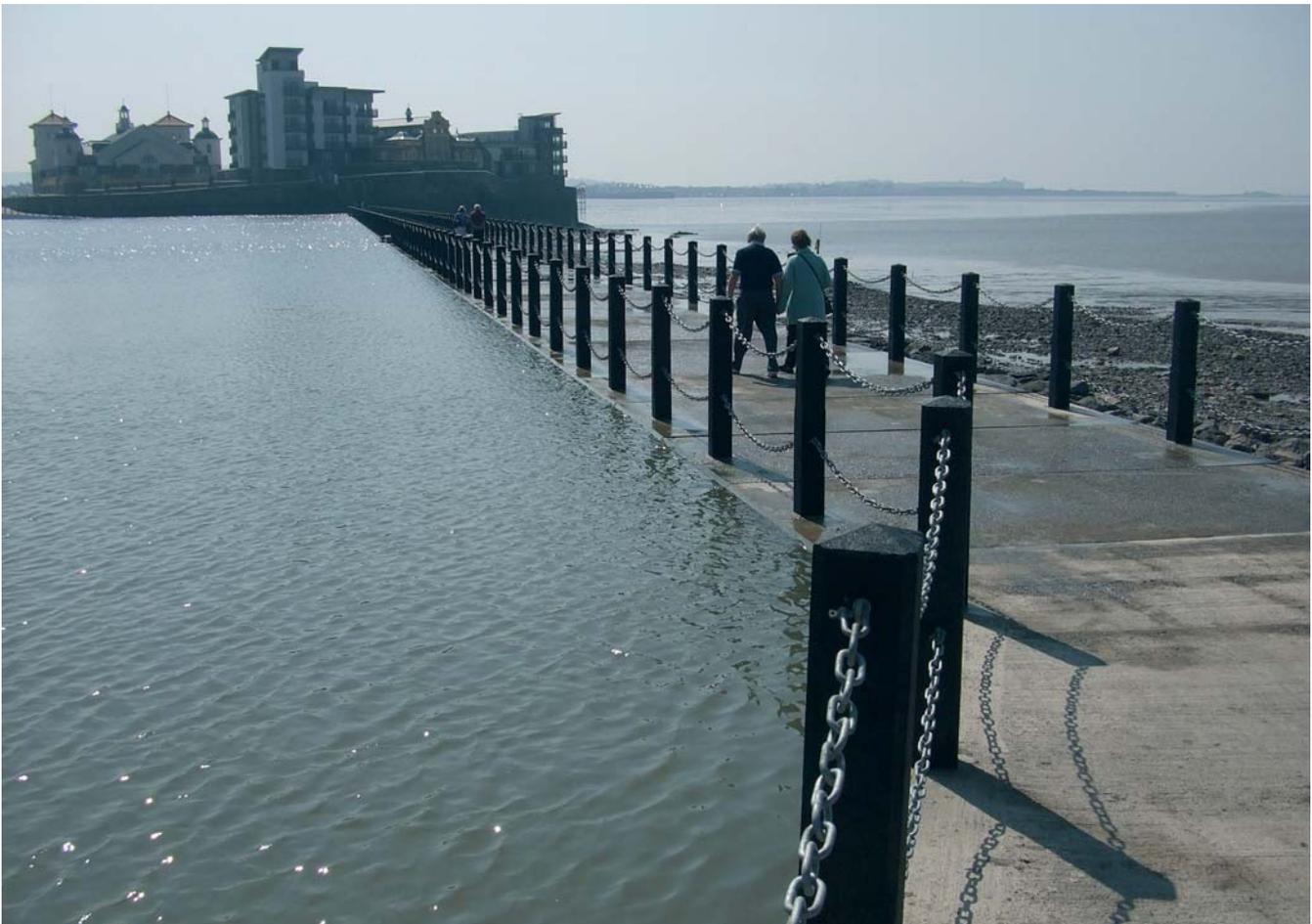


Weston-super-Mare Sea Defence Scheme

two stage scheme using NEC Option C for N. Somerset Council

Weston-super-Mare is a large town on the Somerset coast with a population of over 70,000. The area is heavily reliant on tourism, attracting over a million visitors each year who visit because of the many seaside activities. Properties of the town have suffered from sea flooding throughout history, due to the existing promenade level being too low and the existing sea wall inadequate for current and future tidal range. There have been three significant floods since 1981, the latest in 1996. These incidents can affect up to 3830 residential and 637 commercial properties. The extent of the proposed works covers the majority of Weston's low lying sea defences, from Marine Lake to Royal Sands in the south, a length of approximately 2350m.



View along marine lake causeway showing high water level

photo courtesy Birse Coastal

Problem

The majority of the town's current defences were constructed in the 1880s primarily for amenity purposes to boost the town's appeal as a resort. The intervening years have seen very little change to the defences, with the exception of ongoing maintenance, the addition of a parapet wall and toe strengthening works at Knightstone Island. The defences typically comprise a masonry wall to a level of approximately 7.8mOD with a free standing 0.4 to 0.6m masonry parapet wall above.

To the rear of the wall a wide promenade (8.5m minimum) separates the road and the town from the seawall. The parapet wall is a simply constructed masonry wall without a concrete core or any significant internal reinforcement. This wall consequently has limited strength to resist wave loadings.

Solution

The Environment Agency, in partnership with North Somerset Council employed the project team consisting of main contractor Birse Coastal, a specialist operating division of Birse Civil Limited, design engineers, Royal Haskoning, and ECC PM and Cost Managers EC Harris LLP, to review the current situation and produce solutions. A number of options were developed and budget costed. These were priced in conjunction with EC Harris and Birse Civils.

For the Weston-super Mare Sea Defences scheme, the project team recommended strengthening the parapet wall, improving the drainage, the provision of a secondary flood wall and providing toe protection for the front of the sea wall, where appropriate and reducing annual flood risk to 1 in 200 years (0.5%). It is proposed that in future the rear wall can be raised so that the 1 in 200 year standard



Phase 2 - Artists impression of parade & splash sea wall

courtesy of Birse Coastal

is sustained throughout the 100-year life (timing dependant upon the rate of sea level change due to climate change). This option proved to be the most cost effective, technically sound and environmentally acceptable.

Scheme

The contract value was developed throughout the PAR and currently stands at £29 million with a contract site duration of 30 months. The scheme is to be delivered in two phases and has been procured using the NEC Option C conditions. The programme was for the commencement of Phase 1, Marine Lake, during August 2007, with completion having been successfully achieved in April 2008. Phase 2 recently commenced in May 2008 and is due to complete in April 2010.

These phases include the following key work components:

Phase 1

- * Extension to the Marine Lake causeway adjacent to Knightstone Island;
- * Refurbishment works to the causeway of Marine Lake and beach;
- * Beach refurbishment.

Phase 2A

- * Scour Toe Protection Apron, extending seaward from existing wall between Knightstone Island and Grand Pier.

Phase 2B

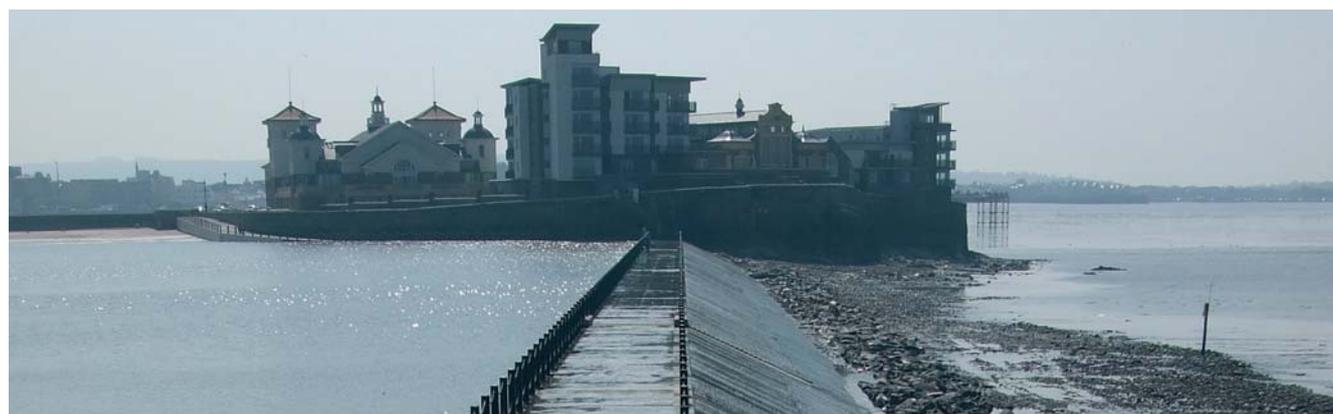
- * A splash wall 9.0m AOD (max height 1.5m above ground) from Knightstone Causeway to the Grand Pier.

- * Refurbish and strengthen existing parapet sea wall between Marine Lake and Royal Sands;
- * Utilising and improving existing features to provide secondary defence between Grand Pier and Royal Sands;
- * Floodgates to allow access through splash wall onto the promenade;
- * improved drainage along the frontage;
- * repair and repointing of the entire sea wall;
- * associated highways improvements;
- * artwork initiative for the sea front.

Conclusion

Phase 1 has been successfully completed, on time and within budget providing a bathing lake and strengthened causeway for Western-super-Mare. The lake is replenished on a spring tide with seawater overtopping the causeway prior to being impounded in the lake creating a permanent bathing pool area. The beach area of the lake has also been extended to create a larger space for children to play, and the bed of the lake has been profiled to ensure a safe, gently sloping, water level. A walkway has also been provided around the recently developed Knighstone Island to create a circular walking route around the lake. The scheme provides a significant enhancement to the area providing not only a boost to the tourism trade and economic prosperity of the area, but also adding to the protection of 4,500 homes and businesses from flooding.

The works were officially opened on the 3rd May where live music, circus performers, stilt walkers, caricaturists, face painters and funfair rides were on hand to provide entertainment - in true seaside fashion. **Note: The Editor & Publishers wish to thank EC Harris for preparing the above article for publication. ■**



courtesy of Birse Coastal