ARECHARGED 'HART'

Synergizing the Housing
Pressure in the Depleted
Landscape on the Fringe of
the 'Groene Hart'

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A RECHARGED 'HART'

Synergizing the Housing Pressure in the Depleted Landscape on the Fringe of the 'Groene Hart'

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To my friends for their love, care, and discussions.

And lastly to my fellow students for pushing me to challenge myself and raise the bar further.

Thank you.



Figure 1, The Fringe at Nieuwerkerk aan den IJssel.

Abstract

Our current time, the Anthropocene, defined by crises, colours the Randstad and its accompanying Fringes in the 'Groene Hart' in the Netherlands, as a depleted landscape filled with economic, ecological, and socially misaligned housing developments, under constant pressure of further terrestrial urbanisation. The thesis seeks to research an alternative perspective to the prevailing market-driven, human-centric spatial zeitgeist that antagonised this misbalance, which is eroding the boundary between society and nature to being a Fringe of fluid hinterland within a depleted landscape. Contributing to housing shortages, environmental degradation, and societal polarization and segregation. Henceforth, the current form is no longer sustainable, and asking for a reiteration of the relationship between the urban and non-urban.

By adopting an ecocentric approach to housing the thesis seeks to foster synergies among, social, economic, and environmental interests by nurturing non-exploitative design. Subsequently, it contributes to the limited body of knowledge in contemporary Dutch urbanism, particularly regarding Fringes and housing developments within production landscapes.

Through the methodology of cycles of research for design and research by design, including literature and cartographic reviews, as well as digital and design interpolation, the thesis develops a design language as a bridging design tool to explore ways to synergise conflicting systems within the peri-urban landscapes. Fostering an overall regional ecocentric strategy.

Concluding with the advocation of a transformative nature-inclusive Fringe of dynamic transitional mosaics of blue-green agroecological parklands with housing developments, advocating a revitalised relationship with the landscape and its natural operation, through the implementation of the Fringe National Parkland. Advocating a strategy of developing from the territory's existing conditions to sustain functions by leveraging its inherent network capacity.

Emphasising the regenerative potential of enabling synergetic Fringes, the thesis paints an alternative promising perspective for the future region. It serves as a visual embodiment of how synergies can revive formerly depleted landscapes while addressing housing needs, offering a reflective outlook in the ongoing debate surrounding terrestrial development.

Keywords

Ecocentric Paradigm, Synergetic Urban Design, Terrestrial Urbanisation, Housing Crisis, Imbalanced Urban-rural Relationship, Pseudo-countryside, Fringe of the 'Groene Hart'.

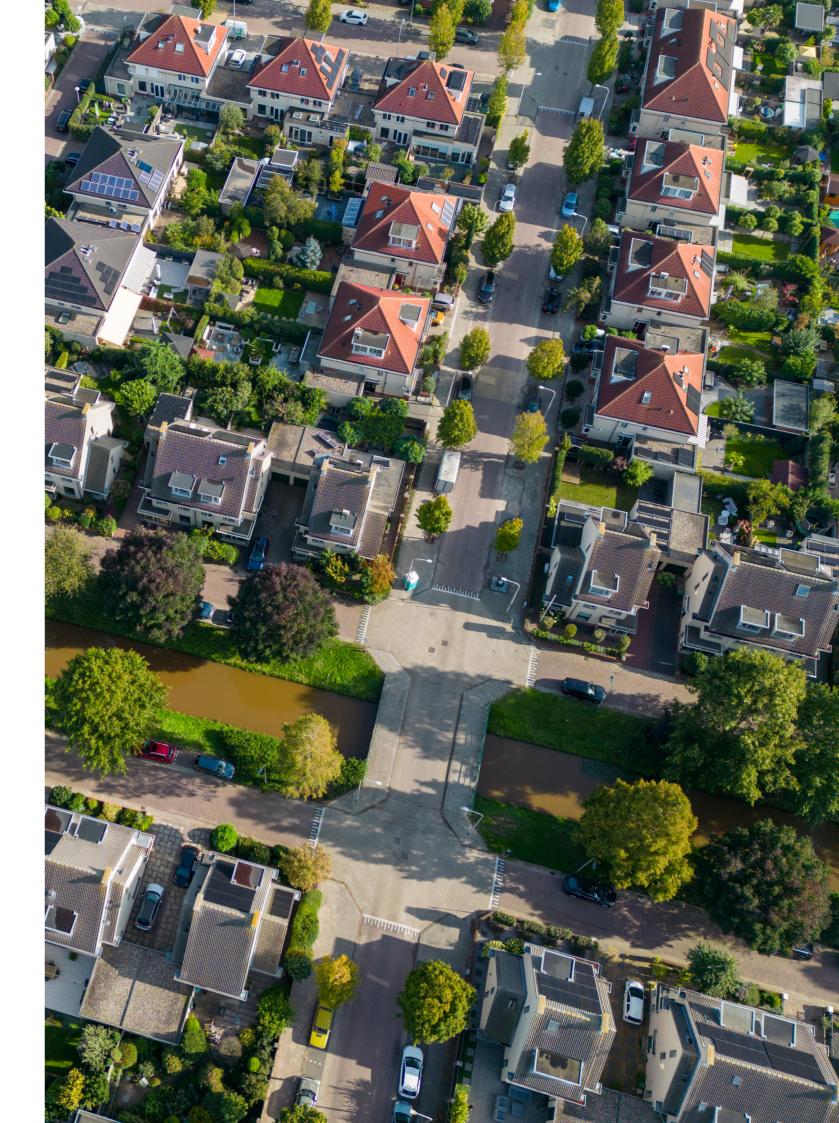


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Figure 3, The Gouw in Weespersluis embodies the anthropogenic terrestrial development and its problematisation.

1. Introduction, Proposition & Motivation

THE HABIT OF TERRESTRIAL URBANISATION

Currently, the Dutch news is dominated by titles ranging from 'Housing shortage rises sharply to 390,000, only less tense from 2028' ('Woning tekort stijgt fors naar 390.000, pas vanaf 2028 minder krapte') (NOS, 2023f) and 'Build, Build, Build, but due to 'Dutch rules' it's not that easy' ('Bouwen, Bouwen, Bouwen, maar door 'Nederlandse regeltjes' is dat zo makkelijk nog niet') (Hetixhe Raba & Rooy, 2023). Similarly, extreme weather is causing disruption, compounded by a rapidly growing population leading to increased housing shortages and resource-related challenges. We are in a time of crisis.

The crisis of particular concern is the continual terrestrial urbanisation, which will not likely stop anytime soon (United Nations, 2019a). Subsequently, there is a dire need to find sustainable housing solutions to accommodate the growing population in an environment of scarcity. The scarcity of housing in the Netherlands is in the scope of over 390.000 homes (Koninkrijksrelaties, 2023a; NOS, 2023f), which will over the years increase to 981.000 homes (Koninkrijksrelaties, 2023a; NOS, 2023f).

This thesis studies the Fringe, the location where the urbanised Randstad meets the rural 'Groene Hart', as one of those areas dealing with the need to reinvent the relationship between the urban and non-urban to combat the housing pressure while offering a place for nature and agricultural production (Koninkrijksrelaties, 2023d; Kooij, 2006; Rijksoverheid, 2023). It intends to put forward an alternative ecocentric model for housing development, which is in synergy, with the natural processes and temporalities, by taking advantage of the location locality.

The 'Groene Hart' is a landscape of cultural and economic significance, rooted in its former peat mining and current food production, which shaped the homogeneous dairy production landscape to the depletion of today's while upholding a habitat for nature (Bureau Peter de Ruyter landschapsarchitectuur et al., 2022; Kooij, 2006). Equally, the 'Groene Hart' is perceived as a picturesque natural landscape, perfect for habitation (Bureau Peter de Ruyter landschapsarchitectuur et al., 2022; Kooij, 2006; Rijksoverheid, 2023).

However, in its current form, it is no longer sustainable, as external pressure is rising, demanding a change in how we use this landscape. Policies such as the 'Woondeals' (Klok, 2023; Koninkrijksrelaties, 2023c, 2023d; Rijksoverheid, 2023), have only raised the social unrest and terrestrial urbanisation further. With municipalities, like the Zuidplas, opting to continue suburbanisation within the Fringes (Gemeente Zuidplas & KuiperCompagnons, 2021).

Consequently, the current era demands a transformation in the way housing is fulfilled on the Fringes.



A GENERIC PLACE IDENTITY

As a child growing up in a suburban area, I witnessed the continued generic terrestrial urbanisation first-hand, as I cycled to school. Initially, I traversed a transitional zone, of pasture meadows with occasional housing. However, over the years, I observed the continued process of urbanisation. To define an area of generic houses, with just one pasture plot separating the village from the city.

The notion of landscape with hard transition and generic design was a pervasive theme throughout these years. This led me to question why these patterns, developments, and dynamic relationships seemed so similar. This ultimately led me to pursue a Bachelor's degree in Landscape Architecture and a Master's in Urbanism. They have taught me that society and the landscape are ever-changing entities, continuously asking for redefinitions of their interplay, following the zeitgeist.

It introduced me to the theory of place identity, which posits that individual behaviour and experiences are connected to the physical environment by its unique characteristics that define a location (Proshansky, 1974). Accordingly, these terrestrial developments, characterised by their profit-centric prefabricated architecture created footloose developments focused on the developer's returns rather than the location's chrematistics.

Consequently, action must be taken to regenerate the place's identity, halting the destruction of each place's intrinsic integrity, in social, ecological, and economic value, which is still present below the surface. This is not only a task for the sake of perpetuating the housing stock and associated dwellers, but also for the ecological value sustaining life's ecosystems, through a landscape in synergy.

Correspondingly, the regeneration of these landscapes is attempted by the implementation of the ecocentric paradigm as an interconnected dependent organism for multiscalar landscape design. Allowing for the continuous evolution of these Fringes, through synergetic landscapes.



Figure 5, Impression of generic housing in Zuyderkroon, Zevenhuizen.



Figure 6, Impression of generic housing in Waterrijk, Weespersluis.

PROBLEM STATEMENT & RESEARCH QUESTION

Accordingly, the thesis addresses the predominant marketoriented, liberal economic focus of spatial development policies, concerning living environment issues and housing shortages in the Netherlands, causing imbalances within society and nature, reminiscent of the past VINEX.

Through the methodology of cycles of research for design and research by design, the thesis attempts to question the mechanisms enabling Fringe terrestrial urbanisation to explore ways to synergise the conflicting systems within the peri-urban landscape of the Fringe. Subsequently, the thesis upholds the following research and sub-research questions, Chapter 5.2 gives a prolonged overview of the research questions and structure.

In light of the growing (urban) population and its subsequent scarcity of available housing in a time of environmental (ecological) crisis:

How can we create a synergy between social, economic, and environmental interests in depleted landscapes like the Fringe of the 'Groene Hart' through the implementation of the ecocentric paradigm in terrestrial development to allow for an alleviation of the housing scarcity?

The sub-questions bolster the main research question and are categorized according to their contribution towards the research.

SQ1: What are the current and ongoing challenges in the Netherlands that are affecting the housing crisis in the Fringe of the 'Groene Hart'?

SQ2: How did the 'Groene Hart' and its depleted landscape in the Fringe arise, and what factors currently contribute to its depleted state?

SQ3: What are the mechanisms driving the persistent housing pressure on the Fringe of the 'Groene Hart', and how do these factors interact with residual identity governing terrestrial developments, alongside the continuous influence of the altered natural state of the depleted landscape on terrestrial development in the area?

SQ4: What can currently, based upon Fringe literature, be defined as the elements and principles of the Fringe of the 'Groene Hart'?

SQ5: How can the ecocentric paradigm direct a synergy between social, economic, and environmental interests and what are the methods elements, and conditions for using the ecocentric paradigm in terrestrial development and design?

SQ6: What potential trade-offs or conflicts might arise between social, economic, and environmental interests when implementing an ecocentric paradigm in terrestrial development, and how can these potentially be resolved or mitigated?

Ultimately, resulting in facilitating dialogue by developing an alternative scenario that envisages a landscape in which housing is an integral part, with a Fringe of synergetic developments. Advocating housing developments that are in synergy with social, economic, and environmental interests within their surroundings.



Figure 7, The problematisation of the Fringe.

2. The Anthropogenic Challenges

The second chapter provides the problem field, the context in which the thesis operates and answers the first sub-research question:

What are the current and ongoing challenges in the Netherlands that are affecting the housing crisis in the Fringe of the 'Groene Hart'?

THE TIME OF THE ANTHROPOCENE

The contemporary global landscape is marked by a multitude of crises, including climatic disruptions, geopolitical shifts, and rapid population growth resulting in housing shortages, resource constraints, and societal fragmentation fuelled by polarized opinions. This era of crises, initiated by human-induced alterations, marks the Anthropocene, characterized by irreversible impacts on Earth's ecosystems and landscapes. Scholars such as Haraway (1988, 2015), Kóvskaya (2021), and Latour (2020) have highlighted the profound effects of human activities on the landscape, ecosystems, and their diverse inhabitants, leading to landscapes dominated by production and extraction, coloured by crises affecting both human and non-human entities (Curry, 2011; Daly, 2014; Rolston III, 2020; Vieira & Sampaio, 2022; Washington & Maloney, 2020; Washington et al., 2017; Yigitcanlar & Dizdaroglu, 2015). This associated concept of terrestrial urbanisation represents the continual process of territorial transformation under human supervision.

> Figure 8, The time of the Anthropocene ((Adams, 2020; Aljazeera, 2022; Bockxmeer, 2022; Buschschlüter, 2023; Ekker, 2023; Haddad, 2023; Hetixhe Raba & Rooy, 2023; Klok, 2023; Larsen, 2023; NOS, 2023a, 2023b, 2023c, 2023d, 2023e, 2023f; Seligman, 2022; Strzyzynska, 2022; Voogt, 2022; Waarlo, 2023) edited by author).

Hurricane Otis: Dozens killed in Mexico's Guerrero state The big picture: Tom Hegen's alluring abstract salt landscape Can the world feed 8 people sustainably? Food production is a major factor in climate crisis and still millions of pe ore than enough food is produ people currently alive on the hungry. Here are some potential sc by Weronika Strzyżyńska people currently alive on the ripple effects of the Covid-19 pandemic and contributed to one of the worst food crises i insecurity affecting 200 million more people rising costs of food, fuel and fertiliser. But there are bigger problems on the horizo passes 8 billion and is predicted to reach 10 De woonci isis is cientists face the challer tekort aan betaalbare huizen

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World Population What will the WC Bouwen bouwen bouwen, maar door

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De Jonge: na 2030 nog eens miljoen woningen

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Bouwen in een badkuip

NOS Nieuws • Woensdag 12 juli, 07:35 • Aangepast woensdag 12 juli, 08:17 Woningtekort stijgt fors naar 390.000, pas

re KNMI-scenario's: grote g

Hitte in Europa weet niet van wijken: bijna 30 graden in Parijs, ook in Nederland erg warm

deVolkskrant

Na een zomer vol hitterecords is het nog altijd niet gedaan met de uitzonderlijke warmte in Europa. Met temperaturen van ruim boven de 30 graden kan het record voor oktober vandadag sneuvelen in Frankrijk, in Spanje gebeurde dat al. Ook in Nederland is het warm voor de tijd van het jaar.



reen energy's tailwinds blow the

look like in 2050?

The scarcity of water is emerging global economic threat. With Chi and India looking the most at risk

Vorld population hits eight billion

end en weinig effectief

deVolkskrant

Huidige problemen op de woningmarkt vragen om actievere rol van overheid



Bewoners en Bouw

De Jonge:

nodig

2.1 The Future Dutch Climate

Recent years have witnessed an accelerated manifestation of climate change, (IPCC, 2023). Projections from the IPCC (2023) and KNMI (2023) indicate that a 1.5°C temperature rise is imminent, and may be reached by 2033 (Melchert Reudink et al., 2023). Nevertheless, the emission reduction commitments currently in place, are insufficient to prevent exceeding this threshold (IPCC, 2023; Melchert Reudink et al., 2023). The Dutch Planbureau voor de Leefomgeving (PBL) has highlighted the current impact of climate change on the Netherlands to already be an increase in the frequency of extreme weather (Melchert Reudink et al., 2023).

The KNMI's 2023 climate scenarios (2023) present two probable trajectories: a low-emission scenario and a high-emission scenario, each with wet or dry sub-scenarios. The scenarios forecast average global warming ranging from 1.7 to 4.9 °C by 2100, accompanied by a mix of wetted winters and drier summers (KNMI, 2023). Consequently, the anticipated climate entails accelerated sea level rise, increased sunshine and droughts, and more frequent extreme precipitation events (KNMI, 2023).

The National Delta Program 2024 (2023) advocates a shift in climate adaptation strategies towards a water and soil-centric design approach, that simultaneously prioritises societal inclusion to enhance social resilience in future projects (Ministerie van Infrastructuur en Waterstaat et al., 2023).

Considering the current limitations in the 'Groene Hart', it is imperative to raise the water levels in peatland areas to safeguard the future. An interdisciplinary approach is essential, as mere compromises are insufficient; strategic decisions must be made (Ministerie van Infrastructuur en Waterstaat et al., 2023).

Consequently, the thesis integrates climate resilience into its design, aligning with projected climatic trends, that provide tangible data and offer a scenario for the thesis development.

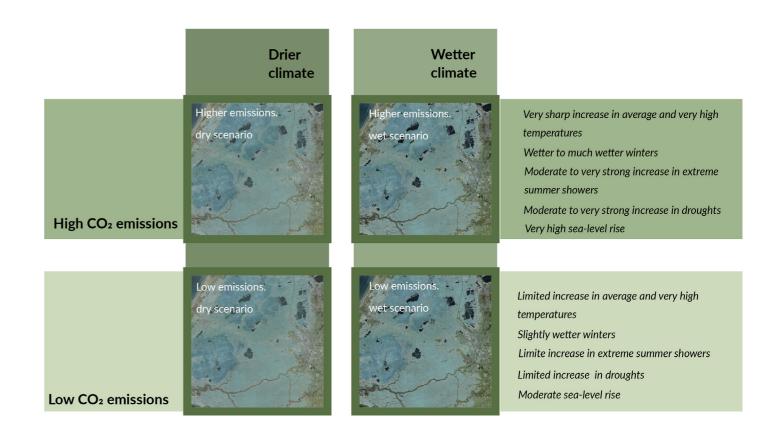


Figure 9, The climatic impacts ((Condos, 2023; KNMI, 2023; Queisen, 2020; Rutting, 2022; Verheijden, 2023) edited by author).

2.2 A Suburban Future

The crisis of particular concern according to the United Nations is the ongoing population growth that leads to terrestrial urbanisation (United Nations, 2019b; United Nations & United Nations Department of Economic and Social Affairs, 2021). The Netherlands is projected to have over 20.6 million inhabitants by 2070, representing an increase of approximately 3 million since 2022 (Centraal Bureau voor de Statistiek & Planbureau voor de Leefomgeving, 2022; Stoeldraijer et al., 2023). This growth necessitates the construction of 830,000 additional houses by 2035, thereby underscoring the pressing need (Centraal Bureau voor de Statistiek & Planbureau voor de Leefomgeving, 2022; Planbureau voor de Leefomgeving, 2022; Stoeldraijer et al., 2022).

The Dutch Central Bureau for Statistics (2023a; Stoeldraijer et al., 2023) predicts substantial growth in mid-sized cities and their adjacent municipalities, particularly in the country's western region (Pieterse et al., 2015). Especially the municipality of Ouder-Amstel (40,9%) and Zuidplas (40,6%) in the Fringe of the 'Groene Hart' (Centraal Bureau voor de Statistiek, 2023a).

European population estimate

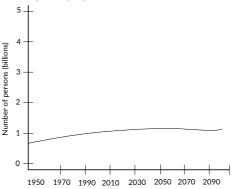


Figure 10, European population estimate ((United Nations & United Nations Department of Economic and Social Affairs, 2021), edited by author).



Figure 11, Current population density ((Centraal Bureau voor de Statistiek, 2023a) edited by author).

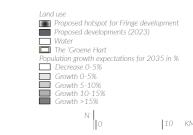


The thesis posits that, based on projected average household sizes, approximately 2.344.600 houses will need to be built by 2070, with 1.406.700 of these expected to be realised within the Randstad region. Accordingly, the scenario anticipates the continuation of Fringe suburbanisation, with projects extending beyond 2050.

It is anticipated that urban populations will continue to expand. Concurrently, young families are projected to relocate from cities to neighbouring municipalities or urban Fringes (Centraal Bureau voor de Statistiek & Planbureau voor de Leefomgeving, 2022; Planbureau voor de Leefomgeving, 2022; Stoeldraijer et al., 2022). The availability of schooling and remote work options near urban Fringes reinforces this trend (BPD, 2021b; Planbureau voor de Leefomgeving, 2022).



Figure 12, Population growth expectations for 2035 ((Planbureau voor de Leefomgeving & Centraal Bureau voor de Statistiek, 2020; Stoeldraijer et al., 2023) edited by author).



2.3 A Pseudo-countryside Development

A suburb is defined as a residential area located on the outskirts of a city, characterised by a variety of housing types and a lower population density compared to urban areas (Reijndorp et al., 2012). Providing residents with a combination of space and amenities. In contrast, the concept of pseudo-countryside development coined by Heins (2004) emerged, influenced by Sieverts' Zwischenstadt theory (2003), denoting an 'in-between city', the concept proposes a transitional agglomeration that is neither urban nor rural but allures idyllic countryside's while possessing characteristics of both (Heins, 2004; Sieverts, 2003). Emphasising a picturesque, yet false, countryside inflates housing demand, viewing them as desirable areas for dwelling, with one foot in the city and one in the rural (Heins, 2004).

Forecasts from the Planbureau voor de Leefomgeving and Centraal Bureau voor de Statistiek (2022; 2023) indicate that there will be sustained interest in these types of developments in the coming decades. Projections suggest that one-third to two-fifths of developments will be suburban (Centraal Bureau voor de Statistiek, 2019). With a focus being placed on diversifying housing stock beyond the single-family home while ensuring the long-term sustainability of developments by utilising nature-based construction materials (Centraal Bureau voor de Statistiek, 2019, 2023e; Jansen, 2020; Lennartz & Vries, 2024; Michielsen et al., 2019; Vink et al., 2024).

BPD, the largest developer in the Netherlands, highlights a shift in development practices toward expanding suburban housing stocks through a landscape-centric method (BPD, 2021a). Emphasising the integration of existing landscape structures and cultural characteristics (BPD, 2021b). By employing this approach, developers can create affordable housing interconnected with existing infrastructure and facilities, while mitigating the loss of natural or landscape value, thus fostering a sustainable and future-proof development (BPD, 2023).

According to Jansen (2020) and the Province of Zuid-Holland (2020), the solution lies in moving from the current low-density housing model of 35 homes per hectare governed by parking norms and land prices towards increased density with efficient space utilization. Leading to diverse residential environments that meet the anticipated demand for community-oriented village dwellings and calm urban developments (Jansen, 2020; Zuid-Holland, 2020).

A report by the Dutch Planbureau voor de Leefomgeving (2012) indicates that the focus on urban renewal in architecture and planning inadvertently neglects the suitability of such for all. Resulting in suburbanisation being primarily driven by developers, with the consequence that the houses are generic and low-quality (Lennartz & Vries, 2024; Reijndorp et al., 2012). Subsequently, it fails to create diverse residential environments on the outskirts of cities (Voogd & Cuperus, 2021). With research only recently, revisiting suburbia due to the NOVEX policies emphasis (Lennartz & Vries, 2024).

This urbanist's emphasis has further led to the thesis' knowledge gap. Limited recent research has been conducted on urbanisation in the Netherlands, with only one study focusing on terrestrial Fringe urbanisation patterns (Nabielek et al., 2013),

chapter 6.1 builds on this study. This leaves research on Fringe housing along the 'Groene Hart' unmapped, a notable gap considering ongoing urbanization trends in the Netherlands.

Consequently, the thesis proposes that attention be directed towards local conditions, to create high-quality pseudo-countryside living environments that strike a balance between urbanity and rurality, tailored to society, locality, and the lifespan (Centraal Bureau voor de Statistiek, 2023e; Michielsen et al., 2019; Voogd & Cuperus, 2021).



Figure 13, A suburb?



Figure 14, A pseudo-countryside?

3. The Identity of the 'Groene Hart' Concept

The third chapter is the first part of the problem analysis phase and gives the contemporary and historical context of the 'Groene Hart's' Fringe and answers the second sub-research question

How did the 'Groene Hart' and its depleted landscape in the Fringe arise, and what factors currently contribute to its depleted state?

In doing so it answers the sub-sub-question:

What is the history of the 'Groene Hart' paradigm and its Fringes?

and

Which structures and mechanisms outline the 'Groene Hart'?

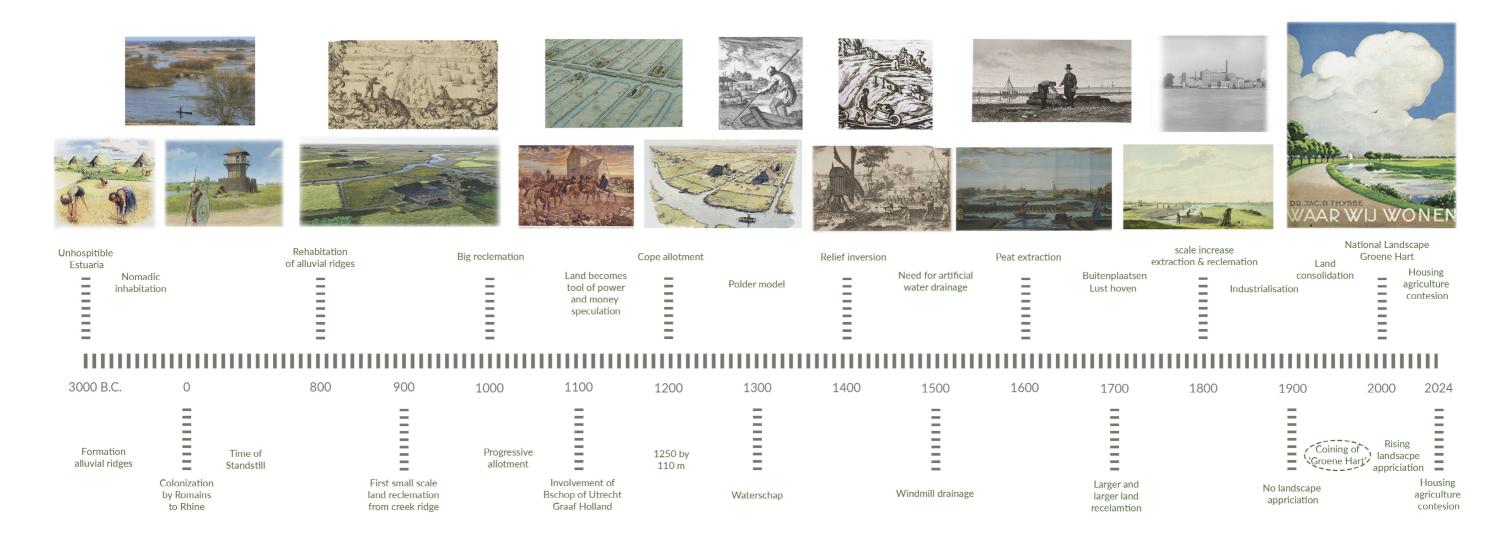
With a depleted landscape the thesis depicts a landscape that has suffered from soil degradation, contamination, overgrazing, pollution, urbanization, and resource extraction, leading to reduced natural and ecological functions and making it less suitable for wildlife, humans, agriculture, and environmental purposes.



Figure 15, The Fringe of the 'Groene Hart'?

3.1 The Landscape Historic Evolution of the 'Groene Hart'

Nested within the heart of the Netherlands, the 'Groene Hart' unfolds as a canvas of intertwining culture and landscape. From the earliest colonizers, it has undergone alteration, comprising a story of adaptation and coexistence between man, water, and nature (Bureau Peter de Ruyter landschapsarchitectuur et al., 2022; Kooij, 2006). This sub-chapter explores the history that has shaped the region's landscape.



The polder landscape is criss-crossed by rivers that divide the reclamations into allotments. The elongated narrow pastures form together open spaces bordered by watercourses, ribbon villages and often overgrown dikes and quays. As a whole, the area comes across as a grand open water space, dominated by high water levels and extensive lake areas.'

Provincie Utrecht & OKRA landschapsarchitecten (2011)

Figure 16, Landscape historical timeline of the 'Groene Hart' ((Aertsen, 1660; Atrentsz, 1625; Balthasar, 1615; Brussel, 1806; Canon van Benthuizen & Koudekerk, 2022; Crabeth, 1520; "De grote ontginning," 2017; "De Molen van Sandelingen-Ambacht, gesloopt ca. 1882.," 2015; Diederik, 2017; Gravure; "Kaart uit 1575; "Kaart van Nederland in de Middeleeuwen," 1749; Kliek, 2008; koningspad.n, 2021; Kooij, 2006; Lankhout & Hofdijk, 1853; luyken & Luyken, 1694; Noordhoff Uitgevers, 2017; Philips, 1741; puurarchitectuur.nl, 2011; "Rijstpellerij Howard & Co.," 2021; romeinen.nl, 2023; Tideman, 1468; TNO, 2007; "Topografische kaart uit 1850," 1850; "Veenontgining en dijkbouw," 2017; Visscher, 1608; Ysele, 1498) edited by author).

PREHISTORY TO ROMAINS

Before human intervention, the 'Groene Hart' was characterized by an extensive estuary encompassing peat and clay (Provincie Utrecht & OKRA landschapsarchitecten, 2011). Due to sediment deposition, alluvial ridges emerged, on which around 5300 BC., the Swifterbant culture started to permanently locate themselves due to their favourable ecological conditions, favourable to fishing, hunting, and small-scale agriculture (Lörzing & Tisma, 2023; Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021; Steenhuis et al., 2023).

In 47 A.D., the Romans conquered the region, establishing the river Rhine as their northern border. Resulting in the construction of Roman fortifications along the riverbanks, stimulating local agriculture and trade. Following the Roman withdrawal in the fourth century, the region experienced a period of stagnation until the Franks reconquered it in the eighth century, revitalizing settlements on the alluvial ridges (Steenhuis et al., 2023). Markedly, this period saw the commencing of the gradual reclamation of peat bogs (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021).

GREAT RECLAMATION

It was not until the tenth century that significant reclamation commenced, by the process termed 'stretched allotment' (optrekkende verkaveling) (Steenhuis et al., 2021; Steenhuis et al., 2023). It involved reclaiming land from the levees along the rivers and gradually dispersing into the bogs. With perpendicular ditches being dug for drainage, while farms and settlements emerged along the levees (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021; Steenhuis et al., 2023).

COPE-ALLOTMENT

In the eleventh century, the Count of Holland and the Bishop of Utrecht intervened by issuing reclamations to third parties, initiating a new phase of systematic reclamation coined copeallotments or cope-reclamations (Bureau Peter de Ruyter landschapsarchitectuur et al., 2022; Lörzing & Tisma, 2023; Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021; Steenhuis et al., 2023). These reclamations spiked in the twelfth and thirteenth centuries and comprised multiple cycles of allotment reclamation that formed a polder, featuring regular equidistant allotment patterns measuring approximately 110 by 1250 meters with farms at the head with natural drainage (Lörzing & Tisma, 2023; Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021).

RELIEF INVERSION

By the 16th century, reclaimed peatlands had reached maximum porosity, hindering natural water discharge due to subsidence and relief inversion resulting from the reclamation (Steenhuis et al., 2021). This caused the peatlands to settle below sea level, necessitating the need for artificial drainage by windmills and dykes, later replaced by steam and electric pumping stations in the 19th century (Lörzing & Tisma, 2023).

To effectively manage this, inhabitants organized themselves in communal water organisations in the 13th century, which later evolved into water boards (Waterschappen) (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021).

PEAT EXTRACTION

Following the thriving Dutch Golden Age, urban demand for fuel led to a reliance on peat extraction from bogs (Steenhuis et al., 2021). Creating dependencies that fuelled large-scale extraction efforts, transforming ever-more agricultural peat bogs into open pit peat mines, reflecting an exploitative urban-rural relationship (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021). Creating commercial peat colonies that industrialised the reclamation, dredged wide strips of peat (trekgaten), dried it on narrow land strips (legakkers), and transported it to cities (Bureau Peter de Ruyter landschapsarchitectuur et al., 2022; Steenhuis et al., 2021; Steenhuis et al., 2023).

Over time, the peat colonies disappeared, leaving expanses of water (Steenhuis et al., 2021). However, after the successful reclamation of the Beemster, policies emerged to drain these lakes after extraction, forming pastures known as the Droogmakerij and Waard (Lörzing & Tisma, 2023). This alteration process continued into the 19th century (Steenhuis et al., 2021).

CHANGING RELATIONSHIPS AND SPATIAL MEMORANDUMS

Simultaneously, in the seventeenth century, wealthy citizens began developing country estates on levees, shifting the perception of rural areas to idyllic retreats (Steenhuis et al., 2023). This bourgeoisie paved the way for subsequent generations seeking rural living, particularly in the 20th century, driven by increased mobility and leisure time (Kooij, 2006).

Correspondingly, toward the end of the 19th century, urban expansion encroached along the Fringe and took a new form and pace, with the establishment of large residential areas and industries (Lörzing & Tisma, 2023; Steenhuis et al., 2021). Subsequently, post-war governmental intervention started to play a role in nationwide spatial development through strategic memorandums outlining future development plans (Bruinsma & Koomen, 2018). During this time, the 'Groene Hart' was coined, and peat pastures underwent rationalization and scale enlargement to maintain economic viability, leading to uniform Ryegrass industrialized (Bureau Peter de Ruyter landschapsarchitectuur et al., 2022; Provincie Utrecht & OKRA landschapsarchitecten, 2011).



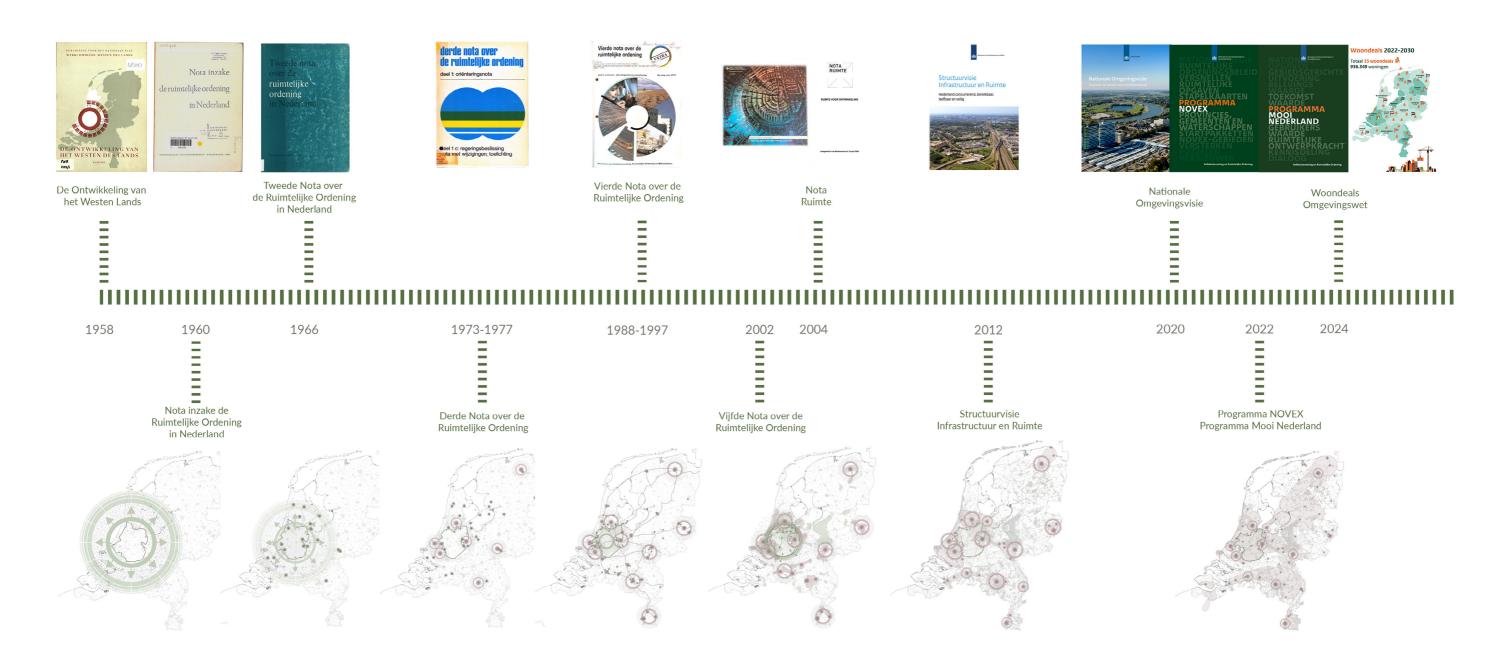
Figure 17, A peat colony in Holland (Schweickhardt, 1783).



Figure 18, A peat farms in Breukelveen in the early 19th century (Brussel, 1806).



3.2 Planning in the Fringe of the 'Groene Hart', A History of Spatial Memorandums



The zeitgeist in the manufacturability of both society and physical space emerged following the rapid industrialization of the 19th and early 20th centuries (Bruinsma & Koomen, 2018; Lörzing, 2021; Wouden et al., 2015; Zonneveld, 2017). In combination with the introduction of the Housing Act in 1901, national spatial planning policies gained momentum, particularly during the postwar reconstruction era when centralized guidance was deemed essential for economic growth (Bruinsma & Koomen, 2018). There was a prevailing belief that well-executed memorandums would lead to prosperity, providing reassurances to the government in the aftermath of World War II.

Henceforth, the government took a leading role in spatial development, issuing a series of memoranda to address countrywide challenges (Bruinsma & Koomen, 2018). Starting with the emphasis on the west of the Netherlands as the economic engine of the country.

Figure 20, Spatial Memorandum timeline ((Koninkrijksrelaties, 2020, 2023b; Ministerie van Binnenlandse Zaken en Koninkrijksrelaties & Volkshuisvesting en Ruimtelijke Ordening, 2022; Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2022; Ministerie van Infrastructuur en Milieu, 2012; Ministerie van Volkshuisvesting en Bouwnijverheid, 1966; Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 1974, 1976, 1977; Ministerie van Volkshuisvesting, 1988; Ministerie van Volkshuisvesting & Ministerie van Algemene, 1990; Netherlands. Ministerie van Volkshuisvesting en Bouwnijverheid, 1960; Sociaal-Economische Raad, 2004; Staten-Generaal, 2000) edited by author).



Figure 21, Diagram of De Ontwikkeling van het Westen des Lands (1958) and of Nota inzake de Ruimtelijke Ordening in Nederland (1960).

DE ONTWIKKELING VAN HET WESTEN DES LANDS (1958)

The First Memorandum, Nota inzake de Ruimtelijke Ordening in Nederland (Netherlands. Ministerie van Volkshuisvesting en Bouwnijverheid, 1960), was preceded by the explanatory nota 'The development of the West of the Country' (Riiksdienst voor het Nationale Plan, 1958) that focused on the development of the provinces of Noord-Holland, Zuid-Holland, and Utrecht. It dealt with the spatial contention regarding the mosaic of land use and conflicting national and international infrastructure (Bruinsma & Koomen, 2018; Rijksdienst voor het Nationale Plan, 1958). The core of the problem is competition in the space (Bruinsma & Koomen, 2018).

Hence, the memorandum sets out three lines of policy:

- 1. Preservation of the historically developed centres within the Randstad as permanent and spatially separated focal
- Preservation of an agricultural central area, the 'Groene Hart' as a large central space.
- 3. Expansion of the Randstad in an outward direction. Housing development is focused on new suburban developments on the Fringe of Randstad by enlarging existing medium-sized cities or developing new cities (Bruinsma & Koomen, 2018; Lörzing, 2021).

NOTA INZAKE DE RUIMTELIJKE ORDENING IN NEDERLAND (1960)

The Memorandum, 'Nota inzake de Ruimtelijke Ordening in Nederland' (Netherlands. Ministerie van Volkshuisvesting en Bouwnijverheid, 1960) focused on infrastructural development to strengthen competitiveness while stimulating even population distribution across the country (Bruinsma & Koomen, 2018). It aimed to alleviate congestion and foster growth in the western part of the country by establishing Randstad Holland, a polycentric metropolis, linking villages and regional centres through infrastructure (Bruinsma & Koomen, 2018; Lörzing, 2021). Simultaneously, it sought to curb urban sprawl by realising large uniform housing, using prefabrication techniques and and ensure amenities were locally available (Bruinsma & Koomen, 2018; Lörzing, 2021).

Moreover, the memorandum introduced the 'Groene Hart' concept (Bruinsma & Koomen, 2018; Lörzing, 2021), defining an agricultural area for food production for the Randstad through land consolidation. Meant to retain urban sprawl and provide recreational spaces at its Fringes, preserving Randstad's modest size (Bruinsma & Koomen, 2018). Subsequently, the Memorandum drafted the Spatial Planning Act (WRO) which was enacted in 1965 (Bruinsma & Koomen, 2018; Lörzing, 2021).



Figure 22, Diagram of Tweede Nota over de Ruimtelijke Ordening in Nederland (1966).

TWEEDE NOTA OVER DE RUIMTELIJKE ORDENING IN NEDERLAND (1966)

In 1966 the Second Memorandum, 'Tweede Nota over de Ruimtelijke Ordening in Nederland', was published (Ministerie van Volkshuisvesting en Bouwnijverheid, 1966) which responded to rapid economic and population growth. Necessitating stricter sprawl policies, since smaller towns in the Fringe were realising housing faster than cities, fuelling suburbanization (Bruinsma & Koomen, 2018; Lörzing, 2021). Hence, the memorandum introduced the 'Groene Hart' as a buffer (Bruinsma & Koomen, 2018) by advocating for concentrated urban growth, through the introduction of functional urban regions, urban environmental differentiation, and bundled decentralization (Bruinsma & Koomen, 2018; Lörzing, 2021; Ministerie van Volkshuisvesting en Bouwnijverheid, 1966).

Bundled decentralization meant concentrating suburbanization in selected cores surrounding Randstad to meet the demand for housing in rural areas (Bruinsma & Koomen, 2018; Lörzing, 2021). Functional urban regions were defined as areas where living, working, and recreational activities intersect, comprising a large city and its growth cores (Bruinsma & Koomen, 2018).

However, in the late 1960s and early 1970s, planners recognized the unpredictability of society. Suburbanisation persists, causing complex Fringes with increasing car mobility, and brain drain, facilitated by supportive rural municipalities (Bruinsma & Koomen, 2018).



Figure 23, Diagram of Derde Nota over de Ruimtelijke Ordening (1973-1977).

Urban area

Water

Buffer zone

External pressui

The 'Groene Ha

Groeikem

Stadskern

DERDE NOTA OVER DE RUIMTELIJKE ORDENING (1973-1977)

The Third Memorandum on Spatial Planning was published in three parts, the Orientation Memorandum (Orientatie nota) in 1973 (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 1974), the Urbanisation Memorandum (Verstedelijkingsnota) in 1976 (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 1976) and the Rural Areas Memorandum (Nota landelijk gebied) in 1977 (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 1977) and outlined the implementation of the second memorandum.

The Orientation Memorandum (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 1974) shapes the legal framework, advocating for an equal distribution of population, employment, and services (Bruinsma & Koomen, 2018).

The Urbanisation Memorandum (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 1976) outlined the growth centres, emphasizing (Bruinsma & Koomen, 2018; Lörzing, 2021):

- Preventing congestion and unbalanced urban development.
- 2. Preserving openness, ecological, and landscape values, especially in Fringes.
- 3. Addressing regional socio-economic disparities.
- 4. Limiting the growth of mobility.

Since 1960, the following growth centres have been realised:

- Amsterdam: Haarlemmermeer, Hoorn, Purmerend, Alkmaar, Almere, Lelystad and Huizen;
- Rotterdam: Spijkenisse, Hellevoetsluis and Capelle aan de IJssel;
- The Hague: Zoetermeer;
- Utrecht: Houten and Nieuwegein.

The growth centres' development led to impoverished cities, causing stagnation in housing construction, and resulting in a mismatch in in the housing market. Subsequently, the compact city concept was introduced to revitalize impoverished spaces' and inner cities through restructuring (Bruinsma & Koomen, 2018).

The Rural Areas Memorandum addressed rural population livelihoods and the impact of ecological quality (Ministerie van Volkshuisvesting en Ruimtelijke Ordening, 1977). It acknowledged the interconnectedness of urban and rural, leading to spatial conflicts (Bruinsma & Koomen, 2018). It introduced to zone rural areas as separate while recognizing landscape harm from land consolidation (Bruinsma & Koomen, 2018).



Figure 24, Diagram of Vierde Nota over de Ruimtelijke Ordening (1988-1997).

Urban area
Water
Buffer zone
The 'Groene Hart
Groeikern

VIERDE NOTA OVER DE RUIMTELIJKE ORDENING (1988-1997)

The Fourth Spatial Planning Memorandum (Ministerie van Volkshuisvesting, 1988) comprised two additional parts, the Fourth Extra Memorandum (Ministerie van Volkshuisvesting & Ministerie van Algemene, 1990), known as the VINEX, and the Fourth Updated Memorandum (1997), known as the VINAC. The memorandum introduced the concepts, the VINEX provided policy frameworks, while the VINAC evaluated and updated the memorandum (Bruinsma & Koomen, 2018; Ministerie van Volkshuisvesting & Ministerie van Algemene, 1990).

The fourth memorandum marked a shift in the zeitgeist, prioritizing market liberalisation, and environment and living qualities. Realised by private sector responsibility through public-private partnerships (Bruinsma & Koomen, 2018). The memorandum focused on:

- Enhancing the Netherlands' global competitiveness, by introducing main ports to foster a favourable investment and business climate.
- Prioritizing qualitative living environments, emphasizing spatial diversity, short travel times, and a focus on intensive agriculture, along with preserving culturalhistorical and natural landscapes.

Housing construction was prioritized to address inadequate stock through the expansion of the functional urban regions with the introduction of VINEX districts. Aimed at locating housing within the Fringe, along with infrastructure, avoiding the 'Groene Hart' but remaining close to Randstad cities (Bruinsma & Koomen, 2018).

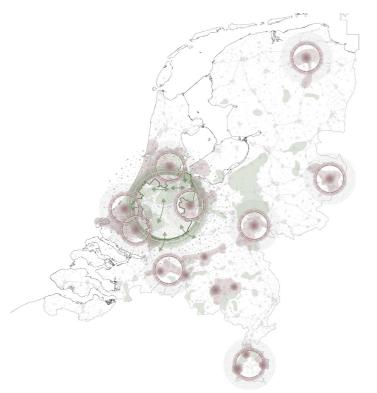


Figure 25, Diagram of Vijfde Nota over de Ruimtelijke Ordening (2002) and Nota Ruimte (2004).

Proposed ecological connection
 National Landscape 'Groene Ha
 Stadskern

VIJFDE NOTA OVER DE RUIMTELIJKE ORDENING (2002)

The Fifth Memorandum on Spatial Planning (Staten-Generaal, 2000) outlines the selective role of the government, emphasising centralization for essential tasks and decentralization for others. It addresses the spread of monofunctional areas, aiming to halt landscape degradation and enhance urban-rural distinction along the Fringes (Staten-Generaal, 2000). While not legally binding, it served as a framework (Bruinsma & Koomen, 2018). Objectives included urban densification, promoting mixed-use in rural areas, and facilitating space transformations to meet local demand.

Moreover, the memorandum introduced the policy of red and green contours for Fringe development (Staten-Generaal, 2000):

- Red contours encircle existing built-up, indicating that new construction must be realised within these red contours.
- Green contours encircle areas with high landscape value, cultural-historical or archaeological sites, signifying preservation, and protection. Developments within this zone are prohibited unless deemed social importance.
- Intermediate zones are areas between the red and green contours where the provinces oversee the preservation of the landscape and cultural-historical values. With a focus on the increase of spatial variation in the landscape.

Notably, the 'Groene Hart' encountered external pressure as the government designated development locations within the Fringe (Bruinsma & Koomen, 2018; Staten-Generaal, 2000).

NOTA RUIMTE (2004)

The Nota Ruimte (Sociaal-Economische Raad, 2004) represents a shift in spatial planning zeitgeist emphasizing market-driven development, with the government providing guidelines, leaving implementation to the market or local authorities, with a focus on infrastructure and organizing spatial developments within urban networks (Bruinsma & Koomen, 2018).

The 'Groene Hart' policy shifted from a 'no-unless' to a 'yesif' policy due to decentralization and pressure from private developers, enabling developments under specific conditions (Bruinsma & Koomen, 2018). The memorandum aims to foster spatial conditions for a vital countryside, designating the 'Groene Hart' as one of the twenty national landscapes (Sociaal-Economische Raad, 2004).



Figure 26, Diagram of Structuurvisie Infrastructuur en Ruimte (2012).

STRUCTUURVISIE INFRASTRUCTUUR EN RUIMTE (2012)

The Memorandum Structuurvisie Infrastructuur en Ruimte (Ministerie van Infrastructuur en Milieu, 2012) prioritizes further relaxation of restrictions. It advocates for compact cities surrounded by distinctive rural areas, with the central government transferring urbanization and landscape policy responsibilities to provinces and municipalities (Bruinsma & Koomen, 2018). This entails that provinces coordinate and realise housing developments, while the central government enhances the international position of the Netherlands and promotes national interests (Bruinsma & Koomen, 2018).

NOVI - NATIONALE OMGEVINGSVISIE (2020)

The Nationale Omgevingsvisie (Koninkrijksrelaties, 2020), complimented by the NOVEX and Beautiful Netherlands programme marks the return of a long-term vision and implementation strategy.

Together, these initiatives aim to refine the National Environmental Vision and the Environment and Planning Act (Omgevingswet) (Koninkrijksrelaties, 2020). It delineates four priorities:

- Providing room for climate adaptation and energy transition
- Fostering sustainable and circular economic growth.
- Cultivating healthy urban and regional environments.
- Ensuring resilient rural regions.

The central government maintains its role of setting spatial guidelines, with implementation delegated to lower levels or the market (Koninkrijksrelaties, 2020). The focal points include constructing a million new homes, accommodating energy and climate adaptation, and transitioning to circular agriculture (Koninkrijksrelaties, 2020). The approach is area-specific, considering the unique characteristics and qualities of each region (Koninkrijksrelaties, 2020).

NOVEX PROGRAMMA (2022)

The NOVEX programme outlines how the national government and local authorities, make spatial planning decisions, prioritizing spatial quality (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2022). The national government takes the lead, ensuring coherence and integration in policies and national programmes to accelerate implementation. The programme aims for provincial control and area-specific management within the assigned NOVEX areas, targeting priorities outlined in the Nationale Omgevingsvisie (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2022).

MOOI NEDERLAND PROGRAMMA (2022)

The Beautiful Netherlands programme (Mooi Nederland programma) connects the NOVEX to the National Environmental Vision through design proposals, that strike a balance between the use of space and qualitative living environments (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties & Volkshuisvesting en Ruimtelijke Ordening, 2022). It holds an experiential value and envisions a future that preserves beauty, functionality, resilience, and sustainability (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties & Volkshuisvesting en Ruimtelijke Ordening, 2022).

WOONDEALS (2023)

The Woondeals (Koninkrijksrelaties, 2023b) serve as the alleviation of the housing shortage within the NOVEX program. Concurrently, 35 deals incorporate agreements upon the number of homes to be developed, their location, type, and interest group (Koninkrijksrelaties, 2023c).



Figure 27, Diagram of current Nationale Omgevingsvisie (2020), Programma NOVEX, MOOI Nederland & Woondeals.



3.3 The disparities of lower governmental policy agendas and intentions

The ongoing discussions shaping the 2050 agenda for the 'Groene Hart' underline a range of sustainable housing policies at various governmental levels, reflecting diverse yet conflicting interests (Lysias Advies, 2023; Tisma & Meijer, 2018). Emphasizing sustainability, ecological resilience, climate adaptation, and housing sufficiency, aligning with objectives outlined in the NOVEX and Woondeals, giving attention towards constructing the million new homes while accommodating climate adaptation and circular agriculture (Koninkrijksrelaties, 2020). The national government acts as the mediator, ensuring consistency through clear agendas, while implementation rests on provincial authority, navigating areaspecific municipal agendas (Koninkrijksrelaties, 2023b).

These governmental structures follow the principles of network governance, sharing responsibilities in legislative and financial backing, with the government taking a facilitating role (Tisma & Meijer, 2018). Contradicting, this decentralized system has led to conflicting interests and overlapping responsibilities, favouring capital-powerful developers supported by rural municipalities (Bruinsma & Koomen, 2018).

The lack of formal administrative borders and fragmented responsibility within the 'Groene Hart' has created a region of internal competitiveness, and governmental depletion, requiring a simplified regulatory framework provided by the national government to guide spatial planning initiatives, coupled with the endowment of essential knowledge and citizen participation (Korthals Altes, 2018; Tisma & Meijer, 2018). Accordingly, it can be concluded that the depleted landscape arose due to human landscape alteration and governmental policy fragmentation.

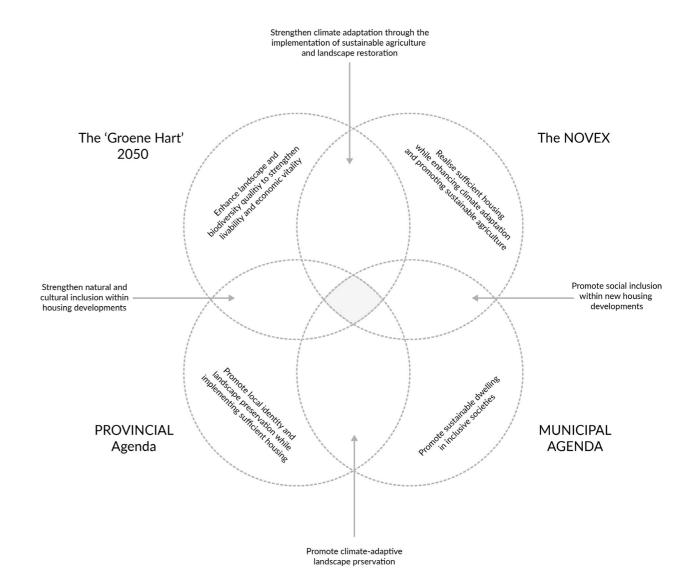


Figure 28, The negotiation of objective convergences in the spatial puzzle of governance.

Currently, provinces mediate between the national government and municipalities, by translating national policies into specific rules. Focused on preserving local identity and realizing sufficient housing through large-scale projects near existing infrastructure (Korthals Altes, 2018; Noord-Holland, 2023; Utrecht, 2023; Zuid-Holland, 2023).

Municipal interests prioritize improving their competitive and financial position, attracting new residents to sustain tax incomes and amenities through creating diverse dwelling environments and inclusive social communities through market partnerships (Gemeente Gouda, 2018, 2022; Gemeente Zuidplas, 2019; Maakdestad & Gemeente Zoeterwoude, 2022; Zonneveld & Nadin, 2021). Waterboards focus on maintaining water safety and restoring water habitats and fish migration while accommodating and advising development projects (Wiering & Arts, 2006).

Consequently, the negotiation of objective convergences asks for a different approach. Tisma and Meijer propose Integrated Landscape Management (2018) as a collaborative approach for negotiating converging objectives, emphasizing stakeholder collaboration and expertise within the landscape perspective to enhance quality and sustainability collectively (Tisma & Meijer, 2018).

Successively, by identifying common goals this strategy aims to address challenges encountered during spatial memorandums of the late 20th century, by fostering cross-agenda alignments and regional synergetic Fringe development. However, it also necessitates hierarchical or Integrated Landscape Management governance, to navigate network fragmentation and oversee implementation (Tisma & Meijer, 2018). Hence, revisiting the ancient Polder model of negotiation and consensus.



Figure 29, Municipalities in the 'Groene Hart' ((Centraal Bureau voor de Statistiek, 2023b) edited by author).



Figure 30, Waterboards in the 'Groene Hart' ((Waterschapshuis, 2023) edited by



Figure 31, Provinces in the 'Groene Hart' ((Centraal Bureau voor de Statistiek, 2023b) edited by author).

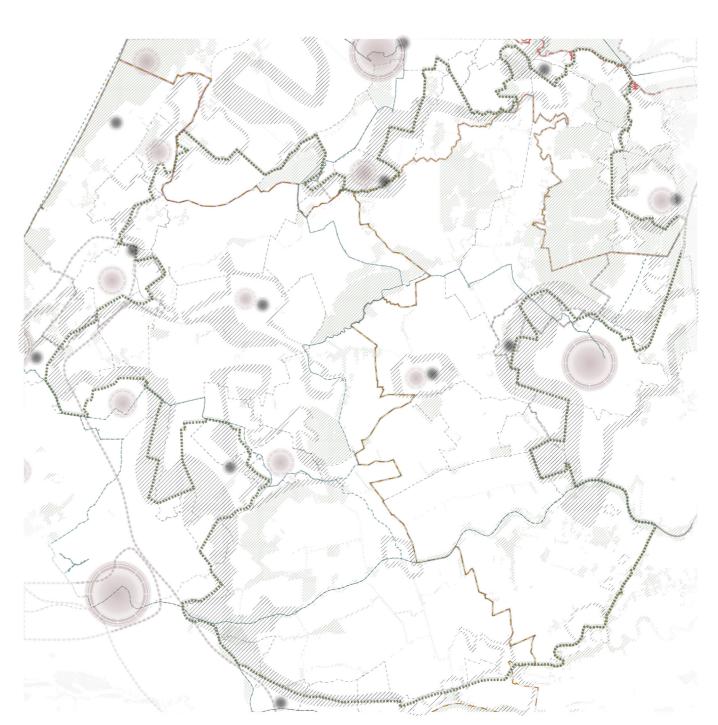


Figure 32, The spatial conflicts and fragmentation of administrative borders.



3.4 The Spatial Structures of the 'Groene Hart'

The narrative of the 'Groene Hart' and its Fringe is inseparable from the interconnected urban ring of Randstad Holland, serving as its spatial framework (Zonneveld & Nadin, 2021). Spanning the western part of the Netherlands, Randstad encompasses Amsterdam, Rotterdam, The Hague, and Utrecht, along with a cluster of smaller cities surrounding the 'Groene Hart'. Encompassing 7000 km², with 8.2 million inhabitants, Randstad constitutes one-third of Dutch urbanized areas (CBS, 2021b; Centraal Bureau voor de Statistiek, 2018) characterised by its blue-green river network and infrastructural connectivity. Despite its significance, Randstad lacks administrative unity and exhibits flexible boundaries over time, resembling a polycentric metropolitan area akin to a horseshoe or heart shape.

The spatial uniqueness is embodied within the mosaic of ruralurban land use, demarcating a stark contrast and borderscape between the monocultural pasture landscape of the 'Groene Hart' and the intricate patchwork of the Randstad. This contrast embodies an identity of contrast, a borderscape of hard transition.

The polycentric concept aims to spatially balance development and economic opportunities across the region, enhancing urban-rural areas (Zonneveld & Nadin, 2021). It embodies an interconnected urban cluster with competitive advantages in international competition (Oel, 2021), enhanced by its embedded infrastructure (Zonneveld & Nadin, 2021). Achieving polycentricity requires developing physical and organizational infrastructural networks to facilitate flows (Meijers et al., 2016), necessitating governmental support (Bruinsma & Koomen, 2018).

While Randstad's spatial structure revolves around a polycentric urban layout, with specialized functions and a car-centric infrastructure network (Stead & Meijers, 2013), the focus on other city regions like Brabantine City, Arnhem-Nijmegen, and Groningen-Assen-Leeuwarden, has expanded polycentric flows beyond Randstad, depleting the in-between landscapes, including the Fringe (Zonneveld & Nadin, 2021). Leading to enlarged commuting distances and a footloose population, detached from its dwelling, and working location.



Figure 33, The location of the 'Groene Hart' in the Netherlands.



Figure 34, The polycentricity of the surrounding Randstad, giving the 'Groene Hart' its spatial structures ((Centraal Bureau voor de Statistiek, 2023c; Meijers et al., 2016; Oel, 2021; Stead & Meijers; Werff et al., 2023; Zonneveld & Nadin, 2021) edited by author).

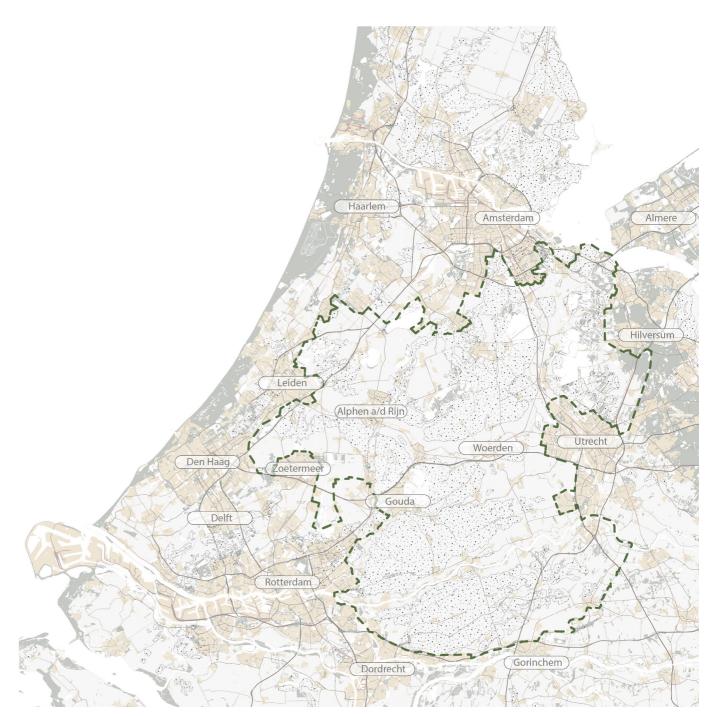
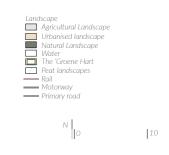


Figure 35, The spatial structures in the 'Groene Hart'.



The spatial structures within the Panarchy framework acknowledge their interconnectedness across spatial, social, ecological, and economic systems forming a dynamic nested hierarchy. Comprehending the complexity of the polycentric dependency relations within the Fringe, various maps illustrate the layers of the Panarchy, spatial structures and associated flows, present in the region, operationalizing its complexity.

A notable spatial structure is the one of nationally protected sites, underscoring the scarcity of natural corridors within the 'Groene Hart'. These protected areas include the central Rhine Limes line and the Dutch Water defence line, prioritizing cultural entities over natural features (RIVM et al., 2019). This emphasizes the regional identity as a cultural green space associated with food production, contrasting the surrounding urban. A notion present within the disappearance of the prohibition on construction and the National Landscape demarcation (Kooij, 2006; Pieterse et al., 2015; Steenhuis et al., 2021).

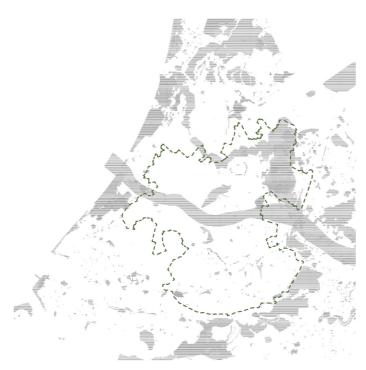


Figure 36, Protected areas around the 'Groene Hart' ((RIVM et al., 2019) edited by author).

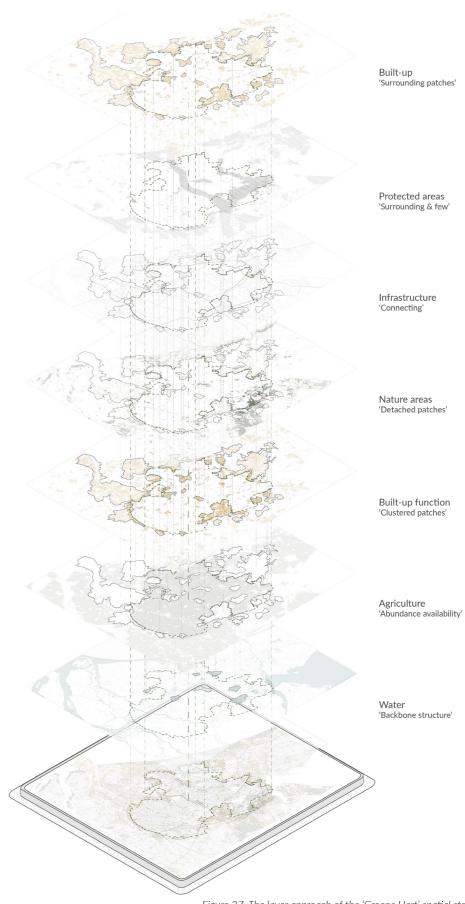


Figure 37, The layer approach of the 'Groene Hart' spatial structures within the Panarchy ((Buchhorn et al., 2020; CBS & PBL, 2015; Centraal Bureau voor de Statistiek, 2018, 2023c; Klimaateffectatlas, 2023; Nabielek et al., 2020; RIVM et al., 2019; Rutte & Abrahamse, 2014) edited by author).

3.5 An Urbanisation of Enclosement

The landscape transformation in Randstad and 'Groene Hart' involves a sequence of economic cycles marked by urban expansion and agricultural scale-enlargement. Commencing with a colonizing perspective and persistent extractive practices, the 'Groene Hart' underwent significant alterations during the last century.

In the mid-20th century, a significant shift from rural to urban land use commenced with the expansion of urban areas, driven by the Dutch government's focus on developing the Randstad. Coined by Albert Plesman in 1938, the term 'Randstad' marked the initiation of terrestrial urbanization and governmental spatial planning efforts. Until the 1950s, the landscape experienced cycles of alteration focused on resource extraction, retaining its rural characters, featuring minimal urbanization and landscape fragmentation (Lörzing & Tisma, 2023). It showcased a flat landscape adorned with a rhythmic pattern of elongated ditches and pastures.

The governmental focus on Randstad emerged as a planning concept aimed at establishing a cohesive polycentric urbanised western Netherlands, emphasizing the management of urbanisation processes and the preservation of the area's polycentric nature (Zonneveld & Nadin, 2021). This approach evolved, transitioning from controlling suburbanization through growth centres in the 1960s and 1970s to reinforcing urban areas through a 'compact city' policy from the late 1980s (Steenhuis et al., 2021).

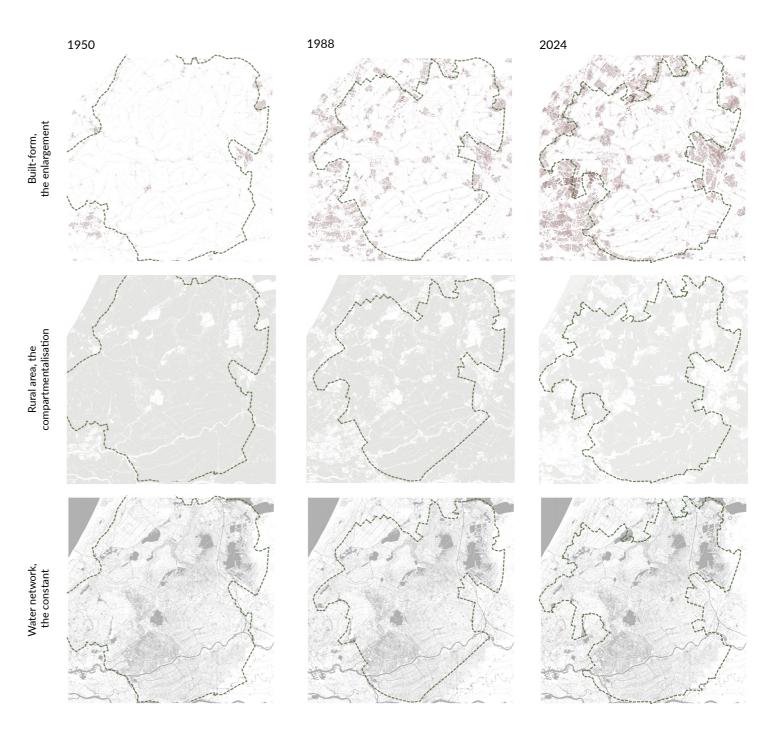


Figure 38, Alteration of urbanisation through time.

As a result of redevelopment, rural-urban migration, and population growth, the Randstad cities grew quickly, necessitating the direction of urbanisation towards dedicated growth cores and the Fringe, maintaining a ring of distinctive cities around the agricultural heartland (Steenhuis et al., 2021). However, by the 1980s, a shift towards a neoliberal market-driven zeitgeist, led to spatial planning being driven by developers, resulting in the relaxation of construction bans and a surge in terrestrial urbanisation (Korthals Altes, 2018; Zonneveld & Nadin, 2021).

While small-scale preservation efforts were made to protect natural spaces, the negotiation of economic prosperity became the primary driver of landscape fragmentation, resulting in distinct urban and agricultural zones, demarcating the identity of contrasts. This mosaic reflects the palimpsests of the past and sets the stage for future synergistic frameworks.

In essence, the Fringe of the 'Groene Hart' has transformed into a densely urbanized area, serving residential and productive purposes, marked by ongoing terrestrial urbanization and extraction practices contributing to wealth accumulation.

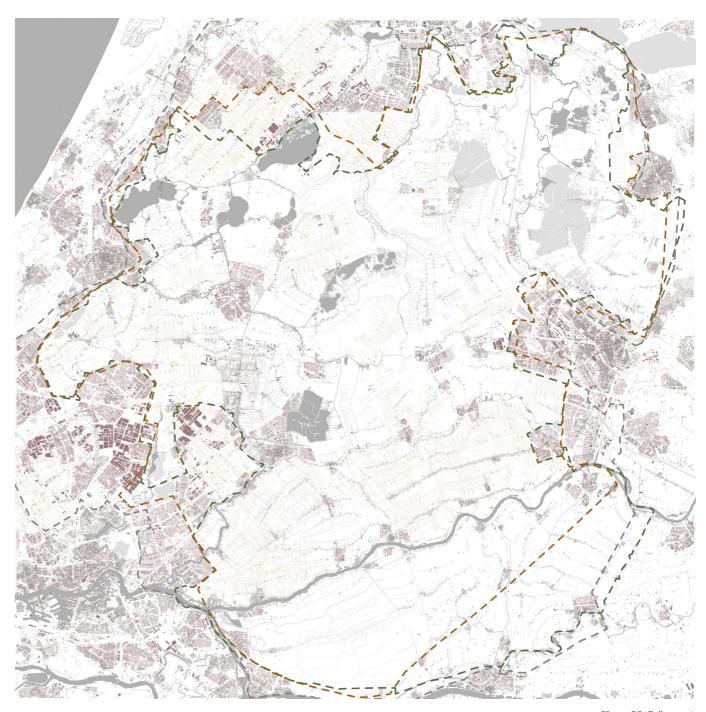


Figure 39, Palimpsest.



3.6 The Geomorphology of the 'Groene Hart'

Forming the foundation for life and land use is the landscape, embodied by the Critical Zone (Latour et al., 2020), a comprehensive framework encompassing the intricate processes vital to life, from the geochemical substrate to organic ecosystems, emphasizing the co-creation of our planet by humans and non-humans (Latour et al., 2020).

Subsequently, the 'Groene Hart' is underpinned by its geomorphological layers, reflecting its deltaic character characterized by flat sedimentation expanses interwoven with discharging watercourses, primarily located below sea level. Over centuries, humans' alteration has transformed the natural wetlands into polder landscapes reclaimed for agriculture and urbanisation, resulting in an artificial territory marked by elongated lines and agricultural resource-extracting practices. Water management remains crucial, evident in the extensive network of canals and dikes crucial for draining water from the vulnerable lowlands. Embodying its deltaic location, beyond its function to the interplay of problems related to infiltration, seepage, and salinization.

Contradicting this blue association is the appropriation of a green landscape. Despite this perception of the 'Groene Hart' as an area of pristine natural values and operationalisation, ecological assessments reveal a landscape depleted of biodiversity and ecological richness, primarily due to human alteration and environmental pressures, with urban areas often perceived as having higher value (Nationale Databank Flora en Fauna & Georegister, 2017; Rijksinstituut voor Volksgezondheid en Milieu, 2017). Hence, terrestrial urbanisation intensifies the degradation of natural fertility, leading to soil compaction, water insecurity, salination, and biodiversity loss (Farjon et al., 2004).



Figure 40, Specie richness highlights the low biodiversity within the 'Groene Hart' ((Nationale Databank Flora en Fauna & Georegister, 2017; Rijksinstituut voor Volksgezondheid en Milieu, 2017) edited by author).



Natura 2000
The 'Groene Ha



0 KM

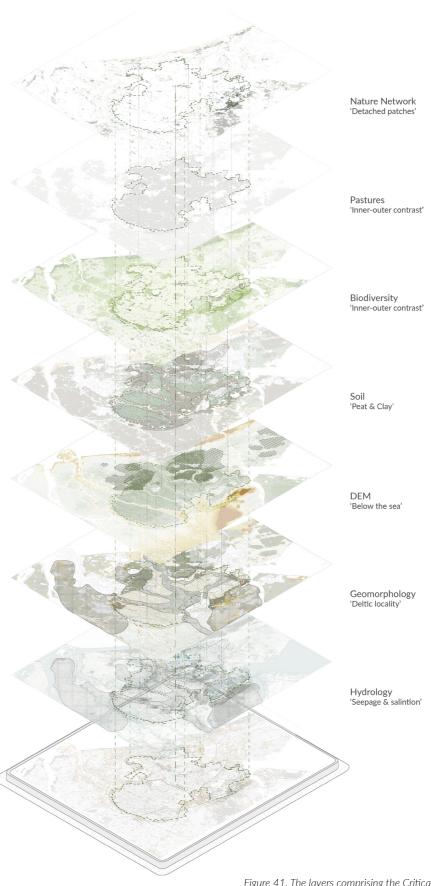


Figure 41, The layers comprising the Critical Zone of the 'Groene Hart' ((Centraal Bureau voor de Statistiek, 2018, 2023c; Erfgoed, 2015; Klimaateffectatlas, 2023; Melchert Reudink et al., 2023; Nationale Databank Flora en Fauna & Georegister, 2017; Panagos et al., 2022; Rijksinstituut voor Volksgezondheid en Milieu, 2015) edited by author).

A state strengthened by the Critical Zone's complexity that expands beneath the surface with diverse soil types presenting inherent limitations for various land uses. Peat soils, for instance, are susceptible to alteration and lose their carbon storage capacity through oxidation when the water level decreases, underscoring the sensitivity of soil functions to human activity.

The 'Groene Hart' features Podzol, Sand, Clay, and Peat soils each with distinct subtypes, distributed according to landscape elevation and proximity to water bodies. Clay soils predominate in higher elevations near the coast or rivers while peat soils are found in a sequence from alluvial ridges to polders, including Polderpeat, Meandowpeat, and Buypeat soils.

This complex Critical Zone underscores the interdependence of human activities and natural systems, necessitating ongoing human intervention and resource extraction. Therefore, transitioning towards a more synergistic relationship between humans and non-human entities is a necessity for enabling self-regulation.

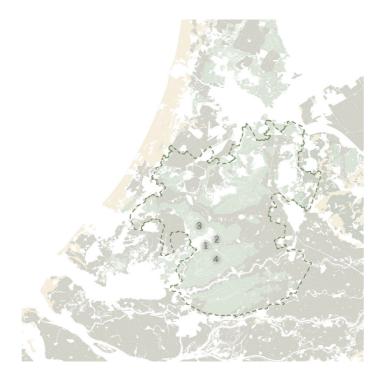


Figure 42, Simplified soil map ((Panagos et al., 2022) edited by author).



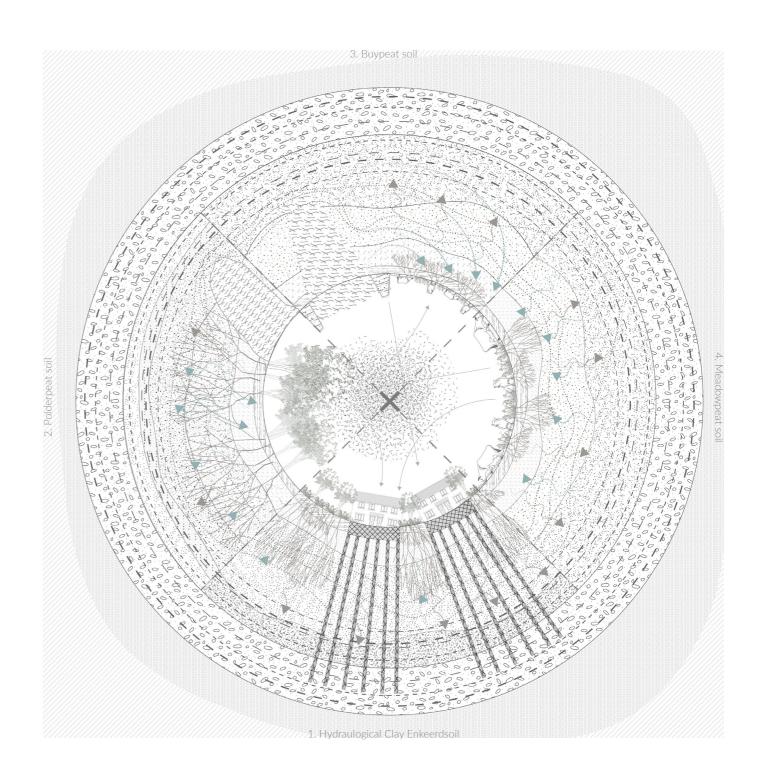


Figure 43, The critical zone of the 'Groene Hart'



3.7 The Current Identity

PROFILES OF THE URBANISATION

Nested within the heart of the Netherlands, the 'Groene Hart' reveals an intricate interplay between human settlers and the natural environment, functioning as an interwoven landscape for agriculture, habitation, and limited nature, accentuated by human palimpsests of alterations.

Depicting a landscape of contrasts, reflecting diverse human perceptions and use. Leading to an identity of crossroads. One perception depicts a functional space, defined by urbanisation, as a human production landscape designed to meet economic needs, resulting in the uniform depleted elongated pasture landscapes, that ask for continuous alteration. The other depicts the epitome of rural landscapes, with abundance in beauty, culture, and charming villages, ideal for dwelling with easy access to urban centres for commuting.

Such dynamics produce a fragmented landscape, placing ecological stress on both human and non-human elements and fostering polarization and territorial segregation.

























Figure 44, The current identity of the 'Groene Hart'.

3.8 The 'Groene Hart' Paradigm – A Depleted Landscape?

As situated in the heart of the Netherlands, the concept of the 'Groene Hart' expands as a backdrop of intertwining culture and landscape, constantly evolving and revealing insights into the intricate relationship between human settlers and the natural environment. Leaving no doubt that it holds significant cultural, economic, and ecological value, as a habitat for nature deeply intertwined with human activities.

Its cultural and economic significance is rooted in its history of human alteration and exploitation, tangible in the formal peat mines and the current dairy production landscape. Despite its perception as a pristine natural environment, the landscape reflects a state of depletion, stripped of its natural richness and functionality. Yet, it holds a duality, as a landscape perceived as pristine countryside.

Despite its recognition as the quintessential Dutch landscape, the 'Groene Hart' existence as a unified entity only endured for merely a decade (Steenhuis et al., 2021). Its conception as a unity emerged in the 1960s and gained general acceptance by the 1990s (Lörzing & Tisma, 2023). Nevertheless, the cohesive image was only clear from a distance, as the area's diversity persisted in people's minds and the Fringe underwent continuous terrestrial urbanisation.

Since 2005, emphasis on diversity and economic activities further led to a gradual erosion of its cohesive identity, with the landscape evolving into the hinterland of individual cities and towns, (Bruinsma & Koomen, 2018; Kooij, 2006; Steenhuis et al., 2023).

This fluidity in the interpretation of the 'Groene Hart' underscores its dynamic nature, with shifting governance and evolving development plans shaping its landscape, open to personal positioning and interpretation. It can be concluded that the 'Groene Hart' as a defined entity does not exist. While it embodies a depleted landscape arising from human alteration, it does not fit the criteria of a paradigm, which requires a widely accepted set of beliefs and concepts. Nonetheless, its fluid interpretations and meaning leave room for potential evolution into a paradigm in the future. Hence, the thesis upholds the last defined Groene Hart outlines which is a combination of the NOVEX area outline and the Structuurvisie Infrastructuur en Ruimte.



Figure 45, The 'Groene Hart' imagined by Dr. Jac P. Thysse for a Verkade album (Kooij, 2006).

4. A Three-pillared Problem

The fourth chapter completes the second part of the thesis, the problem analysis phase, and concludes with the problem statement. It comprises the third section of the problem analysis and gives an overview of the unbalances present within:

What are the mechanisms driving the persistent housing pressure on the Fringe of the 'Groene Hart', and how do these factors interact with residual identity governing terrestrial developments, alongside the continuous influence of the altered natural state of the depleted landscape on terrestrial development in the area?

The first part answers the sub-question:

What are the economic causes and mechanisms behind the continuous housing pressure on the Fringe of the 'Groene Hart'?

The second part answers the sub-question:

What caused a disconnected residual identity instead of a place identity to govern terrestrial developments in the Fringe?

The third part answers the sub-question:

How does the altered natural state of the depleted landscape continuously play a role in terrestrial development along the Fringe?



Figure 46, Development of Weespersluis.

A HOUSING PRESSURE

The current housing scarcity finds its causes in economic, ecological, and social, elements not aligning, such as population growth, limited building sites, demographic shifts, bureaucratic procedures, high costs, and the continuing nitrogen crisis (Lennartz & Vries, 2024; Rijksoverheid, 2023). However, the primary cause is political (Klok, 2023; Melchert Reudink et al., 2023; Obbink, 2020; Pieterse et al., 2015), stemming from the liberalisation of spatial planning policies advocated by successive cabinets since the 1990s, leading to the disappearance of countrywide spatial memorandums (Kooij, 2006).

The policy shifted towards shaping the country through market economics with embedded decentralisation and the demise of the Ministry of Housing and Spatial Planning in 2010 (Obbink, 2020). Consequently, provinces and municipalities gained authority in spatial planning (Klok, 2023; Kooij, 2006; Korthals Altes, 2018), laying the foundation for the current housing shortage, driven by a fragmented, market-driven economic focus (Klok, 2023; Obbink, 2020).

Simultaneously, the lifting of the construction ban within the 'Green Hart' in 2010 (Kooij, 2006; Pieterse et al., 2015), and the disappearance of its protected designation (Steenhuis et al., 2021), facilitated continuous terrestrial urbanization and administrative fragmentation (Korthals Altes, 2018; Pieterse et al., 2015).

Since 2018 renewed attention on national planning policies has resulted in the development of, NOVI, NOVEX, and Woondeal programs (Eerenbeemt & Smit, 2018; Koninkrijksrelaties, 2023a, 2023c; Melchert Reudink et al., 2023; Rijksoverheid, 2023), aimed at developing seventeen locations, through urban renewal or new suburban areas, with the 'Green Hart' among them due to perceived profitability and expedited development compared to urban renewal (Eerenbeemt & Smit, 2018; Koninkrijksrelaties, 2023a, 2023c; Rijksoverheid, 2023). Again, prioritises economic emphasis which has historically overlooked ecological and social considerations, as stressed in the critiques and lessons of the former VINEX developments.

Consequently, areas prioritizing economic development in housing face conflicting elements arising from a lack of attention to those by the developing party. Each interest, economic, ecological, and social has its underlying problem aiding the overall problem. In the case of the 'Groene Hart', an altered natural landscape and a conflicting residual identity caused polarisation between the urban and the hinterland (Carson et al., 2022). Therefore, finding a solution to the housing problem becomes a disputed pillared issue. Ultimately creating a scarcity of housing which leads to pressure on the Fringes to develop.

'The problem of the thesis is the predominant market-driven, liberal, human-centric economic emphasis of spatial development policies tackling living environment issues, housing scarcity in the Netherlands, leading to a disbalance within society and nature. Giving rise to economic, ecological, and social unaligned housing developments on the Fringe of the 'Groene Hart' susceptible to similar pitfalls as the previous VINEX developments.'

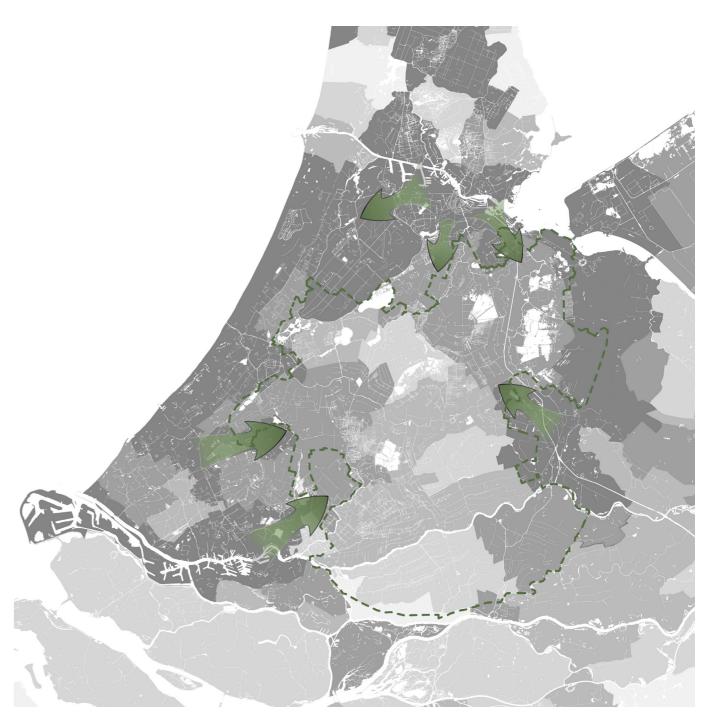


Figure 47, Housing pressure heat map ((BPD, 2024; BPD et al., 2023) edited by author).

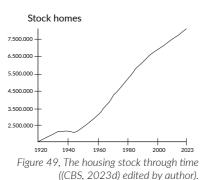


4.1 Pseudo-countryside Economic Paradigmatic Problem

The current housing scarcity expands beyond mere numeric availability to encompass a mismatch between housing options and demographic fittingness (Bockxmeer, 2022). The average new home is priced at around 411.000 euros, while over half of homebuyers seek properties for around 255.000 euros (Obbink, 2020). The underlying problem is the continued popularity of pseudo-countryside dwellings that conflict with a disconnected demographic housing supply.

Booi and Boterman (2020) attribute this phenomenon to the escalator region theory (Fielding, 1992) where urban areas attract single households like students or migrants, while suburbs charm families. This demographic trend underscores the preference for spacious homes with gardens on the urban Fringe, which echoes the rural idyll but offers urban amenities, often referred to as pseudo-countryside dwellings (Eerenbeemt & Smit, 2018; Heins, 2004). These were realized through the VINEX and earlier New Town development programs (Heins, 2004), and continue to be vastly realised along the Fringes. These developments, prevalent in areas like the 'Groene Hart', have been facilitated by developers seeking profitable ventures amid abundant agricultural land (CBS, 2023b, 2023c, 2023d; Voogt, 2022).



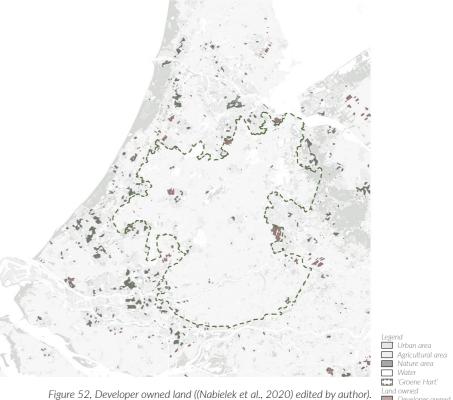


Stock of new-build homes 60000 40000

Figure 50, The stock of newly build homes through time ((CBS et al., 2020) edited by



Figure 51, New housing developments since 1995 ((CBS & PBL, 2015) edited by edited by Deve author).



Contradicting this emphasis on pseudo-countryside developments is the demographic trend, which highlights the growing demand for elderly and starter homes (CBS, 2023b, 2023c, 2023d; Langenberg & Jonkers, 2022; Nijskens & Lohuis, 2019; Obbink, 2020). Contrary to traditional narratives of housing shortages due to construction limitations, the disconnect between supply and demand is now exacerbated by demographic shifts (Jansen, 2020; Langenberg & Jonkers, 2022; Pieterse et al., 2015). Due to more starters entering the market and fewer elderly moving into nursing homes (Langenberg & Jonkers, 2022), caused by the lack of medium- to small-sized homes being developed (Langenberg & Jonkers, 2022; Lennartz & Vries, 2024).

Moreover, the housing stock is progressively incompatible with the evolving society, with a surge in large, expensive single-family homes, alongside a rise in single-person households (Langenberg & Jonkers, 2022). Consolidated by the slow but steady decrease in average inhabitants per house, to currently 2,2 dwellers per house (CBS, 2021a, 2023a, 2023d). This mismatch is poised to worsen if current trends persist, leading to costly, and overly spacious housing being unobtainable to many, resulting in a competitive and heated market, especially within the Fringe of the 'Groene Hart' (Langenberg & Jonkers, 2022; Lörzing, 2021; Nijskens & Lohuis, 2019; Pieterse et al., 2015).

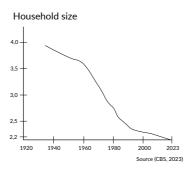
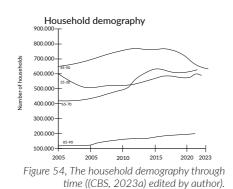
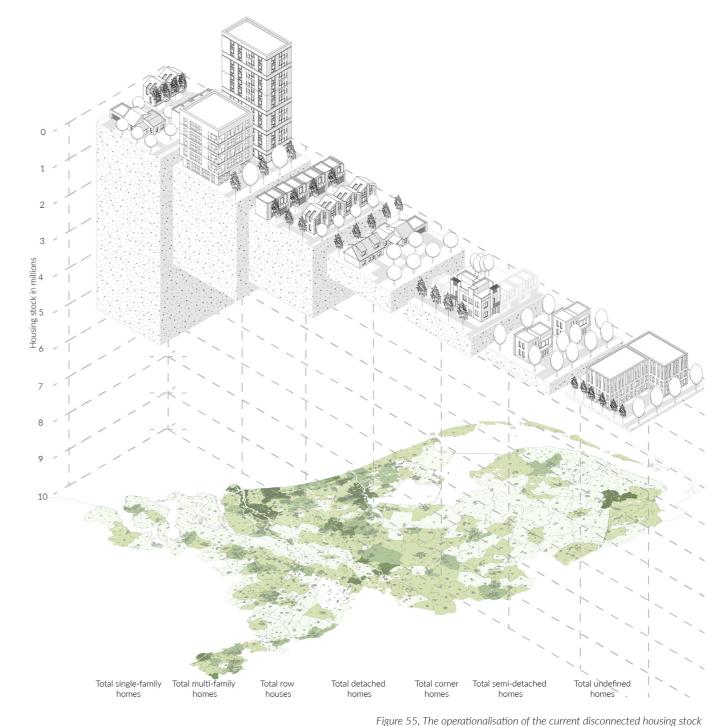


Figure 53, The household size through time ((CBS, 2023a) edited by author).





((CBS, 2021a, 2021b, 2023a, 2023b, 2023c, 2023d; CBS et al., 2020; Centraal Bureau voor de Statistiek, 2021, 2023c; Peters et al., 2022) edited by author).



4.2 The Societal Residual Identity Problem

The problem with the societal notion lies in that the socio-economic orientation of spatial housing policies often overlooks the intrinsic place identity of the landscape (Kühn, 2003). This imbalance manifests itself in two ways, on one side the perceived identity, the residual identity, facilitates the continual migration of families to the Fringe of the 'Groene Hart' by the pseudo-countryside development mechanism driven by the regional operationalisation of the polycentric region (Zonneveld & Nadin, 2021), and the footloose nature of these families (Meijers, 2005; Pieterse et al., 2015). Forecasting continual future expansion (Pieterse et al., 2015).

On the other hand, the misconception of place identity leads to a polarization between the urban and the non-urban, evident in the notion of Randstadisme versus countrysideism (Kessel, 2021; Voogd & Cuperus, 2021). A contention regarding the perception people in the hinterland have of the urban and the Fringe have of the pseudo-countryside, and vice versa that extends beyond tangible (Brenner & Katsikis, 2020; Voogd & Cuperus, 2021). To embody a measurable divide that enhances the perceptive divide measurable in health, political preferences, and education levels (Voogd & Cuperus, 2021).



Figure 56, Polycentric Network within the Netherlands ((Centraal Bureau voor de Statistiek, 2023d; Meijers et al., 2016; Oel, 2021; Stead & Meijers; Werff et al., 2023; Zonneveld & Nadin, 2021) edited by author).



The 'Groene Hart' agricultural hinterland is often depicted merely as a functional, economic space, serving urban needs, with its elongated homogeneous pastures resulting from fragmentation and ecological constraints (Kooij, 2006; Kühn, 2003; Pieterse et al., 2015). Contradicting, it is also romanticized as the quintessential countryside, rich in natural and cultural heritage, a perception that gained prominence in the early 20th century with Fringe developments and the coining of the term 'Groene Hart' (Kooij, 2006; Pieterse et al., 2015). This duality prolongs a status quo loop, utilising residual identity to attract newcomers while hindering efforts to integrate the actual place identity and involve local communities (Steenhuis et al., 2021).

Both perspectives acknowledge the existing status quo, impeding potential transformations and continuing the area's operationalisation (Steenhuis et al., 2021). However, it needs to be recognized that perceived identity stems from the area's deep cultural significance, both historically and societally (Steenhuis et al., 2021). Neglecting the specific location characteristics undermines its identity and hampers proactive problem-solving efforts.

The Residual identity



Figure 57, The residual Identity in a neighbourhood.



Figure 59, The residual Identity in public spaces.



Figure 61, The residual Identity in housing.

The Actual identity



Figure 58, The actual place Identity in the lints.



Figure 60, The actual place Identity in the meadows.



Figure 62, The actual place Identity in housing.

4.3 The Ecological Altered Natural State Problem

The ecological unbalance underlying the economically oriented spatial housing policies is the altered state of the landscape. Over time, human-initiated alteration in the landscape has diminished its biodiversity and ecological functions to serve economic gain depriving it form its biodiversity and natural richness (Bureau Peter de Ruyter landschapsarchitectuur et al., 2022; Kooij, 2006; Melchert Reudink et al., 2023; Pieterse et al., 2015; Pointer, 2023)

This altered state implies the current degradation of the environment in the Dutch polder within the 'Groene Hart'. These are typically monotonous peat pasture areas primarily utilised for dairy farming or housing (Melchert Reudink et al., 2023). Despite their intended natural value, these landscapes are under pressure to meet human demands, leading to environmental stressors like water level reduction, chemical use, and nitrogen emissions, driven by intensive agriculture and housing developments (Bureau Peter de Ruyter landschapsarchitectuur et al., 2022). The continued terrestrial urbanisation has, therefore, contributed to soil degradation, water insecurity, salination, and biodiversity loss (Farjon et al., 2004), exacerbated by cross-regional pollution within the river basin's location.

Proposed housing or agricultural expansions continue this trend, in a similar fashion to how humans reclaimed these landscapes (Kooij, 2006). Consequently, there is an imbalance between human interference, production needs, and environmental preservation, necessitating ongoing human involvement for operational functionality. Addressing this imbalance amidst climate change involves reintegrating natural resilience within polders to foster a symbiotic relationship between human and natural systems, thus mitigating climate change effects. Underscoring the need for collaborative efforts to co-construct territories that harmonize urban and natural landscapes.

QR very poor value, quality of soil

te processing | leaching & runoff (kg N/ha/yr)

Relief
Water

Terre:

Industrial source of pollution)

up to 25

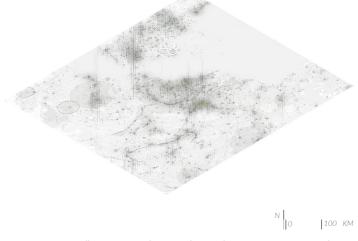


Figure 63, Pollution accumulation in the Northwestern European catchment (((ESDAC) & Commission; Buchhorn et al., 2020; European Environment Agency, 2023a, 2023b; Gauthier et al., 2021; Klimaateffectatlas, 2023; Panagos et al., 2022; Panagos P. et al., 2012; Toth G et al., 2008) edited by author).

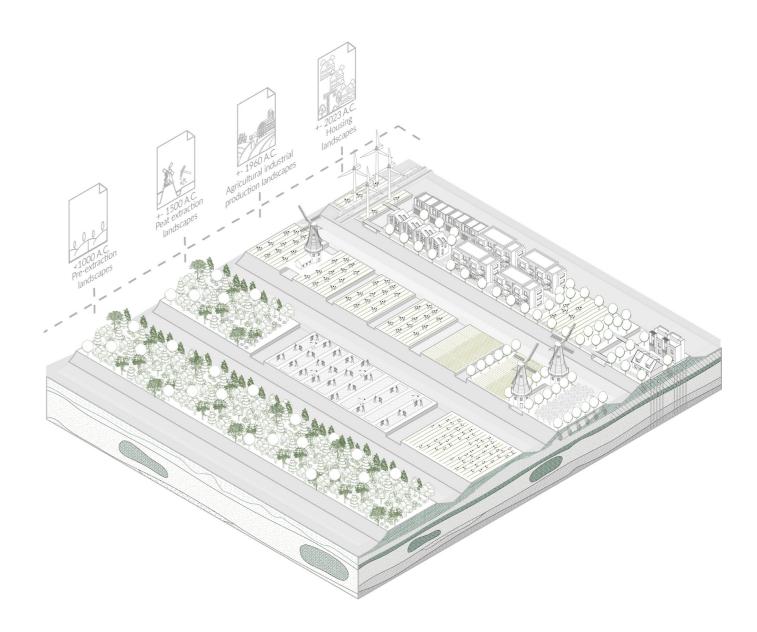


Figure 64, The alteration of the natural state throughout history (((ESDAC) & Commission; Buchhorn et al., 2020; European Environment Agency, 2023a, 2023b; Gauthier et al., 2021; Klimaateffectatlas, 2023; Panagos et al., 2022; Panagos P. et al., 2012; Toth G et al., 2008) edited by author).



4.4 Concluding Problem Statement

The overall problem of the thesis is the predominant market-driven, liberal, human-centric economic emphasis of spatial development policies tackling living environment issues, and housing scarcity in the Netherlands, leading to a disbalance within society and nature. Giving rise to economic (A), social (B), and ecological (C) unaligned housing developments on the Fringe of the 'Groene Hart' susceptible to similar pitfalls as the previous VINEX developments.

A: Disconnected demographic pseudo-countryside development The pseudo-countryside development housing stock is progressively incompatible with the needs of the population due to a demographic disconnect.

B: Residual Identity

Disconnected economically attractive residual identity is creating contentions between urban hinterlands hindering future change.

C: Altered natural

The landscape's altered natural hydrology and ecological function for human economic extraction deprive it of its biodiversity and natural richness. Currently, these polders are monotone homogeneous peat pasture landscapes serving dairy production or housing developments.

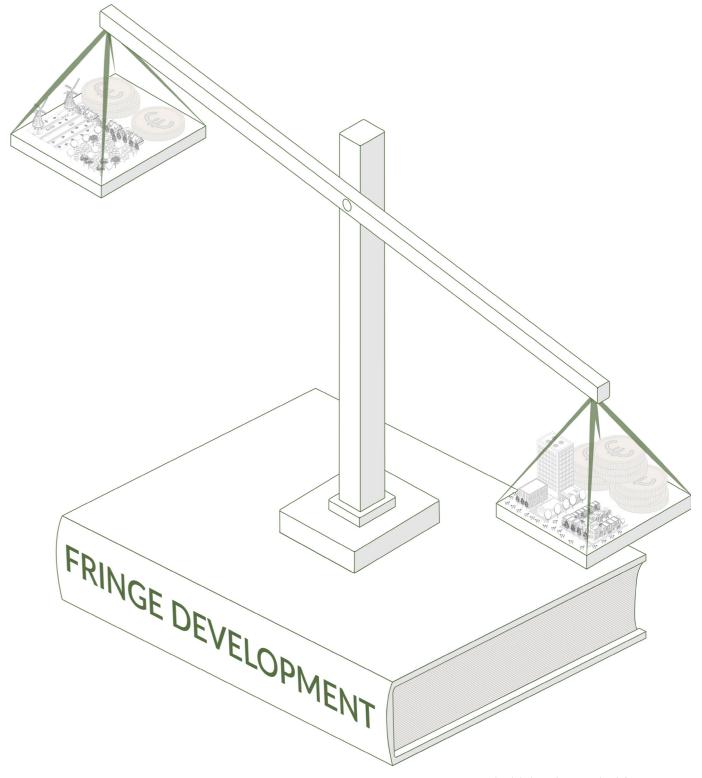


Figure 65, The disbalance between the different systems.

THE NON-SYNERGETIC SYSTEMS

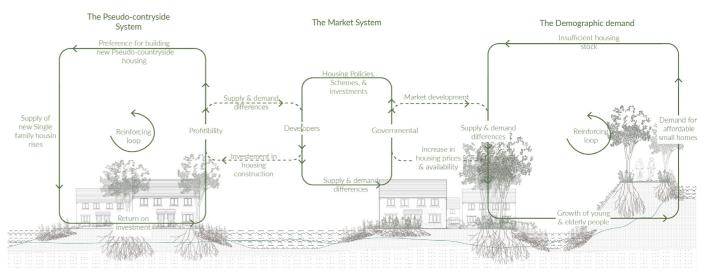
Subsequently, the unaligned non-synergetic systems are consecutively economic (A), social (B), and ecological (C) systems:

A: ECONOMIC SYSTEM

The economic system perpetuates the continuation of the pseudo-countryside mechanism driven by market demand, neglecting societal needs. A system of utilising cultural perception to fulfil a specific profitable market, while neglecting the demographic. Accordingly, denoting a non-synergised threefold, the pseudo-countryside self-reinforcing loop, the demographic self-reinforcing loop, connected by the negotiation of governmental policies and the developer interests, bending towards profitability instead of societal demand.

B: SOCIAL SYSTEM

The societal system deals with the mechanism of residual identity that allows for the continuation of the current contention regarding the actual identity of the place. Entailing a system of placemaking and place memory mechanisms to negotiate societal appropriation. Again, this signifies a threefold, a place identity loop, a residual identity loop, and the negotiation within the contention loop.



The Economic System

Figure 66, The non-synergetic economic system.

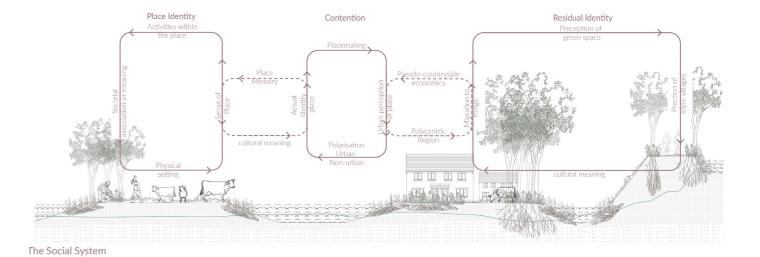
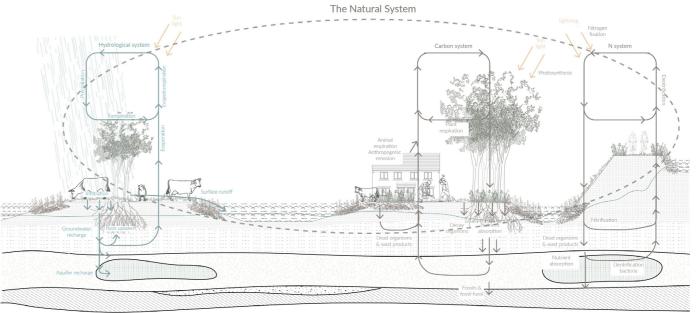


Figure 67, The non-synergetic social system.

C: ECOLOGICAL SYSTEM

Currently, the natural system contains an array of individually operating cycles, the carbon, oxygen, nitrogen, hydrological, and mineral cycles. The individuality implies that the biotic and the abiotic cycles do not operate disjointly, hence spatially they affect one another, but not in an optimal form. Consequently, the system searches in its negotiation process for cooperation.



The Natural System

Figure 68, The non-synergetic natural system.

5. Research Framework

The fifth chapter gives an overview of the research framework. In doing so it outlines the entire process of the thesis.

5.1 Research Aim, Hypothesis, & Outcome

RESEARCH AIM

The thesis aspires to provide a new resilient ecocentric perspective on housing developments for the Fringe of the 'Groene Hart' until 2080. It aims to promote an ecocentric housing approach that synergises social, economic, and environmental concerns by nurturing non-exploitative practices between humans and nature. This transformation envisions the Fringe as a vibrant mosaic of agroecological urban developments, nurturing a renewed construction with the landscape and its ecological operationalisation. By highlighting the regenerative possibilities of fostering synergetic Fringes, it paints an alternative promising picture for the future region.

RESEARCH HYPOTHESIS

The hypothesis involves integrating the ethical principles and values of the ecocentric paradigm consistently into a comprehensive regional housing strategy that creates a synergised Fringe of the 'Groene Hart.' This strategy aims to enable a synergetic and sustainable vision, prioritizing non-exploitative synergies among social, economic, and environmental interests within housing developments.

RESEARCH OUTCOME

The project aims to create an ecocentric development strategy for the Fringe of the 'Groene Hart' unleashing the area's natural potential through synergies between human and non-human entities, with design implementations as an outcome. Expanding upon the central hypothesis proposed in the thesis and studio, it reframes the Fringe of the 'Groene Hart' not just as a hinterland or Zwischenstadt, but as a dynamic co-creation that has shaped the existing status quo. Consequently, offering an alternative perspective for envisioning a unified regional housing strategy that catalyses wider regional planning and design initiatives, addressing housing scarcity. The expected are:

- A visual representation of the Recharged Hart development strategy.
- A model of land use and policy strategies to inform the proposal of territorial functions.
- A cartographic multimedia report, encompassing the methodologies, literature review, project narrative, and conclusion.



Figure 69, A 'Groene Hart'.

5.2 Research Questions

The Main Research Question

In addressing the problem statement and achieving the research aim, the thesis' research question is:

In light of the growing (urban) population and its subsequent scarcity of available housing in a time of environmental (ecological) crisis:

How can we create a **synergy between social, economic, and environmental** interests in **depleted landscapes like the Fringe of the 'Groene Hart**' through the implementation of the **ecocentric paradigm** in **terrestrial development** to allow for an alleviation of the **housing scarcity?**

The sub-questions support the main research question and are divided based on their role towards the overall research.

The Sub-research Questions

THE CONTEXT - PROBLEM FIELD

The first research question is aimed at finding the contextual background, in which the thesis operates:

SQ1: What are the current and ongoing challenges in the Netherlands that are affecting the housing crisis in the Fringe of the 'Groene Hart'?

This sub-question is focused on identifying the problem field.

PROBLEM ANALYSIS

The second part of the thesis demarcates the problem analysis phase, intended to analyse, and further define the problem statement. This phase is broken down into two sections. The first section gives a contemporary and historical overview of the Fringe of the 'Groene Hart':

SQ2: How did the 'Groene Hart' and its depleted landscape in the Fringe arise, and what factors currently contribute to its depleted state?

The second section focuses on the economic, social, and ecological unbalances inherent within the current terrestrial development, contested urban-rural relationship, and extraction practice of the altered natural landscape in the Fringe:

SQ3: What are the mechanisms driving the persistent housing pressure on the Fringe of the 'Groene Hart', and how do these factors interact with residual identity governing terrestrial developments, alongside the continuous influence of the altered natural state of the depleted landscape on terrestrial development in the area?

FRINGE ANALYSIS

The area of intervention, the third part of the thesis, provides the spatial perspective of the current Fringe as a whole and its principle as a green belt colonised by VINEX developments:

SQ4: What can currently, based upon Fringe literature, be defined as the elements and principles of the Fringe of the 'Groene Hart'?

STRATEGY & DESIGN

The fourth part of the research comprises a strategy towards the implementation of the research and offers insights into how it can best be designed. The section introduces the lens through which the synergy could be constructed, and acts as the bridge between theory and the actual design:

SQ5: How can the ecocentric paradigm direct a synergy between social, economic, and environmental interests and what are the methods elements, and conditions for using the ecocentric paradigm in terrestrial development and design?

EVALUATING PHASE

The concluding section of the research evaluates and reflects the proposed implementation strategy of the research and offers insights towards the conclusion:

SQ6: What potential trade-offs or conflicts might arise between social, economic, and environmental interests when implementing an ecocentric paradigm in terrestrial development, and how can these be resolved or mitigated?

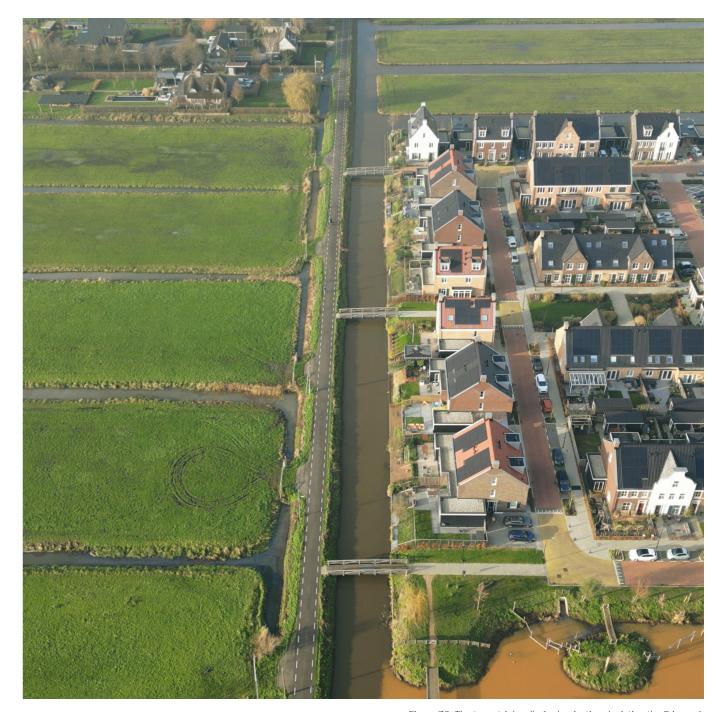


Figure 70, The terrestrial wall of urbanisation depicting the Fringe of Moordrecht.

Proposed Outcome of the Research Questions

The thesis encompasses six sub-research questions, each contributing to the overall trajectory, complexity, and planning. The proposed outcomes for each question exemplify the necessary steps to achieve these aims, demonstrating the potential for an ecocentric perspective within terrestrial development. Furthermore, the results highlight the role of landscape architecture and urban design in addressing social, environmental, and economic challenges through spatial design. Anticipated outcomes arising from these questions are as follows:

- **SQ1**: The establishment of site-specific adhering prospects and guidelines is answered in chapter two.
- **SQ2**: The documentation of historical and contemporary definitions and structures inherent within the 'Groene Hart' is answered in chapter three.
- **SQ3:** The documentation of the economic, environmental, and social-spatial problems and their characteristics are answered in chapter four.
- **SQ4:** The documentation of the current Fringe and its structures and principles are answered in chapter six.
- **SQ5:** A set of spatial ecocentric Fringe design principles, followed by multi-scalar design strategies and interventions related to the synergetic Fringe is answered in chapter seven.
- **SQ6:** The establishment of evaluation criteria tailored to the ecocentricity of the Fringe for assessing synergetic housing is answered in chapter eight.

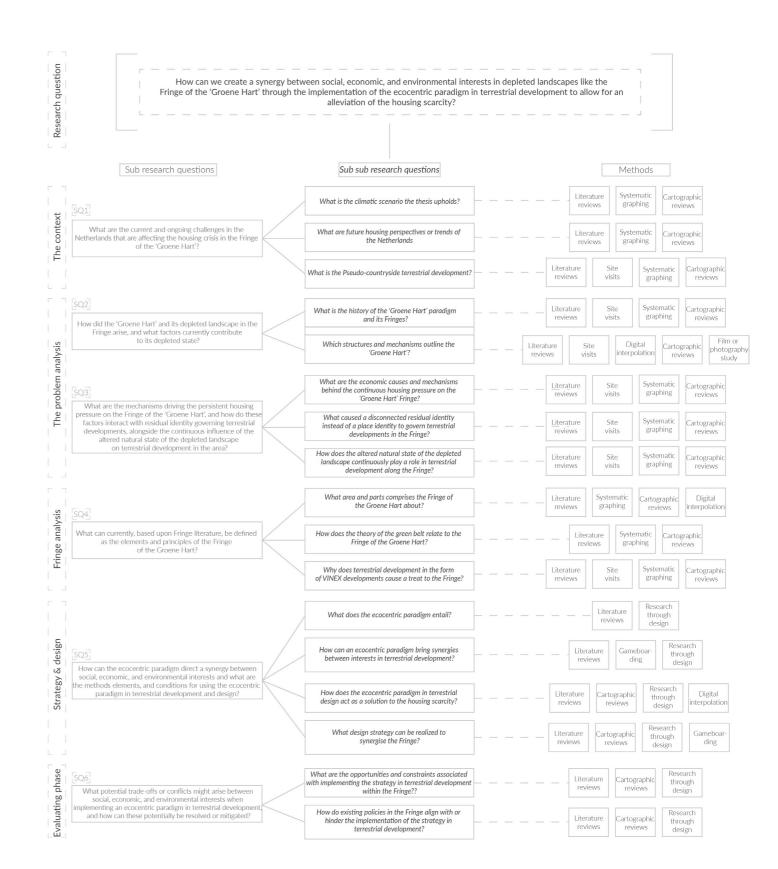


Figure 71, Research questions connected to the intended method.

5.3 Theoretical Framework

The theoretical framework outlines the connections between theories shaping this thesis. This process entails a multiscalar examination of territorial development, employing research and design processes, using scalar coils, capable of uncovering contextual spatial, and critical interdependencies with the 'Groene Hart' Fringe. The coils rely on the encirclement of identified domains intersecting spatial challenges outlined in the problem statement. Operationalizing these coils entails the application of a multi-domain theoretical foundation guided by terrestrial values to initiate ecocentric planning and design.

By utilising the notions of the Critical Zone (Latour et al., 2020) and Panarchy (Gunderson & Holling, 2002) frameworks for analysis, the project navigates the complexity of the terrain and identifies ecocentrism as a crucial element within the synergetic coils. Consequently, the project explores methods for revitalizing depleted landscapes to foster resilient relationships within the Fringe.

Hence, the territorial design aims to infuse housing with evolutionary, sustainable qualities and regenerative coexistence with nature. Informed by ecocentric theory, the design incorporates principles of Synergetic Urban Landscape Planning (Tillie, 2018) to enhance synergy, into an unpredictable future. Steering this process is a personal proposition within the planner's triangle of sustainability (Campbell, 2016), which serves as an ethical and political proposition, emphasizing an ecocentric perspective. This perspective advocates for a long-term vision rooted in humanity's responsibility for care, emphasising the need to balance human-nonhuman relationships toward non-exploitative forms of coexistence.

The Theoretical Lenses

Anthropocene

The Anthropocene depicts a time of irreversible impacts of human activities on earth's ecosystem, and landscape (Haraway, 2015), as an ongoing progression, affecting both human and non-human entities through evolution (Haraway, 1988, 2015; Kóvskaya, 2021; Latour et al., 2020). By studying the Anthropocene humans' alteration of natural environments becomes palpable (Ellis, 2014).

Situated Knowledge

The theory of situated knowledge challenges the ideas of objectivity and underscores that knowledge is rooted in a particular context (Haraway, 1988). By pointing to the plurality of the landscape, the theory comprehends the complexity of the Anthropocene (Haraway, 1988).

Planners' Triangle for Sustainability

The planner's triangle for sustainability portrays the planner's task to define his position towards the concept of sustainability by depicting the planner's priorities, conflicts, institutions and their corresponding paradigm to achieve these across the conflict (Campbell, 2016). The usage of the triangle allows for defining one own's proposition.

Place Identity

The theory of Place Identity denotes the distinct and unique characteristics that define a location, outlining the distinctiveness that distinguishes it from other places, and giving it a sense of individuality and personality (Devlin, 2018; Lewicka, 2008). It offers a way to connect behaviour and experiences to the physical environment (Proshansky, 1974).

Critical Zones

The theory of the Critical Zone implies the tin life-sustaining layer of the earth's surface, embodying a framework for the processes that sustain life through geochemical cycles and living organisms (Latour et al., 2020). Within the thesis, the framework offers a systematic method for analysis while acknowledging human and non-human agencies as co-agents in shaping the plant (Latour et al., 2020).

Panarchy

The concept of Panarchy (Gunderson & Holling, 2002) implies a framework for understanding human and nature's transitions over time, acknowledging their systems at various scales, structures and interactions. Implying a tool for understanding dynamic complex systems inherent in nested hierarchies linking adaptive cycles within nested hierarchies (Gunderson & Holling, 2002). The thesis, it comprehends and orders the complexity embedded within the human urban-rural spheres.

Ecocentrism

Ecocentrism embodies a worldview describing a synergy between humans and nature, in which neither element is more significant than the other (Vink et al., 2024; Washington & Maloney, 2020). It emphasizes that humans are an integral component of the ecosystem, and their well-being is tied to the well-being of the entire natural system (Curry, 2011; Daly, 2014; Rolston III, 2020; Vieira & Sampaio, 2022; Vink et al., 2024; Washington & Maloney, 2020; Washington et al., 2017; Yigitcanlar & Dizdaroglu, 2015). The ecocentric lens offers the Fringe an alternative zeitgeist.

Synergetic Urban Landscape Planning

Synergetic Urban Landscape Planning implies an integrated approach towards implementing synergies among development within the operationalisation of the urban (Tillie, 2018). Synergy denotes the cooperation of two or more entities resulting in a combined effect that is greater than the effects of each entity alone (Tillie, 2018). Within the thesis, it acts as an example of how to develop synergies.

Landscape Ecology

Landscape Ecology is the science of studying the relationships between spatial patterns and ecological processes on the earth's surface (Wu, 2008). In the field of landscape ecology, people and the built environment are integral components of the landscape (Chamorro et al., 2015). By utilizing the science within the Critical Zone framework, an understanding of both the horizontality of the landscape's ecological processes and the verticality of the Critical Zone processes arises (Chamorro et al., 2015; Vink et al., 2024).

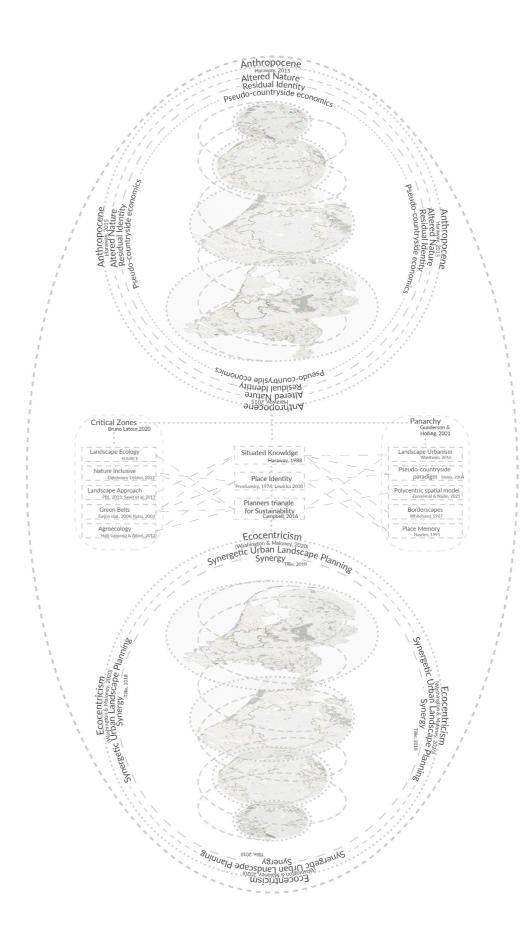


Figure 72, The theoretical framework.

Nature Inclusivity

Nature Inclusivity is the science of ensuring that social, economic and nature conservation is integrated within the project, accentuating thriving biodiversity through an emphasis on functional ecosystem and natural resilience (Dijkshoorn-Dekker, 2022; Vink et al., 2024; Vink et al., 2017). Within the thesis, it implies, through the ecocentric lens, the development of habitat diversity and climate resilience.

Landscape Approach

The Landscape Approach within the Critical Zone denotes the translation of the framework to the Dutch context (Horn & Meijer, 2015). It aims to integrate different stakeholders at the landscape level, finding cross-sectoral solutions, that are better than the sum of sector-specific solutions (Horn & Meijer, 2015; Sayer et al., 2013).

Green Belts

The Green Belt embodies the concept of a zone that separates the urban from the landscape while serving as a tool to halt urban extension into the landscape (Farjon et al., 2004; Kühn, 2003). Within the Critical Zone framework, the theory functions as the cultural notion explaining the historical mechanism behind the separation between the urban and the rural.

Agroecology

Agroecology embodies an interdisciplinary framework, combining agricultural practices with ecological principles within the fields of landscape ecology (Altieri, 2018). It represents a shift from a conventional impute-based farming system to an extensive regenerative approach that prioritizes integration among its ecosystems and biomes (Altieri, 2018; Gliessman, 2021). The Critical Zone framework, connects the adaptive cycle back into the realm of design, forming the bridge between theoretical understanding and practical design.

Landscape Urbanism

The theory of Landscape Urbanism comprises a framework combining Urban Design with Landscape Architecture. It considers the landscape as a generative and organizing force which actively influences structure, functions, and the operationalisation of the urban (Waldheim, 2016). The Panarchy framework formulates the role of how the alterations and states of the landscape are connected to the creation and operation of the urban.

Pseudo-countryside Development

The theory of Pseudo-countryside Development encompasses the Zwischenstadt theory, posting the idea of the 'in-between city', as the place where most people live in transitional urban agglomerations which are neither truly urban nor rural but possess characteristics of both (Sieverts, 2003). Heins (2004) adds the notion of residential environments (Heins, 2004), seeing these transitional environments as the zones for dwelling, with one foot in the city and one in the rural, combining the idyllic nature of the rural with the commodities of the urban, inflating demand (Heins, 2004). Hence, connected to the hierarchy of the Panarchy framework.

Polycentric Spatial Model

The Polycentric Spatial Model is a spatial operationalisation concept for regions, implying a regional structure characterized by the presence of multiple independent centres or nodes, with distinct functional specialisation within the spatial operationalisation the region operates (Zonneveld & Nadin, 2021). The theory within the Panarchy framework following the Landscape Urbanism logic, explains the regional operationalisation.

Borderscapes

Borderscapes are dynamic multidimensional zones where physical, social, and political borders intersect and shape the landscape as fluid temporal zones of differentiated encounters (Krichker, 2021; Rajaram & Grundy-Warr, 2007; van Houtum & Spierings, 2012). With the theoretical notion of Green Belts, Borderscapes are those locations where the Green Belt meets the Urban or the Landscape, comprising a zone of transition (Farjon et al., 2004; Kühn, 2003). Henceforth, it is referred to as a Fringe (Whitehand, 1967), fitting within the hierarchies of the Panarchy framework by encouraging an understanding of cities that go beyond the centre-periphery dynamics, recognizing the interplay of edges as elements in the formation and transformation of landscapes.

Place Memory

The concept of Place Memory outlines that the history and memory of the place shape the identity (Hayden, 1995). Accordingly, through time history can perceive a connotation based on memory. Therefore, the identity of a place is not static but can evolve under the influence of urban development, demographic changes, economic shifts, and cultural influences.

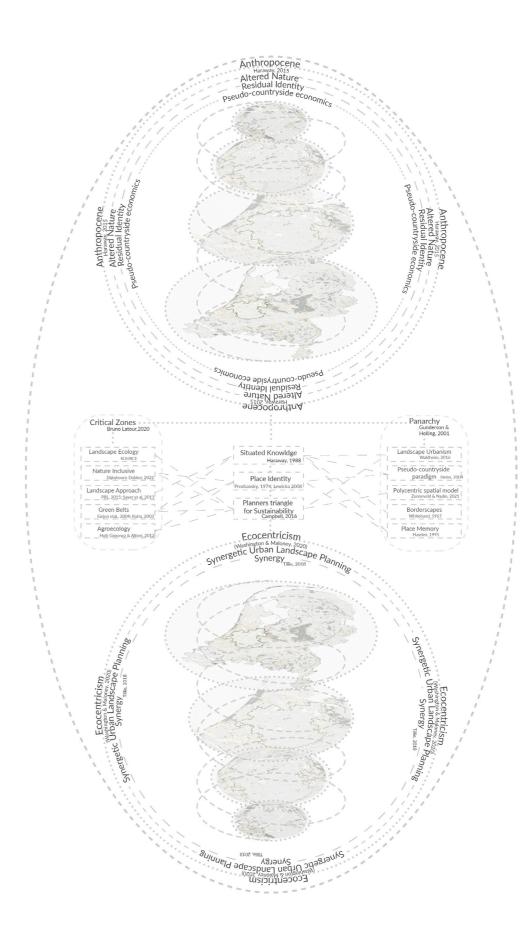


Figure 73, The theoretical framework.

5.4 Conceptual Framework

The conceptual framework outlines the interconnectedness of concepts and design within this thesis. The coil of terrestrial development underscores the establishment of complex systems of interdependencies, linking the Anthropogenic crisis to the Fringe. Analysis through the Critical Zones and Panarchy framework reveals an unsustainable housing model stemming from ecological, economic, social, biophysical, and housing concerns. Consequently, the project proposes a territorial reorganization to inaugurate a new multiscalar synergetic coil guided by ecocentric values. This represents the initial step toward synergizing the mosaic of depleted landscapes and terrestrial developments within the Fringe.

The Conceptual lenses

Terrestrial Development

Terrestrial Development encompasses the conceptualization and study of growth, evolution, and transformation on Earth's surface. It integrates various disciplines to understand the dynamic interaction among ecological, geological, climatic, and anthropogenic factors shaping human territories. In doing so it uncovers the patterns, structures, and functions of ecosystems, considering both natural and human-induced influences. It involves land-use changes, biodiversity dynamics, geological processes, and environmental factors, providing a comprehensive understanding of Earth's terrestrial systems.

Altered Nature

The concept of Altered Nature implies a human-initiated environmental alteration aimed at adapting the ecosystem to serve humans, beyond the state of co-existence. Fluctuating the relation to one of dependency upon continuous human interference. Causing the biotic and abiotic to decline. Creating a landscape of depletion, existing to add (socioeconomic) value for the human.

Residual Identity

Residual Identity refers to the identity of a place that remains in that place or is perceived to be the identity of the place after it has transformed over time. These transformations involve design implementation, strategies in governance, or a combination, aimed at changing the perception, people have of a place. The theories of place identity and memory, explain that identity can be altered to combat a perception of the place.

Pseudo-countryside Economics

The concept of Pseudo-countryside Economics is an evolvement of the theory of Pseudo-countryside Development, adding the notion of economic demand and profitability. With the demand being from the footloose dweller. The profitability lies in the fact that the developer prefers to develop within the pseudo-countryside location. Creating a visage circle of demand versus location availability versus profit.

The Depleted Landscape

A Depleted Landscape refers to the deterioration of the quality and productivity of the land in soil quality, soil contamination, overgrazing, pollution, urbanisation, and resource extraction. Leading to a reduction in natural and ecological operationalisation, making them less suitable habitats for wildlife, humans, agriculture, and environmental purposes. This implies landscapes that have suffered from forms of land degradation and have lost (some of) their natural or productive qualities.

The Fringe

Within the theory of the Borderscapes (Krichker, 2021; van Houtum & Spierings, 2012), and the theory of the Green Belts (Farjon et al., 2004; Kühn, 2003), those locations that depict the meeting of the urban and the rural, are the Fringe (Whitehand, 1967). A dynamic zone of transition and change, influenced by factors such as urban expansion, suburbanisation, land use and economic development.

Ecocentric Paradigm

The Ecocentric Paradigm embodies the concept of ecocentrism but turns it into a paradigm. Underscores the inherent worth and interdependency of every living entity and its surrounding environment. Seeing that humans are an element within a broader ecosystem and that their welfare is linked to the overall well-being of natural systems. This synergy is realized through a cooperative and balanced coexistence.

The Synergetic Landscape

The concept of the Synergetic Landscape symbolises the implementation of synergetic landscape planning through the ecocentric paradigm upon the landscape. Implies a landscape which has an inherent balance between its social, economic, and environmental elements.

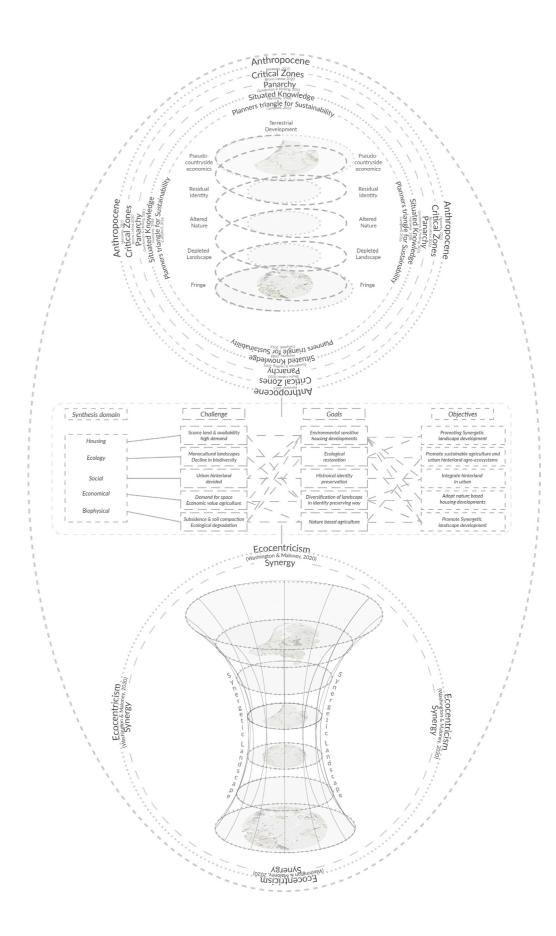


Figure 74, The conceptual framework.

5.5 Methodological Research Framework

The project encompasses five essential modules, each contributing to the anticipated outcomes. A literature review underpins each phase, providing systematic insights across diverse domains and supporting specific methods.

The first phase, the contextual problem field, defines the line of inquiry and establishes the contextual background through scenario-based perspectives. Literature reviews transform theories into thesis-specific prospects and guidelines, tailored to the Dutch site-specific context.

The second module, the problem analysis phase, culminates into four consecutive research before the design sections. These sections explore aspects like pseudo-countryside economics, altered nature, and residual identity, using literature reviews, cartographic reviews, systematic graphing, and a choice of digital interpolation studies to contribute to the problem statement and establish a theoretical and conceptual framework. The narrative is shaped within the ecocentric paradigm and frameworks such as Critical Zone and Panarchy.

The third module, Fringe analysis, follows a similar approach with additional case studies to exemplify theoretical concepts.

The fourth module, strategy and design, entails research through design phases, incorporating an ecocentric synergetic lens to identify spatial interdependencies and opportunities for the Fringe. This phase integrates insights from previous research, addressing landscape depletion and housing scarcity while proposing a synergetic design strategy.

The fifth phase, the evaluation, establishes, criteria for evaluating synergetic housing developments, tailored to the ecocentricity of the Fringe. These criteria inform design and policy implementations, initiating new design loops or leading to thesis reflection and conclusion.

Design thinking is fundamental throughout each phase, guiding the generation of scenarios and choices through both convergent and divergent thinking. This iterative process of analysis, synthesis, and projection mirrors, the research-through-design approach embedded within the modules.

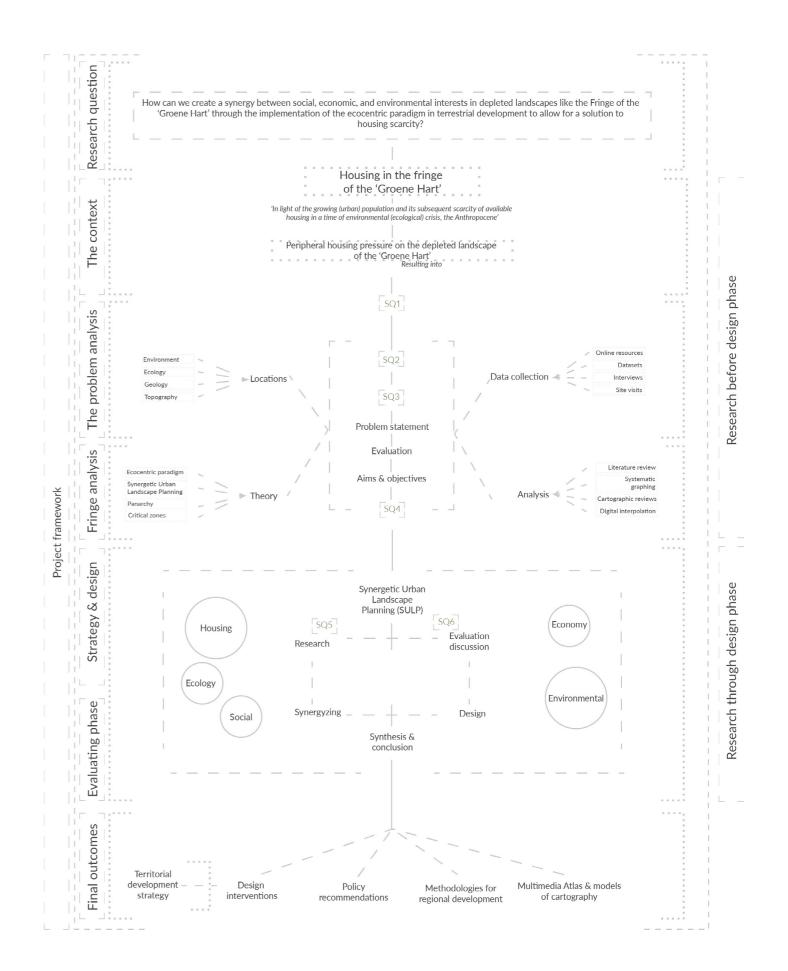


Figure 75, Methodological research framework.

5.6 The Scales of the Thesis

The thesis centres on examining the Fringe of the 'Groene Hart' in the Netherlands, particularly its spatial design and operationalisation in response to housing pressure. Attention is given to the operationalisation influenced by the altered natural landscape, shaping housing market dynamics. Hence, the thesis requires a multiscalar approach to illustrate continuity and propose alternative designs.

The design proposal entails creating a mosaic of agroecological urban housing developments at diverse spatial scales within the Macro, Meso, and Micro scales. The design scales adapt to specific subjects or challenging conditions, considering temporal dimensions.

THE MACRO SCALE

The project's largest scale aims to contextualize significant challenges within the framework of this thesis. It operates at an abstract level of the Randstad Holland, emphasizing the interrelations between challenges and the system's synergetic functioning. This approach results in a regional strategic plan, visually represented through large-scale maps and diagrams, accentuating the strategic connections with the surrounding urban belt.

THE MESOSCALE

On this scale, the strategy intertwines with the landscape's regional conditions at the territorial level. The strategy will be designed to implement new housing morphologies that align with the landscape conditions. This integration of various disciplines will be conveyed through maps, isometrics, and diagrams of a schematic nature, with a focus on its integration within the entire area, allowing for the incorporation of the network aspect of the Fringe.

THE MICROSCALE

On this scale, the relationship between housing developments and diverse landscapes and their uses are detailed to illustrate an alternative case for the 'Vijfde dorp' in the municipality of the Zuidplas. This scale will illustrate the effects of interventions on residents and the surrounding landscape. The integration will be communicated through (isometric) maps and sections, complemented by collages and diagrammatic schemes to provide eye perspectives with a tangible sense of the ecocentric transformations.

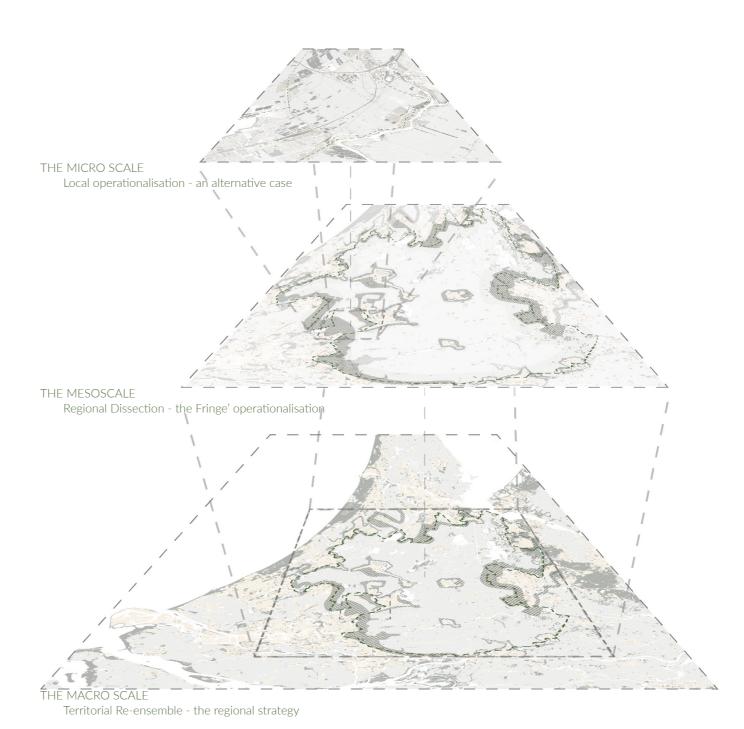


Figure 76, The scales of the thesis.



THE MICROSCALE OF THE ZUIDPLAS - HET VIJFDE DORP

The case for the 'Vijfde dorp' circumscribes the challenge of accommodating all new homes within existing urban areas, given that not everyone desires or can live in the urban (Gemeente Zuidplas & KuiperCompagnons, 2021). Consequently, there is demand for affordable green environments, homes with gardens, and compact hamlets with recreational spaces. This plan envisions an 8000-dwelling new village development in the Zuidplaspolder, aiming to create a sustainable village offering housing options for various budgets, ample services, and green spaces.

Situated within the Zuidplaspolder near Rotterdam, Den Haag, and Gouda, the site is strategically positioned along motorways and railroads, an important development location within the Southern Randstad. Embodying challenges related to landscape, living, recreation, nature, and agriculture on a smaller scale (Brands & Kessel, 2022). Designated as of national interest for housing development in the recent coalition agreement, the project involves a public-private partnership, with the Municipality of Zuidplas actively participating alongside governmental authorities and developers.

The envisioned masterplan entails compact quarters surrounding a central park, featuring a mix of housing types and densities with different thematic (Gemeente Zuidplas & KuiperCompagnons, 2021). Development principles aim to preserve the local village identity while forming a green buffer containing further Fringe development. The allotment structure serves as the development framework, facilitating a gradual transition towards a wetter landscape with a high ecological value with agriculture mixed in.

In essence, the demand for 'traditional' suburban housing developments in this case of landscape contention offers an opportunity to explore an alternative approach.



Figure 77, Location of the Fifth village.

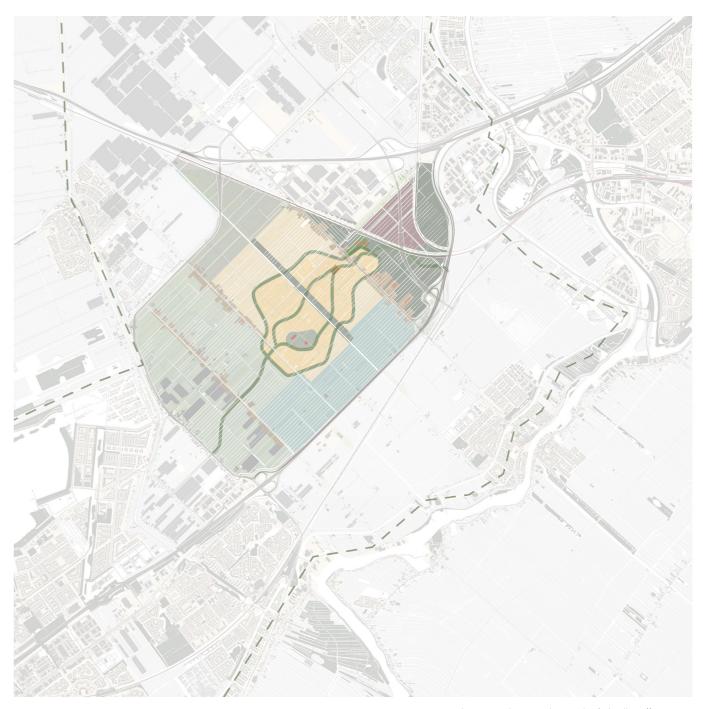


Figure 78, Currently proposed masterplan for the fifth village ((Gemeente Zuidplas & KuiperCompagnons, 2021) edited by author).



N O

5.7 The Scientific, Societal, Ethical Relevance & Limitations

Limits

Given the intricate nature of territorial projects, it is determined that the territorial reorganisation of the Fringe will focus on connecting the 'Groene Hart' and its surrounding Randstad, with an accent on housing and associated aspects like society, ecology, and economy. This approach excludes or downplays other regions with different administrative, regional, or theoretical, units, a decision made to maintain the thesis's experimental focus and prevent unnecessary complexity.

Moreover, while recognising the importance of urban renewal and densification in addressing the housing crisis and limiting suburban Fringe developments, this thesis allocates limited attention to such projects due to its focus on housing within the Fringe.

Likewise, this thesis refrains from explicitly addressing topics such as energy transition, circular economy, or the agricultural nitrogen crisis. Instead, it examines those themes only when they intersect with housing and land use issues within the 'Groene Hart' Fringe.

Scientific Relevance

Research on housing within the 'Groene Hart' Fringe remains limited, particularly when considering its role beyond the contemporary urbanism realm and economic activity, creating a knowledge gap. Despite recent attention on housing scarcity and related ecological, and agricultural debates have shifted attention towards areas outside the traditional metropolitan, Fringes, especially in combination with production landscapes remain unexplored in the Netherlands. This thesis offers a fresh perspective on housing within these Fringes, portraying them as shared spaces for humans and non-human entities, intentionally designed within synergy beyond traditional suburban norms.

The 'Groene Hart' Fringe serves as an illustrative case, highlighting a historically human-altered landscape evermore on the edge of urbanisation. Within its defined boundaries, it encapsulates various aspects of urban and non-urban utilisation and politicization.

Societal Relevance

The 'Groene Hart' and its Fringes hold significant historical importance for Dutch urbanisation and civilisation, embodying the quintessential Dutch landscape, to the development of the organisational 'polder model' and prosperity through peat excavation and farming.

However, as underscored by critical analysis, the region has borne witness to encapsulate the conflicts inherent in capitalist systems. It encompasses various challenges such as resource extraction, industrialization, environmental degradation, societal divisions, and housing scarcity.

Given these complexities, it would be naïve to assume that any single thesis could independently engage all the stakeholders and offer a comprehensive blueprint for the future. However, a thesis can achieve an alternative perspective on housing development within the Fringe.

This perspective challenges the prevailing economically and politically driven approach by advocating for an ecocentric approach that values both humans and non-human entities equally. It serves as a reminder of the shared history of civilizations that once viewed the landscape as a communal space free from exploitation.

Fthical Relevance

Throughout history, the 'Groene Hart' has not only shaped a shared identity and history but has also been statically utilized to reinforce its spatial, political, and economic significance. In the context of the Anthropocene, these dynamics are evident through the complex interdependencies between the 'Groene Hart' and its hinterland, particularly the Randstad, in terms of housing and resource relationships.

This study prioritizes these relationships, acknowledging their impact on both human and non-human entities. As urban designers addressing these issues requires a critical mindset that transcends personal biases and challenges the prevailing preconceptions legitimized by dominant power structures.

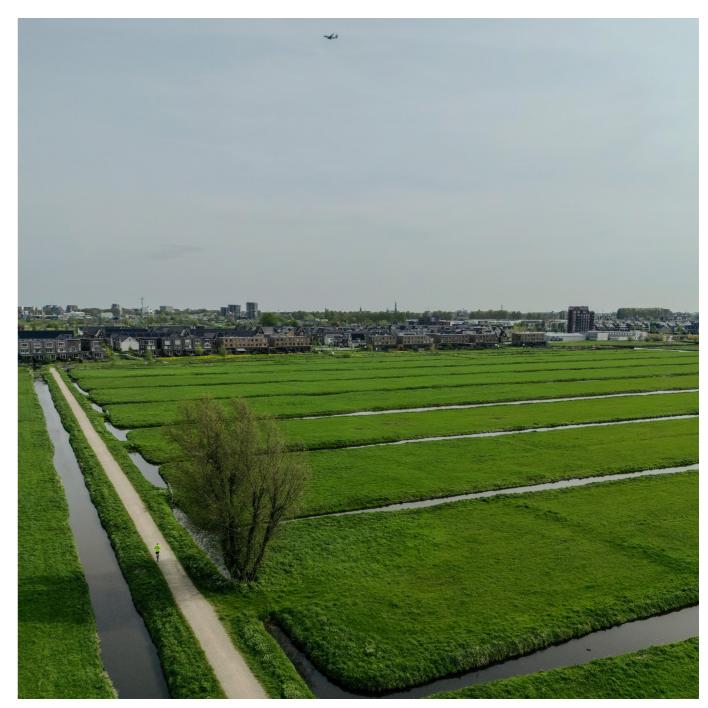


Figure 79, The Fringe at Westergouwe.

6. The Composition of the Fringe

The sixth chapter gives an overview of the third part of the thesis, the composition. It outlines the current Fringe, as well as the philosophies demarcating it. Clear agreement about what the Fringe is, is a necessity since it was determined that 'Groene Hart' is not a paradigm, let alone a defined entity. In doing so it concludes the sub-research question:

What can currently, based upon Fringe literature, be defined as the elements and principles of the Fringe of the 'Groene Hart'?



Figure 80, The Fringe of the 'Groene Hart', Zevenhuizen.

6.1 The Fringe of the 'Groene Hart'

Between the urban and the rural, a dynamic zone of transition and change, influenced by urban expansion, suburbanisation, land use and economic development occurs. Typically, this zone signifies the peripheral zone of a city to the rural, coined the rural-urban Fringe (Whitehand, 1967), characterised by its proximity to the urban. However, exhibiting different land uses, development patterns, and demographic characteristics compared to the central part of the city or rural.

Historically termed the 'Stadtrandzone' in 1936, the Fringe was introduced by the geographer Herbert Louis, as an extensive emerging area at the urban periphery during pauses of urban expansion (Whitehand & Morton, 2004). Subsequently, it is closely related to borderscapes which denote a transitional territory, which can be gradual or of hard passage but has an element of temporality to it.

In the Netherlands, extensive urbanization has altered most of these Fringes in recent decades, with further shifts towards urban development expected. These changes result in diverse intricate hybrid landscapes, featuring a mosaic of residential, commercial, agricultural, and recreational spaces, that exhibit diverse spatial and functional characteristics (Nabielek et al., 2013), particularly evident around the 'Groene Hart' (Bryant et al., 1982; Gallent et al., 2006; Nabielek et al., 2013), blending rural and urban as walls of terrestrial urbanization.

The demarcation of the current Fringe is based upon a quantitative methodology outlined by Hamers, Nabielek, Piek and Sorel (2009) and by Wagtendonk and Schotten (2000), entailing that the size of the Fringe depends on the size of the urban, with the size varying throughout, the larger the urban area, the wider the Fringe (Nabielek et al., 2013). The width of the Fringe is calculated based on the following two formulas which were interpolated, and merged using QGIS:

Outer Fringe (m) = $\sqrt{\text{urban surface area (m}^2)} / 6$ Inner Fringe (m) = $\sqrt{\text{urban surface area (m}^2)} / 12$

Creating a 128.756-hectare area. The size of urban areas was extracted from the Bestand bodemgebruik 2017 by the Centraal Bureau voor de Statistiek (2018), and the dominator was enlarged based upon Hamers, Nabielek, Piek and Sorel (2009) methodology to fit the Dutch Fringe.

Despite maintaining a predominantly green character (M. Piek & Niet, 2010; Vreke et al., 2007), the rural-urban Fringes in the 'Groene Hart' face increasing pressure from competing land-use demands, particularly from urban functions such as housing, employment, and recreation. This ongoing transformation underscores the importance of addressing the challenges posed by urban encroachment on natural and agricultural areas within these Fringes.

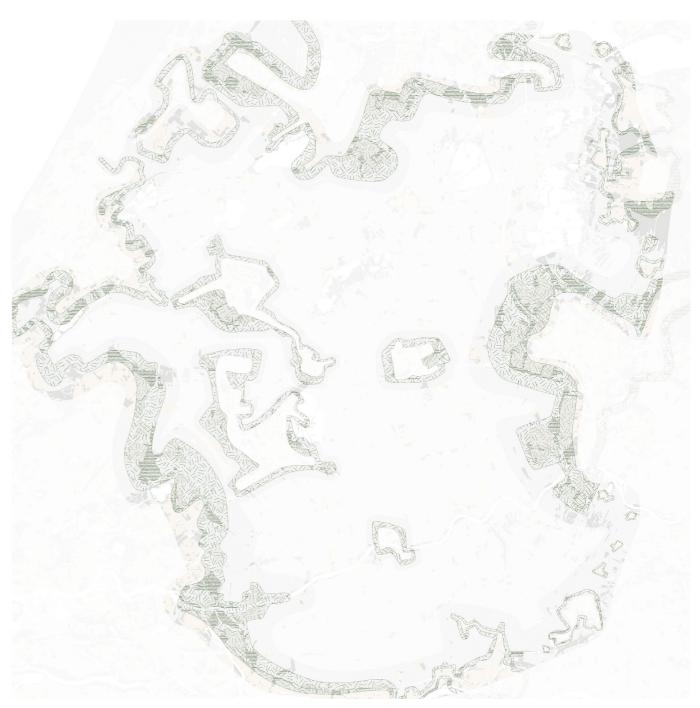


Figure 81, The parts of the current Fringe.



6.2 Parts of the Fringe

The dynamic nature of the Fringe facilitates diverse land uses, necessitating a classification system. This thesis adopts the classification system of Bestand bodemgebruik 2017 by the Centraal Bureau voor de Statistiek (2018), which combines different categories to categorize the complexity of the Fringe. In the 'Groene Hart' Fringe, distinctions are made between large-scale residential areas (e.g., VINEX neighbourhoods), small-scale residential areas (e.g., lint villages or hamlets), commercial and business areas, retail centres, recreational spaces, and intermediate agricultural areas, as outlined below. The location of the current Fringe is defined in the preceding subchapter.

LARGE-SCALE RESIDENTIAL AREAS

Residential housing takes centre stage as the prominent urban function comprising 10.436 hectares. Recent years have highlighted the creation of extensive suburban neighbourhoods following the Vinex program. Examples include Ypenburg (The Hague), Carnisselande (Rotterdam), Leidsche Rijn (Utrecht), and Almere Buiten (Almere). Despite offering various housing types and styles, these Vinex locations have been criticized for their monofunctionally and lack of adaptability in addressing future urban transformation challenges.

COMMERCIAL, BUSINESS PARK & RETAIL CENTRES

Often, these developments occupy residual spaces between motorways and residential areas, featuring furniture, hardware stores and garden centres, in proximity to motorways. Generally, these retail zones are marked by a highly functional layout. Within the Fringe, they occupy 4.842 hectares.

RECREATIONAL AREAS

Examples include sports grounds, allotment gardens, natural areas, and parks as well as indoor skiing facilities, thermal baths, and multiplex cinemas. Within the Fringe, they occupy 13.422 hectares.

IN-BETWEEN AREAS & AGRICULTURE

Intermediary zones exhibit administrative fragmentation, delineated by municipal borders and spatial fragmentation. Contradicting, it comprises homogeneous agricultural pastures. Within the Fringe, it stretches 72.054 hectares.

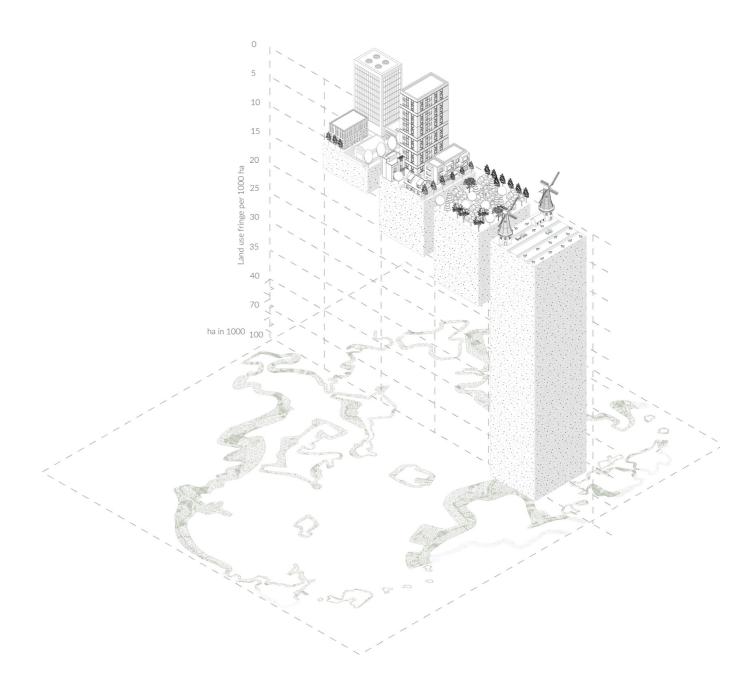


Figure 82, The current Fringe along the 'Groene Hart' ((Centraal Bureau voor de Statistiek, 2018) edited by author).





Figure 83, Large-scale residential areas.



Figure 84, Commercial areas, business parks and retail centres.



Figure 85, Recreational areas.



Figure 86, In-between areas & agriculture.

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The Spatial Structures of the Fringe

Another method to classify the Fringe into defined spatial entities is by following the landscape structures (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2023). Subsequently, the distinction between the Open polder, Block allotment, Stretched allotment, Droogmakerij polder, Waard, Riverlint, Old alluvial ridge, and Big river zones arises. In the continuation of the thesis, this classification system will be utilised as the principal classification tool, due to its ability to define spatial entities and regions within the Fringe. Something the land use classification could not.

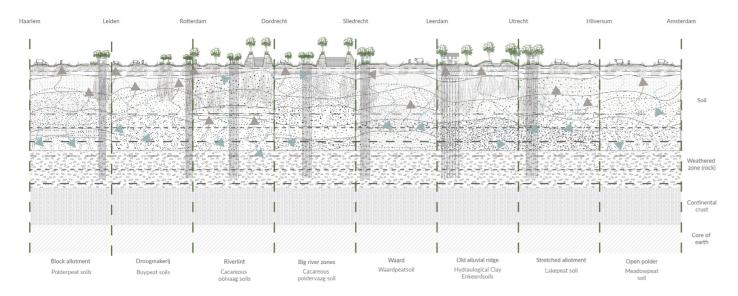


Figure 87, The regionalism of the Fringe.





Figure 88, The spatial structures of the Fringe.



OPEN POLDER

The Open polder demarcates an open agricultural pasture landscape, directionated by ditches with high water levels, for drainage (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021). The open space is sharply contrasted by river ribbons on the outskirts of the polder. Typically housing only takes place on the outskirts adjacent to the river ribbons with the polder, being filled with pastures in stripe allotment (Steenhuis et al., 2023).

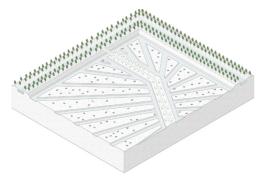


Figure 89, Open polder.

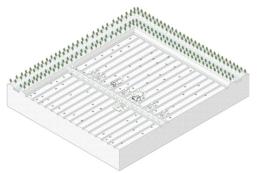


Figure 91, Stretched allotment.

STRETCHED ALLOTMENT

Stretched allotment differentiates from block allotment by being a vast and open agricultural landscape in stripe allotment, directionated by ditches with high water levels, for drainage of less width (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021). Similarly, built-up lint ribbons run perpendicular to the allotment.

BLOCK ALLOTMENT

Block allotment delineates a vast agricultural landscape in blocked allotment, directionated by ditches with high water levels, for drainage (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021). The elongated allotment finds its basis within the cope allotment and gives these landscapes its perpendicular reclamation originating from the built-up lint. In these lints of compacting and widening nature, housing takes place (Steenhuis et al., 2023).

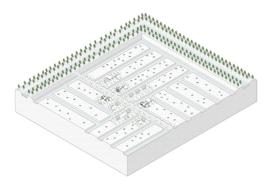


Figure 90, Block allotment.

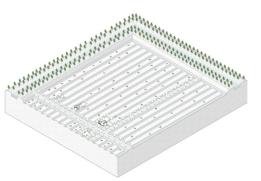


Figure 92, Droogmakerij polder.

DROOGMAKERIJ POLDER

Droogmakerij polder distinguishes an open rationally arranged pasture of orthogonal layout, with fixed dimensions, directionated by ditches with high water levels (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021). The openness is contrasted by surrounding high dykes. Throughout the polder, built-up lint ribbons filled with tree lines crisscross the openness (Steenhuis et al., 2023).

Waard

Waard establishes a vast striped meadow pasture landscape, directionated by ditches with high water levels (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021). The stripped allotment finds its basis within the cope allotment and gives these landscapes its perpendicular nature, of strong longitudinal direction. The reclamation originates from the built-up lint. In these lints of compacting and widening nature, housing takes place (Steenhuis et al., 2023).

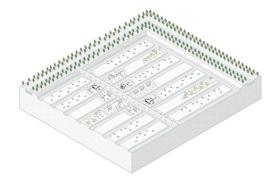


Figure 93, Waard.



Figure 95, Old alluvial ridge.

OLD ALLUVIAL RIDGE

An old alluvial ridge delineates a wide meandering zone around a meandering river, with a mosaic of land use, resembling a form of block allotments with lots of greenery, villages, roads, and orchards along the ridge (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021). Originally, the zone had a gradual transition to the surrounding landscape.

RIVERLINT

Riverlint differentiates a narrow, but variable meandering lint ribbon around a small river, with a mixture of roads, housing, and orchards, on either side (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021). The ribbon is elevated in the polder landscape, with grass embankments at the transition.

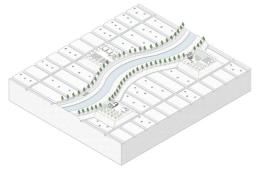


Figure 94, Riverlint.

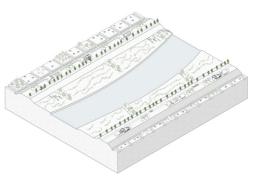


Figure 96, Big river zones.

BIG RIVER ZONES

Big river zones define a wide-open zone around the central large rivers. The zone outlines large-scale dikes with dep floodplains flanking the river ridge (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021). The inner dike zone gradually changes into an open meadow landscape.

6.3 A Green Belt or a Green Heart

A spatial concept related to the traditional meaning of the rural-urban Fringe is the Green Belt, entailing a means to preserve landscapes by designating distinct zones separating urban areas from rural. Serving as a tool to curb urban sprawl and preserve natural values, reflects the cultural ideal of integrating cities into picturesque rural landscapes to provide recreation, nature, and food to urban dwellers (Farjon et al., 2004; Kühn, 2003). This influential notion continued to shape modern landscape architecture and urbanism throughout the early 20th century, particularly after the introduction of garden cities by Ebenezer Howard in 1902 and consecutive garden city-inspired urban expansion neighbourhoods (Kühn, 2003). Becoming the standard tool in the United Kingdom to control urbanisation making it widely implemented, as exemplified by the Metropolitan Green Belt around London (Kühn, 2003).

In the Netherlands, the embodiment of the Green Belt concept is evident within the Randstad Metropole and accompanying 'Groene Hart', conceived as a reversed green belt surrounding a green centre. Aligning with Albert Plesman's idea and introduced as a planning concept in the first two spatial memorandums, (Netherlands. Ministerie van Volkshuisvesting en Bouwnijverheid, 1960; Rijksdienst voor het Nationale Plan, 1958) as a tool to separate the cities, protect the agricultural lands from urban expansion and offer space for recreation (Bruinsma & Koomen, 2018; Lörzing, 2021), functioning as a traditional green belt.

A prominent interpretation of the Green Belt concept within the Netherlands is reflected in Amsterdam's landscape relationship policy, denoting the Scheggen structure. Coping with the need to expand the city in the early 20th century resulted in Amsterdam under the supervision of Cornelis van Eesteren developing the Algemeen Uitbreidings Plan in 1935 (van Rooijen, 1990). Van Eesteren under the zeitgeist of the Garden City movement, Hermann Jansen's Berlin Stadtvisionen plan and Bauhaus included the notion of access to public green spaces, to allow its dwellers a place to breathe (Borsi, 2015; van Rooijen, 1990). Within the AUP Amsterdam would not have an additional ring of urbanisation but a lobe structure, in which the new extensions protrude like fingers into the surrounding rural green landscapes, with the green wedges (Scheggen) reaching deep into the urban (van Rooijen, 1990; Ven Eesteren Museum).



Figure 97, The Algemeen Uitbreidings Plan in 1935 (van Rooijen, 1990; Ven Eesteren Museum).

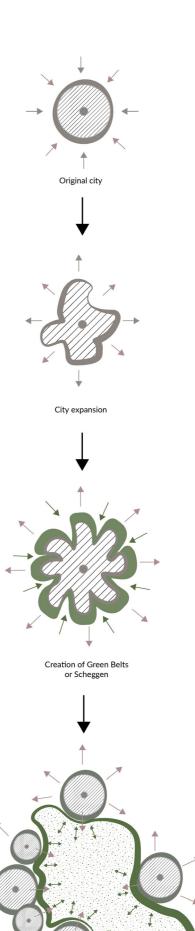


Figure 98, From Green Belt concept to succession of a 'Groene Hart'.

The design philosophy involved a continuous green trail, ensuring that every inhabitant was within a 10-minute bike distance of greenery (Feddes & Hellemondt, 2011). Realised by the wedges structure, as continuous greenery connecting the house to the large scale of the landscape, through a series of courtyards, green strips, and parks that connected onto the Wedges, creating park landscapes (Feddes & Hellemondt, 2011; Krombeen, 2017).

Today, Amsterdam's Scheggen form an integral part of the city's spatial policy, serving as a crucial element in limiting urban expansion and enhancing the city's resilience to climate change (Architectuur Centrum Amsterdam, 2019; Gemeente Amsterdam, 2011). The inclusion of green deep into the city contributes to its overall quality of life and increases social appreciation for these areas (Bos & Vogelzang, 2018). Hence showcasing that the design by Van Eesteren and further municipal policy implementation have withstood the test of time, as they are continuing to be valued and preserved.

Subsequently, research has shown that Green Belts are effective in reducing urban sprawl, particularly when integrated into wider regional strategies with legally binding policy frameworks (Pourtaherian & Jaeger, 2022). The case for the Amsterdamse Scheggen underscores the importance of long-term strategies in accommodating city expansion while preserving the values of surrounding landscapes, emphasizing the need for sustained, society-valued visions in urban development.



Figure 99, Amsterdam's Scheggen 1950.



Figure 100, Amsterdam's Scheggen 1988.



Figure 101, Amsterdam's Scheggen 2023.



6.4 The Demise of the Fringe, a VINEX or a NOVEX Development

Like the current NOVEX developments, the VINEX concept of new outer city suburbanisation represented a solution to address the escalating housing crisis caused by decentralization and suburbanization during the 1970s and 1980s. Rooted in the 'Vierde Nota Ruimtelijke Ordening Extra' memorandum, and influenced by New Urbanism principles, VINEX aimed to counter the loss of rural and natural land at the urban Fringe while alleviating road congestion (Karsten & Stigter-Speksnijder, 2006; Lörzing et al., 2006). The developments were designed to attract businesses and residents with above-average incomes, those who had previously moved away from the city, by promoting urban sustainability, and reducing car dependency by integrating public transport (BIJN, 2004; Boeijenga et al., 2008; Hoff, 2006; Lörzing et al., 2006; RIGO Research et al., 2006).

Characterized by functional layouts, spacious design, and ample green spaces, VINEX neighbourhoods followed a standardized, often prefabricated program, comprising 30% social rent and 70% ownership (Boeijenga et al., 2008; Hoff, 2006; Lörzing et al., 2006; RIGO Research et al., 2006).

Critics argued that the neighbourhoods were monotonous, and lacked diversity and social cohesion, with an overabundance of abundant single-family homes and insufficient services (Karsten & Stigter-Speksnijder, 2006; Taal, 2022; Verweij, 2006; Witman, 2015; Zonneveld, 2006). Additionally, the attempt to please everyone resulted in a lack of unique identity and architectural diversity, failing to align with either urban or rural characteristics, contradicting the original intention (Karsten & Stigter-Speksnijder, 2006).

Critics attribute problems to the introduction of thematization, noting that similar themes, like water or history, were in abundance (BIJN, 2004; Karsten & Stigter-Speksnijder, 2006; Landman, 2021; Lörzing et al., 2006; Verweij, 2006). Accordingly, neighbourhoods adopted similar identities, lacking distinctiveness, catering to commercial marketing themes rather than local society and place identity.

This led to a uniform and monotonous interchange of identities, with the commonality being adherence to the former allotment structure as a landscape embedding element. An aesthetic repressing the zeitgeist, linking restrained functionalism to the use of traditional materials, coined the 'vernacular' style, one of historicizing postmodernism (Karsten & Stigter-Speksnijder, 2006; Lörzing et al., 2006).

Commonly, attributed to having caused the demise of the VINEX, and in continuation threatening the Fringe and NOVEX developments, are the vague guidelines comprising the VINEX doctrine (Karsten & Stigter-Speksnijder, 2006; Lennartz & Vries, 2024; Lörzing et al., 2006). Resulting in developments of interpretation, not to the fullest fulfilling the doctrines as is illustrated in the following case study.



Figure 102, A VINEX standardized prefabricated house in its characteristic Vernacular, historizing post-modernistic style, Nesselande, Rotterdam.



Figure 103, Water, dunes vernacular thematization within the Nesselande Rotterdam VINEX.

A Case Comparison of Fringe Developments

This section presents a case study towards a current Fringe development, examining its contemporary nature, and underscoring its susceptibility to previous critiques of VINEX.

Weespersluis Bloemendalerpolder

Located between the intercity-connected village of Weesp and the A1 motorway, the Weespersluis Bloemendalerpolder development occupies a transitional zone on the Fringe of the 'Groene Hart', strategically located to retain its small-town rural character while maintaining proximity to Amsterdam and the Gooi. With approximately 3,550 single-family homes ranging from row to detached housing, with a coination of affordability (Velden et al., 2014).

Distinguished by its non-traditional public-private partnership using a concession model, the Weespersluis project delegates realization entirely to market parties, aligning with contemporary market-driven trends and the New Urbanism zeitgeist (Zeeuw et al., 2014). Notably, the government mandates that at least two-thirds of the development incorporate sustainable green-blue natural recreational infill, a commitment upheld by the developers to foster inclusivity in both the local social identity and natural context, differentiating themselves from earlier VINEX developments (Zeeuw et al., 2014).

Emphasizes the interconnectedness of greenery, water, and residential areas, the project highlights the central Gouw waterbody's role in introducing the identity and landscape of the Vecht (Zeeuw et al., 2014). However, there's a deliberate shift in strategy, utilising Vecht's embedded character as a marketing focus rather than emphasizing its proximity to infrastructure or Weesp (Zeeuw et al., 2014). This represents a departure from the initial commitment to inclusivity of local society and place identity, leaning towards the VINEX notion for commercial profit, utilizing constructed identity for commercial purposes. While its embedded nature serves a marketing purpose and practical place to dock your sloop.



Figure 104, The location of Weespersluis, near Weesp.



Figure 105, Weespersluis situated along the A1 motorway near Amsterdam.



Figure 106, The embedded green spaces among the commercial thematization.



Figure 107, Weespersluis development ((Velden et al., 2014) edited by



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Notably, the development maintains VINEX's commitment to adhere to the former allotment structure as a foundational element for landscape structure. The plans emphasize that this follows the governmental two-thirds rule (Nauta et al., 2014). Conspicuously, the approach includes incorporating existing ditches and allotment pots whenever feasible, forming a natural structure with four pillars, a northern forest opening, the Gouw serving as the blue heart, parks avenues, and canals connecting to the Vecht in the east, along with green avenues and canals linking Weesp to the development in the south (Nauta et al., 2014; Velden et al., 2014).

Thematization and identity differentiation are evident within the development quarters, with each employing generic VINEX themes of water and history. The central design revolves around 'strolling in the 'landscape', while quarters like Waterrijk focus on 'living by the water in the landscape', the historic quarter Lanenrijk on 'bringing the landscape into the residential area', and the historic urban Vechtrijk on 'living by the park in the landscape' (Velden et al., 2014). Orientation, density, and landscape relationships further distinguish the quarters, reflecting thematic choices based on local context. The cohesive thematic DNA, evident in the consistent use of colours and bricks, is maintained throughout the development via buyer contracts (Velden et al., 2014).

Moreover, the thematization underscores the pitfall of the VINEX doctrine, focusing on a homogeneous audience of highly educated prosperous single families (Velden et al., 2014). Contradicting the connotation of affordability and integration among local rural communities (Zeeuw et al., 2014). However, perfectly fitting to the widespread implementation of the neighbourhood's design principles, protecting the housing values.



Figure 108, The disappearing landscape connection towards the Vecht.



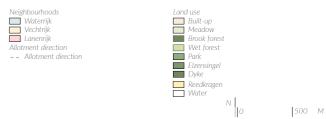
Figure 109, The employment of generic historic thematization similar as to the VINEX.



Figure 110, Exemplary build-form to nature transition.



Figure 111, Allotment direction Weespersluis ((Velden et al., 2014) edited by author).



Distinctively, Weespersluis meticulously integrates into the Fringe, particularly focusing on the build transitioning into the natural surroundings within the neighbourhood, achieved by a detailed rule-based transition plan that considers the landscape features to determine the method of transition, independent of the lot usage (Velden et al., 2014). The plan encompasses five types of transition, each with associated rules, as illustrated in the accompanying diagrams and map.

In conclusion, the Weespersluis Bloemendalerpolder Fringe development comprises similar foundational points embodying the VINEX critiques and New Urbanism. Conversely, it exemplifies the method for DNA protection through the standardisation of design principles. Upholding a possibility for Fringe inclusive transition.



Figure 112, Weespersluis transition strategies ((Velden et al., 2014) edited by author).



Figure 113, Weespersluis transition strategies ((Velden et al., 2014) edited by author).



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VINEX conclusion

The downfall of VINEX developments, and the subsequent threat to Fringe and NOVEX developments, is attributed to the ambiguous guidelines within the VINEX doctrine (Karsten & Stigter-Speksnijder, 2006; Lörzing et al., 2006). With solutions to the current housing crisis continuing in the zeitgeist of the VINEX doctrine and New Urbanism, it makes the NOVEX neighbourhoods similarly susceptible. With the critiques centring around the neglect of place identity caused by the presence of the same multiple identities in these neighbourhoods, a compromise in both location's genius loci, services, and dwellers' identities as shaping tools. These issues underscore the continuation of market-driven economic-centric developments leading to unaligned housing developments within the Fringe of the 'Groene Hart'. Raising the challenge to not fall for the previous mistakes within the development of the Fringe developments.



Figure 114, VINEX multiple non-place specific identities present.



Figure 115, VINEX place identity as a shaping tool.

6.5 The Conclusion of the Spatial Analysis of the Fringe

The Fringe represents the transitional zone between urban to rural areas, like Green Belts designed to contain urban sprawl. It demarcates a transitional strip of residential, commercial, agricultural, and recreational spaces, dependent upon urban size, with a green character. However, due to market-driven spatial policies and developers, there's a shift towards primary housing, like the disappointments experienced with VINEX.

To come to a new reality for the Fringe one must learn the lessons from the past and the present. Currently, the living environment suffers from increased external pressure to build housing and associated infrastructure, while internal issues include the need to address subsidence through wetland restoration and the transition from intensive dairy farming to a more sustainable model. In addition, there is an increase in 'dwelling' and recreation, declining biodiversity, and enhancing nitrogen problems. The spatial analysis within chapters three, four, five, and seven indicates the interwovenness within the different bottlenecks through networks of interdependencies and correlations, implying that solving one or one by one is not an option.

Continuing the current path is no longer a viable option. Hence, a cross-sectoral cooperative approach is necessary, transcending borders, and seeking synergetic solutions. Suggesting that the Fringe should no longer be a place of demarcation but a place of graduality, a delta landscape of land usage and interactions fostering synergies of non-exploitative housing.

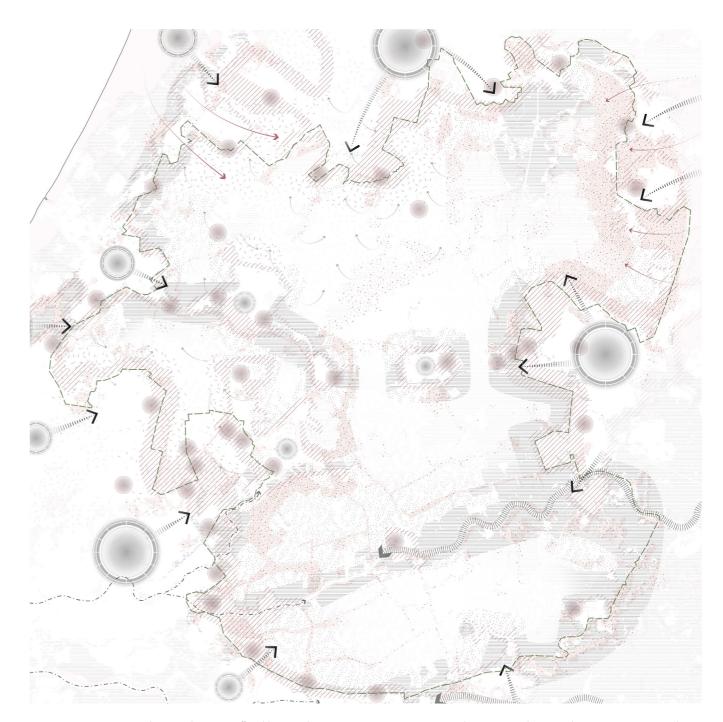
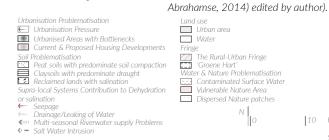


Figure 116, Fringe analysis conclusion map ((Buchhorn et al., 2020; CBS & PBL, 2015; Centraal Bureau voor de Statistiek, 2018, 2023c; Erfgoed, 2015; Klimaateffectatlas, 2023; Melchert Reudink et al., 2023; Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2021; Nabielek et al., 2020; Nationale Databank Flora en Fauna & Georegister, 2017; Panagos et al., 2022; Rijksinstituut voor Volksgezondheid en Milieu, 2015; RIVM et al., 2019; Rutte &



7. Design Strategy

The seventh chapter gives the design strategy, the fourth part of the thesis and answers the sub-research question:

How can the ecocentric paradigm direct a synergy between social, economic, and environmental interests and what are methods elements, and conditions for using the ecocentric paradigm in terrestrial development and design?

Concluding with insights into how the Fringe could be designed.



7.1 Design Preconditions - An Ecocentric Future

An ecocentric future embodies the theory of ecocentrism as a paradigm, fostering a synergetic partnership between humans and nature, with equal emphasis on both elements, highlighting their mutual importance (Vink et al., 2024; Washington & Maloney, 2020). It acknowledges nature not merely as a tool, but as a goal, aiming for mutual benefit and coexistence with humanity, stressing the intrinsic value and interdependence of all living beings and their environments. Recognizing humans as integral components of a larger ecosystem, where their well-being is intricately connected to the health of natural systems (Curry, 2011; Daly, 2014; Rolston III, 2020; Vieira & Sampaio, 2022; Vink et al., 2024; Washington & Maloney, 2020; Washington et al., 2017; Yigitcanlar & Dizdaroglu, 2015). Achieving this ecocentric future involves fostering synergetic and balanced coexistence.

This approach contrasts the zeitgeist of New Urbanism in contemporary urbanism, which is inherently human-centric, advocating for sustainable urban design, to enhance human wellbeing and economic prosperity (CNU, N.d.). Similarly, it deviates from lan McHarg's 'Design with Nature' (1969), which, despite considering locations' natural elements and quality, primarily aims to improve the human experience in a human-centric manner.

Implementing an ecocentric future starts with the shift to nature-inclusive design, where plants and animals are equal parts alongside humans in the design (Pierre & Klok, 2015). This entails viewing natural elements not as additions but as integral components of the architecture, with architectural elements reflecting the site's ecological values, incorporating its blue, green, and brown networks (Vink et al., 2024). Such design practices emphasise Nature-Based solutions and materials that integrate ecological considerations with other values (Vink et al., 2024; Vink et al., 2017).

According to the book 'Making Urban Nature' (Vink et al., 2017) and its sequel 'Building Urban Nature' (Vink et al., 2024), implementations should combine nature inclusivity with agroecology, fostering diverse habitats with embedded resilience, to support thriving biodiversity (Stiphout et al., 2019). This involves the interdisciplinary integrations of regenerative approaches to ecosystems and biomes, aligning with the principles of agroecology (Altieri, 2018; Gliessman, 2021). Such methodology prioritizes designing a process, rather than fixed outcomes, integrating complex habitat and species gradients to shape conductive conditions for natural systems to co-evolve with built environments (Vink et al., 2024). Additionally, fostering succession, and thought networks beyond individual sites is crucial for the shared functioning of ecosystems.

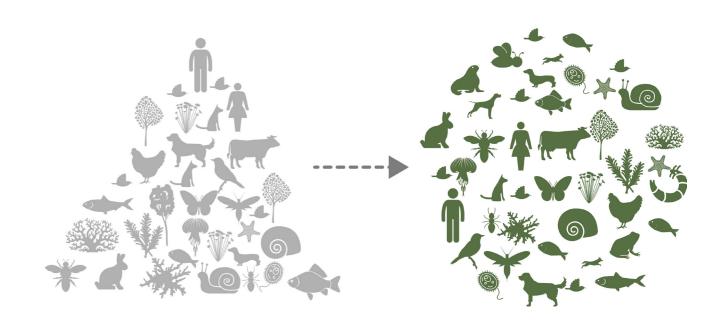


Figure 118, For nature-inclusive ecocentric developments, one must shift from an anthropogenic to an ecocentric paradigm ((Butler, 2018) edited by author)

7.2 Design Preconditions - The Rights of Nature

Fundamental within the ecocentric paradigm is the philosophy of the right of nature, stating that nature possesses inherent value and rights regardless of its utility to humans or non-humans (Challe, 2021), asserting that ecosystems and their components have worth and deserve protection (Alves et al., 2023).

This perspective advocates for legal and policy frameworks that protect ecosystems and species, enact conservation efforts, and prevent environmental degradation, based on their intrinsic worth, independent of human interests (Alves et al., 2023; Challe, 2021). Like Latour's notion of a 'parliament of things', it calls for acknowledgement and engaging with non-human elements to safeguard their intrinsic value (Latour, 1991). It recognises the need for implementation of the right of nature into legal structures, beyond the second nature idea, to prevent exploitation and degradation, requiring a shift away from exploitative practices in urban design towards ethical interactions with non-human entities (Alves et al., 2023; Barkham, 2021; Challe, 2021; Roggema et al., 2021).

This shift includes transitioning away from an alternating exploitative system to an ethical operationalisation guided by principles of natural justice and environmental stewardship (Bandopadhay & Pandey, 2020). Exemplified by the agricultural transition towards agroecological methods that prioritize environmental stewardship.

In urban design, this entails moving from a market-driven approach focused on housing and infrastructure, in which ecosystems and biodiversity are afterthoughts (Roggema et al., 2021), to one that considers landscape qualities and ecosystems from the outset, embracing landscape urbanism principles (Bandopadhay & Pandey, 2020; Waldheim, 2016). Rather than treating green spaces as mere amenities added to housing projects, the emphasis is on integrating urban fabrics within landscape systems.

Incorporating the rights of nature requires blurring the divide between humans and nature, emphasising humans' inclusion within nature. This necessitates experiencing and acknowledging the interdependency between humans and the natural world (Oudman, 2022), shaping legal policies and landscapes accordingly.

This shift results in new landscapes governed by natural processes rather than human management, fostering self-sustaining ecosystem synergies. It entails creating spaces for wild nature to thrive, guided by clearly defined policies and boundaries established within a framework akin to a 'parliament of things' for the Fringe (Poppel, 2020).



Figure 119, The right of nature.

7.3 A Synergetic Design Theory

Within the ecocentric paradigm, a synergetic design theory entails creating landscapes in balance with its operationalisation, signifying, that when two or more elements interact within the landscape, their sum exceeds their individual impact (Tillie, 2018). This approach, exemplified in Synergetic Urban Landscape Planning (Tillie, 2018) and Integrated Landscape Management (Tisma & Meijer, 2018), integrates, by negotiation, social, economic, and environmental systems to foster synergies within the operationalisation of the landscape (Tillie, 2018).

Within the Fringe the economic system involves the negotiation mechanism of market and demographic demand, housing stock, and governmental and developer intentions, The social system comprises the negotiation between place identity, residual identity, and placemaking. The natural system comprises the cooperation between Biotic and Abiotic cycles such as carbon (biogeochemical) and hydrological cycles.

To achieve synergy, methods like 'Synergetic Design' (Kabre, 2020) and Speculative Gameboarding (Endemann et al., 2022) can be utilised. 'Synergetic Design' aims to enhance the systematic capacity to generate and evolve the vitality of life at the site, through a loop of research by design until a system of synergy emerges (Kabre, 2020). Speculative Gameboarding facilitates spatial negotiation and strategy development, translating complex dynamics into understandable design principles through iterative mapping and stakeholder engagement (Endemann et al., 2022).

Combining these methodologies promotes ecocentric synergy in the anthropocentric Fringe, fostering regeneration rather than extraction. This approach aims to create preliminary design principles, a design language, that paves the way towards a future of rejuvenated landscapes in succession. Consequently, this results in preliminary design principles capable of starting the negotiation phase towards the 'Recharged Hart' future. Sections 7.5 to 7.7 delineate the approach.



Figure 120, The non-synergetic systems.

7.4 A Social Synergy

To understand society's rationalities toward future Fringe perspectives and to involve society in the synergetic ecocentric future within the rights of nature, Mary Douglas' group-grid method (1970), supported by Hartmann (2012), Grass route theory insights, and PBL publications like 'Ruimtelijke Verkenning 2023' (Hamers et al., 2023) and 'Rehearsing the Future' (PBL, 2020) where used. Together this resulted in defining four social rationalities along with corresponding Fringe land policies, translating the theoretical foundation to scenarios. Concluding to a section outlining the stakeholder's power-interest and network dependency for a synergetic future.

The group-grid method categorizes social rationalities into two dimensions, group, and grid (Douglas, 1970; Mamadouh, 1999). 'Group' denotes the degree to which individual choices are shaped by group solidarity, reflecting societal interaction levels. High group values indicate communal decision-making, whereas 'grid' denotes how individual choices are influenced by social status and adherence to unwritten rules in policymaking, with a high 'grid' indicating top-down governance (Douglas, 1970; Mamadouh, 1999). By combining these categories, four rationalities emerge, shedding light on societal responses (Douglas, 1970; Mamadouh, 1999).

Such societal evaluations are essential to avoid technocratic and individualistic biases, ensuring the inclusion of the broader societal spectrum and accounting for potential societal transformations (Hartmann, 2012). Therefore, there's a need to move beyond quantitative, reductionist methodologies toward qualitative methods (Hartmann, 2012).

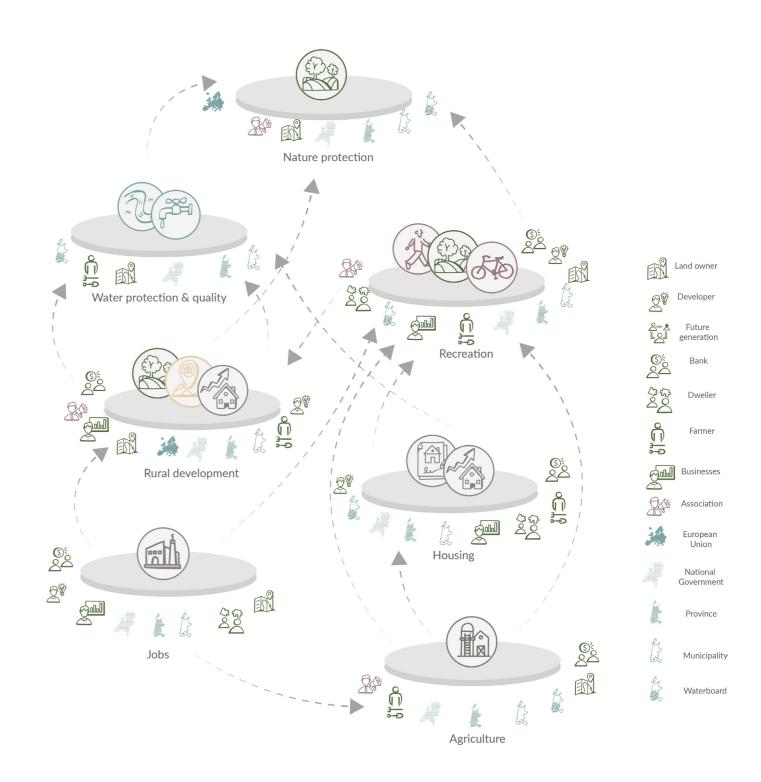


Figure 121, Current fragmented stakeholder network (pictograms used by (Project, N.d.; Stocks, N.d.) edited by author).

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The social rational scenario's

The conservative

The conservative scenario depicts a society characterized by conservatism, the desire to maintain the status quo (Mamadouh, 1999). Individuals are organized into groups or bubbles, feeling connected within their circles but not to the broader population. In this worldview, luck, rather than individual control, determines outcomes (Hartmann, 2012). The government plays a facilitating top-down role to preserve stability without imposing strict regulations (Hamers et al., 2023; Hartmann, 2012; PBL, 2020).

Conservative individuals or societies resist change, accentuating individual liberty and responsibility to uphold existing economic values. This viewpoint is favoured by those who value small-scale rural or suburban lifestyles and prioritize minimal interference in their affairs (Hamers et al., 2023; Hartmann, 2012; PBL, 2020).

In this scenario, the Fringe is governed by sub-regions with regional autonomy, mirroring existing fragmented governance structures (Hamers et al., 2023; PBL, 2020). This perpetuates spatial fragmentation and polarization, with development following market trends and ownership patterns, maintaining the current physical landscape (Hamers et al., 2023; Hartmann, 2012; PBL, 2020).

The individualist

The individualist scenario depicts a society driven by neoliberal decision-making, emphasizing individuality, market reliance, and selective benefits (Mamadouh, 1999). It advocates a liberal governance structure favouring competitive market-driven governance and policies (Hartmann, 2012). Central government facilitates public-private partnerships to spatially develop through market-oriented schemes, led by commercial developers responding to market trends and regional competitiveness (Hamers et al., 2023; Hartmann, 2012; PBL, 2020).

Individualists prioritize egocentric values, championing individual liberty and deregulation. This viewpoint resonates with a significant portion of the population, particularly middle-aged and older individuals from rural or Fringe backgrounds (Hamers et al., 2023; PBL, 2020).

In this scenario, the Fringe falls under public-private partnership control, structured as a 'Gemeenschappelijke Exploitatie Maatschappij' (GEM) (Hendriks, 2015). This model defines the Fringe as a joint venture entity, governed by boundaries and competitive planning schemes managed by a partnership between developers, NGOs, and the government. Development focuses on housing clusters around economic hubs within a semi-autonomous agroecological landscape (Hamers et al., 2023; PBL, 2020).

The stratified

The stratified scenario entails a society characterised by hierarchical decision-making (Mamadouh, 1999), emphasizing strong governmental trust and adherence to rules and regulations to uphold justice and fairness (Hartmann, 2012). This model entails a centralized governance structure with top-down planning, led by technocratic planners that balance societal interests, based on expert knowledge, to prohibit the tragedy of the commons (Hamers et al., 2023; Hartmann, 2012; PBL, 2020).

Individuals or societies within this scenario exhibit straightforwardness, with a progressive for rule-bound beliefs and optimism about societal progress. This demographic comprises a broad representation of the population, with a notable inclination towards higher education, young adolescents, families, and elderly individuals (Hamers et al., 2023; PBL, 2020).

Within this scenario, the Fringe becomes under governmental or governmental-affiliated control, defined as a cultural landscape with prescribed boundaries and land policies managed by organisations resembling Staatsbosbeheer. Development prioritizes large-scale governmental initiatives, guiding strategic housing development along public transport nodes within an agroecological landscape framework, outlined in specific criteria and rules, conveyed by memorandums (Hamers et al., 2023; PBL, 2020).

The commoner

The commoner scenario portrays a society characterised by egalitarianism and community (Mamadouh, 1999). This system emphasizes bottom-up governance, valuing social equality, democratic decision-making, and community cohesion (Hartmann, 2012). It entails a collaborative planning approach where empowered citizen initiatives at the local level contribute to national governance (Hamers et al., 2023; Hartmann, 2012; PBL, 2020).

Commoner individuals or societies prioritize participatory solidarity, social justice, and communal care, fostering a positive outlook on the future. This perspective resonates strongly with a diverse demographic, particularly young adults, families, and educated seniors (Hamers et al., 2023; PBL, 2020).

In this scenario, the Fringe is divided into subregions governed by local commons, communities collectively owning and sharing responsibility for the land under the legal framework of Mandeligheid (Kadaster, 2023). Despite this subdivision, cohesion and awareness among subregions are maintained, fostering a varied spatial pattern (Hamers et al., 2023; PBL, 2020). Development within these commons focuses on small-scale, village-like structures, fostering tight-knit communities (Hamers et al., 2023; PBL, 2020).

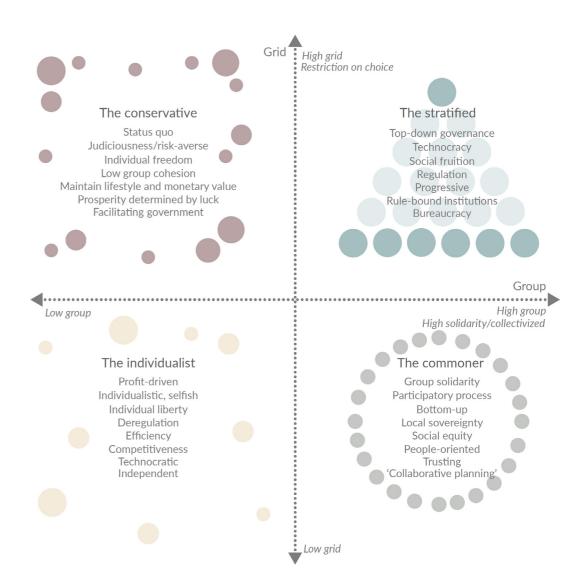


Figure 122, Social rationalities ((Douglas, 1970; Mamadouh, 1999) edited by author).

The stakeholders

Public Future generations European Union Interest: being considered in today's decisions as these have impacts on Interest: Reaching the goals of the European Habitat Directive, The Green Deal, the Paris Agreement and the future prosperity and ability to the EU directives for regional devel-National Government Business owners (Non-farmers) Interest: Providing sufficient and Interest: Sustain or increase its capacity to operate within the area. diverse housing pallets, while transforming its economy to a model of sustainable circularity. Provinces Farmers Interest: Providing sufficient and Interest: Receiving support for the diverse housing pallets, while transtransition of the practices and forming its economy to a model of societal recognition for their job. sustainable circularity. Municipalities Interest: Providing sufficient and | Education facilities

Waterboards

Interest: Providing and improving hydrological safety and quality.

diverse housing, with a high quality

of life and local social inclusivity.



Nature/landscape associations Interest: Improving the health and quality of the biosphere and retaining or enlarging societal support and

cultural heratige.

Interest: Taking an actively part in the

transitional practice, while staying up to date with technological improvements, and retaining societal support.



| Banks/financiers

Interest: Investing in projects that see future profit, while maintaining societal support by following consumer trends.



Plants & animals

Interest: changing current practices to more environmentally sustainable

Interest: Maintaining their way of

dwelling, receiving governmental support in lacking services and



| Developers

Interest: Investing in development projects with sufficient profitability, while following both societal demand and conscience though meeting shareholder expectations



|Urban inhabitants

Interests: Maintaining access to their the fringe.



Landowners

Interest: retaining the retaining the monetary value and productive



| House owners & dweller Interest: Retaining the monetary value, while dwelling within a rich



Rural inhabitants

hinterland for recreation, while if desired offering the ability to move to



Figure 123, The stakeholders interest (pictograms used by (Project, N.d.; Stocks, N.d.) edited by author).

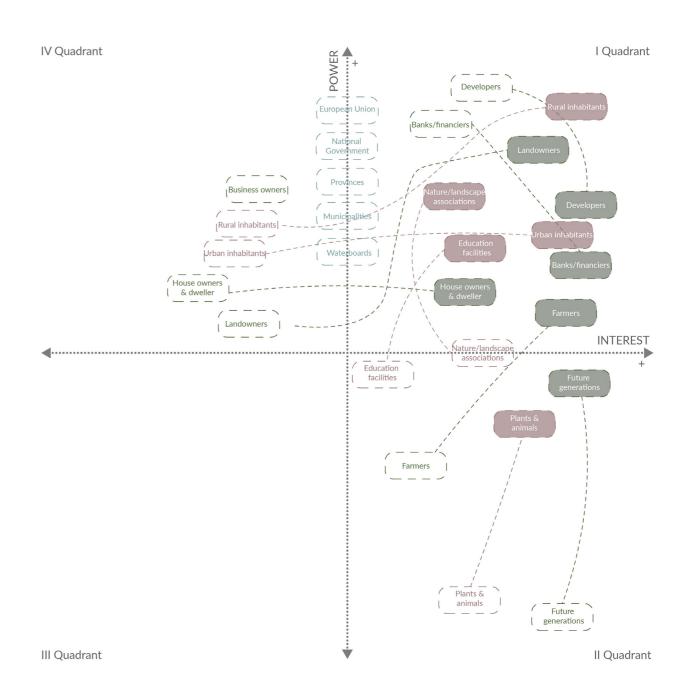


Figure 124, The power-interest quadrant.

From power VS interests to social synergies

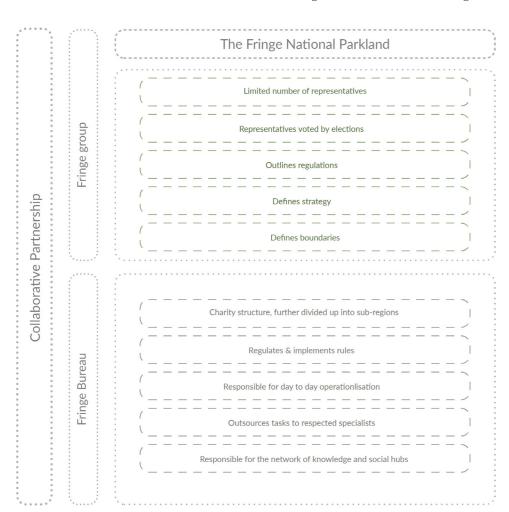
Societal rational scenarios reveal a divided society, torn between pursuing personal or communal interests, necessitating efforts to achieve social synergies by empowering marginalized voices while addressing individualistic concerns (Brüggen, 2018). This process necessitates communal debate to update our collective models and assign value to previously overlooked communal or natural values, particularly for rationalities that do not prioritise Fringe protection and the right of nature.

Central to creating social synergy, and appointing rights to the Fringe is transitioning the valuation of previously undervalued Fringe, into something deemed valuable by society. To achieve this, the Fringe should become an entity that people want to be part of, accomplished through unity-building initiatives, such as community participation and knowledge-sharing networks (Stuurgroep Van Gogh Nationaal Park et al., 2020). Knowledge and societal hubs, serving as platforms for information dissemination and informed debate, play a pivotal role in fostering a common consensus towards an ecocentric future (National Park City foundation, 2019).

However, achieving social consensus through communal means necessitates adverting the failure of individualistic perspectives (Homo Economicus) as argued by Garret Hardin in her article 'The Tragedy of the Commons' (Hardin, 1968). By implementing the eight basic principles advocated by Elinor Ostrom in her 1993 book 'Governing the Commons' (1993) into the method of integrated landscape management (Tisma & Meijer, 2018), people can collectively successfully govern together through communal bottom-up governance (Ostrom, 1993).

Likewise, achieving social consensus demands clarifying the organization of the Fringe. Three of the four rationalities advocate for organizing the Fringe under a communal entity resembling a collaboration partnership concept, a new form of a spatial organisation akin to Hoogheemraadschap or Staatsbosbeheer, which regulates spatial development while outsourcing day-to-day operations to specialists (National Park City foundation, 2019; Stuurgroep Van Gogh Nationaal Park et al., 2020). This organizational structure aligns stakeholders' interests, fostering acceptance of ecocentric values and unity among stakeholders.

Continued engagement within stakeholder networks reinforces the potential for social synergies, emphasizing the importance of embracing societal differences as strengths for a synergetic future.



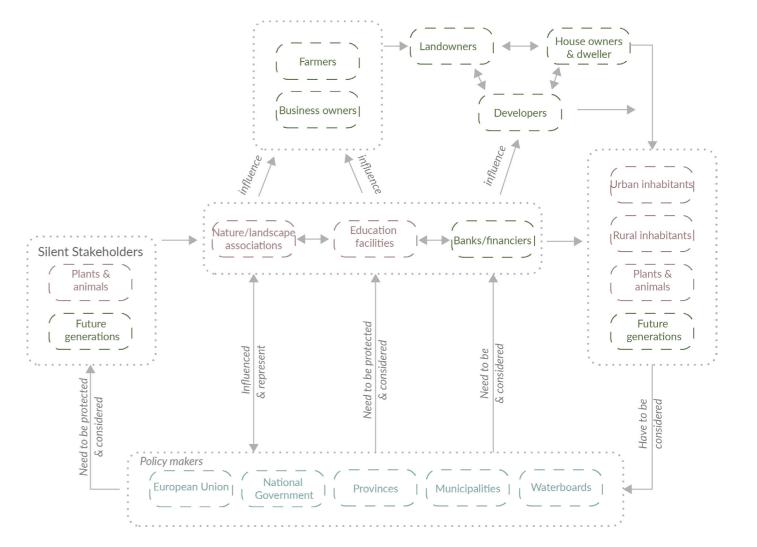


Figure 125, Outline of the governance structure of the Fringe.

Figure 126, The stakeholder network dependency.

7.5 Design Language

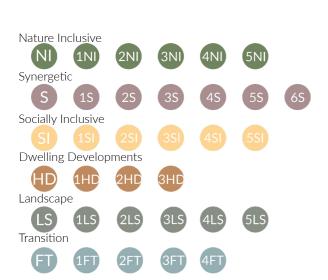
To manifest the ecocentric paradigm's synergetic approach to a concrete design, a design language and accompanying pattern booklet have been developed to translate the theoretical underpinnings to a spatial design. The patterns range throughout the scales and in types of interventions and are categorised into two pillars, the theoretical means, and the spatial means, and add to one or more goals, aligning with the identified systems and the proposed synergetic design methodology. The goals are nature-inclusive, synergetic, socially inclusive, dwelling developments, landscape, and transition. The degree to which a pattern addresses the goal is illustrated by the difference between capitalisation among the symbols.

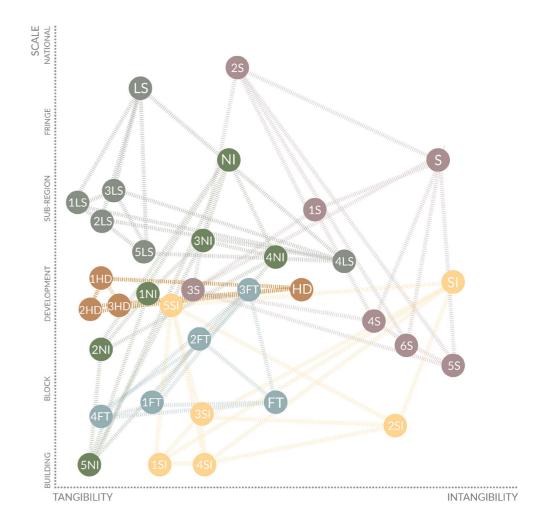




Figure 127, The design language matrix.

Amid the pillars a hierarchy of exchange and interdependency shapes the matrix of relationships allowing for the patterns to be translated into location-specific design. These design principles are structured for use in spatial negotiation within the synergetic design approach and highlight how Fringe development could evolve under the influence of the right of nature. Due to the patterns being categorised based on their main goal, they exist out of five nature-inclusive patterns, six synergetic patterns, five social-inclusive patterns, three dwelling development patterns, five landscape patterns, and four transition patterns. The next few pages outline the theoretical and spatial goals and associated means. Detailed descriptions of the individual patterns are given within the accompanying pattern booklet and appendix.





Theoretical Design Goals

Nature inclusive

Nature inclusive is the spatial manifestation of the ecocentric paradigm and centres around the design methodology of nature inclusive design, the idea that natural elements are not just add-ons but integral parts of the architecture. It emphasizes incorporating architectural elements that align with the site's potential (Dijkshoorn-Dekker, 2022; Vink et al., 2024; Vink et al., 2017). This approach shapes conditions rather than prescribing fixed outcomes, allowing natural systems to evolve alongside built forms as one (Vink et al., 2024). The means are:

- Location-based developmentsNature based solutions foundation
- Agroecological foundations
- Habitat of diversity
- Carbon positive materials foundations

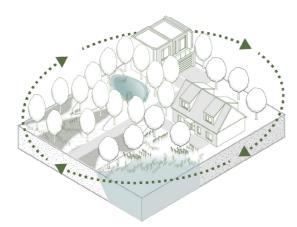


Figure 129, Nature inclusive.

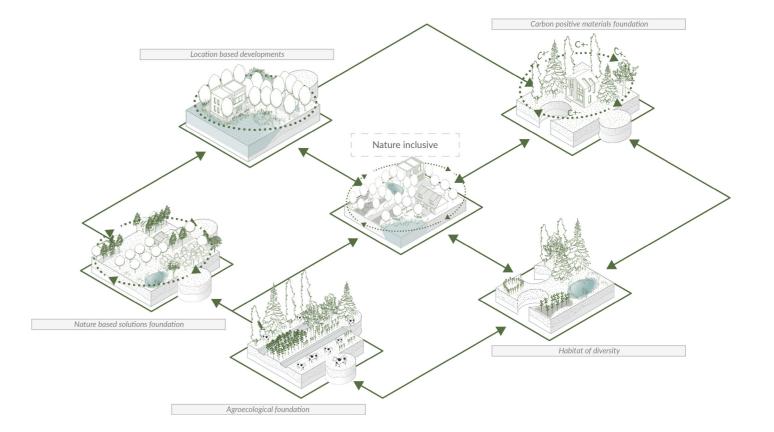


Figure 130, The nature inclusive matrix.

Theoretical Design Goals

Synergetic

The synergetic goal emphasizes achieving balance in the landscape (Tillie, 2018). It suggests that when multiple elements interact within a development's landscape, their collective impact exceeds that of each element. This involves implementing systems of recuperation and succession to foster regeneration among the development, its landscape, and its inhabitants (Tillie, 2018; Tisma & Meijer, 2018). The means are:

- Spatial negotiation of systems
- Legislative unityA nature of transitionNature value
- Social value
- Economic value

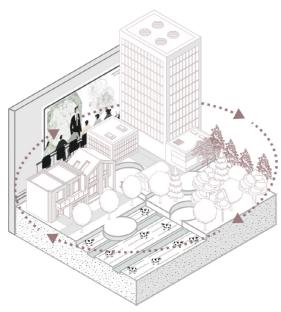
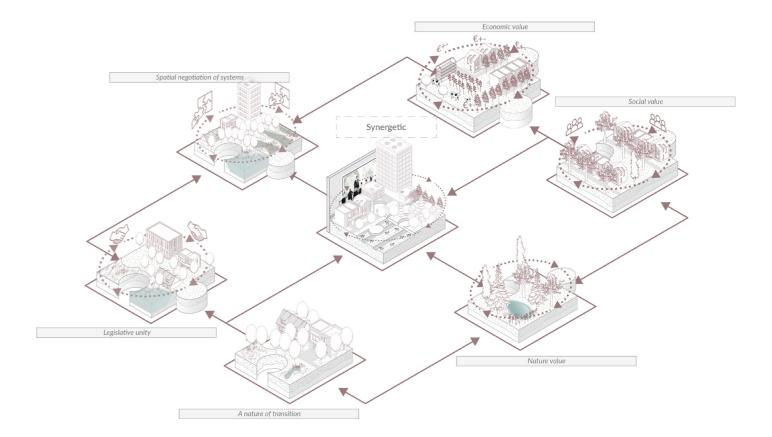


Figure 131, Synergetic.



Theoretical Design Goals

Social inclusive

The social inclusive goal demarcates the shift pseudo-countryside developments must undergo, to cope with prospects inherent in societal demand. Highlighting that housing development goes beyond the traditional form to include a landscape, and its wider society to allow them to become societal and ecologically inclusive (BPD, 2021a; Centraal Bureau voor de Statistiek, 2019; Jansen, 2020; Manen et al., 2024). This involves creating locationspecific housing fitting to their context and demography (Zuid-Holland, 2020). The means are:

- Diverse housing palletCommunal foundation
- Communal morphologies & densities
- Reduced building footprint
- Access to mobility

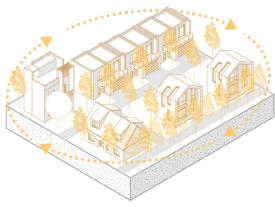


Figure 133, Social inclusive.

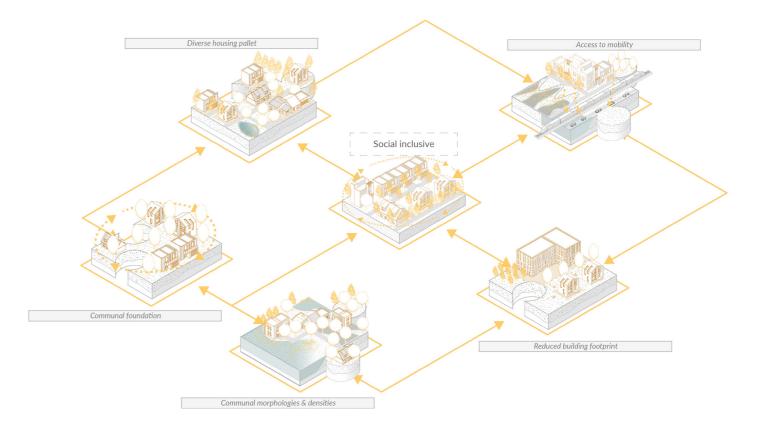


Figure 134, The social inclusive matrix.

Spatial Design Goals

Housing developments

The Dwelling development goal demonstrates how nature inclusive housing development can be combined with ambitious afforestation, agroecology, rewetting, increased biodiversity, and circular resource thinking to create healthy and socially connected Fringe morphologies (Jansen, 2020; Vink et al., 2017). Comprising of cluster of small communities that put the environment, biodiversity, and sharing of resources at the forefront, while meeting the continued demand for Fringe dwellings (Centraal Bureau voor de Statistiek & Planbureau voor de Leefomgeving, 2022; Stoeldraijer et al., 2023). In meeting the demand, the housing developments will comprise an obligatory set of rules based on prospects stressed, obstructing the formation of ambiguous guidelines. Entail the following housing stock, 30 % single housing, 30 % two-person housing, and 40 % single-family housing, of which 40 % of affordable housing is realised through three exemplary housing morphologies (Boeijenga et al., 2008; Hoff, 2006; Jansen, 2020; Lörzing et al., 2006; Manen et al., 2024; RIGO Research et al., 2006; Zuid-Holland, 2020). In doing so it showcases an alternative pseudo-countryside model. The means are:

- Nature inclusive housing typology
- Village inclusive housing typology
- Urban inclusive housing typology

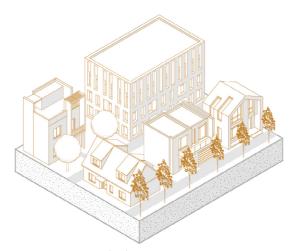


Figure 135, Housing developments.

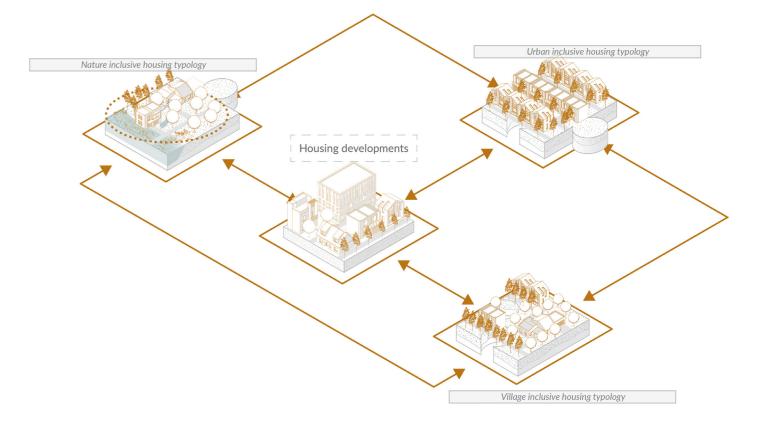


Figure 136, The housing developments matrix.

Spatial Design Goals

Landscape of sustainability

The landscape of sustainability goal circumscribes the reinvention of the original blend of agricultural, cultural, and economic significance inherent within the Fringe. Showcasing a landscape of sustainability that prioritizes soil fertility, hydrological function, and a harmonious blend of housing, natural abundance, and agriculture (Pierre & Klok, 2015; Stiphout et al., 2019). This involves incorporating location-specific agroecological and natural areas (Altieri, 2018; Gliessman, 2021). The means are:

- Wet agriculture
- (Wet) silvo agriculture Dry agriculture
- Nature restoration
- Rewetting

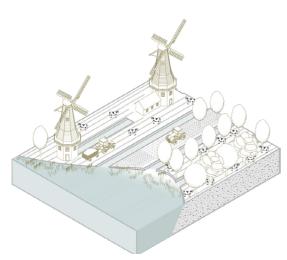


Figure 137, The landscape.of sustainability.

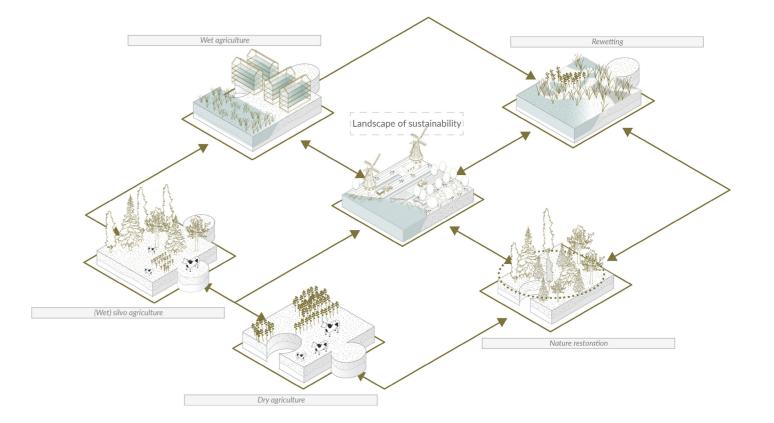


Figure 138, The landscape of sustainability matrix.

Spatial Design Goals

Fringe of transition

The Fringe of transition goal turns the existing mosaic of urban-rural edge into a dynamic transition zone, fostering naturalinclusive housing for diverse households. Prioritizing local communities and farmers, it envisions an ecocentric synergetic shift where the landscape integrates with other land uses (Vink et al., 2024). This involves transforming bare agricultural fields or current mosaics into ecocentric districts within inclusive landscape deltas. The means are:

- A gradual transition
- Urban-rural delta Local based program
- Nature on the footsteps

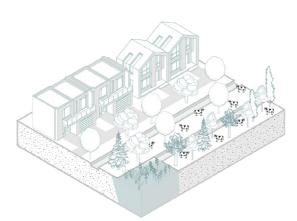
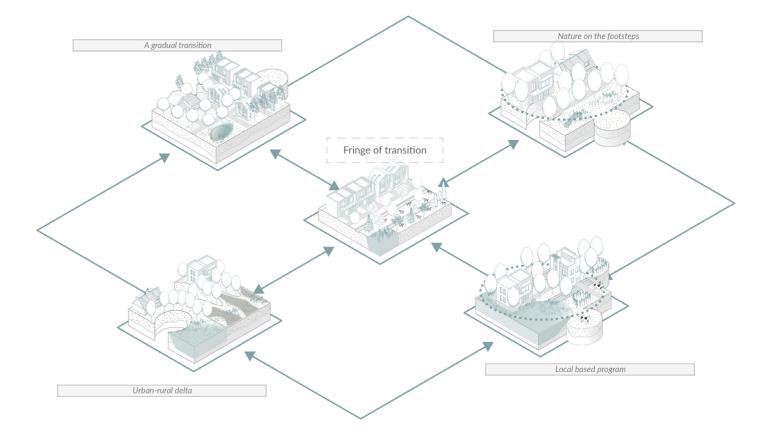


Figure 139, Fringe of transition.



7.6 The Design Framework

The design process commences by embracing an ecocentric paradigm and its synergies to initiate natural succession, involving the integration of the theoretical backing and spatial analyses into cohesion. This is achieved by the developed design language, which allows for the negotiation across domains to address current challenges on the Fringe and its functions. Marking a three-step project.

I - Territorial Re-ensemble - Macroscale

The territorial re-ensemble establishes the contextual framework for the ecocentric paradigm, highlighting the interplay between challenges and system functioning. It restores the geomorphological and ecological integrity of the region through synergistic approaches.

II - Regional Dissection - Mesoscale

The regional dissection combines the territorial strategy with conditions at the Fringe, demonstrating the potential for housing and agroecological development. This provides a pathway for operationalisation by illustrating the functional changes and potentials required to achieve the desired composition at the macroscale.

III - Local operationalisation - Microscale

Local operationalisation presents an alternative case for the 'Vijfde dorp' in Zuidplas municipality, showcasing systematic principles of synergetic developments within the Fringe. It delves into potential layouts and the impacts of interventions on residents and the surrounding landscape.

The ecocentric paradigm shift is fuelled by its transformative values, derived from the authors' interpretation of theories advocating for a synergistic relationship between nature and man. In practical terms, this paradigm shift is driven by current challenges related to the Fringe. As a result, these spatial strategy projections are expected to illustrate various functional gradients while contributing to a territorial re-ensemble.

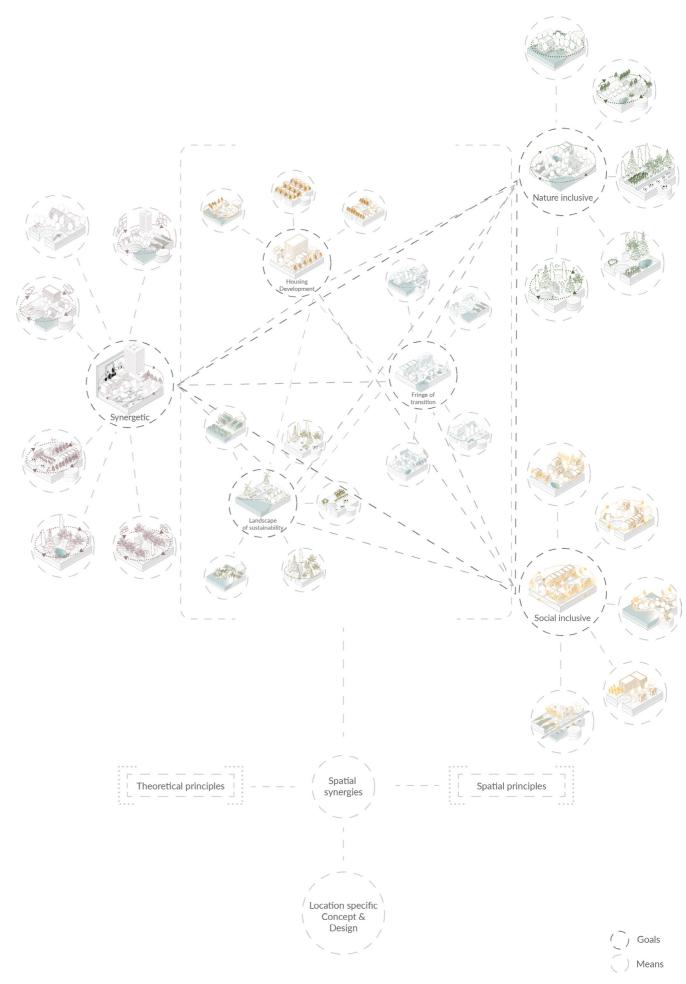
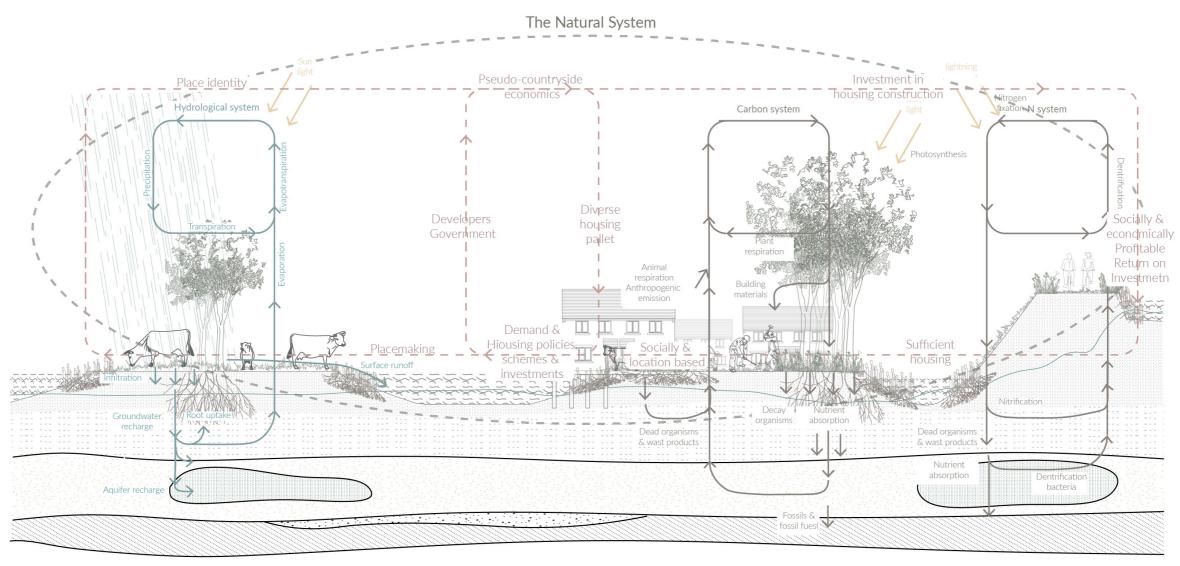


Figure 141, The design framework.

7.7 The Synergizing System Strategy

The process of achieving the ecocentric paradigm shift within a territory starts with fostering synergy, a strategic process wherein ecological systems, namely the negotiation between abiotic and biotic elements, establish ecological resilience as the backdrop for social and economic systems to operate. This ecological framework dictates the circumstances and criteria within which economic and social interactions occur. The social and economic systems aim to merge into a unified system characterized by an outer loop, governing interactions with the ecological system, and an inner loop, managing governance and developer interactions. These interactions shape socially inclusive housing needs and placemaking processes, demonstrating the potential for synergy within landscapes.



The Synergetic system

Figure 142, The synergised spatial systems.

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The spatial translation of synergising these systems entails the negotiation between the landscape's capacity to sustain its land usage and the integration of the territories' inherent network.



Figure 143, The locations' capacity for land use.

The landscape's capacity to sustain its land usage entails a shift away from the compartmentalization of the landscape, with its rationalities and monocultures, towards a unified web of dynamic mosaic patches based upon the location's soil, elevation, hydrology, biodiversity, and fertility. The implementation allows for a development model that promotes natural succession, and biodiversity with a regenerative capacity, to prevent landscapes' ecological trade-offs, beyond the contemporary soil-water leading policies of locality boundedness (Kennisportaal Klimaatadaptatie, 2024; Kolen et al., 2024).



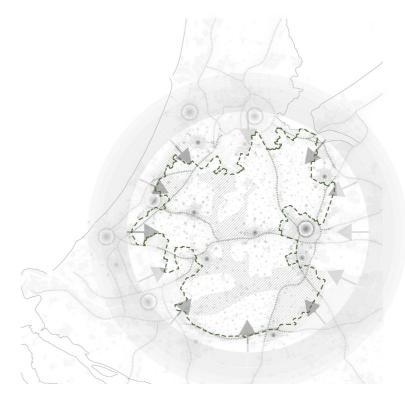


Figure 144, The external and internal pressure on the landscapes' axes.

The integration of the territories' inherent network necessitates a shift from successive terrestrial expansion and aversion of degradation towards a system of steppingstones, utilising the landscape's inherent networks to guide these external and internal pressures along it. Aimed at minimizing the demand for the construction of new networks within the 'Groen Hart', but stimulating connectivity throughout the entire region by enhancing those networks that are already existing. Promoting a sounder regional system that offers gradients of agroecological housing developments along its Fringes, with agroecological lands within.



7.8 The 'Recharged Hart' Design Concept

Encompassing the thesis notions of a 'Recharged Hart' future, the concept for the synergetic ecocentric future entails the revitalisation, but made contemporary, of the former green belt model for the 'Groene Hart', as advocated by Albert Plesman and introduced as a planning concept in the first two memorandums, De Ontwikkeling van het Westen des Lands (1958) (Rijksdienst voor het Nationale Plan, 1958) and Nota inzake de Ruimtelijke Ordening in Nederland (1960) (Netherlands. Ministerie van Volkshuisvesting en Bouwnijverheid, 1960).

The concept embodies the advocation of denoting the Randstad, the urban belt, and the 'Groene Hart', agricultural cultural belt, as separate entities, to separate the cities and protect the agricultural lands from urban degradation (Bruinsma & Koomen, 2018; Lörzing, 2021). Accordingly, functions as a traditional Green Belt, therefore defining the 'Groene Hart' as one. The 'Recharged Hart' concept takes this notion but adds the Fringe between these two entities. This Fringe operates as a so-called parkland or green wedge, similar to the idea for green wedges along the city of Amsterdam by Cornelis van Eesteren as part of the Algemeen Uitbreidings Plan of 1935 (Van Rooijen, 1990).

The Fringe becomes the Fringe National Parkland, a biodiversity ring, alleviating external and internal pressures while offering a place for housing developments, connection, and bordering growth. The Fringe functions as an eco-cultural transition zone, enhancing eco-cultural amenities that improve the operationalisation and health of the agricultural inner 'Groene Hart' and the urban Randstad. In operating it functions as a retaining buffer for water and purifies air, becoming the Harts' lunges. Attracting traditional pseudo-countryside dwellers along with local inhabitants and even farmers who together create local dwelling communities and food resource chains.

Consequently, it is a node to the former urbanist concept of the Green Belt, the traditional meaning of the rural-urban Fringe (Farjon et al., 2004; Kühn, 2003), and the spatial art vision for the Green Heart by Harrison Studio (1994). Accordingly, the Recharged Hart's future is one of Fringe agroecological housing concepts embracing an ecocentric approach, fostering a renewed connection with the landscape and its natural processes. Emphasising the regenerative potential by promoting synergetic Fringes, away from the current fragmented policies that gave way to situations like Bentheim Zoetermeer.

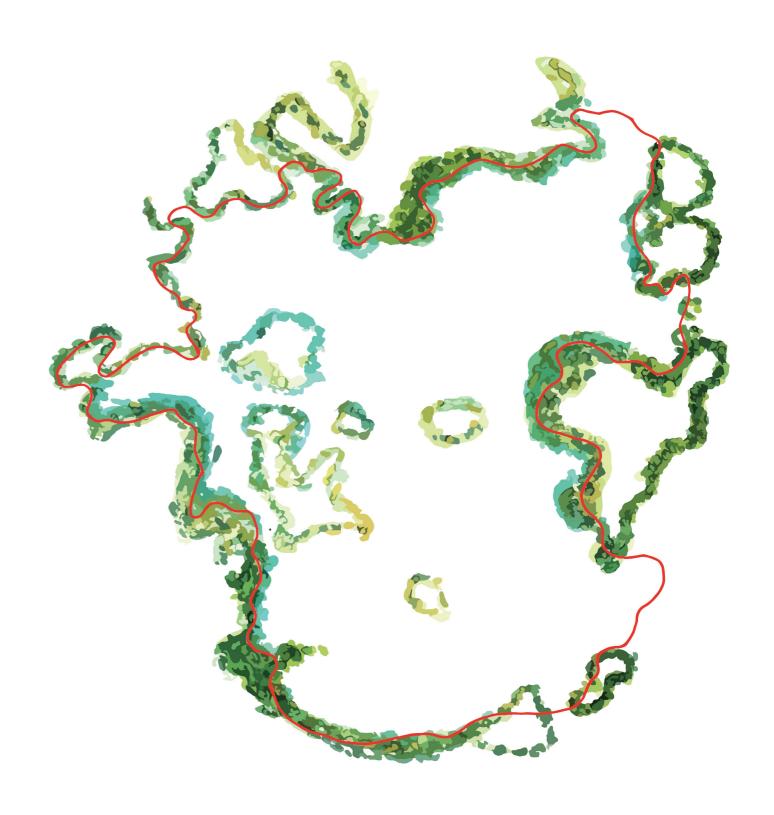


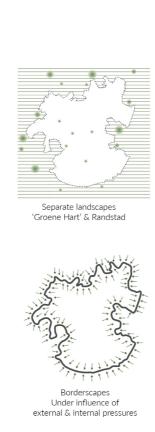
Figure 145, The 'Recharged Hart' concept.

7.9 Territorial Re-ensemble - Macro Scale

The integration of the synergetic strategy within the concept of the Fringe National Parkland accentuates the interconnected nature of their relationships, origins, synergies, and dependencies. Subsequently, the 'Groene Hart' and the Randstad are considered as one entity, mutually indispensable, connected yet separated by a space that intertwines and entangles the external and internal pressures (Fringe). Their operationalisation only functions effectively when both are present.

The regional strategy leverages the city's polycentricity as an asset to enhance connectivity along the inherent landscape structures. This encompasses connecting these centres by operational lines along the landscape structures to connect the region and directing the development of Fringe housing along these lines (network). This approach not only optimizes space within the Fringe but also opens opportunities for diverse agroecological usage, throughout the 'Groene Hart'. By highlighting strategic connections with the surrounding Fringe, the demand for housing is economically and socially met, interweaving landscape integration in the larger whole.

With the initiated land use being based upon the layers of the Critical Zone, entailing that the programming of land use is based upon the landscape's capability to sustain usages without continual human interference or the usages causing harm to their operationalisation (regional approach). This natural inclusive approach necessitates initial human-initiated conditions to be implemented afterwards successive stages of natural functioning take over the continual operationalisation.



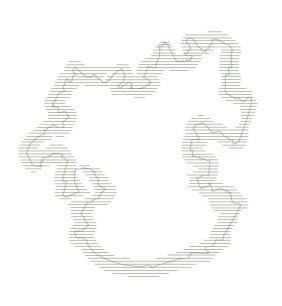


Footloose transit landscape Connection through the area.



Creation Fringe National Park

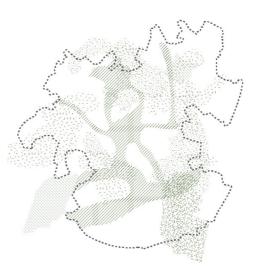
Figure 146, The necessity of the establishment of the Fringe.



Fringe



Network



Landscape capacity to sustain usage



Regional approach

Figure 147, The ingredients of the territorial re-ensemble.

Based on this principle, sites capable of accommodating the region's agricultural function and cultural character are allotted. As prescribed the agricultural product evolves from pasture-based to (aquatic) agroecologically crop-based product grounded upon the location's suitability for usage, initiated by the location's soil, height, hydrological and fertility (landscape's capability to sustain usage). In those locations unsuitable for agriculture or those locations in need of revitalisation and natural connectivity, nature is envisioned. With each type again being dependent upon the location's characteristics and functioning.

Consequently, to implement the strategy to its fullest critical actions are established, to bridge the individual notions within the territory. The critical actions are the transition to governing and approaching the Fringe as an entity (C.A. 1), implementing enhanced connectivity (C.A. 2), the agroecological transition to location-based agriculture (C.A. 3), and the sub-regional approach to development (C.A. 4).

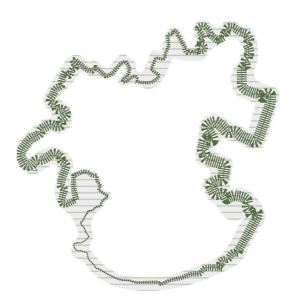


Figure 148, The Fringe governance as a unity (C.A. 1).

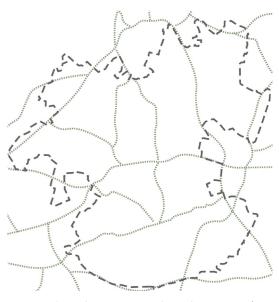


Figure 150, The implementation of enhanced connectivity (C.A. 2).

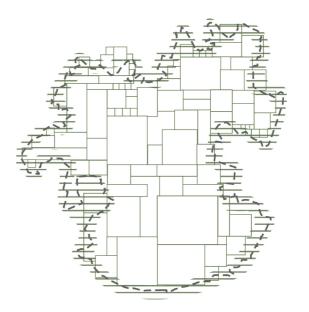


Figure 149, The agroecological transition (C.A. 3).

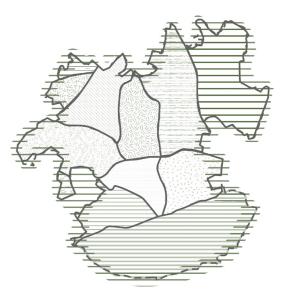


Figure 151, The sub-regional approach to development (C.A. 4).

The critical action of most importance on this scale is the one-off creating governance unity in the Fringe (C.A. 1), through the creation of the Fringe National Parkland. The unity incorporates a collaborative partnership governance, derived from Integrated Landscape Management (Tisma & Meijer, 2018). This involves governance by one organisation, the collaborative partnership, entailing that there is shared co-ownership and co-responsibility over the Fringe. This organisation outlines and regulates regional development within the defined boundaries and regulations while outsourcing day-to-day operations to respected specialists, resembling an organisation like Staatsbosbeheer (National Park City foundation, 2019; Ostrom, 1993; Stuurgroep Van Gogh Nationaal Park et al., 2020), similar to communal governance as outlined by Elinor Ostum in 'Governing the Commons' (1993).

The collaborative partnership is implemented by the creation of a Fringe group, a group of a limited number of representatives who form a parliament of things, comprised of government officials, civil society organisations representatives, and company representatives. Together, the group establishes the Fringe Bureau, an organization tasked with the day-to-day operational tasks and development of the Fringe, but where possible it outsources work to specialists, establishing an overall governance unity for the Fringe.

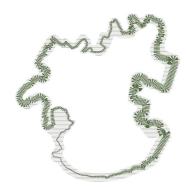


Figure 152, The Fringe governance as a unity (C.A. 1).

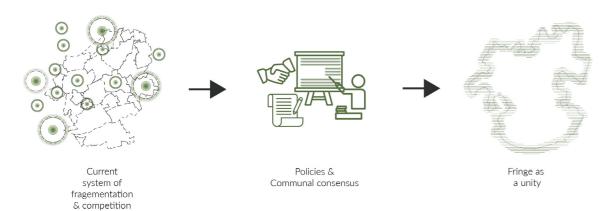


Figure 153, The critical action of the Fringe.

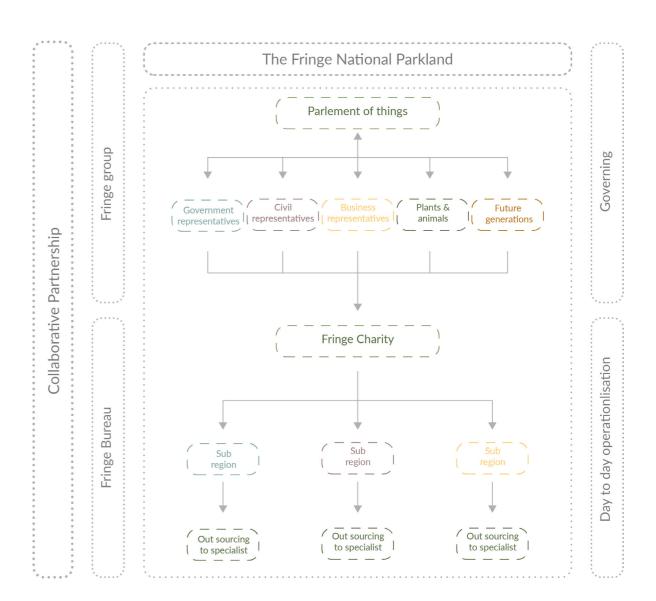


Figure 154, The Fringe unity governance structure.

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The critical action of implementing enhanced connectivity (C.A. 2) entails the integration of the human infrastructural network, focused on connecting the polycentric Randstad, into the landscapes smaller scale regional networks, to foster terrestrial lines of connectivity corridors, throughout the region, along which developments and pressure alleviation can take place.



Figure 155, The implementation of enhanced connectivity (C.A. 2).

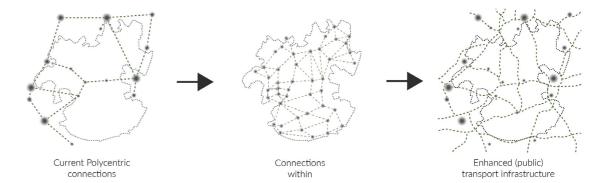


Figure 158, The enhanced connectivity.

The critical action of the agroecological transition to location-based agriculture (C.A. 3), signifies the shift from a conventional intensive input-based farming system to one of extensive regenerative approaches that prioritizes integration among its ecosystems and biomes (Altieri, 2018; Gliessman, 2021). Initiating a system of working with the location's suitability for agricultural usage, instigated by the location's soil, height, hydrological and fertility. Through education and incentives, the transition is stimulated to reintroduce the agroecological diversity of the landscape from before the land consolidation.

The critical action of the sub-regional approach to development (C.A. 4) necessitates the shift to the acknowledgement that the region consists of multiple sub-regions that together constitute the region in which the Fringe is situated, substituting the shift away from a system characterised by monocultural landscapes and landownership development paradigms to a system of utilising the location's characteristics and possibilities to define its usage.

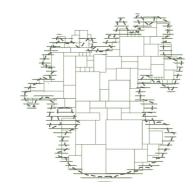


Figure 156, The agroecological transition (C.A. 3).

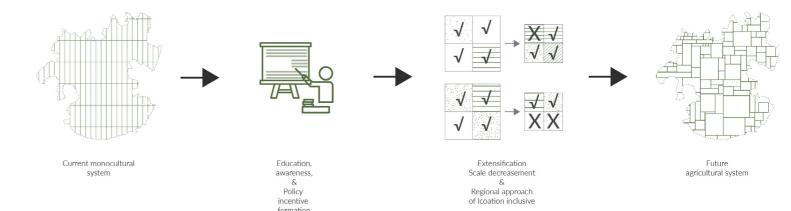


Figure 159, The agricultural transition.



Figure 157, The sub-regional approach to development (C.A. 4).

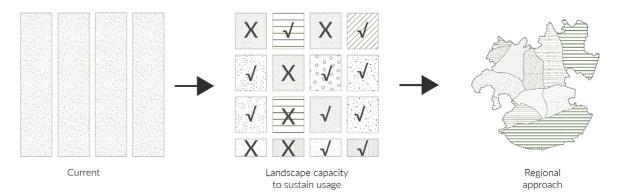


Figure 160, The subregional approach to development.

Overall crafting a regional strategy focused upon integrating the regional challenges within the regions working to foster the lock-in of conditions that allow the future continual synergy to succeed through the process of natural succession.

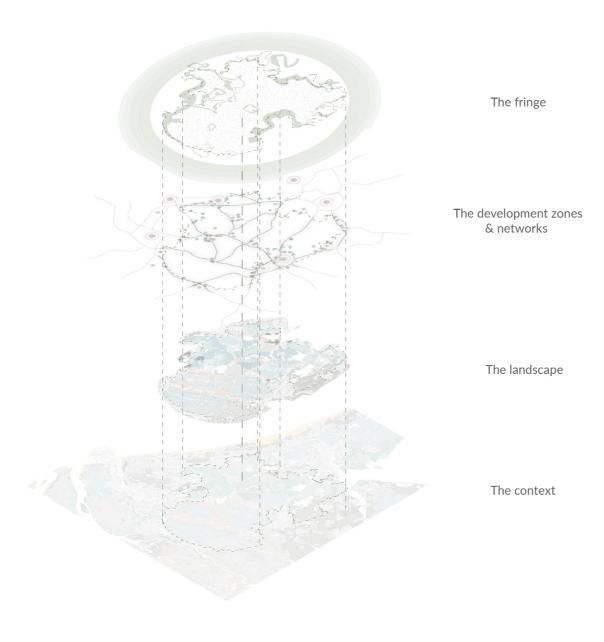


Figure 161, Diagram explaining the different layers in the overall strategy map.

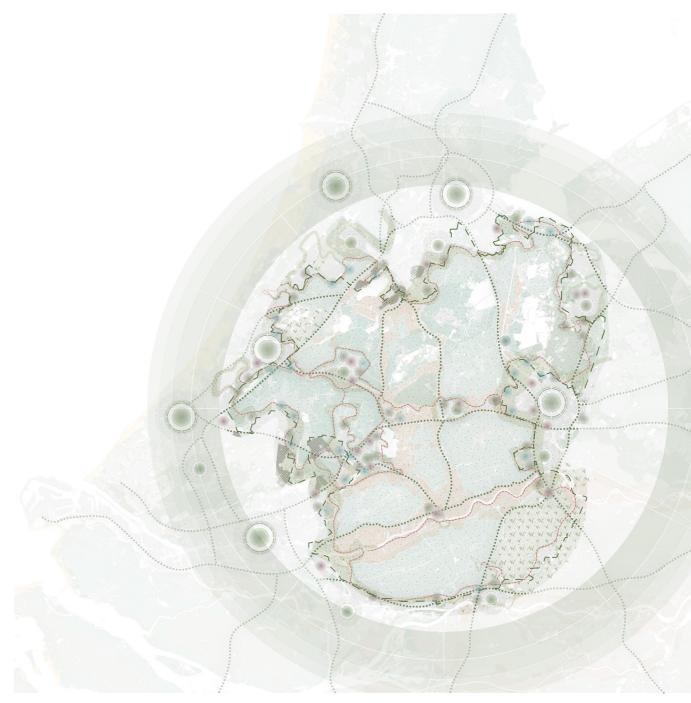


Figure 162, Macro scale design proposal.



7.10 Regional Dissection - Mesoscale

Mesoscale regional design matrix

To embody the territorial re-ensemble strategies' subregional line, a matrix of possibilities is established to translate the design language to the subregions of the Fringe. With the pillars following the landscape structures' regionalisation, and the categories of housing and landscape. These design principles underscore the potential evolution of Fringe development influenced by ecocentric notions.

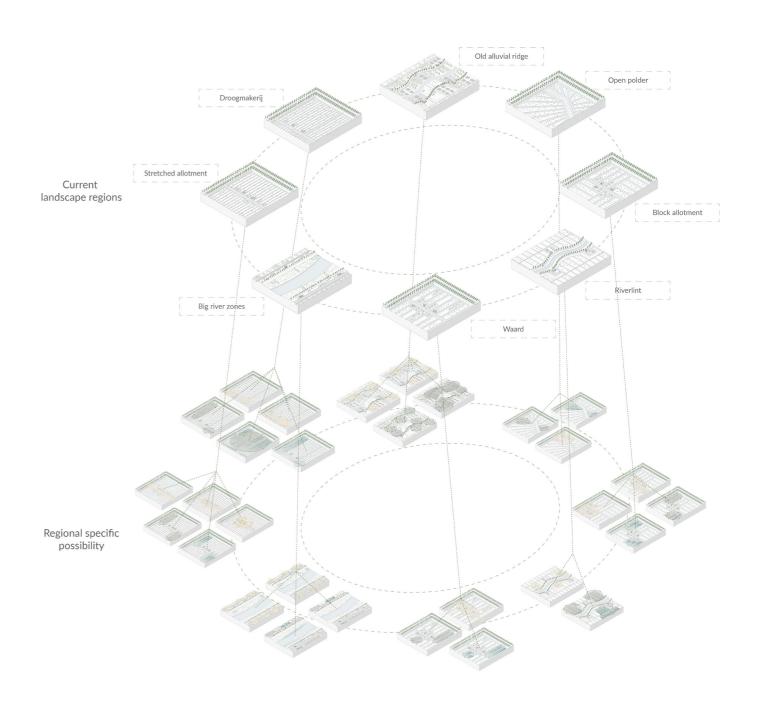
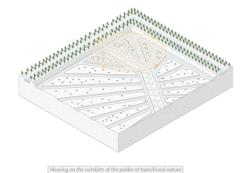
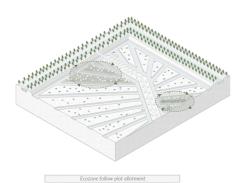


Figure 163, Mesoscale regional design matrix.

Open polder

The open polder necessitates that housing takes place on the outskirts of the polder and is of a connecting but transitional nature (Lörzing & Tisma, 2023; Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021; Steenhuis et al., 2023). This ensures that the edges of the built-up are soft and publicly accessible while aligning with the ditch structure. Simultaneously, the built-up breathes diversity to align with the diversity along the lint ribbons. Concurrently, nature and agriculture follow the dominant landscape's structure, the plot direction, and the pattern of the ditches. When developing nature or new agricultural infill, the characteristics, and the diversity, of the area are preserved to a more brook infill. With the exception being for areas under the influence of subsidence, these are rewetted and used for either wet cultivation or nature development (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2023).





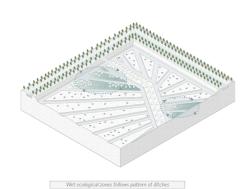




Figure 164, Panorama of the future Open polder.

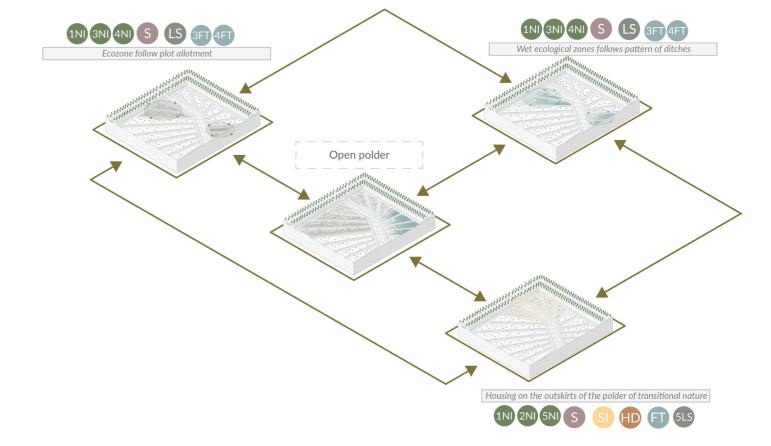
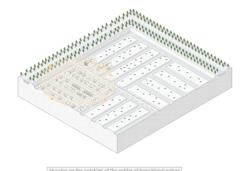
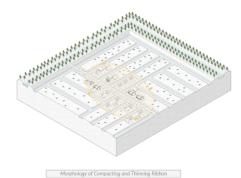


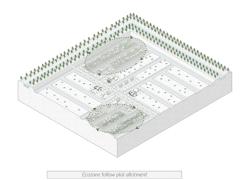
Figure 165, Top, Housing on the outside of the polder of transitional nature. Figure 166, Mid, Ecozones follow plot allotment.

Block allotment

The block allotment involves housing like the Open polder, located on the polder's outskirts, characterized by a connecting yet transitional built-up (Lörzing & Tisma, 2023; Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021; Steenhuis et al., 2023). These developments concentrate and follow the characteristic lint ribbon and are of a diverse yet compacting and thickening kind. Hence, nature and agriculture align with the plot direction and ditch patterns. When developing new nature or agriculture, preserving the area's characteristics and diversity is essential. Exceptions include areas affected by subsidence, which are rewetted for wet cultivation or nature is developed, with the dry areas following a brook orientation (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2023).







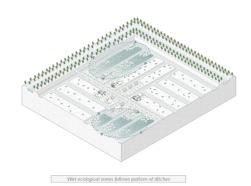




Figure 169, Panorama of the future block allotment.



Figure 173, Bottom, Wet ecological zones follow pattern of the ditches.

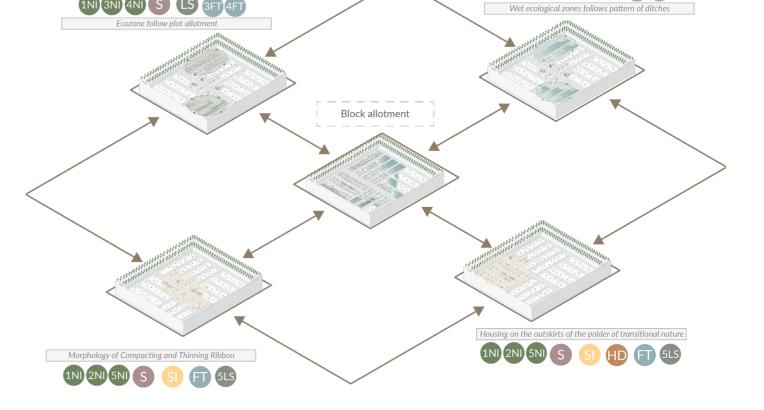


Figure 174, Block allotment relationship matrix.

Stretched allotment

The Stretched allotment comprises housing developments adjacent along characteristic ribbon-like structures (Lörzing & Tisma, 2023; Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021; Steenhuis et al., 2023), exhibiting diversity while also compacting and thickening. Hence, these developments are embedded within the legakkers structure and vegetation. However, within these developments, the houses concentrate around each other, forming a so-called community erf or village. Nature and agriculture affiliates with the plot direction and ditch patterns, to preserve the area's characteristics and diversity during the development of nature or new agricultural or brook infill, in subsiding areas, rewetting takes place for wet cultivation or nature development (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2023).

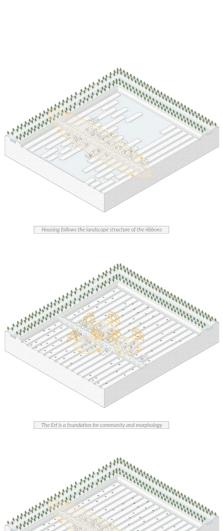


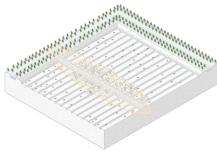
Figure 175, Panorama of the future Stretched allotment.

Figure 176, Top, Housing follows the landscape structure of the ribbon. Figure 177, First mid, The erf is a combination of buildings and community. Figure 178, Second mid, Variation of built-up in the lints.

Figure 179, Third mid, Ecozones follow plot allotment.

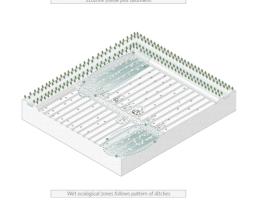
Figure 180, Bottom, Wet ecological zones follow pattern of the ditches.





Morphology of Compacting and Thinning Ribbon





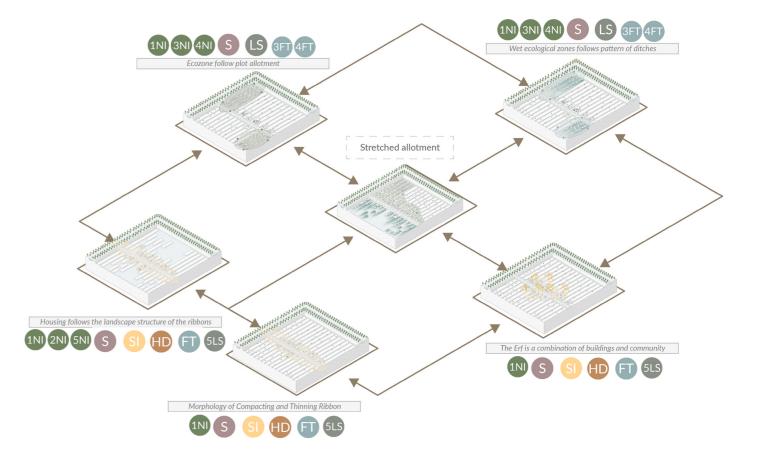


Figure 181, Stretched allotment relationship matrix.

Droogmakerij polder

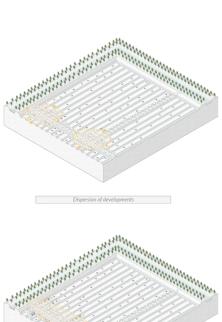
The Droogmakerij polder involves an orthogonal, hierarchical water system, initiating housing developments to be adjacent and linked to the orthogonal structure of the reclaimed land (Lörzing & Tisma, 2023; Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021; Steenhuis et al., 2023). Like the other polders, housing follows the lint ribbon. However, along this ribbon, the developments are not clustered but dispersed and follow a staggered structure. Simultaneously, the ditches' pattern preserves the area's characteristics and diversity during nature or new agricultural infill development of brook kind in dry areas or rewetted kind in subsidence areas (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2023). Contradicting, the Droogmakerij's unique enclosed polder operationalisation makes it suitable to be, entirely transformed into another landscape, beyond the Fringe, therefore the rewetting does not have to happen per allotment but can be done polder-wide (Steenhuis et al., 2023).

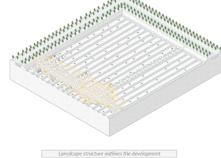


Figure 182, Panorama of the future Droogmakerij.

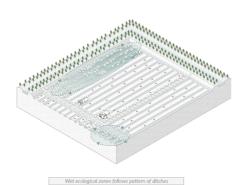
Figure 183, Top, Dispersion of developments. Figure 184, First mid, Landscape structure outlines the development. Figure 185, Second mid, Ecozones follow plot allotment. Figure 186, Third mid, Wet ecological zones follow pattern of the ditches.

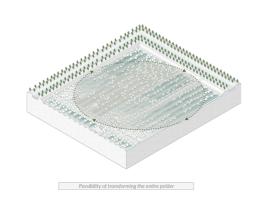
Figure 187, Bottom, Possibility of transforming the entire polder.











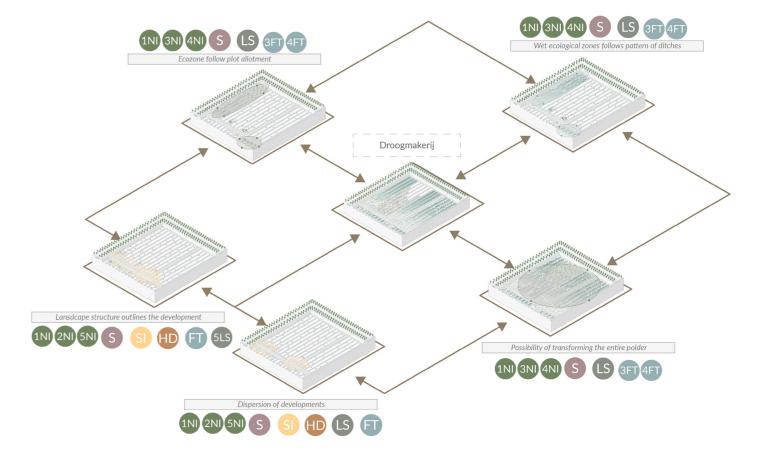
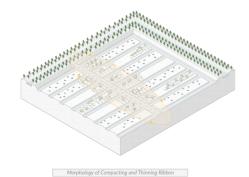
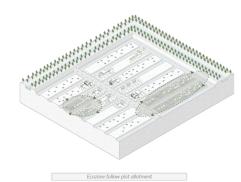


Figure 188, Droogmakerij polder relationship matrix.

Waard

The Waard denotes that housing developments are adjacent to characteristic ribbon-like landscape structures while exhibiting a diversity of compacting and thickening (Lörzing & Tisma, 2023; Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021; Steenhuis et al., 2023). Subsequently, the ditches outline the patterns of nature and agricultural development, that follow the notion of rewetting in areas of subsidence and brook of those who are not subsiding (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2023).





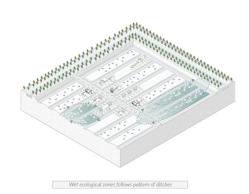




Figure 189, Panorama of the future Waard.

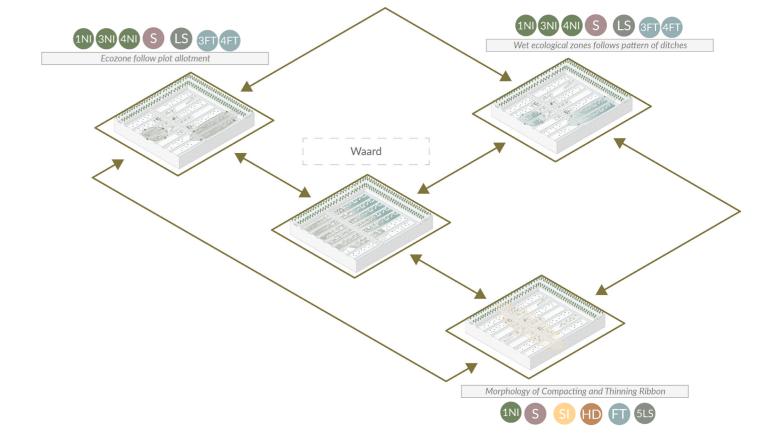
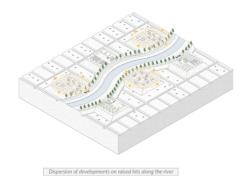


Figure 190, Top, Variation of built-up in the lints. Figure 191, Mid, Ecozones follow plot allotment. Figure 192, Bottom, Wet ecological zones follow pattern of the ditches.

Riverlint

The Riverlint means that housing developments are dispersed on the raised ridges along the river and follow a staggered structure (Lörzing & Tisma, 2023; Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021; Steenhuis et al., 2023). Subsequently, nature and agriculture follow the landscape's mosaic on the higher ridge, preserving the area's characteristics and diversity during the development of nature or agricultural areas (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2023).



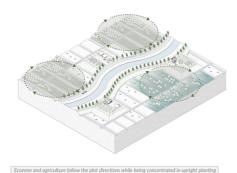




Figure 194, Panorama of the future Riverlint.

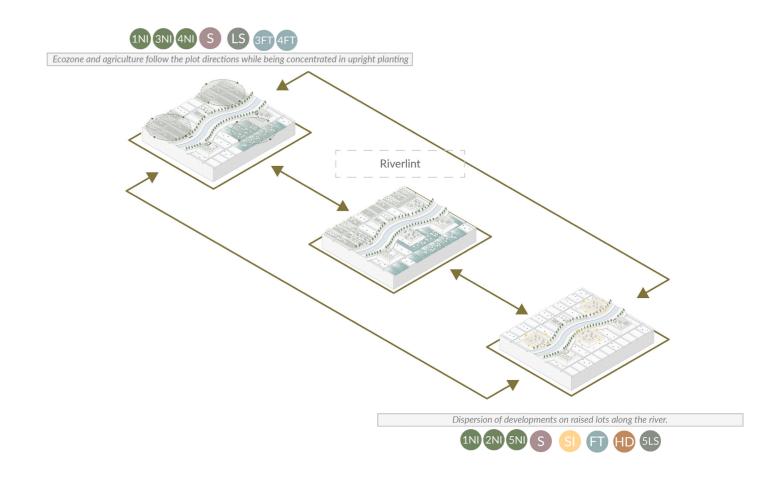


Figure 195, Top, Dispersion of developments on raised lots along the river. Figure 196, Bottom, Ecozones and agriculture follow the plot directions while being concentrated in upright planting.

Figure 197, Riverlint relationship matrix.

Old alluvial ridge

The old alluvial ridge necessitates that housing developments are dispersed along the elevated ridge and follow a staggered structure of widening and thinning nature (Lörzing & Tisma, 2023; Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021; Steenhuis et al., 2023). In tandem, the adjacent plot direction outlines the nature and agriculture infill, preserving the area's characteristics to ensure diversity during the development of new nature or agricultural spaces. Hence, combinations of crops with brook plots are mixed among the mosaic (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2023).







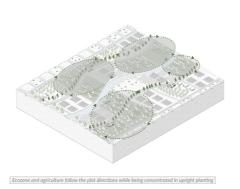
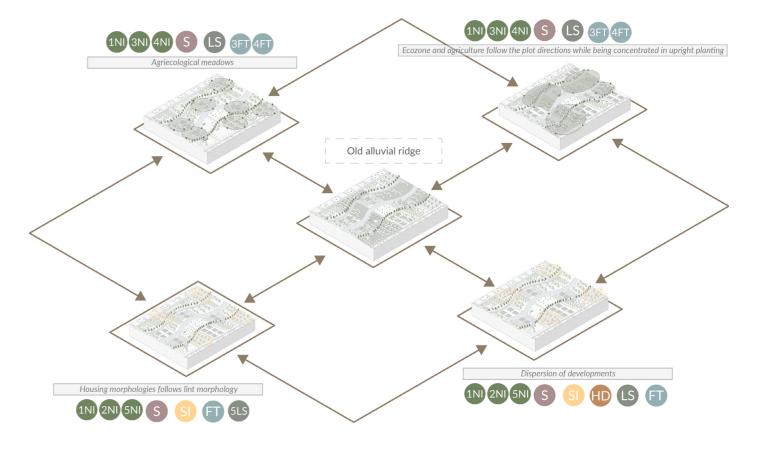




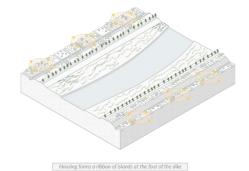
Figure 198, Panorama of the future Old alluvial ridge.

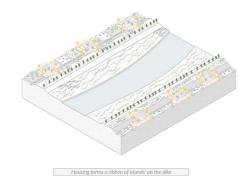


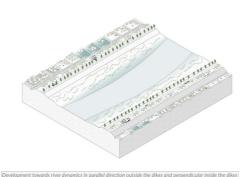


Big river zones

The Big river zones underscore that housing developments either take place on ribbons behind the dykes or onto the dyke (Lörzing & Tisma, 2023; Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2021; Steenhuis et al., 2023). Nature and agriculture align to the ditch patterns, with the exception being that nature outside the dykes is linked to the river dynamics and follows a perpendicular structure (Provincie Utrecht & OKRA landschapsarchitecten, 2011; Steenhuis et al., 2023).







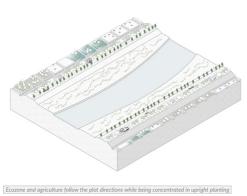
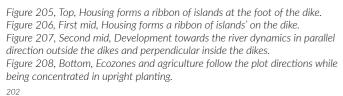
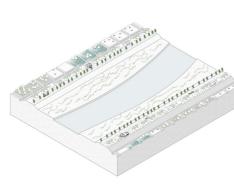
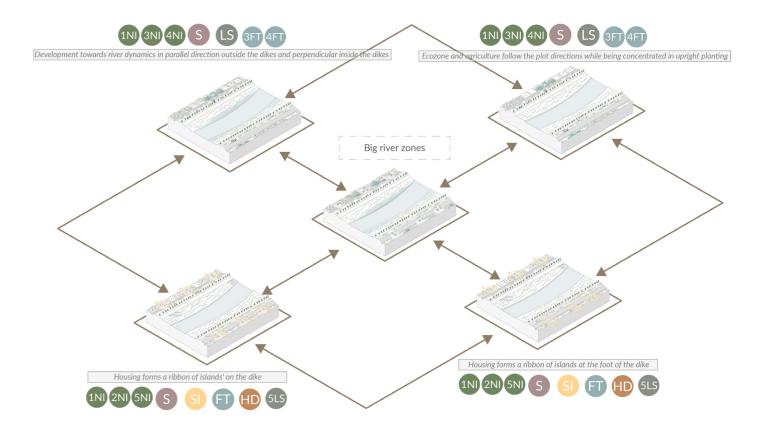




Figure 204, Panorama of the future big river zones.







Regional dissection - regional interfaces

The developed design matrix of possibilities highlights the array of interfaces and functions for each Fringe region. Allowing for the creation of a diverse yet operative Fringe parkland with housing possibilities, embracing the ecocentric approach, and fostering a renewed connection with the landscape and its natural succession process.



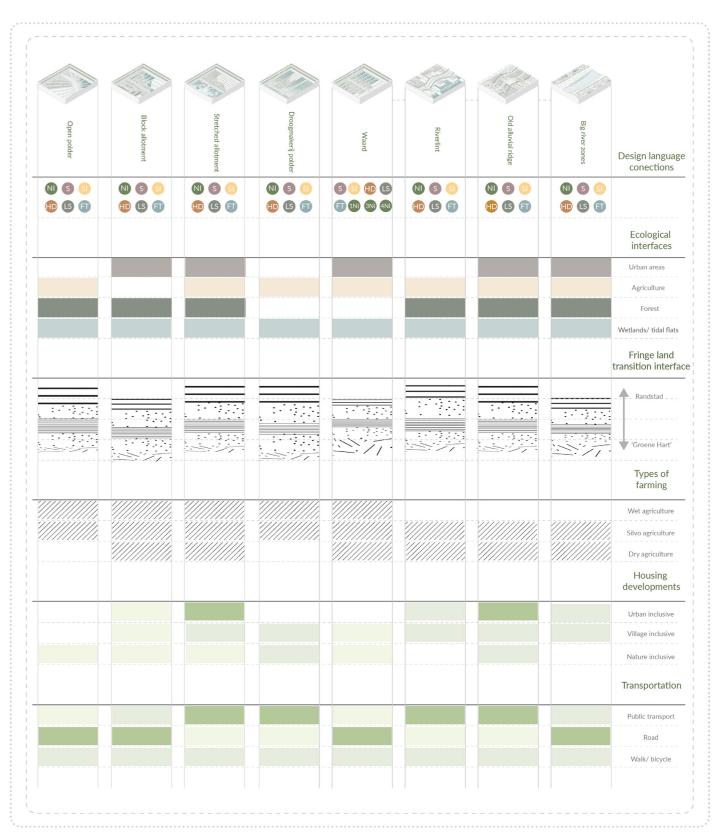


Figure 211, Regional dissection functions & interfaces matrix.



Figure 210, Regional dissection panorama.

Regional dissection - operationalisation

The strategy for implementing the Fringe at the regional level entails the integration and arrangement of the different typologies of Fringe housing developments within it. This approach recognizes the fact that the Fringe is not homogenous, rather, it is a heterogeneous territory comprised of distinct mosaics, characters, and intricacies that have an impact on how housing developments can transpire, as delineated in the preceding section.

Fringe housing developments & density

Based on future population perspectives, and societal trends, mentioned in Chapter 2, it has been determined that of the 1.4 million homes to be realised by 2075 roughly 468.928 new homes need to be realised among the Fringe (Centraal Bureau voor de Statistiek, 2019).

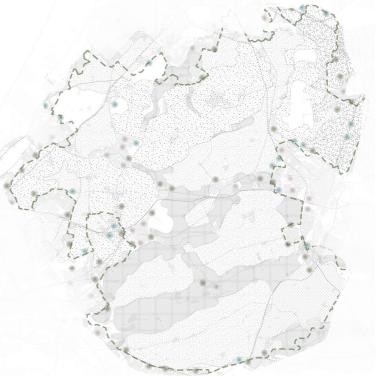
The establishment of the land uses within the regional strategy signifies the spatial negotiation of the Critical Zone and its inherent nature-inclusive character in making the developments part of their respectable locations. While simultaneously including them among the Panarchy's characteristics of place identity and network.

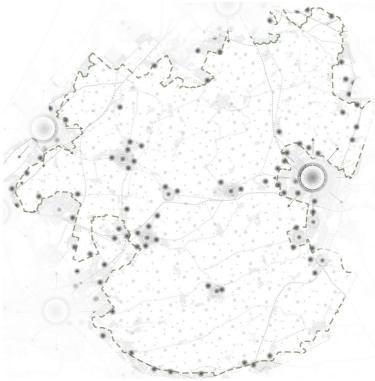
Likewise, the housing strategy follows the pathway of interpolation of external and internal pressures. Entailing that its location is based upon the landscape's ability to sustain the development without human interventions or causing harm to its functioning and the landscape's inherent networks while adding simultaneously the notions of integration among the local communities and demand.

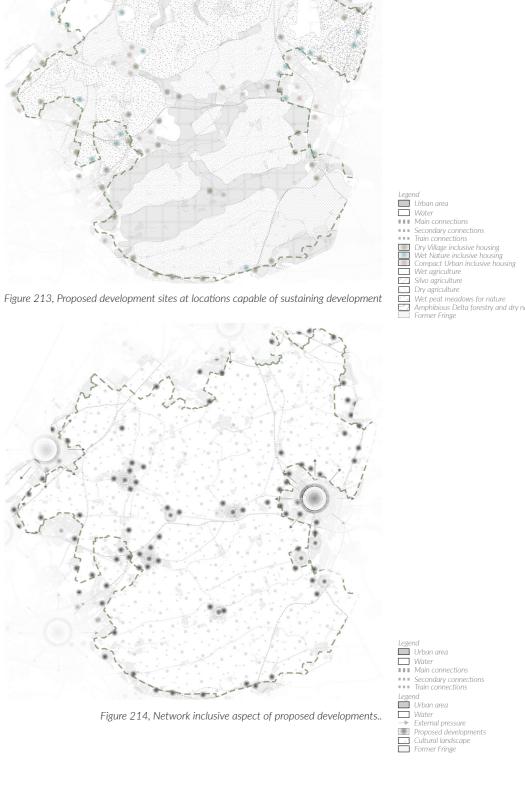
Therefore, a strategy entails the integration of the proposed development typologies from the design language, nature inclusive typology, village inclusive typology, and urban-inclusive typology, within the found suitable locations for such a development. Consequently, the Fringe can accommodate eighty-four developments.



Figure 212, The overall ingredients of the regional dissection.







The diversifying of developments is based on strategically positioning them near the landscape network, enabling connectivity and integration into the polycentric nature of the larger region. This diversification opens avenues for incorporating nature-inclusive typologies into biodiversity-rich landscapes with circular resources through actions like rewetting, agroecology, and afforestation (Kennisportaal Klimaatadaptatie, 2024; Ministerie van Infrastructuur en Waterstaat, 2024). With an average typology density of up to fifty homes per hectare.

The Village inclusive typology is located at the crossroads of exciting villages and larger agglomerations, with up to sixty homes per hectare. The Urban inclusive typology is located outside the Fringe at locations of urban renewal, entailing a realisation outside the scope of the thesis. Consecutively, the proposed development typologies entail a departure from the traditional sense of pseudocountryside development with an average density of 35 dwellings per hectare governed by parking norms (Jansen, 2020; Zuid-Holland, 2020).

The eighty-four developments are divided accordingly into twenty nature inclusive housing developments, thirty-eight village inclusive housing developments, and twenty-six urban-inclusive housing developments.

- Number of homes to be realised 468.928 homes, across, 84 developments.
- 20 nature inclusive: 112.543 homes, 2251 ha, with an average of 113 ha per development.
- 38 village inclusive: 211.018 homes, 3517 ha, with an average of 93 ha per development.
- 26 urban inclusive: 145.368 homes, 1938 ha with an average of 75 ha per development.
- With the Fringe consisting of 128.756 hectares, it will exist out of 7706 hectares of housing developments.

Successively, the Fringe stays true to its blue-green characterisation, with only 7706 hectares dedicated to housing developments, 5,98 precent of the total Fringe area, with an average density across the entire Fringe of 3,64 homes per hectare. Leaving much space to be developed into the parkland, and successively, offering future potential for additional development within the parkland after 2080, in those locations suitable that are not yet developed until 2080.

Within the Fringe, the density of development is however not spread equally. It is at its densest in the development, with within the Fringe on average the density being the highest near one of the cities of Randstad or around the inherent landscape networks.

Consequently, the development plan underscores the notion that under the supervision of a national strategy in combination with developing compactly, there is only little space needed to fulfil the future housing need and the country is far from being full.

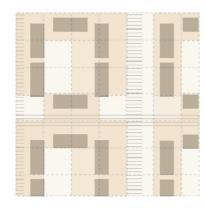


Figure 215, Current suburban density.

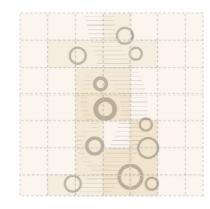


Figure 216, Future development density.

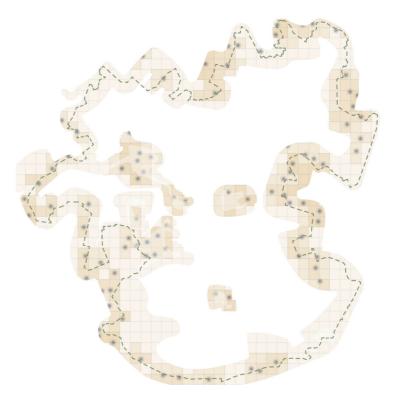


Figure 217, Fringe density map of developments.

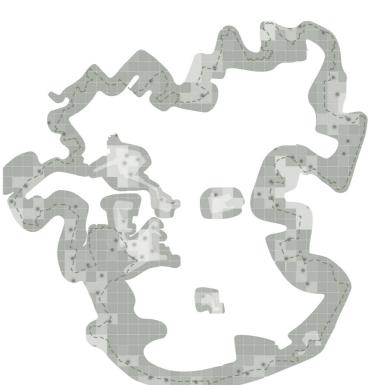


Figure 218, Fringe agroecology density.



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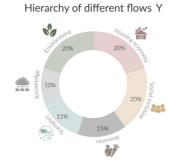
Flows of the Fringe

To determine the operationalisation and structure of the synergetic system within the Fringe, a scoring system was developed, based upon a flow categorization hierarchy. The categorisation follows a hierarchy of flows at different scales with different levels of importance. Flows are classified into external, regional, and local, with some flows being bidirectional and some being unidirectional. Subsequently, the flows are assigned different scores of X, according to their scale and directionality.

Moreover, the different flows are classified into six categories in the scoring system: housing economy, social-inclusivity, environmental, resources, transportation, and knowledge, where housing economy refers to the flows of capital. Social inclusivity refers to the exchange and inclusion of culture. The environment refers to biodiversity and ecosystem operationalisation. Resources refer to food and materials. Transport is driven by connectivity. Lastly, knowledge refers to the research and development sharing within the Critical Zone hubs. Subsequently, each flow has a different weighting time due to its importance within the synergy. Housing economy, social inclusivity, and environmental account for 20%, resources account for 15%, transportation for 15%, and finally knowledge for 10%. The percentage sets the Y value in the flow equation.

The regional subdivision of the Fringe per subregion is calculated separately by summing their X's and multiplying them by the proportion of that kind Y to get that value Z. Hence, 'Z housing economy = X housing economy * Y housing economy'. The individual Z values of the flows are added up to get the overall regional score. The formula is $\Sigma X1*Y1+\Sigma X2*Y2+.....+\Sigma X6*Y6=Z1+Z2+.....Z6$ = Final result'





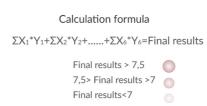


Figure 219, Scoring principles.

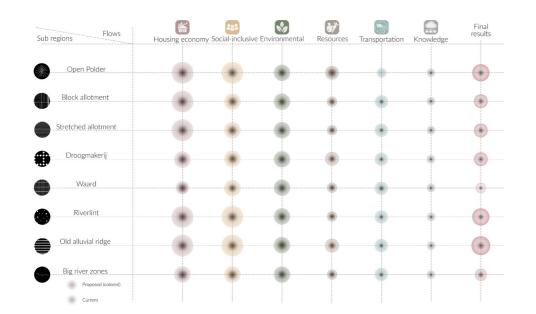


Figure 220, Table of Fringe scores.

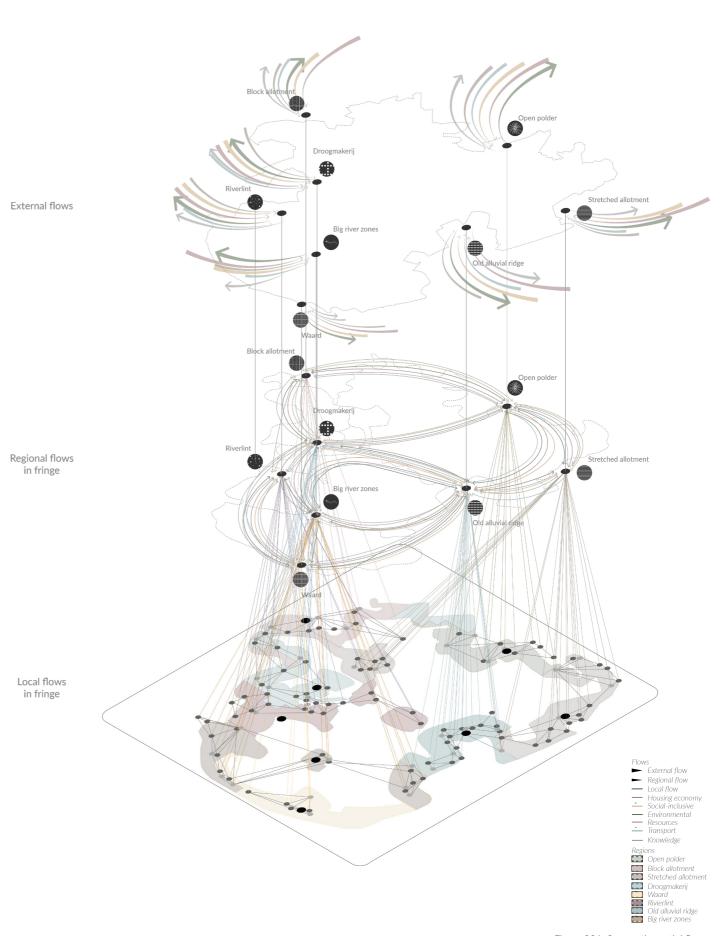


Figure 221, Synergetic spatial flows.

Based on the results of the scoring system the structure of the synergetic system and the Fringe is designed and can be explained. Eight subregions with different characteristics form the Fringe National Parkland. The diagram on the right showcases the synergetic flow system through the scales. From the largest scale, the Fringe continues to attract external flows from global, national, and regional levels. Within the regional scale, the network of developments and Critical Zone observatories, in combination with the landscape subregional characteristics strung together within the six flows, forming a synergetic recharged Fringe. On a local scale, small-scale synergetic networks are formed within the subregions.

Subsequently, by accenting the multifaced characteristics of the subregions, the operationalisation of multifunctionality and diversity integrates external, regional, and local flows into the operationalisation of the entire Fringe and beyond. Creating a breathable bio-diversity ring, a cable of sustains urban pressure, while delivering ecological and dwelling relief.

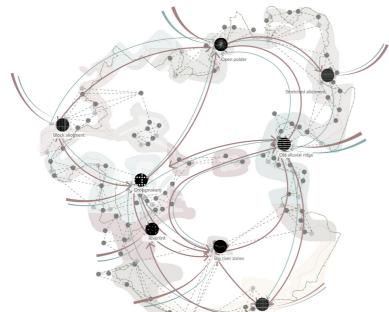


Figure 222, The economic flows.



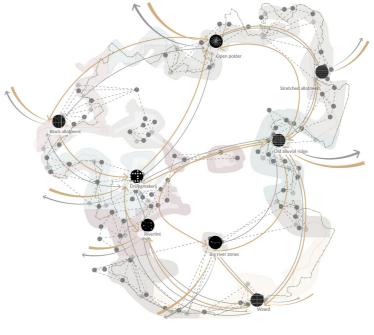


Figure 223, The social flows.

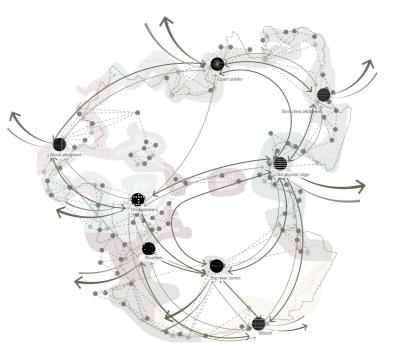


Figure 224, The natural flows.





Resources
Regions
Open polder
Block allotment
Stretched allotment
Droogmakerij
Waard
Rivierlint
Old alluvial ridge
Big river zones

Fringe trail

Secondary Road connections
Train connections

Critical actions

To ultimately integrate the housing strategy into the operationalisation of the Fringe a network of internal connectivity is necessary, to prevent internally fragmented developments like the current NOVEX successively. The connectivity is achieved by the critical actions of the establishment of a recreative Fringe trial network and a network of social and knowledge hubs.

The critical action of the Fringe trail necessitates the creation of a recreative walking and cycling trail that physically binds the Fringe Parkland together. It connects a variety of different landscapes and developments along a 462-kilometre multi-day trail. By being a walking and cycling trail it breathes the ecocentric perspective and allows the travellers to fully emerge into the Parklands beauty, making them value both the places and the ecocentric perspective.

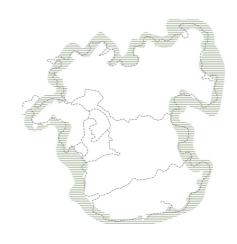


Figure 225, Action the Fringe trail.



Figure 227, The critical action of the Fringe trail.

The critical action of the Critical Zone observatory knowledge hubs involves a network of research and development centres aimed at offering a network of locations for creating awareness, and education, and to monitor the conditions of the landscape and its systems. While functioning as a method to physically connect the Fringe regions and its developments. It serves as a tool to spread the value of the ecocentric way of life, in doing so it fosters communal debate and social synergies across its dwellers.

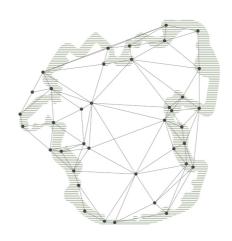


Figure 226, Action network of Critical Zone observatories, social and knowledge hubs.

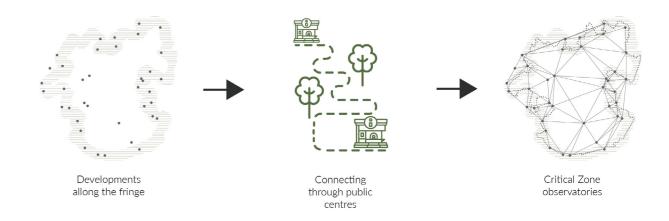


Figure 228, The critical action of the critical zone observatory network.

All together fostering the case for the Fringe as a place of connecting the urban to the rural without depleting one of its inherent values. Therefore, realising novel housing structures that harmonize with the natural landscape and socio-economic conditions.

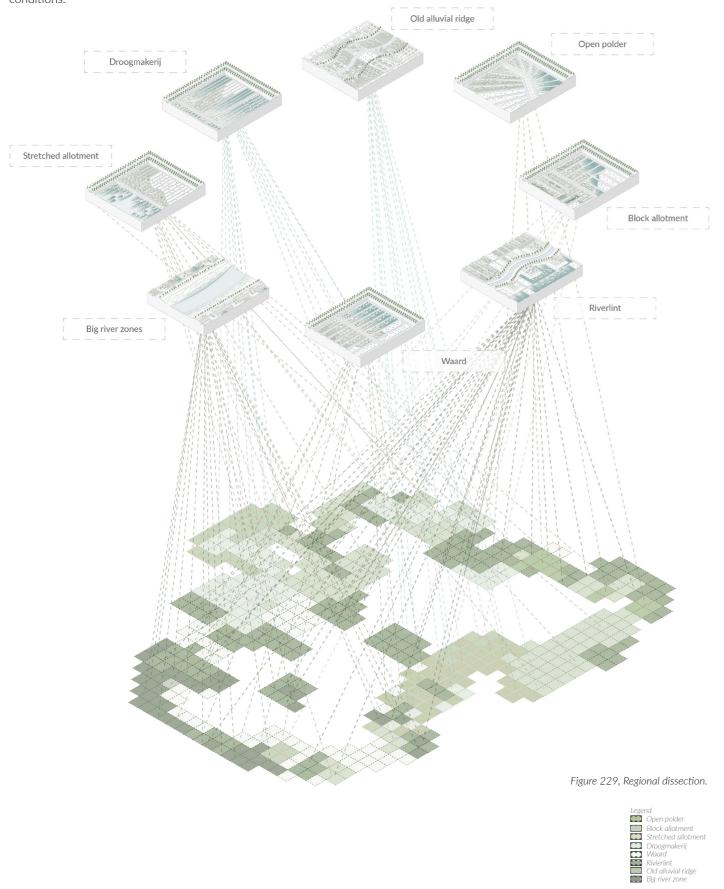
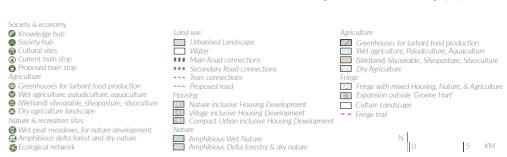




Figure 230, Mesoscale design proposal.



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7.11 Local operationalisation - Microscale

The Fringe alternative for the Zuidplas

The microscale showcases how on the site of the proposed 'Vijfde Dorp' in the municipality of the Zuidplas, an alternative for the realisation of a new town within the open landscape is possible.

Contradicting, it shows that with the development of several smaller locations within the Fringe National Parkland by the implementation of the housing typologies the same amount of housing can be realised, among the Fringe, keeping the open polder open. While creating the envisioned non-exploitative nature-inclusive transitional zone of the Fringe.



Figure 231, Location of the microscale.



Figure 232, Currently proposed masterplan for the fifth village, see figure 78 for detail ((Gemeente Zuidplas & KuiperCompagnons, 2021), edited by

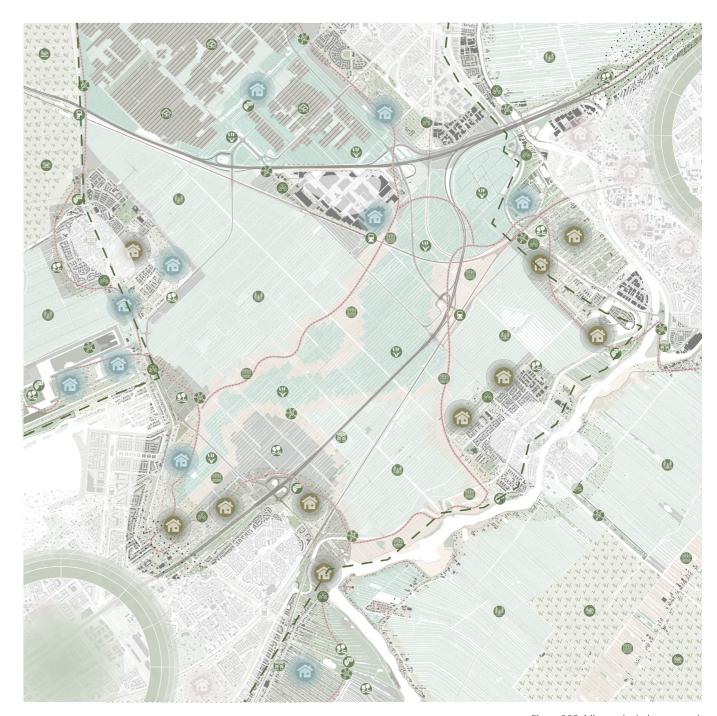


Figure 233, Microscale design proposal.

Society & economy

Knowledge hub
Society hub
Cultural sites
Current train stop
Proposed train stop
Agriculture
Gerenhouses for (urban) food production
Gerenhouses for (urban) silvopasture, Silvoculture
Gerenhouses for (urban) food production
Gere

To illustrate how the strategy employs the synergetic notions of the Critical Zone and the Panarchy within a smaller-scale example. Showcasing how the external and internal pressures are extracted to designate the transitional zone. One of inundation, evolving in character and width, by following the location, puzzles with the surroundings to create the dynamic parkland zone of transition nature-inclusive agroecological housing.

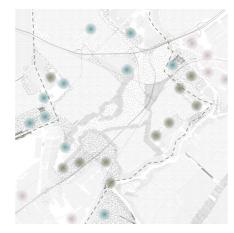


Figure 234, Fringe developments integrated within the landscape.



Figure 235, Microscale design proposal.



Local operationalisation – Fringe development principles

The next section clarifies with diagrams the principles of the Fringe and the synergetic typologies at the microscale. It shows how housing developments could be incorporated within the Fringe. Afterwards, a section exemplifying a nature-inclusive Fringe development, and a village-inclusive development follows. Together the examples paint the picture of how housing developments will be included within the Fringe. Showcasing its intricate dynamic mosaics that foster a renewed connection with the landscape and its natural processes. Emphasizing the regenerative potential of synergetic Fringes, it envisions a promising future.



Figure 236, Location of the nature and village inclusive Fringe development examples.



The Fringe transition

The principle of transition demarcates opening towards a wideopen panorama of the 'Groene Hart' while offering a more enclosed dense atmosphere around the urban edge, establishing the design language patterns of the urban-rural delta and the gradual transition of density. The transition from the urban to the rural builds from the urban by a small zone of meadow to a thick wooded layer forming the core, outlining the place for housing development and the location of the Fringe trail. In continuation moving outwards the transition in increments of ten precent opens. Successively, the transition is closely related to the principle of density. The natural infill of the Fringe breathes this transition through the type and density of the planting cover.

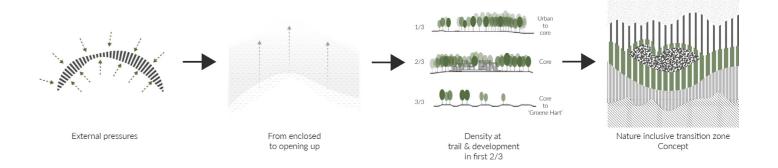


Figure 238, Principle for transition.

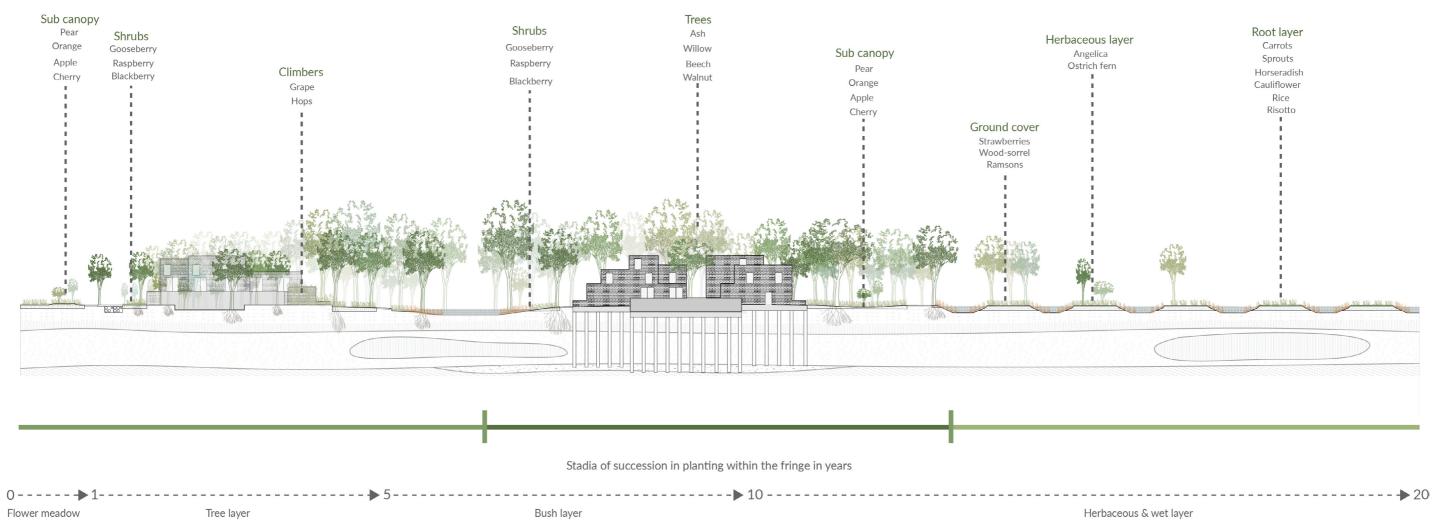


Figure 239, Principles for planting and transition within the Fringe.

The principle of movement

The principle of movement within the Fringe denotes the separation of fast and slow traffic. Entailing that fast traffic, motorised vehicles, can only travel to the developments, where they park underground. Or it travels directly across the Fringe between the Randstad, and the 'Groene Hart'. The Fringe does not serve as a parkway. The Fringe itself is experienced by moving along the Fringe trail, accessible by slow movement only, by foot or bike. Therefore, the predominant form of movement throughout the Fringe is by foot, in the spirit of the ecocentric paradigm.

The principle of density

The principle of delineating density resembles the principle of transition. Hence, the density changes the Fringe form being defined as a wall of terrestrial urbanisation to a blend of urban and rural elements conducive to linear passage. This entails that both the built-up and the wooded density is concentrated at the core along the Fringe trail, within the first two-thirds of the Fringe from the urban side, with density decreasing in 20% intervals towards the 'Groene Hart'.

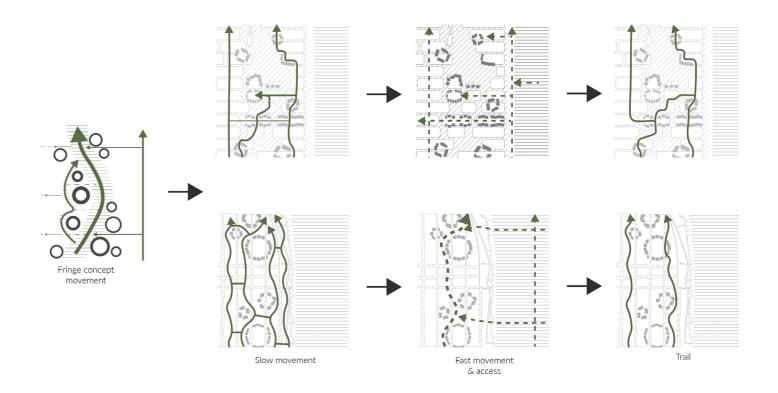


Figure 240, The principle for moving through the Fringe.

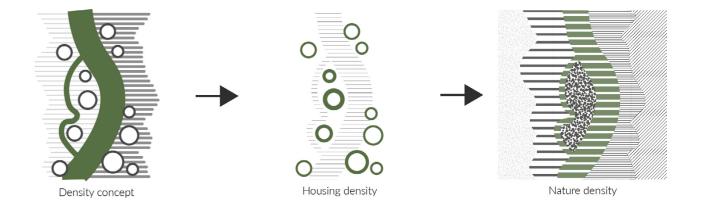


Figure 241, The principle for density.

The principle of a flexible typology

The circular typology denotes one that can be varied in types and sizes of infill. With the houses being oriented towards public inner areas while remaining enclosed towards the outer edges (Groenendaal & Vijver, 2023). This arrangement fosters synergies, adaptability, and inclusivity across different sites while allowing for flexibility in accommodating varying societal demands, such as the inclusion of larger or smaller housing units (Manen et al., 2024). Therefore, the typology offers adaptability to be included, yet adapted to a varied landscape. Subsequently, it accommodates the reachability of synergies, both within the typology and with the surrounding landscape.

The principle of accessibility

The circular typologies allow despite appearing enclosed, for adaptability in how it connects to the outside Fringe. Therefore, it offers a multitude of accessibility options. While outwardly enclosed, these clusters protect from elements like water while offering a sense of nature inclusion through unobstructed views of the surrounding landscape and immediate access.

The principle of public-private space

The circular nature of the typologies encourages communal interactions, care, and safety within inner spaces while offering both private and semi-private outdoor areas. The turned-around typology of the building block forces by design, daily social interaction. These interactions may occur during walks to shared underground parking or within social hubs and semi-public spaces, they are simple (Manen et al., 2024). Yet these small moments of contact stimulate the process of sustaining the societal synergies and stimulate the communal feeling, and care of the public space (Sim & Gehl, 2019). Simultaneously, these interactions stimulate societal participation to actively take part in the caretaking tasks in and around the developments, diminishing the risk of the owners' association turning into degradation.

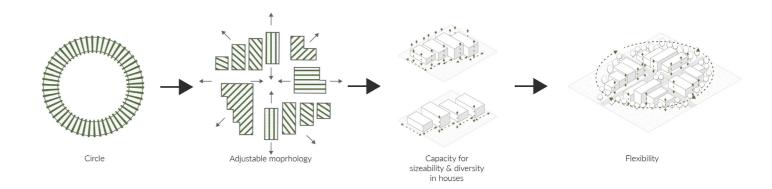


Figure 242, The principles for flexibility in typology.

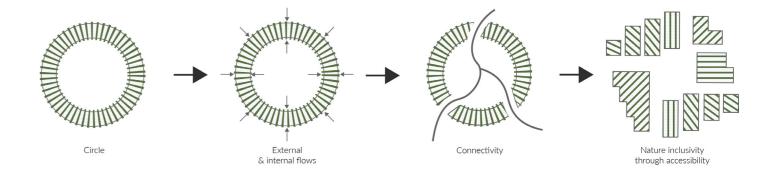


Figure 243, The principles for accessibility.

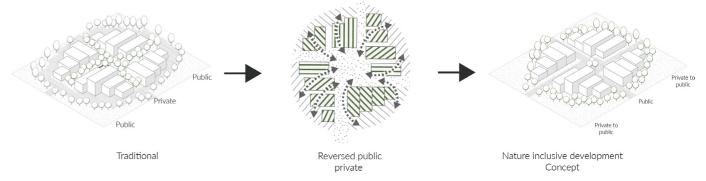


Figure 244, The principle for public-private space.

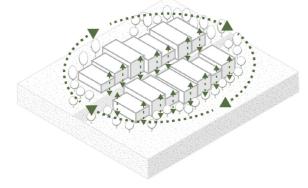


Figure 245, Typological concept for a synergetic development synergy.

The synergetic typology

By combining the previous typological principles, it becomes apparent that there are two synergetic typologies possible within the ecocentric paradigm. One that is circular and one that consists of short linear blocks.

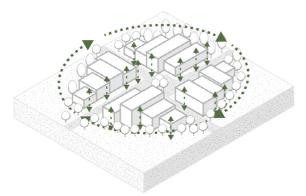
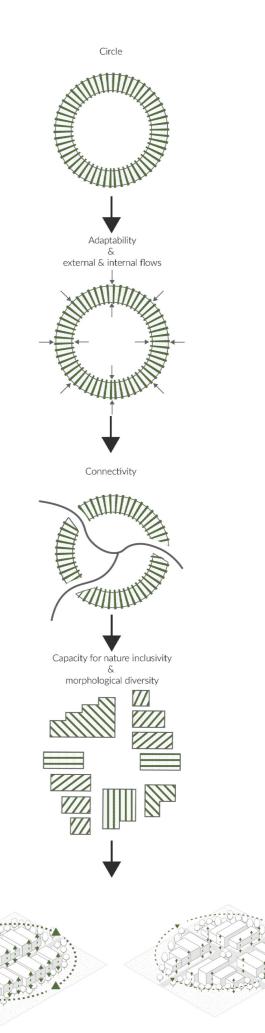


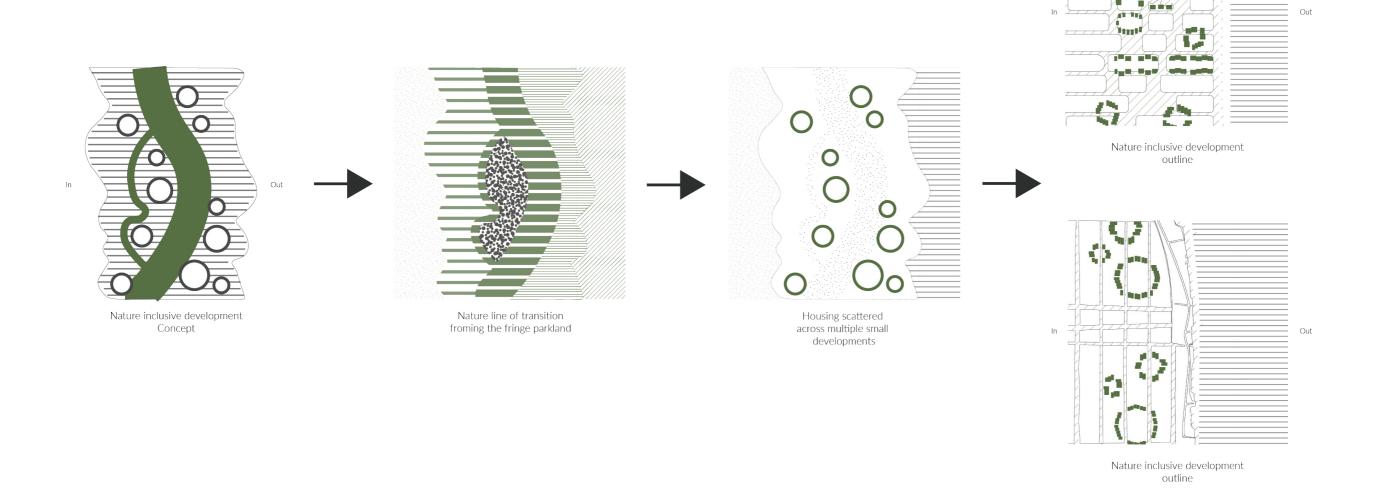
Figure 246, Typological concept for a synergetic development synergy.



 $\label{thm:proposed_figure_247} \textit{Figure 247}, \textit{Typological diagram for a synergetic development synergy}.$

The synergetic development

Consequently, by combining the individual principles, the concept layout for the different housing developments within the Fringe emerges. The next few pages exemplify further how these developments would look and feel within a real location along the Fringe of the municipality of the Zuidplas.



Local operationalisation – Fringe example developments

Nature inclusive

The nature inclusive Fringe example illustrates how housing developments can blend with a rewetted natural landscape within the Parkland. This elongated, water-rich location underscores the importance of integrating housing at certain locations within water-rich landscapes to boost biodiversity and accommodate aquatic dwellings, at those locations suitable for housing. Such an approach nurtures the emergence of lively yet diverse and interconnected Fringe communities throughout (Jansen, 2020; Vink et al., 2017).

At this location, the Fringe adopts the design of a 'lint', with the waterbody serving as the central feature around which development clusters and trails are situated. The waterbody becomes the foundational element shaping the rest of the area. Serving as the heart of the ecosystem, the waterbody allows for the gradual transitions to lower density towards the outskirts, fostering the natural succession landscape.



Figure 249, An example of a nature inclusive housing cluster.



Figure 250, An example of a nature inclusive housing development along

- Knowledge hub
 Society hub
 Cultural sites
 Cultural sites
 Current train stop
 Proposed train stop
 Agriculture
 Greenhouses for (urban) food production
 Wet agriculture, paludiculture, aquaculture
 Wetland) silvoarable, silvopasture, silvoculture
 Dry agriculture landscape
 Nature & recreation sites
 Wet peat meadows, for nature development
 Amphibious delta forest and dry nature
 Ecological network
- Fringe Development
 Fringe
 Fringe
 Groene Hart'
 New development
 Frees
 Trees
 Land use
 Existing development
 Building
 Existing green
 Water

By integrating the nature inclusive typology at this location, the parkland meets the societal demand for authentic rural deployments reminiscent of 'off-the-grid' living (Pierre & Klok, 2015), typically found far from urban areas but now made feasible along the Fringe, in relative proximity to the urban. With a community density of up to 50 houses per hectare, this approach promotes self-sufficiency and circular production of food and resources, aligning closely with ecocentric design principles (Vink et al., 2024; Washington & Maloney, 2020).

The type of typology suitable for this location is the elongated one but due to the predominant rationality of the elongated landscape, it requires a similar rational approach to allotment within the inclusion of the typological clusters. Despite serving as connecting structures for the Fringe, the allotment doesn't impede the inclusion of circular clusters as well. However, the primary cluster on this site resembles a traditional lint village, while the others adhere to the concept, presenting an alternative pseudocountryside model.

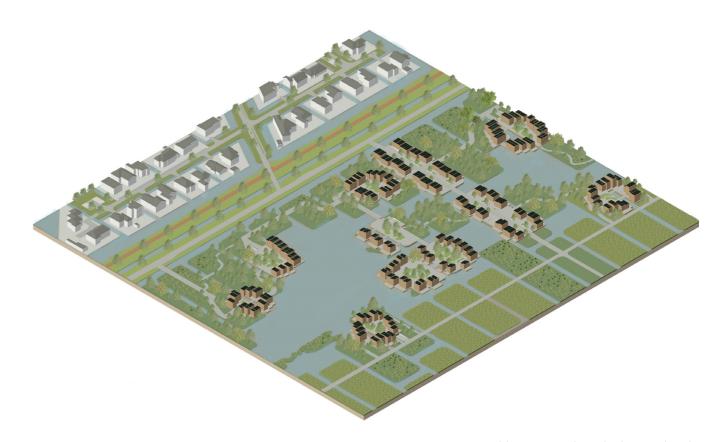


Figure 251, Isometric model of a nature inclusive development along the $$\operatorname{\textit{Fringe}}$.}$

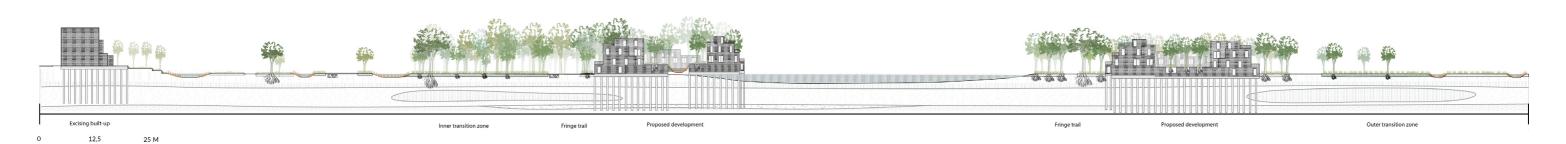


Figure 252, Section of the Fringe at a nature inclusive development.



Figure 253, An example of how nature inclusive housing can be included within the landscape.

Village inclusive

The village-inclusive Fringe exemplifies how housing developments can merge with existing neighbourhoods bordering agricultural areas along the Fringe. Integrating both the existing community and the agricultural landscape within the housing development enhances societal integration and biodiversity. This approach fosters vibrant and interconnected Fringe communities (Jansen, 2020; Vink et al., 2017).

At this location, the Fringe forms a park zone, with a central wooded area acting as the connecting element around which development clusters and trails are situated. The park serves as the foundational landscape element, benefiting both existing residents, drawing them in, and natural processes, that spread to the agricultural fields. As the heart of the ecosystem, the park gradually transitions to lower density at the edges, facilitating natural succession and acting as stepping stones for biodiversity spread throughout the surroundings.



Figure 254, An example of the Fringe trail through the village inclusive housing development.



Figure 255, An exemplary case of a village inclusive housing development along the Fringe.

Society & economy

Nowledge hub
Society hub
Connections
Cultural sites
Cultural sites
Current train stop
Road
Road
Road
Rogiculture
Pringe Development
Fringe Develop

50 M

The development features clusters of detached village-like quarters, interspersed with small-scale community developments, to create a cohesive village atmosphere (Centraal Bureau voor de Statistiek, 2023e; Michielsen et al., 2019; Voogd & Cuperus, 2021). With up to 60 houses per hectare, these clusters include small shops and amenities integrated throughout. Like nature-inclusive developments, these village-like clusters adopt a circular layout. By integrating surrounding neighbourhoods and denser developments within Fringe National Parkland, these projects meet the societal demand for village-like living.

The elongated layout necessitates a rational approach to allotment within cluster development. While serving as connecting structures for the Fringe, the allotment does not hinder the integration of circular clusters, thus presenting an alternative pseudo-countryside model.



Figure 256, Isometric model of a village inclusive development along the Fringe.

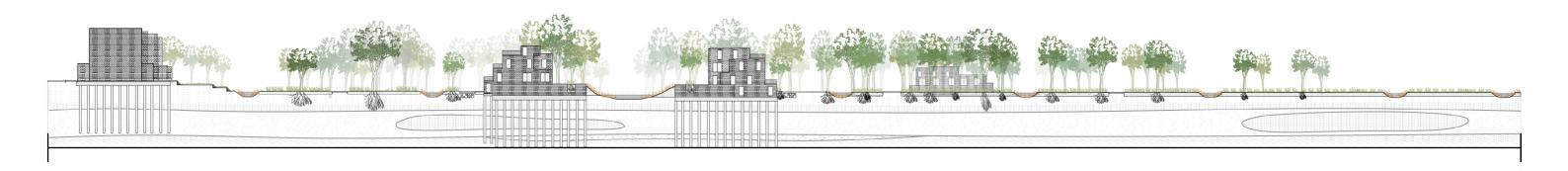


Figure 257, Section of the Fringe at a village inclusive development.



Figure 258, An example of a village inclusive housing cluster inner space.



Figure 259, Microscale eye-perspective from within the landscape.



Figure 260, Microscale eye-perspective from within the development.

7.12 Phasing

The implementation of the synergised Recharged Hart follows the pathway of a threefold succession phasing: the reconfiguration phase, the build-up phase, and the succession phase. These separate phases demarcate a group of actions that together form an overall successive element, a phase, in time of the overall strategy. The coined critical actions are further utilised as tools to implement the strategy across a timespan, by using their interconnected nature as separate pillars, that together form a hierarchical strategy, of consecutive connected actions. Within each Local operationalisation critical action, specific internal steps are necessitated to implement to overall action. Each of these internal steps connects to the successive step in the action while allowing for trickling down into other internal steps of other critical actions. Simultaneously, these actions are divided over their primary spatial scale. Consequently, like the overall strategy, the phasing is open-ended and not finale, allowing for the successive stadia to shape, and reshape the synergies, and thus the 'outcome'.

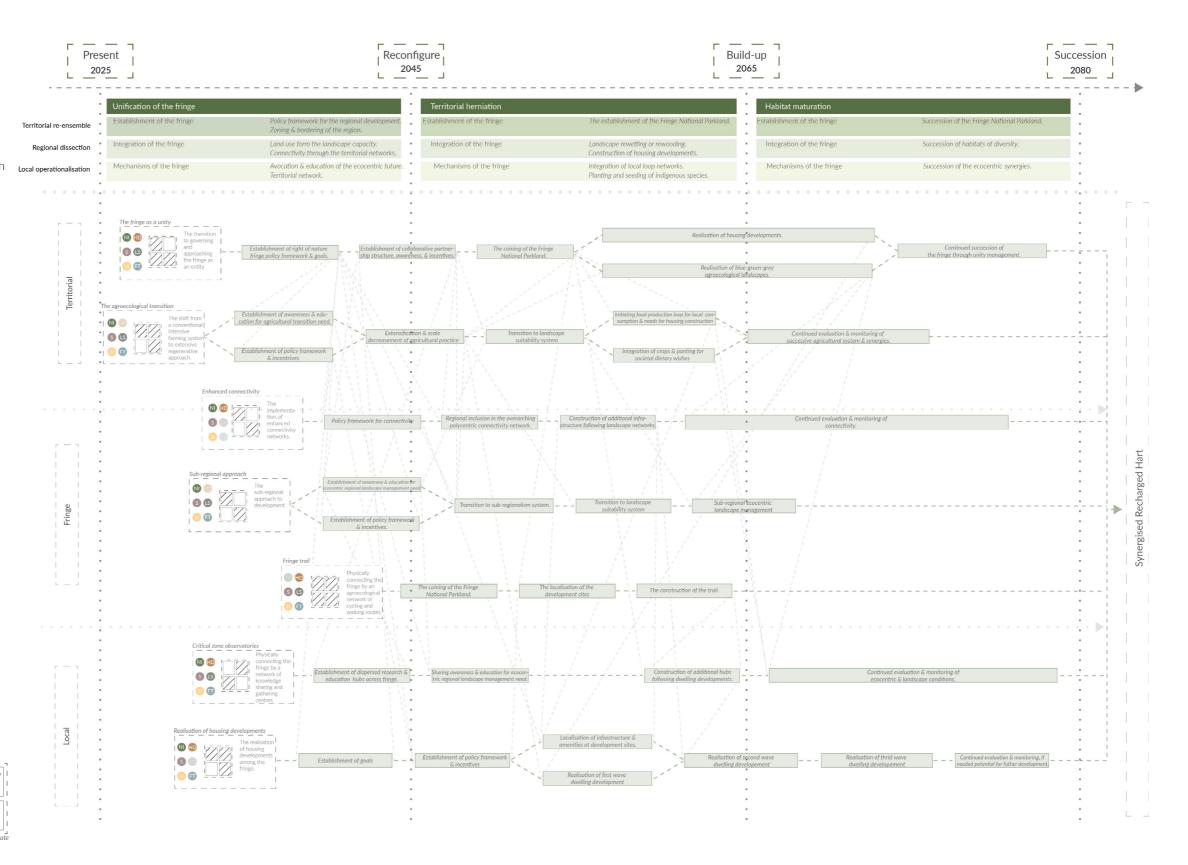


Figure 261, Phasing timeline.

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Phasing - the reconfigure phase

The first succession phase, the reconfiguration, demarcates the phase that unifies the Fringe. Successively, it defines the foundational steps of the strategy, the phase of policy framework development, and the phase of developing societal awareness and support through education and incentives. With these foundations, the bordering of the Fringe, and its inherent landscape infill can be shaped. The policy fundament shapes the way forward for the successive integration of the Fringe, and transformation based on the notions of the strategy, the landscape's capacity, and its networks.

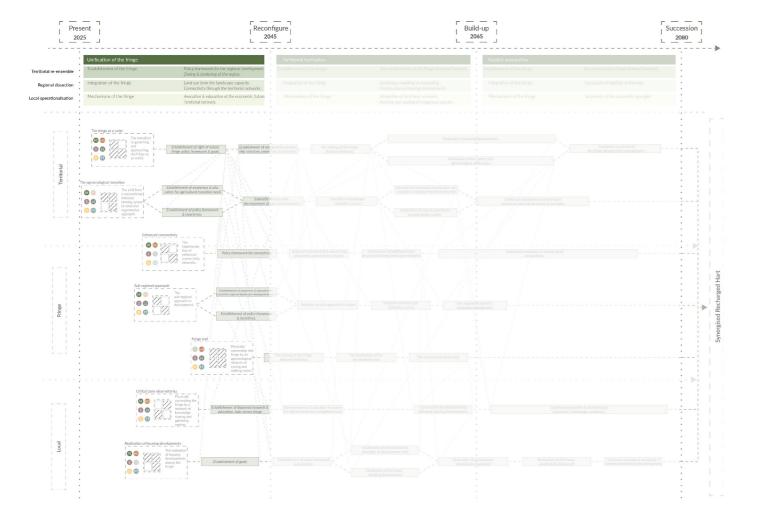
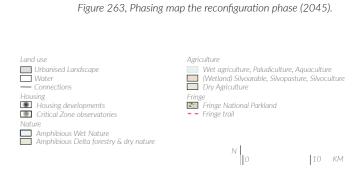


Figure 262, Phasing table of the reconfiguration phase.





Phasing - the build-up phase

The second phase, the build-up phase, denotes the phase of territorial herniation. Implies the successive coination of the Fringe National Parkland, and the iterative process of integrating and transforming the regional landscape through the processes of rewetting, rewilding, and rewooding, to fit the landscape's capabilities. Resulting in the shaping of the conditions of the Fringe and its regions, from where they can successively establish the synergies and co-evolve. Consequently, the build-up phase entangles an iterative process in which local stakeholders are continuously involved to protect local needs (economic, and social) and cultural inclusivity alongside agroecological outcomes.

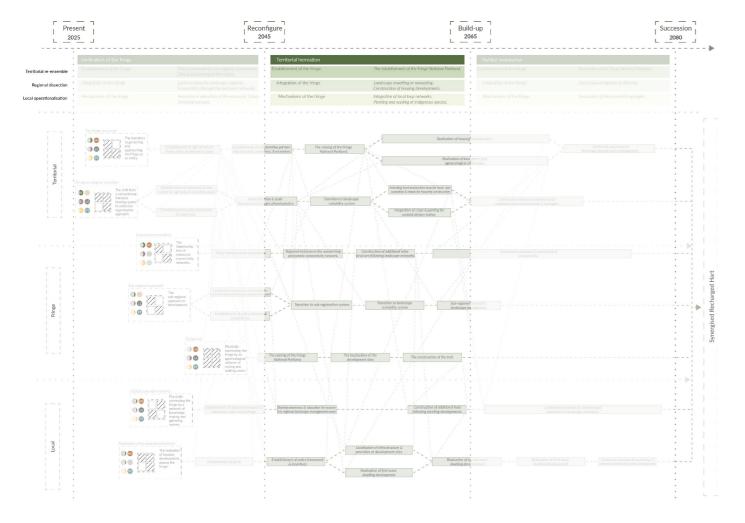


Figure 265, Phasing map the built-up phase (2065).



Figure 264, Phasing table of the built-up phase.

0 10 KM

Phasing - the succession phase

256

The third, and final phase, the succession phase, signifies habitat maturation. Indicating the formation of habitats of diversity throughout the Fringe, with its agroecological housing developments spread across the Fringe parkland. Subsequently, due to the nature of succession, the final phase has an open ending, allowing for by evaluation of the co-evolution of the synergies. Resulting in the revitalisation of the 'Groene Hart', the 'Recharged Hart'.

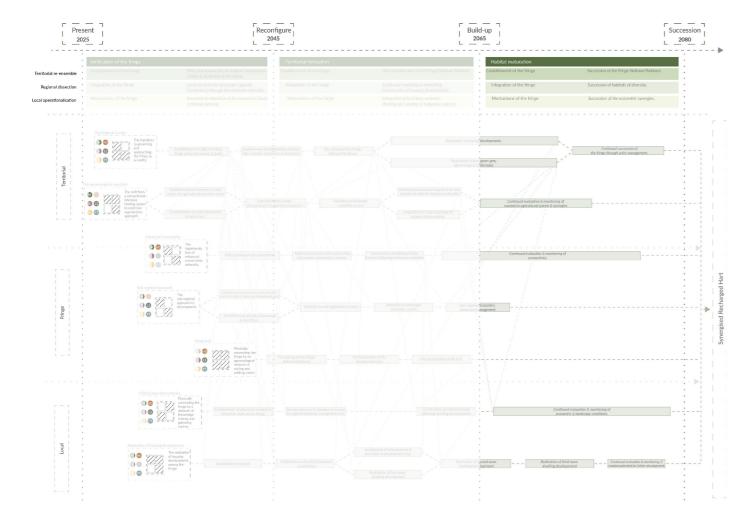


Figure 266, Phasing table of the succession phase.



Figure 267, Phasing map the succession phase (2080).





8. Design Evaluation & Discussion

The eighth chapter, the fifth part circumscribes the research evaluation and discussion. This chapter reflects upon the proposed design strategy and elaborates towards the conclusion. Answering the sub-research question:

What potential trade-offs or conflicts might arise between social, economic, and environmental interests when implementing an ecocentric paradigm in terrestrial development, and how can these potentially be resolved or mitigated?



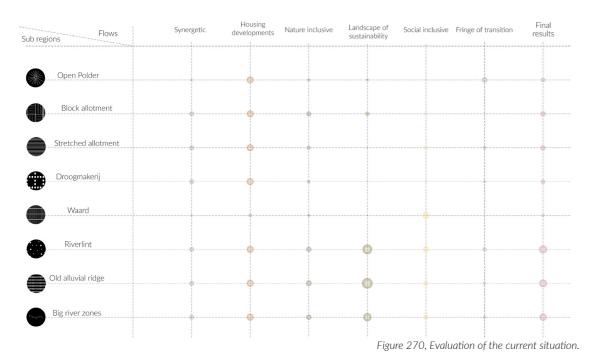
Evaluation

The method of evaluation used is based upon evaluation methodologies like the TEED-stad method (Kennisportaal Klimaatadaptatie, N.d.) and the Doughnut for Urban Development method (Birgisdóttir et al., 2023). Subsequently, the evaluation is divided into the three pillars of unbalances, the economic, environmental, and social, and its corresponding goals. The goals are graded with a value of zero to five, of which zero denotes non-existent and five high. The economic values are the synergetic and the housing development value, the environmental are nature-inclusive, and the landscape of sustainability, and the social pillar is formed by the social-inclusive and Fringe of transition. The evaluation values combine the conclusion of the spatial analysis and the synergetic flow results. For example, the synergetic value is determined by taking the flow value and interpolating it with the scoring system.

The synergetic value reflects the balance between social, natural, and economic assets in the landscape, and its ability to regenerate synergy after disturbance. A rating of zero indicates minimal synergies, while five signifies constant synergies. Housing development value assesses how well new housing meets demographic needs and integrates with its location and community. A score of zero indicates an unbalanced housing stock, while five indicates adaptable, future-proof housing.

Nature-inclusive value measures the diversity and ecological richness of the natural system. A rating of zero suggests low ecological functionality, while five signifies a balanced natural ecosystem. Landscape sustainability value evaluates the qualitative balance of the landscape and its integration with green-blue-brown networks. Zero denotes a landscape requiring constant human intervention, while five denotes a landscape in synergy without human interference.

Social-inclusive value assesses the integration of societal diversity and demand in development and cultural appropriation. Zero indicates minimal social attachment or participation, while five reflects constant participation and attachment. The Fringe of transition value gauges the role of the Fringe as a transitional zone connecting rural and urban areas, indicating integration and flow exchange. A score of zero suggests a deteriorated state, while five indicates a socially established Fringe.



Synergetic value
 Balances in the landscape
 Social, natural, economic assets The Current situation Regeneration capacity Housing developments Fringe of transition value Improvement of Location integration
Flow integration & exchange Location specific Social inclusive value Nature inclusive value Ecosystem servi Biodiversity Cultural appropriation Ecological value Habitat diversity Landscape of sustainability value

• Quality of the landscape Location specific Green-blue-brown network

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The evaluation of the current situation shows that the current situation hovers around one, with the outliers being those regions that form landscape networks. Underscoring the depleted nature and the problem statement of the current system.

Likewise, the evaluation of the 'Recharged Hart', showcases improvement across the board, highlighting the achievement of reaching the set goals, denoted by the average value hovering around four to five. It however also denotes that there is a significant noticeable regional difference in the success of continuing to sustain and achieve synergies. Pointing towards that regionalism is both a strength and a weakness. It allows for reaching the synergies, but also for the difference in the extent to which they are met, as illustrated by the outliner of the Waard allotment. Since the 'Groene Hart' is not a regional entity but consists of multiple. Symbolising future potential for further development.

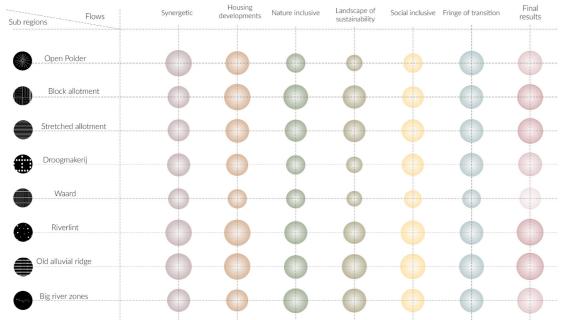
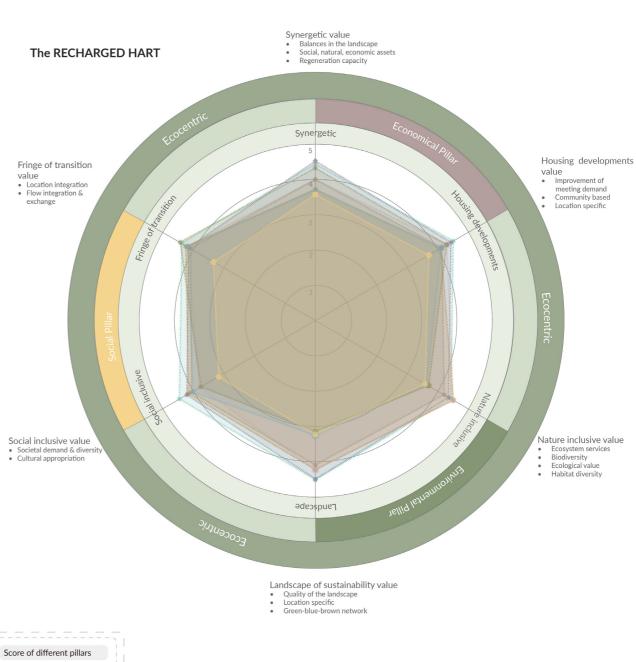


Figure 272, Evaluation of the future situation.





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Discussion

The short nature of policies and strategies of the last decades, focused on swift scores has resulted in the contemporary fragmented nature of the Dutch Fringe, with its low valuation. Measuring up to shaping an opportunity to alter the course, of short-sightedness to one of longevities and consistencies, inherent within natural succession processes. In that sense, it is possible to develop lasting iterations within long timeframes, elevating the need for quick fixes to former mistakes. However, requiring the evolution away from fixed clearly defined constraints, to a system of holistic appropriation with territorial uncertainties and dynamics, a system of the long durée in which humanity repositions itself among the web of life.

These constraints are further embodied within the coining of the shift to an ecocentric paradigm, as radical. Symbolising societal contemporary beliefs that we, humans, are elevated above the natural system, and therefore the progressive ecocentric approach crashes with a more conservative society and political climate. Indicating singlehandedly, the need for such radical proposals to change the chance to promote the ecocentric perspective through these proposals.

These promotive views, see results, as the current slow but steady paradigmatic shift within the practice of urbanism shows. Moving away from a classical paved, or building-block emphasis focused upon urban renewal and expansion towards a more landscape urbanistic approach as advocated by the landscape urbanism movement. Consolidating the opportunity for paradigmatic shift.

Contradictingly, the exciting policies follow a similar pathway of being not aligned with the strategy and being of a fragmented and undefined kind. In the sense that there are numerous frameworks considering the rural-urban Fringe, but due to their regional, often municipal, or provincial nature, they are not related to one another, creating a fragmented structure. As has happened with Bentwoud near Zoetermeer, or the Scheggen of Amsterdam.

The strategy's regional underpinnings recognise this fragmentation, yet its subregionalism potentially makes it similarly susceptible, as the evaluation highlights. Successively, the implementation of the Fringe Parkland fundamentally necessitates the inclusion of the collaborative partnership framework, as a tool to guide development in the socio-climate-territorial realm, by setting the proposition of a synergised planning system.

On a similar footing, similarly, not aligning with the strategies implementation is the current practice and policies nature of developing from the locations locality and landownership point of view. Even though, afterwards, the guiding principle becomes soil, hydrological leading, it is locked onto a location. The deeply rooted nature of this lock-in hinders the appropriation of another approach. Hence, the advocation of the ecocentric paradigm offers the opportunity to navigate this lock-in. In making the presumption of landscape capacity and networks, the vocal point in its strategy framework, providing ecological worth beyond ourselves.

Consequently, the design brings an alternative territorial strategy for the Fringe, that advocates an ecocentric future through the incorporation of a landscape-oriented approach, away from lock-ins of locality and ownership. By sticking to the open-ended nature of the project it shapes circumstances, it sets a stage, from where future co-evolution of the parkland can take place through the process of natural succession, communal debate, and continual monitoring.



Figure 274, The Fringe at Westergouwe.

9. Reflection

The ninth chapter concludes the fifth part of the thesis, by adding a reflection towards the concluding research evaluation. It comprises seven sections. With each section answering a specific reflective question.

1. What is the relation between your graduation project topic, the studio topic, your master track, and your master programme?

The continued terrestrial urbanisation, in a time of climatic crisis, is ongoing and demanding ever more resources and space. The field of urbanism, which once was initiated to shape this urban process (Waldheim, 2016), shifted its predominant attention towards urban densification and renewal. Should re-intervein and come up with new imaginary future perspectives to foster the knowledge gap and cater to the ongoing debate. Especially since the urbanists' interdisciplinary field advocates to (re)create suitable inclusive urban environments (Campbell, 2016).

Accordingly, the field of urbanism is slowly evolving away from the classical sense of the field, which focuses on the design of the small-scale, the building block and the neighbourhood following rationality and urban renewal with an emphasis on aesthetic considerations, as is advocated by movements like New Urbanism, the 15-minute city, and the Architectural Uprising movement (Arkitekturupproret), resulting in designs that may not endure over time. Towards a landscape urbanist approach that appoints a shaping role to the underlying landscape as a fundamental propagative forming dynamic (Waldheim, 2016). Substituting my devotion to this movement, inherent within my background as a landscape architecture graduate (BSc), and Urbanist master student, I adhere to the interdisciplinary beliefs that these fields are closely dependent, if not no longer separate.

Subsequently, the thesis followed this line of inquiry, by utilising a synergetic approach, inherent within landscape urbanism, to fill the terrestrial urbanisation knowledge gap in the Dutch profession. It accentuates the importance of integrating the intricacies of urban and non-urban landscapes, recognizing their multi-layered complexity, character, interplay, and interdependence. Advocating for a more inclusive and resilient methodology. Accordingly, it recognized that the dynamic relationship between landscapes and humanity is crucial for harmonizing their coexistence. As they both contribute to shaping a cohesive and sustainable future.

Consecutively, this mindset culminates from the MSc Architecture, Urbanism, and Building Sciences program, which enhances the capability to bridge challenges spanning various disciplines. Accumulating towards forming the methodological and theoretical underpinnings, by the variety of the curriculum in scales and tasks, designing with uncertainties in Q1, design with ecologies for urban micro-climates in Q2, Urban metabolism and strategic system thinking in Q3 and the intricacies of urbanisation, regionalism, and flows in Q4.

Sequentially, the thematization of Altered Nature, Poetics of Change innate in this year's Transitional Territories graduation studio, underscores the devotion to landscape urbanism, by its openness to explore systematically, yet spatially the territorial integration of urban with the natural to address housing scarcity, while simultaneously allowing for the unfolding of explorative design, and the advocation of a shift from passive land use to recognizing nature's active role in generational continuity.

Successively, the thesis contradicts the commonality of treating the urban and the landscape as separate entities. It views them as interconnected and dependent, forming a dynamic evolving organism.

Yet the studio, approach to paradigmatic poetic footings allows for the acknowledgement of perusing an extreme scenario beyond the current zeitgeist of tangible realism within territorial strategic projects for the Dutch context. Granting it to aid the ongoing territorial Dutch discussion. Hence, the thesis concludes with the demonstration of a potential for transforming depleted resource-extracted landscapes into opportunity scapes, through the ecocentric synergetic nature-inclusive design.

Consequently, the thesis emphasizes the need for a harmonious blend of urban design, cultural heritage, society, biodiversity, nature, and resilience. Creating a paradigm where humans and nature are equally valued, fosters sustainable design that aligns with natural conditions. In this perspective, every territory represents a collaborative effort between urban and natural elements. The Transitional Territories graduation studio uniquely places this paradigm at its core, while allowing for the process of shifting between the different disciplines and scales of the master programme interdisciplinarity.

2. What is the relation between research and design in your graduation project?

In this thesis, research and design are complementary approaches, that enhance one another, similar to the methodology of research through design by Lenzholzer, Duchhart, and Koh (2013). Denoting a process of constant dialogue, providing input to one another to experiment and progress. The dialogue sparks a loop of exchange that with each drawn line sparks new research, while research justifies each drawn line. A dynamic that was constantly present throughout the thesis progression, either consciously or unconsciously.

Subsequently, the thesis does denote different stadiums of emphasis. Firstly, the stadium of research before design and secondly, a stadium of research through design. Inherent is that throughout the thesis, design is always present, either consciously or subconsciously. During the initial phases of the thesis' problem statement, and analysis, research took precedence, shaping a solid theoretical framework, with the design being subconsciously present. Similar to how Kumar (2019) outlines research in a design context.

Within the design, and evaluation phase, design gained prominence, leveraging theories to explore various design options across different scales. Hence, within the projects, the balance evolves from initially being research-biased to transitioning towards being design-biased.

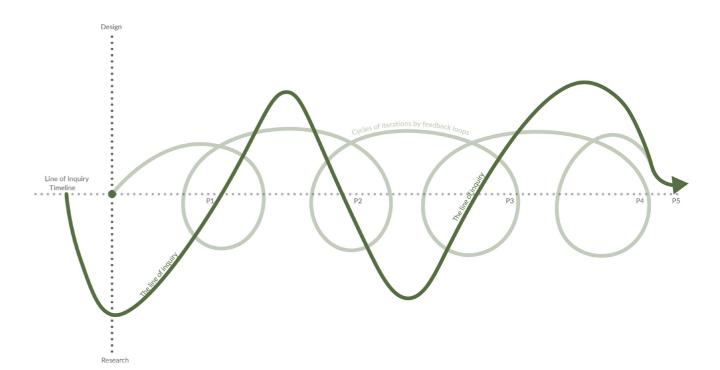


Figure 275, The research through design line of inquiry.

3. How do you assess the value of your way of working (your approach, your used methods, used methodology)?

The project aims to develop a resilient ecocentric perspective on Fringe housing by emphasizing a synergetic approach to foster synergies between social, economic, and environmental interests. This requires employing a systematic methodology, which in hindsight could be considered closely resembling the maximalisation method as it can act as a framework for conducting research through design with methods including, literature reviews, systematic graphing, cartographic reviews, site visits, digital interpolation, film or photography studies, stakeholder analysis, and synergetic design. Within the thesis, these frameworks were provided by the Critical Zone and Panarchy framework, which provided tangible footings.

On the contrary, due to the extent of the research phase, and ultimately the complexity and scope of the thesis it proved to be challenging to translate the theoretical and spatial findings into a design tool, with which could be designed. Subsequently, a loop of experimenting commenced resulting in the development of a derived pattern language, without initially realising it. Successively, it took successive coaching by my mentors and commencing in the tapas intensive of the pattern language to realise this. Leading to the method of coining a design language to translate theoretical backing and analysis into the design.

Secondly, the predominant textual nature of the literature review and the inherent complexity of the unfolding design made it difficult to visually explain the strategy beyond maps and text. Causing the possibility of inadequate and superficial conveying of the understanding of the theories and ultimately the strategy. Likewise, on a similar footing as the explorative search for the design language a series of iterative diagrammatic experimentation commenced. Resulting in the collection of matrixes substituted by diagrammatic explanations of principles.

Accordingly, the inherent complexity of designing with the uncertainties of designing for synergies, were overcome. Catering to creating an open-ended strategy that prioritizes setting the initial condition to natural succession, over delivering a fixed outcome. However, due to the extent of this inherent complexity, the thesis had to narrow its scope, leading to not every design and critical action element gaining the same depth.

4. How do you assess the academic and societal value, scope, and implication of your graduation project, including ethical aspects?

Given that housing is a fundamental human need, providing adequate housing is crucial for societal well-being. Conducting explorative research on new housing strategies in a changing landscape can inform future developments and enhance the resilience of existing housing. This societal relevance is supported by participatory research involving site visits, spatial negotiation, the design language, and design integration. However, it is naïve to expect any single thesis to engage all stakeholders or provide a definitive blueprint for the future. Instead, a thesis can articulate an alternative perspective on housing development at the urban Fringe.

By 2070, an estimated 1.406.700 additional homes will be needed within the Randstad, with one-third to two-fifths located at the urban Fringe (Centraal Bureau voor de Statistiek, 2019; Centraal Bureau voor de Statistiek & Planbureau voor de Leefomgeving, 2022; Stoeldraijer et al., 2023). New innovative approaches are needed to allow for this realisation within a contested landscape. This thesis addresses this knowledge gap by employing the mixed method research methodology, including source validation and genealogy as prescribed by Kumar in the book 'Research Methodology: A step-by-step guide for Beginners' (2019). This involves validating data through multiple sources and using standardized methods for categorizing papers, scholars, institutions, and data.

The interdisciplinary nature of urban design plays a pivotal role in driving change across science, practice, and governance. In shaping, our environments it reflect societal values and influences all aspects of life. Therefore, the urban designer has the ethical obligation to ensure inclusivity and sustainability. However, it is important to balance this with cost considerations, as the ecocentric approach necessitates a more expensive development than traditional ones, potentially skewing the project's social diversity and making implementation less likely.

Simultaneously, the ethical value commences around adherence to consistent citing systems and the prevention of plagiarism. Additionally, the placement of human and non-human entities at the forefront can cause tensions as it possibly adds a political layer. Consequently, the thesis requires an approach beyond personal biases, while questioning the current paradigms.

5. How do you assess the value of the transferability of your project results?

With the objective of the thesis being to cater to the discussion regarding the rural-urban Fringe, the thesis' outcome must reflect transferability. This transferability is reached by concluding the research before the design phase with a design language, that can be used in similar projects to kick-start the spatial synergetic negotiation process, it is however not a directly applicable pattern language, it requires per-project adaptation. Simultaneously, the transferability is reached by the advocation of the alternative strategy who function as a reflective perspective within the discussion surrounding development plans.

Consequently, the transferability of the research coincides with the societal relevance of the thesis. In the sense that the location of the 'Groene Hart' and its Fringes are universally acknowledged within society as a location of profound importance to Dutch culture and identity and the inherent environmental problematisation and housing pressure. Accordingly, the transferability of the research is routed within the locality of the 'Groene Hart' and its innate diversity and problematisation. Therefore, making the thesis results, and design language less applicable to other locations, implying that the thesis results are primarily transferable to the Dutch context. However, this proposal does not consider the financial aspect of the strategy, introducing ambiguity regarding feasibility and transferability.

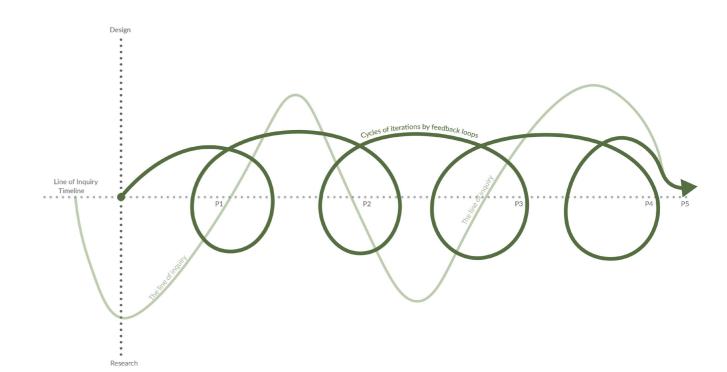


Figure 276, The research through design feedback loops.

6. How does the project temporality relate to an extended future beyond its time frame within the notion of the Transitional Territories graduation studio?

The ecocentric nature of the project necessitates operating from the underpinnings of the current problematisation and the notion of nature inclusive design. Therefore, it is apparent that the outcome is not one of a definitive state, but rather open-ended, leaving a design that shapes the conditions for the continual process of succession to happen. Hence, the design encapsulates the establishment of conditions, not a final definitive design.

Consequently, the thesis outcome targets towards 2080, while not implying the definitive temporality. It envisions that the strategy by 2080 has set the conditions for the continual landscape succession to operate in synergy. Therefore, the temporality of the thesis goes beyond 2080 towards the extended future of Transitional Territories.

7. How does the project navigate the ecocentric paradigm inherent in personal political propositions towards an objective thesis result?

Within the scope of adherence to the ethical value of the thesis, the thesis requires careful balancing between personal position and personal biases to achieve an objective result. This involves acknowledging and understanding one's perspectives and biases related to ecocentrism while maintaining a commitment to impartial research. However, it does entail that the thesis operates within the balance between personal motion and societal and scientific relevance.

Therefore, to achieve objectivity, it is essential to critically assess and incorporate diverse viewpoints, engage with existing literature, and research, and uphold rigorous methodology to question preconceptions. By embracing a comprehensive and inclusive approach, the thesis navigates the polarization around both the housing issue and climate change while striving for an objective and well-supported outcome.

Consequently, there is a form of politicised ideas present. Nonetheless, by taking the critical positioning of perusing the ecocentric paradigm the thesis contributes new insights to the academic sphere.

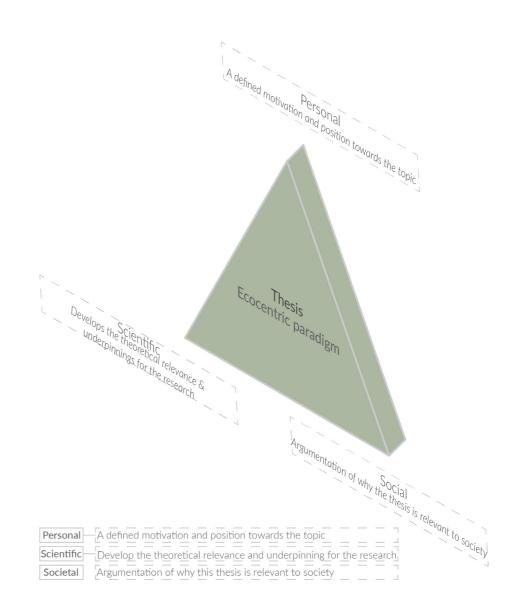


Figure 277, The careful balancing of biases and objectivity.

10. Conclusion

The conclusion of the thesis draws upon the concluding paragraphs throughout the thesis. Consequently, one can summarise that the 'Groene Hart' and its corresponding Fringe reveal a dynamic interplay of culture and landscape, illustrating the evolving relationship between human settlers and the natural environment. Unquestionably, exhibiting cultural, economic, and natural value, it leads the region towards an uncertain future.

These interplays intersect along the notion of appropriation routed in a history of alteration, exploitation, and fragmentation with significant biodiversity trade-offs, tangible in the fluidity of the 'Groene Hart' planning concept. Represented by the former peat mines, current uniform pseudo-countryside neighbourhoods and agricultural dairy production landscapes. Serving as a case study for demonstrating how the evolving planning zeitgeist created depleted landscapes over the last decades.

Assembling on these zeitgeists, the depleted landscape is directly linked to the current challenges, concurring with the accommodation of sufficient housing, environmental degradation, and societal polarization and segregation. Moreover, the predominant economic zeitgeist has led to the continued enlarging disbalance between society and nature and eroding the Fringe to being a fluid hinterland.

With these systems operating under strained conditions, facing climate adaptation, subsidence, and ecological issues, who currently prevent effectively addressing cross-boundary regional-wide ecological initiatives to turn the zeitgeist. However, these challenges intersect with the current regional agendas, but due to their fragmented competing nature, fail to act accordingly.

Subsequently, the Fringe is continuing to face challenges from market-driven, human-centric development policies and developers, transforming the Fringe into a transitional zone marked by compartmentalization. Creating a zone of economic, ecological, and socially misaligned housing developments and landscapes. Successively, continuing the current path is no longer a viable option. As the Fringe is ever more interwoven in a web of interdependencies and correlations pressuring upon the Fringe.

Consequently, a cohesive approach aligned with shared values can spatially and systematically drive interventions that leverage upon the qualities. The implementation of the ecocentric paradigm with its inherent synergetic approach and right of nature-based Fringe National Parkland offers the chance to challenge the commodification of both nature and housing and to propose an alternative development scenario, as is coloured in the previous chapter. One that moves away from the presumption of locality bondages developments and settles with policy and interest fragmentation.

To form a blue-green-grey biodiversity longue recharging the internal heart as the long for the long durée. Subsequently, it offers the potential to further develop the thesis line of inquiry beyond the scope of the thesis. While utilising the lessons within contemporary Fringe development.

Main research question:

How can we create a synergy between social, economic, and environmental interests in depleted landscapes like the Fringe of the 'Groene Hart' through the implementation of the ecocentric paradigm in terrestrial development to allow for an alleviation of the housing scarcity?

It can be concluded that within the lens of the ecocentric paradigm, a synergy between social, economic, and environmental interests can be achieved by allowing the ecological system to set the circumstances in which the social and economic systems operate. This entails through the process of spatial negotiations that within the Fringe and its larger territorial extent spatial synergies are achieved by the strategy of combining developing from the territories condition to sustain the functions with utilising the territories inherent networks capacity.

The perspective of the Fringe National Parkland serves as the visual embodiment of how such synergy can revive formerly depleted landscapes in combination with accommodating sufficient housing. The approach allows for the alleviation of housing scarcity by the realisation of eighty-four synergetic housing developments, realising 468.928 homes. The design recognizes the significance of providing a spatial entity that functions as a buffer to continual terrestrial urbanisation as offers an ecological blue-green biodiversity belt that fosters the prosperity of both the inner and the outer territories.

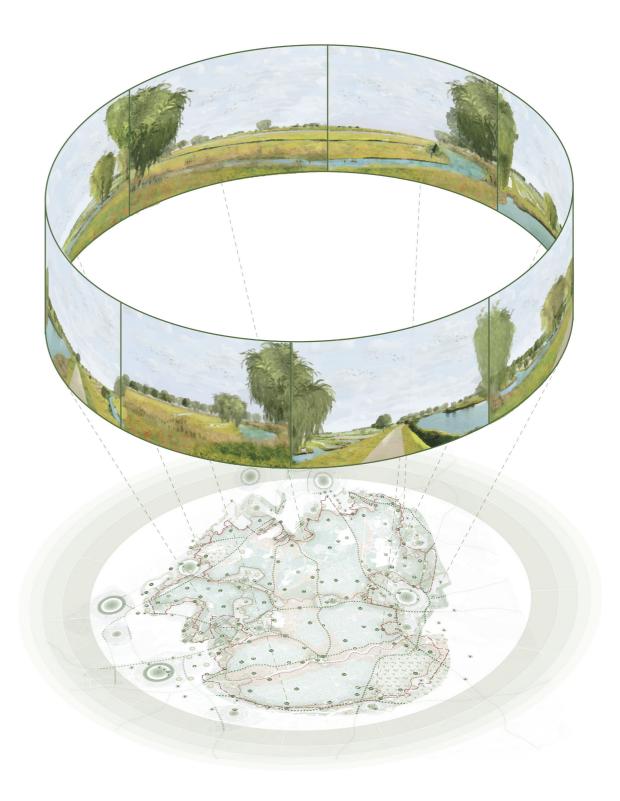


Figure 278, The 'Recharged Heart' future proposition.

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Appendix

I. Superfluous Maps

Season	Variable		Climate in 1991-2020 = reference period	2050 (2036-2065)			2100	(2086-2115)			
				Ld	Ln	Hd	Hn	Ld	Ln	Hd	Hn
Year	Global temperature rise compared to 1991-2020		+0.8 °C	+0.8 °C	+1.5 °C	+1.5 °C	+0.8 °C	+0.8 °C	+4.0 °C	+4.0 °C	
	Global temperature rise compared to 1850-1900		+1.7 °C	+1.7 °C	+2.4 °C	+2.4 °C	+1.7 °C	+1.7 °C	+4.9 °C	+4.9 °C	
	Sea level allong the Dutch coastline	average level	0 cm 1	+24 (16-34 cm)	+24 (16-34 cm)	+27 (19-38 cm)	+27 (19-38 cm)	+44 (26-73 cm)	+44 (26-73 cm)	+82 (59-124 cm)	+82 (59-124 cm)
		rate of change	3 mm/year ¹	+3 (1-6) mm/year	+3 (1-6) mm/year	+5 (4-8) mm/year	+5 (4-8) mm/year	-1 (-4-4) mm/year	+11 (6-23) mm/year	+11 (6-23) mm/year	-1 (-4-4) mm/year
	Temperature	average	10.5 °C	+0.9 °C	+0.9 °C	+1.6 °C	+1.5 °C	+0.9 °C	+0.9 °C	+4.4 °C	+4.9 °C
	Precipitation	amount	851 mm	0%	+3%	-2%	+3%	0%	+3%	-3%	+8%
	Solar radiation	average	120 W/m²	+5.8 W/m²	+4.8 W/m²	+5.4 W/m²	+2.5 W/m ²	+5.8 W/m ²	+4.8 W/m ²	+7.1 W/m²	+1.3 W/m ²
	Humidity	average relative humidity	82%	-1%	-1%	-1%	0%	-1%	-1%	-1%	+1%
	Evaporation	potential evaporation	603 mm	+7%	+6%	+9%	+6%	+7%	+6%	+17%	+11%
	Wind	average wind speed	4.8 m/s	-0.1 m/s	-0.1 m/s	-0.0 m/s	-0.0 m/s	-0.1 m/s	-0.1 m/s	-0.1 m/s	-0.1 m/s

Figure 280, FSI ((BAG & PBL, 2019) edited by author).

Figure 279,The future climatic scenarios ((KNMI, 2023), edited by author).



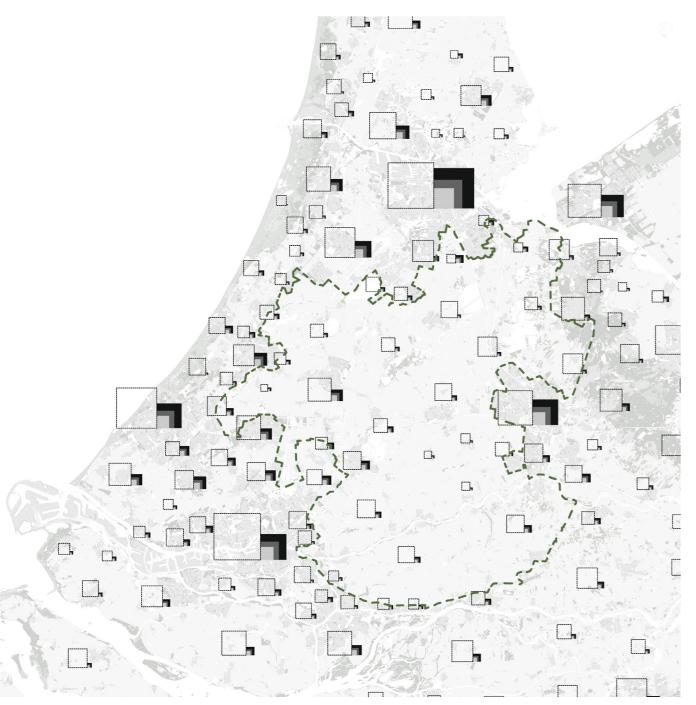


Figure 281, Proposed space index for housing in 2035 ((CBS & PBL, 2019) edited by author).



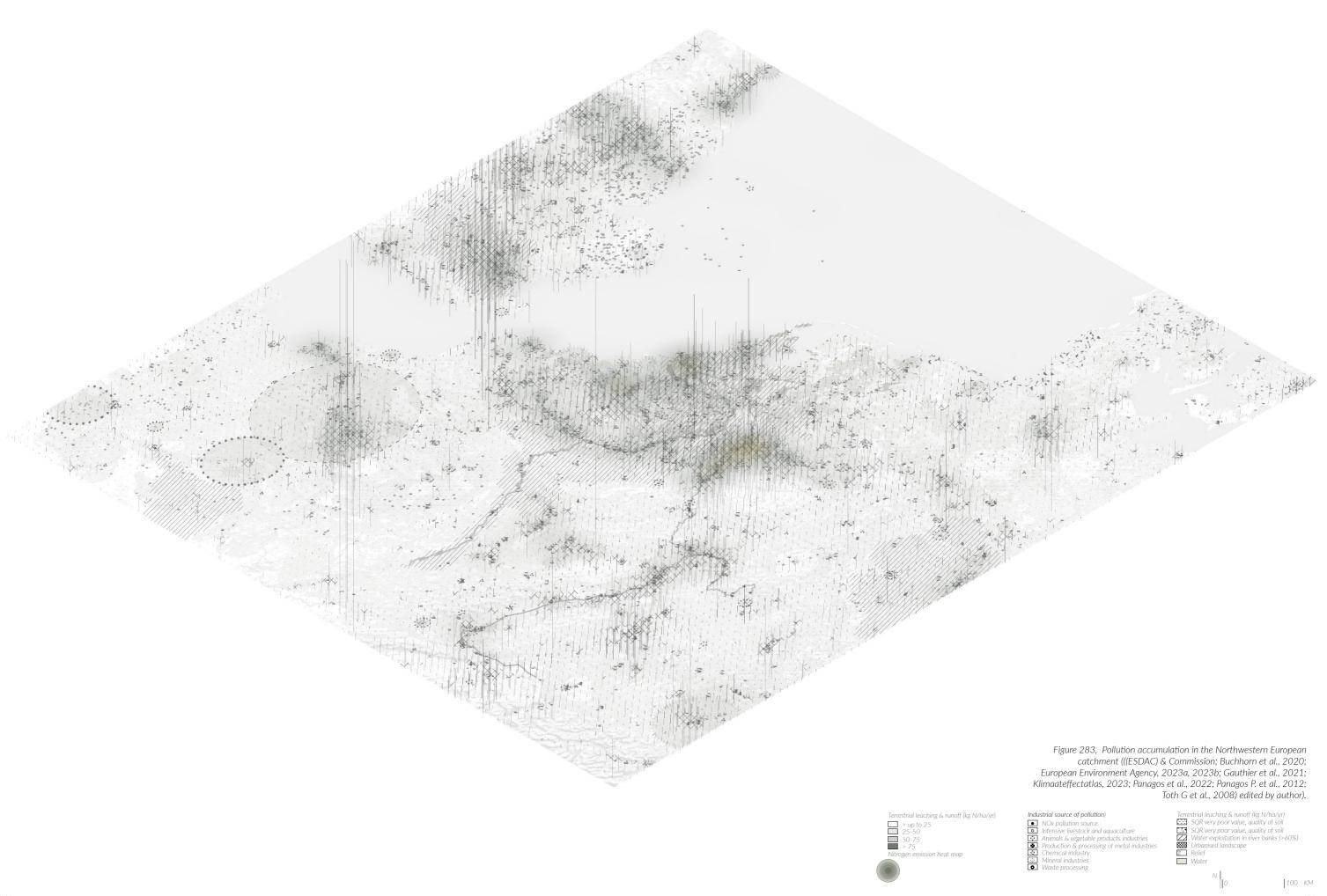


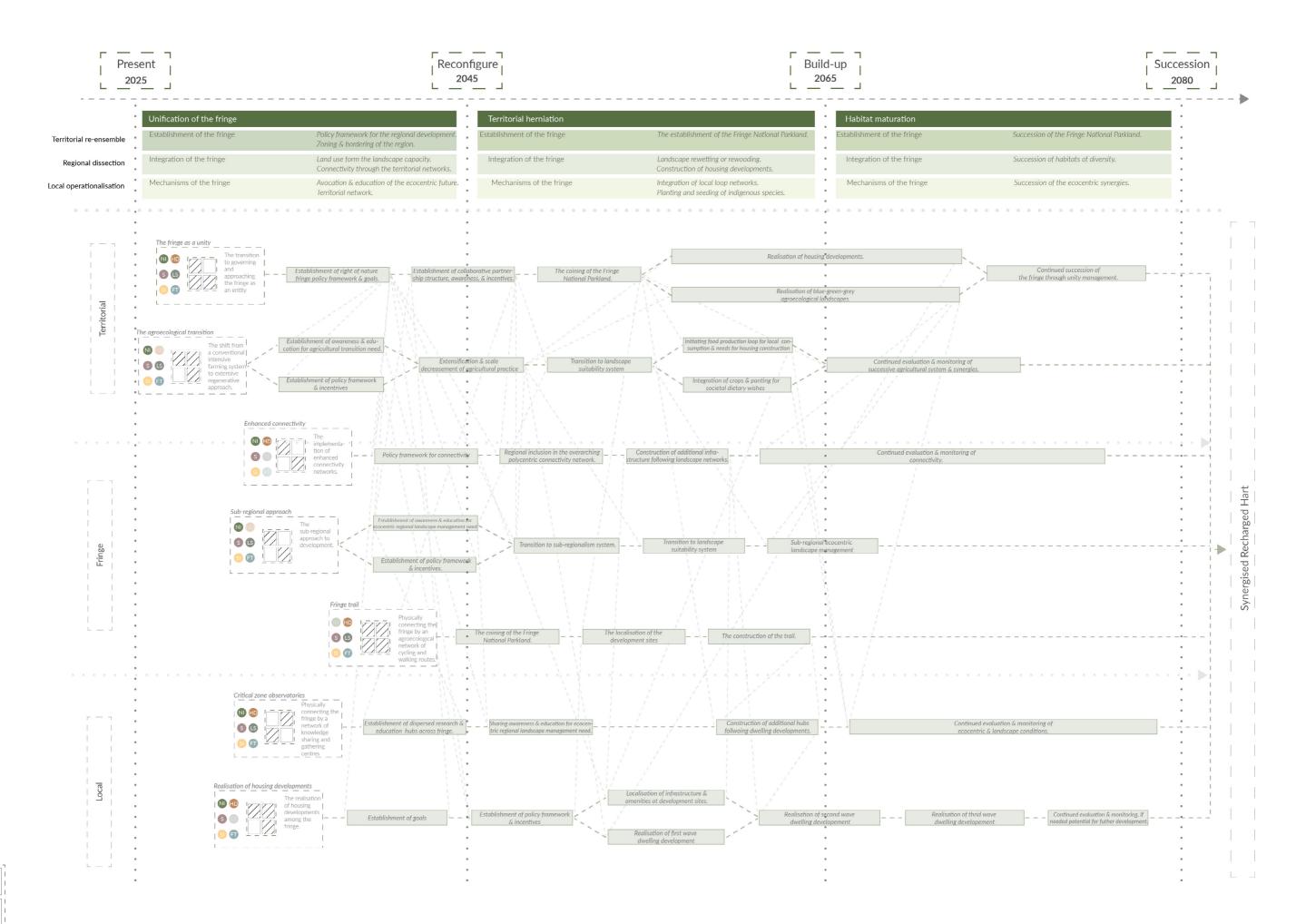
Figure 282, Proposed NOVEX Housing developments areas ((Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2022; Nabielek et al., 2020), edited by author).



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II. Design Language

Theoretical Design Means

Nature inclusive

LOCATION-BASED DEVELOPMENT

A location-based development implies that the development is embedded within the local natural and social systems inherent within the landscape site. Entailing that the developments are integral parts of the location, intricately connected to the environment, forming an entity of shared co-evolution and operationalisation within the habitats of diversity (Curry, 2011; Daly, 2014; Rolston III, 2020; Vieira & Sampaio, 2022; Vink et al., 2024; Washington & Maloney, 2020; Washington et al., 2017; Yigitcanlar & Dizdaroglu, 2015). Hence The development is grounded on the location's inherent soil, water, and natural capital, the development follows what the location can support, and its physicality alters to become inherently part of the location (Vink et al., 2024).

NATURE-BASED SOLUTIONS

Nature-based solutions imply the usage of integrating natural elements and processes into the operationalisation of the landscape through physical design implementations and focus predominantly on improving a location's ecosystem, and hydrological and ecological functions (Vink et al., 2024). These solutions leverage the benefits provided by nature to enhance resilience, sustainability, and liveability beyond human centricity (Vink et al., 2024; Vink et al., 2017). Physical implementations focus on improving the green-blue networks and are Integrated landscape management, Assisted natural regeneration, rain gardens, cross-slope barriers, Bio-retention cells, (Bio-)Swales, Wadis, and Green Roofs (Vink et al., 2024; Vink et al., 2017).

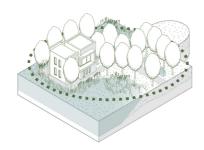
AGROECOLOGICAL FOUNDATION

Agroecological foundation means implementing ecological principles as the core of agricultural practices, as a part of landscape development (Altieri, 2018). This signifies a departure from traditional intensive input-dependent farming practices towards a holistic regenerative community approach that emphasizes and utilises the interconnectedness of ecosystems and biodiversity at each location (Altieri, 2018; Gliessman, 2021). Examples are agroforestry, food forestry, and Silvoarable.

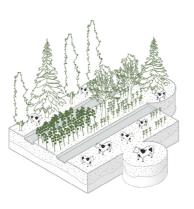
HABITAT OF DIVERSITY

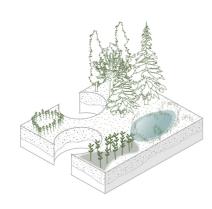
Habitats of diversity refer to environments that comprise a wide range of different biomes supporting a variety of different species. These habitats exhibit high levels of biodiversity and operate as an ecological network of steppingstones, allowing for the shared operation of the entire system and flow exchanges (Stiphout et al., 2019). Therefore, they are essential for the health of the entire ecosystem as they support functions like nutrient cycling, pollination, and pest control (Vink et al., 2024). Protecting and preserving habitats of diversity is critical for maintaining biodiversity and ensuring the long-term sustainability of ecosystems (Vink et al., 2024; Vink et al., 2017). Epitomizing the diversification of monocultural systems inherent within today's Fringe landscapes.

Figure 285, Top, Location-based developments. Figure 286, First, mid, Nature-based solutions. Figure 287, Second mid, Agroecological foundation. Figure 288, Bottom, Habitat of diversity.

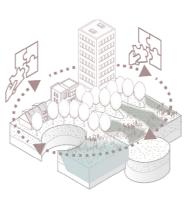




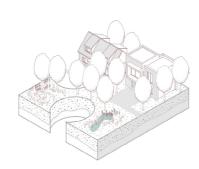


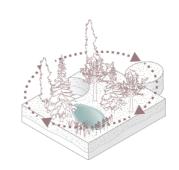












CARBON-POSITIVE MATERIALS

Adopting carbon-positive materials aligns with the envisioned substitution of environmentally detrimental building materials with nature-based alternatives, a fundament for the implementation of the ecocentric future (Vink et al., 2024). This involves utilizing locally sourced or recycled materials such as bricks, natural stone, or wood from nearby production forests or queries (Stiphout et al., 2019; Vink et al., 2024).

Synergetic

SPATIAL NEGOTIATION OF SYSTEMS

Spatial negotiation of systems means synergizing the social, economic, and ecological systems and designates the denotation of the design as a process, not a fixed product, involving a methodology with strategic implementations, incorporating diverse habitat and species gradients. Implemented through spatial negotiation of the site systems to find its synergy (Vink et al., 2024; Washington & Maloney, 2020). While integrating its temporality through co-evolution and interweaving the built form, fostering a seamless integration as time progresses (Vink et al., 2024). In a physical sense, this principle means the spatial integration of separated systems loops into an integrated loop of cooperation.

LEGISLATIVE FOUNDATION

A legislative foundation entails the creation of a comprehensive transition strategy grounded in specific policy that considers the spatial characteristics of the terrain with policy and stakeholder backing. It leverages landscape and social attributes to dictate the nature and approach of the transition, like developer-based environmental thematic contracts. Implying the need for achieving consensus, through spatial unity, by implementing a collaborative partnership within legislation (National Park City foundation, 2019; Stuurgroep Van Gogh Nationaal Park et al., 2020). For the Fringe, this implies the introduction of policies that legally back the Fringe designation as a national park, and its collaborative partnership governance, of the Parliament of things and its foundation. The legislative foundation is embedded within het Rijk and strengthens inter-municipal, provincial and waterboard cooperation.

A NATURE OF TRANSITION

A nature of transition demarcates a Fringe, as a passage of changeover where the outskirts are no longer defined by strict urban boundaries, but rather transition into a balanced mix of urban and rural elements. This involves creating a gentle transitional area featuring local landscapes with values tailored to both the community and the location (Vink et al., 2024; Vink et al., 2017). It seeks to transform the current mosaic into a vibrant transition area and envisions a harmonious blend where the landscape merges with other land uses as inclusive landscape deltas.

NATURE VALUE

The natural value of the former and perceived landscape is deeply valued within society and the ecological operationalisation (Pierre & Klok, 2015). However, due to the inherent nature of the intensive agricultural or urbanised landscape, the need for constant landscape alteration and climate change, the current depleted landscape requires resurfacing its intrinsic value and mutual reliance on the revitalisation of the ecosystem (Curry, 2011; Vieira & Sampaio, 2022; Yigitcanlar & Dizdaroglu, 2015). It necessitates using the location's intrinsic natural operation, instead of a human-altered one.

Figure 289, Top, Carbon-positive materials.
Figure 290, First mid, The spatial negotiation of systems.
Figure 291, Second mid, Legislative foundation.
Figure 292, Third mid, A nature of transition.
Figure 293, Bottom, Nature asset.



SOCIETAL VALUE

The societal value echoes the cultural appropriation and affection inscribed within the current agricultural rural landscape, its economy, and society. Entailing a landscape of homogenous elongated pastures with small rural village communities, the quintessential Dutch countryside place identity with strong societal value. With the implementation of the ecocentric synergetic system, these landscapes and communities transform to being included within the developed Fringe (Vink et al., 2017). Utilising its current place identity, communities, and its societal residual identity to its advantage without catering to further polarization, forcing human inclusion as an inherent societal value (Lörzing & Tisma, 2023).

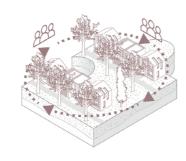
ECONOMIC VALUE

The economic value is deeply inscribed within the current operationalisation of the pseudo-countryside mechanism and its inherent single-family house emphasis embodying the Fringe (Eerenbeemt & Smit, 2018; Heins, 2004). Subscribing monetary system of value pent up in houses as accumulations of wealth. Wealth to developers and homeowners, who would want to continue to cherish their operationalisation. Moreover, the locations possess an attractive force to people who want to live there, a given which will continue to exist in the future (Centraal Bureau voor de Statistiek & Planbureau voor de Leefomgeving, 2022; Stoeldraijer et al., 2023). Prescribing the necessity to include housing in the landscape, to both meet future demands and to comfort dwellers.

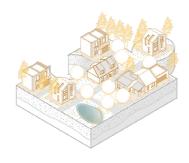
Social inclusive

DIVERSE HOUSING PALLET

Diverse housing options require unique, location-specific architecture and a range of housing types, moving away from the standard single-family homes often seen in typical suburban developments. Tailored architecture reflects local identity and fosters a sense of belonging, enhancing community cohesion (Centraal Bureau voor de Statistiek, 2023e; Michielsen et al., 2019; Voogd & Cuperus, 2021). Offering various housing styles prevents areas from becoming uniform and ensures they meet societal and architectural preferences (BPD, 2022). Recognizing a gap in housing for seniors and first-time buyers, there's a need for smaller, more affordable homes beyond traditional single-family dwellings (CBS, 2023b, 2023c, 2023d; Langenberg & Jonkers, 2022; Nijskens & Lohuis, 2019; Obbink, 2020). To address this demand, housing developments must adhere to specific guidelines regarding affordability and size.



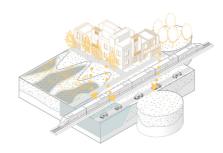












COMMUNAL FOUNDATION

Communal foundation implies the embodiment of the method of societal negotiation and inclusion within the synergetic process, asking for further dialogue about the topic, before finalising the spatial translation of different design principles and embedded processes (Alexander et al., 1977; Hamers et al., 2023; PBL, 2020). Serving as a reminder that choices must be made, cause compromises are no longer an option to tackle anthropogenic urgencies (Hamers et al., 2023; PBL, 2020). Subsequently, both within governance and within the development there must be a form of communal, communal care, and communal participation (Hamers et al., 2023; PBL, 2020). Hence, it embodies a spatial stakeholder puzzling process.

COMMUNAL MORPHOLOGIES & DENSITIES

Communal morphologies and densities imply a housing system fitting to the location's place identity and societal demand. Making the built fabric breathe local identity, resources, and needs. By tapping into the interconnected networks of the area, the ecological effect of the site is enhanced to be included within the fabric, location, and society (Vink et al., 2024). Consequently, local landscape characteristics and societal demand determine the form of the built fabric, fostering networks that support collaborative efforts within the community, aligning with its temporal and social fabric.

REDUCED BUILDING FOOTPRINT

Reducing the footprint of the building entails the implementation of the place optimisation theory proposed by Barend Jansen entailing a system of increased density and diversity within the build form which allows for the decrease in paved surfaces while meeting the demand for community-based centrum villages (Jansen, 2020). Freeing up space for carbon and watersequestering landscapes and requiring fewer resources (Jansen, 2020; Vink et al., 2017; Zuid-Holland, 2020).

ACCESS TO MOBILITY

Access to mobility implies that within the Fringe and its proposed housing developments sufficient mobility infrastructure needs to be present. With the focus on public transport networks supported by the bike as the last-mile solution, to prevent the VINEX pitfall of car-centric housing developments from repeating (BIJN, 2004; Boeijenga et al., 2008; Hoff, 2006; Lörzing et al., 2006; RIGO Research et al., 2006). While simultaneously those who would like to dwell within these neighbourhoods desire infrastructural connectivity.

Figure 294, Top, Social asset. Figure 295, Mid, Economic asset. Figure 296, Bottom, Diverse housing pallet. Figure 297, Top,Communal foundation.
Figure 298, First mid, Communal morphologies & densities.
Figure 299, Second mid, Reduced building footprint.
Figure 300. Bottom. Access to mobility.

Spatial Design Means

Dwelling developments

THE NATURE-INCLUSIVE HOUSING TYPOLOGIES

The nature-inclusive housing typology entails rural morphologies with dwellings embedded within the landscape in its most extreme form (Pierre & Klok, 2015). With a community density of up to 50 houses per hectare, the development embraces the atmosphere of the rural to one of 'off the grid-like', self-sufficient housing which stimulates the circular production of food and resources taking the nature-inclusive notion of ecocentric design literally (Vink et al., 2024; Washington & Maloney, 2020).

THE VILLAGE-INCLUSIVE HOUSING TYPOLOGIES

The village-inclusive housing typology entails village-like quarter morphologies with small-scale community developments scattered in and around existing villages, connecting local communities, and creating a village-like atmosphere location (Centraal Bureau voor de Statistiek, 2023e; Michielsen et al., 2019; Voogd & Cuperus, 2021). With Up to 60 houses per hectare in housing clusters with small shops, and amenities mixed in between.

THE URBAN-INCLUSIVE HOUSING TYPOLOGIES The urban-inclusive housing typology entails a dense urban morphological model. This type is not found within the Fringe and should be achieved through urban renewal or construction within the wasteland of the urban, denoting that when this type is chosen by the synergetic method, it entails realisation outside of the scope of the project (Jansen, 2020; Vink et al., 2017; Zuid-Holland, 2020). Densities should be above 75 hectares per dwelling within mixed-use neighbourhoods (Jansen, 2020; Michielsen et al., 2019; Vink et al., 2017; Zuid-Holland, 2020).

Landscape

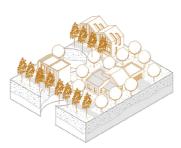
WFT AGRICULTURE

Wet agriculture refers to farming practices conducted in waterrich environments, often involving the cultivation of crops in flooded or waterlogged fields. Within the Fringe, it entails agricultural production in the prospected rewetted areas and comprised of the techniques of Paludiculture, and Aquaculture (Bureau Peter de Ruyter landschapsarchitectuur et al., 2022; Buro Sant en Co et al., 2019).

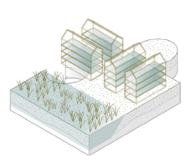
(WETLAND) SILVO AGRICULTURE

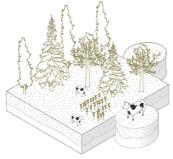
Silvo (wetland) agriculture entails the techniques of Silvoarable, Silvopasture, and Silvoculture, agricultural utilises the production of forest as the basis for the landscape. Signifying the combination of crop or animal cultivation with the management of forests aiming to create a sustainable and multifunctional system that benefits both agricultural production and environmental conservation. These forests serve the purpose of producing carbon-positive building material while stabilising the soil's carrying capacity and restoration (Altieri, 2018; Buro Sant en Co et al., 2019).

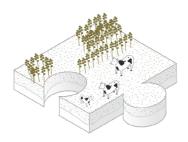




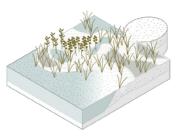


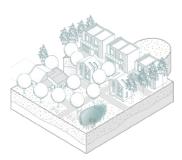


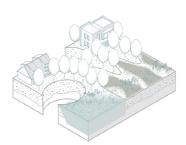












DRY AGRICULTURE

Dry agriculture implies the continuation of current agricultural practices such as Greenhouses and derry or arable farming, in an extensive form. Embracing the notion of agroecology within traditional forms of agriculture with minimal inputs and low intensity of management. It emphasizes utilizing vast expanses of land to maintain extensive practices, promoting biodiversity conservation (Altieri, 2018; Buro Sant en Co et al., 2019).

NATURE RESTORATION

Nature restoration implies the formation of green buffers forming an antithesis to the urban. Revitalizing natural ecosystems to create a protective barrier between human activities and the environment. Aimed to enhance biodiversity, mitigate environmental impact, and provide a sustainable buffer zone that safeguards ecosystems and promotes resilience in the face of human-induced changes (Stiphout et al., 2019; Vink et al., 2017).

REWETTING

Rewetting implies the formation of water buffers by restoring and maintaining waterlogged conditions in former peat meadow ecosystems, aimed at enhancing water retention, reducing soil degradation, and supporting biodiversity. Rewetted areas serve as a buffer against drought and contribute to the health and resilience of aquatic and terrestrial habitats (Bureau Peter de Ruyter landschapsarchitectuur et al., 2022; Ministerie van Infrastructuur en Waterstaat et al., 2023).

Transition

URBAN-RURAL DELTA

The Urban-rural delta landscape entails that the Fringe comprises Wedges or Scheggen penetrating through the Fringe in a meandering fashion to meet the urban. This entails that the Fringe comprises of nature infilling within its core which gradually transitions, openers towards the 'Groene Hart'. The core nature infilling follows the path of the Fringe trail and is of the most tick nature around the built-up development clusters. Gradually towards the outside of the Fringe by increments of 10 % the landscape openers. Encapsulating a landscape of habitat diversity comprising thriving natural rich systems with intertwined resilience (Stiphout et al., 2019).

A GRADUAL TRANSITION OF DENSITY

A gradual transition indicates that the Fringe is no longer denoted by terrestrial walls of urbanisation but evolves into a balanced denotation of urbanity and rurality suitable for linear passage. Entailing a soft transitional space comprised of local environments with case-specific values appropriate for both the society and the site (Centraal Bureau voor de Statistiek, 2023e; Michielsen et al., 2019; Voogd & Cuperus, 2021). This means that the built-up density is situated within the core of the built-up clusters. These clusters are located within the first two-thirds of the Fringe from the urban side. With the density decreasing with intervals of 20% at each interval.

Figure 301, Top, The Nature-inclusive Housing Typologies. Figure 302, First mid, The Village-inclusive Housing typologies. Figure 303, Second, The Urban-inclusive Housing typologies.

Figure 304, Third, Wet agriculture.

Figure 305, Bottom, (Wetland) silvo agriculture.

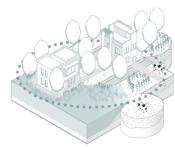
Figure 306, Top, Dry agriculture. Figure 307, First mid, Nature restoration. Figure 308, Second mid 240, Rewetting. Figure 309, Third mid, Urban-rural delta. Figure 310, Bottom, A gradual transition.

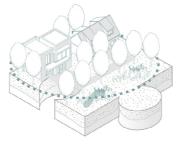
Spatial Design Principles

LOCALLY BASED PROGRAM
The programme of the Fringe is based on local identity, availabilities, and needs. Embracing embedded networks of the locality to elevate the ecological potential of the site by integrating it within the present blue, green, and brown networks (Vink et al., 2024). Extending the focus beyond the site tangible to establish networks that facilitate the collaborative functioning of the system both within the temporality and within its embedded social and perceived place identity.

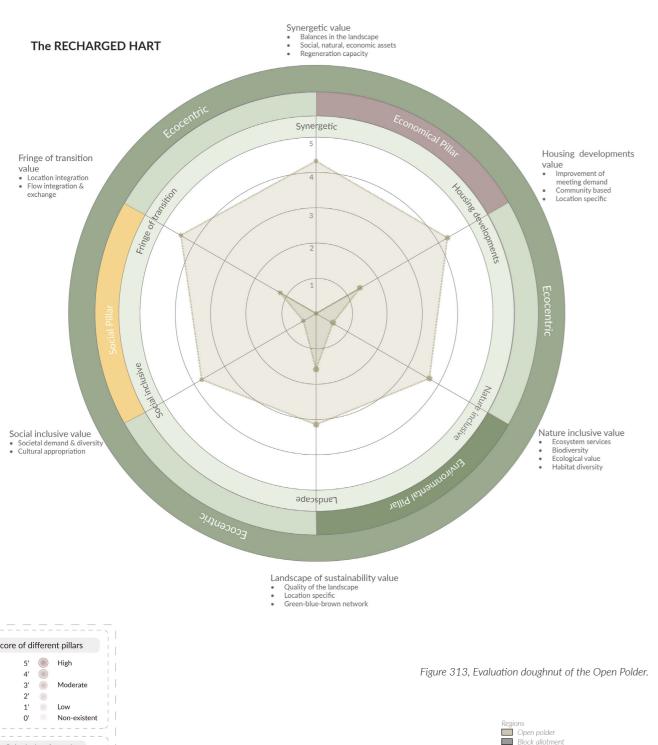
NATURE IN THE FOOTSTEPS

Nature on the Footsteps entails the further inclusion of the natural system within the built environment, as a shared coconstruct. Through the inclusion of Nature-based solutions and green-blue networks throughout the dwelling environment (Vink et al., 2024). Hence, the natural system and the building form the architecture as a notion of succession (Stiphout et al., 2019; Vink et al., 2017).

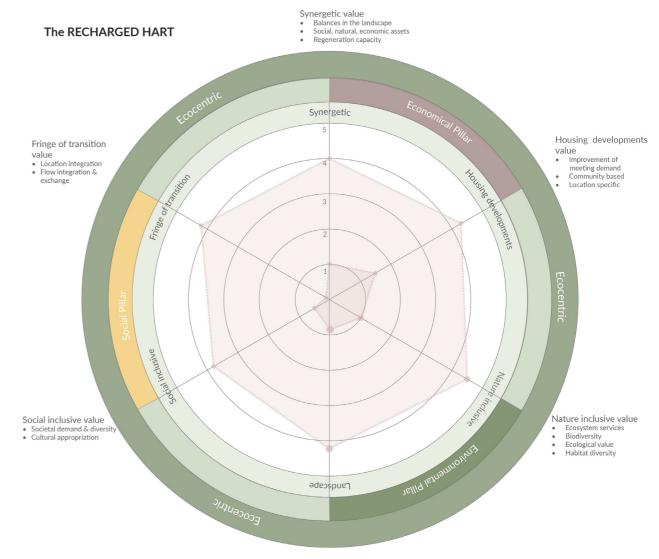




III. The Evaluation Comparisons

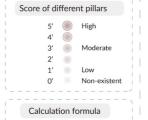


Score of different pillars Regions
Open polder
Block allotment
Stretched allotme
Droogmakerij
Waard
Rivierlint
Old alluvial ridge
Big river zones Calculation formula $\Sigma X_1 + \Sigma X_2 + \dots + \Sigma X_6 = Final results$ Final results > 25 25> Final results > 20 Final results < 15





- Quality of the landscape
 Location specific
 Green-blue-brown network



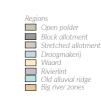
 $\Sigma X_1 + \Sigma X_2 + \dots + \Sigma X_6 = Final results$

25> Final results > 20

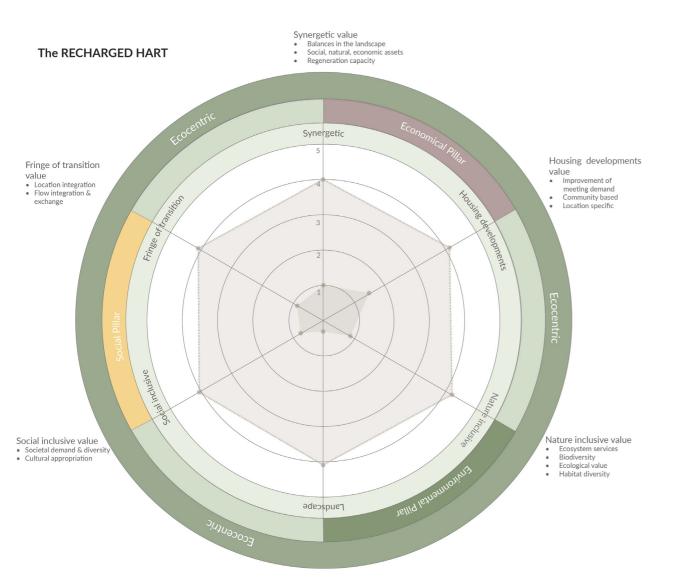
Final results > 25

Final results < 15

Figure 314, Evaluation doughnut of the Block allotment.

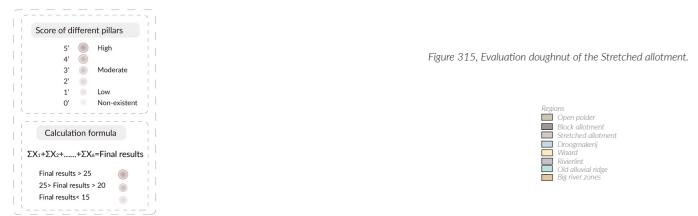


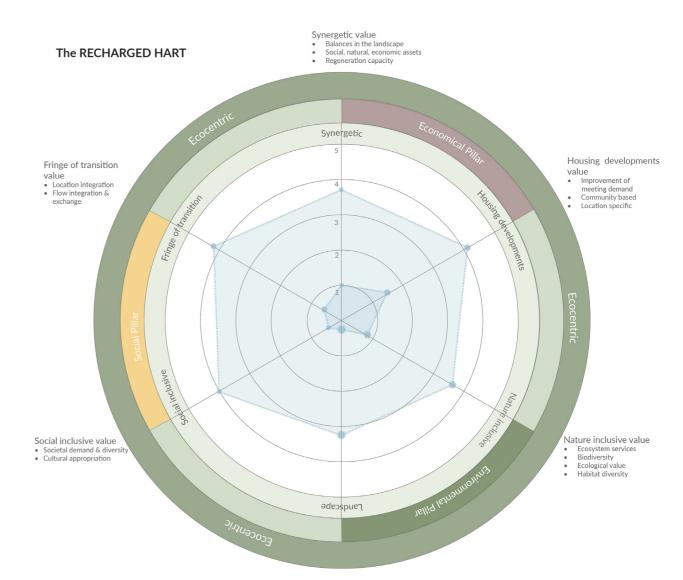
303





- Quality of the landscape
 Location specific
 Green-blue-brown network





Landscape of sustainability value

- Quality of the landscape
 Location specific
 Green-blue-brown network

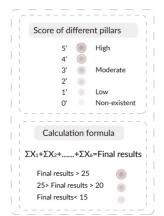
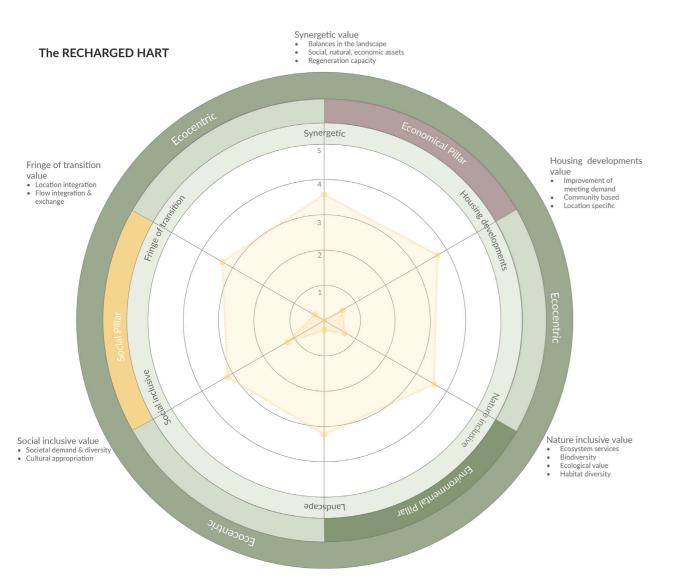


Figure 316, Evaluation doughnut of the Droogmakerij.

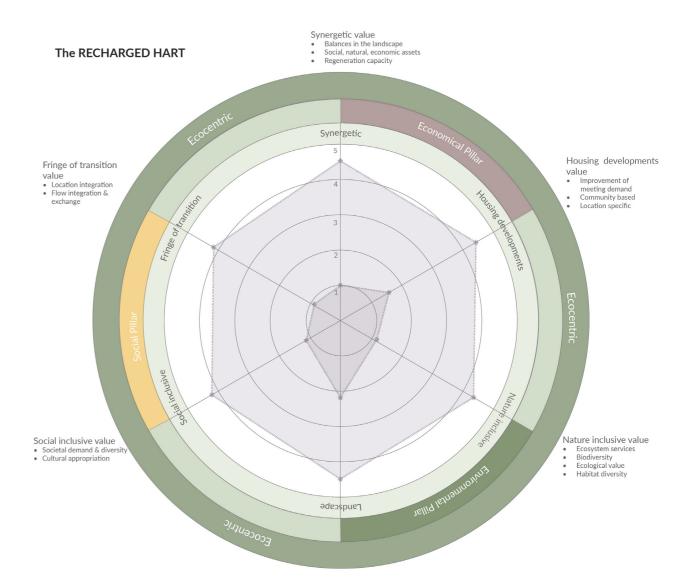






- Quality of the landscape
 Location specific
 Green-blue-brown network





Landscape of sustainability value

- Quality of the landscape
 Location specific
 Green-blue-brown network

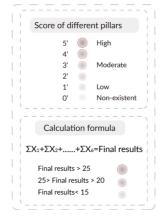
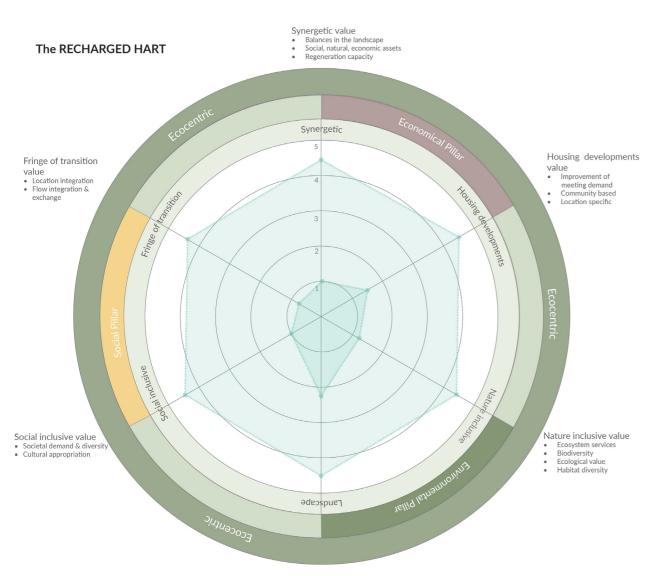


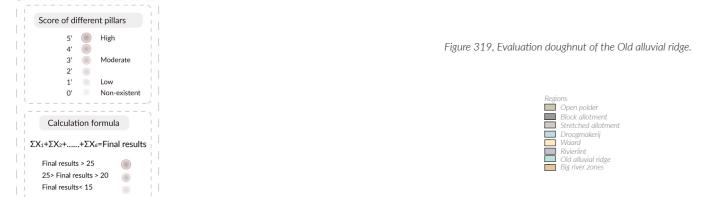
Figure 318, Evaluation doughnut of the Riverlint.

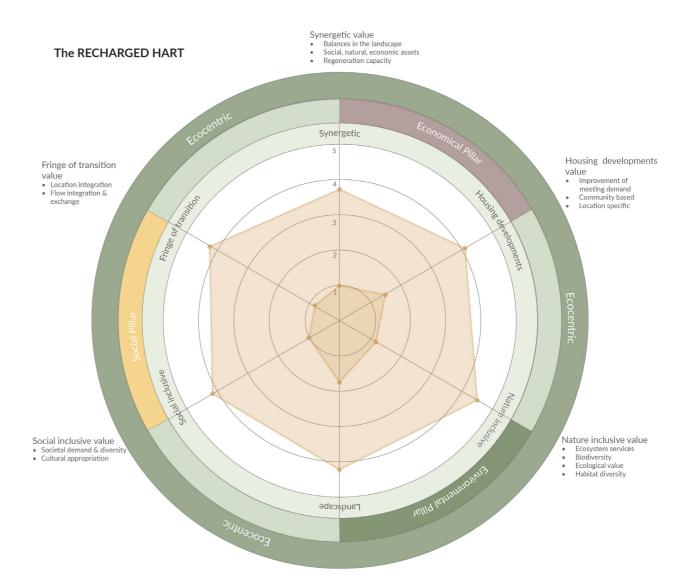






- Quality of the landscape
 Location specific
 Green-blue-brown network





Landscape of sustainability value

- Quality of the landscape
 Location specific
 Green-blue-brown network

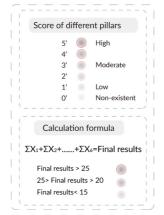


Figure 320, Evaluation doughnut of the Big river zones.



