



# Hamble Harbour – New Seawall Hamble Estuary, Hampshire, UK River Hamble Harbour Authority/Hampshire County Council, WSP, Suttles, Bournemouth University, Artecology

# **BIG Biodiversity Challenge Award Category:**

# Innovation

# **Project overview**

A new concrete seawall was required to replace >100 year old intertidal concrete frontage surrounding the base of the Hamble Harbour Master's building. The new seawall facing was completed with Reckli formliner and bespoke wooden moulds to create 'letterbox crevices' and integrated pools for sea life.

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

Three pre-characterisation surveys found just 12 species inhabiting the lower extent of the seawall, which was otherwise barren. Limited habitat was incidentally provided by cracks as a result of concrete deterioration and some canopy-forming algae at the base which provided shelter for the odd snail. The old seawall therefore had low value for wildlife, in addition to falling into disrepair.

# What were the reasons behind this project ?

The drivers were based upon duties as a public body and on opportunities to increase biodiversity value of a structure, and to demonstrate the efficacy of using in-situ formliners and custom moulds to create a bioreceptive seawall with habitat features integrated within the design, instead of 'bolting on' retrofit interventions which add time and cost. This method of habitat integration can help to address biodiversity net gain by engineering bioreceptivity into the structure itself. The formliner was chosen for its natural rock appearance, providing shelter while also softening the normally harsh aesthetic of a concrete seawall for the local community.



The >100 year old seawall in disrepair, photographed in August 2019



The new **seawall** in August 2021, showing textured surface and voids.



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#### What were the biodiversity measures taken?

Following consultation with eco-engineering experts at Bournemouth University, the following biodiversity measures were taken for the Phase 1 seawall in August 2021:

- A reusable Reckli formliner was used to increase surface area and texture, to increase shaded and wet areas on the seawall
- Concrete was made using recycled binder material GGBS to limit carbon footprint, reduce alkalinity for rapid primary colonisation, and increase the service life of the structure
- Wooden hollow boxes were nailed onto the formliner to create 'cubic' and 'letterbox' voids in the concrete frontage, adding further habitat features. The cubic voids slope inwards and downwards to retain water
- Pre-cast concrete rockpools 30cm in depth were placed at the toe of the seawall, providing additional habitat in the lower portion of the tidal range

Based on the initial findings and lessons from Phase 1, the following measures were added to the Phase 2 section in April 2023:

- Increased height on the lip of the cubic void, to retain a greater depth and volume of water
- · Wider aperture on the pre-cast concrete rockpools to allow for easier surveying
- Nine retrofit artificial rockpools that were on the old Phase 2 wall were removed and replaced on the new Phase 2 concrete frontage. The artificial rockpools do not sit flush against the rocky textured seawall, providing dark and sheltered habitat behind them, favoured by shanny fish and sea squirts. The Marineff artificial rockpools will help seed the new Phase 2 seawall with biota, having been colonised and in the marine environment since the summer of 2020

The design of the seawall was a close collaboration between all parties, and engineers reported that the use of the form-liner was straightforward.



The Reckli textured form-liner in position for concrete to be poured for the Phase 1 seawall



Left: the wooden moulds still in the seawall after the Reckli form-liner has been struck from the in-situ concrete seawall. Note the nails that pinned them to the form-liner. Right: the pre-cast rockpools



## **Further information**

# **Early Colonisation**

Mobile fauna such as sea snails and amphipods have already been observed using the puddled water in the cubic voids as shelter at low tide and would not have been able to do this without the habitat features included in this scheme. Although the high tidal range of the Phase 1 wall may limit colonisation today, in the decades to come it will provide life-saving stepping stones for intertidal sea life as sea level rises and our planet heats up.

## Legacy

Monitoring of colonisation of Phase 1 and 2 wall is ongoing by Bournemouth University students, with potential for publication in academic journals and guidance documents.

The Harbour Authority will be demonstrating biodiversity gain experience with practitioners in the Hamble and the wider Solent.

A sign for public engagement has been commissioned and will be placed in view of the adjacent popular public boardwalk to share the story behind the new seawall design.

Although simple, the innovative use of wooden moulds to produce integrated macro-scale habitat features is feasible, inexpensive and easily replicable. The moulds can be adapted to any shape, size and height on the form-liner and can therefore be customised to each site and even each panel, and are quickly chiselled out of the seawall.

The **Reckli form-liners are being donated** to a pilot scheme which will host a library of form-liners for loaning to other coastal schemes, reducing high overhead costs associated with commercial eco-engineering products, increasing habitat and reducing waste to landfill.



The public engagement sign design to be printed and installed at the site.



Left: a cubic void retaining water. Right: a letterbox crevice with a lip of green algae. Both photos taken two months post creation.



# **Further information**

#### **Project Team**

- Client/Funding/Project Management
  River Hamble Harbour Authority / Hampshire County Council
- Design Engineers WSP
- Contractor Suttles
- Design Support & Monitoring Bournemouth University
- Design Support Artecology

#### What was the motivation for carrying out the enhancement?

The Harbour Authority, part of Hampshire County Council, works proactively to enhance and conserve biodiversity though its functions and duties. The new seawall offered an opportunity to develop, learn and demonstrate biodiversity gain to harbour practitioners. It was important to obtain proof of concept for integrated habitat design in an in-situ concrete seawall as, at the time of initial design, no coastal scheme in the UK had achieved this. It was also important to see how macro-scale features could be achieved inexpensively and easily, to maximise replicability in other schemes.







*Top: solitary sea squirts in the pre-cast rockpools at the toe of the Phase 1 seawall.* 

Bottom: an amphipod hides in the water in one of the cubic voids