

West Bay Coastal Defences



West Bay is a small Dorset community in Lyme Bay, part of the UNESCO World Heritage Site Jurassic Coast. Heavily reliant on tourism, it is at risk of flooding along its sea frontage, which comprises the harbour flanked by East Beach and West Beach.

This partnership project between the Environment Agency and Dorset Council installed robust new defences at the two beaches.

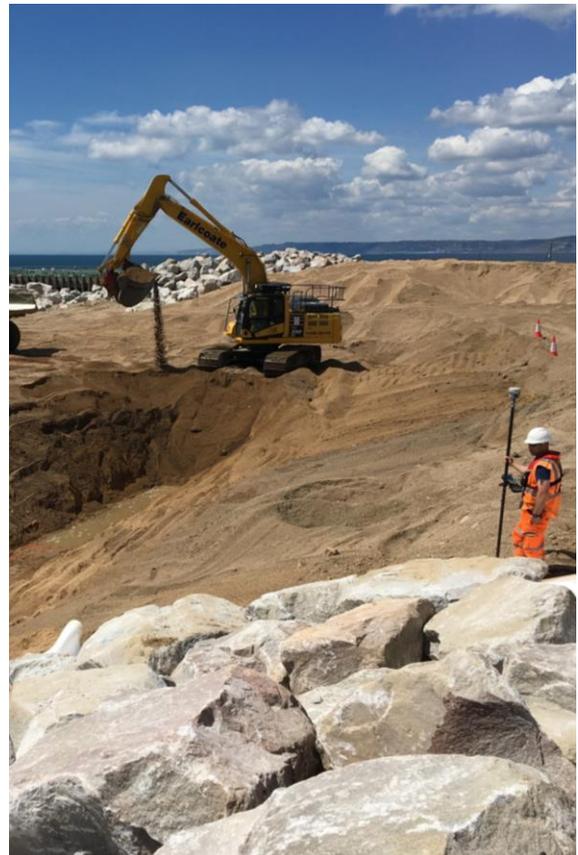
- **Date of completion: Oct 2019**
- **Cost: £6.3m**
- **Location: West Bay, Dorset**

Challenges and solutions

As a major gateway to the 185-million-year-old Jurassic Coast, West Bay sits within this World Heritage Site and identifying and delivering a financially and environmentally acceptable major scheme required early collaborative working.

Innovative design of a buried rock revetment at East Beach avoided both concrete usage and installing flood walls. A major technical challenge was demonstrating the standard of protection at East Beach could be achieved through beach management, combined with the buried rock revetment. Unique to this scheme, the beach and flood modelling approach incorporated a MIKE SHE infiltration model to represent the flows through the shingle bank.

A new rock groyne at West Beach enabled an enlarged amenity beach. A Purbeck stone-clad set-back flood wall enhances the landscape value. The set-back flood wall will combine with temporary flood defences, deployed by the harbourmaster, under exceptional conditions. This allows the natural beach to be maintained as the first line of defence. It reduces needs for much larger coastal, engineered structures and is more environmentally sustainable. Repeated laser survey by drone of the groyne is enabling accurate 3-D assessment, monitoring of structural behaviour post-construction, and improved future designs.



Benefits and achievements

The project sustainably manages the risk to West Bay of catastrophic breach (as experienced in 1974) and secures its long-term economic and social viability. The community is now safe for 50 years from East Beach breaching in significant storm events. Recent storms have shown the improved resilience of the beach. The re-usable granite core solution has integrated with the landscape, retaining the dynamic response of the World Heritage Site to climate change. The increased stability of the beach enhances its leisure value.

The public are protected at West Beach from the annual risk of wave overtopping and flooding of properties as happened in 2014. A large, more sustainable beach has been created. An attractive, robust Esplanade flood wall replaces the weak, brick wall. It fronts Old Shipyard Estate, where we worked closely with management and residents through construction to minimise disturbance and enhance their grounds.

Considerate Constructors Scheme marked the site 'excellent' and it remained accident-free. The low-carbon designs innovatively addressed the technical constraints of the exposed sites. The project successfully met coastal Special Area of Conservation, Annex 1 species beach habitat, Listed Building and AONB status requirements.



Fascinating facts

- ❑ 36,000 tonnes of Scottish granite were delivered by 200m-long barge to the beaches over a three-week period in May 2019, creating a major viewing spectacle for visitors.
- ❑ Rocks weighing up to 12 tonnes each – the average weight of a London double-decker bus – ensure the stability of the West Beach rock groyne, where waves could reach 4.5 metres high.
- ❑ The visually stunning West Bay cliffs and beach (as featured in the Broadchurch TV series) have been preserved by the innovative engineering design of a buried rock core, resulting in over 250 properties now being better protected from catastrophic coastal breach flooding, and with economic benefits to the community over 50 years assessed at £350m.

People who made it happen:

- Client: Environment Agency
- Client Partner: Dorset Council
- Design Consultant: Jacobs
- Principal Contractor: BAM Nuttall Ltd.
- Cost Consultant and ECC Project Manager: Arcadis LLP

More about this project:

dorsetcoast.com/projects/west-bay-coastal-defence-improvements/