

Thotti Mane - Indian Courtyard House in Blacksburg

Sai Keerthana Srinivasan

Thesis submitted to the faculty of the Virginia Polytechnic Institute and State
University in partial fulfillment of the requirements for the degree of

Master of Architecture
In
Architecture

Scott H Gartner, Chair

Kay Edge

Hunter Pittman

July 16th, 2015
Blacksburg, Virginia

Keywords : House, Courtyard, Indian,

Thotti Mane

Thotti Mane - Indian Courtyard House in Blacksburg

Abstract

Having grown up in a India, the importance of the courtyard was imbedded in the very essence of the understanding the architecture of a house. The project started of with the intention of designing a courtyard house, and eventually evolved to a house based on the principles of Indian building norms and cultures that have been cultivated for centuries. The fact that it is designed in the setting of Blacksburg, Virginia, these norms and cultural aspects were modified to suit the context of its surroundings. The projects resolves itself through details of practical elements that are romantized by implementation of Indian building traditions and everyday rituals while the structural aspects of the house was made to reflect the local practices and methods.

For my Mom, Dad, Vandana and Thatha for always standing by me and supporting me through this entire process.

To my professors and committee members, for having my back through the toughest of times.

And a shout out to all the wonderful people I have had the immense pleasure of meeting in the past 10 months.

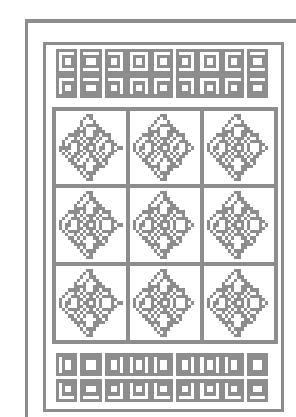
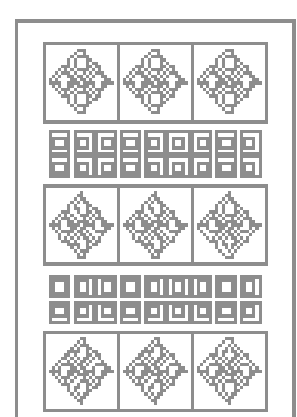
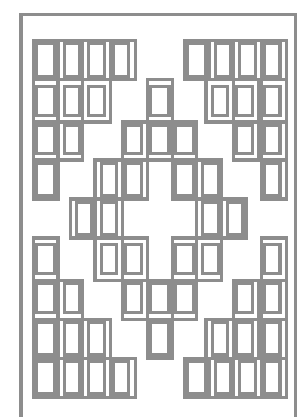
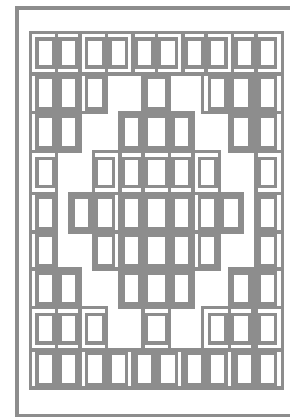
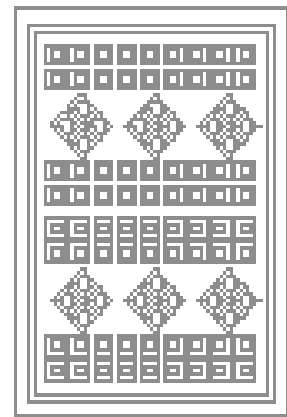
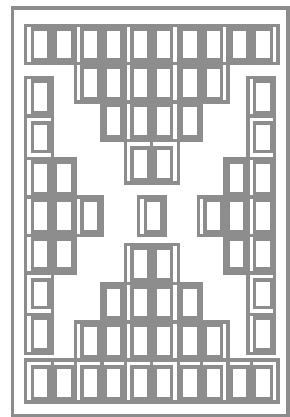
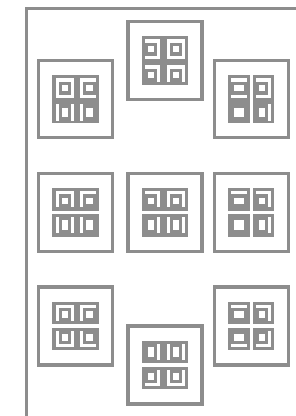
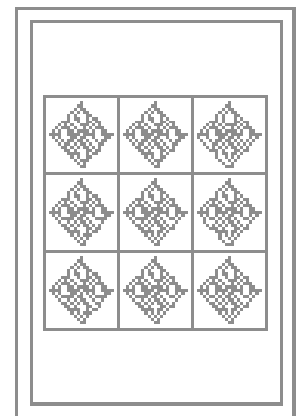
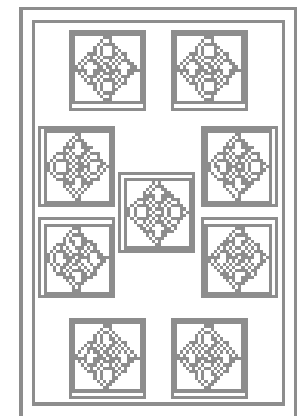
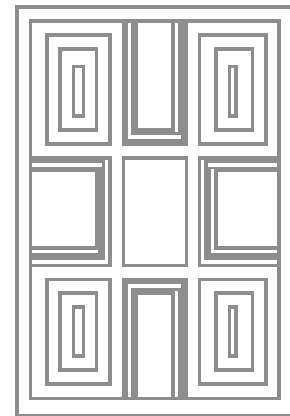
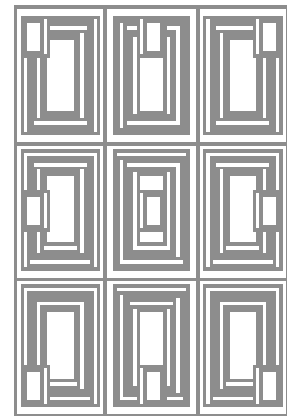
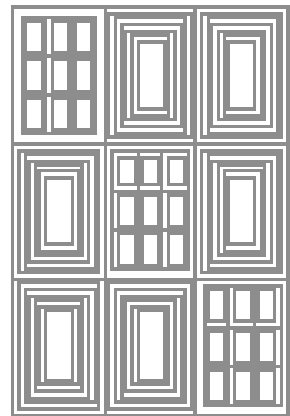
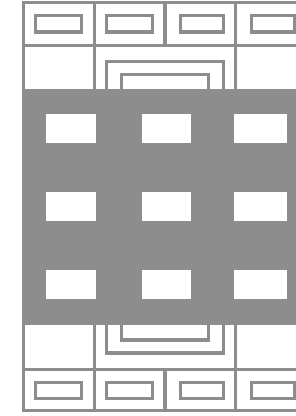
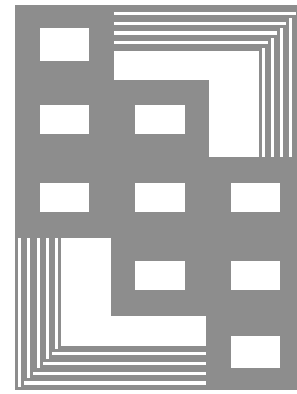
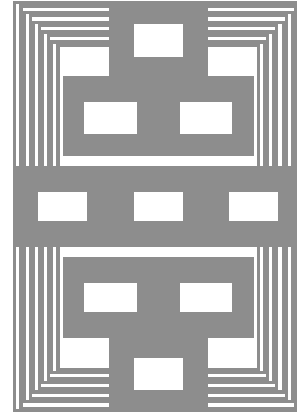
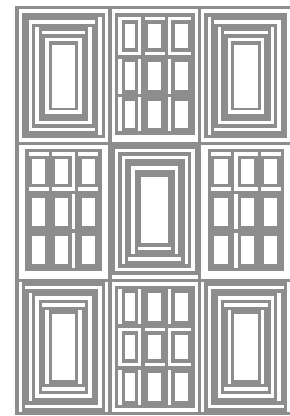
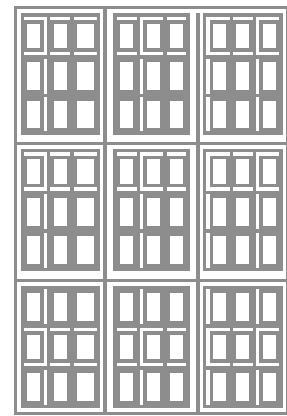
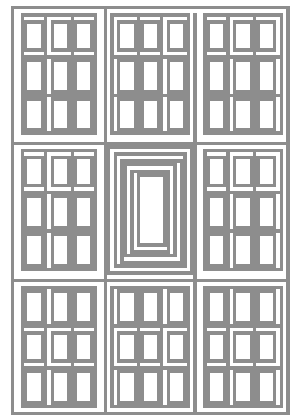


TABLE OF CONTENTS

Abstract ii

Acknowledgements iv

Table of Contents vii

Introduction 2

Vaasthu 3

The Site 5

Site Plan 7

Development 14

Thotti Mane 19

Structure 50

God in the Details 54

The Power of 9 76

Views and Model 86

Realization 98

Image Credits 99

THOTTI MANE

AN INDIAN COURTYARD HOUSE

INTRODUCTION

The architecture of any place takes birth from its culture, history and traditions that have defined that region for years and years. The project took me through understanding what makes an Indian household a home and why.

One of the main essential elements is the courtyard which proves its necessity due to the tropical climate and passive heat loss mechanism it offers.

The challenge of introducing a courtyard in a climate like that which exists in Blacksburg is to maintain the conditions of the courtyard while adapting to the scientific parameters.

The corridor around the courtyard is used for circumambulation or connecting spaced to the rest of the house which is covered by the Malnad style roof which allows for water to drain into the courtyard and has also become a

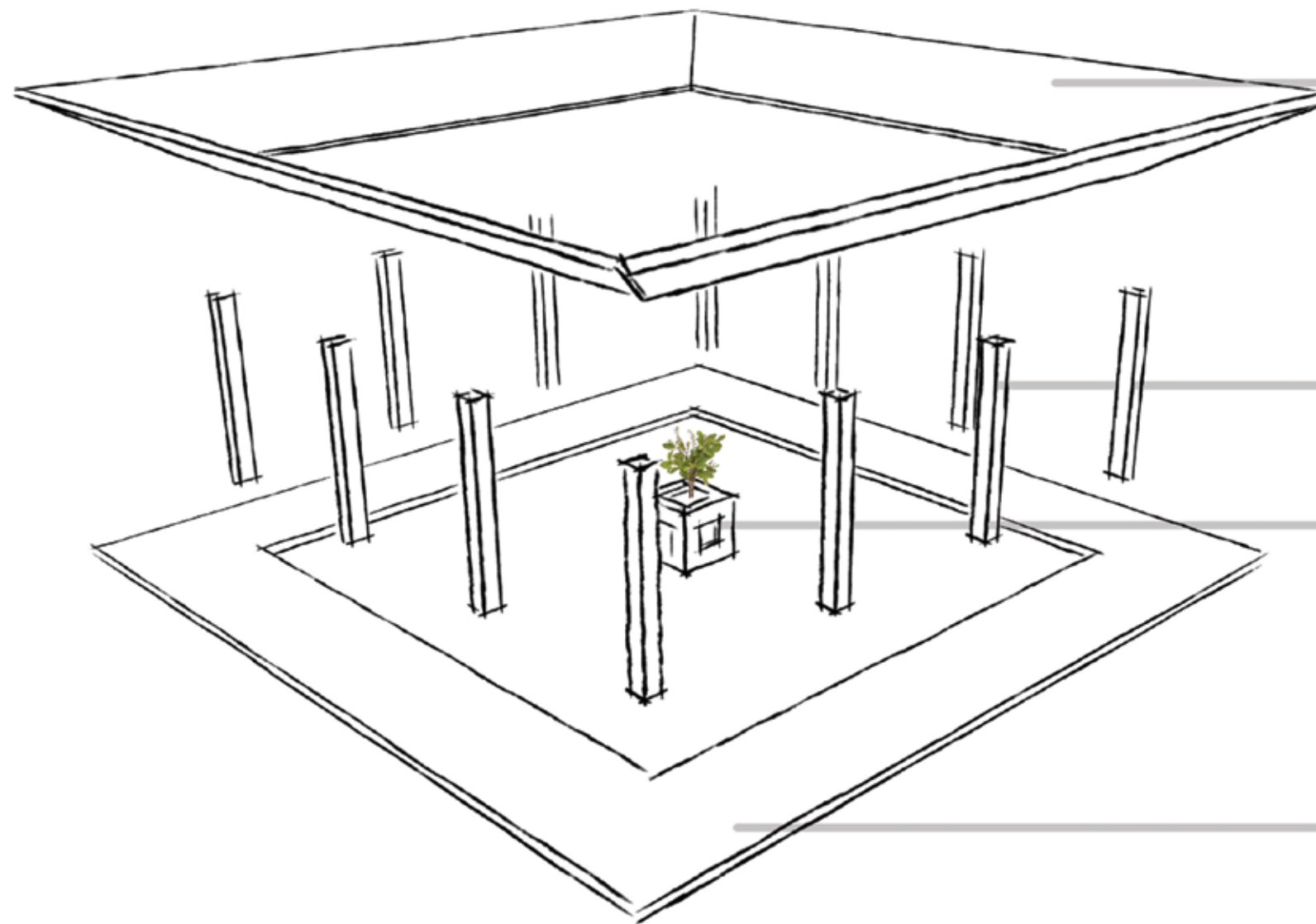
At the center of the courtyard is the Tulsi katte.

Scientific name - *Ocinum Tenuiflorum*. Tulsi, which is Sanskrit for "the incomparable one"

Tulsi is a consecrated plant that holds lot of importance for the traditional Hindus. In most of the Hindu homes, people worship Tulsi plant on a daily basis. Traditionally placed at the center of the Courtyard and a path around allowing for circumambulation during prayer.

Tulsi leaves is an essential part in the worship of God Vishnu (Narayana) and his Avatars including God Krishna, God Rama and other male Vaishnava deities like Hanuman, Balarama, Garuda and many others. Tulsi is a sacred plant for Hindus overall and is also worshipped by Hindus as the avatar of goddess Lakshmi. Water mixed with the petals is given to the dying to raise their departing souls to heaven.

A major challenge was to identify what was unique about an Indian house. What made this house different from any other contemporary house? How did the courtyard, apart from being essential for climatic purposes in the Indian subcontinent become a vital architectural element in an Indian household?



MALNAD ROOF WITH CLAY ROOF, ALLOWS FOR RAIN DRAINAGE AND SHADE FOR THE JAGGLI KATTE

PILLARS GENERALLY FOR STRUCTURAL SUPPORT - BECOME AESTHETIC AND DECORATIVE ELEMENTS
ACTS AS A SCREEN, AND DEVICE OF SEPERATION

TULSI IS A CONSECRATED PLANT THAT HOLDS LOT OF IMPORTANCE FOR THE TRADITIONAL HINDUS. IN MOST OF THE HINDU HOMES, PEOPLE WORSHIP TULSI PLANT ON A DAILY BASIS.

TRADITIONALLY PLACED AT THE CENTRE OF THE COURTYARD AND A PATH AROUND ALLOWING FOR CIRCUMABULATION DURING PRAYER.

JAGGLI KATTE - CORRIDOR AROUND THE COURTYARD.
INTERACTIVE SPACE, SPACE OF CIRCULATION TO OTHER SPACES
INSULATION SPACE

Courtyard and it essential elements

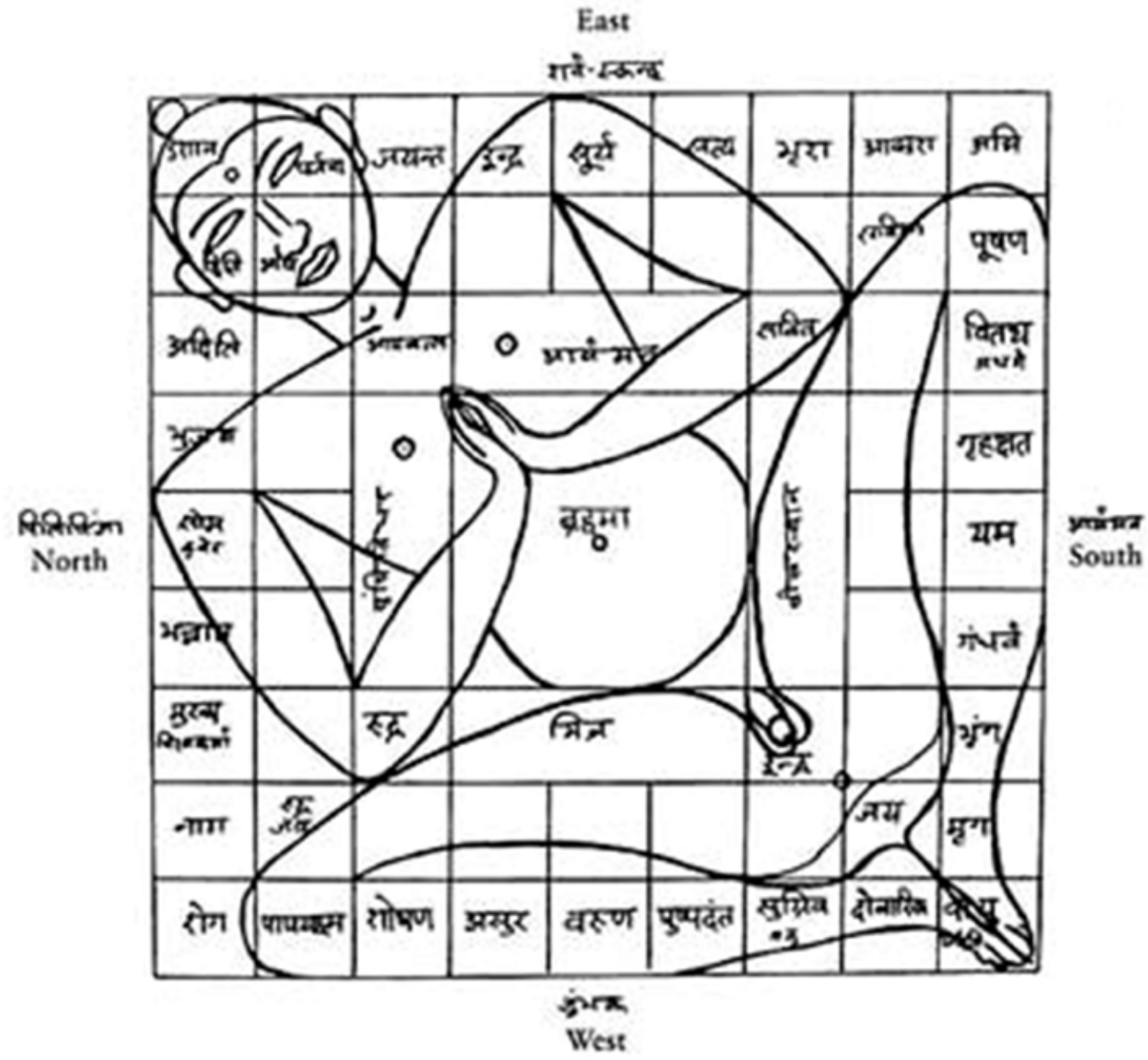
VAASTHU

The story of the Vaasthu Purusha Mandala is that a god created a man with insatiable hunger cast a shadow over the earth. To avoid further destruction, Brahma, the creator called upon the gods of the 8 cardinal directions and pinned him down while Brahma himself jumped on his middle. As Vaasthu Purusha was his own creation, a compromise was made and was granted the boon that he will be worshiped by anyone who will build a structure on the earth.

In reality, Vaasthu Shastra is a set of rules and guides for building making maximum benefit of the environment, sun, light, wind direction and the magnetic field of that area.

These set of rules have become a major influence on the design of any building in the Indian Subcontinent, which is now its own industry.

Overtime, it has become more religious and has become a necessary set of conditions to follow in the planning of the house. For purpose sake, the implementation of the Vaasthu principles was self- modified on scientific terms to suit the environment that the Thotti Mane is set in.



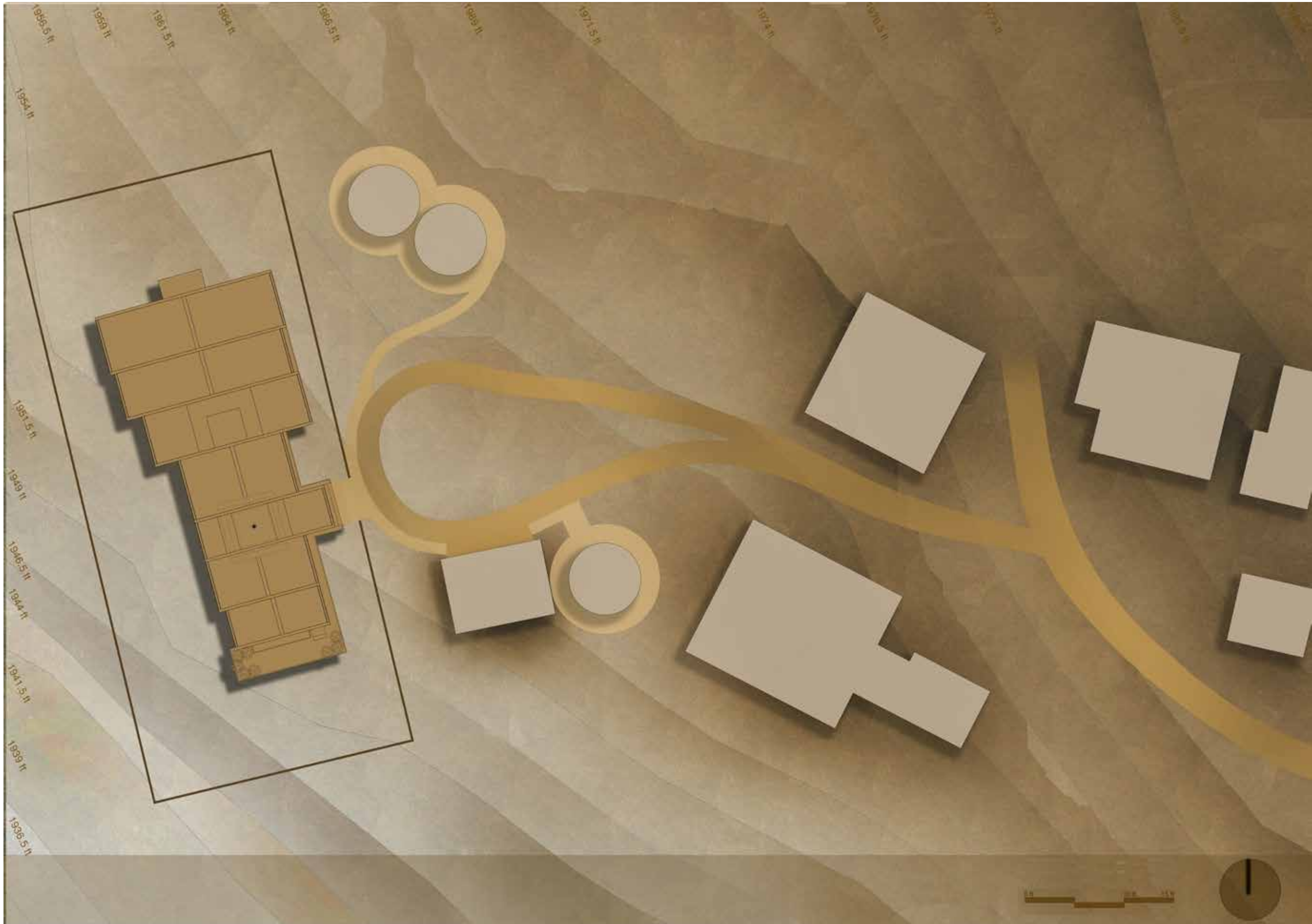
PAPARASHASTI	PILIPINJA								CARAKI
ROGA	AHI	MUKHYA	BHALLATA	SOMA	BHUVAGA	ADITI	DITI	AGNI	
PAPA-YAKSMAN	RUDRA						APA	PARJANYA	
SIKSHA		RAJA YAKSMAN	PRITHIVIDHARA			APA VATRA		JAYANTA	
ASURA		M	BRAHMA				A		INDRA
VARUNA		I					R		SURYA
KUSUMA-DANTA		T					Y		SATYA
SUGRIVA		R	VIVASVAN			SAVITRI		BHRISHA	
DAU-VARIKA	JAYA						SAVITRA	ANTAR-IKSHA	
PITARAH	MRIGA	BHRINGA-RAJA	GAN-DHARVA	YAMA	BRIHAT KSHATA	VITATHA	PUSHAN	ANILA	
PITANA	ARYAMAN								VIDARI

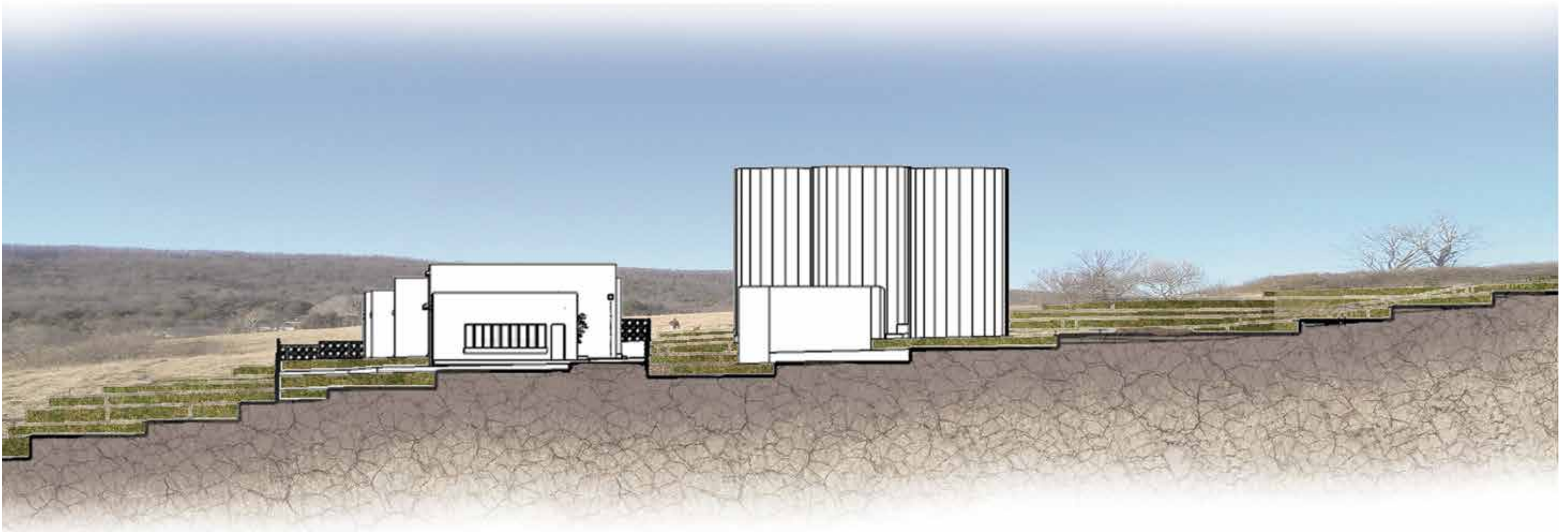
THE SITE





SITE PLAN

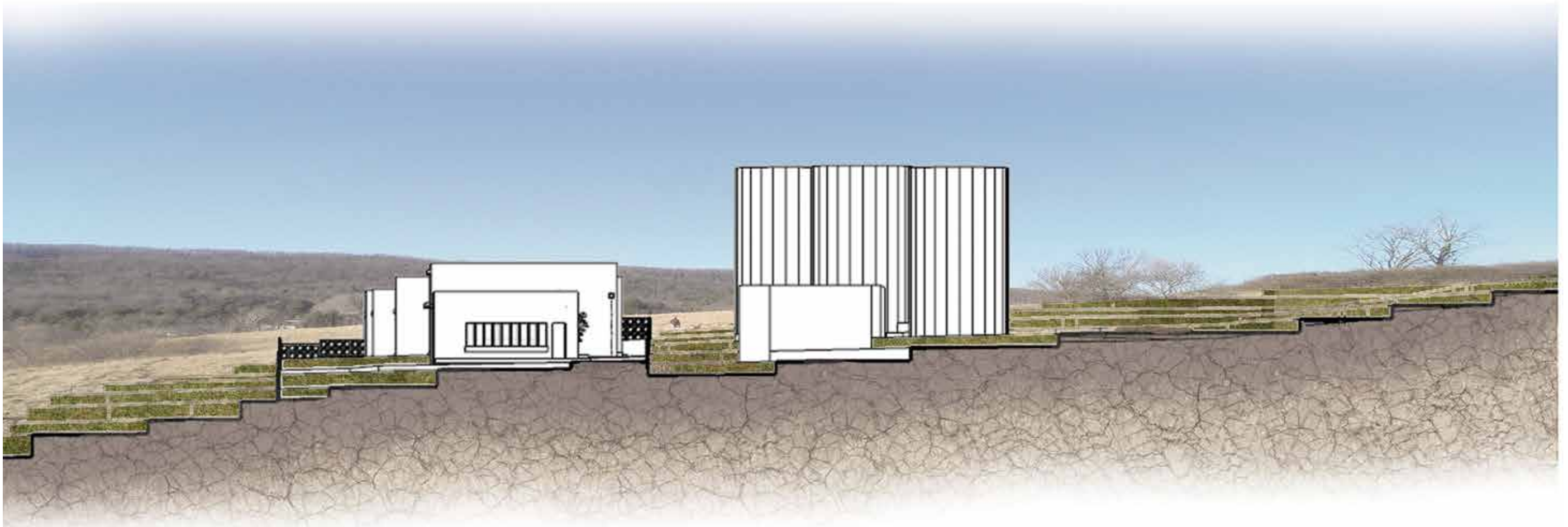




LONGITUDINAL SITE SECTION

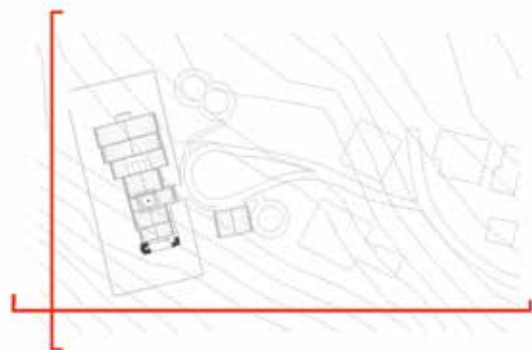
KEY PLAN



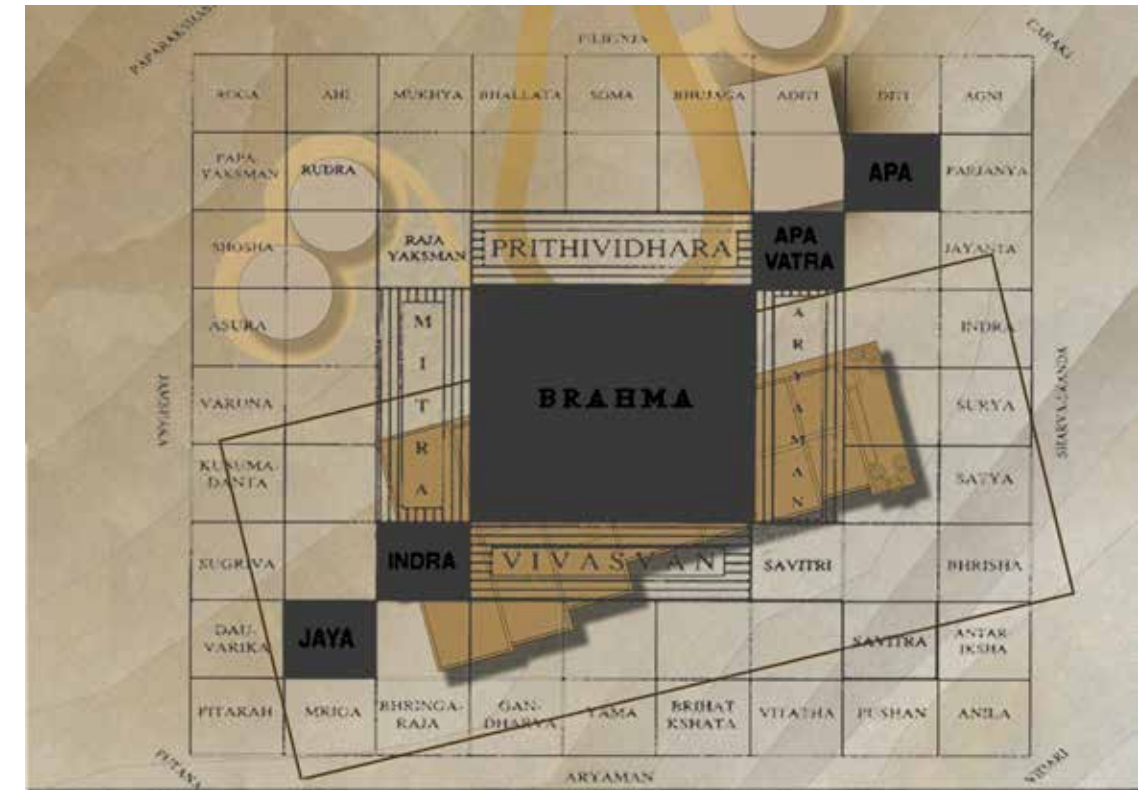


LONGITUDINAL SITE SECTION

KEY PLAN



The vaasthu map is overlapped over the site plan.
The application of the vaasthu rules start from the site plan.
By orienting the site in the North west - south east direction, most rooms gets direct access to views towards the mountains while also maintaining penetration of light into all areas.
It also gives opportunity to frame the house inbetween the silos which allows to use the surroundings to be a part of the house.

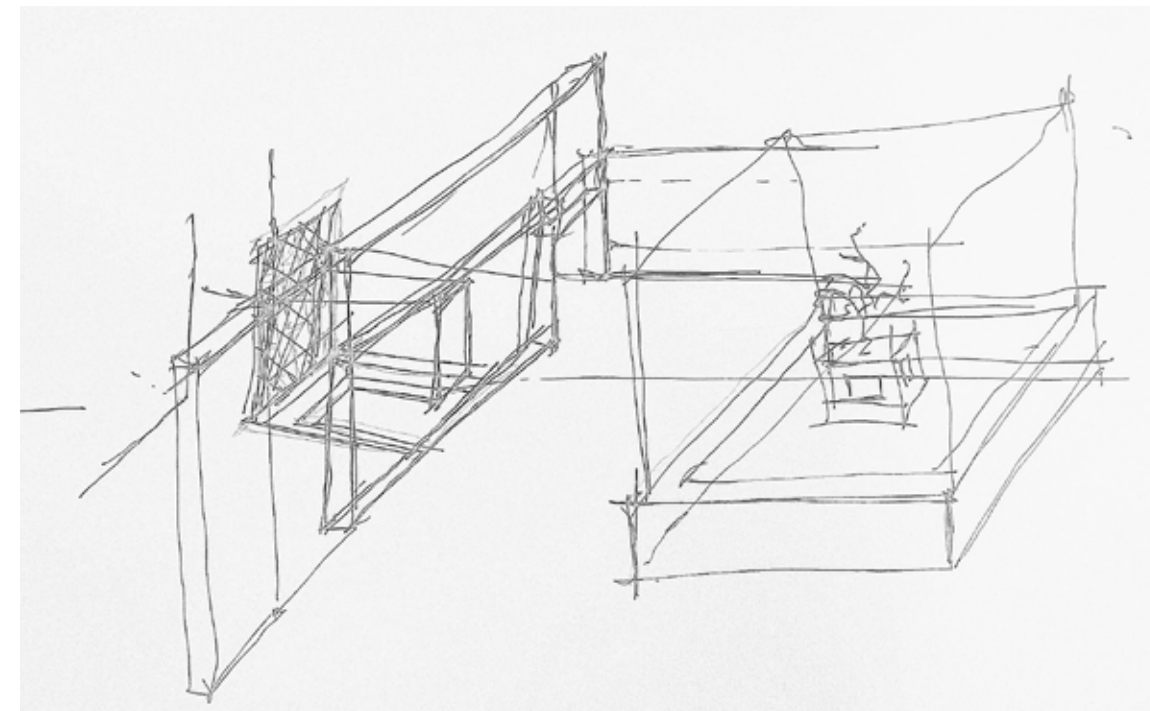
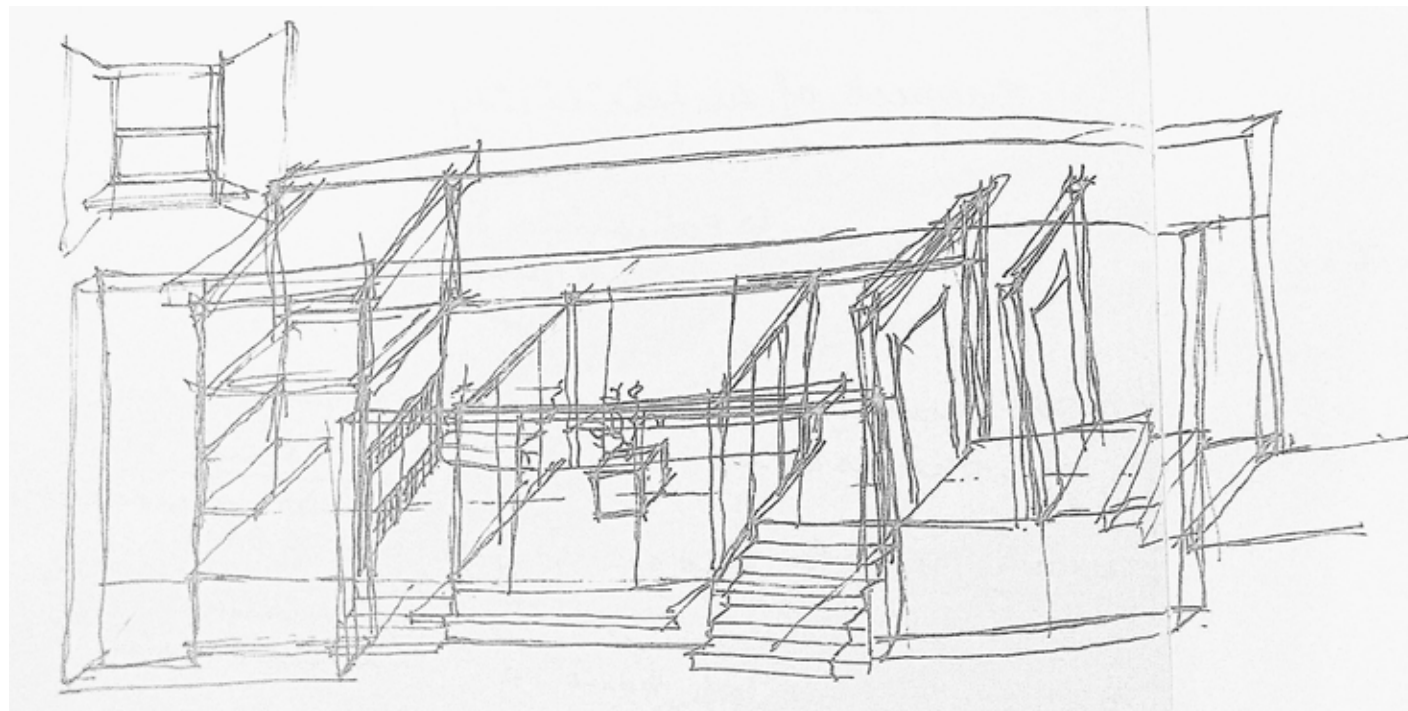
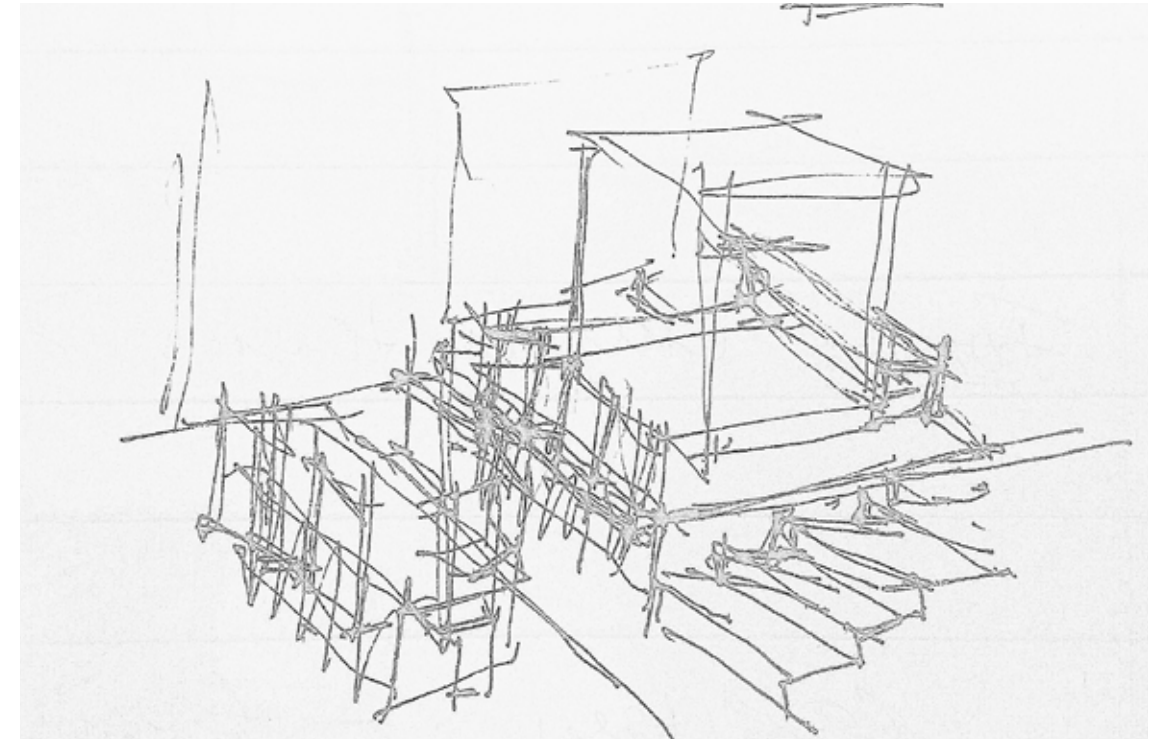
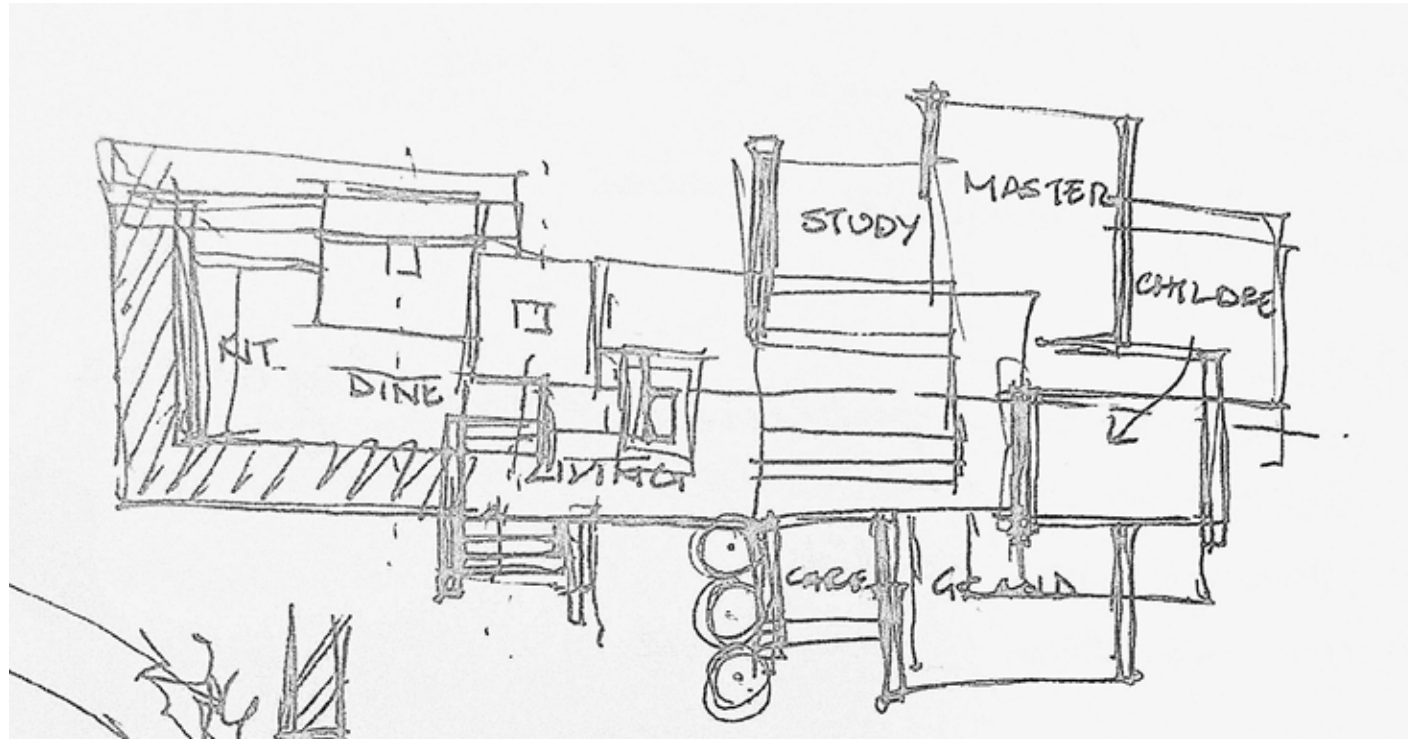


View of the house framed inbetween the silos

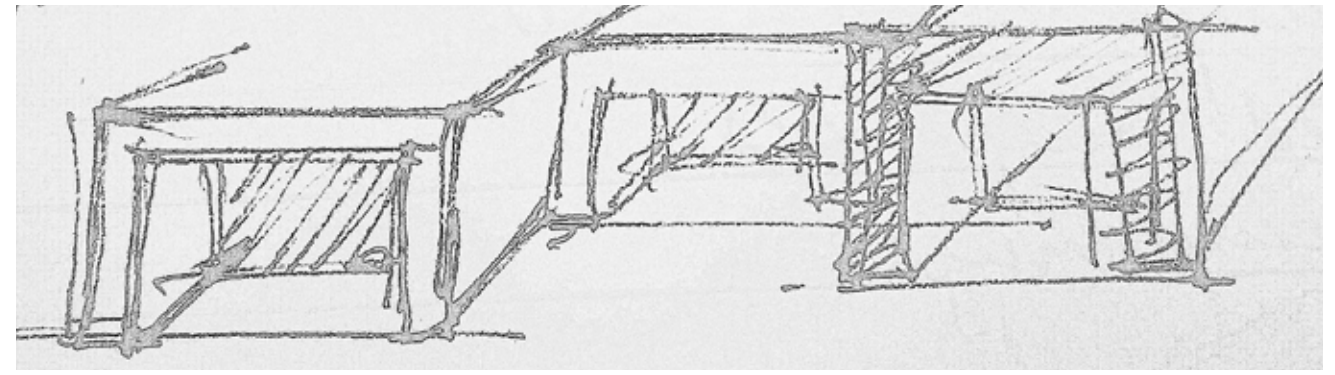
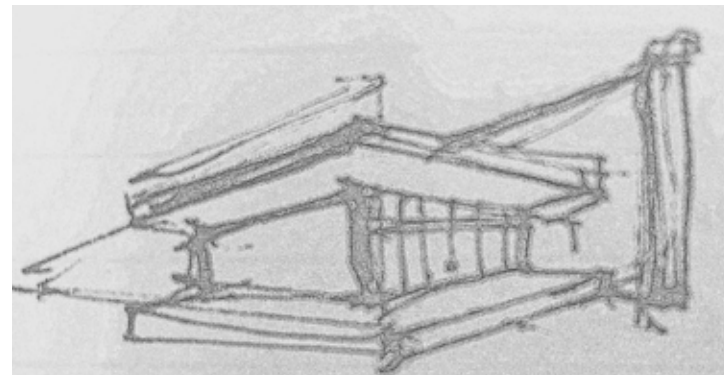
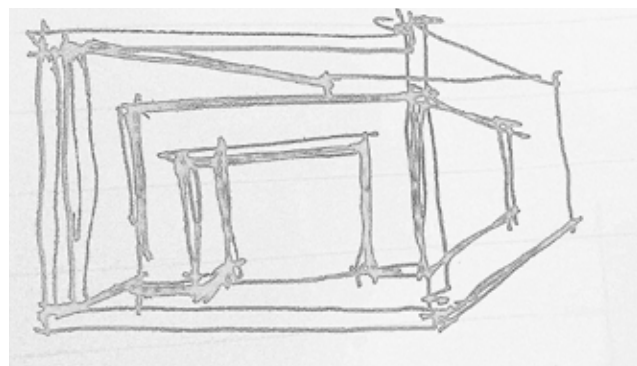
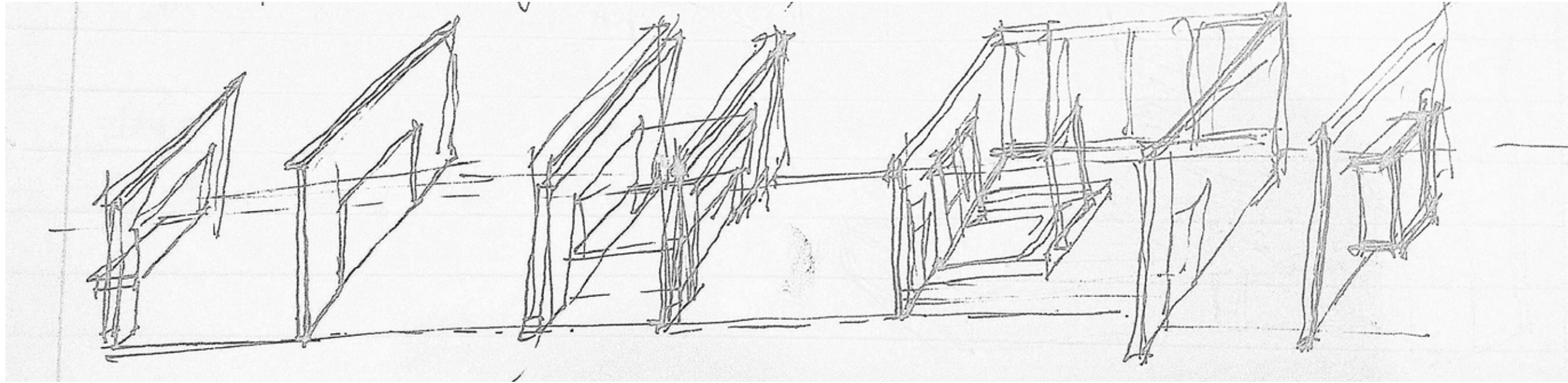


SITE MODEL

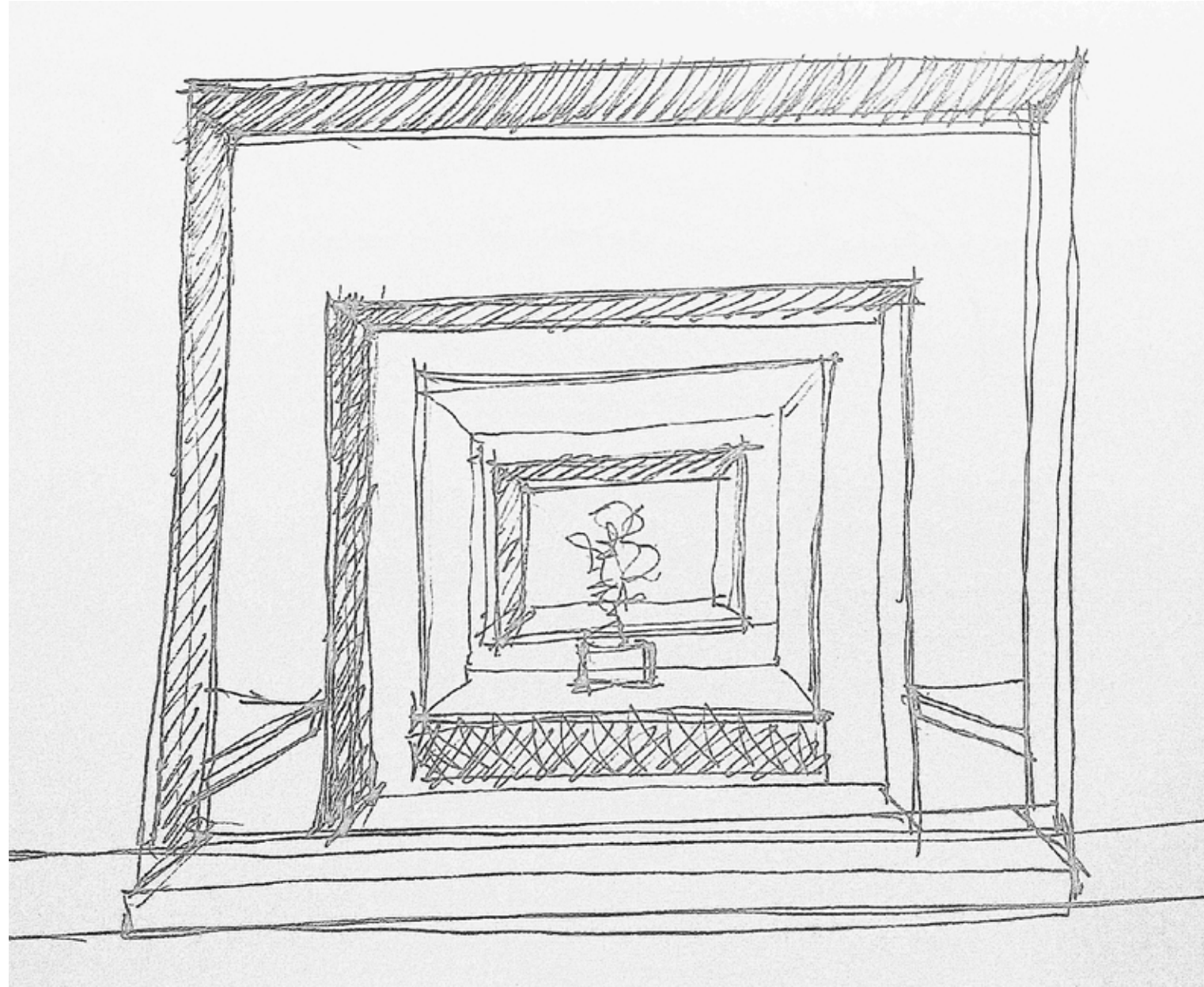
DESIGN DEVELOPEMENT



Arrangement of spaces through around the courtyard as anchoring point for the whole house



Use of structural concrete walls to segregate different areas and also used as blank surfaces to hold light patterns and possibly personal embellishments for the family.



The courtyard being the heart of the house, will contain frames through doorways and arches. Each frame carrying the person from one portal to the next. Like a series of thresholds where the first entrance is the main one.

THOTTI MANE



FIRST FLOOR PLAN



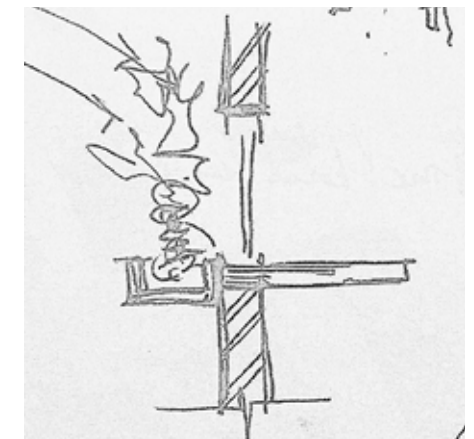


ROOF PLAN

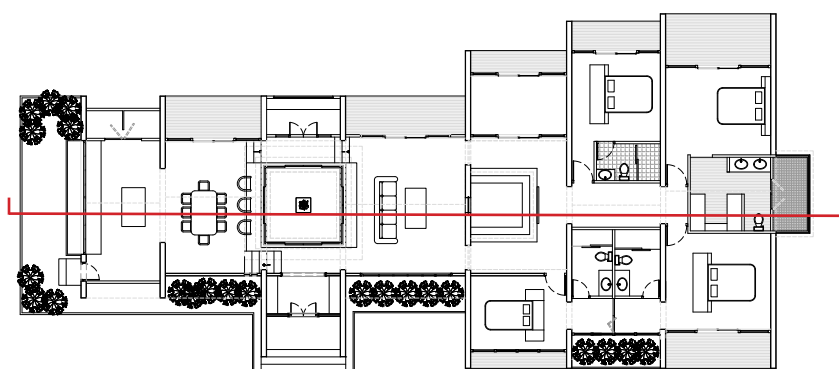
The section highlights the implementation of the light corridor around the courtyard as a reminiscent of the the corridor that exists around the Indian courtyard. Interactive spaces like breakfast table and seating is used around the courtyard to extend the courtyard into the house with the prayer room and the main entrance unit encasing the other dimensions of the courtyard.



Breakfast table at the same level as the courtyards



Kitchen herb garden on one end reflected on the other end by a green master bathroom

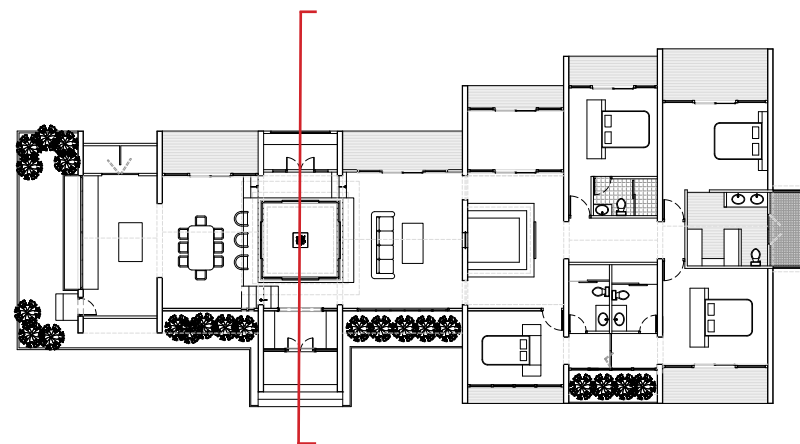
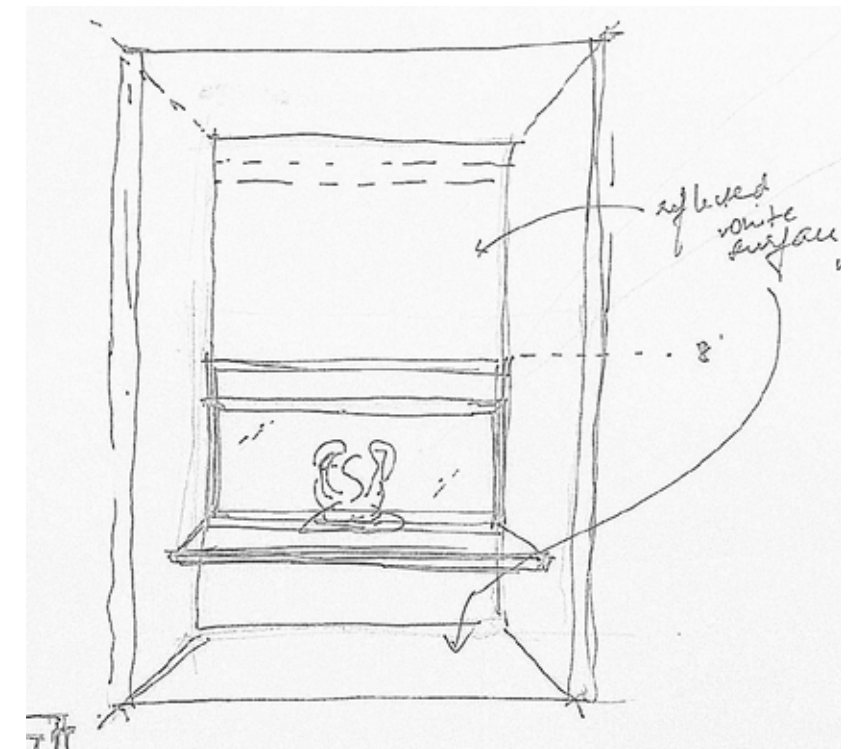
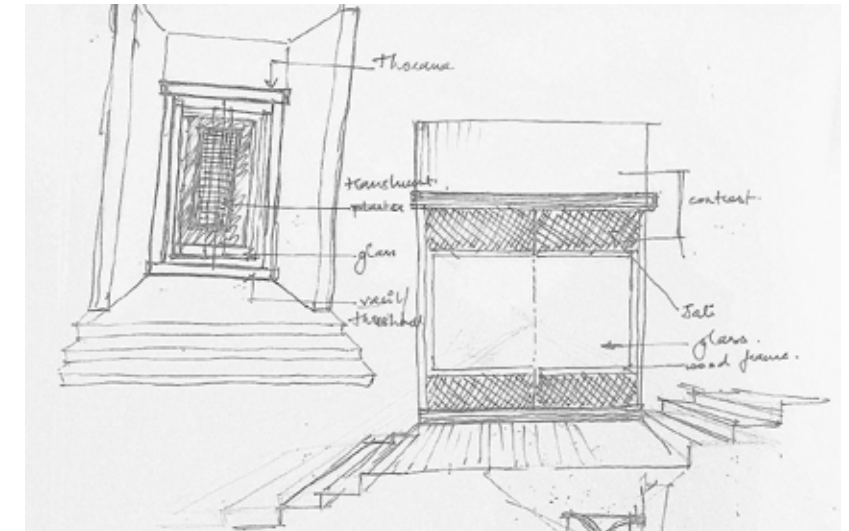




SECTION AA



The main entrance to the house and prayer room are accentuated by the use of doors and portals using similar materials while incorporating light and sound as a part of the entry way.

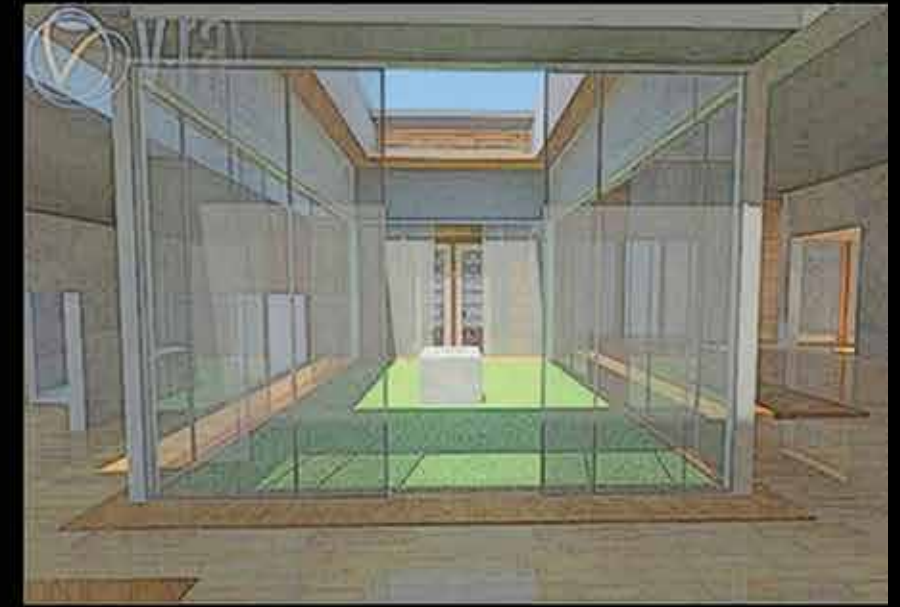




SECTION BB

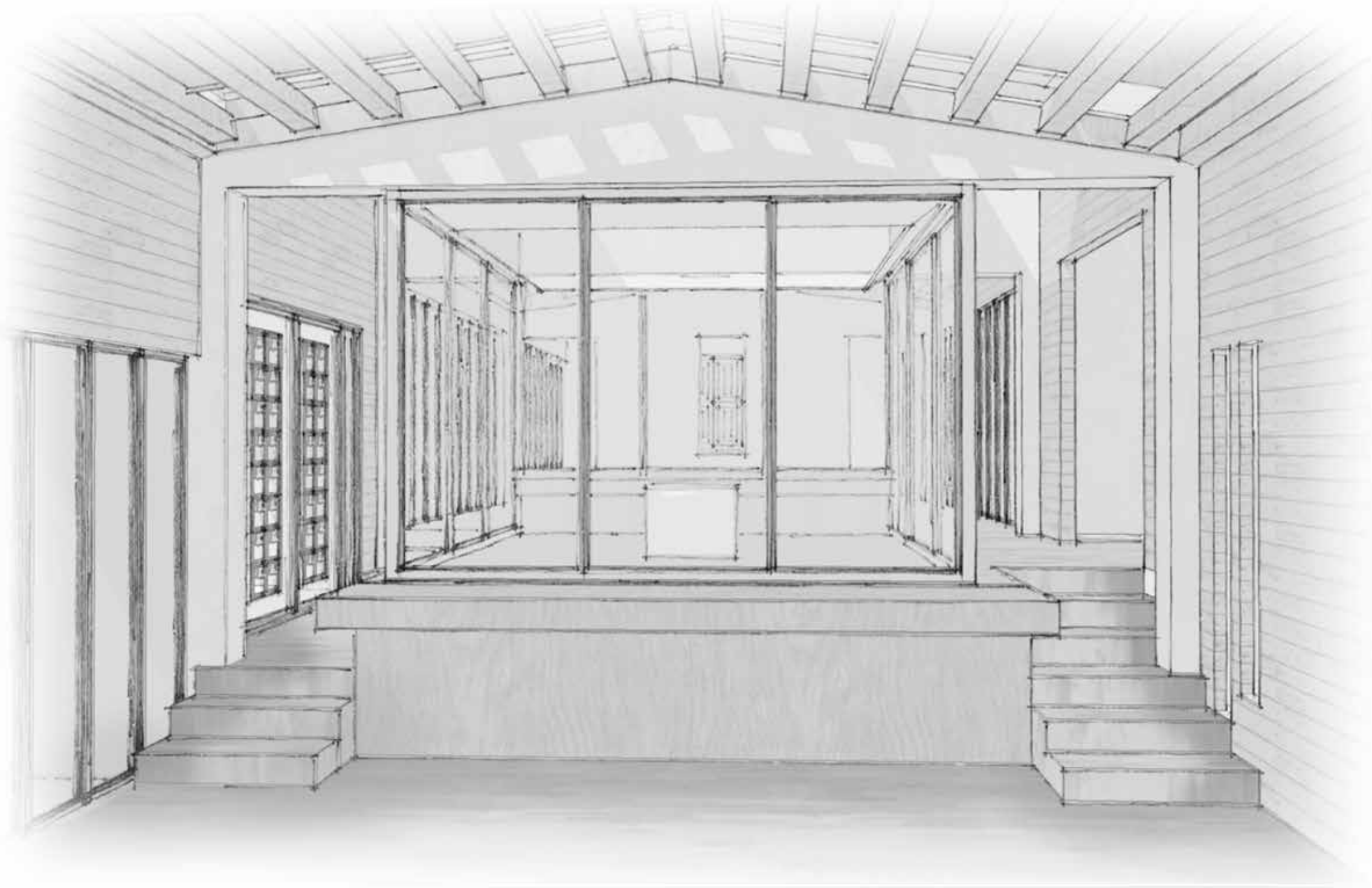


FROM THE ENTRANCE...

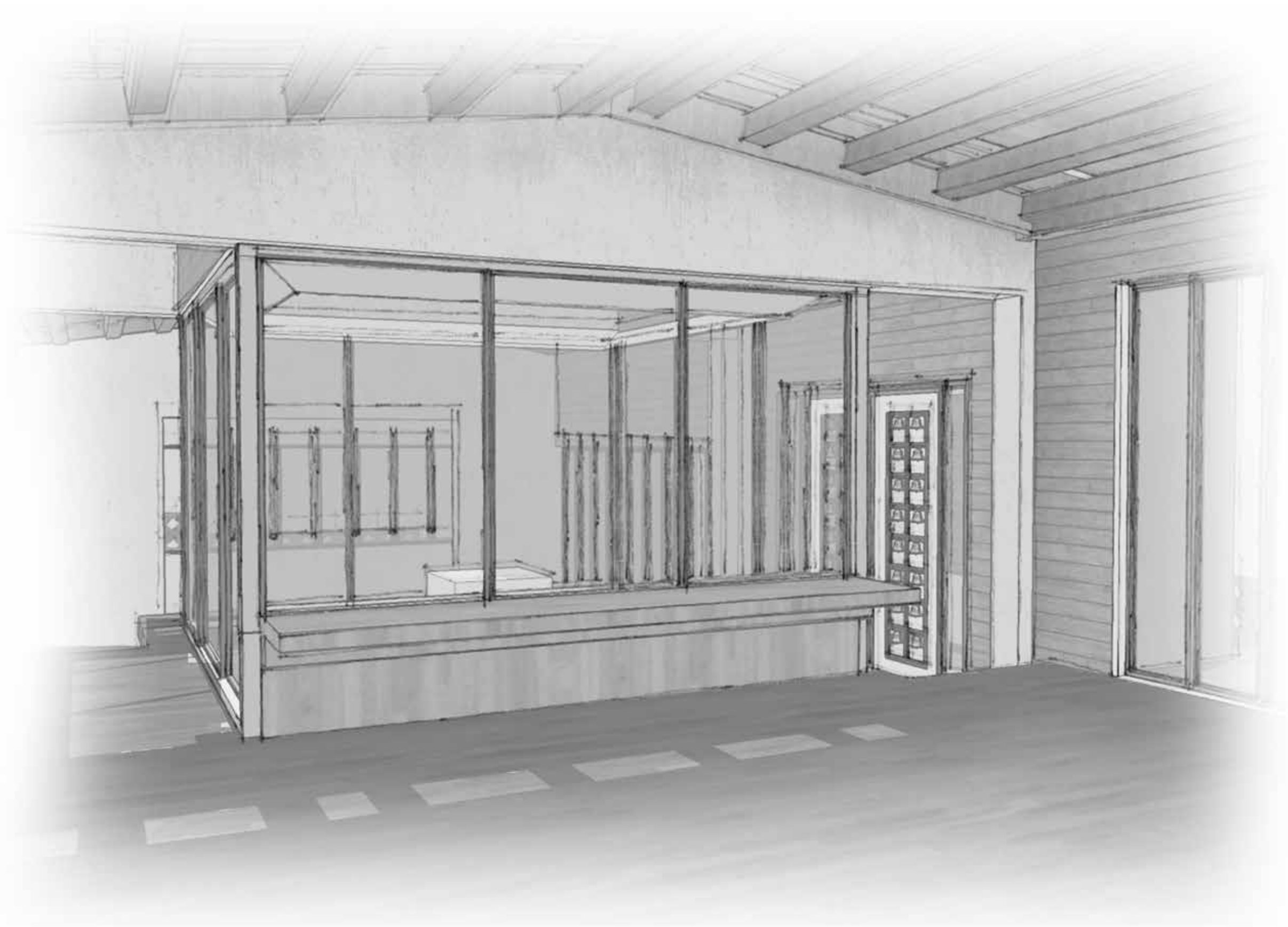


...TO THE PRAYER ROOM



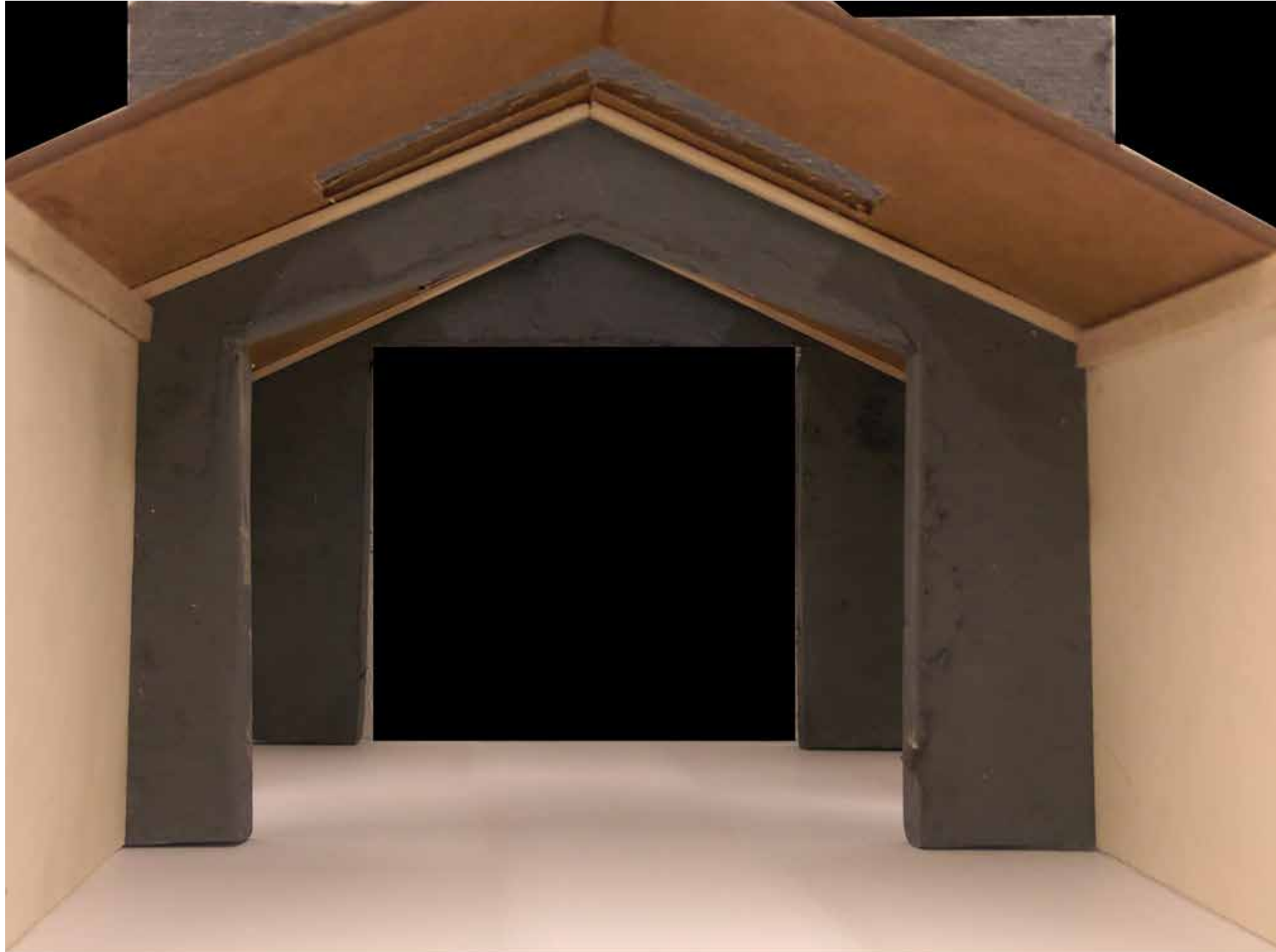


VIEW FROM DINING ROOM

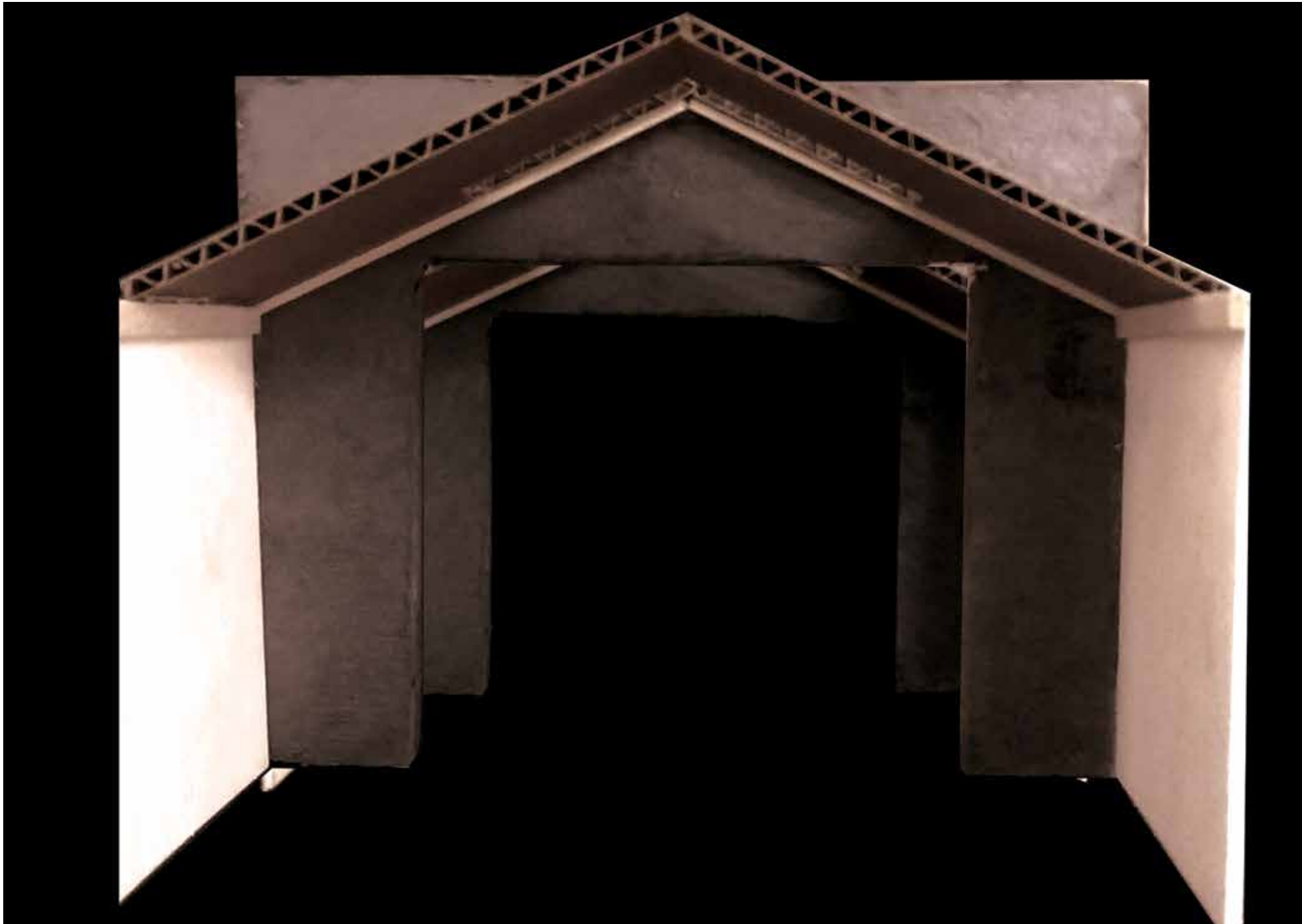


VIEW FROM DINING ROOM

The graphical aesthetics of gable vs square shape of the arches was studied .
Due to the frame concept that exists through the house. To maintain the same visual frame (excluding the roof), the idea of using the square arches was retained from previous schemes



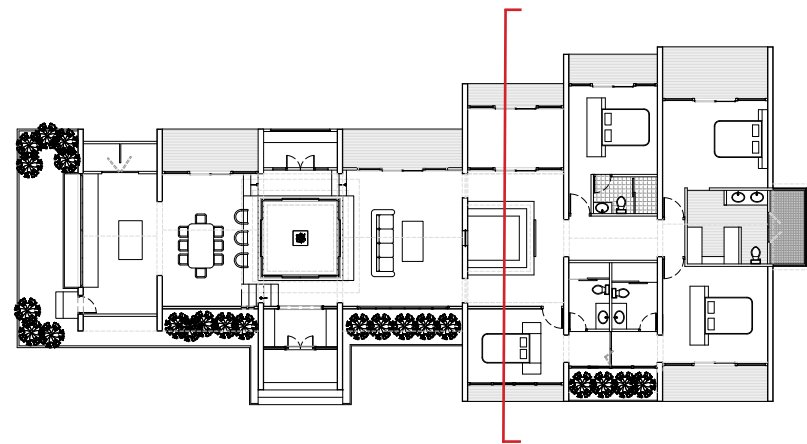
Study of parallel arches of square and gable profiles to implement within the frames of the house.

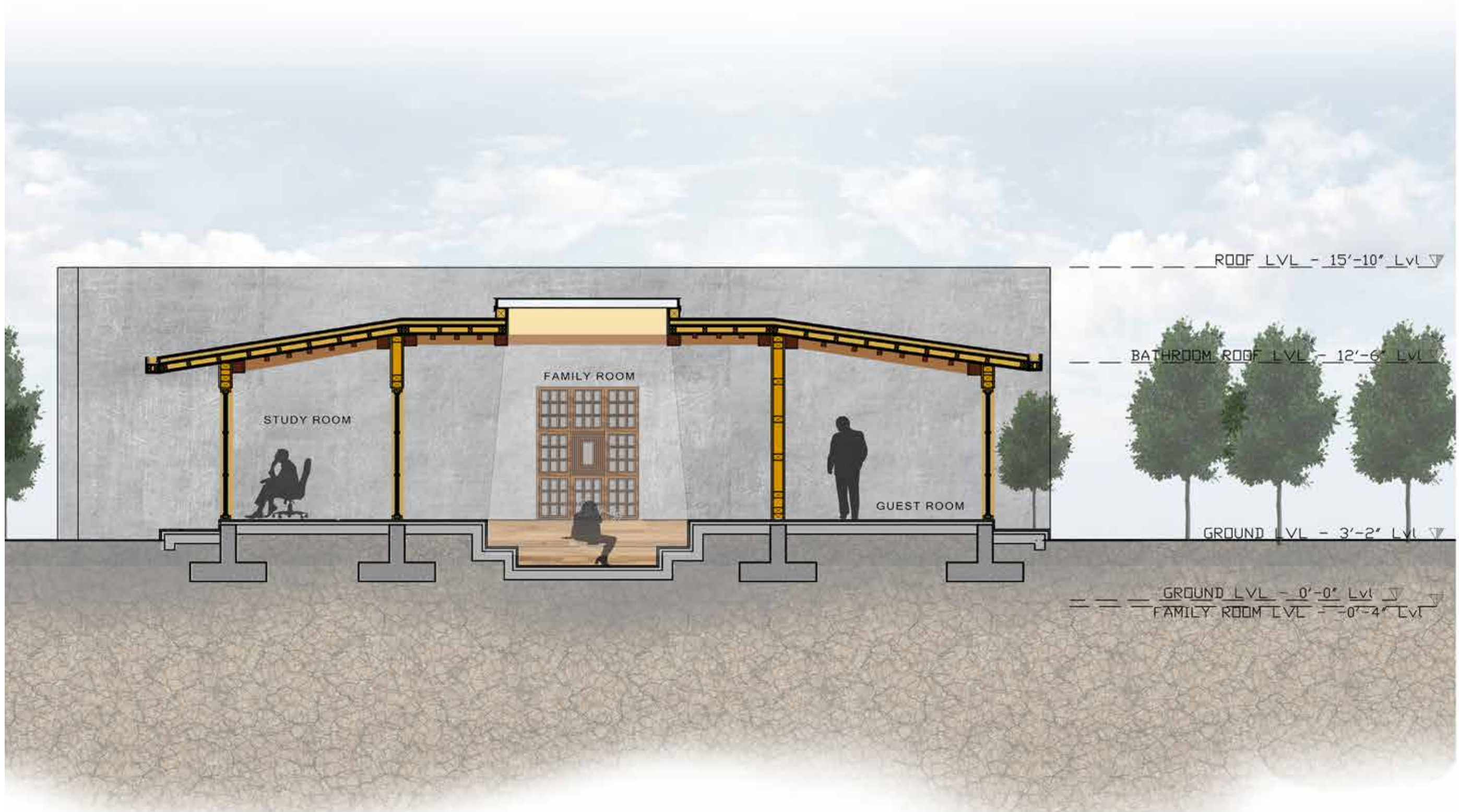


Study of parallel arches of square and gable profiles to implement within the frames of the house.

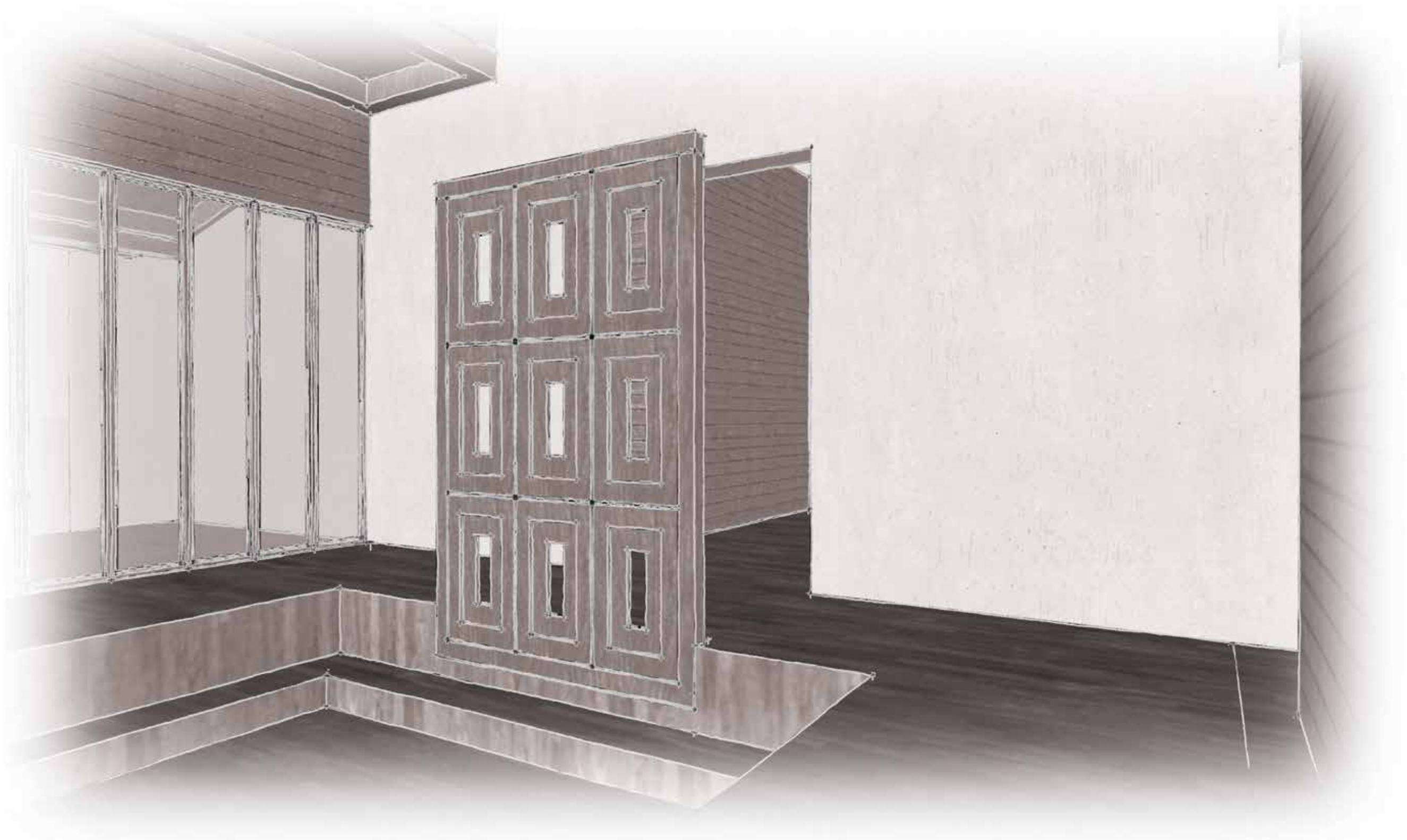


Study of parallel arches of square and gable profiles to implement within the frames of the house.

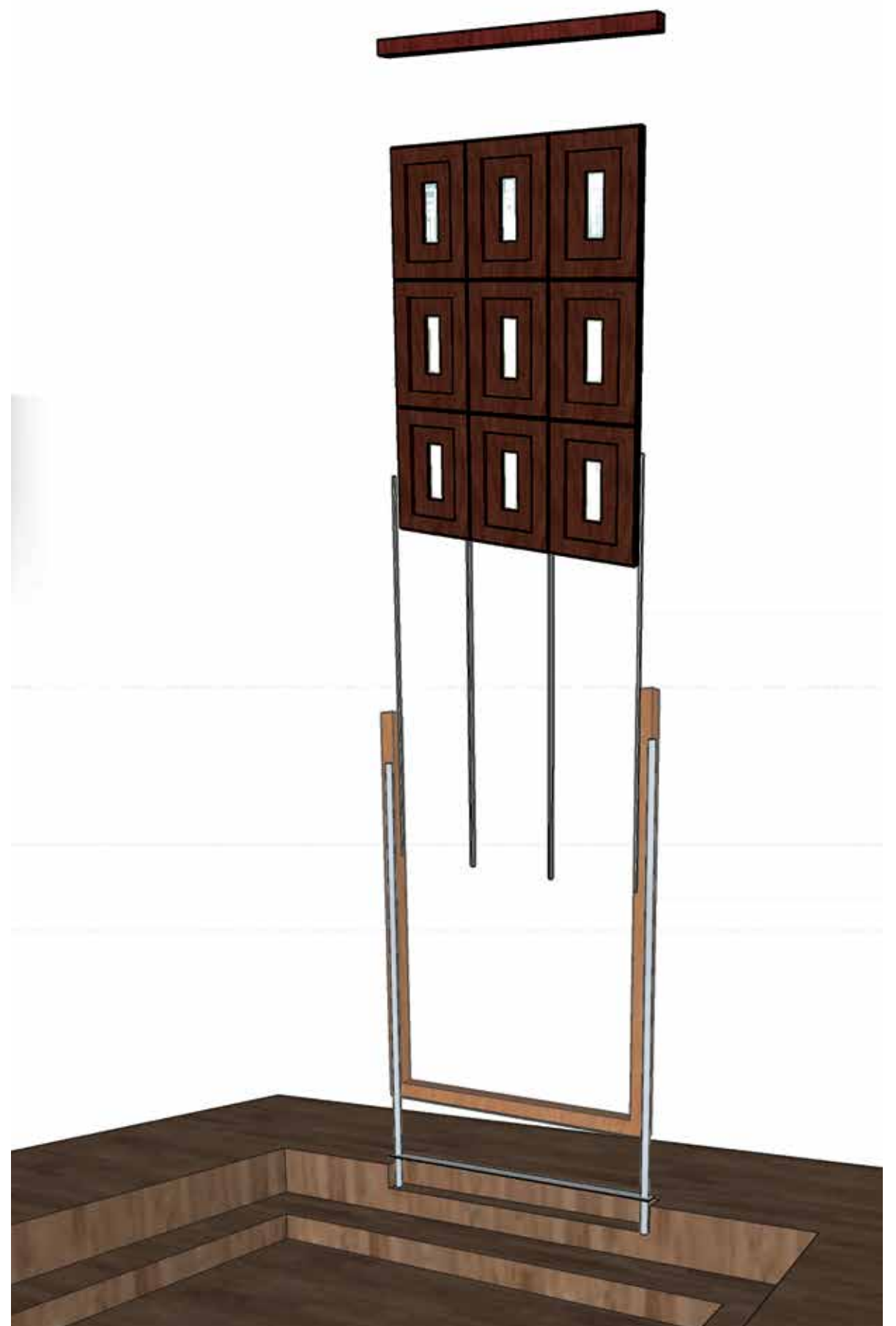
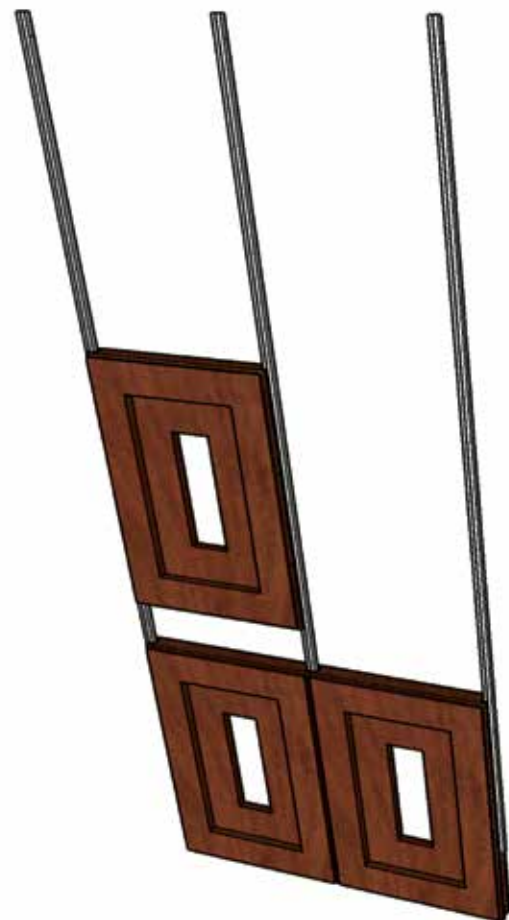




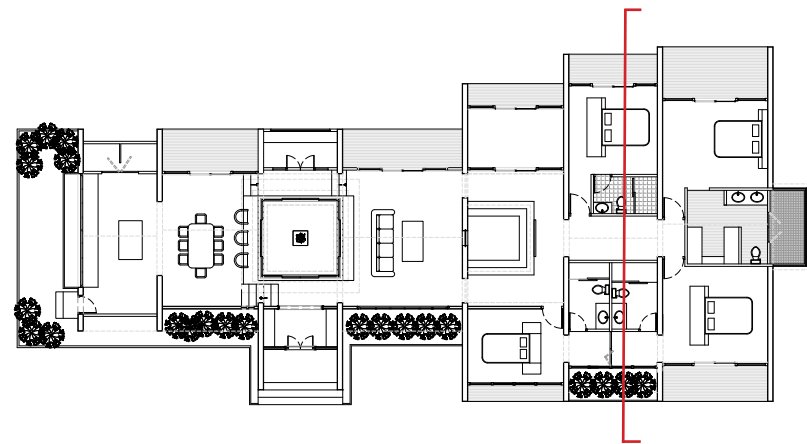
SECTION CC 

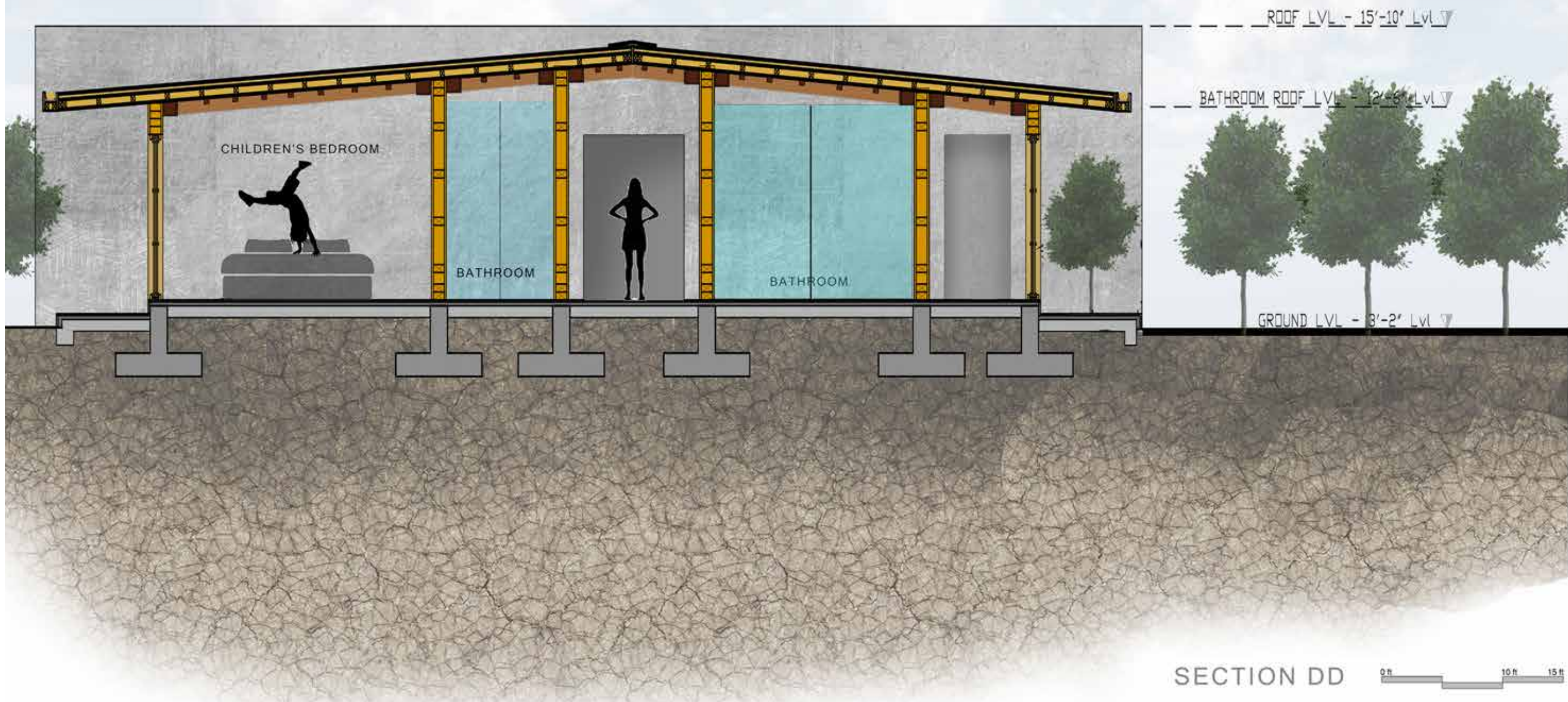


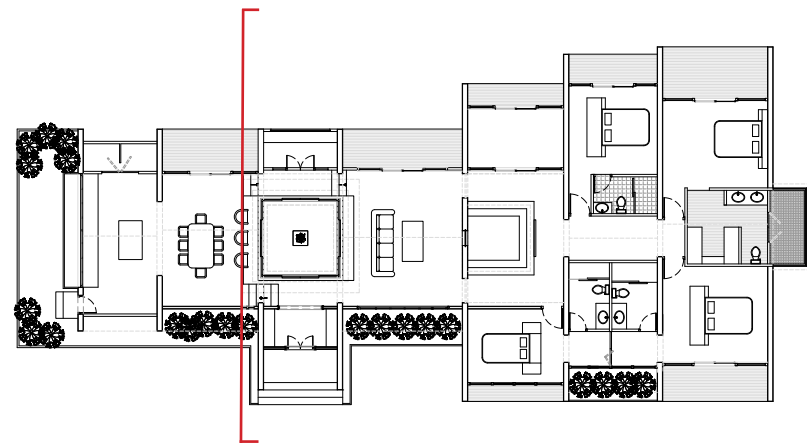
View of the Family room

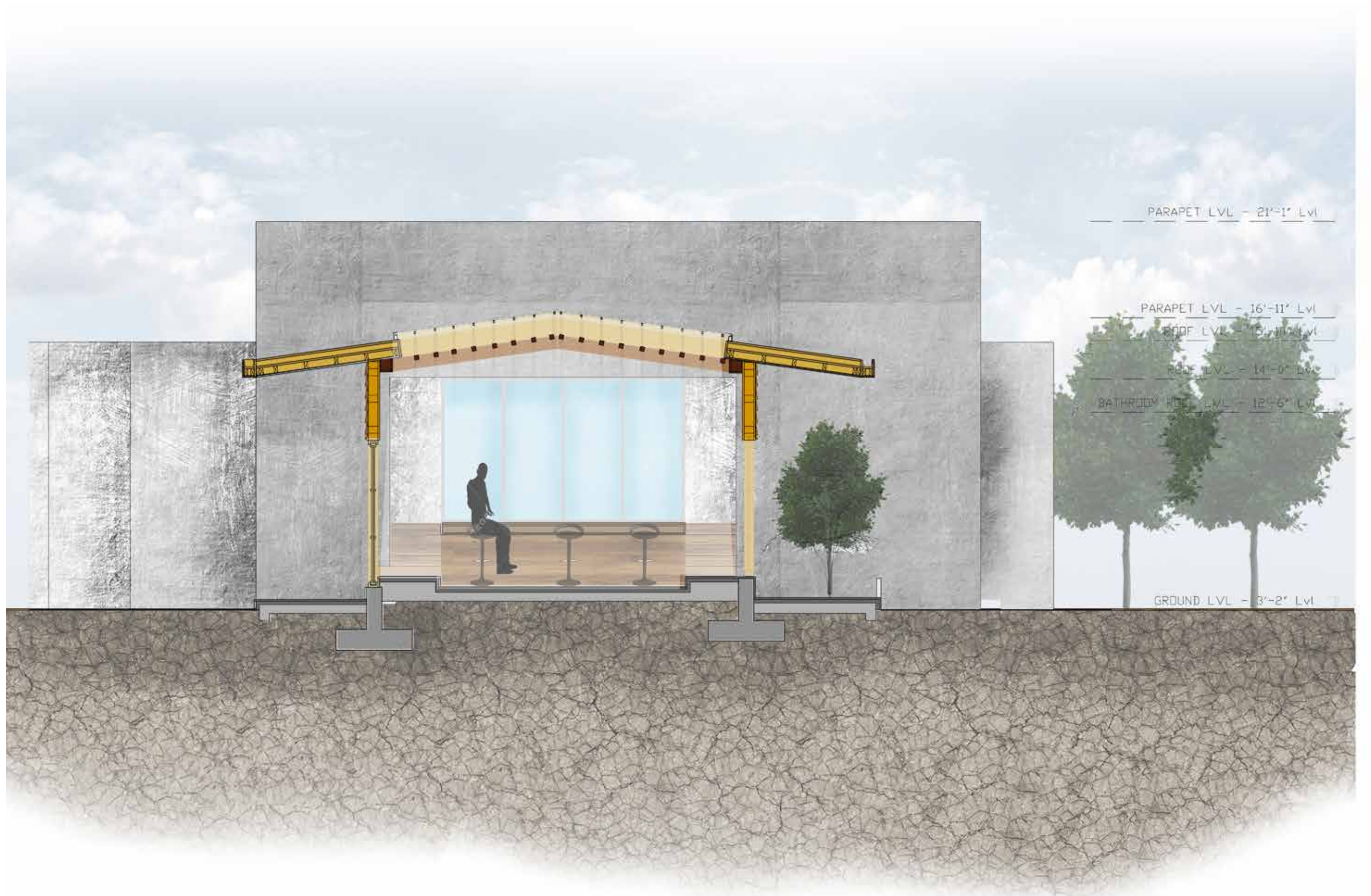


Detail of Jali wall assembly









PARAPET LVL - 21'-1" Lvl

PARAPET LVL - 16'-11" Lvl

ROOF LVL - 15'-10" Lvl

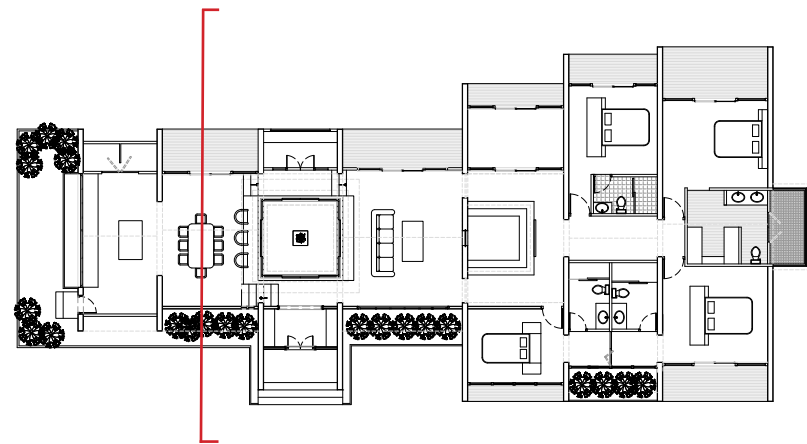
ROOF LVL - 14'-0" Lvl

BATHROOM FLOOR LVL - 12'-6" Lvl

GROUND LVL - 3'-2" Lvl

SECTION EE

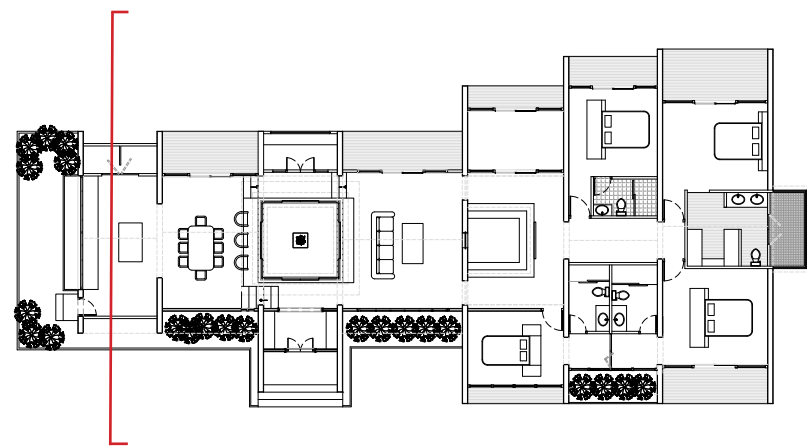






SECTION FF

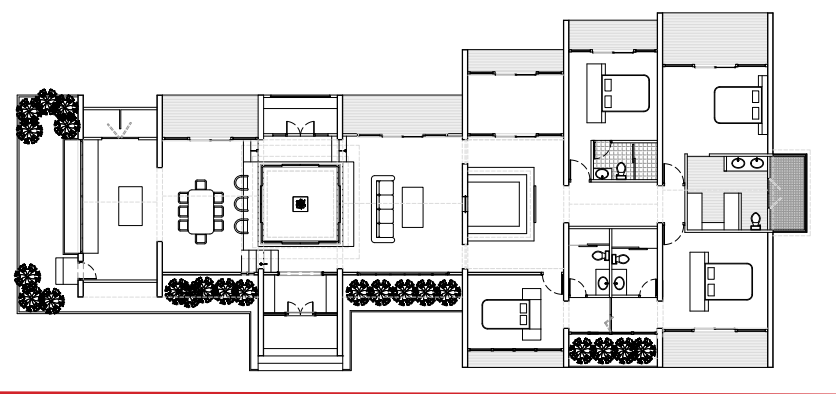






SECTION GG



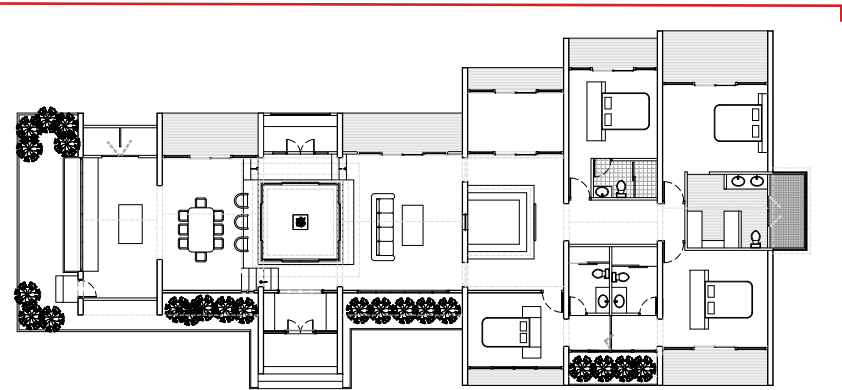


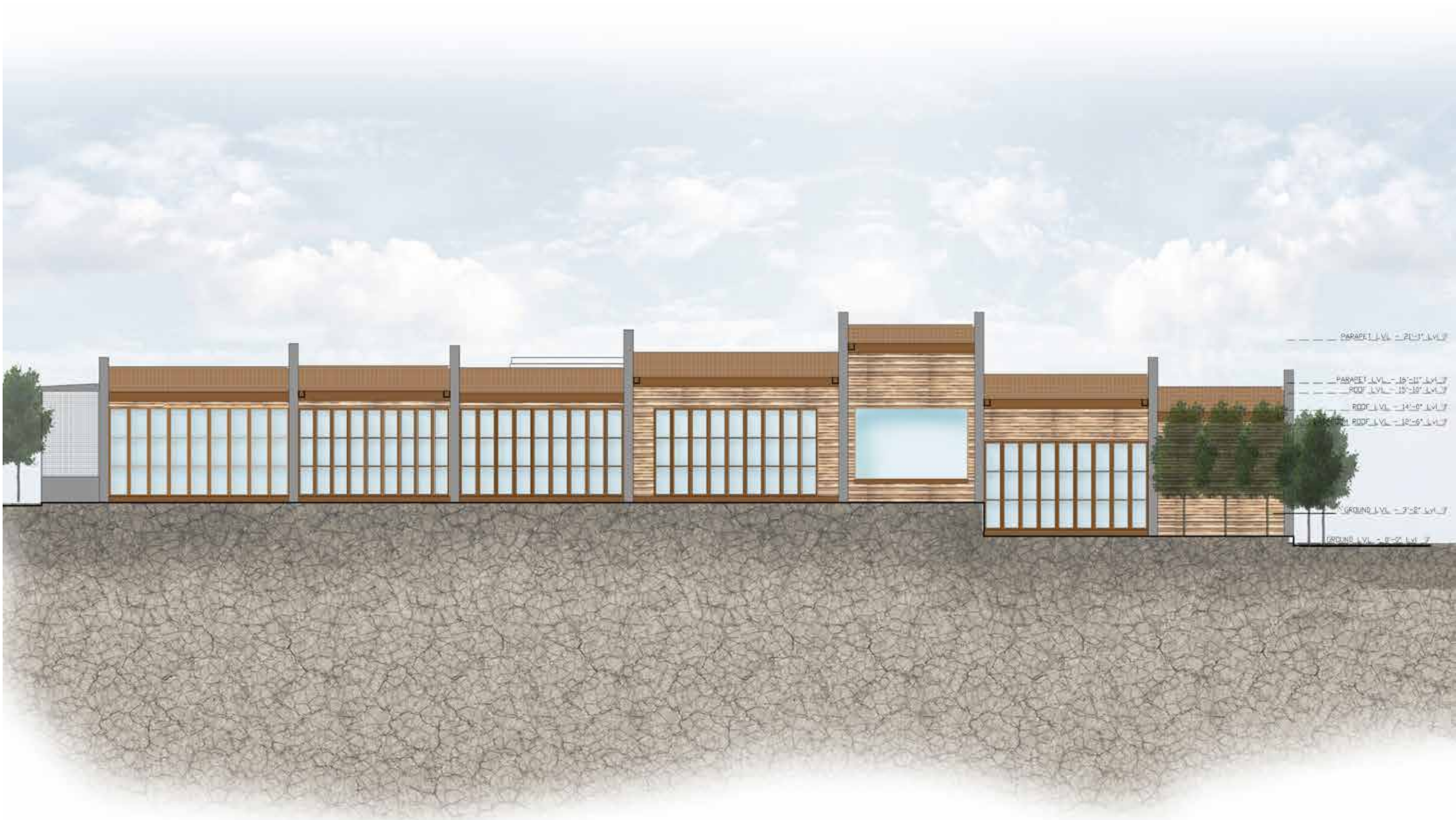


15'

SOUTH WEST ELEVATION



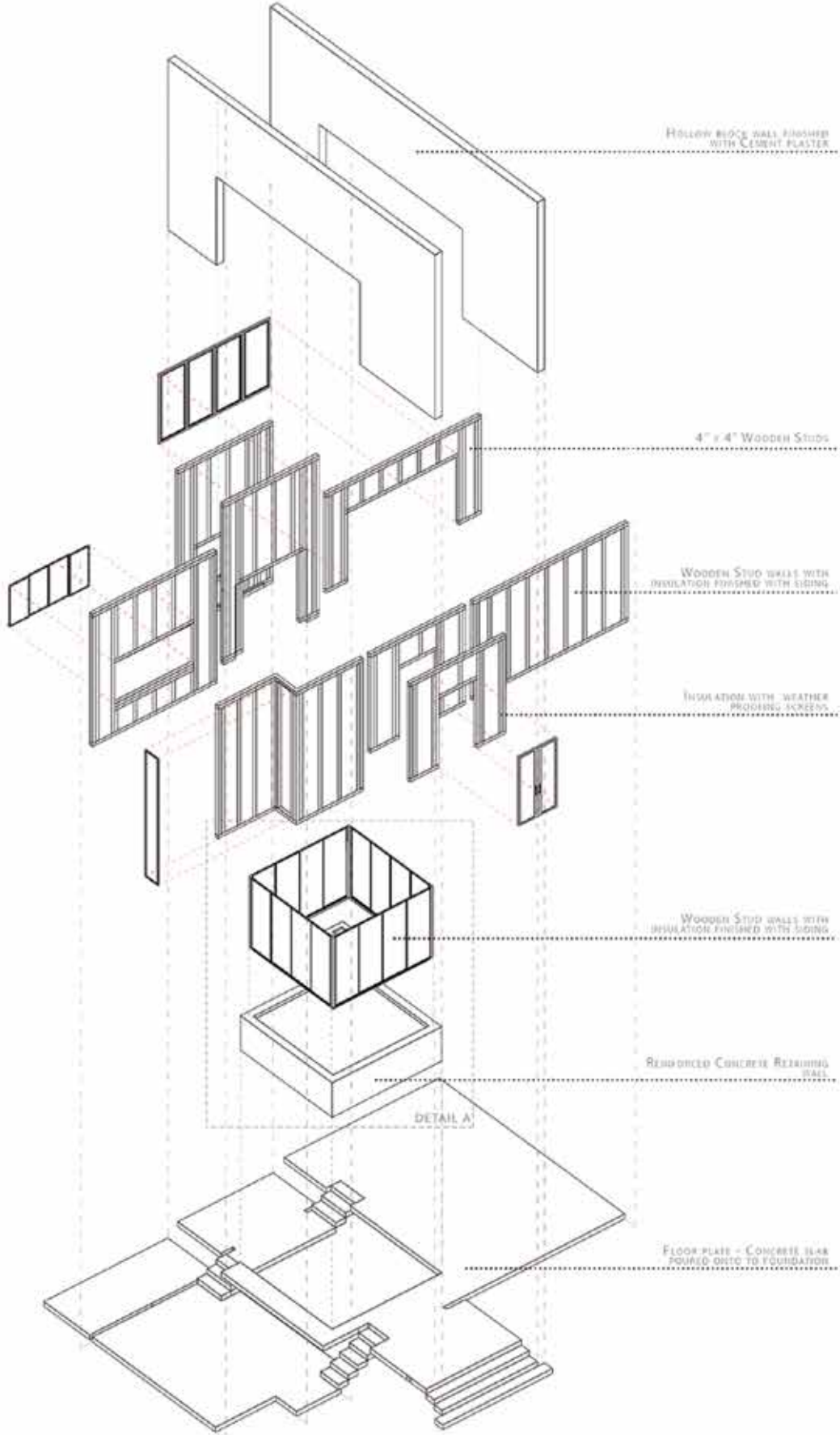




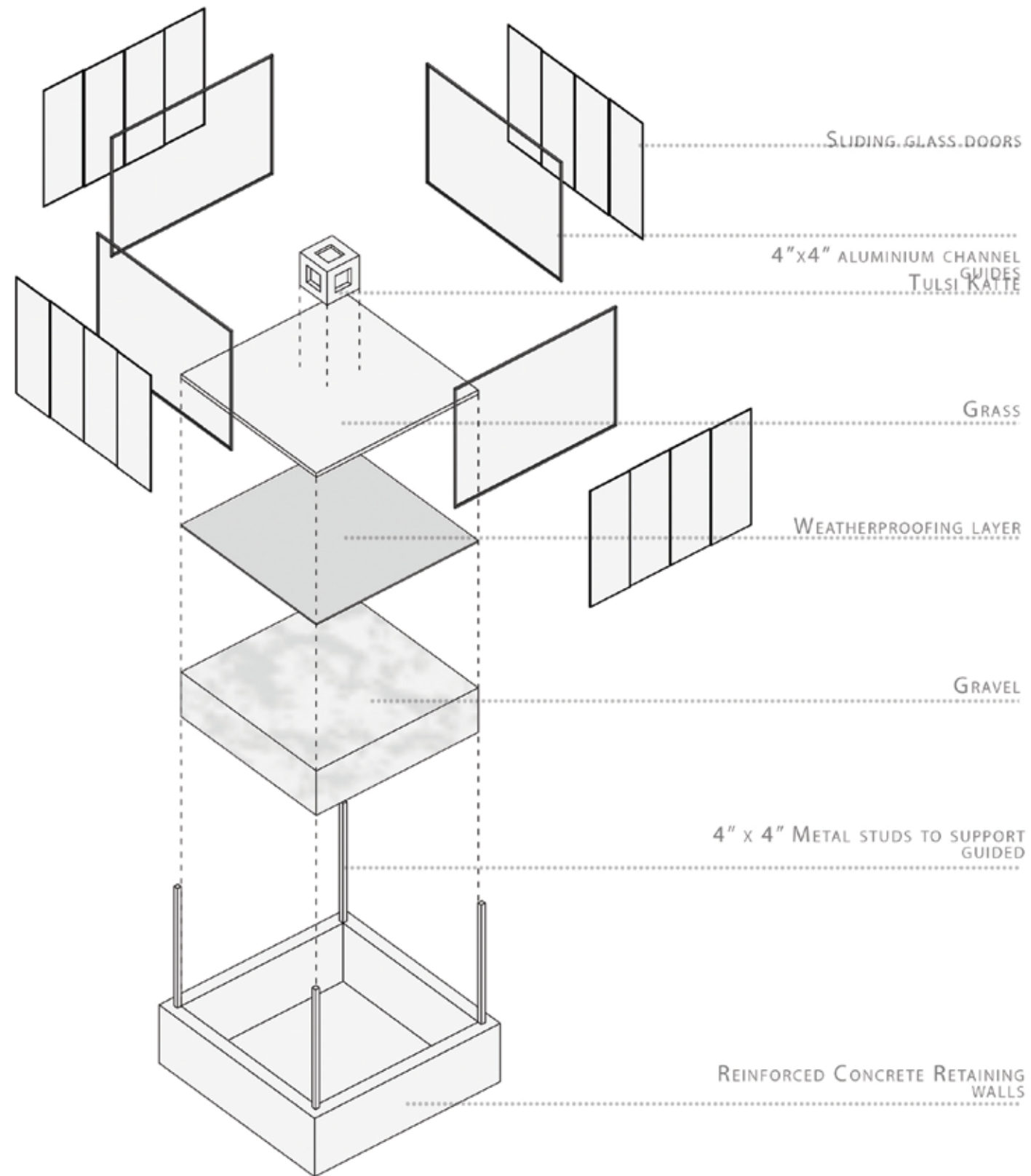
NORTH EAST ELEVATION



STRUCTURE

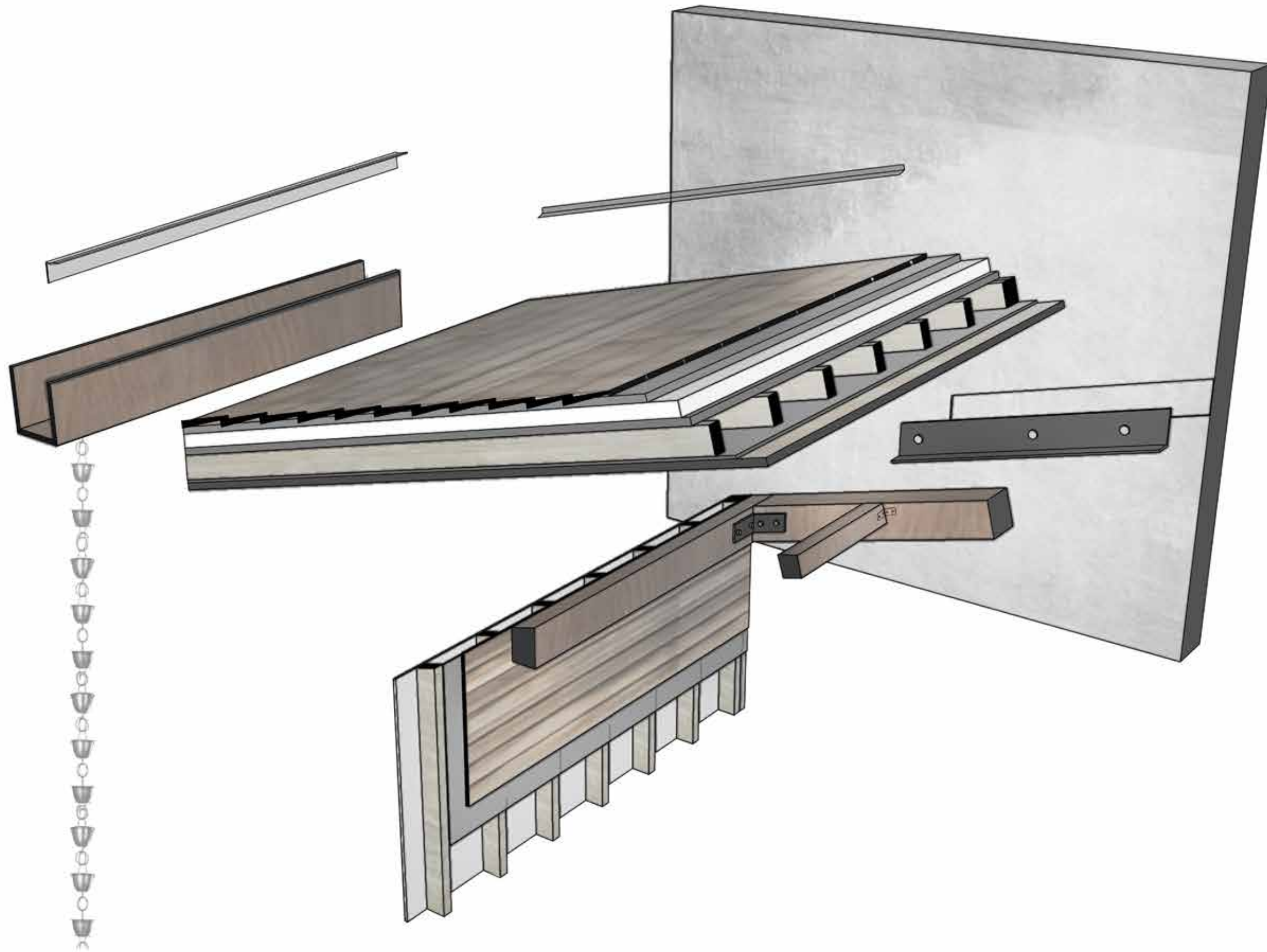


The walls of the house apart from the concrete are comprised of stud walls resting on basic concrete footings. With 9 part folding doors and windows as indicated in the plan.



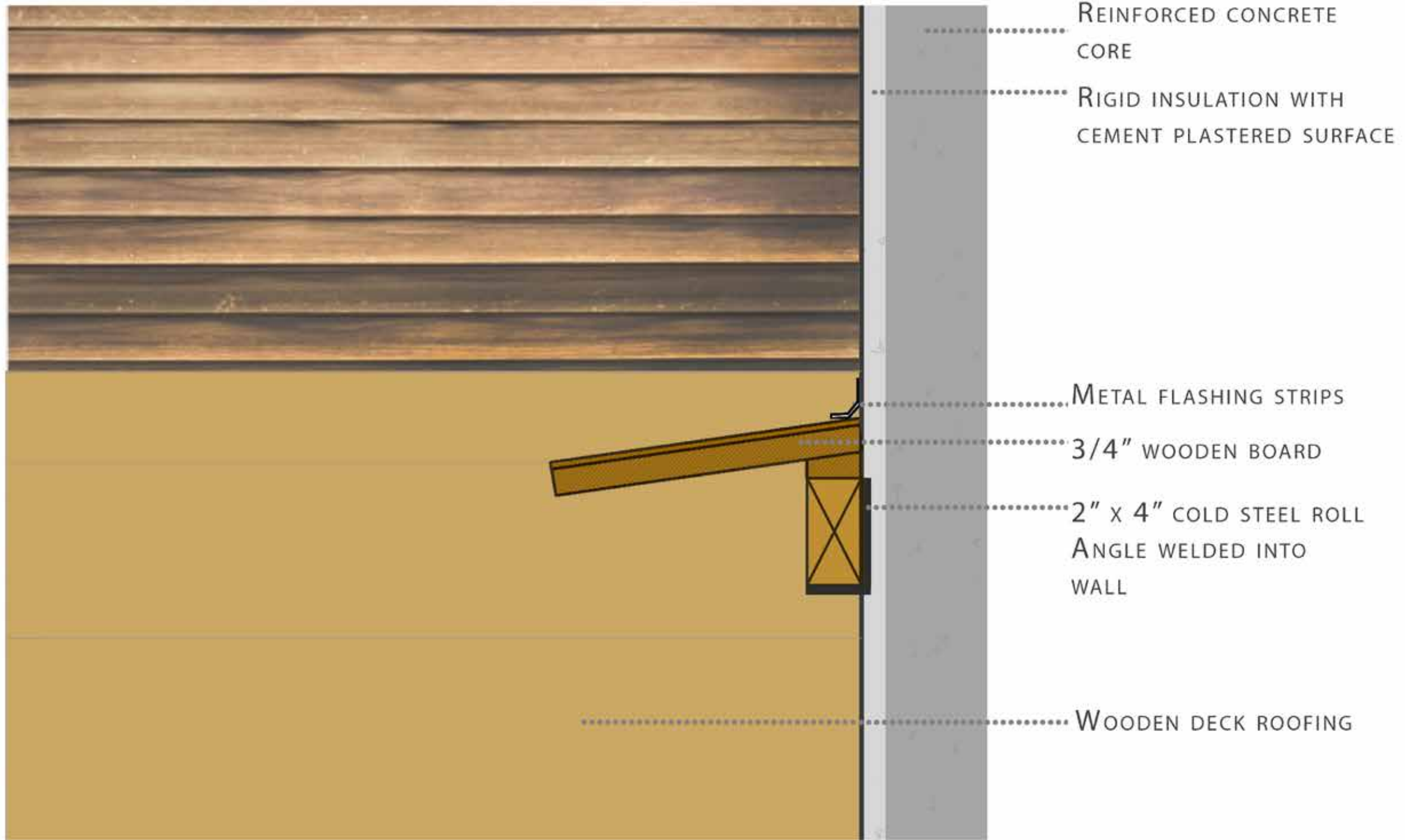
The courtyard is an isolated entity of the house with its own structural integrity.

The stud walls stand on the foundation.
The primary beam is bolted to the stud walls
The transverse beam is bolted into the concrete wall with a metal cleat in a groove in the concrete wall.
The roof then rests on the beam with secondary beams for additional rigidity and support.
The box gutter is attached to the roof structure.
Metal flashing is installed as indicated.



EXPLODED VIEW OF THE BEAM AND ROOF CONNECTION

GOD IS IN THE DETAILS....



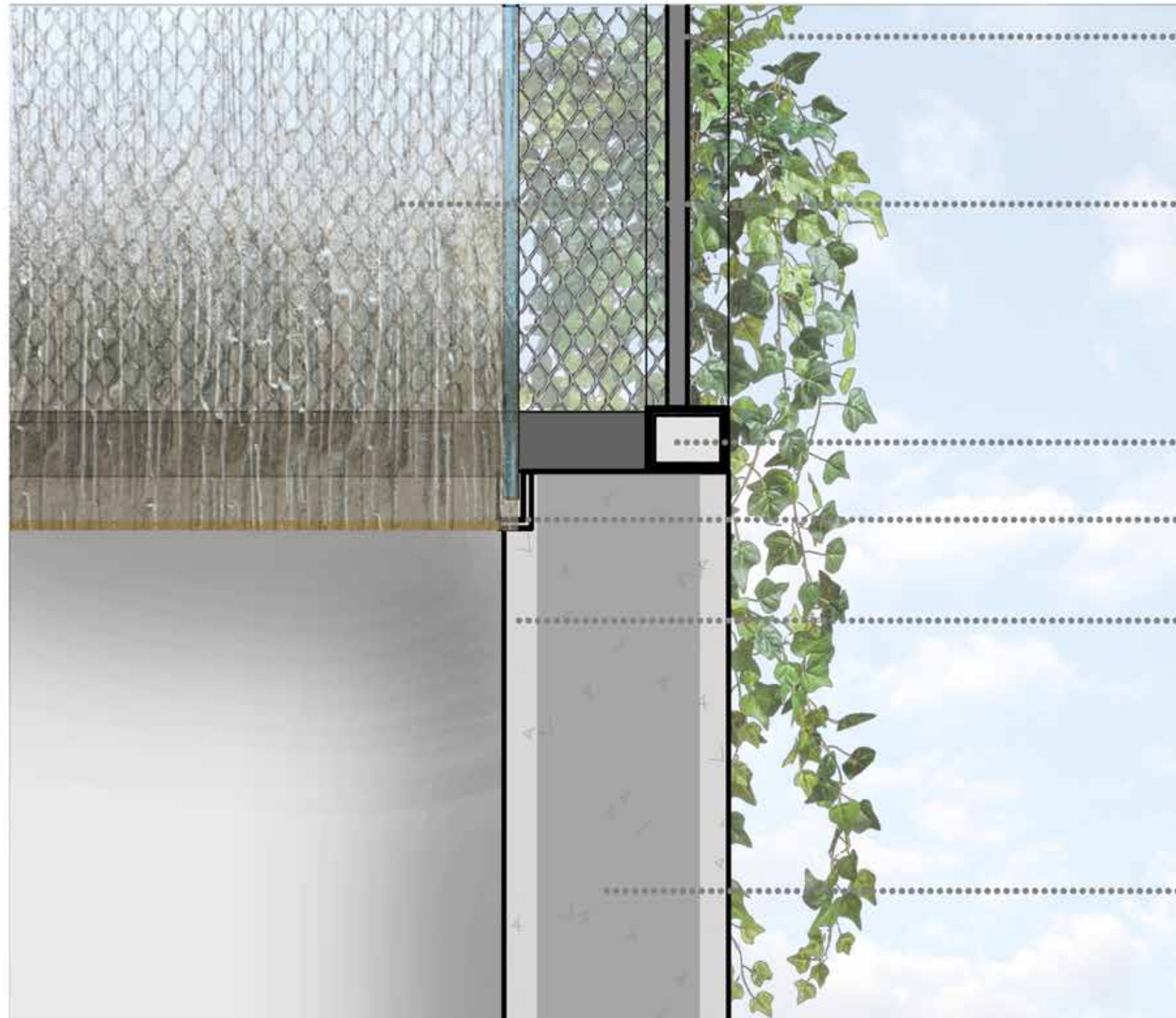
MALNAD ROOF OVER COURTYARD

SCALE: 3'' = 1'

The house ends on green on either side.
Both areas important for everyday living - Kitchen and Bathroom

The kitchen is surrounded by the kitchen and herb garden. And the bathroom has a glass surrounded by green creepers and plants so as to create a see through and yet private green alcove.





WIRE MESH WELDED TO
2" x 3" CHANNEL

12MM THICK RAIN GLASS

12MM THICK RAIN GLASS

1" x 1" STEEL ANGLE
WELDED INTO WALL

RIGID INSULATION WITH
CEMENT PLASTERED SURFACE

REINFORCED CONCRETE
CORE

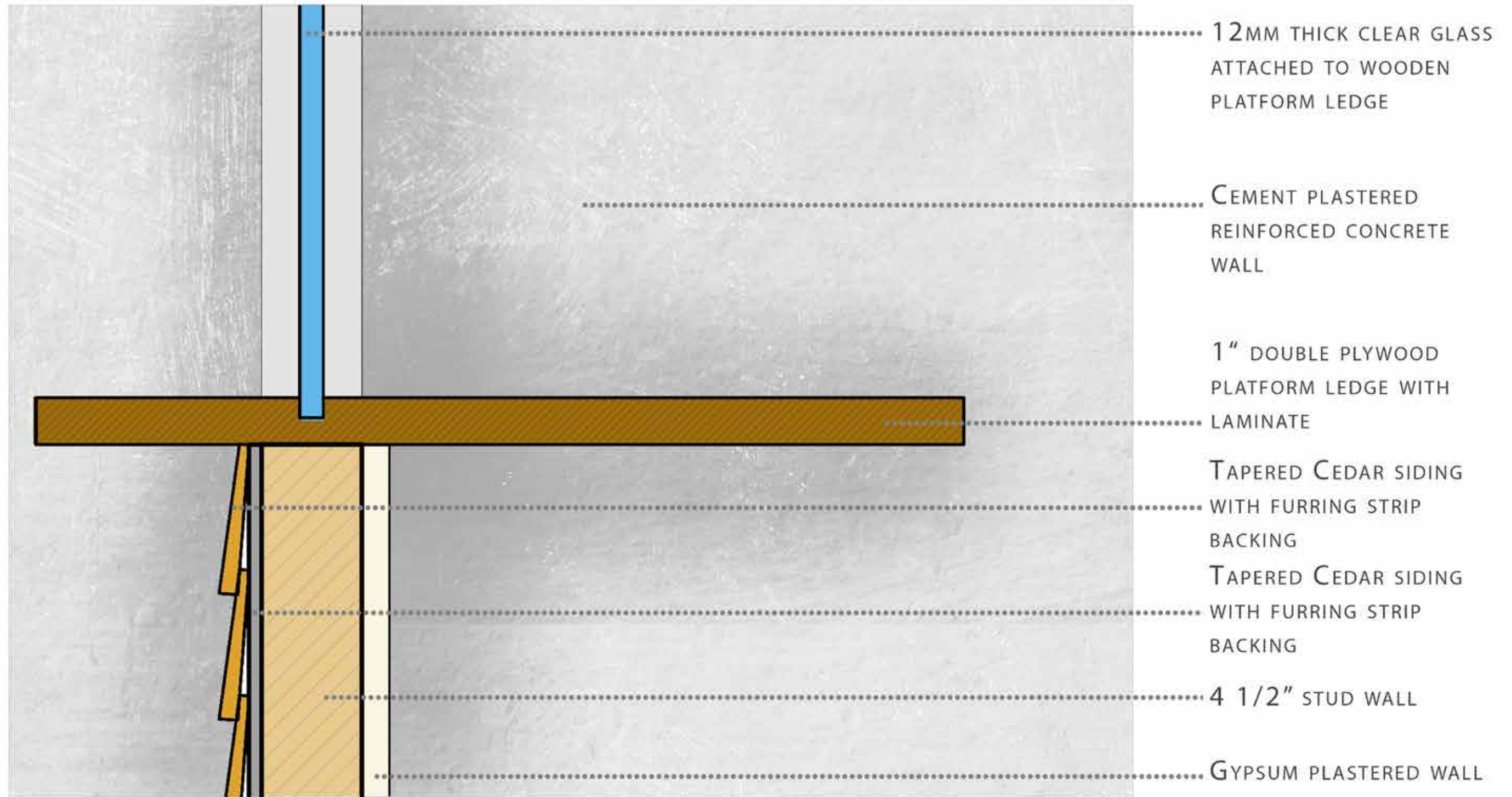
RETURNING TO NATURE -

BATHROOM GLASS DETAIL

SCALE: 3'' = 1'

The prayer room platform where the idol is kept is framed by a picture window . This expands the interior space of the prayer room and the backdrop of the idol is served by the view of the mountains.





EXTENDING OUT OF THE FRAME

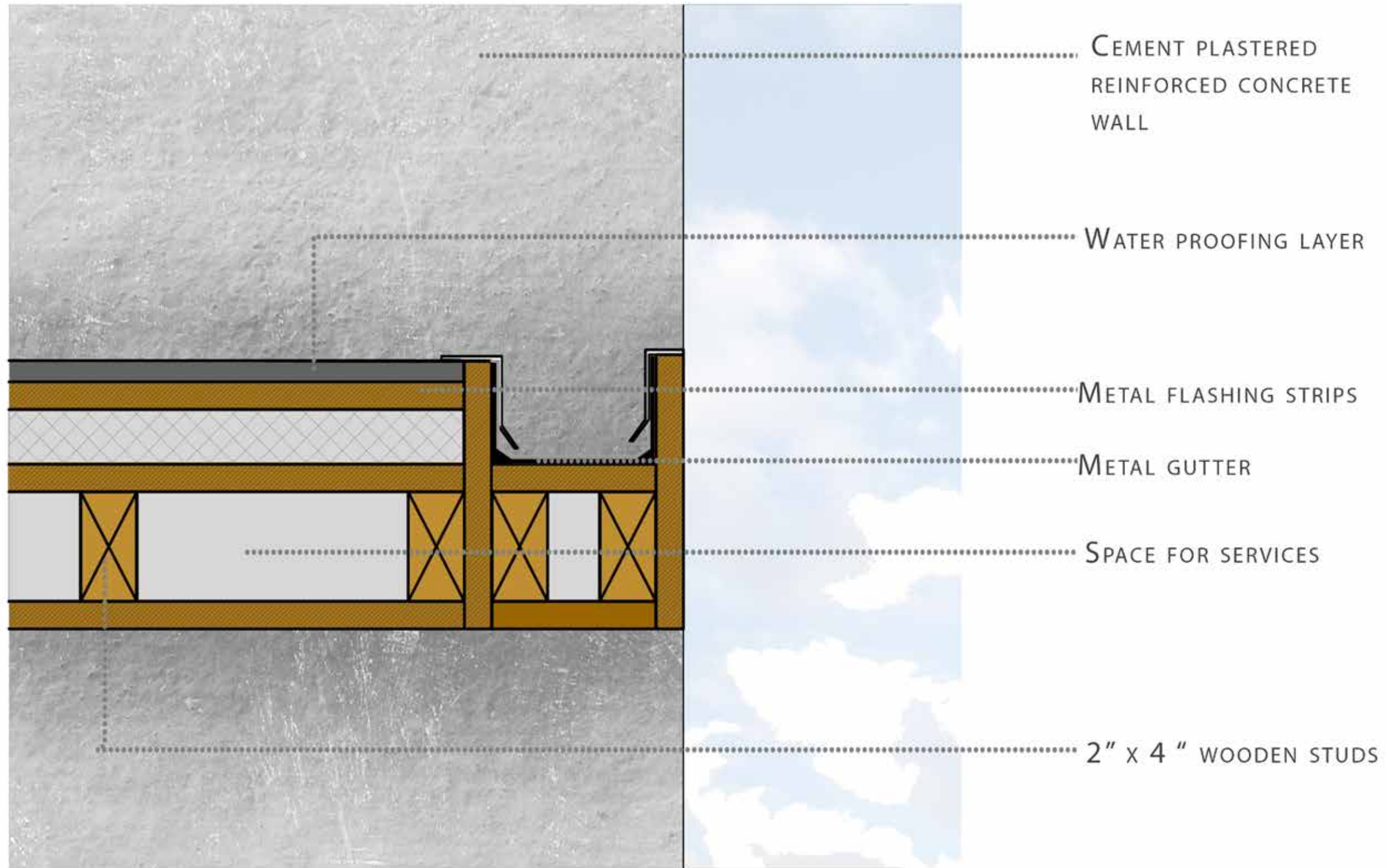
PRAYER ROOM LEDGE

SCALE: 3'' = 1'

The gutter system along with the rain chains are inspired by the hidden but yet effective way of use similar to that used by Tadao Ando, in the Modern Art Museum, Fort Worth, Texas.

This allows for clean lines in the elevation, establishing a sense of horizontality along with the chosen effect of the siding.





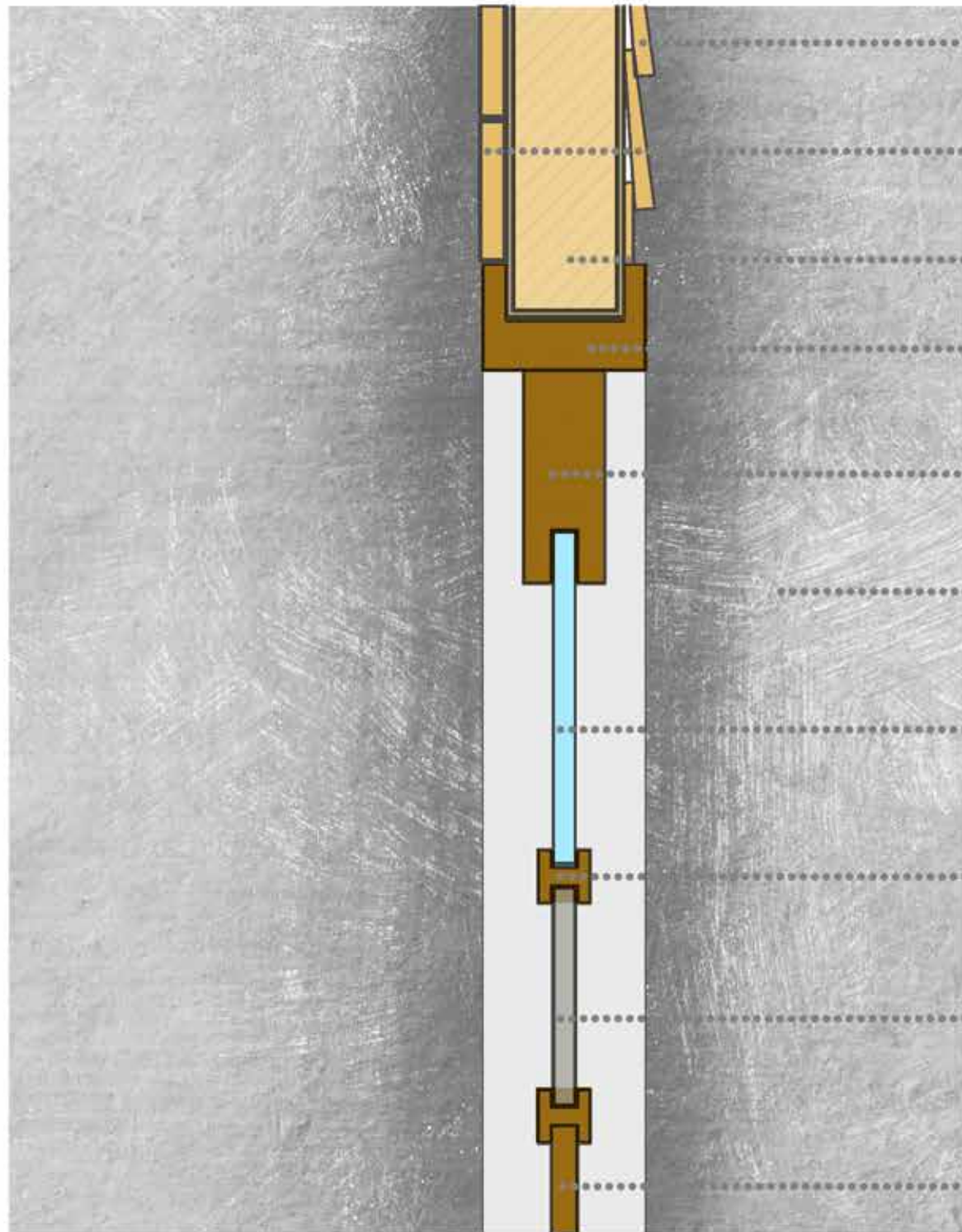
RAIN WATER GUTTER

SCALE: 3'' = 1'

The door is framed within a frame, that holds frames (of view) which also the first frame of the series as you enter the house.

To allow for privacy and security , a combination of glass, transparent and translucent and wood is used.





TAPERED CEDAR SIDING
WITH FURRING STRIP
BACKING

WOODEN SLATS AS
INTERIOR FINISHING

4 1/2" STUD WALL

DOOR FRAME ATTACHED
BY FORM INTO THE STUD
WALL

HEADER OF DOOR

CEMENT PLASTERED
REINFORCED CONCRETE
WALL

8MM TRANSLUSCENT
GLASS

WOODEN MULLION

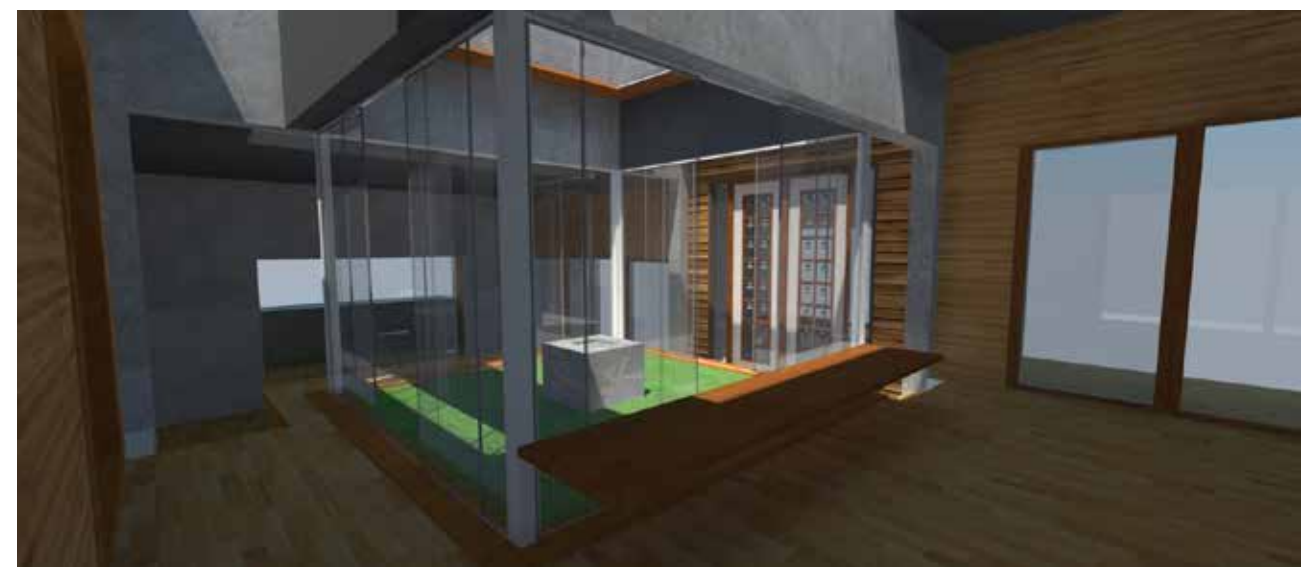
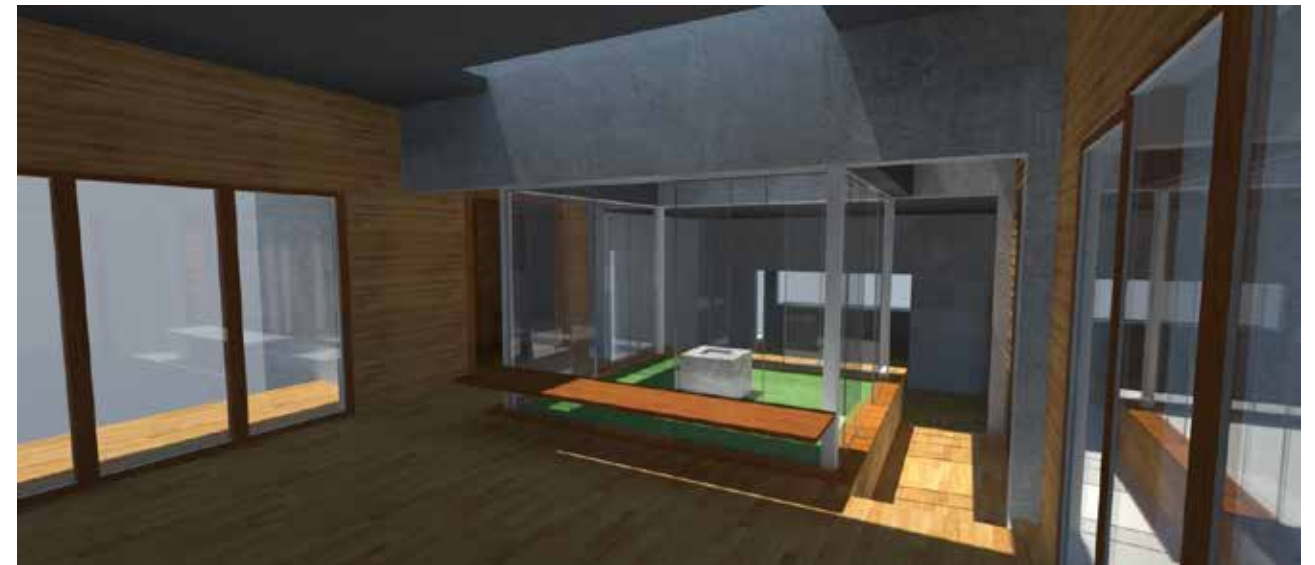
PLASTER BOARD

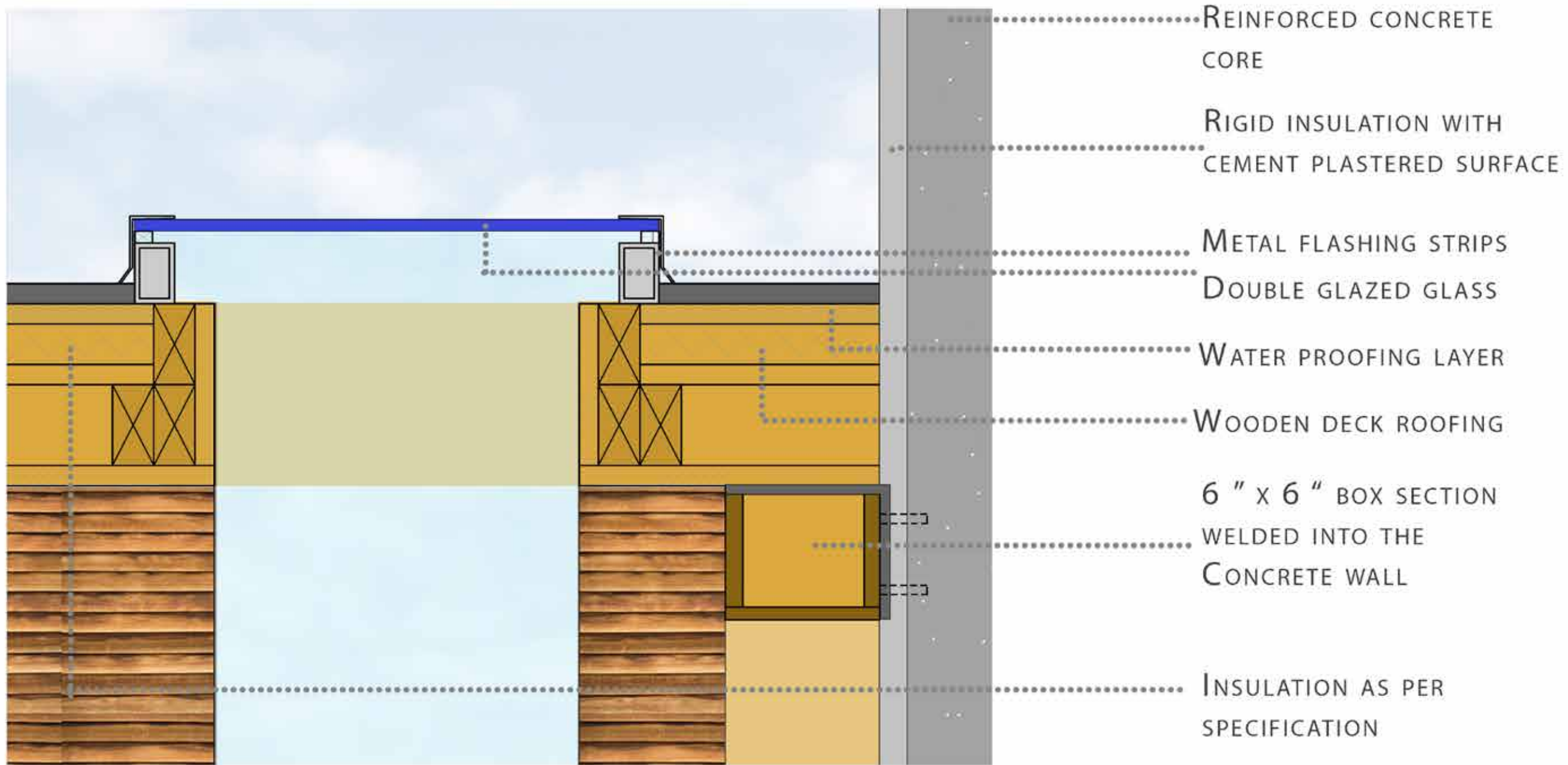
1/2" THICK WOODEN
BOARD

FRONT DOOR DETAIL

SCALE: 3'' = 1'

The light corridor is a reminiscent of the corridor that exists around the tradition Indian courtyard.
The corridor in the design is to allow the inclusion and connection of the surrounding areas and spaces of the Thotti Mane into and with the courtyard.





LIGHT CORRIDOR

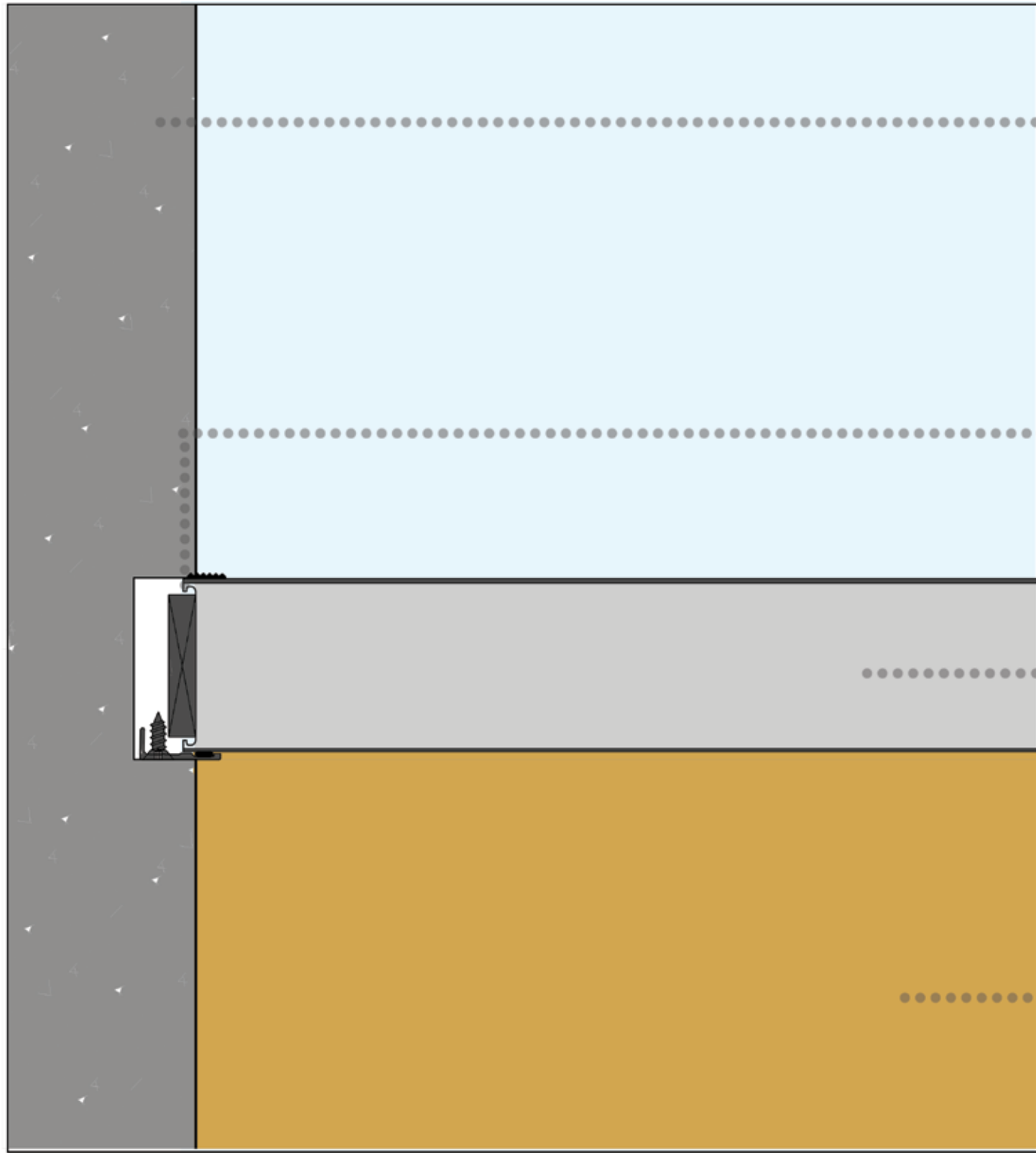
SCALE: 3'' = 1'

Kalwal skylights are structural in nature and therefore can span larger areas.

The family room which was thought of to be an area of gathering and contemplation with its step down seating area and right at the centre of all the bedrooms and study areas.

Again to bring in the outside , inside - the kalwal skylight is used to highlight the entire seating area.





RIGID SURFACE
REINFORCD CONCRETE

KALWAL ATTACHMENT AS
SPECIFIED BY THE MANUFACTURER.

KALWAL PANEL AS PER
SPECIFICATIONS BY THE
MANUFACTURER

6 X 6 INCH BEAM RESTING
ON THE ROOF PANEL TO
HOLD THE ROOF PANEL.

KALWAL ROOF DETAIL
SCALE : 3 " = 1 '



Rain chains is an alternative to a downspout for a rainwater gutter system.

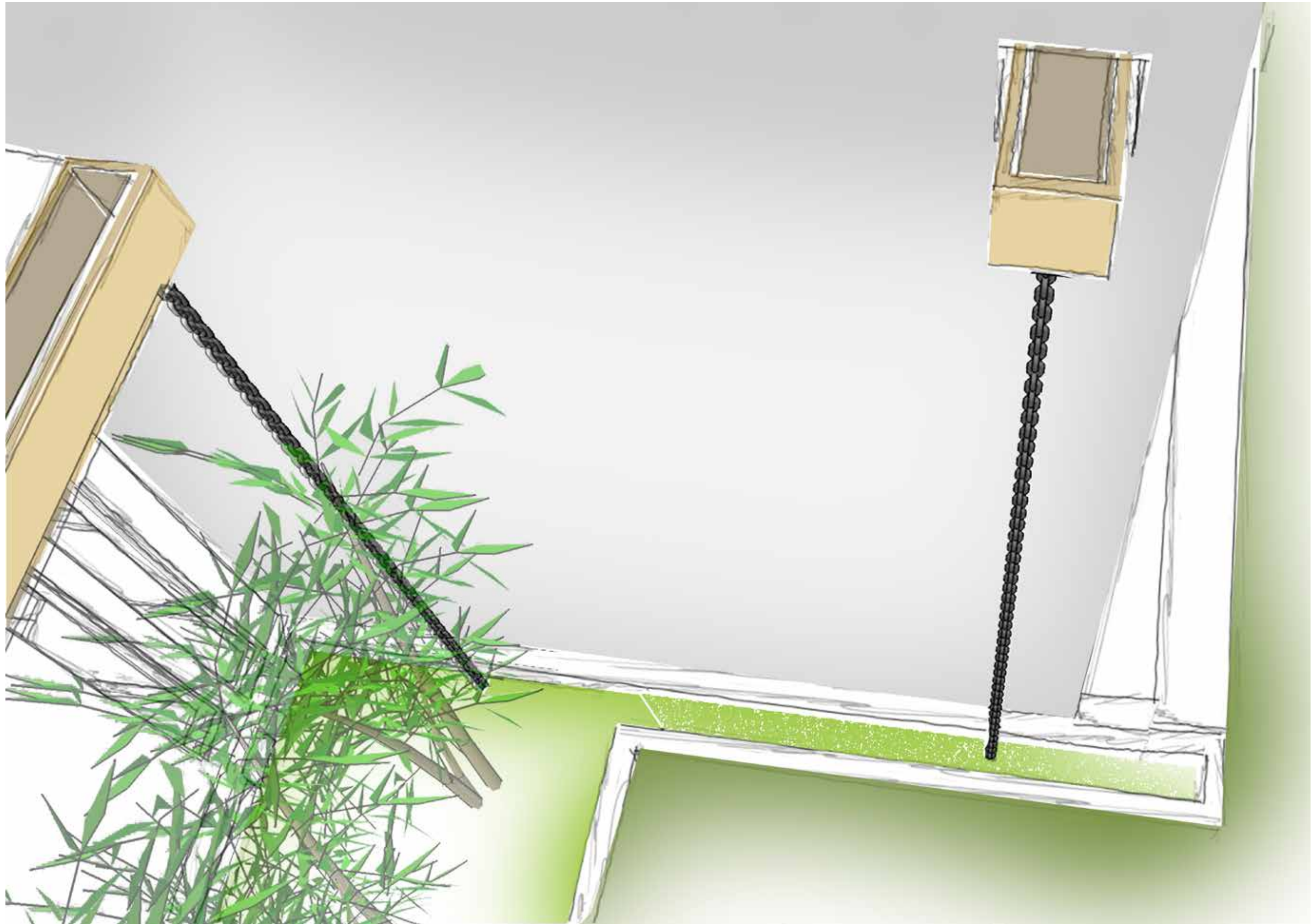
Although highly decorative as a water feature, it allows to channel the flow of water from a height to a particular location one would like to guide the water on the ground, especially away from the foundation.

Iconically made of metal cups, they are also known to be made out of brass and allows of precious metals.

These chains are used in the design to guide rain water flow into garden spaces located at regular intervals

RAIN WATER
CHAIN

SCALE: 1" = 1'



Kolam is a form of drawing that is drawn by using rice flour/chalk/chalk powder/white rock powder often using naturally/synthetically colored powders in Tamil Nadu, Karnataka, Andhra Pradesh, Kerala and some parts of Goa, Maharashtra, Indonesia, Malaysia, Thailand and a few other Asian countries.

A Kolam is a geometrical line drawing composed of curved loops, drawn around a grid pattern of dots. In South India, it is widely practised by female Hindu family members in front of their houses. More complex Kolams are drawn and colors are often added during holiday occasions and special events.

(from wikipedia)

The entrance of the house is therefore provided with an extra platform to allow for the inclusion of Kolam as a way of inviting whoever enters the house. Mythologically they are known to ward off evil and attract good spirits.

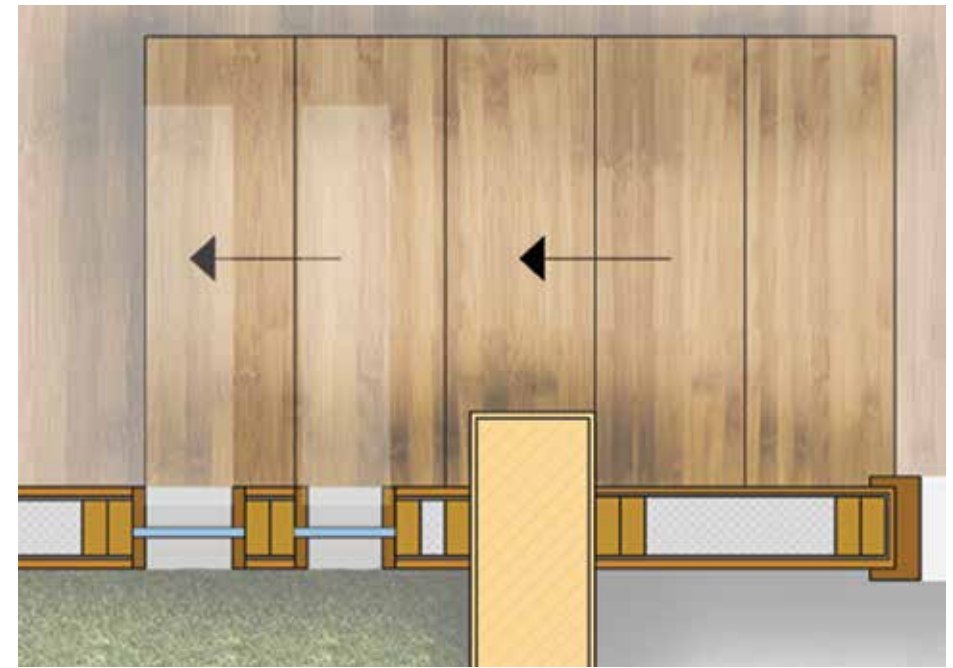




The Prayer room is opened up through a large picture window which also terminates as the end point for the frames that start from the entrance.



The material for the wall of the prayer room will be cladded with marble - the gloss and shine will be used to create an ethereal environment by reflecting light and sound in the small space.



The slight extensions of the concrete wall create dark corners .
Light highlights which light each individual step or accent that space.



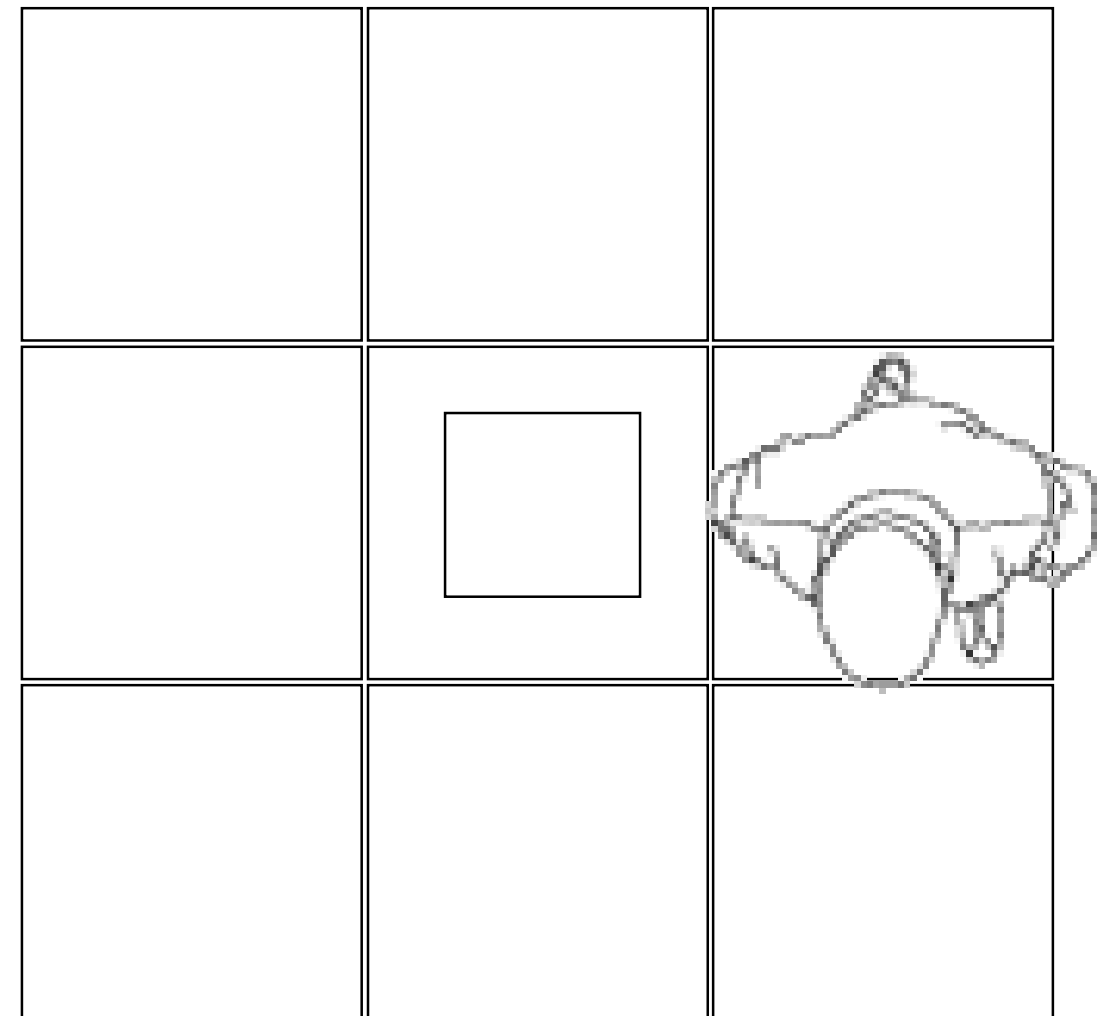
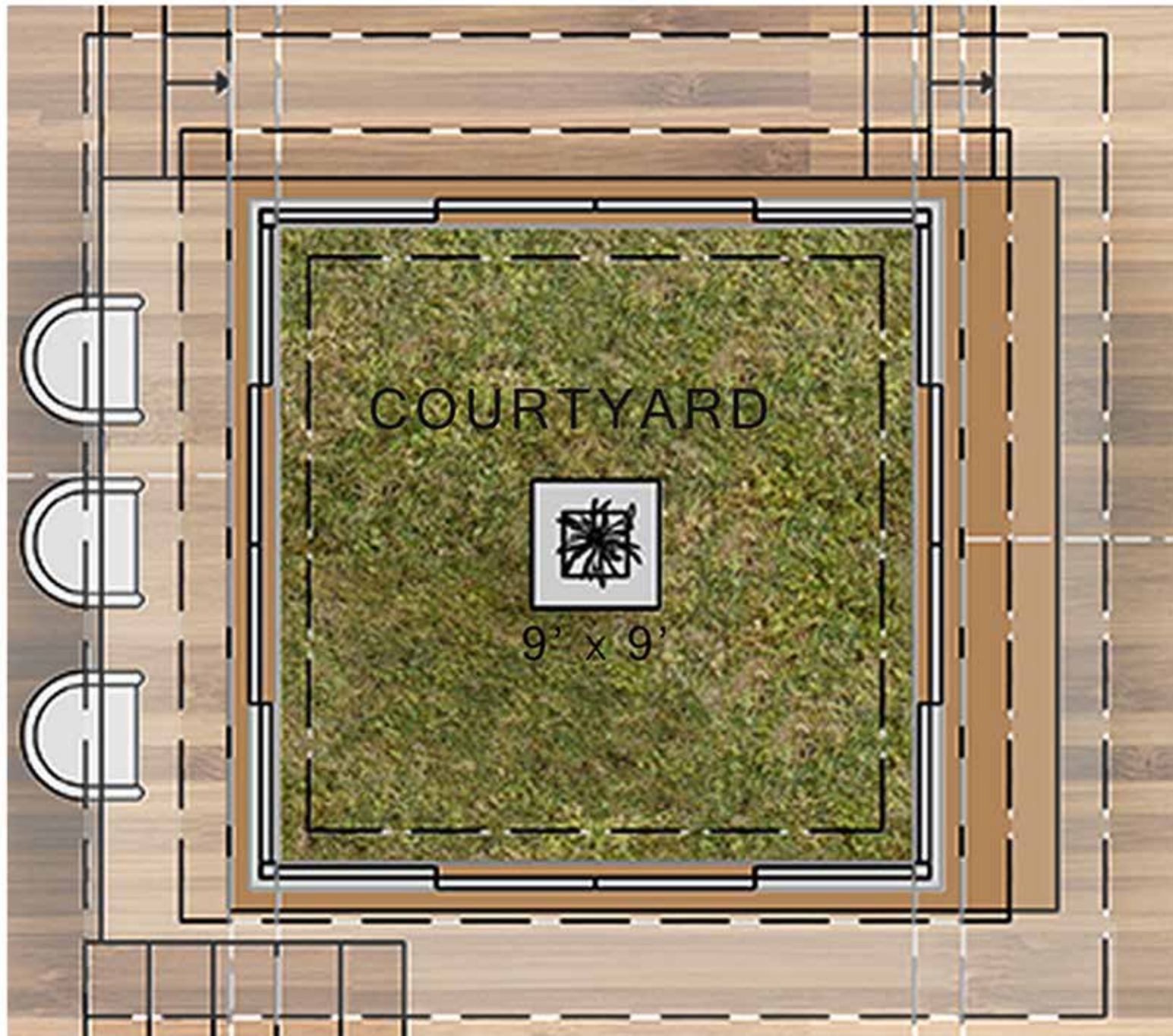
STUDY MODEL OF THE EFFECT OF LIGHT BEHIND THE CONCRETE WALL

THE POWER OF 9

Even as indicated in the Vaasthu map, it is divided into 9x9 parts. Most elements in Indian Architecture has 9 parts or multiples of it. The said concept of the power of 9 is derived from numerology and astrology.

For the project, an attempt was made to design with the number 9 and apply it to portals, doorway patterns, jail pattern walls, the Tulsi katte, prayer room and the courtyard.

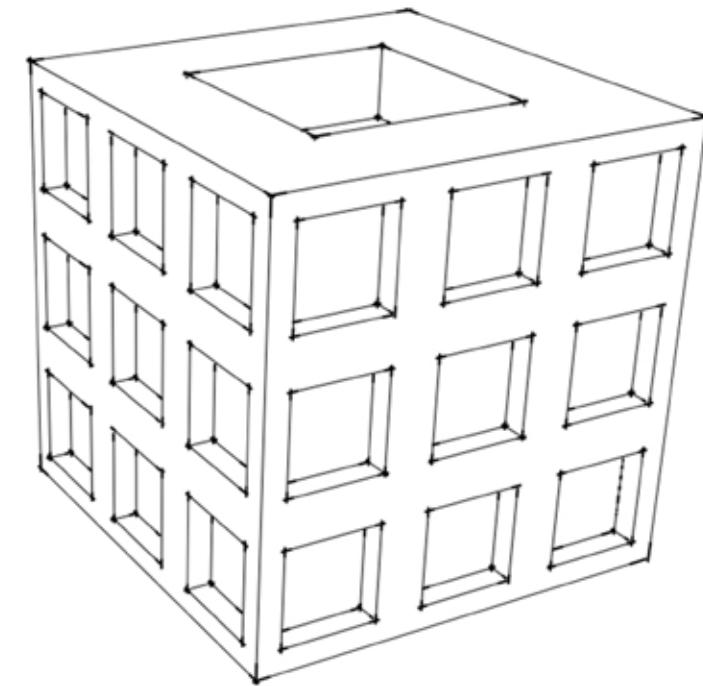
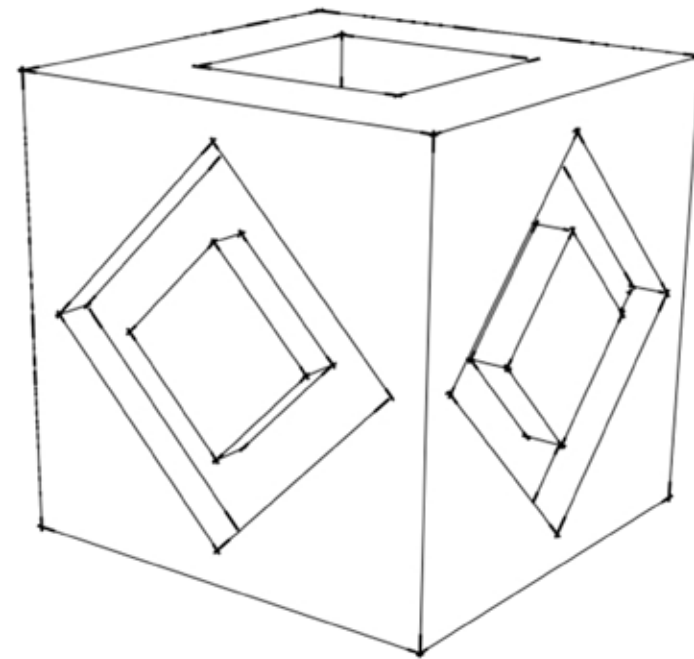
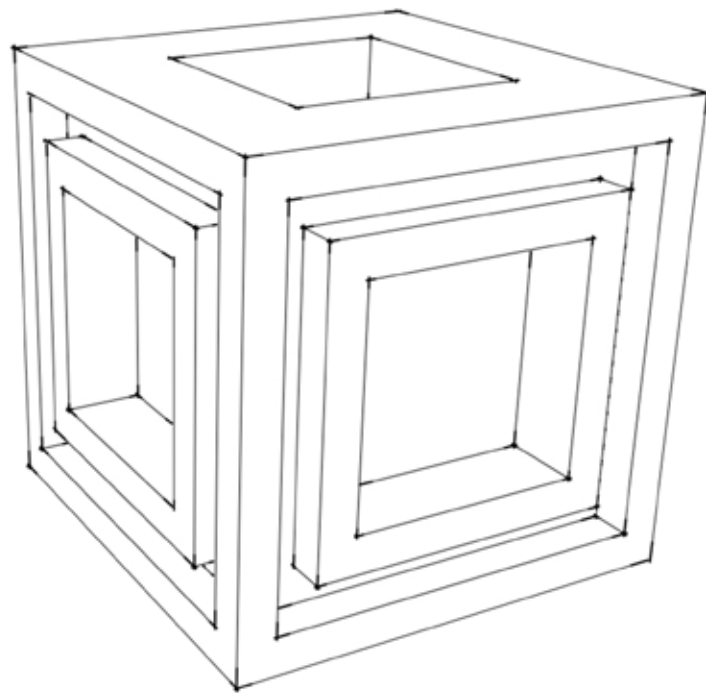
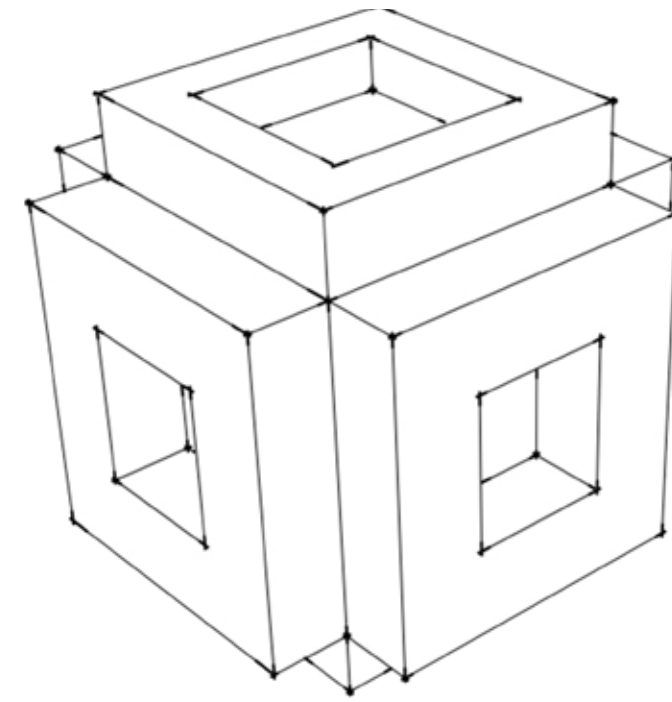
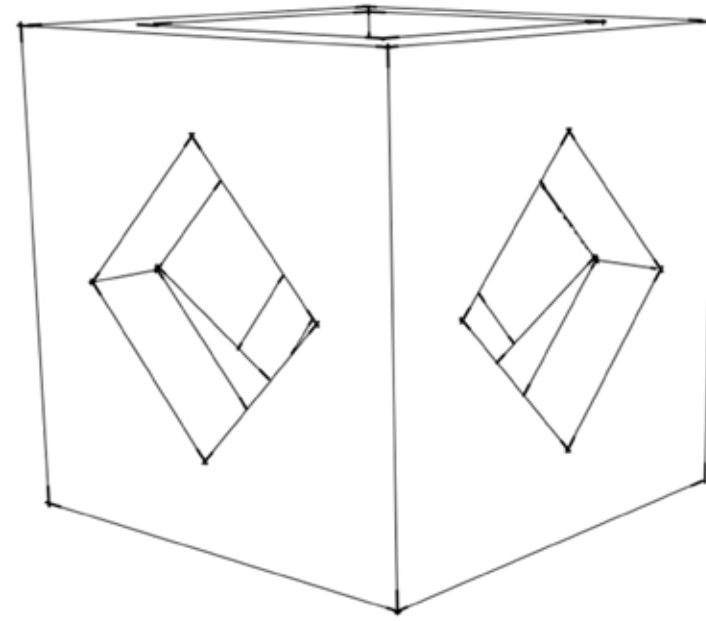
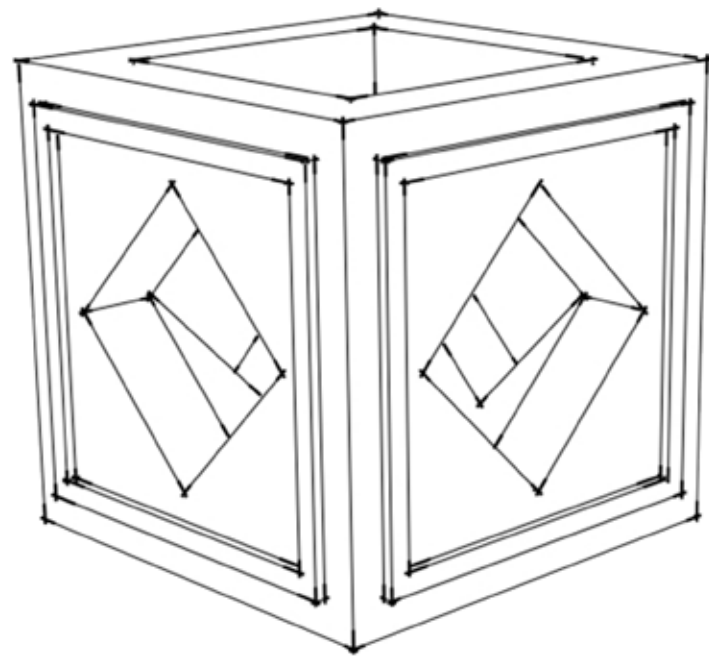
According to numerology, the number 9 lives in the world and acts as a connection between all of mankind. It identifies with humanity and brings together the environment from around the world and different cultures. The 9 is said to be the least judgmental of all numbers, the most tolerant and the most conscious.

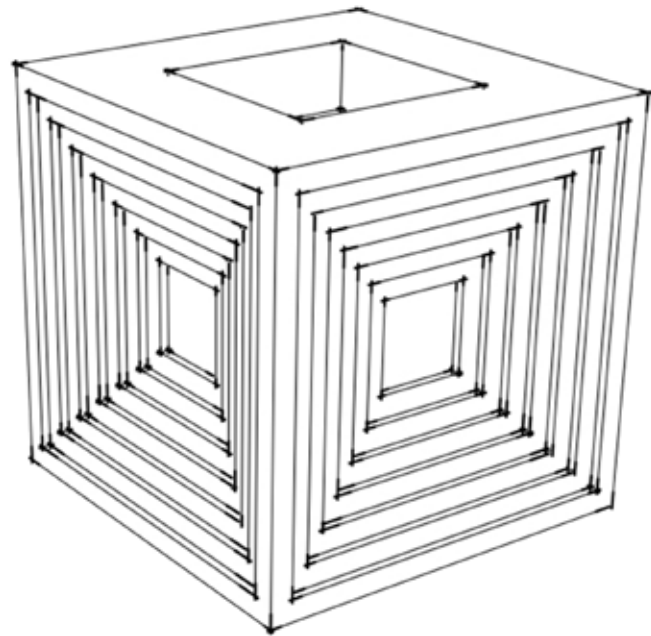
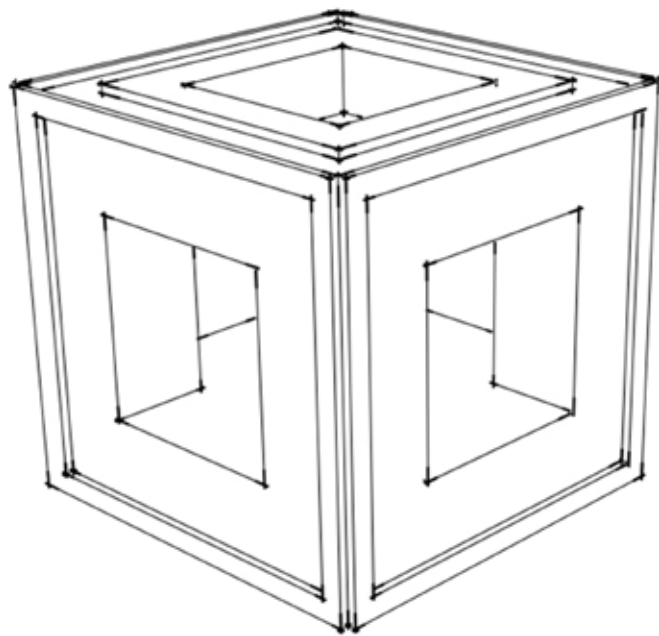
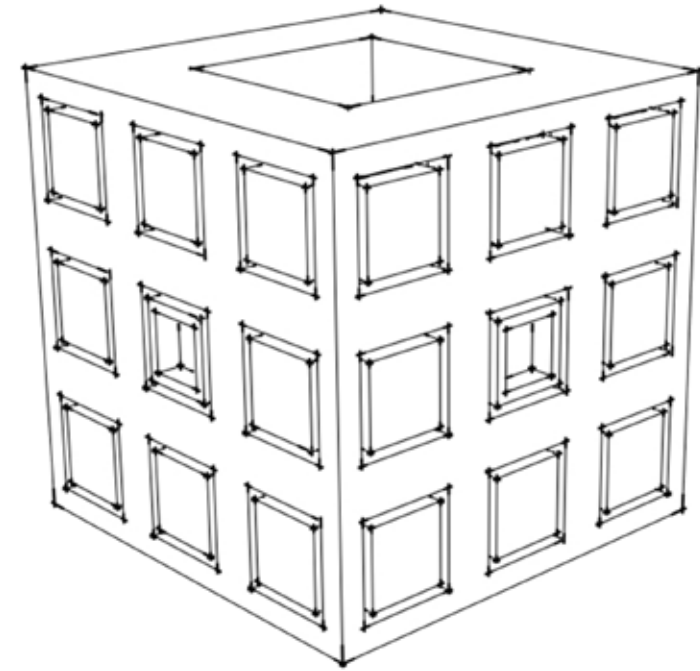
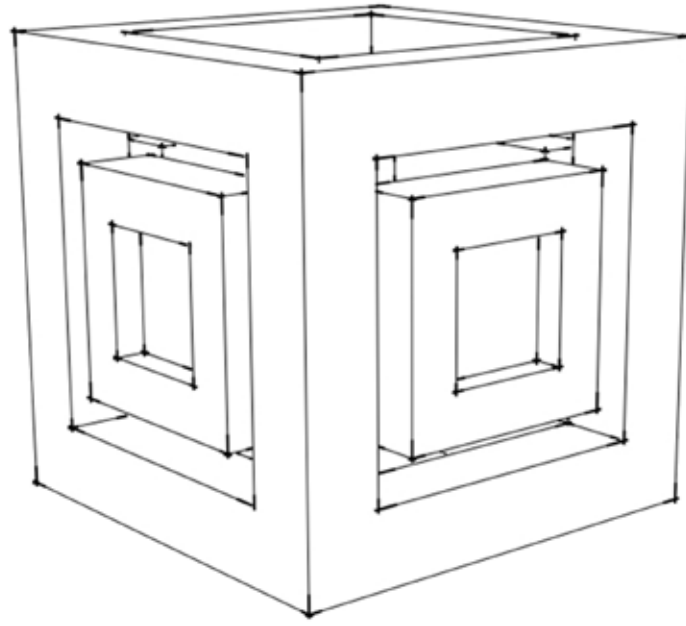
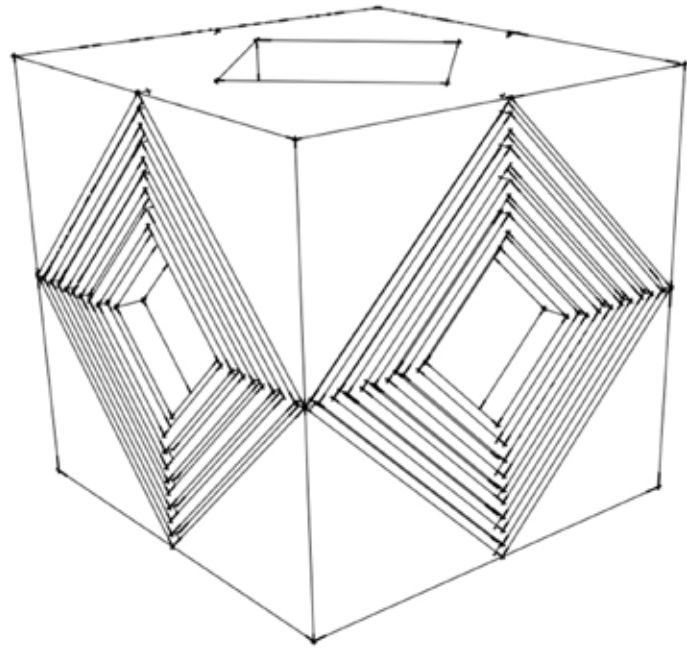


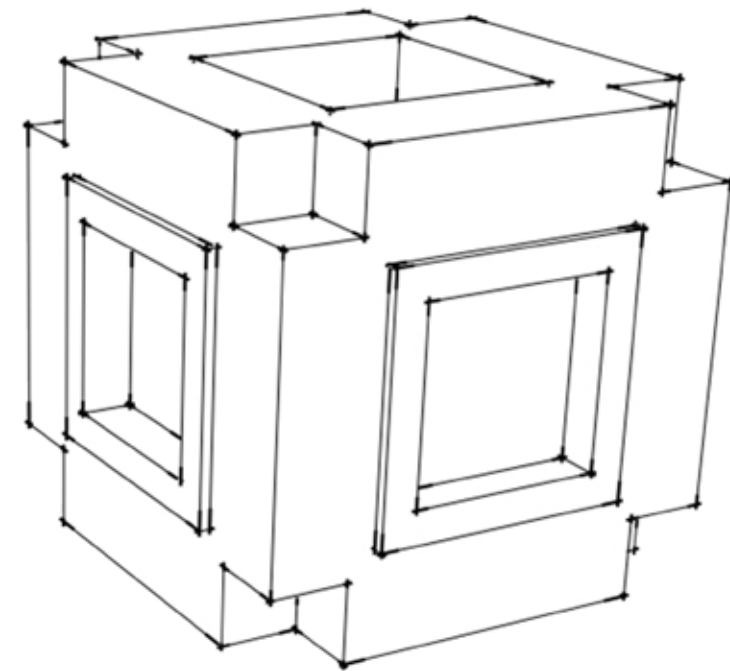
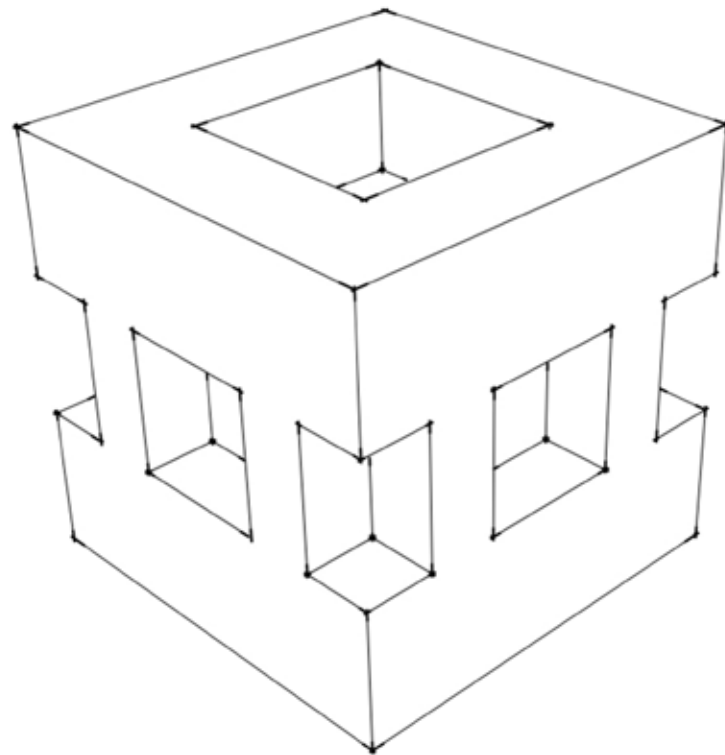
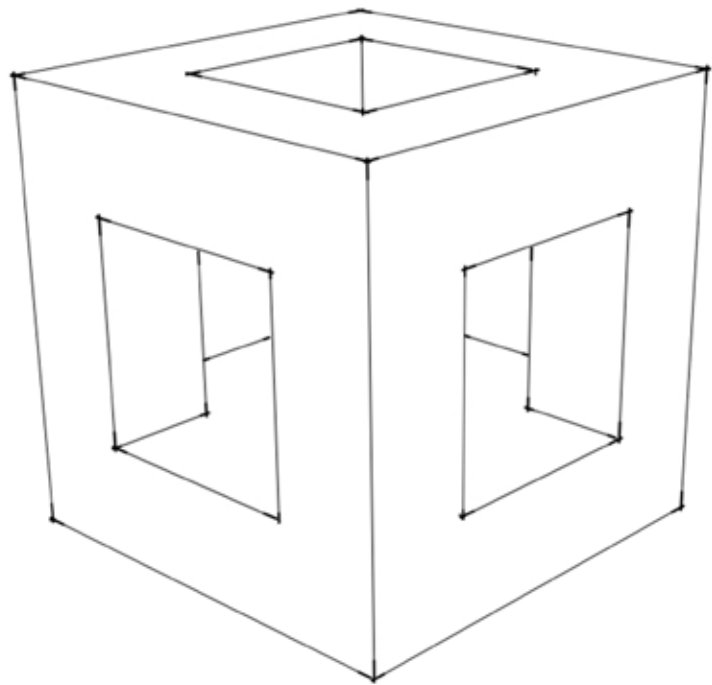
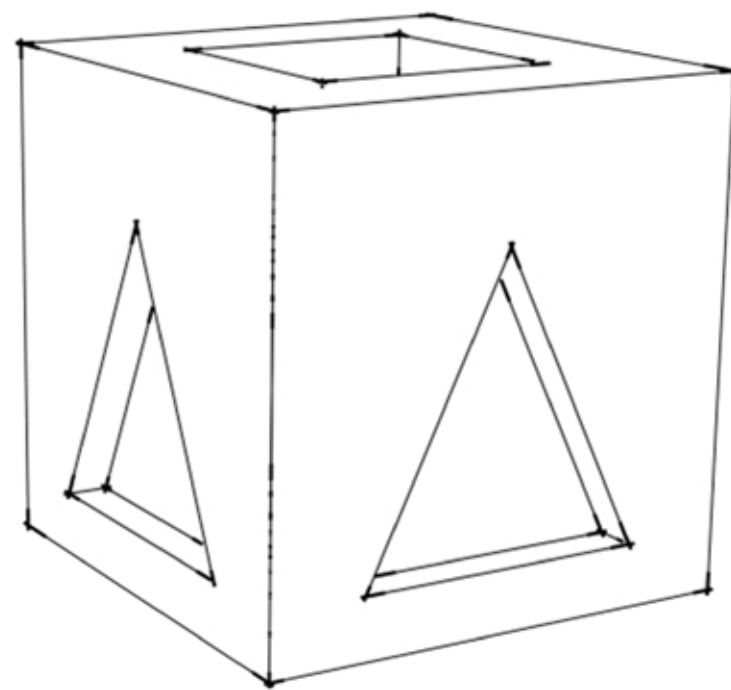
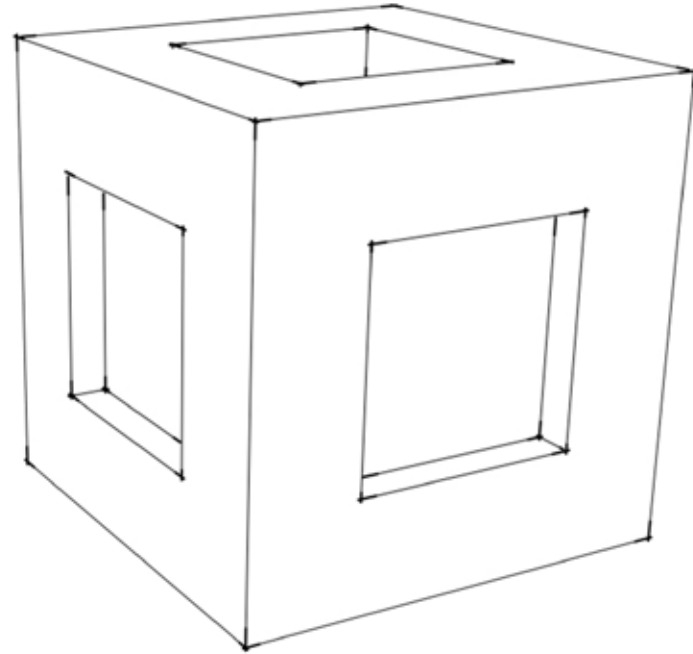
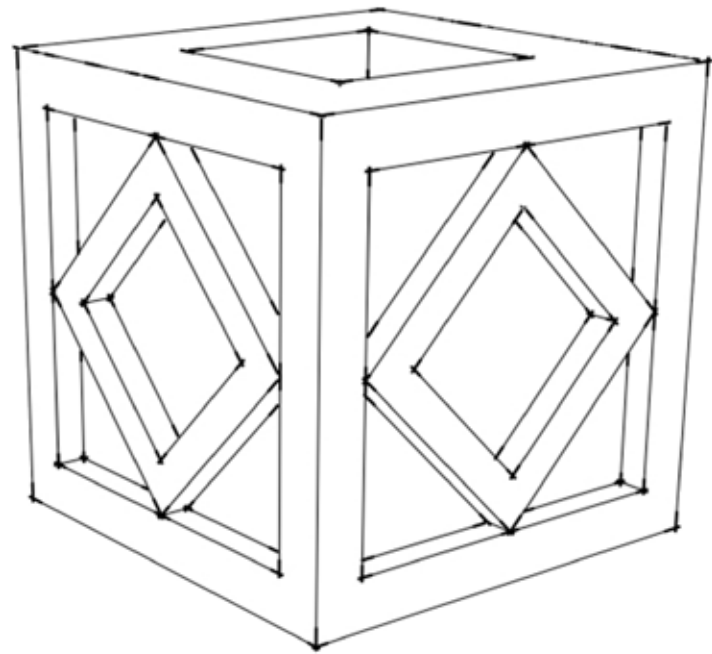
Tulsi Katte

The tulsi katte not only dimensionally is based on the number 9 but also visually.

With 9 parts,
9 divisions
9 segments
or just 9 edges









The pooja room door is one of the more important elements in house.

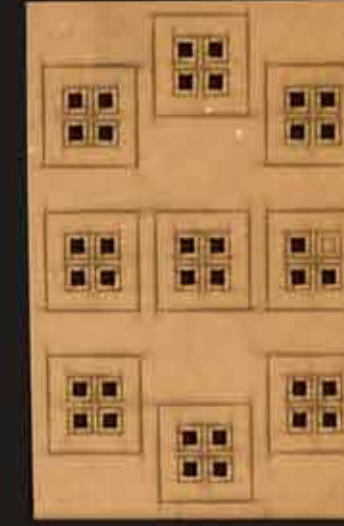
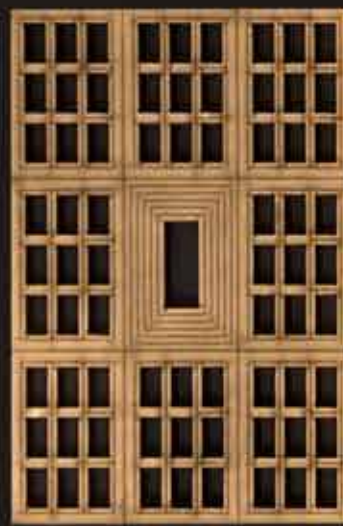
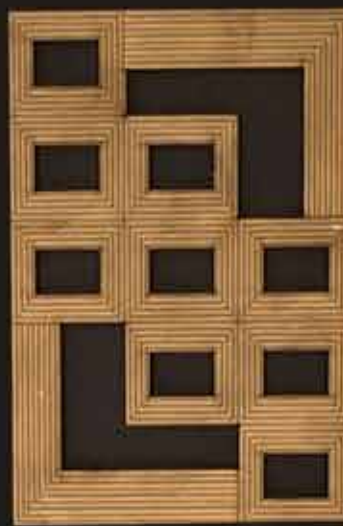
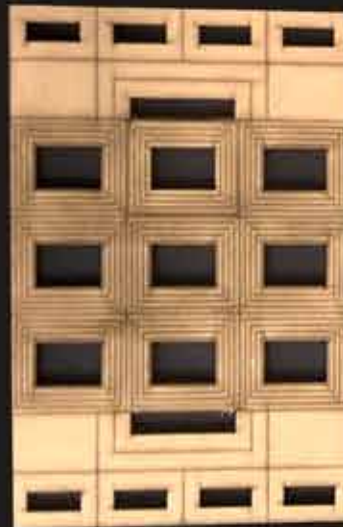
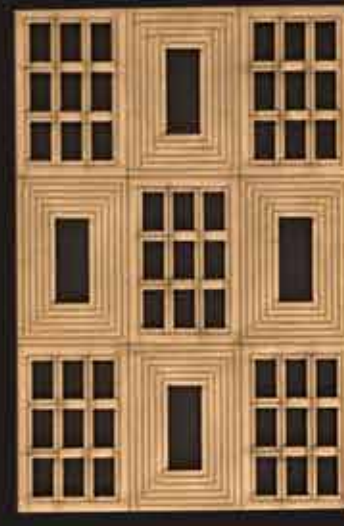
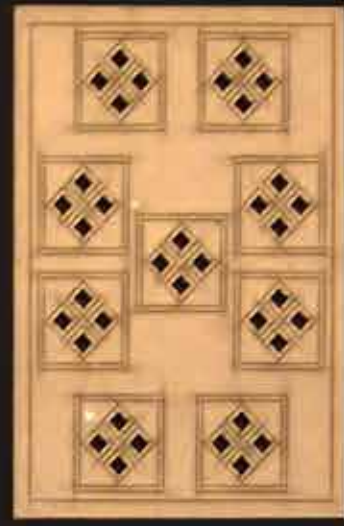
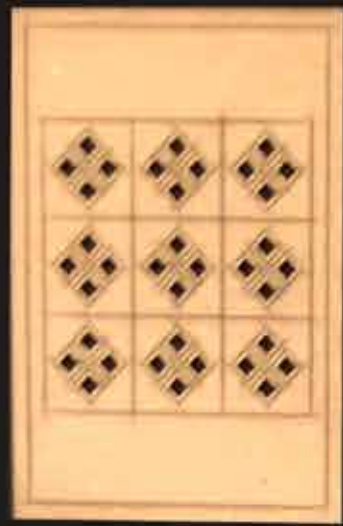
And therefore does not visually excite the person but through sound as well.

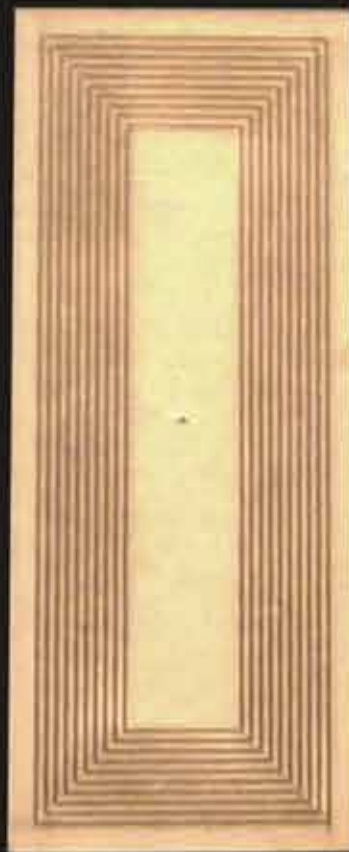
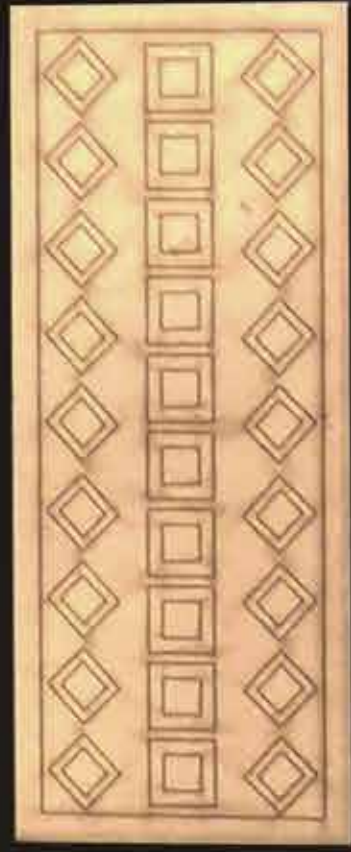
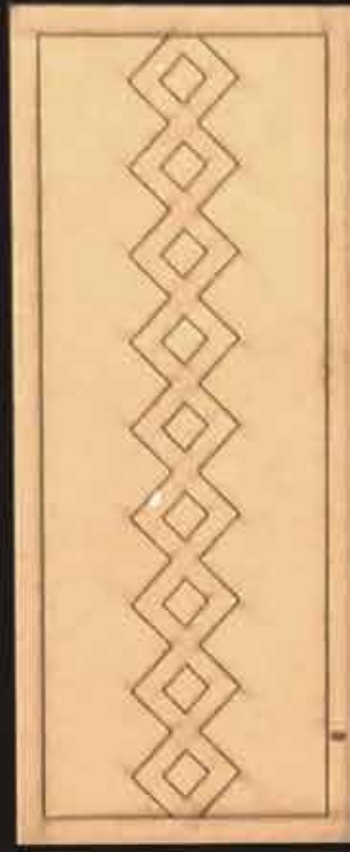
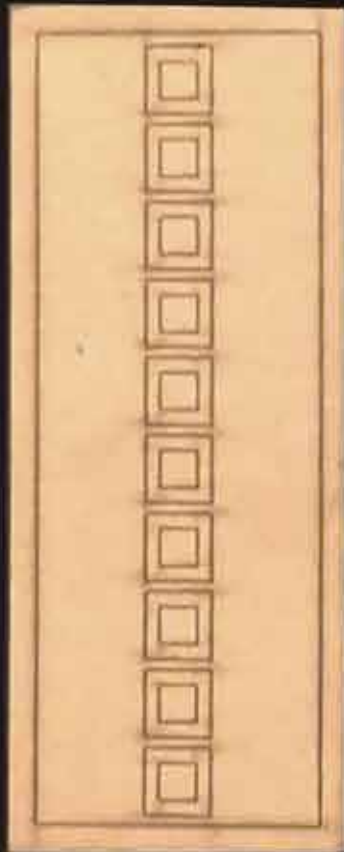
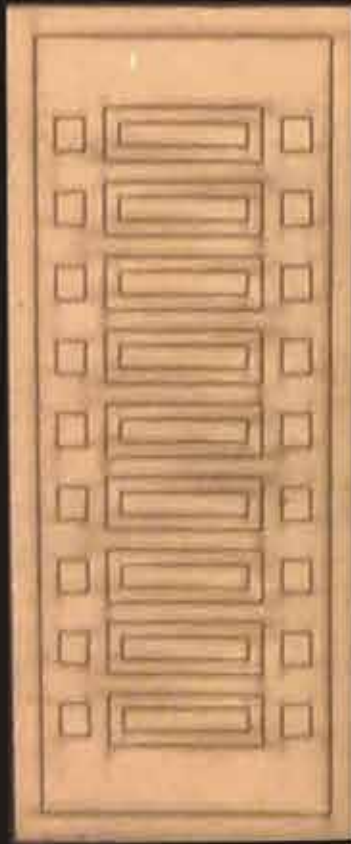
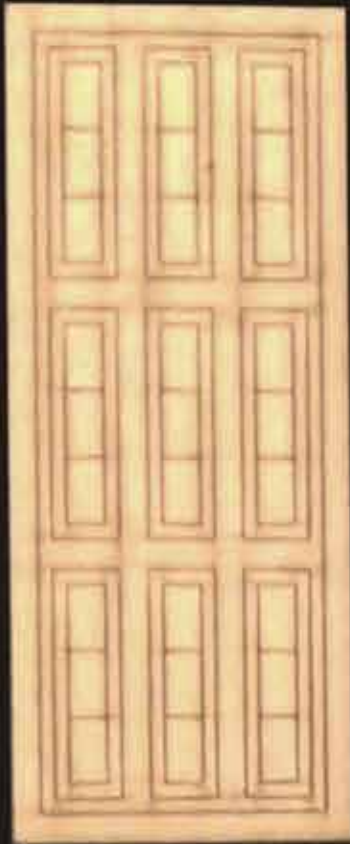
Bells are used in temples to create a sense of ethereal quality to the environment and rid of all other noises and distractions while one prays.

In a house, the bells will be used to let the other inhabitants in the house know when the prayer room is in use, and will serve as an invitation to join in prayer.

The Marble used inside the prayer room, will hopefully allow for the sound to bounce off the non-absorptive surface to sustain the sound of the bells when moved or shaken.







VIEWS AND MODELS

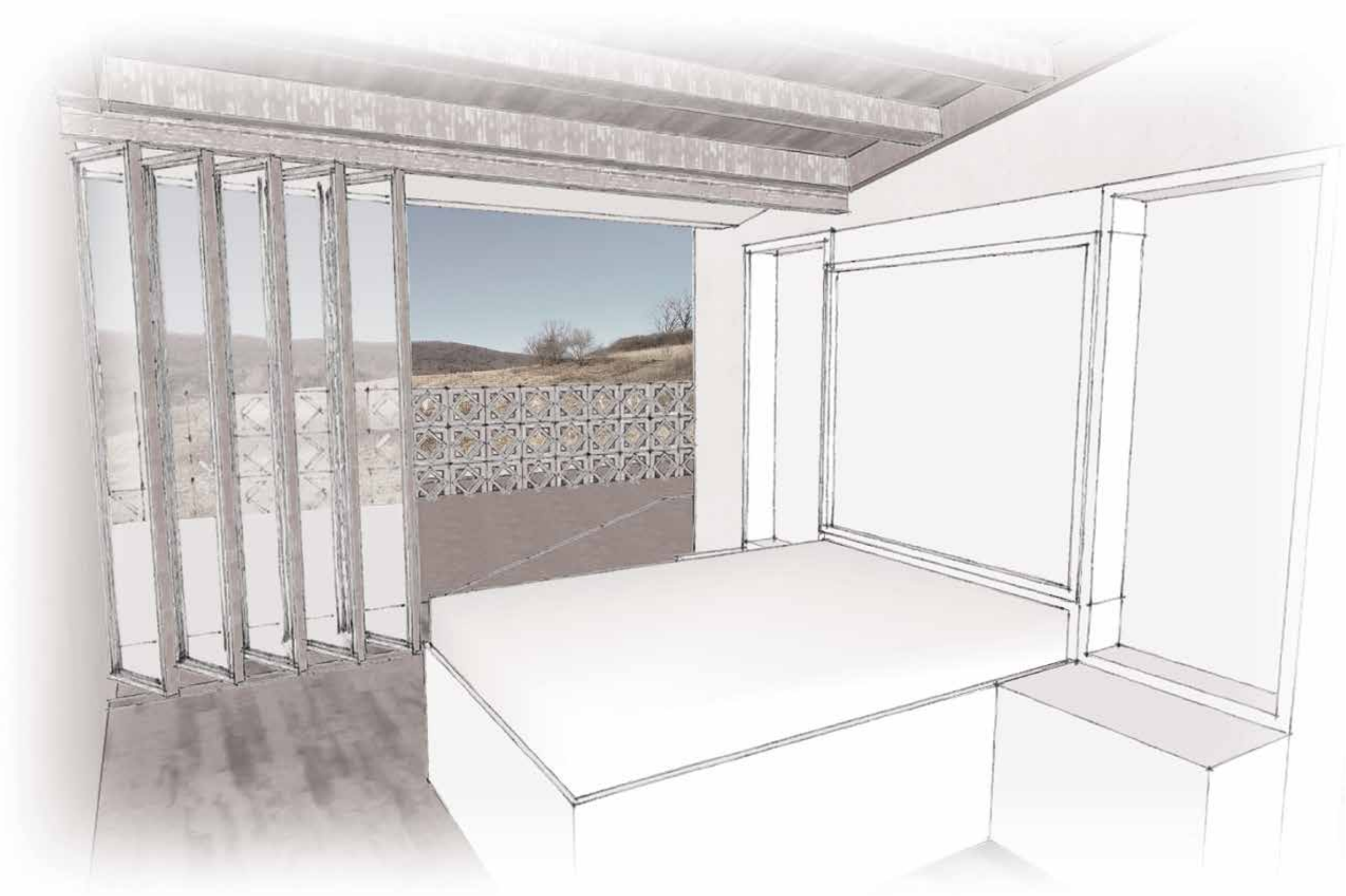


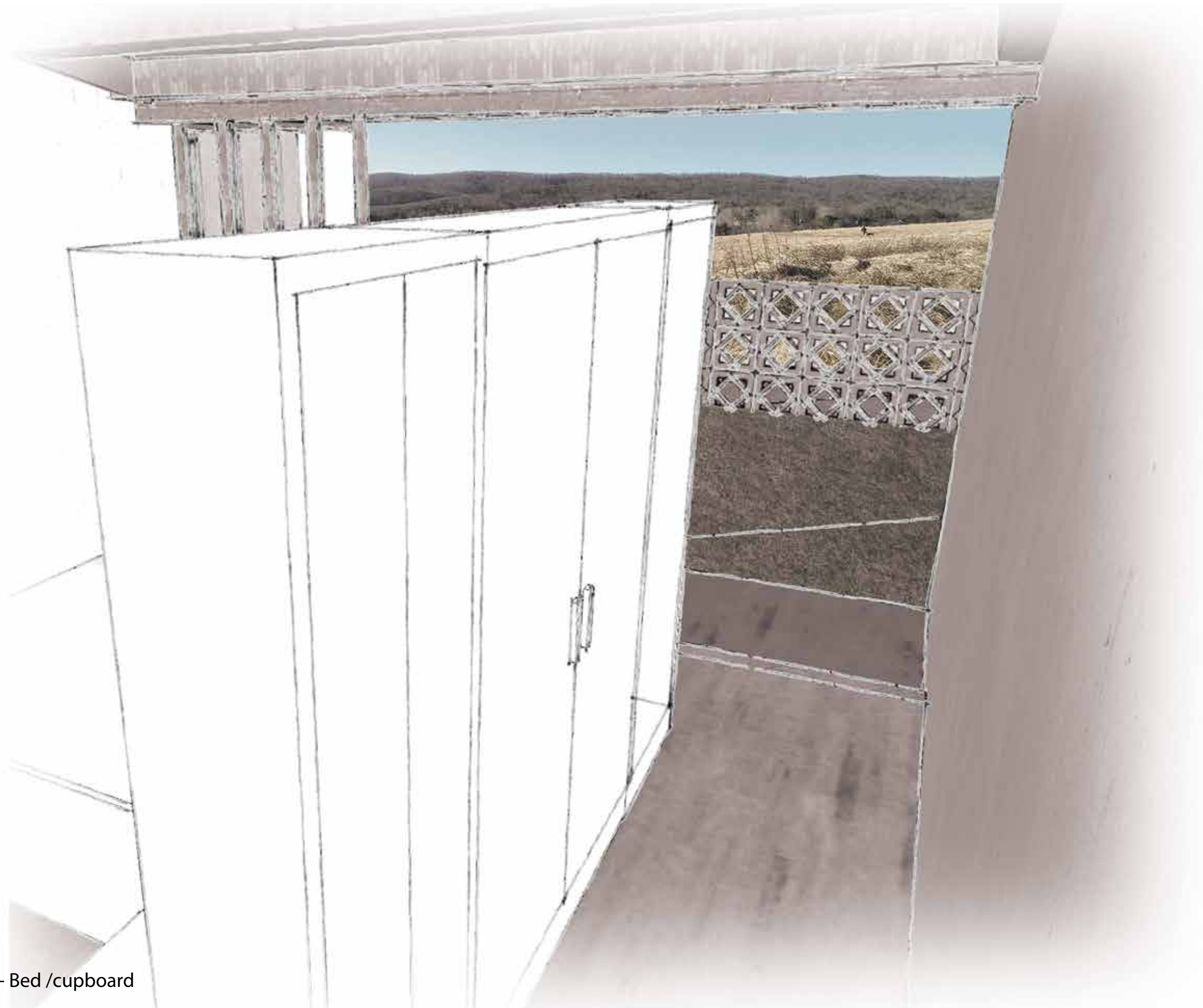


View of the house from the north east

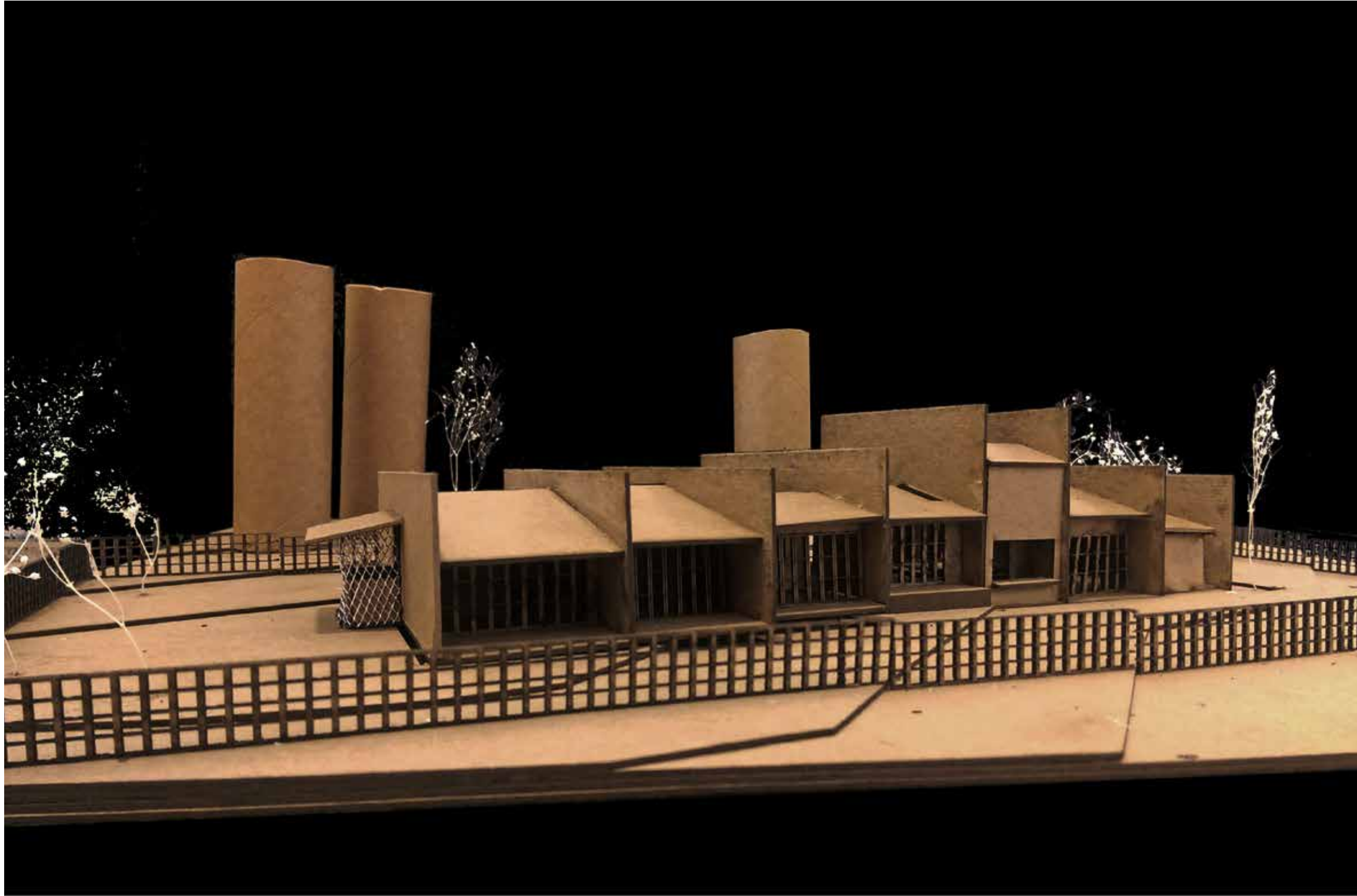


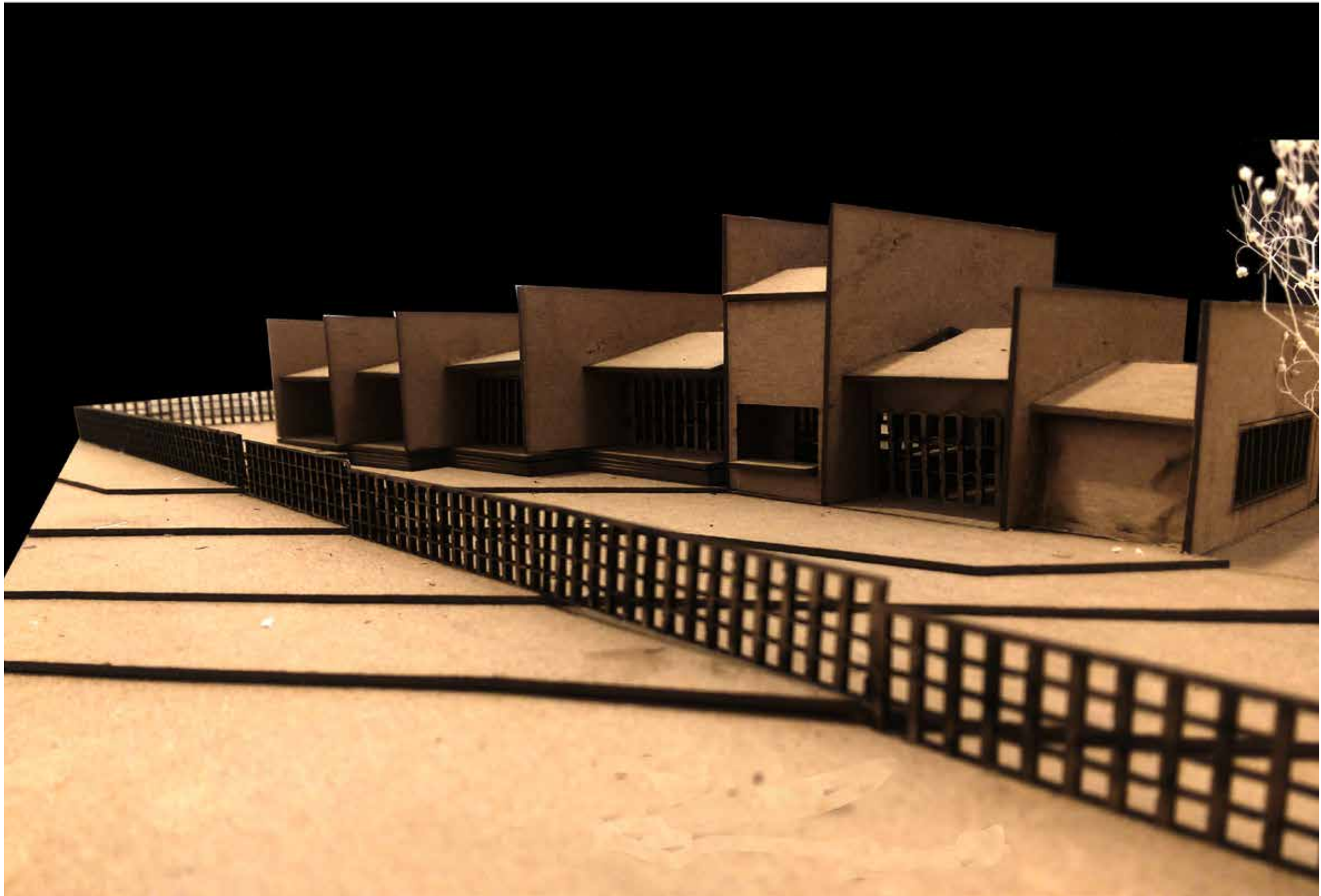
View from the North East

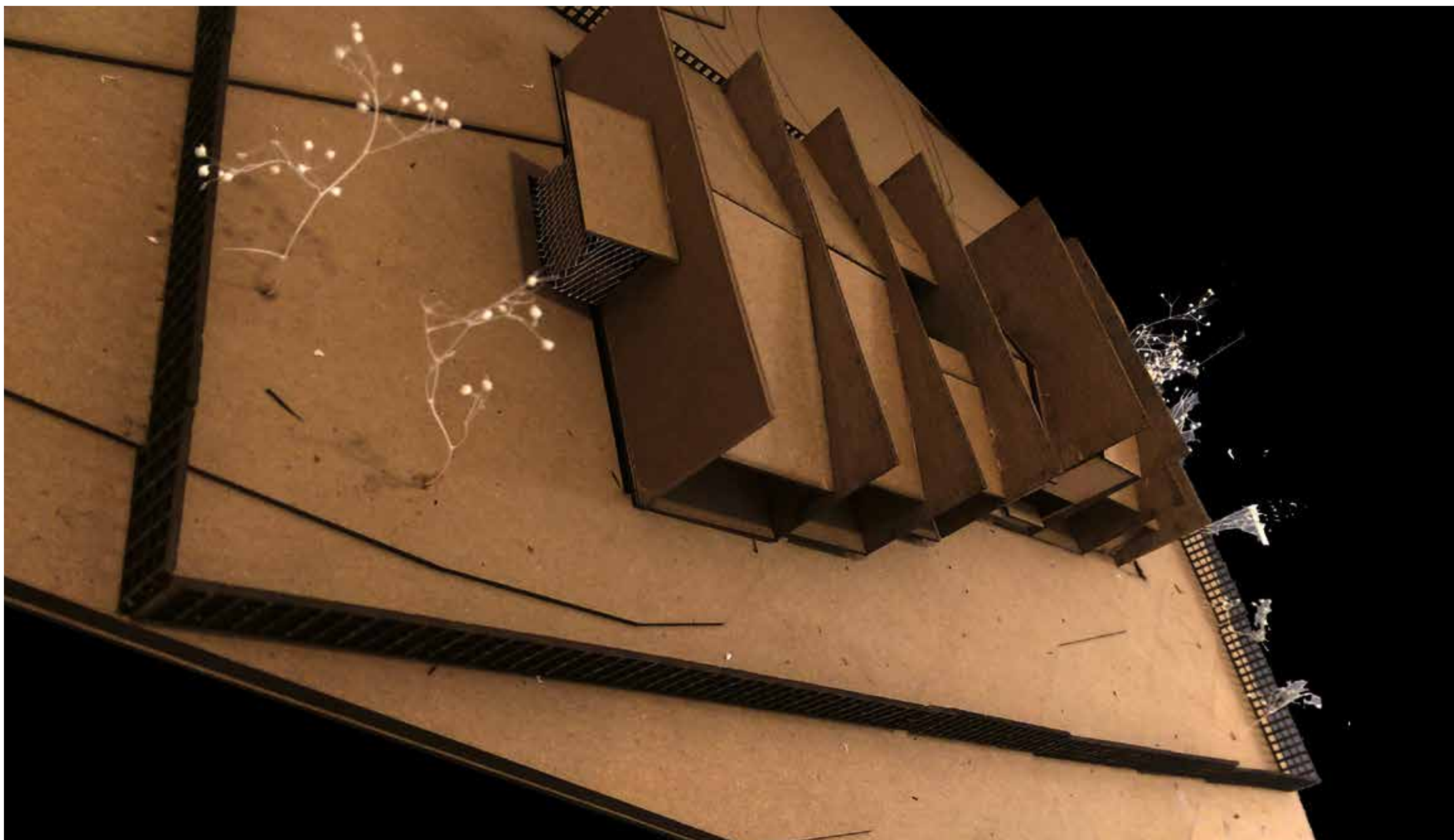


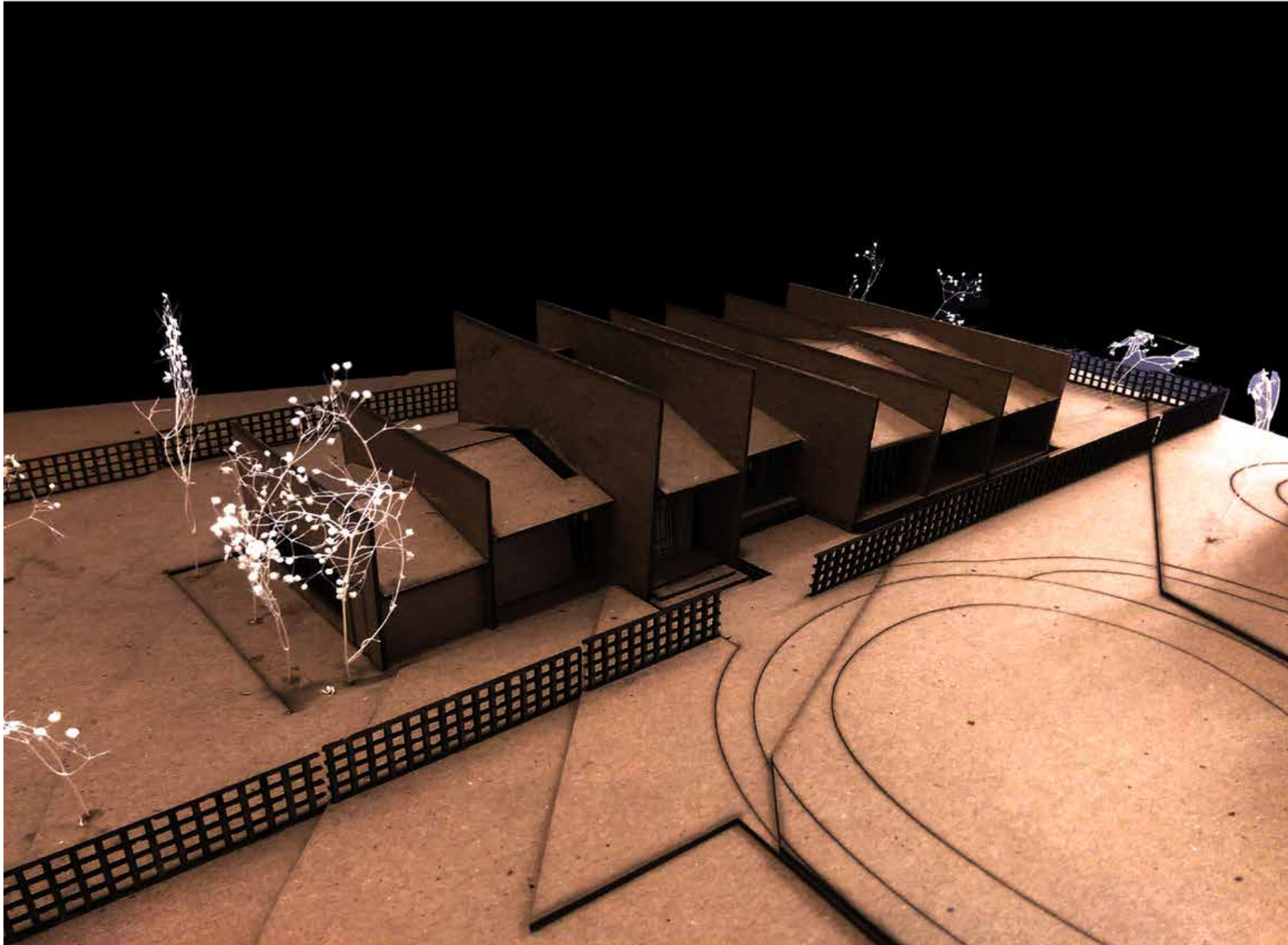


View of the bedroom - Bed /cupboard









REALIZATION

What I learnt from this project – Each culture has a different perception of what makes a house. And is perceived through the use of different methods, materials and practices although the concept of doors, windows and walls and other things remain the same. But there are somethings that cannot be replaced, things that have been passed on by traditions and practiced for centuries.

These elements or habits are what makes it easy for people to live comfortably in an environment and doing this project has helped me reinforce the realization that it's important to understand what these mean and where they come from and apply them in architecture to the best of one's capabilities.

Most architects get to design a house somewhere in their career and Thotti Mane will always remain special, as it helped me learn and explore something that I've grown up with but took for granted in my short architectural career. This exploration will continue as long as I remain and architect and hope to get the opportunity to do it again and again in the future.

ALL IMAGE CREDITS GO TO THE AUTHOR

