Steffen Nijhuis
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Resilient Estate Landscapes Gelderland

Past | Present | Future

Jap Sam Books

Resilient Estate

Landscapes

Gelderland

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Foreword

Gelderland has many beautiful castles, country estates and country houses. They are iconic in regions such as the Zuidelijke Veluwezoom ‘Gelders Arcadia’ and in the Graafschap near Zutphen. I am proud of this beauty. There are numerous regions in Europe that also have beautiful country estate landscapes. They are a cultural and tourist enrichment of a region, just like ours. In an urbanising Europe, such estate landscapes are worth their weight in gold.

The Interreg project INNOCASTLE has brought together countries in the European Union that have beautiful country estate landscapes: Romania, Spain with the province of Badajoz, the United Kingdom with National Trust, the Flemish government with the University College of Ghent and the Dutch province where I am Provincial Executive: Gelderland. We have exchanged a wealth of knowledge and experience in order to give the historic estate landscapes a good future.

All over Europe, historic country estates are facing the challenges of urbanisation and climate change. We are very much aware of this. In Gelderland, we are working on resilient rural areas. This requires thinking on a regional scale, applying an area-based approach in which owners and the input of designers play an important role. This book showcases good practices and explores the challenges and possible solutions.

Exchanging experiences in the Dutch and the European context helps us and provides us with alternative perspectives. What strikes others about Gelderland is that the Dutch approach has led to easily accessible historic landed estates, and to owners and authorities working together. What strikes us about other regions in Europe, for example, is the innovative approach to visitors with new themes and new techniques. We learned from each other and hope to do so in the future.

On behalf of Gelderland I would like to thank the Delft University of Technology, Gelders Genootschap and the partners in Innocastle for their contributions to this publication. I hope it will inspire the preservation and development of estate landscapes, in Gelderland and beyond.

Peter Drenth
Provincial Executive Gelderland,
Deputy responsible for Heritage

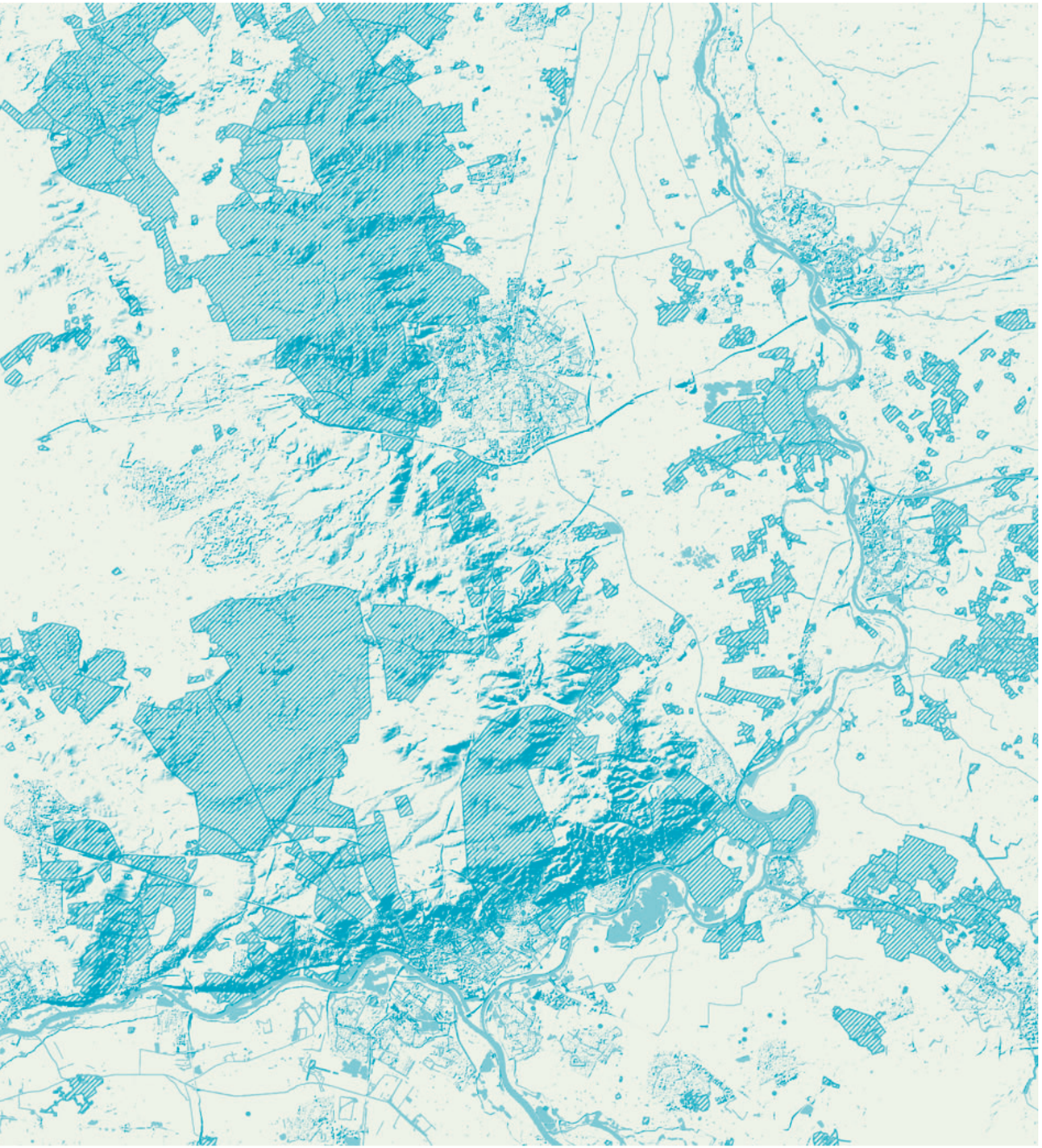


Table of Contents

05
Foreword

11
Introduction

23
Towards a Landscape-Based Regional Approach for Future-Proof Heritage Estate Landscapes

47
[CLOSE-UP]
Three Estate Landscapes in Gelderland

67
The Historical Development of Estate Landscapes in Gelderland

91
[CLOSE-UP]
Country Estates in Their Landscape Context

121
Three Living Labs as Learning Cases in Gelderland

151
[CLOSE-UP]
Landscape-Conscious Water System Development in Practice

155
Good Practices in the Dutch and European Context

185
From Policy to Implementation

200
References

205
Appendix

207
About the Authors

207
Acknowledgements

[FIG. 01]
Castle Biljoen in Velp. Together with Beekhuizen it was a prestigious, private landed estate. Natuurmonumenten acquired Beekhuizen early on; Biljoen was acquired much later by Geldersch Landschap. (Photo: Henk Monster)

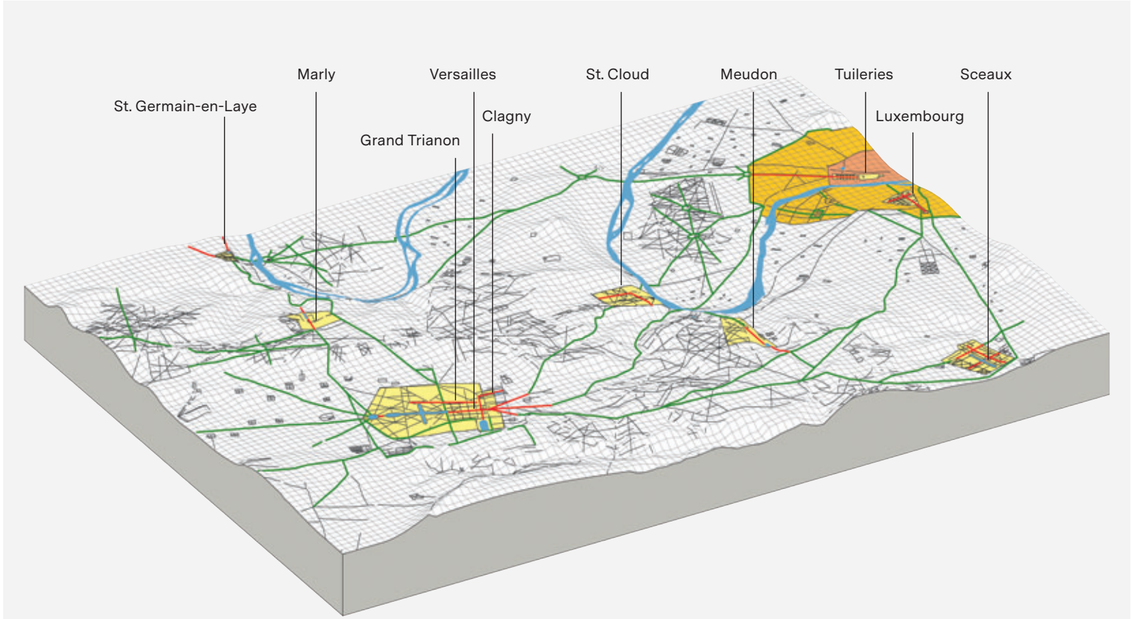
[FIG. 02]
Gelderland has a varied landscape with forests, large rivers and rural areas. The area has been popular with the landed elite since the late Middle Ages, especially around the provincial capital Arnhem, along the river IJssel and in the most eastern part of the province, known as the Achterhoek. Glacial ridges such as the Veluwe provide enormous differences in height by Dutch standards and are a beautiful location for country estates. A special feature is that rivers flow a short distance from the ridges. Map by Christiaan Sgrooten, c. 1573. (Royal Library of Belgium, Brussel)

Introduction

The province of Gelderland, in the Netherlands, inherits a large number of historical castles, country houses and landed estates. They are concentrated in zones where they form the most important landscape characteristic. These zones are here called (heritage) estate landscapes [FIGS. 1 & 2]. Residents and visitors highly value these heritage estate landscapes. For many, the presence of attractive country estates is a given, but behind the conservation there are great efforts to keep these beautiful environments alive.

This book is about these heritage estate landscapes in Gelderland. Not only to look back and do nothing but conserve, but also to connect the heritage qualities of these landscapes to contemporary issues through design. Climate change and urbanisation have a significant effect on the management and protection of these heritage landscapes. Abundance and shortage of water, spatial fragmentation and increasing pressure from recreation and tourism are only a few of the challenges that need to be addressed. The complexity of these challenges requires a regional perspective to understand the coherence and systemic relationships between the estates and find common ground in which stakeholders can work together to increase the resilience and adaptability of these valuable landscapes.

The objective is to present a landscape-based regional approach to understand, plan and design estate landscapes. It elaborates a preservation-through-planning approach that takes spatial development with historical landscape structures as a basis and engages in a process with meaningful stakeholder engagement and visualisation/communication to invent spatial strategies and principles founded on co-creation and collaboration while employing spatial design as an essential means. This book provides clues for the protection and development of future-proof estate landscapes by presenting a practice-oriented approach and its implementation in policy, planning and design. While showcasing best practices from the region and beyond, the book wants to share experiences for addressing the past, present and future of heritage estate landscapes.[1]



[FIG. 03]
Analysis of the spatial relationship of the historical estates around Paris that make up a regional system. (Image: Steenbergen & Reh 2011)

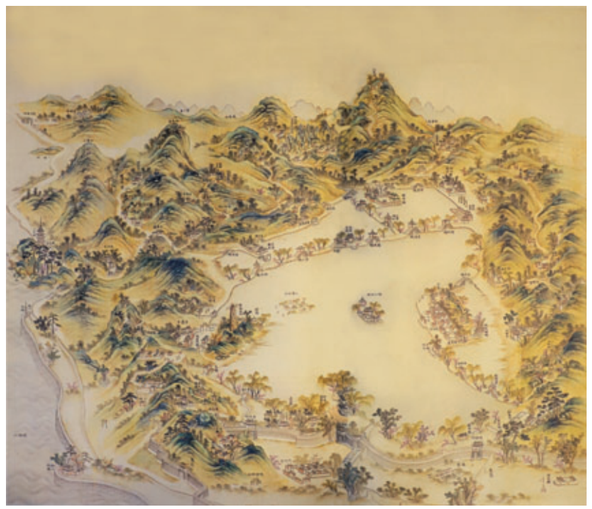
[FIG. 04]
Bird's-eye view of a historical estate landscape around the Western Lake in the Chinese city of Hangzhou, anonymous, 1760. A World Heritage site since 2011, this estate landscape is famous for its historical gardens, pavilions and pagodas. (Image: Historical Atlas of Hangzhou)

[FIG. 05]
The estate landscape around Turin, Italy, around 1810. A regional designed territorial system of royal residences, gardens, hunting grounds and farming organised by axial road patterns. (Carta topografica di Torino e dei dintorni)

Heritage Estate Landscapes

In heritage estate landscapes, the regional landscape character is determined by several historic castles, country houses and estates.[2] Here ensembles of historic buildings together with their gardens, parks, agricultural land, forests, etc. are powerful agents that have shaped regions, landscapes and societies across the world. Great examples of these territorial systems can be found in Germany, the UK, Belgium, Italy, France, Denmark, Portugal and Spain, but also in Russia, Japan and China, we find beautiful exemplars [FIGS. 3, 4 & 5].[3]

Building estates and their landscapes were for centuries dominated by the nobility, for whom landownership was a basis for power.[4] The land was of little use without one or more country houses on it. These were 'power houses' for ruling, business and leisure. The estate landscapes are the setting for court or papal residences, hunting lodges and parks and farming. In that respect, estate landscapes are an expression of the motives and ideals of their owners, combined with the spatial, functional and economic possibilities of the territory. Estate landscapes are thus an important cultural expression with sometimes emblematic significance [FIG. 6].[5]

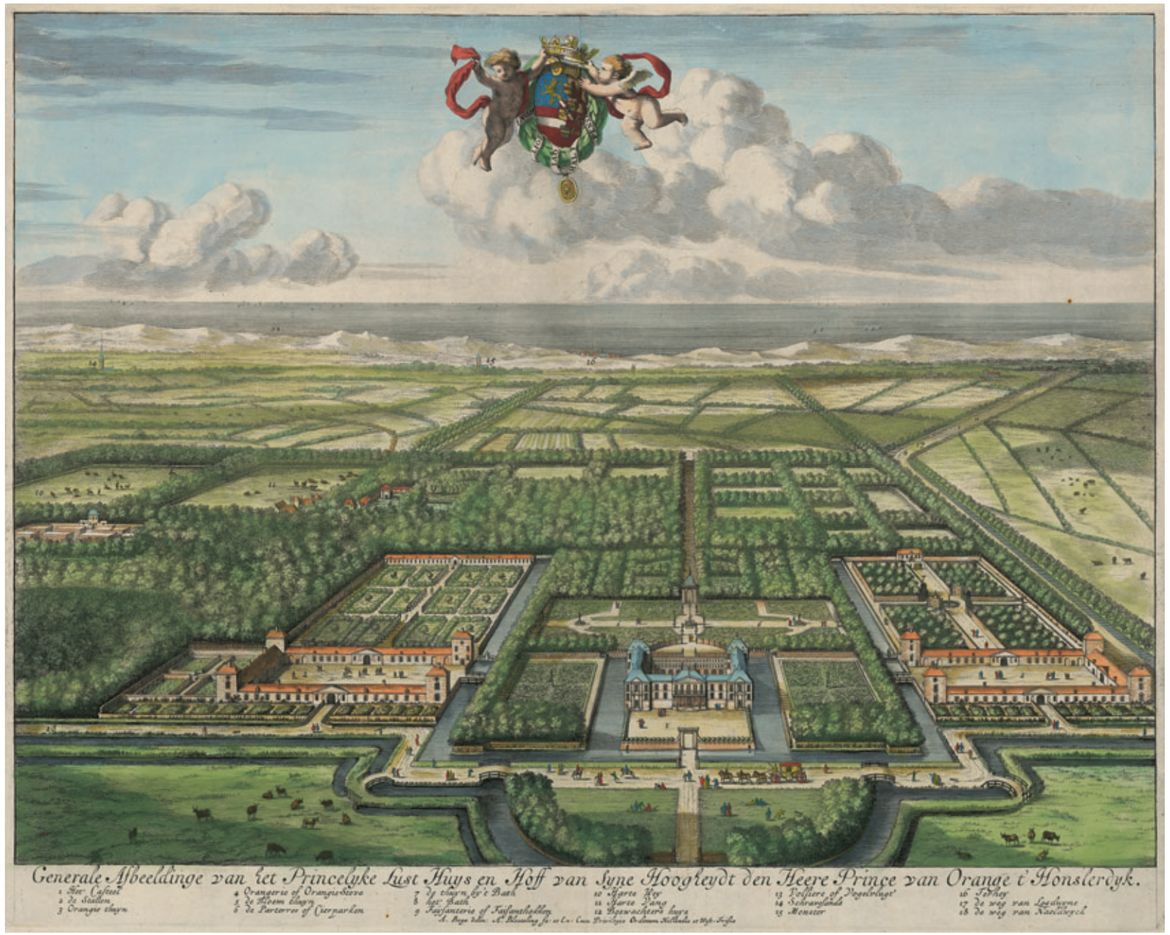


There is thus a direct link between the country estates and the landscapes they form. The natural landscape context and land positions were important factors for the choice of location and decisive for the use and landscape architecture design of the gardens and parks.[6] Here networks of water and roads organised the territory for control, providing resources and good connections to urban centres. Transport networks over land and water allowed the nobility to travel easily between the city and their country estates.

Valuable Landscapes

These heritage estate landscapes now represent great heritage values, which materialise in monumental buildings, gardens, parks and other landscape elements. Valuable nature and well-developed ecosystems are also often concentrated here. Much more than in other landscapes, the traditional agricultural man-made landscapes within these zones have retained their identity. Because of their cultural-historical significance and natural beauty, estate landscapes offer plenty of opportunities for tourism, recreation and sport. This also makes them of great economic value.[7]

For many centuries, the landscapes and cultural history of the Netherlands have been influenced by the presence of large landowners and resulted in a wealth of estate landscapes across the country [FIG. 7]. The country houses with gardens, parks and estates formed an important intersection between practical aspects of economic management and

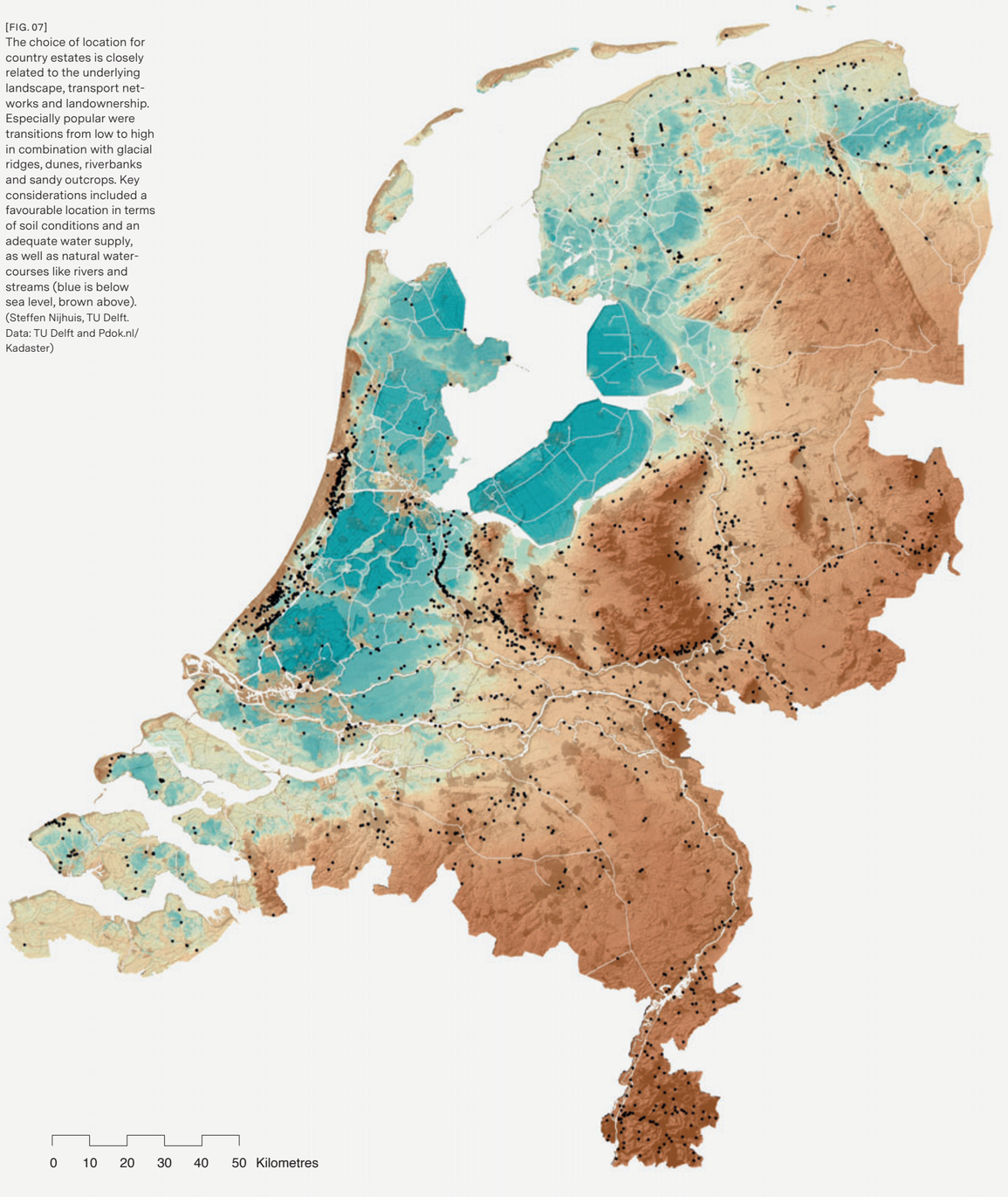


aesthetic landscaping. Often a castle or country house was linked to large landholdings of several hundred, even thousands of hectares, with a diversity of functions and landscapes. Examples can be found around the cities of Amsterdam, Haarlem, Leiden and The Hague, but also in other parts of the country.[8] Here, however, country houses and landed estates are much smaller than most European counterparts, whereas, for instance, in the UK, estates are regarded as over 1,200 hectares. In the Netherlands, most country estates are between 5 and 200 hectares, with some landed estates of over 1,000 hectares as exceptions. Nevertheless, similarities exist as estate-building was traditionally dominated by nobility, as it was in other European countries. Furthermore, the rise of new elites have led to the creation of new country estates, as also seen elsewhere. Despite the modest estate sizes, there is a tremendous regional impact as country houses and estates are often located close together and make up estate landscapes. Here the identity of the landscape is directly related to the castles, country houses and estates.

Regarding country houses and estates, the Dutch National Heritage Agency has listed monuments, such as country houses, coach houses, estate farms, tea pavilions, garden ornaments, parks and (parts of) country estates. There are 552 listed country estates in the Netherlands, called a complex or ensemble of nationally listed country estates.

[FIG. 06]
Bird's-eye view of the (no longer in existence) 17th-century royal estate of Honselersdijk (South-Holland), where the garden was a reflection of the polder landscape, a supreme expression of control over water and nature with Prince Frederik Hendrik in the role of the protector of the 'garden' of Holland. A. Bega and A. Blooteling, c. 1680. (Private collection Fam. Nijhuis)

[FIG. 07]
The choice of location for country estates is closely related to the underlying landscape, transport networks and landownership. Especially popular were transitions from low to high in combination with glacial ridges, dunes, riverbanks and sandy outcrops. Key considerations included a favourable location in terms of soil conditions and an adequate water supply, as well as natural watercourses like rivers and streams (blue is below sea level, brown above). (Steffen Nijhuis, TU Delft. Data: TU Delft and Pdok.nl/ Kadaster)



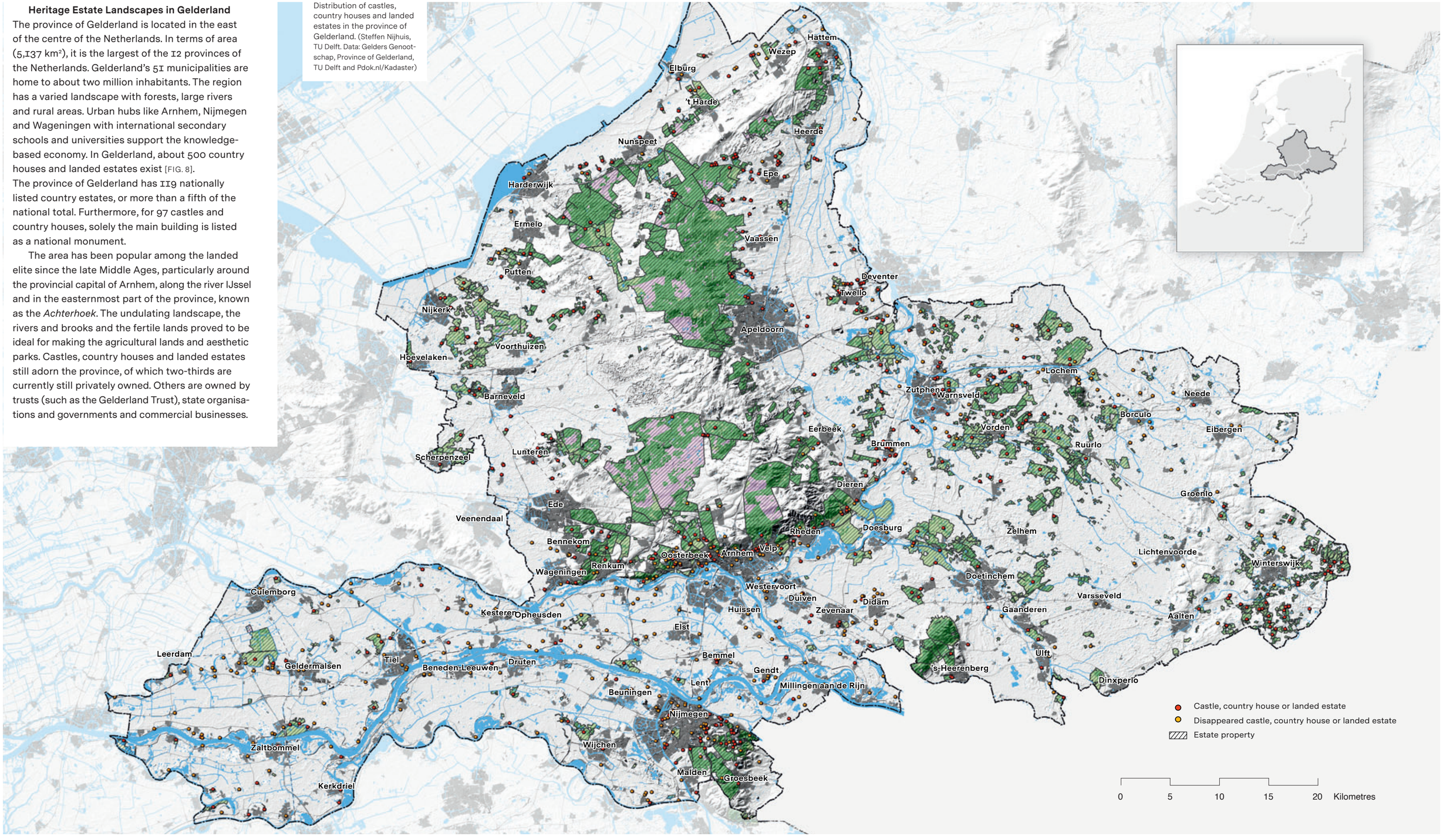
Heritage Estate Landscapes in Gelderland

The province of Gelderland is located in the east of the centre of the Netherlands. In terms of area (5,137 km²), it is the largest of the 12 provinces of the Netherlands. Gelderland's 51 municipalities are home to about two million inhabitants. The region has a varied landscape with forests, large rivers and rural areas. Urban hubs like Arnhem, Nijmegen and Wageningen with international secondary schools and universities support the knowledge-based economy. In Gelderland, about 500 country houses and landed estates exist [FIG. 8].

The province of Gelderland has 119 nationally listed country estates, or more than a fifth of the national total. Furthermore, for 97 castles and country houses, solely the main building is listed as a national monument.

The area has been popular among the landed elite since the late Middle Ages, particularly around the provincial capital of Arnhem, along the river IJssel and in the easternmost part of the province, known as the *Achterhoek*. The undulating landscape, the rivers and brooks and the fertile lands proved to be ideal for making the agricultural lands and aesthetic parks. Castles, country houses and landed estates still adorn the province, of which two-thirds are currently still privately owned. Others are owned by trusts (such as the Gelderland Trust), state organisations and governments and commercial businesses.

[FIG. 08]
Distribution of castles, country houses and landed estates in the province of Gelderland. (Steffen Nijhuis, TU Delft. Data: Gelders Genootschap, Province of Gelderland, TU Delft and Pdok.nl/Kadaster)



Conservation and Protection

In terms of conservation and protection of estates, there is a long tradition in the Netherlands, but since the 1930s, policymakers have turned away from the estate landscapes in their entirety.[9] The focus is on the building as a monument and not on the building in the landscape context. For sustainable conservation and development of castles, country houses, and estates, it is crucial to understand them in their landscape context.[10] This is to relate individual country houses to their immediate surroundings – garden, park, grounds – as a physical, functional and social ensemble but also on a regional scale, where clusters of several country houses are considered in their surroundings and make up estate landscapes [FIG. 9]. In historic estate landscapes, the buildings and other functions are interwoven with the landscape, as it were. They are part of the whole from which they derive their picturesque effect, which they in turn partly give back to the whole according to the 19th-century landscape architect prince Hermann Von Pückler-Muskau.[11]

Future-Proof Heritage Estate Landscapes

To achieve future-proof heritage estate landscapes it is necessary to put historic castles, country houses and landed estates in a regional perspective. Take the periodic droughts that are having an adverse effect on estate gardens and parks: that problem can only be solved by a regional approach because the water system is a regional system. Tourism, too, demands more than any individual estate is able to facilitate. What is needed is a supra-local approach that connects interesting places via attractive routes and ensures a dispersal of visitors.

This calls for a landscape-based regional design approach that deals sensitively with historically valuable landscape features while also enhancing the spatial quality by shaping changes.[12] Such a strategy can be used for understanding historical castles, country houses and landed estates as a coherent whole and within their social and ecological context.[13] It is a form of knowledge-driven spatial design in which knowledge of the vertical and horizontal integrity – the structure – of the estate landscape serves as a basis for its preservation and development. In this approach knowledge of landscape heritage and spatial planning reinforce one another. New tasks involving water, nature, heritage, recreation and farming are seen not as a threat, but as an opportunity to strengthen the structure of the estate landscape and to add spatial qualities related to identity, experience, use and sustainability.

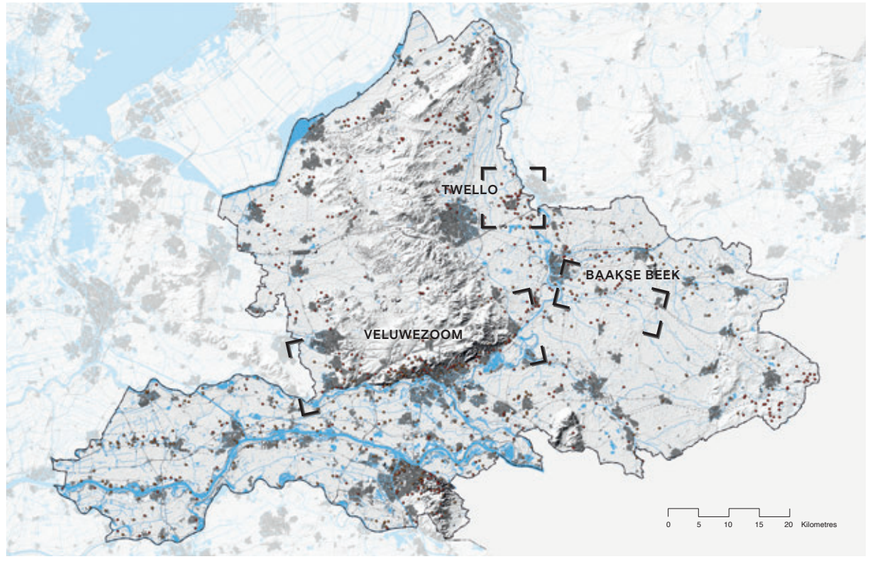
Design as research on a local and regional scale can be employed for the spatial exploration and visualisation of development strategies, principles and potential integrated solutions. This occurs in a participatory process where stakeholders collectively weigh up the pros and cons, learn together, find common ground and co-create. Owing to the combination of content, involvement and process, the landscape-based regional design approach becomes a powerful methodology for increasing the resilience and adaptability of the heritage estate landscape and, in so doing, making this landscape future-proof.

Three Learning Cases

Though the book presents an approach and practices that are useful for other regions too, three heritage estate landscapes in Gelderland serve to illustrate the application of the approach and its outcomes: [1] Estate landscape Veluwezoom, located at the south-east-facing flank of the Veluwe, a glacial ridge; [2] estate landscape Baakse Beek, located in the undulating cover-sand landscape along a brook with the same name in the *Achterhoek*; and [3] estate landscape *Twello* in the flood plains of the river IJssel [FIG. 10].

Though the choice of the cases is arbitrary – because how to select in such a rich pallet of heritage estate landscapes present in Gelderland – for practical reasons we focussed on well-known heritage estate landscapes in which estate owners, municipalities, the Province, the water management

[FIG. 09]
Estate landscapes as scale-continuum. (Steffen Nijhuis & Elyze Storms, drawing: Shirley Warlich)
- The country house or castle is the main building, the core of the country or landed estate;
- The country house or landed estate as a heritage ensemble (including a country house or castle, parklands, woodlands, farms, etc.);
- The country house or landed estate as a part of a broader cultural landscape; the estate landscape (including neighbouring country and landed estates, villages, etc.); and
- A region to which the estate landscape belongs. From this spatial level, one can easily zoom out to the provincial and national level, and, if needed, the international level.



[FIG. 10]
Three estate landscapes in Gelderland as learning cases. (Steffen Nijhuis, TU Delft. Data: Gelders Genootschap, Province of Gelderland, TU Delft and Pdok.nl/Kadaster)

authority and others were already collaborating to some degree. The cases represent the 'low-hanging fruit' in the province, ready to be developed further, facilitated and studied. These particular heritage estate landscapes were also part of a collaborative project of TU Delft Landscape Architecture, the Province of Gelderland and heritage organisation Gelders Genootschap in the framework of the 'Characteristic and Sustainable Heritage (KaDEr)'-programme and the EU-Interreg project Innocastle.

Structure of the Book

In chapter 2 we outline the landscape-based regional approach that can help to protect and develop the heritage estate landscapes. Next to theoretical backgrounds, it elaborates practical ways to understand the estate landscape as a living system and the strategic role of design in collaborative processes.

To be able to apply a landscape-based regional approach, an understanding of the history and genesis of the estate landscapes is needed, addressed in chapter 3 and two intermezzos providing more backgrounds to the three selected estate landscapes and some of their estates.

Chapter 4 then discusses the three cases in more detail. Here the living labs are introduced, as well as their focus and take-home lessons. Also, landscape architecture design explorations showcase the possibilities for the development of future-proof heritage estate landscapes. Here an intermezzo focusses on an example of using historical landscape structures for creating a climate-robust water system.

Chapter 5 shows best practices from other regions in the Netherlands and European countries as inspiration, especially from partner countries in the Interreg project Innocastle. Finally, chapter 6 reflects on the possibilities of incorporating the landscape-based regional approach in the actual practice of governance and policy-making around the protection and development of heritage estate landscapes.

1 Parts of the following text have been published in Nijhuis, Thissen & Storms-Smeets 2021.
2 Van der Wyck 1983; Maas 1967; Oldemeijerink 2017.
3 E.g., Steenbergen & Reh 2011; Fagiolo 2011; Dyrmann, Finch & Frausing 2019.
4 Girouard 1978.
5 E.g. Bezemer-Sellers 2001.
6 Bijhouwer 1946; Van Lutter velt 1948; Van Tent 1967; Maas 1967; Harten 1992; Renes 1996; Koppert 2015.
7 Ruijgrok 2012, 2018.
8 Renes 2021.
9 Van der Wyck 1983a; Thissen 2021.
10 E.g. Bierens de Haan 1994; Van Assen & Wierda 2002; Steenbergen & Reh 2003; Verschuure-Stuip 2019; Spiekhout 2020.
11 Von Pückler-Muskau 1834/2014.
12 Nijhuis 2021, 2022.
13 For other research perspectives, see: Ronnes 2021.

[FIG. 01]
De Wiersse, a monumental estate that is privately owned and inherits an internationally famous historical garden that attracts many visitors.
(Photo: Leontien Lamers)

[FIG. 02]
Embellishment of the estate grounds is from all times. From the house and pathways sightlines and views framed by clumps of trees and shrubbery were the subject of careful design. 19th-century design for the pleasure grounds around Ruurlo Castle, E.C. Scholten, 1879. (Gelders Archief, Arnhem)

Towards a Landscape-Based Regional Approach for Future-Proof Heritage Estate Landscapes

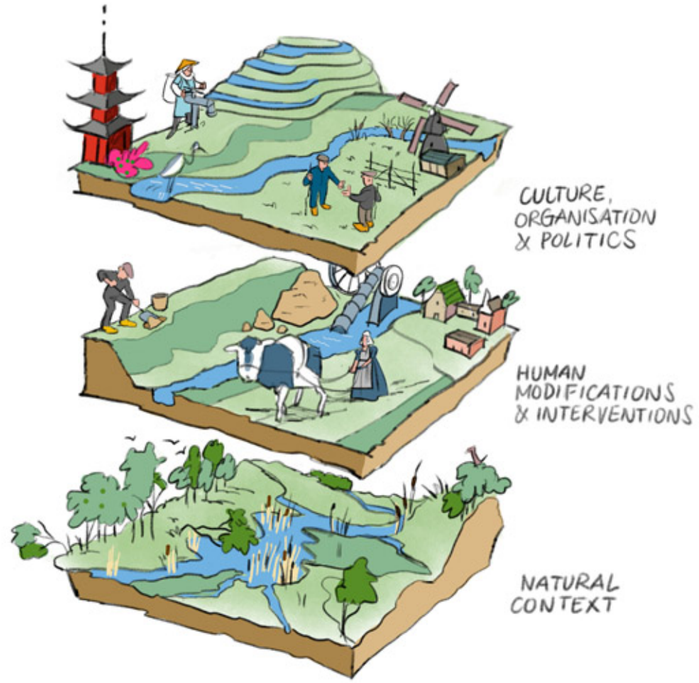
Heritage estate landscapes around the globe are under enormous pressure from climate change and urbanisation – along with associated challenges relating to water, nature, energy, farming, recreation and tourism.[1] For instance, climate change has a significant effect on the water management of estate landscapes, especially the abundance and shortage of water, and changes in temperature that threaten the vegetation on the grounds.[2] At the same time, the pressure is increasing due to ongoing urbanisation and related recreational needs and increased influx of visitors [FIG. 1].[3] Also, rural landscapes have to deal with spatial fragmentation due to urbanisation, changing ownership, change of function, new infrastructure and so on. These challenges have such huge spatial consequences and are so complex that a regional perspective or 'helicopter view' is necessary in order to understand the coherence and systemic relationships within and between the estates and find common ground on which stakeholders can work together. At that level, based on the existing landscape structure, spatial strategies can be developed for the protection of the estate landscape and to achieve coherent solutions that also add new qualities [FIG. 2]. But how can we understand heritage estate landscapes from a spatial point of view, throughout the scales? How can we apply this knowledge in protecting and future-proofing them? [FIGS. 3 & 4]

Understanding Estate Landscapes as a Living System

Heritage estate landscapes are not only expressions of investment, enjoyment or power; they are also genuinely cultural landscapes. A definition of cultural landscapes adopted by the Council of Europe is: 'An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.'[4] This definition emphasises two aspects: landscape as the result of interaction of humans with their environment and the dynamic nature of the landscape. Landscape changes with and without human intervention. Sometimes the changes are far-reaching, sometimes less so. Some changes, such as the consequences

[FIG. 03]
Fragmentation is a problem that has threatened the coherence of estate landscapes for a long time. The construction of the railway in Arnhem interrupted the continuous spatial relationship from Sonsbeek with the lower parts. Album Staats Evers, 1865. (Gelders Archief, Arnhem)

[FIG. 04]
Due to water level changes caused by an abundance and shortage of water, the root system of this monumental beech became susceptible to wind and was blown over at Het Medler estate. (Photo: Steffen Nijhuis, TU Delft)



[FIG. 05]
The estate landscape and its genesis can be understood by examining three layers and their interrelationships: the natural context; human modifications and interventions in this; and the culture, organisation and politics. (Steffen Nijhuis, TU Delft, drawing: Shirley Warlich)

of climate change, take a long time to become visible. Nevertheless, change can also occur swiftly, as when a new housing development is built in a former agricultural area. This is why landscape can be conceived as a living system, which is to say, a complex and dynamic network of subsystems that are constantly changing in response to natural processes, social demands and technical possibilities. In this perspective, we should understand estate landscapes as an interface between nature and society, which manifests itself in a material space of both structures and processes.

Layering

A practical and widely used method entails analysing the landscape in layers and organising them according to the influence and dynamics of change.[5] Unpacking the estate landscape in layers is a way of grasping the different systems and subsystems and their relationships. This dissection into layers should not be seen as a static or hierarchical arrangement. Instead, it is about discrete layers that influence one another to a greater or lesser degree, and that influence may also change with time.

The estate landscape and its genesis can be researched by examining the following three layers and their interrelationships: the natural context, or the 'hardware'; human modifications of or interventions in this, or the 'software'; and the cultural, institu-tional and conceptual ideas, or the 'orgware'[6] [FIG. 5].

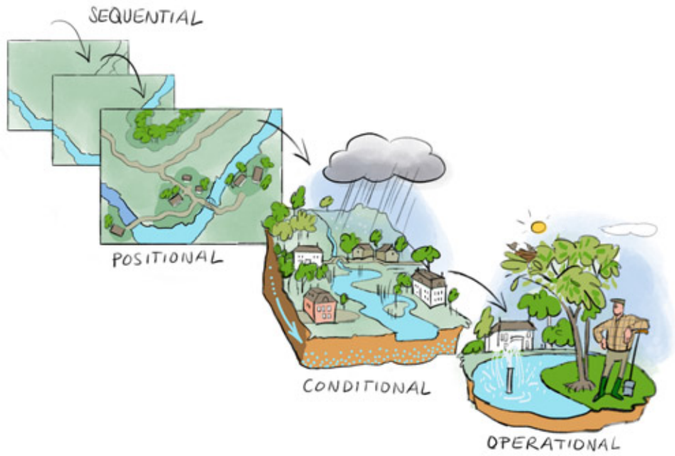
Natural Context: The natural context refers to the relief, water, soil, geomorphological structure, climate and related ecosystems. This first layer should not be regarded as a discrete factor but as a central and inextricable component of the system that determines how the landscape can be used. Estate landscapes tend to be found in transition areas between high and low ground related to glacial ridges, dunes, levee deposits along rivers and sandy outcrops with brooks. The dynamics of this primary condition are characterised by a slow, often almost imperceptible process of change, repetition and natural cycles.

Human Modifications and Interventions: The logic of the estate landscape cannot be understood without considering human modifications of the natural context: the second layer. Human activity is part and parcel of using the natural context for living, working, food production and recreation. Human beings appropriate the natural environment through agriculture, building country estates and their gardens, road and canal building, canalisation of watercourses and so on. In the Netherlands as well major reclamation schemes like the Beemster Polder (1612) were created for farming, but also for the construction of country houses as a refuge from the city.[7] Over the course of history, the cultivation of the natural landscape has resulted in a succession of sometimes far-reaching, irreversible changes.

Culture, Organisation and Politics: This third layer comprises the cultural, spiritual and religious conceptions of the natural context and our engagement with it, including the state of science and technology, organisational forms, political movements, design concepts and aesthetic ideals. Water, for example, has different meanings in different cultures, which can find expression in landscape-architectural treatments in parks and gardens. The dynamics of this layer relate to the relatively short term, linked to people and politics.

Spatial Relationships

An understanding of estate landscapes is inherent to the concept of the layers and their relationships that constitute the landscape system. The estate landscape is a relational structure that connects and influences scales and spatial, ecological, functional and social entities. The estate landscape is a holistic system and a scale continuum that we can only understand by looking at different spatial scales and their relationships.[8] That is to say that individual country houses, together with their gardens, parks and grounds, make up an estate, and that multiple estates make up an estate landscape, and the estate landscapes make up a region. Thus, country estates are part of a scale-continuum in which relationships are shaped via the attachment, connection and embedment of a specific site or location into the broader landscape context at different scale levels. We can analyse these relationships at different scales by looking at positional, conditional and operational factors and their interactions [FIG. 6].[9]

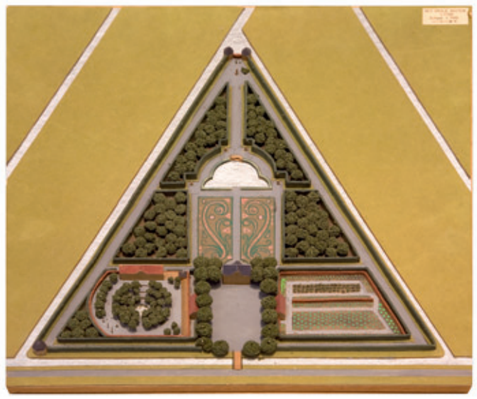


[FIG. 06]
Exploring estate landscapes at different scale levels and their positional, conditional and operational relationships. Sequential relationships are also important to understand the development through time. (Steffen Nijhuis, TU Delft, drawing: Shirley Warlich)

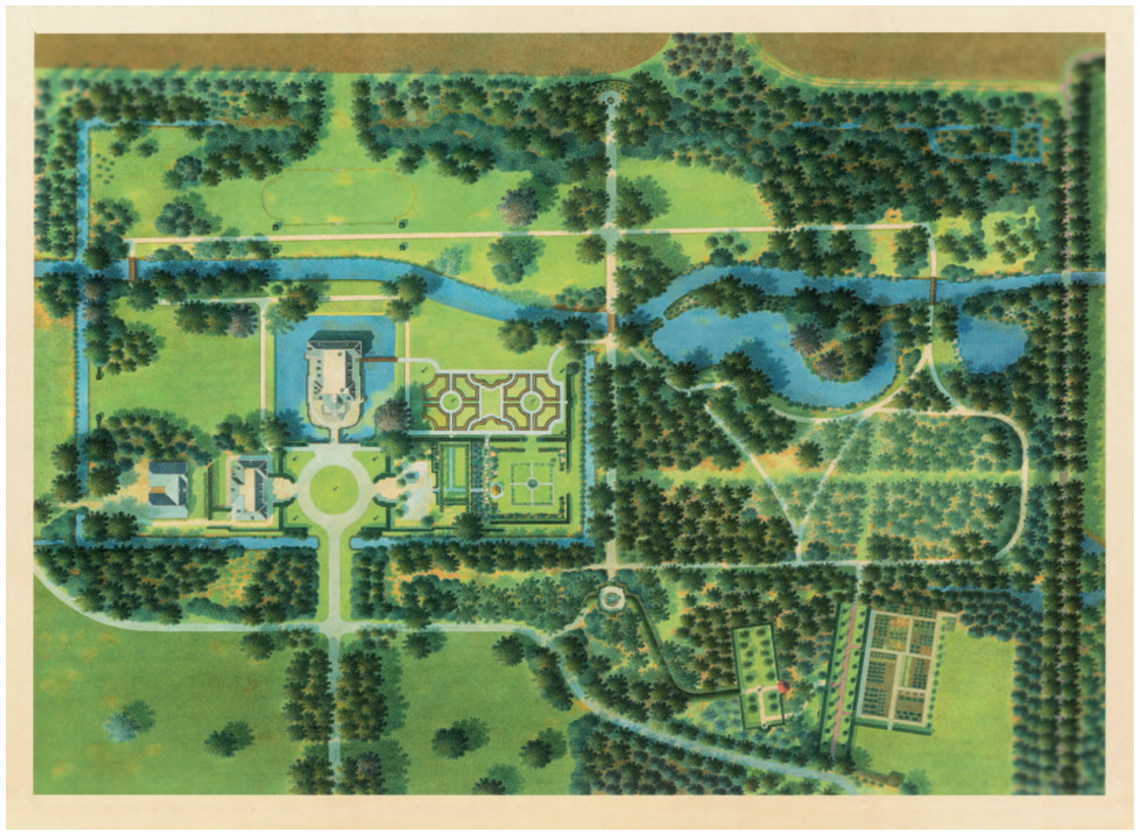
Positional Relationships: This type of relationship refers to the regional scale and is about the location of the estate landscape in the natural and urban system. These types of relationships determine the possibilities for land use such as farming, forestry and leisure. The adjacency to cities, accessibility, value and availability of (new) land, and strategic positions in terms of geopolitics and social status were also important allocation factors.[10] Furthermore, the social and commercial networks of landowners have been significant in shaping estate landscapes, through their choices of designers, design, plant and tree species, and the way the landscape was used.[11]

The distribution and characteristics of the different estate landscapes are often related to physical-geographic landscape types they are connected too, such as the river landscape, cover-sand landscape, dune landscape and landscape of the glacial ridges. Each of these landscapes has its own distinct spatial-visual appearance, structure, history and coherence between physical, biological and anthropogenic factors.[12] As mentioned in the introduction chapter, we focus on three particular estate landscapes related to the south-eastern edge of the glacial ridge the Veluwe, the cover-sand landscape around the Baakse Beek and the floodplain of the river IJssel **[Close-up: Three estate landscapes in Gelderland]**.

Conditional Relationships: At the scale level of clusters of estate landscapes and individual country estates conditional relationships such as accessibility by boat, carriage and train were important, as well favourable soil conditions – not too wet, not too dry and stable enough to build on –



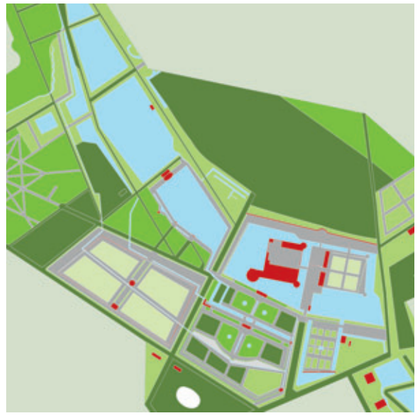
[FIG. 07]
Model of the ideal estate on a small parcel of land as proposed by Pieter de la Cour van der Voort in his famous treatise on estate-building published in 1737. J.T.P. Bijhouwer, 1960s. (Photo: Steffen Nijhuis, TU Delft)



[FIG. 08]
The gardens at De Wiersse underwent several transformations. At the beginning of the 19th century several garden sections within the large framework were changed to the English landscape style. The boxwood parterre with roses and a sunken garden with flowering borders to the east of the house are from around 1912. Later romantic views with sightlines terminating at a statue, staircase or hill were added. Aquarelle by Frits van Amerongen, c. 1990. (De Wiersse Archive)

and access to sufficient surface water, along with natural watercourses such as rivers and streams. The available land and its possibilities for the creation of pleasure grounds, agriculture and so on were also important conditional factors.[13] Conditions were also improved by the construction of road or barge canals and water works to control the water. 17th- and 18th-century Dutch virtues such as reasonableness, frugality, thoughtfulness and audacity were important in this regard, as exemplified by the 18th-century treatise on the design and construction of country estates by Pieter de la Cour van der Voort, where he elaborates design ideas on how to reach optimal spatio-visual conditions on only small parcels of land [FIG. 7].[14] Based on the conditions and the time of the development, the regional differences in the landscape types become apparent.[15] For instance, the estate landscapes in the floodplain of the river IJssel are very different than the estate landscape related to the river Vecht (near Amsterdam).

Operational Relationships: These relationships refer to the site conditions that affect the country estate directly. The availability of water, moisture and nutrients in the soil and microclimatic aspects such as light, precipitation, wind and temperature



1718

1722

1863

2010

[FIGS. 09 A, B, C & D]
Reconstruction of the development of Rosendael garden and park based on the garden designs of J. Smit & B. Elshof (1718), D. Marot (1722), J.D. Zocher jr. (1863), present situation (2010). (Maps: Luc Joosten, adapted by Steffen Nijhuis, TU Delft)

are important factors. At the operational level, the interventions and constructions to enhance the site conditions by roads and pathways, irrigation and drainage, fertilisation of poor soils, plantations, grazing, etc. are also of crucial importance. The 18th-century landscape architect Humpry Repton identified three distinctive zones that make up the country estate: [16] [1] the garden or 'dressed ground' around the house, [2] the park stretching into the middle distance and, for landed estates, [3] land for agriculture, agroforestry and hunting. Each of these zones have their particular function and divide 'working' from 'pleasure'.

The pleasure grounds – the garden and park – are intentionally designed by the owners to embellish the estate, often with help of anonymous or well-known garden and landscape architects. These pleasure grounds are often referred to as garden art to indicate the cultural significance and reflect the interplay of fashion and taste in the period in which it was designed.[17] The landscape architectonic composition of the gardens and parks can take on many forms, ranging from geometric to naturalistic typologies, but are often the result of incremental changes of style over the centuries [FIG. 8 & 9].[18] Composition elements such as fountains, parterres,

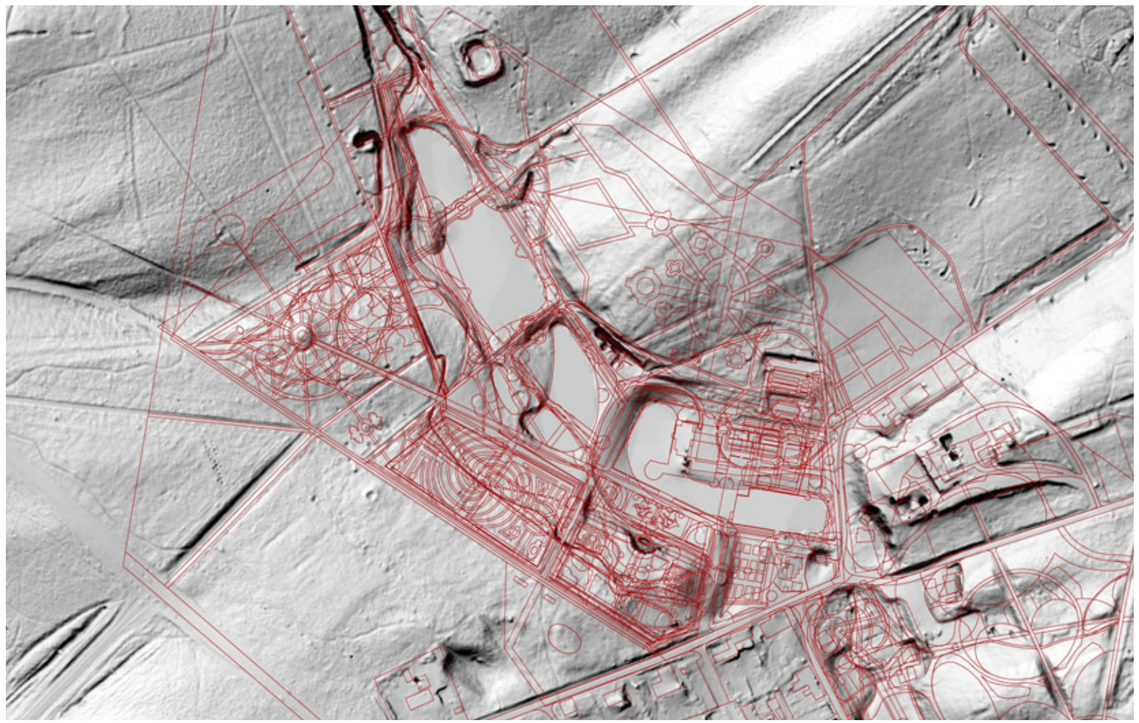
topiary, tree avenues, sculptures, clumps of trees and vistas are some of the landscape-architectural features one can find in the pleasure grounds of the estate [FIG. 2]. For landed estates there is an additional zone dedicated to agriculture, agroforestry and hunting. Here agricultural land was the economic basis and is used for different forms of farming: cattle for meat and milk, growing crops for food production, forestry for wood production, hunting and so on.[19] In this zone one often can find traces of cultural-historical features and land use, such as flood meadows, groove forests (*rabattenbossen*; lines of trees planted on the ridges between ditches), watermills, etc. Here roads with tree avenues often connect the different functions on the ground and are a visual marker of control. **[Close-up: Country estates in their landscape context]**

Estate Landscapes as Ongoing History

Time is an essential factor in understanding estate landscapes. Over time estate landscapes underwent transformations resulting from selections based on possibilities and evaluation. Some structures, patterns and forms were preserved; others continue to develop or are replaced by new ones, resulting in a rich historical and typological variation.[20] Spatial transformation or series of transformations usually balance more permanent landscape structures and others more prone to rapid change.[21] The more permanent ones tend to be resistant to change and, over time, become more robust (and even inert). Those asynchronous transformations turn the landscape into a layered whole in which physical traces of time can reinforce or contradict one another.[22]

Therefore, the estate landscape as we can see it now is the result of developments, events or land use from the past. Soil formation or erosion, heavy fertilisation, flooding, irrigation and canalisation are sequential factors with great impact on the conditions of the estate. As mentioned before, changing taste and fashion stimulated estate owners to transform their gardens and parks over time [FIGS. 9 & 10]. In addition, processes related to inheritance had often great effect on landownership and the spatial coherence of the estate landscape. Each of these transformations provides a window on a range of chronologies, events and meanings that connect the traditional and the contemporary, the tangible and the intangible. In that respect, an estate landscape is so rich in meaning that it can be 'read' as

[FIG. 10]
The garden of Rosendael Castle as palimpsest. Remnants of the past are still visible in the terrain. (Map: Luc Joosten, adapted by Steffen Nijhuis, TU Delft)



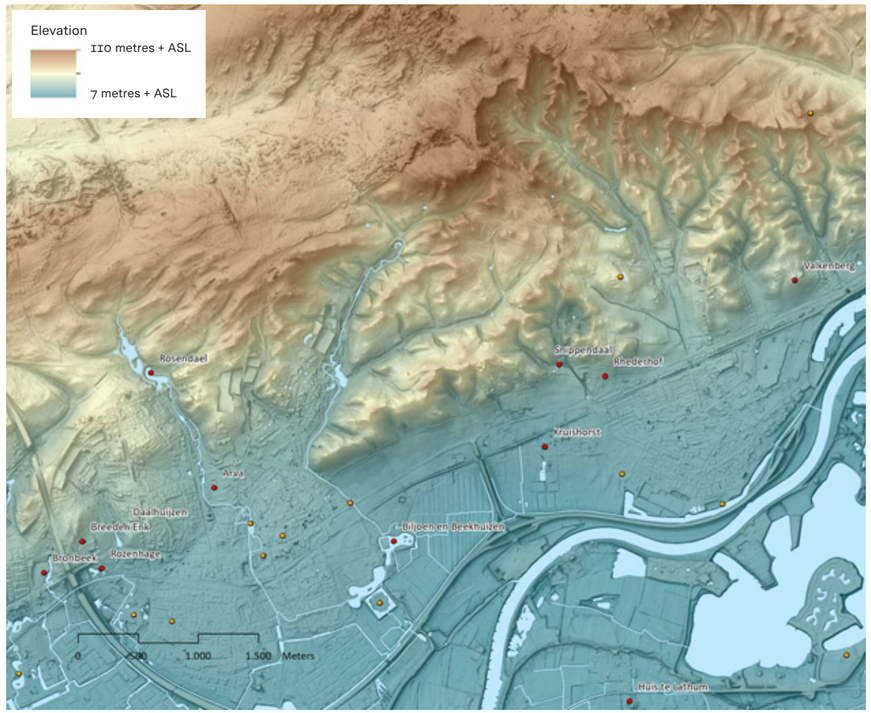
a biography, as a palimpsest that illustrates the key activities that have contributed to the formation of that landscape.[23]

Key to the estate landscape as history is the notion of the *longue durée,* the landscape as a long-term structure that changes over time in the process of 'sequent occupance'.[24] Knowledge of these historical traces is one of the starting points for new transformations of the estate landscape: the addition of new 'layers'. The evolution of the estate landscape is inherent in the 'erasure' and the 'writing' of history. As we see it now, the estate landscape results from a gradual process of selection in which some elements remain, and others change or are replaced.

Visual Representations and Topographic Data

In the process of understanding estate landscapes at different scale levels and through time visual representations and topographic data is essential. This is to represent the estate landscape as it lies within one's own direct experience and to convey the physical shape and pattern of the region or site and its development.[25] Contemporary and modern (historical) maps, plans and vertical aerial photographs, as well as oblique and eye-level photographs, paintings, etchings and drawings, in digital or analogue form, are all useful sources of topographic data and provide an impression of spatial patterns and the visual appearance of the estate landscape at certain points in time.[26] Other documentary sources, such as estate and personal papers, guide books and visitors' descriptions and planting lists can also be used.[27]

Topographic and thematic maps are considered primary sources for exploring estate landscapes and their development, as they are detailed and generally the most reliable visual representations of cultural and natural features on the ground.[28] Donkersloot-de Vrij (1995) introduced a useful typology of topographic maps for landscape research, with private estate or property maps (pre-cadastral maps), cadastral maps and ordnance survey maps as important categories. The famous map series of the estate landscapes of the East-Veluwe and Overijssel compiled and made by Van der Wijck can serve as an example.[29]



[FIG. 12]
High-resolution height data obtained by airborne terrestrial laser scanning prove to be very useful in research on estate landscapes. (Steffen Nijhuis, TU Delft; data: Pdok.nl/ Kadaster)

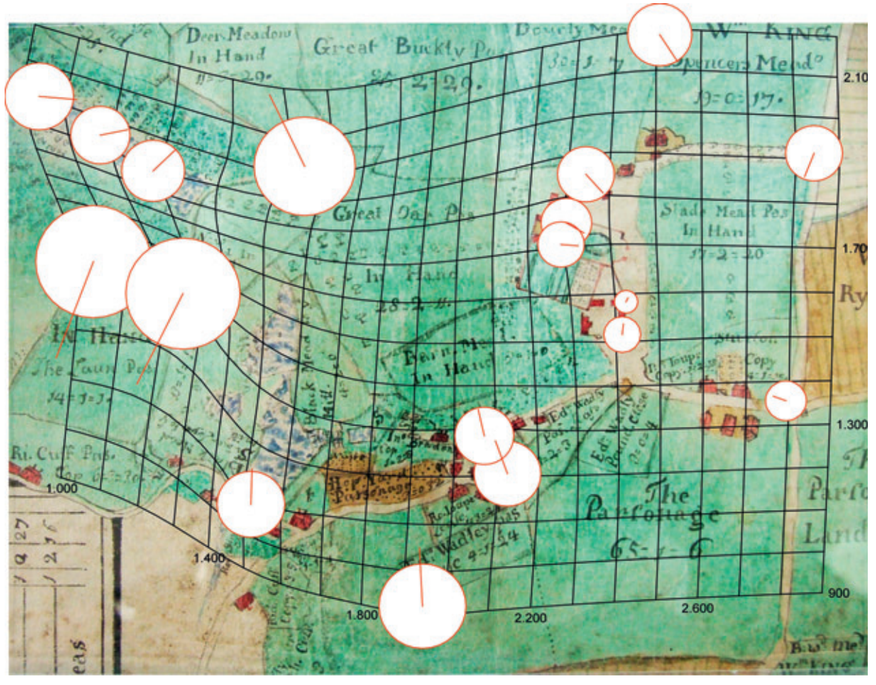
[FIG. 11]
Historical survey maps are important sources of topographic data. 17th-century survey of the Wierser broek, a swampy area in the swampy stream valley of the Baakse Beek and the higher grounds called *horsten* between De Wiersse, Het Medler and De Wildenborch. Nicolaas van Geelkerkercken, 1651. (Gelders Archief, Arnhem)

[FIG. 13]
Design drawing by H. Copijn of the lower part of the Hemelse Berg estate in Oosterbeek (1872–76). The drawing provides information about the intentions of the landscape architect; for example, he paid much attention to sightlines and panoramas towards the river Rhine and provided a varied planting of trees and shrubs. (Wageningen University, Special Collections)

[FIG. 14]
Cartometric analysis of a historical map (1722) of the English estate Stourhead to determine the level of accuracy. (Steffen Nijhuis, TU Delft)

Maps of a much larger scale are plans (i.e. design plans). These are detailed maps with a high level of accuracy and provide precise information on buildings, vegetation, water or paths. Plans present views of a horizontal slice of the landscape design from above and represent the patterns and geometric relationships of a ground plan. Useful plans in garden architecture research include: design plans, planting schemes, thematic study maps and technical details as important complementary categories.[30] Thematic maps focus on a specific theme or subject area. Particularly useful are those thematic maps that isolate topographic features such as relief (i.e. contour lines), hydrography and land use, or show soil types, hydrology and geological features [FIGS. 11, 12 & 13]. Elevations and sections are like plans but present a vertical slice of the landscape design and provide a sense on how it works internally. Three-dimensional drawings are visual representations of solid objects on a two-dimensional surface depicting their relative positions, sizes and relationships viewed from a particular viewpoint. Virtual and physical scale models add the possibility to switch viewpoints dynamically (i.e. through movement) and to construct or observe spatial relationships three-dimensionally.[31]

Geographic Information Systems, GIS in short, are powerful digital instruments for spatial research into historical estate landscapes aimed at increasing knowledge about historical layout, spatial coherence and development over time.[32] Applications include data gathering, the use and processing of available analogue and digital sources as well as cartometric source analysis, measurement and correction of



deviations in historical cartographic material in the interests of reconstruction [FIG. 14]. Promising in this regard is the use of terrestrial laser scanning techniques, enabling researchers to acquire high-resolution full-colour three-dimensional point clouds of the pleasure grounds and architectural features [FIGS. 15, 16 & 17]. GIS-based analyses of the spatial structure and coherence over time from horizontal (from inside) and vertical (from above) perspectives is also a significant application, together with diffe-rent forms of representation such as maps, virtual landscapes and three-dimensional prints. In these ways can GIS effectively extend the researcher's observation via measurements, simulations and experiments, and opens new perspectives on the situational and cultural-historical aspects of country estates, which can play a part in value assessment and decisions regarding the use and management of these living green monuments.[33]

Landscape-Conscious Design Strategies

Urbanisation, climate change, loss of biodiversity and increasing tourism calls for a future-oriented approach because rapid spatial development and functional change can compromise the layering and legibility of the heritage estate landscape. There is a danger that the cultural identity of the estate landscape will disappear and result in irreversible damage and loss of capital.[34] Avoiding this outcome requires a careful approach in the form of a regional spatial strategy based on in-depth knowledge of the landscape and its development over time. It also calls for 'management of change', focussed on creating resilient estate landscapes in which the past continues to play an important role.[35] The existing 'landscape logic' – as a result of the layering and relationships as discussed before – provides starting points for planning and designing resilient estate landscapes across the scales. In that perspective the landscape itself provides structure, ecological coherence and variation, but is also flexible and multifunctional.

Thinking about the future requires the involvement of designers, such as landscape architects and urban designers. Every designer consciously or subconsciously bases his or her work on general principles, leading to a particular design strategy.[36] A design strategy is a plan of action to achieve an overall aim. In other words, it implies having to choose a consistent manner of approach which is recognisable in the way it works and in its design outcomes. There are at least four landscape-conscious design strategies that take the spatial context, functionality and flexibility at different scale levels as a starting point: [37]

Firstly, by taking the natural landscape system and its related processes as a starting point. This entails a multi-scale and 'vertical approach' that takes advantage of variations in the relief, soil and water system when siting and designing changes and adding new functions.[38] This is important since diversity and identity of the estate landscape are in large part a reflection of the diversity of the physical substratum. The natural system is formed by the relief, water, soil, geological subsoil, climate and the related ecosystems. The natural substratum determines where one can do what under what conditions, or even better not to. For example, we can improve the logic of the landscape by taking into account natural differences in height such as moraines, riverbanks and stream valleys in spatial planning and design. These determine the natural direction

[FIG. 15]
Employing a field instrument, a terrestrial laser scanner, to create a digital point cloud of the shell gallery in the park of Rosendael Castle. This technology can be used to create a detailed digital copy of architectural and natural features for study and monitoring. (Photo: Steffen Nijhuis, TU Delft)

[FIG. 16]
Visualisation of a high-resolution true colour laser scan of the shell gallery in the park of Rosendael Castle, 2019. (Steffen Nijhuis, TU Delft)

[FIG. 17]
Visualisation of a high-resolution true colour laser scan of a part of the Rosendael park, garden and castle, 2019. (Steffen Nijhuis, TU Delft)

[FIG. 18]
De-canalising the Buurserbeek at the Lankheet estate (Haaksbergen, Province Overijssel) was important for the reintroduction of the traditional method of flood meadows at the estate, but also contributed to redevelopment of brook ecosystems and increased the sponge capacity of the area.
(Photo: Sjon Heijenga, Beeldbank van de Leefomgeving)

[FIG. 19]
In the Achterhoek, groove forests (*rabattenbossen*) were traditionally used for enabling forestry under wet conditions. Nowadays they can serve as reservoirs to store water for dry periods.
(Photo: Eric Brinckmann)

[FIG. 20]
Reopened historic church path near Renkum to increase the accessibility of the estate landscape.
(Photo: Sjon Heijenga, Beeldbank van de Leefomgeving)

[FIG. 21]
The cover-sand landscape is characterised by a small-scale spatial composition with alternating patterns of farmland and forests.
(Photo: Leontien Lammers)

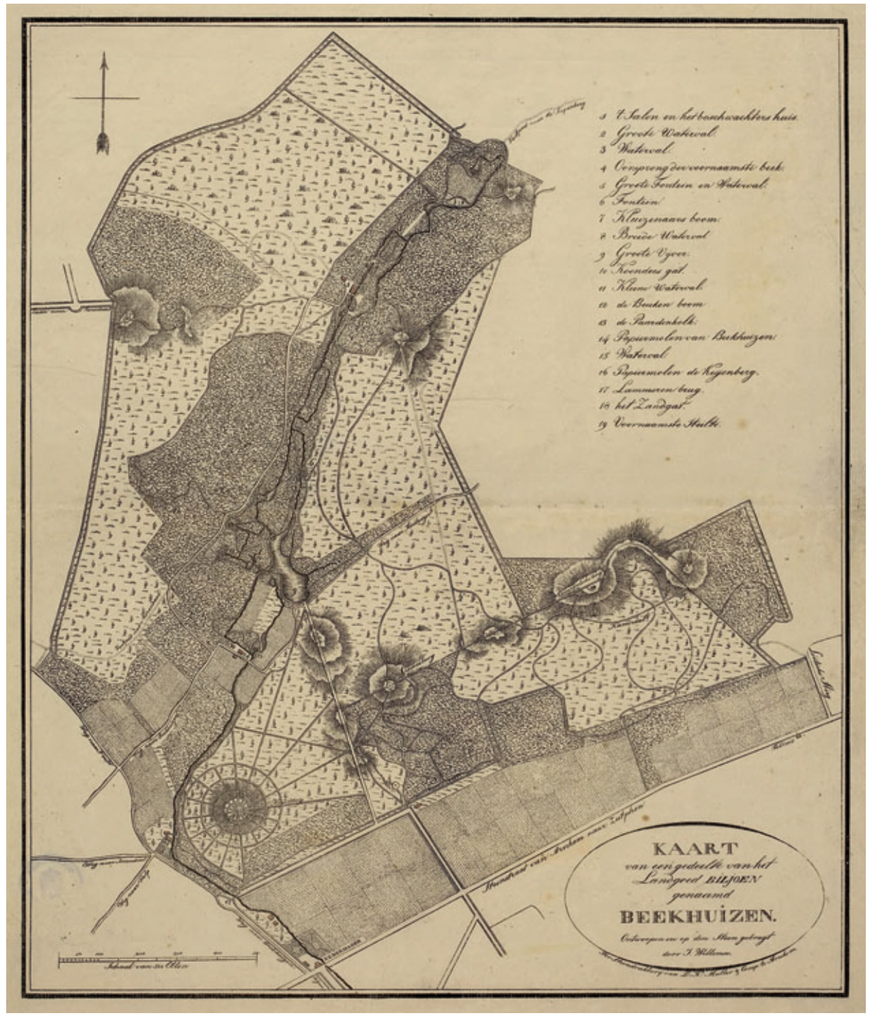
[FIG. 22]
Reuse of traditional flood meadows at the Lankheet estate (Haaksbergen, Province Overijssel). For this purpose, the system of banks, ditches and reservoirs was restored.
(Photo: Eric Brinckmann)

of water flow, where water infiltrates or ex-filtrates through seepage, or where water is retained or collected. By considering this logic in the design or transformation of an existing situation a safe and sustainable water system is created. Another example is stream restoration, whereby canalised streams regain their natural course and special ecosystems develop [FIG. 18]. In terms of species selection, the obvious choice is to use indigenous species adapted to local natural conditions to ensure healthy planting and contribute to ecological coherence and biodiversity. Inspiration for planting and management can be gained by looking at the (potential) natural vegetation and the related ecological succession.

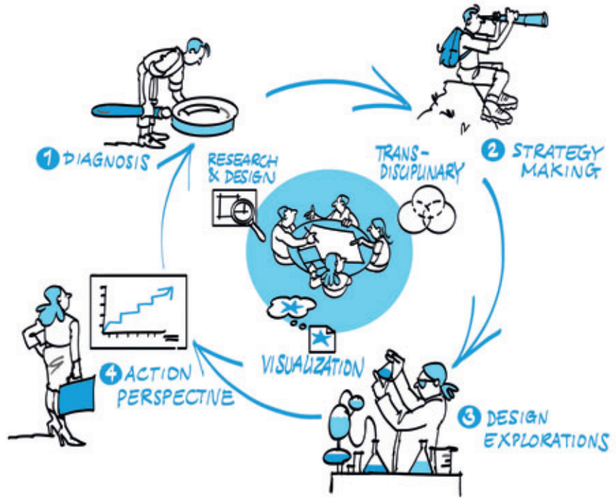
A landscape-conscious design strategy also makes use of landscape history. In the course of time, every landscape changes with certain structures, patterns and elements remaining, others developing or being replaced by new ones, as discussed before. Old structures and related practices often contain important information about the condition of the terrain or cultural attitudes.[39] By consciously allowing historical landscape elements to be part of spatial development, the identity of the area is strengthened. Traditional landscape management is a great source of inspiration in this respect, as it often includes cultural-historical landscape elements as part of water solutions, such as flow meadows to replenish groundwater or groove forests for water buffering[40] [FIGS. 19 & 22]. Or, for example, reopening historic church paths or clog paths to increase the accessibility of an area [FIG. 20]. In this way, the landscape remains rich in meaning and the landscape of the past becomes part of the future.

Spatial perception is a crucial part of a landscape-conscious design strategy. By working with the spatial-visual characteristics of the landscape,

[FIG. 23]
Connecting the farmland visually to the pleasure grounds at De Wiersse through application of the landscape architecture principle of 'borrowing scenery'. (Photo: Steffen Nijhuis, TU Delft)



[FIG. 24]
In the period from about 1775–90, a park was created in the hills at the Biljoen-Beekhuizen estate according to the idea of Baron van Spaen, who created a fascinating Arcadian landscape, referred to as 'Gelders Arcadia', in which a route leads visitors along a number of views with special elements, such as a large cascade, a meandering stream, pavilions, garden ornaments and viewpoints with panoramic views. This is the earliest design of a park in the landscape style in Gelderland with the involvement of J.G. Michael, who also designed the first landscape garden of the Netherlands at Beeckestijn in the 1860s. (Noord-Holland). Map by J. Willemse, 1823 (Gelders Archief, Arnhem)



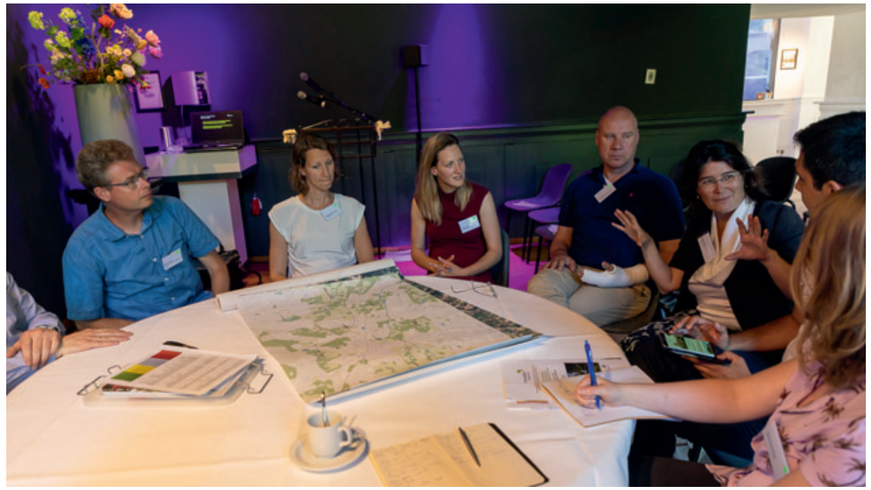
[FIG. 25]
Landscape-based regional design as an adaptive planning and design process that consists of four iterative stages of co-creation in which research and design, visualisation and transdisciplinary working plays a central role. (Steffen Nijhuis, TU Delft, drawing: Shirley Warlich)

such as the size and scale of the space, enclosed or open, orientation of the space, clear boundaries or not, presence of sightlines, etc., one can enhance legibility and enrich spatial experience [FIG. 21].
In estate landscapes, sightlines and panoramas often play an important role: that of making the surrounding landscape scenery or a particular landmark visually ('borrowing scenery') part of the garden or park architecture [FIG. 23]. Routing and scenography are also often important features of parks and gardens around estates, such as can be experienced in the first landscape garden of Gelderland, Beekhuizen, near Biljoen [FIG. 24].[41] Unity, spatial layout and outward appearance are important spatial characteristics that determine the perception and appreciation of the heritage estate landscape.

Landscape is also a social construction. Therefore, a landscape-conscious design strategy should be part of an approach which is also about cooperation between landowners, citizens, experts and authorities in order to make joint considerations, learn together and co-create.

Landscape-Based Regional Design Approach

In a landscape-based regional design approach, landscape logic and landscape-conscious design strategies are linked in a process aimed at promoting socio-ecological inclusivity, diversity and flexibility – preconditions for the emergence and continued existence of a resilient system.[42] This adaptive planning and design process is based on four iterative phases: gaining understanding (diagnosis), strategy making, design explorations and defining an action perspective [FIG. 25].[43] The basic condition of such a process is formed by a strong relation between research and design, visualisation and transdisciplinary working. This landscape-based regional design approach effectively creates conditions for change and guides it in positive directions through the development of robust landscape structures that connect spatial levels of scale and provides scope for individual elaboration at the local level. Adopting a landscape-based regional design approach to the challenges facing the heritage estate landscape can contribute to integrated sectoral activities and lead to coordinated sustainable outcomes that profit everyone. It is a design-focussed and transdisciplinary approach that guides, harmonises and shapes change by:[44] [1] taking the regional landscape structure and associated processes as a basis (vertical approach), and the natural landscape as a guiding principle in the design of spatial transformations of estate landscapes at all levels of scale; [2] creating and regenerating living ecological and social systems; [3] (bio)diversity, cultural history and multifunctionality as the basis for socio-ecologically inclusive and water-sensitive estate landscapes; [4] developing resilient and adaptive spatial frameworks; [5] robust landscape structures for the coherent development of the region (long-term strategy) while adopting an enabling and flexible approach for local projects (short-term intervention); [6] pursuing a design-focussed, multidimensional approach; [7] knowledge-based spatial design as an integrated approach involving owners, academics, entrepreneurs, professionals and government officials.



[FIG. 26]
Estate owners, experts and government representatives think together in a workshop. (Image: Province of Gelderland)

[FIG. 27]
Master plan for Twickel's garden and park by Van Gessel (1995–2000). In this design, two parts of the park were connected by a new avenue. With this, a connection was restored that already existed in the historical plan by Daniel Marot, a designer from the beginning of the 18th century. (Drawing: Michael van Gessel)

New Collaborations:
Co-Creation of Knowledge and Ideas

A landscape-based regional approach also means striking a new balance in the relation between experts, citizens and governments. This calls for a process that is not confined to the domain of landscape experts, but which seeks the active involvement of landowners, administrators, the entrepreneurs and other stakeholders [FIG. 26].[45] The idea is that the participation of all these parties in strategic planning, design and decision-making will enhance the resilience and adaptability of historical estate landscapes – not just in a physical sense, but socio-economically as well. Resilience is defined as a system's ability to react to change or disruption without any alteration to the primary condition.[46] Adaptability is the degree to which certain practices, processes or structures can be modified to suit changing social, economic or ecological circumstances. Modifications can be spontaneous or pre-planned, carried out in response to or in anticipation of such changes.[47] This implies a shared understanding of how the landscape system works on the part of all participants. It also requires a forward-looking, proactive approach in which the interaction between citizens, businesses, experts and government is pivotal.

This can be achieved by building an adaptable social infrastructure to assure equity in the face of socio-economic change and meaningful participation by stakeholders in planning and policy decisions.[48] In practical terms this can be achieved by setting up 'living labs' (or 'communities of practice'). Here the focus is on collaborative thinking and on the generation and implementation of sustainable solutions on different levels of scale. This process is supported by a combination of research, design, engagement and imagination.[49] A living lab can work with both a region and a shared approach. Landowners, academics, designers, entrepreneurs and policymakers work together on an existing situation, defined by geographic and administrative boundaries.[50]

The experience of experimenting responsibly together, of monitoring outcomes and learning from mistakes, gives rise to an informal space in which

everyone is equal.[51] Biodiversity, modularity and tight feedback can strengthen resilience capacity, social capital, slow variables and thresholds and innovation.[52]And this is consistent with the social and political circumstances that are required in order to arrive at solutions on a policy and practical level. Successful examples of this approach can be found in the Dutch Provinces of Gelderland, Zuid-Holland and Utrecht. In Gelderland, the provincial authority, the water board Rhine and IJssel, landowners, conservationists and farmers work collaboratively on challenges relating to the Baakse Beek estate landscape, as we will see later. The end result is that historical structures are preserved and developed further in the interests of sustainable water management, biodiversity and recreation, while there is also scope for local modifications to meet the needs of individual landowners. **[Close-up: Landscape-conscious water system development in practice]**

The Strategic Role of Design

What is the role of the design in such an approach? The spatial designer applies their intellectual and design skills to conceptualisation and form-making. They draw on knowledge from other disciplines, such as cultural history, ecology and water management, which they spatially translate and integrate. 'Designing is an activity the aim of which is to visually represent an innovative solution, wholly new in the designer's conceptual world, to a given task or problem.'[53] Definitions like this, which refer to a process or action, are dominated by verbs like 'find', 'produce' and 'translate'.[54] Designing consequently acts as an intellectual tool for structured thought and action aimed at generating ideas and exploring possible solutions. This method is termed 'design as research'.[55] Targeted searching in a process where thinking and producing go hand in hand is central to this approach. Research and design mechanisms are combined with imagination, creativity and

[FIG. 28]
A new steel bridge designed in the historical park of Twickel (Delden, Overijssel) adds an extra layer to the experience while making visitors spatially aware of the crossing of a small water stream by opening up new views, emphasising the movement and sound of water with a little waterfall hidden underneath the bridge. (Photo: Steffen Nijhuis, TU Delft)

innovation. During the process a conscious or unconscious synthesis occurs, which crystallises in a visual form – through drawing, charting or modelling things using analogue or digital means.[56]

Design as research is a powerful research method for addressing complex spatial tasks in an integrated and creative manner. Its application to estate landscapes is not about opposing change or locking up the existing landscape, but about creating landscape qualities through well-designed new developments. It involves a structured design process in which important aspects are highlighted and design briefs are translated spatially and given concrete form. Spatial design is used to explore possible solutions from a variety of perspectives, but also, via design as research, to come up with and immediately visualise new solutions. The application of design strategies in which historical continuity as well new landscape-conscious design additions play a role often lead to successful implementation of ideas for future-proofing country estates and the landscapes they make up. This is nicely illustrated by the work of landscape architect Michael van Gessel, among others, for the integration of a golf course at the estate of Groot Engelenburg in Brummen, the reconstruction plan for the country estate of Groeneveld near Hilversum or the masterplan of the Twickel estate near Delden, with beautiful additions to the historical park that blend the old and the new [FIGS. 27 & 28].[57]

In a research-through-design process, in this perspective several co-creative sessions are organised together with owners, regional and local governments, landscape designers, experts, students and other stakeholders. Design outcomes provide a context for conversations and observations about the importance of certain landscape structures and elements and make it possible to discuss solutions and measures in terms of their spatial qualities.

1 Parts of this chapter have been published in Nijhuis, Thissen & Storms-Smeets 2021 and Nijhuis 2021.
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3 Watkins & Wright 2007; Aanhoudend droog 2020.
4 Council of Europe 2000; Zonneveld 1995.
5 Braudel 1966.
6 Nijhuis 2020; Nijhuis 2021.
7 Fleischer 2007.
8 Nijhuis 2021.
9 Adapted from: Van Wirdum 1979. See also for a landscape ecology perspective: Van der Molen et al. 2011 and Jalink & Jansen 1995.
10 Maas 1967; Van Tent 1967; Koppert 2015.
11 Smeets 2005.
12 Berendsen 2000.
13 Van Tent 1967; Koppert 2015.
14 De la Cour van der Voort 1737.
15 Bijhouwer 1946.
16 Repton 1803/1980.
17 Van Sypensteyn 1910; Bienfait 1943.
18 For landscape architecture compositions and their typological variation: Steenbergen & Reh 2003.
19 Van Cruyningen 2005; Van Oosterom 2022.
20 Bobic 1990.
21 Ibid.
22 Roymans et al. 2009.
23 Samuels 1979; Corboz 1983.
24 Sauer 1925; Whittlesey 1929.
25 Nijhuis 2015.
26 For plans: Seiler 1985. For maps: Koeman 1968, 1978; Van Mingroot 1989; Donkersloot-de Vrij 1995. For paintings, engravings and drawings: Halpern 1992; Harris & Hays 2008; Richardson 2013.
27 Schmidt 1985; Hunt 1992; Williamson 1992; Grillner 2006.
28 Koeman 1968; Donkersloot-de Vrij 1995.
29 Van der Wijck 1983, 1988.
30 Seiler 1985. An important source of historical maps and plans in the Netherlands are the Special Collections of the Wageningen University & Research.
31 Nijhuis 2015.
32 Nijhuis 2015, 2016.
33 Ibid.
34 Planbureau voor de Leefomgeving 2021.
35 Fairclough 2008.
36 Vroom 1992.
37 Nijhuis 2022b.
38 J.T.P. Bijhouwer (1898–1974), professor of landscape architecture at Wageningen University, was an important pioneer of this approach, in part due to his expertise in plant geography with a focus on the natural distribution of plants in relation to soil. See: Bijhouwer 1926, 1971.
39 Berkes 2018.
40 Berkes 2018; Bleumink & Neefjes 2018.
41 Tromp 2012.
42 Folke 2016.
43 Nijhuis 2022a.
44 Ibid.
45 Renes 2004.
46 Walker & Salt 2006.
47 Folke 2016.
48 Ahern 2011.
49 Maas, Van den Broek & Deuten 2017; Schliwa & McCormick 2017.
50 Maas, Van den Broek & Deuten 2017, 8.
51 Ahern 2011.
52 Walker & Salt 2006.
53 Boekholt 1984, 27.
54 Hamel 1990.
55 Nijhuis, De Vries & Noortman 2017; Nijhuis & De Vries 2019.
56 Ibid.
57 Bertram 2009.

[FIG. 01]
Estate landscapes represent enormous economic value in terms of nature and culture, but also in terms of possibilities for tourism, recreation, farming and forestry.
(Photo: Leontine Lamers)

[CLOSE-UP]

Three Estate Landscapes in Gelderland

Steffen Nijhuis, Michiel Pouderoijen and Elyze Storms-Smeets

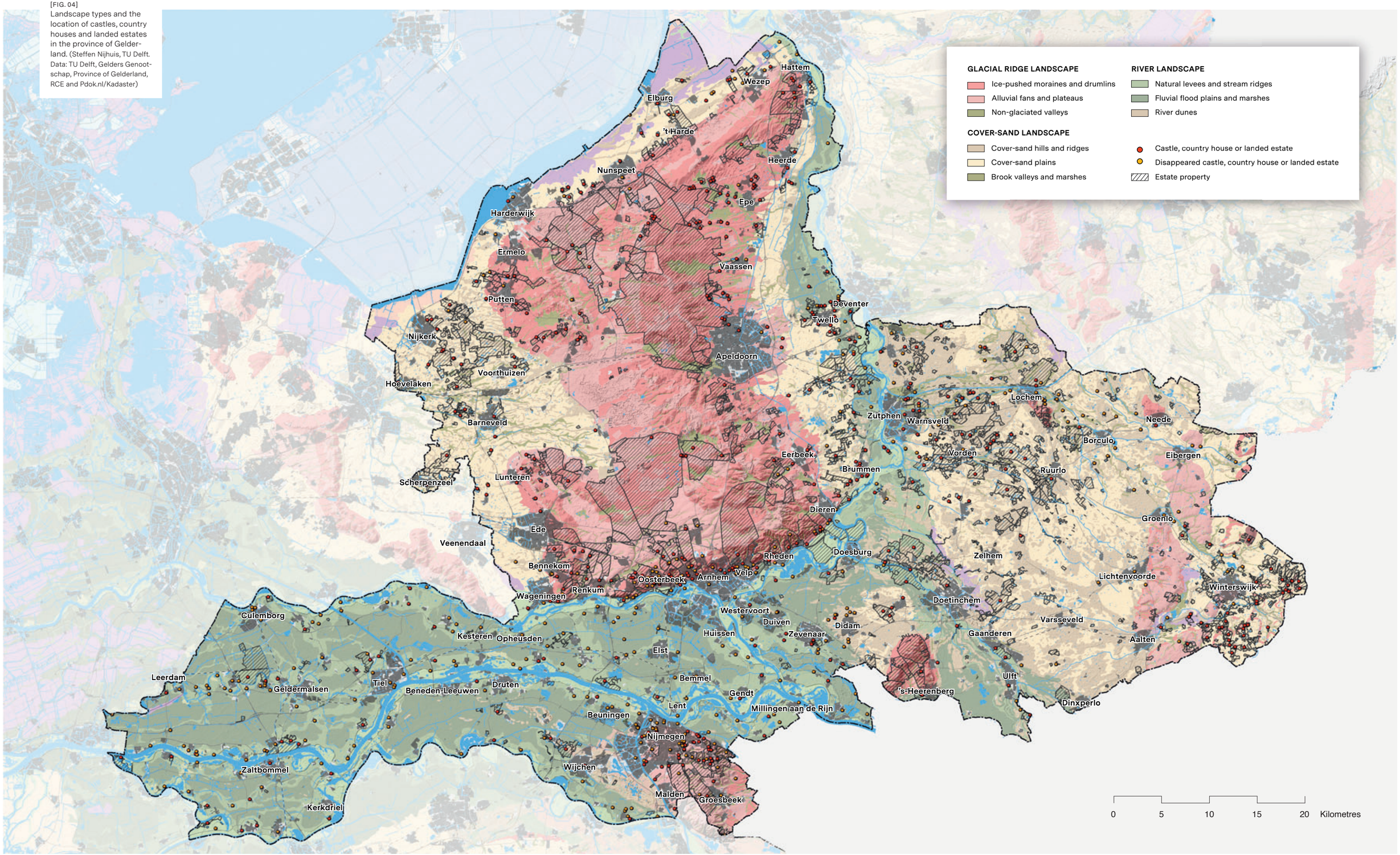
The location of castles, country houses and landed estates in the region is usually determined by natural topography, hydrology, accessibility, land availability and possibilities for land use. In Gelderland there are roughly three landscape types that help to understand the positional and conditional relationships of the estate landscapes: [1] the landscape of the glacial ridges, [2] the river landscape and [3] the cover-sand landscapes [FIG. 4]. Each of these landscapes have their own spatial and systemic characteristics.[1]

Around Arnhem and up to Apeldoorn and Hattem, the estate landscapes are related to a glacial ridge called the Veluwe, especially the south and east side with concentrations around Arnhem and Apeldoorn. The glacial ridge is nowadays covered with forests and patches of heathland. In this region the estates are usually positioned at the flanks or in the valleys. Here the gradient is relatively steep with, for the Netherlands, spectacular height differences offering nice views and fresh water, often articulated in the landscape architecture design of the garden and parks. Here one can find fine examples such as the 17th-century royal palace Het Loo of stadtholder and King William III, with its famous geometric garden, water works and high-pressure fountains. Especially the Kings Fountain could reach a spectacular height of 13.5 metres and competed with the fountains at the French court at Versailles [FIGS. 2, 3 & 5].[2] At the gradual sloping west side of the Veluwe there are also a few estate landscapes, especially in the transition towards the former Zuiderzee, roughly between Nunspeet and Nijkerk. In the south there is another glacial ridge at Nijmegen with an estate landscape between city and Groesbeek also covered with forests. In the river landscape of the IJssel with its levee-deposits, river dunes and flood plains one can also find clusters of strategically positioned estates in the relatively open landscape. In the east, the region called Achterhoek is dominated by a moderate,

[FIG. 02]
The 17th-century royal estate Het Loo is located on the east flanks of the Veluwe, where it could benefit from sufficient water supply via a sophisticated regional water system. Close-up of a map by W. Leenen, 1748. (Paleis Het Loo, Apeldoorn)

[FIG. 03]
The local articulation of the water system for the famous water works and fountains in the palace garden. Close-up of a cadastral map by M.J. de Man, 1827. (Nationaal Archief)

[FIG. 04]
Landscape types and the location of castles, country houses and landed estates in the province of Gelderland. (Steffen Nijhuis, TU Delft. Data: TU Delft, Gelders Genootschap, Province of Gelderland, RCE and Pdok.nl/Kadaster)



undulating cover-sand landscape that is bisected by brooks and their low-lying valleys. This is a small-scale, varied landscape with a subtle topography characterised by a system of sandy ridges and brooks and fen ecosystems[3] in the shallow valleys and a spatial mosaic of farmland alternating with forests. Here the estate landscapes can be found along the brooks, such as the Baakse Beek. Near the German border around Winterswijk other clusters of historical estates can be found in the form of gentlemen's farmsteads, called *scholtengoed*.

Within these regions we find different historical estate landscapes which showcase a wide variety of socio-cultural origins and developments, resulting in a rich pallet of architectural typologies, park and garden architecture and cultural landscape elements. Here we highlight three significant estate landscapes that represent each of the earlier mentioned regions to provide a window into their spatial and cultural diversity.

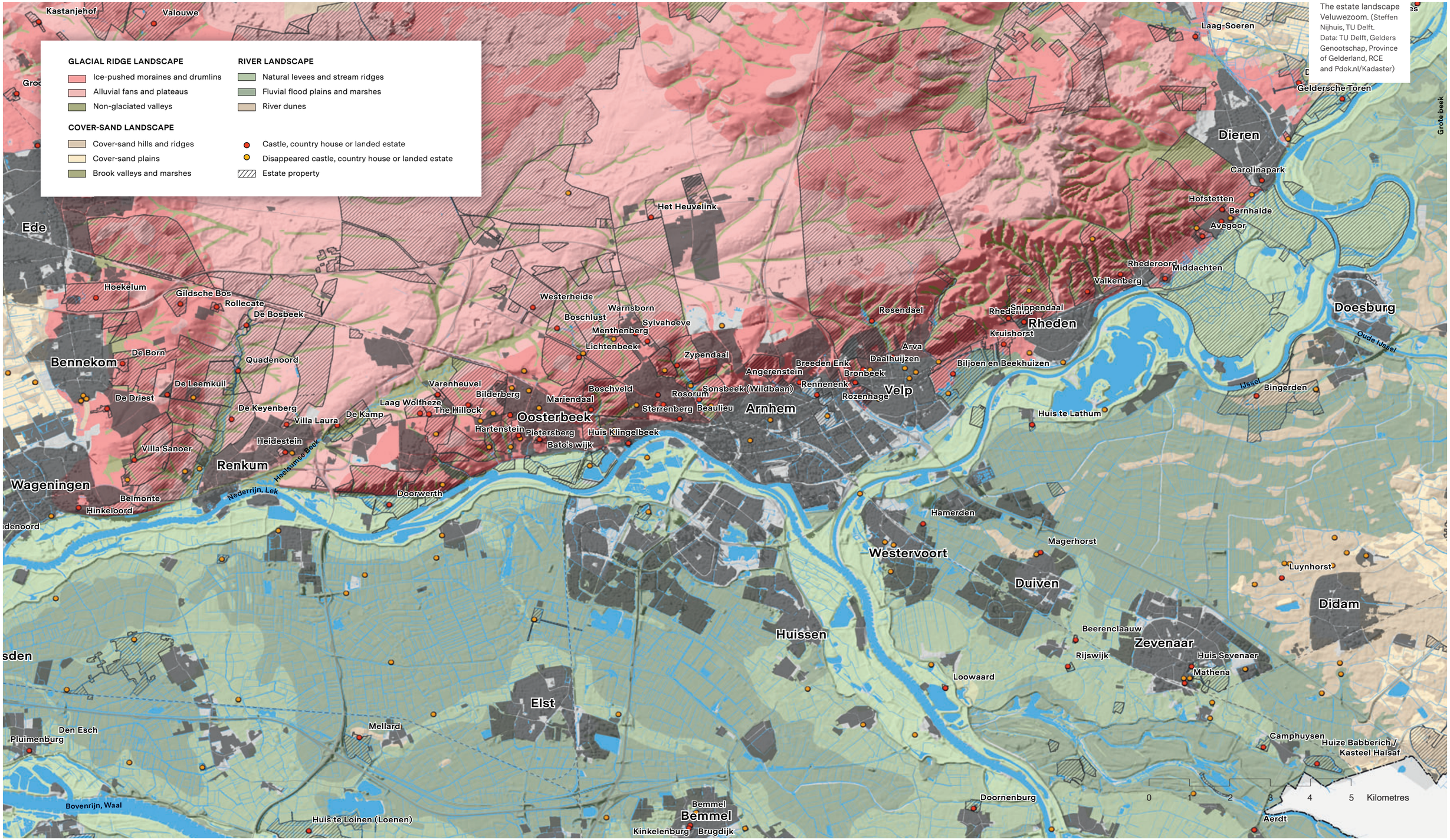
Estate Landscape Veluwezoom: Estates in the Landscape of a Glacial Ridge

This region known as Veluwezoom or Gelders Arcadia has been popular among the landed elite since the late Middle Ages, including noble families, stadtholders, city regents and bankers [FIG. 7].[4] Here we find many castles, country houses and landed estates such as Rosendael, Middachten, Biljoen, Doorwerth, Geldersche Toren, Sonsbeek, Zypendaal, etc.[5] One of the special aspects of this estate landscape is that it shows almost the entire chronology of Dutch country estate development: the emergence of castles and lordships (c. 500–1600), the foundation of small countryside refuges by urban regents (c. 1600–1800),and the creation of villa-like country estates for a new elite of bankers, industrialists and lawyers (c. 1800–1940). The historic country houses and landed estates are manifestations of their time and therefore very diverse: from transformed noble castles with large-landed properties to regent country estates to villa-like country houses for the newly wealthy. Not only the architecture of the house and park, but also the use, the anchoring in the cultural landscape and the social significance went through developments. Originally, medieval estates such as Doorwerth and Middachten were characterised by large land holdings of 500 to 1,500 hectares, with different landscape types and functions [FIG. 6], a big difference with early 20th-century country estates such as De Kamp and Laag-Wolfheze, where the heath was not an indispensable part of an agricultural system, but was seen as romantic nature.

Here the natural landscape is dominated by the geomorphology of the south face (the Veluwezoom) of the earlier mentioned glacial ridge Veluwe.[6] The glacial ridge originates from the ice ages, when

[FIG. 06]
Middachten castle and estate is located on the gradient of the Veluwe to the IJssel. (Photo: Pieter van den Berg, MVO TV)

[FIG. 05]
The gardens with the water work at royal palace Het Loo. Bird's-eye perspective by P. Schenck, 1700. (Paleis Het Loo, Apeldoorn)



[FIG. 07]
The estate landscape Veluwezoom. (Steffen Nijhuis, TU Delft. Data: TU Delft, Gelders Genootschap, Province of Gelderland, RCE and Pdok.nl/Kadaster)

[FIG. 08]
The Beekhuizer Beek is one of many man-made water streams to collect and direct groundwater that surfaces at the flanks of the Veluwe. (Photo: Steffen Nijhuis, TU Delft)

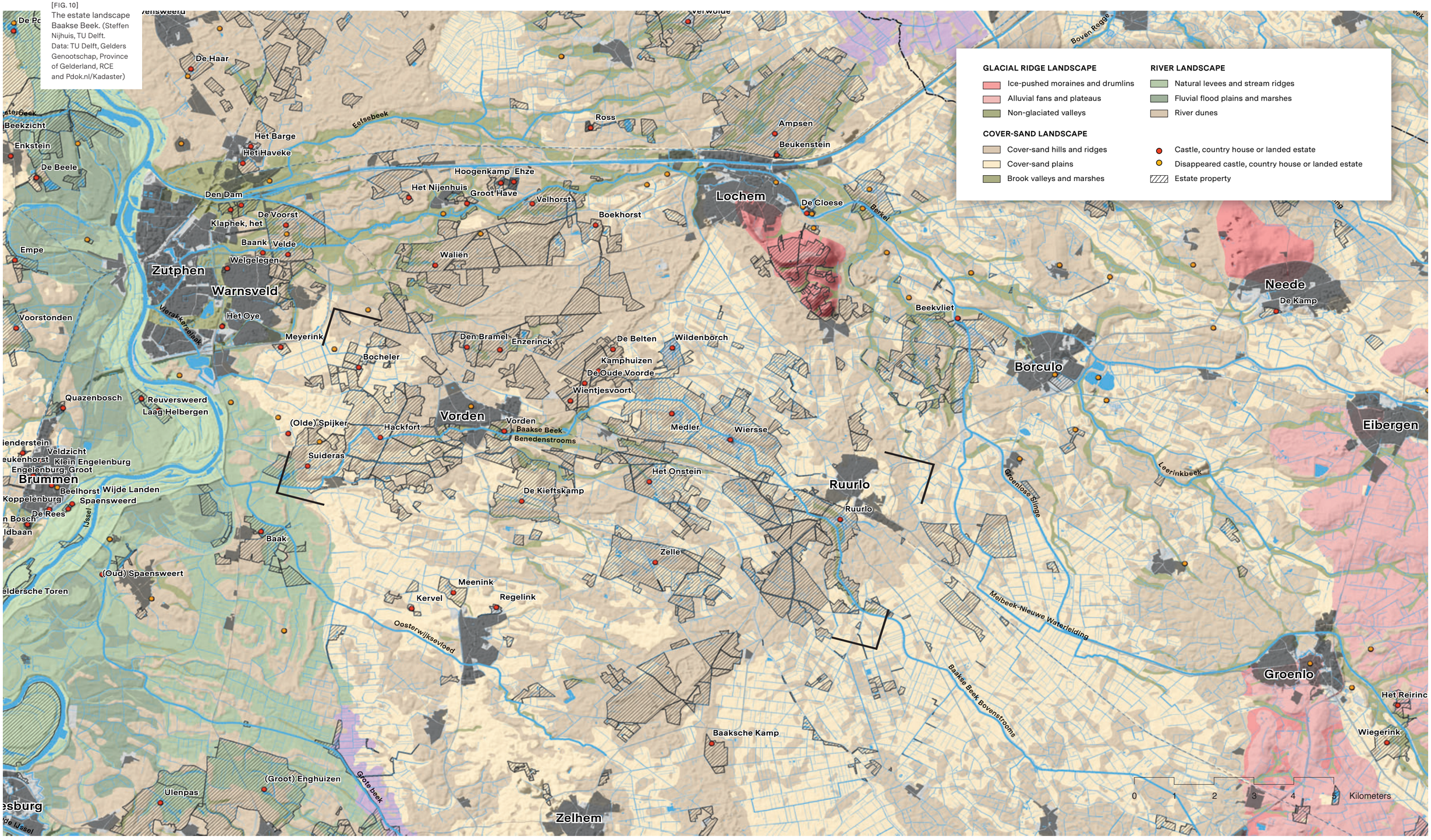
[FIG. 09]
Spraying fountains of 18th-century fountain floor as part of a shell gallery in the park of Rosendael Castle. (Photo: Steffen Nijhuis, TU Delft)

sand and gravel were pushed forwards in frozen condition by moving land ice and piled up into an elongated ridge reaching heights of about 100 metres above sea level. Later valleys were formed by flows of water from thawing ice sheets. Most valleys are asymmetric because the slopes received an uneven amount of sun. At the bottom of the slope there are leaching fans of entrained sediment. Within the sand volume of the glacial ridge there is a groundwater reservoir fed by rainwater infiltration that flows underground to the lower grounds. Therefore, in the valleys and at the foot of the slope, very clean groundwater often comes close to the surface. By digging trenches at these places escaping ground water could be collected and directed. These so-called *sprengen* were frequently used at the edges of the Veluwe for drinking water, driving watermills and later also for the paper industry and laundries [FIG. 8].[7] Due to the large height difference in this undulating landscape, it was often possible to power several mills placed in succession in the stream. Sometimes a stream was artificially guided along contour lines of the valley to create sufficient height difference where desired. A mill pond (*wijer*) in the supply route ensured a constant flow of water and reduction of water shortages during milling. On estates, *sprengen* were also frequently used to feed ponds and ornaments such as waterfalls, cascades and fountains, which are nicely visible at, for example, Castle Rosendael [FIG. 9].

Estate Landscape Baakse Beek: Estates in the Cover-Sand Landscape

In the sandy area of the Achterhoek, the settlement locations for estates are the stream valleys of, among others, Oude IJssel, Berkel and Baakse Beek [FIG. 10]. In the estate landscape Baakse Beek we come across a large number of castles of 13th- and 14th-century origin, including Hackfort, Vorden, Baak and De Wildenborch, Ruurlo, Suideras and De Wiersse.[8] In general, the moated castle grounds were located in the stream valleys, as well as in the meadows and hayfields. The fields with tenant farms and possible hunting areas were located on the higher grounds. Country houses of

[FIG. 10]
The estate landscape Baakse Beek. (Steffen Nijhuis, TU Delft. Data: TU Delft, Gelders Genootschap, Province of Gelderland, RCE and Pdok.nl/Kadaster)

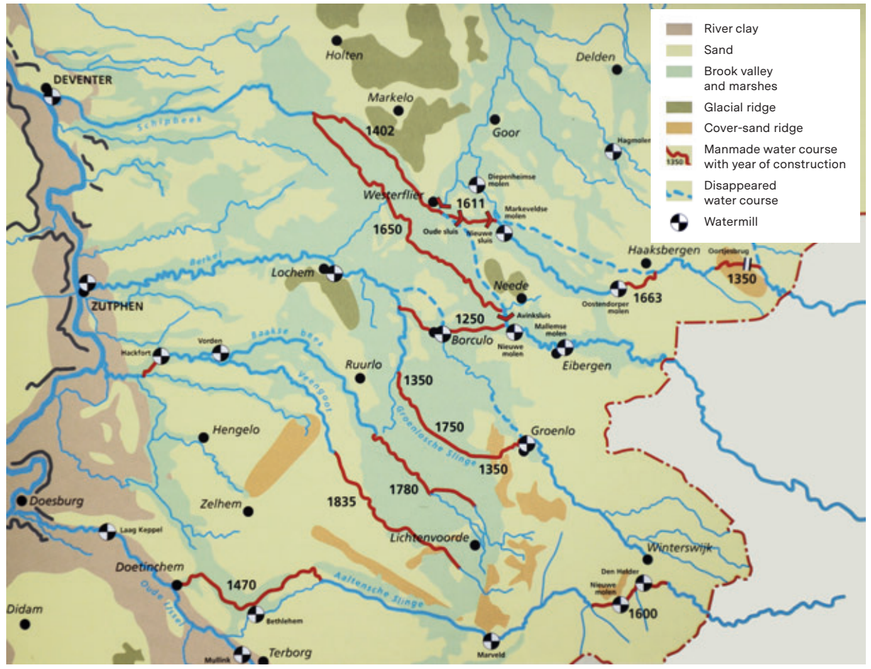


city regents arose in the 17th and 18th century, often in close proximity of the cities and regional roads. Examples include estates such as Het Medler and Het Onstein. Younger estates, from 1800 onwards, were often smaller in size, located on former wastelands and if possible close to new railway and road networks.

The slightly west-facing regional landscape is characterised by a finely meshed pattern of cover-sand hills and ridges and shallow brook valleys with small water streams and fens [FIG. 11].[9] Here one can find an intricate system of natural brooks that over time are adjusted, canalised and extended to drain and irrigate the land and used to drive watermills [FIGS. 12 & 13].[10] Height differences of locally about one metre can often be well observed in the terrain due to sometimes relatively steep edges [FIG. 14].

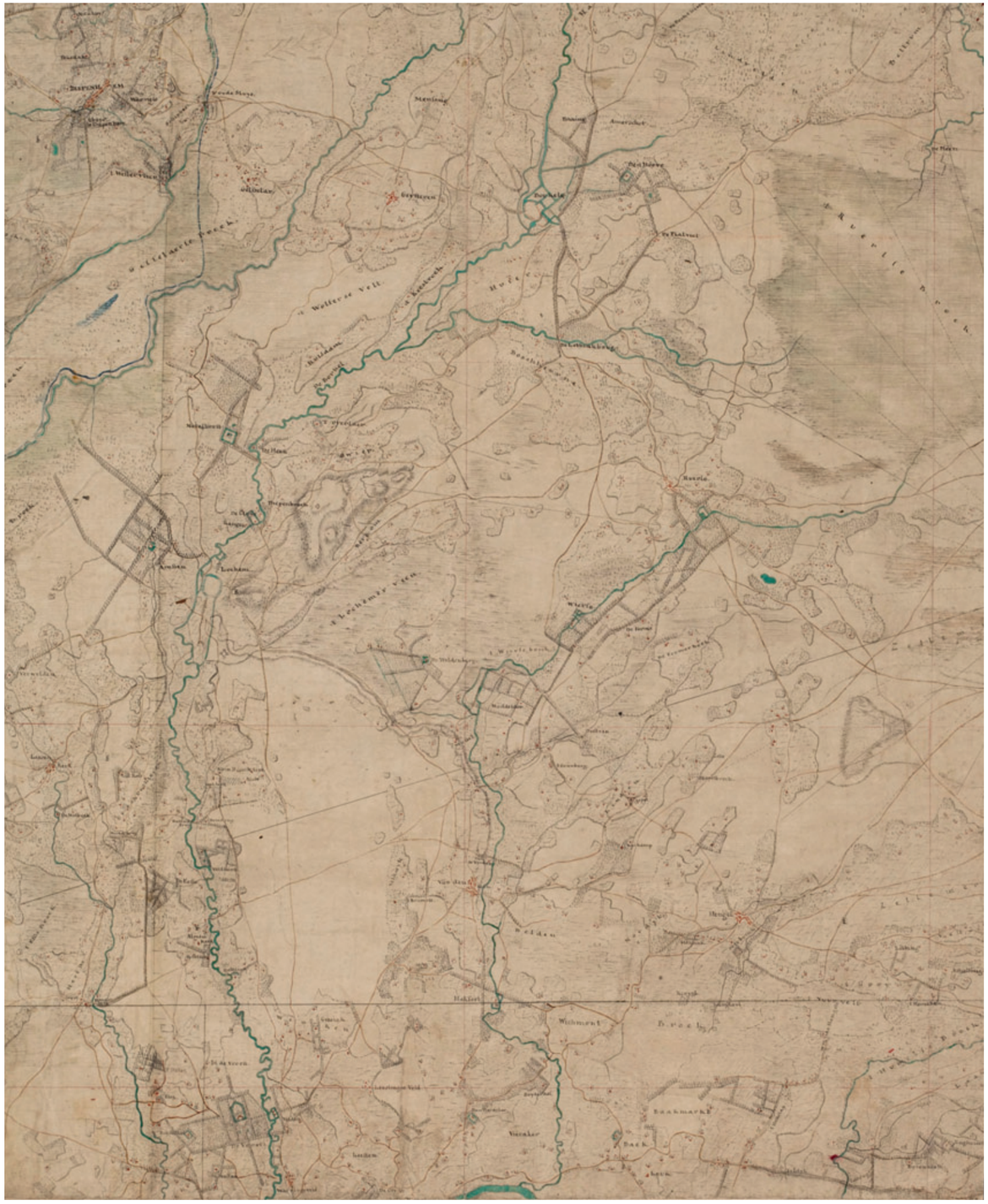
Traditionally, arable farming can be found on the *kampen*, which has raised these cover-sand ridges even further by organic fertilising, while the low, swampy areas are often used as grassland. In many low areas groove forests – raised earthen ledges – have been dug for forestry purposes. Older farms have invariably been built at the edge of cover-sand ridges, between arable land and meadows.

The Baakse Beek as a stream originated in the *Ruurlose broek*, a low-lying fen ecosystem on the plain of washed-down cover sands at the foot of the Eastern Dutch plateau. As a result of the reclamation of this plain for agriculture, the water discharge became more irregular, causing flooding downstream. The canalisation of the Baakse Beek and the digging of the Veengoot did solve these problems, but the areas that depended on a steadier



[FIG. 11]
A 19th-century survey of a part of the Achterhoek depicting the meshed pattern of cover-sand hills and ridges, shallow brook valleys and the related system of brooks. The estates are connected to the water courses. North to the left. (Gelders Archief, Arnhem)

[FIG. 12]
The brooks of the Achterhoek and its man-made extensions and watermills. (Image: Driessen, Van de Ven and Wasser, 2000)



water supply dried out [FIG. 15]. On several of the estates, irrigation systems, called flow meadows, were in use to channel mineral-rich seepage and/or brook water over the grasslands.[11] Acidification of the soil was prevented and the additional supply of fertiliser allowed up to three cuts of hay to be harvested. In some places the quays that were part of that system are still visible around meadows.

Estate Landscape Twello: Estates in the River Landscape

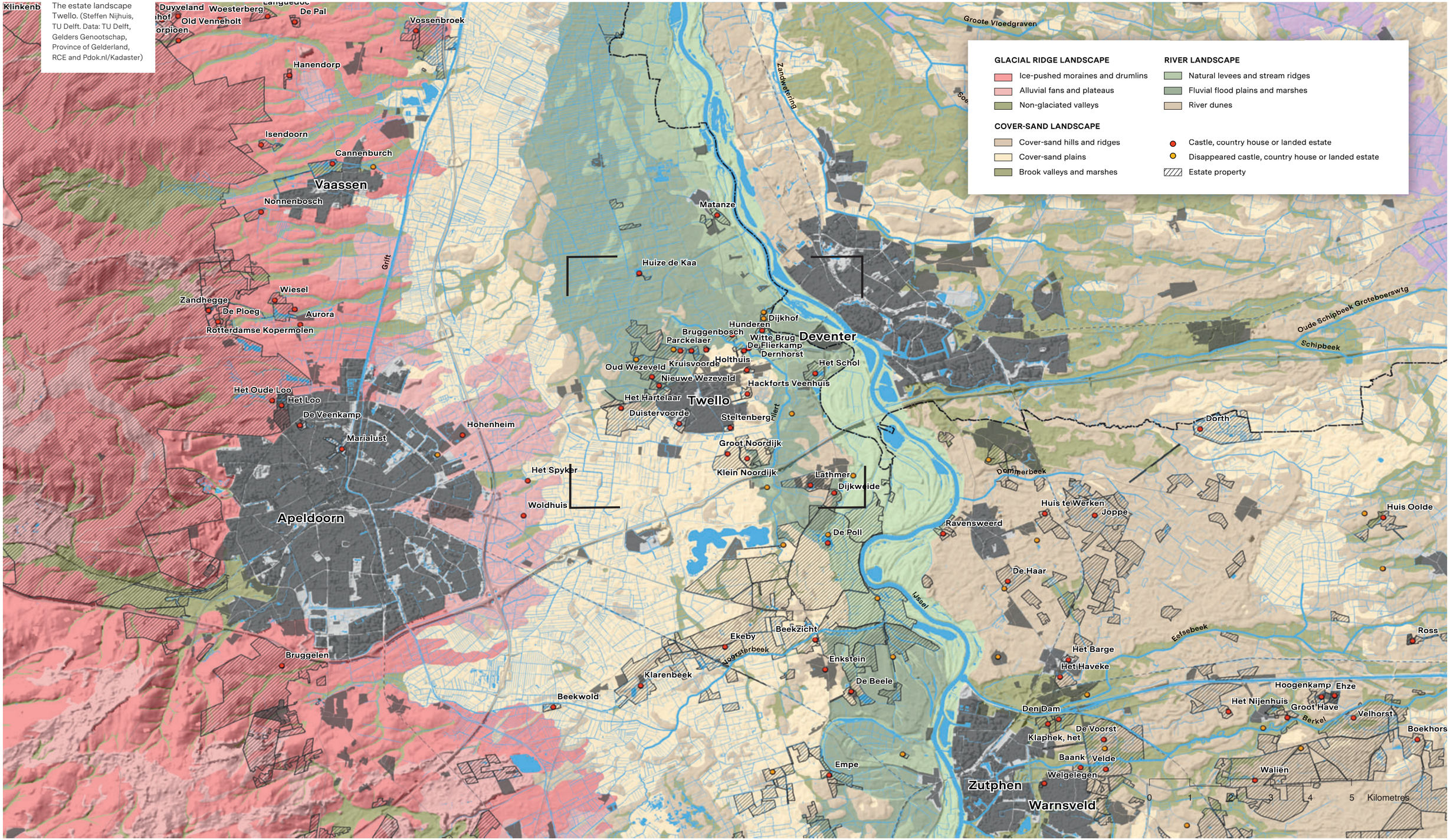
The area offers a wide variety of landscapes in the high-sand transition area from the Veluwe to the IJssel Valley [FIG. 16]. Around Twello several so-called *havezaten* – enforced farmhouses or small fortified houses – existed, such as 't Wezeveld, Kruisvoorde and Het Holthuis. Many gentlemen's chambers for city regents and merchants could also be found at farmsteads in the 18th century,

[FIG. 13]
The watermill at Hackfort castle, near Vorden. (Photo: Steffen Nijhuis, TU Delft)

[FIG. 14]
The relatively steep gradient between the sandy ridge and brook valley at Hackfort castle. (Photo: Steffen Nijhuis, TU Delft)

[FIG. 15]
The Veengoot ('moor drain') is a canal in the water system of the Baakse Beek. It was broadened and deepened as part of extensive works in the period 1960–75, aimed at draining agricultural land. Nowadays the drainage on estate land, even agricultural land, is regarded as too strong, contributing to poor landscape and nature quality. Recent droughts attributed to climate change have made the situation worse. (Photo: Pieter van den Berg, MVO TV)

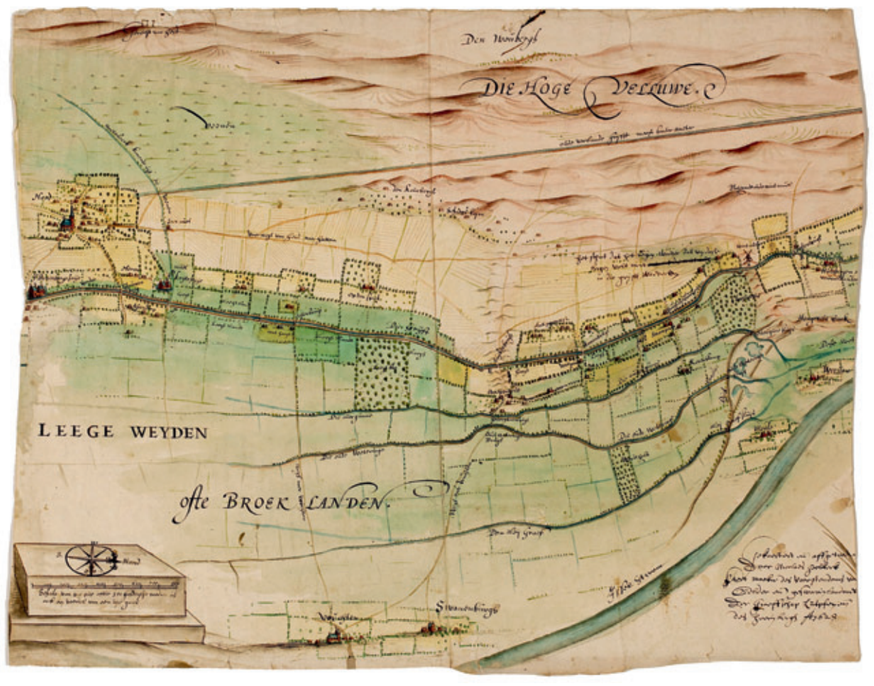
[FIG. 16]
The estate landscape Twello. (Steffen Nijhuis, TU Delft. Data: TU Delft, Gelders Genootschap, Province of Gelderland, RCE and Pdok.nl/Kadaster)



such as Het Hartelaer, Groot- and Klein Noordijk, Bruggenbosch and Dijkhof [FIG. 17].[12] These summer retreats at farmsteads were often transformed, in the 19th century, into a grand country house, illustrating the social climb of the owners. In the 18th and 19th century wealthy families from the surrounding cities bought plots of land to build country houses and country estates.

The transition area between the glacial ridge Veluwe and the IJssel river contains a complex pattern of different deposits, from the glacial ridge in the west to the river in the east and from sand to clay: fans and plains of snowmelt sandy deposits, cover sand and ridges, vast flood plains with clay and old rivers streams in the centre and levee deposits and river dunes along the river.[13]

These differences in the subsoil create a variety of conditions in terms of hydrology and soil composition. The wide range of vegetation communities and different land uses in the region are the spatial reflection of these conditions. In particular in the flood plains IJssel, the terrain conditions were very wet throughout history, not only because of river floods but also because of seepage water from the Veluwe. It was not until the embankment of the IJssel in the 14th century and the simultaneous canalisation of brooks that the hydrological situation improved [FIG. 18]. The brooks south of Twello run mainly north-south, with their source on the Appensche en Gietelse Veld, a relatively high cover-sand ridge that stretches between Klarenbeek and Gietelo.



[FIG. 17]
Bruggenbosch estate in the outskirts of the village Twello. (Photo: Pieter van den Berg, MVO TV)

[FIG. 18]
Survey of the lands between the Veluwe and the river IJssel. Clearly visible are the low-lying flood plains in which brooks such as the Grift find their way and the relatively higher grounds which is suitable for building farms and estates North to the right. N. van Geelkercken, 1628. (Gelders Archief, Arnhem)

1 More detailed information on the landscape structure and types can be found in: Schets 1985; Rensink et al. 2016.
2 Pols 1984; Renting 2022.
3 Spongy and peaty land saturated or partially covered with water.
4 Storms-Smeets 2011.
5 See e.g. Jas et al. 2013; Storms-Smeets 2011; Oldenburger-Ebbers, Backer & Blok 1996.
6 Schets 1985; Stichting voor Bodemkartering 1975, 1979a.
7 Menke et al. 2007.
8 Tenbergen 1971; Jas et al. 2013.
9 Schets 1985; Stichting voor Bodemkartering 1979b, 1982.
10 Driessen, Van der Ven & Wasser 2000.
11 Baaijens et al. 2011.
12 Oldenburger-Ebbers, Backer & Blok 1996.
13 Schets 1985; Stichting voor Bodemkartering 1979a, 1983.

3

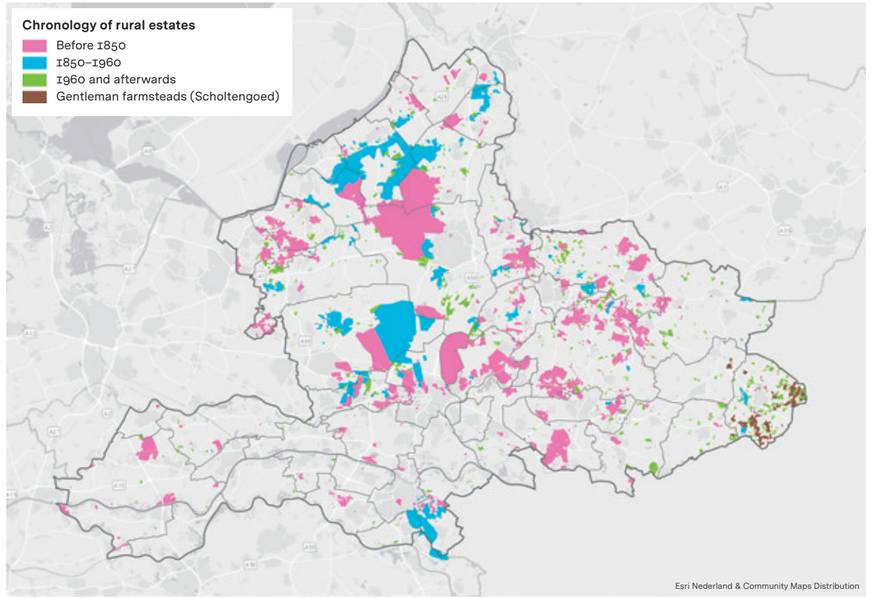
The Historical Development of Estate Landscapes in Gelderland

[FIG. 01]
Historical estate landscapes are often the result of the pursuit of an Arcadian landscape. Depiction of an Arcadian landscape by Jan Willem Pieneman, 1813. (Rijksmuseum, Amsterdam)

Knowledge of the historical development of estate landscapes can be useful for present-day researchers, planners and designers, policy makers and other stakeholders, especially in relation to the current challenges. To speak in the words of Dutch country house researcher Henri van der Wyck, 'To look back is to look ahead'.[1] Thorough research must first be carried out, Van der Wyck argued, in order to better place the historic country houses and estates in 'monumental-landscape, environmental-technical and cultural-historical policy'. Indeed, 'the future of Dutch country estates lies in the past'.[2] This applies not only to individual country estates, but also to estate landscapes. A better understanding of the various processes of estate-building, transformation and adaptation through time helps to make substantiated choices in the 21st century. The historic country houses and landed estates are manifestations of their time and therefore very diverse: from transformed noble castles to regent country estates to villa-like country houses for the newly wealthy [FIG. 1]. Not only the architecture of the house and park, but also their use, their anchoring in the cultural landscape and their social significance went through developments. This stratification and diversity in estate landscapes is one of Gelderland's most special features.

Historical Processes of Estate-Building

Creating an estate and building a castle, manor or country house was a grand undertaking. Estate-building occurred when the conditions were right: in times of economic prosperity and peace, with the presence or rise of a powerful elite, and the availability of land. It appears that the majority of new country houses and estates were created by a newly wealthy elite, whereas the old elite continued to invest in ancestral properties.[3] When building a new estate, the choice for a particular location must be seen as an important, well-thought-out decision. Often such choices are explained in terms of physical landscape aspects: which landscape type offered the best defence or had the best ground for supporting a stone building? In reality, a number



[FIG. 02]
Chronology of historic country houses and landed estates in Gelderland. (Map: Elyze Storms-Smeets, Gelders Genootschap)

of varying aspects have to be taken into account, including economic, political, societal and social factors. When studying geographical aspects of country houses and landed estates, one needs to wonder what motivated the newcomer to invest in land and creating an estate. In his authoritative *Life in the English Country House* (1978), Mark Girouard writes that we should view castles and country houses as *power houses*, as 'houses of a ruling class', and that 'when a new man bought an estate and built on it, the kind of house which he built showed exactly what level of power he was aiming at.'[4] Equally, the kind of estate he created and the location of his new country seat reflected his motives, aspirations and means.

By mapping the location of the castles and country houses in Gelderland according to their foundation periods, a particular pattern becomes apparent. The main phases of estate-building in Gelderland are: [1] 500–1600: castles with large landed estates for nobility (landed elite); [2] 1600–1800: noblemen hunting estates, regent country houses for city regents and gentlemen's chambers at farmsteads; [3] 1800–1940: smaller country houses near cities or cultivation estates on former wastelands for elite born of finance, commerce and industry; [4] The east of Gelderland is furthermore characterised by the presence of gentleman farmsteads with estates, so-called *scholtengoederen* [FIG. 2].

Here we shall look deeper into the three most important phases of estate-building, between 500 and 1940. Each phase is distinguished by a shift in the type of owners, landownership, functions, social and societal meaning and significance, (landscape) architecture and location. Of course, during these consecutive time periods there were also processes of destruction or demolition of older landed properties and quite often the fall of an older property led to the rise of a new, modern estate.

[FIG. 03]
Rosendael castle near Arnhem. (Photo: Erwin Zijlstra Fotografie)

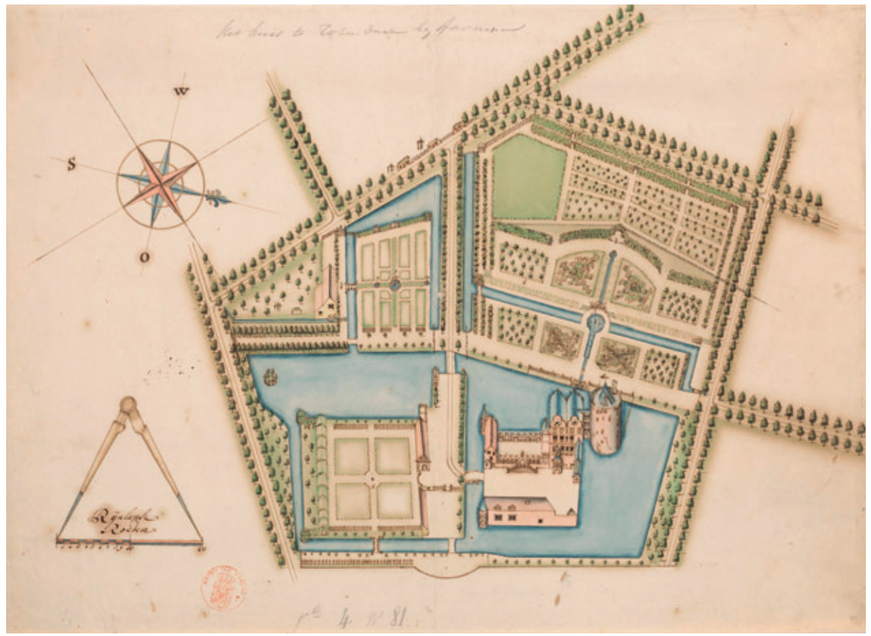
Noble Great Landownership and Castles

The earliest country houses and landed estates were formed through the transformation of medieval castles. The height of castle building was in the 14th century, when almost 130 castles were built in present-day Gelderland. During this period, the lower-lying river and brook landscapes became the most popular location. There are dozens of examples of 14th-century castles along the rivers Rhine, IJssel, Maas, Waal, Oude IJssel, Berkel, Baakse Beek and Linge. Think of castles such as Nederhemert, Doorwerth, Middachten, Buren, Doddendael, Hackfort and Dukenburg. The distribution and location choice of castles was related to a combination of factors: landscape, economic, social and territorial context.[5] The large number of castles and noblemen's houses in the river landscape of the Rhine, IJssel, Maas and Waal can partly be explained by the fertility of the soil and by the population density.[6] It is furthermore linked to the desire (and need) to be close to water. The location near water was not only important – from a defence point of view – for the water supply of the castle moat, but also for economic reasons, such as transport, toll collection, fishing and for powering watermills. Not all castles were located in close proximity

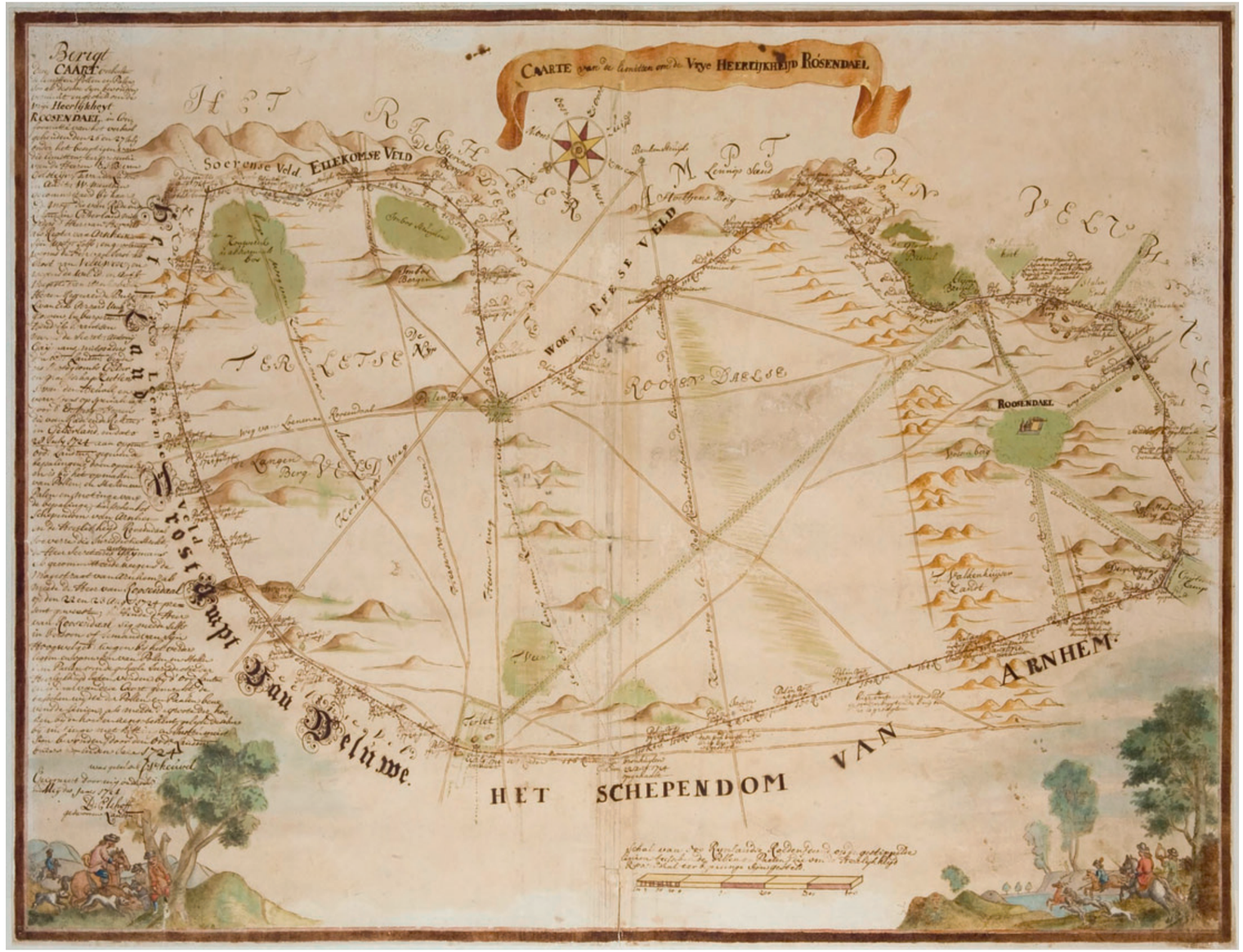
to the large rivers. Rosendael castle near Arnhem, for instance, was situated near a brook in the undulating landscape of the southern Veluwe [FIG. 3]. This choice of location is easy to understand if one considers the function of the property and the motivation of the founder (Reinald I, count of Gelre) to build here. The castle was built as a hunting lodge, close to the greatly valued hunting grounds of the Veluwe.[7]

In the 17th century, the medieval castles, which had lost their original military function, were transformed into country houses.[8] The owners of these castles were members of the high and low nobility, including families such as Van Westerholt, Van Reede, Van Arnhem and Van Raesfelt. Seasonally the nobles would move into the city, but their main residences were in the countryside, often close to major towns.[9] The castles themselves were often radically renovated, and the surrounding landscape was embellished with avenues and geometric gardens with orangeries, ponds and garden ornaments. Particularly famous were the gardens of Rosendael, created at the end of the 17th century by Jan van Arnhem and his wife.[10] Surrounding the castle was a park of some 40 hectares with avenues, parterres, fountains, caves, cabinets, waterfalls, fish ponds, a watermill and star-shaped woodlands for hunting [FIG. 4]. The larger estate was surrounded by solitary trees, small hills and boundary poles that formed a so-called *limietgrens* or *ringallee*, as a visible marker of the noble rights of Rosendael, including hunting [FIG. 5].

In the sandy area of the Achterhoek and on the eastern edges of the Veluwe, the castles can be primarily found in the valleys of smaller rivers and streams like Oude IJssel, Berkel and Baakse Beek.



[FIG. 04]
Design map of the gardens of Rosendael, c. 1700. (Rijksmuseum, Amsterdam)

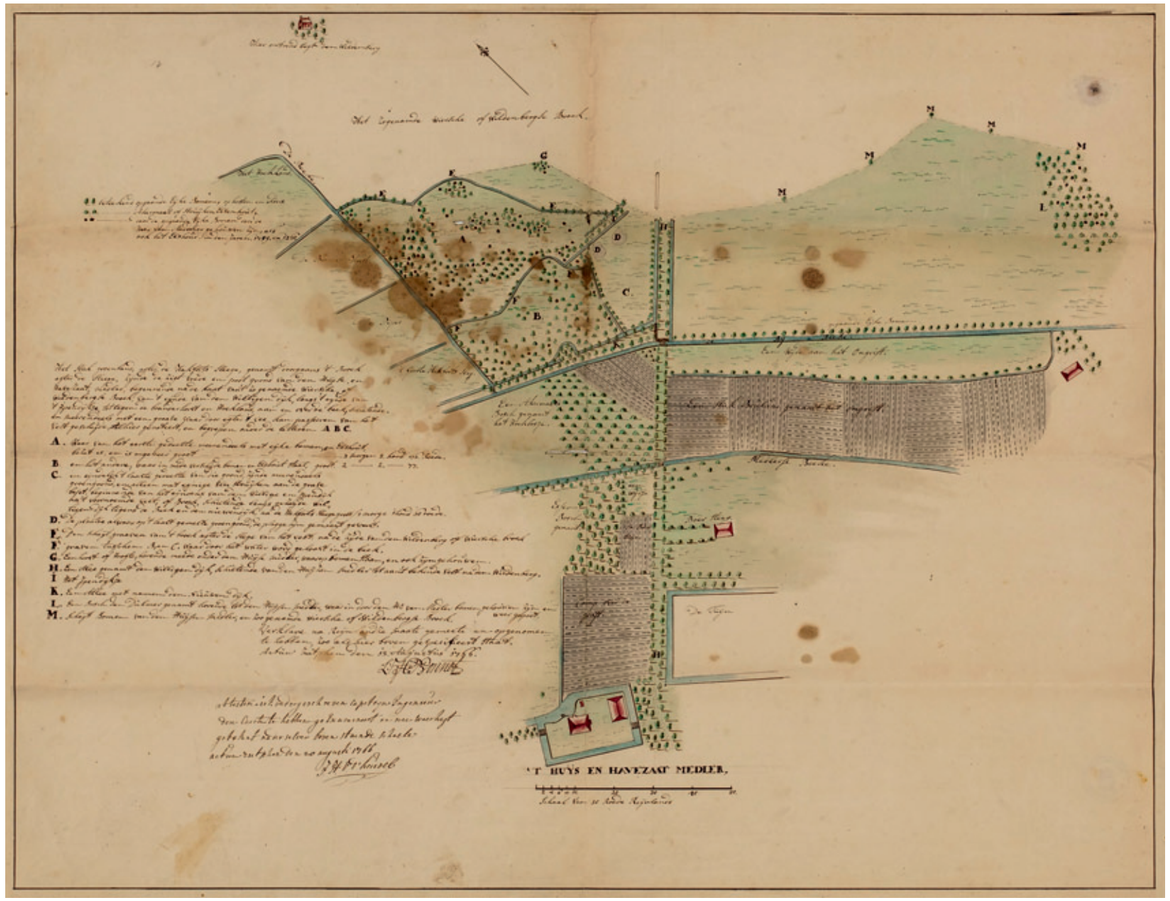


[FIG. 05]
Rosendael estate was surrounded by solitary trees, small hills and boundary poles that formed a so-called *limietgrens* or *ringallee*, as a visible marker of the noble rights of Rosendael, including hunting. I. van Heuvel and B. Elshoff, 1724. (Gelders Archief, Arnhem)

In the Baakse Beek area we come across a large number of originally 13th- and 14th-century castles, including Hackfort, Het Medler, Vorden, Baak and Wildenborch. In general, the moated castle grounds lay near the brook, together with the meadows and hay meadows [FIGS. 6 & 7]. The arable fields with tenant farms and hunting grounds were on the higher grounds.[11] Several castles are located near a ford in a river or stream and are named after this so-called *voorde*. A vast majority of castle names with *voorde* occur in the Achterhoek, such as Vorden, Landfort, Hackfort en Bredevoort and, near Twello, for instance, Duistervoorde and Kruisvoorde.

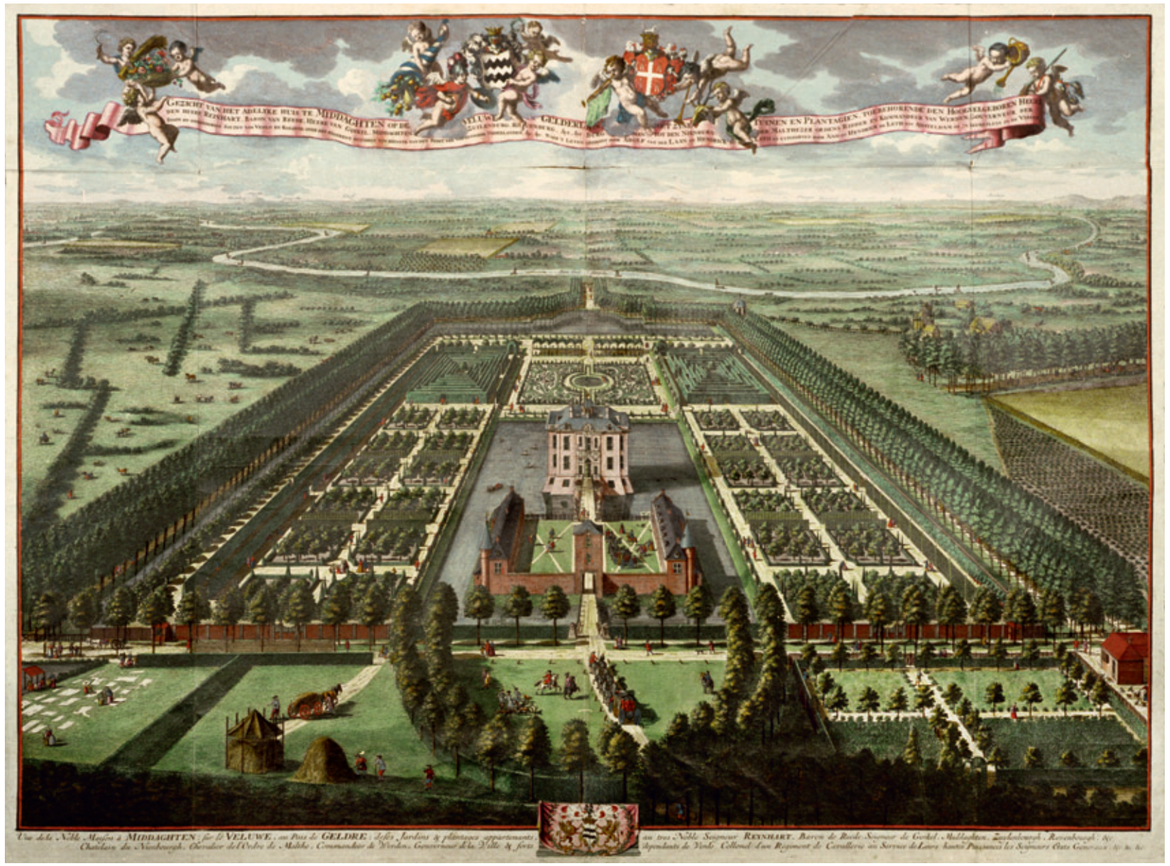
The castle of Hackfort was created at the ford in the stream Hackfortse Beek, at the site of an older farm.[12] The stream powered a watermill, a feature often seen at medieval estates in the Achterhoek. Hackfort was a so-called *havezathe*.

From the 16th to the 18th century, the possession of a *havezathe* meant political and territorial power, as it came with a certain status and rights. For instance, it gave the owner the right to hunt and fish, it enabled him to enter provincial government and it ensured exemption from the house tax. Around 1600 the estate of Hackfort came under the ownership of the Van Westerholt family, who extended the landed property. At the end of the 17th century two long oak tree avenues were created. Together, the avenues form a cross in the middle of the estate.[13] At the end of the 18th century the revolutionary annexation of the Netherlands by France meant the abolishment of noble rights and privileges. Nevertheless, the Hackfort estate remained in the ownership of the Van Westerholt family well into the 20th century. When the last descendants passed away (in the period 1964–81), the entire



[FIG. 07]
't Medler near Vorden.
L.H. Bonnet, 1766.
(Gelders Archief Arnhem)

[FIG. 06]
Hackfort castle and estate is still a heritage ensemble of 800 hectares, including tenant farms, watermill, orchard, vegetable gardens, woodlands, parks and agricultural fields. (Photo: Pieter van den Berg, MVO TV)



[FIG. 08]
View of the noble house of Middachten. A. van der Laan, c. 1729–30. (Middachten Estate Archive)

[FIG. 09]
Hunting party of William III at Het Loo estate on the Veluwe. (National Gallery Ireland)

estate of 800 hectares (including arable fields, meadows, woodlands, orchards, 44 tenant farms and one watermill) was transferred to the nature organisation Natuurmonumenten.[14]

A river castle that still exists to this day is Middachten [FIGS. 8 & 10].[15] The castle was strategically built near an old river arm of the IJssel. In addition, the moated castle grounds were oriented towards the river (southwest-northeast). When one approaches the castle from Middachterallee, it seems – at first glance – that the geometrical 17th-century construction is incorrectly situated, with an illogical bend in the driveway. However, during the reconstruction of the castle in the years 1693–97 for the noble Van Reede family and the creation of a geometric system of avenues, the medieval layout was retained as the starting point. The river remained the main traffic route even after rebuilding, as is clear from the bird's-eye view of Van der Laan and De Leth from 1724. The example of Middachten furthermore shows the extend of landed property belonging to the castle. Geometric gardens surrounding the castle illustrate the transformation from a military to a recreational function; they included vegetable gardens and fruit orchards, and orangeries with exotic fruits. Further afield we see the tenant farms and arable fields with cereals such as oats, wheat, rye and barley. Towards the river lie the pastures for cattle grazing (providing meat and milk), and hay meadows for the cattle's

[FIG. 10]
Middachten estate, with the 18th-century estate of Rhederoord to the west and the royal hunting grounds of Hof te Dieren to the north. North is left. (Middachten Estate Archive)

winter feed. In a small brook, north-east of the castle, a duck decoy was made. Further to the north, woodlands were used for various kinds of forestry and hunted for game, and sheep grazed the heathlands, producing wool, meat and milk and providing manure. Before the invention of fertiliser, the sheep manure was a crucial part of the agricultural system of these estates. Each Middachten tenant farm used a pathway, a so-called *schaapsdrift*, to lead the sheep from the farm through the woodlands towards the heathlands. In the late 17th century these pathways were 'upgraded' into geometric avenues. Originally the estate of Middachten was about 500 hectares large, but would grow in the 19th century to approximately 1,000 hectares.

1600–1800: Noblemen Hunting Estates and Regent Country Houses

Parallel to the transformation of castles into recreational country retreats, the establishment of completely new country estates took place. Two remarkable social groups can be distinguished as the founders of these new estates: first, the stadtholder family and noble friends, and second, city regents around the cities of Arnhem, Nijmegen, Zutphen and Deventer.

Hunting, a noble right, was the primary reason for the stadtholder family, and their friends of noble families, to build hunting lodges, country houses and small palaces [FIG. 9]. In 1647 stadtholder William II purchased lands from the former commandery of the German Teutonic Order. The commandery at Dieren was transformed into a hunting lodge and the lands developed into a vast hunting park (*wildbaan*). His son, William III of Orange (since 1689 King of England, Scotland and Ireland), further improved the house and surrounding landscapes. Hof te Dieren was not the only hunting paradise for stadtholder-king William III, who turned the Veluwe into a grand hunting landscape with various hunting lodges and palaces, including Het Loo (his main seat), Coldenhove, Hoekelum and Hoog Soeren [FIG. 11].[16] So-called kings' roads (*koningswegen*) allowed him to travel between his hunting lodges.[17] The stadtholder family was a great inspiration for the noble families of Gelderland, who

[FIG. 12]
The palatial country house of de Voorst. Romeyn de Hooghe, 1675–1711. (Photo: Artokoloro/ Alamy Stock Photo)

[FIG. 11]
The royal palace Het Loo near Apeldoorn with its typical geometrical gardens and water works. (Photo: Frans Lemmens/ Alamy Stock Photo)

transformed their ancestral homes, for instance at Middachten and Rosendael, and even stimulated the built of new seats. The country house of De Voorst is a wonderful example [FIG. 12]. The grand house was created for Arnold Joost van Keppel, a close friend of William III, at the site of a former (demolished) medieval castle. He hired the infamous architects Jacob Roman and Daniel Marot, who earlier had designed the palace of Het Loo for William III. Around his new country house Van Keppel created large formal gardens with water basins, parterres, avenues and vegetable gardens. It was named 'the Versailles of the Achterhoek'.[18] Other examples of noble country houses established in this period are Oldenaller, Staverden and Vanenburg, all on the Veluwe.[19]

The second group created very different properties; not particularly near the Veluwe for hunting, but near the cities where they owned a town house. From the 1600s, city regents from Arnhem, Nijmegen and Zutphen started investing in landed property in the countryside. Particularly around Arnhem, which was an important administrative centre at the time, new country estates were established by regent families.[20] As the need to stay close to the city was great, the regents

[FIG. 13]
The grounds of Zypendaal estate. W. Leenen, 1753. (Gelders Archief, Arnhem)

chose to purchase existing agrarian properties or former monasteries. After many monastic goods were confiscated in the Arnhem region as a result of the Reformation (c. 1580), they were placed under the management of the States of the Veluwe. From 1640 onwards some of these goods were sold in public and often bought by wealthy individuals, including members of the city council, such as the Everwijn, Brantsen and Tulleken families. The purchase of land and the creation of a country estate was seen as a good investment, a way to demonstrate their new status, wealth and taste, and offered a refuge from the city, an escape to the countryside. The regents created country estates on the purchased land, such as Zypendaal, Menthenberg, Presikhaaf and Lichtenbeek [FIGS. 13, 14, 15, 16 & 17]. The new owners built a summer house with outbuildings on their country estate: coach houses, orangeries for exotic plants, gardeners' houses and tea houses. Large-scale parks were created with geometric gardens and oak and beech avenues leading to the heathlands. The existing streams, which originally served to power watermills, were re-used within the country estate landscapes, especially for the construction of ponds, fountains and cascades. The owners also started to cultivate

[FIG. 14]
Zypendaal in Arnhem has been the country seat of consecutive city regents, including mayor Van Bayen (1720–43). (Gelders Archief, Arnhem)

[FIG. 15]
The country house of Menthenberg near Arnhem, c. 1740. (Gelders Archief, Arnhem)

[FIG. 16]
Presikhaaf estate, created on former monastic lands, c. 1740. (Gelders Archief, Arnhem)

[FIG. 17]
The modest country seat of Lichtenbeek, to the west of Arnhem, c. 1740. (Gelders Archief, Arnhem)

the purchased bare heathlands, which were converted into arable land or forest. In the vicinity of Arnhem, extensive forests were created on the initiative of Hendrik Willem Brantsen on Zypendaal, Rutger Huygens on Klarenbeek and Adriana van Bayen on the Hartjesberg (Sonsbeek). Initially, the new country estates were between 50 and 200 hectares in size, although some would grow extensively through the purchase of former heathlands and neighbouring farmsteads. The estates served as a country retreat; the focus was on the aesthetic landscape, but all the properties also had economic grounds such as arable fields, meadows and forests. Indeed, the estate was an important source of income for the owners, but usually the owner also had a wide range of other income sources. If we, for example, look at Zypendaal estate (approximately 135 hectares in size), it appears that, although the estate generated income from wood production and tenant farms, this did not generate enough to create or even maintain a new country house and new gardens in 1762–64. Therefore, the Brantsen family also had other sources of income, such as lands elsewhere (including plantations in Suriname) and investments, and were strategically married to wealthy heiresses. Their wealth was partially invested in the creation of extensive terraces along baroque ponds, which still exist today.[21]

Also in the east of Gelderland, numerous new country estates were created in the 17th and 18th centuries. The urban-rural relationship between the cities of Zutphen and Deventer with the surrounding areas has been an important factor in this. For example, various country estates have been created by Zutphen and Deventer regents in the current municipalities of Voorst, Lochem, Bronckhorst and Brummen. Initially many of these properties were not very great or grand; in fact they were small gentlemen's chambers (*herenkamer*) as an attachment to a farmstead.[22] Thus the medieval farmstead Het Entel was bought in 1757 by Lodewijk van Bylandt, who demolished the old farm and built a new one, including a small room for himself. The room was beautifully decorated with wallpaper from Plymouth, French glass in the windows and blue stone tiles. Van Bylandt used the estate for experimental forestry and hunting. The small estate near Het Entel was enlarged in the 1800s into Beekvliet estate by salesman Jan Derk Langenberg from Zutphen [FIG. 18]. Near the stream De Slinge, the owner built a simple summer house, as a refuge from city life.[23] Also around the rural village of Twello, close to the city of Deventer, many gentlemen's chambers at farmsteads for city regents and merchants could be found in the 18th century, such as Het Hartelaer, Bruggenbosch and Dijkhof. These summer retreats at farmsteads were often transformed, in the 19th century, into a grand country house, illustrating the social climb of the owners. This is beautifully illustrated by Het Enzerinck near Vorden [FIGS. 19 & 20].

[FIG. 18]
Zutphen merchant Langenberg created a modest country house Beekvliet near De Slinge as a summer refuge. (Private collection Fam. Gelderman)

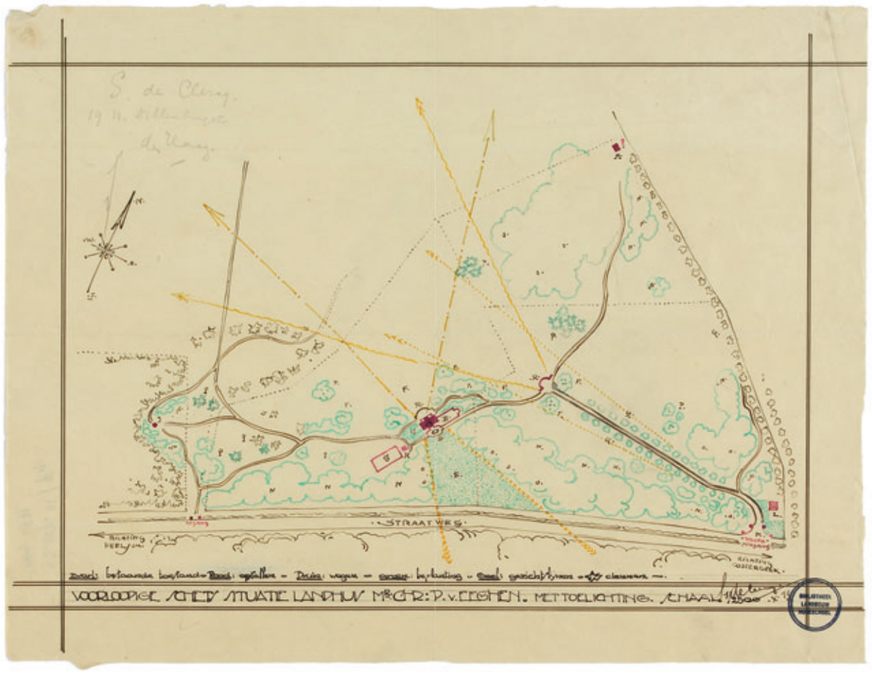
[FIG. 19]
The gentlemen's chamber at farmstead called Het Enzerink. (Gelders Archief, Arnhem)

[FIG. 20]
The transition process from the gentlemen's chamber at a farmstead to a grand country house was also evident at Het Enzerinck. (Collection Geldersch Landschap & Kasteelen, Arnhem)

1800–1940 (New Money, New Estates)

The emergence of new money in the 19th century was an important impulse for a new phase of estate-building. This new money was born of processes of urbanisation and industrialisation: an urban *nouveaux riches* with interests in banking, trade and industry. Despite the origins of their money, many of these individuals chose to invest part of their wealth in landownership. In Gelderland two types of new estates were created: small country seats with grand houses in popular areas like the Veluwezoom (around Arnhem) and large cultivation estates on former wastelands.

If we look at the Veluwezoom, nearly 40 new country estates were established from 1800 onwards. The already beloved landscape of the Veluwezoom gained extra interest thanks to the artists' colony that developed around Oosterbeek. The new founders were newly wealthy such as lawyers, architects and project developers from the west of the country and Dutch emigrants who had stayed in the Dutch Indies (so-called *Indiëgangers*). Land was not the primary source of income for these individuals. In general, the new estates were smaller than the existing estates in the area. Transport improvements proved to be



[FIG. 21]
First design sketch for the new estate of Laag-Wolfheze, 1919, which would surround the new country house of the Van Eeghen family. (Special Collections, Wageningen University & Research)

[FIG. 22]
The former *havezate* Het Holthuis, near Twello, was bought by industrialists J.F. Nering Bögel in 1837 as a summer retreat. His grandson turned it into a permanent residence. (Gelders Archief, Arnhem)

[FIG. 23]
The landscape architecture firm H. Copijn & Zoon made a new design for the garden of Het Holthuis, 1925. (Wageningen University & Research, Special Collections)

crucial, and particularly the expanding railway network, such as the construction of the Utrecht-Arnhem railway in 1843–45, allowed these newly wealthy to invest in landownership far away from Amsterdam and Utrecht, yet be 'back in town' within a day.

In addition to the infrastructural improvements, insight into land availability is important to understand the distribution pattern. The increasing scarcity of land near Arnhem (as a result of existing large landholdings and urbanisation) meant that younger country estates were forced to be further away from the city, often on former wasteland. In some cases, however, the (partial) sale of land owned by impoverished noble families or regents turned out to be the basis for a new country estate, such as Bronbeek, which was created around 1820 through the purchase of the northern part of Lange Water estate. The new owner was the Amsterdam rentier Hermen Steijgerwalt, who built a small country house with farm on a slope of the Paasberg and created a park with ornamental plants and a vegetable garden. A man-made brook was dammed up to create small waterfalls, ponds and a fountain.

After 1900 hardly any new country estates were founded. On the Veluwezoom, country estates such as De Kamp, The Hillock, De Leemkuil, Huize Eekland and Laag-Wolfheze [FIG. 21] arose on sites that were still available, often on former wastelands of older, but fragmentated estates. For the new estate owners, the country estates functioned as semi-permanent homes in the countryside. It is striking that 'nature' such as the Wolfhezerheide was emphatically included as an aesthetic part, whereas in earlier times the heathland with grazing sheep had been a vital part of the agricultural system.

In other parts of the province we see similar processes. During the 19th century, members of the Zutphen and Deventer elite, including nobility, regents, merchants and industrialists, also invested in land and the creation of a country house. Around Twello former *havezates*, like Kruisvoorde and Het Holthuis [FIGS. 22 & 23], and farmsteads with gentlemen's chambers, like Bruggenbosch, were bought and greatly transformed. Sometimes the existing building was extended and beautified, sometimes the new owners decided to demolish the old house and completely build a new home in accordance with the new standards of comfort, beauty and style. The surrounding landscapes were also altered in the popular landscape style, characterised by irregularity and a love for nature.

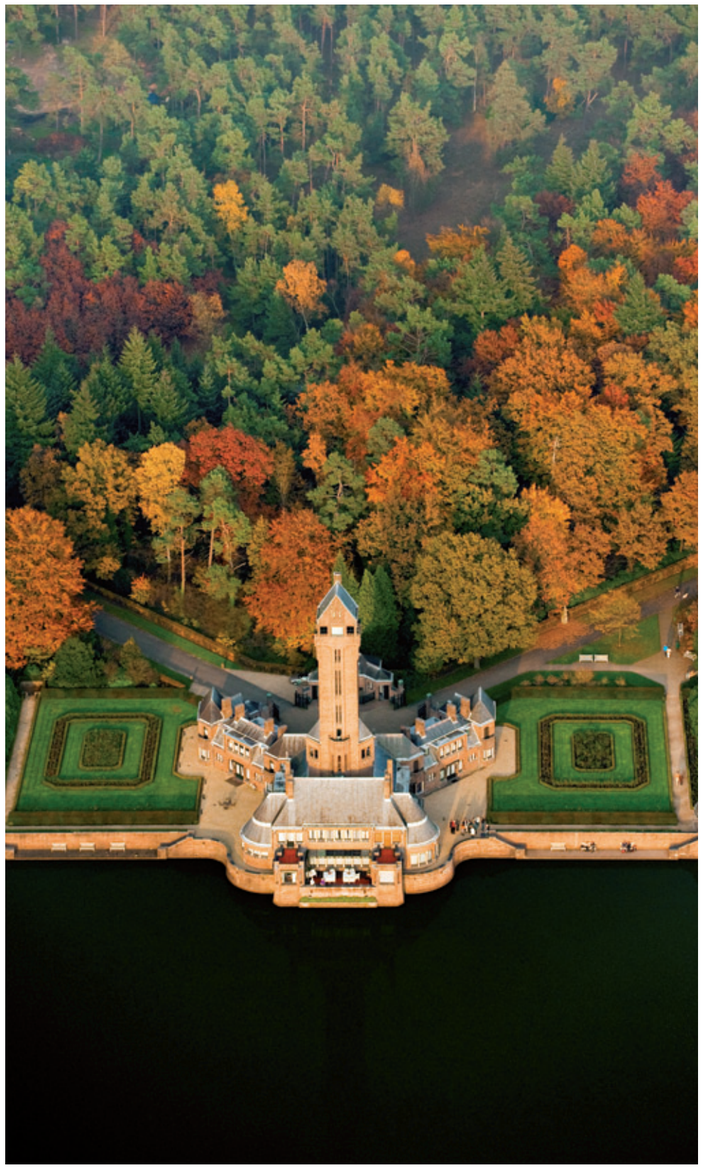
The second group of 19th- and early 20th-century estates was directly connected to the partition and privatisation of communal land, formerly held by communal organisations (in some parts of Gelderland called *marken*). The communal ownership and management of wastelands like heath and fens had been a part of agricultural communities and landscapes for centuries, but the national government's wish for privatisation and cultivation of these lands resulted in a shift in landownership. As for most small farmers it was too costly and complicated to cultivate these areas, much land was coming onto the market, a process that benefited both existing estate owners and newly wealthy who aspired to become (great) landowners: for instance, on the Veluwe, where the large heathlands were in communal ownership and management of the *marken* of Otterlo and Deelen. Around 1850 the members of the *marken*, the farmers with rights to the commons, sold large tracts of heathlands and sand dunes to a small number of individuals. New 'cultivation' estates were formed, such as Hoenderloo estate of approximately 1,400 hectares by Johan Sickesz from Arnhem and Hoog Baarlo estate by Albertus van Ingen. A large part of the southern heathlands of the Veluwe, called 'Deelen' and 'Oud Reemst', was owned by the noble family Van Pallandt-Torck of Rosendael estate. Between 1850 and 1910 these great landowners, both old and new money, started foresting the wastelands with Scots pine and oak coppice, and cultivating the heath into arable lands with farmsteads.[24] New avenues with oak and beech trees were created to improve the infrastructure, mark the estate boundaries and add aesthetics to the landscape. From 1909 a new player arrived: Anton Kröller and his wife Helen Müller. As the director of the successful Müller company, with shipping and ore trade as core businesses, Kröller earned a fortune. This new wealth enabled Anton and Helene to purchase the Hoenderloo estate in 1909, a place where they could express their love for nature, hunting and horse-riding. In the following years they purchased other estates and landed properties, including Hoog Baarlo estate (138 hectares) in 1912, De Pampel (644 hectares) and De Bunt (21 hectares) in 1913, Deelen (2,621 hectares) and Oud Reemst (1,239 hectares) in 1916 and De Kemperberg estate (556 hectares) in 1921. Ultimately, they created an

estate of over 6,800 hectares.[25] Between 1915 and 1920 a large country house was built by architect H.P. Berlage: Jachthuis Sint Hubertus [FIG. 24]. In 1935 the vast estate was transformed into National Park De Hooge Veluwe.

The case of De Hooge Veluwe also gives us some insight into the fall of existing estates, and it seems that the Kröller-Müller family profited from the decline of families like the Van Pallandt family at Rosendael castle and estate. From the late 19th century, like in other west European countries, it became increasingly difficult to maintain country houses and estates.[26] In the (similar) British context, country houses were regarded as 'white elephants': a remarkable possession of which the (maintenance) costs are out of proportion to its usefulness.[27] The deteriorated financial position of the (old) landed elite was, among other factors, the result of decreasing incomes from the landed property (forestry, agriculture, etc.) and other sources like the Russian bonds that became worthless after 1917. Expenses kept rising, often due to increasing employment and maintenance costs, sometimes due to a too-luxurious lifestyle that didn't correspond anymore with the new reality. Particularly the exponentially increasing succession tax brought many members of the landed elite into financial trouble. The diminished social and political position of the landed elite was also of importance.

At its height, the landed property of the Van Pallandt family of Rosendael was approximately 10,000 hectares large, including land outside the so-called *ringallee* such as Deelen, Oud-Reemst and Planken Wambuis. From the late 19th century onwards the landed property decreased with every succession as a result of inheritance division among family members and the sale of lands to pay the ever-increasing succession taxes.[28] Thus in 1916 the Van Pallandts sold over 3,800 hectares of land outside the *ringallee* to Kröller-Müller. In 1933 Rein van Pallandt wrote a letter to the Minister of Defence, pleading to buy the Planken Wambuis, as the family was desperate to pay succession taxes. Eventually it was sold to an insurance agency. In 1938 the northern part of the estate within the *ringallee*, called Imbosch, was sold to nature organisation Natuurmonumenten. At the start of the Second World War Rosendael estate had shrunk enormously. The sale of thousands of hectares of land had enabled the family to pay the succession taxes and other costs, but it also meant a decrease in income. As a result, the family did not have the means to restore the castle and park that had been heavily damaged during the war. Eventually, in the 1970s the heart of the estate (a castle and park of 44 hectares) was left to nature organisation Geldersch Landschap. After six centuries the noble estate of Rosendael was no longer in private ownership. Rosendael can be seen as 'a typical example of where it went wrong',[29] which 'teaches us the impermanence of power and wealth' [FIG. 25].[30]

[FIG. 24]
The hunting lodge Sint Hubertus formed the centre of the large hunting estate of the Kröller-Müller family. (Collection National Park Hooge Veluwe. Photo: Lars Soerink)



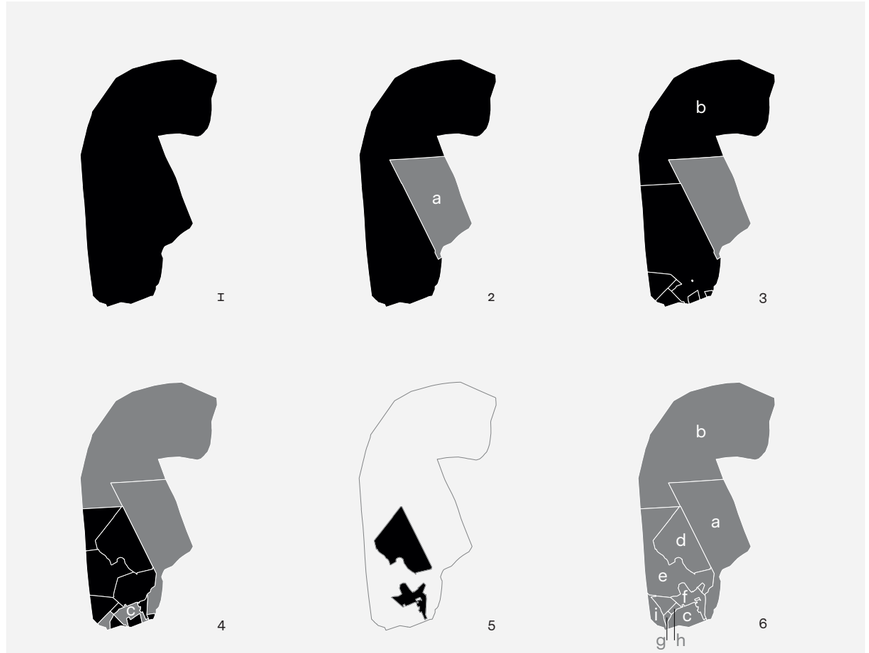
The Second World War can be seen as a break in Dutch estate-building. In Gelderland more than 80 country houses and estates were used for a war-related functions, such as military headquarters, hospital, barracks and V1 installations, but also schools, orphanage houses and a refuge for evacuees.[31] Due to the war many estate buildings and landscapes were damaged, as at Rosendael, or even completely destroyed. Many surviving estates and country houses, which even before the war proved to be an increasing burden for the impoverished estate owners, now became impossible to keep in the family. As a result, various estates were transferred from private to public or commercial ownership. Others, however, managed to survive and adapt once more, such as Middachten, which is owned by a descendant of its original founder.

Country Houses and Estates in Gelderland

If we look at Gelderland through the centuries, we see particular patterns for the foundation, use and design of country estates in different periods [TABLE 1], from the creation of castles and manors with large landownership (c. 500–1600) to the establishment of country estates for urban regents (c. 1600–1800), to the foundation of villa-like country houses near cities and large cultivation estates on former wastelands (c. 1800–1940). In general, new estates were founded by new elites, each with different desires, possibilities and ambitions.

[TABLE 1]

PERIOD	ESTATE TYPE	FOUNDERS	LOCATION	ARCHITECTURE	EXAMPLES	EXAMPLES
Middle Ages and 16th century	Castles with large landed estates.	High and low nobility, counts/ dukes of Gelre.	Close to river or brook.	Defensible castles (inc. Gothic and Renaissance). From c. 1600 converted into country houses.	Very large estates (over 500 hectares) with a diverse, multi-functional landscape with farming, forestry, hunting, sheep herding and aesthetic parks. Geometric park (Renaissance), ponds and networks of allées. Watermills along streams.	Rosendael, 't Medler, Middachten, Biljoen, Nederhemert, Doorwerth, Middachten, Buren, Doddendael, Hackfort and Dukenburg.
1600–1800	Noblemen hunting estates, regent country houses near cities and gentlemen's chambers at farmsteads.	Stadtholder family and noble friends; city regents.	In the vincinity of cities as Arnhem, Nijmegen, Zutphen and Deventer, along major roads.	Baroque, Dutch classicism, French Louis styles.	The stadtholder family and their noble friends created hunting estates on and along the relief of the Veluwe. City regents created relatively large estates with profitable farmlands and forests with at their core a temporary country home with gardens and parkland. These regent country estates often arose from former monastic property or from gentlemen's chambers at farmsteads. Geometric parks (Baroque and Rococo), ponds, networks of allées and hunting grounds. From late 18th century, landscape park with cascades.	Hunting estates like Hof te Dieren, Coldenhove, Hoekelum and De Voorst. City country estates like Warnsborn, Zypendaal, Menthenberg and Rhederoord near Arnhem, Het Entel/ Beekvliet and Het Enzerinck near Zutphen.
1800–1940	Smaller country houses near cities and cultivation estates on former wastelands.	Elite borne of finance, commerce and industry, occasionaly nobility.	Close to new rail and tram lines, but also existing roads, as in Oosterbeek, Wageningen and Ellecom. Cultivation estates located high on the relief of the Veluwe and other former wastelands.	Neoclassicism, neo-Renaissance, neo-Gothic, ecclectisism, chalet style. From 1900: new historicising style, cottage style, English country house style and Gooi country house style.	Relatively small properties near the cities, geared to recreational use and enjoyment of nature. Mixture of utility and beauty. Principally (romantic) landscape style and mixed garden style. And larger cultivation estates on former wastelands, with forest plantations, arable lands and hunting grounds.	City country estates like Bronbeek, Belmonte, Laag-Wolfheze and Bruggenbosch. Cultivation estates like Hoenderloo and de Hoge Veluwe.



[FIG. 25]
The dissolution of the large private landownership of Rosendael. Once one of the largest and finest county seats in Gelderland, it fragmented from the late 19th century and is currently owned by various institutional and governmental organisations. (Drawing: M. Pouderoijen, TU Delft, after Koman 2017)

1. Landownership before 1860.
2. Situation 1860. Transfer of the Rozendaalse Veld [a] to the the Trustees of Velp, in 1917 and 1921 donated to Rheden.
3. Inheritance distribution 1932. The Imbosch [b] was sold in 1938 sold to Natuurmonumenten.
4. Situation 1948. The grounds under [c] were sold to various private persons.
5. Situation 1977. Last private possession by the Van Pallandt family.
6. Landownership in 2017. Municipality of Rheden [a], Natuurmonumenten [b], various private individuals [c], Rozendaal municipality [d], Staatsbosbehel [e], Geldersch Landschap en Kasteelen Foundation [f], Stichting Sint Nicolai Brotherhood [g], S.A. Zimmerman [h]. The part at [i] was handed over to the municipality of Arnhem after the A12 motorway was cut through.

The grounds around Deelen, Reemst and Planken Wambuis, which for some time were part of Rosendael's landholding are not included here.

This was reflected in the characteristic structure, design and layout of the new sites. However, the motives of the respective new elites to shape their outdoor life differ from period to period.

With regard to economic exploitation of newly founded estates, it is striking that the scale of landownership overall decreased in successive periods: while land remained a good investment, it became less and less important as a source of income for the owner. Originally medieval estates such as Doorwerth and Middachten, they were characterised by large land holdings of 500 to 1,500 hectares, with different landscape types (from wet soils in the floodplains to dry soils on the Veluwe edge) and functions. This differs greatly from early 20th-century country estates such as De Kamp and Laag-Wolfheze, where the heath was not an indispensable part of an agricultural system – an exception are the large cultivation estates created from former wastelands in the 19th and early 20th centuries, particularly on the Veluwe. New agricultural methods and tools, such as artificial fertilisers, enabled the cultivation of wastelands into arable fields or plant the lands with pinewood forests.

Another factor that influenced when and where new estates and country estates were established was the availability of land. The moment when individual country estates were sold on will often have been a coincidence. But here too, similarities between different country estates can sometimes be found: the release of monastic properties, the sale of large estates and the subsequent division into smaller units or the division of former communal wastelands could be a common starting point for a next generation of country houses and landed estates.

Finally, a third aspect should not be left unmentioned: the influence of traffic routes (by water, road and rail) on the location of country houses and landed estates. Whereas initially the most important traffic routes were by water (for instance the rivers Rijn and IJssel), from the 17th century onwards travel over land was much improved, becoming quicker and safer than before. And in the 19th century the railways were particularly important, like the rail connection Utrecht-Arnhem in 1843–45 that stimulated the growth of the estate zone of the Veluwezoom.

This knowledge of the stratification of country houses and estates has also been useful for the present day: for instance in the estate landscape Veluwezoom (presently also known as Gelders Arcadia), where estate owners, heritage experts, governments and other stakeholders have been working together since 2007. Here, the socio-historical-geographical analysis of the country houses and estates and the resulting area- and ensemble-oriented approach has formed the base for new heritage methods and policies. It has, furthermore, stimulated a broader perspective towards country estates as heritage ensembles: in the province of Gelderland 119 estates are listed as national monuments, so-called 'complex rijksbeschermde buitenplaatsen', whereas some 500 (remains of) country estates have been identified. In the estate landscape Veluwezoom only 15 of the more than 100 estates and country estates have been designated as national monuments, and at those 15 many culturally and historically valuable structures and areas – such as royal roads, old forests, fields and wastelands – are not protected. It was therefore important to also inventory and analyse structures that transcend estates and municipalities, such as avenues, royal roads, man-made brooks and vistas.[32]

Gelders Arcadia's geographical heritage approach resulted in the following: attention to the entire collection of country estates (and not just the national monuments, as was the case in the past); focus on country estates as cohesive heritage ensembles, including understanding of social, economic, landscape and political factors that have contributed to their development and design; the realisation that the estates form an important basis for the character of the entire living environment of the region, both in the past, present and future.[33]

The twofold analysis of individual country estates (as ensembles) on the one hand and the country estate landscape on a regional scale (as a system) on the other formed the basis for discussions with government authorities, owners and other stakeholders to formulate possible solutions to contemporary challenges and problems. Thinking in two scales led to the improvement of municipal and provincial policy and was the basis for better cooperation at the local and regional level.

1 Van der Wyck 1983a.
2 Kuiper 2012.
3 Storms-Smeets 2021.
4 Girouard 1978, 2.
5 Storms-Smeets 2013, 15–23.
6 De Bont & Mulder 2003.
7 Jas et al. 2013.
8 Of course, not all medieval castles made the transition to grand country seats. Many were altered into small farmsteads or disappeared altogether.
9 Kuiper 2019, 193–232.
10 Bierens de Haan 1994.
11 Wardenaar, Zondervan, Haartsen & Storms-Smeets 2006, 39–57.
12 Keverling Buisman 1998.
13 Keverling Buisman 2013, 149–152.
14 Purmer 2018; Purmer 2020, 9–32; Steentjes & Storms-Smeets 2019.
15 Hoekstra 2002.
16 Renting 2022.
17 Bijster 2019; Gietman, Kuiper, Storms-Smeets & Wessels 2021.
18 Van der Wijck 1983a, 141–149.
19 Olde Meierink & Storms-Smeets 2015, 180–207.
20 Storms-Smeets 2011; Storms-Smeets & Reesink 2016.
21 Storms-Smeets 2020, 235–63.
22 Such 'herenkamers' were also present in other parts of the Netherlands, like around Amsterdam, as recently researched by Van Oosterom 2022. It shows an interesting, and little-known part of the estate-building process in the Netherlands.
23 Storms-Smeets 2016, 11–12.
24 Veldhorst 1965, 117–38.
25 Derks et al. 2007.
26 Storms-Smeets 2017, 407–21.
27 Mandler 1997, 1–5.
28 Koman 2017.
29 Keverling Buisman 2006, 365.
30 Van der Wyck 1988, 33.
31 Storms-Smeets & Vogelzang 2020.
32 Storms-Smeets 2011.
33 Van Bleek, Storms-Smeets & Van Winden 2011.

[FIG. 01]
The relation to the glacial ridge and its valleys is clearly visible in the estate landscape Veluwezoom. At the individual castles, country houses and landed estates this is reflected in the location and orientation of the building, the design of gardens, parks and avenues of trees along roads, but also in the organisation of land use for farming, hunting and forestry. In yellow the country estates. Map by M.J. De Man, 1802–1812. (Special Collections, Wageningen University & Research)

[FIG. 02]
The climax of the walk at Beekhuizen was the Great Cascade, in which Van Spaen let his memories of Tivoli and Schaffhausen come together. Etching by J.G. Michael from c. 1765 after an original by C. Henning. (Gelders Archief, Arhem)

[CLOSE-UP]

Country Estates in Their Landscape Context

Steffen Nijhuis and
Michiel Pouderoijen

Estate landscapes have different characteristics because of their position in the natural context and social-cultural backgrounds. At the level of individual castles, country houses and landed estates there is also a wide variety in the way in which they relate to each other and their immediate landscape context [FIG. 1]. At this operational level conditions related to topography, water, soil, transport networks and landownership are created or articulated at a local scale. This becomes visible in the location and orientation of the building, gardens, parks and avenues of trees along roads, but also in the organisation of land use for farming, hunting and forestry [FIG. 3]. Some country estates and pleasure grounds take advantage in their design of the landscape context via sightlines and panoramas while integrating views. Others make use of the availability of natural water for creating moats, fishponds and water works in parks and gardens, for fertilising the land by controlled flooding of meadows (flow meadows) and watermills for milling cereals, pressing oils and paper-making [FIG. 2]. The forests and the heathlands at the Veluwe were also perfect hunting grounds for the nobility and becomes visible in the so-called Kings roads and so-called *sterrenbossen* (star-shaped pattern of roads in the forest; see FIG. 1 Hof te Dieren).

What follows are a few portraits of country estates in the estate landscapes: Veluwezoom, Baakse Beek and Twello. It is impossible here to give a complete overview of all the country houses in the respective estate landscapes. Based on this limited selection, one can get an impression of the rich variety of country houses in Gelderland.[1] It also gives an idea of how owners have exploited the opportunities offered by the landscape and turned them to their advantage.

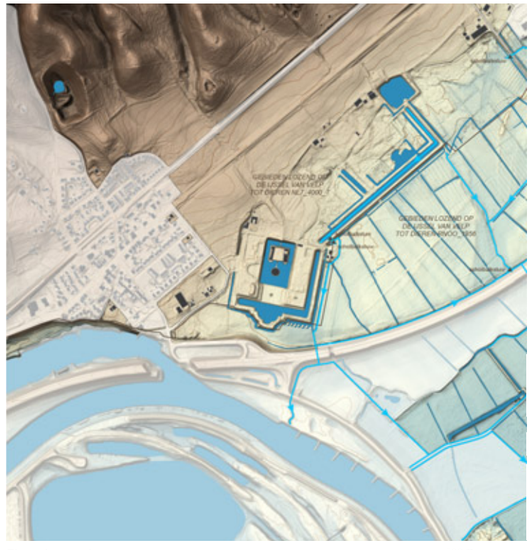
[FIG. 03]
Avenues are iconic landscape architecture features that have often a great impact on the experience and organisation of a region. (Photo: Leontine Lamers)

Examples from the Estate Landscape Veluwezoom

Middachten

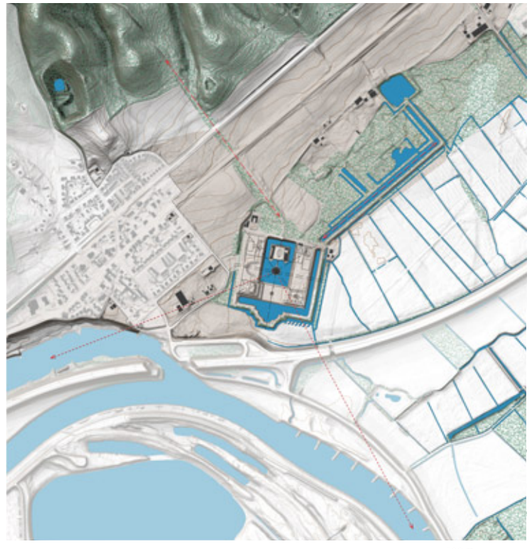
It is assumed that the current structure of avenues and watercourses around the castle of 1355 was created in one go during a renovation around 1690. The map shows the old farm road, the original connection between the villages at the bottom of the slope on which the farms were situated as well as the *schaapsdriften* (routes for sheep) that ran from the farms to the heathlands on the Veluwe. The Middachter Allée is possibly an offshoot of the old farm road. Several of these roads are included in the more or less geometric system of avenues on the estate and planted with beech or oak trees. The square of avenues, canals and ornamental gardens around the castle stands out from the large framework due to its remarkable angular deflection. The garden has a formal layout with internally symmetrical parterres around a central axis with the castle in the middle. Part of it was used as a utility garden. In the course of the 19th and 20th centuries the garden was changed by various landscape architects. Initially partly in the English landscape style, in 1901 H.A.C. Poortman made a design in a modern interpretation of the formal garden, which was adapted not long afterwards by R.E. André. The plantings with, among others, shaved box hedges were considerably reduced around the Second World War by J.T.P. Bijhouwer with M. Ruys and J.H.R. van Koolwijk. The garden now consists mainly of an ancient rectangular structure of axles and paths with lawns and some older garden parts in between.

In the Middle Ages, the area at the foot of the moraine was very wet due to escaping groundwater. The brook at Middachten springs into the Fazantenbos at the foot of the moraine. Around 1690, a reservoir was built there that feeds the 'canal grande' (now known as the Paardengracht, as the most important aquifer in a system of existing brooks and ditches of which the Ruitersbeek and Middelste Beek also form a part). This canal fed the newly constructed outer canal around the castle



Elevation and water system.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)

500 m



Landscape structure.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)

500 m

Situation around 1900.
(Map: Pdok.nl/Kadaster)

1000 m

Situation around 2000.
(Map: Pdok.nl/Kadaster)

1000 m

Middachten aerial photo.
(Photo: Pdok.nl/Kadaster)

1000 m

Middachten aerial photo – zoom-in.
(Photo: Pdok.nl/Kadaster)

125 m

Middachten (Photo: Pieter van den Berg, MVO TV)

Rosendael (Photo: Henri ter Hall, Gelders Archief)

garden. In the north-east corner of it a cascade was made with a water-spouting dolphin. There would have been a water-driven corn mill in the south-east corner, but no traces of it have been found. Excess water is drained to the IJssel via the flood-plains. The digging and expansion of the surface water system over the centuries resulted in more and more seepage water being drained away via ditches, thus causing parts of the estate to dry out.[2]

Rosendael

In 1667, Jan van Arnhem laid out geometric gardens in the valley, despite the fact that it was hardly suitable for this purpose due to its curved shape. Long, central axes and sightlines directed towards the main building were lacking, but the garden sections were given an internal symmetrical design. A large maze, inspired by French examples, was also part of the garden. When the English landscape style became fashionable, J.D. Zocher Jr. overhauled almost the entire park, after earlier adjustments to the landscape style in 1836. Walking along winding paths, framed by strategically placed solitary and grouped trees in various colours for an optimal experience of depth, different views were presented over rolling hills and ponds with curved banks to buildings and garden ornaments, some of which still stem from previous designs. Hills play an important role in the structure of the park as a focal point or as viewpoint. In the past, 12 avenues came together on the Sterrenberg; later the east side was modified in landscape style by Dirk Wattez. This landscape designer also drew up a plan for the area around Koningsberg, in which part of it was parcelled out and at the same time the visual relationships between park sections were strengthened.

Water was drawn from several springs dug into the steep slope of the moraine. Part of the water flowed under natural decay through a series of dammed-up ponds in steps, formed by artfully designed cascades and waterfalls, down the stream valley. Another part was artificially guided along coutour lines and fed the shell gallery, *bedriegertjes* ('cheeters': hidden fountains in the floor) and fountains. Downstream the water was

500 m

Elevation and water system.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)

Rosendael

High
Low
Terrain elevation

Drainage system with flow direction

Weir, dam

Miscellanous water

Building

500 m

Landscape structure.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)

Spatial relationship

View

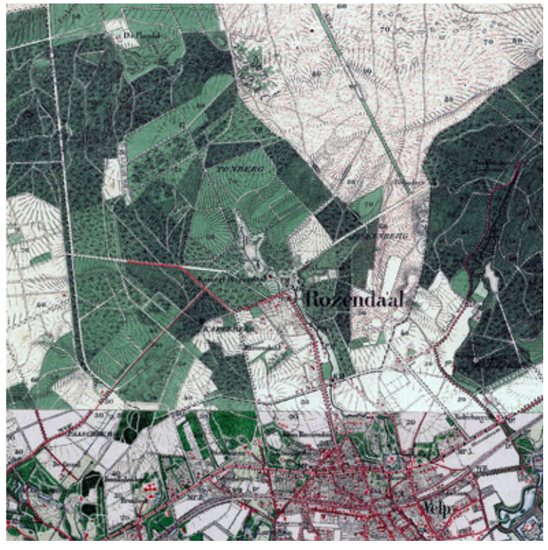
Garden layout

Forest, grove

Water

High sands and sand ridges

Building



1000 m

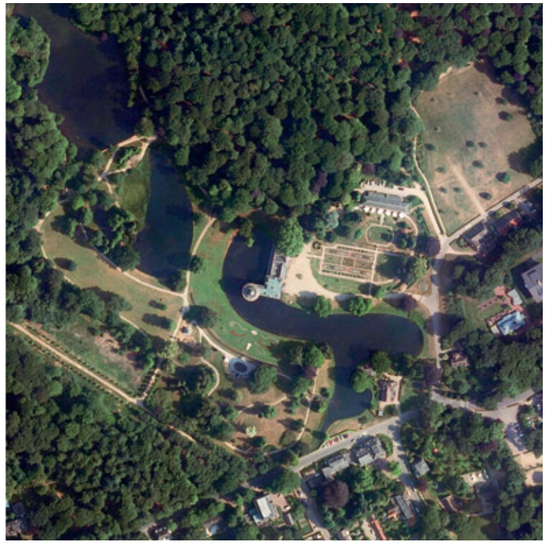
Situation around 1900.
(Map: Pdok.nl/Kadaster)

1000 m

Situation around 2000.
(Map: Pdok.nl/Kadaster)

1000 m

Rosendael aerial photo.
(Photo: Pdok.nl/Kadaster)



125 m

Rosendael aerial photo – zoom-in.
(Photo: Pdok.nl/Kadaster)

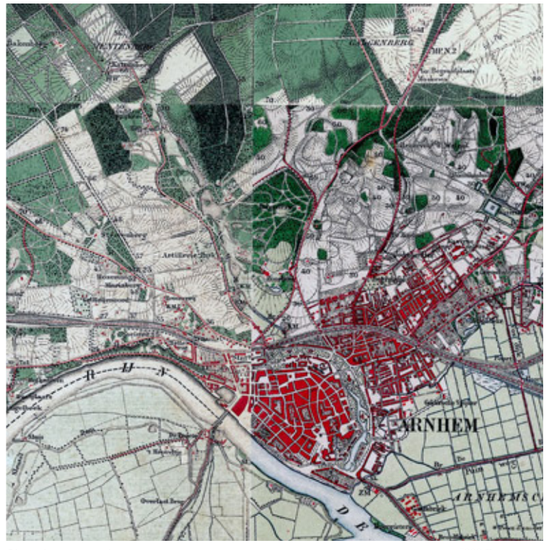
mainly used to power several watermills, after which it flowed through a large number of weirs into the ponds and canals of the estates Overhagen and Biljoen, into which the Beekhuizense Beek also flowed. From there the water was led through the floodplains via De Hank to the IJssel river. Nowadays excess water is discharged into the IJssel by the pumping station Velperwaarden (formerly known as De Volharding, a windmill and drainage sluice).[3]

Sonsbeek

The estate consists of an open brook valley and more closed forest on the slopes. After the house from the 15th century, built on an island in the estate's large pond, had fallen into disrepair, in the middle of the 18th century a new house was built on the hillside by Anthony Viervant by order of Lady A. van Bayen de Hartgersberg. From the end of the 18th century onwards, several successive owners largely transformed the estate into the English landscape style, with winding paths along organically shaped water features and views over open fields to buildings, among others, framed by groups of trees and forest edges. From the house, various views of the outskirts of the city are framed by backdrops of tree groups. The watermills in the valley are thus hidden from view. Many of the newly planted trees are exotic species. In the forest several attraction points have been laid out. On the Apostelenberg a circle of 11 lime trees has been planted. Around 1827 a belvedere was built on one of the highest mountains, a square brick tower with neo-Gothic style features and a platform made from steel. Because of its great height it offers a wide view over Arnhem and its surroundings. To the west of the tower lies, as a romantic surprise in the forest, the Ronde Weide, an oval-shaped meadow where black sheep used to graze. Due to lack of money, parts of the estate west of the Zijpendaalseweg and east of the Sonsbeekweg and Apeldoornseweg were sold for urban development. In 1899, the remaining part was bought by the municipality and opened up as a city park. On the remnants of the walled vegetable garden to the west of the house, the Steile Tuin, a decorative hillslope

Elevation and water system.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)

Landscape structure.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)



Situation around 1900.
(Map: Pdok.nl/Kadaster)

Situation around 2000.
(Map: Pdok.nl/Kadaster)

Sonsbeek aerial photo.
(Photo: Pdok.nl/Kadaster)

Sonsbeek aerial photo – zoom-in.
(Photo: Pdok.nl/Kadaster)

Sonsbeek (Photo: Pieter van den Berg, MVO TV)

Het Medler (Photo: Pieter van den Berg, MVO TV)

garden, was laid out in 1999 to celebrate the 100th anniversary of Sonsbeek as city park.

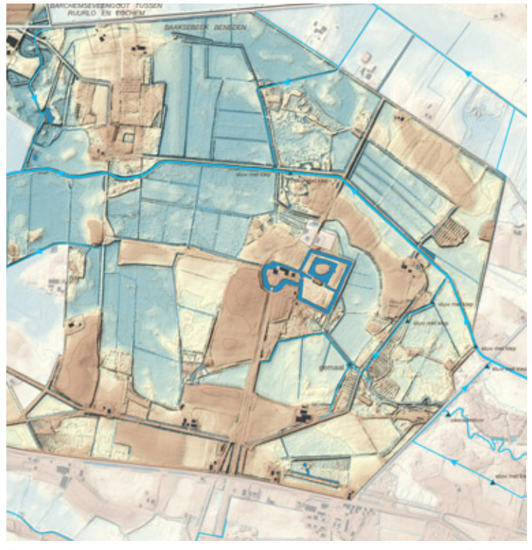
The Sint Jansbeek, which flows over Sonsbeek estate, springs in the slopes of Zypendaal estate, slightly higher uphill, about 35 metres above the Rhine River. Along the way, several *sprengen* contribute to the water volume. The brook has been dammed in various places, initially to power watermills, through which it also widens into large meandering water features and ponds. In some places these height differences have been used for decorative waterfalls. Recently the lower part of the brook, which had become obsolete due to the advent of steam engines, has been partly reopened with a slightly modified route in the city centre of Arnhem. On the Rijnkade it plunges over the edge of the quay into the Rhine.[4]

Examples from the Estate Landscape Baakse Beek

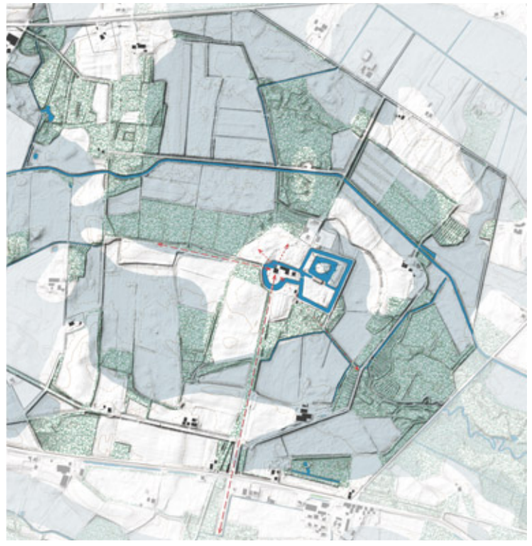
Het Medler

In the otherwise modest decoration of the estate, the monumental driveway catches the eye. It consists of a double row of oaks in a grass verge on both sides, which ends in an open space on the other side of the provincial road. To the rear, an open space with a circular avenue of red beech trees embraces the house and forms a backdrop to the pastures and woodland, intersected by avenues, located behind it.

Before canalisation, the moats around the (house) islands were directly connected to the Baakse Beek, which was about 200 metres more to the south. It is possible that the house used to sit on the oval island 'de Pol', where large quantities of bricks were excavated. The islets are now used as a soberly decorated garden. The water from the Baakse Beek was impounded and used for the irrigation of the estate by means of an ingenious system of articulated quays, weirs and outlets. Downstream, the water was collected in the Medler Laak and further drained to the IJssel.[5]



Elevation and water system.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)



Landscape structure.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)

Situation around 1900.
(Map: Pdok.nl/Kadaster)

Het Medler aerial photo.
(Photo: Pdok.nl/Kadaster)

Situation around 2000.
(Map: Pdok.nl/Kadaster)

Het Medler aerial photo – zoom-in.
(Photo: Pdok.nl/Kadaster)

De Wiersse

The landscape is small-scale, with alternating fields and meadows lined with rows of trees and interspersed with forest. The geometric pattern of avenues is oriented towards the canalised Baakse Beek and the roughly east-west-oriented cover-sand ridges. In the floor plan several squares can be recognised, which reduce in scale around the house. From the main house, centrally located in the composition, two visual axes have been constructed at the front and the back, which are accompanied by symmetrically placed decorations, especially near the house. At the beginning of the 19th century, several garden sections within the large framework were changed to the English landscape style. After the turn of the century, Victor de Stuers restored the then-dilapidated estate. His daughter designed a boxwood parterre with roses and a sunken garden with flowering borders to the east of the house. Her later husband, W.E. Gatacre, added romantic views to the garden and provided more structure. He invariably ended sightlines in the garden with a statue, staircase or hill. Especially particular are the visible stratification and alternation of formal and romantic garden sections.

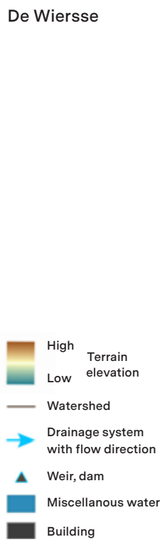
The Baakse Beek flows approximately in an east-west direction over the estate. This main watercourse has been dug and canalised in different stages – originally the house was situated north of the stream while currently the stream passes north of the house. In several places the previous winding stream can still be found in the relief. The house is situated in the stream valley and is surrounded by a double moat. In low plains a pattern of ditches and canals has been laid out, roughly parallel to the stream course. The flow rate and distribution of water is controlled by means of weirs. In the past, this system was used for irrigating meadows with mineral-rich water, which significantly increased the yield of the land.[6]

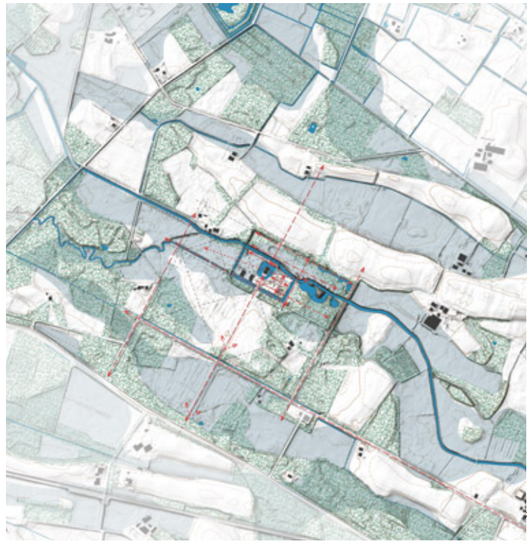
De Wildenborch

The history of de Wildenborch is marked by decay and renewal. Several times the estate was divided and sold, and almost all wood stands were cut down and sold. The castle fell into disrepair several

Elevation and water system.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)

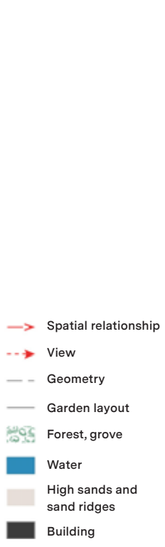
500 m

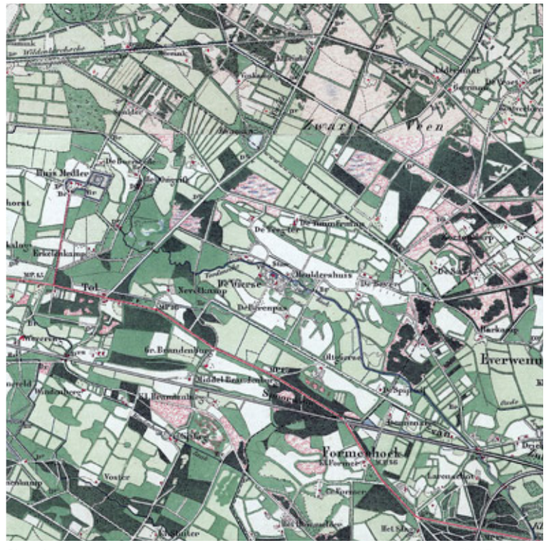




Landscape structure.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)

500 m





Situation around 1900.
(Map: Pdok.nl/Kadaster)

1000 m

Situation around 2000.
(Map: Pdok.nl/Kadaster)

1000 m

De Wiersse aerial photo.
(Photo: Pdok.nl/Kadaster)

1000 m

De Wiersse aerial photo – zoom-in.
(Photo: Pdok.nl/Kadaster)

125 m

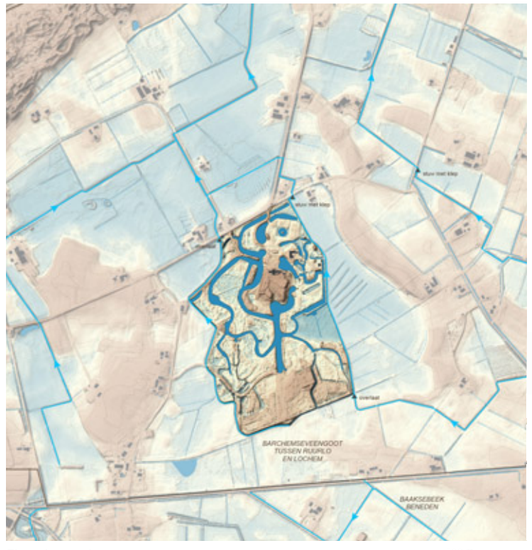
De Wiersse (Photo: Pieter van den Berg, MVO TV)

De Wildenborch (Photo: Pieter van den Berg, MVO TV)

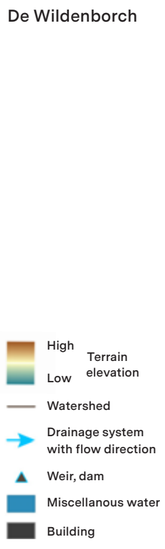
times and was probably largely demolished at the end of the 17th century, with the exception of the tower from c. 1530, which forms the heart of the current house and has been rebuilt several times since then.

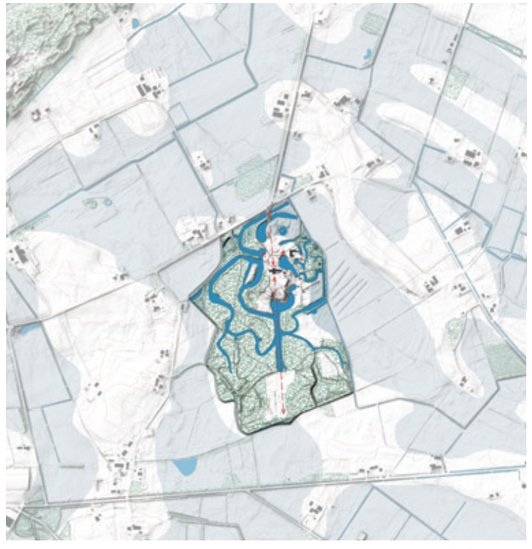
The shape of a landscape park with meandering water features and paths only came into being in the 19th century by a transformation of the famous poet A.C.W. Staring from an earlier formal layout of which the 600-metre-long water axis formed the centre. The current layout consists of a series of interlinked spaces with a more formal layout. The edges are lined with woodland and the visual relationships between them are shaped by tree groups and solitary trees.

De Wildenborch was founded in the middle of a large and inaccessible fen plain on the watershed between the Berkel and the Vordense/Baakse Beek. This marshland came about by poorly permeable buried ice-pushed ridges in the vicinity, which pushed the groundwater upwards. Probably the fortified house at this strategic location was surrounded by moats, a perfect hideout for the robber knight around 1372. Later the drainage was improved, especially from 1804 onwards, on behalf of A.C.W. Staring. He commissioned the digging of the Wildenborchse Veengoot, a canal that drains on the Berkel. Previously, the water was led back to the Baakse Beek, but due to impoundment at watermills downstream, drainage in that direction was often no longer possible. When improving the drainage, the poorly permeable ridges were dug through, causing the groundwater level to drop. On the one hand, this made the area suitable for agriculture; on the other hand, the soil dried out more quickly.[7]



Elevation and water system.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)





Landscape structure.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)

Situation around 1900.
(Map: Pdok.nl/Kadaster)

De Wildenborch aerial photo.
(Photo: Pdok.nl/Kadaster)

Situation around 2000.
(Map: Pdok.nl/Kadaster)

De Wildenborch aerial photo – zoom-in.
(Photo: Pdok.nl/Kadaster)

Examples from the Estate Landscape Twello

Het Hartelaar

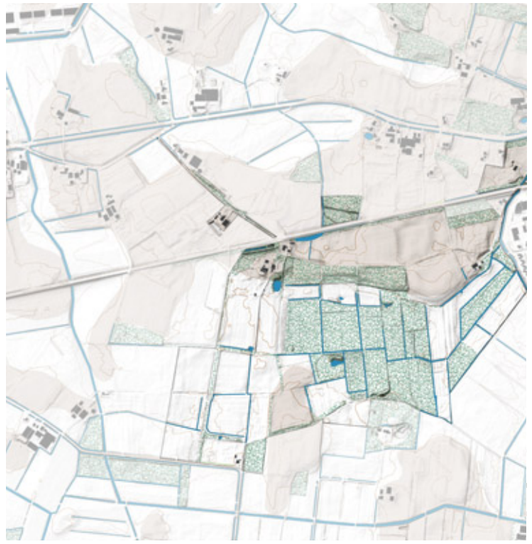
The main house sits on the edge of a cover-sand ridge, right in the reclamation axis (the current Leemsteeg road) of the former marshlands south of it, but the orientation of the house follows the edge of the ridge. In there was an access avenue from the south. The subdivision of the estate follows the curvature of the cover-sand ridge. In front of the house lies a meadow with several solitary trees. To the east, on the cover-sand ridge, was a recreation forest with winding paths that ran around the house in a small, wooded area to the west of it. The south-eastern part of the estate consists mainly of coppice. The plots, in use as grassland and arable land, are bordered by avenues and hedgerows.

The low-lying areas drain into the Hondsgrift (Oude Twellose Beek), which flows into the Terwoldse Wetering. For the purpose of water distribution, the Grote Wetering, Kromme Beek Teuge, Oude Twellose Beek/Hondsgrift, Twellose Beek and Fliert are interconnected by a transverse canal, the Koppelleiding West and Koppelleiding Oost. Due to intensive dewatering some brooks receive little water.[8]

Groot and Klein Noordijk

From the house Groot Noordijk two forest plots fan out, within which a winding system of paths has been constructed and which frame the view from the house to the east and south. The main road that cuts through the estates is planted with a monumental double and triple row of trees. The access has been reorganised several times and now runs in a loop through the dense recreation forest, where the house with an open meadow in front of it reveals itself as a surprise. A double row of trees visually anchors the house to the main road but isn't physically accessible. Around the house there are a small pond and a walled vegetable garden. On Klein Noordijk, created as a separation from Groot Noordijk, the landscaping

Elevation and water system.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)



Landscape structure.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)

Het Hartelaar

High
Low
Terrain elevation

Drainage system with flow direction

Weir, dam

Miscellanous water

Building

Spatial relationship

View

Geometry

Forest, grove

Water

High sands and sand ridges

Building

Situation around 1900.
(Map: Pdok.nl/Kadaster)

Het Hartelaar aerial photo.
(Photo: Pdok.nl/Kadaster)

Situation around 2000.
(Map: Pdok.nl/Kadaster)

Het Hartelaar aerial photo – zoom-in.
(Photo: Pdok.nl/Kadaster)

is adapted to the new house from 1856 onwards. It has a similar layout with lines of sight to Groot Noordijk and to the south, framed by monumental groups of trees and recreational forest plots accessible by footpaths. The site also includes a vegetable garden and an orchard.

On either side of the low cover-sand ridge, the Twellose Beek and the Fliert run through the shallow valleys of river deposits and cover-sand plains. Both streams originate from the south on a relatively high ridge across the river and then flow northwards into the Terwoldse Wetering, which is discharged into the IJssel via a pumping station. Previously, the water ran further downstream through the low-lying marshlands and was only discharged into the IJssel near Hattem.[9]

1 See for overviews: Tenbergen 1971; Van der Wijck 1988; Oldenburger-Ebbers, Backer & Blok 1996; Storms-Smeets 2011; Jas et al. 2013. There is also a wealth of monographs of individual castles, country houses and landed estates available, such as: Keverling Buisman 1998; Gietman & Jas 2020; Andela 2008.

2 More information: Van der Wijck 1988; Oldenburger-Ebbers, Backer & Blok 1996; Hoekstra 2002; Storms-Smeets 2011; Jas et al. 2013.

3 More information: Van der Wijck 1988; Bierens de Haan 1994; Oldenburger-Ebbers, Backer & Blok 1996; Storms-Smeets 2011; Jas et al. 2013.

4 More information: Van der Wijck 1988; Oldenburger-Ebbers, Backer & Blok 1996; Storms-Smeets 2011.

5 Tenbergen 1971; Jas et al. 2013.

6 More information: Tenbergen 1971; Van de Kaa 1990; Oldenburger-Ebbers, Backer & Blok 1996; Gatacre 2002; Jas et al. 2013.

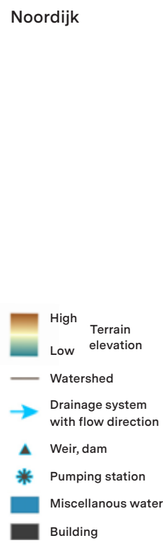
7 More information: Tenbergen 1971; Oldenburger-Ebbers, Backer & Blok 1996; Jas et al. 2013.

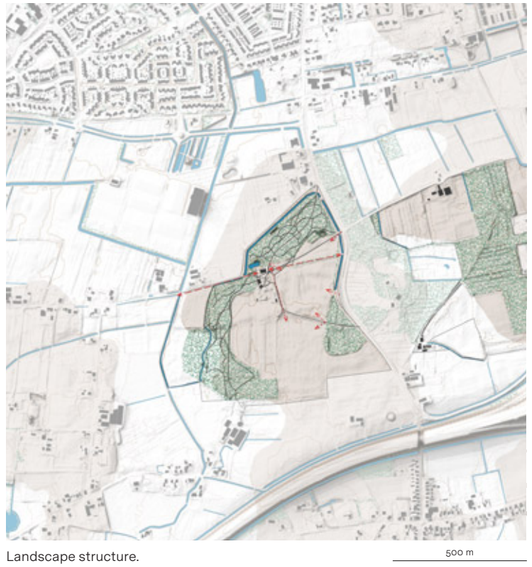
8 More information: Oldenburger-Ebbers, Backer & Blok 1996.

9 More information: Oldenburger-Ebbers, Backer & Blok 1996.

Elevation and water system.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)

500 m





Landscape structure.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)

500 m

Situation around 1900.
(Map: Pdok.nl/Kadaster)

1000 m

Situation around 2000.
(Map: Pdok.nl/Kadaster)

1000 m

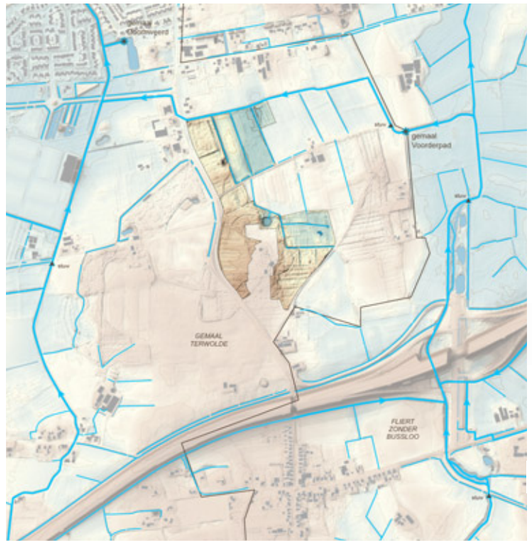
Noordijk aerial photo.
(Photo: Pdok.nl/Kadaster)

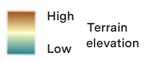
1000 m

Noordijk aerial photo – zoom-in.
(Photo: Pdok.nl/Kadaster)

125 m

Klein Noordijk





Watershed

Drainage system with flow direction

Weir, dam

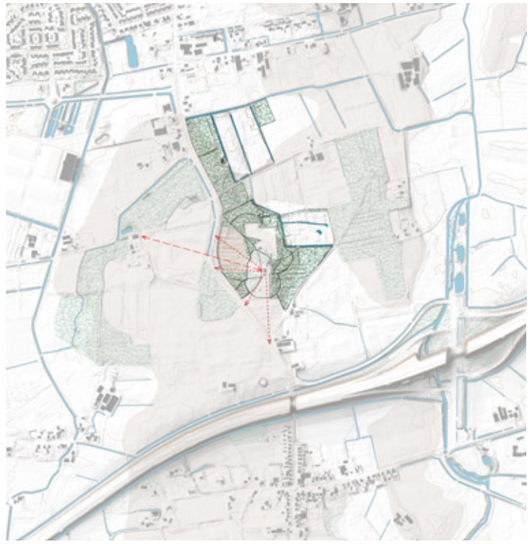
Pumping station

Miscellanous water

Building

Elevation and water system.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)

500 m



Spatial relationship

View

Garden layout

Forest, grove

Water

High sands and sand ridges

Building

Landscape structure.
(Image: Michiel Pouderoijen and Steffen Nijhuis, TU Delft)

500 m

Situation around 1900.
(Map: Pdok.nl/Kadaster)

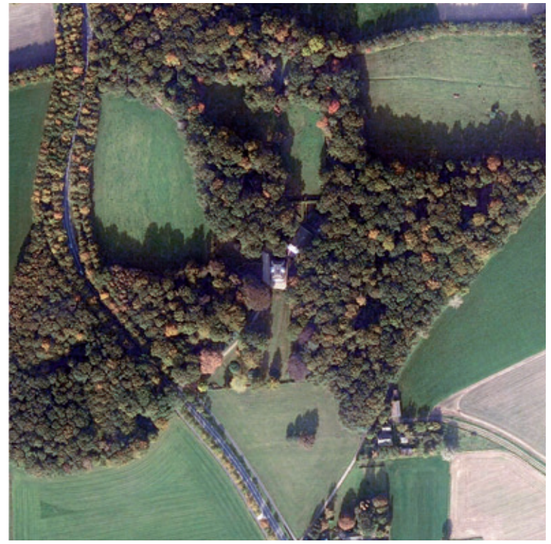
1000 m

Klein Noordijk aerial photo.
(Photo: Pdok.nl/Kadaster)

1000 m

Situation around 2000.
(Map: Pdok.nl/Kadaster)

1000 m



Klein Noordijk aerial photo – zoom-in.
(Photo: Pdok.nl/Kadaster)

125 m

Noordijk (Photo: Pieter van den Berg, MVO TV)

Klein Noordijk (Photo: Pieter van den Berg, MVO TV)

[FIG. 01]
Sonsbeek park is a popular destination by tourists and the citizens of Arnhem.
(Photo: Ron Giling Alamy Stock Photo)

Three Living Labs as Learning Cases in Gelderland

The present-day challenges that face historic estates are manifold. Together with local stakeholders, such as estate owners, heritage experts, municipalities, water boards and the Province of Gelderland, three significant present-day challenges were identified for protecting and developing the estate landscapes in Gelderland: climate adaptation, heritage tourism and spatial fragmentation due to urbanisation.[1] How can these challenges be met with respect for the heritage values? The presumption is that these challenges cannot be solved on a single estate but require a multi-scale landscape approach, as put forward in chapter 2. This implies a role for (governmental) organisations that work on the regional scale, such as the provincial government, water boards and owner associations.

In order to be able to set up a living lab that can involve local stakeholders, address specific issues and generate solutions utilising the earlier explained landscape approach, the three main challenges are connected to three particular estate landscapes.

This resulted in the setup of the following three living labs: [1] heritage tourism: heritage estate landscape Veluwezoom; [2] climate adaptation: heritage estate landscape Baakse Beek; [3] spatial fragmentation: heritage estate landscape Twello.

In these three living labs, local stakeholders, experts and students from TU Delft identified each region's specific problems and potentials and generated ideas for future development. Each living lab provided a platform to collaborate, co-create and experiment while using real cases and implementing solutions. Each of these labs has its own set of stakeholders and dynamic, and most of them are still running.

The three living labs are learning cases that shed light on how to deal with specific challenges and enabled us both to explore the power of research through design[2] and, moreover, to discuss and improve government agencies' role in maintaining, developing and improving historic country houses, castles and landed estates in a landscape context.

[FIG. 02]
Zypendaal estate is beautifully situated in the green hilly outskirts of Arnhem and together with the Gulden Bodem and Sonsbeek being directly part of the estate landscape Veluwezoom. (Photo: Pieter van den Berg, MVO TV)

[FIG. 03]
Tourism concepts for the estate landscape Veluwezoom. (Image: De Culturele Zaak i.s.m. SB4 and Kingkorn, Veluwezoom Vol Verhalen, 2021)

Heritage Tourism and Spatial Quality in the Estate Landscape Veluwezoom

In the estate landscape Veluwezoom [FIGS. 1 & 2], the municipalities of Arnhem, Renkum, Rheden, Rozendaal and Wageningen and owners such as the private estate Middachten and the Gelders Genootschap work on finding a good balance between strengthening heritage tourism in the estate landscape and preserving heritage values.[3] Nowadays parts of the estate landscape are overcrowded, such as Sonsbeek in the city of Arnhem and Heuven De Posbank in the municipality of Rheden. Other interesting parts are less known and less visited.

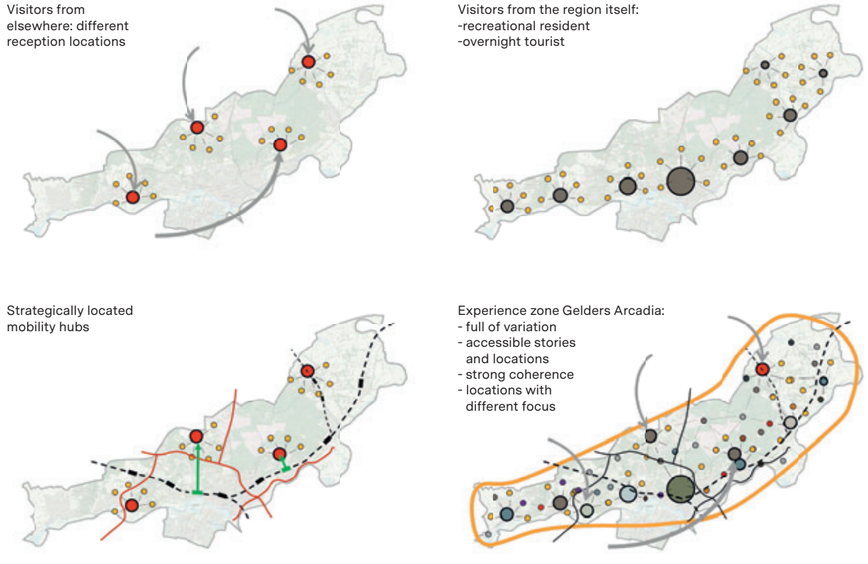
Objectives include the development of estate landscape Veluwezoom (Gelders Arcadia) into a coherent publicly accessible experience zone that links the heritage of castles and rural estates to the qualities of landscape and nature, including the broadening and deepening of heritage tourism by telling other stories of the heritage landscape, among them stories about the influence of high nobility and the Second World War. The challenges include the development of a realistic model of organisation based on cooperation between the main stakeholders, the municipalities, heritage owners and entrepreneurs.

Characterised by the relief of the glacial ridge, the south-facing slope with significant height differences was popular among the Dutch elite from the Middle Ages onwards. Medieval castles and landed estates, 18th-century regent country estates and modern 19th- and 20th-century country houses can be found. In total, over 100 country and landed estates have been identified. Also, important landscape architecture heritage can be found here, like the previously mentioned landscape gardens in Gelderland at the Biljoen-Beekhuizen estate, some of the first in the Netherlands.

Special features in this estate landscape are the landscape structures created by the stadtholders and their noble friends, such as the so-called kings' roads. Stadtholder King William III constructed long roads on the Veluwe, his hunting grounds, to connect various hunting lodges and castles. The maintenance and touristic promotion of such 'power landscapes' are complex as the kings' roads are owned by various private and institutional owners and are situated in several municipalities.[4] A joint vision and management are challenging to realise. Also, not many (heritage) tourists are aware of the history of these power landscapes. The features are not always well recognisable. The continuity of initiatives is demanding, as the partnerships arise with temporary projects but come to a standstill at the end of a project. The five municipalities try to take the lead, but this is not an easy task. Estate landscapes have a positive effect on regional economic benefits and can strengthen regional heritage tourism. Heritage tourism can also be a valuable source of income to estate owners, thus helping to sustain these estates. Therefore, a regional tourism vision is necessary [FIG. 3].

The learning case of the estate landscape Veluwezoom showcases that a regional partnership on heritage estate landscapes, in which both estate owners and authorities participate, can be successful in the exchange of knowledge and experiences. Entrepreneurs (museums, hotels, restaurants, etc.) are interested in a regional approach and willing to participate [FIG. 4]. At the same time, no one wants to take the lead towards regional tourism. Therefore, the role of the provincial government is crucial to initiate, stimulate and facilitate regional development. In order to do so, the following actions are taken:

CONCEPT



[1] making the theme 'power and splendour' one of the main tourist promoting themes in the province, and creating a community of practice in which heritage owners and touristic entrepreneurs can take part; [2] execution of a project that enables heritage owners and touristic entrepreneurs to tell the story of their place in the regional estate landscape, made possible by a heritage pact; [3] search for continuity in regional collaboration in the estate landscape Veluwezoom, for example by setting up a foundation or trust.

Climate Adaptation in the Heritage Estate Landscape Baakse Beek

This living lab addresses the significance of the estate heritage for water issues, particularly climate adaptation: dealing with long periods of drought and occasionally heavy rain in the estate environment [FIGS. 5]. Objectives include: making heritage part of changing the water system towards climate adaptivity, finding out what role the regional authority can play best and introducing landscape design as a contribution to move from analysis to solutions.

The estate landscape Baakse Beek consists of landed estates and agricultural land, interconnected by the brook carrying the same name. The majority of the estates date back to Medieval times. Trust organisations own some, but most of them are privately owned [FIG. 7]. Most of the estates are A-listed as ensembles of buildings, gardens, parks and water features. In recent years, climate changes have led to long periods of drought and short intervals of intense rainfall. In order to address this issue, the regional water authority Waterschap Rijn en IJssel and the Province of Gelderland – looked at the significance of the estate heritage for water issues [FIG. 6].[5] The regional water authority and the municipalities, and private and other owners collaborate to find solutions for present-day challenges to water management, nature and agriculture. The focus is on water retention within the context of historic water management structures in the estate landscapes.

The learning case of Baakse Beek showcases that an estate landscape such as this one has many opportunities to combine and connect various themes: nature, heritage, water management and exchange of landed property. Spatial quality is a primary condition in addressing the present-day challenges at estates. There is also an opportunity for tourism and recreation. The living lab shows that the multi-scale spatial approach facilitates integral short- and long-term solutions that only can be achieved by the joint efforts of landowners, the water board, nature conservation groups and the regional authority. The following actions are the result of this collaboration: [1] they are developing and implementing a joint regional water management plan. Historical landscape structures and cultural elements are rehabilitated and play a role in buffering and retaining water in the region. [2] setting up a monitoring-pilot of the impact of drought on the heritage of country houses and historic estates that make up the estate landscape; [3] identify situations in estate zones where construction measures need to be implemented to solve problems caused by drought.

[FIG. 04]
Warnsborn estate is now a hotel in Arnhem and takes advantage of regional tourism in the estate landscape Veluwezoom.
(Photo: C. Gouwenaar)

[FIG. 05]
Long periods of drought are causing serious problems to the regional water system of the Baakse Beek, amongst other places in the cover-sand landscape. Dried-up water stream on the Hackfort estate.
(Photo: Steffen Nijhuis)

[FIG. 06]
Quality framework for the development of the heritage estate landscape Baakse Beek. This plan is meant to help execute physical measures in line with landscape and heritage. The framework pays special attention to the landscape features on estates that are relevant to contribute to climate adaptation: dykes, watermill complexes, historic inundation sites and groove forests.
(Waterschap Rijn en IJssel 2020, drawing: Bosch & Slabbers)

Core Quality: Stream Valley Estates as a Combination of Utility and Pleasure

Nut
- Former manor
- Watermill landscape (existing and former)
- Quays through the lowlands (source: AHN)
- Groove forest (source: Development Vision)
- Possible water meadow (source: Design Study Water Management Vista)
- Monumental farms (source: RCE)
- Brandenborch farm

Lust
- Aesthetic water features
- Avenues main axis
- Other avenues
- State-protected country estate incl. garden and park (source: RCE)
- Important sightlines and monumental spaces

Core Quality: Stream Valley Estates as a Combination of Utility and Pleasure
- Cover-sand landscape
- River landscape
- (Former) floodplain landscape
- Wet heath and brook clearing landscape
- Historical farmland complexes
- Historic watercourses (source: Historic Map 1843)

Other
- Other drains
- Monuments (source: RCE)
- Forest on RCE estate
- Forest on estate
- Forest outside estate
- Property of the estate (source: RCE)
- Railway line
- Disappeared railroad line
- Hessen road (source: Historical map 1575)

[FIG. 07]
De Wiersse is a privately owned landed estate and suffers like other estates in the region, such as Het Medler, De Wildenborch, Suideras and Hackfort, from shortage of water. (Photo: Pieter van den Berg, MVO TV)

Spatial Fragmentation in the Estate Landscape Twello

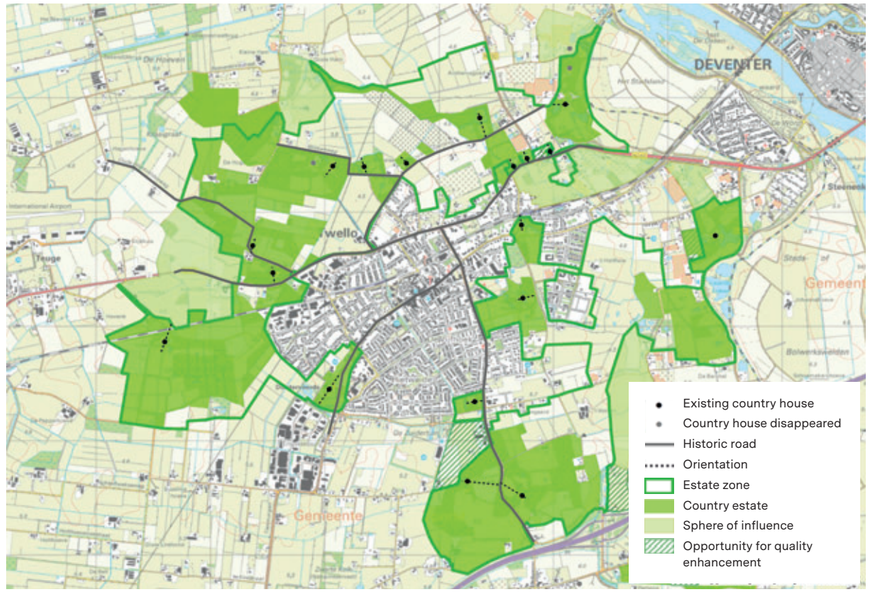
This living lab is about combatting spatial fragmentation of the estate landscape of Twello in the middle of the urban triangle Apeldoorn-Zutphen-Deventer. Spatial fragmentation has occurred through infrastructural and urban expansion. Here the regional authorities, the municipality and owners around Twello worked on identifying the heritage qualities that are important to the spatial cohesion of the estate zone. The goal is to keep the estate landscape as a whole, as there is a risk that fragmentation increases and quality disappears. This living lab is established to help the municipality incorporate heritage qualities in local policy for the protection and development of the estate landscape.

The region around Twello is described as 'the green heart of the city triangle' enclosed by the cities of Apeldoorn, Deventer and Zutphen. The area offers various landscapes in the transition area from the Veluwe into the valley of the river IJssel.

The beauty of this rural area was recognised early on. In the 18th and 18th centuries, wealthy families from the surrounding cities bought plots of land to build country houses and country estates. Twello has a wide-ranging estate landscape (also called the Green Carré), full of monumental buildings in a park-like environment. This rich cultural history is a crucial part of the region's identity that it wants to retain and – where possible – strengthen. This estate landscape is threatened by the construction of roads and houses [FIG. 8]. A common goal and plan are needed to make sure to keep this alive through an active community. Therefore, recognition of the estate landscape Twello as a heritage zone is important. In all new developments, the spatial quality and the cultural values should be leading. This requires knowledge of the collection rather than knowledge of the individual monuments.

This learning case of estate landscape Twello showcases that new spatial policy tools can be developed to protect and develop the heritage

[FIG. 08]
Bruggenbosch estate admits a variety of urban developments. Nowadays the urbanisation around Deventer and the position of Twello in the middle of the city triangle Deventer-Zutphen-Apeldoorn poses challenges to saving the historic qualities of the estate landscape. (Photo: Pieter van den Berg, MVO TV).



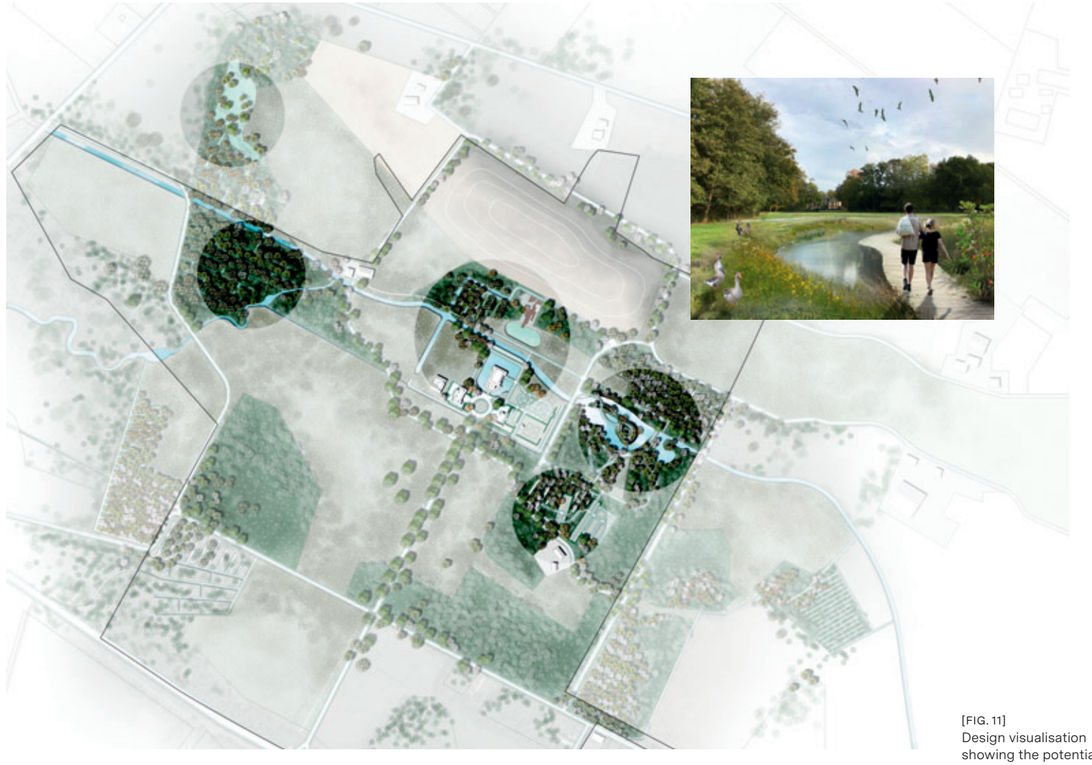
[FIG. 09]
Analysis of estate biotopes in the estate landscape Twello. The estate biotopes help to define the existing country and landed estates and connecting areas, areas with opportunities to strengthen the estate landscape (often former estate lands) and areas with a 'sphere of influence'. (Elyze Storms-Smeets, Gelders Genootschap, 2020)

qualities of the estate landscape. In this case, the concept of the 'estate biotope' was explored further [FIG. 9]. The estate biotope helps to define the existing country and landed estates and connecting areas, areas with opportunities to strengthen the estate landscape (often former estate lands), and areas with a 'sphere of influence'. The estate biotope identifies essential aspects of the country houses' locations and orientations and landscape architecture composition elements, such as lanes and vistas. Having this information is vital for the municipality to preserve the estate landscape and individual estates' existing estate qualities and helps to offer insights when investigating new development opportunities. The experiences of the municipality of Voorst are being compared with other experiences of municipalities dealing with their estate landscapes.

Important outcomes of this living lab include: the experiences of the municipality of Voorst are compared to the ones of other municipalities dealing with their estate zones and with their stakeholders, especially heritage owners. The result will be shared with all relevant municipalities. The experiences of Voorst and other municipalities are put towards the renewal of the spatial policy of the province regarding estate landscapes and other heritage landscapes.

Design as Form of Dialogue and Co-Creation

In the three living labs, design plays an essential role to get a grip on the complexity of the mentioned challenges and address them in an integrated and spatial way. The challenges for the preservation and development of the heritage estate landscapes have impacts that cut across local to regional scales, so setting up a design process that addresses these scales and engages a wide range of relevant stakeholders proved helpful for formulating design briefs and identifying potential spatial outcomes.[6] In the living lab, a structured but informal design



process was employed. Various co-creation rounds are gone through by estate owners, regional and local authorities, landscape designers, experts, students and other participants. As such, the living lab was like a design studio that consisted of a range of public meetings or workshops that addressed the challenges of utilising design and integrated them into a more extensive and more protracted process of developing and implementing solutions. Also, the input of landscape architecture design students was valuable as they provided fresh, unbiased perspectives and stimulated the creativity

[FIG. 10]
For experts and students, field study creates opportunities for first-hand experiences that encourage critical thinking, long-term retention, transfer potential, positive attitudes towards science, appreciation for nature and increased scientific curiosity. (Photo: Steffen Nijhuis, TU Delft)

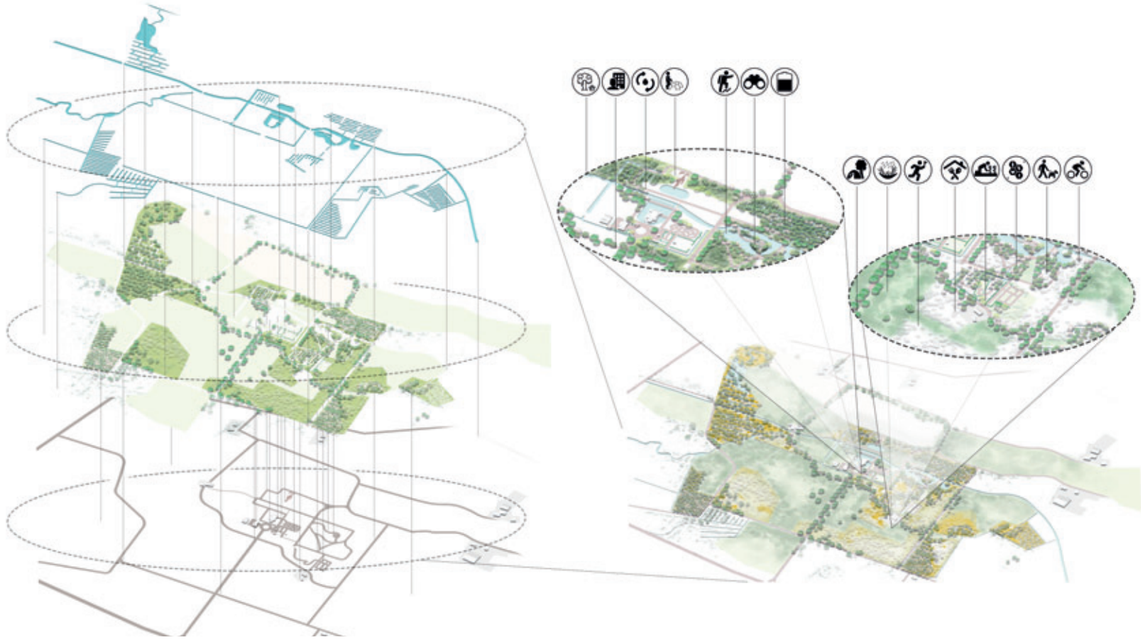
and imagination of the involved participants.[7] The resulting informal space, independent of everyday hierarchies, fits in well with the social and political conditions needed to generate solution on a policy level and practical level.[8]

In this context, the design outcomes for each estate landscape provided a context for conversation, observation and construction, not only in spatial terms but also in cognitive terms [FIG. 10]. The design helps to set the problem or possibility by 'naming' the things that will be attended to and framing the context in which they will be attended (framing of thoughts).[9] The design process identifies what users and stakeholders think about future developments at different scale levels. Positioning ideas, programmes and demands in outdoor space make it possible to discover the possibilities, limitations and questions that call for further exploration.[10]

Designing in this regard is employed as a systematic search for possible solutions to a spatial problem. This activity aims to visualise an innovative solution to a problem that does not yet exist in the designer's mind.[11] It is also the base for the representation of solutions that were not previously visible. Rather than a straightforward process, the design is iterative and runs through various cycles of idea formation, drawing up representations and testing visualised ideas.[12] While going through this process, three types of knowledge were generated: project-based, form-based and idea-based.[13]

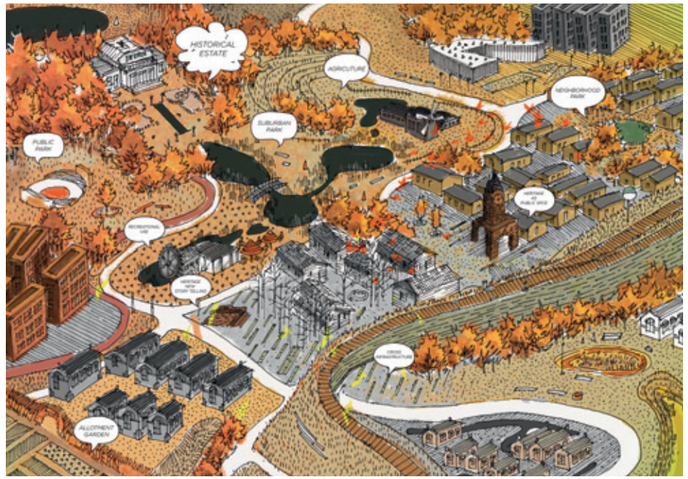
Project-based knowledge generated by design concerns the situation in its surroundings and the integrated solutions provided for it. In the estate landscape Baakse Beek, for instance, the landscape-based design approach helped to understand and create systemic relations among the individual

[FIG. 11]
Design visualisation showing the potential of spatial and systemic integration of individual estates. This type of visualisation enables stakeholders to deliberate about legal, political, cultural, functional, economic and ecological aspects and their relations. (Map: Huiying Liu, TU Delft; collage: Yingjie Zhang, TU Delft)



[FIG. 12]
Design exploration on how water management, ecological development and recreation can be integrated as a landscape system while reactivating historical water elements like groove forests and water meadows. (Image: Huiying Liu, TU Delft)

[FIG. 13]
The Baakse Beek stream as a route. Scenography of the route clarifying the relation-hip between cultural-aesthetics elements, movement and landscape experience. (Image: Yingjie Zhang, TU Delft)



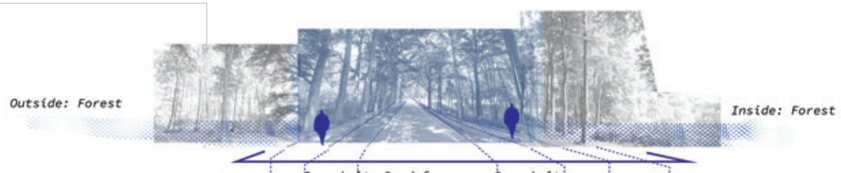
[FIG. 14]
In this design exploration, the development of integrative green-blue networks increases the accessibility and contributes to coherent ecological networks and reactivates the water system. (Image: Li Qian, TU Delft)

[FIG. 15]
Water, urban agriculture and accessible urban forests and natural parks are connecting historical estates with their urban surroundings and synthesise seemingly contradictory interests while bringing together different stakeholders. (Image: Zhaotun Chen, TU Delft)

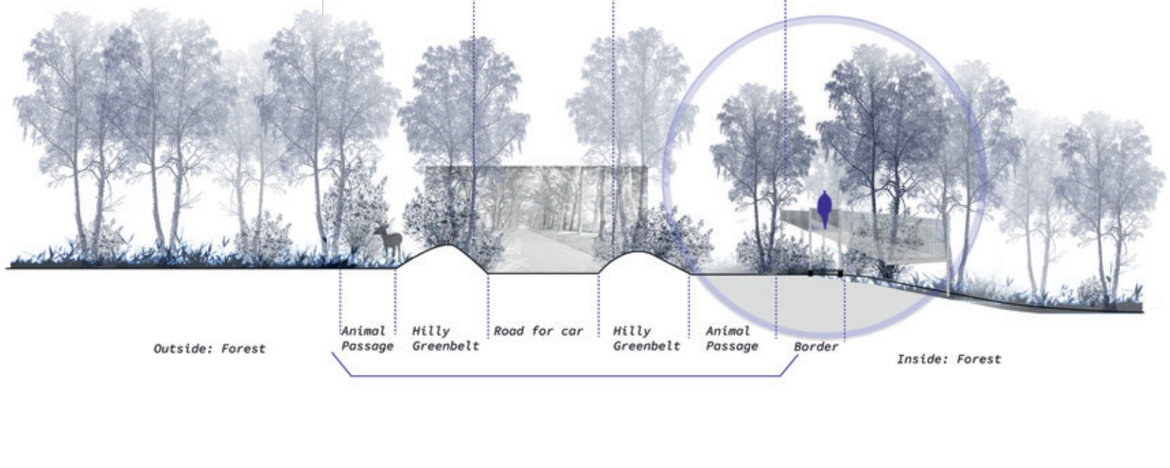
estates in order to increase the sponge capacity of the water system while reactivating historical landscape elements, but also to boost the ecosystem and the spatial experience within the landscape [FIGS. 11, 12 & 13].[I4] Seemingly conflicting agendas and stakeholders, such as water management, heritage protection and urban development, are integrated and can strengthen each other. The design process can also help to deliberate about the functional and ecological possibilities of estate landscapes in the urban context. For instance, the Veluwezoom historical country estates near Arnhem can be considered as building blocks for a new green-blue infrastructure that not only reconnects the city to its surrounding estate landscape by means of routes, ecological networks and water, but also creates a social infrastructure in which people can meet, work and enjoy the surroundings [FIG. 14].[I5] The historical estates encapsulated by urban tissue can also play an integrating role in spatial and social-ecological ways with accessible urban forests, urban agriculture and natural parks [FIG. 15].[I6] Here the design showcases how seemingly contradictory interests, changing restrictions and conflicting agendas can be synthesised while working with various actors, applying diverse methods and operating in various fields.

[FIG. 16]
Design application of building with nature and room for the river principles to raise awareness for natural dynamics, water fluctuation and to experience different spaces connected to gradients along the Veluwe.
(Image: Yuyu Peng, TU Delft)

Node B: Before



Node B: After



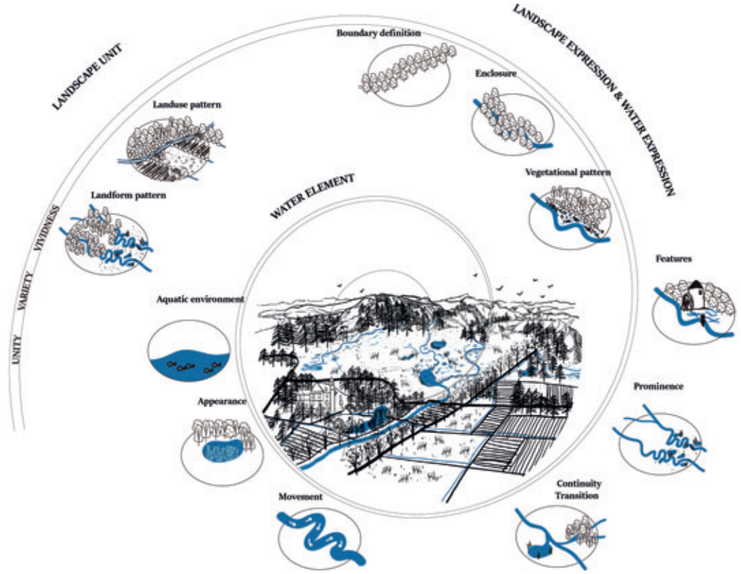
Form-based knowledge involves visual communication and the materialisation of the design (that is, how can it be created?). Here the assessment, exploration and realisation of qualities of landscaping schemes and technical constructions are explored further. For instance, different sets of landscape design principles, on working with natural processes and designing transitions, were developed and tested through design [FIGS. 16 & 17].[17] Design principle refers to a basic idea or rule that explains or controls how something happens or works. Examples include design principles for strengthening the spatial-aesthetic characteristics [FIG. 18], sustainable water management, nature-based solutions, historical land management practices and so on [FIG. 19].[18] These design principles were derived from desk study, field study, precedent study and conversations with heritage, water and ecology experts. Through design explorations and 'drawing and calculating' procedures, the possibilities of the design principles are contextualised and tested in the estate landscape of the Baakse Beek [FIG. 20].[19]

The type of design explorations focusses on the development, fabrication, proposal and translation of ideas into words and images. For example, here the idea that a heritage landscape can be considered as a dynamic system that bridges the past and the future can be explored. In the case of Hof te Dieren, the notion of the landscape as palimpsest was employed as an approach to make the historical traces in the site visible and to add new elements of development to meet the contemporary demand [FIG. 21].[20]

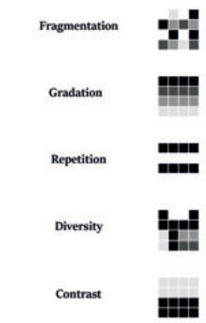
[FIG. 17]
Applying design language to road boundaries to emphasise continuity, widen in-between ecosystems and reflect topographical differences. (Image: Yuyu Peng, TU Delft)

[FIG. 18]
Spatial design principles to strengthen the interrelationships among water, landforms and vegetation in the estate landscape Baakse Beek. (Image: Yingjie Zhang, TU Delft)

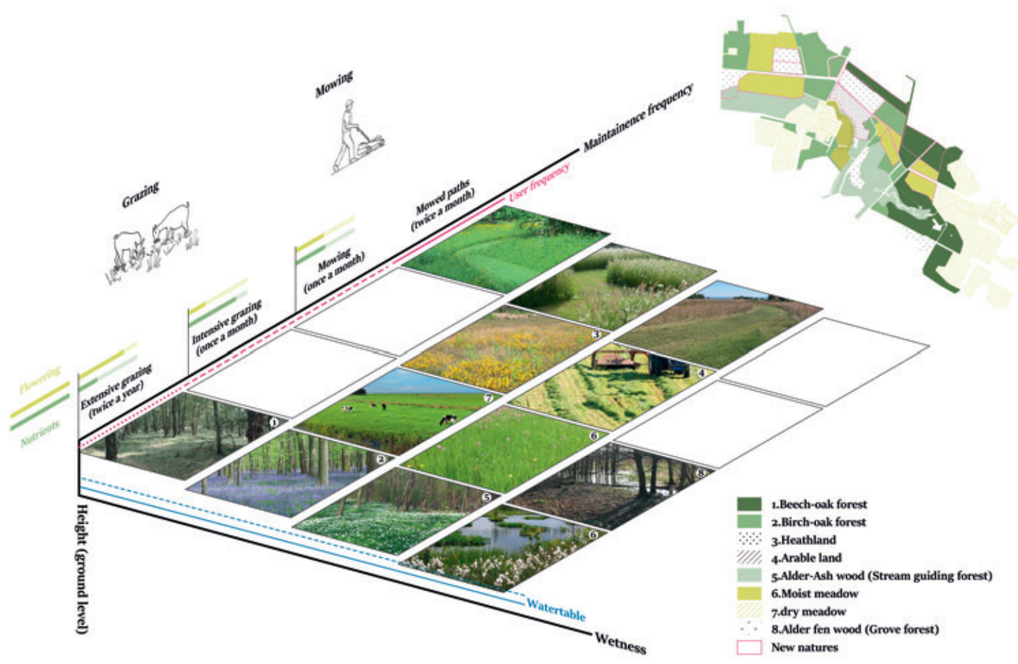
[FIG. 19]
Set of management principles based on natural processes such as hydrology, soil typology and ecological succession. (Image: Yingjie Zhang, TU Delft)

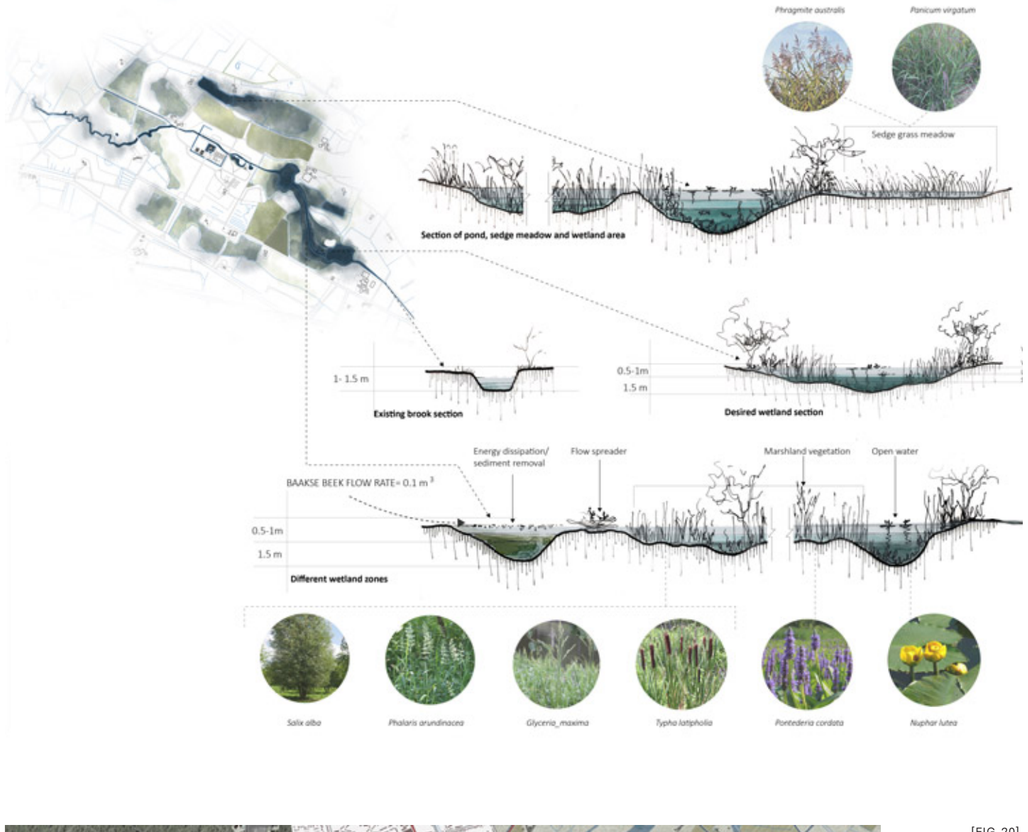


Spatial modification principles



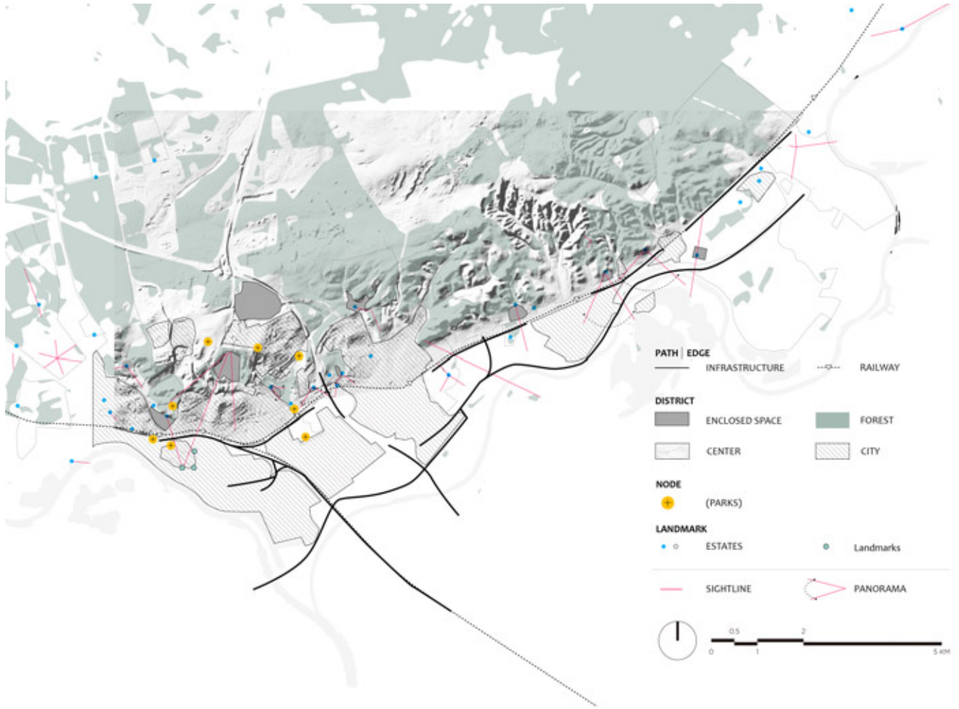
Spatial coherence in landscape could be rebuild through adjust the spatial layout of landscape elements like the landuse, vegetation patten or specific architectonic features to deliver or strengthen spatial feeling of contrast, diversity, repetition, gradation or even fragmentation.





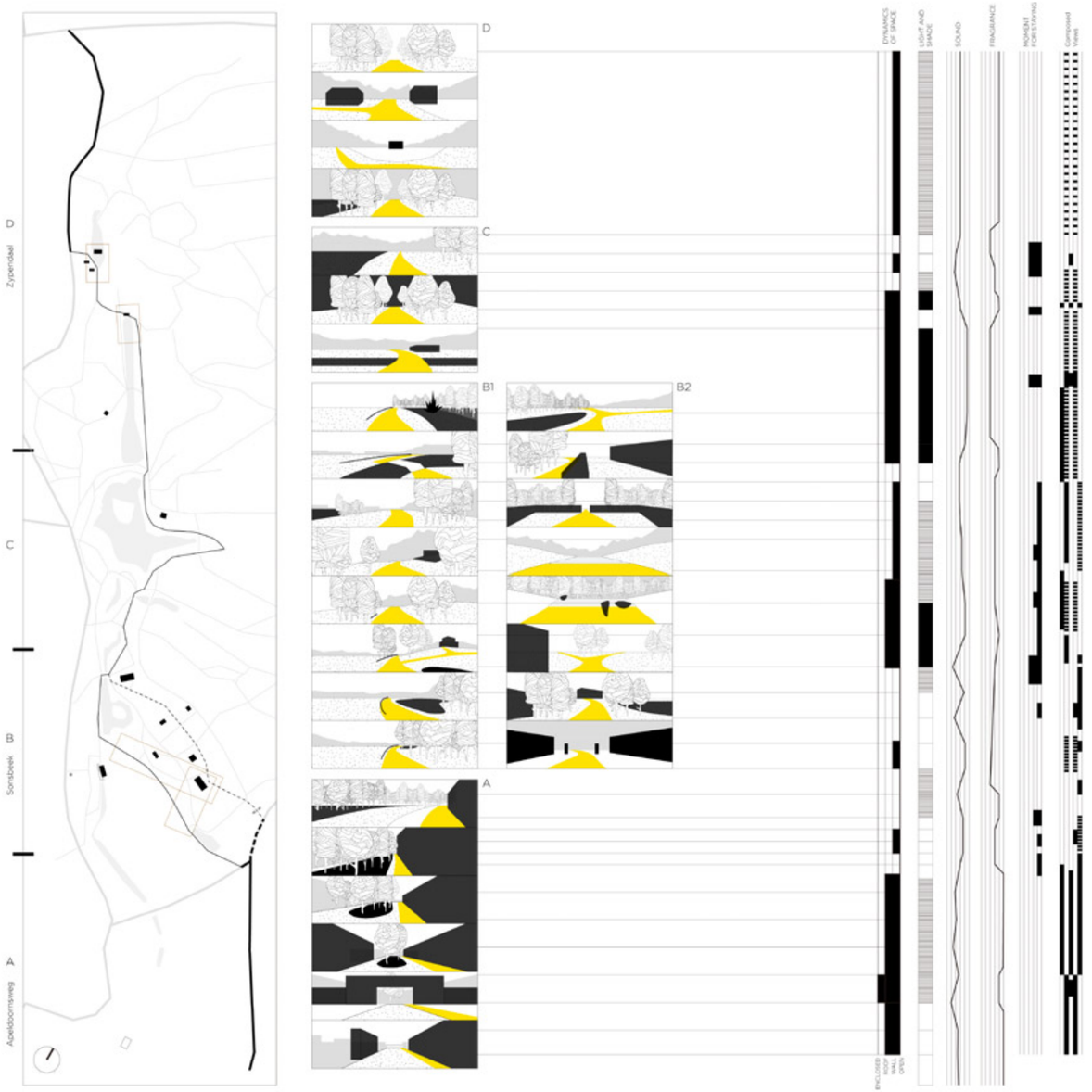
[FIG. 20]
Design explorations of the applicable retention ponds and riparian zones following a 'drawing and calculating' procedure.
(Image: Alia Shaded, TU Delft)

[FIG. 21]
Bridging the past and the future. A new palimpsest layer for the estate landscape of Hof te Dieren.
(Image: Beiqi Yuan, TU Delft)



[FIG. 22]
Speculating about the regional spatial and ecological coherence of an estate landscape in which ecology, water management, heritage and forestry synergise.
(Image: Yanjiao Wang, TU Delft)

[FIG. 23]
Sightlines, panoramas and sequences relate different scale levels, reconnect the country estates with their surrounding landscape and guide urban development.
(Image: Ming Jiang, TU Delft)



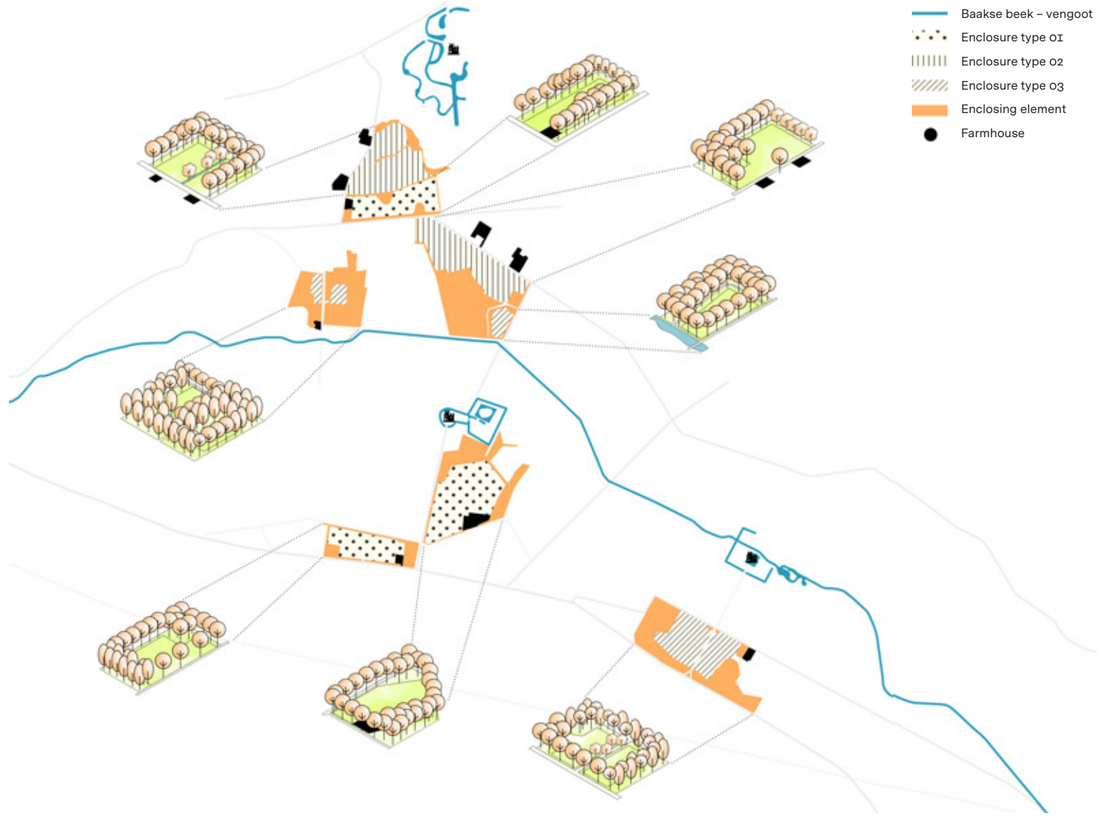
Experience analysis

[FIG. 24]
Analysis of the sceno-graphy following a walking route from Sonsbeek to Zypendaal addressing sensorial aspects related to light and shade, fragrance, sound and so on. (Image: Li Qian, TU Delft)

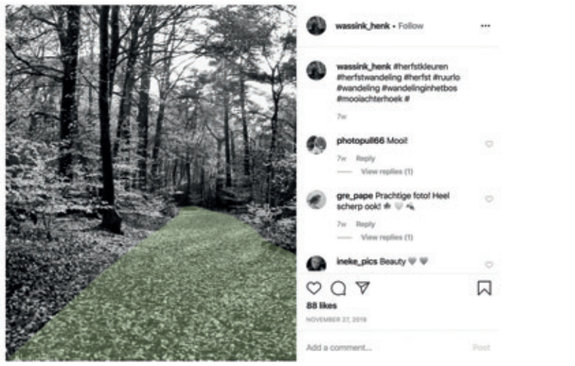
[FIG. 25]
Enclosures as sensorial destinations in the estate landscape Baakse Beek. (Image: Barsha Amarendra, TU Delft)

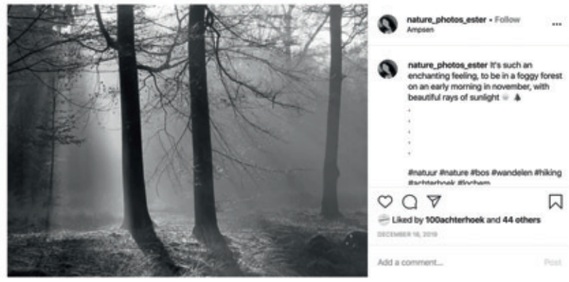
Idea-based knowledge consists of creative, intuitive and speculative knowledge and the structured knowledge that results in a spatial strategy. It is vital to understand that individual country estates are part of a regional landscape system. While working on individual estates, one can contribute to regional structures and processes through the development of adaptive re-afforestation strategies [FIG. 22].[21] The regional design explorations are based on a proper assessment of the situation by all stakeholders; the problem is structured and defined based on the feasible solutions that have been proposed. In this respect, landscape architecture can make valuable contributions by employing its affinity for strategic thinking and acting in a political context, in addition to the power of imagination. This is illustrated by exploring the potential of a spatial-visual framework for the development and protection of historical estate landscapes. Sightlines, panoramas and sequences do not only relate different scale-levels, reconnecting the country estates with their surrounding landscape and guide urban development, but also cross different municipal and property boundaries [FIGS. 23 & 24].[22] In the context of heritage estate landscape protection and development, design can describe prospective futures based on new forms of collaboration between stakeholders and expertise from more extensive civic and professional networks.

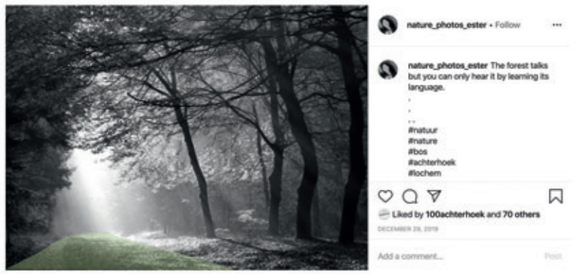
From a conceptual viewpoint, design explorations produce ideas and proposals with space for poetic and speculative approaches, which promotes imagination and unexpected proposals. Landscape narratives, for instance, offer fascinating ways of knowing and shaping landscapes that are not typically addressed by conventional documentation [FIG. 26].[23] This approach has led to the curation of a tapestry of sensorial stimulating and engaging



Enclosure types







Narratives that highlight points along pathways in the landscape

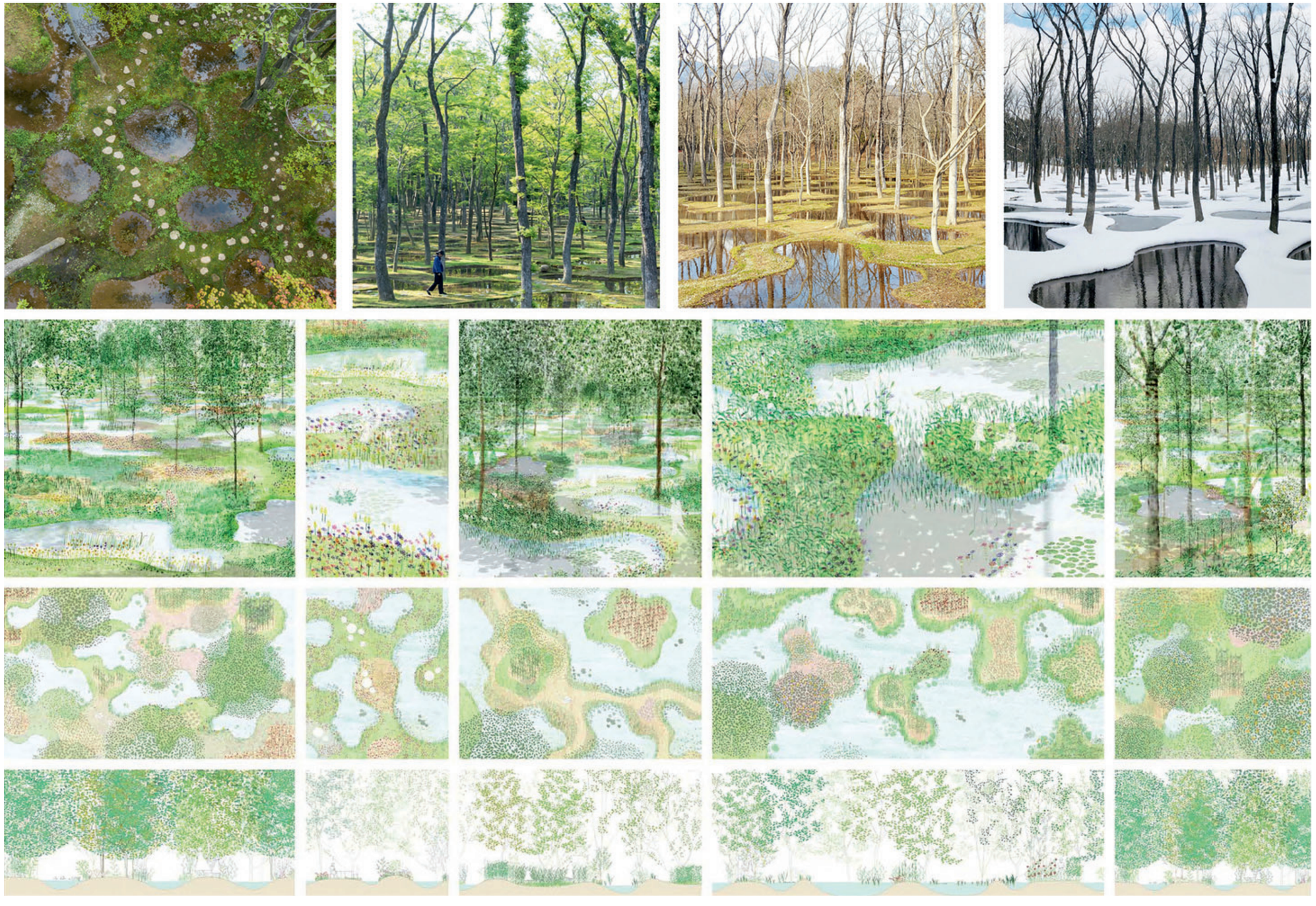
Narratives that highlight specific places where qualities of the landscape were perceived

Narratives of the landscape

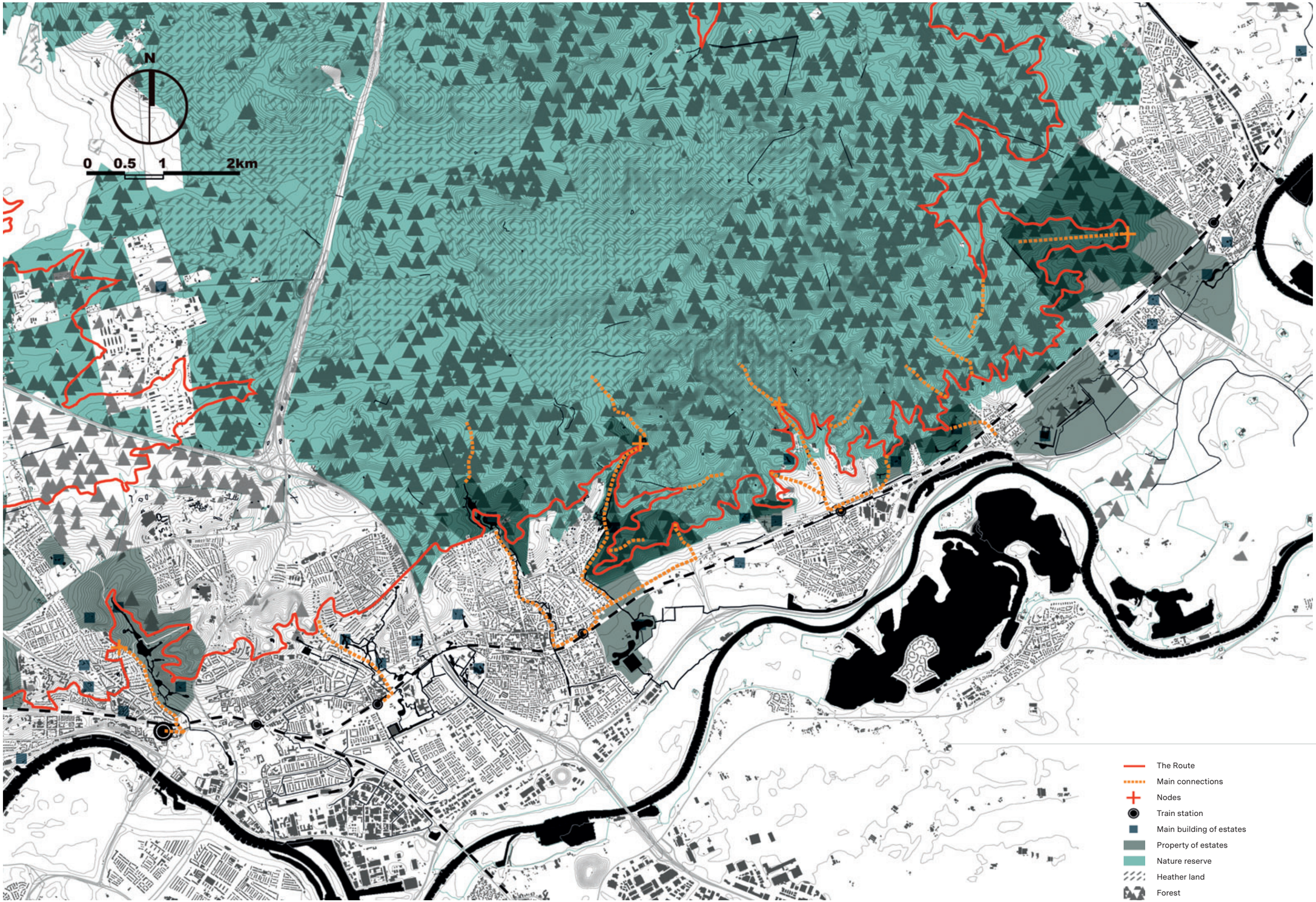
[FIG. 26]
Landscape narratives connect people to places through elements and structures that evoke certain stories, feelings and emotions (Image: Barsha Amarendra, TU Delft)

spaces along the Baakse Beek [FIG. 25].[24] International examples such as the project 'Botanical Garden Art Biotope', a water garden in Tochigi (Japan) by Junya Ishigami that served as inspiration. The atmosphere and poetry of the project bears close resemblance with the groove forests in the estate landscape Baakse Beek and shows the landscape architectural potential to reactivate these cultural-historical elements [FIG. 27]. Another example is the conceptual design of a recreational route that connects the estates of the Veluwezoom by following the 36-metre contour line that makes the visitors aware of the topography, (re)connects the estates and improves accessibility of the region [FIGS. 28 & 29].[25]

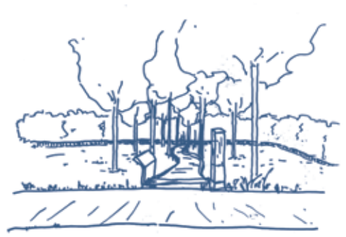
Reflecting on the process and the outcomes, the observation is that landscape architects can make valuable contributions in all phases of a living lab if they have an affinity for strategic thinking and acting in a political context, in addition to the power of imagination. In the context of historical estate landscape protection and development, design can describe prospective futures based on new forms of collaboration between stakeholders and expertise from more extensive civic and professional networks.



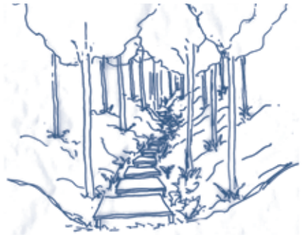
[FIG. 27]
The project 'Botanical Garden Art Biotope', a water garden in Tochigi (Nasu Mountains, Japan) by Junya Ishigami + Associates as inspiration for the development of groove forests in the estate landscape Baakse Beek.
(Images: Junya Ishigama)



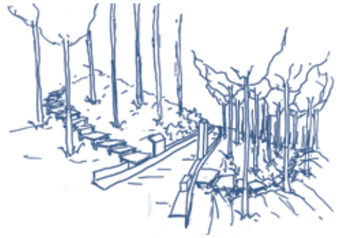
[FIG. 28]
A physical contour line as a means for experiential design and to connect estates and stakeholders. (Image: Mengchi Wei, TU Delft)



[1] Access from urban to nature. Instruction on boards, trees as direction, planting on the hill is visible in sight.



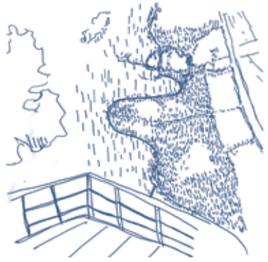
[2] Stairs leading to the route (36 m). Follow the valley in contour lines, dense planting, enclosed environment.



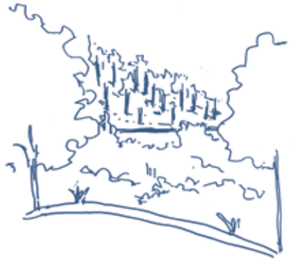
[3] The route (36 m), connecting point. Instructions on boards, two sides of stairs leading to the upper and lower area.

[4] Stairs leading to the viewing platform on the top. Reletively sparse in planting, following the ridge, have visual connection with the top.

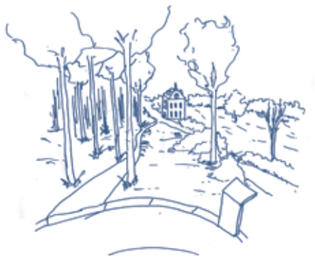
[5] Viewing from the platform to the heatherland.



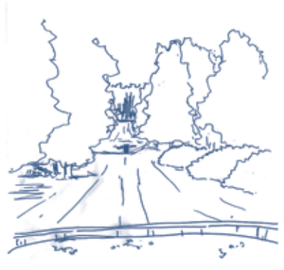
[6] Viewing from the platform to the route area. Recognise the route because of the infrastructure and the difference with the planting on the two sides of the route (dense in lower part, sparse in upper part). Have a clue on what the route can reach.



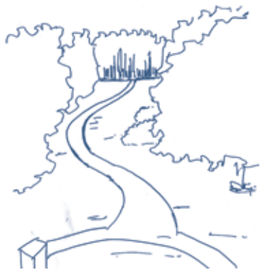
[7] Viewing from the route to the other side of the route. Trimming at some point to create visual connection on the route, to encourage visitors to continue on the route.



[8] Viewing from the route to the estate main building with the access to the building, encourage the visitor to take deeper exporation.



[9] Viewing from the front of the building to the garden.



[10] Viewing from the garden to the route. See the route from the garden, have access to back to the route.

[11] Stairs to leave the route.

[FIG. 29]
Design principles to increase the experience of the estate landscape along the recreational route. (Image: Mengchi Wei, TU Delft)

Conclusion

Though the regional authority has a successful programme of investing in (built and green) monuments, some challenges cannot be met by this policy, e.g. the problem of drought that affects the gardens and parks of individual rural estates, which can only be solved by a regional approach since the water system is a regional one. Moreover, the challenge of durable tourism cannot be met by an individual country estate, but also requires a regional approach that connects interesting places by routes through attractive landscapes. Furthermore, there is increasing use of parks and forests for recreational use in the present-day COVID-19 crisis, with lockdowns and closed gyms. A regional approach for spreading visitors is needed.

That is why a landscape-based regional approach has been introduced. This implies a spatial approach to heritage, specifically to country houses, castles and estates, analysing historical and modern developments and processes on various spatial levels in a landscape context. A spatial and design-oriented view focusses upon how different actors and forces interact in particular places, shaping the character of these places while at the same time being shaped by them. Furthermore, it explores how more comprehensive processes influence developments in a particular place at a local, regional and provincial level. A spatial approach can also help governments stimulate conservation and innovation processes of country houses and estates, thereby connecting goals and challenges on a regional level to those on a local level. By taking a spatial approach, one will look at particular places (country houses and estates) and the space in which these places exist: the social, economic and political contexts of the region.

This landscape-based regional approach also increases the resiliency and adaptive capacity of the heritage estate landscapes by providing a perspective on protection and development through design. In this regard, regional landscape design is a valuable tool to address climate adaptation, tourism and spatial fragmentation of heritage estates landscapes. The key is that understanding estate landscapes as systems are the basis for identifying spatial design principles that address multiple scales ranging from individual estates and ensembles of estates to regional structures and processes. The design-oriented living labs proved to be a handy platform to learn based on current challenges, together with owners, municipalities and other stakeholders. It also helped build an adaptable social infrastructure to assure meaningful participation by stakeholders in planning and policy decisions. Here regional authorities, local private and institutional landowners, students and experts have been working together in regional estate research, design and policy-making, and educational and art projects. The findings of the living labs support the regional authority in renewing their heritage policy programme and provide regulations and subsidies to contribute to the protection and development of future-proof heritage estate landscapes.

1 Innocastle Baseline Survey 2020.
2 Nijhuis & De Vries 2019.
3 Van Bleek, Storms-Smeets & Van Winden 2011; Storms-Smeets 2011.
4 Veluwezoom 2021.
5 Waterschap Rijn en IJssel 2019, 2020.
6 Hinterleitner, Daamen & Nijhuis 2021.
7 For an overview of student work see the appendix: MSc graduation design projects TU Delft Landscape Architecture 2017–2020.
8 Hinterleitner, Daamen & Nijhuis 2021.
9 Schön 1983.
10 Nijhuis & De Vries 2019.
11 Ibid.
12 Ibid.
13 Adapted from: Grocott 2010.
14 Liu 2020; Zhang 2020.
15 Qian 2020.
16 Chen 2020.
17 Peng 2022.
18 Zhang 2020.
19 Shahed 2020.
20 Yuan 2020.
21 Wang 2020.
22 Jiang 2020; Qian 2020.
23 Amarendra 2020.
24 Ibid.
25 Wei 2020.

[CLOSE-UP]

Landscape-Conscious Water System Development in Practice

Louis Lansink and
Louisa Remesal

In the estate landscape Baakse Beek, the province and Waterschap Rijn en IJssel, together with land and estate owners, the possibilities of a regional planning and design approach for landscape-conscious water system development are being explored [FIG. 1]. Such an approach strives for sustainable and social-ecological inclusive solutions. This is important to combat the effects of climate change and increase the sponge capacity of the region in order to address abundance and shortage of water and facilitate the development of healthy ecosystems. The intention of this landscape approach is to optimise the integral function of the estate landscape in pursuit of a system that does not undermine, but rather reinforces co-existence of multiple functions and links water and heritage.

Reversed Landscapes

In water management, especially in the last two centuries, natural processes have been merely neglected, because from a technical point it was possible to adjust the natural context relatively easily without understanding the long-term consequences. In this functional approach large-scale land consolidation projects meant that much of the original landscape disappeared under the pretext that everything can be engineered for economic prosperity. But this has its downside. Next to becoming mono-functional, fragmentation and a decrease of biodiversity, this resulted in a water system that was geared to drainage in the technically optimal ways for the single purpose of efficient water management. Now this technical water system is causing problems: accumulation of water in the downstream parts of the system in times of heavy rainfall and shortage of water in dry periods, decline of biodiversity and decay of heritage landscape elements.

Originally, there was considerably more topography in the area. Through levelling operations, high sand ridges were brought into the valley. Abandoned stream valleys were closed and added to the agricultural plots. The watercourses as we know them today have often been moved several times and bundled into large watercourses, which

[FIG. 01]
Landscape-conscious water system development at De Wildenborch. In the meadow to the right newly dug ditches enhance the ecological quality and increase the capacity to store water in periods with heavy rainfall. The necessary adaptation of the water system also benefits the historic water features in the garden and park of De Wildenborch.
(Photo: Waterschap Rijn en IJssel)

[FIG. 02]
A newly created historical water passage in the water stream, called '*voorde*', enables farmers to get on the land without obstruction.
(Photo: Steffen Nijhuis, TU Delft)

were deepened, widened, disconnected or connected and canalised further. The current, sometimes deep ditches are currently undermining developments of, in particular, groundwater-related flora and fauna. The sponge effect of entire catchments has been largely lost as a result. Now, too much water is draining out of the area, and the challenge is to retain water and prevent droughts. Another example of how the landscape reversed is visible in land use in relation to water management. In the past, corn and other cereals were grown on the higher sandy ridges of this coversand landscape, and there was grassland (hay meadow) in the stream valleys. Nowadays, grassland is located on the higher grounds and suffers from drought, and corn is grown in the stream valley where it suffers from too wet conditions; thus the land use is completely contradictory to the logic of the natural landscape. And until recently the water management policy was that the water system should follow the function, strengthening this contradiction even more and diverting it from durable solutions.

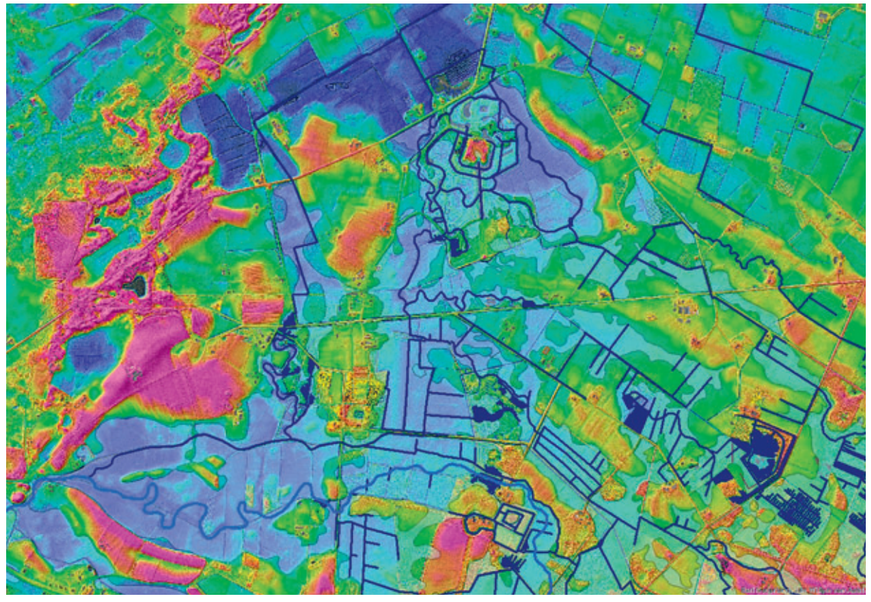
Nowadays water authorities like the Waterschap Rijn en IJssel take another approach. Now, the water management policy appropriates a landscape-conscious water system development. This implies a different way of looking at ground and surface water. The credo is: “The closer we stay to the original functioning of a natural system with as few artificialities as possible, the more resilient and with considerably less regular maintenance. Such a water system is sustainable and cost-effective.” The natural water system is taken as the basis in relation to the soil and geomorphology, and the organisation and location of functions follows that logic. No longer are the functions of nature, agriculture, water or recreation separated. Thanks to its natural abilities and characteristics, the system can become largely self-supporting again. But where to start?

Hidden Clues in the Landscape

In making plans for an area often the present landscape is taken as a starting point, which is the result of centuries-long transformations in the natural context. However, this natural context and the understanding of its development is the main condition for a future-proof landscape. In a landscape-based approach, the natural context relief, water, soil, geomorphological structure, climate and related ecosystems are taken as the basis to understand the area. Hidden in the subsoil, one can find important clues such as historical natural water streams and the related ecosystems, which maybe be reactivated and used to address contemporary challenges. In such an approach the layers and structures in the soil are employed to reconstruct the water system in its most natural form. It is important to find out the characteristics of such a water system and the geomorphological and soil-formation processes that played a role in it. It is a step back in time with the aim of consciously taking a step forward and to see to what extent lost values can be (technically) fitted into current spatial structures. Above all, it means in depth knowledge of how the water system developed through time to be able to make conscious choices in the planning process.

Mapping and classification of the geomorphology, the various soil types and their distribution form the basis of a landscape-conscious approach to water system development. High-resolution topographic data and soil maps are important sources, but field study is inevitable. By drilling, soil layers (horizons) are interpreted and assessed for colour, texture, loam content, but also for groundwater fluctuations and whether something is sand, peat or clay. The results show whether the area is a seepage zone, an infiltration area or a transition zone with a lateral (vertical) groundwater flow. It is also possible to determine whether or not an area has dried out, the peat has oxidised or a soil profile has been disturbed by excavation work. All these aspects also determine the geological value of an area and its potential for future development. Surprises regularly occur in mapping soil. By rediscovering the original water system, for instance, one can suddenly see the links with initially seemingly isolated systems. Here also the relation between water and heritage becomes apparent. Castles, country estates, watermills and bridges arose at then-crucial locations, often related to water. Disappeared historical landscape elements are also discovered, such as shallow water passages (*voorde*), diverted or landfilled streams or sideward sloping parcels (*gekruinde percelen*) from the Middle Ages. Sometimes even remnants of build structures can be that suggest the presence of, for example, a mill pit and watermill or the contours of an old system of canals.

[FIG. 03]
Landscape conscious reconstruction of historical water streams in the Baakse Beek watershed near De Wildenborch and Het Medler. Topography in the background. Clearly visible are the formerly spongy low-lying areas. (Map: Louis Lansink, Waterschap Rijn en IJssel)



Design and Implementation

The research results in careful reconstruction visualised via maps [FIG. 3]. These maps are crucial in the dialogue with (agricultural) entrepreneurs and estate owners, among others. Original landscape values and potentials are discussed and how they can be applied in the area. In this process of knowledge exchange and co-creation, raising awareness is important, paired with understanding and a willingness to think about redevelopment. In addition to the landscape research, the possibilities also need to be explored together with the stakeholders – testing technical feasibility, maintenance – and management recommendations. In this way, the design, including opportunities and bottlenecks, can be weighed and tuned as carefully as possible. In such a way, all stakeholders work together on the design and implementation of a robust water system that is climate-adaptive and contributes to biodiversity and protection of cultural-historical elements. It also generates a system in which the causal relationship between topography, soil and water is restored. Here one can find water passages inspired by historical examples, instead of generic culverts, not weirs but fish passages [FIG. 2]. And also allows functions that have the potential for contributing to a future-proof, thriving and economic feasible landscape.

[FIG. 01]
The restoration of the water system at Het Lankheet (Haaksbergen, Overijssel) contributes to the protection and development of tangible and intangible heritage. (Photo: Sjon Heijenga, Beeldbank van de Leefomgeving)

Good Practices in the Dutch and European Context

This chapter comprises various examples of good practice in heritage estate landscapes in the Netherlands, Spain, Romania, Belgium and the United Kingdom [FIG. 1]. Though this is not a complete overview, the activities showcased here cover a variety of topics and themes related to the protection, development and management of historical estate landscapes. From policy instruments and the role of government to participation and co-creation. From preservation and restoration to adaptation and transformation of country estates. From modern, digital touristic instruments to academic research with new insights into the past, present and future of these places. Overall, these successful practices show the development of the heritage sector, which increasingly embraces regional landscape-based approaches to heritage and that focusses on cooperation between estate owners, heritage professionals, government officials, practitioners, researchers, designers and citizens. The insights and knowledge from these good practices can be transferred, replicated or adapted in other contexts.

[THE NETHERLANDS]

Building Connectivity: Country House Partnership Bronckhorster Kroonjuwelen Beraad (BKB)
Eelco Schurer

Bronckhorst is a unique municipality. Nowhere else in the Netherlands are there so many beautifully preserved historic country houses and estates. The Bronckhorster Kroonjuwelen Beraad (BKB) was founded in 2013, bringing together the owners of these properties which are all listed on the National Monument Register (the so-called ‘complex rijksbeschermde buitenplaatsen’). It is becoming more and more challenging to conserve country houses and estates. Owners are confronted with a number of conservation issues, such as high maintenance costs, climate change and the need for new economic models. In the BKB partnership, country house owners work together to share experiences and to increase awareness of the value of historic estates for the local community and for nature.

Approach: The estate owners tackle these challenges by working together, sharing knowledge and creating awareness. They also aim to build support and partnerships with government bodies. By joining forces, owners can collaborate on conservation issues such as water management. They can share the costs – and benefits – of developing new economic models or business plans. And they can work together to recruit volunteers. The BKB is a coalition which works transparently within an agreed framework. It seeks to share information among owners and with the outside world in equal measure. The main stakeholders are the country house owners and government officials. The main beneficiaries are the owners and public who visit them. Some country houses and landed estates are owned privately, others by institutions. Thus, the Dutch Society for Nature Conservation (Natuurmonumenten) and the Gelderland Trust (Geldersch Landschap & Kasteelen) are both involved in the network, as well as many private owners. The following country houses and landed estates are part of BKB: Hackfort, Suideras, Kasteel Vorden, Wientjesvoort, 't Medler, De Wildenborch, De Wiersse, 't Zelle, De Kieftskamp, Enghuizen, Den Bramel, 't Enzerinck and Keppel [FIG. 2]. Also the municipality of Bronckhorst is actively involved.

Results: Thanks to the BKB, local politicians have become more aware of the values of country estates (heritage, nature, community, economy, etc). As a result, the country estates are better embedded in local policy. Bronckhorst municipality has become more active (changing their role from passive to active). For instance, the municipality has initiated several stakeholder meetings and brainstorming sessions about the value of heritage and new possible developments at a particular estate.

Lessons learned: Not all owners feel comfortable joining such stakeholder meetings, where people discuss the future of their property. Such methods require a high level of trust among the participants in order to work well. The BKB experience shows that when both private landowners and trusts work together, they can be a powerful, effective and independent voice for country houses and estates. The BKB is able to deliver a strong message to government, and it has become easier to discuss actual challenges and developments regarding country estates with the municipality and other politicians or experts. The owners have also found it very valuable to exchange knowledge and sometimes even tools for addressing similar challenges.

[FIG. 02]
Castle Hackfort near Vorden is one of the nationally listed estates in the country house partnership. (Photo: Pieter van den Berg, MVO TV)

[FIG. 03]
Spatial development strategy for Gelders Arcadia, developed together with the involved municipalities, NGOs and estate owners. (Gelders Genootschap 2016, drawing: Poelmans Reesink Landschapsarchitecten)

Gelders Arcadia: A Spatial Approach to Regional Cooperation

As discussed before, the estate landscape Veluwezoom encompasses the municipalities of Arnhem, Renkum, Rheden, Rozendaal and Wageningen. Characterised by the relief of glacial ridge, the area was popular among the Dutch elite since the Middle Ages. Here you can find medieval manors, 18th-century landed estates and 20th-century country houses. In total, the region counts over 100 historic estates. But until recently, each was working independently of one another. The heritage and nature qualities of the estate landscape, as well as at individual estate level, were under threat from urbanisation and infrastructural developments. Furthermore, high maintenance costs and the search for new economic functions endangered the survival of individual estates. In response, the project (New) Gelders Arcadia investigated new challenges, opportunities and ways of adaptation for the country houses and estates. Since 2007 the five mentioned municipalities, heritage agency Gelders Genootschap, the province of Gelderland and the local private and institutional landowners have been working together in regional estate research and policy-making and setting up educational and art projects. The aim was to analyse and understand the heritage values of the region, create awareness of these among owners, governments and experts and investigate ways of strengthening and exploiting these qualities in a collaborative way.

Approach: The project used a spatial approach, working at various spatial levels: the country house or castle, the estate as heritage ensemble, the wider cultural landscape and the regional zone. With this approach estate owners, heritage experts and governments could better understand the past, present and future developments of their region. The project brought together the heritage consultancy Gelders Genootschap, the province of Gelderland, the municipalities of Arnhem, Renkum, Rheden, Rozendaal and Wageningen, and private, governmental and institutional estate owners, such as Middachten estate, the Gelderland Trust and Natuurmonumenten [FIG. 3]. Heritage participation played an important role and led to many workshops, symposia, brainstorm sessions and interviews with people and organisations that are directly involved.

Results: The project resulted in various publications, including an atlas of the estate zone, cycle routes and an oral history book. Further collaborations resulted in a visionary document for the whole estate zone, educational and art projects as well as improvements at individual sites. The local and provincial governments have also embedded the estate zone into their policy-making. The project led to a growing network of stakeholders: at the first meeting in 2007 only 20 people attended but in a few years this number had grown to a network of more than 500 estate owners, politicians, experts, tourism organisations, etc. Over 5,000 people have attended theatre and music festivals. Even more important, the zone as a whole and the individual country estates have now been imbedded in local, provincial and national policy!

Lessons learned: The spatial approach is particularly valuable and transferrable. It focusses on the ways different actors and forces (social, economic and political) interact at particular places, shaping their character, while at the same time being shaped by them. It can also help governments to stimulate processes of conservation and innovation. The Gelders Arcadia project demonstrates the value of regional partnership and a regional approach. Since it started in 2007, awareness of the value of heritage has grown immensely. There have been improvements in the analysis of past and future processes, and governments and estate owners have worked together with counterparts on similar issues and challenges. Working together and building a relationship of mutual trust has proven to be essential. However, despite these positive developments in regional collaboration, there are as yet no examples of large-scale restorations or redevelopments on a regional scale. Furthermore, it has turned out to be difficult to keep continuity in leading the regional partnership. Currently, municipalities are taking the lead, but it is not always easy.

Middachten: Adaptation and Participation in a Privately Owned Estate

Age Fennema and Franz Count zu Ortenburg

The first mention of Middachten appears in the year 1190, and although the castle dates from the early Middle Ages, the house in its present form was built towards the end of the 17th century and still includes some medieval parts. Middachten has never been sold but has always passed from one generation to the next. Furthermore, the interior of the castle is complete and still has many of the original household goods. The management of the estate is in the hands of the 25th Lord of Middachten, Count zu Ortenburg. As a country seat, Middachten is characterised by its completeness as an ensemble with tangible heritage (buildings, landscapes, works of art, artefacts, etc.), intangible culture (such as traditions and horticultural knowledge) and natural heritage (including significant natural landscapes and biodiversity). In addition, Middachten is still an active working estate. Besides the castle, park and gardens, the estate also includes farms, agricultural land and woodlands. The chore of the estate (150 hectares) is listed as a national monument. Middachten furthermore includes 42 nationally listed monumental buildings and four municipally listed buildings. The estate of Middachten works closely together with the local community, governmental authorities and educational organisations.

Approach: Middachten is an active working estate with many monumental values. The house is not run as a museum, but as a family home, which from time to time is open to the public. Each generation of owners kept adapting to new challenges and opportunities [FIG. 4]. From the 1980s, at a time when many privately owned houses were still very private indeed, Middachten opened its the doors, allowing visitors to the castle and the gardens, working together with an increasing number of volunteers as well as finding alliances with neighbouring estates and with governmental authorities. Since 2000 the family has closely worked together with local, provincial and national governments in the so-called *proeftuin Middachten* (testing ground Middachten). This has resulted in a historic analysis of the estate and a jointly created plan for future maintenance, aiming to ensure the sustainable conservation of this privately owned and active working estate. Adaptation and participation are key notions. Middachten was (and still is) a pioneer in this cultural change of estate management, focussing on cooperation with various stakeholders: from privacy and closed doors to open arms and mutual goals. This attitude has allowed them to maintain the historic qualities and create new economic and social opportunities.

[FIG. 04]
Franz Count zu Ortenburg is the current owner of Middachten: 'At Middachten we work with respect of our heritage, taking into account the possibilities of the present and with consideration of the developments towards the future.' Here he holds a new wind vane for the castle. (Gelders Archief, Arnhem)

Results: Middachten is still a 'testing ground', pioneering in its collaboration with universities and schools (e.g. academic research on estate culture and horticulture), testing new methods and policies for heritage protection (such as historic interiors) and pioneering in the energy transition and climate adaption within historic landscapes and buildings. This adaptive and cooperative approach has strengthened the bonds with the community, with local and provincial governments and with (inter)national experts. Participation proved to be crucial: it helped build a place of trust and togetherness. It has furthermore, resulted in the national nomination of Middachten as cultural heritage of national, iconic significance in 2020.

Lessons learned: The success of this collaborative adaptation doesn't mean it's easy. With every political change, with new spatial challenges and alterations in funding possibilities one needs to revalue, reshuffle and recreate the way the cooperation is formed, who the (key) players are and how one can work together. The jointly created plan for the future is the core in all of this; it offers a long-term direction, even when suddenly the economic, political, financial or social situation changes. The cultural attitude of adaptation and participation have created a way to react to such changes, while holding onto the conservation of historic qualities and characteristics, both tangible and intangible.

Heritage Ensembles of South Limburg

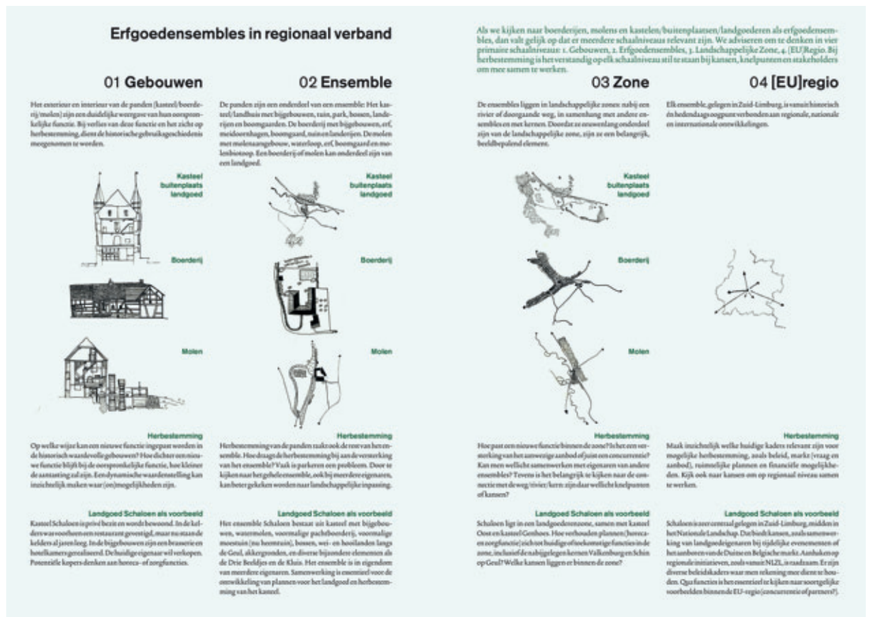
In the National Landscape of South Limburg, the southernmost part of the Netherlands, the number of monuments per 1,000 inhabitants is far above the national average. South Limburg would not be the same without its monumental watermills, farmhouses and castles. However, many parts of this region are dealing with population decline and the vacancy of both monumental and non-monumental real estate. The decline of heritage ensembles as a result of vacancy can have a major impact on the quality of the South Limburg landscape. Commissioned by the Province of Limburg, heritage consultancy Gelders Genootschap led the 2018 project on vacancy and reallocation of monumental castles, country estates, farms and windmills in the National Landscape of South Limburg. The aim of this project was to investigate how the various stakeholders such as owners, governments, real estate agents and entrepreneurs can give more direction to an accelerated redevelopment of monumental heritage in the National Landscape of South Limburg.

Approach: The watermills, farms and castles were viewed as heritage ensembles: functionally coherent spatial entities with a shared social and societal history. The farm with outbuildings, yard, orchard, garden and lands; the mill with miller's building, watercourse, yard and orchard; the castle or country house with outbuildings, garden, park, forests, farmlands, fish ponds and orchards. Each ensemble is part of a larger cultural landscape and the EU region of South Limburg, which borders Belgium and Germany. For the municipalities of Eijsden-Margraten, Gulpen-Wittem, Meerssen, Nuth (now: Beekdaelen) and Valkenburg an analysis has been made of vacancies at monumental castles, farms and mills. The vast majority of the vacant heritage ensembles turned out to be farms. Furthermore, it is expected that more monumental farms will become vacant in the coming years due to company closure or simply because the buildings and landscapes are too fragile and unfitting for the scaling-up of agriculture businesses. It often concerns large farms, which are difficult to repurpose

and – thanks to their location – have a great impact on the spatial and societal character of villages. Participation was an important part of the project, which brought together various government bodies (the province of Limburg, National Heritage Agency, municipalities), private and institutional heritage owners and various experts, such as estate agents, heritage experts, funding consultants and building cooperations. Participation took place through personal interviews, design studios, role-playing games, workshops, fieldtrips and symposia.

Results: The database of vacant monuments has been used by the municipalities and embedded in their local action plans for the reallocation of heritage sites. The Province of Limburg has introduced the 'ensemble approach' in their provincial heritage policy and set up a new Heritage Lab to continue aiding, guiding and consulting heritage owners. A toolbox with instruments was made for the various stakeholders, including instruments on heritage policies, funding opportunities, ownership and use, and finding new owners and functions [FIG. 5]. In this toolbox, a reallocation instruction was introduced, advising stakeholders to think in four primary spatial levels: the building(s), the heritage ensemble, the wider landscape with various ensembles and the region. During the process of reallocation of vacant monuments, it is advisable to address values, challenges, opportunities, policies and stakeholders at each spatial level. For instance, a building might look ideal to be redeveloped into a hotel, but what about needed facilities in the direct monumental landscape, such as parking? And what about the spatial and societal connection with the bordering village? Or what about other hotels in similar buildings in the region that are a big competitor on the tourist market?

Lessons learned: During the project it became very clear that the reallocation process of vacant monuments is long and complicated, and therefore often emotional for owners. Taking time to listen to their stories, needs and hopes for the future turned out to be crucial. It helped to determine what kind of instruments and partnerships were needed to smoothen and speed up the process and to stimulate trust between stakeholders. In the Dutch context this, among other factors, means that experienced heritage officials are needed at municipal and provincial level. It was furthermore an eye-opener for both owners and government officials that the ensemble approach ensured both a better understanding of the history of our heritage and a better insight into future solutions to redevelop heritage sites. Learning from the way our ancestors used and developed their living environment helps to find better solutions for present-day spatial and societal challenges.



[FIG. 05]
Guidelines for the ensemble approach to heritage: from building to ensemble to cultural landscape to region. The ensemble approach can help to get better insights into spatial qualities, stakeholders, policies and present-day challenges on each scale. (Elyze Storms-Smeets, Gelders Genootschap)

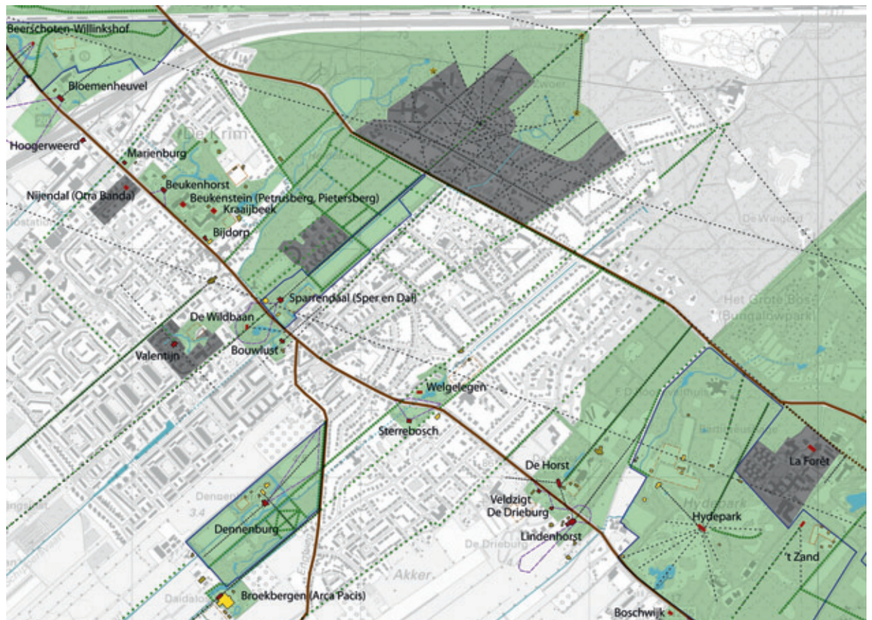
Estate or Country House Biotopes

Spatial fragmentation of estate landscapes is an issue that is often overlooked, but has a big impact on the character, function and economic possibilities of estates. We can identify two broad types of spatial estate fragmentation: [1] particularly processes in the 20th century, such as succession taxes and lower income, lead to the breaking-up of a large number of landed properties. As a result, many country and landed estates are currently owned by numerous owners, all with their own management strategy. This multiple ownership with differences in management has led to spatial fragmentation, sometimes very bluntly through the erection of fences splitting lanes in two, sometimes through lack of knowledge and cooperation.
[2] Spatial fragmentation has also occurred through the building of new suburban areas, or the creation of new routes (rail, road, water). Very often infrastructural and urban expansions have led to a break in the continuity, contiguity and morphological coherence of estate landscapes. Spatial fragmentation of estate landscapes is a widespread phenomenon. Particularly in urbanised areas it has become problematic to maintain estate characteristics of non-listed estates or estate parts. As a result, in 2010 the province of South-Holland decided to map and catalogue the 223 listed and non-listed country estates and define a so-called estate or country house biotope. In 2013 the Province of Utrecht created their own version of estate biotopes.[1] Almost 300 individual country estates and nine estate zones were defined.

Approach: Estate or country house biotopes were introduced by the provinces South-Holland and Utrecht as a new method to anchor estates and estate landscapes more firmly in provincial policy and spatial planning. The biotope instrument was based on the existing windmill biotope, which was introduced in the 1970s. The objective of the new estate biotope was to both protect historic estate qualities and stimulate or enable new developments in a fitting way. The biotope included, among others, the estate itself, the physical connection with its surroundings (such as roads and waterways) and the visual relation between the estate and the surrounding landscape (vistas and panoramas). In defining the estate biotopes, participation with stakeholders was crucial.

Results: Despite the many similarities, the estate biotopes in South-Holland and Utrecht turned out to be quite different instruments. Whereas in South-Holland the present-day physical and visual relations of the country house with its surroundings (park, estate, wider cultural landscape) were the bases for the biotope, in Utrecht the biotopes were

[FIG. 06 A]
The estate biotopes in the estate landscape Utrechtse Heuvelrug in the Province of Utrecht. (SB4 and Province of Utrecht)



based on the historic estate areas and spatial connections in a wider landscape. As such Utrecht not only looked at individual estates but also defined so-called estate zones, with estate clusters such as the Utrechtse Heuvelrug [FIG. 6 A & 6 B]. Another important difference between South-Holland and Utrecht is that the former decided to use the estate biotopes as a juridical instrument to (dis)allow new developments, whereas the latter used biotopes as a signalling and informative tool to create participation and cooperation between estate owners, governments and developers.

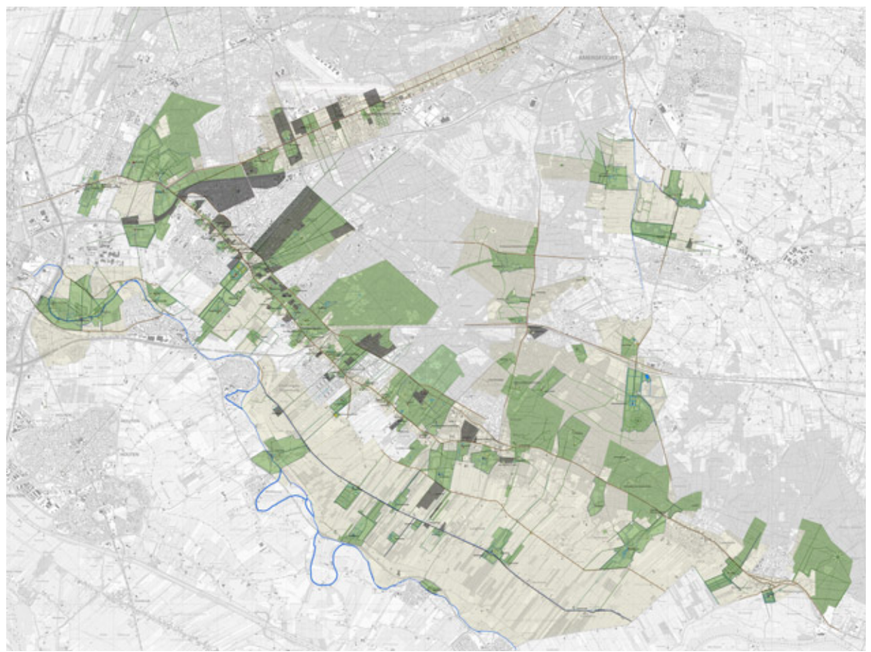
Lessons learned: Though both instruments have the same name, the approach and results are quite different. The South-Holland version is very much a top-down tool, set firmly in provincial policies. The Utrecht version, though initiated by the province, is based much more on bottom-up participation. Thus, a cluster of country estates on the Utrechtse Heuvelrug, initially left out of the estate zone, were added at the request of the estate owners. In other provinces governments are looking into their own versions of the tool, for instance in the municipality of Voorst, where it helped to define the areas of estate qualities (the existing country and landed estates and connecting areas), areas with opportunities to strengthen the estate landscape (often former estate lands) and areas with a 'sphere of influence'. Having this information is vital for the municipality to preserve the existing estate qualities of the estate zone and individual estates, but also helps to offer insights when investigating new development opportunities. The changes in the estate biotopes as a tool partly reflect changes in heritage policy, being more and more embedded in spatial policy and being more and more about participation and collaboration.

New Research, New Insights for Gelderland

The heritage sector is changing. No longer do we regard monuments as never-changing objects, but as ensembles that always have been and will be in transition. As a result, there is a need for new research and new insights into the past and possible future developments of these ensembles and their buildings and landscapes. Whether it's the base for a restoration or redevelopment, or it's a tool to discuss social and cultural meanings of heritage, new research can help. The Province of Gelderland has decided to financially support such research. Here we show several good practices of recent research heritage projects in Gelderland.

Social cost-benefit analysis of country houses: For the provinces of Gelderland, Utrecht and Overijssel consultancy Witteveen+Bos made a social cost-benefit analysis of monumental country houses (2012). The maintenance costs of country houses are often so high that owners ask provinces for financial help. The use of provincial funding, and thus public money, for the preservation of heritage can be legitimised by the social benefits of the country estates. In order to make well-funded decisions about future financial programmes the provinces needed more information about the economic and societal meaning of country houses.
A social cost-benefit analysis (SCBA) was carried out to show in what way provincial funding of country house maintenance and development leads to the strengthening of social prosperity. This prosperity lies in both financial (for instance the profits from restaurant or an agricultural company) and non-financial benefits (for instance health, recreation and living). The research resulted in a very clear conclusion: country estates and estates deliver a lot more benefits than they cost. In short, investing in estates and country estates pays off! And since most of the benefits of this heritage benefit the inhabitants of the area, the outcome of this SCBA legitimises financial assistance from the government. In 2016 another SCBA was made for privately owned country houses in Gelderland, showing that about 30% of the nature in Gelderland falls under the management of private country estates. The owners bear a large part of the maintenance costs. The green heritage, which is of great social importance, is very vulnerable because it must be intensively maintained [FIG. 7]. Both reports ensured the continuing funding of monumental country houses and estates and strengthened the partnership of the governments with the estate owners.

Historic analyses of Gelderland Trust estates: The Gelderland Trust (Geldersch Landschap & Kasteelen; GLK) owns over 150 nature areas, castles and estates in Gelderland. With the financial help from the province of Gelderland, in 2018 GLK started a long process of getting heritage research reports



[FIGS. 06 B]
The estate biotopes in the estate landscape Utrechtse Heuvelrug in the Province of Utrecht. (SB4 and Province of Utrecht)

[FIG. 07]
Green heritage is an important part of country estates. The maintenance of green heritage involves professional skills and is often still depended on external funding. (Photo: Leontine Lammers)

for all their landed estates. Various heritage consultancies were assigned to research the cultural and landscape history of a particular estate, mapping and valuing historic relics, and offering new insights and advice on preserving and developing the estate as a heritage ensemble. The new information was used for new maintenance and redevelopment plans, for communication and education about the estates and for making well-grounded choices in the day-to-day estate management. Among the newly researched estates are Warnsborn, Lichtenbeek, Doorwerth, Staverden and Kieftskamp.

The forgotten terraces of Zypendaal: Zypendaal estate is one of the icons of Arnhem and has a rich history. Despite the changes in ownership and garden styles, the park of Zypendaal still has three terraces along baroque ponds. The terraces, along with the ponds and beech avenues, are a remarkable expression of the late 18th-century country life of an Arnhem regent family. Terraces were built to allow strolls through hilly areas where the visitor would have a beautiful view of the valley with the country house. The terraces are a unique example of late 18th-century garden architecture in the Netherlands. However, due to erosion, tree loss and decay estate owner, the municipality of Arnhem is looking for possibilities to restore and preserve this unique heritage structure. New research was needed to give insights as no historical or modern sources mention the terraces. They are not even named in the descriptions and valuations of the Cultural Heritage Agency, nor in local garden historical publications. Thanks to a provincial funding the municipality could commission Gelders Genootschap and archaeology consultancy BAAC to investigate these mysterious terraces (2016 and 2019). Through archaeological digs, archival research and the use of 18th-century garden theory books, the researchers revealed the design, build and use of the terraces through time [FIG. 8]. Together with a municipal landscape designer the research team also investigated possibilities for restoring the terraces, ponds and avenues. One important aspect is the social meaning of Zypendaal, as it's a public park. The various reports have been used by Strootman Landscape Architects for a new estate plan of Zypendaal and future choices of restoration and preservation, both on the short and long term.

[FIG. 08]
Archeological research at the 18th-century terraces of Zypendaal estate. (Photo: Elyze Storms-Smeets, Gelders Genootschap)

[FIG. 09]
Sonsbeek park in Arnhem is a popular spot for visitors and locals. (Photo: Elyze Storms-Smeets, Gelders Genootschap)

Visitor Traffic Monitor
Menno Feitsma

The worldwide pandemic of COVID-19 has had an enormous impact on our lifestyles. In the Netherlands, for instance, new regulations demanded a safe distance of at least 1.5 metres between people. At the same time, it became obvious that nature and heritage sites were increasingly popular – partly due to the fact that indoor sport centres, cinemas and theatres were closed. In the summer of 2020, more and more people ventured into parks, forests and nature reserves for their sport and recreation. For instance, Sonsbeek Park in Arnhem had a record number of 17,000 daily visitors [FIG. 9]. Tourism Veluwe Arnhem Nijmegen developed a visitor traffic monitor with support from the Province of Gelderland for the summer of 2020. This tool monitors visitor streams and spreads them across the province in order to provide safe recreation spaces in the times of COVID-19.

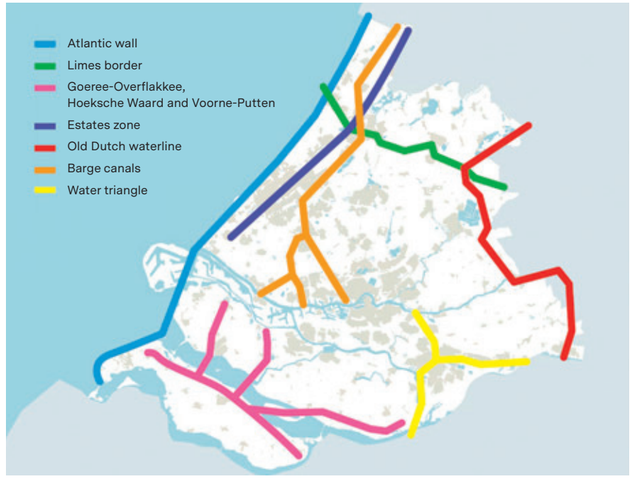
Approach: Local experts in the field indicated several times a day whether it was crowded, a bit crowded or not crowded at all. By offering alternatives to crowded places, visitors were more equally spread across the province. In this way the tourist board contributed to safe recreation in COVID-19 times. The focus was on places where a lot of daytime recreation takes place. The guiding principle in determining the pressure was the extent to which experts estimated that the 1.5-metre economy was still guaranteed. With the efforts of hundreds of experts, the tourist board had sufficient coverage for the whole province of Gelderland.

Results: The tourist board created a so-called 'heat map', showing overcrowded areas in red and quiet places in green. The heat map was made accessible directly via the websites of the regional marketing organisations and local newspapers. On the channels of the regional marketing organisations, alternatives were provided for the too busy (i.e. red) places. The heat map was furthermore made available through a widget so that recreation entrepreneurs, museums, municipalities and accommodations could place it on their own websites. Over 150 websites used this widget. With this information, visitors to and residents of Gelderland could determine their travel plans. Over 475,238 visitors were monitored in the summer of 2020 over approximately 400 locations in Gelderland. The most visits were recorded on Friday 31 July, namely 29,152. The innovative monitor received much press coverage. About 100 publications about the monitor appeared in (online) newspapers and magazines (reaching approximately 3 million people), and eight national radio and television programmes paid attention to the new instrument (reaching approximately 5 million people). On social media the monitor got over 650,000 impressions and 25,000 clicks (6.75% click-through rate). After the successful summer experiment, the tourist board decided to research into further automation: replacing expert measurements with available (big) data sources. In April 2021 the visitor monitor was awarded the international Covid & Tourism Strategy Award.

Lessons learned: This visitor monitor is a powerful tool for authorities at a local, regional and national level, but also for (tourism) entrepreneurs to ensure a safe visit to tourists in a pandemic context, especially during the busy weekends and holidays. Obviously, the monitor alone is not sufficient for creating a 'corona-proof' outing. Local landowners and governments have to work together for practical on-site solutions, such as one-way traffic, better routing and communication about do's and don'ts in parks, forests and nature reserves. Spreading the visitors is one thing; making sure they keep to the pathways, park in the allocated places, don't litter and stay out of restricted nature zones is another.

Heritage Line Country Houses of South-Holland
Onno Helleman

The province of South-Holland started a new provincial heritage programme in 2013 called 'heritage lines' (*erfgoedlijnen*), focussing on certain heritage themes that are crucial for the province [FIG. 10]. A heritage line is formed by objects or areas around the same heritage theme with a certain geographical coherence. There are seven heritage lines, including – among others – the so-called Atlantikwall (a defence line from the Second World War), the Lower German *limes* (northern border of the Roman empire), the water-rich areas of Biesbosch, Kinderdijk and Dordrecht and the estate zone along the sea coast. The goal is to inform inhabitants, pupils, tourists and entrepreneurs about the history and heritage of this province, and to cooperate with heritage organisations, municipalities and other stakeholders to protect, develop and experience these heritage lines. The estate zone runs geographically along the inner dune edge, on the beach relief between the Westland to Noordwijkerhout and Hillegom and along the canals Vliet and



[FIG .10]
The heritage lines of South-Holland. (Province of South-Holland)

[FIG. 11]
Berbice estate near Voorschoten. (Photo: Collection National Heritage Agency of the Netherlands)

[FIG. 12]
Duivenvoorde castle. (Photo: Collection National Heritage Agency of the Netherlands)

Haarlemmertrekvaart. The province of South-Holland runs the heritage lines and is helped by heritage organisation Erfgoedhuis Zuid-Holland.

Approach: Each heritage line works with a so-called heritage table, which brings together museums, heritage institutions, entrepreneurs, volunteers, heritage owners and municipalities. At the heritage table of the estate zone, all these parties work together to improve the way you can experience the heritage. At the heritage table stakeholders can pitch ideas and submit project proposals for co-financing from the province of South-Holland. At the meetings feedback is given on the proposals by the province and other table participants. Each heritage table has drawn up a common vision for the future with criteria for testing submitted project proposals. There are regular evaluations, and possible new tasks (such as inclusion and polyphony) are introduced and criteria are tightened where necessary. The heritage table of the estate zone is called *Hollands Buiten*. It focusses on preserving and improving the estate zone, realising economic supports and increasing recognisability and coherence between the estates [FIGS. 11 & 12].

Results: On the website *geschiedenisvanzuidholland.nl* several locations, stories and activities for each heritage line have been written down, or even shown through short videos. The province of South-Holland has a special funding programme for the heritage lines. In the past they have funded, for instance, heritage days and blogs, improvements to heritage estate buildings or landscapes, the organisation of heritage seminars, Day of the Castle, historic research as a base for new estate plans and the promotion of and communication about country houses. The funding ranges in amounts from 10,000 euro to over 300,000 euro.

Lessons learned: The heritage table helps to reinforce ideas, create new collaborations and strengthen the heritage network. The subsidies subsequently help to realise these ideas. It furthermore shows that even relatively small funding can help immensely. The heritage lines programme is still active and is a good example of provincial policy that has been continued over various political periods.

The Tangible and Intangible Water Heritage of Het Lankheet
Eric Brinckmann

At Het Lankheet estate in the province of Overijssel historic water systems have been restored and reconstructed. It's a system of natural water sources and man-made banks, ditches, small canals and brooks, reservoirs and water meadows, which farmers used to flood their hay lands. The flooding helped to circulate calcareous water, which stimulated the grow of nutritious plants, and the ever-flowing water added oxygen to the soil. The water system was used in the winter months, so the slightly warmer water protected the soil from freezing. The production of hay could be threefold. The oldest relics date to 1350. The system was rejuvenated in the 19th century by estate owner Gerrit Jan van Heek, but due to the canalisation of the Buurserbeek in 1894 and 1937 it was not successful. Whereas before the canalisation it took a water drop 16 days to travel from the source to the river IJssel, as a result of the canalisation it only took nine hours. Thereafter the water heritage and flood system of Het Lankheet were forgotten.

Approach: In 1999, Het Lankheet estate reintroduced the traditional method of flood meadows. An important aspect was (at least partly) de-canalising the Buurserbeek, which once again meanders slowly through the landscape. The flood meadows were reused and the system of banks, ditches and reservoirs restored [FIG. 13]. The private estate owners of Het Lankheet work together with Waterboard Rijn and IJssel, which is responsible for the water management in this river system and have helped with restoring the historic water system. The owners also worked closely with volunteers from local history and nature clubs for actively working with the water system [FIG. 14].

Results: The reintroduction of the system helped to improve the quality of water and land. Furthermore, the old systems of streams, ditches, gutters and depressions can be used in autumn and winter to retain water. This makes the landscape more resistant to prolonged drought. The medieval system thus helps in modern-day climate adaptation. Also, in the event of excess water the flood meadows can be used to store the water. But it's not only about the reuse of tangible water heritage. At Het Lankheet the intangible heritage is just as important. The techniques of flooding meadows and the use of traditional tools have been recognised as national intangible heritage. Education is also an important part, through excursions, workshops and guided tours.

Lessons learned: The volunteers that work at Het Lankheet estate make notes of their experiences with the flood system. It helps them to learn and adjust. It also shows that the usefulness of irrigating, preserving and restoring biodiversity, and creating a climate-robust landscape (water storage and retention) and herb-rich grass yield is beneficial for organic dairy farming.

[FIG. 13]
The flood meadows can be reused because of the restored system of banks, ditches and reservoirs.
(Photo: Eric Brinckmann)

[FIG. 14]
Volunteers help to reintroduce old techniques for maintaining the flood meadows.
(Photo: Jan Dolfing)

[SPAIN]

Technology Transfer for Free Access to Museums and Archaeological Sites in Extremadura and Alentejo Based on Mobile Devices (LIMUS)

Patricia Mora and Roberto Ballesteros

The main objective of the Limus Project is the transfer of developing technology from the university to the museum sector in Extremadura (Spain) and Alentejo (Portugal). During the project, the technology, based on mobile applications, has been tested under real conditions and targeted at people visiting museums and archaeological sites [FIG. 15]. Via this technology, visitors receive content relevant to the visited sites without any technical obstacles. Just by getting close to the works, the relevant knowledge is transferred to visitors in a customised manner. The project started in May 2017 and ended in the summer of 2021.

Approach: The Limus project was a partnership between the University of Extremadura, the Ministry of Culture, Tourism and Sport, the municipality of Evora and Mertola Archaeological Field. This technology has been valued using a business model methodology developed for technological centres and has been validated by various agents involved in the value chain. Its benefits include usability, easy application and commercial potential. The developed technology consists of a group of beacons and markers that, by means of undetectable signals, enable the museum visitors' mobile phones to know whether they are close to a specific museum work. As a result of this recognition and proximity, the technology suggests to visitors some downloadable media content (text, images, audio and video), providing the opportunity to broaden their understanding of the work. In a later product version, a role reversal between the beacons and mobile phone is employed, converting the former into a signal receiver for the second partner. This interaction provides information to the museums about the visitors' behaviour, allowing the ability for a customised visitor's experience.

A set of activities were developed focussing on the identification and analysis of the technology for its further protection, transference to other EUROACE territories[2] and potential commercialisation. This analysis was based on the following variables:
APPLICATIONS: to know the possible uses of the technology and the possible sectors where there could be a potential demand for its application.
MATURITY: degree of technological development, based on its positioning in one of the various Technology Readiness Levels (TRL), and providing valuable information for the decision-making process on valorisation and commercialisation, either in its current state or after the incorporation of new developments and functionalities.
PROPERTY: define possible restrictions detected during the protection and exploitation stages, based on the knowledge from those people participating in the product development.
SUBSTITUTES: similar technologies having comparable usability, together with the possible existence of products having either the same or lower efficiency but accomplishing the required expectations.
DIFFERENTIAL VALUE: aspects of the technology that differentiate it from other existing technologies or marketable products providing a better value or more attractive proposition.
MARKET DEMAND: identification of potential clients being interested in the different technological functions previously identified.

Results: The Limus project focussed on various activities, including the identification and mapping of the museum spaces in the EUROACE area, the implementation and adaptation of the new technology to museum spaces to modernise them and the establishment of a cooperation network on heritage and technology.

Lessons learned: The new technology has a great scientific impact, but implementing and placing it in the market and into society was less successful. For an efficient transferability, any research results should be transformed into a marketable product. The cultural industry and the implementation of digital technologies is a recommended combination that will be indispensable in the future. The museums, thanks to their digitalisation processes, will improve the users' experience, providing a more customised product range.

[FIG. 15]
Modern technologies were used to create a new visitor experience. (Photo: Santiago García Villegas)

[FIG. 16]
Medellin castle in Extremadura. (Photo: Santiago García Villegas)

Paradores of Spain

Patricia Mora and Roberto Ballesteros

In the early 20th century the Spanish government decided to set up a new hotel infrastructure, using historic monuments and beautiful landscapes. Red de Paradores (the Paradores hotel chain) was created in 1928 when the first establishment was opened in Avila province (Parador de Gredos). The opening of Merida castle in Badajoz (1933) is a

clear example of how hospitality was combined with the restoration of castles, palaces and convents, thereby rescuing these neglected and abandoned heritage sites (fig. 16). The Paradores chain is a pioneer business model at the international level, involving rehabilitation and adaptation of state-owned heritage assets in Spain to be managed as high-quality hotels. The hotel chain has been deeply committed to the rehabilitation of historic and artistic national heritage throughout its 90-year history. Today, the Paradores chain includes 97 tourist hotels across the whole of Spain.

Approach: The commercial company Paradores de turismo SME SA has developed a business model based on its mission to create a policy tool that projects a modern and quality image of the Spanish tourism industry, pursuing territorial integration, recuperation and the maintenance of historic and artistic national heritage, as well as the preservation and enjoyment of natural spaces and landscapes. The long-term vision is to become a network of hotel establishments based on integral quality service, differentiation, accessibility, customisation and commitment to sustainability (natural, economic and historic environment). This addresses the key success aspects from the Paradores business model as possible reference to other European territories with state-owned heritage assets that are at risk of being lost for ever.

Results: The Paradores is a historic hotel chain created in 1928. Nowadays, it's a commercial company established (100% public administration) to manage the business of 97 hotels, with over 4,500 qualified and motivated staff. It is recognised (through awards) as number one in Spain for cultural and nature tourism and has over 258,000 euro in total annual economic income (52% rooms, 48% restaurants). The earnings before Interest, Taxes, Depreciation and Amortization (EBITDA) is 39.1 million euro. In total there are 6,125 rooms available. Yearly the Paradores have over 1.4 million clients (65% national origin, 35% international origin).

Lessons learned: Paradores are a modern hotel chain in Spain, pioneering in that it is led by the public sector. It is a working business model and a policy tool that projects a modern image of the Spanish tourism industry. The quality of the heritage rehabilitation and maintenance remains a challenge, however. Nevertheless, there is potential in learning from the Paradores model, which is a strong product, marketed as a collection and therefore emphasising the quality of the brand. It also lends itself well to cultural tourist routes connecting the Paradores and thereby stimulating heritage tourism. The Paradores model could provide a template for future public-private partnerships in other countries. A good legal framework is necessary to support the business model.

[ROMANIA]

Cronicari Digitali: Digital Storytellers

Raluca Barbulescu, Adina Dragu
and Irina Iamandescu

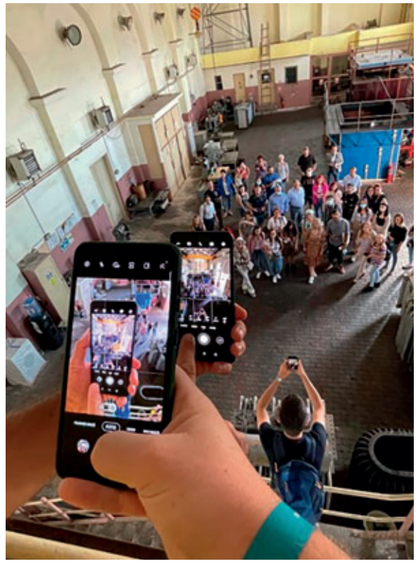
The aim of the Romanian project Digital Storytellers (Cronicari Digitali) was to promote cultural heritage by transforming representatives of generations X, Y and Z into ambassadors that engage their audience. The European Year of Cultural Heritage was a chance to highlight the contemporary value of heritage. Until June 2018, Romania addressed the issue targeting experts and history enthusiasts. None of this left a mark on the general public. It became crucial to bring forth the celebration in order to start a wide conversation about national heritage and engage the general public.

Approach: The National Institute of Heritage from Romania (NIH) reached out to Zaga Brand to lay out a budget-free communication project highlighting the Institute's activity and its relevance in this day and age to a general public. The campaign focussed on changing the attitude of people aged 18–35 towards heritage, the age group that is most active and involved in recommending and backing up ideals. The heritage issue seemed irrelevant to them, and their input was needed for consistent results. Using the most recent studies to determine the dynamics of different social channels, the team decided to focus on Instagram, due to its visual component, stories engagement rate, overall reach and the ability to receive quick feedback. The campaign also consisted of events dedicated to Instagrammers, expeditions to the heritage sights, Instagram competitions, digital projects, media interventions and two masterclasses, all of which generated content in the digital medium [FIGS. 17 A & B].

Moreover, since March 2020, Cronicari Digitali started to produce a podcast – *Cronicari Digitali* podcast. In the pandemic, many young people, less interested in architectural, industrial or traditional heritage, needed social inclusion, family connections and reassurance that we will all return to normality. That's why the podcast was going to tell them about everything that is valuable and must be passed on to future generations. Family, friends, music, culture, personal heritage and cultural heritage: these have become the main topics discussed. When we selected the speakers, we had in mind the magic mix of celebrities, public figures and digital influencers (about personal heritage), along with experts, associations and NGOs involved in the protection and promotion of cultural heritage. The two types of guests and themes were to bring together both young people interested in celebrities and educational topics in general, as well as those interested in cultural legacy.

Results: The project has significant visibility and online impact. It has developed its own online community and has won several awards. Starting with a subject 'stuck' in a specific community, sometimes hard to understand by a young audience, the project sparked curiosity, interest and involvement in a hitherto somewhat inaccessible field, but relevant to the identity of future generations. By the end of 2021, the project had reached over 27 million people, with over 36,000 posts, 1 million stories and 73 vlogs published by the content creators and #cronicaridigitali community.

48 Heritage Instameets all over the country, focussed on different heritage themes – history, art, culture, architecture, gastronomy, industrial heritage and personal heritage – were organised to bring hundreds of Instagrammers together.



[FIGS. 17 A & B]
The Cronicari Digitali project in Romania has attracted many young adults to engage in the heritage sector through modern communication channels like Instagram in addition to expeditions to heritage sites. The project has been very successful and was awarded several awards. (Photo: Cronicari Digitali)

Over 200 heritage buildings, sights, and attractions were discovered during the organised offline events. The project was awarded Best Digital PR Campaign in 2018 at the IAB MIXX Awards, the Golden Award for Excellence in Communication / Culture and Art at the PR Awards in 2018, the Silver Award for Excellence in Communication Social Media, in 2019 at the Civil Society and Webstock Gala and at the PR Awards 2021 with the Silver Award for Excellence in Social Media.

Lessons learned: The main challenge was to translate a perceived elitist subject from the academic language to the Millennial dialect, keeping it relevant for younger audiences. But staying within a 6,000-euro budget from possible partners and the agency's own income was also a challenge. The Digital Storytellers is an inspiring example of raising awareness of heritage issues to new audiences. It is easy to transfer to any other region, as long as one of the partners understands how to target the desired audience. Especially the events dedicated to Instagrammers could help bring in the vital public support needed to save and develop certain monuments.

Ambulanța pentru monumente: Ambulance for Monuments

Raluca Barbulescu, Adina Dragu, Irina Iamandescu

The 'Ambulance for Monuments' works in a race against time to save some of the hundreds of landmarks in Romania that are under threat of collapse and degradation. Since 2016, Ambulance for Monuments has mobilised hundreds of volunteer experts, students, passionate amateurs and trained craftsmen to join forces with mayors, priests, local councillors and other community representatives to save endangered heritage, thereby raising awareness of the value of cultural identity and encouraging a sense of stewardship [FIG. 18].

Approach: The 48 interventions include repairing collapsing roofs and walls, improving drainage and stabilising wall paintings. Many were undertaken on local, national and World Heritage sites, such as churches, mills, manor houses, railway stations and ruined forts [FIG. 19]. The initiative also trains young people, addressing a skills shortage that exists throughout Europe and ensuring future sustainability. The heart of the programme in each region is an intervention kit: an 'ambulance' equipped with tools, construction equipment and materials. It's an umbrella initiative with a strong focus on local decision-making and ownership. This ensures close cooperation between private and public bodies. Local and regional authorities cover most of the costs, while private companies and donors fund additional materials, equipment and tools. Communities host volunteers and provide meals. The conservation work is carried out by Asociația Monumentum (lead), and six other NGOs: Asociația pentru Patrimoniu Activ-PACT, Asociația Vernacular, Asociația Arhaic, Asociația Actum, Asociația Inima Olteniei and Asociația Atelierul de Patrimoniu.

Results: The 'ambulance' has delivered vital conservation work: 48 interventions including three churches listed on Europa Nostra's '7 Most Endangered' list. It furthermore engages people: over 300 volunteers and more than 100 students were involved. It led to the creation of five new jobs for craftsmen, and many others in producing raw materials such as shingles, lime, tiles and bricks. The project helped to build a heritage community with four new heritage NGOs established to deliver local programmes. The partners include over 30 local, regional and central authorities, five universities and 20 NGOs. Hundreds of mayors, priests, local councillors and other representatives of local communities have joined forces with the volunteers to curb the destruction of their own heritage. This has raised local communities' awareness of the importance and value of cultural identity and encouraged a sense of stewardship. The project has enjoyed the support of His Royal Highness The Prince of Wales and The Anglo-Romanian Trust for Traditional Architecture.

Lessons learned: Once started in 2016, the project kept growing and rolling avidly like a boulder going down a hillside. The greatest challenge remains the lack of trained personnel necessary to extend the project so as to fulfil the demand. The pilot project in Southern Transylvania has been successfully completed, but the model was designed to be replicated and grow continuously, rather like a franchise system. The team at Asociația Monumentum would like to extend the initiative on an international level, thereby saving as many monuments as possible. They are currently working towards establishing new ambulances in the Romanian regions not yet covered. At the same time, they appreciate the importance of increasing professional development through the training of new craftspeople who are both passionate about heritage and able to increase the range, quality and efficiency of ambulance interventions. Such people, and hence their training, are crucial to the success of the project and its franchises in other regions.

[FIG. 18]
Restoration of a historically significant building in Transylvania by Ambulante Pentru Monumente. (Photo: Ambulanta Pentru Monumente)

[FIG. 19]
Since 2016, Ambulance for Monuments has mobilised hundreds of volunteer experts, students, passionate amateurs and trained craftsmen to join forces with mayors, priests, local councillors and other community representatives to save endangered heritage. (Photo: Ambulanta Pentru Monumente)

[BELGIUM]

Heers castle: Landscape as an Asset in a DIY Revitalisation of a Heritage Site

Bert de Roo and Sylvie van Damme

The Renaissance castle of Heers is a crossroad of European influences: a show wing (18th century) with well-preserved stucco by Swiss artists Moretti and Gaggini, a courtyard with an Italian loggia, an English landscape park, a classic French interior and a neo-Gothic gatehouse with chinoiseries. However, 20 years of neglect now threaten the castle, particularly the leaking roof, which is causing serious damage and endangering structural stability [FIG. 20]. Neither the owners nor the authorities had the capacity to restore or take responsibility for Heers. In response, a group of engaged volunteers created the NGO 'Heerlijk(heid) Heers' and they have been fighting since 2017 to rescue the castle. Focussing on the surrounding landscape can bring the needed funds and attention to create a community around a decaying heritage site and to eventually revitalise it. In 2021 the castle was purchased by the Flemish government and, at the start of 2022, leased to heritage organisation Herita for 35 years. Herita will work on a participative restoration project for the castle, park and estate.

Approach: Because the majority of the buildings are in a decaying condition and dangerous to enter, the volunteers have focussed on the landscape around the castle, which acts as a backdrop. The park has been cleared and made accessible. Small-scale (temporary) interventions and events

[FIG. 20]
For years, Heers castle had been up for sale and was left by its owners in a derelict state, until a group of local volunteers started a rescue operation. Finally, in 2021, the castle and estate were purchased by the Flemish government in 2021, and leased to heritage organisation Herita in 2022. Participation will play an important role in the new restoration plans. (Photo: Paul Hermans)

interacting with the surrounding landscape are used to explore the potential of the site and increase awareness. Activities have created media attention and slowly developed an interested community surrounding the castle. 100 volunteers are now connected to the site. They organise events and maintain the park. More than 10,000 people have visited the castle and local and regional authorities support the NGO in their fight to safeguard it. It is a unique bottom-up approach with a focus on the landscape. The volunteer group makes the park accessible, organises events and aims to increase public awareness. The volunteer group stays important, as Herita is now creating restoration plans for the castle and the estate.

Results: The NGO of Heers castle created a wide interest in the estate over the course of three years. They did this without a starting budget. Making the park accessible was the only possibility to start public activities. Since the start, 10,000 visitors have visited the site. As a result, in October 2020, the regional government decided to invest in the site. Local authorities also came on board to help maintain the broader landscape surrounding the castle. Private foundations like the Fondation Roi Baudouin stepped in too. Now that castle and estate are leased to Herita, a new phase in participative spatial planning and restoration is starting.[3]

Lessons learned: The interventions and activities didn't aim to raise the necessary funds for the restoration but instead sought to build awareness and increase expertise in exploiting the site's potential. The aim is to attract external funding, and, as such, the success partly depends on external decisions. Restoring larger heritage sites is challenging and the cost can be overwhelming. This group of volunteers started without a plan and without funding, but with passion and enthusiasm. The core of their strategy became the public activities they made possible on the site. This created a community and the necessary awareness to mobilise governmental institutions, eventually leading to cooperation between experts and local and regional authorities.

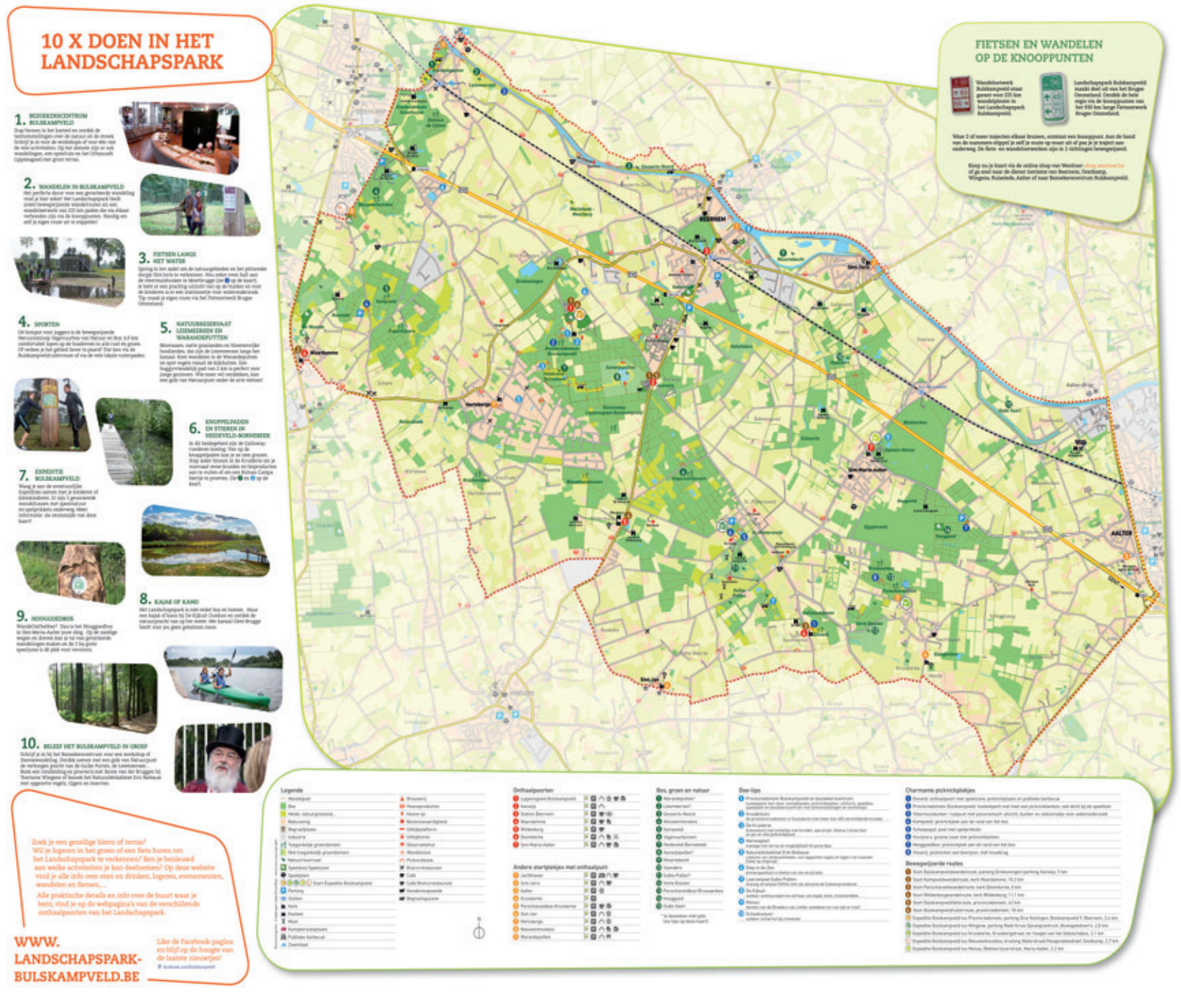
The landscaped park, with the castle as a backdrop, became the largest asset as the buildings remained too dangerous to enter. Approaching the landscape as the main space was a necessity but proved very valuable. Costs are limited, flexibility is large and it is manageable for a small group of volunteers. The determination of the volunteers at Heers castle can be an example for both community initiatives and public authorities around Europe of how to start saving the stories of heritage sites before restoration funding and long-term solutions can be arranged.

Bulskampsveld – Landscape Challenges for Historic Estates

Bert de Roo and Sylvie van Damme

Bulskampveld is a landscape park in the province of West Flanders with a high density of historic castles, manors and estates. It provides innovative policy insights in how to deal with this specific type of heritage from a landscape-based approach. Lecturers and students from University College Ghent developed strategies for Bulskampveld on how to preserve, develop or transform the regional identity of the area, using historical estates as the drivers in this process. The knowledge will feed back into regional policies governing heritage. Historic castles, manors and estates should be seen as holistic entities of buildings with their surroundings. Only this way can we make a true link between heritage and regional development.

Approach: Historically, castles and manors have had a close connection with their surrounding annexes and land (such as outbuildings, gardens, parklands, farmlands, woodlands, nature, etc.) and all this was managed as a unity resulting in a typical landscape. Today, these landscapes are valued for the recreational, historical and natural qualities [FIGS. 21 & 22]. Together, this forms an important aspect of the regions, identity and its future development. However, due to urban pressure, upscaling and industrialisation of the agricultural sector as well as changes in forestry and evolving wages, the business models of these estates are no longer sustainable. This, for example, can result in problematic ground water levels, loss of biodiversity, loss of forest or nature, loss of heritage



[FIG. 21]
The discovery map of the regional landscape park Bulskampveld.
(Image: https://www.brugse-ommeland.be/nl/landschaps-parkbulskampveld/welkom)

and so forth, eventually resulting in the possible disappearance of the region's unique identity.

Results: To safeguard and develop this identity, multiple public partners in Flanders agreed to join forces in 2011 and work together ever since within the region. University College Ghent has investigated various scenarios for the future development of these landscapes. Students from the advanced bachelor 'landscape development' developed strategies to deal with the park. Some ideas that came up in this process are: [1] a strategy to develop key elements of the region into unique selling points – Bulskampveld Climate park, an agroforestry hub, a rewilding zone or a 'place of silence'. [2] A strategy to strengthen the connection of the domains with their context – grouping the estates by proximity and connecting them to the needs of the village or neighbourhood. [3] A strategy based on strengthening weak links between stakeholders or spatial elements in the area. [4] A strategy based on reactivating the historical drainage system and field ponds to increase the region's 'sponge' effect as an effort to stabilise groundwater levels.

Lessons learned: Several stakeholder meetings brought various owners in Bulskampveld together for the first time. The interaction between private and public owners was specifically valued. The provincial domain in the region functions as a gateway to the landscape park. Contact between the provincial domain's manager and the different owners in the region is important for the further development of the region and its estates. The meeting format, if done on a regular basis, could be of great value for the local collaboration between owners. While there are several organisations which support estate owners, they are all on a Flemish or Belgian level. A more regionally oriented partner for the estates could structurally support local cooperation and stimulate a more holistic approach. Based on the knowledge obtained from Buskampveld, the University College Ghent provides advice and policy recommendations to the Province of West Flanders and the Agency of Immovable Heritage in Flanders to improve heritage policies such as Onroerend Erfgoeddecreet (the Decree on Immovable Heritage) that influence this specific type of heritage directly.

[FIG. 22]
At Menas estate a special trail for children has been designed, which turned out to be hugely popular. (Photo: Elyze Storms-Smeets)

[FIG. 23]
Visitors to various National Trust properties lend a helping hand during their visit. (Photo: National Trust)

[UNITED KINGDOM]

Visiteering
Catherine Leonard and June Taboroff

Societal changes are affecting people's ability and willingness to volunteer. Historic country estates are therefore developing more flexible volunteering offers, such as the idea of 'visiteering' (visit and volunteer) illustrated by the National Trust at for instance Rainham Hall, Powis and Croft Castle. Visiteering is a way to involve people, as part of a regular visit, in a volunteering activity such as cleaning items from the collection or helping out in the gardens [FIG. 23]. Finding out more about the work of the house team, seeing behind the scenes and participating in vital conservation work is a good way of building engagement.

Approach: Visiteering has been introduced to get visitors to an estate or country house involved during their visit through 'bite-sized' activities, such as leaf collecting, making compost, planting spring bulbs, building a new orchard or garden kitchen. The estate owner, manager or gardener will give full instruction on all tasks and provide gloves and tools. Usually, specific days are chosen for visiteering, and people can drop in at any time to join in.

Results: Through various concepts of offering innovative and interesting experiences to visitors, the National Trust has adapted the aspect of volunteer work. The method of visiteering is used at various National Trust sites. For instance, during a visiteering week at Rainham Hall, east London, some 1,000 snowdrops were planted, vegetable beds were worked on and just a couple tonnes of soil shipped in for the Orchard project. The concept

of visiteering thus helps the estate owner to get small chores done, but most of all it is a new way of connecting and engaging.

Lessons learned: Choice and flexibility were key components in the 'visiteering events', demonstrating the different kinds of volunteering roles available with the Trust. Visiteering has the potential to attract visitors, to build engagement and to create a new experience at estates. It's promoted as a way to learn new skills, meet other people and have a fun time at a special place. Visiteering is also a great way for people to find out wat it is like to volunteer at a country estate. It's a method that could be used at any country estate, but it does need coordination and planning. Visiteering works best during holidays and weekends, when there will be plenty of volunteers / visitors.

Regional Country House Partnership

Christopher Ridgeway and Oliver Cox

Dedicated to researching the architecture, landscapes, collections, families and archives of the country houses of Yorkshire, a collaboration was set up in 1999 between seven country houses and the University of York [FIG. 25]. The Yorkshire Country House Partnership (YCHP) was the first, but ever since other regional country house partnerships have been formed in the United Kingdom, such as the Thames Valley partnership between the University of Oxford and various country houses, and the partnerships of the Institute for the Study of Welsh Estates (ISWE) and the Centre for the Study of Irish Country Houses and Estates with Welsh and Irish estates, respectively.

Approach: Each country house partnership aims to promote a deeper understanding of the shared histories of the houses through interdisciplinary scholarly research [FIG. 24]. The partners are both private and public country house owners and education organisations such as universities. The partnership also involved student placements for both postgraduate and undergraduate students and careers talks by country house curators.
At the centre of the research are the archives and collections of country houses and the families that lived in them. As storehouses of stories these archives are the most reliable and rewarding way of creating and discovering new narratives to enchant visitors at National Trust (and Historic Houses Association) properties.

Results: The academic research has helped to understand the history of the houses (and their adjoining grounds) better. It also provides a practical support network for house curators and an arena for interdisciplinary collaboration with the wider academic community and across the heritage sector. Thus in Yorkshire the partnership was extended with five other country houses. Important research results have been shared through conferences, publications and exhibitions, including *Duty Calls: The Country House in Time of War*, telling the story of how these estates and their communities dealt with the hardships of war during three centuries. Other interesting research projects from British country house partnerships are 'The Jewish Country House' and 'Maids and Mistresses'.

Lessons learned: The challenge has been to better link the two worlds of academic research and the heritage sector. Curators, house managers and stewards worked together with scholars from different disciplines, such as architectural history and landscape history. The partnership has given academics access to country estate buildings, collections and landscapes. Furthermore, through the partnerships the scholars were stimulated to think about the way in which their research has the potential to engage beyond the academy. It also enabled estate owners and curators to understand the places they run much better and to tell the many stories of country house culture. The partnerships are founded upon mutual benefit and two-way knowledge exchange.

Indeed, mutual benefit is required for successful partnership activity, even if the benefits are different for each partner. Working together in a country house partnership showed the importance of flexibility and that the benefits of collaboration can be both immediate and take a number of years to appear. Long-term thinking and investment in sustained partnership management are therefore important. All the partnerships have joined the European Network for Country House and Estate Research (Encounter), initiated by the Danish Centre for Country House Study at Gammel Estrup.

[FIG. 24]
A unique roof conservation project at The Vyne, a former Tudor 'power house' in Hampshire, involved open access to the roof for visitors during the restoration works. Researchers of Oxford University work closely with the National Trust on combining new technologies with knowledge of centuries-old practices. (Photo: O. Cox, Oxford University)

[FIG. 25]
Castle Howard in Yorkshire is one of the members of the Yorkshire Country House Partnership with York University. (Photo: Wikimedia Commons)

1 Holtman 2014; Verschuuren-Stuip 2015.
2 See: https://www.euro-ace.eu/en/what-is-euroace/Introduction.
3 See: https://www.herita.be/nl/monumenten/kasteel-van-heers.

[FIG. 01]
The grand canal and the vegetation in the monumental park of the historical estate Wildenborch suffer from drought. Here regional strategies for heritage protection and sustainable water management are inseparably linked together. (Photo: Leontine Lamers)

From Policy to Implementation

In the Netherlands, it is widely recognised that characteristic landscapes have high societal value: among other things, as a location factor for living and business, for health and for recreation and tourism.[1] This has been demonstrated several times specifically for heritage estate landscapes, starting in 2012 with a study for the social benefits thereof in the provinces of Gelderland, Utrecht and Overijssel.[2]

At the same time, there is a growing social concern about the decline in the recognisability and accessibility of Dutch cultural landscapes. This includes the concern about the removal of landscape elements, the deterioration of characteristic openness and views and the fragmentation of historical estate landscapes. The concern is widely shared, not only among heritage and landscape professionals but also among citizens[3] and is sometimes referred to as ‘landscape pain’. The background to the concern is the increasing land usage for new residential areas, solar parks and wind turbines, distribution centres, data centres, etc., whereby highly valued landscapes are being replaced by low-valued landscapes.[4] The speed of change of the cultural landscape and the complexity of the many tasks that lay claim to space have increased dramatically. The complexity created by the many tasks in an environment with high heritage and landscape values requires design skills more than ever to address these issues in an integral and forward-looking way.[5]

While the problems are widely acknowledged, central government involvement in spatial planning and cultural landscape policy has declined sharply since 2010. National policy for the cultural landscape has been deregulated since 2010.[6] Incidentally, there is still a good deal of attention paid to historic country estates,[7] with national designations, a system of granting permits with provinces and municipalities each playing their own role and a provincial programme for financing restoration, recovery, change of function and sustainability. But this attention is focussed on individual country estates, not on estate landscapes or zones.

National Ambition: Combining Tasks in a Landscape-Based Regional Approach

The national government of the Netherlands has recently adjusted its spatial policy. This also has consequences for the relationship between the large-scale present-day challenges and heritage values as they occur in heritage estate landscapes. After ten years of restrained spatial policy, the national government wants to regain control of a number of major assignments. The tasks were formulated in 2020 in the national environmental vision (NOVI): combating climate change and stimulating climate adaptation, promoting energy transition, providing space for living and working, making agriculture more sustainable and improving biodiversity. Water and soil should be leading factors in making choices. The NOVI aims at the maximum possible combination of various tasks in an area approach. Instruments include regional deals in which various ministries and provinces make agreements on packages of projects that are important for the region in question in order to fulfil the tasks.[8]

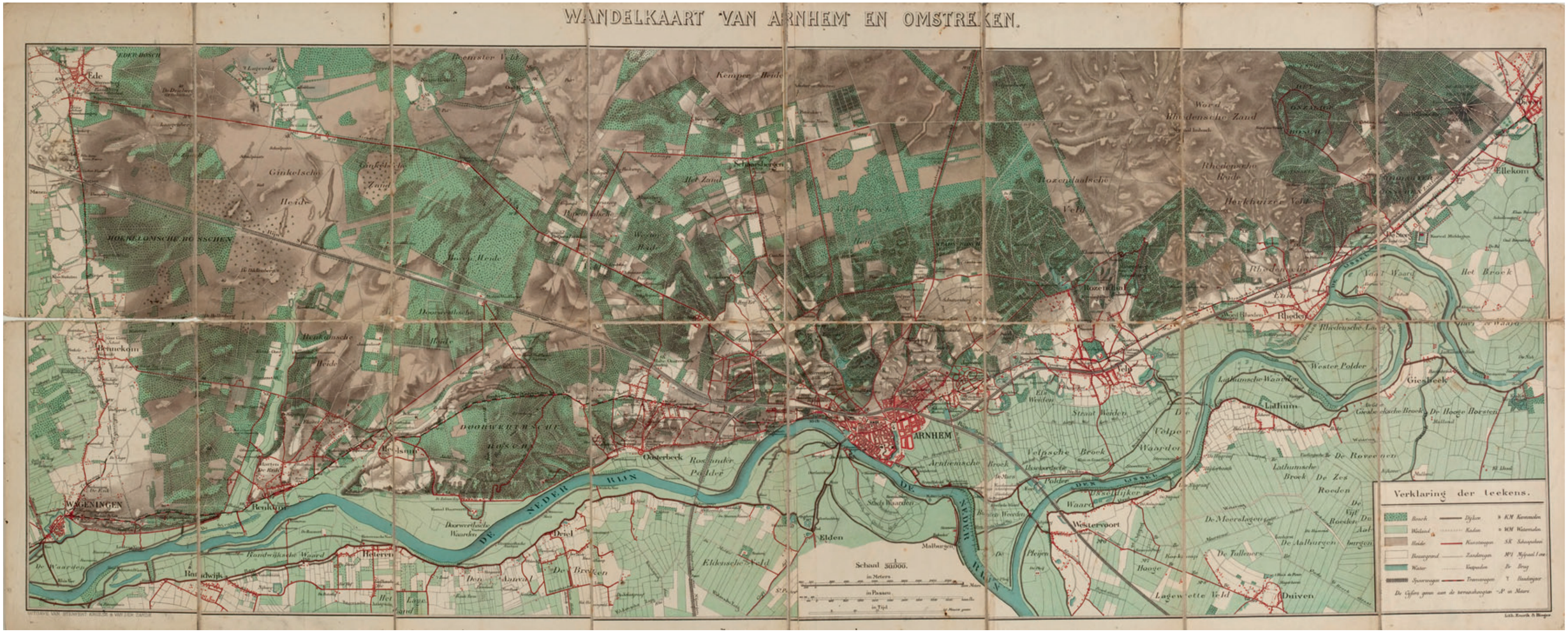
On 17 May 2022, as an extension of the NOVI, the Minister of Housing and Spatial Planning sent a letter to the House of Representatives explaining his plans to give an impetus to the approach to the major challenges, together with other government bodies and social partners, while maintaining or improving spatial quality, the living environment and strengthening landscape and heritage. He asks provinces to make plans for areas where the tasks converge and makes an unprecedented amount of money available for implementation. By mid-2023, it should be clear which 'spatial puzzle' can be put in place in order to give a substantial impulse to the implementation thereafter.[9]

It is interesting that the principles from the NOVI are common to historic country estates: multiple use of space, focussing on area characteristics and preventing the passing on of negative aspects of land use in time and/or space. For the province of Gelderland, zones with a high density of historic estates and country houses are therefore interesting to include in the implementation as indicated in the Minister's letter. What can these heritage estate landscapes mean for an urbanising province? [FIGS. 2 & 3]

Programming through a Landscape-Based Regional Approach in Gelderland

The national development with the NOVI has its parallel in Gelderland. In 2019, the provincial government adopted an ambitious strategic plan: the 'Gaaf Gelderland' ('Great Gelderland') environmental vision. The core of the environmental vision

[FIG. 02]
The estate landscape around Arnhem with its striking lanes and parks has always been a popular destination for tourists. Walking map for visitors to Arnhem and environs, 1866–90. (Gelders Archief, Arnhem)



consists of a series of major (spatial) tasks, each with its own objectives, and a number of principles on how to achieve them.[10] It is now clear that the current programmes alone will not suffice to implement the environmental vision. The programmes are arranged thematically, such as Water, Climate Adaptation, Nature, Housing, Provincial Roads and Landscape and Heritage. As the major challenges occur in the same regions, several programmes are always involved in fulfilling these tasks. Much can be achieved in the regions through cooperation between the programmes but because the incentives are mainly programmatic and not inter-programmatic and less area-specific, opportunities for an integral approach are missed. This situation is problematic for historical country estates and country houses, where, after all, by definition there are combinations of functions and qualities. Against the background of this analysis, the province of Gelderland is preparing a change in its programming, whereby a considerable part of the tasks will be realised via a landscape-based regional approach, combining the various tasks and the quality dimension of heritage and landscape. This changed programming takes advantage of the large sums of money that the national government has promised in January 2022 in order to fulfil, with and through the provinces, a number of major tasks in the region – see the Minister's letter of 17 May 2022 mentioned above. All of this offers new opportunities for country estates and country houses, whereby it is important not to approach these individually, but in the first instance as estate landscapes, zones of country estates and country houses. It is precisely

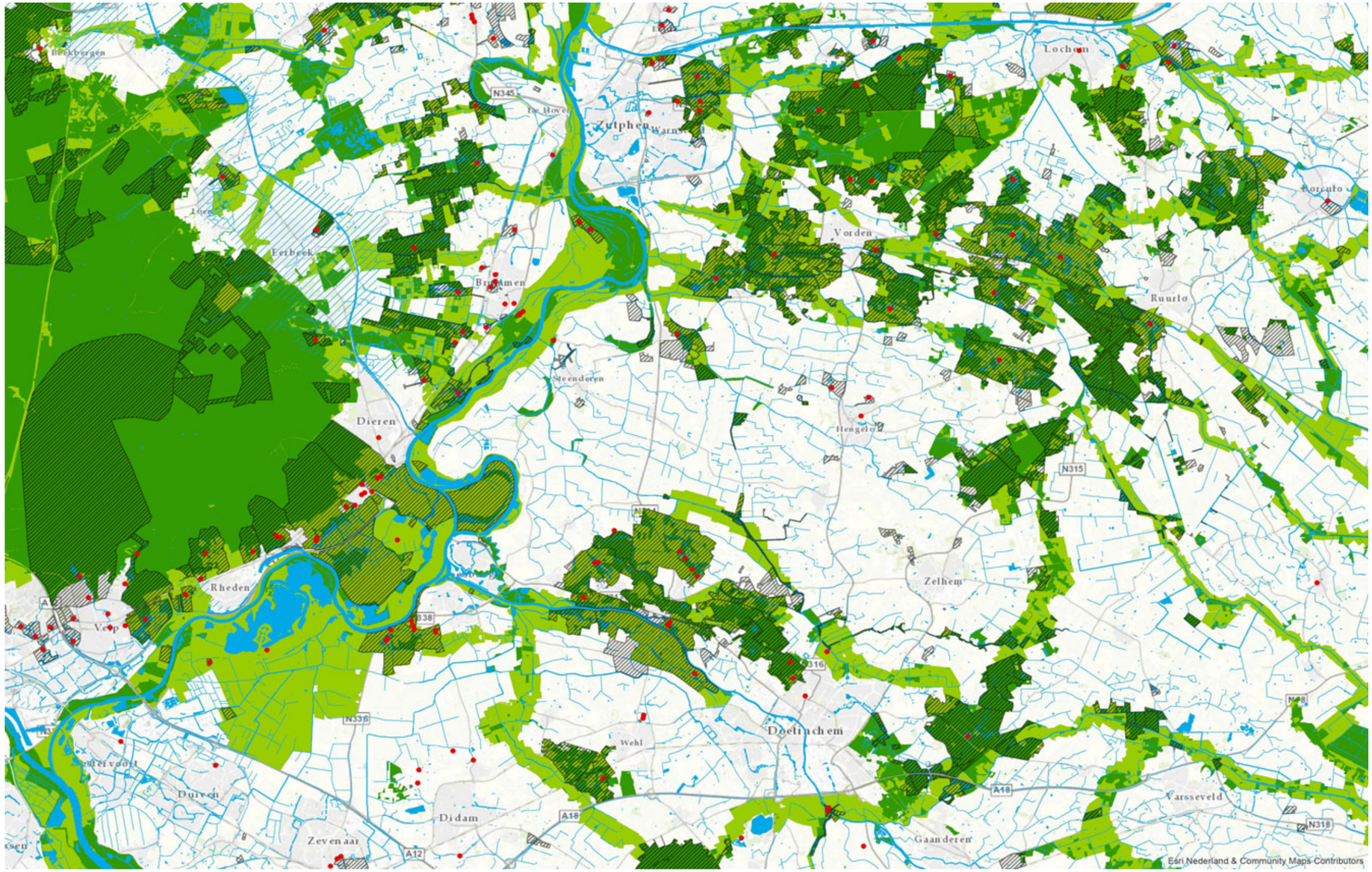
[FIG. 03]
Sonsbeek is a successful example of how heritage can play a significant role in an urban context, offering possibilities for recreation and ecology while at the same time creating an attractive face for the city. (Photo: Buiten-Beeld / Alamy Stock Photo)

at the level of zones that opportunities exist to link landed estates to major challenges [FIG. 4].

For the policy programme Heritage, it is important to be relevant to the major area-specific tasks. In 2021 an explicit starting point in this respect was included in the policy programme. The story of the estate areas must be able to be told attractively and accurately and the underlying data must be available. The story is currently being updated as part of a study that will lead to a new determination of the most characteristic heritage at the regional scale level, of which the estate zones will be a part. This study is in line with the regional guides 'Landscape and Spatial Quality' that were made in 2021 from the programmes Spatial Planning, Landscape and Heritage as an aid for working on the major challenges. These guides present core qualities per region within Gelderland for spatial quality, landscape and (landscape) heritage. They also provide development goals and design principles for each region. The various heritage estate landscapes are part of the regional guides.[11]

Lessons from KaDEr and Innocastle

Where heritage is involved in large (area-focussed) assignments, it turns out that this helps to steer the fulfilment of the assignments in a meaningful direction that appeals to society. The learning cases carried out within the framework of the Gelderland heritage innovation programme (KaDEr, 2016–21) and the Interreg project Innocastle (2018–22) show that it is quite possible to involve heritage in tackling major spatial challenges.[12] Learning cases that were the subject of KaDEr demonstrate this. One example is the restoration and change of function of the iconic Eusebius church, including its surroundings, in Arnhem, which led to a widely appreciated revitalisation of the city centre. Another example is the Nieuwstad in Zutphen, where a new perspective on heritage was combined with the involvement of citizens and schoolchildren and the promotion of craftsmanship. What the province is trying to do is to involve experts, owners and authorities in the development process, and not only to tell the story themselves but to let experts



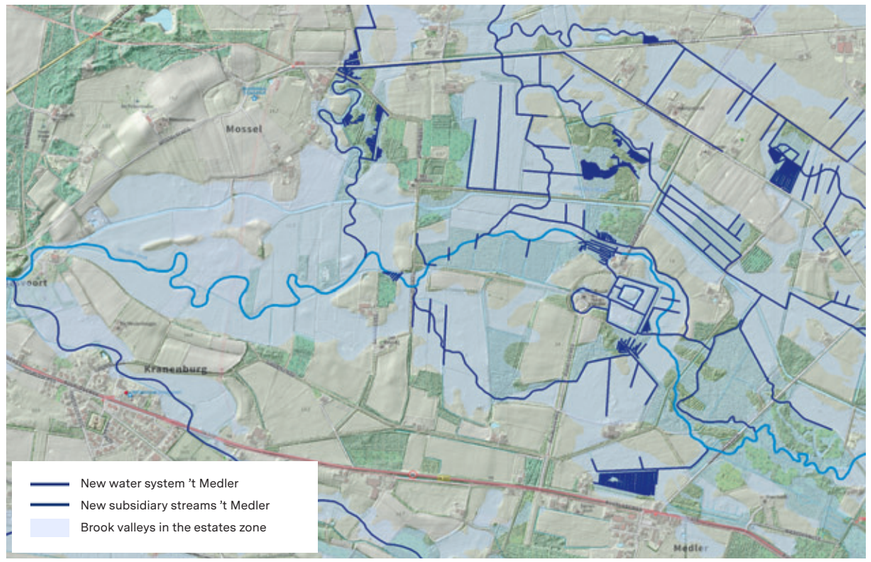
[FIG. 04]
The heritage estate landscapes have a great potential to contribute to the development of coherent nature and water networks that can play a crucial role in combating fragmentation, adapting to climate change and increasing biodiversity. In green the proposed green-and-blue network with the estates, red dots and hatching. (Map: Steffen Nijhuis, TU Delft. Based on data from: Province of Gelderland, Gelders Genootschap and Pdok.nl/Kadaster)

[FIG. 05]
For estates such as De Wiersse, a regional approach is inevitable for sustainable water management and address abundance and shortage of water. (Photo: Hielkje Zijlstra)

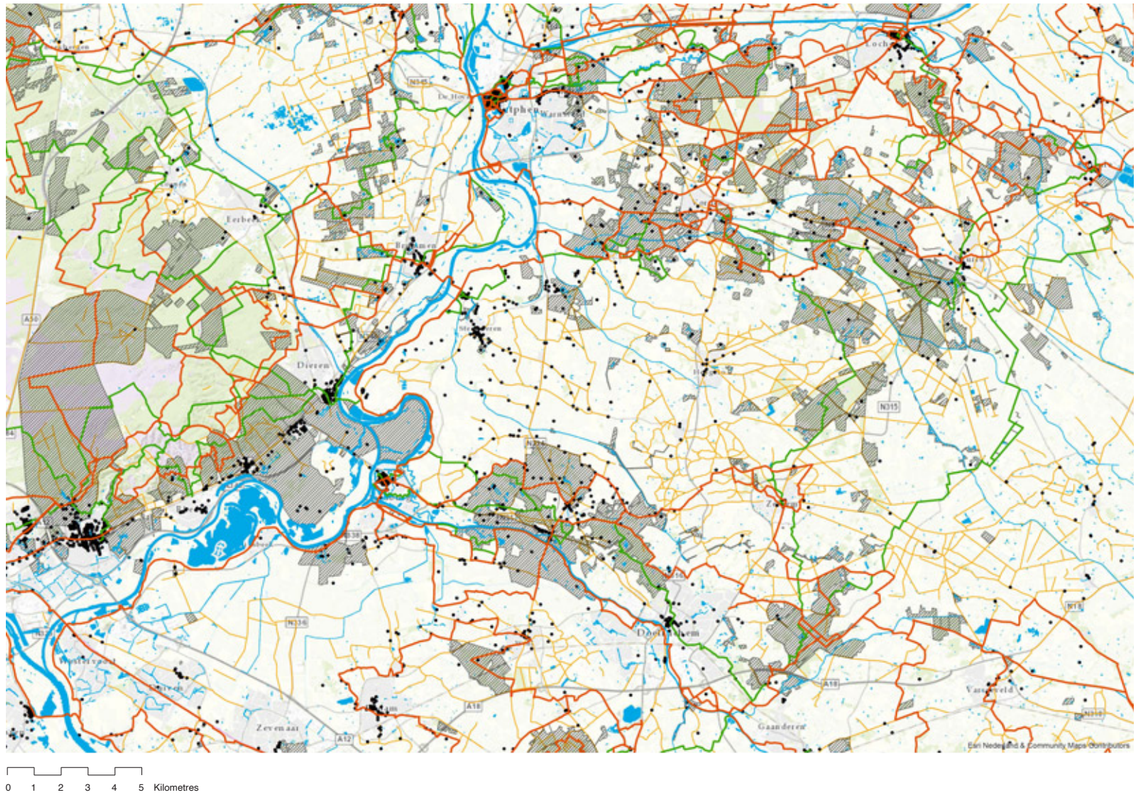
and heritage owners do the talking. Temporary heritage workshops have been set up in a few places. One of these places was the Reuversweerd country estate, where during the restoration, preservation and change of function of the buildings and the green environment numerous owners, experts, students and professionals participated in discussions, clinics on technical subjects and design research.

In the context of the Interreg project INNO-CASTLE, also part of the innovation programme KaDEr, three leaning cases were executed that focus on the connection of the heritage values of country estate zones to major challenges. The Baakse Beek country estate zone demonstrates that explicitly involving the heritage of country estates and rural properties in working on climate, water and nature issues leads to a widely supported result. Success factors are cooperation between authorities and thematically diverse programmes, the leading role of the water board, a thorough system analysis at various scales, the provision of cultural-historical data and the involvement of designers. The programme for the heritage estate landscape Baakse Beek has reached the implementation phase for several clusters of estates [FIGS. 5 & 6]. Measures will lead to more water retention capacity, less drought damage, expansion of water-related nature, more and better-quality water in historical water features, contemporary use of historical landscape structures and less risk of building foundations being damaged by drought [FIG. 8].

The heritage estate landscape of the Gelders Arcadia shows that the landscape of country estates is of almost inestimable value to nearby urbanised areas, partly because of the tourist-recreational opportunities it offers. By discovering the many unique places within the estate zone, a better spread and more diverse content can be offered. A start has been made with the project 'Verhalen van de Veluwezoom' (stories from the Veluwezoom), which was developed within a heritage pact between municipalities and the province. Much will be done by (cooperating) municipalities, heritage owners and tourist-recreational entrepreneurs [FIG. 7].



[FIG. 06]
Design for the estate 't Medler, strengthening the position of the designed landscape around the castle (green and purple: moats, small canals, lanes, gardens) within the wider landscape in which the brooks are redirected in the historical beds (blue lines and areas). In red the current canal that drains the surface and ground water deep and very quickly, contributing to drought that is harmful for heritage and nature. (Waterschap Rijn en IJssel, 2019)



[FIG. 07]
The potential to develop a continuous regional network with loops of recreational bike trails and walkways can connect the heritage of cities and villages with the historical estate landscapes and reactivate historical landscape elements, such as historic church paths or clog paths. (Map: Steffen Nijhuis, TU Delft. Based on data from: Province of Gelderland, Gelders Genootschap and Pdok.nl/Kadaster)

It is a vital part for the plans for the urbanisation of the urban heart of the province of Gelderland, which are currently being prepared. The country estate zone can be part of a green-blue framework that is being developed with designers as part of regional spatial development. By explicitly naming Gelders Arcadia as a green zone that is part of the urbanisation strategy, the threat of fragmentation is counteracted.

The issue of impending spatial fragmentation is also urgent elsewhere, such as in the city triangle Apeldoorn-Zutphen-Deventer, which includes the heritage estate landscape Twello. The pressure on this heritage estate landscape is big, and must be taken into consideration in for example, the realisation of new housing plans [FIG. 9]. The Municipality of Voorst steers for spatial qualities, which are largely derived from the presence of country estates. This steering requires knowing the spatial qualities, whereby the municipality of Voorst shows itself to be a forerunner. Recent housing plans in the zone spare the monumental estates and contribute to the tasks, not only living things but also nature and water.

The housing plans near Twello have been the subject of local politics in relation to heritage and have caused local unrest among individual country house owners who are not happy with the arrival of residential areas in their vicinity.

KaDEr and Innocastle showed for the country estate zones that thorough knowledge is an indispensable basis. A study has been carried out for the entire province of Gelderland that maps out all the areas with spatial characteristics that are associated with the past or present presence of historical country estates and country houses. The study not only indicates the previously known areas where protected values occur, but also areas where no specifically protected values occur.

One of the experiences of KaDEr and Innocastle is that good initiatives can be traced back to enthusiastic individuals who have deep knowledge, make connections, see opportunities and show courage. For the continuity of the work, it can be a risk when these people drop out. What helps is recognising that this is the case and enabling these individuals to share and transfer their knowledge and insights.

Changing Instruments

A number of practical instruments support the provincial ambition. The province is currently creating a viewer with various map images of country estates, country houses and the zones in which they are concentrated, compiled from separate data sources. The viewer will be a public facility and can easily be combined with, for example, data sets of the major tasks. Also in the area of knowledge development, the Province will support heritage owners who do not know enough about their monumental estate to be able to deal with today's challenges. They can commission research, which the province supports financially.

An important instrument is the statutory heritage consultancy, in which various authorities work together to safeguard heritage values in spatial development. This instrument is also aimed at protected estates, of which there are 119 in Gelderland. In the past, this instrument was used mainly on a sectoral basis, but nowadays it is used more broadly, for example by directly involving owners, explicitly coordinating with regulations in other fields and involving the monument's surroundings. The latter anticipates the coming into force of the new Environment Act, which will make this mandatory.

A new instrument is the Heritage Deal, in which valuable heritage is linked to a concrete task. One of the deals in Gelderland focusses on climate adaptation in estate landscapes, which includes a knowledge and learning programme aimed particularly at private owners. Another heritage deal focusses on the reconstruction of an old access road in the heritage estate landscape Veluwezoom. The need for traffic calming will be seized upon to bring back the grandeur and function of this historic road and improve the spatial and visual relations with the surrounding country estates, including vistas, formal tree avenues, pathways and streams on both sides of the road [FIG. 10].

[FIG. 08]
Newly added fish passage connected to the historical watermill at Hackfort.
(Photo: Steffen Nijhuis, TU Delft)

[FIG. 09]
Urban pressure is a serious treat for the coherence of the estate landscape Twello and illustrative for similar developments in other urban regions. (Photo: Pieter van den Berg, MVO TV)

The instruments also include the previously mentioned regional guides 'Landscape and Spatial Quality', in which the heritage zones have a place, linked to ideas about the tasks they can contribute to. It is important that the guides, under the umbrella of spatial quality, also identify cultural landscape and heritage qualities and are inter-programmatic in nature. Another example of inter-programmatic working is the inclusion of heritage, especially in estate areas, in the cooperation agreements with the water boards in Gelderland. This leads to explicit attention to, for example, climate adaptation in estate zones.

Challenges Ahead

Obviously, many challenges remain. One is the role of the province in relation to other authorities, especially municipalities and water boards. Another is the involvement of private owners. The experience so far is that a significant group of owners know how to find the authorities and participate in knowledge and learning programmes set up by authorities or in their own circles. In order to also appeal to the others, a targeted effort is required from governments together with owners. The province also ensures good internal coordination to facilitate private owners. To this end, the province has a heritage estates counsellor who can show owners the way within the provincial apparatus. A third factor is time: working on country estates and estate zones requires years of investment, while some parties expect quick results. Fortunately, in the province there has been considerable support from all interested parties for a long time now for working on a sustainable future for the resilient estate landscapes of Gelderland.

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1 Van Dam et al. 2019b 27–31.
2 Ruijgrok 2012, 2018.
3 Van Dam et al. 2019b 8, 20–21.
4 Van Dam et al. 2019a.
5 Nijhuis 2021.
6 Tisma et al. 2019, 51–53.
7 Van Dam e.a. 2019b, 8.
8 Nationale Omgevingsvisie 2020.
9 Kamerbrief 2022.
10 Omgevingsvisie 2018.
11 Streekgidsen 2021.
12 Zeilstra, Nijhuis & Quist 2021; The Innocastle Baseline Survey 2020.

[FIG. 10]
Estate Hof te Dieren (municipality of Rheden), a former royal Domain in the estate landscape Veluwezoom. The reconstruction of a provincial road provided the opportunity to restore historical alleys and pathways. Nowadays, Hof te Dieren is one of the locations of the annual cultural estate fair of Gelders Arcadia. (Photo: Pieter van den Berg, MVO TV)

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MSc Graduation Design Projects TU Delft Landscape Architecture 2017–2020

From 2017 until 2020 MSc Landscape Architecture graduation students and their mentor teams from Delft University of Technology (TU Delft), Faculty of Architecture and The Built Environment were involved in design-oriented research on future-proofing heritage estate landscapes in Gelderland.

In 2019–20 there was a dedicated graduation laboratory entitled 'Gardens of Gelderland: Design Research Explorations into Resilient Estate Landscape', coordinated by Bieke Cattoor and Steffen Nijhuis from the Section Landscape Architecture. Here 11 students supervised by a team of experts from TU Delft elaborated strategically chosen learning cases 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.

The students participated in workshops and fieldtrips, and there was an international exchange programme with the Politecnico di Torino, Faculty of Planning and Design, Inter-university Department of Urban and Regional Studies and Planning lead by Steffen Nijhuis, Claudia Cassatella and Mauro Volpiano in 2019.

Overall, the input of landscape architecture design students was very valuable as they provided fresh, unbiased perspectives on the development of the estate landscapes in Gelderland and stimulated the creativity and imagination of the involved stakeholders.

Below is an overview of the Landscape Architecture MSc graduate students who participated and their supervisors, together with their theses, which can be freely downloaded by scanning the QR-codes.

The participants of the international exchange program at the water-mill from Hackfort near Vorden. (Photo: Steffen Nijhuis, TU Delft)

Amarendra, B. [2020]
Curating Experiences: Rethinking the Estate Landscape for Sensorial Affordances.
Supervision: Saskia de Wit and Angeliki Sioli.
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Chen, Z. [2020]
From Isolation to Integration: Transforming Three Estates into an Urban Landscape.
Supervision: Eric Luiten and Lidy Meijers.
TU Delft, Landscape Architecture.
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Jiang, M. [2020]
Exploring Estate Space: Exploring the Visual Relationship in the Estate Landscape of Gelders Arcadia.
Supervision: Steffen Nijhuis and Leo vd Burg. TU Delft, Landscape Architecture.
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Supervision: Steffen Nijhuis and Hielkje Zijlstra. TU Delft, Landscape Architecture.
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Sandy Rural Landscape and its Water System in Times of Climate Change: A Case of Baakse Beek Watershed.
Supervision: Gerdy Verschuure and Teake Bouma. TU Delft, Landscape Architecture.
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Peng, Y. [2022]
Betweenness: Tangible and Intangible Boundaries for Formulating an Estate Landscape in Gelders Arcadia.
Supervision: Saskia de Wit and Marc Schoonderbeek. TU Delft, Landscape Architecture.
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Qian, L. [2020]
From the City, into the City, beyond the City: Integrating the Historical Country Estate into the Arnhem City as Key Components of an Urban Structure.
Supervision: Saskia de Wit and Taneha Bacchin. TU Delft, Landscape Architecture.
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Shahed, A. [2020]
Rejuvenating Links: Estates and Hinterland: (Re)exploring the Value of Productive Cultural Landscape and its Link to the Heritage Estates of the Baakse Beek Area.
Supervision: Bieke Cattoor, Saskia de Wit and Kristel Aalbers. TU Delft, Landscape Architecture.
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Wang, Y [2020]
Forest Landscape Restoration for Climate-Adaptive Estates in the Baakse Beek Region.
Supervision: Steffen Nijhuis, Bob Ursem and Bieke Cattoor. TU Delft, Landscape Architecture.
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Wei, M. [2020]
Arcadia Again.
Supervision: Eric Luiten and Hielkje Zijlstra. TU Delft Landscape Architecture.
http://resolver.tudelft.nl/uuid:00ac3d80-c93d-45c5-9ea5-1dcc5ff5758b.

Yuan, B. [2020]
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Colophon

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The views expressed in this publication are those of the authors and do not necessarily reflect the views of their employers, funders or affiliated institutions.

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The province of Gelderland, in the Netherlands, has many castles, country houses and estates. Together, they form historic estate landscapes that partially determine the regional landscape character. Climate change and urbanisation have a significant effect on the management and protection of these heritage landscapes. An abundance and a shortage of water, spatial fragmentation and increasing pressure from recreation and tourism are only a few of the challenges that need to be addressed. The complexity of these challenges requires a regional perspective to understand the coherence and systemic relationships between the estates and to help find common ground in which stakeholders can work together to increase the resilience and adaptability of these valuable landscapes.

Resilient Estate Landscapes Gelderland proffers a landscape-based regional approach to understanding, planning and designing heritage estate landscapes. It elaborates a preservation-through-planning approach that takes spatial development with historical landscape structures as a basis and engages in a process with meaningful stakeholder engagement and visualisation/communication to invent spatial strategies and principles founded on co-creation and collaboration while employing spatial design as an essential means.

Resilient Estate Landscapes Gelderland results from a collaborative project of TU Delft Landscape Architecture, the Province of Gelderland and heritage organisation Gelders Genootschap in the framework of the Characteristic and Sustainable Heritage (KaDEr) programme and the EU-Interreg project Innocastle. The book provides a powerful roadmap for the protection and development of future-proof estate landscapes by presenting a practice-oriented approach and its implementation in policy, planning and design. While showcasing best practices from the region and beyond, the book is a valuable resource for every-one interested in the past, present and future of heritage estate landscapes.

A collaboration of:
Delft University of Technology
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KaDEr
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