# Hannah Haytko-DeSalvo

Architecture Portfolio

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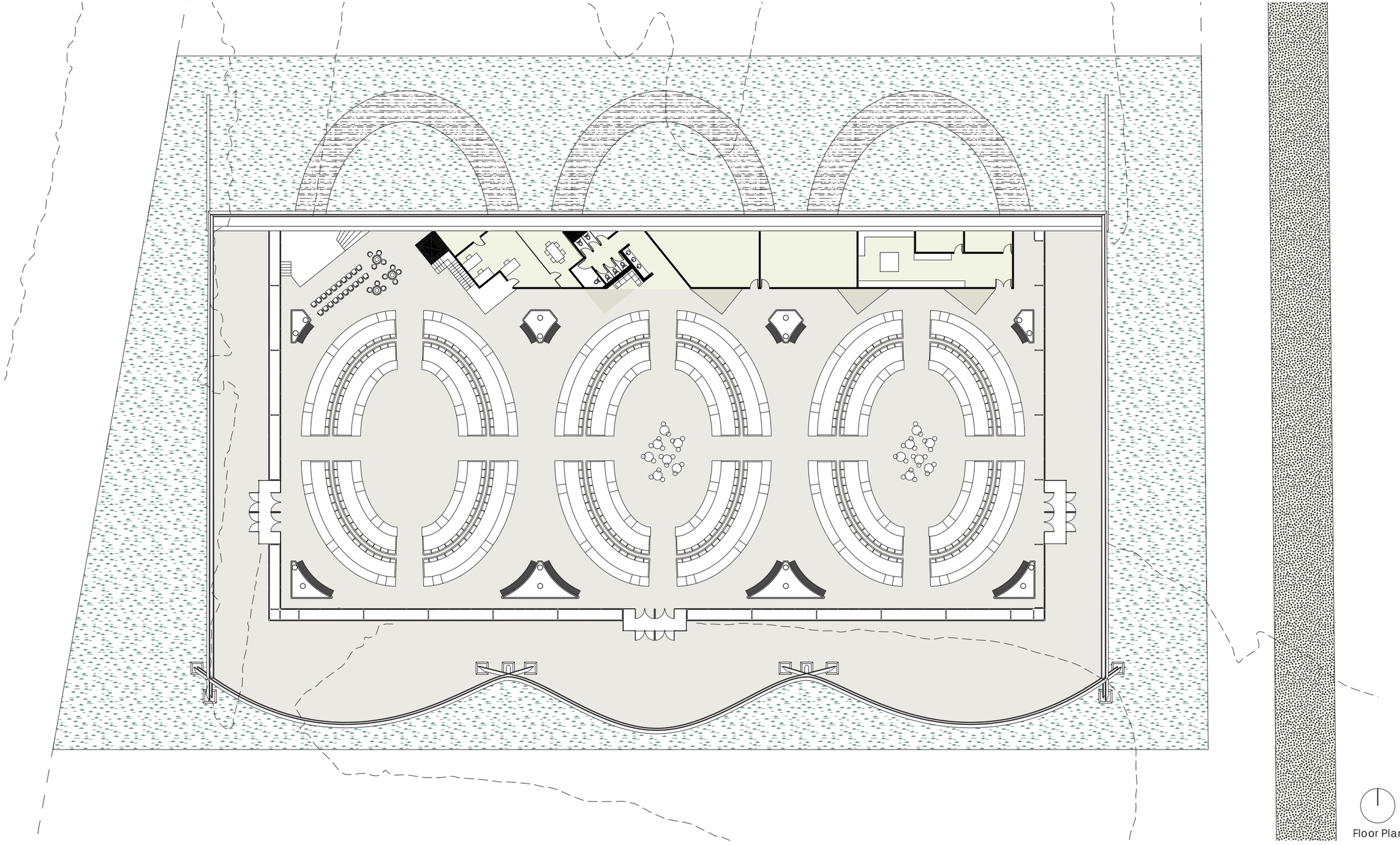
# Hazelwood Green Farmer's Market

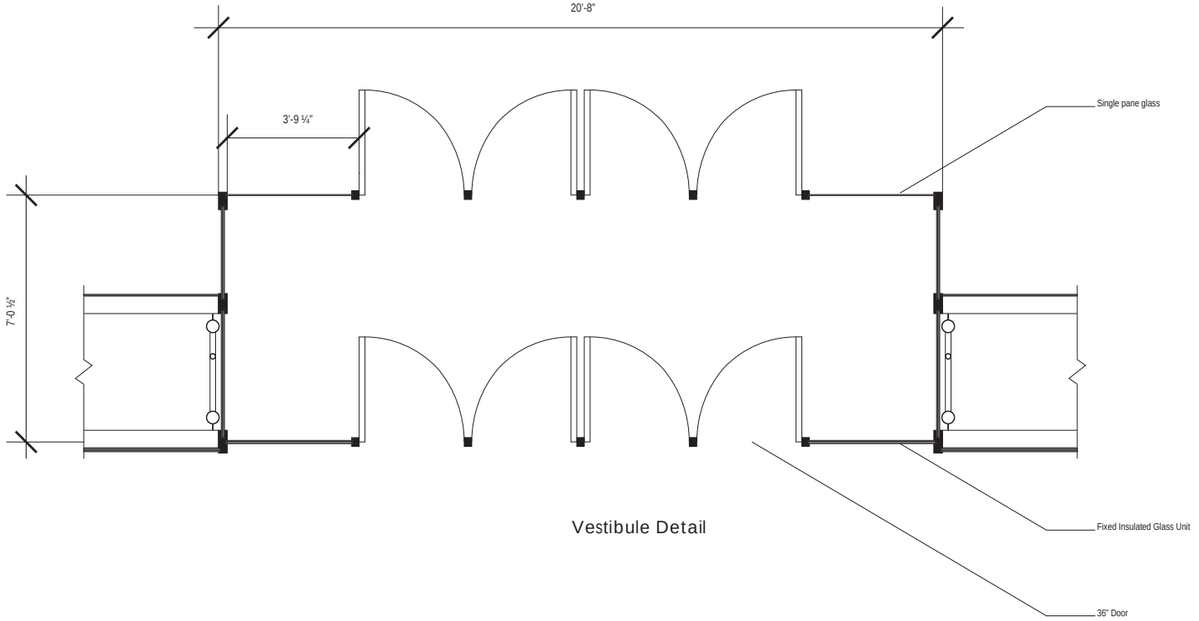
Fall 2022 Studio



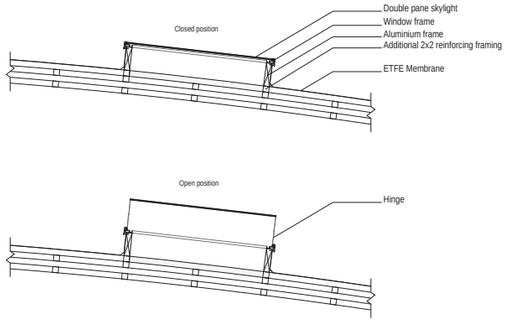
Floor Plan

The main concept for this farmer's market was inspired by *S M L XL* by Rem Koolhaas, Bruce Mau, and Hans Werlemann. For this project, the structure is the XL, the M is offices, restrooms, MEP and acts as house within house, and the XS is the market stands. With a proposed greenway on the south, the Monongahela River to the west, and the main road to the east, we designed a structure that opens up on these elevations. The structure is created entirely with 2x2 pieces of wood, which work in compression to create the light and elegant curving form.

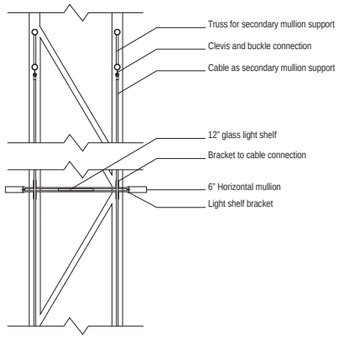
Double facades with operable elements on the south and west sides of the building allow for natural thermal regulation. They have been designed with Climate Studio to achieve efficient daylighting and thermal results. The facade system works with the MEP system to naturally ventilate the building, significantly reducing building loads.



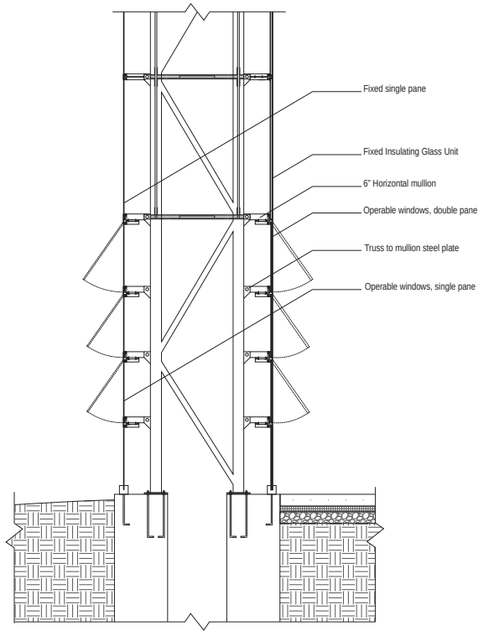

Vestibule Detail



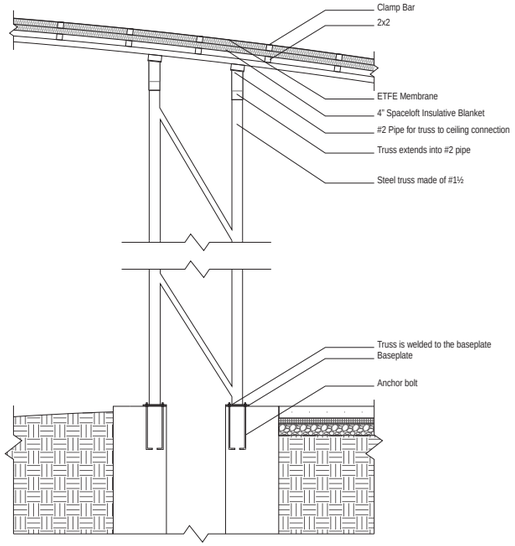

Operable Skylight Detail



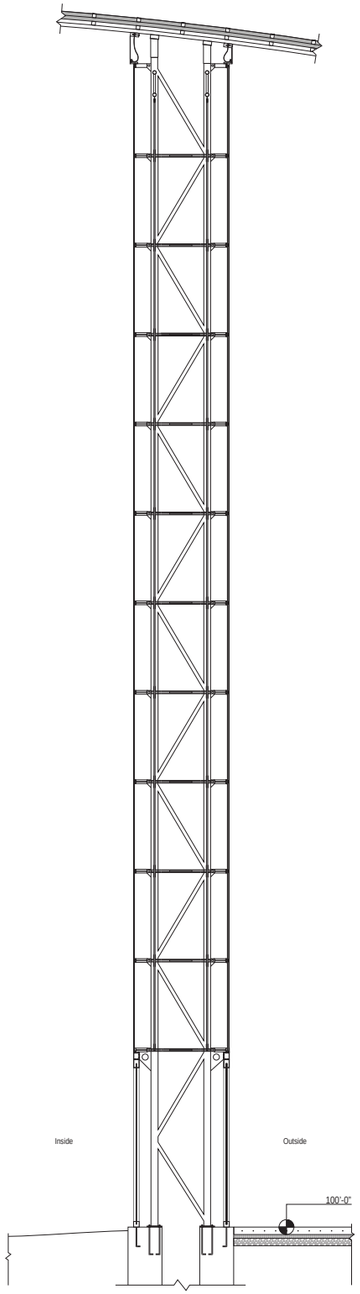

Light Shelf Detail



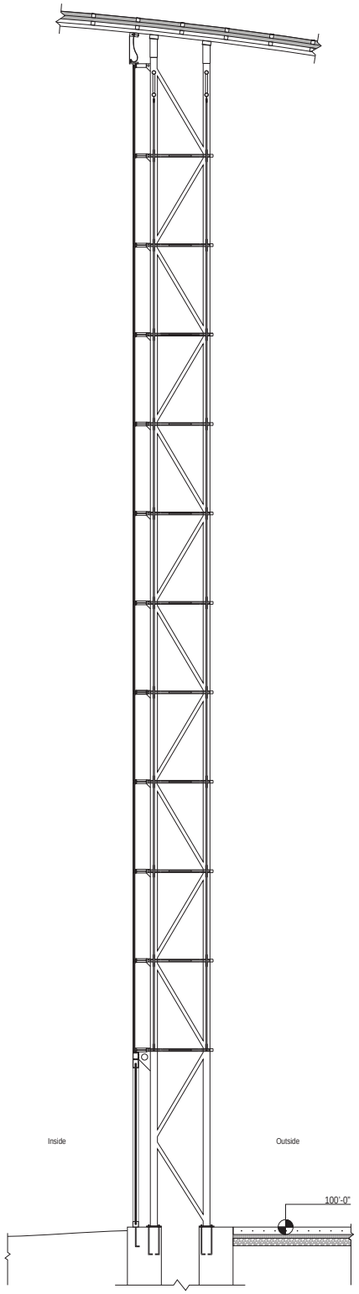

Operable Window Detail



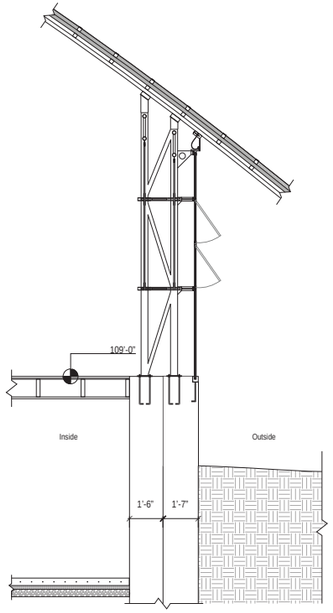

Truss and Roof Detail



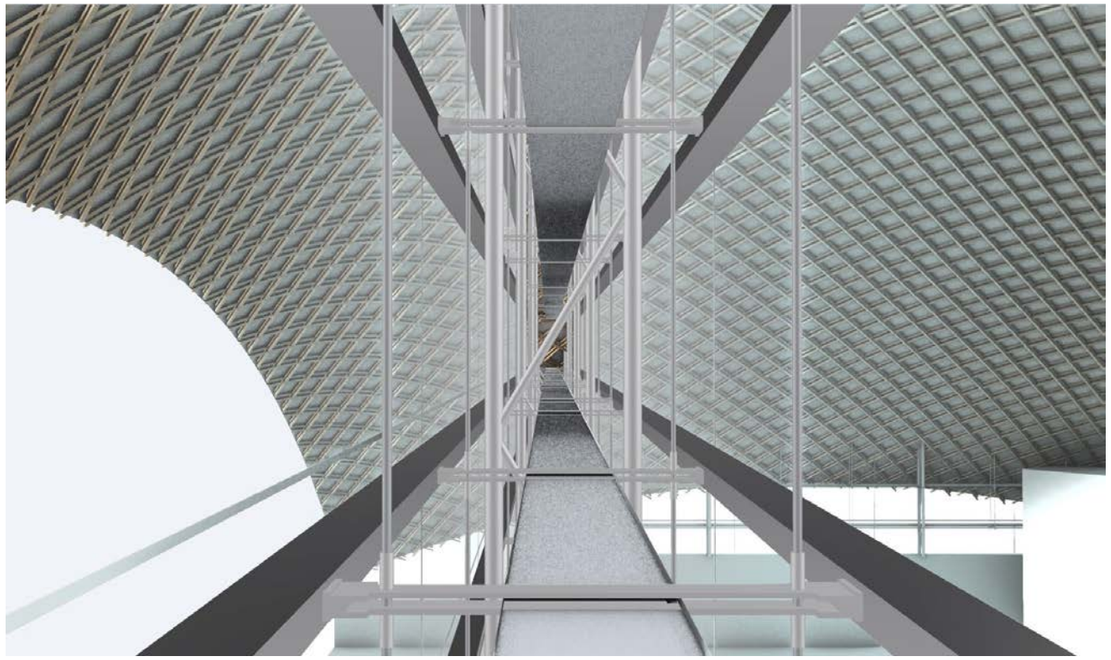

Typical West and South
Enclosure Section

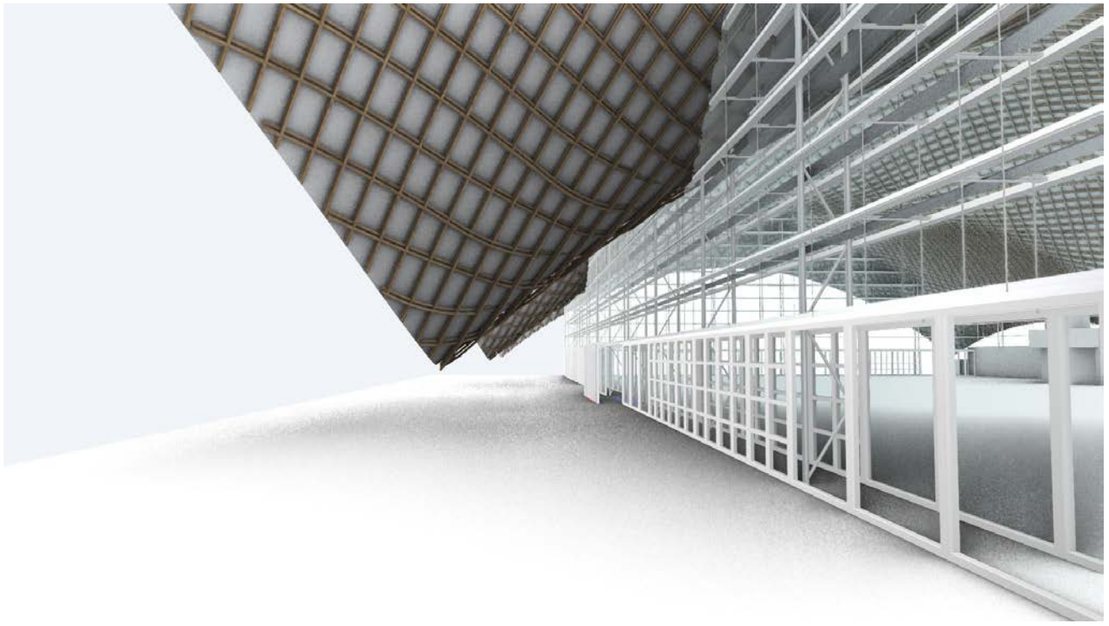



Typical East
Enclosure Section

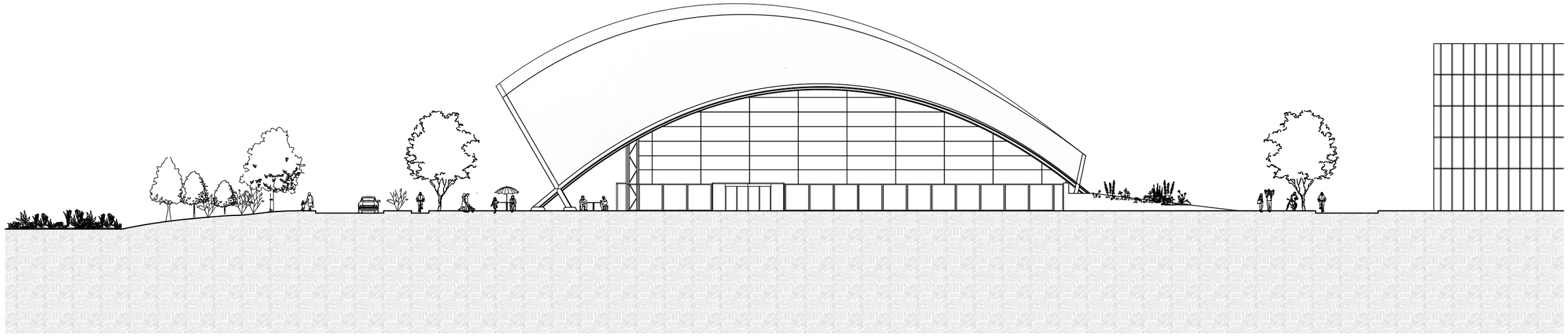



Typical North
Enclosure Section

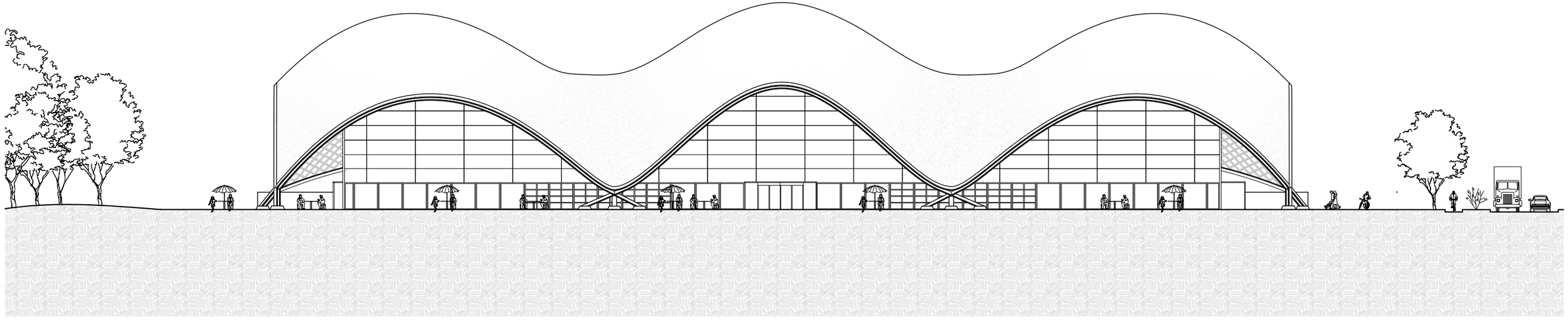




Rhino Enclosure Perspectives



East Elevation

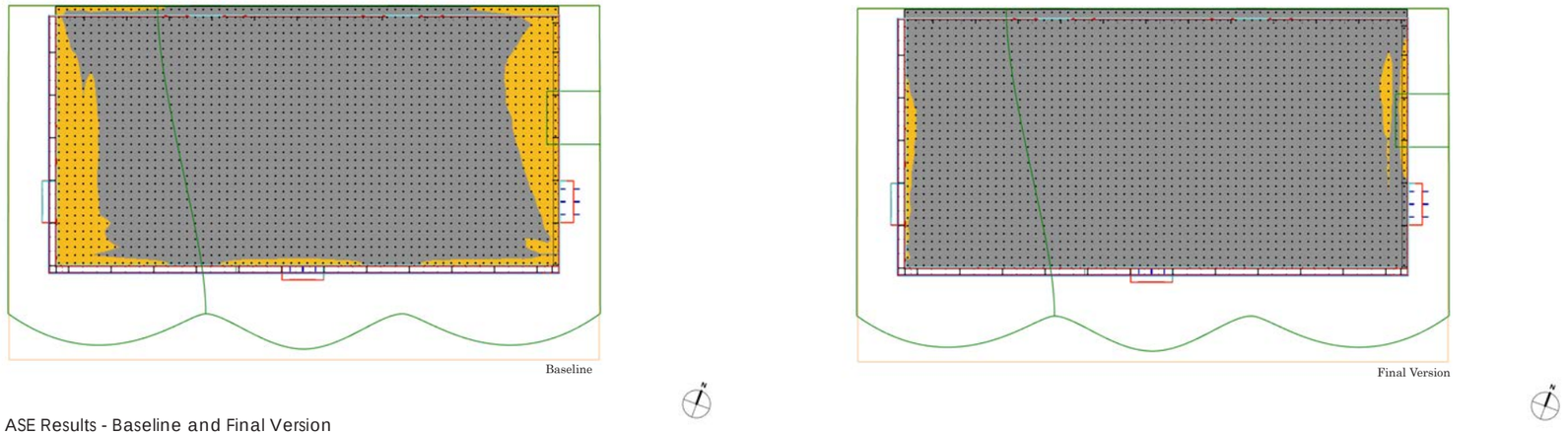


South Elevation

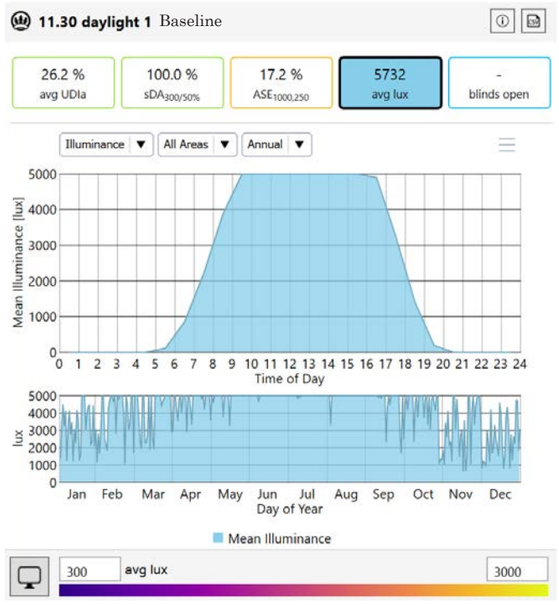
The building was designed in an iterative process with the optimization of daylighting and energy consumption guiding design changes. Climate Studio was used for this analysis using the Rhino model. The images on this page show the results of the baseline and final model.

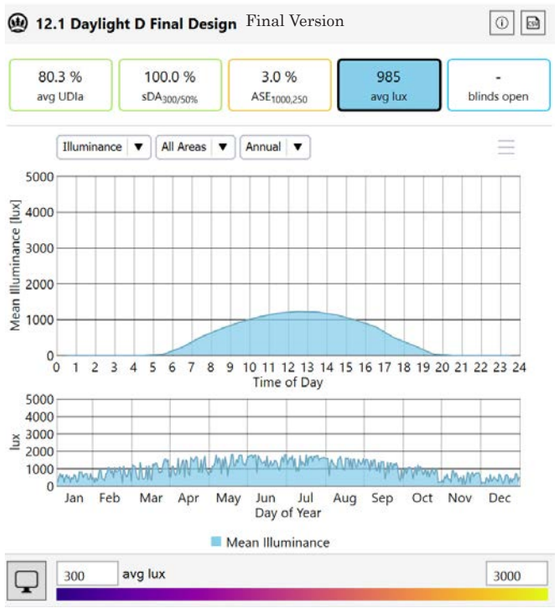
Because of the glazed facade, the spatial daytlight autonomy (sDA) was 100% in the baseline design, but the average lux was excessive and the annual sunlight exposure (ASE) was high. By increasing the reflectivity of the glazing, changing the roof material to one with lower visible transmittance, and installing light shelves within the double facade, the sDA was able to stay the same while ASE and average lux were reduced to comfortable levels.

Using Climate Studio's preset materials and conditioning setpoints, the building had a site Energy Use Intensity (EUI) of 156 kBTU/ft$^2$, and most of the energy was used for heating and cooling. By setting the specific building materials, implementing a conditioning schedule, and using natural conditioning when possible, the site EUI decreased to 68 kBTU/ft$^2$, as there was a significant reduction in heating and cooling energy loads.



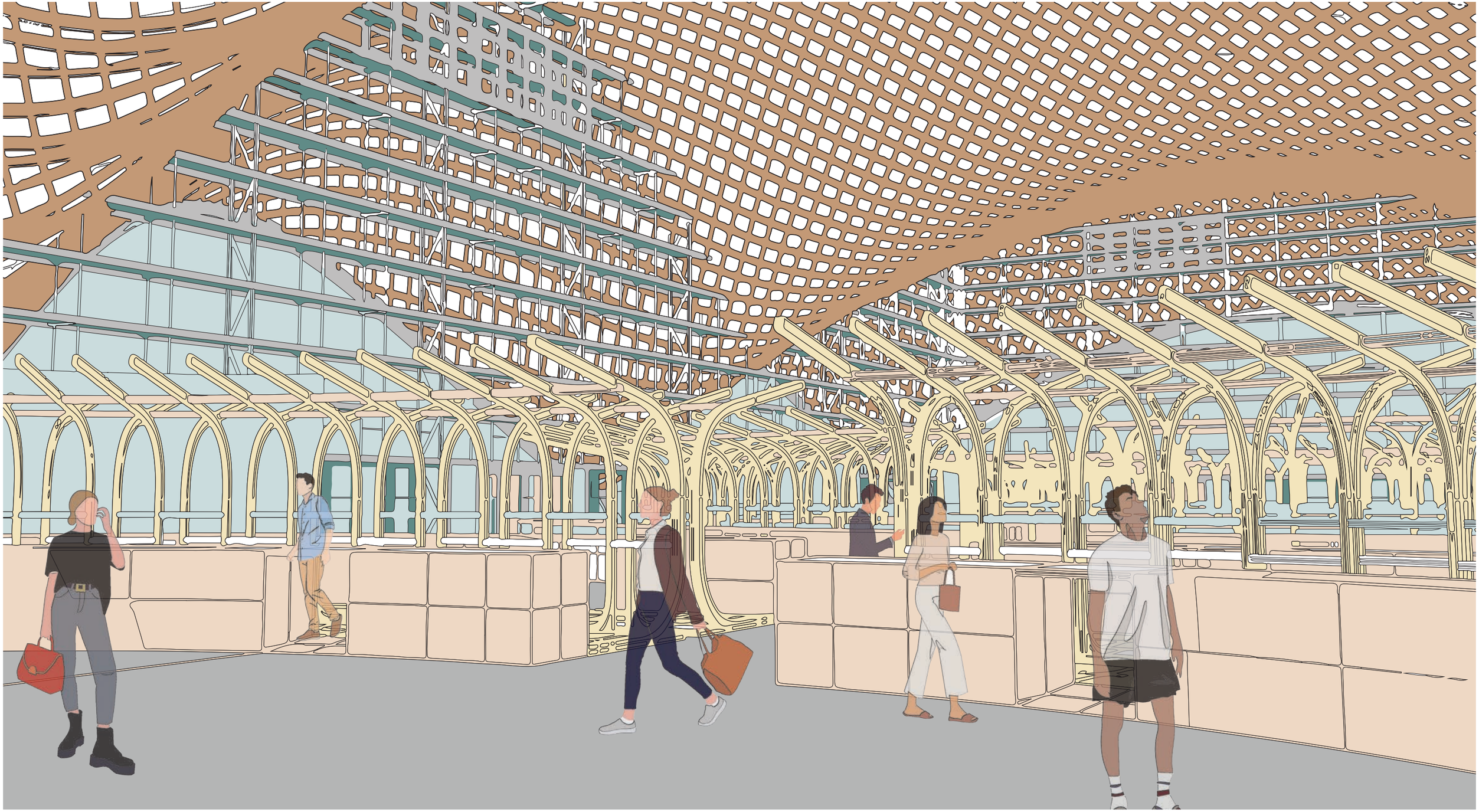

ASE Results - Baseline and Final Version

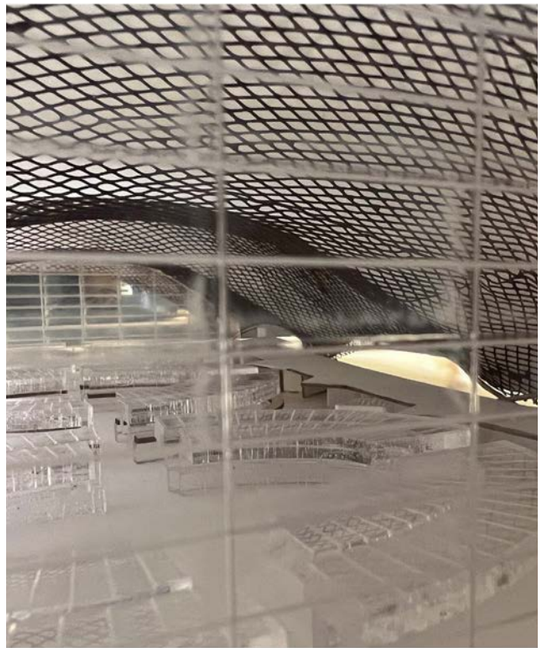


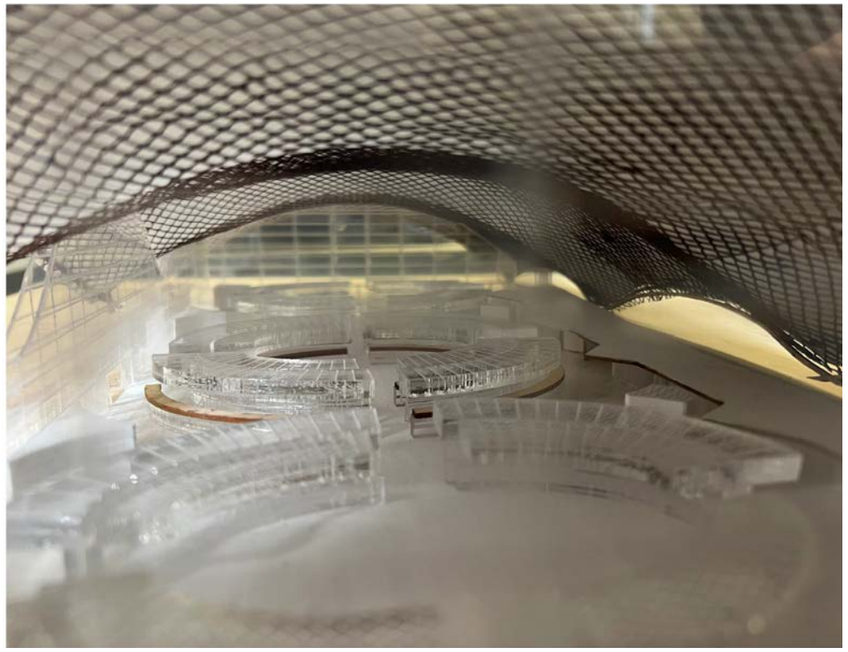




Lux Results - Baseline and Final Version


Thermal Results - Baseline and Final Version

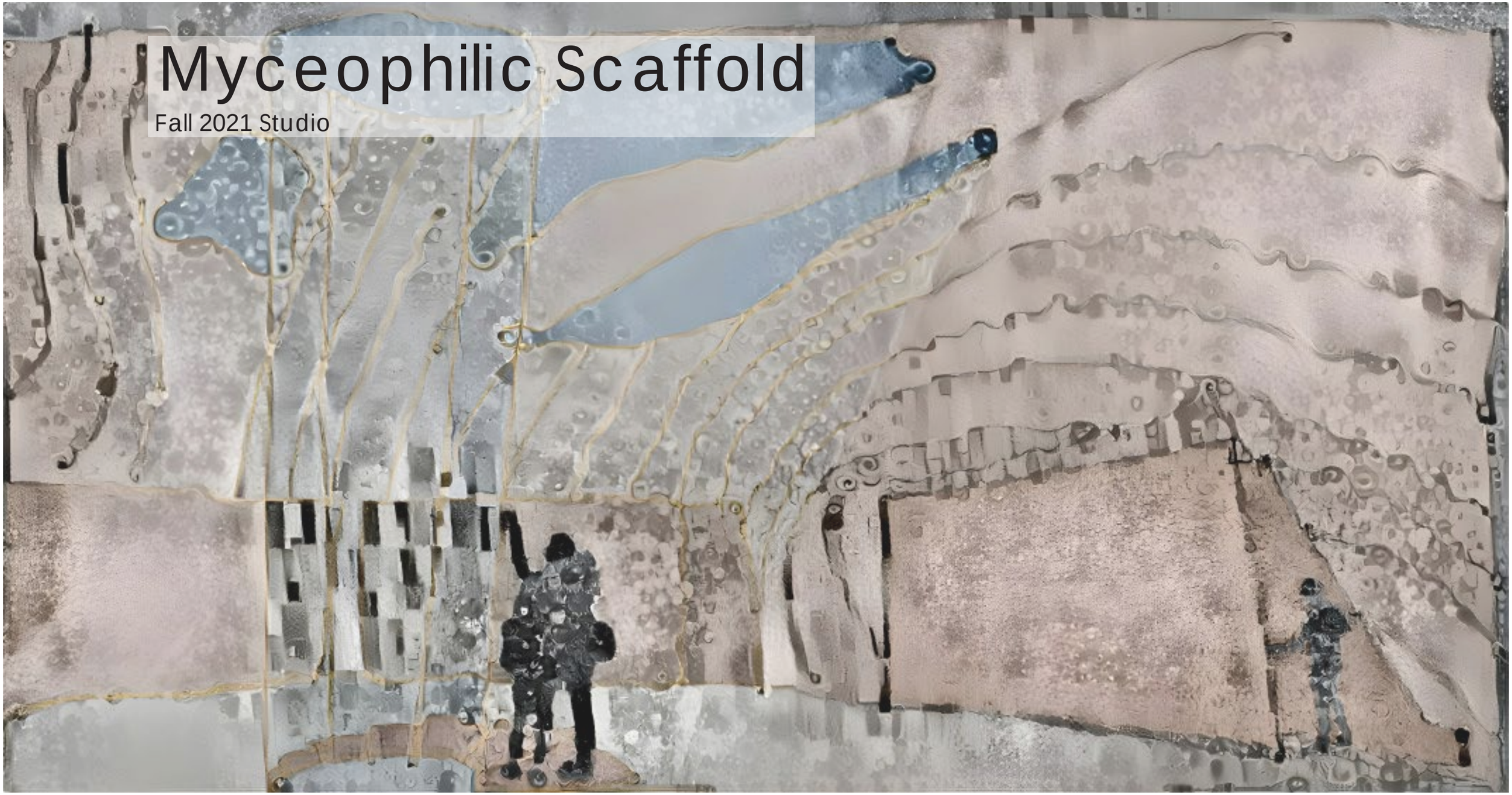


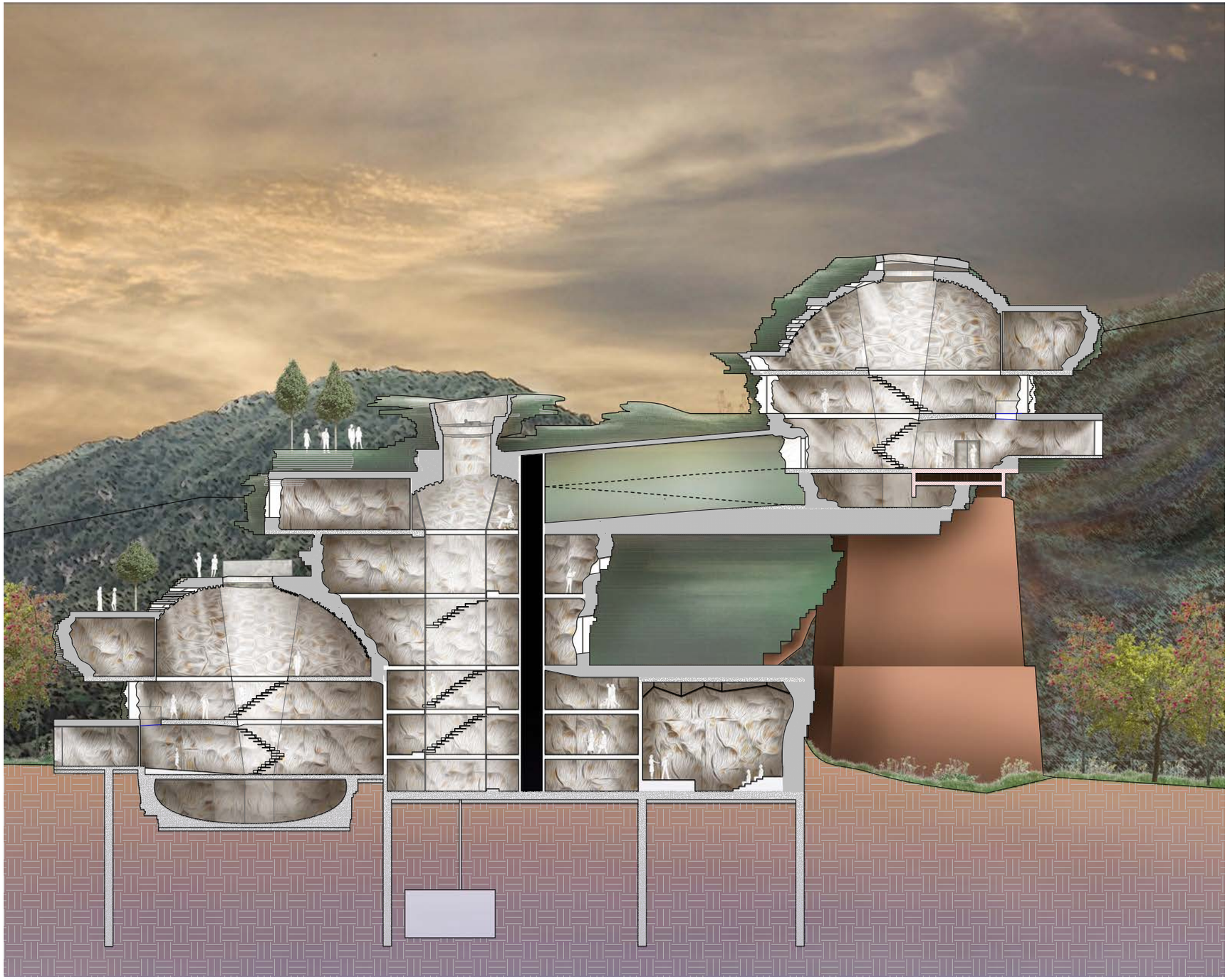




# Myceophilic Scaffold

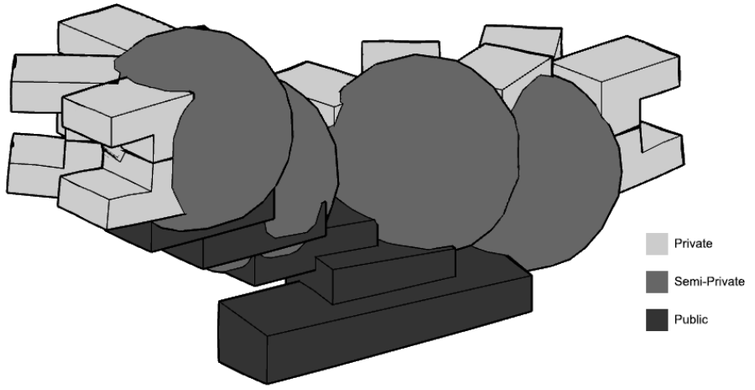
Fall 2021 Studio



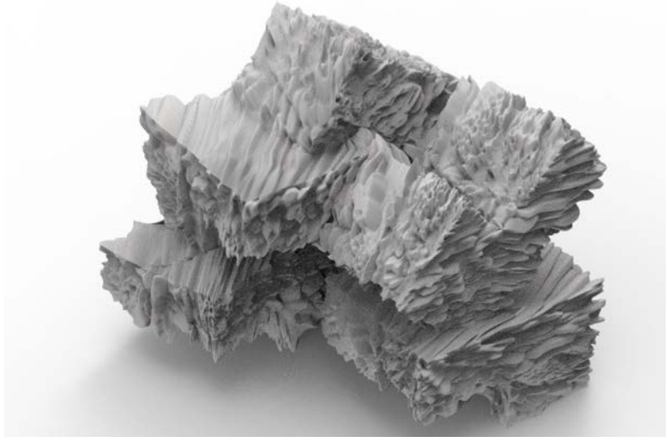


This project, a halfway house in Pittsburgh, aims to give inhabitants ownership, a sense of belonging, and agency. This will be achieved in part through the maintenance of the facade bioswale and mycelium interior panel systems. The public space extends from the ground level to the bridge, allowing for connection for everyone to Aspinwall from central Pittsburgh. A supportive community network will grow through various programs which encourage Pittsburgh residents to visit the building, such as a park and a gallery. Integrating the public into this building will help residents learn and adjust to life within a welcoming community. Strictly avoiding prison-like design choices (harsh light, sterile surfaces, grid based design, etc.) aims to make the building welcoming and comforting to residents. Generous amounts of light in semi private spaces from oculi create communal spaces that are exciting to be in and that encourage interaction. The oculi are also a passive cooling strategy. The thick walls provide a thermal mass to store solar heat for later use. The exterior of the building is a bioswale consisting of native plants to filter water. On site water collection and storage is used as grey water throughout the building and to maintain the bioswale when necessary.

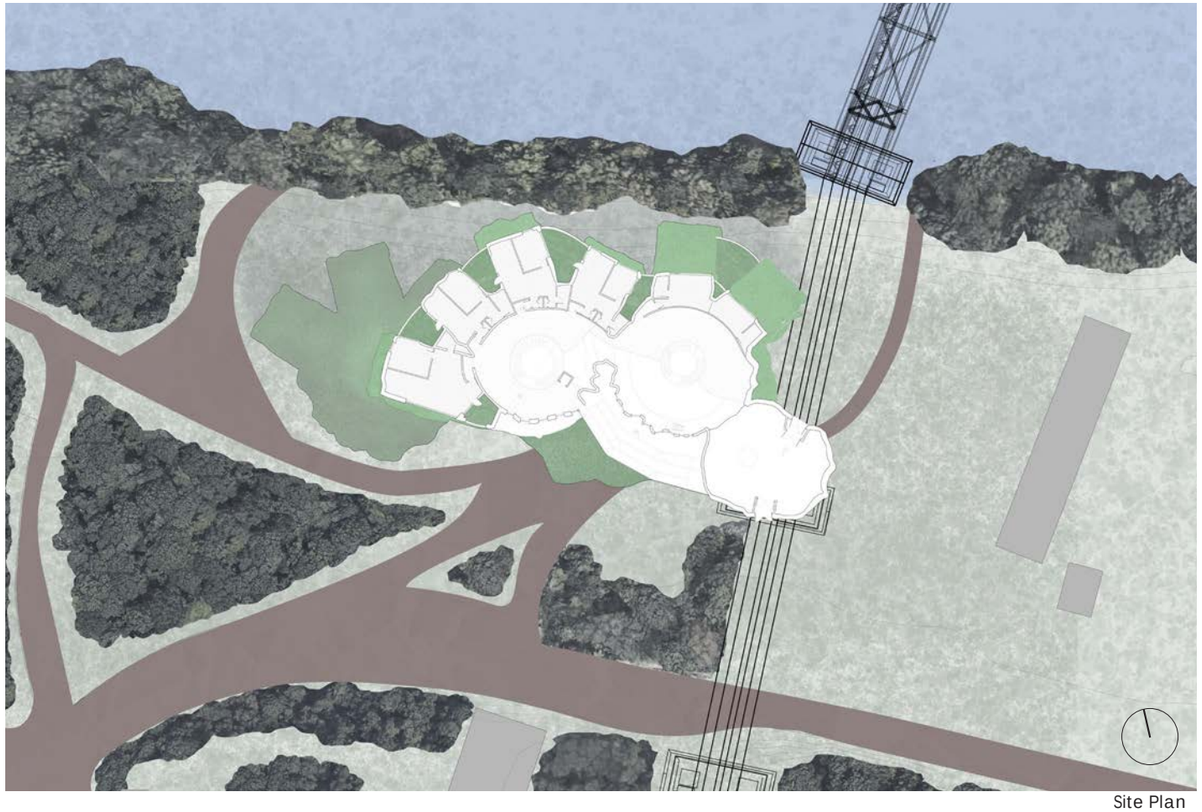

Public Space Diagram




Program Diagram

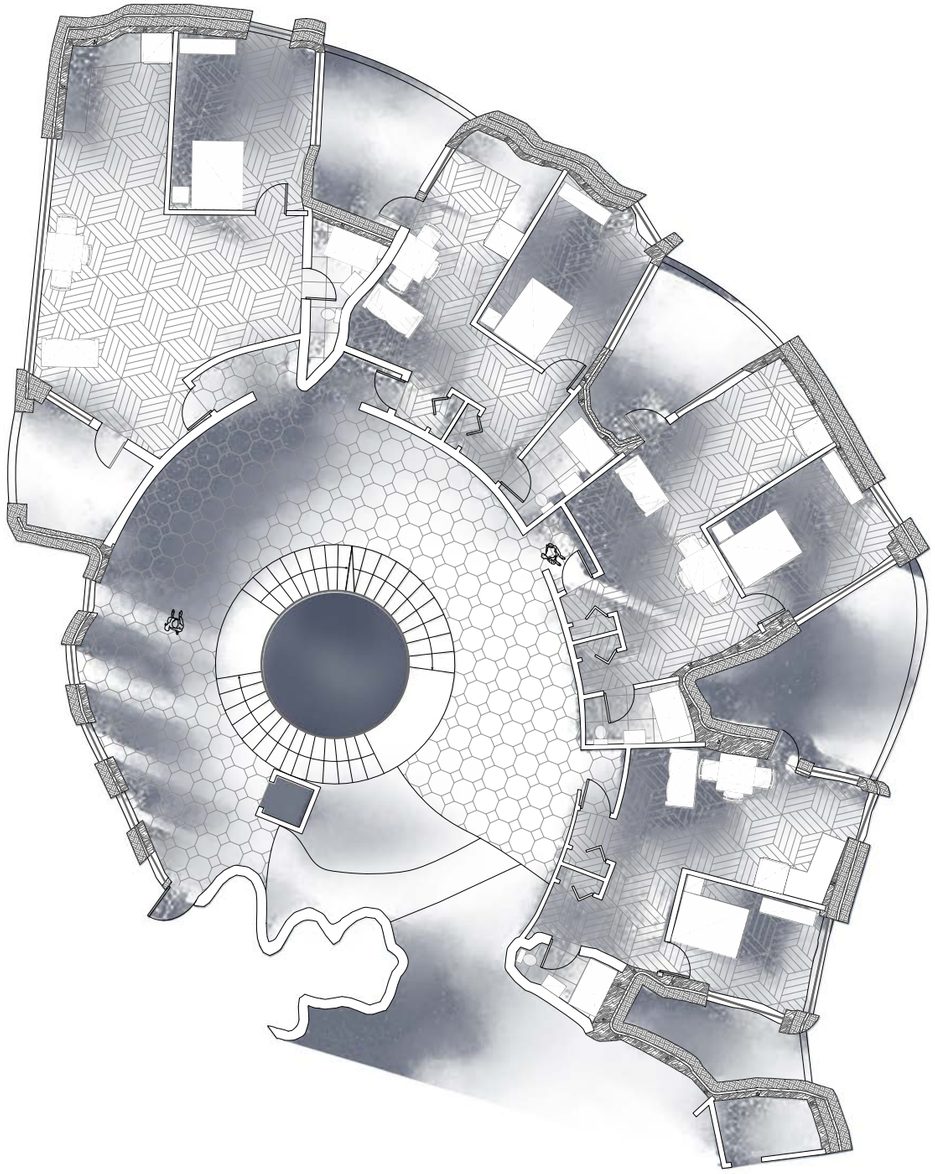


Texture Mapping Initial Test

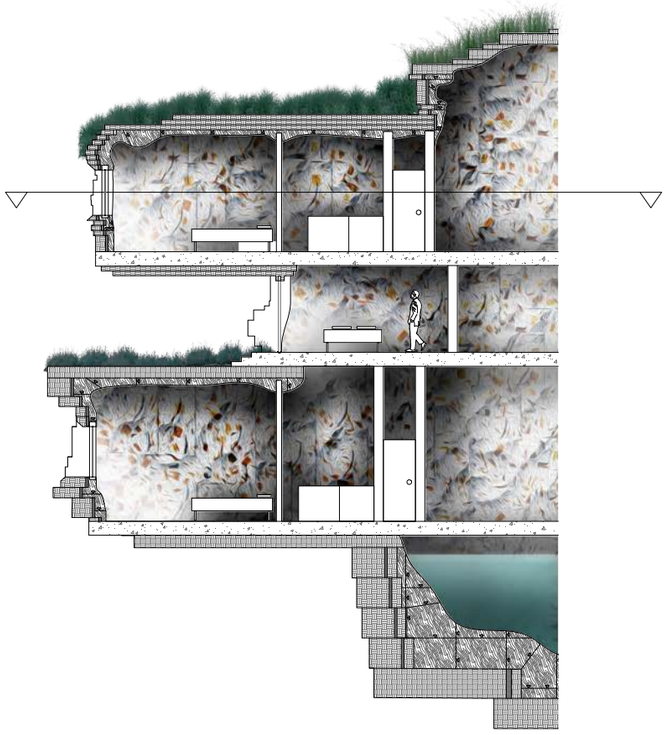


Site Plan

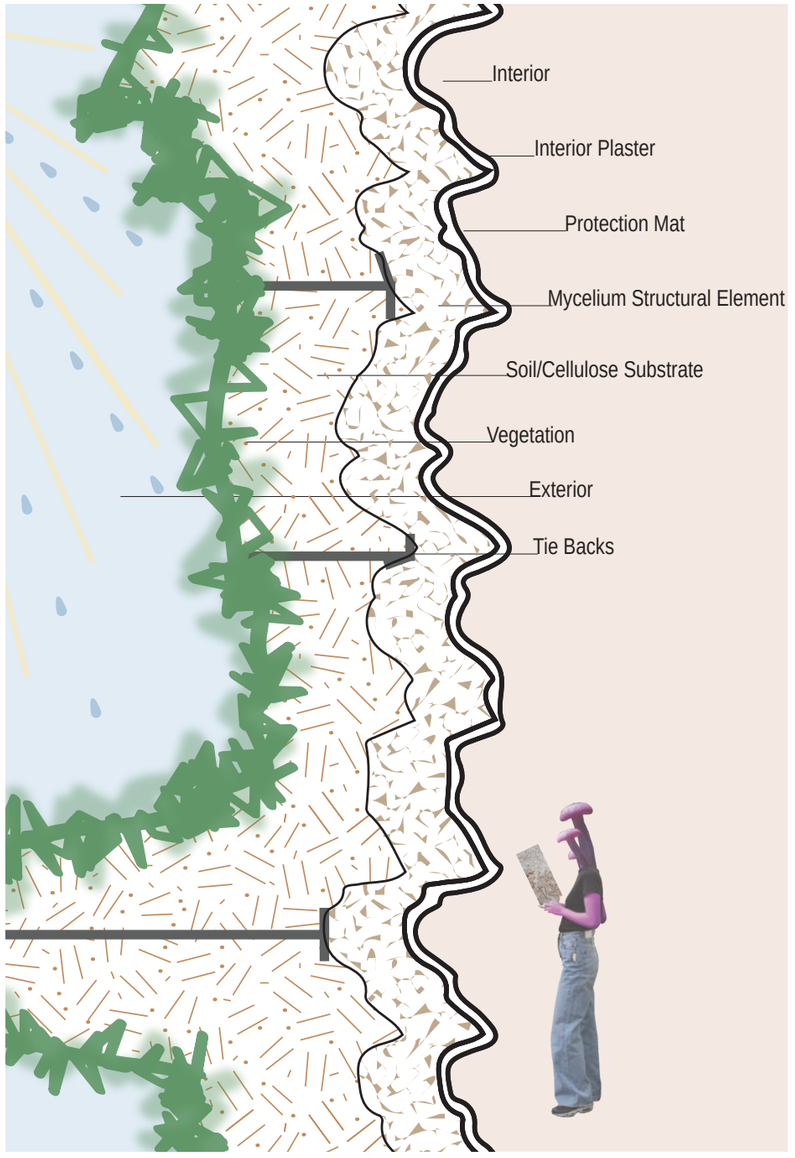
Study Model



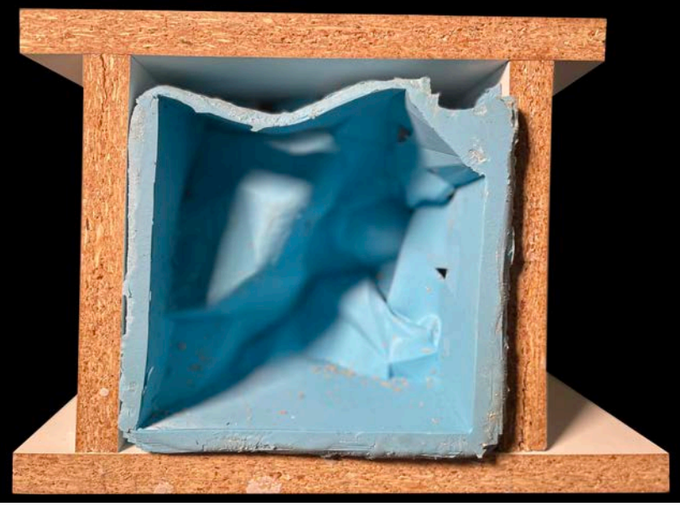
Plan

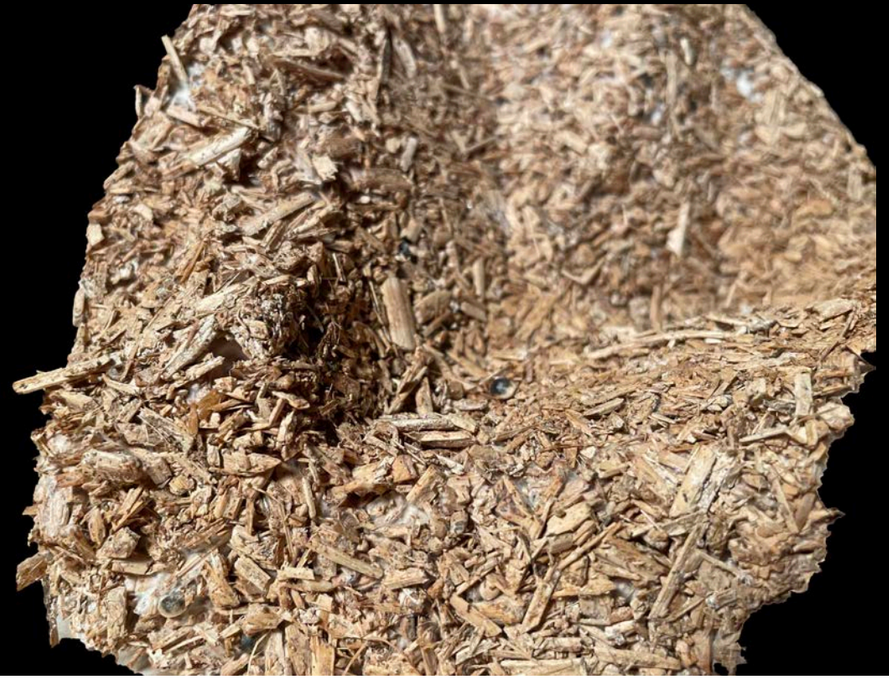


Section




Wall Section





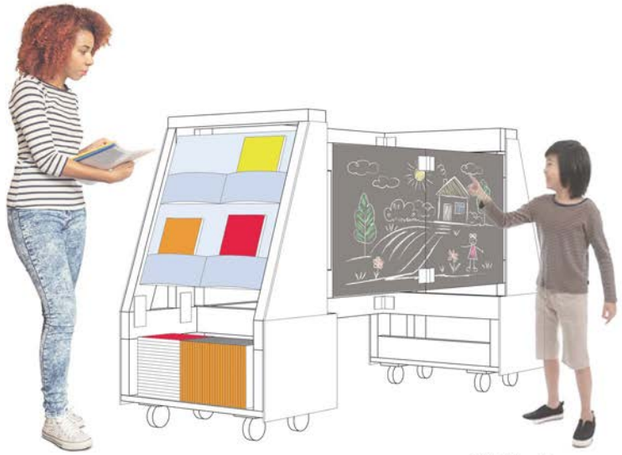
# Freedom By Design

## Mobile Library Project

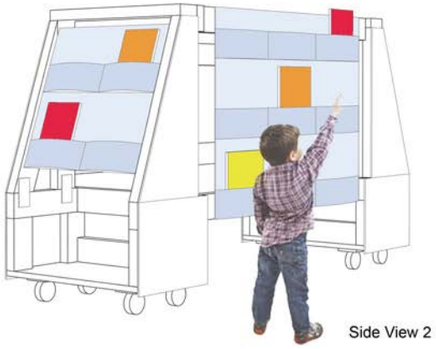
For this project, Carnegie Mellon University's chapter of Freedom By Design (FBD) partnered with Reading Ready Pittsburgh, a local community organization dedicated to promoting early childhood literacy. Having created little libraries for them the previous year, we already had an established relationship. A key aspect of their mission involves distributing books to children at public events throughout Pittsburgh. Typically, volunteers would set up tables stacked with books, however, this setup was not very engaging for young children choosing their books.

Reading Ready Pittsburgh approached us to design a more interactive and portable book display. The solution needed to be engaging for kids, operable by a single volunteer, showcase the book covers, and compact enough to fit in a car.

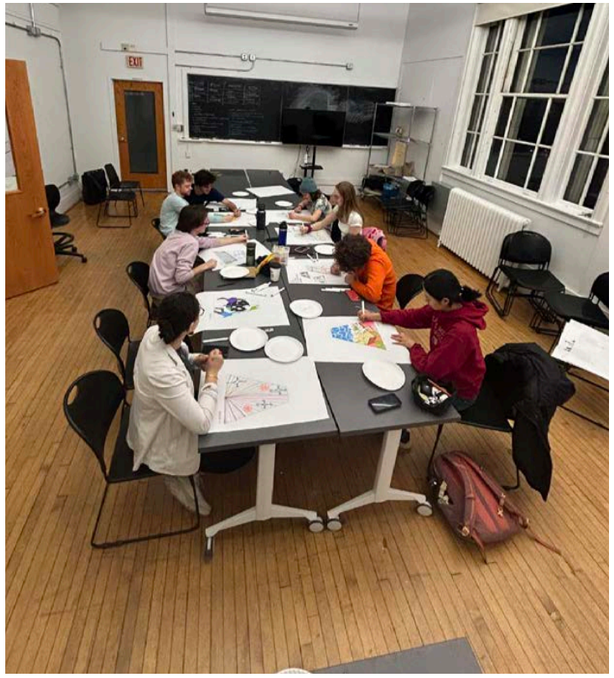
The FBD team held several design sessions and woodshop meetings to create the mobile library. The final design features an expandable, onsite assembly system that can adjust based on the number of books to be displayed. The structure, made from easily liftable 2x4 pieces, holds books in durable fabric pockets made of sturdy canvas. Panels on the sides are decorated with kid-friendly artwork designed by our team.

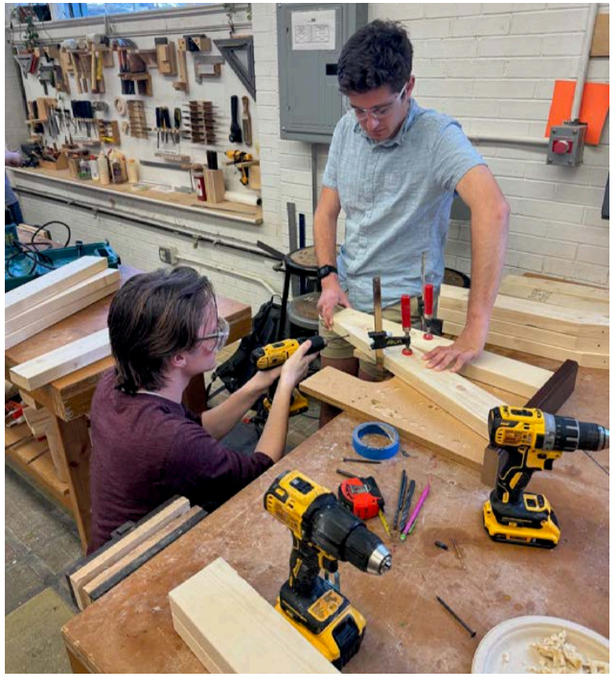


Side View 1



Side View 2



# Detroit Residence

Fall 2023 Studio

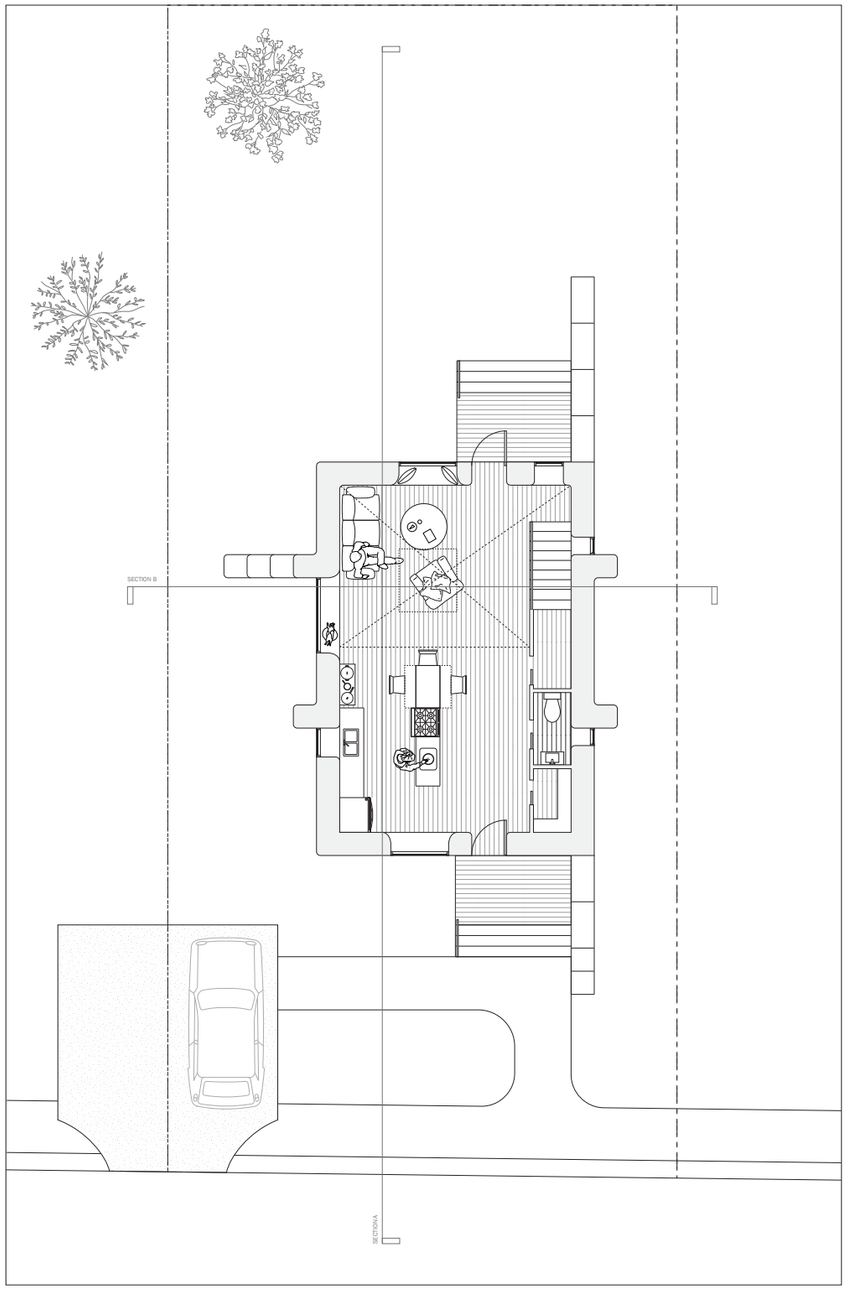
Located in a northwest neighborhood of Detroit, this house is designed to be a starter home for first time buyers to address the issue of wealth generation and the increasing financial difficulty of purchasing a home. Design choices were made with the needs of one/two people in mind. As a starter home, affordability was a driving factor in design choices; minimizing the square footage to 915 square feet, a reduced surface area to volume ratio for heating cost reduction, and a simple footprint to make construction simpler were major design decisions.

The materials of this house aim to be bio-based and limit toxic chemicals that are brought into the home. All exterior walls of the house are made of straw bales. Straw is a waste material that is burned to dispose of, which releases carbon into the atmosphere. Straw bales can be sourced locally, are relatively inexpensive, they insulate well, the straw wall assembly reduces the number of materials needed for a typical wall assembly, and their depth creates interesting spaces within the house. The bales are also structural. This limits the height of the house and requires structural horizontal bracing for more than one story, this accomplished through straw bale buttresses.

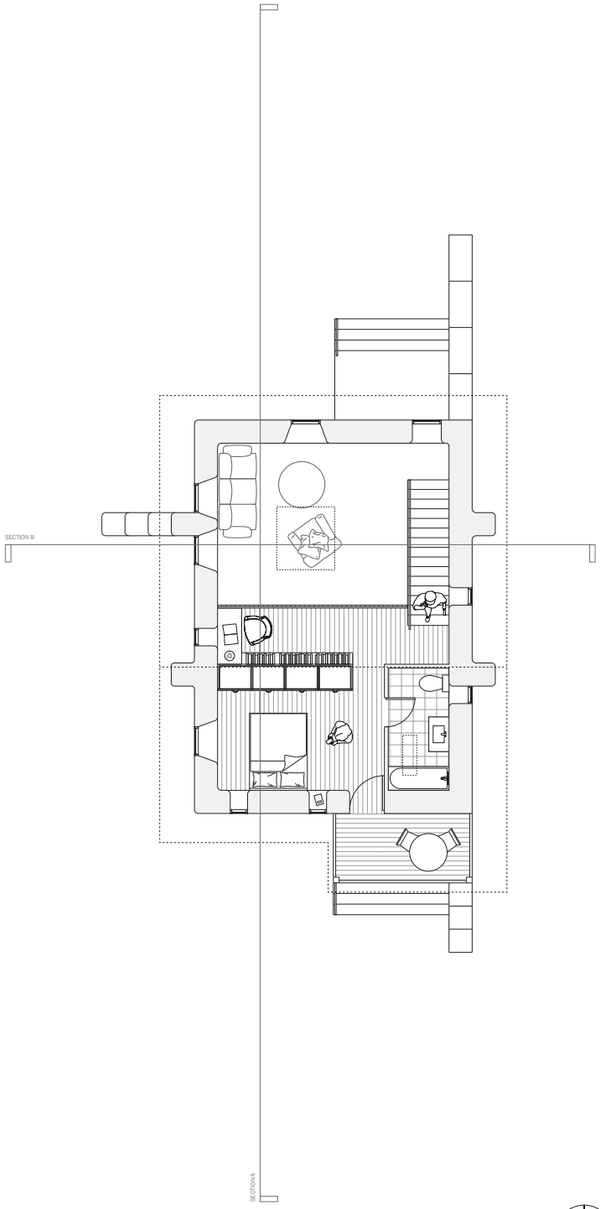
Typical to straw bale houses, the interior and exterior walls are plastered. This allows the windows and doors to have soft curves where they pierce through the wall

As straw has its limits, the floor, roof, and interior wall framing are typical timber construction. The topmost section of the wall also has a timber assembly to handle the roof slope.

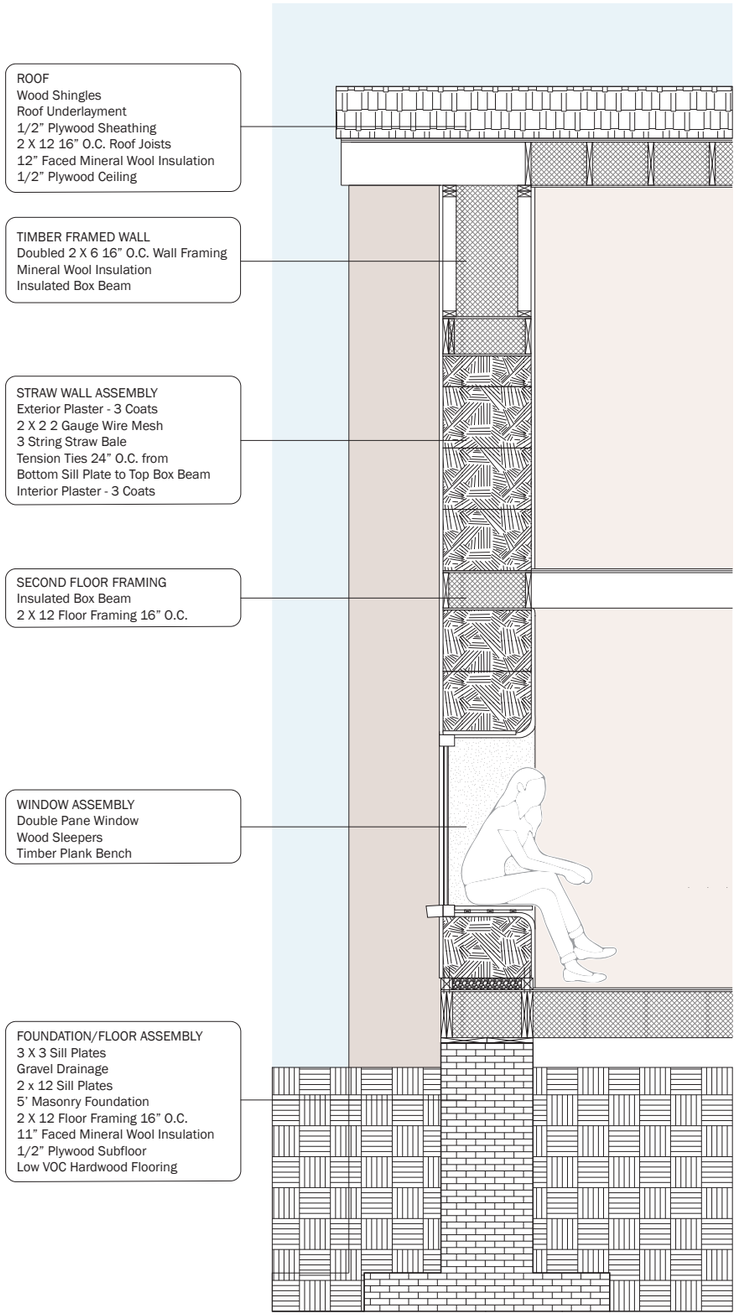
Using the BEAM tool, I roughly estimate that the house emits 23,350 lbs of carbon through its construction. The most intensive components are the brick foundation wall, plaster finishes, hardwood flooring, and windows. Calculations for how much carbon the straw sequesters vary widely. Even the lowest estimation, (20,853 lbs) nearly equates to the carbon emitted, and if the timber framing is factored in, the amount sequestered outweighs the amount emitted.



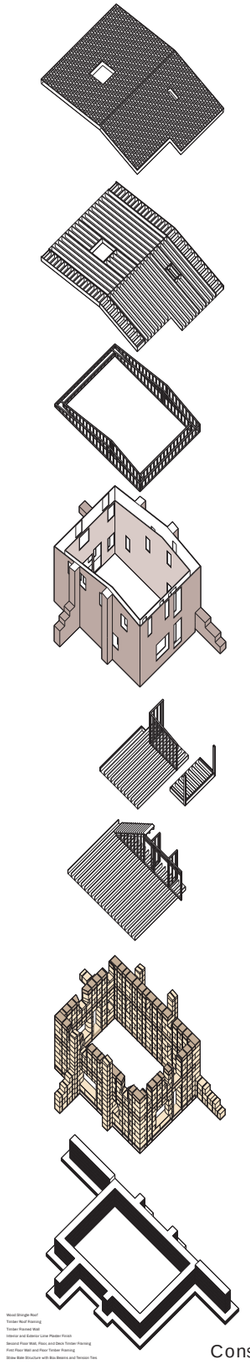

First Floor Plan



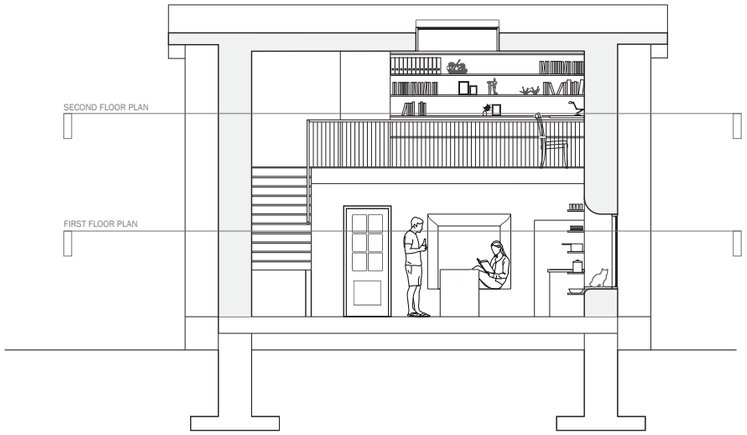

Second Floor Plan



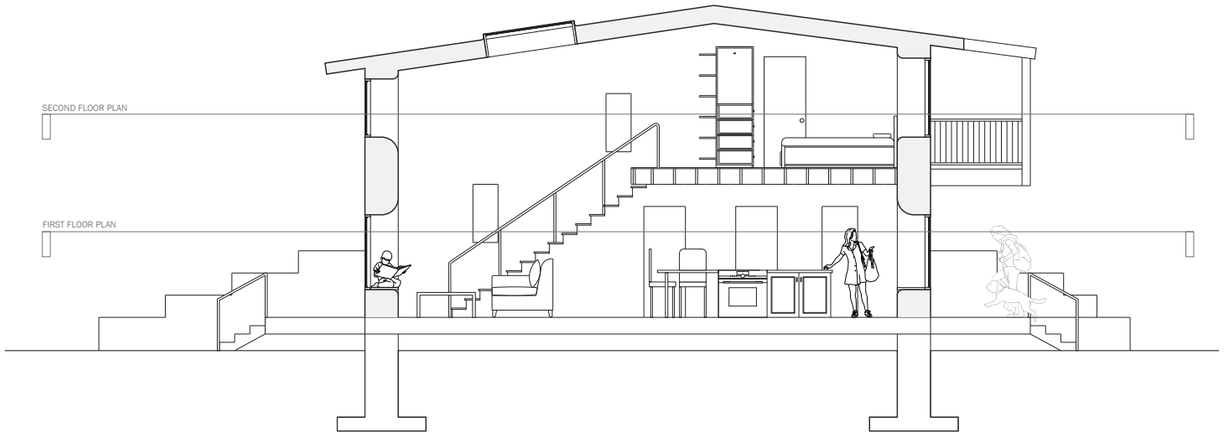

Wall Section




Construction Diagram




Transverse Section




Longitudinal Section

Interior Perspective

Window Bench Collage

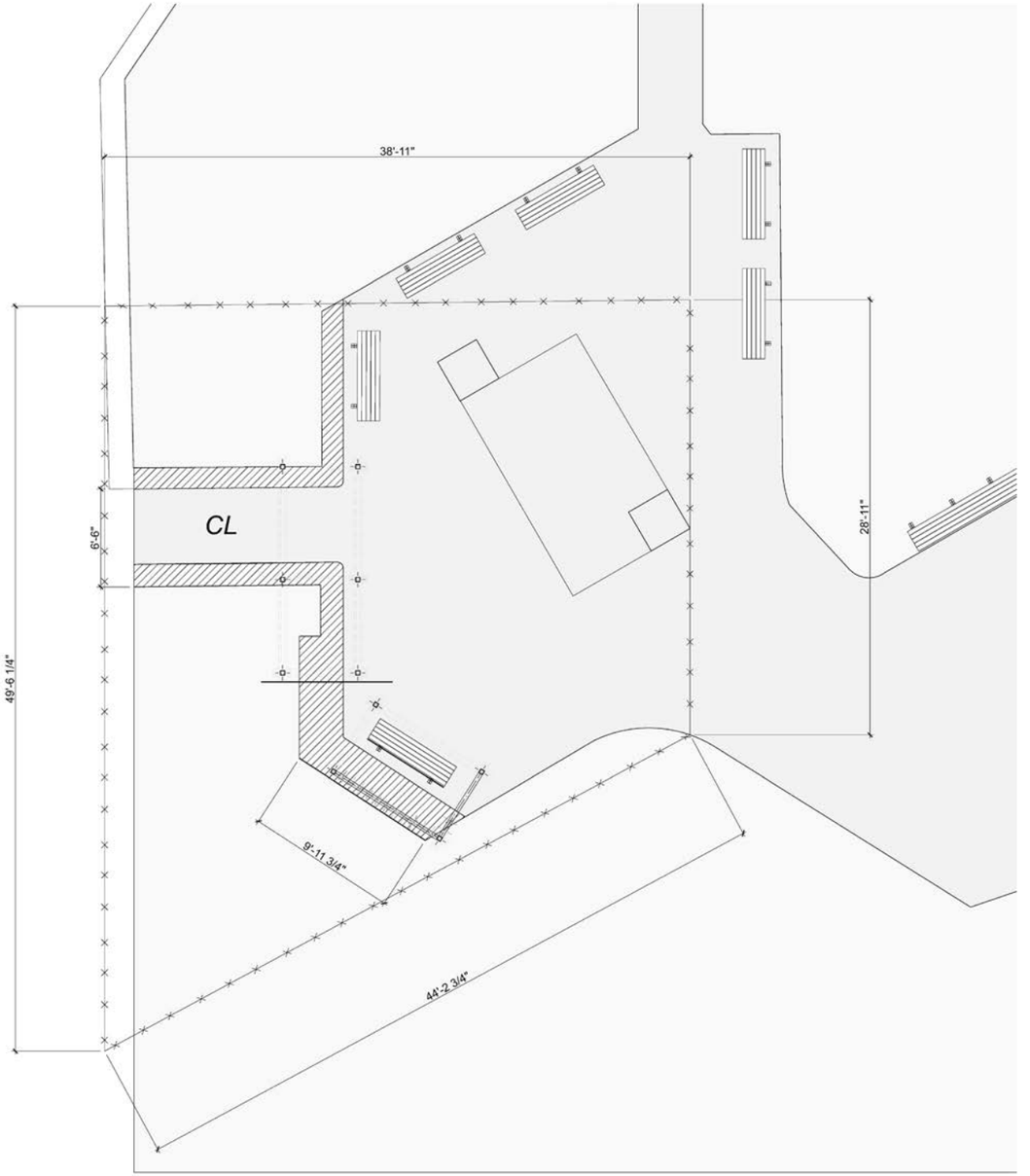
# Peace Garden Pergola

Spring 2024 Studio

The Peace Garden is located behind the Fine Arts building on the Carnegie Mellon Campus, it is a quiet area where students and faculty take breaks. Our studio team was tasked with building an outdoor structure to add to the relaxing atmosphere of the garden. With a timeline of 14 weeks, the design process was limited to 7 weeks, and it was built to completion before the end of the semester.

Located on the southern edge of the garden, the timber structure provides shade over an existing bench as well as a formal entry into the garden from the library. The entrance and the existing bench sandwich a new sitting area. Vine plants are planted at the corners of the posts so that they can creep up and curl around the roof structure to provide shade. The whole structure is joined with mechanical joints to be completely disassembleable. Black locust wood was chosen for its durability and to match the existing benches in the garden.

The group of students in this studio were from various years within architecture school, and we all learned how to work on a construction team with power tools on a job site. When mistakes were made, we learned from them, and they made the project better. After 7 weeks of challenging and demanding physical work, the project was completed. Several months later, the pergola is used frequently, students are often seen hanging out on the new seating, and eating lunch under the new private canopy.




1 Site Plan
SCALE: 1/4" = 1'-0"

0 2' 4' 8'

ARCHICAD EDUCATION VERSION

Design/ Build Studio

Carnegie Mellon University
School of Architecture

OWNER:
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5000 Forbes Ave
Pittsburgh, PA 15213

SoA FACULTY:
S.Lee
SoA STAFF:
J.Holmes
S.Sontag

COURSES:
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48-410
48-467
48-510

Design/ Build Studio Proposal for the Peace Garden

4919 Frew Street
Pittsburgh, PA 15213



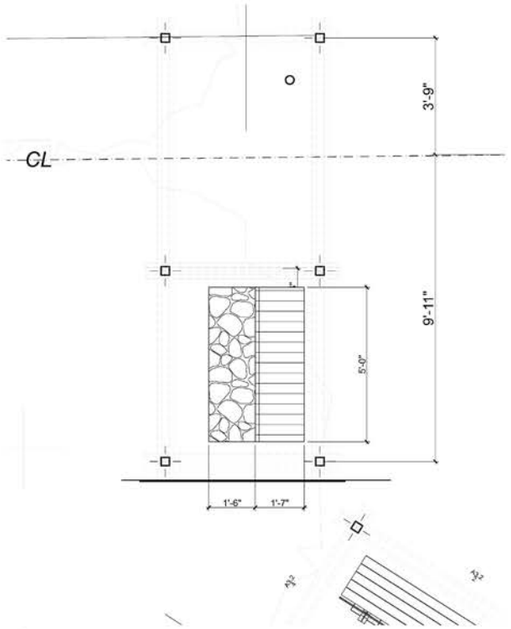
Project Number: **DBS–S24**
Drawn By:
Date: **02/22/2024**

| No. | Description | Date |
|---|---|---|

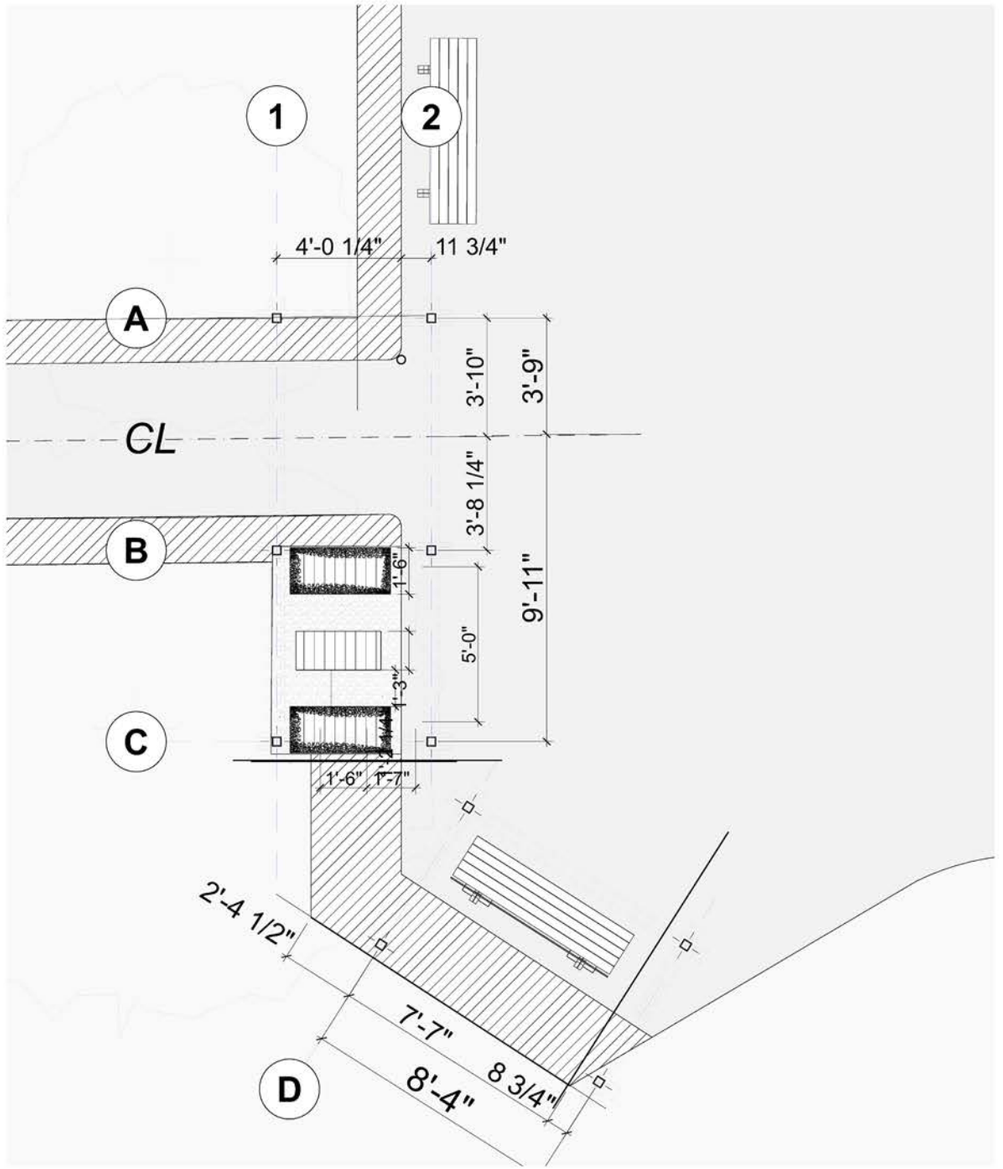
**MID-SEMESTER REVIEW**

**Site Plan**

Plot Date: 2/29/24, 11:11
Dwg No:
**L1.1**




2 Gabion Design Alternative
SCALE: 1/2" = 1'-0"




1 Ground Level Plan
SCALE: 1/2" = 1'-0"

ARCHICAD EDUCATION VERSION

Design/ Build Studio

Carnegie Mellon University
School of Architecture

OWNER:
Carnegie Mellon University
5000 Forbes Ave
Pittsburgh, PA 15213

SoA FACULTY:
S.Lee
SoA STAFF:
J.Holmes
S.Sontag

COURSES:
48-205
48-410
48-467
48-510

Design/ Build Studio
Proposal
for the
Peace Garden

4919 Frew Street
Pittsburgh, PA 15213



Project Number: **DBS–S24**
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| No. | Description | Date |
|---|---|---|
| | | |

**MID-SEMESTER REVIEW**

**Ground Level Plan**

Plot Date: 2/29/24, 11:11
Dwg No:
**A1.1**


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