



James Burkhalter

ARCHITECTURE
PORTFOLIO

Selected Works
2018-2019



James Burkhalter

Email: jakb20@bath.ac.uk
Website (WIP): james-burkhalter.com



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Trombone with Seven Bells

S

Project: Instrument
Year: 1
Semester: 1

To design and model an exhibition cabinetto ('a room within a room') for the Bath Music Festival, where an instrument – given at random – will be displayed, played and experienced.

Requirements:

Site:

Assembly Rooms
Abbey
Station
Guildhall
Pump Rooms

Spaces:

Display Space
Exhibition Wall
Demonstration Space
One-person Sound Booth

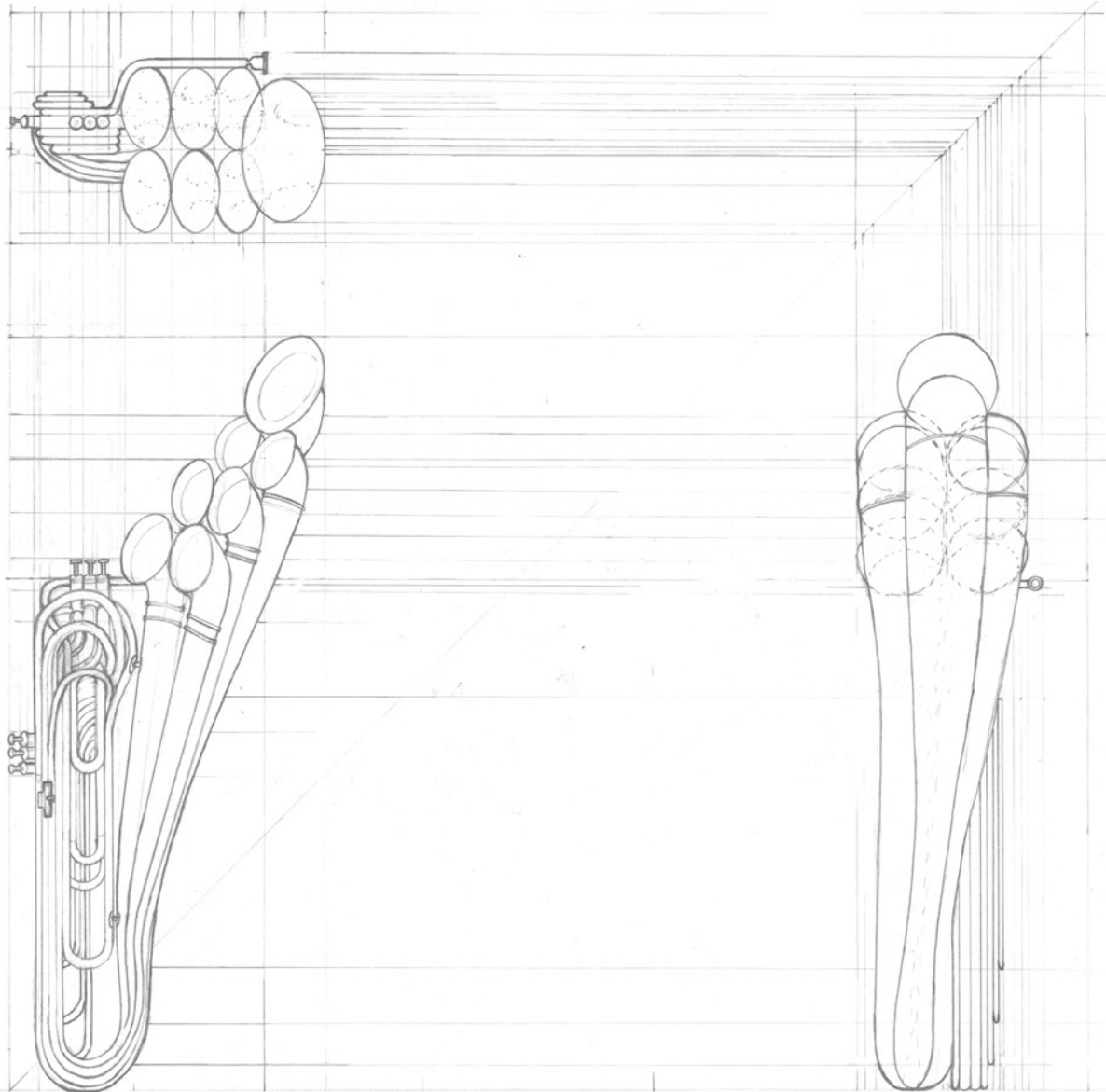
Dimensions:

4000 x 5000 x 4000 mm

Materials:

Timber

Note: Must be transferable from site to site.



Traditional orthographic study of the Trombone with Seven Bells

The Instrument

Trombone with Seven Bells

Period: 19th Century

Creator: Adolphe Sax

Creation:

Another product in the challenge of achieving purity in sound, it was a manifestation of valves, bells and slide lengths. These valves were prevented from combining to prevent the production of any off-key notes.

The Musical Instruments Museum (MIM) describe the trombone as: 'hugely impressive, acoustically trustworthy, but heavy, cumbersome and troublesome to make'¹.

Design Development

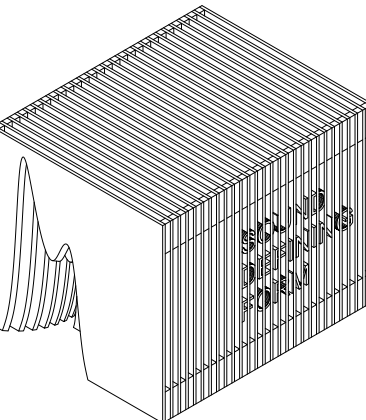
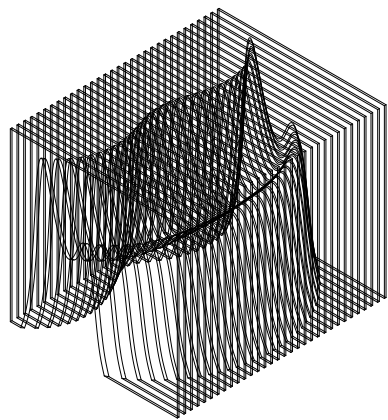
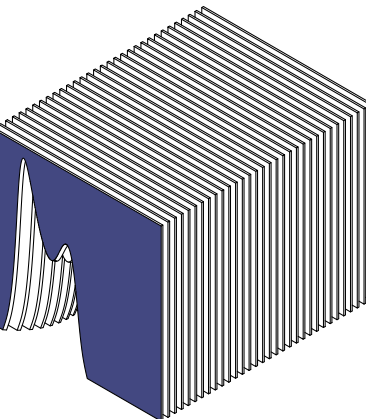
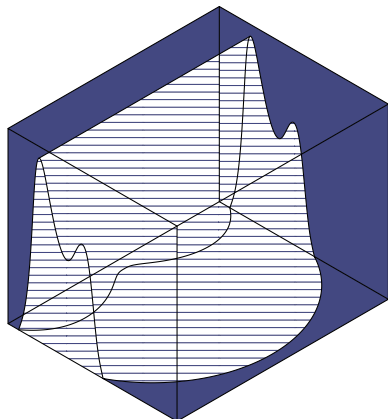
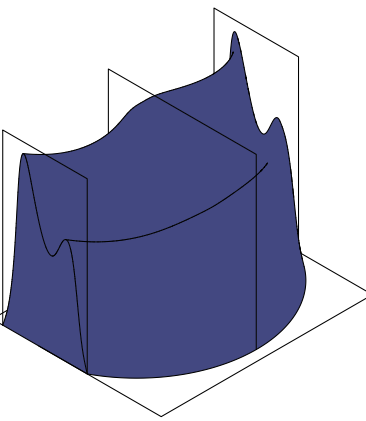
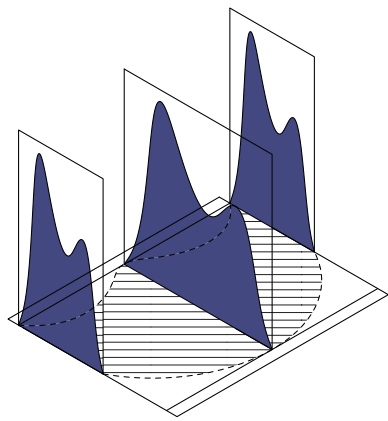
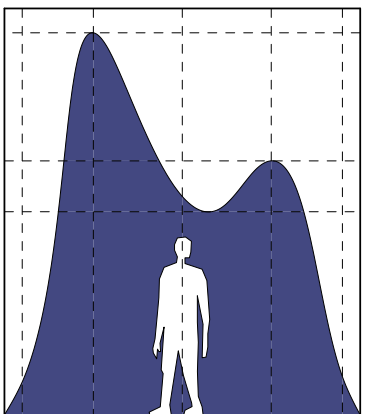
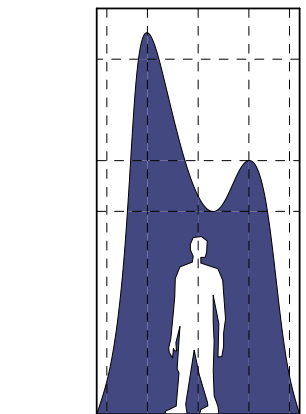
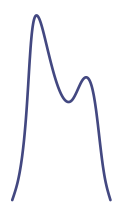
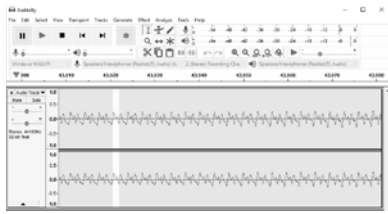
Abstraction

Adolphe Sax's perfectionism for purity motivated his creation of the Trombone with Seven Bells.

Acoustic purity can obviously be heard, but what does it look like?

The waveform of the Trombone with Seven Bells is a direct visualisation of both Adolphe Sax's perfectionism and the materiality of the trombone going beyond the object itself, first contributing to the sense of hearing and now to sight.

Utilisation of this form exemplifies *Gesamtkunstwerk*² or Total Design, the principle of unifying all aspects of life through music and architecture; a term used by Wagner during the 19th century and inspiring the following process.



Waveform

A series of repeated waveforms (with two peaks of different sizes and one trough) make up the melody. The determinate form for the pavilion and a visualisation of Adolphe Sax's perfectionism.

Ergonomics

To create a weaving path to guide the user, different sized waveforms were needed. An entrance/exit (left) and a central space (right) that is twice the scale in width of the entrance/exit.

Melody

The starting waveform has been lofted and curved along an arc to meet the centre waveform and mirrored. Note: Boundary edges were offset by 250 mm for material/structural stability.

Form

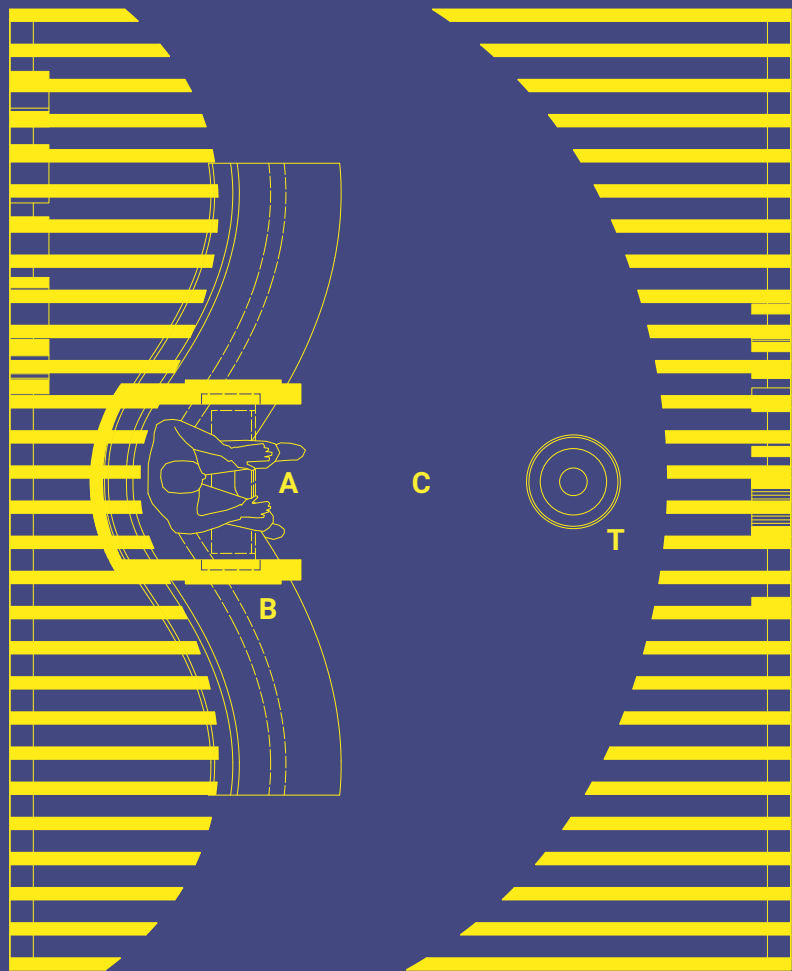
A subtraction of this form from the provided volume (4.0 x 5.0 x 4.0 m) results in a solid cave-esq internal space that is then divided into timber (plywood) panels between battens.

Concept

Each panel appears as a single note but concurrently develops an internal melody (plan) that would vary in amplitude (height) and frequency (width). An almost symbiotic relationship where the Trombone with Seven Bells dictates the space it occupies through the physicality of the sound it produces:

Sound defining form

Drawings



4.92 m

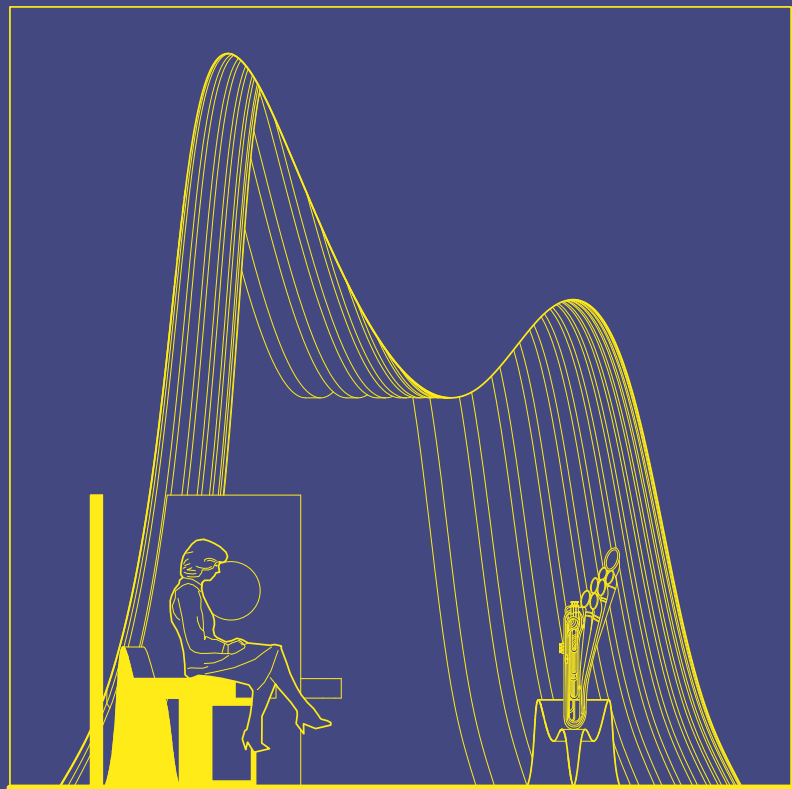
4 m

Plan

- T. Trombone with Seven Bells
- A. One-person Sound Booth
- B. Exhibition Wall
- C. Demonstration Space

Paraded by its melody, shifting walls guide the user into the central space and towards the trombone with seven bells. Deceptively simple, the pavilion's cubic volume is unassuming and occupies the entirety of the site's allocated floor space. Contrasting the complexity of the internal space.

Externally a rhythm of slits and the opening's size hide the instrument from view, evoking a sense of surprise upon seeing its peculiar shape.

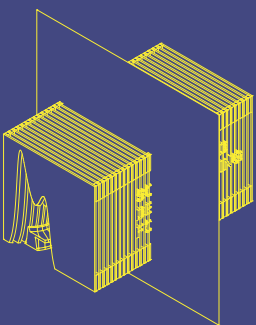


4 m

Section

- High peak height: 3800 mm
- Low peak: 2500 mm

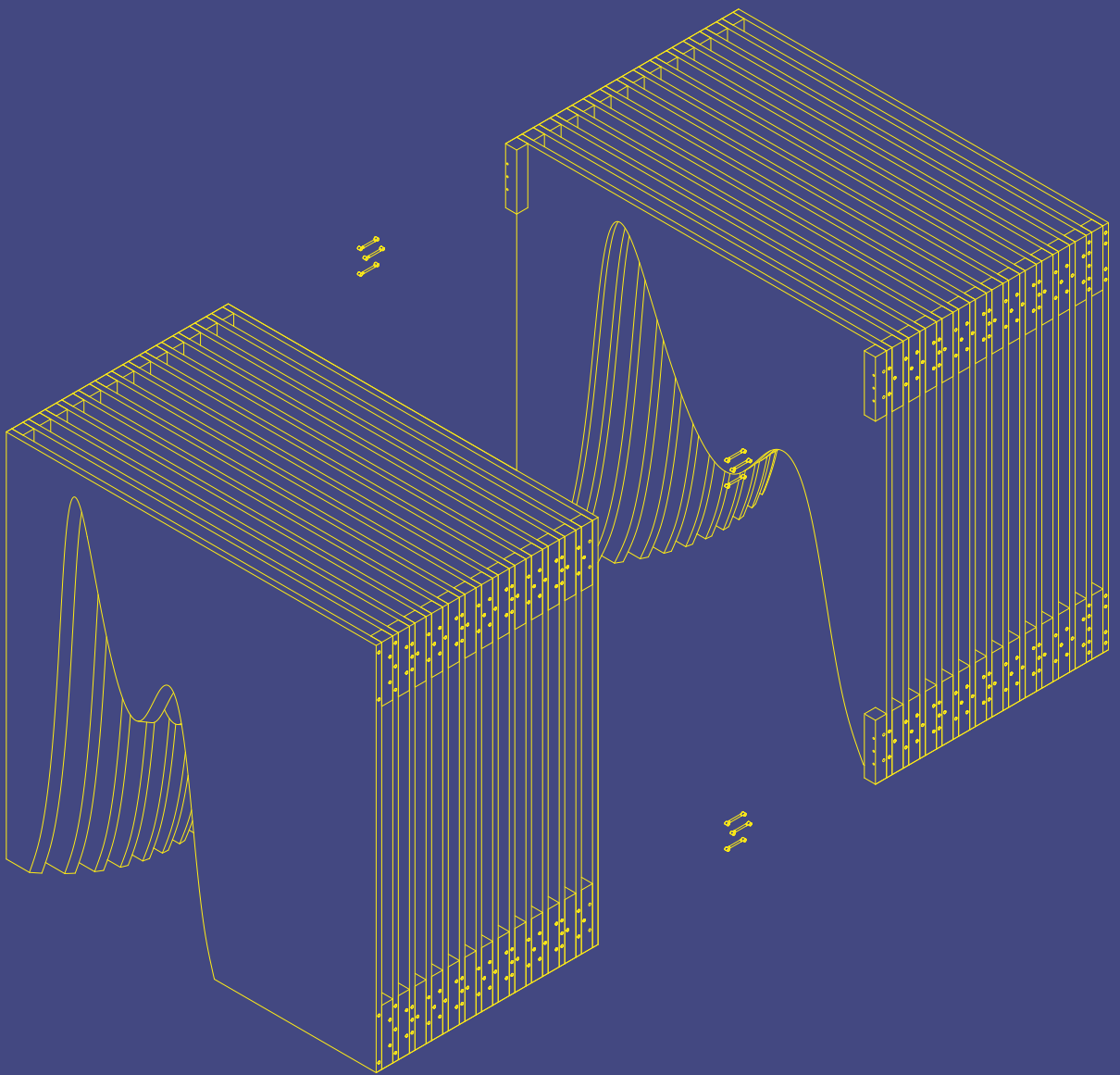
Section Cut:



Cut away directly through the horizontal centre of the pavilion, the utilisation of the waveform is apparent, as highlighted by the: structure, display case and seats.

Sitting facing the trombone, the user is invited to a private experience where they can enjoy the instrument alone but also hear and learn about it from the sound booth (sound proof headphones) and information (exhibition wall) situated either side.

Storage for the exhibition is situated directly beneath this seat for items such as brochures, posters, etc.



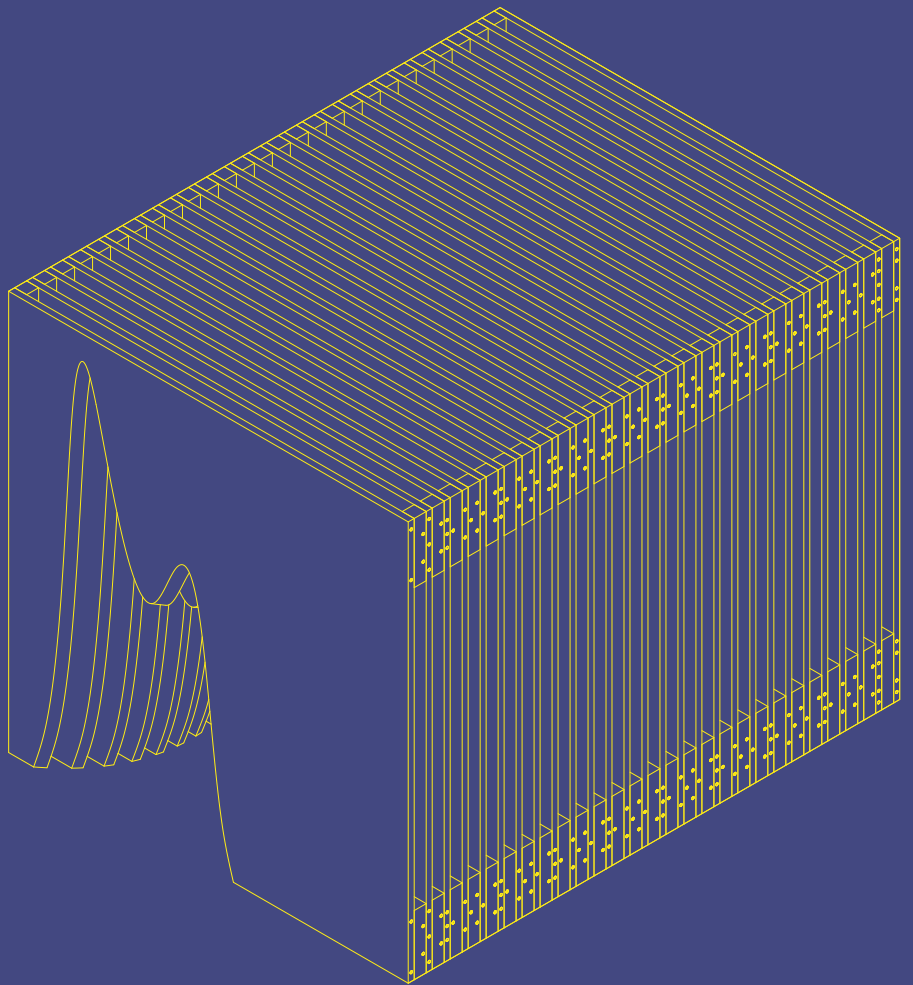
Construction & Cradle-to-Grave Analysis

Material: Jumbo Plywood

Dimensions: 4000 x 2800 mm

CAM lock fittings are used to join the waveform panels together through interlocking battens and the edges of the plywood.

Securing of these pieces for transport, assembly and disassembly is highly versatile as a result of the nature of the panels and joining method. Subsequently exemplified by how it can be transported in bulk; one piece or halves, or progressively through a series of equally sized sections.



Temporary CAM lock fittings also limit the quantity of material that is permanently damaged, resulting in a significant percentage of plywood sheets and battens to be recyclable. As well as aid in build speed due to its simplicity of use. Optimising energy efficiency for both recycling and transport for construction at new site.

Protection of the plywood when used externally is highly recommended and can be achieved through numerous varnishes, water seals and polymer coatings. In wet and windy weather it is imperative that the instrument is protected and sealed within its container by a glass or polymer case that fits around the display holder.



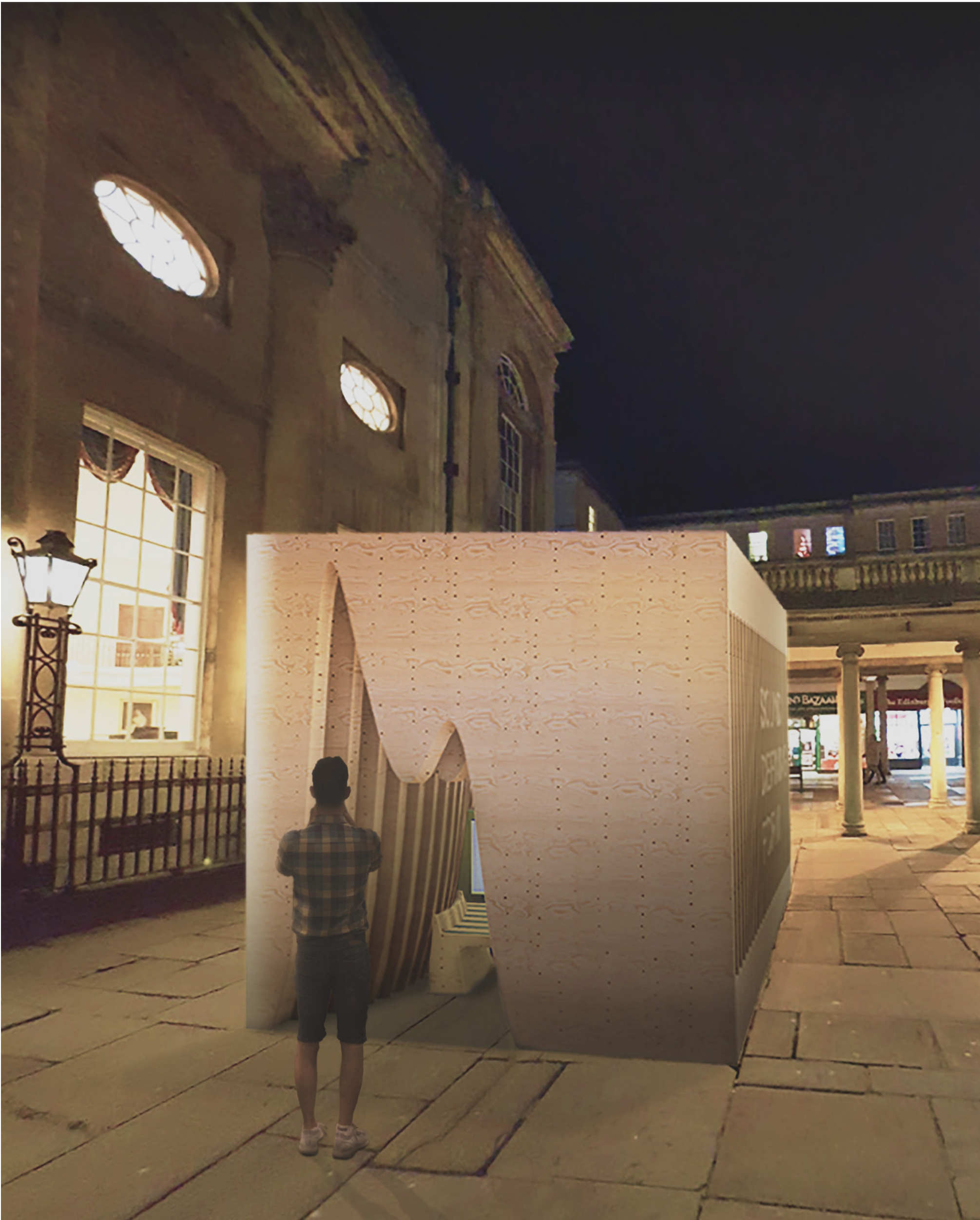
1:20 Model



Constructed using the same materiality as the pavilion, each plywood sheet has been made by hand and are all individually bespoke to form the unique curving and varying interior. Each joined by four balsa cuboids (battens) and wood glue.

The paperclip symbolises a modest interpretation of the trombone with seven bells as it rests within its revolved waveform case.

Bath Abbey



Library

463,400

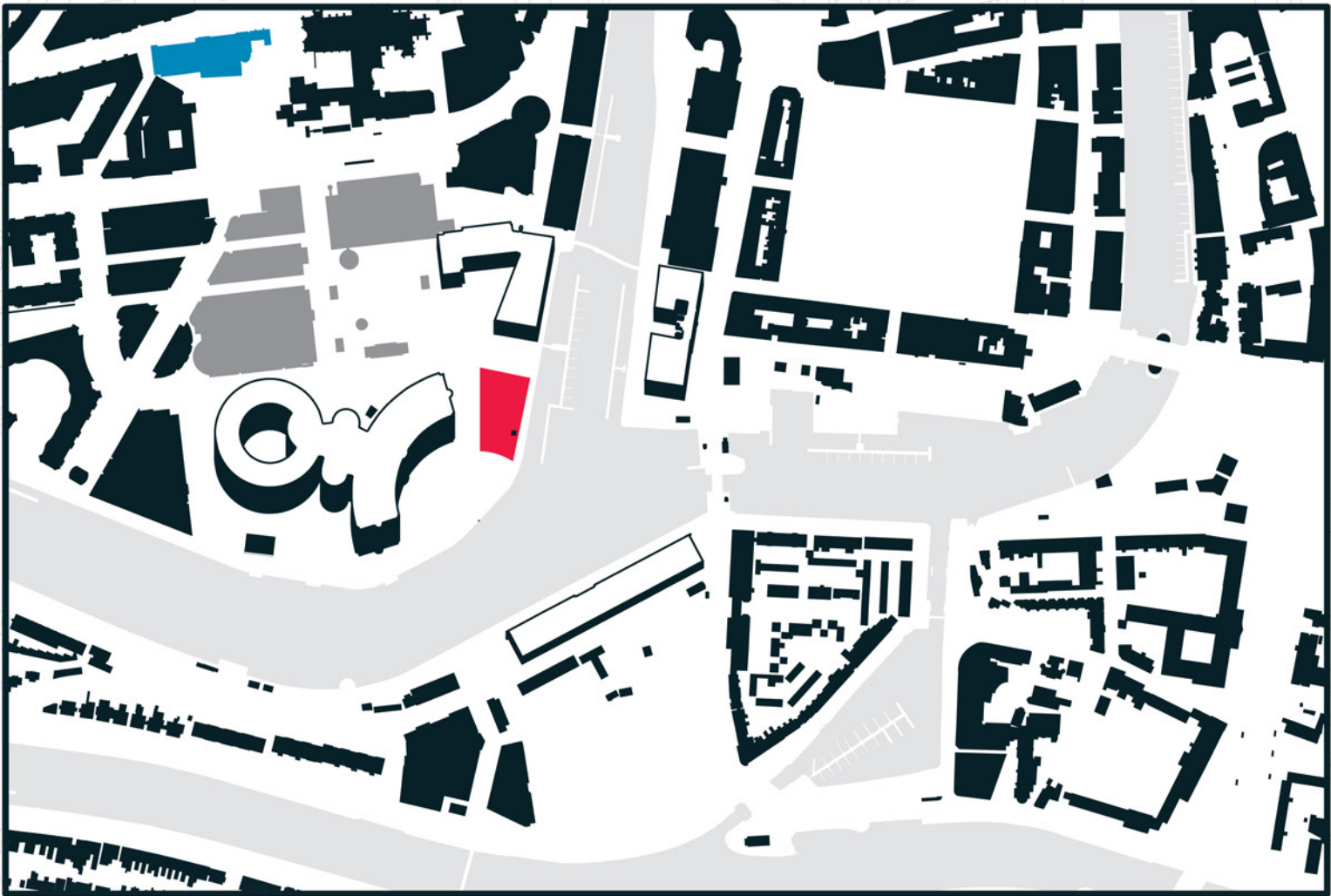
Population of Bristol in 2018 [REF]

32.5 v.s. 40

Average age of Bristol v.s. Average age of England and Wales



Almost one in five people are below the age of 16 in Bristol



S

Project: Library
Year: 2
Semester: 1

Design of small to medium sized civic library in Bristol.

As libraries move from a 'transactional' to a 'relational' service, the traditional function and spatial arrangements need to meet a growing technological need, with the architecture responding to a more contemporary and urban setting. The use of libraries has diversified to offer a greater range of activities and cannot be considered as just storage for books.

Coffee shop: 75
Server bar area: 15
Store: 10
Plant room: AS REQUIRED
Library spaces: 500
Quiet
Maker
Social
Common

Schedule of Accommodation (m2):

Reception and Temporary book storage area: 20
Inquiries counter: 20
Office: 20
Staff room: 20
General storage: 20
Community room: 100
Main toilets: 50
Children's book and reading area: 150
Children's toilet / changing area: 25
Reference library: 50
Total: 1075
Circulation: 10-15%
Total (approx.): 1200

Bristol's libraries are in a considerable decline and have become 'significantly worse' [REF] in the last three years.

Why?

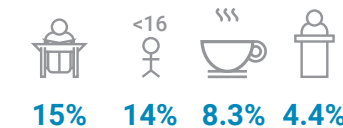
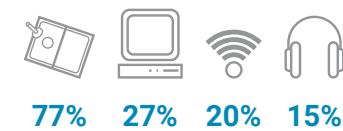
Despite being a relatively young society – with there being more children (below the age of sixteen) and young adults than people over the age of fifty – young people account for the lowest percentage of library visitors within their demographic. While those between the ages of sixty-five and seventy-four account for the greatest percentage within their range.

In combination with a considerably low use of studying or children's spaces, this data highlights a major issue in Bristol's libraries:

They are not accounting for their primary demographic. Resulting in generations who miss out on experiencing a library from a young age to likely be intimidated by it as a study space when they mature.

How are Bristol's libraries used?

User priorities emphasise the importance of each building space. Information access (*borrowing resources*, using a *computer* or *wifi*, etc.) account for a majority of people's visit as opposed to the café or event spaces. While *studying* and *children's learning* seem relatively low in comparison.



35.7%

Visited a library in the last twelve months



Bristol



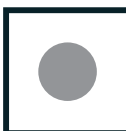
Bristol Harbour



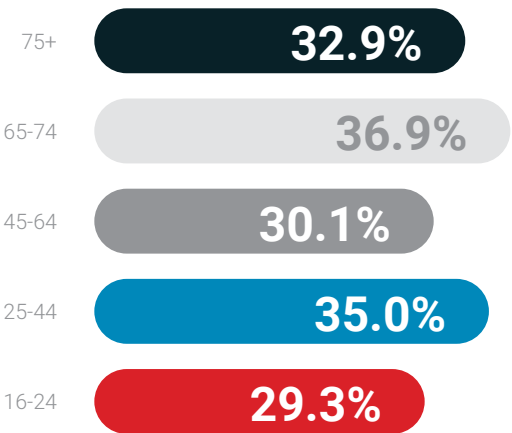
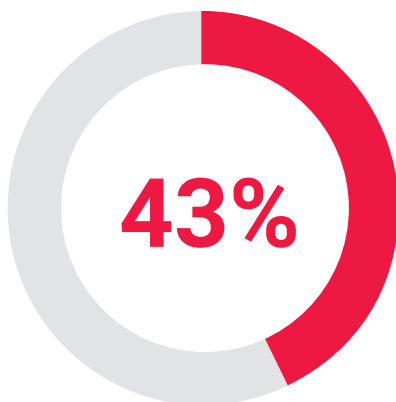
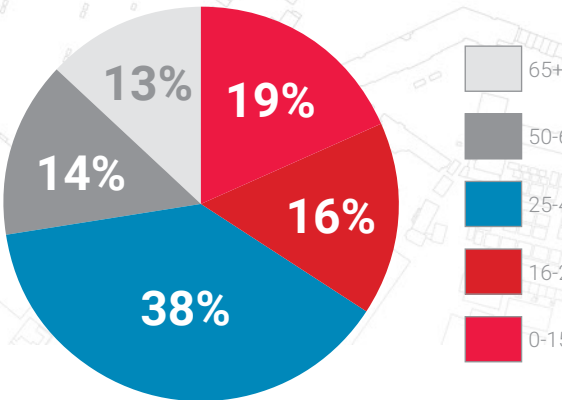
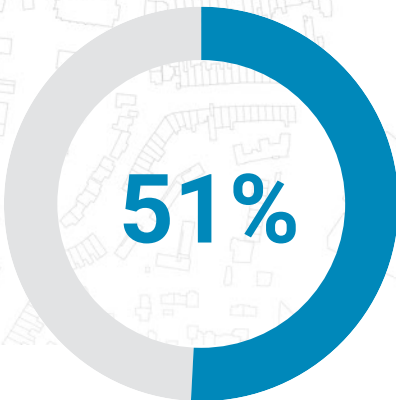
Bristol Central Library



The Site: Lloyds Amphitheatre



Millenium Square



Site Analysis

The Site

Located next to the Lloyds headquarters and amphitheatre, it is clear that any adjacent building should rival it in monumentality.

Nature

The site allows for lots of natural lighting and orientation opportunities — though it will be overshadowed from the west by the Lloyds building. A south-western prevailing wind direction can be utilised for natural ventilation.

Urban Context

Noise from the V-shed, a restaurant and bar area, dictates the placement of quiet and family spaces to be on the southern side of the building. While views to the south and east; as well as minimal possibility for noise; highlights that the core library should be on the harbour-side of the site.

Access Routes

A perimeter path encircles the main site, with the route between the Lloyds building and the site providing direct access to Millenium Square. A road leading to an underground car park could enable delivery access from the north.

Key Features

A dock cabin is present on the site and should be integrated within the fabric of the building or through landscaping. The stean crane is Grade II listed and centres the arc of the amphitheatre.

Orientation

Orientation to the Lloyd's curve and/or the waterfront through continuing the arc, following tangents, etc. is a key challenge that the Library should resolve. Moreover, as the site is raised, there are opportunities to manipulate the ground plane of the site and the ampitheatre (e.g. through excavation).

Fire Exit

A fire exit is positioned at either end of the Lloyds building, restricting how close the library can get to it.

Rhythm

A vertical rhythm of column pairs run along the arc of the Lloyds building. Appearing mirrored either side of the crane. Yet the mass of the building is contrastingly asymmetric, with the volume of the site being the missing piece.

Process Diagrams

Puzzle piece solution

A solution to extend the Lloyds building and subsequently reclaim the amphitheatre as a public space by introducing a massing that would rival the Lloyds buildings in monumentality.

The amount to which the massing extends from the Lloyd's building has been determined via the floor area in the briefs requirements.

Resolving the curve

Continuing the circular arc of the Lloyds building to meet the V-Shed and in parallel with the waterfront; the massing now appears mirrored to the central crane, completing the Lloyds building.

Justifying the entrance

As a puzzle piece, the curved segment flows with the fire exit of the Lloyds building. Subsequently, the main entrance has been positioned within the semi-circular joint and between the path created through the massing and the Lloyds building.

The link

The link between the two structures removes the need to have a draft lobby as a glass structure, or vegetation and columns would provide sufficient protection from prevailing winds.

Introducing the library concept

The library's layout illustrates the idea of a journey – a beginning (service), middle (vertical circulation) and an end (the library space) – a promenade synonymous with literature.

Repeating the column pattern

The rhythmic pattern of the columns are distinctive when viewed from across Bristol harbour. This rhythm has been replicated by stepping back the façade to create masonry fins. Where from the south and north façade they are purely aesthetic, in the east they act as solar shading.

Landscaping and Adjustments

The link has been converted to a cover to allow people to walk straight from the Millennium / Waterfront square and into the library or amphitheatre. Additionally, the existing slope has been made thinner while maintaining its existing gradient.

Additional features

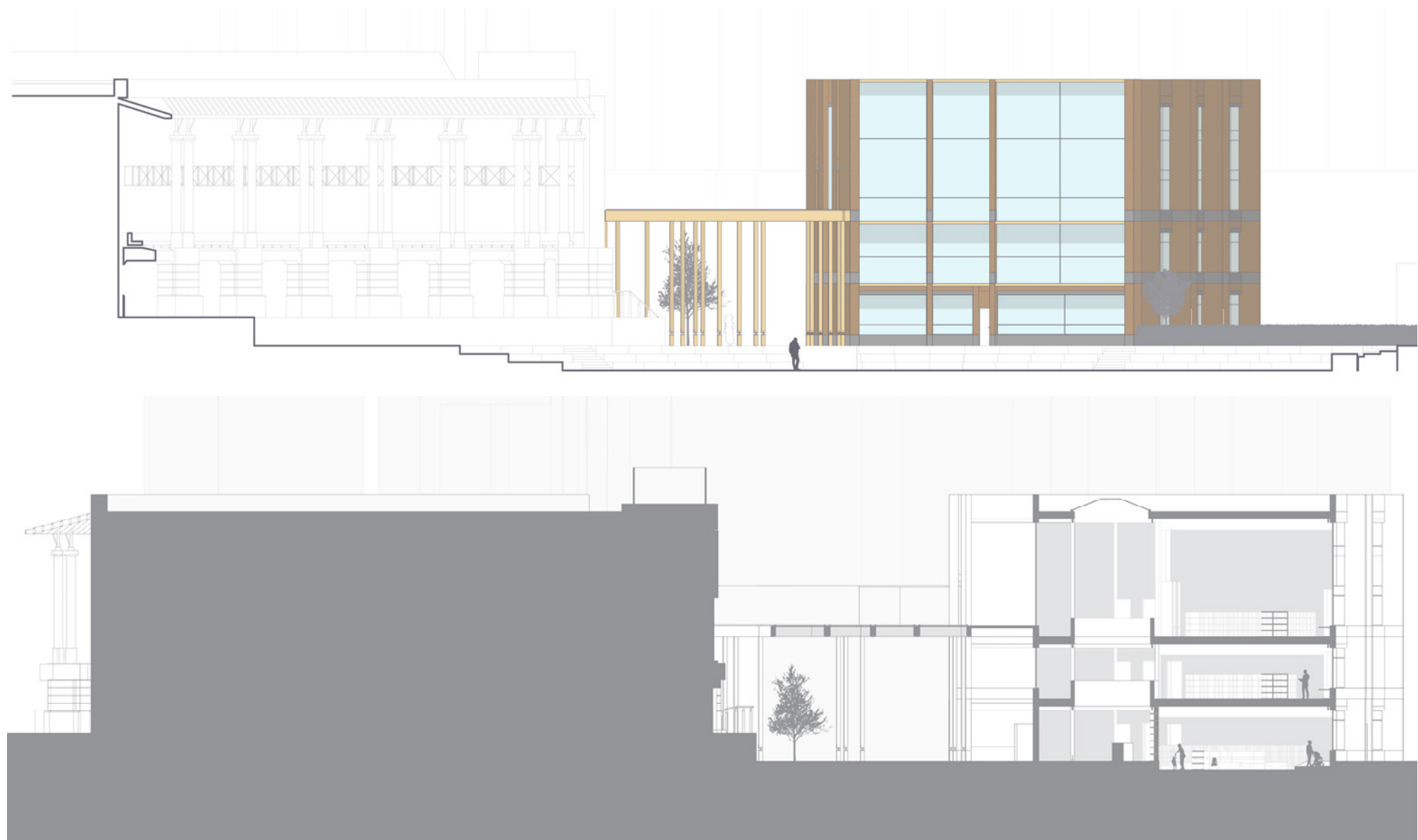
South-western prevailing winds warrant a double skin façade to act as a solution to the southern masonry fins previously created – providing both solar shading and natural ventilation. A glazed top has been provided to the link roof to allow light to reach in between the two masses, effectively producing a glazed street.

4 m

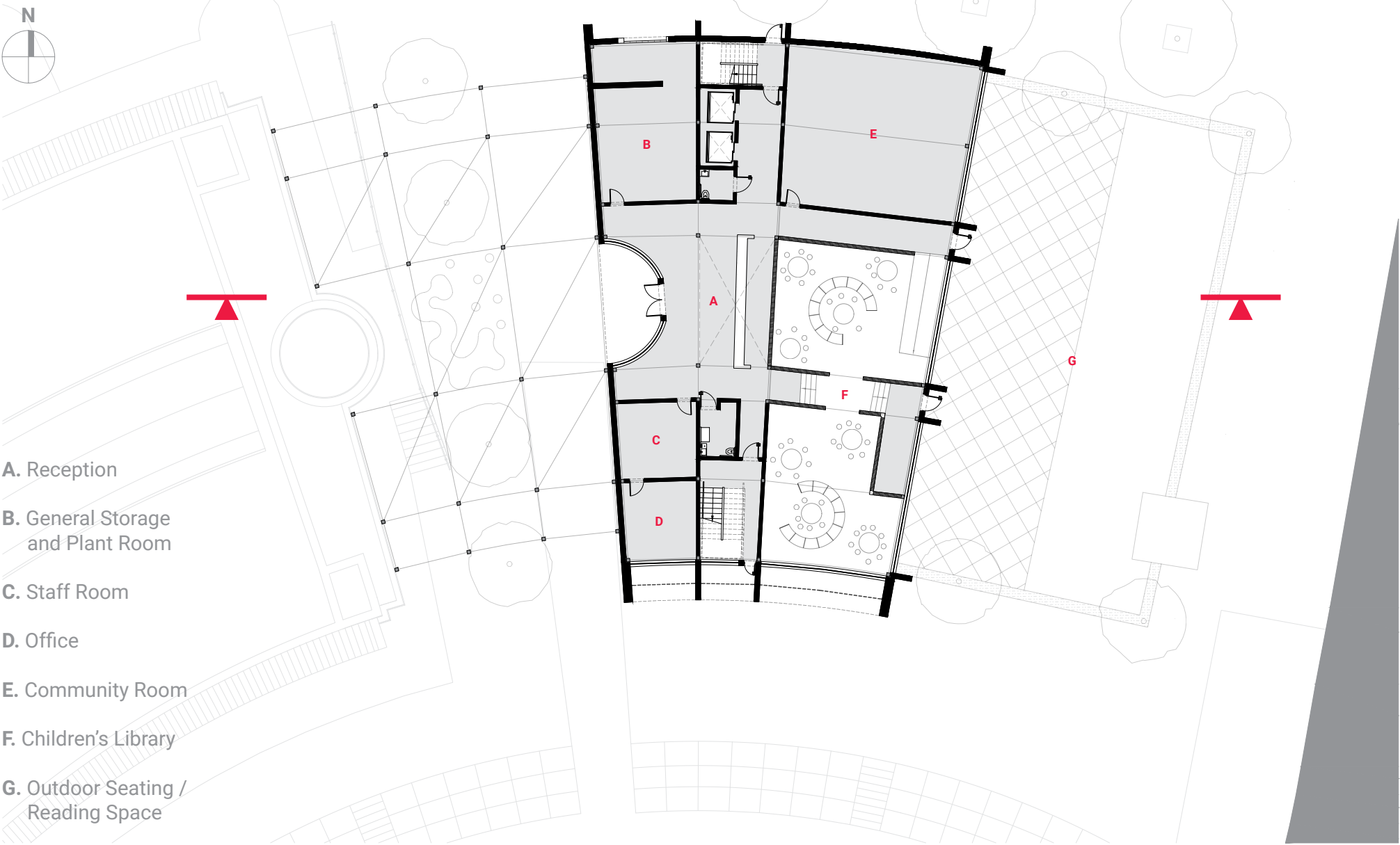


1:500 Context Plan

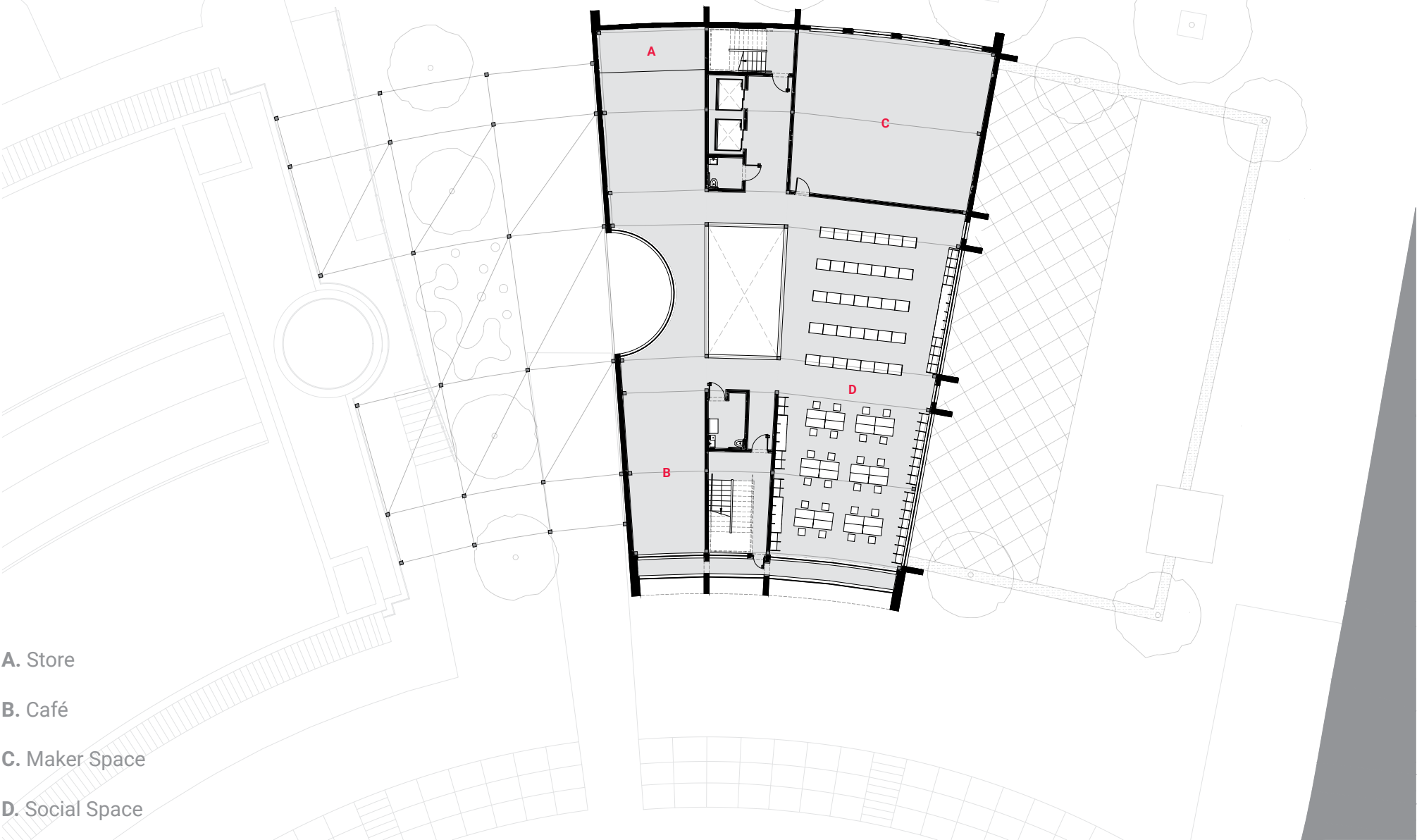
BRISTOL HARBOUR



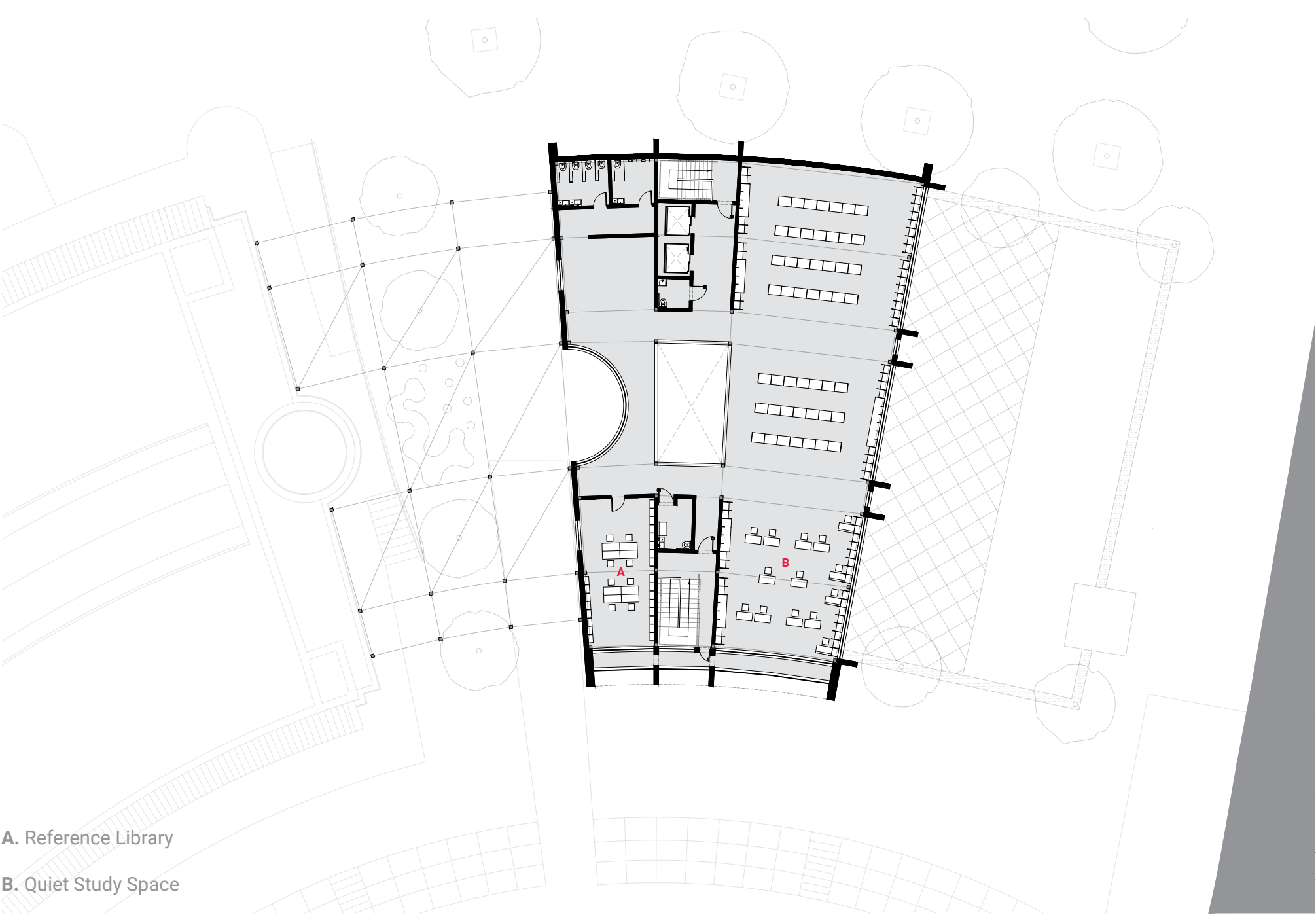
0 4 8 20 m
2 6



- A. Reception
- B. General Storage and Plant Room
- C. Staff Room
- D. Office
- E. Community Room
- F. Children's Library
- G. Outdoor Seating / Reading Space



- A. Store
- B. Café
- C. Maker Space
- D. Social Space



- A. Reference Library
- B. Quiet Study Space

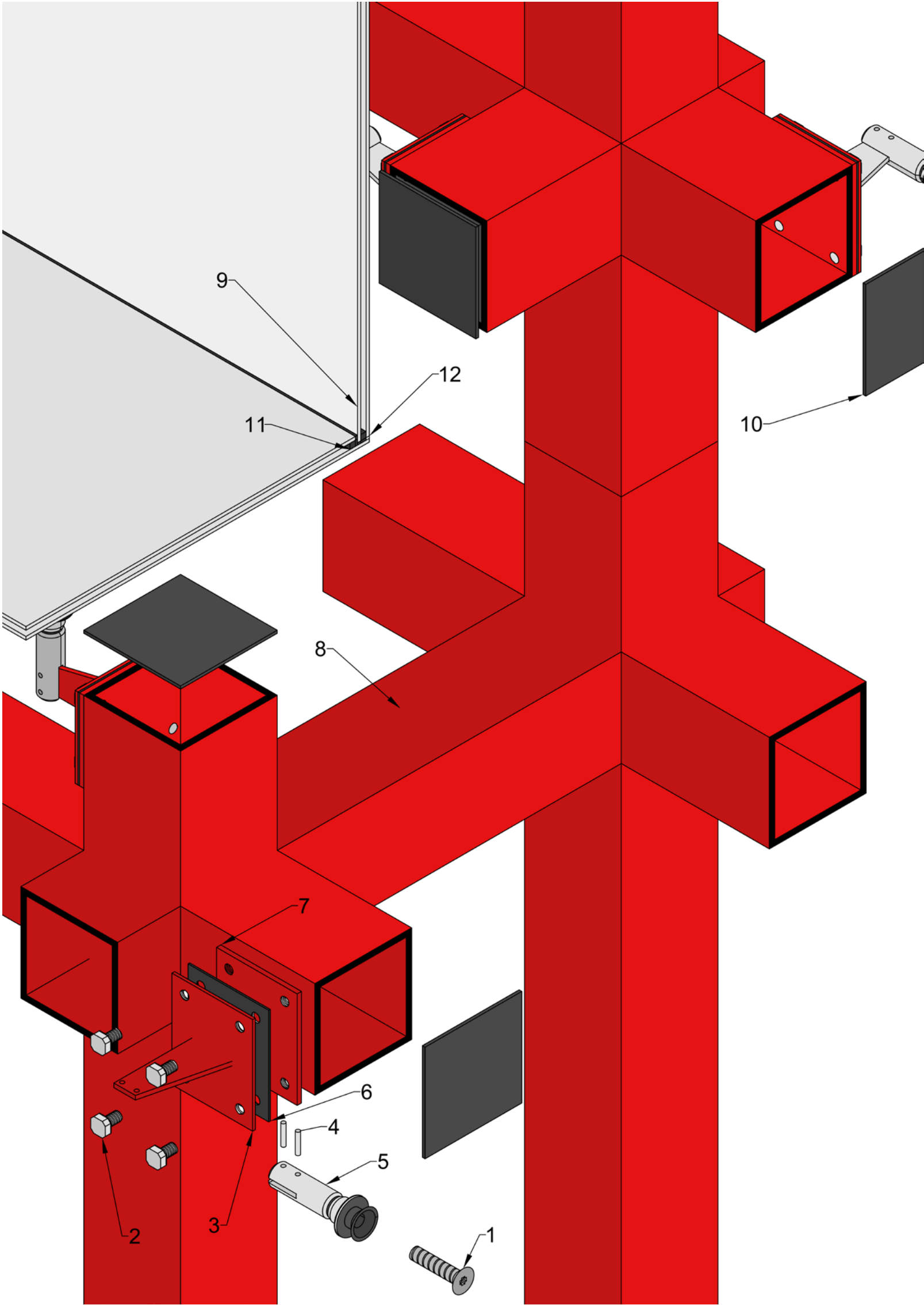


C
Construction Drawings

Panel Glazing Detail

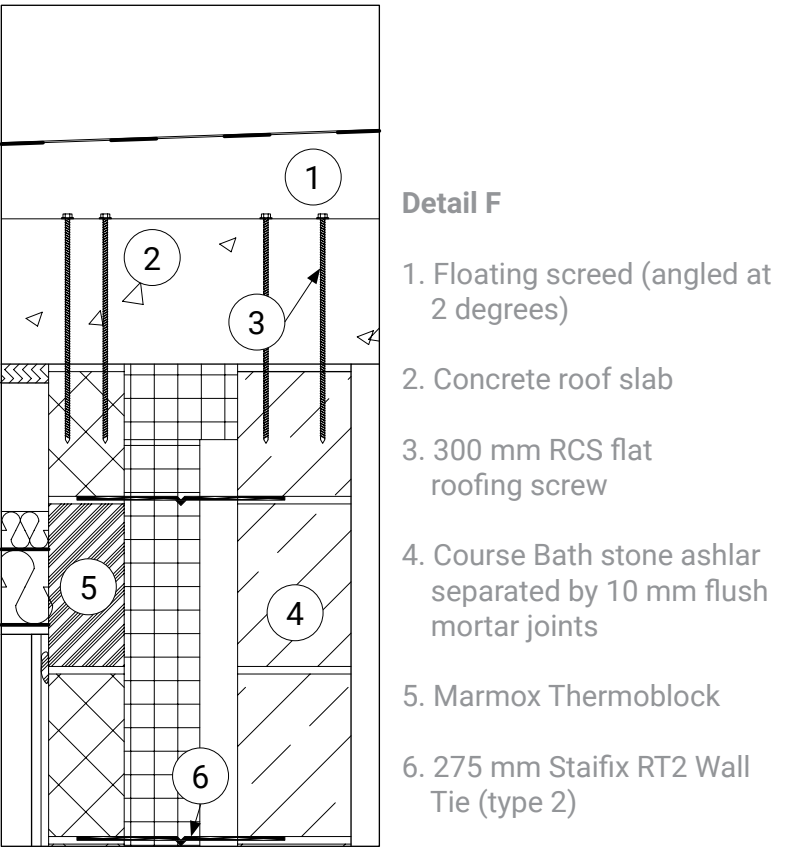
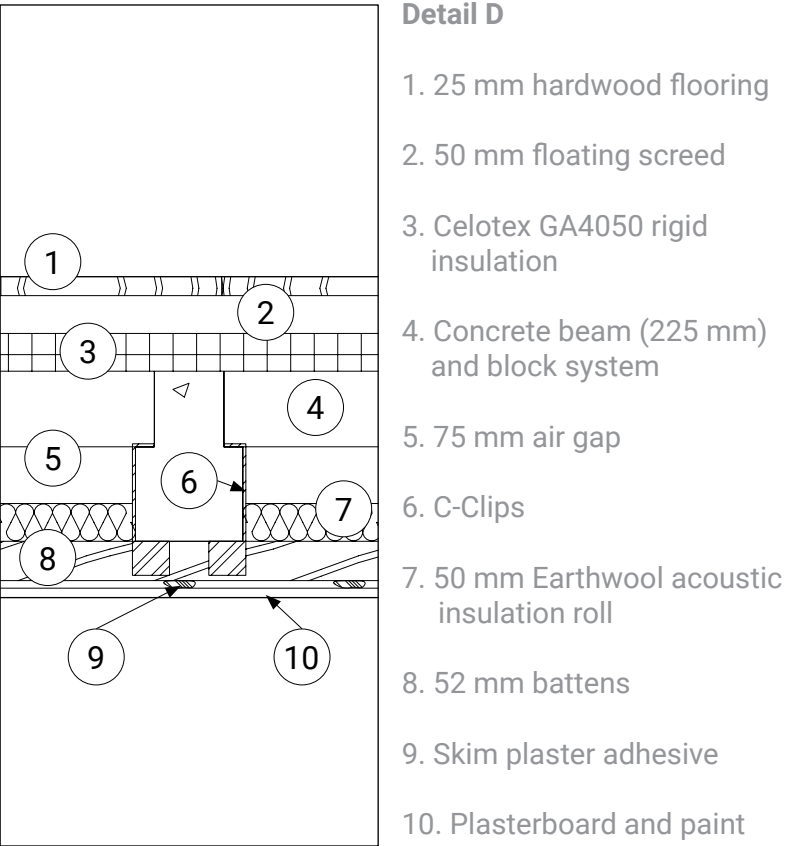
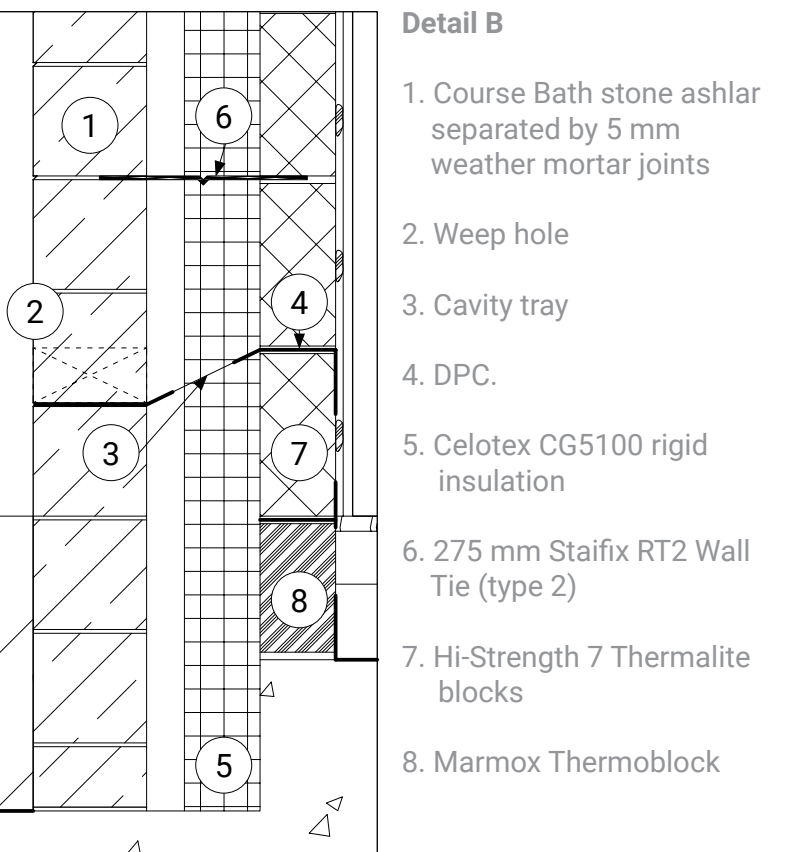
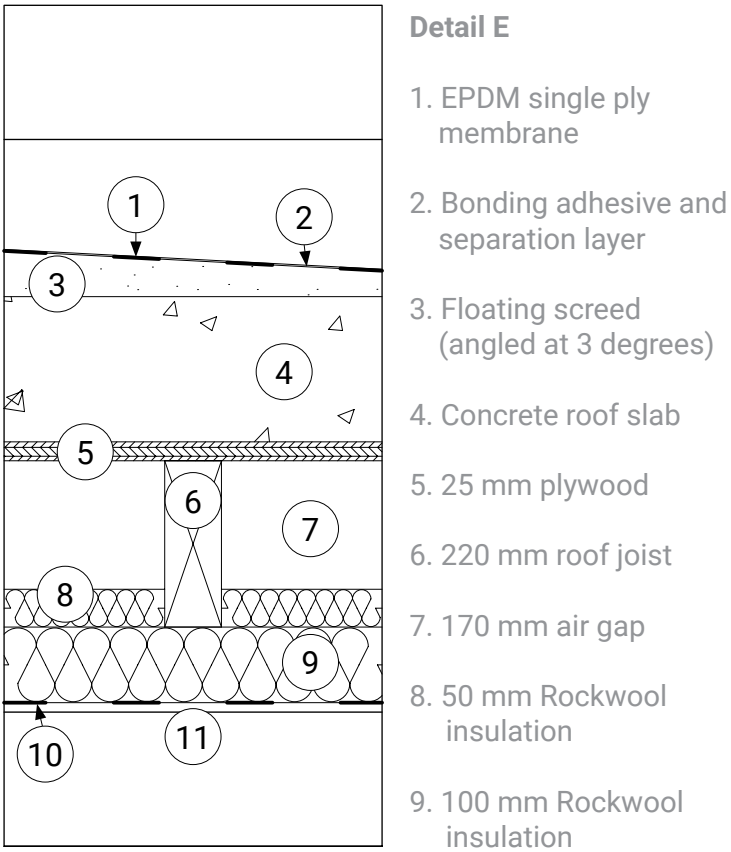
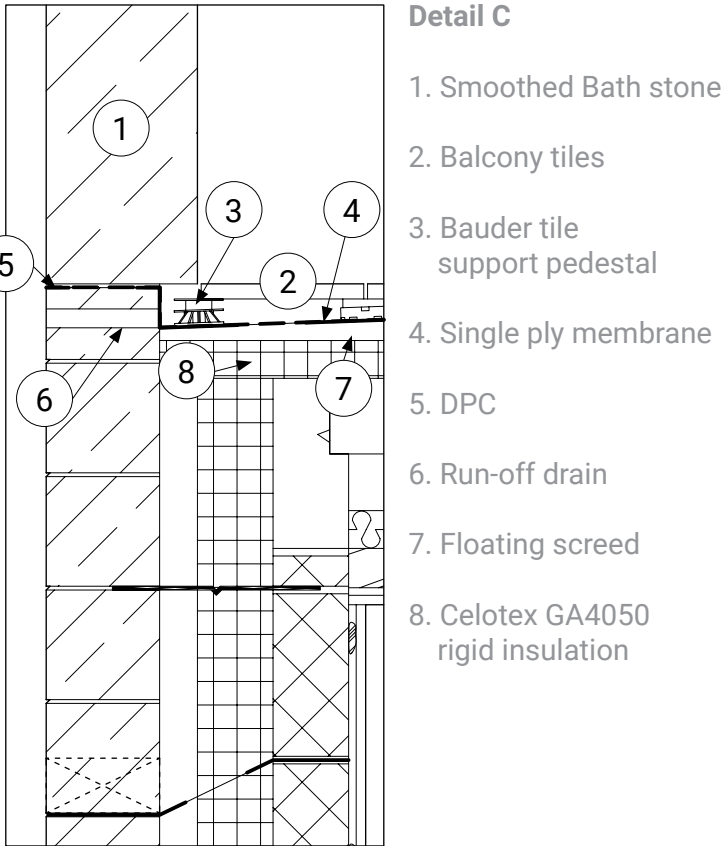
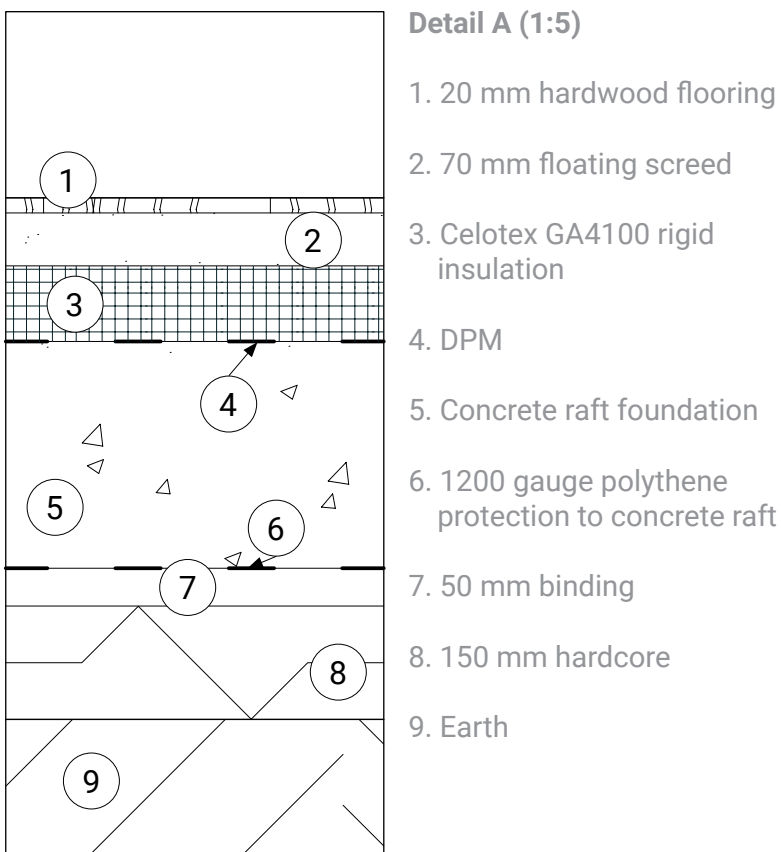
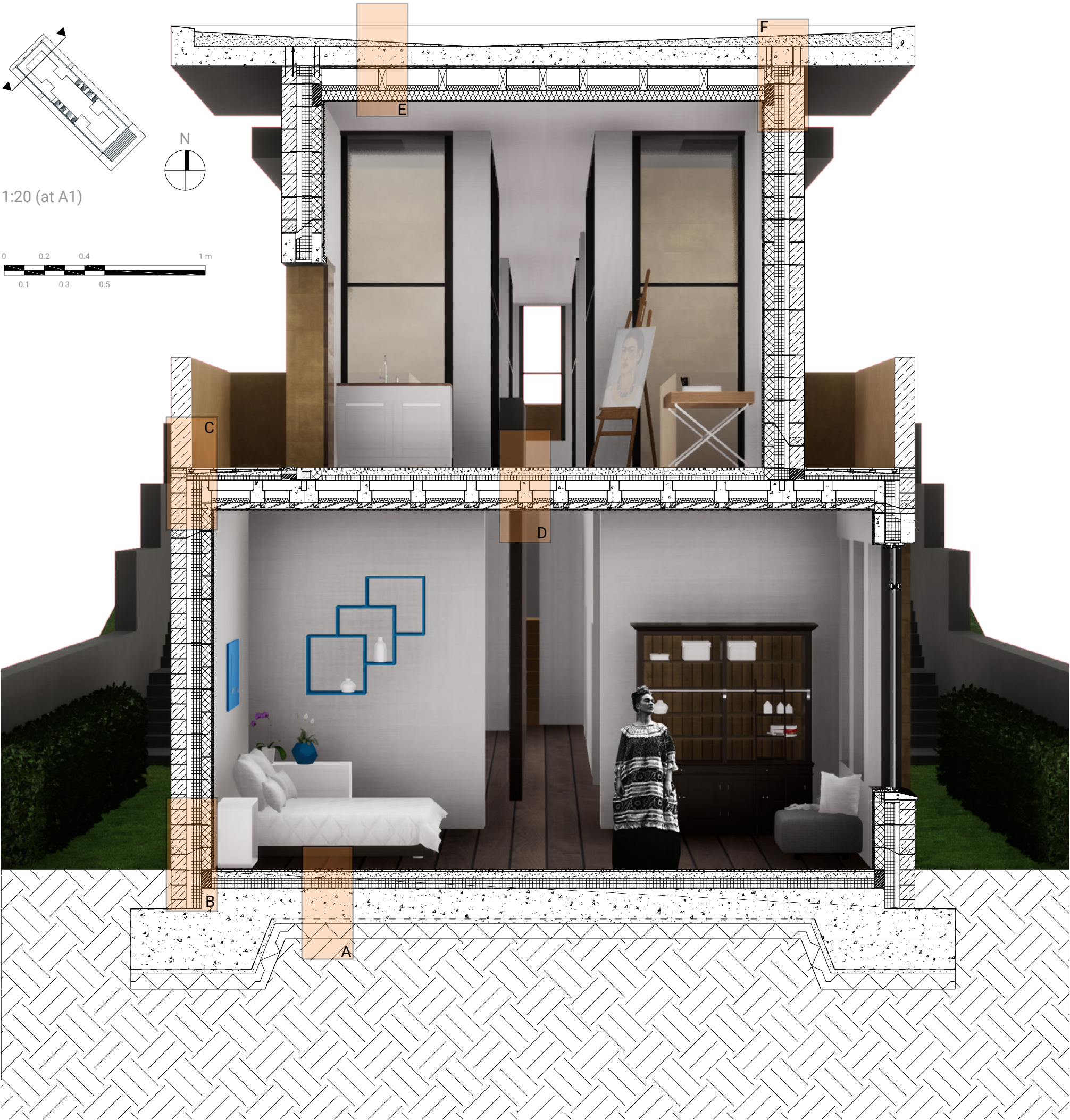
Project: Cappella
Year: 1
Semester: 2

- 1. M24 screw
- 2. M16 screw with washer (1 mm)
- 3. Laser-cut 7.5 mm thick red galvanised steel plate
- 4. Ø 7 mm red stainless steel cylinder
- 5. Red stainless steel articulated fixing
- 6. 3 mm thick silicon
- 7. Red galvanised steel plate fixing plate
- 8. 180mm depth, 10 mm thick red galvanises SHS (Square Hollow Section)
- 9. 6 mm thick external Pilkington Activ Suncool glass and internal 6mm Pilkington Optifloat - up to 6000 x 6000 mm in size
- 10. 15 mm silicon caps for ends of SHS
- 11. 10 mm transparent acrylic block
- 12. 4 mm silicon butt joint between windows



Masonry House Detail

Project: Significant Others
Year: 1
Semester: 2



Hybrid Structure

Project: Bristol Museum
Year: 2
Semester: 1

Inspired by Amin Taha's Masonry-CLT wall construction for Barret's Grove; a hybrid structural system was designed for the museum.

Acting similarly to a composite panel within a curtain wall, CLT panels have been divided within standardised dimensions and stacked on top of each other between the flanges of steel universal columns.

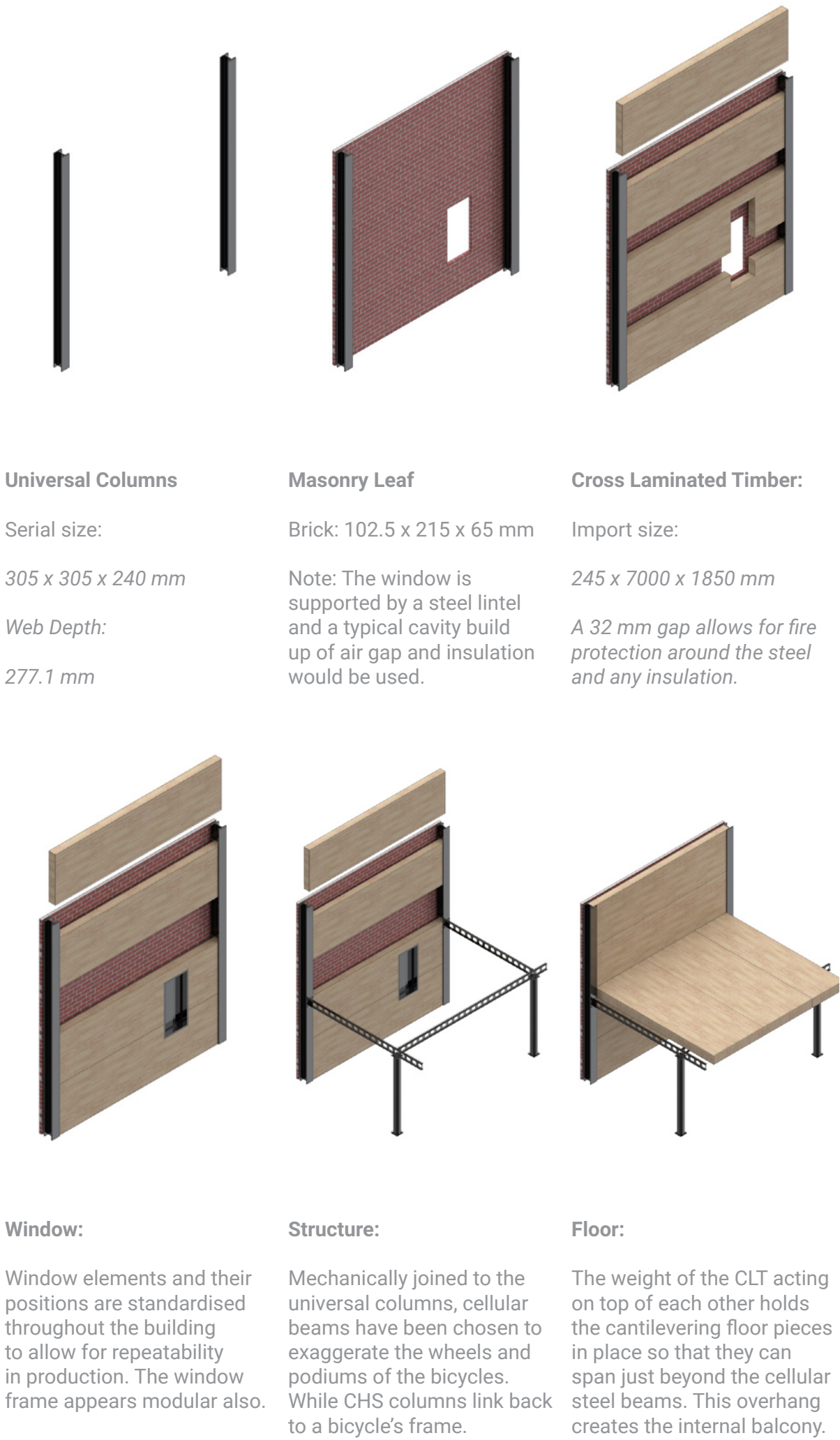
Why?

This build-up allows for much greater spans and removes the need of traditional or mechanical joining between the CLT panels.

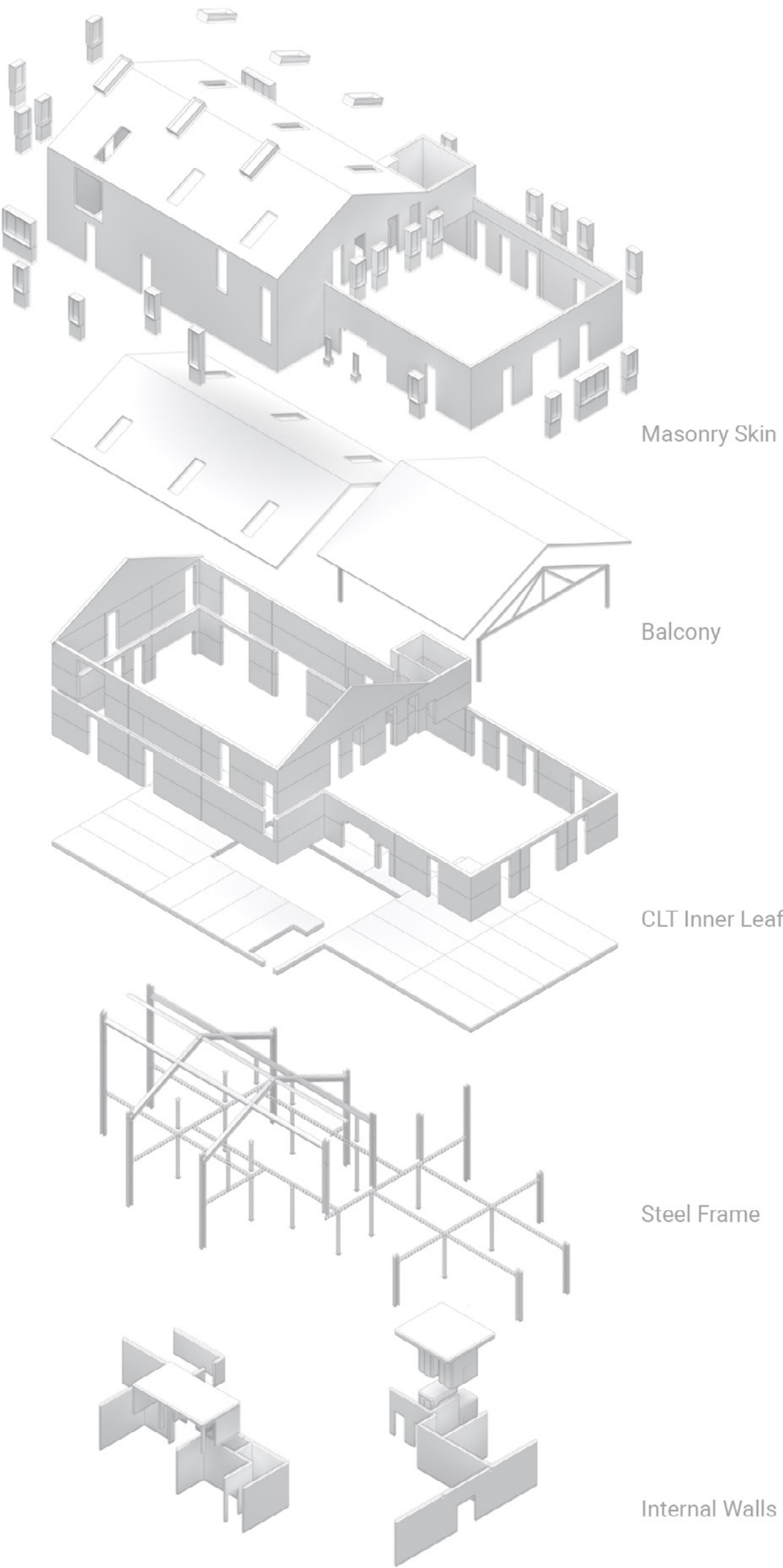
CLT can be modulated and repeated throughout the entire structure.

Allows for the brick to become a roof elements in the same way as Barret's Grove. Removing the need for the less sustainable alternative of a zinc roof which has over twenty times the embodied energy and fifty-five times the embodied carbon than brick⁴.

Exposed internal flanges maintain the industrial aesthetic that I wanted to achieve.



Exploded Axonometric of the Hybrid Structure



M
Modelling
+ Sketching

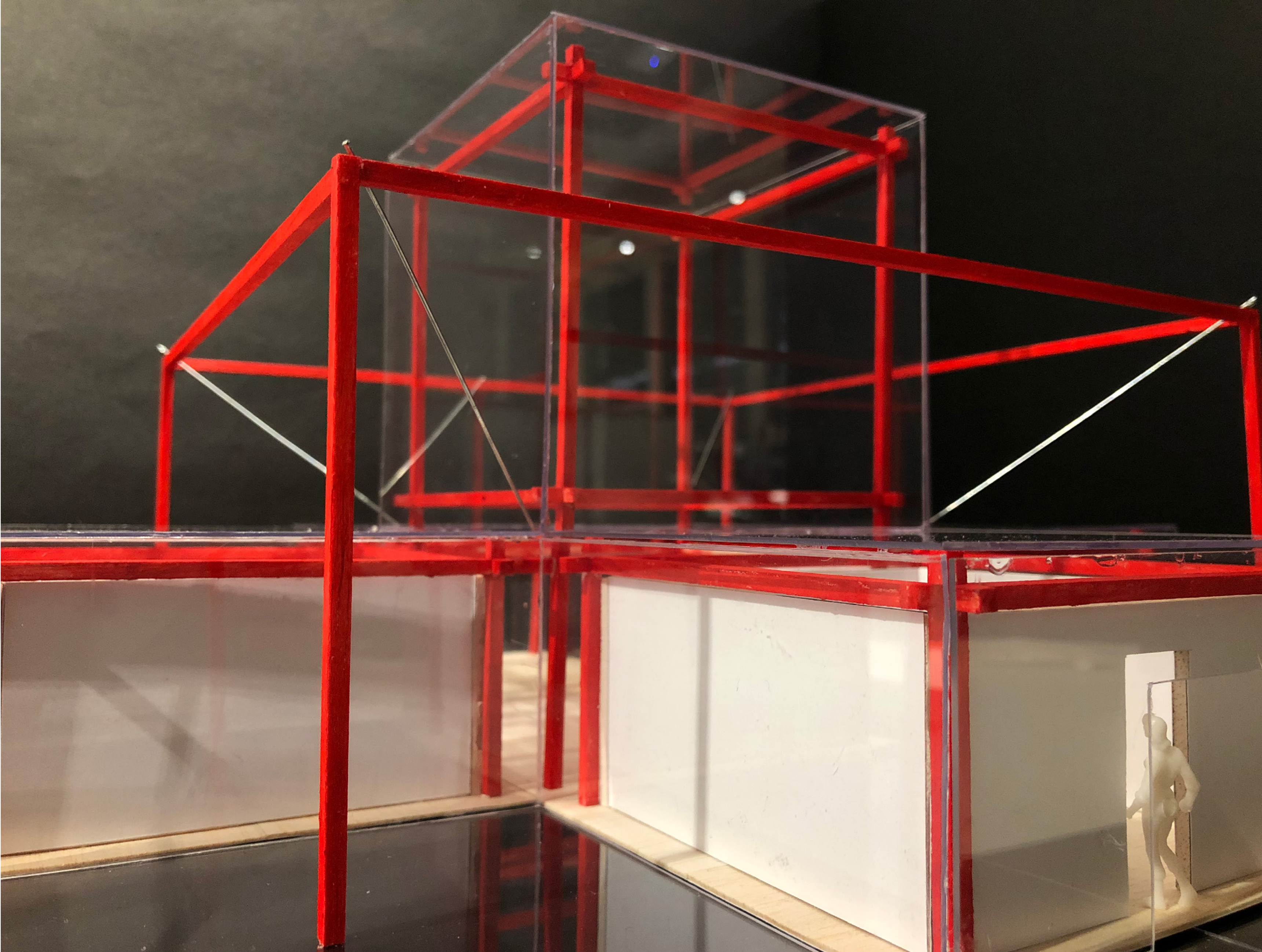


Reciprocal
Sculpture

Project: Reciprocal
(Group Project)
Year: 1
Semester: 1

A full scale timber structure illustrating the concepts of *reciprocal* and *cantilever*.

Consisting of a lattice of interlocking pieces of OSB, a curving form cantilevers outwards. It is this dependency of each piece to contribute to the cantilever that embodies the reciprocal approach to the sculpture.



1:50 Chapel Model

Project: Cappella
Year: 1
Semester: 2



Crafted by hand, this 1:50 model depicts a Chapel at night on the University of Bath's lake.

It consists of balsa, PETG, wire frame and card that have been joined with standard UHU glue. To emphasise the reflection of the lake, a PETG sheet has been joined to black card to create a mirror.

1:100
House Model

Project: Cappella
Year: 1
Semester: 2



Made by hand from plywood, balsa, PETG and reconstituted cork; the final model has been crafted to a high level of accuracy at a 1:100 scale. Emphasising a proficiency in the use of workshop tools and a maturity in model making.

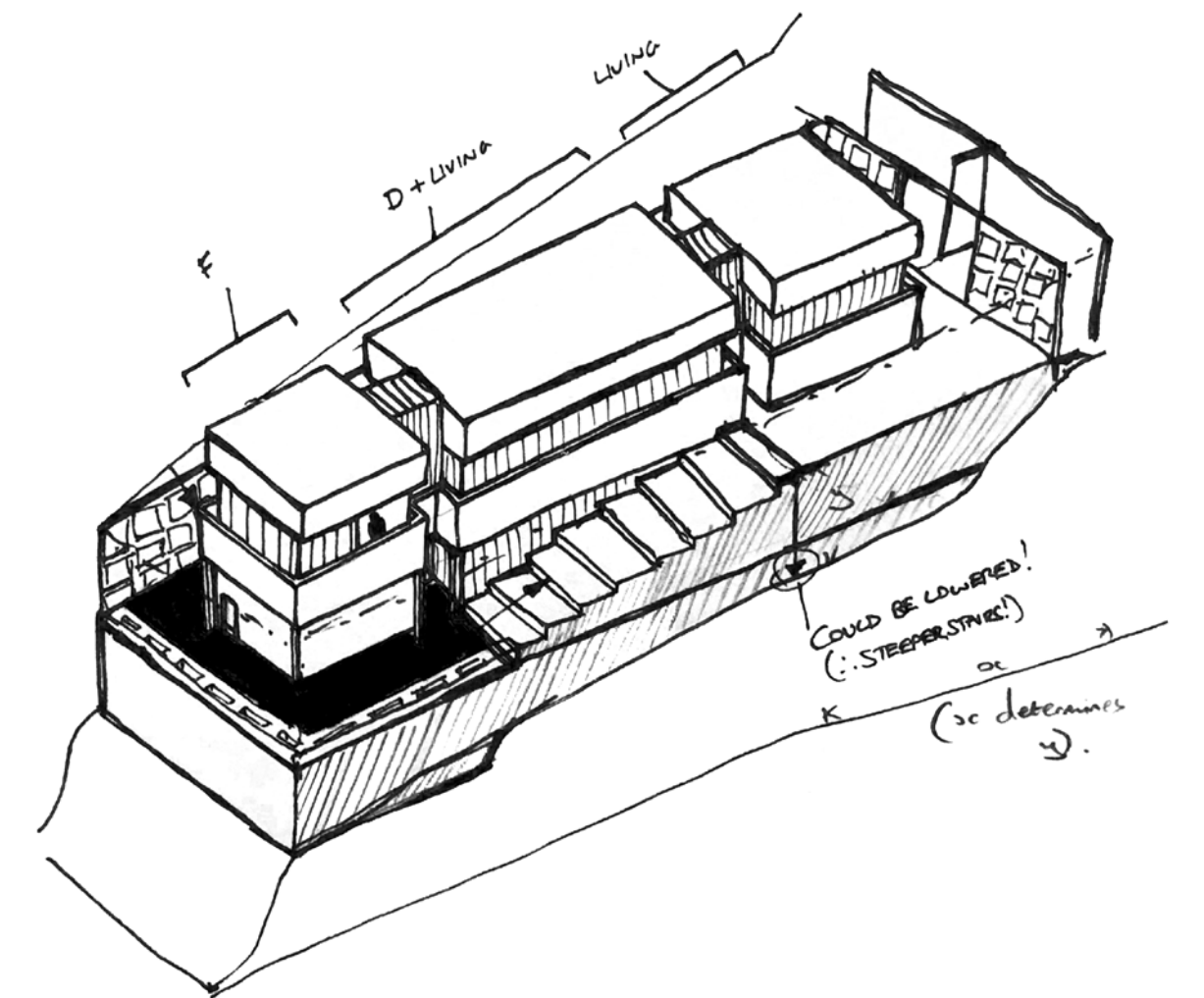
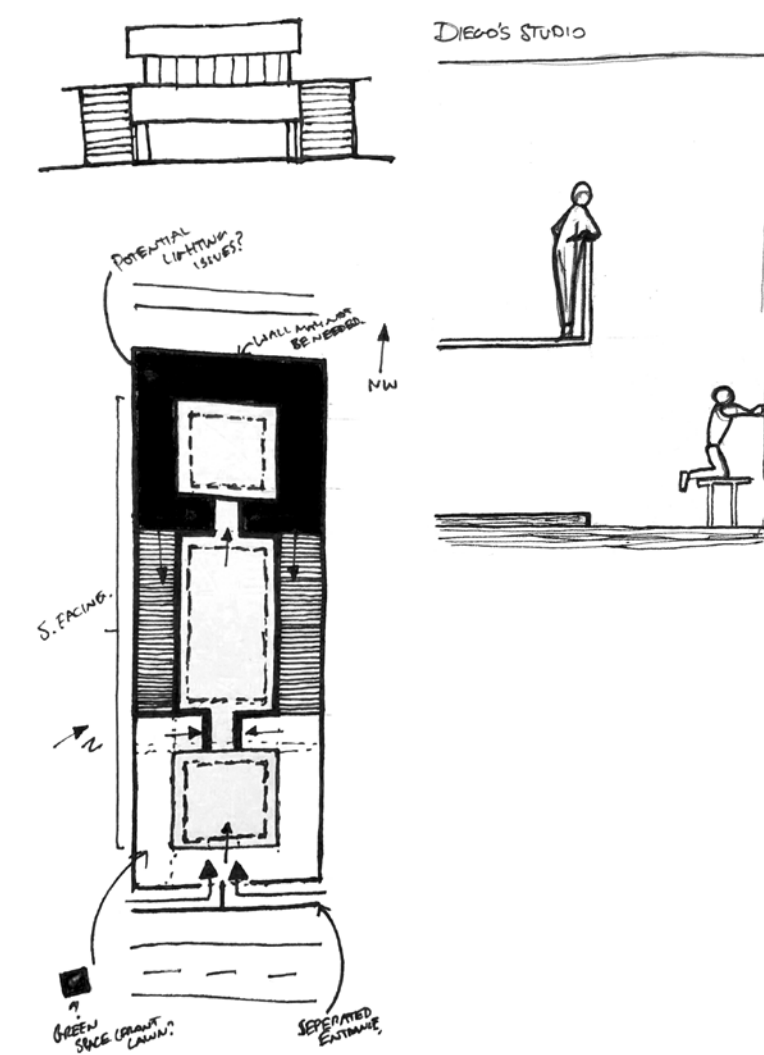
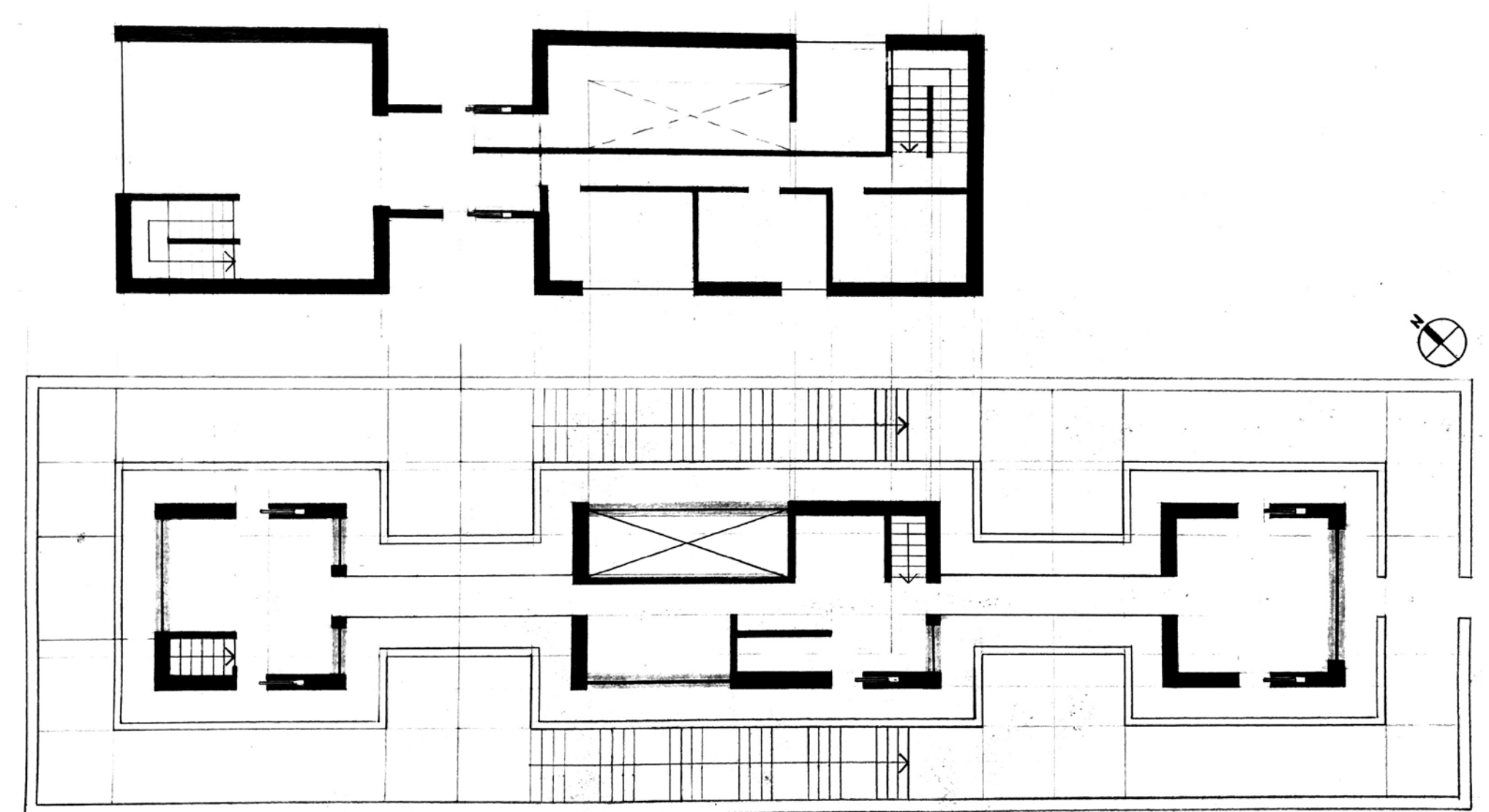
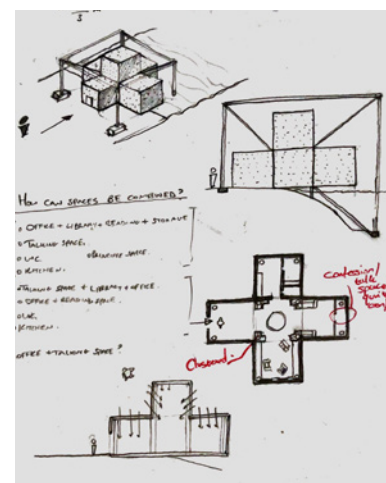
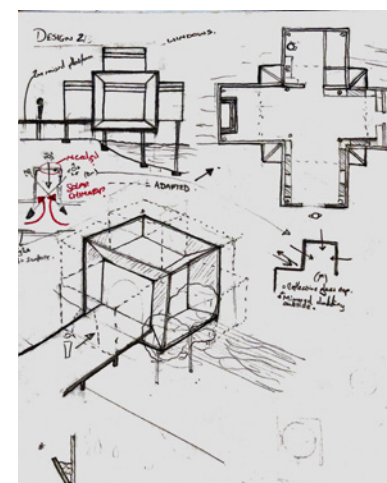
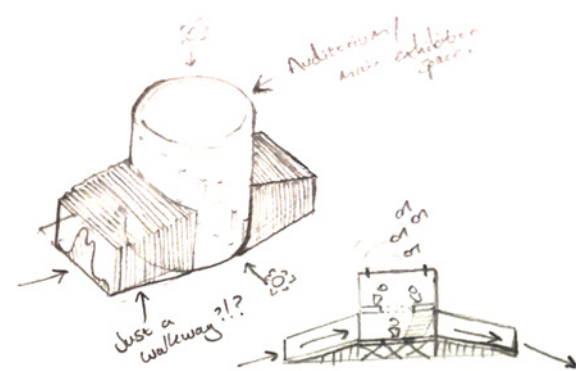
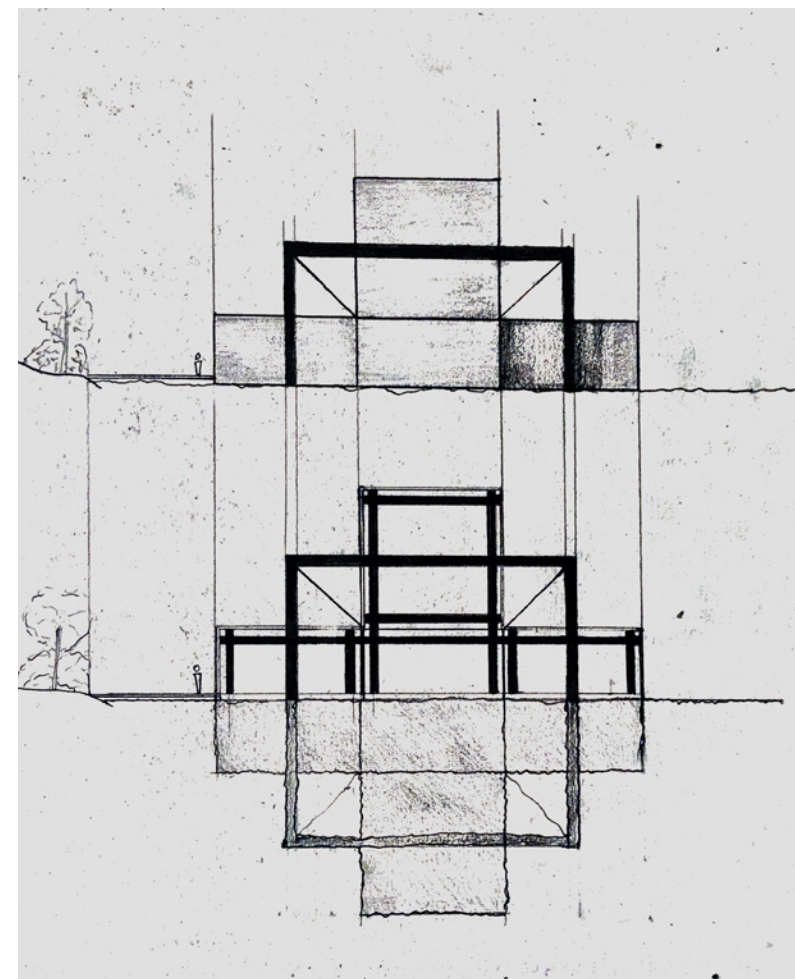
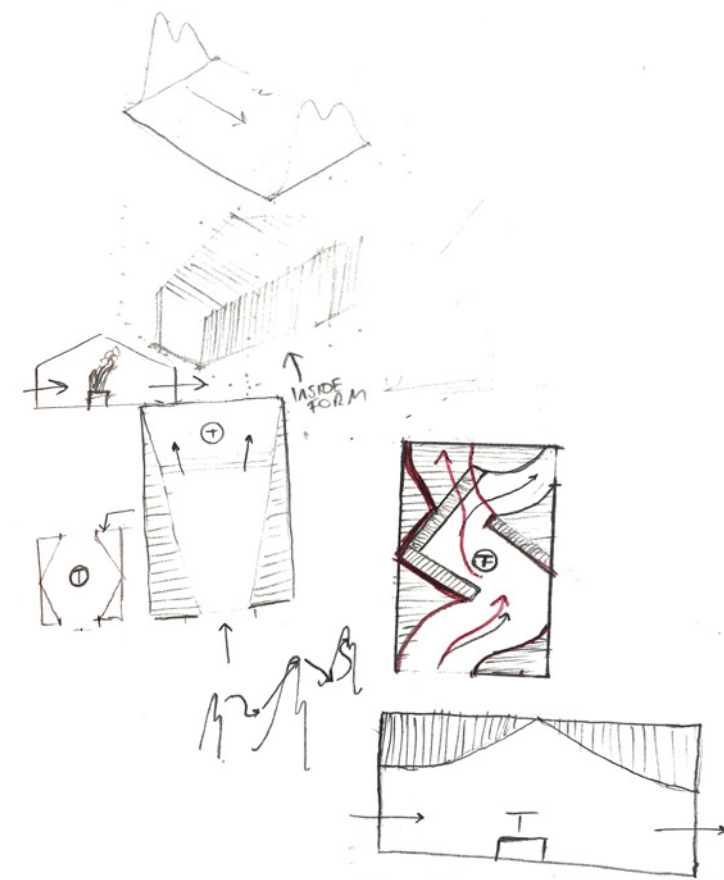
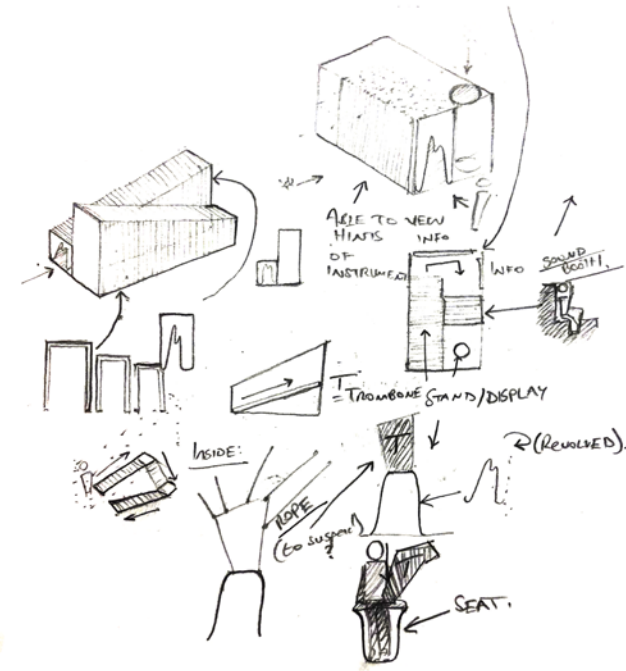
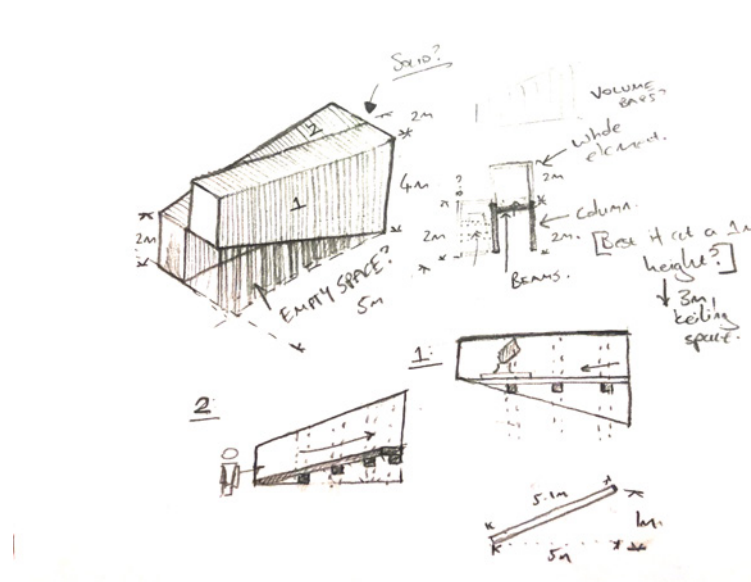
Each layer has been designed to be removable for presentation purposes so that tutors (and clients) can thoroughly interact and engage with the internal and external spaces.

The use of plywood in the final model provides reassuring rigidity and weight associated with a bespoke masonry house project.



A Range of Sketches

Project: Various
Year: 1



P
Personal
Projects



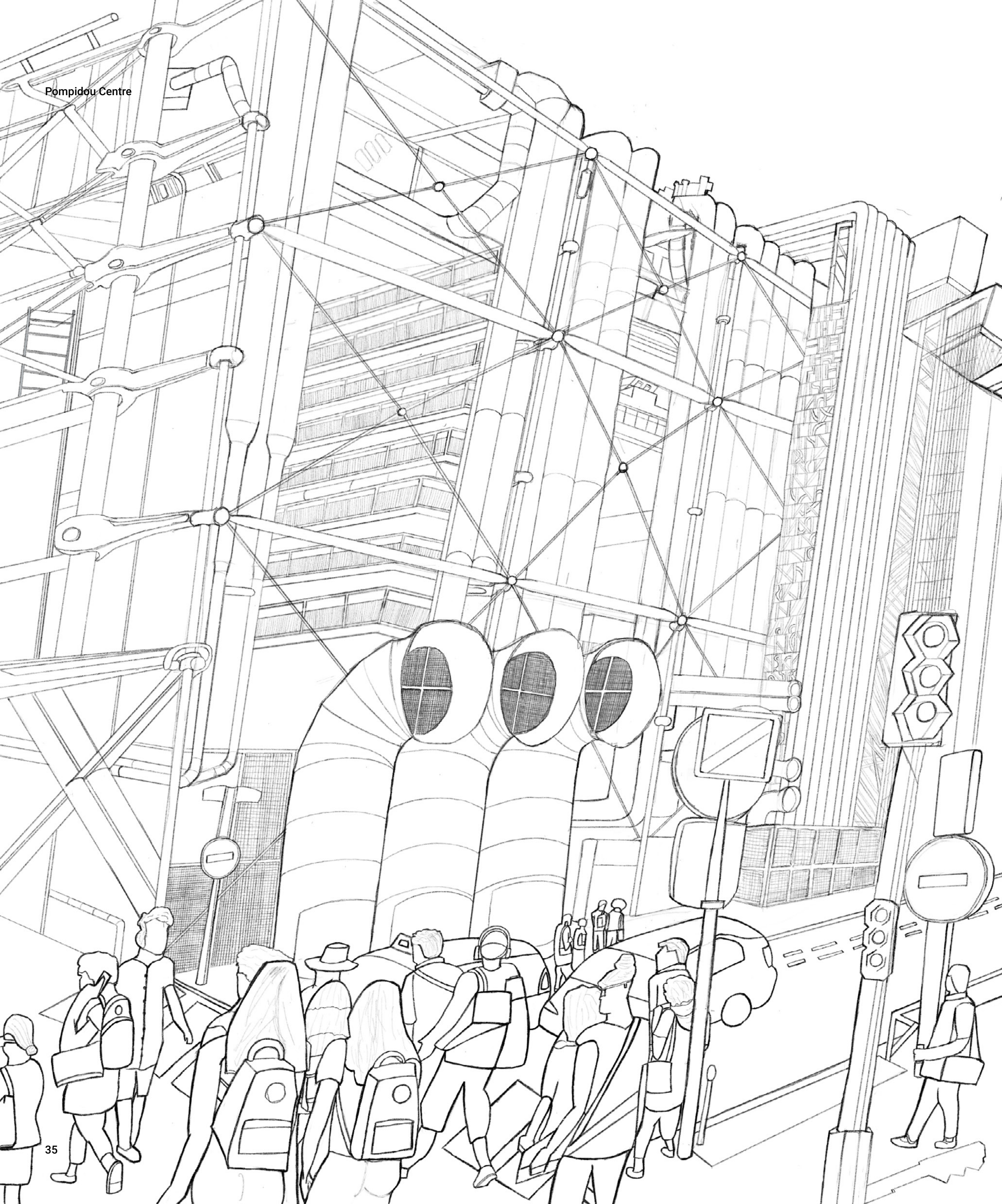
A Door
in Geneva

Format: Watercolour
Year: 2018

Pompidou Centre

Format: Digital Linework,
Observational Drawing

Year: 2018

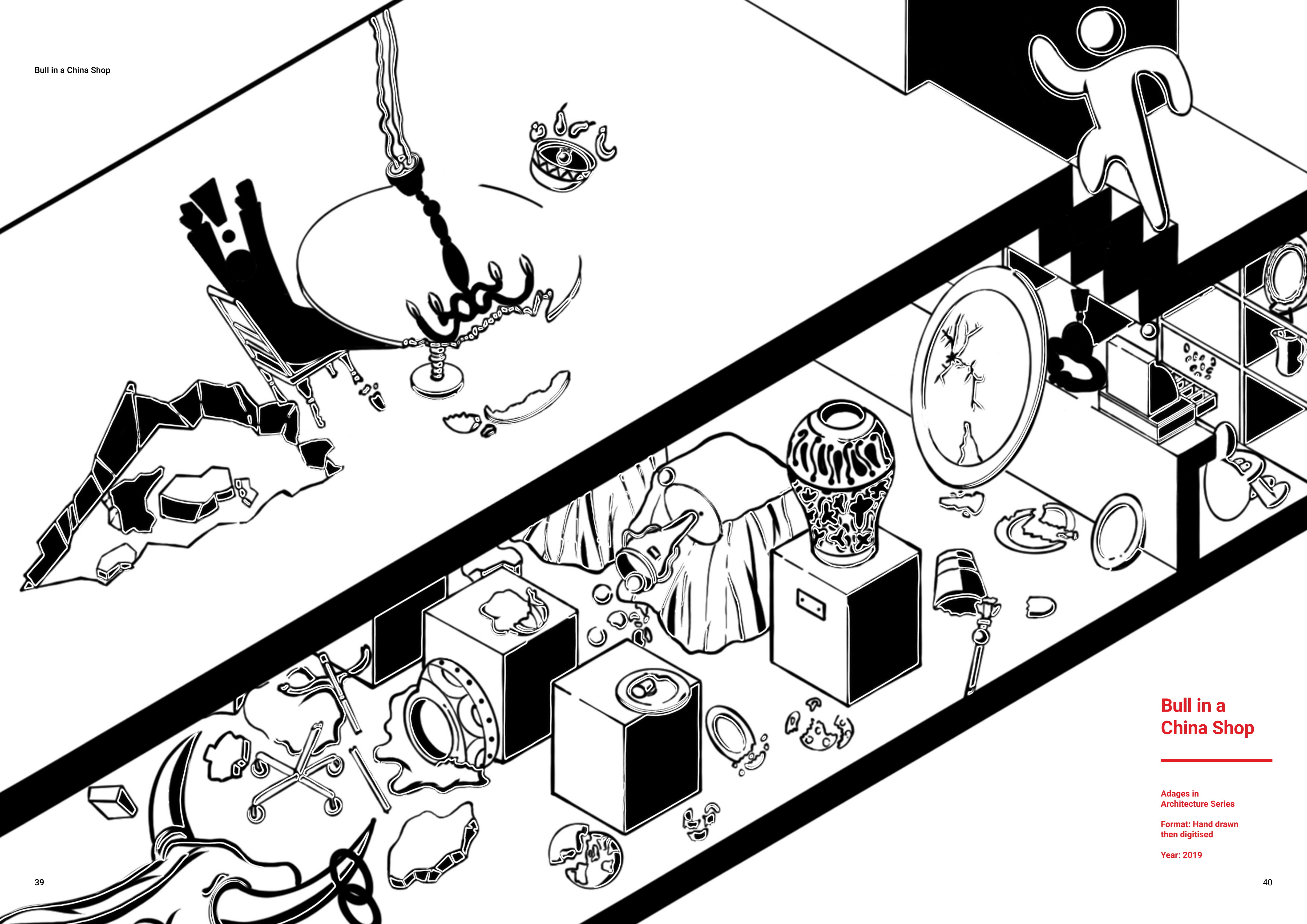


Pompidou Centre

Format: Digital Rendering

Year: 2018





Bull in a China Shop

Adages in
Architecture Series

Format: Hand drawn
then digitised

Year: 2019

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