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Saskia de Wit
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(Eds.)

Gardens of Gelderland

Design Research Explorations into Resilient Estate Landscapes

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Preface

In this graduation lab landscape architecture students from TU Delft explored the landscape assets of private and dispersed heritage properties and developed design strategies to engage them in future-proof landscape development. The focus of the lab is on the landscape system of castles and historic country estates in Gelderland, a region in the East of the Netherlands, also known as the 'Garden of Gelderland'. Strategically chosen learning cases are elaborated via research-through-design to explore landscape architecture principles for context-sensitive water management, landscape coherence, ecological development and recreation at multiple scales, as well as their spatial implications.

This lab is connected to the project 'Design Atlas Heritage Estate Landscapes Gelderland', which is part of 'KaDEr: Karakteristiek en Duurzaam Erfgoed Gelderland', a research program of TU Delft funded by the Province of Gelderland, which in turn is related to the project 'Innocastle Interreg Europe'. Some of the outcomes will be included in the design atlas, for inspiration and as a display of a wide range of possibilities for future development and implementation. In that way, estate owners, municipalities, water authorities and other stakeholders can benefit from the research carried out by the students and their supervisors. Also, we had the opportunity to organize an international exchange program with students and researchers from the Politecnico di Torino in Italy. As such the lab also enabled international students, researchers, policymakers, and estate owners with different cultural backgrounds to compare findings, to discuss design principles, and to develop alternative approaches to protection and development of the estate landscapes across Europe.

I like to thank the students and their supervisors for the insights and inspiration provided by their projects. The COVID-19 pandemic and the related sudden changes in circumstances showed how resilient you really are! I am very grateful to Paul Thissen from the Province of Gelderland for his commitment to the project and generous financial support. Also thanks to Elyze Storms, Karlijne Looman, Hielkje Zijlstra, Ciska van der Genugten, Monique de Rooij and Louis Lansink for their input and guidance, practical help and enthusiasm. It was also a great pleasure to collaborate with my esteemed colleagues Claudia Cassatella and Mauro Volpiano from Politecnico di Torino, Faculty of Planning and Design. Thanks to them, it was possible to set up the exchange program. Also, the generous support and hospitality from Gelderse Landgoederen & Kastelen, Waterschap Rijn & IJssel, Gelders Genootschap and Ms Mary Gatacre from De Wiersse is highly acknowledged.

I am happy that our design lab at TU Delft provided a platform for this fruitful collaborations and helped the students thrive. I am proud of the results as they showcase a stimulating and promising array of solutions and possibilities for a sustainable Garden of Gelderland.

Steffen Nijhuis,
KaDEr Project leader
Delft, 16 July 2020

Contents

Introduction

Counting over a hundred, Gelderland's estates harbour a tremendous landscape wealth. Not only do many of them offer extraordinary historical garden experiences; together these estates make up a vital landscape constellation. Over the past few centuries indeed, their cumulative impact on the landscape has gained strategic proportions. This powerful cumulative effect can be traced back to the extended sphere of influence of each single country estate: on the one hand, an estate engages in an intricate spatial relation with its immediate hinterland; on the other hand, most estates are inextricably linked with the networks and flows feeding the Gelderland territory. Multiply this multiscalar relational behaviour of a single estate by a hundred, and what you get is an incredibly performant territorial landscape system.

Already before its actual construction, an estate starts engaging with the land, as the future estate owner scouts for the perfect parcel, surveying and weighing its scenic and functional assets –a panoramic view, a high and dry ground, a fertile soil, an affordable plot, abundant water supply, a well-connected location. This engagement with the land and with the flows and networks veining its grounds only grows stronger over the course of an estate's lifespan. Depending on their specific needs, different types of estates developed different types of relationships with the land. Many of Gelderland's oldest estates, for example, find their origin in military castles that took up a defensive attitude towards their hinterland and one of strategic control towards mobility and resource networks. Country estates established during the seventeenth and eighteenth century, on the contrary, often depended on farming or forestry for their livelihood. They developed a relation with the land that is based on production, relying on hydrological networks for water supply and energy, and on mobility networks for transportation. Many of them are reconverted monasteries, precisely possessing these assets. Later on, around the start of the 19th century, the new elite's longing for nature and outdoor recreation in good company –read 'high society'– became the determining factor for an estate's location. Scenic landscape qualities were sought after and enhanced; the proximity of hunting grounds or a small town was in demand, and an easy connection to the owner's main residence was highly valued.

Over time, the needs of these estates were repeatedly redefined in response to changing economic, cultural, social, political and environmental contexts. As consequence, the relationship of these estates with the surrounding land, networks and flows required continuous reshaping. Spatial fragmentation due to ongoing urbanization and the proliferation of infrastructure networks, ongoing disintegration of estate grounds and partition of ownership, increasing maintenance costs, loss of income and of social acceptance, are among the most pressing spatial and economic challenges Gelderland estates had to confront over the past century. Today, climate change and other sources of environmental degradation are posing unprecedented challenges to the estates as well as to the larger Gelderland territory, especially the disastrous (clean) water shortage, most tangible in the images of empty moats but also a potential dead blow to productive agriculture.

Gelderland's estates are at the heart of these pressing social, economic and environmental challenges: they are not only affected rather violently, they also hold strategic keys to mitigating them. Firstly, the estates occupy strategic positions within the regional landscape. They are extremely well embedded within the green-blue networks of the Gelderland province: the estates are not only passively tapping into these networks, but are moreover in an excellent position to actively re-shape these networks. The same goes for the position of the estates in relation to centres of urbanization and socio-cultural activity: many small villages boomed or even originated because of an estate, and many of the Province's larger towns as well as many places of cultural or recreational interest are strongly characterized by their presence. Secondly, and as briefly explained in the introductory paragraph, the cumulative impact of Gelderland's estates on the landscape is of a territorial scope. Indeed, with each of the estates strongly influencing its immediate hinterland as well as the regional networks and flows, the aggregate of the many hundred estates that Gelderland harbours is a performant territorial landscape system. Thirdly, having repeatedly been challenged by shifting conditions and policies resulting in numerous transitions over the course of centuries, the remaining Gelderland estates have demonstrated their capacity for change. On top of the fact that they are highly valued for their heritage and aesthetic value, many of these estates have proven their worth as dynamic and adaptive landscape components.

To summarize: having developed over centuries in a continuously shifting relation with both their immediate hinterlands as well as with regional flows, networks and policies, Gelderland's estates constitute a performant and adaptive territorial landscape system. As a consequence, they could make a powerful contribution to mitigating some of the spatial and environmental challenges threatening their future as historical and cultural beacons, as well as endangering the sustainability of the entire province. These are the main ingredients of Resilient Heritage Landscapes: Garden of Gelderland, a graduation lab of the 2019-2020 TU Delft Master of Science in Landscape Architecture. In this lab, eleven international students, under supervision of four landscape architecture academics and ten interdisciplinary colleagues, have conducted eleven design-research explorations in dialogue with numerous local and provincial stakeholders. Each of these 11 design-research explorations takes on a different approach, assumes a different position towards landscapes and landscape architecture, looks at the Gelderland estates constellation from a different perspective and works with their landscape capacities in a distinct way.

Bieke Cattoor
Lab coordinator
Resilient Heritage Landscapes: Garden of Gelderland
MSc Landscape Architecture
TU Delft, 2019-2020

The presence of water in the Beek enhances the visual perception of the landscape through reflections and effects of winds and rain on the water's surface.

Courtesy of Barsha Amarendra

Eutrophication in the inner moat of estate De Wiersse (September, 2019)

Courtesy of Alia Shahed

Dried up grand canal in the inner garden of estate Wildenborch (October, 2019)
Courtesy of Alia Shahed

Introduction to the Design Research Sites

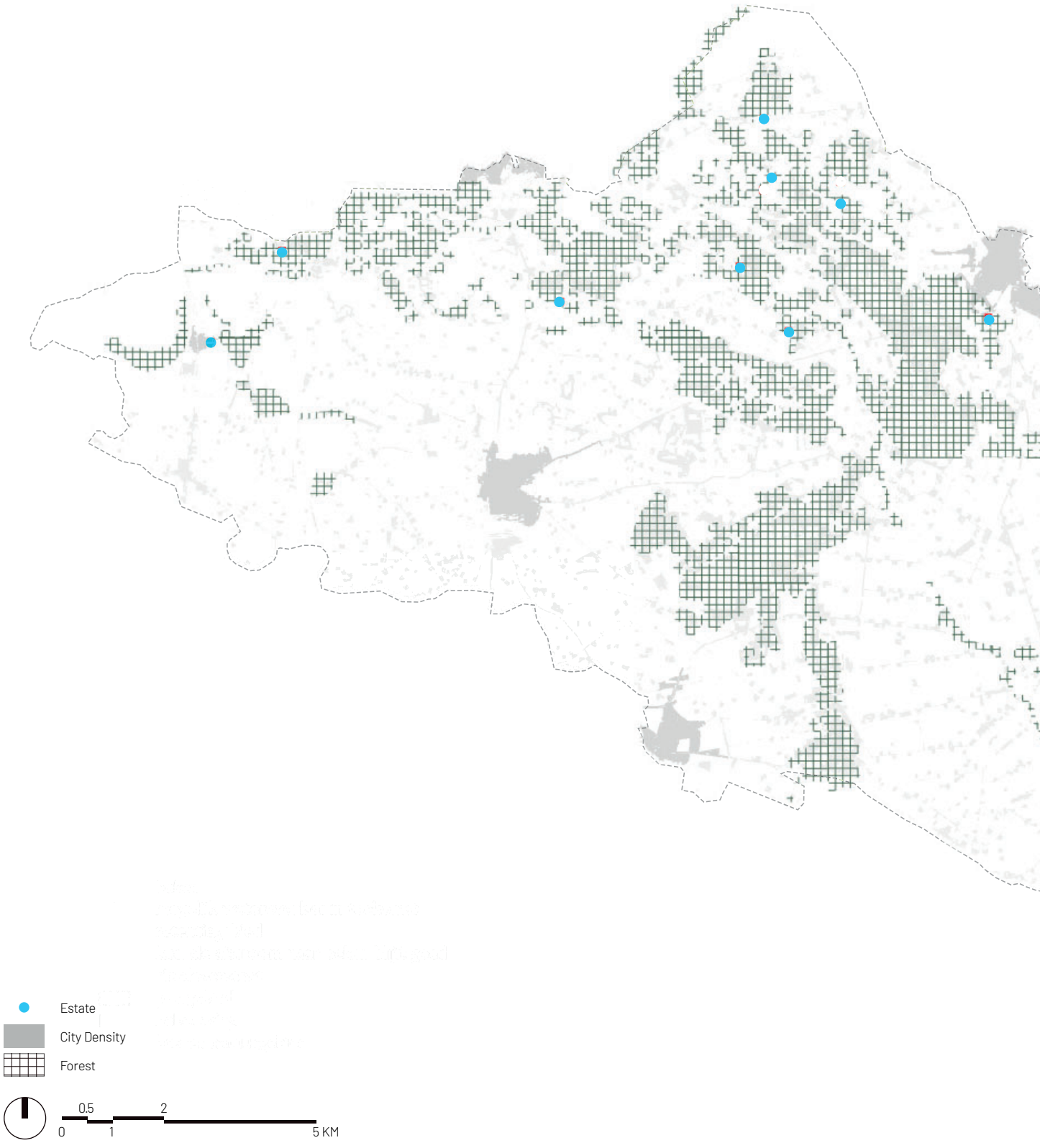
Baakse Beek Area

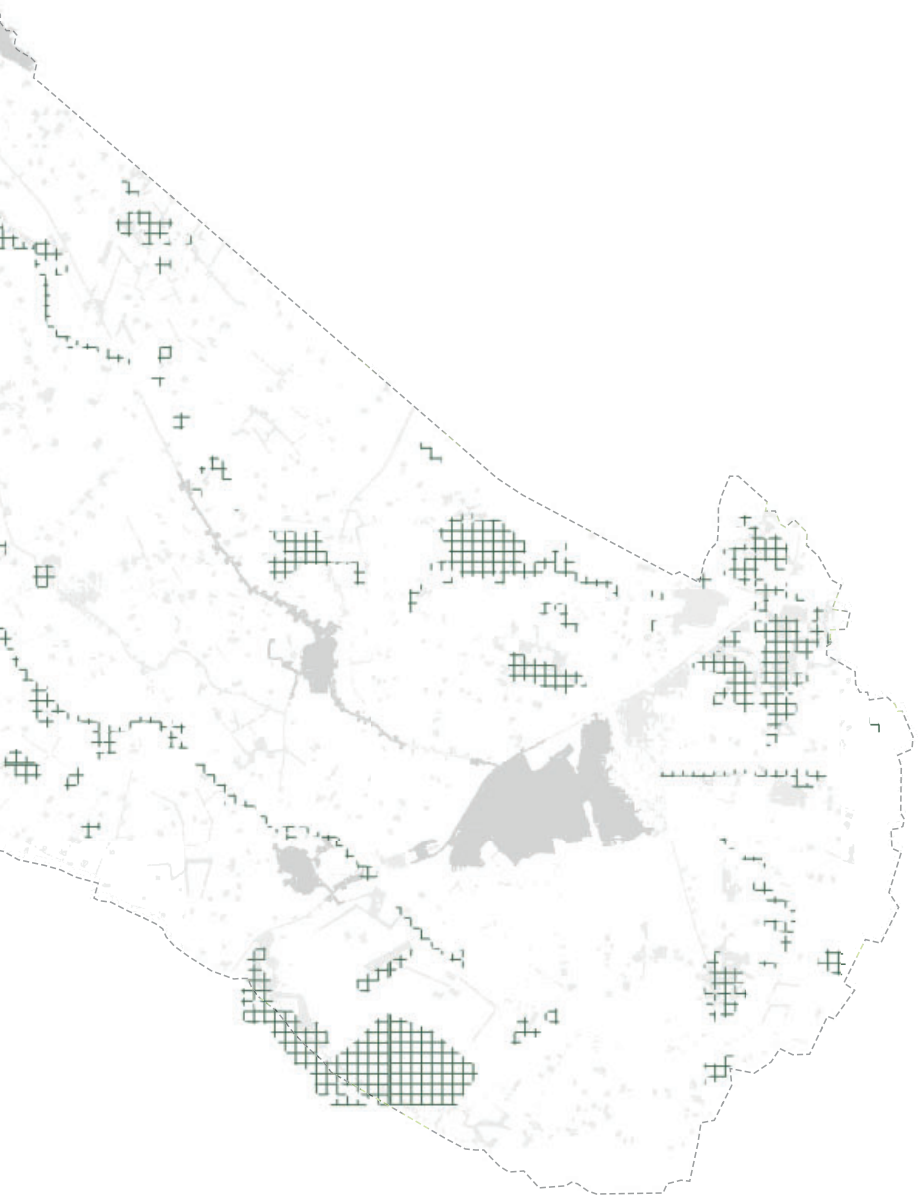
The geological activities of the Pleistocene era in the region between the Dutch Eastern plateau and the Ijssel led to the formation of a landscape characterised by a mosaic of forests on sandy ridges and wet, swampy areas in the lower elevations. The brook Baakse Beek originate from the eastern Dutch plateau and flow through a predominantly flat sandy landscape interspersed by gently rolling sand ridges and plateaus, until it flows into the river basin of the Ijssel.

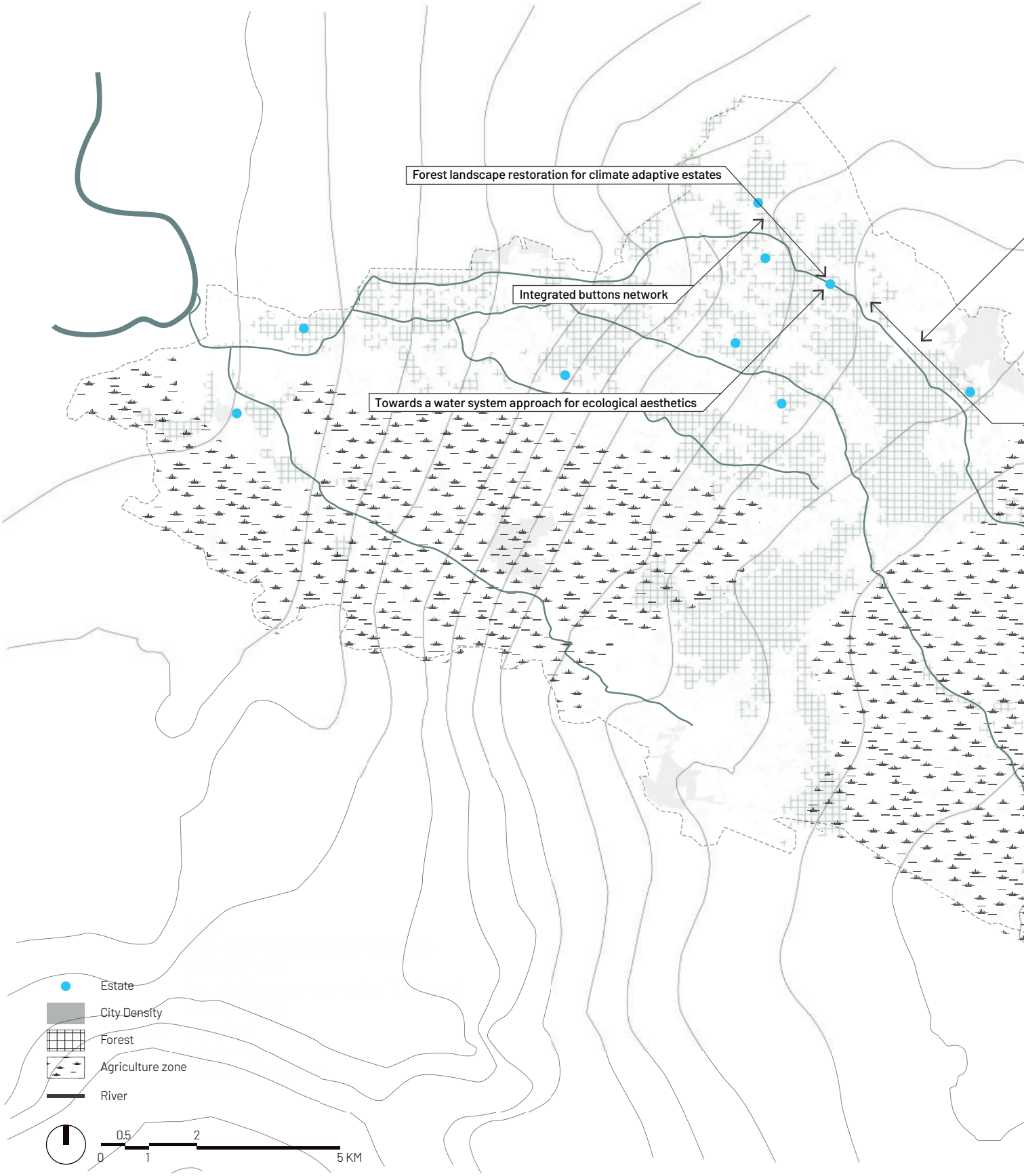
The first estates in the region, developed along the brook and dates back to the 1300s. While they were initially set up for defensive purposes, they later came into the possession of the nobility. This change in ownership led to drastic transformation in the landscape of the Baakse Beek. The estate owners undertook reclamation of the wet areas to power their mills and also dewater the surrounding of their estates to develop agricultural and forest grounds. They brought in innovations in agriculture that led to a rise of commercial agricultural production. However, over time, with the industrial revolution coming in and weakening economic status, agriculture no longer interested the estate owners, and they left the tasks of land reclamation and dewatering in the hands of the farmers. The estate owners only safeguarded their estate grounds in accordance to the Nature Act 1928, resulting in the maintenance of the mosaic landscape within the estates. However, this led to the upper course of the Baakse Beek being intensively dewatered and systematicly cleared of all cultural landscape elements. At present, in its journey through the upper course and middle course, the Baakse Beek flows through two disjoint landscape typologies; an upper course of intensive dairy agriculture and a middle and lower course consisting of a number of stately estates.

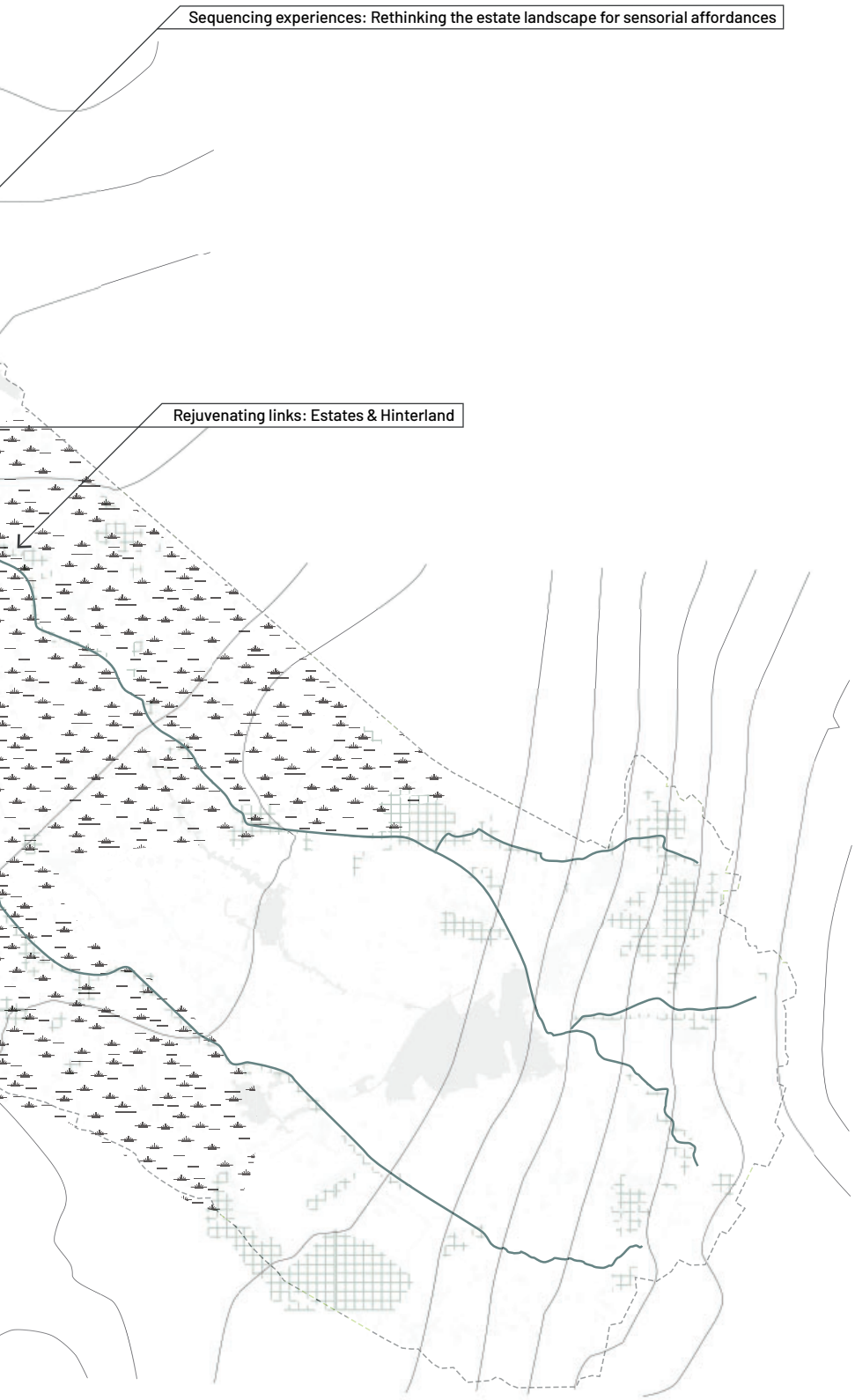
The historical transformation of the Baakse Beek and its landscape has resulted in present day challenges of drought, heightened by climate change, poor water quality and a vulnerable ecological condition. The graduation projects based on the Baakse Beek, specifically in it's middle course, between the towns of Vorden and Ruurlo, focus on tackling the problems of water, ecological restoration, and envisioning a network of recreational opportunities and opportunities for landscape appreciation.

Barsha Amarendra (Text)
Ming Jiang (Maps)
Gelderland Lab Students


Estate
City Density
Forest
0.5
2
0
1
5 KM




Forest landscape restoration for climate adaptive estates
Integrated buttons network
Towards a water system approach for ecological aesthetics
Estate
City Density
Forest
Agriculture zone
River
0
0.5
1
2
5 KM


Sequencing experiences: Rethinking the estate landscape for sensorial affordances
Rejuvenating links: Estates & Hinterland

Visual connection between an estate and its surrounding wet meadow

Courtesy of Yingjie Zhang

Main building of estate Rosendael, with its surroundings

Courtesy of Mengchi Wei

Zypendaal house, combination of symmetry and water. Courtesy of Li Qian

Gelder's Arcadia

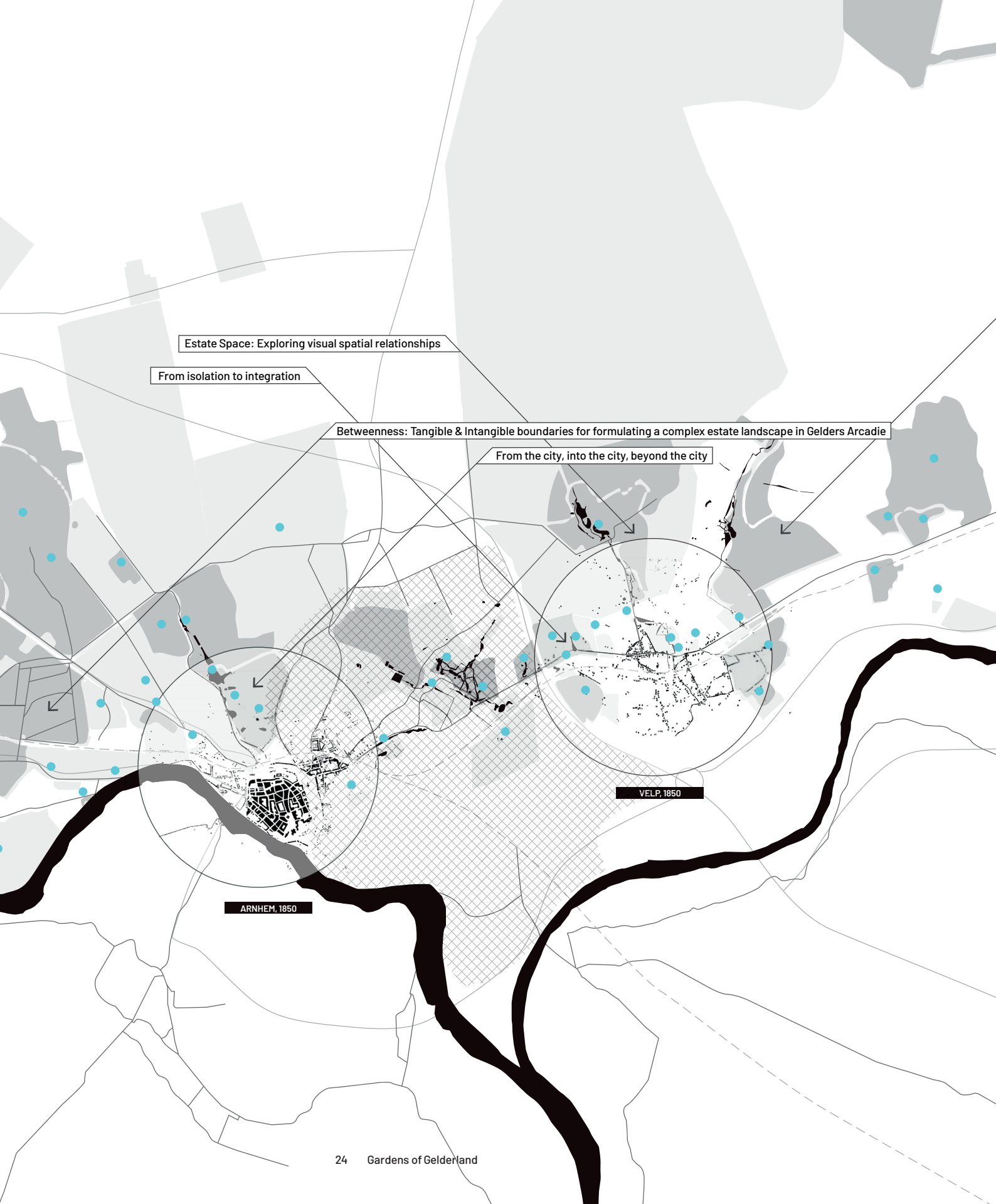
In the plains between the Veluwe and the IJssel river, the movement of ancient moraine, together with the activity of the IJssel, led to the formation of large areas of river clay soil and sand soil. These geographic features became a precursor to the earliest agricultural development in the region of Arnhem, as well as the basis of choice for setting up the earliest country estates in the region. These country estates are mostly concentrated in the southern part of Veluwe and happen to be located at the same altitude.

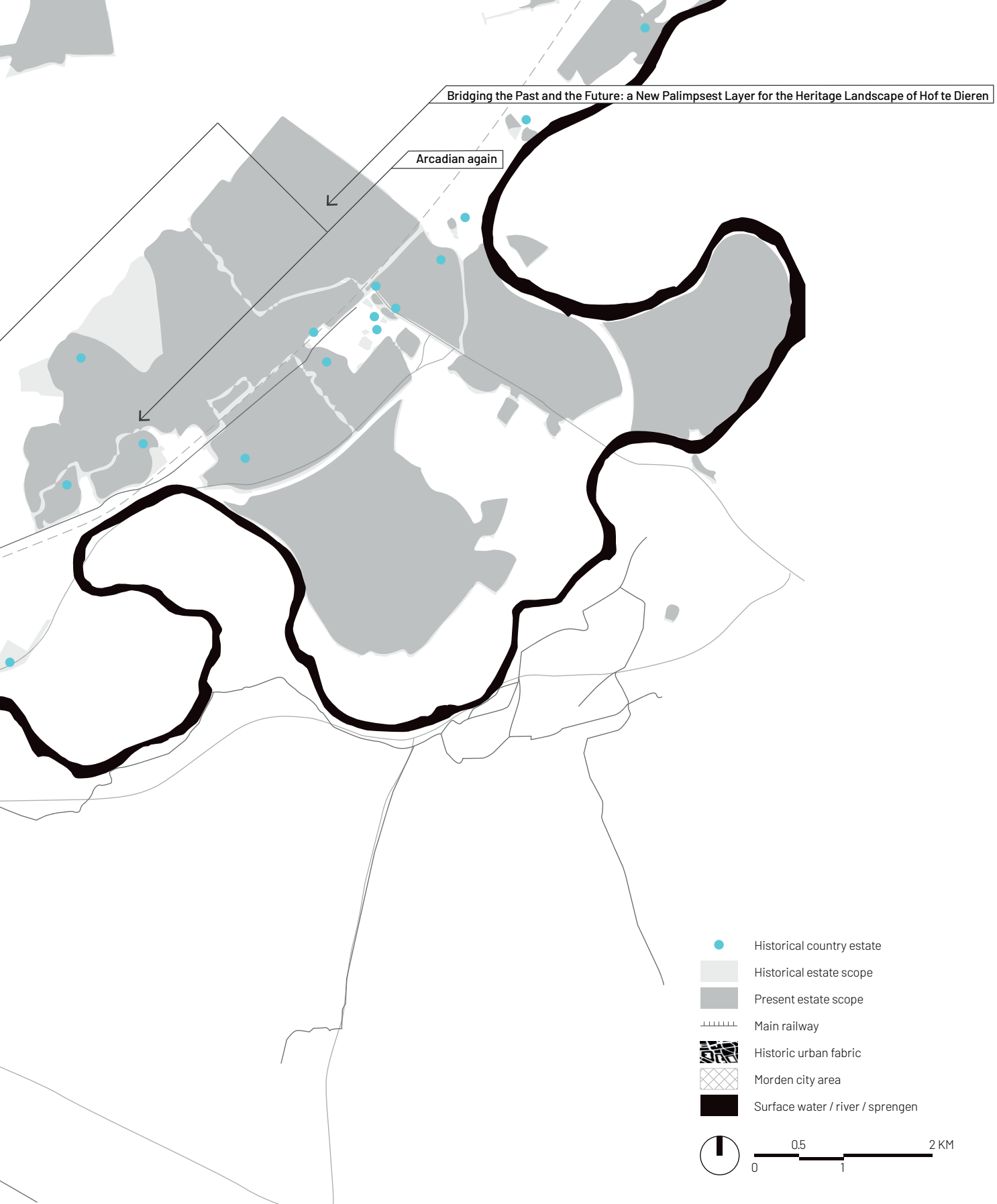
The estates can be categorised into three time periods of construction. The first set of estates were built before the year 1600 and were built nearby or surrounded by the water for defensive purposes. The next set of the country estates were built between the years of 1600 and 1800 and belonged to the noble classes. They build the estates at the suburban areas, close to the agriculture lands and water source for living needs. The last set of historical country estates were built after the year 1800 and were under the ownership of the new elites. The new elites used the estates as an entity to show off their wealth and also to experience nature, exclusively. Thus, most of the estates from this time period were located near the Veluwe.

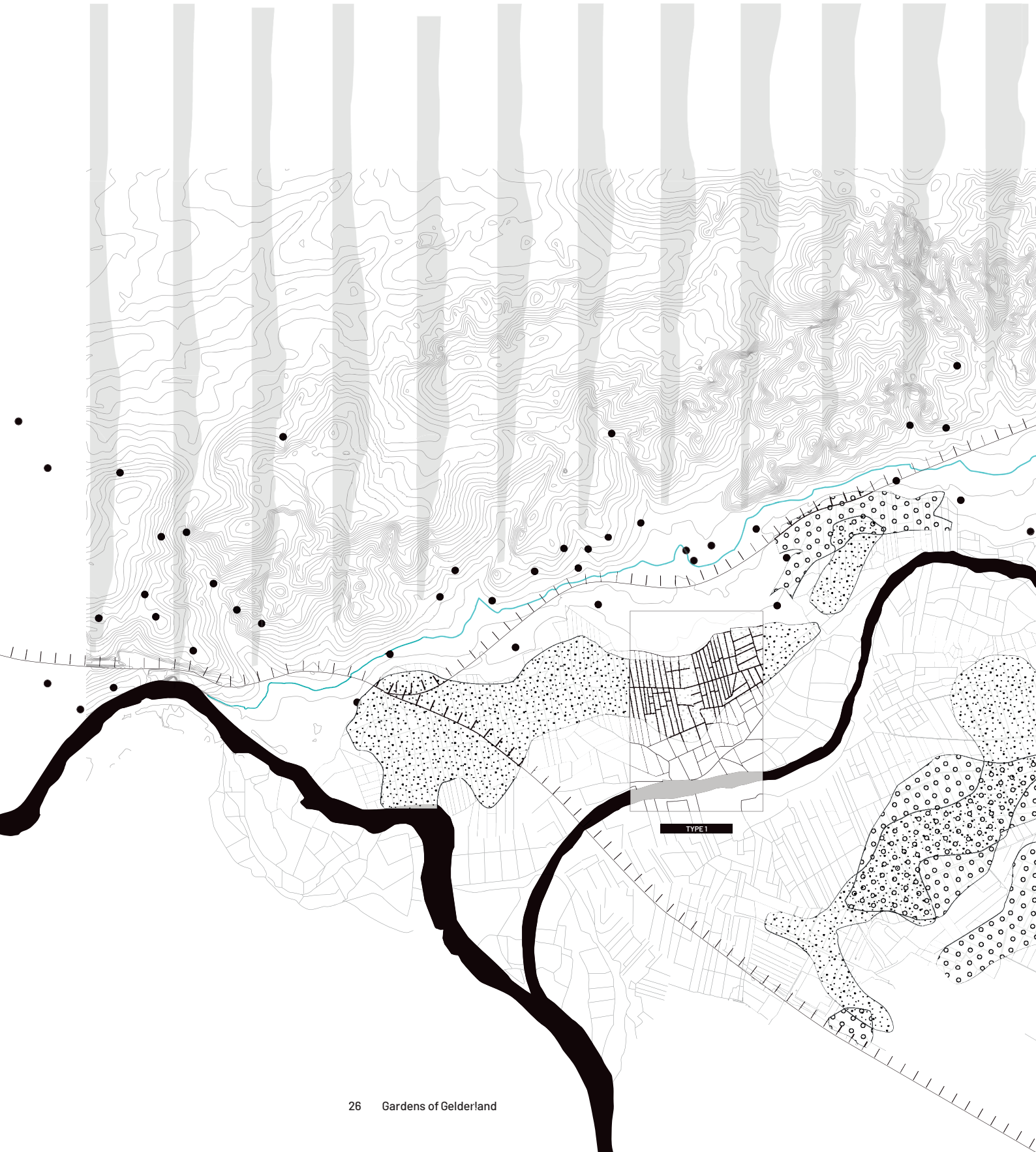
As a result of sprawling urbanisation, some of the historical country estates were annexed by the city, and were transformed into public, green spaces or residential areas. A number of these estates were restored and integrated into the city fabric such that the old paths used to connect the country estates with the old city areas, have now become main roads of access. Over time, more complex road networks developed through the country estates, in order to connect the city areas to the northern part of Veluwe. The country estates in this network of urban densities, thereby, represents the geological characteristics that led to their establishment in the region historically and stands as an evidence to the present century's urbanisation of Arnhem, Velp, Rozendaal and Rheden.

The graduation projects based in this region, deal with issues of spatial fragmentation and need for enhancing the unique spatiality of the country estates and the need to create ecological and recreational corridors connecting the different topographical areas such as the floodplains of the Ijssel, the urban cores, the country estates and the Veluwe into a coherent and cohesive whole.

Barsha Amarendra (Text)
Li Qian (Maps)
Gelderland Lab Students


Estate Space: Exploring visual spatial relationships
From isolation to integration
Betweenness: Tangible & Intangible boundaries for formulating a complex estate landscape in Gelders Arcadie
From the city, into the city, beyond the city
VELP, 1850
ARNHEM, 1850


Bridging the Past and the Future: a New Palimpsest Layer for the Heritage Landscape of Hof te Dieren
Arcadian again
Historical country estate
Historical estate scope
Present estate scope
Main railway
Historic urban fabric
Morden city area
Surface water / river / sprengen
0
0.5
1
2 KM


TYPE 1


TYPE 2
Historical country estate
Dividing line
Ditch pattern
Main railway
Contour line
Wetter river clay area
High water table area
0
0.5
1
2 KM

Pond in the garden of Hof te Dieren in winter

Courtesy of Beiqi Yuan

Formal lane system in production forest of Hof te Dieren

Courtesy of Beiqi Yuan

The boulders record the landscape formation by the moraine during the ice age. The scratch and coloring of the stones shows the hidden landscape process by wind and sedimentation.

Courtesy of Yuyu Peng

PART 1 Design Research Experiments in the Baakse Beek Area

Rejuvenating links: Estates and Hinterland

(Re) exploring the value of productive cultural landscape and its link to the heritege estates of Baakse Beek area

Alia Shahed

Supervisors:
Bieke Cattoor
Saskia de Wit
Kristel Aalbers

The research and design exploration for resilient heritage landscapes of the future, looks at the heritage estate not just as a composition of a historic building and its garden ensemble but as a centrally organized economic system and a spatial assemblage of living, leisure and production going beyond the garden and including the hinterland. In the Achterhoek region, the hinterlands composed of agricultural lands and forestry, were lifelines of the living and leisure functions of the estates even in the early 20th century.

In the production history of Achterhoek, two major events took place that largely determine today's landscape character of the area. They were respectively, the 'Marken division' in 1820's initiated by the powerful estate owners and the 'post-World War 2 land consolidation' after 1950s mostly taken up by the farmers. Most of the forestry and the characteristic 'backstage landscape' of the estate area, were developed at the time of the Marken division. During the land consolidation after WW2, the East Achterhoek landscape accommodated intensification of agriculture. Thus, the forestry and the characteristic landscape along with its diversity were somewhat lost into a more homogenized open landscape in the East Achterhoek, whereas the estate owners protected the cultural landscape of the estate area for the appreciation of its experiential qualities, its nature value and the leisure opportunities it provided them. But over time, the productive hinterland lost its value and strong connection with the estates as it was not enough as an economy generator anymore. Consequently, most of the estates were taken up by conservation organizations in the 1970's for their maintenance and protection.

Today, the richly protected heritage estate zones only cover the estate building and the garden, but the hinterland is not equally seen as an important part of the heritage. Once, the hinterland was an invaluable part of the estate and even during the post WW2 crisis, the estate owners ensured the protection of their hinterlands. Today, the heritage estates are perceived and maintained as points in space rather

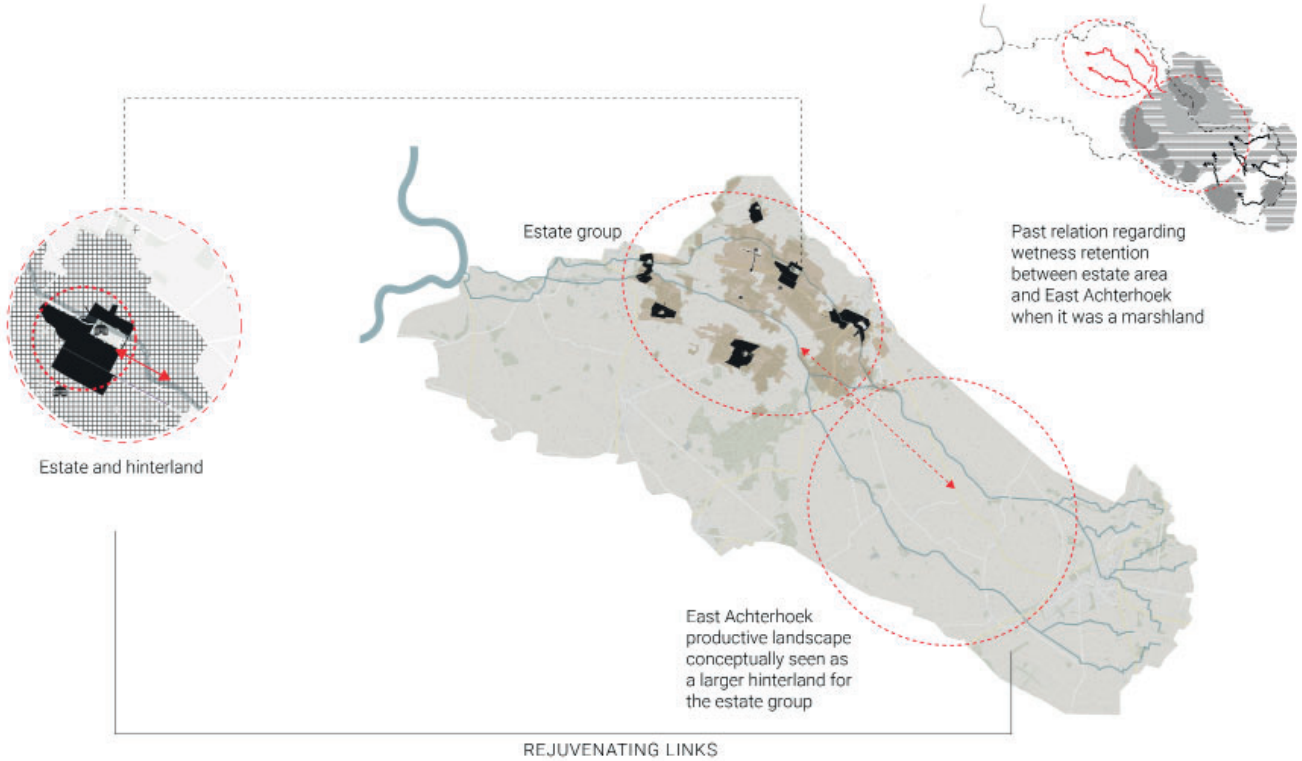


FIG 1 Conceptual diagram showing the rejuvenation of links between the estate and the hinterland across scales

than an integrated system in the larger landscape. To make them resilient for future, they cannot be treated as dispersed points. That is why, there is a need for re-exploring the value of the hinterland and finding new functional and experiential links between the hinterland and the estates in order to make them resilient for future.

In the current scenario, the estates are faced with severe water scarcity during prolonged summer periods and the situation is predicted to worsen with further climate change consequences. Going back in the history of water management, it is found that the productive landscape and its processes have influenced and altered the 'Baakse Beek' (brook system) and the wetness storage capacity of the region especially the East Achterhoek area. In addition to water scarcity, these processes have induced loss of ecology, loss of biological and spatial diversity, loss of environmental qualities and are only triggered towards economic maximization. Here, a lack of awareness of the resulting impact on the adjacent estate area is noticed. Thus, we find another missing link between the estates and the broader cultural landscape (which used to be a wetness storage area for the estates) as well. If suitable measures are taken in the productive landscape, this situation might improve. This, in turn, generates new possibilities of repurposing and revaluing the productive hinterland and restore its link to the heritage estates through different scales.

FIG 2 Conceptual vision depicting the desired future of wetness condition in the region

The problem field leads to the main objective of the research and design which is to rejuvenate links between the estates and the hinterland across scales. Here, the idea of wetness retention in the productive cultural landscape, creates a new scope of reviving these links. Thus, new possibilities are created to restore balance between ecology and economy and for new experiential qualities. In order to retain wetness in the productive landscape, a set of principles are derived and applied to generate a wetness matrix for the entire Baakse Beek area.

Along with the historical awareness and site appraisal, the theoretical understanding of the value of cultural landscape as a heritage component, the role of landscape architecture in depicting these hidden values and the new paradigm of wetness over the previous paradigm of a linear water source (Mathur & Cunha, 2014), shaped the thinking process, analysis and design.

Based on the research objective, four broad criteria are fixed under which, appropriate principles are then sought. They are, wetness retention, economy generation, scope for leisure and experiential qualities and ecological impact. From the precedent studies, relevant toolboxes and historical awareness, a group of principles are initially selected to be tested further and applied in the site. These principles provide an array of options including forest and plantation types, new farming practices and various degree of wetlands with or without surface water storage.

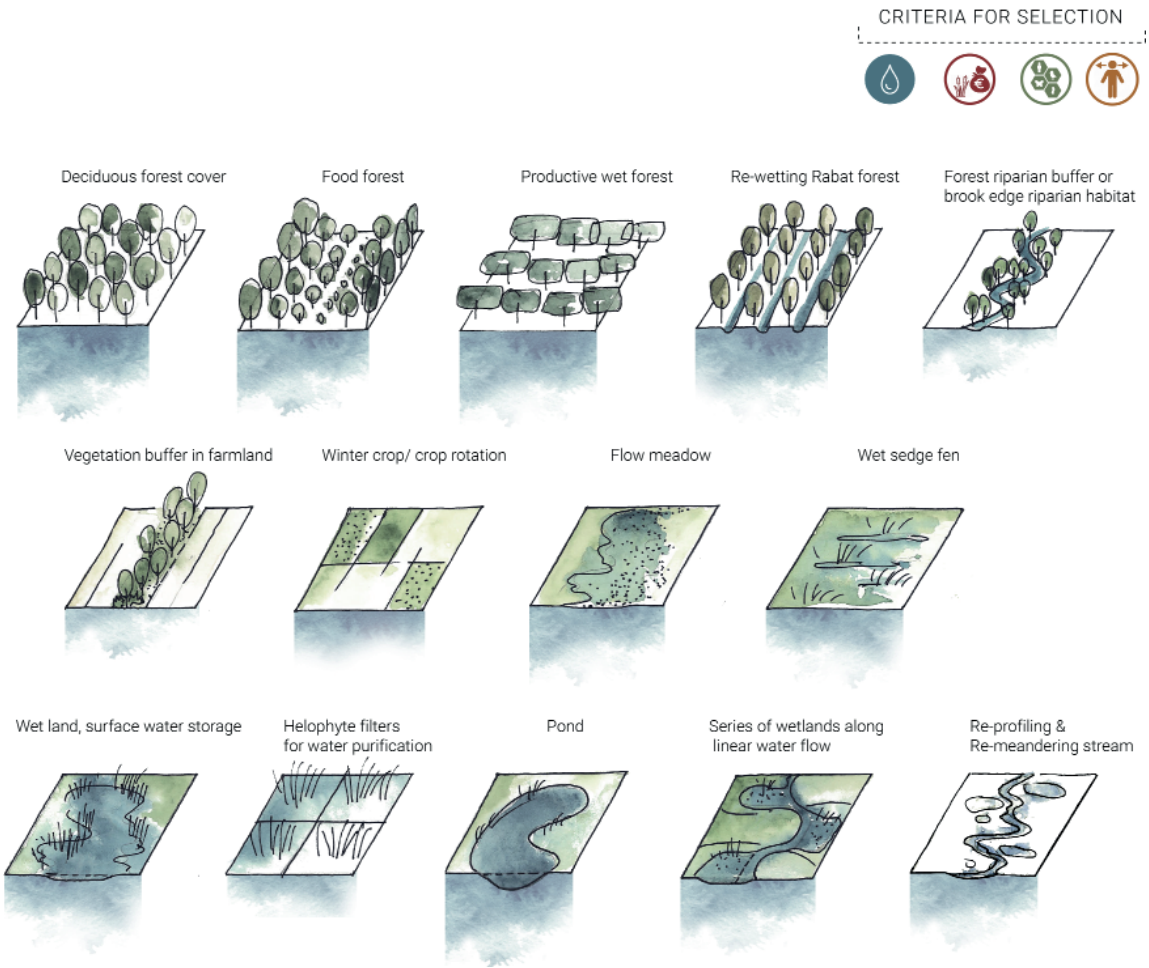


FIG 3 Initial selection of wetness retention principles based on the four major criteria namely, wetness retention, economy, ecology and human experience

Based on the analysis on the various landscape types in the Baakse Beek area, groups of appropriate principles are assigned to each landscape type to form an initial wetness matrix. The matrix is meant to convey a collection of appropriate measures for retaining wetness in the productive landscape of Baakse Beek area. Some of these measures can be applied in macro or meso scales as a part of a robust area plan and some can be applied individually for micro scale wetness retention. The matrix is a better strategy than a fixed masterplan as it creates the possibility to provide an array of options for local stakeholders where they can decide themselves which measure is most appropriate for them at a certain time in a certain context.

For the estate landscape, this wetness matrix can create new possibilities for the productive hinterland to become an active support for the estates regarding functionality, leisure and enhanced nature values. The estates thus find new inspiration in managing and re-valuing their hinterlands and rejuvenate their link to the hinterland. Similarly, in macro scale, the matrix helps to bring back the lost link between the estate area and greater productive landscape of East Achterhoek where wetness is retained in the landscape for the combined benefit of all.

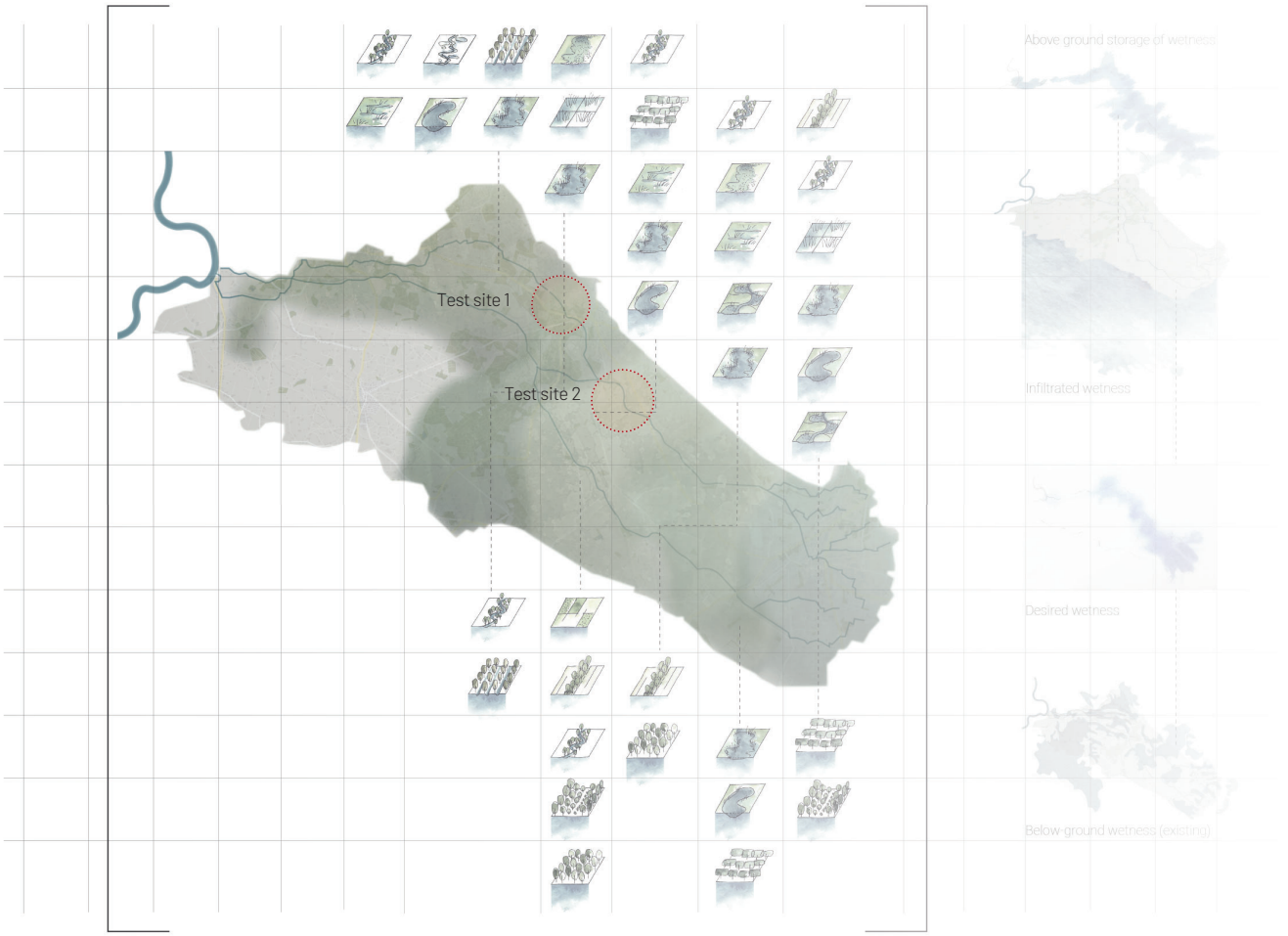


FIG 4 Initial wetness matrix with appropriate set of wetness retention principles for each of the landscape types

After developing the initial wetness matrix, two micro scale test sites are selected from the area of Baakse Beek for detail design exploration. The main goal here, is to rejuvenate the functional and experiential links between estate and hinterland through landscape architectural interventions where wetness is retained in the productive hinterland. Here, appropriate wetness retention principles from the wetness matrix are applied as a part of the design exploration.

In the site of Estate De Wiersse (micro scale design test site 1), the landscape architectural intervention initiates wetness retention in the surrounding hinterland so that a functional link is created between the estate and the immediate hinterland. Here, a routing is designed from the estate to the wetness retention spaces in the hinterland so that this retained wetness along with the existing cultural landscape qualities can be experienced by visitors of this heritage place. Thus, the experiential link is also rejuvenated. The design of routing and spatial experience in the hinterland reverberates the routing and experience of the inner garden and creates a continuity between them. The design addresses the existing visual axes from the garden to the hinterland with the new paths, platforms and bridges.

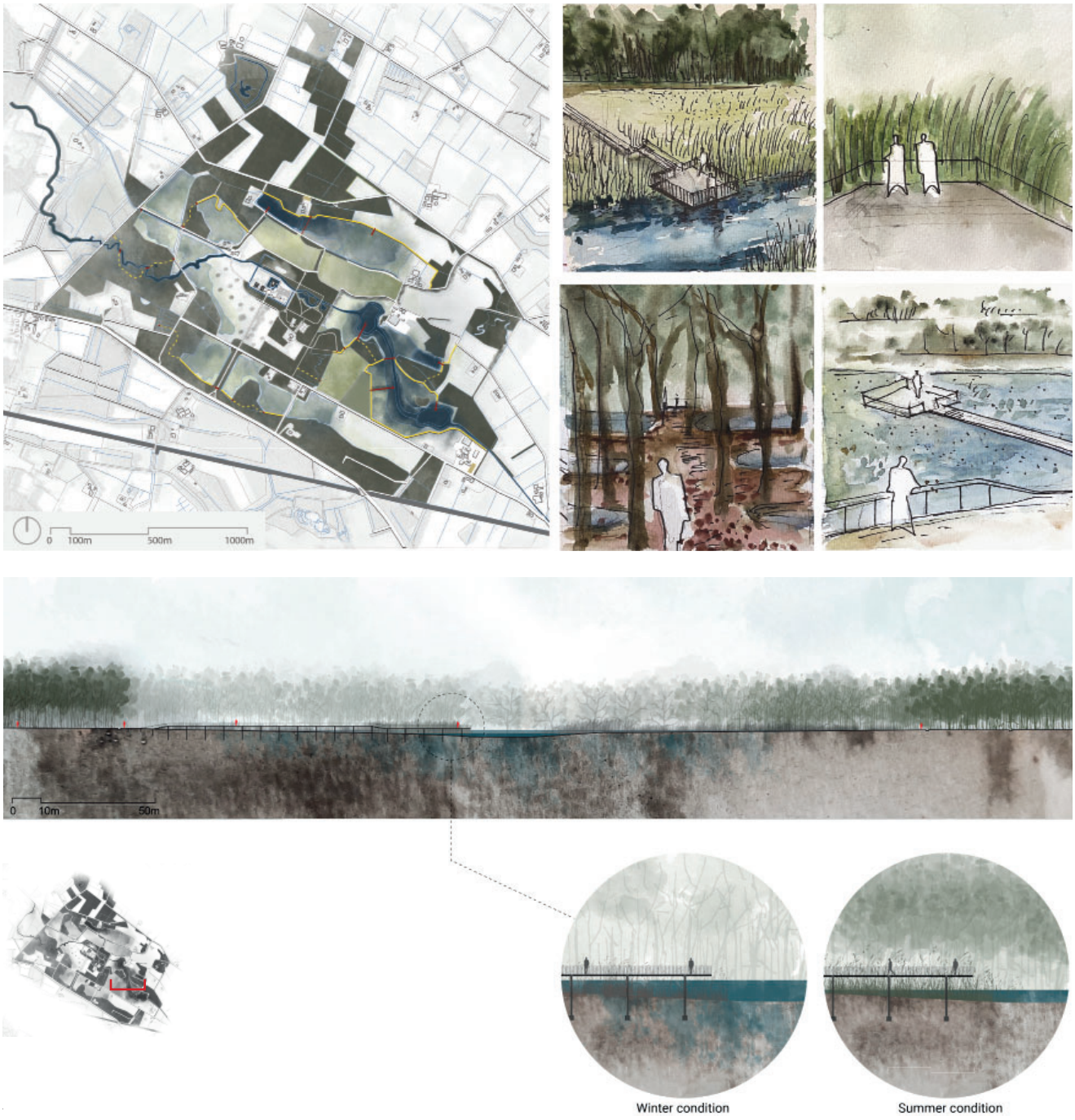
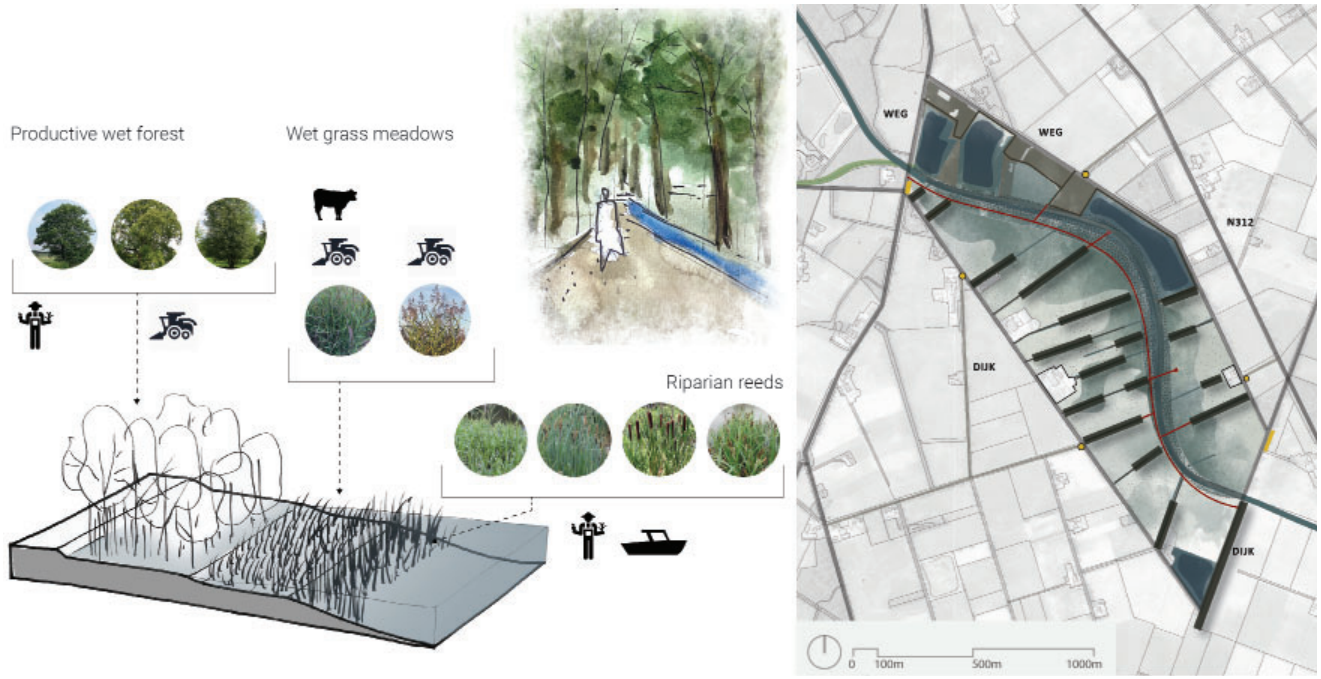


FIG 5 Plan, section and sketches depicting the design intervention at Estate De Wiersse

The inherent enclosure quality of the "Coulisse" landscape is further emphasized by the wetness retention spaces of the design. The detail design of paths, bridges and platforms, the choice of materials are also inspired from the existing characteristics and materials found in the garden and cultural landscape.



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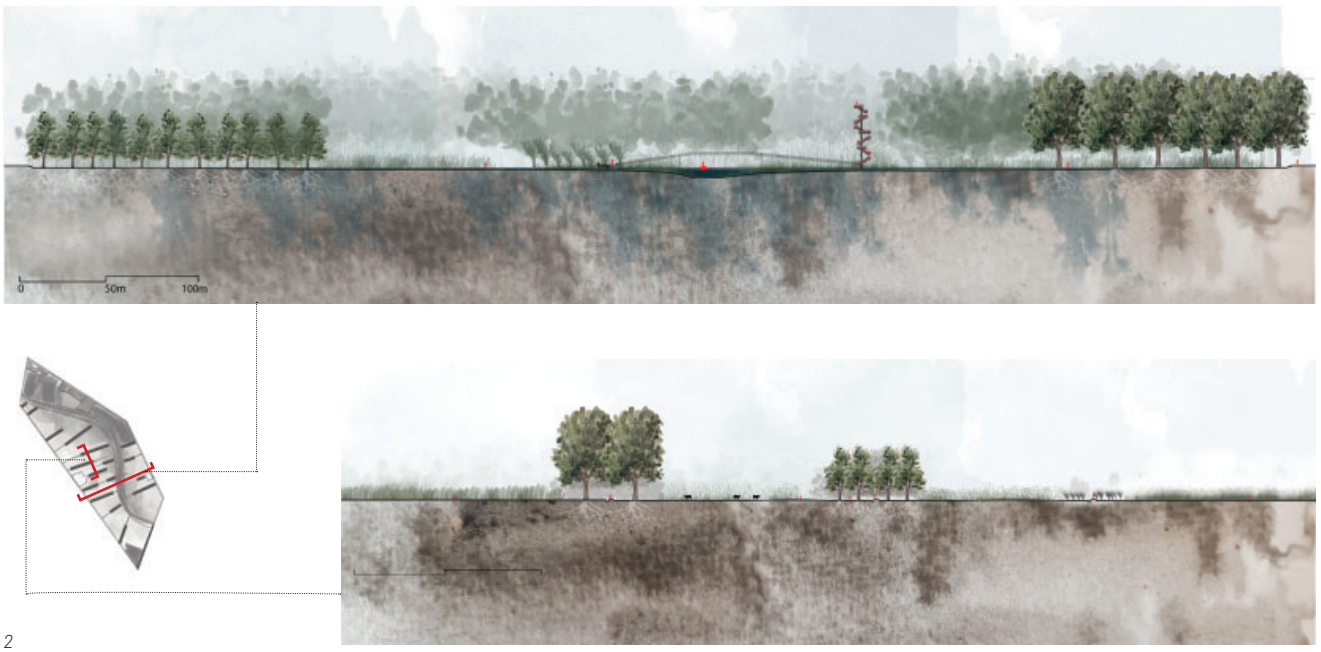

2

FIG 6 Plan, section, sketch and maintenance diagram depicting the design intervention at the agricultural site located in East Achterhoek

For the East Achterhoek agricultural site (micro scale design test site 2), the landscape architectural intervention focuses on wetness retention, productivity of the land parcels and how this productive landscape can be experienced by people for leisure. This intervention is a micro scale example that indicates the link and coherence of wetness measures between the estate area and East Achterhoek and hence, the restoration of a link across a broader scale.

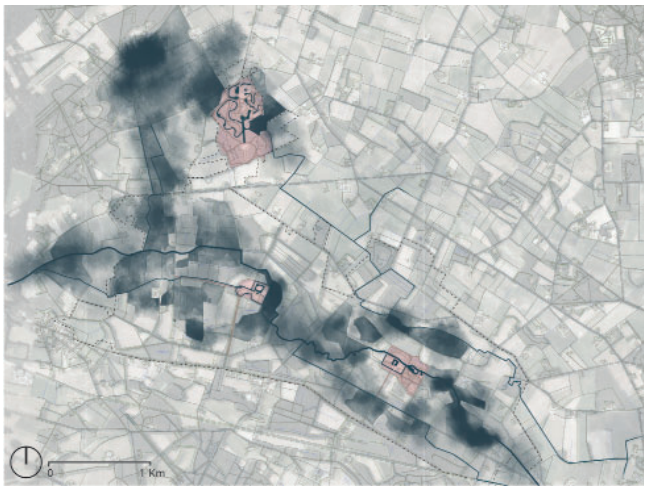

FIG 7 Meso scale projection of wetness retention encompassing the three estates namely, De Wiersse, T Medler and Wildenborch

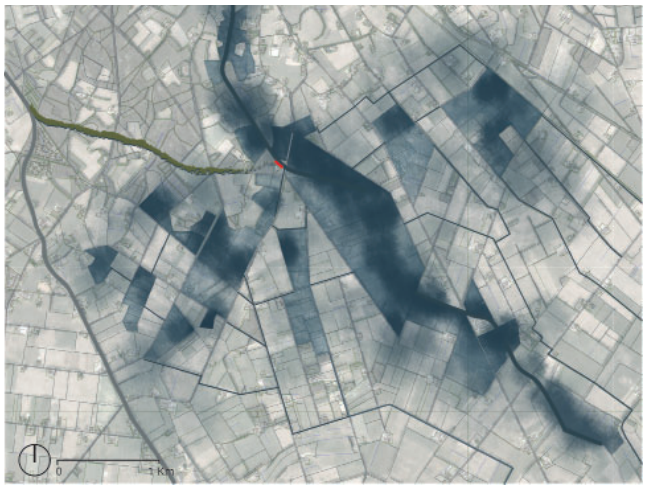

FIG 8 Meso scale projection of wetness retention in the peat reclamation landscape of East Achterhoek

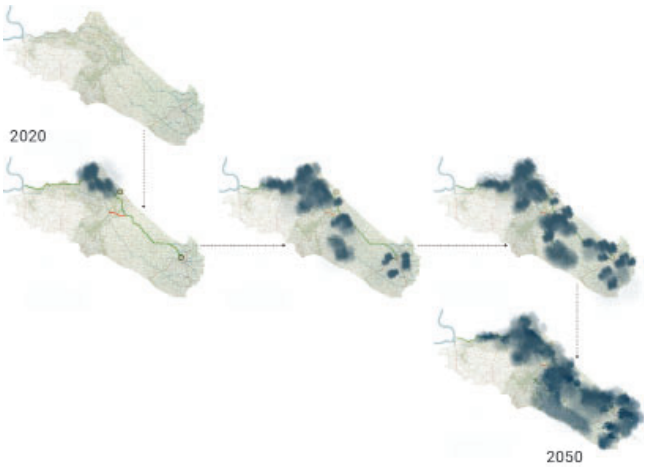

FIG 9 (Left) Probable future phases of wetness retention interventions in the scale of the region; (Right) Projected future vision of wetness situation in the entire region

In the design, this site is conceived as a pilot project (or a wetness retention area in a circular faming initiative) to implement wetness retention principles in the intensive agricultural landscape. The spatial design of the site represents historic and present layers of interventions in the area in the last 200 years. The vegetation that are planted here for creating these spatial experiences are all energy crops or cattle fodder and generate economy for the farmer. Majority of the routes that are designed here serve for both maintenance activities and leisure. A separate leisure route is also designed keeping the heritage tourism aspect in mind. The balance of production and leisure experience resonates the characteristic quality of an estate. The balance in ecology and economy is achieved by shifting to alternative wet crop production.

The micro scale designs provide directions for meso scale interpretations. The meso scale projections help us to comprehend that these wetness interventions are not isolated measures and together, they should function as a system where the paradigm is shifted from a linear water course towards a unified "rain terrain" (Mathur & Cunha, 2014). The macro scale interpretation provides a basic understanding of what is expected in future and a vision, towards which the entire region should work for. The

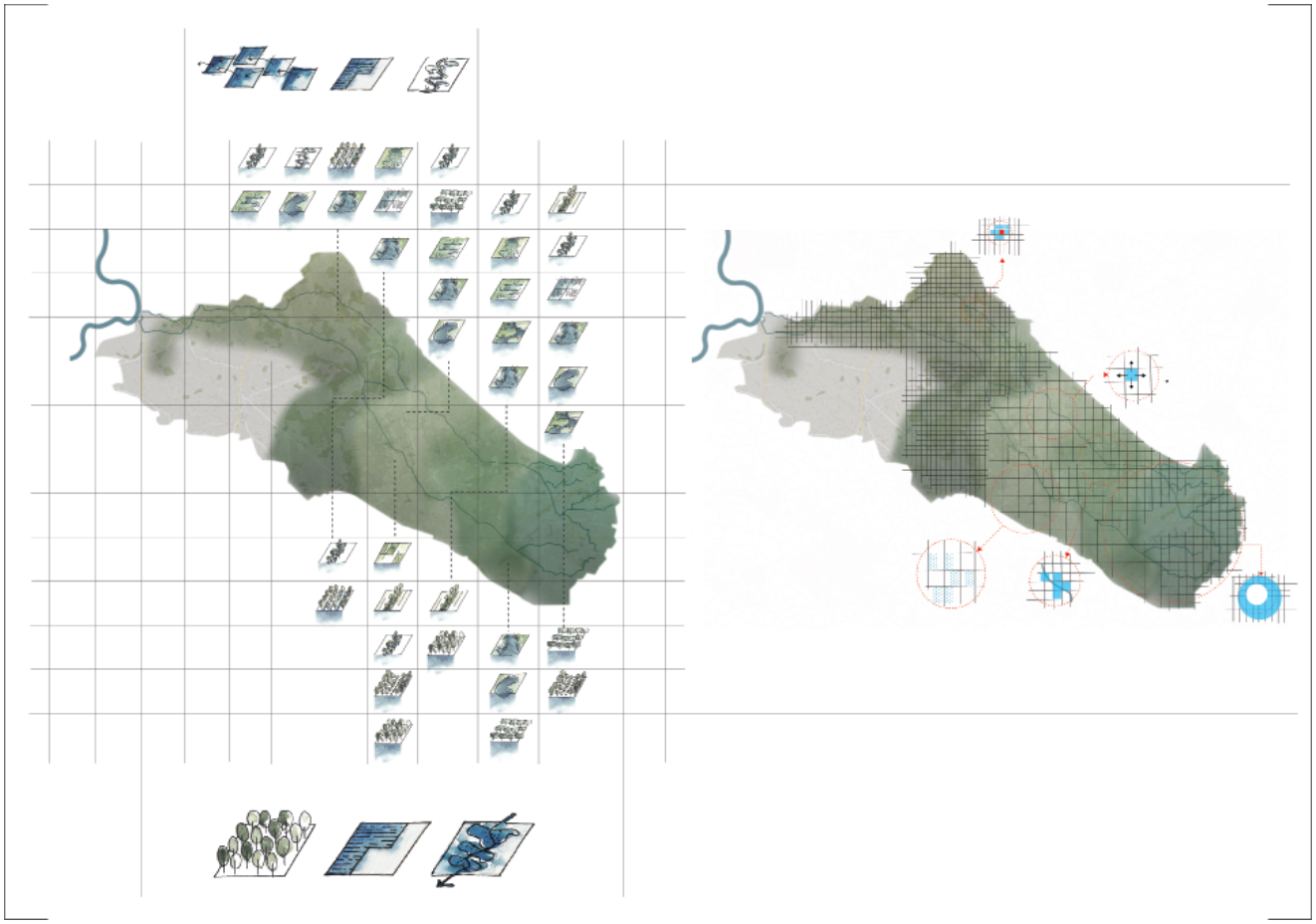

FIG 10 (Left) The initial wetness matrix is further elaborated and wetness principles are designated for different scales of intervention for the area. (Right) The feedback structure shows the extent of a wetness intervention in terms of area and how the retained wetness interacts with the site and surroundings.

of what is expected in future and a vision, towards which the entire region should work for. The learnings from all these different scales are then reflected in further development of the structure and interpretation of the wetness matrix.

From the discussion above, it can be said that, this thesis intends to address the value and underlying possibilities of surrounding cultural landscape context for the experience, understanding and functionality of a heritage place and how future resilience can be achieved by a coherent link to the broader landscape. This idea of integrating heritage places to their broader context can be explored for different heritage places in diverse geographical locations. Also, the thesis points out the fact that cultural landscape is an evolving heritage component and the micro scale designs emphasize on the implicit attributes of a cultural landscape to make them explicit so that people can experience them. This potentiality of cultural landscape as a leisure destination can also be explored in other geographical and cultural contexts. Finally, we can say that, in today's world, where cultural heritage landscapes are facing numerous challenges such as climate change, loss of economy, pressure of urban encroachment and many more, this thesis in the site of Baakse Beek area, can inspire researchers, designers and related stakeholders to think of possibilities where heritage values can be coupled with resilience strategies for a desirable future for these heritage places.

References:

Mathur, A., & Cunha, D. D. (2014). Waters everywhere. In A. Mathur, & D. D. Cunha (Eds.), Design in the terrain of water (pp. 1-11). Pennsylvania: Applied Research + Design Publishing with University of Pennsysvania School of Design.

Climate Resilient Estate Landscape in Baakse Beek

Towards a landscape architecture approach for water management, ecology, and spatial experience

Yingjie Zhang

Supervisors:
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Bieke Cattoor
Maurits Willem Ertsen

Introduction

Climate change and its consequences on water management and the ecosystem are undoubted facts in Baakse beek area. To combat floods and give way to agricultural development, numerous changes have been taken place. As a result, the land and water system are no longer adaptive to climate change. Land extraction decreased the soil's capacity for water retention dramatically and resulted in lower groundwater levels. The stream is canalized so the water cannot stay in landscape and the stream is partly dried out. The spatial coherence in the landscape is now almost unnoticeable. The banks are standardized and lost diversity, which means a decrease in the variety of flora and fauna. A reduction in woodland and heathland after land consolidation has degraded ecological quality and diversity. Mono-functional land use makes the landscape no longer attractive.

If we reconsider the value of historical water management approaches and the relationship between ecology and human perception in the landscape, a balance in the water system and ecology will return to the landscape. More importantly, this could become a bridge that links the history and the future of the estate landscape in the region and open up new possibilities of re-defining the values of the estate landscape, eliminating effects from climate change, and gaining an increasing awareness of the ecological values in the landscape.

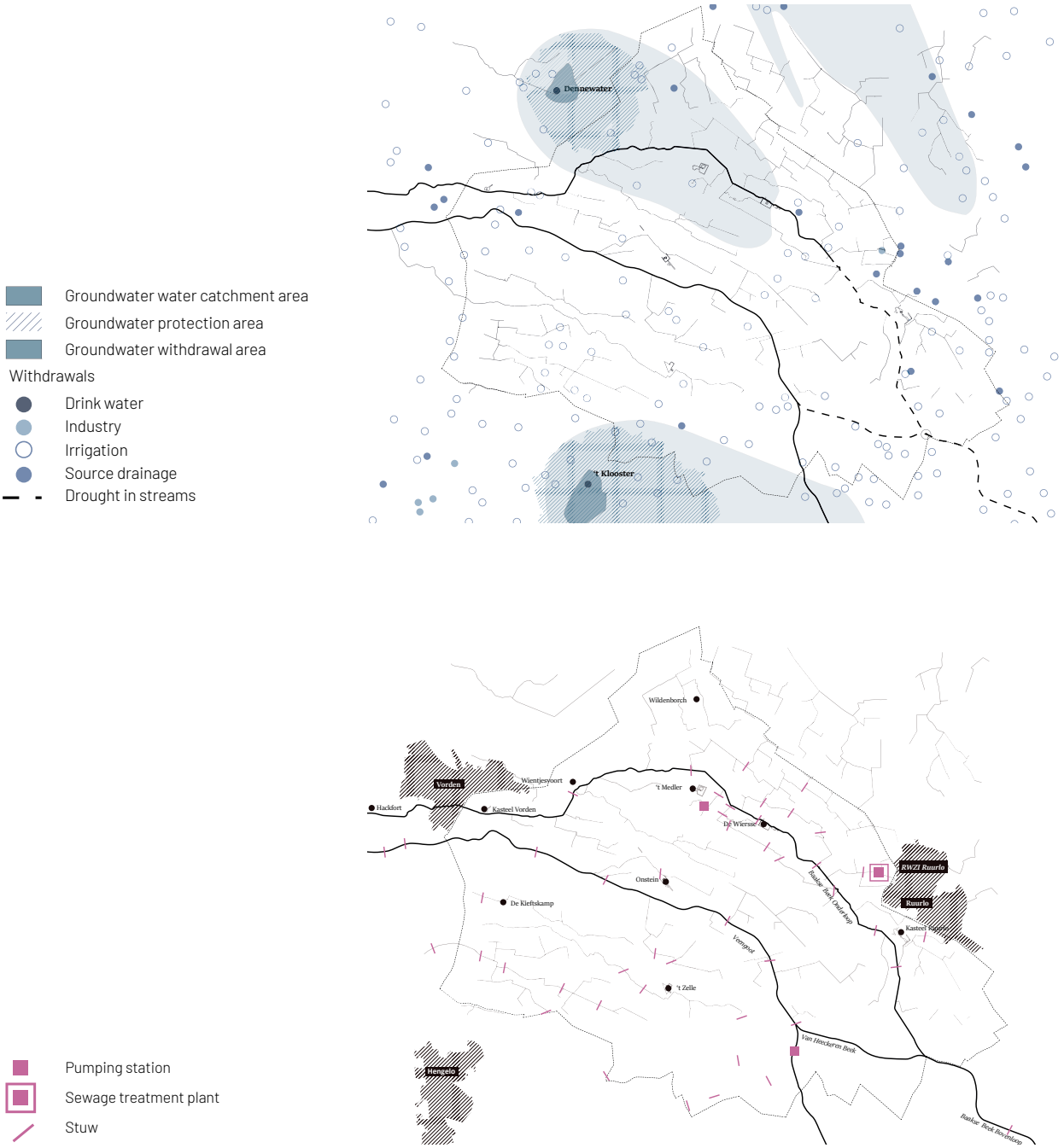


FIG. 1 In dry seasons, groundwater are extracted for irrigation, drink water and industries. Large part of the Baakse beek is dried out in summer

FIG. 2 A lot of weirs are built on stream for level management. Weir helps retain water in the stream, at the same time slow down the flows and become barriers for migration.

In this project, the idea of "ecological aesthetics" provides pathways for rethinking the relationship between human spatial experience and the ecology function of the landscape. This work combines design research and research-by-design.

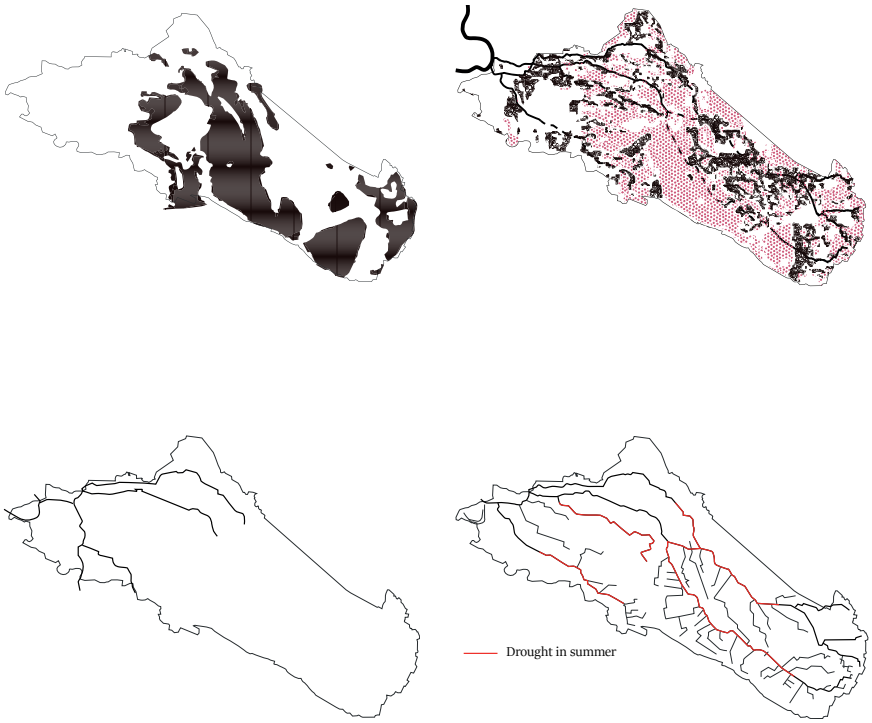


FIG. 3 Peat distribution in 1200.

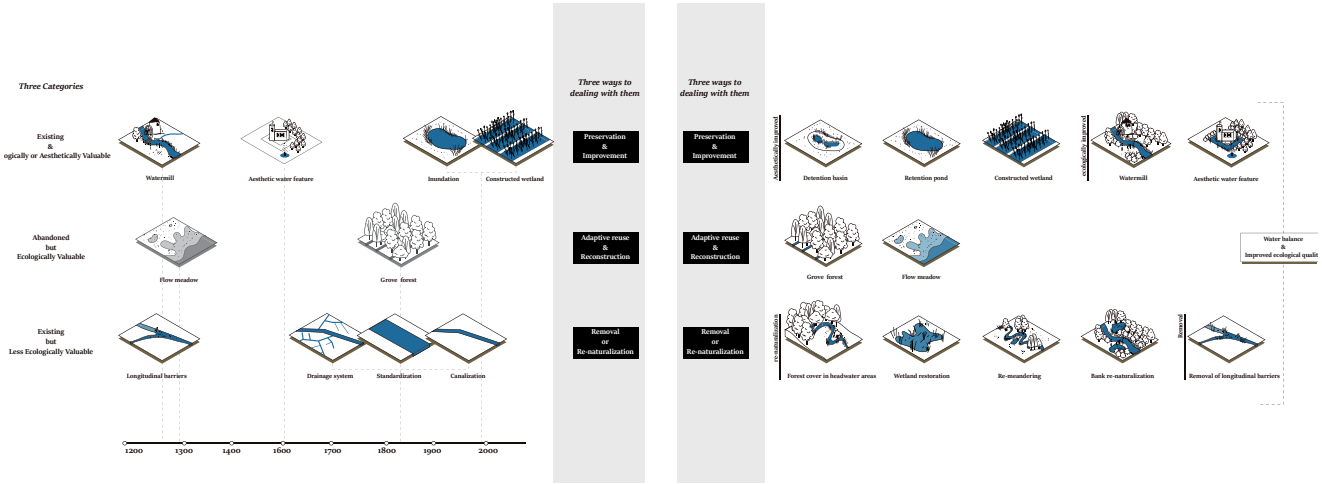
FIG. 4 Soil map in the twentieth century. The soil lost storage capacity as a result of peat mining.

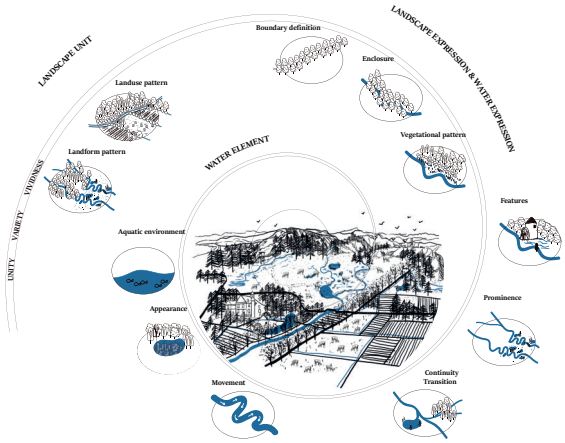
FIG. 5 Watercourse in Baakse beek basin in 1200.

FIG. 6 Watercourse in Baakse beek basin in 2019. Watercourse is extended and canalized. The stream is partly dried out in dry seasons recently.

The first half of the study follows the research-based-design approach. Landscape design is used as a goal-oriented interdisciplinary method to help break down the climate-related problems into parts that can be investigated individually.The second half of the research follows the design-based-research approach. The design explores potentials for the estate landscape through testing different ways of combining the findings from research. The design is considered as a 'journey of discovery' (Short, 2008 cited in Nijhuis and Bobbink, 2012).

The added value of the design not only lies in providing building stones to address the climate-related issues in Baakse beek area but also explores methods of bringing together the environment and humans in the landscape. Concerning the guiding theme of the studio, landscape as infrastructure, infrastructure as landscape, the definition of green-blue infrastructure goes beyond utility and therefore acts as a basis for exploring potentials for the site concerning their civic and cultural significance. The historical water structures are used to communicate naturalness and translate the ecological patterns into cultural language. This implies a new relationship between landscape design and water management towards a future-proof spatial development.





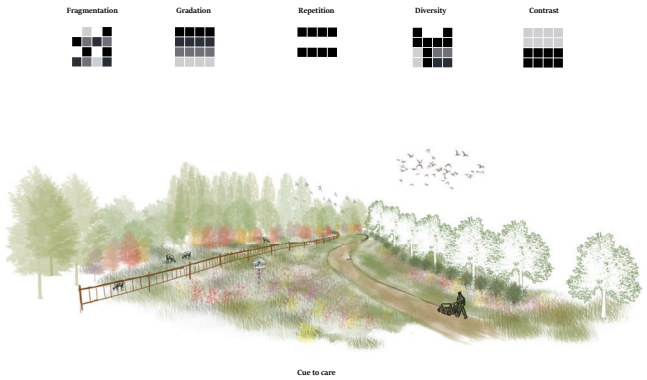


FIG. 7 Soil map in the twentieth century. The soil lost storage capacity as a result of peat mining.

FIG. 8 Design principles

FIG. 9 Classification framework based on Litton and Tetlow (1974) for water in landscape to show the interrelationships among water, landforms and vegetations, and spatial design principles to rebuild this relationship in Baakse Beek.

FIG. 10 Spatial design principles on multiple scales. Enhance spatial organisation at regional scale and design with cultual aesthetics landscapes to communicate ecological functions at local scale.

Design principles

To take values from historical landscape elements for a future-proof landscape, local historical water management approaches are studied and resulted in three categories with each their ecological importance. There are different ways to use the categories. For example, the adaptive reuse of the ‘rabatten’-forest to store water in the dry season and drain extra water during peak discharge. The flow meadow system could be combined with the constructed wetland to store and purify water. The re-naturalization of the stream and its bank will slow down the flow and give water more space in the stream and the landscape.

Litton and Tetlow (1974) developed a classification framework to show the interrelationships among water, landforms, and vegetation. According to this framework, the spatial landscape experience is made up of a series of components ranging from large to relatively small scale and from general to the particular character. Frequently water elements contribute to the coherence of a landscape. However, in Baakse beek area, in recent years, agricultural developments and climate change resulted in a loss of spatial coherence. At the regional scale, the unity of the landscape could be rebuilt through enhancing the spatial organization of landscape elements to strengthen the spatial experience of contrast, diversity, repetition, gradation, or even fragmentation. At a very local scale, it is also essential to design with cultural-aesthetic elements to reveal the human interaction with the natural landscape and to communicate its ecology function. A crucial principle raised by Nassauer (1995), cues to social care, gives way for presenting ecologically quality of landscapes to people. This involves design interventions like mowing, planting in a row, flowering plants, and architectonic details.

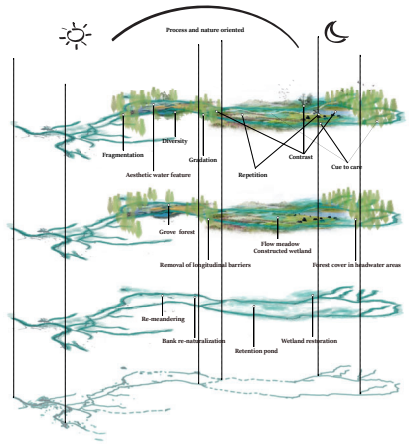


FIG. 11 Design objectives

Design objectives

Design objectives are set up for application. There are three key design objectives, which are water balance, improved ecological quality, and spatial expression of the ecological function. An overall goal of the design is to pave the way for a self-evident and future-proof landscape.

Results

The possibilities of applying particular design principles are explored at suitable locations in the region. Two strategies are used to implement five design principles. The first strategy is water-focused for a better-connected and future-proofed blue and green structure across the entire catchment area. Three water-related design principles are part of this strategy: stream re-naturalization, water retention, and water purification. The second strategy emphasizes on strengthening multidimensional spatial experience through adjusting spatial layer and building cultural aesthetics layer on the blue and green structure. This strategy entails the application of two design principles: spatial modification and cue to care. By overlapping them, on the one hand, a relatively comprehensive regional vision is reached with every single part of the landscape firmly joined together. On the other hand, the characteristics of each landscape will be preserved and consolidated.

The design exploration in Medler-Wiersse cluster is set up in three stages. It aims to bring back the balance in the landscape. This does not mean to go back in time, but to take values from the historical element for a future-proof landscape.

In the first stage, two landscape ecology models are developed in a layered way. The water layer is the basis. The vegetation structure layer is the carrier of ecology. The spatial layer incorporates the former two layers and is elaborated in two models. Model 1 takes the landscape of the 1850s as the basis, which is commonly used as a reference for the ideal landscape in the Netherlands. . By adding new valuable green and blue elements and functions to the current system, the Baakse beek and its streamside will function as a part of a linear corridor connecting different parts of Gelderland. The two models are compared and evaluated in terms of their contributions to water system restoration, ecological function and spatial quality. Overall, model 2 performs better than model 1 and is taken as the basis for spatial experience design.

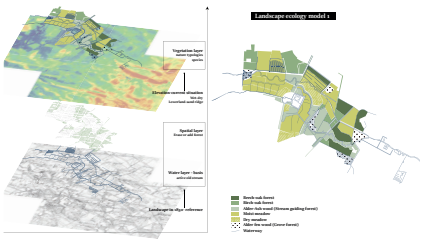


FIG. 12 Building landscape ecology model 1 by layers based on landscape in 1850 and the current topography

FIG. 14 Spatial design option 1

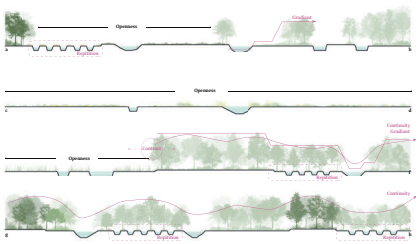


FIG. 16 Spatial consequences of model 1

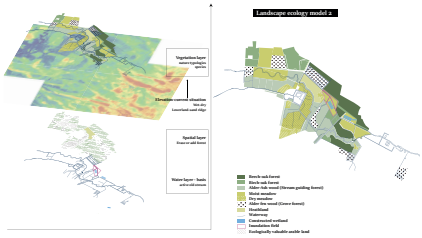


FIG. 13 Building landscape ecology model 2 by layers based on a green and blue network.

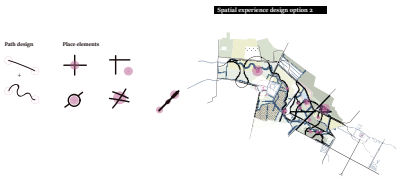


FIG. 15 Spatial design option 2..

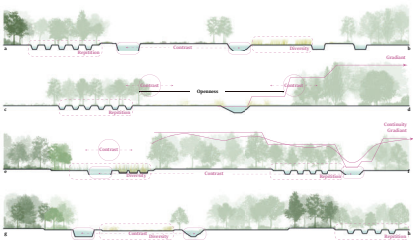
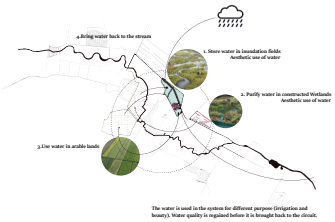


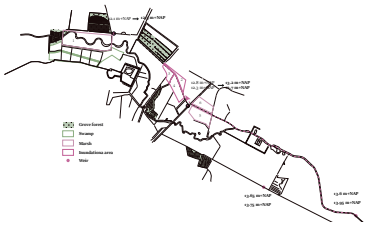
FIG. 17 Spatial consequences of model 2.

The second stage of the design exploration focused on spatial perception. Several spatial design options on path design and placement of cultural-aesthetics elements are tested. Here the aim is not to compare the pros and cons of each design option, but in testing multiple ways for organizing paths and nodes. Two possible spatial design options are proposed and overlapped taking model 2 as the basis.

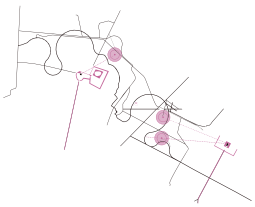
Finally, a possible future vision for the Medler-Wiersse cluster is elaborated in detail, which combines ecology model 2 and spatial design option 2. The waterway is re-naturalized by activating the old stream and adding new meanders to it. The streamside is naturalized for a better spatial experience and ecological purpose. Water could stay longer in the estate landscape in the rabatten forest, the wetland and the inundation field. The wetness conditions might be back in the long term. The design provides a system that the natural water will be collected, transferred, used, purified, and finally brought back to the circuit. Landscape spatial quality is regained through the path and view design: new paths re-define the relationship between water and nature. Two visual connections give a hint of the link between the estate and its hinterland. The human spatial experience is rearranged in a particular order considering the repetition, gradient, and diversity of the vegetation pattern.



Water purification system



Water retention system



View and path

FIG. 19 Three watchtowers are placed on the site. One is on the dry meadow along the human path, the other is on the wet meadow but hidden in the landscape. The third one is placed in the forest. The views form the tower also differs.

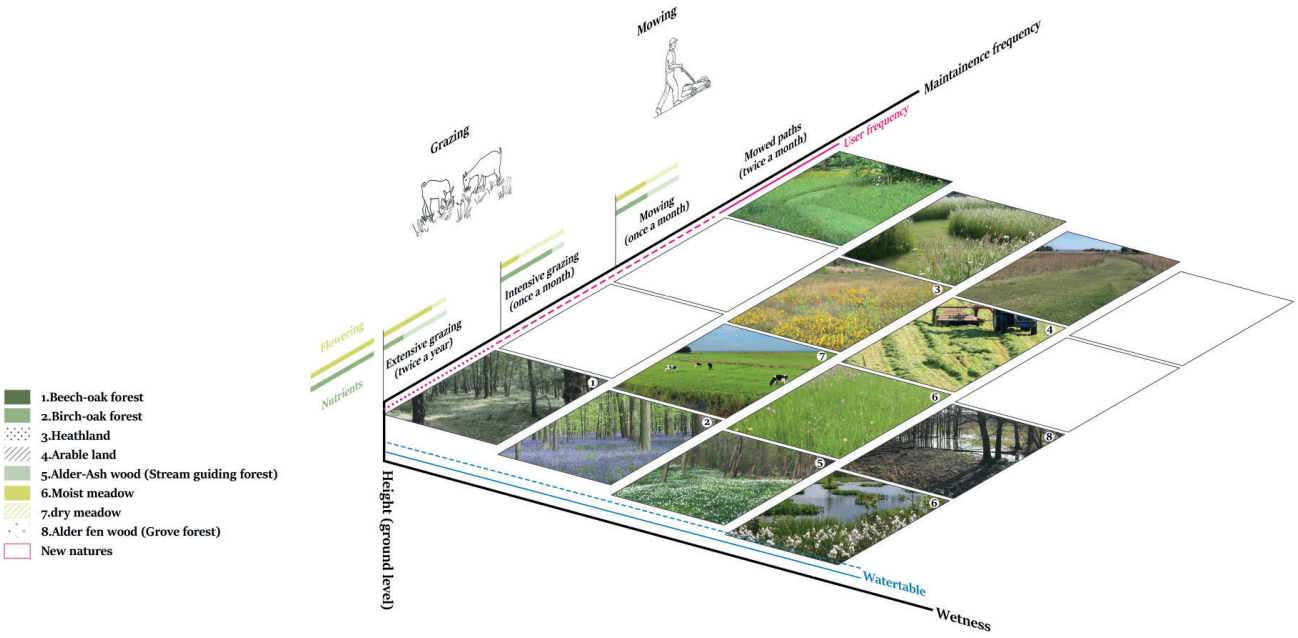
The spatial layout of this design is largely fixed following the landscape ecology model 2. A selection of vegetation species in different types of nature is made. These natures involve beech-oak forest, birch-oak forest, heathland, arable land, alder-ash wood (stream guiding forest), moist meadow, dry meadow, and alder fen wood (grove forest). Within each nature type, local species ranging from ground cover, shrub to the canopy are carefully selected according to their size, color, or texture.

Reed filters on a wet meadow

FIG. 18 Water and ecology design

View from a watertower in the forest

The design also concerns specific landscape design elements according to Nassauer's elaborations on cues to social care. For example, mowing a strip along human paths provides clear signs of human maintenance. It makes a forest or a large meadow more accessible and inviting without a break the continuity of patches for biodiversity. Mowing or grazing could be widely used in all types of natures to communicate nature.



Grazing and mowing toolbox

Mowing a stripe along the human paths

FIG. 20 Among these landscape elements, mowing is a popular way to communicate ecological quality through design. It considers the factors involving the use frequency, elevation, wetness condition, flowering pattern, and nutrients from the soil to design the way and frequency for maintenance in each type of nature.

Finally, the selection of maintenance principles and the level of intervention in this design might result in various conditions for changes and transformations in the landscape over time. The plan could only provide an expected future scenario for the estate landscape, but the reality remains mysterious.

FIG. 21 Wet meadow (5 years)

FIG. 23 Agriculture field (5 years)

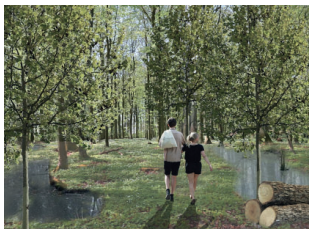


FIG. 25 Rabatten forest (5 years)

FIG. 27 Wet forest (5 years)

FIG. 22 On wet meadows, small water ponds are designed for short term water storage when water level is high in the stream. Over years, they provide wetter conditions for many flora to grow at the edge of the waterbody.

FIG. 24 In the agricultural fields, the land are divided into small patches for different crops to grow in. In a long term, these crops are not only planted for productive purpose, but also for branding the agricultural landscape.

FIG. 26 In the short term, The rabatten forest is designed to be less open for people. But management focuses on improving the ecological quality in it. Over time, it will be more open and inviting for people.

FIG. 28 In the stream forest, the stream bank will become more nature-like and vivid over time characterized by a lot of flowering shrubs and ground covers.

Conclusion

This project is focused on water and ecosystem restoration of the estate landscape by employing spatial design to bridge the disjuncture between landscape ecology and our spatial perceptions of the landscape. During the research and design process, these two aspects have gradually grown towards each other, converging into a proposal for rebalancing the landscape.

This implies a relationship between design and research. The design research approach enables a comprehensive understanding of the Baakse beek and the related estate landscape. It helps to break down the complex climate-related goals into design assignments. In research by design, the design forms a pathway to address climate change and rebalances the relationship between people and their environment, which result in a more resilient estate landscape. It delivers building stones to answer the current global question of how to design with the uncertainty of climate change, finds ways to communicate ecology function in landscape through spatial design, and bridge the gap between the work of water management, ecologist and landscape designer.

Bibliography

Litton, R. B., Tetlow, R. J. (1974) Water and landscape: an aesthetic overview of the role of water in the landscape. Port Washington, N.Y.: Water Information Center.

Nassauer, J.I. (1995). 'Messy Ecosystems, Orderly Frames'. Landscape Journal, 14(2), pp.161-169

Nijhuis, S. and Bobbink, I. (2012) 'Design-related research in landscape architecture', J. Design Research, Vol. 10, No. 4, pp.239–257.

Integrated 'Buttons' Network

Nodal landscape reconnecting Baakse Beek brook ecosystem & recreational landscape system

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Supervisors:
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Hielkje Zijlstra

Introduction

Estate landscapes are vulnerable to climate change. Especially regarding water management, these landscapes face severe challenges regarding shortage and abundance of water, which affects the gardens, ecosystem, forestry and agriculture of these estates. Also, many estates are still inaccessible and remain unknown to the broader public. This research focusses on the estate landscape of the Baakse Beek region while developing a spatial strategy that takes the natural brook ecosystem and the recreational system as the basis for a more resilient and future proof estate landscape. The brook ecosystem here is typical for the sandy grounds in the East of the Netherlands and was a base condition for the allocation of estates, while the recreational system refers to a balanced-interaction among humans, culture, and nature. It's worthy to note that the estate landscapes, which have formed in Eastern Netherlands since the 16th Century, was always a balanced integration of these two systems. Over time the relation of the brook ecosystem and recreational system changed dramatically and grow apart due to sectoral developments that focussed solely on the agricultural optimization of the water system or economic development of recreation.

Regarding the brook ecosystem, for instance, peatlands and other kinds of wetlands disappeared in favour of agricultural production but thereby losing sponge capacity in the upper parts of the brook system. In combination with canalization of the brooks, the water system changed from a healthy and natural brook ecosystem, into a water machine focussed on discharge of water. In the perspective of climate change, this leads to flood problems in the wintertime and drought in summer, but also a significant loss of biodiversity.

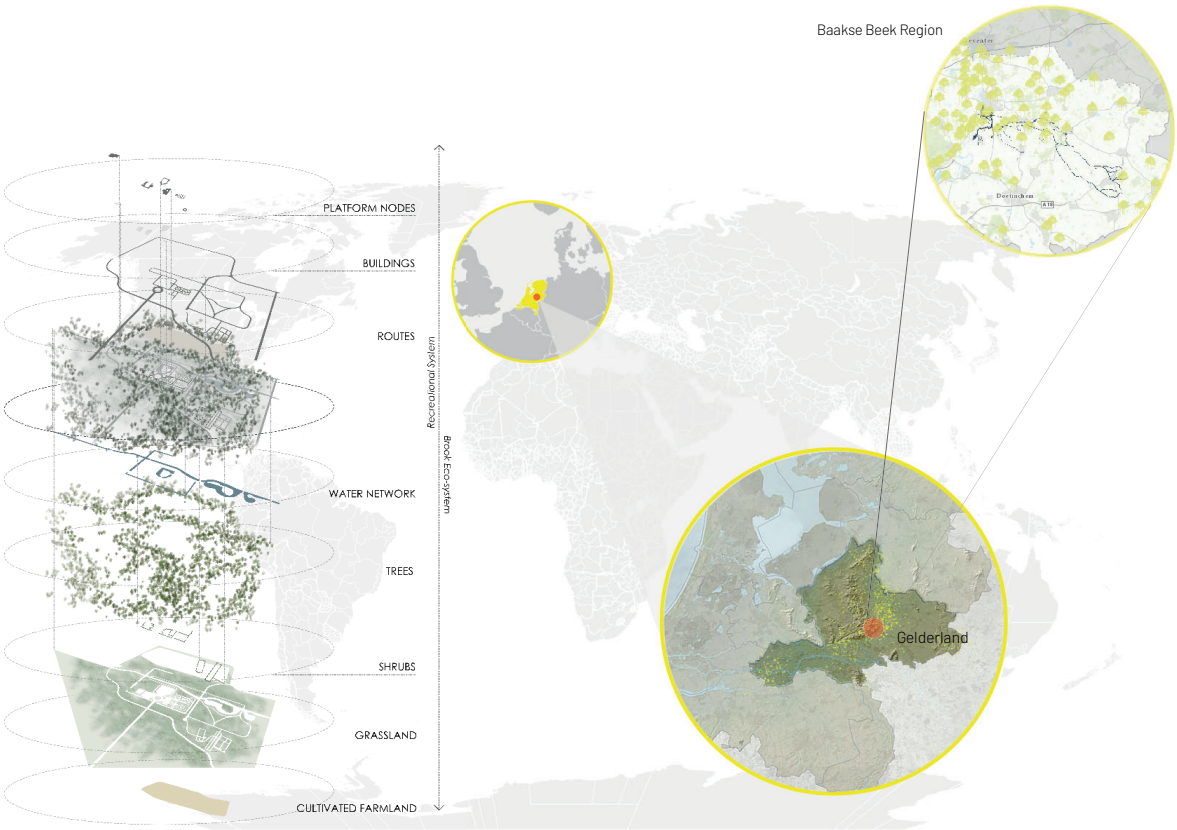


FIG. 1 Project Location & estates layers

Amounts of estates have formed in Eastern Netherlands since 16th Century. The estate landscape is a kind of combination of Brook Eco-system and Recreational System.

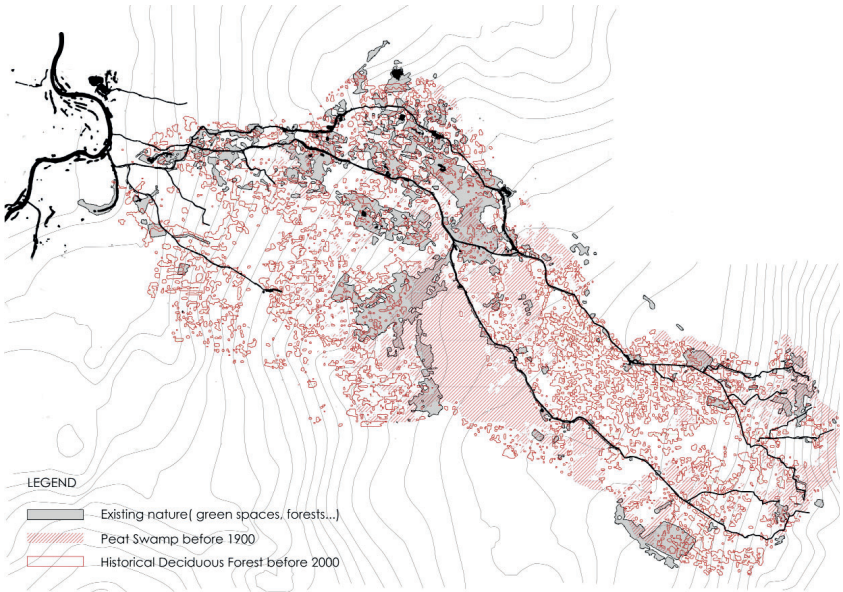


FIG. 2 Changing of Green Structure

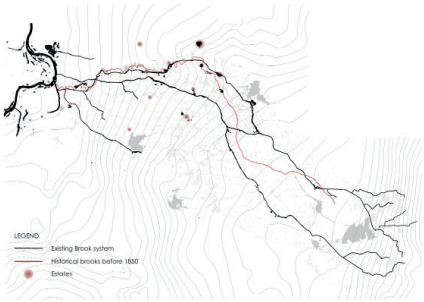


FIG. 3 Changing of Watercourse

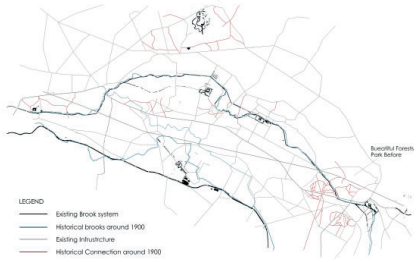


FIG. 4 Changing of Infrastructure

Also, the recreational system faces serious problems because of misbalance in accessibility and functions amongst the estates. Some estates became generic touristic attractions while others remain inaccessible. There is a need for a contextual and adaptive approach where on the one hand the rich heritage estate landscapes can be experienced, but without Disneyfication of the estates, thus avoiding the social and cultural homogenization that is consequent to consumerism, merchandising, and the economy as main driving force.

Hence, now the relationship between the brook eco-system and the recreational system has changed from a close and tight situation to a relatively separated one.

FIG. 5 Possibility of Application

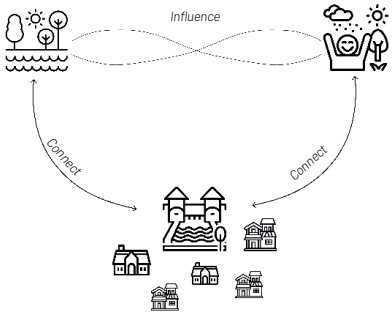
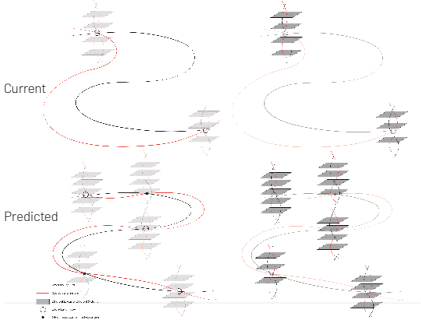
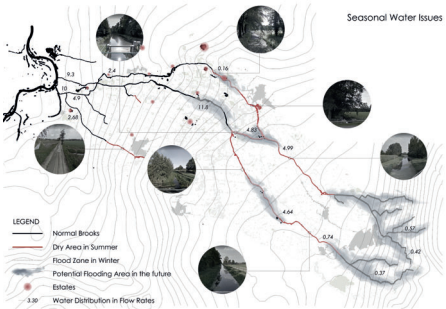


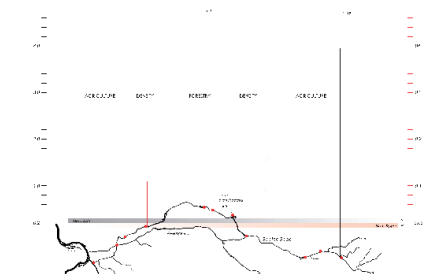
FIG. 6 Objective Framework

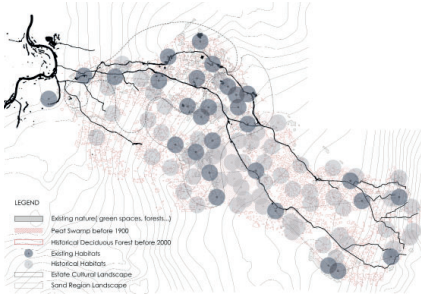


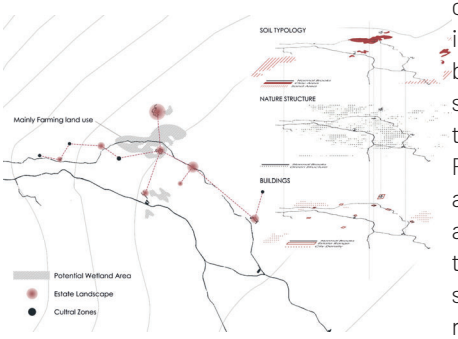
Research Objectives The main objective of this research is to explore the potential of the estate landscape of the Baakse Beek region, in a designerly way, identifying possibilities to restore and develop the interaction of a healthy brook ecosystem and recreational system with the estates as connecting nodes. In entails a multiscale approach for the development of a climate-proof water system with rich biodiversity (by restoring wetlands, including marshlands, floating meadows, groove forests and etc.) that is the backbone of the cultural landscape, where heritage, nature and humans can co-exist and enforce each other.

Results









Brook Ecosystem The plan proposes a strategy focused on the restoration of the water system based on landscape characteristics. There are three main landscape characteristics in the region: terrace fringes, peatland and the lowland stream. However, much of the original landscape and its related ecosystems are transformed into agricultural land with an efficient water discharge system. Also, the spatial variation amongst the different landscape typology changed through increase of spatial scale, removing landscape elements in favour of optimal agricultural production. Especially in the Estate zone Baakse Beek there are still many ecological, historical and spatial qualities present. This plan employs these clues as bases for the future development and to enforce the diversity and variation of landscapes in a spatial way, but also use their hydrological characteristics as the fundament for a healthy ecosystem.

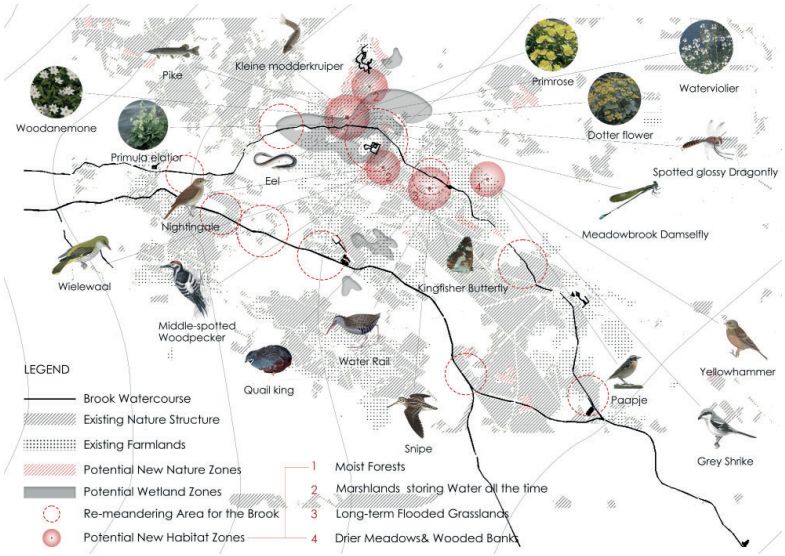


FIG. 7 Elements, summary and potentials on Brook Ecosystem

Recreational Ecosystem The Estate zone also consists of significant historical heritage values related to the rich history of the region. However, many of these values remain to be unknown by the wider public, despite their recreational potential. This plan proposes a recreational system that is contextual and adaptive to the possibilities of the estates. It takes the specific characteristics of the estate of the basis for specific interventions that avoid generic solutions. In some case, that means that estates will be partly opened up for the wider public, others remain closed. The scheme shows a scoring of five main estates of this region according to their accessibility to and inside the estates, eco-experience, cultural activities and values, and leisure ability. Castle Ruurlo is always welcoming bigger groups of people, but Het Medler is only partly accessible experiencing the house from a distance. Each estate has its characteristics and potential in the bigger system. The idea is to balance the interaction between the private estates and the recreational system and allow visitors to experience the specific culture of the estates in the region. Also reconnecting and restoring historical routes are part of the strategy.

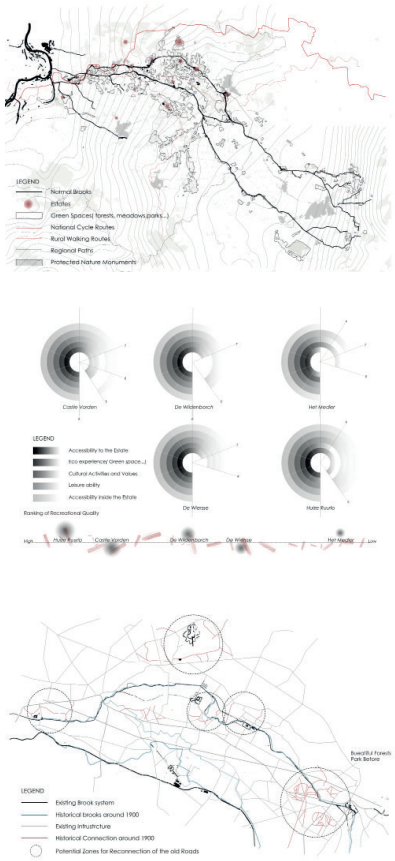
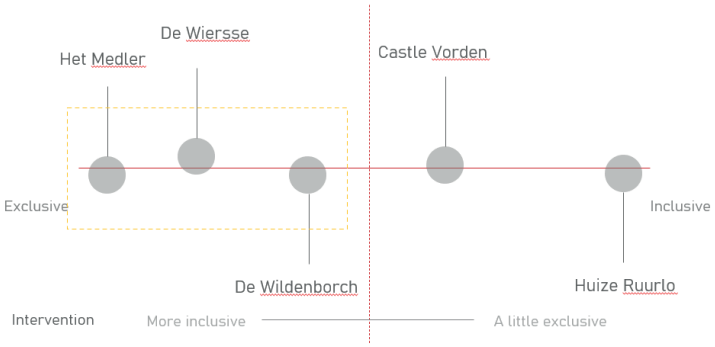


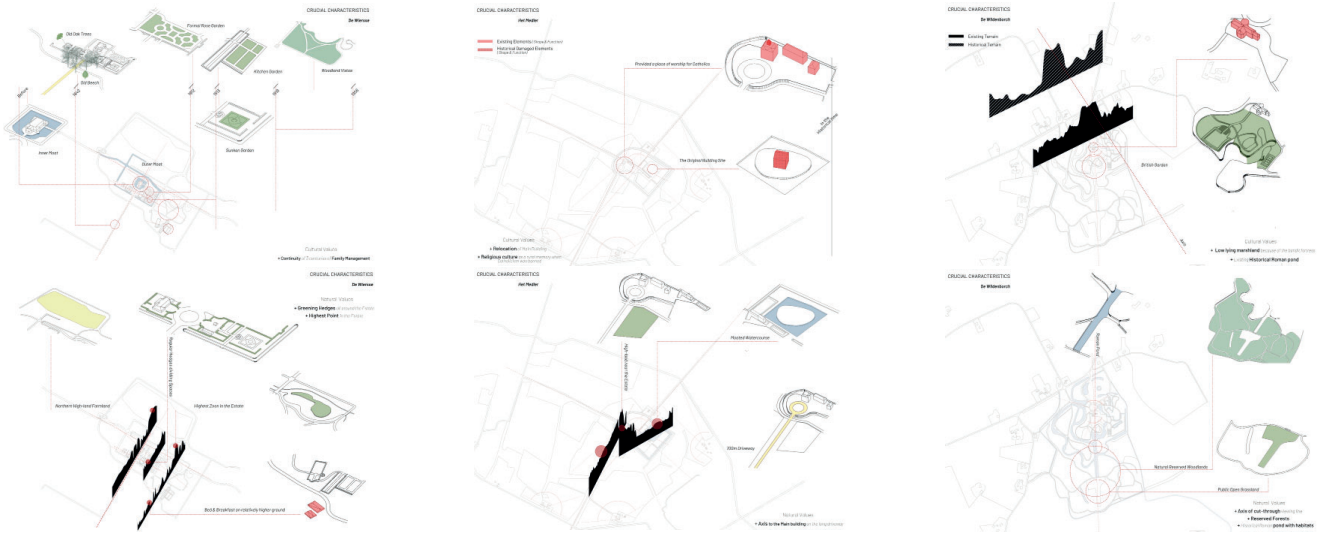
FIG. 8 Elements, summary and potentials on Recreational Ecosystem



Diverse types of interactive landscapes according to specific estate

Estate Landscape System Here the focus is on a cluster of three estates: De Wiersse, Het Medler and De Wildenborch. The spatial composition of these estates and their immediate surroundings serve as an essential clue for design interventions. The geometric pattern of the gardens, the view lines, the landscaped surroundings with curving routes and vistas express a symbiotic combination of the rich cultural history, the brook ecosystem, leisure and agriculture. More particular, the estates can be considered to be nodes where the recreational and ecological system come together. Also, the allocation of the estates and their farmhouses show a delicate relationship with the geomorphology and hydrology of the region. Estates and farmhouses were often built at the edge of sandy ridges so that people can take advantage of both wetness and drought. Nevertheless, there are exceptions: De Wildenborch, for instance, was built in the middle of a wet marsh for defensive purposes, because of defence. Moreover, buildings, especially the estates, were likely to be built on higher ground. The brook system is an important structure that connects the estates and displays the interdependency in terms of water management and ecological exchange. Developing the green-blue connections and recreational infrastructure, as well as the visual connections such as view lines, are taken as the basis for this plan.

Crucial Factors in Each Estate



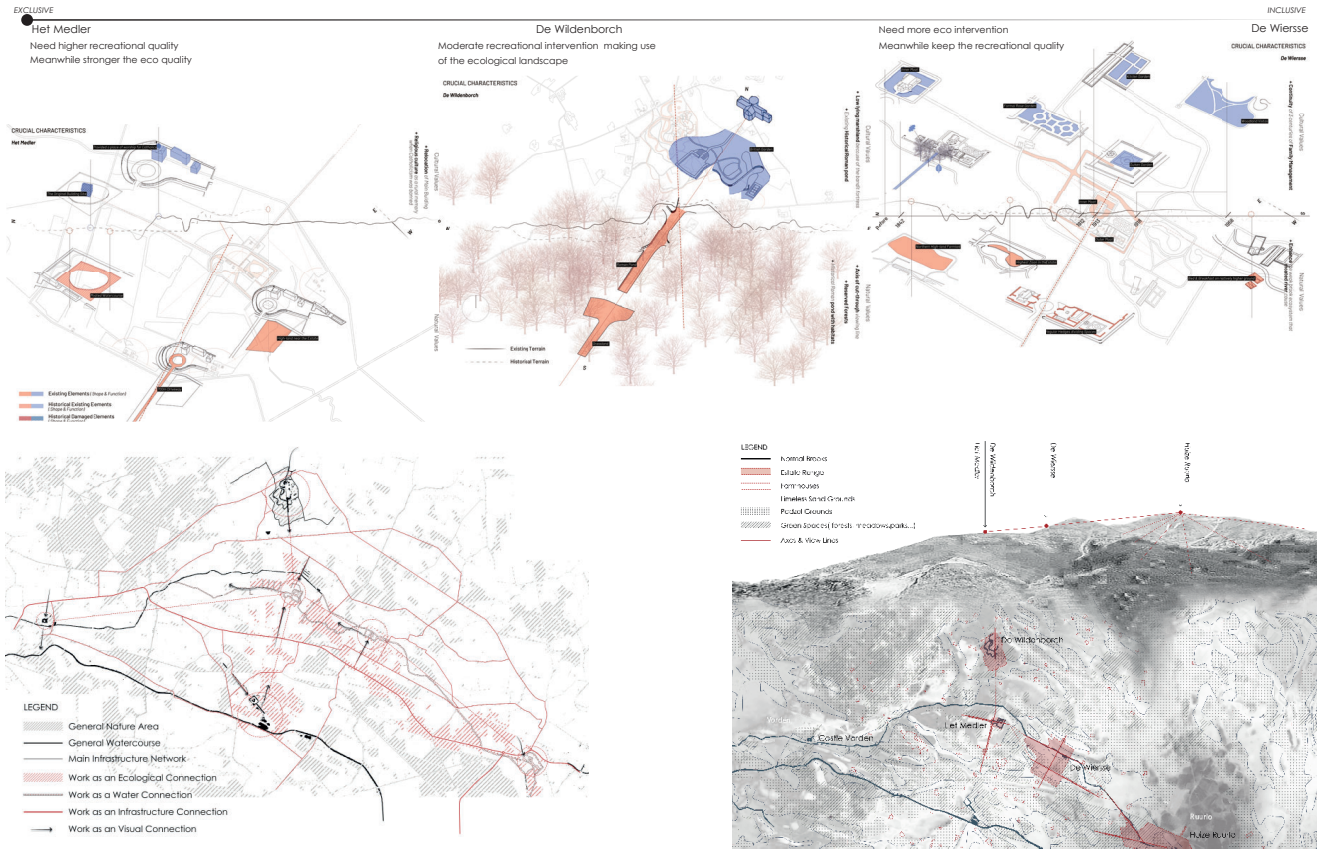


FIG. 9 Elements, summary and potentials on Estate Landscape System

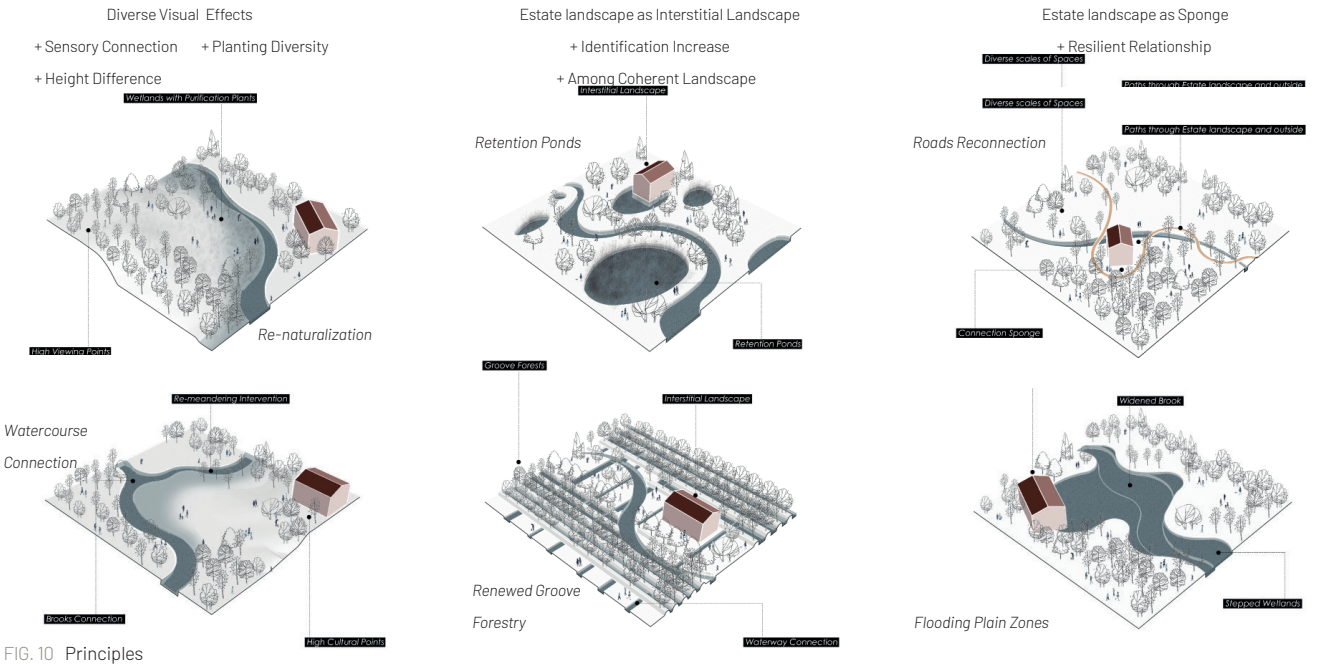


FIG. 10 Principles

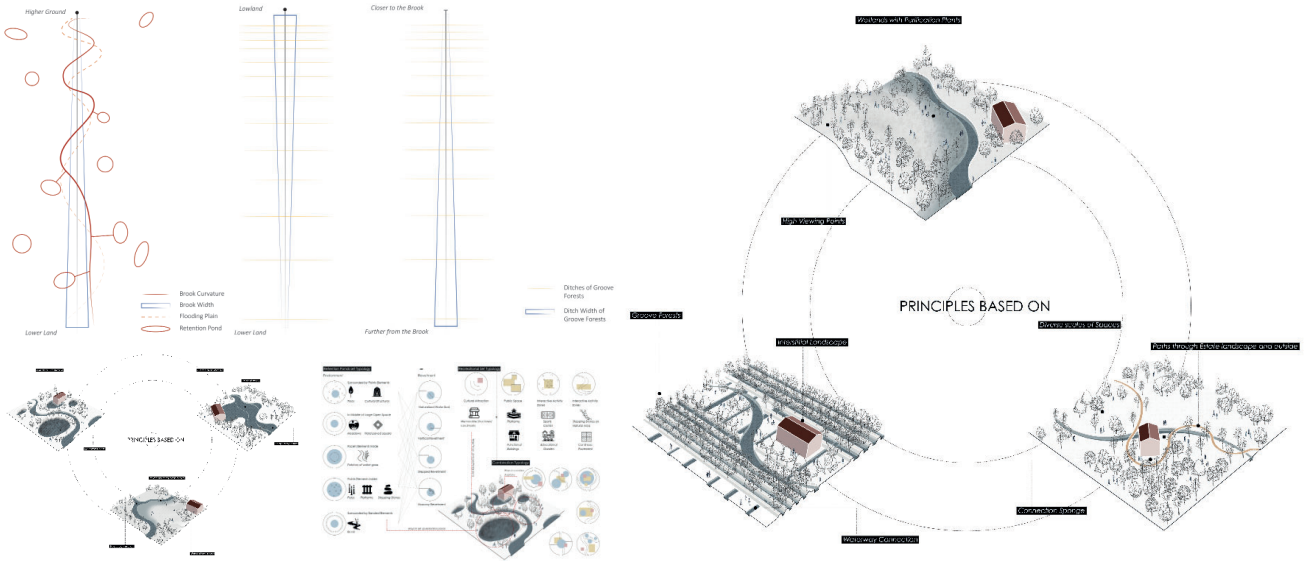
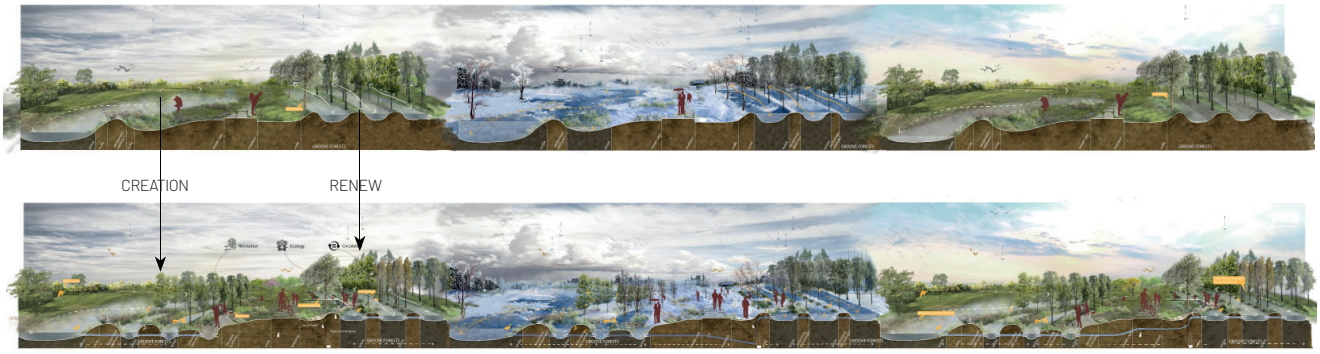


FIG. 11 Principle Sets Applications & Experiments Models

Principles

In order to develop a spatial strategy, several principles where defined regarding spatial experience, connecting landscapes and green-blue development. The principles of spatial experience address spatial-visual and other sensory aspects connection and are geared towards experiencing differences and variation in height differences, vegetation structure and cultural identity. Connecting landscapes is about interconnecting the estates and their surrounding landscapes. Green-blue development is about increasing the sponge capacity of the region and restoring ecosystems and habitats.

FIG. 12 Situation Contrast



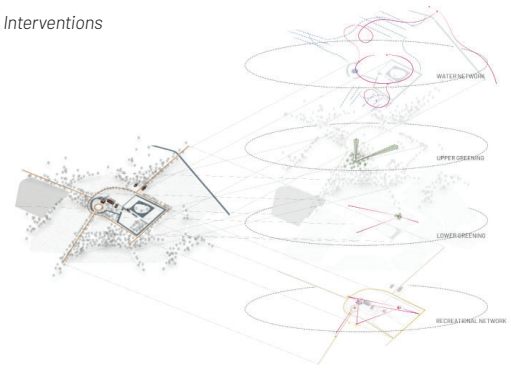
Design Explorations

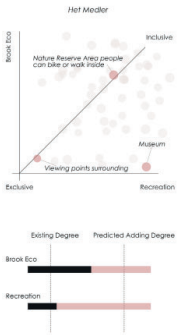
Design experiments (Nijhuis & De Vries, 2020) are conducted as a means to study the possibilities of the application of the principles to the specific estate landscape or larger systems. Among several explorations, here one example is shown that addresses the (re)construction of groove forests ('rabattenbos') and retention ponds. The new and reconstructed groove forests are located in the brook valleys. Weirs and dams are used to control the water in the forests. With high water in brook, water flows into the forest to store water for dry periods. In combination with ecological management and making the forests accessible for visitors, it integrates adaptive water management techniques with the development of ecosystems, making people aware of these cultural-historical interesting landscape elements.

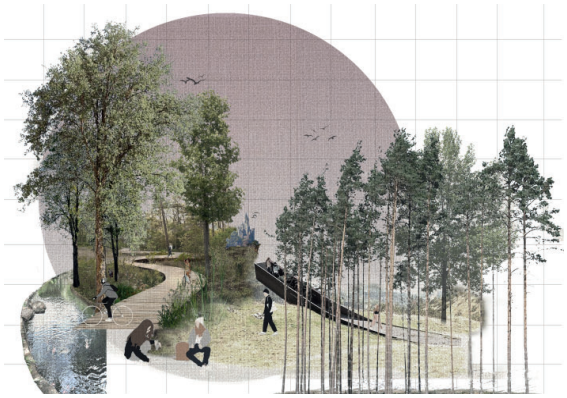
Other interventions are proposed opening enhancing the accessibility network through restoring historical routes and adding new ones. For example, for Het Medler, a cycling route is added along a nature reserve. At De Wiersse, for reasons of ecological development, certain areas remain inaccessible but become part of the scenery, like an English landscape garden. At De Wildenborch some water meadows are opened for small events like picnic parties while enjoying the landscape heritage scenery in late summer, while in the winter and spring these areas can be used to store water.

Het Medler

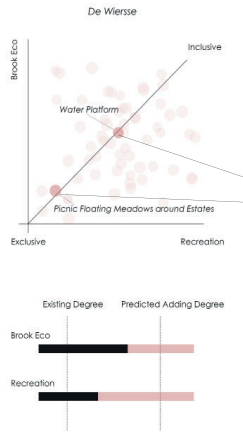
Interventions

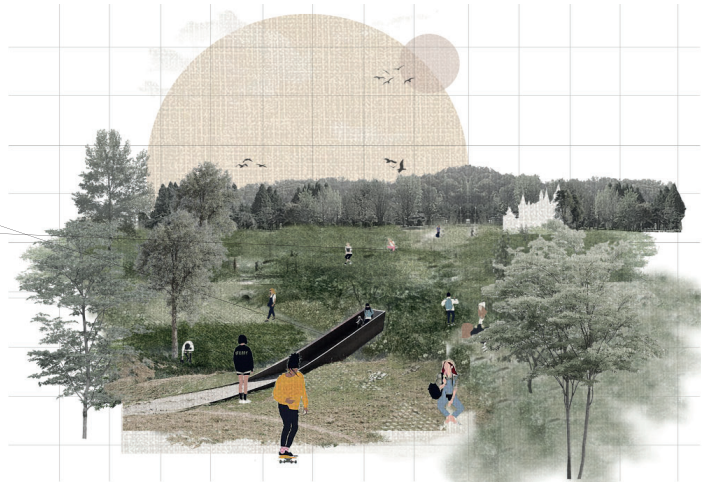






De Wiersse





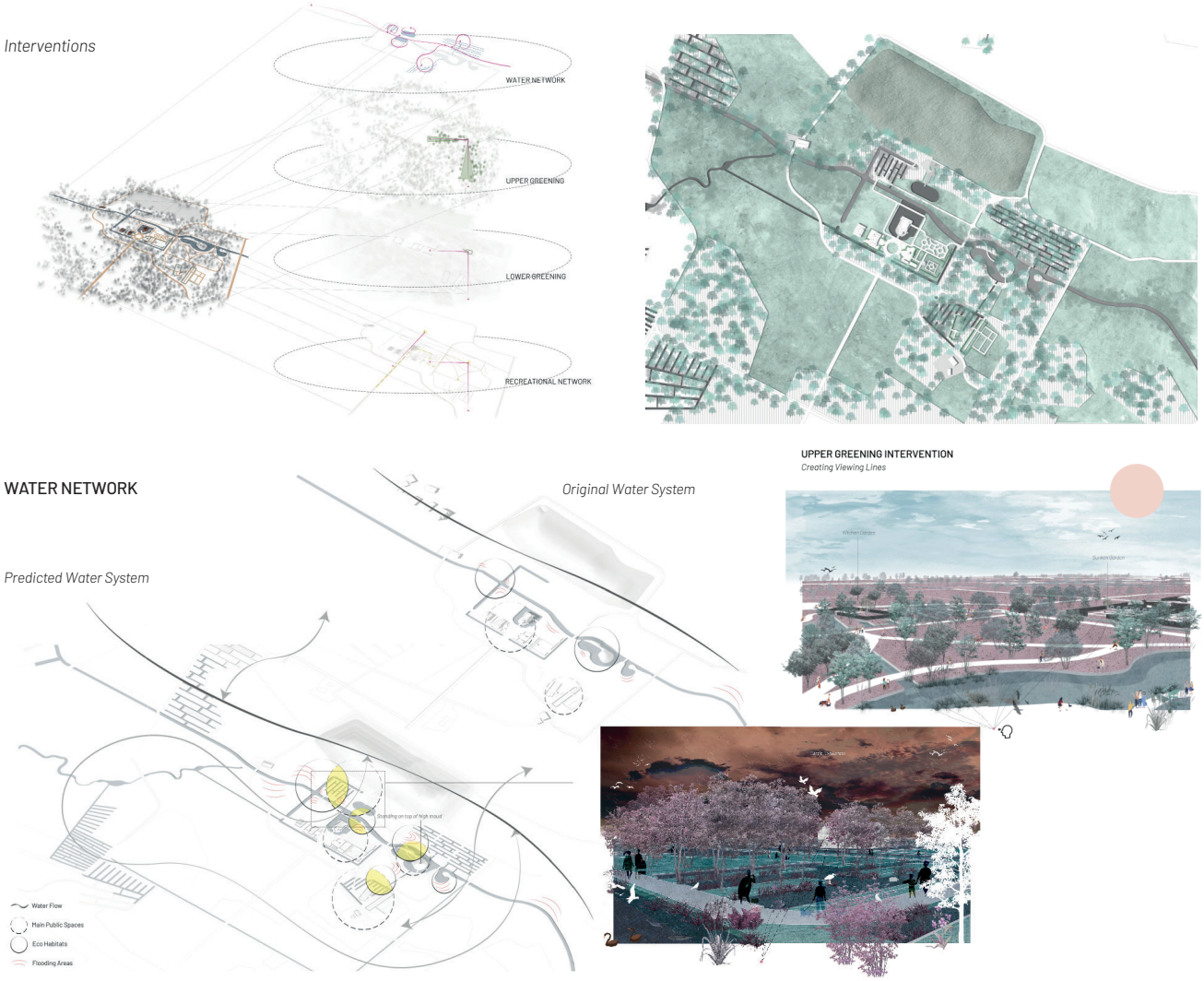


FIG. 13 Application of Groove Forestry Restoration on De Wiersse

Conclusion & Reflection

According to the experiments of groove forests restoration on the 3 estates, there're some zones that suitable for groove water retention areas, including new groove forestry and restored groove forestry. There would be a groove loop connecting the brook and the 3 estates. In this case, some research questions could be solved somehow. For instance, the seasonal water issues, to some extent, could improve a lot. Meanwhile, the restored groove forests inside estates also provide a new type of leisure space with cultural memories.

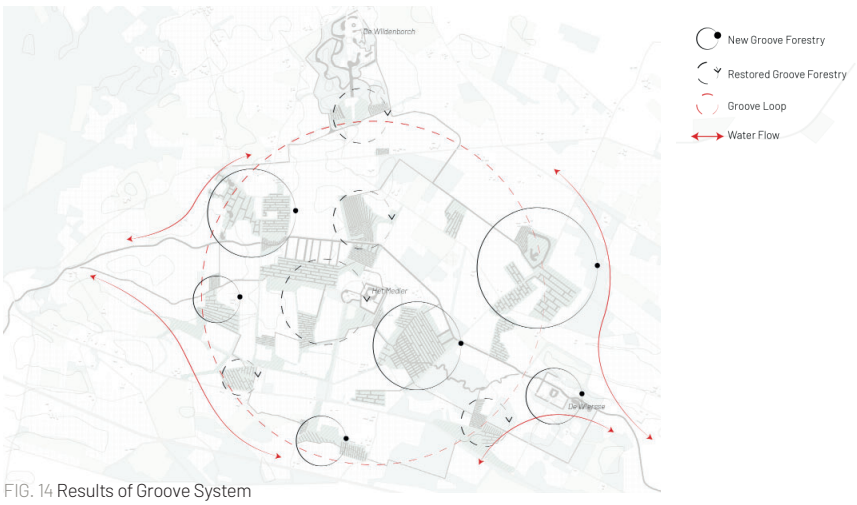


FIG. 14 Results of Groove System

Forest landscape restoration for climate-adaptive estates

Baakse Beek region, Gelderland

Yanjiao Wang

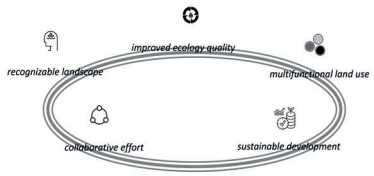
Supervisors:
Steffen Nijhuis
Bieke Cattoor
Bob Ursem

Introduction

The objective of this research is to explore the potential of forest landscape restoration to increase the resilience of the estate landscape in the face of climate change and to promote their cultural-historical values and identity. The approach is based on the understanding of the historical spatial development of the region. The following developments can be identified: human intervention in the form of deforestation has continuous negative impacts on the contemporary landscape, and damaged the forest landscape at that time and erased elements of the historical landscape and its identity. Apart from that, deforestation has negative effects on the climate and connected to environmental problems like increasing temperature, drought, and poor soil condition. Especially drought is a significant challenge in the study area that needs to be addressed.

The research aims to explore the possibility of designing a climate-adaptive estate landscape as a green infrastructure that connects the estates, local history, ecology value and societal value through forest landscape restoration. This study primarily focuses on the territory of two estates, Het Medler and De Wiersse, where ecological restoration of the aquatic eco-system and cultural-historical landscape experience can be strengthened through utilizing forest landscape restoration.

The project is intended to showcase the forest landscape's ability to address the vulnerable aquatic environment and urgent climate change issues and add the same time add spatial quality. The thesis will contribute a vision from the landscape's perspective to the estate zone's further development for people's wellbeing, and balanced benefits of different stakeholders.



Based on literature review and case study, five FLR-related design strategies are identified and applied for the Baakse Beek region, that can be summarized as:

1) Perceivable landscape: readable landscape nodes to approach the culture layer of the space.

2) Improved ecology quality: resilience to drought, enhanced biodiversity and soil function.

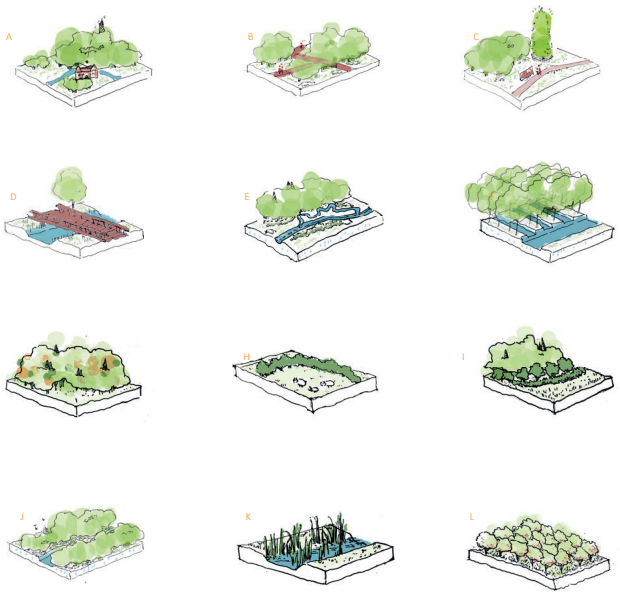
3) Multifunctional land use: space for different acitivity choices

4) Collaborative effort: effecitive negotiations with stakeholders

5) Sustainable development: area-specific method/ constructing in phases/ long-term management

Principles

Here the forest landscape is understood as the main element of the historical identity of the study area. It has great potential and offers multiple possibilities to address the problems the region faces and at the same time adds new qualities to the area.



To deal with the site-specific problems, design principles and spatial interventions are proposed, like implantation and reinterpretation of history and lost landscape elements, new structures for enhanced landscape quality, smart farms, reforestation, afforestation and intensified land use, according to different problematic situations.

FIG. 1 Strategic plan

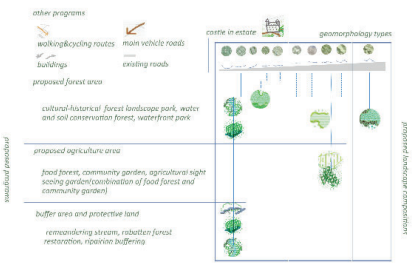


FIG. 2 Legenda

Results

Based on the FLR options framework (Hanson et al., 2015), the new forest landscape proposed for the estate zone integrates several critical interventions that together result in a more resilient ecological environment and appropriates people's wellbeing (see diagram below).

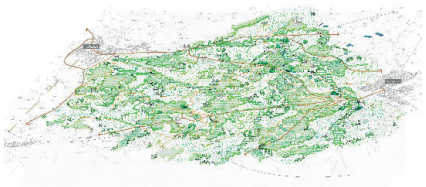


FIG. 3 Proposed forest landscape quality

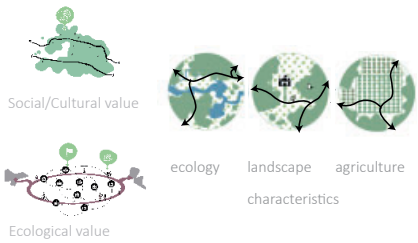
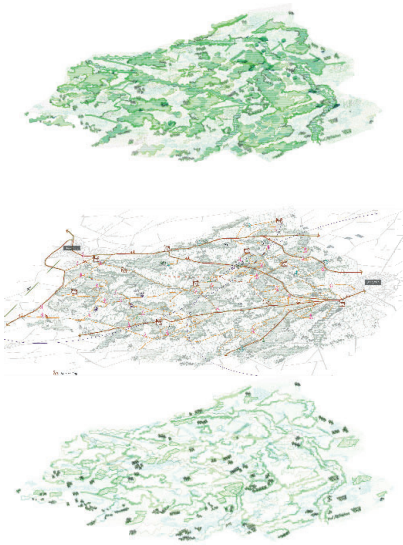
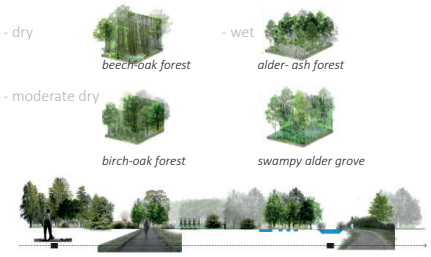


FIG. 4 Vision statement

The design employs three lenses, 1) ecology, 2) landscape perception and 3) agriculture as a multilayered approach for addressing different dimensions of a thriving forest landscape.





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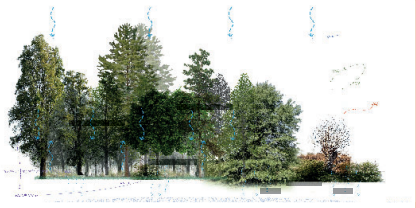
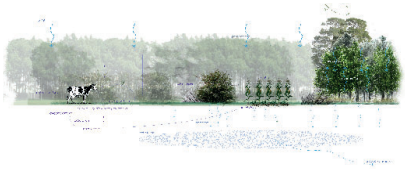


2 forest area

3 waterfront area

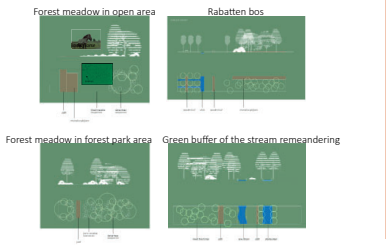


4 agriculture area

FIG. 5 Ecology layer

The ecology layer is based on the FLR framework and the geomorphological conditions of the area to increase water storage capacity, soil conservation and rich biodiversity through the new green infrastructure.

The landscape perception layer is based on the optimization of the existing accessibility network and redefines several recreational routes for multiple activities. New educational and recreational destinations are introduced.



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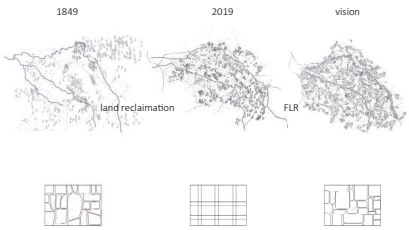

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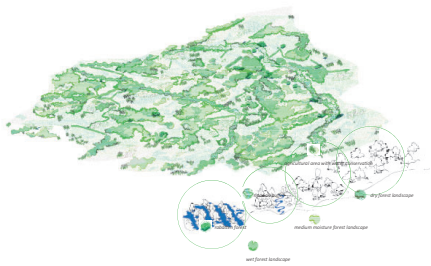

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4

FIG. 6 The landscape perception layer. 1) historical forest types 2) successive phases of landscape pattern 3) spatial qualities in varied forest types 4) The gradient “from the present to the past” this layer creates

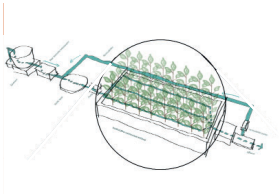


FIG. 7 Recirculating vertical flow construction wetland

FIG. 8 Food forest planting pattern

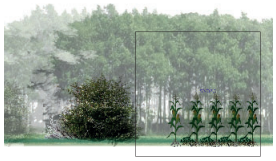


FIG. 9 Smart management and monitoring crops

The potential of agricultural development is promising, considering currently it's the main land use of the whole region. However, to enhance it and make it smart, fragmented agriculture lands are proposed to be applied with agroforestry strategies.

FIG. 10 Coppice woodland

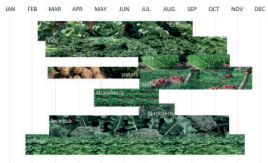


FIG. 11 Reasonable planting calendar

FIG. 12 CSA model

The proposed agriculture layer is to cooperate with the new green infrastructure and sustainably promote agriculture activities.

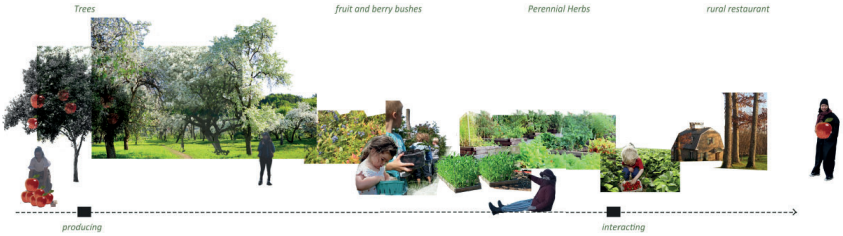


FIG. 13 Agroforestry strategies and marketing model make the products exchange procedure time-saving and recreational at the same time. The agricultural area is not only a place for producing but also a recreational and edible landscape for people's engaging.

The new forest landscape of the De Wiersse includes a new riparian buffer zone and helophyte filters around the Baakse Beek, the historic stream and watercourse near the estate. This increases water storage capacity and enhances water quality.

Historical forest types are proposed for promoting the existing forest and silviculture at the estate. More trees will enhance carbon dioxide sequestration and increase the 'sponge' capacity of the area. Besides, it will remind people of the historical forest landscape, as a signifier of regional identity. Also, mono-functional and industrial agricultural land is transformed into multifunctional forest gardens with agroforestry, which stimulates biodiversity and stimulates visitors' engagement with the landscape. Thus with creating a forest landscape consisting of different forest densities and a variety of typologies, the estate's ecological and societal values will be strengthened. It will also make a positive impact on the landscape of other estates, i.e. Het Melder downstream of De Wiersse.

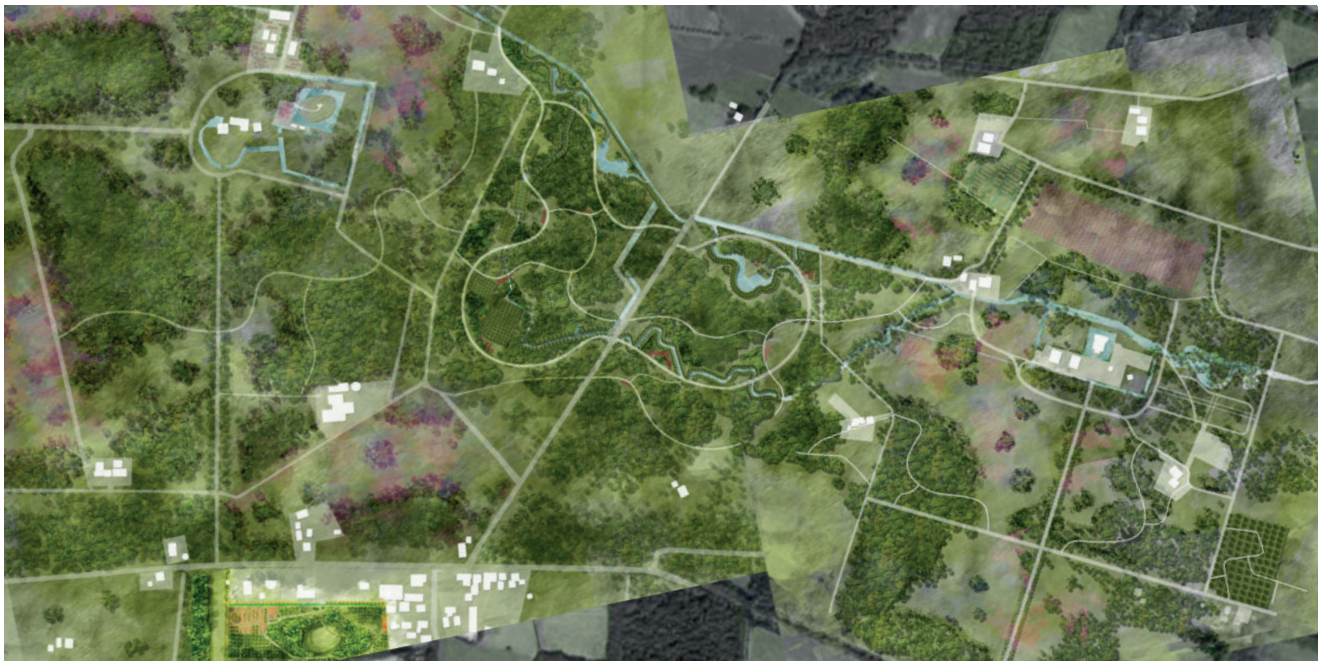


FIG. 14 In the final stage of the landscapes' development and construction and, as the plan above shows, the new forest landscape across these two estates' territories reactivate the historical blue links between De Wiersse and Het Medler. Moreover, the role of the old forest between these two estates and other green spaces are redefined to welcome a new spatial and ecological connection between estates. Garden forests inside and outside of estates also introduce interactive platforms for various people to engage with the cultural-historical landscape.

The new forest landscape proposed for Het Medler provides possibilities for exchanging land with farmers by introducing agroforestry programs in such a way that the historic farmhouses could interact with the scene nearby and people are more aware of the cultural-historical clues in the area. Moreover, these interventions also bring benefit to the ecological environment. Water quality and quantity issues are addressed by planting trees and stimulating natural growth with native species and plant communities according to local conditions. Also, the relation with De Wiersse and surrounding landscape of estate's territory could be revealed through the green and blue link proposed in the new forest landscape, both in physical space and visual space.

Conclusion

The research of designing a resilient cultural-historical landscape through forest landscape restoration provides a new perspective of resilient development of the estate landscape in the Vorden cluster. The proposal as presented here, forest landscape restoration for climate-adaptive estates in the Baakse Beek region, Gelderland, exemplifies how the theories and principles can be applied in the context of estate landscape in the eastern Netherlands. To achieve resilient landscape development, including aspects of ecology, landscape perception and agriculture, the historical role of the forest and its related contemporary and future opportunities for the estates are considered and integrated through multiscale landscape design.

This project calls for more attention to the various values of the forest restoration and what it has to offer for the development of more resilient heritage estate landscapes. It's not only about introducing trees on the land, but also about promoting an ecofriendly environment that stimulates people's wellbeing and at the same time reveals the ecological and cultural-historical layers of the landscape.

Curating Experiences

Rethinking the estate landscape for sensorial affordances

Barsha Amarendra

Supervisors:
Saskia de Wit
Angeliki Sioli

Introduction

The estate landscape of Baakse Beek, although deemed as heritage, is losing prominence and attachment from rural lives. The landscape, in spite of containing various unique spaces does not offer the affordances for engagement and experience, thereby being in a state of disassociation. This broken relationship is further aggravated by the brook decaying functionally, ecologically and sensorially.

Curating experiences offers a revitalisation of the heritage estates to become a setting for formation of experiential narratives and appreciation of the brook, which vitalises the aesthetic and ecological diversity within these estates. In doing so, the research entails the use of narratives as a method for documenting the uniqueness that lies in the basic unit of the landscape's composition i.e the enclosures, mapping the experiences in these enclosures and along the brook, and thereafter, constructing a plethora of socio-cultural engagements and perceptions in and with the landscape. Enriched by the theories of Sensorial Landscape, Seasonality of Landscape and Aesthetic Engagement, the research led to the curation of a tapestry of sensorially stimulating and engaging spaces. The project delivers a way of seeing the brook as integral to the experience of the landscape . It hopes to inspire the different stakeholders of the landscape to envision a more wholesome outlook of looking at the sustainability of these heritage landscapes not only in functional terms, but also in terms of socio-cultural connections that sustain the value of this landscape.

Problem Statement

Brook Health.

Upon visiting the estate landscape, it was realised that the brook showcases its grim state during the summer months. As can be seen in Figure 1, all the four estates along the Baakse Beek; namely Landgoed Vorden, Landgoed Het Medler, Landgoed De Wiersse and Landgoed Ruurlo, suffer from drought conditions and poor water quality.

FIG 1 Brook health in the estates

FIG 2 Top- Wooded bank of Kasteel Ruurlo without water in October. Bottom- Same wooded banks with water in December enhancing the visual quality of the composition

The absence of water in the Beek also affects the level of water in the moats around the Kasteel as depicted in the figure. In addition, a decaying brook is in stark contrast to the ecologically rich grounds the estates maintain.

Moreover, the Baakse Beek is also an important element that adds a sensorial quality to the landscape, through its reflective properties, the sound it produces when it flows through a weir, the ripples on the surface when it rains or its too windy. As seen in figures 2, the presence of water changes the visual qualities of the landscape and allows people to pause and appreciate the landscape composition. Moreover, the surface water intimately linked to the groundwater tables determines the vitality, seasonal changes and existence of the landscape and its elements, thereby also affecting the experience one has moving through the landscape.

Experiential Affordances

The estate landscape is comprised of an array of landscape elements such as different types of forests, meadows, grasslands, crop lands, avenues and windbreaks and the brook. These elements together compose the landscape into a composition of small-scale enclosures. With generations meticulously maintaining and caring for the estate grounds, these enclosures are unique in terms of the temporal and spatial experiences it affords, ordinary spaces that have the power to create narratives for those who are willing to stop, read and listen to the landscape. However, these enclosures either remain unknown to the people due to absence of routing or are demarcated as private estate land. Although the Achterhoek tourism along with the municipality of Bronchorst have been diligently promoting the landscape qualities of the estate region, the network of routes fail to give people the opportunity to appreciate the enclosures formed by the various cultural elements and their inherent spatial and atmospheric qualities as seen in figure 3.

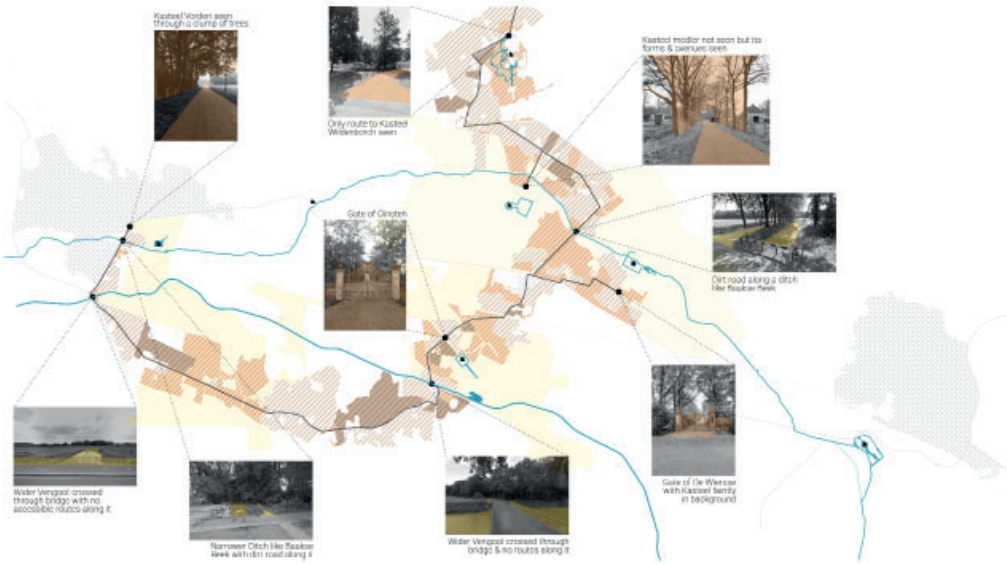
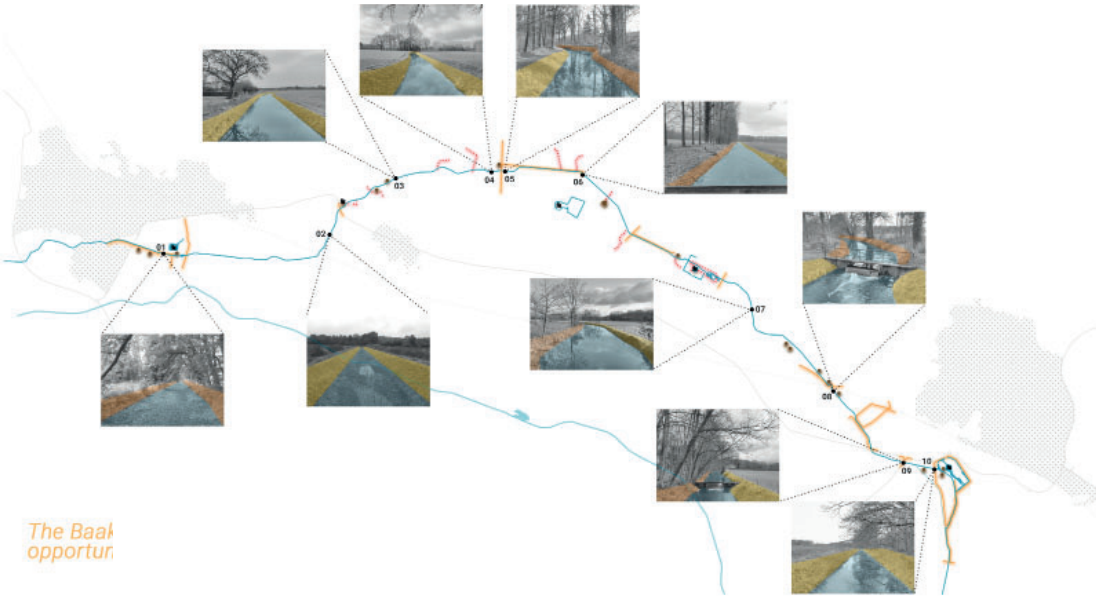


FIG 3 Map showing the Achtkastelen autoroute, the landscapes it goes through and the views it affords.

FIG 4 Map showing the absence of interaction opportunities with the Baakse Beek

The same is true for the Baakse Beek. Most of the Baakse Beek flows through private property with edges that do not inspire active interaction from the residents. But also, there exists very few public routes along it, with the bridges being the only point of interaction with it as seen in figure 4. The Baakse Beek, thus, does not afford the opportunity to engage with it and thereby form experiences.



Remeandering Brook

Not for storing water, but slow it down to recharge ground water and stop quick draining of brook

Helophyte Filters

Reed beeds to filter the high concentration of nutrients present in the brook.

Flow meadows

Not for storing water but soak large parts of meadows away from river edge & fertilise them

Retention Ponds

Works to store water for long time provided there is a clay layer to hold water on surface

Wet Forests

Ditches in the Rabattan Bos as water stores & wet forests with recharging ponds that prevent evaporation

Research Objective

Experiencing the landscape by fully immersing oneself in the setting is in itself an act of Heritage. As understood so far, the experience of the estate landscape's unique spaces and the Baakse Beek is subdued due to the absence of routes and opportunities to pause and read the landscape. Furthermore, the problematique of the Baakse Beek leads to technical solutions, divorced from the spatial and atmospheric experience of the estate. Thereby, the project hypothesis, is to interconnect the theme of water with the experiential dimension of the landscape, which exists within the estate's composition of small-scale enclosures By creating this overlap of themes, the people around the estates who are currently divorced from the estates will be able to form connections to it through individual place experiences in the various spaces in the landscape and witness how the brook system enhances these experiences and the overall vitality of the estate ecosystem. It is assumed that this renewed connection to the landscape would act as a stimulus to organise volunteer groups amongst rural people to help the estates in the future for its maintenance. Thus, the research objective of the graduation project is "To revitalise an estate landscape into a resilient and experiential carrier that reinforces regional Identity."

Design Elaboration

In order to experience and interact with the brook, it first has to be resilient to carry water. For this, a set of design strategies were chosen that would allow water to be retained in the landscape longer and allow for greater infiltration to the groundwater reservoir, as seen in figure 5. Owing to the brook's poor water quality of being rich in nutrients, helophyte filters is one of the strategies for intervening in the Beek. Its placement is such that the estate grounds of De Wiersse receives filtered water, essential for the rich ecological diversity that they maintain.

The next step was to understand the underlying layers of soil, groundwater and topographical conditions of the landscape in order to decide the optimal placement of the different strategies on a regional scale. It is important to realise at this point, that, the Baakse Beek forms an important link between the ecologically rich grounds of the estates, but does not exhibit any distinctly recognisable, ecological quality, in itself. Thus, an additional layer of intervention is made to the Baakse beek by changing the edge conditions. The current edges are designed to become more gradually sloping with minimal maintenance regime to allow the growth of a grass buffer strip along the Beek. This would become a green corridor along the beek, benefitting small animals, birds and insects. Figure 6 illustrates the redesigned water system of the Baakse Beek between the rural towns of Vorden and Ruurlo, along with the ecological qualities it adds to the landscape.

FIG 5 Strategies for brook restoration. While few strategies were chosen since they exhibit a naturally present condition such as meandering the brook and ponds with natural edges. Few of the strategies such as Wet forests and Flow meadows were traditionally present and have been made part of the strategies.

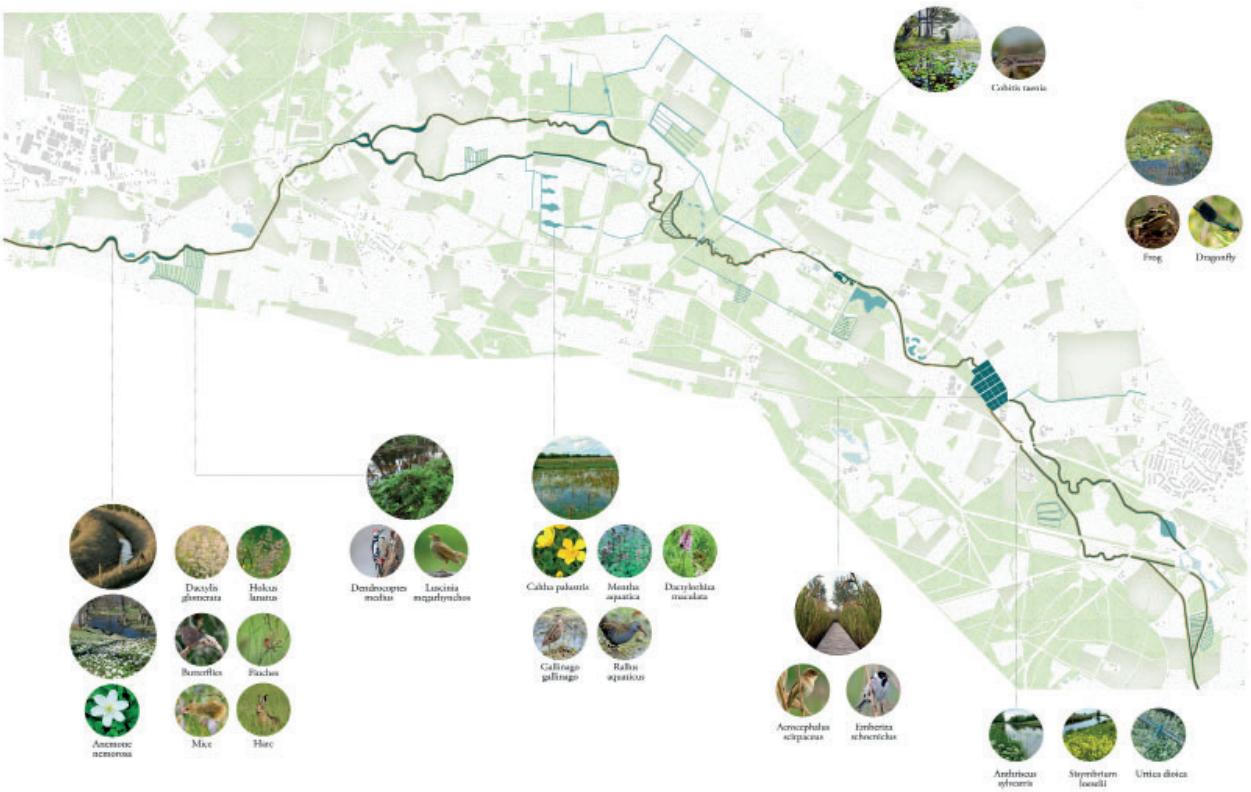


FIG 6 Regional sketch for Baakse Beek showing a brook that meanders more naturally through the landscape, along with spaces created for water infiltration. These spaces also become an ecological habitat, similar to the Baakse beek which is envisioned as an ecological carrier.

FIG 7.1 Impression showing the spatial implication of grass buffer strips along the gradually sloping edges of the Beek. It also highlights the ecological quality of the grass buffer strips and the Beek when it transforms into a flow meadow.

FIG 7.2 Impression showing the spatial implication of grass buffer strips along the gradually sloping edges of the Beek. It also highlights the elements of engagement such as bridges and decks designed at different locations along the Beek.

FIG 8 Ponds in the wet forests of De Wiersse and Het Medler exhibiting different sensorial and seasonal engagement with the water strategy of ponds.

FIG 9.1 Bridge that allows walking over the water. On one side, people can see the islands of trees closely, while on the other side, the pond surface is left open. During winter, mist hangs over the water's surface.

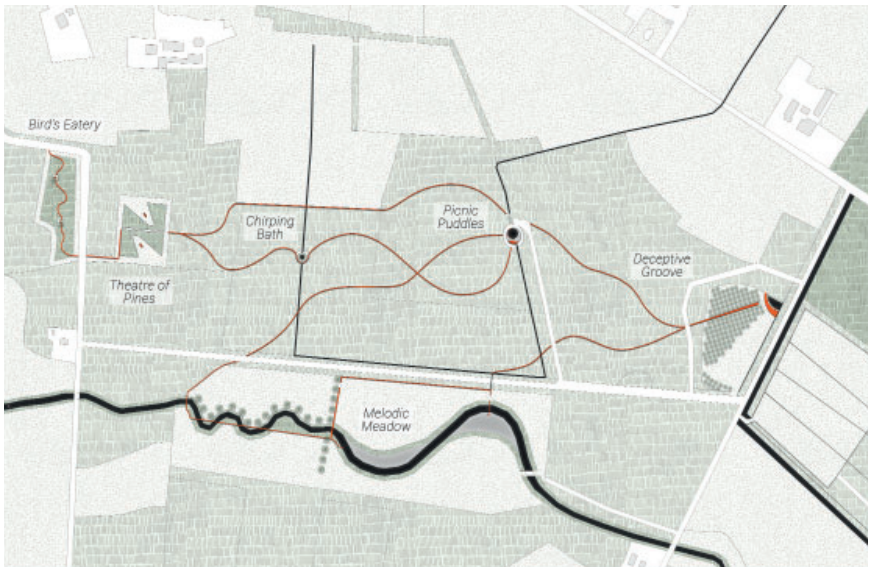
FIG 9.2 Bridges take people to the islands of the rabattenbossen. This allows people to see how water is stored within the forests and also the maintenance that goes into retaining these cultural forests.

The next step in the process of design elaboration consisted of articulating the water strategies to resonate with the speciality of its immediate surrounding and creating an immersive sensorial engagement that also took into consideration the seasonality of water on the estate. Based on the narratives from the walk along-interviews with the estate owner of De Wiersse and estate manager of Het Medler, it was realised that while De Wiersse welcomed visitors on their estate, Het Medler placed restrictions on visitations. This ideology was translated into the design of the ponds in the forests of the two estates. While in Het Medler, the ponds were elaborated to become a habitat for birds, with water becoming a separator between people and the islands of trees; in De Wiersse, the ponds were designed to engage with and contemplate. Water acts as an enclosing element in this case.

Even the seasonal experience of these ponds are varied. While in Het Medler, the water rises to submerge the islands, with only the trees standing out, in De Wiersse,the water surface becomes larger, submerging the shallower areas of grass, thereby becoming a larger enclosing element to the decks. Figure 8 illustrates the elaboration of the ponds on the two estates.

From the social narratives gathered from social media geotagging, it was realised that people value the experiences and moments along routes in the landscape, just as much as in spaces. Thus, the series of ponds in the forests of the two estates are connected with a meandering route that allowed different experiences each time one encounters these ponds. Figures 9 illustrate these moments with water in Het Medler.

FIG 10 Map showing the connection between the water strategies and the enclosures chosen for site reading and subsequent translation through design interventions. From the research approach of using narrative as a tool, it was realised that giving names to spaces transforms them from being an anonymous space into a situated place of experiences. Thus, each of the designed spaces have been given a name. The name narrates the qualities that one can experience upon visiting the curated space in the forests of Het Medler.



Routes were also designed to connect the enclosures to the different water strategies in the northern forests of the estate of Het Medler, as seen in figure 10. Similar strategies of water have been articulated to provide different experiences. For instance, the Picnic Puddle and the Chirping Bath are both water strategies of storing water in the form of ponds, but they have been elaborated to create different engagements based on the narratives collected through social media geo-tagging. As illustrated in figures 11, while the Picnic Puddle is designed to be a transitional space that filters water through reed beds and then collects it in ponds that become social spaces, the Chirping Bath consists of a pond where water from ditches collect and become a space for viewing birds, interacting with the water pond, deep within the forest. Further, the enclosures exhibit sensorial qualities, distinct from one another. These qualities were explored through narrative site reading and social media geo-tagging. The enclosures were then enhanced through design interventions to exhibit its most unique quality. Figures 12 illustrate the different experiences in each enclosure.

FIG 11.1 Water flows into a series of reed beds before flowing into a pair of ponds. While in the summertime, water is contained in the inner pond, accessed through a set of wooden steps, in the winter time, the water overflows into the larger pond, flanked by a wooden deck that allows people to gather by the water.

FIG 11.2 Water from the ditches collect into a pond that is designed with inclined edges that do not allow people to sit next to the water. Additionally, a layer of grass engulfs the pond, acting as a separator between the people and the water, thus giving the birds privacy. The pathway and the seating engulf the pond.

FIG 12.1 The enclosure of Deceptive Groove has been designed to become an apple orchard to maintain the estate's legacy of apple cultivation. The space allows people to observe the farming practices, as well as becomes an indicator of seasons through the blooming of the trees and the meadow beneath them.

FIG 12.2 The design for the Theatre of Pine enhances the observation of the theatrical effects that the pine trees create such as the filtering of sunlight and mist through the trees. It also incorporates the existing sunflower cultivation in the enclosure by making it an essential spatial element for exhibiting seasonality.

FIG 12.3 The enclosure of the Bird's Eatery transforms a space into a sea of sunflowers that would attract birds to come and feed with two tree pavillions offering different experiences with the sunflowers. (Left) One tree pavillion is made higher to view the entire field of sunflowers with bird feeder hanging from the tree to attract birds when the sunflowers are gone, while the other (Right) is made lower for the sunflowers to enclose it, into a garden room with bird feeders on the tree at eye level.

Conclusion

The project Curating Experiences show that by designing the water restoration strategies to exhibit sensorial qualities and tying it together with other unique spaces in the landscape, a coherent link between the Beek and the estate landscape can be created. The project portrays a way seeing the theme of water and the experiential dimension of the landscape as a whole and not as two divergent topics of practical and aesthetic interventions. The method of narrative readings of the site can be generalised to design landscape across the world by involving in the simple act of acknowledging the subtle atmospheres in a space through capturing them into temporal images and thereby experiment with designedly ways of sharing the same experience with a larger audience of the landscape. Another knowledge that the research has contributed is the possibility to weave together the functional aspects of farming in the design of spaces for engagements of non-farming residents and visitors to the landscape. The research sought to understand farming as a daily socio-cultural activity, just like the act of walking and camping, that needed to be incorporated into the revitalisation of the landscape, rather than discarding it. By doing so, it shows how not only the functional need of the beek was weaved into the experiential dimension of the landscape, but the act of farming became an element that created sensorial perceptions in the landscape.

PART 2 Design Research Experiments in Gelder's Arcadia

From the city, into the city, beyond the city

Li Qian

Supervisors:
Saskia de Wit
Taneha Bacchin

Introduction

The historical country estates in Arnhem city are not only heritages. They are the signs of urban colonization, the evidence of transformation of historical social rights, the witness of urbanization process and the manifestation of Arnhem's topographical features. However, new demands are required nowadays. The position of these country estates to the city are no longer clear enough for present and for future as well, which may cause the weakening of Arnhem's heritage culture identity. Therefore, new strategies for the country estates are needed.

By integrating with the current green, water and infrastructure network, these country estates have great potential to become a part of new city backbone. My design proposal is thus to re-organize the urban structure in order to support the urban culture, to recover the order of urban context and create a more resilience and coherence urban habitats network. It includes the large scale urban planning for the whole system, and the zoomed-in landscape designs for several important routes and spots.

The Sonsbeek area is a central node in the green structure of Arnhem, connecting the Veluwe in the north to the river landscape in the south. The design for this area focuses on the landscape and spatial perception of the estate landscape.

FIG. 1 The transformation of urban area,

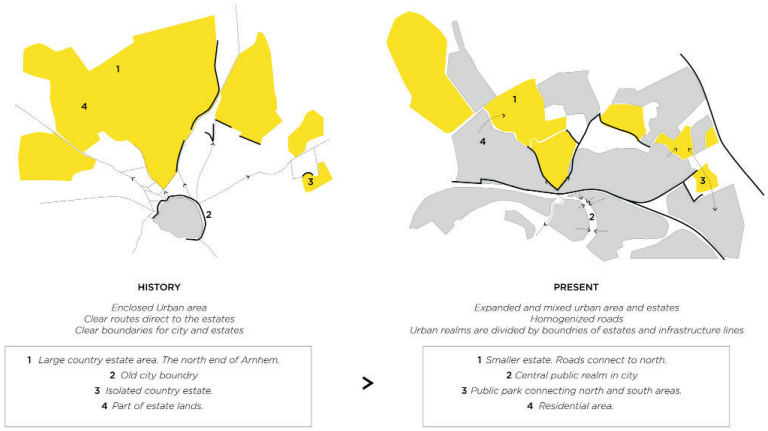


FIG. 2 Fragmented recreational destinations in Arnhem city

The infrastructure network, the country estates and the development of residential areas have together caused the fragmentation issue in Arnhem city. If we look at all the recreational areas in the city, they could be divided into several clusters. Yet the clusters mostly work as destinations without guidance of clear routes. There is nothing in between to connect them.

In the past time, when the historical country estates are still destinations out of the urban area, it is clear for people to go out of the city and find the avenues. Even people inside the city would notice there are something outside the city, because they are easily to enter the avenues.

However, in the current situation,the fragmented recreational areas are divided by dense urban fabric. Even the destinations are inside the city, it is hard for people to notice there are those destinations at the end of the roads. The fragmented recreational area also means the people living inside the city have less recreational areas then the people live near country estates. The historical country estates work as nice urban parks, but yet they only serve for residents surrounded.

Weakened identity, fragmentation and disconnection

With the expansion and development of Arnhem, the former agriculture land and the country yard were annexed by the city. It means that the historical country estates also became a part of the city, they are no longer locating in the 'country' anymore. The historical country estates were once far from the city are now all surrounded by the residential areas and the intrastation networks, showing a completely different situation from the past. The most obvious issue caused by this change is that the position of the historical country estates in the future city becomes ambiguous and uncertain. This uncertainty is also weakening the identity of historical country estates and the related culture. Such weakening not only exist on the routes of space experiencing, but also leads to the urban culture.

When we comparing the current urban structure with the historical urban structure, it is obvious that the relationship between the city and the historical country estate used to be quite clear. It is because they used to be located in the countryside and

FIG. 3 The disconnection of infrastructure and ecology

There is also disconnection issues in Arnhem city. The disconnection both happens on infrastructure networks and ecology perspective. First, the Arnhem government always want to enhance the connection between Arnhem city area with the north Veluwe area. They want to make a route easier for people walk or cycle from Arnhem to Veluwe. However, there is no such a nice cycle and pedestrian friendly route existing. At the north side of Zpendaal, the road is designed to serve for vehicles instead of cycling. Although people can still be riding bike, the landscape experience lacks coherence and variety.

Sonbeek, Zypendaal and Warns born used to be connected, and provide a nice landscape at the north Arnhem city in the history. But now they are separated. The landscape patch is also divided by the dwelling constructions and infrastructure.

Also, the disconnection between Veluwe and Arnhem also existing on ecology perspective. The habitats in Veluwe zoon continues to the south, end in Zypendaal, Sonbeek and Klarenbeek area. There are only few green spaces in Arnhem city could be seen as habitats. Therefore, the habitats are divided by the Arnhem city between Veluwe and the river plain. From the previous analysis, I also noticed that, although there are quite a lot of greens in the city area, but most of them are only simple lawns which are not only lacking of ecological values but also lacking of recreational values. From the map, we could find that the Sonsbeek area just locates on a greate location which could contribute a lot on connecting Veluwe to Arnhem and the river plain from multiple layer.

FIG. 4, 5, 6 The weakened spatial perception nearby the historical country estates

reach these Arcadian landscapes by crossing the countryside landscape. However, although they still try to maintain the 'anti-urban' landscape in the past, they are no longer located in the place that has same landscape quality as they have. Ironically, even if they are now located in the urban area, some of them still looks like locates at the city boundary because of the fragmentation caused by the infrastructure networks. The only different is the spatial perception of today's city boundary is so different from the nature scenery in the past. As destinations, they still keep the same landscape quality in the history. But it makes them become more strange, weakened and abrupt because of the change of the experience on the routes.

As with the position of the historical country estates, the decision of the city government on them is also blurred. Therefore, new design strategies from all scales are required. What role would the historical country estates play in future Arnhem's urban space and urban culture? This is an urgent issue and also the most important issue I am trying to solve.

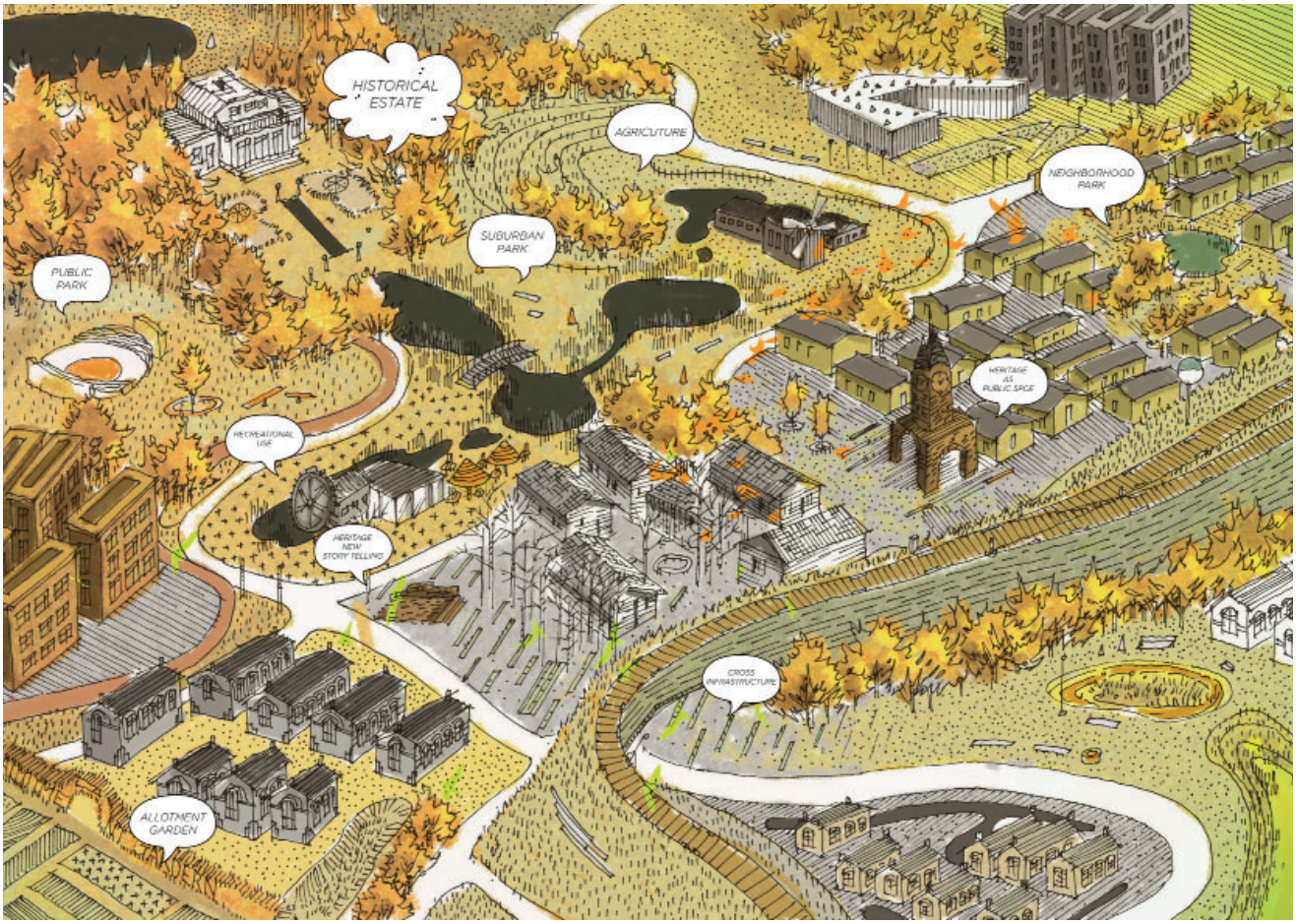


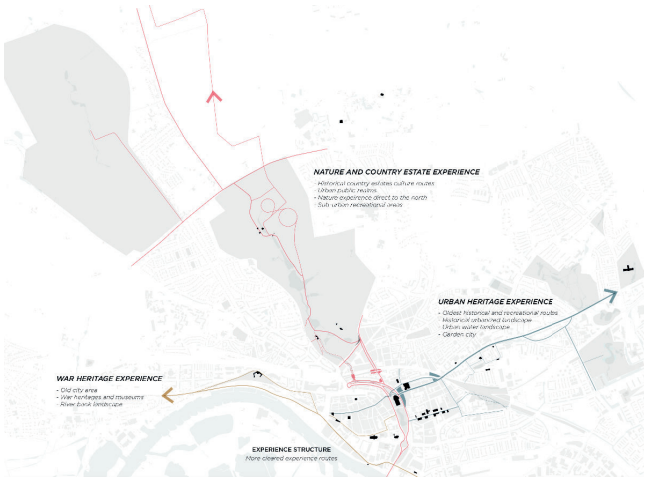
FIG. 7 The secario of Arnhem future: the historical country estates are well integrated with the cit as a part of the green structure

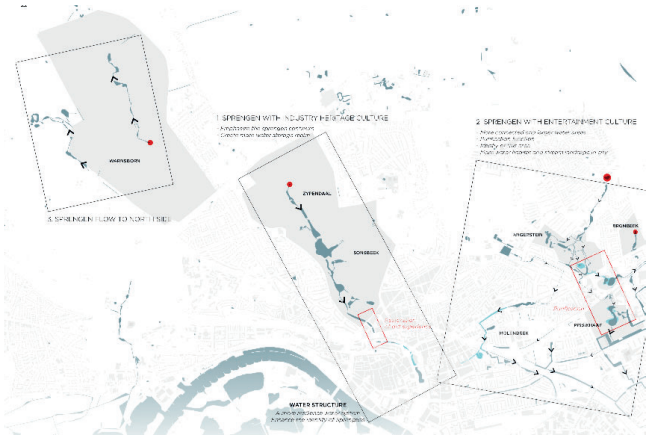
Estate As Building Blocks For A New Green Structure

The main concept is to re-organize the urban structure, to recover the order of urban context and rebuild the city culture by forming a new urban green structure based on the existing urban components. The historical country estates play important roles in this structure because of the linking on different layers. This new urban structure could solve the fragmentation and disconnection issues in Arnhem by having a more resilience and coherence ecology network.

The master plan present the urban planning intention. The current Arnhem road structure was kept, restored and enhanced in the new plan. Based on it, a stronger connection on both south-north direction and west-east direction are built by adding more public spaces, linked routes and new views. Also, more habitats and water are implemented based on the existing urban greens and water system.

Together it does not only form a more coherent habitat network, but also new landscape experiences and entertainments in the city. The whole structure is linking to the city from three layers: the water system, the ecology habitat network and the recreational network.





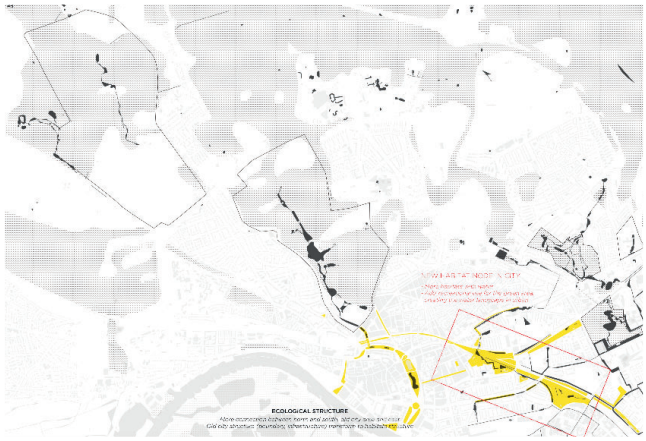


FIG. 8 Urban plan: A new green structure in Arnhem city

FIG. 9 The recreational structure in the new planning: offering clearier urban recreational experience routes

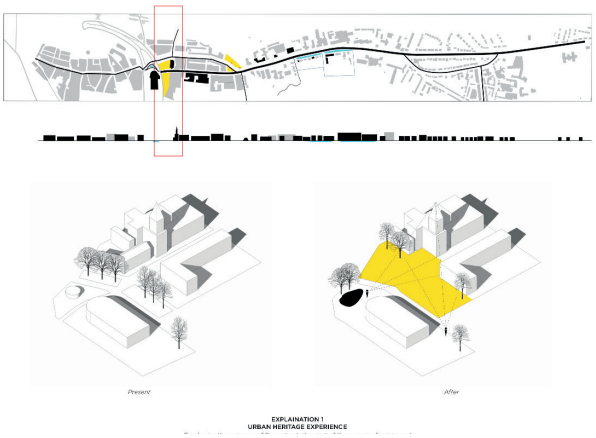
FIG. 10 The new structure provides a more resilience water system combing with the sprengens

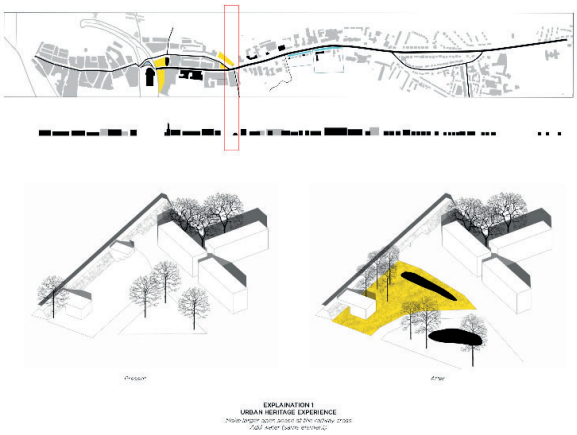
FIG. 11 The new structure provides a coherent habitat network connecting the south river plain with the north Veluwe zone

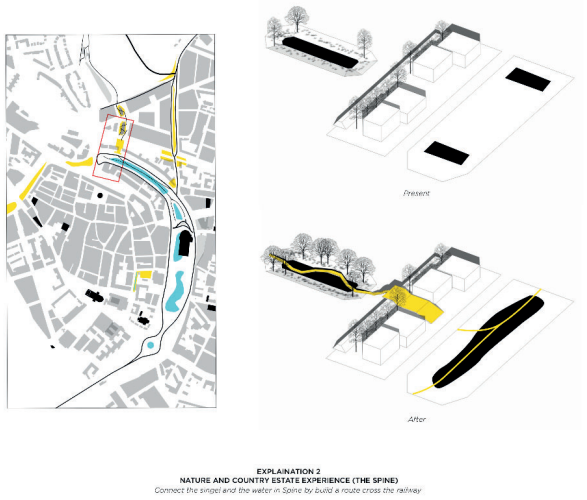
The country estates are all, more or less, become a part of these links.

The current water system is overly dependent on the Angerenstein spregen. It makes the whole water system become vulnerable. Therefore, I expand the water area in Angerenstein park and Presikhaaf park, transform the underground water flow to wider and larger surface watercourse, which connect the water system near the infrastructures. This action is for increasing the water storage capacity and create more water habitats and waterfront parks. The Angereinstein water system, thus become an eco-friendly system and become able to entertain the residents surrounded. The Presikhaaf park area would also have water purification function for the system, because this is where the most surface water flows into the underground water system. For the Sonsbeek sprengen, I restore the water for recovering the old sprengen connection. Therefore, the presence of sprengen culture could be enhanced in the city area.

From the ecological perspective, a new and large habitat node is formed by the new urban design strategy.







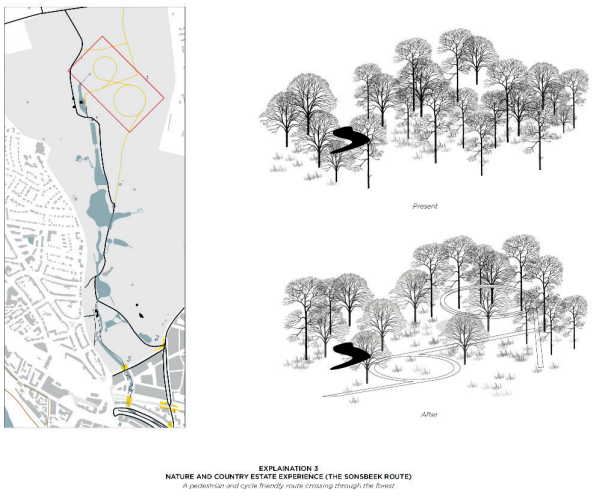
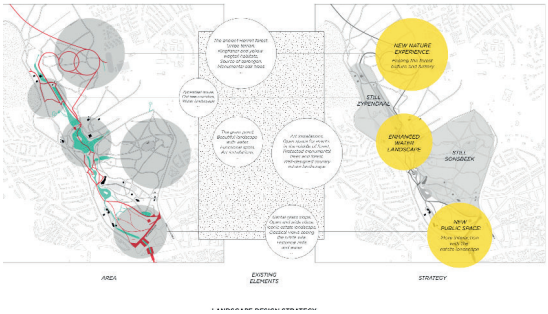


FIG.12, 13, 14 The space design strategies for important points in the new planning

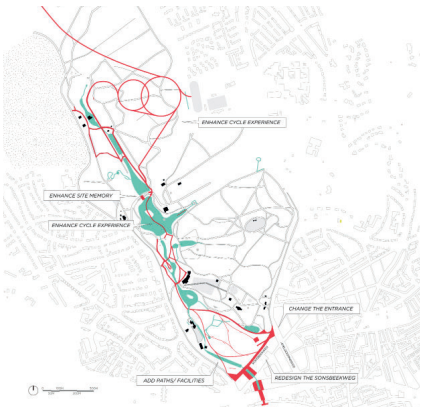
Adding more water and plantations near the railway node would improve the ecology and recreation value for the existing green areas. The rail way node, which used to divide the communities in the past times, has now become a big green space surrounded by neighborhoods. In the area between old city area and Presikhaaf area, a new city landscape related to water and waterfront-green will be built. It would not only connect the urban habitat network, but also improve the living quality for the residents nearby.

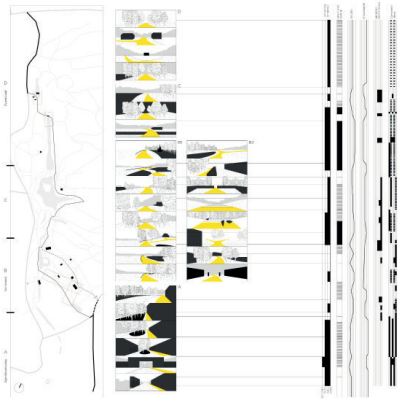
From the recreational perspective, the new structure brings a clearer urban context experience structure. The recreational structure could be divided into three themes. Each theme does not only have one single route, but are consist by multiple roads, spaces, routes and spots. The red color shows the historical country estate and nature experience. It is my design focus in the project, because it forms the most important recreational link between Arnhem and Veluwe. The route is composed of the 'urban spine' area and the new route I designed in Sonsbeek area, from which people could have more interaction with the historical country estate when they riding to north.

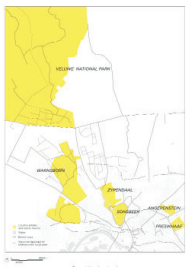



history


future








PRESENT
The country estate as an isolated whole


FUTURE
Add public gradient area
Keep the most typical estate experience
Create coherence and connection at the end

FIG.15 Sonsbeek landscape design strategy

FIG.16 Senario for Sonsbeek future: inviting people into the landscape

FIG.17 The new plan for Sonsbeek zone,

FIG.18 Different roles the water plays among the route

FIG.19 Using Harplin's score to help analysis the experience in Sonsbeek and Zypendaal route

FIG.20 The new route is well connected with the current bicycle network

FIG.21 The new route provides the possibbility for cycling people to enter the Sonsbeek landscape instead of passing it from outside

FIG.22 The material of landscape elements mostly referenced from the current Sonsbeek landscape: reflection from the water and metal, wood from the fence and forest, the white color from the white villa and art installations

Landscape Design For Sonsbeek Zone

In the Sonsbeek area, I divided the route into five parts according to the characteristics of the existing site, in order to create a drama effective. It includes the original Sonsbeek house and Zypendaal house areas, and the 3 new design parts which I called 'the Sonsbeek Trilogy'. They are located at the south of Sonsbeek,

the middle grand Pond and the north Zypendal forest. In the south, by removing the fences and creating a new public square, a transition is created between the urban area and the estates, inviting people to enter the estate landscape.

At the middle part, I designed a new path across the water to keep the coherence route towards north. In the Hermit Forest at the north, I built new bicycle high way and new forest experience to enrich the story of the site.

Arcadia Again

Mengchi Wei

Supervisors:
Eric Luiten
Hielkje Zijlstra

Introduction

My project is about the cluster of estates around the city of Arnhem and the surrounding areas. The main topic of this area is tourism and recreational co-use.

The area bears a unique geomorphological feature in the whole country, that is the huge mountain area on the north side of the river Ijssel. In the past, kings and nobles and other elites contributed a lot to build their own estates in this region. With all this beautiful creations in this area, in 1820, the writer Isaac Anne Nijho described the Biljoen and Beekhuizen as Gelders Arcadië in his book, because of the beautiful estate layout with woody hills and streams, which made him feel the place was far beyond any other in the realm.[1] This feeling matches perfectly to the imagination of the mysterious place 'Arcadia' in the myth.

However, most of the private owners sold out their estates, the territory of the estates shrunk or split apart because of financial problems. Most of estates became owned by foundations or companies. At the same time, the cities grew from the river plain towards the hill. The bigger cities required more public green space. Consequently, the historical estates have a lot of potential to benefit the public and to help the urban landscape develop in a more sustainable way. However, the situation of the estates bears a lot of problems and potentials, and we landscape architects can do a lot to improve their qualities.

Based on all the knowledge and information I mentioned above, I did some advanced analysis on the specific aspects which I esteemed relevant or crucial to my project, trying to find out exactly which problems and potentials lie in the site.

In the first mapping I overlapped the topographic map with the elevation map.(fig. 1.1) Then I concluded the feature of the location of estates based on the mapping and produced another drawing.(fig. 1.2)The mappings show the positions of different elements, and show clearly the typical location of the estates, which is at a ribbon area on hillside. The hillside has a very unique landscape condition, having nature at the back and the urban down in the sight, it has a good view and relatively easy access to both nature and urban areas. That's the main reason why they tended to build their estates on the hillside and I regard it as an important fundamental aspect that I can work on in my project.

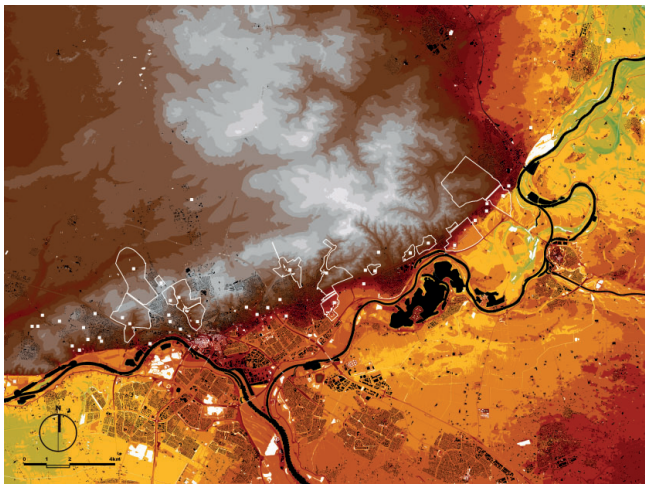


FIG 1 Elevation map with estates and urban area (basic maps from the map room of TU Delft library, and Provincie Gelderland (n.d.)[2])

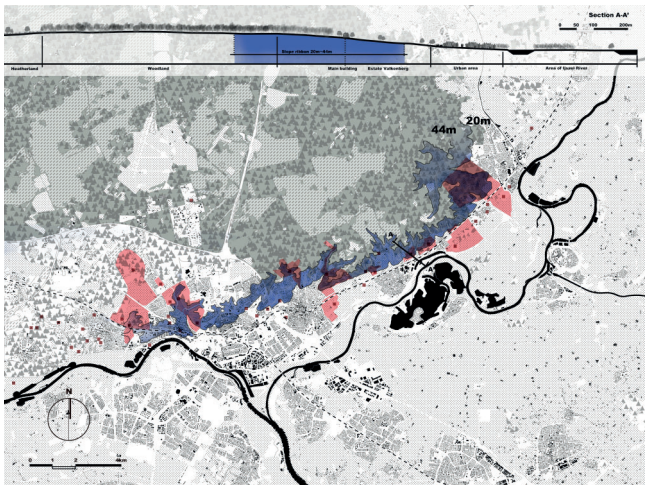
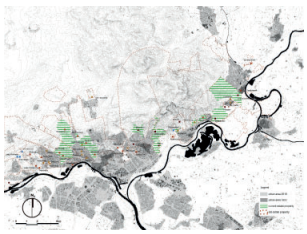
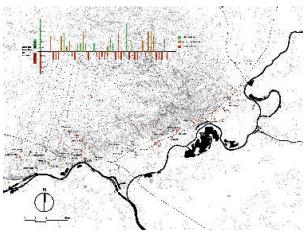
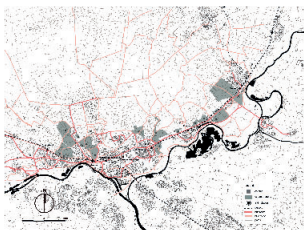


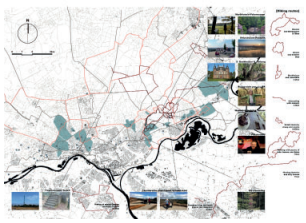
FIG 2 Mapping and section of the ribbon area where the estates are located(,based on basic maps from the map room of TU Delft library, and Provincie Gelderland (n.d.)[2])

In fig. 3-6, I analyzed the site in different aspects. Through analysisI have acquired a better understanding of the existing situation and discovered many problems and potentials that I can work on, especially on the open-private condition and transportation aspects.









FROM LEFT TO RIGHT

FIG. 3 Existing situation with old boundaries

FIG. 4 Current functions of the estates

FIG. 5 Existing transportation map

FIG. 6 Existing hiking and cycling routes

(based on basic maps from the map room of TU Delft librar, and Provincie Gelderland (n.d.)[2], and Gelders Genootschap (GG. 2016. P.25, 35, 47, 51)[1] , Breng (n.d.)[3], Natuurmonumenten (n.d.)[4]

Objective

Those problems and potentials have driven me to question that what I can do as a landscape architect to revitalize the cluster of historical estates. According to this thought, I developed my objective for the project, that is, 'to make the rich heritage landscape value visible, accessible and open for experience to the public and fit in the contemporary context.' To achieve this final goal, I want to use the immaterial concept of 'Arcadia' to hold the cluster of estates around Arnhem and Veluwezoom together, to promote the estates to the public and stimulate people to visit and experience the rich beauty of the area. In this scenario, the estates could gain more credit from the public, that leads to more income for the owners, which in turn can support the maintenance and improvement of the historical sites.

Method

Paul Meurs' book 'Heritage-based Design'[5] provided the necessary theoretical foundation for the project. In the book the author talks about the trends in heritage

related designs. He explains that the heritage values not only lie in architecture, but also in a larger scale like landscape and urban structure. The heritage should also face to the present and to the public. Besides, heritage revitalization projects should concern both development and conservation, and get all the relevant parties involved in the projects, and make the heritage sites interact with its context. What's more, Meurs also demonstrates the values of immaterial aspects of heritage. Just like the fame of Arcadia in my project, I regard it as an important feature of the site that could hold things together.

FIG. 7 Paul Meurs's Heritage-based design[5]

With the support of these theoretical foundations, I finetuned the final goal of this project, that I should redesign the area as the Arcadia for the contemporary context, where breath-taking estates and beautiful nature landscape make the nature and culture come together, where the privately-owned estates show their historical values to the public, and where the set-up of the landscape makes visitors feel they are in a secret and beautiful 'Arcadia'.

Based on the theoretical foundation and analysis, I realized I want to use the cluster of estates as a ribbon and connection, to reorganize the elements to offer the public an ensemble for recreation where people can easily experience the historical monuments and nature reserve. To organize the elements under the concept of 'Arcadia', my main approach is to create a new route as a backbone of the all elements, which should mainly follow one contour line. Based on the route, plantings are reorganized, the road network is reconfigured, the layout of estates is rethought etc. in order to establish a coherent interaction between the different elements and establish multiple access to the new 'Arcadia'.

Principles

To establish my design principles, I firstly divided my project into three different scales, which is the regional scale, the areal scale and the estate scale, as shown below. Different scales show different levels of design and they together form the whole project.

In the regional scale, the most important thing is deciding which contour line the route should follow. I studied the ribbon area and decided to use the 36m contour line. (fig. 4.1) because it smoothly connects the estates and can express the concept of Arcadia the best.

As for the areal scale, I would also like to create the whole 'Arcadia' in this level, with elaborately redesigned paths, and a series of facilities to support the route, in unified layout of the benches, the information boards, the guide signs etc., as well as information centers, the resting points, the viewing points and the access to the estates from the route. Fig. 2.3 is my tool box of how to work with contour lines when organizing the paths.

The last part is the estate scale, in this scale I focused on three estates in the area in more detail, that are Beekhuizen, Rhederoord and Hof te Dieren.

In this scale, firstly, I would analyze them for sorting out the elements with historical and aesthetic values, such as the buildings, the gardens or the structure of the cultivated landscape. Those elements are the ones that I would not touch or change. For the rest of the estates, I would try to reorganize them to fit more in the system I create with the backbone route. I would redesign the paths and boundaries based on the contour lines, and create physical and visual connection between the route and the estates. In addition, I would also dig into some interesting elements that may be lost now and I want to revitalize. Besides, I may also add or rebuild something like buildings and landscape elements that are coherent with the existing heritage context.

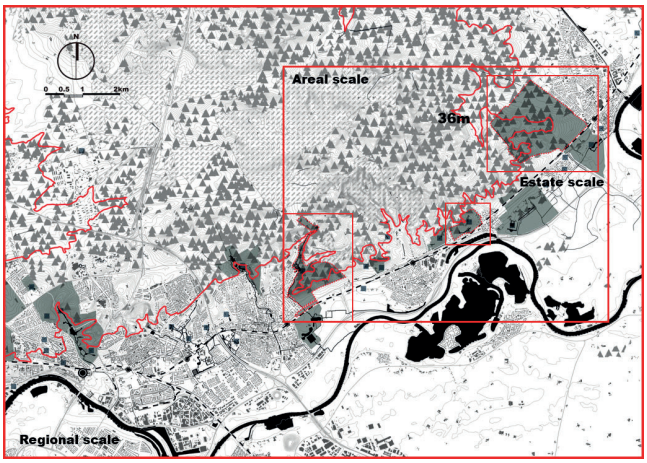


FIG. 8 The location of three scales

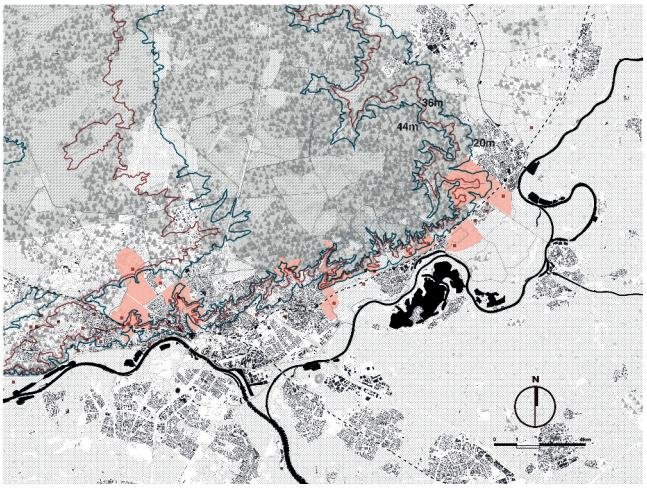
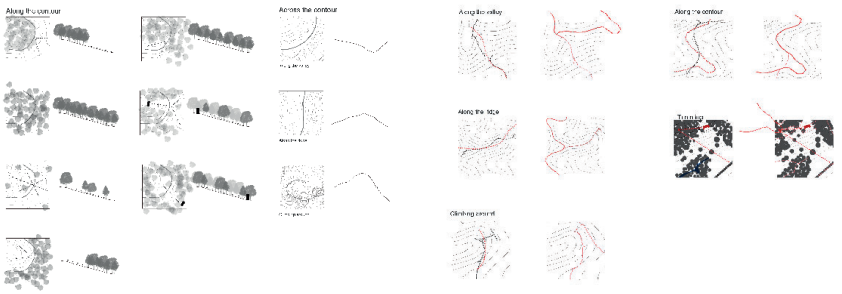


FIG. 9 The choice of the contour line



From left to right

FIG. 10 Tool box of path dealing with contour lines.

FIG. 11 Tool box of how to reorganize the paths and trimming of the planting in the estates.

Results

The resulting design also consist of three part according to the design principles, divided by the three scales.

Regional scale

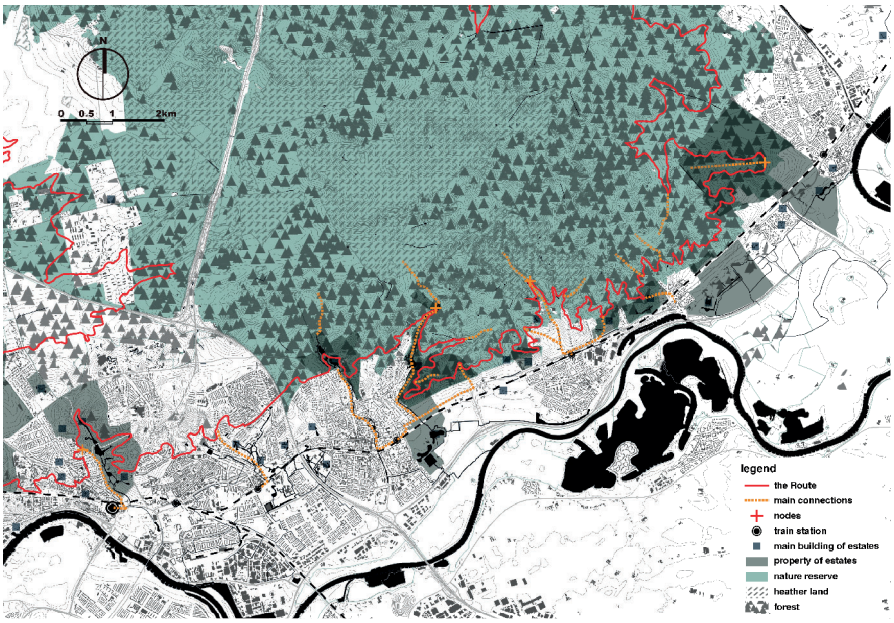


FIG. 12 Masterplan of the whole route with main accesses

In the regional scale, the design shows in a masterplan. (fig. 12) In this scale, I mainly indicate the position of the route and how its fits in a larger scale context, with the main connection between the cities and the route and the natural area, and stretching out. This masterplan mainly provides conceptual guidelines.

Areal scale

In this scale I would build the main structure of 'Arcadia'. The route that connects the estates will strictly follow the 36m contour line. In the whole area, I would like to offer the visitors a series of experiences which will remind them of the feeling of Arcadia. (fig. 14) The whole experience will be supported by a series of unified infrastructure throughout the whole area.

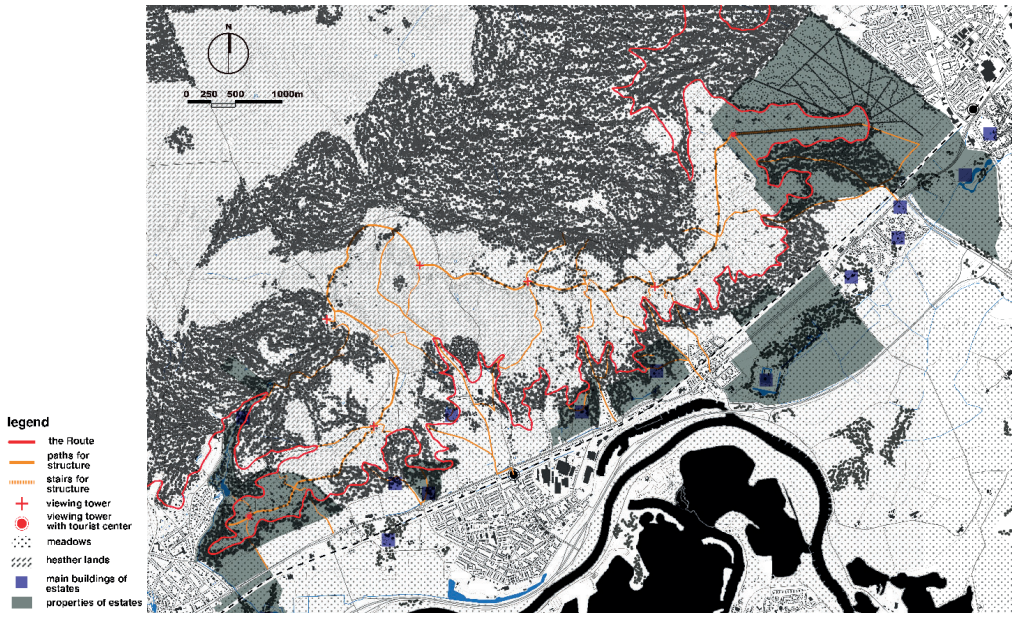
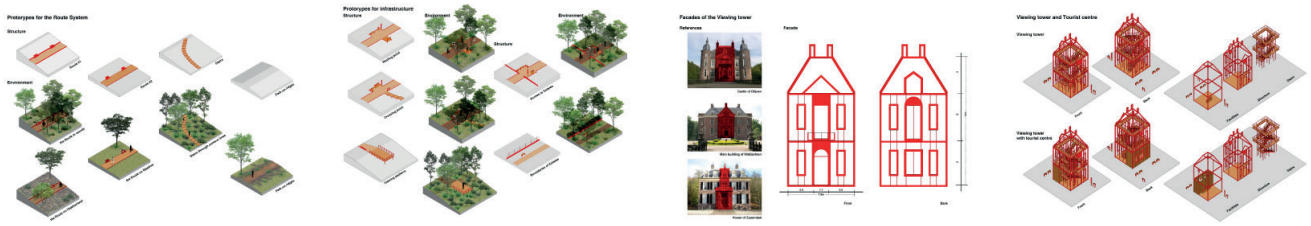


FIG. 13 Masterplan of the area.



From left to right

FIG. 14 Prototypes of the Route system

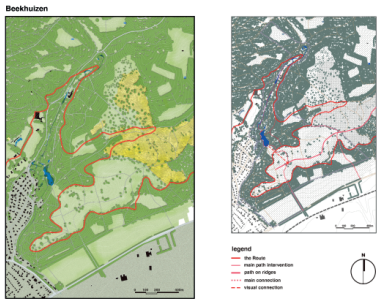
FIG. 15 Prototypes of infrastructure

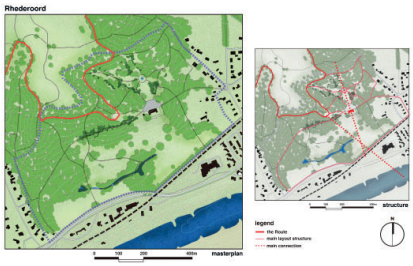
FIG. 16 Facades of the new buildings and pictures of inspiration.

FIG.17 Models of watchtower and tourist centre

Estate scale

In this scale, as I mentioned before, I mainly worked on three estates. After analysis, I studied their features and existing situation. After that I redesigned the estates based on their historical values and existing geomorphological situation, trying to express their unique heritage values as much as possible and make them interact well with the whole routine system in the larger scale context. The results are shown in the drawings.





From left to right

FIG. 18 Masterplan of Beekhuizen and highlighted main intervention

FIG. 19 Masterplan of Rhederoord and highlighted main intervention.

FIG. 20 Masterplan of Hof te Dieren and highlighted main intervention

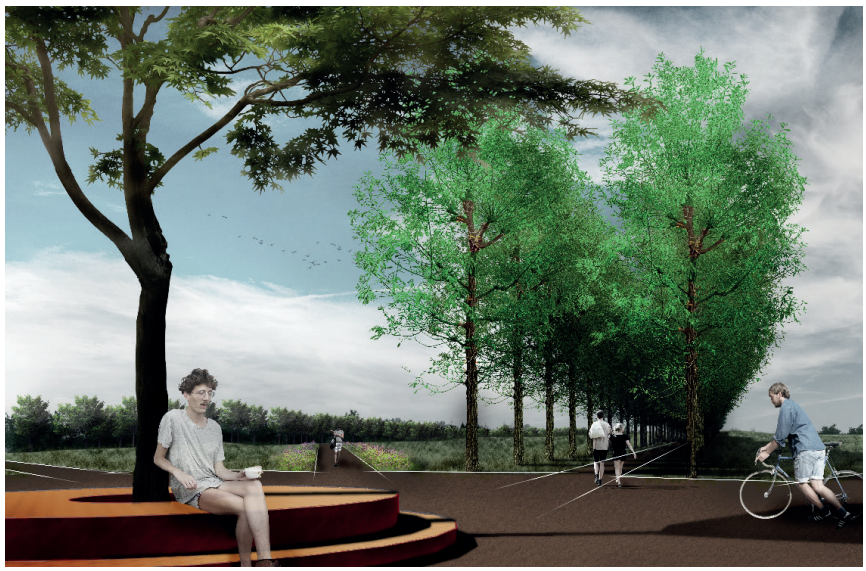


FIG. 21 Perspective drawing from Carolina Berg

Conclusion

With the introduction of a backbone route that follows the 36m contour line in the area, I have created a whole system which connects the estates on the hillside, and hold them together under the concept of 'Arcadia' and promote them to the public. The effects are also supported by the improvement of the entire path network and reorganization of the planting, as well as the introduction of unified infrastructure throughout the whole area. These combined interventions can help people find easier access to the estates and strengthen the feeling of Arcadia, which can let people enjoy the historical and natural values in the area better. Besides, the route can also stretch out to reach further in the whole region. After building up the structure of Arcadia, more interventions should also be done to revitalize the estates and reveal their historical values to the public as much as possible. In addition, more values of the route can also be discovered, to make it more colorful, with multiple experience, making shortcuts etc.

Bibliography

[1]. Gelders Genootschap en Poelmans Reesink Landschapsarchitecten (2016) Gelders Arcadië. Karakteristieken en ambities. Arnhem, Renkum, Rheden, Rozendaal, Wageningen. Arnhem: Gelders Genootschap.

[2]. Provincie Gelderland. (n.d.). Cultuurhistorie. Retrieved May 4, 2020, from https://gelderland.maps.arcgis.com

[3]. Breng. (n.d.). lijnennetkaarten en lijnfolders. Retrieved May 4, 2020, from https://www.breng.nl

[4]. Natuurmonumenten. (n.d.). Natuurgebied – Nationaal park Veluwezoom. Retrieved May 4, 2020, from https://www.natuurmonumenten.nl

[5]. Meurs, P. (2016). Heritage-based design. Delft, Netherlands: TU Delft – Heritage & Architecture.

Betweenness

Tangible & Intangible boundaries for formulating an estate landscape in Gelders Arcadie

Yuyu Peng

Supervisors:
Saskia de Wit
Marc Schoonderbeek

Introduction

Understanding the spatial environment relies on understanding its relationships. The sociologist Georg Simmel pointed out this paradoxical relation in his 1909 essay 'The Bridge and the Door'. Indeed, we can only connect things that we perceive as separate, which is my understanding about boundary in spatial environment. The paradoxes and conflict of boundaries rooted in the research of thesis. The target context – the estate landscape will reflect the paradoxical relation.

The estates ensembles which were owned by privileged class, belong to the 'power landscape', mysterious and inaccessible for ordinary people. And they usually have strong defensive features and boundaries system to declare their private territory.

The Gerlders Acadie (Veluwezoom, Netherlands), characterized by the relief of ice-pushed ridges, was popular among the Dutch elite from the Middle Ages onwards. Therefore, this area left huge amounts of estates territory with heritage transformation issue.

This area is facing land fragmentation and disconnected ecology corridor by hard boundaries composed of grey infrastructure. And the urban sprawl has caused the vanishing of estate landscape, of which has formed the urban-rural fringe. Moreover, the estates territory is like one isolated island fenced by boundary. The design site is one ensemble of two estates (Mariendaal-Rosande) and their separation and connection will work on the urban and regional scale.

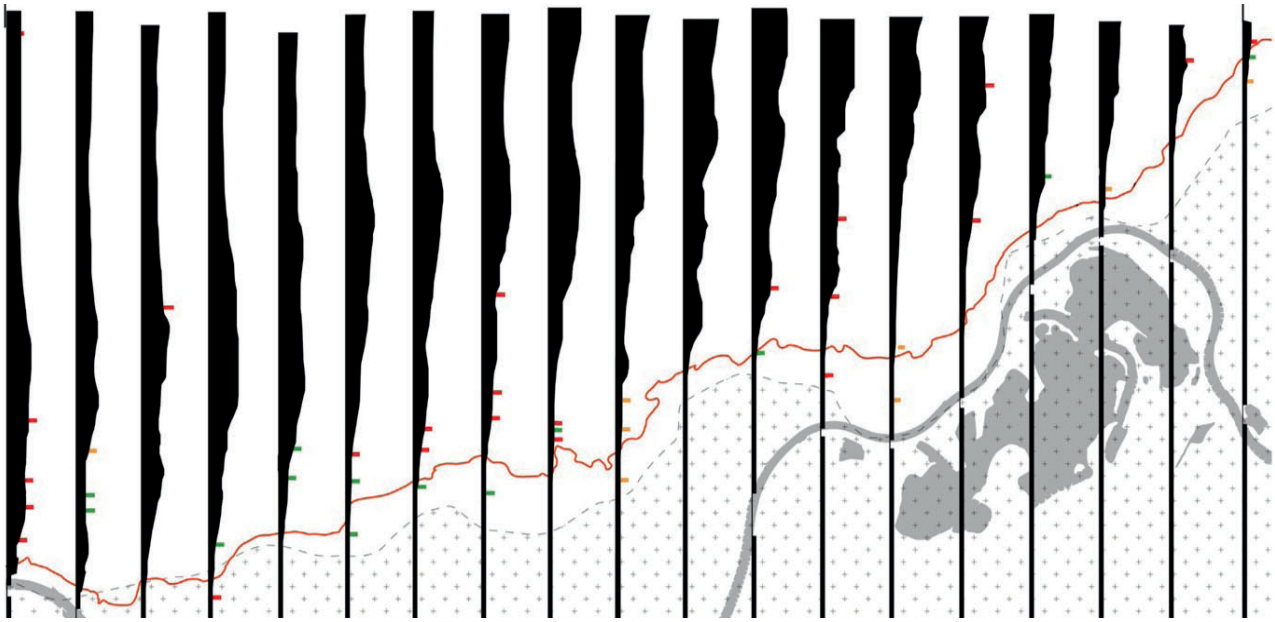


FIG. 1 Mapping

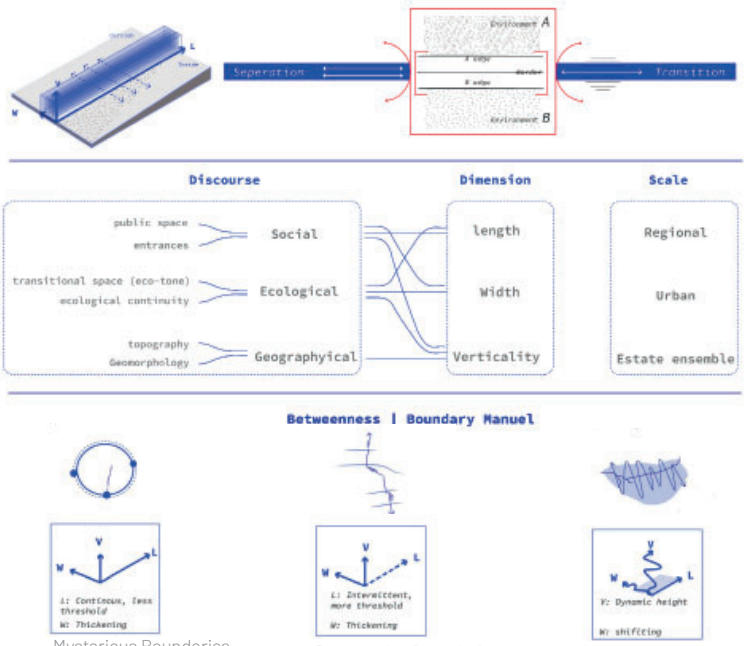
The revitalization of estates landscape relies on the redefining of these boundaries. The transition and separation are understood as the inner concept of boundary. The function of separation will ensure the uniqueness of estate landscape and the transition will mediate the tension of land fragmentation which is also one common issue of Europe urbanization process.

This thesis research the role of boundary, embodying physical tangible form and social and mental intangible meaning, by exploring the site through layers and scales, in the context of revitalizing the heritage landscape.

Boundary Manuel

The boundary Manual seek to translate the influences of social, ecology and context to spatial language. These perspectives gave new insight of understanding of boundaries and spatial definition of boundaries – the length, the width and the verticality. I will try to use this boundary Manuel to work on multi-scales.

The continuous gradient landscape could be enhanced by reconnecting the Slipbeek. While the outside environment of the three zone is diverse, and boundaries are differential, the spatial quality of Slipbeek is differential from hide, half open and open. So the design of boundaries on the hand will emphasize the continuous of Slipbeek, on the other hand the boundaries will be characterized into three themes.



Mysterious Boundaries | Permeables Boundaries | Shifting Boundaries

FIG. 2 Boundary Manuel

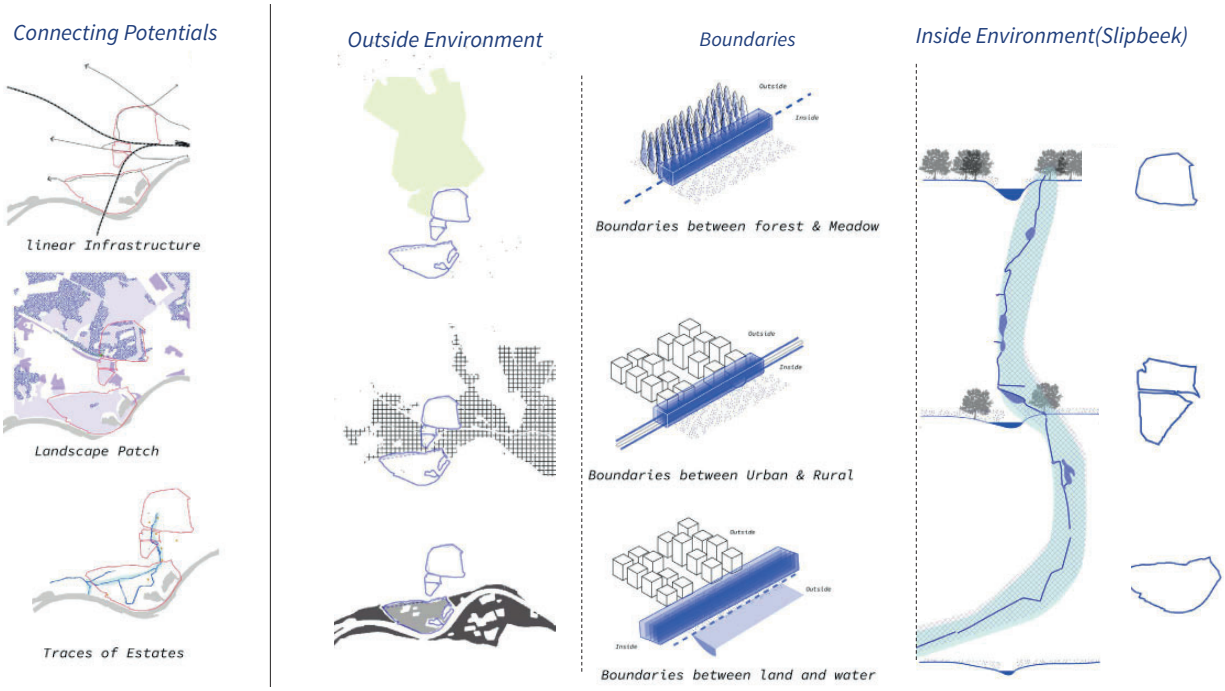


FIG. 3 Characterized Boundaries

PART1 Mysterious Boundaries

The mysterious boundaries means the design intervention on the outer boundaries of Mariendaal to form a forming a more clear-cut impression of power landscape.And it could help to decrease the recreation impact on estates and create a newly protective visiting way.

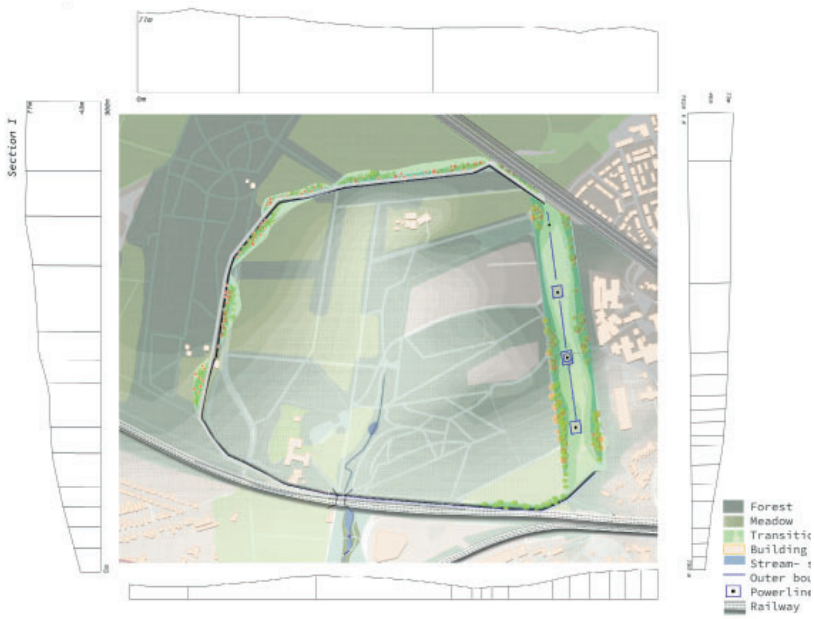


FIG. 4 Plan of Mysterious Boundaries

FIG. 5 Perspective of elevated passage which is in a continuous forest environment, and it don't have clear border to separate the estate landscape with the surrounding. In the sense, designing an elevated route for people to go through this area and also working as clear border.

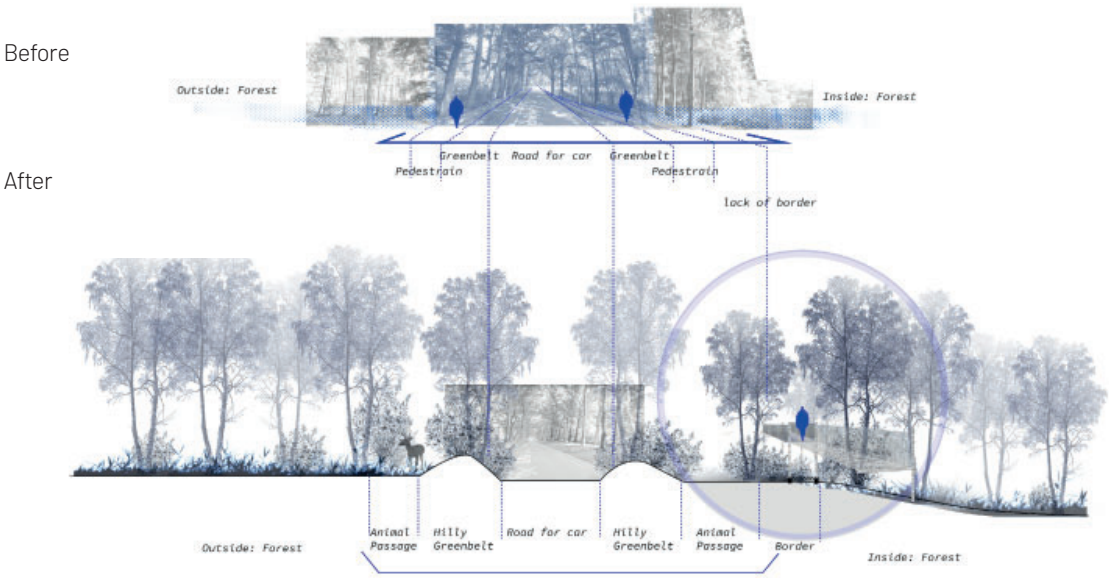


FIG. 6 Sections of before and after situation

In the north Mariendaal, the minimal design intervention is working on the outer boundaries of the highly preserved estate landscape. In other words, the design is trying to put the inside heritage landscape in a seemingly detached condition. However, it doesn't mean the complete separation between heritage landscape with urban environment. The design is trying to build a symbolic boundary impression on the 'sub-site' while it also embodies the landscape gradient on site crossing the boundaries.

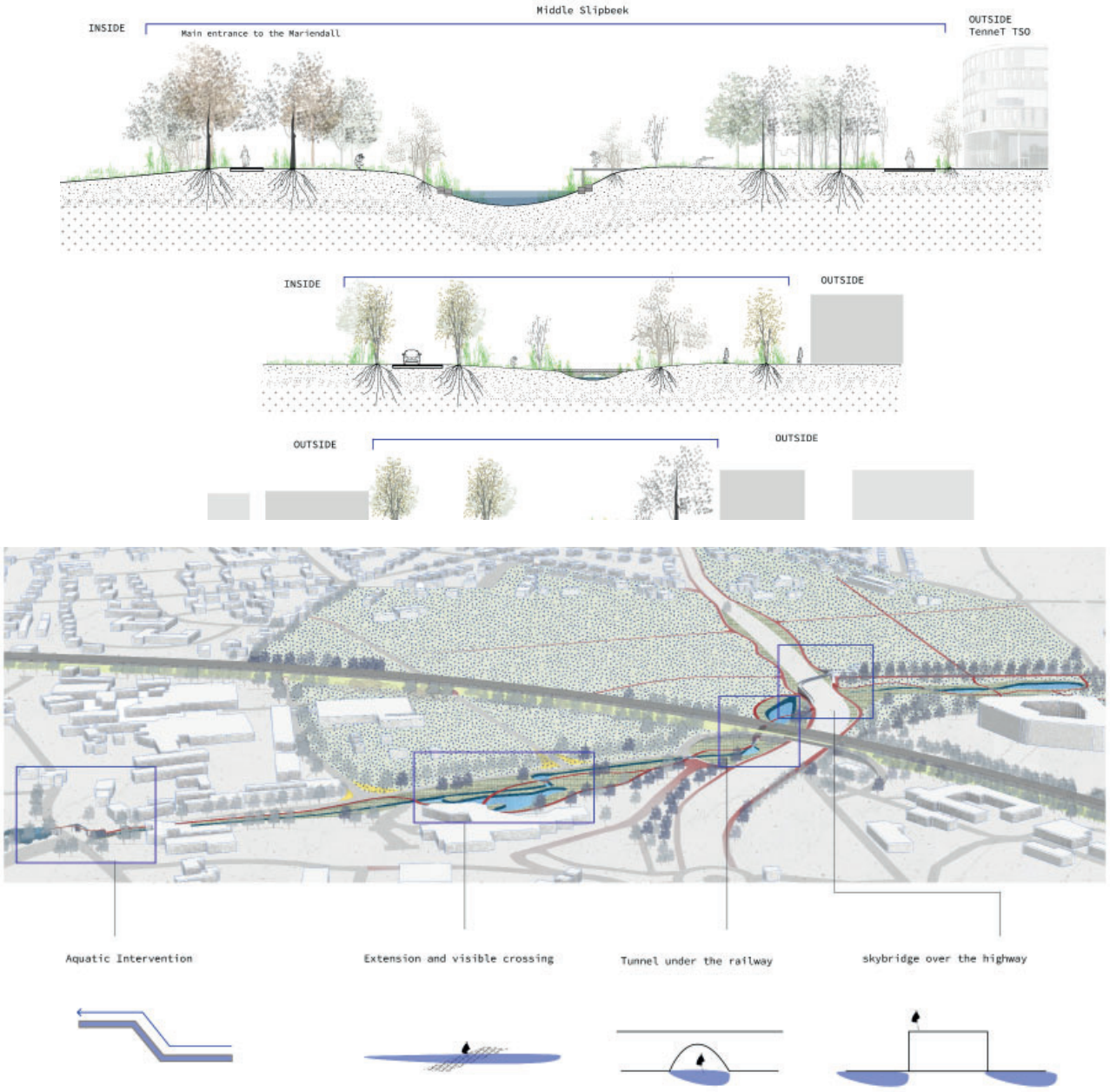


FIG. 7 Landscape section , bird views with important design intervention

PART2 Permeable Boundaries

In the outer Mariendaal, Permeable boundaries. The main idea is to utilize stream as new boundary to reconnecting the inland open field to urban environment. Bring the stream to the greater green system, incorporating with public life. The middle stream of Slipbeek will break the existing boundaries barriers between estate landscape and nearby urban environment. The original plain production landscape will be reactivated with new people's movements. This left-over heritage territory between Oosterbeek and Arnhem is turning into a transitional urban void, bringing breathe for the intense life.

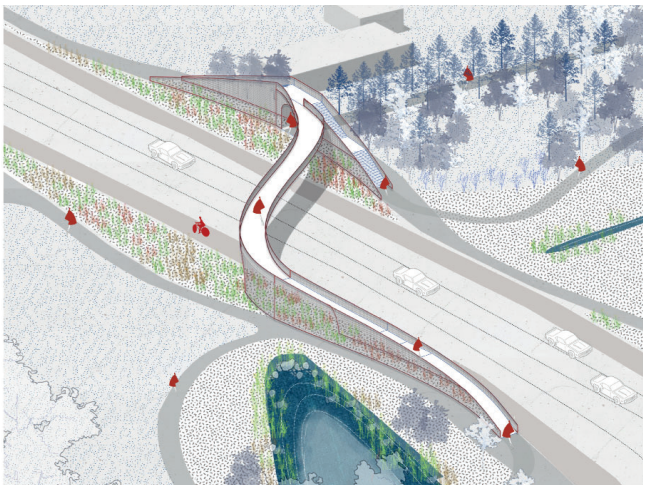


FIG. 8 Birdview of Design Intervention: Skybridge

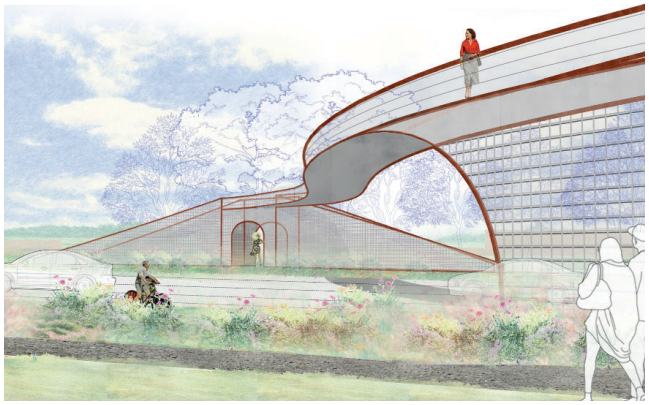


FIG. 9 Perspective of Design Intervention: Skybridge

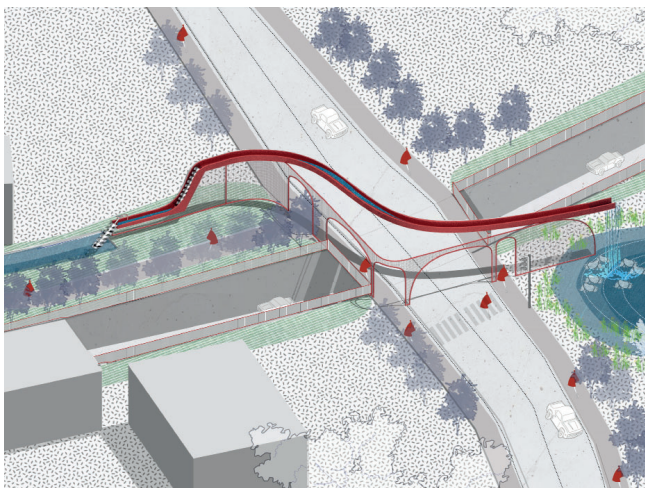


FIG. 10 Birdview of Design Intervention: Aquatic Fountain

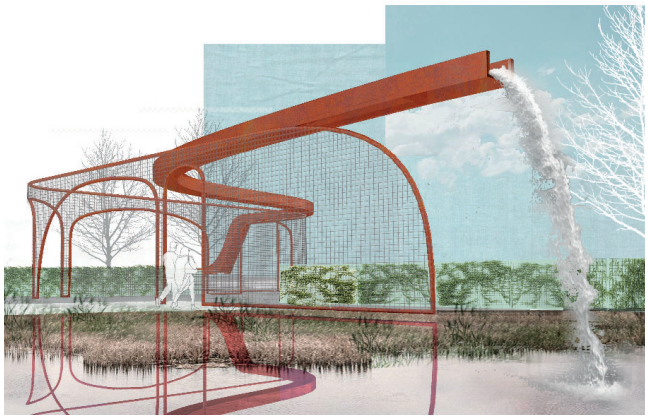


FIG. 11 Birdview of Design Intervention: Aquatic Fountain

The design intervention along the Slipbeek changed the junction way, instead hiding the water underground, while using the vertical weaving, either people on the crossing bridge, in the tunnel, or water is pumped up. The relation between water and people will be more integrated. Thus forming a more visible water boundary.

The skybirdge will change the movements from disconnected to more coherent. The exiting parallel fast-passing transportation will be replaced with clearly divided space. While the Aquatic fountain bring the sensorial experience along the boundaries. The boundary is intangible here, with sound of falling water. boundaries.

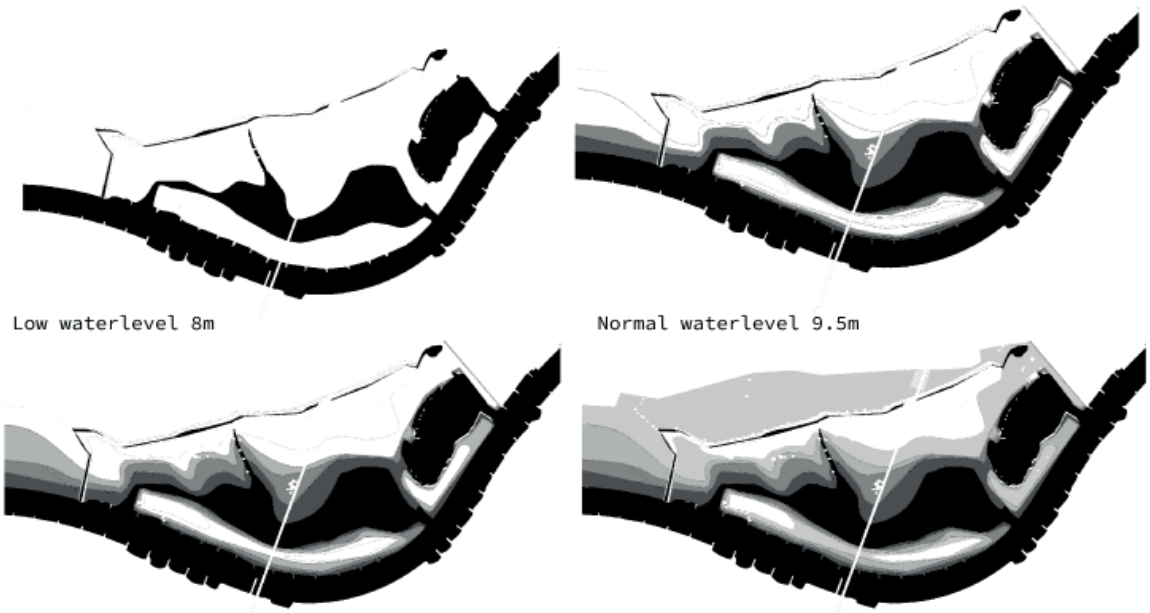


FIG. 13 Plan of Shifting Boundaries

FIG. 14 Design with temporali

PART3 Shifting Boundaries

Echoing to the building with nature and room for the river, the boundary of Rosande estate could be shifting, dynamic formed by nature process, experiencing high tide, low tide, erosion and wind. People, not only as witness but also involver in the process, long time existed ago. Just like ice glacial carved the current landform, the energy of water could carve the boundary. And the power of pushed land also reflected on the boundary formation.

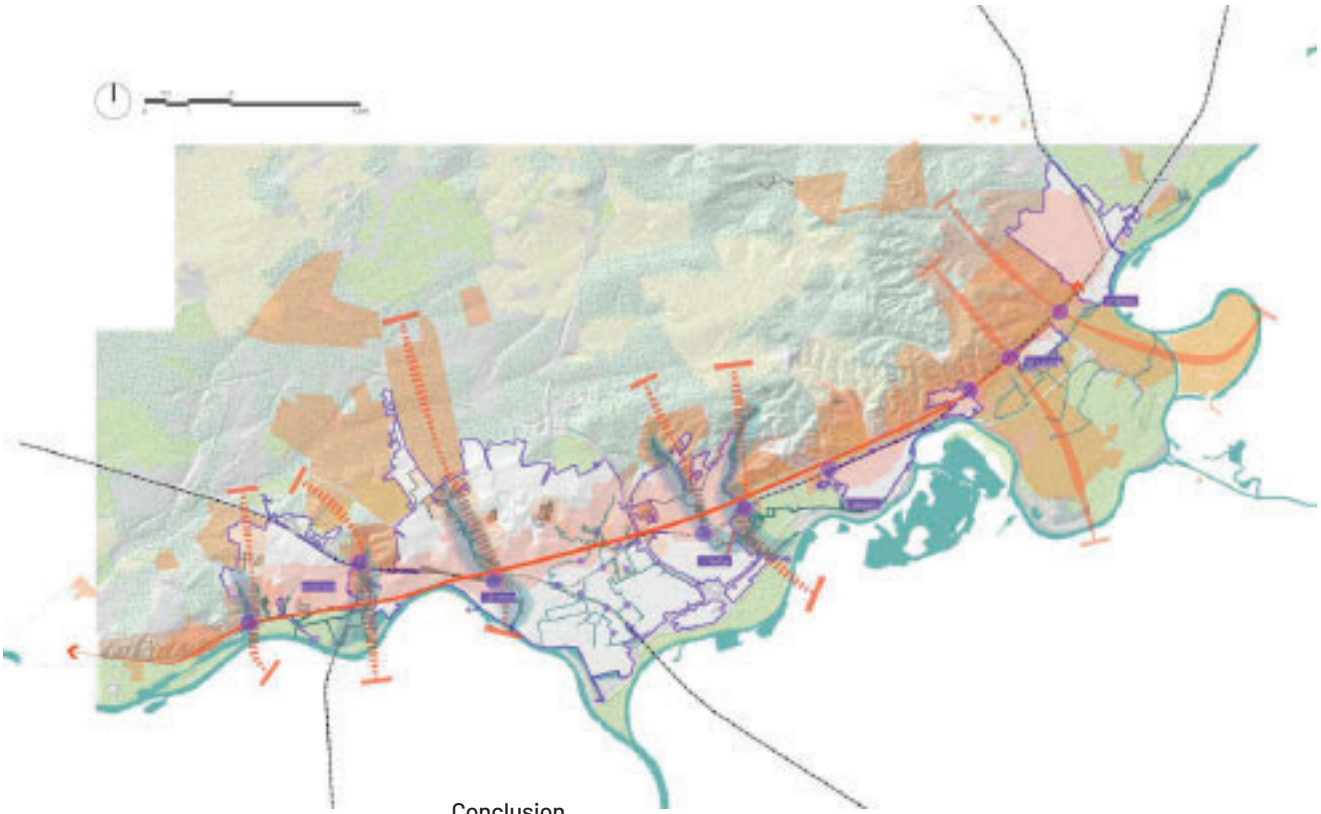


FIG. 15 Regional Reflection

Conclusion

What is unique about the thesis is it breaks up the stereotype of static, linear boundary form. Instead, the project integrates the spatial, ecological and social features of boundary understanding. Moreover, the boundaries are varied from linear elements to whole territories, from detailed to abstract. The understanding of topography boundary, relational boundary, and outer and inner boundary illustrates the potential of boundary thinking. The subtle intervention will help people to experience the differential spatial environments. The estate ensemble will work as an urban-rural fringe in some sense.

Through the design, the nearly invisible topography boundary, which is understood as a hidden landscape in regional scale will be become more recognized.The influence of the hidden topography boundary will be more obvious after the transformation of estates ensemble along the line. The design part varies from mysterious boundary to permeable boundary and shifting boundary, which shows different inner & outer relations. This boundary approaches could be applied into similar relations. For example, the permeable boundary will be suitable for the environment between estates landscape and urban environment. And the mysterious boundary will be more fit for the estates landscape away from urban environment.

All in all, the difference of boundary approaches will adjust to the changeable relations. Testing the boundaries approaches on the Gelders Arcadia, forms a more explicit impression of the estate landscape.

From Isolation to Integration

Transforming three estates into an urban landscape

Zhaotun Chen

Supervisors:
Eric Luiten
Lidy Meijers

Introduction

Located between Arnhem and Velp, this project covers three estates, namely Bronbeek, Daalhuizen and Larenstein, which are situated in the transition area from the Veluwe to the IJssel River.The spatial problem statement is elaborated from two angles: the regional urban scale and the local estates cluster scale.

Looking at the large urban scale, although it is at the edge of two cities, the main landuse in this area is residential housing. There is an obvious unbalanced distribution of social and cultural facilities in the neighbourhood scale, which are mainly grouped in the Arnhem center and partly in Velp. It means less facilities are are within immediate reach of the local neighbours. In addition, the high-quality green open spaces are not enough accessible for the neighbours in this area. Except the problems of unbalanced distribution of urban and landscape facilities, the grey urban infrastructures also poses some serious problems. The highway, the railway track and other urban infrastructures are separating the area into pieces of fragmented space. Apart from the highway isolating the area, it also causes other more general environmental problems, like noise and air pollution, negative spaces underneath the highway which is dark and unsafe, broken ecosystems between Veluwe National Park and the IJssel river.

Looking into the small scale, the cluster of three estates, Bronbeek, Daalhuizen and Larenstein. During their development and urbanization process, they gradually became separated from the urban context and now show less connection with the surrounding environment. Moreover, their territory was cut off by the highway. On the other hand, they lack effective and sufficient social, cultural and green services for the public. These two are the common problems of the three estates. More precisely about each estate, in Bronbeek, the mixed flow of pedestrians and vehicles and mixed use of the mansion are inconvenient. Daalhuizen has a large forest but it is almost completely fenced off and lacks accessibility. There is also a lack of programmatic facilities for the neighbourhood as the estate sits in the group of residential houses. Larenstein has the significant value of ecological forest harboring some rare species.. However, it is also limited by infrastructure and not really integrated with the estate.

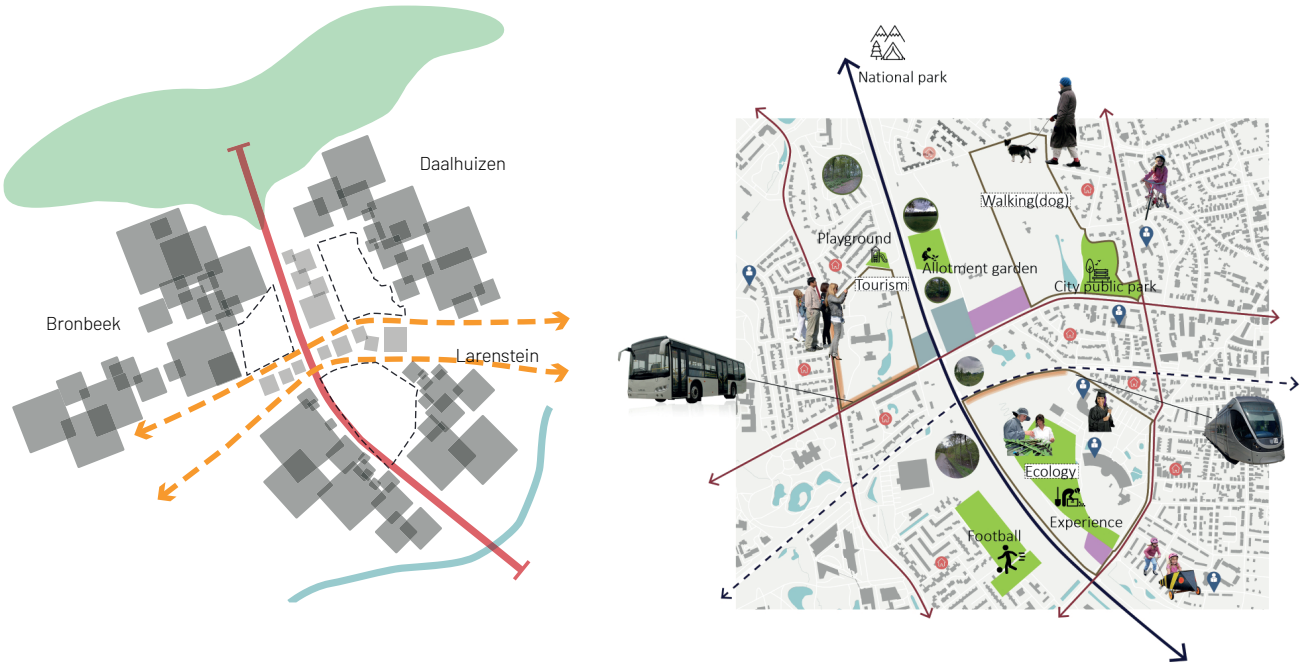


FIG.1 -2 The current situation of the estate cluster

Except the problems (weaknesses) above of the area, it has a significant strength, that is easy public transportation. On the other hand, some weaknesses are the potential opportunities. For instance, the lack of social and cultural facilities means that more could be added in this area.

The diagram on the next page shows the current situation of the estate cluster, including the insert whitespace between interface and (border), its surrounding neighbourhood, the users, the traffic condition, etc.

Objectives

Based on the problem statement in two scales, the objectives are proposed on the large urban scale and small estate scale as well. On the estate scale, our goal is that the fragmented spaces in between are supposed to be reconnected. The missing connection between the estates and urban context are going to be restored. New landscape facilities and new functions are added for the public. For the large scale, the main objective is to repair the ecostructure which is damaged by the highway.

On the other hand, the approach to solve the problems due to the highway is to form green public space sequences and buffer zones along the highway, which are definitely beneficial for the neighbours.

Method

The diagram above right explains the research framework that has been used during the whole project.By analyzing the site context, problems are defined. On the other hand, some historic issues could be realized by reading some literatues.

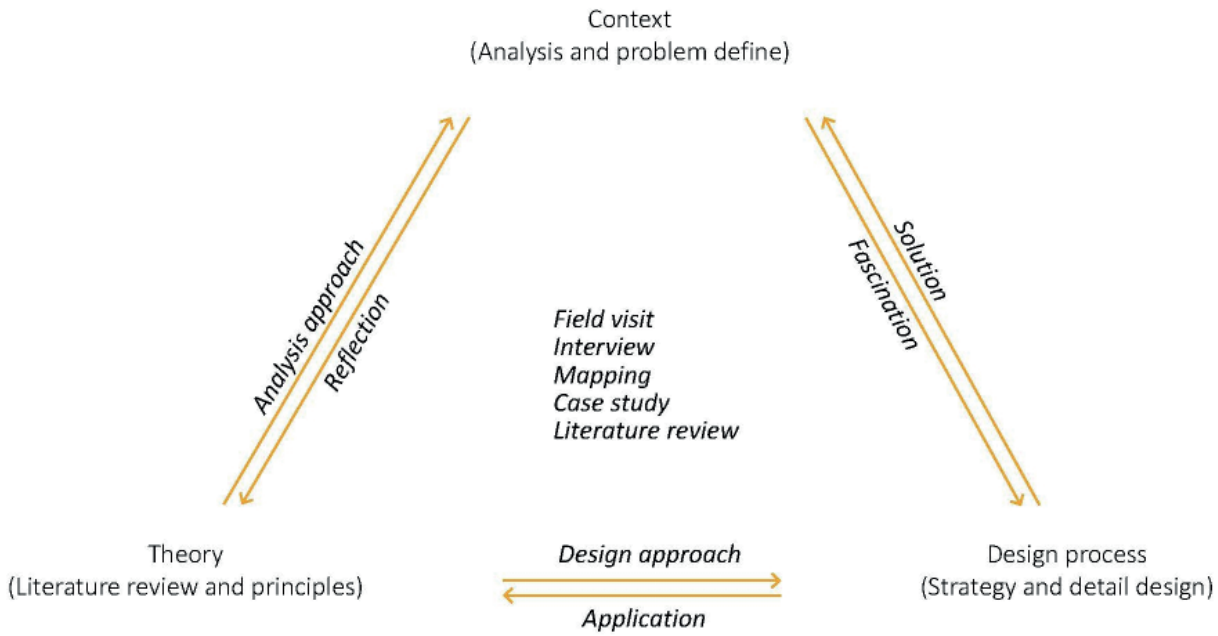


FIG.3 Research method framework

Theory also provides analytical approaches that were applied in the pre-analysis and general principles which will be used in the future design. Design experiments consist of strategies and more precise detailed design, which actually reflect the design principles which I have learned from other cases. On the other hand, design works also is the process of finding the most proper solution to solve the problems which were stated at the beginning. The other way round, the site context fascinated/inspired me to look for the possibilities. Besides context, theory and design experiment, field trip, interviews with local residents, case studies and mapping etc are also the research methods that I applied.

Relevance

It is known to all that there are lots of estates in Gelderland. However, with time going by, the surrounding environment of the estates has changed and new challenges are occuring especially related to the urban pressure. After the period of rapid urban expansion, the estates are threatened by the heavy influence of of this urbanization process which caused territorial separation, functional isolation etc. Under this condition, transformation of the estates is required to adapt to the surrounding urban environment. Therefore, research on urban estates and how to transform them has a significant value nowadays.

On the other hand, my research estates are basically three types of functional estates, Bronbeek as a museum, part of Daalhuizen as a public park, Larenstein as a campus, which are completely different compared to the private dwelling they were before. The research on previous transformation reasons, process and how they are working now indicates the exploration and potentials of various types of estates, which will be more coherent with the urban context.

FIG.4 Bronbeek, Daalhuizen and Larenstein

Principles

According to the scales, the principles are also elaborated in two aspects, from the large urban scale to the small estate scale.

Large urban scale, highway as the ecological corridor

FIG.5 Highway proposal

In the large urban scale, the main principle is focused on the highway. A12 highway goes through Veluwe national park, IJssel river and its floodplain, which have a rich resource of biotopes and siginificant ecological value. Therefore, it has a large potential to connect these two ecosystems as an ecological green corridor. Then how can the corridor be constructed? Further analysis has shown that there are various green spaces along the highway, including utilized spaces like garden, park and football field, but also some waste spaces with high potential to reuse. Some of these green space will be kept as buffer zone. Therefore, the practical way to introduce the highway corridor is to link these green spots along the highway. This green sequence is beneficial for not only the living creature but also neighbourhood, which creates more outdoor activity spaces and reduce the noise pollution from the highway.

Middle local scale, estate cluster as natural-cultural complex

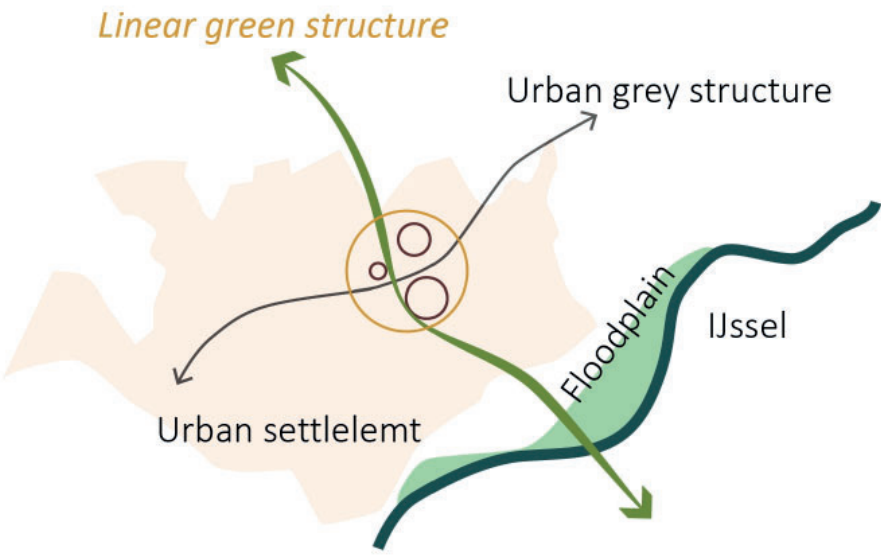


FIG.6 Overall proposal of this area

The estates have their own identities as mentioned before, Bronbeek as a museum and elderly home, Daalhuizen as a city public park, Larenstein as a school. They have a strong historical and cultural significance within the urban settlement. And on the other hand, they are located on both sides of the highway which created the opportunity to develop a linear landscape structure. To summarize, the estates are at the intersection of the newly developed green structure and the urban settlements. Based on this condition, we have proposed three estates cluster should be redeveloped as a natural-cultural complex.

For fragmented space which were separated by the urban grey infrastructure, they will be relinked by the water system that went through the area in the previous time. For the lack of connection with the urban context, the links will be restored. These visual connections from outside the neighbourhood to inside the estates will be more accessible and with less hard fence. To provide additional value for the public, new landscape facilities and extra functions will be added.

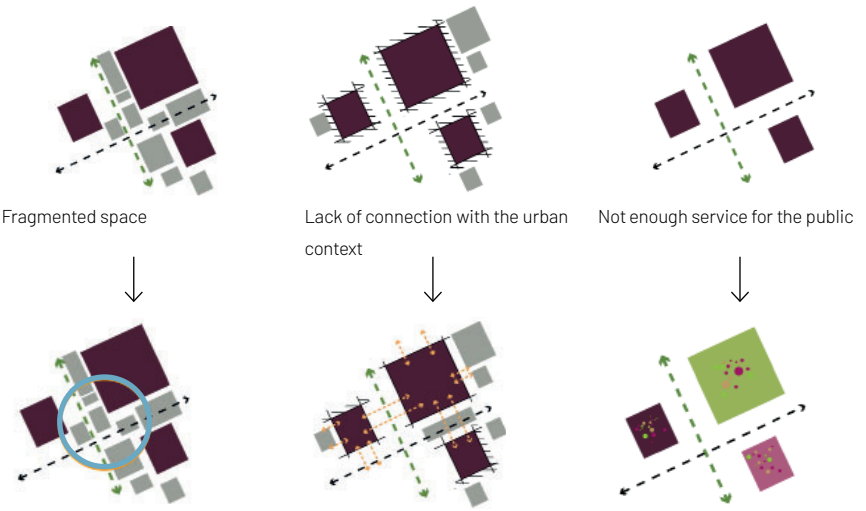


FIG.7 Cluster strategies

Result

After applying the principles into the site, the overall plan gradually evolved. The whole site is connected by water elements. To be more precise, four areas are redesigned, Bronbeek, Daalhuizen, Larenstein and the vacant space in between as the masterplan shows on the next page.

In Bronbeek, ponds have been expanded as it has a water source and is located upstream in the areas of influence. New landscape facilities are constructed for the elderly who are living there: a vegetable garden, an orchard and an amphitheater. Also the hard fence will be replaced by a semi-dense hedge for spatial accessibility.

In Daalhuizen, the forest is accessible rather fenced before. More spacefor outdoor activities are created for the neighbours, such as playground, sports field and exploration in the forest.

Larenstein, as it hosts more biotopes and rare species, less interventions will be introduced. The main change is to develop more ecological facilities for education and some self-maintained food land for campus

Last but not least, the vacant space between the three estates will be transformed into a new allotment garden complex, based on the height different between the highway and the surface.

FIG.8 Masterplan

FIG.9 Water square in Bronbeek

FIG.10 Ice-skiing in Daalhuizen

FIG.11 Eco-educational activities in Larenstein

FIG.12 Terrain allotment garden

There are some collages indicating the scheme of the site in the future.

Conclusion

To conclude, nowdays, the landscape heritage in the city not only has the value of history, age or intentional commemory, but also could have additional value of use after transformation. The major approaches to transformation generally consists of enhancing the links with the urban context, eliminating the negative borders and adding new functions or landscape facilities in the estate. To conclude, they could be integrated within the city as beautiful landscape rather than isolated monument.

References

1. Mısırlısoy, D., & Günçe, K. (2016). Adaptive reuse strategies for heritage buildings: A holistic approach. Sustainable Cities and Society, 26, 91-98.

2. Labadi, S., & Logan, W. (2015). Approaches to urban heritage, development and sustainability. In Urban heritage, development and sustainability (pp. 1-20). Routledge.

3. Kiruthiga, K., & Thirumaran, K. (2019). Effects of urbanization on historical heritage buildings in Kumbakonam, Tamilnadu, India. Frontiers of Architectural Research, 8(1), 94-105.

4. Storms-Smeets, E. (2016). From elite to public landscapes. The case of the Klarenbeek estate in Arnhem, 1880-1950. Virtus| Journal of Nobility Studies, 23, 147-168.

5. Janssen, J., Luiten, E., Renes, H., & Rouwendal, J. (2014). Heritage planning and spatial development in the Netherlands: changing policies and perspectives. International Journal of Heritage Studies, 20(1), 1-21.

6. Agapiou, A., Alexakis, D. D., Lysandrou, V., Sarris, A., Cuca, B., Themistocleous, K., & Hadjimitsis, D. G. (2015). Impact of urban sprawl to cultural heritage monuments: The case study of Paphos area in Cyprus. Journal of Cultural Heritage, 16(5), 671-680.

7. Janssen, J., Luiten, E., Renes, H., & Stegmeijer, E. (2017). Heritage as sector, factor and vector: conceptualizing the shifting relationship between heritage management and spatial planning. European Planning Studies, 25(9), 1654-1672.

8. Benthem, R. J. (1973). Recreational and environmental planning. Biological Conservation, 5(1), 1-5.

9. El Menchawy, A., Aly, S. S., & Hakim, M. A. (2011). The impact of urban sprawl on the heritage areas through the urban fabric of cities. WIT Transactions on Ecology and the Environment, 150, 299-314.

10. Mrak, I. (2013). A methodological framework based on the dynamic-evolutionary view of heritage. Sustainability, 5(9), 3992-4023.

11. Ottens, H. F. (1990). An interpretation of recent trends in urbanization in the Netherlands. The Netherlands journal of housing and environmental research, 49-64.

12. Seung-Seok, B. (2014). Conservation and Management of Agricultural and Fishery Heritage System in South Korea. Journal of resources and ecology, 5(4), 335-341.

13. Howard, P., & Ashworth, G. J. (Eds.). (1999). European heritage, planning and management. Intellect Books.

14. Muhammad, S. (2007). Future urbanization patterns: in the Netherlands under the influence of information and communication technologies (Vol. 363). Utrecht University, Royal Dutch Geographical Society.

15. Orbasli, A., & BArch, D. (2009). Re-using existing buildings towards sustainable regeneration. School of Architecture: place and Culture Identity Group Working Paper.

16. Marshall, S. (2005). Urban pattern specification. Institute of Community Studies, London.

Estate Space

Exploring the visual relationship in the estate landscape of Gelder Arcadia

Ming Jiang

Supervisors:
Steffen Nijhuis
Leo van den Burg

Introduction

Gelderland is a province of Netherlands, located in the central eastern part of the country. It is the largest province of the Netherlands. At the same time, the province has a large number of estates (total 369 country houses in Gelderland which is 18% of Netherlands). Thanks to the Veluwe, which is the largest push moraine complex in the Netherlands and has a very considerable height difference. The height made most of its estates chose to locate at a higher ground in order to gain a good view and as a symbol as power. So, Gelderland has natural advantages in visual experience.

When people first walk in this area, they will immediately be attracted by the various of visual relationships. Not only the road itself is always up and down which create an interesting walking. The estates themselves are rich in vision. They could be generally divided by three kinds. The first one is the relationship between the estate and the city. When visitors stand at the observation area of the park Klarenbeek, they could be attracted by the panorama of the estate park and the Eusebius Church in the city center. The second one is the relationship between estate and infrastructure relics. Rozendaal is a famous estate which used to connect by the king's road. Nowadays, the old trace of sightlines is still exist. The last one is the relationship within the estate itself. The connection of Zypendaal with De gulden bodem is endanger because of the style of the garden changed from Baroque style to English style and the lost of some buildings. However, the sightline is still somehow being guided.harboring some rare species.. However, it is also limited by infrastructure and not really integrated with the estate.

1

2

PARK KLARENBEEK-EUSEBIUS CHURCH
Estate-City

ROZENDAAL-KONINGSEWG
Estate-Infrastructure relics

Zypendaal-De Gulden Bodem
Estates-Estates

FIG. 1-3 Pictures of estates

FIG. 4 Problem-Visual Obstacles

To create a spatial visual framework plan in different scale levels(regional and local)for preservation and development of estates landscapes in urban (to rural) context.

The visual landscape related to the estates is changing constantly by the urban development of Arnhem, with often visual encroachments as a result. Visual obstacles like high rise buildings block significant views that belonged to estates in this region. From Sonsbeek for instance the it was possible to see the river IJssel in past times, but now the scene is blocked by the city and central station. This indicates that urban developments do not take into account the visual relations important for the estates, as there is no policy in place to safeguard visual relationships and provide visual guide lines and design principles. Also the growth of vegetation, planting of new trees and infrastructures have an impact on spatial-visual relationships and are sometimes destructive from a spatial-visual point of view. By comparing the the maps of 1900 and now one can see that many areas have been changed and had a negative impact on the visual landscape of the estates. The estate landscape became fragmented, with the estates as visually isolated islands and lack spatial coherence across the territory because articulated visual relationships are missing. Therefore this study focusses on the development of a multiscale spatial-visual framework for preservation, planning and design of the estates landscape of East-Veluwe, while taking focal points, sightlines and panoramas in and across this region as point of departure.

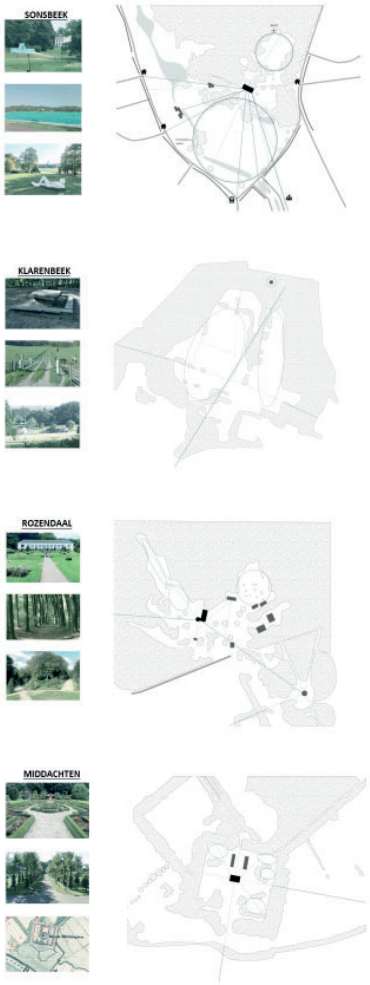


FIG. 7 Spatial analysis of estates in small scale

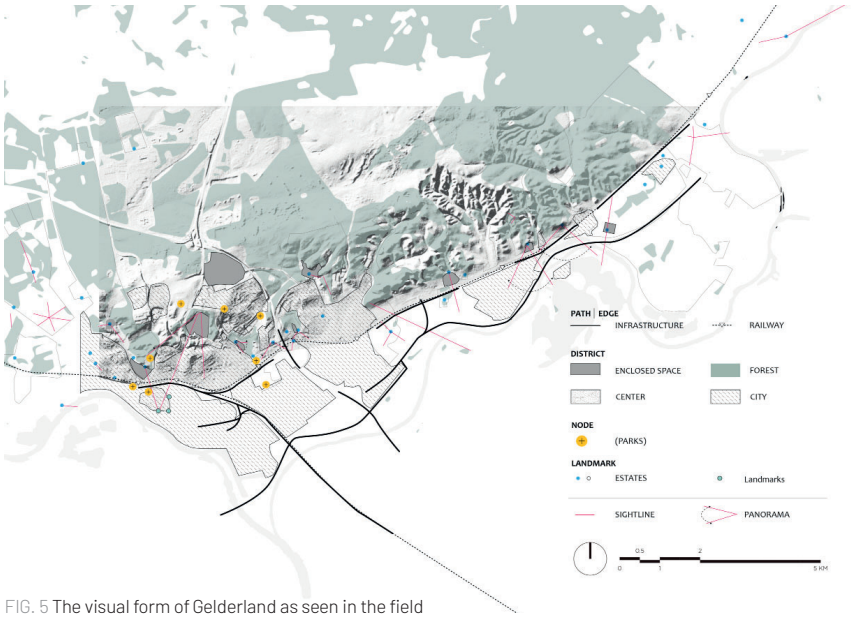


FIG. 5 The visual form of Gelderland as seen in the field

There are three different visual elements-focal point, sightline and panorama in and across this region. Basically they were structured by the historical infrastructures. And follow the method that was been taken in the book the image of the city of Kevin Lynch. I try to make the visual form of Gelderland as seen in the field in order to tell the characteristic of the estates

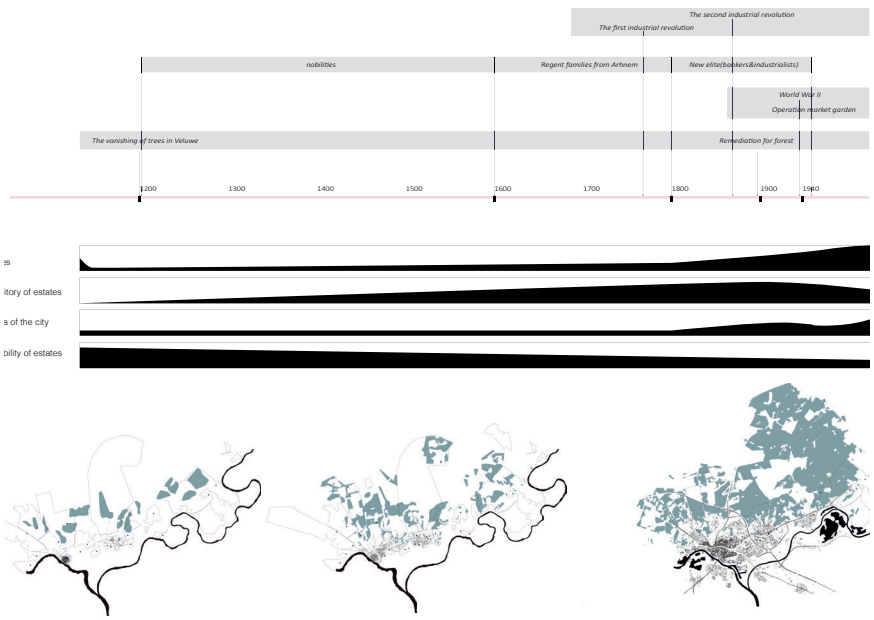


FIG. 6 Historical analysis

As the work of remediating the forest started, the area of the forest began to rise in a fast speed. The city began to seek for room between estates. However, the estates still remain huge and all of them are on the edge of the city.

Principles

Principles are some general tool boxes that being used to adapt into different situation in design.In this project, visual related principles are the target that might help. These principles got some key words. Focal points sightline panorama sequence are the 4 basic elements of vision. They could also be the 4 sets of principles. The book opening spaces provides many methods to emphasize the perceived visual experience which help a lot with this.

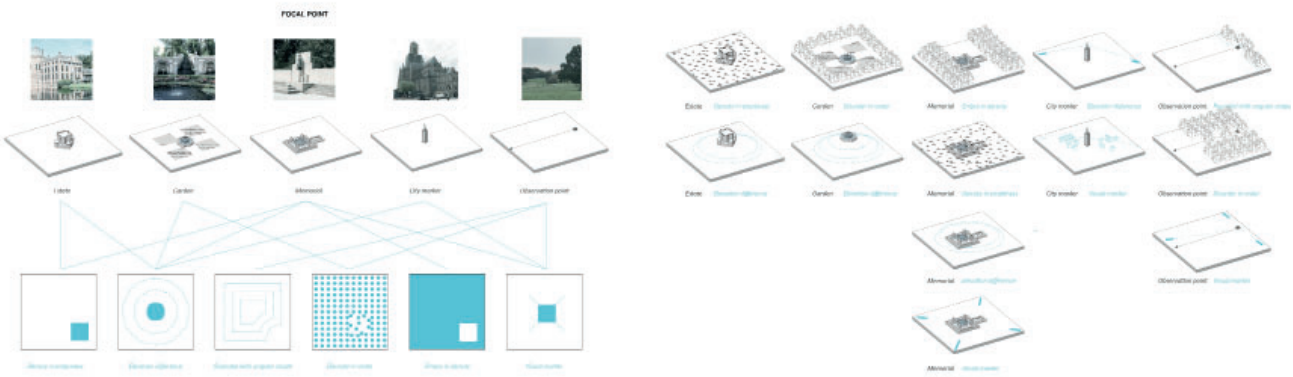


FIG. 8 Principle-Focal point

1) Focal points: Focal points strengthen, change or create spatial situations. They define areas, condense meanings, attract attention are “attractors”. Focal points are anchorage and orientation points for our movement, our looks, our behavior.

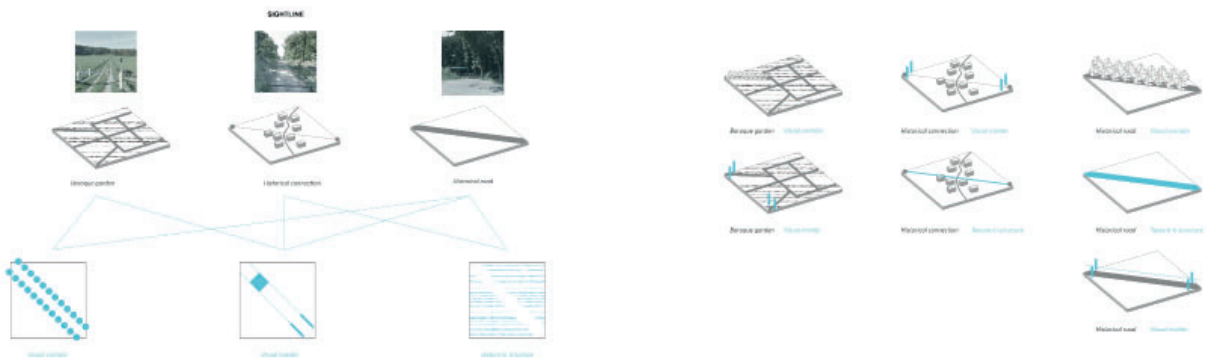


FIG. 9 Principle-Sightline

2) Sightlines: sightlines are about to leading people and make paths. The most important purpose are reveal some of the most important historical connections and infrastructures, trying to build the visual channel between time of past and present.

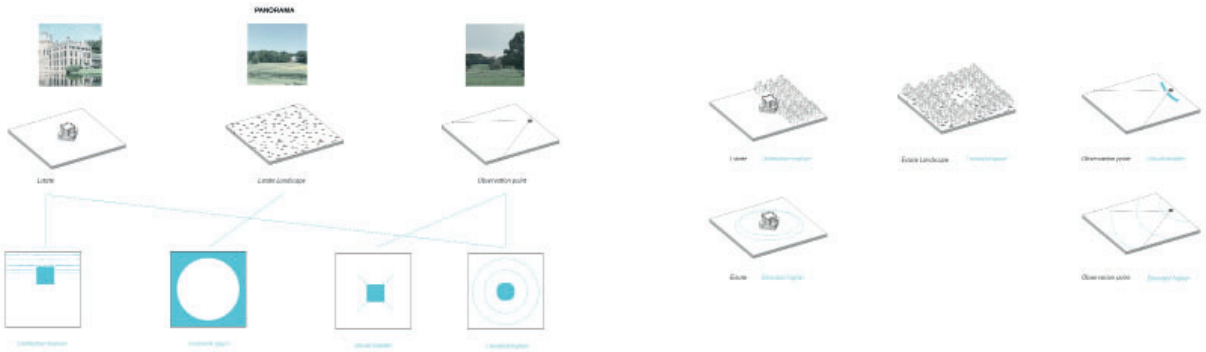


FIG. 10 Principle-Panorama

3) Panoramas: Panorama creates space that formed by vision's limits. It is also an iconic visual character in the area due to the geography and the style of the estate.

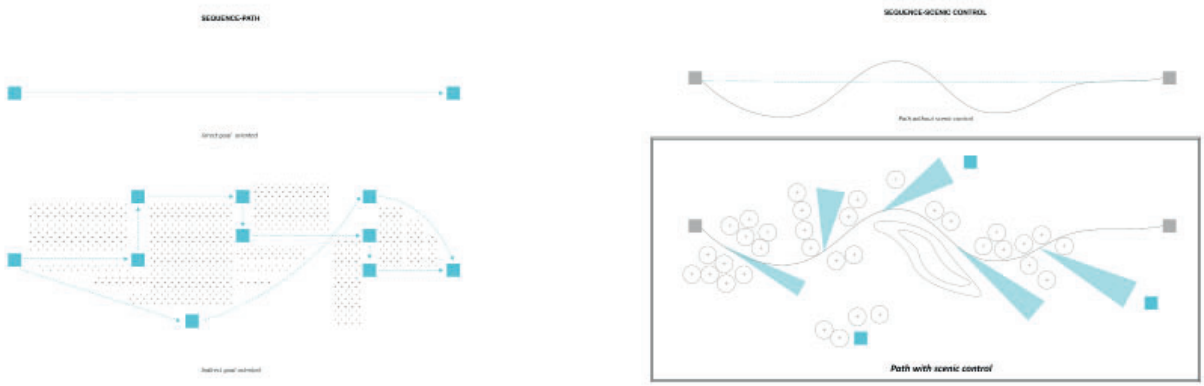


FIG. 11 Principle-Sequence

4) Sequences: Sequence is about the movement of people, so first, path is a vital elements for sequence. There are two different path, direct goal-oriented and indirect goal oriented. These different path have different visual effect when the vision added.The path plus vision form the scene. According to the previous path,there are also two different scenes.When we have a path without scenic control, people will just go straight to the final point, but with the scenic control and the control elements of point, line and panorama, the path with control would be a good sequence to form the visual experience and connect the estates, reduce the fragmentation.

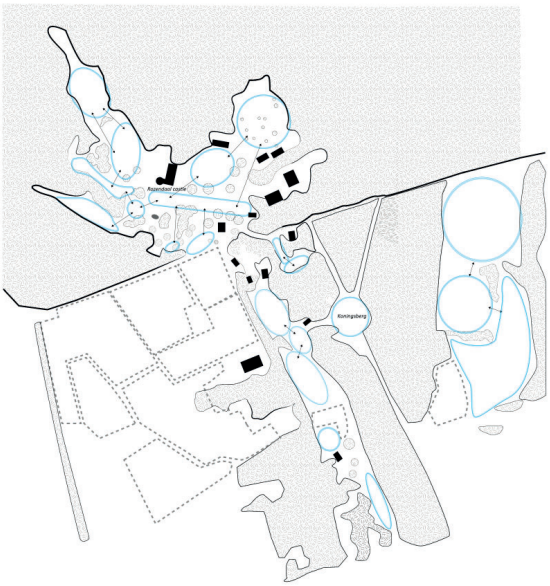


FIG. 12 Spatial analysis of Rozendaal

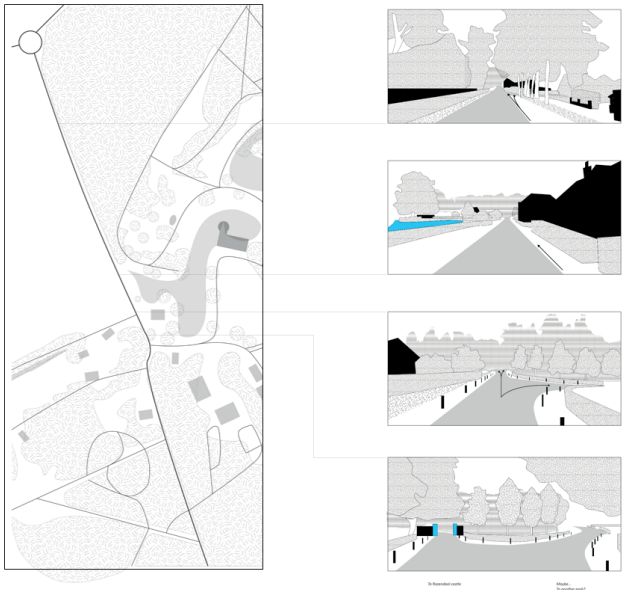


FIG. 14 Visual sequence analysis of Rozendaal

Result

The principles as mentioned before are used as the basis for design explorations to test the possibilities of their application. Three estates are selected: Rozendaal, Klarenbeek and Sonsbeek. Here the Rozendaal estate serves as an example. The spatial-visual composition of the Rozendaal can be characterized as following: the spaces inside the northern part of the estate are tightly connected to each other and the path structure enforces the spatial relationships by opening up and closing off certain spaces. However, the visual connection between the space of the King's Berg to the Castle can be enforced.This is important because the southern part of the estate is visually disconnected with the northern part. But there some other visual particularities. When approaching the estate of Rozendaal from the main parking visitors are guided by the road, trees and wall's. Halfway the castle they will be attracted by the waterbody besides the main house, pulling people into the grounds. This is enforced by the entrance gate which indicates the way to the building on the left. However, by this clear spatial orientation the southern part is often neglected because of spatial concealment and there is simply no spatial indicator to draw the visitors attention.

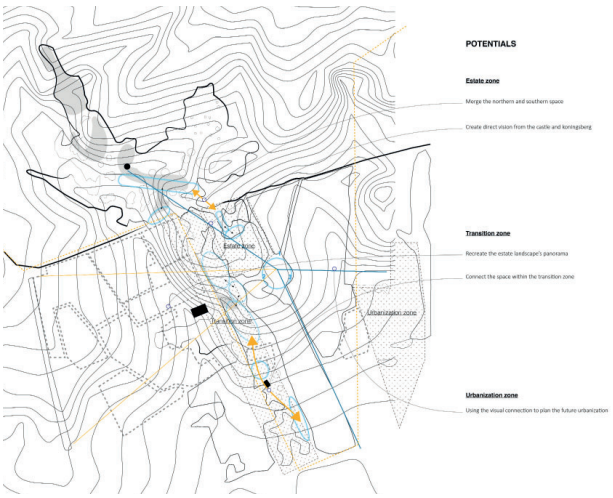


FIG. 14 Potentialsof Rozendaal

Here the design exploration is focussed on re-establishing the visual relationship between the parts of the estate and visually guide people into this area as well. The design consists of three conceptual layers that refer to the past, present and the future, represented by three different zones: 1) The spaces surrounding the estate, 2) urban neighbourhoods, and 3) urban fringes.

FIG. 15 Spatial composition of Rozendaal area

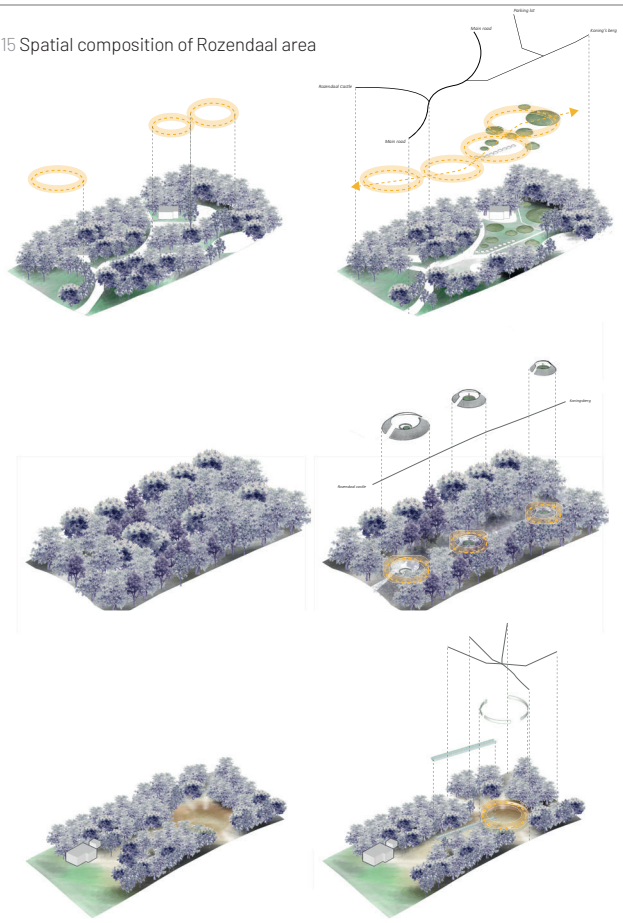


FIG. 16 Design interventions

This set of images explain how the design intervention change the spatial qualities of estate Rozendaal. The left image shows the visual spatial relations in the perspective from the Koningsberg to Rozendaal castle and nearby neighbourhoods. After the intervention, the relation within the estate is more straight forward and tight.

The design itself consists of three interventions: The first is the creation of buffer area that connects the northern part of the estate to the southern part. From before to after, the spaces are opened up to connect people and space from one side to the other. The introduction of small curving mounts guide people visually through the area culminating at the Koningsberg. The second proposed intervention is to create a visual channel creating a strong visual connection (Vista) from the castle to the Koningsberg. The third intervention focusses on enforcing the visual relationships with the neighbourhood by adding a sky bridge. Also architectural structures and walls conceal en open certain views to enhance the spatial experience in the direction of the forest.

FIG. 17 Eye level perspective

Conclusion

Designing resilient heritage landscape is also about rethinking and reconstruction of the visual relations of the estates with the surrounding landscape and amongst themselves. Using visual relationships proofs to be a strong design approach that considers the local conditions like geomorphology and historical patterns that make up the visual landscape. The experimental design for estates like Rozendaal shows that this provides important clues for enhancing the spatial experience and to contribute to spatial coherence. The design principles applied to Rozendaal can also be applied toother estates which also are characterised by enclosed spaces. The obstacles in the design process in Rozendaal also could be a guideline for the other estates. Therefore, there is no doubt that visual relationship is a vital elements for designing landscapes. This visual way of dealing with fragmentation of estates in Gelderland provides a new aspect for policy making. Also it can be regarded a great opportunity for the city Arnhem to rethink the relationship between these precious estates and the city.

Bridging the Past and the Future

A New Palimpsest Layer for the Heritage Landscape of Hof te Dieren.

Beiqi Yuan

Supervisors:
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Bieke Cattoor
Charlotte van Emstede

Introduction

Heritage landscapes carry physical traces of history and individual memories, and thus contribute to cultural identification. This is certainly true for the Gelderland heritage estates landscape. At the same time, most of our heritage landscapes are facing serious environmental and economic challenges. Hence it is necessary to rethink the perspectives through which we look at, and design with these heritage landscapes, among others our ways of interpreting the historical traces when designing for a new development.

Hof te Dieren is of special importance in telling the story of the region and the country, because the site relates to a number of historical processes and events in Dutch history. Once owned by the Teutonic Order, the royal family and a noble family, Hof te Dieren carries lots of clues and stories of many historical processes and events such as the World War II in it. All in all, Hof te Dieren has a rich cultural-historical value, which is not yet fully recognised by people. At the same time, Hof te Dieren is facing a series of challenges that are common in other Gelderland estates such as spatial fragmentation, water shortage, loss of land and income, disappeared building.

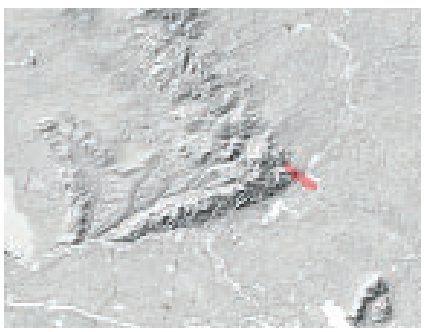


FIG. 1 Location of Hof te Dieren

This research by design explores ways of looking at and ways of reframing a heritage landscape in the context of these contemporary challenges, with a focus on Hof te Dieren. To be more specific, the main question relates to the following sub-questions:

1. how to understand a heritage landscape and its relationship with the region;

2. what approach is suitable for reading the historical traces in the landscape and designing new interventions for a heritage landscape;

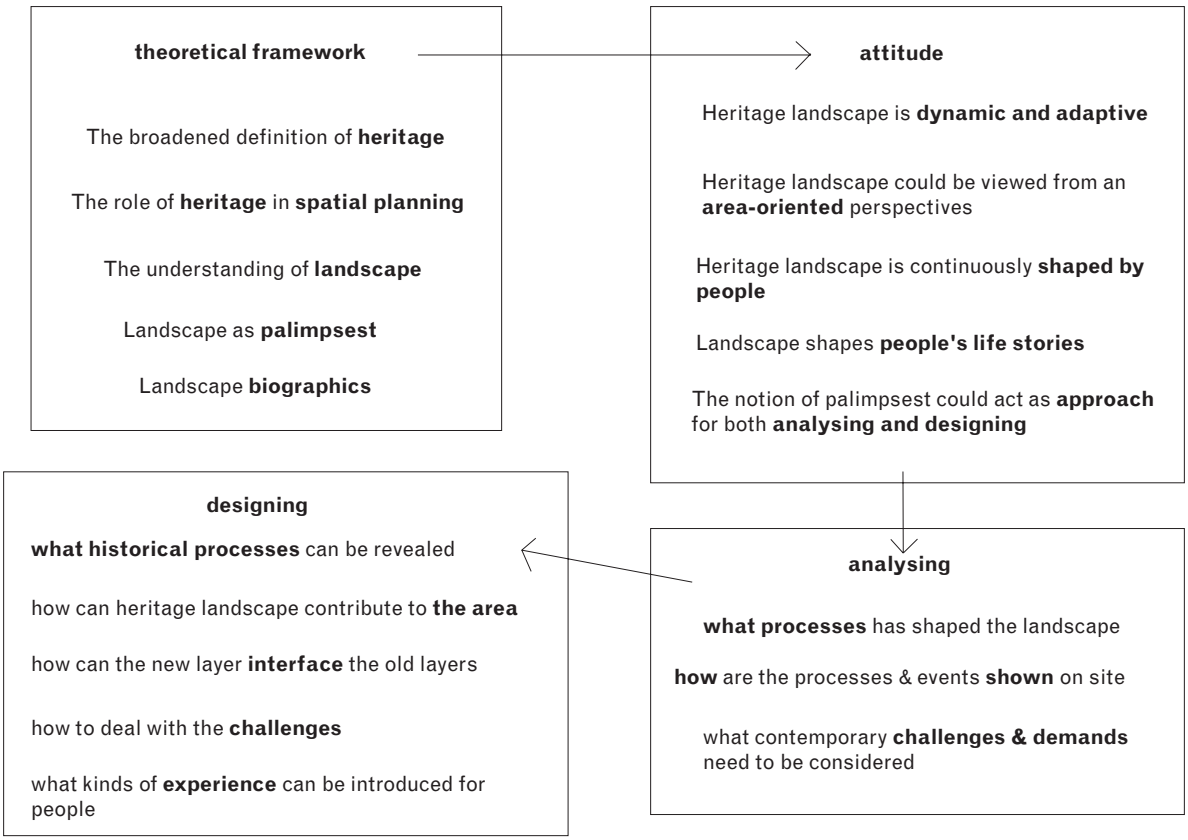


FIG. 2 Research framework

3. what traces of historical events or processes can be found in Hof te Dieren;

4. while designing new developments for Hof te Dieren, how to make the historical traces more visible and how to respond to contemporary challenges and demands.

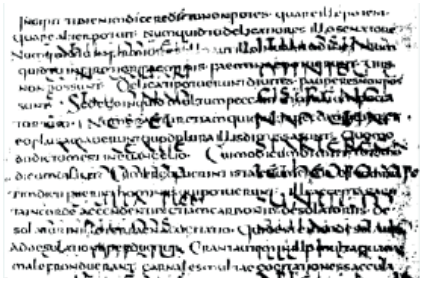


FIG. 3 Palimpsest of Cicero, 4th Century

The word 'palimpsest' initially describes 'a manuscript or piece of writing material on which later writing has been superimposed on effaced earlier writing'.

The theoretical study provided me with a background knowledge of heritage landscape, from which I gradually developed my attitudes and framed my analytical and design approach. The trends observed in the field of heritage (Meurs, 2016) and the theory of landscape biographies (Renes, Hermans & Kolen, 2015) inspire me that heritage landscape could be viewed from an area-oriented perspectives, and that landscape and humans are continuously shaping each other. I consider heritage landscape as a dynamic and adaptive system that bridges the past and the future. The notion of palimpsest -landscapes overwritten by natural and cultural processes- acts as an overall approach in the case of Hof te Dieren to analyse historical layers and to develop a new layer for the landscape.

According to Landscape Biographies (Renes, Hermans & Kolen, 2015), uncovering the historical traces offers a better knowledge of the past, transforming the landscape into a socially vital and environmentally more resilient place. The study of Hof te Dieren could act as an example for this region of how heritage landscapes could be transformed to deal with contemporary challenges and demands, as well as how to make the history more visible.

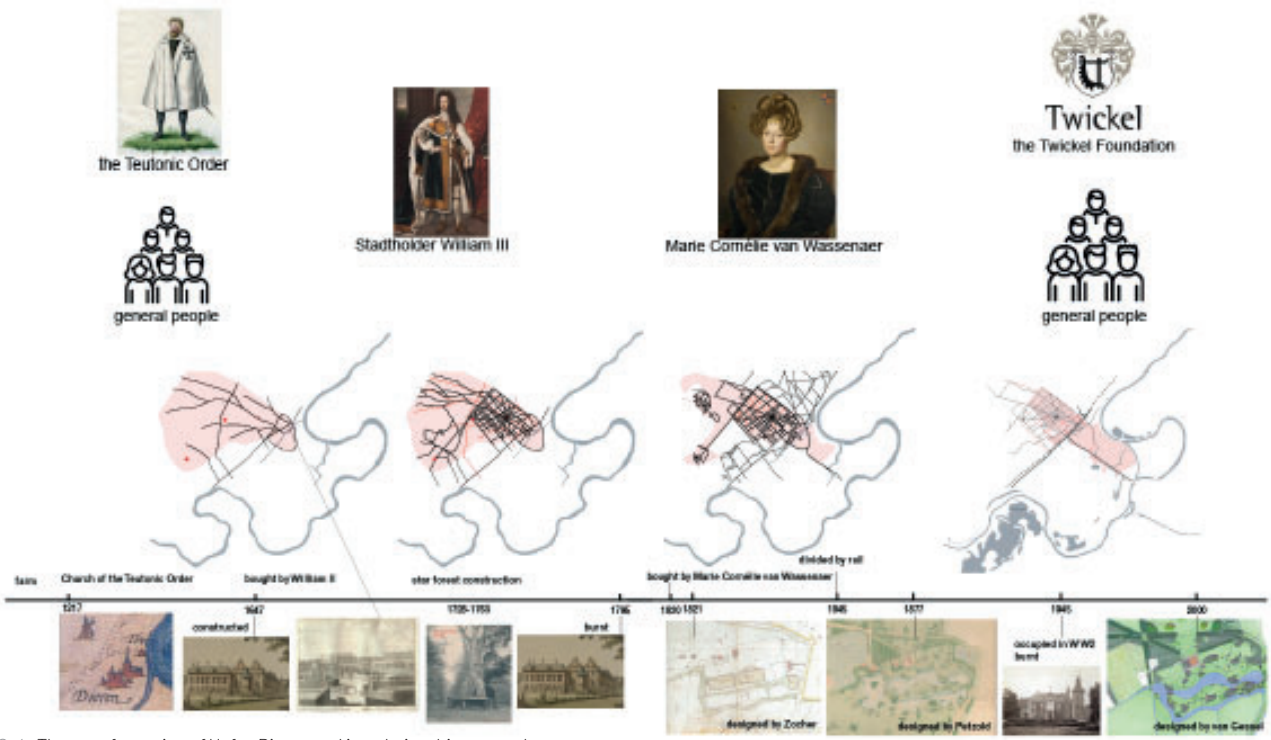


FIG. 4 The transformation of Hof te Dieren and its relationship to people

Site analyses

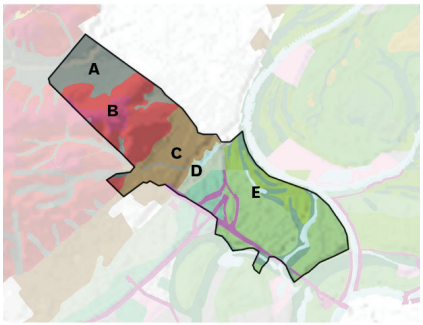


FIG. 5 Geomorphology map

To get a grip on the site Hof te Dieren, it is necessary to look into how it developed into the current performance, including: what natural and cultural processes or events have taken part in shaping the heritage landscape? How are they associated with the current situation of the site?

As shown in the geomorphological map, the land of Hof te Dieren can be categorised into different sub-areas shaped by various natural and cultural processes, which are not fully visible to people. For instance, the formal path structure in production forest covers up the differences between hill and dry valley and hides the exotic species introduced by people. Next to the garden there used to be a wetland forest habitat nourished by groundwater, which has been transformed into meadow with ditches. Protected by a series of dikes constructed through time, the river foreland topography has a differentiated flooding aspect, though with similar appearance. These are some potential clues to make the processes more visible in the design steps.

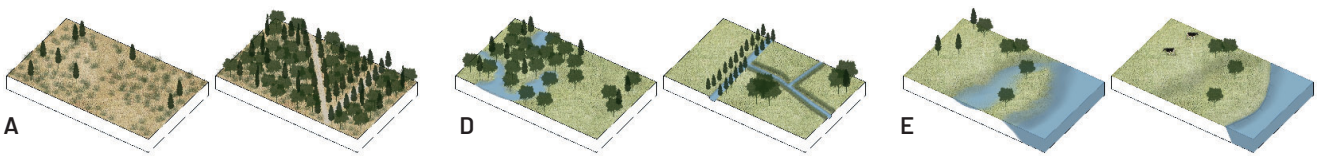


FIG. 6 Historical & current farm land

FIG. 7 Traces of the Royal Period

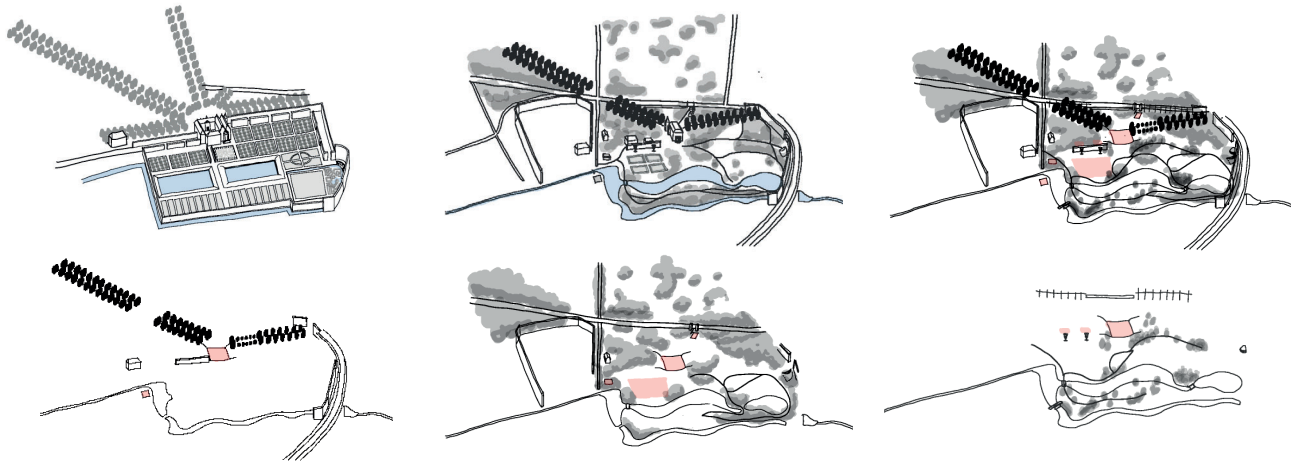
FIG. 8 Traces of the Noble Period

FIG. 9 Traces after WW2

FIG. 10 Sub-areas by dominating layer

From north to south: Royal forest, Traditional farm land, Noble landscape park, Floodplain meadow

By comparing historical territories of Hof te Dieren and overlapping the historical traces, the land can be categorised into several sub-areas according to the dominating time layer of different parts. The production forest is with valuable feature of the House of Orange times, and the central part around the garden mainly keeps the remains of the noble estate phase. The traditional arable land reminds of the early human intervention on the sandy land. The floodplain meadow, as newly added to Hof te Dieren, allows more intervention. The garden is the part with most condensed historical traces from different time layers co-existing. Based on this, the design further explores how the added new layer can be an interface with the old ones.



The Royal Period (1647-1795) & traces left

The Noble Period (1821-1945) & traces left

After WW2 (1945-) & traces left

FIG. 11 Historical traces analysis of the garden

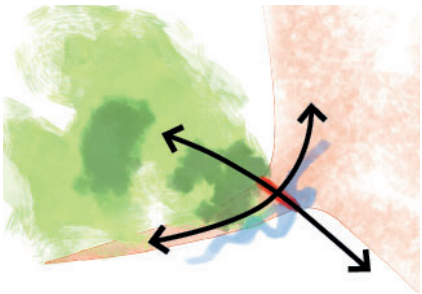


FIG. 12 Potentials in regional scale

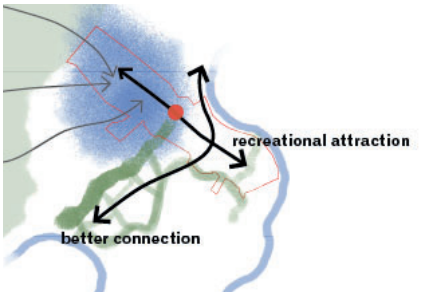


FIG. 13 Potentials in local scale

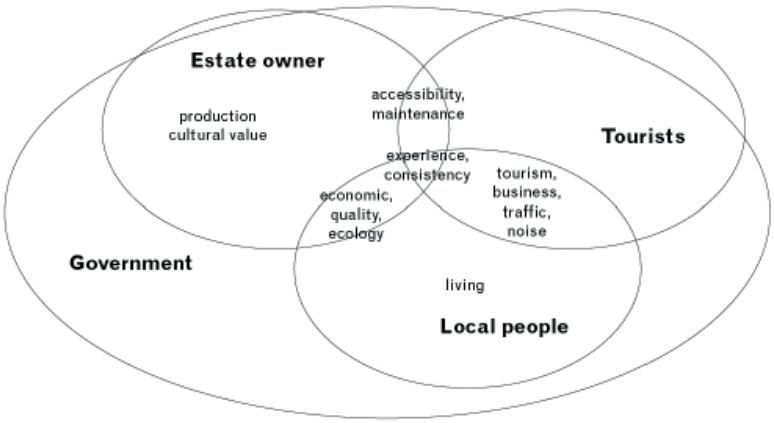
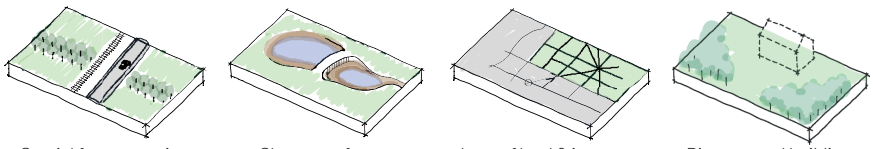


FIG. 14 Interests of different stakeholders

From an area-oriented perspective, Hof te Dieren can be considered as a node that both connects the green & blue structure in north-south direction and connects the cultural landscape structure in east-west direction. The fact that the train station Dieren is a transferring station and Dieren South has been specified as Historical Town shows the potential of Hof te Dieren to attract visitors. Local people are aware of this potential and support this. (Gemeente Rheden, 2019)

In addition, Hof te Dieren is facing some challenges related to sustainability and continuity.The estate is fragmented by both railways and highways. With the main building burnt during the World War II, the estate is not possible to make money by historical building. The agricultural production in the estate is less profitable after agricultural intensification, especially when it is prohibited to use fertilisers due to the drinking water catchment area in the estate. For the same reason, the shortage of water is made worse.



Spatial fragmentation | Shortage of water | Loss of land & income | Disappeared building

FIG. 15 Challenges

Design proposals

Vision 1
spatial palimpsest

Vision 2
spatial +accumulative
palimpsest

FIG. 16 The relationship between the new and the old layers

Inspired by Bailey (2007), I developed two design visions according to two kinds of spatial relationship between the new layer and the old ones: superimposing (accumulative palimpsest) or co-existing (spatial palimpsest). Vision 1 is more conservative: allowing visitors to the historical garden, only intervening the land with less cultural and historical value, adding new experiences and programmes to the floodplain meadow to deal with the challenges and keeping the existing atmosphere. Vision 2 however, is a design that partly erases the old layers when adding the new one. It extracts design principles from the features of the historical traces and uses them as tools to uncover historical traces and to provide the public with various experiences. Many strategies of Vision 1 are also presented in Vision 2, so the following elaboration focuses mainly on Vision 2.

FIG. 17 Existing situation

FIG. 18 Map of Vision 1

FIG. 19 Map of Vision 2

The new layer of Vision 2 consists of three zones: the dry valley (I), the garden and spring forest (II) and the floodplain (III). With some openness, the route via dry valley will be brought back as a new entrance to the National Park, and exotic species introduced in history are highlighted. The recovered spring forest brings back the mysterious atmosphere and is accessible by boardwalks. In the garden, plants mark the historical layout of the gone buildings on the surface. In front of dike, introduced wetland and water retention provides extra water supply for the ponds in the garden and offers activated waterfront possible for recreation use.

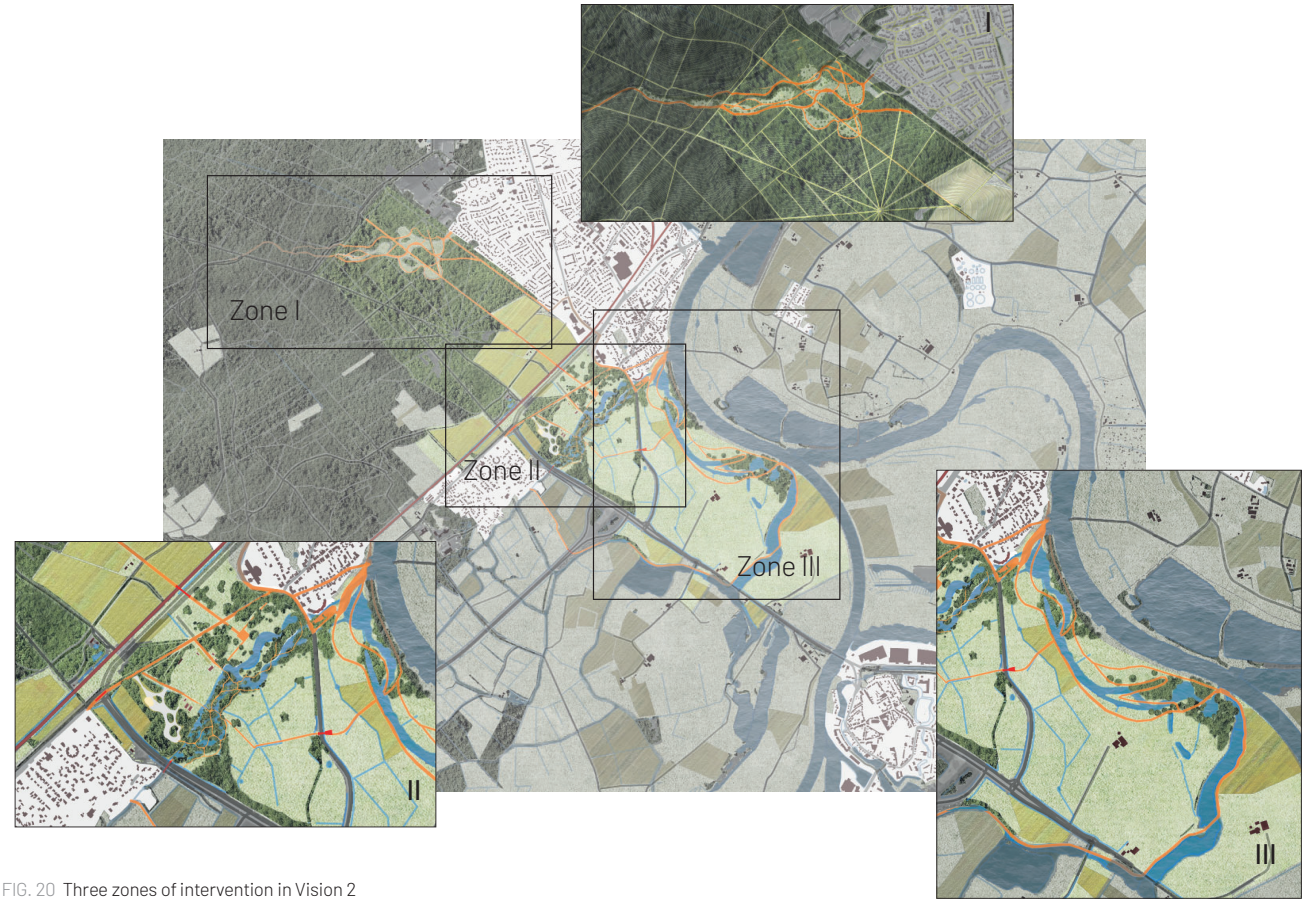
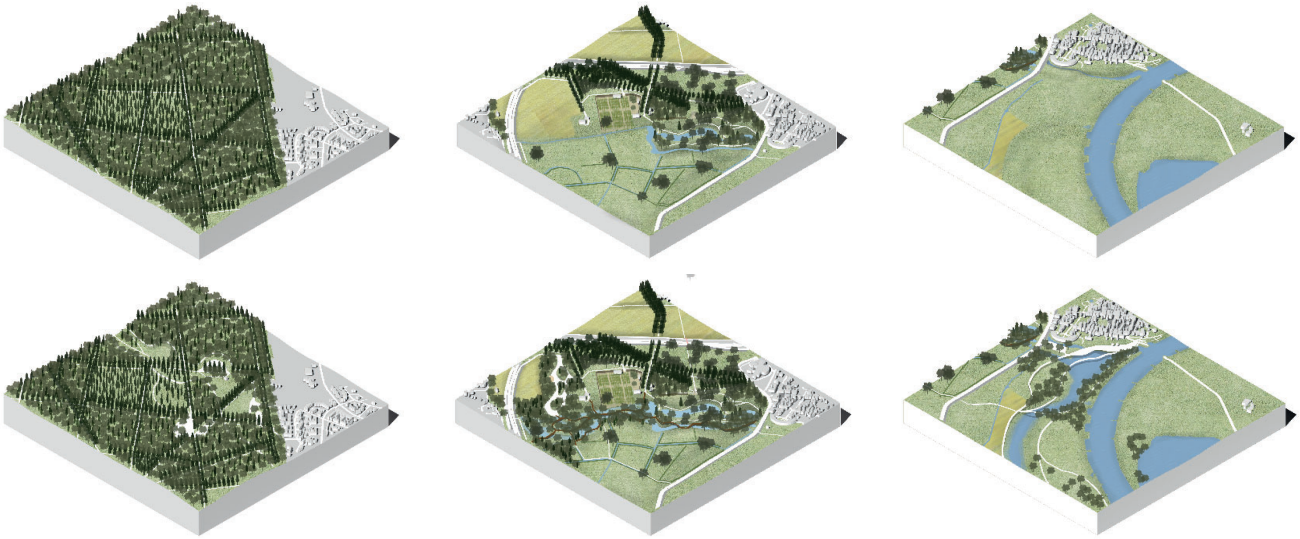


FIG. 20 Three zones of intervention in Vision 2



Before & after of Zone I

Before & after of Zone II

Before & after of Zone III

FIG. 21 Before & after of design zones in Vision 2

Zone I covers two different geomorphology types and the dry valley was used as routes that stretches into the heart of Veluwe. In the forest there are some exotic tree species (*Prunus serotina, Larix kaempferi*, etc). Principles applied in the forests are: 1) to bring back some openness to the dry valley, which can be used as entrance to the Veluwezoom National Park from the Dieren town; 2) to highlight the exotic species introduced by people in history.

Zone II, according to the analyses of historical traces, is the part with most condensed historical traces. For this reason I chose to 1) mark the surface with plants following the layout of building according to the archaeological excavation result. Apart from that, 2) the lost spring forest will be restored, allowing people to walk in it.

Zone III is a less historical part, so more programmes and functions can be introduced to this area. To deal with water shortage problem by supplying extra water, 1) wetland and water retention area will be constructed. The land in front of dike can be transformed into 2) a lively waterfront with recreation-related businesses.

Reconnecting fragments

Wetland & Water retention

Introducing programmes

Highlighting the layout of building

FIG. 22 Strategies for challenges

FIG. 23 Heather at the entrance of the dry valley

FIG. 24 Highlighted American cherry clumps

FIG. 25 Broadwalk in recovered spring forest

FIG. 26 Wetland in floodplain meadow

Conclusion

Heritage landscape can be transformed from vulnerable landscapes into socially vital and resilient landscapes by offering knowledge of the past. To achieve that, a detailed biographical research of the site history is necessary to discover values that are still not visible enough to audience. Those values can then be inspirations or principles for designing further developments. Landscape and people are continuously reshaping each other, which means the designing of a heritage landscape can and should bring changes to people' s life stories.

Bibliography

Bailey, G. (2007). Time perspectives, palimpsests and the archaeology of time. *Journal of anthropological archaeology*, 26(2), 198-223.

Gemeente Rheden. (2019). Omgevingsvisie buitengebied Rheden.

Meurs, P. (2016). *Heritage-based design*. TU Delft.

Renes, J., Hermans, R., & Kolen, J. (Eds.). (2015). *Landscape biographies: geographical, historical and archaeological perspectives on the production and transmission of landcapes*. Amsterdam University Press.

The participants of the workshop attending the lecture sessions

Delft University of Technology and Politecnico

Courtesy of Steffen Nijhuis

Diary of the Exchange Program

Delft University of Technology and Politecnico di Torino

As a part of the graduation lab, there was an exchange program with students from the Politecnico di Torino. The Torino students, along with their supervisors and teachers Claudia Cassatella, Mauro Volpiano, Federica Bonavero and Emma Salizzoni, spent a week in Delft from 19 to 24 September 2019. Activities of the exchange programme included lectures from academics, policymakers, practitioners and landowners, field trips, design workshops and presentations. The workshop aimed to exchange and gather knowledge about the landscape system of castles and historic country estates in both Gelderland (Netherlands) and Piedmont (Italy). The graduation lab, as well as the exchange program, were focused on sharing knowledge and on identifying possibilities through design explorations to derive ideas for the future resilience of these heritage landscapes. The Delft students were also supposed to go to Torino in March 2020 to take part in the second half of the exchange program along with an exhibition of their ongoing works. Unfortunately, due to the Covid-19 pandemic this latter part was cancelled.

19 September 2019

The workshop began with an introductory lecture by Steffen Nijhuis (TU Delft). This was followed by a talk by Elyze Storms (Gelders Genootschap) where she explained the history and evolution of castles and estates in the Province of Gelderland briefly. Mauro Volpiano (Politecnico di Torino) then introduced the students to Italian heritage ideas and the historic rural landscape in Italy. Steffen Nijhuis then introduced the students to the focus areas and strategically chosen heritage estate cases for further research and design, and explained the course of action for the upcoming workshop days. The day ended with students getting to know each other over drinks.

20 September 2019

The day started with an enlightening lecture by Claudia Cassatella (Politecnico di Torino) where she explained briefly how Italy deals with the preservation of is heritage landscape and the growing role of landscape planning in this process. The Torino students then took part in a guided tour in Delft. In the afternoon, the students gathered to engage in searching further information about the sites and desk study of GIS data and maps. The students formed groups according to the research focus and keywords provided by the Delft students. The teachers were present to assist the desk study of the sites and clarify the idea of heritage and related issues to the students.

24 September 2019

The students and teachers took part in a day-long excursion to the Province of Gelderland. The first point of arrival was the Rosendael estate and park near Arnhem. Here, Paul Thissen, representative of the Province of Gelderland, gave a brief presentation explaining the overarching projects KaDEr and Innocastle and addressed the heritage estates, their challenges and opportunities. After this, Ciska van Genugten from Gelderse Landgoederen en Kastelen beautifully elaborated the history and development of Rosendael and took the guests to a guided tour. The students were amazed by the beautiful landscape style park and the numerous meticulously designed and maintained water features of the gardens.

In the afternoon, the excursion group arrived at the Hackfort estate and park. Here, Louis Lansink (Waterboard Rijn and Ijssel) joined the group and explained the role of topography, soil condition, plant types etc. in understanding the existing and past hydrological system of an area. He showed the students around the Hackfort estate and pointed out some characteristic features of the water system and landscape.

The last stop of the day was Estate De Wiersse. Estate owner Mary Gatacre warmly welcomed the group, and she took the group in a guided tour explaining the history of the estate, the history behind different layers of the garden and landscape park's composition and present challenges and possibilities of the estate. The students thoroughly enjoyed the excursion, learned a lot of new information and were delighted by the hospitality of the Gatacre family at the end of the day.

25 September 2019
In the morning, the students took part in an enlightening lecture session by Saskia de Wit and Steffen Nijhuis (TU Delft) on "Flows and scapes". Later in the afternoon, the student groups engaged in discussion, brainstorming and drawing on the application of the principles they devised out earlier. They prepared brief presentations for the next day.

26 September 2019
The day started with presentations by the student groups and further reflection and discussion on the ideas generated in the past week and the lessons learned. This session gave new inspiration to the TU Delft students to carry out their upcoming research and design endeavours. The Torino students also gathered experience of heritage places and their management in the Dutch context. They were able to get a brief idea of the mapping, analysis and design processes of the Delft students.

Progress presentations
On 16 December 2019, the lab students presented their ongoing work to the representatives from the Province of Gelderland. Paul Thissen, Elyze Storms, Monique de Rooij and Hielkje Zijlstra were present in this session. By this time, the students had worked up to the point of defining their problem field, initial research questions, research objective and an initial set of design principles. Each of the students briefly presented their work and talked about the future possibilities of their research and design. The Province representatives made valuable comments, brought up ideas and provided the students with their feedback. In general, they appreciated the students' efforts and were highly enthusiastic about the expected results of their research and design.

Alia Shahed
Graduation Student Garden of Gelderland
MSc Landscape Architecture, TU Delft

Louis Lansink (Waterboard Rijn and Ijssel) demonstrating the water related issues from a set of topographic maps to the students at Hackfort estate

Courtesy of Steffen Nijhuis

Mary Gatacre explaining the current problems and possibilities of the estate De Wiersse to the group

Courtesy of Steffen Nijhuis

The excursion group traversing the estate Hackfort

Courtesy of Steffen Nijhuis

Postface

A closer look, a wider view

Since landscapes are always and everywhere subject to all sorts of natural and societal dynamics, they undergo a permanent transition. A topography that serves a community of urbanites, residents and farmers remains very seldom in a fixed state and less so in the highly productive and intensively cultivated Dutch conditions. This places the efforts aimed at landscape conservation in a problematic context. The paradigm of valuable heritage and listed monuments originated in the course of the 19th century in the context of the built environment: architectural objects, urban ensembles, all made out of dead material. In living landscapes the notion of heritage preservation is much more critical, if not arbitrary.

The graduation project in which TU Delft master students explored and elaborated landscape architectural approaches to the question how to get to an increased sustainability of a large collection of country estates in the Gelderland Province, proved to be a challenging experimental scenery to assess the added value of landscape design in a cultural-historical setting. The outcome shows a wide variety of strategic spatial options that might support a guaranteed persistence of these estates. Roughly summarised we find landscape-based solutions focused on the adjustment of water management, improving visitor's accessibility and differentiation of amenities. In many cases we find combinations of these strategies, leading to landscape configurations that include a regional perspective on the estates. If we take a closer look, not so much at the results but at the way they were developed, two observations come to mind.

Landscape essentials, not values

New configurations interfere by definition with historically appreciated structures and patterns. The designs that were produced represent various gradations of spatial modification, from a subtle update of historical material to bold replacement of obsolete elements. Although many of the students were intrigued by the idea of historical valuation of the estates and put quite some effort in the assessment, the design proposals illustrate that they were actually defining the landscape essentials of the estates. Values are abstract qualifications imposed by experts. They are relative grades based on criteria like authenticity, rareness, uniqueness and integrity. Essentials however, are those component parts or characteristics that constitute the historical heart of the matter. They can be interpreted, enhanced, emphasised or cherished through an intelligent design scheme. Moreover, essentials introduce a perspective of landscape improvement. Essentials question the idea of historical loss and introduce the alternative idea of historical potential as the starting point for a landscape design. Severe valuation as such does not provide such a potential.

Historical conditions, not limitations

Although much time has been spent on the analysis of the historical transformations that took place in the study area, none of the students suffered design paralysis. They found all sorts of landscape precedents, inspiring historical arguments and attractive references to feed their proposals. Our client, the Province of Gelderland, encouraged us to step aside from the historical path-dependency, by asking the students to think and act in terms of sustainable continuity of the estates. Instead of being preoccupied with garden-historical discussions on estate morphology and style, the projects illustrate a more systemic approach to the historical topography. Geomorphology, landscape ecology and regional hydrology play an important role in the process of understanding, diagnosing and redeveloping the present estates. The future of this fascinating cultural landscape depends on a critical reading of the natural conditions that through time have gradually been neglected. If we stick to the interpretation of history as a reservoir of spatial limitations and impediments we will – paradoxically enough – not be able to save the estates.

Eric Luiten
Chair of Landscape Architecture
Delft University of Technology

Courtesy of Steffen Nijhuis

LANDSCAPE ARCHITECTURE

TU Delft