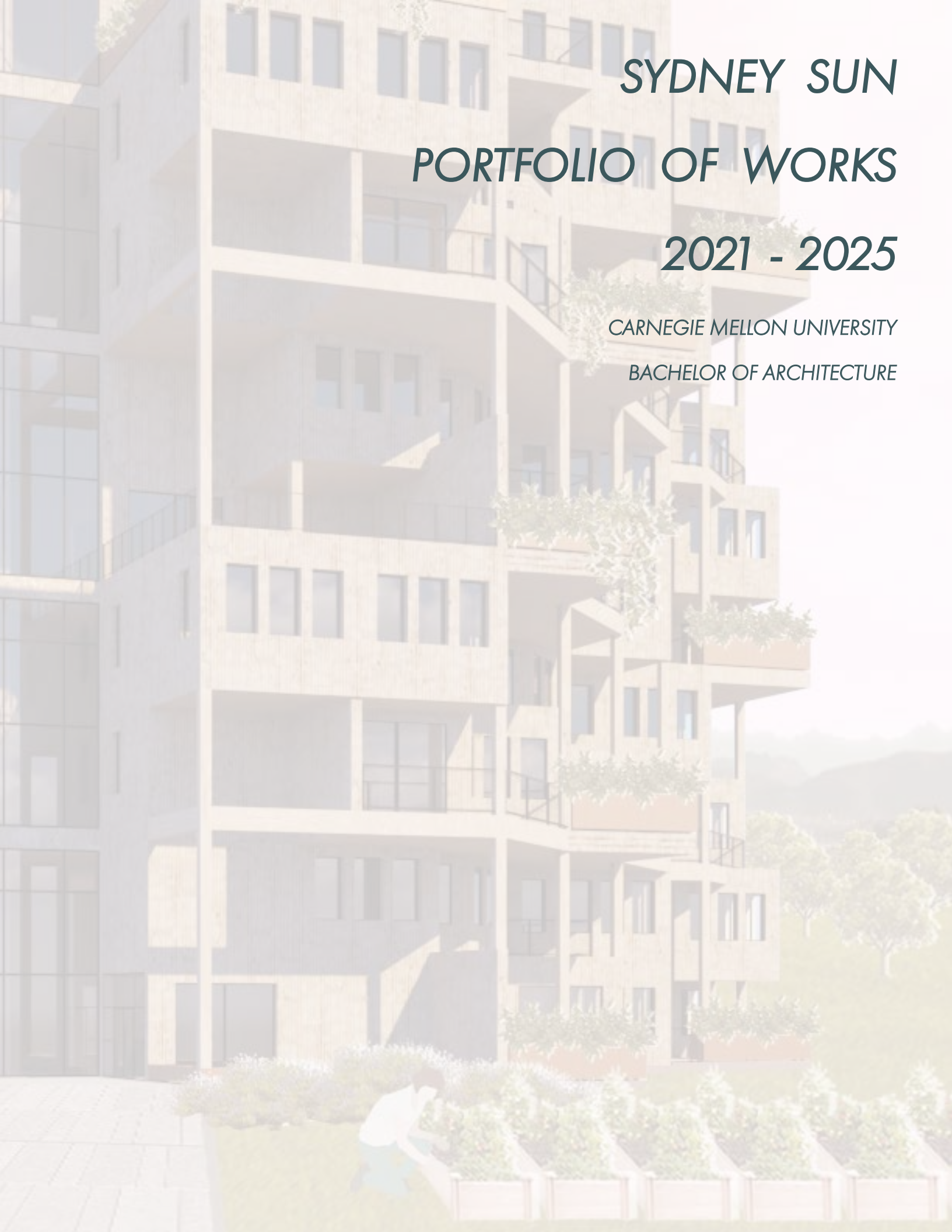


SYDNEY SUN

PORTFOLIO OF WORKS

2021 - 2025

CARNEGIE MELLON UNIVERSITY

BACHELOR OF ARCHITECTURE

Library and Cultural Center 1-6

Mechanic Coffee Patio 7-8

Domesticating Bigness 9-12

The Nodule - Cavern Museum 13-16

Project Slow-Grow 17-22

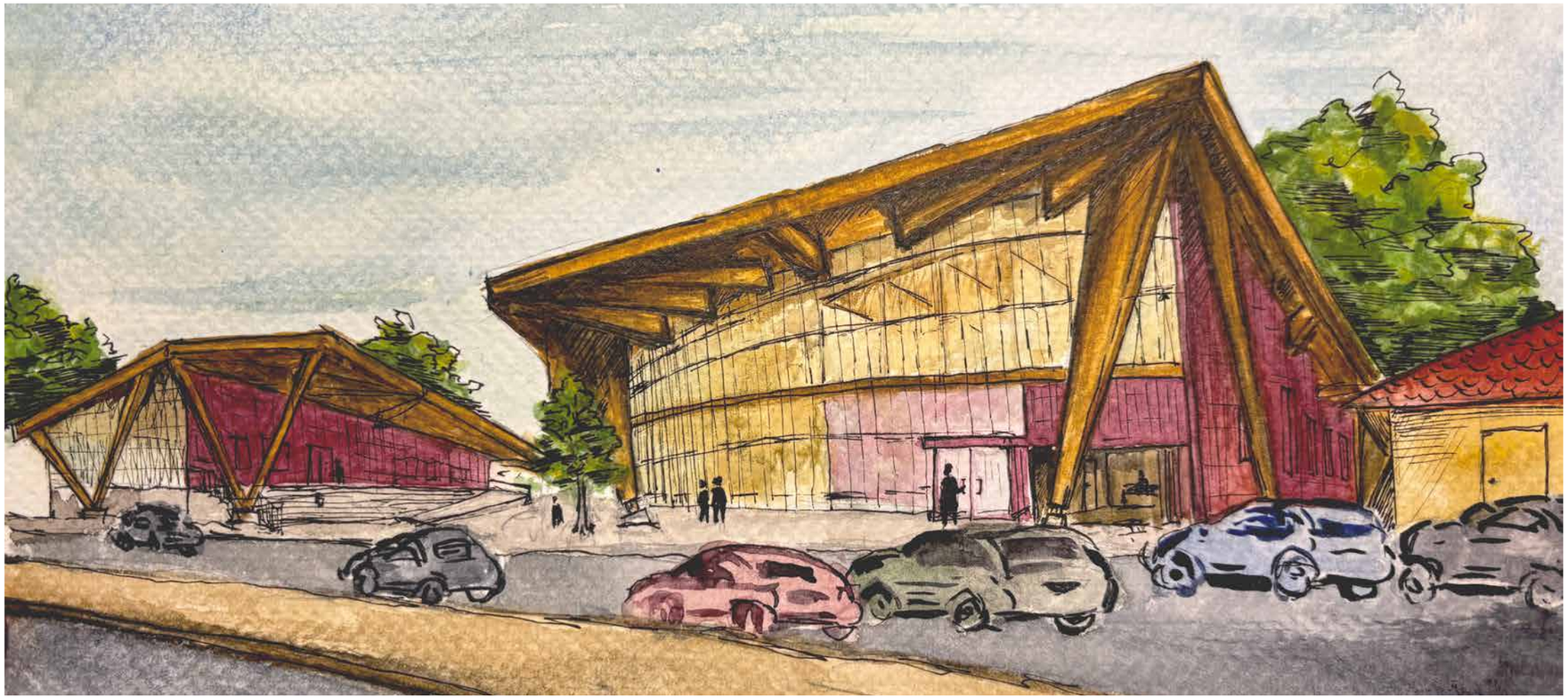
Fashion Design 23-24

Booth Building 25-26

UPHAMS CORNER LIBRARY AND CULTURAL CENTER
Mass Timber Construction with Double Skin Facade

SYDNEY SUN

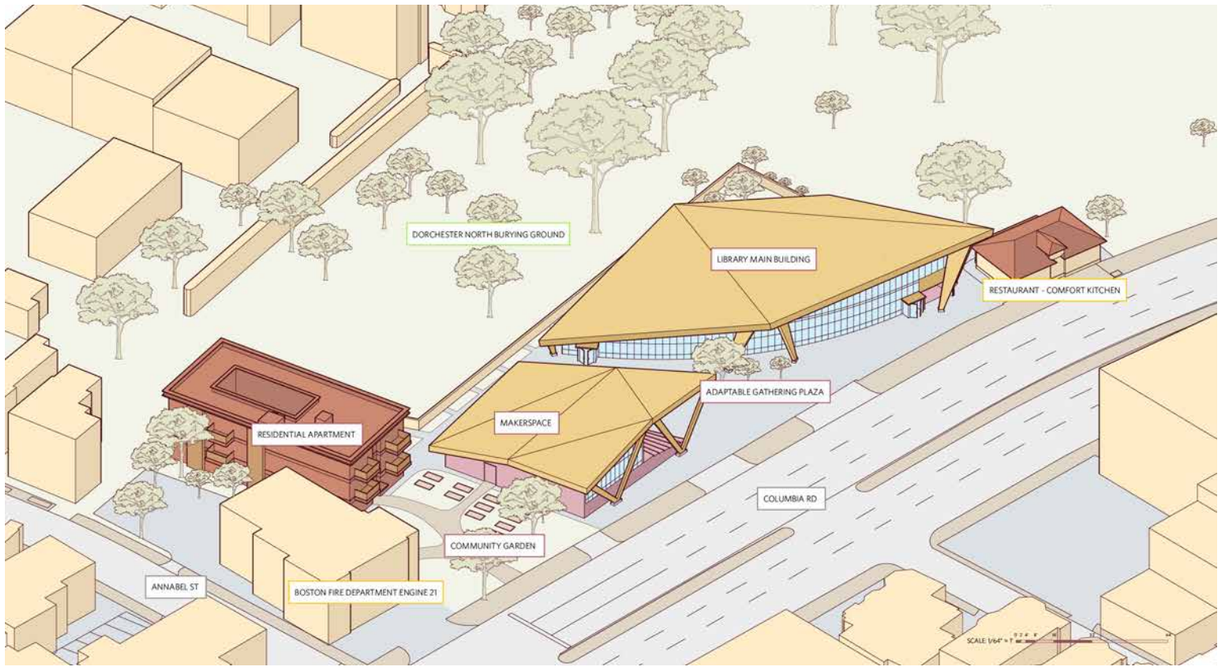
2023 (ORIGINAL) 2025 (RE-WORK)



Uphams Corner Library and Cultural Center redefines and emphasizes the value of a library in modern times. The cultural center fosters a welcoming, close knit community in Boston's historic Dorchester neighborhood -- a culturally diverse and artistic neighborhood. The cultural center is divided into four main areas: the main plaza, a library, a makerspace, and an apartment building situated at the back of the site.

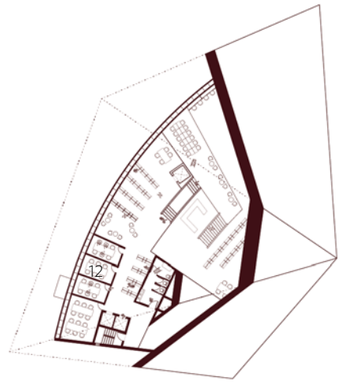
The street facing, west-facing facades are all glass double skin facade systems. Not only does this allow for exposure and connection with the public, the double skin facade system operates to passively regulate temperatures in the building, reducing the mechanical heating and cooling load. Coupled with the mass timber construction of the building structure, this building aims to reduce the negative environmental impacts of architecture.

The circulation of the building emphasizes the connection to the public, while allowing for more secluded moments further within the structure. Though the front facade encourages connection, the east side of the library faces the nearby cemetery park, a more tranquil and private area that provides solitude.



SITE DIAGRAM

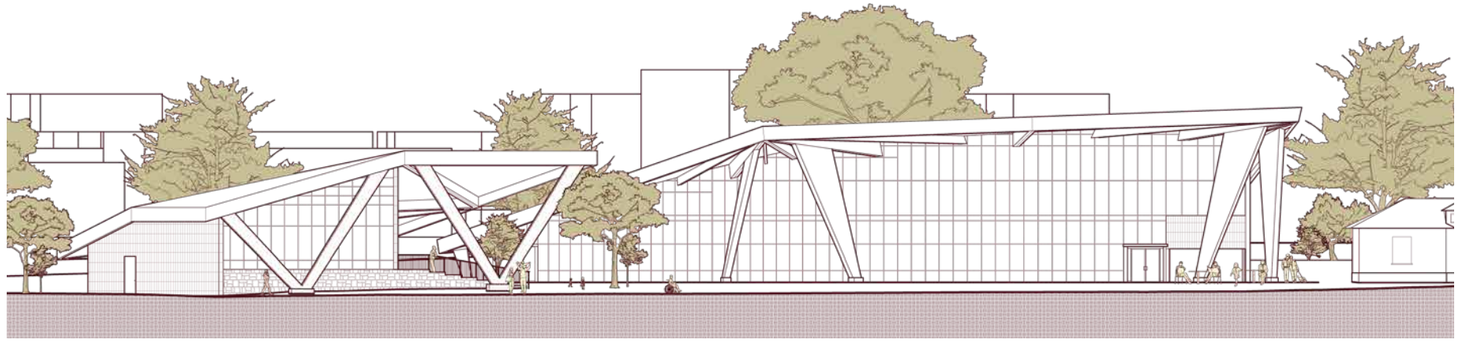
1: GATHERING PLAZA
2: ENTRANCE
3: CAFE
4: RESTROOM
5: EVENT ROOM
6: OFFICE
7: WINDOW-SIDE TABLES
8: INFORMATION
9: TEEN SECTION
10: CHILDREN SECTION
11: COURTYARD
12: MEETING ROOMS
13: MAKERSPACE ENTRACE
14: GALLERY
15: MAKERSPACE
16: RESTROOM
17: GARDEN
18: APARTMENT



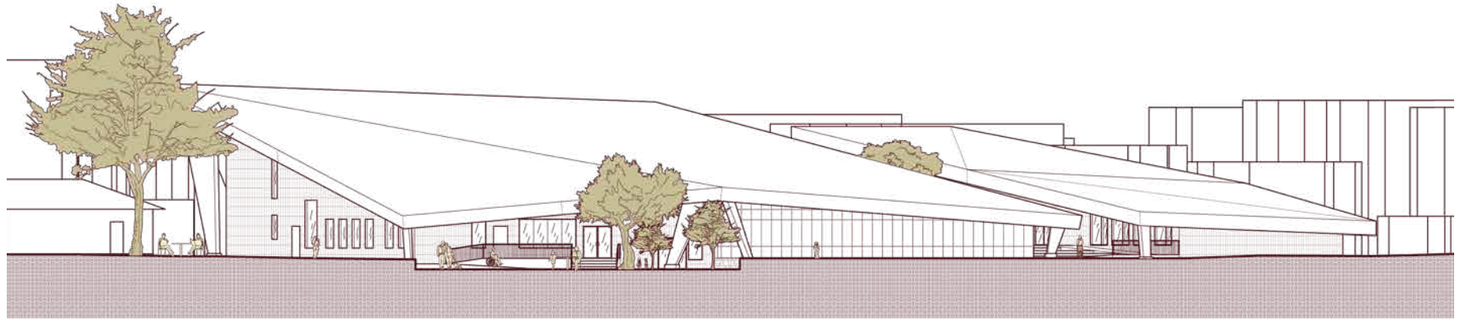
SCALE: 1/32" = 1'
0' 2' 4' 8' 16' 32' 64'

PLAN FLOOR 1

PLAN FLOOR 2

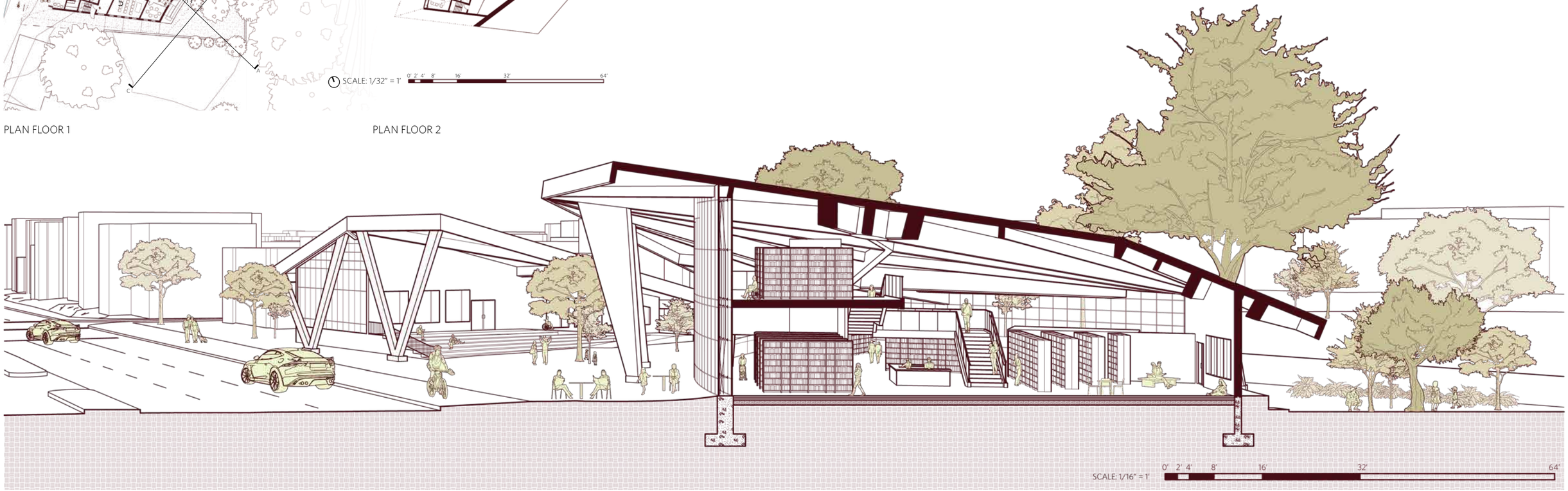


ELEVATION B-B



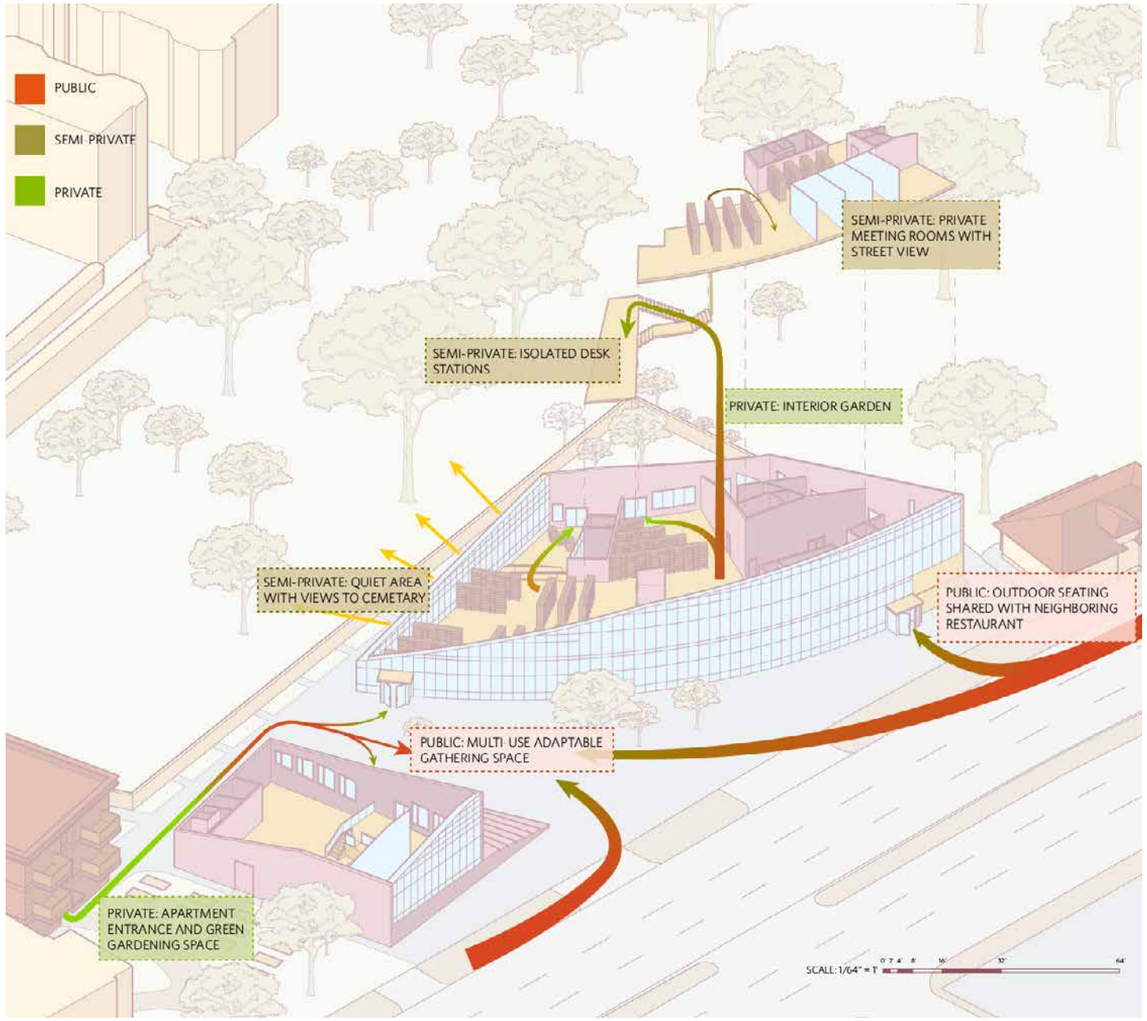
ELEVATION C-C

SCALE: 1/32" = 1'
0' 2' 4' 8' 16' 32' 64'

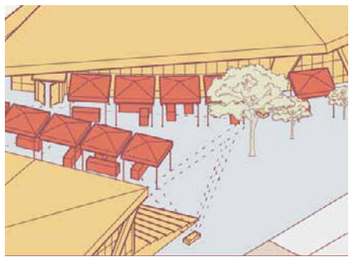


SCALE: 1/16" = 1'
0' 2' 4' 8' 16' 32' 64'

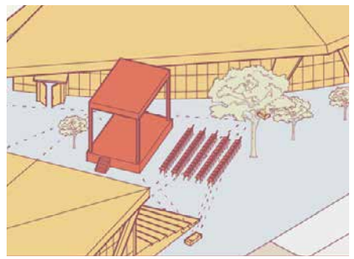
SECTION A-A



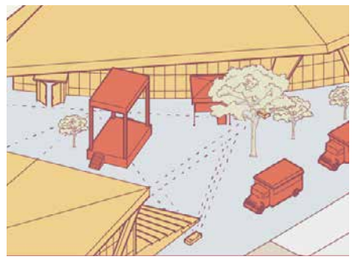
PUBLIC-PRIVATE RELATIONSHIP



MARKET LAYOUT
- FARMERS MARKET
- ARTIST MARKET
- FLEA MARKET

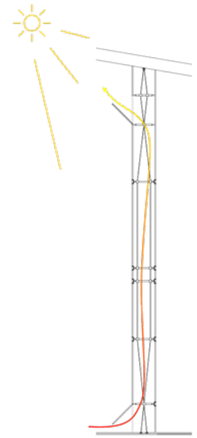


STAGE LAYOUT
- MUSICAL CONCERT
- CULTURAL PERFORMANCE
- SPEAKING EVENT

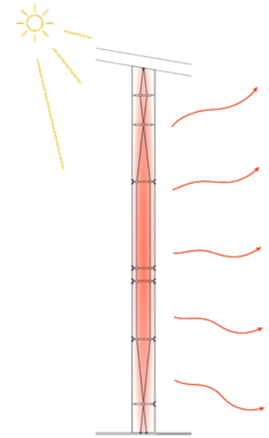


MIX USE LAYOUT
- BLOCK PARTY
- HOLIDAY FESTIVAL

GATHERING PLAZA POTENTIAL LAYOUR AND EVENTS

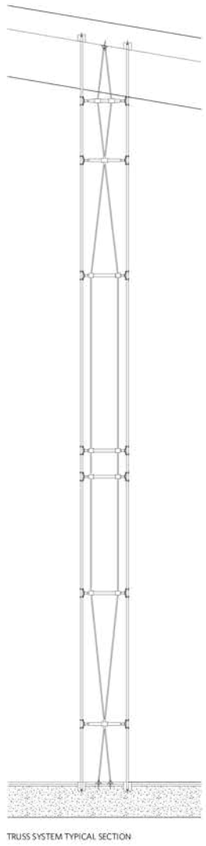


SUMMER - NATURAL VENTILATION AND COOLING

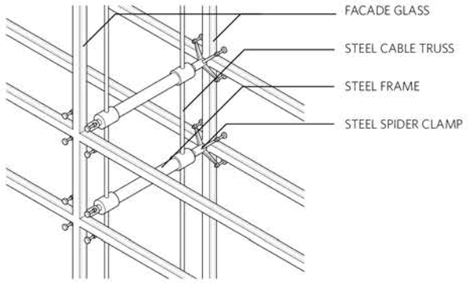


WINTER - THERMAL BUFFER AND PASSIVE HEATING

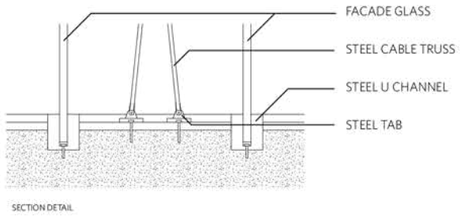
DOUBLE SKIN FACADE THERMAL REGULATION



TRUSS SYSTEM TYPICAL SECTION

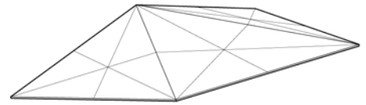


FACADE GLAZING ATTACHMENT DETAIL

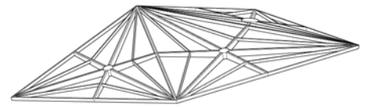


SECTION DETAIL

ENCLOSURE DETAIL

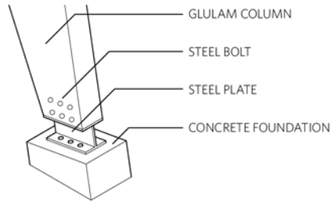


CLT PANELS



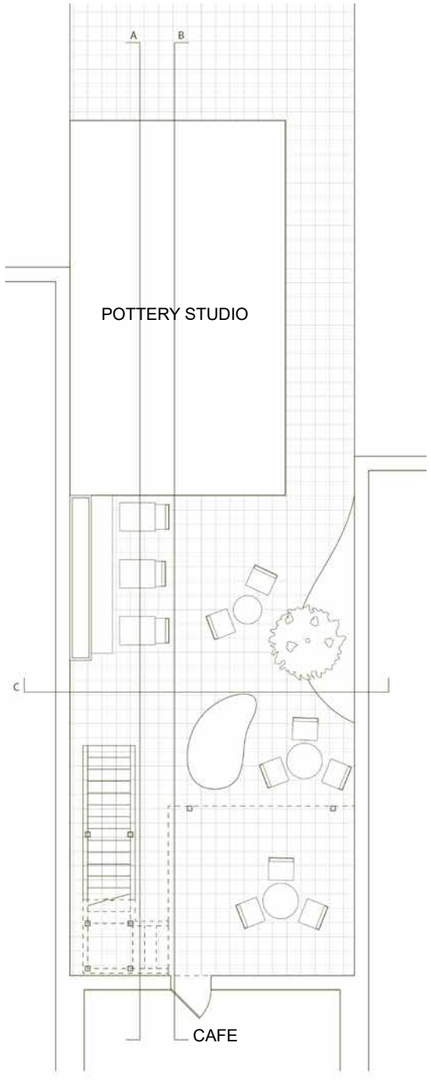
GLULAM BEAMS WITH STEEL ATTACHMENT

STRUCTURAL ROOF



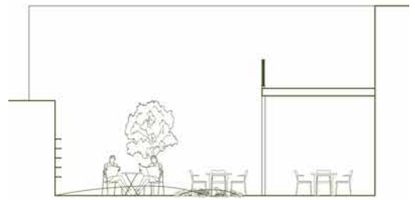
GLULAM COLUMN DETAIL

STRUCTURE DETAIL

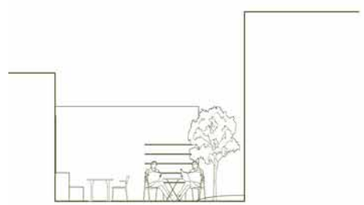


PLAN SCALE: 1’ = 3/32”

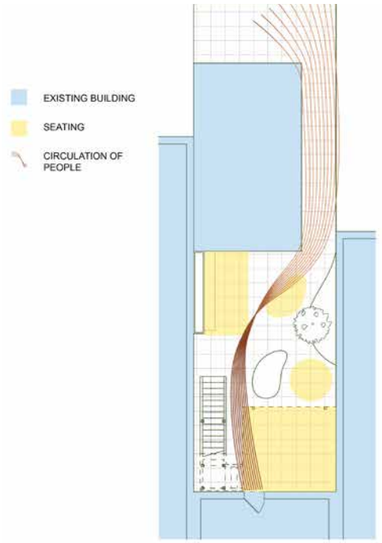
SECTION A SCALE: 1’ = 1/16”



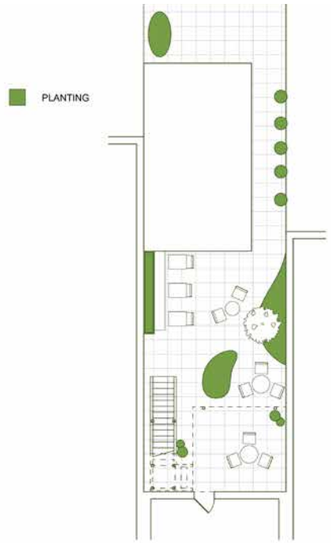
SECTION B SCALE: 1’ = 1/16”



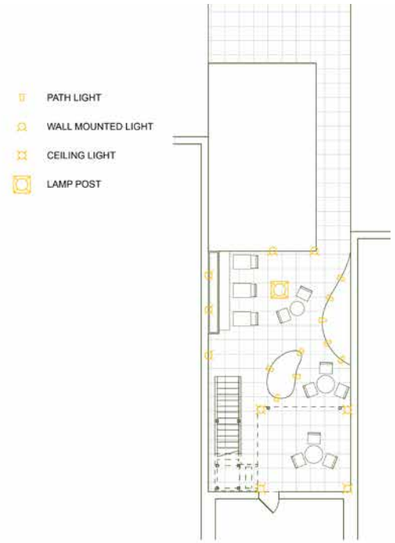
SECTION C SCALE: 1’ = 1/16”



CIRCULATION



PLANTING



ELECTRIC

Mechanic Coffee Patio is a patio addition between the main cafe building and the pottery studio behind the cafe. Irregularly shaped planting areas create pockets of seating, inviting customers to immerse themselves in the garden. A single mid-sized tree provides an anchor for the space, while simultaneously shielding view of the driveway beyond the path.

Construction is underway for the patio and is projected to be finished by the end of November 2025.

PERSPECTIVE RENDER

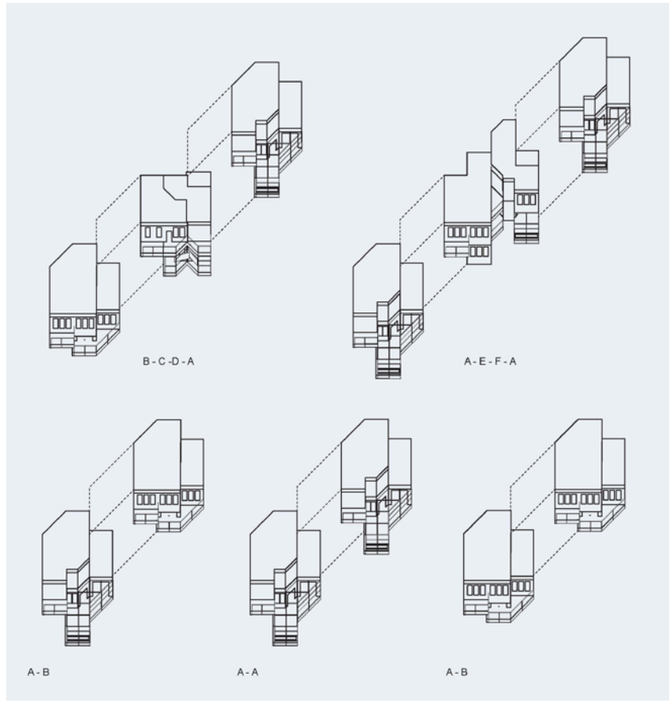
DOMESTICATING BIGNESS
Modular Social Housing + Public Parks

Domesticating Bigness is a modular social housing project that revolves around three levels of urban agriculture -- micro scale of individual private gardens, mezzo scale of communal contribution, and macro scale that involves and welcomes the general public.

The housing community has two different typologies -- courtyard and tower. Each typology is made up of six different housing units, made for residents with different needs, as well as three different communal units. The units are designed on a 20' x 20' structural grid, made for interlocking and aggregation.

The design process began through a flow-chart, categorizing core design concepts, and how the elements are connected. The flow-chart evolves into a program for the project.

AGGREGATION DIAGRAM



UNIT PLAN SECTIONS

UNIT A PLAN SECTION

SECTION A-A'

SECTION B-B'

SCALE: 0' 4' 8' 16' 32'

COMMUNAL UNIT PLAN SECTION

COURTYARD TYPOLOGY

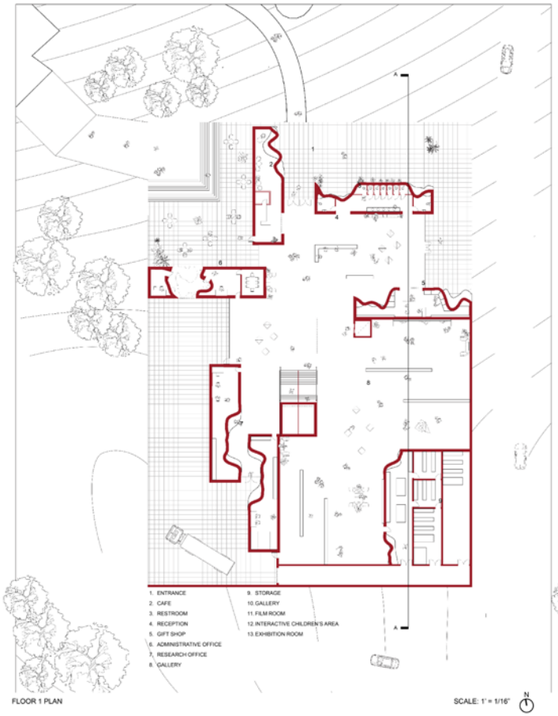
TOWER TYPOLOGY

INTERIOR RENDERS

THE NODULE - CAVERN MUSEUM
Architectural Ceramic Facade

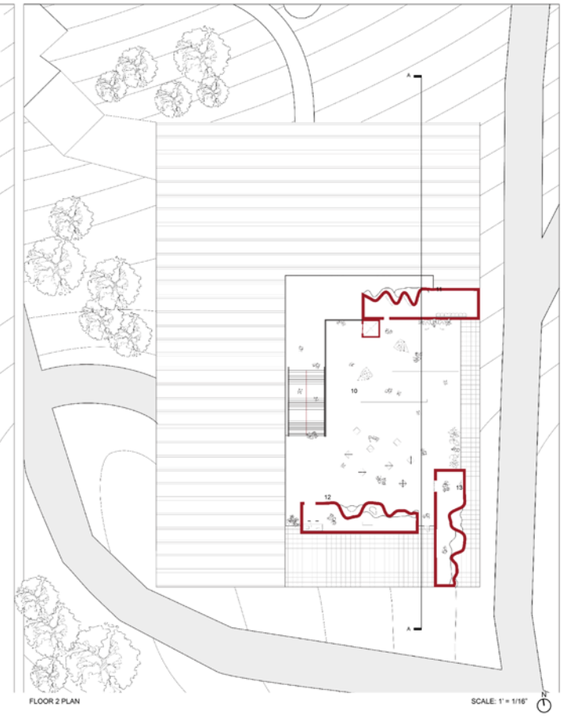
SYDNEY SUN
2024
In Collaboration with Jason Shao

Architectural forms are created through studying the formation of geological features. These forms are used both at the facade module scale as well as the building scale. Techniques such as CNC milling and two part mold casting are used to explore the fabrication of ceramic facade elements, and the system of which to assemble and apply the elements. The ceramic blocks are hung on brackets from a guiding rail to form irregular, angulating walls. The wall surfaces create spaces that are reminiscent of cave interiors but does not aim to replicate the works of nature.



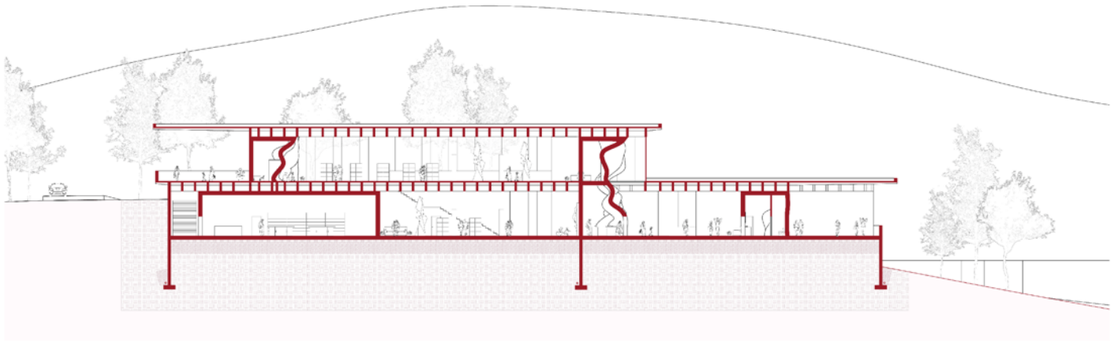
FLOOR 1 PLAN

SCALE: 1" = 1/16"



FLOOR 2 PLAN

SCALE: 1" = 1/16"



SECTION A-A

SCALE: 1" = 3/16"

METHOD 1

Cast in parts to examine Sectional Quality

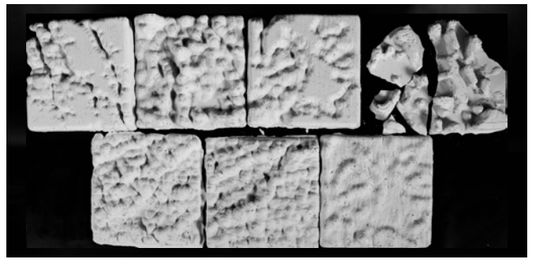
Use “Crumbled Paper Balls” as infill to simulate stone texture

Casting Results

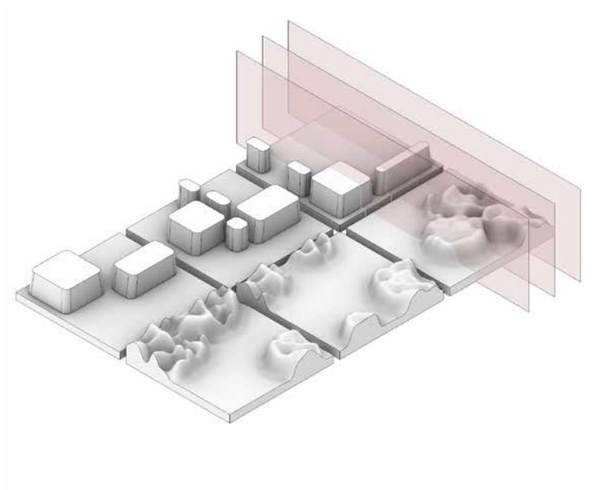
METHOD 2

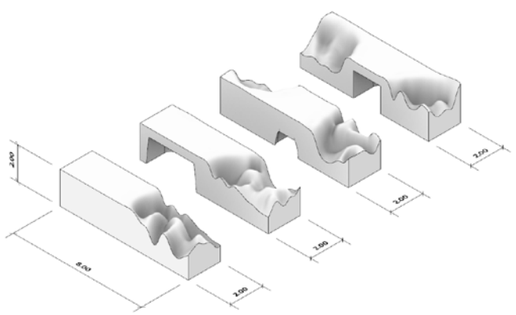
Using texture maps for project different heights

Casting Results

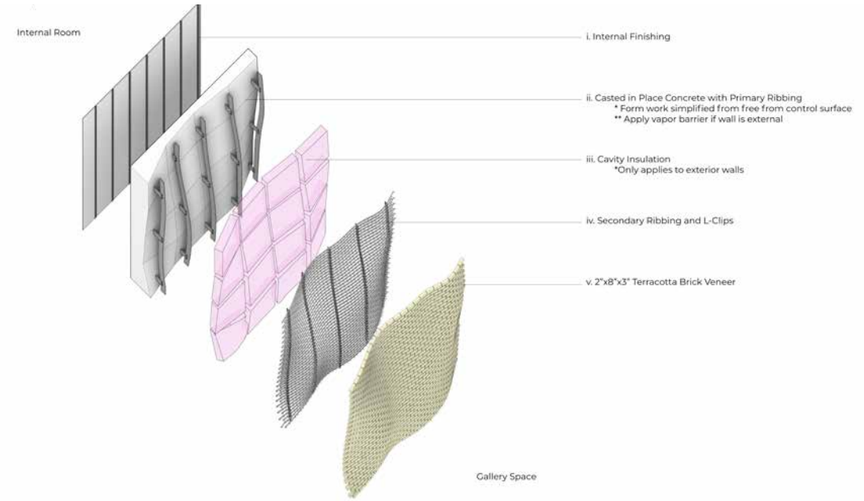


FINAL CASTING FORM BASED ON COMBINATION OF METHODS

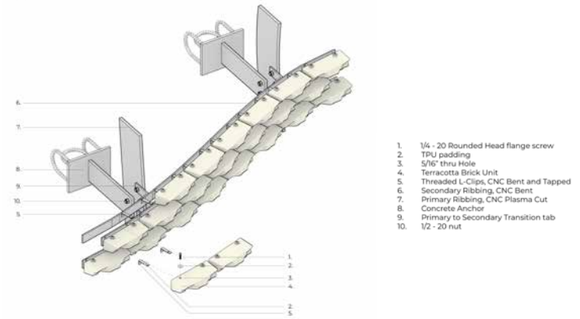




COMPOSITION



ASSEMBLY DETAIL



ASSEMBLY MODEL

FINAL CAST

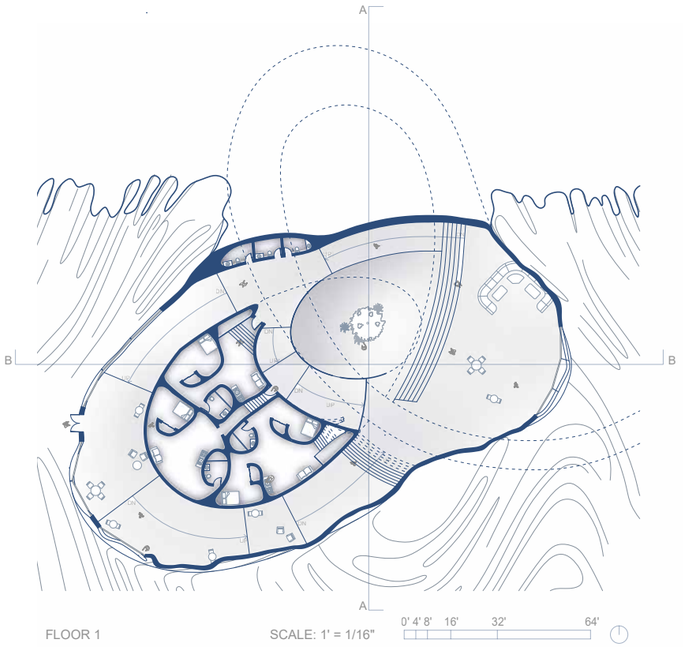
PREVIOUS MOLD ITERATIONS

SYDNEY SUN
2021
In Collaboration with Sarah Kwok

PROJECT SLOW-GROW
A Halfway House Eco-Machine

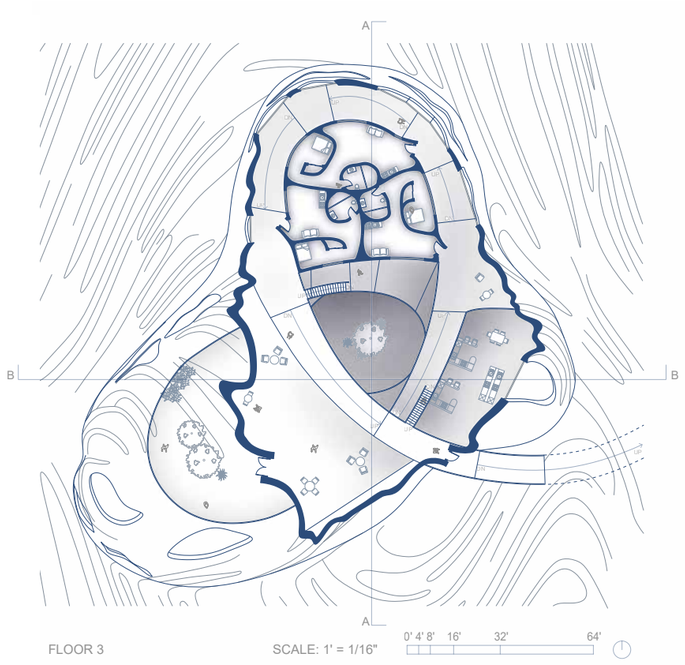
This project is a self sufficient halfway house designed to integrate the inhabitants with the landscape, and to create a community to empower the residents to become self sufficient, to provide for the themselves as well as the community.

Slow-Grow treats the architecture as a continuation of the landscape rather than as an intervention on it. The building and the landscape are designed in tandem with each other to perform as the eco machine in a self-sustained ecosystem that is able to support both itself and the people who are occupying the structure. A texture map of water flow lines is applied to the combined surface of the nearby landscape and building form. The ridges are used as guides for water channeling and window openings.



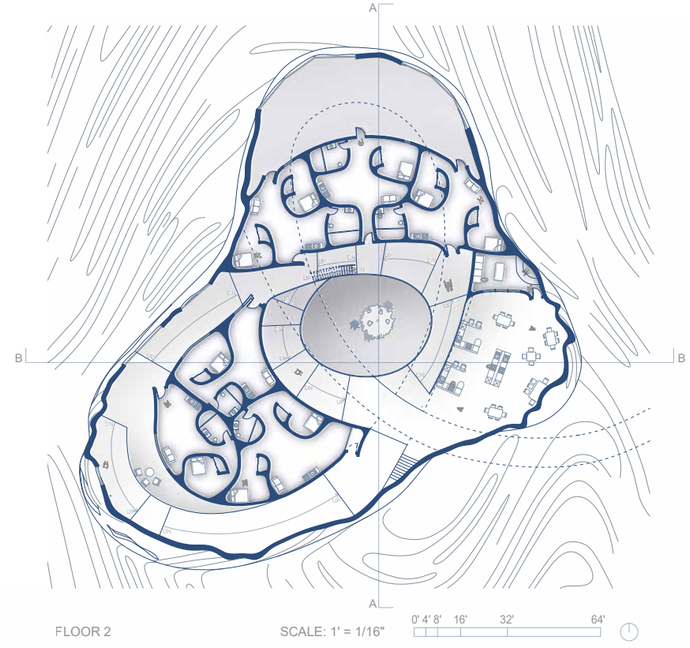
FLOOR 1

SCALE: 1' = 1/16"



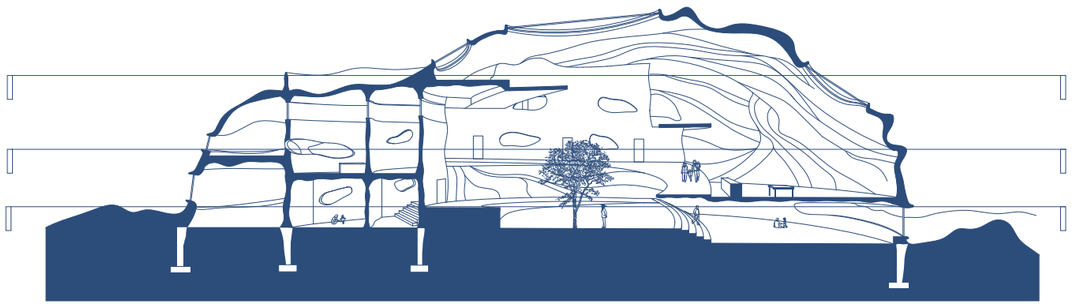
FLOOR 3

SCALE: 1' = 1/16"



FLOOR 2

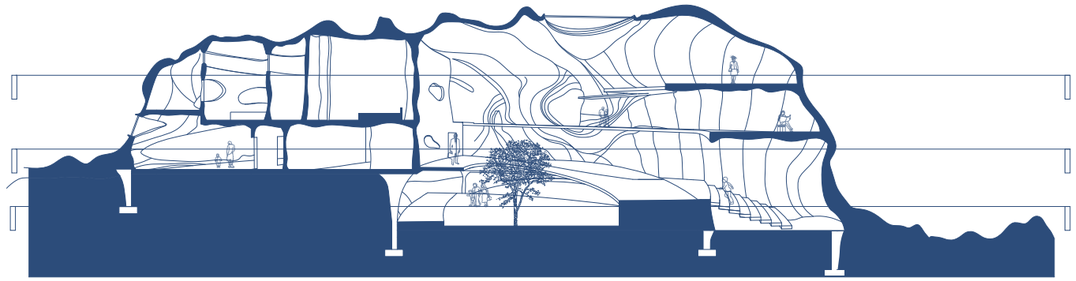
SCALE: 1' = 1/16"



SECTION A

SCALE: 1' = 1/16"

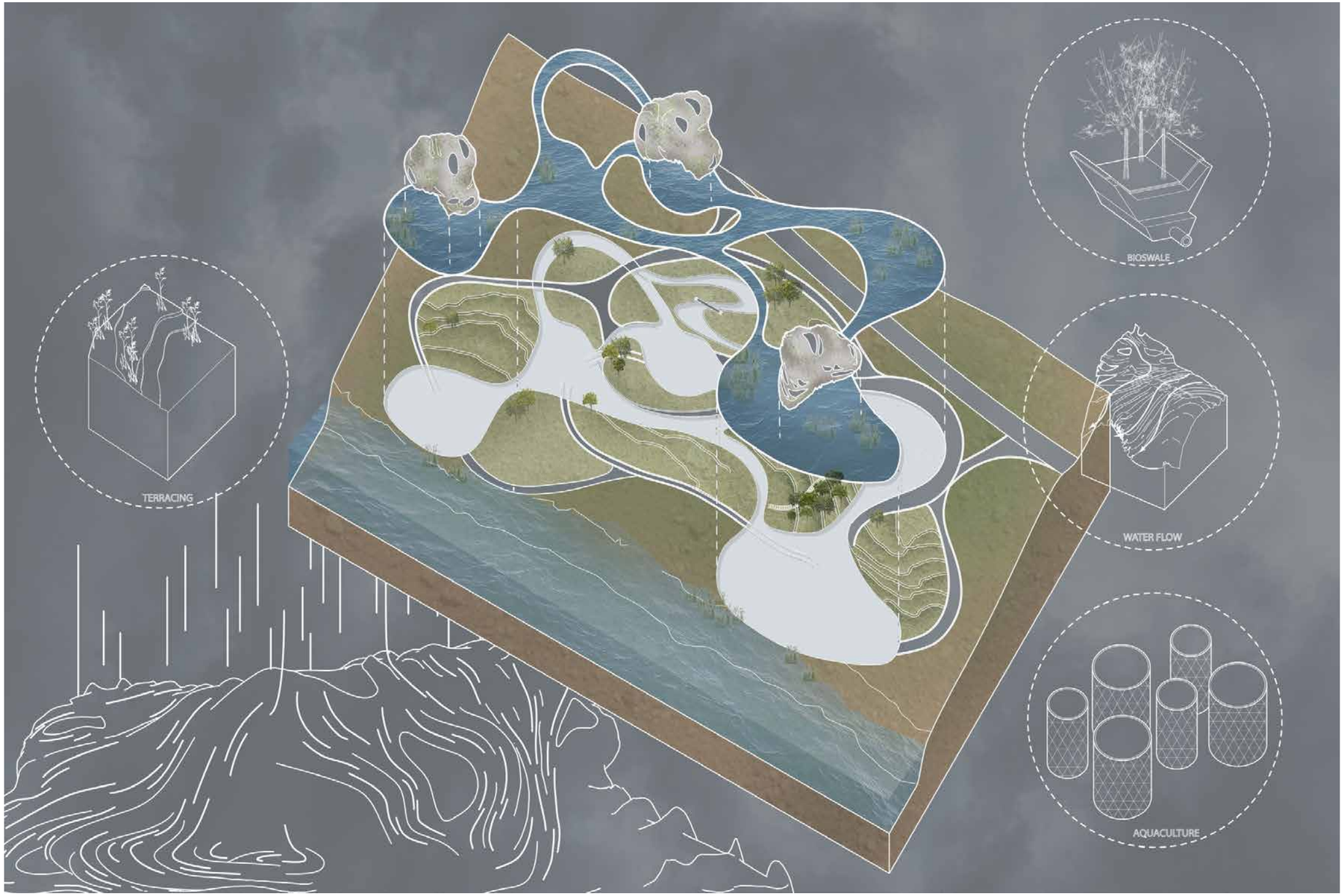
0' 4' 8' 16' 32' 64'

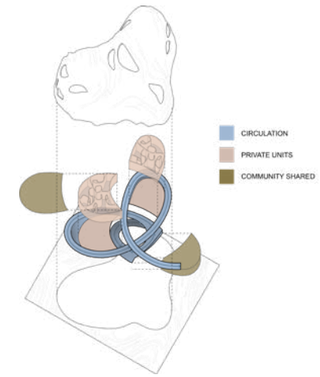


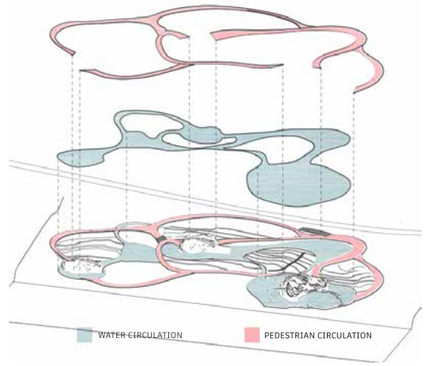
SECTION B

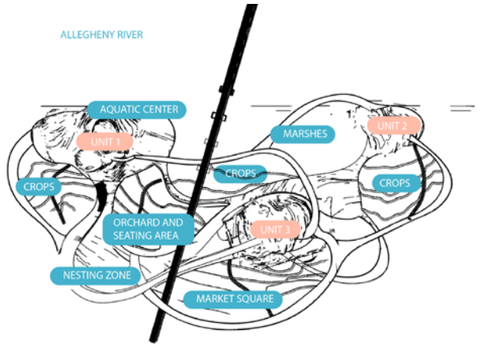
SCALE: 1' = 1/16"

0' 4' 8' 16' 32' 64'


TERRACING
BIOSWALE
WATER FLOW
AQUACULTURE

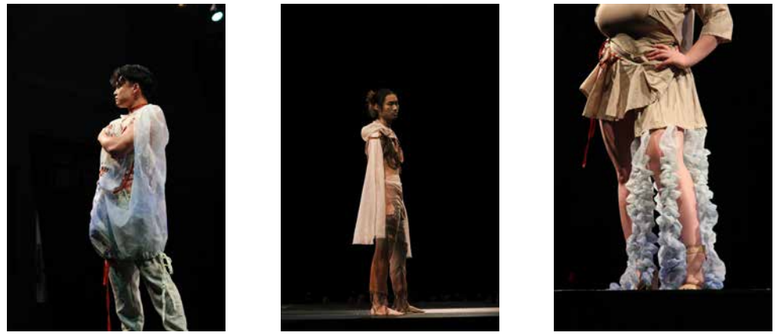

CIRCULATION
PRIVATE UNITS
COMMUNITY SHARED


WATER CIRCULATION
PEDESTRIAN CIRCULATION


ALLEGHENY RIVER
AQUATIC CENTER
MARSHES
UNIT 1
UNIT 2
CROPS
CROPS
CROPS
ORCHARD AND SEATING AREA
UNIT 3
NESTING ZONE
MARKET SQUARE

SYDNEY SUN
2022 - 2023
In Collaboration with Angela Huang, Amy Hu

LUNAR GALA FASHION DESIGN
Nox Memoria



SYDNEY SUN
2023 - 2024

Flux

SPRING CARNIVAL BOOTH
Occupiable Temporary Wood Frame Structure

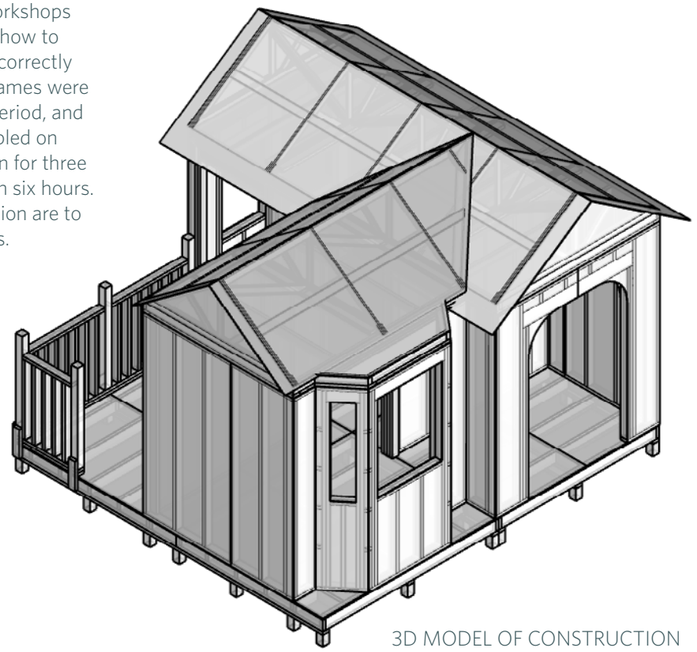
In Collaboration with SDC Booth Exec and Members

SYDNEY SUN
2023 - 2024

SCD Booth - Animal Crossing was a six-month long project to build a wood frame booth where event attendees could walk through to enjoy themed decorations, and play a collaborative game. Rather than having a simple box design, our team incorporated a bay window, curved steps, an open back porch, and a decorative pitched roof. These elements created a more unique spatial experience, and combined with the attentiveness to craftsmanship, really set our booth apart.

As the Architecture Chair, I was responsible for the formal design and structure -- how each and every piece of lumber comes together to ensure a safe and stable booth. Each frame was modeled exactly as it should be constructed, and made into drawing blueprints for members to follow.

I also led construction workshops where I taught members how to operate power tools and correctly build frames. All of the frames were built over a four-month period, and the structure was assembled on site in six days, to be open for three days. and disassembled in six hours. All lumber in good condition are to be used in following years.



3D MODEL OF CONSTRUCTION

First Place
Overall

First Place
Independent Organizations

Environmental Award
Energy Use

Environmental Award
On-Site Practices