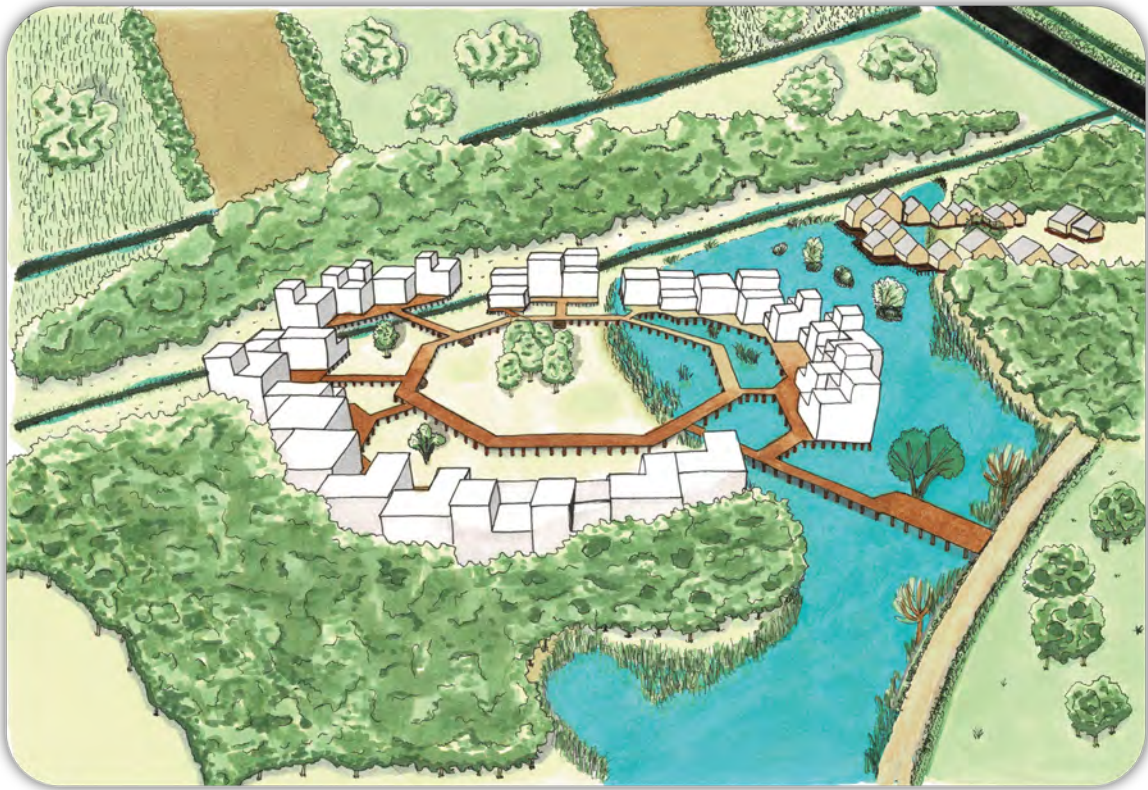


# Designing a new village character



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*Moordrecht, photographs made by author.*

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## Motivation



Fig.1. View on the Zuidplaspolder.

Source: Gouwe IJssel Nieuws (2017)

A few years ago, in the bachelor's programme, I found a shocking amount. He explained that only a limited part of that quantity could be built within the existing cities. So where should the rest go? The dilemma: are we going to sacrifice the green space in "the green heart"? Make the Randstad into one big city and have open space in other provinces? At the time, I was quite certain that every inch of open space had to be preserved, also because I live on the edge of this green heart (fig. 1). But the questions lingered with me and over time the discussion in my head became more complex. We learned that there are limits to the growth of cities, but also to density, and that there is more biodiversity in the city than in the grassland. Much more has been added over time. At the same time, there were developments in the field. At the moment, the municipality where I live, Zuidplas, is planning to build a new village in the grasslands in the Zuidplaspolder. I am not really sure how I feel about that. Investigating the possibilities of this new village may shed some light on the dilemma. It is time to reconsider my position.

Another issue that has been highlighted during my study is social and spatial justice. The first thing that comes to mind is that, of course, everyone deserves a nice place to live, but that is easier said than done. I do believe, however, that we as (future) urbanists have the responsibility to do the best we can to make it happen. It will take more than just mixing different size houses in the neighbourhood. It is also about finding out what makes a community work and who will ultimately pay the bill. It would be great if we could bring some solidarity back to life. Preferably not forced, but heartfelt. Lately there has been another aspect of spatial justice that has occupied my mind. I sometimes wonder whether I have the right to choose to live in a green village that takes up so much more space than a compact city. Spatial impacts, however, have to be weighed against other issues, such as better health and happiness. The lack of these leads to increased social costs in the city. I would like to know whether, when considering multiple perspectives, there can be a balance, so that living in a village can also be a socially responsible choice.

# CHAPTER 1

*Context en problem analysis.*

# Problem Analysis

## Context

### Introduction

The Netherlands is facing a housing shortage. Until 2030 about 845,000 houses will have to be built, many of them in the Randstad conurbation, because the demand for housing is greatest there, as can be seen in fig. 2 (Gopal, Groenemeijer, van Leeuwen, Omtzigt, & Faessen, 2020 p.19). Since only a small part of this number can be built within existing cities, other locations must be found on the outskirts of towns or in open spaces. One of the locations in the latter category is the Zuidplaspolder, on which this thesis will focus. Fig. 3 shows the location of the Zuidplaspolder.



Fig. 3. Location of the Zuidplaspolder. Source: Google Maps.

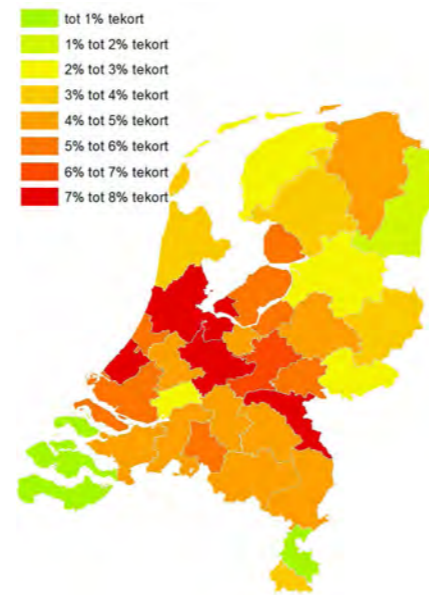


Fig. 2. Expected housing shortage per housing market area in 2025. Reprinted from Primos 2020 p. 19

## History

The Zuidplaspolder was already designated by the national government in 2004 as a development location for the south wing of the Randstad metropolitan area (Zuidplas, 2017). In 2006, the Intermunicipal Structure Plan (ISP) was adopted, which included 15,000 to 30,000 dwellings. It also included business parks, glasshouse horticulture and greenery and nature. This was translated into zoning plans by the municipalities of Nieuwerkerk aan den IJssel, Zevenhuizen-Moerkapelle and Moordrecht in 2009. At that time, there were no concrete plans for the central area.

In the period from 2006 to 2011, the building land required for the development was purchased by the Grondbank RZG Zuidplas (Zuidplas, 2017). This was established in 2004 by the province of Zuid-Holland and the municipalities of Rotterdam, Gouda, Moordrecht, Nieuwerkerk aan den IJssel, Zevenhuizen-Moerkapelle and Waddinxveen. The aim was to strategically purchase land in the Zuidplaspolder to prevent the price from rising (Evaluatie-rapport Grondbank en ROZ, 2013). On the whole, 300 hectares are bought by the land bank and another 300 hectares by private parties, as shown in Fig. 4.

The development of the central area became possible when, in 2010, the municipality of Zuidplas was formed by merging the municipalities of Nieuwerkerk aan den IJssel, Zevenhuizen-Moerkapelle and Moordrecht. As a result of the economic crisis, the major plans were pushed a little further ahead and the focus was first on new construction in and around the existing villages. In 2017, the municipality of Zuidplas made a “bid” to the province to start the conversation again. Zuidplas took this initiative in order to keep charge of the development of the Zuidplaspolder. At the time, there were already fears of plans being imposed by the provincial government. The bid comprised 5,000 homes in or adjacent to existing villages, as laid down in the Zuidplas 2030 Structural Vision and 4,000 in a new village in the central area. The intention is to develop the new village in such a way that it will be possible for it to grow organically and adaptively after 2030, if necessary (Zuidplas, 2017).

Subsequently, in 2018, the provincial government laid down policy in the “Visie Rijke Groenblauwe Leefomgeving”, which focuses on the

development of green and blue as a basis for urbanisation, in order to create a healthy and attractive living environment, and finally, in May 2019, the “Ontwikkelingsvisie Zuidplaspolder - Middengebied” was released by the municipality (Zuidplas, 2019). At the present time, in closed meetings, the municipality is trying to reach agreement with the other stakeholders on the size and exact location of the fifth village and the landscape buffer around it.

## Challenges on site

### Grondbank RZG Zuidplas

One of the difficulties in the current process is reaching agreement between the parties in the Grondbank. The Land Bank owns approximately 300 hectares of land. The risk distribution is as follows: province 40%, Rotterdam 40%, Zuidplas 9%, Gouda 6% and Waddinxveen 5%. At the time, it seemed a good idea to buy this land, but

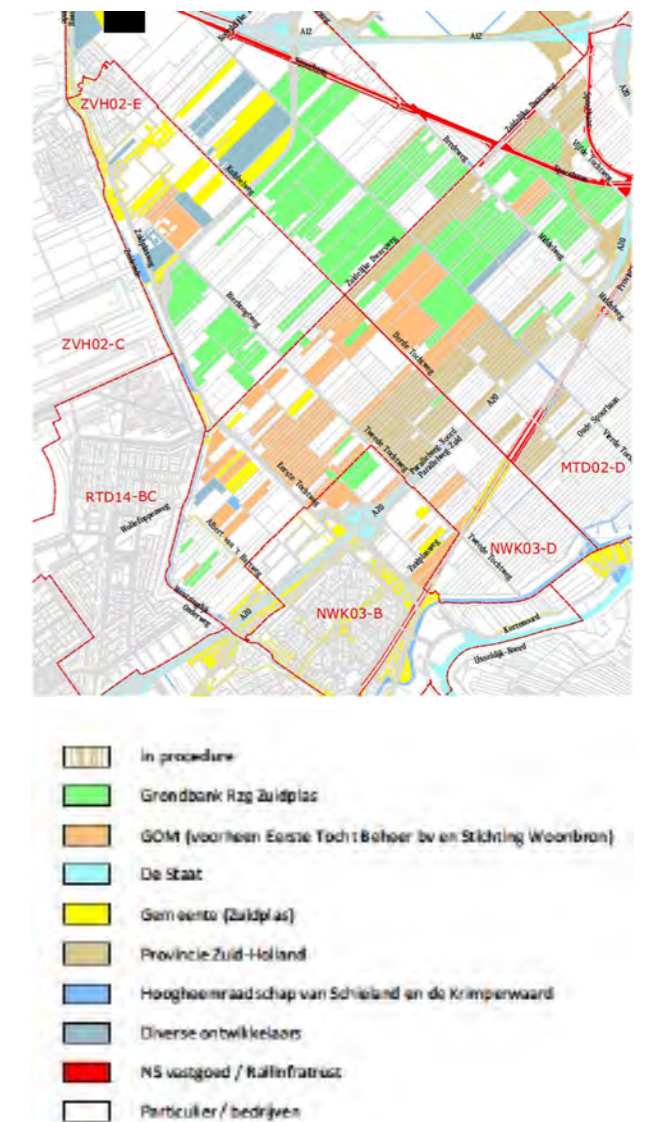


Fig. 4. Overview of land properties, February 2017. Reprinted from Integrale ontwikkeling Zuidplas; bidbook Zuidplas, 2017.

its value dropped significantly as a result of the economic crisis that followed shortly afterwards (*Evaluatie-rapport Grondbank en ROZ*, 2013). Subsequently, the Grondbank had indicated a number of things, related to the planning of the new village, that could be done to reduce the loss of the Grondbank, but too little account was taken of this, according to the Executive Board, as well as the municipality of Rotterdam. These were matters such as locating the village in such a way as to involve more land already purchased and relocating and reducing the landscape area so that it would actually include less land already purchased, as this did not give the highest potential yield (“Andere leden grondbank RZG Zuidplaspolder ‘boos’ over plan Vijfde dorp,” 2019). Now, according to the local press, some of the other parties besides Zuidplas only want to earn as much as possible from the development in order to compensate for the losses suffered (E. Van Leeuwen, 2020; E. Van Leeuwen, 2020e). On the other hand, some political parties in the council find it unfair that Zuidplas has to pay all the preparation costs at this stage, while the other parties will want to share in the proceeds at the end (E. Van Leeuwen, 2020c).

### Water and soil

Then there are the difficulties related to the site

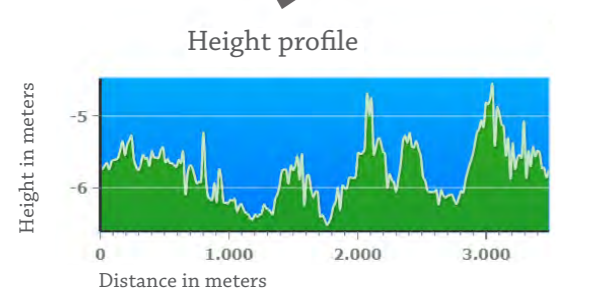
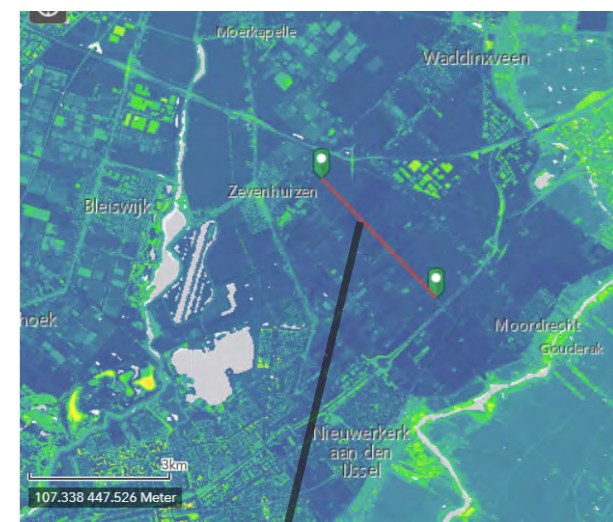


Fig. 5. The Zuidplaspolder is the lowest polder in the Netherlands. Source: Ahn viewer.

itself. The lowest point of the Netherlands lies in the Zuidplaspolder. Fig. 5 (Ahn) shows how deep the polder is. It is therefore clear that a number of water-related issues, such as water storage areas, need to be taken into account (Zuidplas, 2017). The soil in the Zuidplaspolder mainly consists of clay, peat and peaty soil. In the middle is an old creek ridge. This is the winding shape shown in Fig. 6. (Alterra, 2020). As the peaty soil is difficult to build on, the most dense parts of the new village should be built on this creek ridge. However, the landscape link is also partly planned on the creek ridge, so the environmental associations fear that the creek ridge will be filled up and not much will remain of the nature area (E. Van Leeuwen, 2020b).

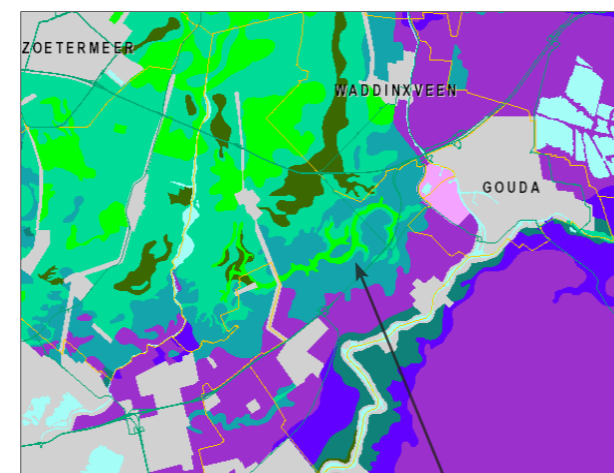


Fig. 6. Soil map of the municipality of Zuidplas. Reprinted from Alterra, 2020

### Mobility

Another concern in this area is future accessibility and mobility. The central area of the polder is conveniently located between the A12 and A20 motorways, making it less attractive to cycle or take public transport. For this reason, extra attention must be paid to this. However, at the beginning of 2020 the



Fig. 7. A selection from last summer's headlines (Hart van Holland, edition Zuidplas, 2020). (Collage by author.)

Rotterdam The Hague Metropolitan Region (MRDH) issued a negative recommendation to the municipality of Zuidplas regarding the extension of the metro from Rotterdam Nesseland, as this proved to be unfeasible (“De ‘kreekrug’ wordt fundament Vijfde Dorp, maar de metro ernaartoe komt er niet,” 2020). Other solutions will therefore have to be sought. On the other hand, the capacity of the roads must also be considered (Zuidplas, 2019).

### Social housing

The municipality of Zuidplas considers it important that there are sufficient affordable homes for all target groups. Social housing must also be sufficiently available in the villages. The aim is to increase this number in line with demand, also in the new village (Zuidplas, 2018). Because of the issues with, among others, the weak soil and the decline in the value of the land owned by the Grondbank, it will be an extra big financial challenge there. At the moment, October 2020, there is the issue of the Vestia housing corporation, which wants to transfer 400 social housing units to the free sector, which will lead to a deficit (“Vestia en Zuidplas steggelen voor rechter over sociale huurwoningen,” 2020). However, this will

not have a direct impact on the Fifth Village, because this village is primarily intended to meet (supra)regional demand. However, account will have to be taken of the national trend of the increasing number of elderly people and the increase in the number of households in general (Zuidplas, 2017, 2018).

In addition to the above-mentioned matters, there are some issues with competition for land. For example, there is glasshouse horticulture that wants to expand and a pig farm with a growing secondary business. Companies like the latter also create a large odour circle that has to be taken into account. There is also a pipeline running through the area. In addition, there is the general problem of PFAS and nitrogen (E. Van Leeuwen, 2020a). For a moment there was another problem. A member of parliament wanted to turn the Zuidplaspolder into a large-scale housing project, if necessary with coercion from the national government. However, this was pushed aside by both the province and the minister (E. Van Leeuwen, 2020d). Fig. 7 shows a selection from last summer's headlines (Hart van Holland, edition Zuidplas, 2020) that illustrate the problems.

## Problem field

The municipality of Zuidplas sees the character of the rural village environment in the middle of the Randstad as a unique and very valuable property that can be used to attract new people. In addition, the residents are very attached to this character and to the identity of their own village. Zuidplas therefore opted to build a new (small) village in the middle of the Zuidplaspolder, instead of expanding the four existing villages, to meet the (supra) regional housing demand. This way, the village character is preserved in all villages. However, it is not very clear what 'village character' is. The municipality describes it as "a lot of low buildings in a green environment" (Zuidplas, 2018, p. 10) and apparently the village should not be too big. These are the characteristics that come to mind first, but is this all that makes a village a village or are there other spatial characteristics that influence the village character? Does community spirit also contribute to the character and if so, how does it translate into spatial characteristics? If the number of houses matters, what is the maximum number? Since the aforementioned challenges put pressure on the village size of 4,000 houses, as desired by the municipality, it would be useful to know which spatial features affect the village character, so that a village can be designed with maximum capacity without losing the village character.

## Problem statement

The municipality of Zuidplas wants to contribute to meeting regional housing demand, but the wishes for both a rural village atmosphere in the villages and careful use of the open space in the Zuidplaspolder, limit the number of houses that can be built in the fifth village. Because it is not precisely known which factors create the village character, it is difficult to estimate how many houses can be built in the fifth village in such a way that the village character is preserved and the village is a sustainable link in the regional green and blue infrastructure.

# CHAPTER 2

*The theoretical underpinning of the project.  
(The deliverable of the course AR3U023 Theories of  
urban planning and design)*

# Getting a grip on the village character

Exploring the concepts of sense of place and sense of community

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## Abstract

The municipality of Zuidplas wants to contribute to alleviating the housing shortage in the Netherlands, particularly in the south wing of the Randstad, while at the same time preserving the village character in the existing villages, as this is seen as unique and highly appreciated by the residents. They want to do this by building a new village with the same character in the middle of the Zuidplaspolder. However, this character is not very clearly defined and it is not known why it is so highly valued. This paper will focus on this last point. By literature review an attempt will be made to answer the questions: How do people experience place and which characteristics do they appreciate? The results will be used as input for the design of the new village. It appears that there is a lot of overlap in the sense of place and community. Although social and psychological factors are important, some physical characteristics have been identified that contribute to the sense of place: geographical location, boundaries, geographical distinctiveness, scale and proportion, and rich imagery. Natural landscape elements are highly valued and the sense of place is strongest when an environment evokes memories, amazement and fantasies.

**Key words:** village character, sense of place, sense of community, Zuidplas

## 1. Introduction

There is a housing shortage in The Netherlands. Until 2030 845.000 houses will have to be built (Gopal, Groenemeijer, van Leeuwen, Omtzigt, & Faessen, 2020). The Zuidplaspolder, designated by the national government in 2004 as a development location for the south wing of the Randstad (Zuidplas, 2017), is situated in the municipality of Zuidplas. The municipality wants to contribute to this building task for the south wing, but at the same time wants to preserve the village character of the villages in Zuidplas and the rural character of the municipality as a whole. The character of rural villages in a densely urbanised environment is seen as a unique and very valuable property that can be used to attract new people and it is also highly valued by the residents. That is why the municipality refrains from extending the existing cores for the benefit of (over)regional demand, but instead intends to build a fifth village, with a maximum number of houses of 4000 (Zuidplas, 2018). However, it is unclear what a village character means. Apparently, the municipality finds it important to keep the number of hou-

ses small. The only other indication given by the municipality is “a lot of low-rise buildings in a green environment” (Zuidplas, 2018), so there is a need for a clearer definition of village character. Once it is known what makes up the village character, this knowledge can be used to examine how large a village can be designed without losing its village character. This is important because there is pressure to build more houses, both because of demand, affordability and from parties outside the municipality. It is also important in the larger context of housing demand, since it can support the search for suitable construction sites in lower density areas. This may have become even more relevant now that people are working more from home because of the Covid-19 pandemic. It is possible that as a result, more people will want to leave the city and live in a village in the countryside (Jenkins, 2020). The research into the village character runs over two tracks. The first is research into which qualities are characteristic for a village and the second is research into how people experience a place and what makes them appreciate a place. This paper will cover the second track. The questions this paper seeks to answer are: How do people experience place and which characteristics do they appreciate? To answer these questions a literature study will be carried out into sense of place and sense of community. With the concept of sense of place scientists research how people relate to place, mostly by trying to define to what extent people are attached to a place and how this came to be. Because in Zuidplas the preference for a rural village environment is expressed by the inhabitants of such a village, who are also attached to the identity of their own village (Zuidplas, 2018), it is plausible that they are satisfied with this village, and that the theories of place attachment and sense of place apply, although, as Stedman pointed out, satisfaction and attachment do not necessarily go hand in hand (Stedman, 2003). It is also likely that the things they value are characteristic of a village. In the end, the latter might not even prove to be important, because what matters in the end is that the new environment is appreciated by villagers and not that it is called a village.

The sense of community is often the first to be mentioned as a village characteristic, so it is important to consider whether and how it can be created and what spatial qualities are needed for this.

The paper will first discuss how people perceive their environment. Then it will elaborate on sense of place, spirit of place and influences on sense of place in section 3, followed by section 4 on sense of community. Finally, the conclusion in paragraph 5 and the bibliography follow.

## 2. How people perceive their environment

The influence of our experiences and social setting already starts with perception, before we are aware of a setting. Because there are far too many signals in our environment to tune in to, the brain selects signals and organises them into a meaning. This leads to personal perceptual styles. The brain decides on what signals to use and how to arrange them based on what a person is used to, prefers, and interests. Perception is also influenced by what a person brings to a setting, such as expectations, intentions, moods and personal preferences. This affects how that person then uses the setting and feels about it (Steele, 1981). If the boy from the example of the climbing tree would not like to climb trees, he would feel differently about the place than if he did. He might not even notice the shape of the tree, because the brain does not consider it important. If he had climbed into the tree and fallen out, that too would make him look differently at this place, because it would remind him of his fall. There are, however, some non-personal factors, which are related to the environment, that influence perception. The overall scale of a setting in relation to the person and the degree of closure are characteristics of a setting that have the same influence on the perception of most people. That is why children sometimes remember things as much bigger than they turn out to be when they see them again when they are older, and why a row of trees can make a square seem closed (Steele, 1981).

After perceiving comes awareness. This can be stimulated by sights, smells, and sounds. People can enter a state of heightened awareness when they are strange somewhere, when they have to make a decision, for example in traffic, or when they feel differently, such as when they are ill or have a hang-over. A special case is increased awareness through certification. In this case, people are more aware of a place because it feels special to them, because it has been in the newspaper, for example, or because it has been the setting for a film (Steele, 1981).

### 3. Sense of place

Already in the nineteen seventies the geographer Tuan wrote about the sense of place. According to Kris Olds, Chair of the Geography Department of the University of Wisconsin-Madison “It was Tuan who gave rise to the recognition among geographers that the intimacies of personal encounters with space produce “a sense of place”” (Gabriel, 2013). He used the term Topophilia, which means “love of place”, to describe the bond between people and place. This is also referred to as place attachment and it is a part of sense of place (Najafi & Shariff, 2011). Stedman (2003) argues that sense of place should also include place satisfaction, since being attached to a place does not necessarily mean being satisfied with it and vice versa. Furthermore he states that sense of place is dominantly seen as a “social construction” in which physical characteristics have no role. This is based on the idea that a physical environment may be attributed a different meaning by different people as a result of different personal experience and cultural identity and thus the features in itself have no meaning. Stedman asks himself whether the meanings people give to places, could also be influenced by the physical features itself, as it is possible that the physical environment influences community culture. As he puts it: “Are we really likely to attribute “wilderness” meanings to a suburban shopping mall?” (Stedman, 2003, p. 673). Cross (2001), a sociologist, divides the feeling of place into the relationship of place and community attachment. Community attachment mainly refers to the degree of attachment people experience. The relationships say a little more about how this bond was formed. She distinguishes six types of relations. People can have multiple of these relationships and also these relationships can change over time. Table 1 (Cross, 2001, p.3) shows these relations, the type of bond that is formed and the process involved with developing the relationship.

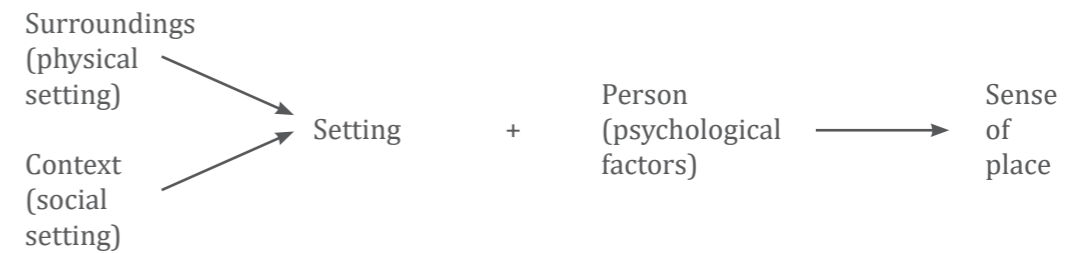
**Table 1.**  
**Relationships to place**

Relationship	Type of Bond	Process
Biographical (9)	historical and familial	being born in and living in a place, develops over time
Spiritual	emotional, intangible	feeling a sense of belonging, simply felt rather than created
Ideological	moral and ethical	living according moral guidelines for human responsibility to place, guidelines may be religious or secular
Narrative (9)	mythical	learning about a place through stories, including: creation myths, family histories, political accounts, and fictional accounts
Commodified	cognitive (based on choice and desirability)	choosing a place based a list of desirable traits and lifestyle preferences, comparison of actual places with ideal
Dependent (9)	material	constrained by lack of choice, dependency on another person or economic opportunity

Reprinted from What is sense of place? by J. Cross, 2001, Paper presented at the 12th Headwaters Conference, Western State College.

The way these relationships are formulated, they indeed seem to be independent of the physical environment, but this will be discussed later.

One of the approaches Cross studied to arrive at a definition of Sense of Place was that of environmental psychology, represented by Steele (1981). According to Steele, the relationship between people and place can be described as transactional. By this he means that people not only take something from a place, but also add something to it, for example by a mood or expectation or a certain action in that place, which could give the place a different influence on them. This last part is rather like the idea of the sense of place through meaning that Stedman (2003) described. The action becomes a memory that adds meaning to the place, which is thereby experienced differently. However, Steele feels the physical environment does have a contribution to make. It is the combination of setting and personal contribution that creates the sense of place, described by Steele as “the pattern of reactions that a setting stimulates for a person” (Steele, 1981, p. 12) and “the particular experience of a person in a particular setting (feeling stimulated, excited, joyous, expansive, and so forth)” (Steele, 1981, p. 11). Steele defines setting as a combination of the physical environment and the social context, that both have an influence, as shown in Figure 1 (Steele, 1981, p. 12):



**Figure 1:** Sense of place. Reprinted from *The Sense of Place*, p. 12, by F. Steele, Boston, Massachusetts: CBI Publishing Company.

For example, a boy sees a great climbing tree, but he is not allowed to climb it. This makes the tree a lot less attractive to him. Without the social context of not being allowed to climb it, the tree and the place would have given him a different, much better feeling.

#### 3.1 The spirit of place

Some settings have a strong spirit of place: “the combination of characteristics that gives some places a special ‘feeling’ or personality (such as a spirit of mystery or of identity with a person or group)” (Steele, 1981, p. 11), which makes different people experience these places in the same way. Steele defines five characteristics that influence the spirit of place: geographic location, boundaries, geographic distinctiveness, scale and proportion and rich images. A strong sense of place is created when one has to make an effort to get to a place, especially when this leads along a special sequence of features and there is a strong contrast between the key feature and the immediate surroundings. Boundaries, or enclosure, either physical or symbolic, distinguish an area as a place and may be an indication of territory (Steele, 1981). Geographic distinctiveness may not seem present in The Netherlands, but to a foreigner, the flat country can be as impressive or at least as distinctive as a mountain. Scale and proportion of the elements in the environment can be about bigness, smallness, or a surprising mix. Although this may provoke strong reactions, such as feeling very small in relation to a huge building, Steele warns that these are not always positive. The last quality is the extent to which the features of the setting are able to evoke mental images (Steele, 1981) or in other words, how easy it is to remember what the setting looked like in a clear and coherent image. This is parallel to Lynch’s research, to which Steele refers. Lynch found that if paths, edges, districts, junctions and landmarks are present in a city, this creates a rich mental picture of that city, which then creates a strong sense of place (Lynch, 1960).

As mentioned earlier, Steele also includes the social context in the setting. He distinguishes between the contribution of the individual, which is a person’s character, and of collections of people. A person’s character is likely to be especially visible in private spaces. In public space, collections of people can have an influence in different ways. One of them is that they are just there, occupying the space and thus being a physical part of the environment. It can make a place feel crowded, but it can also be a pleasant background. Groups of people also offer opportunities for mutual help and a sense of

security, which leads to a good sense of place. Steele does add the striking remark that whether or not the presence of people leads to security also depends on whether or not it is the accepted norm to help people in need (Steele, 1981). This puts Jane Jacobs' idea of eyes on the street into perspective. The spirit of place is also influenced by the kind of people that dwell there. This effect is self-reinforcing. A place attracts people with a certain style. This style then gives the place a spirit that attracts more of that kind of people. In addition to the concentration of a certain type of people, narrowly focused activities can also enhance the sense of place (Steele, 1981). This brings to mind the atmosphere on the schoolyard, where for a period of time almost everyone played fanatically with marbles, followed by the next period in which everyone played catch, followed by a period with the next activity that went feverishly all over the schoolyard.

Steele's next point, in relation to users, that creates a strong sense of place is the presence of both doers and spectators rather than just one of them (Steele, 1981). This can be illustrated by imagining a football match without an audience or a filled stadium without a match on the pitch. The atmosphere is richer if they are both there. This is also related to a good location. It helps if a lot of pedestrians pass by that can stop for a while to watch or join the activities (Steele, 1981).

A special kind of place spirit is the spirit of mystery. It can be provoked by impressive physical characteristics, characteristics in an odd combination, or simply by not knowing what is there, due to inaccessibility or spiritual inaccessibility, such as in cemeteries. Cultural and social factors such as sacred status can contribute to this spirit. It can evoke fantasies and feelings of threat and make people think about the mysteries of life, and it can have a stimulating effect (Steele, 1981).

The last kind of spirit is in personal places. They provide shelter and security and control over the amount of social contact. Making a place more personal can make people feel more responsible for it as opposed to a "no-person's place" that no one feels responsible for and is often neglected (Steele, 1981).

### 3.2 Other influences on sense of place

Besides the spirit of place, the sense of place can be influenced by the time one spends in a place and the recognition of patterns. Memories, triggered by smells, sounds and sights can also have a strong impact. These may be memories made in that particular place, but characteristics in an environment can also remind a person of a similar environment elsewhere. It can even be a "memory" of a distant past or a fantasy, which also contributes to a powerful sense of place.

Forming an image of a new place in advance, for example by reading about it, can lead to immediate recognition. However, as mentioned at the beginning, the expectation can also block the perception of signals other than the expected ones. Finally, spontaneous moments of joy or beauty can be important (Steele, 1981).

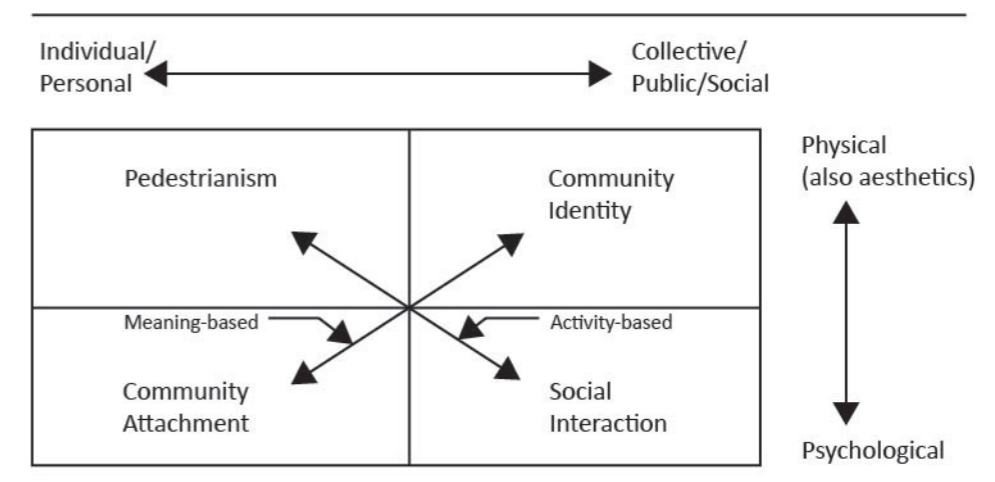
### 3.3 Links between Cross, Stedman and Steele's sense of place

Looking back at the relationships Cross has formulated, some relationships seem to emerge with Steele's ideas. The biographical relationship is likely to lean on memories that can in turn be stronger if the place has a strong identity, which could come for example from history or beauty. The spiritual relationship, a sense of belonging, can be triggered, for example, by the recognition of identity, as in characteristics that remind one of childhood or give rise to an attractive fantasy. The ideological relationship can relate to physical characteristics if the ideology is, in a sense, physical. The physical features this ideology needs will contribute to the sense of place. This may be the case, for example, if a community chooses to be self-sufficient in food, because that would mean having agricultural land. The narrative relationship seems closely related to history, mystery and fantasy. Not only myths, but also personal stories often have a specific physical background. The commodification relationship is likely to be often based on physical characteristics, as these are easier to identify in advance than the immaterial characteristics of different places. The links between Stedman, Cross and Steele's ideas about sense of place indicate that they are not so much different ideas, but that they are complementary. It suggests that a sense of place is indeed based on meanings, but that these meanings are not formed in a kind of vacuum, separate from the environment, just as Stedman suspected. Steele explained how these meanings

are affected by what people bring to a setting, but also by the physical features of that setting. Stedman (2003) confirmed that physical characteristics matter. His research showed that they directly matter to place satisfaction. The influence on attachment is more complex. Through modelling, he found that when physical characteristics change, this leads to new symbolic meanings. However, if the new meanings are as positive (or negative) as the old ones, they do not change the place attachment.

## 4. Sense of community

When asked about the typical characteristics of a village, one of the first things that are mentioned is the sense of community. The difficult thing is that the words place and community are sometimes used interchangeably. The first three relationships to place that Cross (2001) describes, the biographical, spiritual and ideological relationship, also relate to the community. It is difficult to distinguish whether there are two relationships, one between person and place and one between person and community, or whether it is the same relationship and place and community are indeed interchangeable. Kim and Kaplan (2004) carried out research into the influence of the physical environment on sense of community. They defined four domains representative of the aspects of sense of community: community attachment, community identity, social interaction and pedestrianism. Fig. 2 (Kim & Kaplan, 2004, p. 319) shows how they think these domains are related and to what extent they are more physically or psychologically oriented. Pedestrianism is understandably referred to as more physical. How well one can walk around in an area clearly (though not exclusively) involves physical aspects. The other more physical aspect is community identity, because it is the physical environment that provides the identity of place (Kim & Kaplan, 2004). Here the distinction between place and community becomes vague, because community identity then appears to be the same as the spirit of the place, which has the ability to make a group of people experience the same reaction to a place. A certain place spirit can attract a certain kind of people, that then form a community, or it can shape a local community (Steele, 1981), for instance a community of surfers or a community of fishermen near the sea. Kim and Kaplan (2004) consider community attachment and place attachment to be the same in their paper, so here too the lines are blurred, and although they place it in the psychological part of the diagram, Stedman (2003) and Steele (1981) have shown that it has a number of physical components. Social interaction is indeed social, but the physical environment can support it to a greater or lesser extent, for example by improving pedestrianism or providing spaces and opportunities for people to engage in activities and share experiences. B. Hausleitner (personal communication, October 2020) stated that she felt she lived in a village in the city because she felt she was part of a community built up through shared experiences. Additionally Steele (1981) indicated



**Figure 2:** Domains of Sense of Community and Their Hypothesized Relationships. Reprinted from Physical and Psychological Factors in Sense of Community: New Urbanist Kentlands and Nearby Orchard Village, by J. Kim and R. Kaplan, *Environment and Behavior*, 36(3), 313-340

that the people who are present in a place become physical elements themselves and have an effect on the sense of place. This indicates once again how intertwined the subjects are with each other.

By means of a survey, Kim & Kaplan researched the perceived importance of specific spatial characteristics for the sense of community. The natural features, both public greens and the larger natural landscape elements, the lakes and wetlands, scored highest in all four domains. Density scored high in the domain of social interaction in both the low and high density neighbourhood. As a result, this outcome is not unambiguous, but it seems likely that higher density will lead to more social interaction, which is appreciated by the residents of the denser neighbourhood, while the residents of the low-density area, on the contrary, prefer less social interaction. Street layout (understandably) scored higher in the domain of pedestrianism. The highest scores in the domains of attachment and identity were quite similar (green, overall design quality of the houses and architectural style), which confirms their connection to the same spirit of place. In the attachment domain, there was also appreciation for the diversity of housing styles, in the neighbourhood where this occurred. Finally, in all domains the overall layout ranked high. People did not seem to care much about garage location, on-street parking, lot size and block size, although this last one did score higher on social interaction (Kim & Kaplan, 2004).

## 5. Conclusion

This article tried to answer the questions How do people experience place and which characteristics do they appreciate? Because little research has been done into the influence of physical characteristics on the sense of place and sense of community, this article may have remained somewhat superficial. There are not many sources that can refute or confirm what Steele and Kim and Kaplan have to say. That is the biggest shortcoming of this article. Some further research could be useful in that perspective. Furthermore, the results are sometimes somewhat elusive. It appears that there is no precise answer to the questions raised. On the one hand, people do not even (consciously) perceive the same characteristics in an environment, because of the selectivity of the process of perception and awareness. On the other hand literature showed that the concepts of sense of place and sense of community show a great deal of overlap and even seem to be the same on some points, and it appears they are largely evoked by the same features. It turns out the statement “a lot of low-rise buildings in a green environment” is actually a good start in describing village character, as the natural features are indicated as the most powerful and most appreciated physical characteristics of a setting. The complete list of physical features includes geographic location, boundaries, geographic distinctiveness, scale and proportion and rich images. The presence and activities of people influence the sense of place and sense of community and additionally there are many not so tangible things to consider, such as the fact that the character of people and their history and culture help determine how and what they see and experience in a place and what meaning they give to it. The challenge lies in designing a place with a strong spirit that speaks to everyone while at the same time taking into account and leaving room for people’s own ideas, memories and fantasies. Creating a place that is suitable for necessary and desirable activities, but at the same time invites all kinds of people to use it as they wish, perhaps in new and unforeseen ways, and to make it their own. The next step will be to start designing, exploring how the identified physical characteristics can be configured and fitted into the site with its own challenges, in such a way that they create this spirit of place that people appreciate and thus help build a village that is ready for the future.

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# CHAPTER 3

*Methodology*

# Research methodology

## Introduction

In order to relieve the housing shortage in the Netherlands, approximately 845,000 homes will have to be built by 2030 (K. Gopal, Groenemeijer, L., Van Leeuwen, G, Omtzigt, D. & Faessen, W., 2020). The government has designated the Zuidplaspolder, located in the municipality of Zuidplas, as a development area for the south wing of the Randstad. The municipality wants to preserve the current rural character of the existing villages, since it is highly valued by the residents, by building a new village with the same character in the polder, instead of expanding the existing ones. At the same time they want green zones around the villages and a large green zone to connect the greenery in the region, the green heart of the Randstad. The intention is to limit the amount of houses to 4000 for now. However, there is pressure on the number of houses and the construction of the green zone, mainly because of affordability. There are also calls from outside the municipality for a larger village and a smaller green zone. Therefore, this graduation project will investigate how large a village can be made without losing the desired village character and which also contributes to the ecological values by acting as a link in the regional green and blue infrastructure instead of a barrier.

This chapter explains what the research entails, how it will be approached and why this approach is chosen. After the problem statement the research question and sub-questions are dealt with, as well as the aim pursued by the research. The conceptual framework then shows how the coherence between the concepts from the scientific literature is understood and interpreted and how this is used to drive the research. Then the research approach and methods will be further elaborated, followed by the relevance and limitations of the research. The chapter will be concluded by some ethical considerations and a literature list.

## Problem statement

The municipality of Zuidplas wants to contribute to meeting the housing demand in the south wing of the Randstad, but the wishes for both a rural village atmosphere in the villages and a large green zone in the Zuidplaspolder, limit the number of houses that can be built in the fifth village. However, there is pressure to build more houses than the 4000 that the municipality wants. Because it is not known which factors create the village character or which characteristics cause people to have a positive place experience, it is not known how large the fifth village could be designed while maintaining its village character and being a link in the regional green-blue infrastructure.

## Research question

In order to find a solution to this problem, an answer will be sought to the following research question:

How can the typo-morphological characteristics of a village and the characteristics that evoke a strong positive sense of place and sense of community, be used to design a village of maximum population, while preserving the village character, which also functions as a link in the regional green and blue infrastructure, so that this design can initiate a discussion and inspire a new way of living together of man and nature that is beneficial to both?

This question has been subdivided into sub-questions in order to get a better grip on the different aspects of the problem:

1. What are the typo-morphological characteristics of the Zuidplas villages?
2. How can spatial characteristics influence place experience?
3. How can humans and nature live together in a way that is beneficial for both?
4. What are the target groups for the new village and what do they need?

## Research aims

The purpose of this research is to find a new way of living in a village, in harmony with nature, both in terms of greenery and biodiversity, and in soil conditions and water management, and explore how big a village can become without losing its character. Although research is being done into the characteristics of a village, it is not the intention to design a “traditional” village. The main idea is to design an area where villagers feel good and like to live, rather than to make it look like a traditional village. It is about analysing what it is that people find so attractive about a village and using that knowledge to find a new form that people find just as attractive, but that is much more in harmony with nature, so that it contributes to the sustainability of our living environment.

## Expected research output

The outcome will then be a plan for the fifth village in the Zuidplaspolder. In this polder there are a number of very complex issues, which are taken into account as much as possible in the design. However, it is not possible to produce a design that solves all the problems, within the time set for this thesis. That would also require much more multidisciplinary cooperation. Therefore the main purpose of the final design is to inspire and start a discussion about new directions that can be taken. Next to that a set of general design rules will be derived from the design for this particular village, to make the research outcomes applicable to other locations.

## Conceptual framework

Four main concepts are used in this project. The first is the practical concept of the characteristic typo-morphology of the villages in Zuidplas. The inhabitants value the character of their village very much, so it is useful to investigate how these villages are put together. This knowledge will be the first part of the input for the new village design. The characteristic features of the villages are not adopted one on one in the design of the new village. They are viewed through the lenses of the other three concepts and accordingly weighed and (re-) formulated. The other concepts are from theory. An overview of the theories is shown in Figure 8. The concept of sense of place is investigated in multiple fields. It describes how people relate to their surroundings and the extent to which they are attached to it. The approach in this project is from the field of environmental psychology. Although it is generally thought to be based on meanings alone, Stedman (2003) thinks there may be a

role for the physical environment in sense of place. He finds that the physical environment directly influences place satisfaction. It also influences place attachment, but via meanings. The most direct influence of the physical environment is described by Steele (1981). He finds that the physical characteristics that are important in experiencing sense of place and create spirit of place, are geographic location, boundaries, geographic distinctiveness, scale and proportion and rich imagery. Also the presence of people is an important physical characteristic. All factors taken together: there is a strong sense of place if there is identity, history, fantasy, mystery, joy, surprise, security, vitality or memory. The third concept, sense of community, is also considered from the side of social science. Kim and Kaplan (2004) framed it in four aspects: community attachment, community identity, social interaction and pedestrianism. This greatly overlaps with sense of place, where we find the same aspects attachment and identity and aspects related to social interaction and pedestrianism. It turns out that sense of

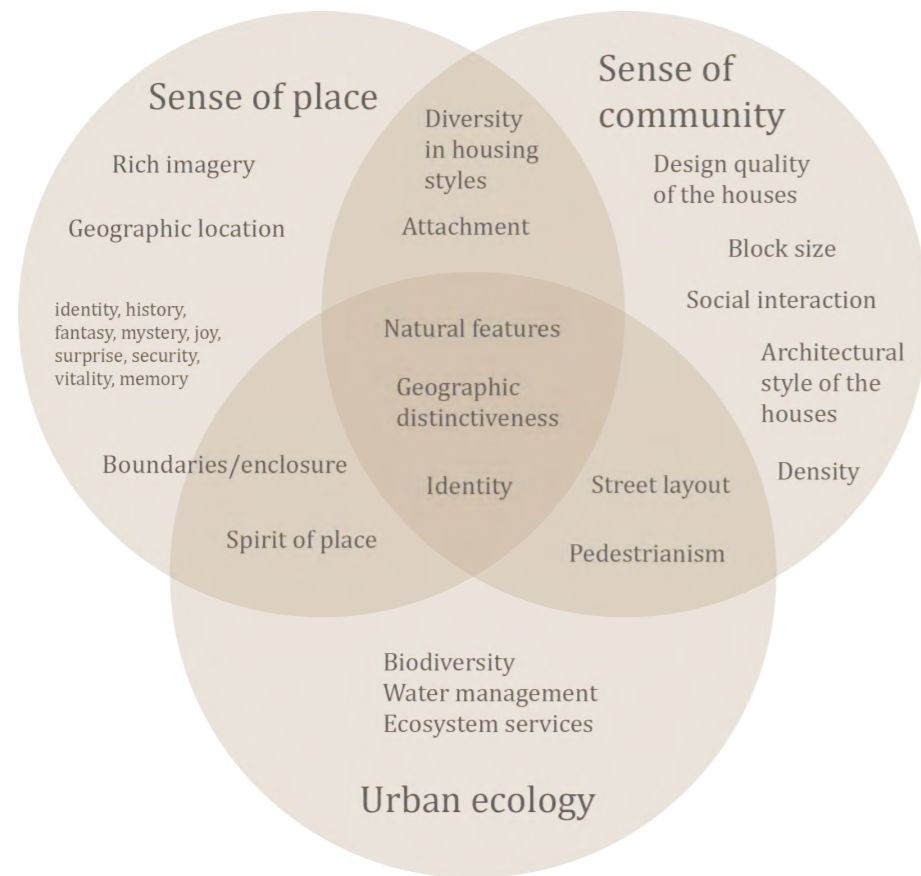


Fig. 8. Overview theories (by author).

community and sense of place are very closely intertwined. The most important features in sense of community are natural features, design quality of the houses and their architectural style, which all contribute to identity and attachment. Block size, street layout and density are more related to social interaction and pedestrianism. With natural features as the most important carrier, both the sense of place and the sense of community are in keeping with the fourth concept, urban ecology. [This aspect has not yet been examined. The primary

objective will be to increase biodiversity and secondary it will be looked at what this means for ecosystem services and how it can be optimised. In addition, it will be examined which other concepts, such as the E-LAUD framework (Kattel, 2013) or ecological land-use complementation (Colding, 2007), could contribute to this project. The information contained in this chapter will be supplemented at a later date.] In the conceptual framework diagram in Figure 9, the relationships between the concepts are visualised.

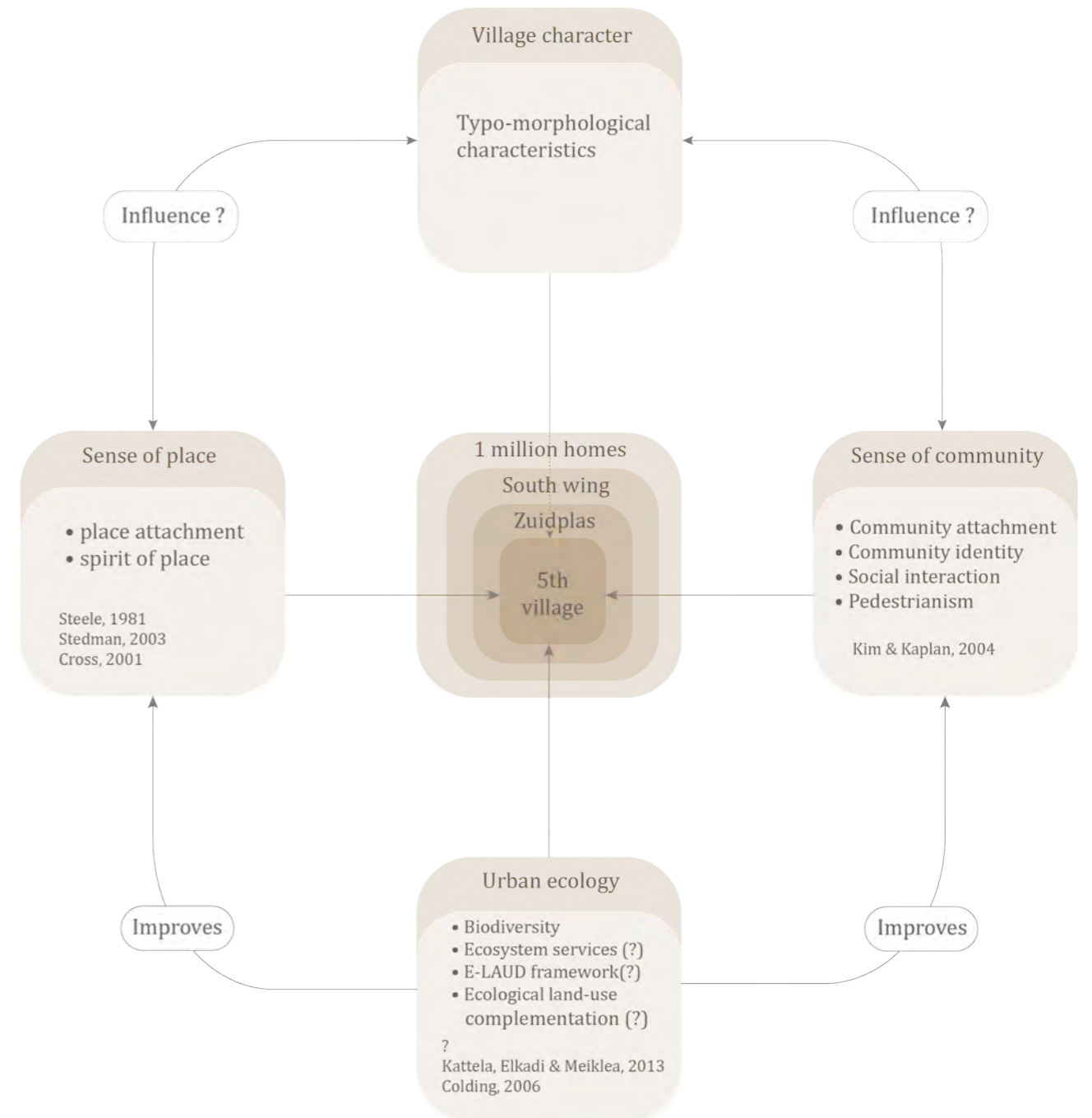


Fig. 9. Conceptual framework diagram (by author)

# Research framework

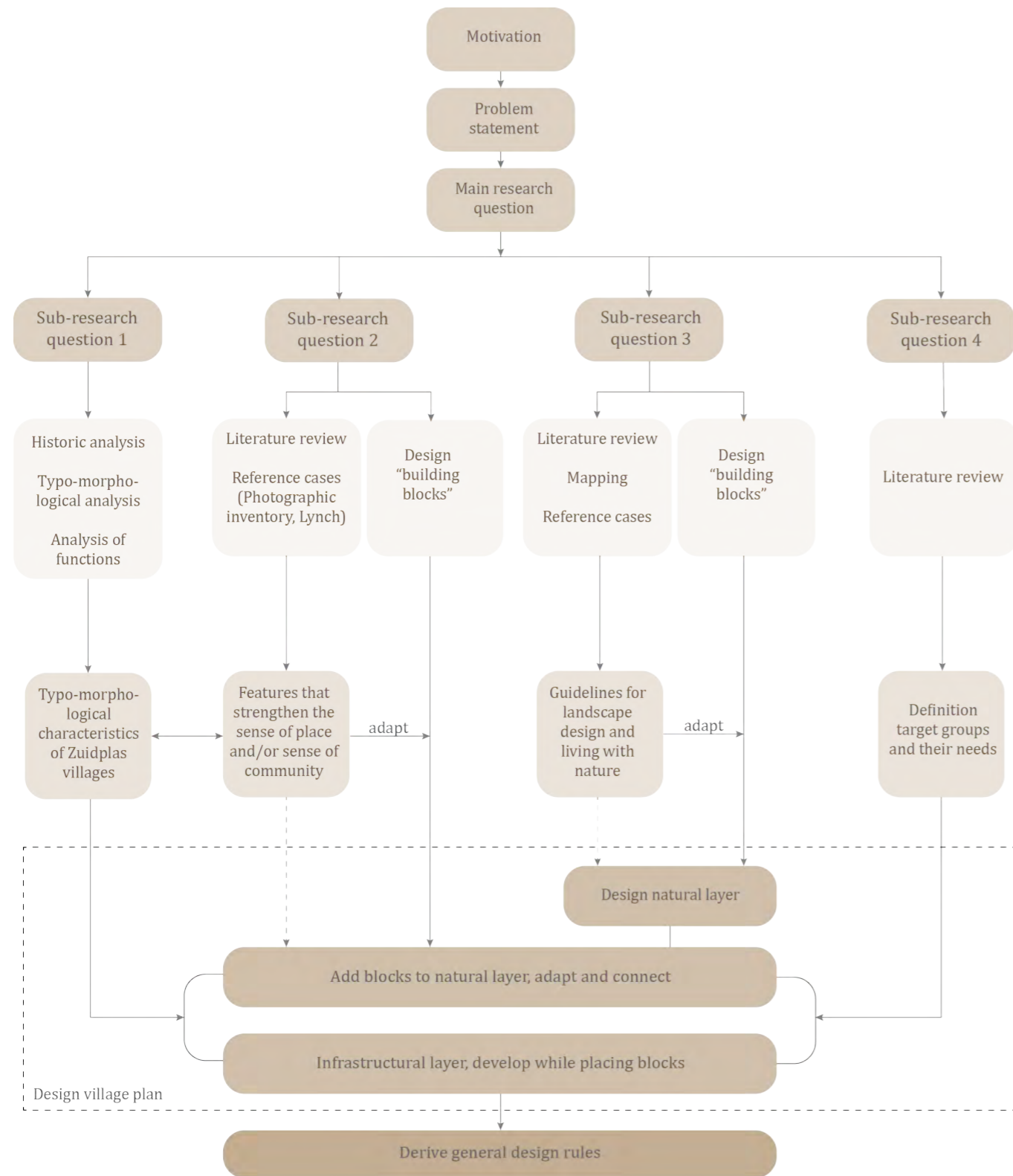


Fig. 10. Research framework diagram (by author)

The research framework explains how the research question is answered. This is done by answering the four sub-questions. Figure 10 shows how this ultimately leads to the design of the new village. However, in order not to get stuck in the many requirements, “building blocks” will be designed earlier. This are spontaneous ideas for parts of the plan, which will later be checked to see if they meet all the requirements and then, if necessary, adapted and put in place. Their location can be determined once the natural layer on the site has been designed, after the analysis of the polder. The infrastructural layer will be developed in conjunction with the placement of the building blocks. In this way, the overall design can be built up.

## Methods

This project is designed as a mixed methods research, coming from a pragmatic world view. The methods used in this project are: literature review, mapping (including QGIS, Spacemate and Space Syntax), photographic inventory, study of reference cases (including Lynch) and research by design. Table 1 gives an overview of the methods per sub-question.

**Sub-question 1** is a quantitative question. This question investigates what a village actually is from a spatial point of view. The literature consists of records of history of the villages, such as old maps, and reports about practical investigations of village types. These will mainly be found online. This will tell something about how these villages got their identity and why certain village types came into being in certain kind of environments. This can help determine what kind of village would fit the environment of the Zuidplaspolder. The mapping will supplement the information on the spatial configuration of the Zuidplaspolder villages. This will help understand what the villages are actually made of. Spacemate will give information about different local densities within a village and how density and the type of buildings are related. Space Syntax reach analysis will show the practical density. What it means to the inhabitants. This will also give some information about walkability as a supplement on the mapping of the kind of paths. A chance analysis will give insight into the hierarchy of the street network. With the photographic inventory will be investigated

what architectural styles are present in the village. All this information could feed the design directly, but in addition to the fact that a village cannot be made out of pieces like a jigsaw puzzle, it could at best create a traditional village. Therefore this information will first be looked at again in sub-questions 2 and 3.

**Sub-question 2** is a mainly qualitative part of the research, although this is debatable. In this part, information is first obtained about the concepts of sense of place and sense of community through a literature study. Although these theories are formed by inductive research methods, doing a literature study is a deductive method. On the basis of these theories, the information obtained in answering sub-questions 1 and 3 is evaluated. It will be examined whether configurations can be recognized that evoke a strong and positive sense of place or how a configuration could be modified to do so better. On the one hand this could be seen as a deductive method, because it is about comparing reality with a theory. On the other hand, the feeling is that it is an inductive method, because investigating what people value is not an exact science. How the assessment turns out could be different for everyone. For this reason, aspects that, according to the literature, are reasonably representative for most people are looked at. The villages that evoke the strongest sense of place (as far as this can be determined) can be further explored and compared using a photographic inventory to capture the best scenes and by using Lynch’s method of the image of the city, which assesses how well people can make a mental image of a place, which contributes to the sense of place (Lynch, 1960). In addition to the Zuidplaspolder villages, a few other reference cases will be studied which seem to do specifically well (or badly) in terms of the sense of place. At the same time, “building blocks” will be designed, which capture the spontaneous design ideas for successful spatial configurations and which can be adapted as knowledge grows.

**Sub-question 3** is mostly quantitative again. It is about the Zuidplaspolder itself instead of the villages. The analysis consists of mapping out what is there, such as the soil conditions, the water system and the infrastructure. Literature research, for the analysis part mainly consisting of reports by or on behalf of the municipality

**Table 1.**  
**Methods per sub-question**

<p><b>Research question:</b> How can typo-morphological characteristics of a village and characteristics that evoke a strong positive sense of place and sense of community, be used to design a village of maximum population, while preserving the village character, which also functions as a link in the regional green and blue infrastructure, so that this design can initiate a discussion and inspire a new way of living together of man and nature that is beneficial to both?</p>			
<p><b>Sub-questions:</b></p>			
1.	What are the typo-morphological characteristics of the Zuidplas villages?	<p><i>Historic analysis</i> literature review, mapping</p> <p><i>Typo-morphological analysis</i> literature review (village types) mapping (pedestrianism, block size, green, street types, spatial configuration, parcellation) (QGIS) + Space Syntax (density) Spacemate (density/building types) Photographic inventory (architectural style)</p> <p><i>Analysis functions:</i> mapping (QGIS)</p>	
2.	How can spatial characteristics influence place experience?	<p>Research by design</p> <p>Reference cases (photographic inventory, Lynch)</p> <p>Literature review</p>	
3.	How can humans and nature live together in a way that is beneficial for both?	<p>Research by design</p> <p><i>Analysis polder:</i> Mapping</p> <p>Study reference cases</p> <p>Literature review</p>	
4.	What are the target groups for the new village and what do they need?	Literature review	

Table 1. Methods per sub-question (by author).

and the water board, should show what should remain, such as protected plants, the habitats of endangered species and certain infrastructure, and what is needed to deal sustainably with the specific challenges of the polder. Theoretical literature on urban ecology will provide the knowledge needed to create the synergy between nature and human habitation, which should also lead to more biodiversity. This will be further studied by analysing reference cases of places where this synergy has been achieved with (some) success. Again, building blocks are designed to capture the spontaneous design ideas for successful spatial configurations, this time related to nature and the polder, and which can be adapted as knowledge grows. Because design is personal and never free of influence from the designer's world view, and because the aim is to design a place valued by people, which is subjective, this is an inductive method, although adaptation with increasing knowledge would be more deductive.

**Sub-question 4** is also a predominantly quantitative question. The literature studied will consist of reports such as Primos 2020 (K. Gopal, Groenemeijer, L., Van Leeuwen, G, Omtzigt, D. & Faessen, W., 2020) and the Woonvisie (Housing Vision) (Zuidplas, 2018) with forecasts of the development of the various population groups and their preferences for a residential environment and the development of the housing market. It will make clear for whom this new village should be designed. An inductive method is also needed to answer this question. Because the new village will be a new kind of environment, people will probably not have expressed a literal preference for it. Their preferences will have to be interpreted, whether they fit in with the newly designed environment.

## Summary

In order to meet the still growing demand for housing on the one hand and to preserve and strengthen nature on the other hand, this project tries to find a new way of life, aimed at people with a preference for a rural village environment, in search of synergy between the natural landscape, biodiversity and human habitation. It will investigate how densely populated the new village can be without losing its character. The research is based

on the theoretical concepts of sense of place, sense of community and urban ecology and on the typo-morphological characteristics of the Zuidplas villages. It has been set up as a mixed methods research. Using deductive methods, it analyses what makes a village a village and how the Zuipolder can be inhabited sustainably. Inductive methods are used to evaluate the sense of place evoked by village characteristics and nature and how this can be used and reinforced to provide a village with a character appreciated by its inhabitants. The next step in developing the framework is to study the literature of urban ecology in order to find the most suitable concepts for this project. On the basis of this, further methods can be selected.

## Relevance and ethical considerations

Getting to grips with the village character makes it possible to offer people who prefer this character a pleasant living environment and at the same time to better meet the demand for housing, both in Zuidplas and elsewhere, and make new plans better affordable. Although the Randstad is often perceived as one big urbanized area, there are actually a lot of small and medium size villages in between the larger cities. When it is known how certain spatial features influence how the character of the place is perceived, this can also be used to design places with a different character when there is a need for it, for instance to make immigrants feel more at ease, or to preserve character in cases of shrinkage or expansion of existing settlements. This ties in with the need for social and spatial justice. Everyone deserves a nice place to live, regardless of income, origin or any other distinction, but it is not easy to achieve. If it is possible to build more houses without losing the village character, this will improve affordability.

By building a sense of community, differences can be overcome more easily. The right physical characteristics can create both a sense of community and privacy (Kim & Kaplan, 2004), which can help people to live together in harmony. So knowing how to build an identity and a community is very useful for every development, urban or rural, especially in an attempt to mix people from different backgrounds. It contributes to the sense of

place, which in turn makes people feel happy and secure (Steele, 1981). On top of that people are more inclined to care for places with a high sense of place (Najafi & Shariff, 2011).

The green link can contribute to biodiversity and become a refuge for urban dwellers. A green zone is often the final part of a project that should not or cannot cost too much. Such a planned zone often becomes smaller and smaller as the plans progress. This is prevented by setting up the entire area as a green zone, in which people also live. The knowledge on how to realise this link can be of great value in the debate on whether or not to preserve open space, such as the Green Heart. This in turn could become even more relevant if Covid-19 were to create a new paradigm in which working from home is the norm. Then more people would be able to move from the Randstad. The new village could serve as a model for new villages or expansions in the less densely populated provinces.

There is also an ethical issue with this however, as already mentioned earlier in the motivation. Do we have a right to want to live in a green village, that takes up so much more space than a compact city? It sometimes seems a little greedy, but on the other hand, it is also a trade-off. You don't have all the facilities at your fingertips. Of course there are more differences between the village and the city, but what is actually an advantage or disadvantage differs from person to person and also changes from different perspectives. For example, if the villagers are healthier because of the green surroundings, it is unfair that people in the city are less healthy, or it is unfair that they still want to live in the city, despite the fact that it costs society more in terms of health care? It would be valuable to find a balance in this, so that it feels fair to both village and city dwellers.

## Research limitations

The main limitation of this research is time. So much research has already been done, that the literature studied will only form a small part of what is there. An effort has been made to select the most appropriate literature.

On top of that, as indicated in the research goal, the Zuidplaspolder has far too complex issues to solve within this thesis, the most important of which are water control, subsidence and CO2 emissions. As a result, the design will not be "ready to build". Therefore, it will serve to inspire and initiate a discussion about a new way of living together with nature. In order to be able to do this, the design should of course not be too far removed from the realistic possibilities. That is why they will be explored as well as possible within the given time.

Perhaps not a limitation, but an issue to be aware of, is the assumption that has been made that the preference of villagers for life in a rural village environment is based on their satisfaction with and attachment to their own village. This seems a safe assumption, but if people are not currently living in the environment of their preference, for instance for financial or pragmatic reasons, this can lead to a distorted picture. A way around this is to consult the document published by the municipality of Zuidplas with the results of the participation process for the fifth village so far, in which a number of inhabitants of the municipality express their preferences. In this way, it is possible to check whether the results of the research correspond to the actual preferences expressed.

## Timeline

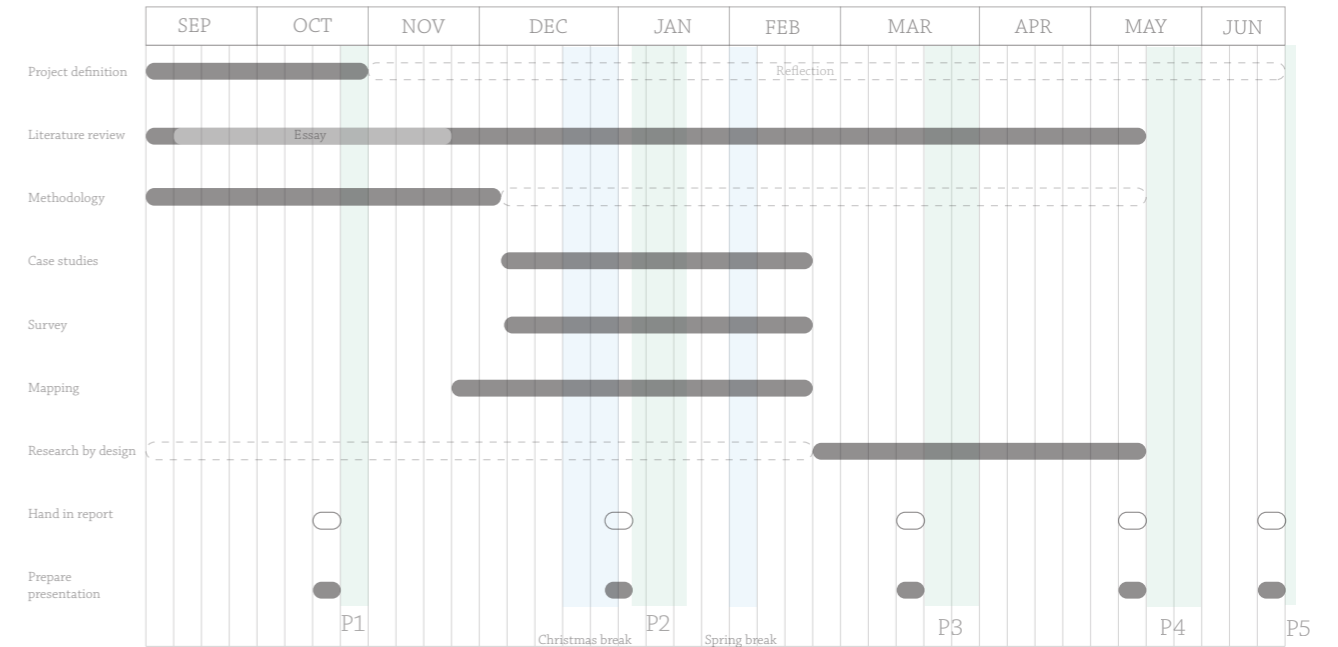


Fig. 11. Timeline

# CHAPTER 4

*Analysis of the Zuidplaspolder*

# Analysis of the Zuidplaspolder

## Historical analysis

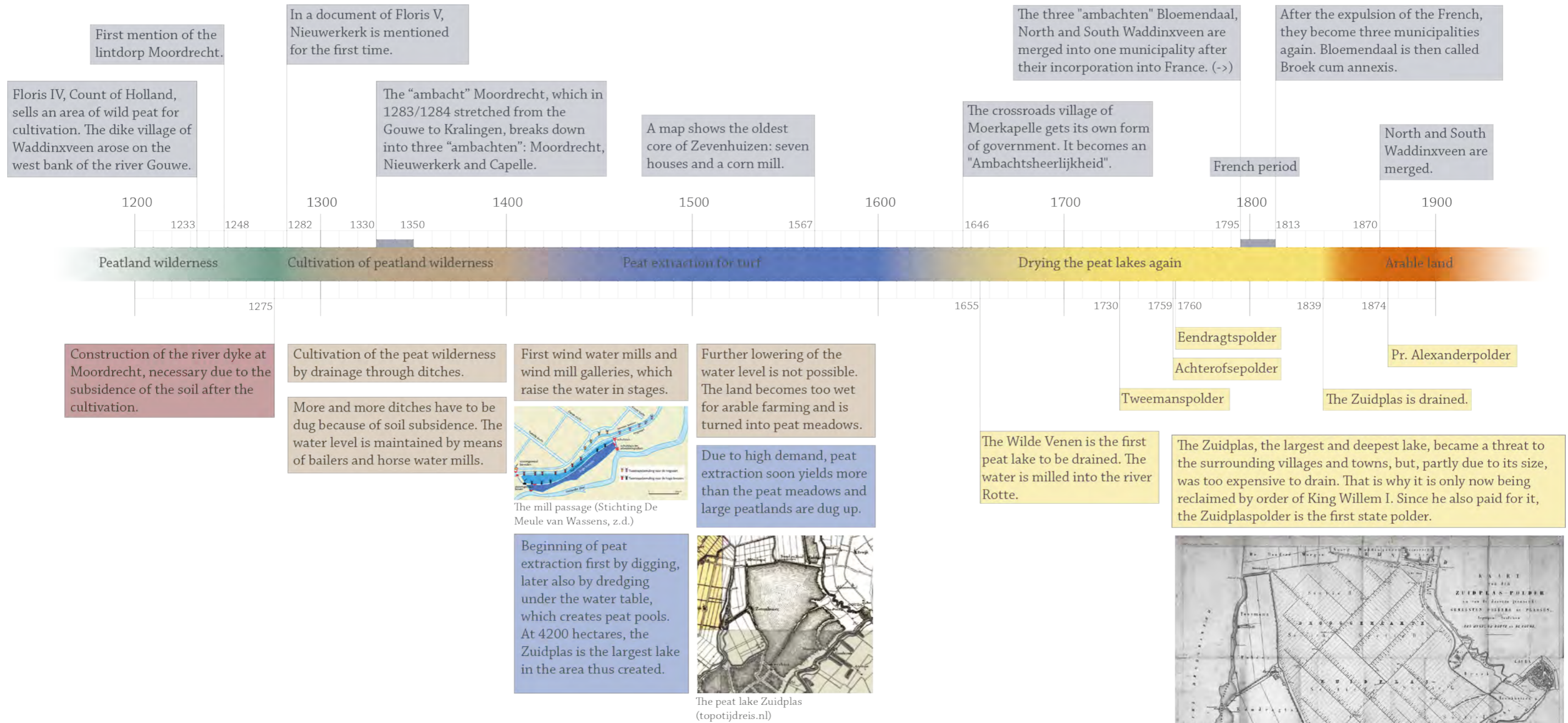


Fig. 12. Timeline of the development of the Zuidplaspolder area (Information source: Mooi Zuidplas.nl)

Before the first reclamation, the area was an extensive peat wilderness. It was a marshy area with forests, especially birches, alders and willows. The first habitation in the area was on the high sand and clay ridges along the rivers Hollandse IJssel and Rotte. Because more agricultural land was needed, the wilderness was cultivated. Ditches were dug so that the water could flow from the higher peatlands to the rivers. The many ditches at right angles to the river led to the formation of narrow plots. Dewatering caused subsidence, so that more and more ditches were needed. Dikes were built and the water in the resulting polders was initially maintained with bailers and horse water mills. Later, wind water mills were built and mill galleries were used, which brought the water up in stages. Eventually, the water level could no longer be kept low enough and the farmland was turned into peat meadows. From the fifteenth century on, peat extraction also began, and due to the great demand for peat, this soon yielded more than the peat meadows and large peatlands were dug up. This resulted in large peat lakes. The peat lakes were divided by elevated small roads with residential areas connected to them. These were spared and are now like higher islands in the area. This also includes the current villages. The Kleine Nespolder, the polder Esse, Gans- en Blaardorp and the Oostpolder have not been excavated ("Geschiedenis van het landschap," 2020).

## Drainage of the Zuidplas

Because the large Zuidplas posed a risk of flooding for Gouda and the surrounding villages, there had been plans to drain it from 1700 onwards, but it always turned out to be too expensive. In 1816 King William I declared himself willing to bear the costs. He commissioned J.A. Beijerinck to carry out the drainage in 1825. First the ring canal and the ring dike were constructed in 1828. Then, with the help of thirty windmills and two steam pumping stations, the Zuidplaspolder was reclaimed. The water from the lake was poured into the ring canal by nine windmills



Fig. 13. The mill passage between Moordrecht and Kortenoord (Stichting De Meule van Wassens, z.d.)



Fig. 14. Plan for the drained Zuidplaspolder (Door Rijksdienst voor het Cultureel Erfgoed, CC BY-SA 4.0Wiki, 2013)

near Waddinxveen and nine windmills between Moordrecht and Kortenoord. From there, the water was poured into the Hollandse IJssel in two stages, via the low and high basins, by twelve mills and the two steam pumping stations ("Drooglegging van de Zuidplas," 2019). Figure 13 shows the mill passage between Moordrecht and Kortenoord (Stichting De Meule van Wassens, z.d.).

After the reclamation there were ditches every 800 metres. The plots were 40 metres wide and 780 metres long. Figure 14 shows this plan (Door Rijksdienst voor het Cultureel Erfgoed, CC BY-SA 4.0Wiki, 2013). The entire network is oriented on the line between the church towers of Moordrecht and Moerkapelle. The Middelweg/Bredeweg is still situated on this line. Figures 15 shows the aerial picture of the polder (topotijdreis.nl). If one superimposes the 1850 map of the Zuidplaspolder over the aerial photograph of today's Zuidplaspolder, as shown in figure 16, it shows that plots have been merged, but the main layout of the polder and

the orientation of the parcelling does not seem to have changed much.

The mills were able to keep the polder dry, but the water level was too high. That is why the steam pumping stations were improved and converted. In 1876 they were replaced. In 1970 these pumping stations were also replaced by the Abraham Kroes pumping station. These are actually two pumping stations in one building. One pumps the polder water directly to the river, without first going into the ring canal. The other pumps the polder water from the ring canal to the river.

Comparison of the aerial photo and the old plan to see what is left of the original plan for the Zuidplaspolder:



Fig. 15. Aerial picture of the Zuidplaspolder (Google maps)



Fig. 16. Aerial picture of the Zuidplaspolder (Google maps) with overlay of the 1850 plan of the drained Zuidplaspolder (see fig.14).

## Development of the villages around the Zuidplas

This section examines the villages in the Zuidplaspolder, using the characteristics described in la4sale's *Kleine Kernen Kookboek* (Timmermans, Godefroy, De Groot, & Van Os, 2002). This book is about villages in North Holland, but the structure can also serve well for the villages in the Zuidplaspolder. They explain that villages have a number of general characteristics that make them a village. In addition, villages in the same area often have some similar characteristics. They belong to a family. Finally, each village has its own unique characteristics. All these features together give a village its identity.

There are no maps available of the villages from the time they were founded. The first maps from around 1815 only show the villages as icons. From about 1870 the villages are realistically represented on the map. From the history

from then on, the family traits of the villages can be traced. They include the following features: origin, landscape relationship (land or water), whether it is a farming or civilian village, and the carrier of the village's structure (Timmermans et al., 2002). There is a problem, however, with villages and their landscape relationship. It is the introduction of the generic neighbourhood in the mid-1990s. La4sale argues that this is an urban form of housing that is spatially introverted and does not relate to its surroundings, thus detracting from the rural core. Many village extensions are also taking place at the moment. Moerkapelle is growing into the polder in the north, but the other villages are expanding into the Zuidplaspolder. Nieuwerkerk aan den IJssel, Moordrecht, Zevenhuizen and Moerkapelle, together with two other hamlets, have formed the municipality of Zuidplas since 2010.

## Waddinxveen (not in municipality of Zuidplas)

Waddinxveen was a rough area along the river Gouwe. The dike village (South Waddinxveen) was founded on the west bank of the river (fig. 17). The area was reclaimed for agriculture. Due to drainage, it sank and became too swampy. Therefore, in the fifteenth century, people switched to cattle breeding. In 1870, the current municipality of Waddinxveen was formed by merging North and South Waddinxveen. Fig. 19 shows how it developed over time. From 1945, the village expanded rapidly by building generic neighbourhoods (fig. 18). The original village on the west bank is completely enclosed by them and no longer relates to the landscape. This is what la4sale calls an asphyxiated core. Only the ribbon to the north-west still has a relationship with the land. The old core is still on the river. After 1870, the wood and paper industries were of particular economic importance. The paper industry is no longer there, but Waddinxveen's wood and furniture industry still exists. On 13 October 2020, Waddinxveen reached the threshold of 30,000 inhabitants (Waddinxveen, 2020), many of whom are commuters.

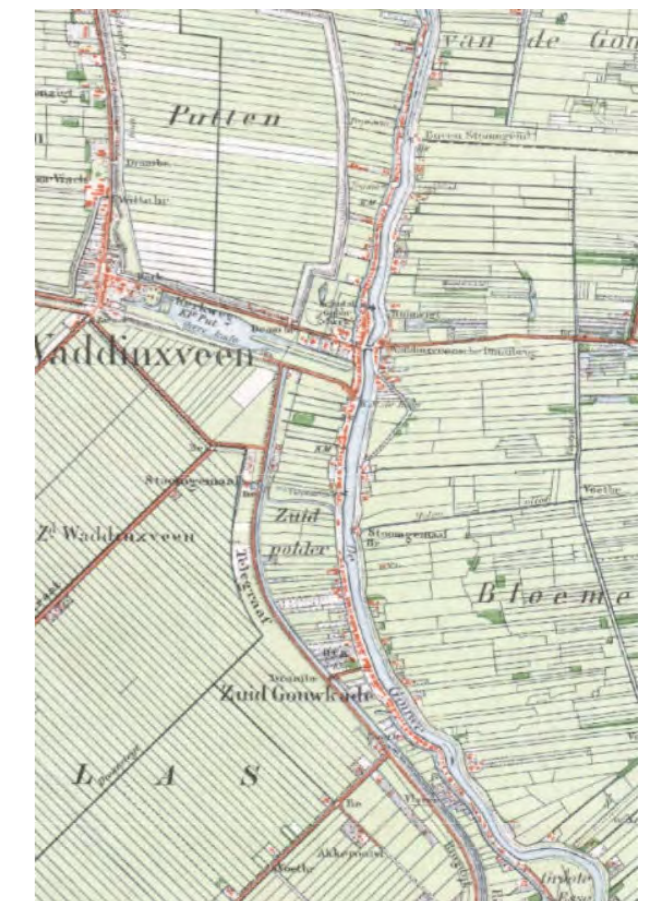


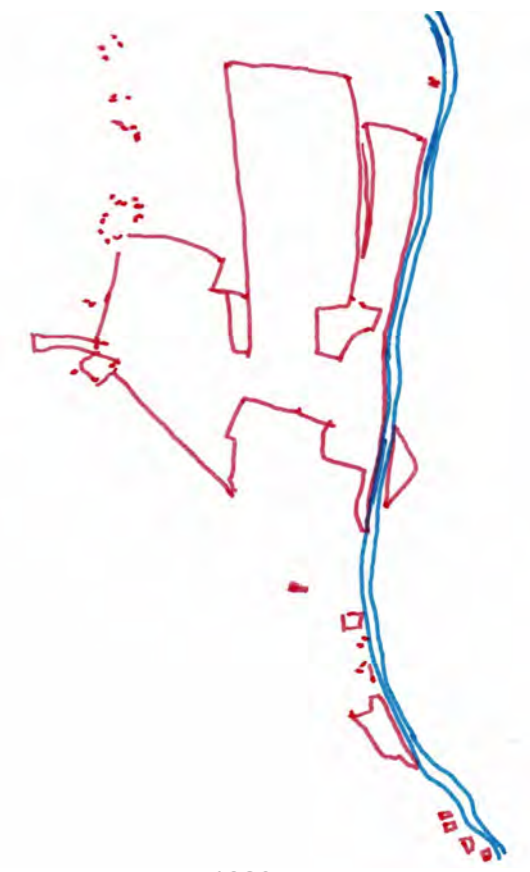
Fig 17. Waddinxveen on the west bank of the river Gouwe in 1900. Source: Topotijdreis.nl



Fig. 18. Year of construction of buildings in Waddinxveen.  
Source: kaart.edugis.nl



1960



1980



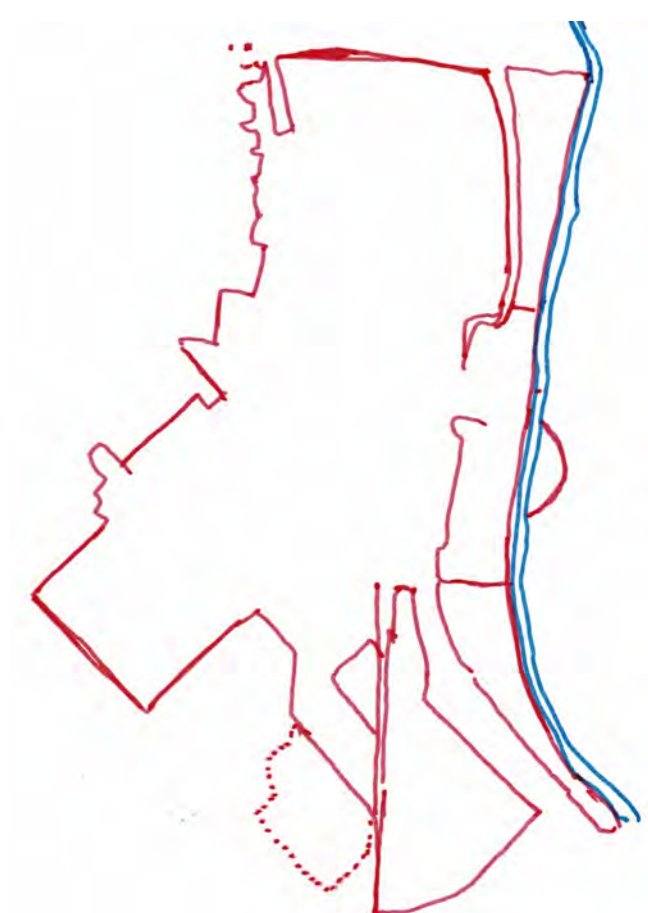
1870



1900



2010



2020

Fig. 19. Development Waddinxveen.

## Moordrecht

The ribbon settlement Moordrecht was founded on a crossing of the IJssel (fig. 20) in connection with the reclamation of the peat. The dike was constructed later, when the land began to subside too much due to drainage. When this made farming no longer possible, people switched to cutting peat. This eventually led to the formation of the large Zuidplas. During this time, the shipping and shipbuilding industry flourished, until most of the peat was gone around 1790. After drainage of the Zuidplas in 1839, the polder was again used for agriculture. In the meantime, there had also been industrial activity in the form of the manufacture of ijssel bricks and rope, wool combing and linen bleaching, but the character remained mainly agricultural. In addition, Moordrecht was a stopping place on the Gouda-Rotterdam route and had a ferry connection with Gouderak on the other side of the IJssel. Fig. 22 shows how the village developed since 1870. In Moordrecht, the construction of generic neighbourhoods started around 1960, as shown in fig. 21. The core still has a connection with the water, but the village as a whole no longer has any relationship with the landscape. This too is an asphyxiated core. On 1 January 2020, Moordrecht had 8,730 inhabitants (CBS, 2020).



Fig. 20. Moordrecht at the crossing of the Hollandse IJssel. Source: Topotijdreis.nl



Fig. 21. Year of construction of buildings in Moordrecht. Source: kaart.edugis.nl

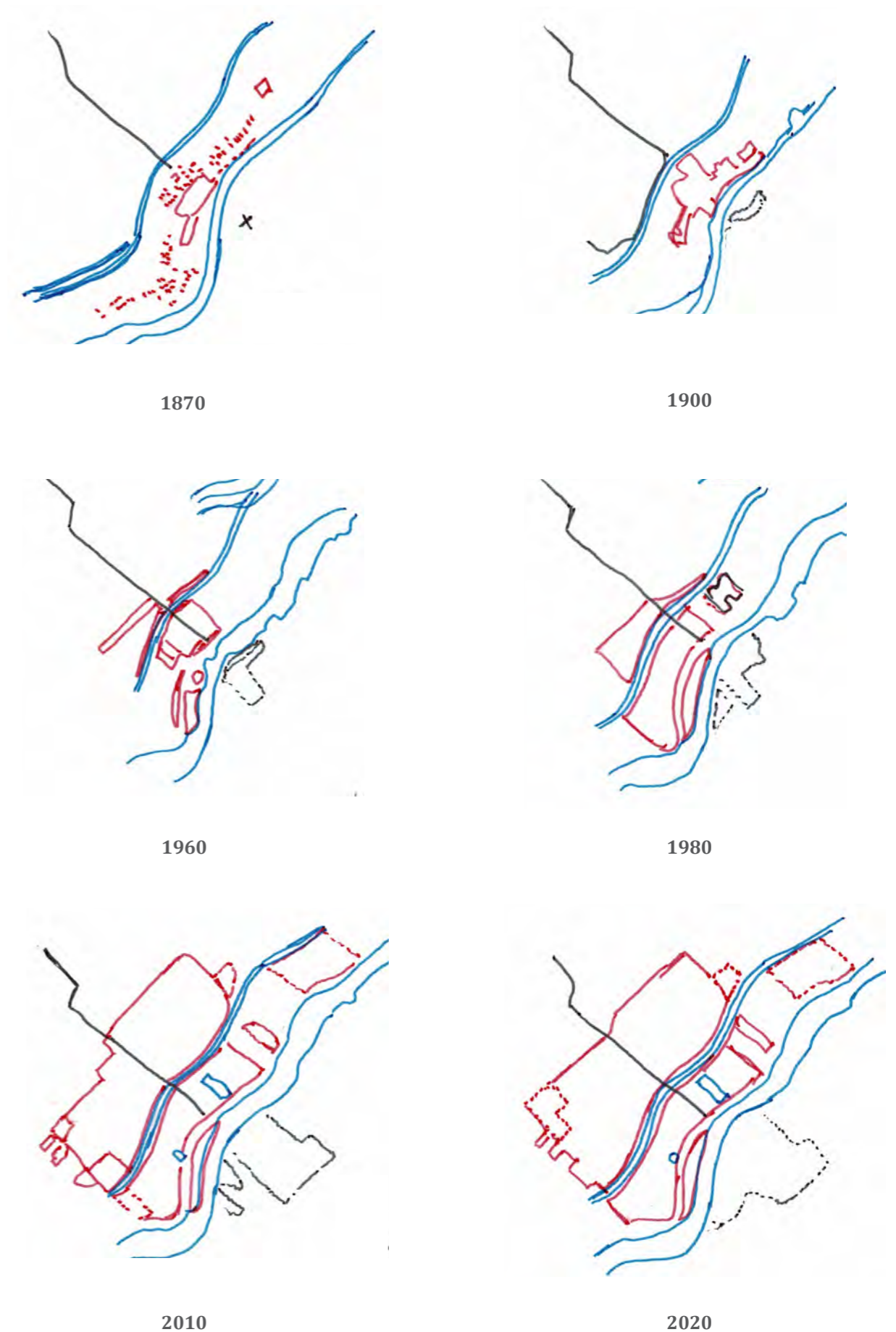


Fig. 22. Development Moordrecht.

## Nieuwerkerk aan den IJssel

The dike village of Nieuwerkerk aan den IJssel was founded on an old bank near the Hollandse IJssel (fig. 23). The 's-Gravenweg was the most important building axis, with the Kerklaan at right angles to it. Originally, the population lived from fishing and hunting. After that, peat extraction became the most important source of income. This gave the village a second core: the old village. Due to the lakes that were created by digging the peat, this core came to lie on a peat island. After the Zuidpolder was drained in 1839 and the Alexanderpolder in 1874, the village became surrounded by fertile ground. This made it an agricultural village with first cattle breeding and later horticulture. In 1855, the village was connected to the railway network, which led to rapid population growth. After the Second World War the village grew even faster (fig. 25). The new inhabitants were mostly commuters. The expansions from that time onwards consisted of generic neighbourhoods, which largely suffocated the old core, (fig. 24), disrupting the original relationship with the agricultural land. As of 1 January 2020, Nieuwerkerk aan den IJssel had 21,795 inhabitants (CBS, 2020).



Fig. 23. The two cores of Nieuwerkerk aan den IJssel. Source: Topotijdreis.nl



1870

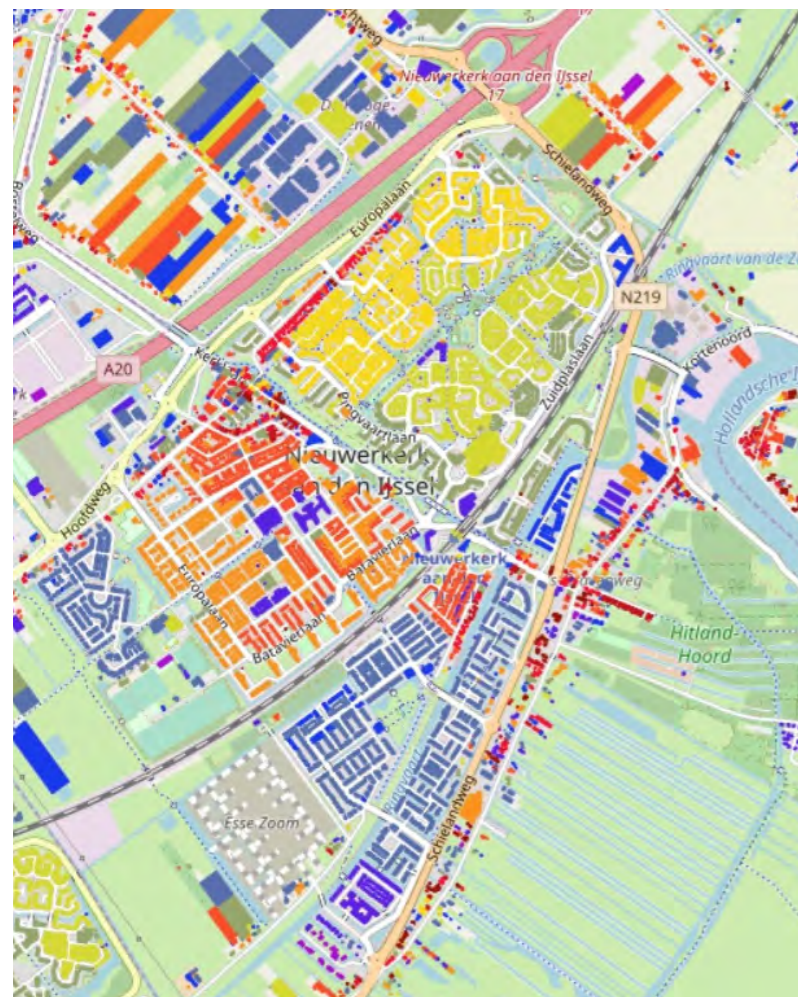
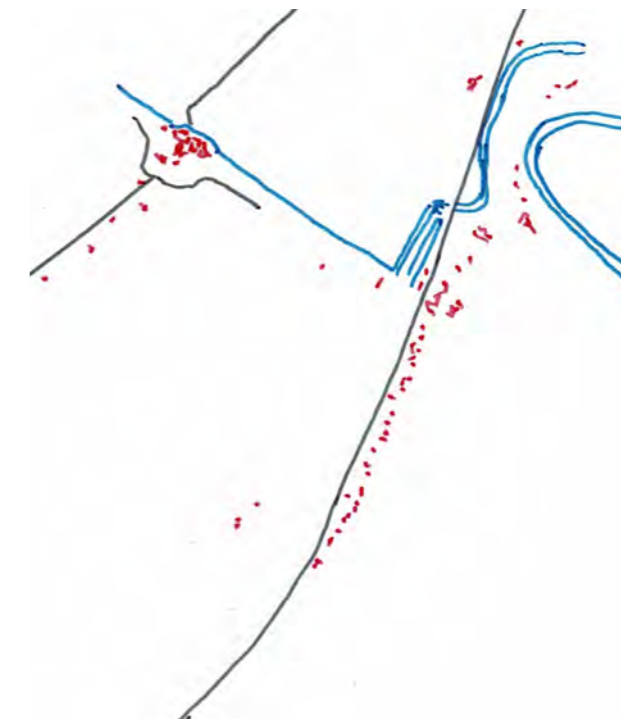


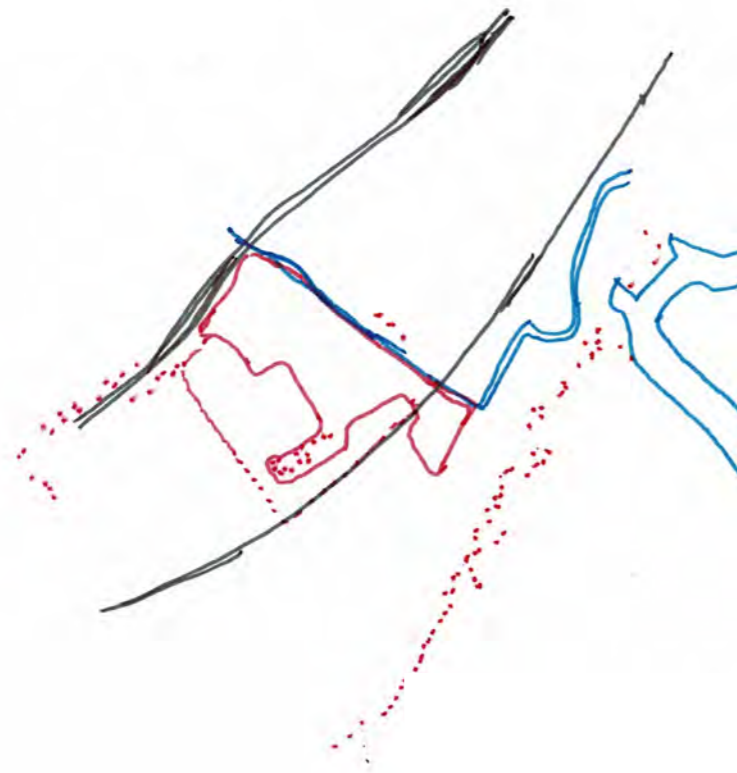
Fig. 24. Year of construction of buildings in Nieuwerkerk aan den IJssel. Source: kaart.edugis.nl



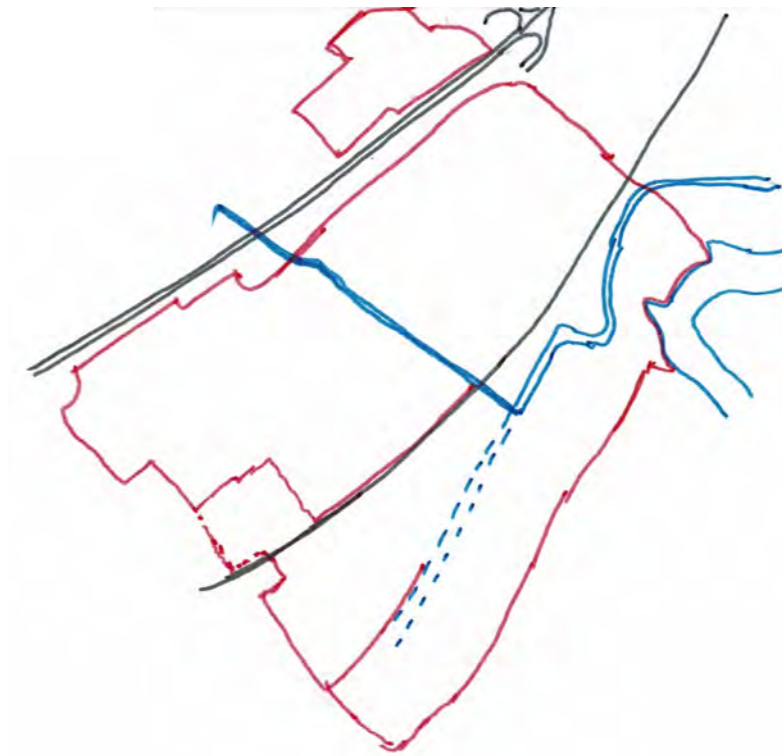
1900



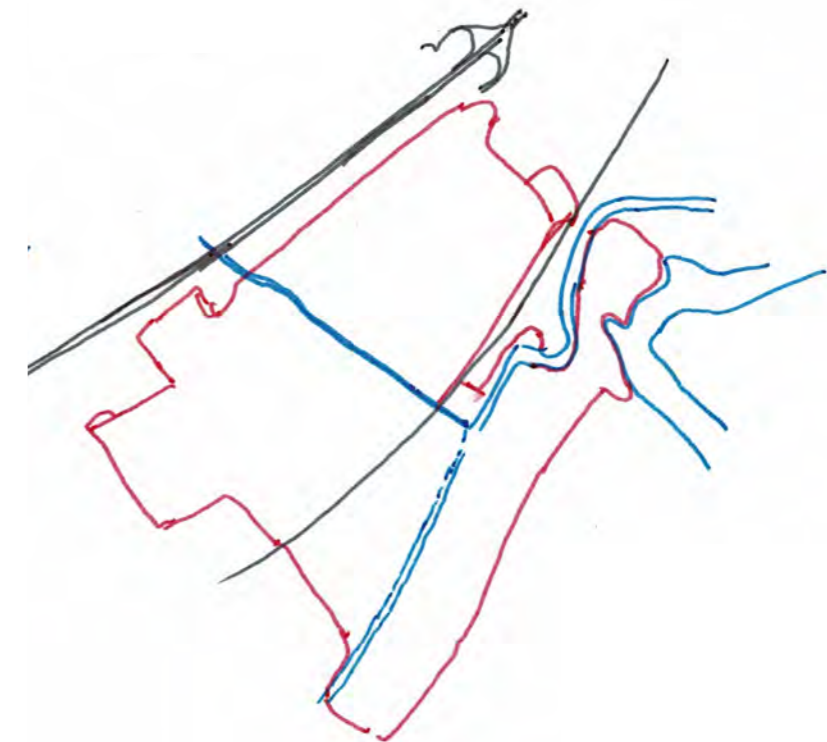
1960



1980



2010



2020

Fig. 25. Development Nieuwerkerk aan den IJssel.

## Zevenhuizen

Zevenhuizen, consisting of seven houses and a corn mill, was originally located on the dike along the Rotte. Due to peat extraction, the current ribbon village of Zevenhuizen (fig. 26) was moved further away from the river and became a peat island. After draining the peat lakes (the Tweemanspolder, Eendragtspolder and the Zuidplaspolder), Zevenhuizen became an agricultural municipality. Here, too, the original core lost its relationship with the landscape as it was encapsulated by generic neighbourhoods, the construction of which began between 1945 and 1965 (fig. 27 and 28). Due to its growth, however, and its location on the A12 motorway, the village is now attractive to commuters. As of 1 January 2020, it had 8,405 inhabitants (CBS, 2020).

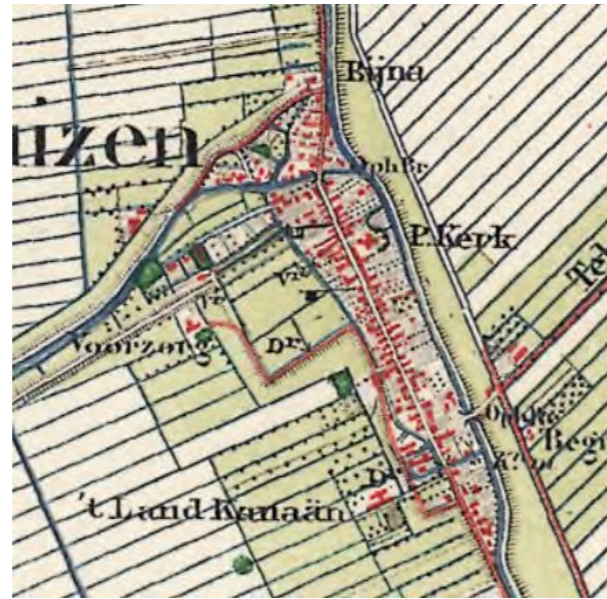


Fig. 26. The new core of Zevenhuizen. Source: Topotijdreis.nl



Fig. 27. Year of construction of buildings in Zevenhuizen. Source: kaart.edugis.nl

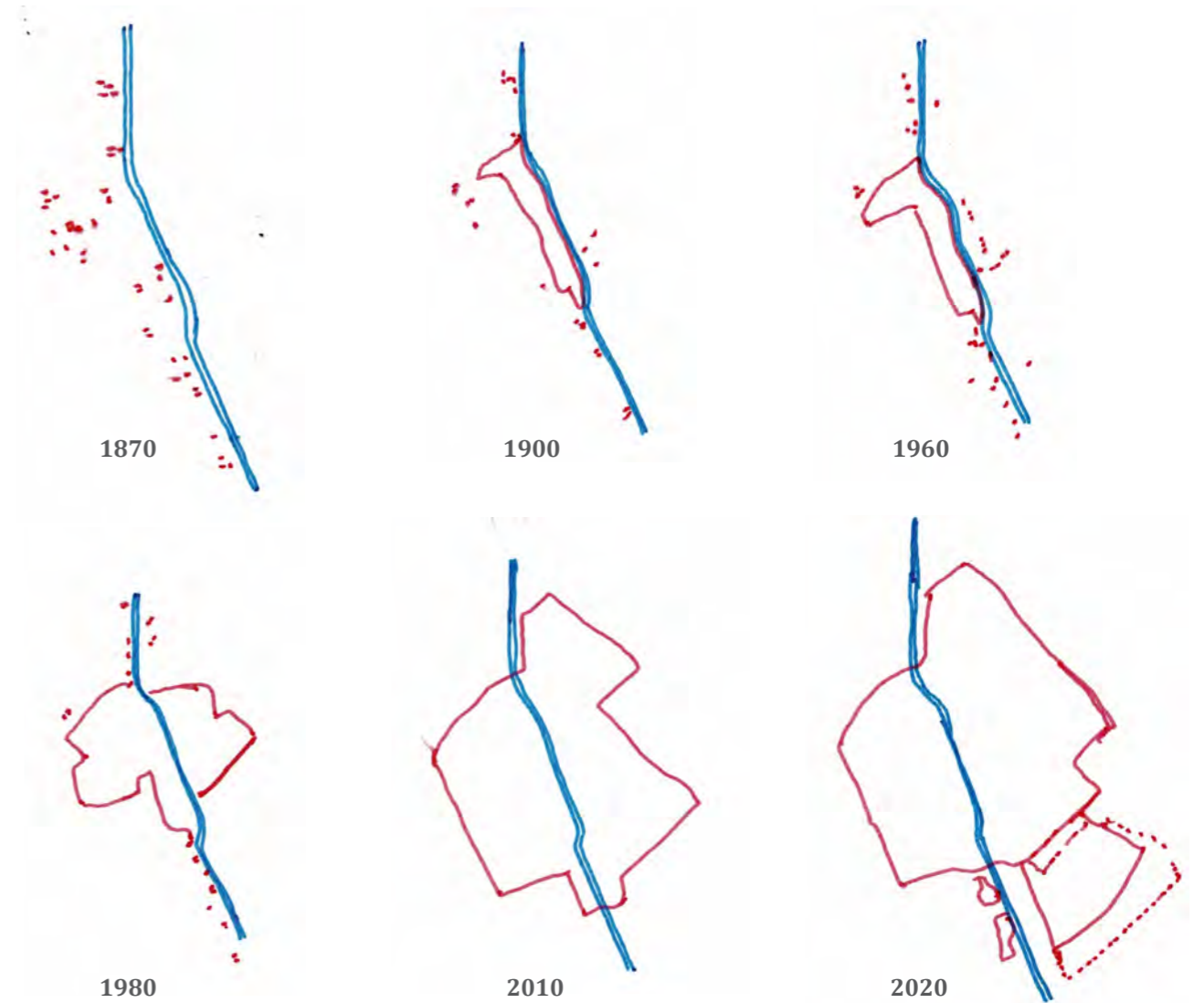


Fig. 28. Development Zevenhuizen.

## Moerkapelle

The youngest village in Zuidplas is Moerkapelle. As can be seen on fig. 29, Moerkapelle was founded on a crossroads. This village also came to lie on a peat island as a result of peat extraction. De Wilde Veenen, north of Moerkapelle, was drained in 1655 and is therefore the oldest drained area in Zuid-Holland. When the Zuidplaspolder was also drained, Moerkapelle became a prosperous agricultural community, because the soil was of very good quality. From 1945-1965, generic neighbourhoods were also built in Moerkapelle on a (relatively) large scale (fig. 30). The core only has some relation with the (agricultural) landscape on the south side. Fig. 31 shows the development over the years. As of 1 January 2020, Moerkapelle had 4,965 inhabitants (CBS, 2020).



Fig. 29. The crossroads in Moerkapelle.



Fig. 30. Year of construction of buildings in Moerkapelle. Source: kaart.edugis.nl

Overall picture of the development of the Zuidplaspolder and the surrounding villages:



Fig. 32. Map of the Zuidplaspolder of 1850 (topotijdreis.nl)



Fig. 33. Map of the Zuidplaspolder of 2020 (topotijdreis.nl)

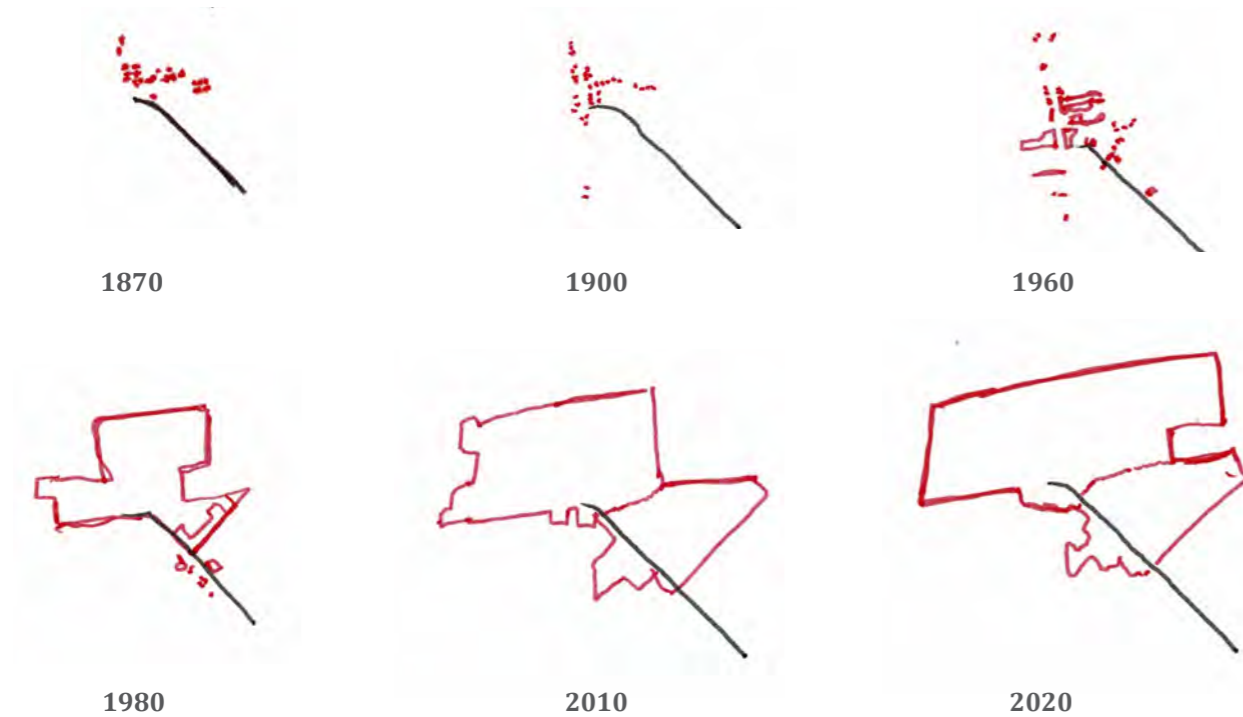


Fig. 31. Development Moerkapelle.

**Table 2**  
**Family traits of the villages**

Village	Origin (founded/evolved/planned)	Landscape relationship (land/water)	Farming/civillian	Carrier structure
Waddinxveen	founded	water, now land	Farm. --> Civ.	River
Moordrecht	founded	water, now land	Farm. --> Civ.	River
Nieuwerkerk aan den IJssel	founded	water, now land	Farm. --> Civ.	River (old bank)/road
Zevenhuizen	founded	water, now land	Farm. --> Civ.	River/road
Moerkapelle	founded	land	Farm. --> Civ.	Crossroads

Table 2. Family traits of the villages around the Zuidplas.

## Conclusion

It appears that all villages, with the exception of Moerkapelle, belong to the same family of ribbon villages founded along a river. Moreover, all villages, including Moerkapelle, were involved in peat extraction and came to lie on

peat lakes. After draining the peat lakes, they all became agricultural communities. Due to the growth with the construction of the new districts, they became mainly civilian, popular with commuters.

## General characteristics of villages

The villages are analysed using la4sale's "small cores cookbook" (Timmermans et al., 2002). After analysing the historical family traits, the general characteristics of villages are now examined. These deal with the individual dwelling, the private land, the backbone of the village, the public space, building on the land as it is, the traffic profile, the mix of functions and core strength. In the family properties, a number of things have already emerged, such

as the backbone of the villages and the fact that all villages have an old core, but are all enclosed by generic housing developments. La4sale conducted this study to investigate how identity can be preserved when a village is expanded. With a new village, there is nothing to build on. Building a "new historic village" with these characteristics would feel very artificial. Therefore, it is good to look at it and see what could be useful for the new village, but it is not discussed in detail.

## The individual house

Village:



In the days when the villages were founded, people built their own houses. As a result, all houses are very clearly individually identifiable and are mostly privately owned.

Non-village:

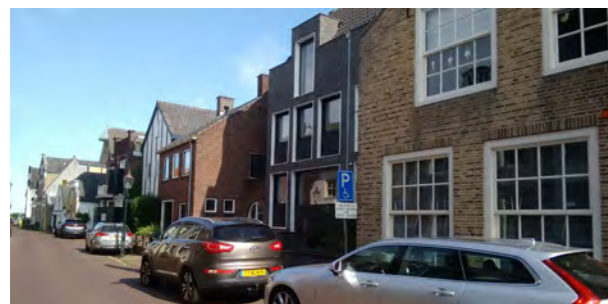


Repeating blocks of terraced houses, urban villas and semi-detached houses. Fig. x shows some examples of this in the villages in the Zuidplaspolder.

Waddinxveen:



Moordrecht:



Nieuwerkerk aan den IJssel:



Zevenhuizen:



Moerkapelle:



Fig. 34. Individual houses and repeating blocks. Source: Google Streetview.

## Private land

Village:



In a village, all dwellings are ground-level and have a large garden or yard, surrounded by a ditch, hedge or gate. It is often the large trees in the front yards of farms that give the village its green appearance.

Non-village:



Houses without private land, such as apartment buildings, urban villas and flats.

Waddinxveen:



Moordrecht:



Nieuwerkerk aan den IJssel:



Zevenhuizen:



Moerkapelle:



The height maps (fig. 35) show that the various villages consist almost entirely of single-family dwellings, often with fairly small gardens. In addition, there are a few low apartment buildings here and there. A few high-rise flats (in yellow) can only be found in Waddinxveen and Nieuwerkerk aan den IJssel.

Fig. 35. Building height. Source: Ahn-viewer.

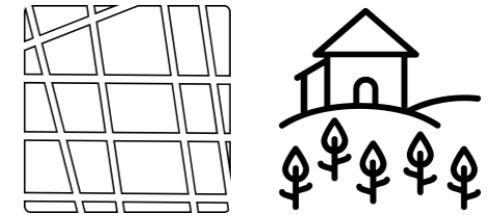
## Backbone from the landscape

Village:



The houses in a village are oriented towards the backbone that comes from the landscape structure on or along which the village has grown, such as a river, a road or a crossroads.

Non-village:



Extensive street fabrics and building "in the wild". What is the backbone of the various villages was discussed in the previous section under family traits.

## Public space

Village:



Villages have little public space. Often, the backbone of the village, such as the village street, is the main public space, where all public activities have to take place. This strengthens the community feeling. There is also little public green space. Usually a few large trees on a square or along the road. The rest of the green appearance is provided by greenery in private gardens and trees in farmyards.

Non-village:

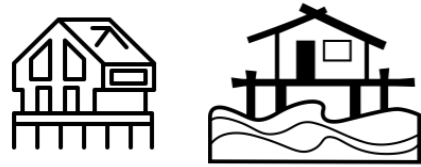


The appearance of many small green areas and parks today is not village-like.

This difference can already be seen in fig. 34 on pages 48 and 49. In Zuidplas, it can be seen that as the villages grow, the village street no longer suffices as the main public space. There is a need for a square for markets and events and more space for larger supermarkets. When there are no events, the square usually serves as a car park, which does not enhance the atmosphere. In Moordrecht, the core was renewed in 2006, while in Moerkapelle a place is now being sought for the expansion of the supermarket. If the village continues to grow, a shopping centre will be built, as in Waddinxveen and Nieuwerkerk aan den IJssel.

## Building on the existing ground

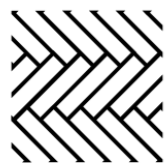
*Village:*



In the past, building was done on the existing subsoil, which meant that villages had a relationship with the landscape and the landscape also provided diversity because building could not take place everywhere, and not everywhere in the same way. Modern techniques make it possible to build with the diversity of the landscape again instead of everywhere in the same way by dumping sand.

## Traffic profile

*Village:*



On the old country roads, the users made allowances for one another: agricultural traffic, cars, cyclists and pedestrians. As traffic increased, the roads were widened and the speed went up. To increase safety, separate bicycle lanes and traffic calming measures were introduced. All this at the expense of the village character and safety. New insights focus on bringing the various traffic flows together again. The original profiles of the village have more character and ultimately also offer more safety, by making the motorist feel like a guest in the village.

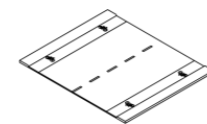
*Non-village:*



Raising the ground with a sand packet, so that everywhere, on wet and dry ground, the same construction takes place.

This characteristic is important to keep in mind when designing the new village. From a certain point onwards, a layer of sand is normally deposited on which to build. However, it does not seem to have much added value to investigate exactly which houses were built on a sand layer and which were not.

*Non-village:*



Wide asphalt lanes with speed bumps, free cycle paths and all kinds of traffic calming measures and signs.



The pictures that have been shown so far already show that there are many brick roads in the villages. However, there are also a few wide asphalt roads, like the ones in these photos. These are mostly through roads and district access roads. There are also some variations, such as wide clinker roads with separate bicycle tracks and narrow asphalt roads with bicycle lanes (fig. 36).



Fig. 36. Asphalt lanes and free cycle paths.  
Source: Google Streetview.

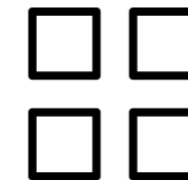
## Mixture of functions

*Village:*



In a village there is great freedom of mixing. All kinds of buildings and functions can be mixed together.

*Non-village:*



Monotonous neighbourhoods, shopping centres and industrial sites.

Fig. 37 shows where the different functions are located in the villages. In the small villages, there is a mixture of functions in the core. In the larger villages, everything is spread a little over the whole village. All villages have mono-functional residential areas and business parks. The two largest villages, Waddinxveen and Nieuwerkerk aan den IJssel, have large shopping centres.

Waddinxveen:



Legend

- |   |   |   |
|---|---|---|
|  Gathering   |  Office      |  Sports   |
|  Health care |  Shops       |  Industry |
|  Education   |  Hospitality |  Lodging  |

Fig. 37a. Distribution of functions. Source: QGIS, data from BAG.

Moordrecht:

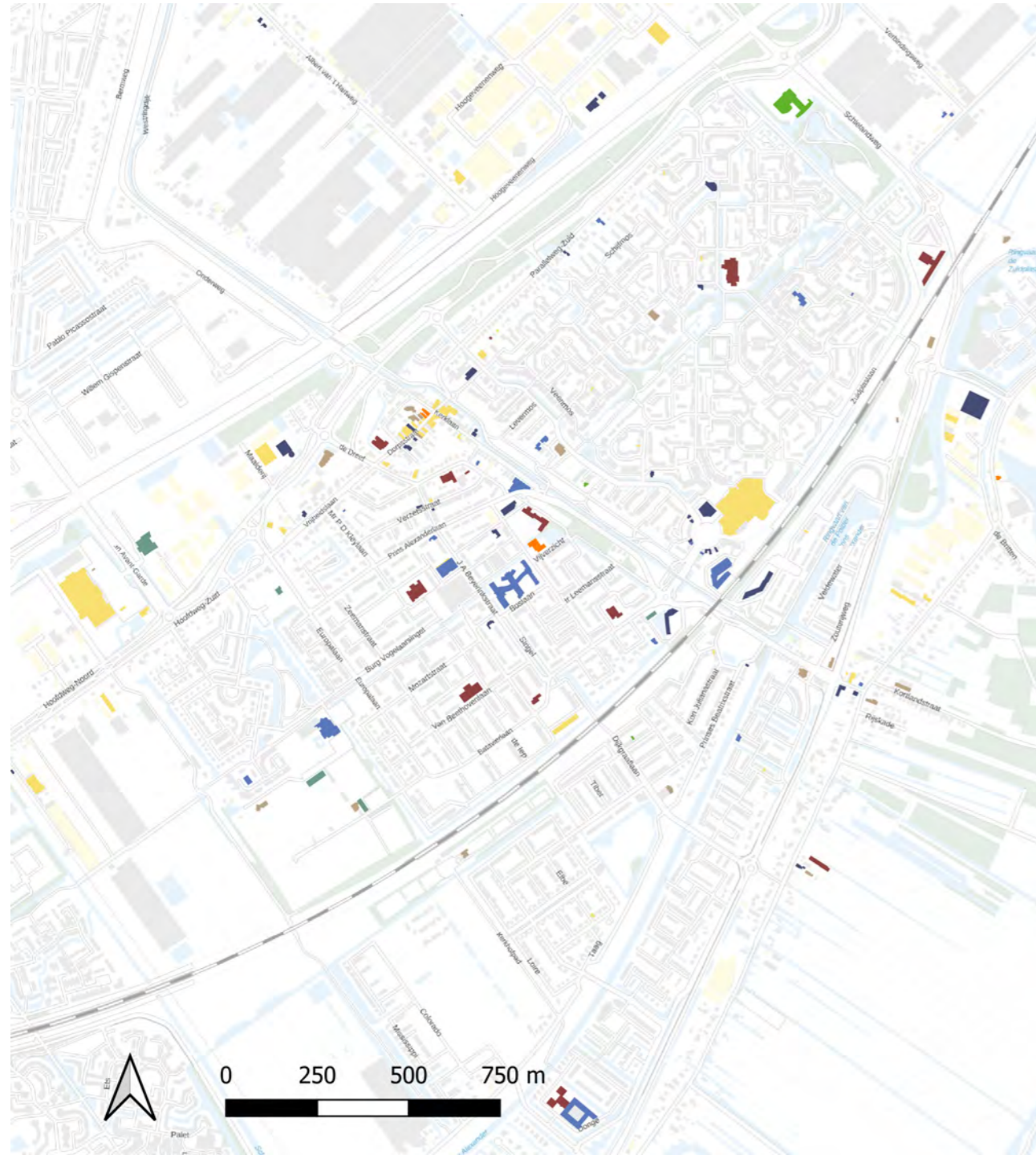


Legend

- |   |   |  |
|---|---|--|
|  Gathering   |  Office      |  Sports   |
|  Health care |  Shops       |  Industry |
|  Education   |  Hospitality |  Lodging  |

Fig. 37b. Distribution of functions. Source: QGIS, data from BAG.

Nieuwerkerk aan den IJssel:



Legend

- |   |   |   |
|---|---|---|
|  Gathering   |  Office      |  Sports   |
|  Health care |  Shops       |  Industry |
|  Education   |  Hospitality |  Lodging  |

Fig. 37c. Distribution of functions. Source: QGIS, data from BAG.

Zevenhuizen:



Legend

- |   |   |  |
|---|---|--|
|  Gathering   |  Office      |  Sports   |
|  Health care |  Shops       |  Industry |
|  Education   |  Hospitality |  Lodging  |

Fig. 37d. Distribution of functions. Source: QGIS, data from BAG.

Moerkapelle:



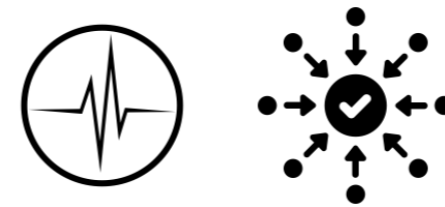
Legend



Fig. 37e. Distribution of functions. Source: QGIS, data from BAG.

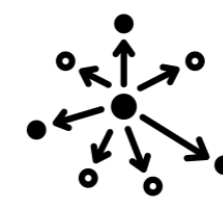
## Core strength

Village:



Core strength is what distinguishes a village from a ribbon, hamlet or other group of houses. It starts with the name of the village and shows itself further in facilities. It gives meaning and makes the community feel connected to the village. To retain this meaning, the core must be kept vital and must grow along with social changes and accommodate new functions, while functions that have become obsolete disappear. Existing functions must be given the chance to adapt. The core strength must remain in proportion to the village.

Non-village:



Relocating functions to a place outside the core.

As already mentioned under public space, with the growth of the villages comes the need for more space for various functions than the centre can offer, so that they are placed outside the centre. (Partly) because of this, the old core loses its vitality, which has led to the impoverishment of the village street in Moordrecht, for example. Also, things that were already outside the centre are placed further outside, such as sports fields, often to make way for housing, which reinforces the mono-functionality.

## Conclusion

According to the principles of la4sale, the villages in the Zuidplaspolder are not really villages anymore. The typical village characteristics can still be found in the historical cores of the villages and still contribute to the identity of the villages, but for most inhabitants, they are not part of the immediate living environment.

This is confirmed by the Rosetta 2020 government housing classification (Overheid.nl), as shown in fig. 38.



Fig. 38. Zuidplas in Rosetta 2020 government housing classification. Source: Overheid.nl



## Successful neighbourhoods

The residents of the villages value their living environment very much, but because the Zuidplas villages are no longer “typical” villages, there must be something else that sparks that feeling. Theory has already shown that the green landscape plays a major role, as do the low-rise buildings. Another important factor is the sense of community. This is confirmed by the opinions expressed in the public participation document (Consultatiedocument, Consultatieronde ter verrijking, versterking en verdieping van de concept-ontwikkelingsvisie Zuidplaspolder 2019).



Research shows that the cauliflower district scores the highest among residents (fig. 39). It is valued for its small scale, cosiness, greenery and variation (Eenink, 2007). The characteristics that are appreciated most, as shown in fig. 40 (Quaedflieg & Mooij, 2013), are:

- cul-de-sac access
  - collective green zone between clusters
  - dwellings around enclosed collective outdoor space
  - small-scale green layout of the neighbourhoods
- or:
- scattered in groups in a shared green area.



Fig. 39. Cauliflower district in Nieuwerkerk aan den IJssel. Source: Google maps.

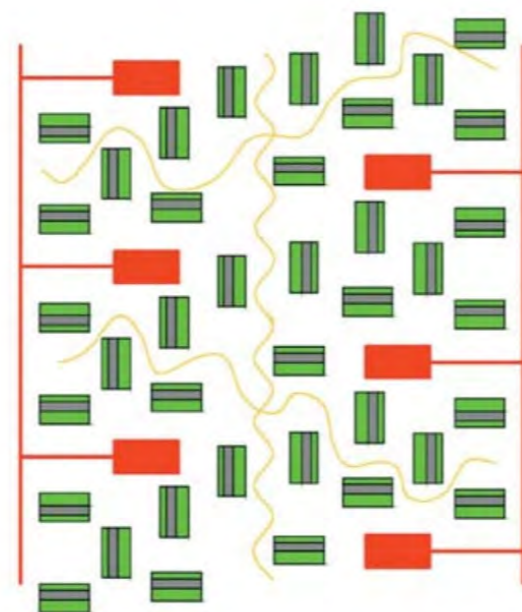
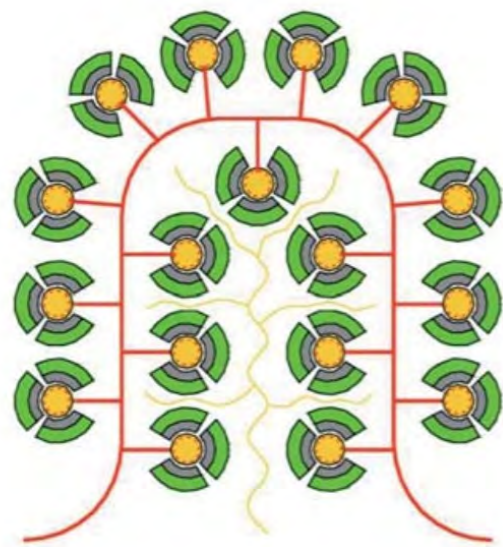


Fig. 40. The characteristics of cauliflower neighbourhoods that are appreciated most. Source: Joris Quaedflieg, Bureau Stedelijke Planning / Bouwfonds & Harald Mooij, TU Delft, 2013

It should be noted, however, that the physical environment alone does not create cohesion. A sense of community is nurtured by social interaction. This can be facilitated by the built environment, but people must be open to it. They also need a reason to go out and meet each other. To this end, it is important that the neighbourhood facilities are suitable for the residents. (Steinvoort, 2011).

A disadvantage of some residential areas, also in cauliflower districts, is that very closed back sides face the public space, sometimes also the front sides of the houses across the street (fig. 41).

In general, closed rear sides, even with gardens on either side of firebreaks, do not make for a pleasant environment (fig. 42). The gardens themselves can be a problem for water management and biodiversity in the neighbourhood, as many gardens nowadays are either completely or to a very large extent paved.



Fig. 41. View of closed rear sides, bordering on public space. Source: Aerial view Moordrecht: Google maps, photographs: by author.



Fig. 42. Backyards on either sides of a firebreak, Moordrecht. Source: Google maps.



# Analysis of the Zuidplaspolder

## Water system

The Zuidplaspolder is managed by the Schieland and Krimpenerwaard Water Board (fig 43 and 44).



Fig. 43. Waterboards (QGIS, data from province of South Holland).

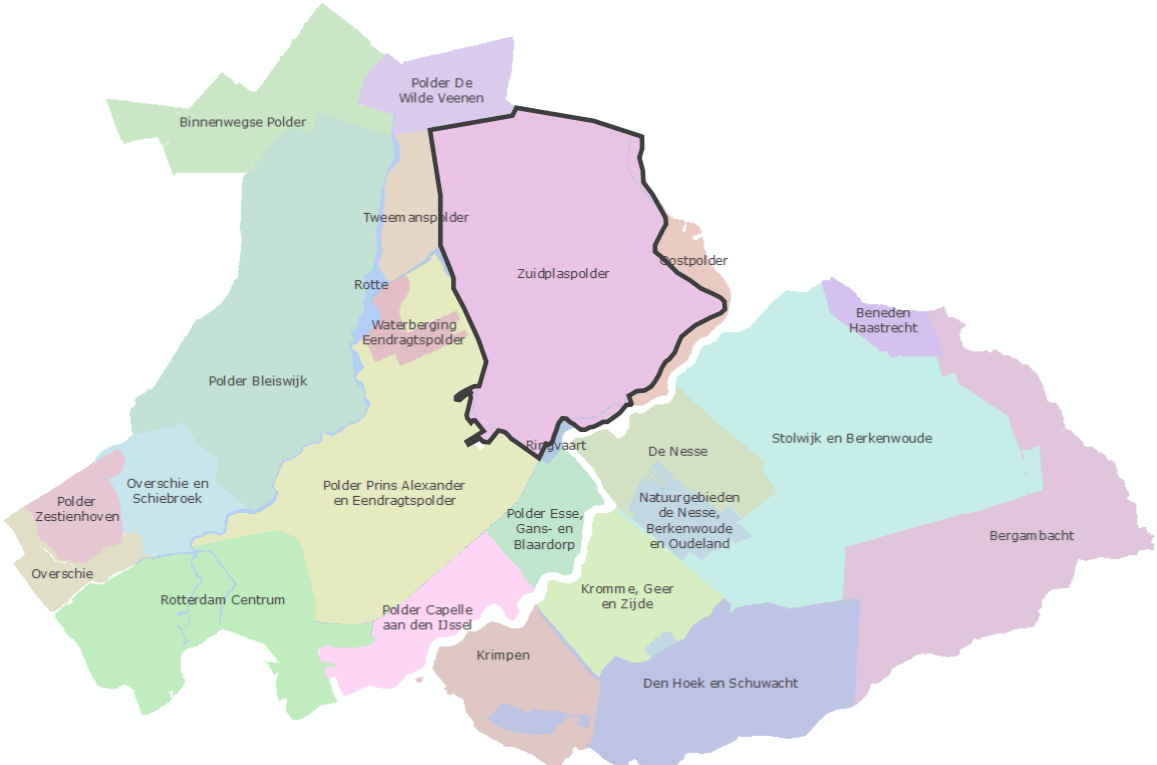


Fig. 44. Location of the Zuidplaspolder (peilbesluiten.png) schielandenkrimpenerwaard.nl)

Traditionally, one of the most important tasks of the water board has been to maintain the water level so that the polder, which has been drained with great effort, does not fill up again. Pumping stations are used to pump the water from the low-lying polder up to the bosom and the river. Sometimes they are also used to let in water, but in the Zuidplaspolder this is done through

a lock (Snelle sluis). Fig. 45 shows where these pumping stations are located and the area they cover. The Abraham Kroes Pumping Station is the main pumping station of the Zuidplaspolder. There are a number of smaller pumping stations in the polder. In addition, weirs and dams are used to regulate the water level in the polder.

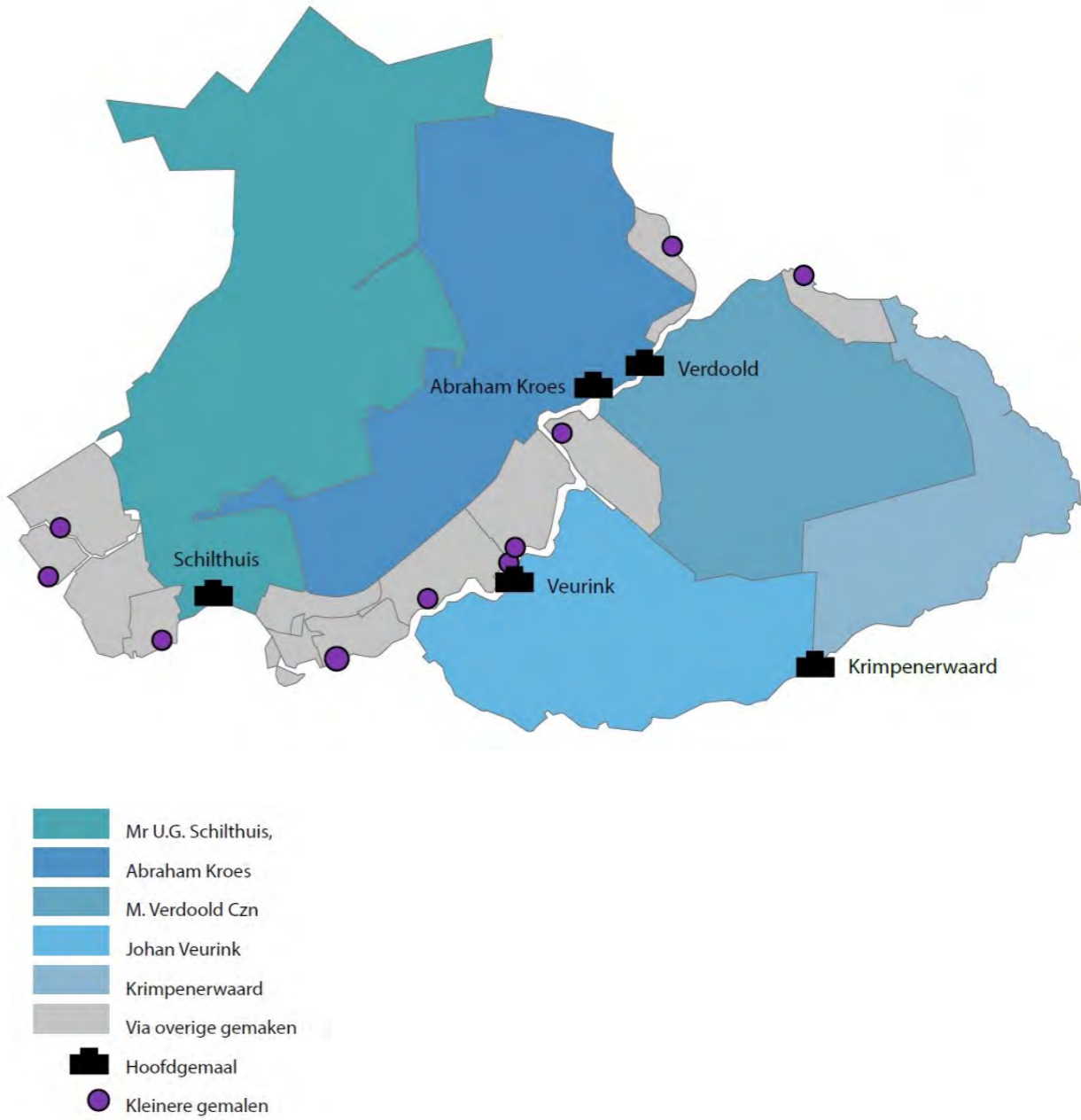


Fig. 45. Location of pumping stations and the areas they cover (Waterbeheerplan 2016-2021, Hoogheemraadschap van Schieland en de Krimpenerwaard).

As mentioned before, the Abraham Kroes pumping station actually consists of two pumping stations in one building. One pumps the polder water directly to the river, without first going into the ring canal. The other pumps the polder water from the ring canal to the

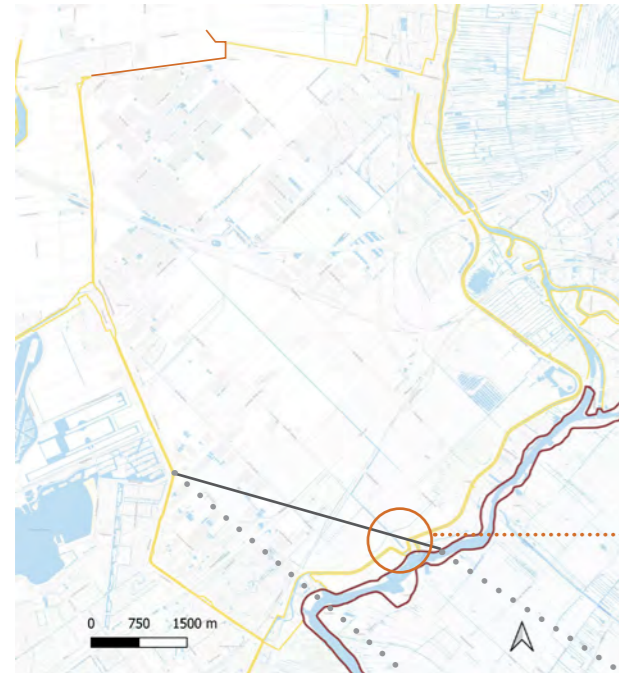


Fig. 46. Flood defences Zuidplaspolder (QGIS, data from province of South Holland).

river (Fig. 47). Fig. 31 shows the dikes around the Zuidplaspolder. The primary flood defences are the dikes of the river Hollandse IJssel, the regional flood defences are the dikes of the ring canal. The grey line indicates where the cross-section in fig. 46 intersects with the Zuidplaspolder. The section (fig. 48) shows the height differences between the polders, the dikes, the ring canal, the rivers, and the different water levels within the polders, and the relationship of the Zuidplaspolder with the adjacent polder systems. The grey arrows indicate the often salty and nutrient-rich



Fig. 47. The Abraham Kroes pumping station. (<https://www.diegoude.nl/wp-content/uploads/2019/08/Lezing-2019-05-27.pdf>).

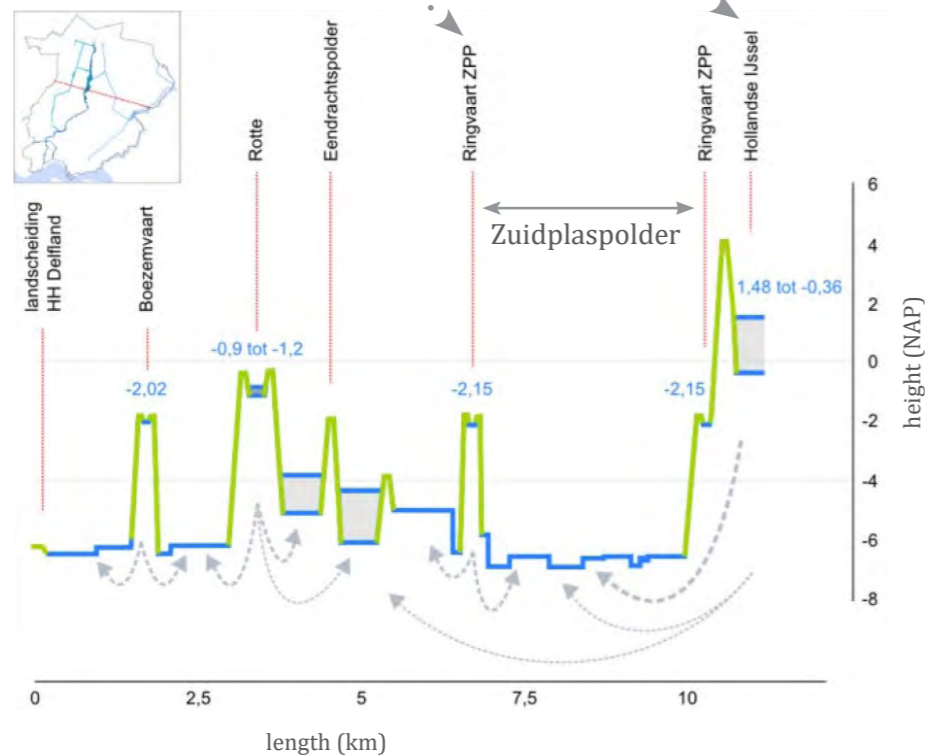


Fig. 48. Section water systems schieland (adapted from Nota Watersystemen HHSK, Hoogheemraadschap van Schieland en de Krimpenerwaard).

seepage that is pushed upwards in the very low-lying polder. Seepage is also shown in fig. 50. This usually has a negative impact on the environment in the polder. Sometimes, however, seepage with a favourable composition is pushed up, as is the case in the peat area north of Moordrecht. Partly as a result of this seepage, a valuable environment has been created here, in which a number of protected species of plants and animals can be found. This will be discussed later.

As fig. 48 already showed, many different water levels are maintained. The height of these levels is mainly determined by the function of the water level area. For example, in agricultural areas the level is kept artificially low while in places with old buildings on foundations of wooden piles it is kept higher. Fig. 49 gives an indication of the large number of different water level areas in existence.

To drain the land and bring the water to the pumping station, but also to allow water to flow in case of drought, there are many ditches in the polder. The main waterways for draining water are shown in fig. 51. Those for the inlet of water are shown in fig. 52.

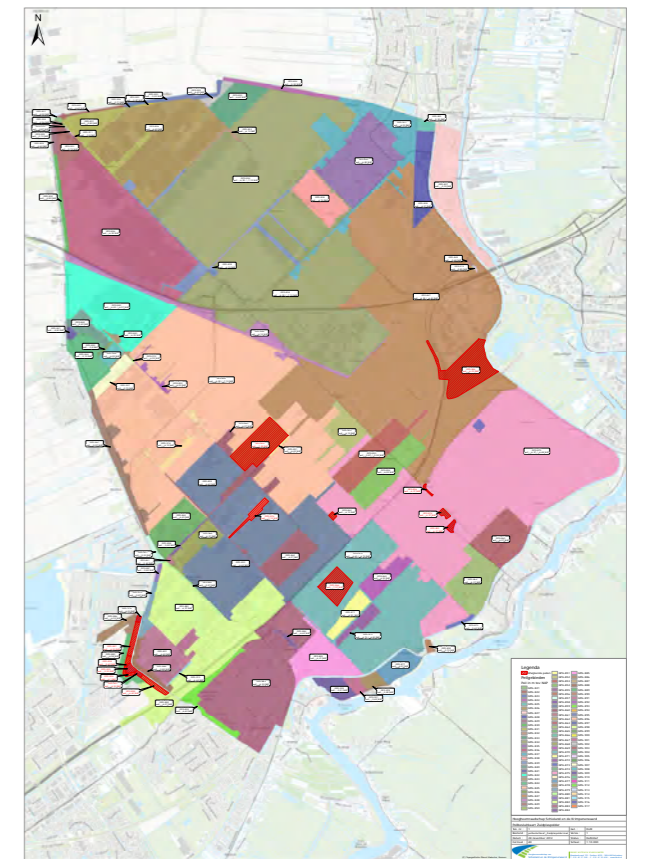


Fig. 49. Overview of the number of different water levels maintained in the Zuidplaspolder by the water board (Hoogheemraadschap van Schieland en de Krimpenerwaard).

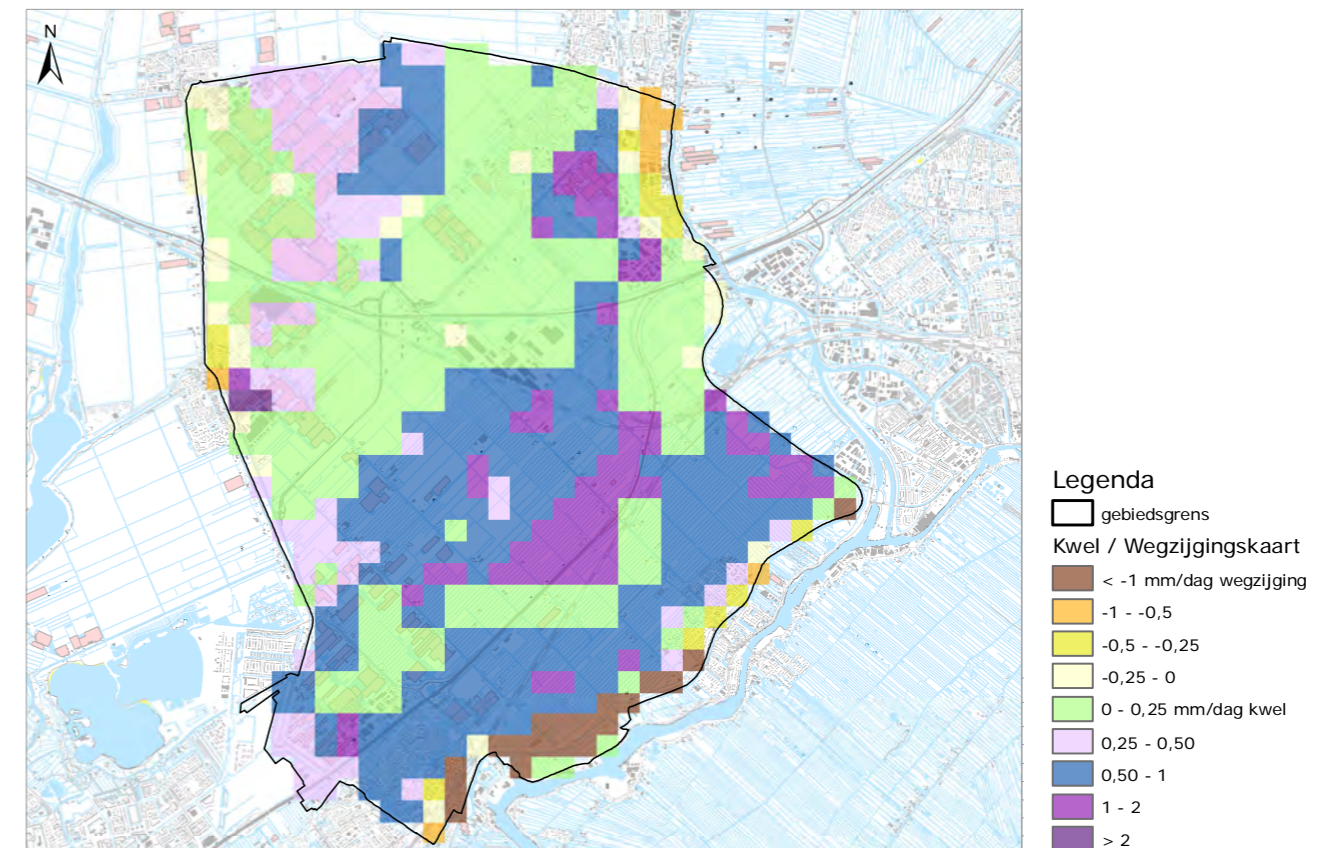


Fig. 50. Seepage (Hoogheemraadschap van Schieland en de Krimpener waard).

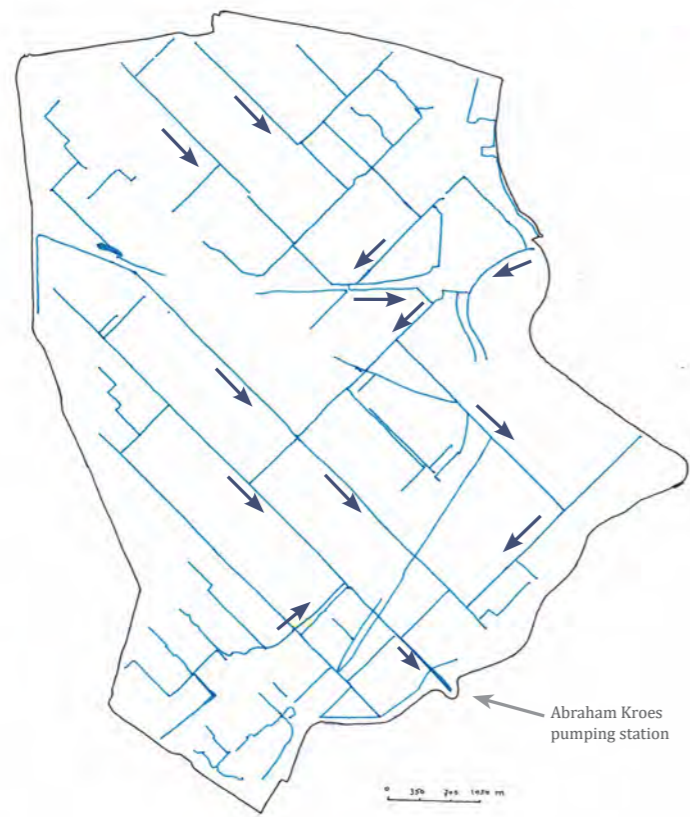


Fig. 51. Main watercourses for the discharge of water (based on information from Hoogheemraadschap van Schieland en de Krimpenerwaard).

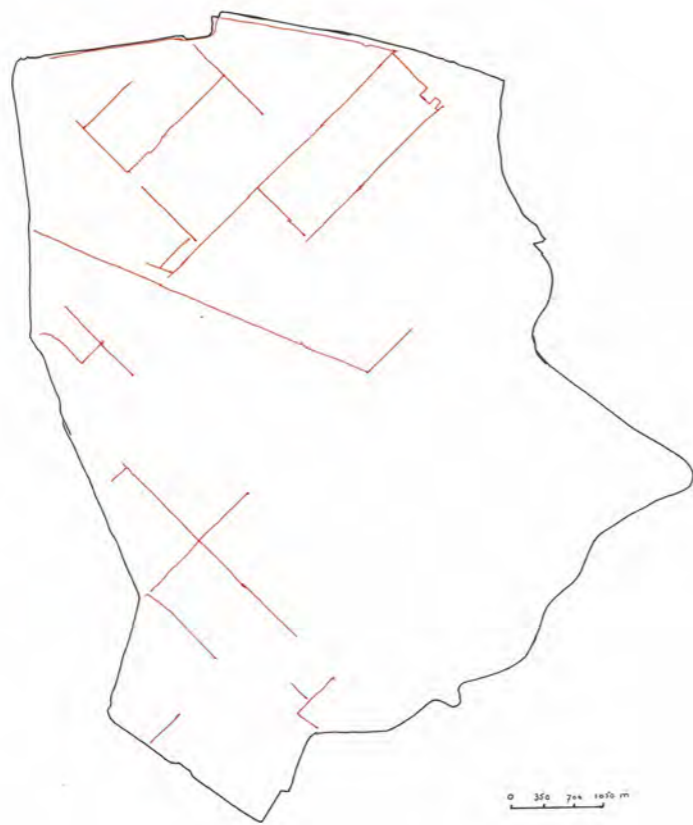


Fig. 52. Main watercourses for the supply of water (based on information from Hoogheemraadschap van Schieland en de Krimpenerwaard).

Nowadays, however, droughts are becoming more and more frequent. If the rivers discharge less water, seawater will force its way into the estuaries (fig. 53). That is why the supply of fresh water is now also an important task of the water board. In times of drought, the Convention on Small-scale Water Supply (Klein-schalige Water Aanvoer (KWA)) allows water

to be brought in from other areas. fig. 54 shows where the intake points are and how water flows in. If the drought is not so severe, or if the local water system is to be flushed, local water can also be brought in from the ring canal. Fig. 55 shows where the different subareas get this water from.



Fig. 53. Infiltration of salt water from the sea (QGIS, data from province of South Holland).

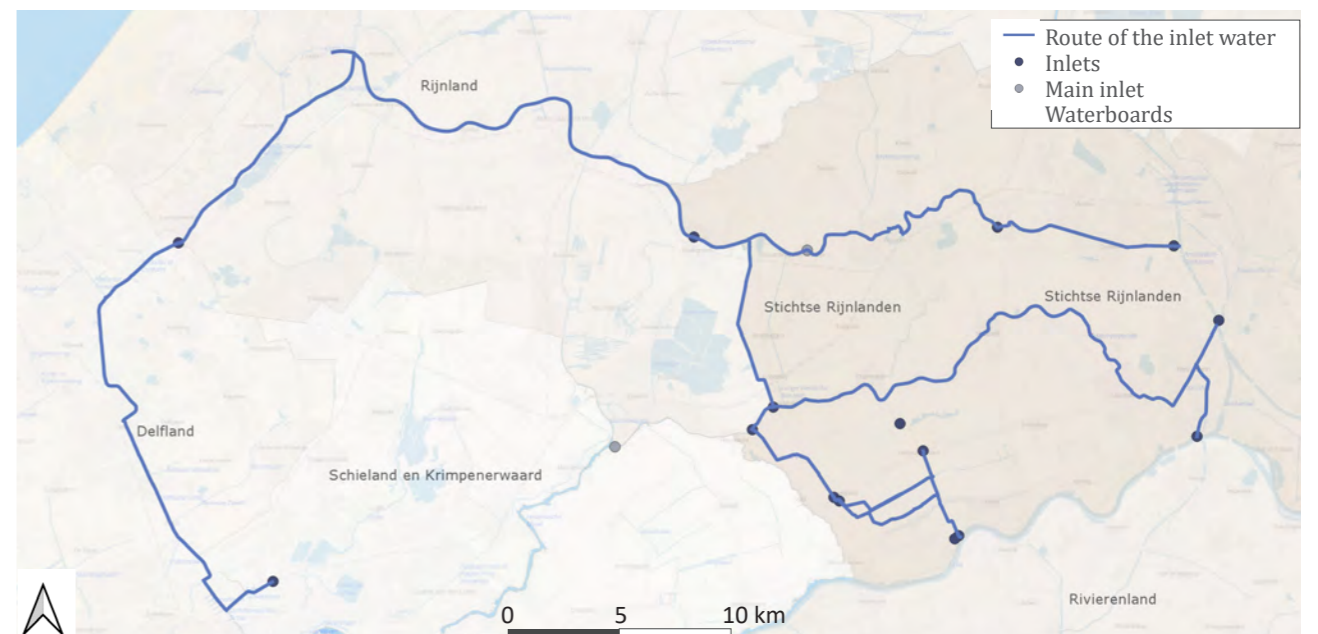


Fig. 54. Inlets and route of the water flowing in (QGIS, data from province of South Holland).

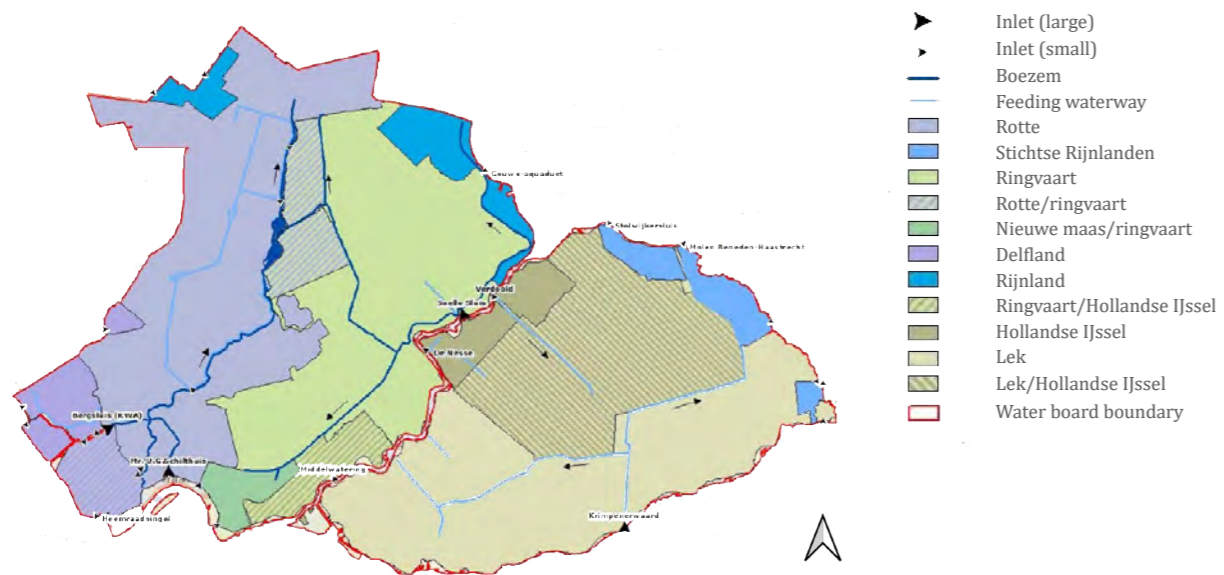


Fig. 55. Origin of the inlet water (Waterbeheerplan 2016-2021, Hoogheemraadschap van Schieland en de Krimpenerwaard).

Whether water needs to be brought in or discharged is largely determined by the weather, in particular the amount of precipitation and evaporation. In case of extreme precipitation, the drainage system cannot always keep up with it and water remains on land. This can be seen in fig. 56. The amount of standing water also depends

on the height differences in the terrain and the absorption capacity of the soil. This capacity is shown in fig. 57.

Due to the higher demand and lower availability of water, water levels are kept higher in summer than in winter. Figure 58 shows the average highest water level.

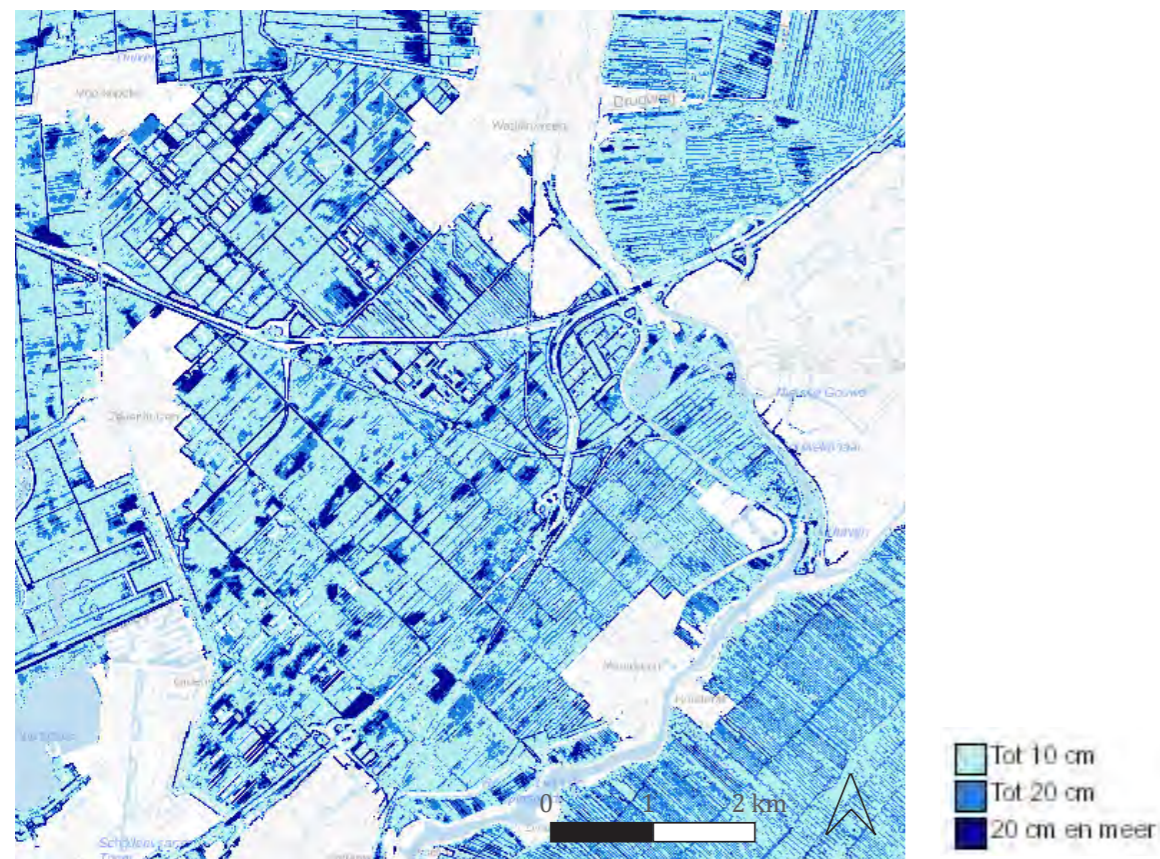


Fig. 56. Average water depth at extreme precipitation (QGIS, data from province of South Holland).

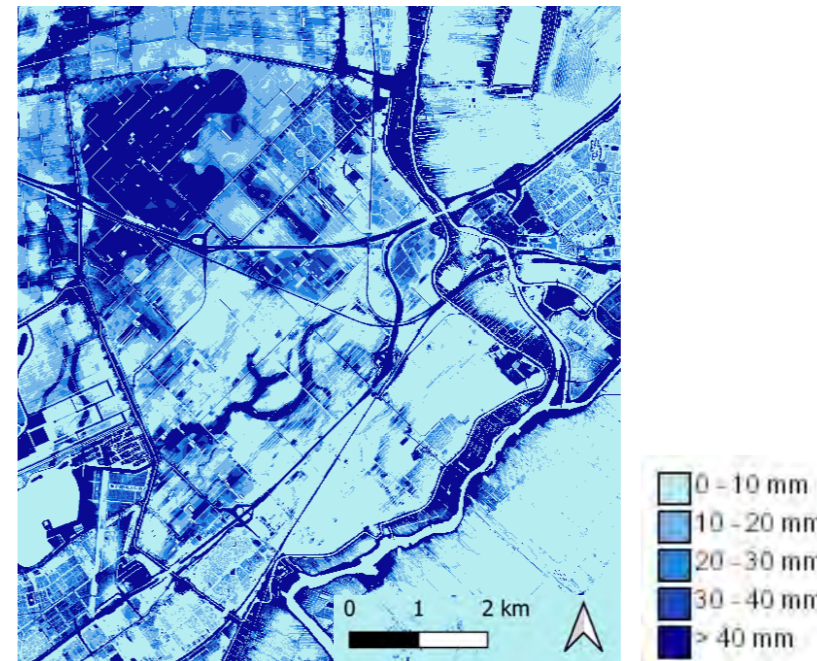


Fig. 57. Water storage capacity in the soil (QGIS, data from province of South Holland).

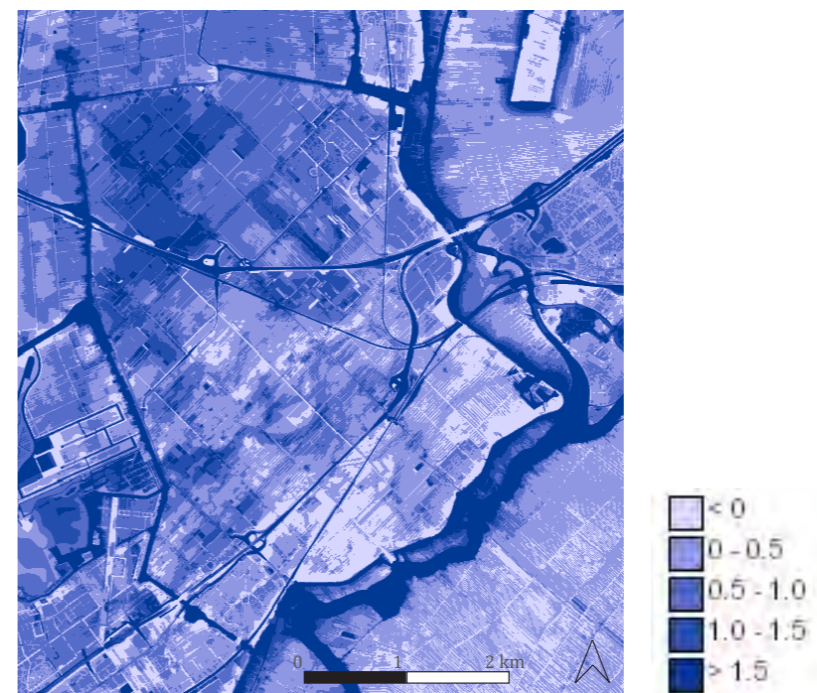


Fig. 58. Average highest groundwater level (QGIS, data from province of South Holland).

## Conclusion

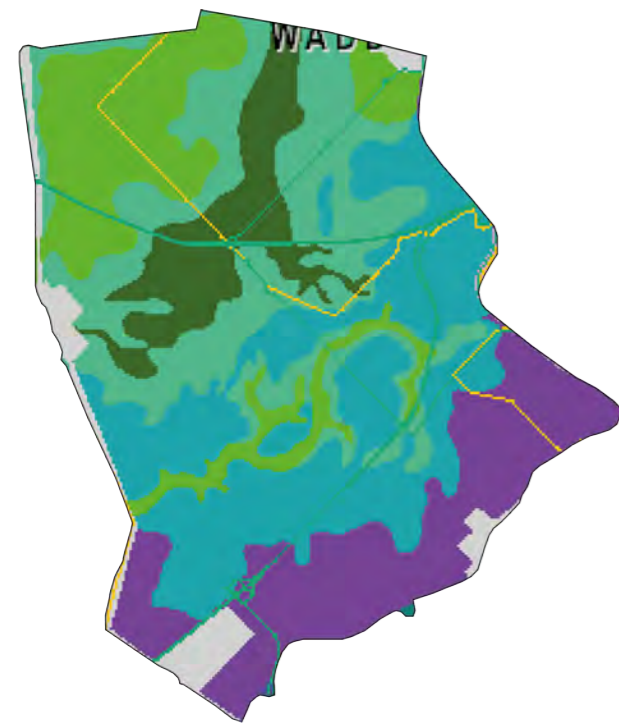
The polder can only be kept dry by a lot of pumping. However, the artificial lowering of the water level is no longer sustainable. Pumping costs too much energy. Moreover, lowering the water level causes the soil to subside, releasing a lot of CO<sub>2</sub>, after which the level must be lowered again. This circle must be broken. In addition, due to climate change, in the future, greater amounts of precipitation will fall at once

and there will be longer dry periods. To cope with this, the water must be buffered so that it does not do any damage and there is enough water in the polder in dry periods.

# Analysis of the Zuidplaspolder

## Soil

The main soil types found in the Zuidplaspolder are clay and peat (fig. 59). On the old creek ridge there is some sandy clay and on some parts cat clay. When this cat clay comes into contact with oxygen, sulphuric acid arises, making the soil acidic and infertile. In some parts of the Zuidplaspolder, however, this acidic groundwater, which ends up in the ditches, leads to some rare vegetation that needs to be protected (van Diggelen, Verstijnen, Smolders, & Roelofs, 2020). As can be seen from figures 59 and 60, on the clay soil there is arable farming, while on the peat soil there is mainly grassland.

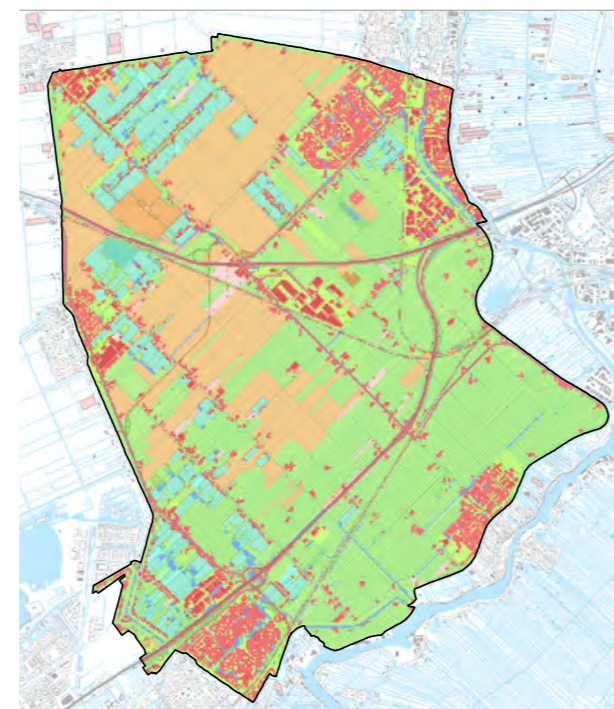


- Municipality
- Earthy topsoil on deep peat
- Peat on unripened clay
- Sandy clay with homogeneous profile
- Light clay with homogeneous profile
- Clay with heavy intermediate layer or subsurface
- Buildings

Fig. 59. Soil map of the municipality of Zuidplas. (Reprinted from Alterra, 2020)

## Nature and habitats

The peat meadows form a very suitable environment for various species of meadow birds, including a number of protected species such as the redshank and the black-tailed godwit. The grass snake and natterjack toad can be found in the clay areas. The little owl lives in the ribbon development and the rougher gardens there. The watercourses and the peat and cat clay areas are important for the conservation of the common bat. The water shrew probably lives in the ditches and the moorland (Peereboom, Okhuijsen-Schepman, Van Suijlekom, & Haarsma, 2008). Fig. 61 shows where these species can be found.



- Legend
- Zuidplaspolder
  - Landuse**
  - peat/pasture
  - arable farming
  - greenhouses
  - built environment
  - main roads and railways
  - nurseries

Fig. 60. Land use (Hoogheemraadschap van Schieland en de Krimpenerwaard).



- Clay
- Clay and peat
- Peat

Fig. 61. Location of habitats of various species in the Zuidplaspolder. Source: drawing by author, data from Peereboom, Okhuijsen-Schepman, Van Suijlekom, & Haarsma, 2008

## Ground level and ground water level

The Zuidplaspolder, with its lowest point of 6.76 metres below NAP, is the lowest polder in the Netherlands ("Uitersten," n.d.). In some places some peat has remained from peat extraction, in other places it has been excavated down to the clay layer. These clay areas are therefore very low, as can be seen in fig 63. Despite this low position, this is where agriculture takes place and where the water level therefore has to be artificially lowered very far. Figs. 62 a and b are both sections over the same part of the polder, as can be seen in fig 62. Fig. 62a shows the ground level in relation to the soil, fig. 62b shows the ground level in relation to the artificially maintained groundwater levels. The blue line represents a level of -5.8 NAP and shows what would be flooded at this level.

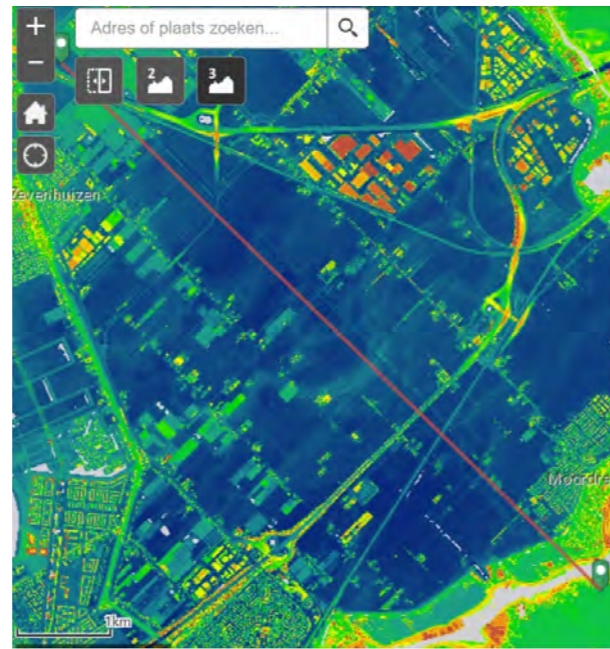


Fig. 62. Hight map of the middle area of the Zuidplaspolder with the location of the sections 62a and 62b. Source: ahn-viewer.

- Clay
- Cat clay
- Sandy clay
- Peat on clay
- Peat

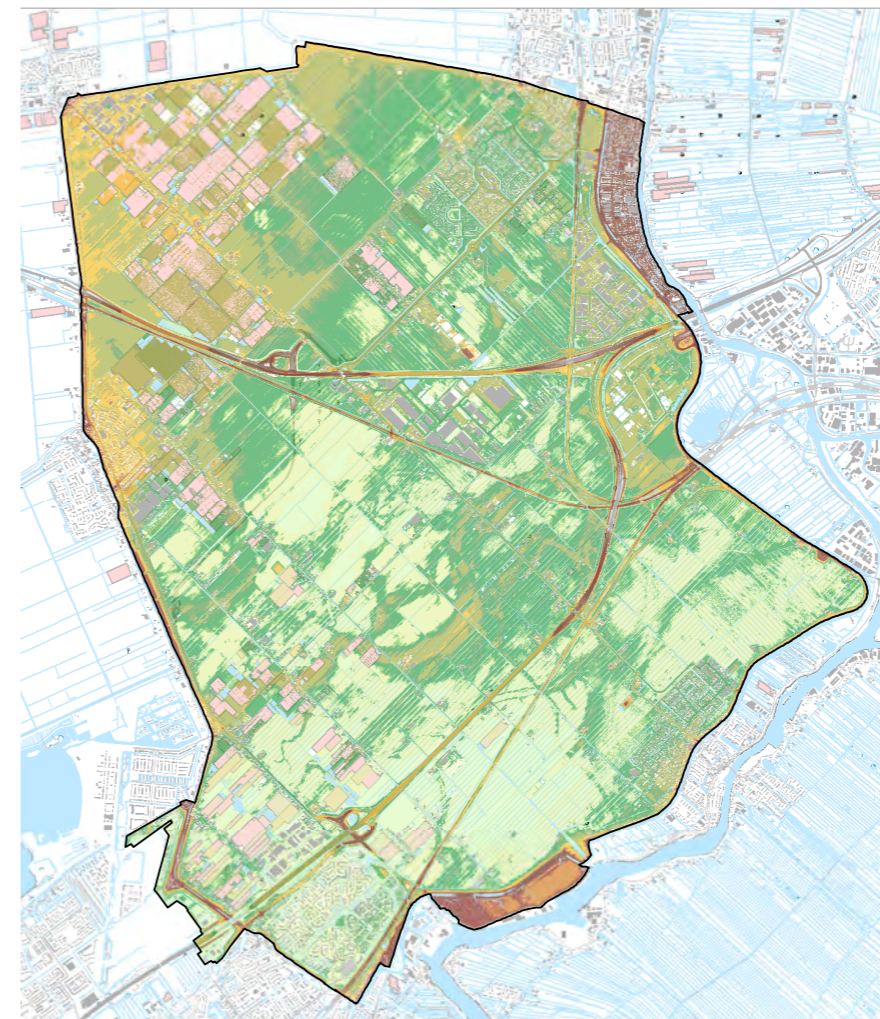


Fig. 63. Hight map (Hoogheemraadschap van Schieland en de Krimpenerwaard).

## Legenda

gebiedsgrens

## AHN2

- < - -8
- 8,61 - -7,25
- 7,24 - -6,15
- 6,14 - -5,8
- 5,79 - -5,7
- 5,69 - -5,41
- 5,4 - -5,25
- 5,24 - -4,66
- 4,65 - -3,75
- 3,74 - -3,25
- 3,24 - -3,15
- 3,14 - -2,75
- 2,74 - -1,64
- 1,63 - -0,7
- 0,69 - 0,63
- 0,64 - 2,13
- 2,14 - 3,46
- 3,47 - 4,59
- 4,6 - 6,1
- 6,00 - >

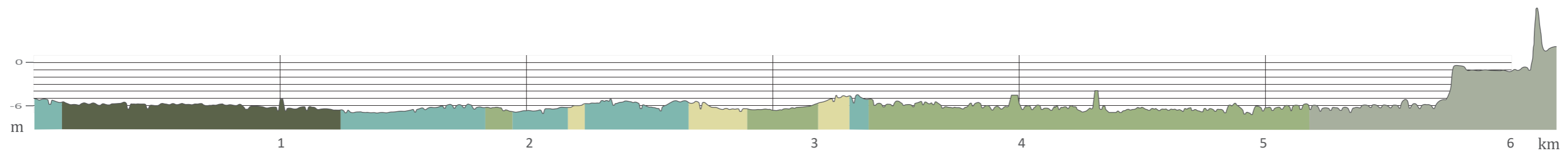


Fig. 62a. Section of the ground level in relation to the soil. Source: by author. Data from ahn-viewer.

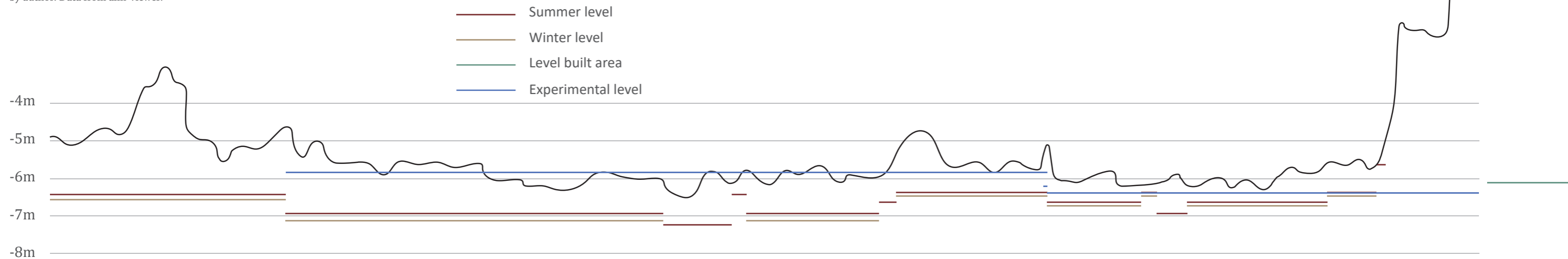


Fig. 62. Section of the ground level in relation to the artificially maintained groundwater levels. Source: by author. Data from ahn-viewer.

# Analysis of the Zuidplaspolder

## Buildings and infrastructure

Although the polder certainly still makes an agricultural impression, figure 64 shows that there are quite a few buildings. Many of the large buildings are greenhouses (fig. 65). The ring canal runs through the villages, so they are

all partly inside and partly outside the polder. Outside the villages, most of the buildings are in the ribbons. Fig. 66 shows the houses. Fig. 65 shows besides the greenhouses, also barns and sheds. The last image (fig. 67) shows

the infrastructure, such as the highway, the railway and main roads and streets.



Fig. 64. Buildings in the Zuidplaspolder. Source: by author, QGIS, data from brt achtergrondkaart, kadaster.



Fig. 65. Greenhouses in the Zuidplaspolder. Source: by author, QGIS, data from brt achtergrondkaart, kadaster.

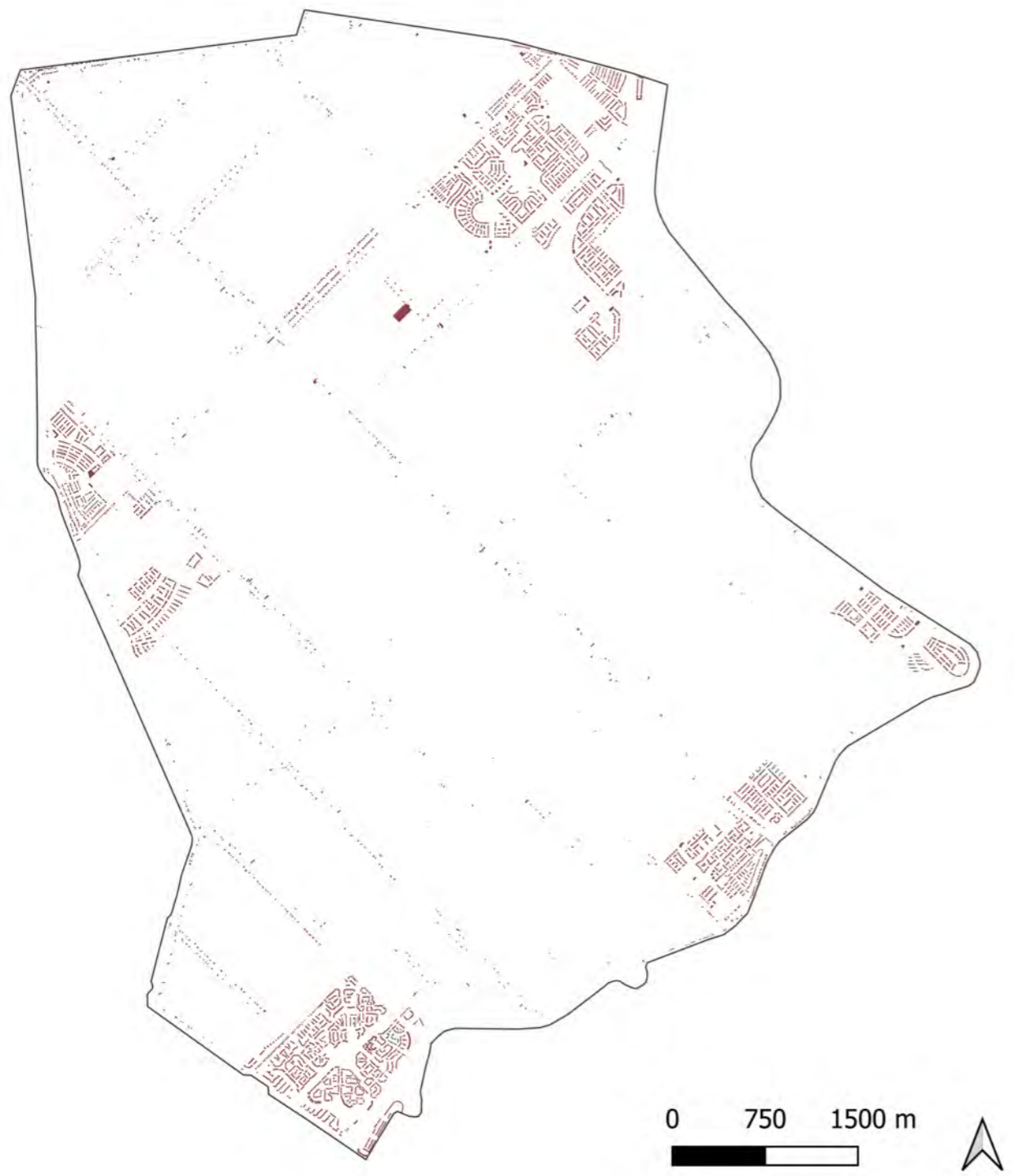


Fig. 66. Houses in the Zuidplaspolder.  
Source: by author, QGIS, data from brt  
achtergrondkaart, kadaster.

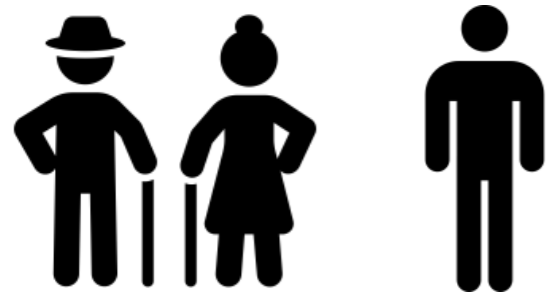


Fig. 67. Infrastructure. Source: by  
author, information from Open  
Street Maps.

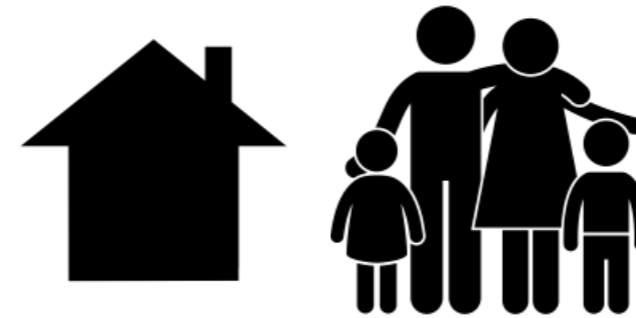
# Analysis of the Zuidplaspolder

## Future inhabitants

Main trends in housing preferences from the Woon 2018 survey:  
(Ruimte voor wonen - De resultaten van het WoonOnderzoek Nederland 2018, 2019)



More elderly and single person households.



Large demand for single-family houses (owner-occupied).  
(Demand exceeds stock.)



More and more older households in owner-occupied homes.



Demand for rental flats from starters.  
(Fill stock left vacant by demand for single-family houses.)



Demand from middle and high income groups for regulated rental housing.



Elderly people are more inclined to consider a flat, but they rarely move house.

Fig. 68. Main trends in housing preferences from the Woon 2018 survey:  
(Ruimte voor wonen - De resultaten van het WoonOnderzoek Nederland 2018, 2019)

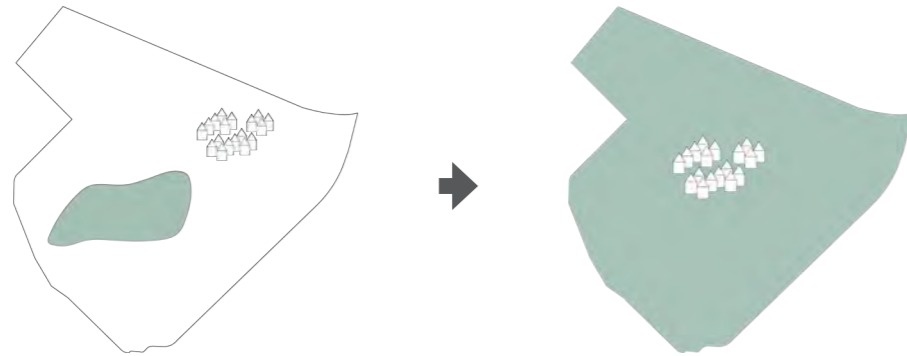
# CHAPTER 5

*Design*

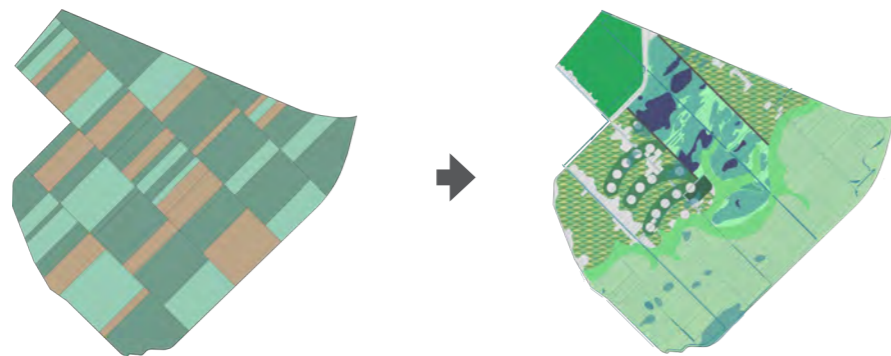
# Design of the new village

## Principles and preconditions

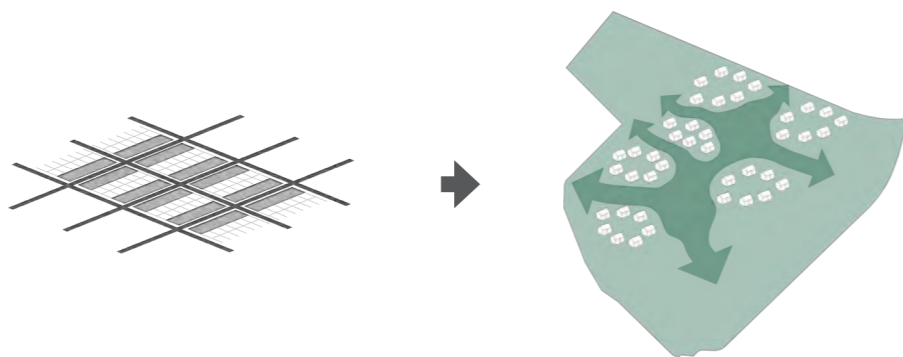
### Principles



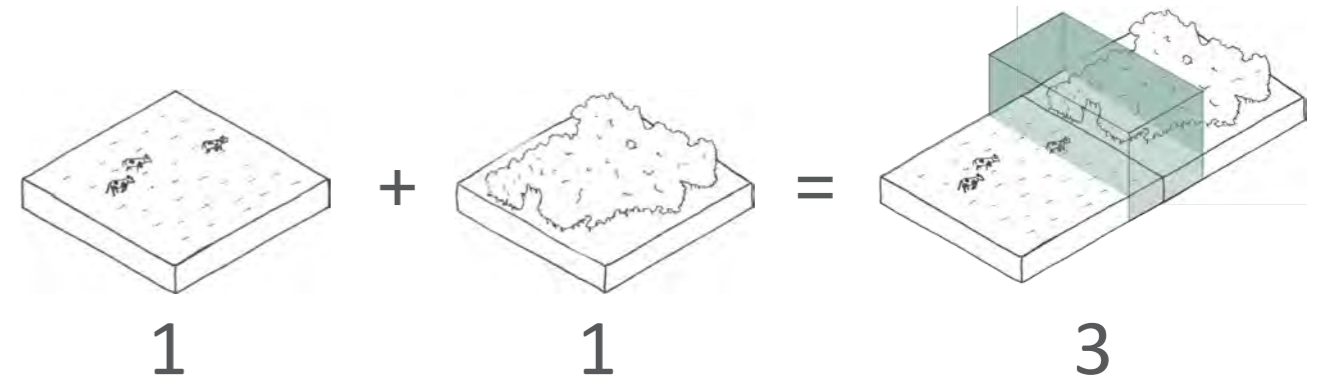
From a village and a green zone to living in the natural landscape.



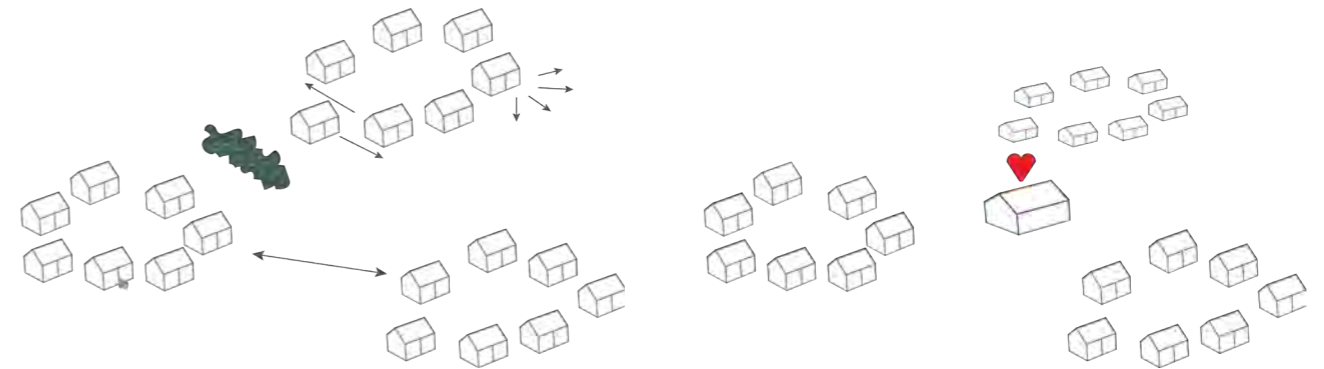
From traditional monoculture agriculture to a biodiversity-friendly landscape and agriculture.



From streets in a grid with enclosed, often paved gardens, to residential clusters where nature can flow through.



"Ecological land-use complementation" (Colding, 2007).



Privacy through positioning, distance and vegetation.

Community centres are at the heart of communities.



The straight lines of the original polder landscape are combined with the flowing forms of nature.

Although it cannot be fully worked out in this project, the aim is to make the village self-sufficient in food, energy and water.

Fig. 69. Design principles. By author.

## Preconditions

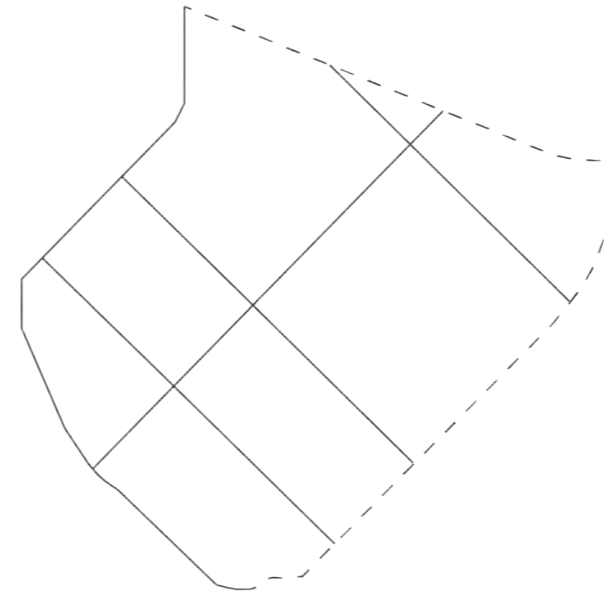


Guidelines of the Water Board for all plans in the polder:

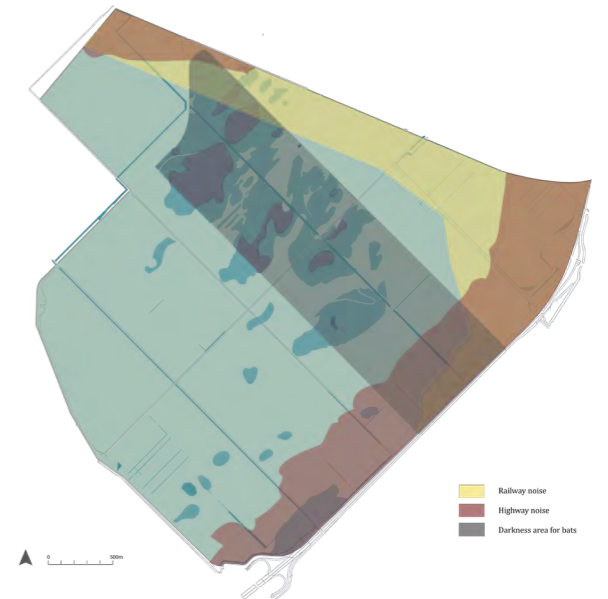
As little fragmentation of water table areas as possible.



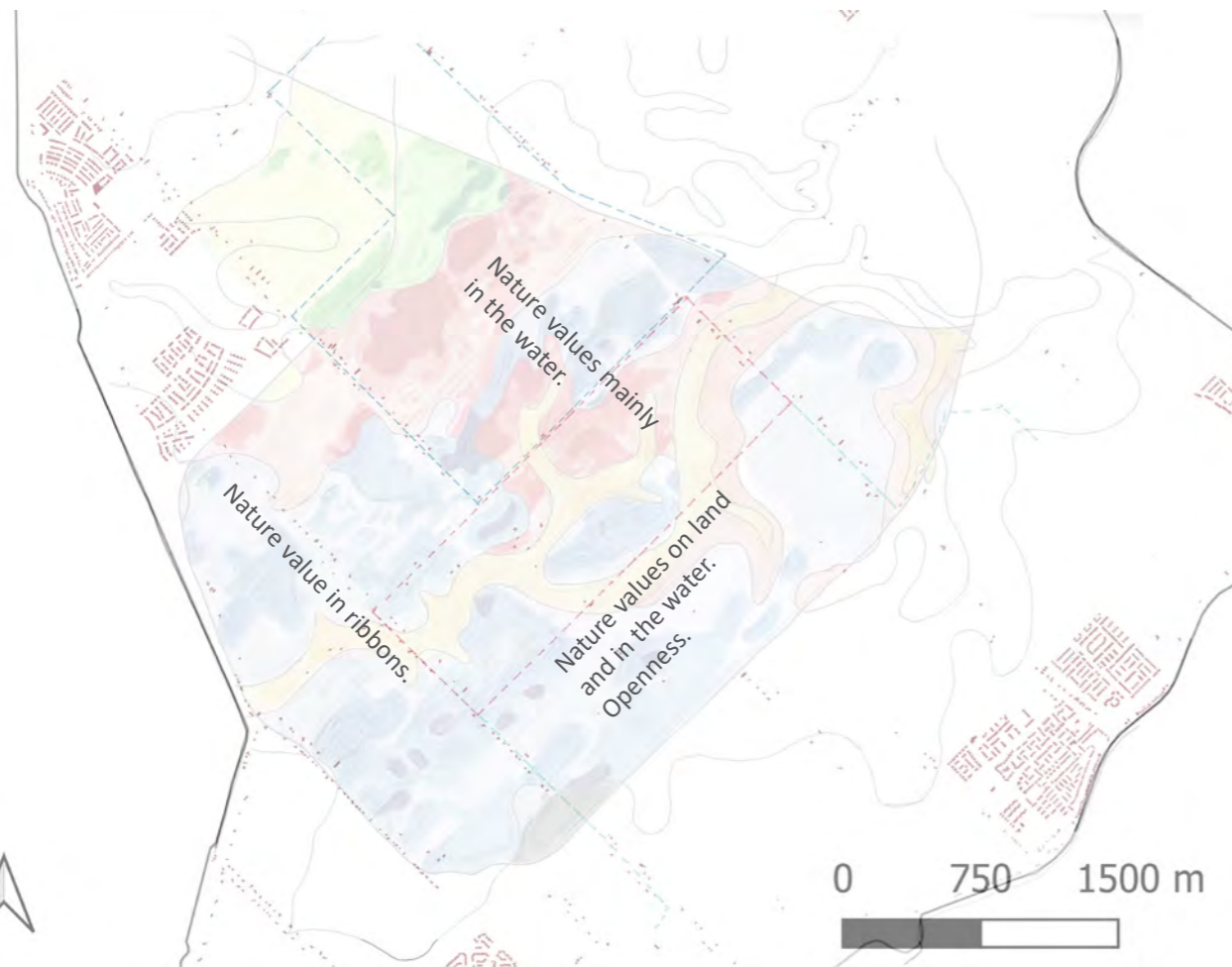
No excavation at the site because of seepage and the risk of soil bursting.



Preserve and use the existing infrastructure.



Take into account the noise pollution from highways and railways. Limit light pollution as much as possible because it harms nature. The indicated waterway is a connecting route for (endangered) pond bats in the area.



Take into account the natural values in the area. Build the most houses where nature is least harmed and where the intervention could help to improve biodiversity. Preserve part of the characteristic openness of the polder and preserve the existing ribbons.

Fig. 70. Design preconditions. By author.

# Design of the new village

## Sustainability

### Building in the lowest polder

After determining the subject for this project, the first question asked was whether you should actually want to build in such a low polder. The fact that the question is asked already implies the answer. Actually, no, but a million houses have to be built somewhere and there is space in the polder. However, it is also not a pleasant idea to build on the last bits of open space and to wipe out the last pieces of green in the already overcrowded Randstad. Hence this investigation into the possibilities of building houses after all, but in a sustainable way.

First of all, it must be established what sustainable building in this polder entails. The first thought, of course, is about the water system. In this project, making the water system more sustainable is used as a carrier for increasing biodiversity. This process is an opportunity to also include circularity and social sustainability (fig. 71).

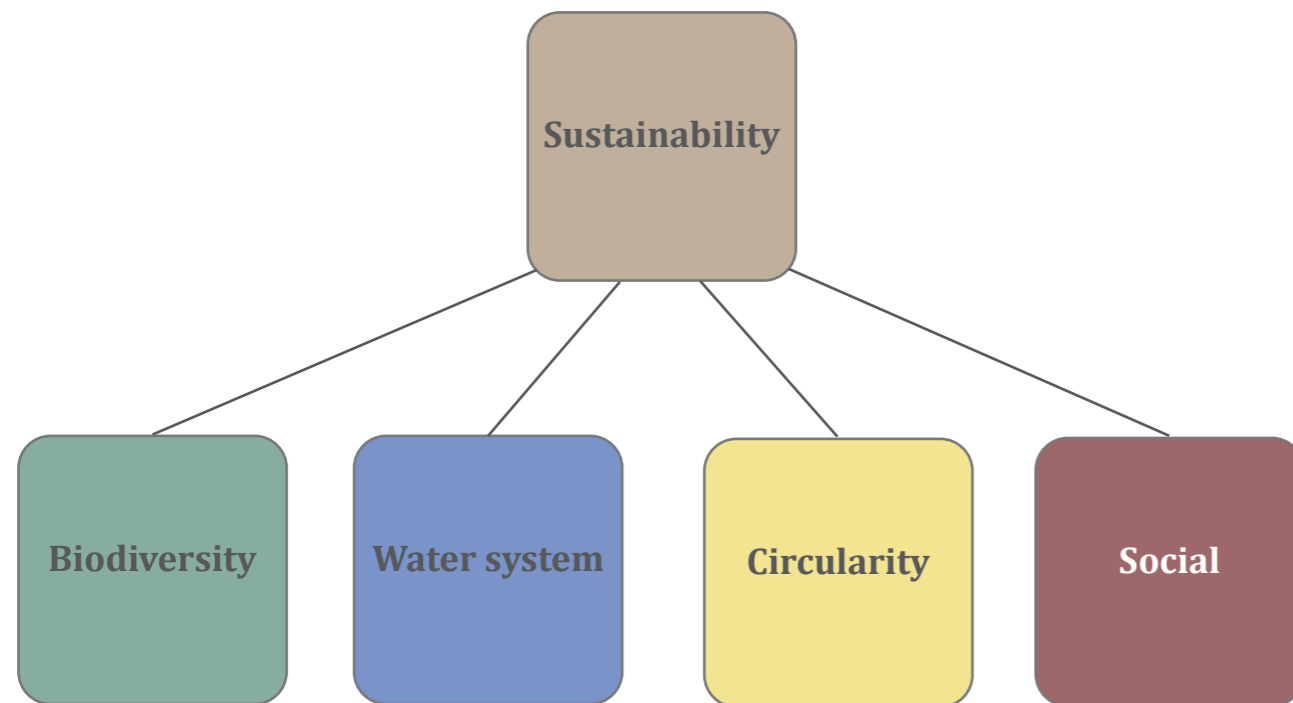


Fig. 71. Components of sustainability considered. By author.

### Determining the site

Before designing can begin, the search area for the location of the new village must first be narrowed down. After analysing the entire Zuidplaspolder, it became clear that the central area is a suitable place to locate the new village (fig. 72). It is the largest unbroken area between the highways and the railway. The north-eastern part of the polder does not belong to the Zuidplas municipality. The area next to it, in the north-west, is densely built up with greenhouses. In addition, the northern part of the polder is higher than the southern part, so measures relating to the water system will have more effect in the south. The peatland south of the highway is very low and not very suitable for building, but very valuable for meadow birds.

### The water system

History is repeating itself. The process of

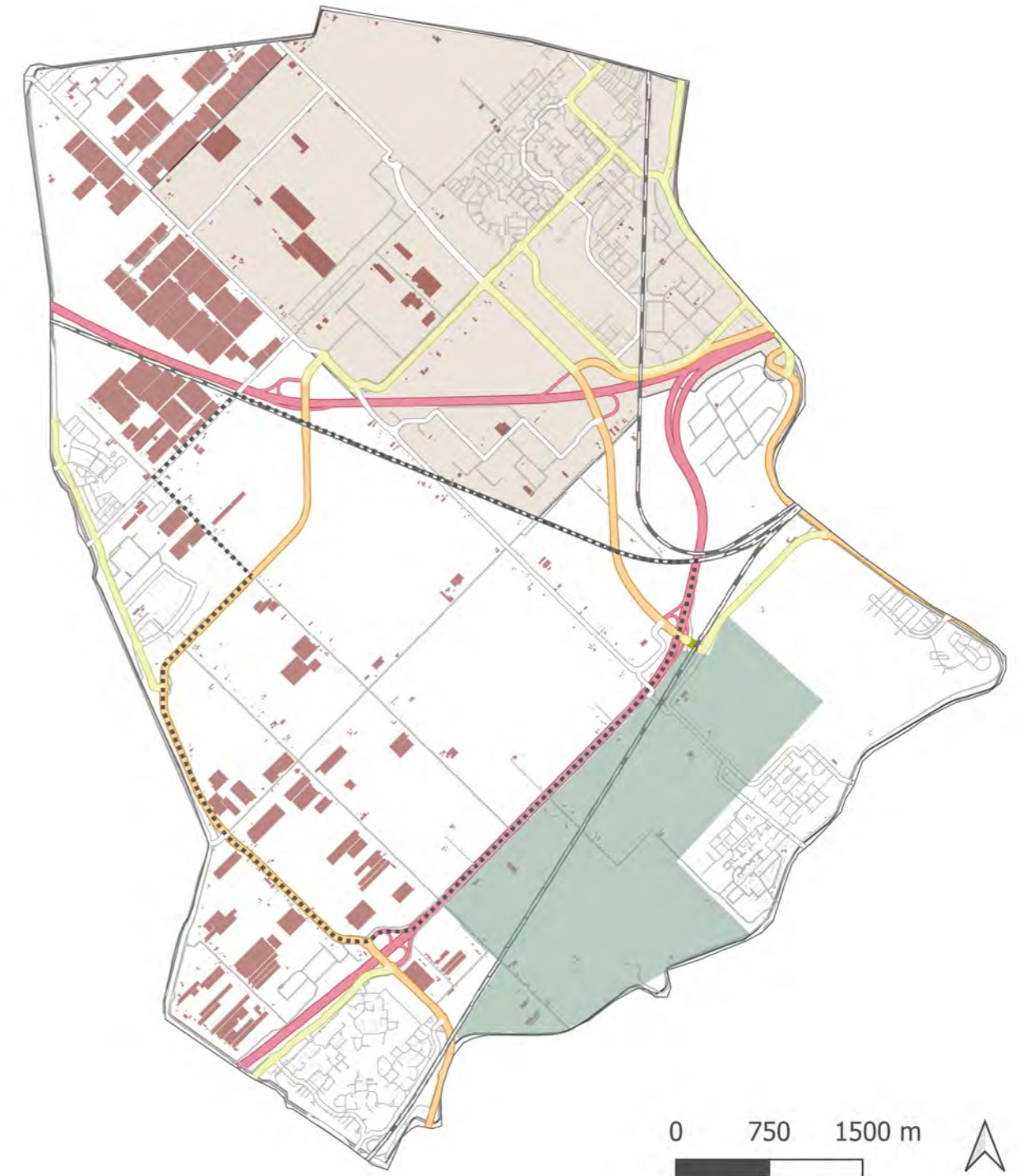


Fig. 72. Infrastructure (information from Open Street Maps).

drainage and subsidence has been going on for centuries and is no longer sustainable. Climate change is leading to higher precipitation peaks, but also to an increasing likelihood of longer dry spells. The soil in the polder is sensitive to drying out. The first element is therefore to create a sustainable water system. This is promoted by raising the water level, which requires less pumping, slows down subsidence and therefore releases less CO<sub>2</sub> into the atmosphere. The higher water level will increase the need for water storage, because the storage capacity of the soil will decrease. Excess water will be buffered so that there is sufficient water for dry periods. However, it is uncertain whether these measures will ultimately be sufficient for a sustainable occupation of the polder in the future. Therefore, all new structures will be built of wood and made dismantable. The wood is lighter and will put less strain on the soft soil, and if the polder has to be completely flooded in the future, they can be reused elsewhere, or at least not leave a lot of waste and pollution behind. Building in wood is more sustainable anyway ("Systeemtransitie Houtbouw Nederland," 2020), provided that sufficient sustainably managed production forests are established in the Netherlands. These forests will also help to retain water and fix CO<sub>2</sub>.

### Combination with biodiversity

Increasing biodiversity is about creating diverse biotopes and gradients. The larger a biotope is, the more species can settle there, as well as more individuals of a species. It is especially valuable to place different biotopes next to each other, because then species can live there that need both biotopes in their habitat (Colding, 2007). The type of biotope is largely determined by the vegetation. The positive influence on biodiversity is therefore greatest when there is a lot of native vegetation. Which vegetation occurs naturally (or would occur if allowed) is largely determined by water regime and soil type. The water regime is influenced by the soil type, the water level and the ground level. The map in fig. 74 shows the combination of soil type and ground level, so that this map in fact predicts what kind of nature will arise at a certain water level. There is still variation possible in succession. If a grass field is mowed regularly it will remain a grass field. If you leave it alone it will develop further until it reaches the final stage of succession: a forest. Fig. 75

indicates possible landscape types on the soil in the Zuidplaspolder. However, these ecological building blocks cannot be copied just like that, because some types require earthmoving, which changes the water situation. With all of the above in mind, a new water level will be established for the site.

### The new level

Analysis showed that the main roads in this part of the polder are at a level of -5,1 NAP. The ribbons are at various levels, as shown in fig. 73. Comparing the level of the land in Moordrecht with the water level maintained by the water board it can be concluded that there should be a difference of 80 cm between the

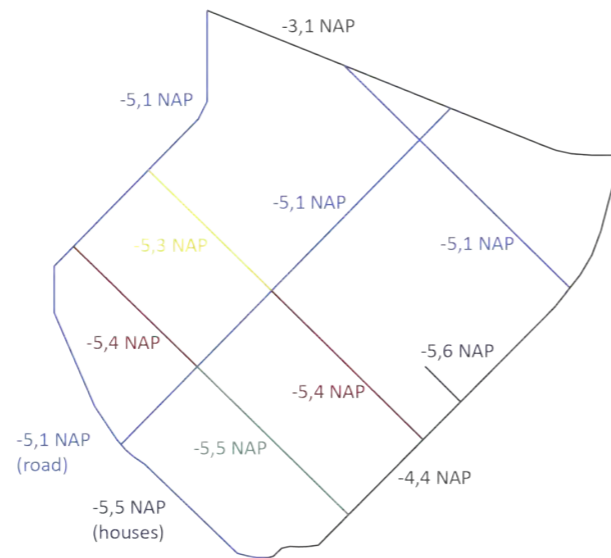


Fig. 73. Level of the ribbons.

groundwaterlevel and the land. Based on the lowest level of -5.6 NAP, this means that for the ribbons, the water level can be raised to a maximum of -6.4 NAP. This situation is shown in fig. 76 on the next page. However, considering this map, it is likely that this water level does not provide the most biotopes. An exploration of different water levels yields three more maps. On fig. 79, (-5.5 NAP), almost the entire site is under water, except for the creek ridge which is not that much higher and will therefore be marshy. This level probably does not provide the most biotopes either. Moreover, it is difficult to make it habitable for people. At level a level of -5.7 NAP (fig. 78), the area is still quite wet and difficult for people to live in, especially considering the facilities they need. In addition, the deeper water is not very valuable as a

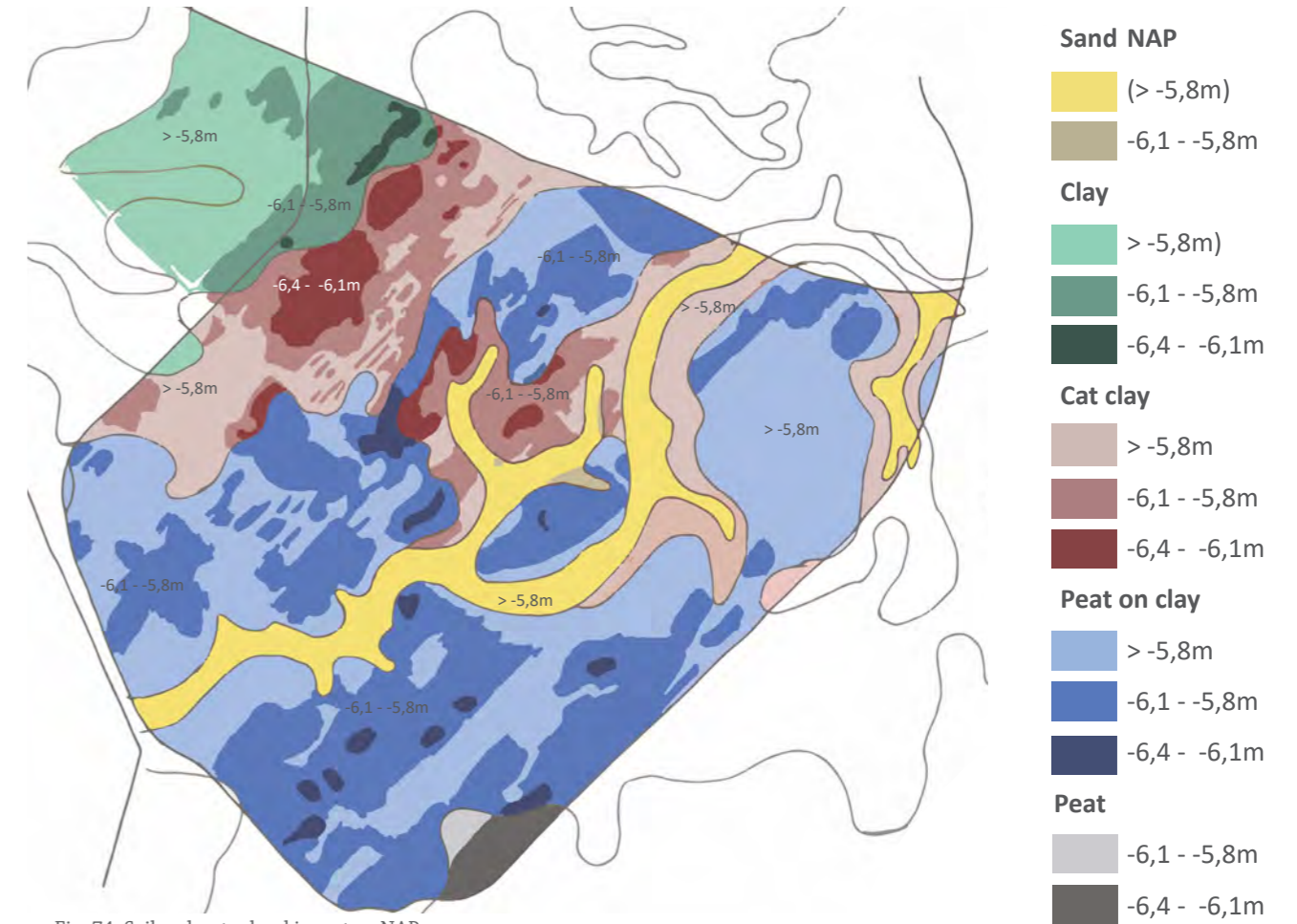


Fig. 74. Soil and water level in meters NAP.



Fig. 75. Ecological building blocks. Source: Klaas Jan Wardenaar, Vista, Dec 2014.



Fig. 76. Water level of -6,4 NAP.  
By author

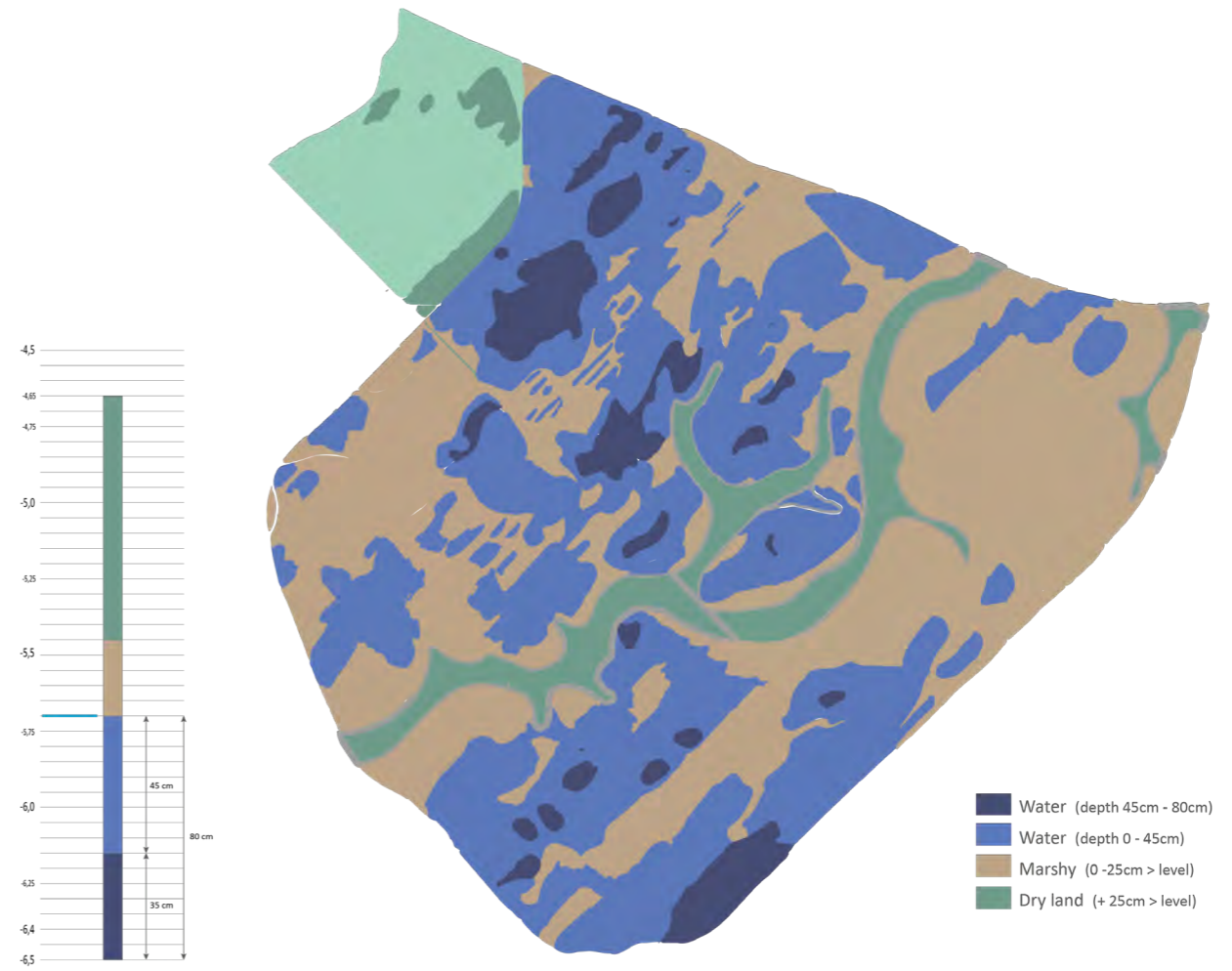


Fig. 78. Water level of -5,7 NAP.  
By author

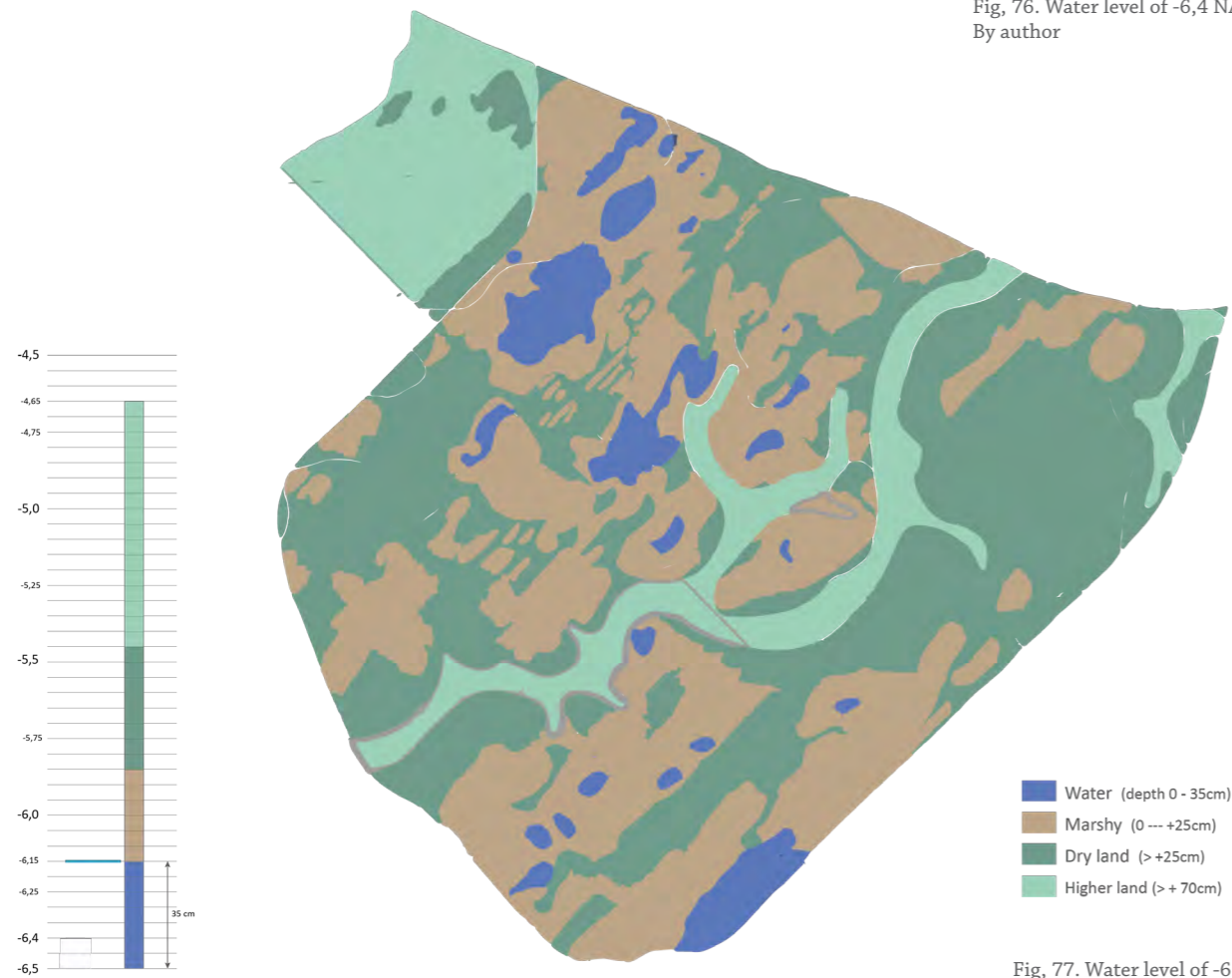


Fig. 77. Water level of -6,2 NAP.  
By author

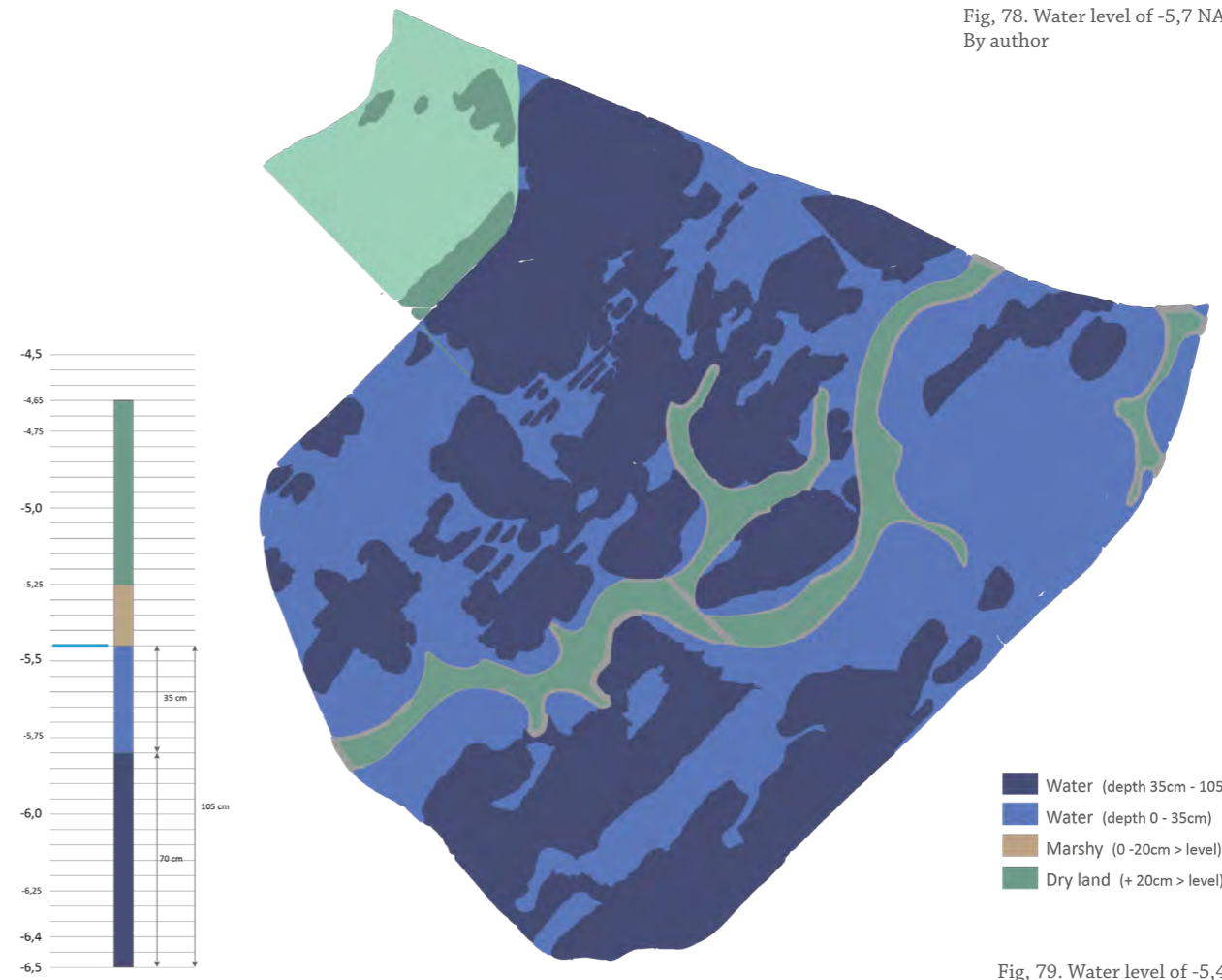


Fig. 79. Water level of -5,45 NAP.  
By author

biotope. The level on fig. 77 (-6,2 NAP) is the most promising. There are several dry and wet areas and there is shallow water. In addition, the meadows in the southeast already have this level and this has to be maintained to protect the rare vegetation along the ditches. However, one thing is missing and that is a water buffer. For that, the larger areas of water on the map of fig. 78, in the north of the site, is suitable. That is why the decision was made to combine the levels of figs. 77 and 78. The result is shown in fig. 80. In the northwest, the wet area is bounded by the (higher) road, in the southeast

by the natural boundary of the creek ridge. On the other sides, new dikes will have to be made to protect the ribbons. Fig. 81 shows a section of the existing road with ditches along it and a section of the new dike on the border of the two areas with different water levels. This shows that the new dike must be about 70 cm high. Since the level of -6.2 NAP is 20 cm above the previously calculated highest possible level of -6.4 NAP, the lowest houses (-5.6 NAP) will only be 60 cm above groundwater level. This may mean that some crawl spaces will have to be made watertight to maintain a healthy living

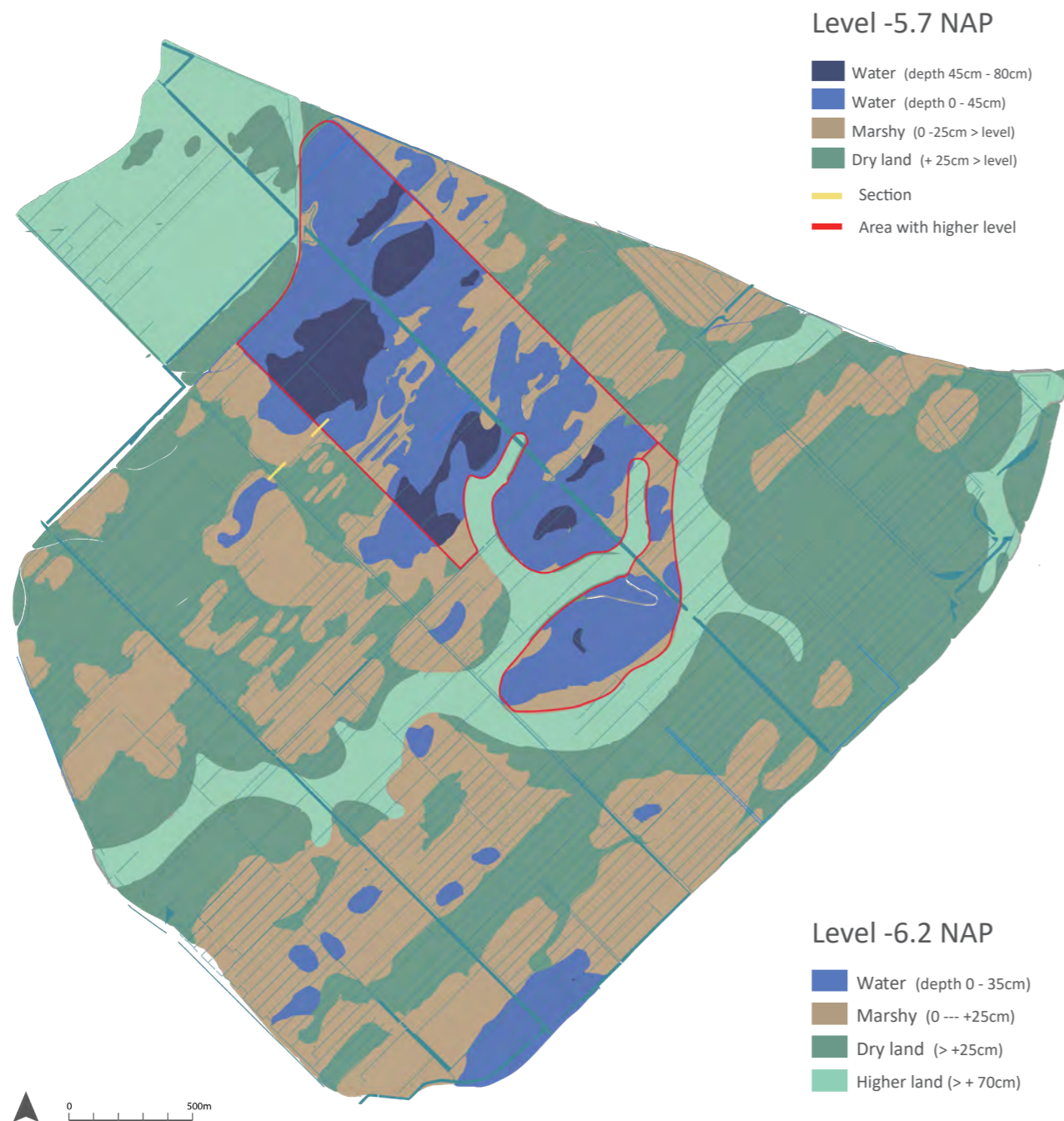


Fig. 80. Combination of the levels -6,2 NAP and -5,7 NAP. By author.

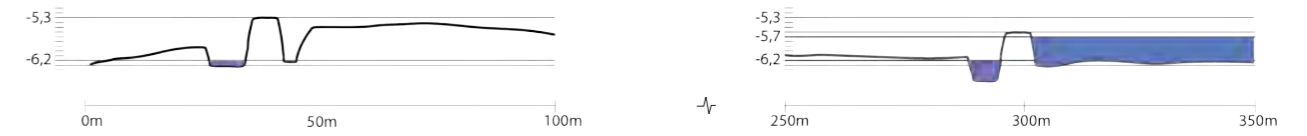


Fig. 81. Section of the road between ditches and a section of the new dike on the border of the two areas with different water levels. By author.

environment in the houses, although the level at the lowest ribbon is already quite high. The level of the small area in the north-western upper corner remains as it is today.

Due to the higher water level, the water in the ditches will be higher and sometimes rise above the banks, thus flooding the land (fig. 82).

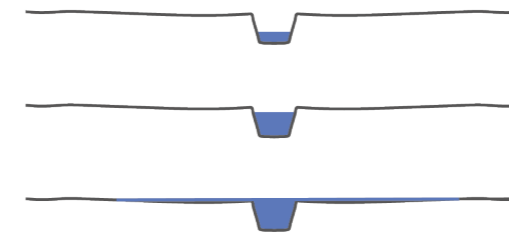


Fig. 82. Sections of higher water levels in the ditches

## The new landscape

With the higher levels set, the area will have a new landscape with new biotopes (fig. 83). Traditional agriculture will no longer be possible, but there will be room for alternative ways of farming on a small scale, with lighter machinery or with wet crops, combined with woodland. The peat meadows will largely remain as a small nature reserve. Most of them already had the higher water level. The marshy

areas will be swampy in winter but accessible in summer. How big and dense a new forest can become and how the area can be used for recreation, depends on whether or not the farmers decide to use recreation as their new livelihood. If many farmers switch to new crops, recreation will be limited to the paths. However, every farmer will be required to cover at least 50% of his land with trees, whether for production or not.



Fig. 83. The new landscape. By author.



Fig. 84. Possible structure of a food forest. Source: Effekt, Copenhagen.

In the area with the higher water level, people will have to restrict themselves to paths, with for example boot paths and elevated paths. Here, the more vulnerable nature can thrive. A food forest will be planted in the north-western tip of the area, where the water level has remained the same. This is only possible there because the forest needs one metre of soil above the groundwater level ("Voedselbossen: Veelgestelde vragen," n.d.) and will benefit from the fertile clay in that area. Figure 84 shows the structure of such a forest. The other part of the woodland will mainly consist of willows (on clay) and alders (on peat-on-clay) and their undergrowth. The woodland can complement the other two biotopes and the wetland area in the southwest, in the Alexanderpolder. The creek ridge will form a transition area between the meadows and the other parts of the landscape and will be given a not too formal, park-like appearance, so that it remains distinguishable and contributes to diversity.

## Green link

From the start, the intention was to design the fifth village in such a way that it would be a green link in the regional green-blue infrastructure. The Zuidplaspolder was taken out of the green heart to be able to build many houses there (fig. 85). The original plan included 35,000 dwellings. Since then, insights have moved on and it is clear that space for nature and recreation is also needed. The most valuable nature areas have been designated as Natura 2000 areas. As can be seen in fig. 86, there are not many of these in the vicinity of the

Zuidplaspolder. The area east of the Reeuwijkse Plassen is the only one in the vicinity. This means that the site can be an important

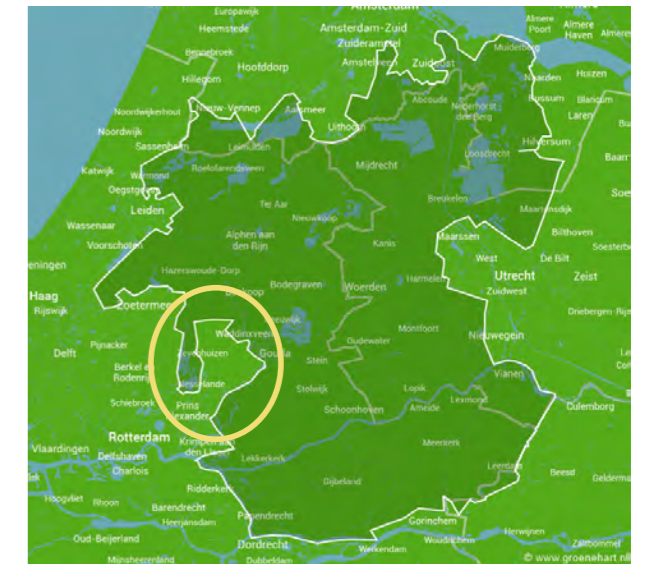


Fig. 85. The Green Heart. Source: <https://www.plaatsengids.nl/groene-hart>



Fig. 85. Natura 2000 areas. QGIS

addition. Closer by there is a similar problem (fig. 87). The site lies in the middle of an area without (as far as biodiversity is concerned) valuable nature. This shows that the site can indeed be an important link. Especially on the line from the east of Rotterdam to Reeuwijk, it is the “missing link”. For the future, it would be nice if a connection could be made with the Bentwoud in the north. There are some natural values in the ring canal, but nothing that extends that far. In the south, the site connects to a large peat meadow area, which could be valuable if it were also managed more sustainably, with a higher water level.

## Circularity

Circularity will not be worked out in detail in this project, but some comments can be made about it. One of the biggest things the new village would contribute to circularity is local food production. The new forms, such as a food forest, small-scale (wet) cultivation and, if successful, a polydome, make use of the cycles in the ecosystem. Polydome (fig. 86) is a concept of Except Integrated Sustainability (“Polydome,”



Fig. 86. Polydome. Except Integrated Sustainability.

2011). It is a large, closed greenhouse in which food and, for example, flowers can be grown in an ecosystem of their own, as happens in a food forest. It is combined with aquaponics, chickens and fish farming. In contrast to the food forest, most of the work in the greenhouse is done by robots. The whole process takes place in a closed loop.

The aim is to make the village energy-neutral. The most important measures are building very low-energy houses, limiting public lighting (which is also better for nature), using solar energy as much as possible, possibly by placing “solar trees” near the houses in the wooded

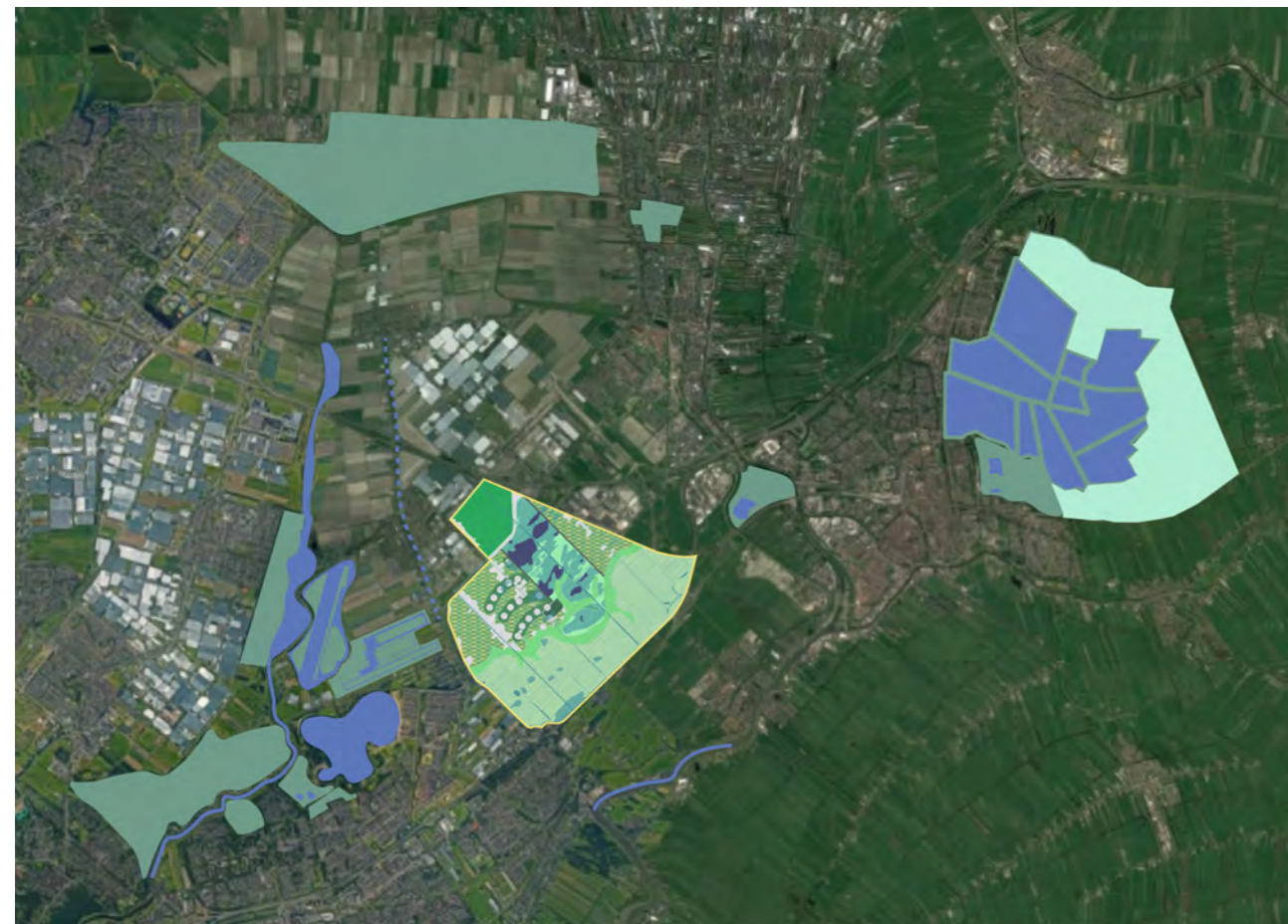


Fig. 87. The new landscape of the Zuidplaspolder as a green link in the region. Source: Google maps, illustration by author.

areas (see components in appendix), and (re)using heat from (the warm part of) the greenhouse.

Local water purification and reuse of water. Due to the higher level, the soil can store less water. Excess rainwater can be collected from roofs and streets and purified in the marshes or helophyte filters and reused for watering crops or flushing toilets. For the purification of water into drinking water and the reuse of black water, a special installation and a permit are needed. It would be a very good addition to the village, as it would mean that far fewer pipes would have to be laid. However, the new village must be built in such a way that it can be dismantled relatively easily without leaving any pollution behind if the water level were to rise too much. The new houses must be reusable building kits. It would probably not be possible to build a water treatment plant in such a way.

As mentioned earlier, the houses are constructed of wood. This is insulating, (relatively) light and solid and the constructions can be dismantled and reused more easily. In the process, the CO<sub>2</sub> remains stored in the wood (“Systeemtransitie Houtbouw Nederland,” 2020). Also during “manufacturing” CO<sub>2</sub> is absorbed instead of emitted. A condition is that the (production) forests are maintained sustainably.

As far as mobility is concerned, the aim will not be a car-free village in the future. Public transport does not function very well in this area and (partly due to the low density) is unlikely to improve any time soon. For example, it has already been decided that the metro line from Nesselande will not be extended. Moreover, the village is likely to be popular with commuters because of its proximity to the motorways. On top of that, public transport proved to be unreliable in times of Covid-19, not only because of the risk of contamination, but also because its use was prohibited. Also, working from home, which is likely to continue to be more frequent, will not make public transport more cost-effective. Therefore, the new village will facilitate electric cars with charging points and sufficient parking spaces, but as much as possible out of the way and out of sight.

## Social sustainability

Social sustainability will probably be based to a large extent on the fact that this village will be very different from others and will therefore attract more like-minded people. This also depends on whether the housing crisis is eased and a more traditional village can be chosen. Most people mention the sense of community when asked what makes a village a village, so this feeling is important to them, although not always positive. However, the people who experience this feeling as too much social control usually do not choose to live in a village. Having said that, it should also be mentioned that it is the sense of community that makes the cauliflower districts in the city the most popular ones (Eenink, 2007).

People who form a community usually are more willing to share, both conversations and thoughts as well as things and space. However, the idea is not to more or less force them into this, but to facilitate it with community centres, events and, for example, shared cars. What might be a difficult point for some people is that there should be no fences around gardens, where residents are more or less entrenched, leading to very unattractive rear sides. Instead, privacy is created by distance and vegetation and everyone actually has the open countryside as their back garden.

The like-mindedness does not necessarily have to do with income or origin, although that will probably have an impact. Love of nature and a nature-friendly way of life can apply to anyone, so everyone should be able to live in the new village. This will be facilitated by different types of houses in different price ranges. A 40% share of affordable houses is aimed for. It is not the intention to create expensive and cheap neighbourhoods in beautiful and less beautiful places, but also not to mix everything haphazardly. Again, the idea is to facilitate and offer choices, not to force.

## The new village

In the first exploratory designs, the existing ribbons were densified. Initially with individual houses, later complemented by residential areas designed as farmsteads and compact clusters on stilts in the wet areas. Then clusters in the woods were added, as well as a core, which ended up completely separate from the other residential areas. Although it could have been a choice to leave it that way and not call the new residential area a village, a new direction has been taken. Therefore, the first designs have been included in the appendix and the new direction will be elaborated on here.

### A new identity

The new village must have its own identity. This cannot be derived from a historical core. Imitating a historical core would probably not have the same effect as a real one. Based on the research for this project, the new identity will be based on the landscape. The houses will be organised in clusters. Each cluster will have the identity of the landscape in which it is

situated. The diversity of the landscape will give rise to a diversity of identities. The form of the new village brings unity to this. Thus, the new identity of the village will be: *unity in diversity, based on the landscape.*

To create diversity in the clusters, a kind of grid was needed, which would place the clusters in the landscape without regard to the landscape in which they landed. This is because this designer (the author) tends to sort unconsciously anyway. This does not mean, however, that the design does not take the landscape into account or is not embedded in it. It is only a tool to achieve diversity. The idea came up to use the pattern of curves formed by the Fibonacci sequence of numbers. This is very appropriate, as it occurs very frequently in nature (fig. 88). Fig. 89 shows what the design could look like if the Fibonacci sequence were applied. A centre with arms spiralling around it. The great advantage is that the application brings not only diversity but also unity: If each arm gets an access road along all the clusters,

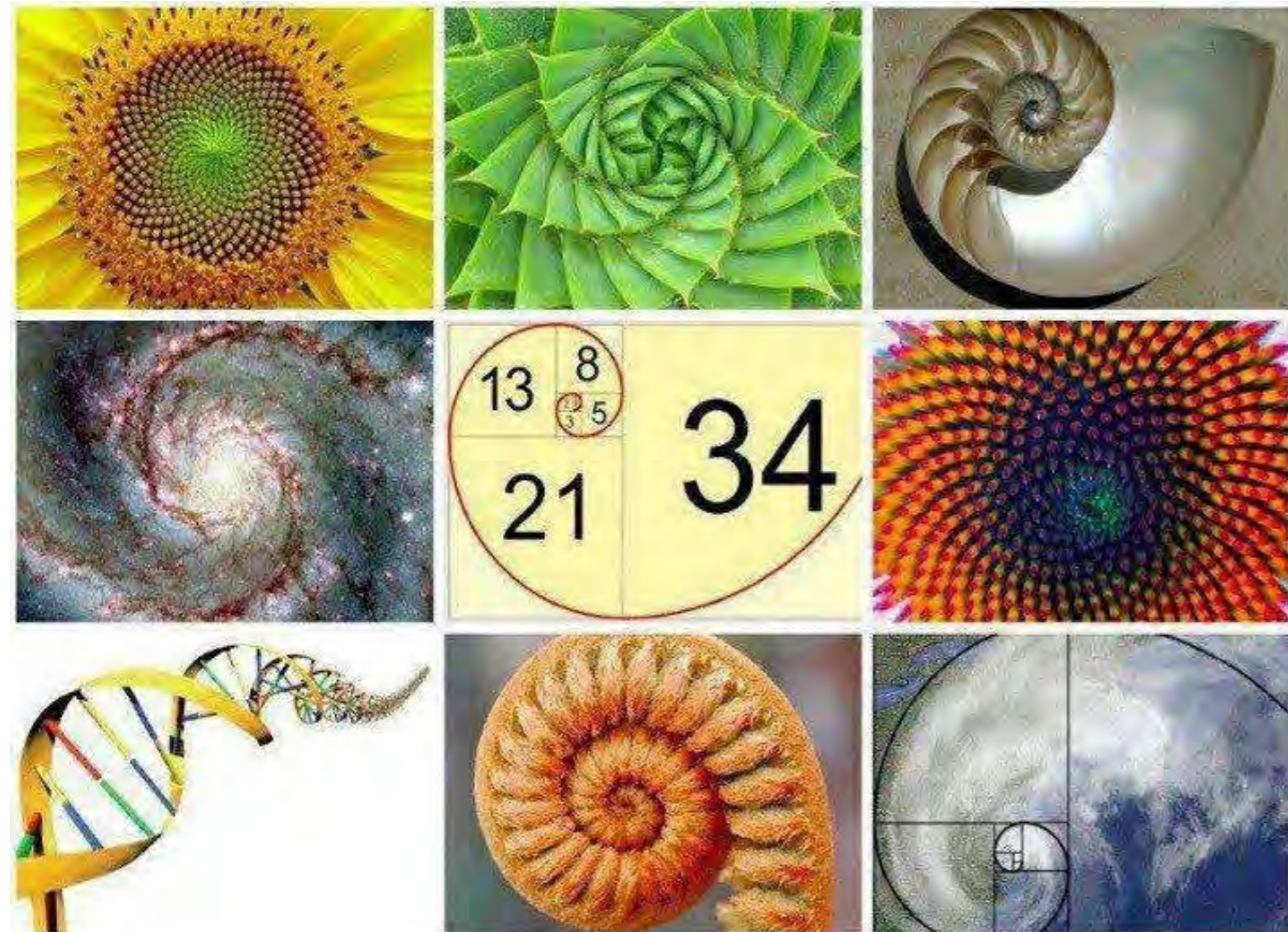


Fig. 88. Some examples of how the Fibonacci number sequence can be found in nature. Source: <https://mytechnofuturemathseasylearn.blogspot.com/p/fibonacci-seriesnumbersequence-god.html>



Fig. 89. Possible form of the village when the Fibonacci number sequence is applied. By author.

then all those roads lead to the core. There are more advantages:

The long lines are reminiscent of the long lines in the polder, but because they are curved, they give a feeling of cosiness and security and also strengthen the unity, because someone standing in the village can see the village around him, despite all the open space.

The open space extends into the core, like the green fingers of the earlier garden city. Although the design requires more surface area, the space in between can be used well for small-scale agriculture and recreation, and a view of the crop fields is good for raising awareness that we need nature for our food supply.

The clusters on long roads instead of regular

urban fabric mean that less infrastructure is needed, which means that the weak soil is not unnecessarily strained.

Possible disadvantages are, in addition to the already mentioned large required area at low density, a somewhat lesser mobility because the roads do not form a finely-meshed network, and less recognisability of the typical characteristics of the "droogmakerij".

It should be noted here that the Fibonacci sequence only serves as a tool and the form need not be recognised. It is by no means the intention to turn the village into a work of art that will be deposited in the landscape without mercy.

## The design for the new village

This is what the new village will look like. The houses will be built in clusters in the landscape. The infrastructure and the housing clusters in general will be discussed on the following pages. After that, one type of cluster, the forest cluster, will be looked at in more detail.



- Food forest
- Woodland surrounding clusters
- Play forest
- Park-like low-density woodland
- Mix of new, small-scale crops and forestry
- Grassland
- Natural vegetation
- Water (0 - 40 cm)
- Water (40 - 80 cm)
- Residential cluster
- Pile dwellings on jetties
- Pile dwellings by the road

Fig. 90. The design for the new village. By author.

## Infrastructure

Existing roads will be used as much as possible. The new roads will be connected to these. The drawing below shows that there are various types of new roads, as well as walking/cycling paths. Only the roads in the core are paved. The other roads are semi-paved and are largely situated on dikes or strong wooden jetties (see fig. 92). Like the existing main roads, they will be at -5.1 m NAP. The semi-paved roads put less pressure on the soil and will not leave

any pollution behind if they ever have to be removed. They also fit better into the landscape. Cables and pipes can run on or under the jetty roads. The roads and footpaths are both on Fibonacci curves, but in opposite directions. This gives a different experience. On the road, you pass all the clusters on one side and the landscape on the other, while on the footpaths you walk all the way through the landscape and occasionally pass between two clusters.



Fig. 91. The infrastructure of the new village. By author.

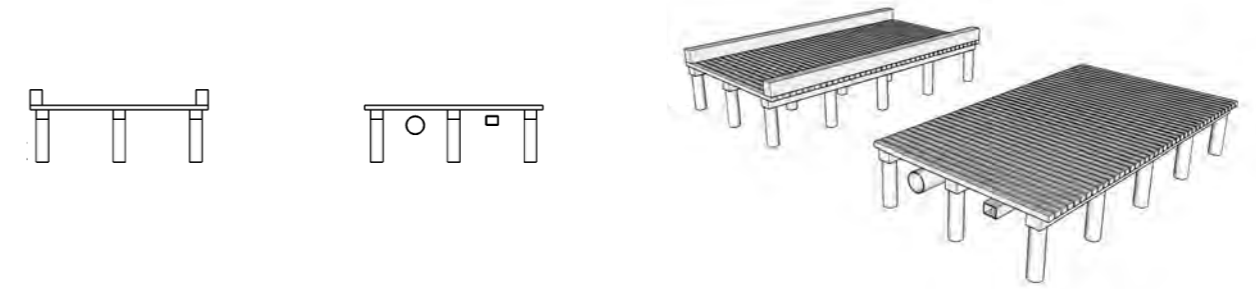


Fig. 92. Jetty road, section and perspective view. By author.



Fig. 93. Impression of the clusters seen from the road. By author.

## Guidelines for clusters

As shown on the map on pages 100-101, the houses will be built in clusters. There will be forest clusters, farm clusters, water clusters and park clusters, and sometimes mixed forms of these, each with its own character, giving future residents a choice. The centre is a special cluster with its own atmosphere. All these

characters together must form a certain unity and determine the village's identity. Guidelines have been drawn up to give direction to this. Below are some guidelines for the clusters in general and some for the forest clusters in particular.

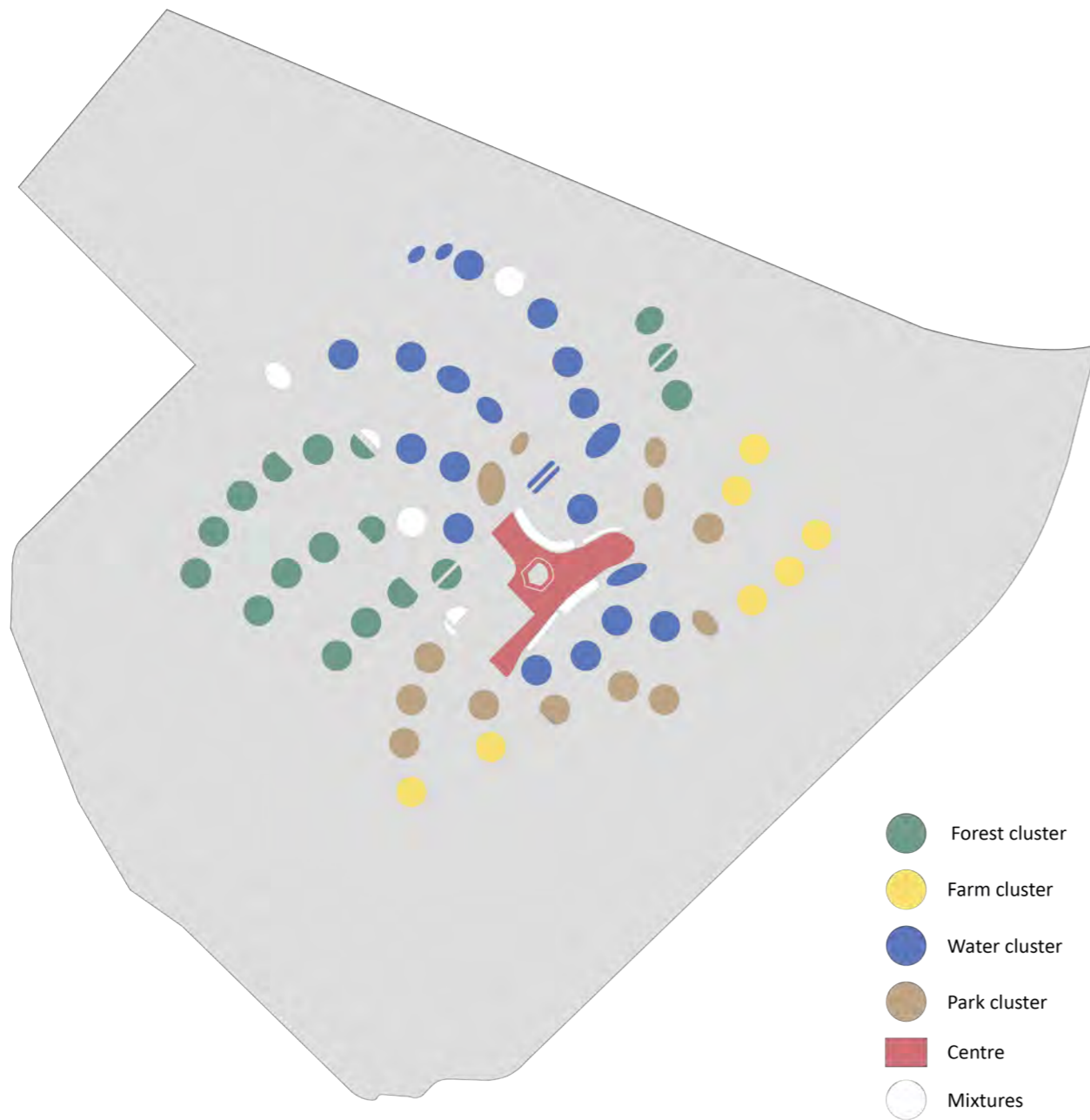
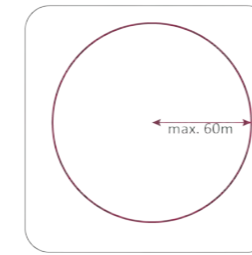
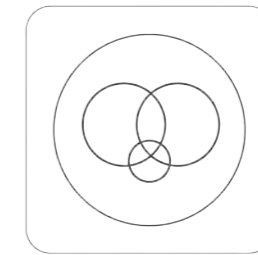


Fig. 94. Location of the different types of clusters. By author.

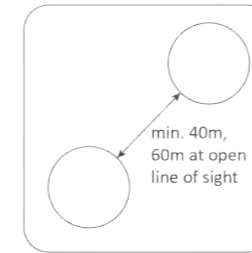
## General guidelines



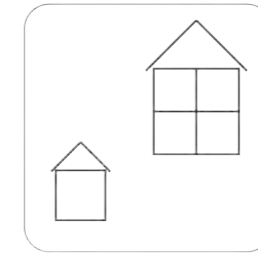
The whole cluster must fit within a circle with a radius of 60m.



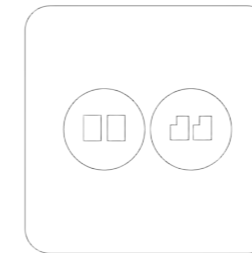
In each cluster there are houses in different price ranges and for different target groups.



There is a minimum distance of 40m between the clusters. In the case of open lines of sight, this is 60m.



Apartment buildings should look like a (somewhat) larger version of the houses in the cluster (or like barns in the farm clusters).



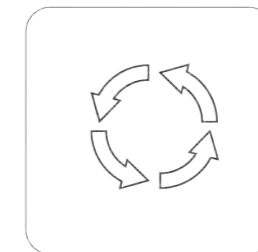
Houses in the same cluster have the same basic shape (except for the park clusters).



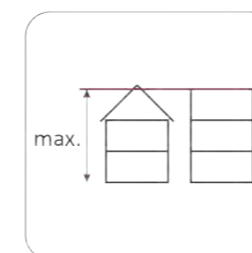
The materials and colours used for all houses should blend in with the surroundings.



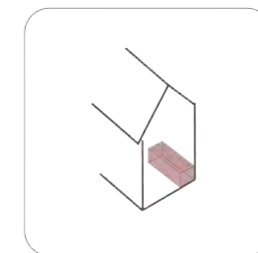
Houses in the same cluster have the same roof shape (except for the park clusters).



Houses are built as demountable kits from recyclable materials.



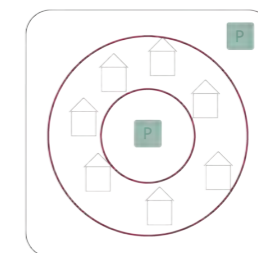
The maximum building height is 3 floors, including the ground floor.



Cars must have a place in the building.



Within a cluster, houses can vary in size and height.



Where possible, a small number of parking spaces for guests, hidden in greenery outside the cluster or, in higher clusters with a large central area, hidden under a green elevation in the central area.

## Forrest clusters

Forest clusters are, of course, clusters in the forest. Most are in lower lying areas. Therefore, the houses are built on piles and there are elevated paths to avoid having to wade through the wet central area after a heavy rainfall. A few forest clusters are situated higher and do not need these facilities. The houses are arranged around a collective courtyard and face the central area. They can be detached, semi-detached or in small groups and all have a modest private outdoor space. Fig. 95 shows what the parcellation could look like. Fig. 96 shows an impression at eye level of a forest cluster. The following pages contain the guidelines for forest clusters in particular, a longitudinal and transversal section and an impression of a cluster with a mixed character. It shows how the “artificial fibonacci design” lands in the landscape and how it blends in with the existing features in the landscape such as the ditches of the peatland and the new features such as wet areas and the forest.

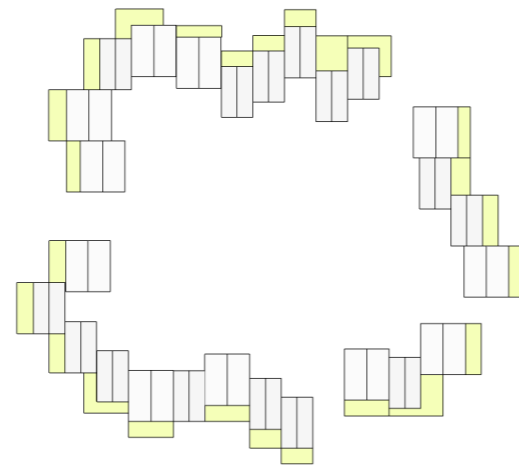
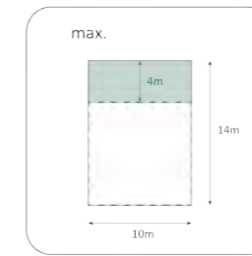


Fig 95. Example of a possible parcellation. By author.

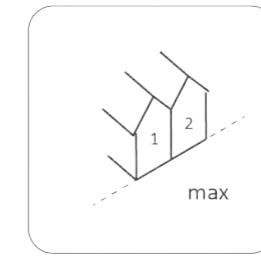


Fig 96. Impression of a forest cluster. By author.

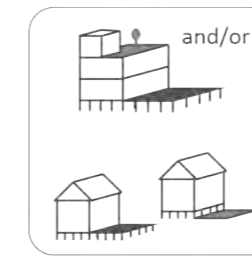
## Guidelines for forest clusters



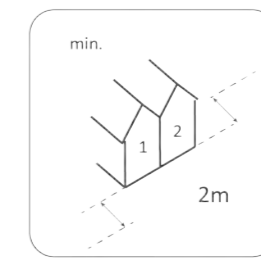
A plot has a maximum size of 10m x 14m, whereby the buildings at the rear may be a maximum of 4m from the edge of the plot.



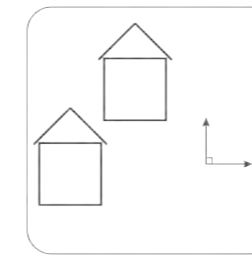
There is a maximum of 2 houses next to each other on the same building line.



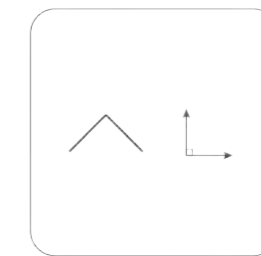
All houses have a private terrace, either on the ground or on piles and/or on the roof.



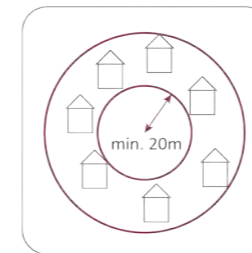
When linking more than 2 dwellings, the next dwelling must be at least 2 m in front of or behind the building line of the one next to it.



All the houses in the cluster are on an orthogonal grid. They stand with their front doors to the collective central area.



All roofs are in the same direction. This need not be the case in every cluster.

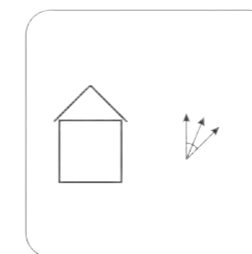


The collective central area has a radius of at least 20m.



In the lower forest clusters, the houses stand on piles.

## Also possible in forest clusters



Houses are not on an orthogonal grid. They do, however, face the collective central space with their front doors roughly.



In clusters where the houses are not on an orthogonal grid, the roofs are (obviously) not all in the same direction.



Fig. 97. Longitudinal section through two clusters. By author.



Fig. 98. Cross section through a forest cluster. By author.

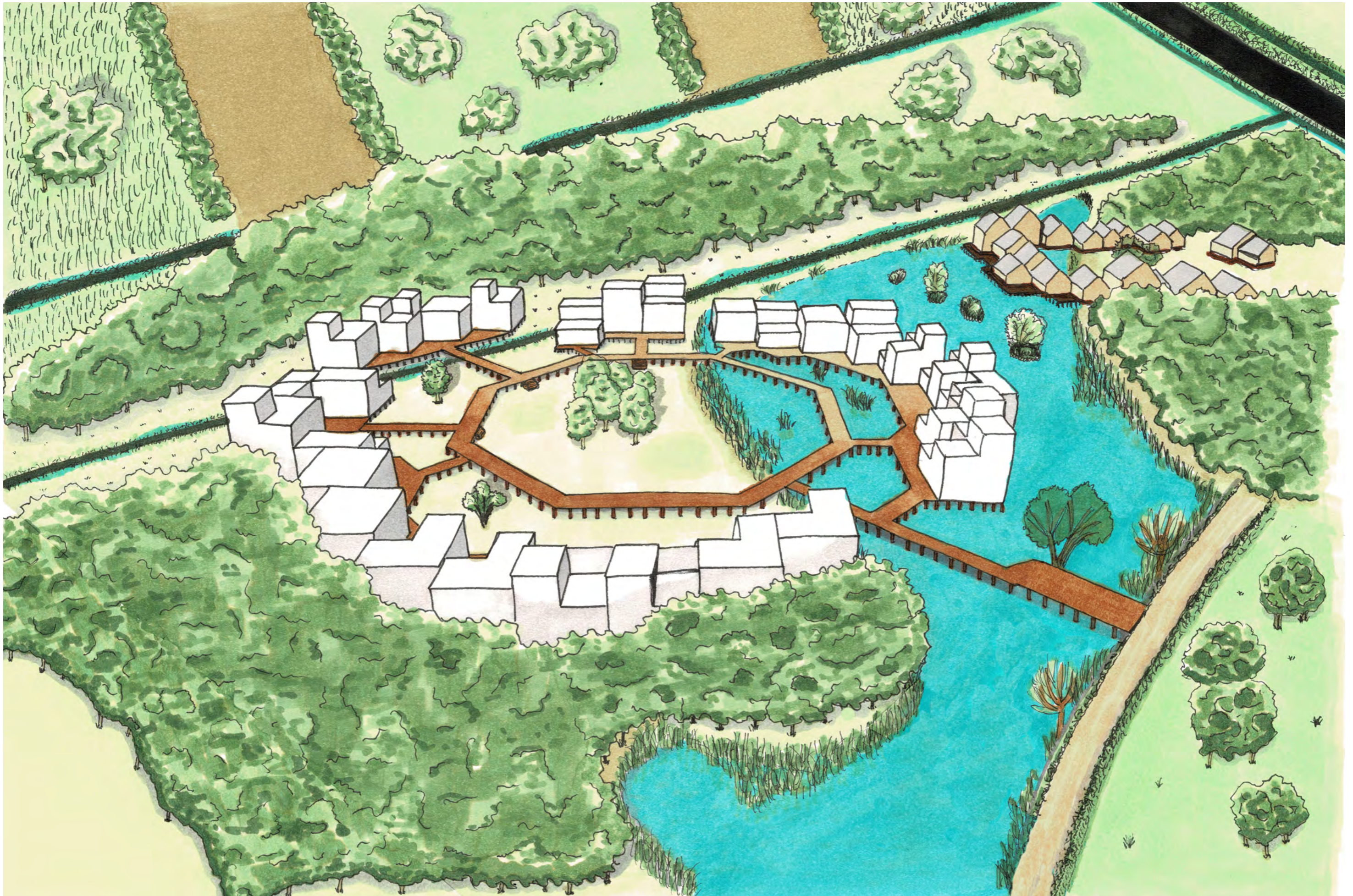


Fig. 99. Impression of a cluster with a mixed character. By author.

## The centre

The centre consists of two parts: The inner ring and the streets around it. The inner ring is located around a common multifunctional centre, which should be designed for various functions, such as events, meetings, markets, recreation and so on. It includes a paved (market) square, terraces of café(s) and restaurant(s), a hidden parking facility, sustainable mobility facilities and lots of greenery. It could also accommodate a children's farm, for example. The buildings around this central area could house local shops, cafés and restaurants, a primary school, childcare facilities, care facilities and a small library. Furthermore, these buildings consist of flats for people who like to live close to the facilities, such as the less mobile elderly.

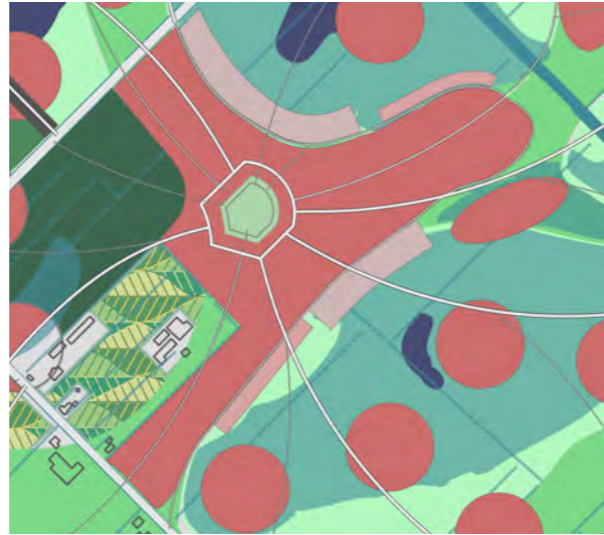


Fig. 100. The centre. By author.

In the streets around the inner ring, the houses face the street and have a private terrace and a common area at the back. It all looks a little more traditional. The through streets are wider than the quieter "residential streets", where only local and slow traffic is allowed. Exceptionally, there is on-street parking in the wider through streets. A few small businesses could be accommodated in these streets.

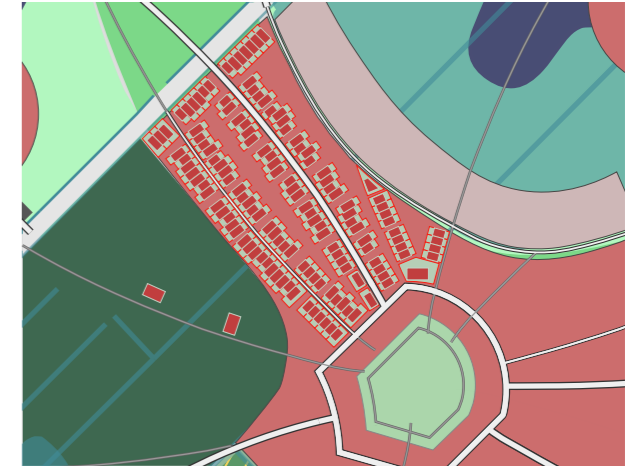


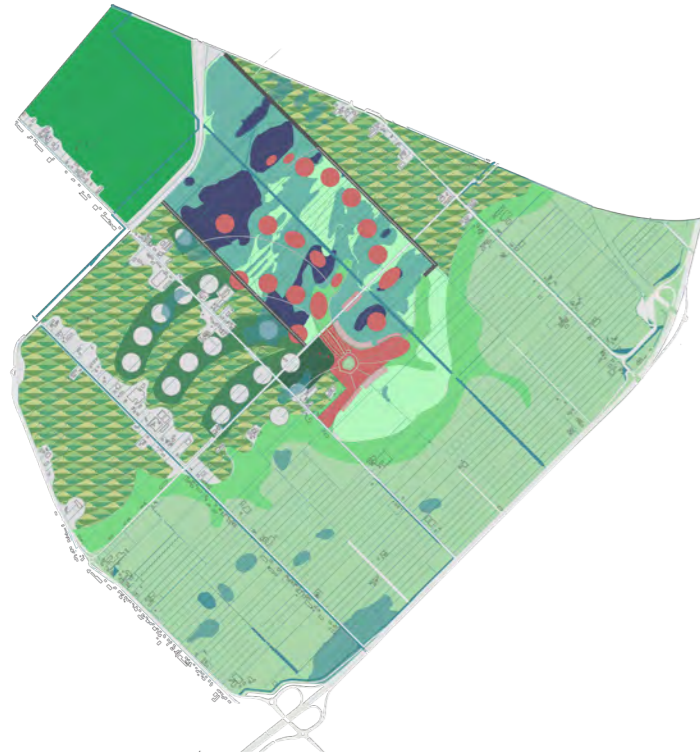
Fig. 101. Example of streets in the centre. By author.



Fig. 102. Impression residential street. By author.

# Phasing

The construction of the village is divided into three phases of five years each.



## Phase 1 0 - 5 years

In the first phase, the dikes will be built around the wetland. The food forest is laid out and the agricultural businesses will have to switch to a new crop and plant trees. The spots of the future forest clusters will be kept open. The clusters in the wetland area will be built as well as the core and the infrastructure needed for those parts.



## Phase 2 6 - 10 years

In this phase, the clusters on the east side will be built. The associated infrastructure is also being constructed. In the meantime, the trees in the park and woods are growing. At the end of this phase, the water level in the wetland area can be raised.



## Phase 3 11 - 15 years

In the last phase, the clusters and infrastructure in the wood will be built as well as the remaining clusters and infrastructure south of the core. The latter are in the final phase because they are located on land that is currently still in use by agricultural businesses. At the end of this phase the water level in the rest of the area can be raised.

## Legend

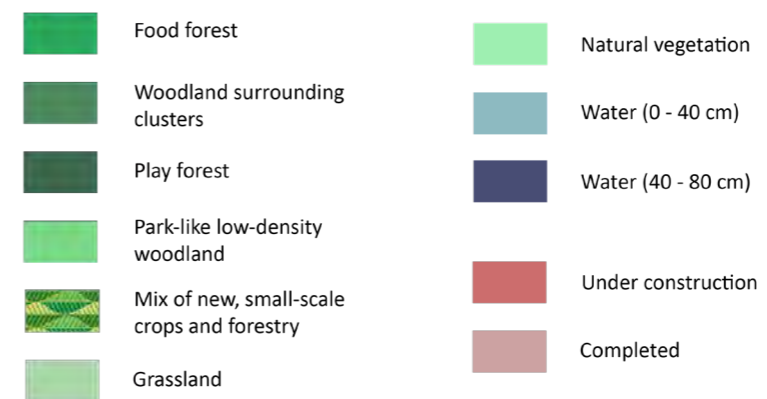


Fig. 103. Phasing. By author.

## Phasing deconstruction

The rising sea level will cause the pressure of saltwater seepage in the Zuidplaspolder to increase. The polder will also become wetter in the future (Deltares, Bosch Slabbers & Sweco, 2021). More and more water storage and buffering will therefore be needed. This makes it very unlikely that the new village will last for centuries. Sooner or later, it will have to make way for water, but since there is great

uncertainty about the rate and extent of the sea level rise, it is difficult to predict when. However, the phasing of deconstruction can be linked to the groundwater level, which will continue to rise in the future. The following phasing is based on this.

- Deconstruction phase 1
- Deconstruction phase 2
- Deconstruction phase 3

### Phase 1

When the water level in the main area, which was set at -6.2 NAP in the plan, reaches the level of the marshland (-5.7 NAP), the lowest lying areas will be flooded. The clusters in these areas have been designed for this, but the clusters that are a bit higher, but not as high as the creek ridge, will have to be dismantled before the water rises any further. A number of existing ribbons will also be flooded. These will have to be evacuated as well, or the water level will have to be fixed at this maximum height of -5.7 NAP.

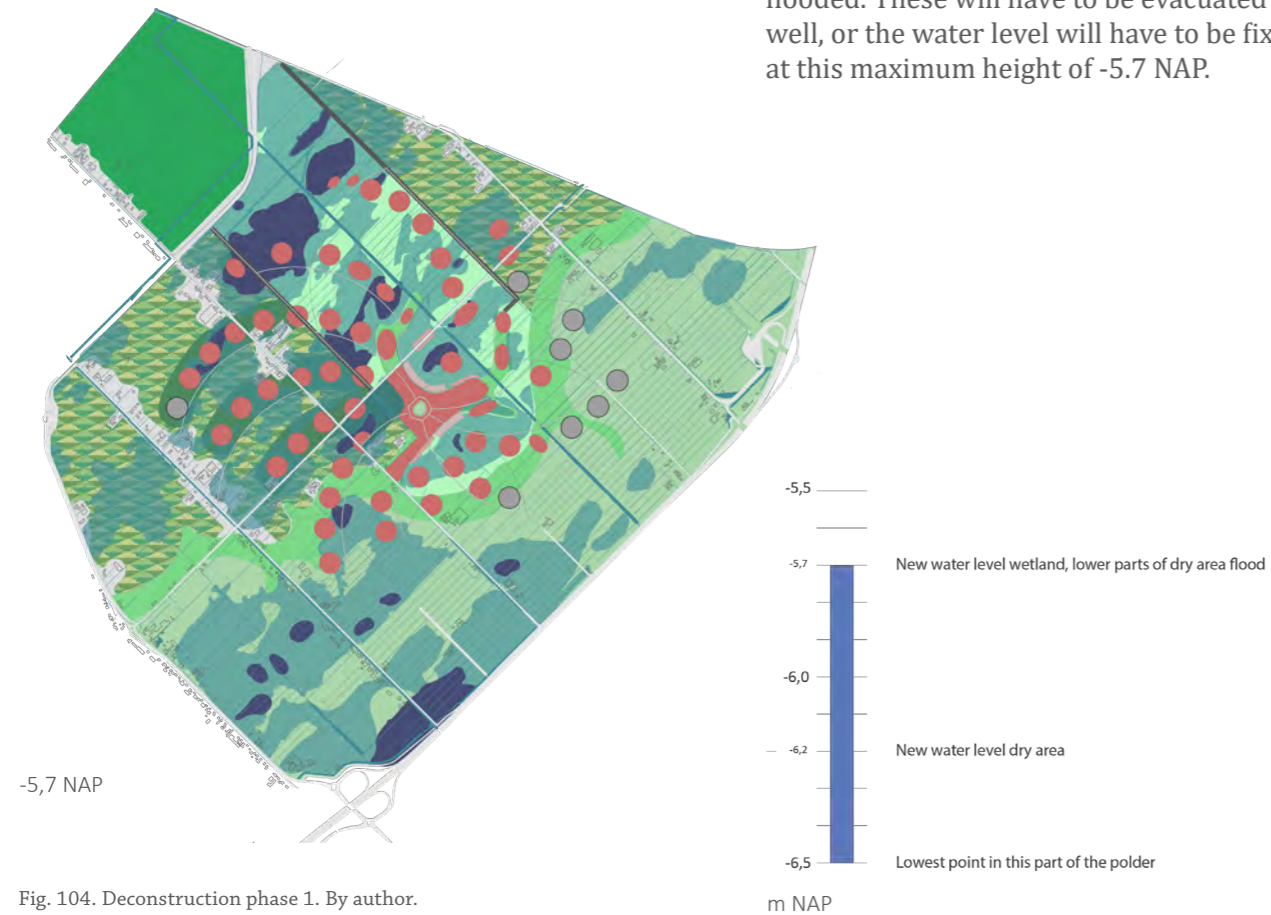
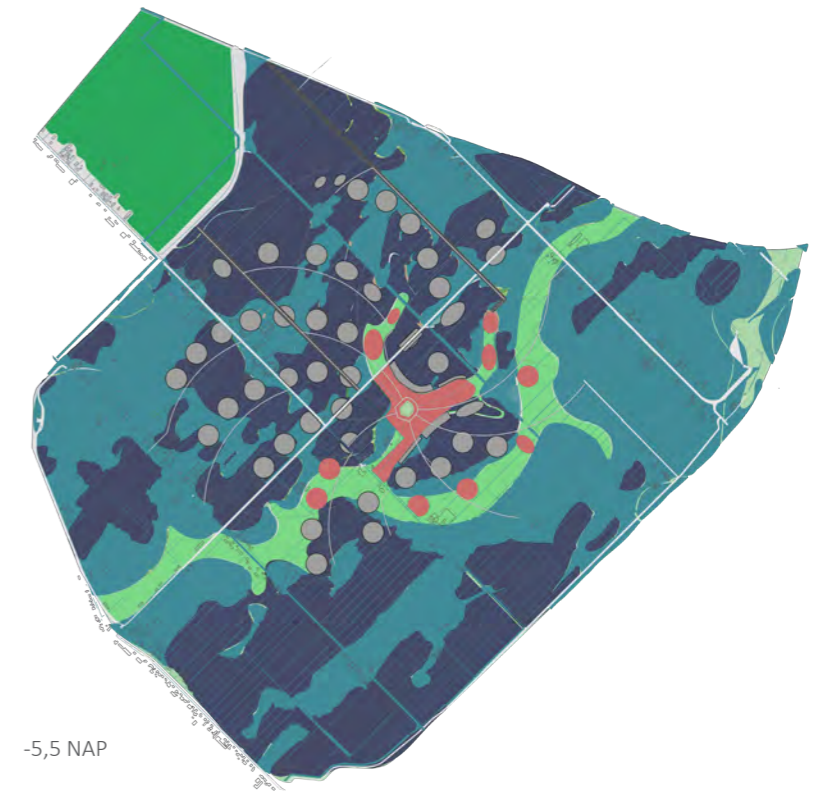


Fig. 104. Deconstruction phase 1. By author.

### Phase 2

If the water is allowed to rise further, at -5.5 NAP only the creek ridge will be above water. At -5.2 NAP, the pile houses will be flooded and must therefore be dismantled before this level is reached. If the section on the creek ridge were to function for a longer period of time from now on, the existing road through this area (part of the ribbon) would have to be raised.



-5,5 NAP

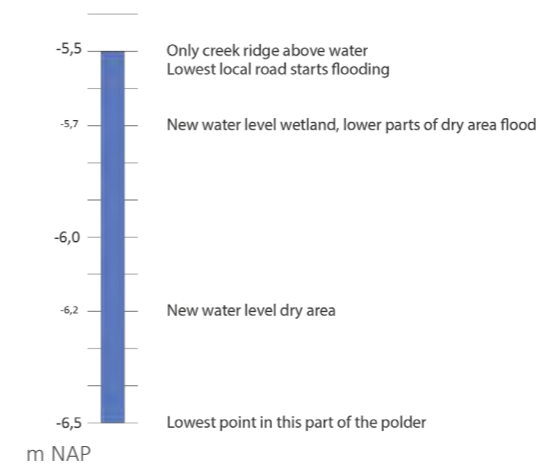


Fig. 105. Deconstruction phase 2. By author.

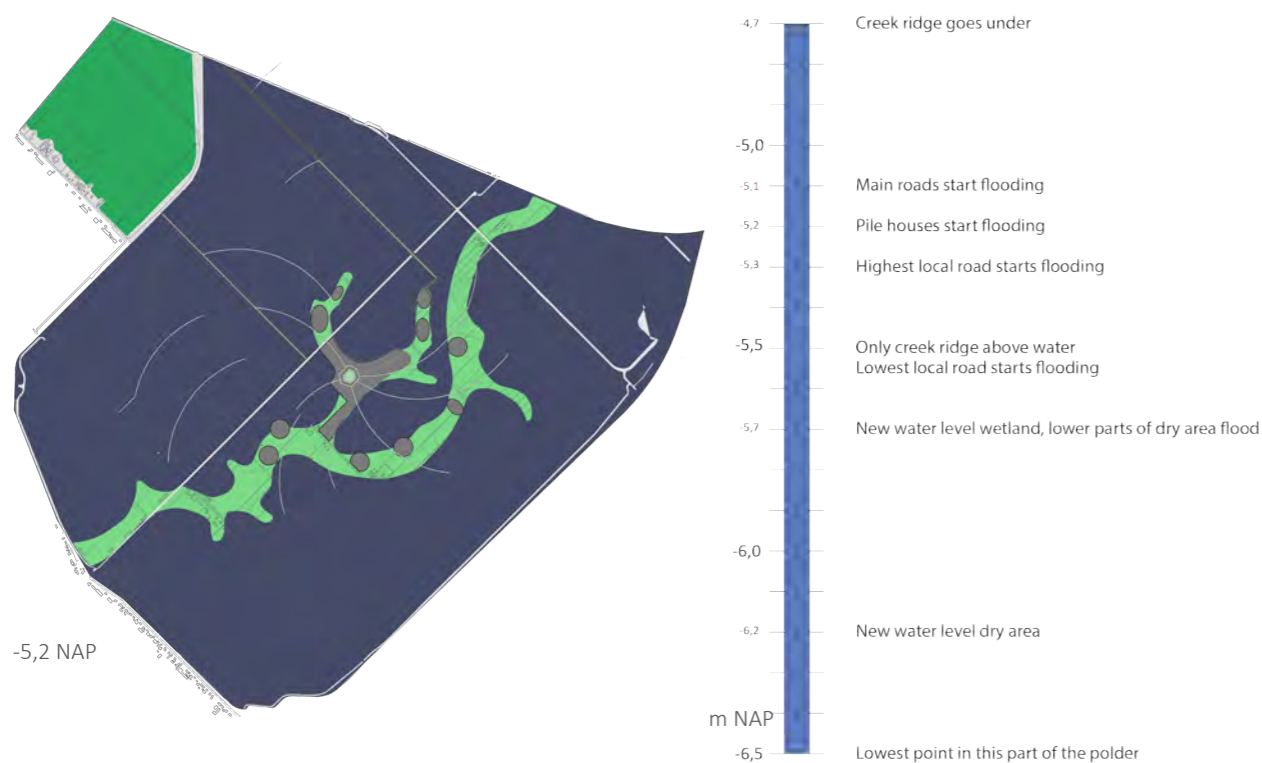


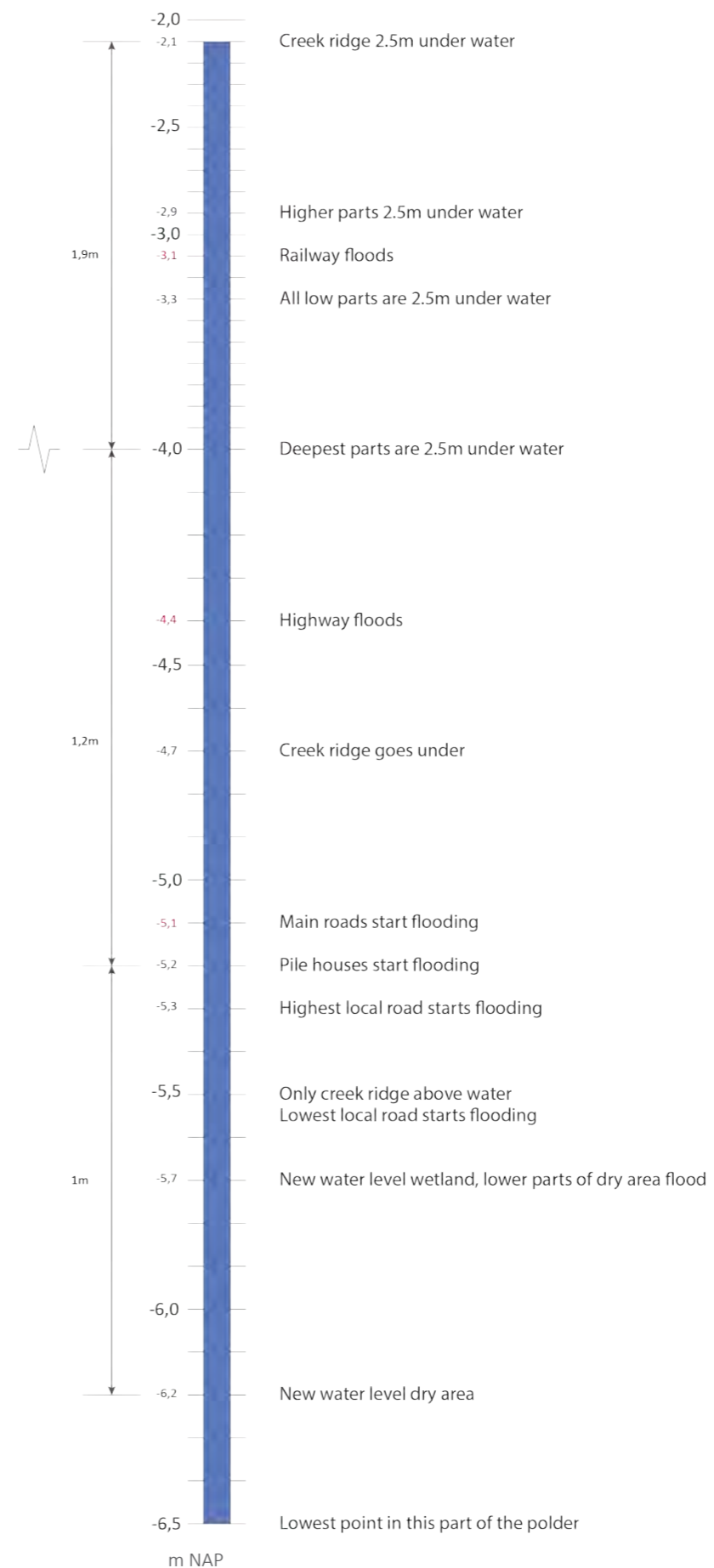
Fig. 106. Deconstruction phase 3. By author.

### Phase 3

From -5,2 NAP a start has to be made with clearing out the creek ridge, unless the level is fixed now. At -5.1 NAP, the main road bordering the area in the southwest and partly in the northwest is flooded. This means that the water would flow out of the area, so this is where the limit of the water level rise is reached, unless this road is also elevated. In that case, the water may rise further until the creek ridge disappears under water at -4.7 NAP.



Fig. 107. End of deconstruction phase 3. By author.



### Why not floating houses?

One of the housing types that the Zuid-plas municipality would like to see is floating houses. However, these cannot be realised here, mainly because the district water board does not allow the excavation of parts of the polder, which is logical because it is precisely the deep location that causes problems. A floating house has an average depth of about 1.5 metres. For water quality it is necessary that there is at least 1 metre of water under the bottom of a floating house. Floating houses therefore require water of at least 2.5 m in depth. The measuring stick on the left shows that the lowest parts of the polder are only under water 2,5m from a level of -4.0m NAP. However, as was shown in Phase 3, the main roads in the polder already flood at -5.1 m NAP and the national road would flood at -4.4 m NAP, which will not be elevated just for the purpose of floating houses.

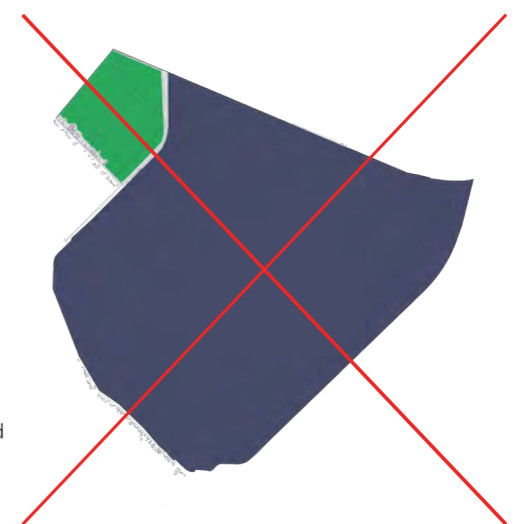
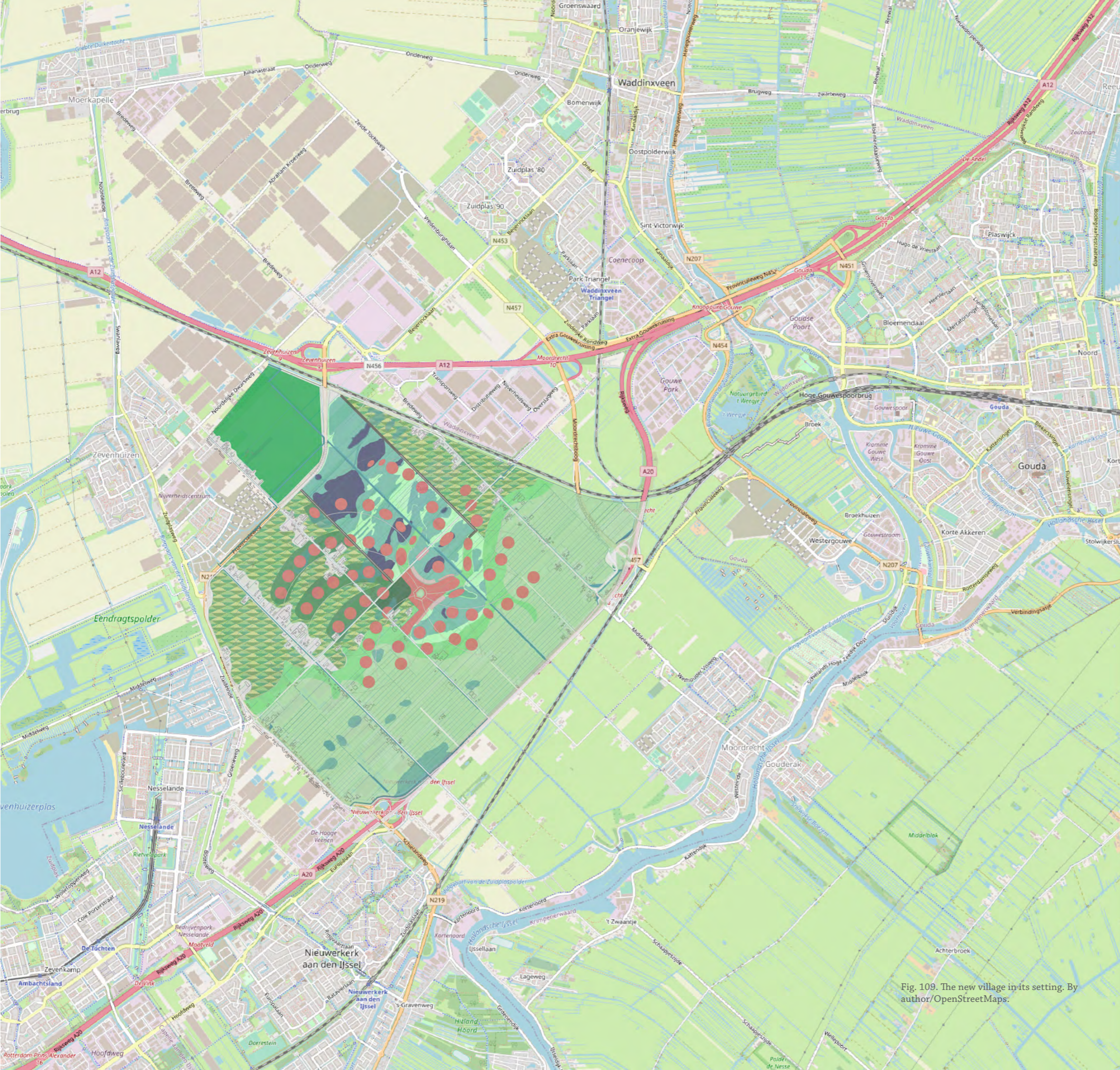


Fig. 108. Consequences of a further rising water level after the deconstruction phase 3. By author.



## The new village in its setting

As this map shows, the new village is close to the other four villages, especially to Zevenhuizen. Because the new village also has a low density, it will only have facilities that are needed on a daily basis and facilities for young children. For example, half a football field or other sports field can be built as a satellite of a sports club from one of the other villages, so that the youngest children can play sports close by. The low density also means that public transport is difficult to make profitable. Although more and more people have electric bikes, this is not a solution for everyone. Many cars will therefore still be needed in the village, unless public transport is looked at differently. In any case, provisions will be made for cars to be as sustainable as possible. Efforts will also be made to ensure that they do not dominate the scene.

## Density

As mentioned, the new village has a low density. It is not yet possible to calculate this exactly. To make a rough estimate: There are about 60 clusters with about 35 houses. That is 2100 houses. The surface of the village (as a rectangle) is 600 hectares, but there is still a lot of agricultural land in between. Without that, there are about 200 hectares left. The density then becomes about 10 houses per hectare. This can still vary considerably if larger or smaller clusters or more or fewer apartments are built.

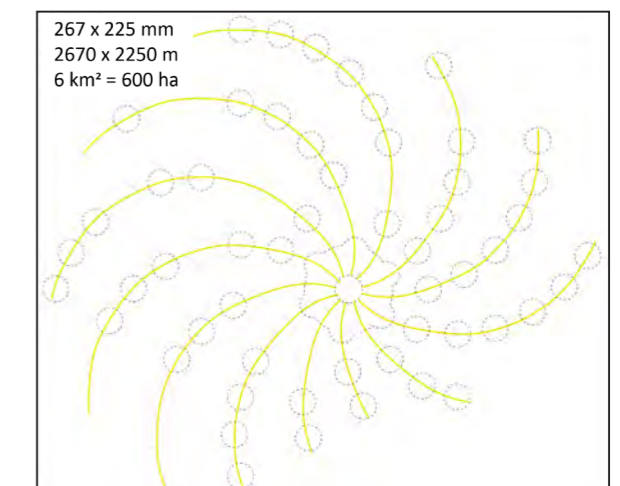


Fig. 110. Surface area of the village. By author.

Fig. 109. The new village in its setting. By author/OpenStreetMaps.

Some more numbers:  
Surface area Zuidplaspolder: 45 km<sup>2</sup>  
Surface area of central area: 9,7 km<sup>2</sup>  
Surface area food forest: 0,6 km<sup>2</sup>

## Reflection

During my studies, a lot of attention was paid to the million houses that we have to build in the Netherlands. Cities are being densified, but not all those houses will fit into the existing cities, so decisions must be made on how to deal with building in the little open space we have. Moreover, not everyone wants to live in the city, even though urbanisation is still increasing. From this point of view, this project to design a new village with a village character is relevant to the relatively small group of people who like to live in a rural village atmosphere. From the point of view of biodiversity and climate adaptation and mitigation, it is relevant to everyone. We must give space to nature because we know that we need it not only to relax there, but because human life depends on it. We need ecosystem services for growing our food and for recreation, but also for their restorative power, so it is very relevant to think about how to balance nature and human needs, because we will increasingly have to share the available space. This also applies to agriculture. The water level in the polder cannot be kept low enough for much longer to make regular farming possible, but this may be an opportunity to experiment with eco-friendly farming and wet crops. In connection with the sharing of space, another relevant theme is learning (more) about how our physical environment can contribute to the building of a community. This is vital for the liveability of our settlements in an increasingly individualistic society and can help the integration of immigrants.

### Methodology

Since the Netherlands is already fully planned, it is not common today to build villages from scratch. I should have included some more specific research on this process. I did not realise enough how different it is from what we have done so far. There is also nothing to analyse on the site except the landscape. Instead, I have analysed other villages and looked at studies that other people have done about villages, but it is difficult to find out which characteristics are transferable and what only works in a specific village. In addition, there seems to be a (partial) difference between what is typical for a village and what residents of Zuidplaspolder like about their village. I had not

anticipated this. However, this is overcome by the literature review. I was looking for an answer in the literature to the question of how physical characteristics of a place influence the feeling that people have with that place. For this, it does not matter whether those characteristics are typically village-like or not.

### Problems

A problem arose from the fact that the village does not yet exist. Housing needs surveys refer to the existing stock of houses. For example, the survey states something like: Starters want an apartment, but they fill up the stock that becomes available because more families move to a single-family house, so the current stock is enough. How does that apply to a village that does not yet exist? I try to solve that by looking at the ratio of flats to single-family homes in other villages and what fits into the landscape.

### Generalising results

A problem with this research is that the results are difficult to measure. Biodiversity takes time to increase and is not easy to measure and it will take quite some time for the landscape to develop into the intended biotopes, as succession cannot be rushed. This also applies to the village. It is not finished with just building the houses. The intention is to give the new village an immediate identity and atmosphere that appeals to the residents, but it still needs to develop and a sense of community and place attachment need time to grow. Yet the aim of this project was never to create a building-ready design. It was to inspire, to explore how big a village can become without losing its character and to show a way in which people can live in balance with nature. If it does that, if it helps people to believe that it is possible and that it can be a desirable way of life, then that is already a good and general result. In that sense, this project was general from the beginning. If you choose to see this project as a real plan, a pilot project to learn from, and you want to generalise it, then it would become a strategy, because the natural landscape and water system determines where to build and how, and that is never the same in other places, but you could generalise the approach and the priorities.

### Ethics

I have never been a big fan of building in open spaces, but the housing shortage leaves no other choice. That is why, in this project, I am investigating whether housing and nature can go hand in hand and whether I can position myself differently. That is difficult, because the results of the project are difficult to measure. Then the question was raised whether you should want to build at all in such a low polder. That adds a new dimension to the problem. On the one hand, it is nice to have an argument for not building in the polder. On the other hand, it has far-reaching consequences for the people who already live there if you argue, for example, that it would be better to flood the polder, as the scientists in Wageningen argue. I am still in the process of finding a position on this. Another thought that came up was about the housing surveys. I wonder whether starters really want a flat or are just content with one because there is nothing else available or affordable. In these times of housing shortage, I think that is actually true for many people and houses. Every (affordable) house will be sold or rented in these times. The new village is an opportunity for a whole new start. It would be nice if no houses were built that people do not actually want to live in, but have to settle for. On the other hand, I do not think it is a bad thing if you, as a young person or young couple, start out in a flat and then, after a few years, switch to a single-family dwelling, or, if you do not feel like gardening or have no time for it, are content with a terrace instead of a garden. Here, too, we humans may have to give in a little to nature.

## The Village

I still have a postcard at home  
showing a church, a cart with horse  
a butcher's shop J. van der Ven.  
A pub, a lady on a bicycle  
It probably doesn't mean anything to you,  
but it is where I was born.  
This village, I remember how it was,  
the farmer's children in the classroom,  
a cart rattling on the cobbles,  
the town hall with a pump in front,  
a dirt road through the corn,  
the cattle, the farms.

And along my father's garden path  
I saw the tall trees.  
I was a child and knew no better  
than that it would never end.

How simple they lived then  
in simple houses among greenery  
with peasant flowers and a hedge.  
But apparently they were living wrong,  
the village has been modernised  
and now they are on the right track.  
For behold, how rich life is,  
they see the television quiz  
and live in concrete boxes

with a lot of glass, then you can see  
how well the sofa stands at Mien's  
and her dresser with plastic roses.

And along my father's garden path  
I saw the tall trees.  
I was a child and knew no better  
than that it would never end.

The village youths clumped together  
In miniskirts and beatle hair  
and yell along to beat music.  
I know, it's their right,  
the new age, just like you say,  
but it makes me a little melancholy.  
I used to know their fathers  
They bought liquorice for a penny  
I saw their mothers skipping rope.  
That village of yore, it is gone,  
this is all that remains for me:  
a postcard and memories.

When I saw along my father's garden path  
I saw the tall trees still standing.  
I was a child, how could I know  
that it would go away forever.

## Het Dorp

*Thuis heb ik nog een ansichtkaart  
waarop een kerk, een kar met paard  
een slagerij J. van der Ven.  
Een kroeg, een juffrouw op de fiets  
het zegt u hoogstwaarschijnlijk niets,  
maar 't is waar ik geboren ben.  
Dit dorp, ik weet nog hoe het was,  
de boerenkind'ren in de klas,  
een kar die ratelt op de keien,  
het raadhuis met een pomp ervoor,  
een zandweg tussen koren door,  
het vee, de boerderijen.*

*En langs het tuinpad van m'n vader  
zag ik de hoge bomen staan.  
Ik was een kind en wist niet beter,  
dan dat nooit voorbij zou gaan.*

*Wat leefden ze eenvoudig toen  
in simp'le huizen tussen groen  
met boerenbloemen en een heg.  
Maar blijkbaar leefden ze verkeerd,  
het dorp is gemoderniseerd  
en nu zijn ze op de goeie weg.  
Want ziet, hoe rijk het leven is,  
ze zien de televisiequiz  
en wonen in betonnen dozen,  
met flink veel glas, dan kun je zien  
hoe of het bankstel staat bij Mien  
en d'r dressoir met plastic rozen.*

*En langs het tuinpad van m'n vader  
zag ik de hoge bomen staan.  
Ik was een kind en wist niet beter,  
dan dat nooit voorbij zou gaan.*

*De dorpsjeugd klit wat bij elkaar  
in minirok en beatle-haar  
en joelt wat mee met beat-muziek.  
Ik weet wel, 't is hun goeie recht,  
de nieuwe tijd, net wat u zegt,  
maar het maakt me wat melancholiek.  
Ik heb hun vaders nog gekend  
ze kochten zoethout voor een cent  
ik zag hun moeders touwtjespringen.  
Dat dorp van toen, het is voorbij,  
dit is al wat er bleef voor mij:  
een ansicht en herinneringen.*

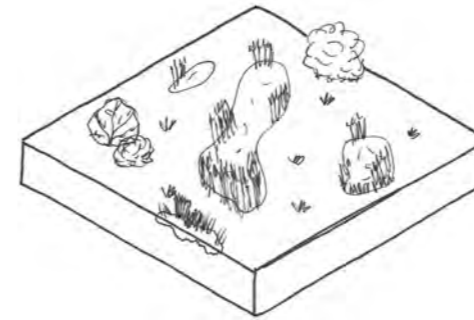
*Toen ik langs het tuinpad van m'n vader  
de hoge bomen nog zag staan.  
Ik was een kind, hoe kon ik weten  
dat dat voorgoed voorbij zou gaan.*

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# Appendix

1



TOOL

### MARSH

Transforming low-lying land into wetlands by raising the water level.

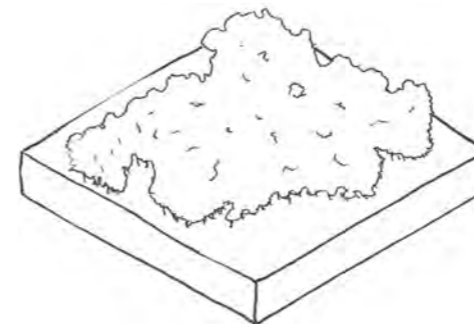
AIM

Enable higher water levels, increase biodiversity.

SCALE: M

SHORT - MEDIUM TERM

2



TOOL

### FOREST

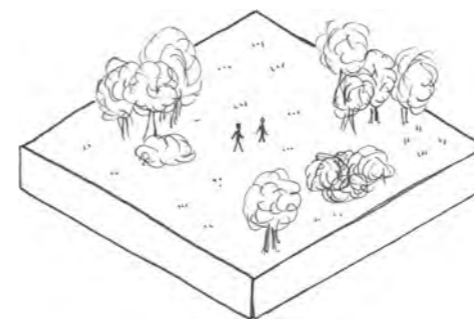
Convert higher ground into forest areas.

AIM

To supplement the diversity of biotopes and thus increase biodiversity. Possibly some wood production. Additionally capturing CO<sub>2</sub>, retaining water and shielding light. Also noise reduction.

LONG TERM

3



TOOL

### NATURE FOR RECREATION

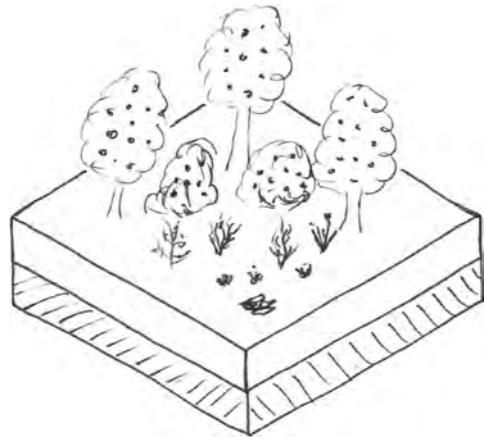
Creating and giving space to less vulnerable "recreational nature".

AIM

Provide space where recreationists can wander through nature and possibly camp.

SHORT - MEDIUM TERM

4



TOOL

### FOOD FOREST

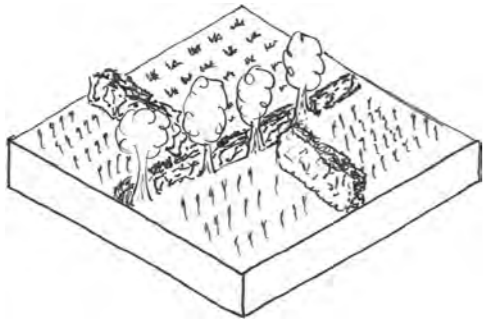
Planting a food forest on what is now monoculture farmland.

AIM

Making food production more sustainable and increasing biodiversity, in a way that farmers can still earn money from the yields and from opportunities for education and recreation. This must then be allowed for in the zoning plan.

MEDIUM - LONG TERM

5



TOOL

### NATURE-INCLUSIVE AGRICULTURE

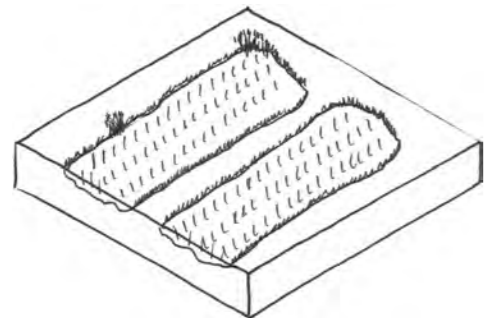
Arable farming on small fields bordered by hedges and rows of trees.

AIM

More sustainable food production and the preservation and creation of habitats for birds, such as the little owl.

SHORT TERM

6



TOOL

### WET CULTIVATION

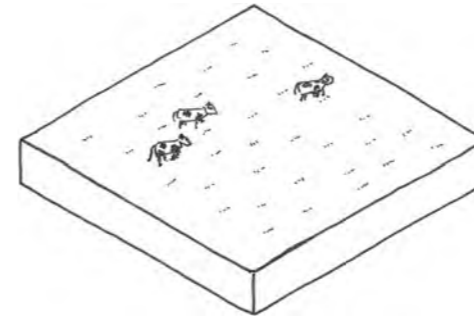
Experiment with wet cultivation.

AIM

Creating opportunities for farmers to still generate an income on wetter soils.

SHORT - MEDIUM TERM

7



TOOL

### (PERMANENT) GRASSLAND

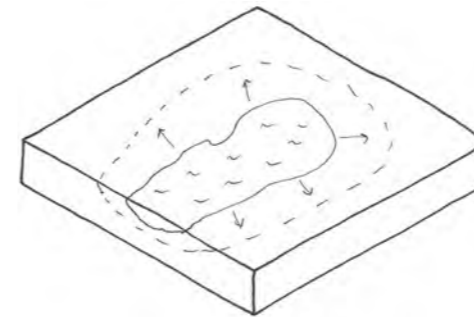
Preserve (part of) the grassland.

AIM

Maintaining and creating meadow bird habitat, meeting the requirements for permanent grassland, creating diversity in biotopes to increase biodiversity, maintaining the characteristic openness in parts of the polder, recreation and livestock farming for the local market.

SHORT - MEDIUM TERM

8



TOOL

### WATER BUFFERING

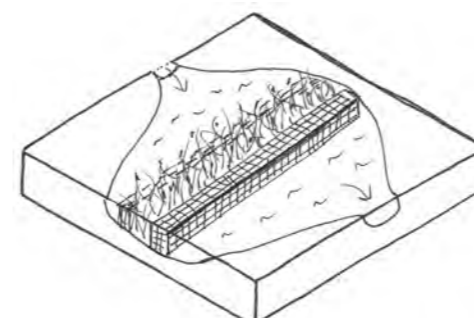
Create a zone for buffering water.

AIM

Create additional capacity for storing rainwater for use in dry periods. Additional water storage is also needed to compensate for the loss caused by raising the water level.

SHORT - MEDIUM TERM

9



TOOL

### WATER PURIFICATION

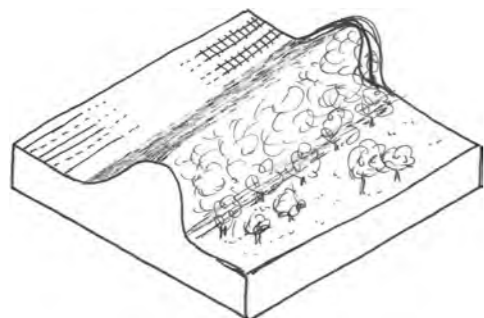
Installing helophyte filters.

AIM

Treating rainwater before it enters the high quality water system. Treating grey water for reuse. The latter requires a permit.

SHORT TERM

10



TOOL

### NOISE REDUCTION

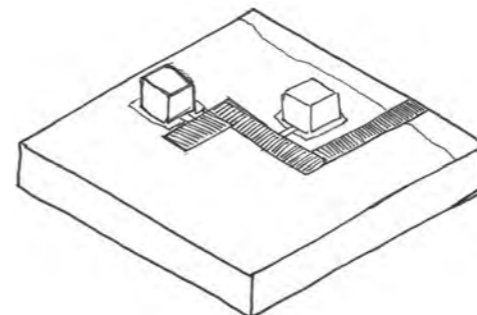
Constructing earthen walls as noise barriers.

AIM

Protection from the noise of the motorway and the railway. Opportunity to create a different biotope. Could have a double function as a dike.

SHORT - MEDIUM TERM

13

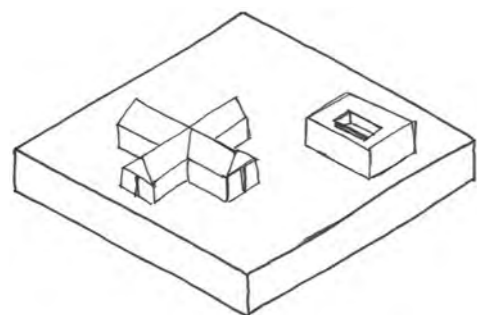


TOOL

### FLOATING HOUSES

AIM

11



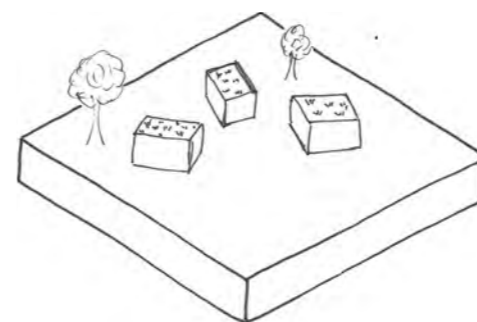
TOOL

### COURTYARD HOUSES

AIM

SHORT TERM

14



TOOL

### GREEN ROOFS

AIM

SHORT TERM

12



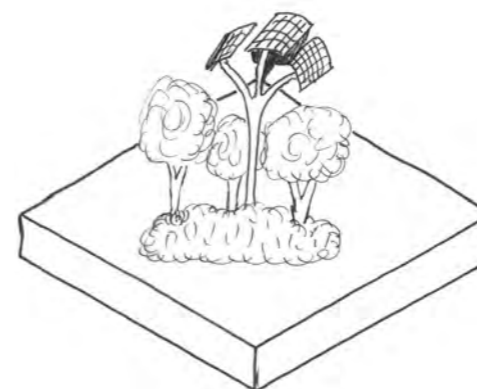
TOOL

### PILE HOUSES

AIM

SHORT TERM

15



TOOL

### SOLAR TREES

AIM

SHORT TERM

# Design of the new village

## Densify the existing ribbons

The first step was to densify the existing ribbons and find out how many houses could be added there, without losing the rural quality of the ribbon. There is normally one farmhouse with accompanying barns on a 40-metre-wide plot. The next one is a few plots further on. With the addition of civilian houses, two houses were put on such a plot. Fig. xx shows that nowadays sometimes a third house is built behind the two front ones with a driveway along the front houses. In this way, three houses fit on one plot. The grain is small (Fig. xx). To try and achieve a slightly higher density, the grain can be slightly enlarged (fig. xx). Many farmhouses are no longer used as such (fig. xx) and the farmhouse or barn is often converted into a single dwelling. Instead, the entire farmyard can be redesigned or newly built. The size of the buildings is large enough to accommodate a number of dwellings. This creates a residential cluster with a very rural atmosphere. With some rough measurements and calculations (to be found in the appendix on page xx), about 1000 to 1800 dwellings can be added in this way. Next, a way of living in the wetter areas had to be found, preferably with a somewhat higher density. This led to the cluster on stilts,



Fig. 44. Infrastructure (information from Open Street Maps).



Fig. 44. Infrastructure (information from Open Street Maps).



Fig. 44. Infrastructure (information from Open Street Maps).

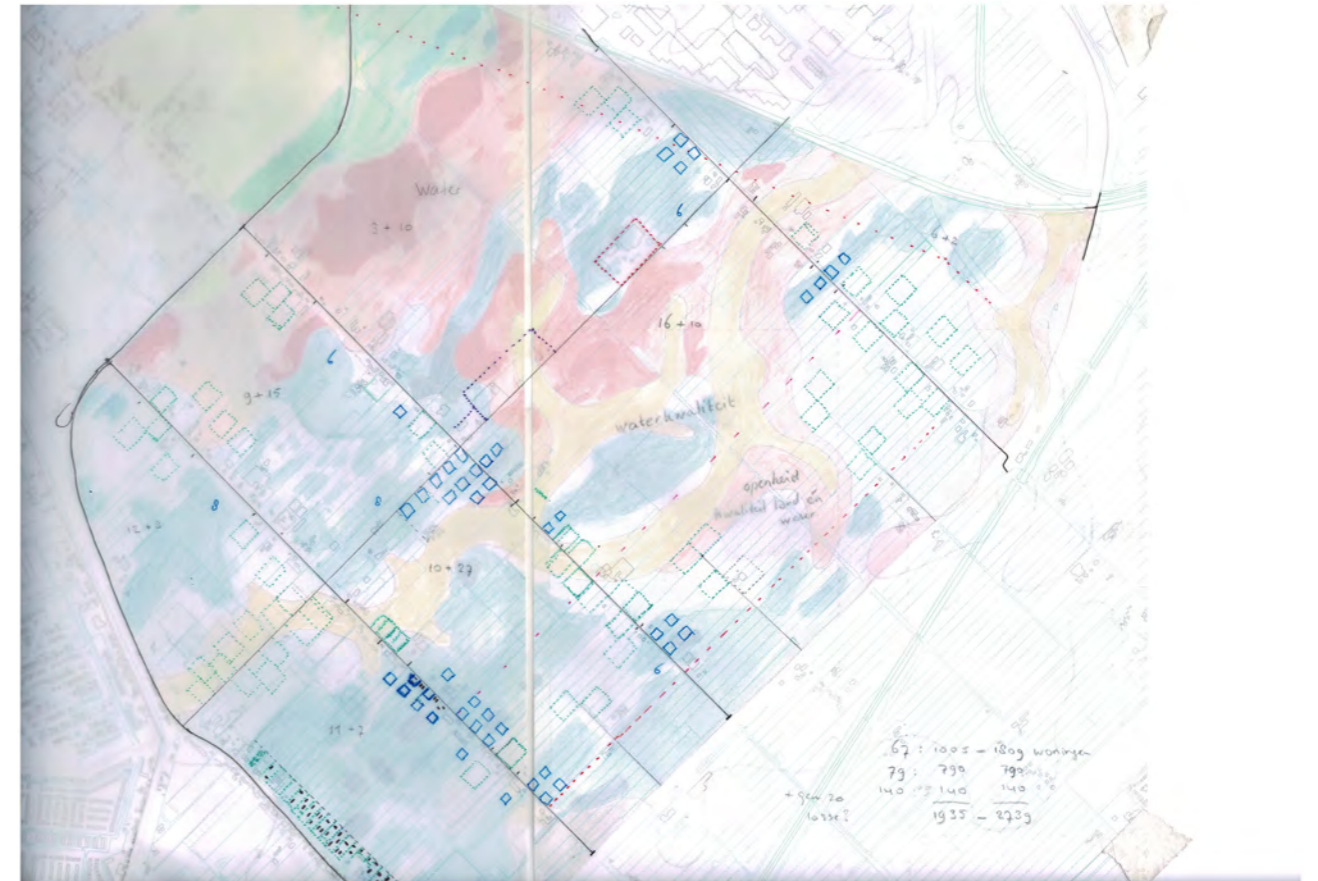


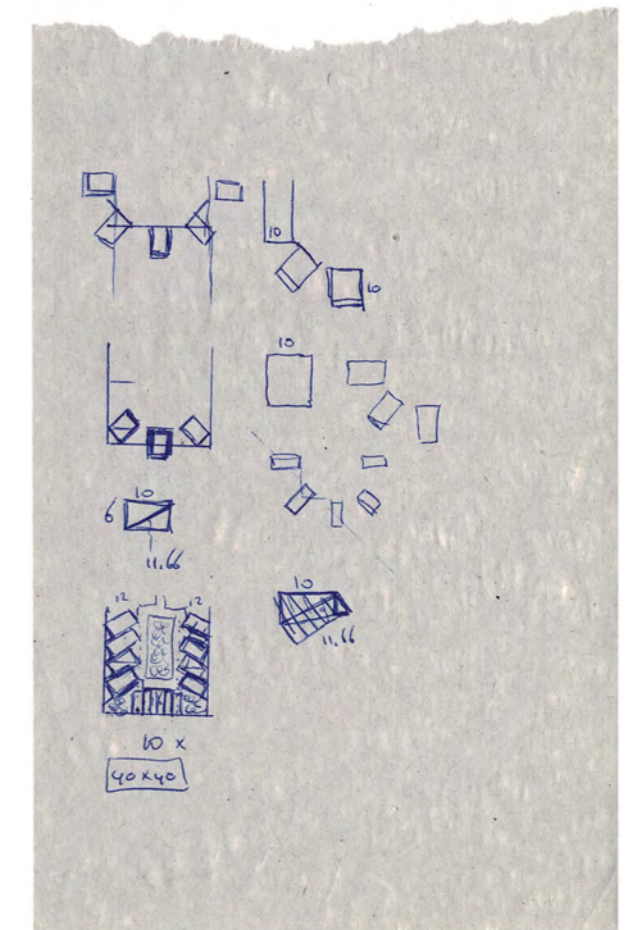
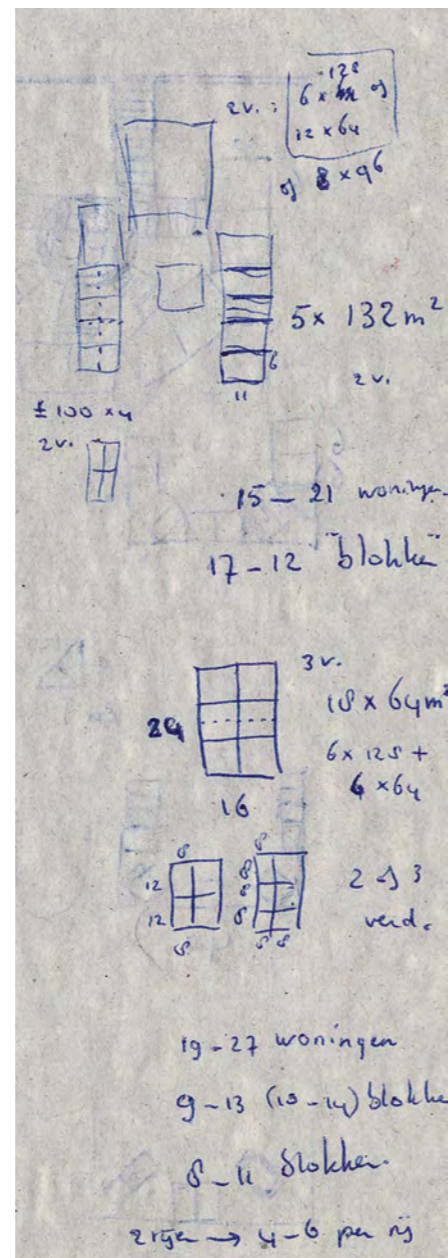
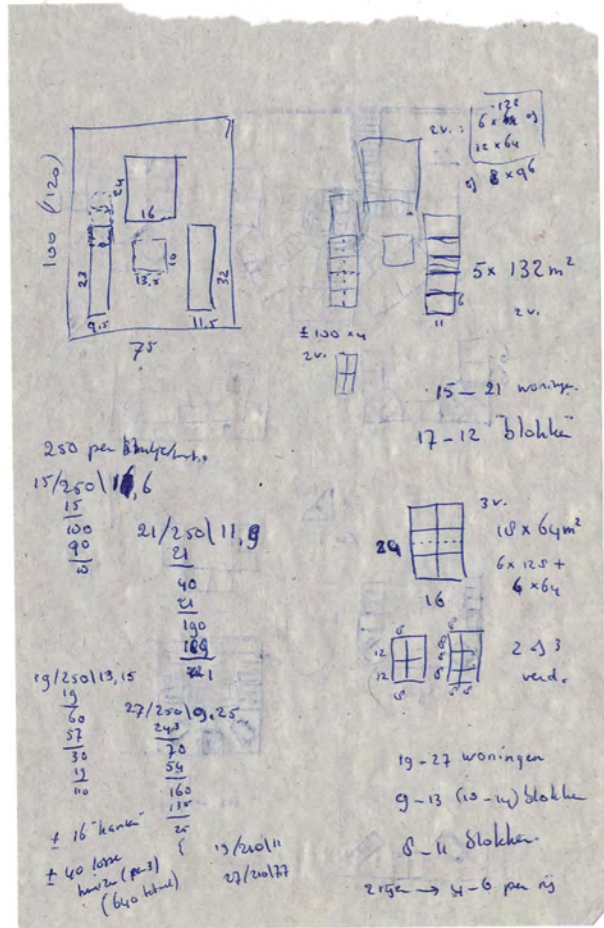
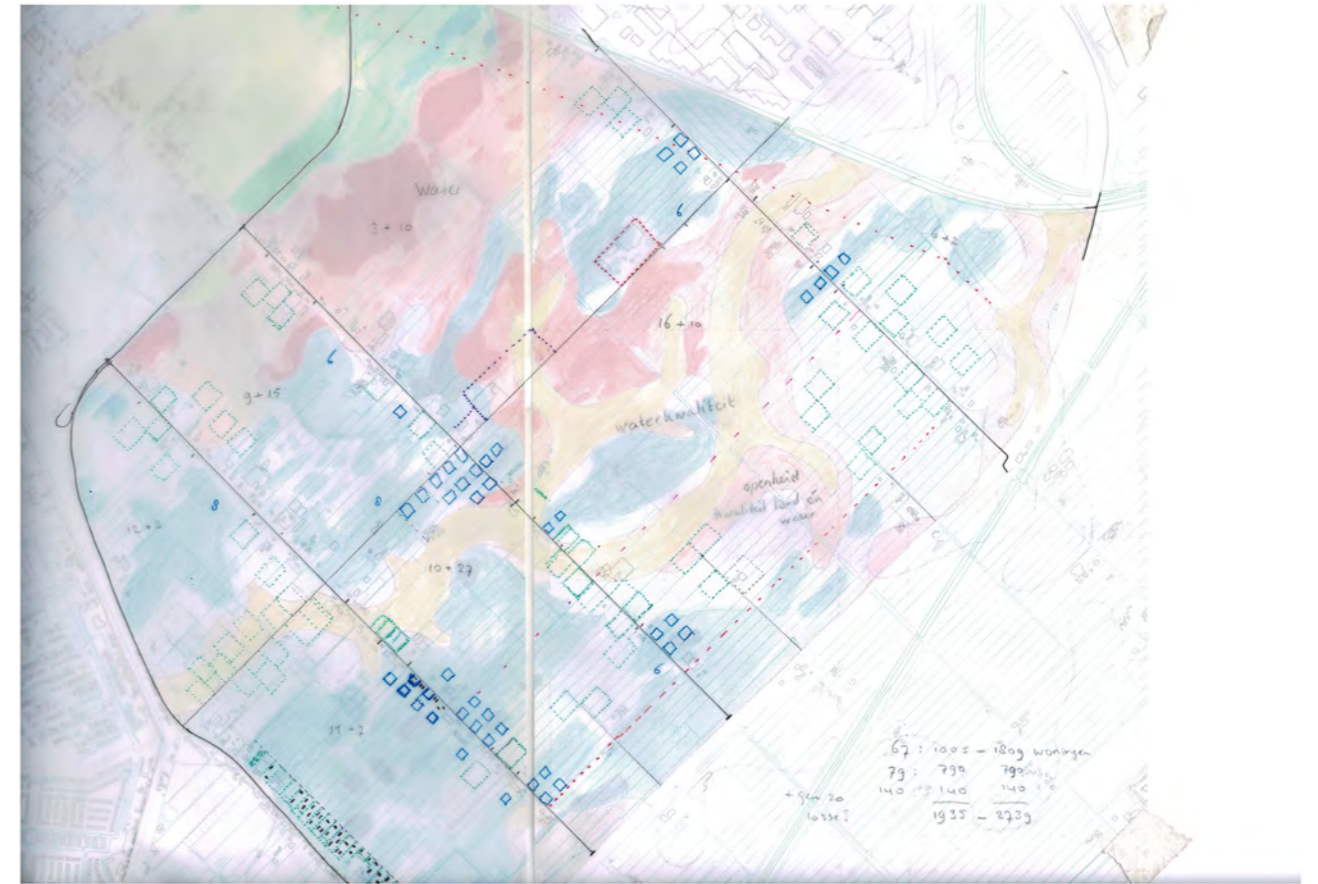
Fig. 44. Infrastructure (information from Open Street Maps).

as depicted on the next page in the wetland habitat. In this way another 790 dwellings could be added (rough calculations on page xx of the appendix), bringing the total to 1790 to 2590 dwellings.

Finally, the individual dwellings have to be added, which are estimated at 140. This brings the densification of the ribbons to a total of approximately 1930 to 2730 dwellings.



Fig. 44. Infrastructure (information from Open Street Maps).



# Design of the new village

## 4 residential atmospheres



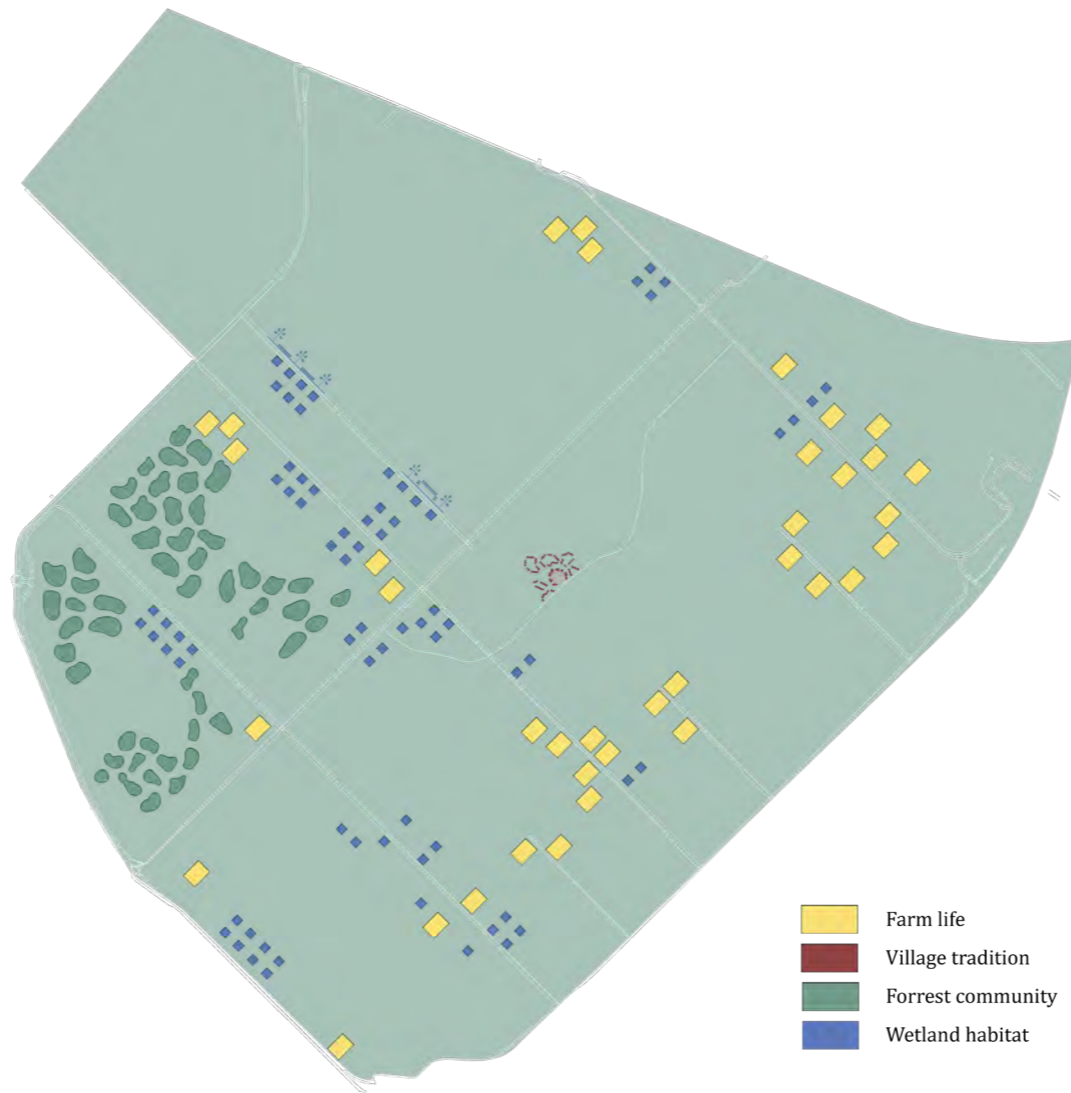
### Wetland habitat

- openness
- pasture or water
- relatively dense in an open landscape
- similar housing



### Forest community

- communal courtyard
- forest
- close to nature
- community centres with a shop and a restaurant
- low density
- diversity in housing



- Farm life
- Village tradition
- Forrest community
- Wetland habitat



### Farm life

- barnyard atmosphere
- pasture
- fully or partly enclosed by trees
- low density
- housing in farm-related building types



### Village tradition

- more traditional on a street, but with
- rural identity
- communal courtyard at the back
- The courtyards are more closed than in the forest communities
- shops and restaurants
- relatively dense
- some diversity in housing



