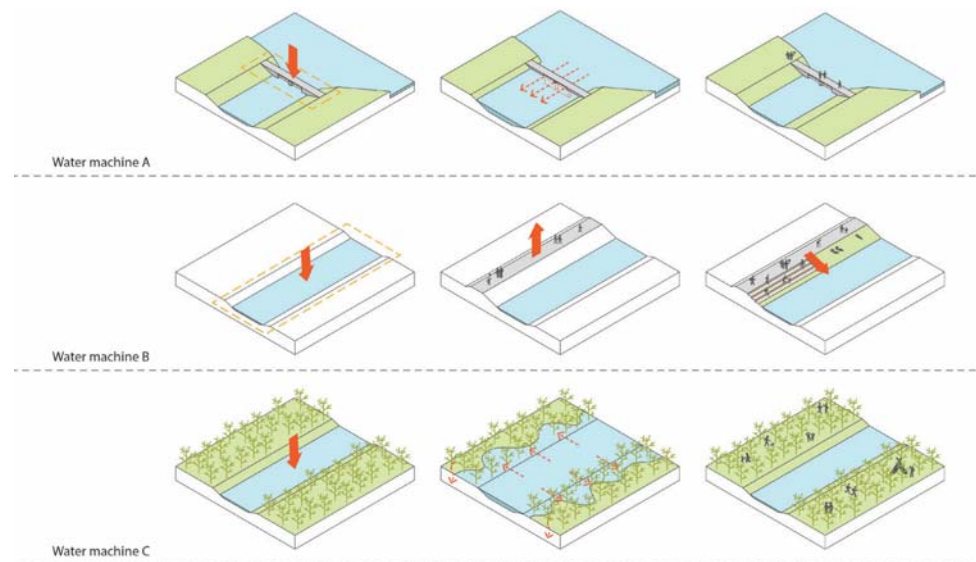
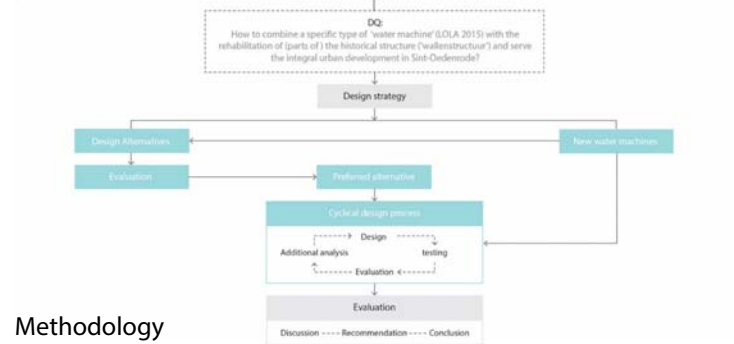
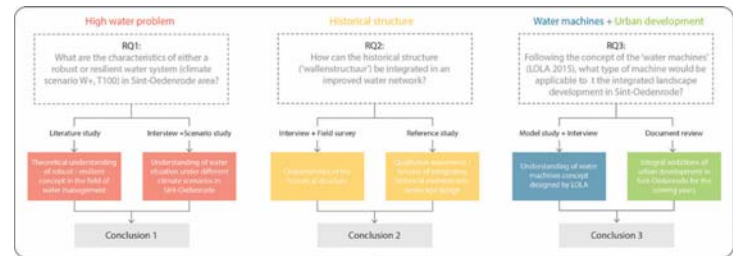
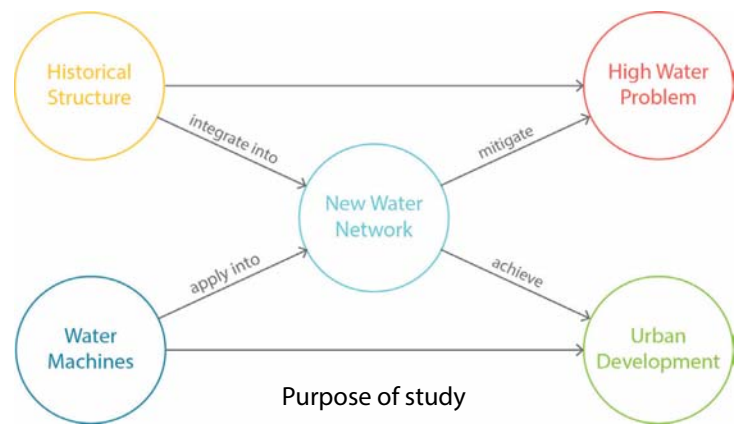
Experiencing the Post-mining Wonder

Reclaiming a new purpose for Post-mining Landscapes in the Quadrilátero Ferrífero (MG), Brazil.

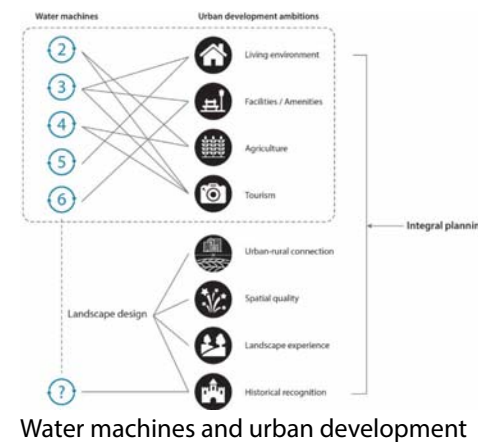
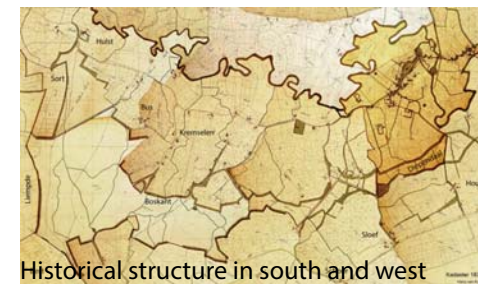
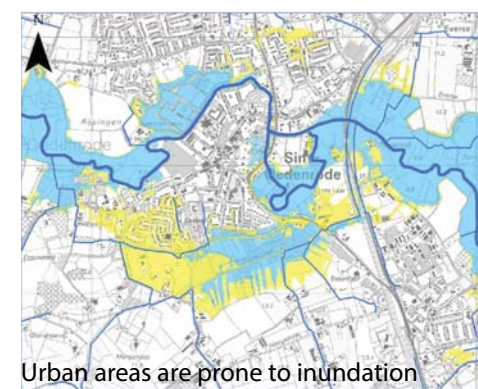
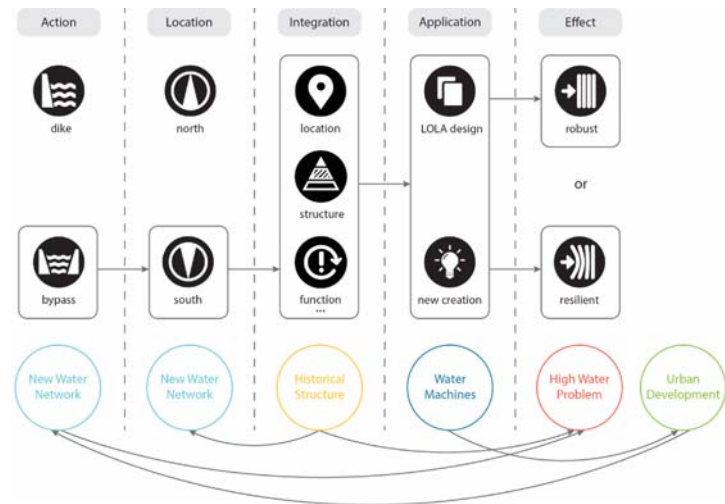
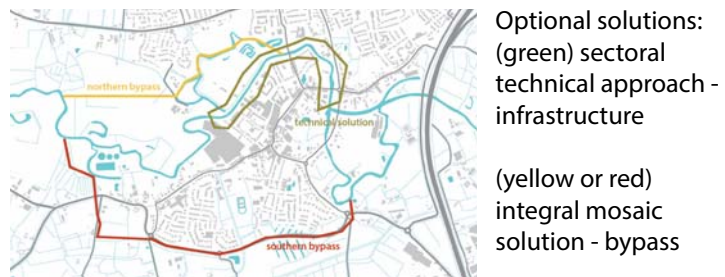
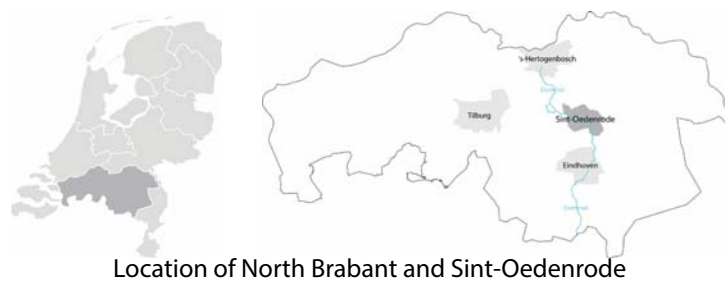
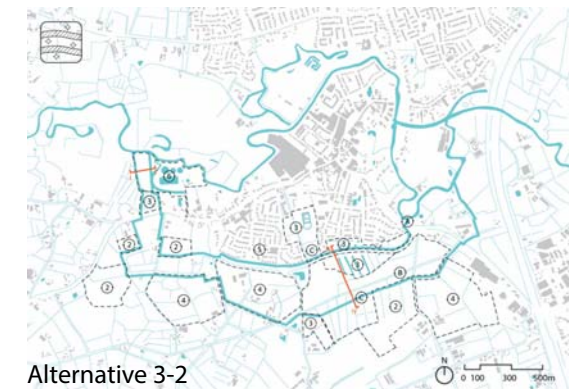
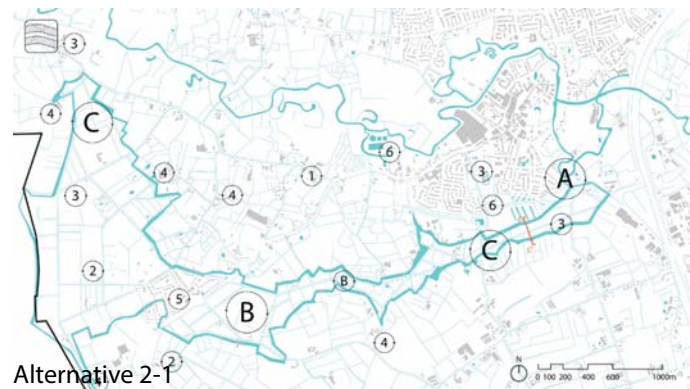
Abstract

The technological developments of the last century left behind many abandoned industrial landscapes which constitute a threat to both the environment and to local. Post-mining landscapes are the result of this process and they are expected to grow in number worldwide, in the coming decades. Reclamation, as defined by Berger, is the practice of recovering these landscapes as a laboratory for new scripts; minimizing their negative impacts and maximizing their aesthetic and ecological functionality. Moreover, the author denounces the failure of landscape designers in looking at these landscapes through a purely technical or economic perspective. Integrating the aesthetic experience beyond its traditional connotations within the sustainability discourse, is an issue raised also by many other experts in different fields of knowledge. Although recently many good examples of reclamation projects are arising, there is a lack of literature on how the scenic aesthetic component of these landscapes should be taken into account together with ecological values, especially for such controversial places as post-mining landscapes. In my thesis, I have investigated upon this issue through a specific design challenge located in the Quadrilátero Ferrífero (MG), Brasil. To understand how reclamation can be achieved, I conducted qualitative research which analyzed the scenic aesthetic and the ecological components of the landscape separately. Finally, I used my design capacities to combine these two apparently divergent perspectives for the specific site and derived some guidelines that could be applied to other post-mining reclamation projects.





New water machines for Sint-Oedenrode



Design strategy

| Category | Criteria | Alternative 1-1 | Alternative 2-1 | Alternative 2-2 | Alternative 3-1 | Alternative 3-2 |
|-------------------------------|---|-----------------|-----------------|-----------------|-----------------|-----------------|
| Historic value | Reinstatement of historical 'wallenstructuur' Opportunities for Experiential design (narrative / education / recreation) | + | ++ | + | + | ++ |
| Ecological value | Diversity of nature and landscape Ecosystem services (local) | + | + | + | + | ++ |
| Economic value | Efficiency of water use Sustainable / productive agriculture Potential for tourism | + | + | + | + | ++ |
| Feasibility of implementation | Budget Consideration and use of existing situation Control and maintenance | ++ | + | + | + | ++ |
| Summary | Values / feasibility | +/+ | ++ | +/+ | +/+ | ++/+ |

Evaluation

Xiao Chen

Supervisor: Paul Roncken

Water machine networking

Designing a future-proof water network for integral urban development in Sint-Oedenrode, The Netherlands

Abstract

A provincial project 'Mosaic Brabant' creates six development mechanisms – water machines that act as new spatial bond to connect urban and nature of North Brabant to steer the interplay of all the ambitions. To translate the regional principles into local proposals, Sint-Oedenrode intends to be a 'pioneer' as an experimental case to test the use of project results and integrated approach of 'Mosaic Brabant'. Together with a new discovered historical structure 'wallenstructuur', they form the starting point of the thesis. In addition, the changing climate has forced Sint-Oedenrode to take measures for unpredictable future, thus the topic is extended to develop an integrated system that involves all the relevant issues.

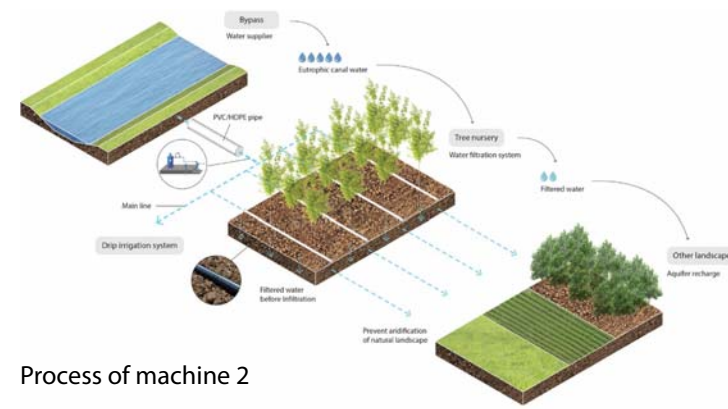
The study therefore begins with looking into the concepts of a sustainable water management and analyzing the water situations in Sint-Oedenrode, getting to know the historical structure and the method of integrating it through landscape approach, a complete understanding of water machines and investigating the requirements of urban development in Sint-Oedenrode. On the basis of the research conclusions, a cyclical design process is conducted which comprises two parts: an exploration of alternatives concerning with different concepts of water system as the possible solution and preliminary plan; followed by further detail design that is line with the characteristics and the goals of Sint-Oedenrode.

As a results, the thesis creates a new integrated water network by applying the regional development principles water machines, and the local existing historical structure 'wallenstructuur', into the specific context of Sint-Oedenrode in the Netherlands. It can not only deal with the high water problem in central urban areas even when subjected to extreme climate scenarios, but also add potential values to water system through various water machine functioning for integral ambitions, which includes historic, ecological and economic values. It finally provides more opportunities that contribute to urban development of Sint-Oedenrode in the future.

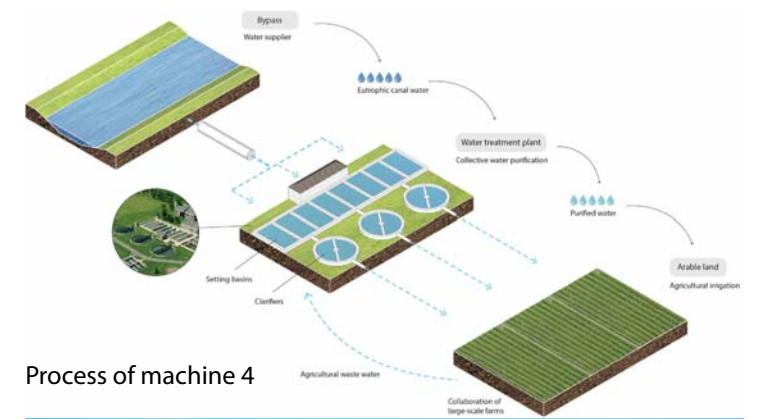
Master plan



Forest Tree nursery Farmland Grassland Flower field



Process of machine 2



Process of machine 4



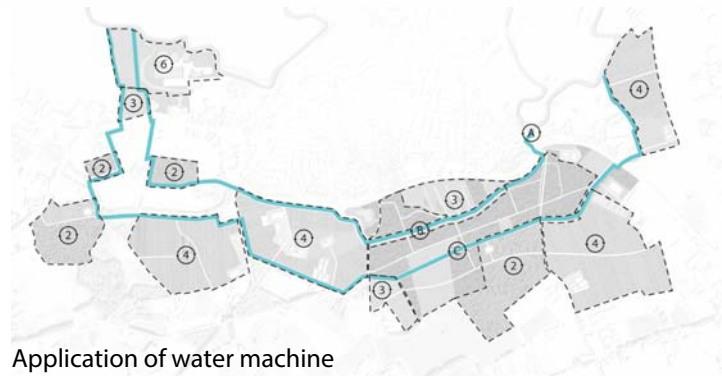
Machine 2 - 'Bio-industrial filter'



Machine 4 - 'Collective water purifier' and flower fields



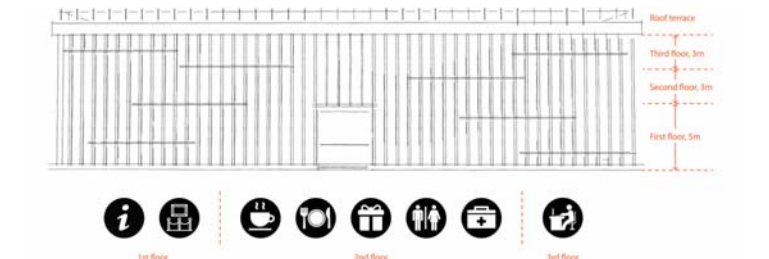
Machine A - 'Sluice bridge'



Application of water machine



Machine 2 - Workshop in tree nursery



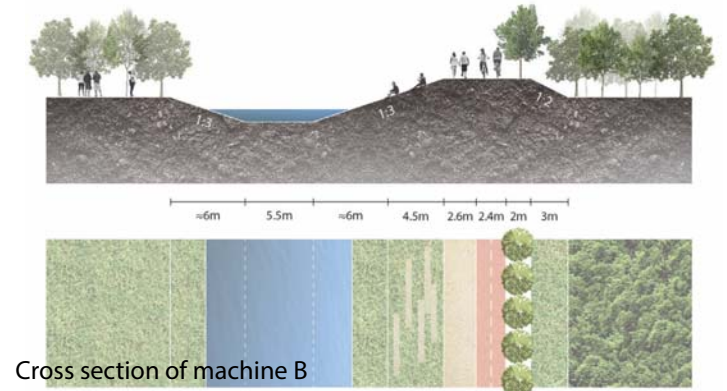
Machine B - 'Regain wallenstructuur'



Machine C - 'Forest as conserver' in normal time



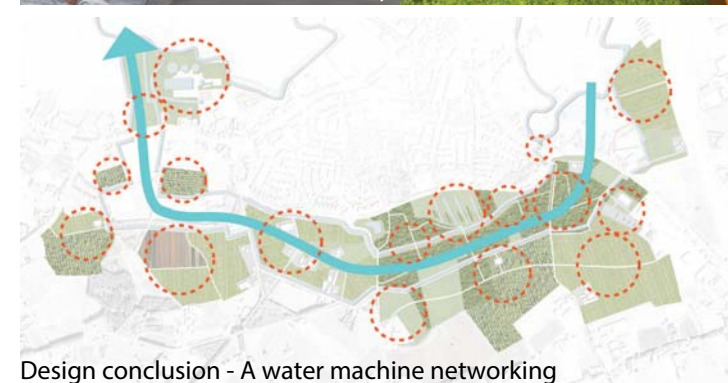
Machine 3 - 'Natural amusement park'



Cross section of machine B



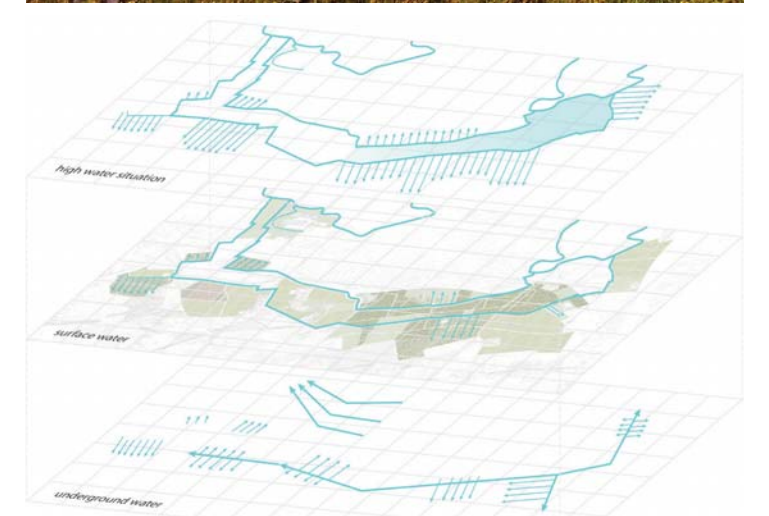
Machine C - 'Forest as conserver' in high water situation



Design conclusion - A water machine networking

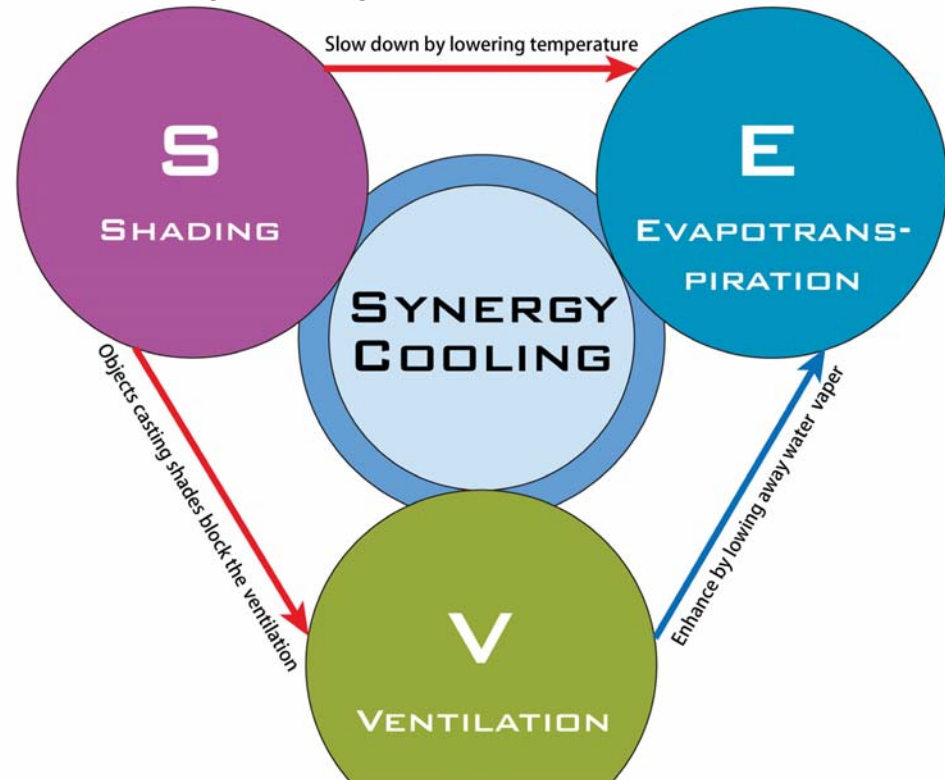


Visitor center at the entrance near A50

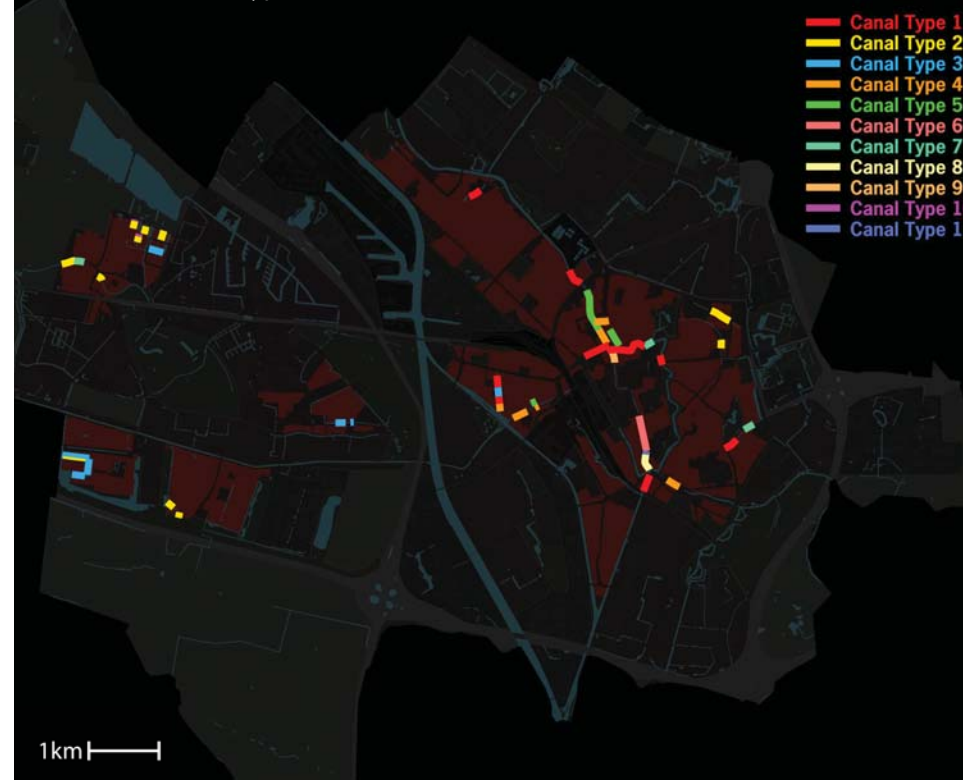


Design conclusion - Water machine interventions

The relations amongst the cooling mechanisms



Distribution of canal types



Zhonglin Gao

Name supervisors: Sanda Lenzholzer, Gert-Jan Steeneld (from Chair Group Meteorology and Air Quality)

Truly Cooling Water Bodies

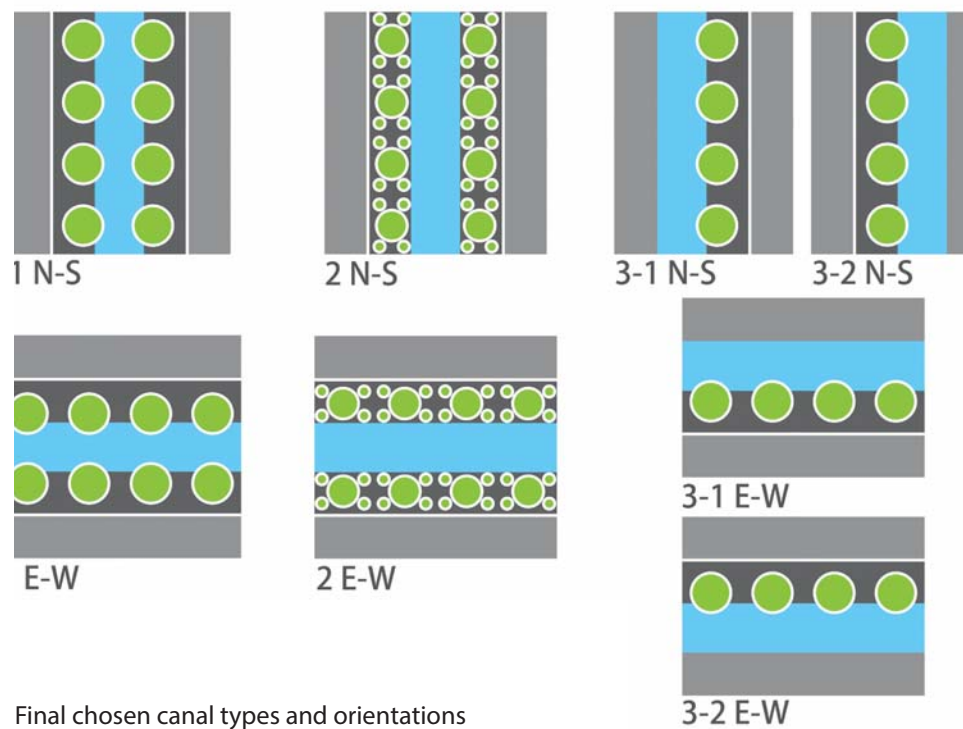
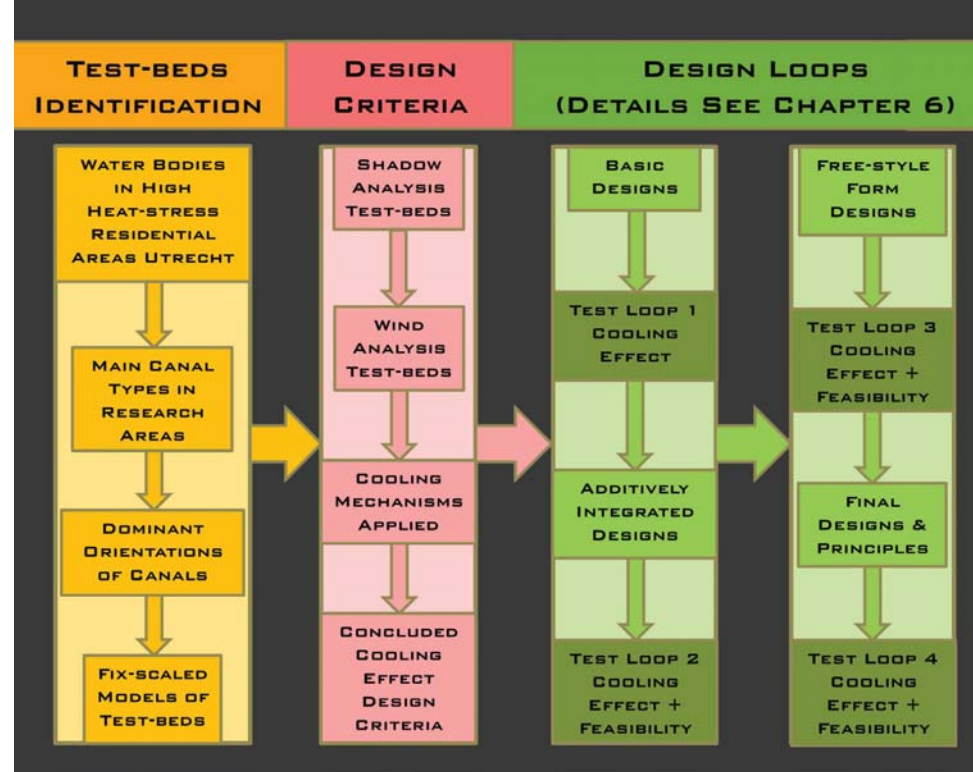
Lowering Urban Heat-stress, Utrecht, Netherlands

Abstract

This master thesis focuses on the “truly cooling water body” design which lowers urban heat-stress in residential areas in Dutch water cities during warm periods, using city Utrecht as an example.

Nowadays, the UHI (urban heat island effect) and global warming have made it more and more urgent to mitigate the urban heat-stress. Water retention for potential flooding has forced Dutch water cities to give more space to water and have more urban water bodies. In the past, designers thought water bodies cool down the environment. However water’s heat inertia makes it heating up the environment during the night in hot periods. It is necessary to design truly cooling water bodies.

The flow diagram of the RTD process

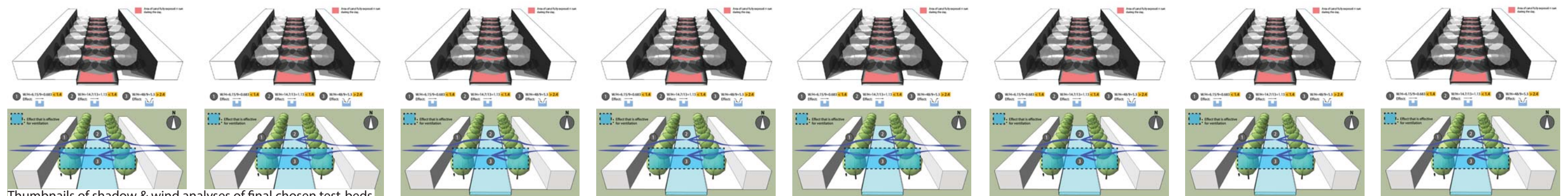


Final chosen canal types and orientations

The whole process of designing truly cooling water bodies follows an RTD (research through designing) process. The typical water bodies are identified in the intersections of residential and high heat-stress areas in Utrecht. They are then analyzed with their shadow and wind behaviors in hot periods.

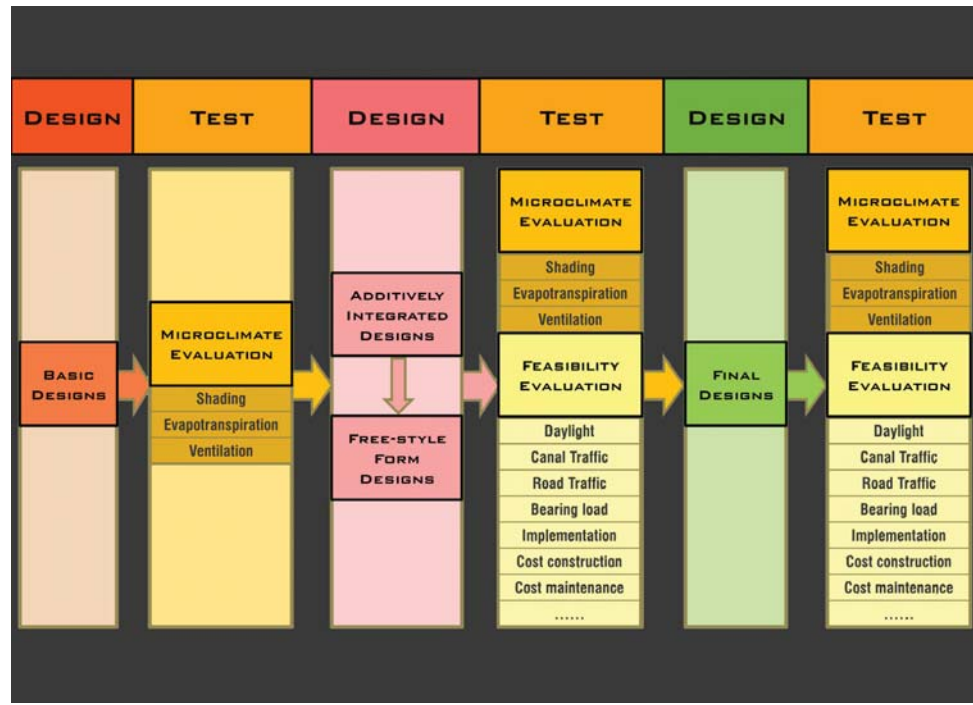
Based on the analyses results, the design criteria are set for the design loops. The process of the design loops of this thesis is iterative, it goes from basic single designs to integrated designs. By combining and synthesizing, adding more evaluating criteria in the later design loops, refinement of the designs is achieved.

Finally, final design recommendations and design principles for representative water body types in the research areas are concluded from the design loops.

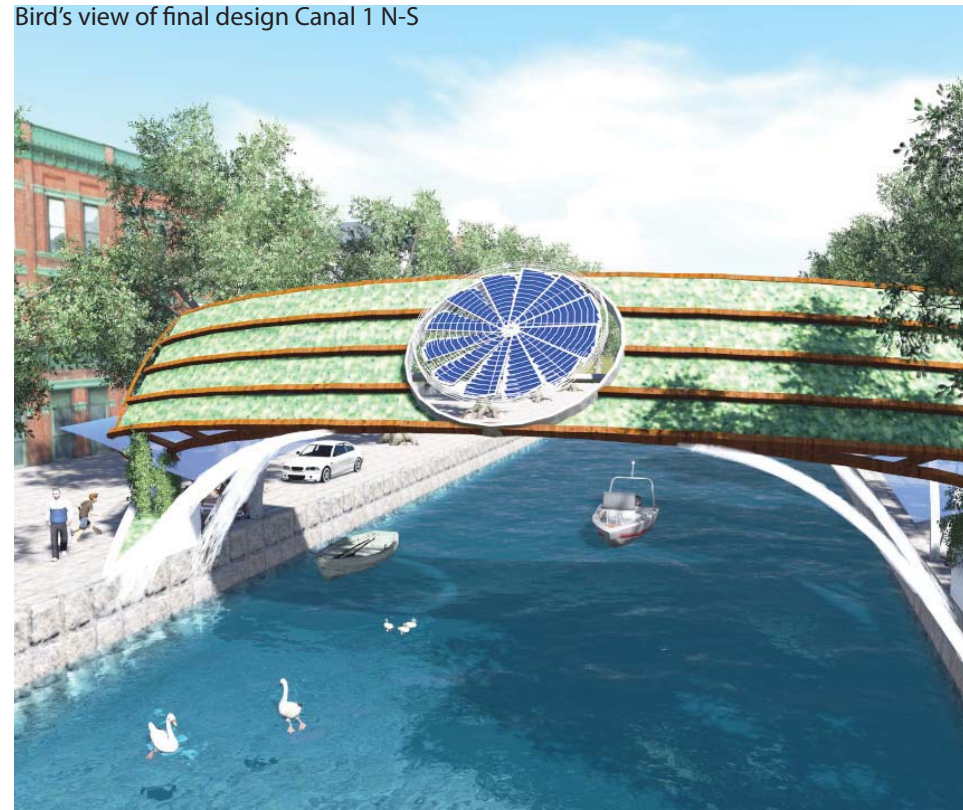


Thumbnails of shadow & wind analyses of final chosen test-beds

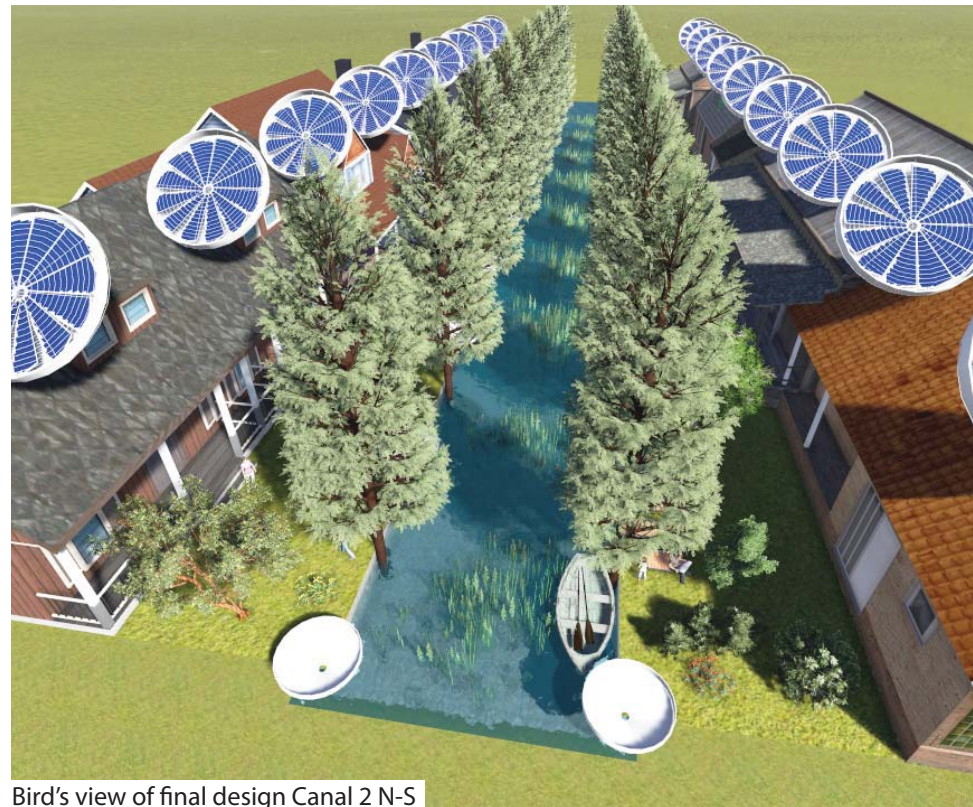
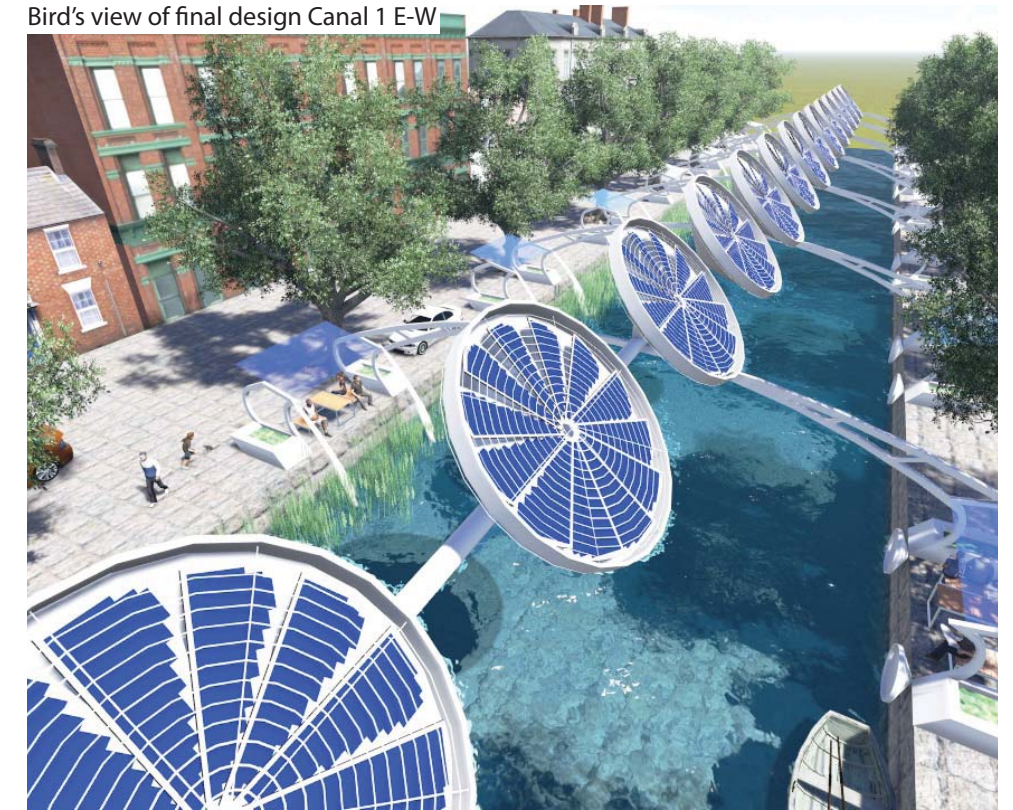
The flow diagram of the design loops



Bird's view of final design Canal 1 N-S



Bird's view of final design Canal 1 E-W

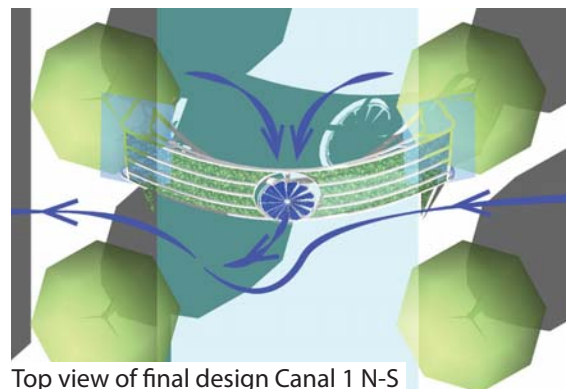


Bird's view of final design Canal 2 N-S

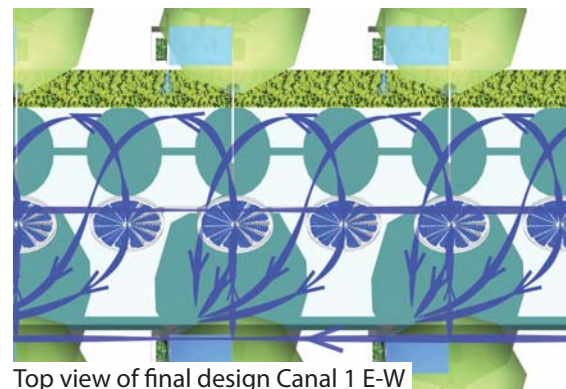


Bird's view of final design Canal 2 E-W

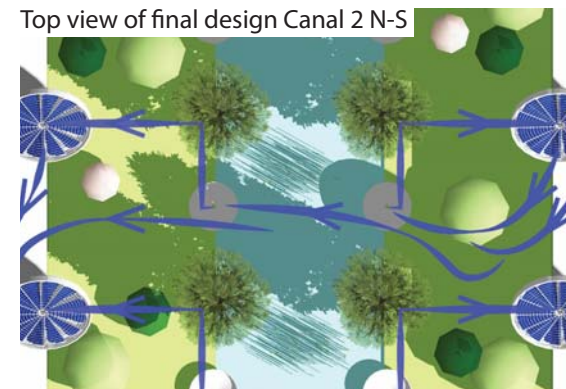
Bird's view of final design Canal 3-1 E-W



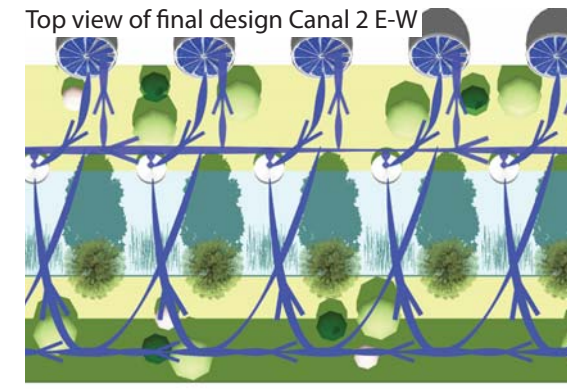
Top view of final design Canal 1 N-S



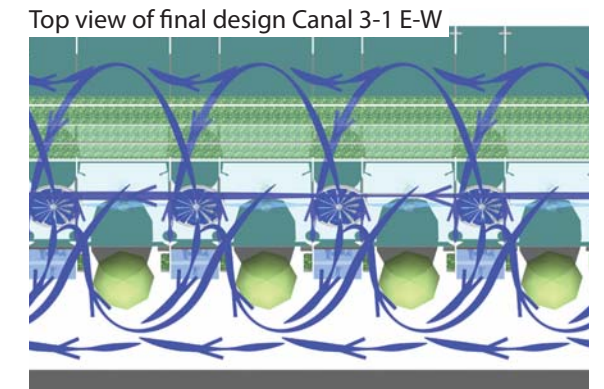
Top view of final design Canal 1 E-W



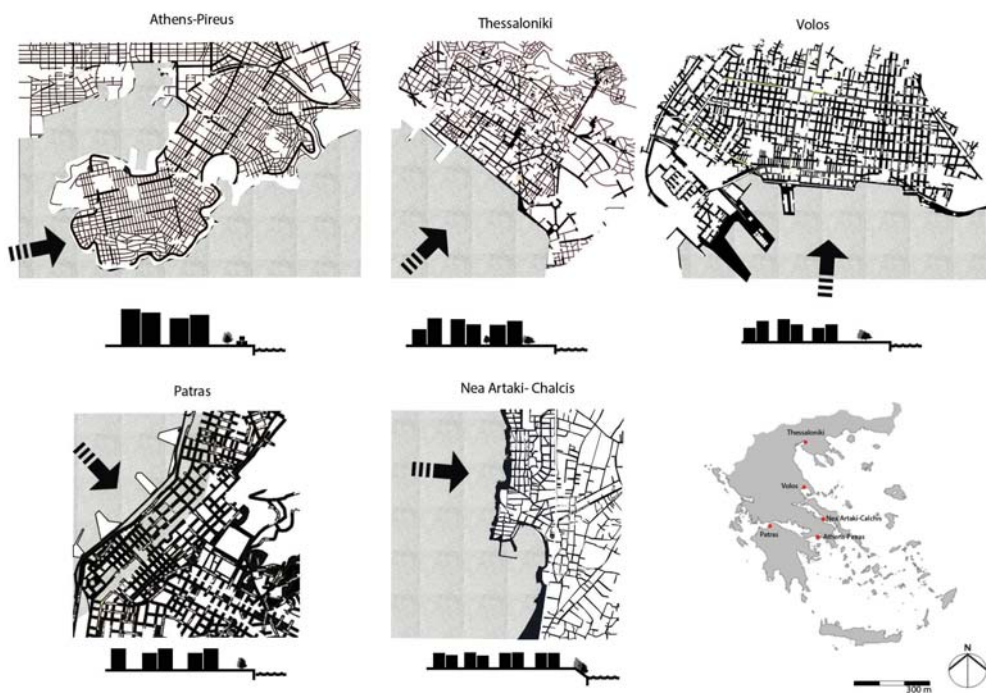
Top view of final design Canal 2 N-S



Top view of final design Canal 2 E-W



Top view of final design Canal 3-1 E-W



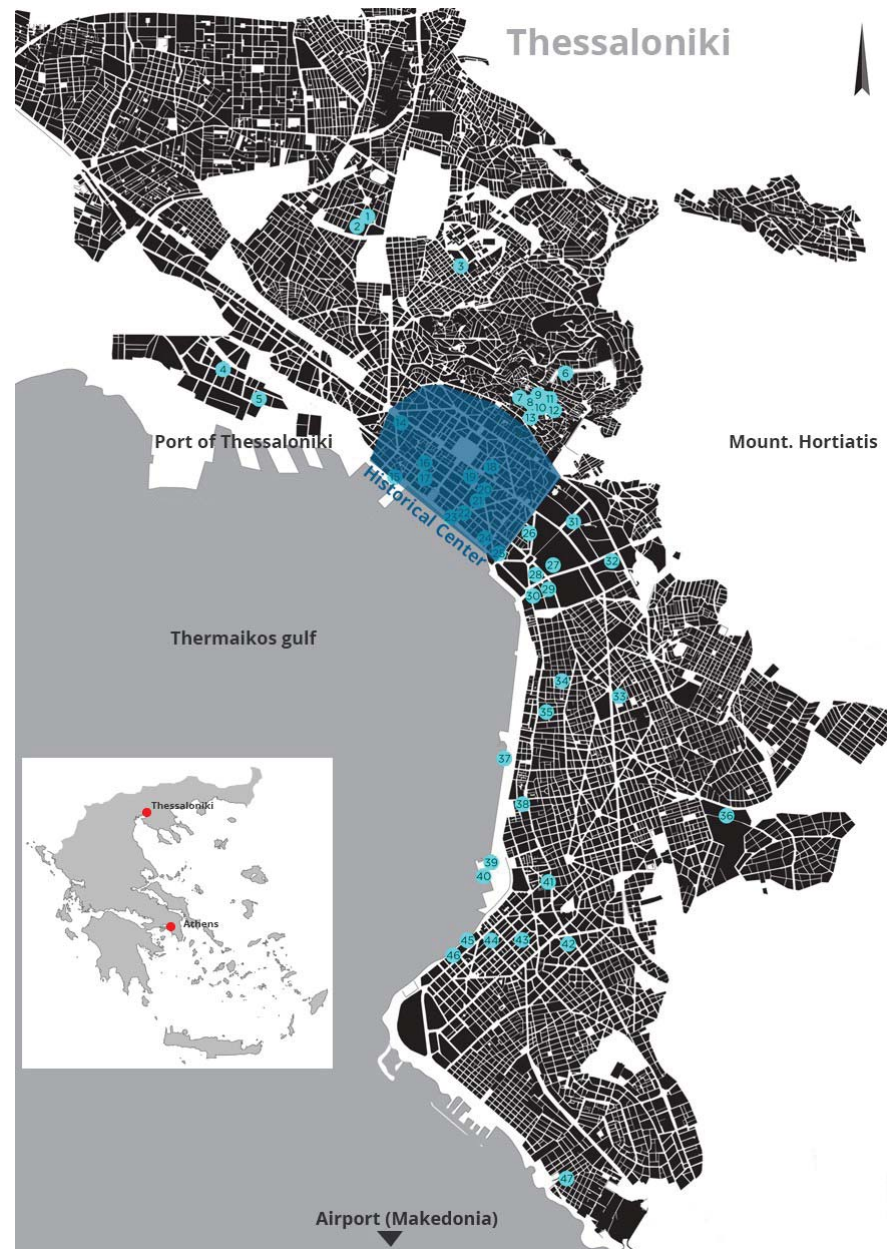
Five dense Greek coastal city centers with similar architectural setup that indicates similar environmental and thermal conditions.



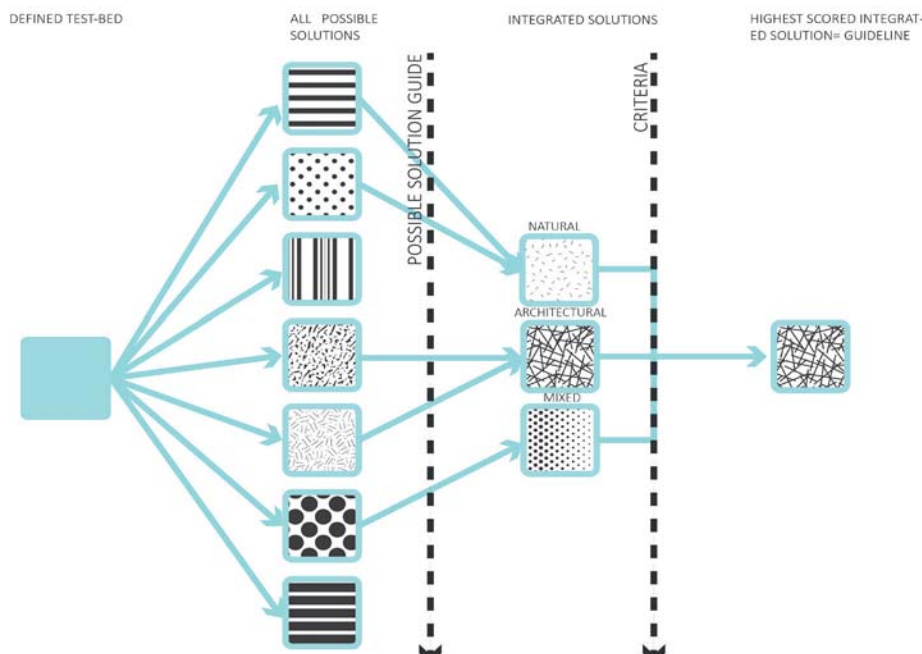
The 5 main types (orientations) and the 14 typical street profiles on the sitegrid structure of the city: NW-SE, SW-NE, N-S, W-E and the waterfront (NW-SE).



Overlap of the shadow and wind analysis is resulted in the four most problematic profiles, that serve as a basis for the test-beds.



EVALUATION PROCESS - The scoring contains four main variations: 0 (the existing situation, when the design did not add to the current conditions) +, ++ and +++ as the highest mark. In order to conclude in the best integrated solution, the evaluation process differentiates summer and winter solutions. When the winter situation was analysed, the evaluation considered that winter thermal conditions such as shading has negative effects on thermal perception.



Name student: **Antonia Cangosz**
Name supervisor: dr.dipl.ing. S (Sanda) Lenzholzer MA

Heat strikes on tourism
A thermally comfortable tourist route in Thessaloniki

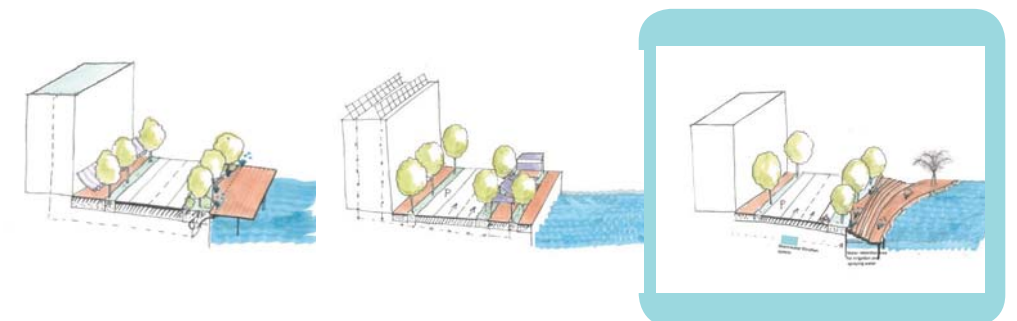
Abstract
Climate constitutes a significant part of the environmental context in which tourism and recreation takes place. However, as a consequence of urban extension and densification influenced by climate change, urban heat and thermal discomfort in urban environment is likely to increase. Thus, considering future predictions, the impact of commulative hot weather on tourism industry of the Mediterranean will have to be considered.

This master thesis aims to create awareness of these extreme meteorological events through the example of Thessaloniki (Greece) where the heat wave phenomenon is very pronounced. In order to solve this striking problem, a climate responsive design was introduced as a result of the research through designing process.

As a consequence of the shadow simulation, wind flow analysis and tourist behaviour study, the most problematic spatial configurations (test-beds) have been identified in a medium sized (5,5 km long) tourist route of Thessaloniki.

Based on the results of the analysis and the previously studied possible solutions, on each test-bed integrated design solutions have been introduced. Then, through the process of the design loops, these optimized solutions have been evaluated through a criteria system. The highest scored integrated solutions (guidelines) are flexible towards seasonality and aim to improve the thermal perception of walking tourists. Within the last design loop, one final guideline was translated into a detailed design. This process helped to reflect on how design guidelines can be implemented on a real site.

Key words: heat wave, urban heat island effect, urban densification, tourism, climate, research through designing (RTD), design guideline, Thessaloniki, Greece



In case of Test-bed 4, the highest scored possible integrated solution is the third solution, that is used as a guideline for redesigning the waterfront.



Problem with the constant sun expose during the discomfort hours (11.00-20.00)



Problem with the ventilation



Problem occurred by the dense traffic that is also a source of anthropogenic heat



Parameters of the waterfront (road Nikis)



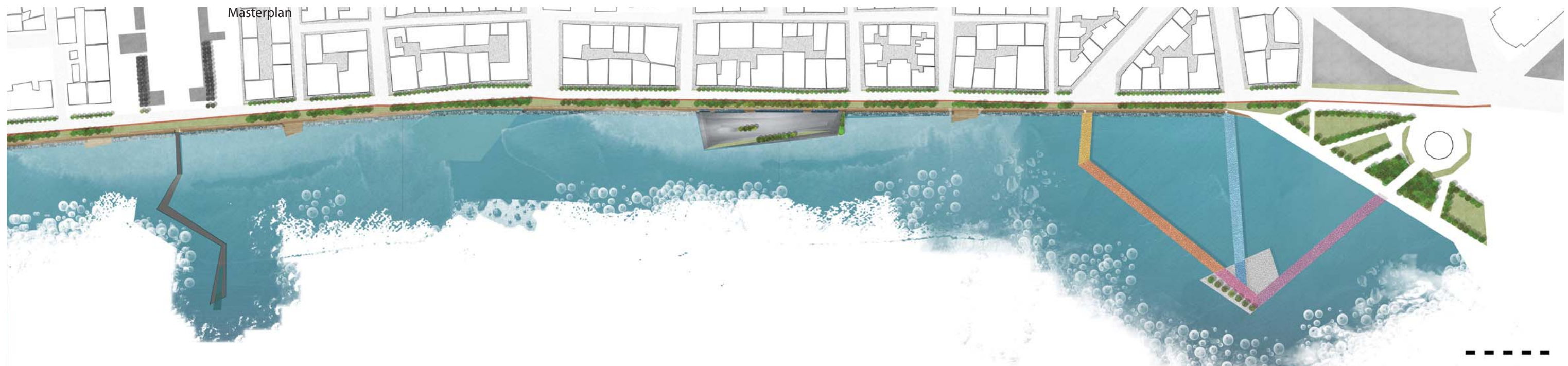
3D section of the connection of additional programming and the guideline



Impression A - Floating path (Path of Orion)



Impression B - Watersquare (Garden of Naiad)



Masterplan

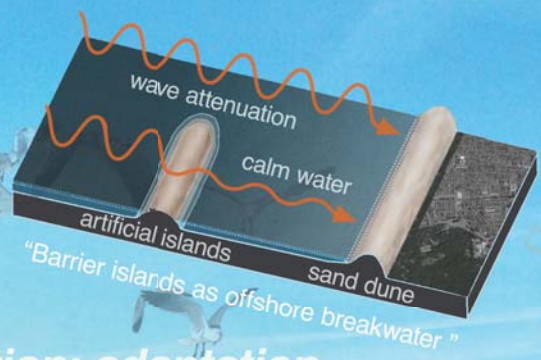
Name student: Changsoon Choi
Name supervisor: Dr. ing. Sven Stremke

Title thesis project: The Blue Heart
Subtitle thesis: A seascape approach to synergetic integration of climate actions in the North Sea

Abstract

Currently, mitigation and adaptation measures are considered as two separate approaches due to differences between the two actions and segregated practices and policy. However, there is a growing interest that a synergetic approach can facilitate integrated climate action bringing substantial benefits to multiple sectors, while reducing the negative impacts of climate change. Nonetheless, the efforts to promote synergies between adaptation and mitigation measures are rare and limited to theoretical and conceptual aspects. There is also little knowledge on how it can be planned and designed in a spatial-explicit manner. Thus, this thesis fills in the knowledge gap by exploring the potential role of a seascape approach for the synergetic integration of climate actions. It has increasingly acknowledged that spatial planning and design such as a landscape approach can function as a framework to coordinate adaptation and mitigation with other socio-economic desires promoting joint benefits. Given the increasing importance of marine environment in times of climate change, this MSc thesis explores a seascape approach based on a systems thinking to a landscape approach. In this thesis marine environment is understood as a new spatial realm at which spatial planning and design can increase the effectiveness of adaptation and mitigation measures while integrating them with careful consideration of marine ecology. This is illustrated by a propositional concept of artificial islands in the Holland coast with the three thematic scopes of the thesis: adaptation (coastal defense), mitigation (renewable energy provision), and ecology (marine habitats) throughout the analysis, planning and design phases. The proposed offshore islands contain diverse programs promoting synergies, for example, coastal protection, energy provision, marine habitat, recreation, education, accommodation, fish farming, aquaculture, algae farming, sustainable way of fishing, and nature experience.

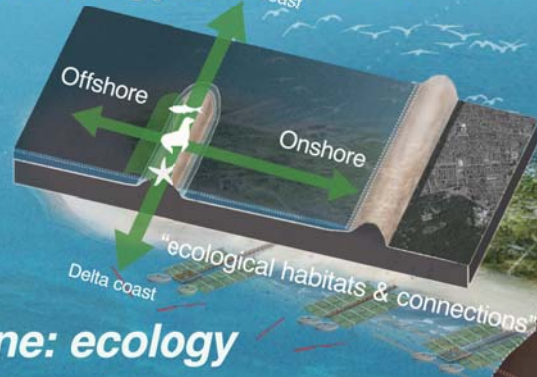
(image) Aerial impression of the proposed islands with three main strategies



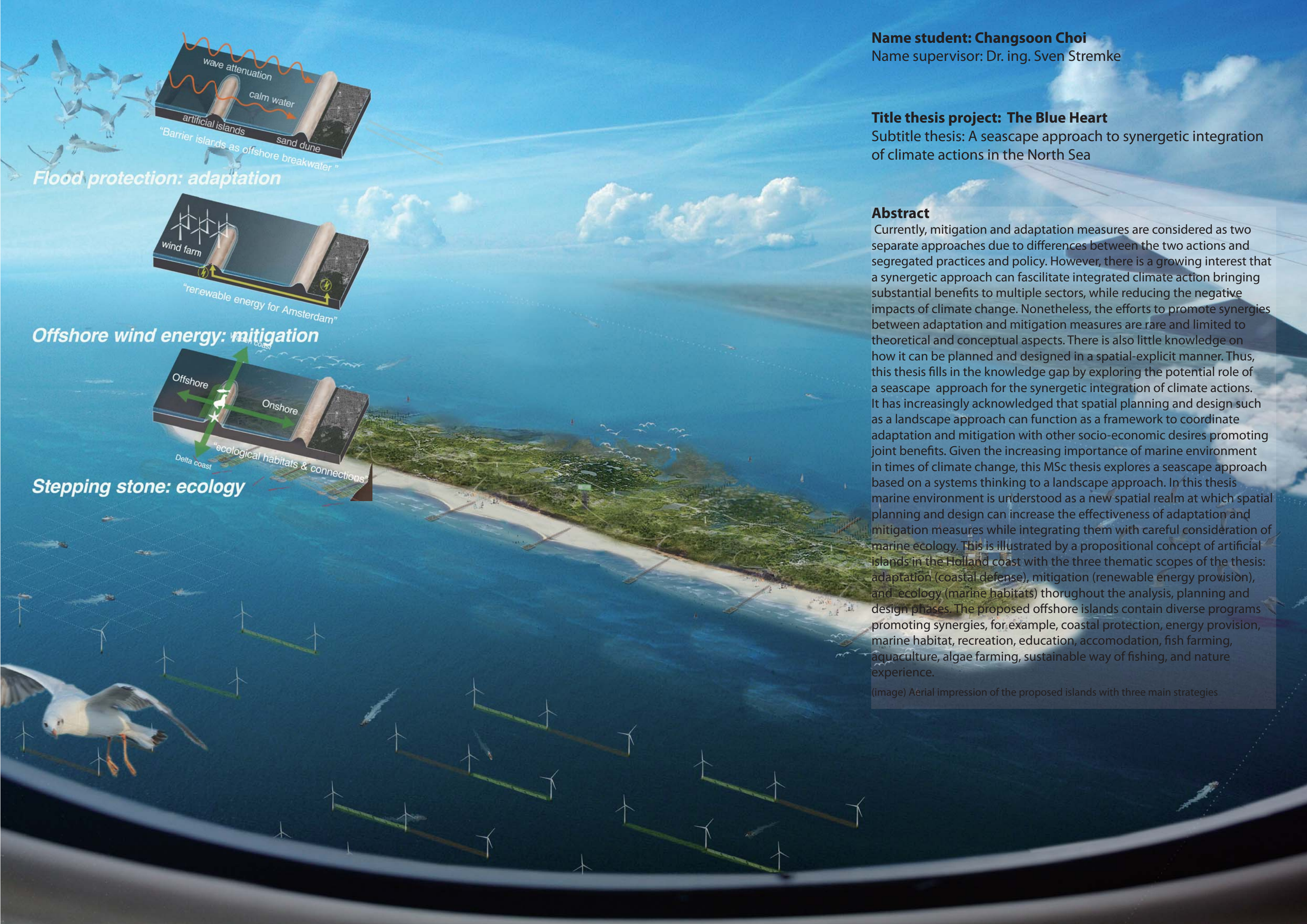
Flood protection: adaptation



Offshore wind energy: mitigation

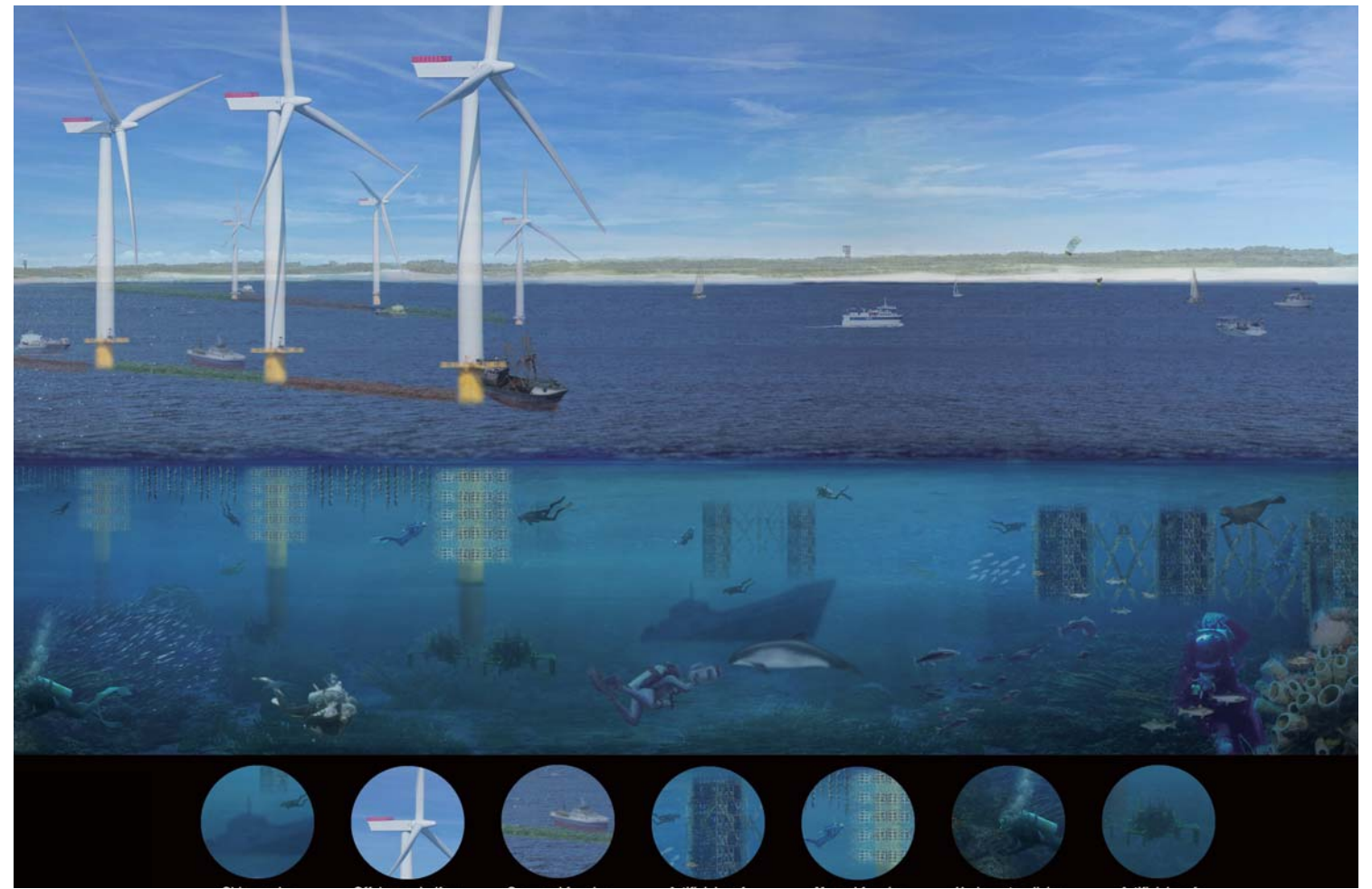


Stepping stone: ecology





On a ferry to the iconic hotel 'the window' in the island



Underwater activities in front of the island



Marine Habitats in the islands and educational opportunities



Productive activities including algae farming and fish cultivations

Photographer n.25

"As positive example I send to you the picture of the lake for sport fishing in the countryside of Chiuro. It's an attraction and can compensate the negative effects of the industrial area on the other side of the road."



Photographer n.11

"As negative example I attach a picture of the industrial site in Chiuro. When I was a child I used to go with my parents "al piano" (the bottom part of the valley) to make hay, ... I remember I used to drink the fresh water of springs, my father told we used to fish river shrimps ... Unfortunately now I am almost not able to recognise those places. Factories and warehouses give job opportunities, but according to me the area could have been planned and designed in a different way, for a better integration in the landscape."



Photographer n.17

"As negative example I choose the industrial area in Chiuro. The warehouses have a strong negative impact on the cultural landscape, in particular the vineyards. In the area no tree planting or green areas have been planned."



Federico Lia

Supervisors: Dr. Ir. MA Rudi van Etteger

Dr. Ing. Sven Stremke

"Performance and Appearance of business sites through the ecosystem services lens: a design in the Italian Alps."

Location: Chiuro, Valtellina, Italy

Abstract

With the rapid urbanization of the last decades and the land-use changes, the quality of the natural and cultural landscape of Valtellina, an Alpine valley in the North of Italy, has been reduced. Beyond the visual component, the ecological performance has been and is constantly damaged.

This master thesis aims to investigate how both performance and appearance aspects of landscape can be integrated in a design proposal in order to make the project effective from the environmental point of view but also able to reduce the visual impact that business sites have on the landscape. The research aims to look at the local landscape through the ecosystem services framework in order to understand which are the services that could be potentially provided and which are compromised by the current land-use management. In addition to this, the research aims to understand how local people perceive the landscape of the valley. Their feedback helped to address the design phase, the site selection and the design strategy interventions. From landscape architect's point of view, there are two main challenges for the design. First of all, there is a need to find a solution to the effects that business sites can have on the environment. Second, it's necessary to make people aware of what's behind the landscape surface they normally look at and that is normally judged on visual aspects.

The conclusions derived from the research and analysis phase have been applied on a specific project site, considering both the key criteria of performance (mitigating the effects of soil consumption) and appearance (mitigating the visual impact of the site). The design and its effects are communicated through visualizations that catch the main interventions proposed for the site but also the benefits that both the area and people can have from it.

functional design



PERFORMANCE

design interventions to reduce the impact on ecosystem services.

experiential/revelatory design



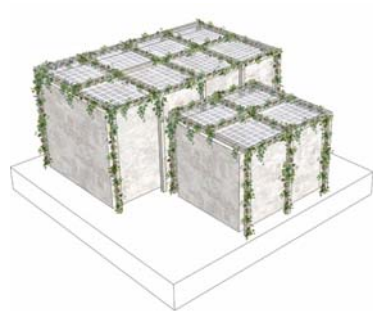
APPEARANCE

design interventions to improve the visual aspect of the site and reveal the hidden.

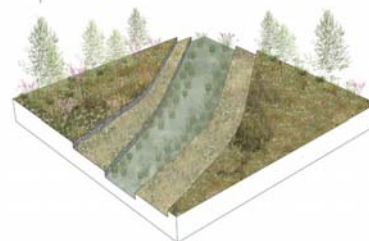
business site design



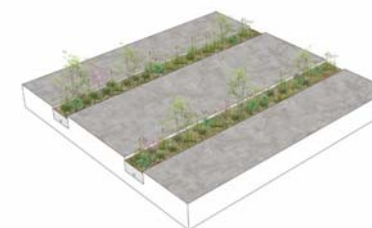
Paved surface_ Multifunctional pillars structure (green roof, pergola)



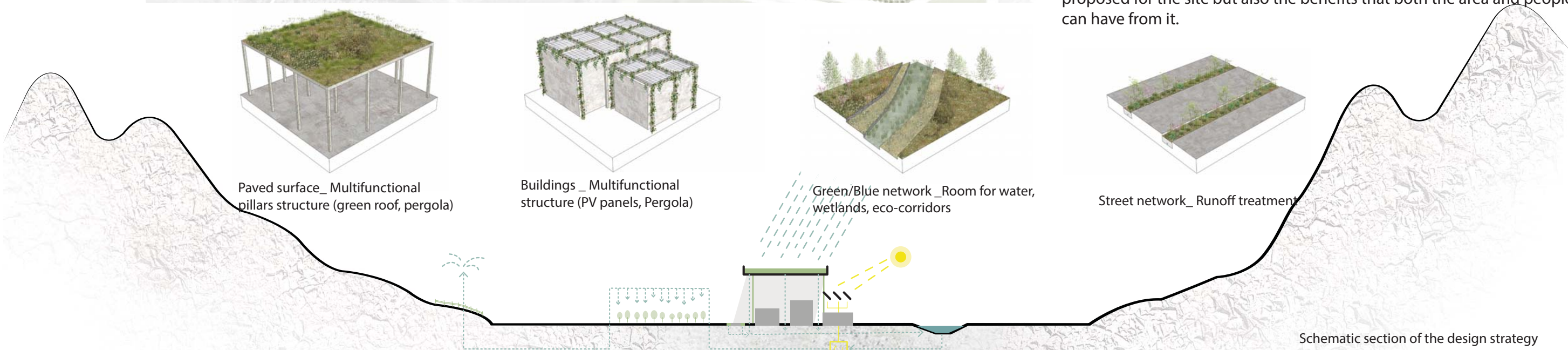
Buildings_ Multifunctional structure (PV panels, Pergola)



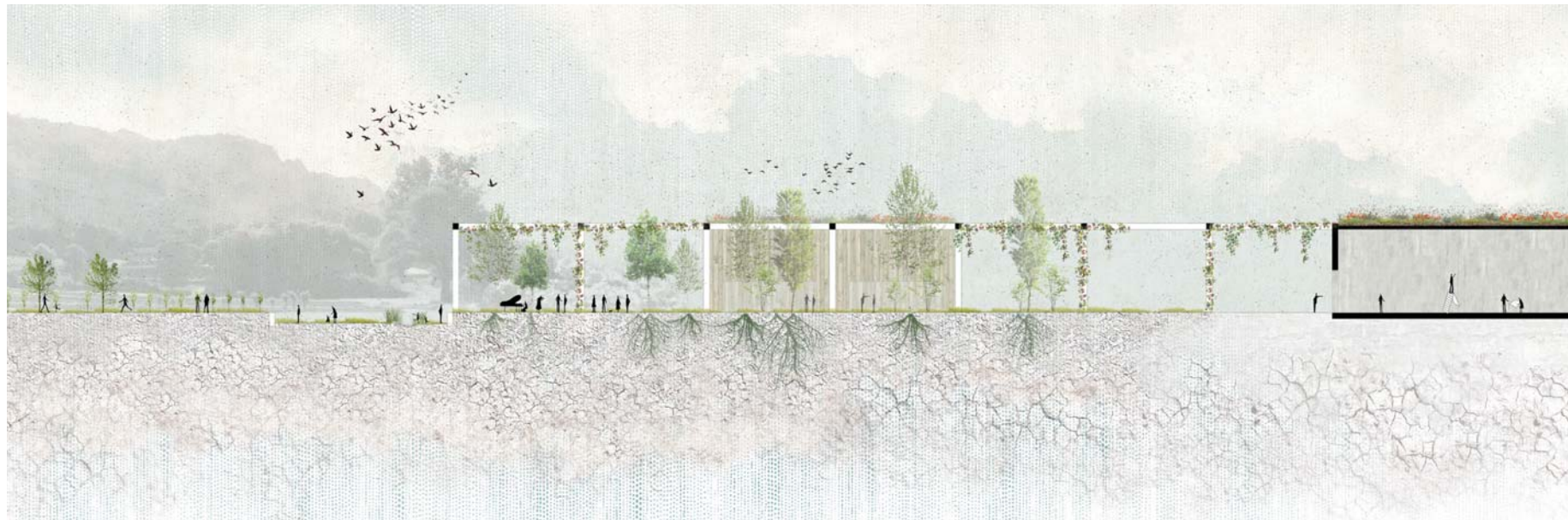
Green/Blue network _Room for water, wetlands, eco-corridors



Street network_ Runoff treatment



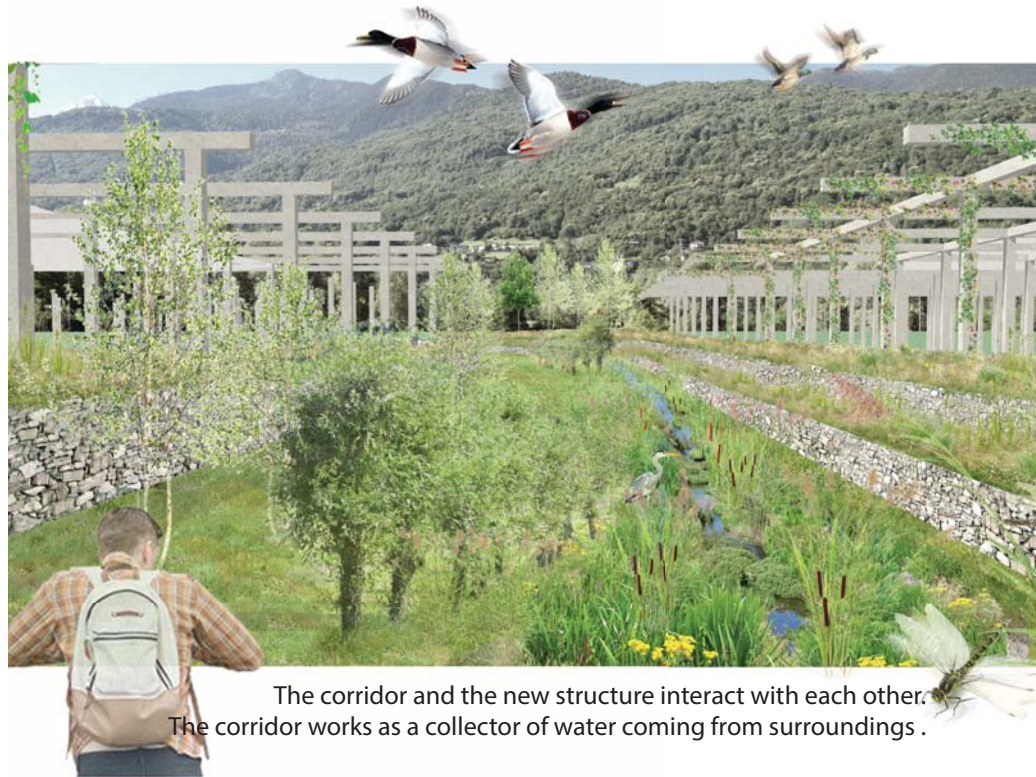
Schematic section of the design strategy



SectionA _ the extension of the site preserve the existing permeable surface. Trees and flowers create the conditions to increase biodiversity.



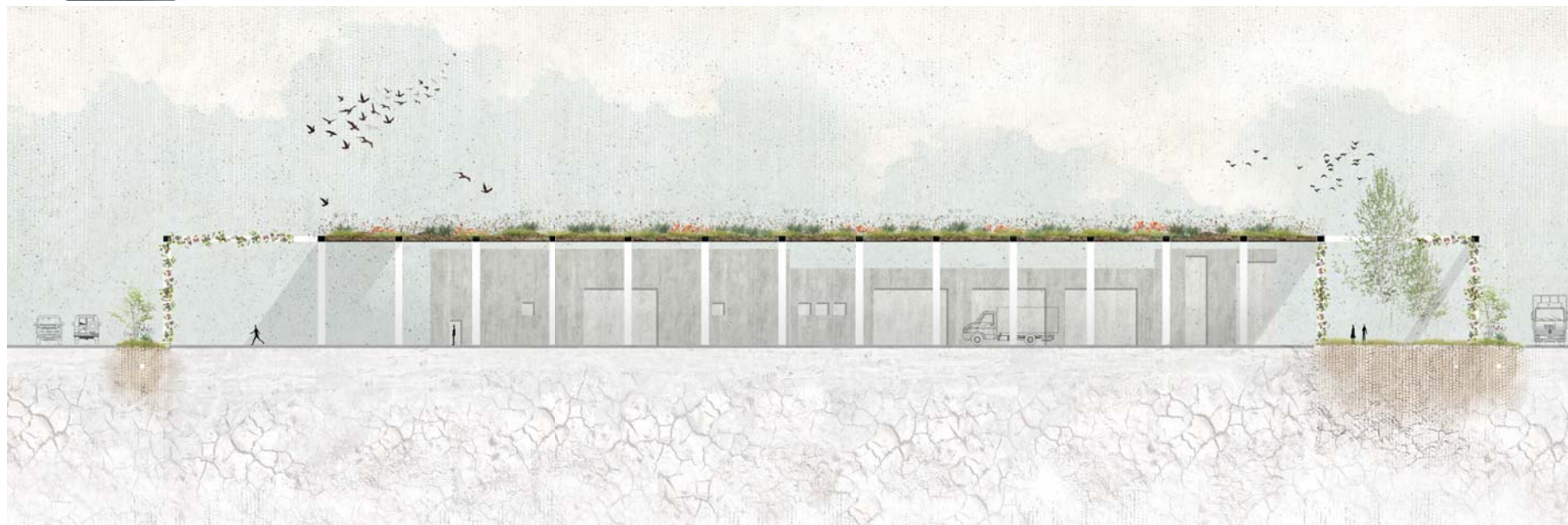
The extension integrates nature and business interventions as a transition zone between the existing site and the countryside



The corridor and the new structure interact with each other. The corridor works as a collector of water coming from surroundings .



SectionB _the corridor creates a connection through the site between the two sides of the valley. It becomes an ecological and recreational corridor.



SectionC _ the structure aims to mitigate the existing buildings from the visual point of view but also increase the green surface and the habitat for insects and birds

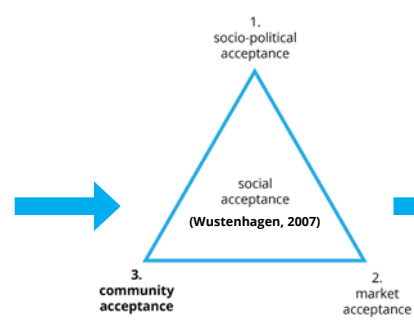


The structure works partly as a green roof to hide but also to catch water. Partly it works as a pergola.

lack of social acceptance



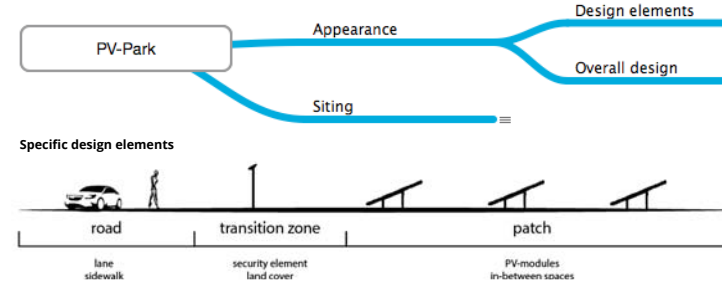
community acceptance



visual impact



appearance and siting of PV-parks



Melvin Creemers

Supervisor: Sven Stremke

Zonnegroeve Mourik

Designing a socially supported sustainable solar energy landscape in Brunssum, Parkstad Limburg (NL)

According to Wustenhagen et al. (2007), Zoellner et al. (2008) and Chiabrando et al. (2009), the visual impact of PV-parks on the landscape is a barrier at a local scale. Research is needed on what design principles are socially acceptable for implementing PV-parks, as well as, what local inhabitants' visual preferences are on the appearance and siting of PV-parks.

Abstract

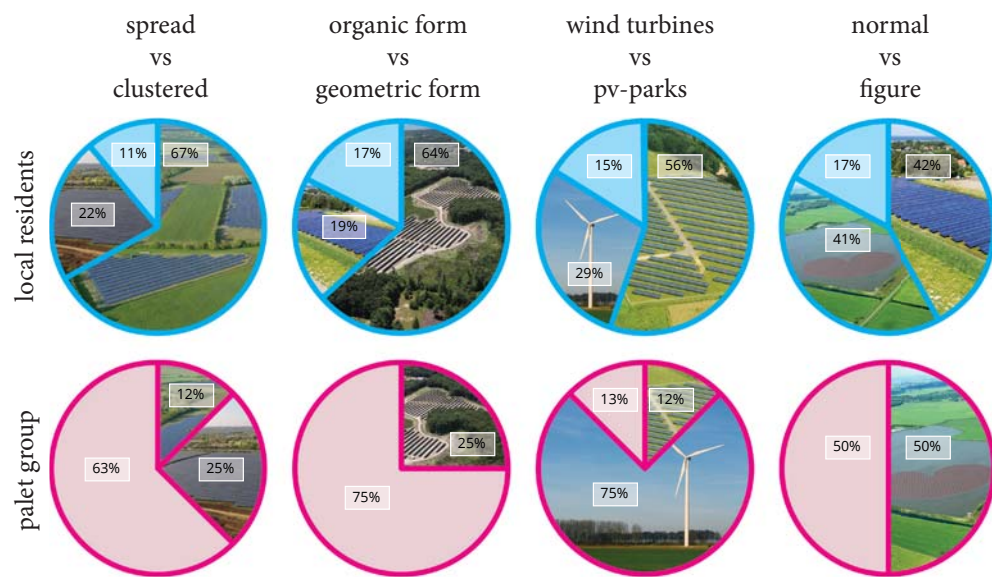
Currently, with the depletion of fossil fuel, the energy transition to renewable energy sources is inevitable. More and more cities are going through this transition. This also accounts for Parkstad Limburg, which is an alliance of eight municipalities in the province of Limburg. In Parkstad Limburg Energietransitie (PALET), an ambition document, they express their desire to become energy neutral by 2040. Part of this ambition is to implement 65 hectares of PV-parks by 2040.

Sijmons (2014) claims, among others, that this energy transition will cause a drastic change in the landscape. According to Wustenhagen et al. (2007), Zoellner et al. (2008) and Chiabrando et al. (2009), the visual impact of PV-parks on the landscape is a barrier at a local scale. Scognamiglio (2015) links the visual impact indicators with the design elements of a PV-park, however it has not been researched what these design elements should look like according to stakeholders in order to minimize the negative visual impact. Therefore, research is done on what design principles are socially acceptable for implementing PV-parks, as well as, what local inhabitants' visual preferences are on the appearance and siting of PV-parks.

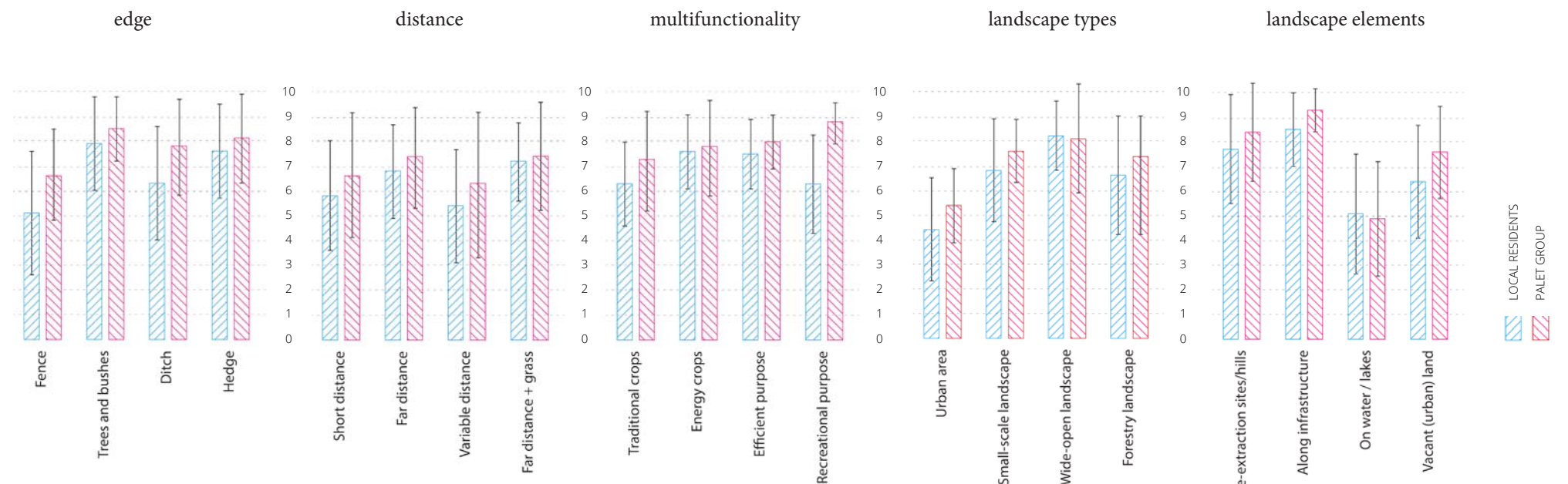
The research question on siting of PV-parks resulted in a conclusive map with the potential areas for implementing PV-parks. The site of the slagheap is chosen to workout in the design phase. With the help of the design principles on the appearance of PV-parks, this site is transformed into a sustainable energy landscape that meets the energy ambition of PALET.

Questionnaire: overall design elements

Questionnaire: specific design elements

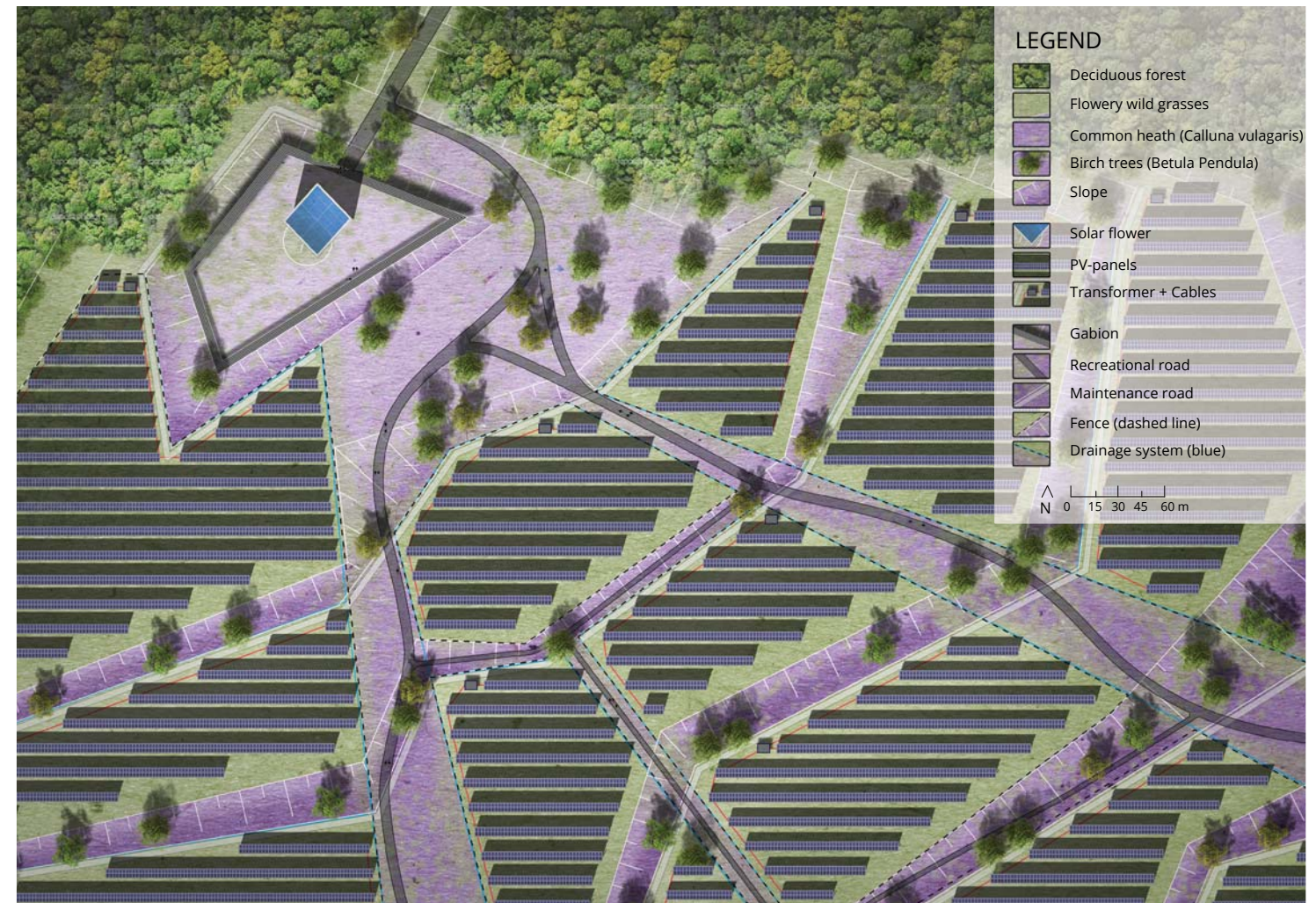
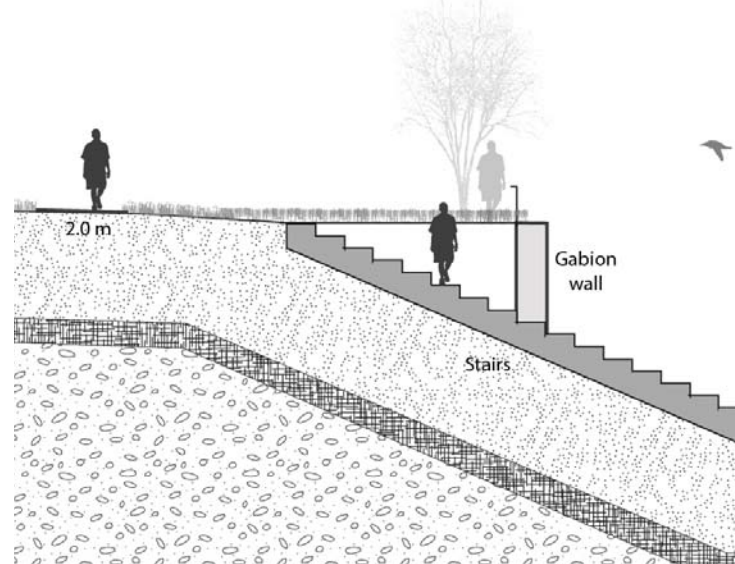
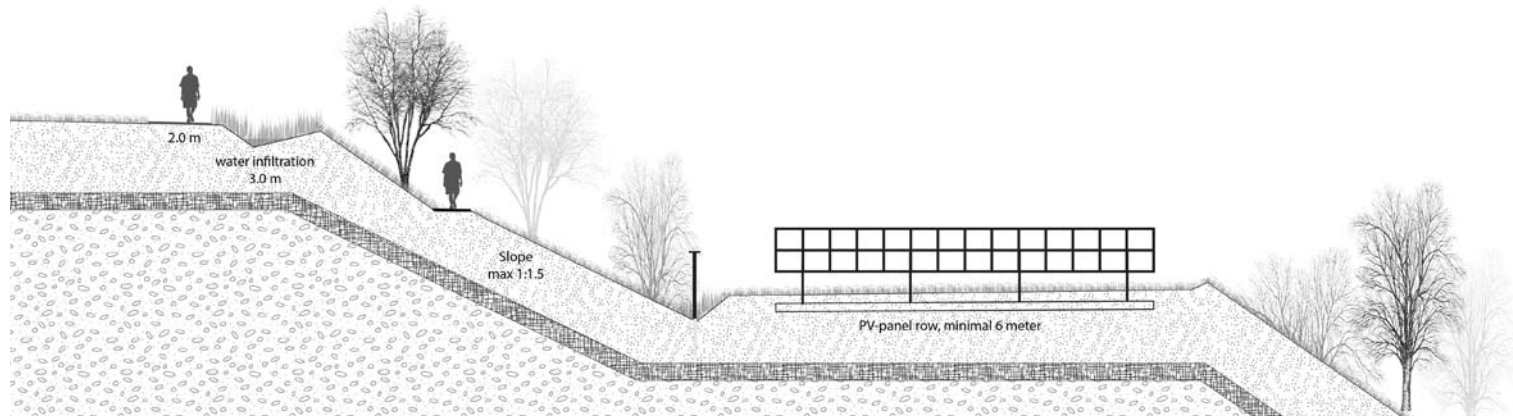
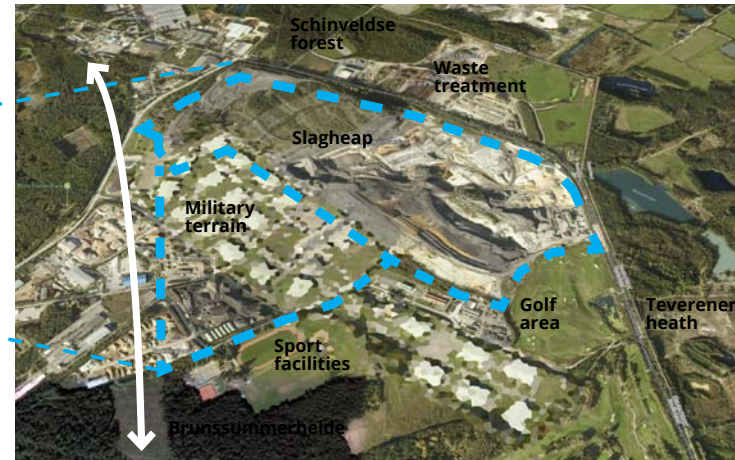
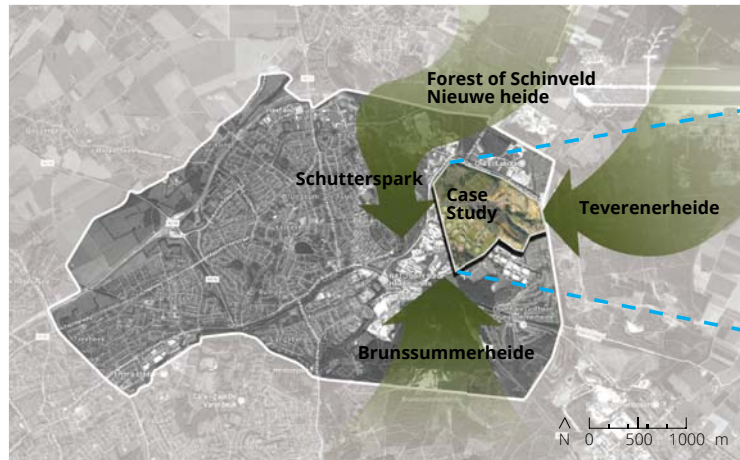
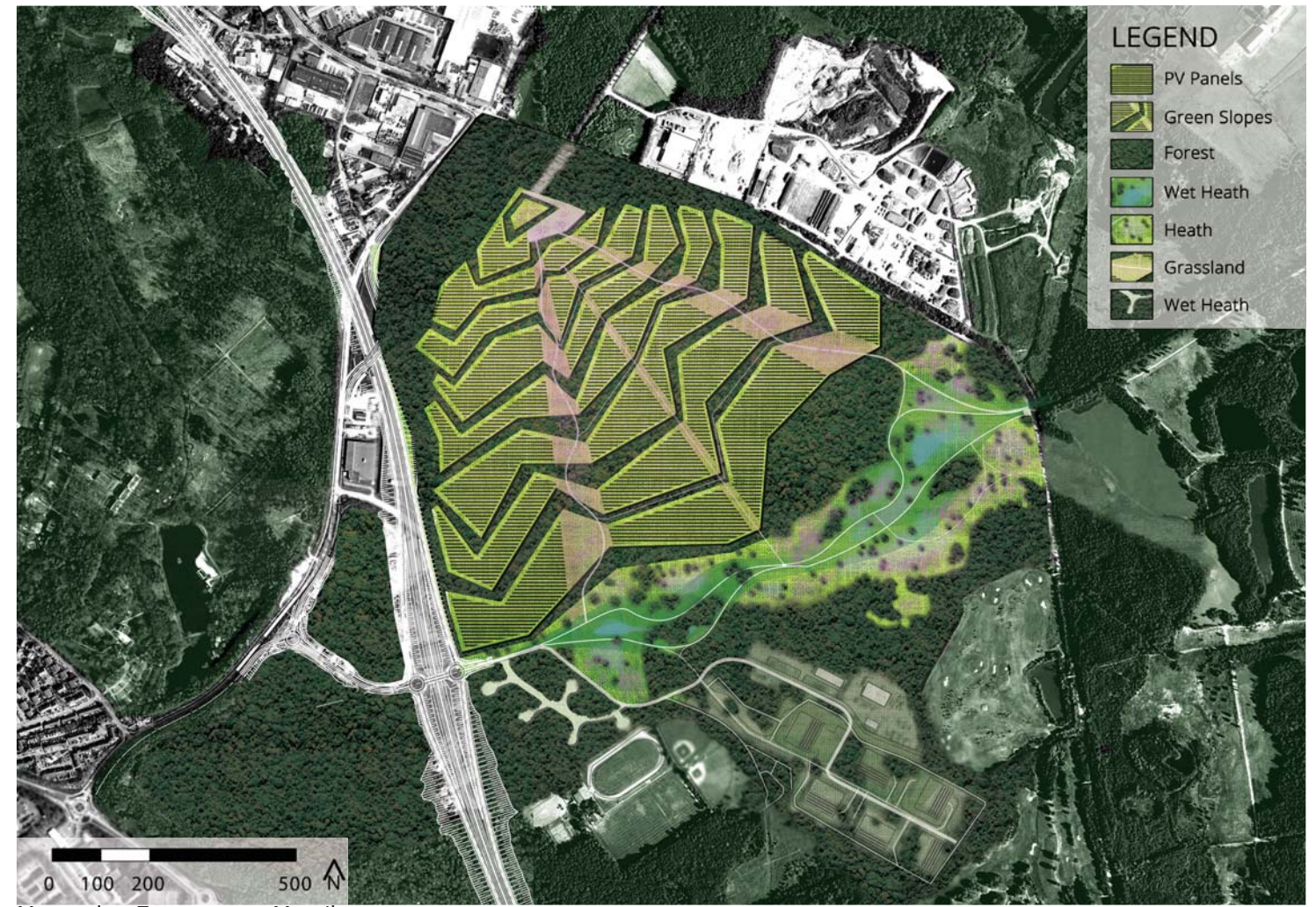
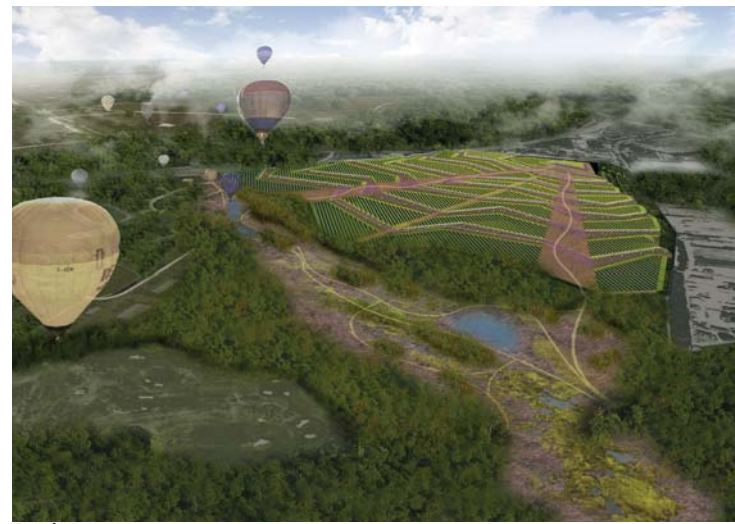
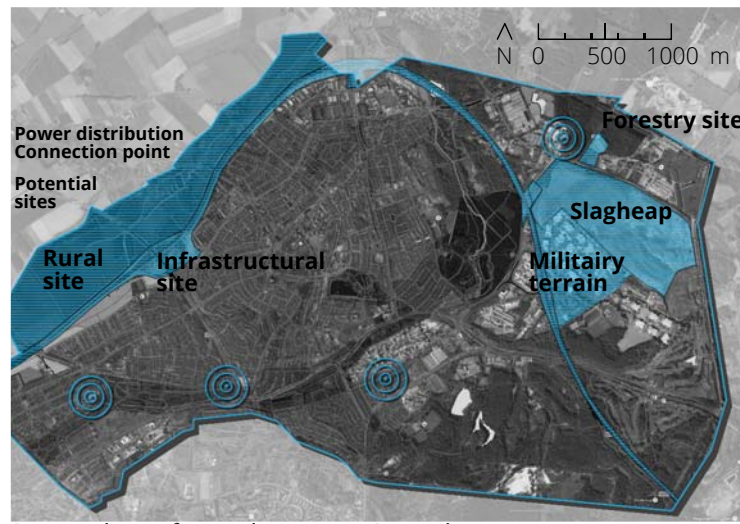


Results questionnaire: overall design elements



Results questionnaire: specific design elements

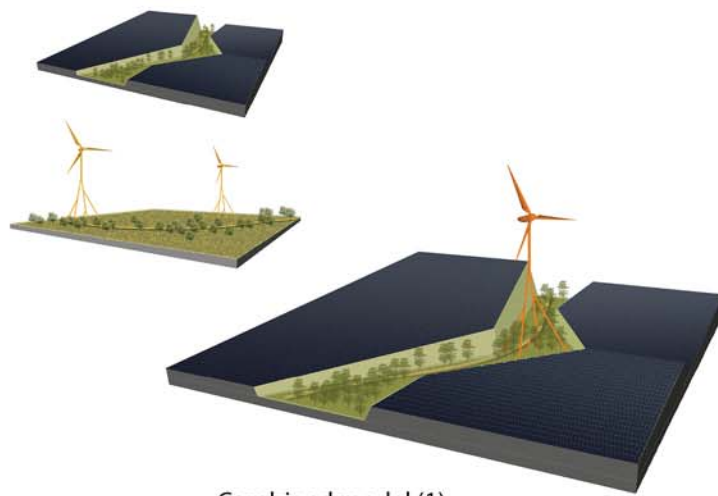
Results questionnaire: siting



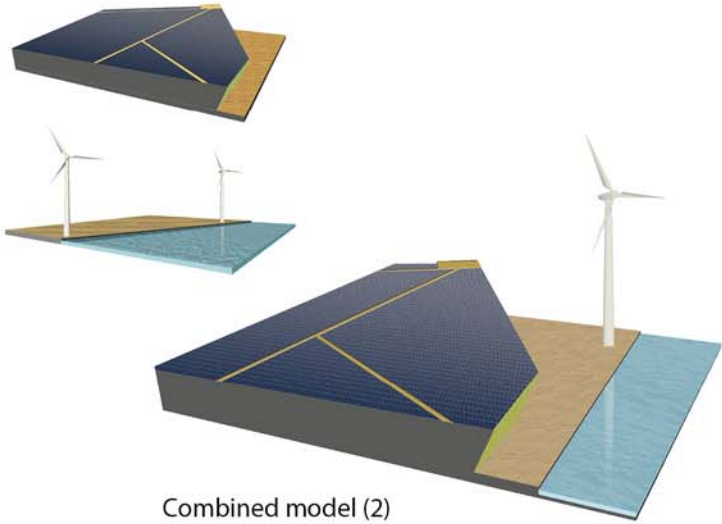
Xiangjun Chen
 Name supervisor: Sven Stremeke

Urban Energy Landscape (UEL)
 (design approach and implementation for urban sustainable energy landscape (SEL) of the middle port area in Amsterdam municipality, Netherlands)

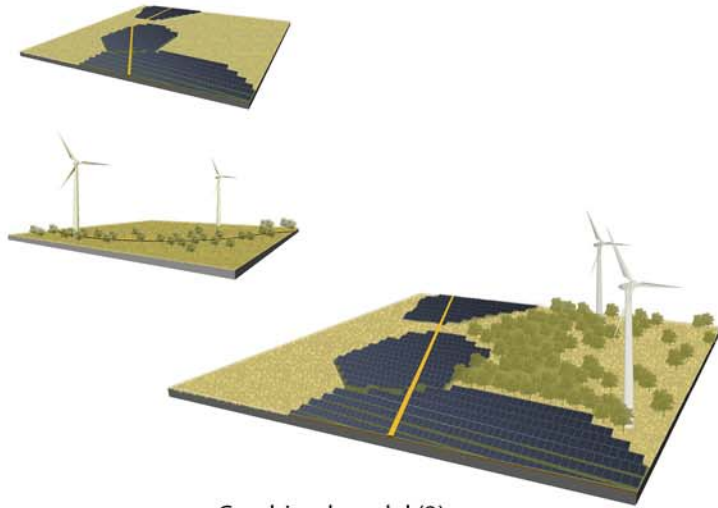
Abstract
 Urban energy transition from fossil-fuel dependence to renewable-energy dependence is inevitable. More and more cities are experiencing this transformation. Amsterdam is one of C40 cities with the ambition to transform into the energy smart city in around 2040. The urban port area is projected in the scenario to be the urban renewable energy source to generate over 40% of electricity for urban dwellings in 2040. How to build up the sustainable energy landscape for the port area should be considered during this transition process. Specifically for the thesis study, after defining the criteria for sustainable energy landscape (SEL), the related design principles are made. After evaluating the integrated sustainability for these design principles, the combined design models are created as the ingredients for a sustainable energy landscape design. After that, with the consideration of multifunctional urban land use and civil liberties for urban port area, it comes up with the design concept of 'energy crystals' as the tremendous urban energy land art, with the combined urban functions of urban energy source, sustainable port industry and urban energy tourist resort. Even though there are a number of dilemmas exist for both research and design processes, the design outcome could be regarded as a brainstorm for the future sustainable energy landscape.



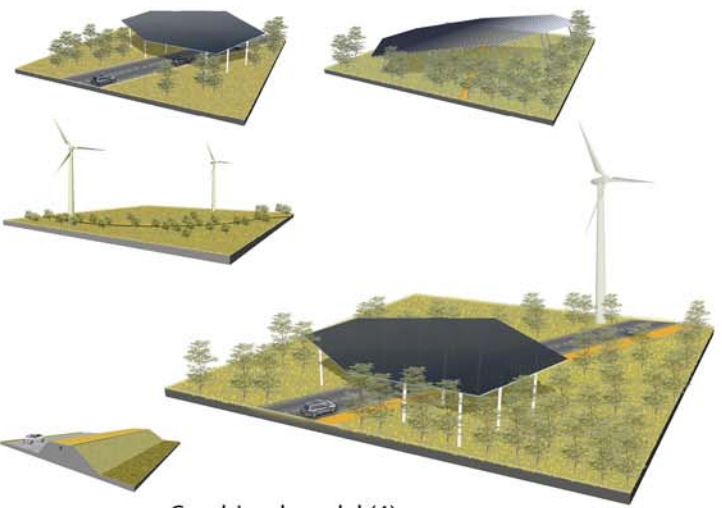
Combined model (1)



Combined model (2)



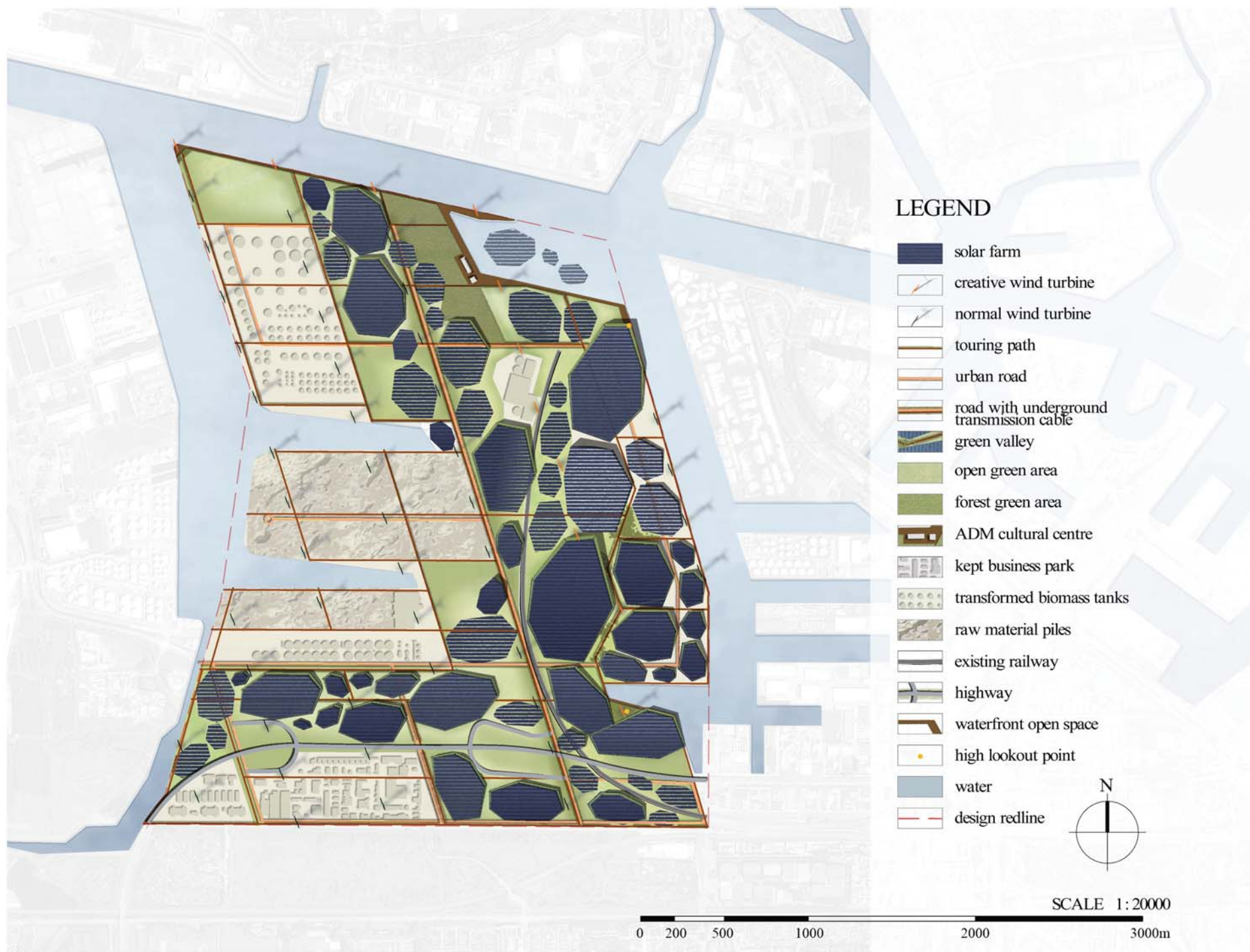
Combined model (3)



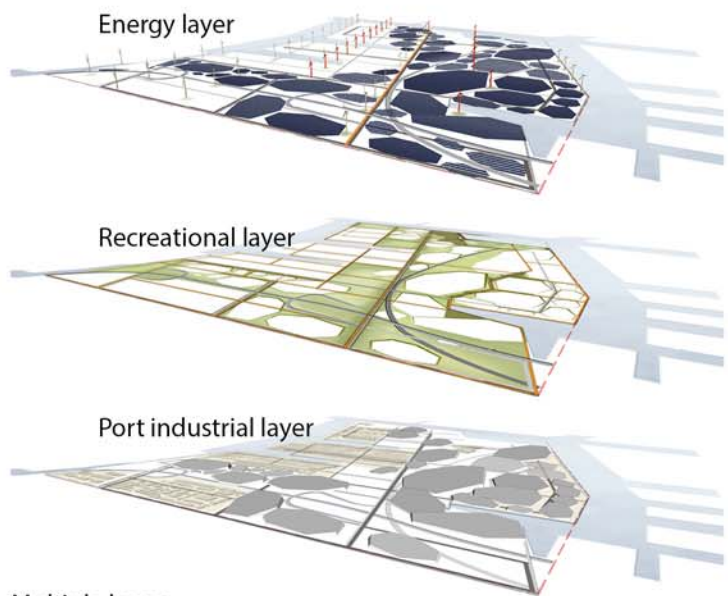
Combined model (4)

| Design principles | Criteria | | Technical dimension (TE) | | Environmental dimension (EN) | Social-cultural dimension (SC) | | | Economic dimension (EC) | | | Overall score |
|--|---|---|---|-----------------------------------|---|--|--|---|---|--|----|---------------|
| | Further develop renewable energy sources (solar PV, wind turbines & biomass) in port area as multifunctional land use | Introduce supporting electricity transmission line in port area as multifunctional land use | Introduce the complete vegetation network for biodiversity and reduce greenhouse gas emission | Embodiment port cultural identity | Introduce renewable energy tourism as a way to promote urban sustainable energy cultural transition | Embodiment renewable energy landscape through multifunctional landscape expression of land art | Introduce green recreational port area as multifunctional land use | Make use of collective flooding prevention as a flexible way to reduce vulnerability of energy facilities | Minimize potential land use conflicts between different renewable energy technologies | Avoid impact on the normal operation of port companies and urban transportation system | | |
| 1 Green facades for industrial building | o | o | ++ | + | + | + | ++ | o | + | o | ++ | |
| 2 Port waterfront recreational area | - | o | + | ++ | o | o | ++ | + | o | -- | ++ | |
| 3 Large inclined solar roof land art | ++ | o | - | + | ++ | ++ | - | ++ | o | ++ | ++ | |
| 4 Touring paths on, through & between solar canopies | o | o | o | + | ++ | ++ | o | o | o | - | + | |
| 5 Touring path through ground free-standing solar farm | o | o | o | + | ++ | ++ | o | o | o | -- | + | |
| 6 Elevated land for ground free-standing solar PV | + | o | + | o | + | o | o | ++ | o | o | + | |
| 7 Sublime wind farm | ++ | o | + | + | ++ | ++ | + | + | - | - | ++ | |
| 8 Vegetation area surrounding wind turbines | + | o | ++ | + | ++ | o | + | - | o | o | + | |
| 9 Touring path through wind farm | o | o | o | + | ++ | ++ | o | o | o | - | + | |
| 10 Optimal wind turbine type and installation | + | o | o | o | + | + | o | o | o | o | + | |
| 11 Elevated land for wind turbines | + | o | + | o | + | o | + | ++ | o | - | + | |
| 12 Wind turbines away from solar farms to avoid shadow effects | + | o | o | o | o | - | o | o | ++ | o | o | |
| 13 Touring path through biomass vegetation area | o | o | o | + | + | + | ++ | o | o | - | + | |
| 14 Staying space inside biomass vegetation area | o | o | o | + | ++ | o | ++ | o | o | - | + | |
| 15 Biomass area Combining to solar farm and wind turbines | + | o | ++ | + | ++ | + | + | + | ++ | o | ++ | |
| 16 Energy transmission line combining to touring path | + | ++ | o | + | + | o | o | o | o | - | + | |
| 17 Elevated land for underground electric cable | o | + | + | + | + | + | o | ++ | o | -- | + | |
| Overall score | ++ | + | ++ | ++ | ++ | ++ | ++ | ++ | + | - | | |

Table evaluation of sustainable energy landscape design principles based on criteria



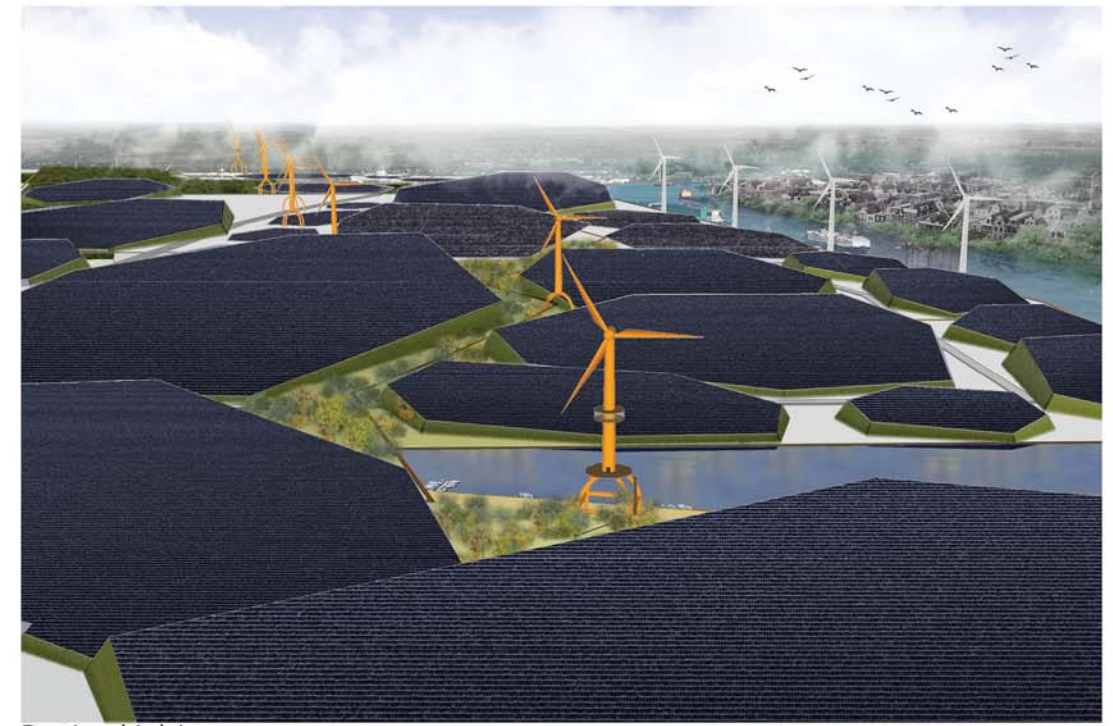
Masterplan



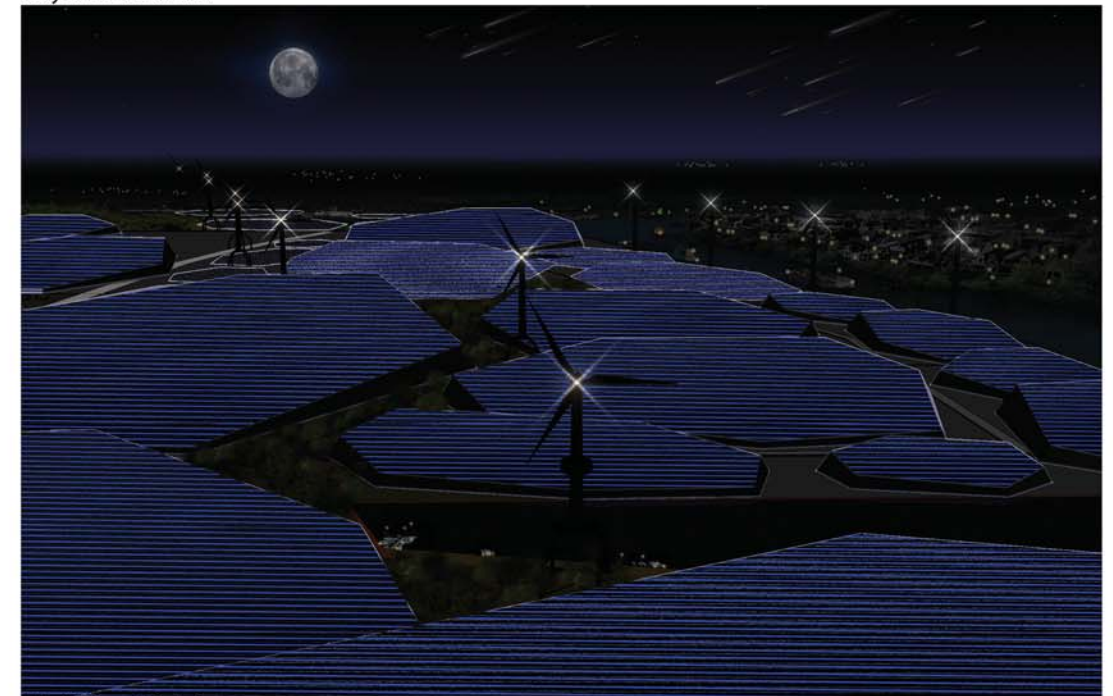
Multiple layers



Visual for 'green valley'



Daytime birdview



Nighttime birdview



Visual for sublime wind farm

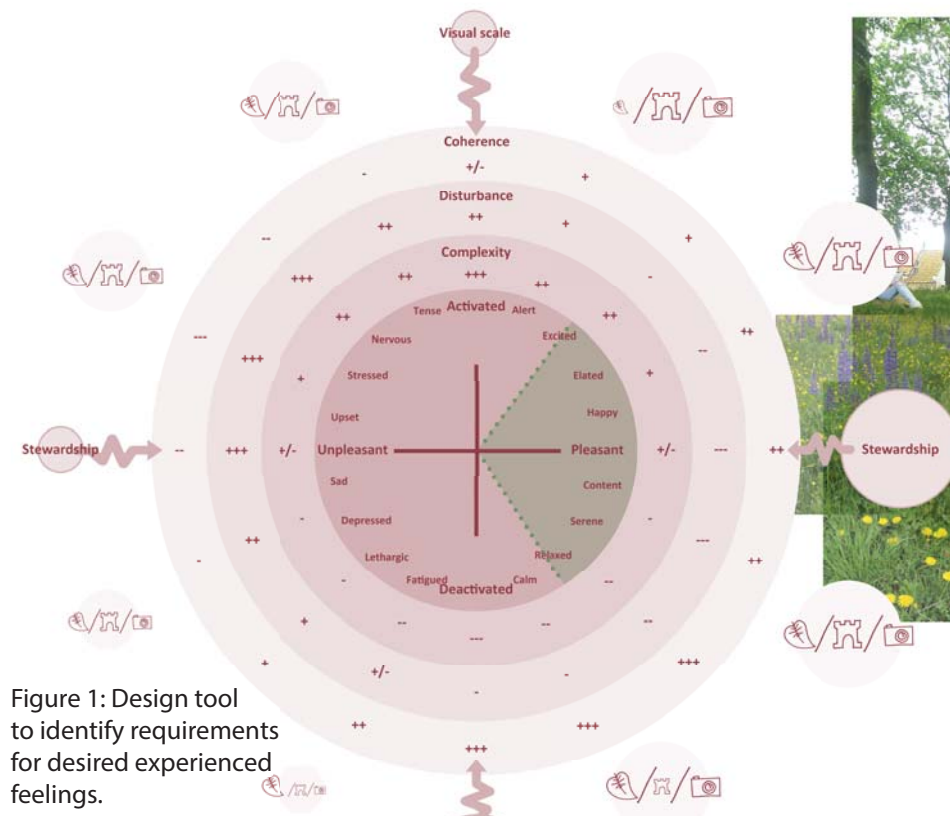


Figure 1: Design tool to identify requirements for desired experienced feelings.



Figure 2: Singelpark visualisation.

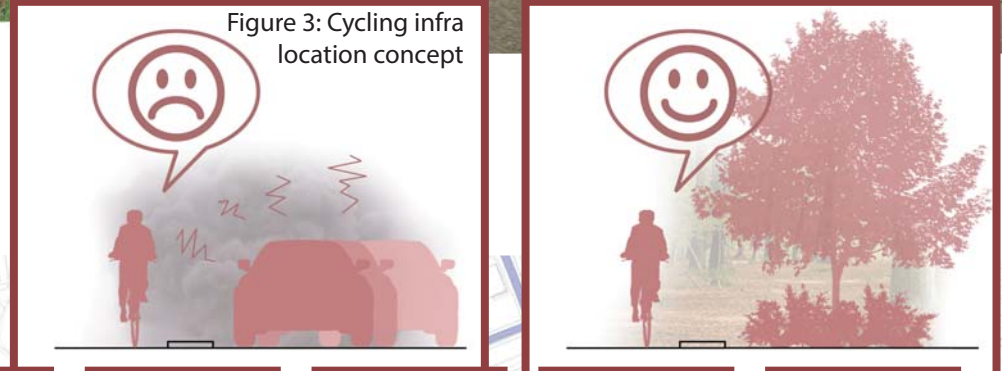


Figure 3: Cycling infra location concept



Figure 4: Optical flow (Gibson, 1950) and its effect on the perception of a landscape



Figure 5: Underpass visualisation



Figure 6: Galgenwaard cyclepath visualisation

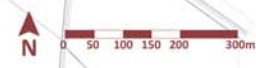


Figure 5: Route relocation.

Thijs Broers

Dr. ir. Rudi van Etteger, Dr. ir. Marlies van Brinkhuijsen & Prof. dr. ir. Adri van den Brink

On That Bicycle

Developing Aesthetic Cycling Infrastructure to improve cycling experience. Utrecht Netherlands

Abstract

The Dutch city of Utrecht wants to become 'world cycling city' in 2020. An extensive programme of interventions is executed to improve the cycling landscape of Utrecht. Routes to outlying villages form the framework for a cycling network within the city. To strengthen these routes, existing infrastructure is upgraded and new infrastructure is developed. However, the contemporary cycling development paradigm focusses solely on functionality. This results in functional and unpleasant cycling infrastructures, leading to unhappy cyclists. Knowledge on how cyclists experience the landscape and how the aesthetic quality of the landscape influences this experience is lacking. A legitimate base of knowledge to scientifically support an experience focused design of infrastructure is missing.

An aesthetic experience analysis was conducted to understand the effects of aesthetic quality of the landscape on cyclists and how this is experienced. Simultaneously, an emotional experience analysis was conducted to understand how the landscape triggered emotions in cyclists. Both analyses were combined to identify relations between aesthetic quality and experienced feelings of cyclists. Aesthetic quality in general has a positive effect on the experiences of cyclists. Two observations were conducted to verify the outcomes. Cyclists in the aesthetically pleasant location behaved better and looked happier and more relaxed. The results were transformed into a design tool and design guidelines.

The developed tool and guidelines were used to (re)design the continuing cycling route from Utrecht central station to the Uithof. This route was characterised by a high level of complexity and disturbance combined with a large number of forced stops due to the presence of motorised traffic. Interventions are designed aiming to increase or decrease specific indicators of aesthetic quality. This thesis also attempts to be an inspiration for all involved in the development of cycling infrastructure. As the Dutch say: "ah, op dié fiets!" (On that bicycle!)



Figure 7: Design recommendations



Figure 8: Gansstraat fietsstraat visualisation

Figure 9: Weg tot de wetenschap visualisation



Figure 11: Gansstraat pedestrian brick layouts

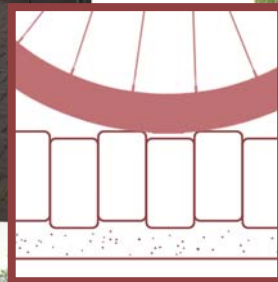


Figure 12: Cyclepath art (Elmar Notebo...

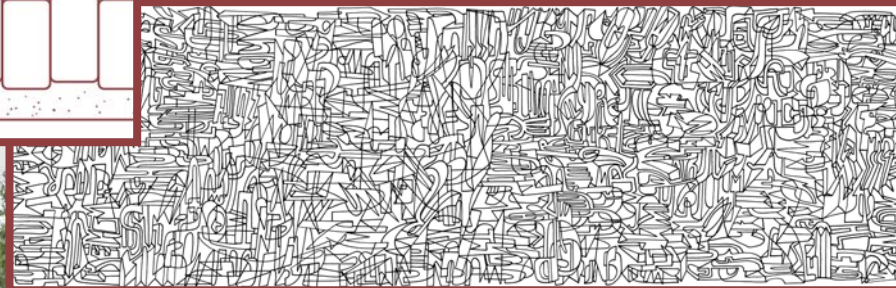


Figure 10: Cycling challenge possibility



Figure 13: Weg tot de wetenschap section

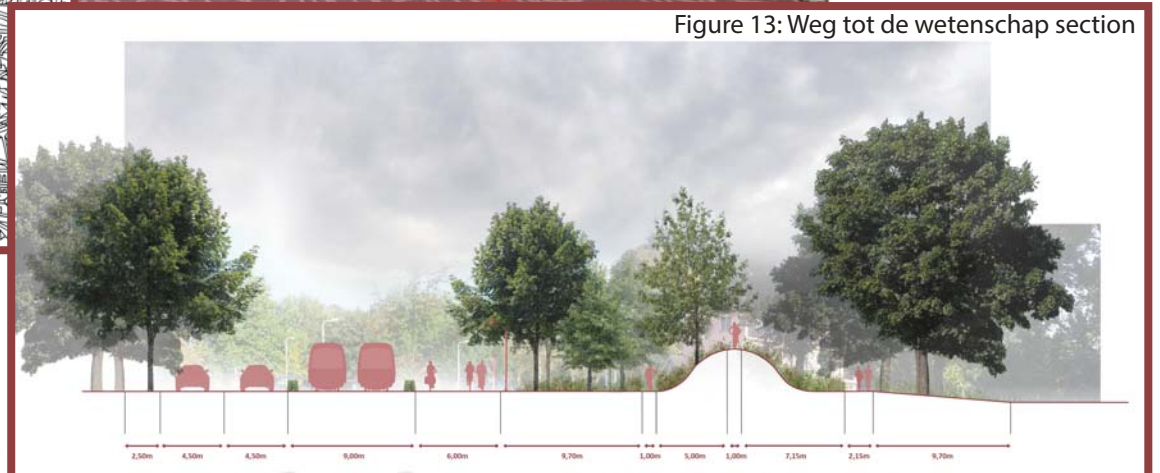
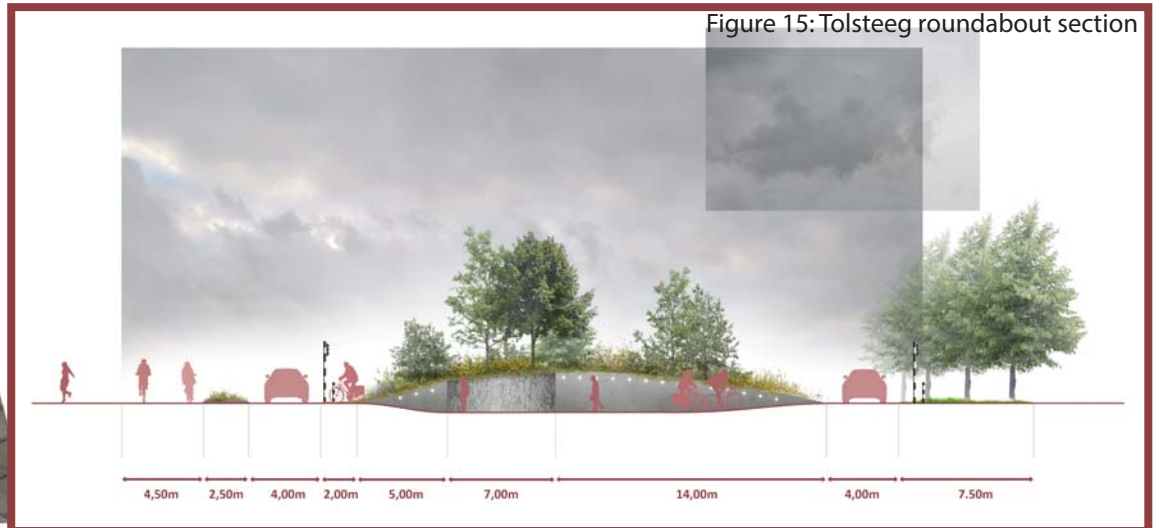
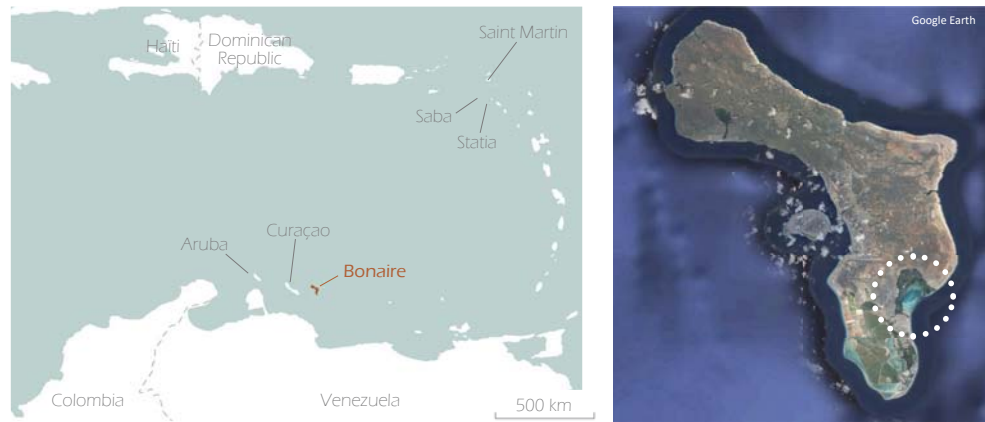


Figure 14: Tolsteeg roundabout design

Figure 15: Tolsteeg roundabout section

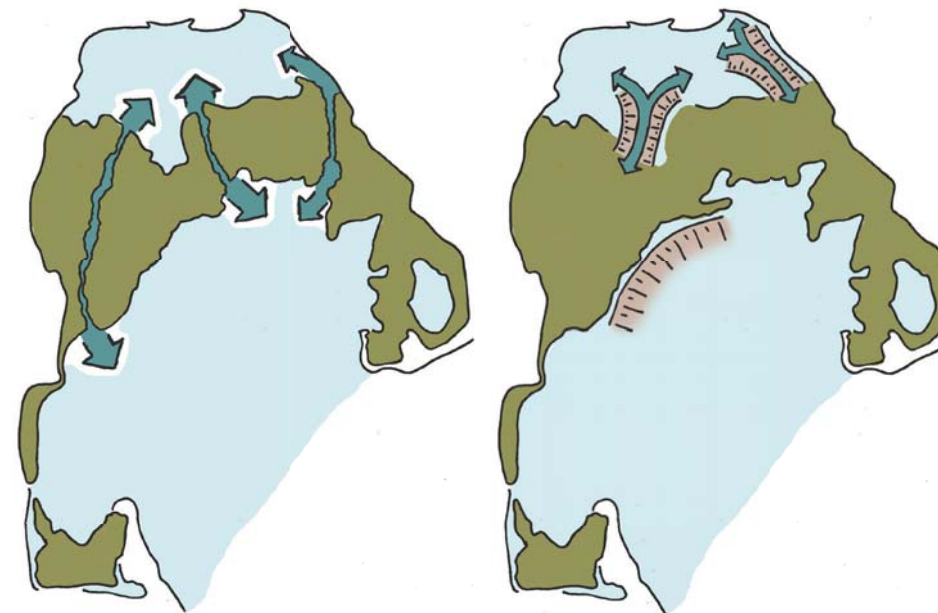




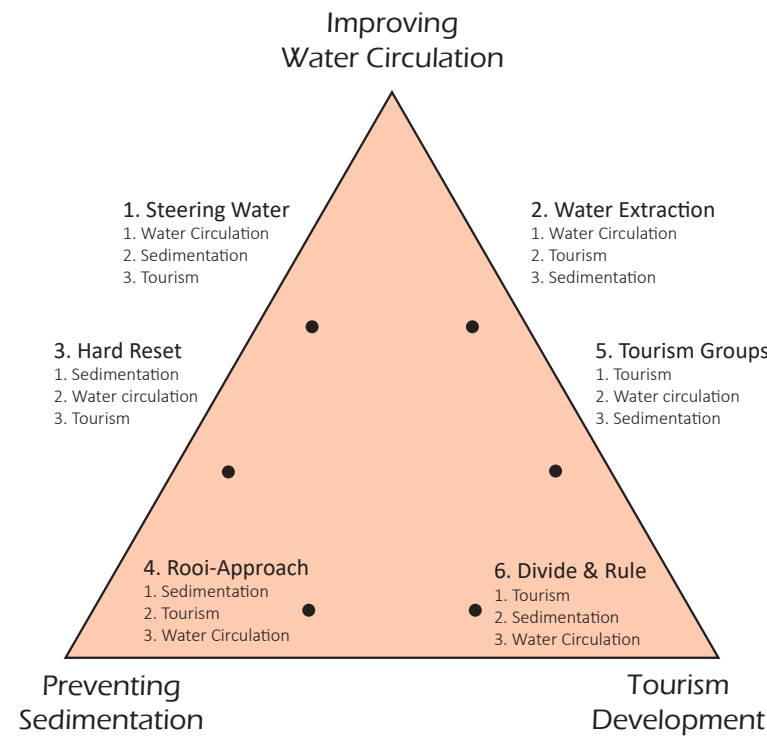
Situation of Lac in the southeast of Bonaire, an island in the southern Caribbean



Lac is of ecological importance because of the mangroves (top) and seagrass beds (middle), providing ecological functions for the coral reef of Bonaire. However, it is also frequented by tourists for wind surfing, kayaking and beach activities. Both processes in the natural system and tourism activities create a pressure on the vulnerable ecosystem



Examples of potential design interventions: Cutting canals through the mangroves to improve water circulation, and dredging in order to take sediments out of the bay



Triangle expressing the prioritization-method, derived from Van Reijn's 2016 MSc-thesis, for determining the focus of the different design variants, that were made in order to systematically explore combinations of potential design interventions

Luc Jenniskens

Ingrid Duchhart, Pieter Germeraad, Klaas Metselaar (SLM)

Beyond Ecotourism:

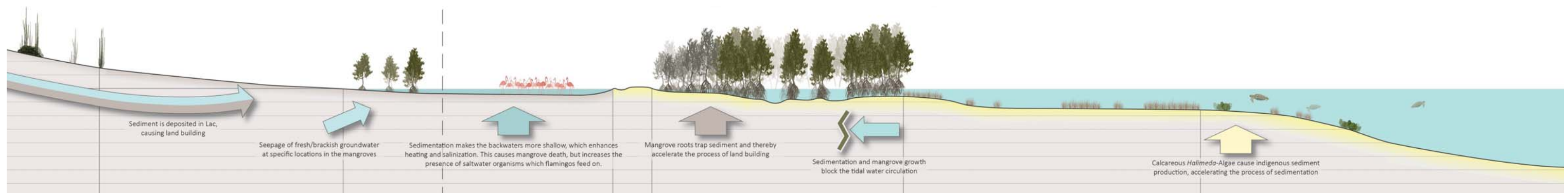
Designing a synergy of tourism development and ecological reinforcement in Lac, Bonaire

Abstract

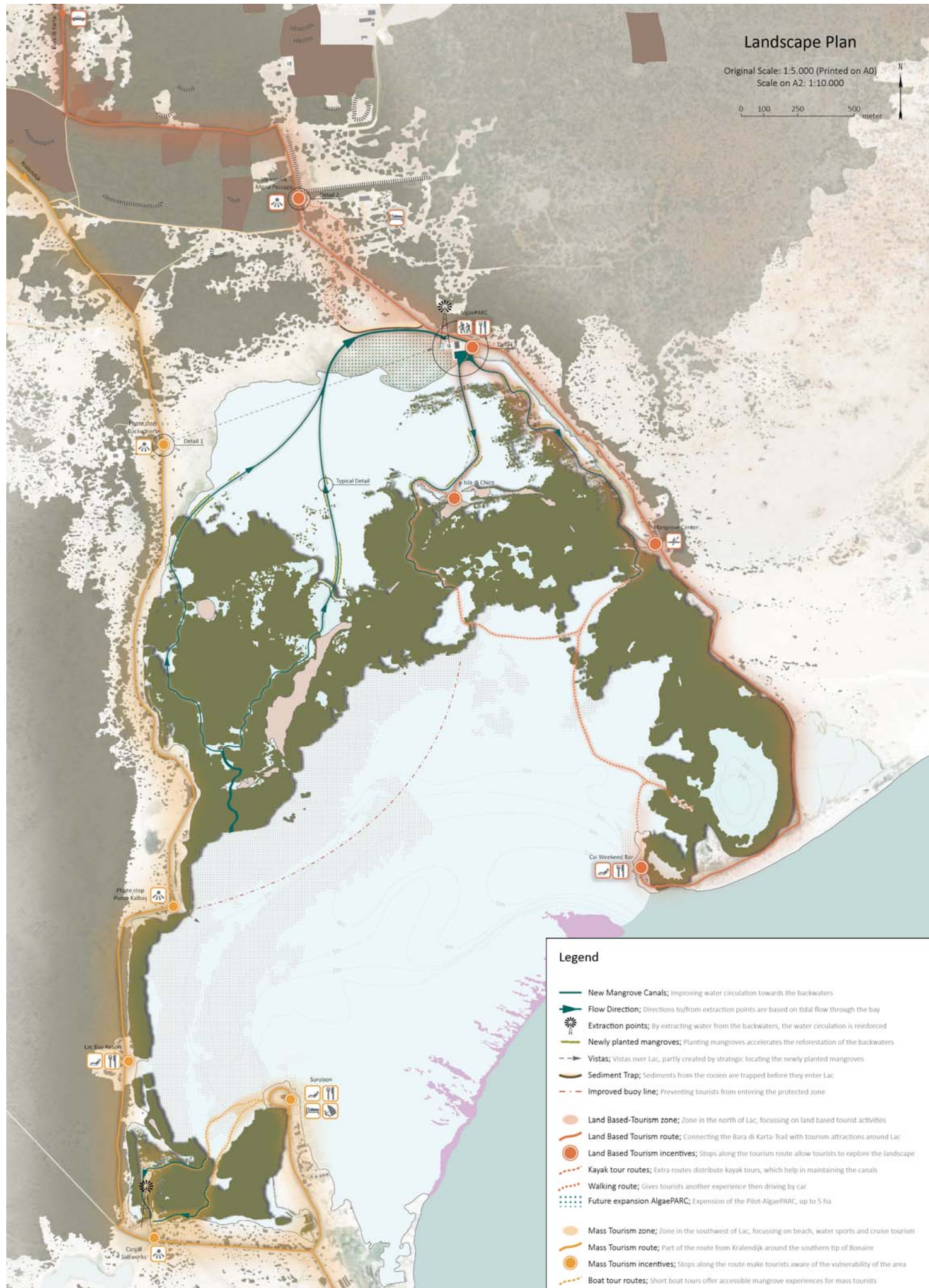
This landscape architecture MSc-thesis studies the area of Lac, a bay on the Caribbean island of Bonaire. It aims to make a landscape design for Lac's catchment, creating a synergy of recreational developments and modifications in the eco-hydrological system where both elements reinforce each other. Through a combination of observations, interviews and desk study, both the natural and the social landscape system of Lac were studied thoroughly in order to understand the landscape dynamics and tourism desires.

Lac is a major ecological area on the island, as the combination of the habitat types of mangroves, seagrass beds and coral reefs provides important nursery and feeding grounds for protected animal species and reef fish. However, the ecosystem of Lac is under pressure of large-scale mangrove die-off in the back of the bay, and a decrease in the area of seagrass beds. The analysis showed that this is primarily caused by blockages in the water circulation in the bay, which reduce water quality, and ongoing processes of sedimentation. Apart from ecological impacts, tourists visiting the bay impact on the environment by trampling seagrass beds and disturbing wildlife at locations where tourism facilities are concentrated.

In the design, the three major processes (lack of water circulation, sedimentation and tourism disturbance) in the bay were used as a starting point for a series of Potential Design Interventions. These interventions were then combined in Design Variants, which each expressed a different focus in combining different interventions, in order to systematically seek for the most optimal synergy between the interventions. Via Multi-Criteria Assessment, a final variant was chosen which was elaborated into a final design. By using new water extraction points which both reinforce the water circulation and simultaneously distribute tourists over a larger area, this final design creates a synergy between tourism and nature developments.



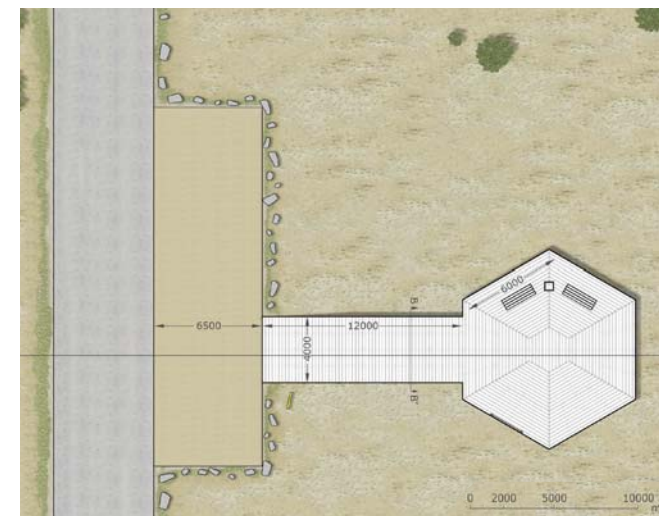
Clip of a section through Lac and its catchment, showing the different landscape units and elevation. Moreover, the section shows the different processes that create the landscape



Landscape Plan; Two tourism zones are created, each encompassing a water extraction point for improving the water circulation



View over a new canal towards the new extraction point, along the young mangroves, seen from the perspective of a kayak



View point along the Seadie Tourism Route, which is meant to make this group of tourists more aware of the vulnerable landscape



The water extraction point along the Land Based Tourism Route functions as an AlgaePARC, and also includes a kayak harbour

Josje Hoefsloot

Name supervisors: Ingrid Duchhart, Pieter W. Germeraad and Germain Bakker (ARA Zambeze)

A landscape framework for informal settlements
to facilitate urban metabolism in Tete, Mozambique

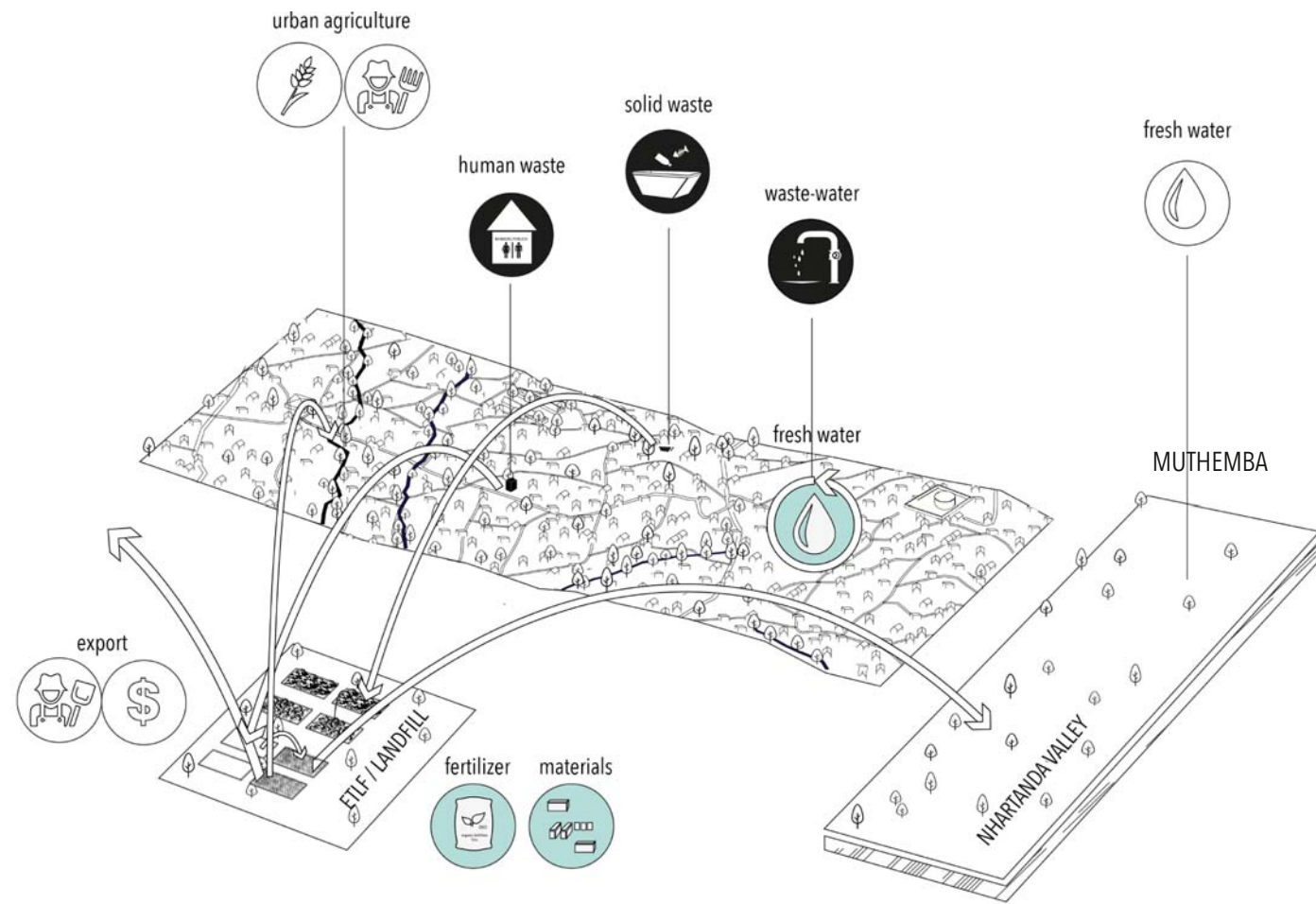
Abstract

The urban population of sub-Saharan Africa is expected to double over the next two decades. Municipalities do not have the (monetary) capacity to provide cheap accommodation, which results in informal settlements. Often, these districts lack basic infrastructure like sewage and proper waste collection.

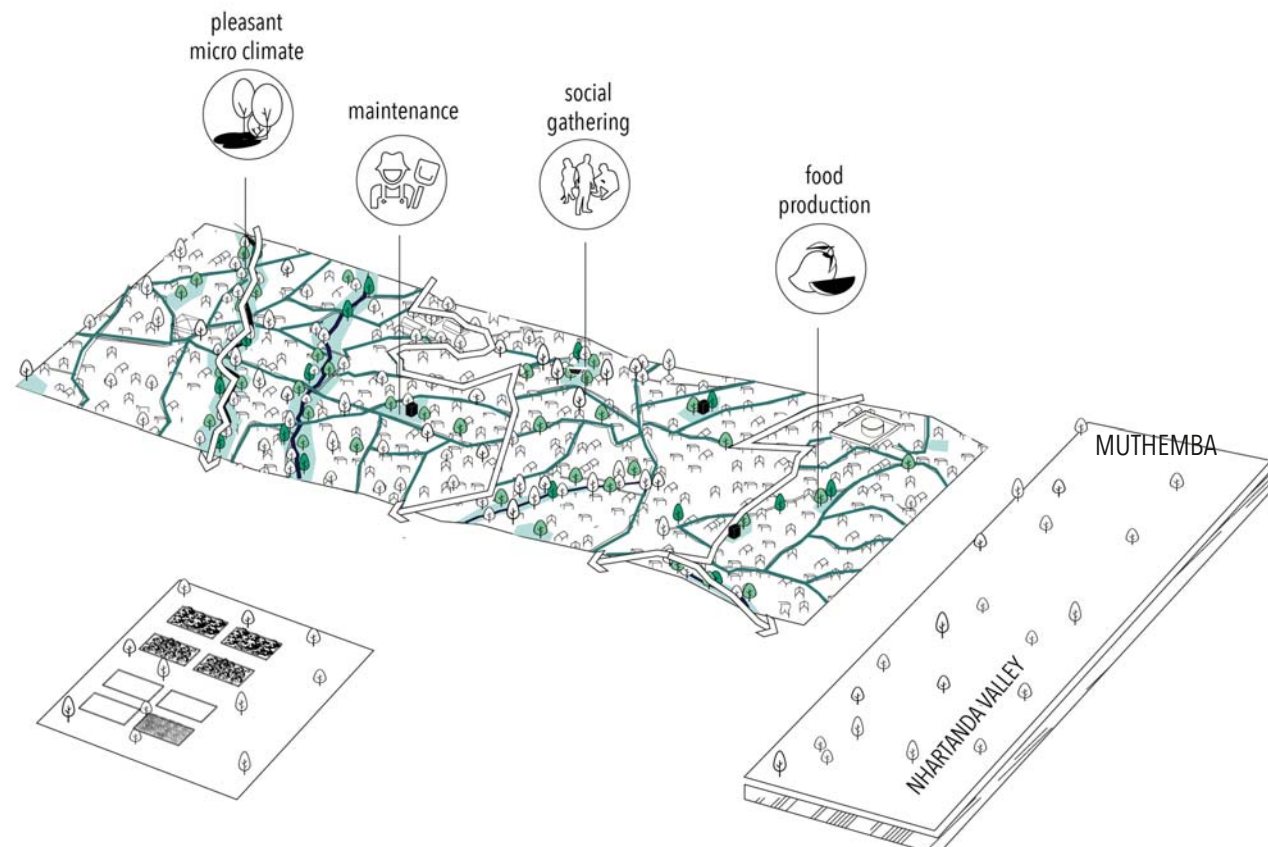
Muthemba is a district in Tete, Mozambique that mainly consists of informal settlements. ARA Zambeze (water governance) stresses that open waste (water) disposal and open defecation contribute to the pollution of the drinking water aquifer of the city. These activities mainly occur in the public spaces of informal settlements. This thesis researches how these spaces could play a role in recycling urban wastes. Crucial is the connection with the drinking water aquifer (Nhartanda valley) and a new faecal sludge treatment site (ETLF).

In Muthemba three public space typologies can be distinguished: natural streams, roads and open spaces. Typical public space designs are made, in order to research its role in terms of urban metabolism. For example open spaces are convenient for public toilets, streams for harvesting rain water and roads for waste water drainage. Urban agriculture and paved squares stimulate use and responsibility to safeguard the public spaces for the future. The designs were translated in tools that can be applied elsewhere in the district or other informal settlements with similar landscape characteristics.

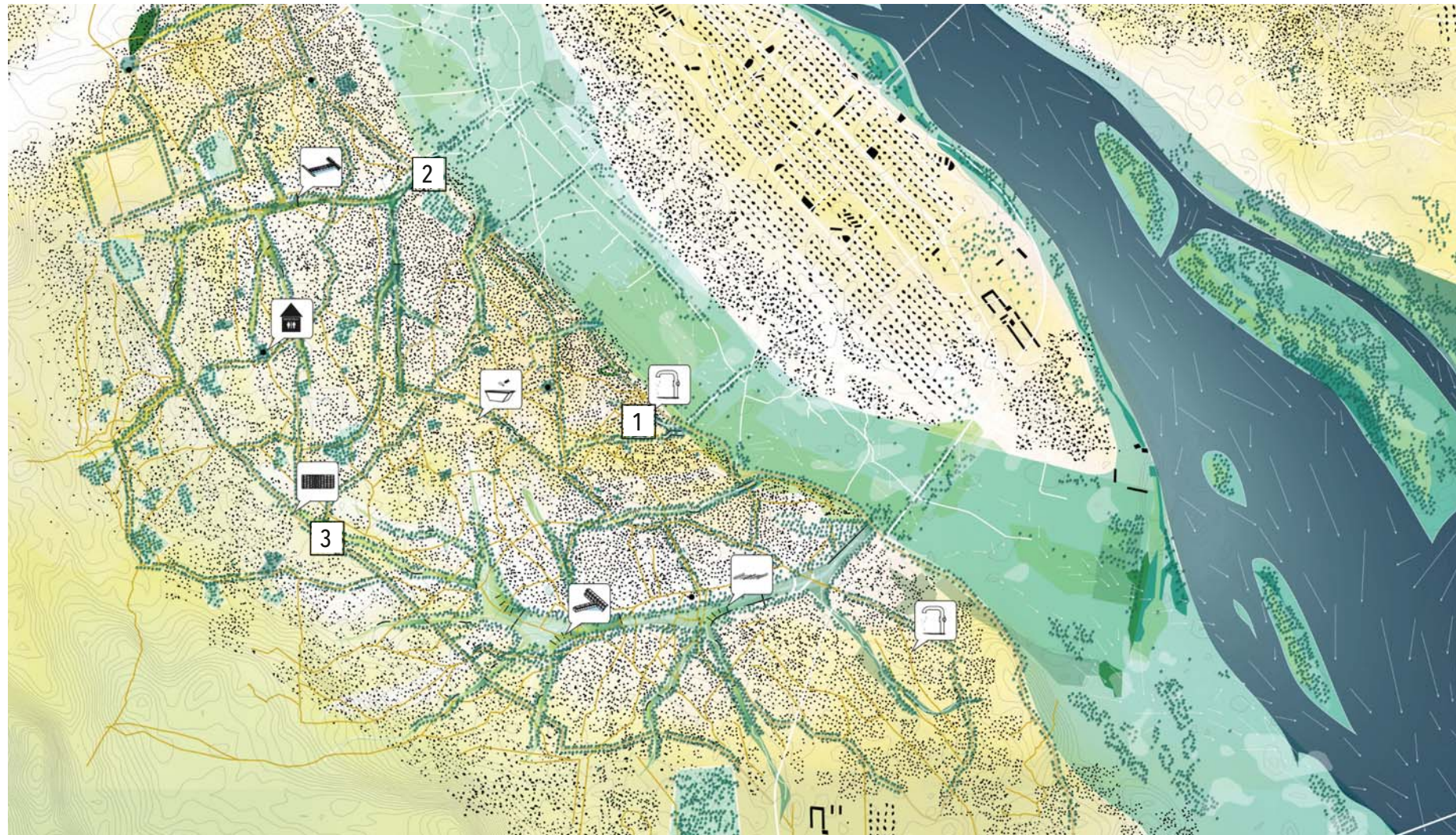
The public spaces together provide a resilient landscape framework for sustainable development of the informal settlements in the future. Sustainability is ensured by the application of design guidelines from 'adaptive ecological design' such as impermanence, non-programming and large-scale networks.



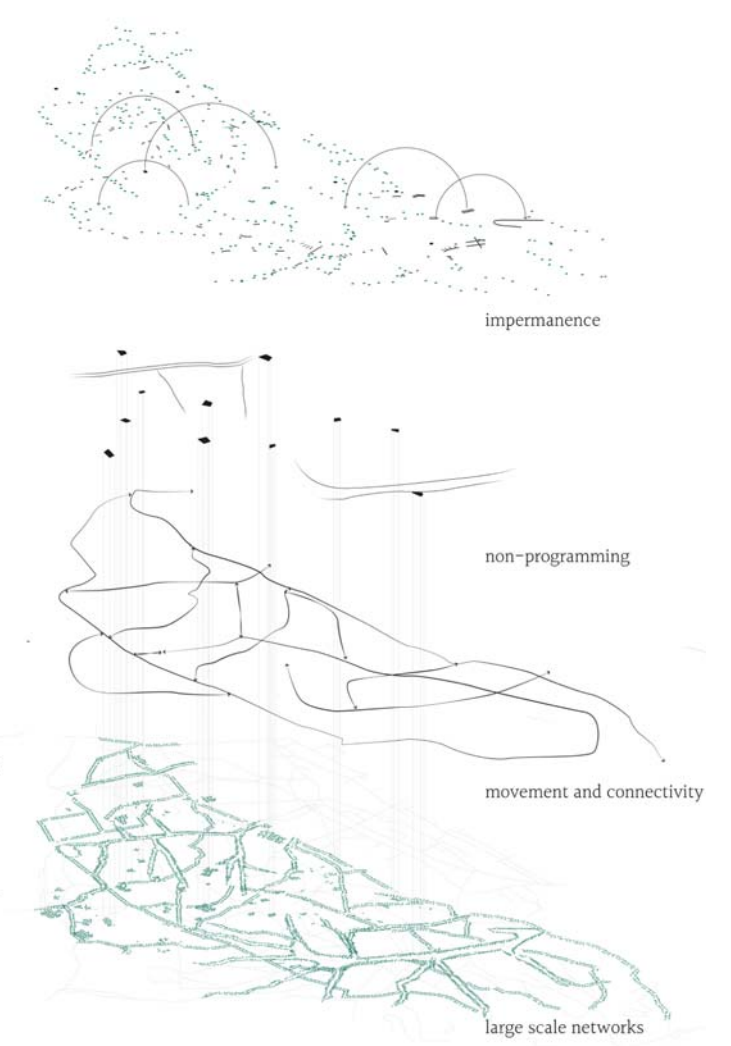
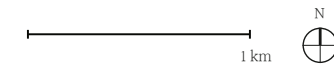
The potential of improving urban metabolism in informal settlements.



The potential of improving public spaces in informal settlements to facilitate urban metabolism and support sustainable development towards the future.



- cement city
- expansion areas
- informal settlements
- concrete road
- dirt road
- topography
- green urban framework
- public toilet
- groyne
- sand dam
- boundary Muthemba
- buildings
- streams
- open spaces
- roads
- Zambezi
- Tools elaborated on page 115



Landscape framework that supports sustainable development of Muthemba in terms of urban metabolism and urban growth.

Design guidelines from 'adaptive ecological design' that ensure sustainable development applied to the landscape framework



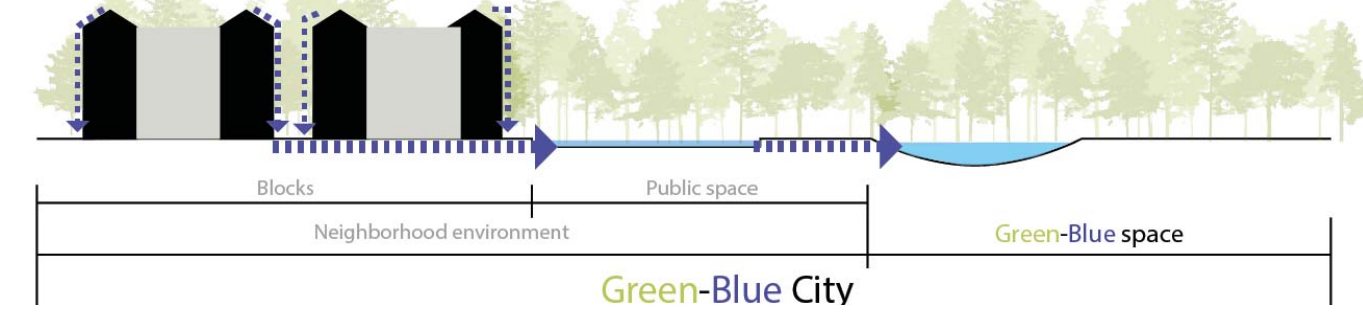
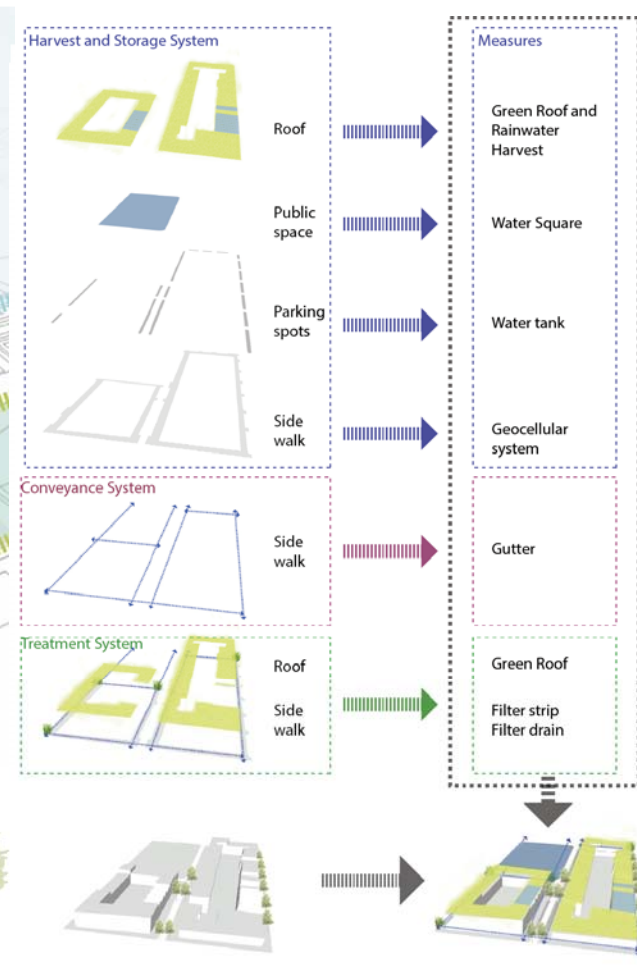
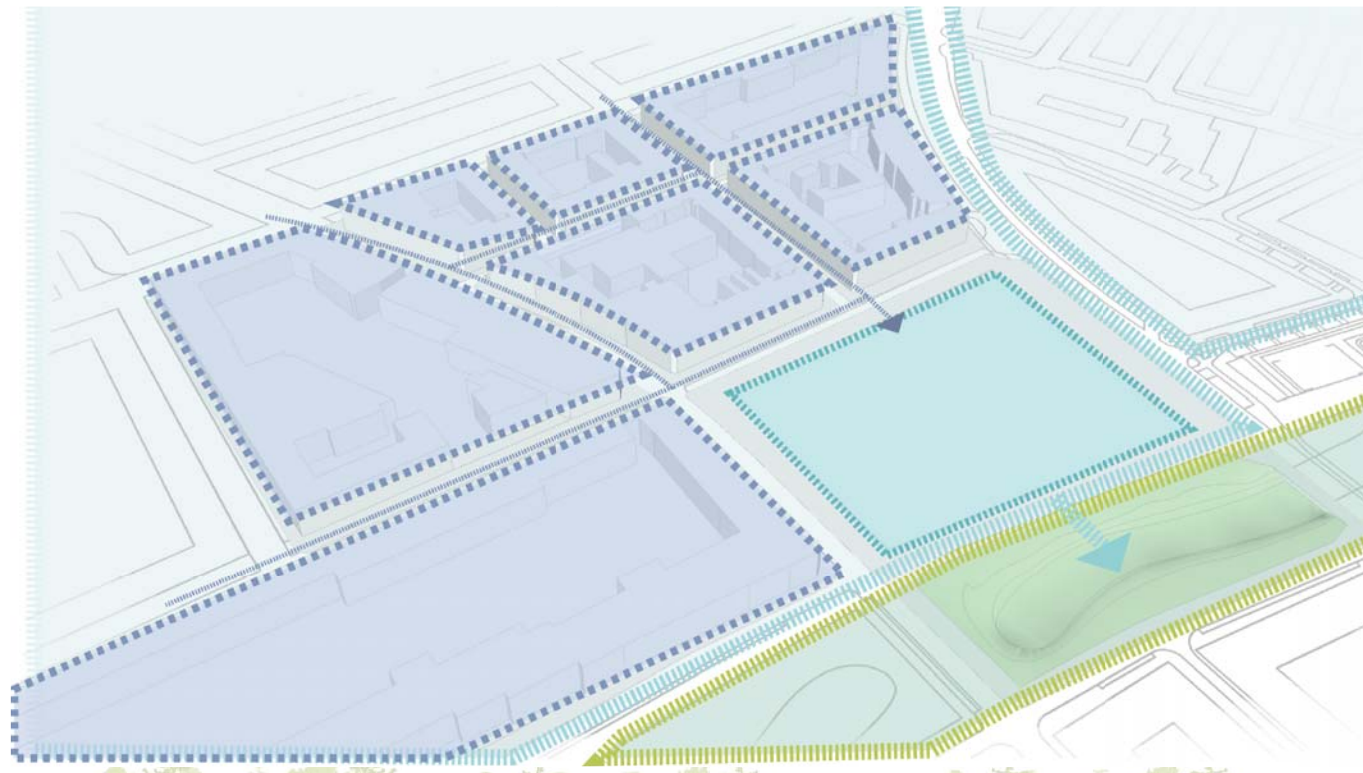
1 Visualisation of open space design, functioning as a collection and treatment node for urban resources.



2 Visualisation of natural stream design, harvesting rainwater for agricultural production which increases care for the public space and quality of the environment.



3 Visualisation of road, draining the waste water which improves the quality of the roads and provides water for trees that protect the roads against informal buildings.



Green-Blue City

| | | | | | |
|---|--|--|--|--|---|
| <p>Water quantity: Hold the water on site.</p> | <p>Water quantity: Drain the excess water to the other areas.</p> | <p>Water quality: The pretreatment facilities at the connection node.</p> | <p>Water quantity: Expand the existing water surface.</p> | <p>Water quality: Introduce 20-60% wetland plants, soft edge and fish community.</p> | <p>Biodiversity: Increase the structural diversity and allow the natural development.</p> |
| <p>Water quantity: Reuse the water on site.</p> | <p>Water quantity: Infiltration is impossible within the area.</p> | <p>Biodiversity: The increasing of biodiversity can be realized on different layers.</p> | <p>Water quantity: Use microtopography to create temporary storage basin</p> | <p>Water quality: Add the pretreatment facility around the inlet.</p> | <p>Biodiversity: Add the bay area, small ponds and path for animals around the pond.</p> |
| <p>Water quantity: Keep water on site for evaporation during summer time.</p> | <p>Water quantity: The space for peak storage and seasonal storage competes.</p> | <p>Amenity: Build multifunctional space.</p> | <p>Water quantity: Allow the water level fluctuation.</p> | <p>Water quality: Lengthen the treatment path.</p> | <p>Amenity: Use nature as recreation.</p> |

Xiaowan Zhang

Supervisors: DT (Daniel) Jauslin MSc
 Design Studio Lecturer Landscape Architecture
 Wageningen University & Research

Adapt Green-Blue space

Implementing the Sustainable urban Drainage System in Rotterdam city context

Location: Rotterdam, the Netherlands

Abstract

Rotterdam is already suffering from the climate change, and the climate change is still developing. There are already some issues happened in Rotterdam, such as the sewer overflow, excess storm water on the street, dike subsidence, inundated cellars and the heat stress. While facing with the results of climate change, the existing urban spaces have low capacity to buffer and solve the issues on their own. Because of the uncertain consequences of the climate change, though Rotterdam city has done some adaptations to solve the problems, there is still a big room for making the city more adaptive to the climate change, in a more sustainable and resilient way.

So this research is about applying the Sustainable urban drainage system (SuDS) to adapt the Green-Blue spaces to buffer the results of climate change, especially within the context of Rotterdam.

The objective is achieved by the research and design process. During the research process, the overall theoretical framework explains the basic knowledge and design criteria of implementing SuDS to adapt the Green-Blue space from the 4 perspectives: water quantity, water quality, biodiversity and amenity. The analysis of the climate change in Rotterdam is served as the important background of the research and design process. Then the designs are made in the Heemradsingel and Essenburgsingel with their surrounding neighborhoods to see how the existing Green-Blue space can be improved, by implementing the SuDS design criteria and measures. A SuDS model and several concrete designs are developed within the building environment and Green-Blue space. The results of the overall study provide a general approach to design the Green-Blue space by implementing the SuDS to buffer the water issues brought by the climate change, within the context of Rotterdam city.

Keywords:

Sustainable urban drainage system (SuDS), Green-Blue space, climate change, Rotterdam, Heemradsingel, Essenburgsingel.

Strategy

To solve the water issues, a SuDS model is developed in the building environment and Green-Blue space. Within the building environment, it can also be divided into 2 part: one is the block and another is the public space. During the rainfall event, the block will hold the water on site firstly. If the water exceeds the capacity that the block can hold, the water will be drained to the public space nearby. However, if the building environment cannot hold the water, the excess water will be discharged to the nearby canal as an emergent solution. A block model is developed, consisting of harvest and storage system, conveyance system and treatment system. And various measures are used. Besides, based on the design criteria and measures, various design strategies are developed from the four perspectives: water quantity, water quality, biodiversity and amenity, on both the building environment and Green-Blue space.



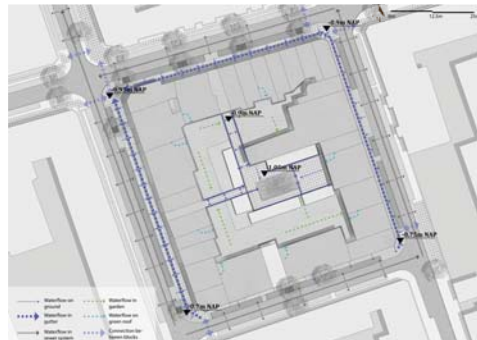
The whole area of Heemraadssingel and Essenburgsingel will be improved based on the SuDS design criteria, to become a multi-functional Green-Blue space that can solve the water issues and enhance the biodiversity and amenity values.



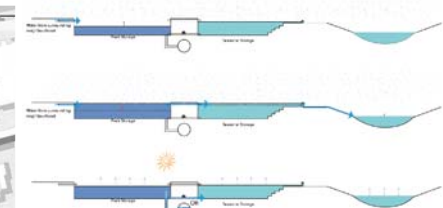
Block design



In this design, 73.6m³ of rainwater needs to be discharged to the other blocks or the water square.



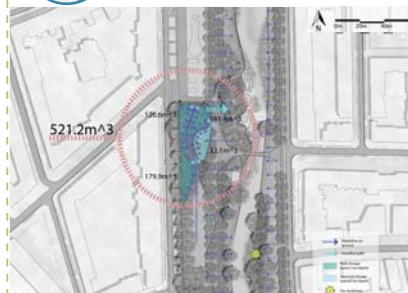
Water square-Heemraadsplein



The water flow between peak storage basin and seasonal storage basin during the raining and sunny day.



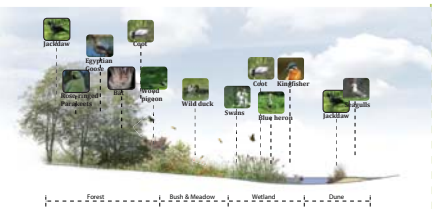
Heemradspark



Totally the peak storage basin can provide 521.2m³ water storage volume, which can match the storage assignment. This area serves as the main recreational area. Children can move the stones by themselves to change the waterways.



Ecological areas in Heemradssingel

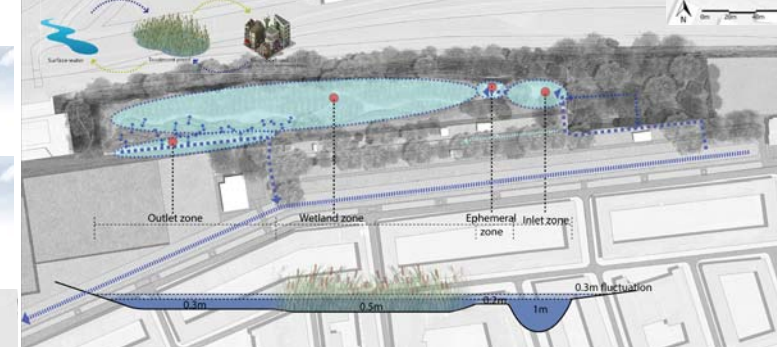


And in the area for wildlife, some wild grasses with flowers, shrubs, and trees are introduced to form the habitat. The available habitats within the areas are the forest, bush & meadow, wetland, and dune.



Essenburgsingel

A new route for the walking with dogs is also designed in the north of Essenburgsingel. Some spaces are designed for people to have recreational activities along the water.



A new treatment pond is designed in the Essenburgsingel West, with around 9500m².



Katarzyna Starzycka
Dr. dipl. ing. S. (Sanda) Lenzholzer MA

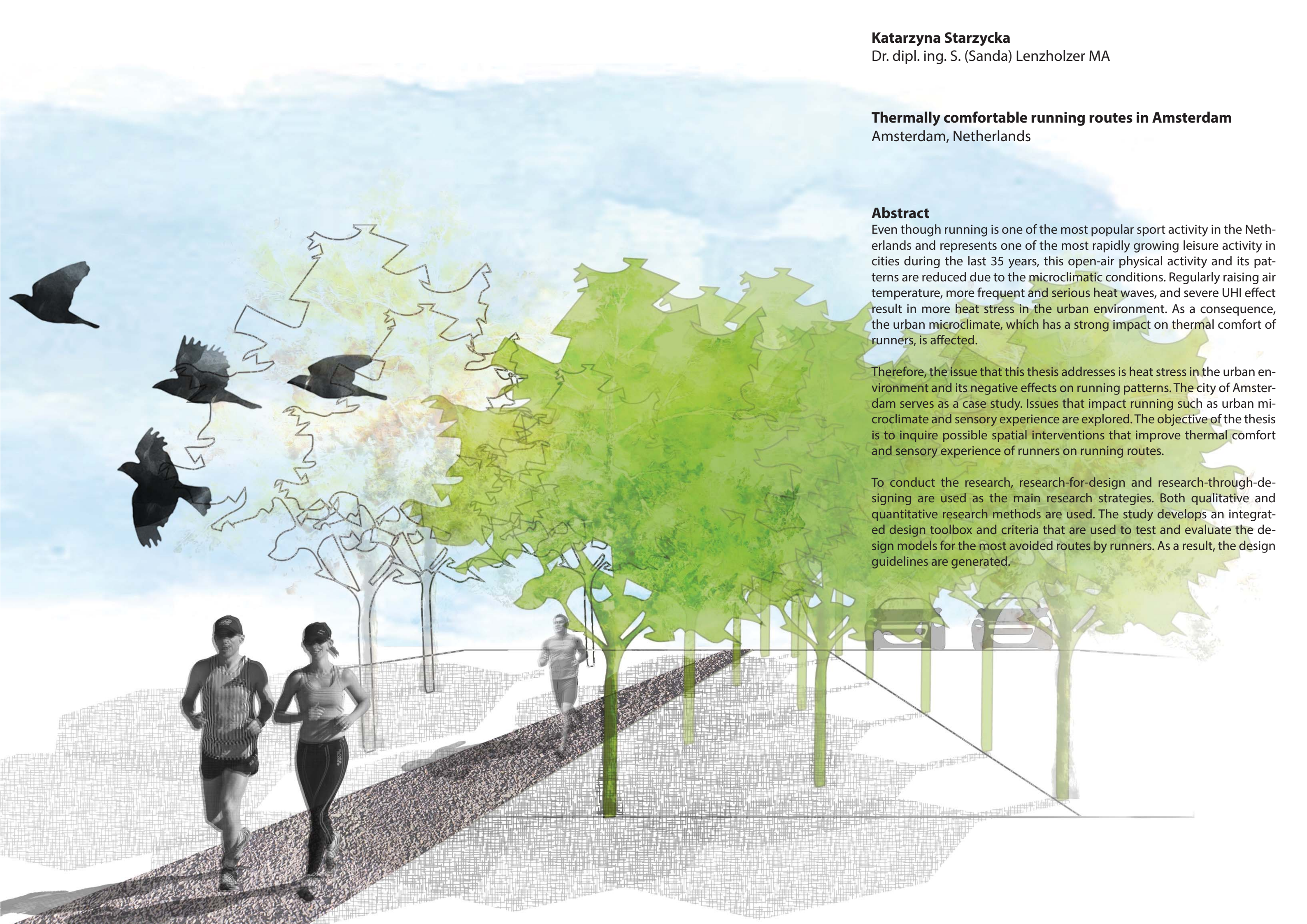
Thermally comfortable running routes in Amsterdam
Amsterdam, Netherlands

Abstract

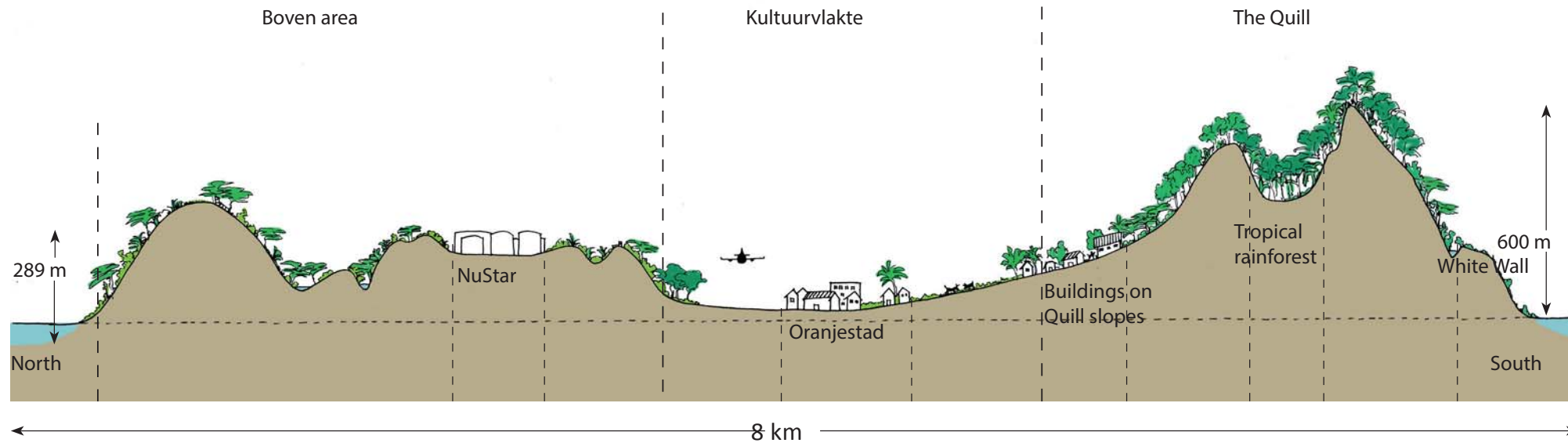
Even though running is one of the most popular sport activity in the Netherlands and represents one of the most rapidly growing leisure activity in cities during the last 35 years, this open-air physical activity and its patterns are reduced due to the microclimatic conditions. Regularly raising air temperature, more frequent and serious heat waves, and severe UHI effect result in more heat stress in the urban environment. As a consequence, the urban microclimate, which has a strong impact on thermal comfort of runners, is affected.

Therefore, the issue that this thesis addresses is heat stress in the urban environment and its negative effects on running patterns. The city of Amsterdam serves as a case study. Issues that impact running such as urban microclimate and sensory experience are explored. The objective of the thesis is to inquire possible spatial interventions that improve thermal comfort and sensory experience of runners on running routes.

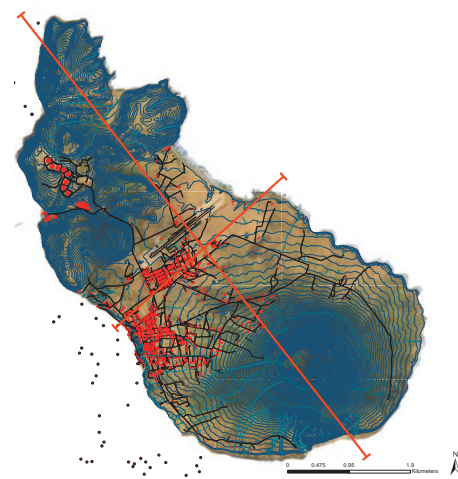
To conduct the research, research-for-design and research-through-designing are used as the main research strategies. Both qualitative and quantitative research methods are used. The study develops an integrated design toolbox and criteria that are used to test and evaluate the design models for the most avoided routes by runners. As a result, the design guidelines are generated.



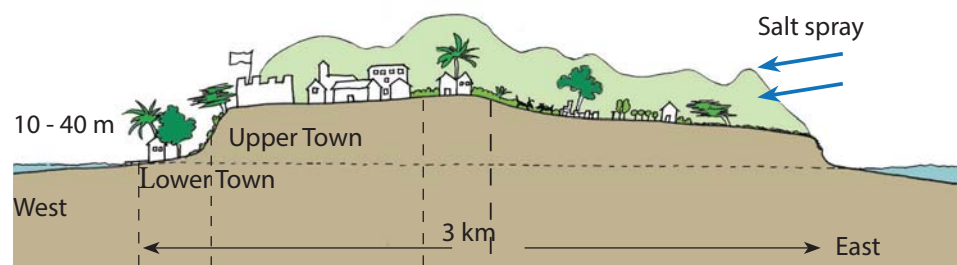
Longitudinal section of Statia



The Caribbean island Sint Eustatius

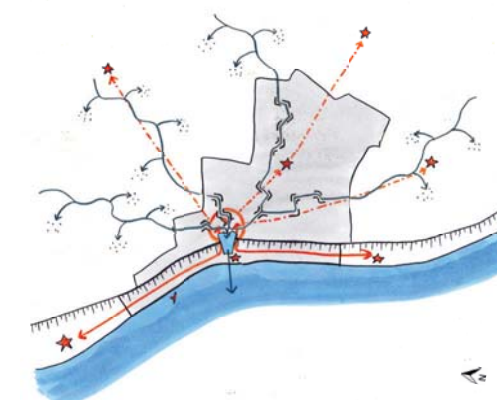


Cross section of Statia



West side - protected Leeward side of the island with Oranjestad (Upper and Lower Town) | East side - windward side with grassy open areas and Zeelandia bay

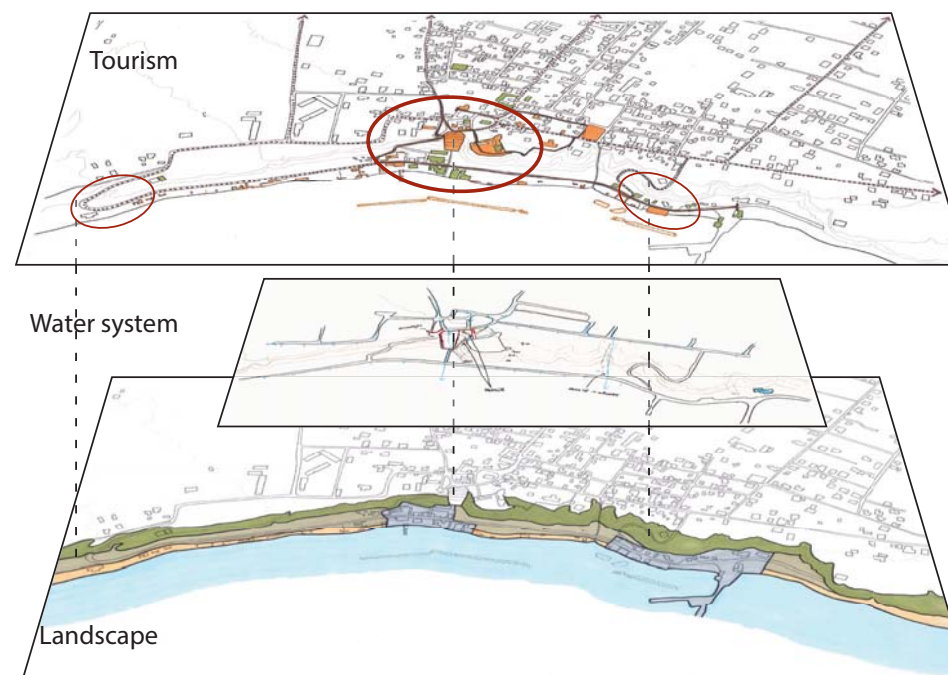
Strategy: develop the node of water and tourism systems into a good connection



Visualising design options for Statian inhabitants: example: cruise ships in Lower Town



Combining the different landscape layers shows the area with the greatest development potential



Ineke van Kapel

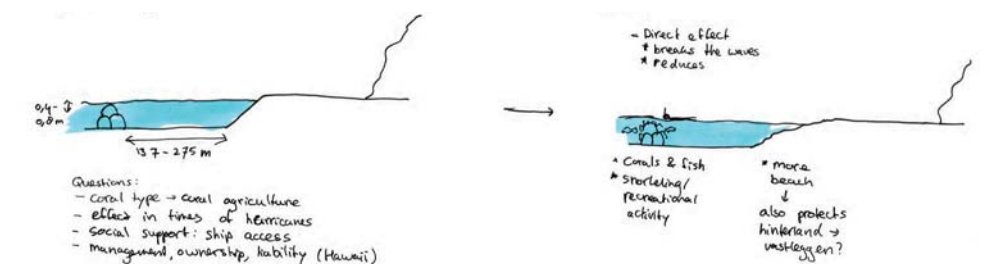
Supervisors: Ingrid Duchhart, Maarten van der Vlist, Mark Zandvoort

Testing the usefulness of Research-through-designing within the Adaptive Delta Management approach in a local design case: Sustainable tourism development in Lower Town, Sint Eustatius (Statia)

Abstract

Research-through-designing (RTD) is a method used in the landscape architectural discipline, where designing is used as a research method. Adaptive Delta Management (ADM) is an approach used in the Dutch Delta Programme to make water management strategies while dealing with uncertainty in future developments. An extensive coding research revealed that in the Dutch Delta Programme, RTD was used to localise the ADM approach. A design case aims to assess if RTD is indeed a useful way to localise the ADM approach. The development of sustainable tourism in Lower Town (LT), Sint Eustatius (Statia), is selected as a design case. LT has to deal with water related issues, such as sea level rise and coastal erosion. RTD within the ADM approach was used as main method for the research. A broad range of spatial scenarios were developed and shared with the inhabitants of Statia. Coastal protection options were explored, but too many uncertainties remained. Therefore the development strategy advises to place developments in the higher situated Upper Town, rather than in LT, and focus the design on connecting these two areas. A no-regret design was made for one area as incentive for future developments. A reflection on the research process showed that RTD was indeed a useful way to localise the ADM approach, in particular for exploring problems and solutions and defining new questions. However, using RTD in this way results in local knowledge and not generalizable new knowledge, which raises the question if RTD is an actual research method.

Exploring options to protect the coast of Lower Town against erosion and sea level rise



Resulting design: a new connection between Upper and Lower Town with recreation opportunities



Current situation on top of the cliff: messy, illogical area without shade



Water flows under the raised square. The area functions as a real view point, Statia's balcony

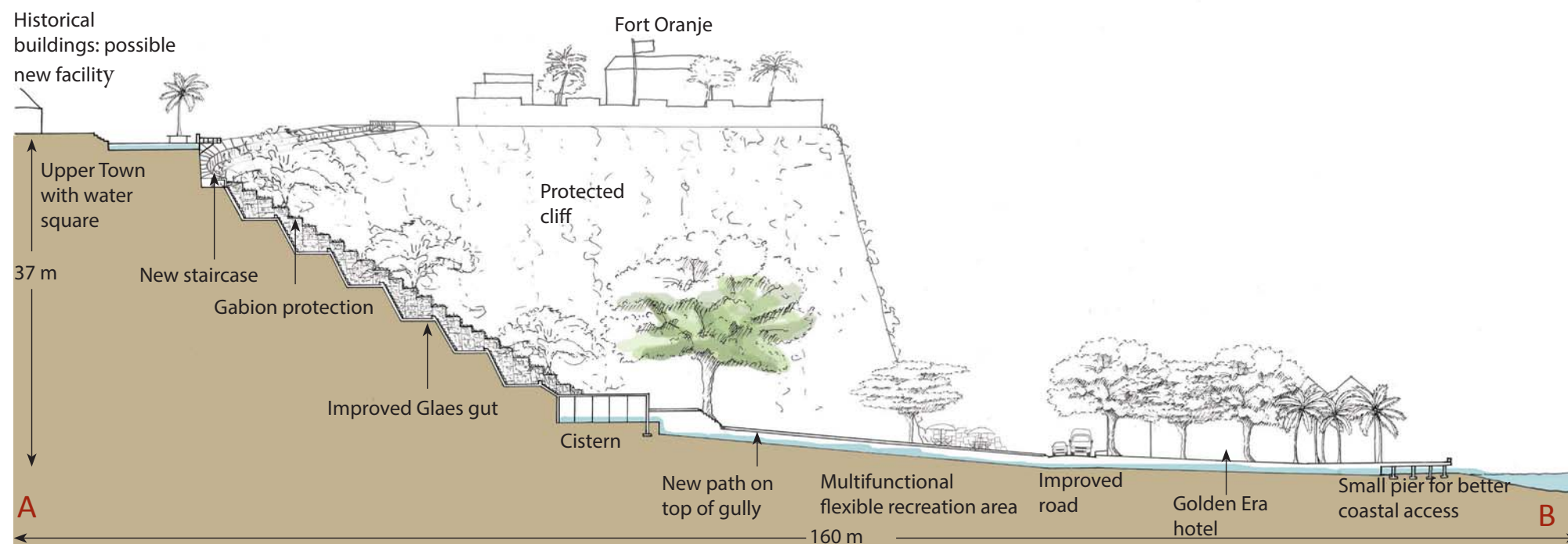


Current situation at Glaes Gut, with erosion at the side and limited water experience

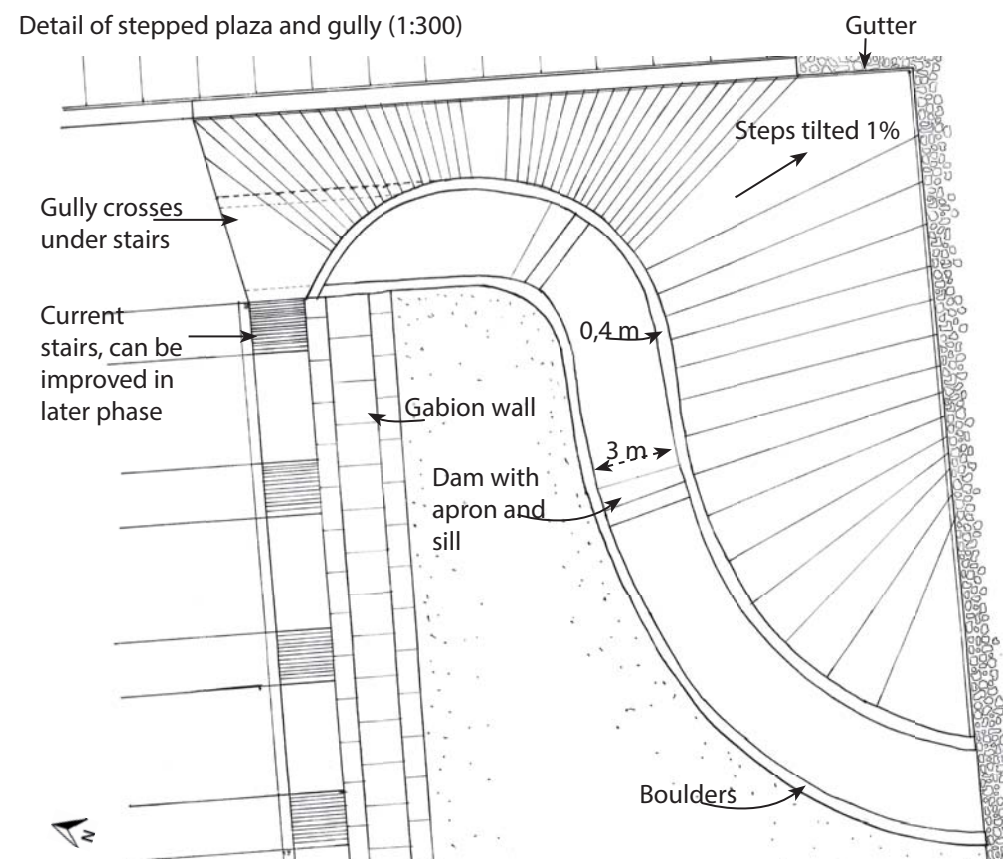


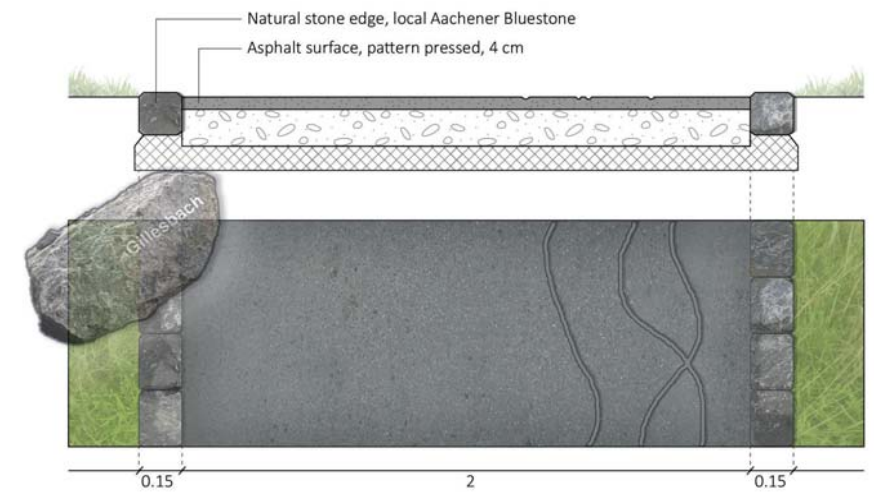
The new stepped plaza improves the connection between Upper and Lower Town and improves the experience

Crosssection resulting design



Detail of stepped plaza and gully (1:300)





The continuity throughout the valleys is strengthened by the design of a path, using local materials. It is a simple way to create a direct visible link to the stream and valley.



The new stream in the forest, with the new continuous path and rock elements guiding the stream.



Detail and section 2 Bridging the Adenauerallee. The valley is enlarged and the stream reopened. From the platform the deep valley and stream are visible again, you are completely enclosed and surrounded by the trees and can experience the deep stream valley.

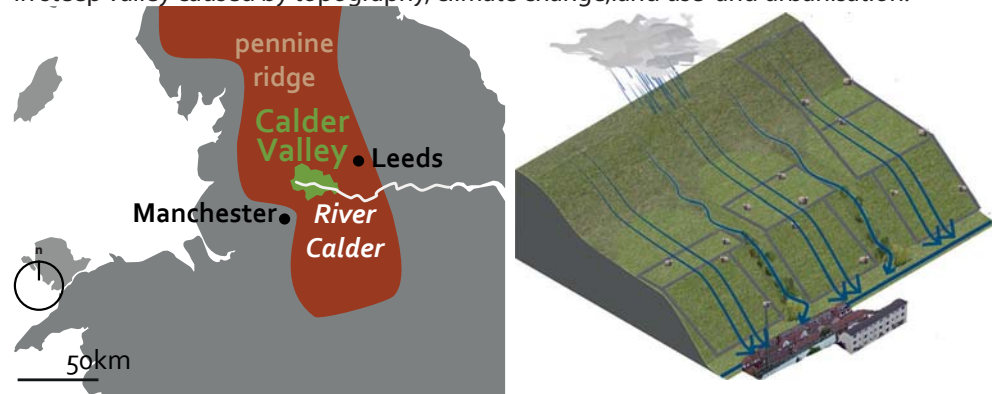


Detail and section 3 A new connection between the city and the valley downstream. The railway dam blocking the valley has been opened so slow traffic can move between the city and surrounding landscape. The design strengthens the visibility of the stream valley and creates awareness of the history of the area and the location of the park in relation to the city centre of Aachen.

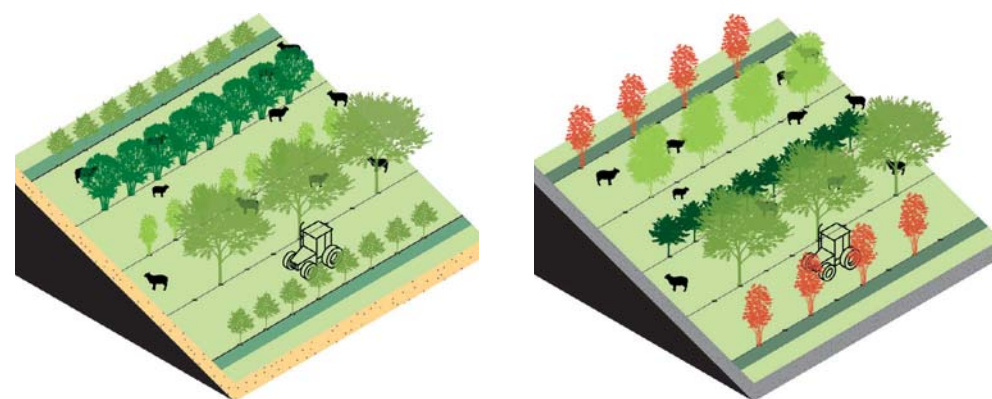
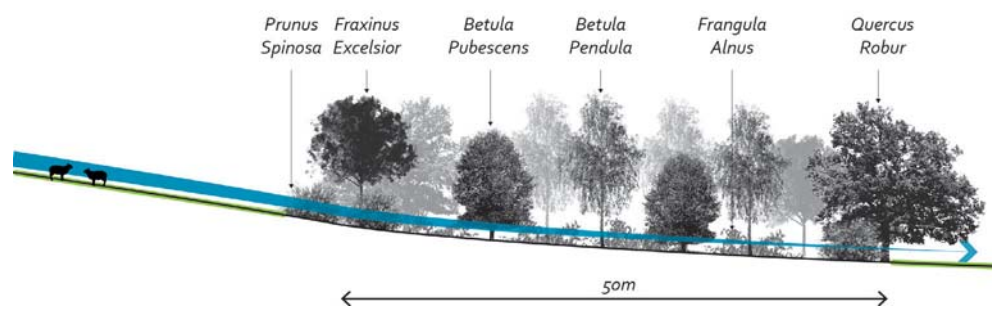
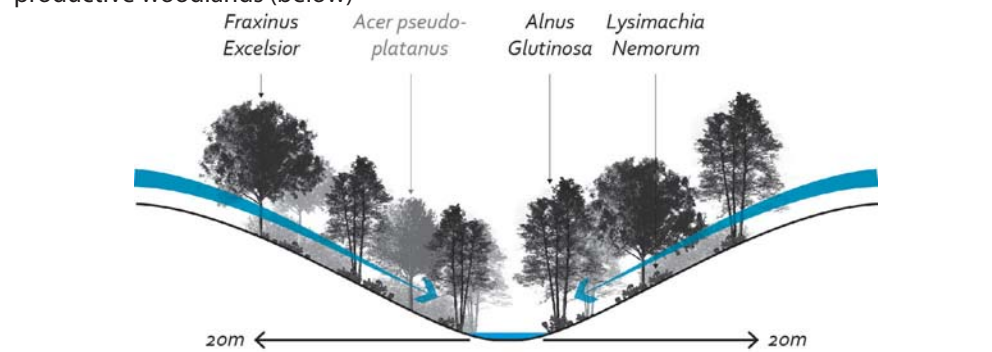


The curving stream, presence of water and sloping stream edges are a subtle hint to the moat no longer visible in the newly enlarged park surrounding the castle.

Case study area: Calder Valley, Yorkshire, England. General problem: rain induced floods in steep valley caused by topography, climate change, land use and urbanisation.



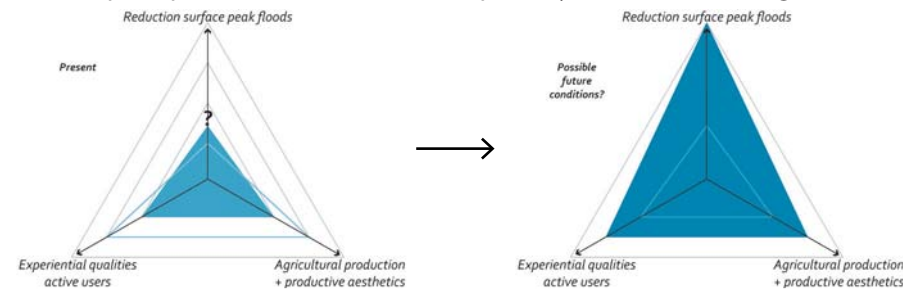
Literature study to find design principles for runoff slowing woodlands (above) and productive woodlands (below)



Woodland planting as part flood reducing package, but new plantings not culturally adopted, because no productive values for farmers & no experiential qualities walkers.



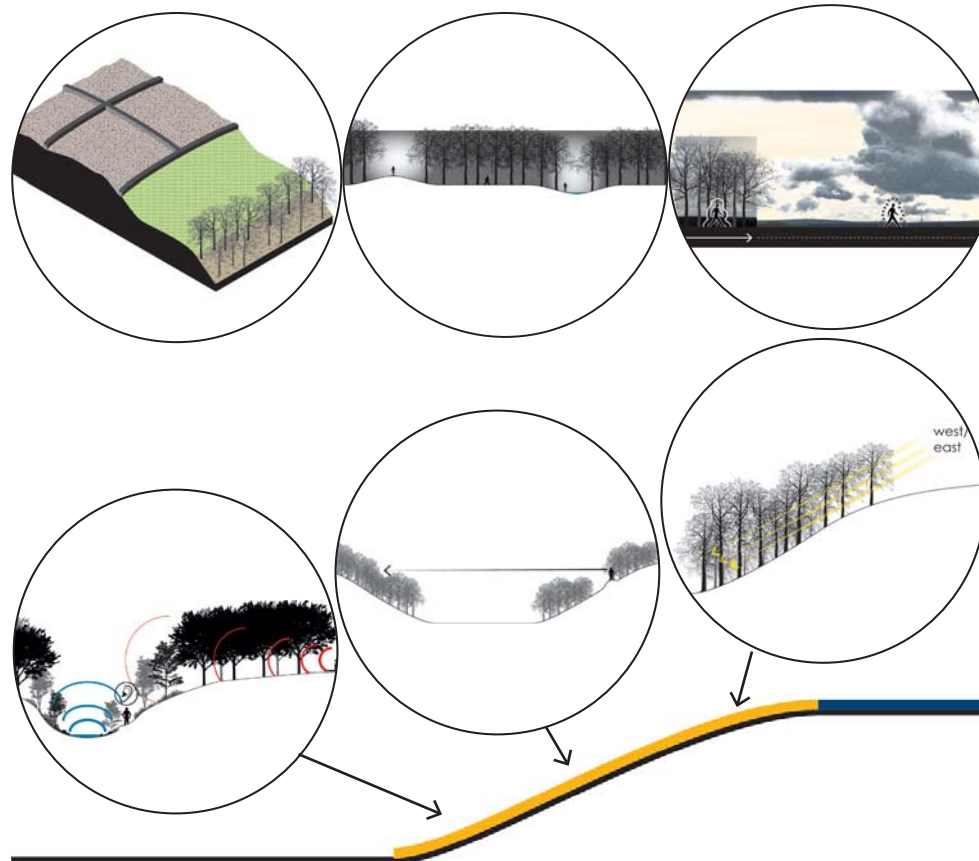
Aim & DQ: investigating possible combinations between hydrological, productive & experiential principles to increase cultural adoptability new runoff slowing woodlands



RQ: Phenomenological walking study to find multisensory, bodily experienced design principles for walkers for woodlands in the Calder Valley



E.g. outcomes(below): principles for whole route (above ones) and place specific (below).



Arjen Venema

Supervisors:

Marlies Brinkhuijsen

Rudi van Etteger

Designing slow motion woodlands

Making flood reducing woodlands more culturally adopted by incorporating productive values and experiential qualities in the Upper Calder Valley, UK

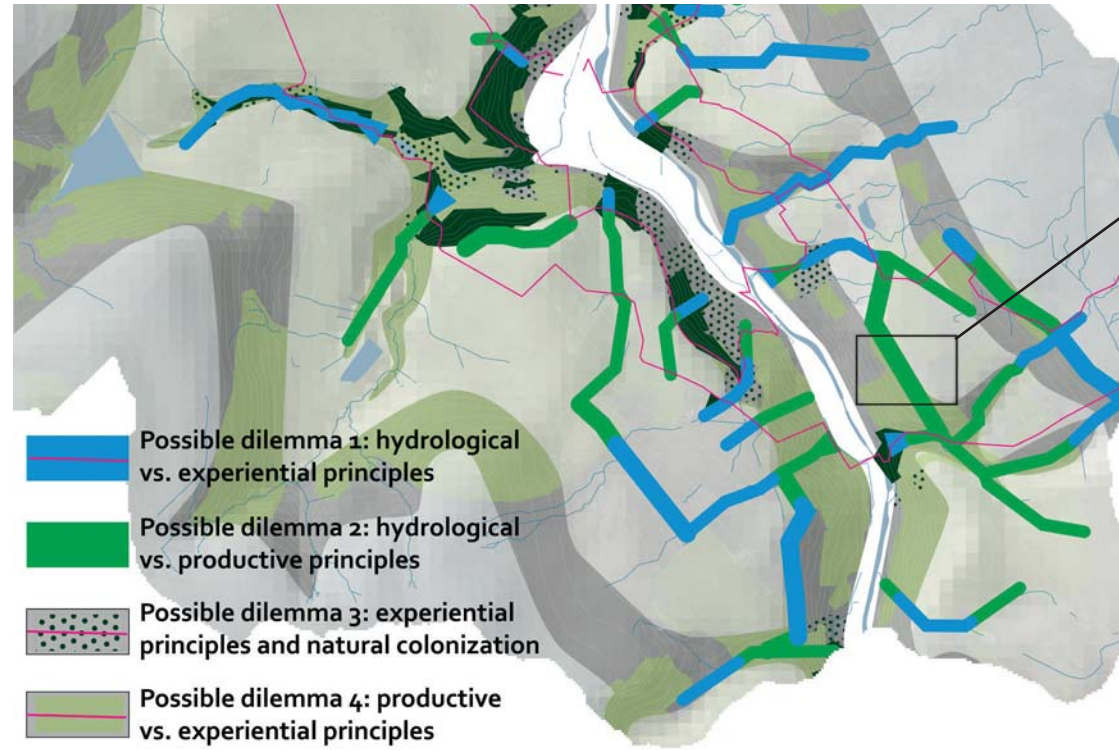
Abstract

Large parts of Upper England flood every two or three years following disastrous peak rain events, leading to both financial and societal damage. This thesis zooms in on the Calder Valley, a flood prone area, due to a combination of steep topography, land use and an urbanised valley. Runoff slowing woodland plantings are an important part of new flood reduction schemes. However, their cultural adoptability and thus implementation is lacking because they lack productive values for farmers and because they lack experiential qualities for walkers. The aim of this thesis is to see how hydrological, productive and experiential woodland principles they can be combined, to create more culturally adopted runoff slowing woodland plantings.

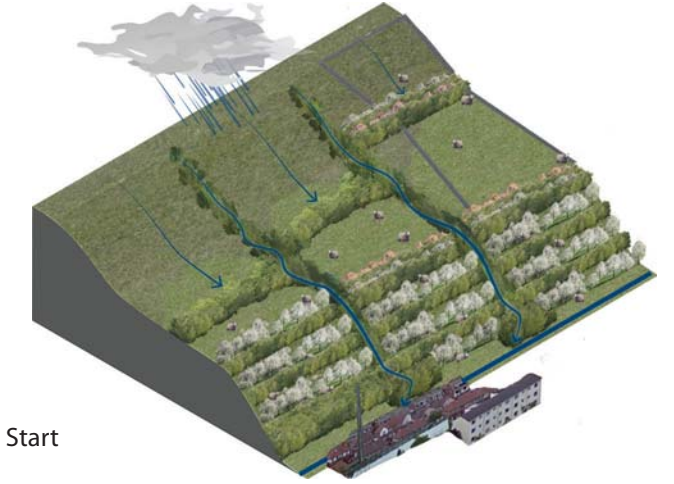
First, a literature study was conducted to find the hydrological principles for woodlands and to find productive values that woodlands could show. This led to design principles for flood alleviating woodlands and silvipastures. After this, a phenomenological walking study was done in the Calder Valley and in five English woodlands, which led to the creation of five categories of experiential design principles that could enhance the experience of: immersive woodlands, nature, an interesting route, pleasurable multisensory information and a sense of place, or landscape drama. Then a landscape analysis was conducted where locations were identified to apply the different principles. These layers were overlaid and dilemmas were identified between the principles. For each dilemma, solutions were drawn and assessed whether they followed the principles. Solutions were chosen because they eliminated or minimized tradeoffs.

Then the integrated design was made, with principles and solutions for conflicts put in place. A visualized route shows the benefits of the integrated design as compared to the existing approach. It can be concluded that the conflicts between the hydrological, experiential and productive principles can be eliminated or minimized by careful design. This thesis is significant in two aspects. First, by adding knowledge on the multisensory, bodily experience of English woodlands and of the Calder Valley, as triggered by certain physical characteristics. Second, this thesis tries to see assess tradeoffs and find solutions for dilemmas between mainly qualitative design principles to heighten social acceptance.

Design process: overlaying principle layers, identify dilemmas, design to eliminate tradeoff



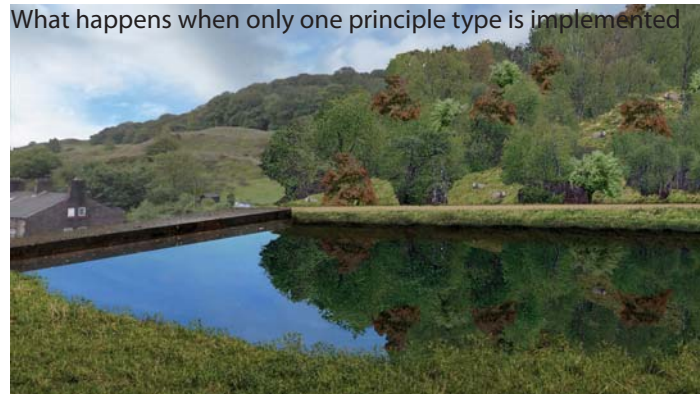
Slow motion woodlands in peak rain event through time



Visualized route: the existing situation



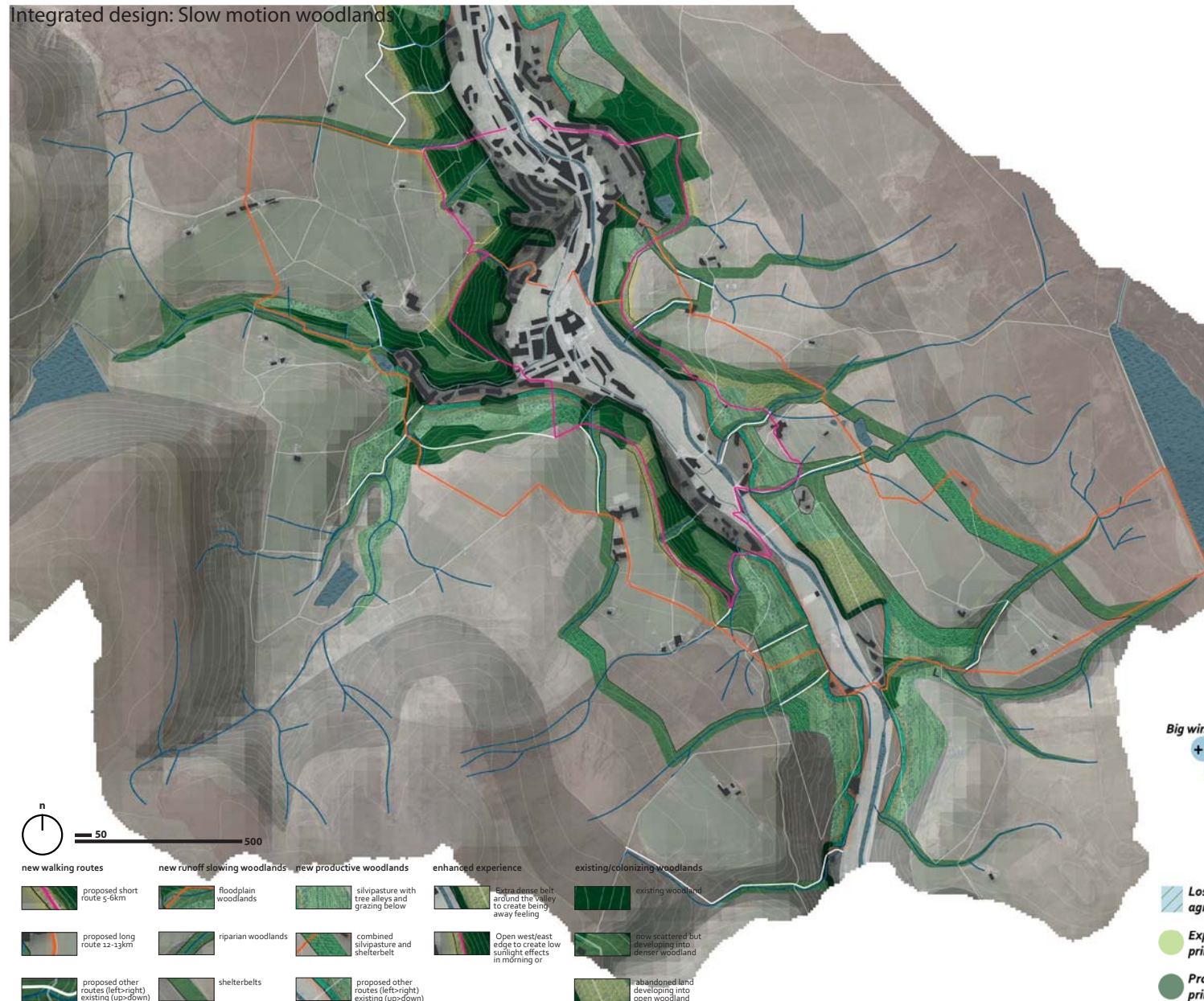
What happens when only one principle type is implemented



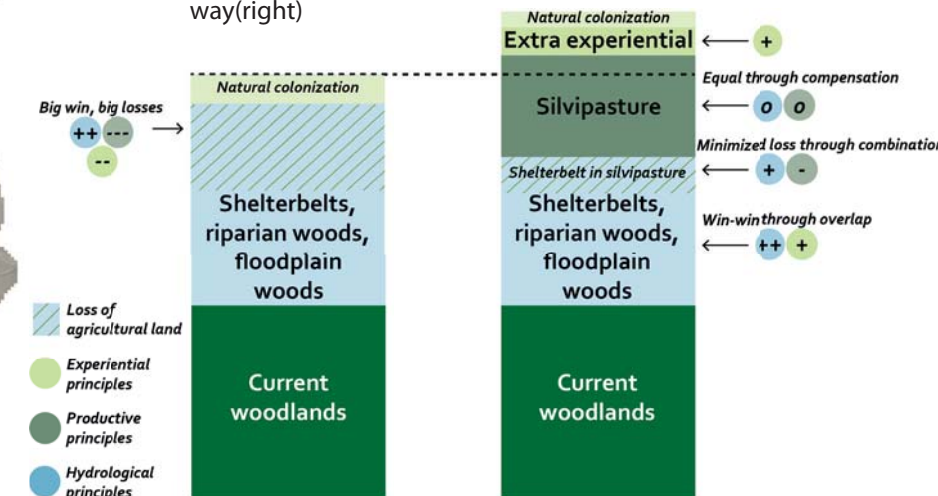
What integrated design could do: additional productive expression

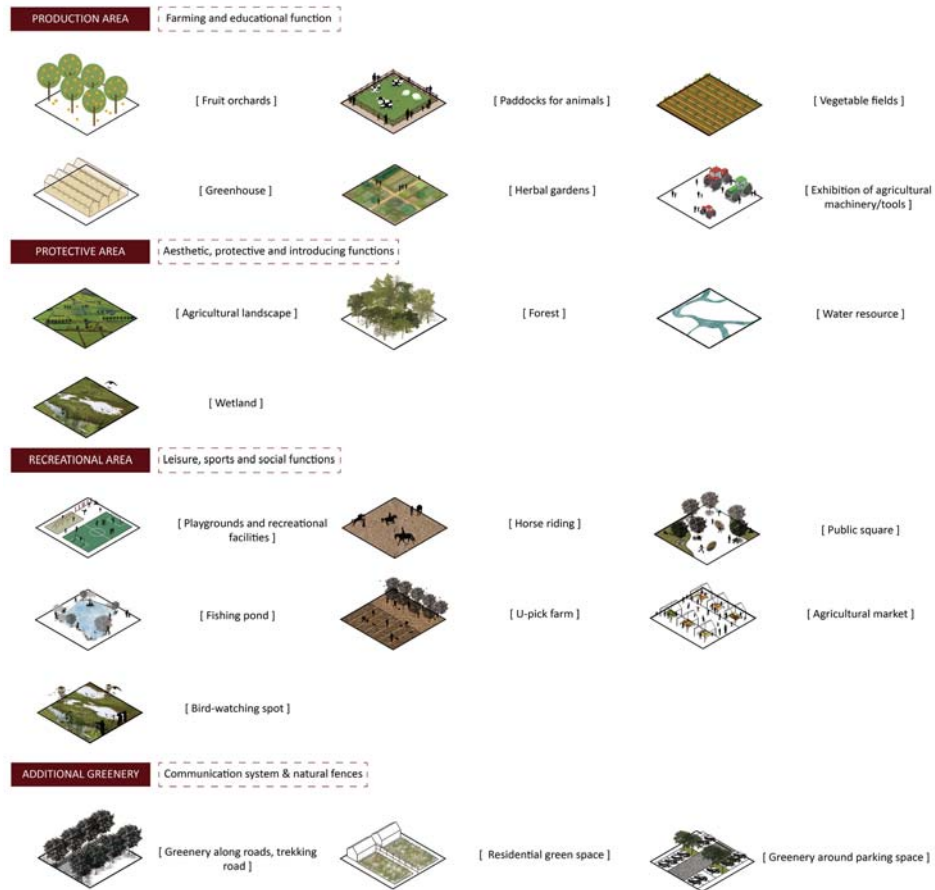


Integrated design: Slow motion woodlands

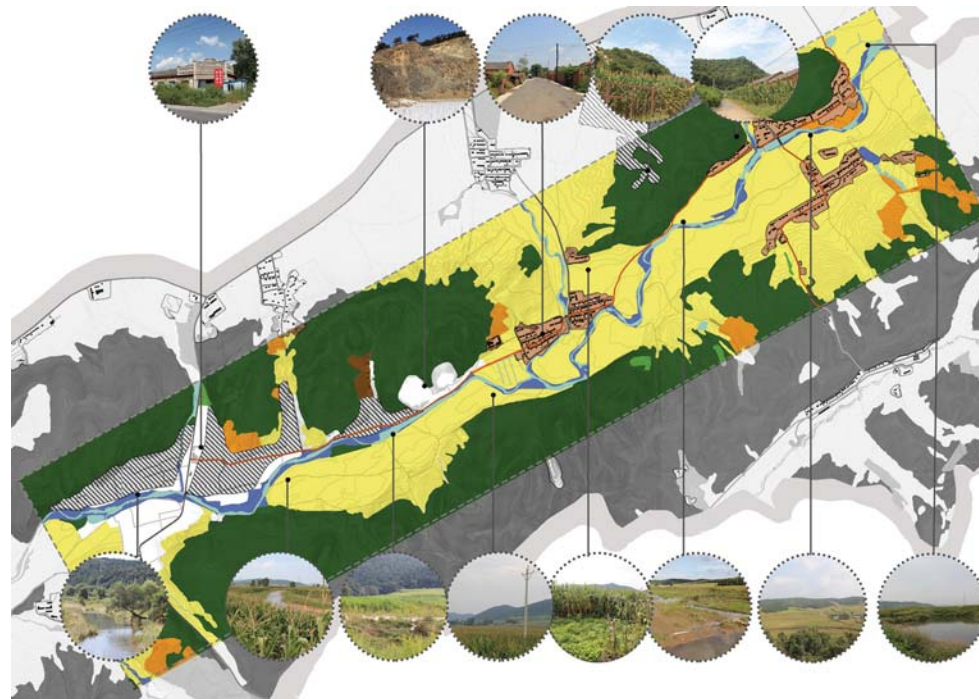


Comparison existing (left) and integrated, designed way(right)

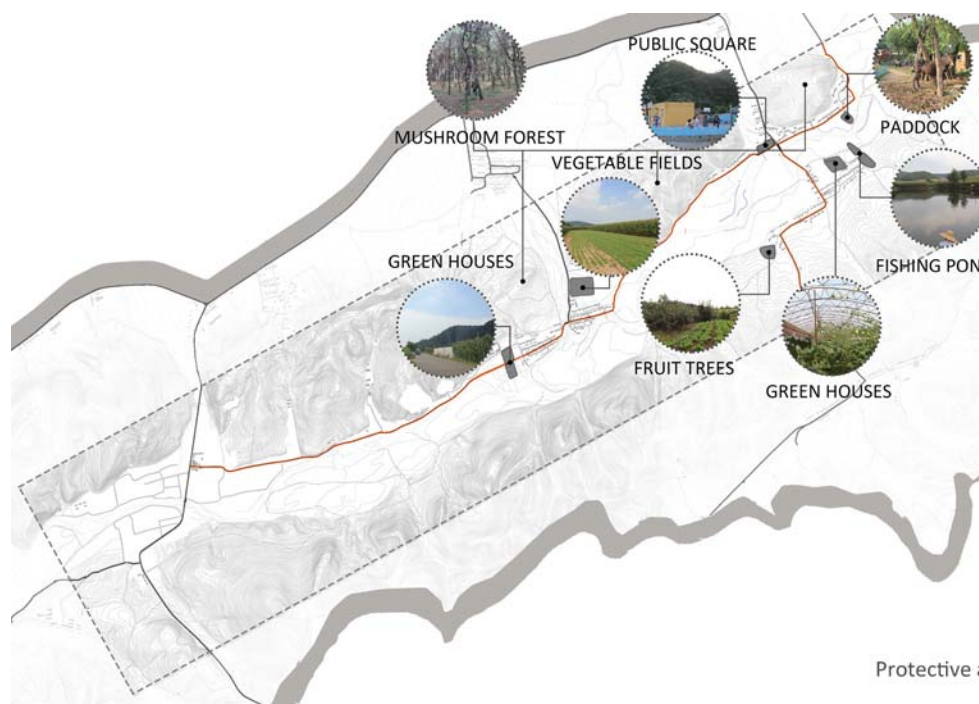




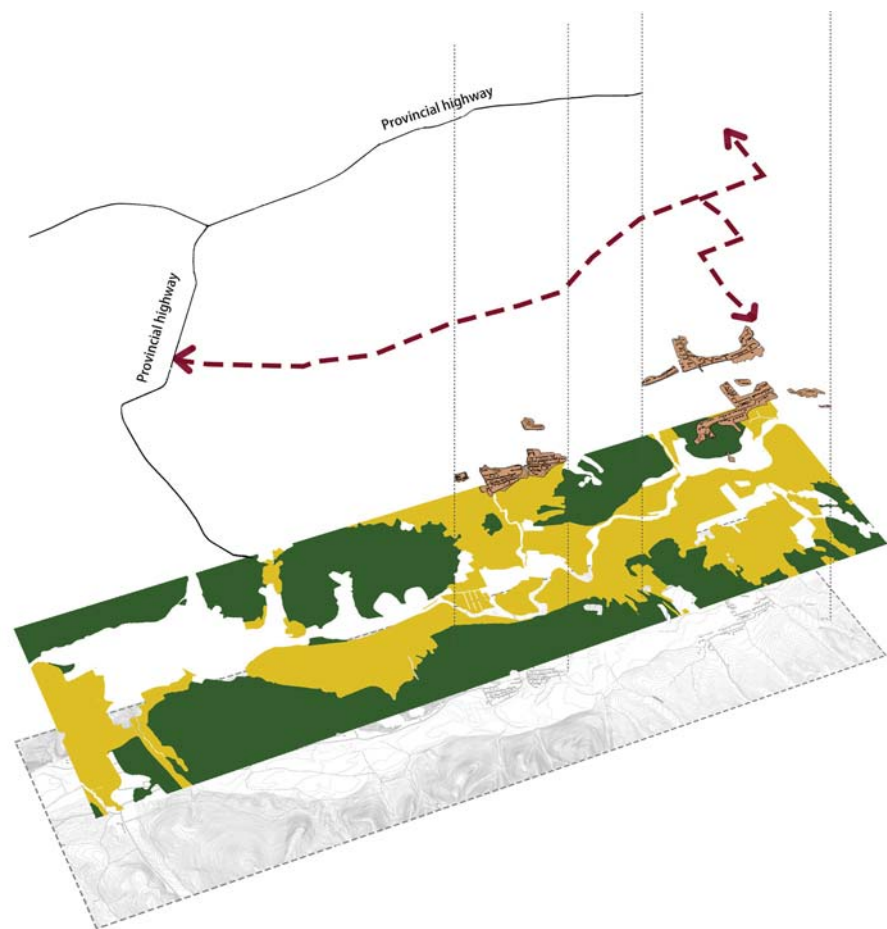
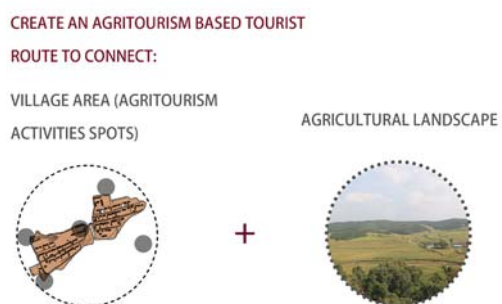
Functions and components of four land use zoning in an agritourism site



Land use map and landscape view along the tourist route



Agritourism-related resources distribution map



Land use map and landscape view along the tourist route

Yunjie Yang

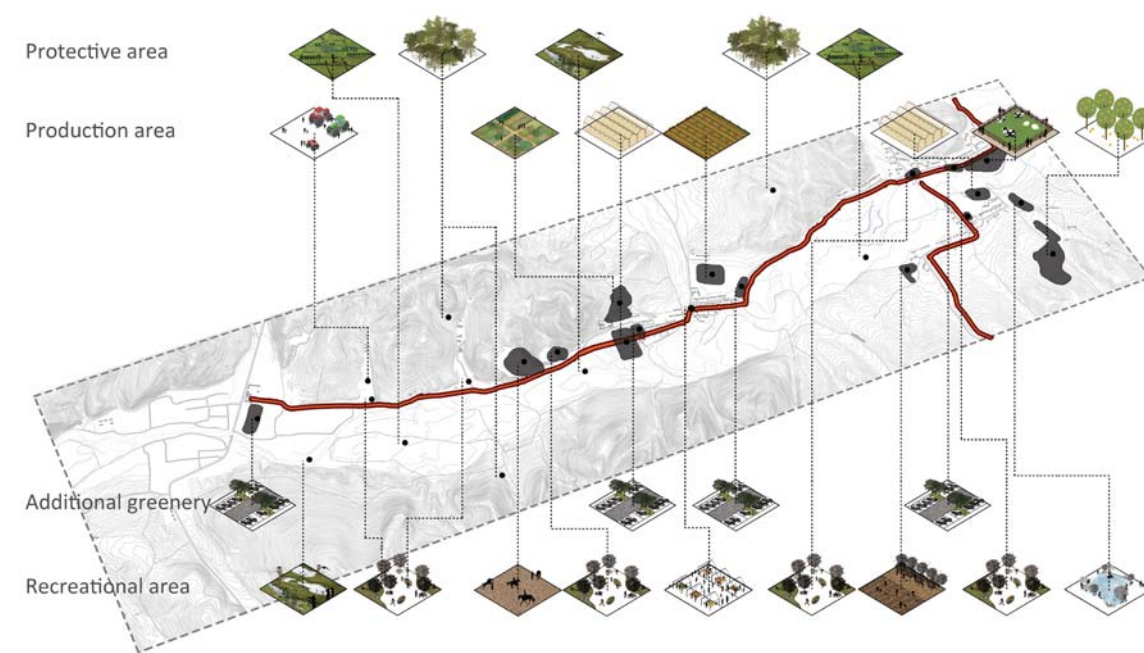
Name supervisors: prof.dr.ir. A (Adri) van den Brink, dr.ir. I (Ingrid) Duchhart, Niek Roozen (Niek Roozen b.v.)

From hollowing area to livable rural area

Developing agritourism from a perspective of landscape design as a catalyst for sustainable rural development, case study in Shenyang, China

Abstract

Accelerated by economic reforms, a large-scale migration of younger workers from rural to urban China has taken place since the 1990s. The rapid depopulation of the rural area caused a massive outflow of rural investment and industries and further created a phenomenon known as "village hollowing". This trend makes differences in the family structure, living environment, and lifestyle. Eventually, it affects the sustainable rural development and leads to the decreasing attractiveness of the countryside and even disappearance of traditional villages. In this thesis, the status of hollowing village refer to the social community, local economy, land use management, public infrastructure will be discussed. Agritourism as a possible catalyst is playing a role in the aspect of reuse of wasteland, creating job opportunities, improving living standards addressing the redevelopment of rural communities. This thesis explores the phenomenon of rural hollowing in China and offers opportunities through agritourism development to revitalize and reconstruction the rural area and thereby creating a sustainable development model for most rural areas in China.



Land use zoning plan

Information center



Racecourse



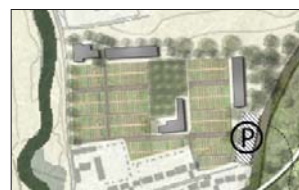
Green house



Botanic garden



Vegetable fields



Eudcation experment fields Paddock



Green house



Fishing pond



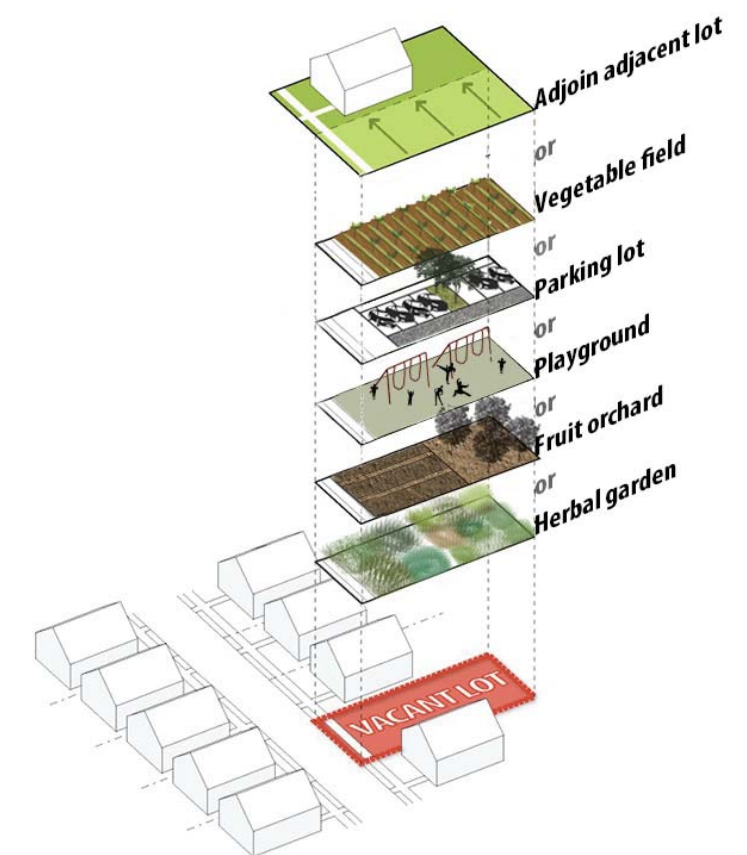
Community square



Fruit orchard



Parking area



A variety of possibilities for land reuse



Visualization of educational experimental fields



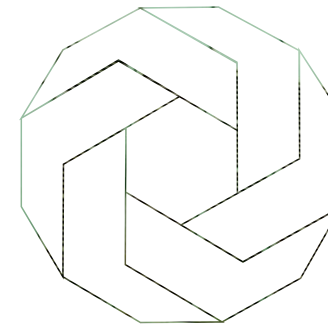
Visualization of wooden walkway in spring (across wetland area)



Visualization of vetetable fields (in peak season)

“Anything is potentially an attraction, it simply awaits someone to take the trouble to point it out to another as something noteworthy, or worth seeing”

- Dean MacCannell (1999) -



Linde Elsinga
 Ingrid Duchhart
 Charlotte Buys (Stedelijke Ontwikkeling/Gemeente Amsterdam)

Seducing the Urban Visitor

A design study into behavior and preferences of tourists in Amsterdam

Abstract

Amsterdam is an increasingly popular destination among tourists, it is expected that the number of tourists visiting the Dutch capital will be doubled in 2030.

This study investigates the content on photos uploaded by tourists on the platform Flickr, in order to understand the patterns preferences and common patterns in tourism behavior. It explores the potential of photo data as a tool in landscape architecture research. By systematically analyzing the content on these photos, this research acquires knowledge that is of relevance for the use and interpretation of the public urban space.

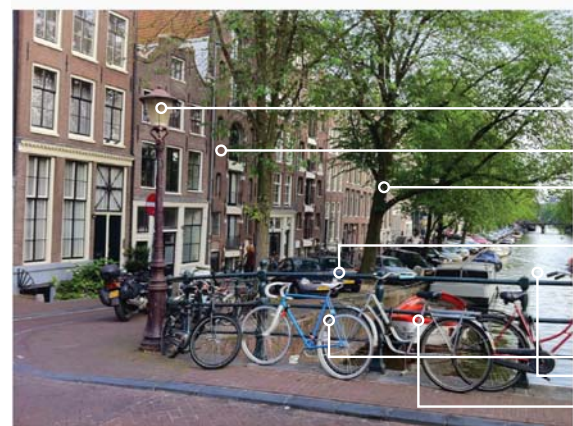
By analyzing photos based on several categories, one can conclude about the use and preferences of tourists in urban environments, which can be of help in understanding the engagement and experience of the physical surroundings they are in.

The outcomes of the visual content analysis serve as the basis for generating the design of a seductive route through the Oosterdok area in Amsterdam. An area that offers (potential) attractions but is still segregated from the adjacent central station. The design involves interventions to be added to the public urban space in order to provide easier access from the central station and better legibility throughout the whole area for tourism purposes.

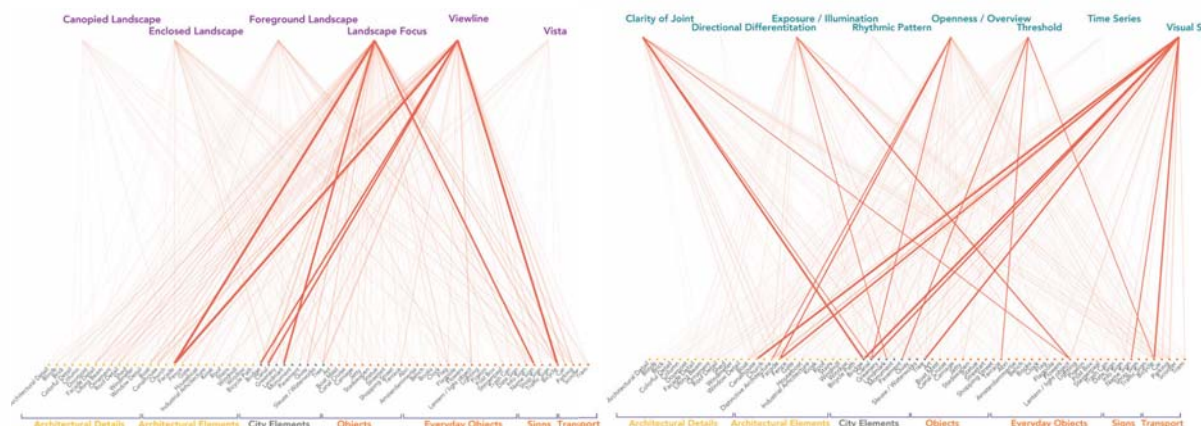
The research shows the potential of photo data in landscape studies and is a small step towards a theory on seductive routes, orientation and accessibility for tourism in complex urban areas. Through observing, analysis and interpretation this study adds up to better understanding of tourism preferences in highly urbanized areas and illustrates the relevance and accuracy of photo data for spatial purposes.



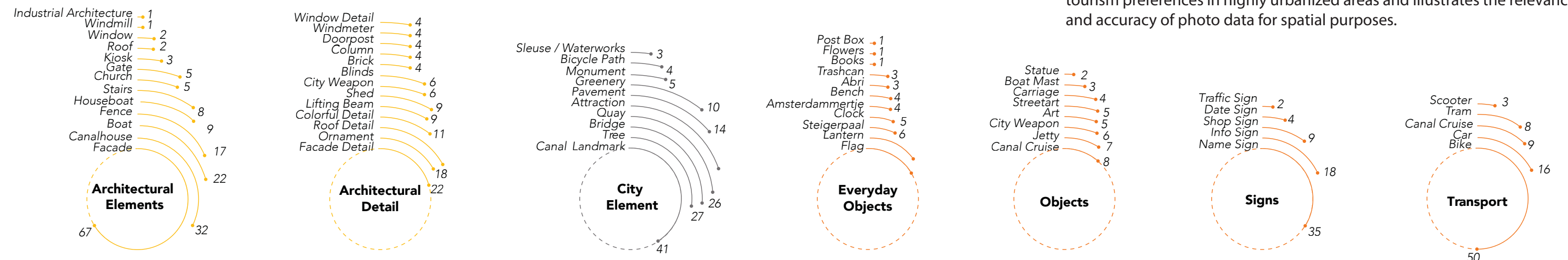
From earlier research on distributions of tourists, route density patterns, as well as the main touristic hotspots (Sander van der Drift, 2015) the design location was chosen: Oosterdok Amsterdam.



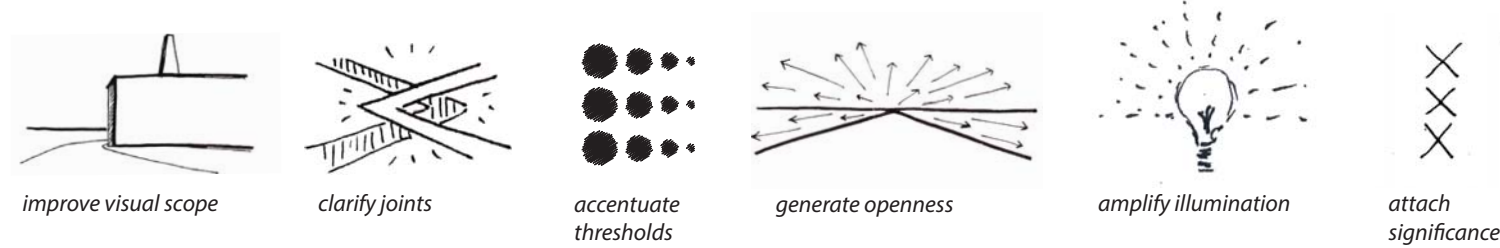
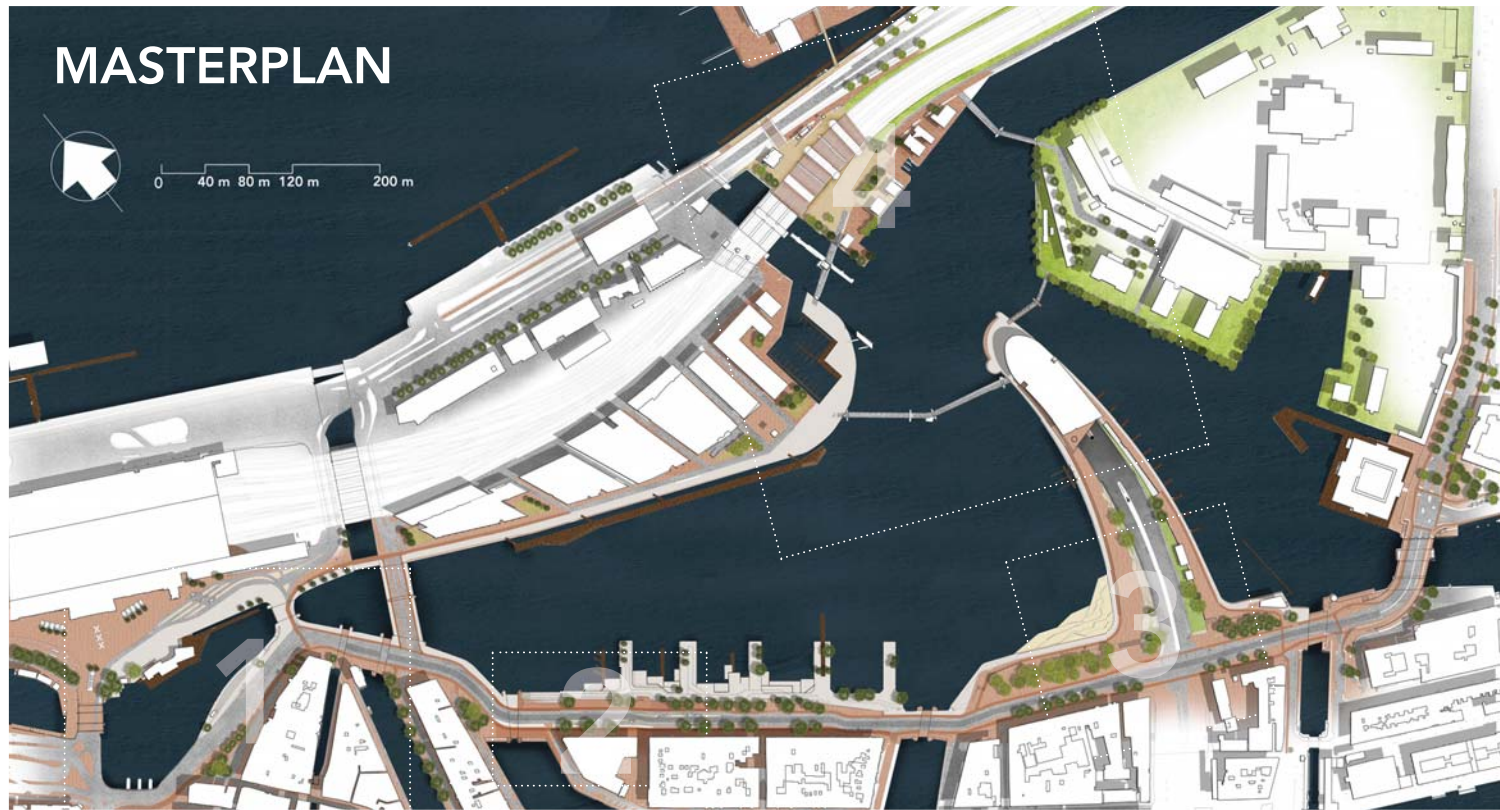
- Scenic Composition, Viewline
 - Canalscape
 - From a bridge
- Quotidian objects, Lantern
- Facade Detail
 - Architectural Elements, Facade
 - Architectural Elements, Canal...
- Tree
 - Continuity
 - Threshold
- Bridge
 - Clarity of joint
- Architectural Elements, Fence
- Transport, Bicycle
- Canal
- Boat
 - Threshold
 - Continuity



Co-occurrences between different facets on the analyzed photos



Number of occurrences of objects on the analyzed photos



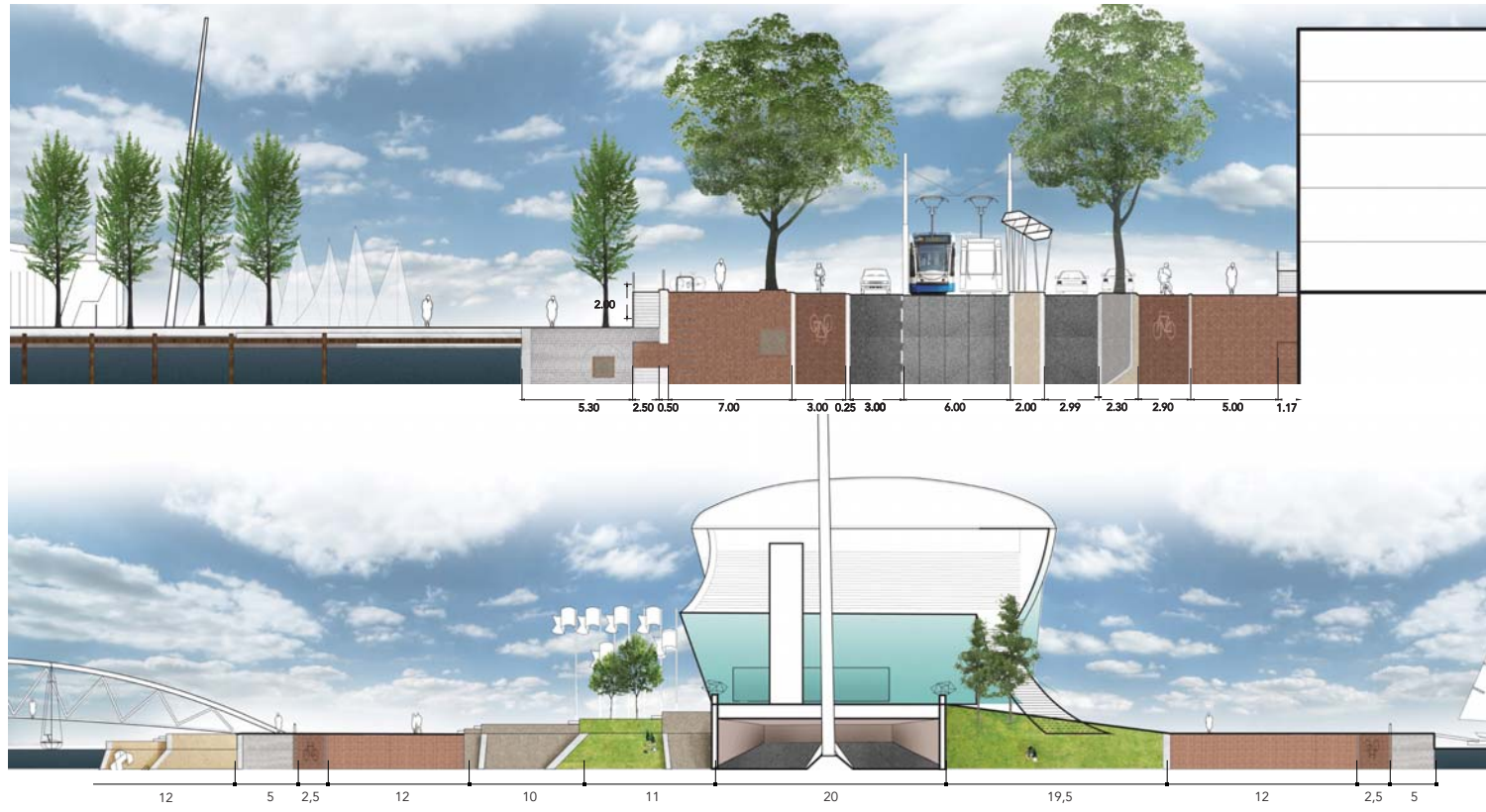
Six guidelines illustrate the different sets of interventions that can be implemented in order to seduce and to help tourists orientate through the complex urban environment.



The Oosterdok area is characterized by four different types of areas that offer potential to become a successful tourism attraction. The design reinforces these qualities through implementing common attributes derived from the content analysis as design guidelines.

The concept for the design is inspired by the analytical framework and the landscape analysis and focuses on three main points:

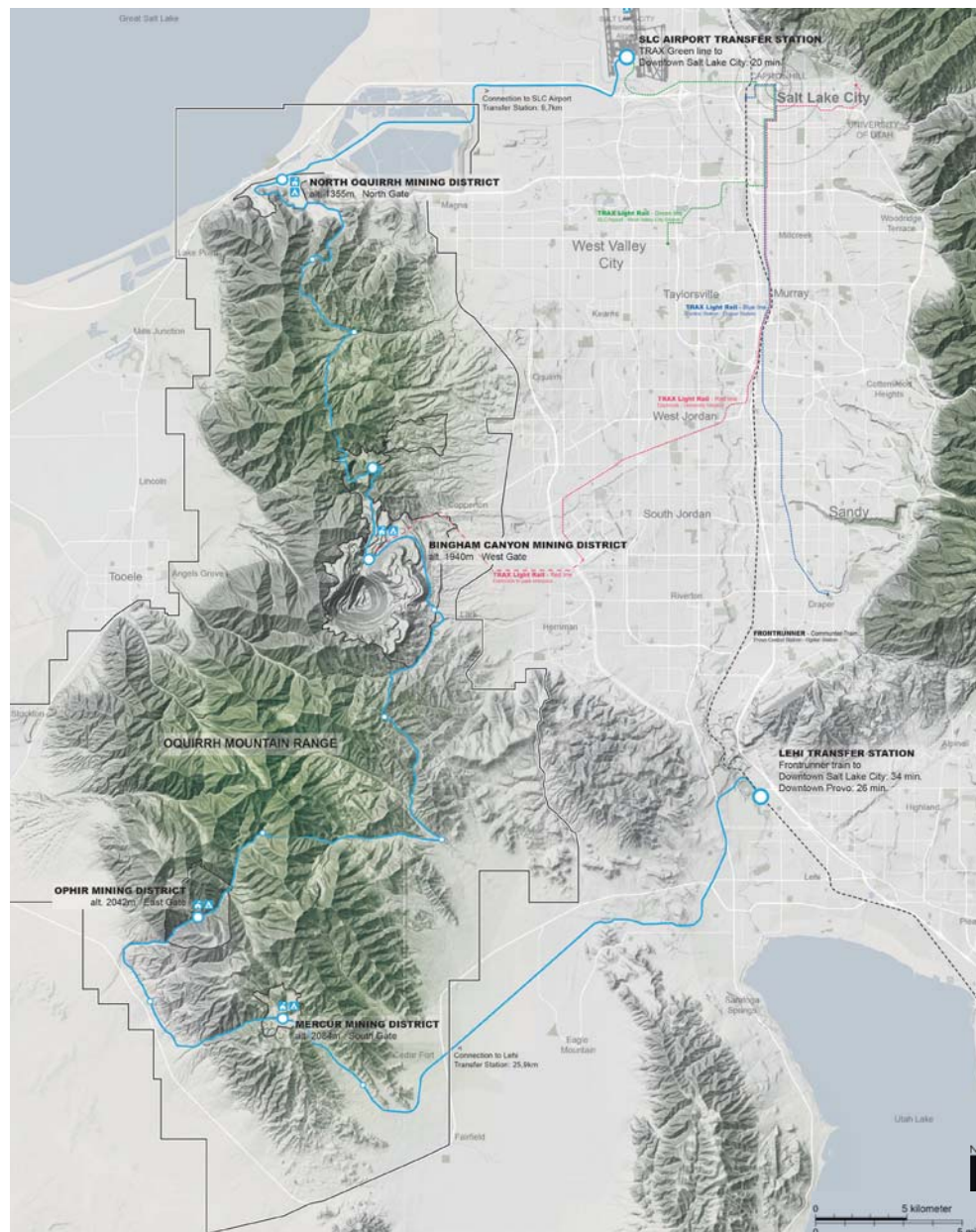
- Creating a seductive route - providing tourists with a typical Amsterdam experience
- Exaggerate appearance by characterizing four typical segments within the area
- Adding significant attractions / activities



Night view on the NEMO with added light mast to provide a reference point visible from far



Introducing a scenic train to access the Bingham Canyon National Park



The scenic train connects the four mining districts and the most remote park areas



Backcountry stations provide access to the remote areas of the new National Park



The scenic train wilderness experience

Frederik Gotemans

Ir. P. Roncken

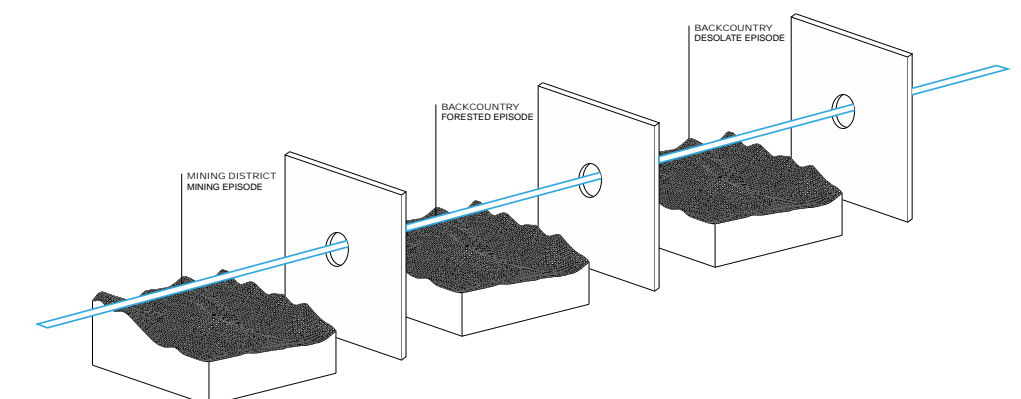
Bingham Canyon National Park

Reclaiming the Bingham Canyon Mine by transforming it into a new generation of National Park - Salt Lake City, United States

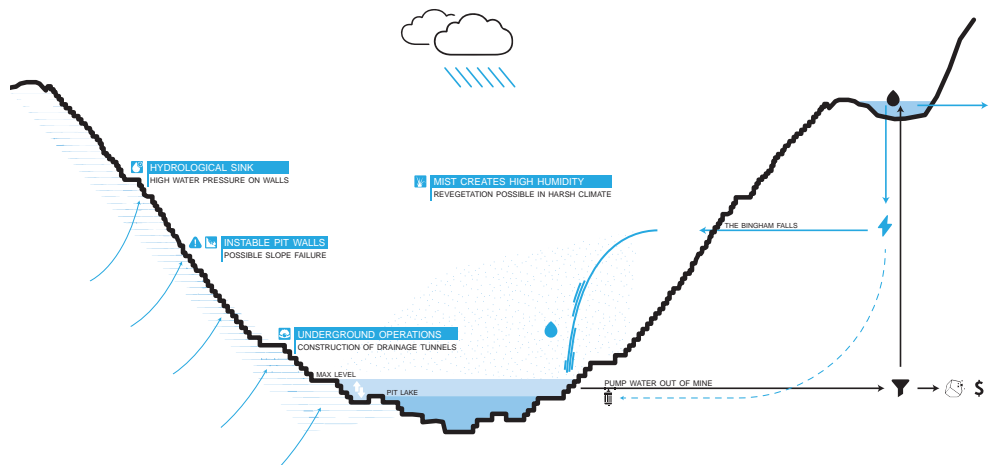
Abstract

In the wake of the industrial revolution, landscapes gradually deteriorated, providing communities with the formidable challenge of reclaiming man-made devastations. Large-scale mine sites provide a case in point. However, the potential contribution of reclamation of devastated landscapes are often ignored or unacknowledged. Addressing this pressing issue, this dissertation examines different pathways to reclamation by exploring the case of the Bingham Canyon Mine near Salt Lake City.

The main objective of this design dissertation is to explore the possibility to transform the Bingham Canyon Mine into a new generation of National Park, inspired by the frontier culture and the sublime that forms the base for the well-known National Park System of the United States. Qualitative research was performed in order to substantiate the proposed design interventions. First the mine and the surrounding landscape are analysed in order to fully understand the wider context of this complex site. Secondly, understanding the current reclamation strategy for the Bingham Canyon Mine was essential. We argue that the current reclamation scenario is insufficient due to several reasons such as not providing a carefully considered and planned post mining land use, fencing the area and shielding it is not a durable solution. Thirdly, an alternative reclamation strategy is proposed, namely transforming the site into a National Park. Therefore we examined whether the necessary preconditions for becoming a national park were present for the Bingham Canyon Mine, which proved to be the case. Furthermore, we conclude that this proposition is contributing to the current discussion on a different level, namely; the future of the National Parks in the United States. Fourthly, the qualitative research performed for this dissertation led to several design interventions proposed to reclaim the Bingham Canyon Mine and transform it into a National Park. Here all the research comes together, i.e., the information is converted into design.



Maximizing the scenic train experience, sensing the different landscape typologies



Scheme for the proposed new system that transforms a problematic landscape process into an opportunity. The Bingham falls, a new icon for the National Park



Technological monitoring mast to ensure visitor safety



Transforming problematic landscape processes into an opportunity



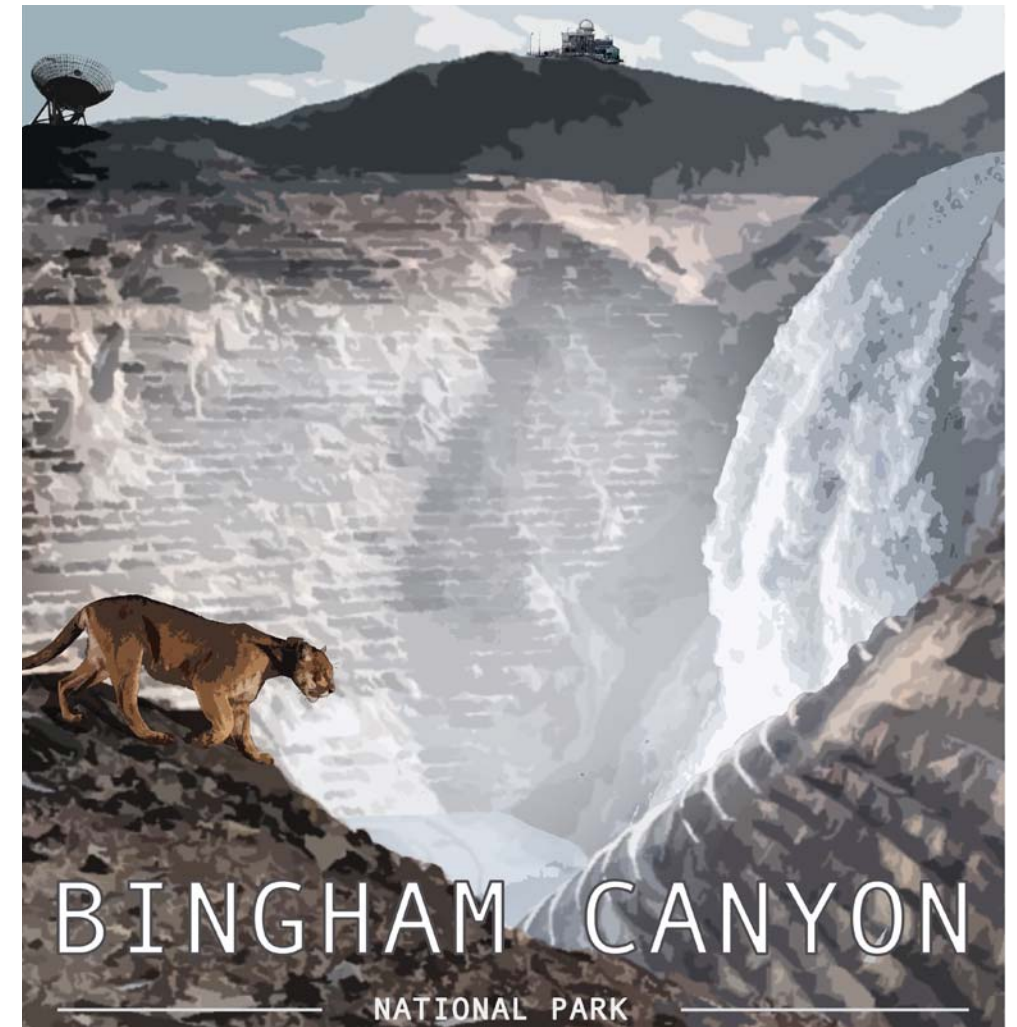
Vaporizer to stimulate re-vegetation



Maximizing visual drama, paradise vs dynamited landscape



Technological monitoring mast to ensure visitor safety



National Park Poster for the Bingham Canyon National Park in the typical graphical style