

PORTFOLIO
architecture + design

Paing Su Ko
2021

Curriculum Vitae

[profile]

Paing Su Ko
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[education]

Master of Science (Timber Technologies)
Architectural Association School of
Architecture, United Kingdom.
2019-2020 Design+Make Programme

Bachelor of Architectural Design
University of Queensland, Australia.
2012-2016

[professional experience]

Weer Architects
Director/ Co-founder (2018-2021)

Design2000
Assistant Architect (2017-2018)

Association of Myanmar Architects
Project Coordinator (2016-2017)

Freelance
Illustrator/ Artist (2014-2016)

[awards]

Elephant Museum Yangon
Design Competition, Winner (2018)

Re School by Volume Zero
Design Competition, Shortlisted (2018)

SONA 1:1
Design Competition, Third Place (2013)

[activities]

Bamboo Lab Myanmar
AA Visiting School. (2017)

**UNESCO Workshop on Assessment of
Heritage Monuments (2017)**

SONA Mentorship Program
Buchan Group of Architects (2015)

[skills]

Language
Burmese (Native)
English (Fluent)

Digital
Adobe Creative Suite
Autocad
Rhinoceros 3D + Grasshopper
Photogrammetry

Analog
Timber Construction + Woodworking
Hand Drawing
Painting + Sculpting
Model Making
Metalworking

[references]

Martin Self
Programme Director
Design + Make Post-graduate Program
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AA Design + Make 2020

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Learning from a Branch



Project team: Paing Su Ko

Role: Research, Design, Making

Course: Master of Science Timber Technologies, Design+Make Program, Architectural Association School of Architecture

Year: 2020

Supervisor: Martin Self, Zachary Mollica, Jean-Nicolas Dackiw

Started as a challenge against the common notion of knots as flaws, the focus of the project evolved into fascination with the internal relationship between the branch and its stem.

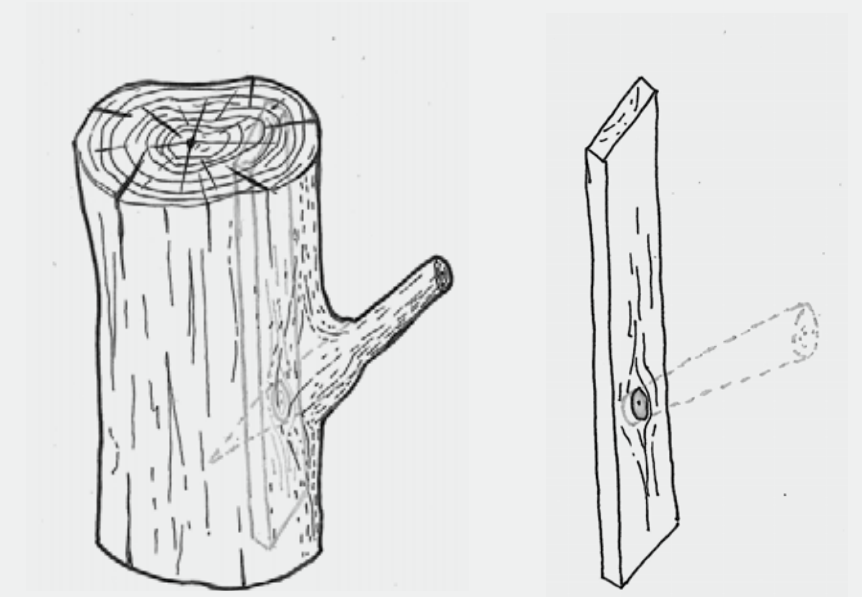
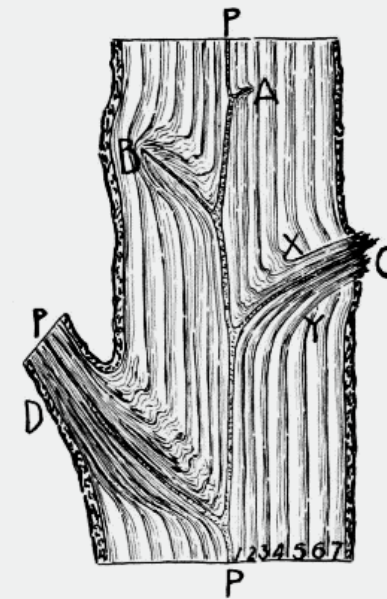
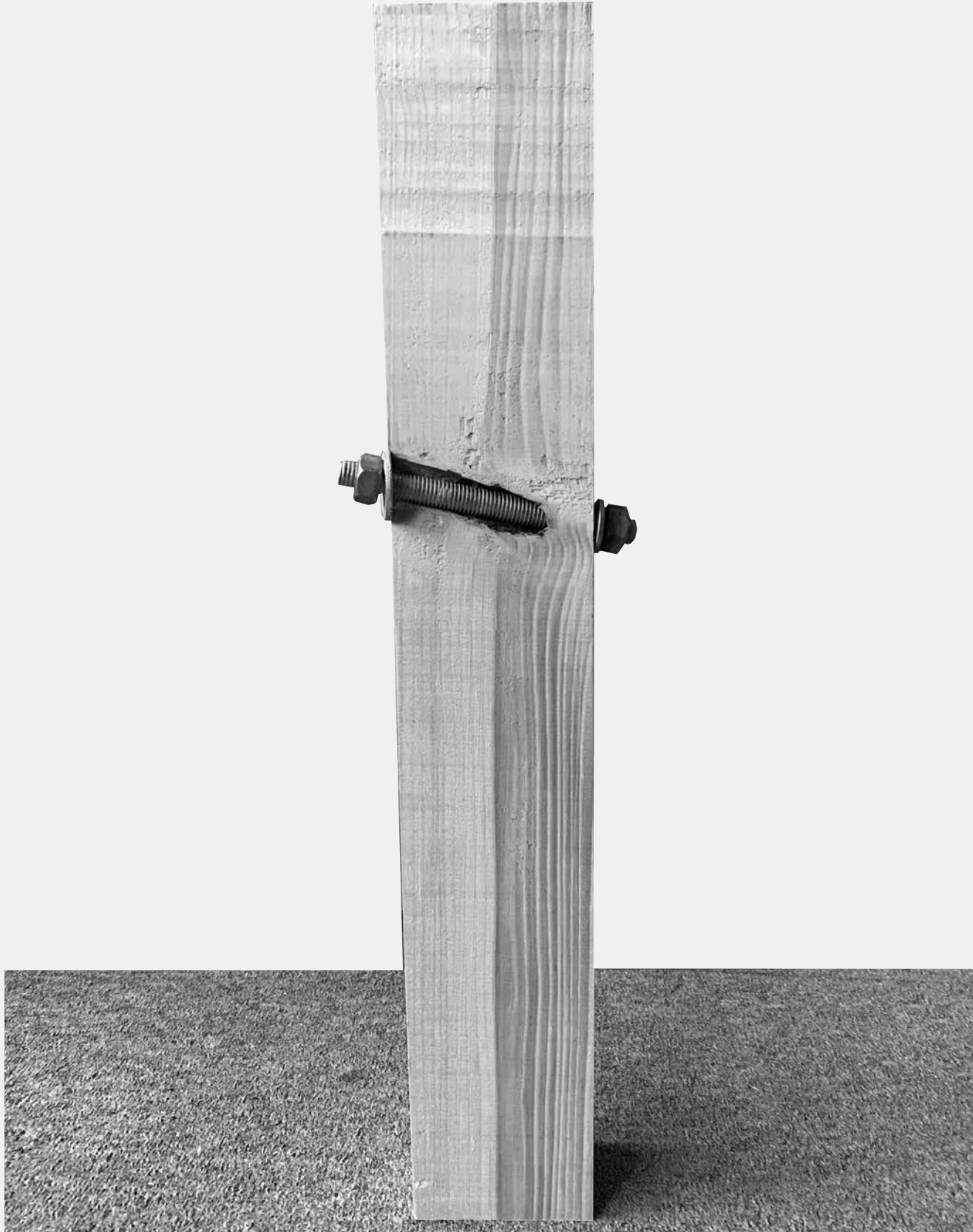
The intention of this dissertation is to uncover the principles behind the mechanical connection between the branch and the stem by constructive approaches rather than destructive approaches as done in the past. The project attempts to reconstruct the branch itself through both digital explorations and physical experimentation in order to achieve a better understanding. From this reconstructive approach, two primary principles are extracted; first is the formation of the branch tails and collars and second is the overlapping of these tails and collars

The final outcome of this dissertation is a designed artefact/ object which exploits and demonstrates the extracted information from the branch-stem connection.

Knots as defects or potential?

A knot is basically a section through the wood of the base of a branch, or a dead branch embedded in the stem due to the natural growth.

Fascinated by this generally disregarded feature of a tree, a couple of tests and experiments were carried out in search of its untapped potential. One such experiment was to test how strong knots would be if used as connection holes in a tensile structure. The tensile strength of knots along the grain direction is tested and compared with the tensile strength of drilled holes. The results are inconclusive which neither proved nor disproved of the potentials of knots.

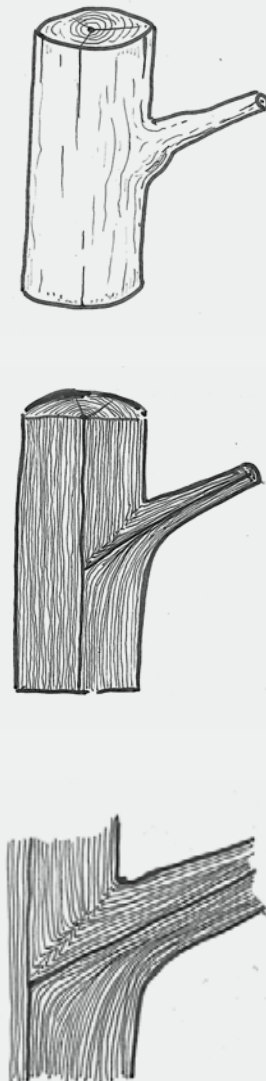
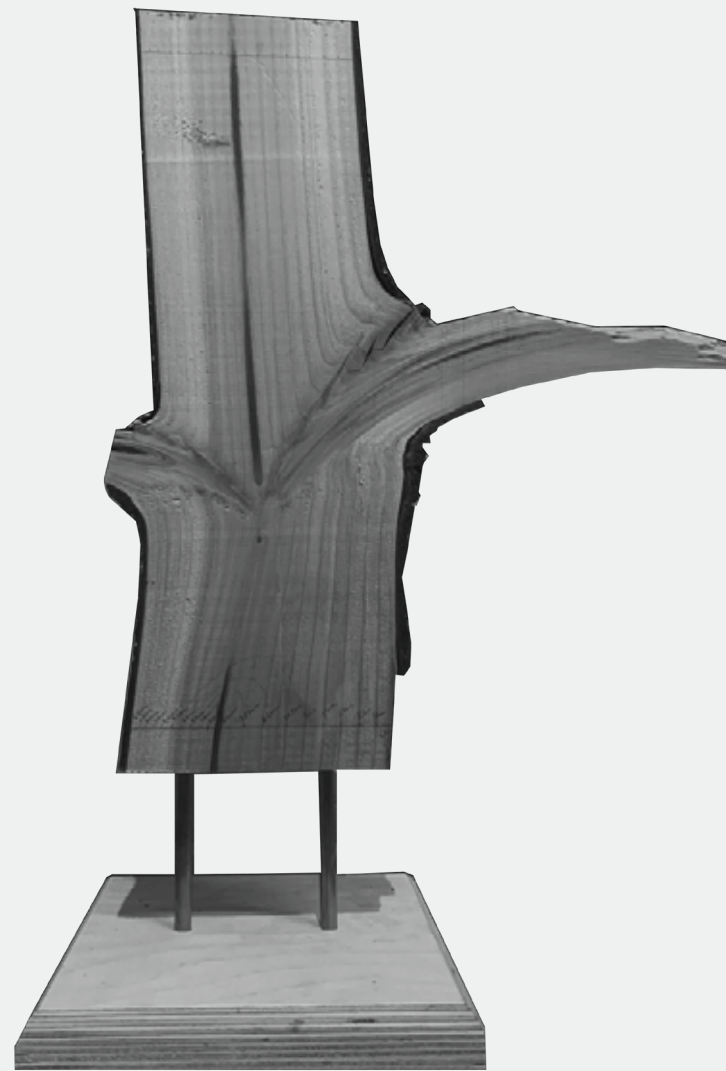


Section of the trunk of a 7 year old tree showing relation of branches to main stem and the origin and formation of knots

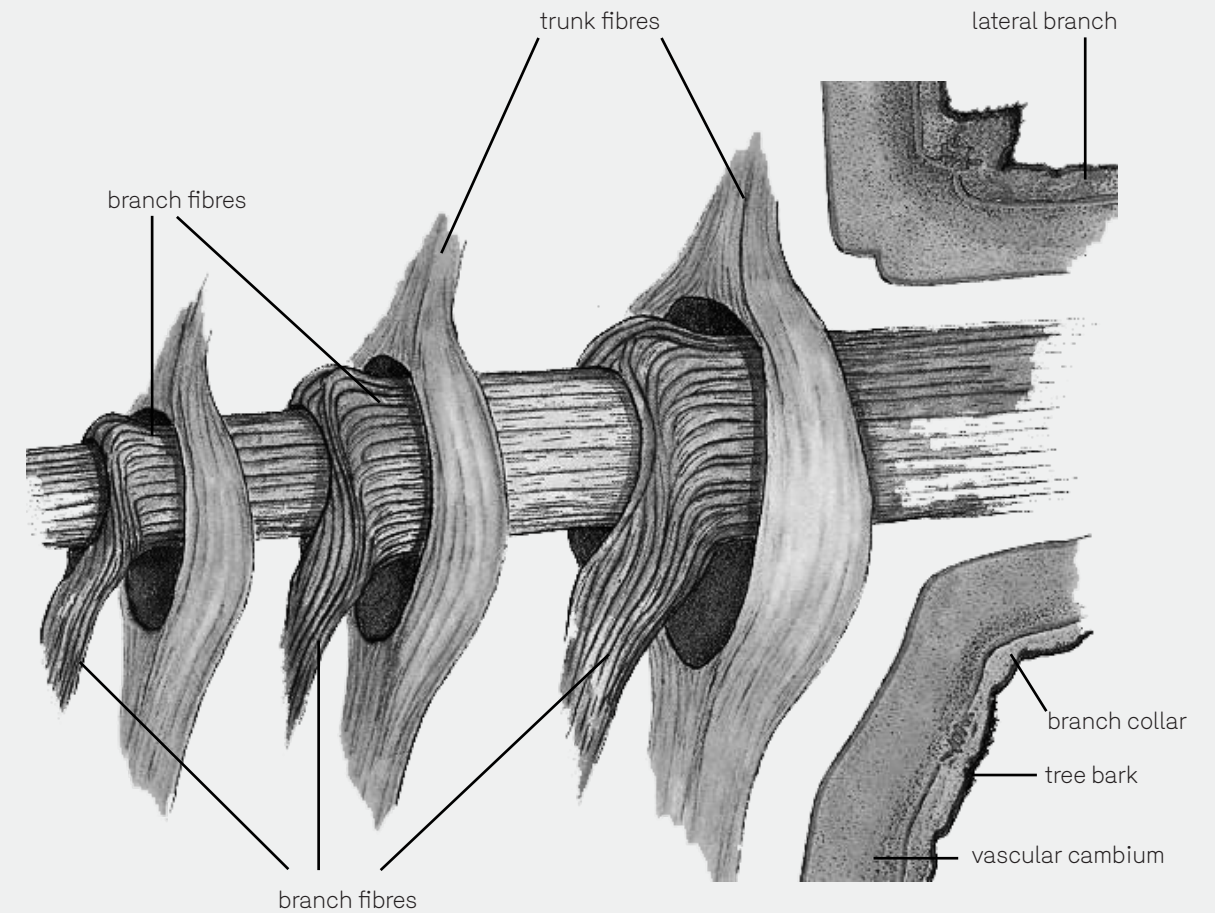
Existing models of Branch Attachments

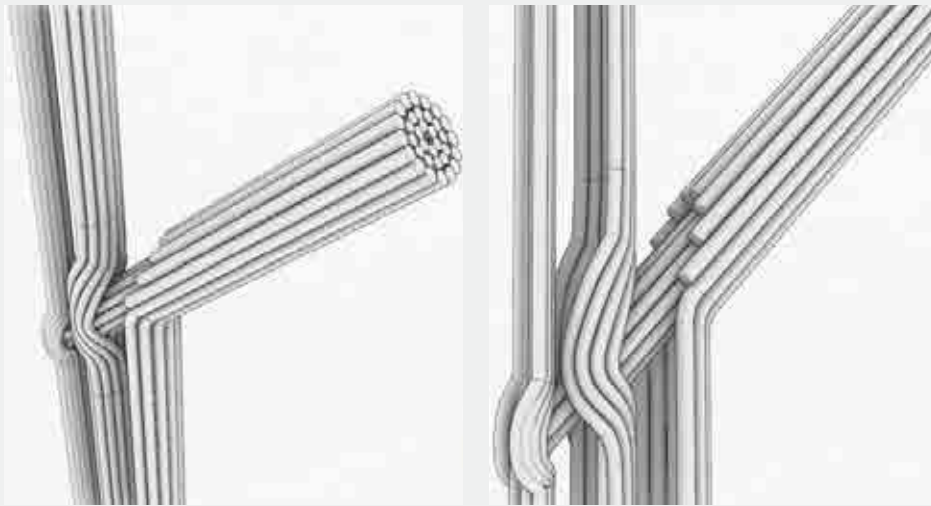
Alex L Shigo's Model of Lateral Branch Attachment

Shigo's model of lateral branch attachment describes the junction as consisting of a joint of woven fibres, in which the branch fibres run along the branch and turn downwards at the junction, while the stem fibres run downwards from above the junction and deviate sideways around it. These stem fibres encircle the branch like a ring or a collar (commonly referred to as the branch collar) and on the upper side of the branch at the junction of branch and trunk, an area with fewer fibres is created. This means that when the crown sways in the wind, the resulting flow of forces which passes down the stem towards the ground is diverted around the branch base.



Mechanically, this is a laminated joint in which annual layers of branch-wood run through the rings of stem-wood that are formed around them and continue in between the stem-wood layers like a series of tails. This cross lamination of branch and stem fibre layers is what provides mechanical strength to the junction making it resistant compressive failure.

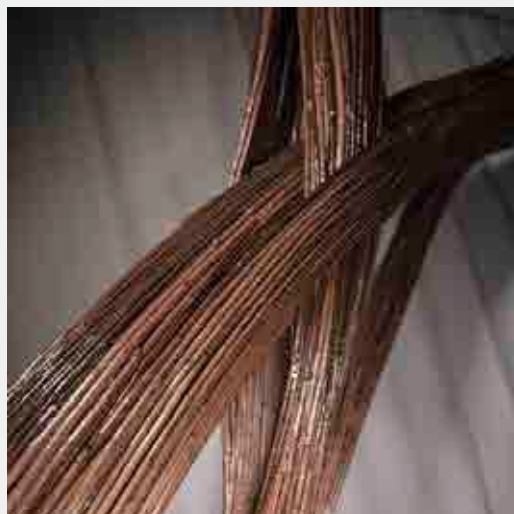




The branch-stem connection is recreated digitally in Rhino to provide better understanding towards how the stem and branch fibres form the collars and the tails and how they interact with each other geometrically. A Rhino Script was also developed with the help of Martin Self to digitally generate a simulation of how a branch would grow annually.

Following the approach of digital reconstruction of the branch-stem connection to show three-dimensional representations, a series of physical experiments and explorations were carried out to find out if that would be possible to create physical representations of how the branch is attached to the stem; specifically the formation of the branch tails and the stem collars. For these physical experiments, willow rods are used to represent the wood fibres.





With every single part of the mould being able to be removed at the end of fabrication, the final result is a hollow, lightweight prototype that exploits and demonstrates the principles extracted from the study of branch-stem junction.

The two demonstrated principles, the formation of branch tails and collars and the natural lamination of these two layers, could provide valuable information towards how to achieve a glue lamination technique where the fibre direction varies locally where necessary in order to achieve efficient and optimized material usage and arrangement. The result is demonstrated as this final prototype as a glue-laminated lightweight object where the grain directions follow the form of the object itself.

Biodiversity Education Centre Putao



Project team: weer

Role: Concept, Design Development, Construction supervision

Location: Putao, Kachin State, Myanmar

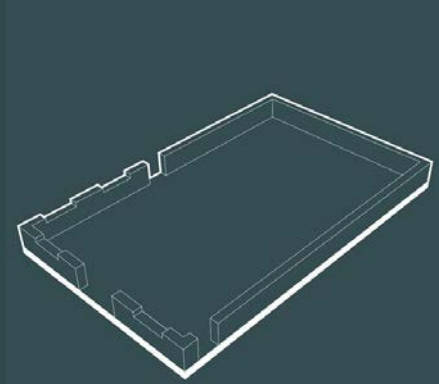
Year: 2018

Client: World Wildlife Fund, Ministry of Environmental Conservation and Forestry

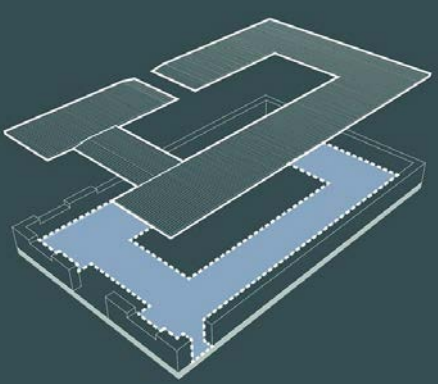
Located in northern Myanmar, the small town of Putao is surrounded by ice-capped mountains and presents a unique vegetation, including rare orchids, as well as endemic birds and animals. This diverse ecosystem is celebrated in the new Biodiversity Education Centre Putao, which opened its doors to the public in December 2019.

The centrepiece of the renovated space is a wooden box, which houses the 'valuables' of the museum, much like a jewellery box. The box is referencing a local construction technique for timber cladding, made by stacking wood planks in an angle, while its inside displays rare animals from the area. The elevated timber floor raises the eye of the observer to the box and the information boards that are framing the space. The circulation in the room follows a U-shape, along which visitors can learn about the natural resources of the area, its biodiversity and cultural heritage, as well as ongoing activities and initiatives related to the natural environment. A small sitting area in front of the box can offer the visitor a moment of rest and contemplation before they exit the museum.

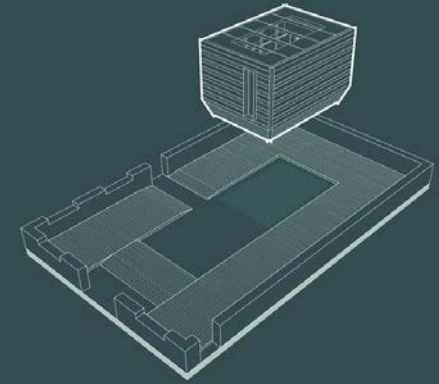
By merging local materials and techniques with new ideas and contemporary visions, this centre becomes a new landmark in the heart of Putao, and offers a space of learning and awareness for locals and visitors, who can appreciate the natural beauty of their environments.



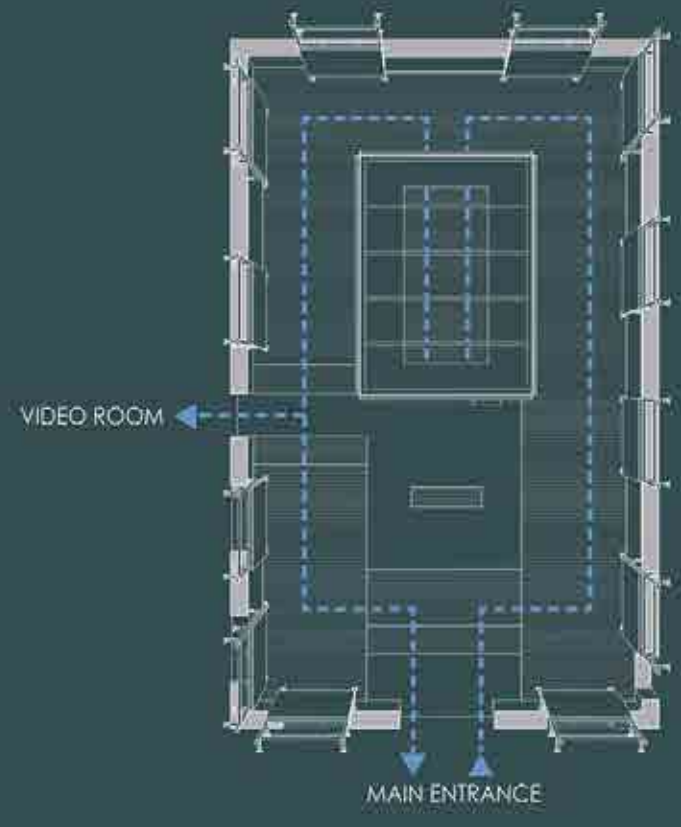
existing space (27' x 44' 6") with one main entrance and two side entrances



U-shaped timber flooring for circulation around the exhibition space



timber box in the centre for exclusive display



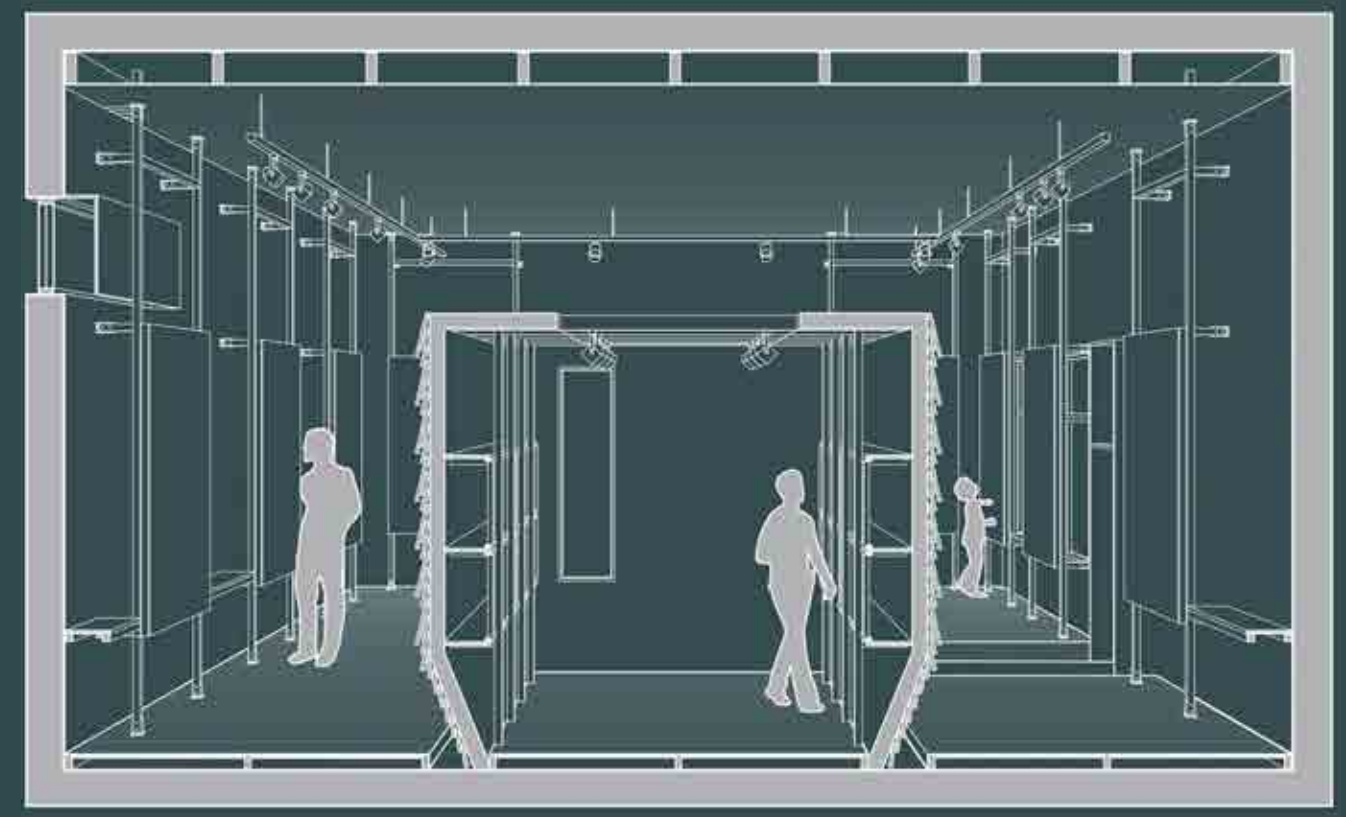
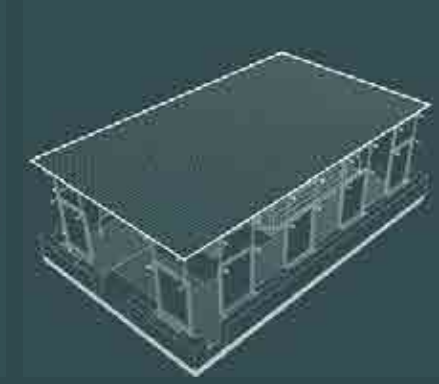
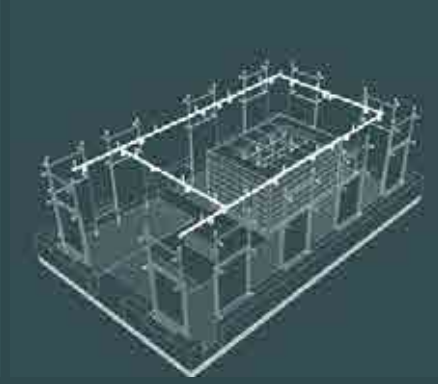
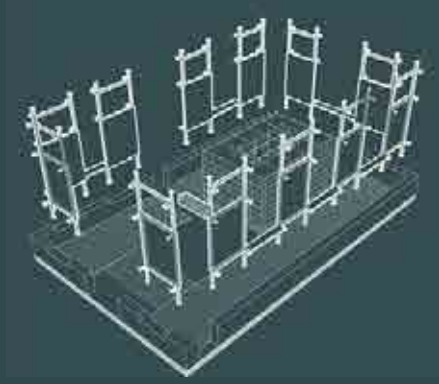
VIDEO ROOM

MAIN ENTRANCE

information boards in timber frame around the wall

timber framing for exhibition lighting

timber ceiling at 15'





Elephant Museum Yangon



Project team: weer

Role: Concept, Design Development, Construction supervision

Location: Yangon, Myanmar

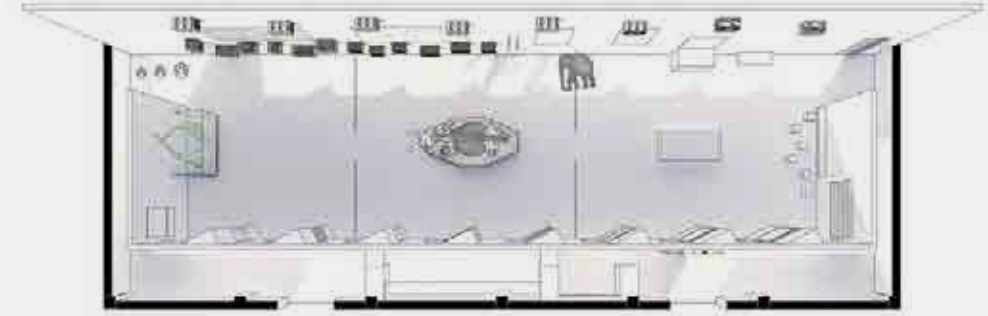
Year: 2018

Client: World Wildlife Fund, Ministry of Environmental Conservation and Forestry

This design is an entry proposal for the competition for the first ever elephant museum in Myanmar and it was selected as the winner of competition.

The main idea of the design is based upon the coherent flow of sectional zones for different exhibition categories and suggested circulation of guests through it.

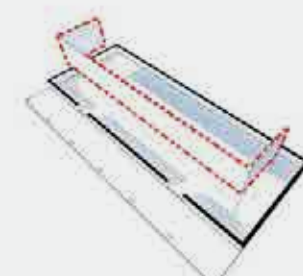
The main space of the museum is designed to evoke a sense of hopefulness and raise awareness and empathy for the threats the elephants are facing today.



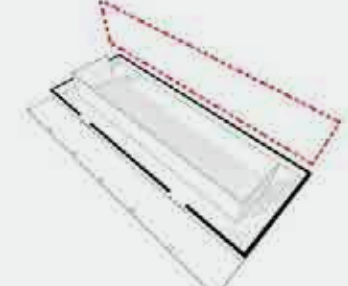
Design Transformations



Existing Space



Partition loop



New partition set back 1'6" from the existing wall



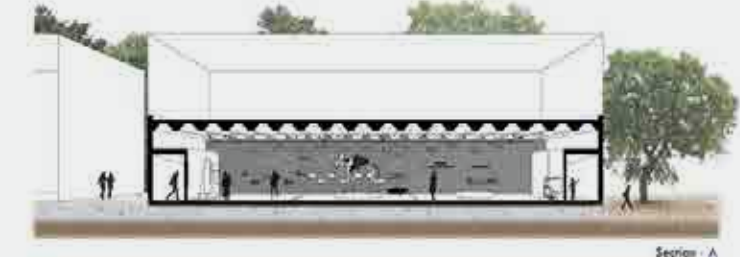
Place the office



Circulation



Put display and furniture



Section - A



Section - B

Artist Retreat



Project team: Paing Su Ko

Role: Concept, Design Development

Course: Architectural Design I (ARCH1100), University of Queensland

Year: 2012

The project was to design a personal studio/ retreat for an artist. The main concept of the design stems from a couplet of words randomly chosen by the studio principal, which was "static / dynamic".

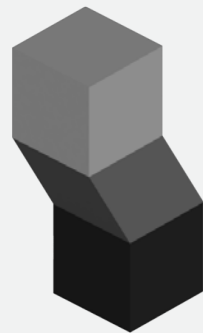
The idea was to create a concrete room that stands strong and static within the landscape on which stands a timber structure with multiple split levels inside, each for different functions and different privacy.



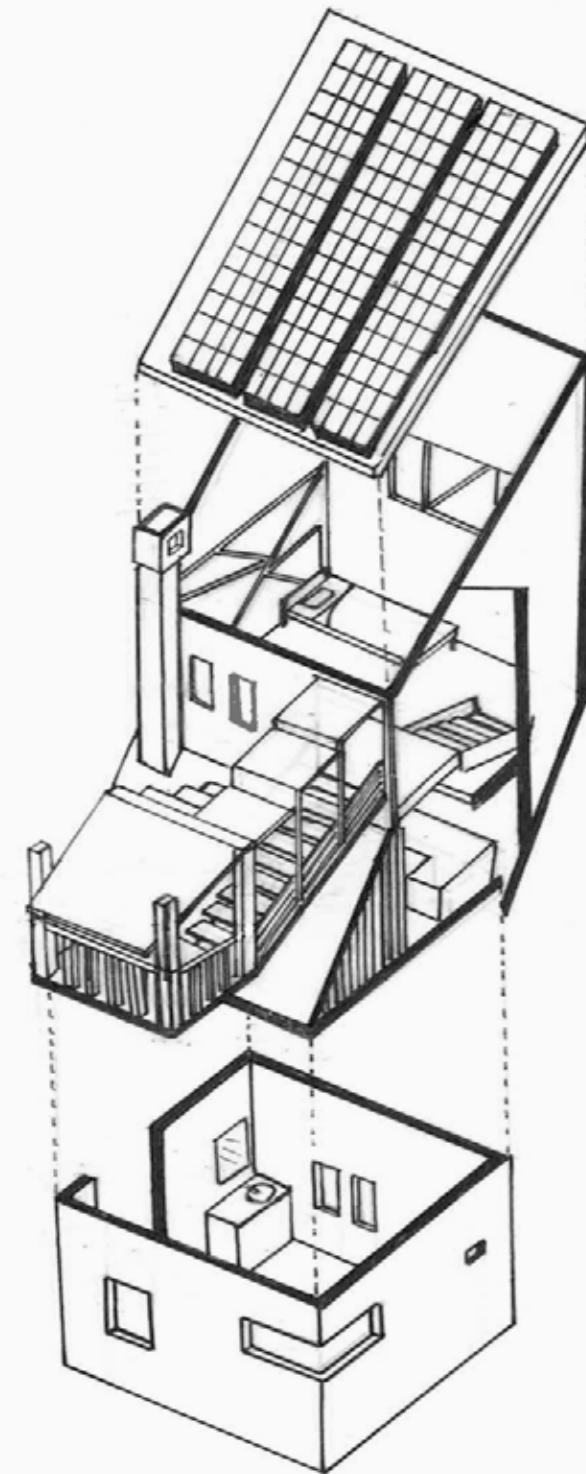
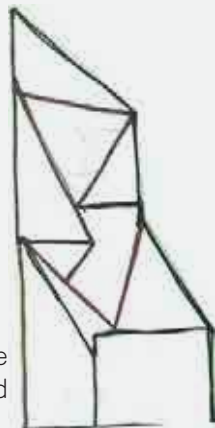
Circulation spaces are outside the main structure, allowing the user to experience the surrounding nature.



The walls and the roof are slanted at certain angles for efficient use of the solar energy.



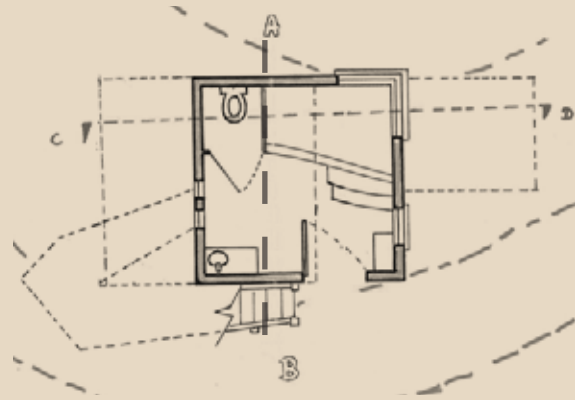
Dissection of the facade into separate panels based on the main structure and the interior spaces.



Second floor plan

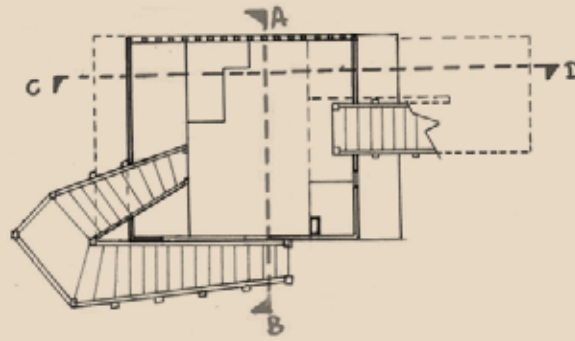
First floor plan

Ground floor plan



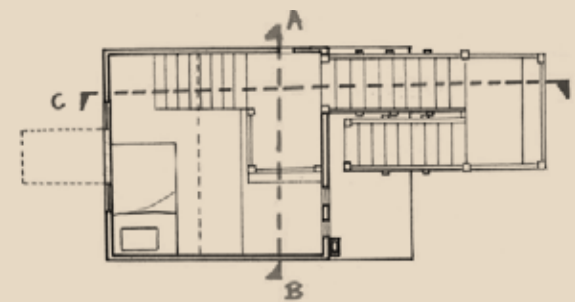
Ground floor plan

The ground floor is the "earth room" which is a solid, confined, square-shaped room enclosed by concrete walls. The "earth room" is partially dug into the ground and it is where the bath and toilet facilities are located. The solid concrete "earth room" is the foundation and from which the upper structures are supported from.



First floor plan

Standing on top of the "earthroom" is a vertical structure built with timber that looks as if it's shifting outwards. Inside of this vertical timber structure are three split levels each serving its own different functions. The first floor, immediately above the "earth room" houses a kitchenette and a small studio space.

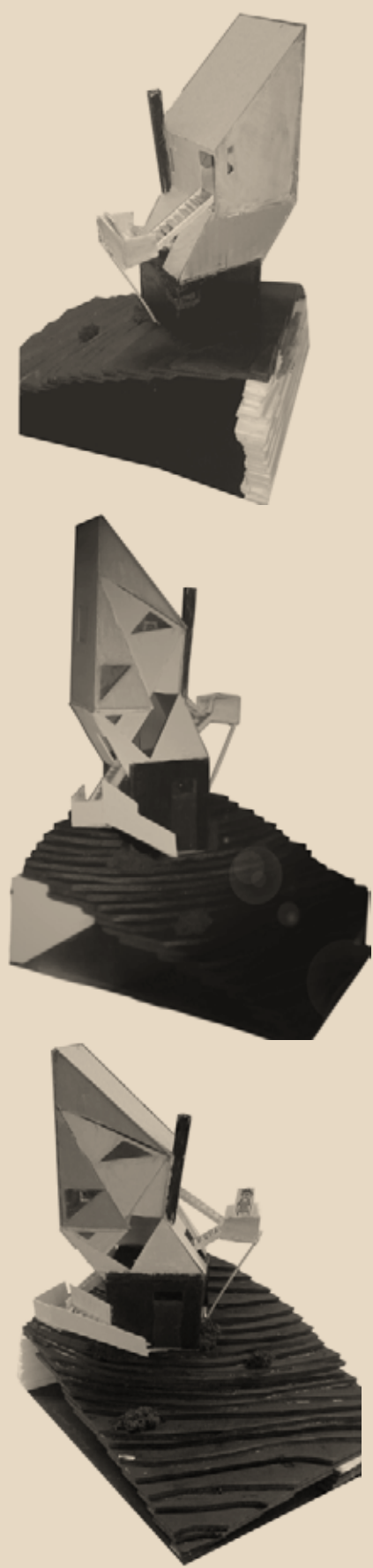


Second floor plan

Right above this floor is where the sleeping area is located. A split level above this area is another space for artistic use.

All these different floors are connected via two separate external stair cases, making it possible for the user to experience the surrounding nature, and a small internal stairs case.





Non-denominational Sacred Space



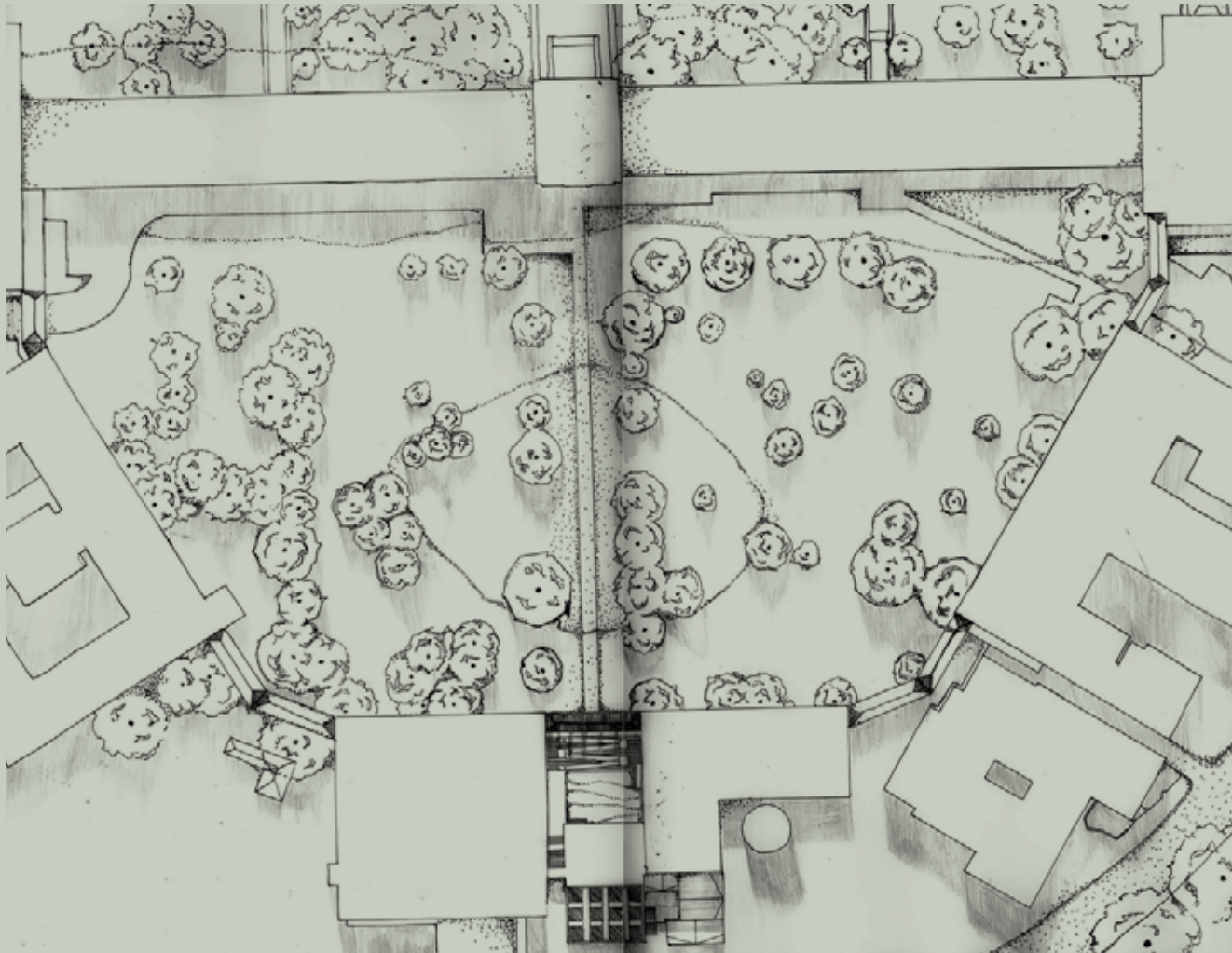
Project team: Paing Su Ko,
Role: Concept, Design Development
Course: Architectural Design V (ARCH3200), University of Queensland
Year: 2015

The brief asks for the design of a non-denominational sacred space (a place of contemplation on campus but also able to accommodate a variety of different religious groups) augmented by a complementary open space and research study center.

"It is the light of the enlightenment that makes us realize that we have been in darkness all along" (119, Diana Eck, 1970)

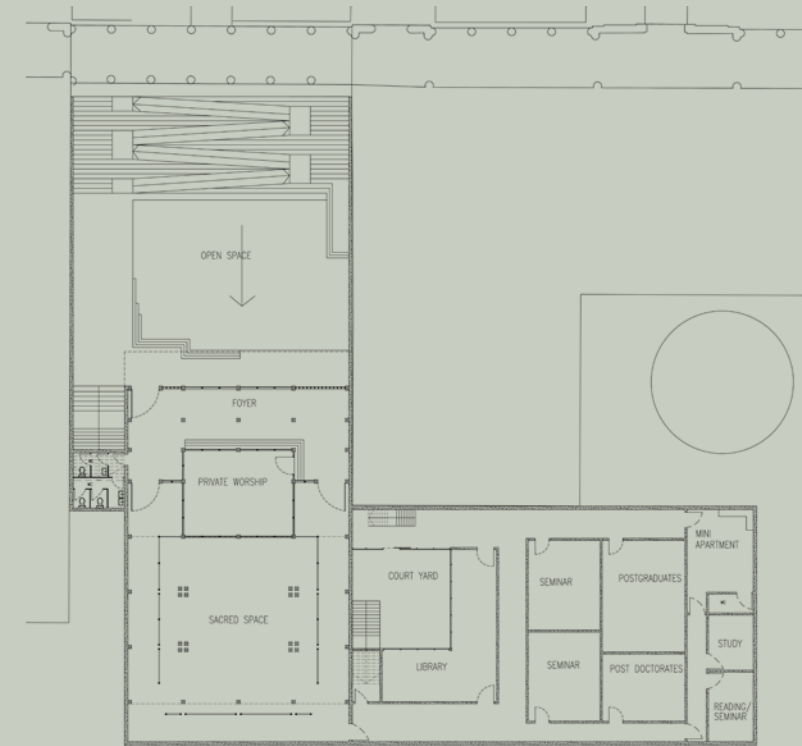
Design intent is to reinforce/extend the central axis of the great court and provide a continuation of the great court onto the open court of the sacred space.

Main idea behind the design is to create a journey where you start from the darkness of the shadows into the enlightened sacred space. Along the journey, parts of the structure itself may reveal and be hidden. The main sacred space where the sun's rays would be shining into through the transparent wall panels and also through the timber structural system would await at the end of the journey. That is where one would go for spiritual and personal contemplation.

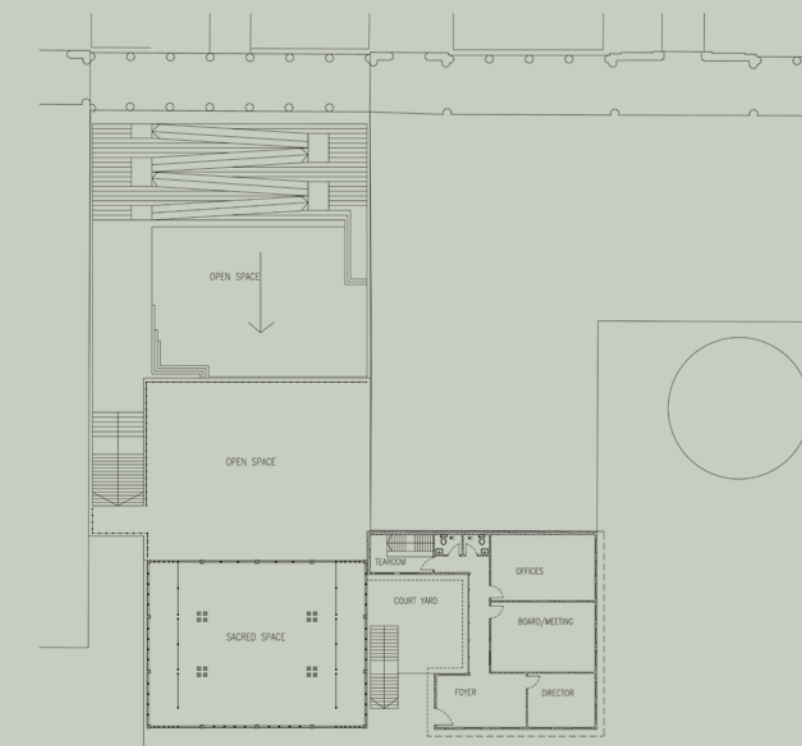


The journey starts at the colonnades surrounding the great court from where one would descend onto the open space in front of the building. The open space continues up another level however still connected to the one on ground via external stairs to the left of the building. Adjacent to the stairway is the entry into the foyer of the sacred space where one could wait or go into the private worship for a peaceful contemplation or meditation.

The destination of the journey "the sacred space" could be entered through two entrances located to the either side of the private worship space. Once entered, one has to walk through small colonnades surrounding and hiding the main sacred space inside with translucent panels. Intentional gaps between the columns and the translucent nature of the panels give a hint of what to expect of the sacred space before arriving there eventually.



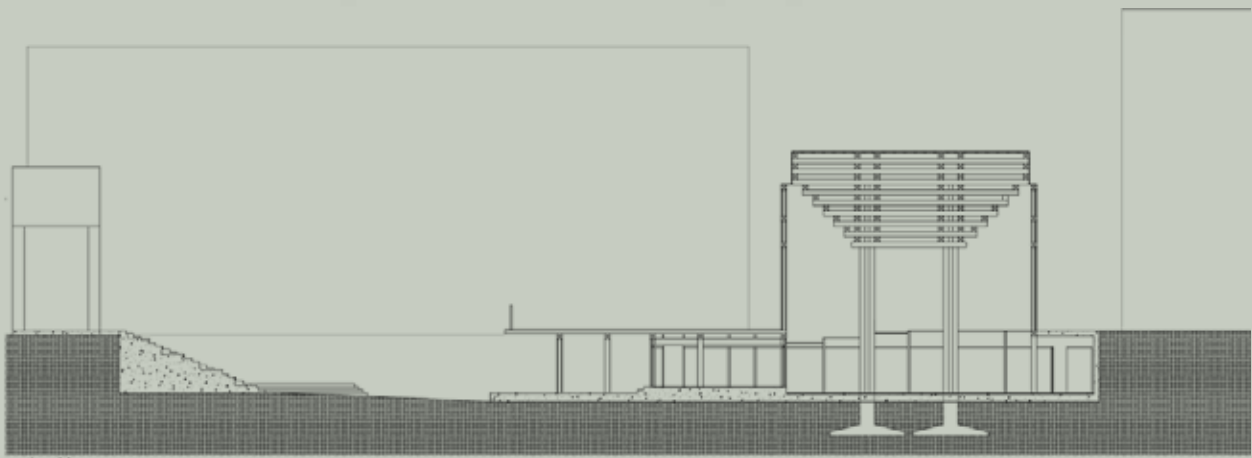
ground floor plan



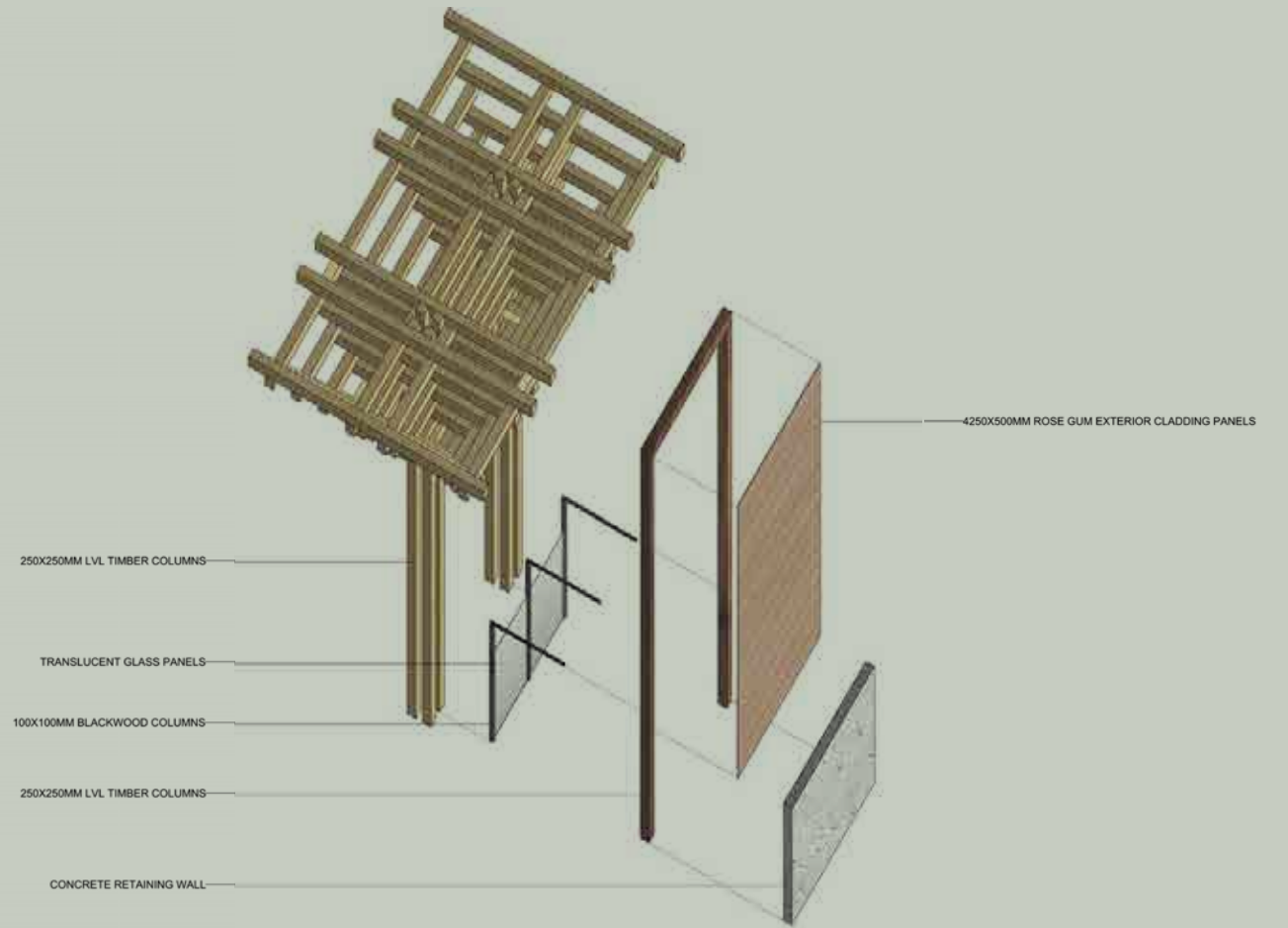
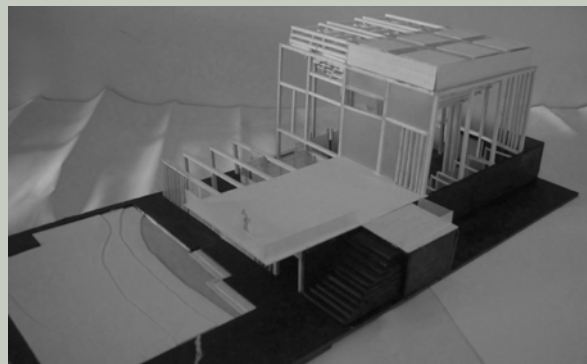
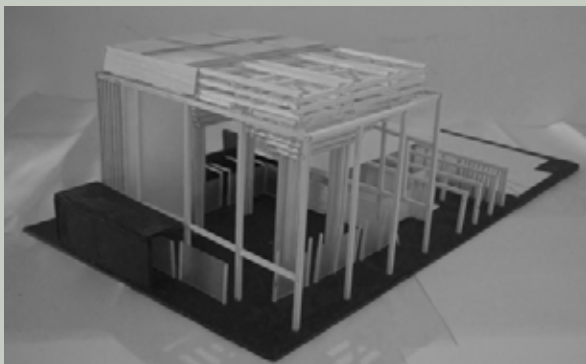
first floor plan



north elevation

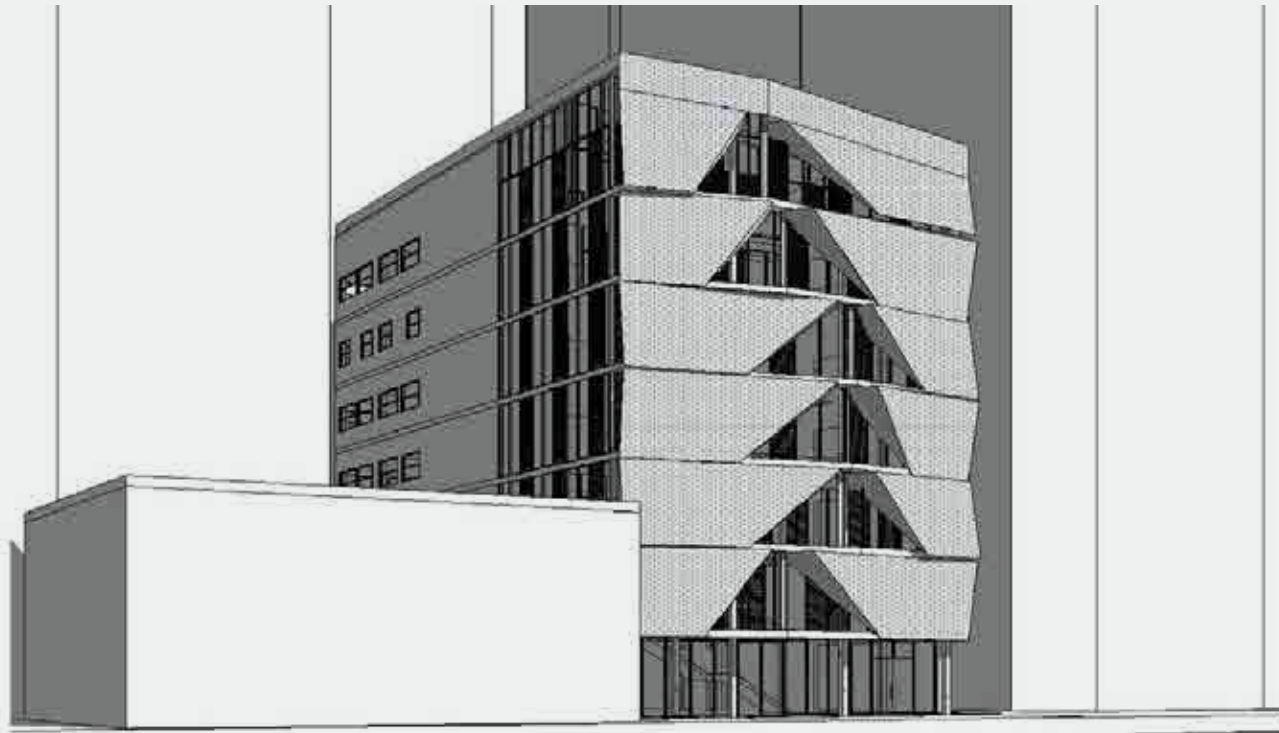


section aa



exploded axonometric of the tectonic timber structure and enclosure

New Architecture School

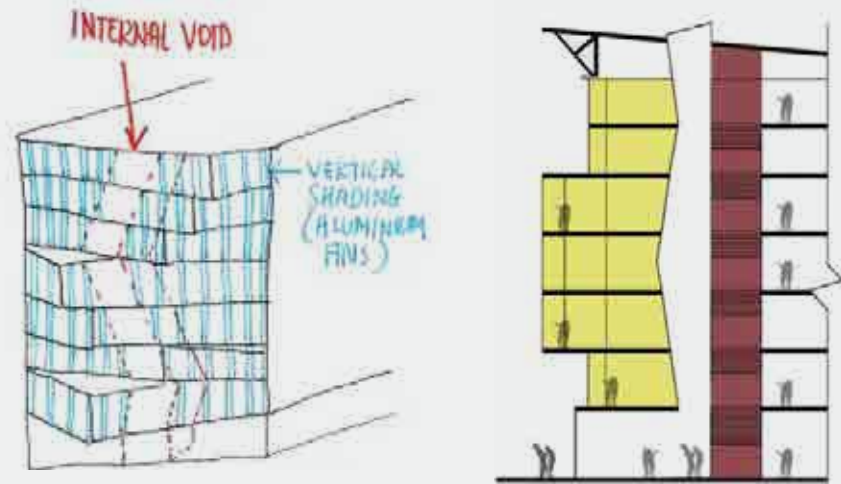


Project team: Paing Su Ko, Sophia Lai, Christy Chan, Kay Tee
Role: Concept, Design Development, Technical Drawing
Course: Architectural Technology IV (BLDG3220), University of Queensland
Year: 2015

The project was to design a new building for the University of Queensland architecture school in accordance with the Building Code of Australia and produce construction drawings for it

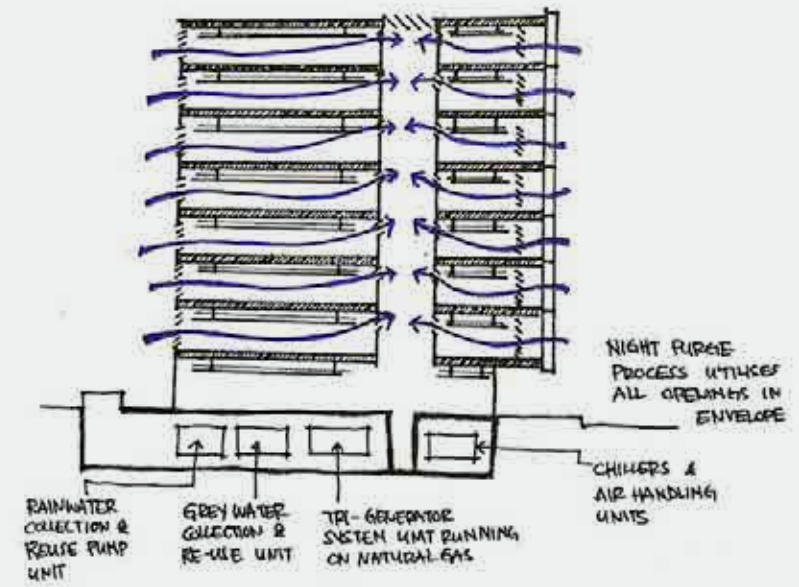
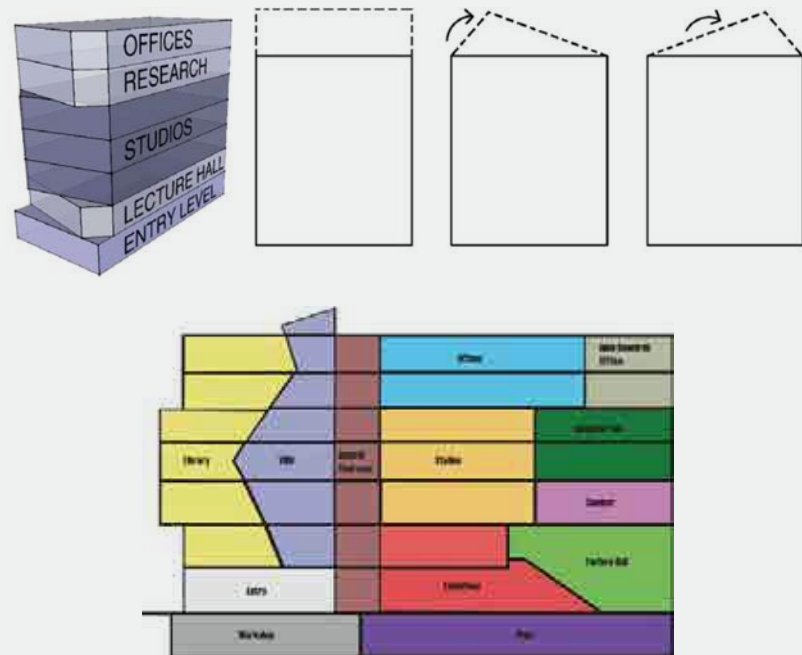
The new school of architecture is located on 65 Mary street in the Brisbane CBD. Some of the restraints that comes with the site are its close proximity to the adjacent building on the right and the overshadowing of the high rise buildings surrounding it.

The void runs throughout the building and shifts on each floor in order to create a dynamic form that is in juxtaposition with the facade which twists according to the shifting of the void.

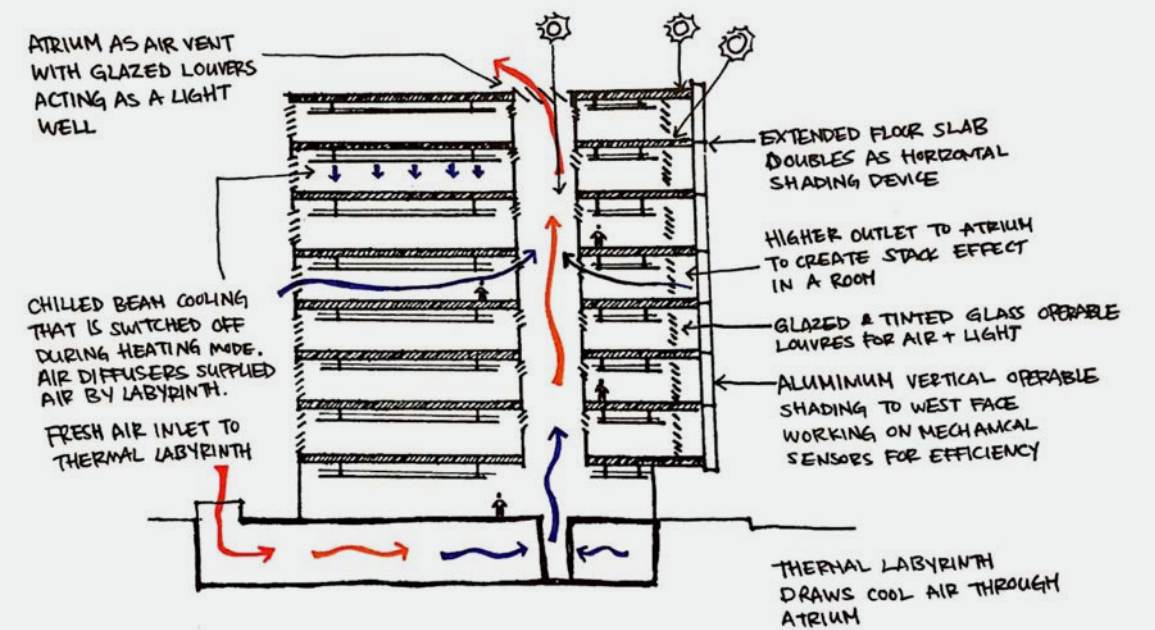


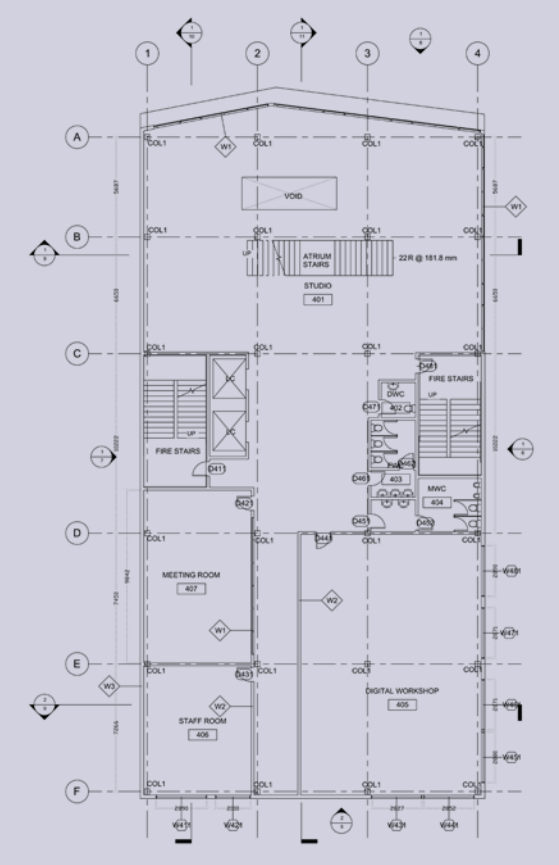
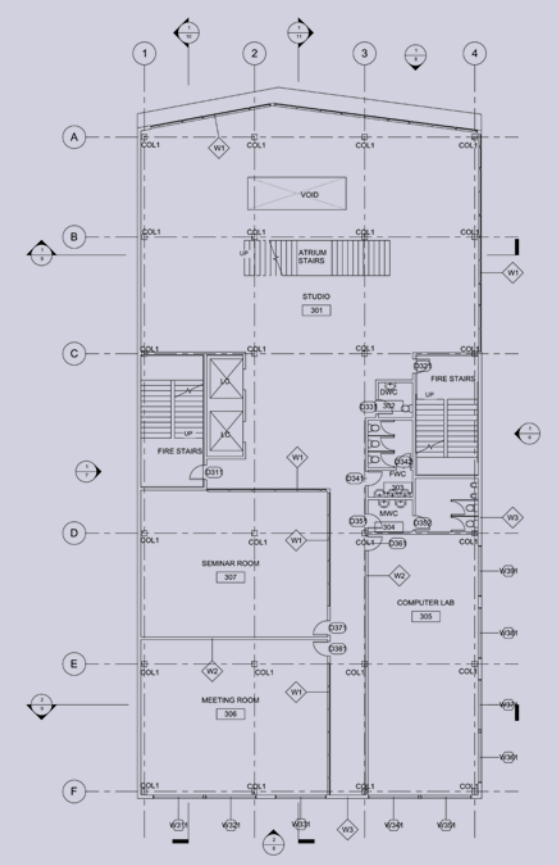
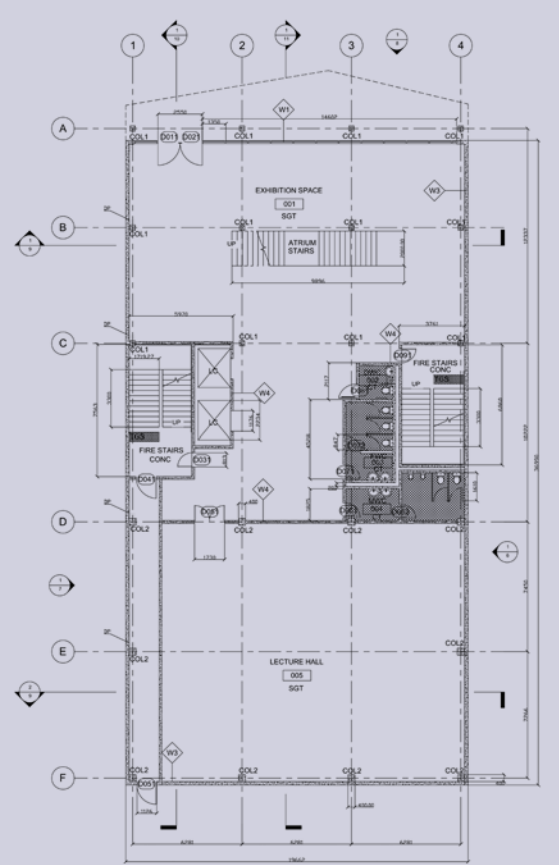
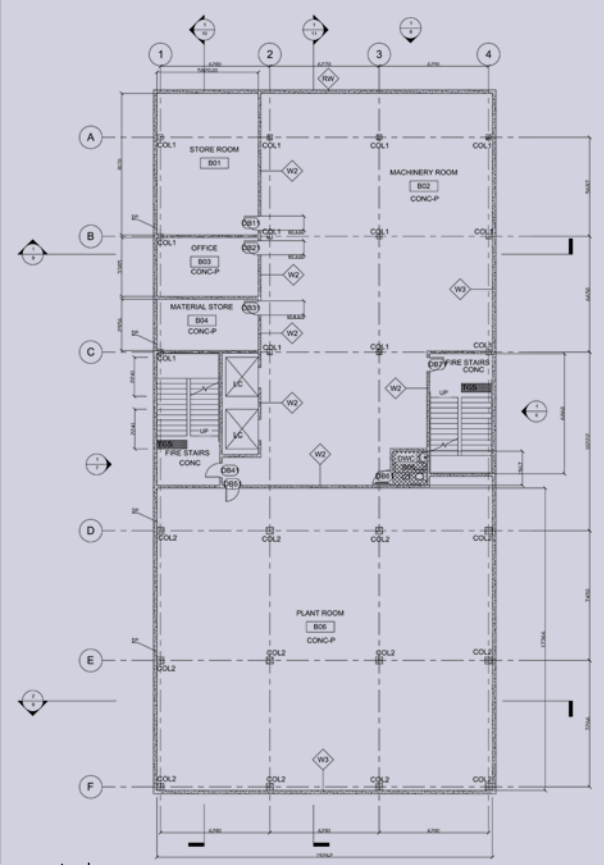
Dynamism in play between the void and the facade

The facade of the building is twisted at different parts to emphasize the different spaces and different programs.



The void also plays an integral part in bringing the light into the building and ventilating the building through acting as an air chimney. These systems work in unison to passively cool the building and helps reduce the energy usage.



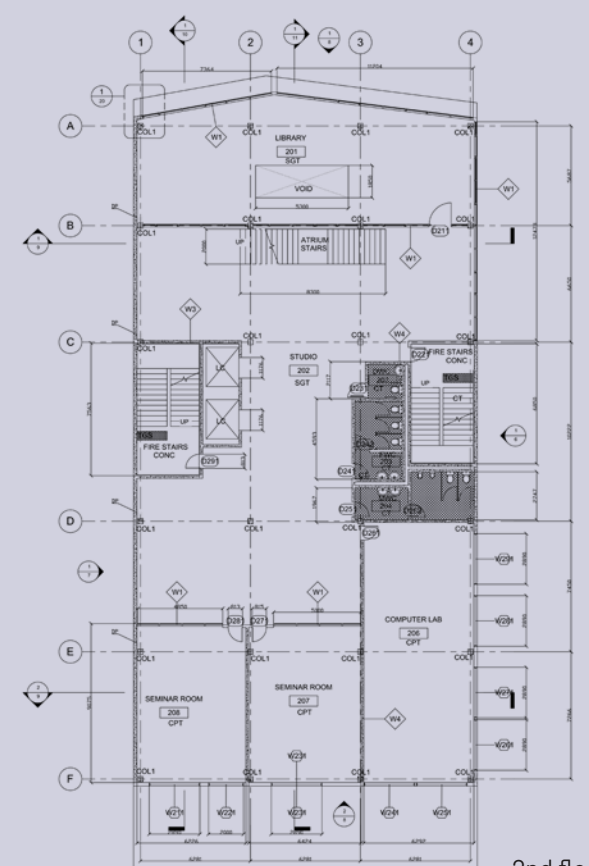
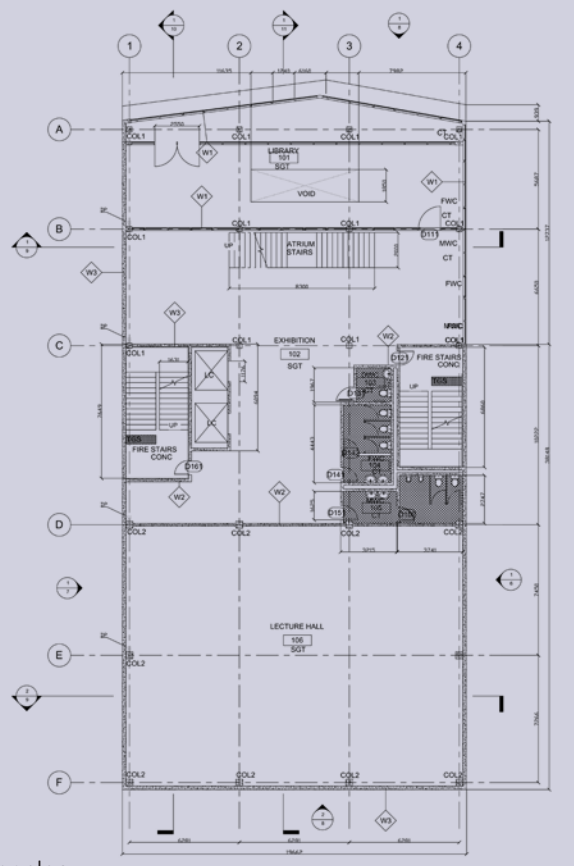


Basement plan

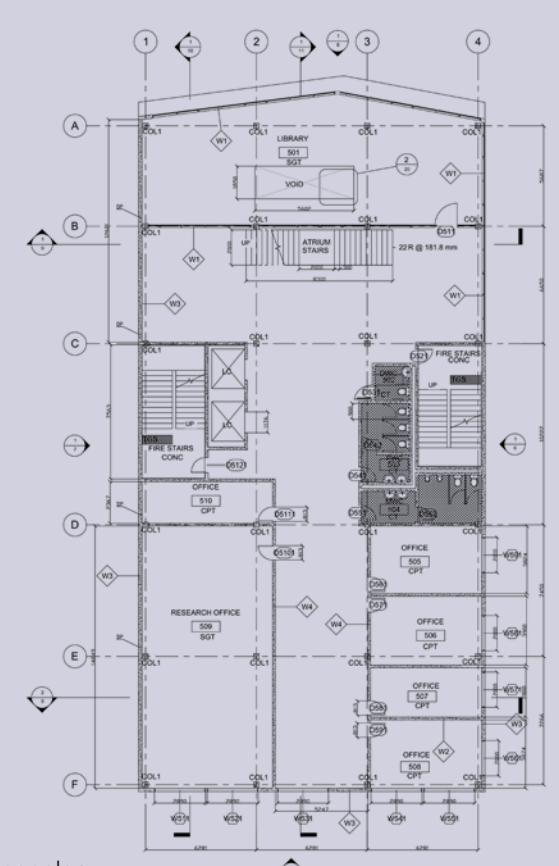
Ground floor plan

3rd floor plan

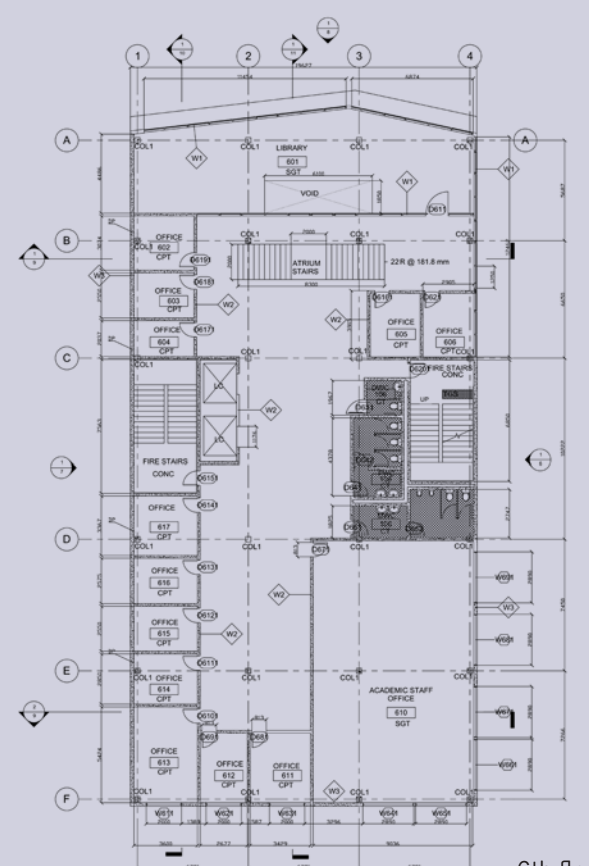
4th floor plan



2nd floor plan

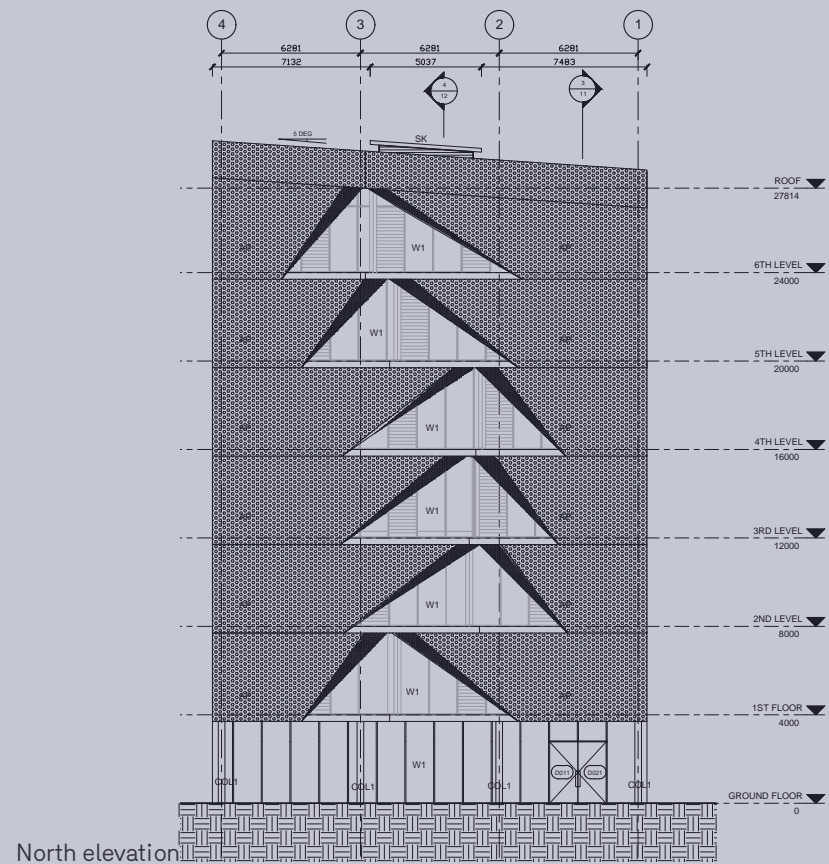


5th floor plan

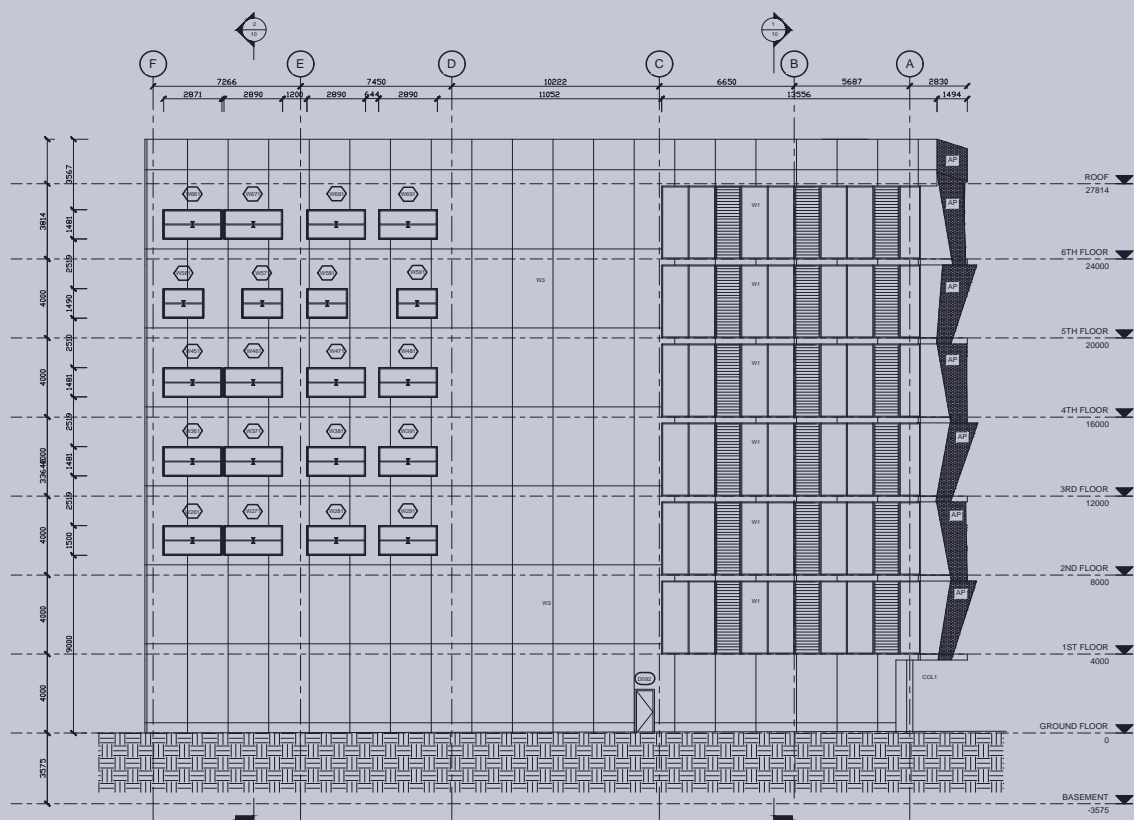


6th floor plan

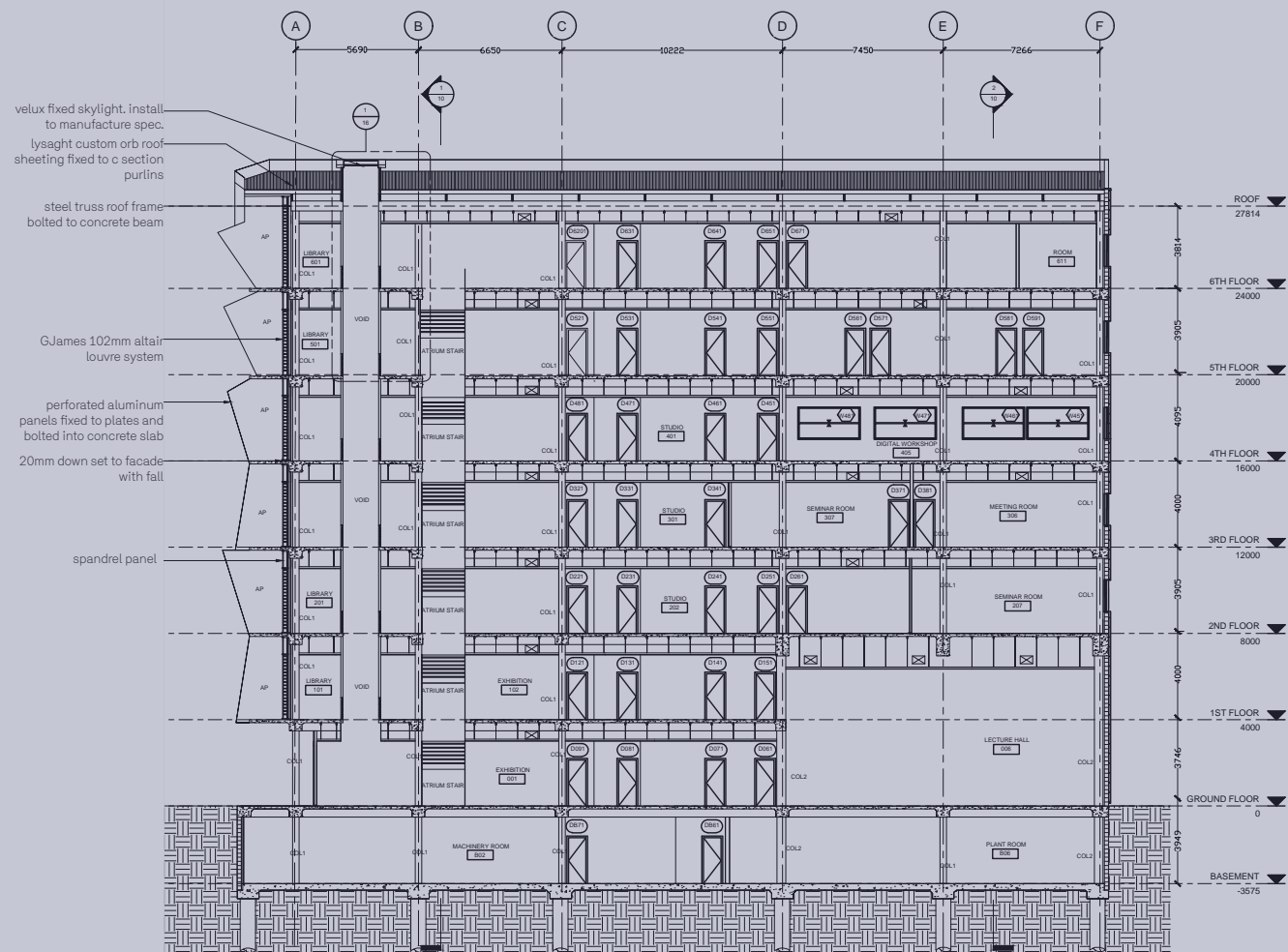
1st floor plan



North elevation

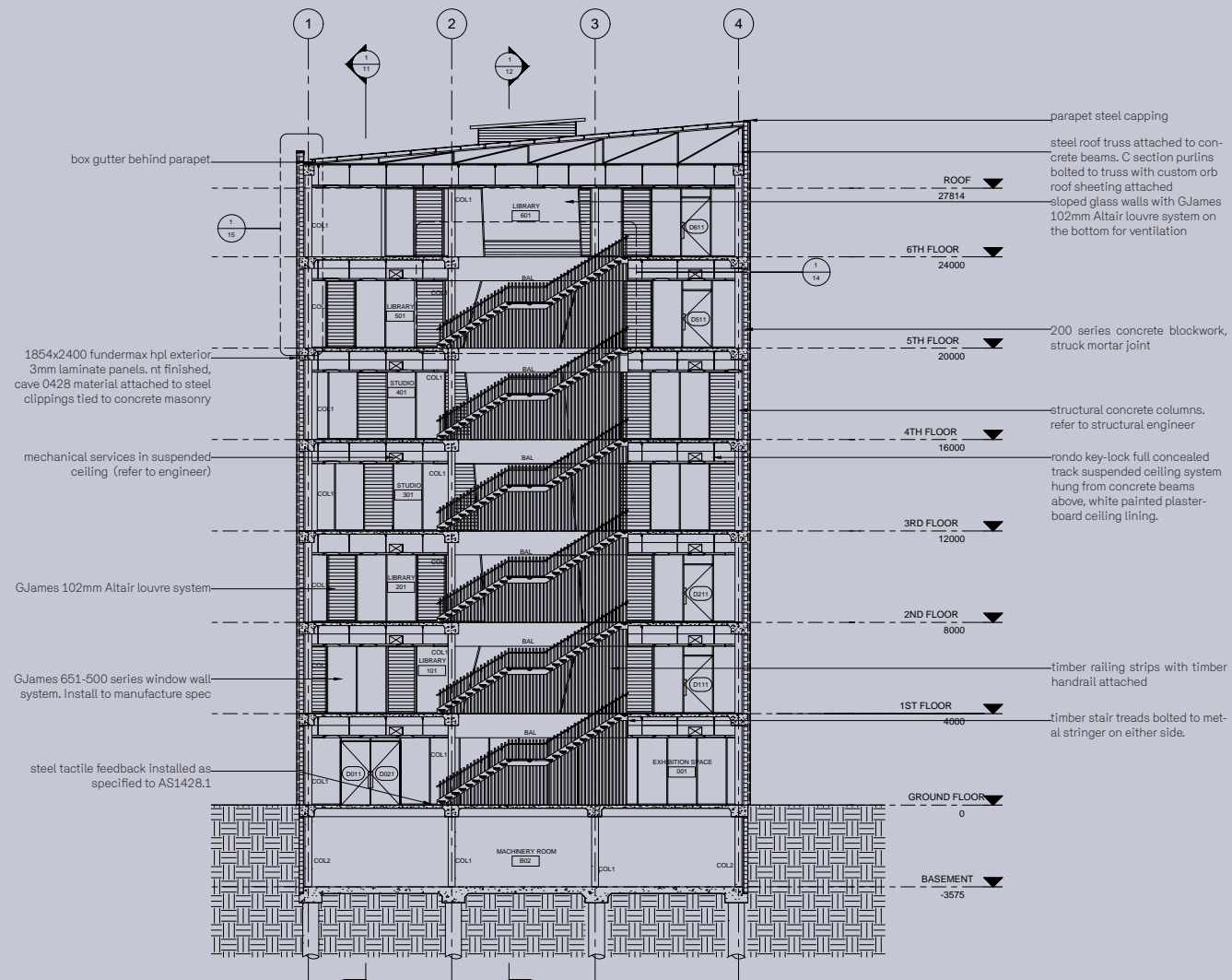


East elevation

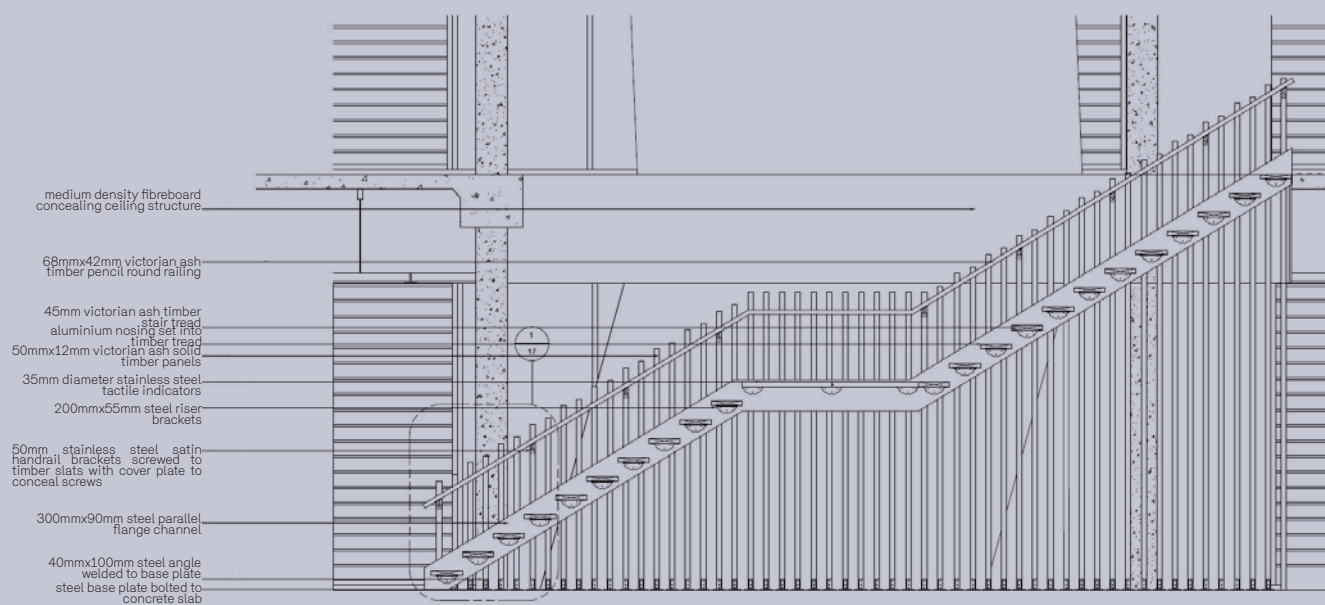


SECTION 4

- velux fixed skylight, install to manufacture spec.
- lysaght custom orb roof sheeting fixed to c section purlins
- steel truss roof frame bolted to concrete beam
- GJames 102mm attic louvre system
- perforated aluminum panels fixed to plates and bolted into concrete slab
- 20mm down set to facade with fall
- spandrel panel



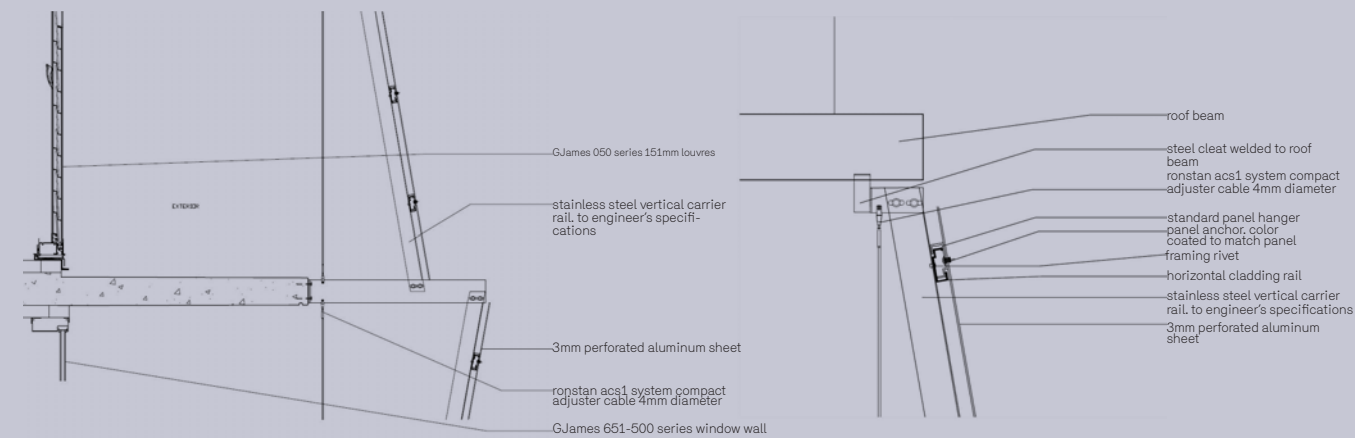
Section 1



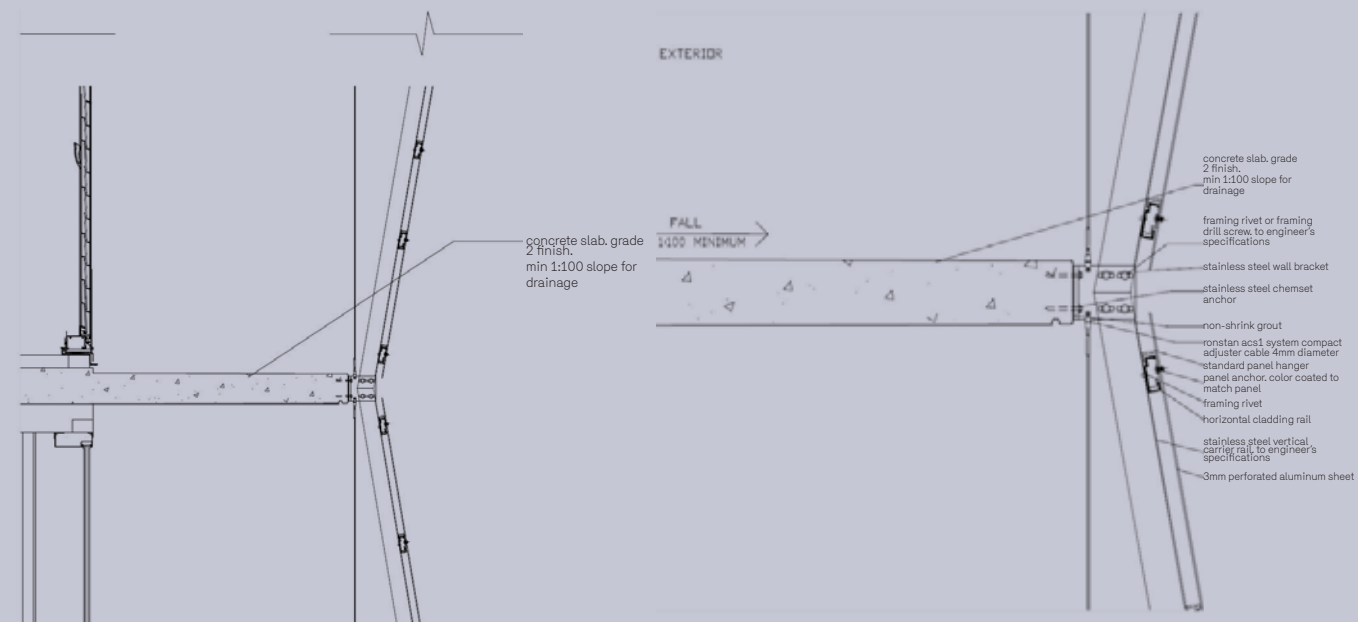
Stair detail

- parapet steel capping
- steel roof truss attached to concrete beams. C section purlins bolted to truss with custom orb roof sheeting attached
- sloped glass walls with GJames 102mm Altair louvre system on the bottom for ventilation
- 200 series concrete blockwork, struck mortar joint
- structural concrete columns. refer to structural engineer
- rondo key-lock full concealed track suspended ceiling system hung from concrete beams above, white painted plaster-board ceiling lining.
- timber railing strips with timber handrail attached
- timber stair treads bolted to metal stringer on either side.

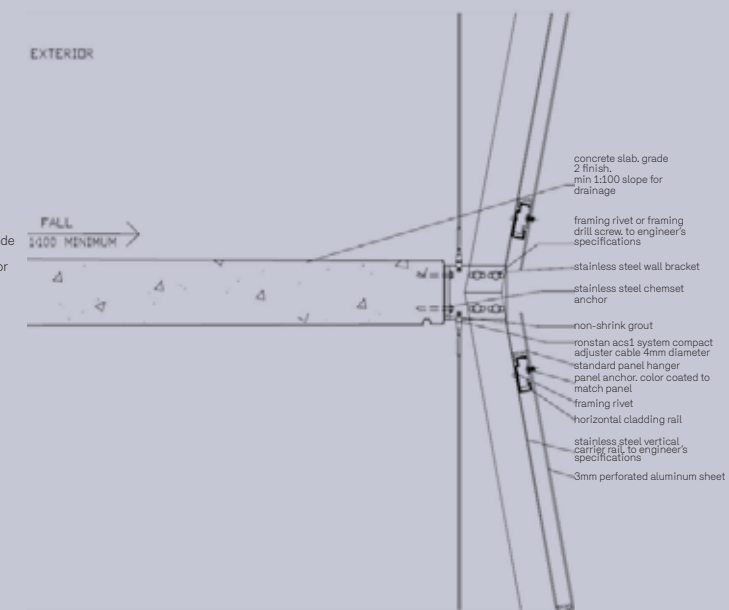
- box gutter behind parapet
- 1854x2400 fundermax hpl exterior 3mm laminate panels, nt finished, cave 0428 material attached to steel clippings tied to concrete masonry
- mechanical services in suspended ceiling (refer to engineer)
- GJames 102mm Altair louvre system
- GJames 651-500 series window wall system. Install to manufacture spec
- steel tactile feedback installed as specified to AS1428.1



Roof to shading detail



Facade section Detail



Floor to shading detail

- concrete slab, grade 2 finish, min 1:100 slope for drainage
- framing rivet or framing drill screw to engineer's specifications
- stainless steel wall bracket
- stainless steel chemset anchor
- non-shrink grout
- ronstan acs1 system compact adjuster cable 4mm diameter
- standard panel hanger panel anchor, color coated to match panel
- framing rivet
- horizontal cladding rail
- stainless steel vertical carrier rail, to engineer's specifications
- 3mm perforated aluminum sheet

Miscellaneous

Woodworking



Under the tree (Architectural Association)



&Proud LGBTIQ Festival



The project is to create a public installation using bamboo for the &Proud "Yangon Pride" LGBTIQ festival.

Four bamboo paraboloids were used as the main basis of the design to represent the idea of creating a curved form which emerges from a rigid square of straight bamboo members, celebrating the juxtaposition of contrasts.

The project brief is creating a "medium to experience the contradictions and complexity of the clearing in relationship to its immediate surroundings."

By focusing on the boundary of man-made conifer patch and a neglected clearing, we seek to amplify perception of the differences between both spaces in order to create an embodied appreciation of the intricacy of the fabric of life.

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