

# Alblasserwaard Vijfheerenlanden Polder

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**CR&ATING  
TOMORROW**  
ARCADIS & KNHM 125 JAAR

6th of April 2013 , The Challenge: Urban Deltas

## Abstract

Alblasserwaard-Vijfheerenlanden faces a big challenge: how can the polder be protected against floods while retaining its identity? Our team has developed an integral strategy that addresses the complexity of the issues. We use the current strengths as the pillars of our strategy: fostering economic growth, preserving cultural heritage, offering new land use opportunities and reducing flood risks. Because many people are not aware of the meaning of flood risks in their daily life, we decided to incorporate education and awareness too. The integral strategy consists of three site specific solutions that together form a robust water safety system: The Frontier, The Transition and The Backbone!

First of all, The Frontier solution consists of a controllable dike overflow along the Lek River. It has three water inlet points that connect to a water distribution network. The Transition is the following solution: it aims to create permanent wetlands together with a network of water storage basins which can be filled in the event of a flood. This allows for a dynamic polder landscape with new land use activities: think about adaptive agriculture, nature development and recreation. Finally, The Backbone comprises the super dike along the Merwede River on the long term, which is the jewel of local engineering. It firmly protects the cities and the surrounding economic area along the south. The idea is to live on the dike rather than behind it and thus making an extension of the urban delta.

We envision that by 2100 the Alblasserwaard-Vijfheerenlanden Polder has become a competitive and water safe society with a strong cultural identity.

Do you also believe that we can make this transition? Then vote for our team and help us creating OUR tomorrow!

## The challenge! → Background on case

Just outside the hustle and bustle of the Randstad conurbation lie the typically Dutch Alblasserwaard-Vijfheerenlanden polders. The Alblasserwaard and Vijfheerenlanden are deep polders. The area is famous for the Kinderdijk world heritage site, its dikes with historical ribbon development, and its wide open landscape. Most of the land is used for agriculture and on the edges of the polders there are some large marine companies that are important for the Dutch economy.

The Dutch Delta Programme was established with the goal of ensuring long term (2100) water safety for the Dutch Delta. However, it has found the Alblasserwaard-Vijfheerenlanden Polder to be one of the most challenging regions to protect because the region is confronted with a complex combination of issues:

- Land subsidence, leading to increased inundation depth in case of a flood.
- Dike strengthening is not longer possible at many places
- Flood risks from rivers and sea are becoming more serious due to climate change
- Impact of floods are enormous, inundation depths of more than two meters are quickly reached as it is a deep polder
- Limited land area available for necessary dike enforcement
- Cultural heritage like the characteristic dike houses and wind mills should be left unchanged as much as possible.

## What is it about? → Alblasserwaard anno 2013: water safe?

From a historical perspective the Alblasserwaard Polder has always been facing flood risks/ water threats as it's located where the sea meets the rivers. A very strategic location for trade, economic development and a strong cultural heritage, considering the value of Kinderdijk World Heritage Site and characteristic dike houses. Its identity has always been strongly connected to water, both in positive and negative ways. One example of the negative effects was the high flood risk and evacuation of the population and cattle in 1995. Dikes are frequently assessed for its effective protection against floods, however, the old dike system is not longer sufficient and the dikes cannot continuously be raised. This demands for an alternative approach and re-think the water safety concept. Innovative solutions are required to make the valuable Alblasserwaard Polder water safe by 2100.

## Methodology: Quick and dirty approach

### Team spirit and process

The team was put in a pressure cooker during 48 hours to trigger our creativity and come up with innovative ideas.

The group process started with getting to know each other, both on a professional and a more personal level. This start-up session provided a good team spirit and created the right atmosphere to have brainstorm sessions and take everyone's ideas serious. Mutual trust, creativity and a hands-on mentality were the pillars of our team.

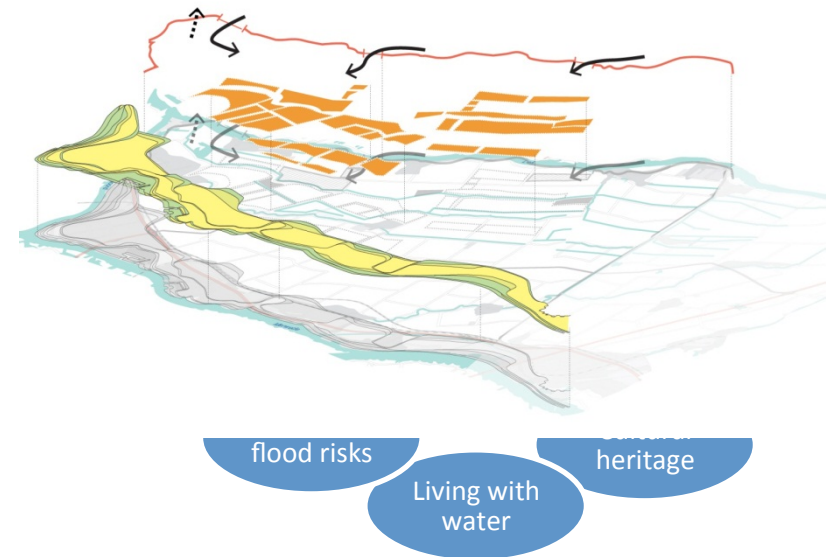
In a spacious and bright room of the Hunderden Estate we made a rapid appraisal on our case study. While having fun and working together several brainstorm sessions were held in which we challenged ourselves to think out of the box. The best ideas were chosen and worked out to in the end form our final solution.

### Data collection

It was tried to collect only the most relevant data considering the very limited time span of the project. A large part of the data needed for the project was provided by the urban planning office of DE.FAC.TO. A representative visited to share her knowledge on the topic and answer any questions. On the second day a representative of the involved government visited as well to share his view on the project. A telephone panel was available for interviews by telephone as well. All in all these experts provided a broad view of the challenges that are faced in this area. In case any additional information was needed it has been looked up over the internet.

## Key elements

Based on all the information the key elements for this project have been defined. First of all a brainstorm resulted in a long list of problems and challenges, after which the most important ones were selected to end up in the short list. These key elements which were used throughout the further process can be found in the figure to the right.



## Integral vision

The vision consists of three aspects: The frontier, The Transition and The Backbone. Together they form a robust system, enforcing each other qualities, both spatially and socially.

## The Frontier

- Controllable dike overflow
- Three water inlet points to feed dynamic polder
- Enables to preserve cultural heritage sites along the old dike
- Bypass for transport network (roads)
- Monitoring of flood risk events

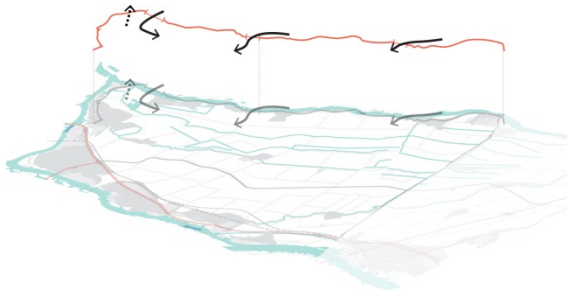
## The Transition

- Dynamic polder landscape
- Created new land use opportunities, eg. flood responsive houses
- **Agricultural transition: intensive farming, energy farming, bio-leisure farming**
- Creation of wetlands and overflow storage basins
- Opportunities for nature and recreation

## The Backbone

- Strong protection measure for economic area and cities
- Extension of the urban delta
- Example of engineering artwork and technology
- Living ON the dike instead of behind it
- Constructed and connected in stages

### A) The Frontier

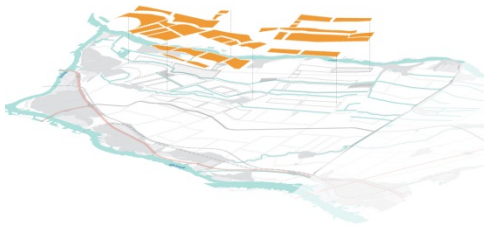


A relieve of the high stresses on the dikes in the north of the area is created in the form of the frontier. Rather than keep increasing the dike heights at this area the vision is to stop working on these dikes and only correct for settlement at the weakest spots. By predefining the spots at which water is allowed to overtop the dikes the water can easily be collected and uncontrolled flooding can be prevented. Small overtopping of 1-2 m<sup>3</sup>/s water is designed to take place on average once every 5 years. By seeing controlled overtopping at this high frequency the population can be made more aware of the fact that they are living in a polder.

### The design

In order to prevent problems with a 1/2000 year flood in the year 2100 it is estimated about 500m<sup>3</sup>/s needs to be withdrawn from the Lek. This 500m<sup>3</sup>/s should flow over the dike at the three predefined locations. These overtopping locations are designed as small dips in the dike with a width of about 500 meters. No large constructions are needed so the current looks of the dikes will hardly be effected. In the centre of the decreased height a small dent is created to allow for high frequency low capacity overtopping (on average every 5 years). In order to prevent nuisance from closed roads the centre part of the dent is bridged with a low bridge. This bridge is created at a height which is related to a 1/100 year water level. The design of one overflow point is in appendix 2.

## B) The Transition



### Lakes/ Retention basins/ Emergency storage areas:

In the future the middle part of the polder fulfills multiple aspirations namely; the artificial lakes, retention basins and emergency storage will be introduced (see also 'vision'), recreation, advanced farming, and preserving cultural and natural heritage. The World Heritage Site of Kinderdijk and other historically important windmills, landscape elements like linear villages and the typical polder structure are the major concerns of preservation and all interventions are fitted in such that existing cultural heritage is perceived. The amount and size of lakes, retention basins and emergency storage can vary according to the changing climate.

### Implementation area and its benefits:

Some artificial lakes will be permanently introduced in the locations such that they have no negative impacts on the essential cultural and natural heritages in the polder. In addition to storing water during the flood season, artificial lakes can be used for the purpose of water sports such as boating, fishing and ice-skating. The presence of artificial lakes will add to the aesthetic value benefiting the area economically. Visualizing in 2100, the agriculture would be intensified and will shift from the traditional conventional farming to more technical farming; the permanently filled basins can even be used to create economic opportunities like fish farming, recreational farming, energy farming, etc.

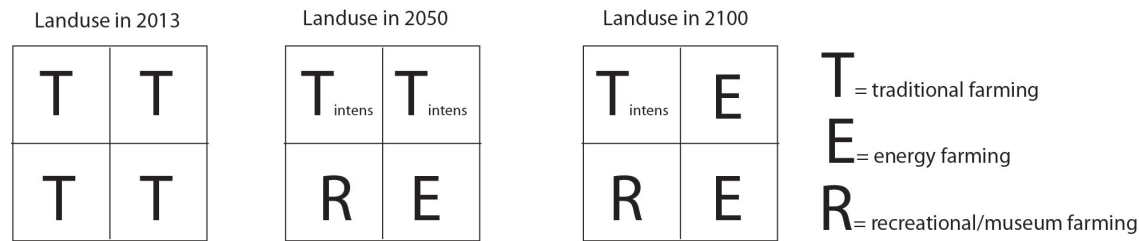
The retention basins will be developed for storage in low level flooding having probability of 1 in 5 years. The motive of these basins will be raising awareness about water safety, and introducing the concept of 'Living with water nuisance'. So, flooding of these basins will be fully controlled ensuring the safety of properties and people however, keeps the presence of water fresh in mind motivating preparedness for disaster. Several emergency storage areas having the

capacity for using in 1 in 2000 years flood condition will be created. As the name suggests, the major objective of creating such storage areas is to reduce the overall pressure in the system during the very high flow in the river.

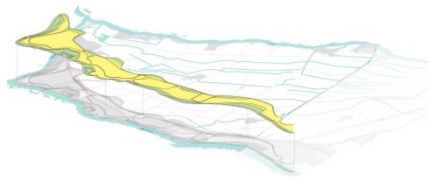
The emergency storage areas are lowered a bit such that in case of a 1/2000 flood event they can accommodate the large amount of water that will flow into the polder. In normal circumstances they can be used for conventional cattle farming or recreation.

**The polder land use transition**

At the moment the main use of land is cattle farming. We believe that this type of farming will gradually be more intensified in more industrial farms, using less space. Contemporary farms can transform into more leisure or healthcare oriented farms with a biological and authentic imago, a trend already visible in other part of our country and very suitable to attract new people from the Randstad to live and recreate in the area. Another option is that the farmers adopt another way of farming, like energy farming. This could also take place in the lakes and retention areas. In this way the current plot structure and polder characteristic are preserved while the polder and its economy adapts to modern developments.



**C) The Backbone**



Vision

- The steam scenario. Extension of the delta metropolis: a high end and attractive place.
- Highly connected to the Randstad. A satellite city.
- Development of economy.

- The current concentration of economy and dwelling should be strengthened. A compact area is easier to protect.
- Living on the dike instead of behind.

#### Why? The problem

- High economic value
- Large part of dike system is not sufficient .
- Opportunities for strengthening are very limited.

#### What?

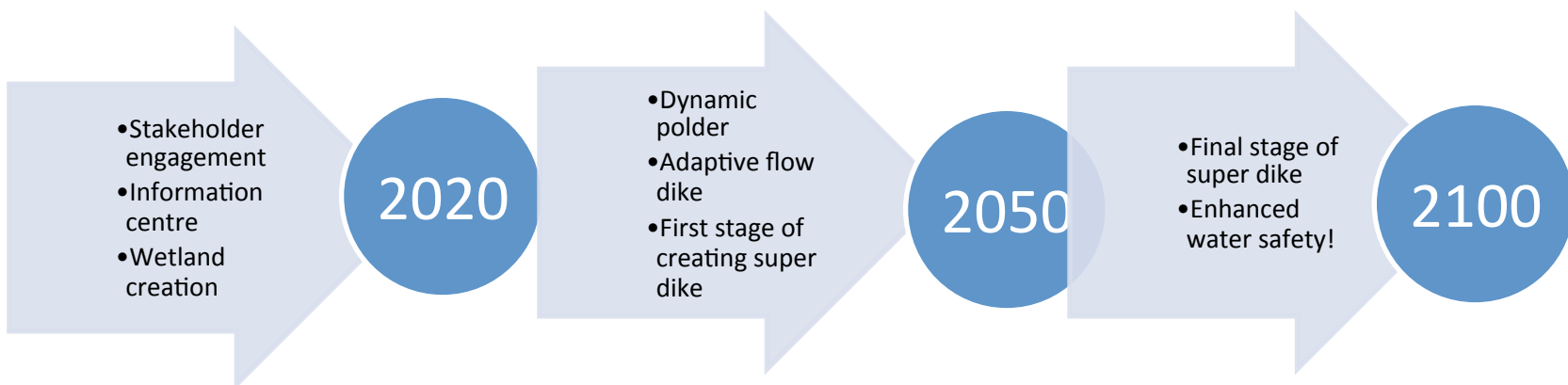
- We introduce a superdike: a plateau where people will be working and living on. Living on the dike instead of living behind the dike.
- The current dike will be extended over a distance varying between 100 and 600 meter.

#### Strategy (how?)

- Incremental strategy: where area's need renovation we take our chance to heighten and broaden the dike.
- We could start with industrial area's since the social attachment is limited and the turnover rate is relatively high.
- Gradually all area's will be heightened and broadened until all will be connected to one superdike.

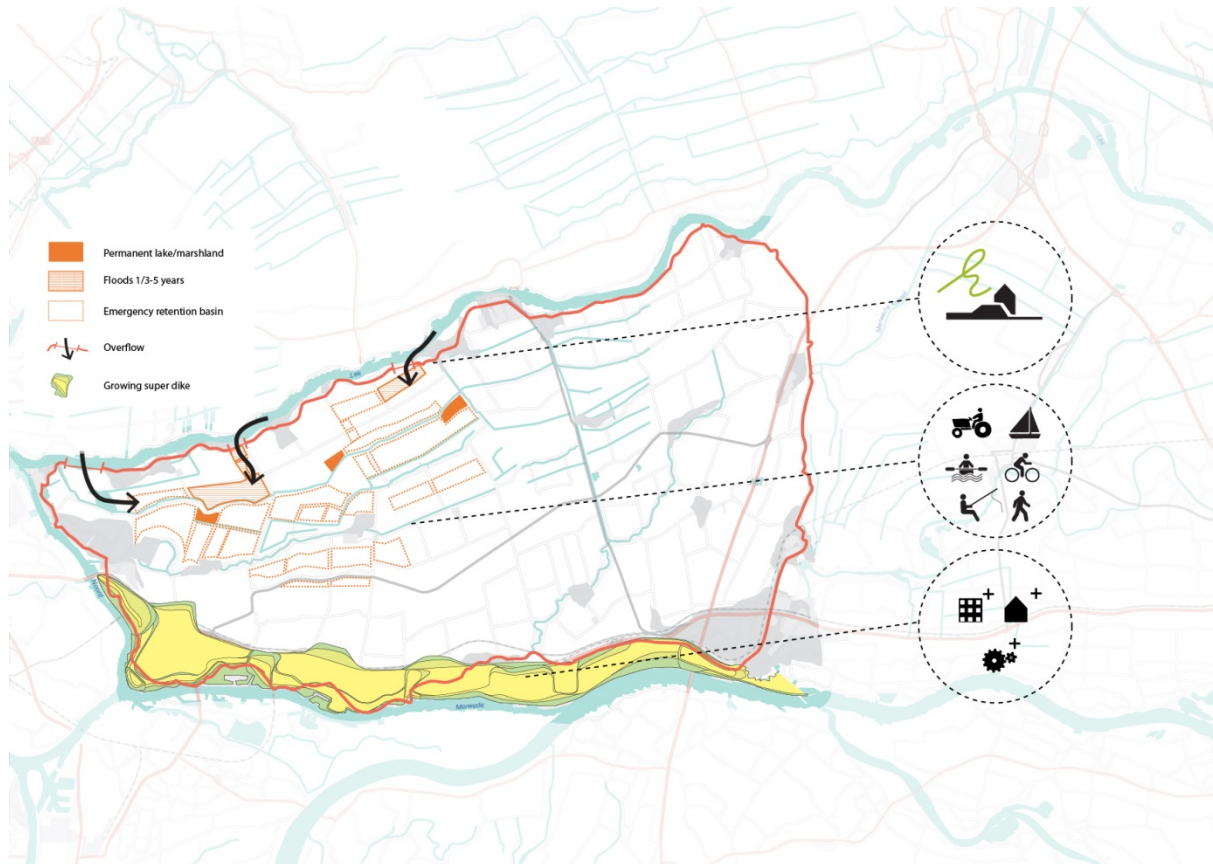
## Timeline of implementation

The strategy will be implemented in several phases. It is intended to include the stakeholders from an early phase so their contributions can be used in working out the project before construction works start. This way the stakeholders will feel connected to the project and are more likely to cooperate with the implementation. Besides the involvement of stakeholders education and raising awareness should be one of the first steps in the process. This can be achieved by an information centre near heritage areas, which can reach large groups of people. Once the initial preparations are finalized the real designing and implementation of the project can start, which will take step by step from 2015 until 2100.





## Conclusion



We have come to the final part, where we relate the solutions back to the initial problem. We envision that by 2100 the Alblasterwaard-Vijfherenlanden Polder has made a transformation into a competitive and water safe society with a strong cultural identity. The population has become more aware of the meaning of flood risks and has therefore adapted to the environment by living with water. The Backbone is a solid structure that fosters economic growth for the region. This is done by protecting the companies already established but also to seek alliances and investment of new companies that want to settle in this top location. The Backbone solution together with the overflows is able to guarantee a long term protection against floods, which of course attracts entrepreneurs that see new economic drivers.

The three aspects of our vision form one integral part that can be illustrated with an example: During the construction of the inlets an educational center can be located near the Kinderdijk touristic area and can both be used for touristic as well as informational purposes. The overflow itself and the process of constructing the overflows and the basins make people live more consciously with the water. At the same time the construction of the basins is the first step in the transition of the conventional agricultural use of the polder. This transition opens up possibilities for leisure and new economies as well, accommodating the growing population on the south side of the polder. This gradually growing backbone is a very attractive and safe place for both current and new inhabitants and investors.

We invite you to help us carrying out our strategy for a water safe future! That is why we provoke you to continue this dialogue, can we adapt together? Here in Alblasserwaard we believe we can! Do you want to see how we will make the move? Then vote for our team to help us creating OUR tomorrow!

## References

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DE.FAC.TO (2040) Future map

## Team members:

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