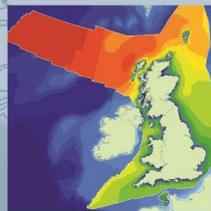
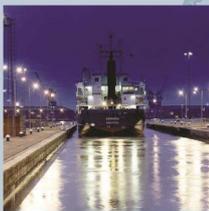


Chowder Ness Managed Realignment Scheme (England)

Case Study

March 2011

Creating sustainable solutions for the marine environment



Basic Statistics

Location	Coordinates (long; lat)	Area (ha)	First Tidal Inundation Date	Years Embanked	Previous Land Use	Tidal Range
Inner Humber Estuary North, Lincolnshire	53.6916845889468; 0.481531942618829	15	July 2006	97	Arable	6.9m (spring)



Plate 1. The managed realignment at Chowder Ness - Google Earth derived aerial view

Design and Management

Chowder Ness was undertaken for the same purpose as another realignment on the Humber, Welwick, which is presented as a separate case study. Both schemes were designed and implemented by the same organisations (Associated British Ports (ABP) and ABPmer), and to very similar timescales and principles. To inform the final design of these sites, numerical modelling was undertaken based on LiDAR elevation data. This was to ensure the correct balance of habitats would be achieved. As mudflat creation was the main objective of the schemes, and as the sites were largely too high for this to occur, the land was re-profiled to increase the extent of lower areas where mudflat could develop (i.e. below Mean High Water Neap (MHWN)). These works included the creation of a gentle slope from the fronting, existing, mudflats to the rear of the sites to assist drainage.

At the 15ha Chowder Ness site, new flood defences were created at the rear of the site to a minimum height of 6.7m above Ordnance Datum Newlyn (ODN). Material for these defences was obtained from within the site from a combination of reprofiling and creation of temporary borrow pits (these were later infilled with material obtained from the seawall removal).

The existing seawall was removed over a length of 570m (some 200m remain), to a level of around 1.6 to 2mODN. This removal, rather than the creation of solitary breaches, was chosen for a number of reasons:

- It improves connectivity with the wider estuary;
- It more closely recreates the type of environments that existed prior to the land claim;
- It enables the whole cross sectional area of the estuary including the realignment site, to respond to estuary wide changes; and
- It increases energy levels within the site, thereby improving the likelihood that mudflat habitat will be maintained (as mudflat creation was the main objective of the site).

The old defence was removed in a series of stages: (1) removing the rear of the embankment, (2) the concrete wave return, the bitumen and rock face, and (3) the overall lowering of the embankment (to levels around 1.6 to 2mODN).



Plate 2. Aerial view of site in December 2006 (5 months post realignment) (taken by ABP)

As Chowder Ness was considered relatively small-scale in relation to the estuary as a whole any predicted changes to the hydrodynamics and sediment dynamics were expected to be extremely localised and relatively small in magnitude (ABPmer, 2004).

Promoters and Objectives

Associated British Ports (ABP) constructed a new Roll-on Roll-off terminal at Immingham Outer Harbour (opened in July 2006), which resulted in the direct loss of 22ha of intertidal mudflat area and potentially up to 5ha of indirect losses in a proposed Special Protection Area (pSPA) and a proposed Special Area of Conservation (pSAC). In consultation with regulatory bodies and local nature conservation interest groups, the two managed realignment schemes at Chowder Ness and Welwick were identified as contributing to a compensation package for the impacts of the above development. The initial objective of Chowder Ness was to create 10.5ha of mud and 0.8ha of saltmarsh to support a variety of invertebrate and bird species.

Funding

Funded by ABP.

Planning Requirements and Consultation

1. The scheme required planning consent under the Town & Country Planning Act 1990.
2. A permanent diversion of the existing footpath was sought under section 119 of the Highways Act 1980 as part of the planning application for the scheme.
3. A formal Environmental Statement was required to accompany the planning application, as the scheme was classed as an infrastructure project comprising coastal works capable of altering the coast (under section 10m of Schedule 2 of the Town & Country Planning (EIA) Regulations 1999). North Lincolnshire Council provided a scoping opinion on the scope of the environmental assessment
4. Under the Water Resources Act 1991 and the Land Drainage Byelaws, the prior written consent of the Environment Agency was required (for any proposed works affecting tidal flood defences). The agreement of the North East Lindsey Drainage Board was also required for changes to land drainage.
5. The consent of the harbour master under the Humber Conservancy Acts 1852 to 1951 was required in relation to the effects of the scheme on navigation in the estuary.
6. An appropriate assessment was undertaken under the Conservation (Natural Habitats &c.) Regulations 1994 (the Habitats Regulations), as the competent authority (ABP) considered that the scheme was likely to have a significant effect on the existing and possible European nature conservation sites.

Monitoring

A ten-year monitoring programme is being undertaken to describe both changes to sites fronting the realignment (in relation to bathymetry, invertebrates and waterfowl), and to the realignment site itself (in relation to topography, saltmarsh composition, changes to intertidal invertebrates and bird and wildfowl usage).

Findings and Lessons



(Taken by: ABPmer, August 2010)

Plate 3. Panoramic view from easterly corner of site

Accretion

In order for the site to support both mudflat invertebrates and saltmarsh plants, it was important that fine marine sediments would be imported into the site, as these would provide the ideal environment for intertidal flora and fauna. Furthermore such sediment import would ensure that the site would continue to increase in elevation as sea levels rise. Observations from previous managed realignments have shown that sites can accrete relatively rapidly immediately after a breach, but that elevation increases then tend to level off. At Chowder Ness, site elevation monitoring has so far followed a similar trajectory. To date, overall, the site has increased in elevation with the main change in elevation occurring in the initial two years following the realignment.

Invertebrates

The monitoring has shown that invertebrates have colonised this new sediment. In 2009, between 571 and 15,429 specimens were found per m² (belonging to between 2 and 6 species). The abundance, diversity and biomass of species in the mudflat have been increasing since the realignment has been implemented, and are now similar to the fronting, pre-existing, mudflat sites; in fact, average abundance within the samples collected in 2008 was greater than the fronting mudflats.



(Taken by: ABPmer)

Plates 4 to 7. Marsh development in the eastern corner – 1 year on, 2 years on, and 3 years on (bottom pictures demonstrating difference two months can make, with sea aster in bloom in the bottom right picture)

Birds

Shorebirds are making good use of the site; for example, a total of 16 different waterbird species were recorded using the realignment site between September 2008 and March 2009. Species observed in the highest numbers on the site included shelduck, golden plover, lapwing, dunlin, curlew, black-headed gull and common gull.



(Taken by: ABPmer, 2008)

Plate 8. Dunlin feeding within the site

Saltmarsh and Grassland

With regards to the development of other habitats, there was a requirement to also create saltmarsh and terrestrial habitats. By 2009, as expected, a small proportion of the site had developed into saltmarsh; this is concentrated along the eastern edge of the site. This saltmarsh is mostly dominated by sea aster, although this is interspersed by other saltmarsh plants commonly associated with the lower marsh, such as spear-leaved orache and sea milkwort. With regards to terrestrial habitats, these were created to support a range of farmland bird species at the top and landward side of the new flood embankment, and along a grassland berm between the base of the embankment and the soke dyke. Within the 2009 surveys, eight bird species were seen to use the grassland, of which six were definitely breeding. These species included moorhen, skylark, meadow pipit, pied wagtail, reed bunting and grasshopper warbler.

Contacts

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References

ABPmer, 2004. Environmental Statement for a Managed Realignment Scheme at Chowder Ness. ABP Marine Environmental Research Ltd, Report No. R.979, 177p.