

RESEARCH PLAN

Lisa Blok

The post-war neighborhood ecosystem

Strategies to optimize the use of ecosystem services in post-war neighborhoods, with the aim of attaining a healthy neighborhood

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Studio

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Argumentations of choice of the studio:

The choice for the studio of Architectural Engineering was made because I was interested in the way the studio approached the design strategy as an ongoing process of developments and research. I believe this approach will lead to a well-substantiated design and can also provide guidance during the design process.

Moreover the studio's focus on seeking inspiring and innovative solutions for current or future environmental and societal challenges was very appealing to me. In my opinion this offers the opportunity to explore your own interests and it allows you to integrate the technical and creative aspect of designing.

Finally, I liked the topics of the graduation studio, specifically renovation for second life, nature inclusiveness and healthy environments. These topics will therefore also be included in my research plan.

Keywords

Ecosystem services; post war neighborhood; health; landscape based approach; nature inclusive; biodiversity

TABLE OF CONTENTS

04	Introduction
04	Problem statement
08	Location
10	Overall design objective & focus
10	Design question
11	Thematic research question
11	Methodologies
12	Planning
12	Ambition
14	Bibliography

INTRODUCTION

My interest in bringing nature back into the city by applying a landscape-based design approach, was the starting point for this research plan. Nowadays, nature-inclusiveness and the consideration of the soil and the landscape have become more of a regularity when designing a new building or neighborhood. However, the importance of this was not always as central as it is in current society. A construction period in which the connection between landscape and city was seen in a different way than it is now, is the post-war period. During this period, the neighborhoods that are now known as the post-war stamp neighborhoods were built. Since the nineties, these neighborhoods have been associated with a poor quality of life due to its many physical and social problems, like the insufficient insulation of the building blocks, the underused green spaces with a low ecological value and health problems among the residents. Moreover, the effects of climate change ask for adaptations in the building stock and public spaces. This graduation project will therefore focus on transforming these neighborhoods into healthy living environments, by following a landscape-based approach.

PROBLEM STATEMENT

Vision and realization

After the second world war, a huge housing shortage arose in the Netherlands. This shortage was caused by a construction freeze during the war, but also by a strong population growth and a shortage of materials and skilled construction workers. In addition, this was reinforced by the poor economic situation in the Netherlands after the war (Blom et al., 2004).

These problems initially led to the establishment of many expansion plans from municipalities. The content of these plans was increasingly based on scientific research, such as population forecasts and traffic developments and led to a structure plan in which various functions, like housing and industry, were given a place around the existing city. In the areas with a residential function, the 'wijkgedachte' was central as an organizing concept. This concept saw the neighborhood as a complete, urban community, which functioned as an independent spatial unit within the city (Blom et al., 2004).

This concept was based on the garden city model of Ebenezer Howard which was published in 1902. His model was a response to urbanization that had led to overcrowded cities in which social problems and poor health conditions predominated. According to his ideas 'Garden Cities' should be planned in the rural areas in a circle around existing bigger cities (figure 01). The Garden City would be a self-supporting unit in which each neighborhood represented a different function and the city would be surrounded by greenery. In this way, Garden Cities were supposed to decentralize metropolitan areas. However, in practice the Garden City functioned like a commuting suburb (Legeby, 2010). Although the Garden City model did not lead to a city ring around metropolitan cities, the social and physical ideals remained. In the Netherlands this led to the idealization of the creation of independent neighborhoods and the spatial separation of functions, which later translated into the 'wijkgedachte' (Blom et al., 2004).

Although the social and physical concept of the 'wijkgedachte' was to build a community surrounded by greenery with its own facilities and was supposed to improve the living conditions, it ended up mainly becoming a physical typology that was frequently repeated during the post-war period. This was also reinforced by the government's ambition to build quickly and cheaply, as a response to the housing shortage and the poor financial situation. Moreover, the quality of the homes was also recognized as a problem during the war. Therefore, minimum requirements were set for the quality and dimensions of homes. In practice, however, these minimum requirements often worked as maximum standards due to cost savings (Blom et al., 2004).

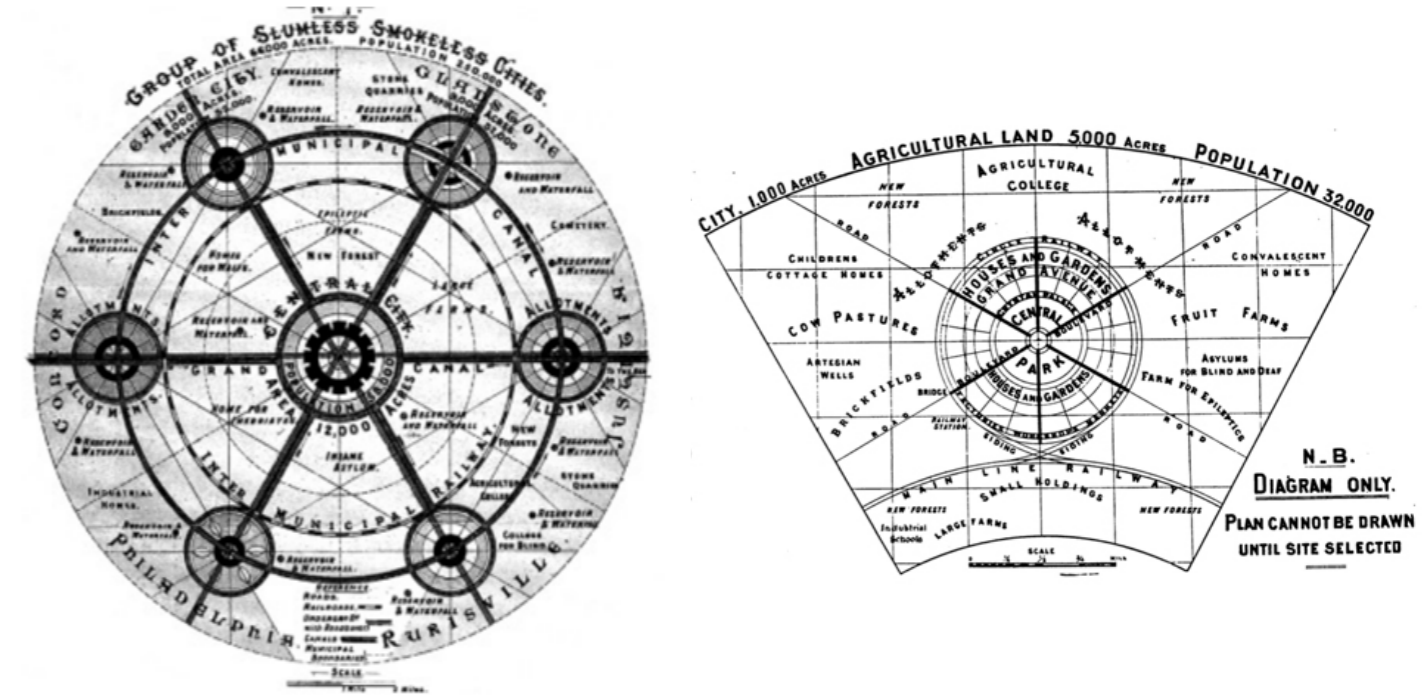


Figure 01: The principles of the Garden City of Ebenezer Howard

Source: Blom et al (2004); Legeby (2010)

Uniformity and standardization

The need for rapid housing construction in the Netherlands and a scarcity of materials led to the rise of industrial prefabricated building systems. Due to the repeated application of this system, the neighborhoods displayed a high degree of uniformity. They consisted of residential units, or 'stamps', which were set up according to a regular, repetitive pattern and a cluster of different facilities, like schools and shops, which were tailored to the number of homes. This, then modern, way of urban planning and architecture became the standard for about 25 years, leading to similarly set up neighborhoods throughout the Netherlands, now known as the post-war or 'stamp' neighborhoods (Blom et al., 2004; Abrahamse & Rutte, 2020). The focus at that time was mainly on quantity and although the minimal requirements for quality and dimensions were met and regarded as an improvement compared to the existing housing stock, it does not meet the wishes of today's society. Moreover, although these neighborhoods were built in different environments and circumstances, this still led to similar outcomes. Nowadays, the post-war neighborhood is often regarded as monotonous and predictable (Argioli et al., 2008; Lörzing & Harbers, 2009; Mens, 2019).



Figure 02: aerial photo of the neighborhood 'Mariahoeve' in The Hague

Source: Haags Gemeentearchief (n.d.-b)



Figure 03: street view of the neighborhood 'Mariahoeve' in The Hague

Source: Haags Gemeentearchief (n.d.-a)

A changed society and housing shortage

The housing units in the post-war neighborhoods still form a large part of the current housing stock. However, although the mass production of these neighborhoods fulfilled the demands at that time, the housing demand and wishes of society have changed. A large part of the buildings in these post-war neighborhoods were originally intended for families, with little regard for cultural and social variation, because Dutch society at that time mainly consisted of a fairly homogeneous native population. This changed from the 1960s onwards. Dutch society became more diverse and households became smaller, with 40 percent of the Dutch households now consisting of one-person households (Blom et al., 2004; Meier, 2006; Obbink, 2016). Due to the migration of families from the post-war neighborhoods and an increase in smaller households, the population density in these neighborhoods has decreased significantly. This development goes hand in hand with a reduction in the number of facilities, like schools, which in turn causes a decreasing level of proximity. This has a negative impact on the neighborhood, as this for example causes an increase in car use and more loneliness. For this reason and the large amount of available open space in these neighborhoods, the post-war neighborhood can contribute significantly to solving the current housing shortage in the Netherlands (KAW, 2020).

Health and well-being

Society has become more appreciative of well-being and health, and the built environment can contribute to this (Coops, 2022). This is especially relevant in post-war neighborhoods, as the population living in these neighborhoods is confronted with a large variety of health issues, like obesity, chronic diseases, depression and loneliness. Reasons for this are, in addition to the population composition of these neighborhoods, often sought in the design of these neighborhoods. They show a high degree of repetition and there is a spatial separation between different functions, like dwellings and facilities. Interventions in the built environment could possibly lead to an improvement of public health in these neighborhoods (Reijneveld et al., 2023). This link between health and urban design is also increasingly supported by literature. Lots of sources describe a clear connection between spatial planning and a variation of health related aspects, like mobility and clean air (WHO, 2022; Reijneveld et al., 2023).

Climate change and ecosystem services

Although nature-inclusiveness and climate-adaptivity are currently becoming more and more common, this was not yet the case when the post-war neighborhoods were constructed. At that time, in order for these neighborhoods to appear in a short time, the existing cultural landscape and therefore the history and identity of the place was erased by applying a layer of embankment sand on top of the original landscape (Abrahamse & Rutte, 2020; Blom, 2012). Therefore, a lot of the post-war neighborhoods have become disconnected from the local environment. Moreover, the built environment has a negative impact on the climate, especially the post-war neighborhoods. In addition, climate change also entails new challenges, for example regarding water security, air pollution and health (Veerkamp et al., 2021).

An opportunity to tackle these challenges and minimize the neighborhood’s impact on the climate could be the implementation and optimization of ecosystem services. These ecosystem services are services or benefits provided by the ecosystem from which the world profits, for example photosynthesis, provisioning of water and CO² storage. Currently the global amount of services provided by the ecosystem is declining because of population growth, urbanization and industrialization. Therefore, the utilization and optimization of ecosystem services could be beneficial for the post-war neighborhoods and the climate. In order to achieve this post-war neighborhoods need to be reconnected to the local environment and its ecosystem services (Ecosystem Services | National Wildlife Federation, n.d.; PBL, 2018).

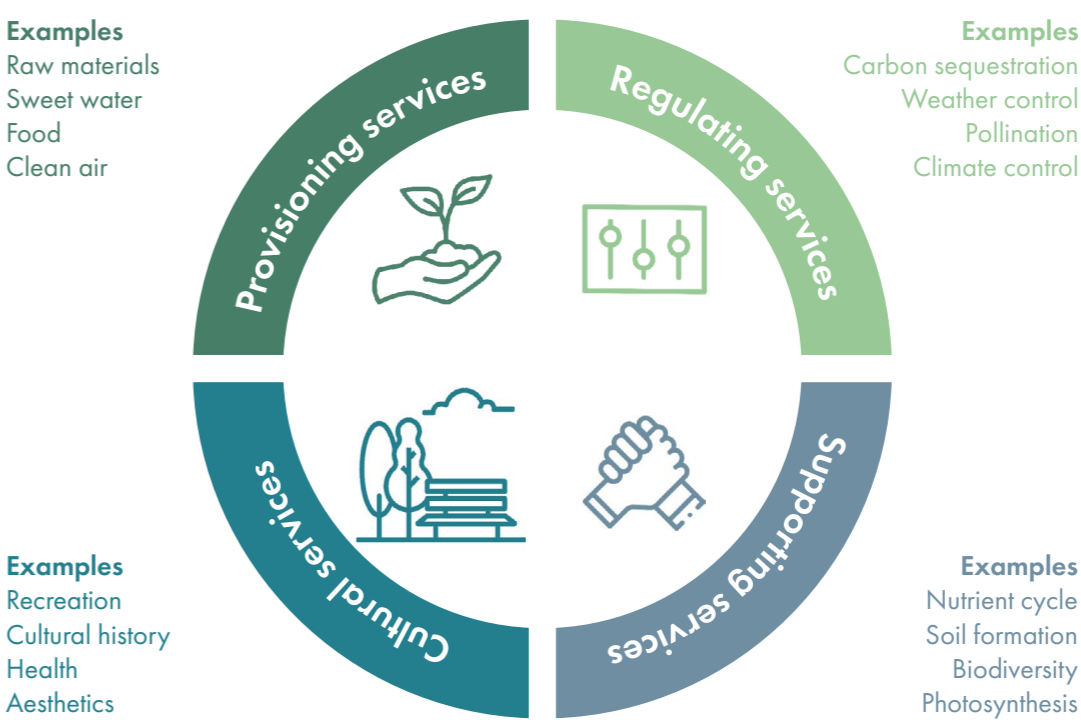


Figure 04: Categories of ecosystem services and examples
Source: Own image

Ecosystem services

As described previously ecosystem services are services which are provided by the ecosystem from which people profit. This paragraph will give a brief introduction of these services and their emergence. The concept of ecosystem services was popularized by the Millennium Ecosystem Assessment which was initiated by the United Nations in 2000. The aim of this publication was to assess the effects of changes in the ecosystem on public health. In addition, it intended to encourage the conservation and sustainable use of the ecosystem and it purposed to determine the positive impact of this on public health. In this report, ecosystem services were used to explore the link between the environment and public health (Millennium Ecosystem Assessment, n.d.). The assessment uses the following definition and categorization of ecosystem services, which is also displayed in figure 4:

‘Ecosystem services are the benefits people obtain from ecosystems. These include provisioning, regulating, and cultural services that directly affect people and supporting services needed to maintain the other services.’ (Millennium Ecosystem Assessment, 2003)

Overall problem

The vision for the post-war neighborhood was to build an independent, complete, urban community fitted to the site. However, the need for rapid housing construction, the poor financial situation and the emergence of industrial prefabricated building systems kept this from happening. This resulted in neighborhoods which consisted of standardized building blocks which were set up according to a regular, repetitive pattern, displaying a high degree of uniformity. In addition, these neighborhoods were often disconnected from their local environment and therefore its ecosystem services. These services could become an opportunity to improve public health in the post-war neighborhood and tackle arising challenges which are the result of climate change.

LOCATION

In the Netherlands, there are various landscape types, which can be seen in figure 05. The research and design of this graduation project will be focused on a post-war neighborhood on peat soil. As can be seen in figure 06, the peat landscape is mainly situated in the Green Heart and the northeast of the Netherlands. This type of soil is sensitive to land subsidence, especially in urban areas. The extent of land subsidence depends on the structure of the soil and the land use, but this can cause a lot of problems in inhabited areas. In post-war neighborhoods, these problems mainly consist of the more difficult processing of heavy rainfall and the subsidence of infrastructure, public green spaces and gardens (Bestuurlijk platform Groene Hart, n.d.; Willemse, 2018).

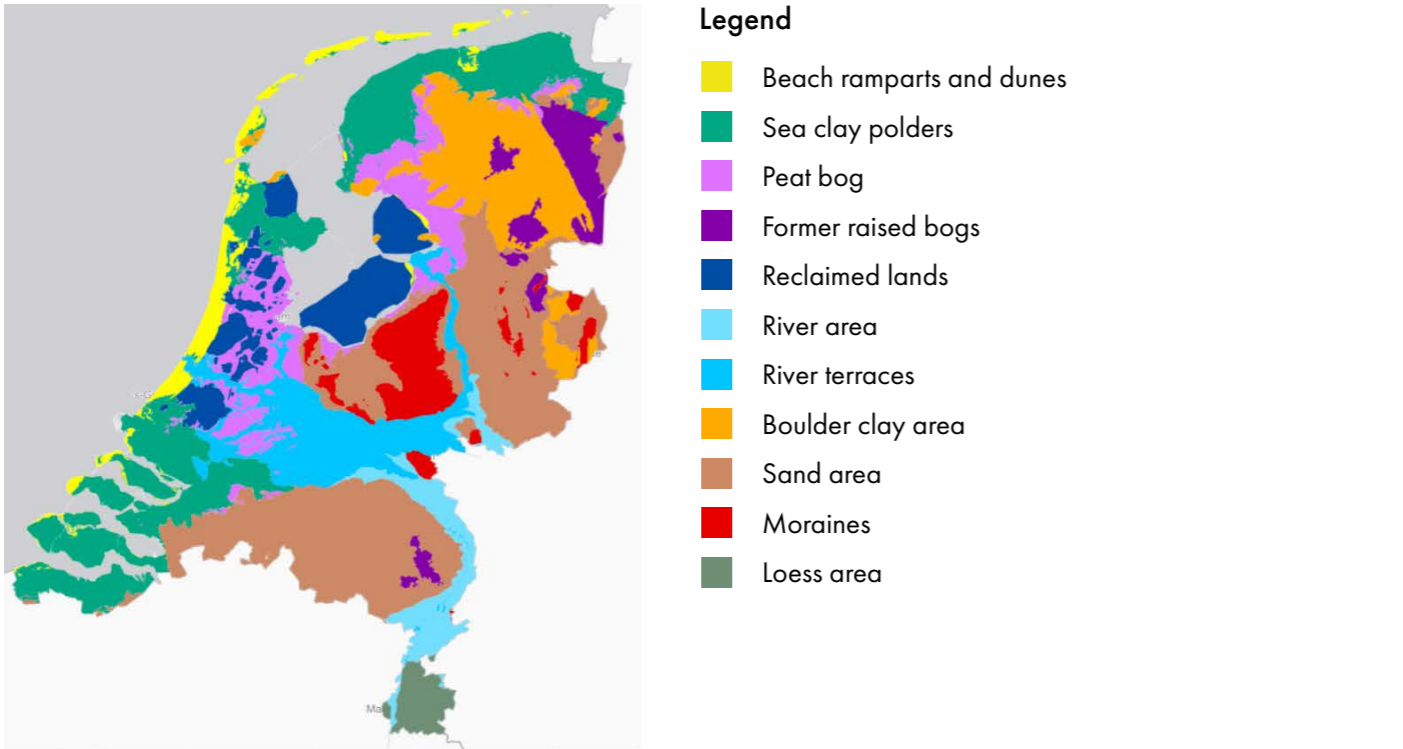


Figure 05: Dutch landscape types
Source: Klimaateffectatlas (n.d.-a)

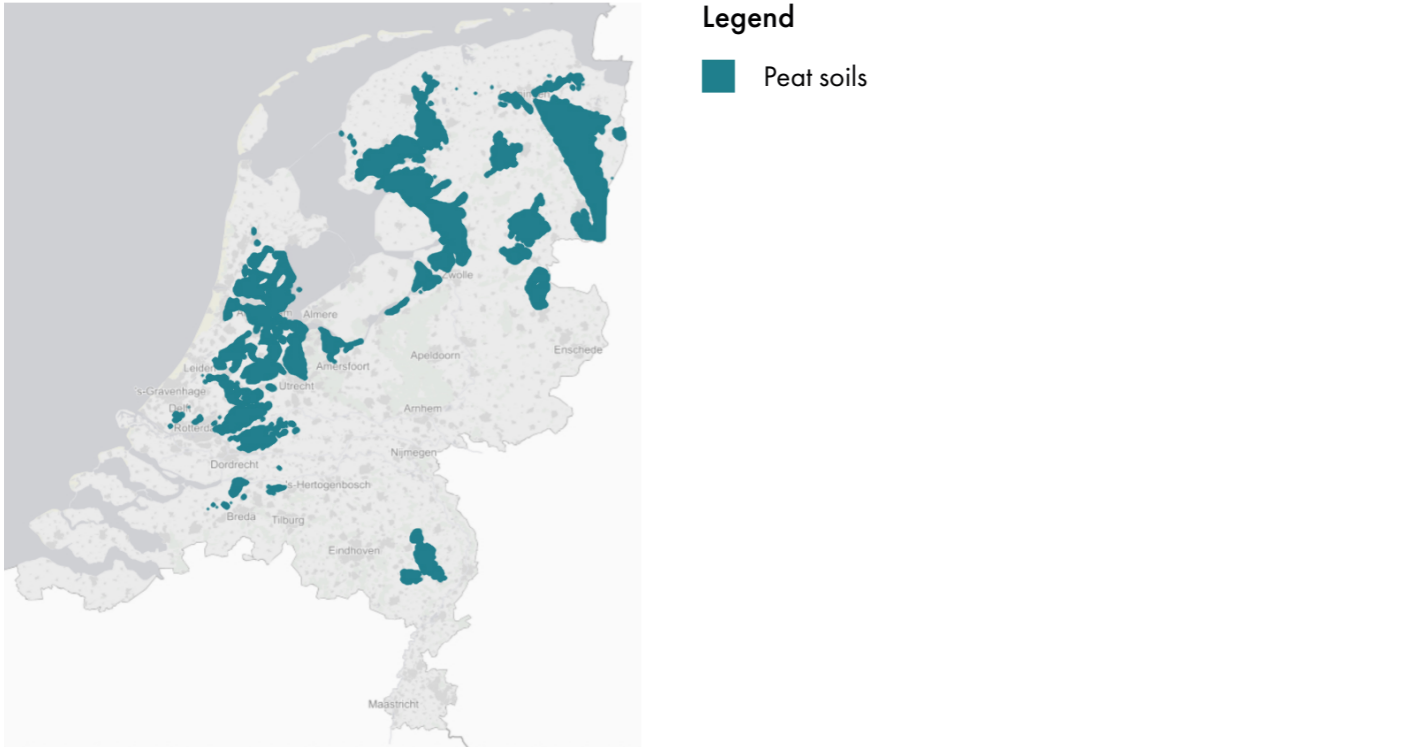


Figure 06: Dutch peat landscape
Source: Own image (Klimaateffectatlas, n.d.-a)

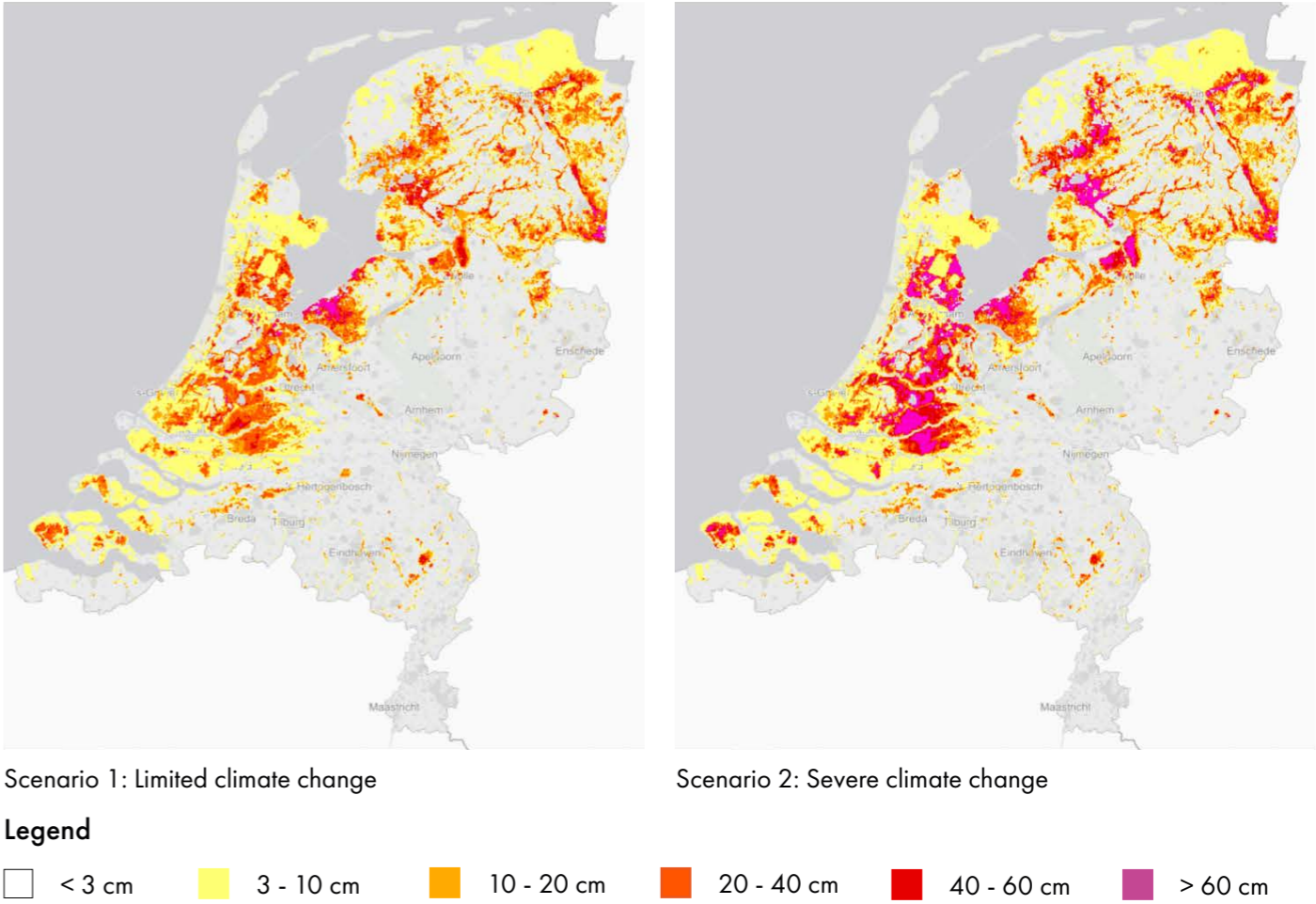


Figure 07: Land subsidence until 2100
Source: Klimaateffectatlas (n.d. -b)

The extent of land subsidence is also closely related to the severity of climate change. Figure 07 shows the amount of land subsidence until 2100. In this case two scenarios are displayed. The first scenario shows the amount of subsidence when climate change is limited and the second scenario shows the amount of subsidence when climate change is severe. Although both scenarios differ, land subsidence will become a challenge in the future (Klimaateffectatlas, n.d. -b).

OVERALL DESIGN OBJECTIVE & FOCUS

The overall design objective of this project is to transform a post-war neighborhood into an overall healthy neighborhood. In this case, this means that health is not only central for living organisms, including humans and animals, but also for the landscape.

The aim of the research within this graduation project is to come to possible physical interventions which can improve health within the post-war neighborhood. These interventions are the physical translation of strategies in which the implementation and/or development of ecosystem services from the peat landscape is used to improve public health and sustainability.

The aim of the design within this graduation project is to improve health and sustainability within the post-war neighborhood by renovation. This renovation will mainly be focused on one stamp within the neighborhood (figure 08). Within this stamp, the interventions and strategies found during the research will be implemented during the renovation. Therefore the design also becomes a 'testcase' in order to show how these interventions can be applied on the level of the stamp in the post-war neighborhood.

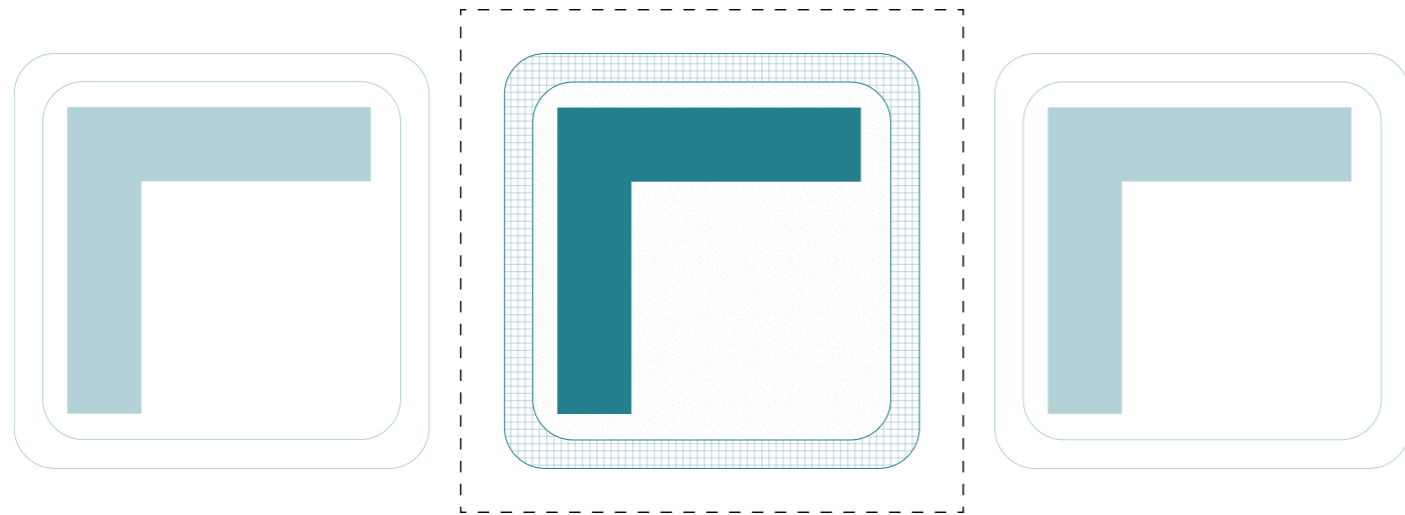


Figure 08: Design focus: the 'stamp'
Source: Own image

DESIGN QUESTION & FOCUS

The design question is:

'How can a post-war stamp on peat soil be renovated following a landscape based approach in order to become more sustainable and improve the well-being of its residents, by implementing and optimizing its ecosystem services?'

In general, the outcome will be a renovated stamp within a post-war neighborhood. The focus of the renovation will be to improve health and well-being by the use and optimization of ecosystem services. However, a more clear vision of the outcome will be formulated during the research phase.

THEMATIC RESEARCH QUESTION

The research question is:

'How can the local landscape and its ecosystem services be utilized and optimized to improve the health and sustainability of post-war neighborhoods in the Netherlands?'

The answer to this question will be found by comparing the ideal vision of a post-war neighborhood stamp, in which the ecosystem provides for all of the services that are demanded within that area, to the current situation. This will lead to strategies and eventually physical interventions on how the current situation can turn into the ideal situation. The sub-questions belonging to this approach are:

1. What is the current demand for ecosystem services in a post-war stamp on peat soil?
2. What is the current supply of ecosystem services from the peat landscape in a post-war stamp?
3. What is the future demand for ecosystem services in a post-war stamp on peat soil?
4. Which ecosystem services should be introduced or promoted to match the supply with current and future demand?
5. Which strategies can be used to implement or optimize these ecosystem services in the post-war stamp?

METHODOLOGY

The research starts with on one hand the demand for ecosystem services at the moment and the future demand in which extra goals might be added, like densification, health improvement, and becoming more sustainable. On the other hand, the current supply of ecosystem services needs to be determined, leading to the gap between those two situations. This gap will be in the form of a list of ecosystem services which are not up to the current or future standard. Then the question arises of how we can fulfill in the current and future demand of ecosystem services. Therefore, strategies will be formulated on how to improve and develop these ecosystem services. In the end the will result in a toolbox with proposed interventions which can be implemented in order to improve health and sustainability in a post-war stamp on peat soil by utilizing and optimizing the ecosystem services of the local landscape. This approach of the research is also visualized in figure 09.

In order to translate the research into the design phase, the toolbox will be used as a guide of possible interventions which can contribute to the transformation of a post-war neighborhood stamp into a healthy environment.

The first part of the research is mainly focused on collecting data and literature on the current and proposed future situation of the post-war neighborhood. Thereafter, the ecosystem of the urban peat landscape and its services will be explored. Thereafter, the research will still look at data and literature for the implementation of these services into an urban environment, but the research will also look at case-studies in which ecosystem services were applied as a strategy to improve a residential block or area. This research will lead to a toolbox of interventions which can all contribute to a healthier post-war neighborhood stamp by implementing or optimizing ecosystem services in a peat landscape. In this case the built environment and ecosystem services will work together to become a healthier neighborhood.

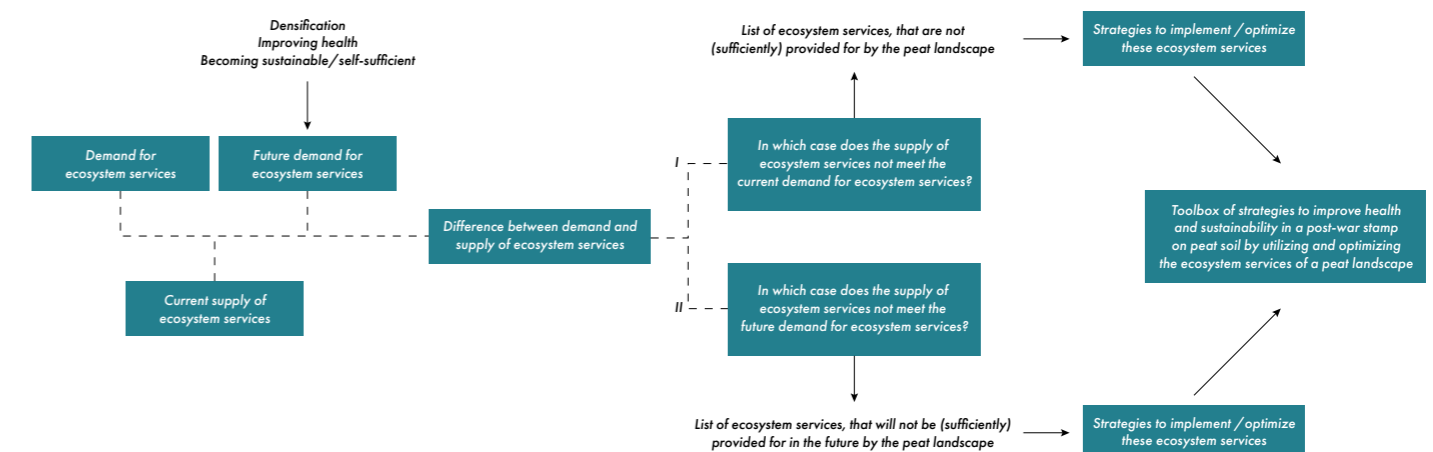
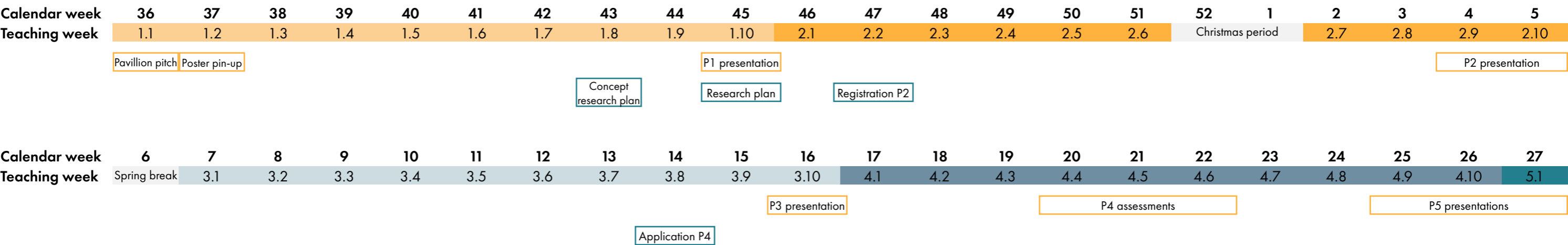


Figure 09: Visualization research
Source: Own image

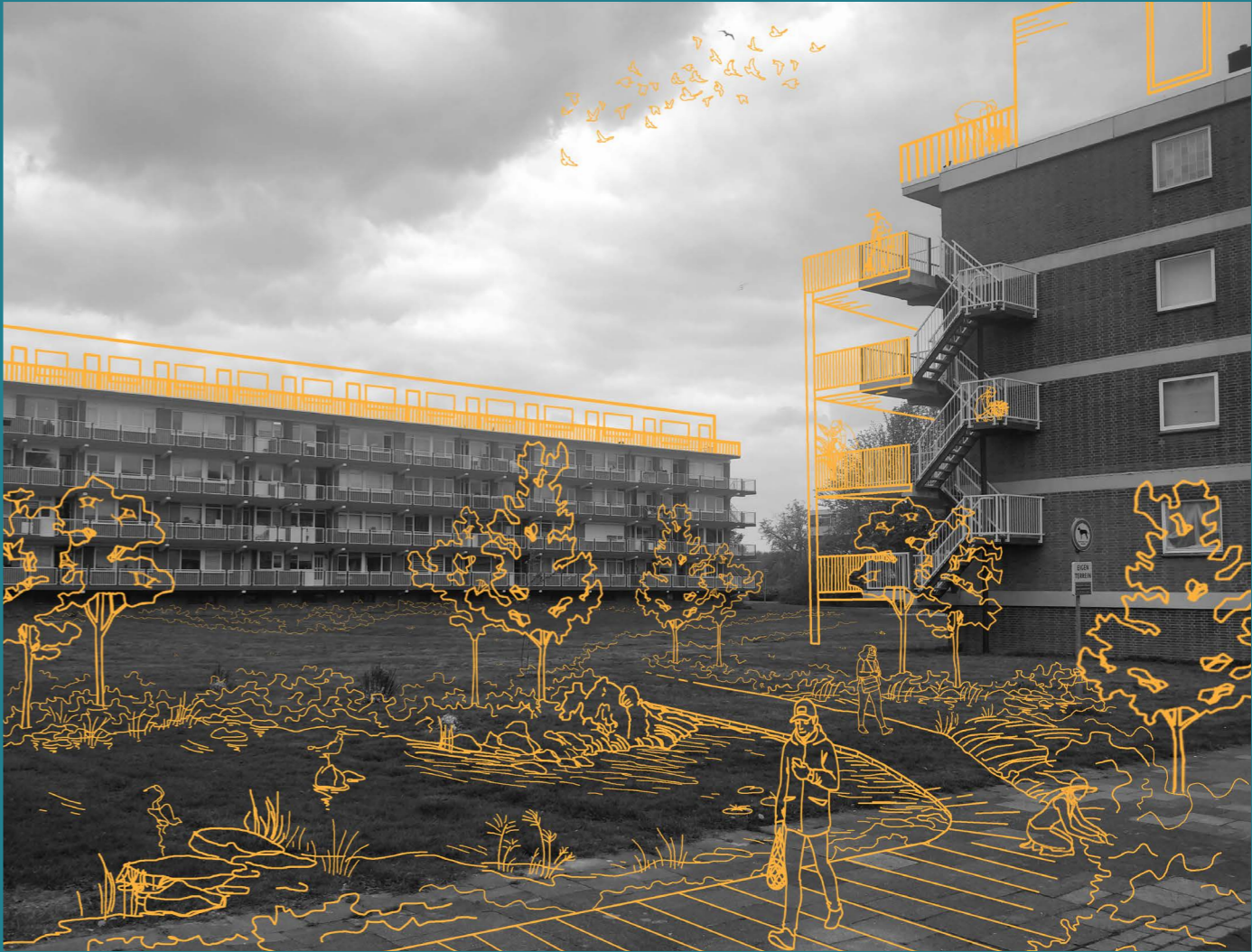
PLANNING

Overall planning



AMBITION

‘The transformation of a post-war stamp into a healthy cityscape in which ecosystem services serve as solutions to current and future challenges. This means that health is not only a central value for living organisms, including humans and animals, but also for the landscape, and the built environment should disturb the local ecosystem as little as possible.’



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