

Brief

Nordhavn Formværk

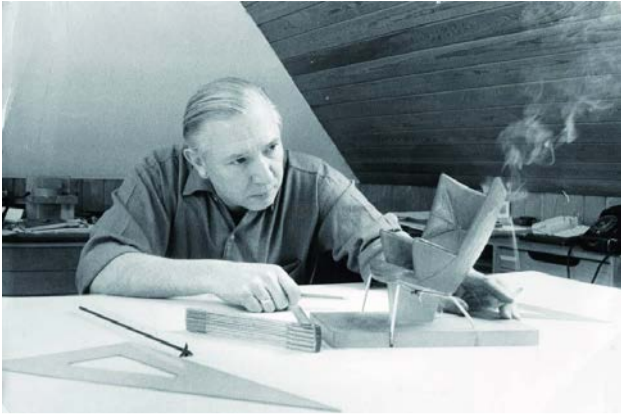


Original Concept Collage

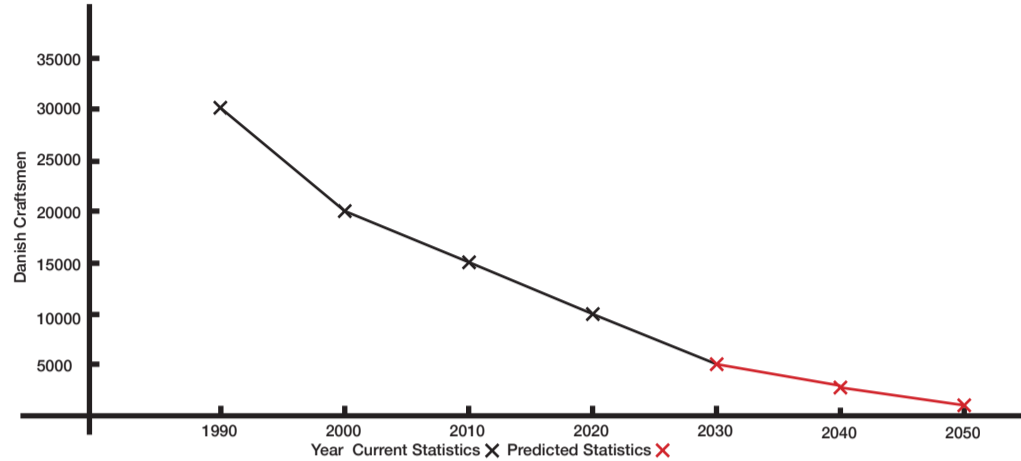
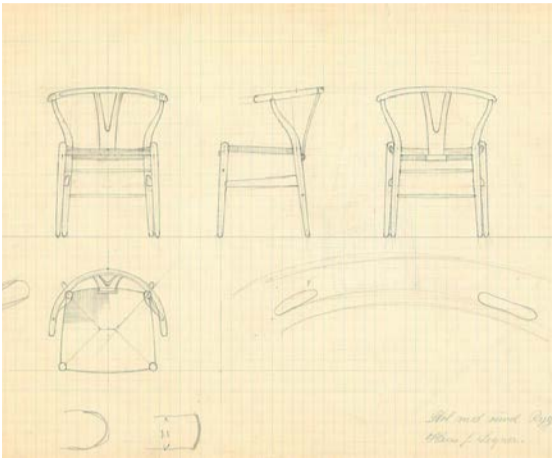
The aim of this project is to create a space dedicated to bringing back the Danish culture and skill of furniture making. The reason the space is needed is because the craftsmanship is being lost and causing the profession to fade away which in turn leads to less and less people knowing how to do it. The space would educate people on fast furniture and its impact on the environment. Ultimately this building would be teaching people to craft furniture in order to keep the profession alive and also have space for people to come to workshops to fix what they already have and make a difference when it comes to throw away culture.

The building itself should reflect the values of danish design with honesty with the materiality to do this I want to keep every material exposed. All the structure works with joinery instead of relying on permanent connections.

Research



Danish furniture culture developed through a strong relationship between craftsmanship, material understanding and functional design. During the twentieth century, designers such as Hans Wegner, Finn Juhl and Børge Mogensen helped establish an international identity centred around simplicity, precision and the honest expression of materials. Furniture was designed not only as an object of beauty, but as something deeply connected to everyday life and human comfort. Timber became an important material within this movement due to its warmth, tactility and ability to express craftsmanship through exposed joints and structural clarity. The close collaboration between designer and cabinetmaker created a culture where making and design were inseparable. This relationship between handcraft and design continues to influence contemporary Danish architecture and interiors, where natural materials, simplicity and human-centred spaces remain central to the cultural identity of design within Denmark.



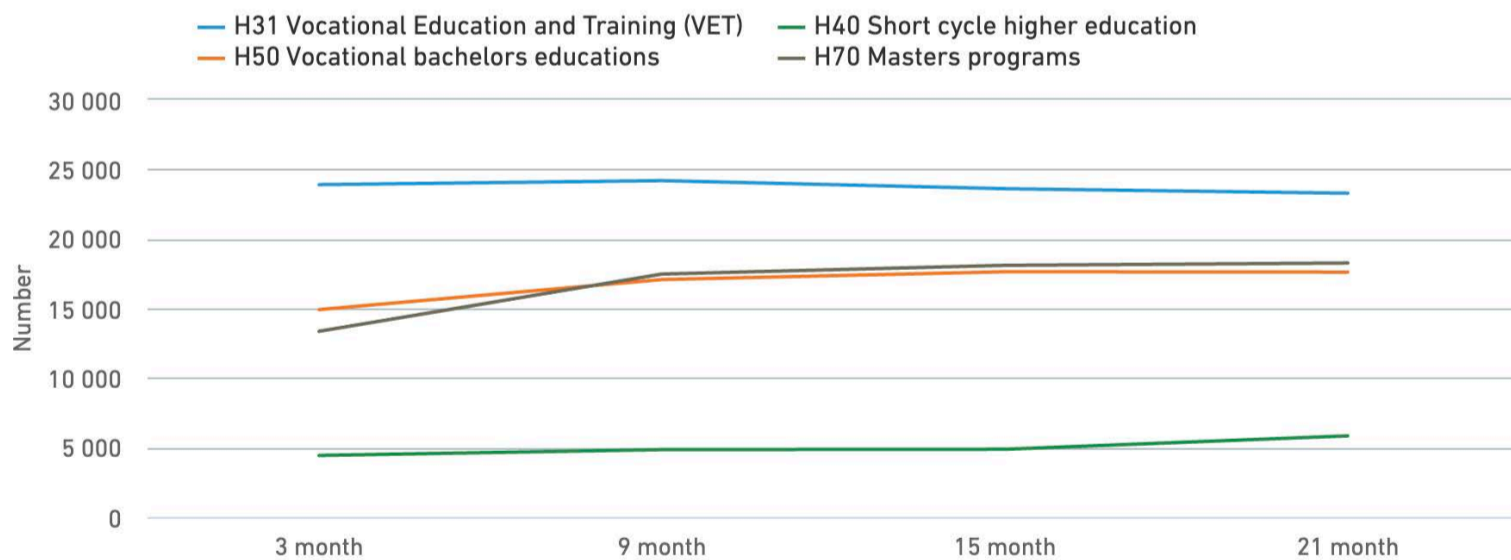
As industrialisation and global manufacturing have developed, many of the practical skills associated with traditional furniture making have begun to decline. Contemporary furniture production increasingly prioritises speed, affordability and mass production over longevity and craftsmanship. As a result, many workshop-based learning environments and specialist making skills are gradually disappearing. Furniture has become more disposable, reducing the connection between people, materials and the process of making. The loss of these skills also represents the loss of cultural knowledge, as techniques traditionally passed between generations become less common within education and industry. Within Denmark, where furniture design forms an important part of national identity, this decline creates questions surrounding how these traditions can continue within contemporary society. The disappearance of spaces dedicated to craft and material experimentation further limits opportunities for collaborative learning and hands-on education, particularly within urban environments where industrial spaces are increasingly redeveloped or replaced.

This graph depicts the decline of craftsmen currently working in danish design related fields. The number has significantly reduced. These figures only extend to 2020 so the red parts are my predictions based of the figures I gathered.

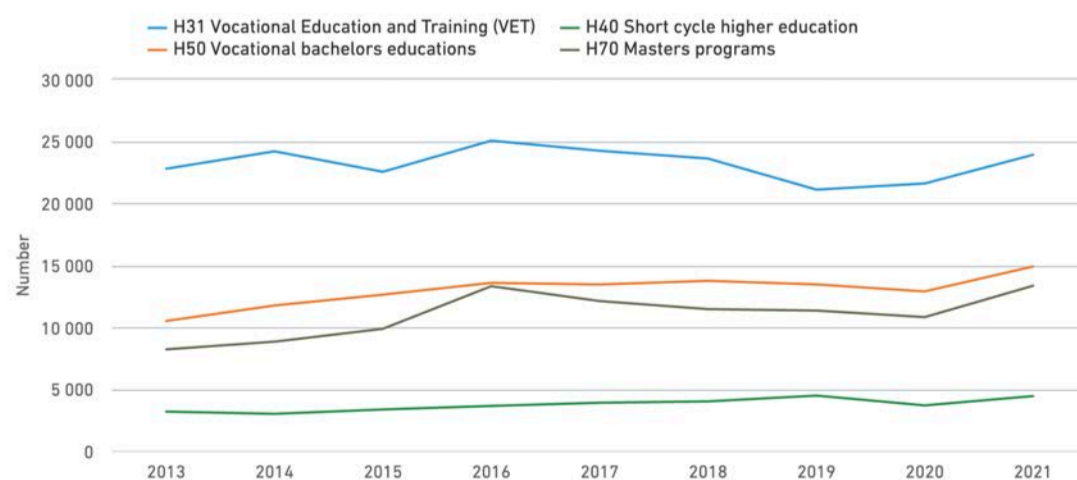


Number of people in employment 3-21 months after completing their education

Status after leaving the education group: Employed | Educational graduation statement: Have completed the education | Time: 2021 | End program in the education group:



Number in employment 3 months after completion of education

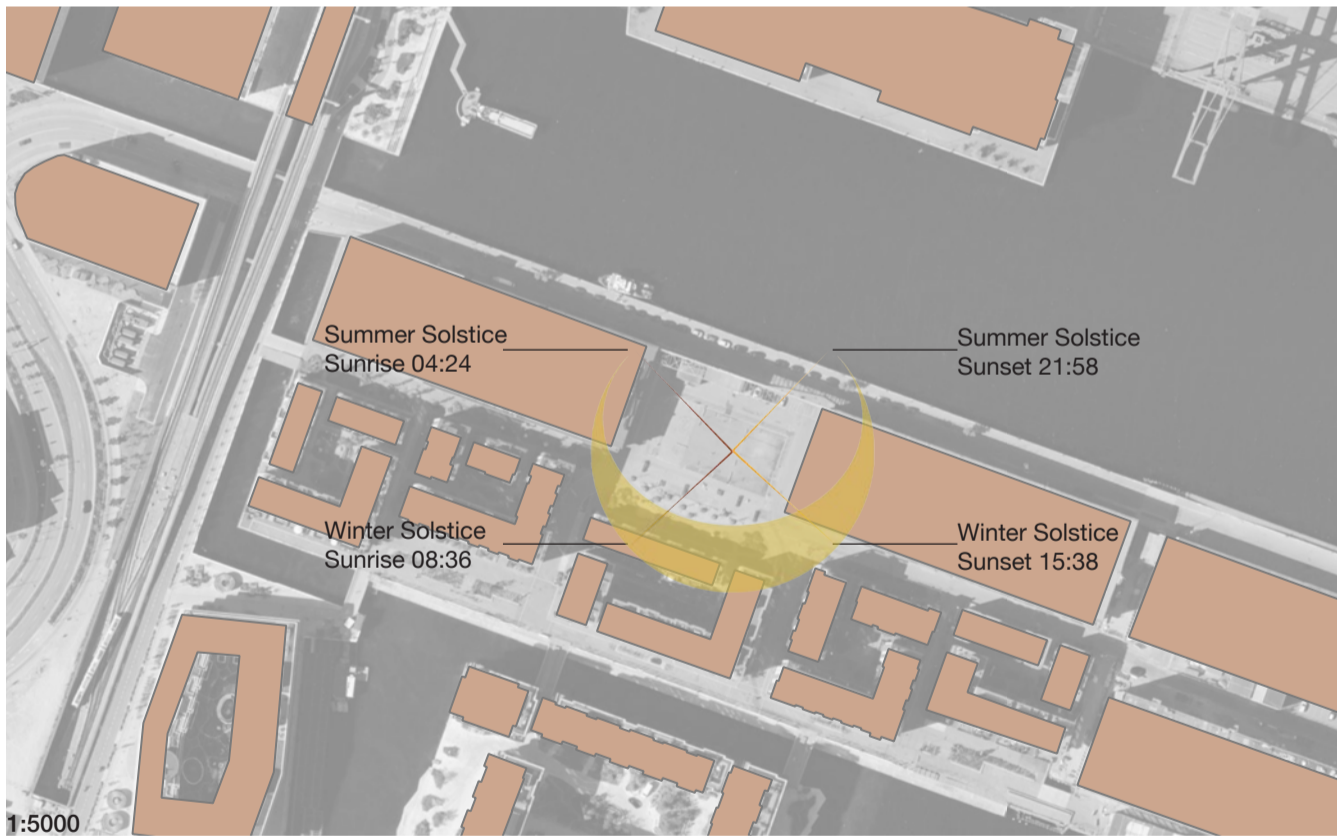
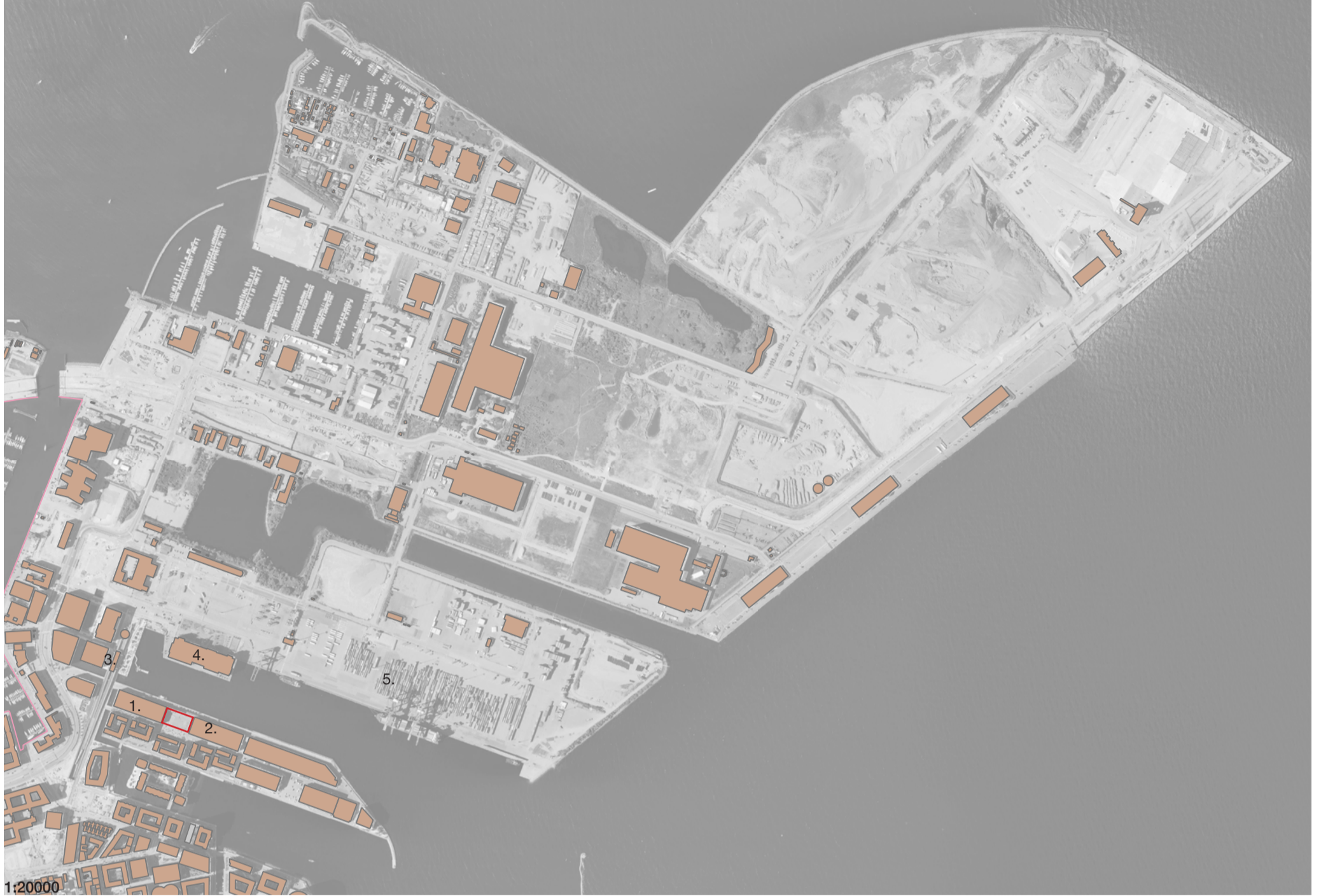


Employment & Vocational Courses

Analysis of Statistics Denmark data reveals that Vocational Education and Training (VET) consistently drives Denmark's strongest labor absorption, with around 24,000 graduates securing immediate, stable employment within three months of completion—outperforming traditional academic routes.

The furniture crafting course hosted in this building utilizes this highly successful VET framework. By bridging historic Danish design principles with hands-on technical skills, the program functions as a direct pipeline into the workforce. Rather than pursuing a purely academic degree, participants acquire specialized, practical expertise that aligns precisely with the sectors currently showing the highest and most resilient employment rates in the country,

Site Analysis



1. COBE Architecture Practice
2. GUBI Furniture Shop
3. Nordhavn Metro Station
4. Nordhavn International School
5. Docks

1:20000 Map

This map highlights the island of Nordhavn and identifies the key surrounding areas that directly influence the site and its development. It demonstrates the relationship between the proposal, nearby transport links, public spaces, waterfront conditions, and existing architectural context, helping to explain how the building integrates into the wider urban fabric.

1:5000 Map

This diagram illustrates the sun path across the site and demonstrates how solar orientation directly informed the development of the building design. The diagram highlights the sunrise and sunset positions during the summer and winter solstices, helping to explain the building's form, orientation, and strategy for maximising natural daylight.



View from the Nordhavn Metro Station towards the site, highlighting the surrounding urban context and the relationship to the adjacent COBE building. The image demonstrates the developing architectural character of the area surrounding the proposal.

This conceptual proposal by Hall McKnight explores a possible future for the existing dockyard area. The image presents an alternative vision for how the industrial waterfront could evolve into a more active and publicly engaged urban environment.

View by COBE showing what has been built in the Nordhavn area. This shows the material palette of the area.

New extension above the GUBI building. This shows the materiality of the site.

Precedents



Kengo Kuma - Nest We Grow

This pavilion uses Glulam columns and beams in order to create the structure which supports the floors and the polycarbonate facade. The building allows for stacked ventilation while using the polycarbonate as a method of heating. The whole building is open in order to bring the community together.

The materiality is really interesting from an environmental aspect and I want to use this in Copenhagen. I believe that using the sites orientation and environmental conditions could allow for a well ventilate and naturally heated building.



Adept - Design School Kolding

This building was useful in understanding how creative education spaces can function through openness and flexibility. The workshops, circulation spaces and social areas are connected in a way which encourages interaction between students and different disciplines. The building allows making and learning to become visible through the organisation of the internal spaces.

The atmosphere created through the use of natural materials and soft light was particularly relevant to my project. I want to create a similar relationship between workshop spaces, communal learning and material expression within my furniture making school in Copenhagen. The openness of the building and the integration of workshop spaces helped inform how my project could encourage collaboration while maintaining a strong connection to craft and making.

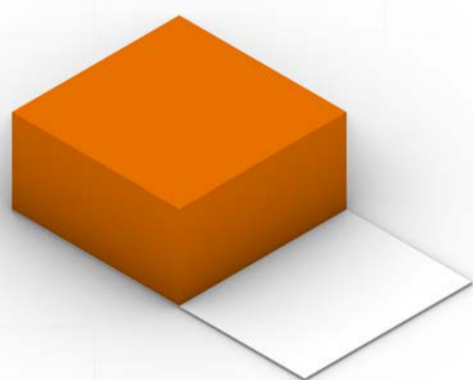


Tucky Design Studio - Horris Hill Theatre

This Project is a theatre for 160 people its design is considerate of its surroundings while using very different materials to what the buildings around it use. The structure is CLT and Viroc. in order to match the surroundings the shape and materiality of the theatre imitate the context by using a red Viroc which looks similar to the victorian bricks used around it. The shape does something similar by being a simplified version of the buildings around it.

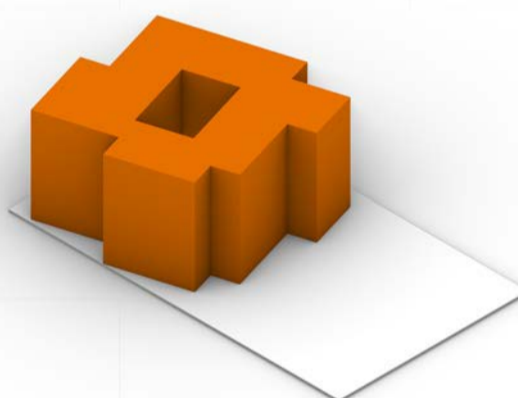
I want to use the Viroc for the same reason since it will fit the brick used in the industrial buildings. The Viroc is also a fire rated wood and cement composite so is great for meeting fire regulations. It is quite sustainable even with its cement content. This is mainly due to the longevity with will reduce maintenance over the buildings lifespan.

Design Development



Site Placement

The building was positioned along the edge closest to the GUBI building to preserve a large open landscape area for public use. This creates a stronger relationship between the architecture and the surrounding public realm while improving movement through the site.



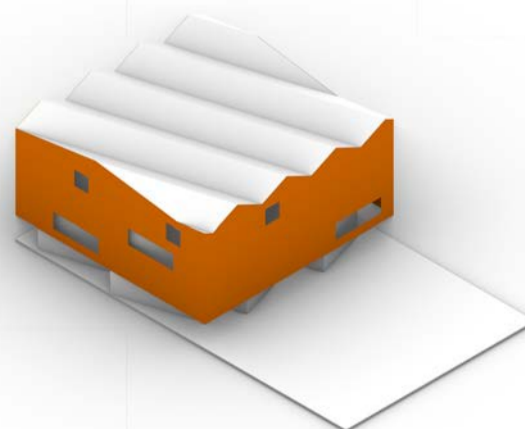
Solar Orientation

The building layout was developed using the angle of the sun to maximise natural daylight throughout the interior. A central lightwell was introduced to bring additional sunlight deep into the building and improve the quality of internal spaces.



Roof

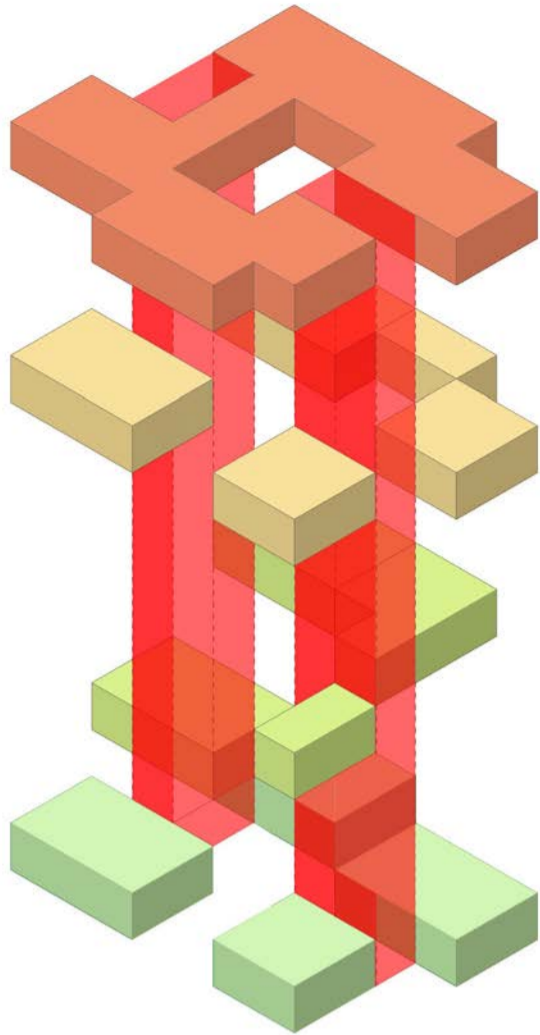
A roof structure was developed to align with the geometry of the site while following the building's south-facing orientation. This maintains the solar strategy of the project and reinforces the angled form created by the building layout.



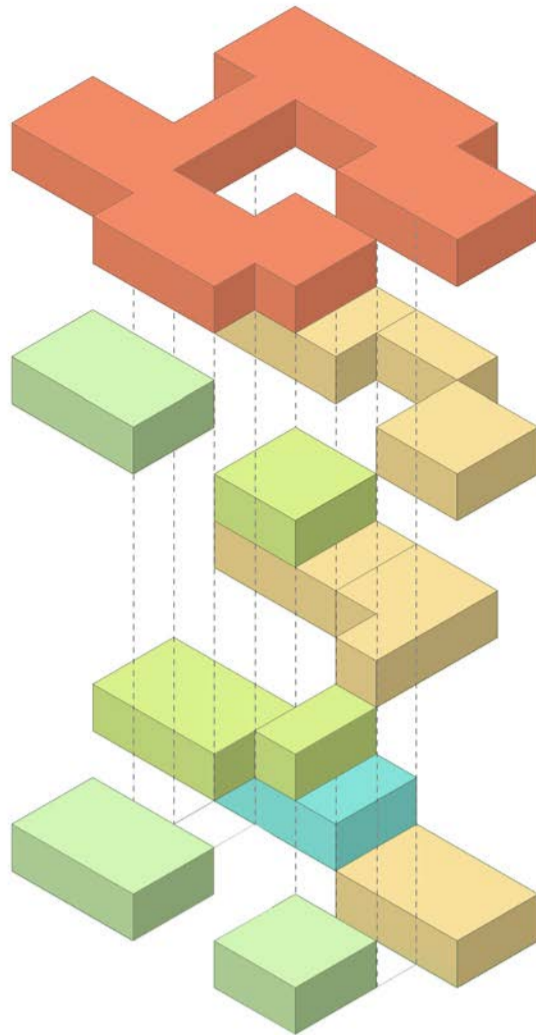
Secondary Façade

A secondary skin was added to help the building respond to the surrounding context and create a more cohesive relationship with the site. Openings were cut into the façade to frame views, introduce visual breaks, and create moments of connection with the landscape.

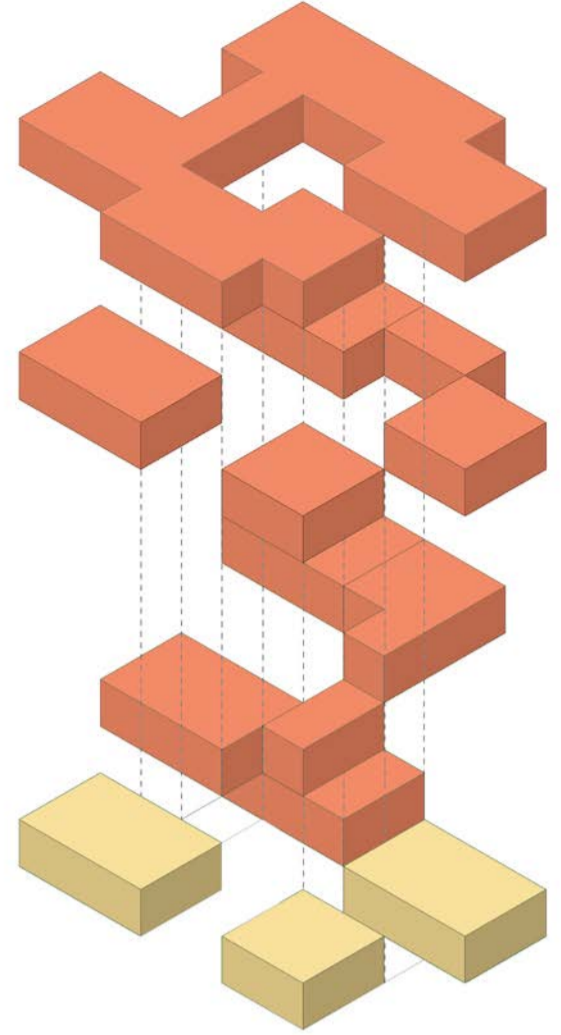
Programmatic Diagram



- 3rd Floor**
- Studio Space
- 2nd Floor**
- Finishing Room
- Photo Studio
- Lecture Hall
- Lounge
- Offices
- 1st Floor**
- Machine Room
- Laser & CNC Room
- Material Research Lab
- Storage
- Ground**
- Exhibition Space
- Cafe
- Public Workshop
- Loading & Storage Bay
- Access**
- Stairs
- Lift
- Service Elevator



- Studio**
- Studio Space
- Crafting Spaces**
- Finishing Room
- Machine Room
- Laser & CNC Room
- Public Workshop
- Other Spaces**
- Photo Studio
- Material Research Lab
- Storage
- Offices
- Exhibition/Versatile**
- Exhibition Space
- Cafe
- Lounge
- Lecture Hall
- Logistics**
- Loading & Storage Bay



- Private**
- Public

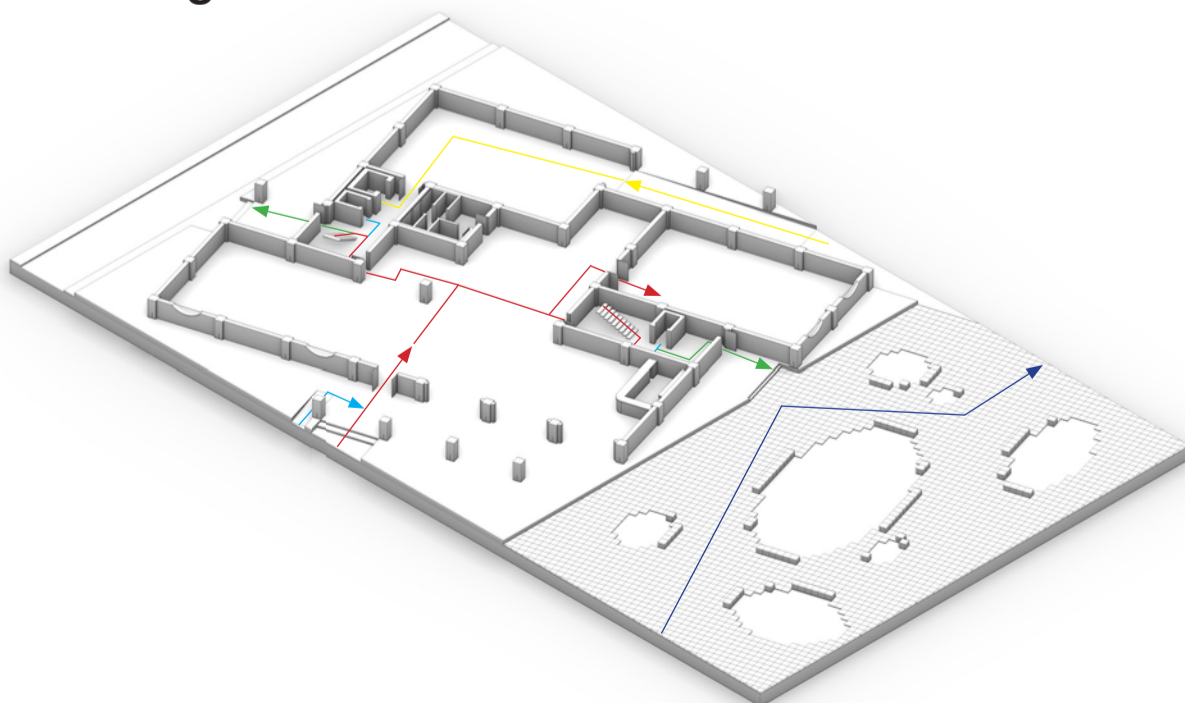
Hierarchy of Space

The hierarchy of spaces within the building is organised to reflect levels of accessibility, privacy, and environmental quality. Public functions are positioned on the ground floor to provide direct and easy access without disrupting the more private student areas above.

The middle floors are dedicated to woodworking and research spaces, creating a balance between practical making and quieter study environments. A lounge space is located along the north side of the building, providing softer and more comfortable lighting conditions for rest and social interaction.

The top floor contains the studio spaces, positioned where the building receives the highest quality natural light. As the primary working environment for students, this level benefits from the brightest and most open atmosphere within the building.

Access Diagram



- Main Access
- Accessible Routes
- Fire Escapes
- Material Transport
- Public Routes

Access

The building has been designed to provide inclusive and accessible movement for all users. Ramps and two lifts located on either side of the building ensure that wheelchair users can comfortably access all floors and facilities. A separate service lift is included to support the movement of materials and large furniture pieces produced by students within the workshops.

Fire escape routes are positioned at both ends of the building within dedicated fire cores, allowing for safe and efficient evacuation. A pedestrianised route along the west side of the site also improves accessibility and encourages safe public movement through the area.

Landscape Strategy



Landscape Design



1:100

- Landscape Buffer
- Transitional Outdoor Space

Landscape Design

The landscape is designed as a public buffer zone between the COBE office and the building, creating an accessible pedestrian space that encourages movement across the site. Its layout follows the same grid system as the architecture to maintain spatial coherence. Openings within the paving introduce planted green areas that soften the hardscape and define places for rest and gathering. Seating is formed from elevated stone blocks using the same material as the paving, reinforcing a unified material language throughout the landscape.

Sheltered Transitional Space

The sheltered transitional space beneath the polycarbonate shell extends the café area beyond the main entrance, creating protected outdoor seating integrated within the landscape. Elevated on the building plinth, the space offers shelter from rain and wind while enhancing the public experience through comfortable, semi-external areas for gathering. This sheltered zone continues around the entire building, creating a consistent and accessible perimeter space that strengthens the connection between architecture and landscape.



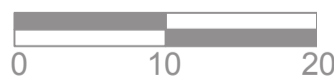
Sheltered Transitional Space



Balconies

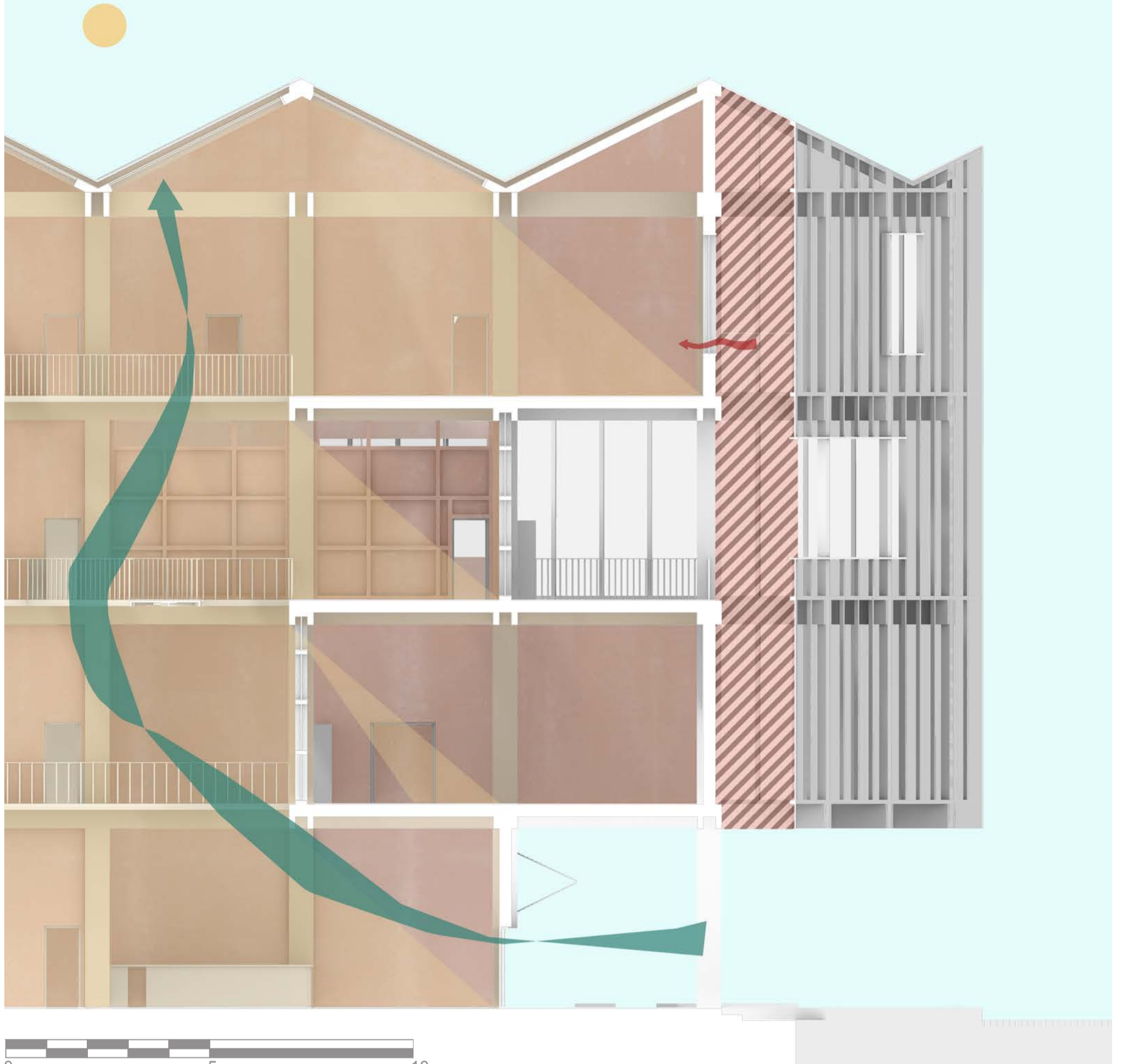
Balconies

The balconies positioned within the polycarbonate shell act as semi-external breakaway spaces for the upper floors. Sheltered from wind and rain while remaining naturally ventilated, they provide occupants with access to fresh air, views, and daylight, creating the experience of being outdoors without fully leaving the protected environment of the building.



1:500

Environmental Strategy



1:100

Stack Ventilation

Stack ventilation allows warm air to naturally rise through the central atrium and exit through roof openings. As the warm air escapes, cooler fresh air is drawn in at ground level, creating continuous natural ventilation throughout the building while reducing the need for mechanical cooling.

Passive Heating Strategy

Operable windows allow warm air collected within the polycarbonate shell to enter the building when needed. This passive system reuses solar-heated air to naturally warm interior spaces, reducing reliance on mechanical heating and improving overall energy efficiency.

Polycarbonate Shell

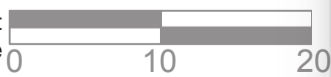
The polycarbonate shell acts as a solar buffer, capturing and retaining heat from sunlight throughout the day. This creates a warm layer of air around the building, reducing heat loss and allowing stored solar energy to contribute to the building's passive environmental performance.

Light Well

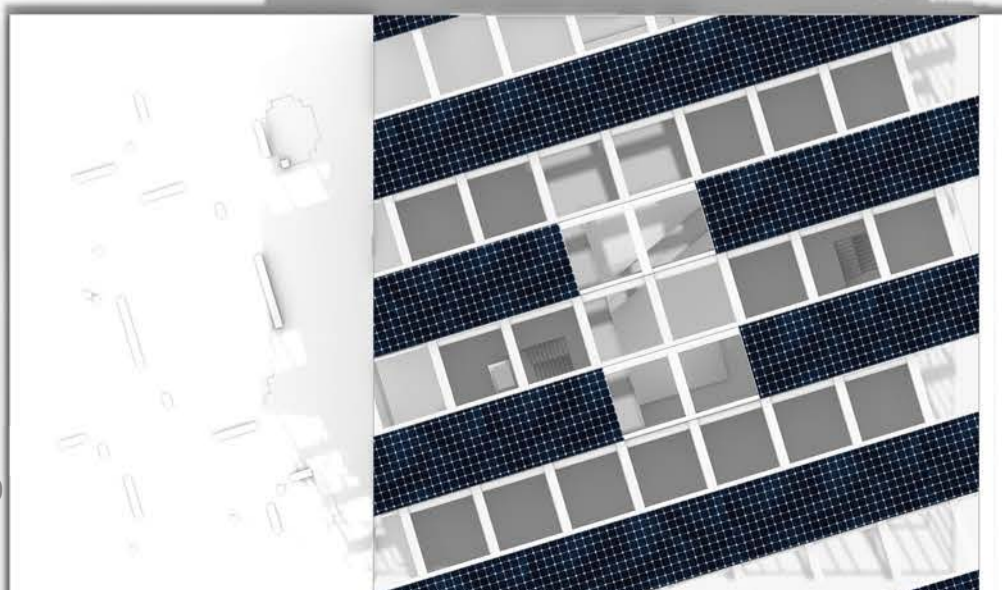
The central atrium also functions as a light well, drawing natural daylight deep into the building. This helps illuminate lower floors, reducing the need for artificial lighting while creating brighter and more connected interior spaces.

Orientation and Photovoltaic Panels

The roof is oriented due south to maximise solar exposure for photovoltaic panels, improving renewable energy generation throughout the day. North-facing roof lights introduce soft, consistent daylight into the building, reducing glare and creating balanced natural illumination within interior spaces.



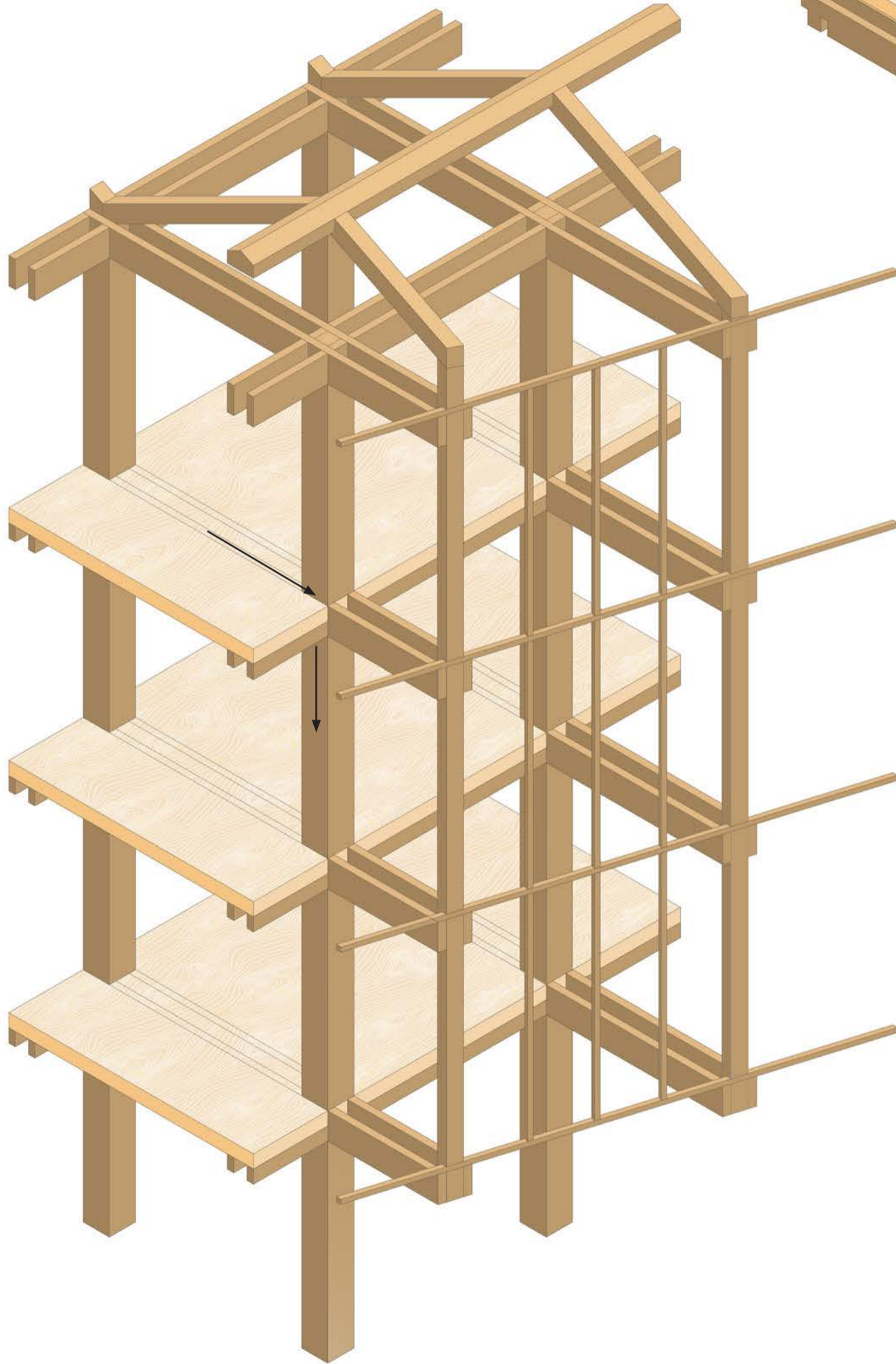
1:500



Structural Strategy

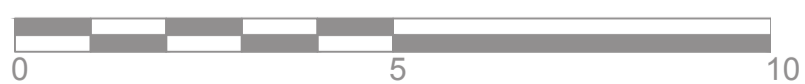
Glulam Structure

The main structure of this building is comprised of Glulam column and beams. The beams are connected with joinery instead of being bolted. The load travels along the beams into the columns. Due to the grid system for the structure to function there needs to be cross bracing to avoid using wires for tension I'm using the CLT within the floors and walls to achieve this.



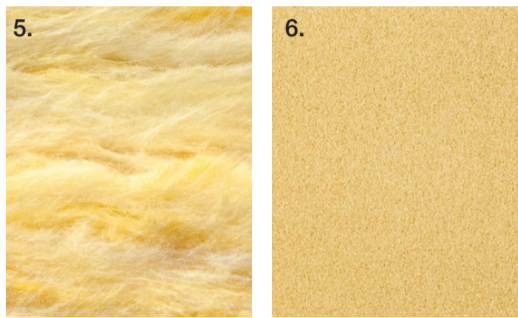
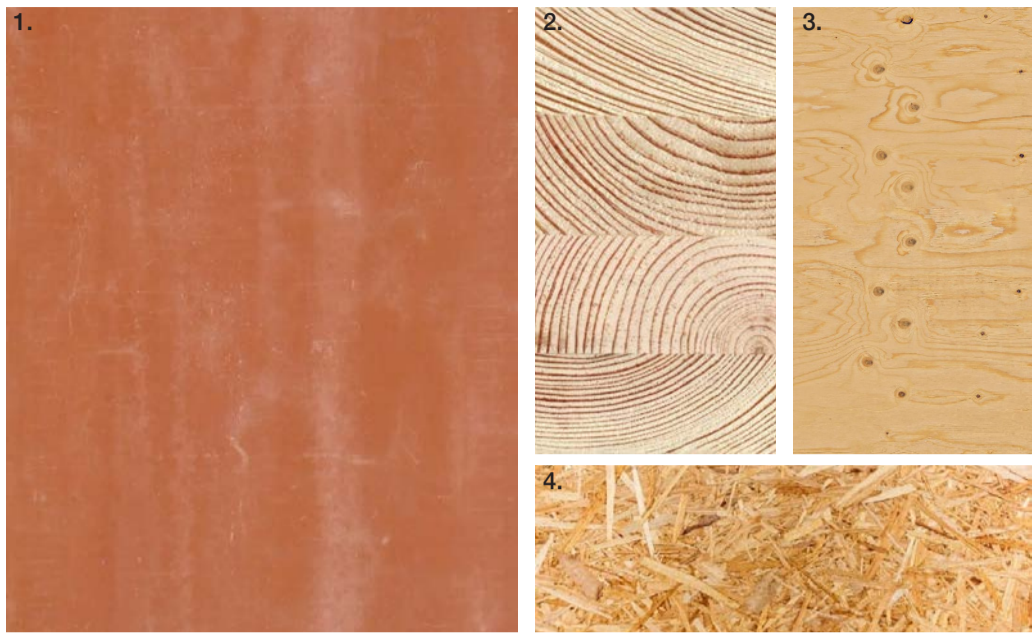
The Facade

The Facade structure is made up of a thinner more lightweight grid in order to hold up the polycarbonate sheets. The structure has to be supported by the crossbeams that hold up the floors.

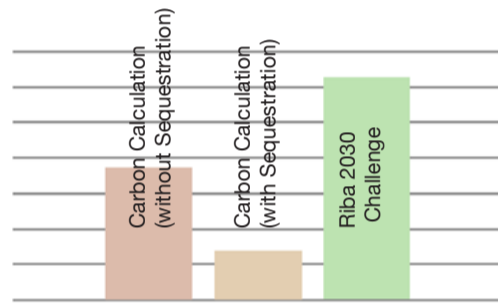


1:100

Material Strategy

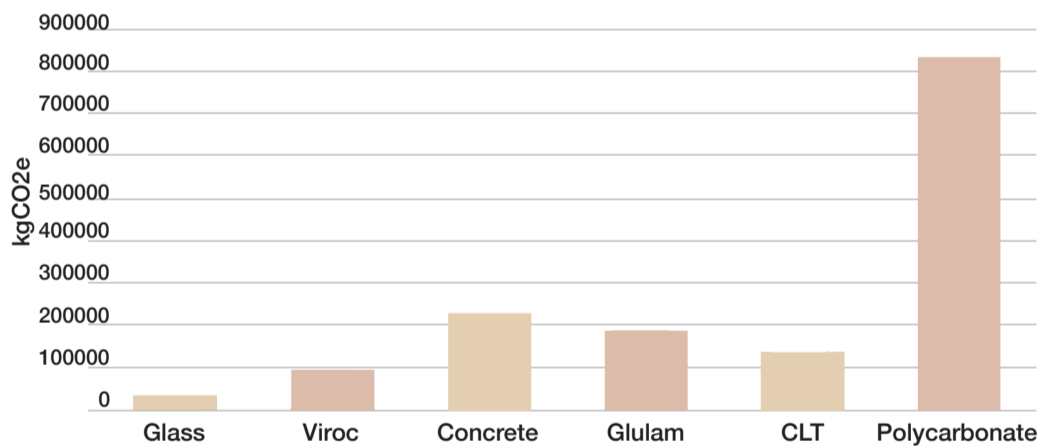


- 1. Viroc Panel
- 2. Glulam
- 3. CLT
- 4. Chipboard
- 5. Rock Wool
- 6. Rigid Insulation
- 7. Polycarbonate
- 8. Timber Batten

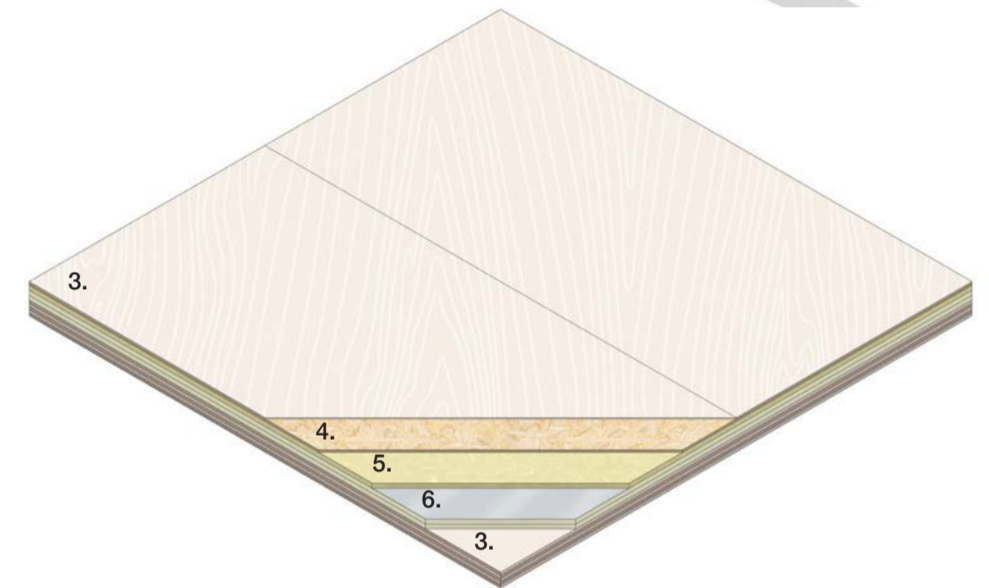
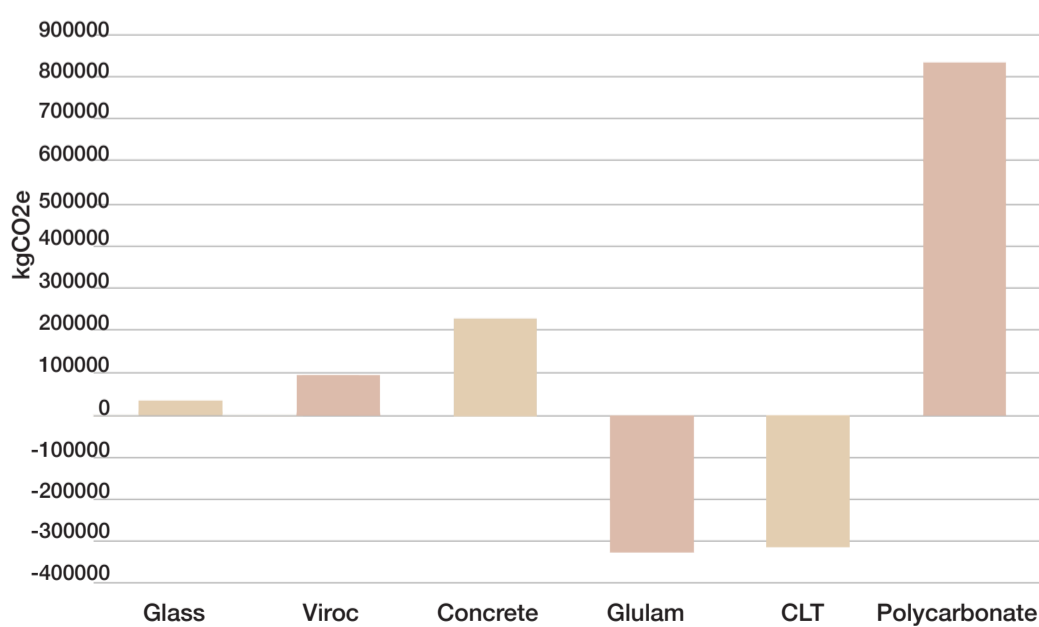


Embodied Carbon

Embodied Carbon (Without Sequestration)



Embodied Carbon (With Sequestration)



Carbon Calculation

The embodied carbon assessment for the building was calculated by multiplying material volumes by their associated embodied carbon factors (kgCO₂e/m³). The calculation includes glass, Viroc cladding, concrete foundations, glulam structural elements, CLT floor slabs, and the polycarbonate facade shell. Polycarbonate contributes the highest embodied carbon due to its energy-intensive production, while concrete also forms a significant proportion because of the volume required within the plinth and foundations.

The total embodied carbon of the building without timber sequestration is 1,495,920 kgCO₂e. Divided across a total floor area of 4020m², this results in an embodied carbon figure of 372 kgCO₂e/m². This can be compared against the Royal Institute of British Architects 2030 Climate Challenge target for whole life embodied carbon, which aims for less than 625 kgCO₂e/m² for non-domestic buildings by 2030. The project therefore performs below the target threshold, largely due to the use of mass timber construction and passive environmental strategies.

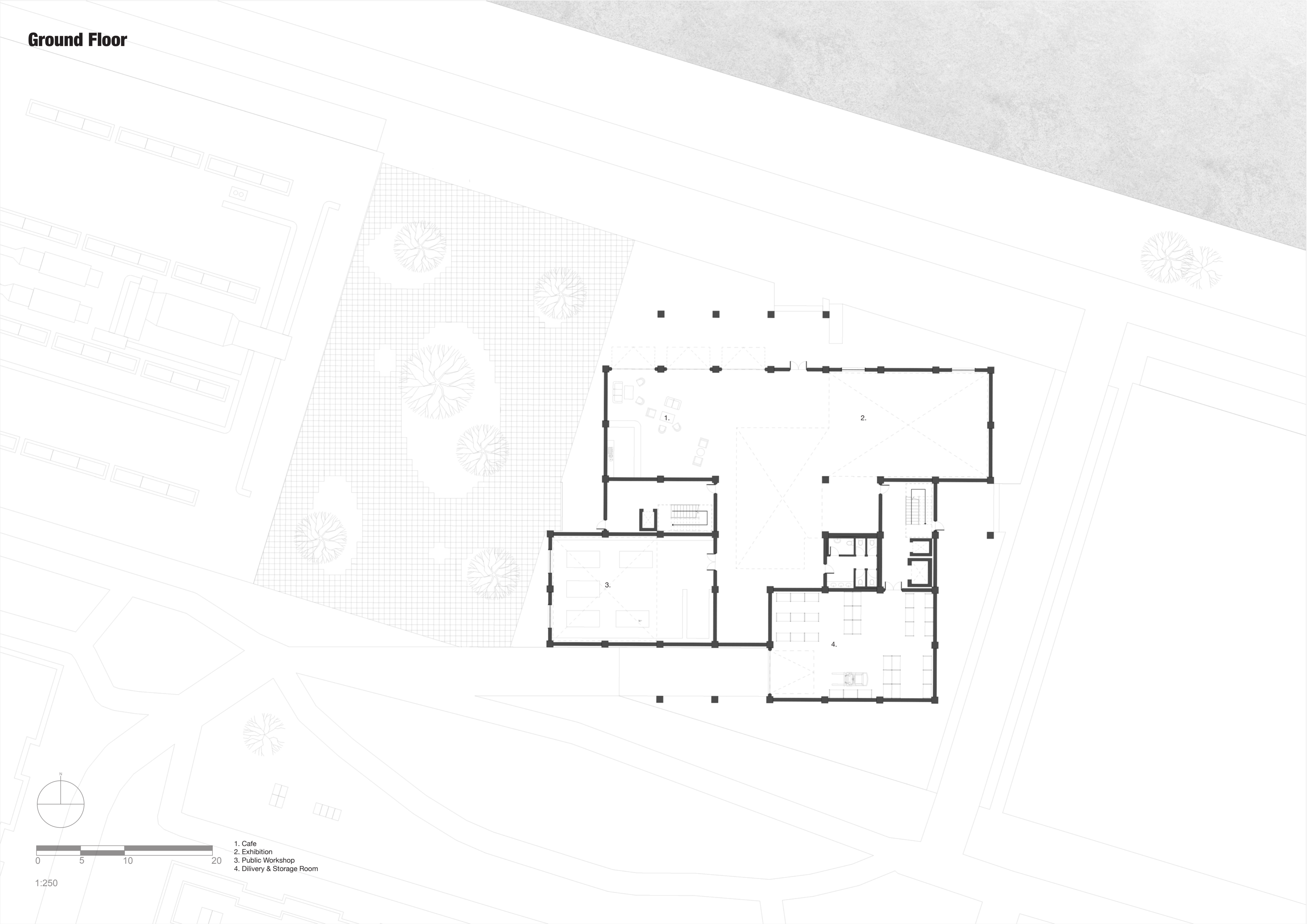
Including Sequestration

A secondary assessment includes the sequestration potential of the timber structure. In this scenario, the glulam structure contributes -321,750 kgCO₂e and the CLT slabs contribute -315,190 kgCO₂e, reflecting the carbon stored within the timber during tree growth. When these sequestration values are included alongside the other building materials, the total embodied carbon of the project is significantly reduced, resulting in an overall figure of 135 kgCO₂e/m². This demonstrates the substantial environmental benefit of using engineered timber in place of more carbon-intensive structural systems such as steel or reinforced concrete.

How the Calculation Works

Each material has a certain amount of embodied carbon emitted per metre cubed with is then multiplied by the volume of each material within the building. Which gives the total amount of Carbon emitted by the building. in order to get the carbon calculation relative to the size of the building the total is divided by the floor space of the building.

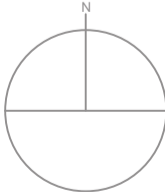
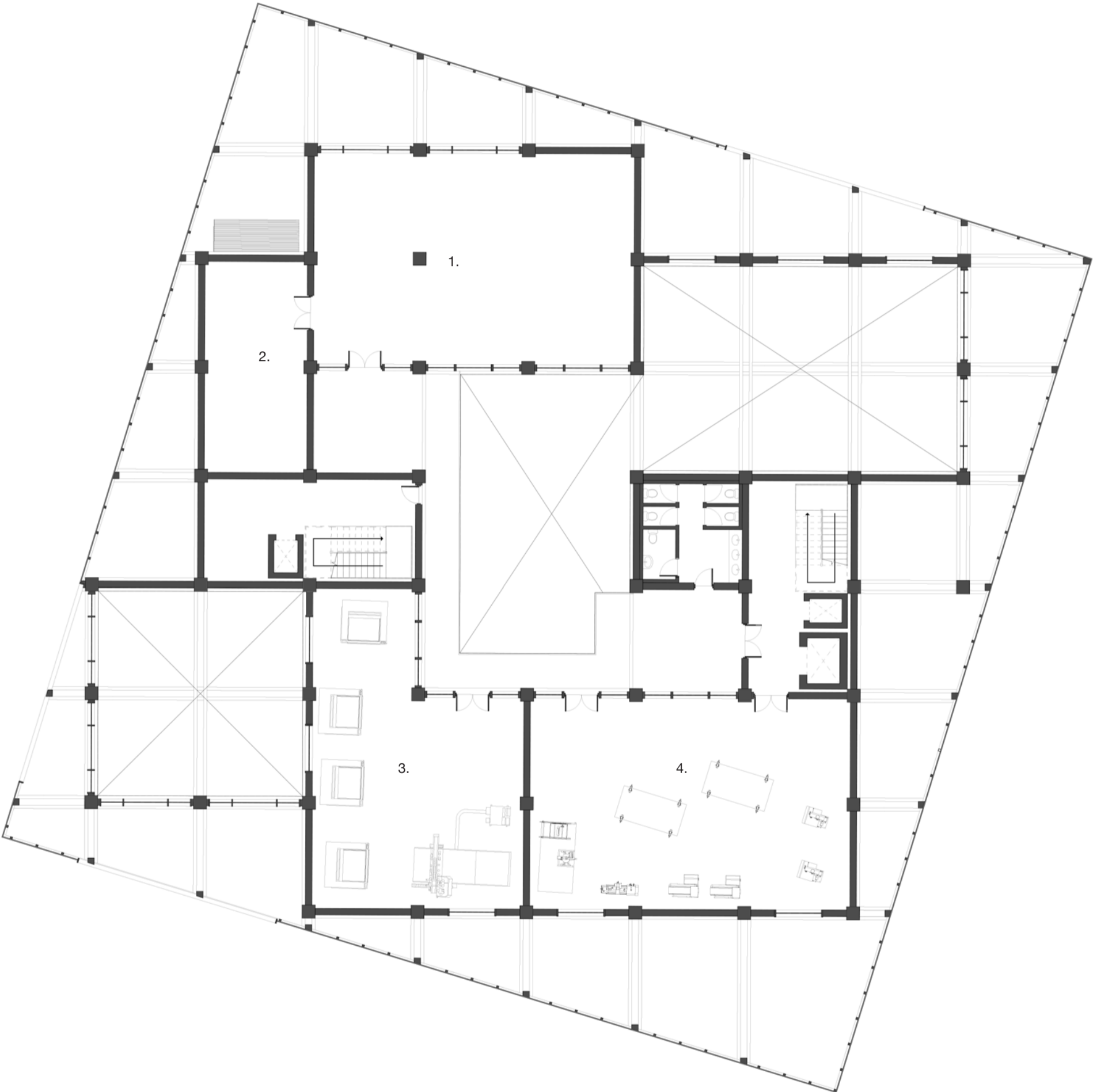
Ground Floor



- 1. Cafe
- 2. Exhibition
- 3. Public Workshop
- 4. Delivery & Storage Room

1:250

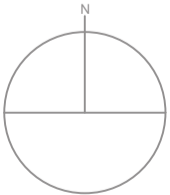
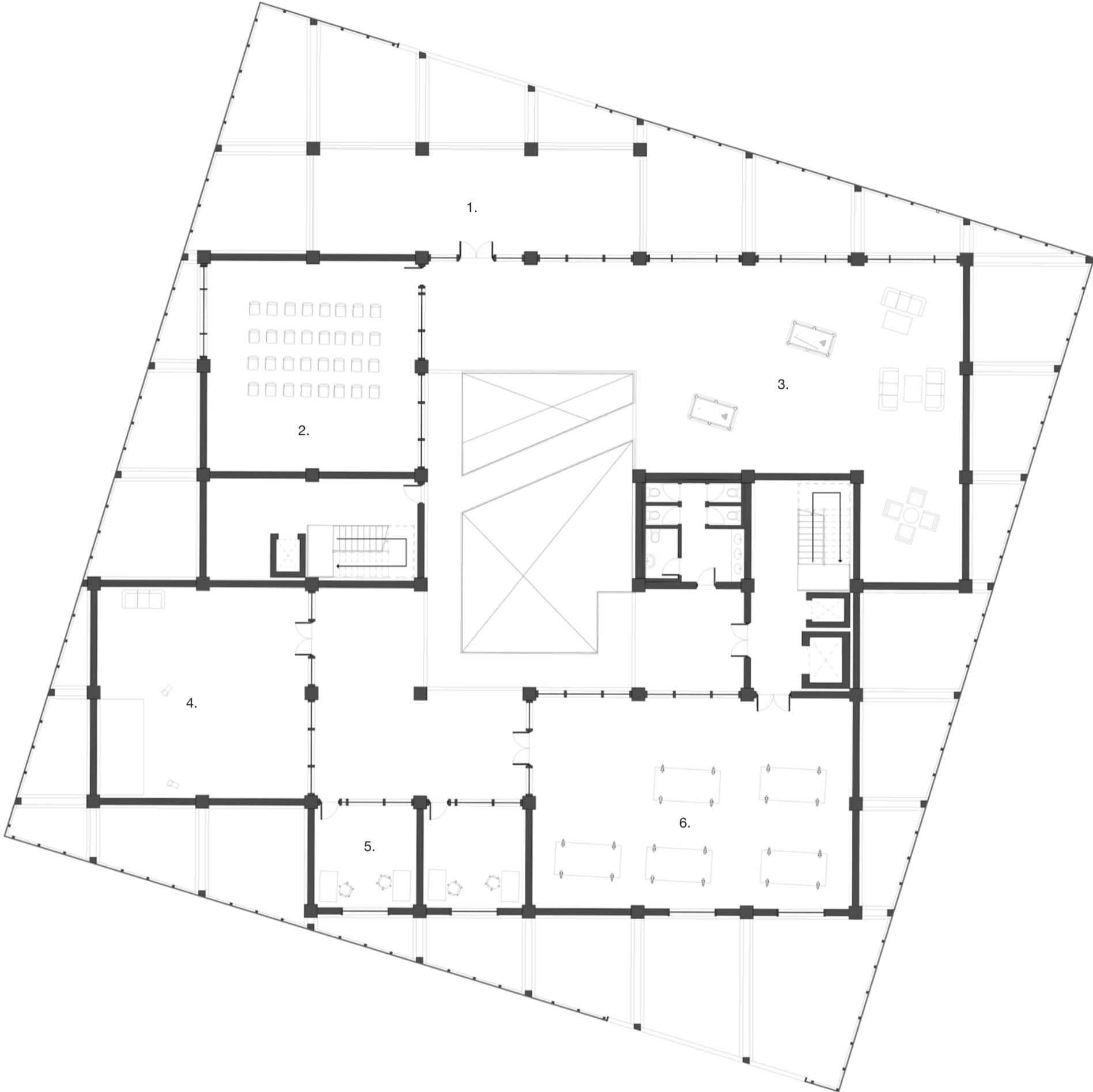
1st Floor



1:200

- 1. Material Research
- 2. Storage
- 3. Laser Cutting Room
- 4. Machine Room

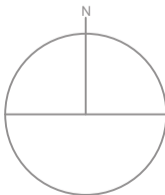
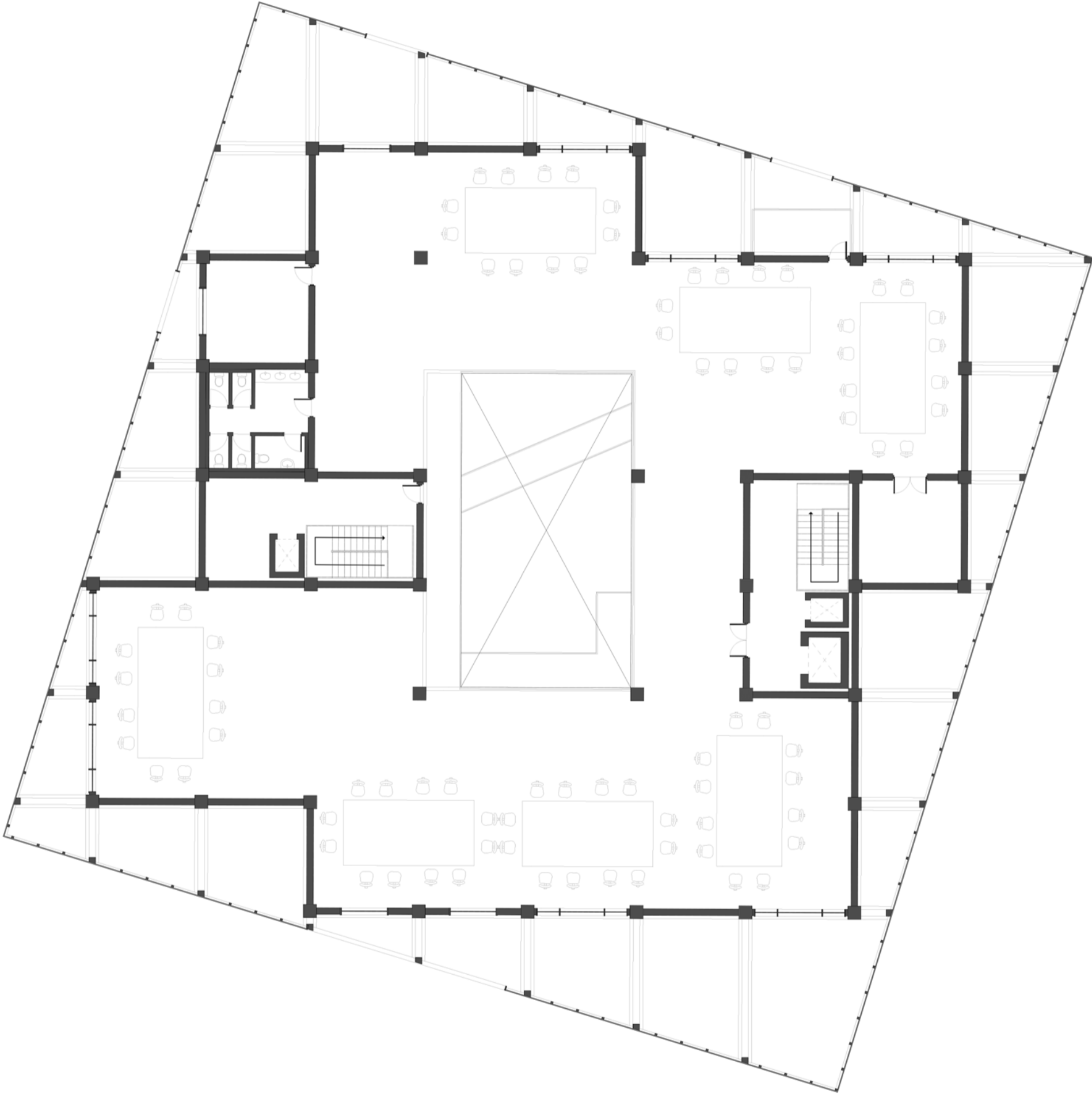
2nd Floor



1:200

- 1. Balcony
- 2. Lecture Hall
- 3. Lounge
- 4. Photo Studio
- 5. Offices
- 6. Finishing Room

3rd Floor



1:200

The whole floor is a studio space with storage rooms