

BRISTOL SEAWEED CENTRE

📍 Old Fire Station, Silver St, Bristol BS1 2AG



“...If seaweed was growing over just 9% of the oceans it could remove all of the human-produced carbon in the atmosphere, replace all of our fossil fuels and sustain increased fish production to help feed our Growing population...”

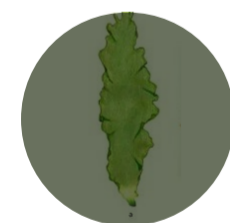
~ De Ramon N'Yeurt et al 2012

INTRO

This project proposes a creative centre exploring seaweed as a renewable resource in response to climate change, material scarcity and the need for sustainable design. As a fast-growing, regenerative material requiring no fresh water, fertiliser or land, seaweed offers new ways to consider future materials, food and environmental responsibility. Through exhibitions, workshops and immersive interiors, the project educates the public on the overlooked potential of red, green and brown seaweeds. Materials such as kelp ash glass, 3D printed algae plastic and seaweed fibre textiles are used throughout, turning environmental research into a tactile spatial experience.

CONCEPT

The concept is driven by the three main types of seaweed: red, green and brown. These categories have been used to create specific spatial zones, forming a clear wayfinding strategy that connects colour, function and environmental meaning. Seaweed is not treated only as a visual theme, but as the foundation for the project's material and spatial language. Each zone reflects a different quality of seaweed, allowing visitors to experience its renewable potential through atmosphere, texture, colour and movement through the building.



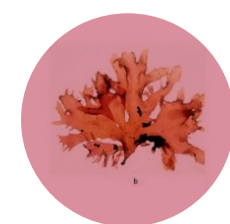
GREEN SEAWEED

Unique because it is closest to land plants and thrives in bright, shallow water. Its key use is in food and fertiliser, due to its high chlorophyll and nutrient content.



BROWN SEAWEED

Unique for its large scale and fast growth, often forming kelp forests. Its key property is producing alginate, used in bioplastics, textiles, food and medical materials.



RED SEAWEED

Unique for its red pigments, which let it survive in deeper, lower-light waters. Its key property is producing agar and carrageenan, used as natural gels and thickeners.



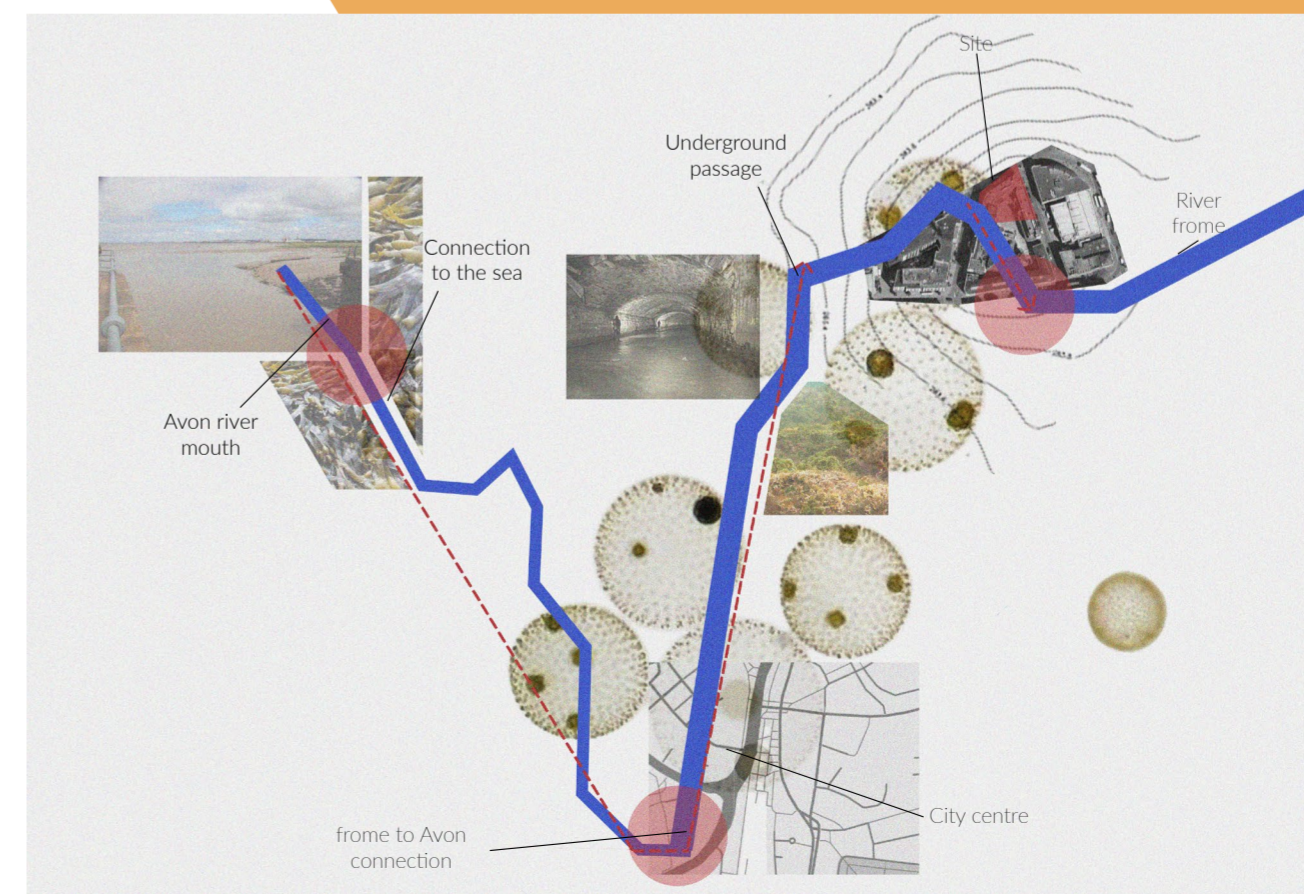
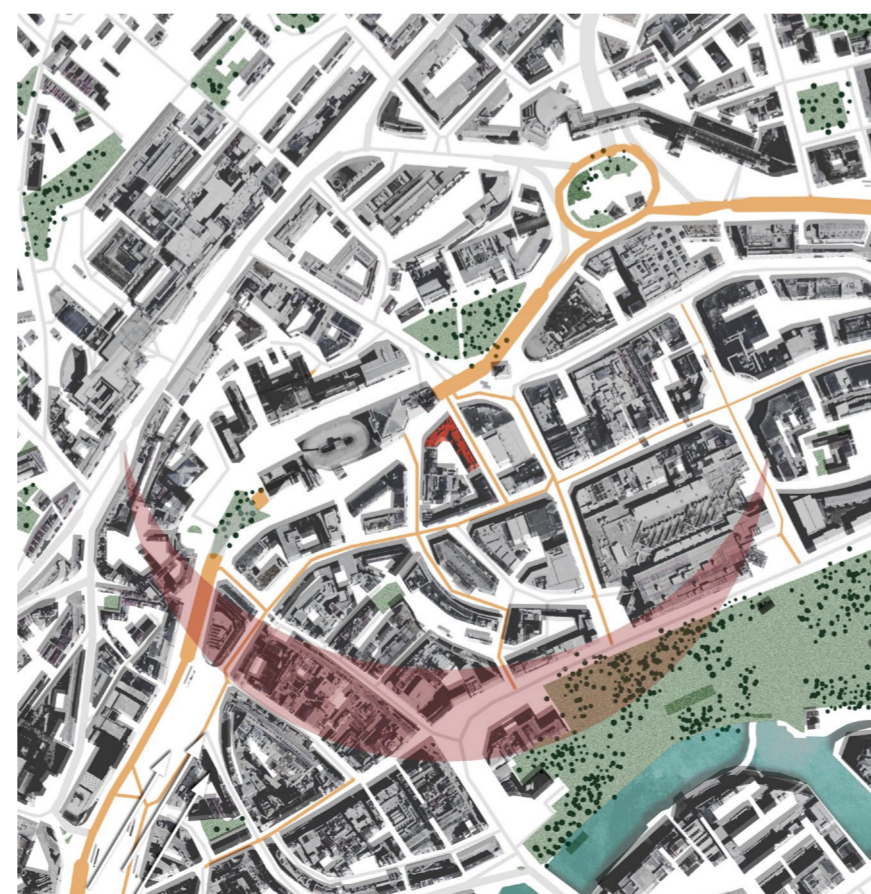
BRISTOLS CONNECTION TO THE SEA

The River Frome runs beneath the site, forming an overlooked layer of Bristol's maritime history. Its hidden presence links the building to the city's trading heritage, water based infrastructure and long standing relationship with the ocean.



OBSERVATIONAL STUDY

-Flushing, Cornwall





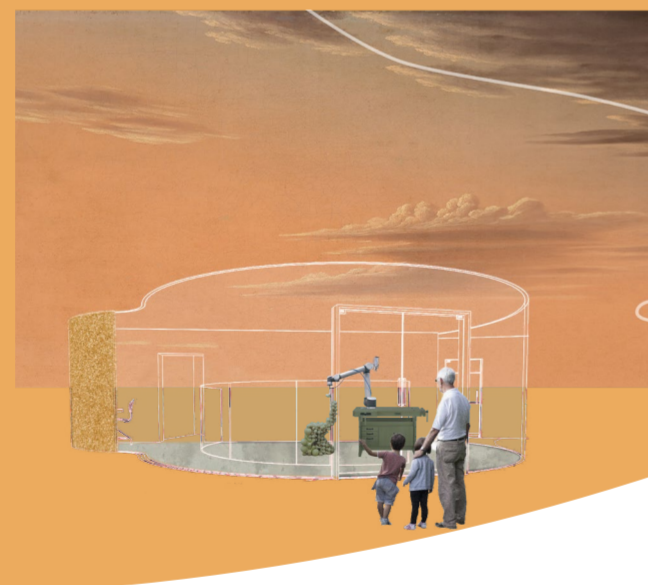
COMMUNITY WORKSHOPS



TEXTILES

This workshop explores seaweed-based textiles through hands-on fabric making and sustainable clothing design. It responds to the environmental impact of fast fashion by introducing renewable fibres as an alternative to resource-heavy and disposable material systems.

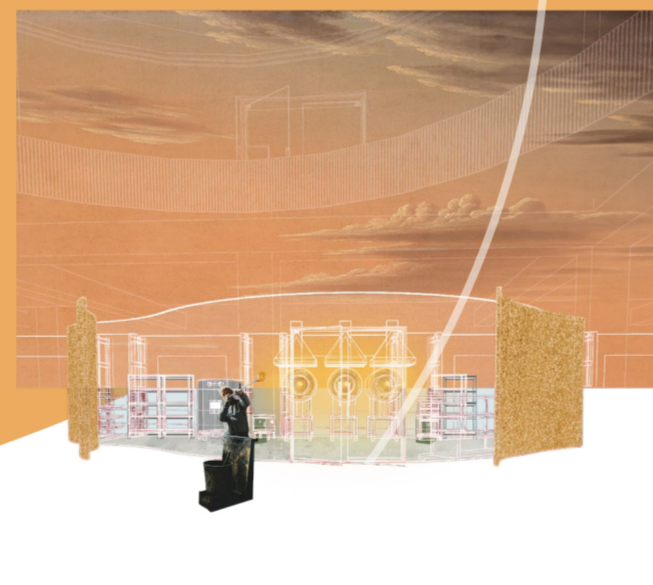
Through making, testing and visible process, visitors learn how seaweed can support slower, circular approaches to fashion, craft and interior textiles. The space connects material exploration with climate awareness, showing how tactile, bio-based fabrics can influence future design, reuse and more responsible ways of making.



3D PRINTING

This workshop explores additive manufacturing through the testing of seaweed-based biomaterials. It focuses on how renewable materials can be developed, formed and applied at different scales, from product design to interior construction.

Through live making and material experimentation, visitors are introduced to emerging sustainable technologies and the environmental potential of bio-based fabrication. The space highlights 3D printing as both a technical process and an educational tool, showing how material research can shape future reuse, construction logic and tactile spatial experiences.

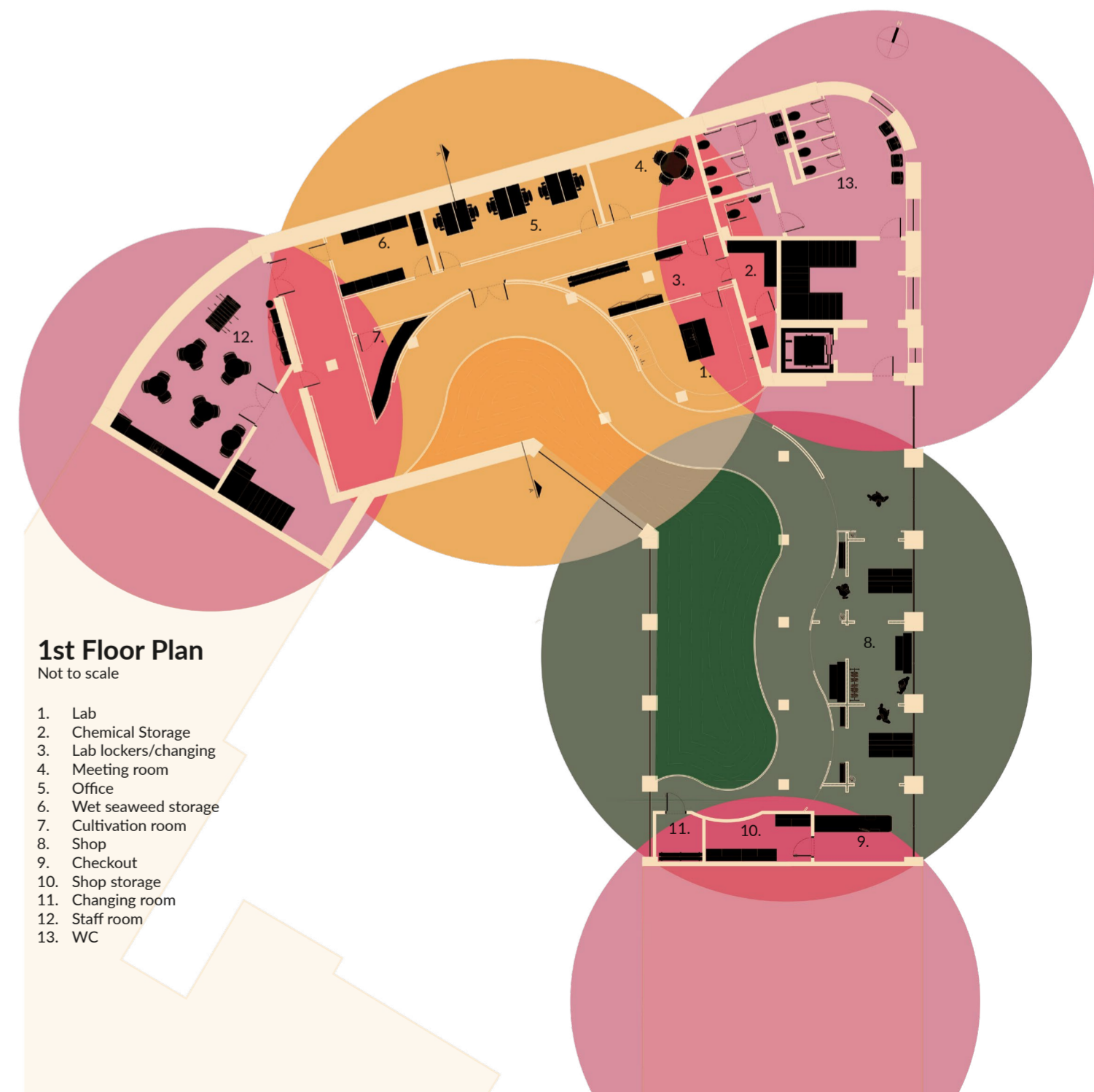
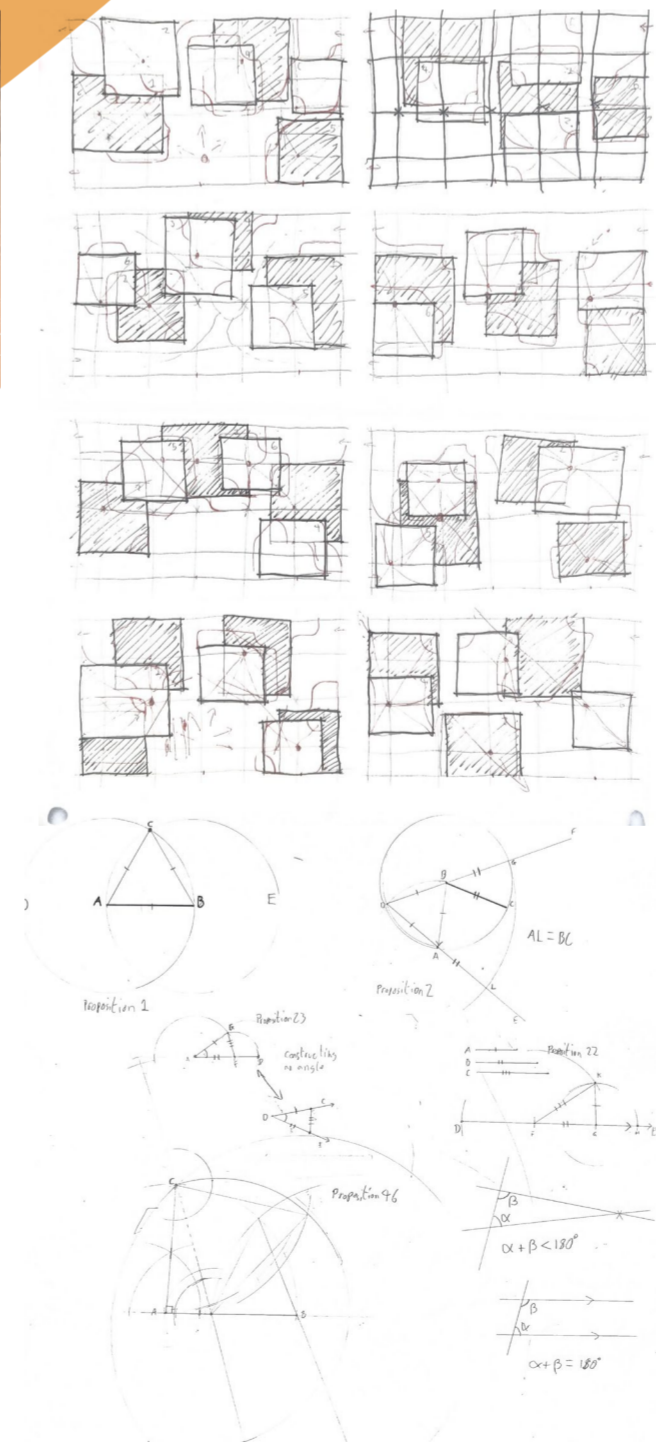


GLASS BLOWING

This workshop explores glass blowing as both a creative process and a way of teaching material responsibility. It references the historic use of kelp ash glass, where kelp ash acted as a flux to help lower the melting temperature of sand. By connecting traditional material knowledge with contemporary sustainable design, the workshop highlights how natural additives can influence construction, energy use and material performance. Through visible making, visitors gain an understanding of how seaweed-based processes can shape craft, environmental thinking and tactile spatial experiences.

RESEARCH LAB

The Seaweed Research Centre acts as the intellectual core of the building, supporting experimentation, innovation and the development of seaweed-based biomaterials. Set apart from the main public areas, it provides a focused environment for material testing, technical development and climate-aware research. A controlled viewing window allows the public to observe this process without disrupting the work, turning research into part of the building's educational narrative. Alongside the lab, a computer and meeting room support collaboration, administration and key decisions, ensuring the centre operates as both a public learning space and a place for ongoing sustainable material development.



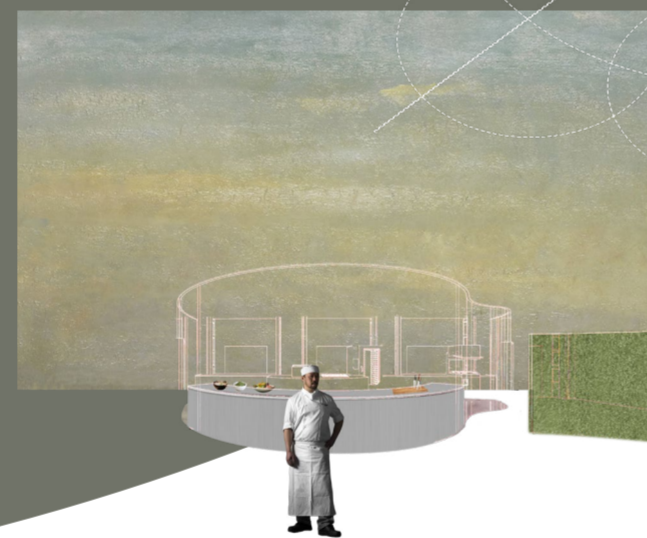
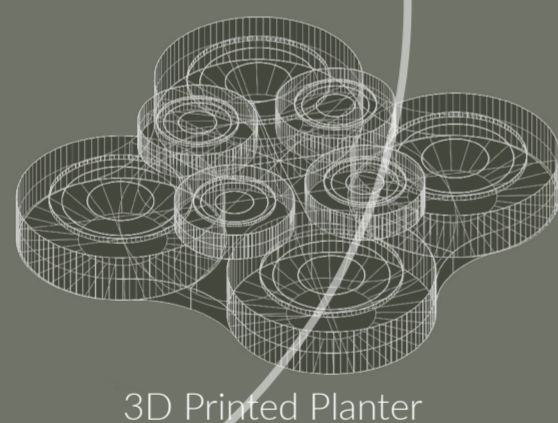
1st Floor Plan Not to scale

1. Lab
2. Chemical Storage
3. Lab lockers/changing
4. Meeting room
5. Office
6. Wet seaweed storage
7. Cultivation room
8. Shop
9. Checkout
10. Shop storage
11. Changing room
12. Staff room
13. WC



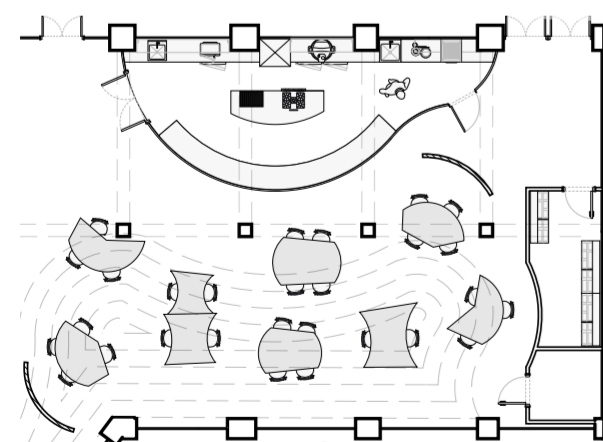
COMMUNITY GARDEN

Located within the central courtyard, the community garden strengthens the social and environmental role of the Bridewell Police and Fire Station site. The space supports urban greening, small scale agriculture and public engagement with sustainable food systems. Seaweed is used as a natural fertiliser to support food growing, with produce feeding back into the site restaurant. This creates a circular relationship between community, cultivation and climate aware dining.

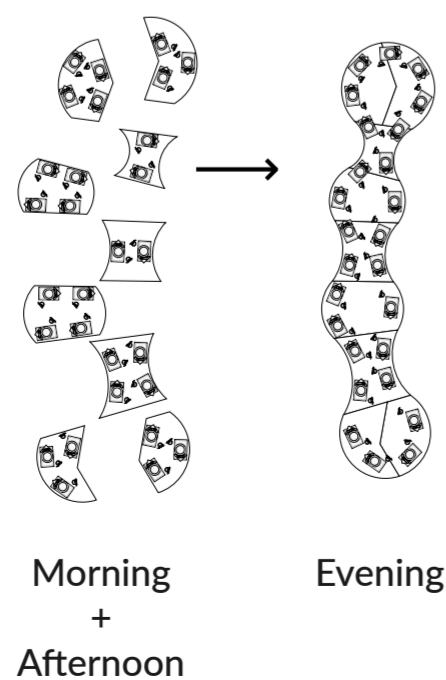


KITCHEN

The restaurant features a kitchen enclosed in clear glass, creating an educational space where the preparation of seaweed-based food is visible to visitors. As a renewable crop that can grow without freshwater, fertiliser or agricultural land, seaweed offers a low-impact alternative within future food systems. Its nutritional value is also central to the concept, with edible seaweeds providing minerals, iodine, vitamins and dietary fibre, which can make up around 23 to 64% of dried seaweed. By exposing the cooking process, the restaurant shows how seaweed can move beyond research and material experimentation into everyday meals, supporting both climate-aware eating and public understanding.



The dining area uses a modular table system that can separate into smaller tables, allowing the space to adapt between day and evening use. By day, it supports a flexible café layout for accessible grab and go seaweed-based food. By evening, it can be reconfigured for communal tasting menus, creating a more educational and social dining experience centred on seaweed as a renewable ingredient.

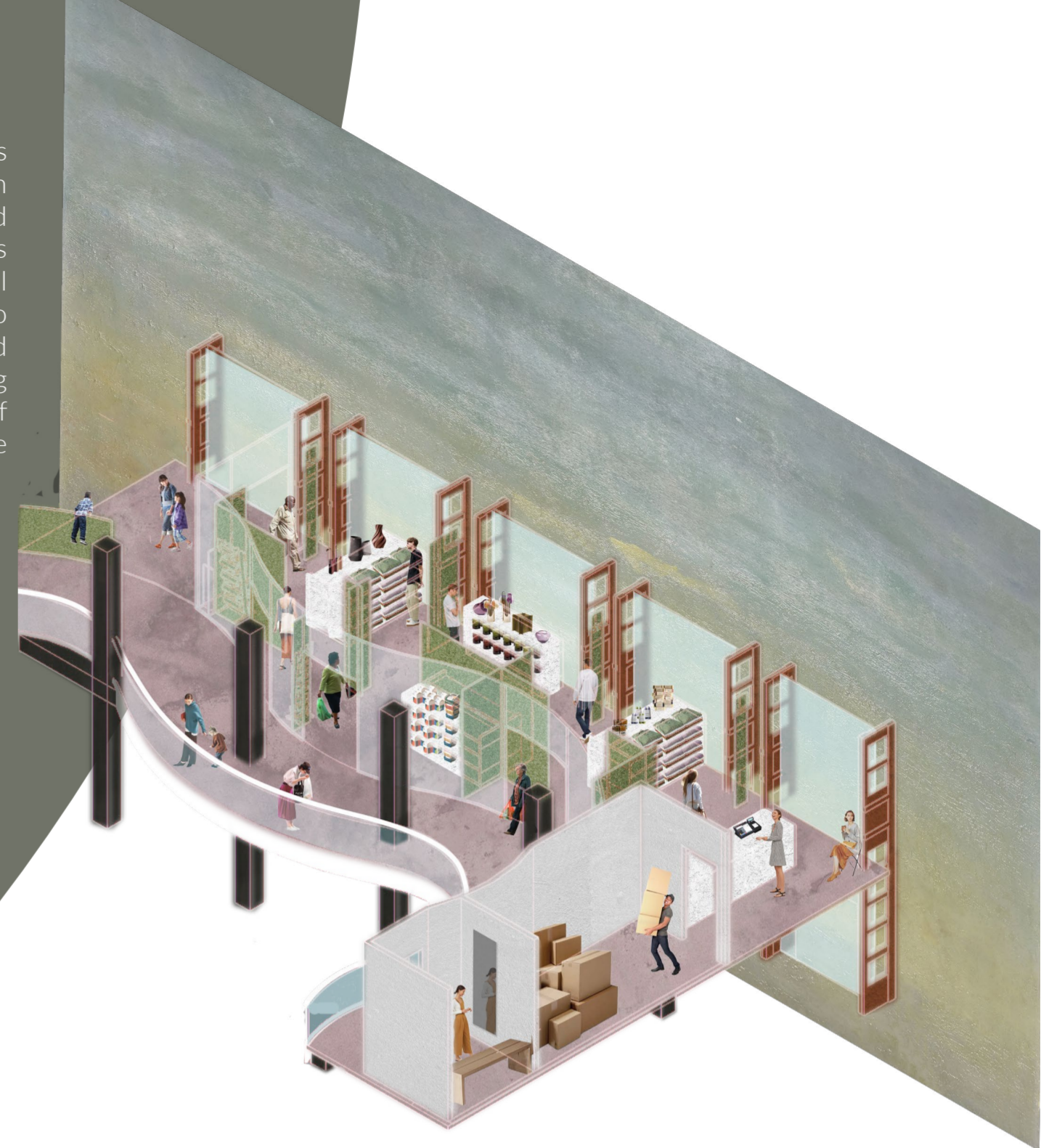


SHOP

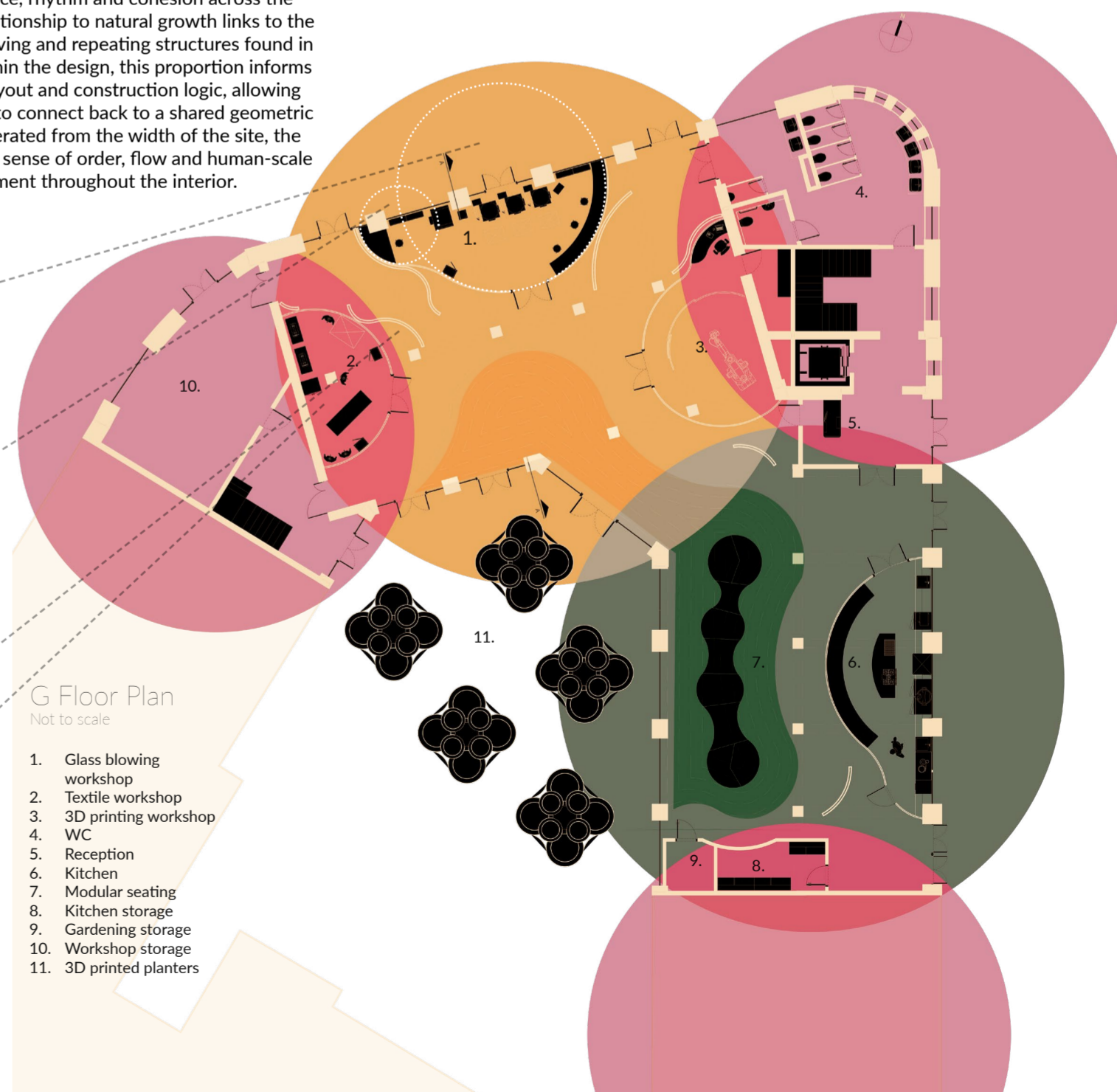
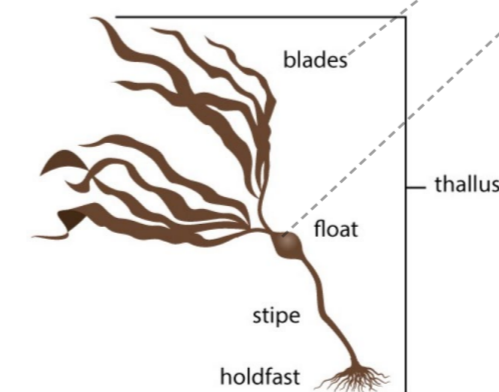
The upper floor shop presents seaweed as an accessible renewable material through a curated mix of in house products and sustainably sourced goods. Open entrances encourage a natural flow through the retail space, making the shop feel connected to the wider centre. Translucent 3D printed algae plastic walls shape the interior, casting layered shadows and creating moments of intrigue, tactility and discovery within the shopping experience.

PRODUCTS

- Algae 3D prints
- Seaweed fibre clothing
- Seaweed glass
- Food/cooking
- Soaps & care



The golden ratio is used as a form finding tool to create balance, rhythm and cohesion across the project. Its relationship to natural growth links to the branching, curving and repeating structures found in seaweed. Within the design, this proportion informs the spatial layout and construction logic, allowing each element to connect back to a shared geometric system. Generated from the width of the site, the forms create a sense of order, flow and human-scale alignment throughout the interior.



MATERIALS

The material strategy is developed directly from the workshops spaces and my own research into seaweed as a renewable material. Seaweed glass, algae plastic and seaweed fibre are woven throughout the interior, allowing the project's material research to shape the atmosphere of the space. Each seaweed-based material responds to its colour zone, creating a clear visual wayfinding system while showcasing different material properties through light, texture and tactility. The remaining palette is kept neutral, using softer tones to create moments of pause between the coloured areas. These materials act as a backdrop, helping to reflect and intensify the colours of the seaweed zones while maintaining balance across the interior.

MATERIAL RESEARCH EXAMPLES



Bio packaging



Sea-cell fibre



Seaweed bio plastic chair



Seaweed dye



Seaweed used to make cob



3D printed algae

“Calmly the wearied seamen rest
Beneath their own blue sea.
The ocean solitudes are blest,
For there is purity.
The earth has guilt, the earth has
care,
Unquiet are its graves;
But peaceful sleep is ever there,
Beneath the dark blue waves.”

~ The Ocean
Nathaniel Hawthorne

3D PRINTED BIO WALLS

Observing light through water
-SS Great Briton



The 3D printed walls running through the space are made from a composite of algae powder and recycled clear ocean plastic. Inspired by the refraction of light through water, the walls are produced using parametric design and randomised G code variations that subtly alter the width of each printed line, making every layer unique. This creates a clear definition between layers and results in a soft, translucent effect that blurs views through the space while enhancing light, texture and material depth.



The red seaweed zone is inspired by the gelling and binding properties of red seaweed. It acts as the connective core of the building, bringing together key support functions such as information points, WCs and reception areas, while providing clear visual way finding for visitors.

MATERIAL EXPERIMENTATION

Home made seaweed bio plastic

Ingredients

- Seaweed powder
- Corn starch
- Glycerine (optional to improve malleability)

Can be injection moulded and has potential for biodegradable packaging

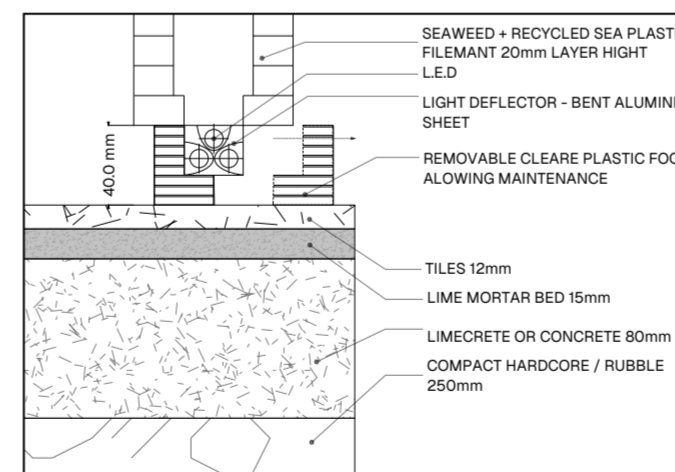


Print head path

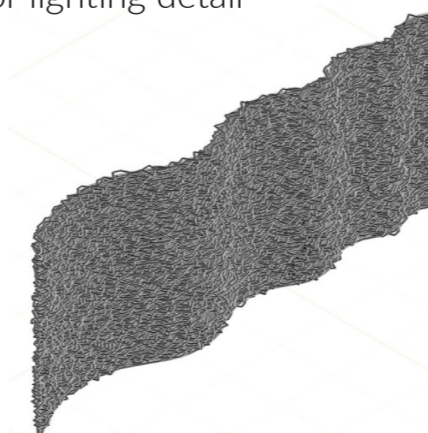
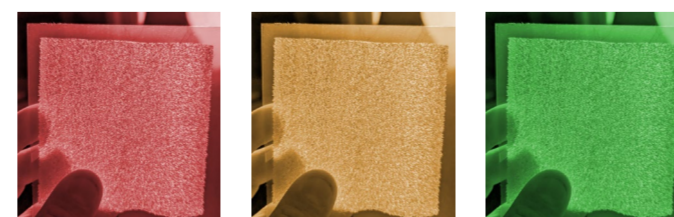


RANDOM EPR INTER HEAD
VARIATION
• VARIATION THICKNESS: 50MM
• POINT DISTANCE: 50MM

EACH LAYER IS RANDOMLY
GENERATED CREATING A "FUZZY
SKIN TEXTURE". ADDING
TRANSLUCENCY AND TEXTURE



3D wall interior lighting detail



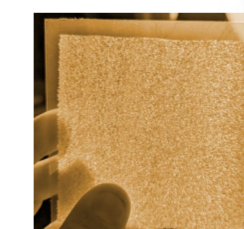
MATERIAL PALLET

COLOUR MATERIALS

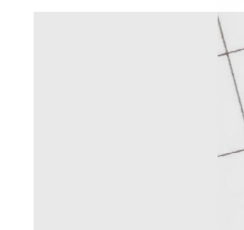
(Colour of material will match zone)



SEA-CELL FABRIC (SEAWEED
TEXTILE)



3D PRINTED SEAWEED PLASTIC

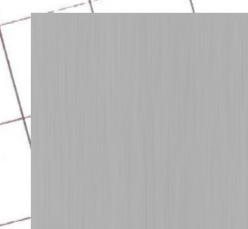


KELP ASH GLASS

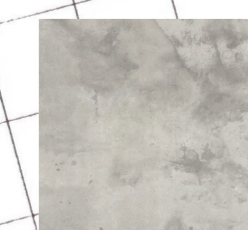
MATERIALS TO REFLECT COLOUR



WHITE RECYCLED OCEAN-BOUND
PLASTIC



BRUSHED ALUMINIUM

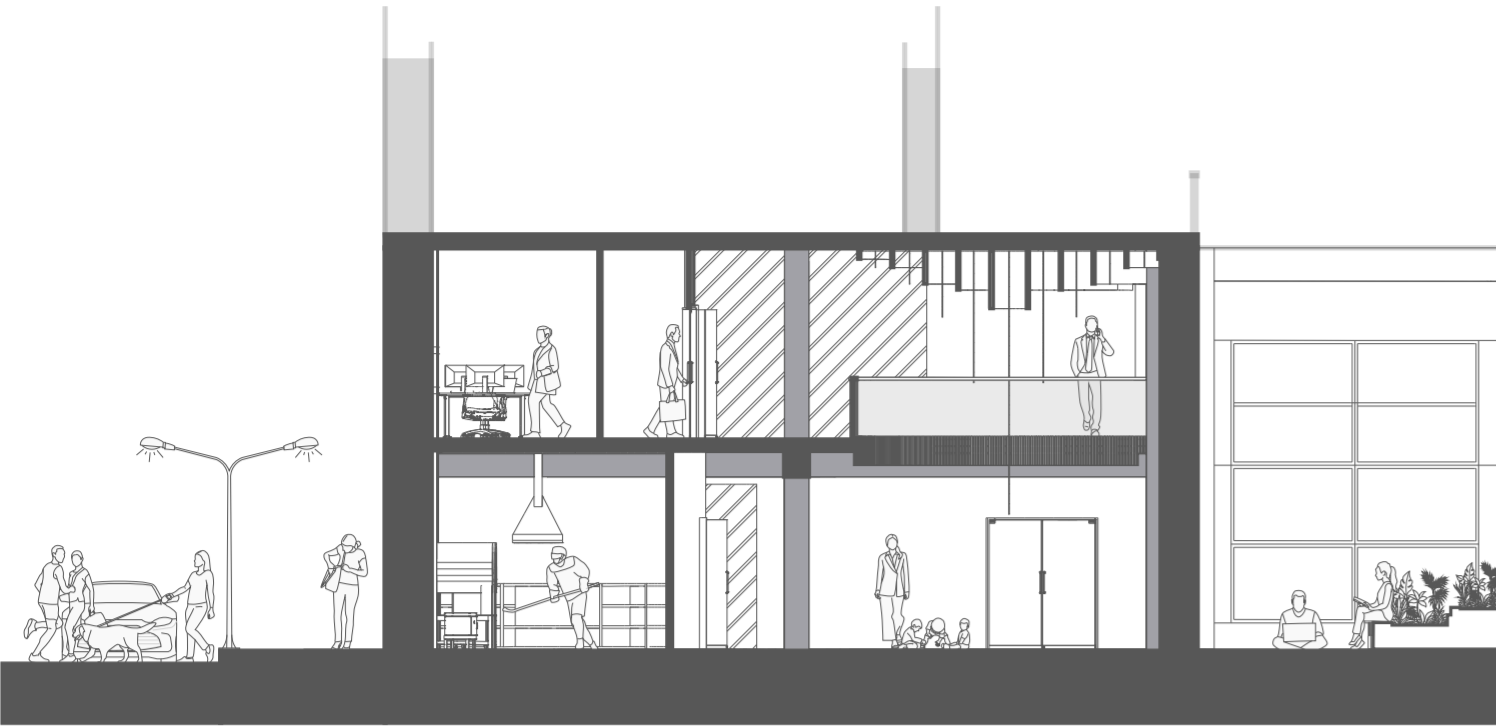
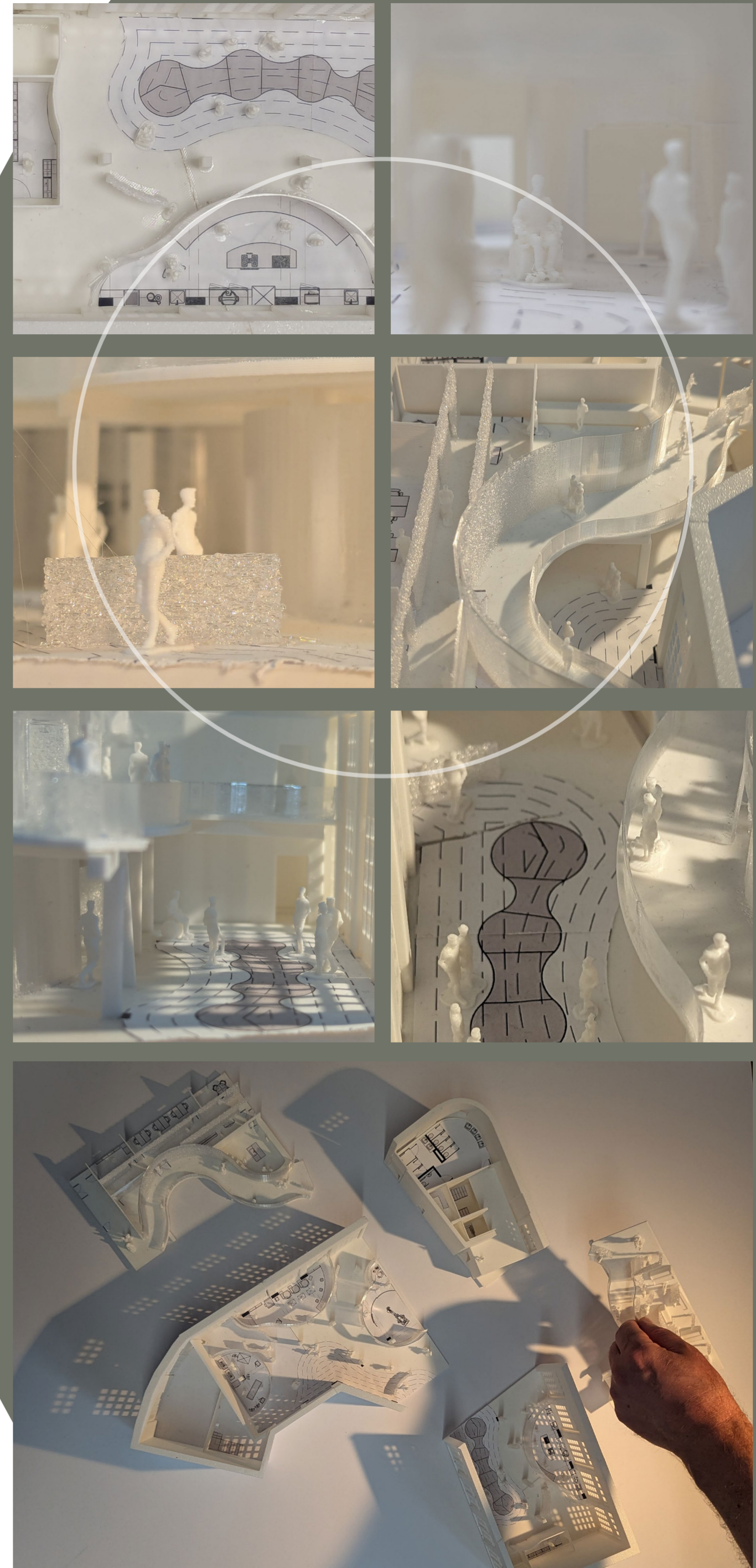


POLISHED CONCRETE

SEA-CELL CELLING FEATURE

How does it feel to swim through a kelp forest?

The ceiling feature was designed in response to this idea. Large hanging drapes of Sea-cell fabric fall through the space, connecting the floors in the same way seaweed connects the seabed to the ocean surface. As people move through the building, the lightweight fabric gently sways, periodically filtering and blocking light like the movement of ocean currents.



Section A
Not to scale

BUSINESS MODEL

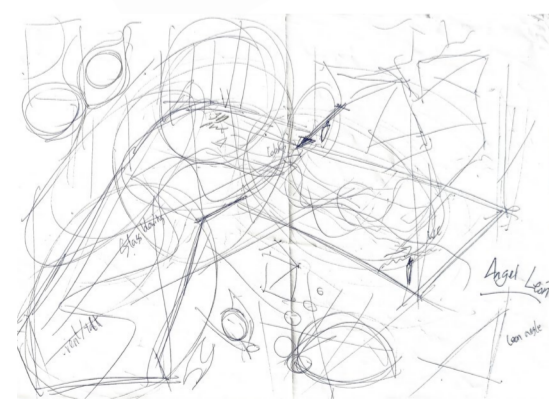
The business model is designed to be socially and financially sustainable. The centre remains **free to enter**, allowing the public to **learn** about seaweed, sustainable materials and climate focused design without cost becoming a barrier. This supports the educational purpose of the project and makes the space accessible to a wider community.

To fund the running of the building, the centre uses a **mixed income model**. Paid workshops, specialist events, tasting sessions and material making classes help **generate revenue**, while **donations and retail sales provide additional support**. This allows the free learning areas to be supported by more focused paid experiences.

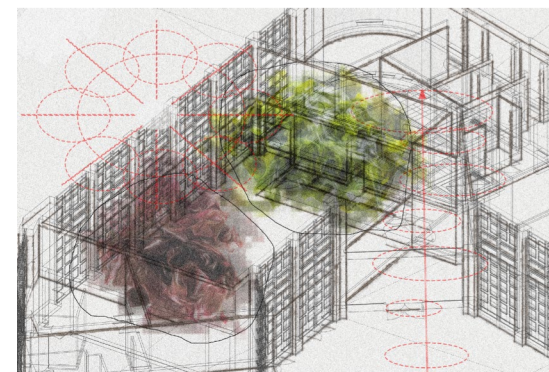
By balancing free education with income generating activities, the centre **creates a circular business model**. Public access builds awareness and engagement, while paid events help maintain the facilities, support staff and fund ongoing research into seaweed based materials. This makes the project more **resilient, inclusive and sustainable long term**.



HOW DOES SEAWEED
FLOW?



HOW DOES SEAWEED
FLOW THROUGH THE
SPACE?



HOW DOES SEAWEED
INHABIT THAT?

