

LIVING SEAWALLS



SEAWALL HABITAT
ENHANCEMENT PANELS
PRODUCT INFORMATION

JANUARY 2024

ENHANCING THE ECOLOGICAL VALUE OF
ARTIFICIAL MARINE STRUCTURES





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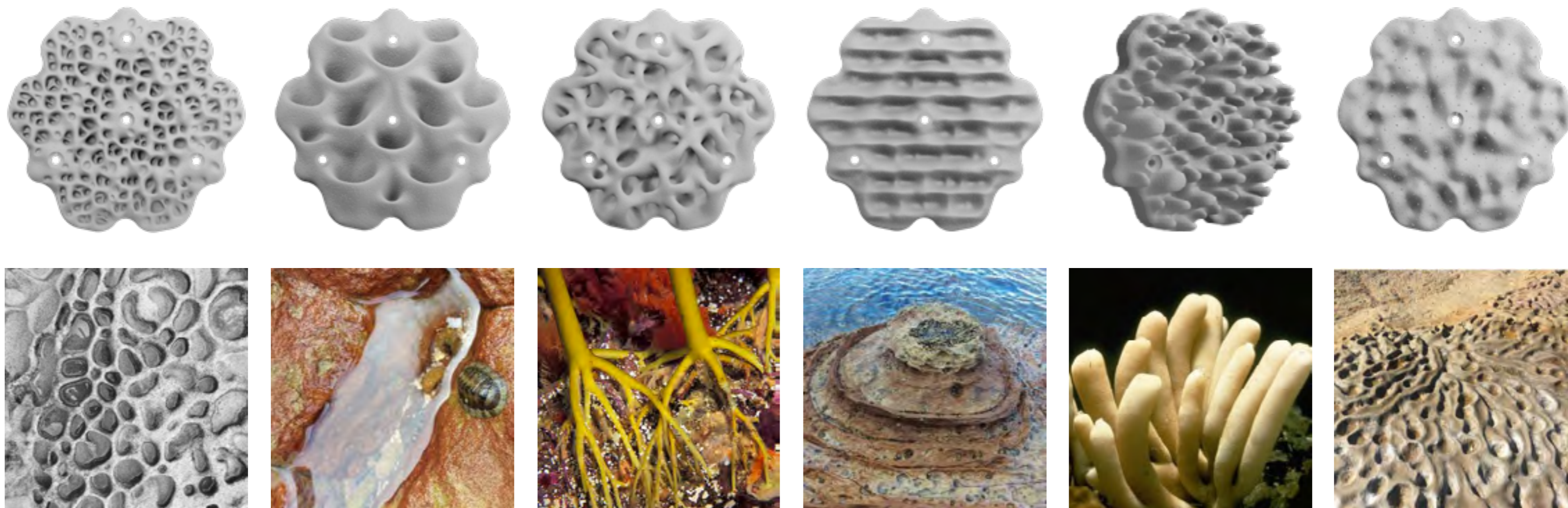




Living Seawalls Solutions

Living Seawalls increase the ecological value of new and existing foreshore developments. This is achieved by designing structures from the outset that are ecologically sustainable and provide multiple end-user benefits. These multi-purpose objectives can be incorporated through a range of engineered and ecological applications. The ideal management response to address the impacts from artificial marine structures is to restore

and/or rehabilitate natural habitats. When this is not possible and construction is inevitable, we offer evidence-based advice on how to best design such structures and/or developments. We offer habitat modules that can be pre-fabricated and incorporated into the design of new marine built structures or fitted to existing structures to enhance their ecological value and provide multiple end-user benefits.



Habitat Design Based on Nature

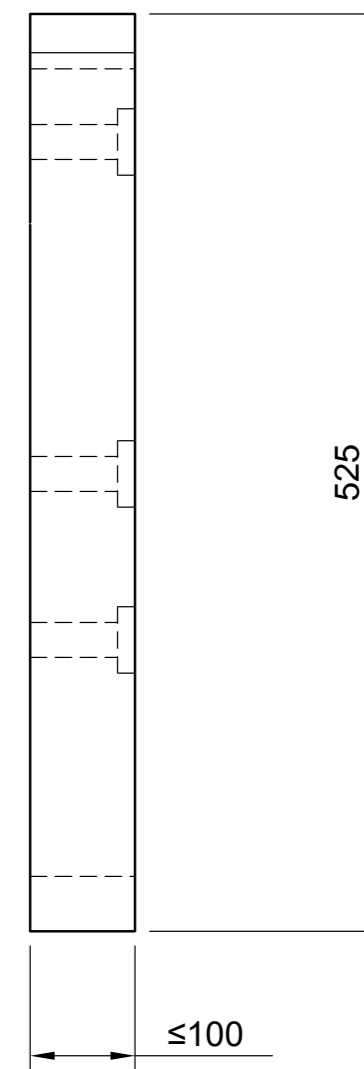
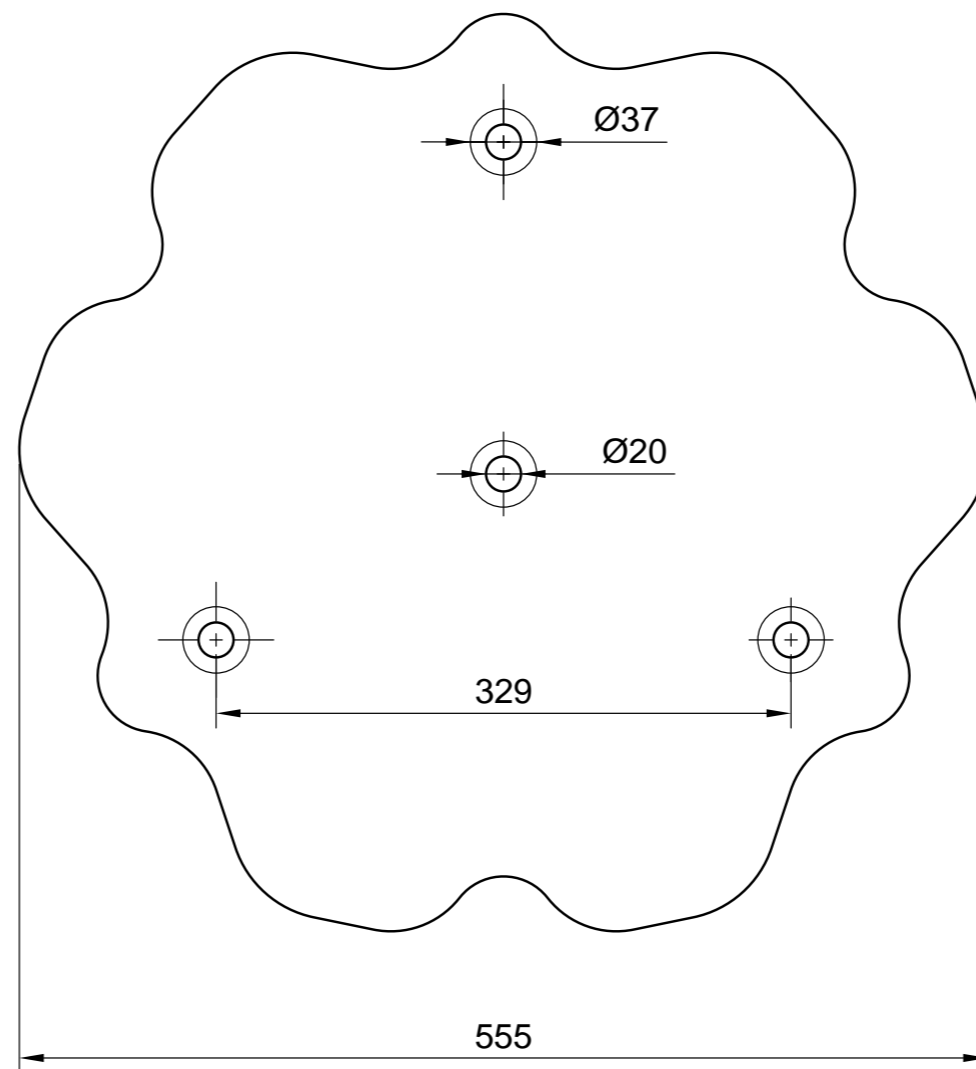
Built structures have, typically, smooth, vertical surfaces, lacking the diversity of micro-habitats often present on natural habitats. Consequently, ecoengineering has mostly focused on increasing surface area and/or habitat complexity of the hard substrata provided by these structures.

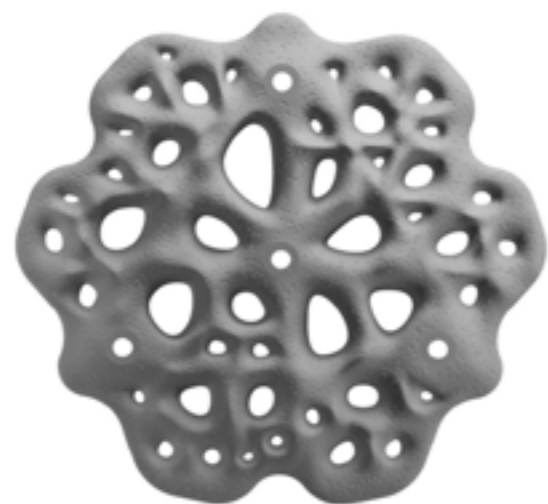
Living Seawalls have innovated an adaptable and customisable approach of adding habitat complexity to marine built structures. Our modular panels come in seven different designs, each mimicking habitat providing features of natural shorelines. This increases available area for colonisation of species and provides refugia from predators and environmental stressors, increasing overall biodiversity.

Habitat Panels

All panel modules are made from concrete and weigh approximately 23-28 kg.

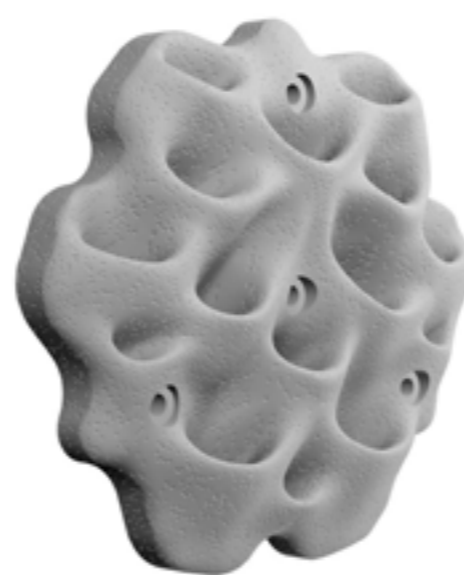
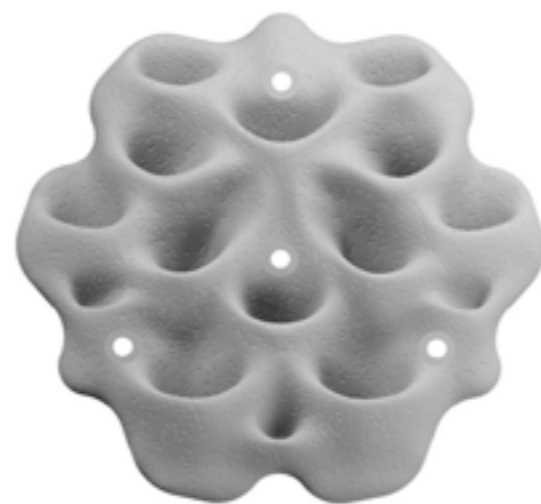
Descriptions are provided with each panel to illustrate the marine communities that may benefit from the design. We have a variety of complex designs available, or we can create a bespoke, site-specific design. All designs can also be cast into larger prefabricated modules.





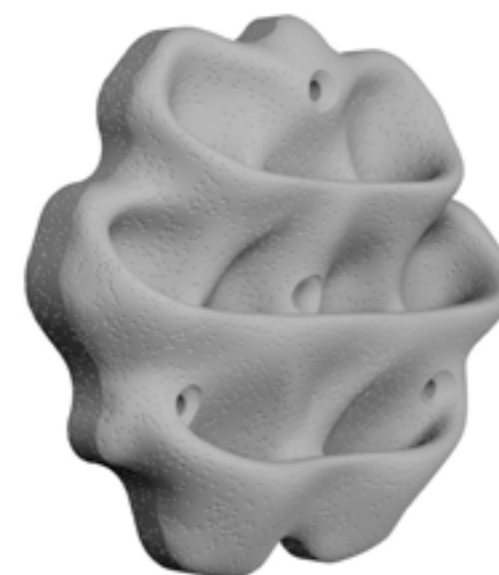
SWIM-THROUGH

Swim-through panels have been designed to provide habitat for small fish such as gobies and blennies. The panels have openings that allow fish to swim through and forage between the seawall and open water. They may be applied at low-intertidal or subtidal elevations.



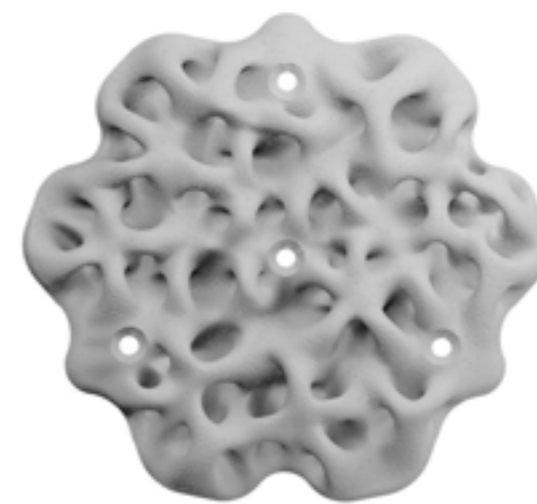
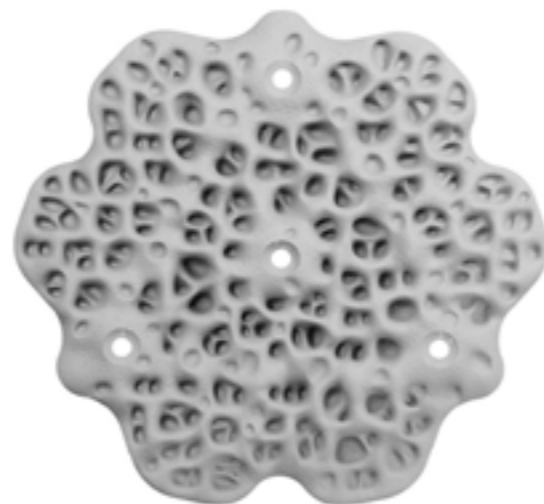
SMALL ROCKPOOL

These mimics of natural rockpools can be quickly colonised by different types of invertebrates and algae. At intertidal elevations they provide shelter from desiccation and temperature stress. In subtidal locations they provide refuge for small fish such as gobies and blennies.



LARGE ROCKPOOL

Large rockpool panels contain water-retaining features, which are virtually missing from seawalls. These panels have been modified to the dimensions of rockpools commonly found in the middle reaches of an estuary.



CREVICES

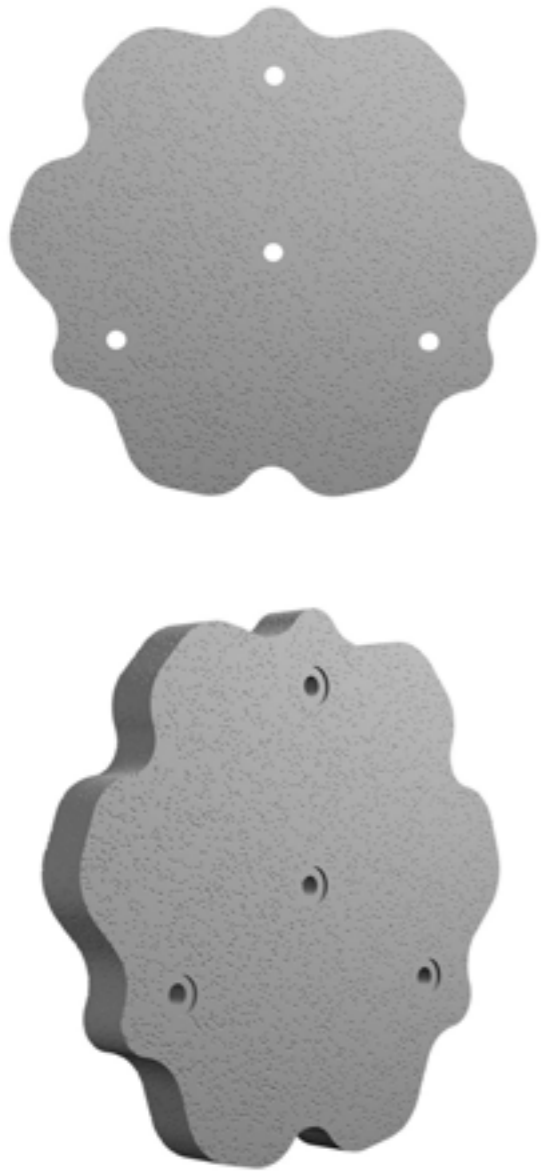
Crevice are a habitat feature that is common on rocky shores. In the mid- to high-intertidal, the crevices provide a cool and moist microhabitats and may protect sessile species from large predators at both intertidal and subtidal elevations.

HONEYCOMB

Honeycomb panels mimic a common weathering pattern of sedimentary rock. When deployed in the mid- to high-intertidal, the small “pits” provide shading and/or moisture retention. They may also provide protection to inhabitants from some large predators.

KELP HOLDFASTS

Large, habitat-forming seaweeds such as kelp have holdfasts that require protective environments to attach and grow. The loops on this panel have been designed for transplantation and attachment of seaweeds such as kelp.



CONTROL

The control panel contains small pits that mimic the fine-scale complexity of sandstone rocks. We recommend including control panels for ecological monitoring of the installation and performance of different panel microhabitat designs.

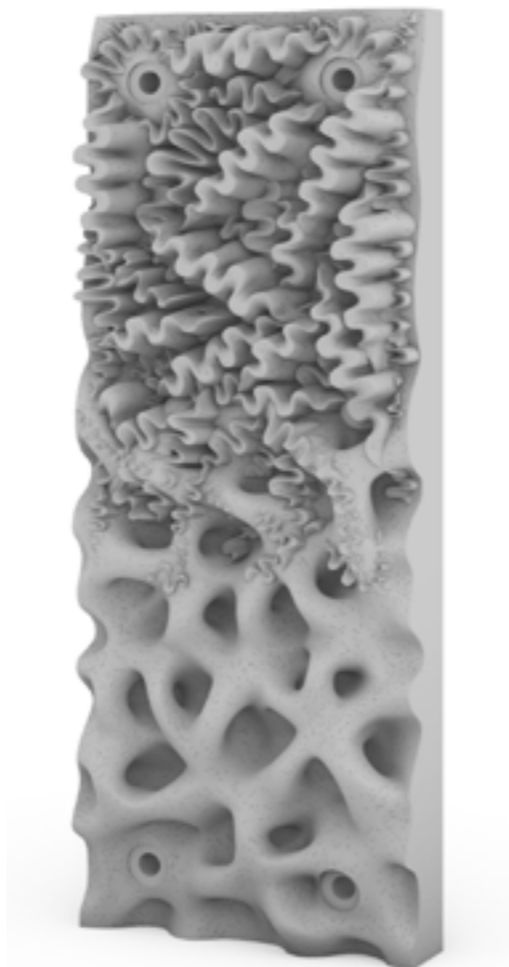




Bespoke Design

Living Seawalls offers bespoke designs to suit different built structures. Our habitat enhancing designs can be made into larger panels, integrated into the fabrication of concrete forms.

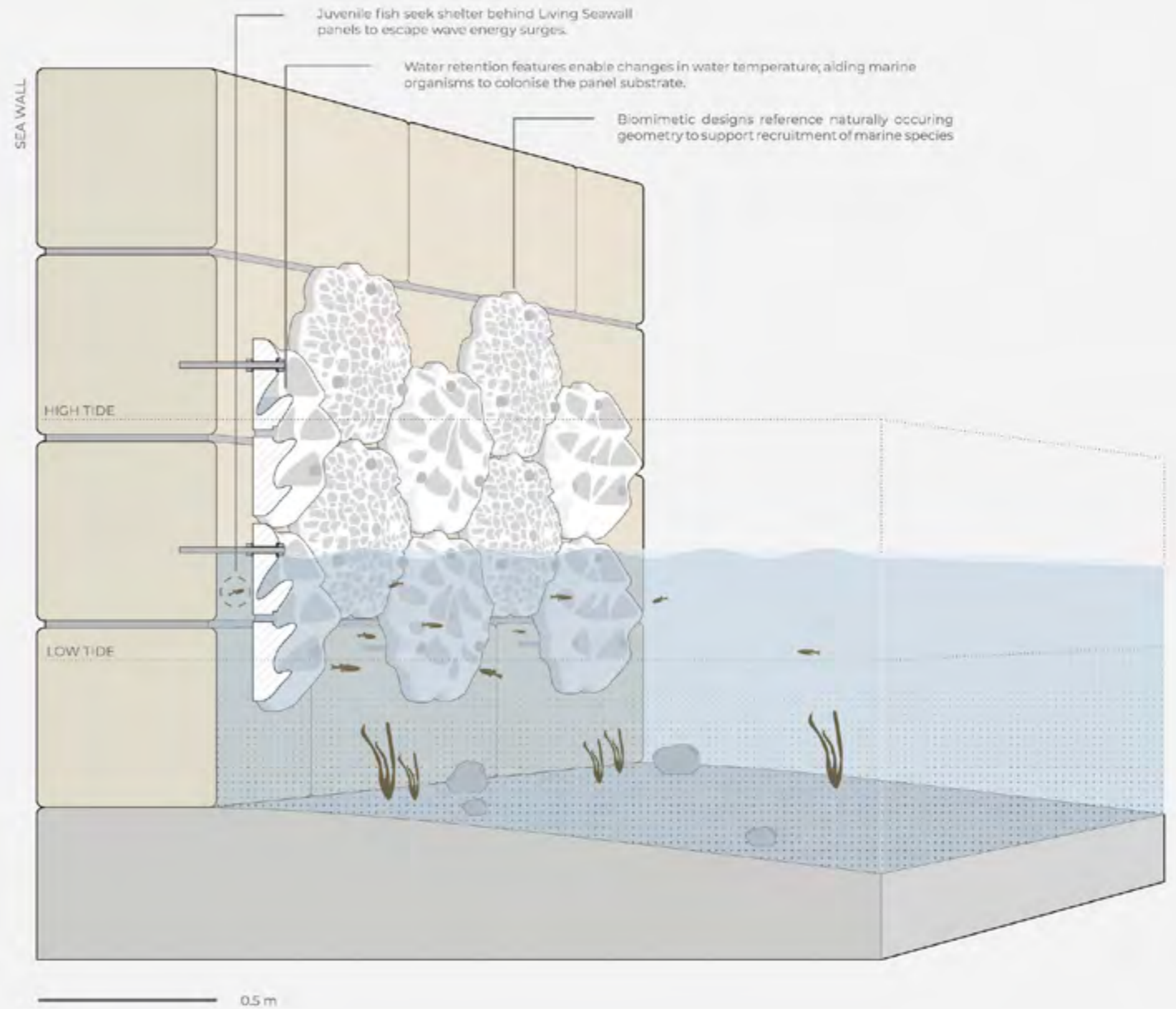
Our bespoke work includes designing rectangular panels to fit within the recesses of a sheet pile wall in Botany Bay and creating a mould system for integration into the prefabrication of concrete pile caps for our Living Seawalls - Living Ports project in Peru.





A Vertical Range

Living Seawalls panels can be placed within the intertidal zone and subtidal areas. Living Seawalls habitat panels can enhance the communities of organisms inhabiting different tidal heights of the structure.





Milford Haven, Wales



Balmain East, Sydney, Australia

A Worldwide Solution

Over 1500 Living Seawalls habitat enhancement panels have been installed in over 20 sites worldwide, including Australia, Gibraltar, Singapore, Europe, UK and Peru. In 2024, new Living Seawalls will be installed in Busan, South Korea and Boston, USA.

Many of these projects were research collaborations with Universities and research institutions to evaluate the efficacy of Living Seawalls solutions in different geographic locations.



Habitat Enhancement

Living Seawalls habitat enhancement panels are made using 3D printing technology and manufactured in reinforced concrete. When co-located, habitat units of differing design can be used to achieve multiple outcomes at one site. The design, size and shape can be tailored to the needs of specific locations.



Retrofit Seawalls

This method has been used for the majority of Living Seawalls installations worldwide. For intertidal locations, works can be completed during low tide times. Three or four attachment points per panel can be used, depending on the local wave energy.

When retrofitting, panels can be offset from the wall by 100mm. This prevents the need to remove existing growth before installation, preserving the marine life in the area.





Install to New Seawalls

For new constructions, mounting rods or frame can be integrated into the construction. The panel can be attached flush to the wall using epoxy. Depending on local wave energy, fewer rod attachment points per panel can be used.





Mount Panels to a Frame

The Living Seawalls habitat panels can be mounted to frames before in-water installation. This method was used at Barangaroo, Sydney. 384 panels were fixed to stainless steel frames. Frames were then installed at 3 different depths beneath a board walk. The frames were attached to the board walk piles.





Expected Install Duration

Costs and duration of installation will vary depending on local conditions and contractor fees.

As a guide, installation of the above 72 panel configuration, retrofitted to an intertidal seawall, takes a team of 3-4 people 3-4 days to install during low tide times.





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Contact

For more information, please contact
info@livingseawalls.com.au

or visit our website
www.livingseawalls.com.au

Living Seawalls works in collaboration with Reef Design Lab

REEF DESIGN LAB

www.reefdesignlab.com