

Construction of CRT Vlassenbroek

What

This action involves the realization of a Controlled Reduced Tide (CRT) in an area called 'Vlassenbroek'. This area has a surface of approximately 91 hectares.

Where

'Vlassenbroek' is located along the river Scheldt on the right bank, near the village of Baasrode in the province of East-Flanders. To the East of Vlassenbroek lies the polder Uiterdijk.

How

First the construction of the last part of the ring dyke to close an area of 91 hectares that will evolve towards mudflats and marshes.

Consequently W&Z will construct the combined in and outlet construction through which the tidal dynamics will be introduced in a 'controlled' and 'reduced' fashion. 'Controlled' refers to the fact that the river water is guided solely through the inlet sluice, while 'reduced' refers to the fact that the tidal movement of the river is mimicked in the polder but in a cropped fashion to avoid the area would be flooded (as it would if the dyke would be breached). This design consists of a sluice with six inlet and six outlet pipes, placed in two rows on top of each other. The inlet pipes have a dimension of 3m x 2,10m, the outlet pipes have a dimension of 3m x 3,10 m.

As a third the onset of a creek will be dug out near this in and outlet construction. The available soil will be used for other works in the vicinity ('work with work' principle). A certain part of the construction of this CRT 'Vlassenbroek' has already been executed in 2013/2014 within the framework of an Interreg 2Seas-project 'PRISMA'. PRISMA stands for 'Promoting Integrated Sediment Management' and focused on useful applications for dredged sediments. Hence approximately 1,8 kilometers of dyke was constructed with nearby dredged material, thus enhancing circular economy.

The construction of a CRT encompasses several large items of infrastructure such as an embankment to protect the rural environment (ring dyke), and the adjustment of the embankment at the side of the river to an overtopping dike, which is flooded by river water at very high water levels in the tidal river. An outlet construction allows the water to flow back to the river when the water level in the river is low enough for the water to flow out of the FCA in a gravitational fashion. When a FCA is combined with a CRT a high inlet construction will be added to the outlet construction. Subsequently with the rhythm of ebb and flow, water flows into and leaves the CRT-area twice a day. Beside those measures also smaller actions are done to tailor a flood control area into a controlled reduced tidal area.

Often is chosen for the onset of a creek; it accelerates the evolvment towards tidal nature as the water flowing in the area via the inlet sluice is pushed further. It also heightens the attraction for several birds such as duck, geese and other water fowl. This creek is dug at

mean low water level, and connecting drainage channels ensure that the area can drain sufficiently in the event of storms.

The area will flood daily in a controlled manner at high tide. A limited amount of water will be let into the area at each high tide via a new inlet construction in the embankment. At low tide, the water flows back into the Scheldt via the low outlet pipes. The imitation of the spring neap tide variation makes a difference in mud flat and marsh habitats and leads to a diverse, functional ecosystem. The estuarine nature that will develop here will contribute towards the conservation objectives for the Scheldt estuary.

Compared with depoldering, the situation in a FCA-CRT is highly controlled; the sluice settings will determine the dynamics and succession of mudflats and marshes. And above that it is to be avoided that a high level of sedimentation will undermine the safety function (loss of storage for river water when needed). The area needs to continue to serve as an FCA in extreme storm tides.

The combined inlet and outlet is a key element in the concept of the FCA-CRT. To introduce a tidal mud flat and marsh ecosystem into a FCA-CRT, a specific system of sluices is required that firstly enables the daily exchange of Scheldt water, and secondly, still ensures that the area can store sufficient water. On the one hand, the sluices must therefore dramatically reduce the inflow of water to ensure the function as an FCA (storage). On the other hand, they must guarantee an essential daily variation in water levels (the tide), maintaining a variation in level between spring and neap tides.

The sluices of an FCA-CRT consist of a system with high inlet openings and low outlet openings. The inlet openings can be adjusted by stop-logs. This system can reduce the tide while maintaining the spring/neap tide variation. This system allows the ecological continuity for the migration of fishes and other organisms between the river and the polder.

As the sluices have to endure serious forces of in and outflowing water and the pressure and shear of a river such as the Scheldt is very substantial, a solid construction is needed; earthmoving, foundations, concrete, gabion baskets and accessories as grids for solid waste, outlet gates and stop-logs are part of a 'basic' sluice.

The dimension and the exact location of the sluice is determined for every separate area based on its specific characteristics related to the functioning of the reduced tide (surface of nature to develop towards tidal nature) and an optimal outflow of the flood area (FCA).

By means of studies (computer models) an optimal combination of inlet openings is determined for a certain desired level of inundation in the tidal area (CRT).

Why

Especially the more upstream parts were subject to a gradual increase of the high tides, with a maximum in the river section between Schelle (Antwerp) and Dendermonde (East-Flanders). The flood control area Vlassenbroek is located in this river section.

The flood control area Vlassenbroek with a total surface of almost 240 ha, will have a large impact on safety for its large surface and its location along the Scheldt. This areas has been

flooded a lot in the past during events of storm, hence in an uncontrolled fashion. Dendermonde, a large and densely populated city, is prone to great potential damage, and will benefit greatly from an operational FCA Vlassenbroek.

By means of an in and outlet construction this FCA will be combined with the development of tidal nature with a surface of 91 ha. The estuarine nature that will develop here will contribute towards the nature objectives for the Scheldt estuary.

