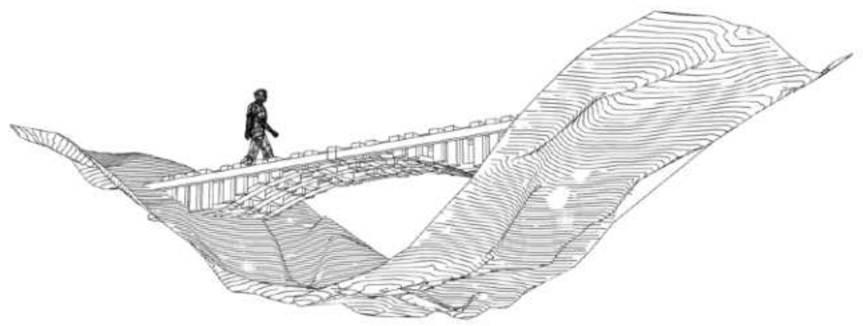
2024

PORTFOLIO

RACHITA VISWANATH COLUMBIA GSAPP I M.S.A.A.D

Academic Arguments, Investigations & Inquiries



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As a student and researcher, I have always sought cues from the natural, cultural and economical context of a place, before theorising transformative interventions. My work aspires solutions that are committed to seeking a balance between sustainability, viability and social equity. Architecture enables my pursuits; it helps me approach these intersections with awareness and responsibility.

Over the past year at GSAPP, I've crossed a subtle yet significant threshold. The experience has moulded me into a conscientious, forward-thinking, and empathetic young architect, refining my ability to approach design issues with certainty and open-mindedness. It's blurred the lines in my thinking, unveiling the political implications that my decisions can bear.

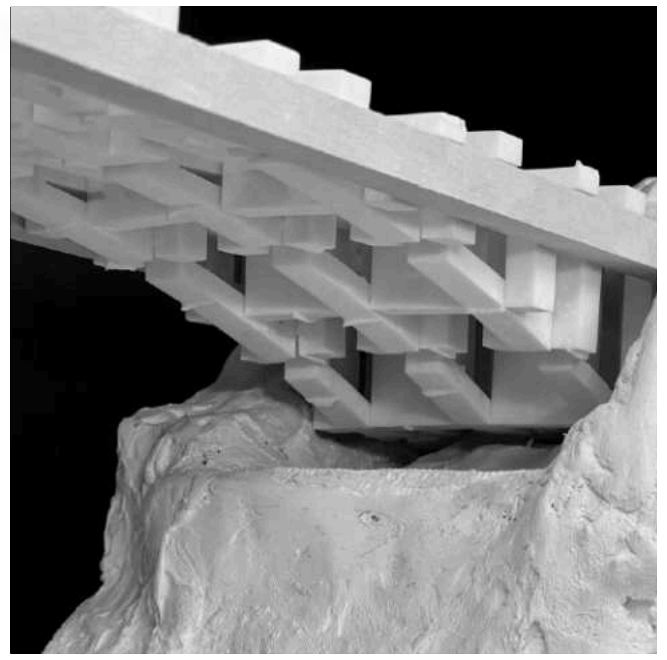
AKNOW LEDGEMENTS

I would sincerely like to thank my mentors & colleagues, who gave every inquiry the privilege of a discourse. I'm grateful for every patient response that has entertained, enlightened and enriched my perspective. Thank you.

SELECTED WORKS I CONTENT

All academic work in this document has been created individually, unless mentioned otherwise. All team members, resources and collaborators have been adequately cited and credited. All work exhibited in this document has been created by me, or exhibits a considerable amount of my creative inputs & contributions.

01



(IM)PERFECTJOINTS

Studio : Stone Matters
Inquiry : Material Research, Construction Strategies

Mentor : Elias Anastas & Yousef Anastas
Team: Abdullah Maddan, Foteini Kallikouni

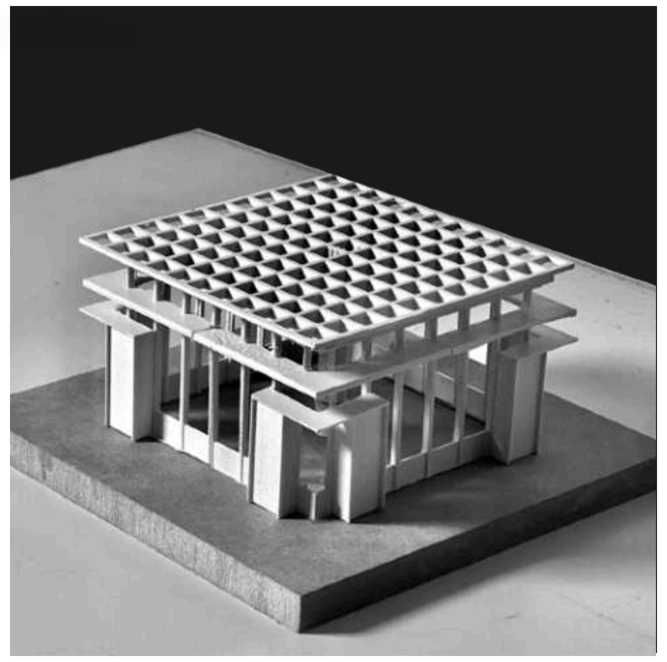
02

MAISON SERRAGO

Studio : Design for Disassembly
Inquiry : Biogenic Material Study, Module Assemblage

Mentor : Gordon Kipping
Team: Aashka Ajmera

03



EICHLER EVOLUTION

Studio : Architecture : A Reality Stranger than Fiction
Inquiry : Innovation, Single Family Housing
Mentor : Michael Bell

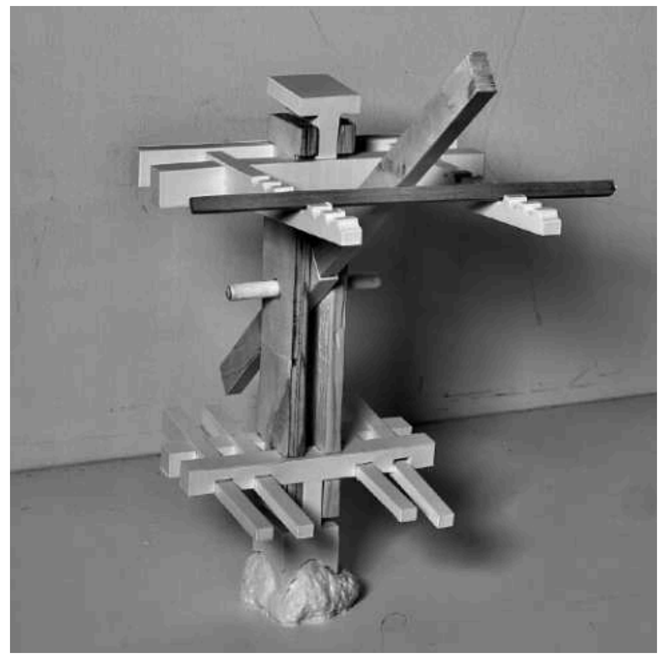
04

METATOOLS

Studio : Computational Tech
The Imagination Project : Accessing Spatial Memory with AI & Projection Mapping

Mentor : Dan Taeyoung
Team: Aditya Mehta

05



COLLECTIVE ASSEMBLIES

Studio : Computational Tech
Inquiry : Biogenic Material Study, Scripting Vernacular joineries

Mentor : Danniely A. Staback Rodriguez
Team: Raymond, Yake, Yunhao

06

SEMINAR OF SECTIONS

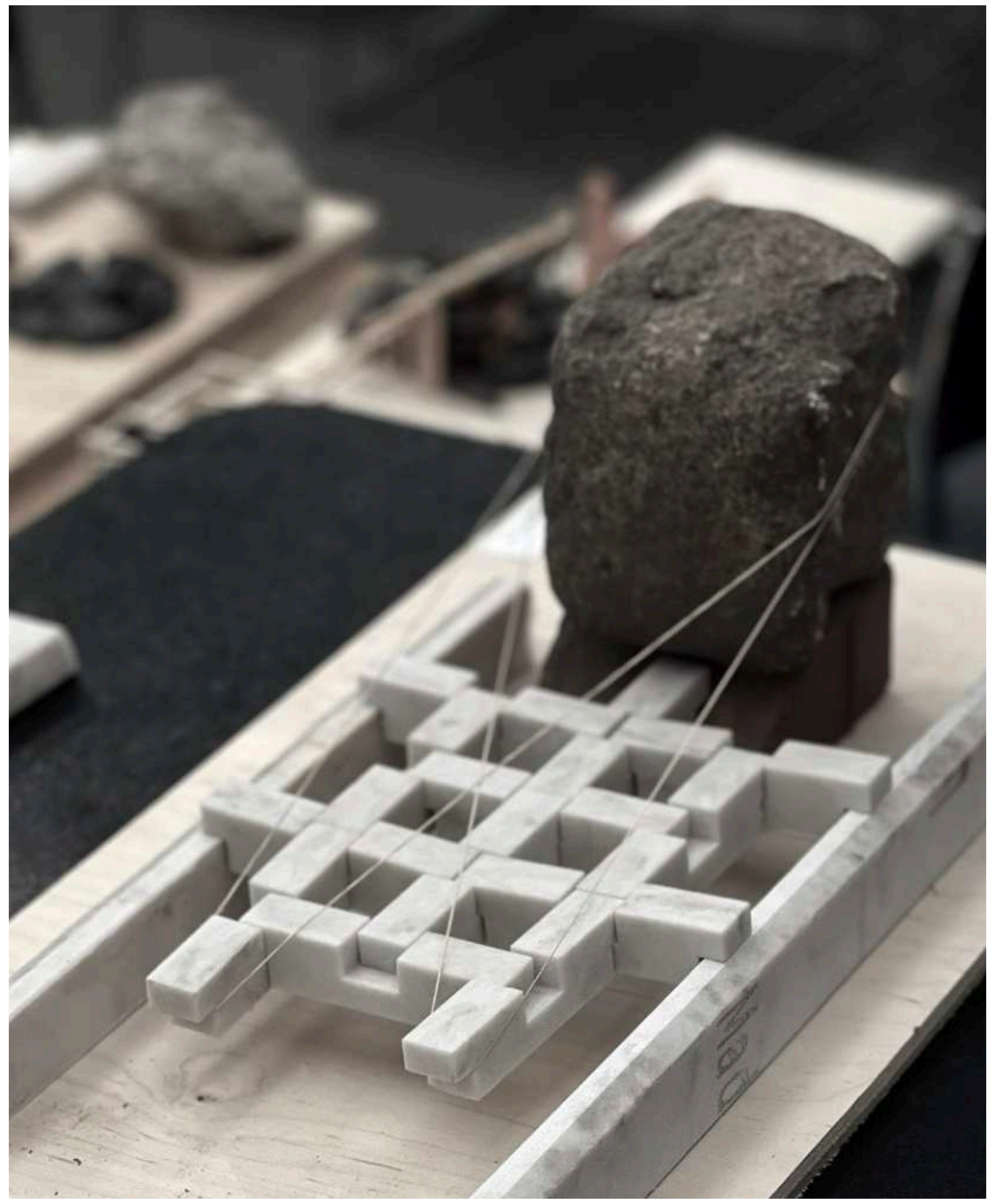
Studio : Building Tech
Project : A School in Yavatmal
Architect : Studio for Environment & Architecture, Mumbai

Mentor : Marc Tsurumaki

01 (IM)PERFECTJOINTS

STONE MATTERS

PROJECT TYPE	Material Research, Construction Strategy
STUDIO	AAD Studio, MSAAD, GSAPP
DURATION	Summer Semester; June-August 2023
MENTOR	Elias Anastas & Yousef Anastas
TEAM	Abdullah Maddan, Foteini Kallikouni

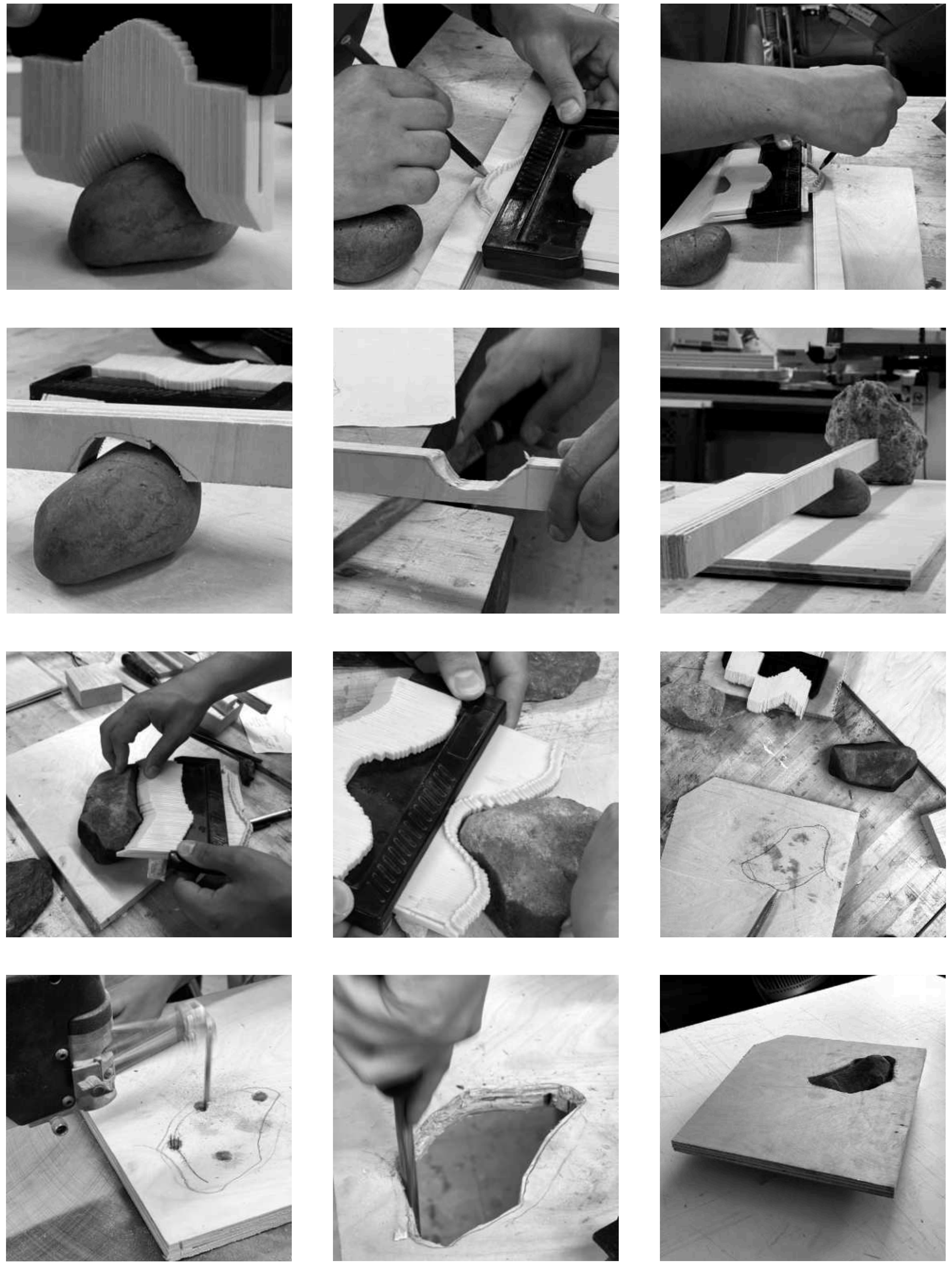


THE BRIEF

The "Stone Matters" studio builds upon an ongoing experimentation-based research into the potential for including structural stone in the language of contemporary architecture, and for combining traditional craftsmanship and materials with innovative construction techniques.
The studio will envision explorative leads on the use of stone that stem from the transdisciplinary and transversal understanding of the use of the material

KEY OBJECTIVES

The (Im)perfect Joint : Fascinated by stone and its different degree of refinements, we wished to device joineries that emerge from their interaction. From the natural rough stone to the most refined piece of marble, each geometry brought with it a unique set of structural properties. Natural roughness has its limitations. without the introduction of stereotomic cuts or binding agents such as mortar, stone assemblies can't be contained within controlled forms. Devising **Low-tech strategies** that embrace the imperfections of stone & irregularities of rough terrains. **Stereotomy** - or the art of cutting stones in specific shapes in the aim of assembling them in larger configurations - is central to the understanding of stone architecture.



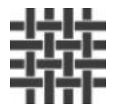
EXPERIMENTS

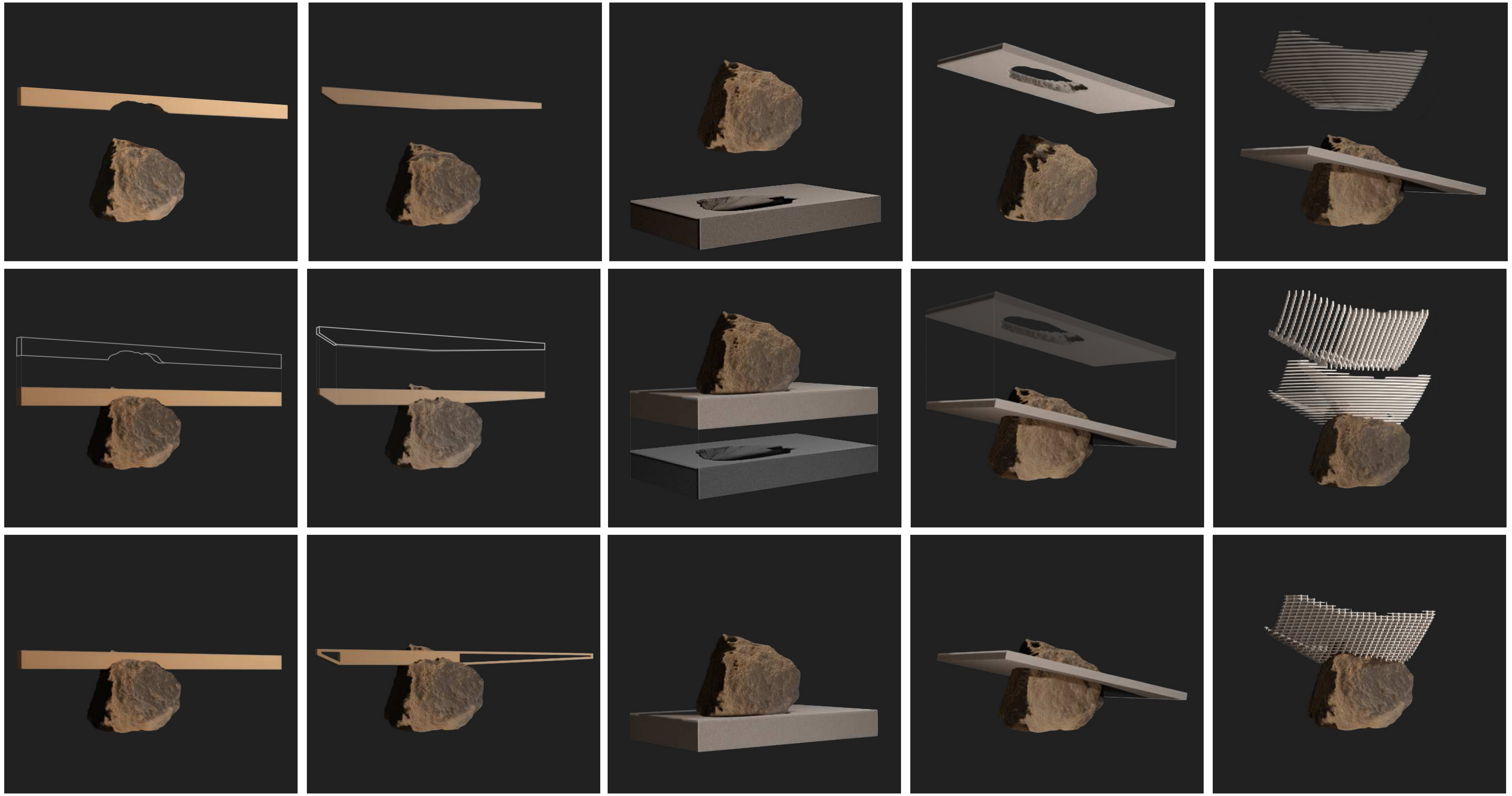
Preliminary experiments revealed a collaborative structural camaraderie between the two materials. The stone in its compressive strength and roughness, hosts the refined light-weight timber that performs in tension. The roughness also intuitively adds structural stability by performing as a counter-weight in cantilevering systems.

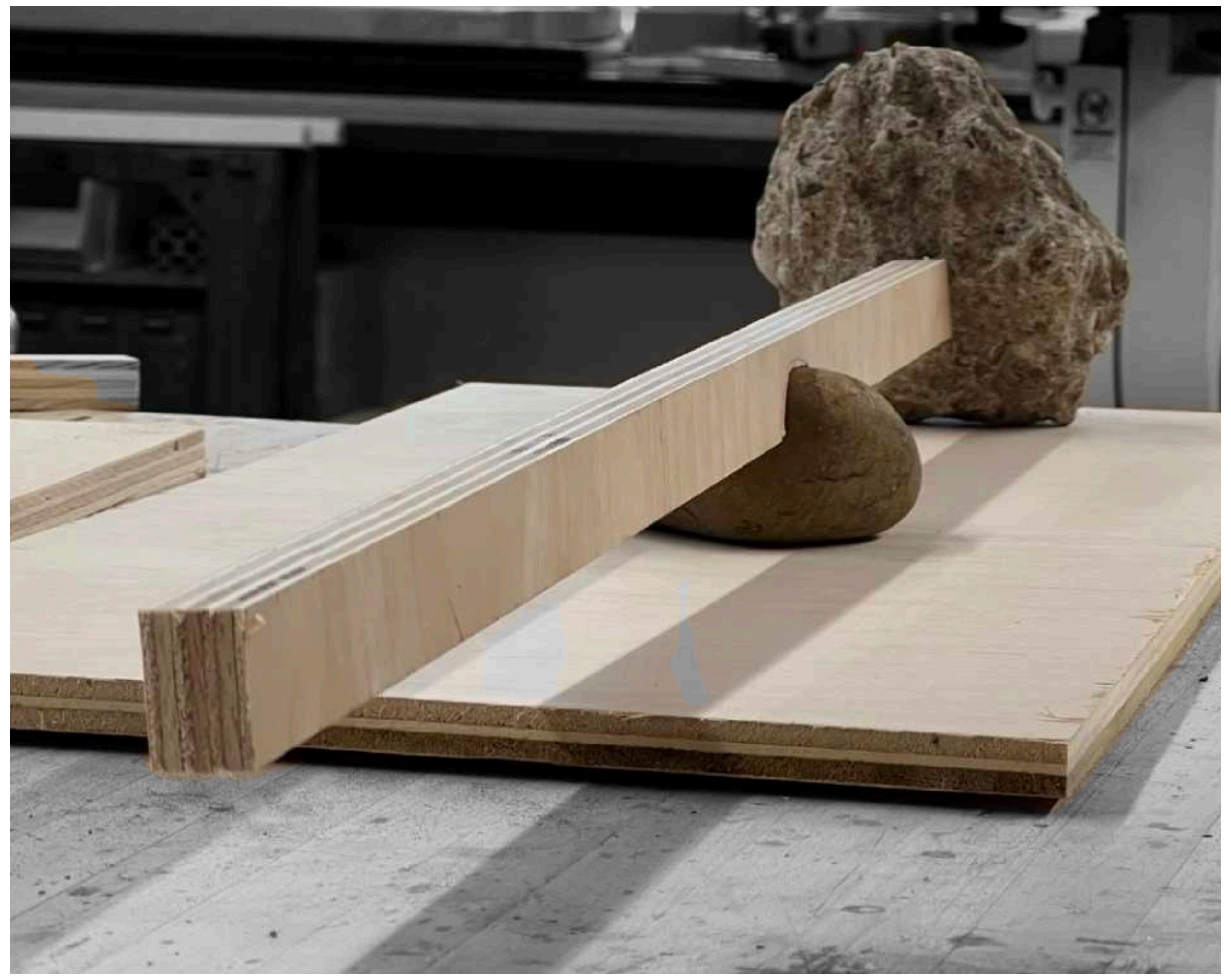

A
Roughness carved into the refined

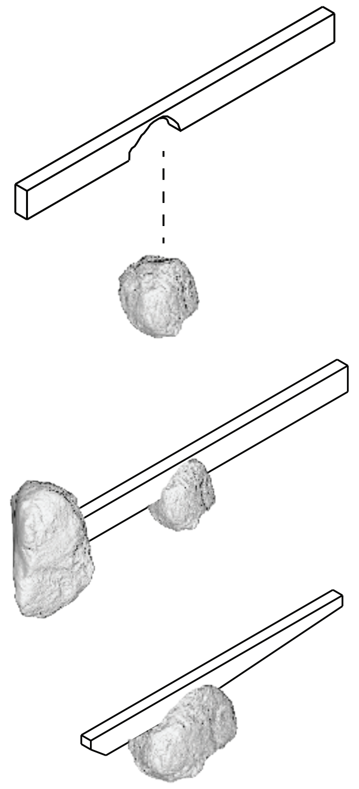

B
Roughness carved with the refined


C
Roughness cast at compression points


D
Reciprocal Weaving



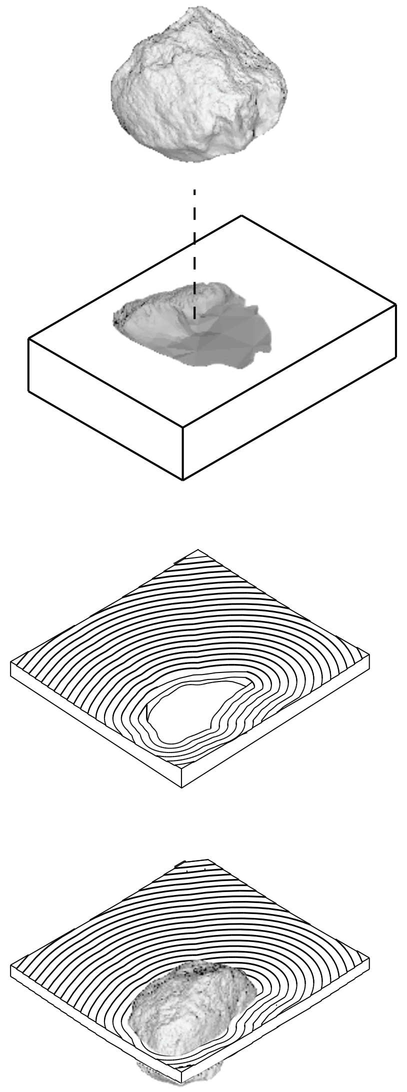


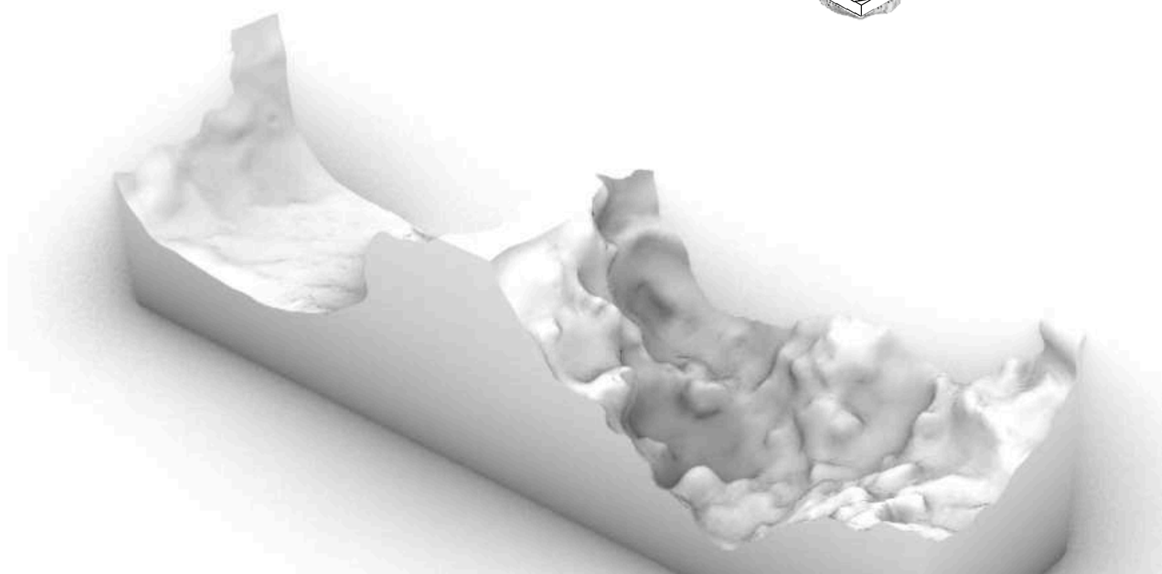


Roughness of the stone carved into the refined geometry : using stone's irregularities to provide compressive strength to cantilevering refinements.

Roughness of the stone carved with the refined geometry : chiseling the rough stone and the refined geometry to optimise the load distributions.

Roughness of the stone cast at compression points: adaptive stereotomy facilitated by volumetric mappings

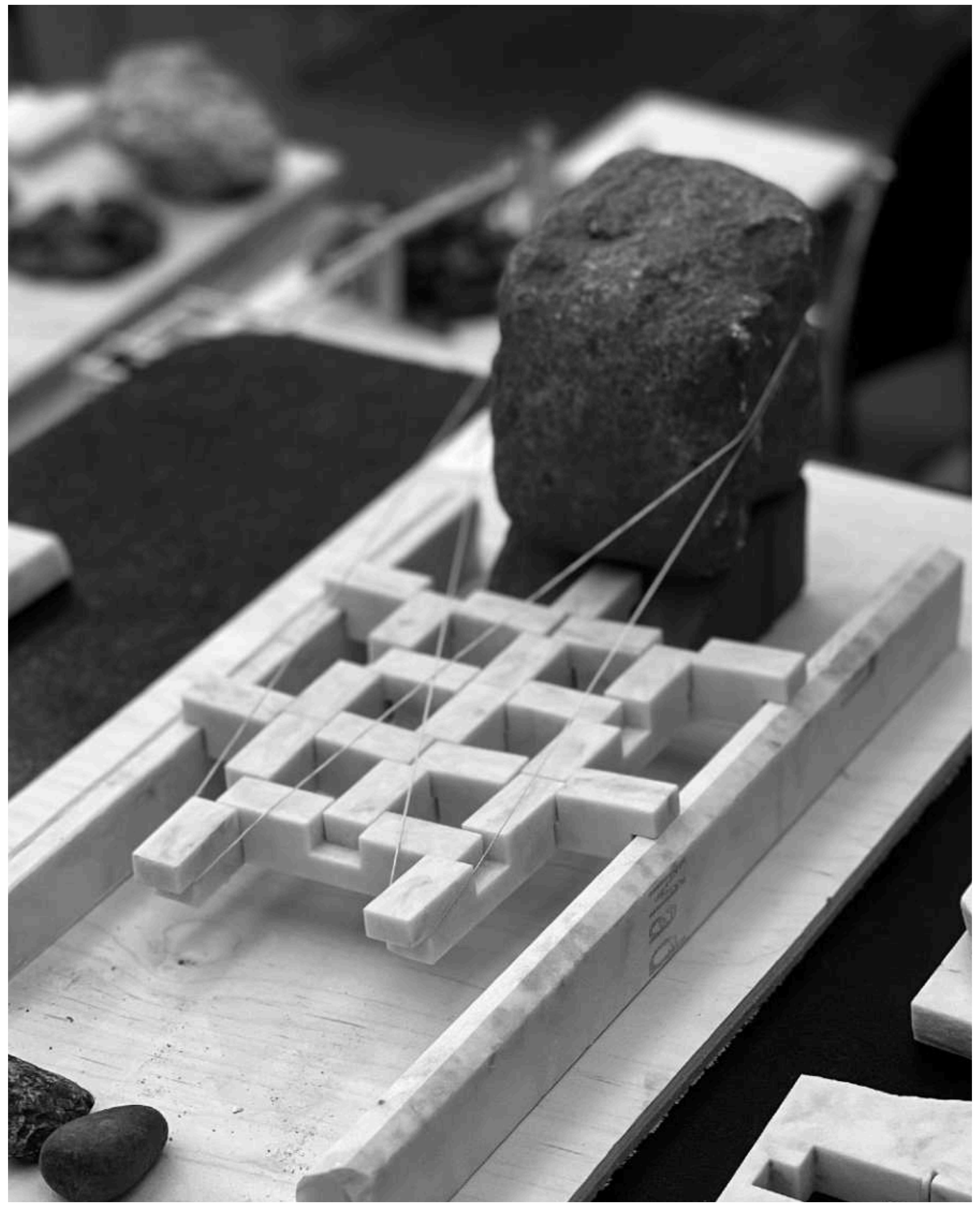


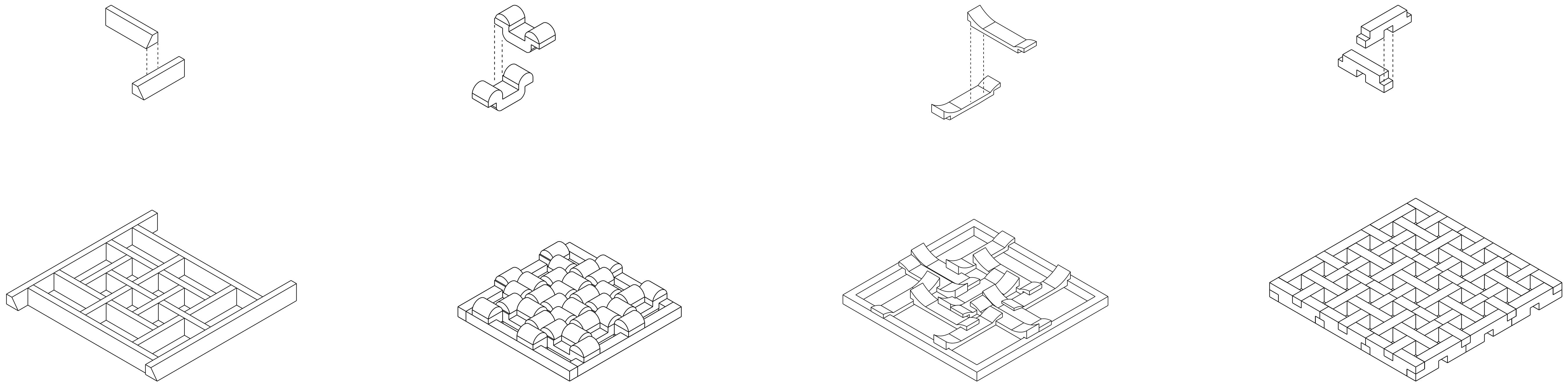


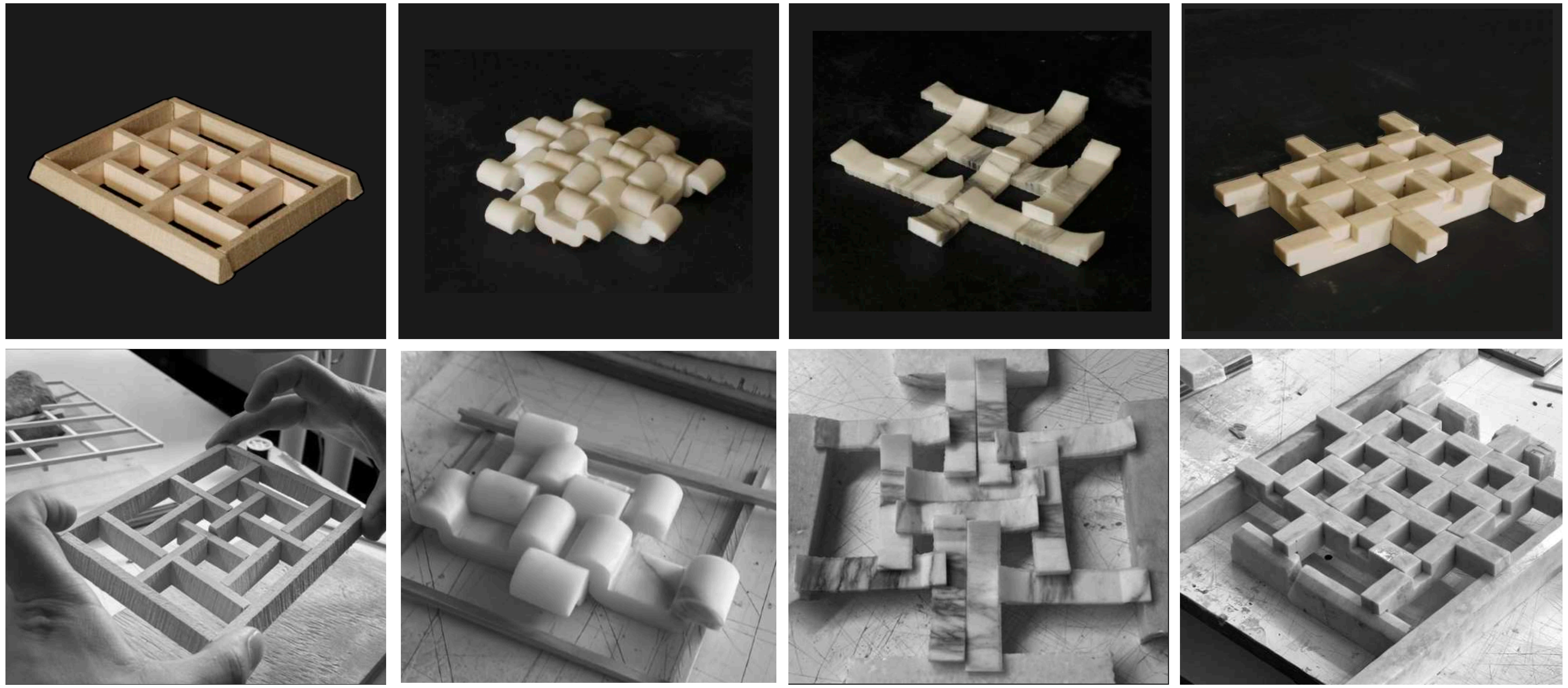
Stone was 3D scanned, and its negative was carved into wood with a CNC script.

Reciprocal Weaving

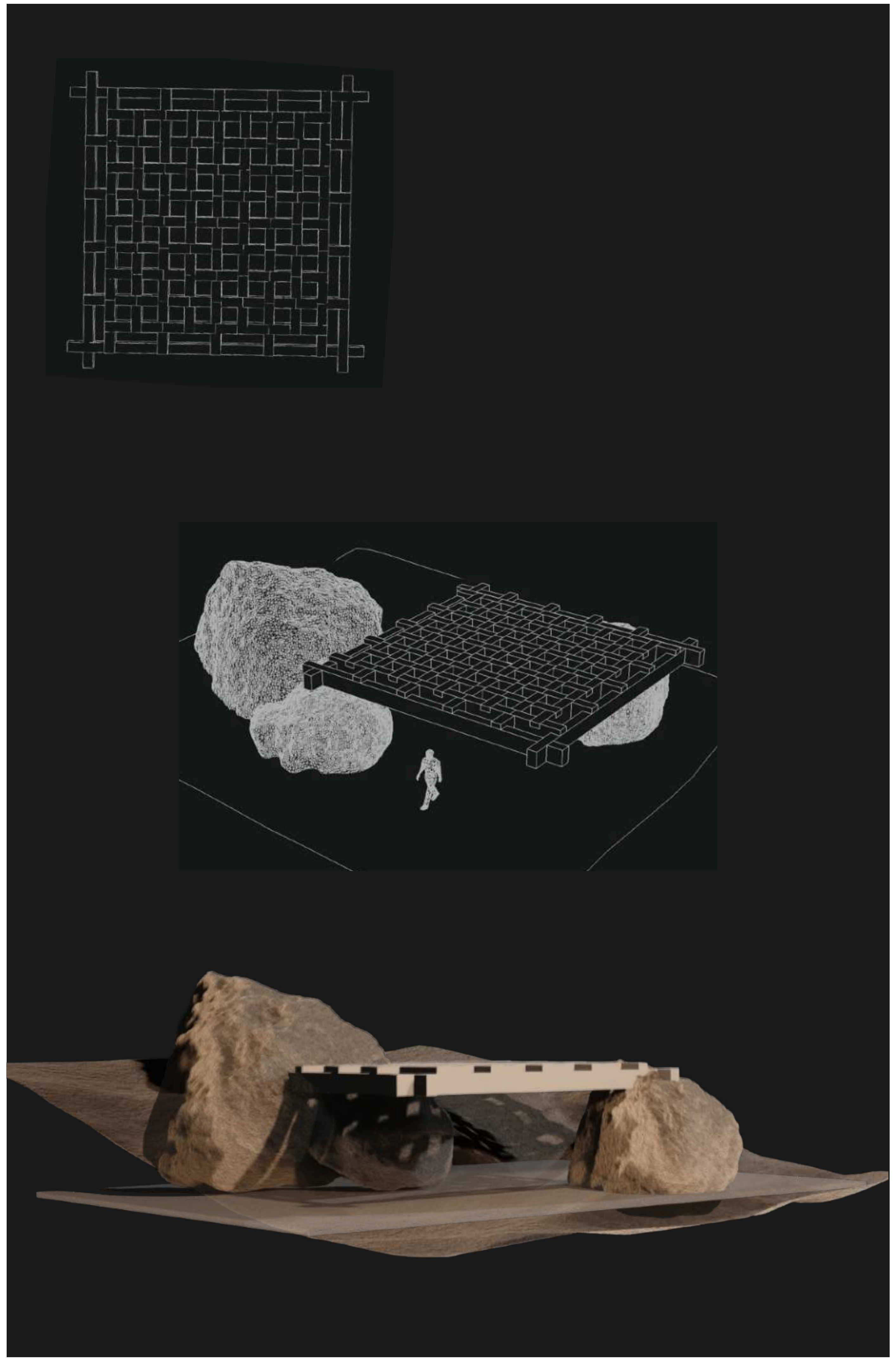
A Stereotomic reciprocal system devices modular geometries that help stones compressive strength perform in tension. A series of simple reciprocal members were two dimensionally cut in marble and tested.

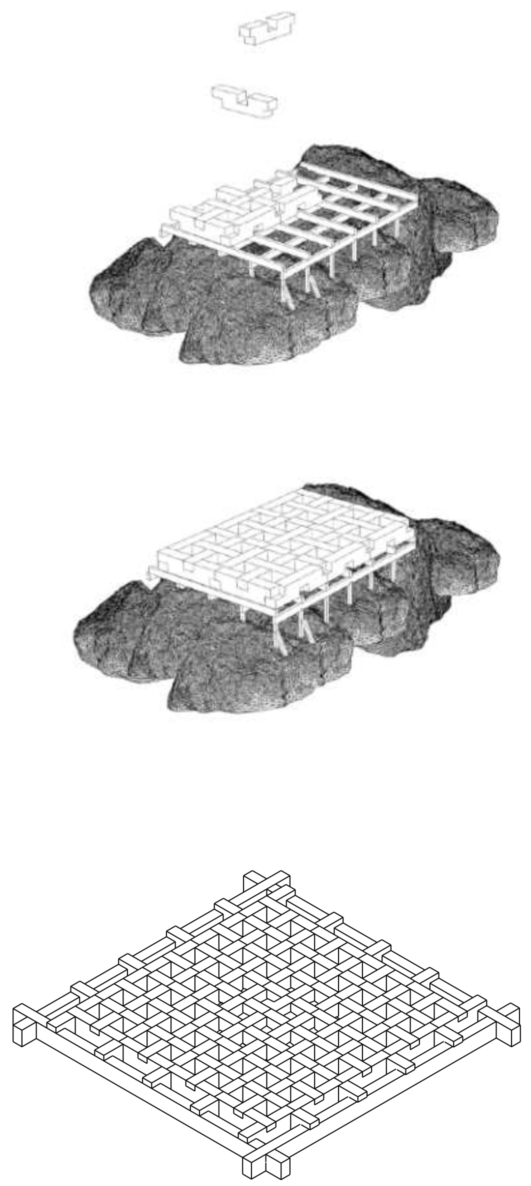






THE SLAB





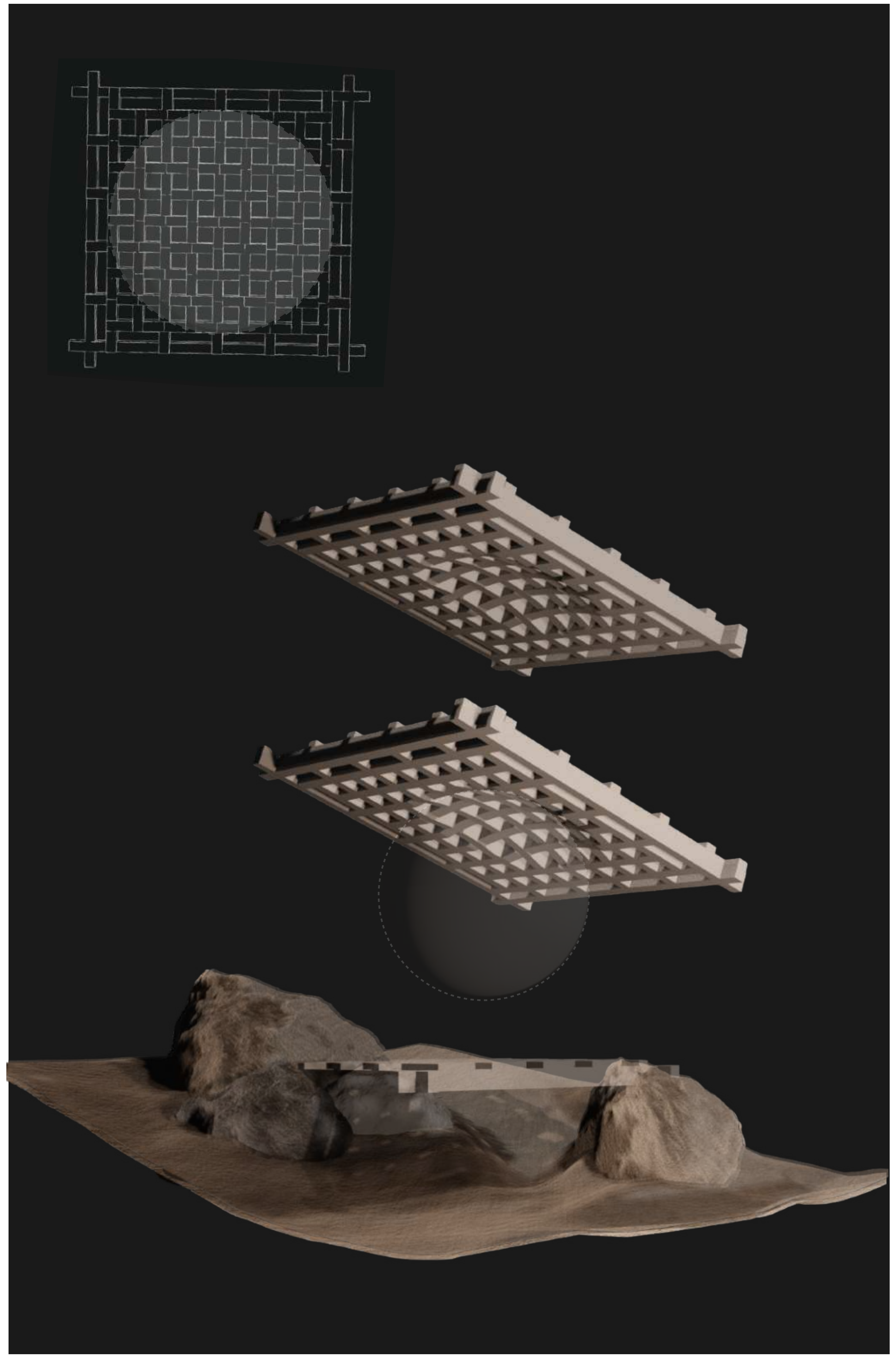
A

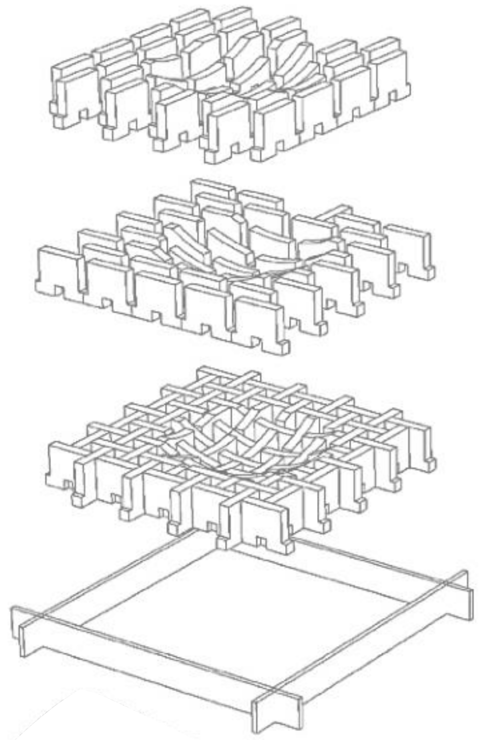
Number of modules 1

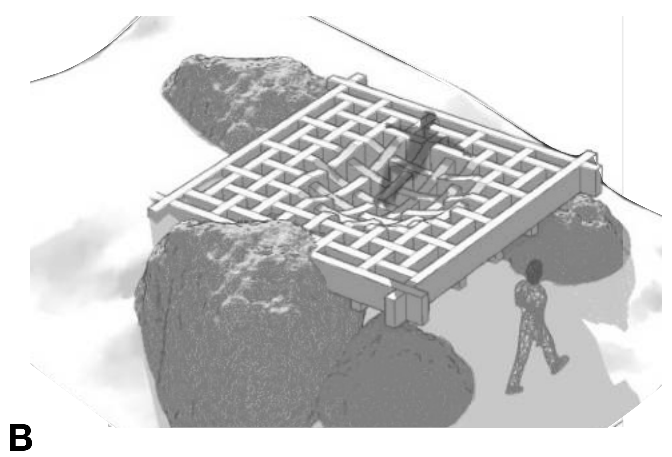
The Slab Assembly, aspires to aid quick and effective construction in erratic/undulating terrains. The typical Reciprocal member is designed to rest its load on two members, and receive the load of two others.

The Irregularities of the Rough stones serve as a framing component for the slab, that modular members are woven into tight weave, canopying over the trench below,

THE SLAB





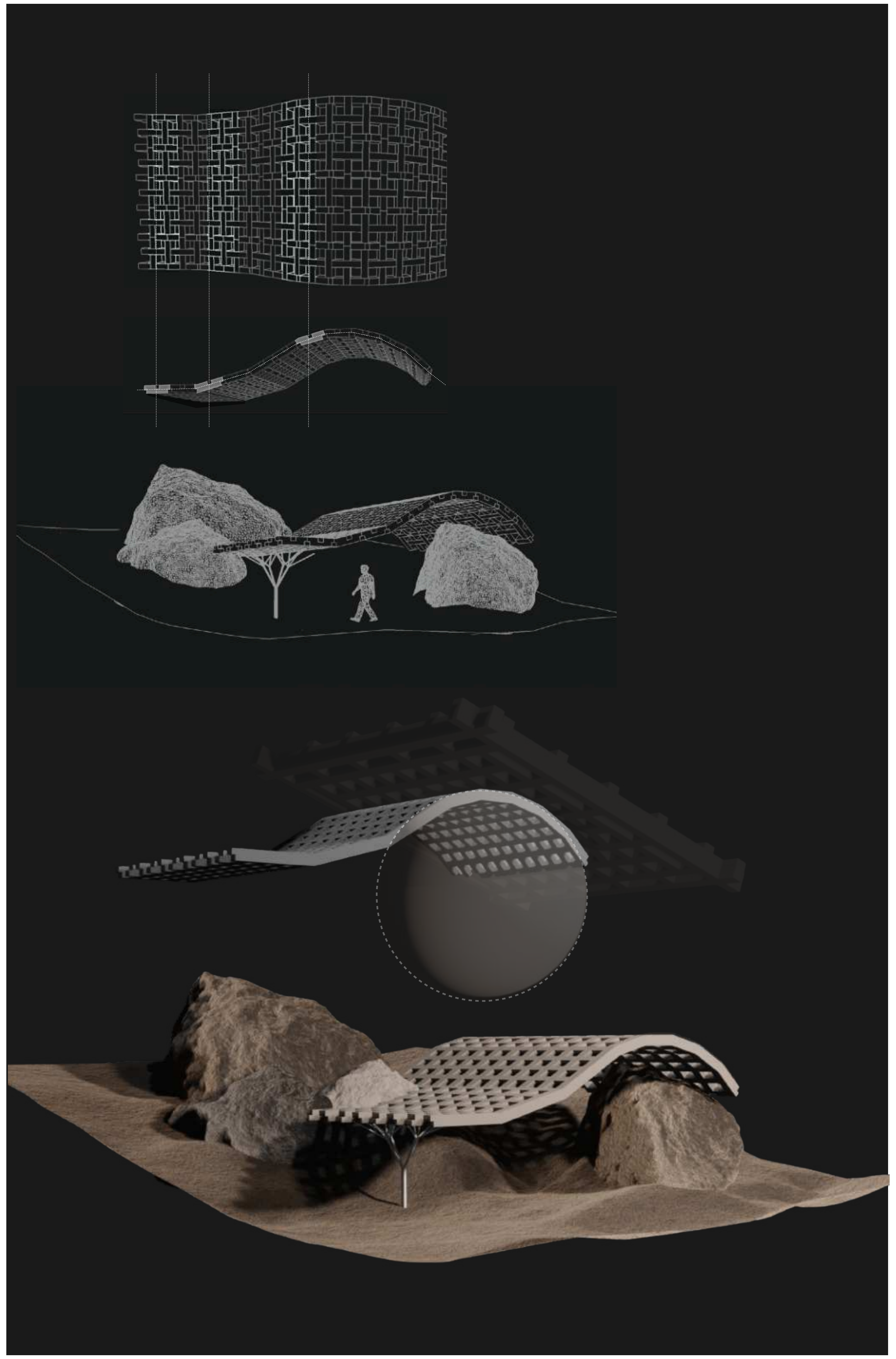


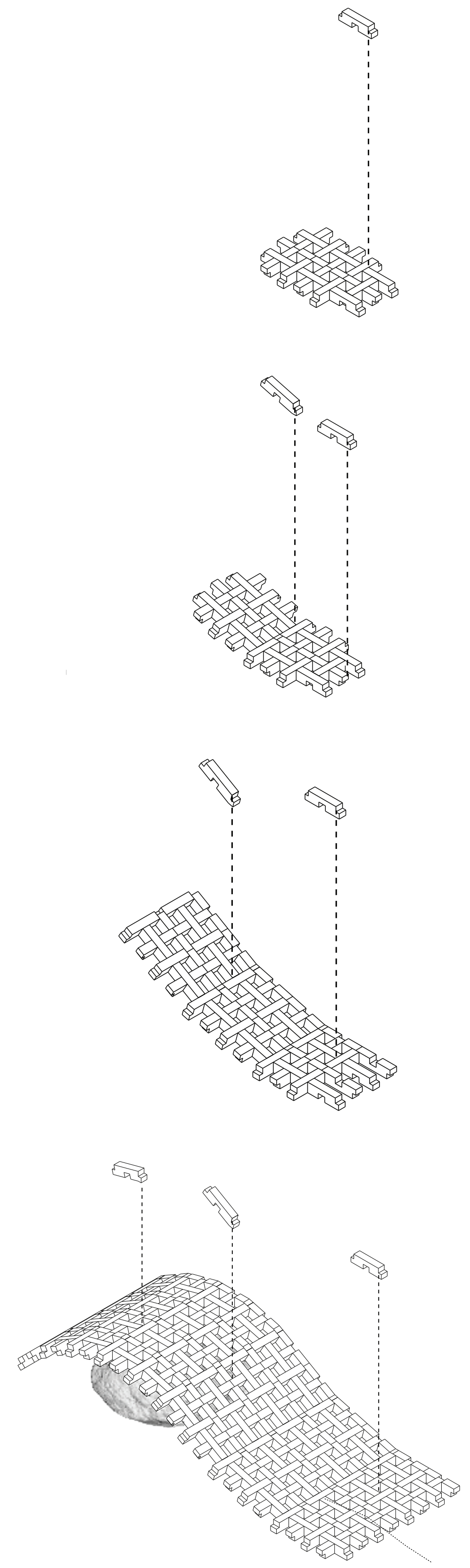
B

Number of modules 1+12

The Depth of the Reciprocal member can be carved into, volumes can be scooped out of the assemblage, prefabricated to precision.

THE SLAB

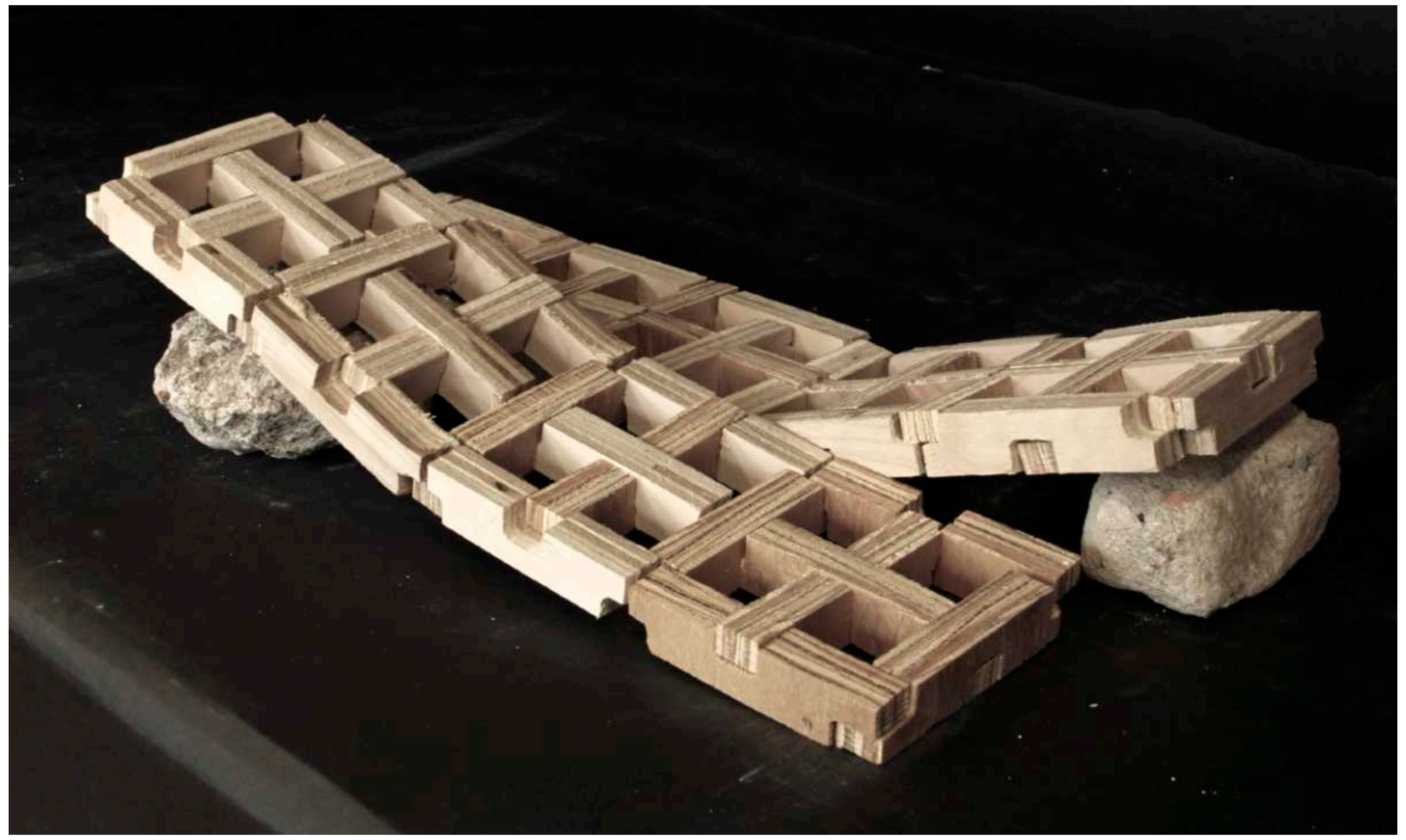


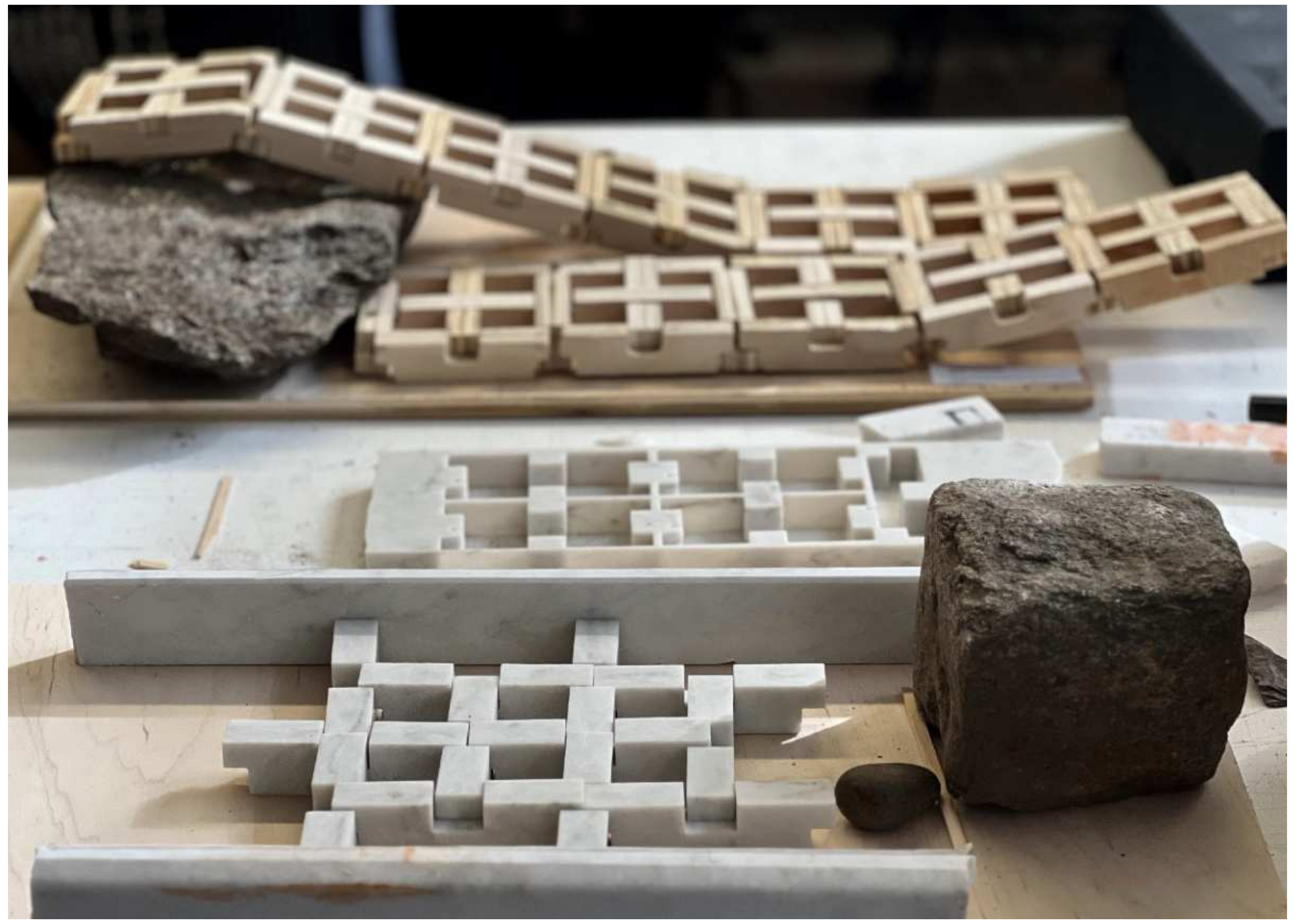


C

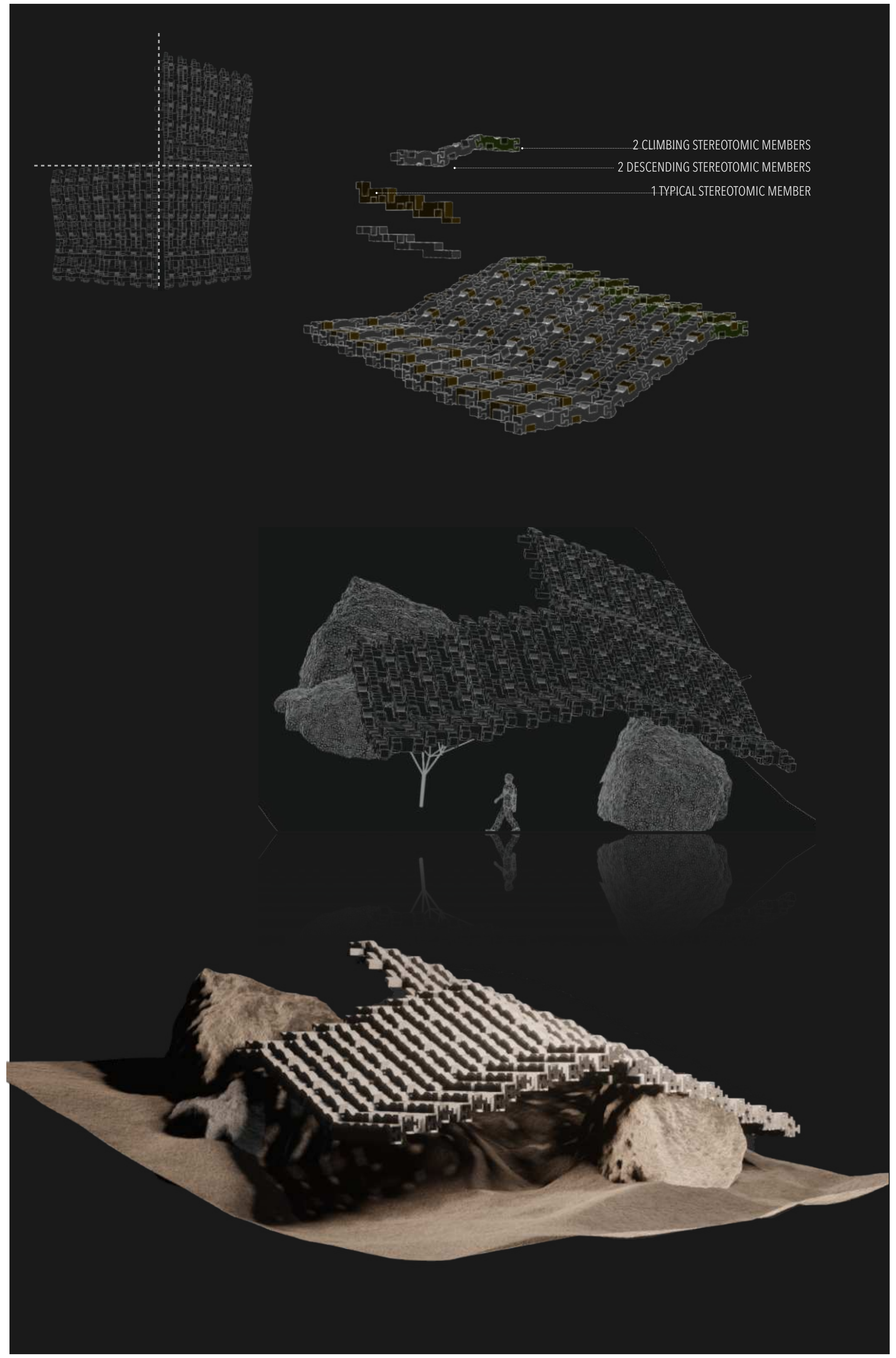
Number of modules 1+1+1

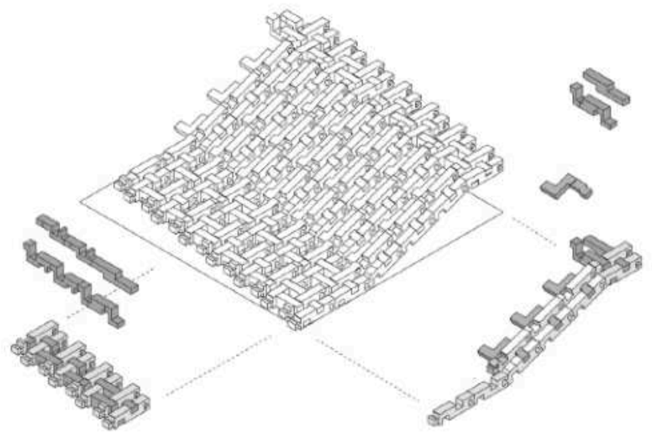
The Stereotomic geometry of the typical weaving member can be modified into 3 variables. Each responsible for changing angles in one axis.





THE SLAB



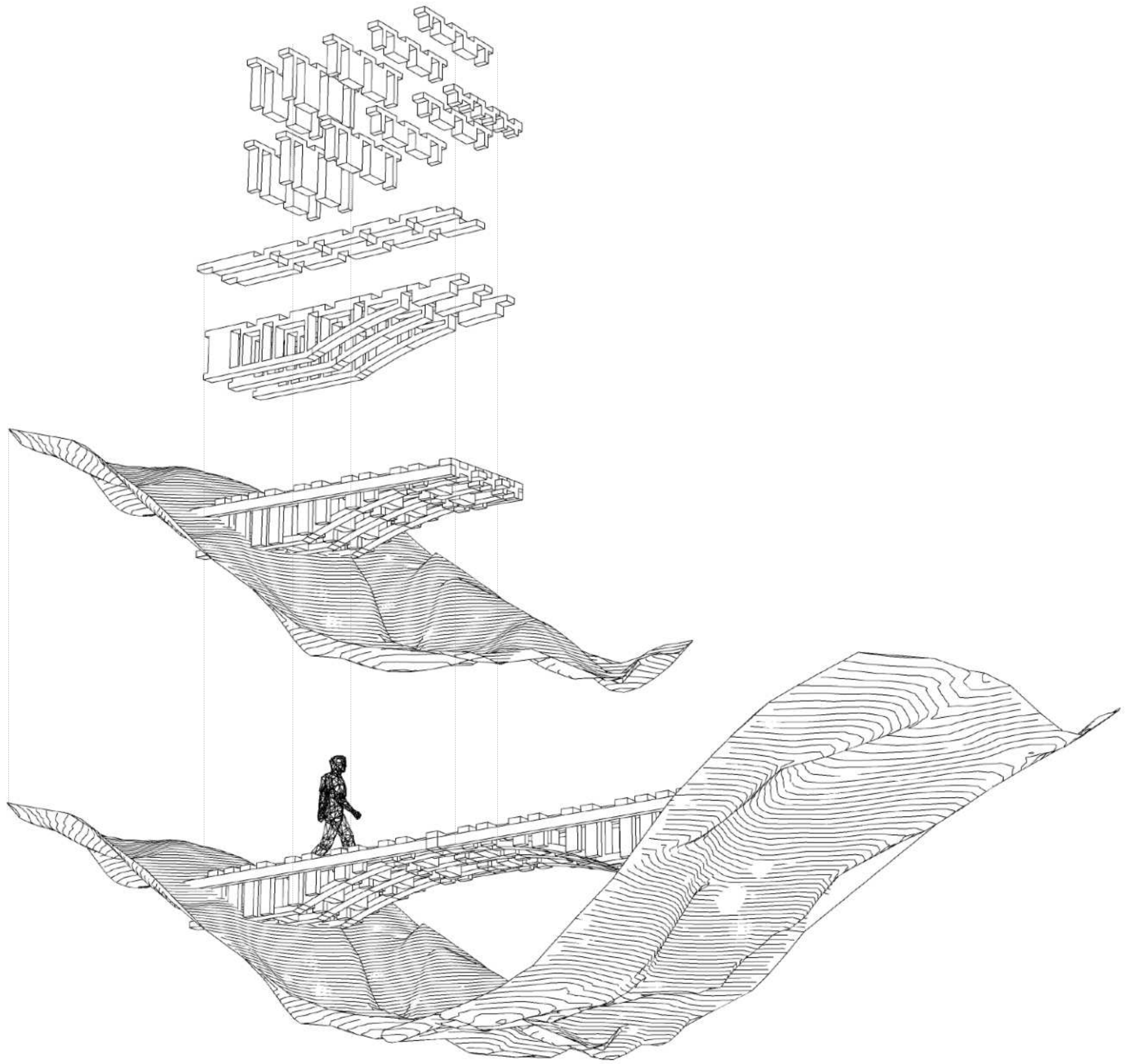


D

Number of modules 1+2+2

The Stereotomic geometry of the typical weaving member can be modified into 5 variables. Each responsible for changing angles in both axis'.

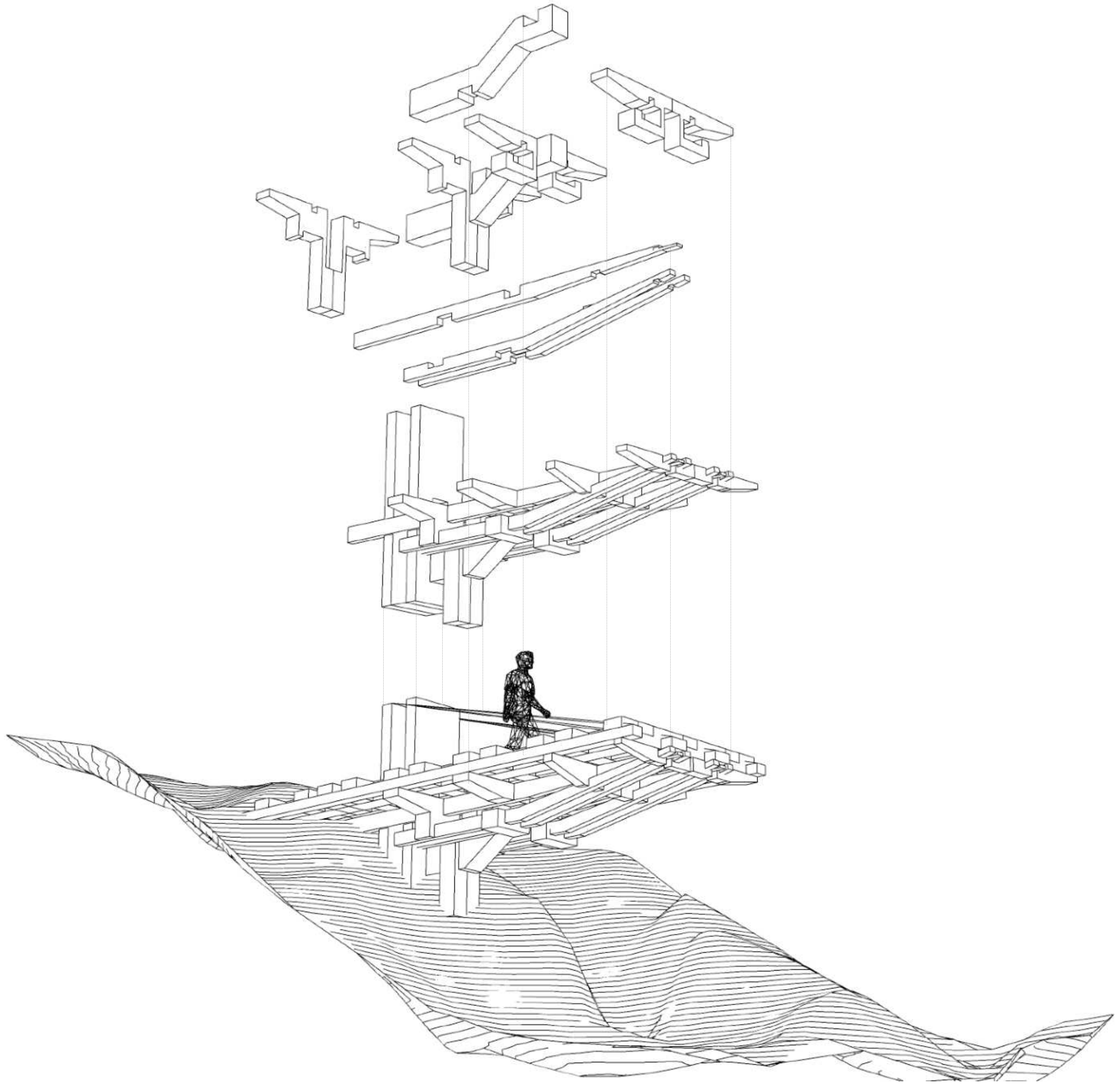
The Climber: is a DIY strategy for irregular terrains, with a kit of parts that include 4 to 5 modular members.
These can be intuitively or computationally determined. Adaptive to terrains, meandering into easily constructible accessiblity pathways

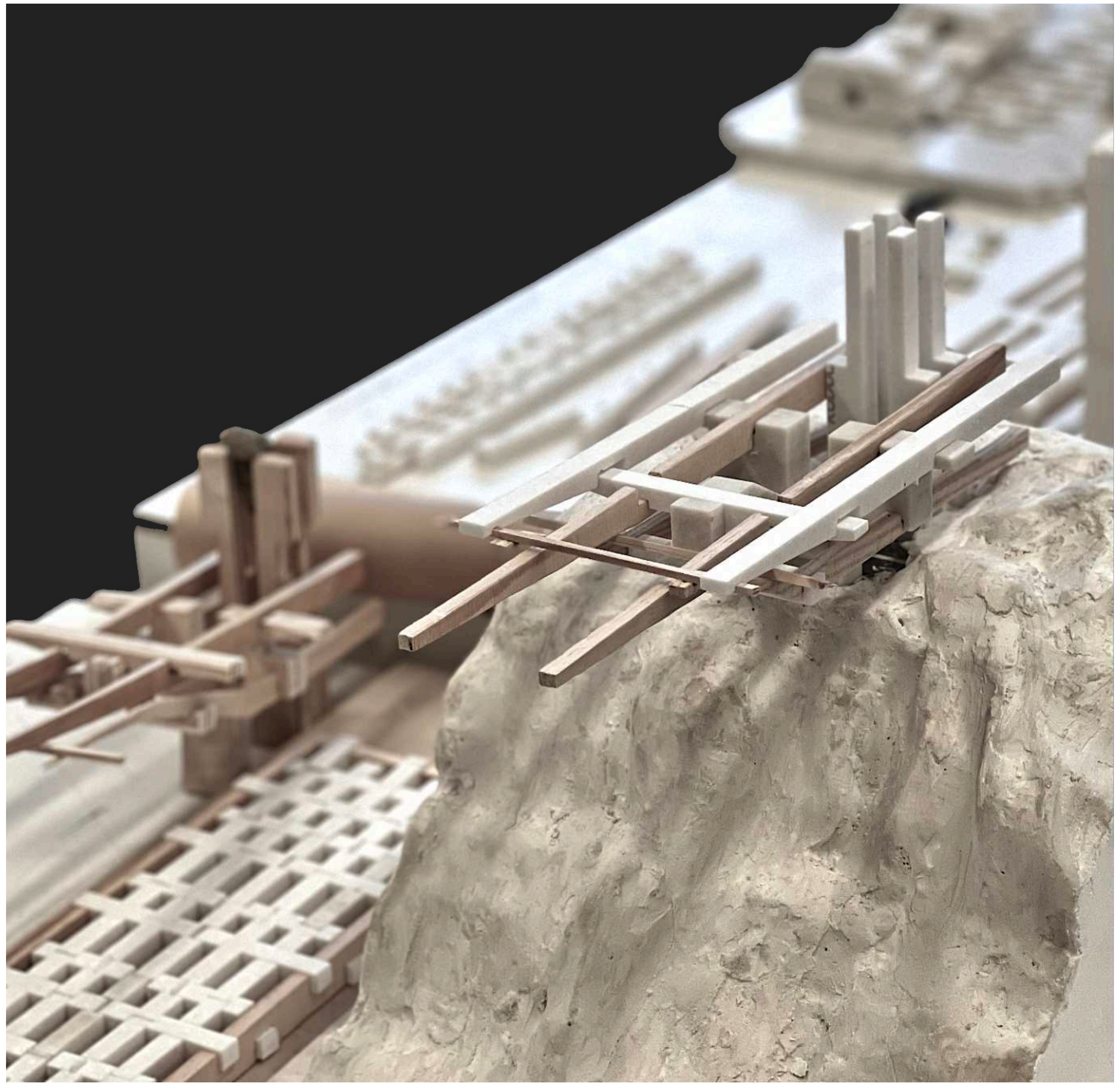


THE BRIDGE

Pre-fabricated stone pieces are assembled to distribute load & tension efficiently along its length. The deeper, heavier Truss members taper in height towards its centre. The tolerances within the stereotomic joinery allow for some flexibility. This also makes the structure more to seismic forces.

This strategy can be deployed to bridge between a 8M to 10M wide ridge. With locally available stone and low-tech cutting tools the material can be assembled and Disassembled like a lego.





THE CANTILEVER

Structural strategies & Modular assemblies that make stone construction simple, more accessible, easy to transport & optimally engineered. Inspired by the Da Vinci Arc, each member is designed to receive the load of two members & rest its load on two members. Each reciprocating system laterally distributes load along the cantilevered system.

A **Mass Timber** interpretation of the Maison Domino

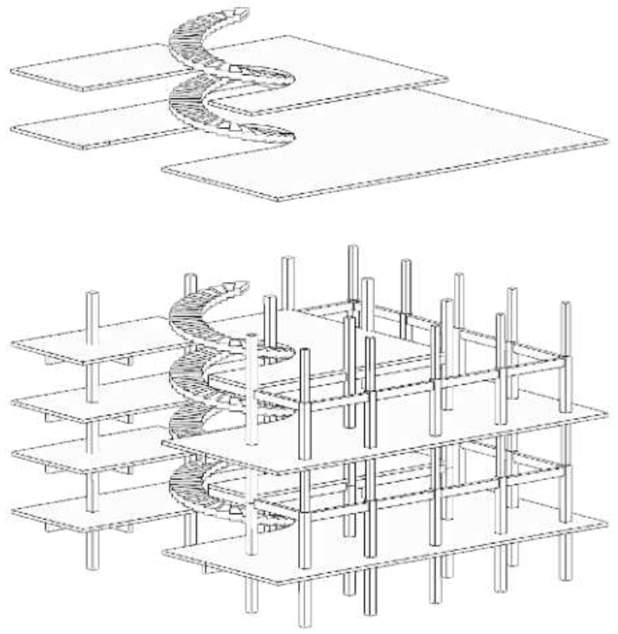
Mass timber sequesters more CO_2 than it emits, making it the most carbon negative resource. Compared to concrete buildings which in their production process emit almost the inverted value of what timber sequesters.

This particular profile of the Maison domino inspired our initial module development. We observed that the Maison's structure & core does not account for universal accessibility, an essential concern that our module aspires to solve.

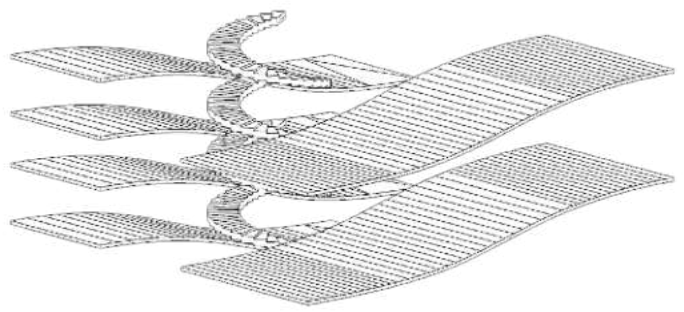
02 MAISON SERRAGO

DESIGN FOR DISASSEMBLY

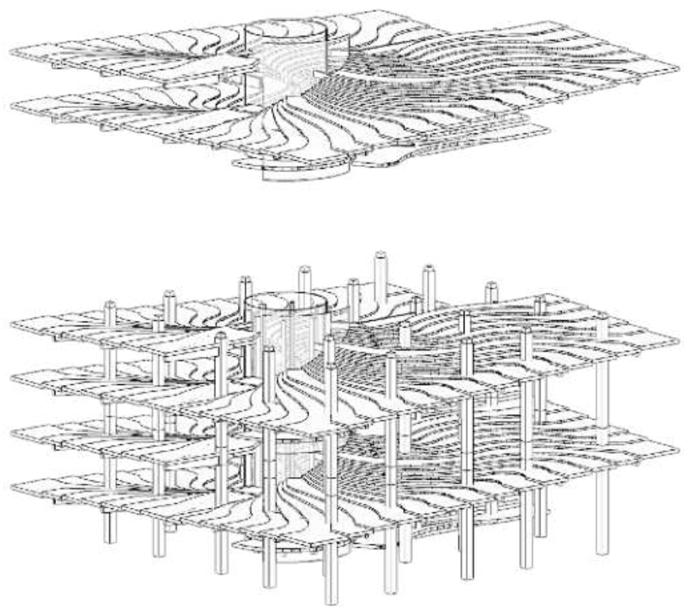
PROJECT TYPE	Biogenic Material Study, Module Assemblage
STUDIO	AAD Studio, MSAAD, GSAPP
DURATION	Fall Semester; September-December 2023
MENTOR	Gordon Kipping
TEAM	Aashka Ajmera



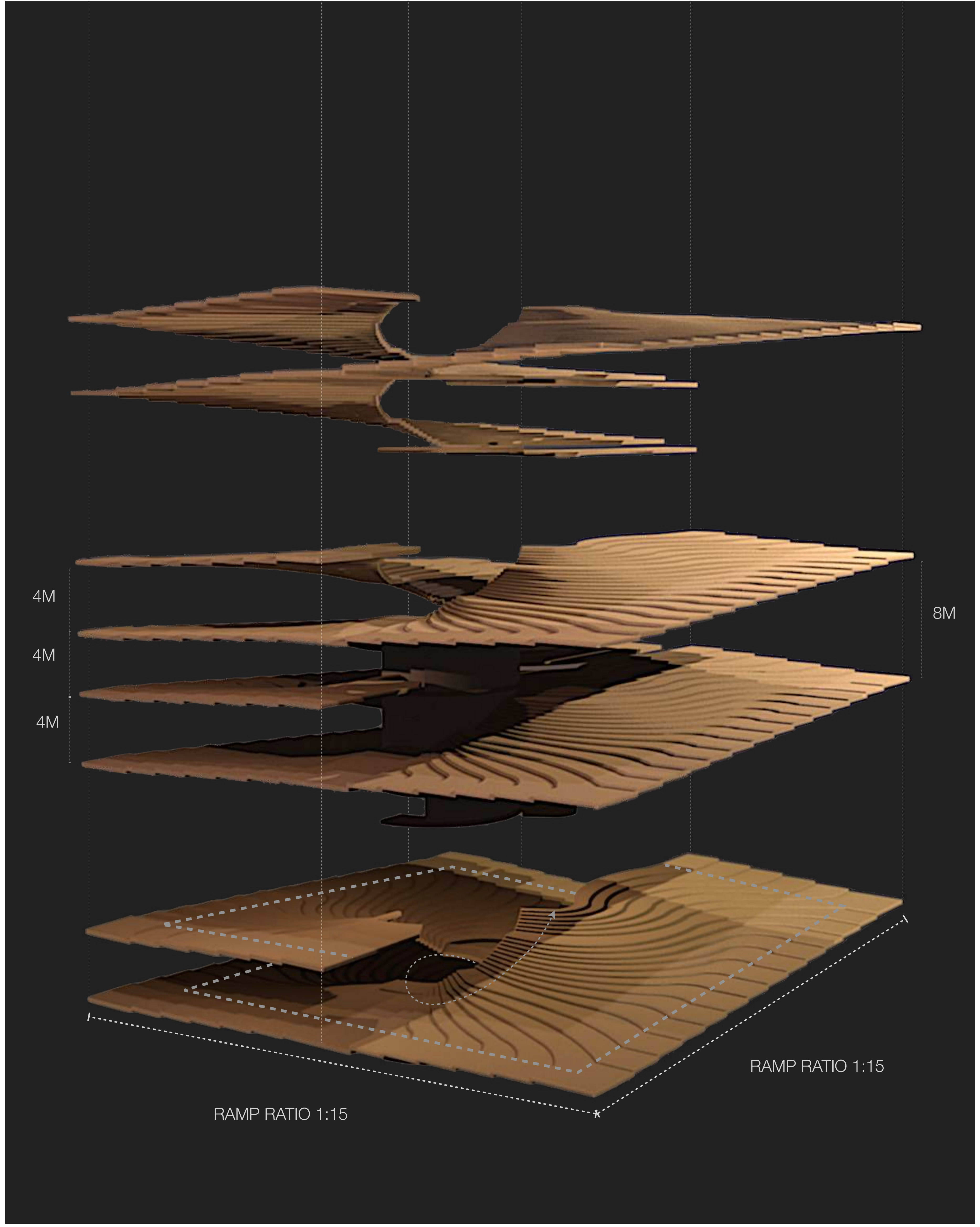
Slab Arrangements



Ramp Arrangements



Accessibility Spiral



Form informed by Accessibility Principles :
Taking accessibility into consideration, our spiral staircase core radially generates into a traversable, peripheral ramp - ratio of 1:15. Denser slab arrangements on the southwest creates a double-height volume on the northeast.

RESEARCH

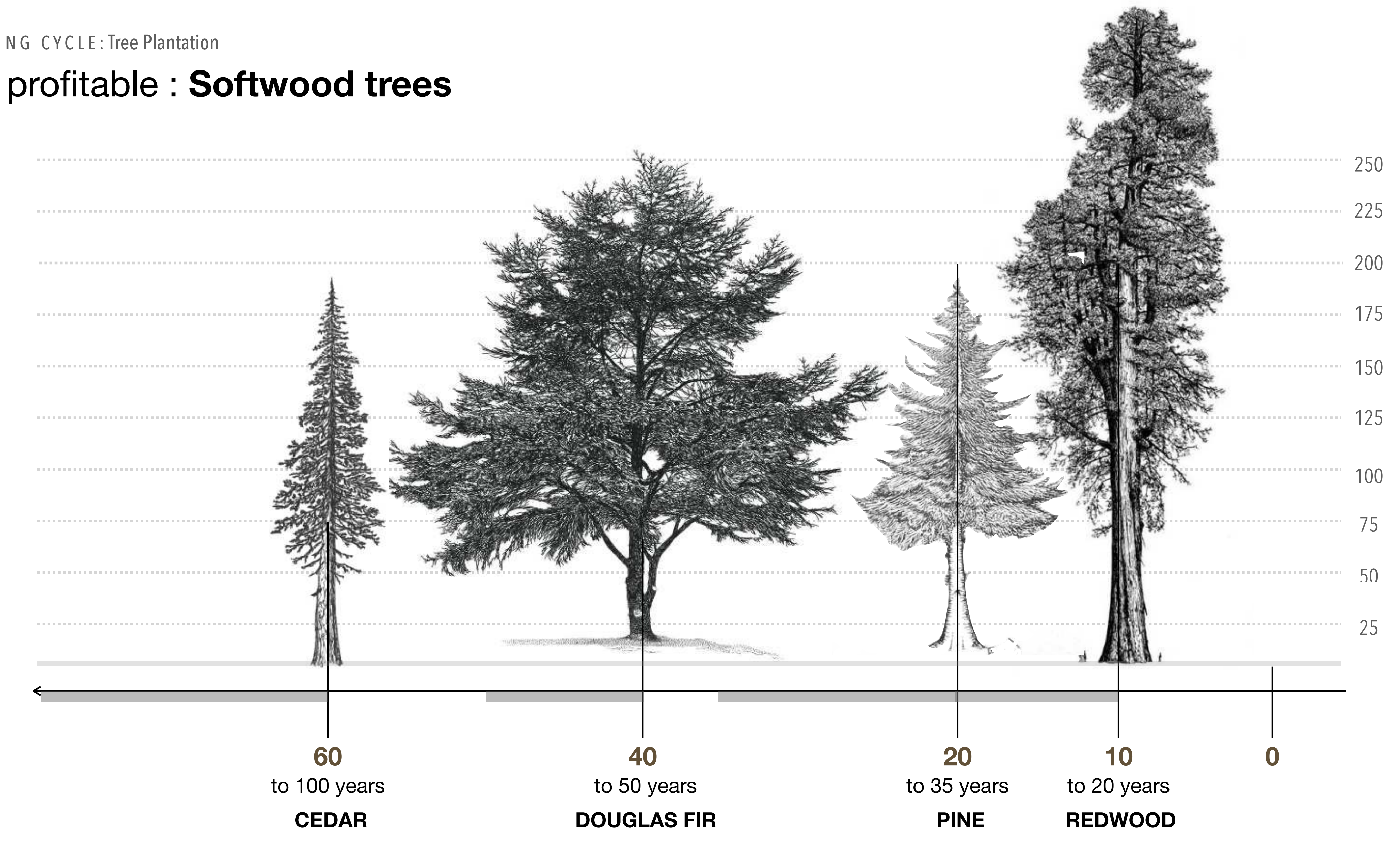
Our research started with the study of embodied carbon in materials, the scale provides a spectrum of values for them. Mass timber sequesters more CO2 than it emits, making it the most carbon negative resource. Compared to concrete buildings which in their production process emit almost the inverted value of what timber sequesters. An even lower carbon negative scope can be achieved by repurposing and reusing materials.

The construction and demolition sector is the second highest contributor to solid waste in the world. Annual construction waste is expected to reach 2.2 billion tons globally by 2025. 20% of the construction waste is wood. This study explains the end result of all these materials. Majority of Wood waste ends up in the landfill, with only 30% of it recycled or reused as Aggregate, fuel & manufacturing products. Hence we further studied the potential of wood waste as a construction material.

Harvesting systems and Re-plantation strategies ensure the regeneration of resources while regulating manufacturing demands.Most trees take 25 to 100 years to mature. Most softwood trees have a harvest cycle ranging from 35 to 60 years. Hardwood trees provide heavier and denser timber. Walnut, mahogany, and teak have a harvesting cycle between 25 to 35 years. Some invasive species such as the Paulownia tree provide fast-growing hardwood, which matures within 7-10 years. It has also been widely planted in North America from Montreal to Florida and west to Missouri and Texas. Paulownia wood is very light, fine-grained, and warp-resistant. Logging strategies for every plantation ensure regenerative maintenance of plantations.
The goal of Silvicultural systems is to ensure that we regenerate more trees than we log. The management of the harvest cycle is crucial to the sustainability of timber.

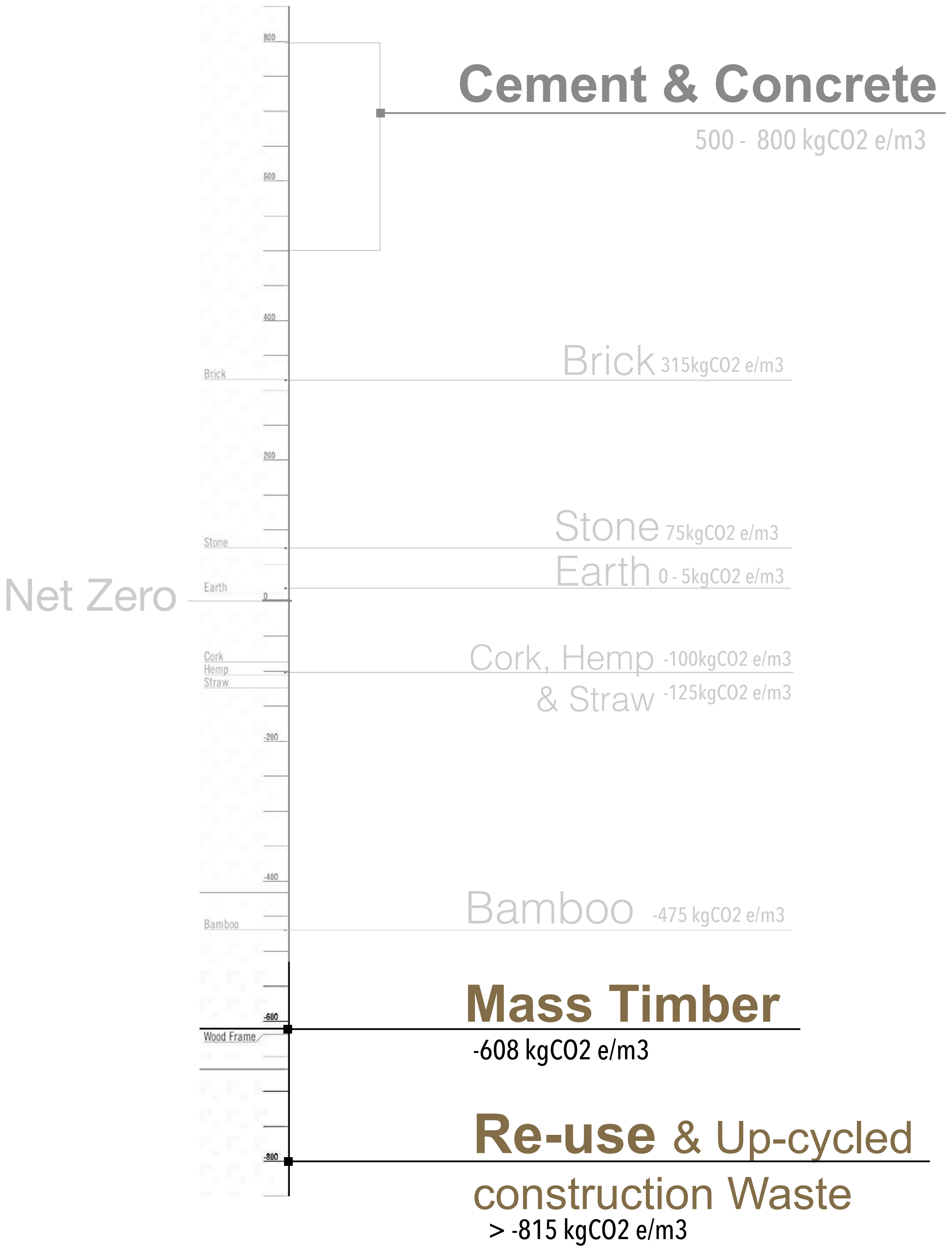
HARVESTING CYCLE: Tree Plantation

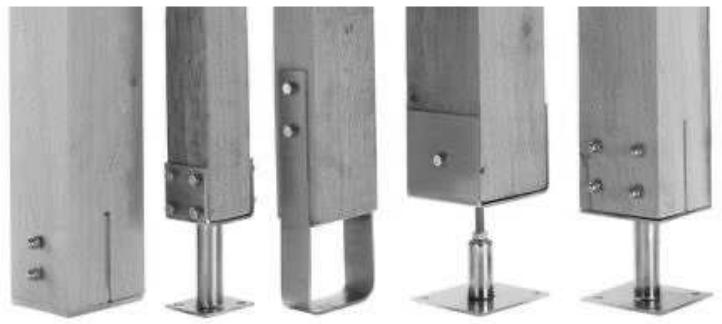
Most profitable : **Softwood trees**



HARVESTING CYCLE: Tree Plantation

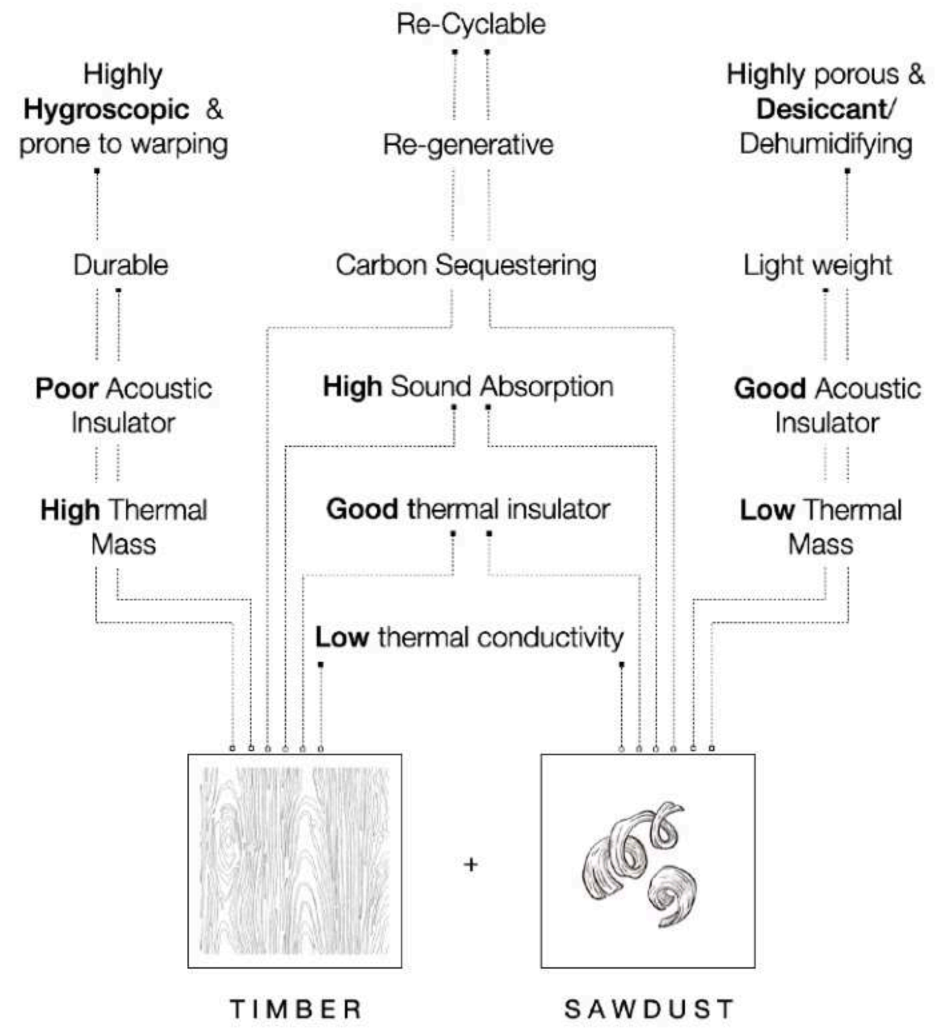
Most profitable : **Hardwood trees**





Component **A :** Glulam Columns
Component **B :** CLT Slabs & Beam

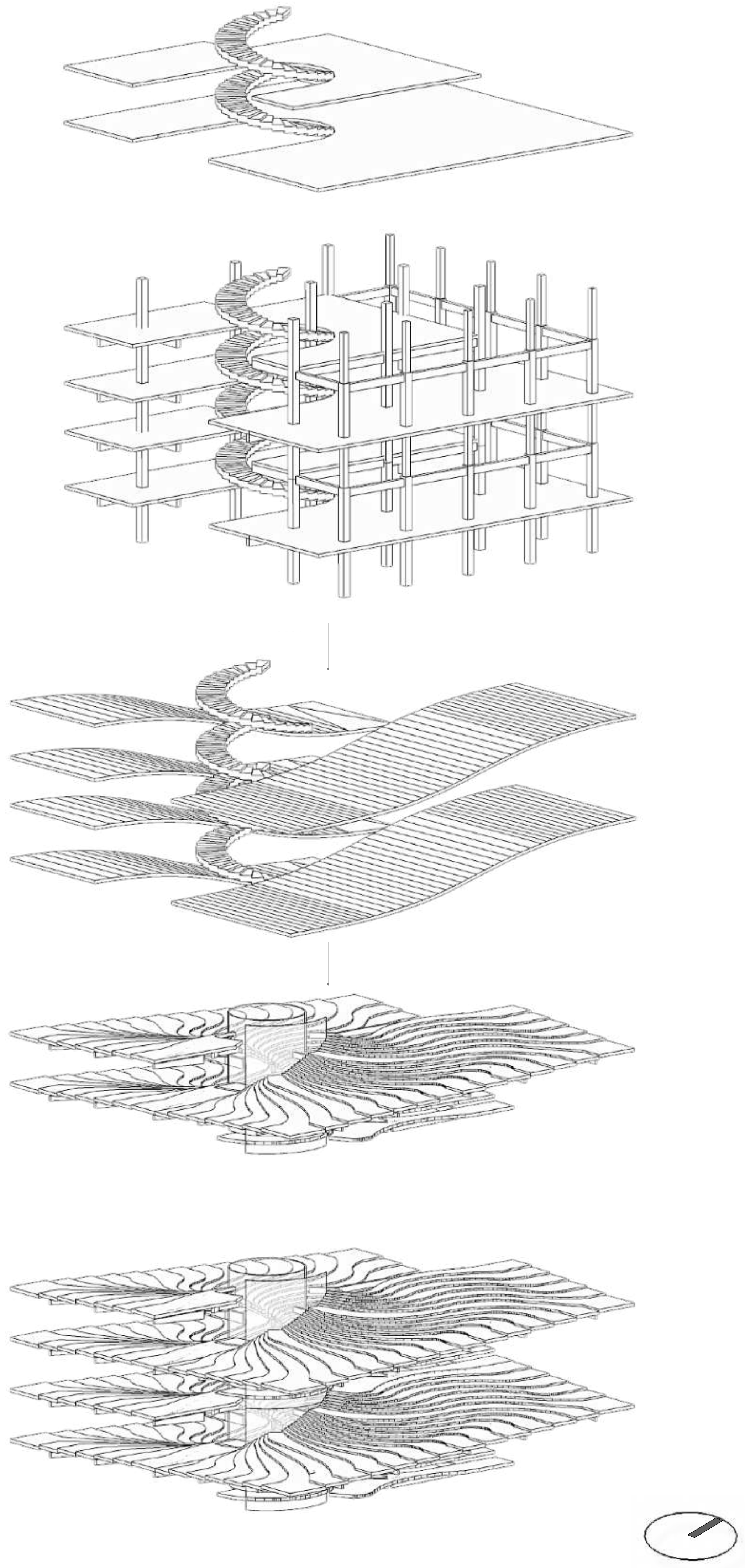
Component **C :** 3D printed sawdust - facade components - **Evaporative-Cooling Screen**



The question that arises is Can the construction industry, which has a very high share in waste production, use the waste it produces? Our point of intervention within the proposed circular economy looks at combining mass timber and timber framing, with up-cycled wood waste specifically sawdust, strategised and designed for disassembly. Along with mass timber and timber framing components, we are also looking at 3D-printed sawdust possibilities in terms of passive screens and thermal buffers. We looked into cumulative properties of sawdust and mass timber, to understand their combined potential. While both the materials mostly share common properties such as good thermal insulation, high sound absorption and low thermal conductivity.

Most of the characteristic divergences emerge from their differences in thermal mass. While wood is durable due to high thermal mass, its high sound conductivity can be seen as an unfavourable property. While sawdust due to its thermal mass, its used for acoustic insulator. Additionally, wood has high hydroscopic property, while sawdust is desiccant by nature. Our module proposes a collaborative strategy that combines some of these properties such as

CITATION : Paul Lewis. Marc Tsuramaki, David Lewis, " Manual of Biogenic House sections", Wood Frame, pg 74



EVOLUTION

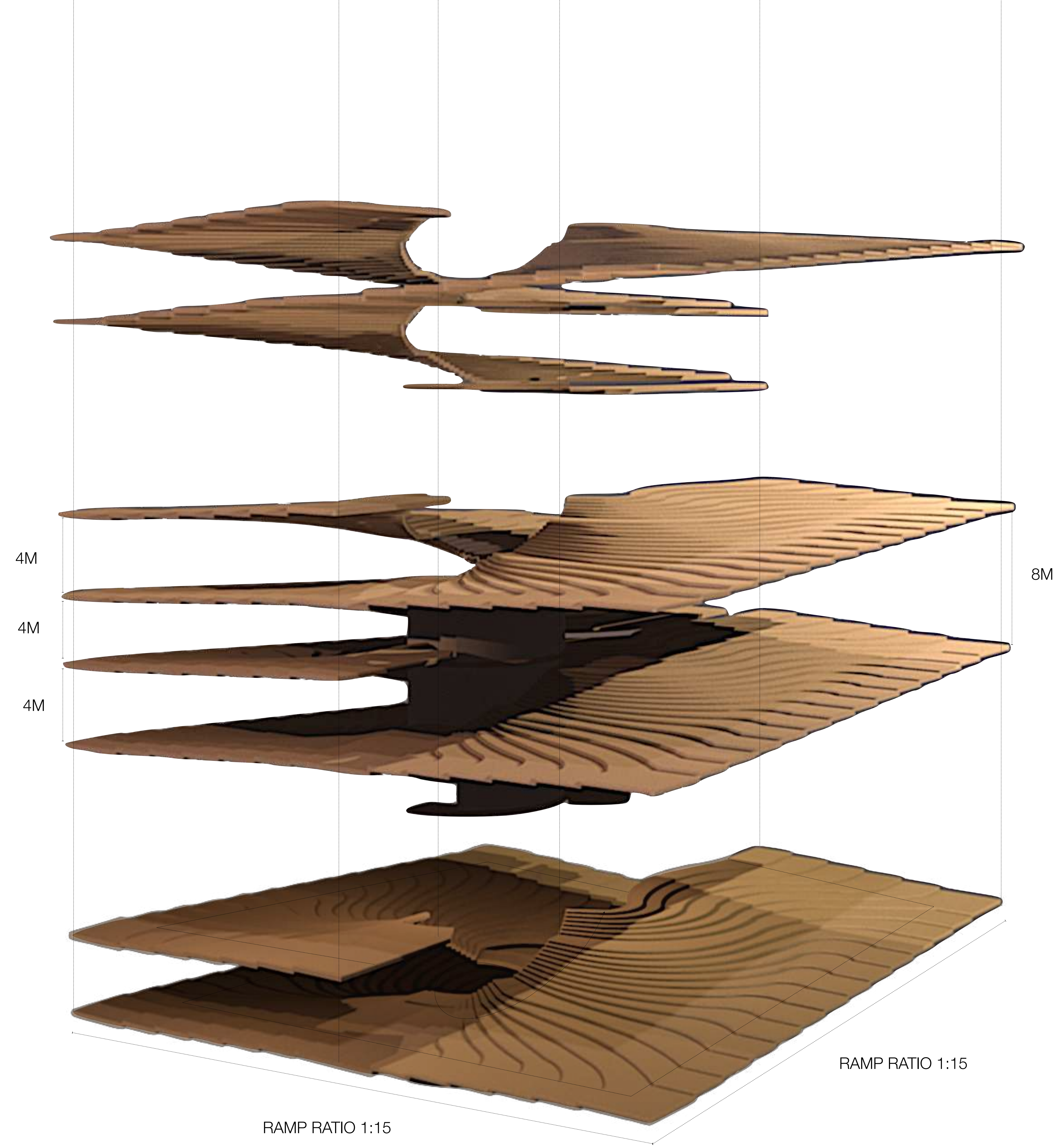
CIRCULATION CORE

SLAB ARRANGEMENT

ACCESSIBILITY RAMPS

ACCESSIBILITY SPIRAL

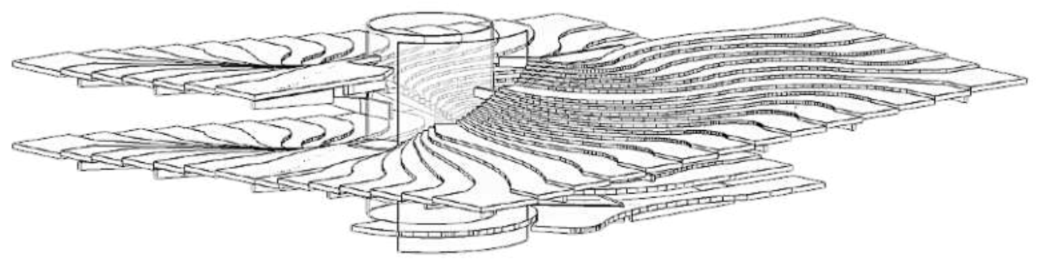
SPIRAL SLAB PROFILE



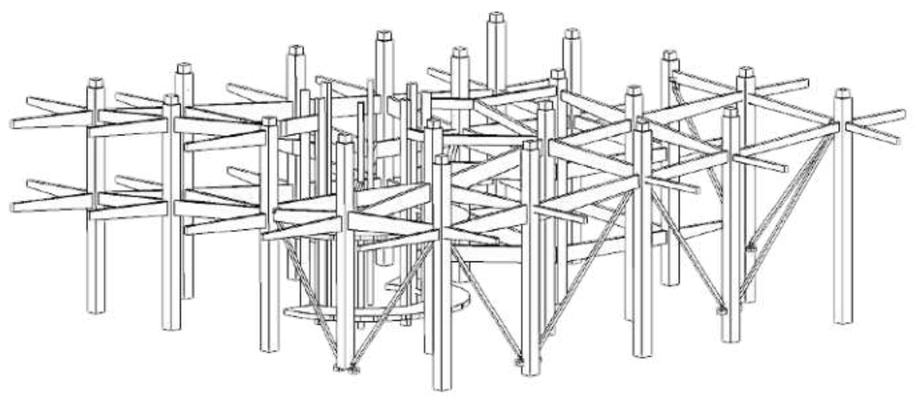
SPIRAL SLAB

The profile of the Maison domino inspired our initial module development. We observed that the Maison's structure & core does not account for universal accessibility, an essential concern that our module aspires to solve. Cross Laminated Timber (CLT) slab profile ; the spiral is computed to accommodate a universally accessible ramp at its periphery. Taking accessibility into consideration, our spiral staircase core radially generates into a traversable, peripheral ramp - ratio of 1:15.

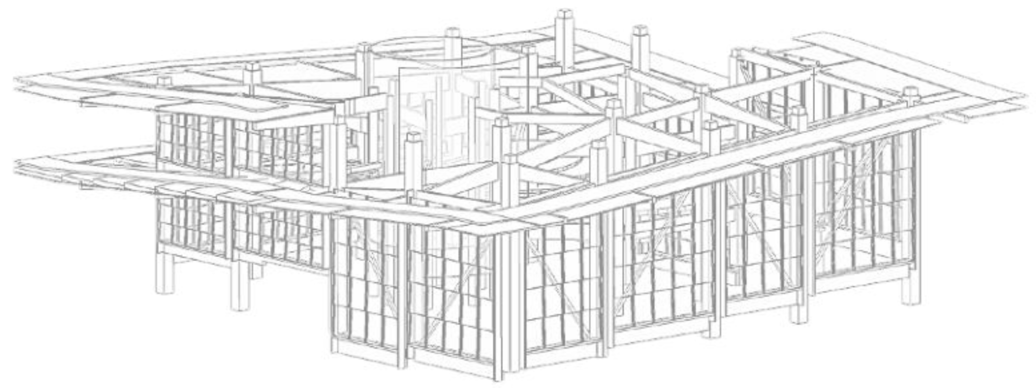
ASSEMBLY



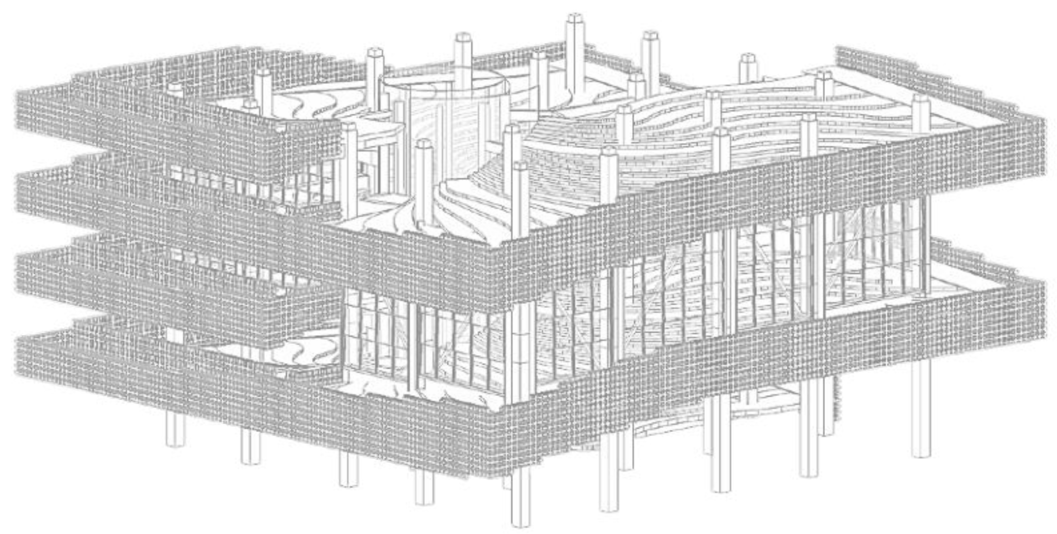
SPIRAL SLAB PROFILE



BEAM & COLUMN ARRANGEMENT

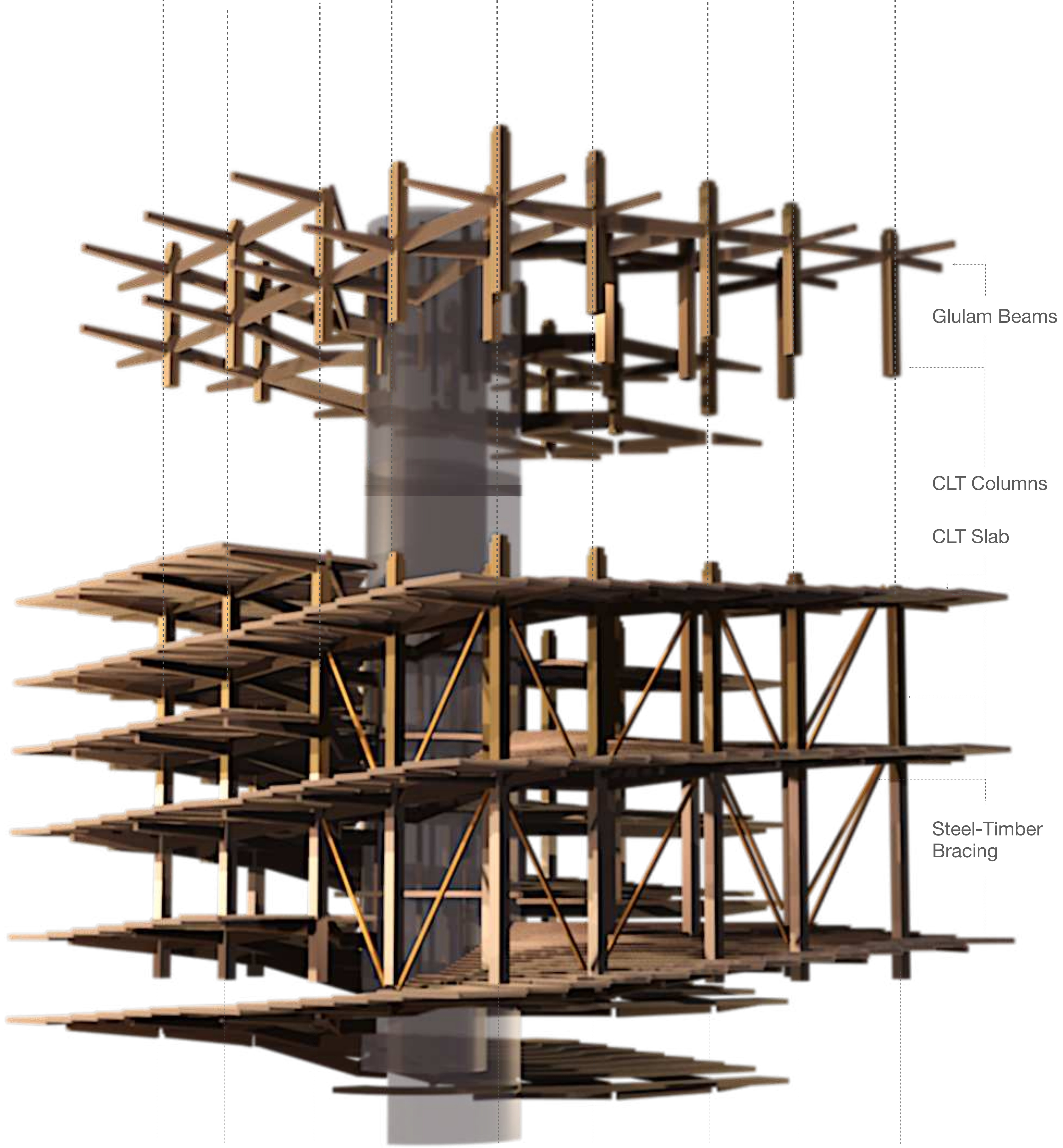


TIMBER FRAME WINDOWS



SERRAGO SKIN

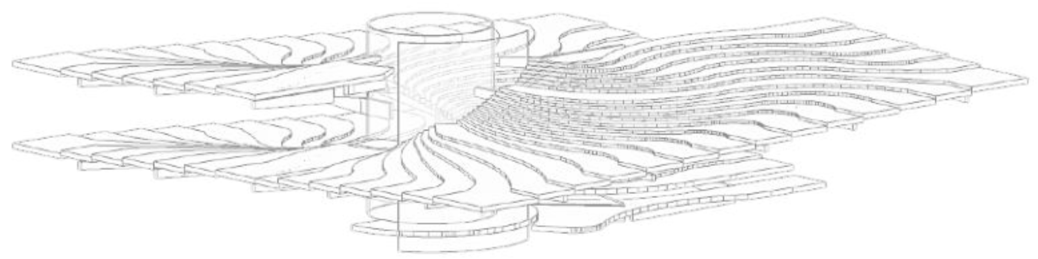
(3D Printed evaporative cooling screens)



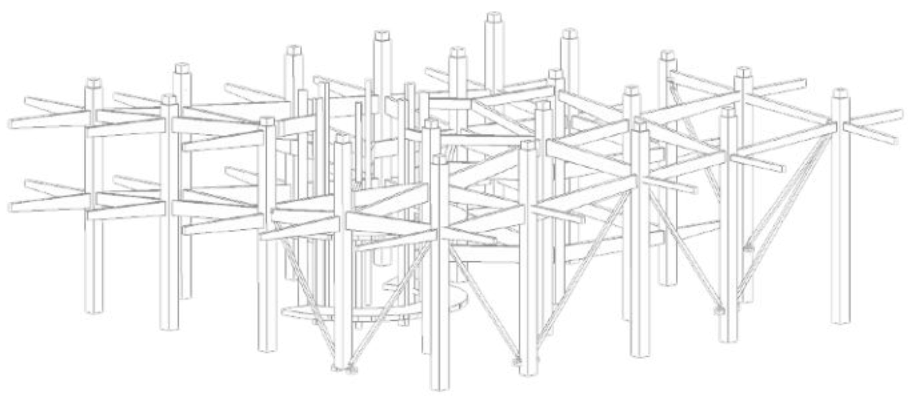
STRUCTURE

The CLT columns and Glulam beams support the spiral profile of the slab. Windows form the primary skin of the module. The secondary skin comprises of our fragment - a composite sawdust screen that aims to create thermal buffers within.

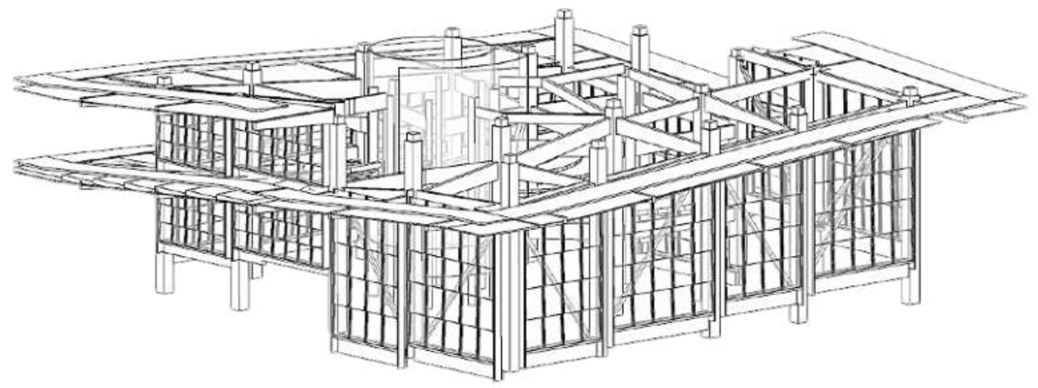
ASSEMBLY



SPIRAL SLAB PROFILE



BEAM & COLUMN ARRANGEMENT



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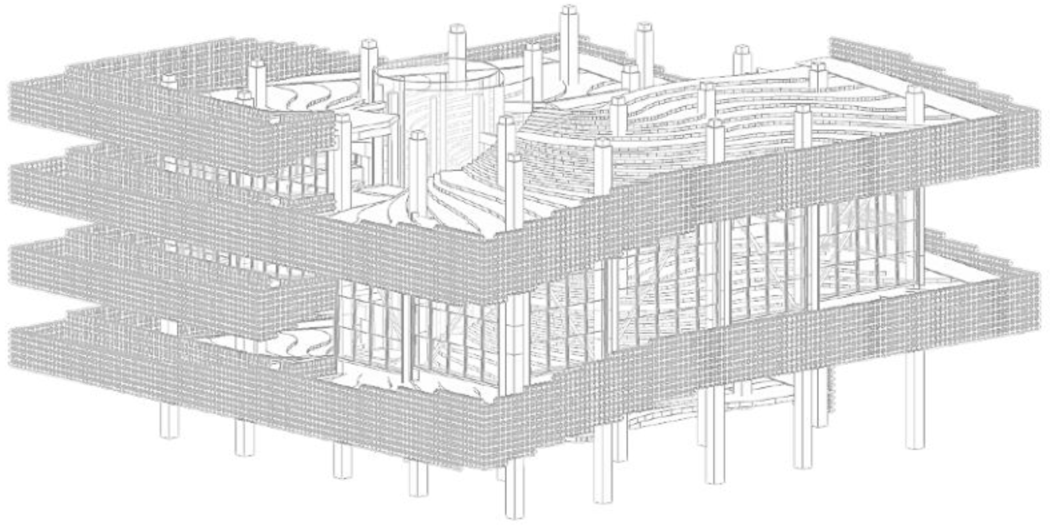


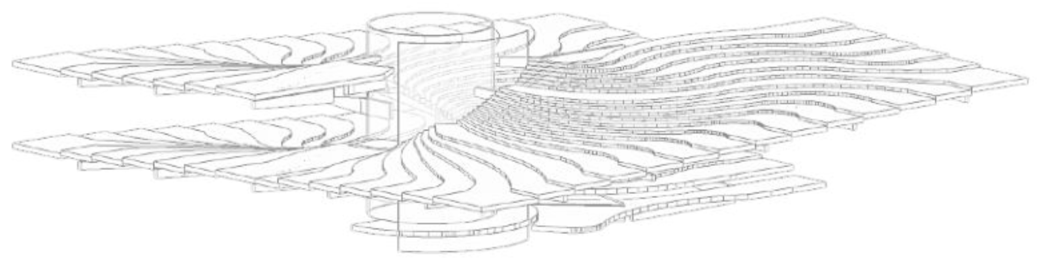
SERRAGO SKIN

(3D Printed evaporative cooling screens)

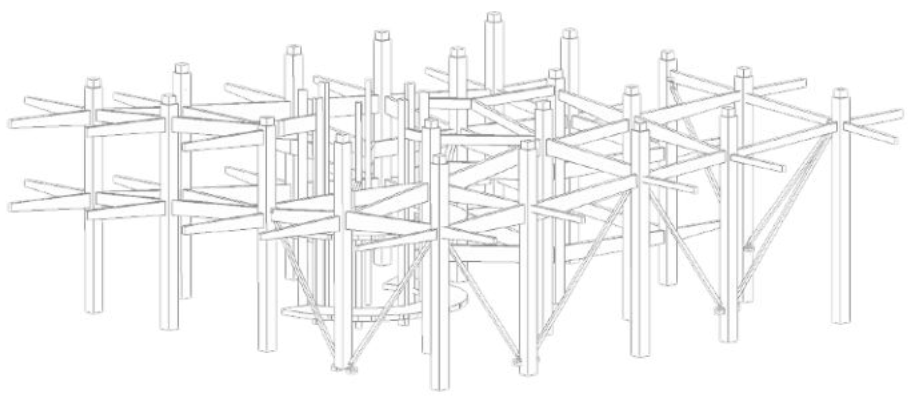
PRIMARY SKIN

The CLT columns and Glulam beams support the spiral profile of the slab. Windows form the primary skin of the module. The secondary skin comprises of our fragment - a composite sawdust screen that aims to create thermal buffers within.

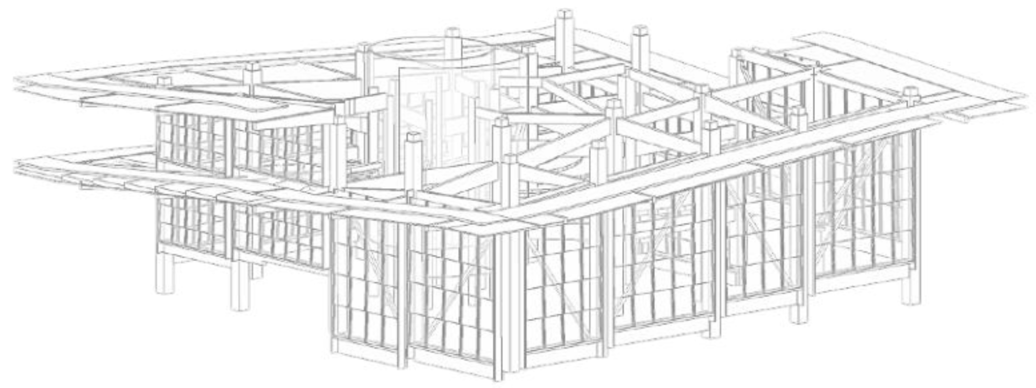
ASSEMBLY



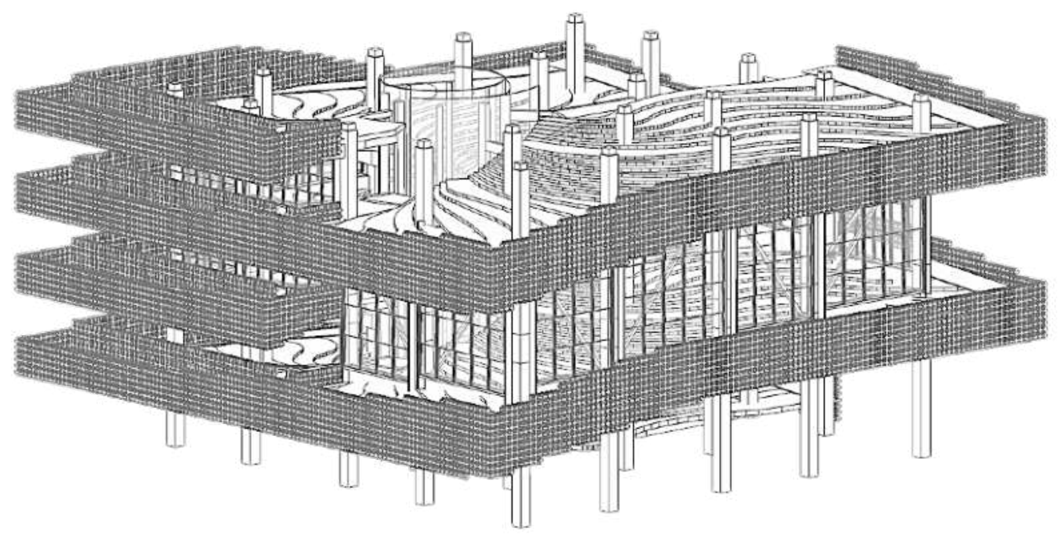
SPIRAL SLAB PROFILE



BEAM & COLUMN ARRANGEMENT



TIMBER FRAME WINDOWS



SERRAGO SKIN

(3D Printed evaporative cooling screens)

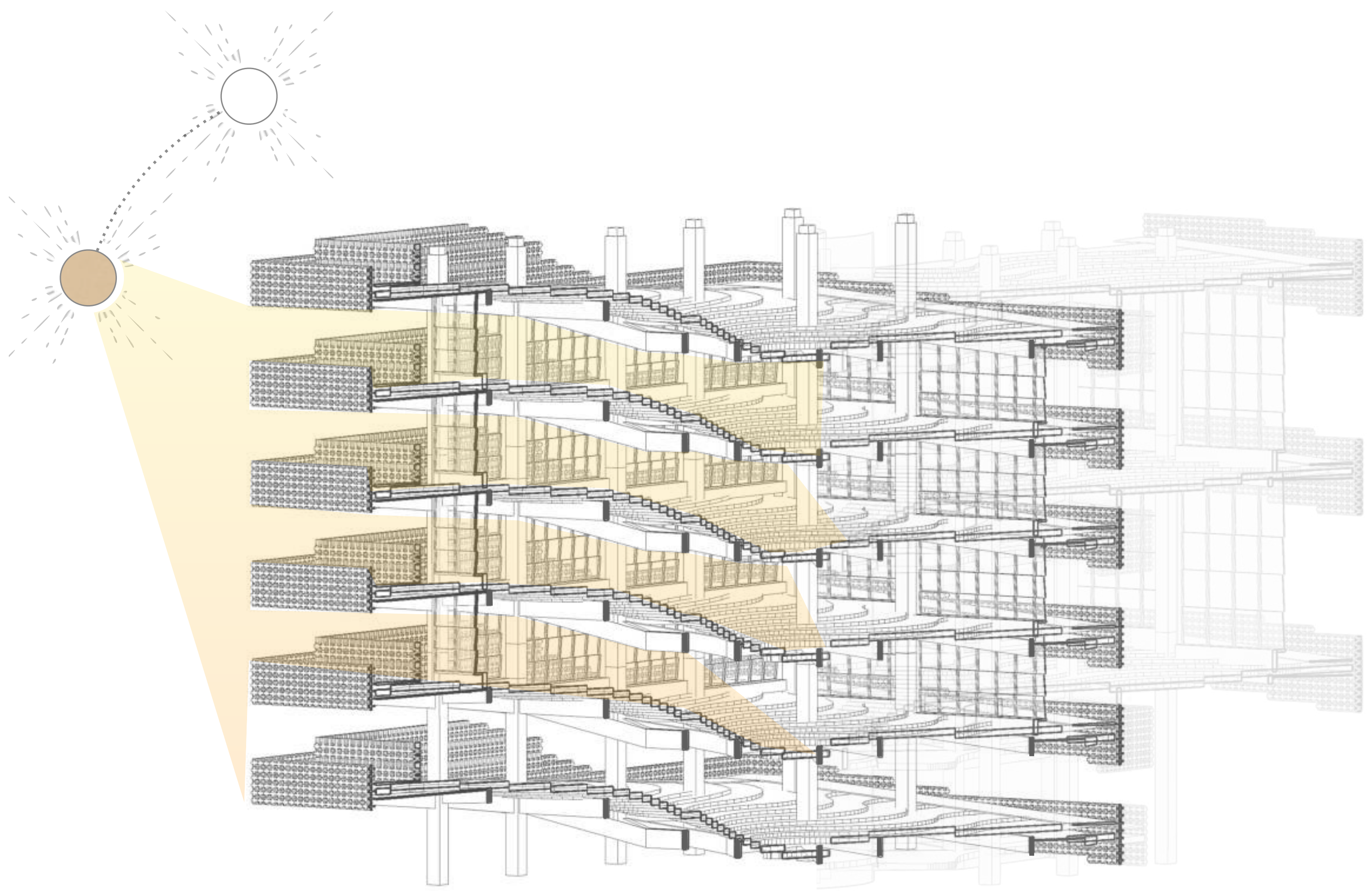
SECONDARY SKIN

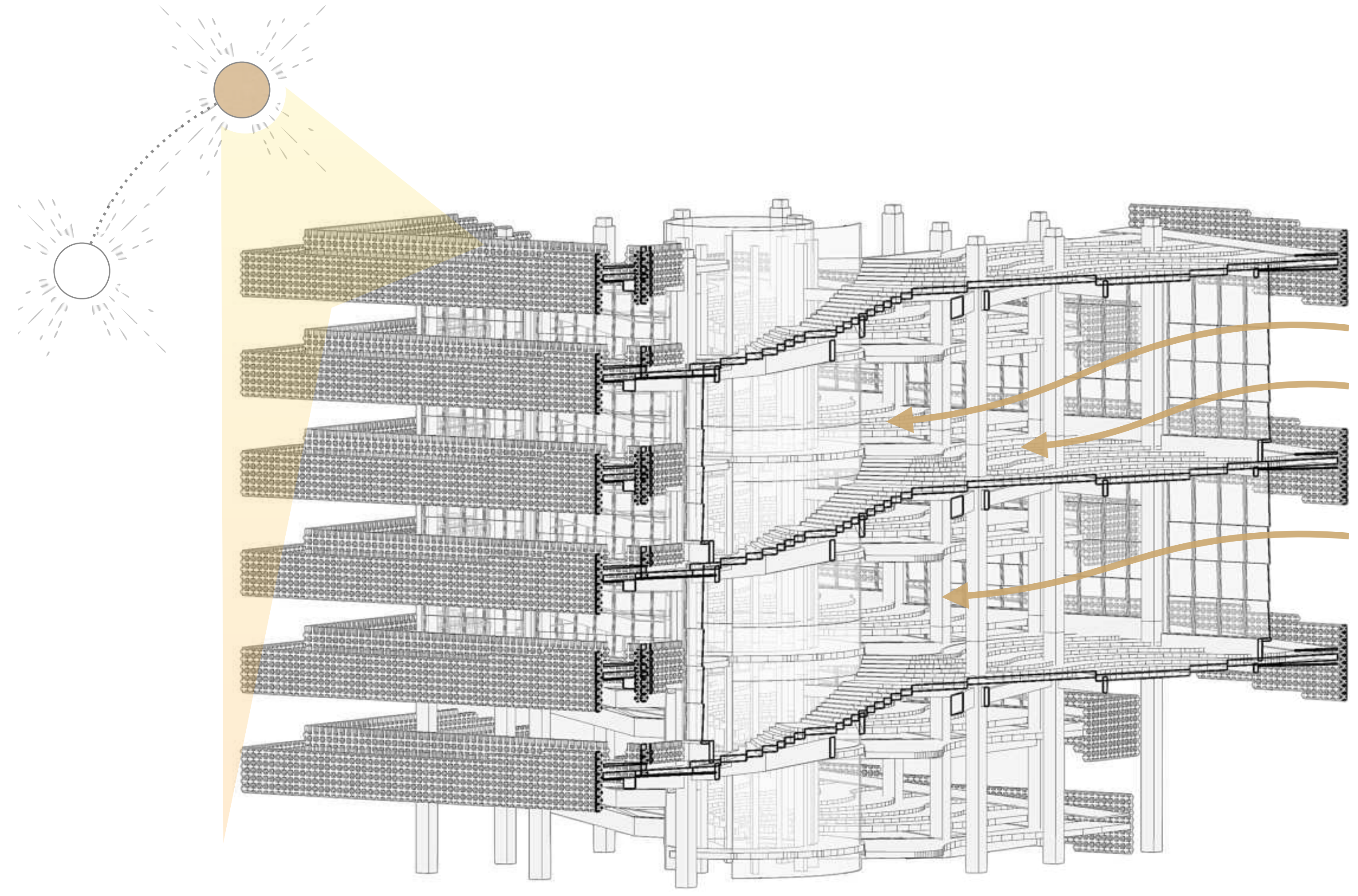
The CLT columns and Glulam beams support the spiral profile of the slab. Windows form the primary skin of the module. The secondary skin comprises of our fragment - a composite sawdust screen that aims to create thermal buffers within.

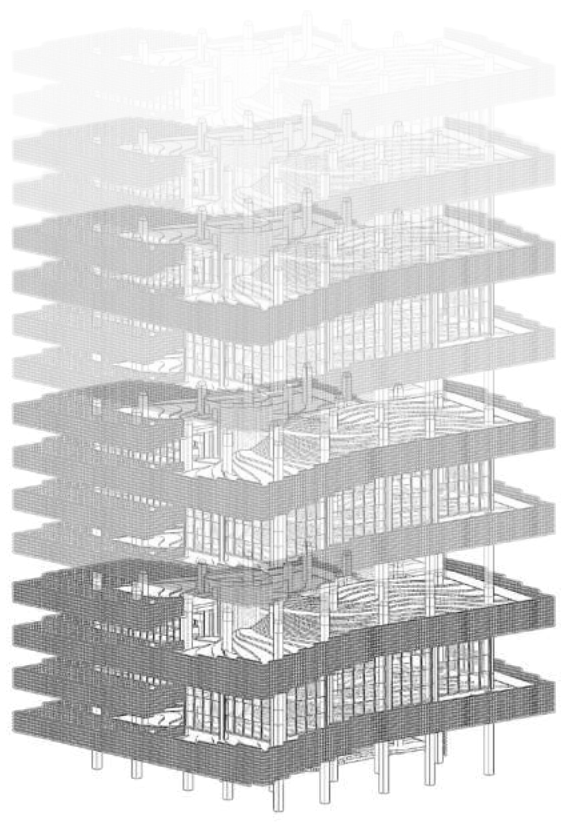
Static form informed by climate **flux**

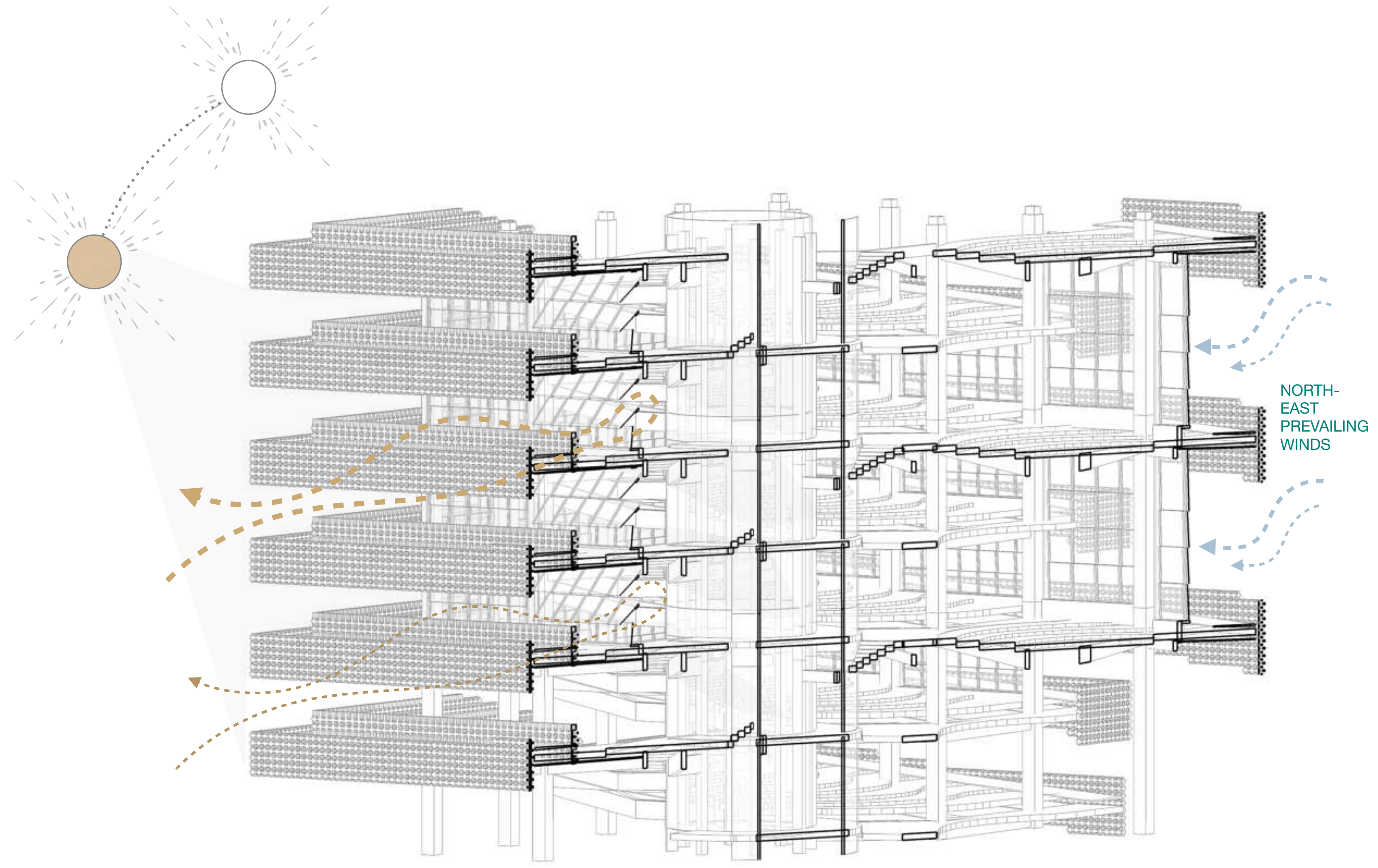
KEY PASSIVE STRATEGIES

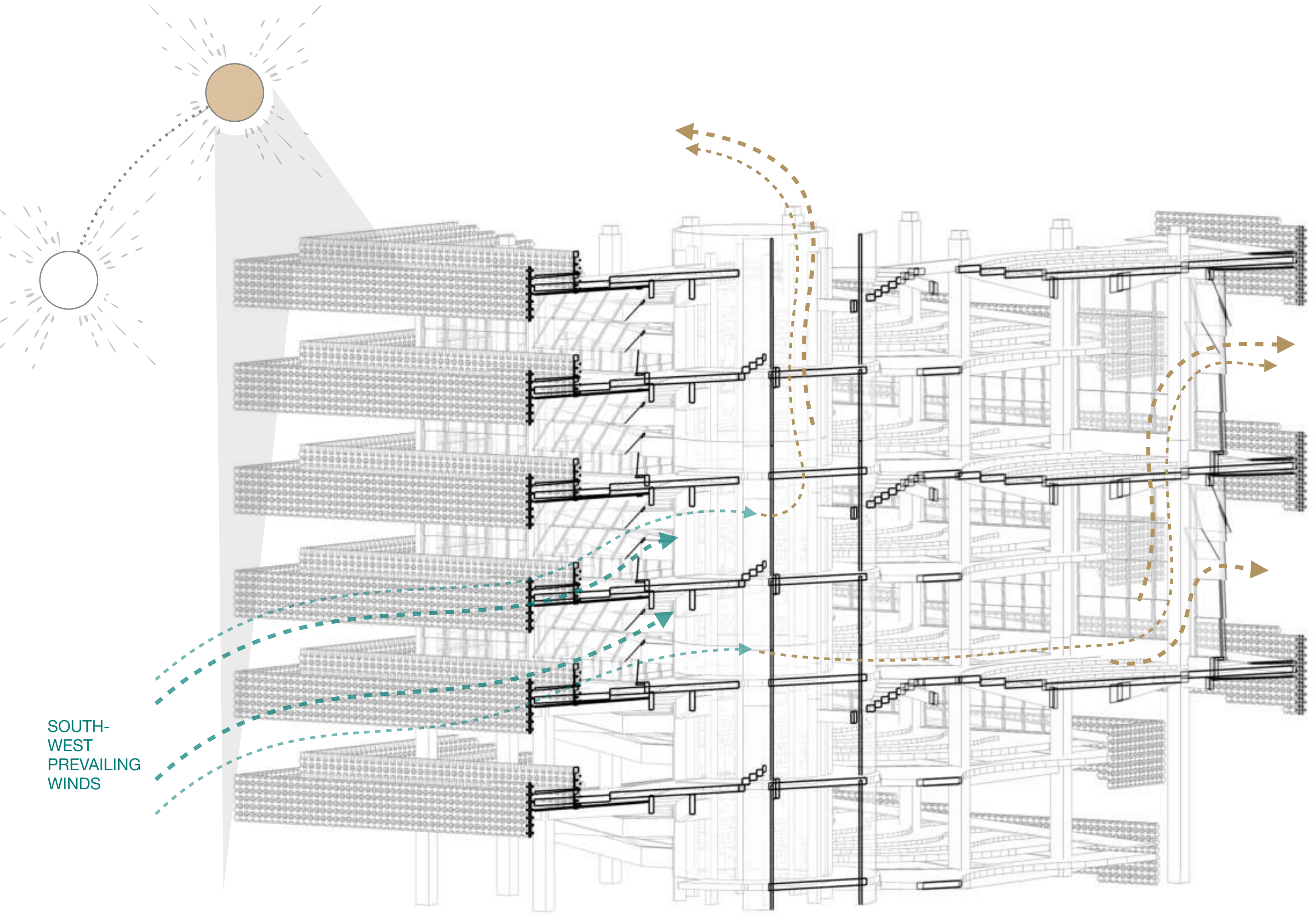
The slope of the spiral slab on the south side helps to optimise the winter sun to penetrate in the structure.While in summers, the denser slab arrangement on the south side helps in providing shade. The double height slab arrangement helps receive the ambient light from north. Our module suggests to different ventilation strategies for both summers and winters. During the winters, the south west corridor acts as a thermal buffer, with the help of double layered sawdust composite screens. The porous nature of the 3d printed sawdust screens helps it hold more dry air, insulating the structure. Most of the ventilation during the winter is directed to the south and south west direction, while the windows in the north remain shut to protect from north east prevailing winds. During summer, the south west corridor facilitates evaporative cooling and cross ventilation. It receives the cool south west winds, which further expands to the larger volume of the structure. A central shaft helps in creating stack effect.











WINTER

▲ Optimised light ventilation during winters.

▼ Ventilation Wind during winters

SUMMER

▲ Shading from the summer sun

▼ Ventilation Wind during summers

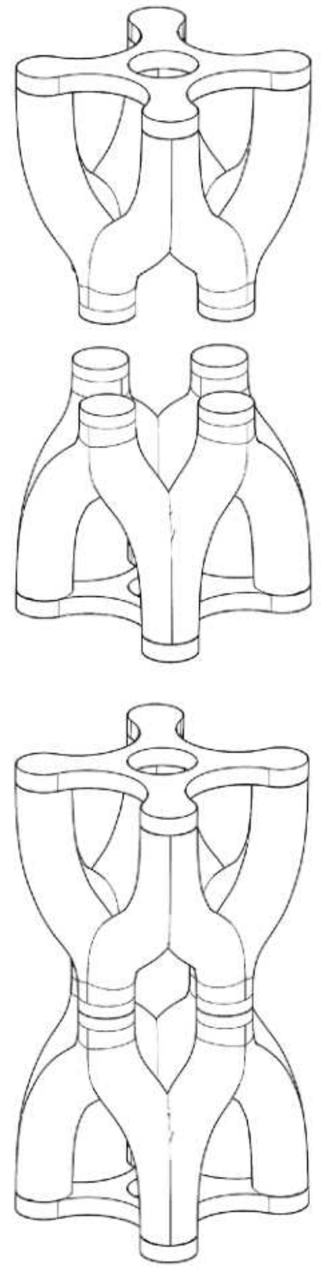
Static form informed by climate **flux**

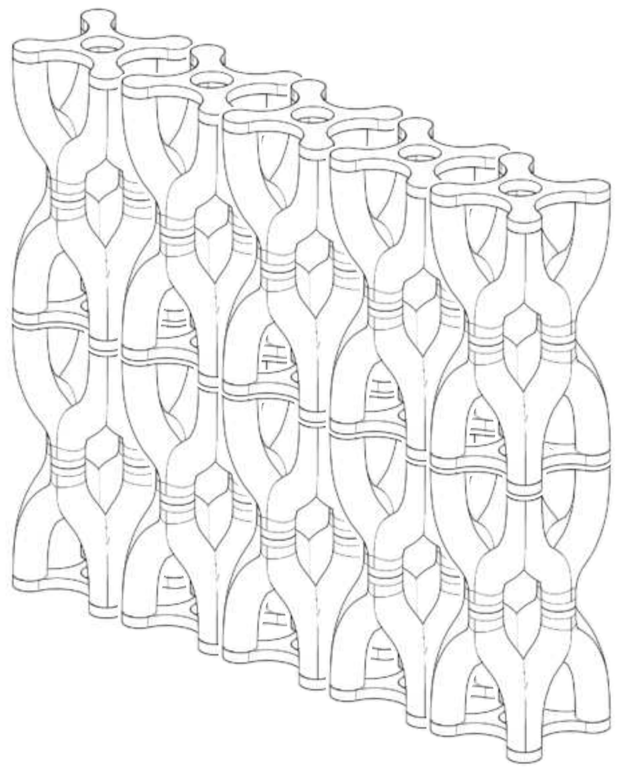
BEAM & COLUMN ARRANGEMENT

TIMBER FRAME WINDOWS

THE. MODULE

The CLT columns and Glulam beams support the spiral profile of the Accessibility slab, Windows form the primary skin of the module. The secondary skin comprises of our fragment - a composite sawdust screen that aims to create thermal buffers within the architecture of the module.The screens facilitate evaporative cooling, insulation and other key passive strategies that respond to climatic flux.



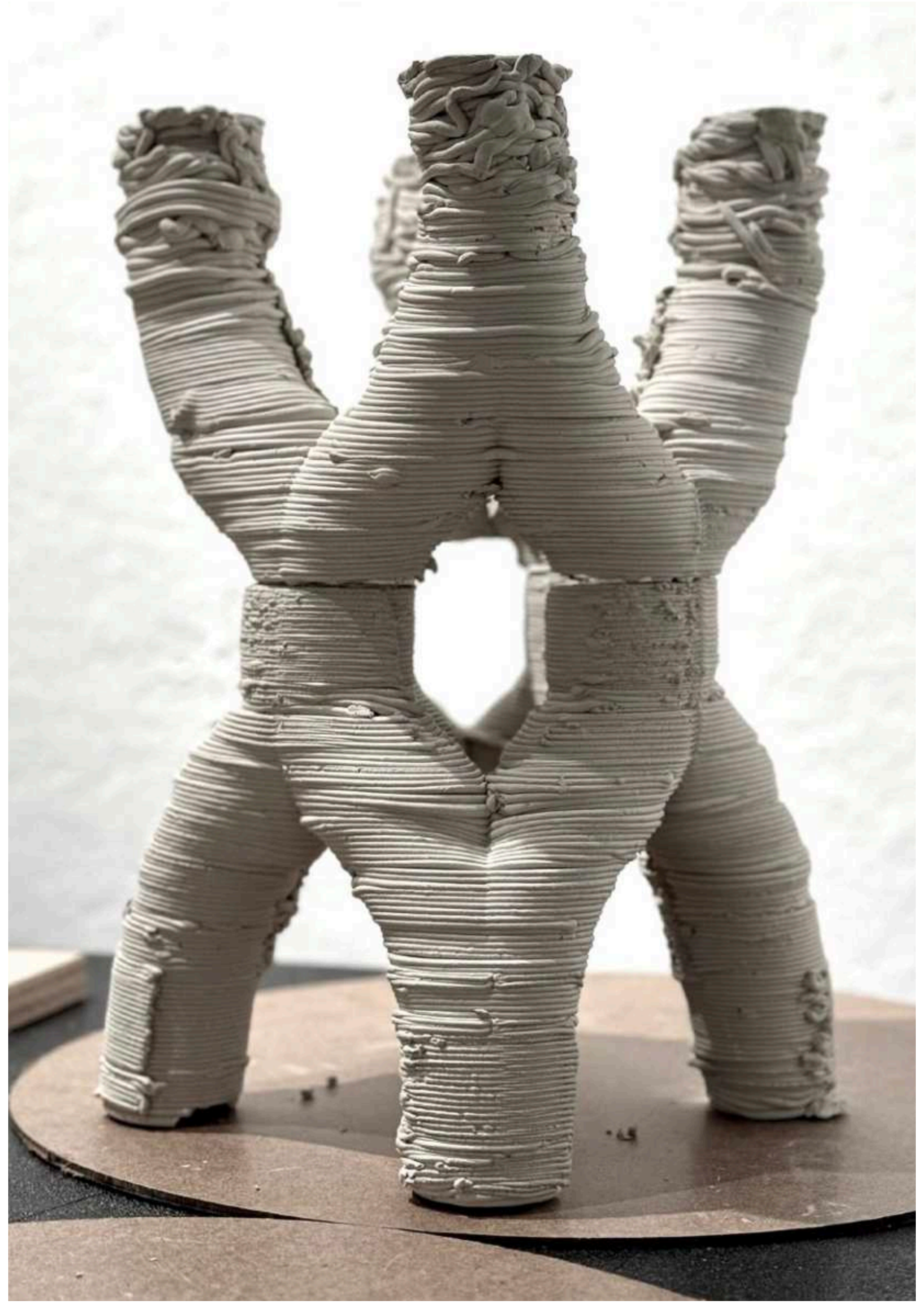


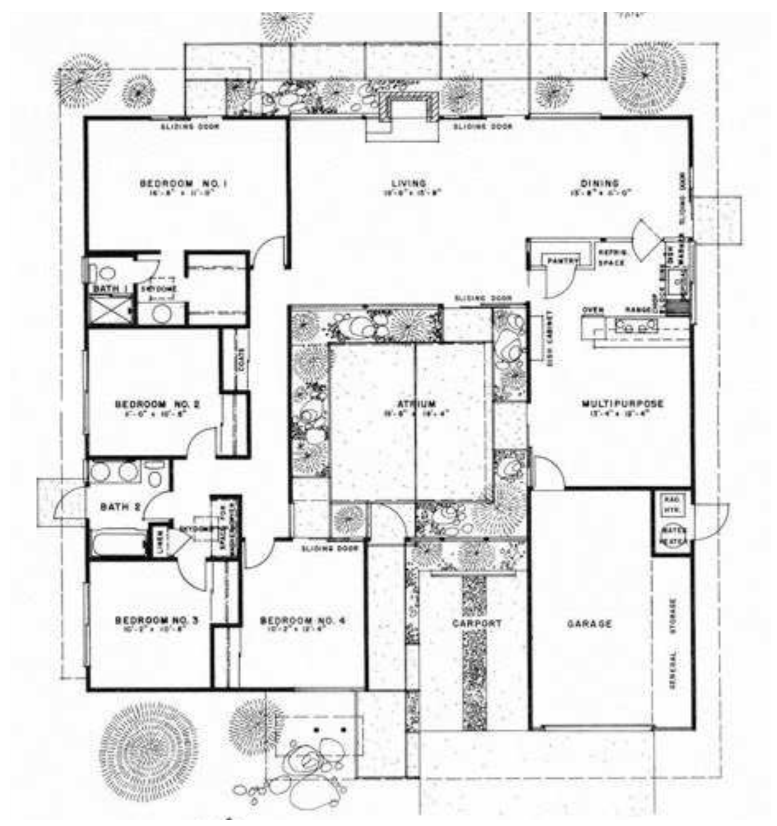
FRAGMENT

3D Printed **Evaporative Cooling screens**

A parallel volumetric study also led to the development of the fragment - a form optimised to be mass printed and assembled to facilitate evaporative cooling.

The specific form and porosity of the material improve the potential pressure contrast between the screen and its surroundings, thereby expediting the cooling of air in summers and retaining dry air for insulation during winters.





03 EICHLER EVOLUTION

Architecture : A Reality Stranger than Fiction

PROJECT TYPE	Design Innovation, Single Family Housing
STUDIO	AAD Studio, MSAAD, GSAPP
DURATION	Spring Semester; September-December 2023
MENTOR	Michael Bell

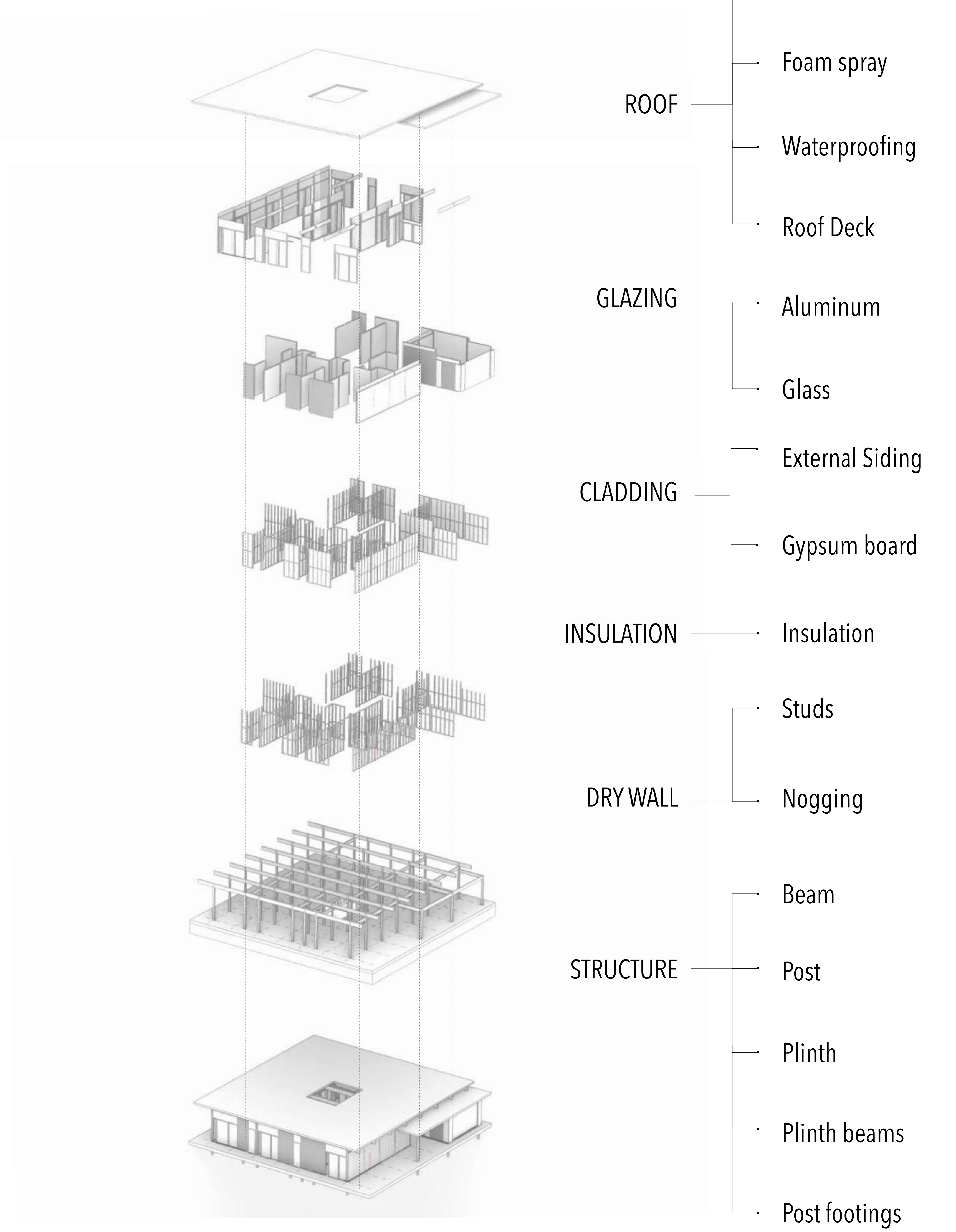
THE BRIEF

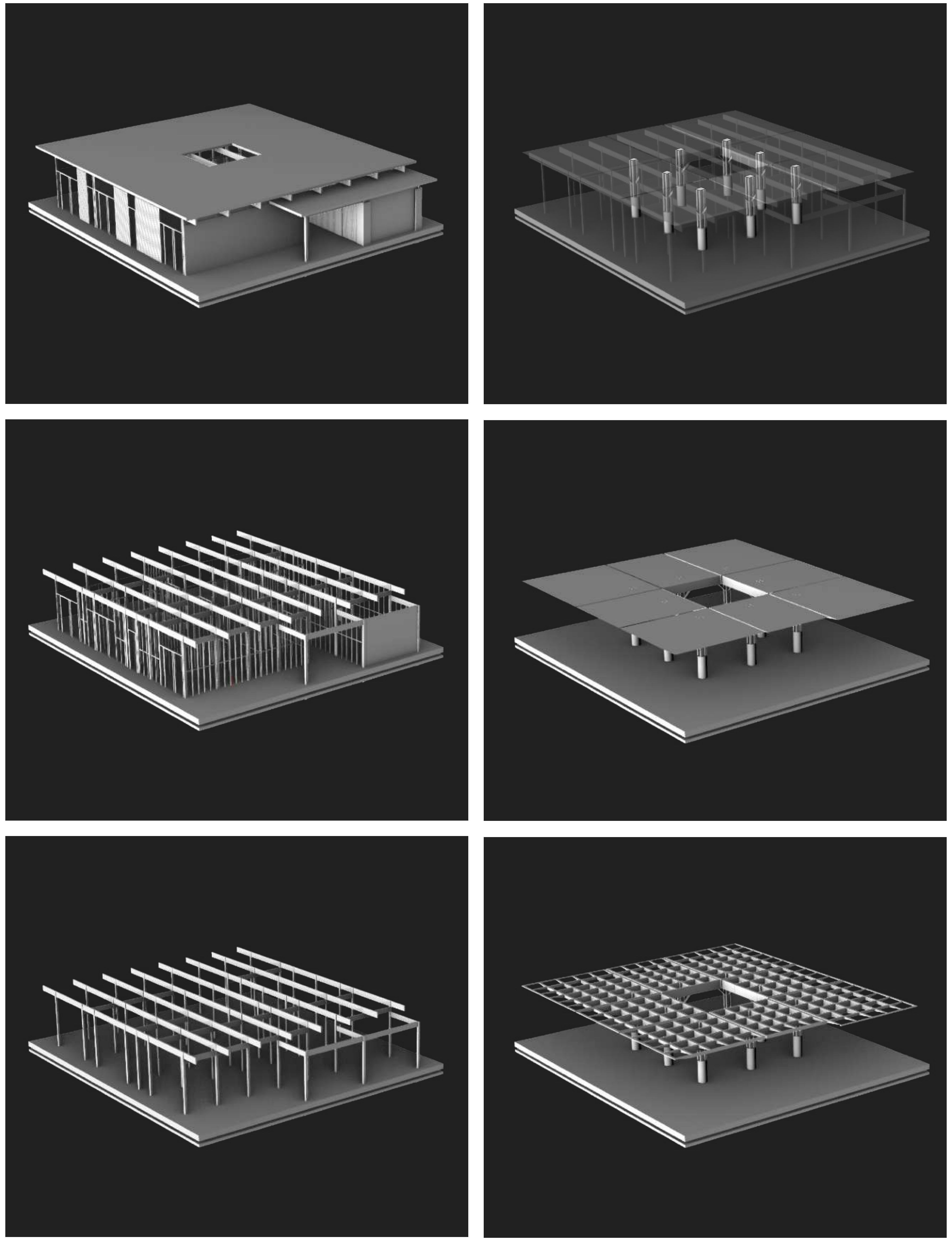
The studio will propose an innovation at the level of manufacturing, construction, materials and material techniques and any new techniques that could alter the ability of housing markets to innovate. The scope and site will vary for each body of research and designer. Our overall site and context will be housing and more precisely a study and beginning proposal for a new type of housing that might reconcile itself with and advance the more than 80 million single-family houses in the United States. There are approximately 130 mil- lion dwelling units in the United States.

KEY OBJECTIVES

The Eichler houses were an anomaly in the 1950s. Joseph Eichler innovated successfully during the housing crisis, with mass manufactured spec houses that denied the typical cookie cutter approach. By introducing atriums he made natural light, ventilation and “ good architecture” affordable. My attempt is to re-imaging and re-innovate the philosophies of the spec house, in an attempt to address the single-family housing demands of today. The solutions aspire to be Climate responsive, mass manufacturable with an intentional engineering hypothesis that abstracts the values of the mid century modern home.

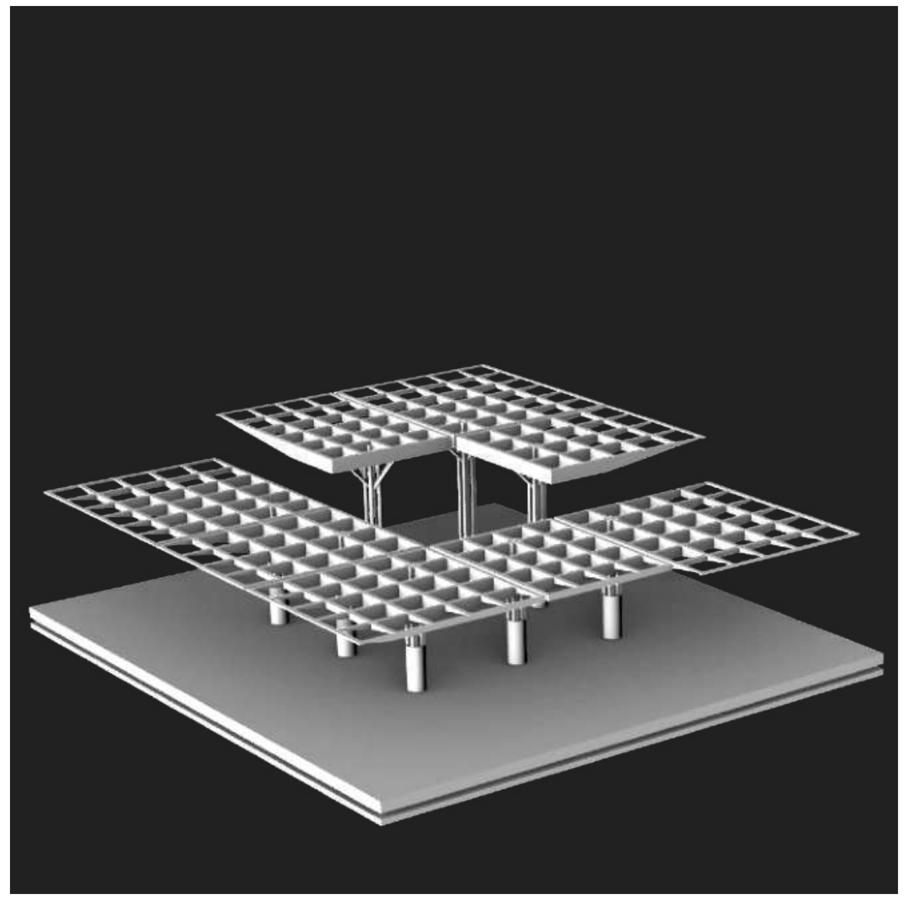
The Eichler **BIM Analysis**



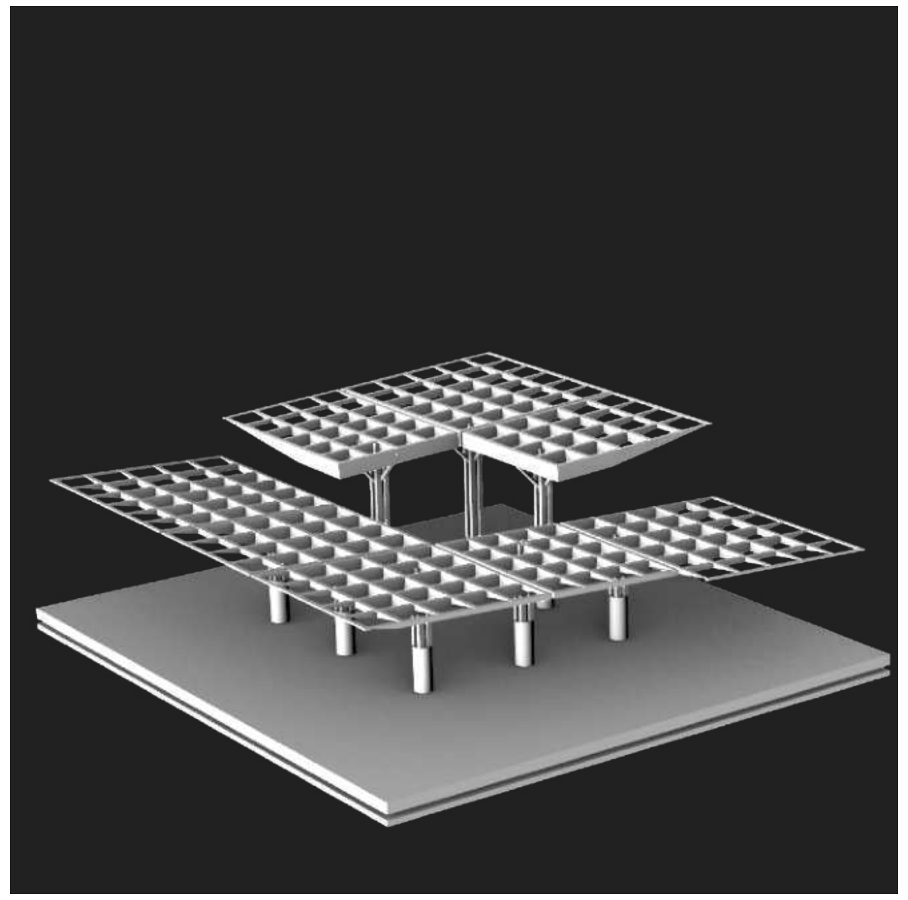


Structural Optimisation

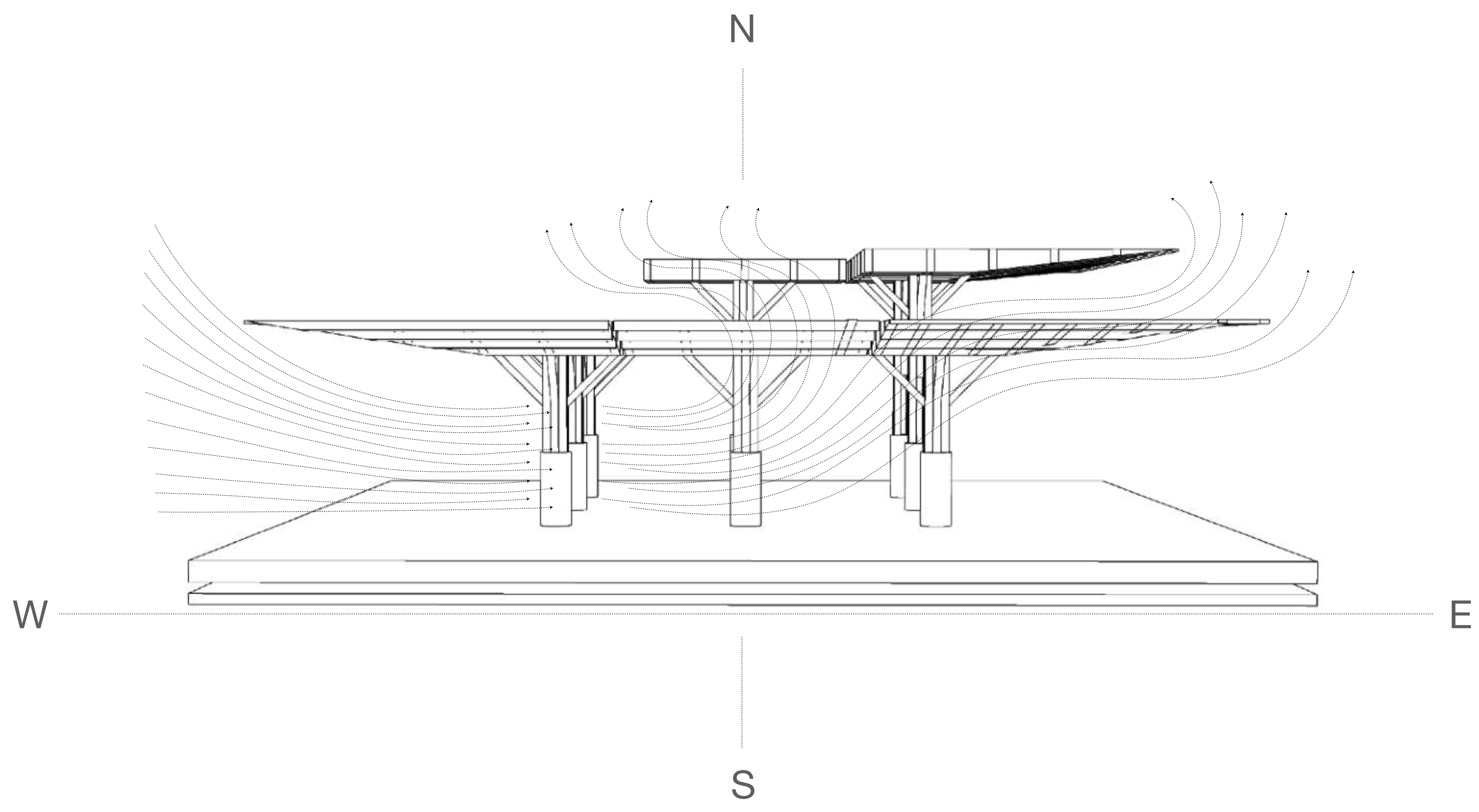
240 Studs, **480** Noggings, **58** Posts, **54** Beams → **6** Columns + **6** Roof x **36** Glulam Beams per Quadrant

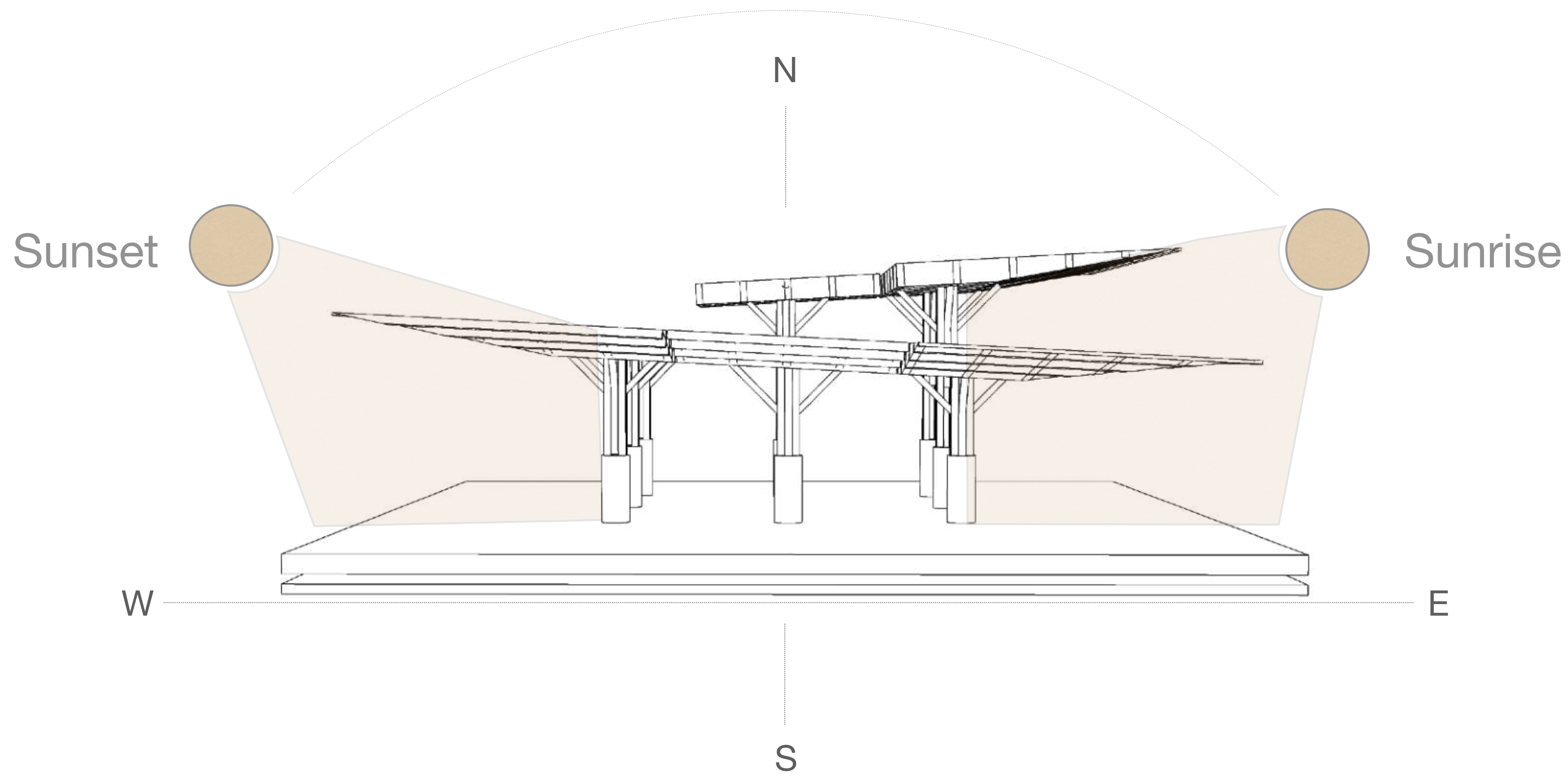


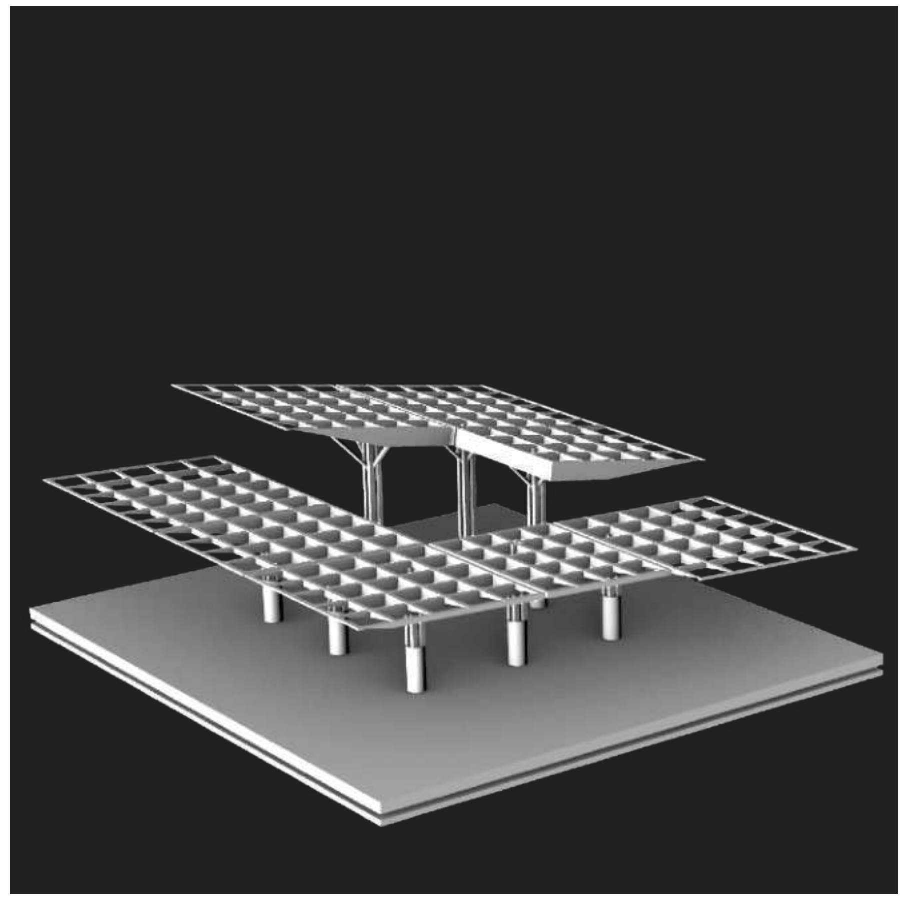
- Managing Pressure Potential



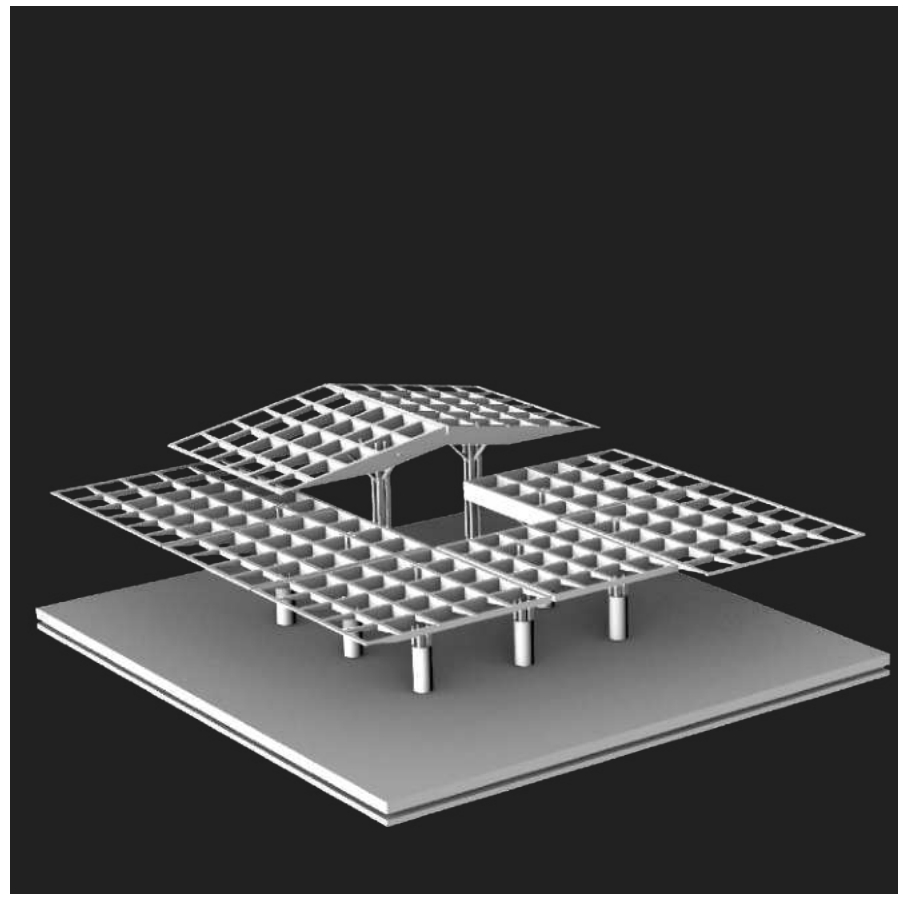
- Day Light Optimisation



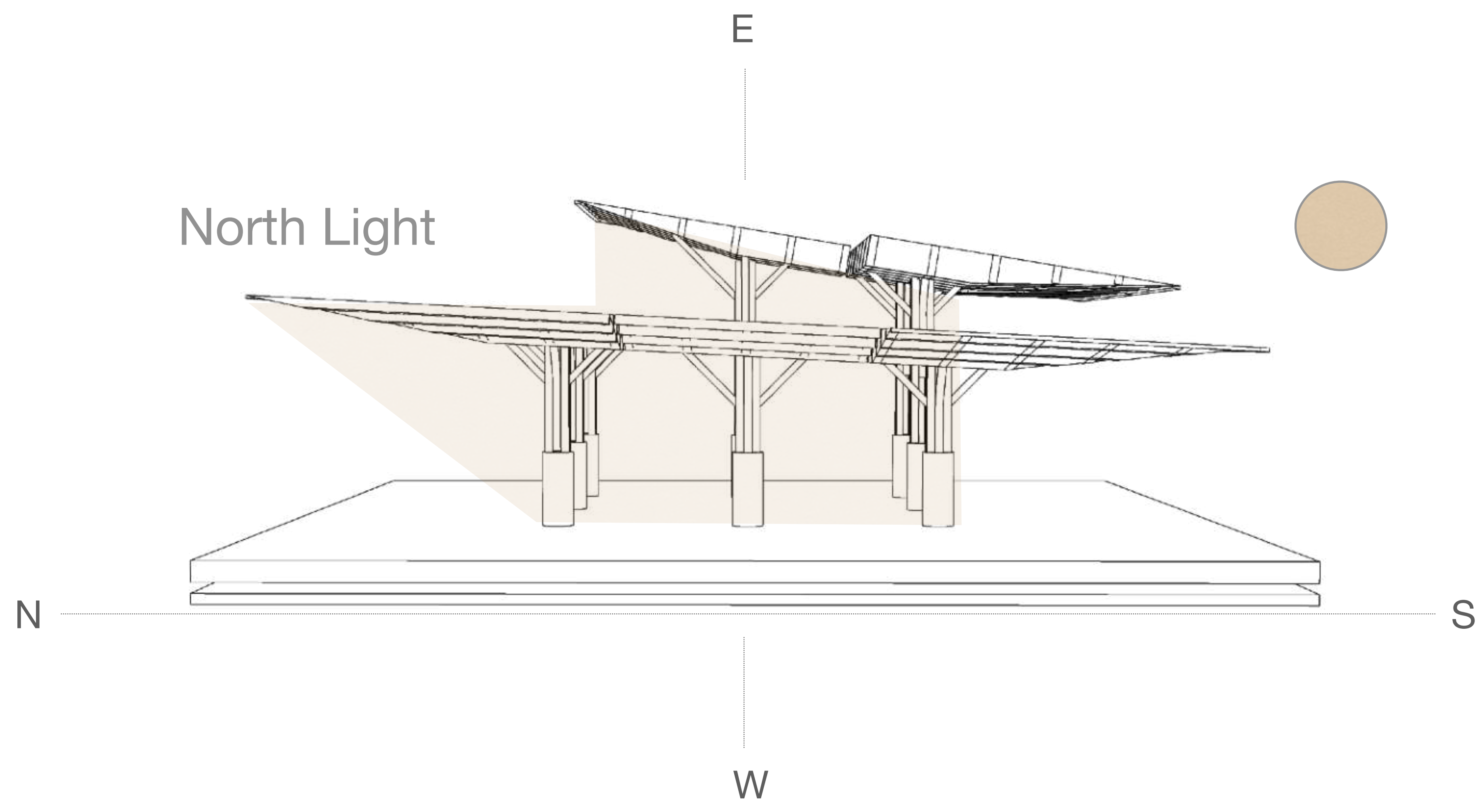


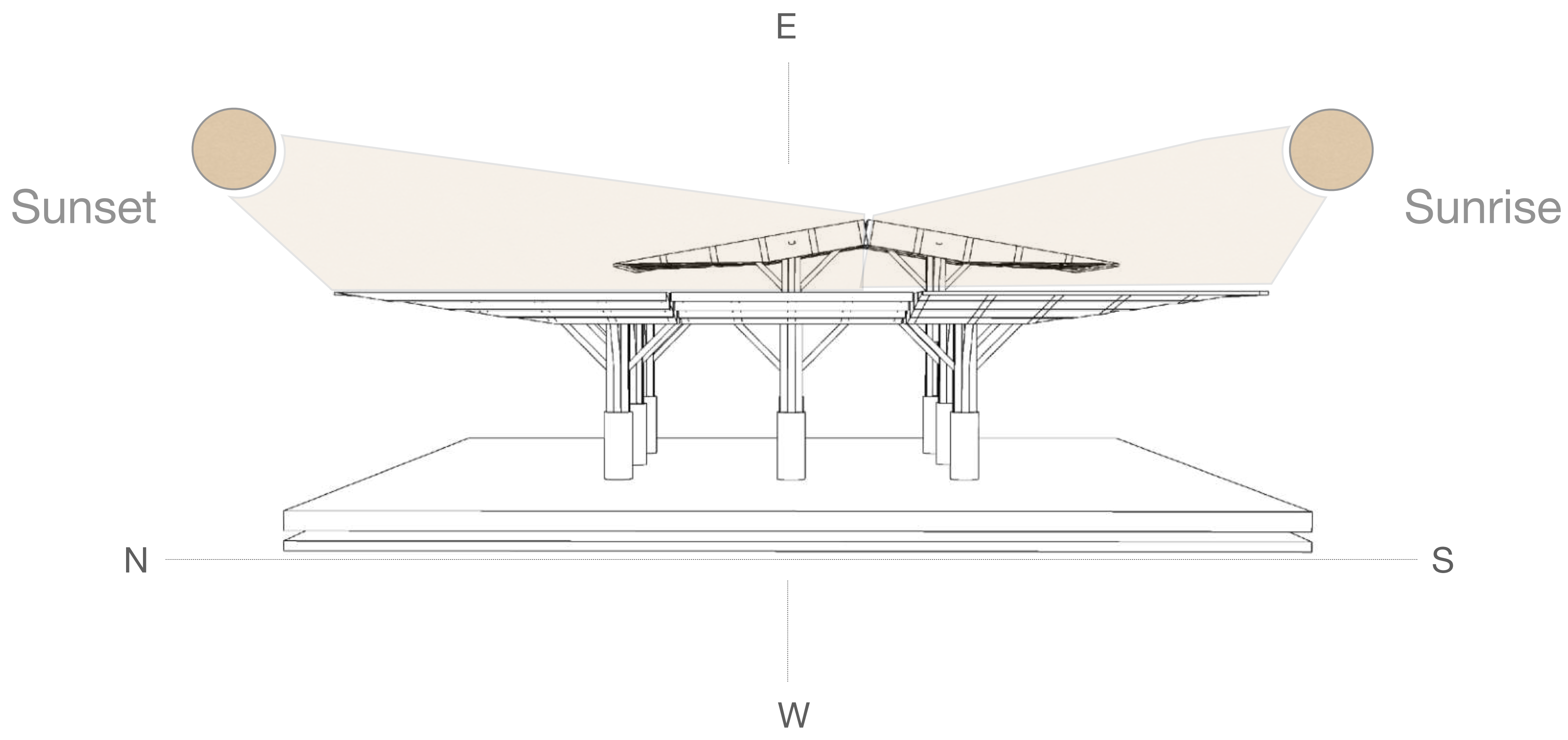


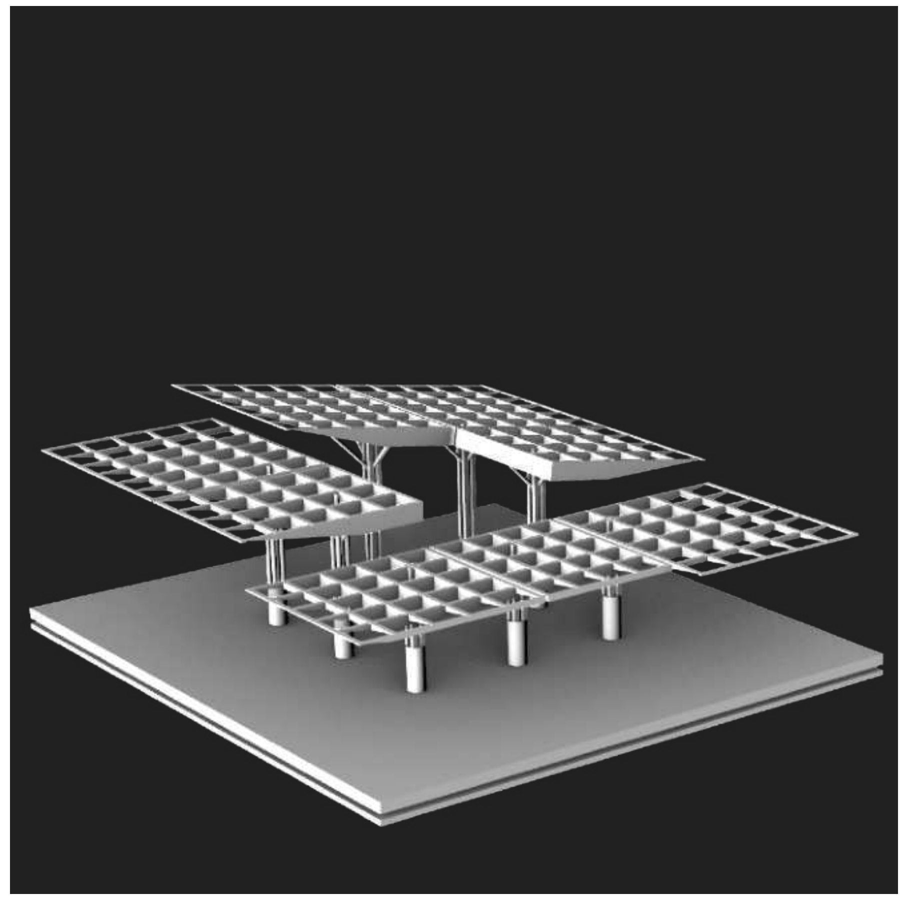
- North Light Optimisation



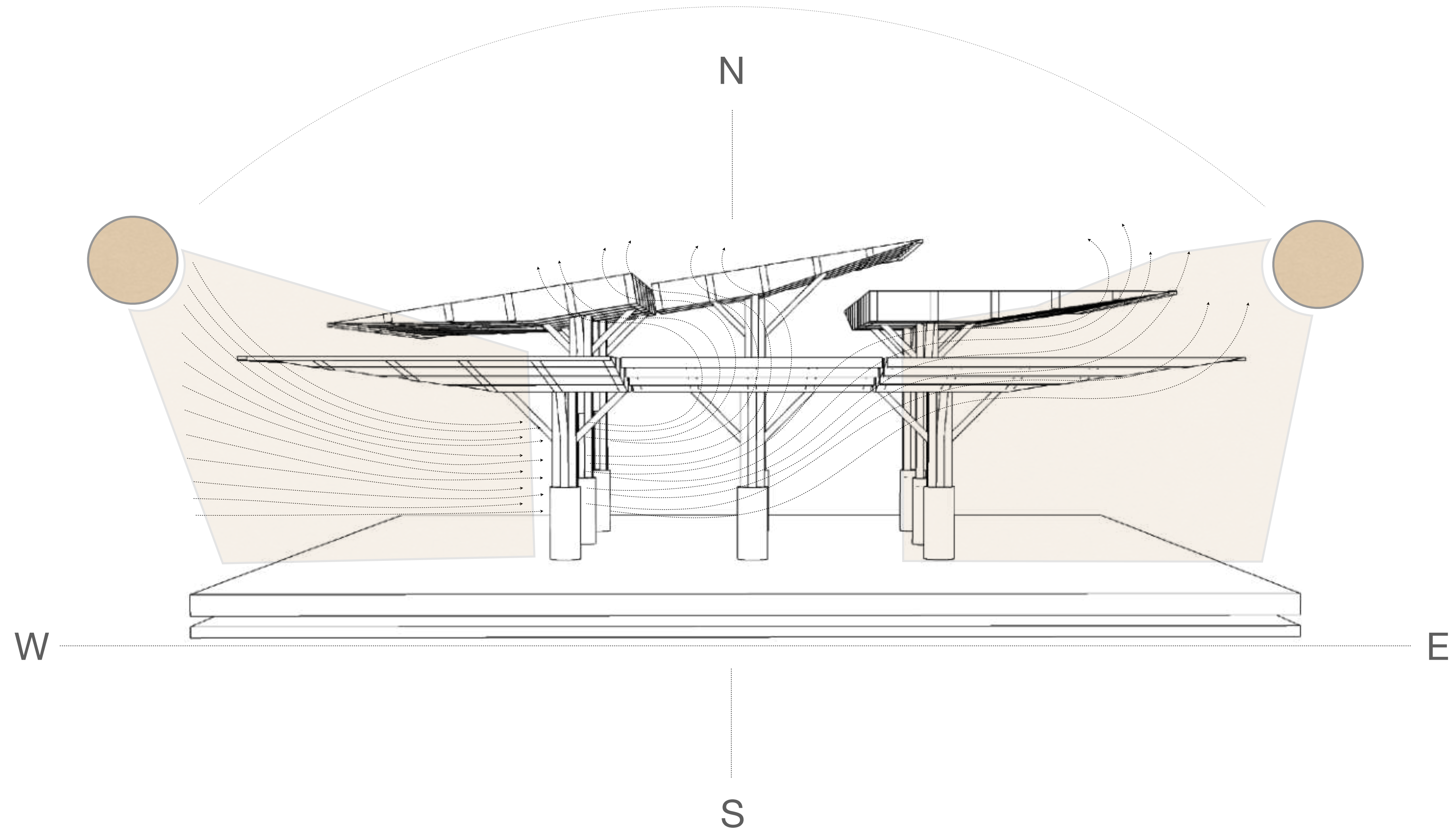
- Harvesting solar power

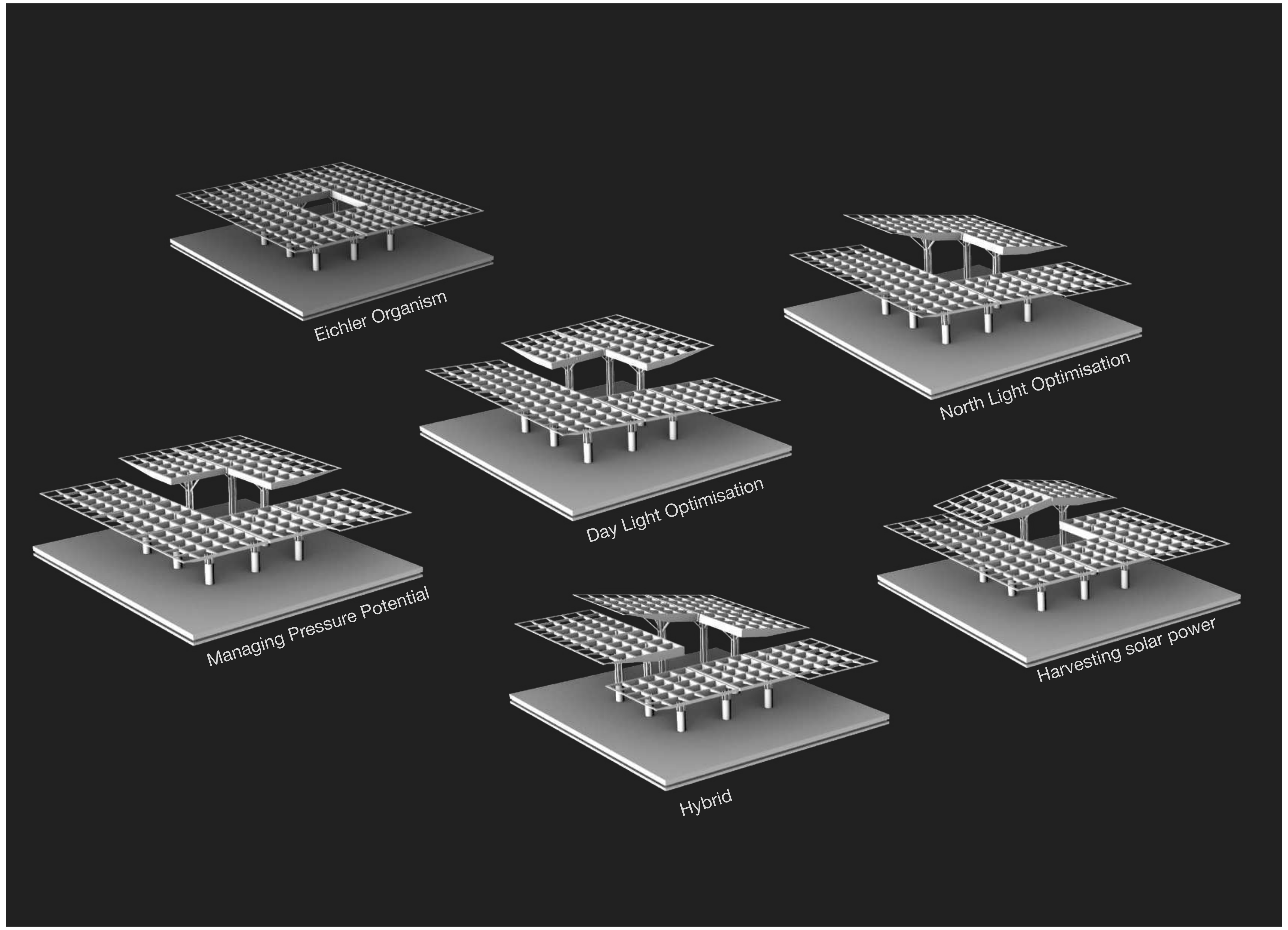






- Hybrid

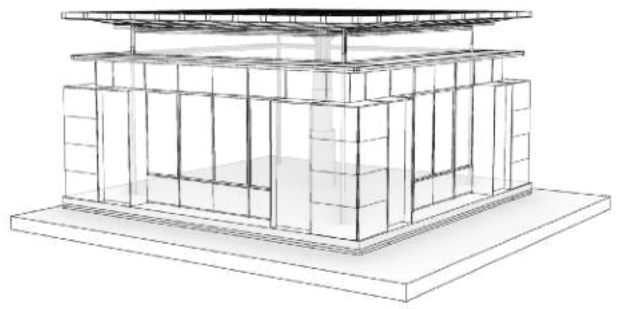




The Eichler **Organism**

The purpose of the **Organism** is to communicate, navigate and negotiate with its surroundings, in collaboration with its inhabitant.

Each quadrant is a **Cell** that enables modularity, autonomy, stability & functional integrity to the philosophies propagated by the organism.



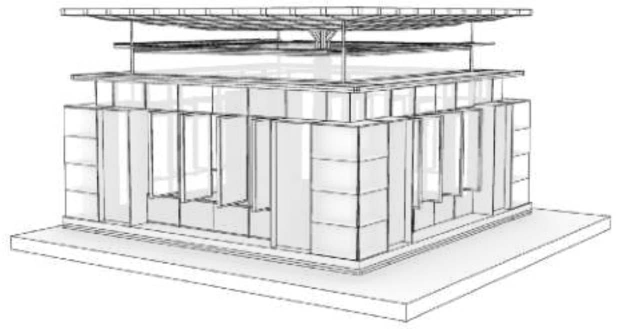
Mode I

Roof Height: 3 Meters

Roof Angle : 0 Degrees

Active Thermal control

Passive Thermal control



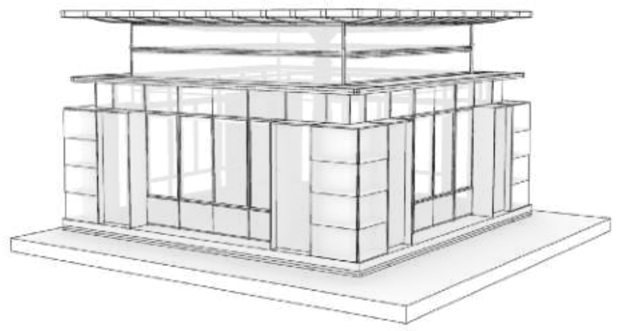
Mode II

Roof Height: 3.6 Meters

Roof Angle : 0 Degrees

Active Thermal control

Passive Thermal control



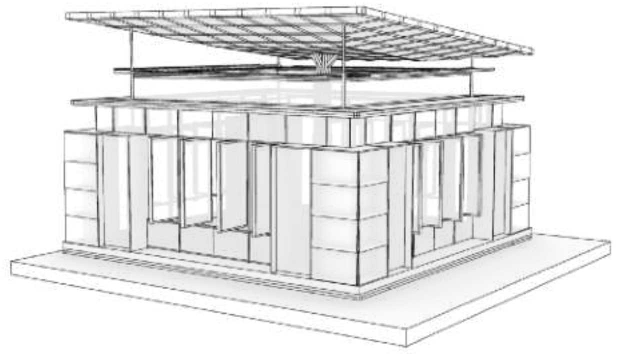
Mode III

Roof Height: 3.6 Meters

Roof Angle : 0 Degrees

Active Thermal control

Passive Thermal control



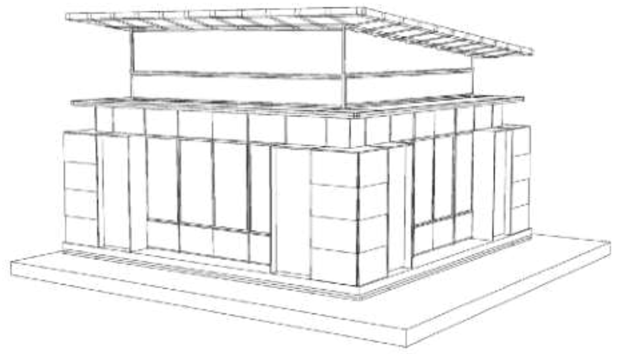
Mode IV

Roof Height: 4 Meters

Roof Angle : 0 Degrees

Active Thermal control

Passive Thermal control



Mode V

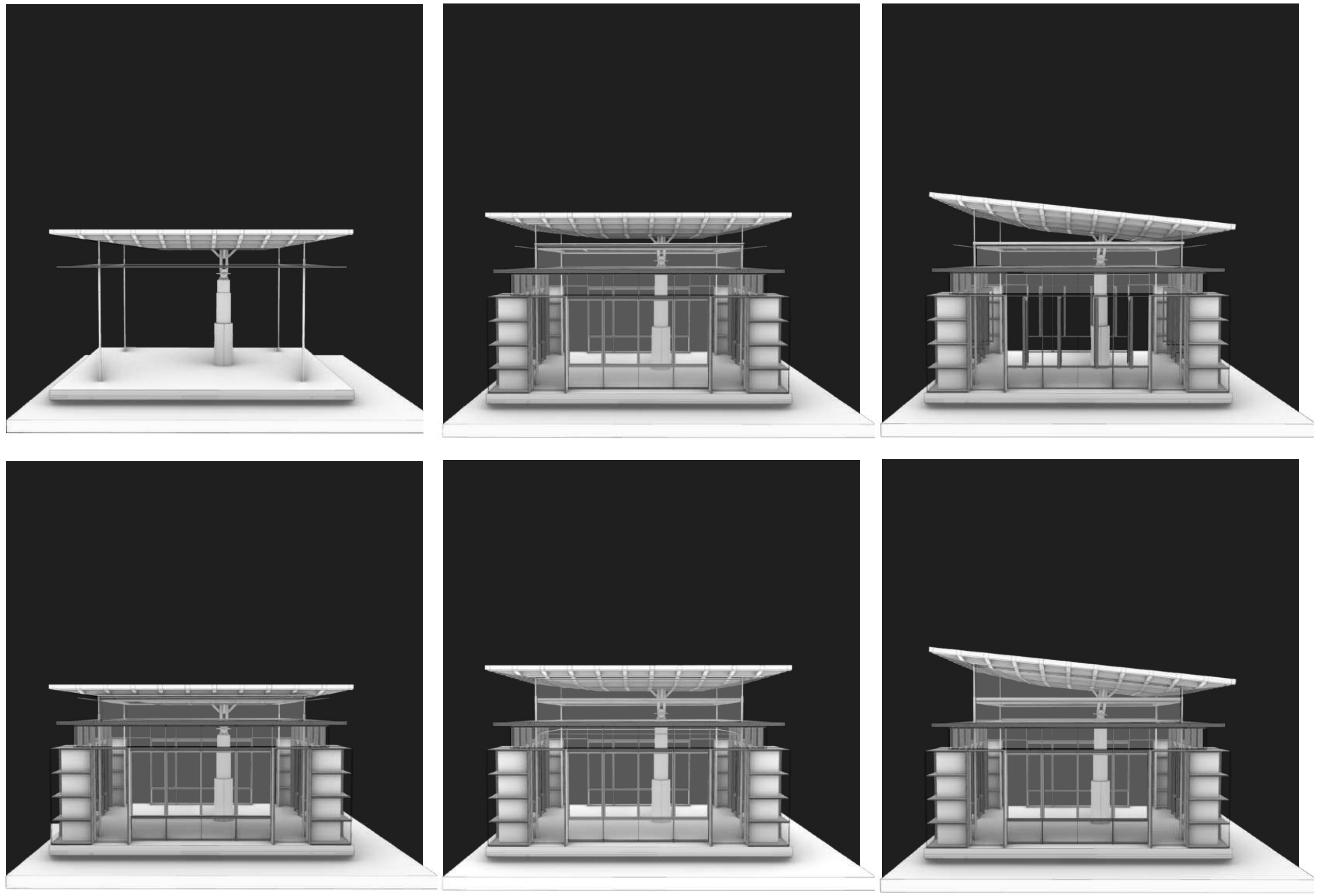
Roof Height: 4 Meters

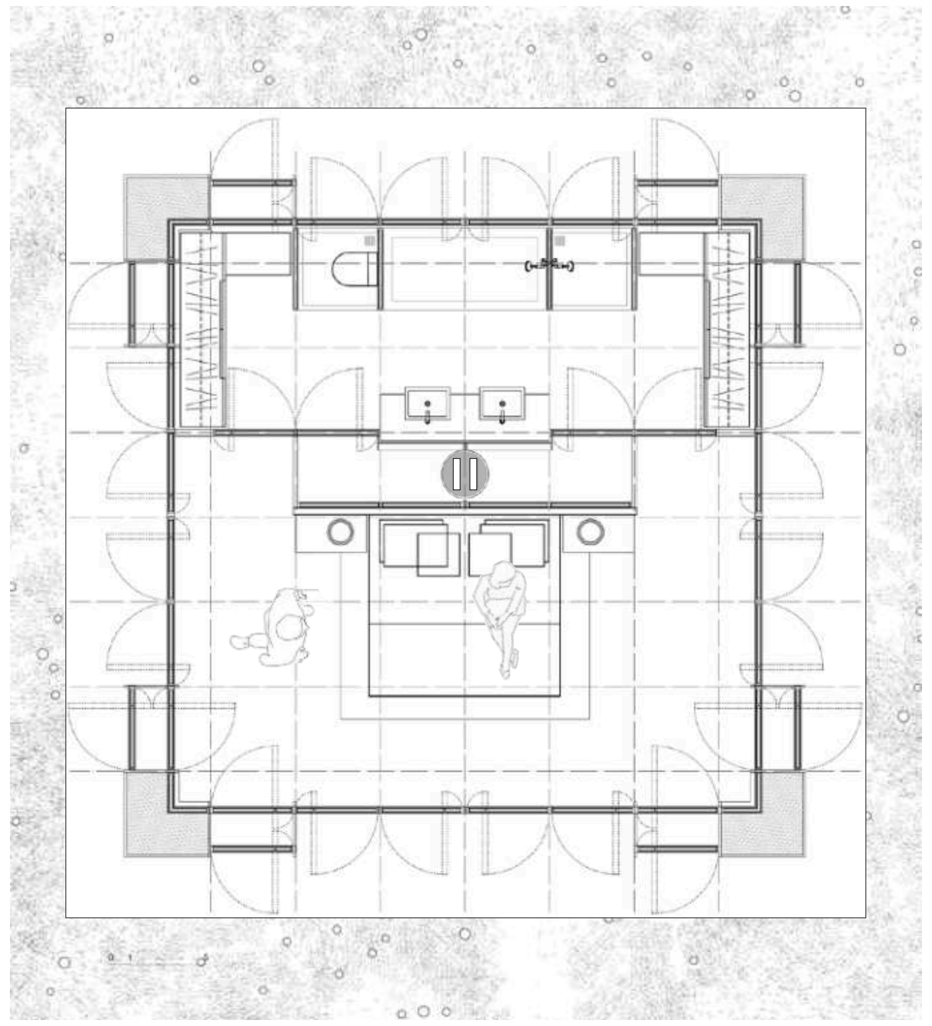
Roof Angle : 0 Degrees

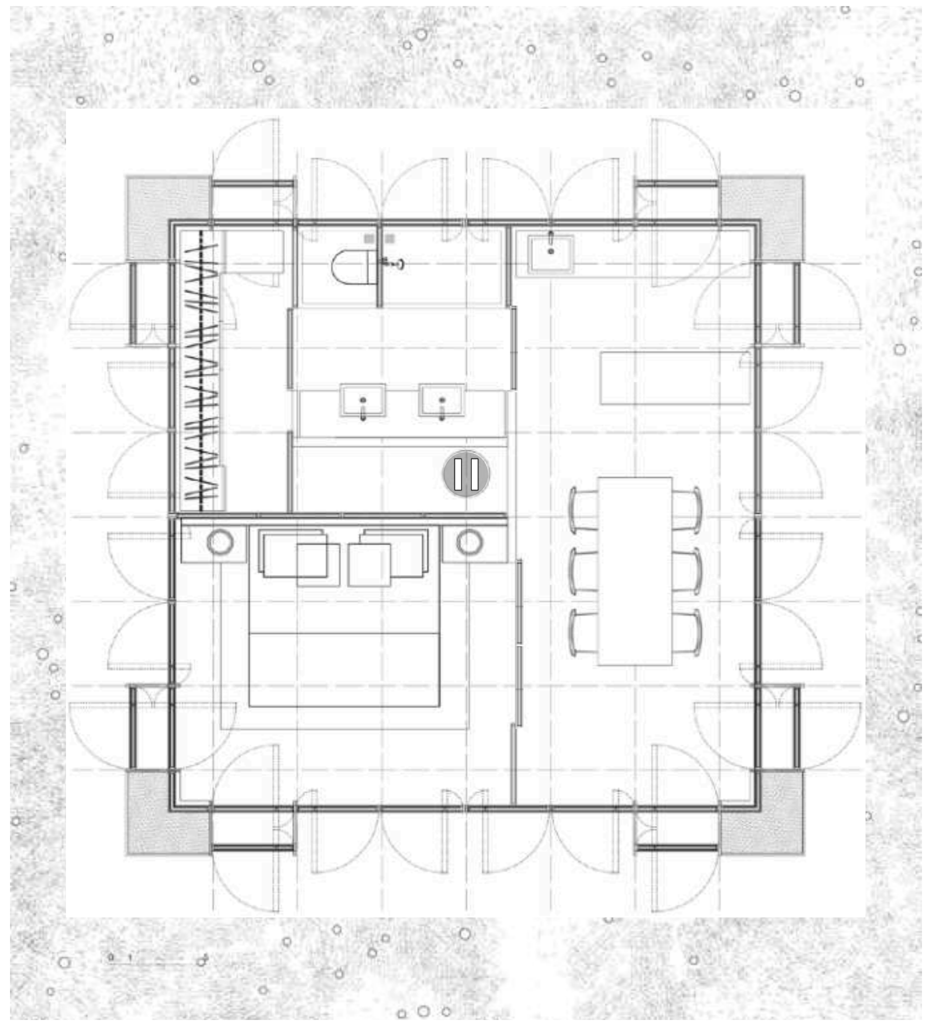
Active Thermal control

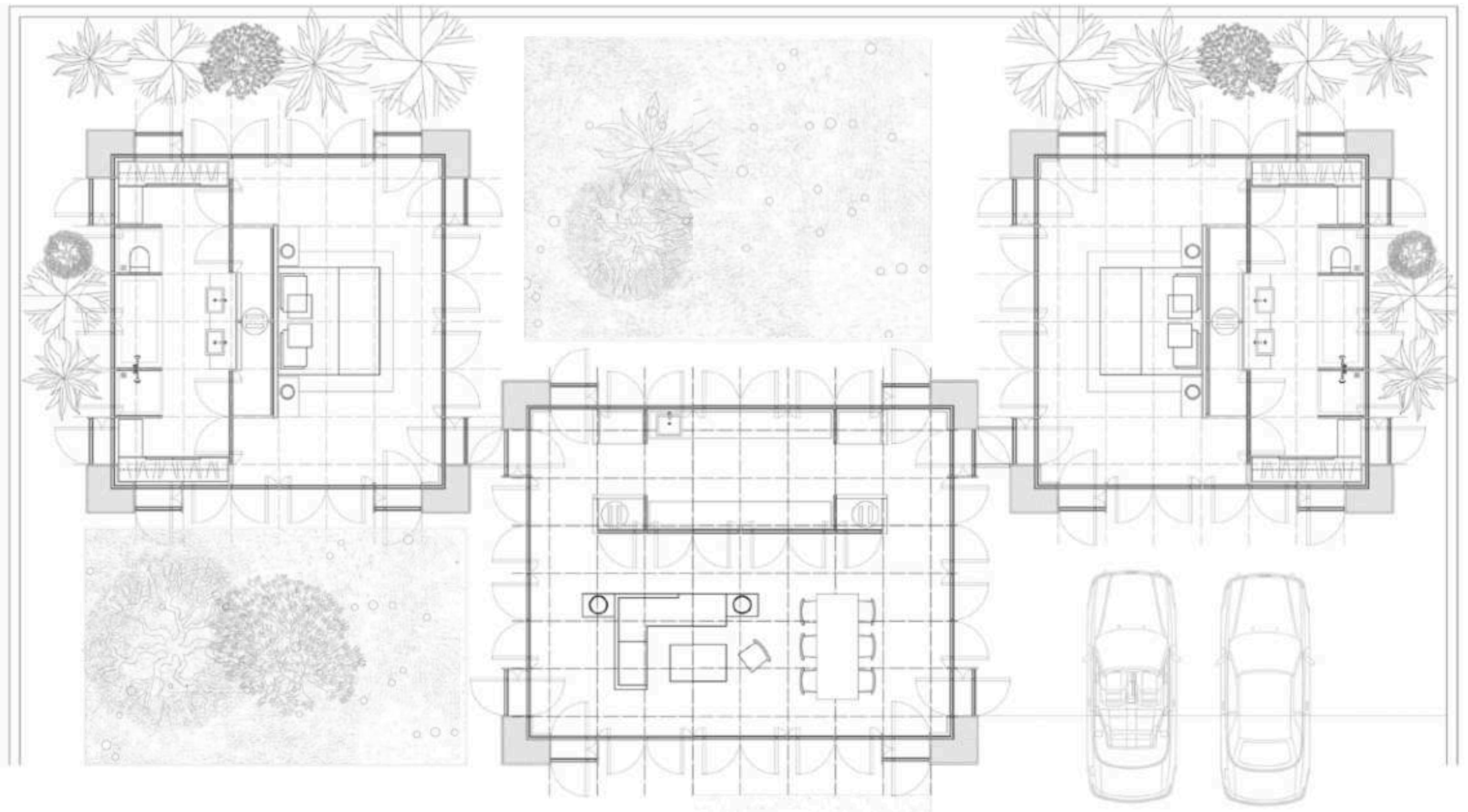
Passive Thermal control

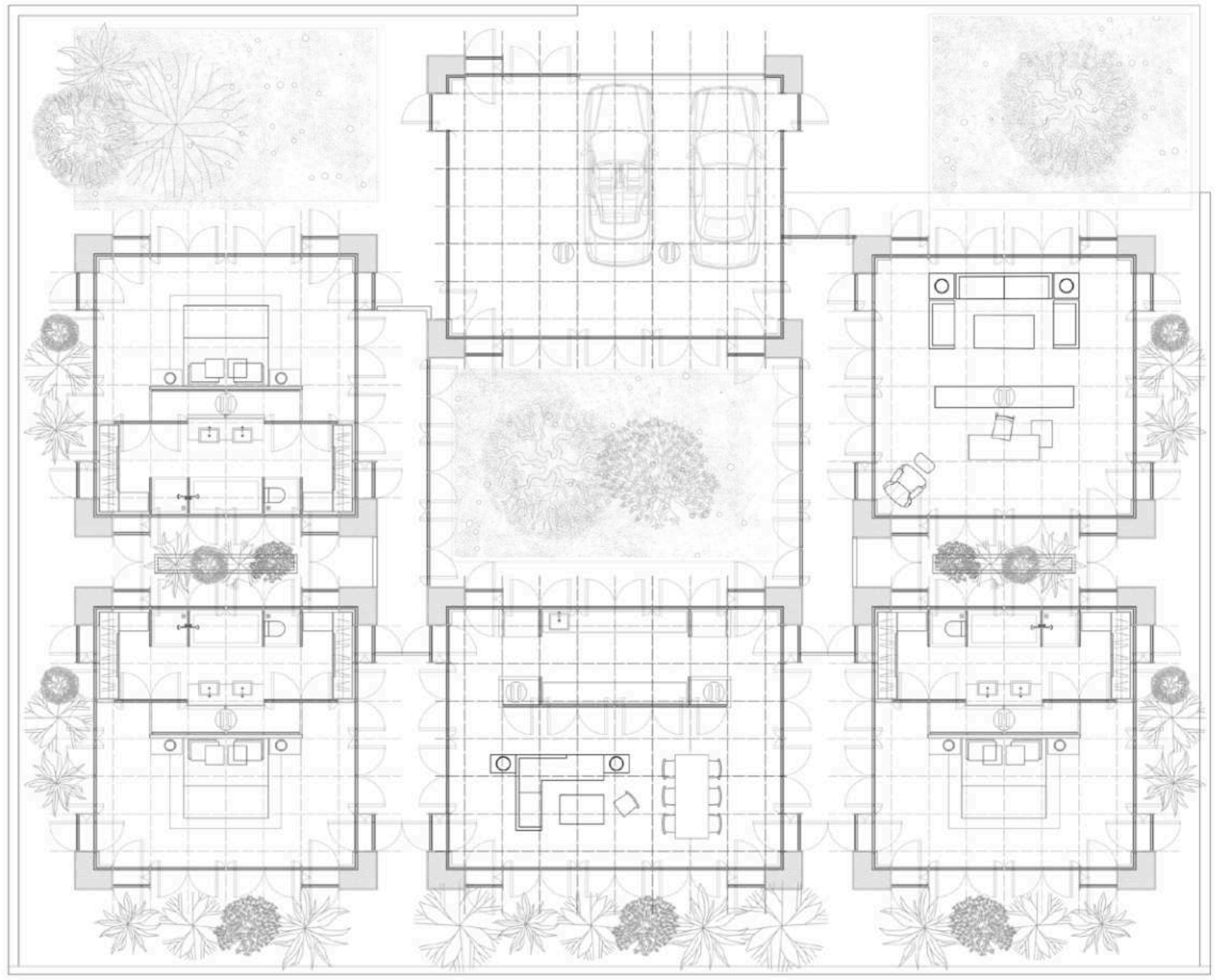
The Eichler **Cell**











CASE STUDY

Two Unusual Projection Spaces
Michael Naimark; Special issue on projection
MIT Press 14.5, October 2005

04 METATOOLS
The Imagination Project

Studio : Computational Tech
Accessing Spatial Memory with AI & Projection Mapping

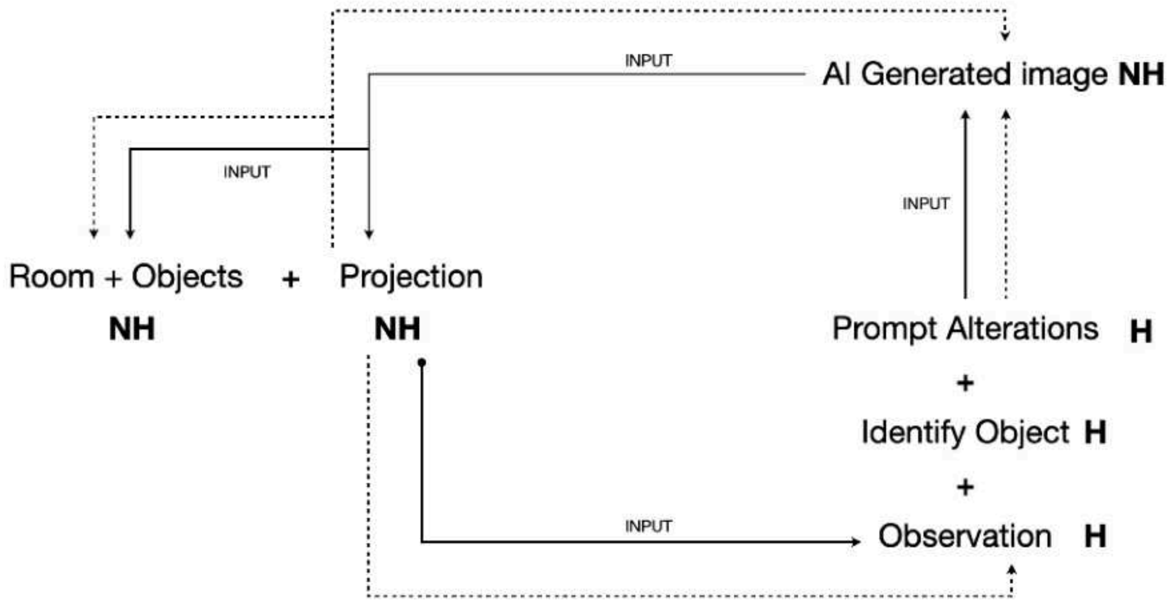
Mentor : Dan Taeyoung
Team: Aditya Mehta

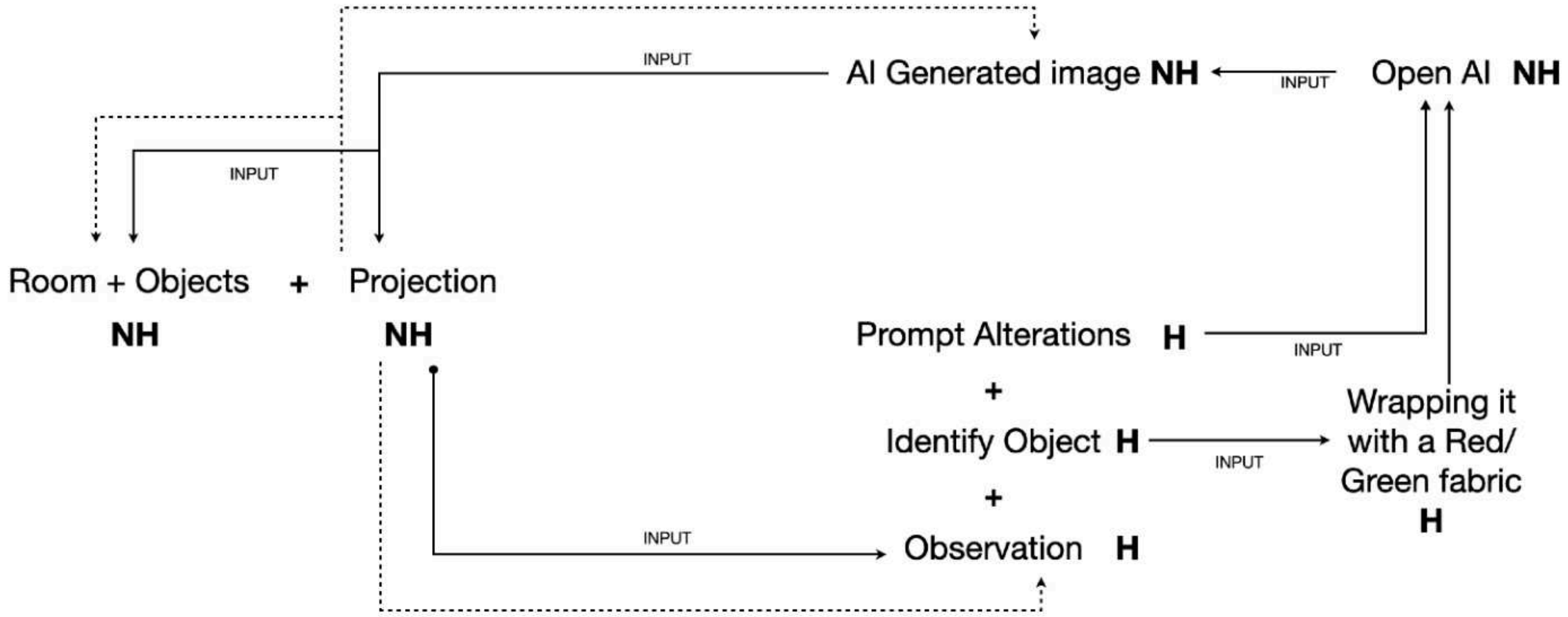
THE BRIEF

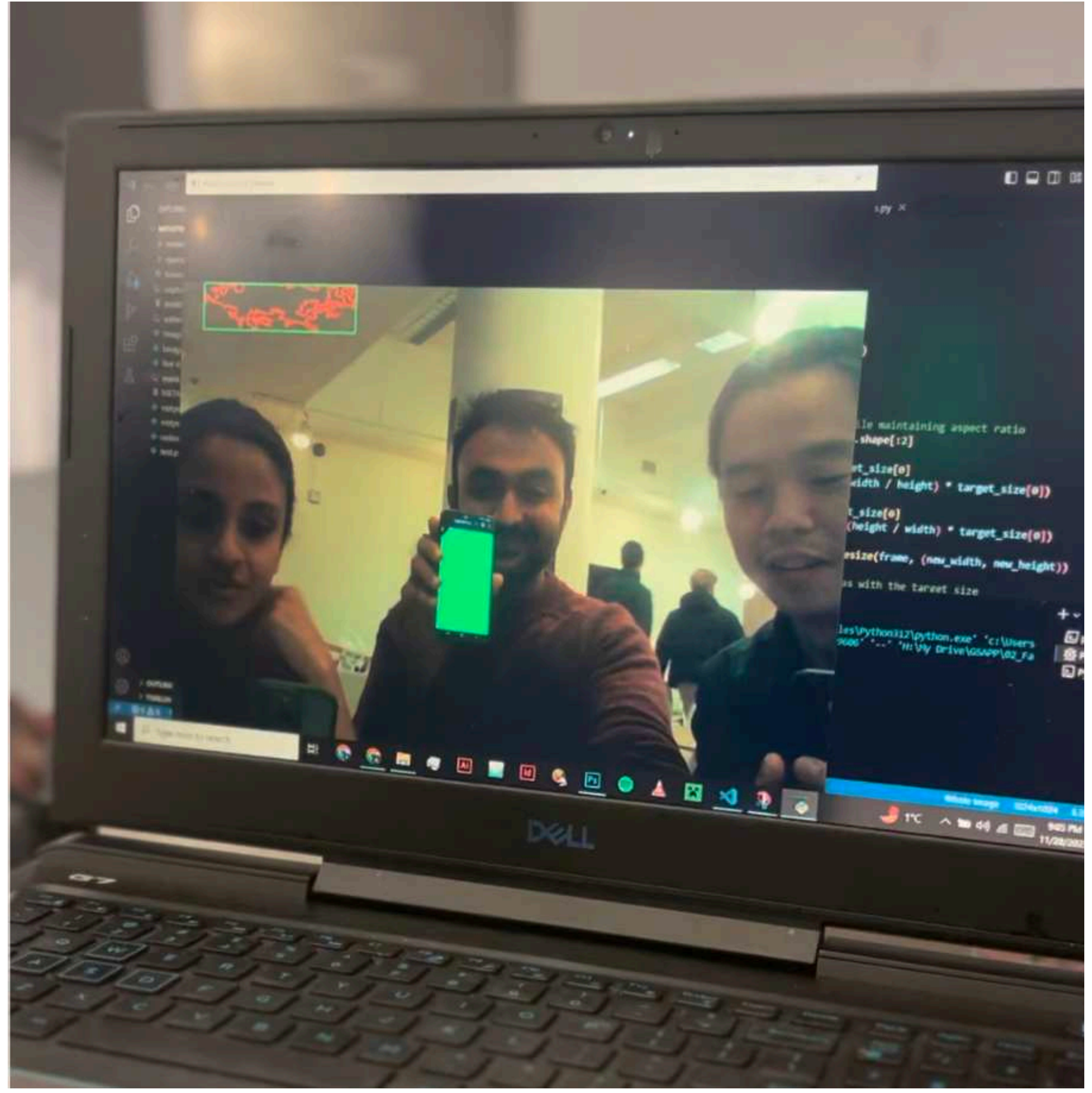
How do tools change our space, how do means and the function they unable change our space. Inspired by books such as " Cognition in the Wild" By Edwin Hutchins & Bruno Latour's "Berlin Key"; the studio helped us code a program that collaborates with its surrounding, into a vague semblance of a feed back loop - with finite variables but infinite possibilities.

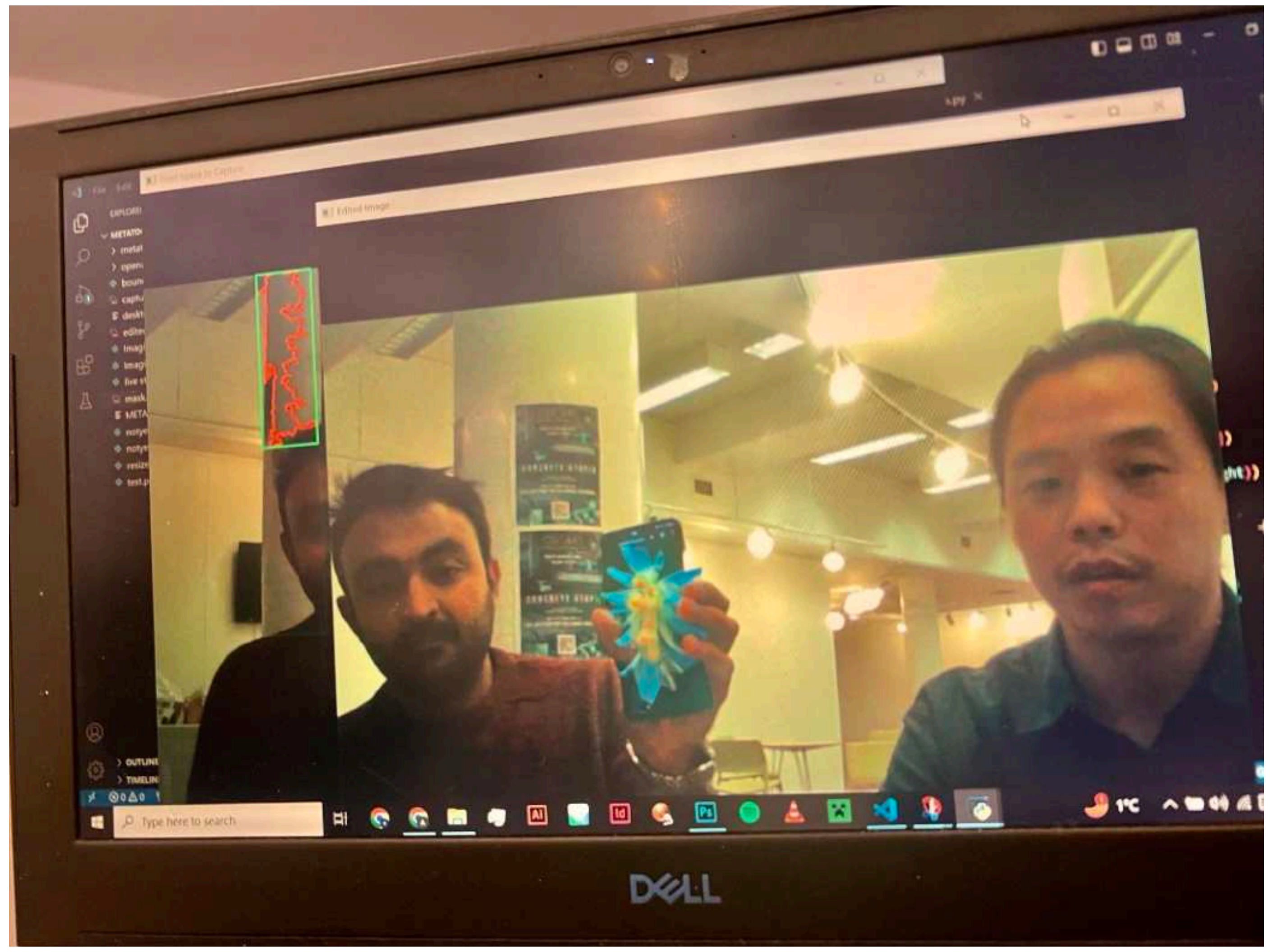
THE IMAGINATION PROJECT

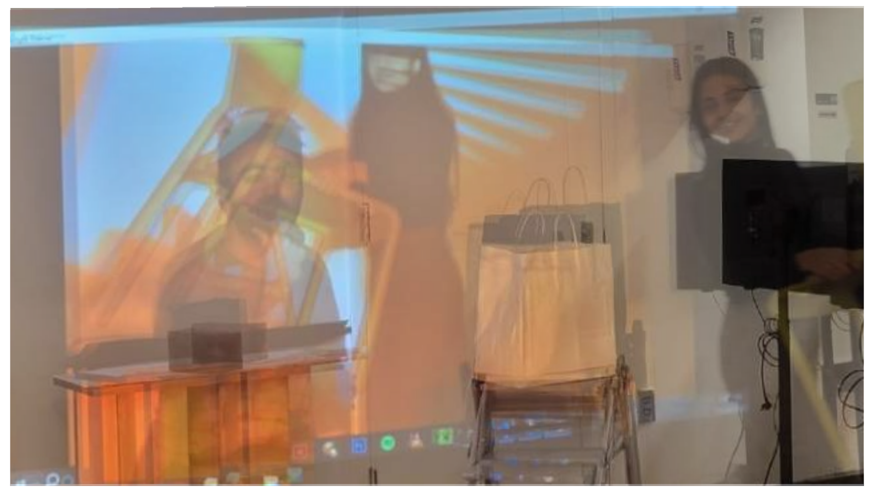
Accessing Spatial Memory with AI & Projection Mapping : The goal of the project was to allow our python script to access Open AI for a realtime - collaboration. A projector was set up in a room, an image of it captured, and projected onto itself. The human would then use a coloured cloak/device/green screen to intervene intent fully. The script is trained to detect the coloured device, Re-imagine its purpose with AI, and projected back onto the room.





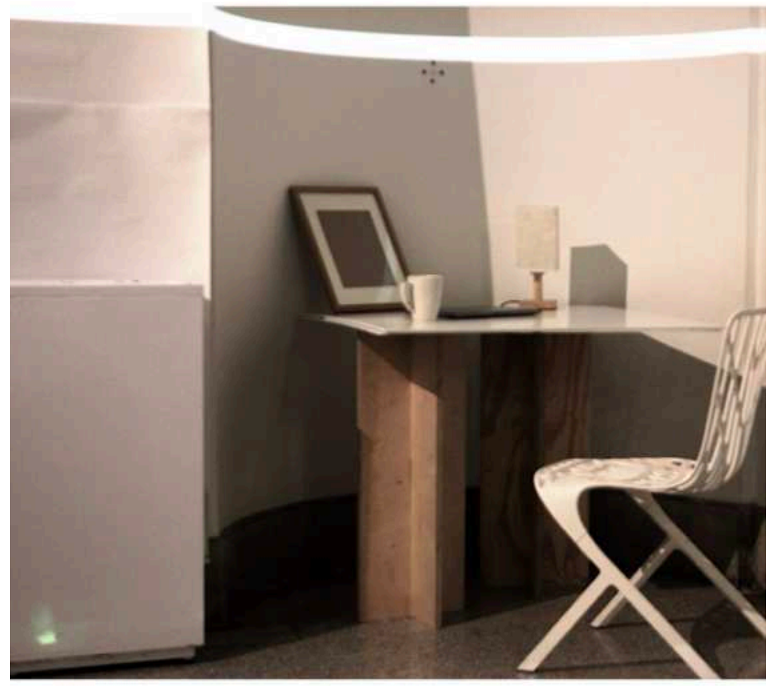


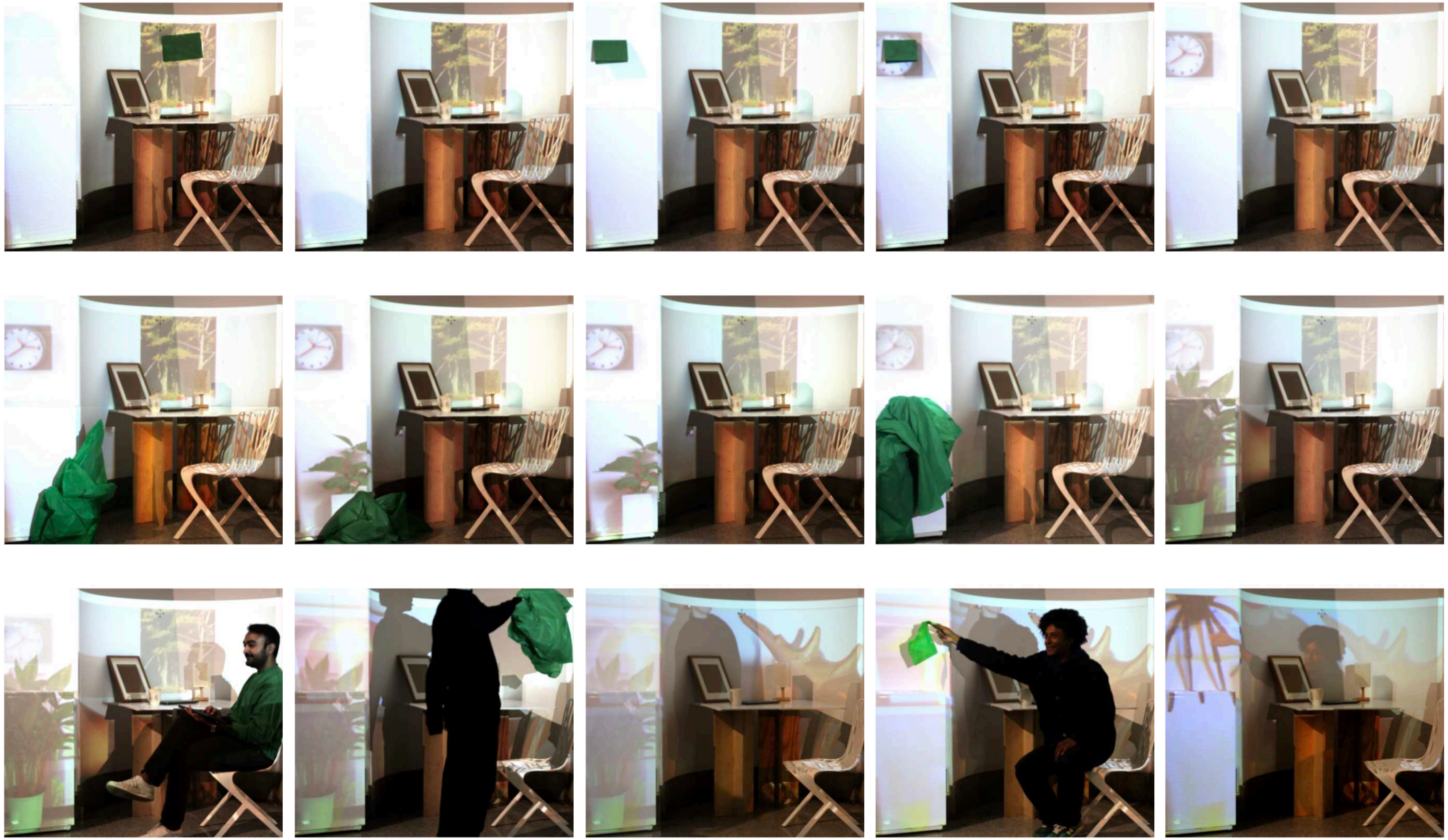


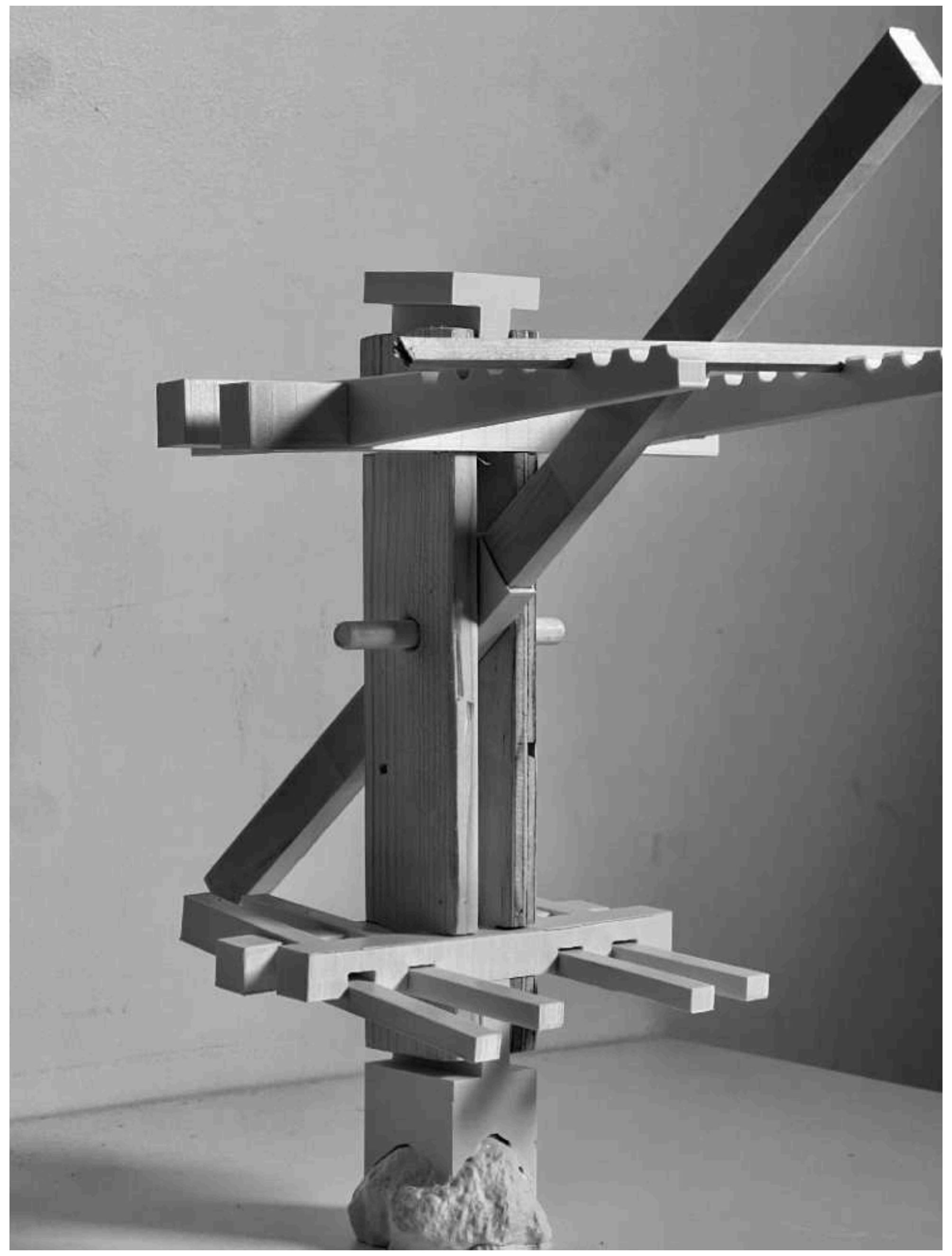


Training the script to recognise Colour ; Training the script to re-imagine

Training the script to project, capture & project again (feed back loop)







05

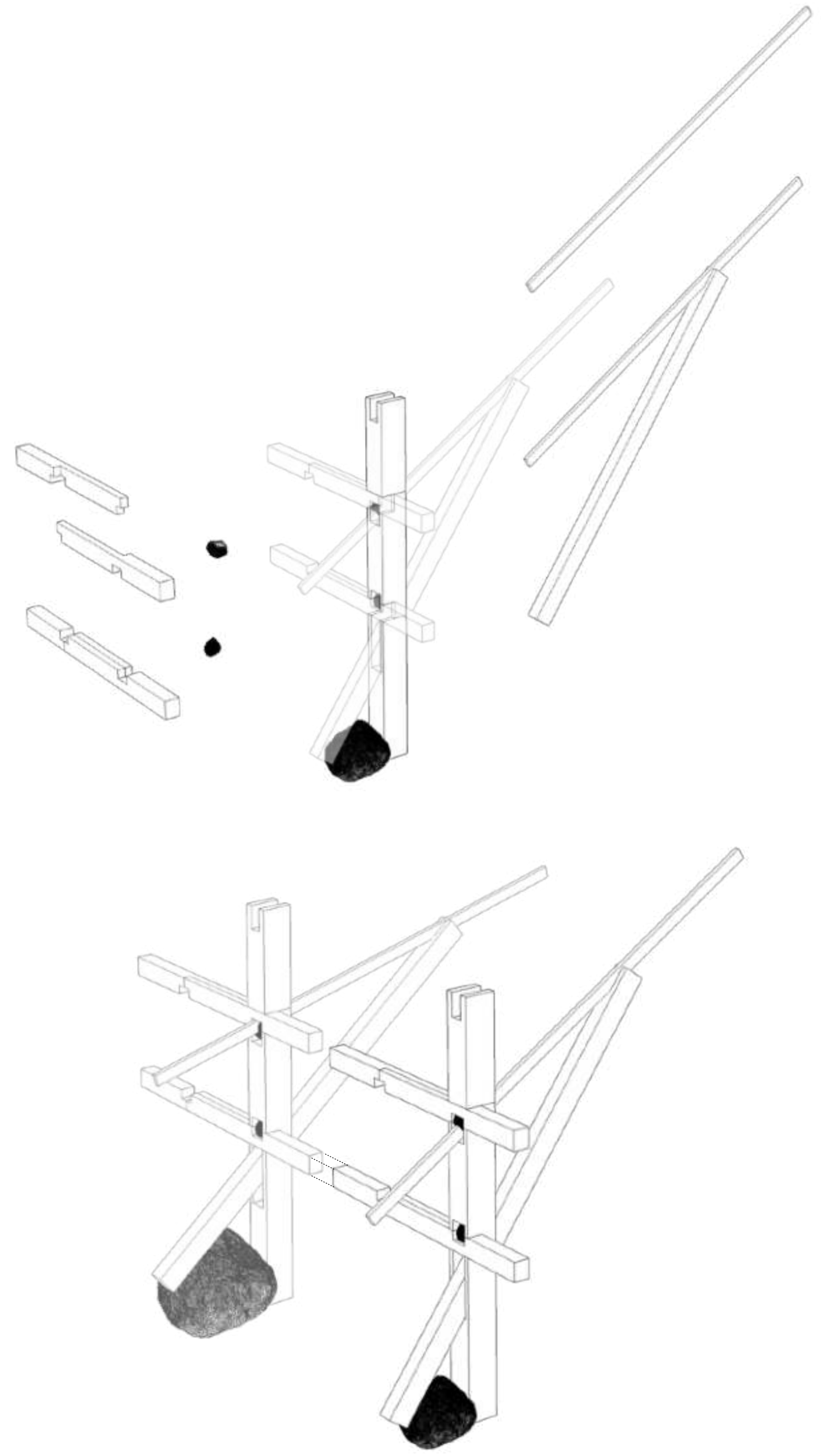
COLLECTIVE ASSEMBLIES

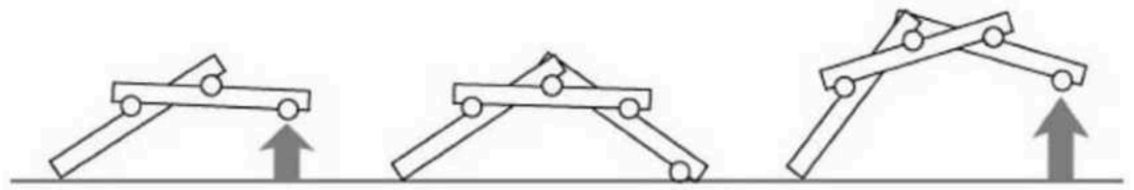
Studio : Computational Tech
The Post & The Canopy, Scripting Vernacular joineries

Mentor : Dannіely A. Staback Rodriguez
Team: Raymond, Yake, Yunhao

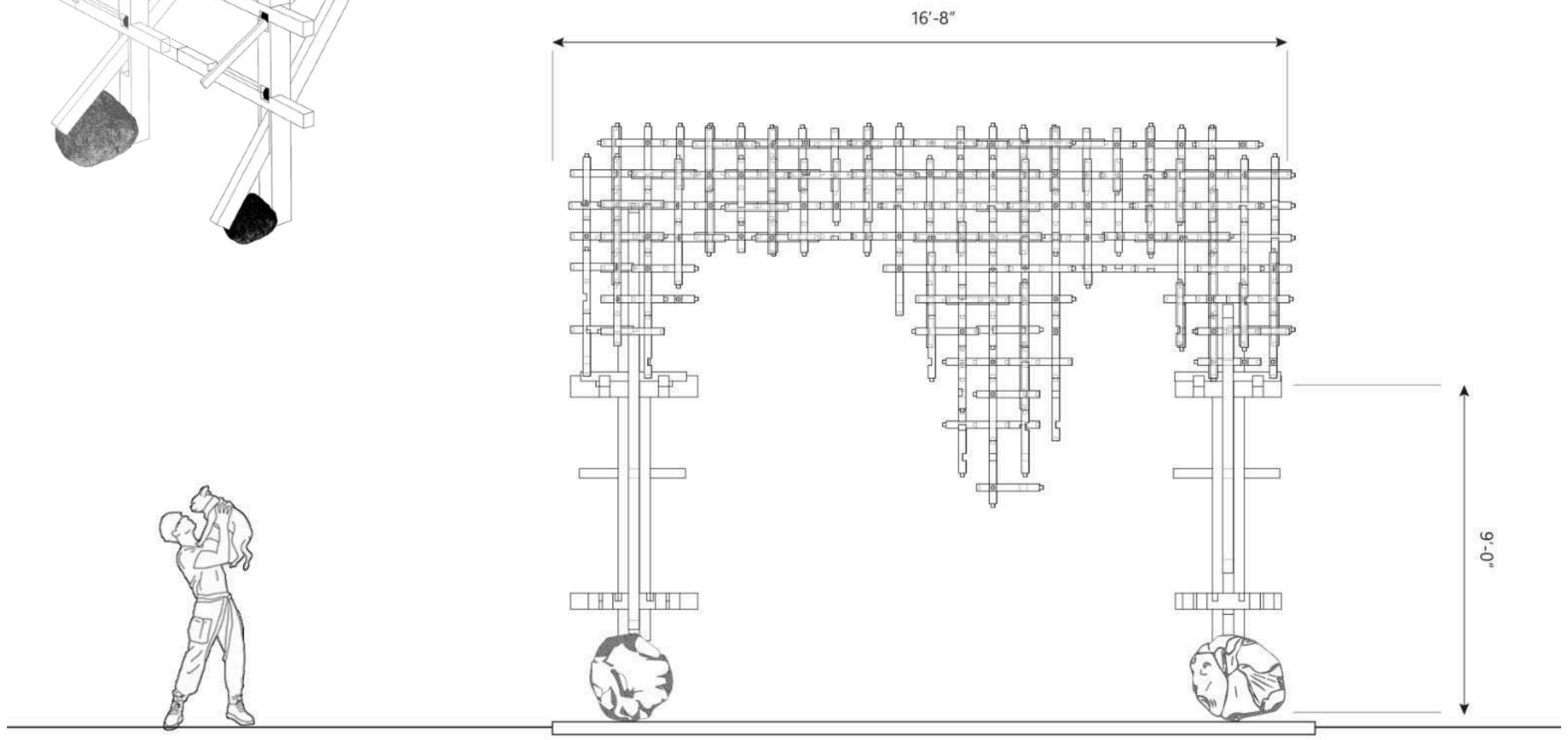
THE BRIEF

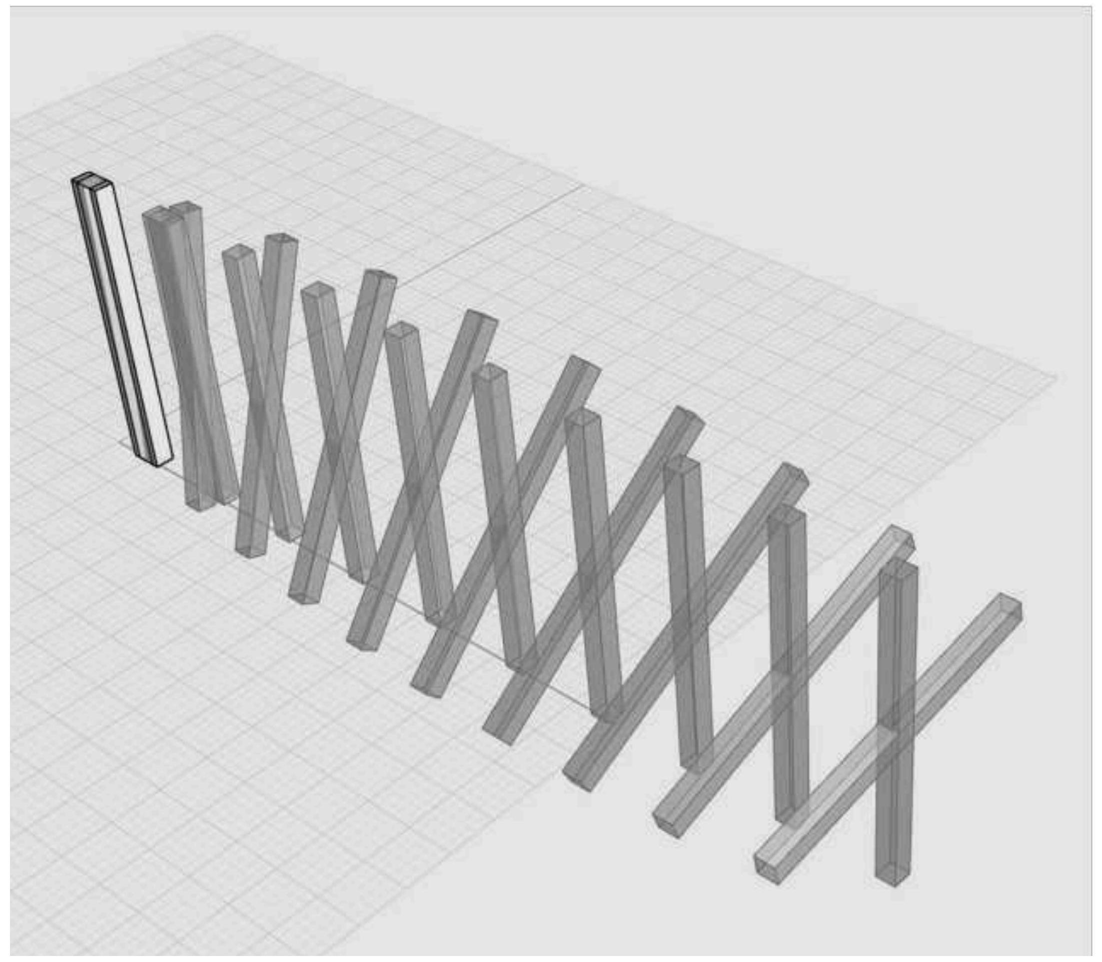
To devise a computational script that allows you to collaborate with one or more variable parameters, allowing technology to enable assemblies that are not composed purely of modular/computer generated components.

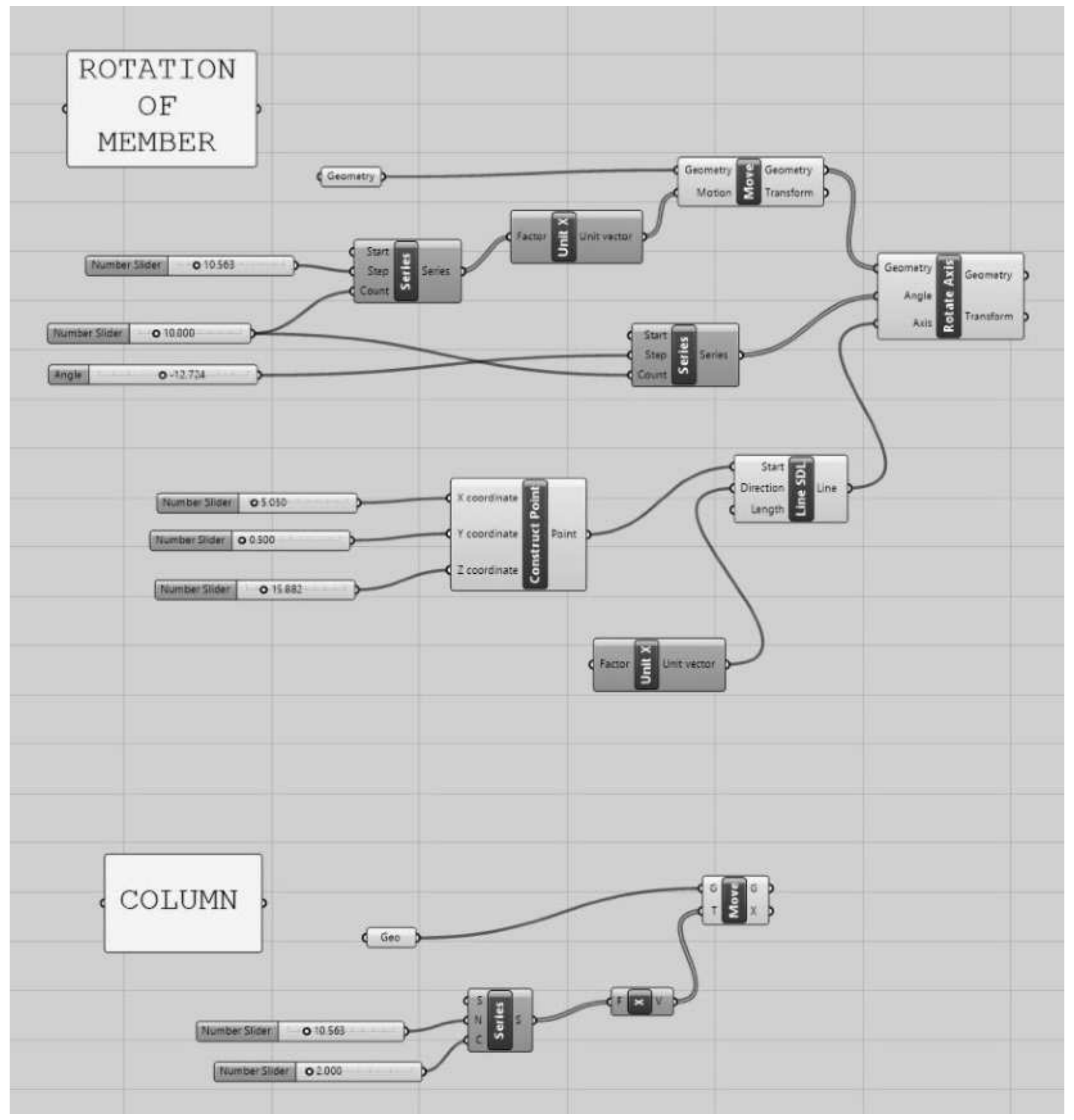


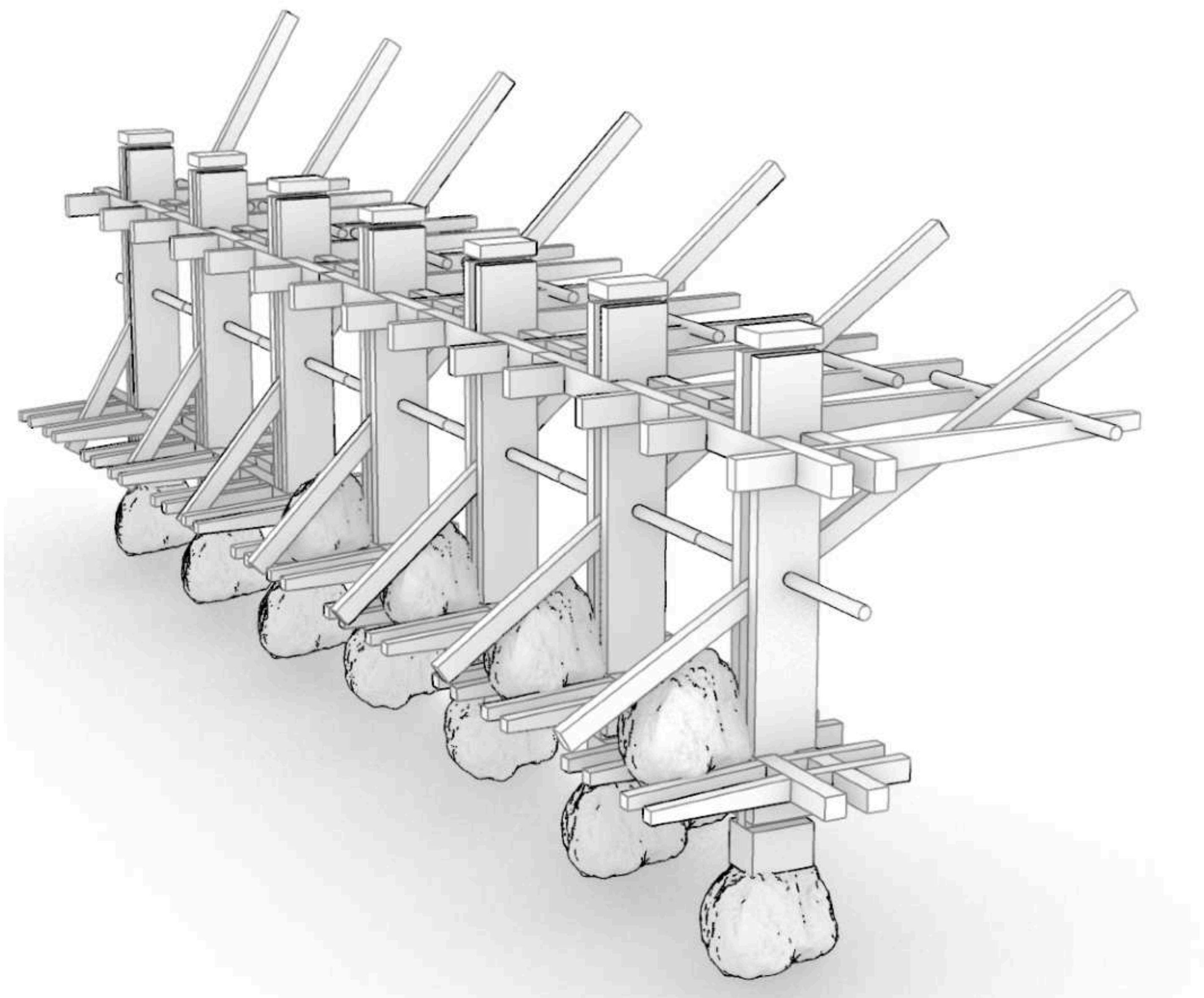


The Post & The Canopy









Diameter of Rock $\propto$ Weight of Rock $\propto$ Angle of Truss

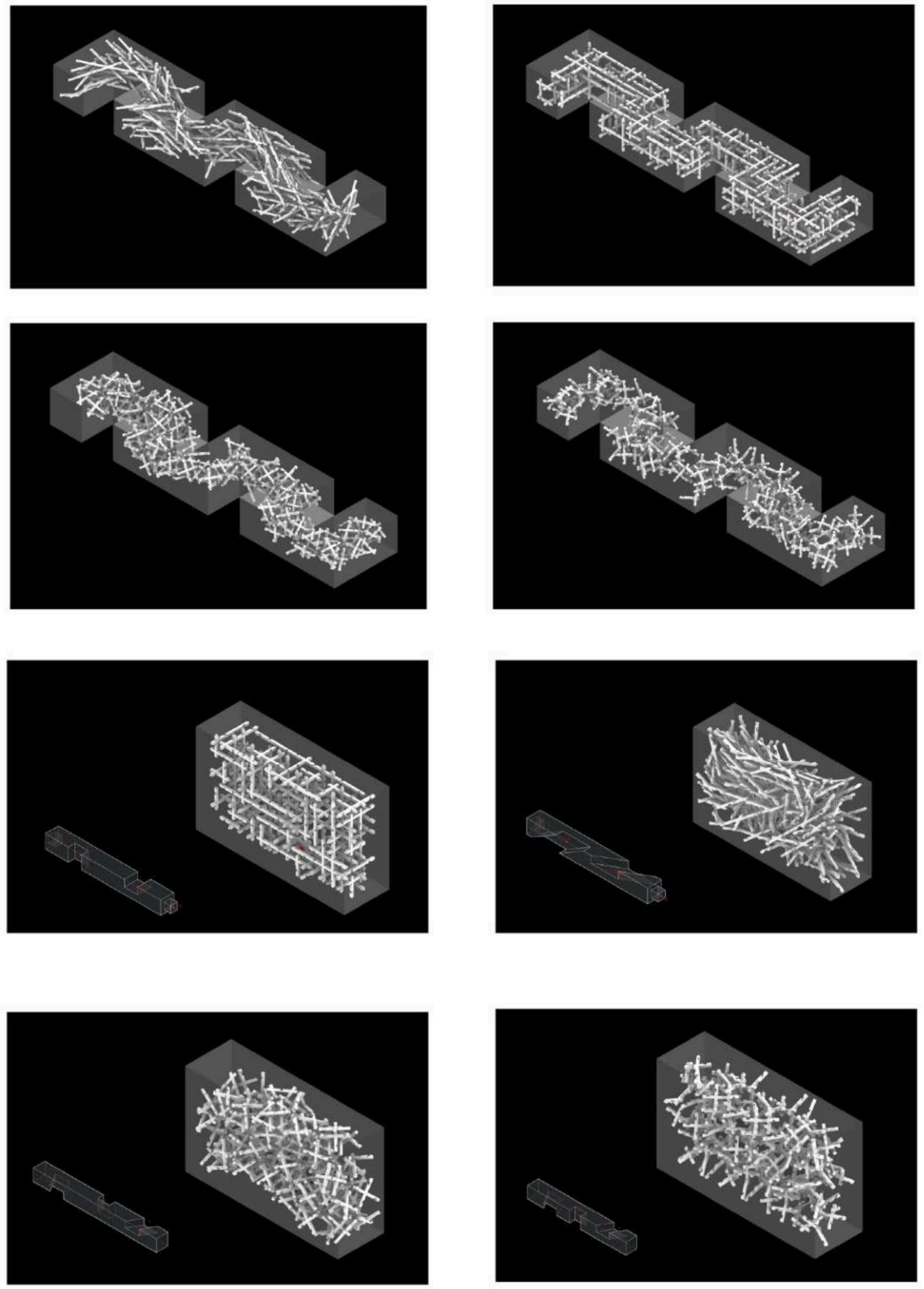
Proportionate to — Proportionate to

Counter-weight provided to the truss

Moment force

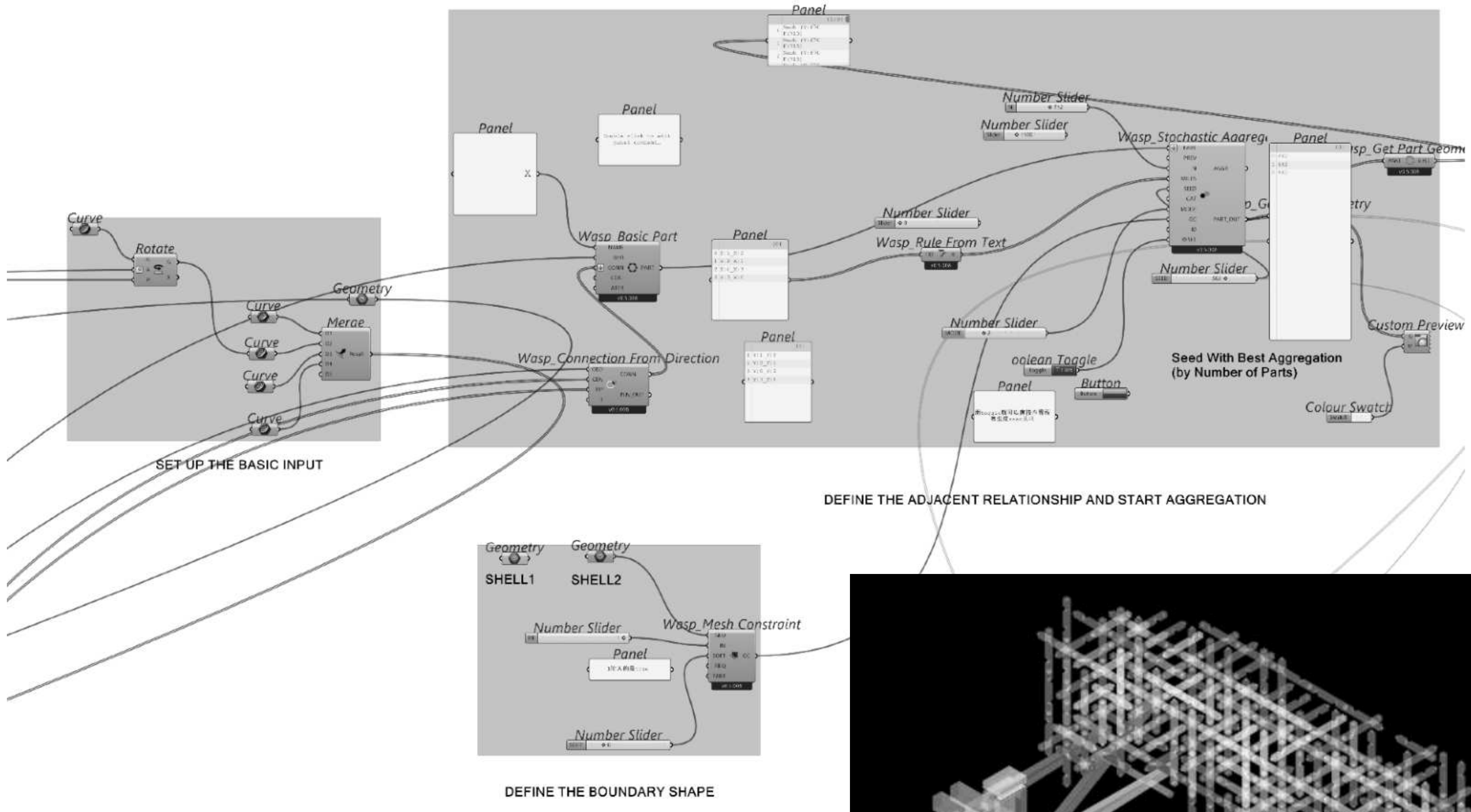
The **Lock-in** Post & Beam system :

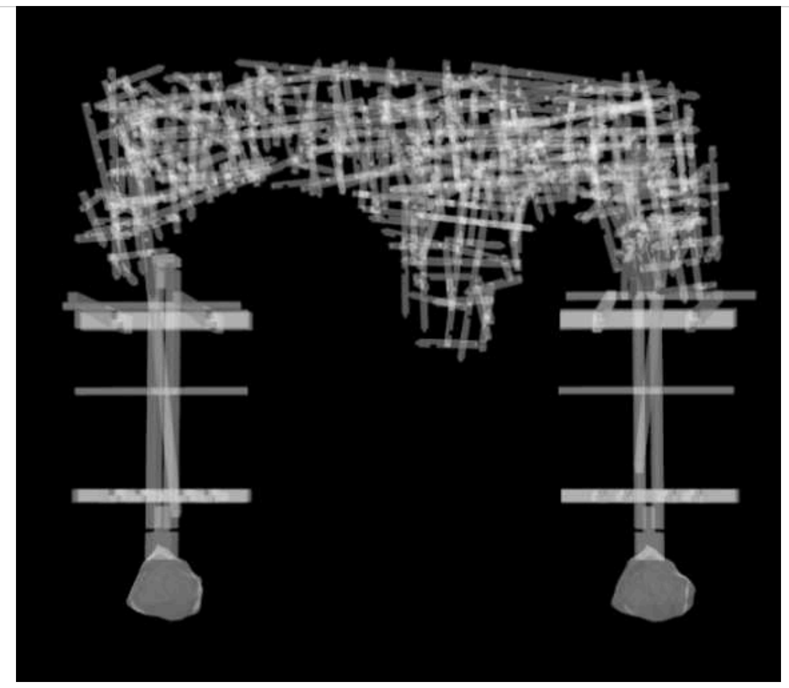
Inspired by the "**Da Vinci Arc**" and the Japanese joinery "**Hikari-tsuke**", We devised a Post & Beam construction detail, one that uses computational technology to incorporate the unique geometries of rough rocks/rubble. Each geometry is 3d scanned and fed into a parametric script, to enable a "lock-in" truss detail. The diameter of the stone determines the inclination of a truss member. Modular wooden members allow the structure to "lock-in" into a state of reciprocity. The proposal is an attempt to use Grasshopper to feed in variables that allow the modular members (wood) to collaborate with the non-modular components(Stone). This technique can be deployed to recycle construction or quarry waste into framed structural components.

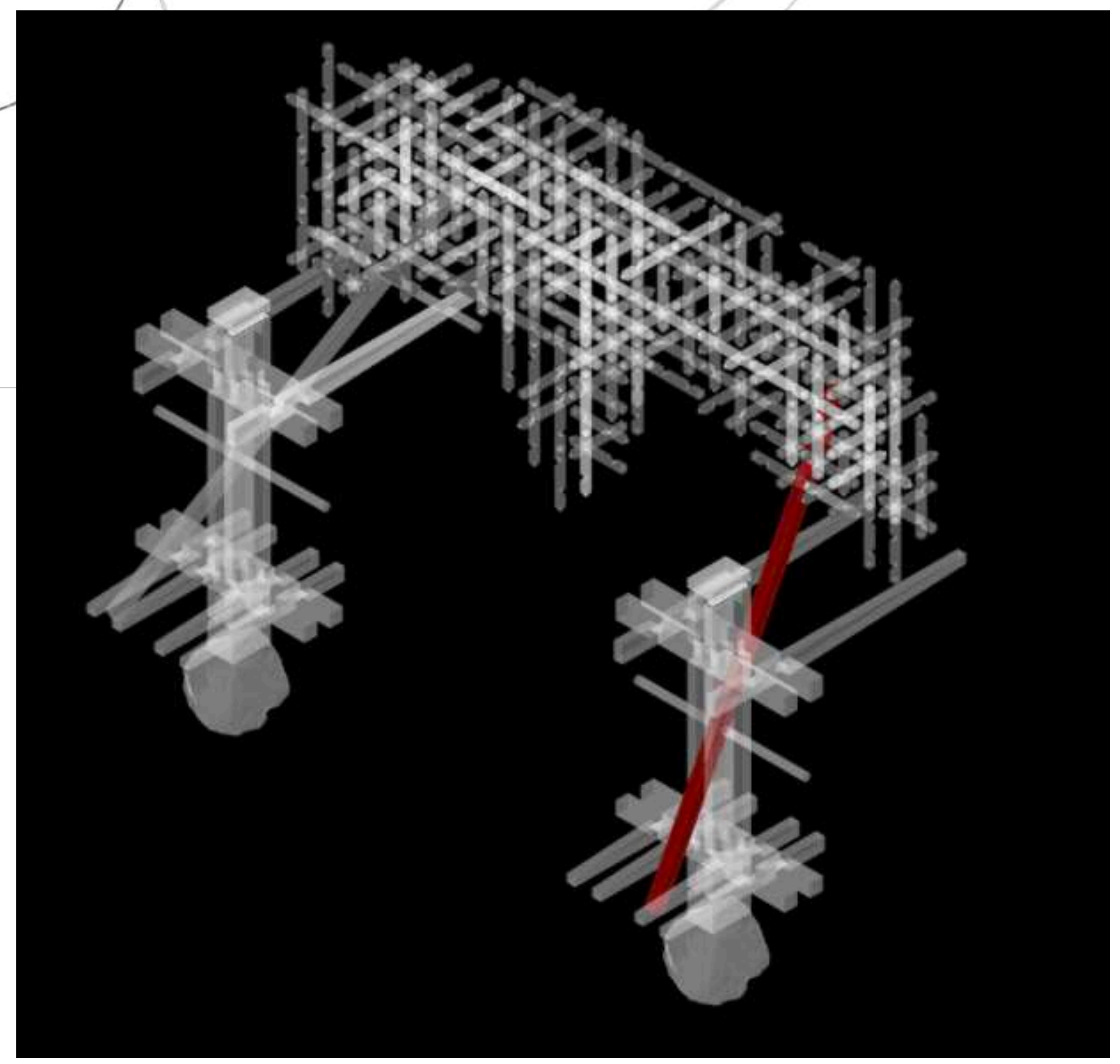


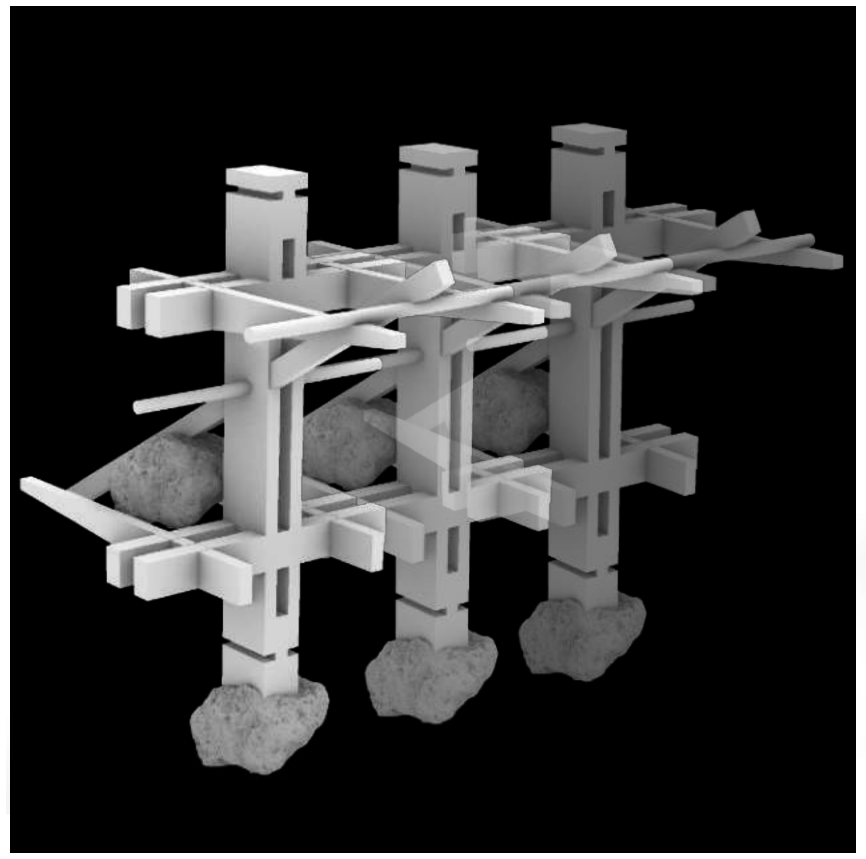
AGGREGATION STUDIES WITH DIFFERENT PARAMETERS: ANGLE, SIZE, DIRECTION

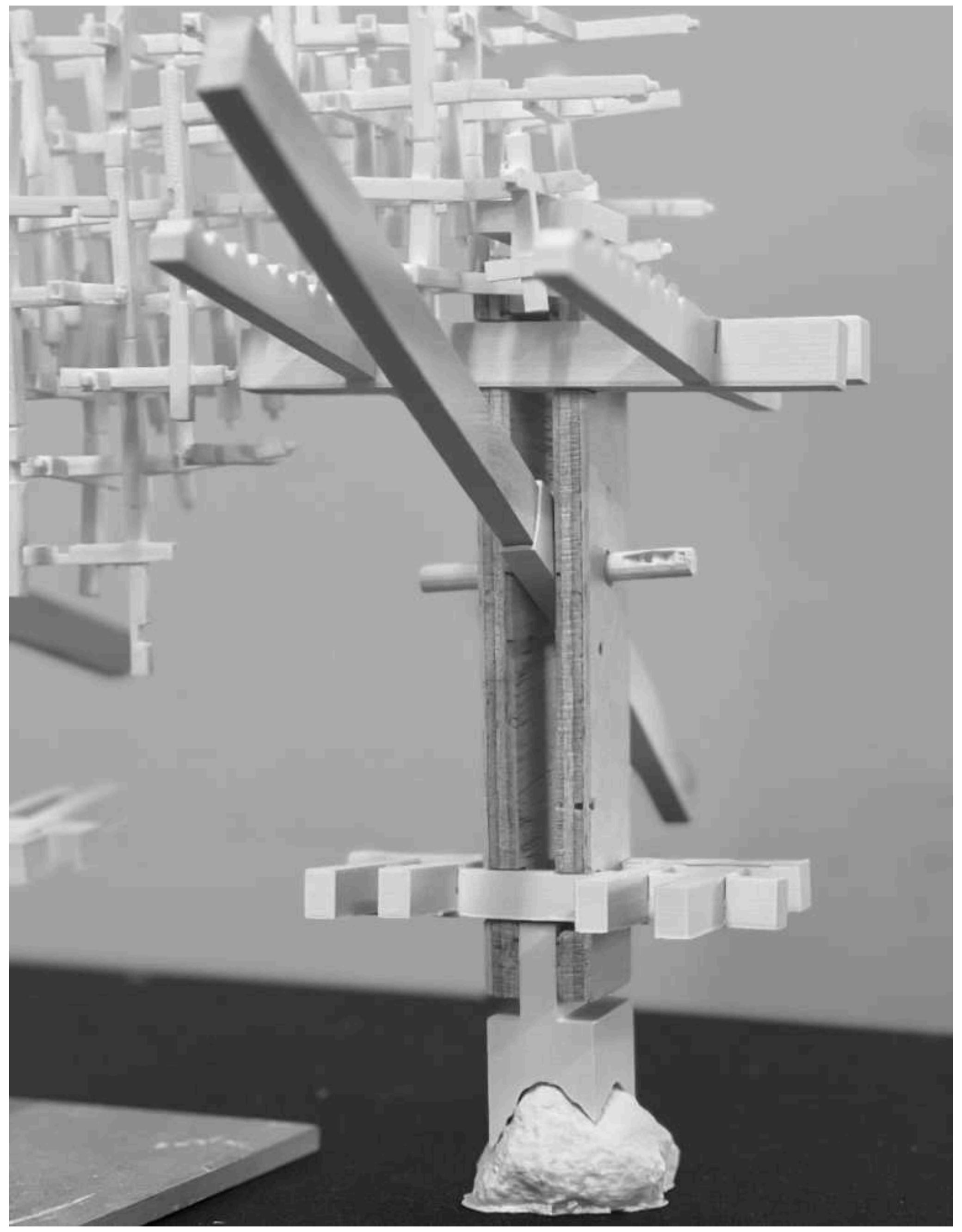
The **Canopy**: Script

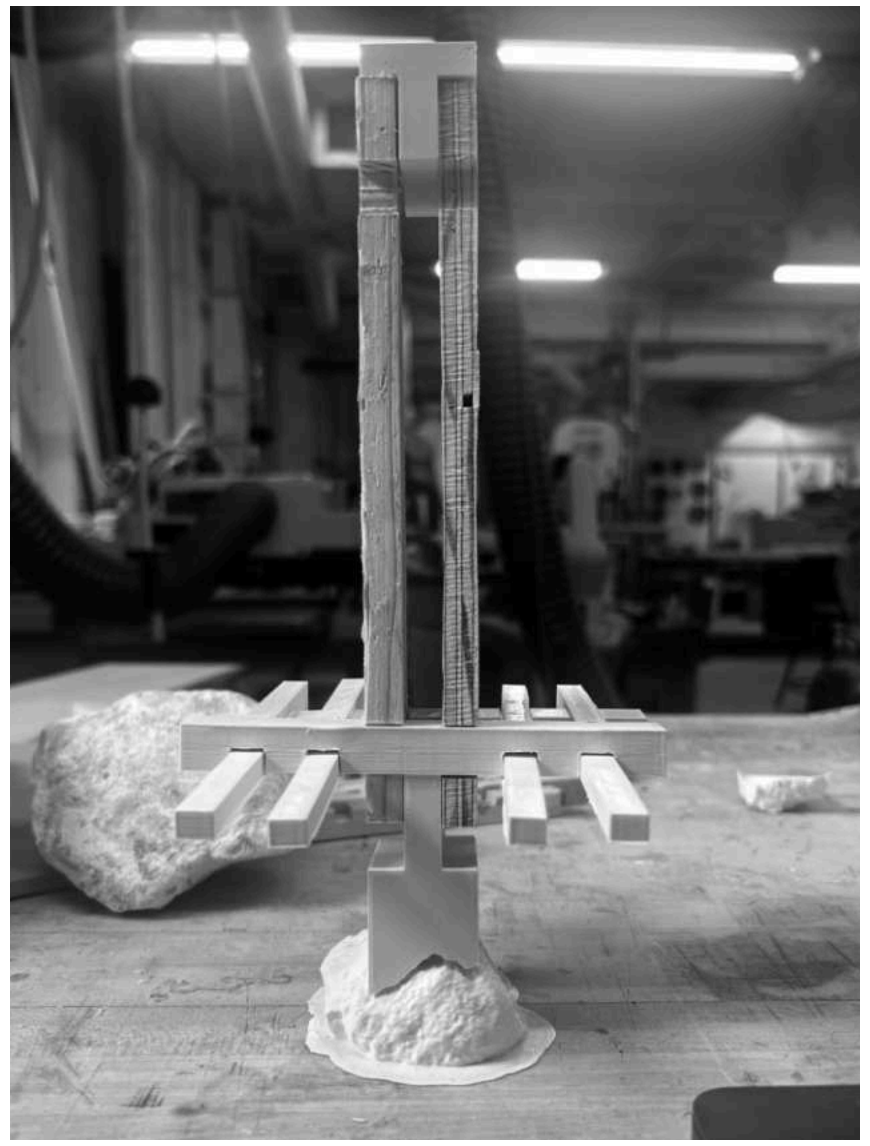


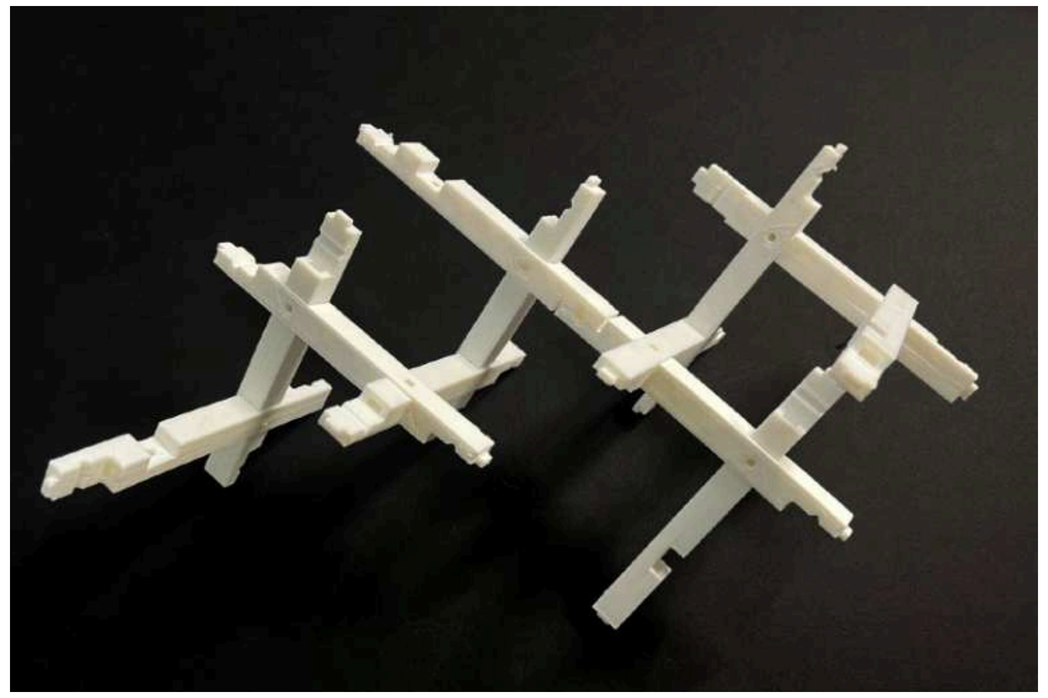


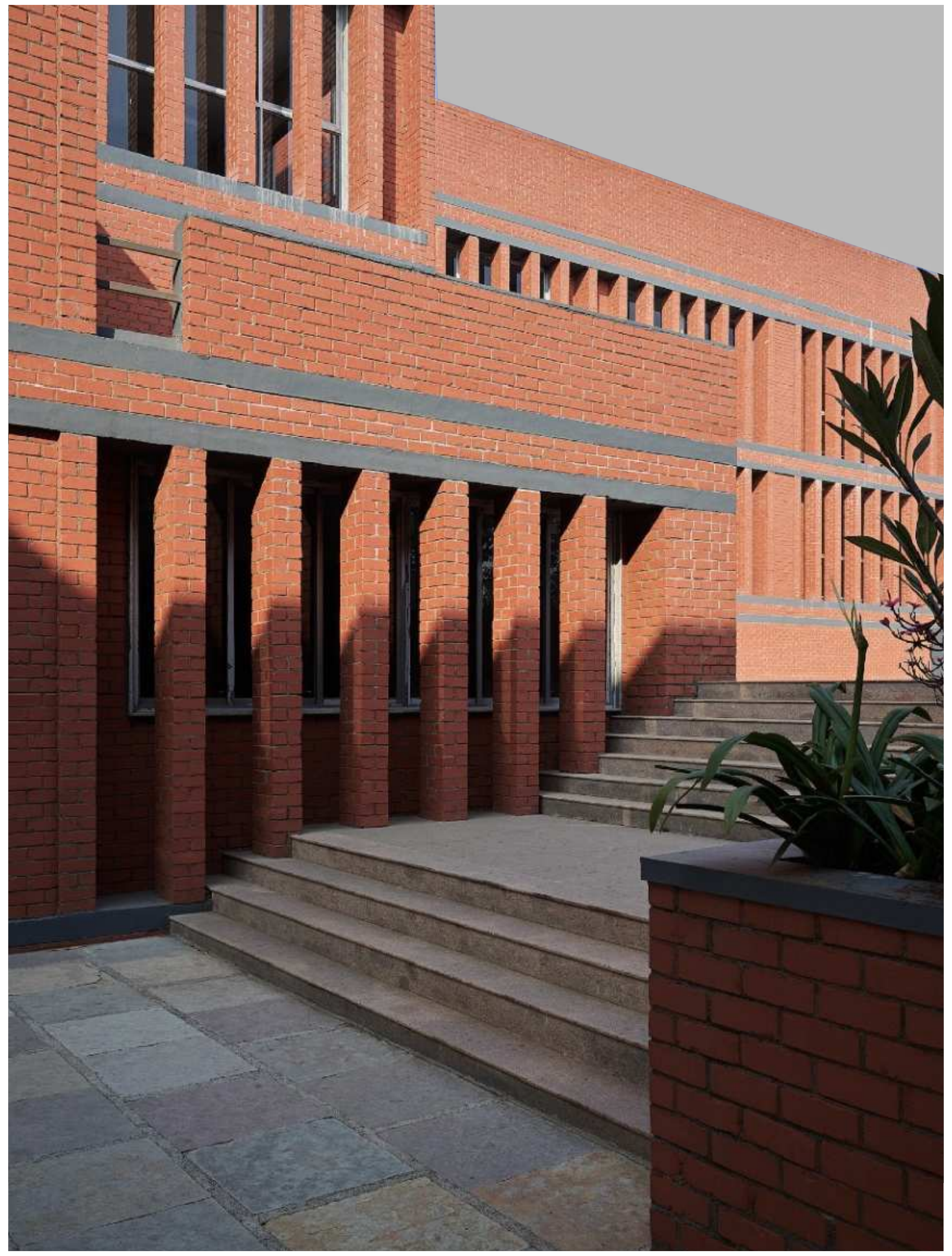












08 Seminar of Sections

MANAGING PRESSURE POTENTIALS

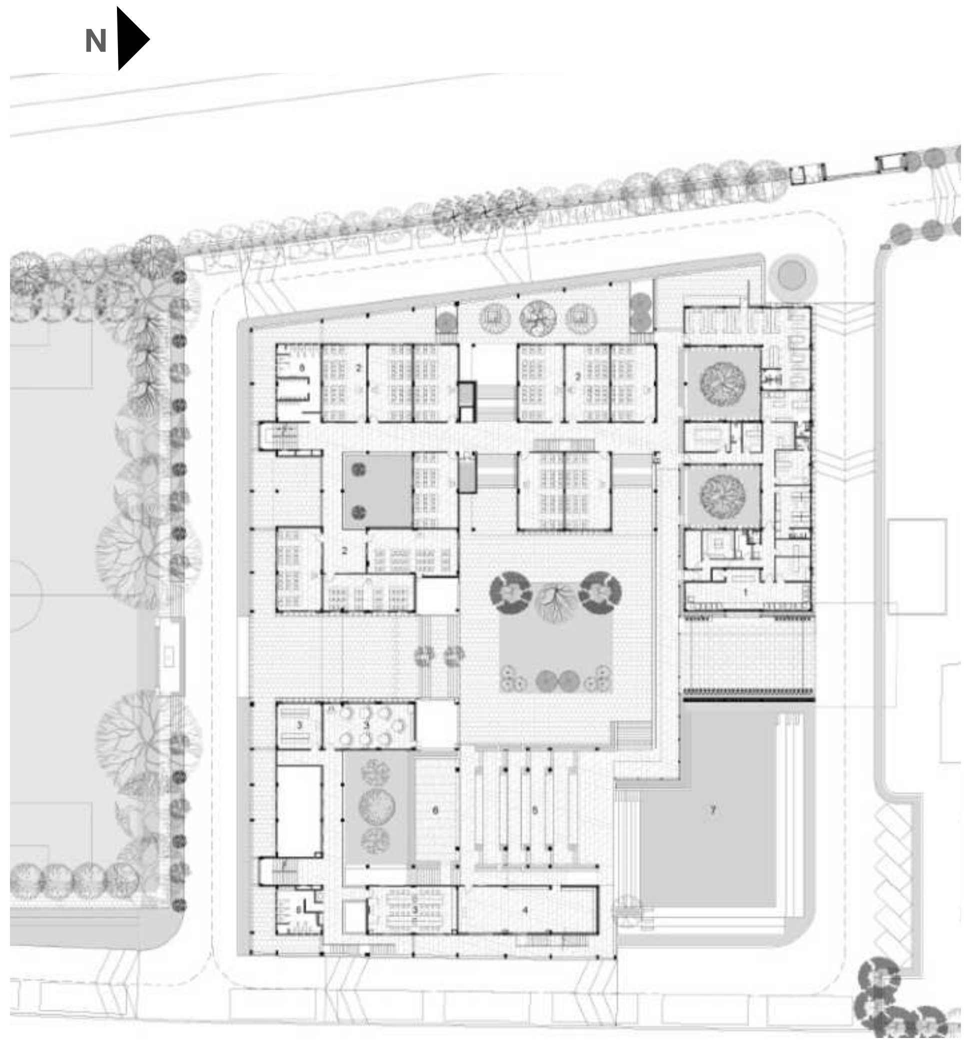
STUDIO Seminar of Sections, Building Tech
MENTOR Marc Tsurumaki
PROJECT A School in Yavatmal
SITE Yavatmal, Maharashtra, India
ARCHITECT Studio for Environment & Architecture, Mumbai

ABSTRACT

In a region that experiences one of the most **oppressive climatic conditions** *in the country , We envisioned a school for impressionable minds. An un-jaded approach at massing & architecture conceptualised by us as interns, led to a vision that was arduously executed by the Team in the next three years.The school has emerged as a precise manifestation of the Vastu principles and response to climatic conditions. The spaces formed are therefore carefully crafted with abundant light ventilation and visual connectivity.* **Climate-responsive** *elements like weather-screen, courtyards, volumetric composition, and various other* **strategies** *that are sensitive to immediate context, shaping the architecture into an enticing experience. The school has been designed incorporating our ancestral concept of sustainability - Mandala. Our traditional practices believed that four elements, - Earth, Water, Fire & Air must remain united in a specific proportions, within a structure for spiritual harmony.Building material & technology form are integral to the design. Compressed & stabilised earth blocks are made out of excavated soil, they are four times less polluting than conventional bricks. Apart from its aesthetically pleasing vernacular appearance, it is also a cost and energy effective material. Use of exposed concrete & earth blocks made of site soil attains the harmony between built form and its arid surroundings. Furthermore, the structure has been placed along the natural site contour, so as to minimise cut and fill.*

THE SECTION

A sectional investigation of this project unveils the core intentions that guided its design. The form was instinctively guided by cultural values of sustainability, with one of them emerging as the Management of pressure potentials. Elements such as rain-screens, courtyards, and terraces were intentionally arranged to channel the southwest winds. The section facilitates alternating transitions from low to high pressure zones, effectively accelerating wind velocity. By strategically managing pressure through architectural design, the building optimises its natural ventilation. The chosen section highlights this capability, presenting a spatial equivalent of a wind contours that delineates wind patterns. With denser lines indicating high pressure points and the contrary applies for the reverse.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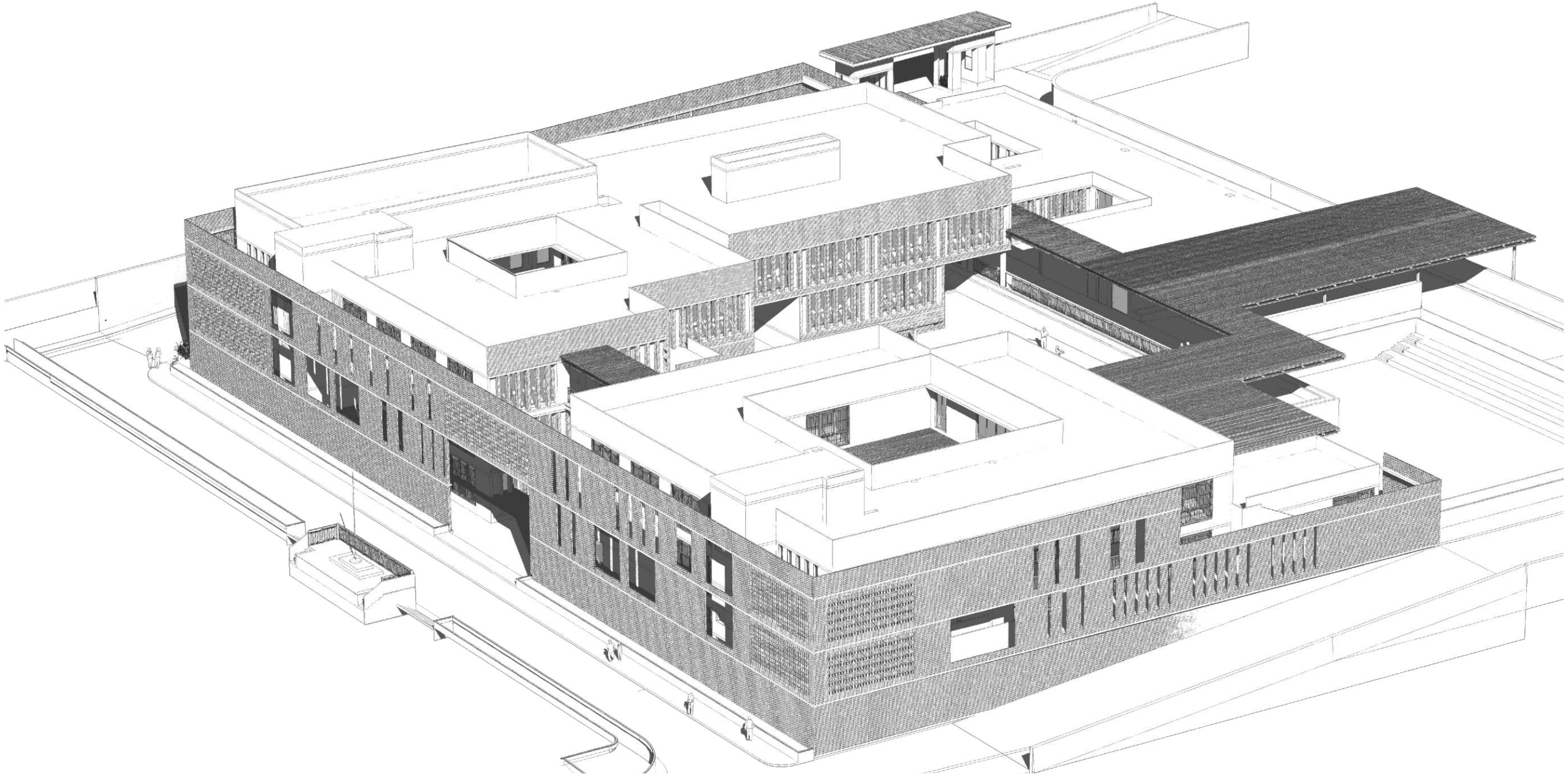
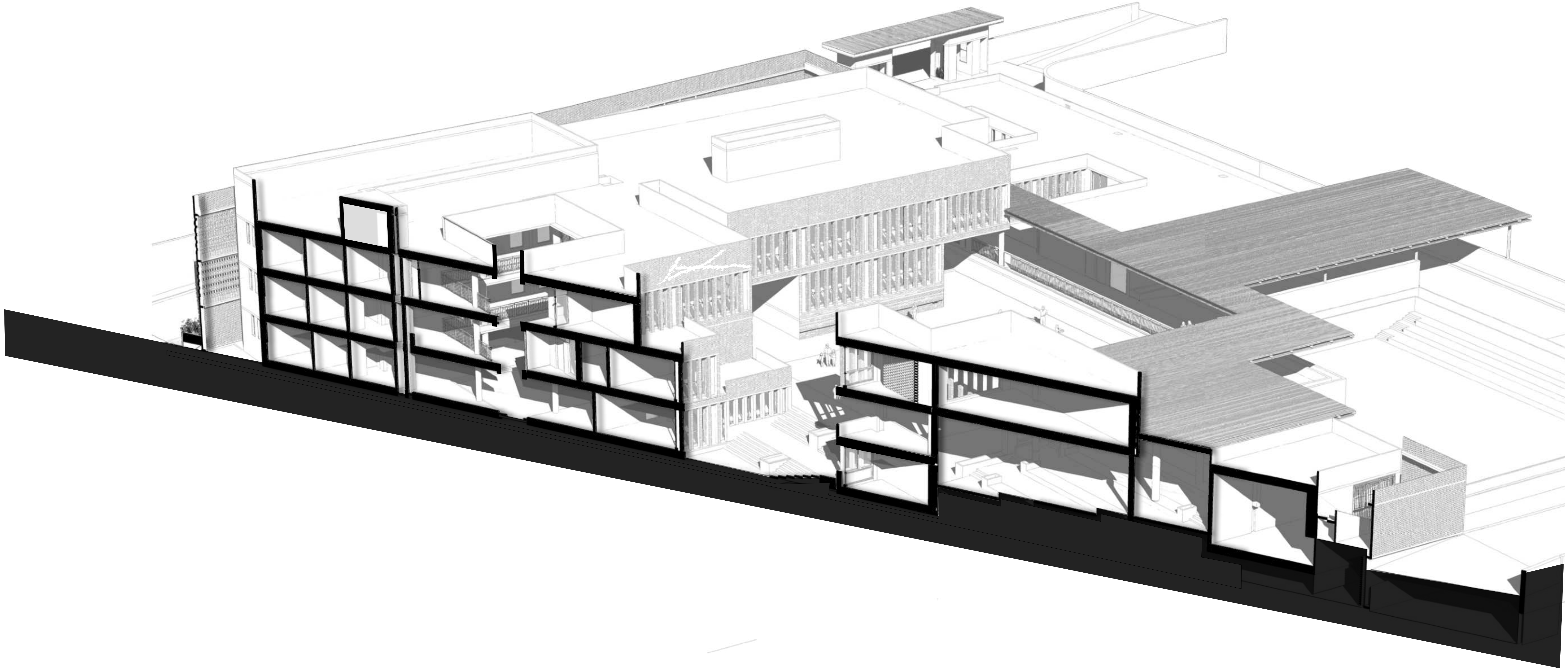
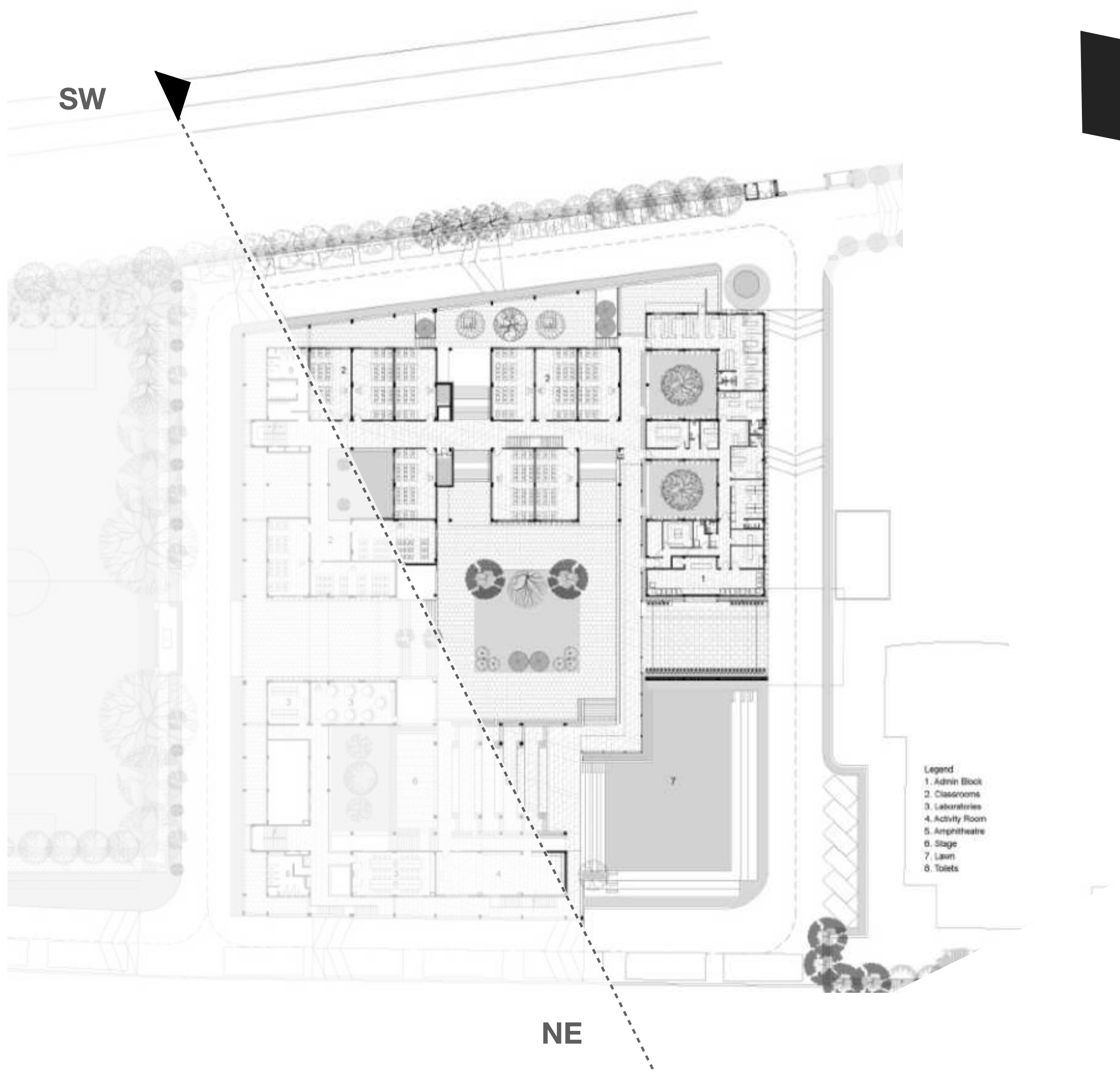
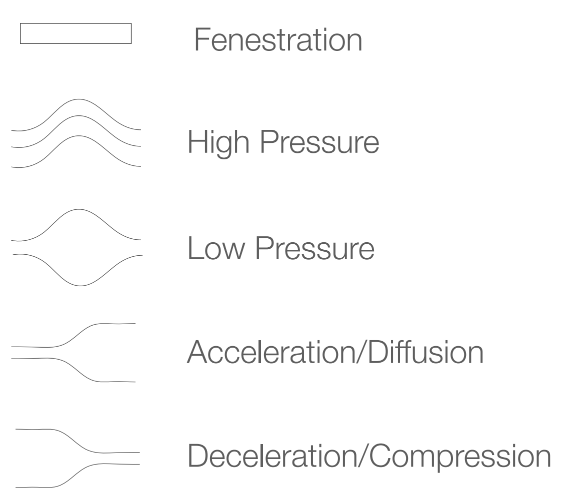
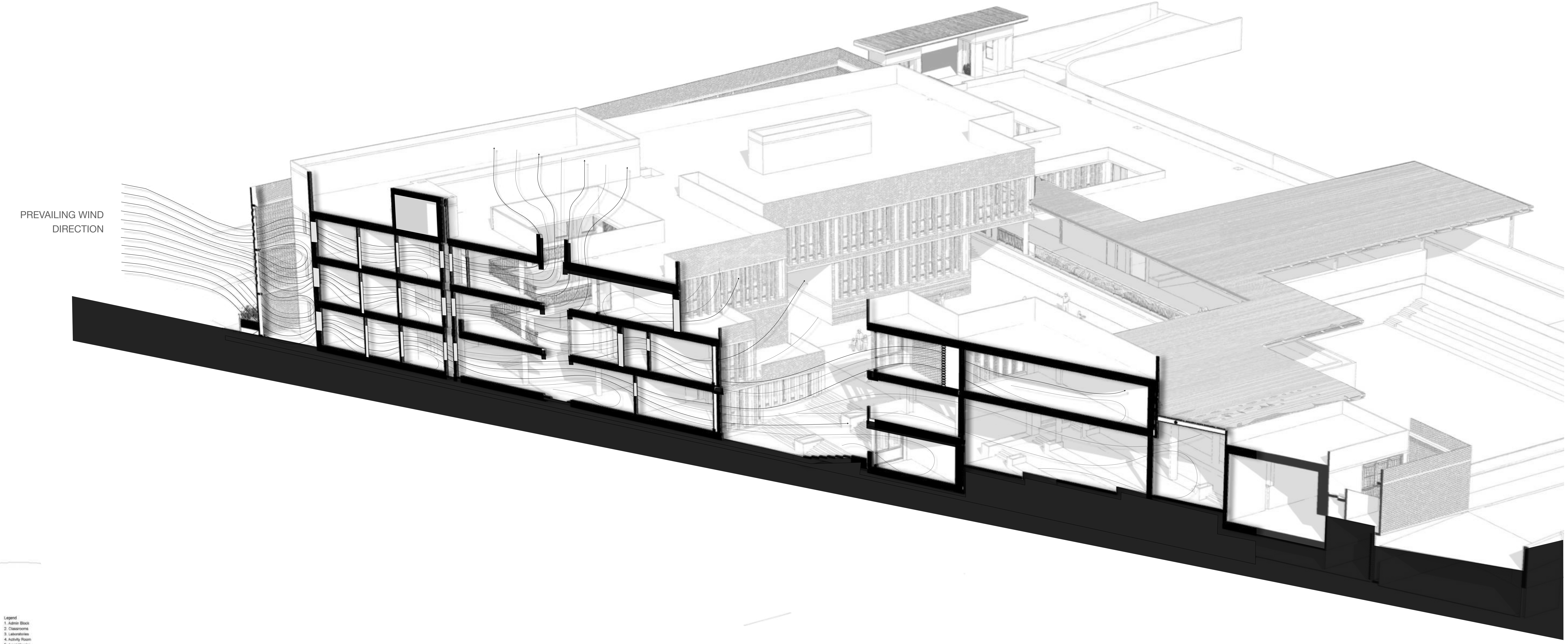
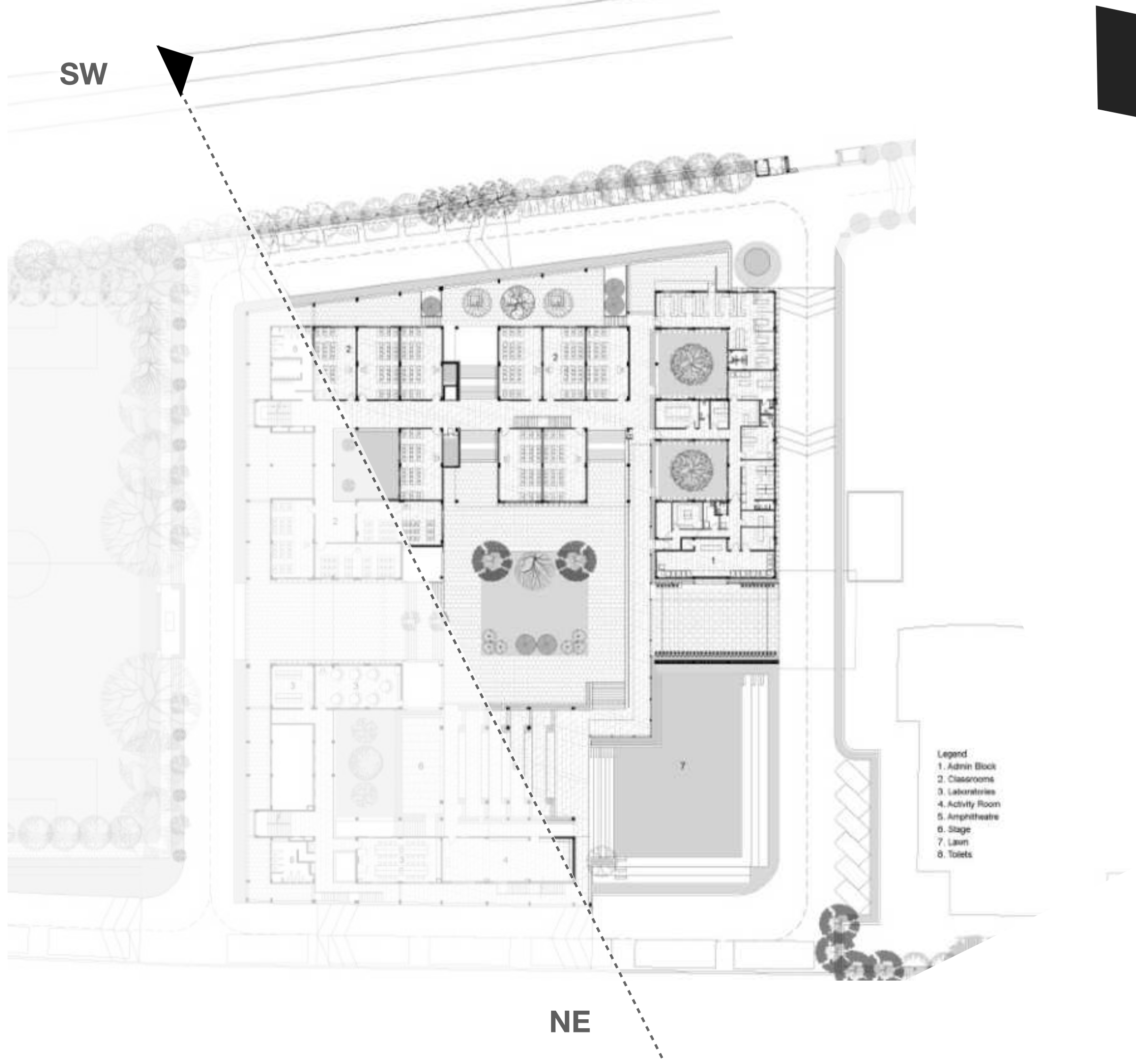





SW
NE
Legend
1. Admin Block
2. Classrooms
3. Laboratories
4. Activity Room
5. Amphitheatre
6. Stage
7. Lawn
8. Toilets


Fenestration
High Pressure
Low Pressure
Acceleration/Diffusion
Deceleration/Compression


PREVAILING WIND
DIRECTION


SW
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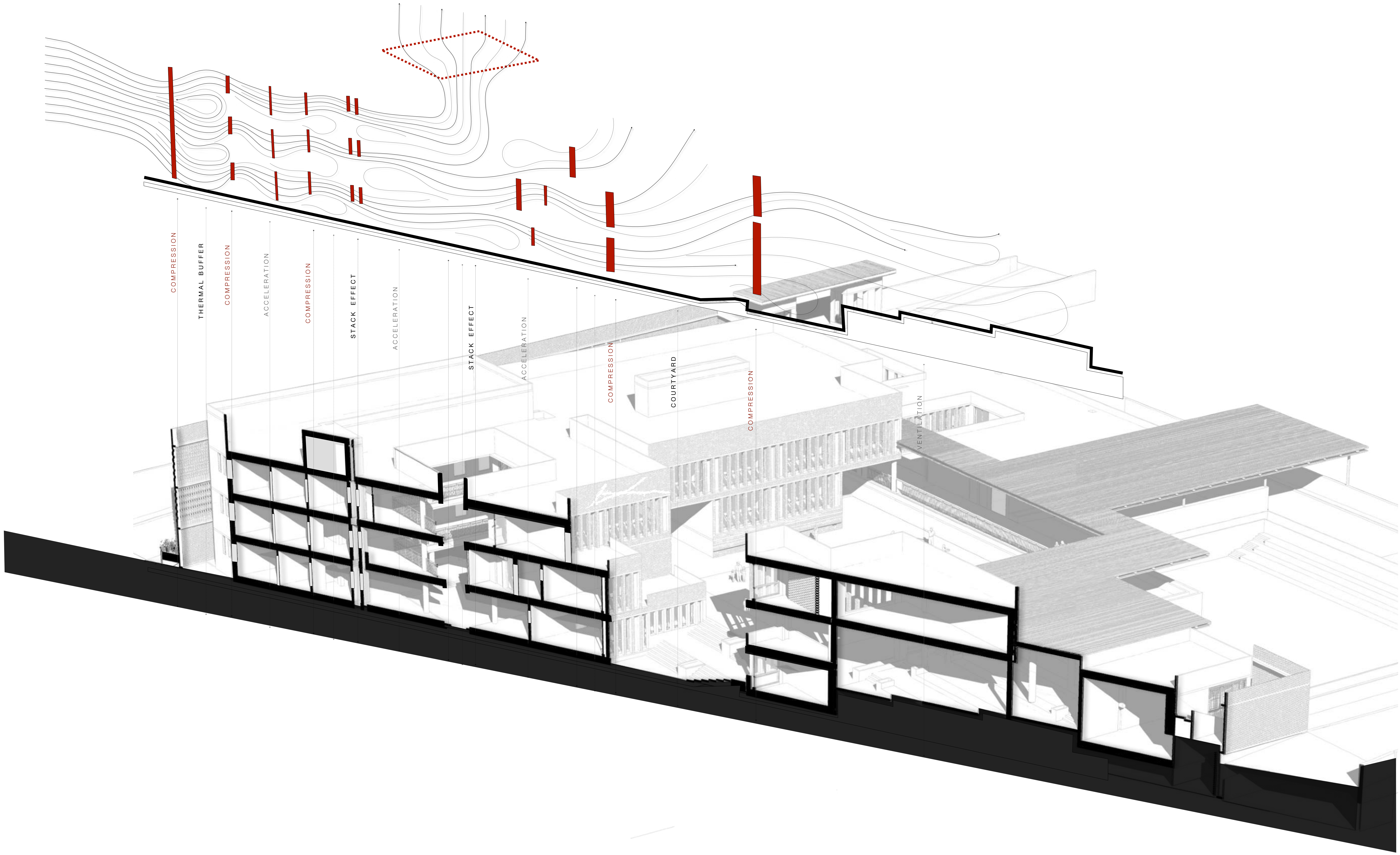
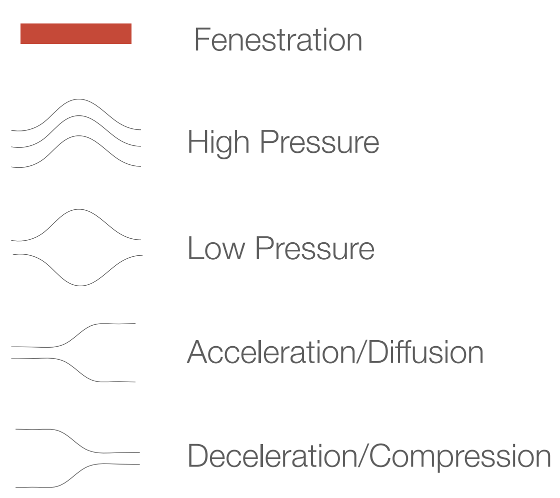

COMPRESSION
THERMAL BUFFER
COMPRESSION
ACCELERATION
COMPRESSION
STACK EFFECT
ACCELERATION
STACK EFFECT
ACCELERATION
COMPRESSION
COURTYARD
COMPRESSION
VENTILATION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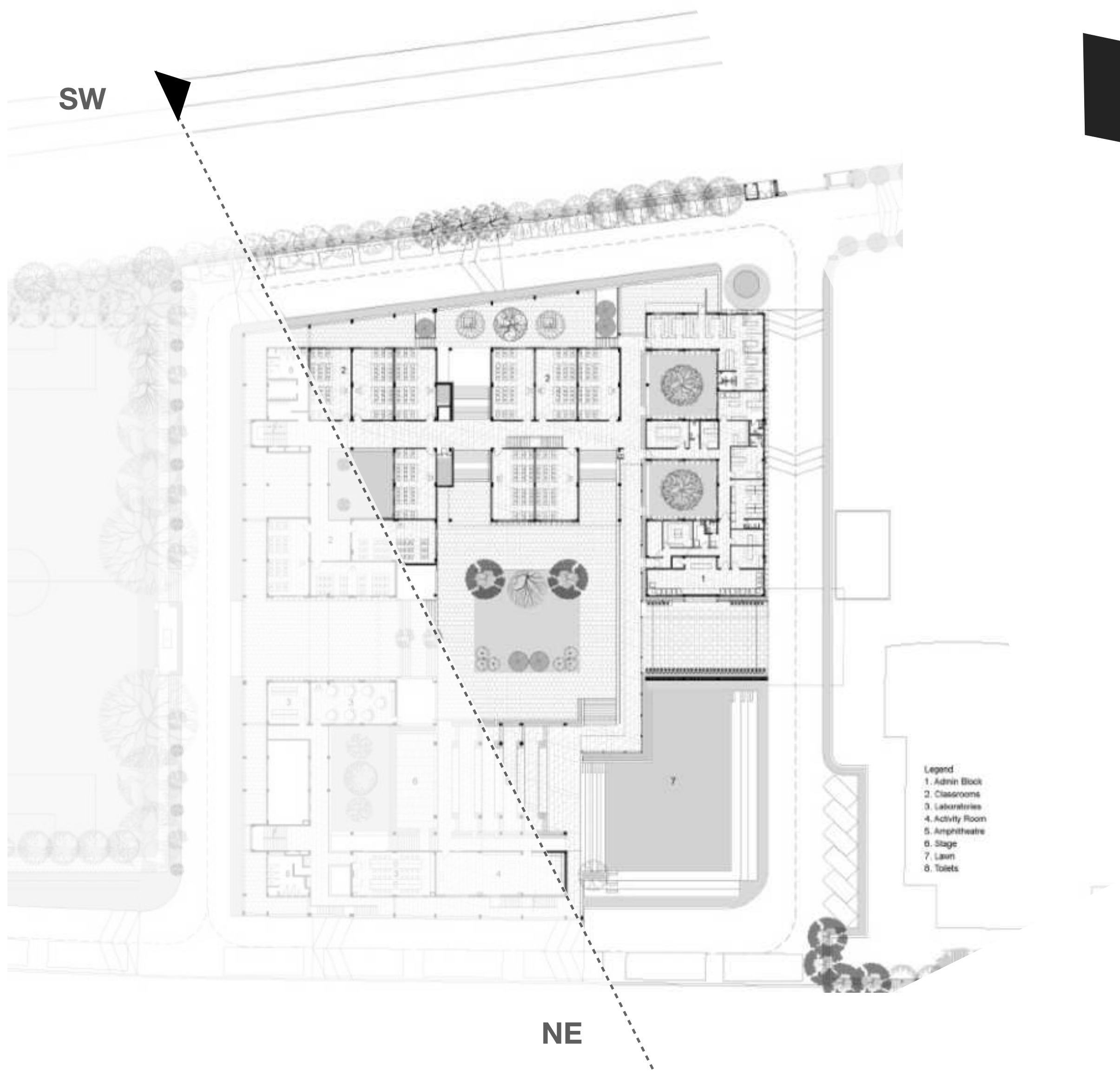
SW
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PORTFOLIO

Academic Arguments, Inquiries I **Professional Works**

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