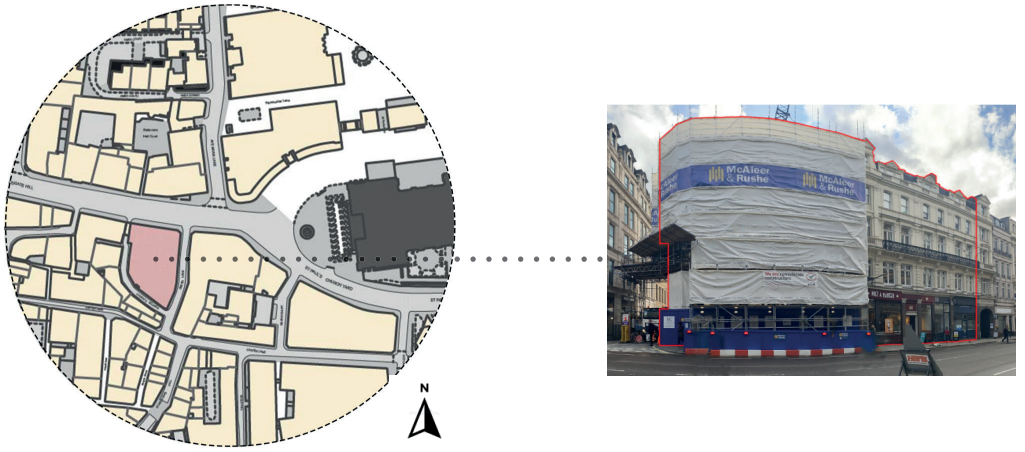
# DESIGN STATEMENT
# ELIFNUR ULUCAY (DS.06)
# DES 2B: A COLLEGE OF NATURAL PHILOSOPHY

## CLIENT, COMMUNITY & CONTEXT

The brief is to design a College of Natural Philosophy on the same site as the mathematical house. The client of the project is the IIC (International Institute of Cosmism) who will be overlooking and funding the project. The occupants of the college are students studying a science based course at university, practising doctors, academics and researchers.

The site is located on Ludgate hill in the City of London. North east of the site is St.Pauls Cathedral. The site is affected by its topography as there is one contour line that goes through the site directly with a spot height of 15m above sea level. South of the map beneath my site there is another spot height at 13.4m showing that there is a gradual slope towards the south west.



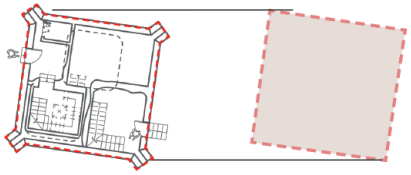

Map showing site and the surrounding context

## CONCEPTS & STRATEGIES

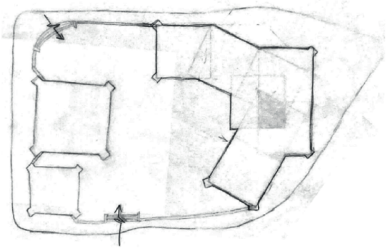
The form of my college is derived using the square module from the mathematical house on site. Using this, I have explored ways to unify the mathematical house and the college through materiality, form and placement on site. The college is made up of a library building and a research centre that are joined, creating a flow of people between the two buildings at both podium level and a higher level.

My college explores the concept of increasing life expectancy of people with illnesses that shorten their lifespan, using medicine and modern technologies, which I've interpreted from the cosmist idea of immortality.

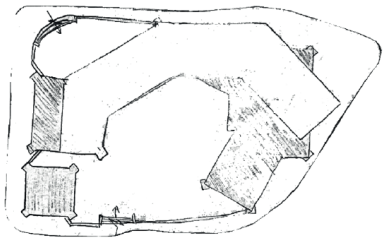
The facade is a glass curtain wall that holds azolla in the cavity, similar to the mathematical house, contributing to many environmental benefits. However, the research centre also accommodates a small scale azolla farm on the roof terrace to be used as a bio - printing material.



Square module from existing Mathamtical house on site.



Ground floor



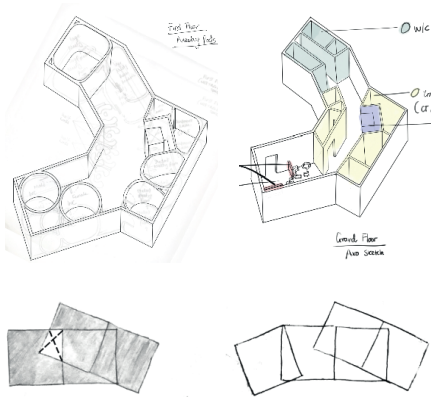
Connecting floor

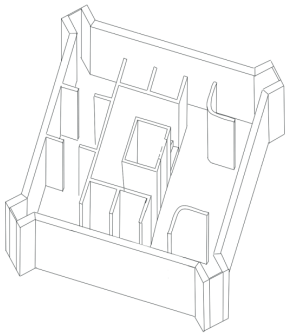
## CREATIVE PROCESS

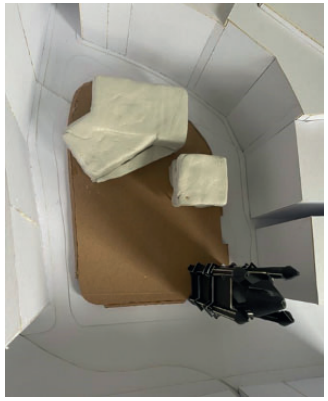
Throughout the project I have explored the form of the buildings that make up my college through iterative drawings and axonometric sketches. After the initial sketches, I started modelling 1.200 massing models of card and clay on my 1.200 site model, which helped me understand how the buildings and podium would intersect with each other.

The massing models and sketches developed the exterior form on site, next to my mathematical house. Whereas the axo drawings, started to explore the interior spaces, flow of people and eventually the programme of both buildings.

For the facade I experimented with water and glass bowls with and without frit to explore the shadow effect created by the south facing facade.



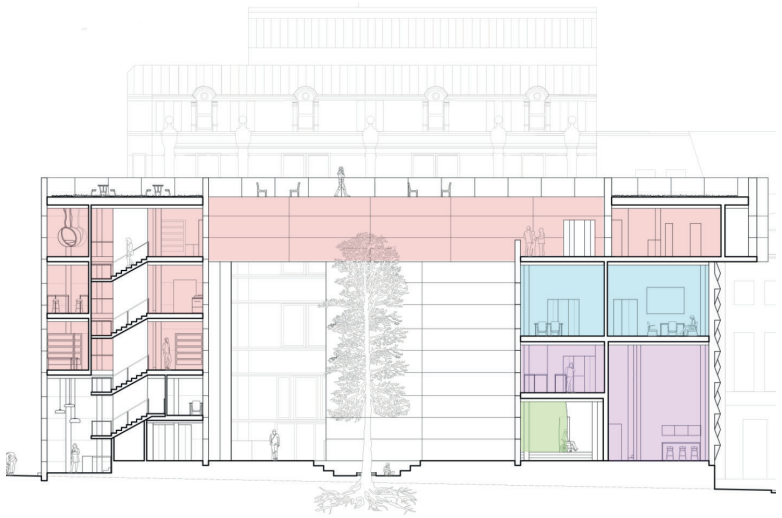




## PROPOSAL & PRACTICAL RESOLUTION

The proposal for my college of natural philosophy is that it's made up of two buildings, a library building and a research centre. The library is a part of the college that is used for education and resources for students and the researchers, whilst the research centre has labs, bio-printing workshops and imaging pods to facilitate the experiments and research through practical methods.

I developed the research centre to have the spaces for experimentation which can take place using the equipment from the labs and machinery like the bio printers. The library can accommodate both quiet study spaces and group conversational spaces to encourage discussion and increase the work ethic of students interested in the science behind life extension



# REPRESENTATION

Title page
Contents page

# DES2B: A COLLEGE OF NATURAL PHILOSOPHY

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# CONTENTS

# A SOLITARY TREE STUDY

'A solitary tree' is a  1822 oil–on–canvas painting by  German painter Caspar David Frierich. It displays a panoramic view of a solitary oak tree in the foreground and plains of mountains and other trees in the background, forming a romantic landscape. Th crown of tree is damaged and the trunk of the tree which extends upwards intersects with branches to form the Christian cross.

I walked around my local area to photograph trees in the urban context. Looking at their branches, the shape, how it interacts with the surrounding context and the point of intersection at the ground. When focusing on how the tree sits on the ground, my biggest preference was the crate like box that contained the tree, distinguishing the tree from the pavement. Using these trees as references I will design and place my own tree on site.

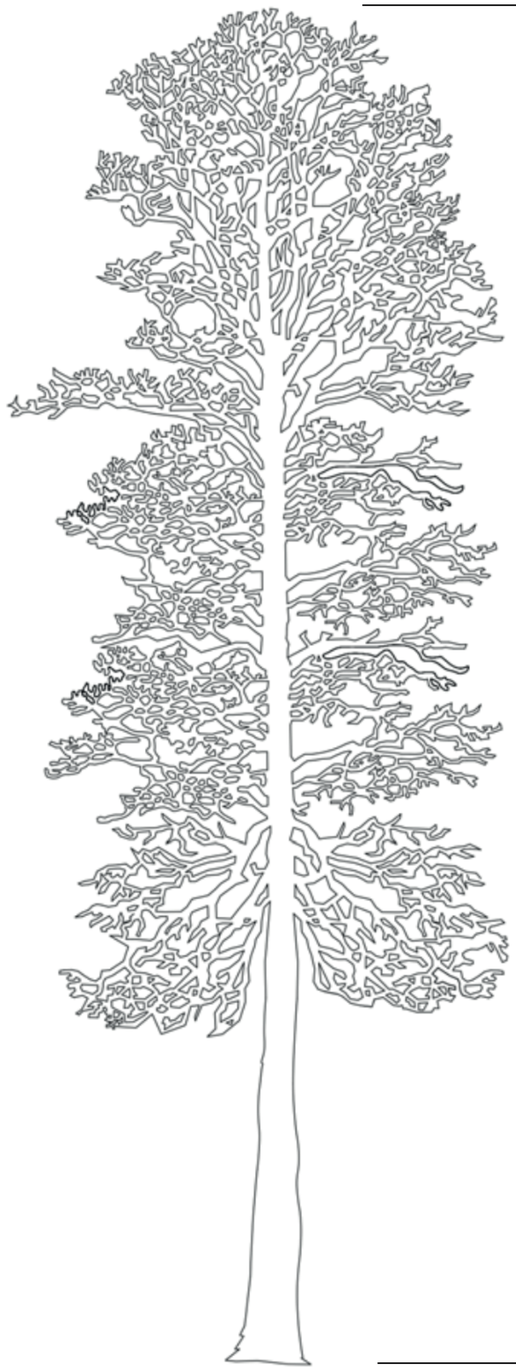
FIRST HAND IMAGES OF TREES IN THE URBAN CONTEXT

# MY SOLITARY TREE

Taking reference from the trees in my surrounding area, I have designed my own tree that I will place onto the site at Ludgate Square. The tree has a height of 15m and width of 5m. The tree is taller than it is wide as the surrounding buildings on my site are very tall.

After observing the ways which the trees can intersect the ground, I am going to use the crate-like box from my first hand study as influence, to place my tree in an interior courtyard. My initial thought is that the courtyard will be in my building, closed to the public and only accessible to the occupants of my college.

EXAMPLES OF TREES IN COURTYARDS




MY SOLITARY TREE

## PRECEDENT STUDY: 9 SPACES 9 TREES

9 spaces, 9 trees (1982–1983) is a art installation by Robert Irwin, an American artist. The installation consists of a gird format with 9 separate social spaces, that was initially planned for the rooftop of a building in Seattle, which later got cancelled.

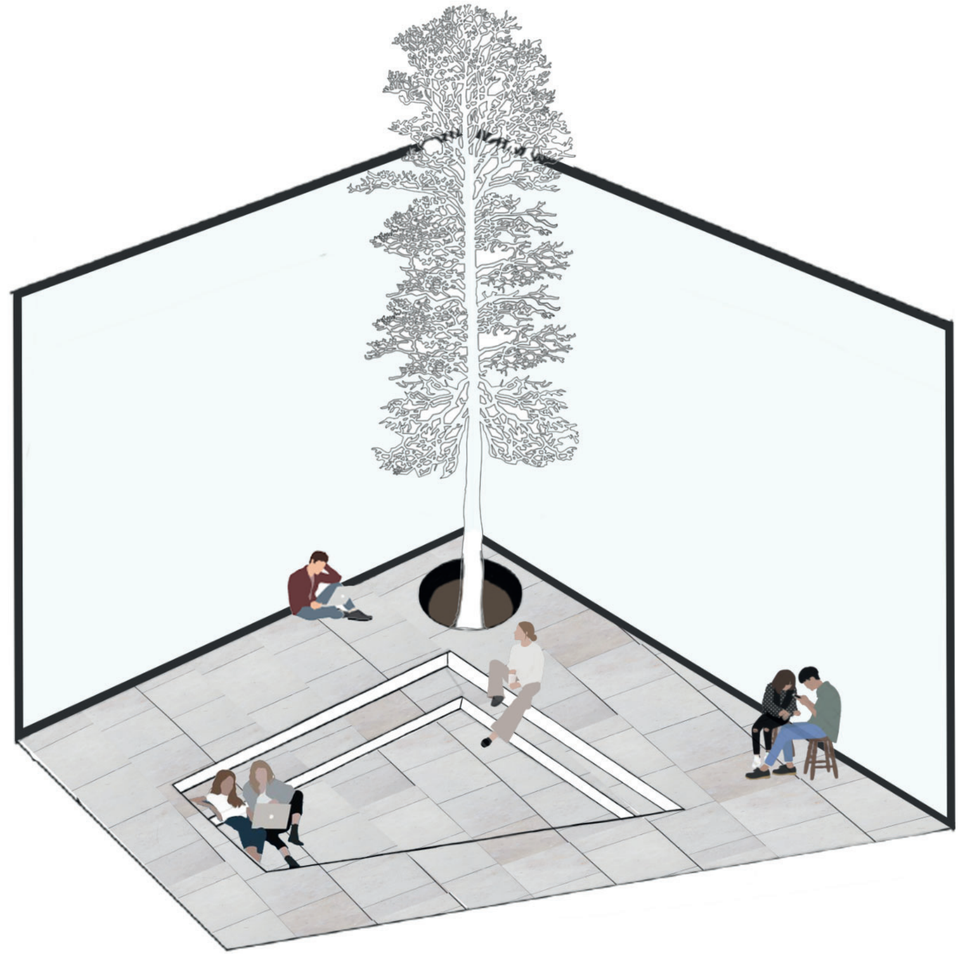
I associate the containment of the trees in a grid format with a similar form to an internal courtyard. The tree on my site could be the focal point of a socialising space for the occupants of my college.

The small trees are contained in concrete filled with soil and wood chips layed on top.

Seating area and table around the tree - used for gathering as a social space

# CONCEPT COLLAGES

SOLITARY TREE ON MODIFIED SITE



TREE IN MY COLLEGE

This is a concept collage of my how my solitary tree might exist in my college of natural philosophy. Influenced by Irwins 9 spaces 9 trees my solitary tree will be the main social space for the academics and researchers. The space can be utilised for individuals to get fresh air, socialise or have time outdoors without leaving the college. A void can be created beneath the podium for seating.

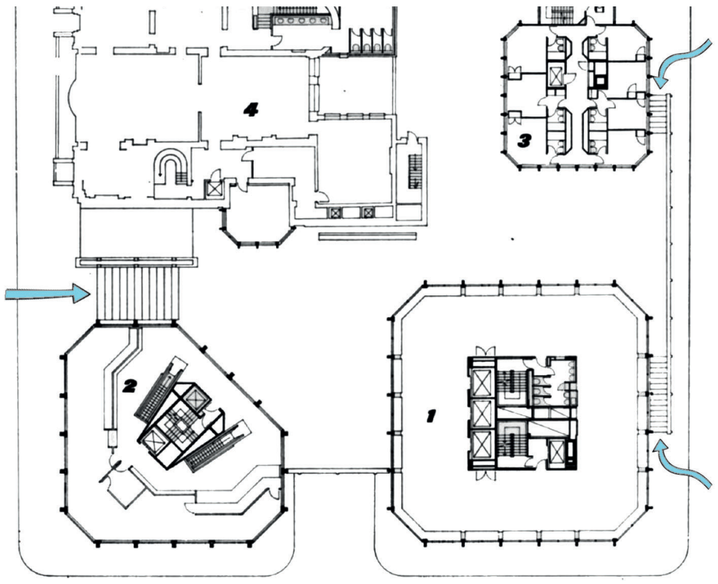
# SITE PRECEDENT

## PRECEDENT STUDY: THE ECONOMIST BUILDINGS

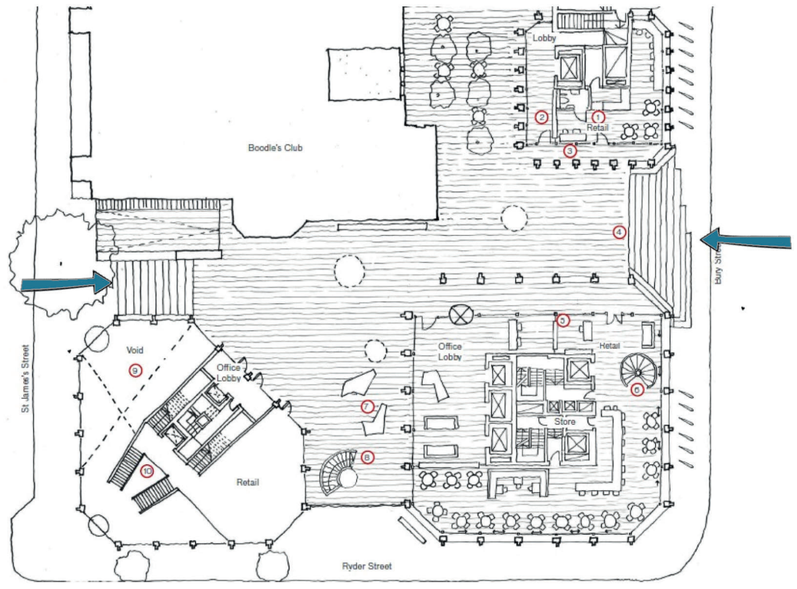
The Economist Buildings, designed by architects Alison and Peter Smithson, consists of three buildings that are located in the City of Westminster. The buildings are placed on a 'plaza', raised one storey above ground, that is accessed by the stairs and ramp on either side. Each building has a different programme, however they are uniform through their form and cladding. The programme and height of the building alongside the rhythm of windows, differentiates them from each other.

This project carefully considered how the three buildings would affect the circulation of people as well as the vehicle movement. Whilst there is a flow of people on the plaza, conceptually creating an enjoyable public space, beneath there is an entrance for vehicles on Ryder street. Using this precedent will help determine changes to the ground on my site, and the relationship between the college and the datum. I will also consider the flow of people onto the podium and entrances into the college at different levels.

Initial stair access to the plaza




Built access to the plaza

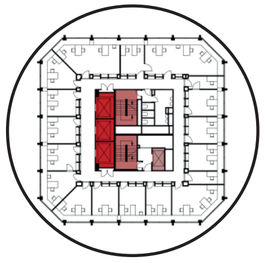




ELEMENTS THAT TIE ALL THREE BUILDINGS TOGETHER

Portland stone cladding

Concrete Structure

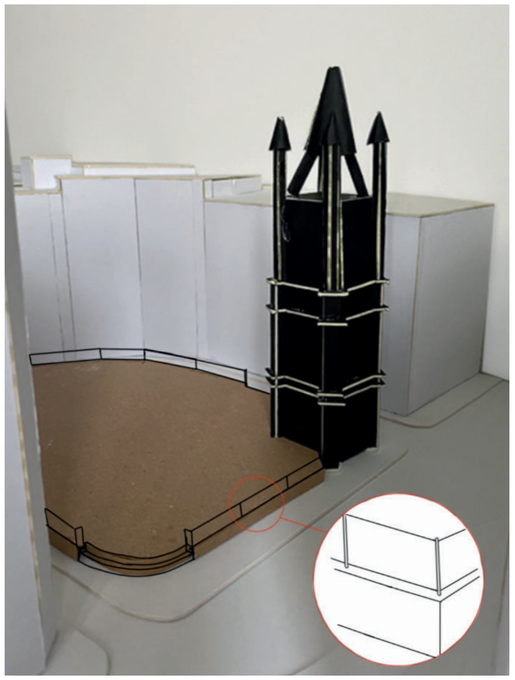


Building form

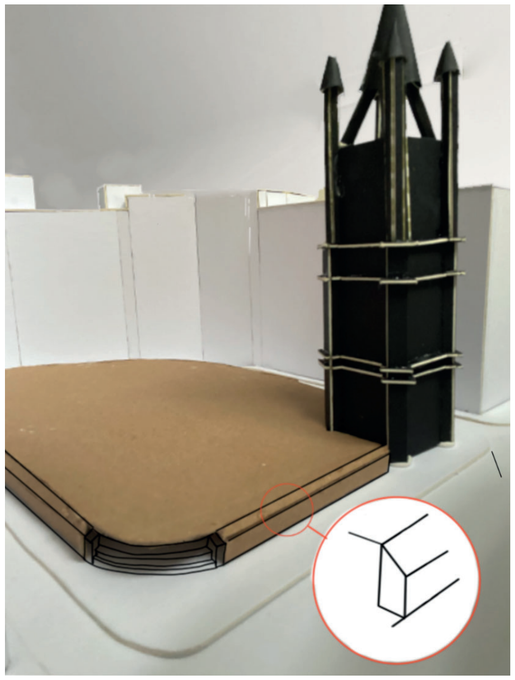
# SITE GROUND & PODIUM

## PODIUM SHAPE

The curved podium edge prevents people from sitting on the edge, whilst making it feel open with views onto the podium, inviting people of the public to walk across. Whereas the podium edge with the barrier makes it feel more exclusive, and open to a set group of people.



Podium edge with barrier

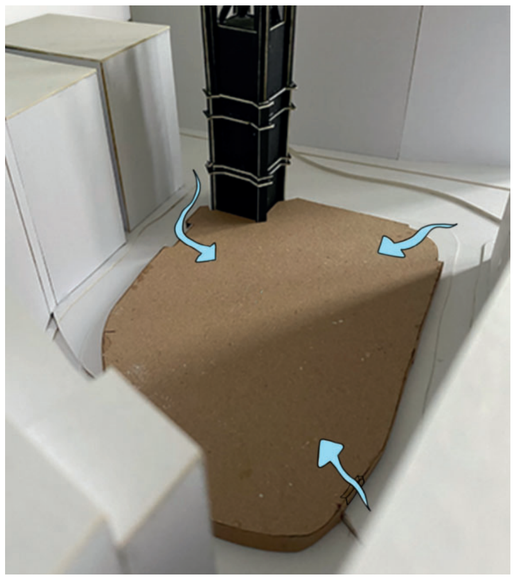


Curved podium edge

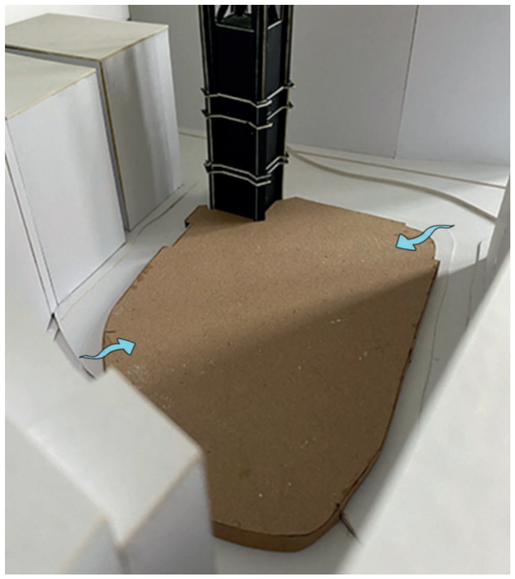
## ACCESSIBILITY

The podium will have pedestrian access onto the podium from two or three separate entrances. One from the corner joining Creed Lane and Ludgate Hill (main road) and another from Ludgate square.

Accessibility onto the podium includes stair and ramp access increasing inclusivity and accessibility.



Three entrances

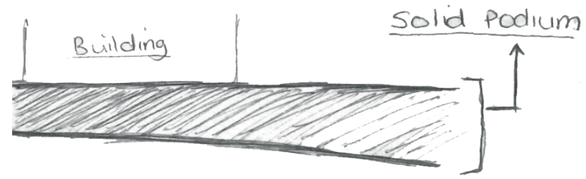


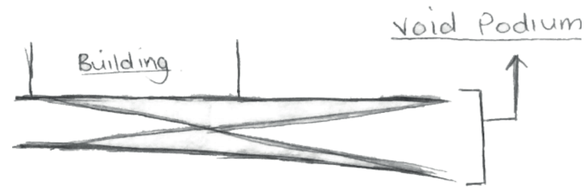
Two mirroring entrances

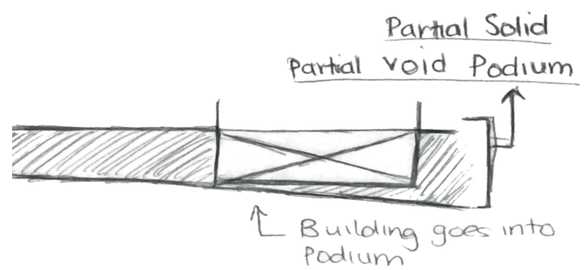
## BENEATH THE PODIUM

Beneath the podium it is going to be partially solid, partially void. The interior courtyard in my college, will accommodate my solitary tree and function as an outdoor social space. The seating around the tree will form at the void in the podium.

The mathematical house cuts into the podium, which provides one access to the building from the ground and one access from the podium. To unify my college of natural philosophers with the existing building on site, the college will be accessible from different entrances at street and podium level.



# PODIUM MATERIALITY: CORK

Cork is a sustainable material with properties that satisfy the atmospheric conditions of my podium. It's water, fire and rot resistant, durable, source of good energy consumption and it can be harvested from bark without damaging the tree, making it environmentally friendly.

## PRECEDENT STUDY: SERPENTINE GALLERY PAVILION

Swiss architects Herzog & de Meuron collaborated with Ai Weiwei in 2012 to design a pavilion at the Serpentine Gallery. The pavilion is designed with eleven columns each characterising past pavilions. The twelfth column represents this pavilion. The interior of the pavilion including the flooring is clad in cork. This includes the columns, seating and flooring.

My podium is going to be made from waste wine stoppers from bars in the local area into cork panels. In the centre of my podium beneath the tree, there will be seating for a social space that will be built into the podium, similar to the pavilion.

Carbon dioxide absorbed by oak trees is stored in the cork for a lifetime making it carbon positive

**70%**
of cork produced goes into flooring, furniture, insulation etc...

**30%**
of cork produced is for wine stoppers, from which >75% becomes waste

Carbon stored > Carbon released in production

Pubs & bars in local area
(Wine cork waste can be sourced for my podium)

# CLIENT & OCCUPANTS OF THE COLLEGE

## CLIENT

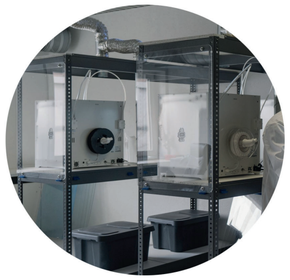
The client is the International Institute of Cosmism (IIC). They are an organisation that have commissioned us to build a College for Natural Philosophy. The IIC also commissioned the mathematical house for the anatomist which exists on the site at Ludgate Hill as anatomy and science is an infinitely evolving philosophy.

## COSMISM

Cosmism refers to resurrection of the body and immortality, referencing fictional figures like dracula. When discussing the idea of cosmism with current day technology, it links to the idea of prolonging life. This crosslinks with increasing life quality, anatomy, transplants and the human body. Where immortality is a belief of cosmists, extending life is a concept which has been developing in the world of medicine for years.

## CLIENT NEEDS / FACILITIES

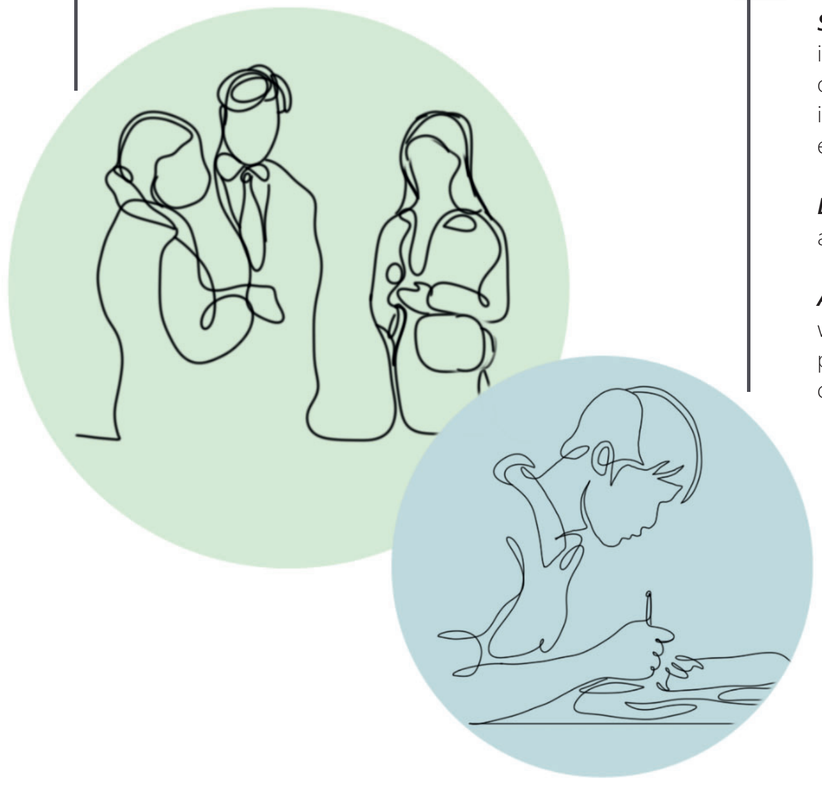
Laboratory



Bio-printing workshops

Imaging rooms

Library





## OCCUPANTS OF THE COLLEGE

***Students*** studying science based at university. This includes students studying medicine, bio med and other degrees that require lab work or a study space in a library which has resources on transplants, bio engineering anatomical material and cell culture.

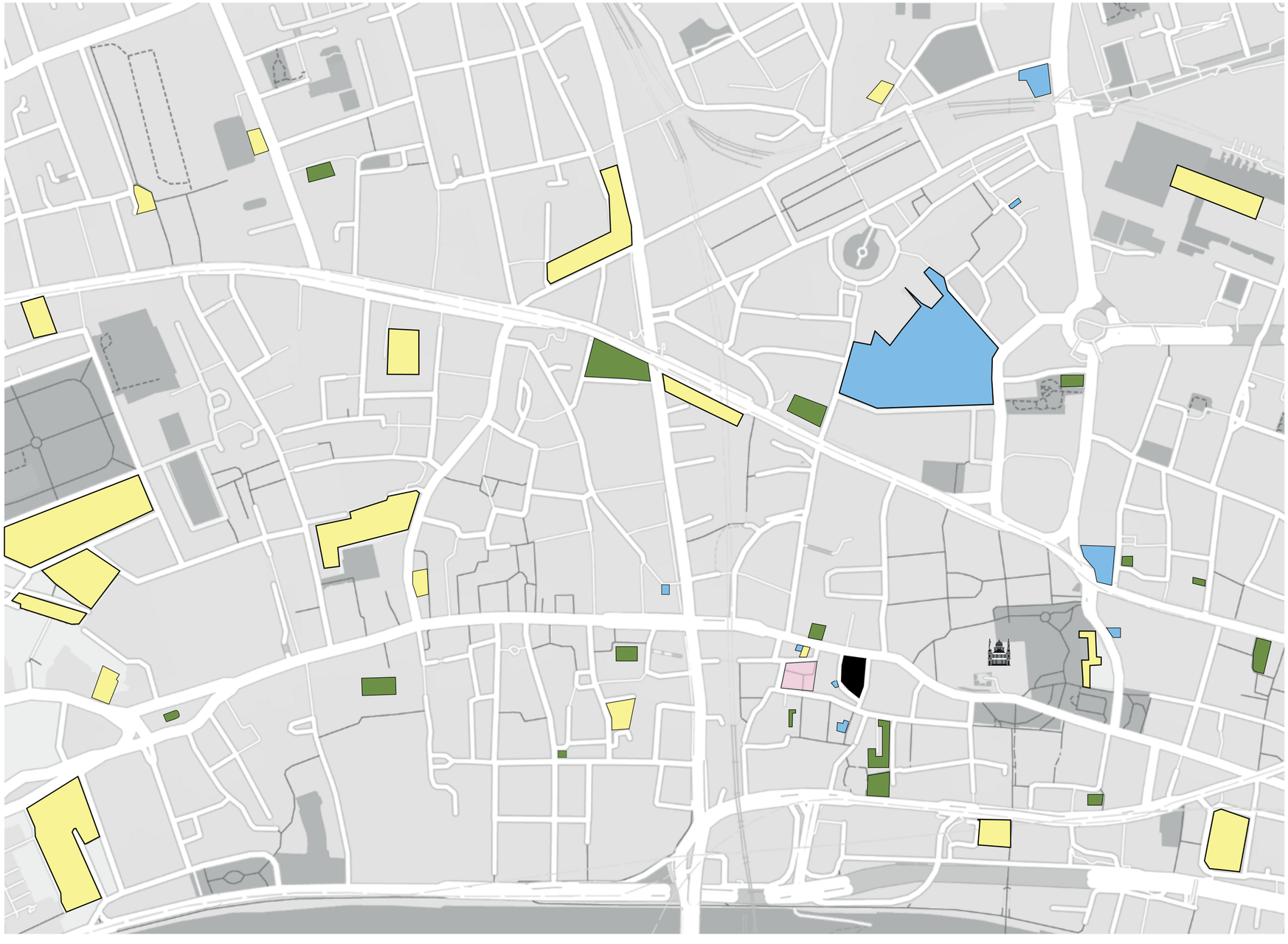
***Doctors*** that are doing research or collecting data for academic publishings and papers, out of hospital hours.

***Academics & researchers*** use the library and the workshops to experiment with the possibilities of bio printing organs and tissues for transplants, looking at cell culture.

# SITE ANALYSIS: PROGRAMME OF SURROUNDING CONTEXT

This map shows institutional, medicinal and religious buildings in the surrounding area of my site, Ludgate Hill. There is a high density of institutional buildings that are mostly composed of university campuses and school libraries. Where the largest medical building on the map is a hospital, the smaller ones are private GP services and fertility clinics.

There are a high quantity of churches in the area with only three Islamic centres that contain prayer rooms and one temple. There are no morgues or cemeteries that currently exist today, however in 1520 there was a cementary adjacent to the site.



**Site**
(Ludgate Square)

**Medicine related buildings**
(eg Hospitals and clinics)

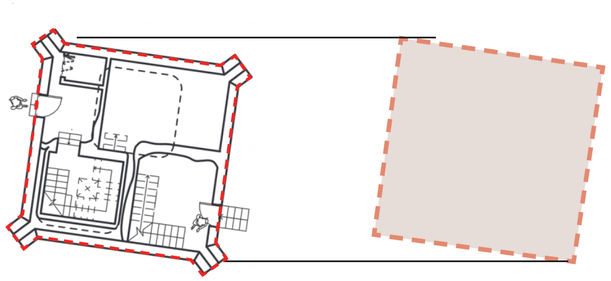
**Religious buildings**
(Churches, Mosques and temples)

**Educational institutes**
(eg Universities, schools and libraries)

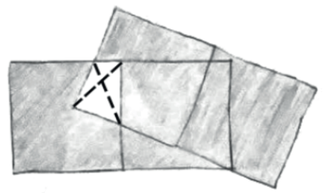
**Cementary**
Prior to replanning of the city, in 1520 a cementary used to exist near the site

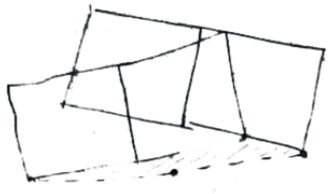
# DESIGN DEVELOPMENT: RESEARCH CENTRE

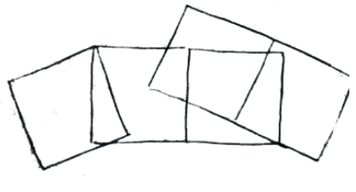
## INITIAL IDEAS

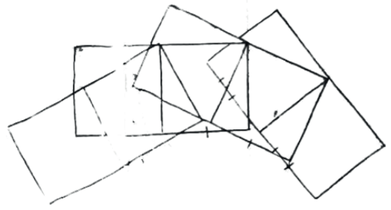


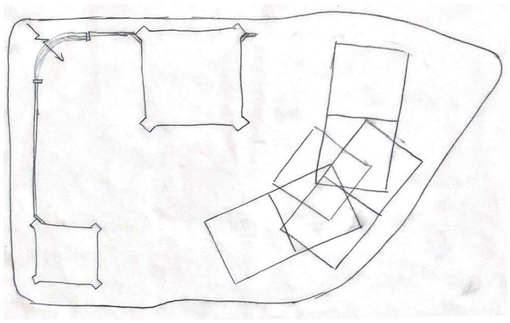
Square module from existing
Mathematical house on site.



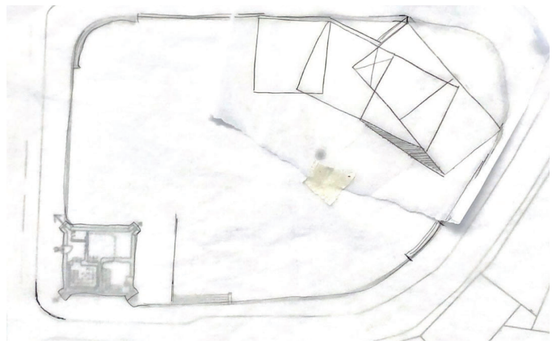




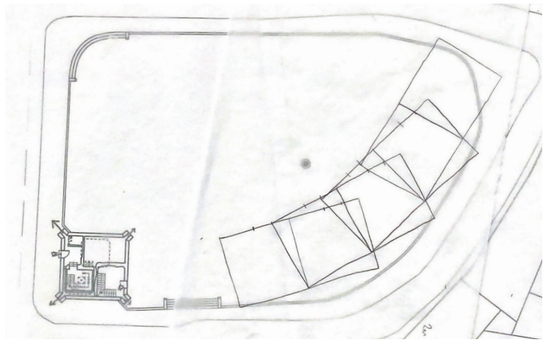




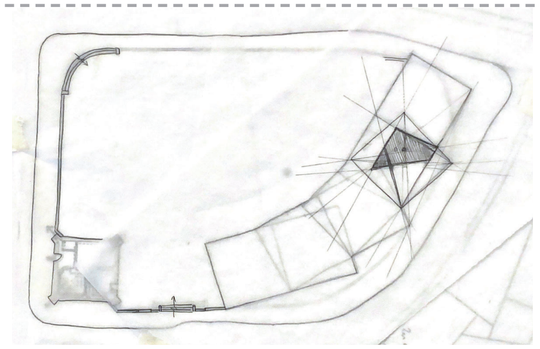
Iteration 1



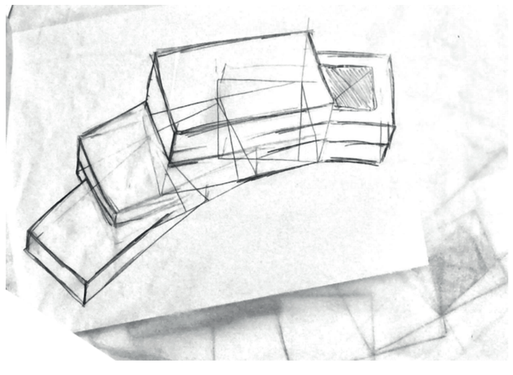
Iteration 2

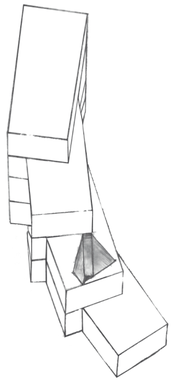


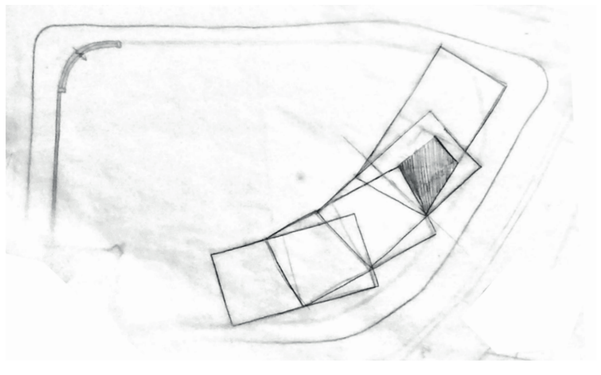
Iteration3

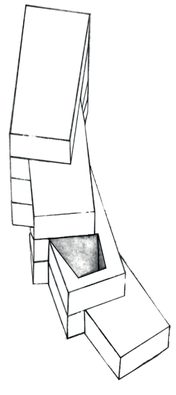


Iteration 4



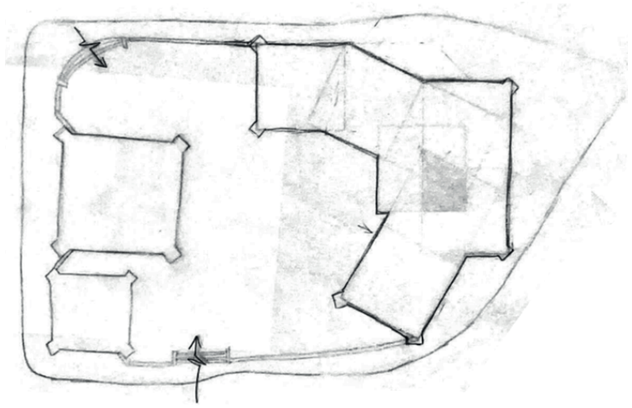




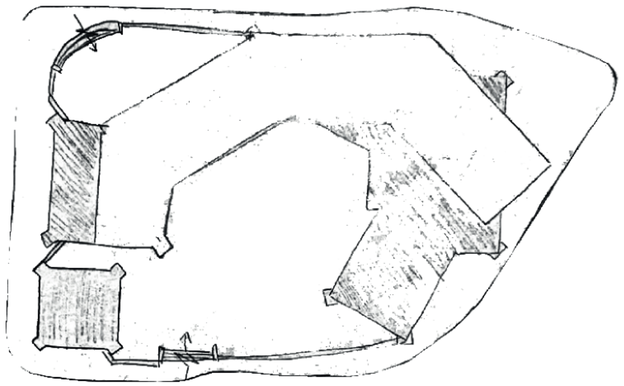


Iteration 4- axonometric sketches for placement for interior courtyard

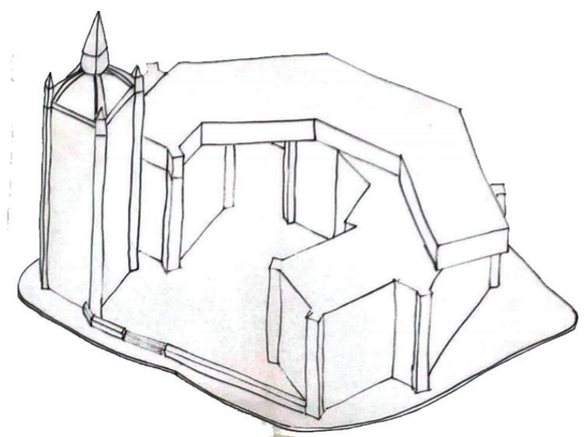
# DESIGN DEVELOPMENT: FINAL ITERATION



Ground floor

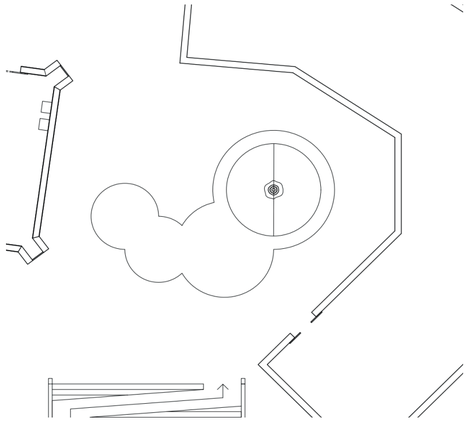


Connecting floor

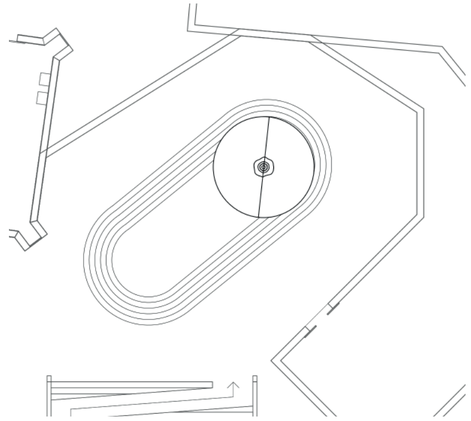


Axo Sketch

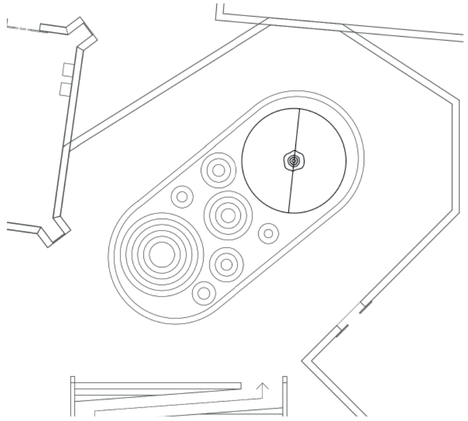
# DESIGN DEVELOPMENT: THE INTERIOR COURTYARD



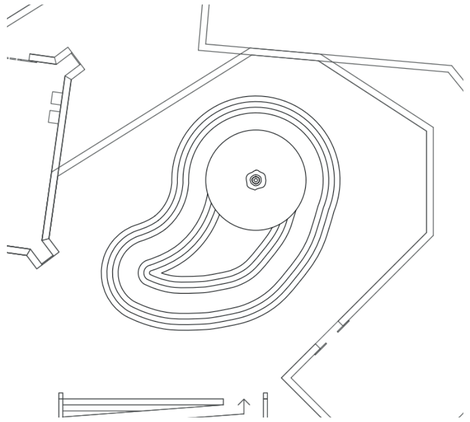
Iteration 1



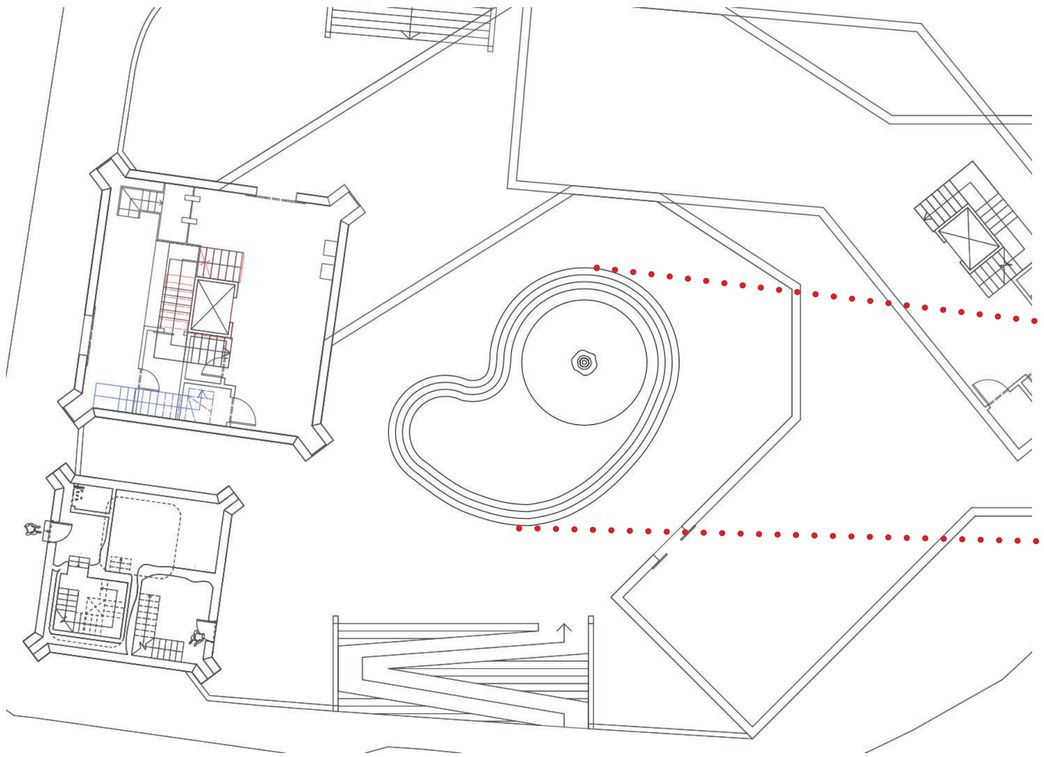
Iteration 2



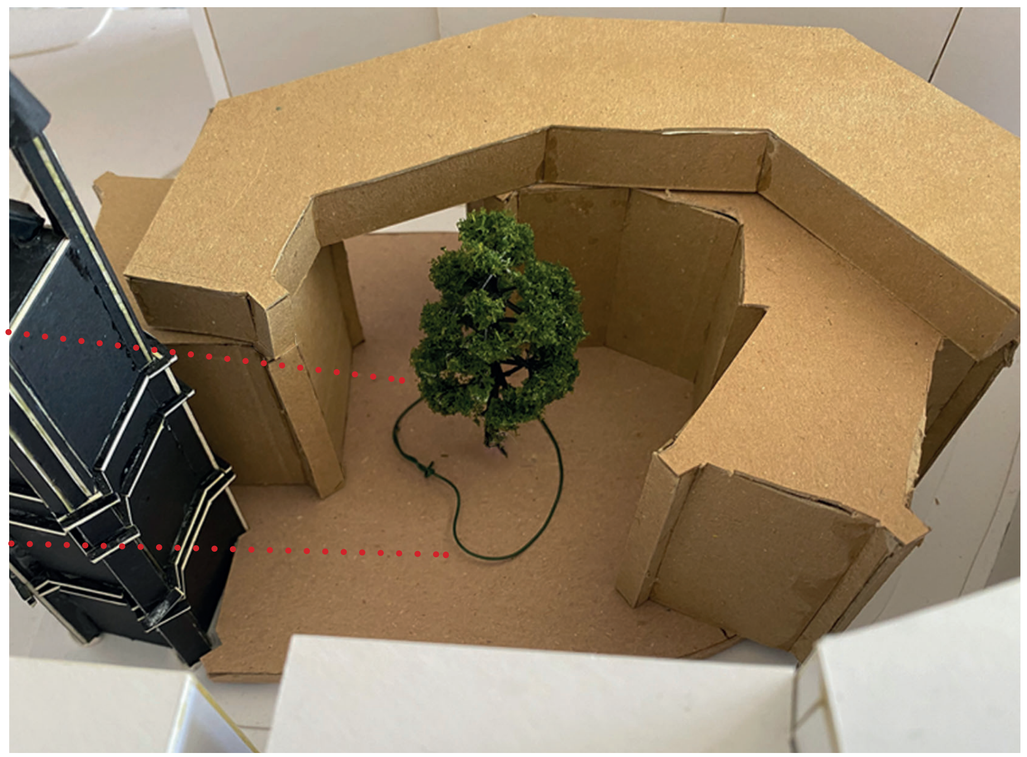
Iteration 3



Iteration 4



Iteration 5

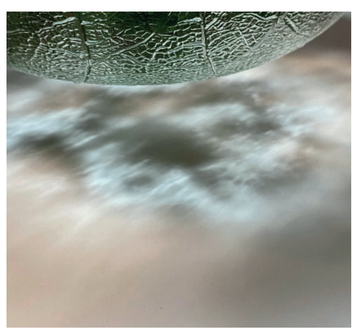


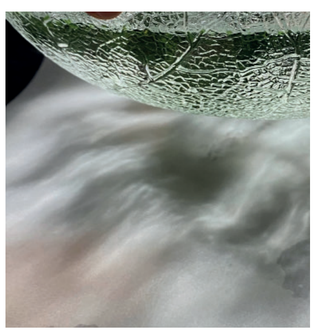
Outline of iteration 5 on model

# SOUTH FACING FACADE - EXPERIMENTATION

Imaging and bioprinting spaces are volumes in my college of natural philosophy that use projection, shadow and translucency to progress and experiment.

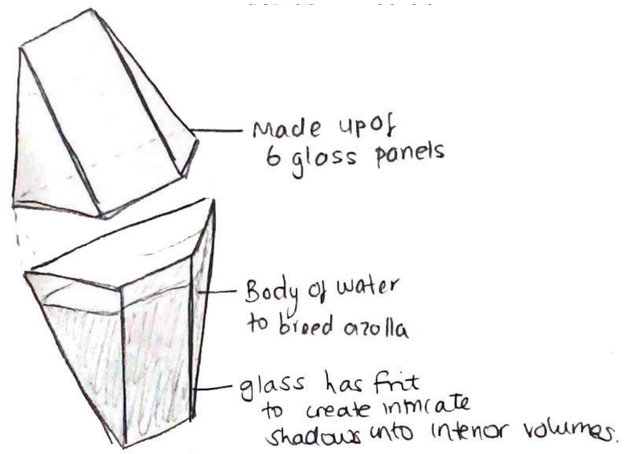
I experimented with reproducing these characteristics through the azolla in my facade. I did some tests on what kind of shadows are created through water and glass that could potentially hold the azolla in the curtain wall.

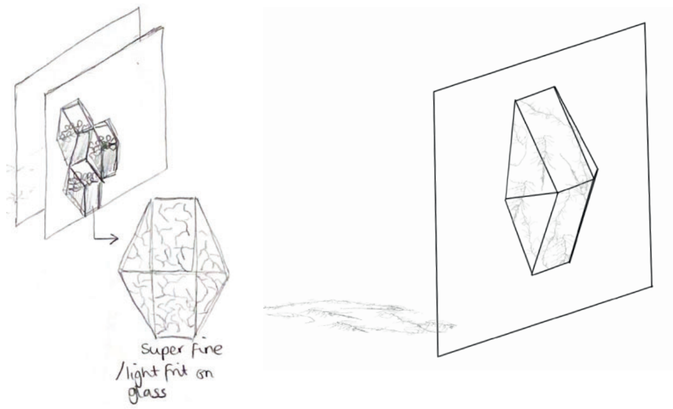


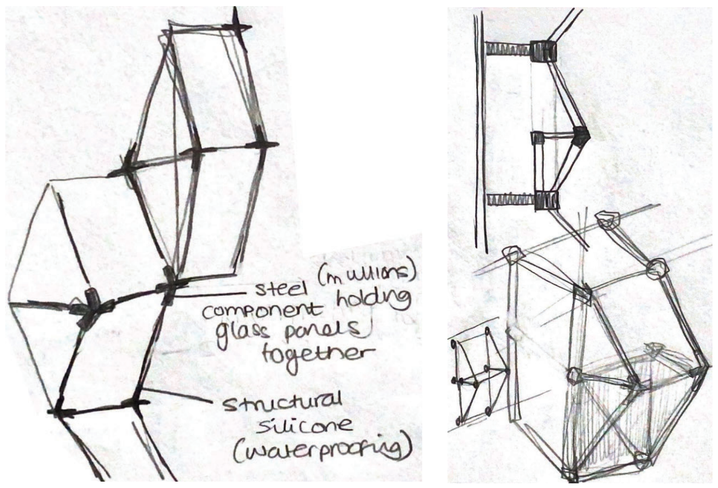


Architects Future systems created this facade on Oxford street. The facade displays a tessellation of glass pockets, creating a rhythm through the facade.

I will apply this to my facade, using six panels of frit glass to make each pocket on the curtain wall. These pockets will hold a small volume of water to breed the azolla on the south facing facade. The frit on the glass will create shadows of roots, in relation with how bio printing and imaging in my college projects an element of the biology onto a screen, the facade will replicate this for the azolla

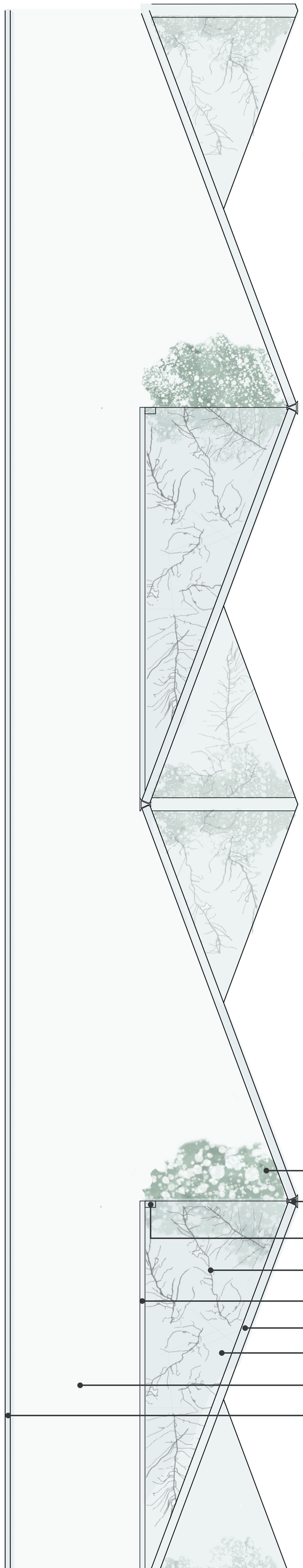


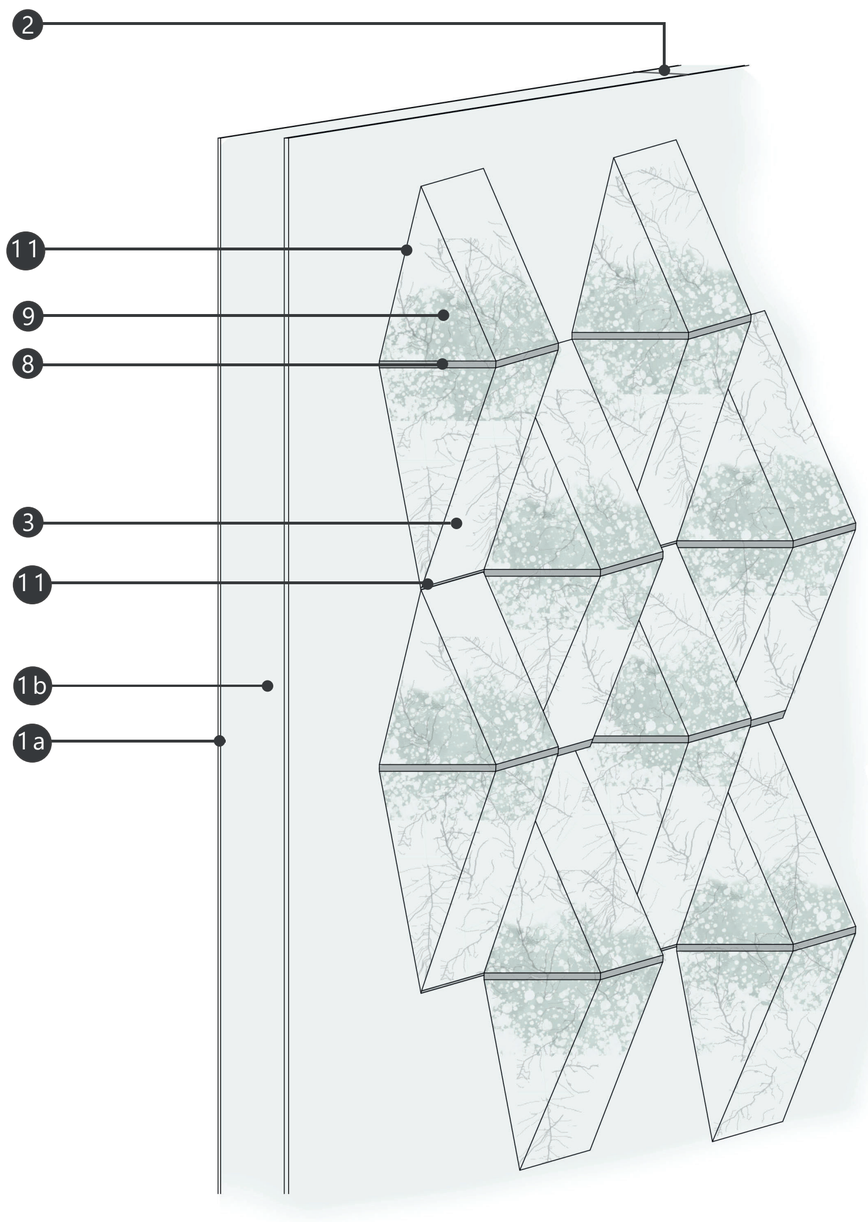




Exploring the joinery of the panels to the curtain wall

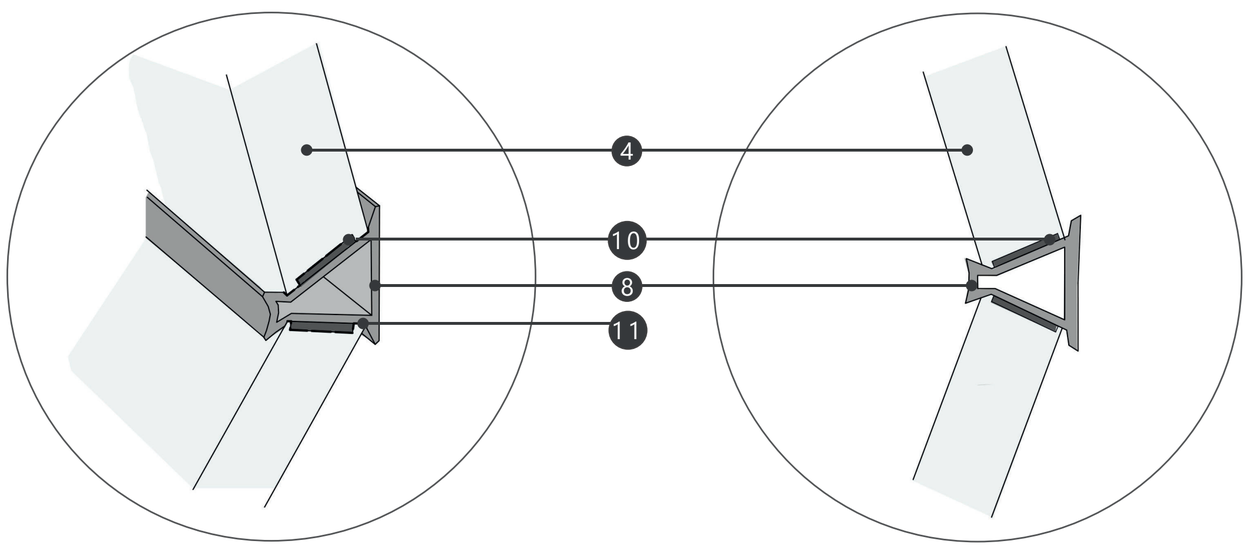
# DETAIL 1| SOUTH FACING FACADE




2D Detail
Scale 1:5 at A1



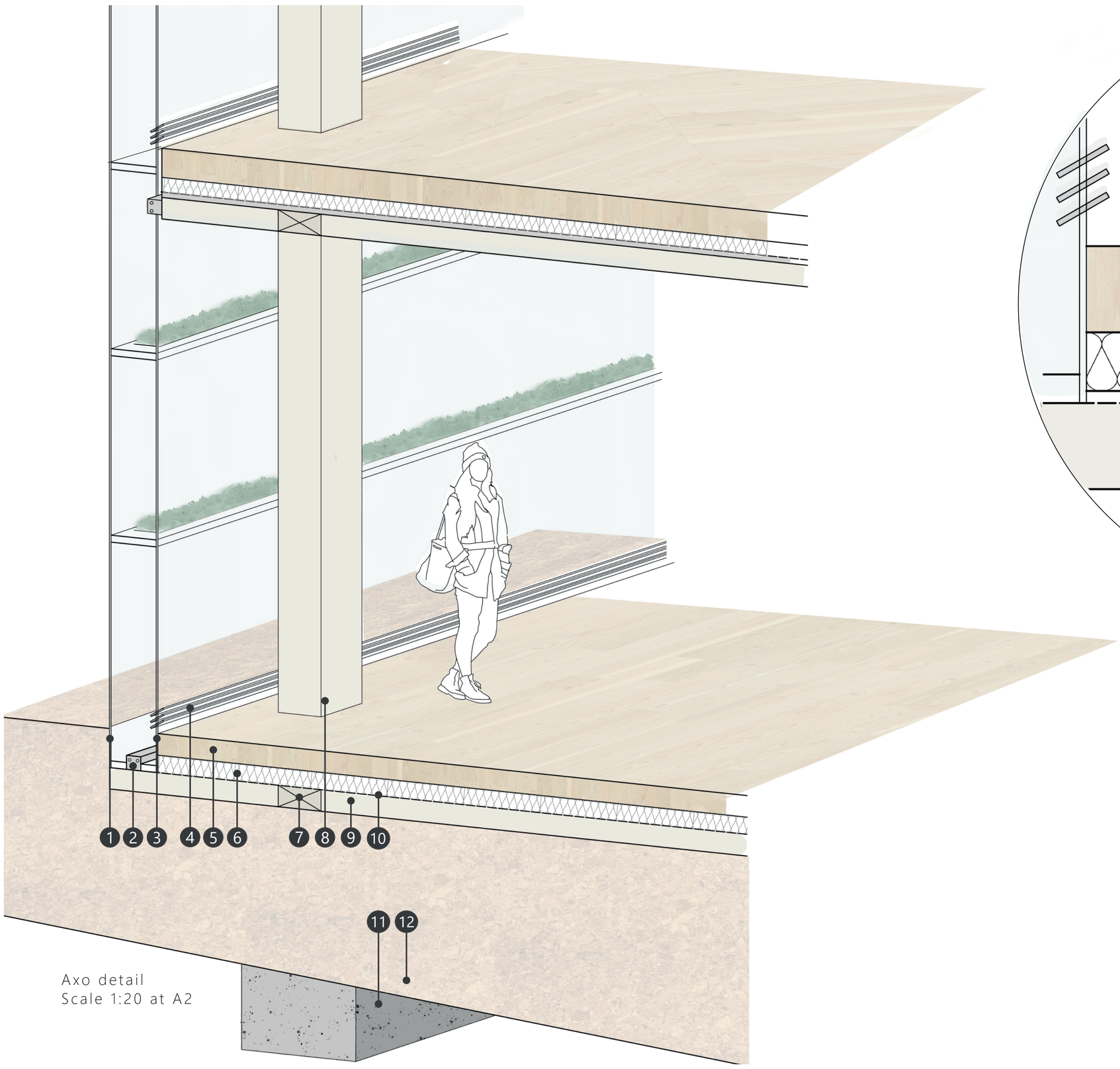

Axo detail
Scale 1:20 at A1



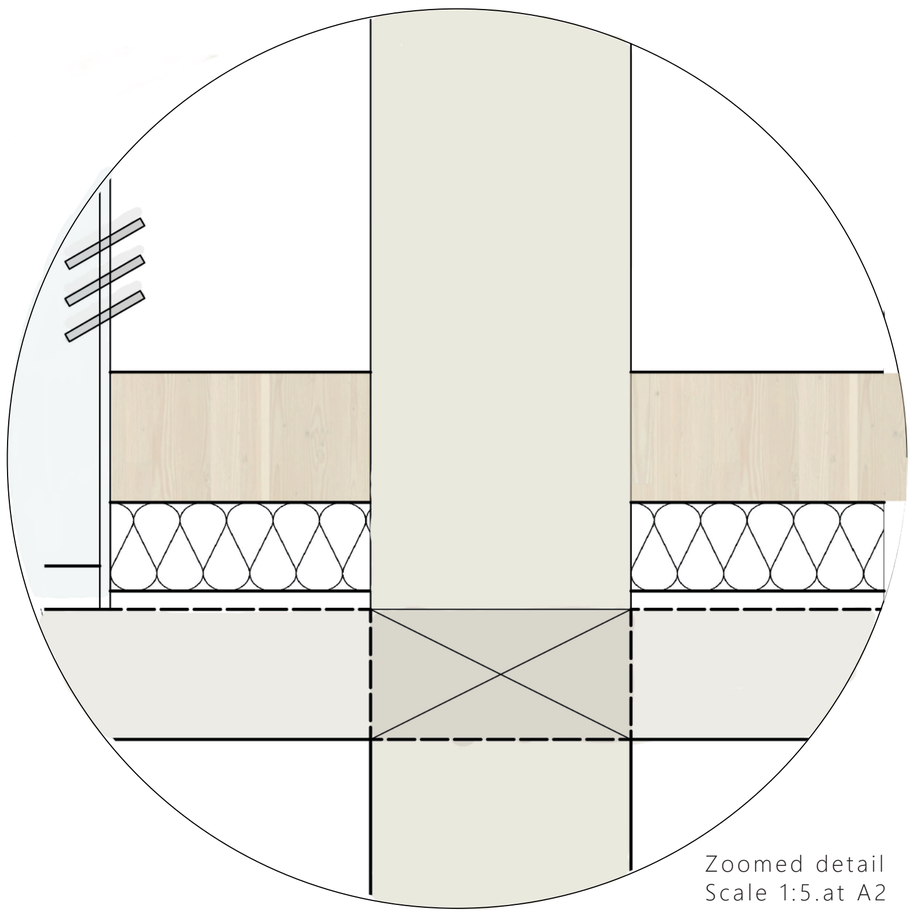

Zoomed detail of 130 degrees steel glass connector
Scale 1:1 at A1

01a- 12mm Low E interior glass
01b- 12mm Low E exterior glass
02- Glass structural fin
03- Body of water to breed azolla
04- 20mm Low E exterior glass panel
05- 12mm glass panel
06- Frit 12mm glass
07- steel connector
08- 130 degrees steel glass connector
09- Azolla
10- Dust Shield
11- Structural waterproofing silicone in all joints

# DETAIL 2| INTERSECTION OF FACADE AND GROUND




Axo detail
Scale 1:20 at A2



Zoomed detail
Scale 1:5.at A2

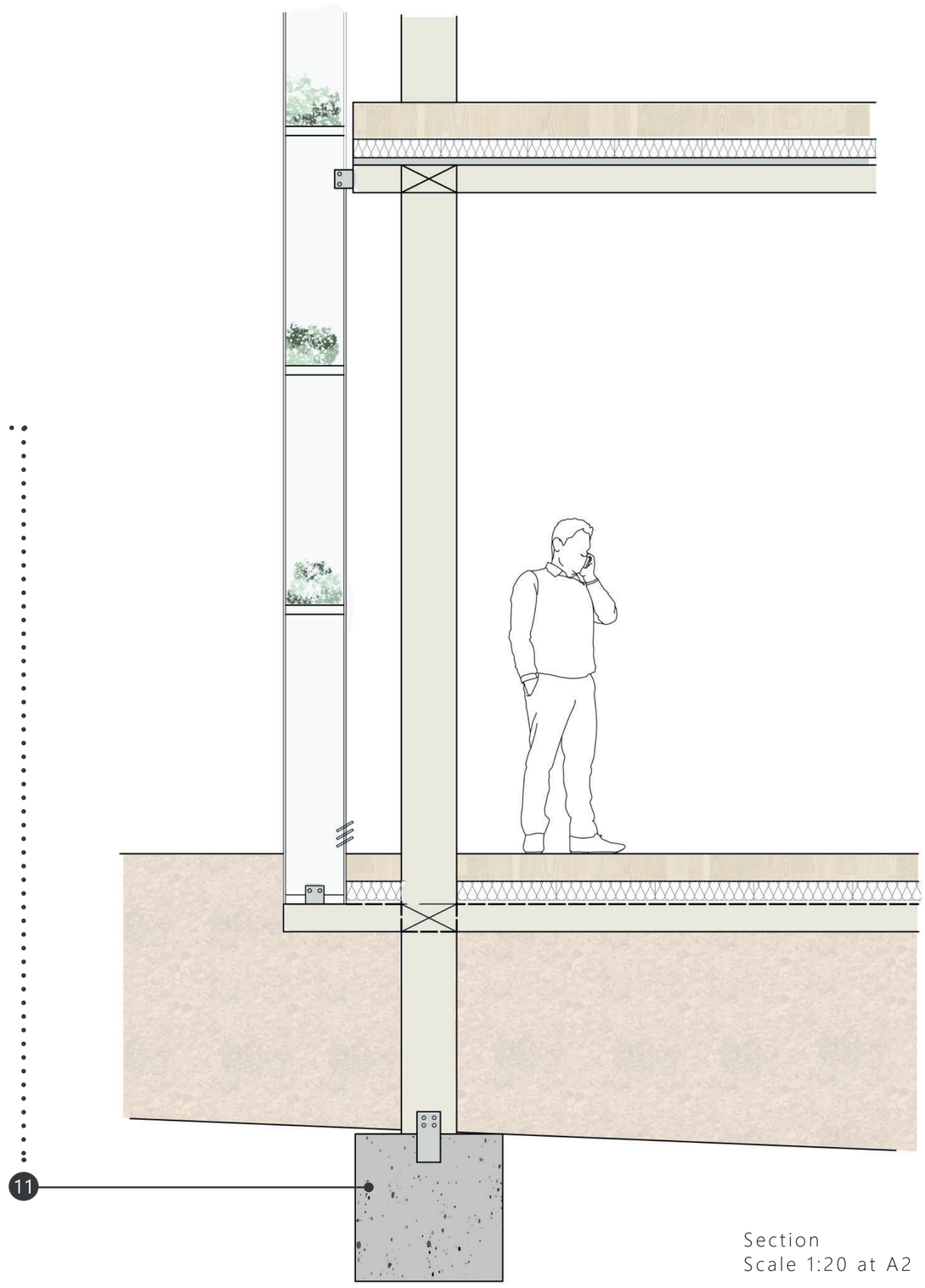
01- 12mm Low E exterior glass
02- 100mm steel connector
03- 12mm Low E interior glass
04- Air Vent
05- 150mm Cross laminated timber
06- 120mm insulation
07- Secondary GluLam beam
08- 300mm x 300mm GluLam column
09- 150mm primary beam
10- Waterproof barrier
11- 800mm concrete pad for column
12- Cork podium

## STRUCTURE

My college of natural philosophy has a timber structure that is incorporates glulam columns and primary and secondary beams. The columns and beams are the strucutral support for the floors and ceilings, whilst they also have a steel connector to intrsect and support the glass curtain wall.

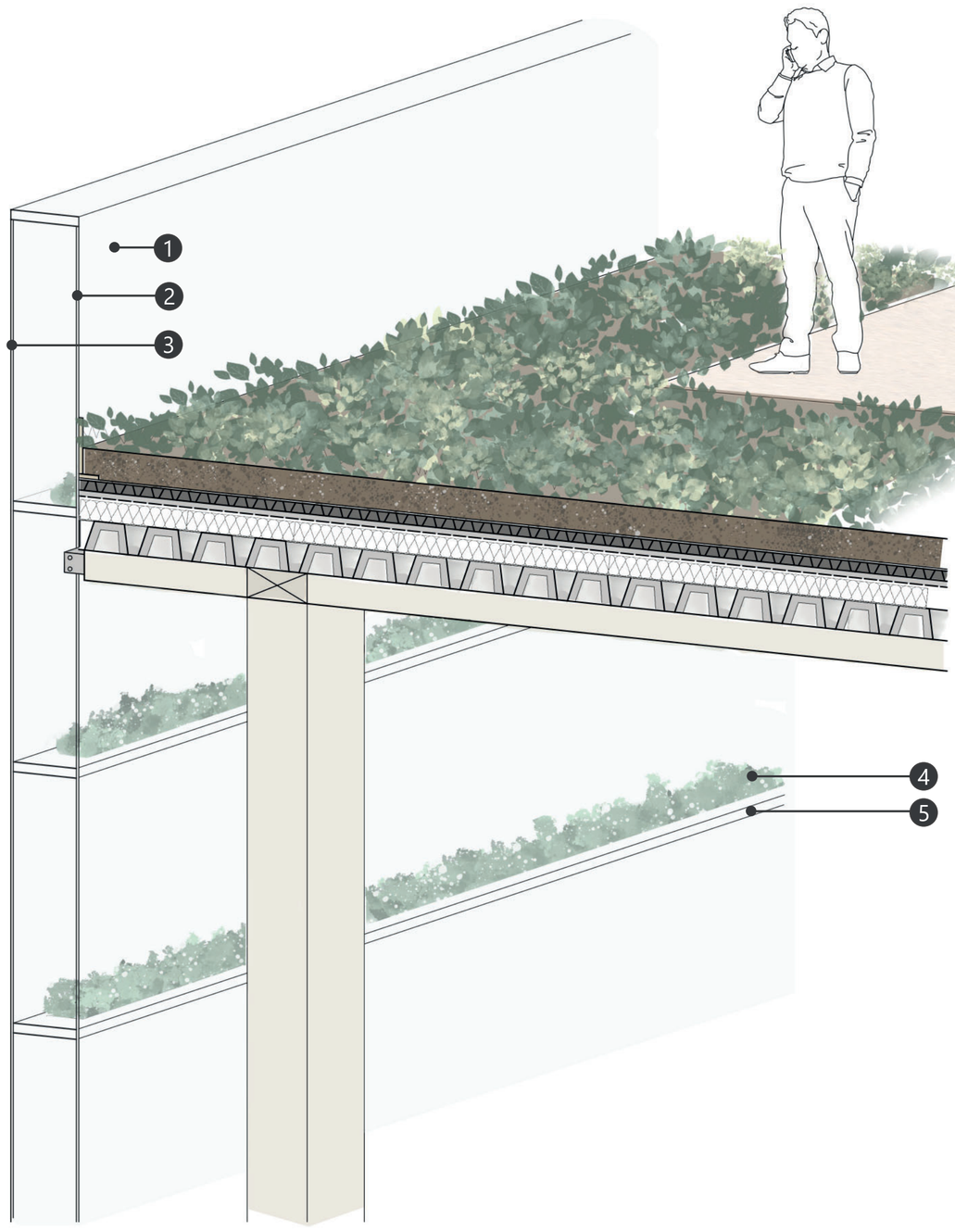
## FOUNDATIONS

Reinforced concrete pads are the foundations for both the library building and research centre that make up my college of natural philosophy. These pads are beneath the cork podium and they intersect with every glulam column that's a part of my timber strucutre.

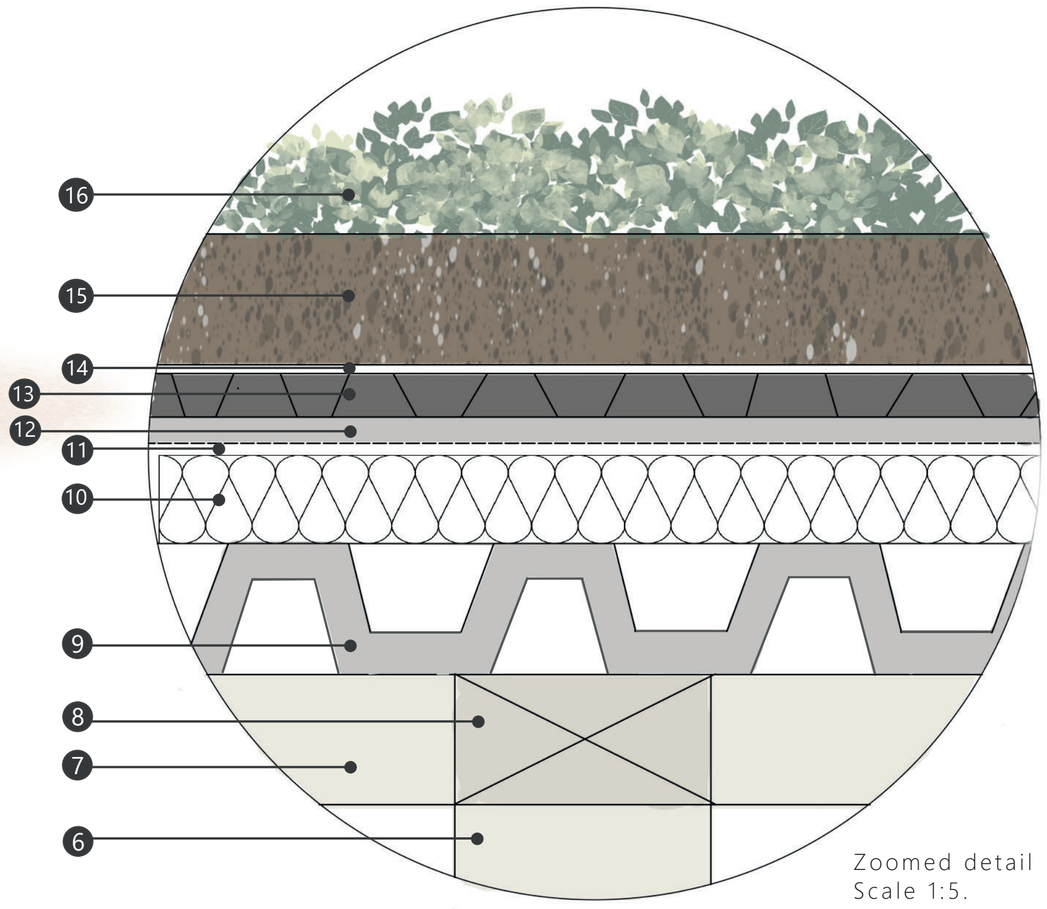



Section
Scale 1:20 at A2

# DETAIL 3| INTERSECTION OF THE FACADE AND SEDUM ROOF

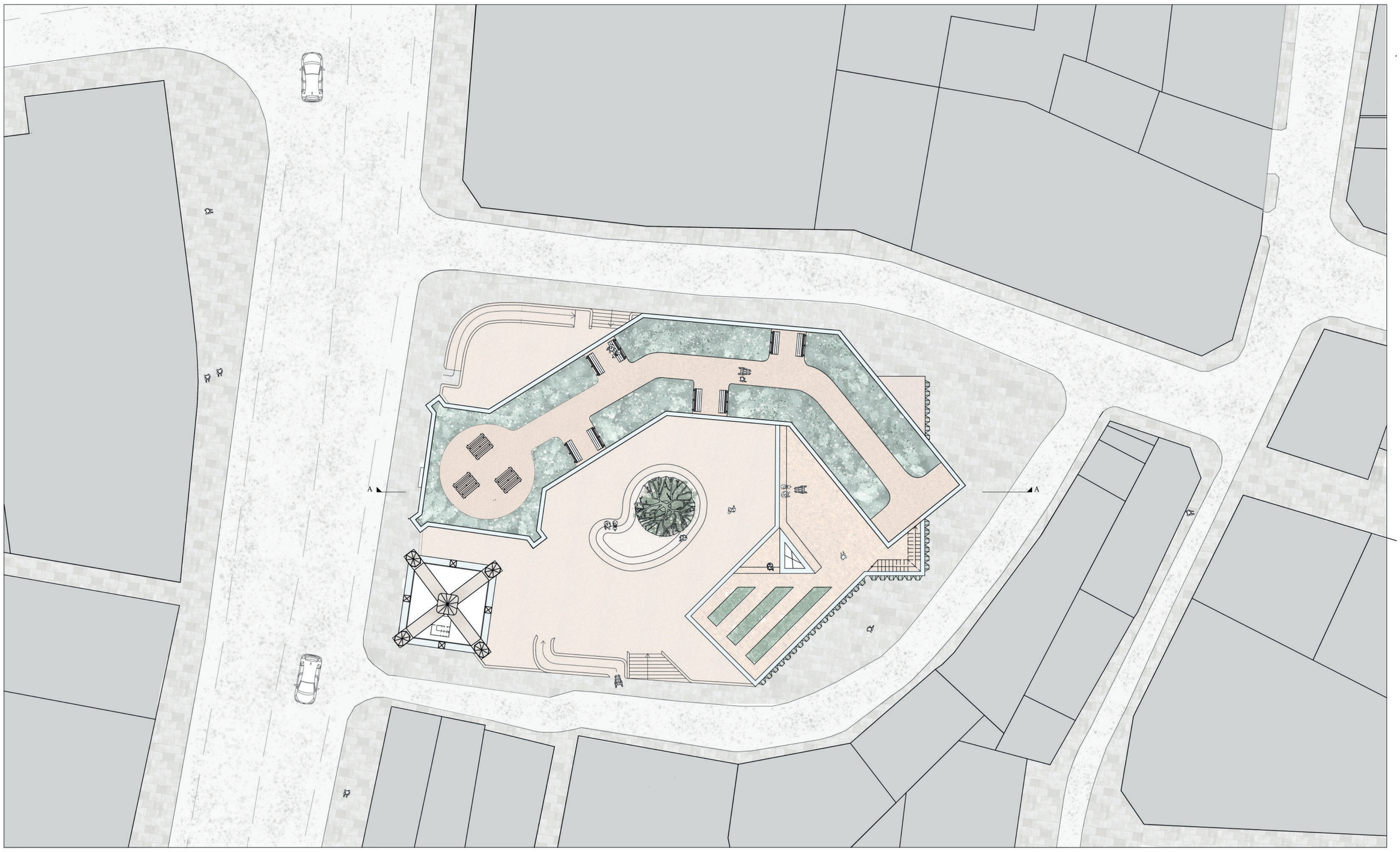



Axo detail
Scale 1:20



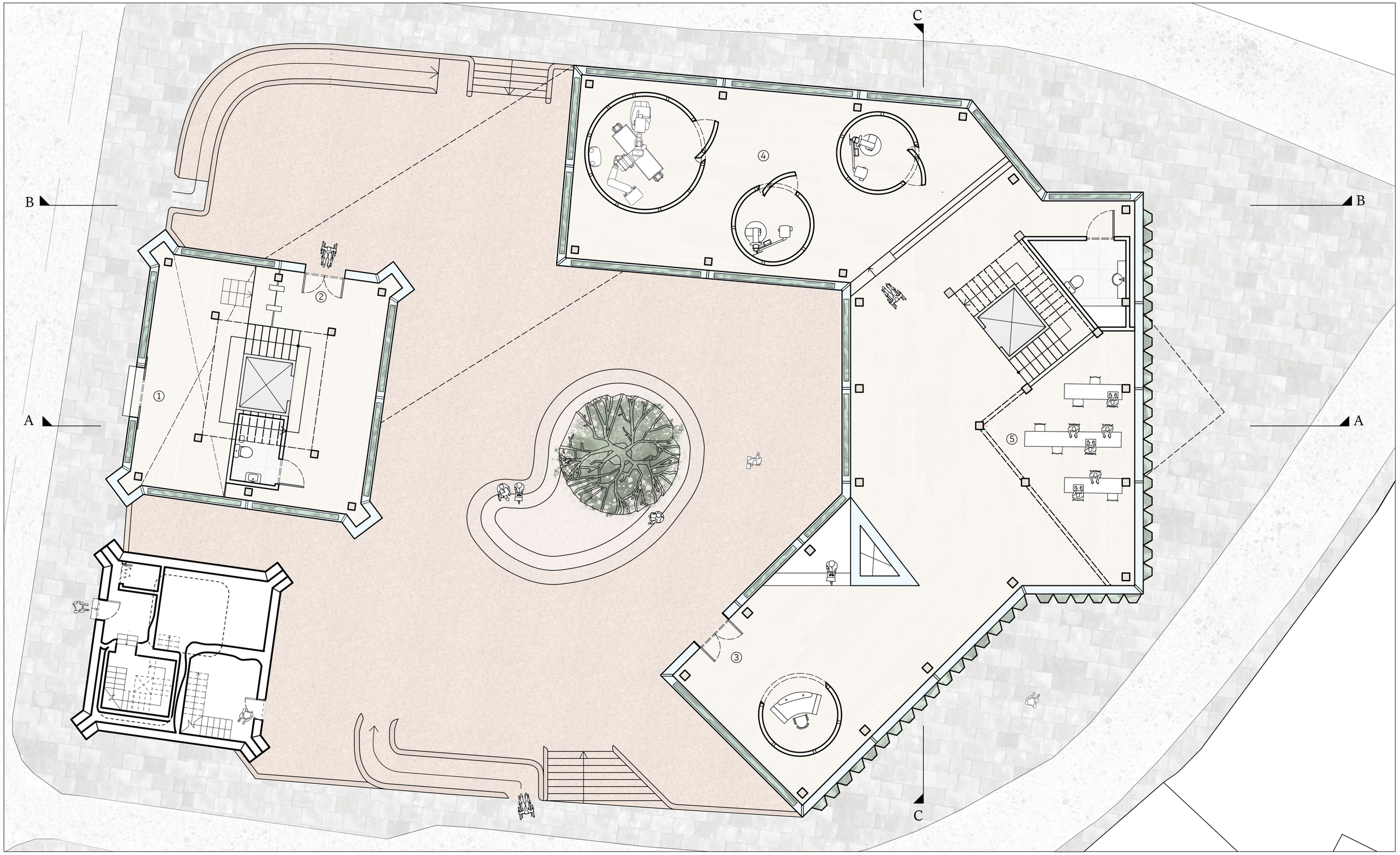

Zoomed detail
Scale 1:5.

01- Glass parapet
02- 12mm Low E interior glass
03- 12mm Low E exterior glass
04- Azolla in glass curtain
05- Horizontal glass beam
06- 300mm x 300mm Glu-lam column
07- 150mm primary beam
08- Secondary Glu-lam beam
09- 150mm corrugated steel roof deck
10- 100mm rigid foam insulation
11- Waterproof membrane
12- 30mm Sheet barrier
13- Retention and drainage layer
14- 10mm filter fabric
15- 150mm growing substrate
16- Shallow vegetation




Roof Plan
Scale 1:200 at A2
0 2 4 6 8 10 M

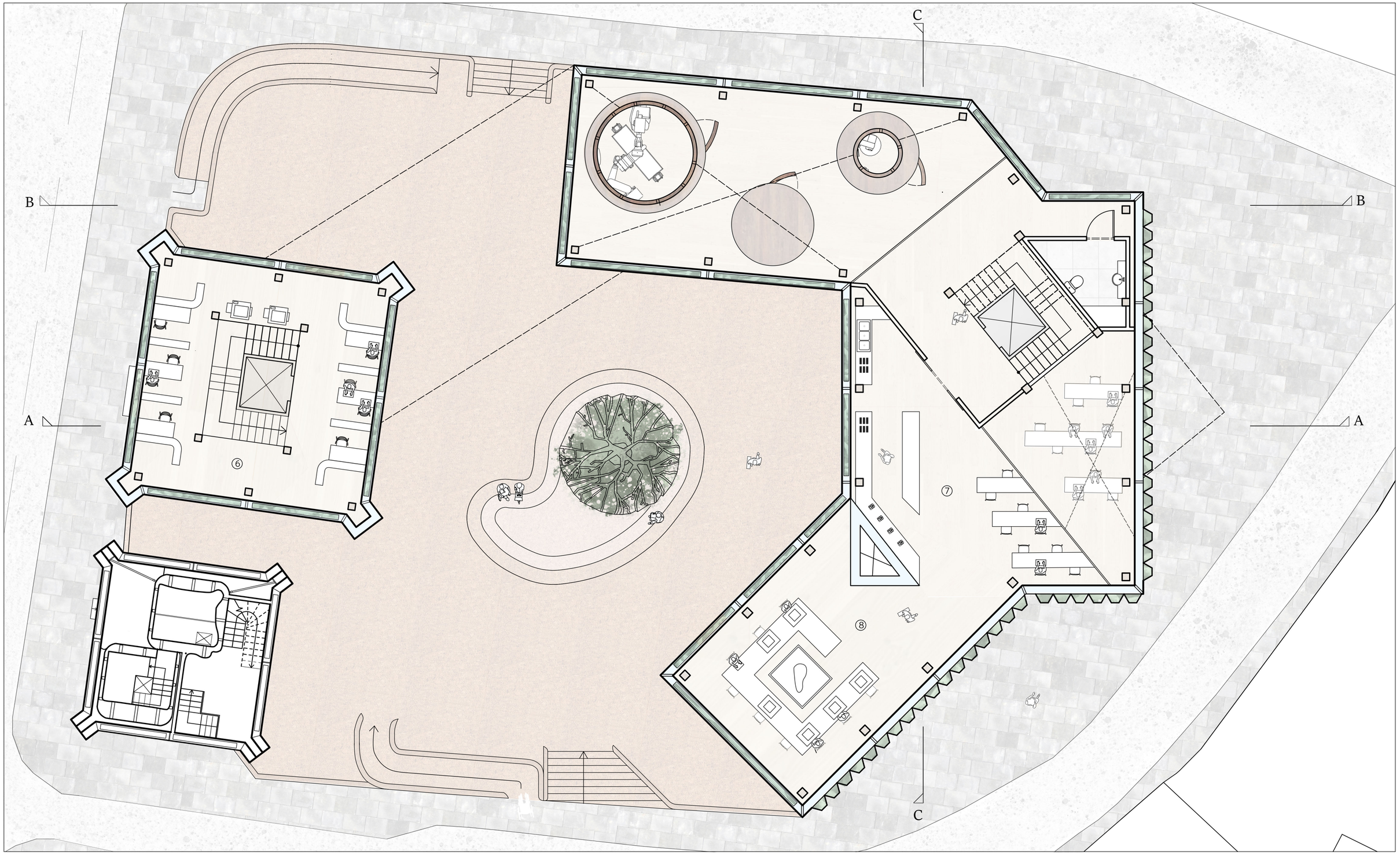
SITE SECTION
Scale 1:200 at A2
0 2 4 6 8 10 M




Ground floor
Scale 1:100

0 1 2 3 M

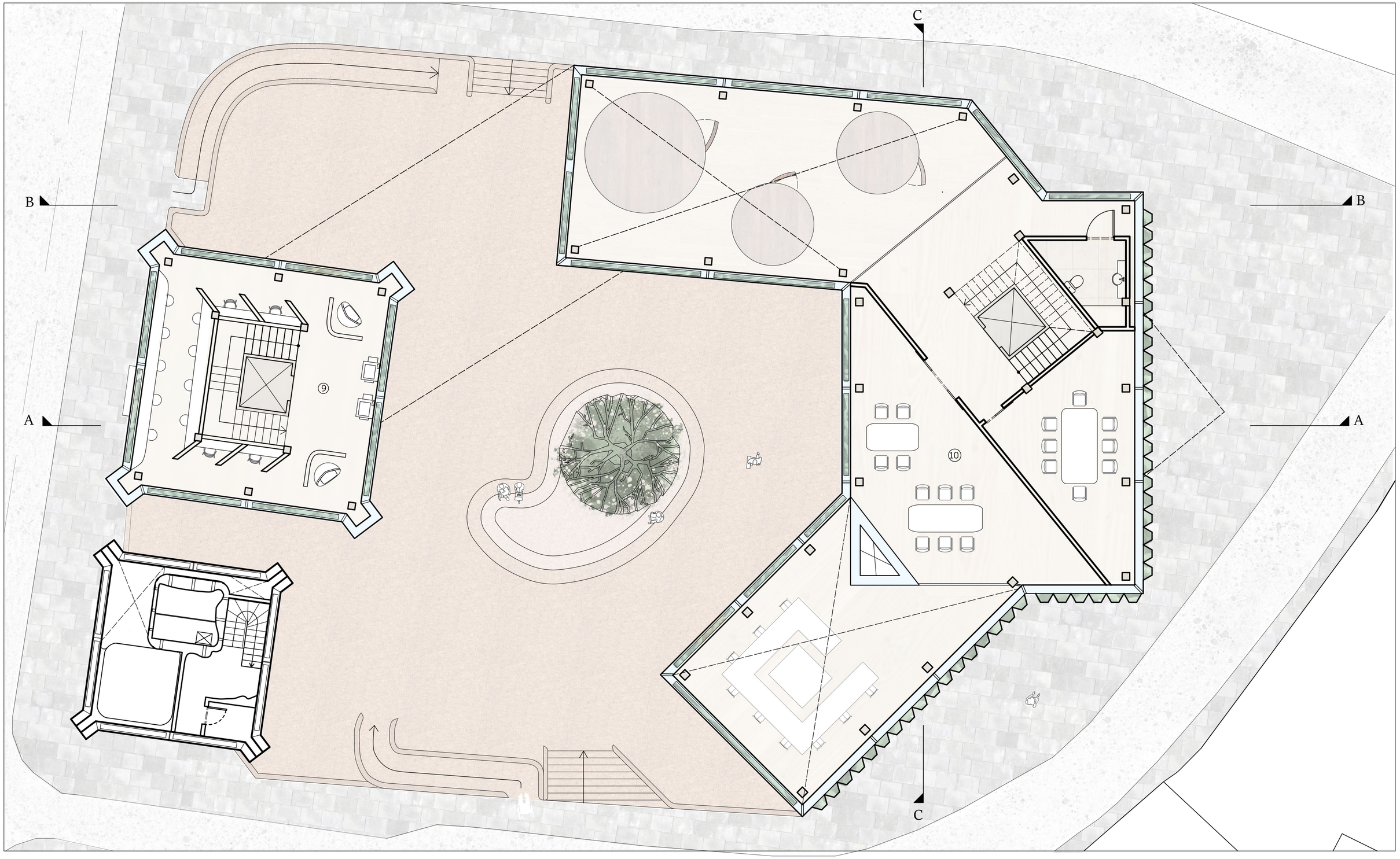
① Cafe space (street entrance)
② Library reception (podium entrnace)
③ Reception space
④ Imaging pods
⑤ Lab 1




First floor
Scale 1:100

0 1 2 3 M

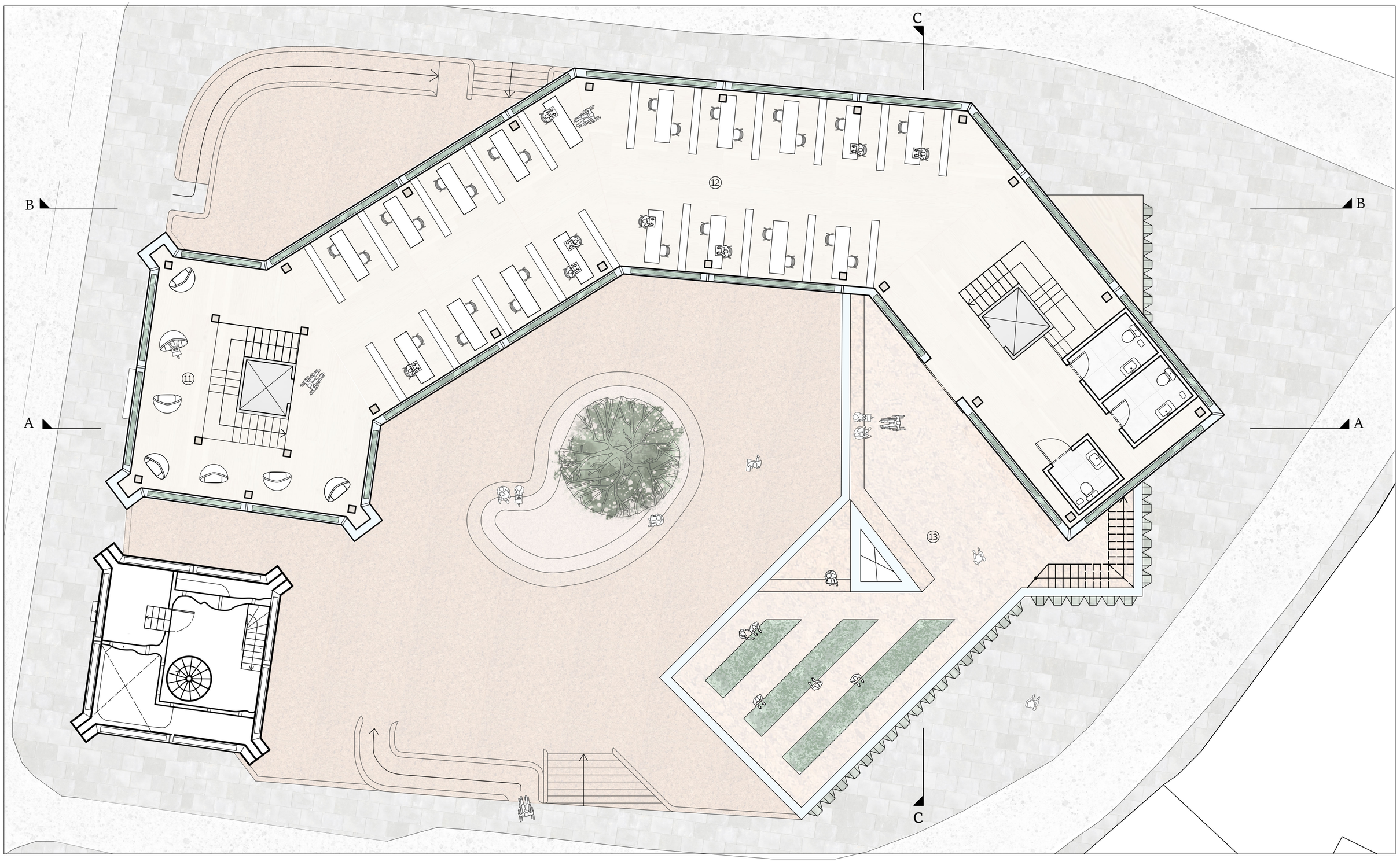
⑥ Individual library study space
⑦ Lab 2
⑧ Bio-printing workshop




Second floor
Scale 1:100

0 1 2 3 M

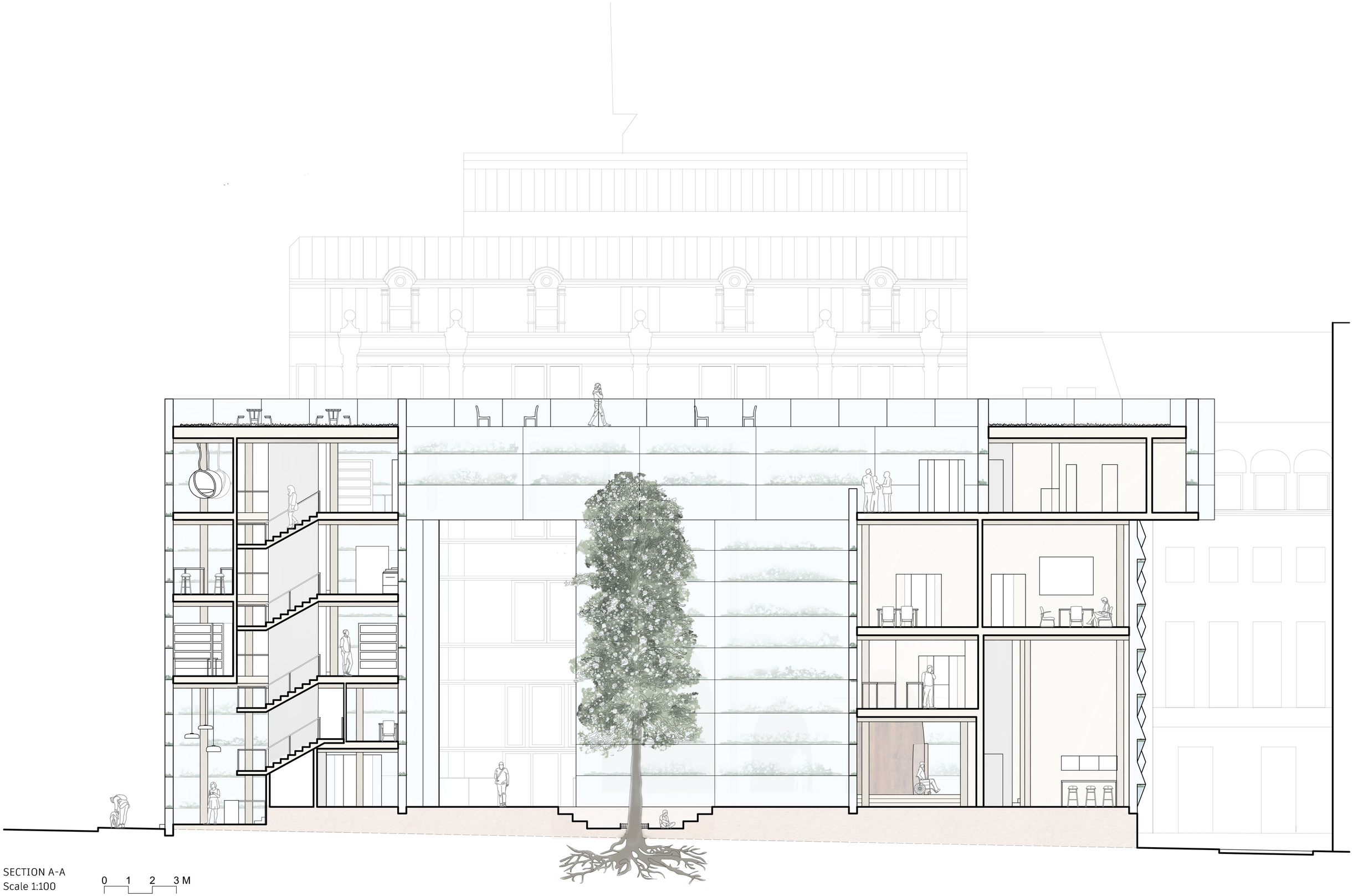
⑨ Open plan library study space
⑩ Meeting Spaces




Third floor
Scale 1:100

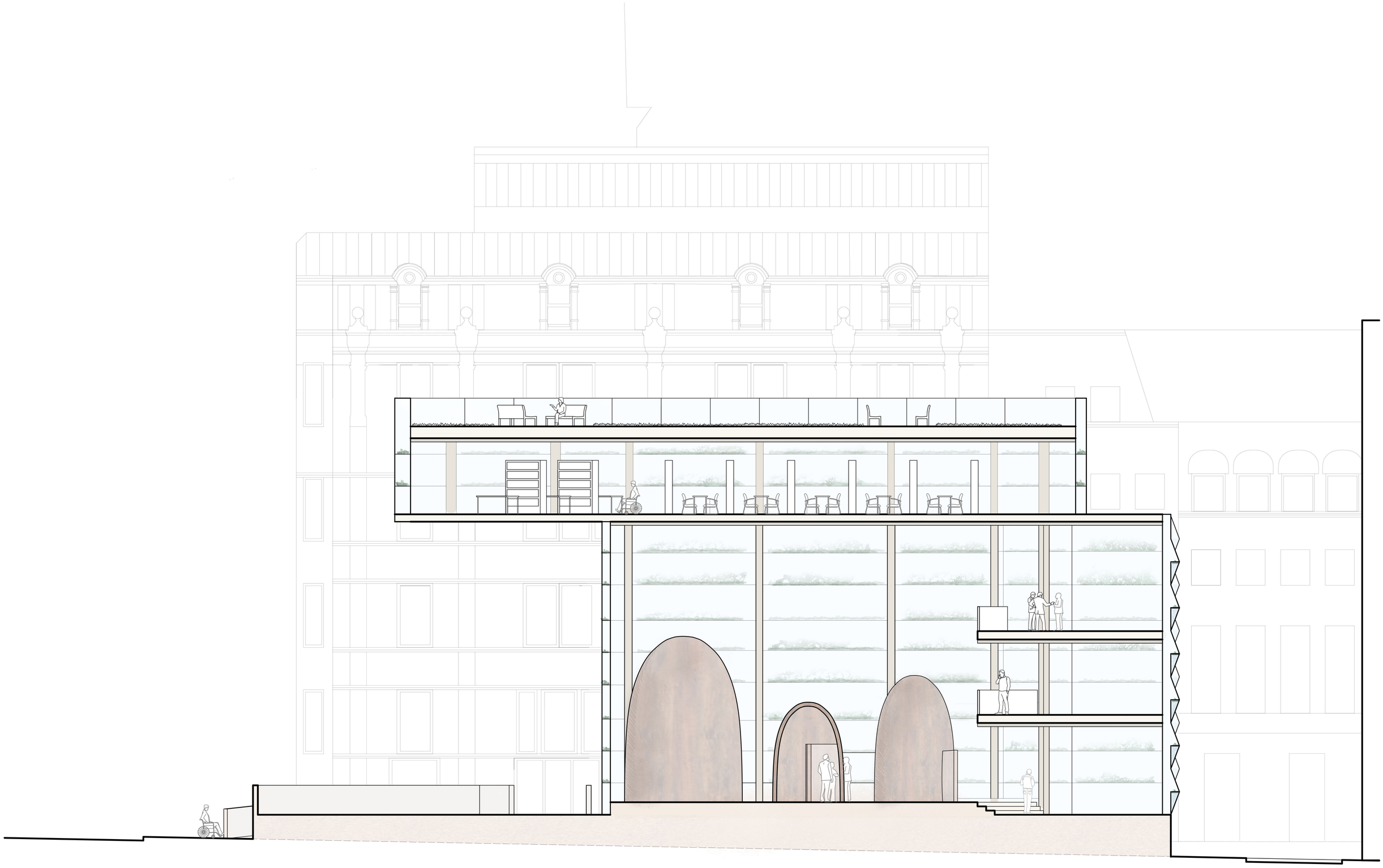
0 1 2 3 M

⑪ Individual reading nooks
⑫ Joint floor study space
⑬ Roof terrace with azolla farm



SECTION A-A
Scale 1:100

0 1 2 3 M



SECTION B-B
Scale 1:100

0 1 2 3 M

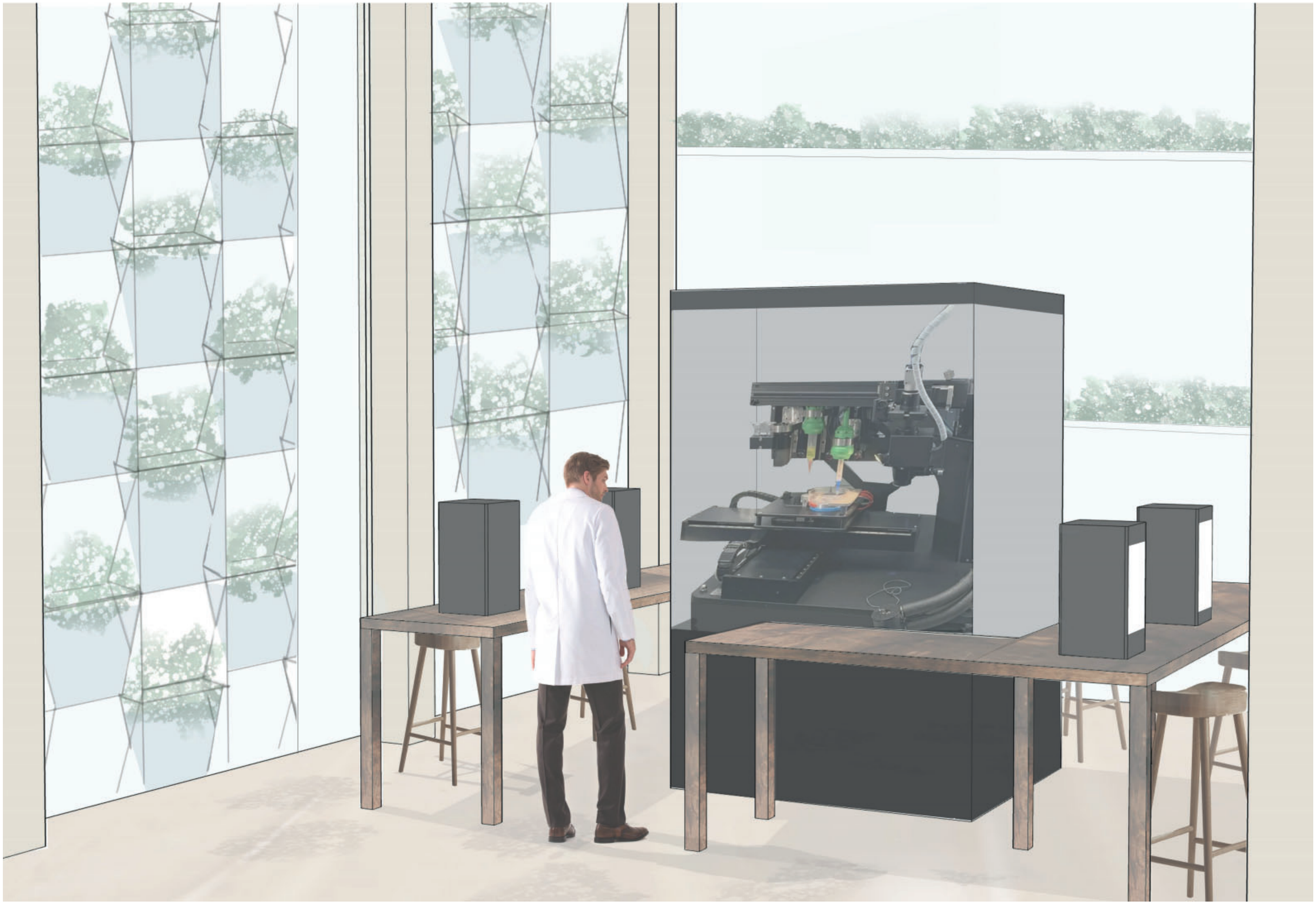
SECTION C-C
Scale 1:100 at A2

0 1 2 3 M

SOUTH ELEVATION
Scale 1:100 at A2

0 1 2 3 M

VIEW 1: LIBRARY INTERIOR VIEW



VIEW 2: BIO-PRINTING WORKSHOP

VIEW 3: EXTERIOR VIEW

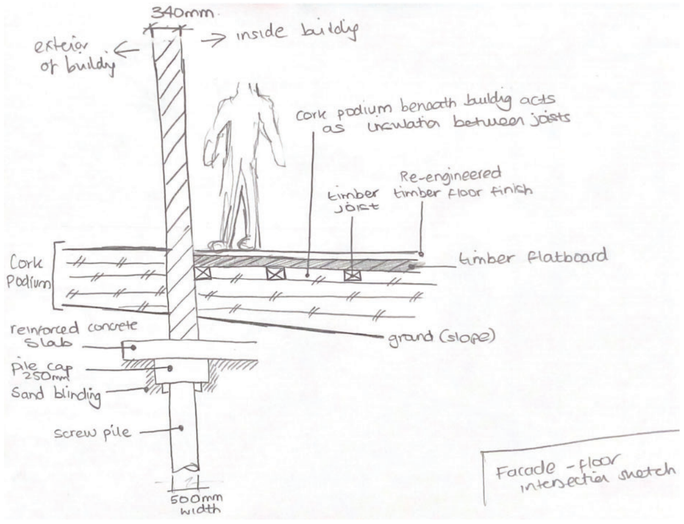
# APPENDIX

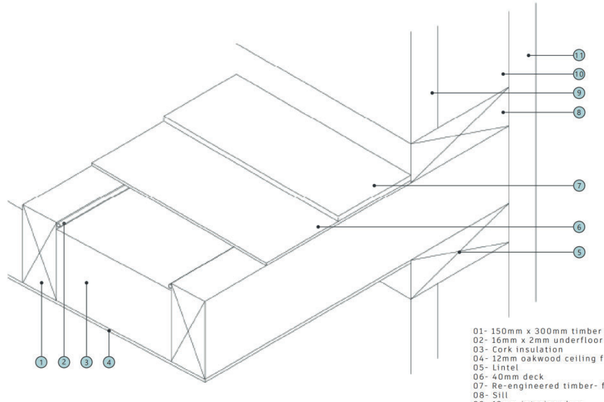
# DEVELOPMENT OF DETAILS

A series of initial sketches showing the exploration process of finding the correct structure and detail drawings. Developing the sketches to try to work out intersections with the ground, flooring and roof.

None of these drawings are part of my final details or final building structure.

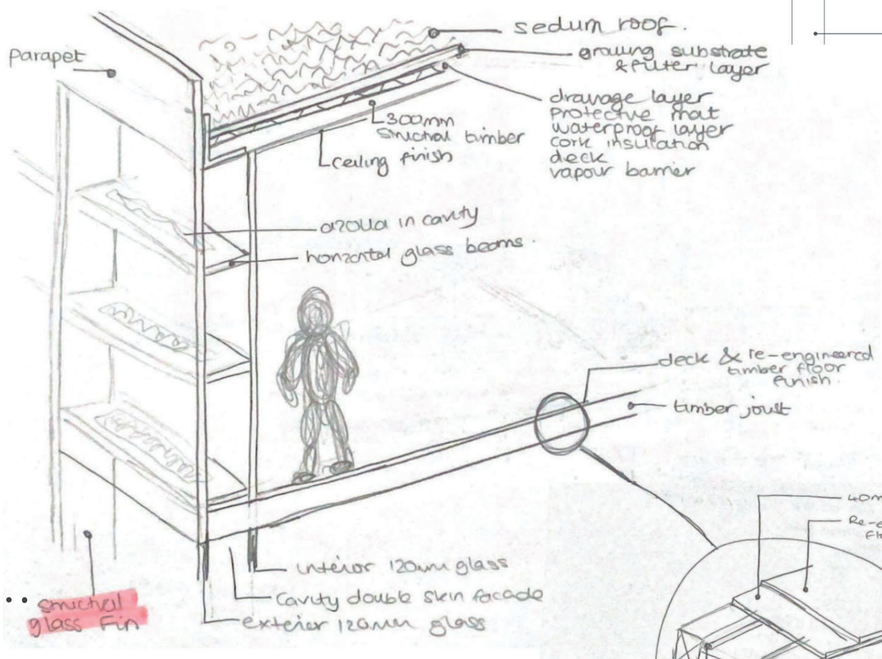
## Flooring / ground intersection

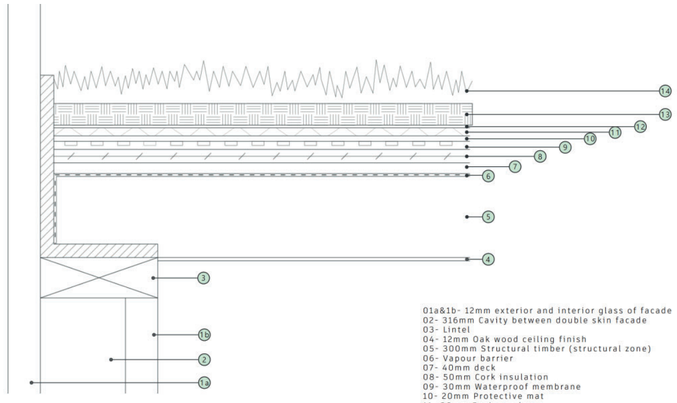


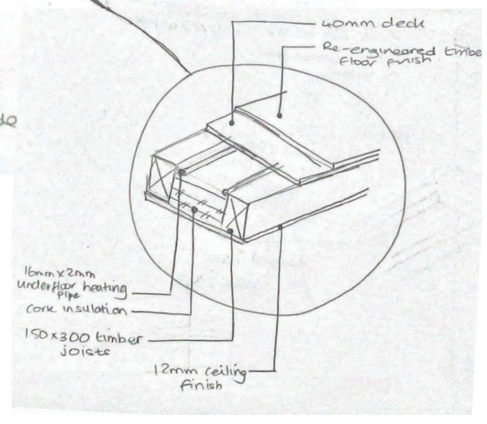

01- 150mm x 300mm timber joists
02- 16mm x 2mm underfloor heating PEX pipe
03- Cork insulation
04- 12mm oakwood ceiling finish
05- Lintel
06- 40mm deck
07- Re-engineered timber- floor finish
08- Sill
09- 12mm interior glass
10- 316mm cavity inbetween double skin facade
11- 12mm exterior glass

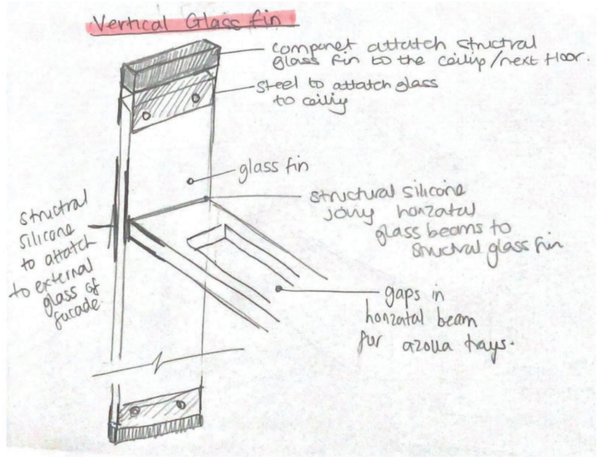
## Roof & facade



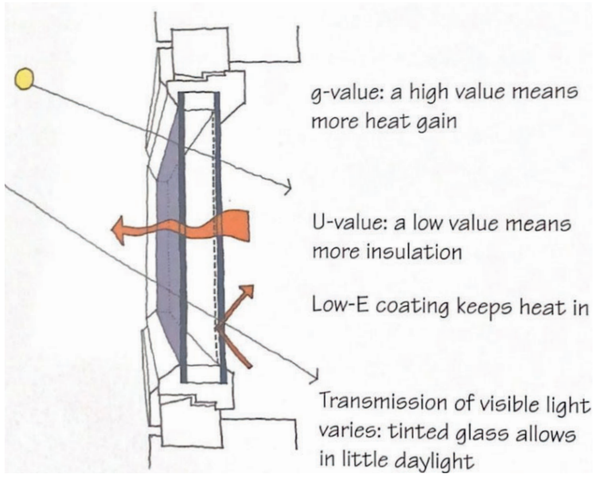



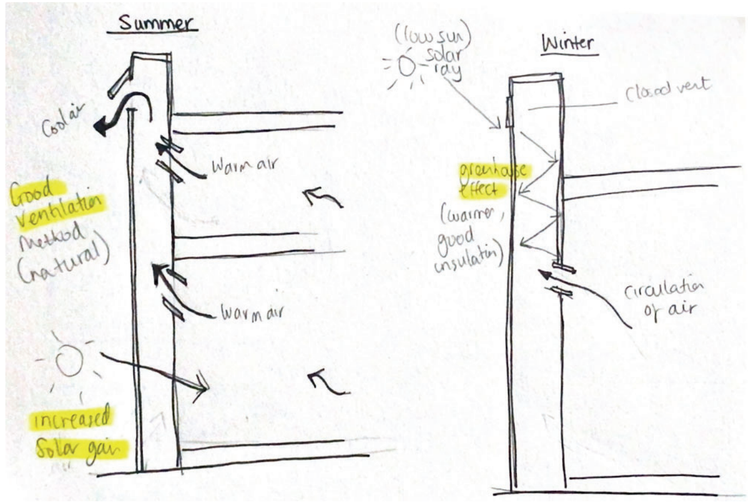

01a&1b- 12mm exterior and interior glass of facade
02- 316mm Cavity between double skin facade
03- Lintel
04- 12mm Oak wood ceiling finish
05- 300mm Structural timber (structural zone)
06- Vapour barrier
07- 40mm deck
08- 50mm Cork insulation
09- 30mm Waterproof membrane
10- 20mm Protective mat
11- 30mm Drainage layer
12- Filter layer
13- 80mm Growing substrate
14- Sedum



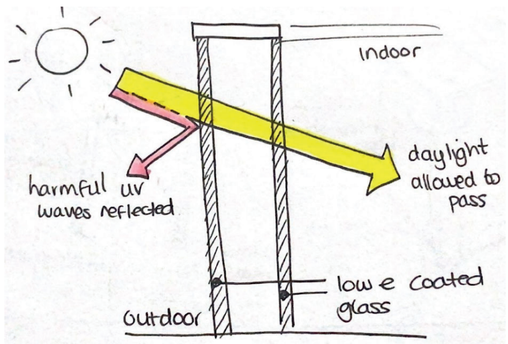



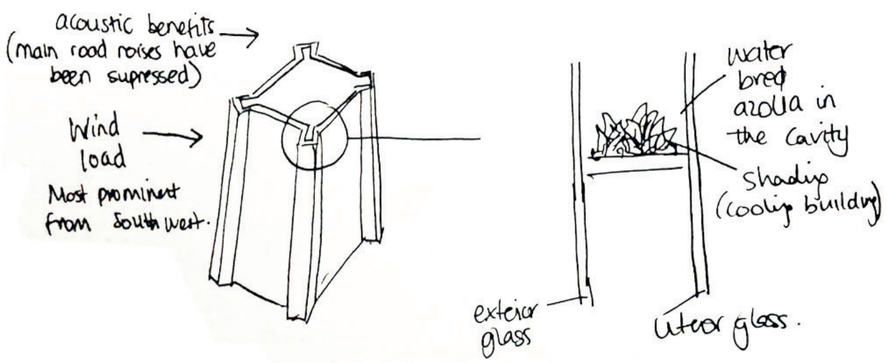
# DEVELOPMENT OF CURTAIN WALL FACADE

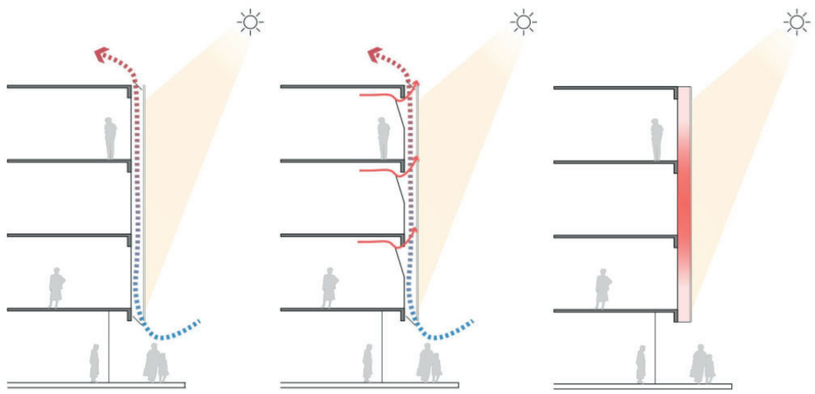



| Insulating Glass Type | Visible Light | | Solar Radiation | | U-value | |
|---|---|---|---|---|---|---|
| | % transmitted | % reflected | % transmitted | % reflected | Winter | Summer |
| clear + clear | 78–82 | 14–15 | 60–76 | 11–15 | 0.42–0.61 | 169–192 |
| clear + low-e | 49–86 | 12–15 | 17–56 | 17–25 | 0.23–0.52 | 133–157 |
| clear + tinted | | | | | | |
| gray | 13–56 | 5–13 | 22–56 | 7–9 | 0.49–0.60 | 74–152 |
| bronze | 19–62 | 8–13 | 26–57 | 8–9 | 0.49–0.60 | 76–152 |
| blue | 50–64 | 8–13 | 38–56 | 7–9 | 0.49–0.58 | 120–154 |
| clear + coated | | | | | | |
| silver | 7–19 | 22–41 | 5–14 | 18–34 | 0.39–0.48 | 36–59 |
| blue | 12–27 | 16–32 | 12–18 | 15–20 | 0.42–0.46 | 58–73 |
| copper | 25 | 30–31 | 12 | 45 | 0.29–0.30 | 44 |



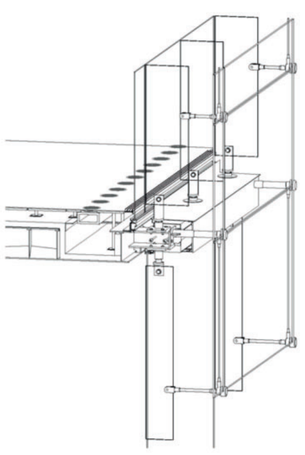



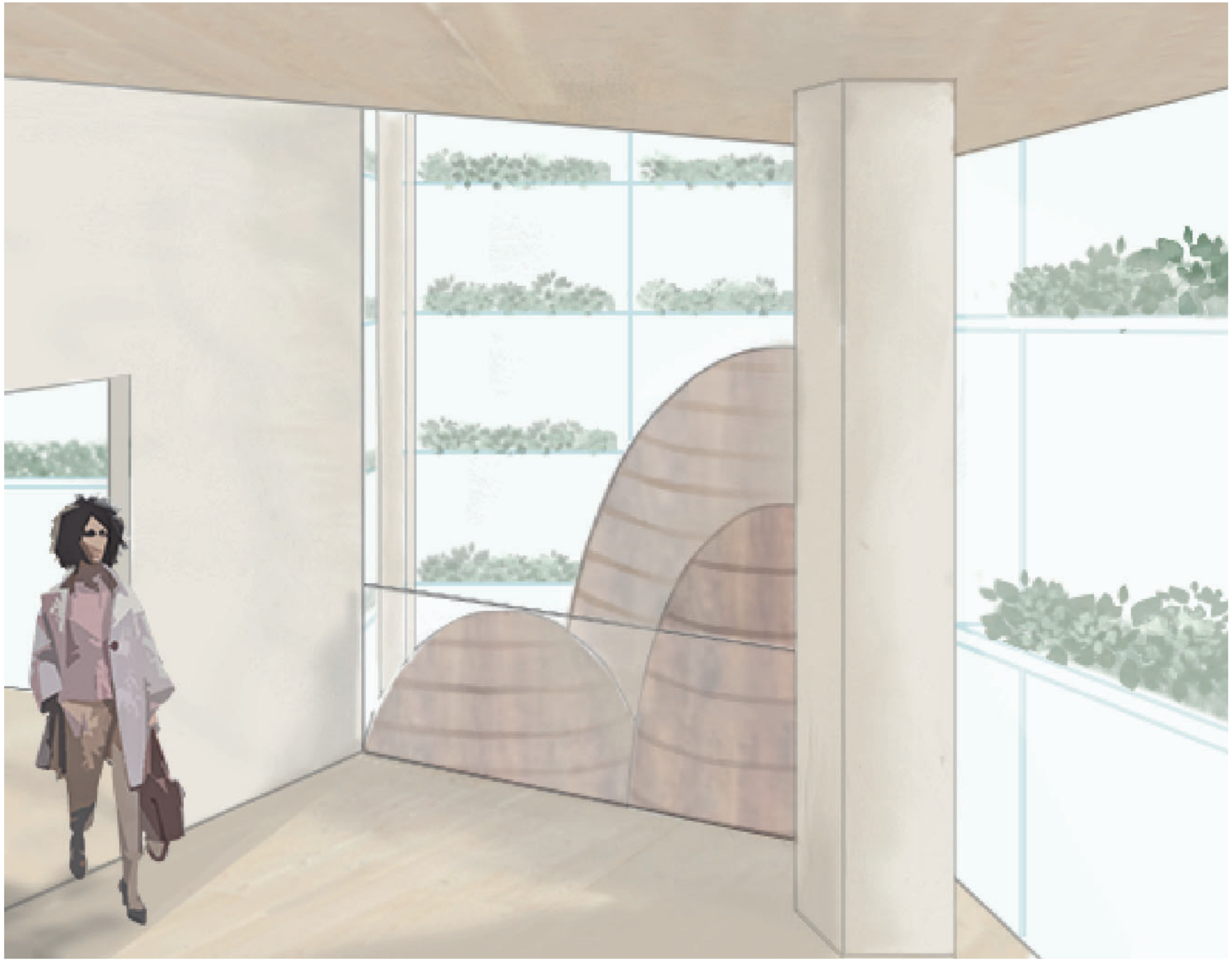



**PRECEDENT**
Sendai Mediatheque
Toyo Ito & Associates

The facade of the building is made from glass and metal. The ground floor has views outside from the double glazed skin. It also functions as part of the buildings system controlling the climate.

Like this building, I will also use the facade as a way to control heat and ventilation in my building.





VIEW of IMAGING PODS