Old Colwyn Coastal Defence and Active Travel Scheme
Colwyn Bay, Wales
Conwy County Borough Council

BIG Biodiversity Challenge Award Category: *Innovation Award*

Project overview

The Scheme forms part of the Colwyn Bay Waterfront Project – a multi phase coastal defence and regeneration programme. A rocky shore habitat has been integrated within the hard engineered structure design by enhancing the rock revetment, sea wall and existing groyne and outfall areas to promote colonisation by marine life.

What were the biodiversity conditions on site, prior to the enhancement?

The site itself comprised areas of intertidal sand along with small areas of shingle, gravels and boulders offering limited diversity of habitat opportunities and low biodiversity value (assessed as being of less than local significance). The existing waterfront comprised hardstanding and amenity grassland verges of negligible ecological value botanically or for wildlife. The working area was designed to avoid features of elevated ecological interest, such as a sparse blue mussel bed and Honeycomb Worm reefs. The internationally important Liverpool Bay Special Protection Area lies adjacent and mitigation has been designed to safeguard the associated wintering bird population.

What were the reasons behind this project ?

Storms and overtopping at Old Colwyn are causing regular damage to the promenade and defences, which are in danger of failure. Nationally important infrastructure assets including the A55 and London-Holyhead railway line, buried infrastructure (including large diameter sewers) and nationally important active travel routes are at significant risk.

As well as achieving the required coastal defence standard and reducing overtopping, the team had an ambition to go above and beyond the requirement to mitigate the Scheme's ecological effects by integrating a variety of novel ecological enhancements typically absent in hard engineered designs with subsequent monitoring to inform future Schemes.

Looking North-East from Porth Eirias across Scheme area (prior to construction) – Mott MacDonald Ltd

Examples of recent storm damage - Conwy County Borough Council

What were the biodiversity measures taken?

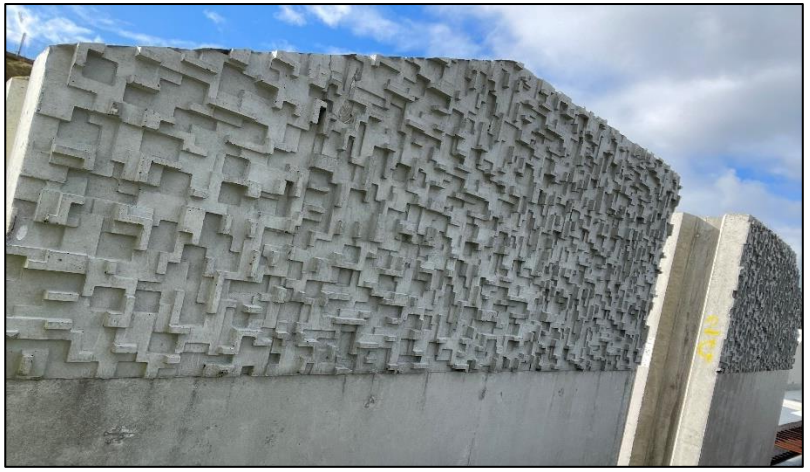
Following an initial biodiversity workshop, the Scheme was identified as having significant potential for ecological enhancement. During subsequent meetings and through discussions with manufacturers, measures were selected allowing the integration of site specific and novel habitat innovations within the hard engineering design to increase intertidal biodiversity. Optimal areas for ecological enhancement and connectivity were selected in discussion with marine biologists and ornithologists.

On Scheme completion, the following will have been installed:

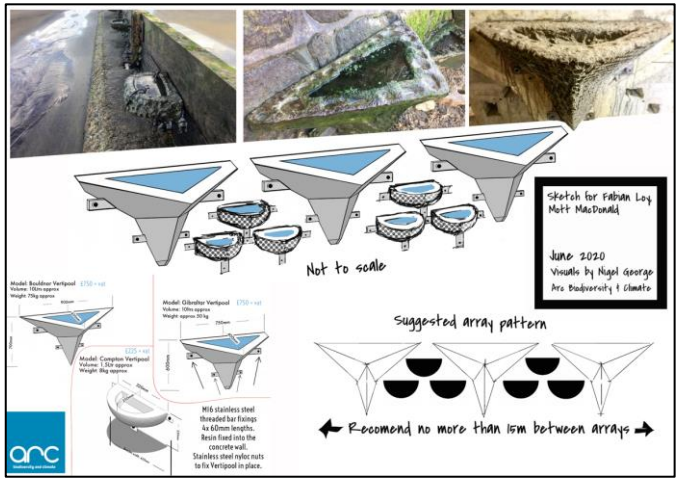
- **Three clusters of tidal pools** (ECOncrete® COASTALOCK™ units) located within areas of localised rock revetment enhancement.
- **Enhanced rock revetment** along approximately 160m (25-30% enhanced rock) in the lower intertidal revetment area. The enhanced revetment (sourced from local quarries) comprises areas of rock with more complex surfacing, including drill holes/cores and concave depressions/pitting, encouraging water retention and enhancing intertidal biodiversity.
- **Enhancement of three groyne structures** with two ecological armouring unit habitats (ECOncrete® Oyster Shell model) per groyne near mean low water.
- **The installation of a range of Vertipool™ features** (Artecology) to retain water on vertical surfaces at lower tidal states at stepped access points and at an access build-out (with some in accessible locations for education).
- **The placement of textured panels** (ECOncrete®, Banagher Precast Concrete) along the intertidal sections of the perpendicular access steps and outer walls with a specific admixture to enhance colonisation by marine life, providing micro niches.

The above measures were combined with proposed terrestrial enhancements including the planting of a new picnic and outdoor classroom area (currently amenity grassland) on the promenade, bird boxes, bat boxes and proposed wildflower planting, receiving support from the public and statutory consultees.

Volunteers from Mott MacDonald Ltd completed an intertidal plastics survey as part of the project and are also intending to complete the future Scheme monitoring.



Banagher Precast Concrete produced precast seawall units with ECO Seawall surface finish, achieved using the ECO seawall formliner with Azouri pattern (ECOncrete®) – Conwy County Borough Council



Examples of Vertipool™ features – Nigel George, Artecology

Further information

The installation methods proposed for the enhancements include the use of hand tools for rock surface enhancements, precast formwork for the textured panels, placement of precast artificial tide pools within the revetment and ecological armouring units within the groyne structures, and fixing of Vertipools™ using threaded bars and resin.

Conwy County Borough Council (CCBC) are updating their beach management plan to ensure maintenance teams are aware of (and can protect) the sensitive local habitats. Information boards will educate the public on the species present, along with information outlining the importance of the new ecological enhancements and how the changes made will benefit these species. Following a beach plastic survey, the potential for the education of the public about the marine plastics has been identified. CCBC are considering that in the future, the beach could be classed as a single use plastic free zone.

On completion, the Scheme is to be monitored by volunteers from Mott MacDonald Ltd every 3 months to determine the success of the enhancements and their replicability on other coastal engineering projects. Several lessons learned sessions have already been completed between members of the design team and CCBC in relation to new coastal projects in the county.

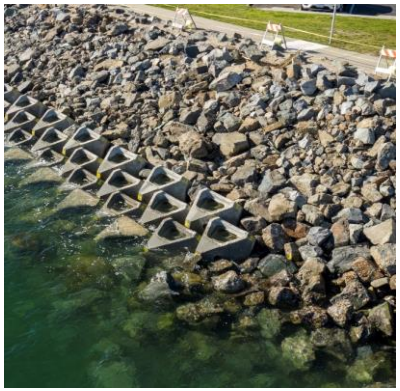
Sustainability (including biodiversity) was a key driver, it was registered with CEEQUAL and subsequently achieved a strategy and design stage Outstanding award (92%). The Scheme supports UN Sustainable Development Goals 14 (Life Below Water), 15 (Life on Land) and the Wellbeing of Future Generations Act Goal 'A Resilient Wales'.

Project Team

- Client / funders: Conwy County Borough Council / Welsh Government Resilient Roads Fund and Welsh Government Local Transport Fund
- Design team members: Mott MacDonald Ltd, BCA Landscape.

What was the motivation for carrying out the enhancement?

The team were committed to delivering the best environmental outcomes and there was a keen ambition to go above and beyond the required mitigation to deliver enhancement. The knowledge gained from the monitoring of the enhancements will be invaluable for understanding how grey infrastructure can successfully be made greener in the UK coastal environment, particularly in consideration of climate change and the likely increased need for similar hard engineering projects going forward.



ECOncrete® COASTALOCK unit examples from another scheme – ECOncrete®

Visualisation looking west across the finished Scheme area at high tide – Mott MacDonald Ltd