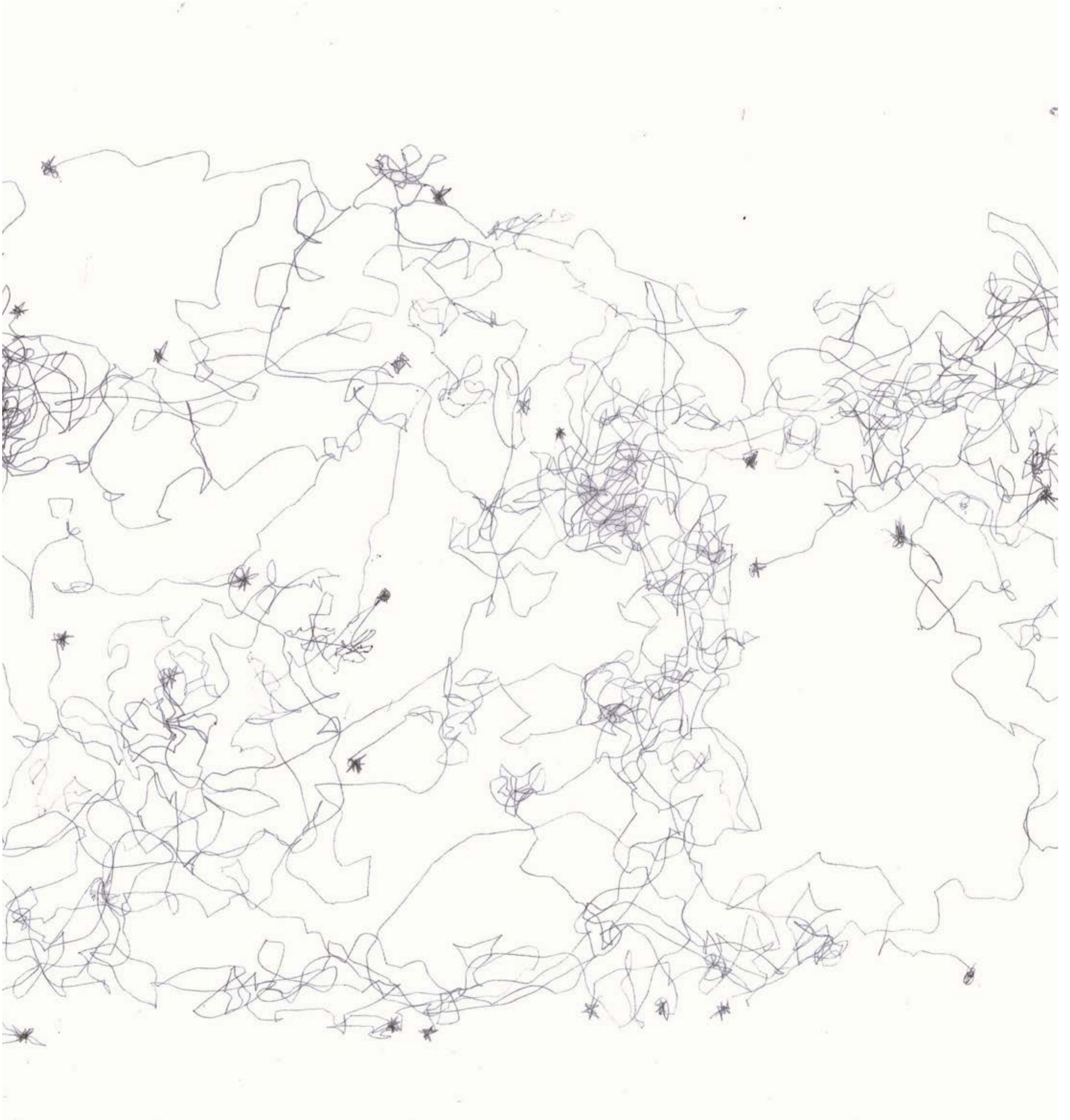


Solitary

Nurture through Nature



Radhika Chagane

1802948

CIND7002

How can we mimic the interactions of antisocial bees to inform and explore designs, programs and a navigation System to support the autistic community and improve skill set surrounding memory within Hounslow Heath?

Narrative

A world where senses are heightened, shows the beauty of everything mundane. From the ignored flickering of the traffic lights to the noise of the rushing city with natures songs slowing faded in the background. Where every touch of the banister can make you count the scratches and the untold story of the scrapped paint, that once sat smoothly. Everything is awake. But when this sensitive world exposes itself and then refuses to ever quieten down, what do you do? How do you explain each sense and the feelings surrounding it.

'Uncomfortable' is the word many use that suffer from Autism. Currently 1/100 children in the world have from autism. A figure that will only increase over time. When being diagnosed you are not only being finalised with autism but other health issues that were/are overlooked. Autism is a spectrum, where each individual is different in the various symptoms they carry.

A specific concern that peoples with autism face is memory issues. They have weak working memory especially with spatial information as well as autobiographical episodic memory. Which is the bank of experiences we have stored in our memory to determine our actions and behaviour to be accepted in society as well as keep ourselves safe.

These problems with long term memory and complex information causes anxiety for this community leaving them alienated as well as more prone to diseases like dementia when they get older. It also contributed to the difficulties they faced with behaviour, interaction, and learning.

Where Autism in humans leave them feeling isolated other communities within nature work differently. An example of this is the society of bees. Bees are known to be one of the hardest working insects. Recent studies have shown that antisocial bees share genetic profile with people with autism. When analysing their behaviours and the response of social bees, they found that these bees carried on with their activities and let the antisocial bees do what they wanted. This created a harmonious community where no one was disregarded, and encouraged participation from antisocial bees even if it was minimal.

This project revolves around designing with the theme of nurturing through nature using bees and the way they communicate and interact as an inspiration for design.

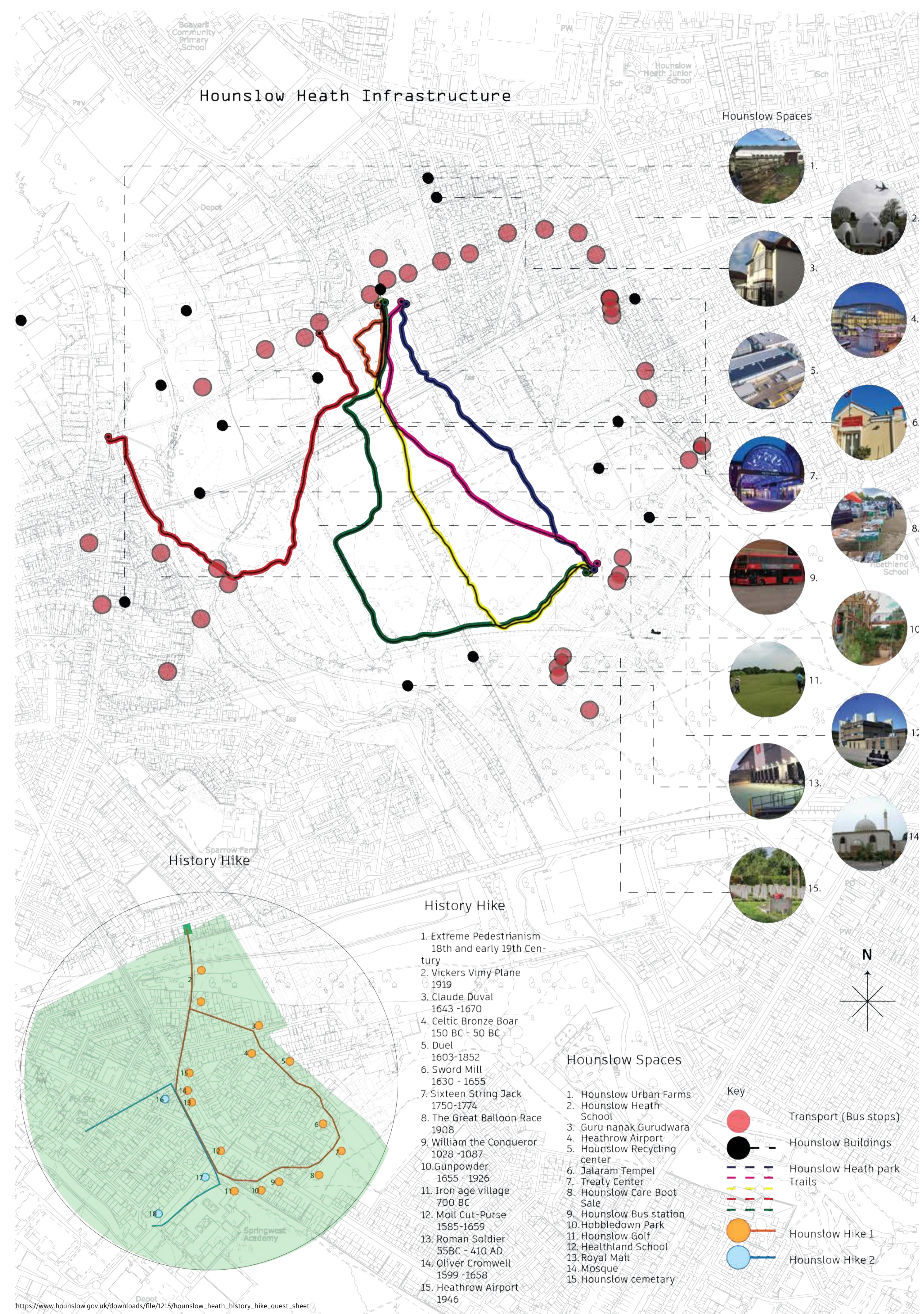


Site Model

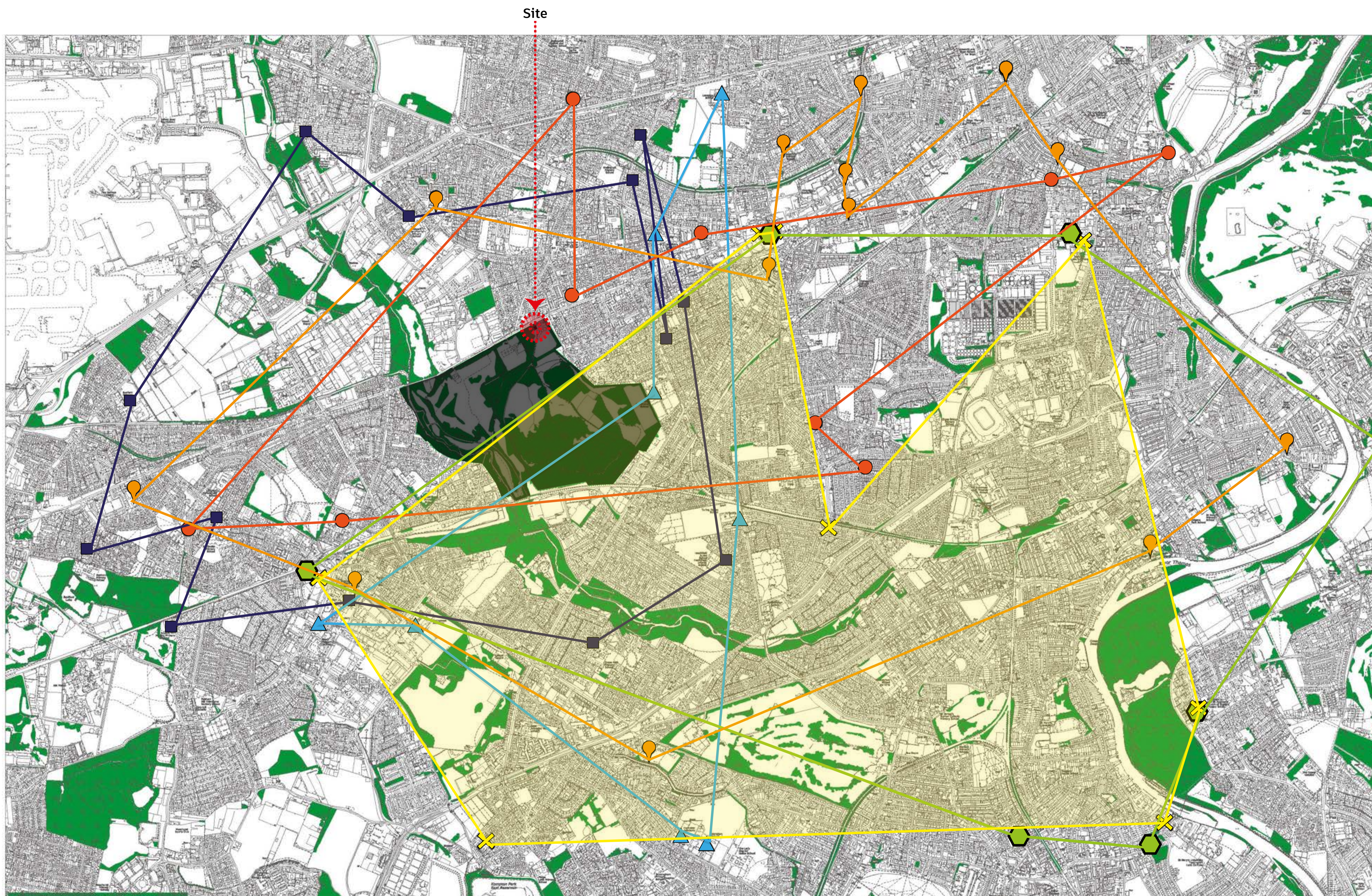
My site is located in Hounslow heath, a park I live close to and have visited for the past 20 years. The location of the space is very close to the main roads and is surrounded by public infrastructures. The park carries a nature reserve and is home to over a 4000 different types of species.

At the entrance of the space there is a visitor centre, that is currently shut due to COVID and is now abandoned. This temporal structure is my main site where my building would sit.





Existing Site Plan 1.60 on A2



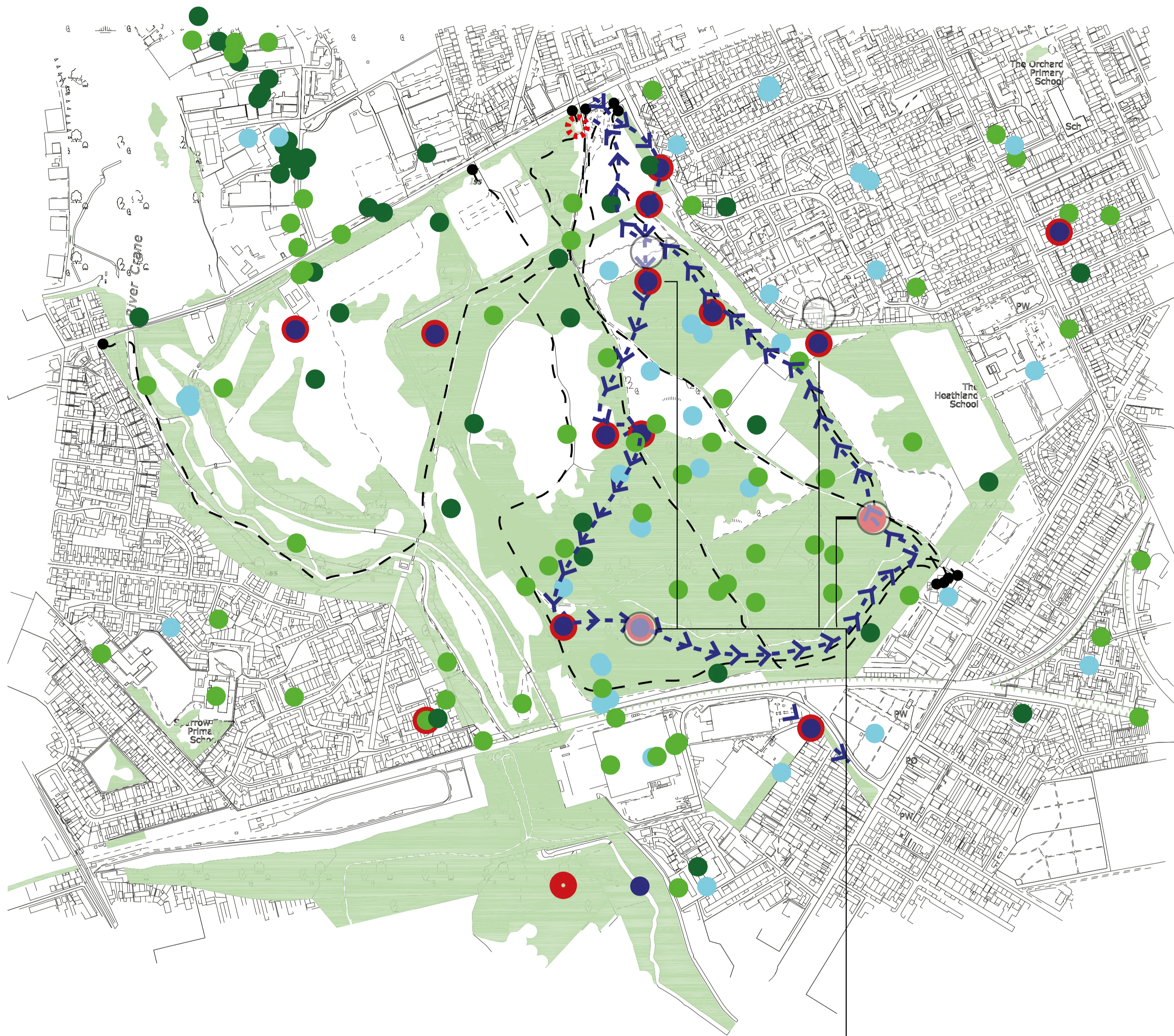
Key:

- - Primary schools
- ▲ - Secondary schools
- - Care/Dementia homes
- - Disability support centers
- ✕ - Autism support centers
- ⬡ - Art centers

Map Showing Surrounding Infrastructure

The map shows a large number of schools and support spaces. However the support for ASD is very limited.

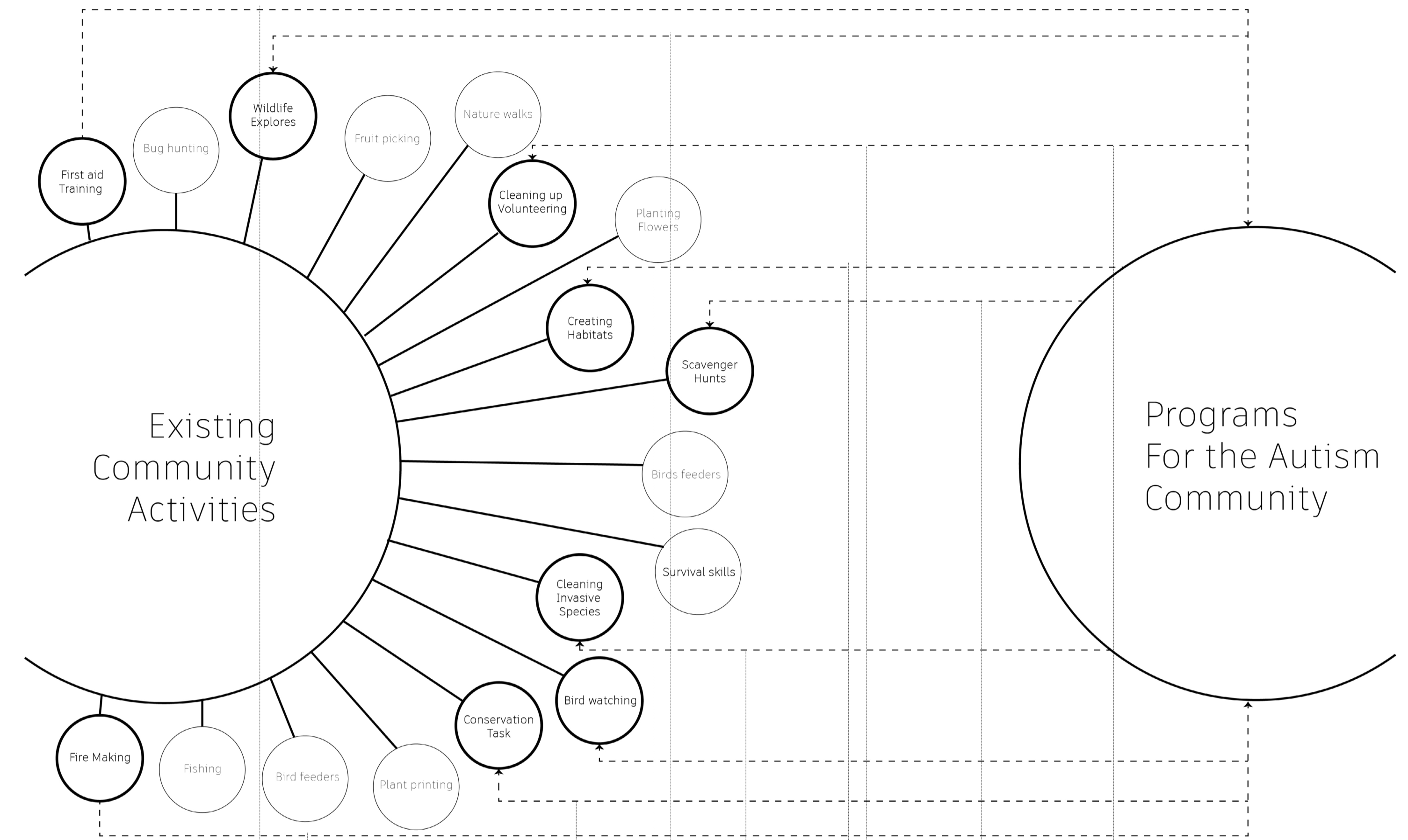
Map Showing Biodiversity and Routes within Hounslow Heath

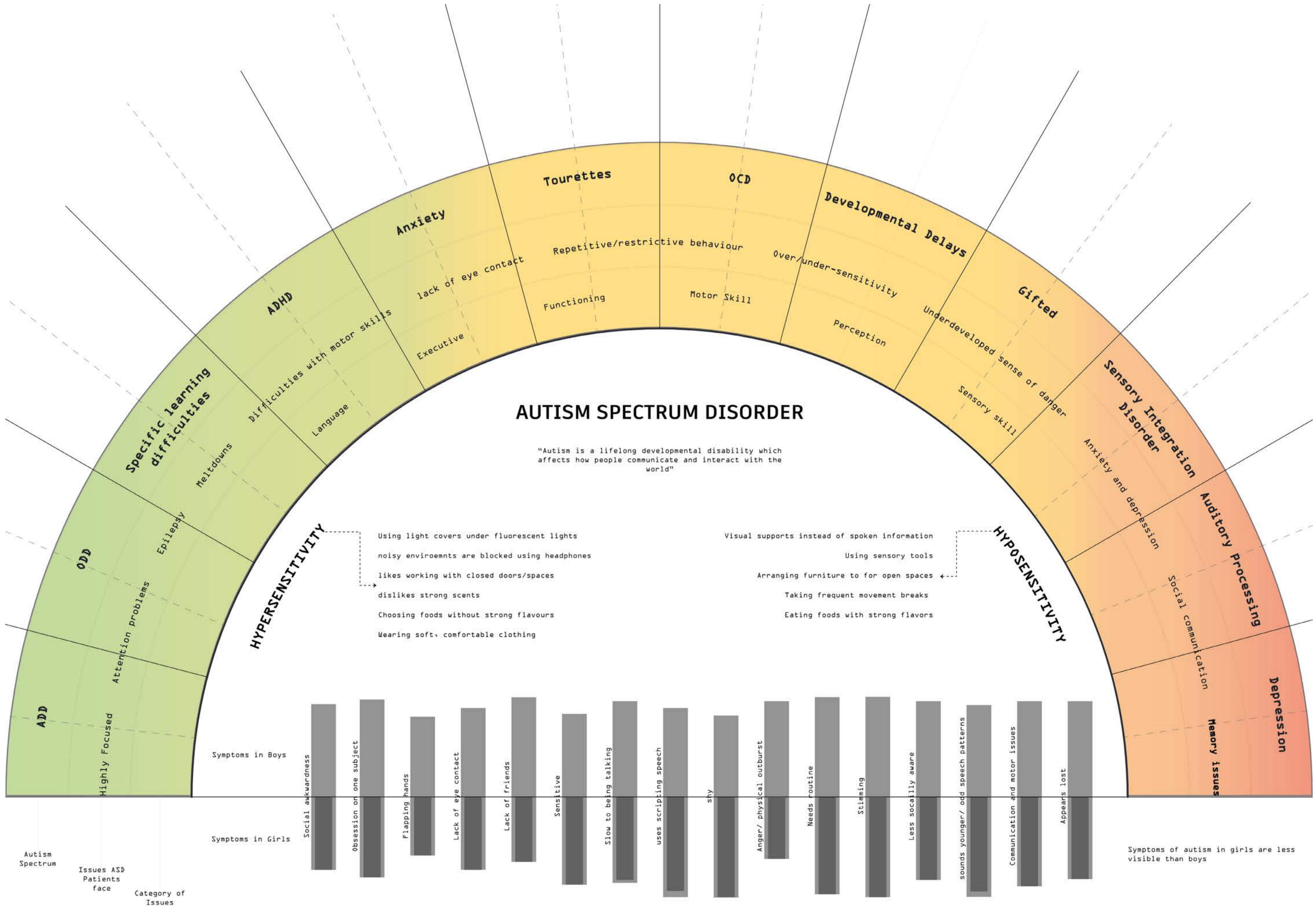


- Key:
- Bees - dark blue x
 - Animals - light blue x
 - Plants - dark green
 - Insects- light green
 - bees and wasp- red x
 - Site
 - Routes taken to explore - - -
 - Route through the hives >>>
 - Entrance and exits
 - Selected Pavilion Locations

Pavilion Locations were selected using observed bees and wasps Hives. These Pavilions would carry the existing activities from the Hounslow Heath rangers and new programs to implement "Nurture through Nature".

Existing Programs from Hounslow Heath Rangers for Pavilions



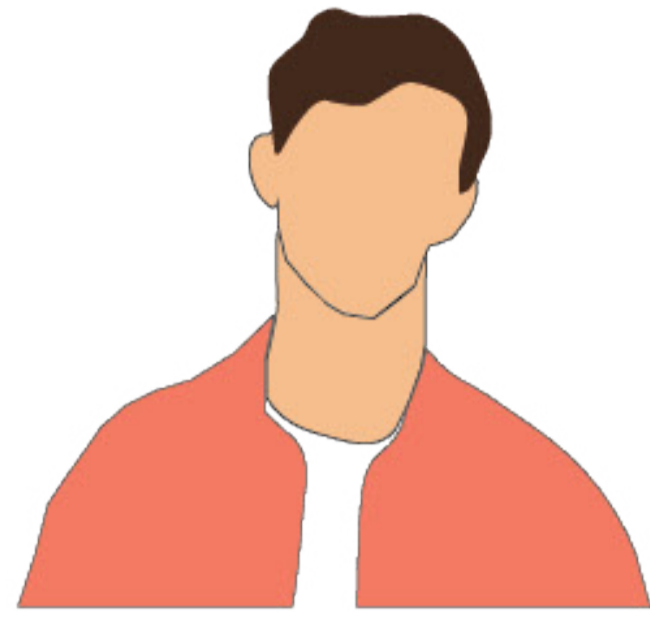


Autism Spectrum

Issues ASD Patients face

Category of Issues

Interview with the Autistic Community



Colin - 46

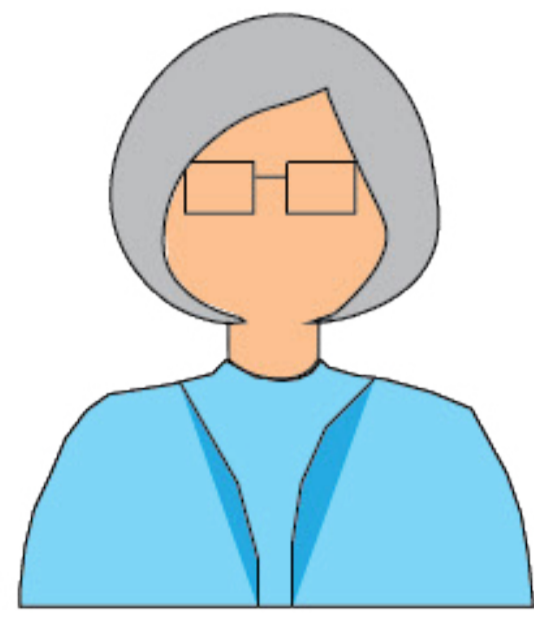
"The way it should be on, or my meltdowns are using an explosive, they're usually I just become a recluse or come reserved and all become very quiet."

You know, after the diagnosis, understanding the fight or flight didn't make the laptop, which ours is a bit more, not enlarged, but at a young age where you usually enlarged. So we kind of. Oh, Our cortisol levels are constantly high, you know, and they're supposed to, you know, kind of taper off through the day. But unfortunately, autistic people where their amygdala is over-active or overdeveloped, and even as kids, sometimes that's hard.

Like even when I was a kid, I had to organize all my toys before I could play with them and I had to go in a specific. You know, even till this day, like odds are evil. Memory issue

stimming is the most calming thing for myself so. But I don't even know if these other people in this chat room either stems changed because like

Everything needs to be subtle. If anything is too strong or any-thing's too bright or any thing's too loud, that's gonna be a turn off for everybody in the room."



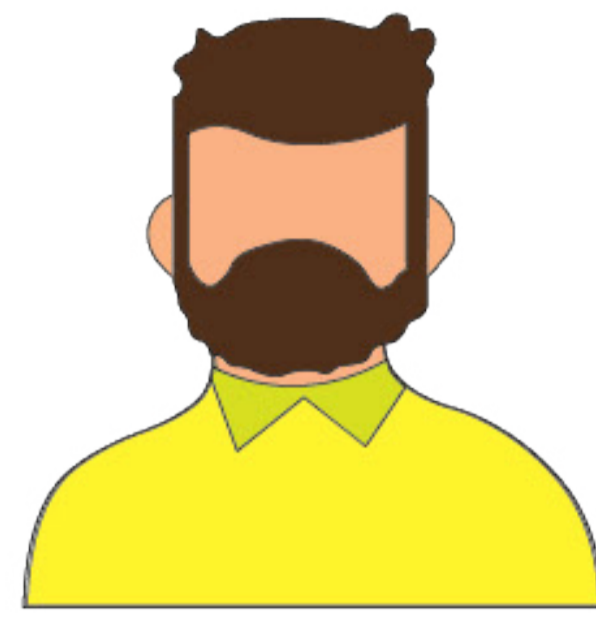
Claire - 85

"But I do have a lot of sensory issues I don't like. Bright lights I don't like. Voices and I like kind of soft things to touch, but my main problem is with fluorescent lights and or when I go to hospital say. If I'm lucky, they have a separate room. Hearing, but it doesn't seem to affect. I still don't like loud noises and. They don't really buzzing fluorescent lights Turn the lights down If somebody speaks in and they've got their back to the light like they're against the window, then I can't lip-read them."

Up lighters and then a direct flight on something.

Individual switches on the lights and then I can sit under one where the light is switched off. But a lot of lights these days just have one switch for the whole room and then start. I'm good

I prefer like a slightly warm colour light as well."



Christian - 46

"Some people like shaded places. Some people like Sunny places. The people like stuff away from doors. Noises. Some people don't mind that. Everybody has different sensory, shall we say, hearing issues, yeah, and brightness issues, Noise issues."

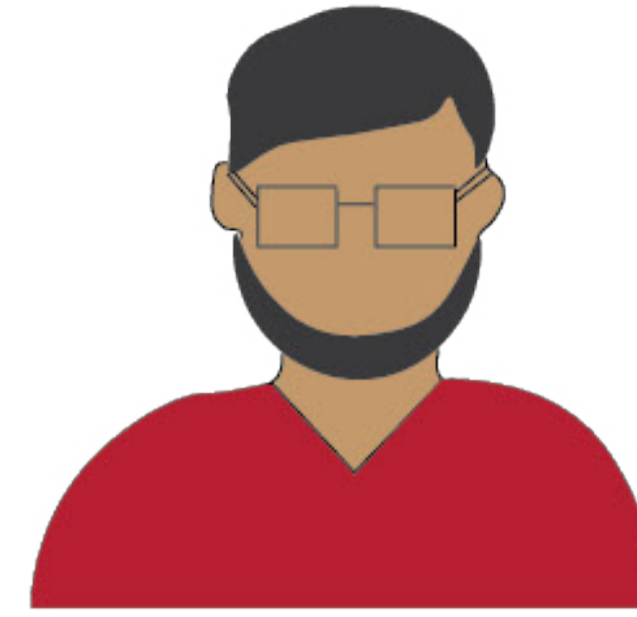
You might go to the sunny room and you might like the quiet, dark room. You might like the one with the big screen. The one with no screen, You know what I mean? I think cubicles, you know, you get if you think that, the opposite of an open office cubicle office.

Everyone's got headphones and everybody can talk

Everyone's got headphones and everybody can talk and. They're on the screen. And we can control the brightness in the cubicle, the signed in the cubicle and whoever is watching them in the cubicle.

Maybe having a label on your chair or some kind of thing? Because everybody likes to sit in the same place with the same people around them, I guess, and also when things are on wheels. School When people used to pull furniture right, it used to squeak on the floor. Maybe not chairs with wheels.

There might be different themes associated with each room, so people remember them because everyone who's autistic like space."

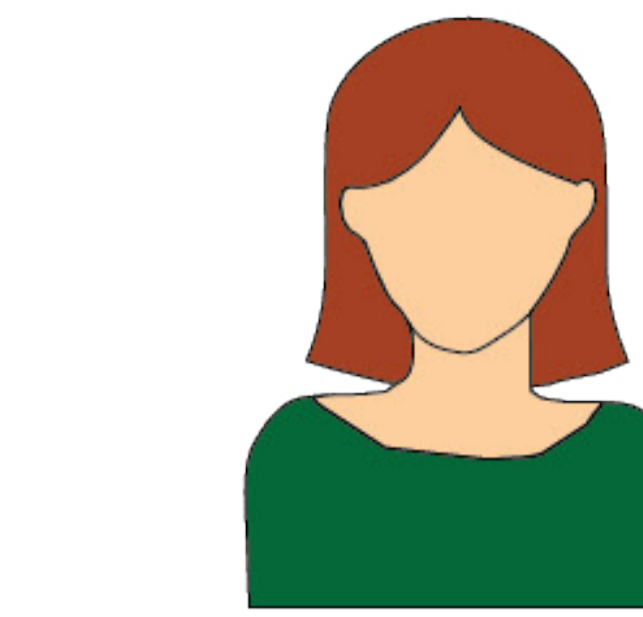


Ryand - 30

"It was too late to get me into a specialist score because people had already decided kind of on their secondary schools."

Airport paid to have like kind of igloos and of primary school playground.

My colleague was talking about plant seller and he got me thinking that we're talking about unlikely. But what if we had like some certain smelly plants in the garden, like, I don't know, like echinacea or camomile or, I mean in our guide and we've got like chocolate mint"



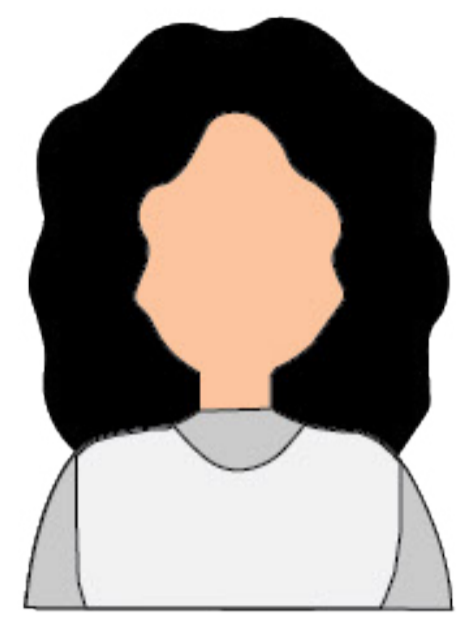
Stacy - 37

"I don't like it being too bright. Yeah, too much noise, different noises all at once. It's very disorientating. And just being in a room with a lot of people, especially people I don't know, Within an environment. So are there set colours or set feels or things like that, actually when you come into an environment you can focus on and reset yourself or make you feel calmer in that environment Stacy had."

Definitely soft furnishings and bean bags. I like to fidget in the chair and when I was at school I was always swinging on my chair and I'd always get told off for it, but I concentrate better if I'm moving rather than if I'm not. Not right lever I don't like. Philip Lever. So if you've got like comfy sofas and chairs, make them sort of fabric. Um, comfy ones. As for decor, I quite like pastel colours, so like maybe a pastel blue or pastel green. I don't really like white because I find it a bit too clinical. I don't like really bright colours as well."

And I wouldn't say to put the furniture like to put the furniture in the room so close together. I wouldn't feel comfortable sitting next to some And maybe it's like if you had softer music playing in the background of some of that. Not everyone obviously likes music, but if it's kind of soft music in the background so that you can still hear people talk and that I find that quite calming

How I recognize a room is I remember. Is the furniture or you know, a certain object in the room, but I also memorize whereabouts in the room it is, so if some thing's moved. That's moved because I remember it being there specifically."



Emily-may - 40

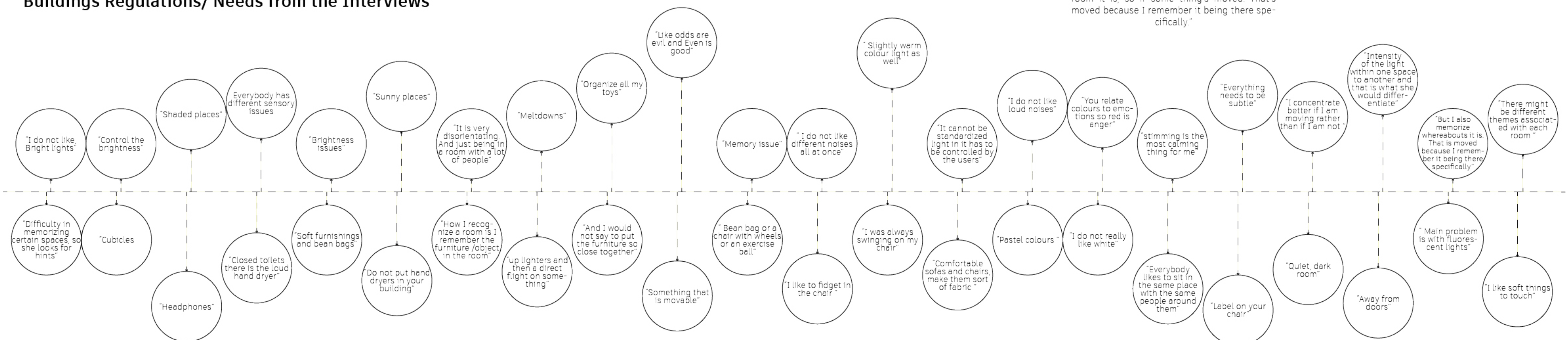
"If there's light and it can't be standardized light in it has to be something that's controlled by the users at that time of using that space because."

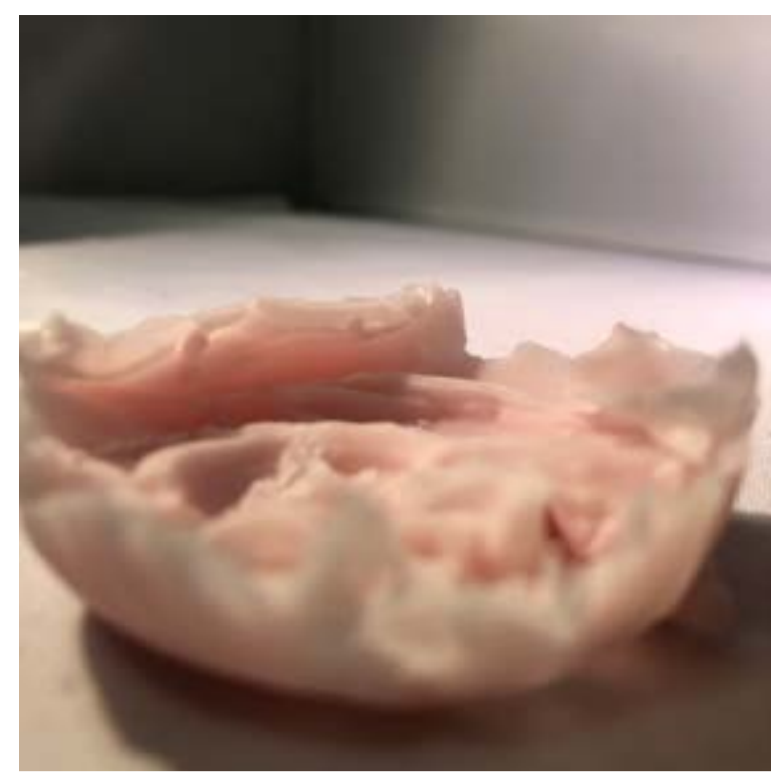
Something that's movable, you know, so like a bean bag or a chair with wheels or an exercise ball, because they're pretty good as well, because you can lay on them and you can.

Visually, it's quite good for autistic people to be able to process what they need to do in a room by what's in there. For some autistic people, unless they're in that space, they don't generally remember that space because it's too much to process all the time

And toilets as well, because. Often happens is autistic people find it really difficult to go to a place, go to the toilet in a place they don't feel safe. And with public toilets and public conveniences, there's gaps sometimes. Or there's the loud hand dryer. Do not put hand dryers in your building."

Buildings Regulations/ Needs from the Interviews

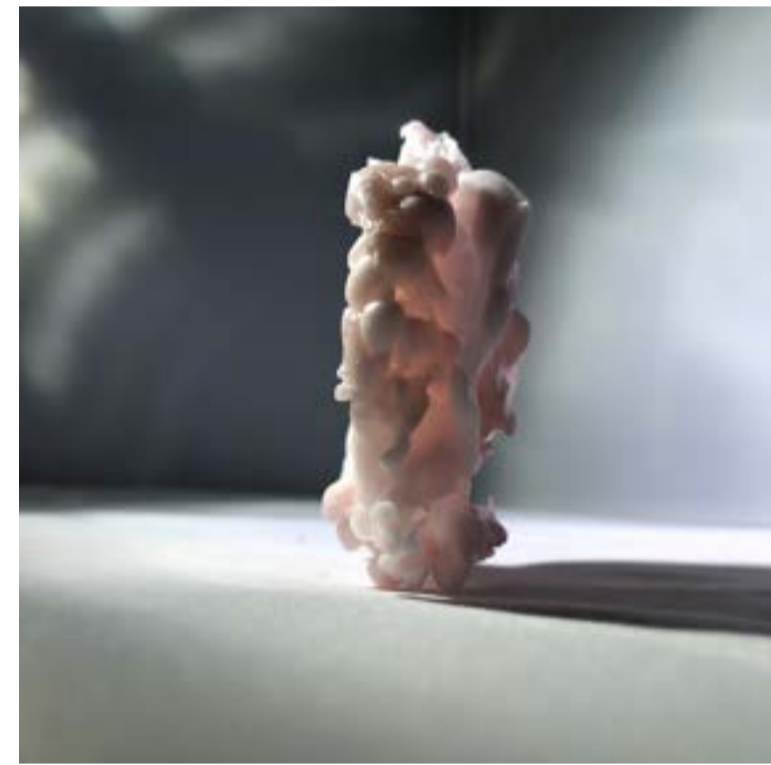




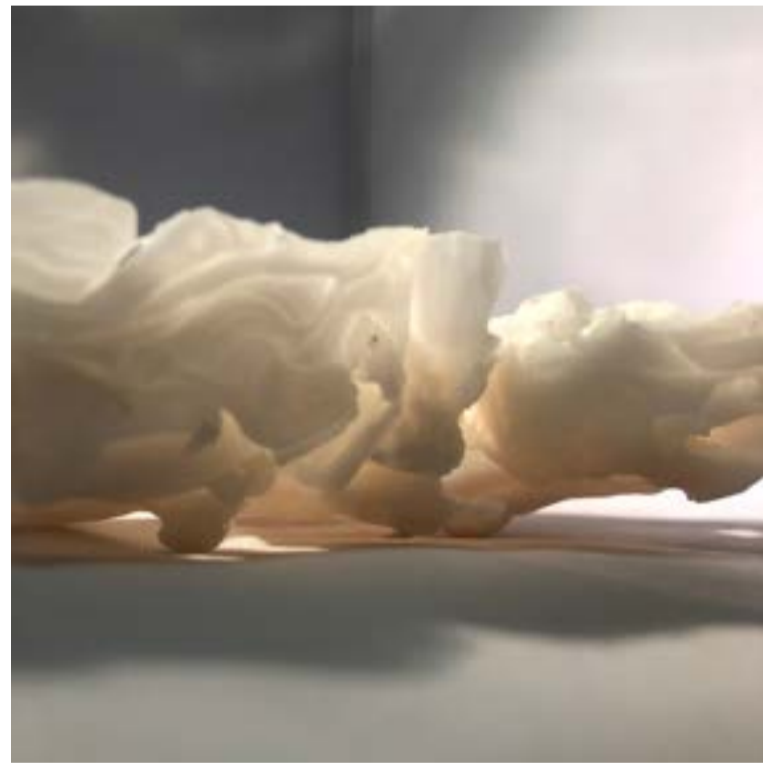
Wax experimentation through hot wax in a small container and cold water poured in



Wax experimentation by pouring hot wax in cold water



Wax experimentation by pouring hot wax in cold water



Wax experimentation by pouring hot wax in a jar full of ice



Wax experimentation through hot wax cold water and foil

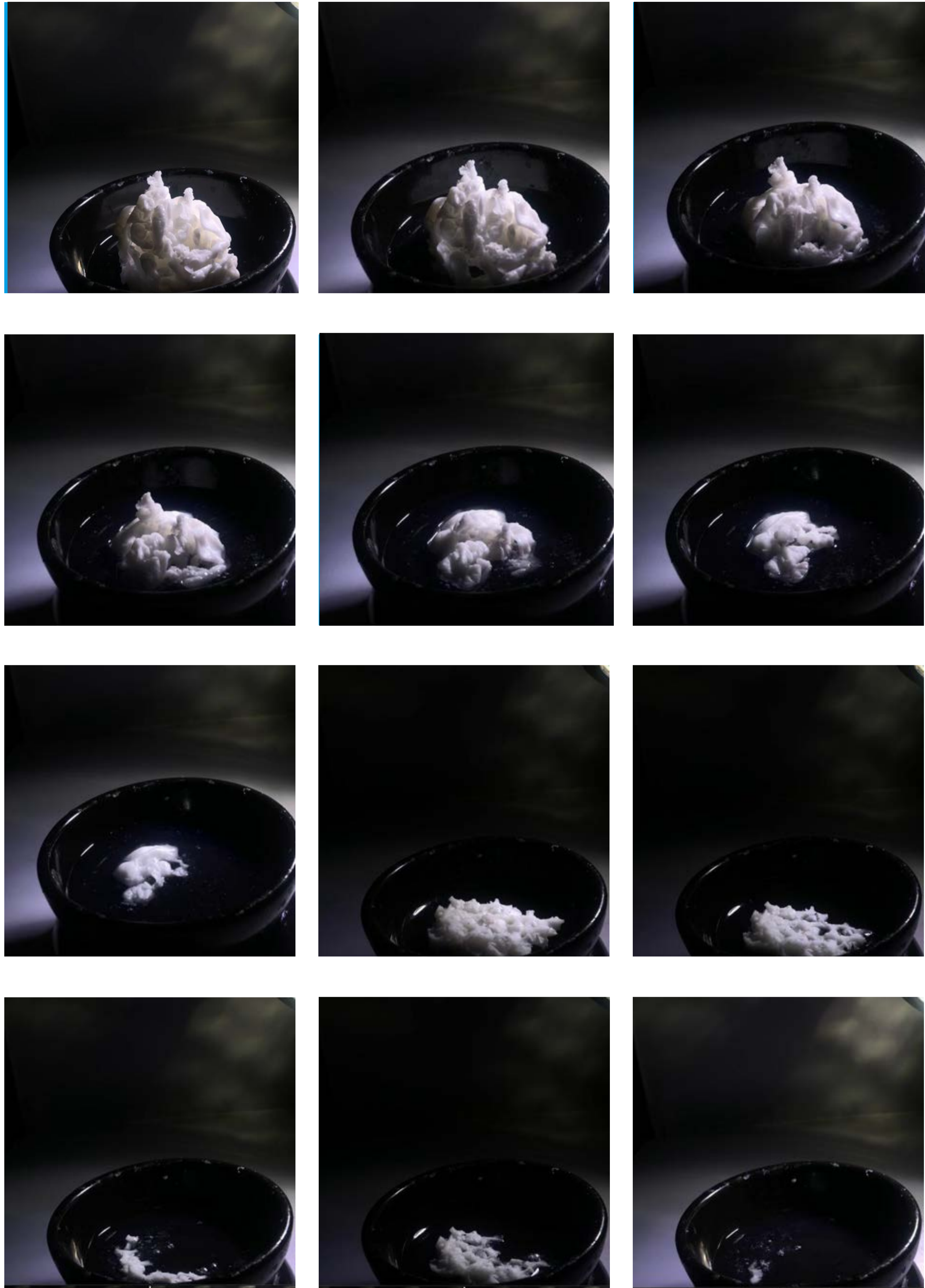


Wax experimentation through hot wax cold water and cling film



Wax experimentation by pouring hot wax in cold water

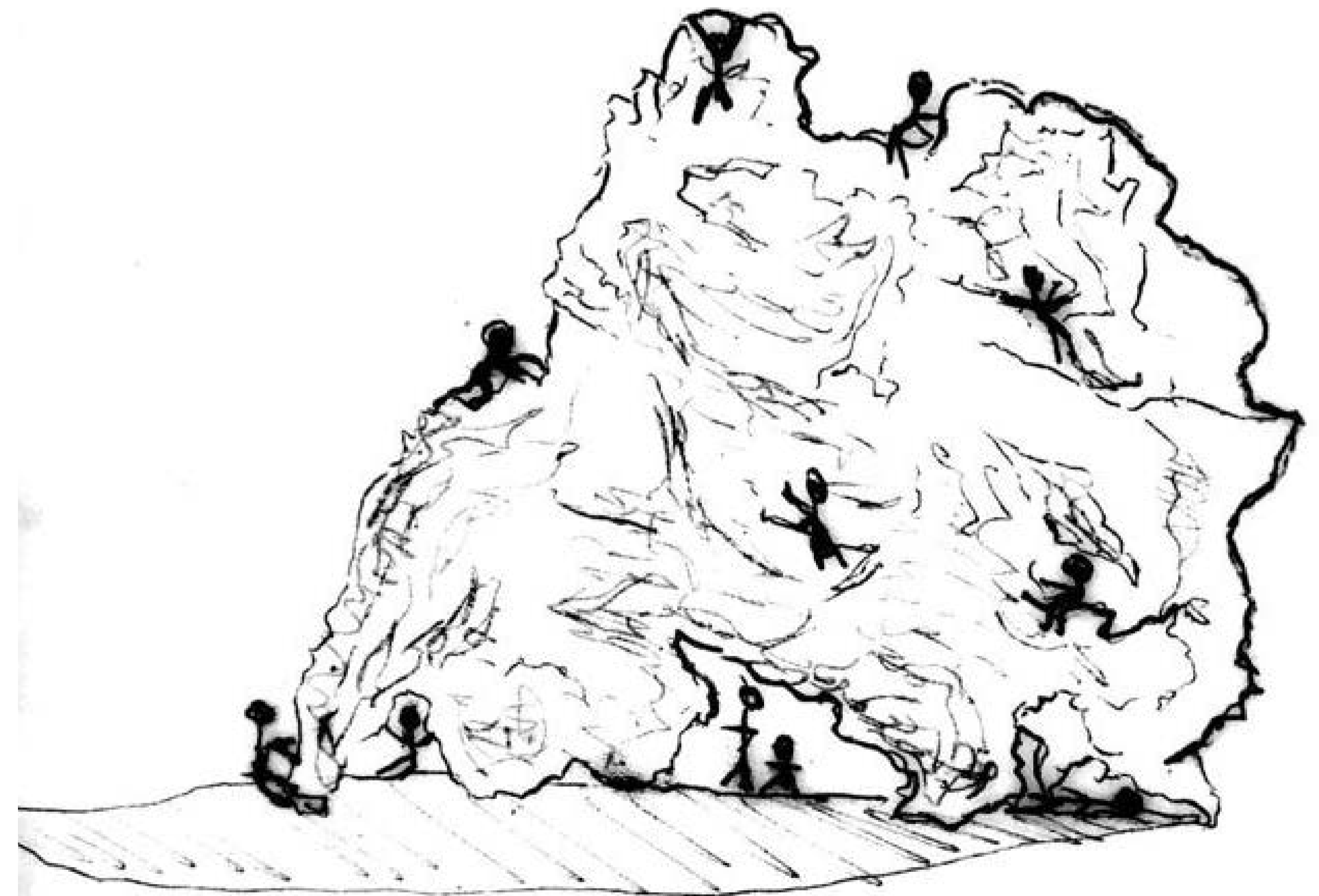


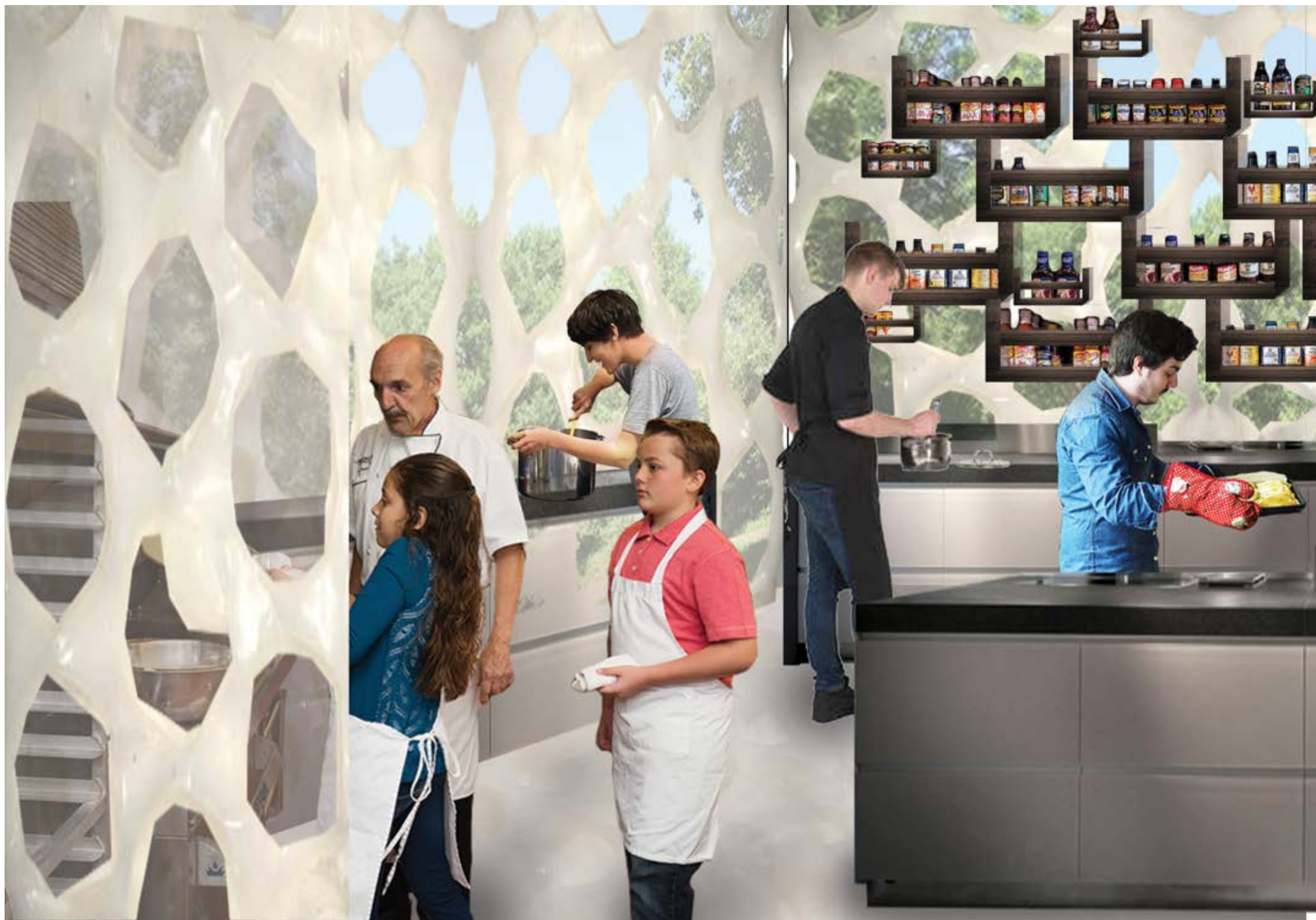


Experimentation to observe the melting rate and changes within the structure of wax overtime in an oven



Collage of wax models being interacted with at a large scale





Collage with wax models to show program in Kitchen



Collage with wax models to show program in Teaching rooms



Collage with wax models to show program in Pavilion

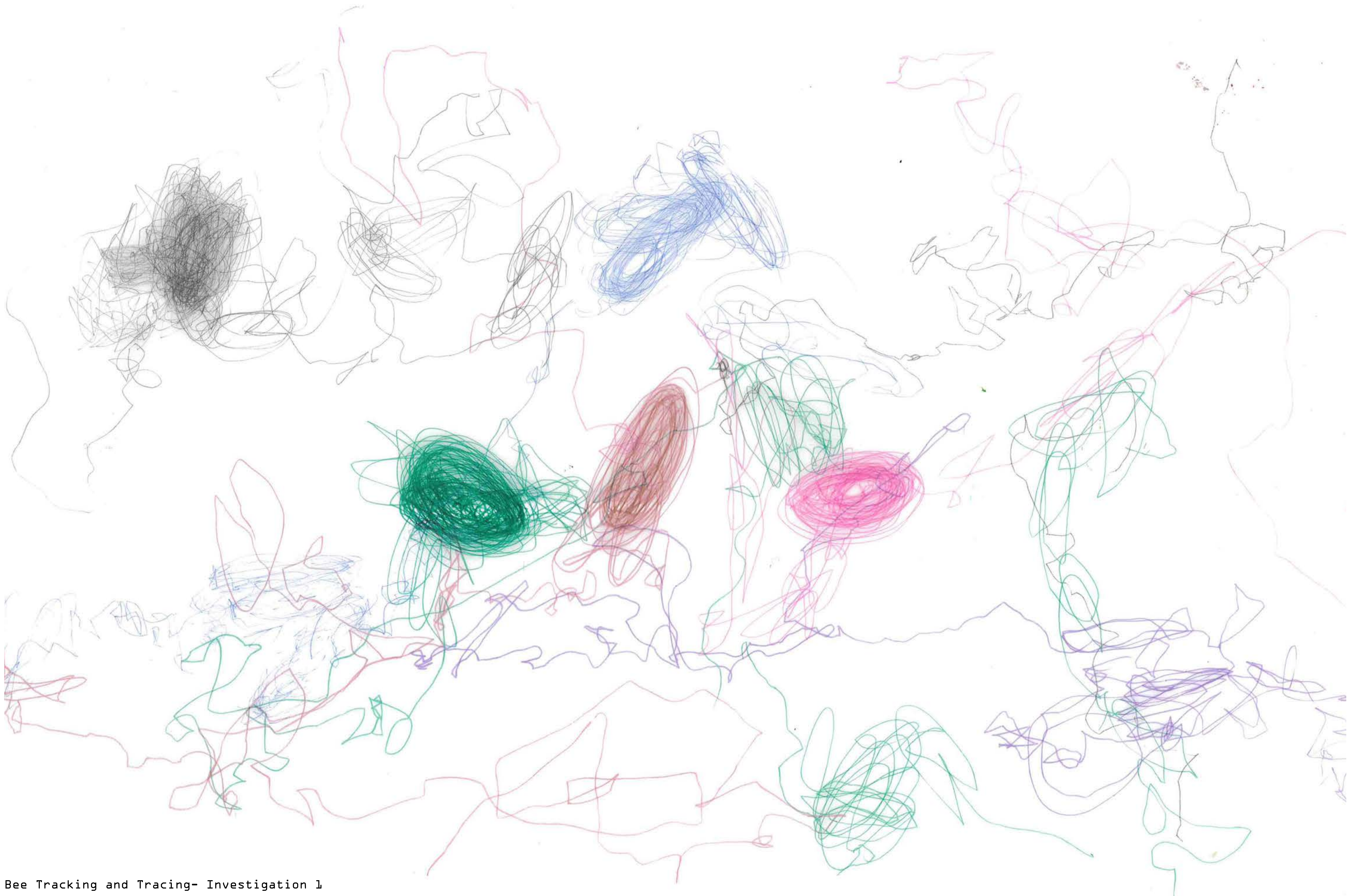


Collage with wax models to show program in Sensory room

Observing and Tracking Bees in a Hive



By tracking and observing these bees I was able to identify different ways they communicated and iterated with each other as well as how they performed these tasks with different locations of the hives.



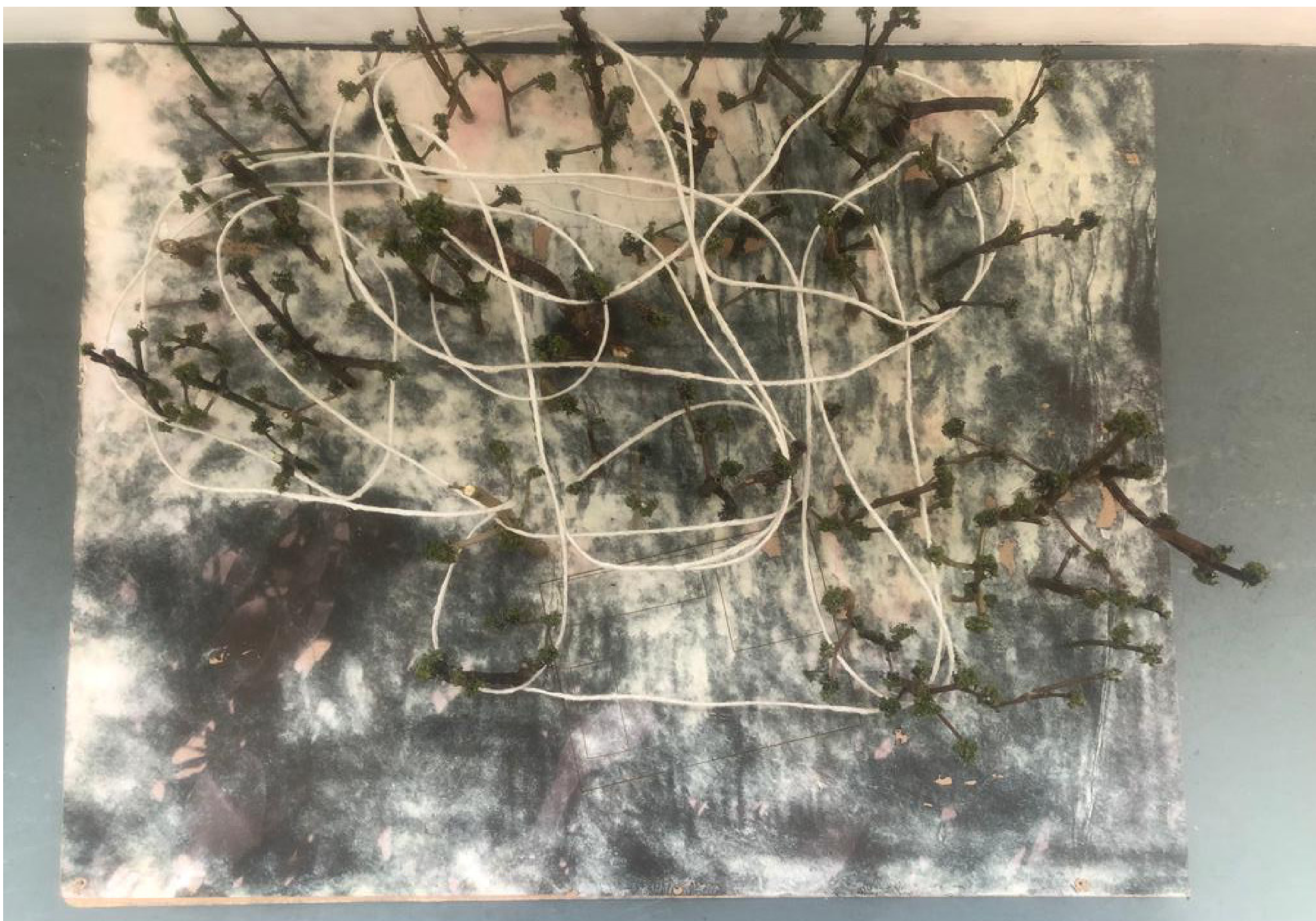
Bee Tracking and Tracing- Investigation 1

For this experiment I focused on a couple of bees for short period of time. Using these peculiar routes I was able to identify the social and antisocial bees that stayed in one area and limited contact, this can be seen in areas where the lines and scribbles are intense.



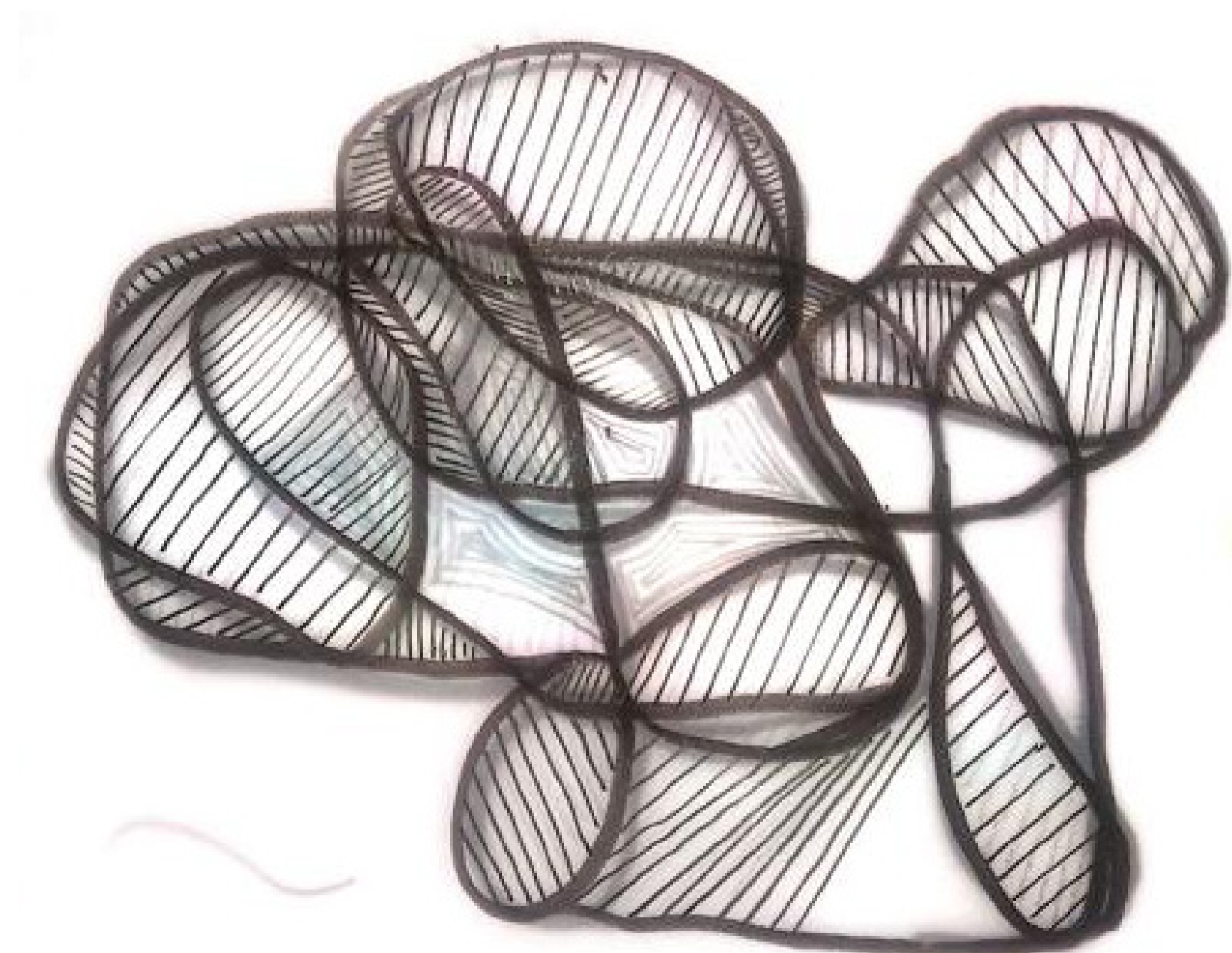
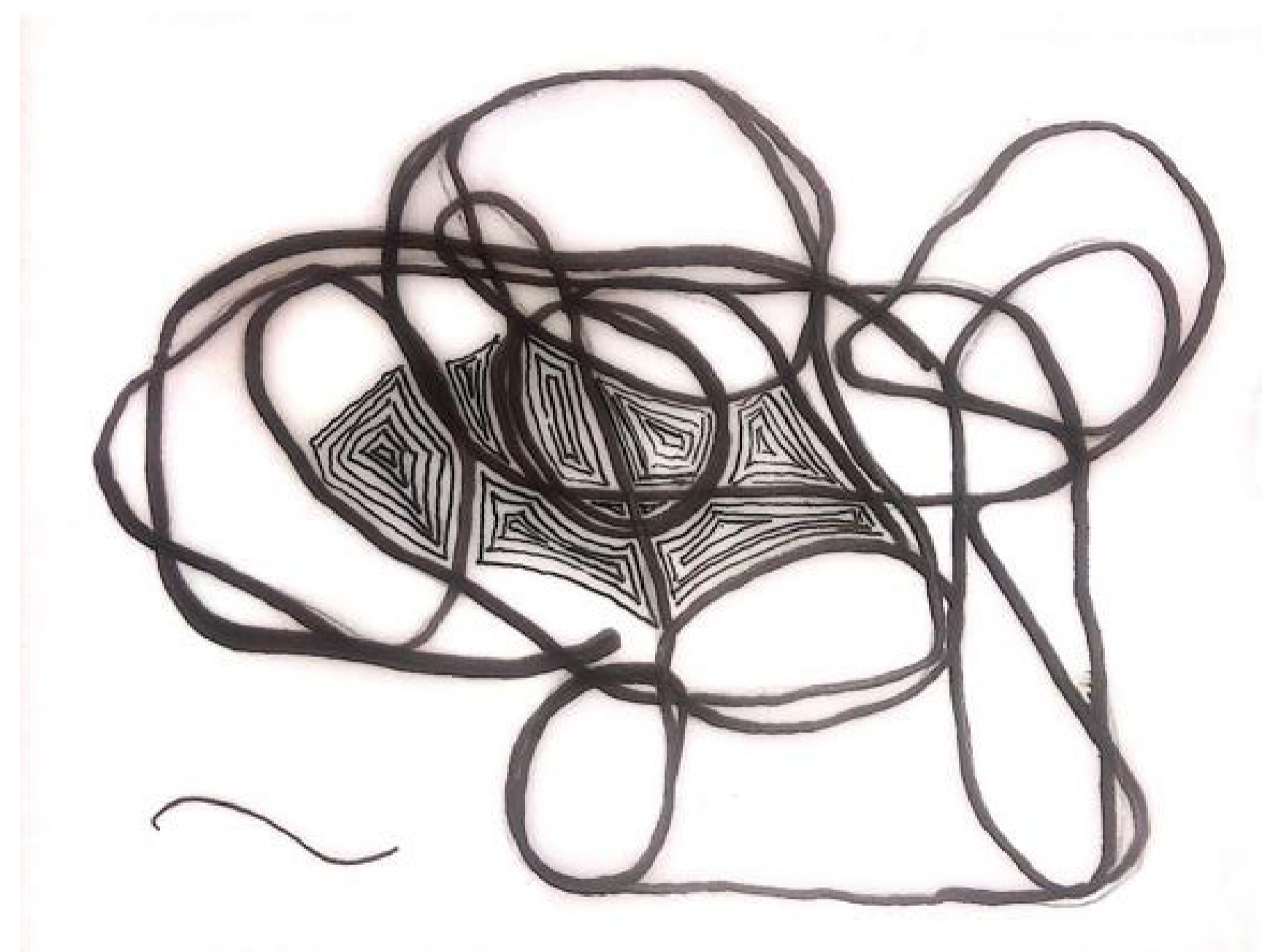
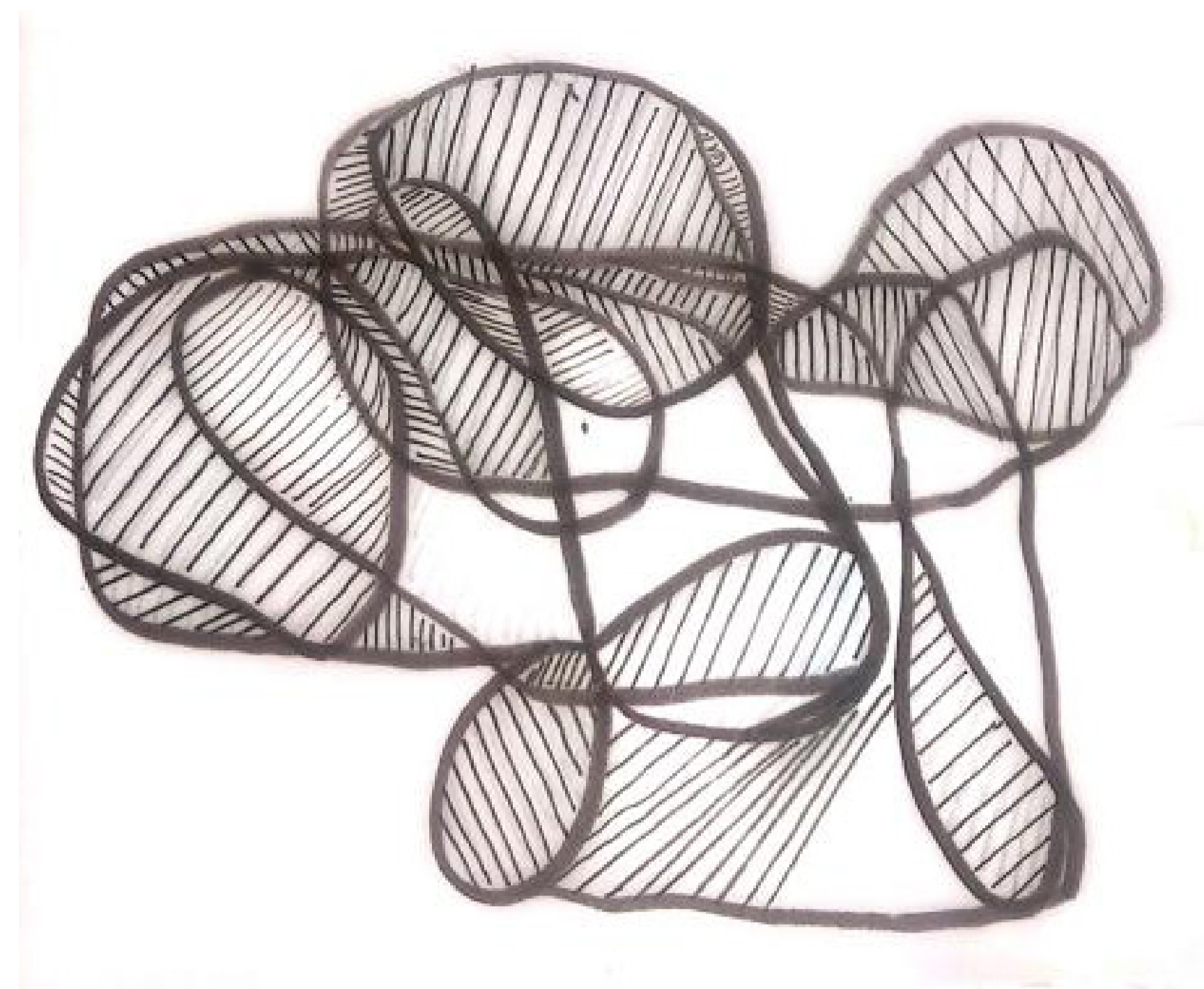
Bee Tracking and Tracing- Investigation 2

To develop this investigation, I followed more bees within a large interval of time. This specify drawing helped with the formation of my building and spaces.



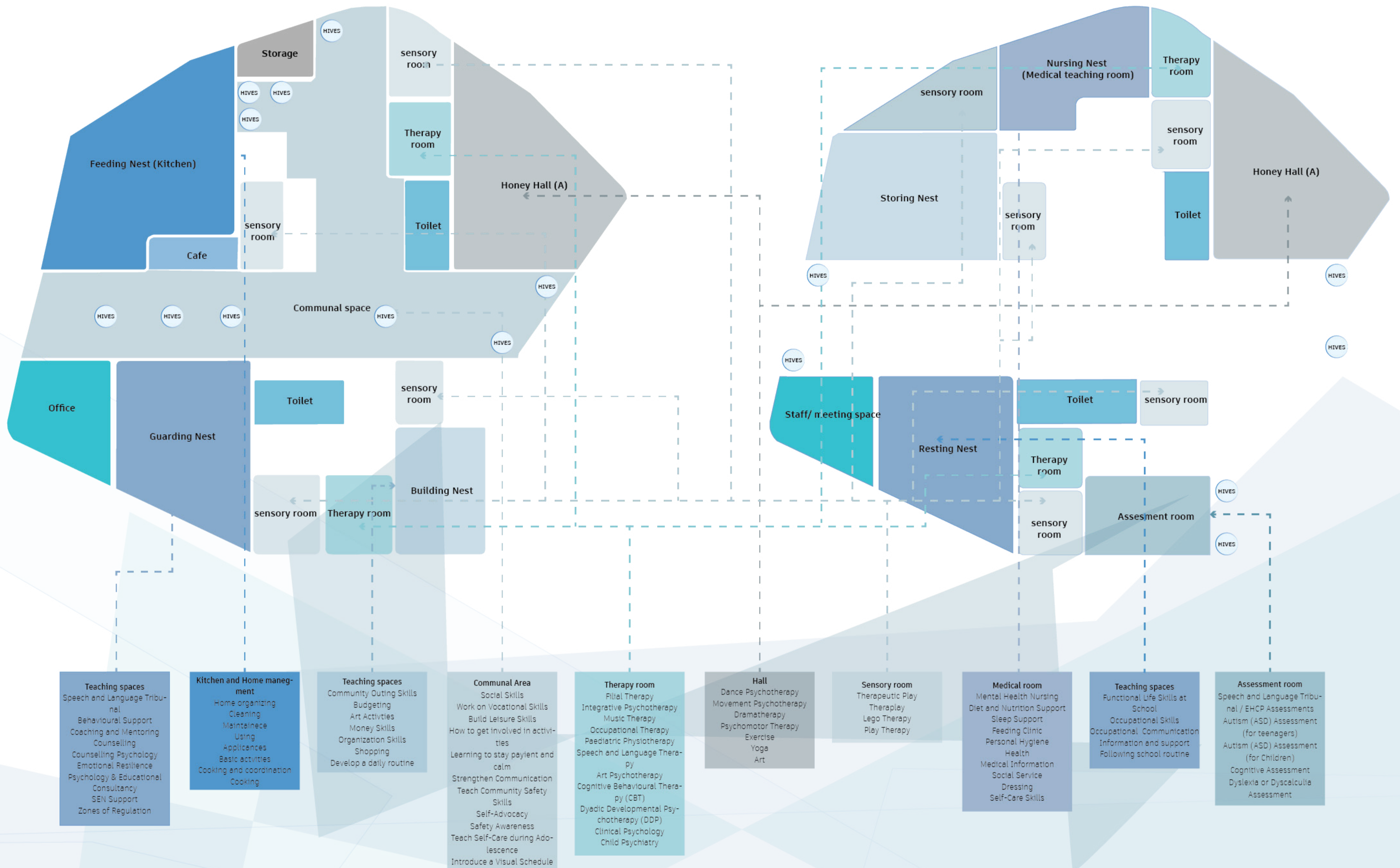
Model showing trees surrounding Hounslow Heath Visitor Centre

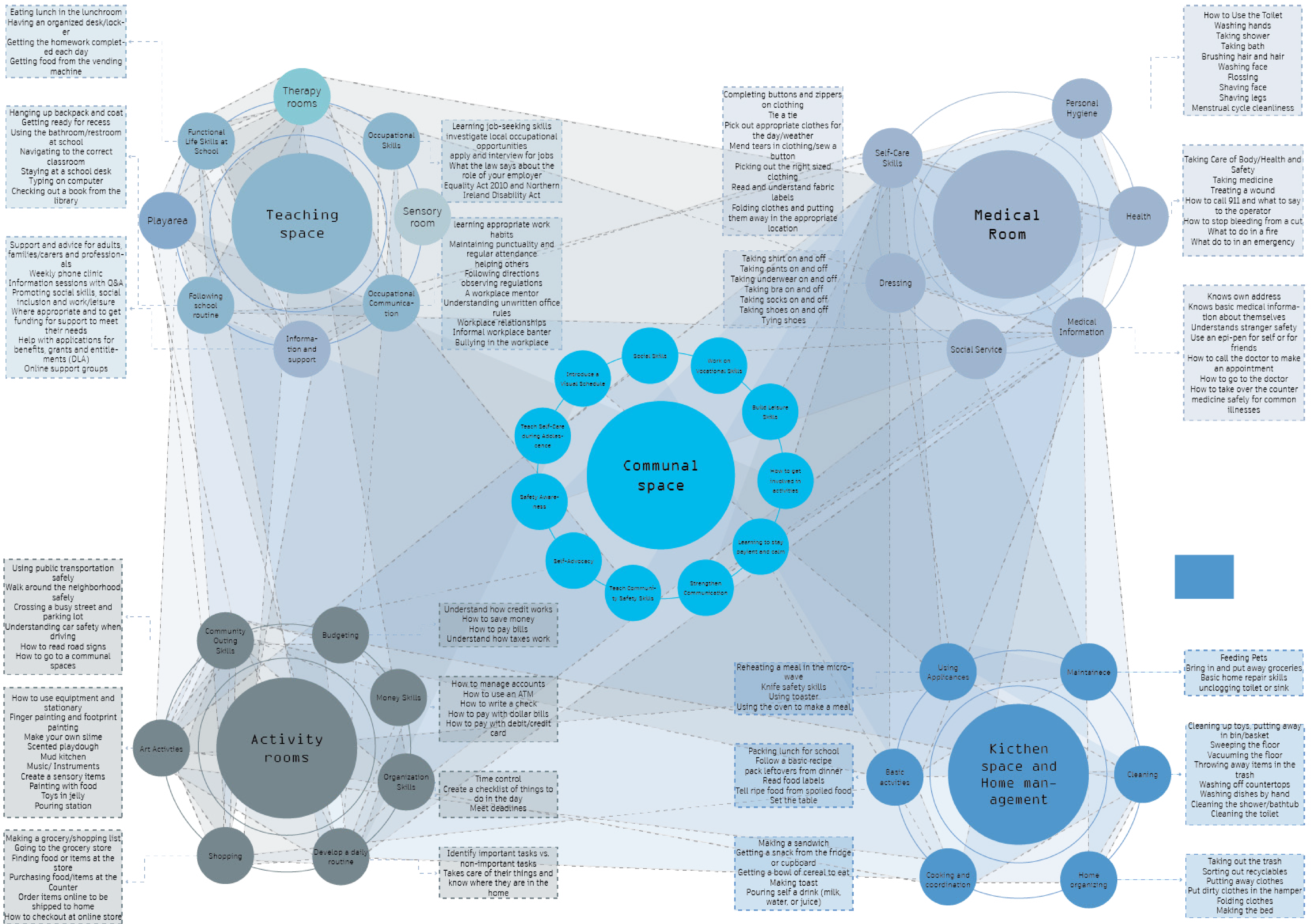
The tree model is overlapped with string that follows the pathway of the bee tracing and bee routes inspiring form of design and selection of trees within the interior



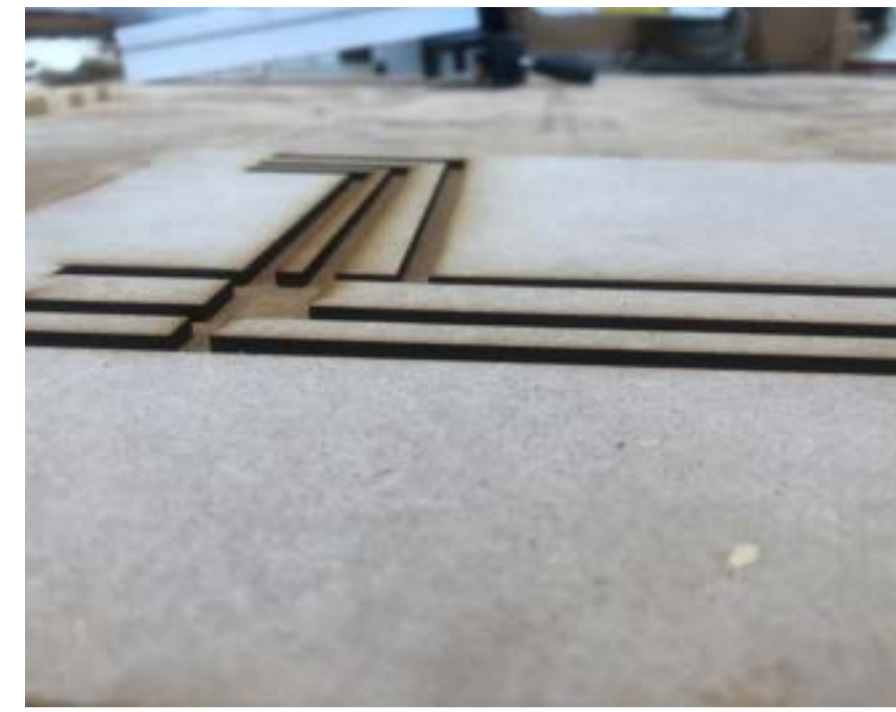
Developing the tree model through drawing to understand what trees I want to keep within my site and what tree can be taken and placed elsewhere

Final Programs and design for the Learning centre





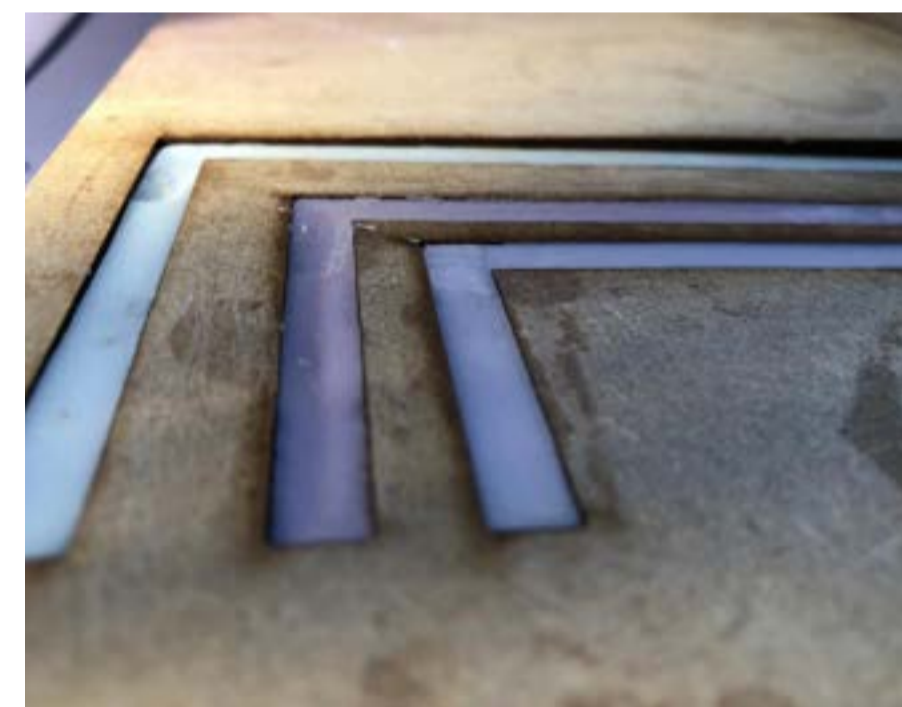
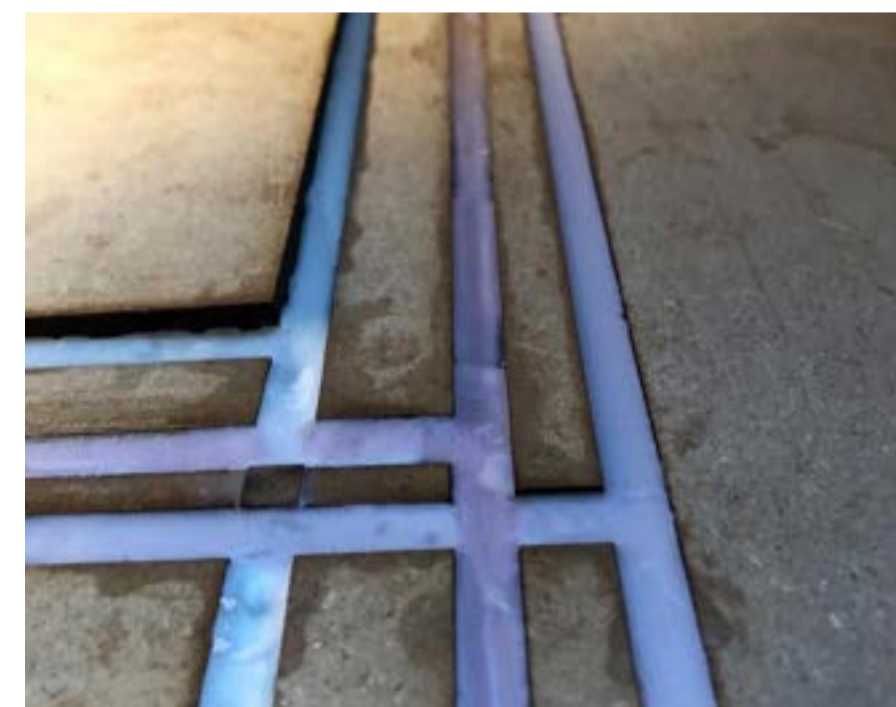
Physical Fabrication for Wax Navigation System



Process of making mould to pour wax in



Wax structure and form for walls towards the sensory room



Wax mimicking the floor navigation system towards therapy rooms and teaching rooms

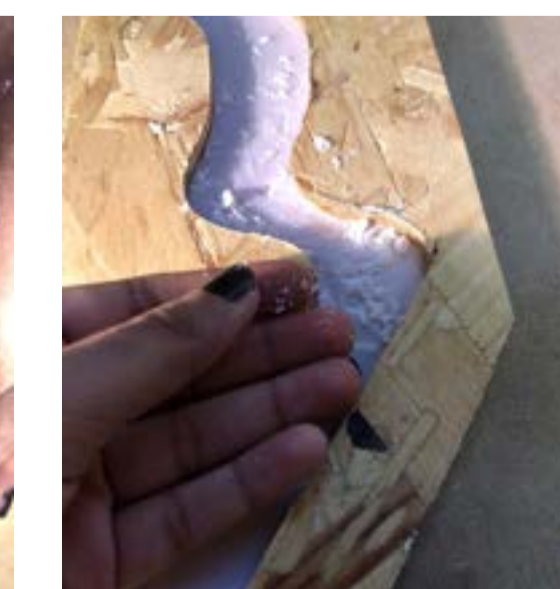
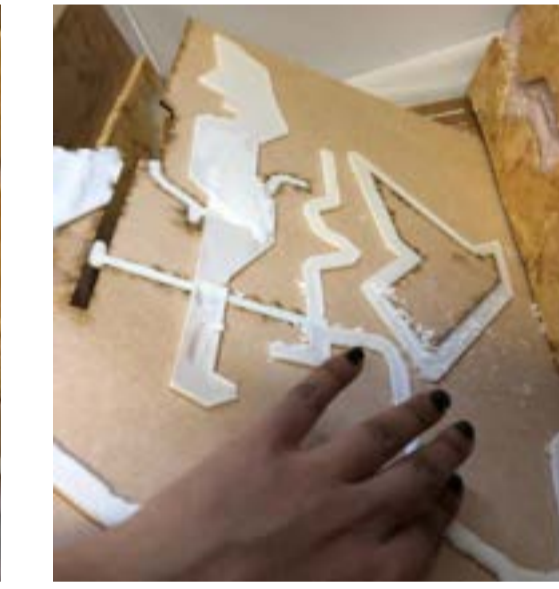
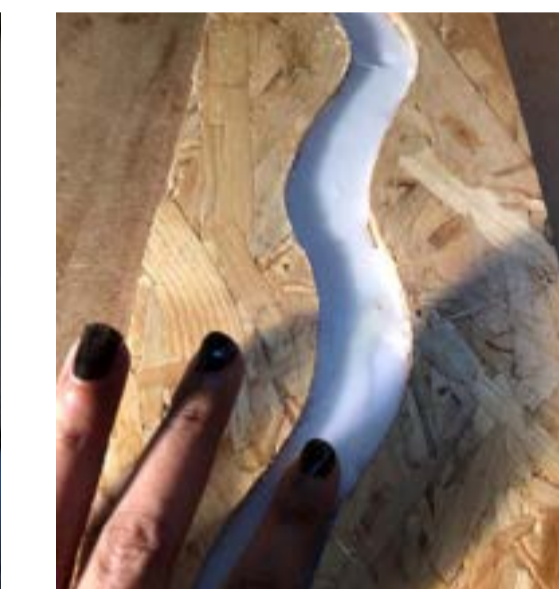
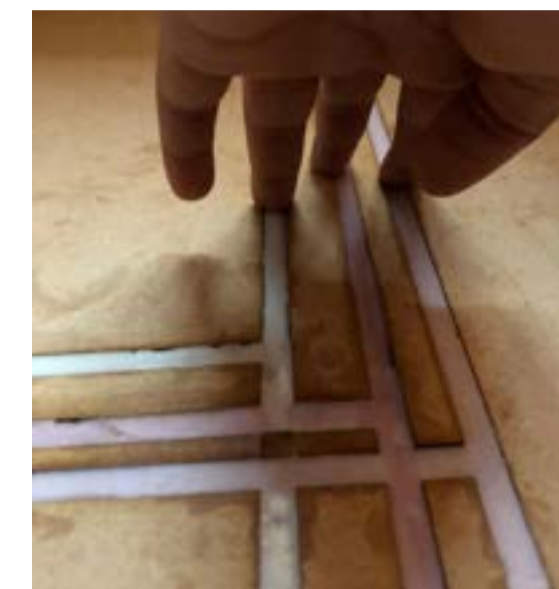


Floor and wall wax navigation system combined



Wall wax navigation systems at different heights and positions

Tracing and Recording Stimming interactions with Wax Navigation system



Stimming on wax through scratching, stroking, picking, tracing altering the form of the wax interior

Outcome of stinging interactions with Wax Navigation System





Perspective of Teaching Room



Perspective of Teaching Room



Perspective of Teaching Room 2



Perspective of Open Communal Space



Perspective 5 of Sensory Room



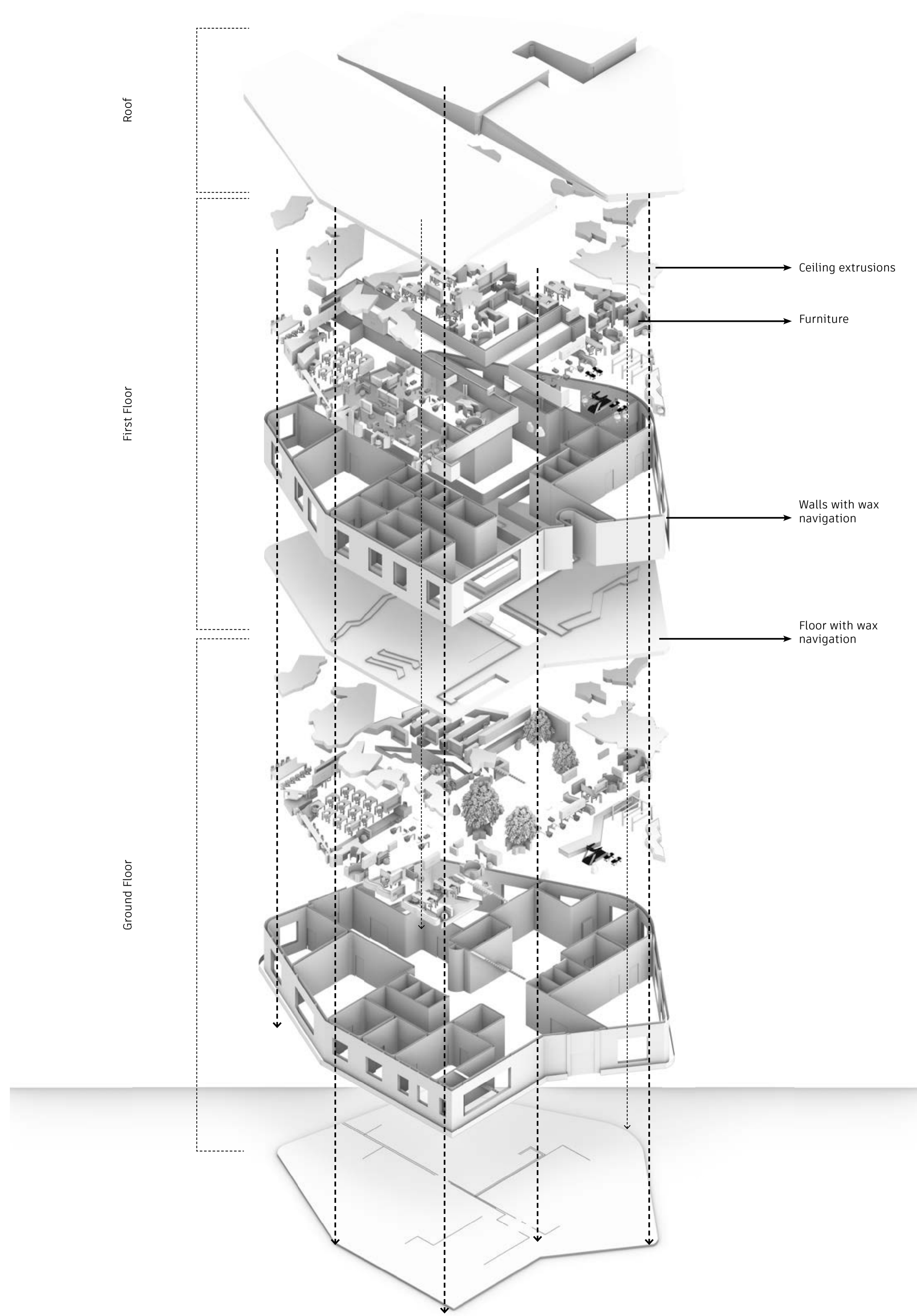
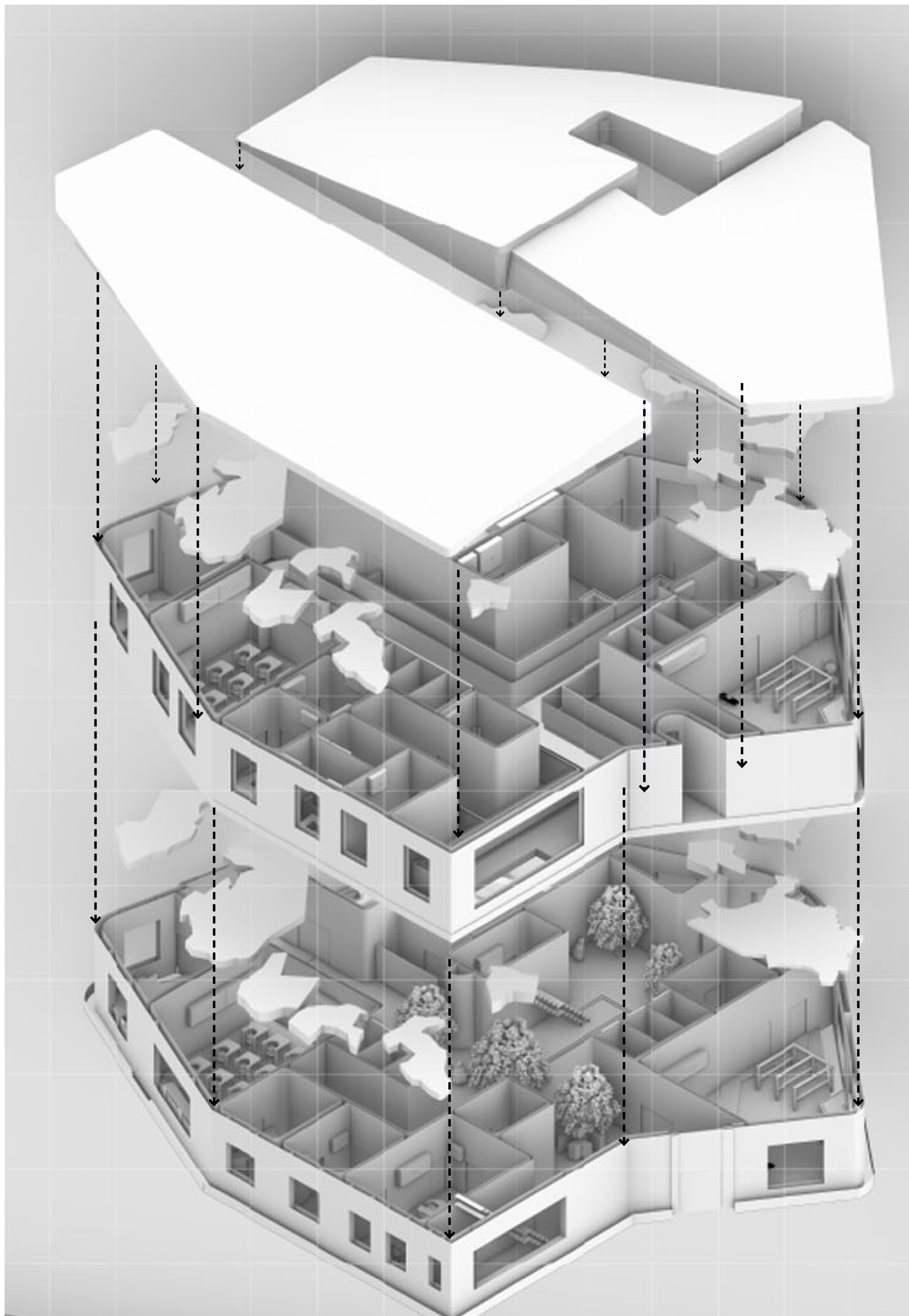
Perspective 5 of Sensory Room



Perspective 6 of Staff Office

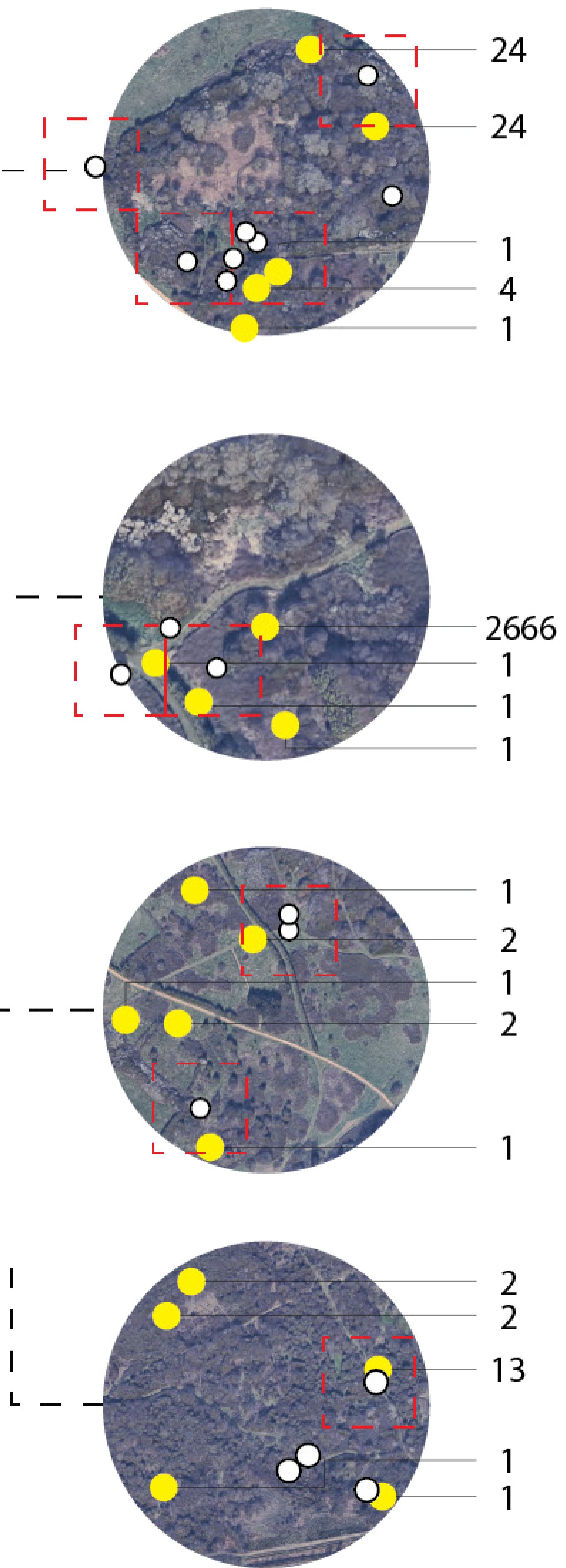


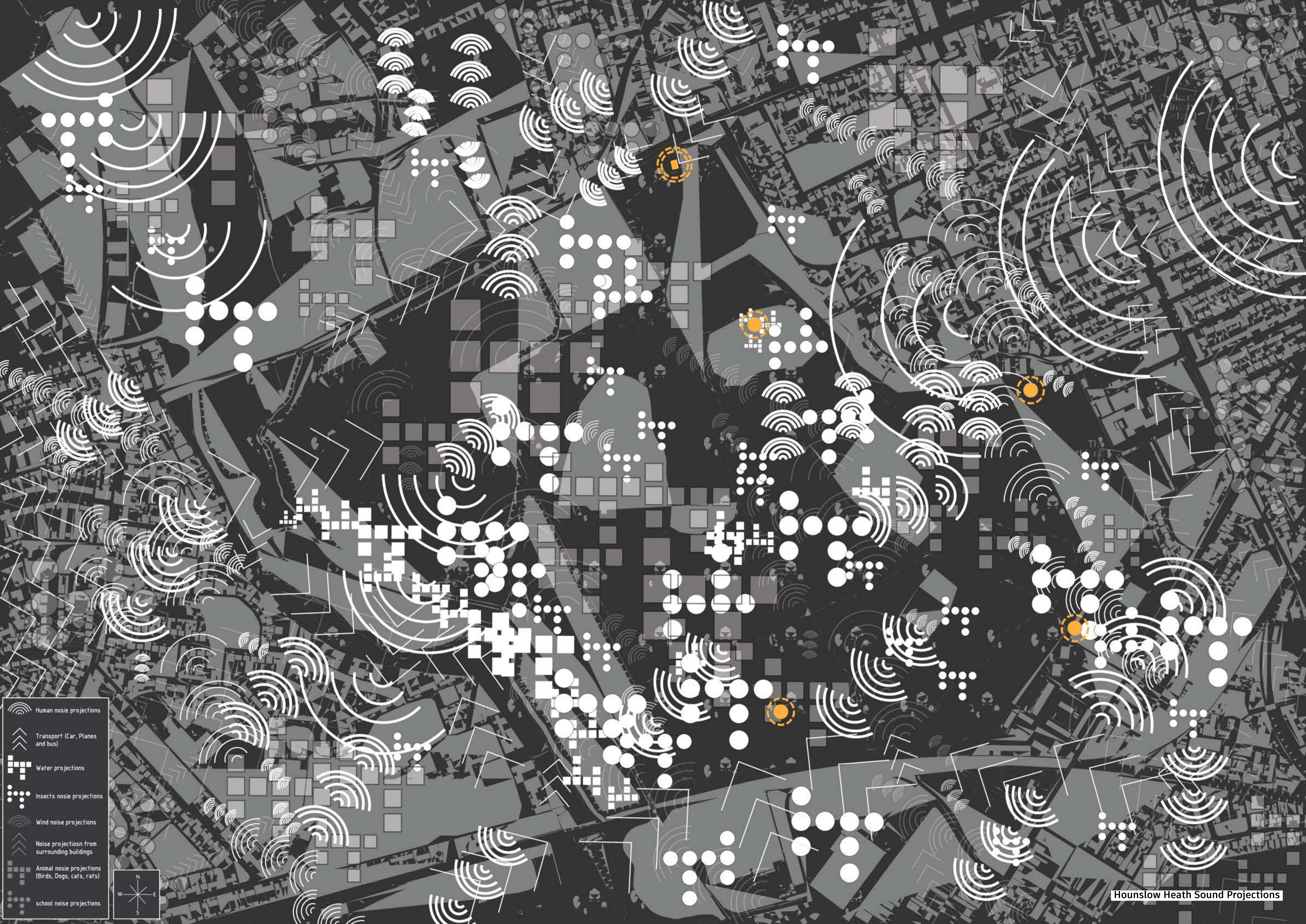
Perspective 5 of Hall room





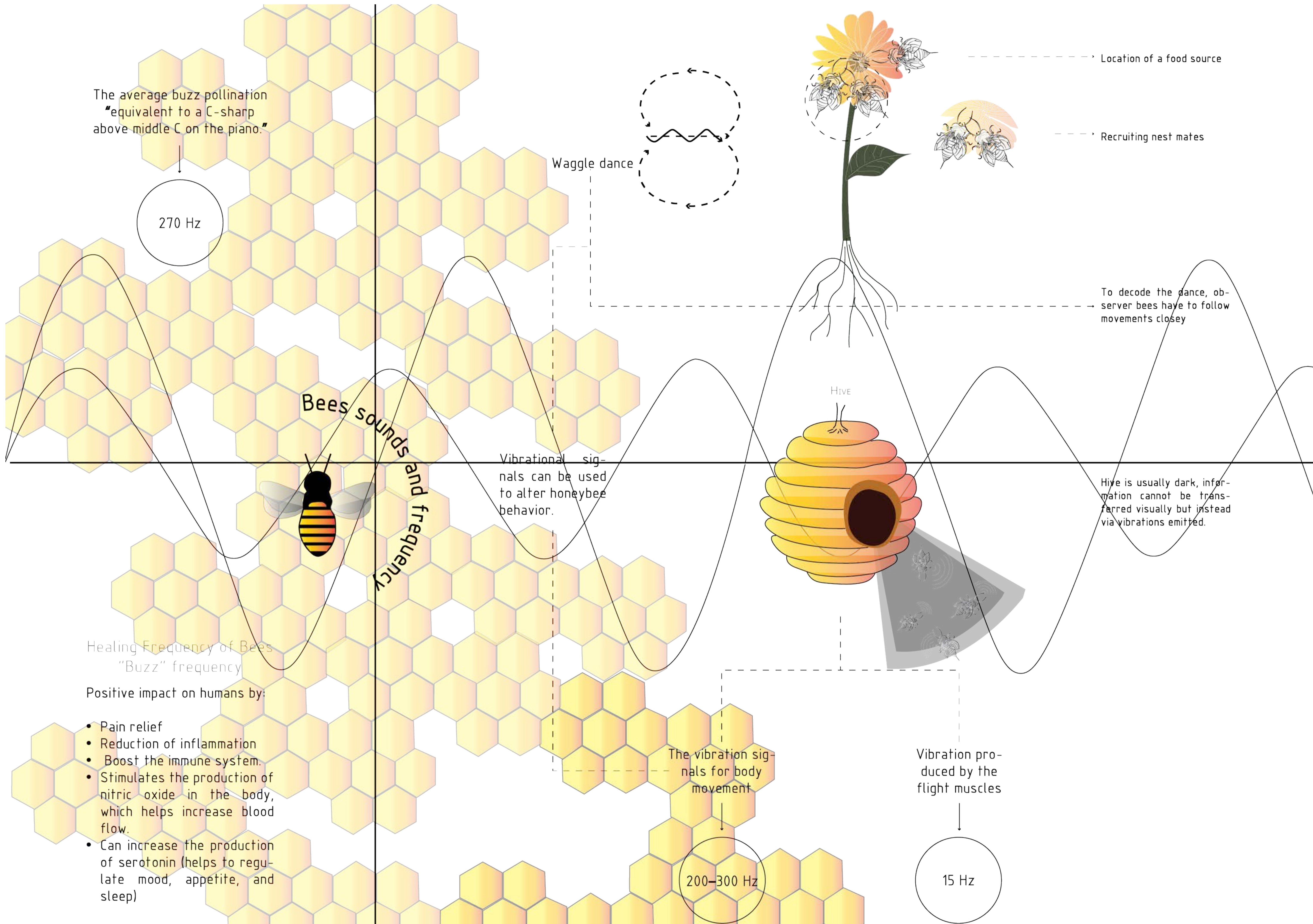
Recorded species in selected areas





- Human noise projections
- Transport (Car, Planes and bus)
- Water projections
- Insects noise projections
- Wind noise projections
- Noise projections from surrounding buildings
- Animal noise projections (Birds, Dogs, cats, rats)
- school noise projections





The average buzz pollination
"equivalent to a C-sharp
above middle C on the piano."

270 Hz

Waggle dance

Location of a food source

Recruiting nest mates

To decode the dance, ob-
server bees have to follow
movements closey

Bees sounds and frequency

Vibrational sig-
nals can be used
to alter honeybee
behavior.

Hive is usually dark, infor-
mation cannot be trans-
ferred visually but instead
via vibrations emitted.

Healing Frequency of Bees
"Buzz" frequency

Positive impact on humans by:

- Pain relief
- Reduction of inflammation
- Boost the immune system.
- Stimulates the production of nitric oxide in the body, which helps increase blood flow.
- Can increase the production of serotonin (helps to regulate mood, appetite, and sleep)

The vibration sig-
nals for body
movement

200-300 Hz

Vibration pro-
duced by the
flight muscles

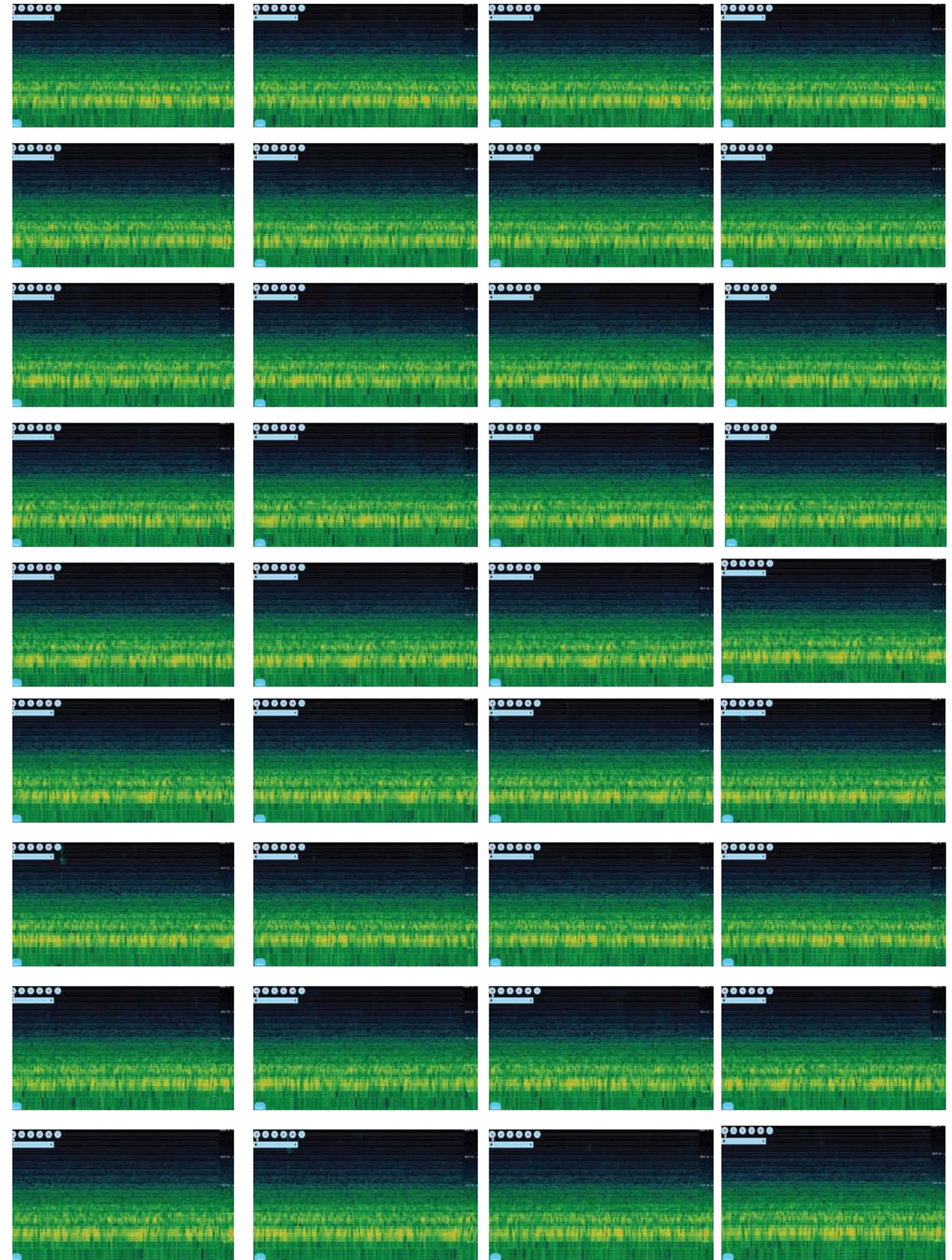
15 Hz

Spectrogram Investigation

A challenge the autistic community face is sound sensitivity that led to sensory overload. Certain frequencies and vibrations have a positive impact on the cognitive development and emotions. Bee frequencies were one of the sound vibrations marked high for calm and tranquillity. Bee uses these frequencies to change behaviour and movements to understand information.

This research focuses on investigating how these interactions can help and inspire to develop the design further through shapes and materiality to tackle the issues of sound sensitivity.

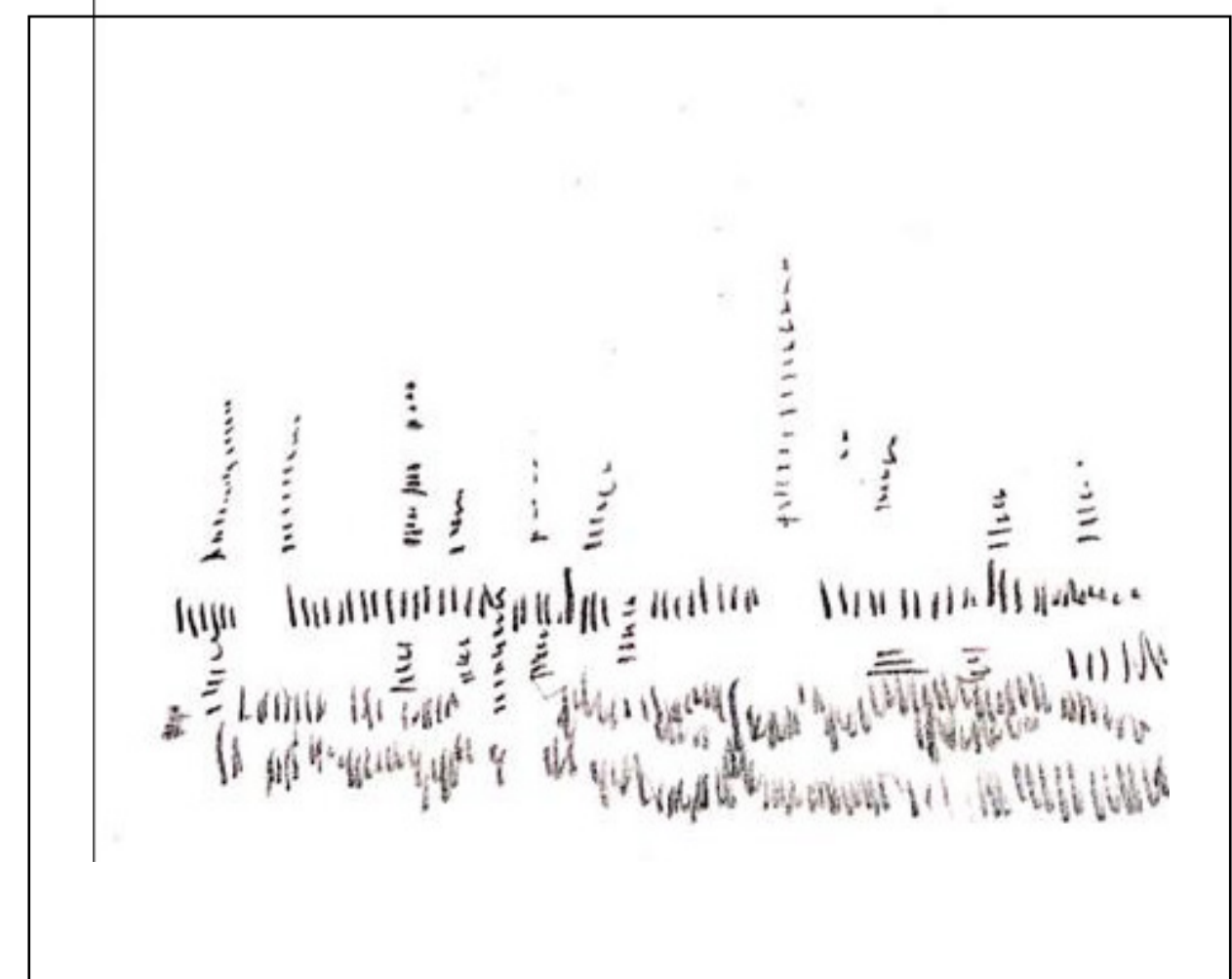
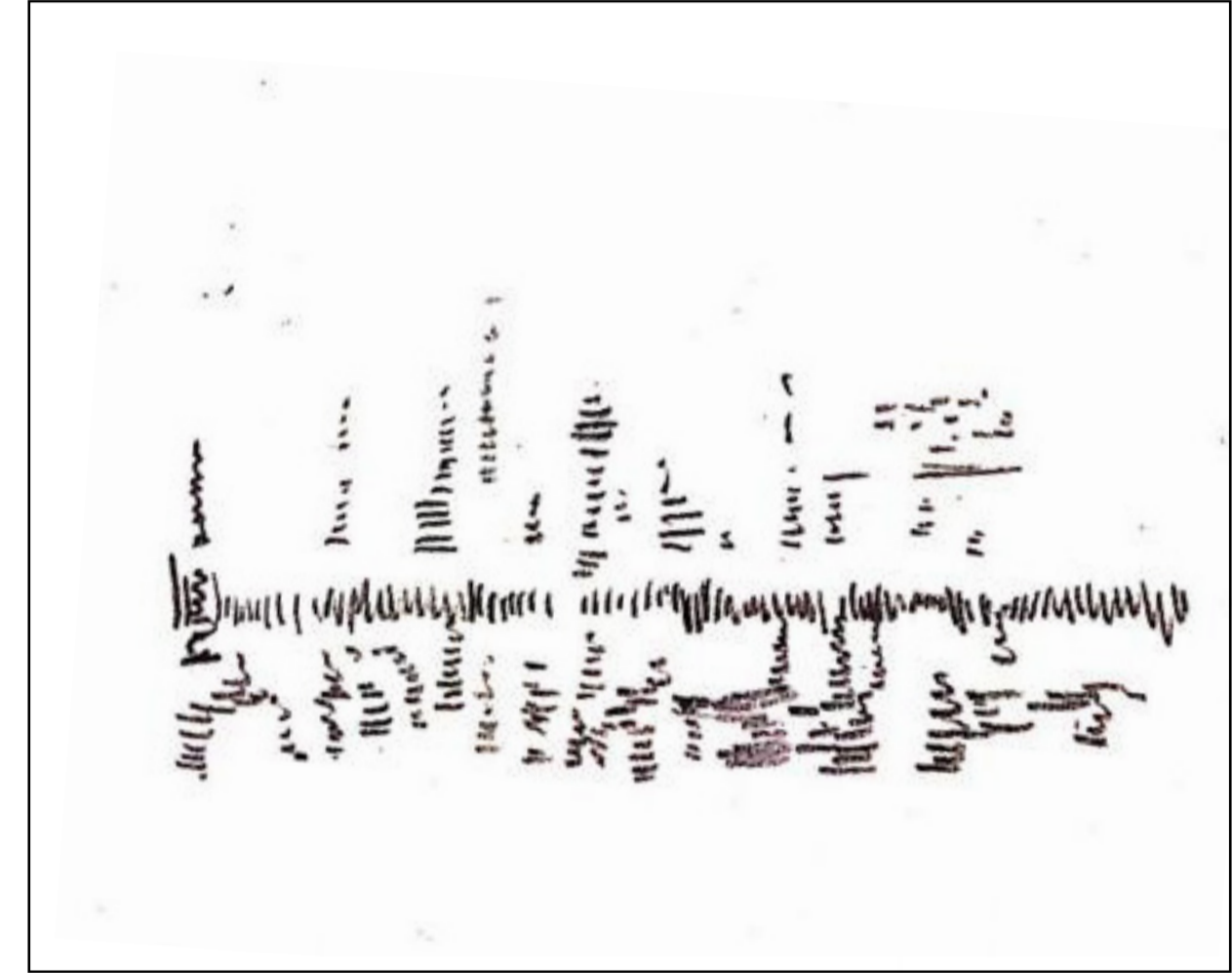
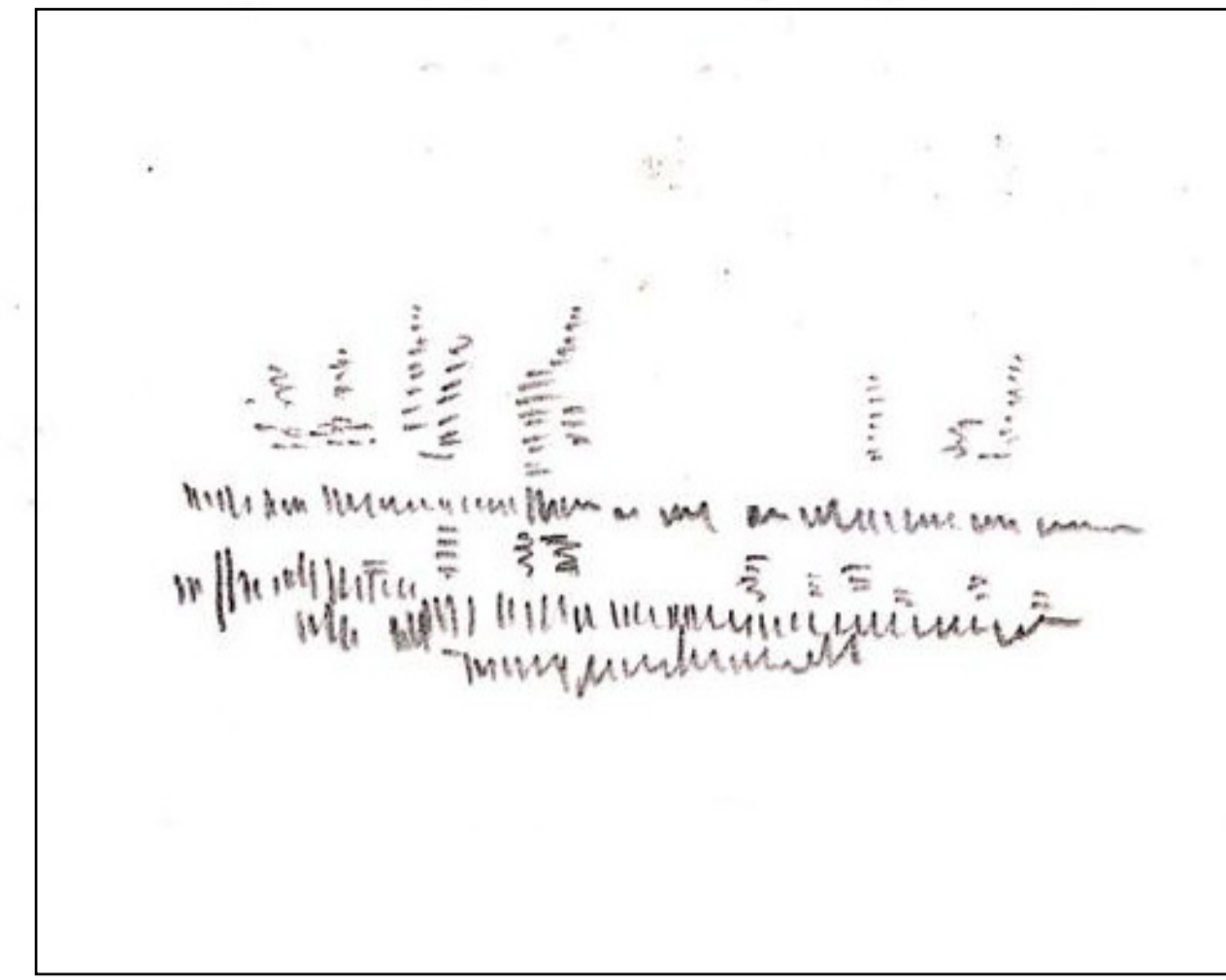
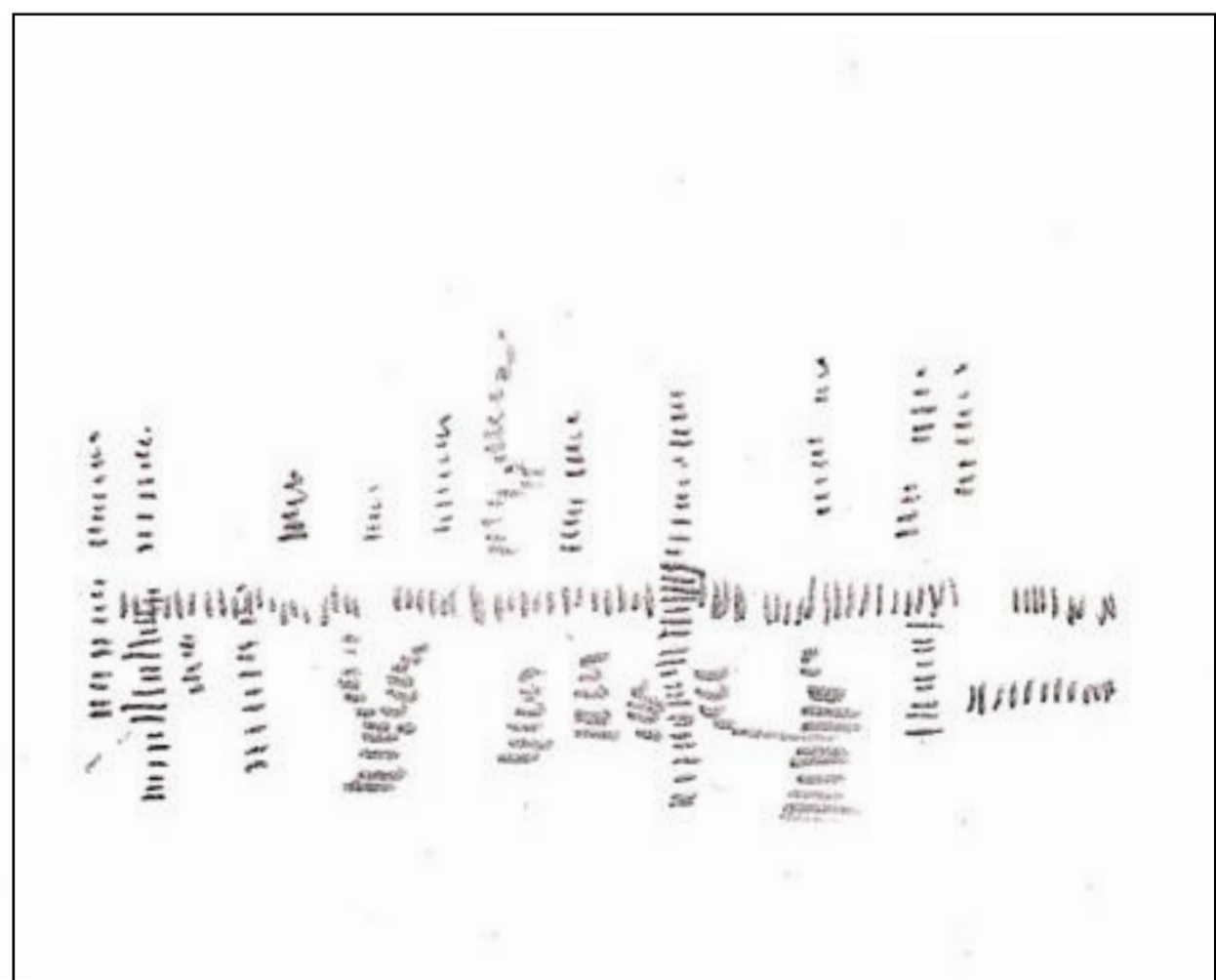
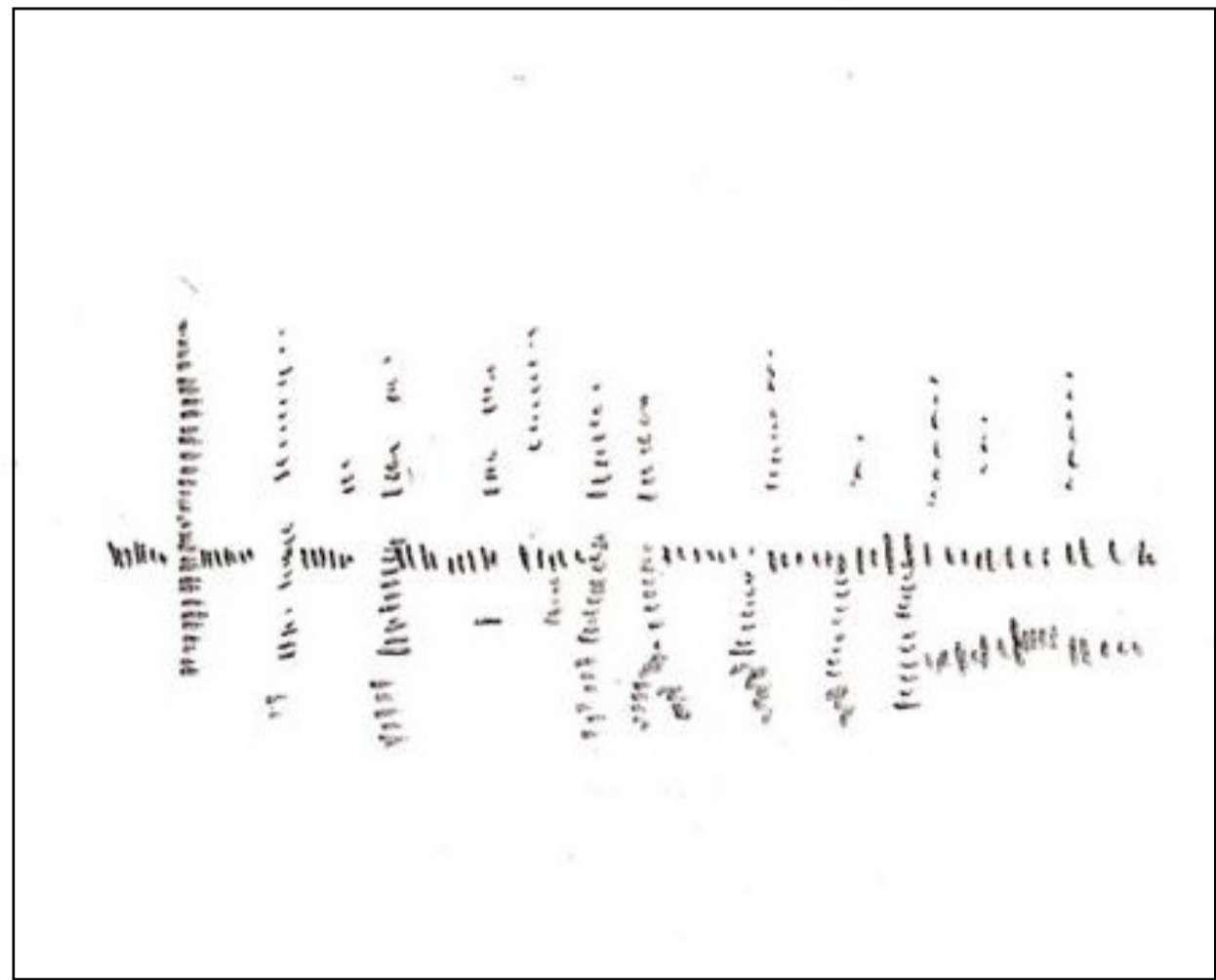
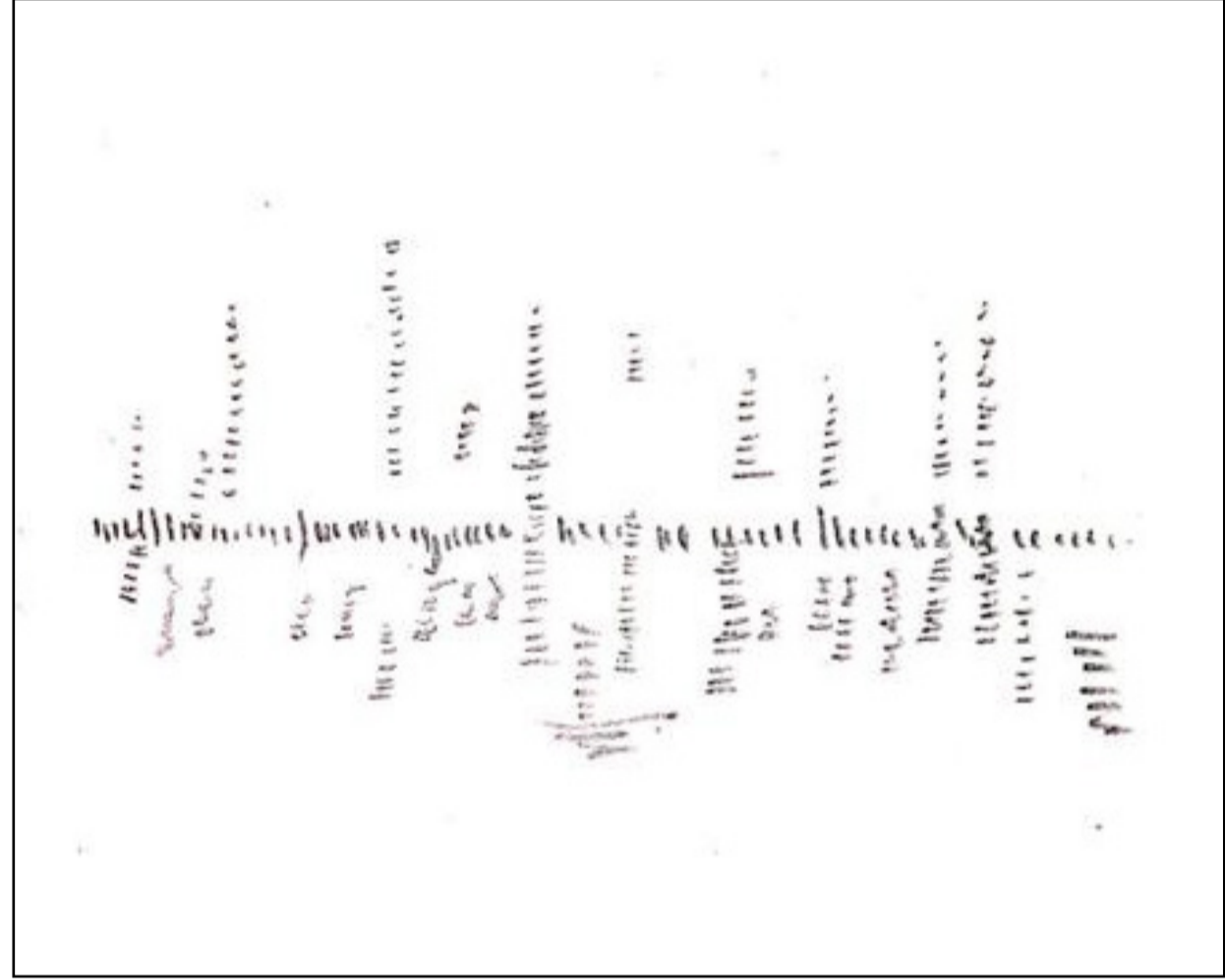
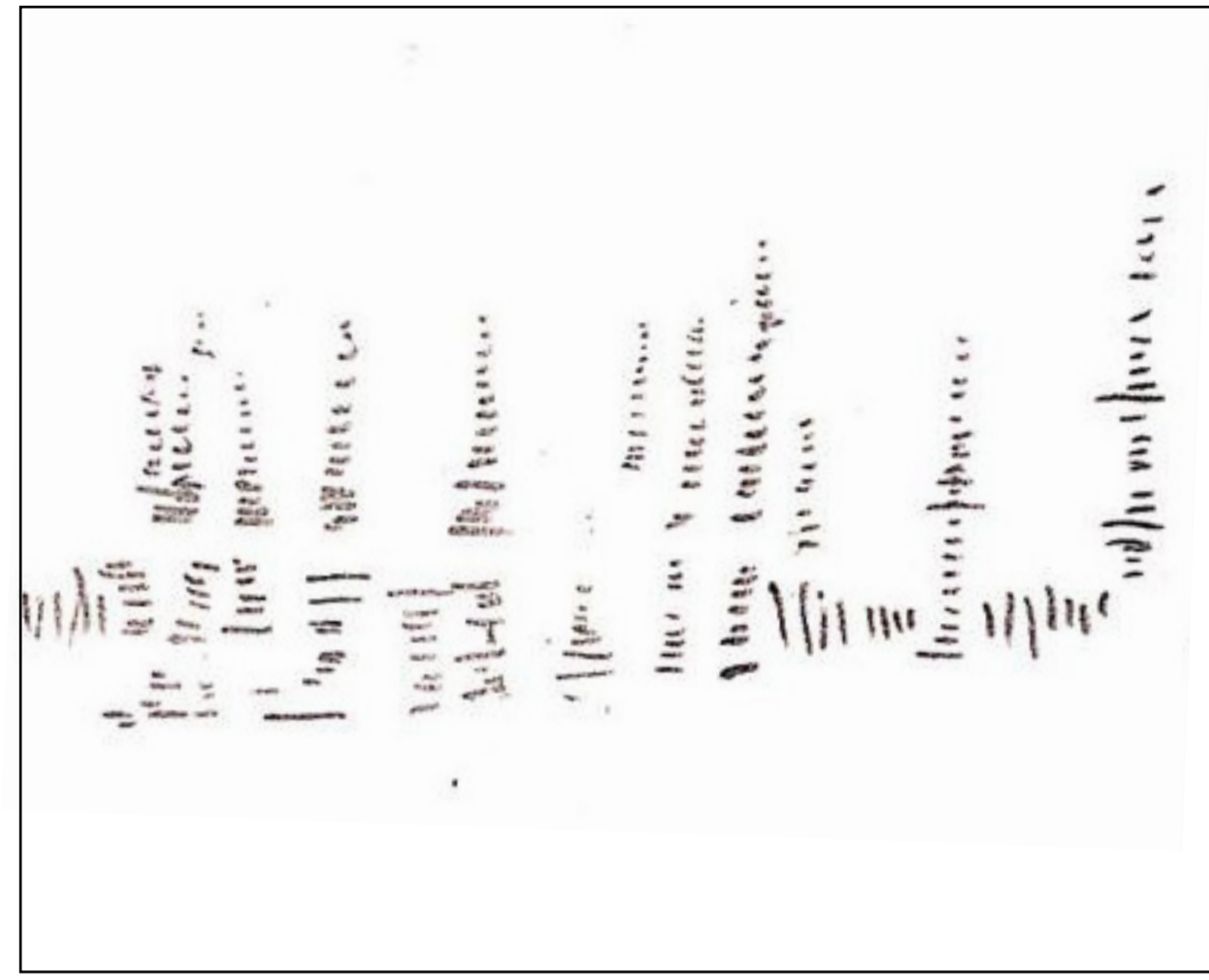
To develop this design, I used the bee video's audio and translated them in different spectrograms to show how sounds and be visually represented.

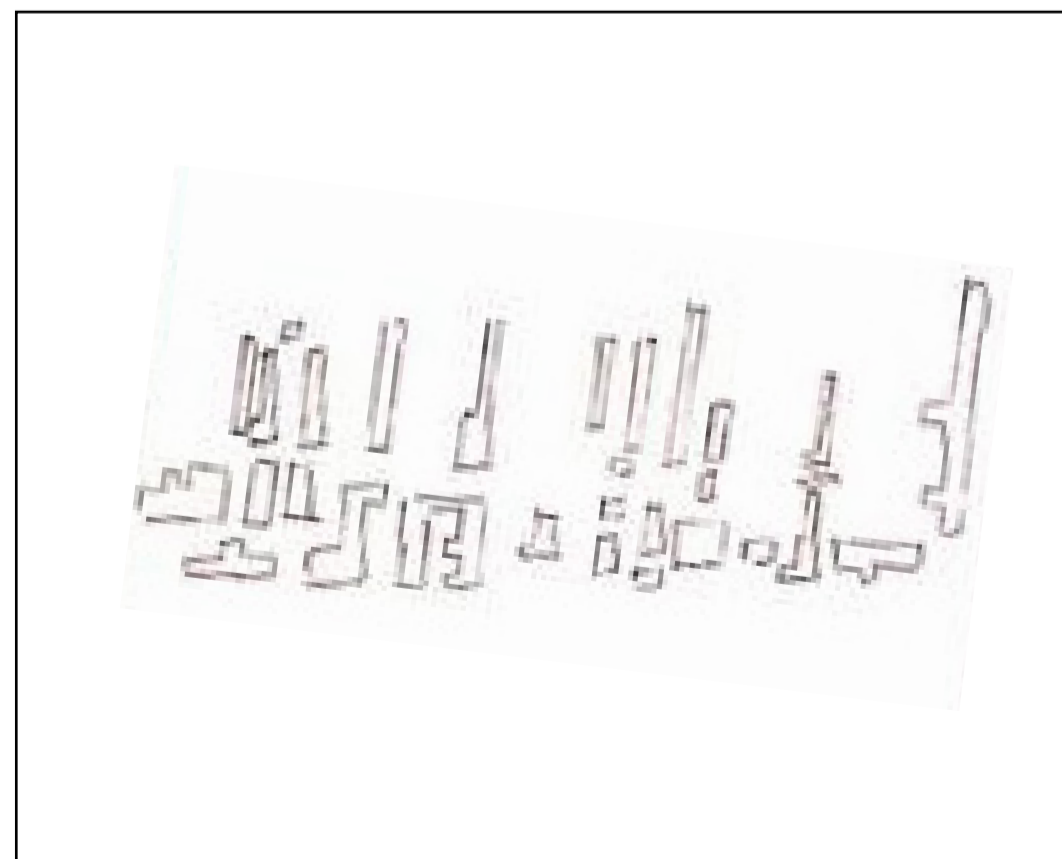
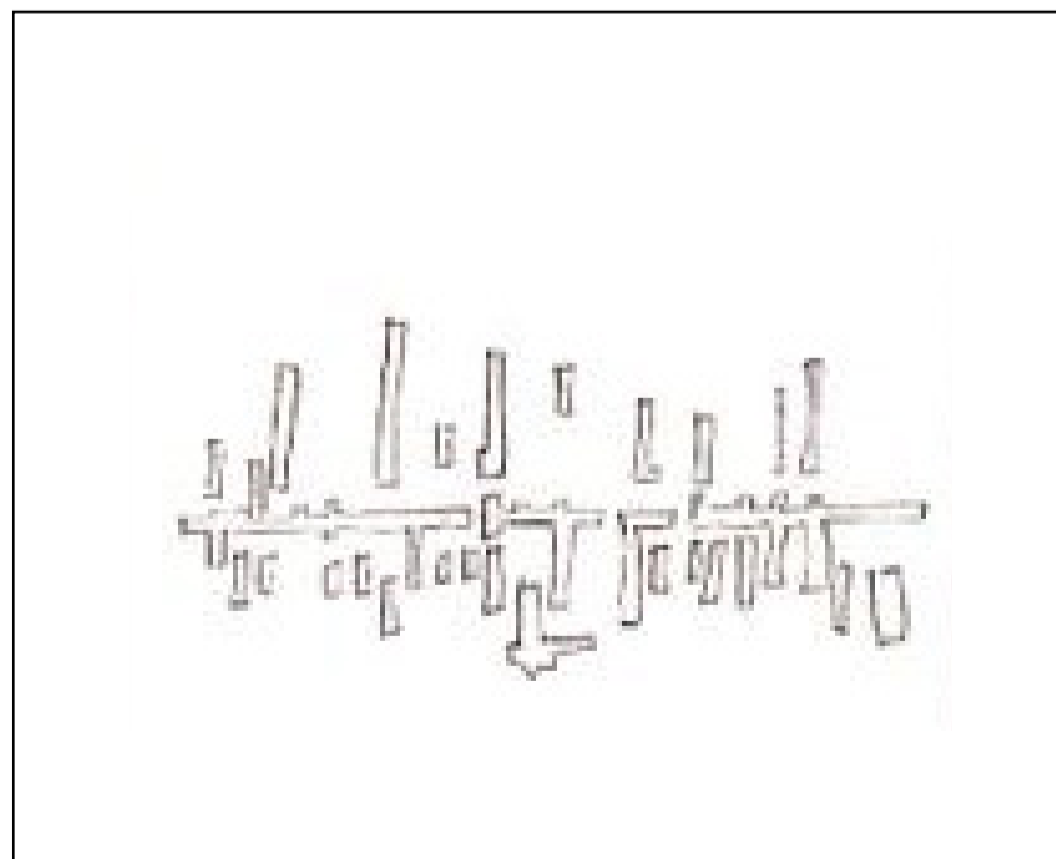
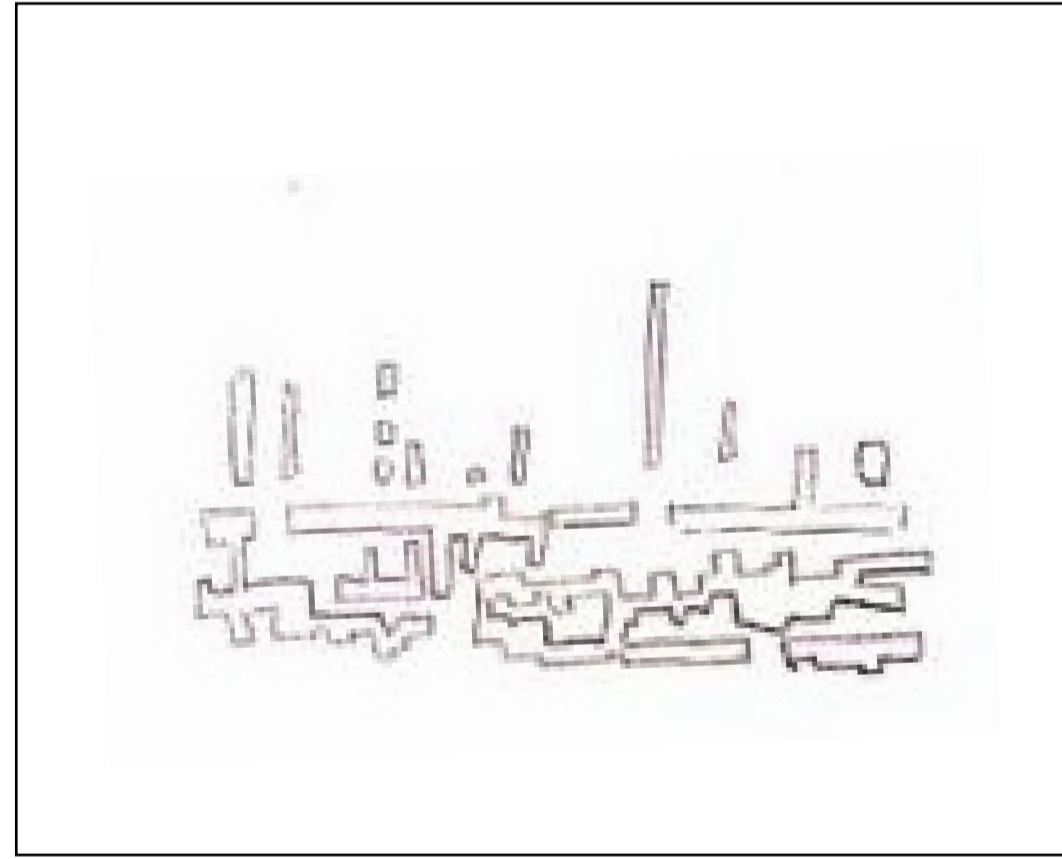
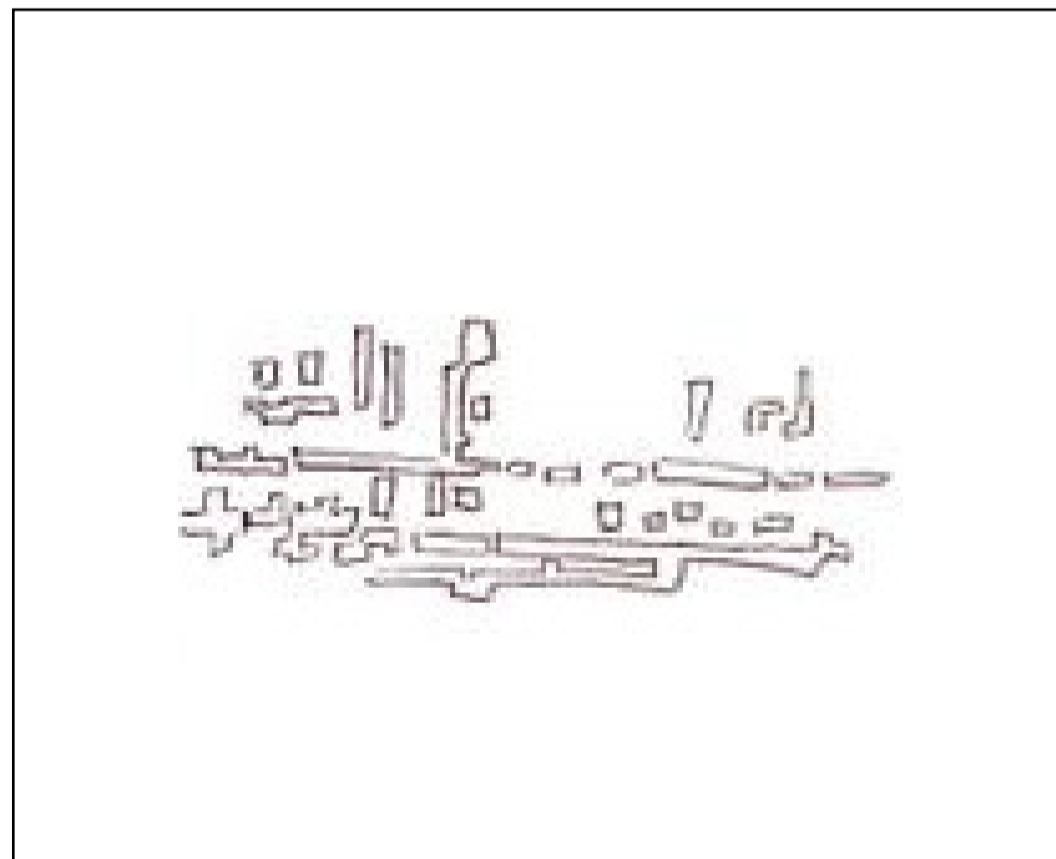
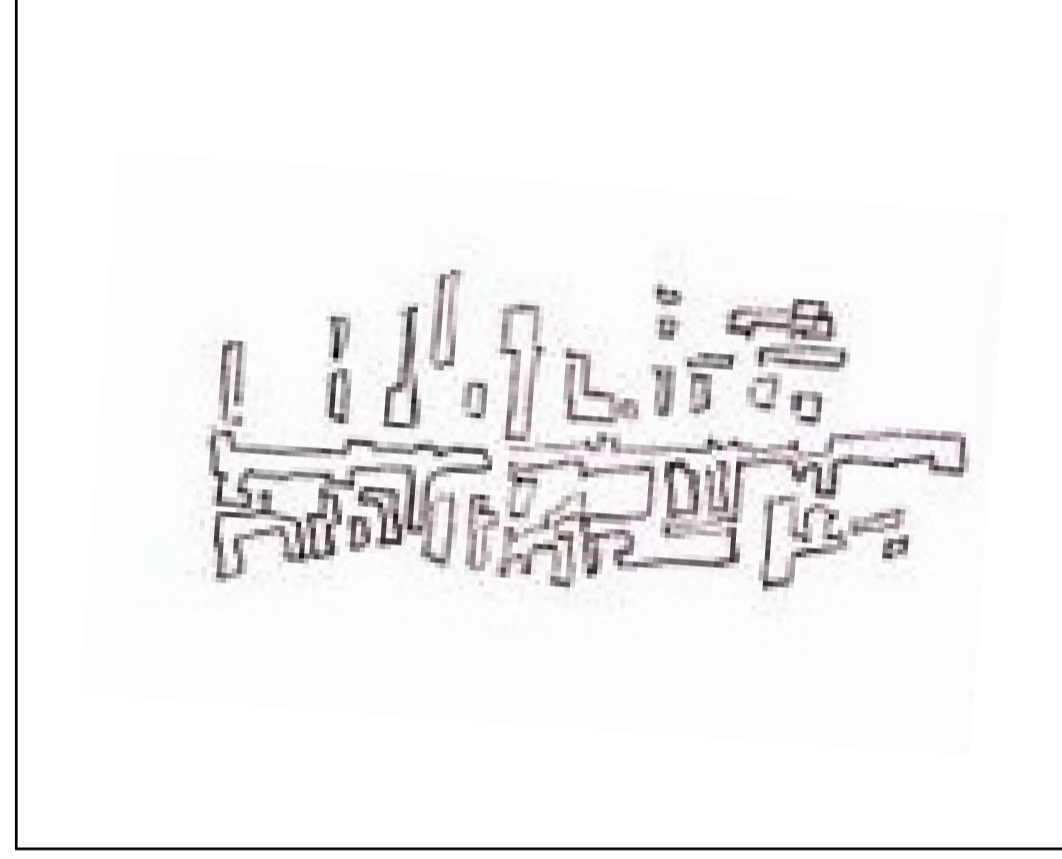
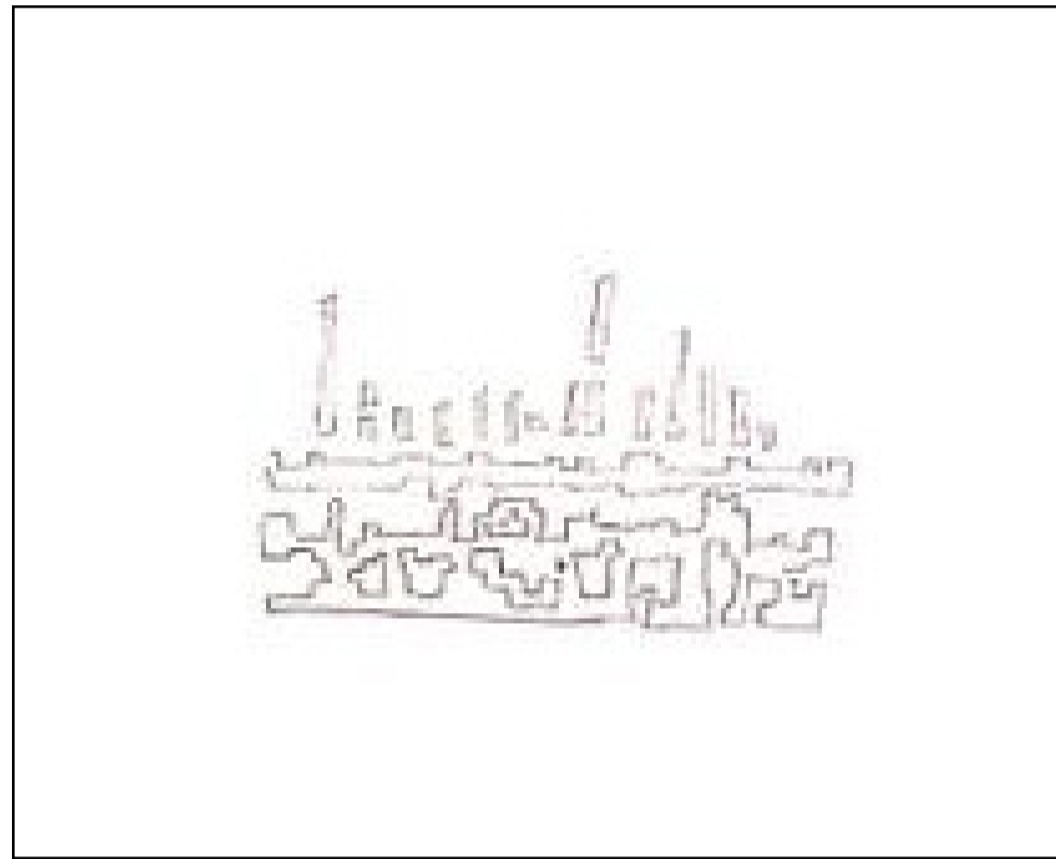
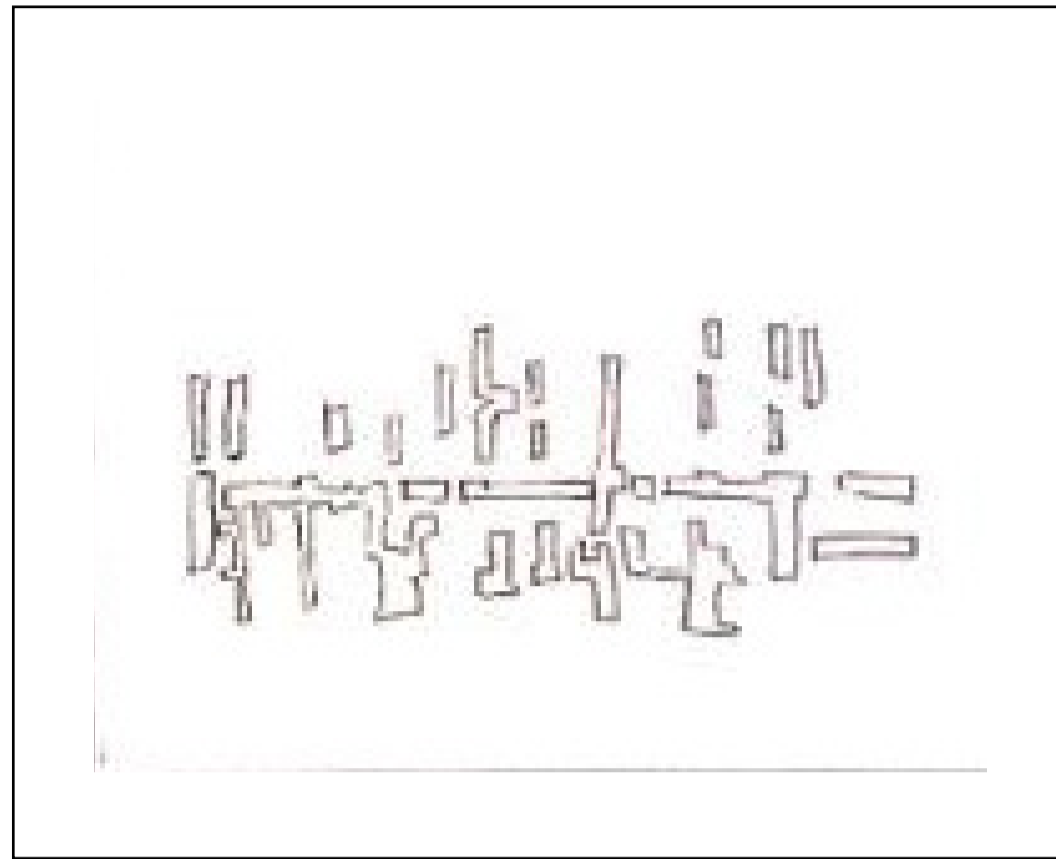


Spectrogram Analyser 7 – chosen visual to develop.

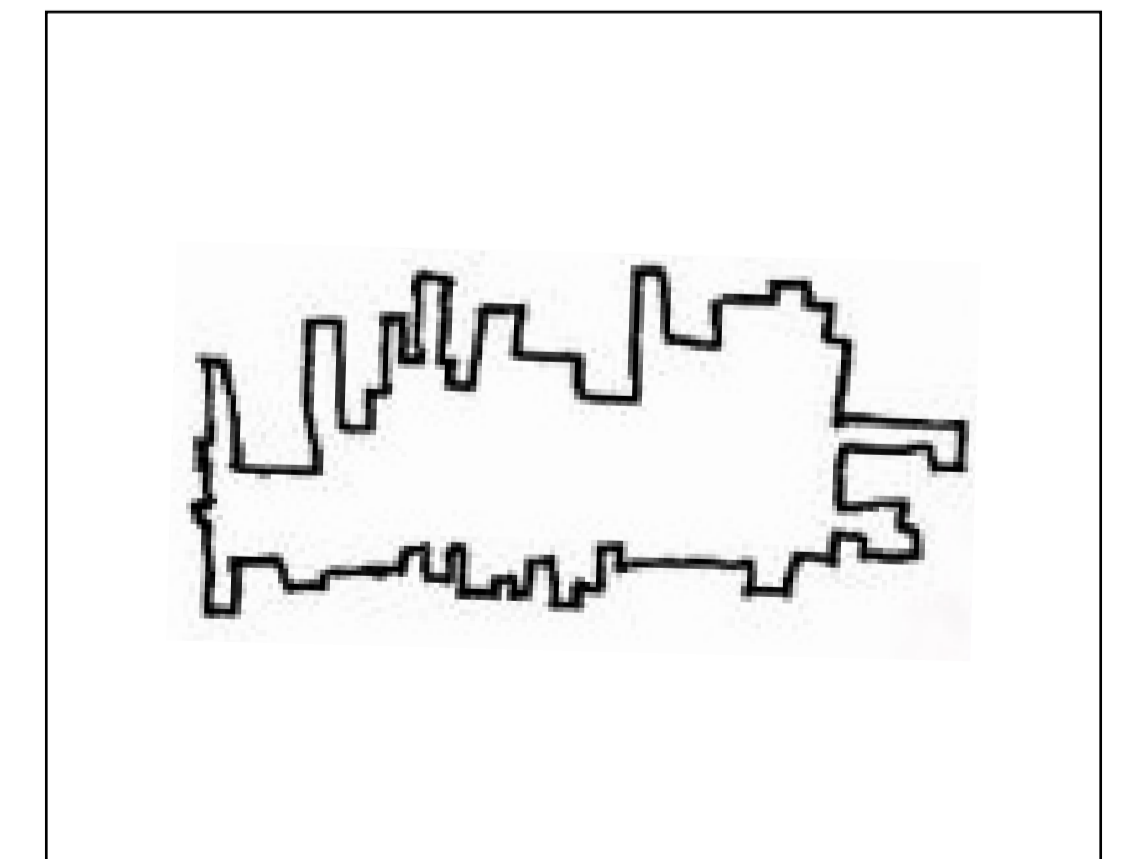
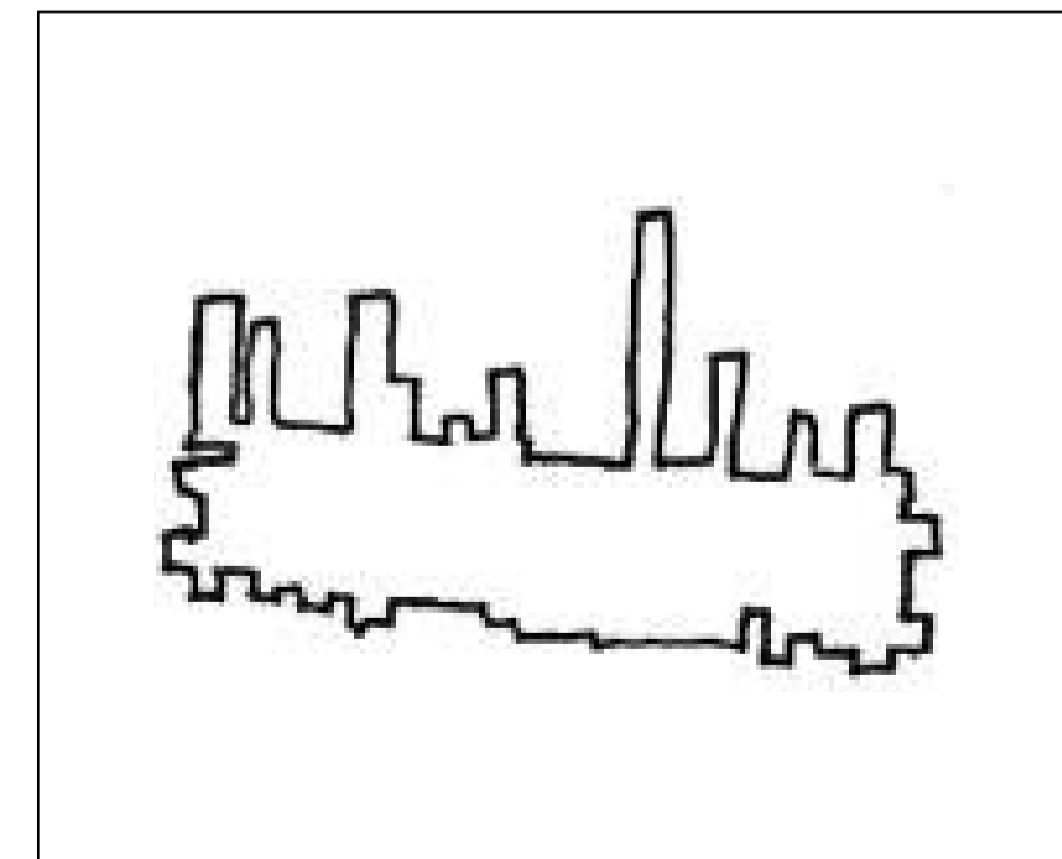
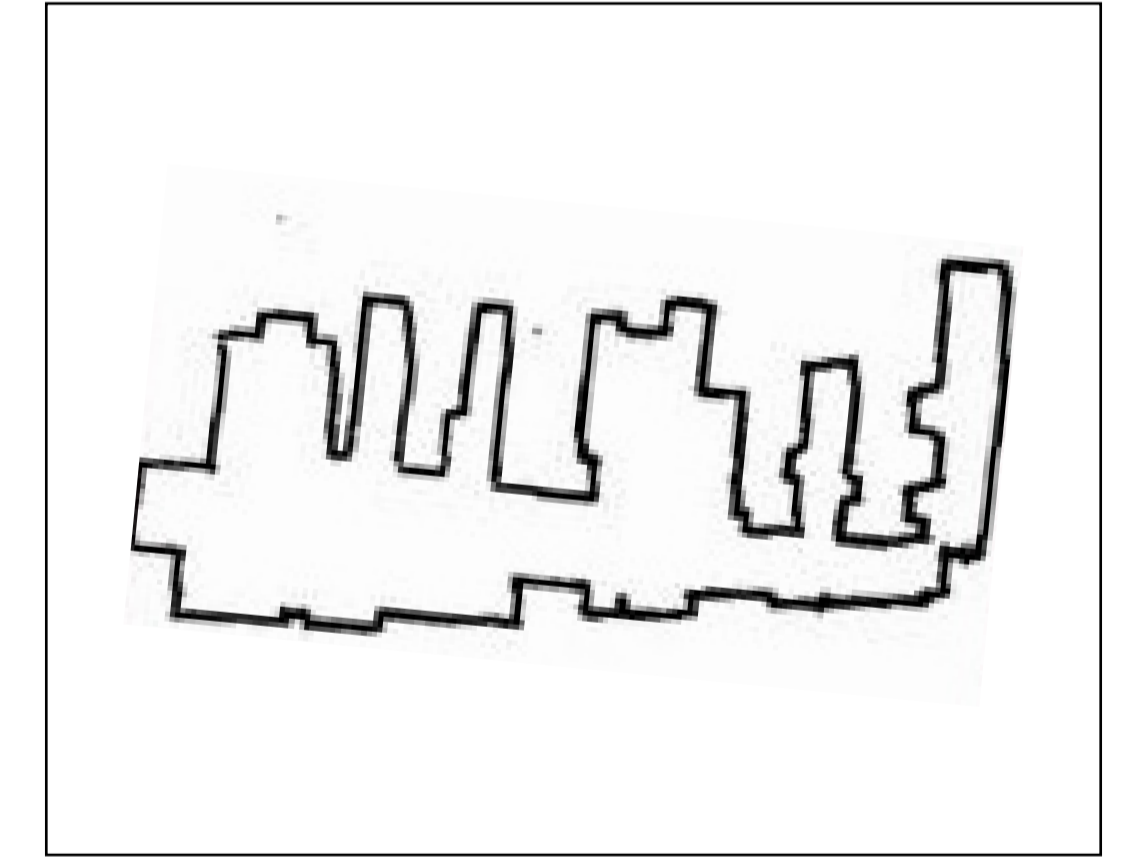
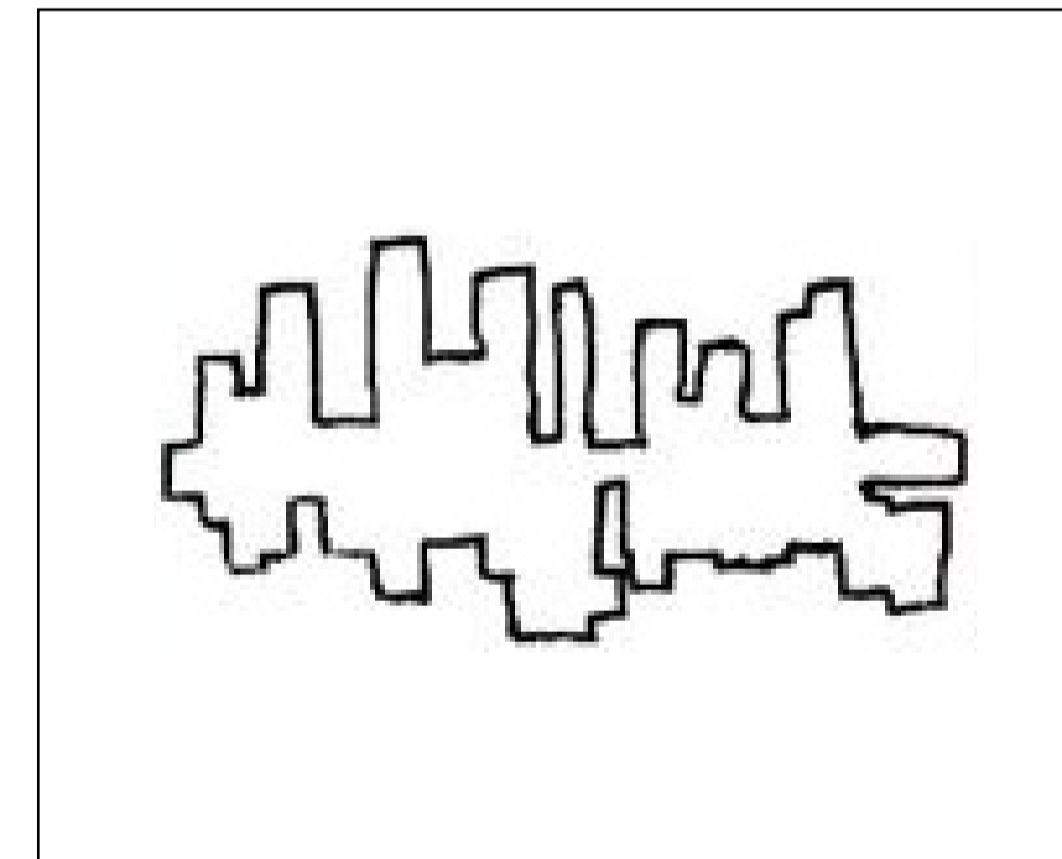
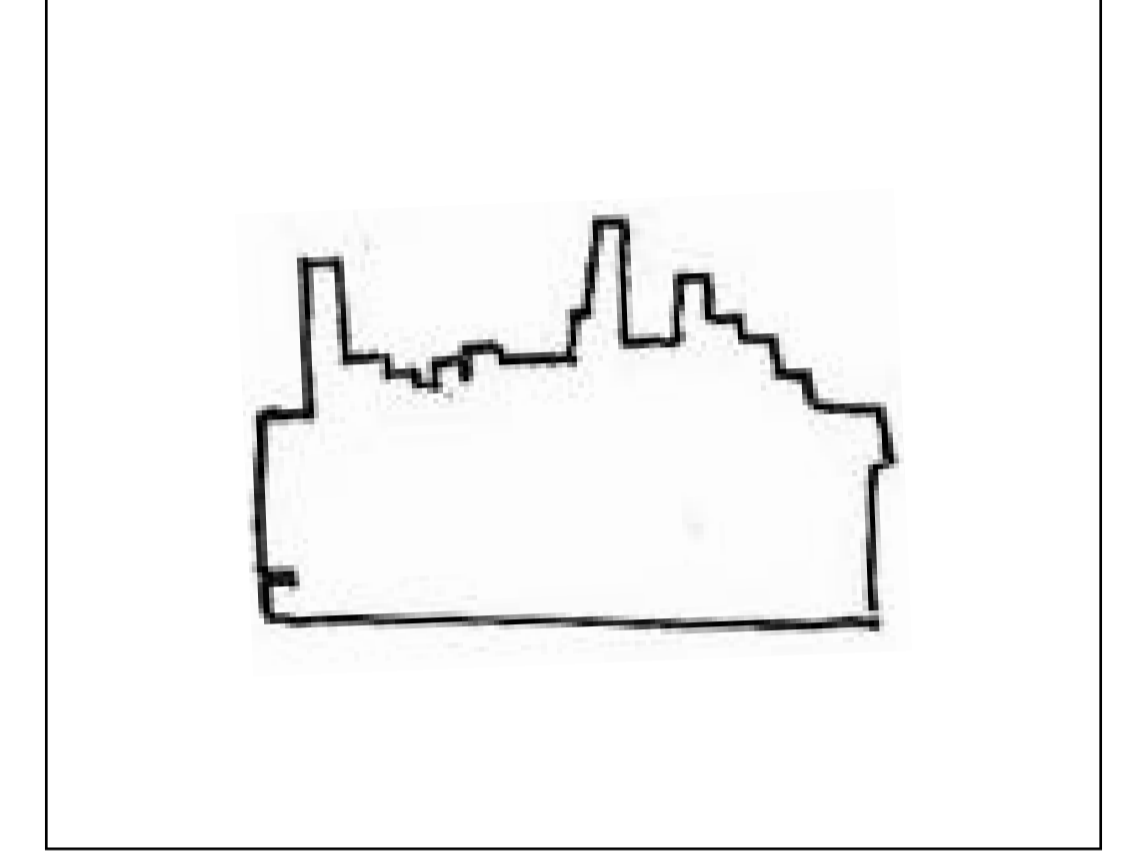
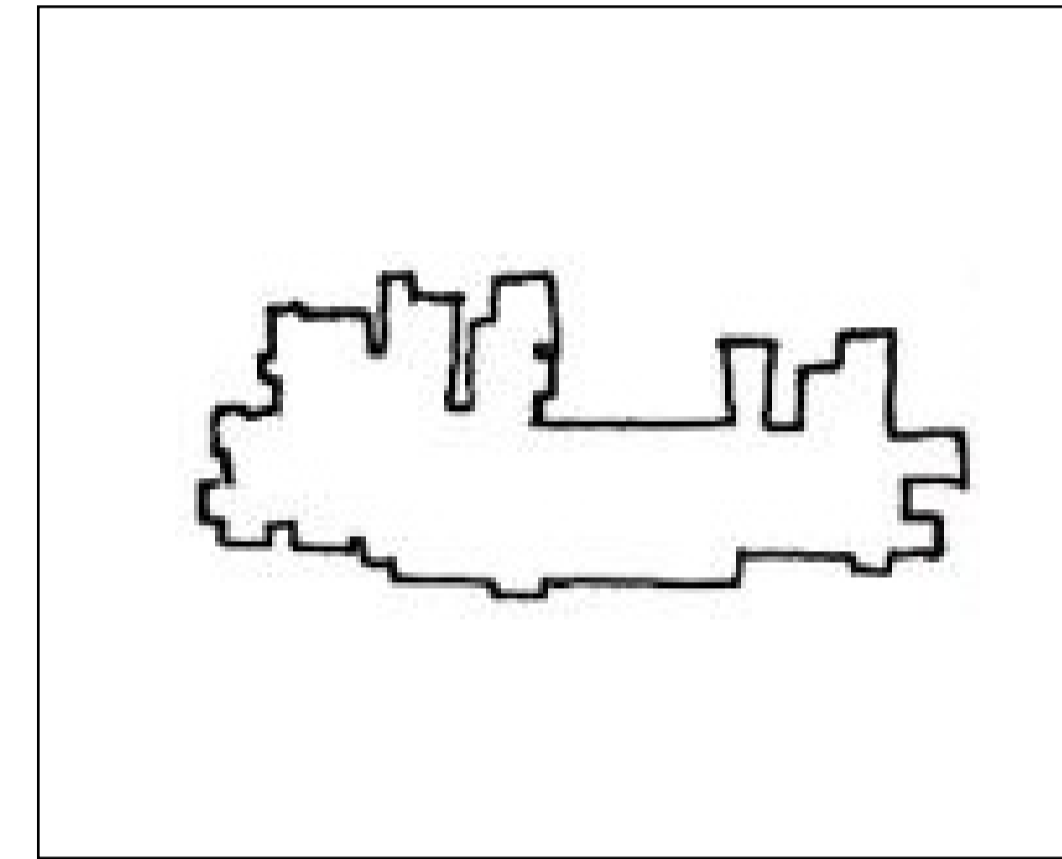
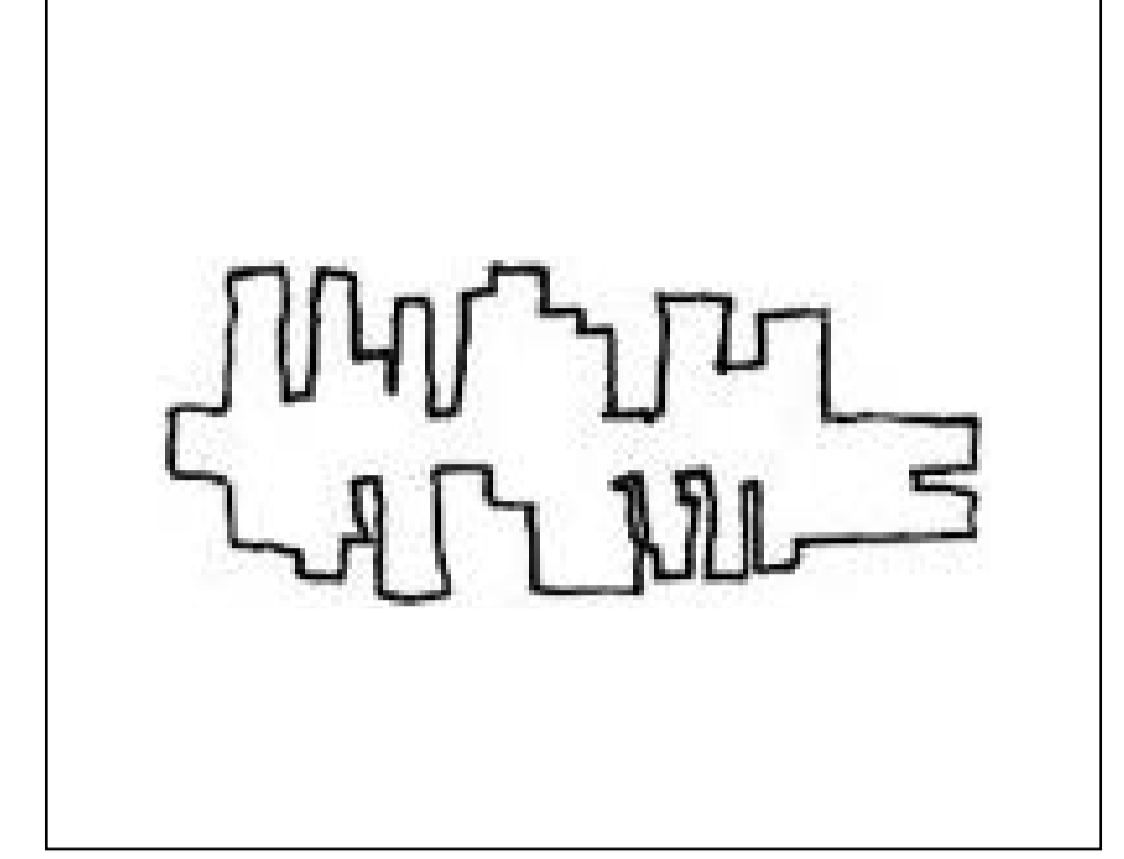
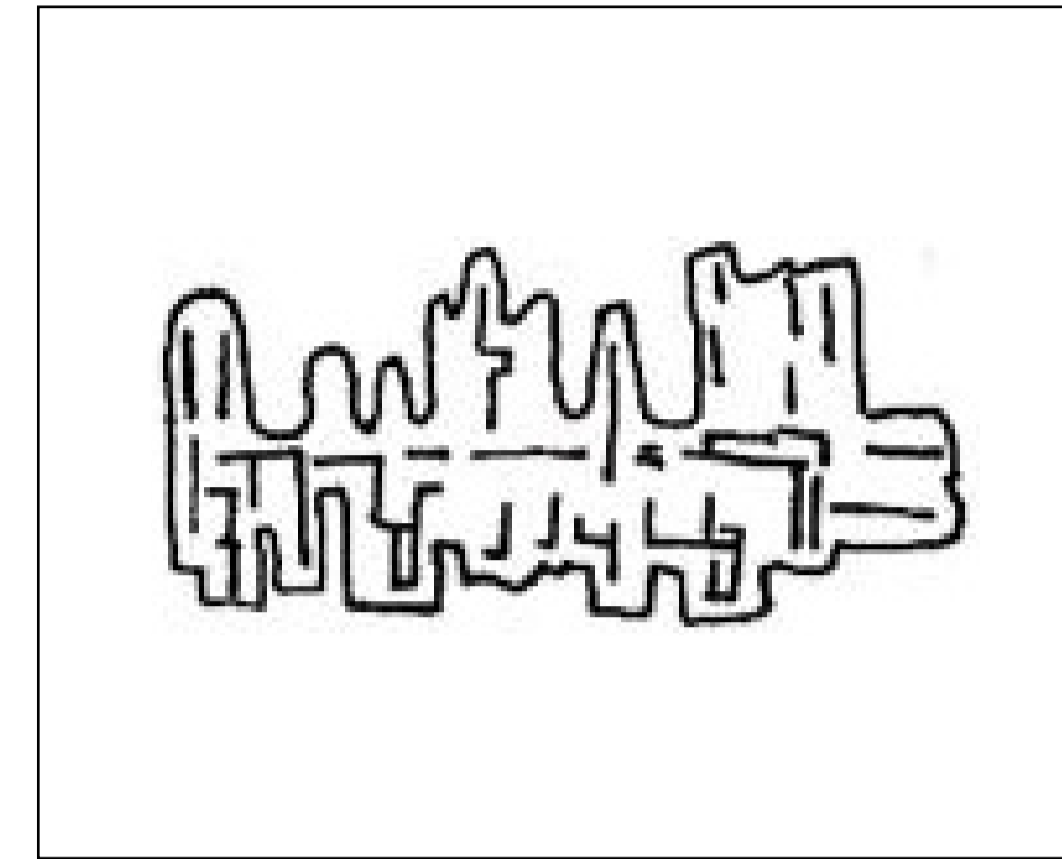
Development of Investigation through Drawing

The spectrogram was then developed into detailed drawings. Showing various Flows, waves and patterns created in the process



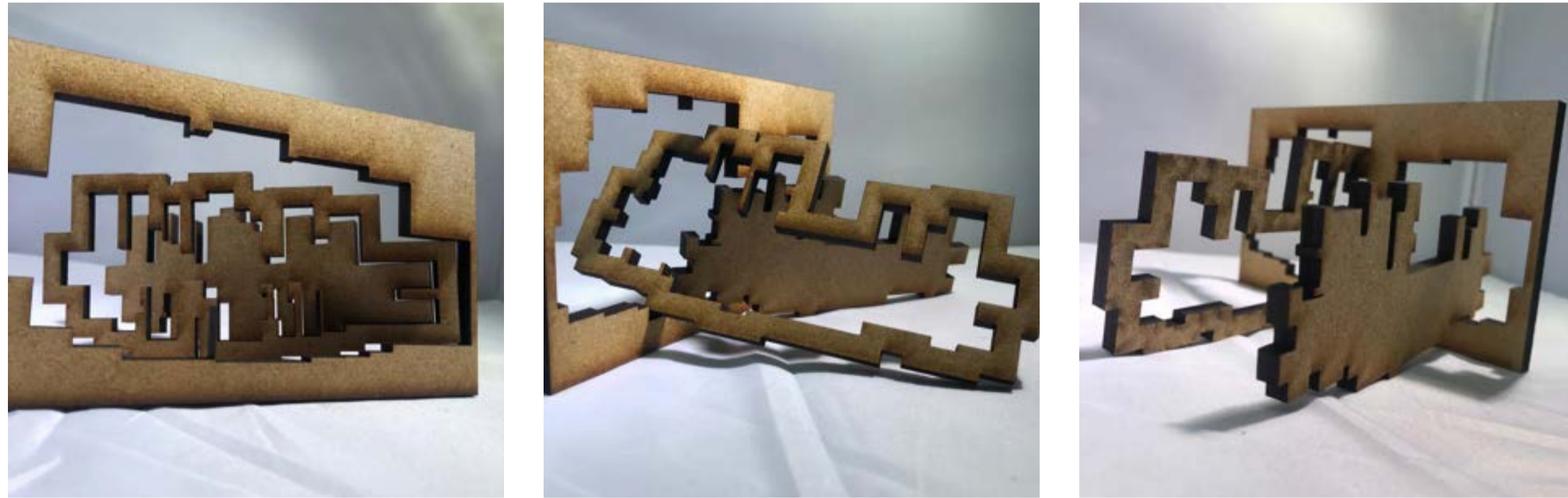
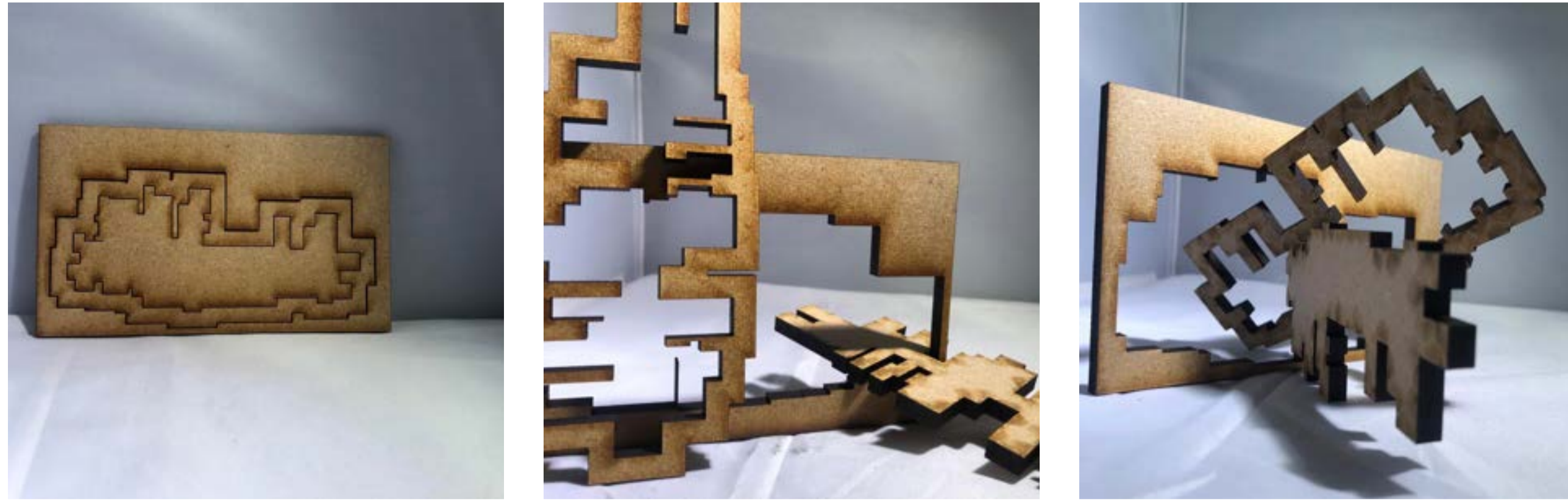


Iterations of spectrogram drawings

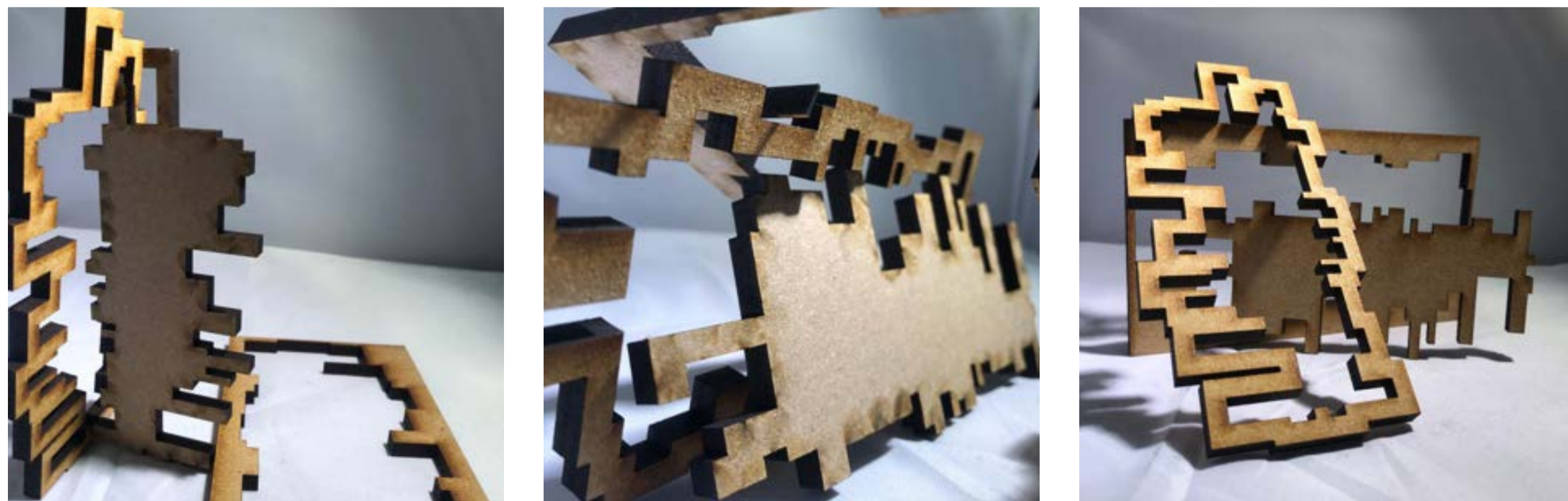


Simplified Spectrogram drawings focusing on outlines

Spectrogram Drawings Developed into Model



Spectrogram Model 1- The Models were inspired by the Spectrogram drawings and were laser cut and CNC, creating unique shapes that were further explored through photography of different elements and compositions.



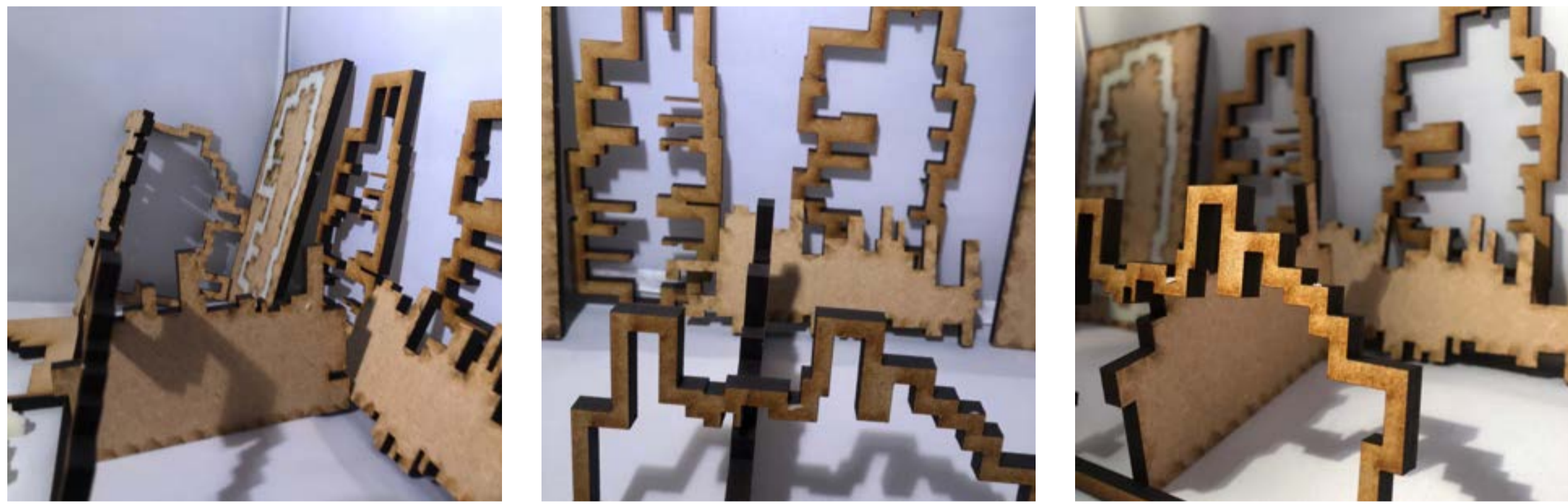
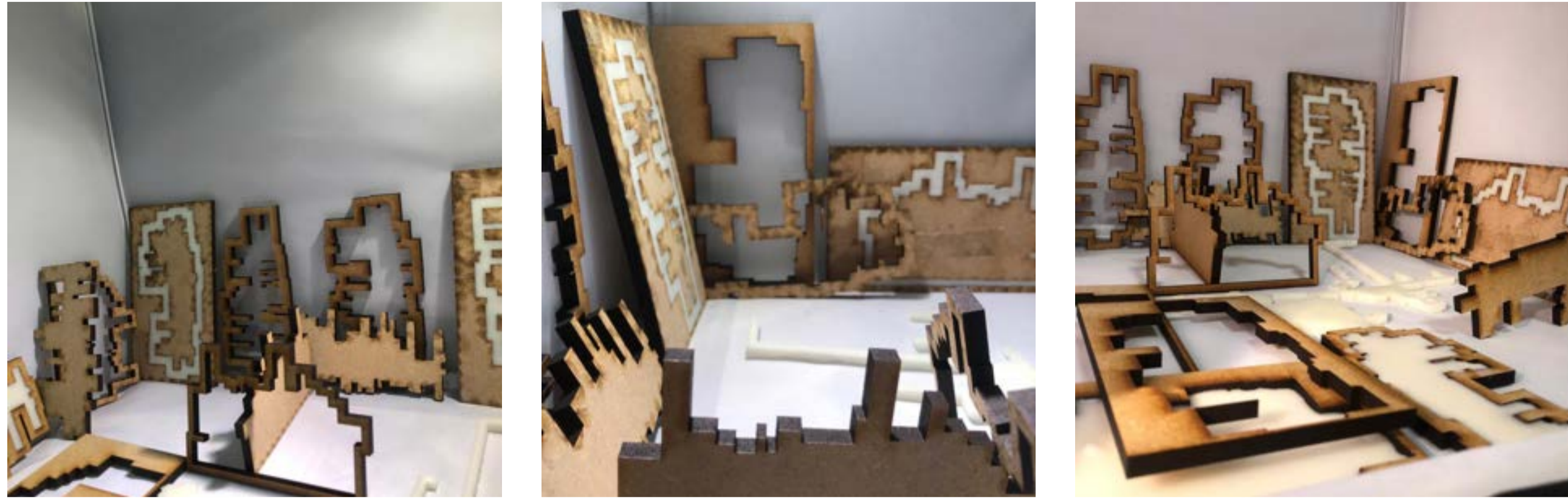
Spectrogram Model 2



Spectrogram Model 3



Spectrogram Model 4



Spectrogram Models with embedded wax and laid out in a format mimicking the existing building to show how the routes with the wax navigation system can be developed



Models of Outlined Spectrogram Drawings



All Models of Drawings Compilation



Rendered Cabinets, Shelves, and Bookcases

These structures are unique showing individuality and will also play a part in giving each room originality for easy identification. This would help with the issue of weak spatial memory for the autistic community, with each room having different numbers of these furniture pieces as well as various compositions. This was aided by the previous photography experimentation of the 3D models.

Development of Simplified Spectrogram Drawings into Abstract Formations



Model 1



Model 2



Model 3



Model 4



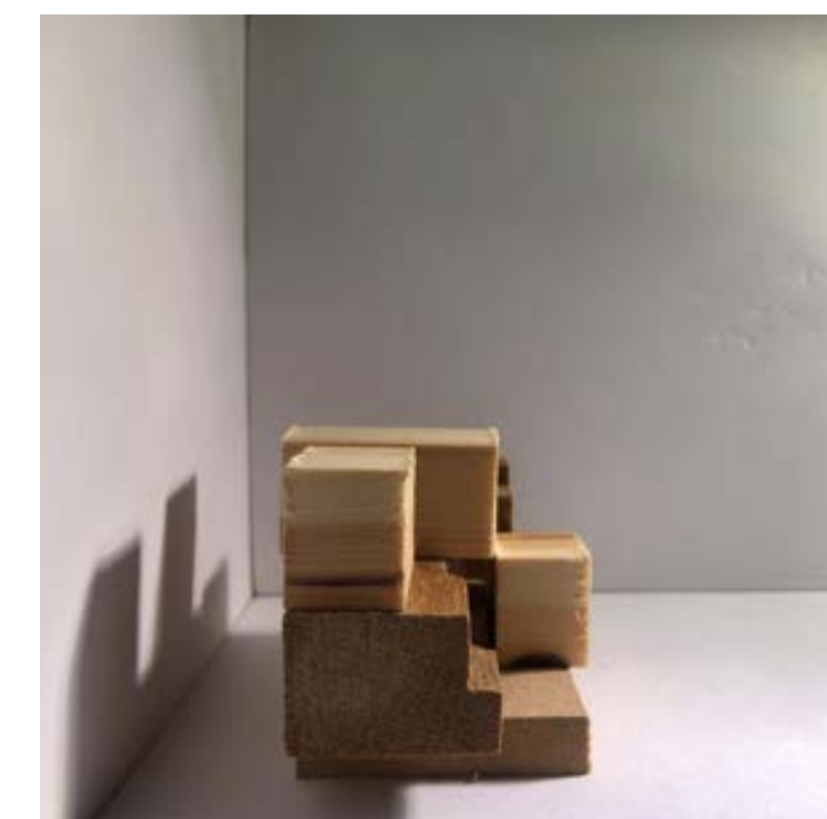
Model 5



Model 6

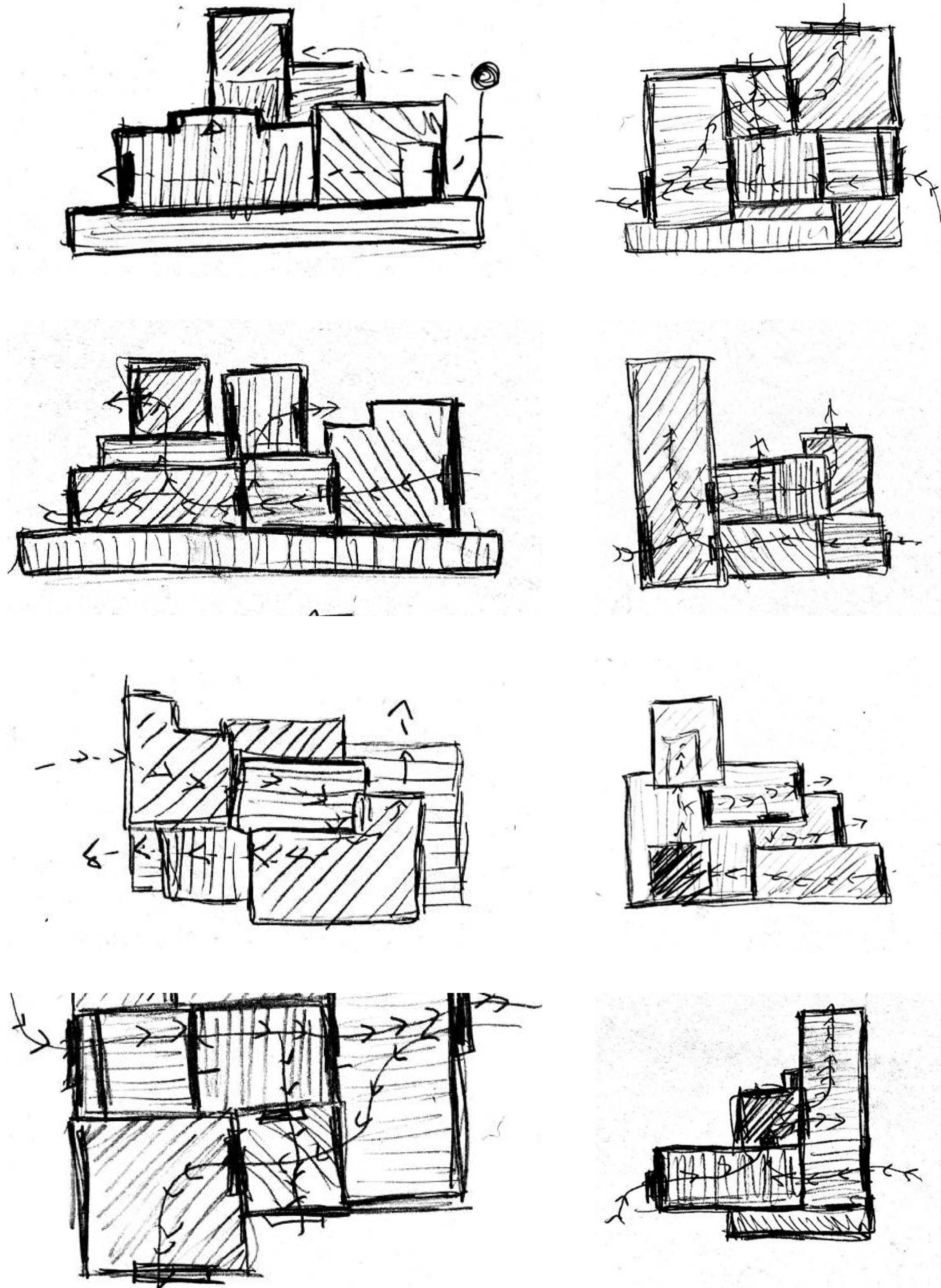


Model 7 - Abstract Formation Models Combined

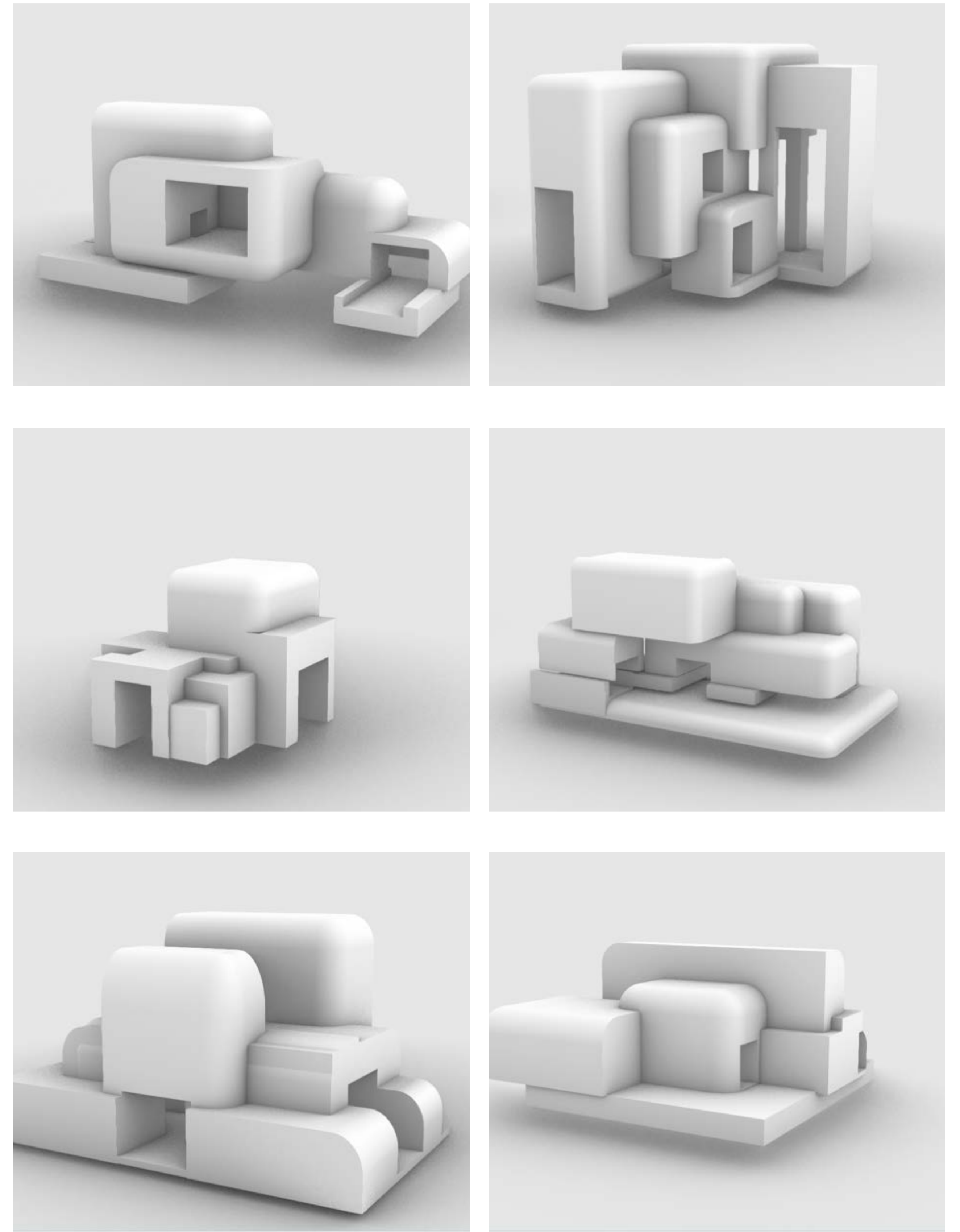


To understand there were multiple ways of developing a drawing I used various symmetrical 3D assemblies of timber pieces to imitate the plan view of spectrogram drawings that were simplified. To create abstract arrangements. When viewing them from as an elevation or sections these structures changed in perspective into different levels height and sizes.

Analysis of Abstract Formations through Elevation Drawings



Drawings Developed into Sensory Room Caves

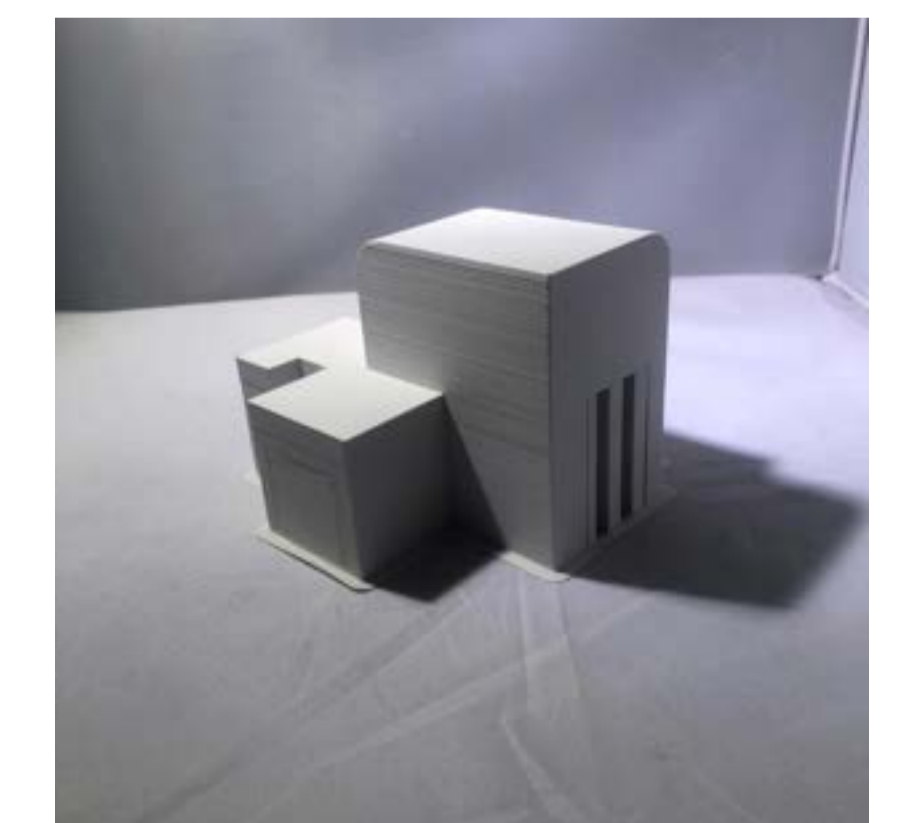
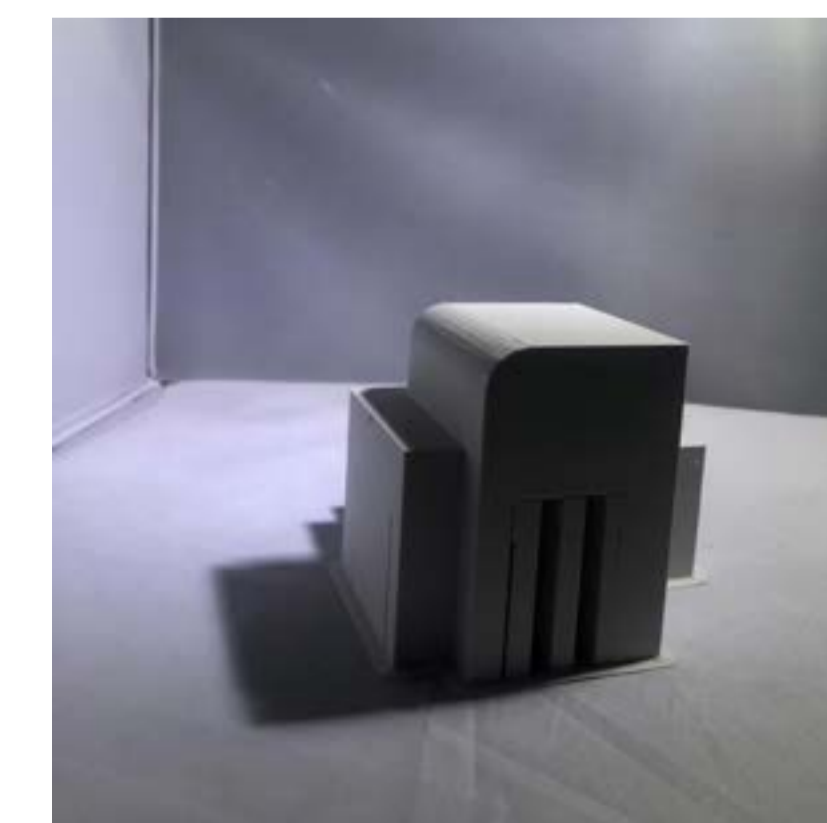
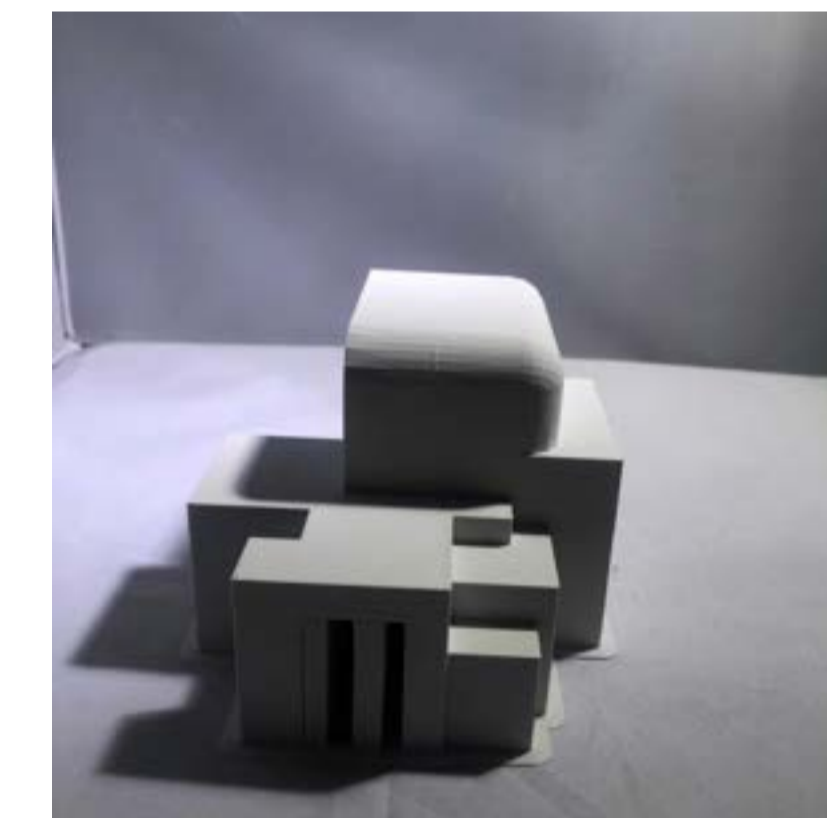
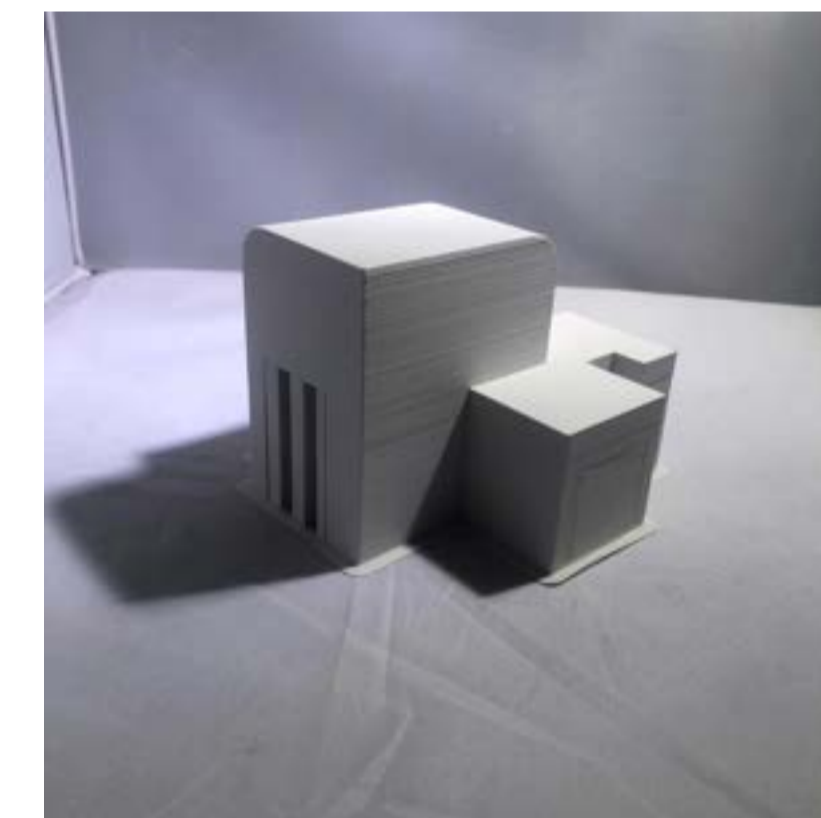
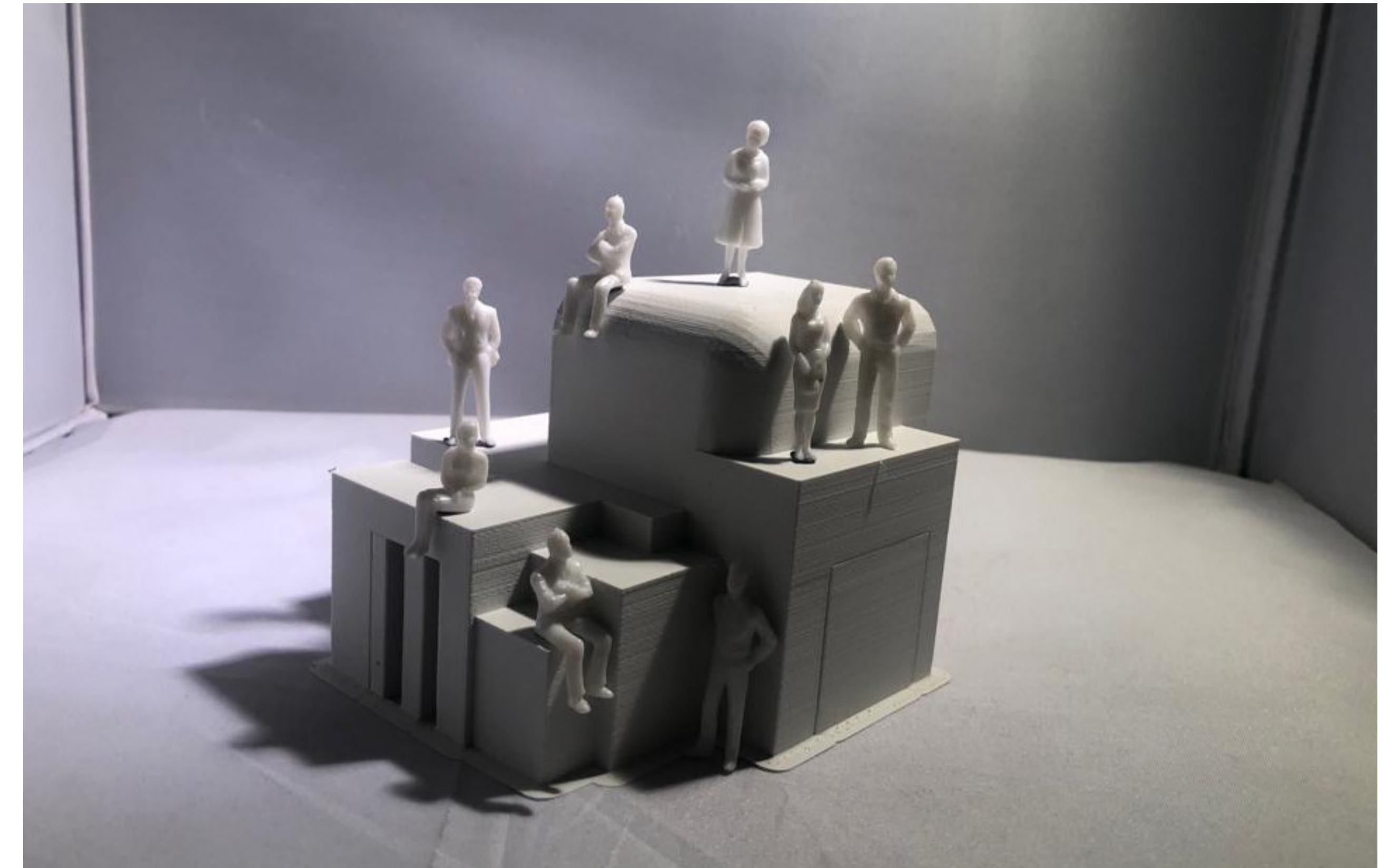


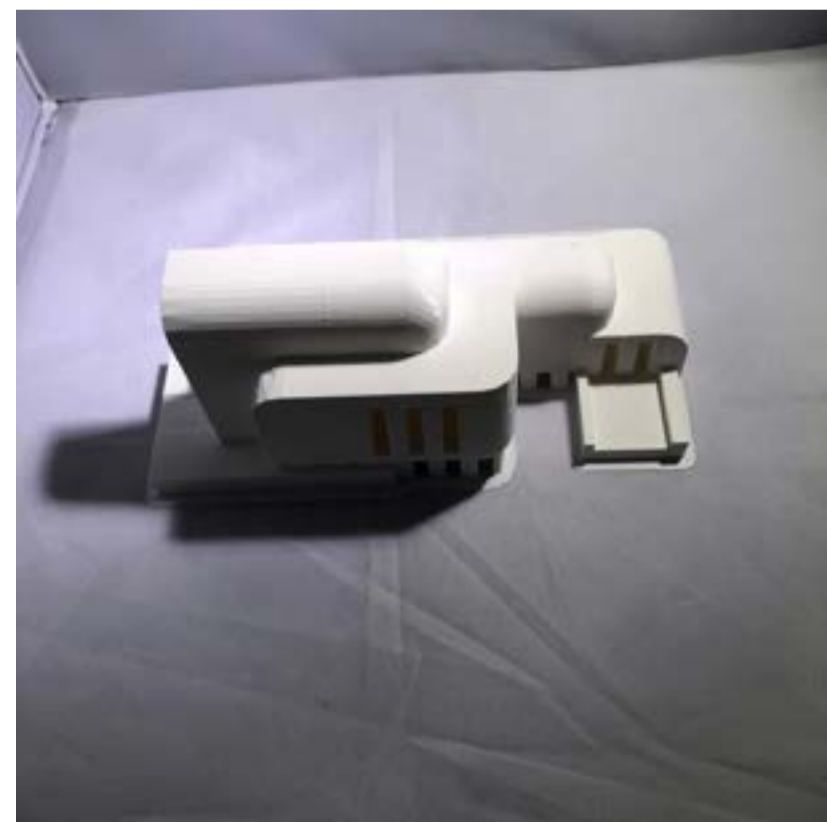
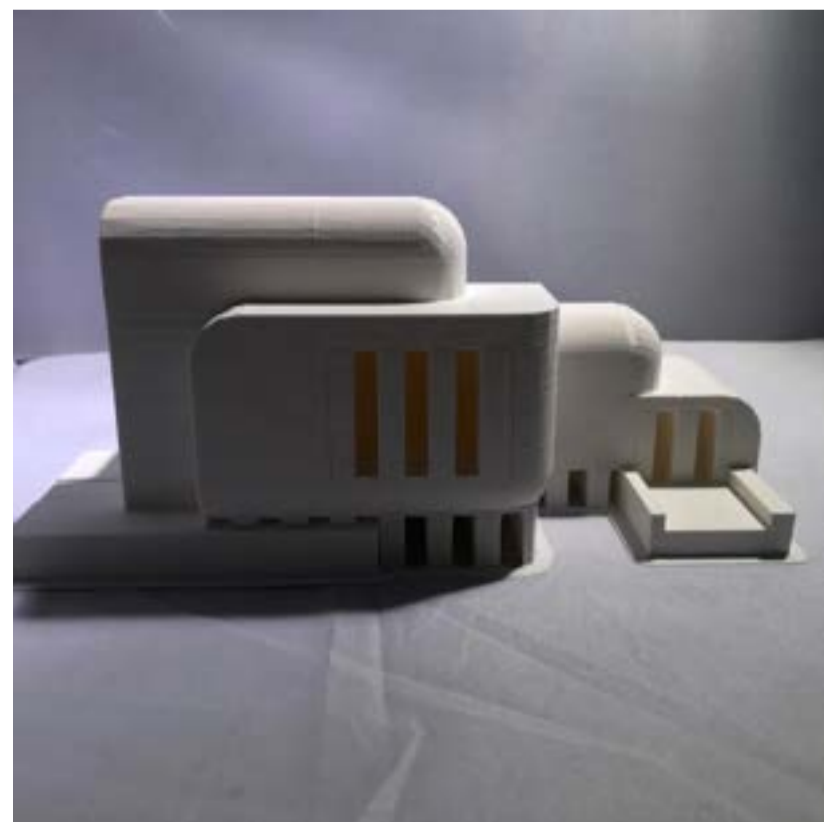
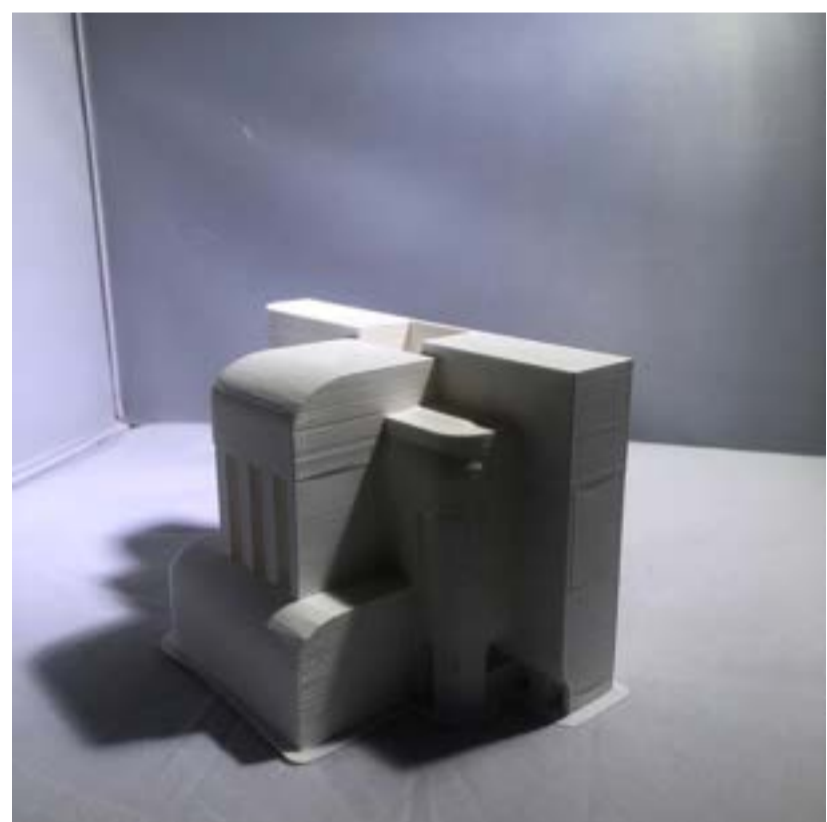
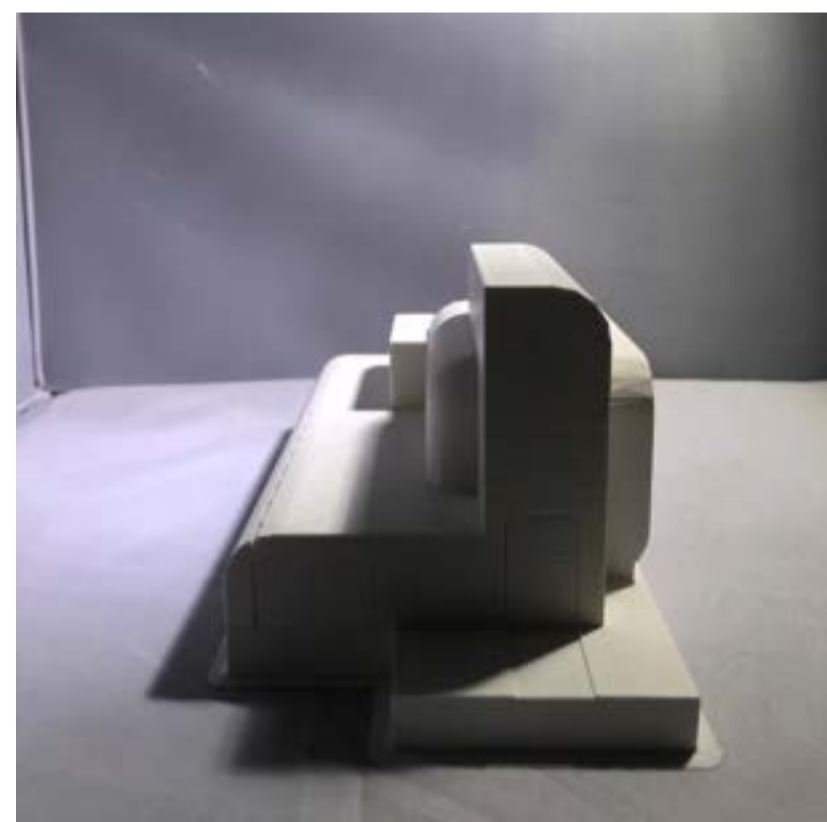
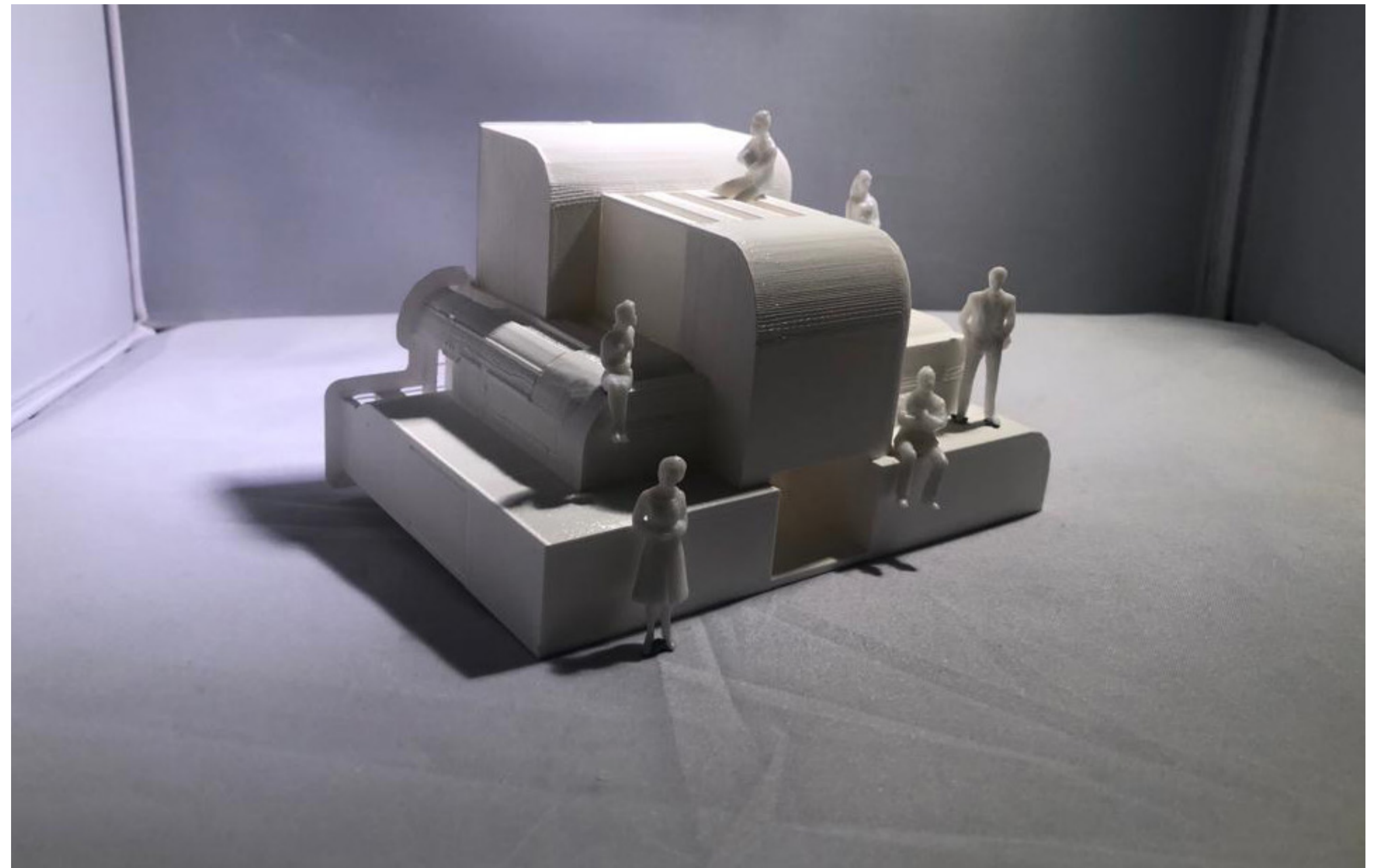
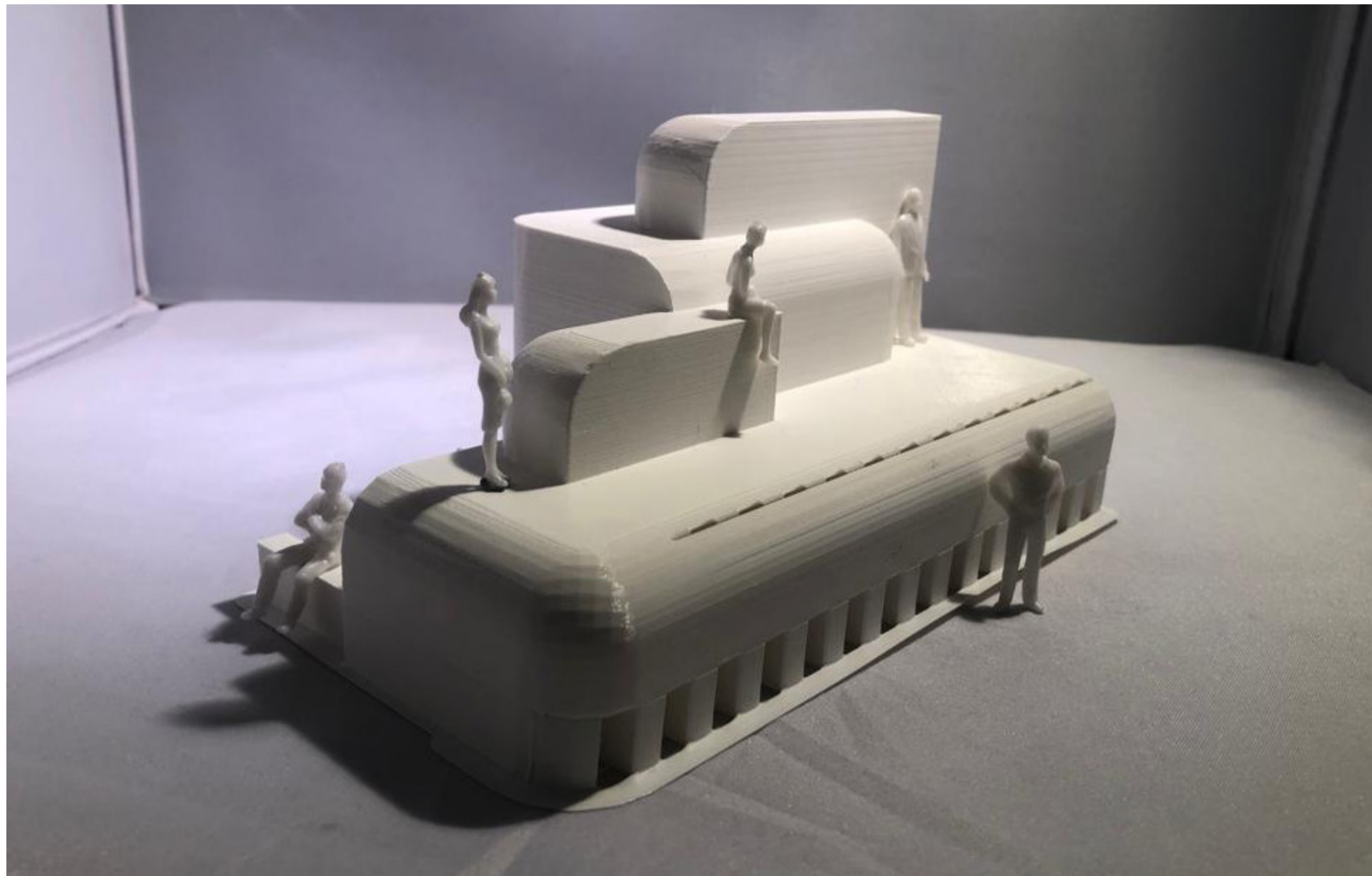
The drawings and models were composed into rhino mock-ups. By visualising them as play areas I carved entrances and exits out of them, imagining how participation would take place.

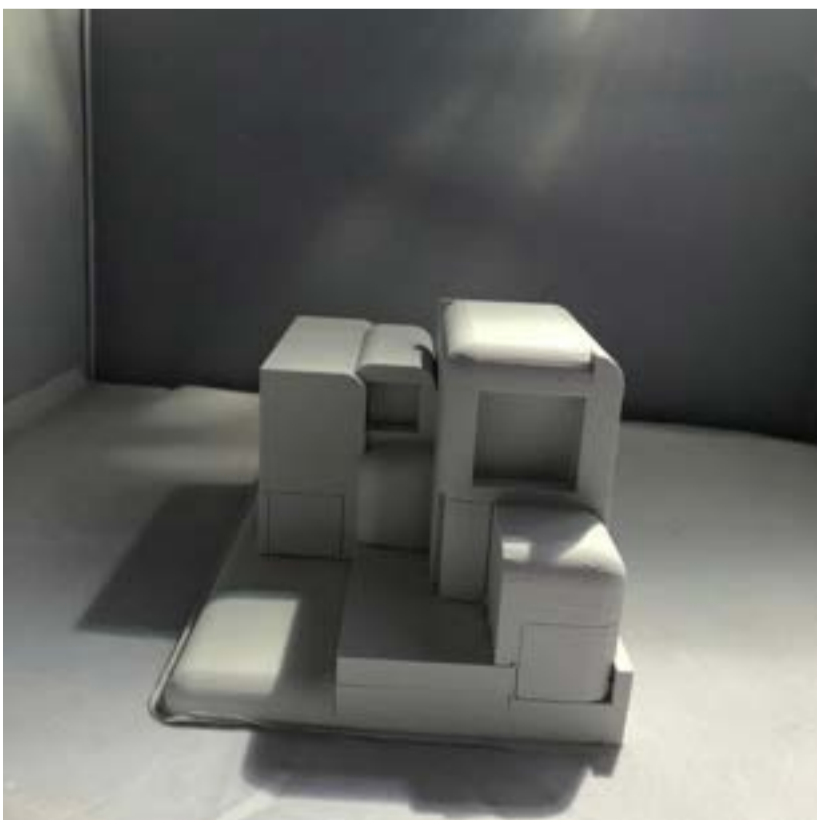
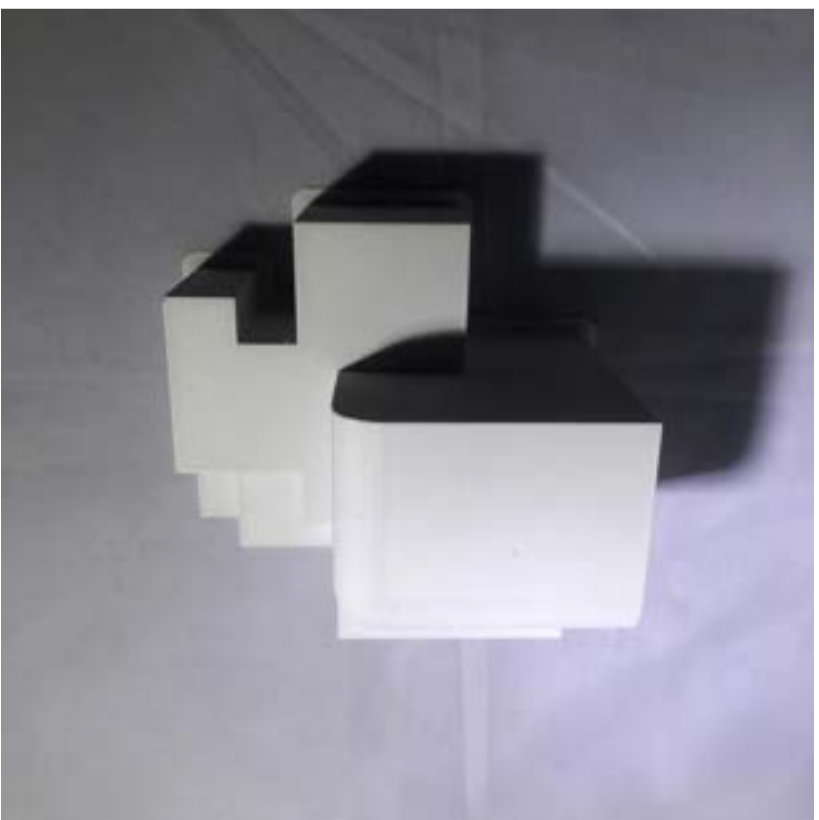
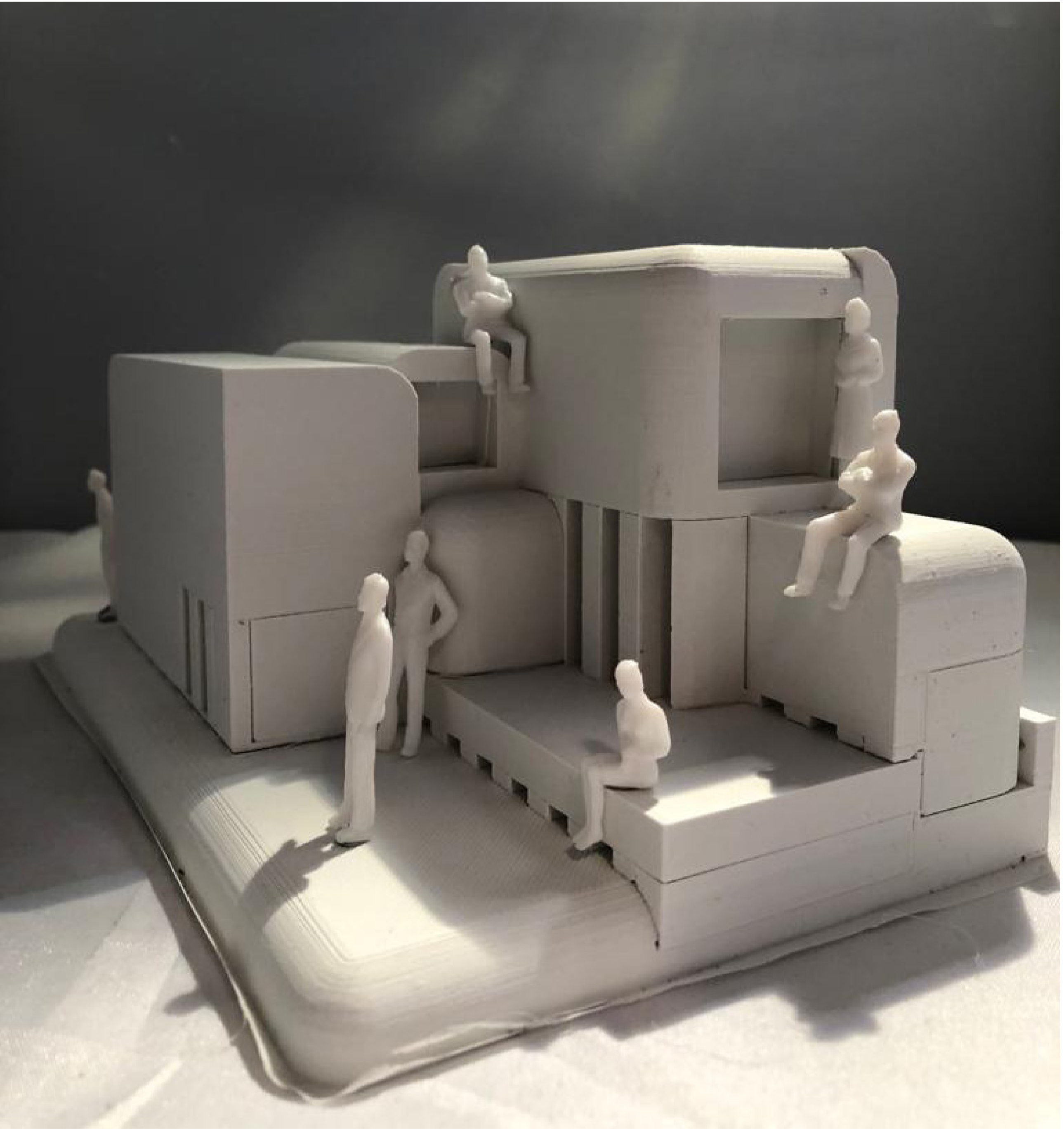
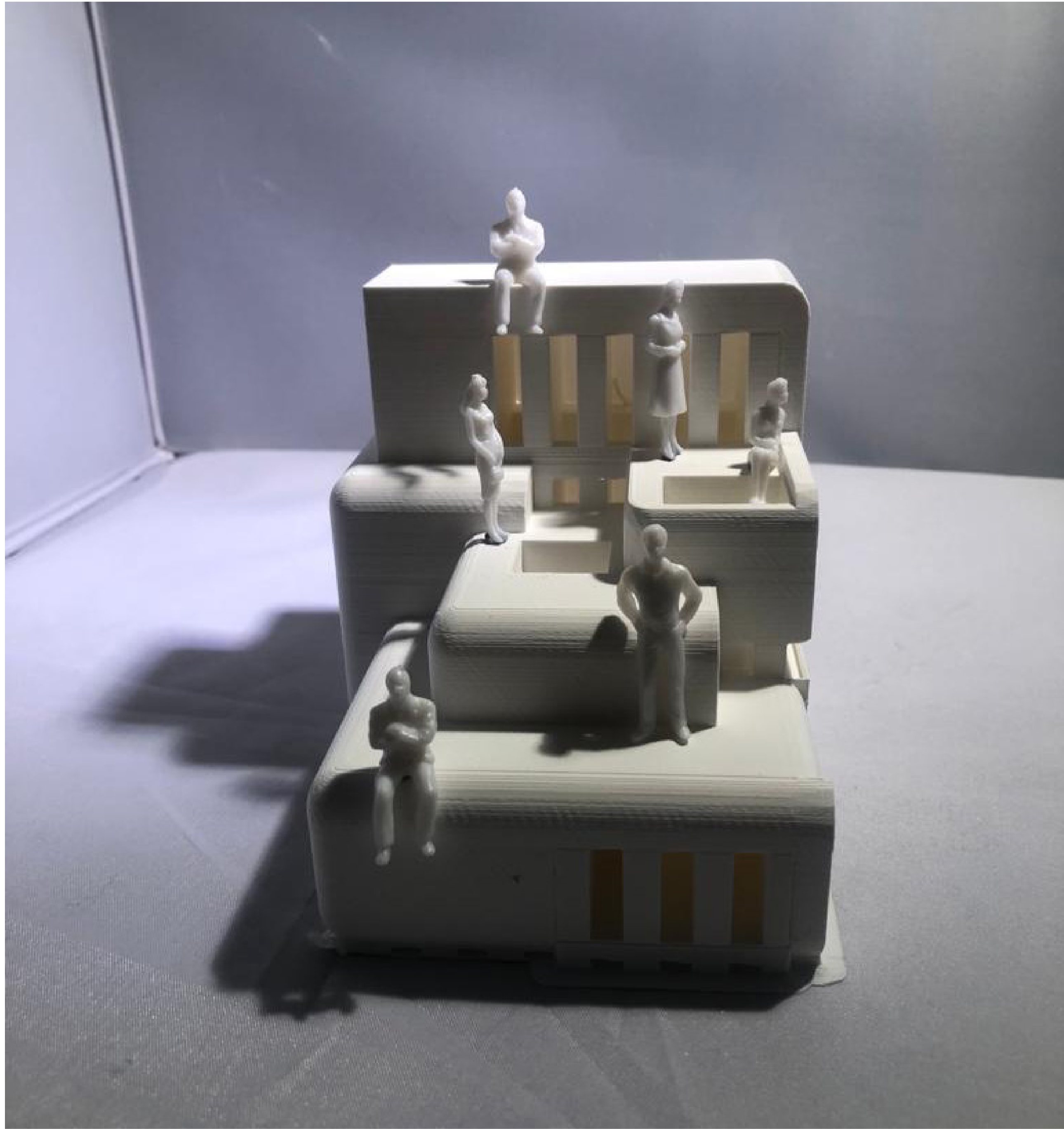
Models of Abstract Formations with Interactions

The rhino models were 3D printed into physical structures where it was easier to visualise interactions that would take place using models of scaled down people. The scales of the people were not accurate however it gave a picture of how the space, corners, seating, and tunnels would be communicated with human contact. The precedent 'Sensory PLAYSCAPE' investigates Autistic children's body language and how they

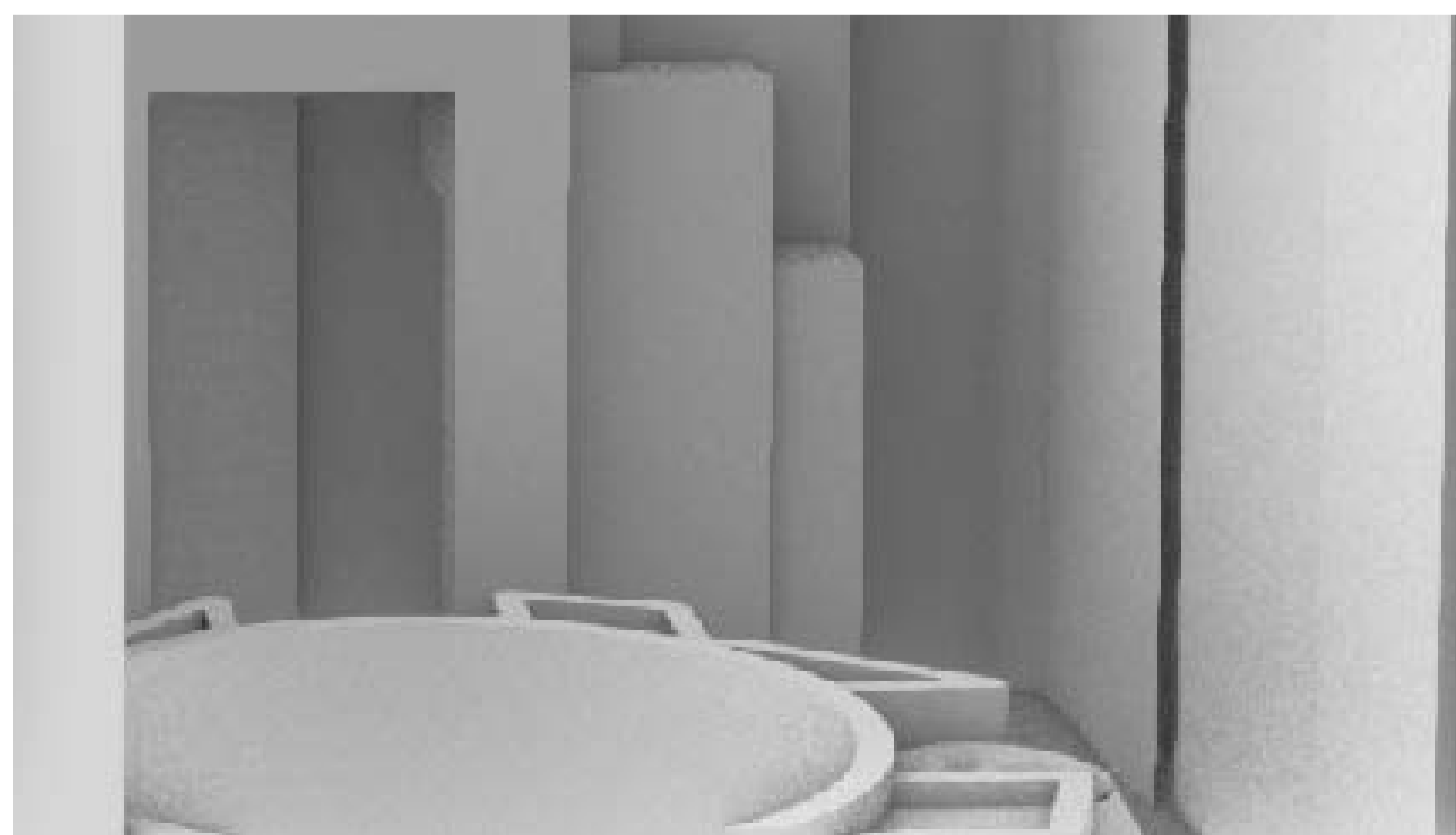
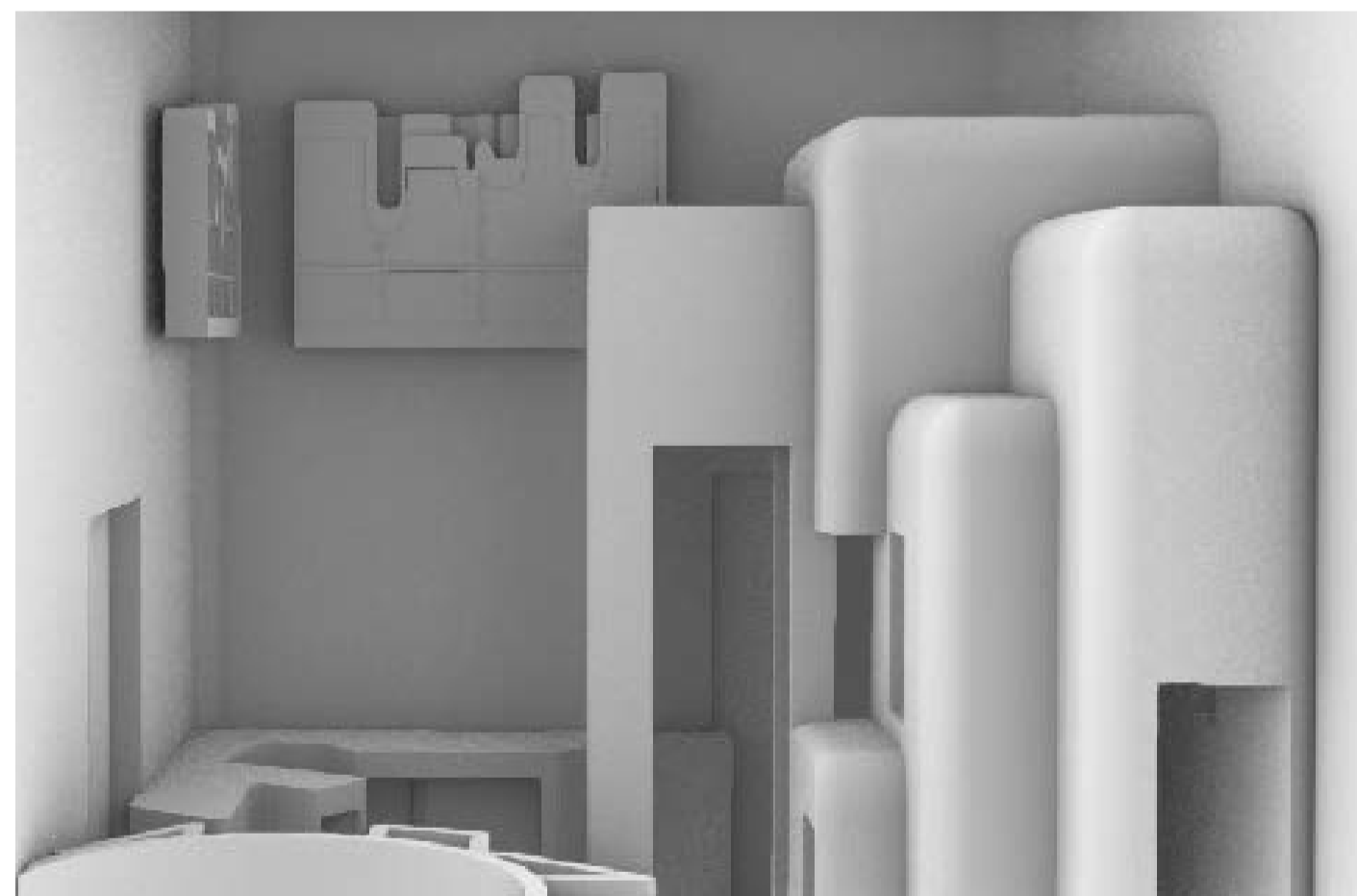
interact with play spaces and tactical textures, along with ways this can be therapeutic. By adding these structures to the existing sensory room, replaces bean bags with a larger soft space and allows them to familiarise and explore abstract shapes. It also gives them the opportunity to relax and utilise the space in a way they can use to calm down; whether it be sleeping, lying, sitting, hanging or hiding.



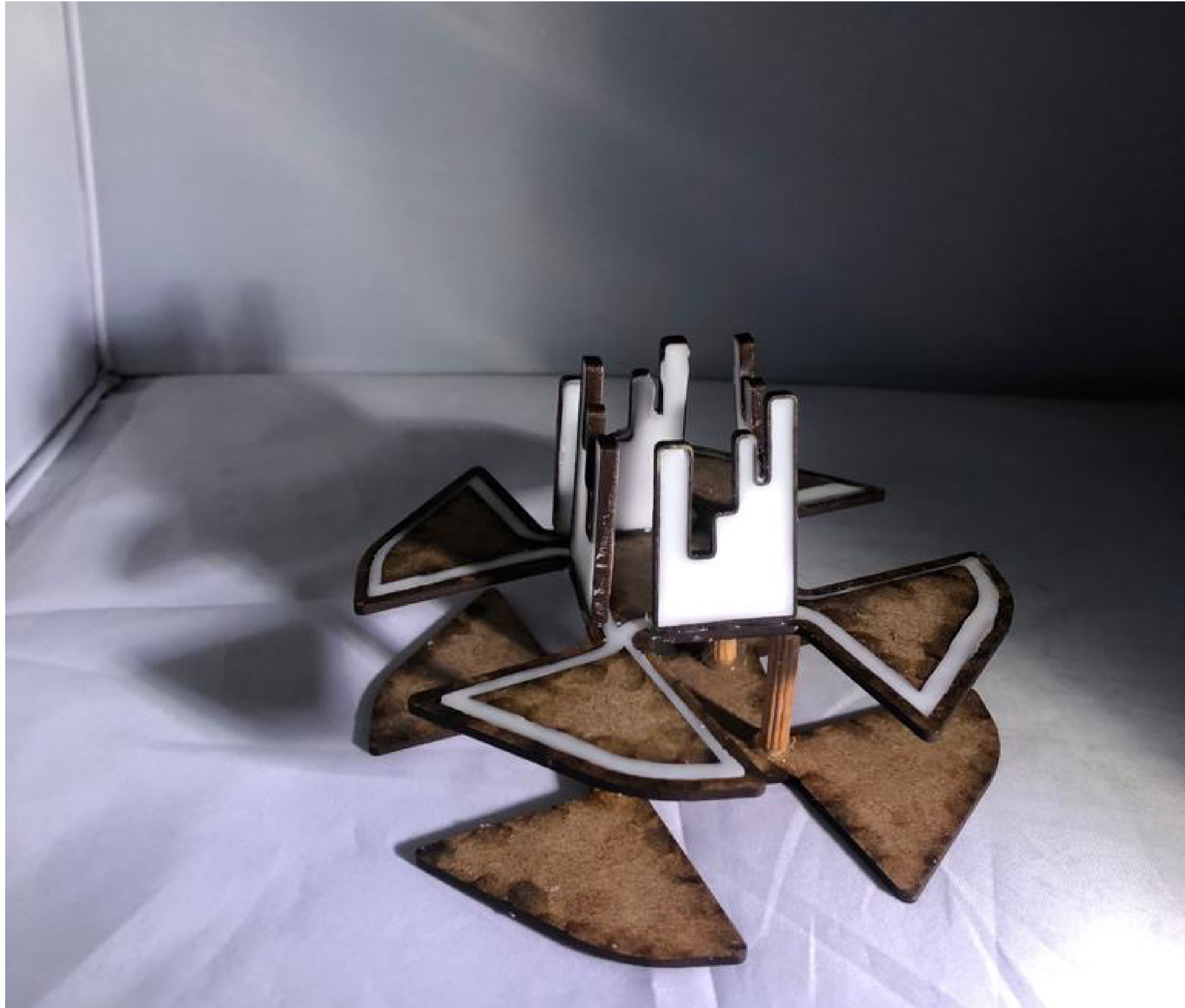




Perspective of Sensory Rooms

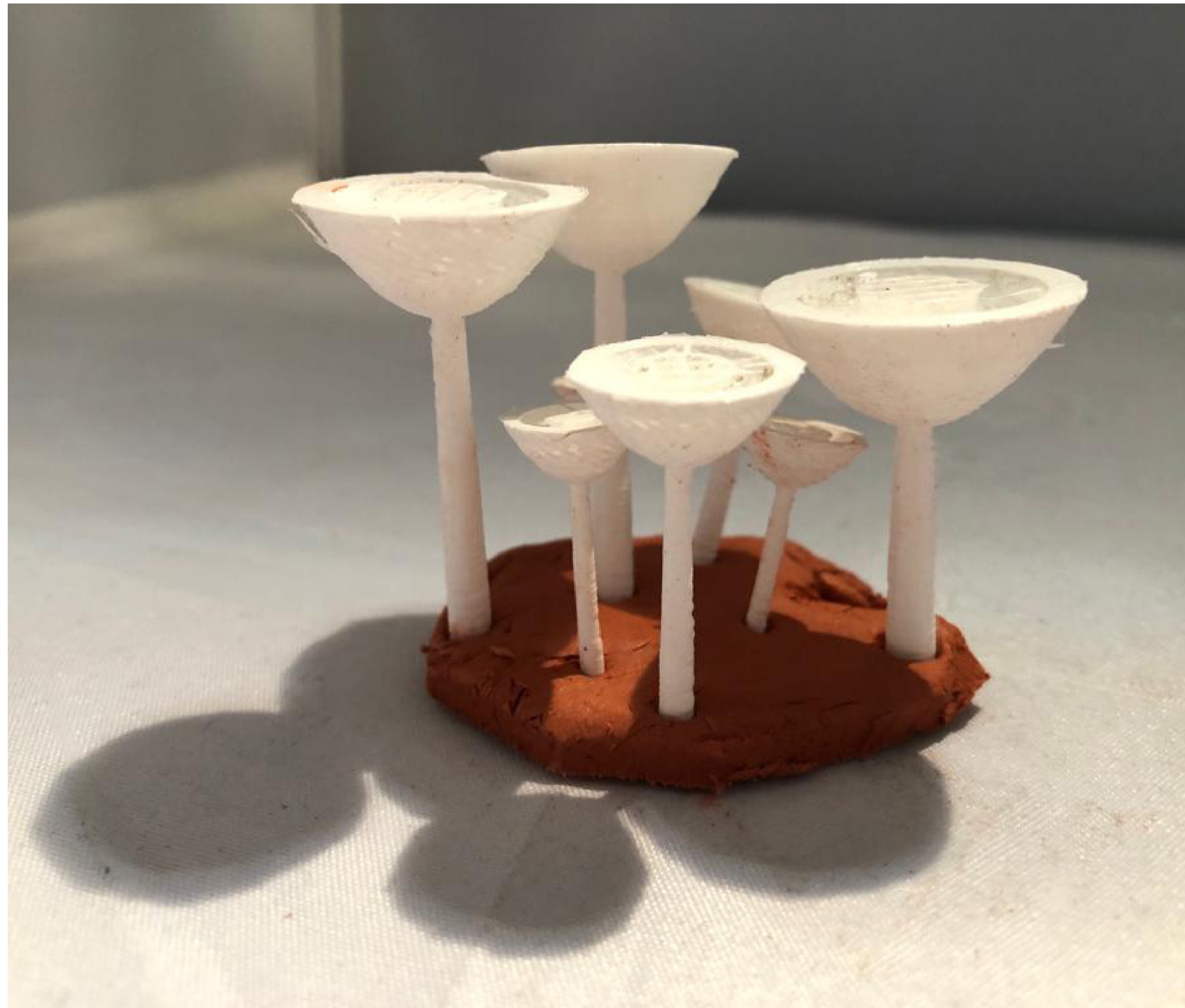


Improved Design for Outside Seating Area

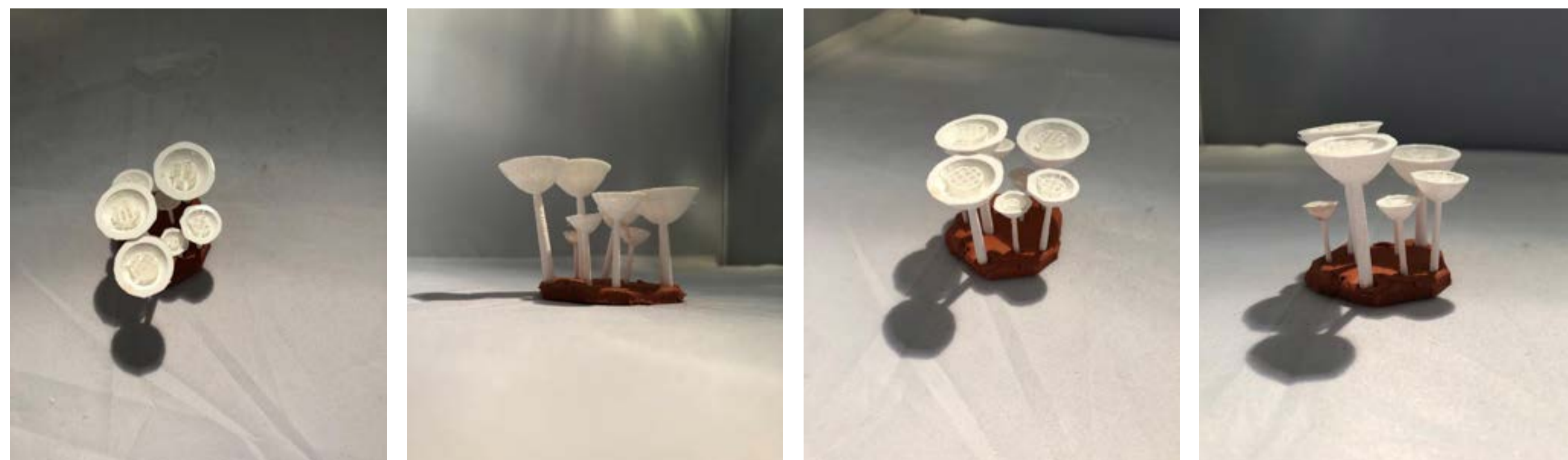


The edges of the seats were smoothed out and I also experimented with the amount of wax placed on the edged as well as the gaps between them with the wax frames.

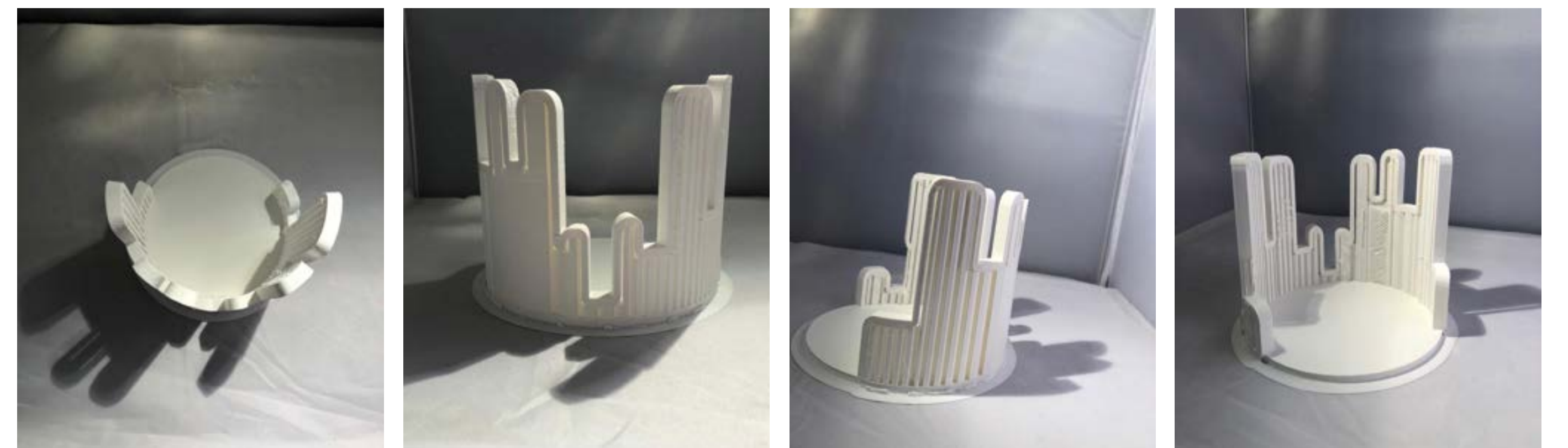
Model of Bee cups



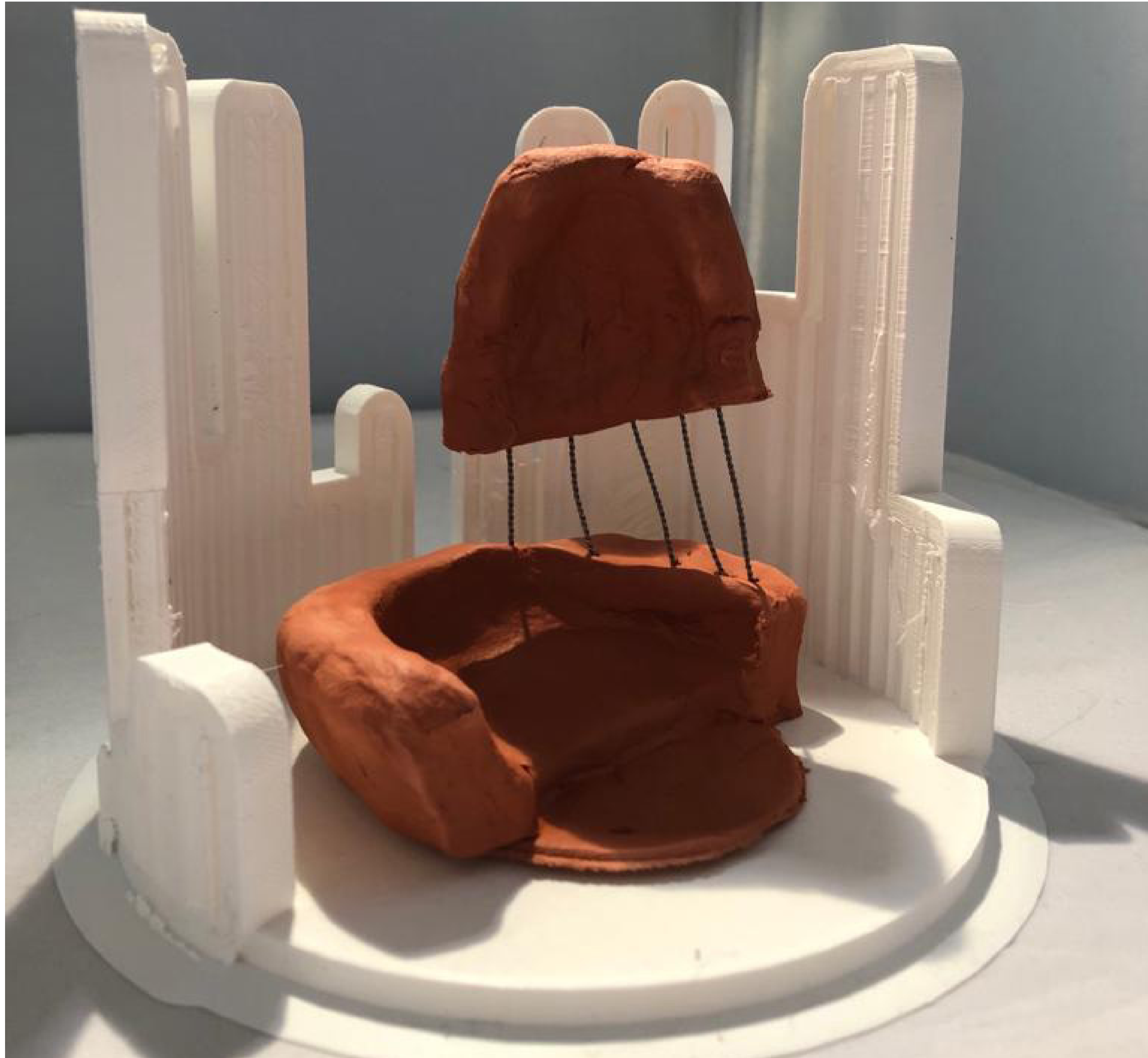
Model of Wax tubes for Hive and pavilions



These Bee cups were a design to be placed on the pavilions as small pots to catch water and become the feeding grounds for bees and other insects. They would be colourful and covered in fluorescent paints attracting bees. Encapsulating the concept of bees partaking within the outside of the Pavilions.

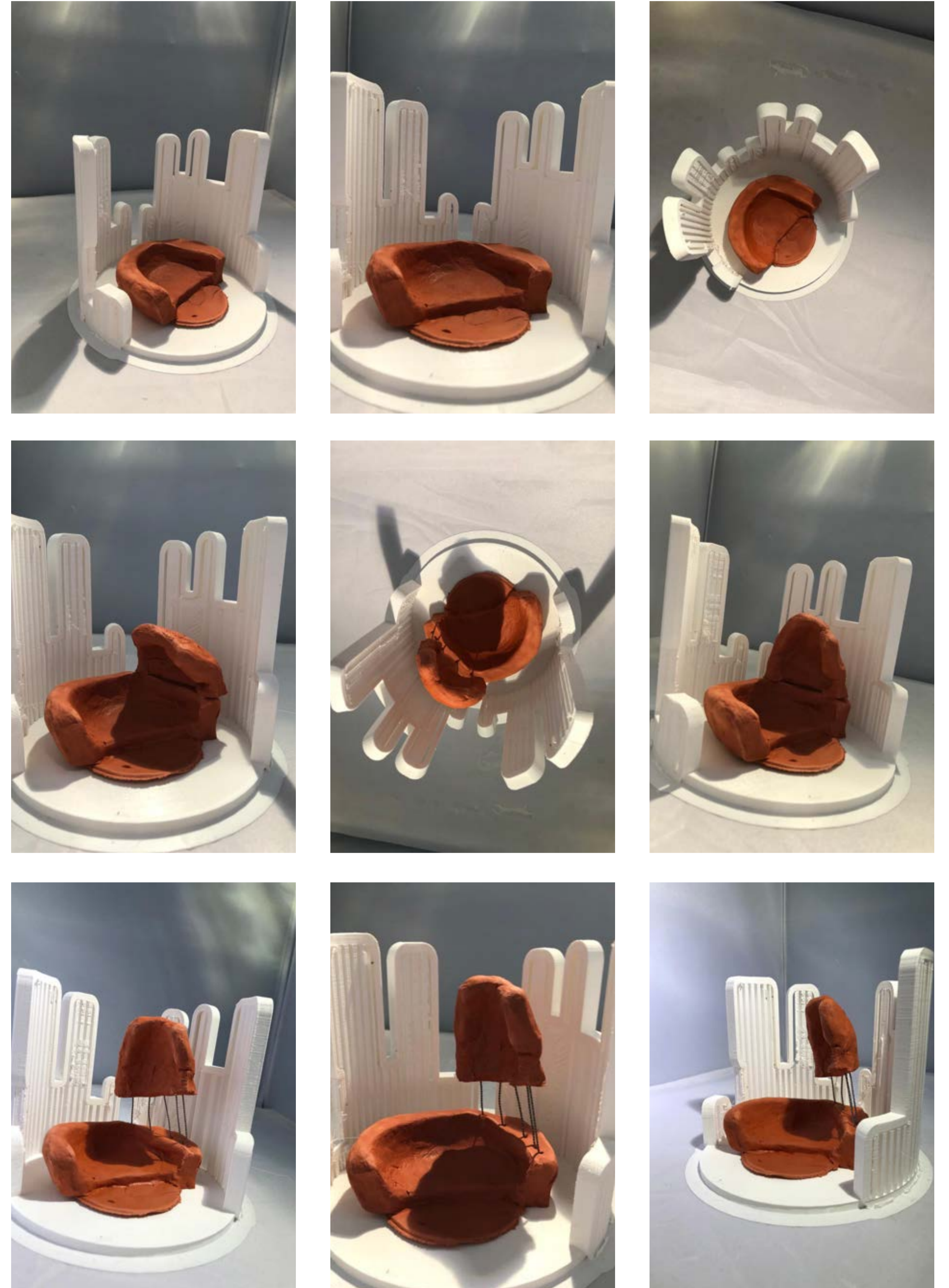


The tubes were inspired by the spectrogram drawings. They are way tubes that would wrap around the pavilion and the individual Hive. One showing how the interior and exterior spaces are connected whilst representing a shelter and providing a stinging space.



Hive/ Isolation Pod Sectional Model

The hive is an isolation pod mainly made from Clay with doors that close and open. The interior of the space is fully managed by those inside, giving the autistic community full control over sound and lighting; aspects they are sensitive too. The section tries to represent the thickness of the spaces, inside to show how sound penetration would be difficult. The pod sits on the wax structure that encapsulates it. Allowing those around the space to continue stinging and playing with shapes and forms.

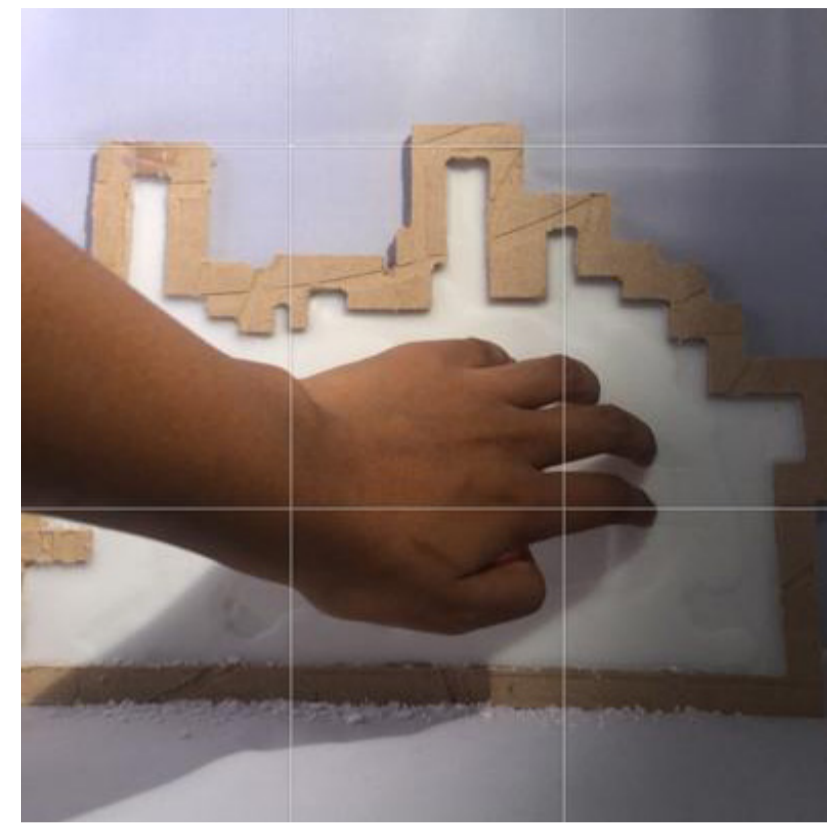
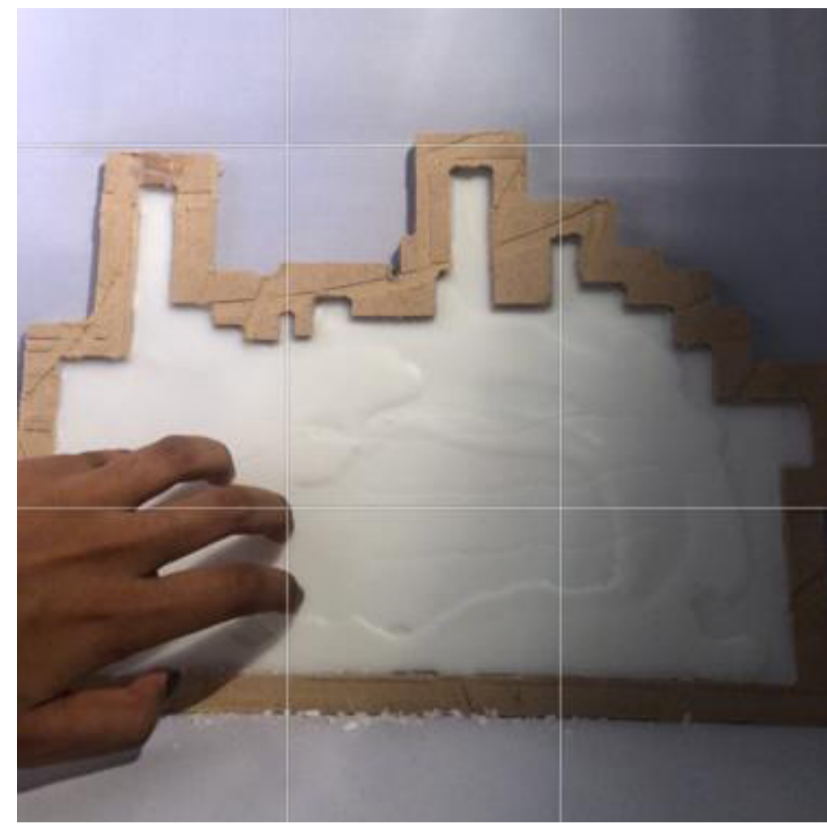
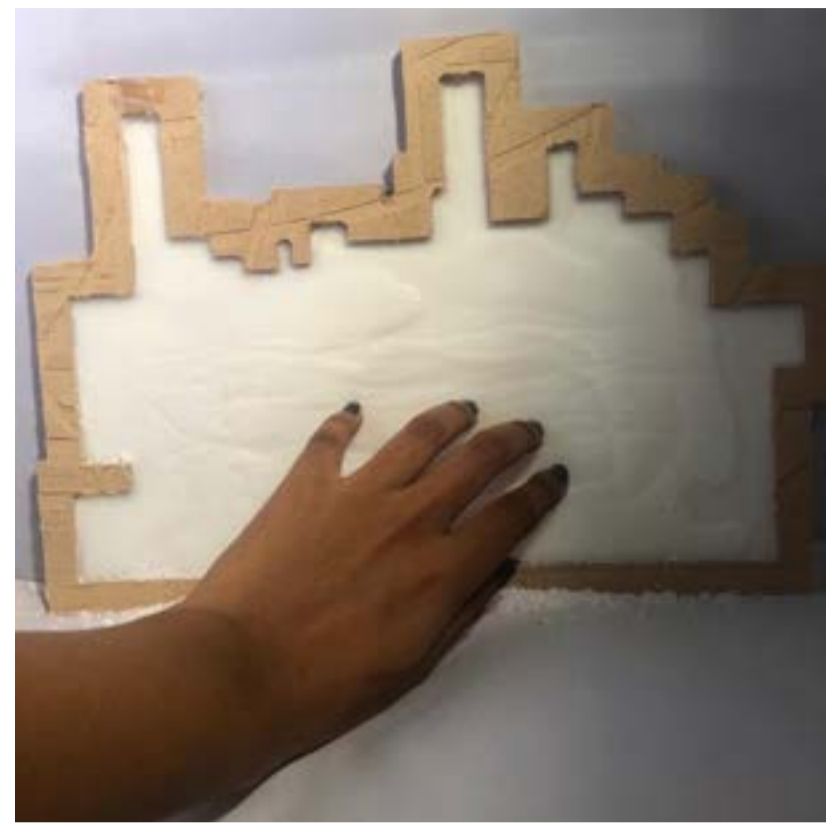


Annotation

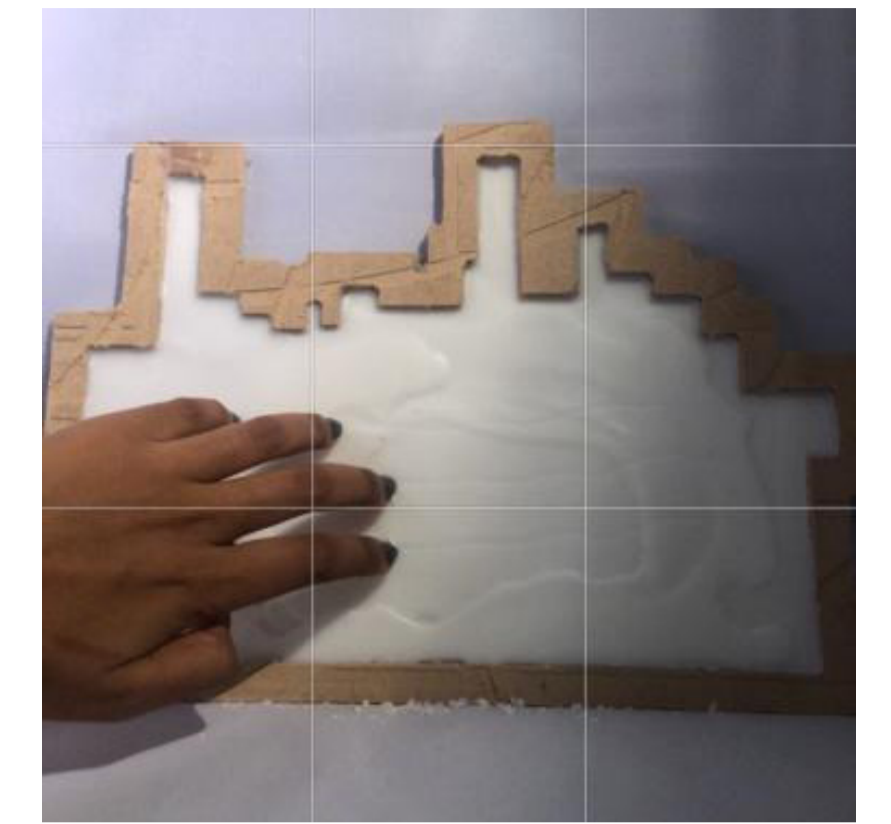
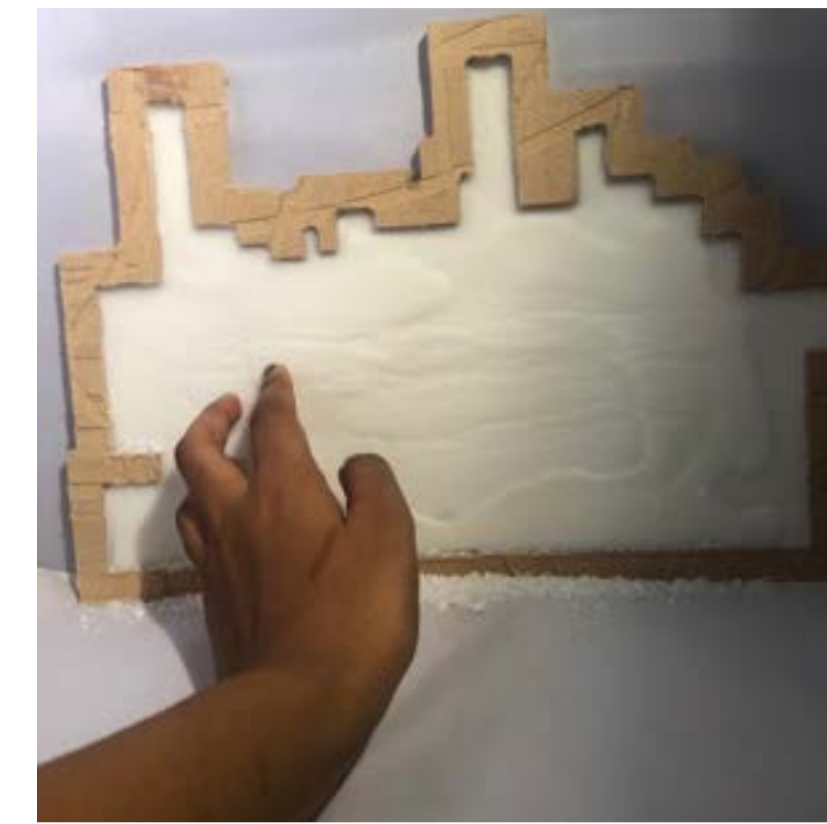
Final Pavilion Render



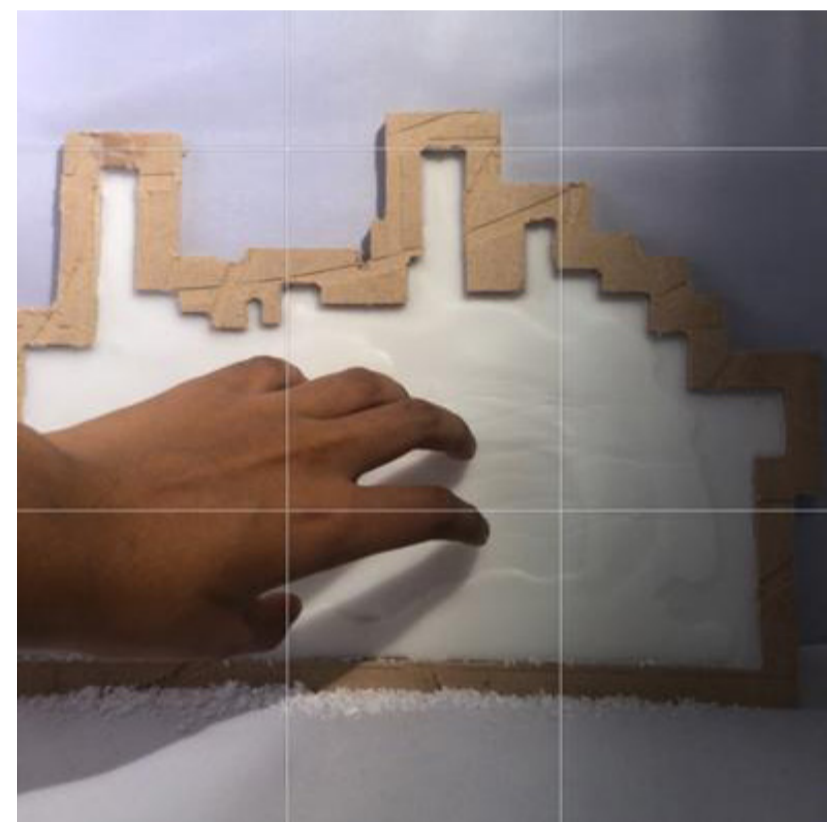
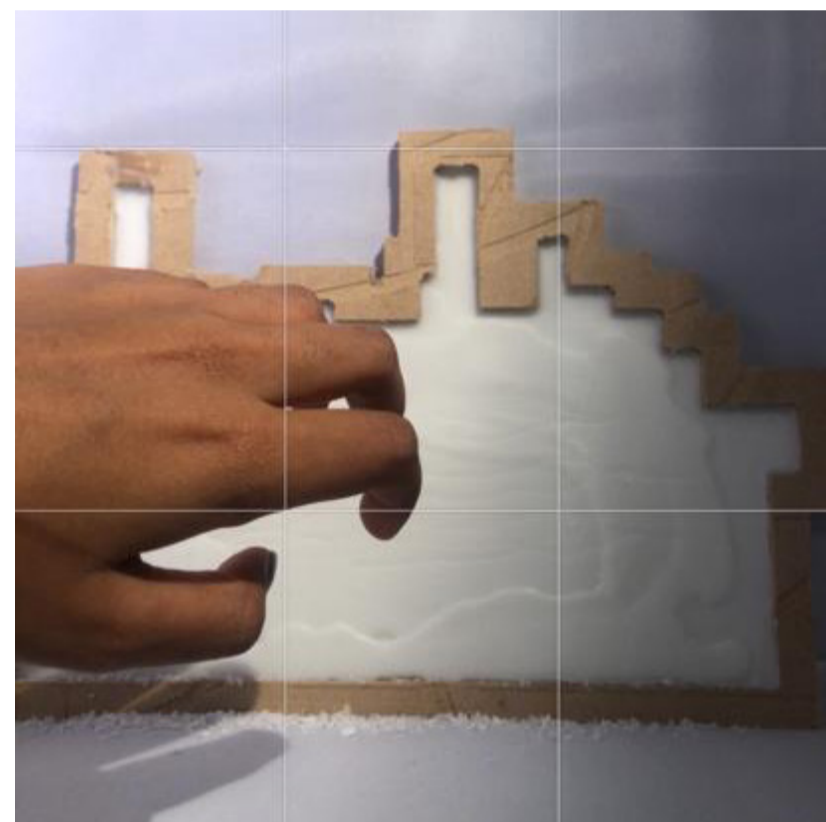
Stimming on Wax Experimentation Over a period of Time



Time: 1 minute



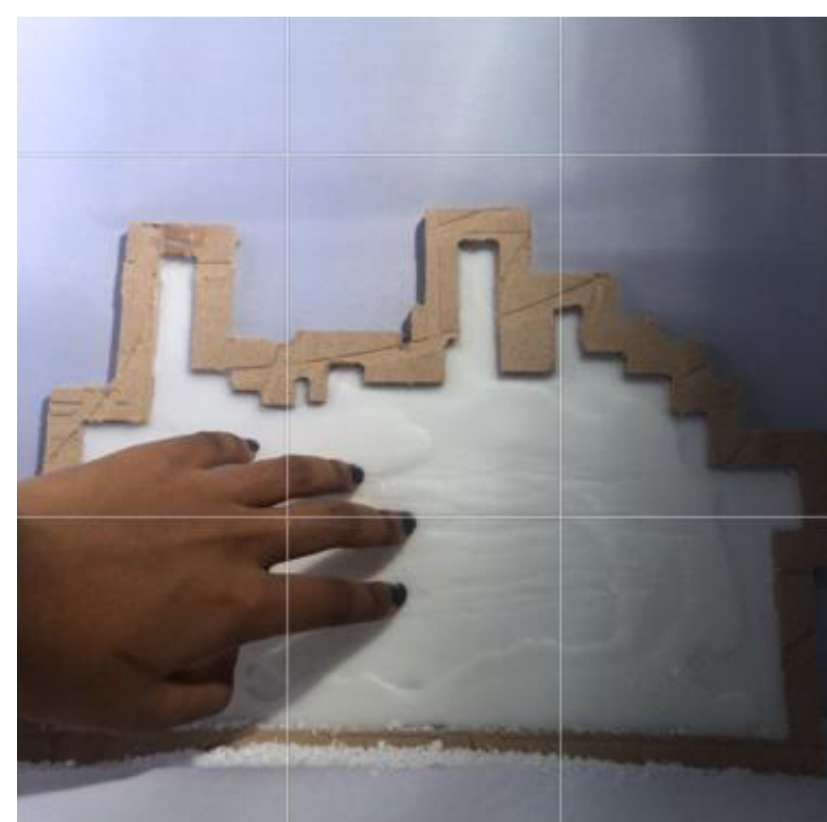
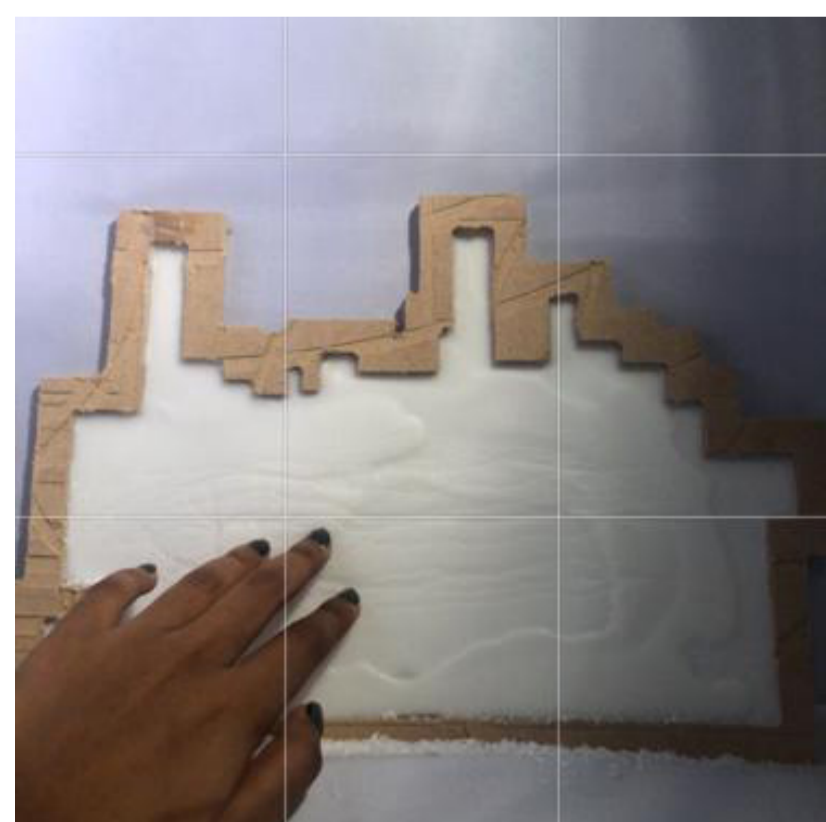
Time: 5 minute



Time: 3 minute



Time: 6 minute





Time-lapse of the outcome of Stimming on Wax Experimentation

I experimented with different Stimming methods over a period of time. The methods used were, scratching using nails and objects, finger tracing, breaking wax, stabbing/punching using nails and objects. I realised that it didn't take long for the wax to break, the time it took for this experiment to show the first signs of broken wax was 25 minutes. However, factoring in the number of children and the amount they stay within the centre. The depth of wax must be much thicker, to be sufficient for enough stimming to take place.



Time-lapse of the Action of Stimming on Wax Experimentation

I also realised that the pattern from my previous design contained a lot of sharp edges therefore the trail and route was changed to one that flowed better and was smoother. Once this experiment was completed the wax particles were everywhere and cleaning this up was difficult. Which meant I need a system that could dispose the wax particles, safely and efficiently.



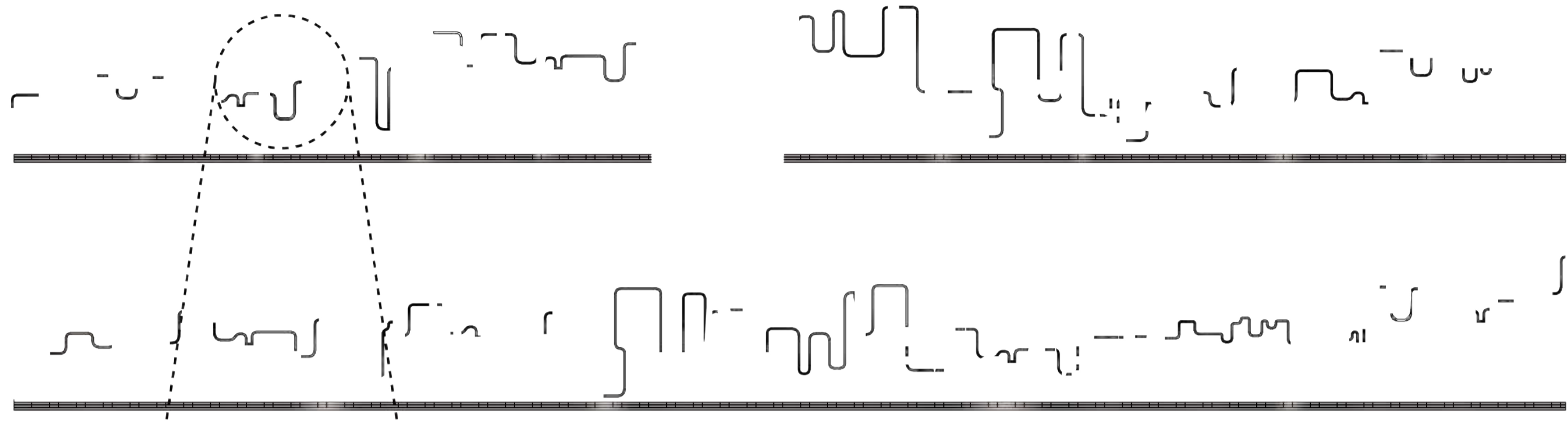
Wax Disposal System Experimentation

Gutter/ Wax Disposal System

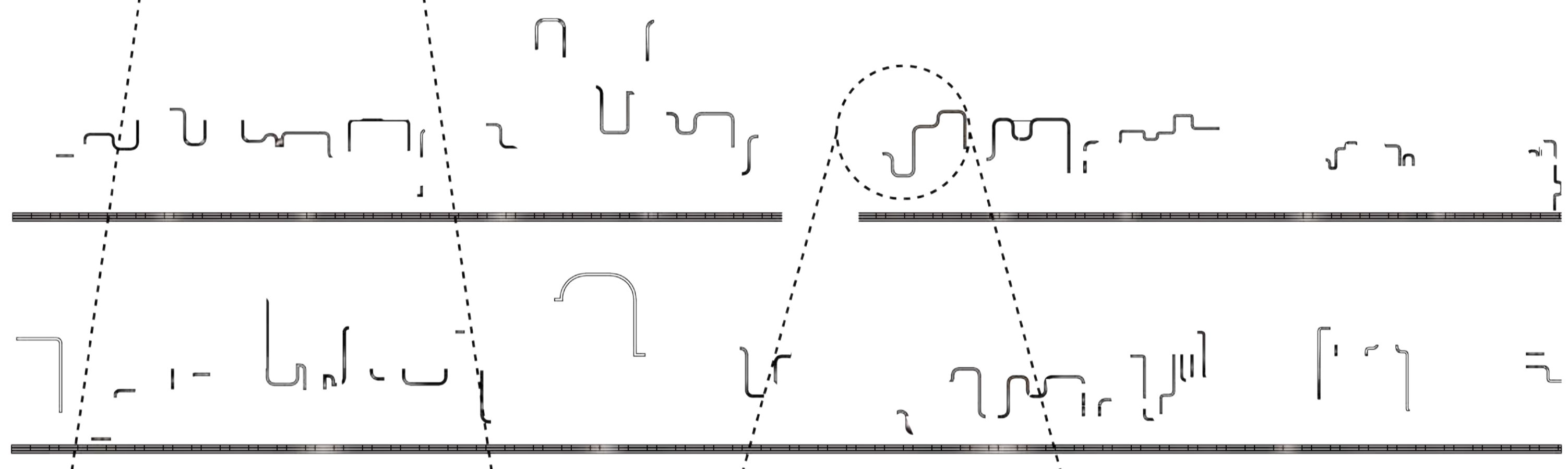
The disposal system works using underground Heating. There would be a mesh like gutter placed under the wax walls. As the stimming takes place the particles will filter out of the mesh into the tubes that would be warm, melting the wax and filtering it through pipes that would then bring it to the collection point to be collected by the employees to be manually refilled on the walls. This system recycles the wax and automatically cleans the mess from the stimming.

Experimental Model of Gutter/ Disposal system of Wax

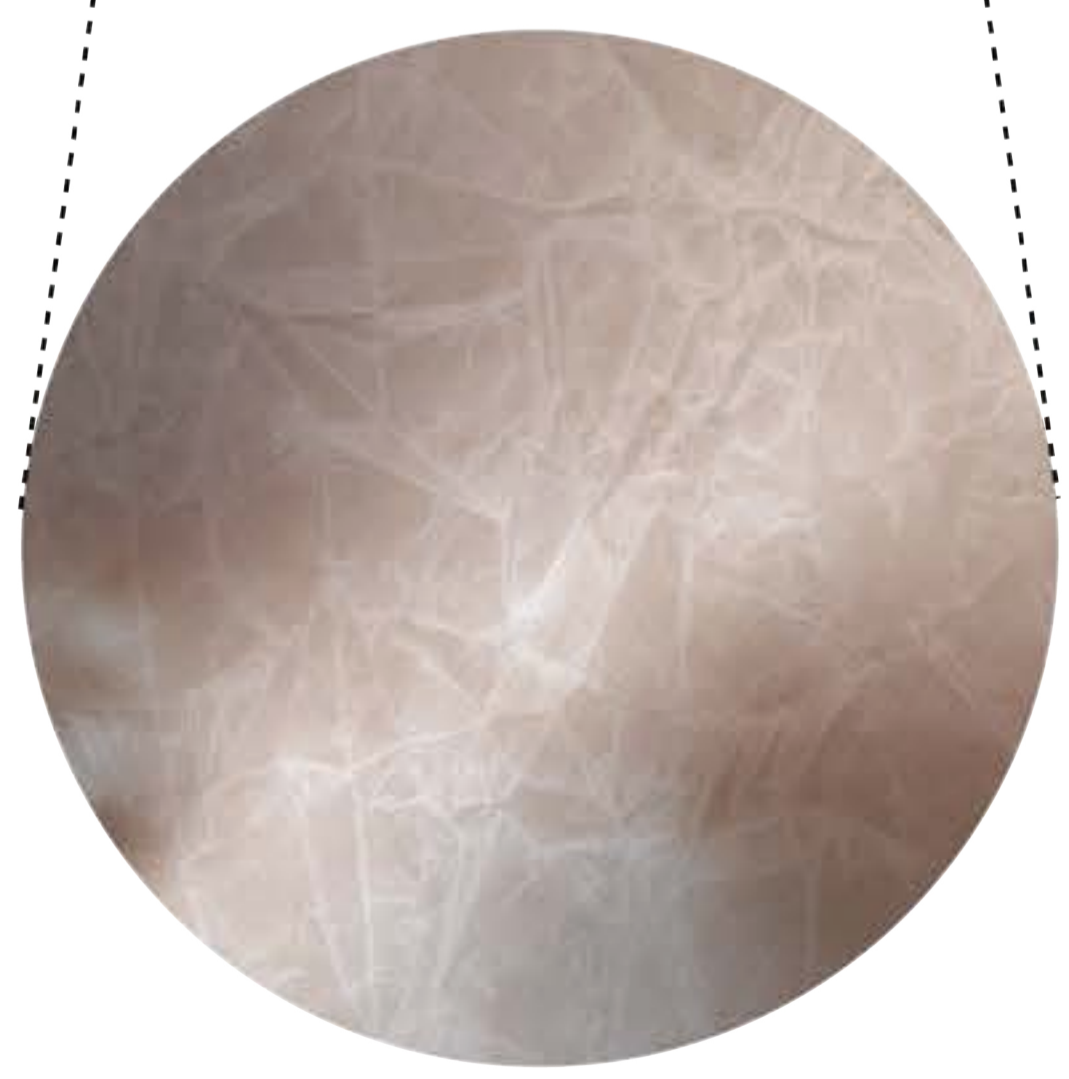




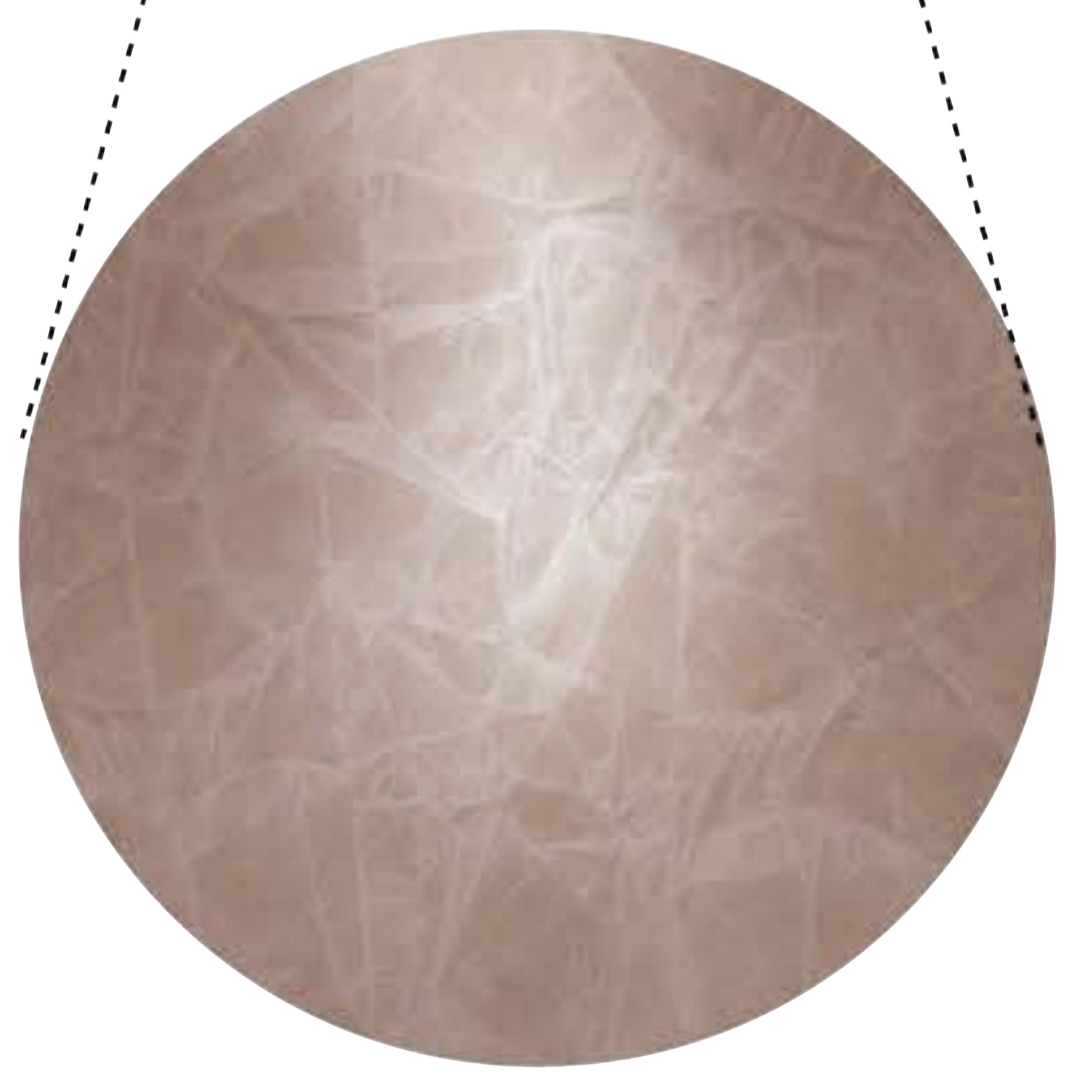
Section of Wax navigation System on walls (Ground Floor)



Section of Wax navigation System on walls (First Floor)



Zooming into Wax system with different lighting



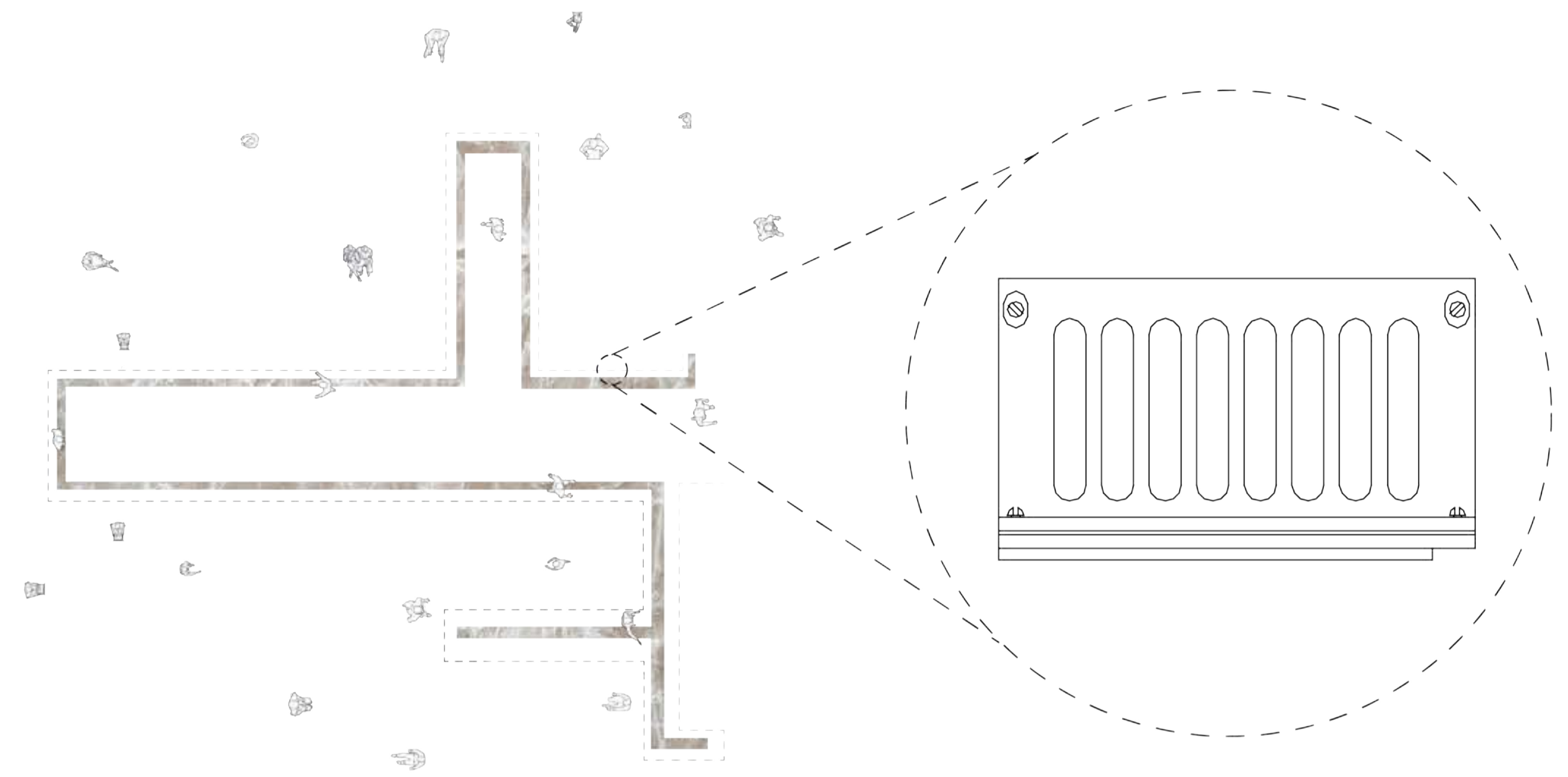
Zooming into Wax system with different lighting



Wax experimentation 1

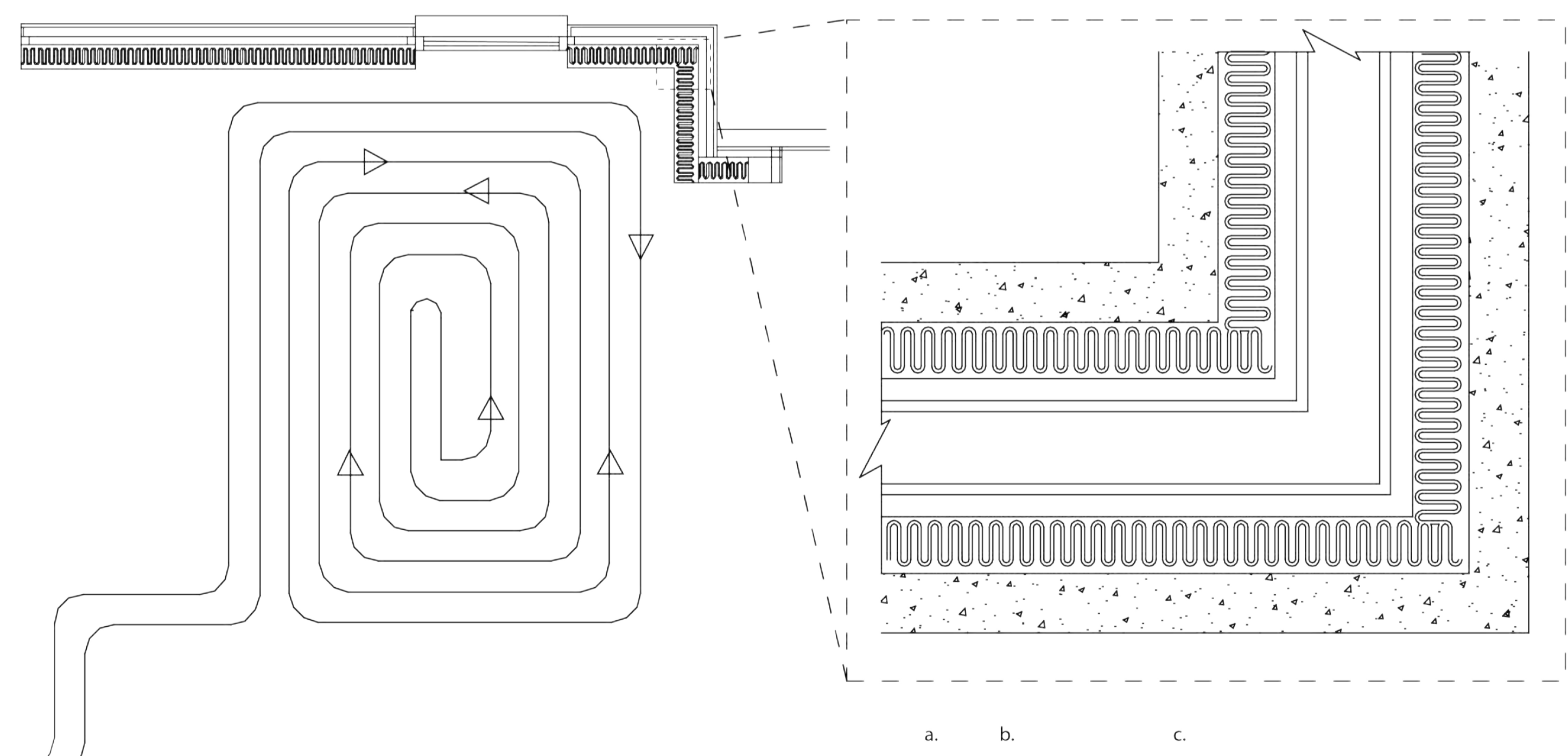


Wax experimentation 2



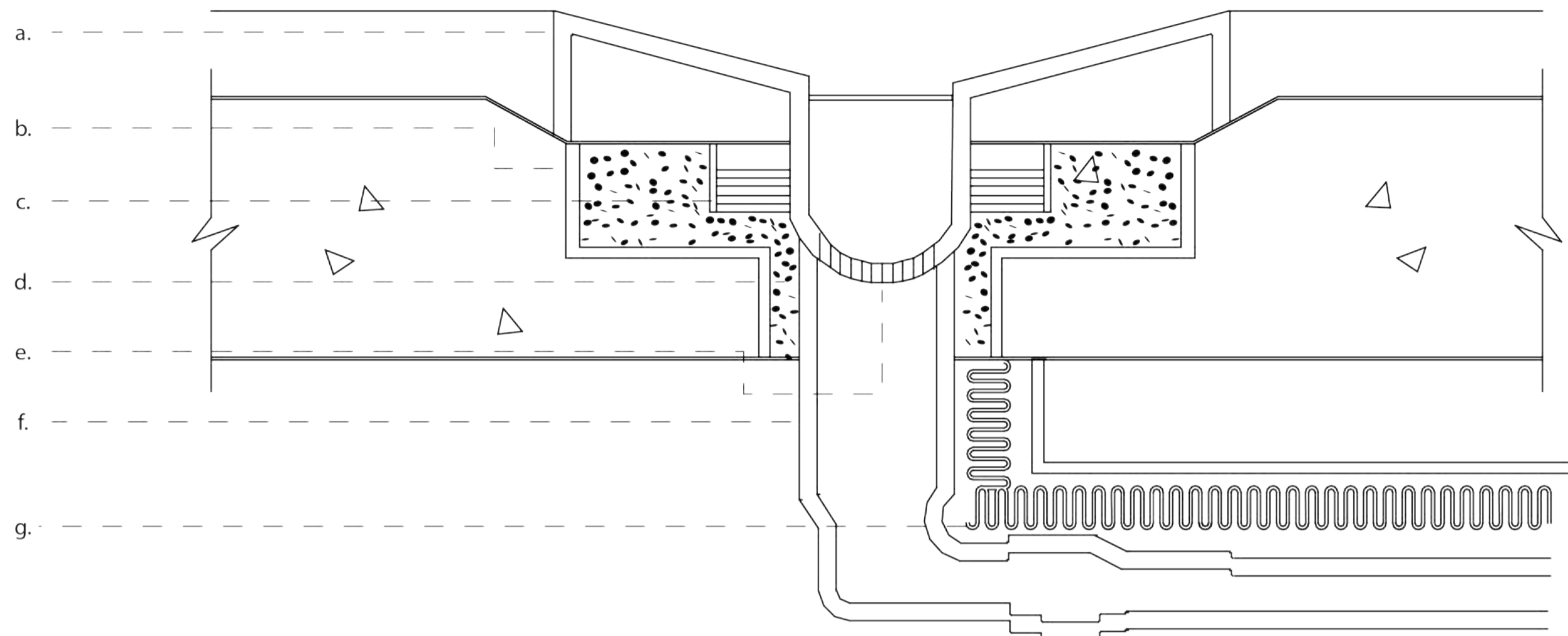
Plan view of Floor Wax Navigation system

Plan of Gutter - Wax disposal system



Floor Heating system for Wax temperature control

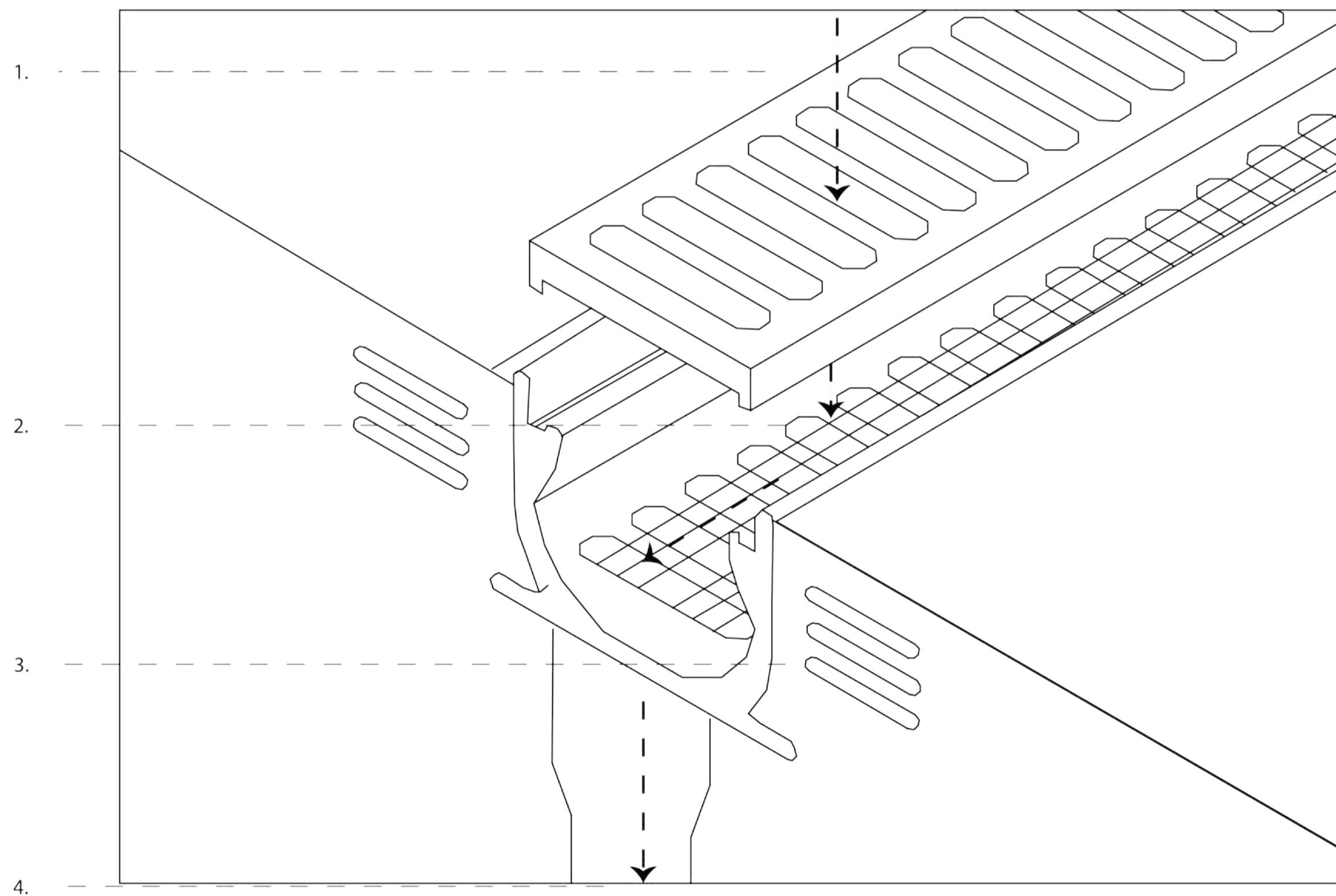
Zooming in Heating system
a. Heating pipes and insulation
b. Concrete
c. Pipe and Filter



Section of Wax Disposal System Embedded on Floor

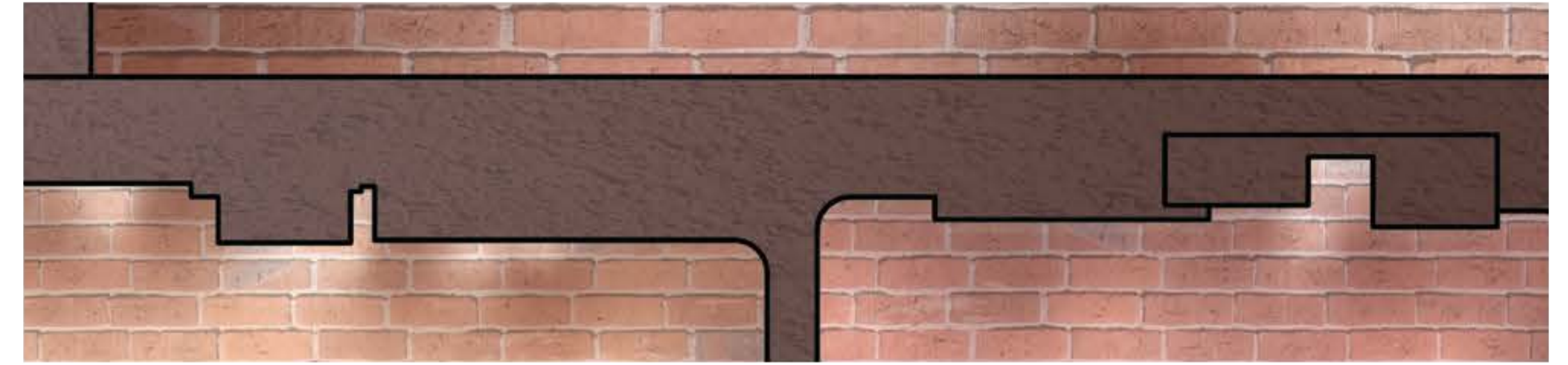
Disposal system Elements

- a. Slope towards the gutter system
- b. Air Controlled membrane
- c. Temperature control Heating system
- d. Concrete
- e. Wax Filter
- f. Pipe towards collection
- g. Temperature control Heating system for tube

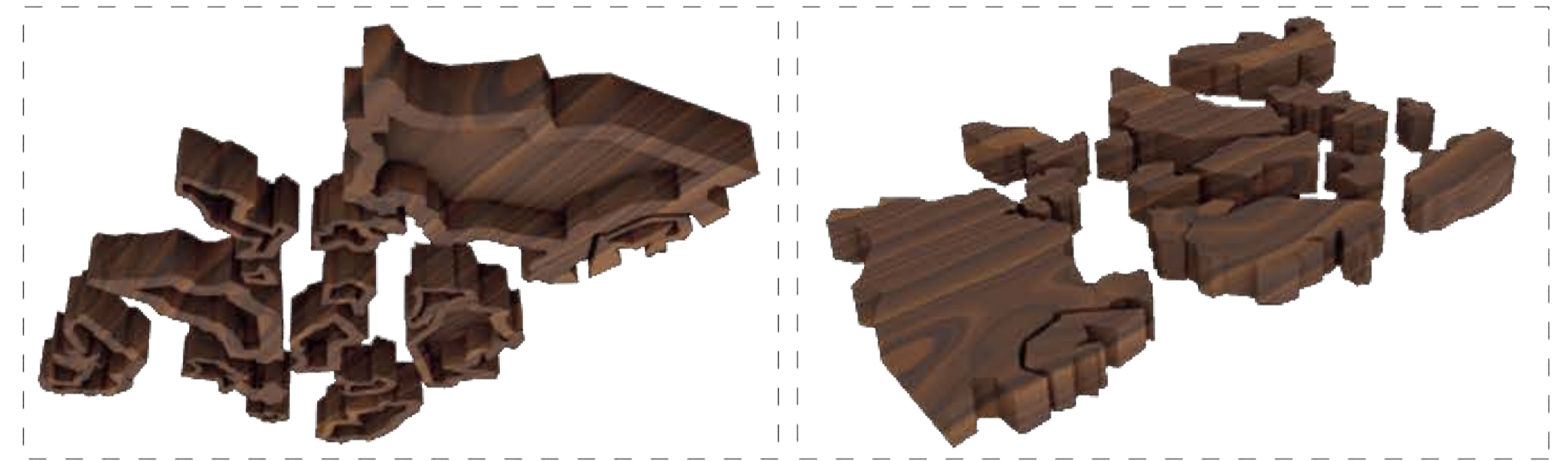


Steps within the Disposal System

1. Once the stinging actions are performed the wax would fall in the gutter
2. The filter system would filter the wax out
3. The temperature control using insulation and heat would help the wax not harden and flow through Pipes
4. Which would then flow out the tubes towards collection point where the wax could be reused.

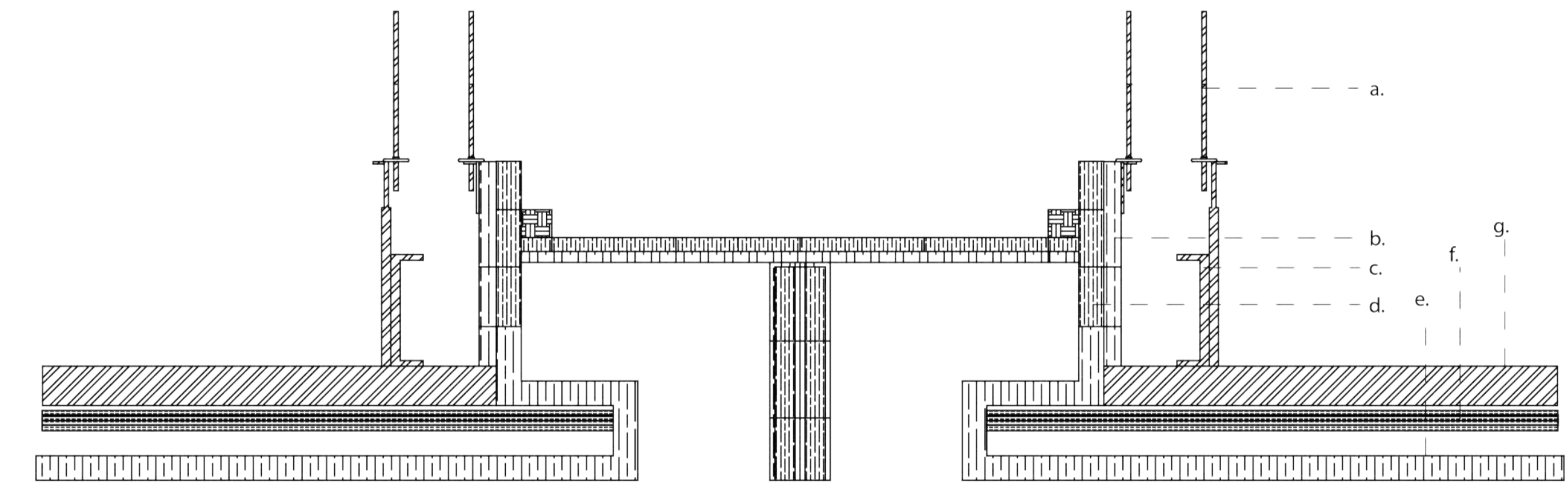


Section of Ceiling Extrusions for indirect light fittings



Ceiling Extrusions Bottom View

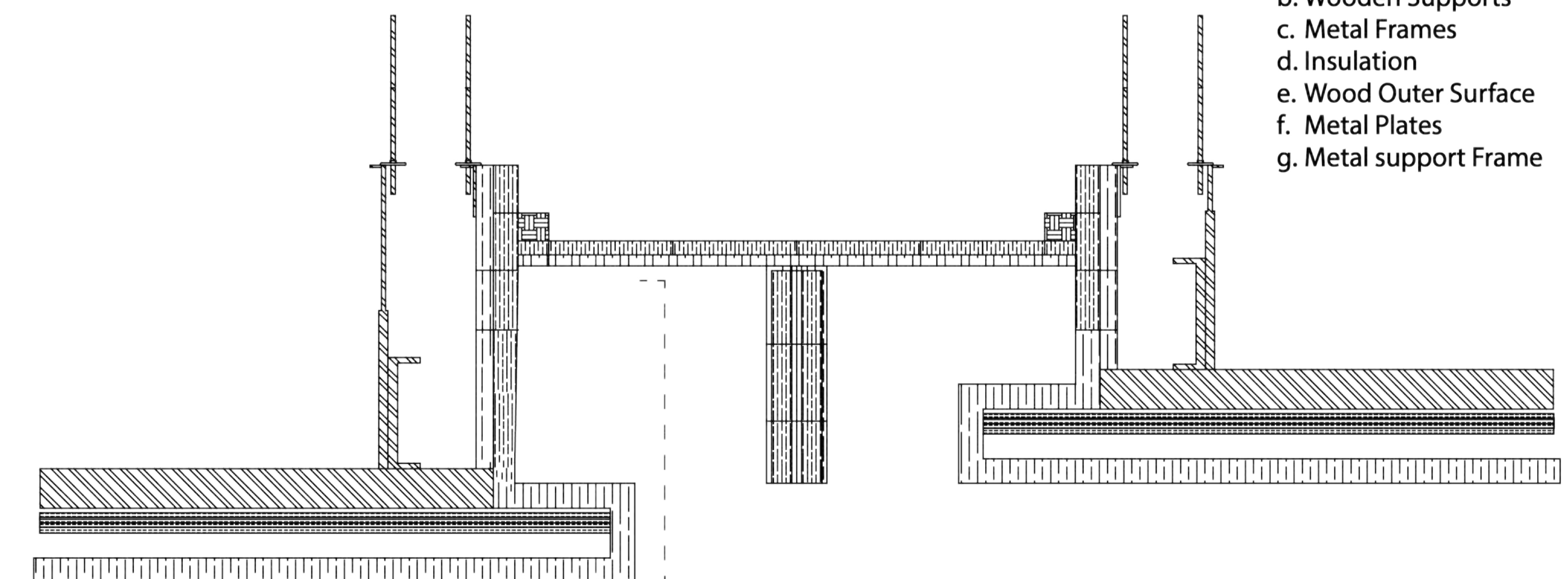
Ceiling Extrusions Top View



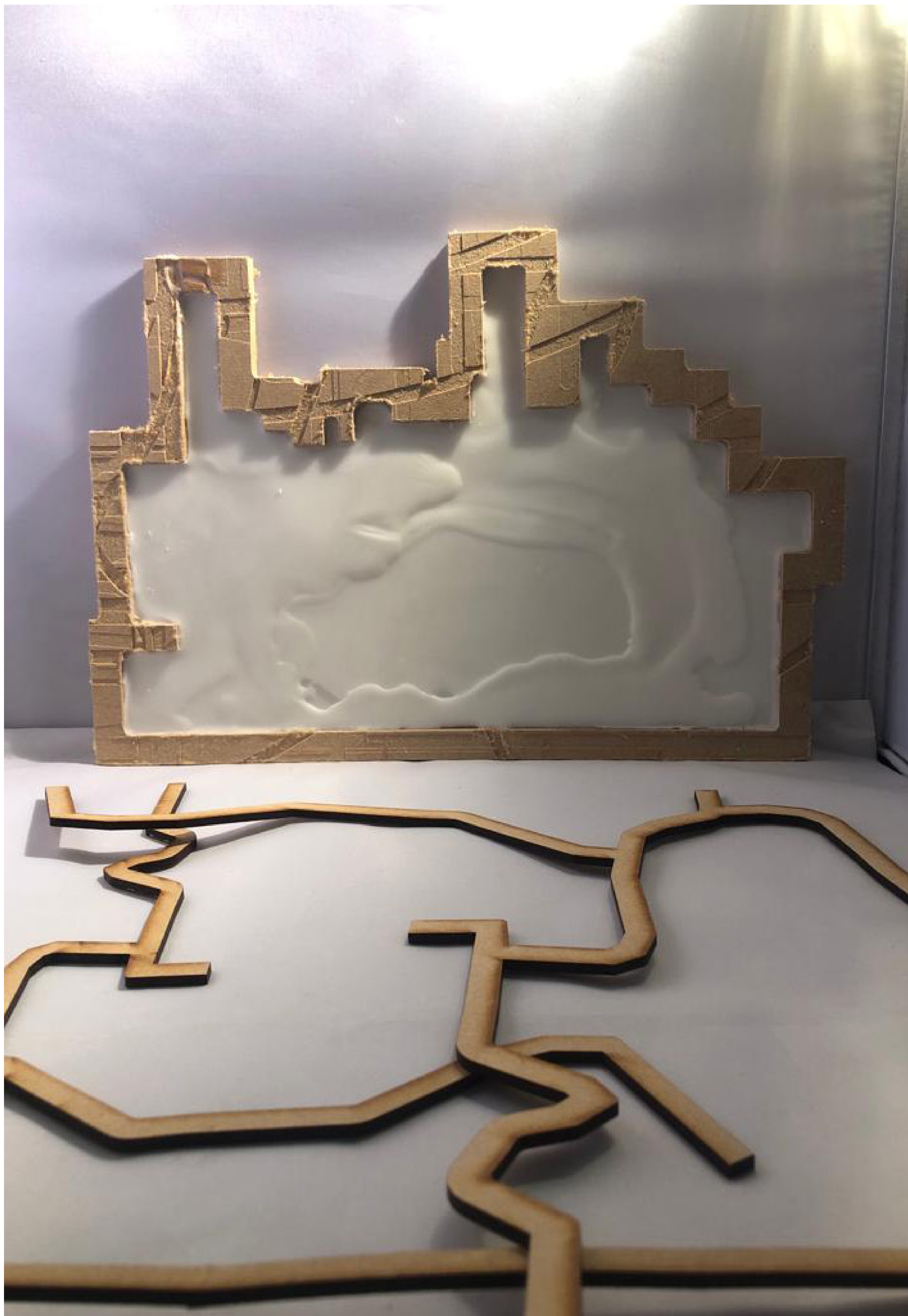
Technical Section showing Ceiling Extrusion on the same level

Ceiling Extrusion

- a. Hanger Rods
- b. Wooden Supports
- c. Metal Frames
- d. Insulation
- e. Wood Outer Surface
- f. Metal Plates
- g. Metal support Frame



Technical Section showing Ceiling Extrusion with different projections



Final Drawings of Solitary

The Plans, sections and elevations have been developed for the final realisation. The spaces have been updated with the new furniture pieces and new furniture pieces. The Kitchen is simplified to allow a free-flowing space along with vents and storage spaces. The tables in classroom both group and Invidia have a new pattern for the wax stinging embeddings. This pattern is also applied to the entire building walls, eliminating the sharp edges and creating an easier route to follow. The Chairs have been iterated to be much lighter, with a delicate bounce to permit stinging. Each space has cabinets, shelves, and bookcases, that were designed using the sound waves. These spaces also give each area its own identity along with various ceiling shapes and depth, helping with easier recognition. The hives and outer seating spaces have also been updated along with sensory rooms that have a new addition of play caves that becomes part of the architecture. These drawings have been rendered in a much brighter light and shade compared the previous render; representing the playfulness of the space whilst controlling direct intense lighting, to accommodate the autistic community's needs.



Plan of Solitary Learning Centre



Plan of Egg Pavilion



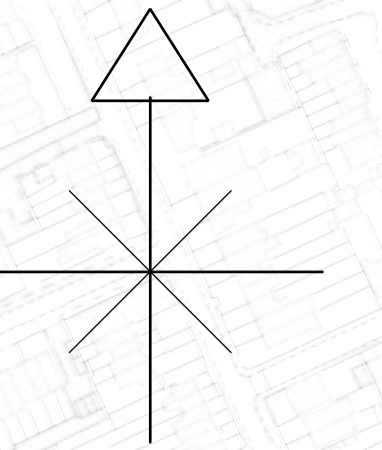
Plan of Larva Pavilion



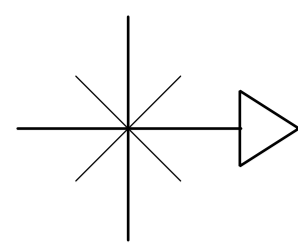
Plan of Pupa Pavilion



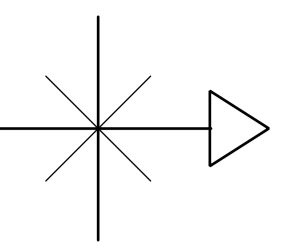
Plan of Adult Pavilion



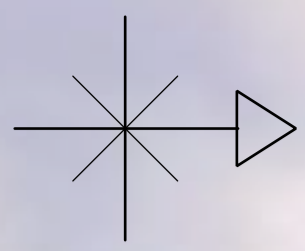
The four Pavilions are selected in these positions to help with selected activities. Each activity chosen helps with certain a skill set that needs improving from the Spectrum and are inspired by existing activities and interviews. These activities also align with certain labours from Bees.



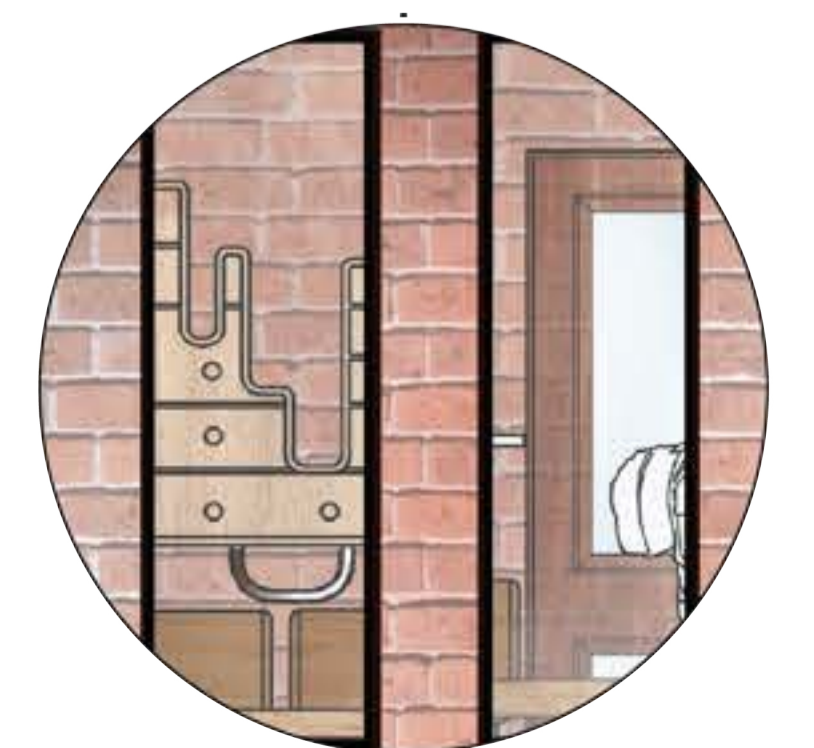
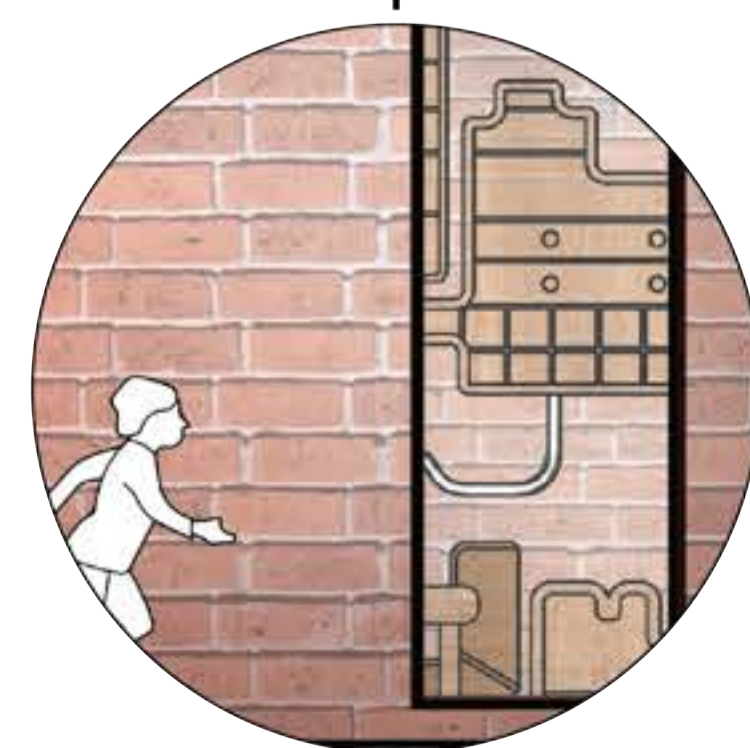
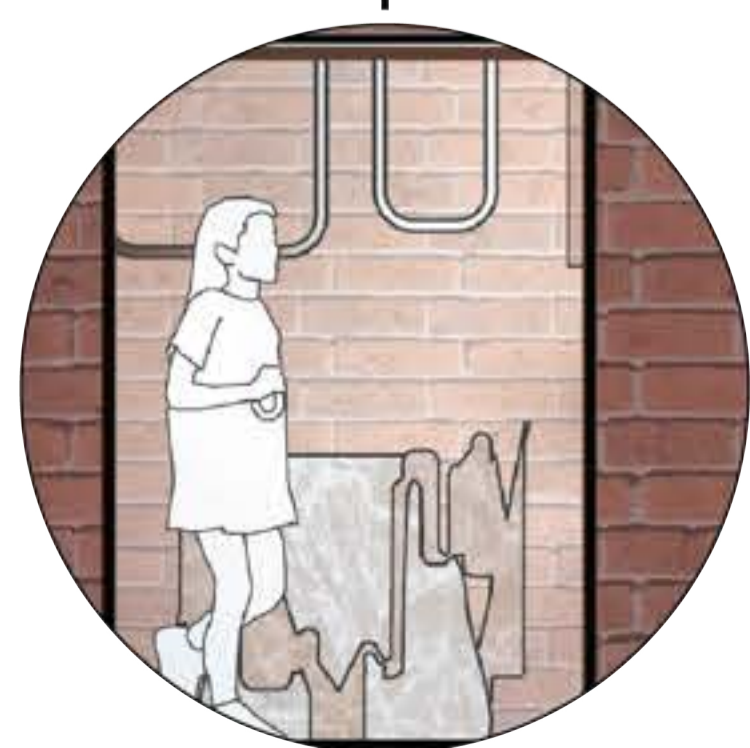
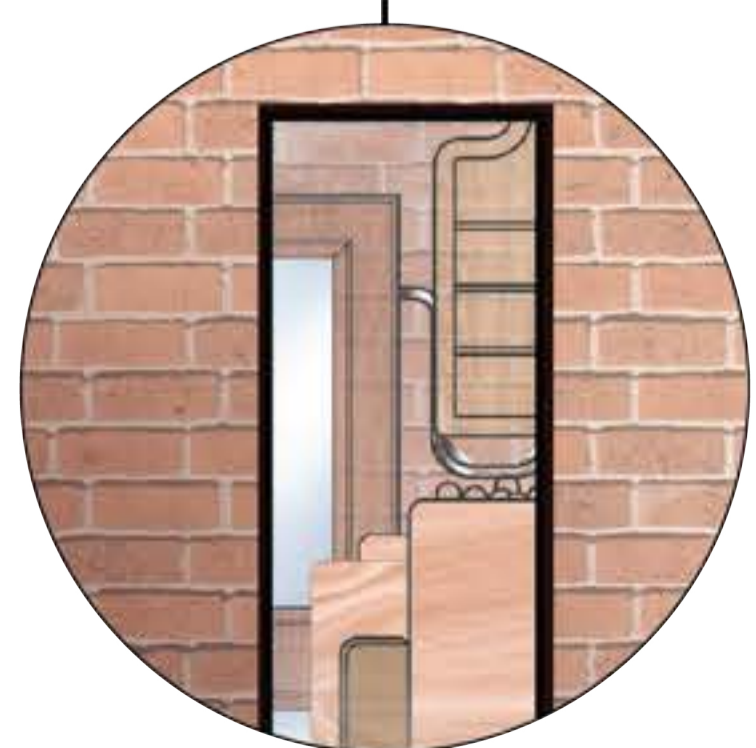
Ground Floor Plan of Solitary 1.100 on A2

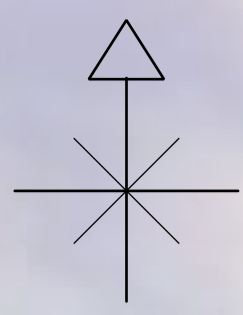


First Floor Plan of Solitary 1.100 on A2

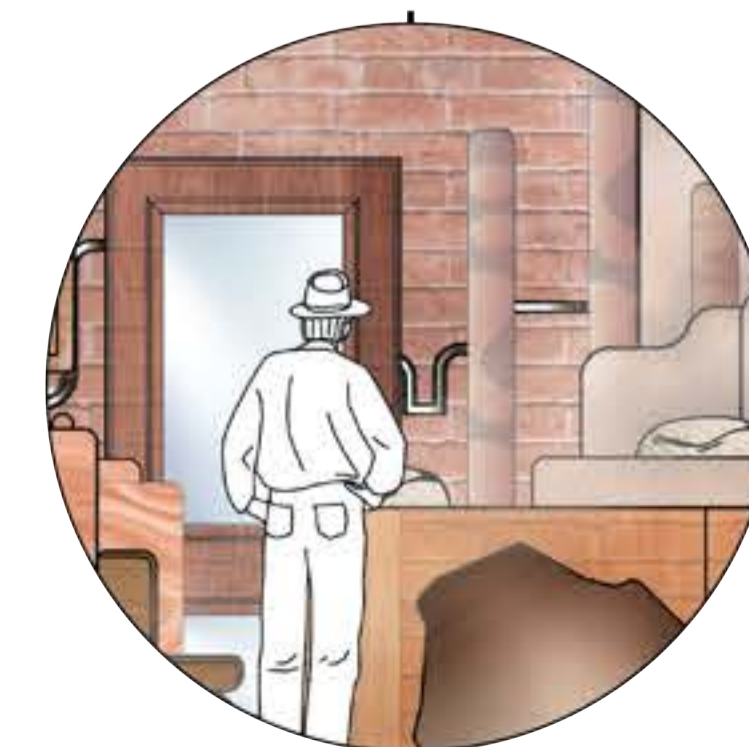
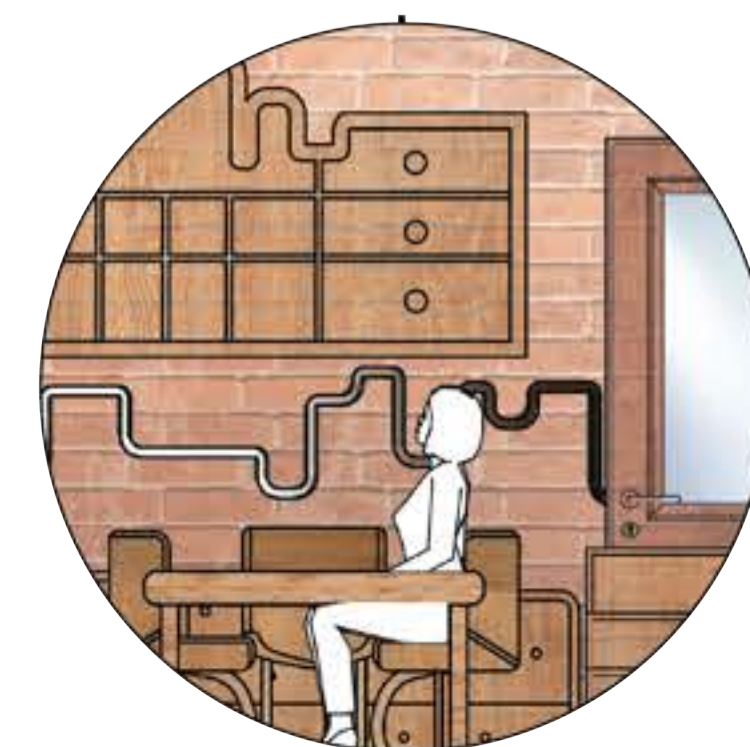
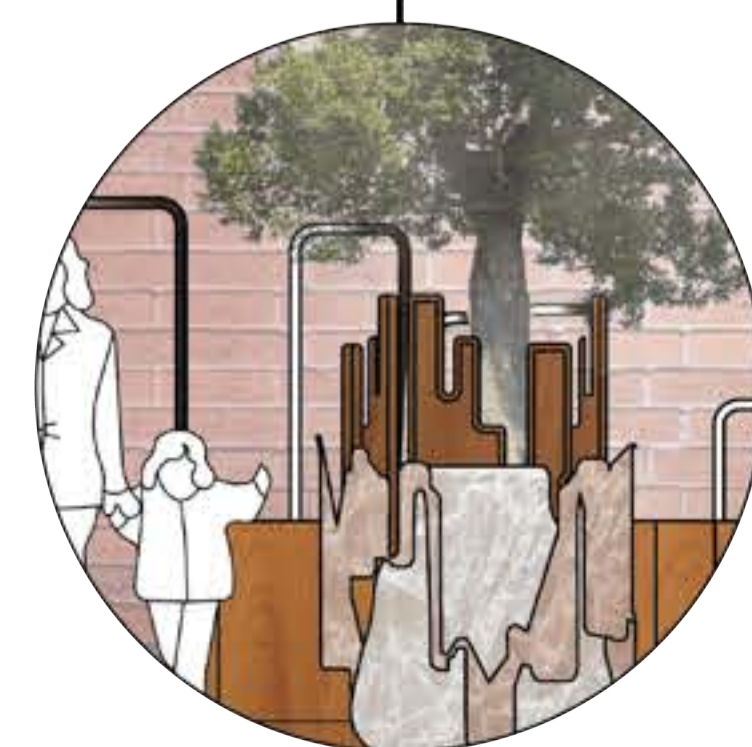
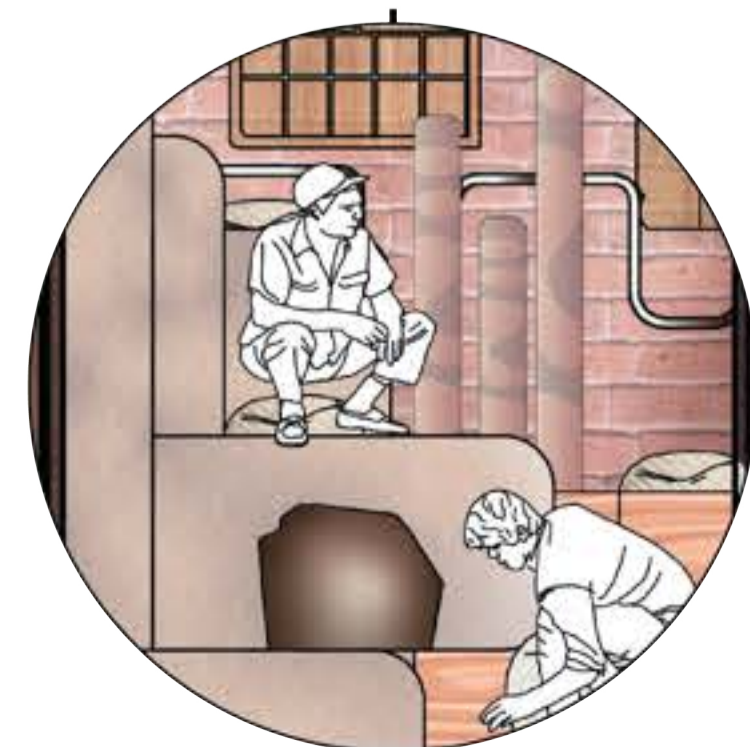
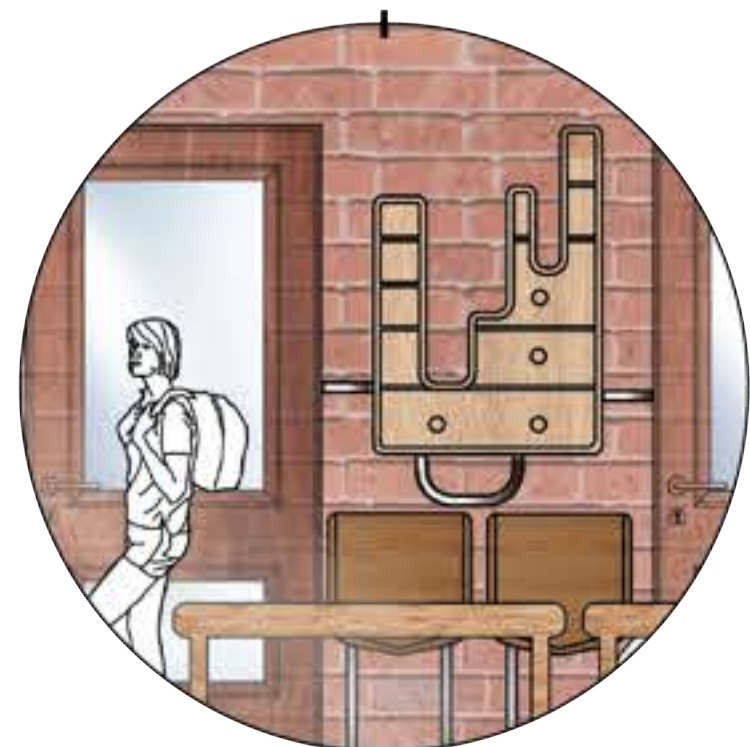
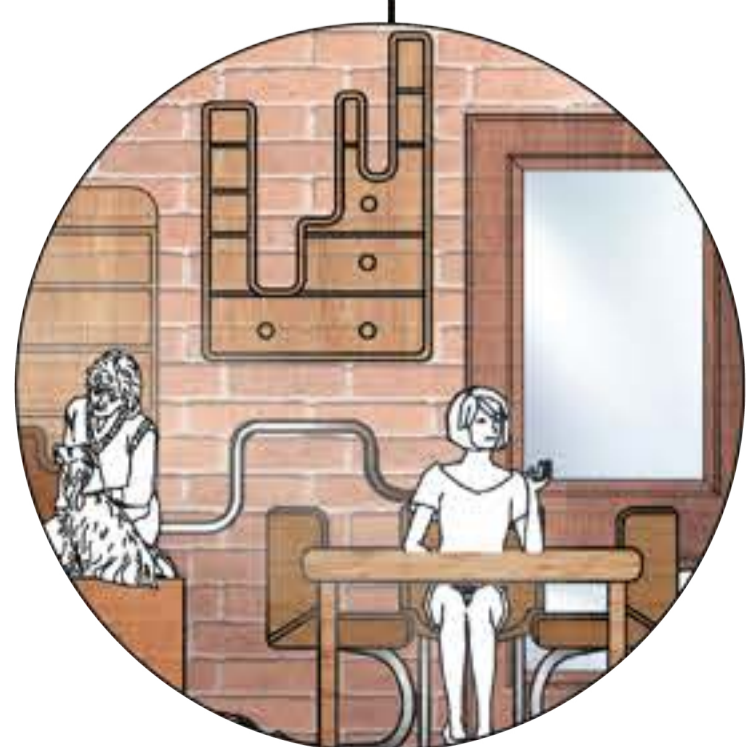


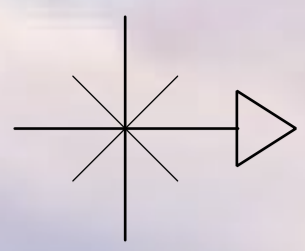
Front Elevation of Solitary 1.50 on A1



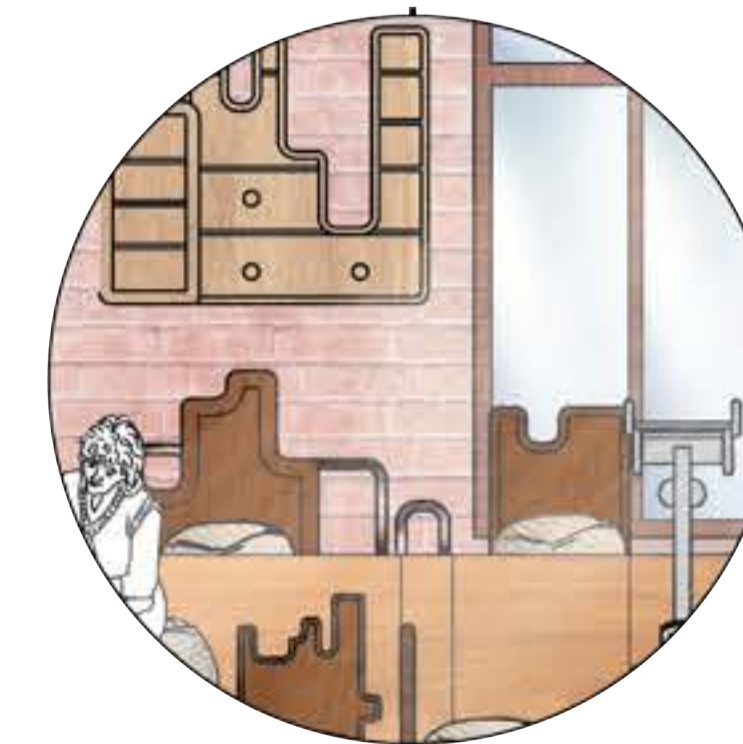
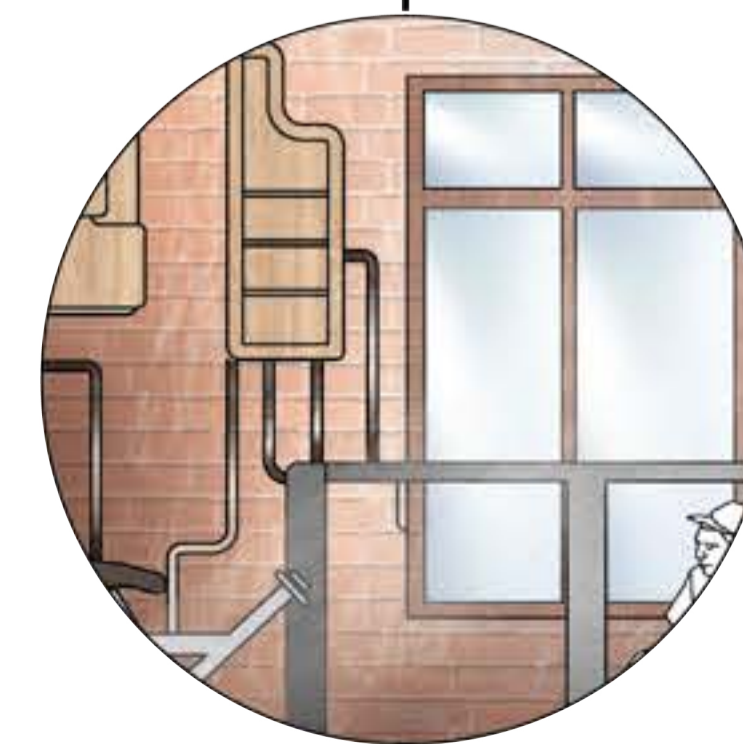
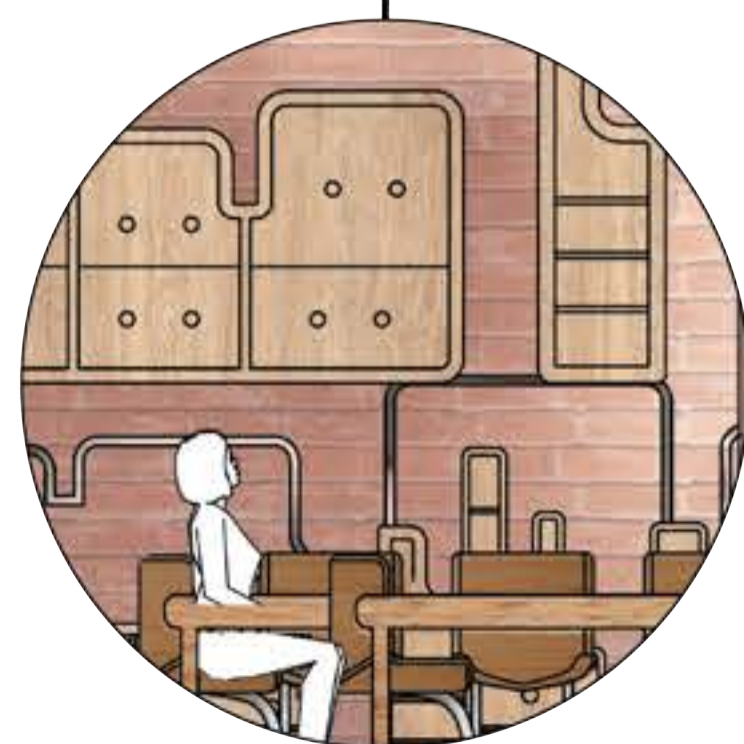


Longitudinal Section of Solitary 1.50 on A1





Latitudinal Section of Solitary 1.50 on A1

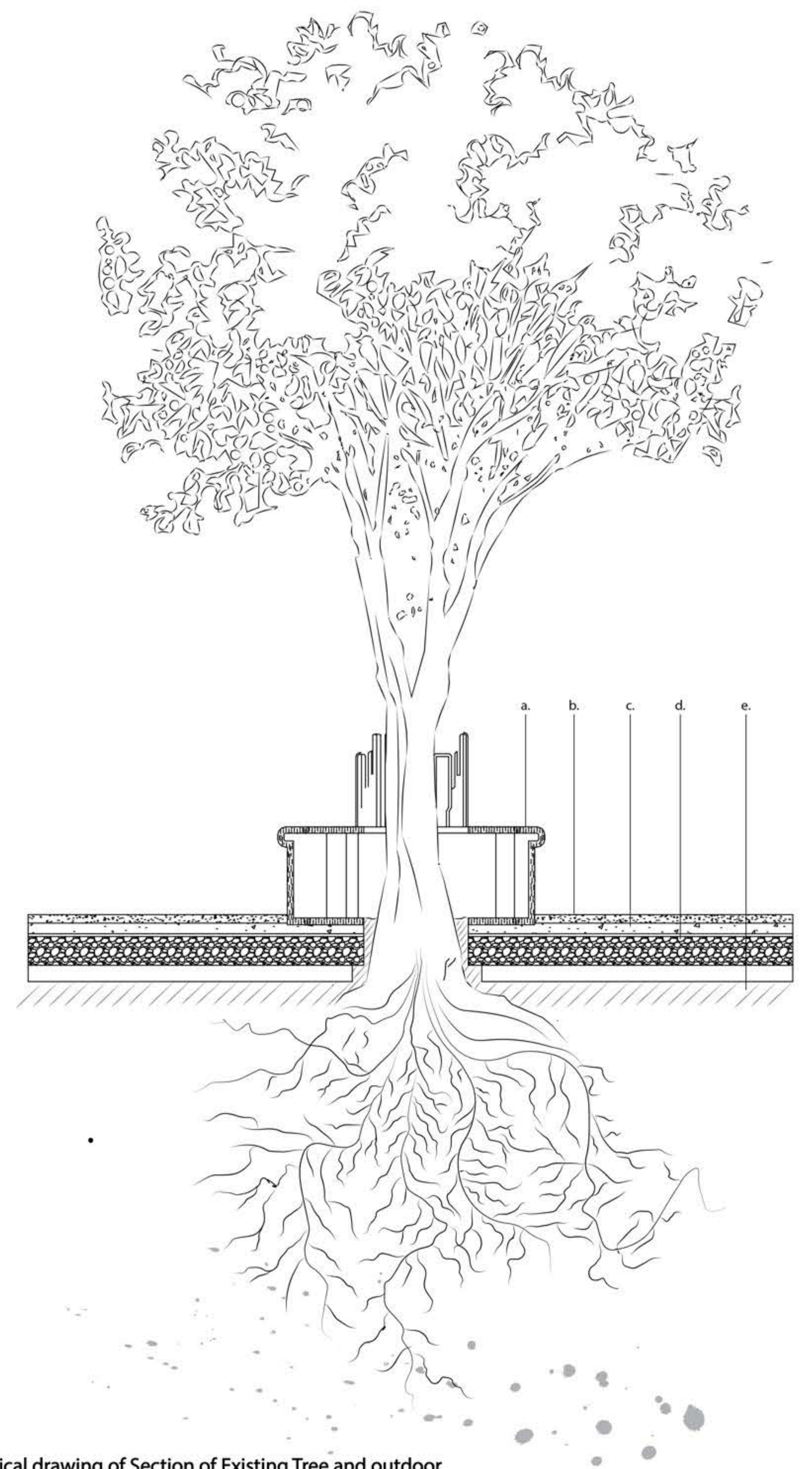


Section of outdoor seating surrounding Existing Tree



Elements from Sections surrounding the tree roots

- a. Wood (Plywood)
- b. Stone flooring
- c. Concrete
- d. Gravel
- e. Earth



Technical drawing of Section of Existing Tree and outdoor seating

Perspectives

