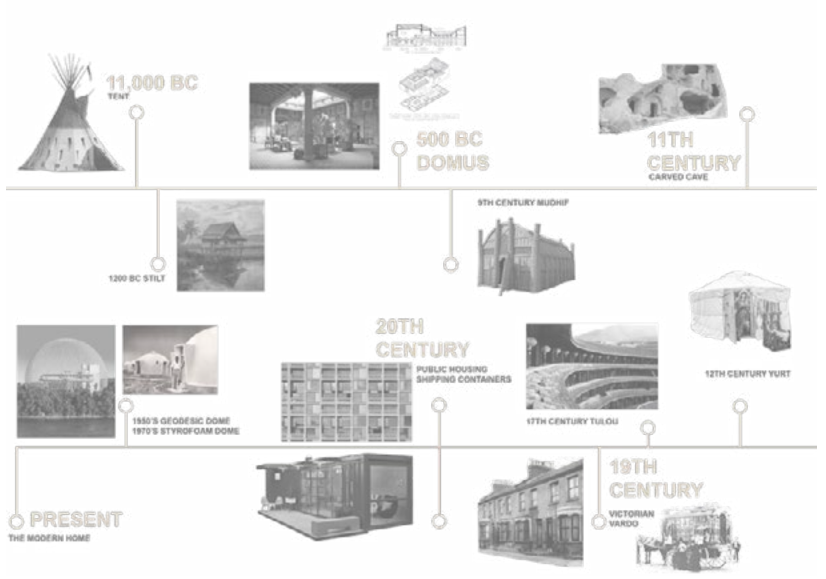

Tamper Restaurant View

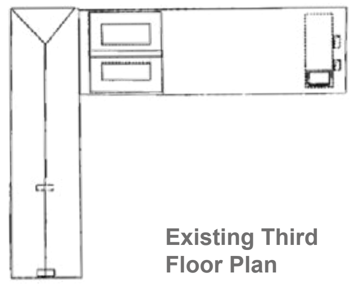

Courtyard View


Street View



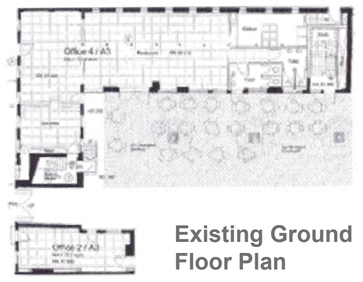
Existing Building
Built in the late 19th Century, this grade II listed building was previously used as a cutlery works. As one of the few survivors from its industrial time period, many of its original features have been retained. Following a £3 million refurbishment, the building currently houses a restaurant, cafe, offices and student accommodation. In keeping with this rich industrial heritage, I aim to retain as many original features as possible within my own design.

Housing / Community Through Time
To the left, I am exploring how housing types have changed over time and the crucial role that community has always played. Early human settlements were often built around shared resources and social structures. Prehistoric and ancient civilizations built their shelters around communal circles to provide security and safety. Medieval people built their homes in villages, around churches and markets. Looking at today's modern society, we emphasize building around green spaces, co-living and eco-communities.


Existing Third Floor Plan


Existing Second Floor Plan


Existing First Floor Plan


Existing Ground Floor Plan

IAD SITE ANALYSIS & CONTEXT

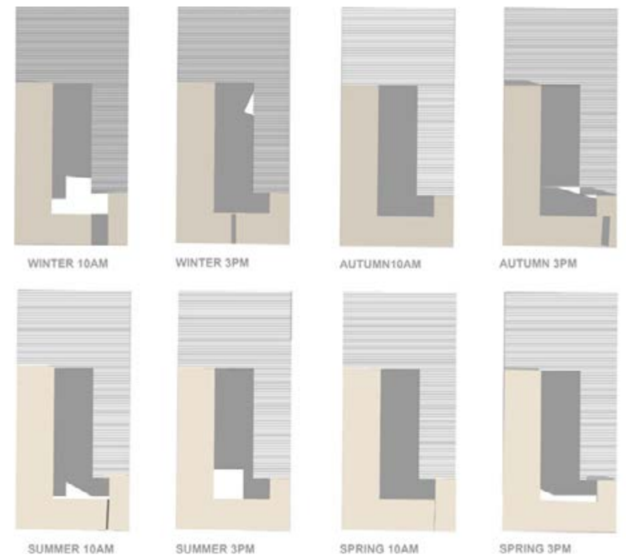
On this page, I have learnt about the existing site and the context surrounding it. I have discovered that there are vast amounts of neighbouring green spaces and so I will look to continue this trend within my own design. With the building being in the city centre, there are multiple modes of transport encircling the site, including a nearby train station, tram stops, buses and the interchange.

68 % **No Car**
98.3 % **Flats & Apartments**
94.1 % **Population Density**
45.8 % **Live Alone**

Above - Relevant statistics regarding demographic information surrounding the site. This information has helped me to understand who my demographic is and what needs they may have eg. no car - maybe the building would benefit from having cycle store.

Below - I have explored how the sun path affects the building. You can see that throughout the winter and summer months, the courtyard is almost always shaded. I will therefore have to consider this within my design, especially when accounting for green spaces.

Sun Paths Over The Year



Affordability & Efficiency

Affordable housing plays a vital role in helping society and the business ecosystem to flourish. By increasing the construction of low-cost homes, the UK can take significant steps toward improving public health and overall well-being, enhancing educational opportunities, boosting employment rates, driving economic growth, and addressing homelessness within communities. Safe, stable, and affordable housing provides families with a secure foundation, allowing them to focus on work, education, and personal development without the stress of unaffordable living costs. Through attentive and stategic design I aim to create a building that offers occupants year-round cheaper running and living costs.

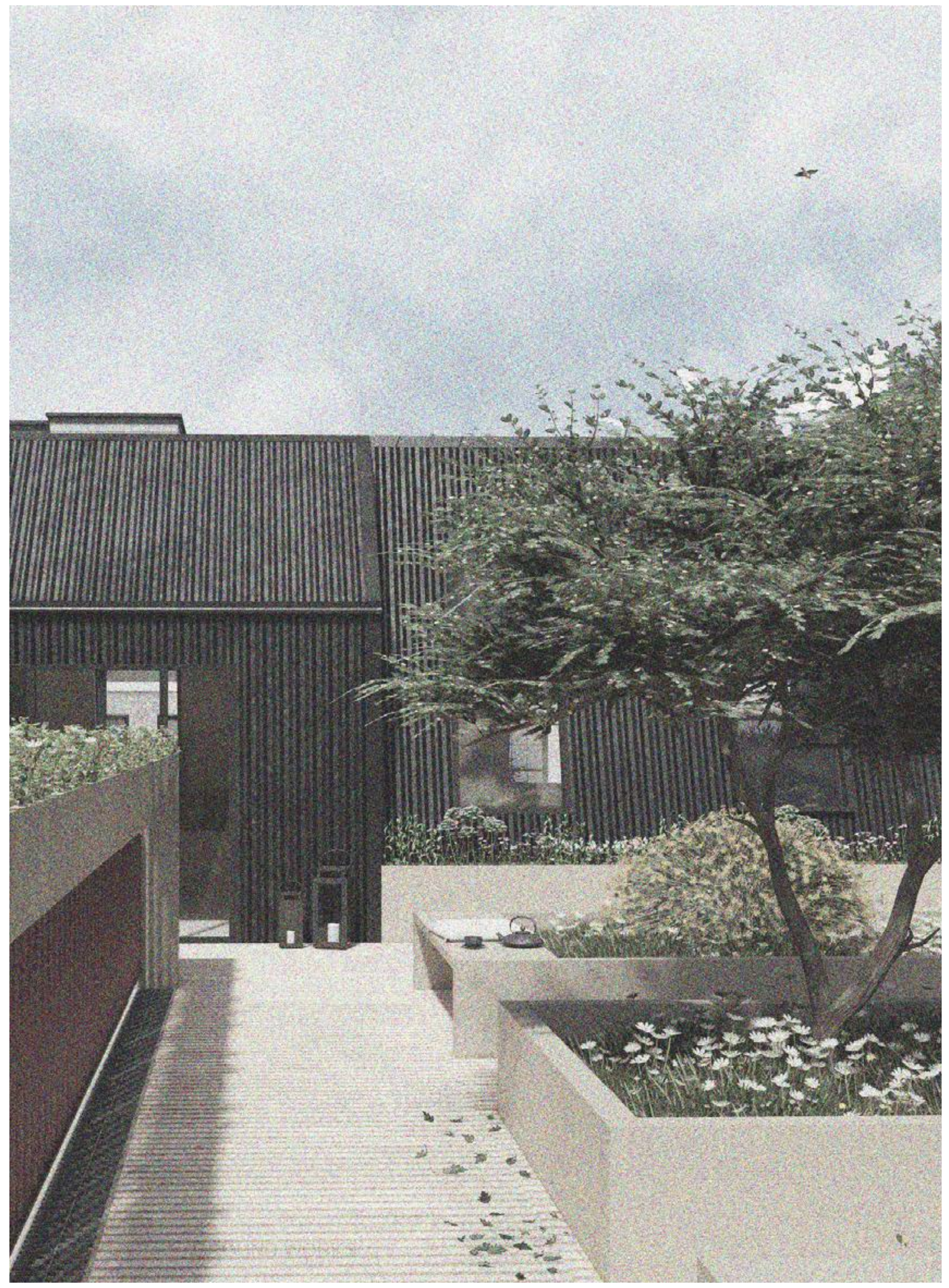
Sustainability

Sustainability is becoming increasingly important in today's world, and it is essential to ensure that the environmental performance of the building is carefully considered. Beyond its immediate function, the building must be designed with the future in mind, prioritizing energy efficiency, resilience, and long-term sustainability. Creating a high-quality, low-energy building not only benefits the environment but also enhances its economic viability. Sustainable design acknowledges the financial and ecological functions of a building, reducing and minimizing its carbon footprint. Integrating renewable energy solutions such as solar panels and wind turbines, along with efficient recycling and water management systems, plays a crucial role in achieving this vision. By implementing these strategies, I hope to create a building that is not only functional and cost-effective but will also contribute to a greener and more sustainable future.

Community

Community is essential within homes as it encourages a sense of belonging, security and support. Creating a close-knit community with shared amenities and social spaces will help a mix of people to connect with one another and allow them the opportunity to build relationships. I will consider the idea of 'curated collusions', designing spaces where residents may 'bump' into each other. This may be through shared entrances and balconies. Overall, a strong community within housing developments creates a healthier, happier, and more resilient society where people feel a true sense of belonging.

"We shape our buildings and then they shape us"
- Winston Churchill.



Cavity Wall Model

This model is a scaled-down representation of the proposed cavity wall system. As the building is Grade II listed, the existing external brickwork will be retained. To support a more sustainable and energy-efficient retrofit, the design incorporates mycelium thermal blocks alongside Pavatextil-P insulation. A ventilated air gap is maintained between the brickwork and insulation to reduce the risk of moisture ingress. Internally, the wall will either be finished with plaster or, as shown here, a birch plywood finish.

Mycelium

To further explore the concept of mycelium as a construction material I have investigated the product itself. I have produced a number of mycelium blocks as photographed on the right.

I created the mycelium blocks using a mixture of mycelium spores and a composite of reishi and beech sawdust. To portray the idea of using mycelium as thermal blocks I used cube and rectangle moulds. I compacted the mixture into these various moulds, then placed them in a dark, humid environment at approximately 25°C to encourage colonisation. Over the course of 14 days, the mycelium grew and bonded around the composite. Following this initial growth phase, the blocks were incubated in a moisture-controlled environment for a further 7 days. To stop any continued growth and ensure the spores were fully deactivated, the blocks were heat-treated in an oven at 200°C for 30 minutes.

Taking this investagtion further, I looked into the thermal properties of the mycelium block. Below is a graph comparing mycelium with Kingspan thermal insulation. Overall, I discovered that mycelium insulates much less effectively than Kingspan at the same thickness - about 3x worse in terms of U-value. Therefore, this means that 50mm of Kingspan insulation would have around the same thermal properties as 150mm of mycelium. Kingspan is engineered for high performance, while mycelium is more sustainable, biodegradable, and eco-friendly, but not as efficient thermally. Considering this, I propose a mix of mycelium and Pavatextile-p. Pavatextile-p's thermal value's are typical for a natural fiber-based insulation, putting it in a similar range to mineral wool and better than straw or hemp.

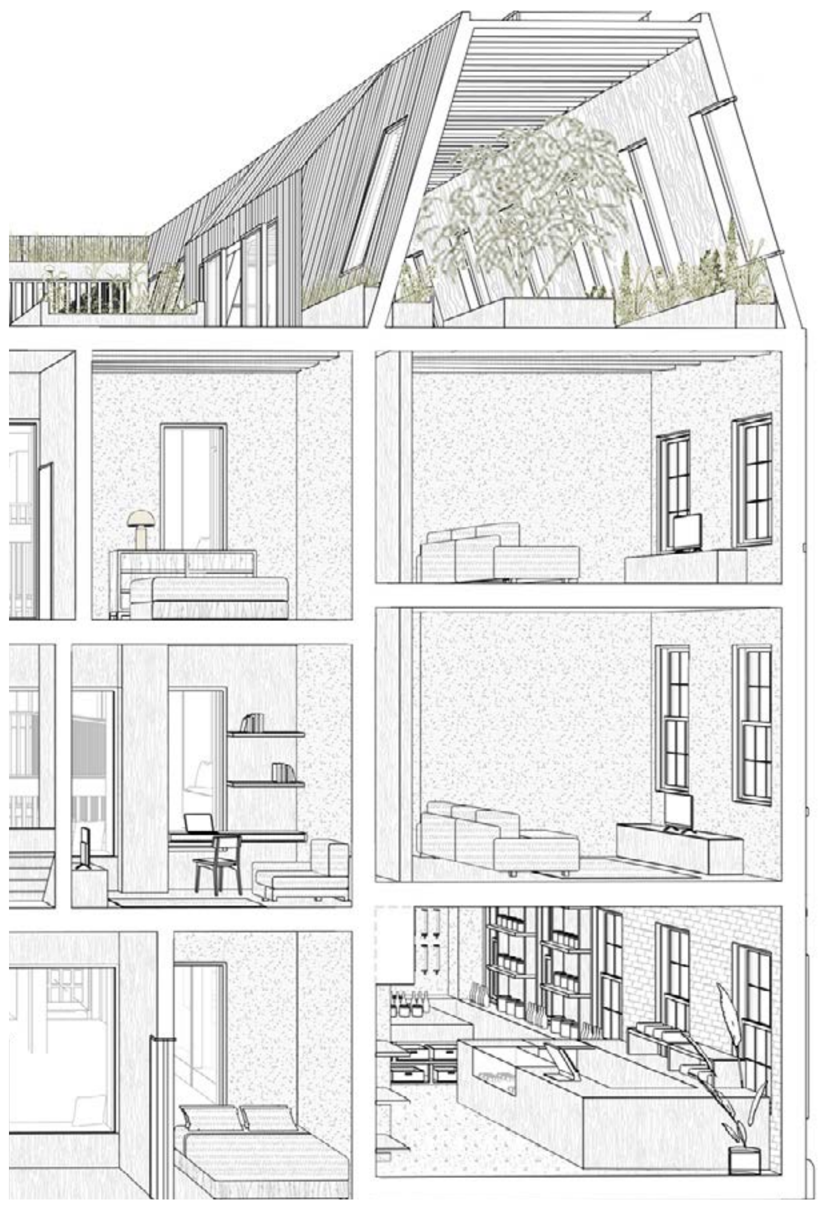
Material	Thickness	Thermal Resistance (R)	U-value
Mycelium	18.75 mm	0.270 m²·K/W	**3.70**
Kingspan	18.75 mm	~0.893 m²·K/W	**~1.12**


Composite Material


Mycelium Spours


Block Moulds


Grown Mycelium



Possible Materials that could be used for the retrofit.

Internal Walls
Plywood
18mm fire retardant paged polish pine softwood plywood euroclass b (2440mm x 1220mm)

External Walls
Existing / reclaimed bricks
Reclaimed industrial blend imperial bricks (75mm x 228mm x 110mm)

Doors / Frames
Solid birch hardwood

Internal Flooring
Plywood
18mm Chilean Tongue & Groove Radiata Pine Softwood Plywood B/C Tg4 (2425mm X 600mm Fsc)

Ceiling
Plywood
18mm chilean tongue & groove radiata pine softwood plywood b/c tg4 (2425mm x 600mm fsc)

Railings
Powder coated steel
FP1000 Plain Mild Steel Fence Panel 1000mm x 1190mm Ruby red powder coated

Trusses / Pillars
Steel structure with solid hardwood cladding in birch

Roofing
Corrugated steel
Steel Corrugated Roofing Sheet - Polyester Jet Black Paint Coated - 0.5mm / 0.7mm

Proposed External

01. Expanded Concrete beads
02. Pavotextile denim insulation
03. Mycelium thermal block
04. Plywood sheets

Proposed Internal

05. Birch Plywood sheets
06. Hardwood finishes
07. Neutral fabrics
08. Warm tones

Solar Panels

Solar panels are important for both the sustainability and affordability of the building. They provide a renewable energy source while reducing long term energy costs for the residents. These panels help to reduce carbon emissions whilst conserving the Earth's natural resources. I plan to incorporate solar panels thoughtfully within my design, positioning them in the sunniest spots.

Under Floor Heating & Heat Pumps

Under floor heating is a great alternative as it is more energy and cost efficient than standard radiators. It distributes heat better, improves overall air quality and allows more free wall space. Heat pumps work well with under floor heating as they are both designed to run at lower temperatures whilst still producing the same level of heat. Considering this further, heat pumps pair well with solar panels and wind energy, making it even more eco-friendly.

Triple Glazing

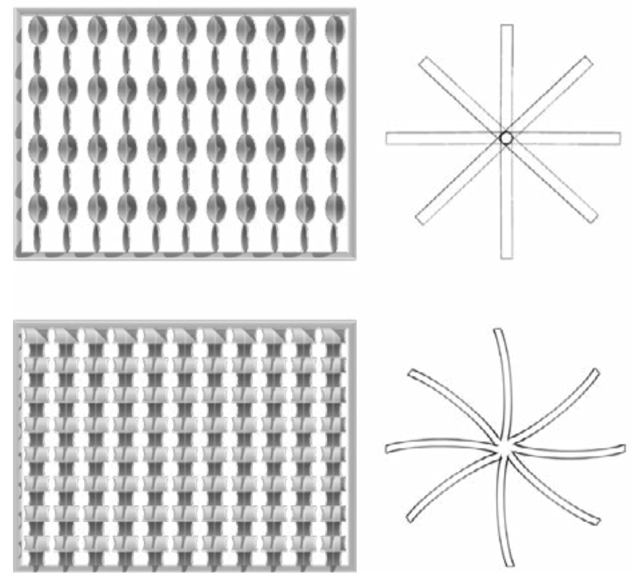
Upgrading to triple glazing significantly improves the building's thermal performance. There are many advantages to consider, including lower energy bills, less condensation, noise reduction and reduced carbon footprint.

Wind Turbine Wall

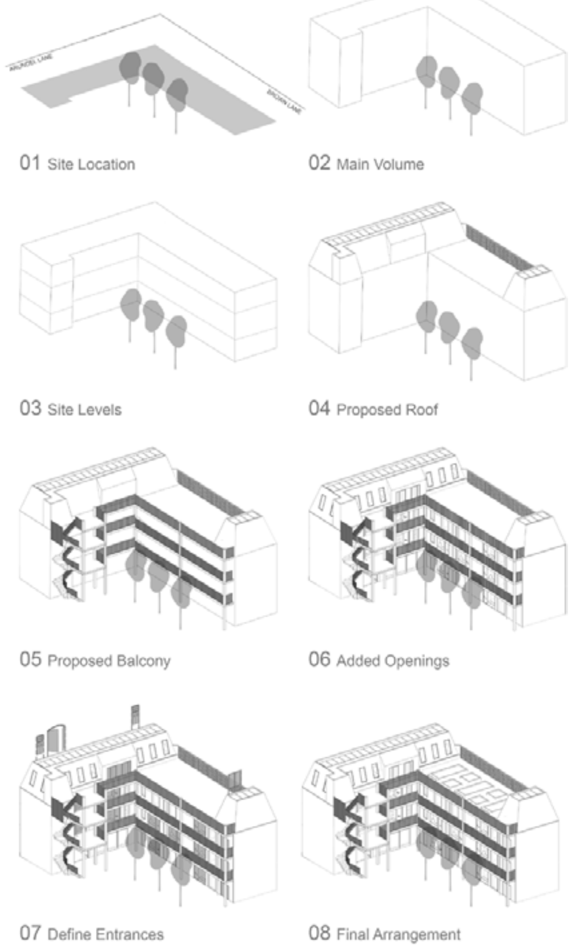
Wind turbines are another reliable and efficient technology which create renewable energy. Below I have modelled three different turbine wall layouts. I aim to position these walls on the rooftop garden. They'll act fundamentally as a wind turbines but also as sculptural pieces which help to block out the wind. In order to ensure the best use of the renewable energy produced, storage batteries may need to be stored in the basement. Studying the material, it would need to be made from a smooth, lightweight fabric such as anodized aluminium. A bronze finish would allow the turbine wall to integrate seamlessly with the other natural wood finishes.

Turbine Model

To the left are photographs of the turbine wall prototype. I have cut out my design onto foamboard to help me understand its configuration. It has also helped me to understand how the wind turbine will impact a space eg. the light shadows.



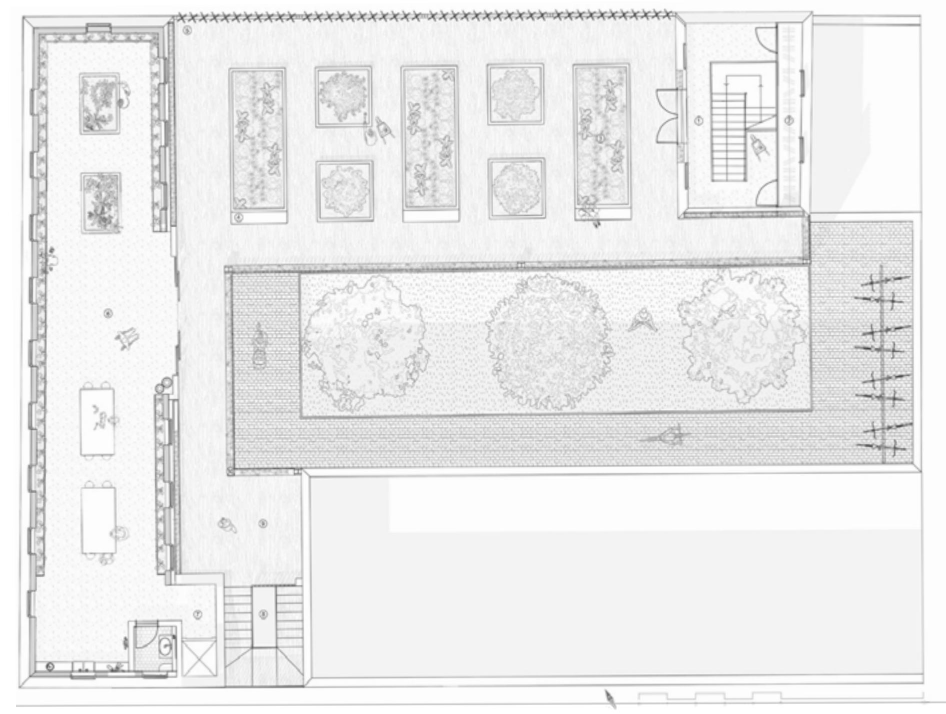
Building Explained...

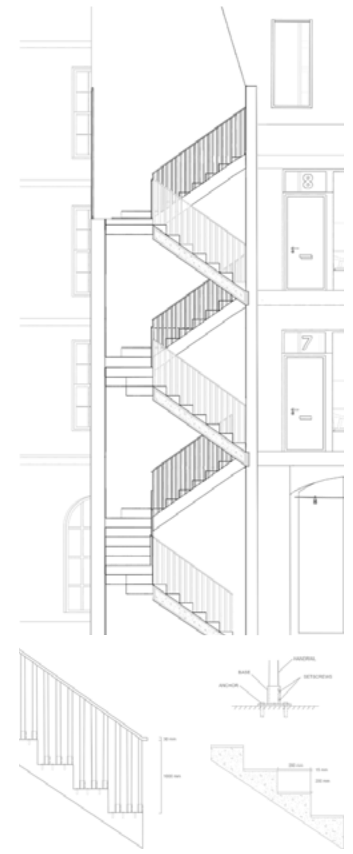


How Is The Space Used?

As I begin the design process, I aim for the building to be split into public and private spaces. In conjunction with the building providing comfortable and contemporary housing, I'd like it also to play a role in the community. I propose including a zero-waste shop on the ground floor of the building which will support local businesses and feature produce from its own rooftop garden. Unfortunately only 34% of Sheffield's waste ends up composted, reused or recycled. Addressing this issue, I intend for there to be an educational room that provides Sheffield with advice regarding eco-living in the city. On the third floor, there will be a roof top garden designated to the residents and community. This garden will give locals an opportunity to learn new skills, work as a community and generate some extra income by selling home-grown produce.

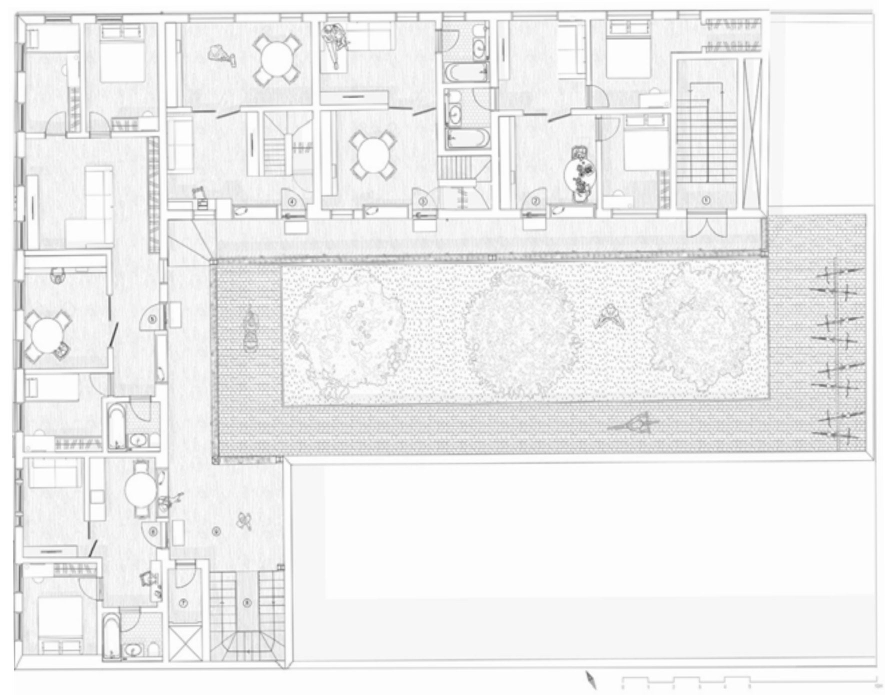
Shared Courtyard





The third floor features a mansard roof extension and rooftop garden - a shared space for residents and the public to learn, grow, harvest and sell. This garden serves as a lively hub for connection, collaboration, and community exchange.

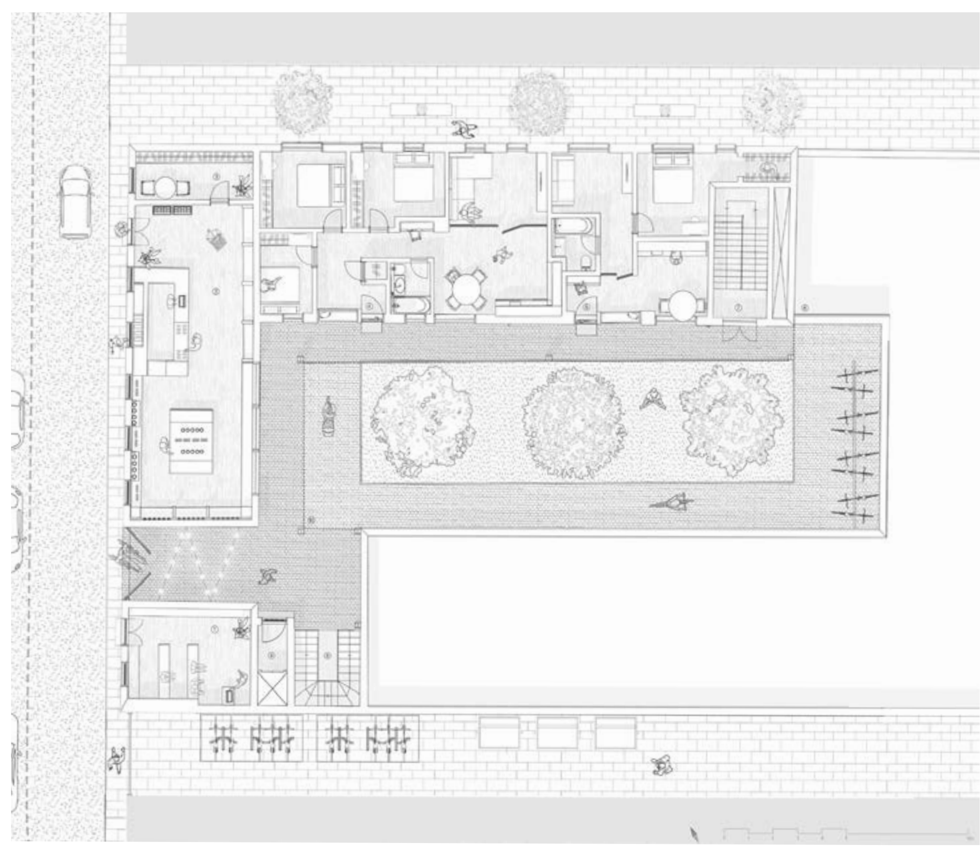
01. Internal emergency exit
02. Storage space
03. Planters
04. Seating
05. Wind turbines
06. Greenhouse
07. Lift shaft
08. External emergency exit
09. Balcony
10. Planters



The first floor gives access to five private apartments, each reached via a shared balcony. Overlooking the central courtyard, the balcony features integrated planters which introduce greenery and enhance the outdoor space, creating a more inviting atmosphere.

01. Internal emergency exit
02. Apartment three - 2b
03. Apartment four - 2b
04. Apartment five - 2b
05. Apartment six - 3b
06. Apartment seven - 1b
07. Lift shaft
08. External emergency exit
09. Balcony
10. Planters

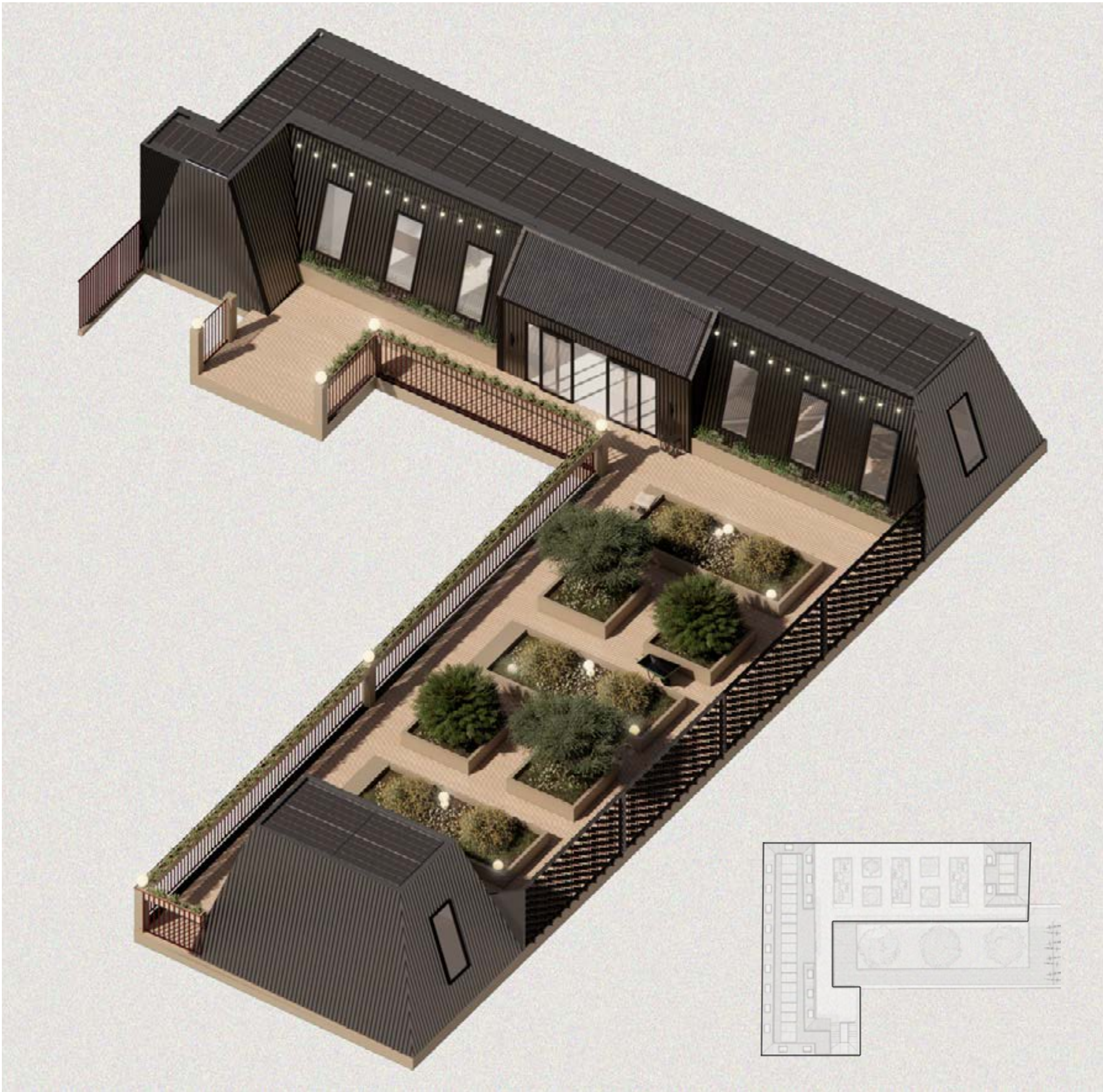
Above is a detailed view of the proposed balcony, constructed from steel beams and finished with timber slats. All materials are treated for outdoor durability, and a slight fall ensures proper drainage beneath the railing.



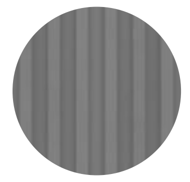
The ground floor is designed to balance community use and private living. Its main features are a zero waste shop, an educational space, a central courtyard and access to private apartments. The coutyard is a shared green space for the residents and it retains three existing trees. There are two fire escape staircases and an accessible lift to the upper floors.

By pedestrianising Brown Lane, the aim is to create a safer, more welcoming public space adjacent to the building. This will enhance the building's visibility and also help reduce noise and air pollution. Additionally, it encourages informal gatherings and social interaction, supporting the building's community-focused design.

01. Education Room
02. Zero Waste Shop
03. Staff / storage room
04. Apartment one - 3b
05. Apartment two - 1b
06. Existing bin store
07. Internal emergency exit
08. External emergency exit
09. Lift shaft
10. Courtyard / bike store



The orthographic view illustrates the structure of the mansard roof extension. Central to the garden is a number of planters that form the focal point of the wooden decking. These planters offer ample growing space and incoporate integrated seating for the user. The wind turbine wall functions as both a privacy screen and a sustainable feature, casting dynamic shadows on the garden throughout the day. The roof is constructed from black corrugated steel, designed to complement the building's black façade details.

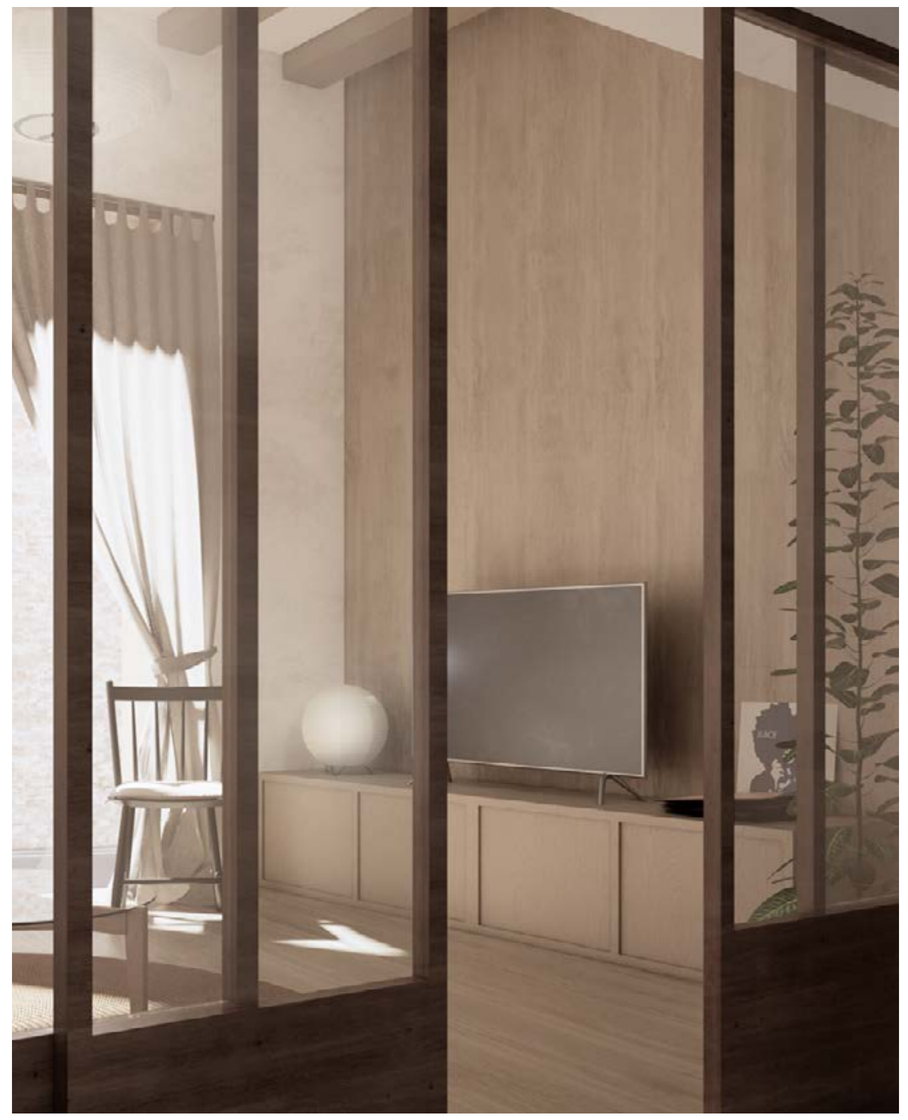


Collaboration was central to the design of the indoor rooftop garden. Large workshop tables anchor the space, encouraging group gatherings, shared learning, and community-led activities. The perimeter of the space is lined with planters filled with herbs and pollinator-friendly plants like lavender, thyme, and wildflowers. These can then be sold in Sprout, the zero waste shop on the ground floor.

A combination of wood for planters and permeable concrete for flooring or structural elements provides an ideal environment for plant growth. This approach ensures optimal airflow and moisture control, supporting the health and vitality of the plants while maintaining a sustainable and functional design throughout.

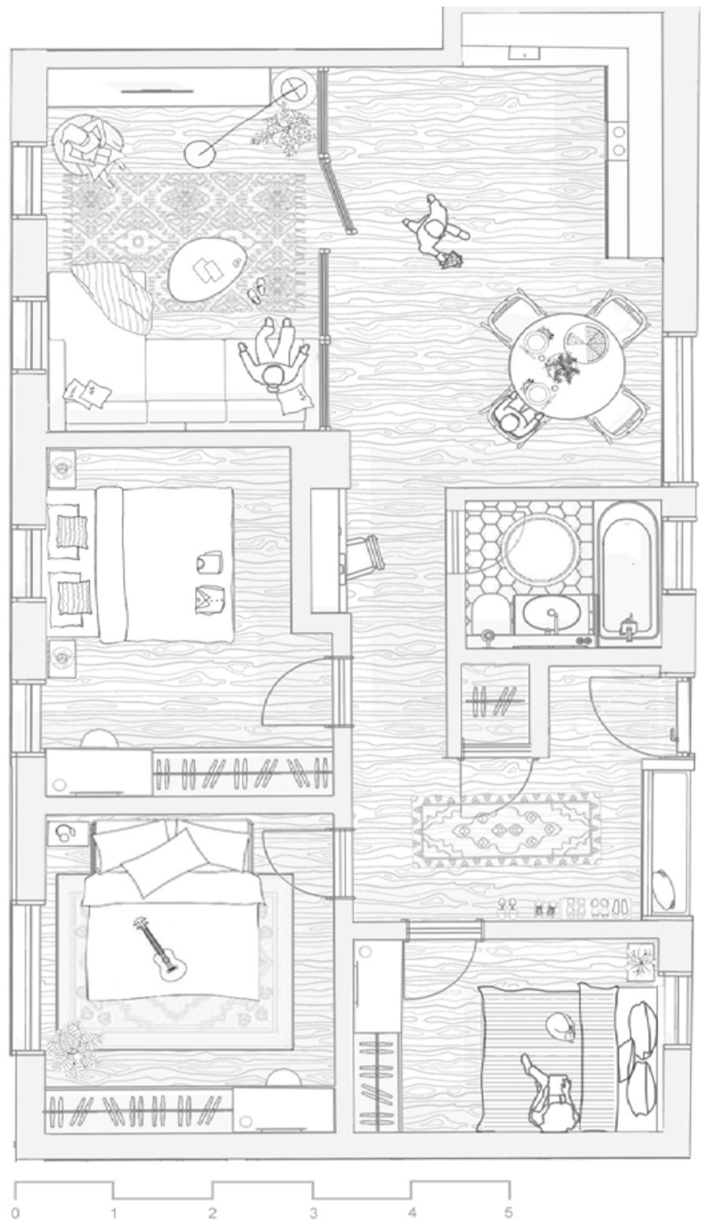
Rooftop Indoor Garden

Shared Balcony / Terrace

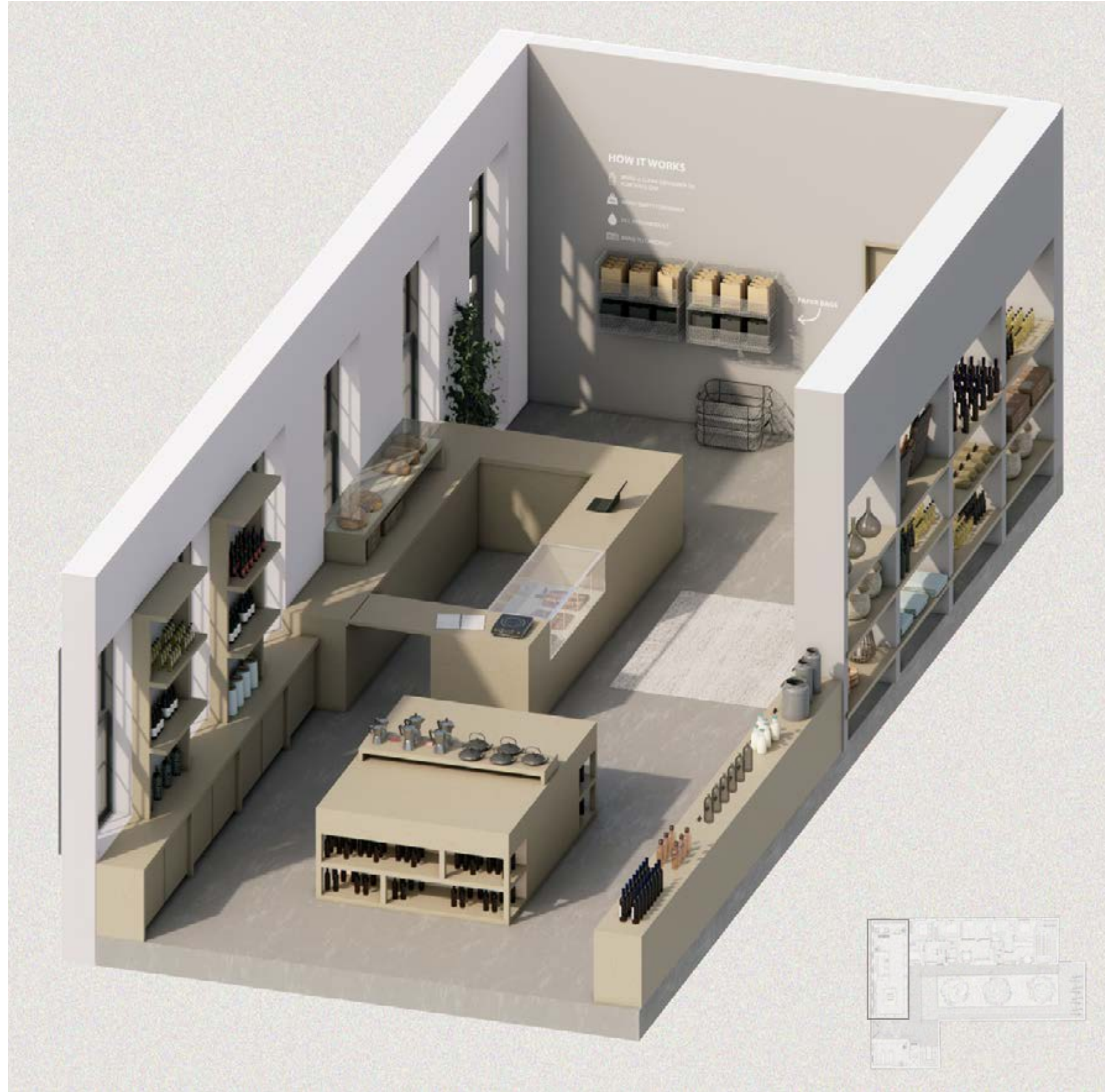


Apartment Living Area

IAD DESIGN - APARTMENT CLOSER DETAIL



IAD DESIGN - SPROUT. PLAN CLOSER DETAIL



Sprout - "to grow, spring up, or come forth as or as if a sprout"

Sprout is a minimalist zero-waste shop in Sheffield's city centre. It provides both residents, local sellers and visitors with a welcoming space to buy and sell sustainable products. By promoting the use of reusable containers and reducing plastic waste, Sprout helps promote a circular economy within the community.

A selection of locally sourced goods, including fresh bread, pastries, fruit, vegetables, and dairy products would be regularly on display. In addition, long shelf-life items such as oils, wine, dried pasta, and lentils would be available alongside household essentials like cleaning products and toiletries. Items grown from the rooftop garden would be frequently stocked.

IAD VISUALISATIONS

Apartment Dining / Stairway

IAD VISUALISATIONS

Sprout - Zero Waste Shop