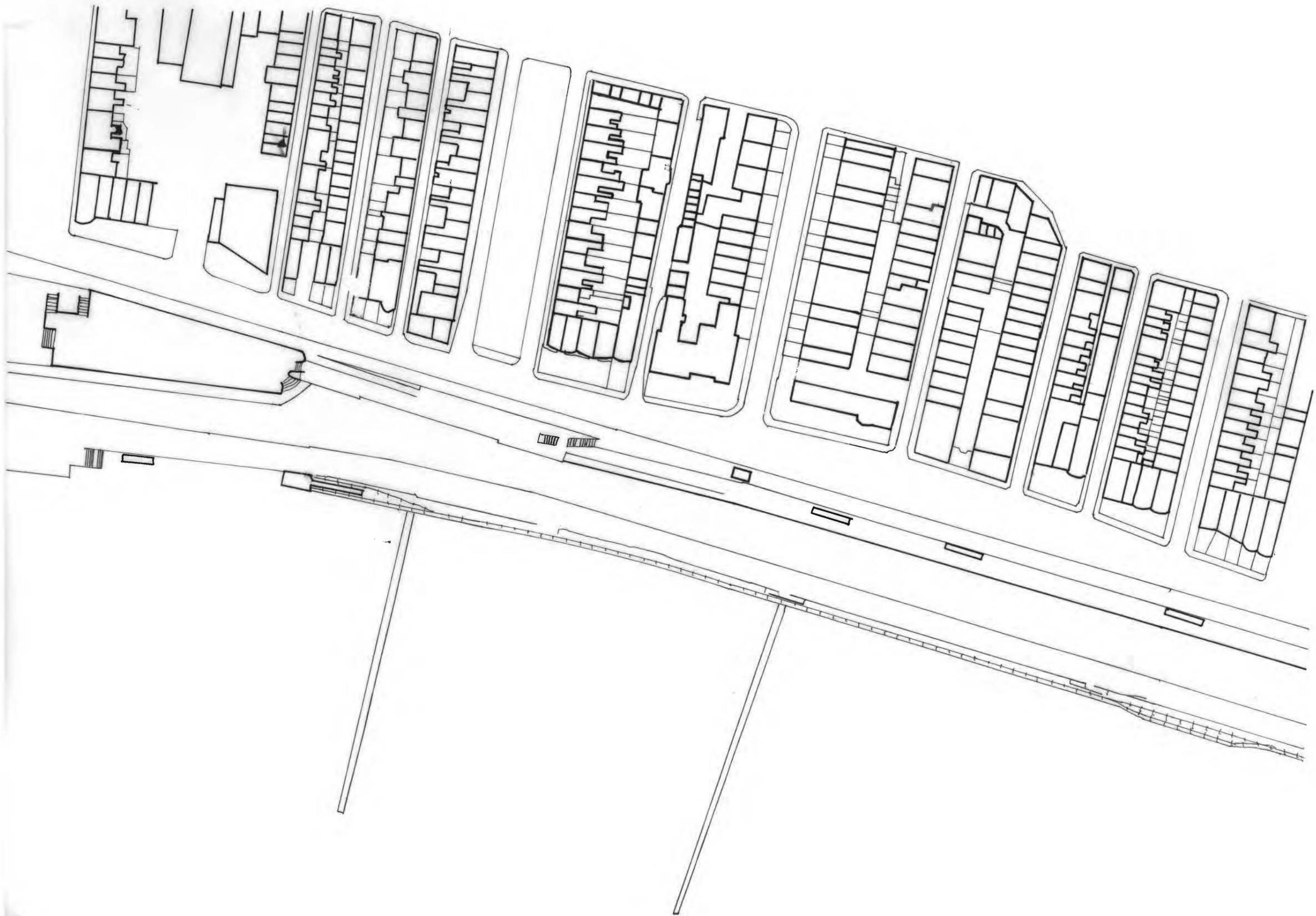


AD471 Design Portfolio

Kathleen Burden  
18807391





Scale - 1:1250 on A3

# How Glass is Made

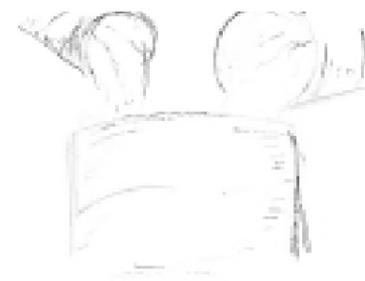
1

Obtain Silica Sand – Silica sand is composed solely of silicon and oxygen and its chemical purity allows it to be transparent. Silica sand can be mined in England, usually surface mined in open pit operations from quartz. Glass without iron impurities is best as this will turn the glass slightly greenish.



2

Chemicals are added – Sodium carbonate lowers the temperature needed to make glass. However, it allows water to pass through the glass so calcium oxide (lime) is added to stop this from happening. Other chemicals, such as iron oxide or sulphur compounds can also be added to produce certain colours.



3

Mixture is melted in a Kiln – Silica sand without any additives becomes molten glass at 2,300 degrees Celsius. The sodium carbonate reduces the temperature needed to 1,500 degrees Celsius.

4

Stir and remove bubble – The mixture needs to be stirred to a consistent thickness and more chemicals can be added, such as sodium sulphate or sodium chloride.

5

Glass is shaped and cooled – Glass needed to make beads is usually shaped in thin rods sorted by colour to allow it to be melted again and shaped to make beads. The glass needs to be cooled in a kiln, which is called annealing. This removes any stress points that may have formed in the glass during cooling.



Glass is 100% recyclable, therefore to make my glass beads this full process does not need to be followed as ready-made glass can be melted and used.



# Exsiting Workshop



This workshop is called Dragonfly beads. They make decorative beads for jewellery such as earrings, necklaces and rings. Beaded animals are usually made in people's homes or on the streets where they are sold so they don't usually have a dedicated workshop. This is because in South Africa, unlike in England, it is warm enough to work with delicate objects outside.

What sort of lighting is ideal in the workshop?  
Overhead lighting is best.

Is it better to work with natural light or mostly artificial?  
We have both natural and artificial light. The one thing you need to put in is ventilation. Our workshop is pretty open so we get a lot of ventilation this way.

What are the key pieces of machinery/tools they use?  
Lamp-work torch with propane and oxygen connection, can use oxygen concentrator,  
Kiln for annealing glass,  
Tools for shaping beads,  
Tools for cleaning beads (I use Dremel),  
Eye Protection,  
Extracting kit.



How big is your kiln?  
My kiln is 25cm in diameter. It is not a traditional beadmakers kiln as they are usually square or rectangular. A large kiln usually measures 737mm wide, 508mm long and 432 mm high externally and 508mm wide, 203mm long and 114mm high for the internal space. It can be plugged into standard house hold mains (230 V).

What are the dimensions of the workshop?  
3000mm x 6000mm Workshop space with 2000mm x 1000mm per person plus space for making up jewellery. We have four torches.

How much storage space do you need?  
Pigeonholes for glass rods, Shelves for wires, jewellery, glue, bead release.

Where do you get your electricity from? Any renewable resources?  
We have an ordinary wall plug for kiln and lights.

What's the ideal temperature to keep the workshop at?  
Best to keep the workshop cool as the torches burn at 800 degrees.

How many people do you have working in the workshop?  
I have three people working in my workshop.

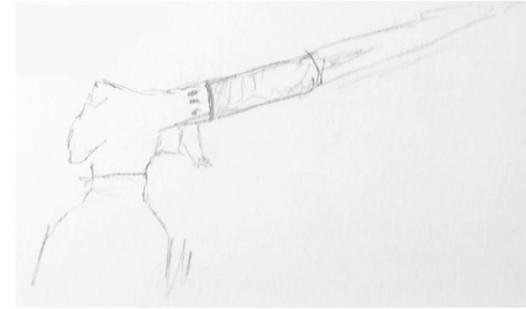


# How glass beads beads are made in a workshop

- 1 Protective eyewear and gloves are worn.



- 2 A butane or propane blow torch is ignited after it is mounted on a table securely.



- 3 The blowtorch is then used to melt a thin cylinder of glass. A mandrel (a heat resistant rod covered in wax) is held below the melting glass and turned evenly to form the shape of the bead.

- 4 More coloured glass can be melted on the same bead to create a larger, patterned bead if desired. These larger beads are usually used to make jewellery rather than beaded animals.

- 5 Once the bead is completed, it's removed from the mandrel and cooled in a kiln.



## The Product of my Workshop

Using the beads made in my workshop, I then want to create 'beaded animals'. I was born in South Africa, but my family moved to England when I was very young. One of my most prominent memories of South Africa are these beaded animals which were usually sold on the streets. I want to make them in my workshop because they are usually made by people living in chanty towns as the skill of making them is relatively easy to learn. This means that almost anyone can be employed to make the animals and I can hold workshops to show the public how to make them as well.

Because the beads are made in the workshop, I can control the size of the beads and therefore the size of the animals. They can range from small shelf decorations to representing the actual size of the animal they look like- or even bigger!

I also want to make jewellery from the beads as it can be made from the same material but expands the variety of objects sold in my workshop consequently causing more customer interest.



## Initial design ideas

Here are some early rough design ideas I have. At the moment I don't want to think about the structure of my workshop but instead how I might be able to use space and where I may get space from. I want to try and keep the arch in my workshop as well as maintaining the green wall, so I've kept this in mind whilst thinking about how to use the space around my arch. I've also begun to think about which areas I want to be public (blue) or private (red). These areas are currently flexible as I want to narrow down how much space I want and where I want to take space from.

For sketches 1 and 2 I thought about using the space from above my building, going high enough as to allow another way to access it. Although access from the pavement above the arch is something I wish to try and include in my design, the height of the building and the connection to the pavement means that any sunlight that previously reached the green wall would be gone. The main plant that grows on the green wall is the Japanese spindle and, although it can grow in shady areas which is evident from the wall remaining alive under the shade of the arch, it would need some sunlight to allow for photosynthesis.

In my second sketch I thought about taking space from underneath the arch. As the roots for the plants are mainly in the limestone concrete used to make the wall, taking space from below shouldn't harm the green wall. Because of this I included it in my next three design ideas.

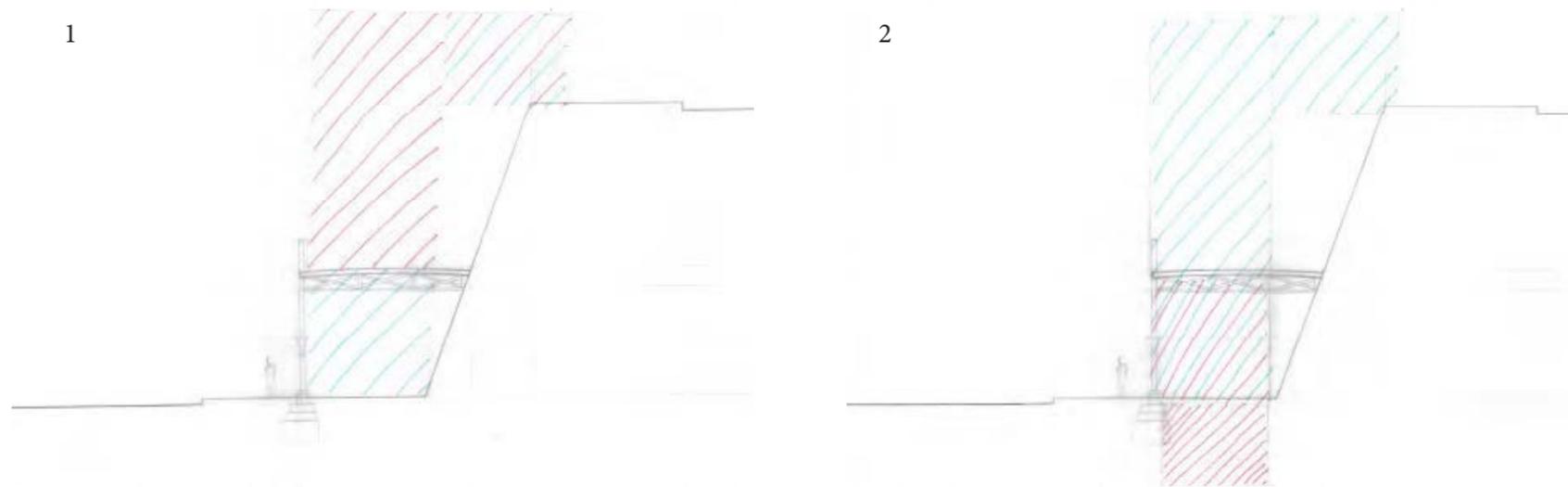
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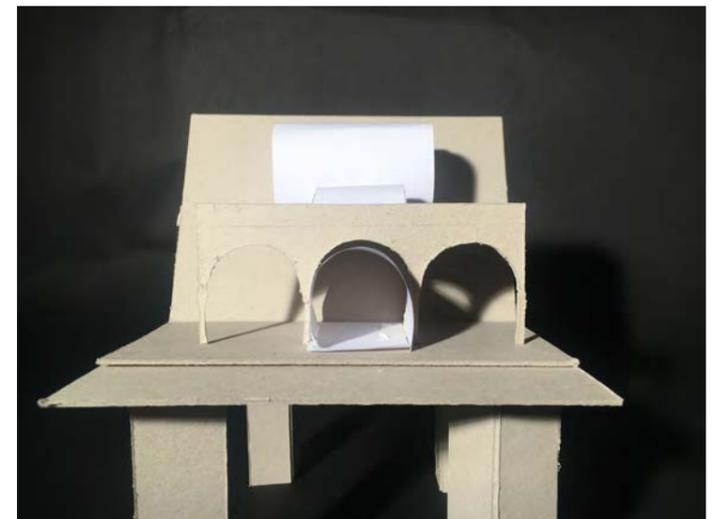
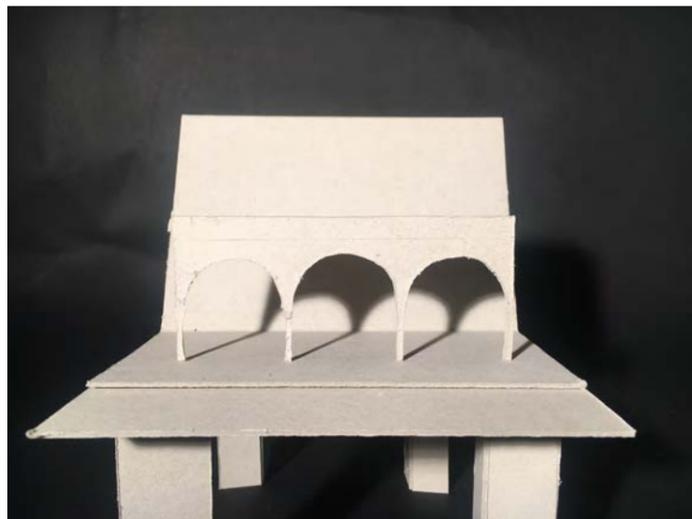
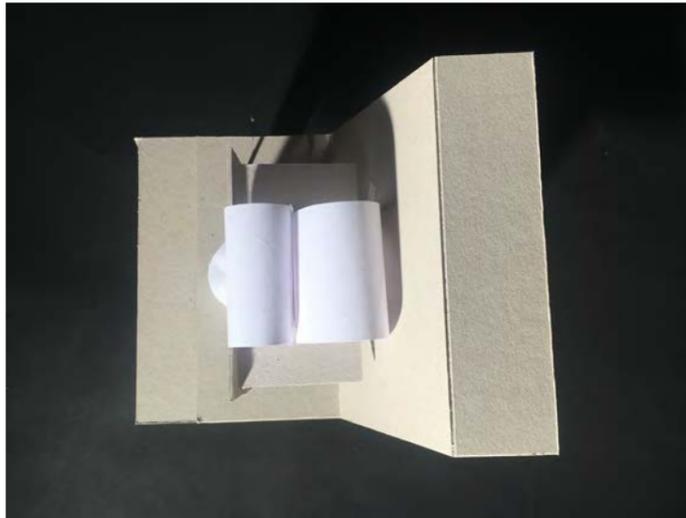
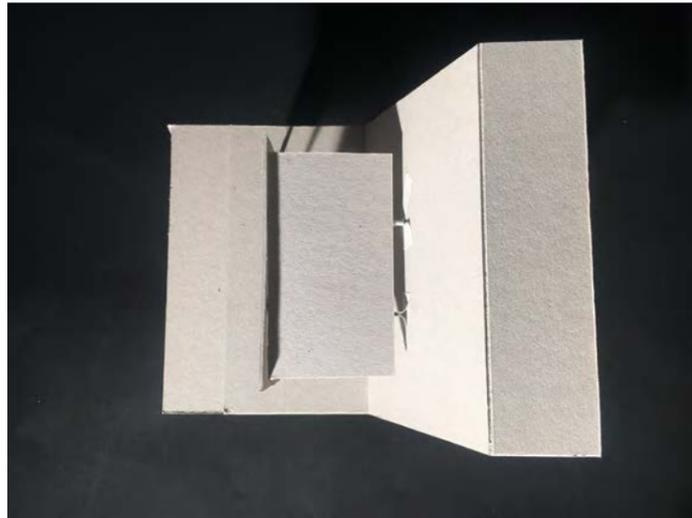
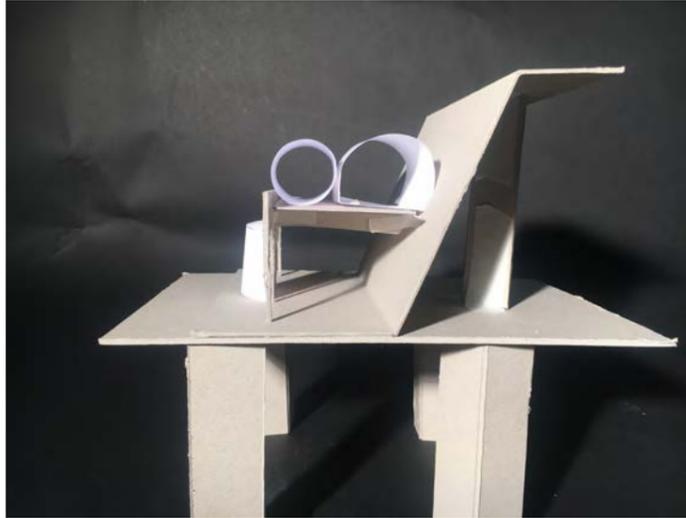
Private

Public

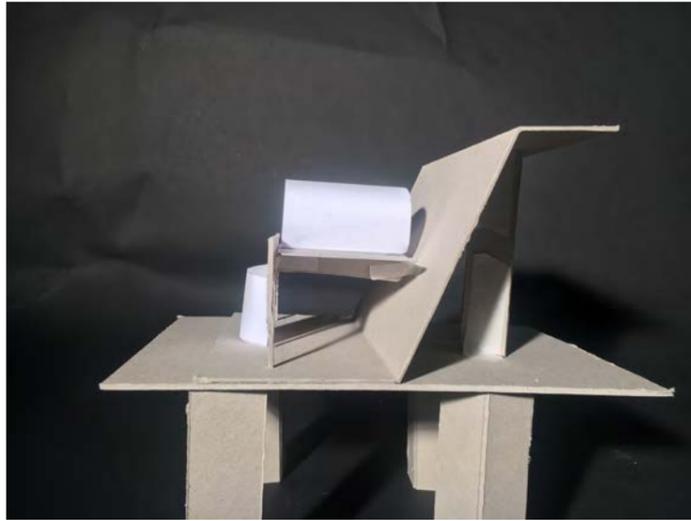


1

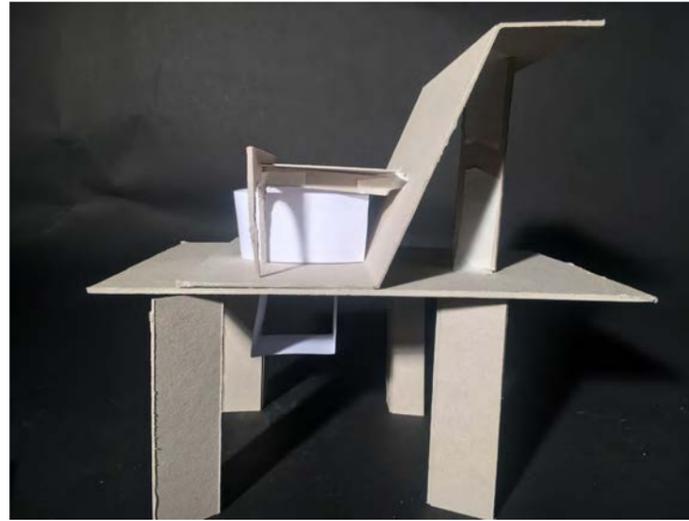
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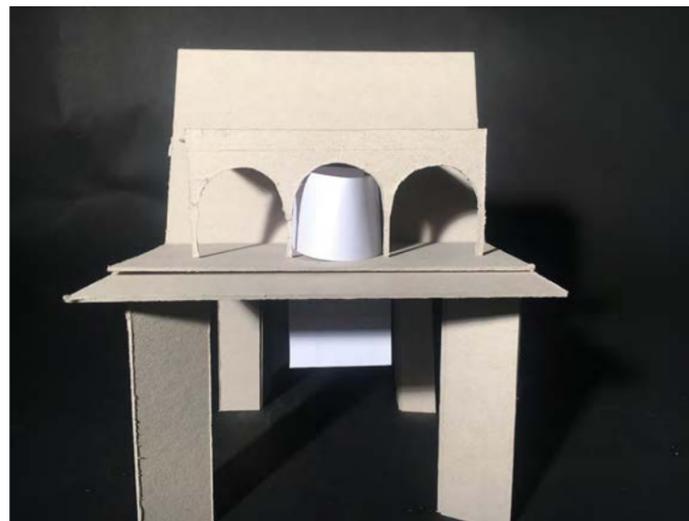
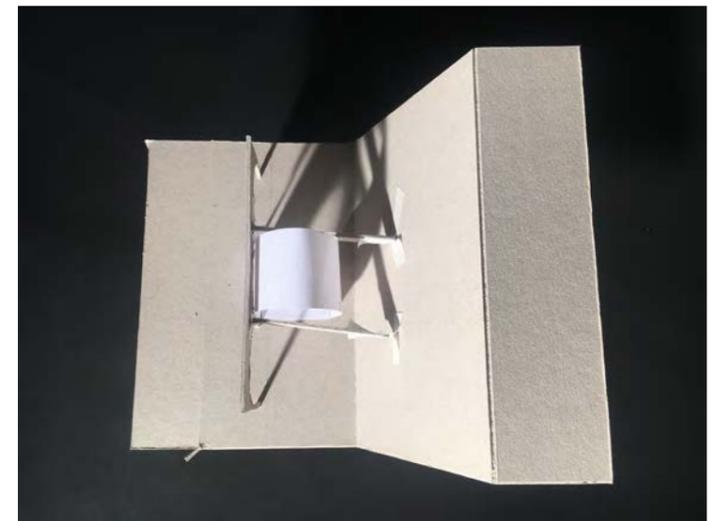
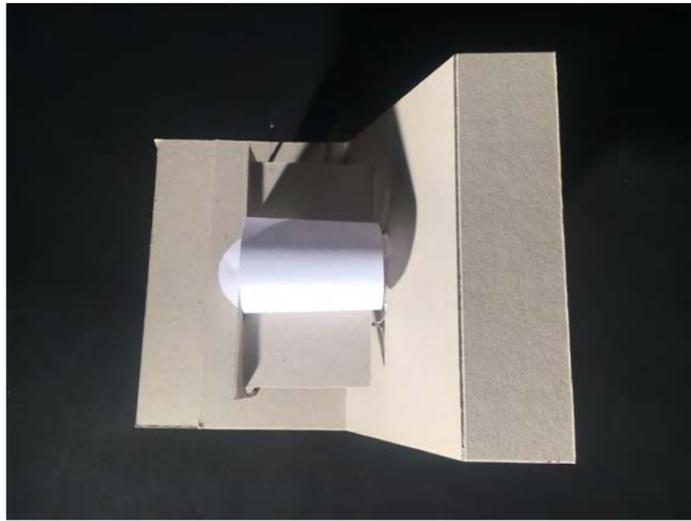
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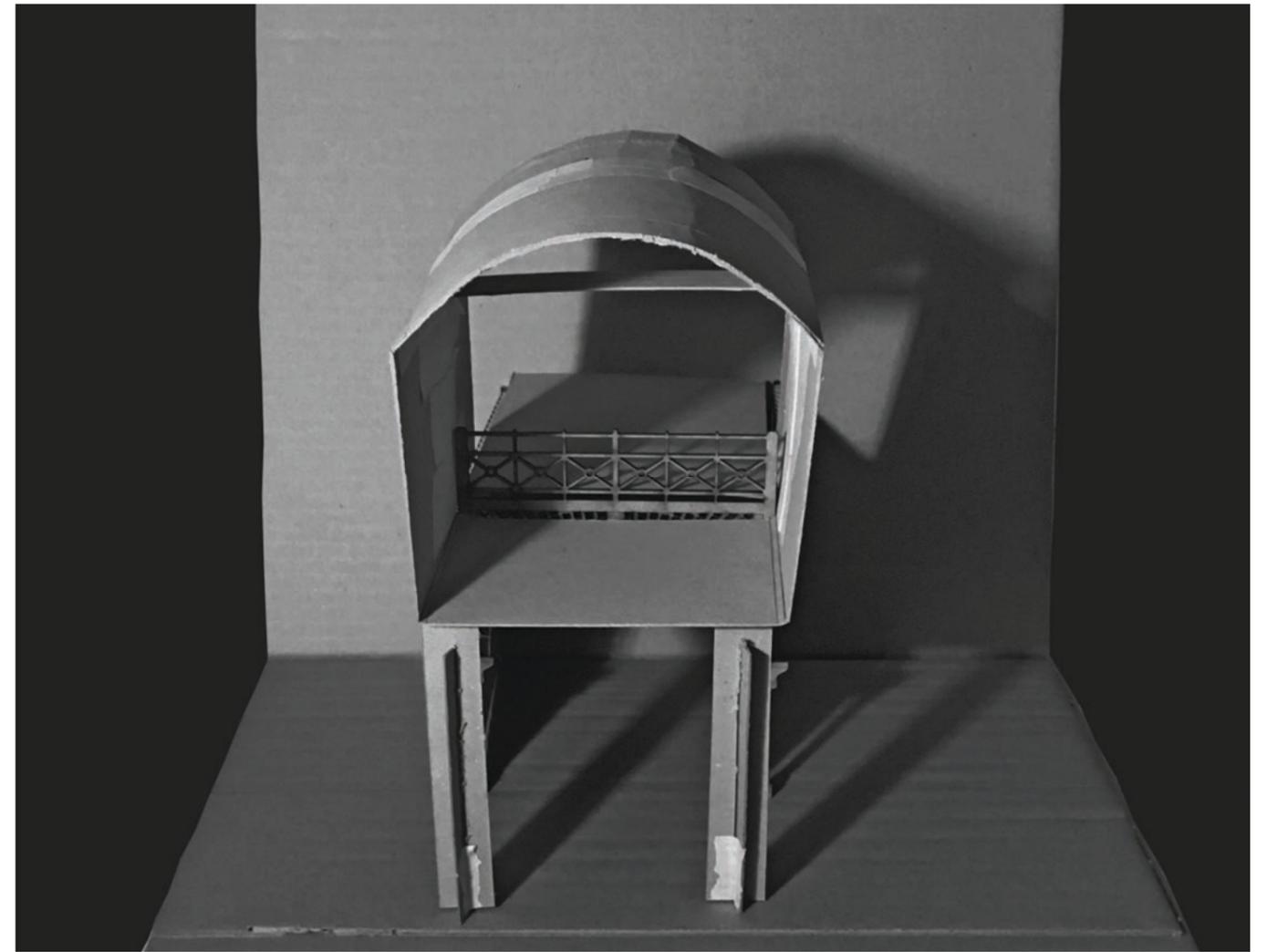
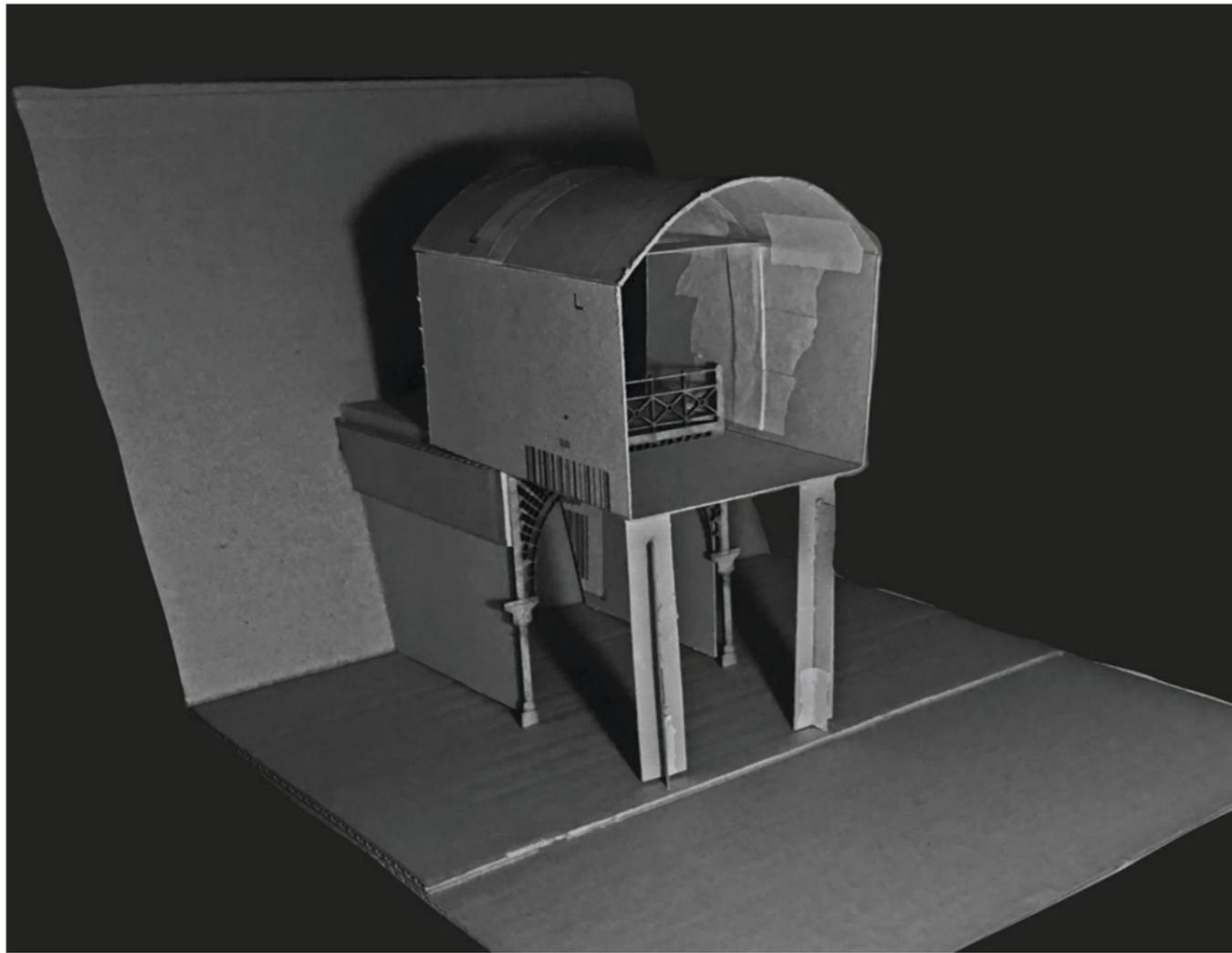
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5

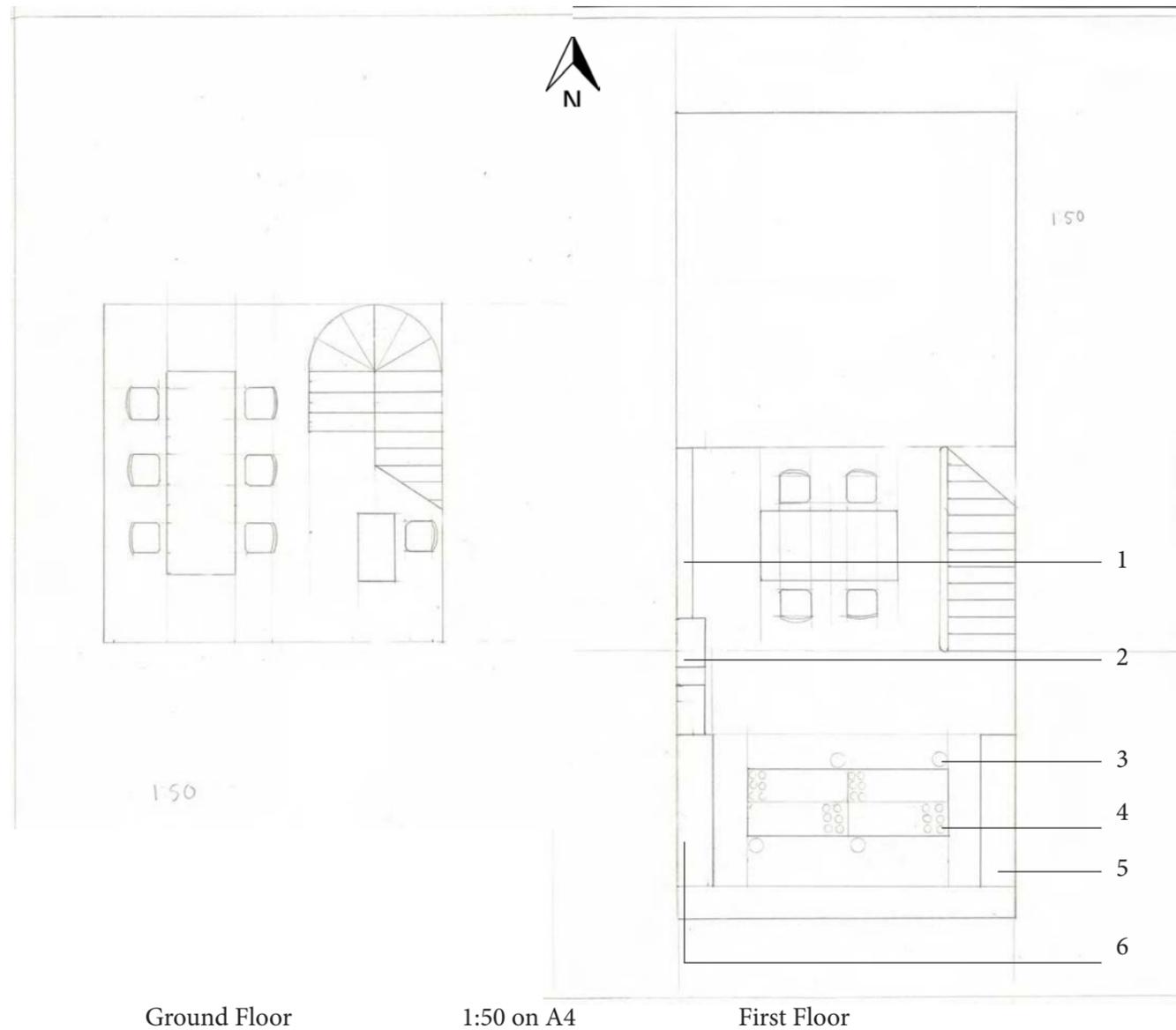






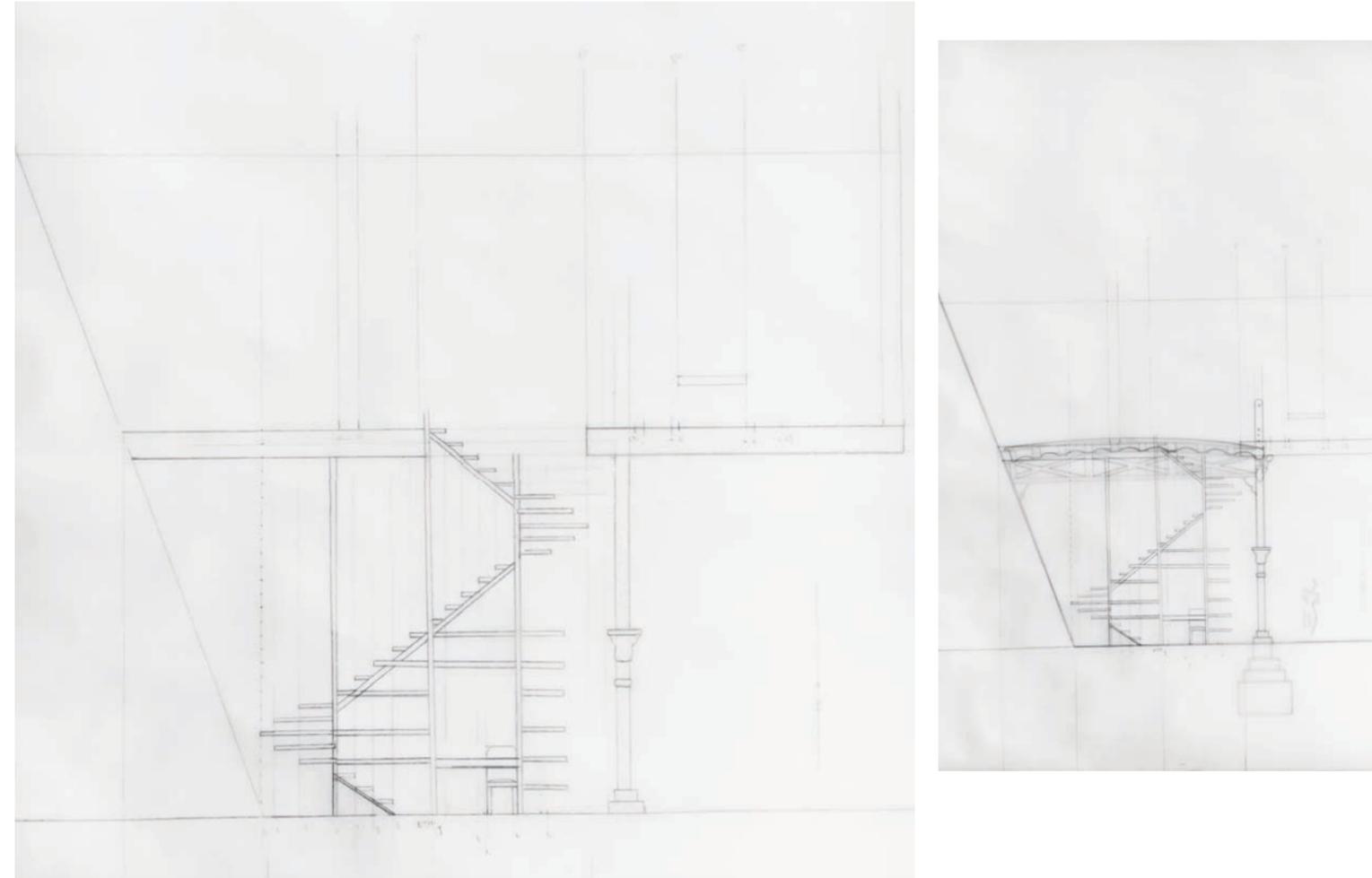


To begin with, I began the plans with the idea that the downstairs would be the public area, the shop combined with a public workshop. The upstairs would then be the private space; a workshop just for the staff. I wanted to do this as Dragonfly beads had their workshop set up in a similar way, however they did not have a public workshop space. I wanted to put the public workshop space downstairs by the shop as it would advertise itself to customers, whilst giving them a glimpse into how the beaded animals and jewellery is made.



- (1) Shelves to hold completed beaded animals or jewellery
- (2) Kilns
- (3) Blow Torches
- (4) Standing desks with pots to hold glass rods
- (5) Shelves to hold glass rods
- (6) Shelves to hold completed beads

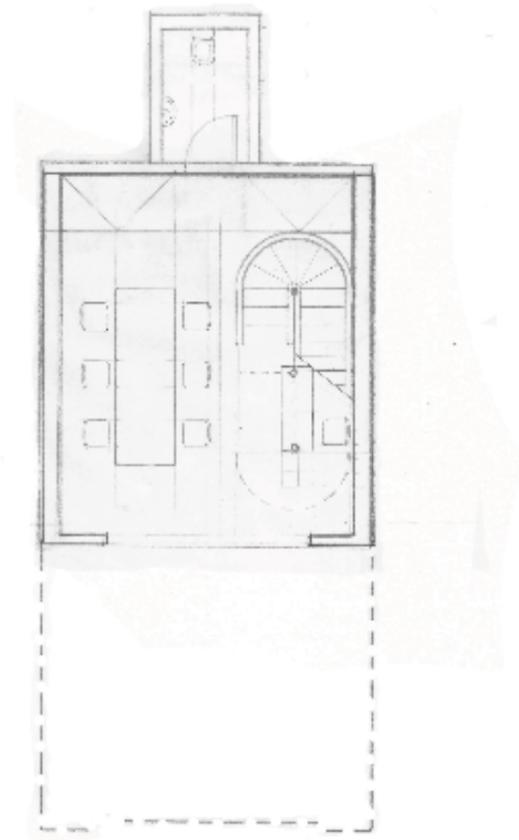
The workshop space upstairs comprised of individual desks used to make the beads, a larger group table used to make the beaded animals and jewellery, two kilns and storage space. I wanted to put into two large kilns, rather than just one small kiln like at Dragonfly beads as my workshop would be producing more beads.



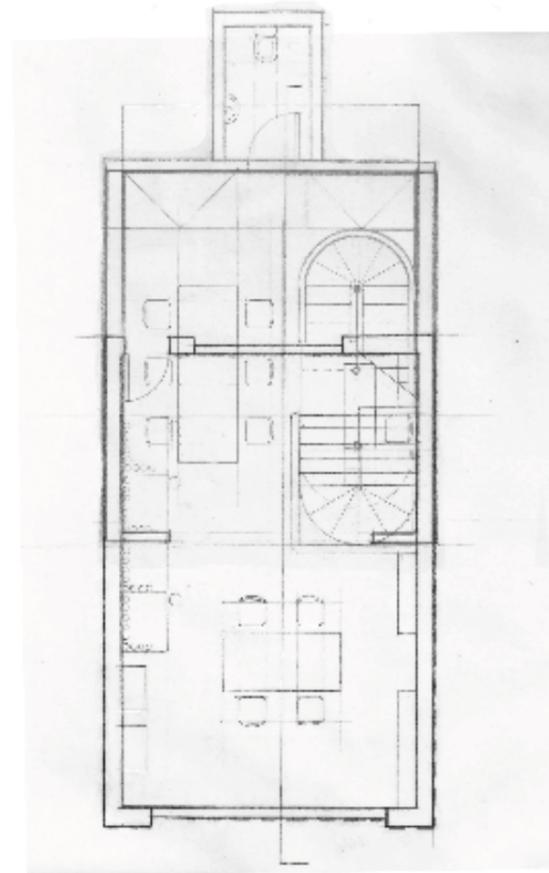
1:50 on A2

After mapping out where everything went in the plan, I began working on my section. Starting with the stairs, I immediately realised that I hadn't calculated the stairs correctly in my plan, so had to change this in the section. I also wanted the stairs to be used as shelving as well to display products for customers, as well as having the desk beneath them. I was able to do this thanks to the high ceiling, allowing a lot of space under the stairs. As the stairs wind back on itself, it takes up a lot of space in the ground floor, so I wanted it to have more than one purpose.

I then added a toilet to this design iteration and overlapped the ground floor and first floor plans so see how they'd line up.

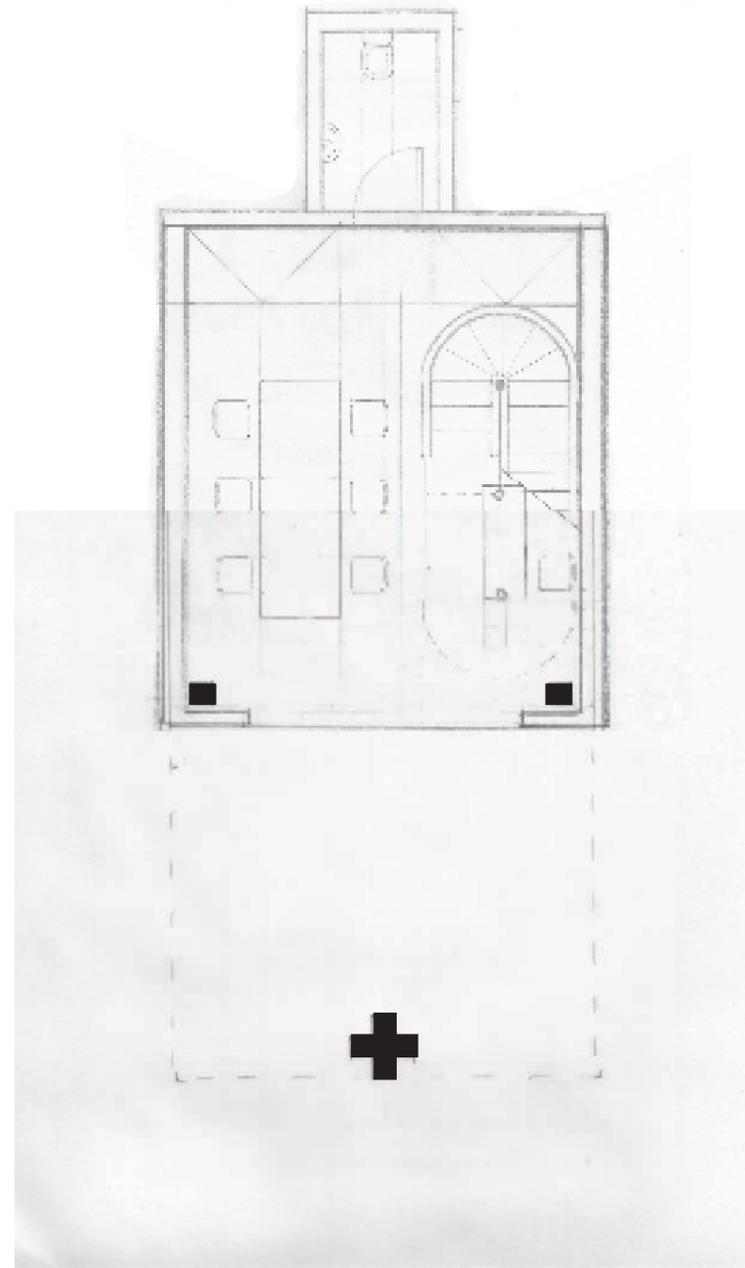
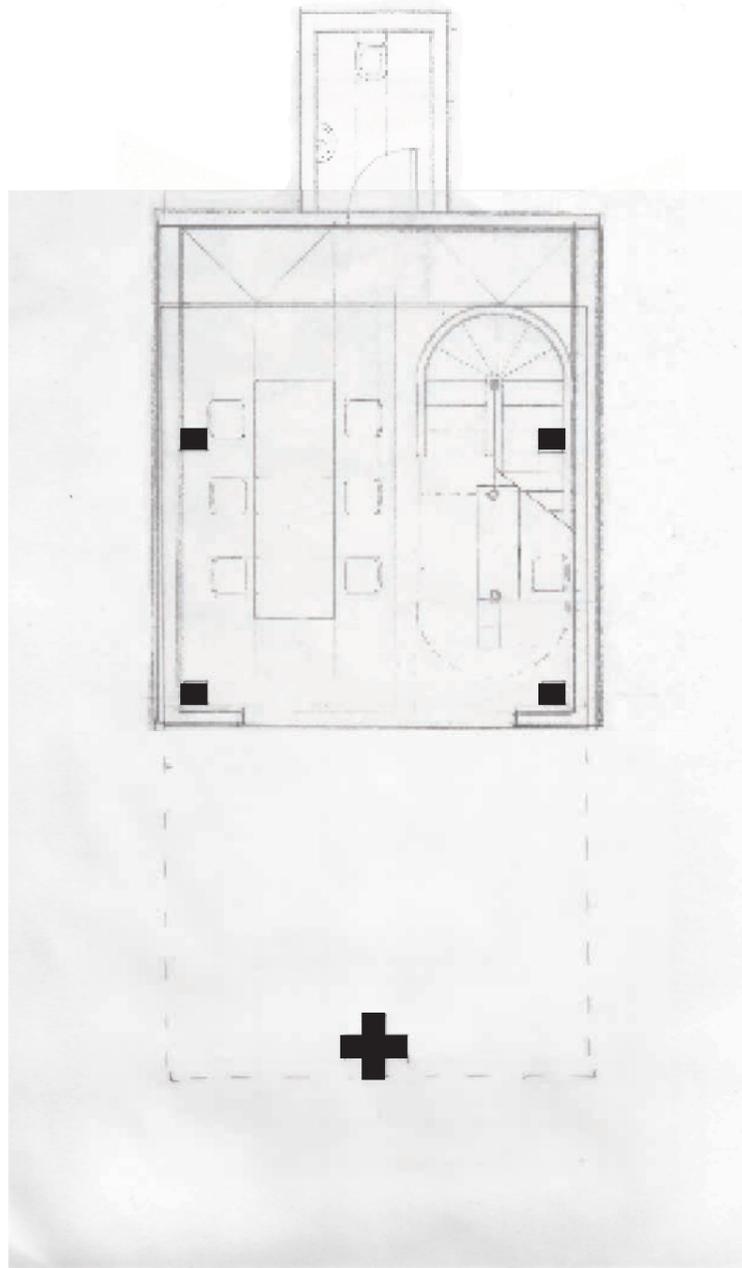


Ground Floor  
with Toilet

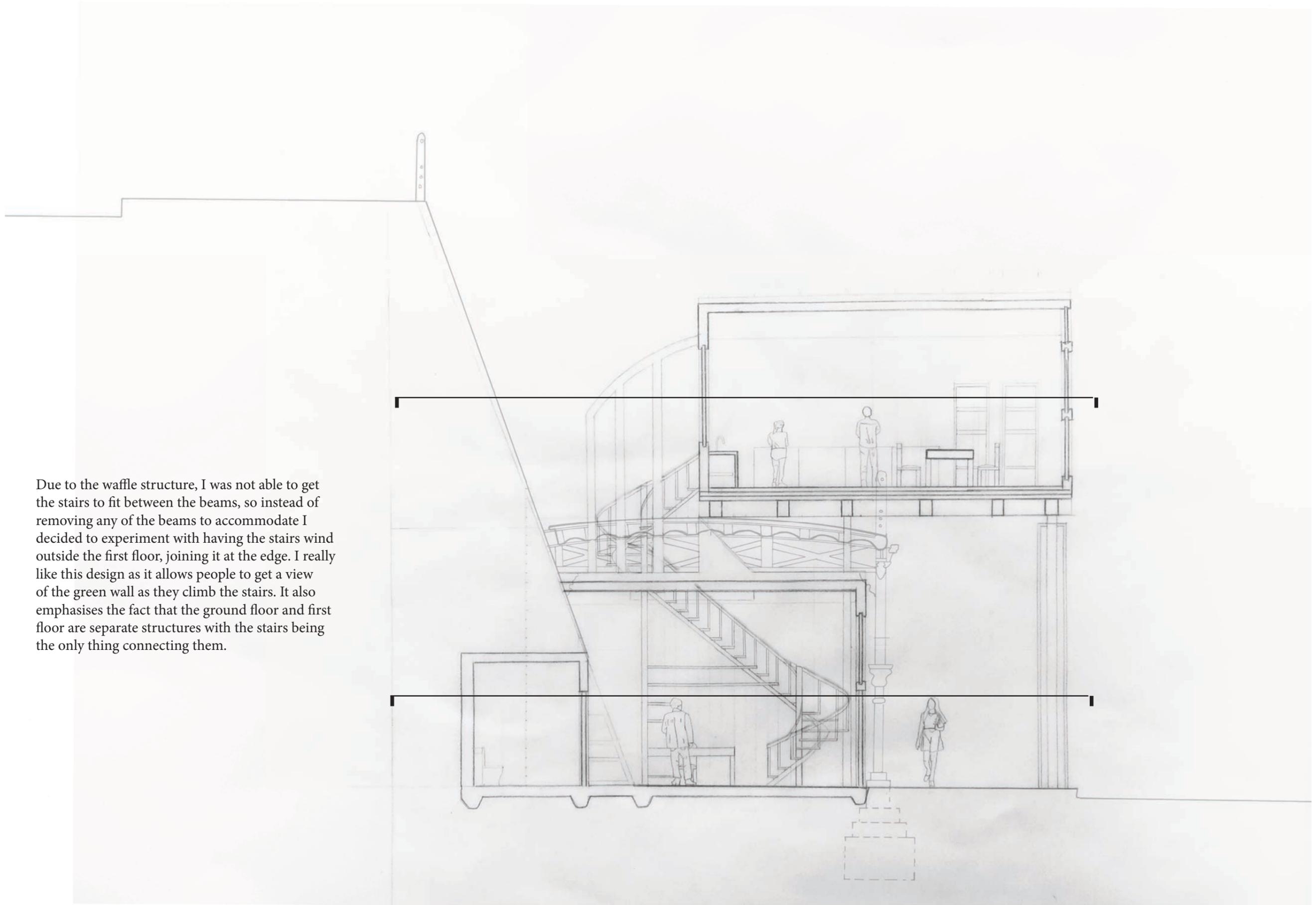


Ground and First  
Floor overlay

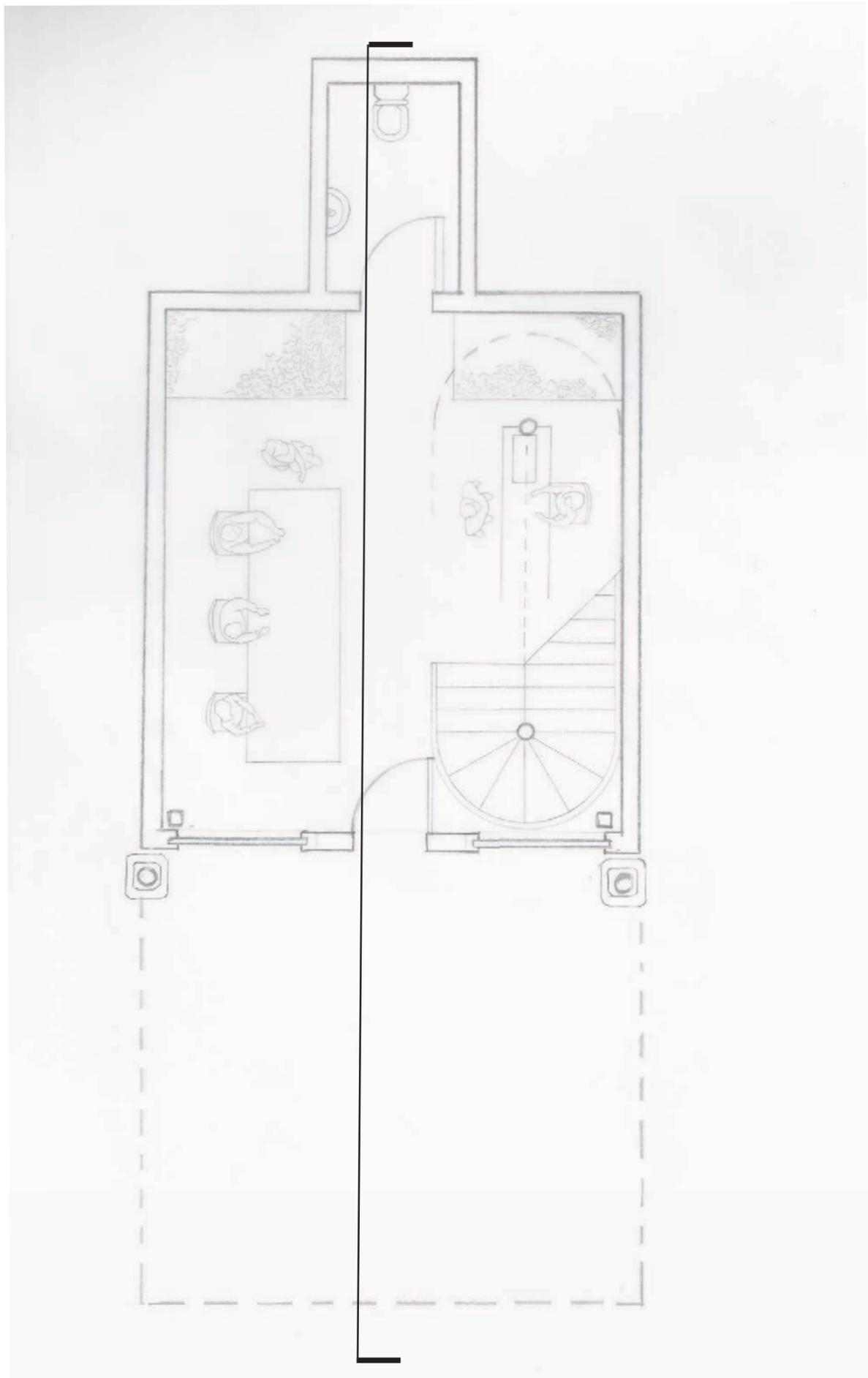




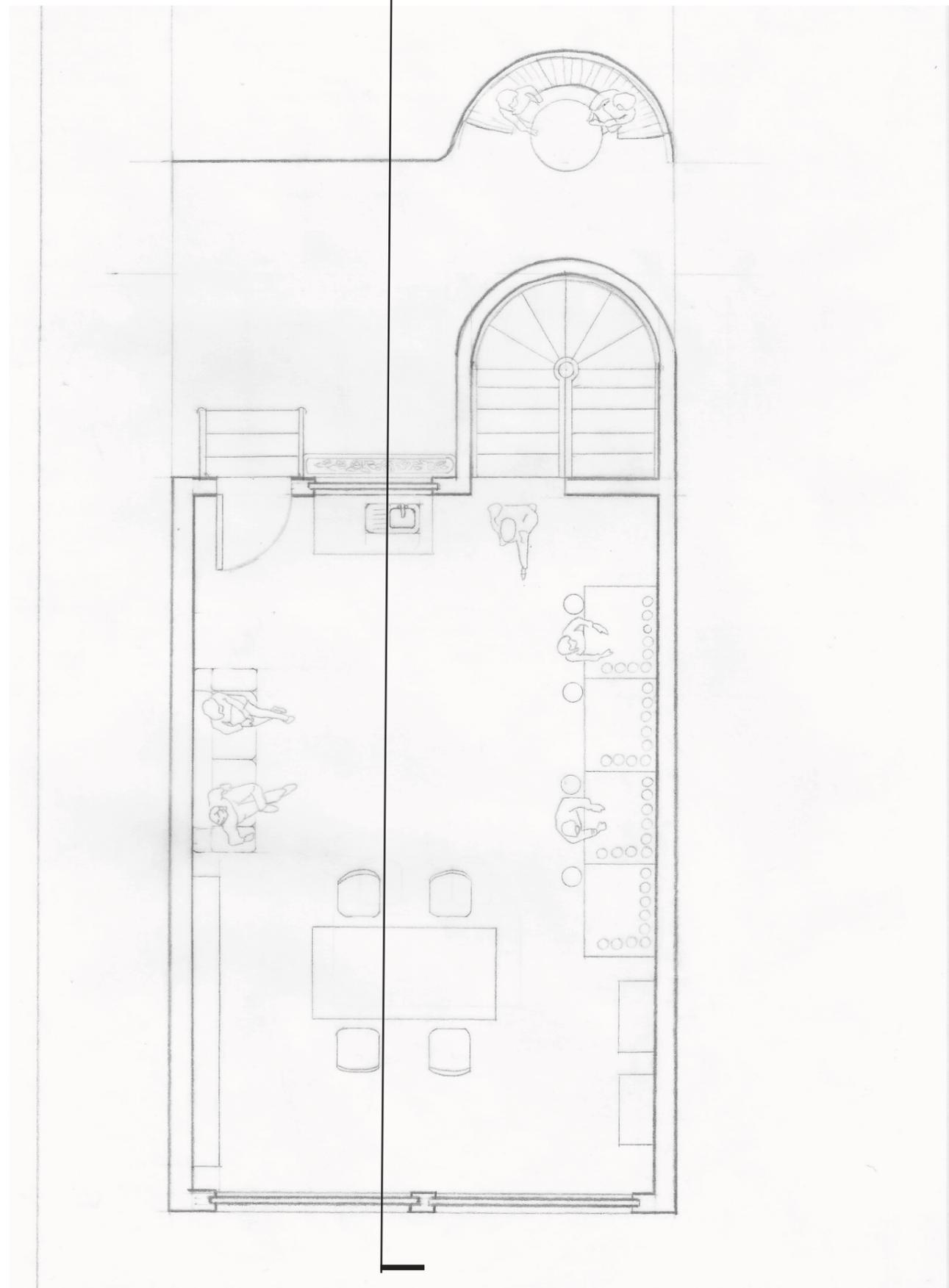
I then overlaid the plan for the columns, which would hold up the first floor, onto my ground floor plan to see how they would slot in. Because the front cross column is so big, along with the strong waffle structure, I don't need the back columns as the front column cantilevers the back structure.



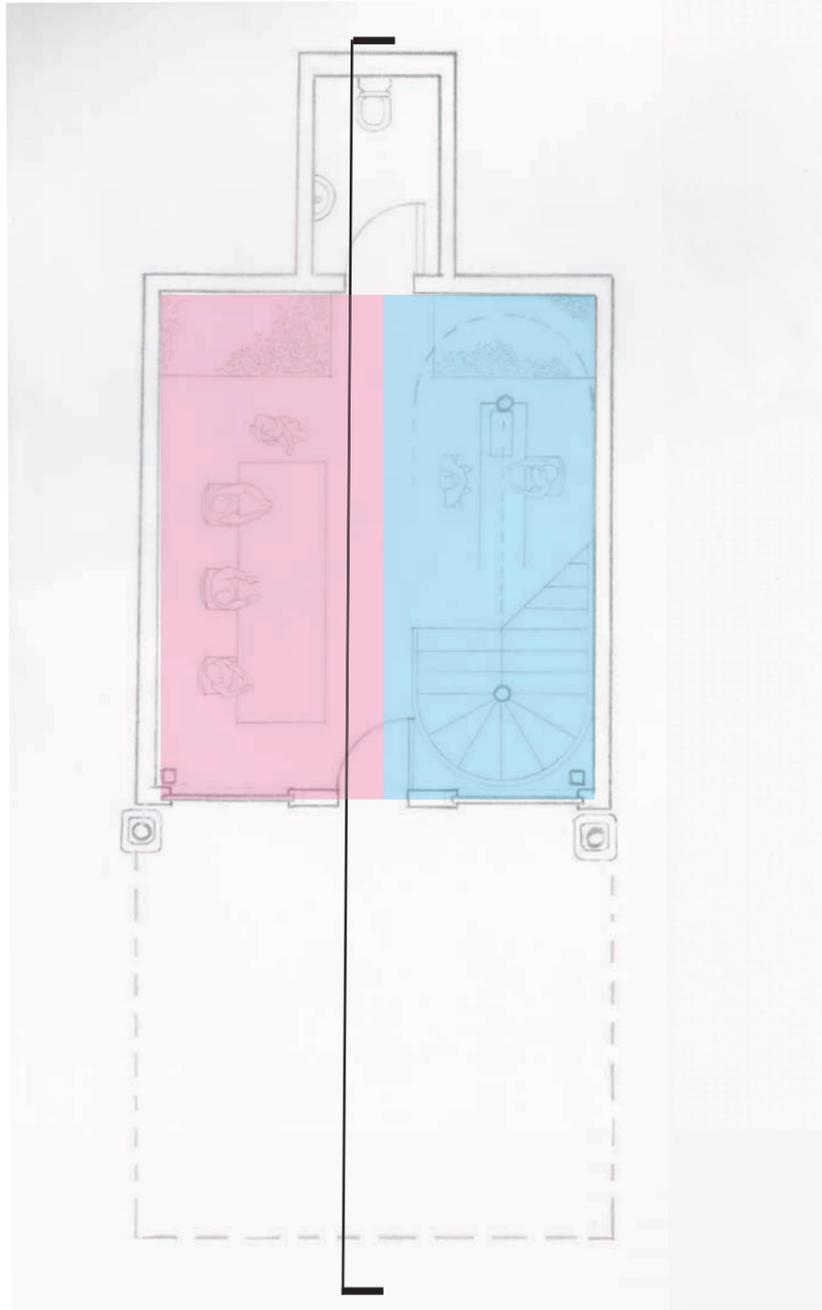
Due to the waffle structure, I was not able to get the stairs to fit between the beams, so instead of removing any of the beams to accommodate I decided to experiment with having the stairs wind outside the first floor, joining it at the edge. I really like this design as it allows people to get a view of the green wall as they climb the stairs. It also emphasises the fact that the ground floor and first floor are separate structures with the stairs being the only thing connecting them.



Ground Floor  
1:50 on A4



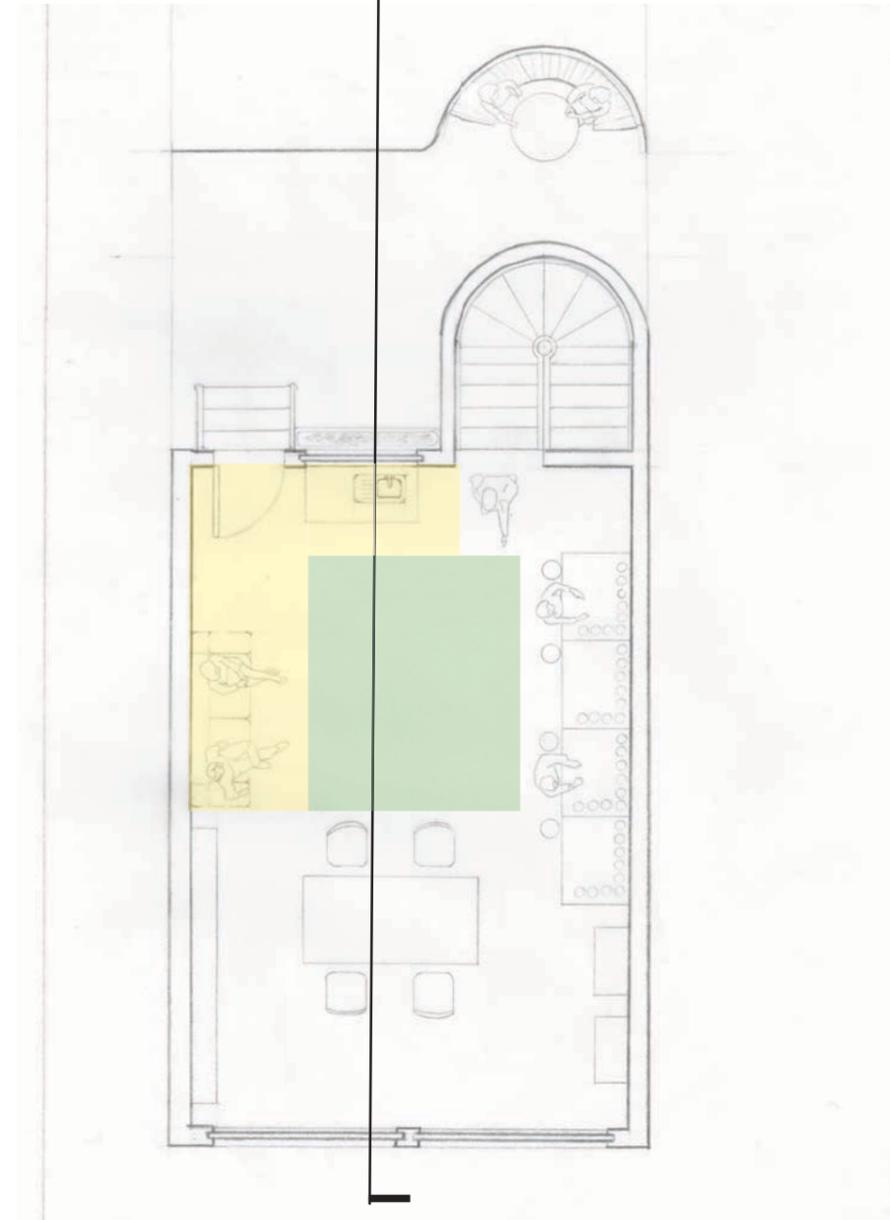
First Floor  
1:50 on A4



Ground Floor  
1:50 on A4

I changed my plans again to design them with the new staircase. I kept the design for the ground floor largely the same, having the shop space (blue) underneath the staircase, comprised of a desk and shelves extended from the steps of the stairs. The Public workshop (pink) now has less chairs, allowing more room to walk about in and have access to the staircase.

The front of the ground floor has a centred single glass door surrounded by glass so that the arch can still be seen from inside the shop. I'm able to have a lot of glass here despite this area being South-facing as the ground floor hangs over the pavement, creating shade from direct sunlight.



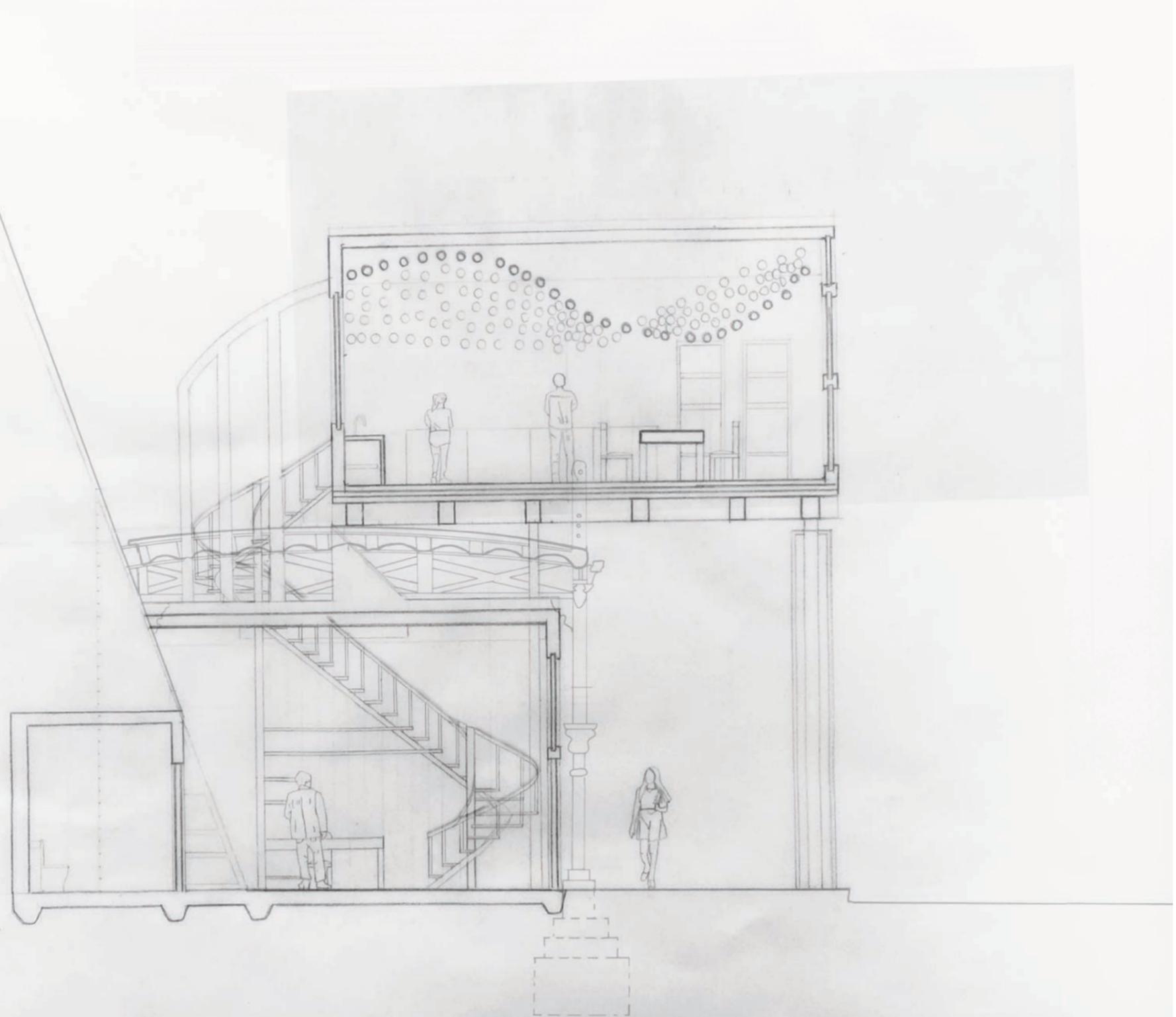
First Floor  
1:50 on A4

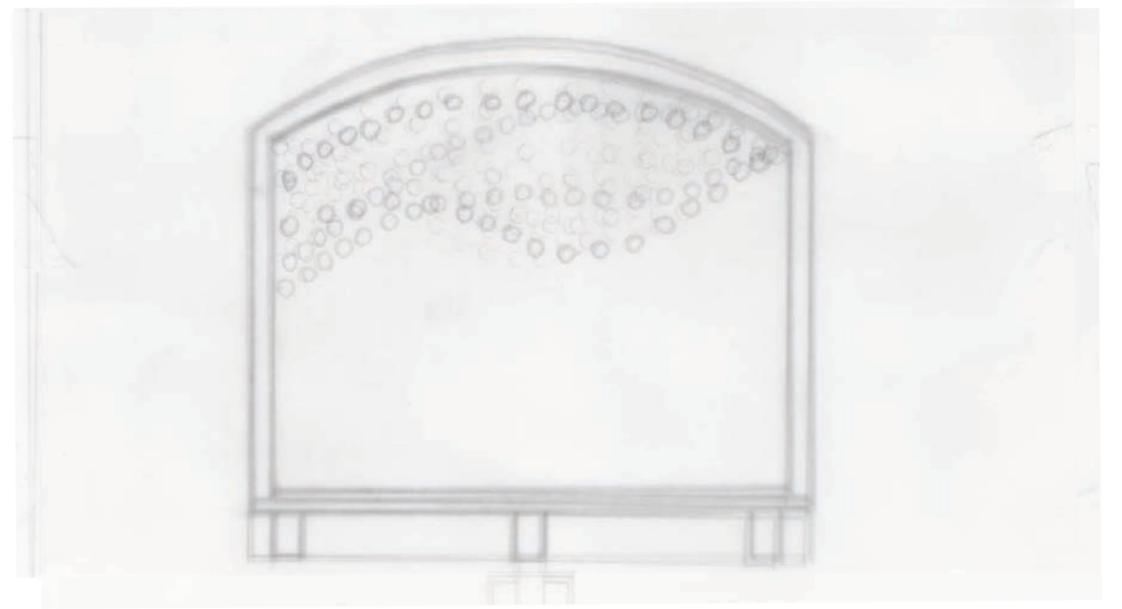
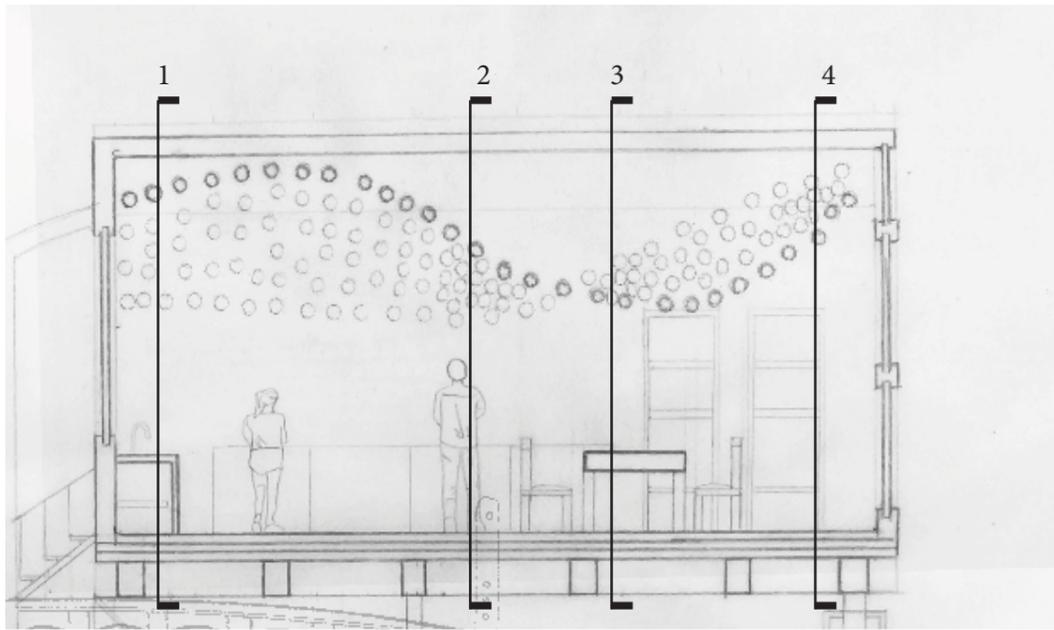
As the staircase is no longer inside the first floor, this allowed for much more space internally. With this new space I added a small break area (yellow) with a couch and countertop. I also added a small table outside the first floor making more use of the space as a break area. I also left a large area of floor space clear (green) so it could be used to work on larger projects. I did have to flip the stair case so that it is entered from the front of the shop rather than the back

The high ceiling works well in the ground floor as it makes it appear more spacious, with more area to play with when I was designing the stairs and shop space. I wanted the first floor to also have a high ceiling, mimicking the ground floor and allowing for the curved roof, which mimics the shape of the arch, emphasising it. However, some of the work that goes on in the workshop is very delicate, such as the bead making and the making of smaller beaded animals on the tables. Because of this, I wanted to make this spaced feel smaller and more enclosed to allow people to bring their focus further into the process. In order to do this I designed an internal beaded ceiling,

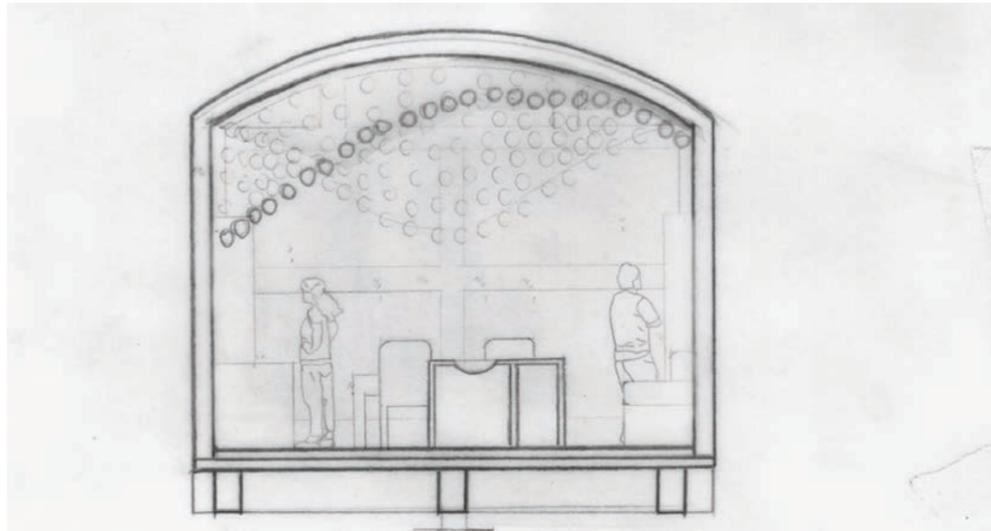
This ceiling either bends down to create a low ceiling over places where small, fiddly operations are carried out, and rises high where larger beaded animals are created and over the break space.

Using a beaded ceiling would still allow the heat to rise away from the work areas.

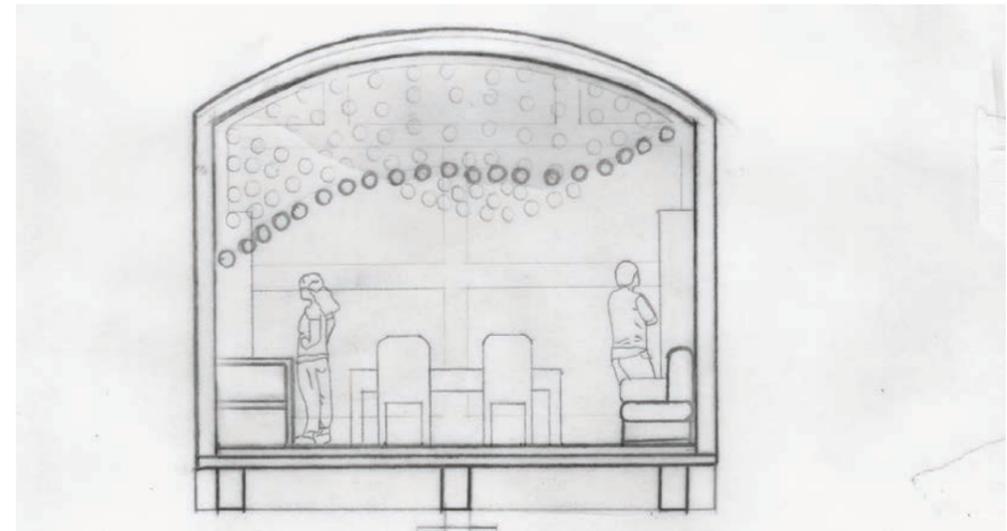




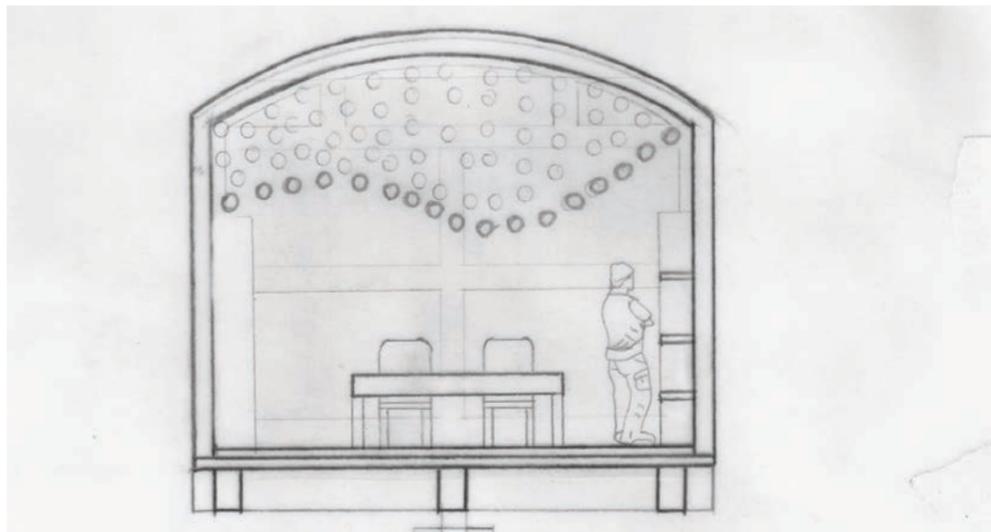
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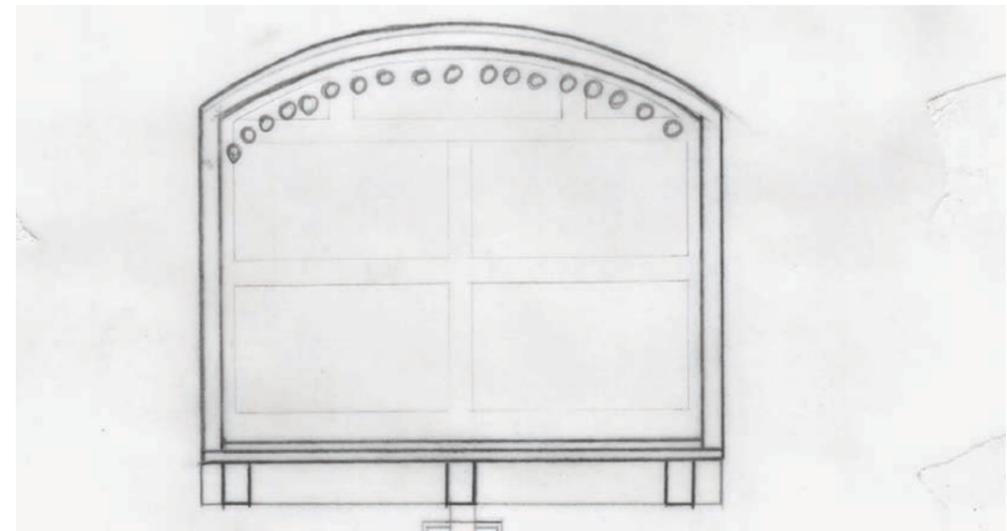
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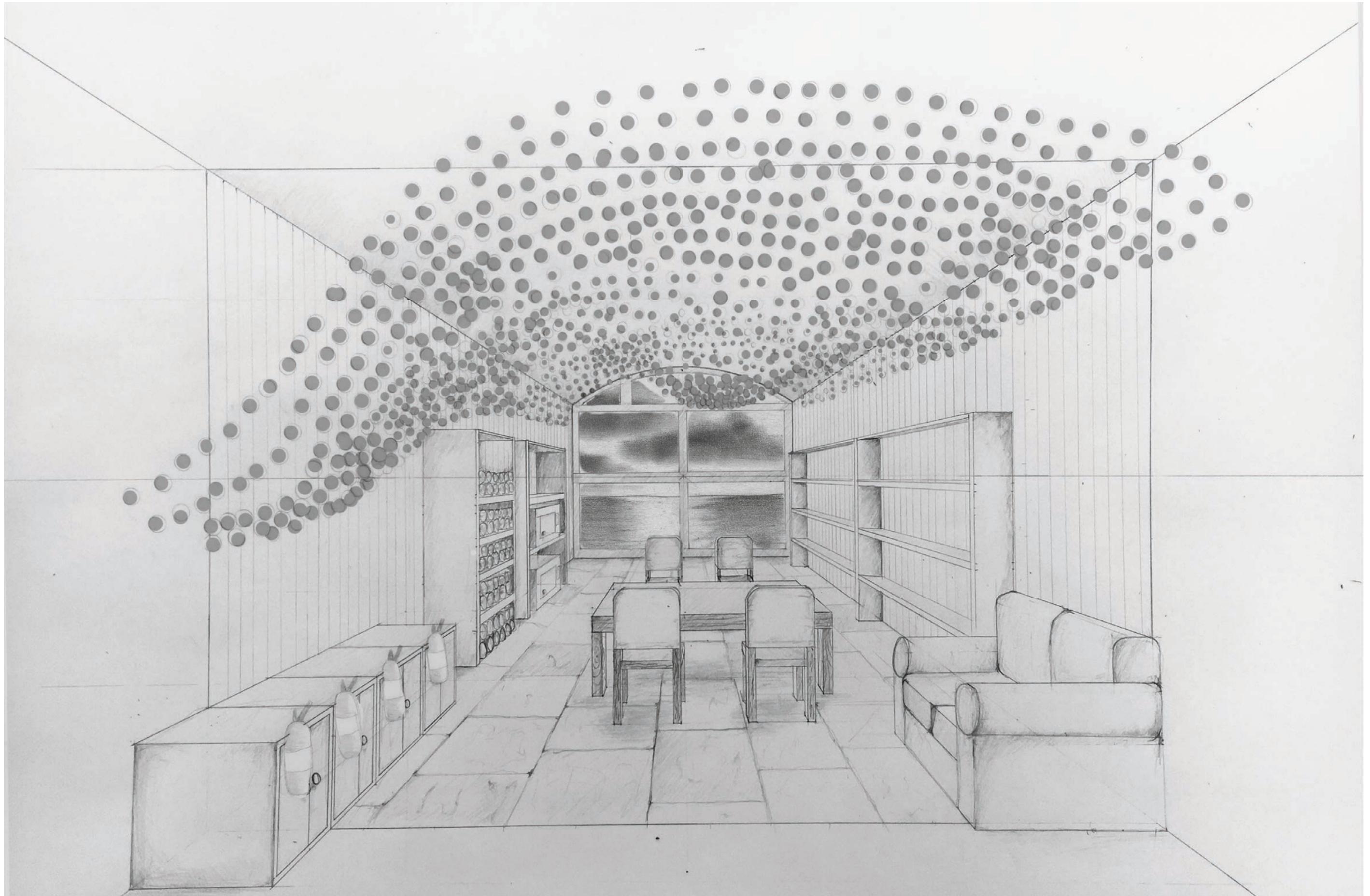


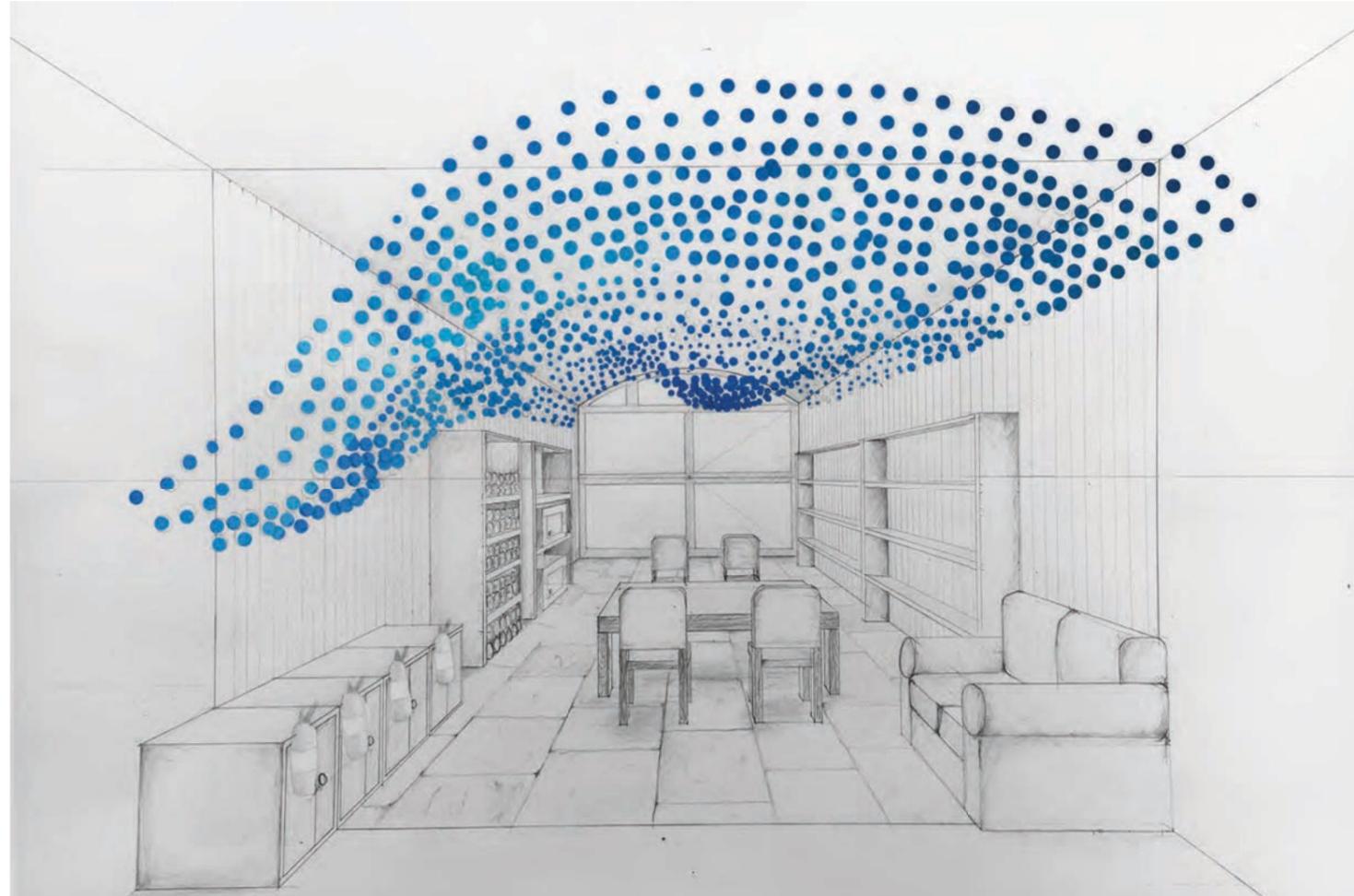
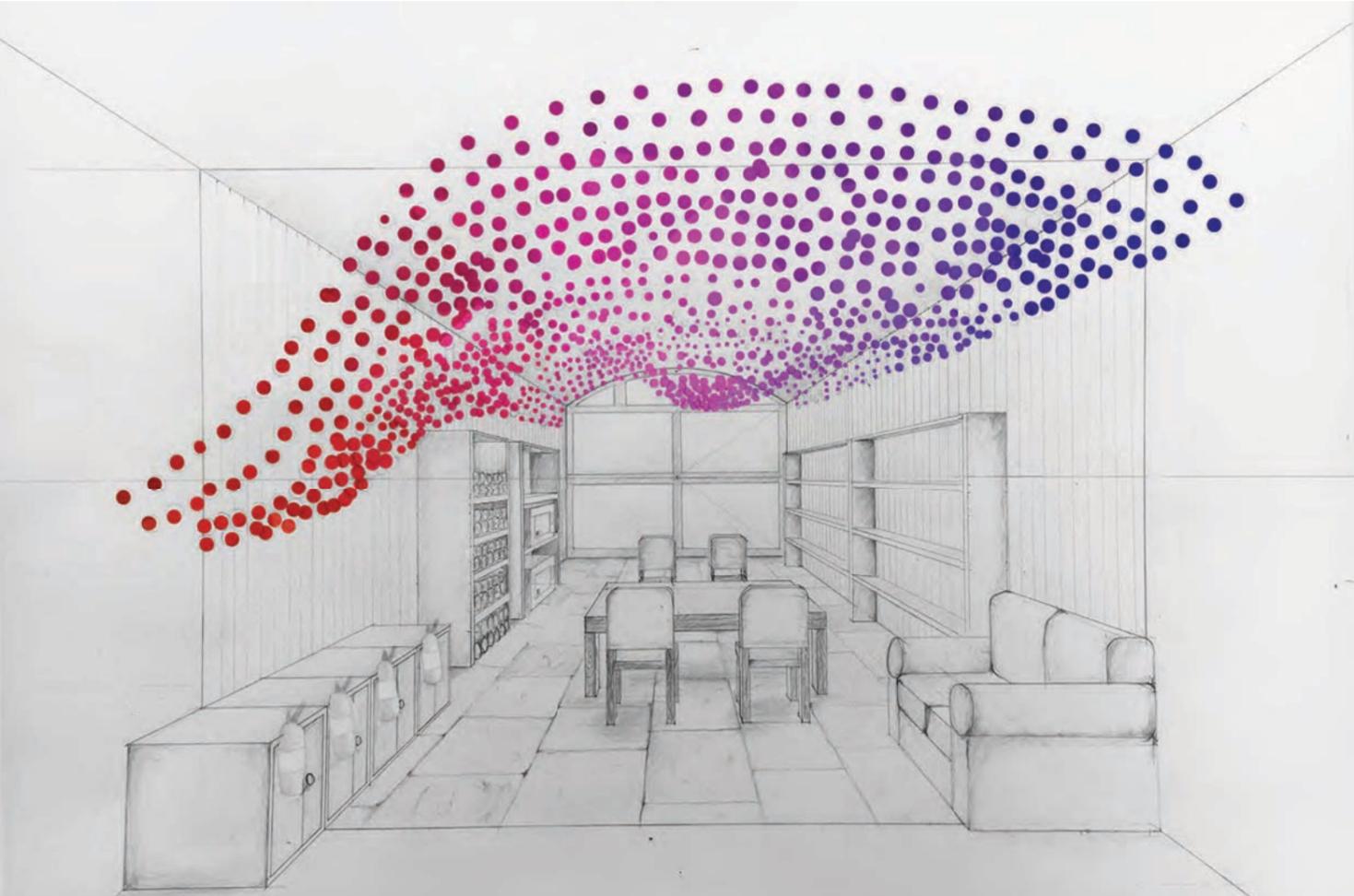
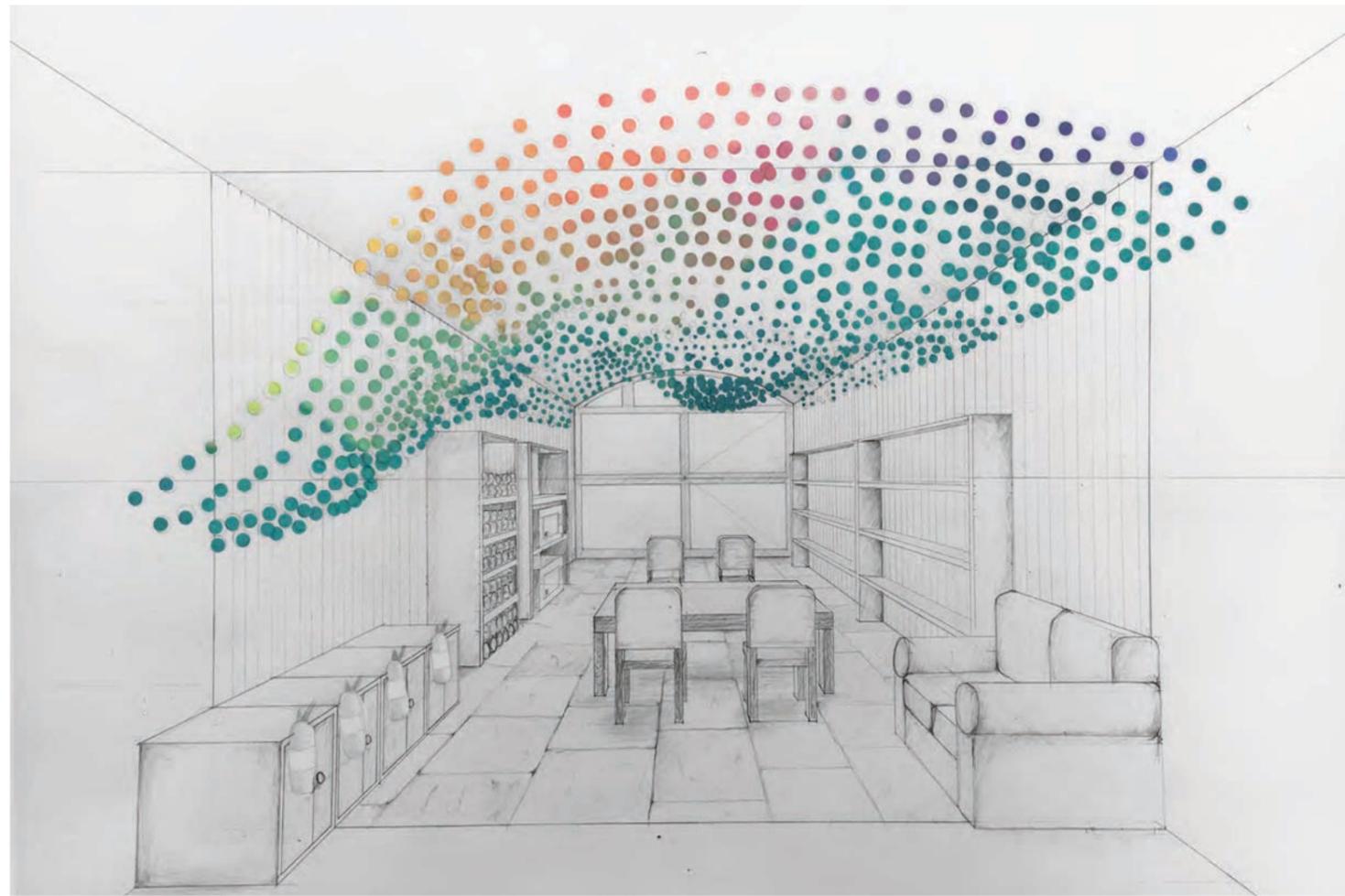
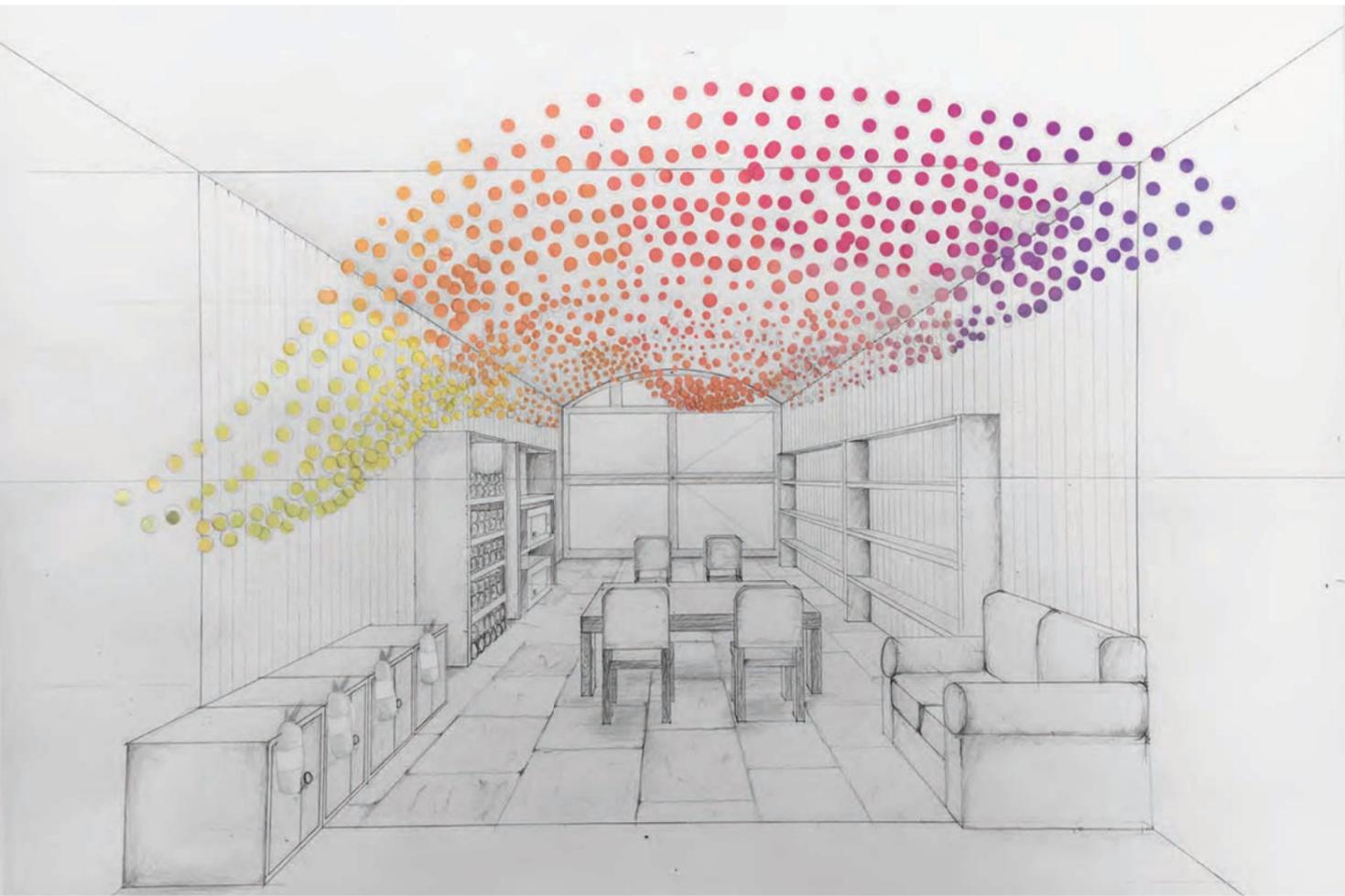
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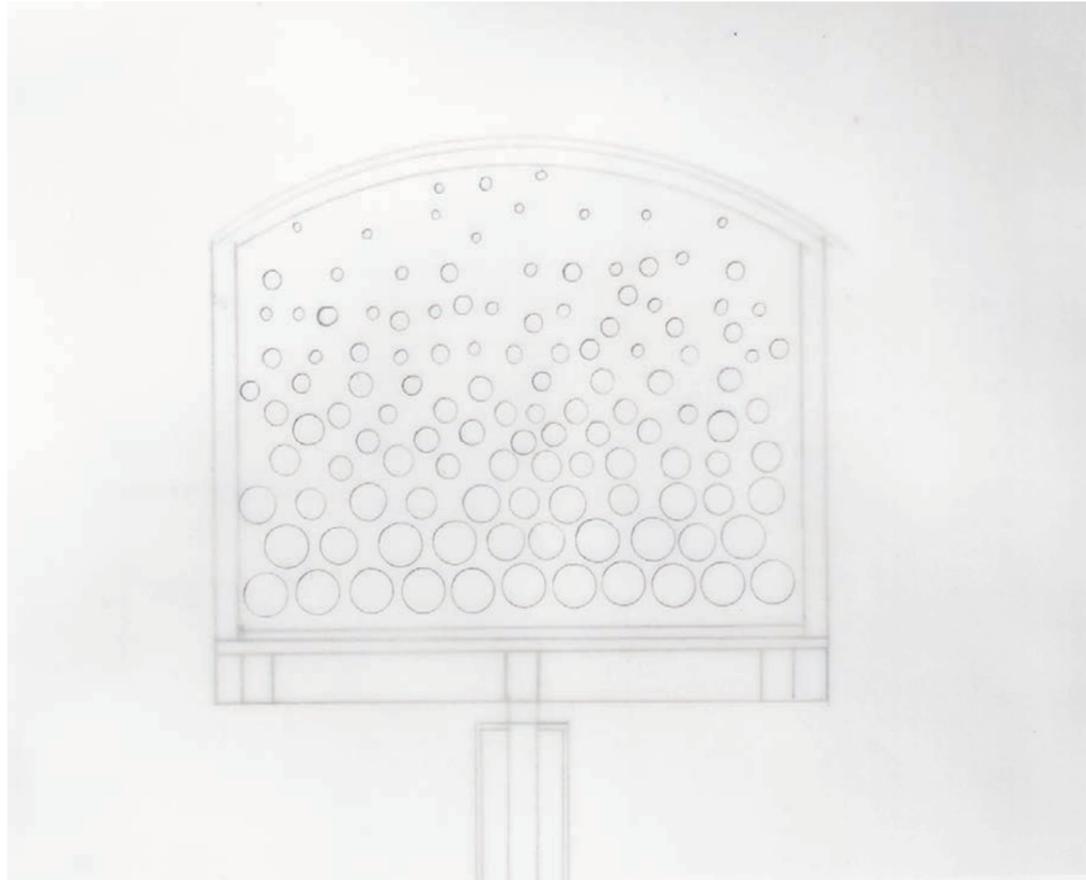


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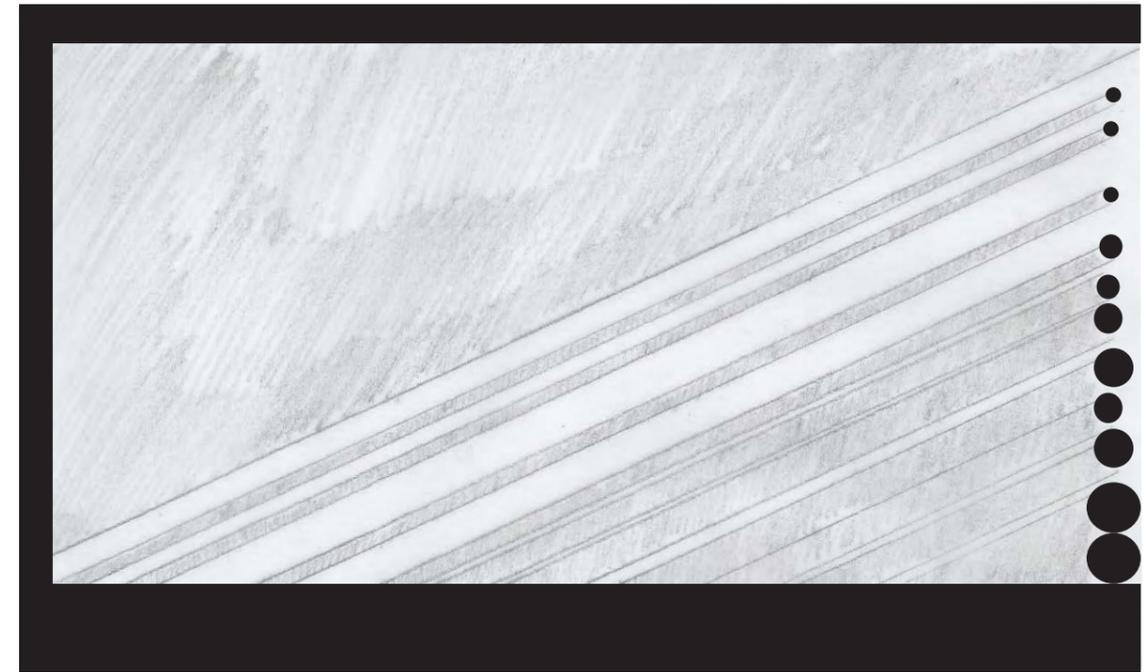




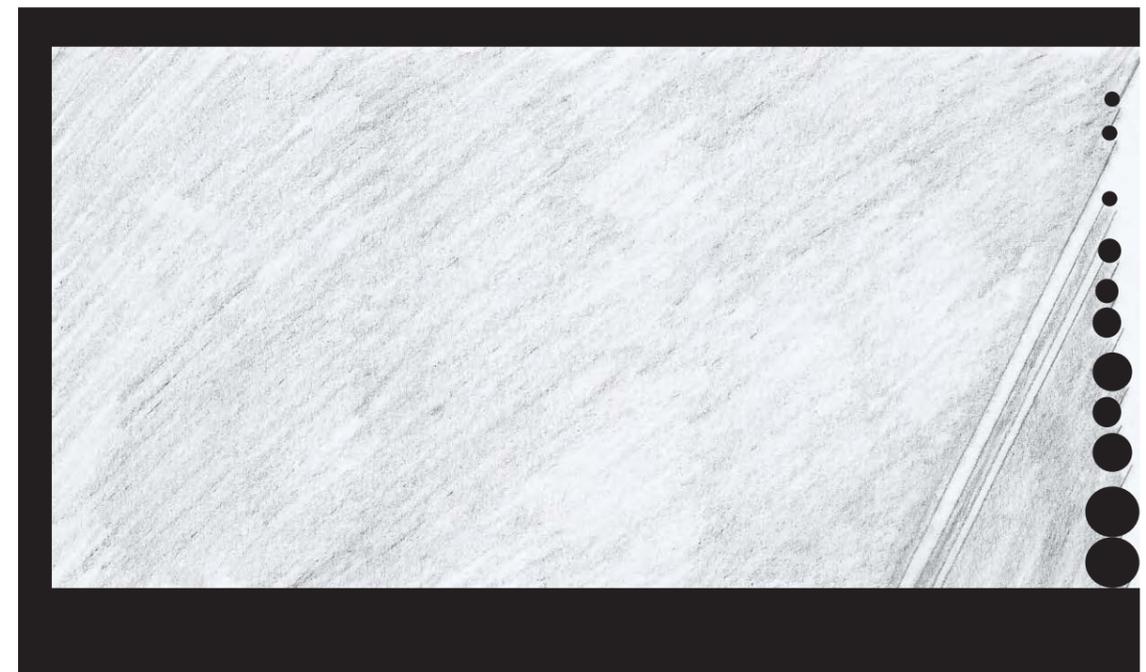




Winter Solstice Shadow Plan



Summer Solstice Shadow Plan



As the first floor has large, south-facing glass windows, a lot of light is entered through the workshop. This isn't particularly good as it makes my workshop too bright. To combat this issue, I designed an internal beaded façade to block most of the light entering my workshop. I want this façade to be changeable, beads could be added or removed to adjust the lighting needed depending on what is being made. For example, on a cloudy day in winter beads could be removed to allow for more natural light to enter if a large beaded animal is being built at the back of the workshop. Alternatively, in the summer beads could be added to prevent too much light entering. This idea was inspired by Kengo Kuma's Chinese museum of art, and how the 'floating' tiles would create shadow patterns.

