

# Controlled reduced tide to produce flood control area and new habitats in Kruibeke - BE

## 1. Policy Objective & Theme

- ADAPTATION TO RISK: Managing impacts of climate change and safeguarding resilience of coasts/coastal systems
- ADAPTATION TO RISK: Preventing and managing natural hazards and technological (human-made) hazards
- SUSTAINABLE USE OF RESOURCES: Preserving coastal environment (its functioning and integrity) to share space
- SUSTAINABLE ECONOMIC GROWTH: Balancing economic, social, cultural development whilst enhancing environment

## 2. Key Approaches

- Integration
- Ecosystems based approach
- Technical

## 3. Experiences that can be exchanged

Creating a flood control area which means that, in case of a storm surge, the storm tide of the estuary becomes truncated and flows over an overflow dyke into the designated area in a controlled manner.

## 4. Overview of the case

The creation of a controlled, reduced tide into a flood control area in an estuarine river system to provide a more sustainable form of flood management control. This innovative system allows the creation of new habitats.

## 5. Context and Objectives

### a) Context

The Scheldt estuary is about 160 km long bordering Belgium and the Netherlands. The controlled inundation area is a low-lying old polder bordering the Scheldt just south of Antwerp. The Flood Control Area in Kruibeke is the most important flood control area of the Sigmaplan of 1977 which was designed to protect the Sea Scheldt basin against storm surges from the North Sea. Kruibeke is the last of 13 flood control areas to be built and at 580 ha is the largest flood control area of the Sigmaplan. 300 ha of the area are designated as mudflat and marshland. Twice a day, at high tide, a limited (reduced) amount of water flows into the area, mimicking the natural tidal regime to create a matching landscape. This system is unique in Europe. It is already recognised as a Birds and Habitat Directive Area. 150 ha of the site will become a Grassland Bird Area, with open grasslands and meadows. The farmers who lost their land in the polder will ensure the maintenance of the grasslands. 40 ha of Elzenbroek forest and other types of forest will be created in compensation for the forest lost by the construction of the ring dyke of the flood control area. Without the construction of the flood control area, the Kruibeke polder would have remained agricultural land without any additional value to nature or to the safety of the Scheldt estuary. The combination of a safety project with nature by using a controlled reduced tidal system is also recommended when compensation for lost mud flats and marshes is needed.

### b) Objectives

The Flood Control Area in Kruikebe aims to reduce flood risk in the Seascheldt Basin, support existing habitats and heighten ecological values by creating new habitats and recreational possibilities for all.

## **6. Implementation of the ICZM Approach (i.e. management, tools, resources)**

### **a) Management**

The Seascheldt Department of Waterways and Seachannel NV (Waterwegen en Zeekanaal NV) has no official partners while constructing the Flood Control Area. There is, however a managing commission that monitors the creation of the nature habitats in the area. This Commission consists of the Seascheldt Department (Waterways and Seachannel), the Agency for Nature and Forest, the Kruikebe Municipality, the Farmers Guild East Flanders, Kruin – the local Nature Association, Department for Sustainable Agriculture, Department for Environment, Nature and Energy Policy, Province of East-Flanders.

### **b) ICZM tools**

The current river dyke will be lowered by 1.5m to create an overflowing dyke. A fibred, open stone asphalt layer will protect the crest and the inner slope. In several locations the inlet and outlet sluices will be constructed to induce the controlled reduced tide or to allow de-watering of the flood control area. A high ring dyke around the flood control area will ensure the safety of the surrounding communities. This dyke ensures that the Scheldt water remains in the inundation area and does not flood the hinterland. At low tide, the water flows back to the river through outlet sluices, thus emptying the area. De-watering of the hinterland is guaranteed by the Barbierbeek stream and the northern and southern de-watering ditches.

Scheldt water flows in and out of the tidal areas twice each day. This has a positive effect on the development of different habitats, but is not allowed to compromise safety. In case of an emergency, the flood control area must be empty to allow as big a portion of the storm surge as possible to flow into the area. A storm surge that floods the flood control area is expected on average once or twice a year. The sediment of the estuarine water is held back by the sluices to avoid silting up of the flood control area which would reduce its water take-up capacity. The use of high inlet sluices creates a wide range in inundation frequencies, favouring diverse marsh ecology. These sluices also aerate the estuarine water, even functioning as a lung for the estuary.

## **7. Cost and resources**

No costs are available.

## **8. Effectiveness (i.e. were the foreseen goals/objectives of the work reached?)**

At this point, the inhabitants are protected against water levels with average return periods of 70 years. Once fully operational, the level of protection will increase to once in 350 years. 300 ha of mudflat and salt marsh, 150 ha of birds grasslands area and 40 ha of Elzenbroek and other types of forest have been created. Service roads running alongside all the dykes will accommodate maintenance teams and walkers alike. Slow and fast traffic (mountain bikers, horsemen, cyclists) will be separated wherever possible, amateur fishermen can also set their bait along the ditches aside the ring dyke.

## **9. Success and Fail factors**

The results of a social cost-benefit analysis helped public-sector bodies in taking relevant decisions.

Stakeholder participation started too late in the process. This led to the construction of the Kruikebe site suffering severe delays due to protest actions, problems with building permits etc. By engaging stakeholders only in a later phase, a part of their trust was already lost. Giving stakeholders the opportunity to think along and to decide along constituted a major step forward in mutual relations. However, it took a long time to regain trust and get the implementation planning back on track.

A flood protection zone near houses always causes fear, particularly as Kruikebe had no history of flooding. It is important to

provide enough information and a single contact person that can reassure people involved.

## 10. Unforeseen outcomes

The positive impact on the water quality was greater than expected.

## 11. Prepared by

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## 12. Verified by

It was not possible to verify this case.

## 13. Sources

- ComCoast Projects Kruibeke and Lippenbroek (B) 2007 Rijkswaterstaat, Netherlands
- ComCoast flood risk management schemes 2007 Rijkswaterstaat, Netherlands



ComCoast - Kruibeke\_Lippenbroek\_EN (833.59 KB) 



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