



YINGYAO LU PORTFOLIO

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Selected Works

2020-2024

Portfolio Link: https://issuu.com/luyingyao0921/docs/portfolio_yingyao_lu

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Movie Theater Design
Academic Studio

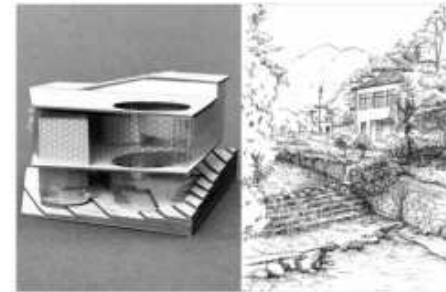
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PROFESSIONAL WORK



01

ECOSILIENT URBAN PATCHWORK

Mix-Used Housing Design, 2024
Academic Studio (Group Work)
University of Michigan
Site: Downtown, Detroit
Instructor: Lars Gräbner, Christina Hansen
Design Software: Revit(Buildings), Rhino(Landscape),
Adobe Suite, Lumion

EcoSilient Urban Patchwork is a community-driven residential project in downtown Detroit.

Urban Integration & Greenway Connectivity

- Transforms a dead-end street into a vibrant Greenway, reconnecting downtown to the riverfront.
- The Greenway weaves through the site, creating active communal spaces and enhancing pedestrian engagement.
- Two residential towers act as landmarks, transitioning into lower-rise areas to respect the neighborhood scale.

Human-Centered Living & Social Interaction

- Diverse unit typologies (from studios to townhouses) accommodate different lifestyles and backgrounds, fostering a sense of belonging.
- Communal terraces, shared spaces, and wide corridors encourage social engagement.
- Setbacks on commercial floors activate the Greenway with retail, cafés, a gym, and bicycle parking.

Sustainable & Eco-Friendly Design

- Hybrid concrete and CLT structure minimizes environmental impact.
- Wood shutter facades enhance shading and energy efficiency.
- Green roofs, solar panels, and community farms contribute to long-term sustainability.

SITE & FORM STRATGY



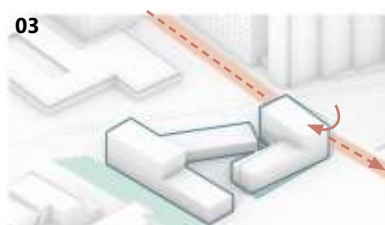
01 02



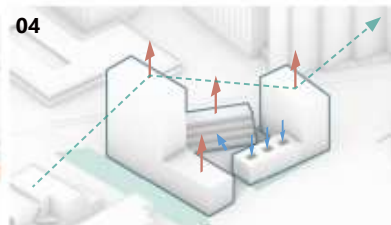
604 Abbott St, Detroit, MI 48226



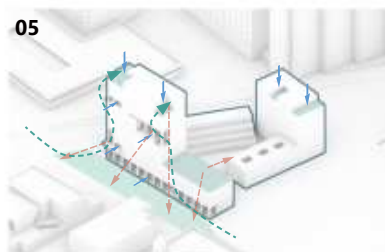
Define the boundaries of the site.



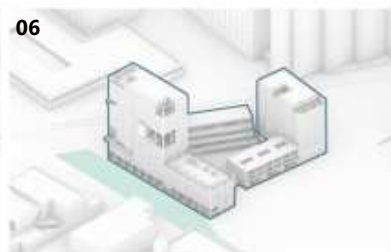
Rotate the residential tower to maintain consistent orientation with the street.



Two towers → Landmarks & Responding to the height of neighboring buildings.



Locate collective space. Push back and Interact with greenway.

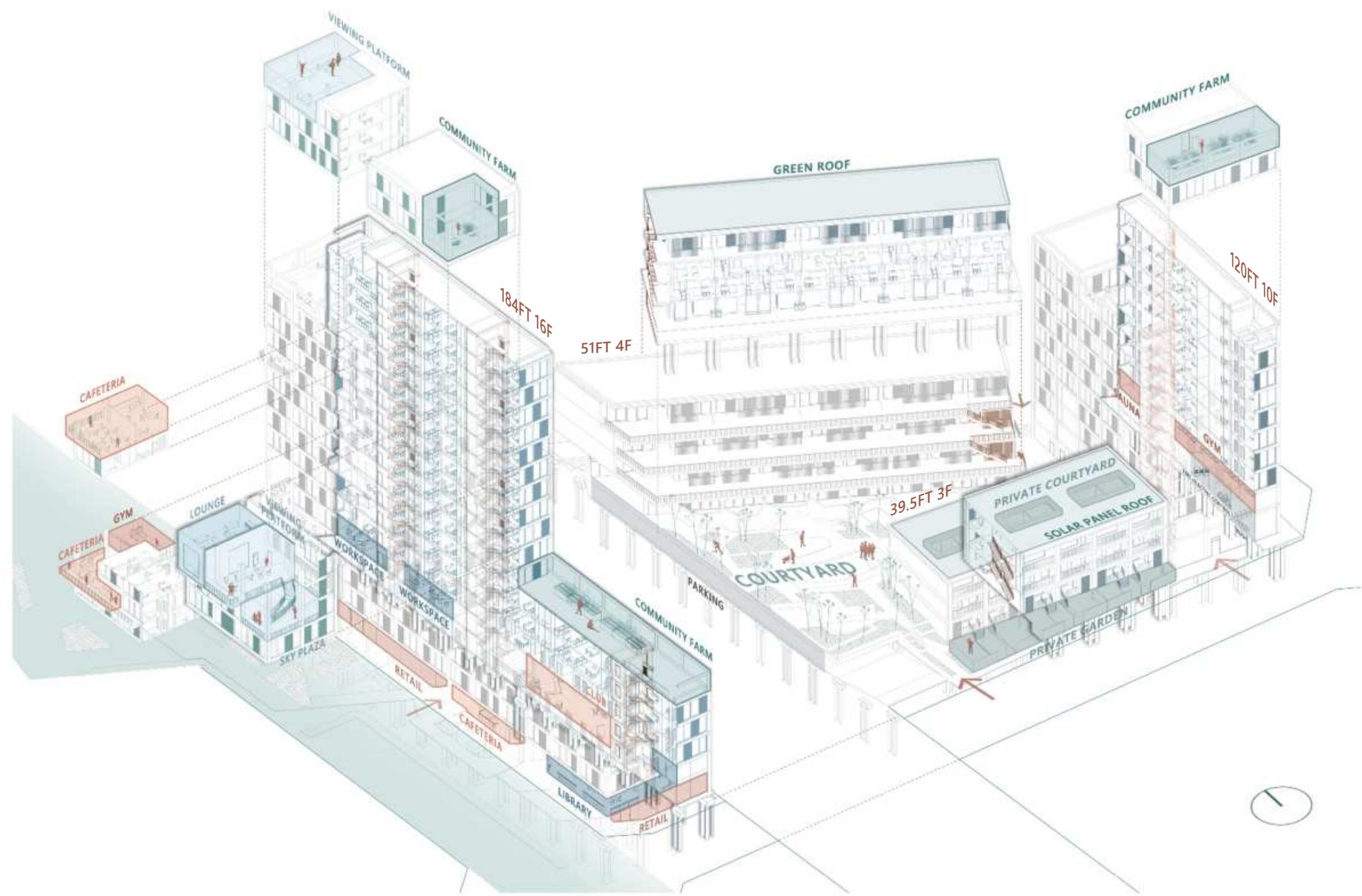


2 Towers+ Terrace+ Townhouse

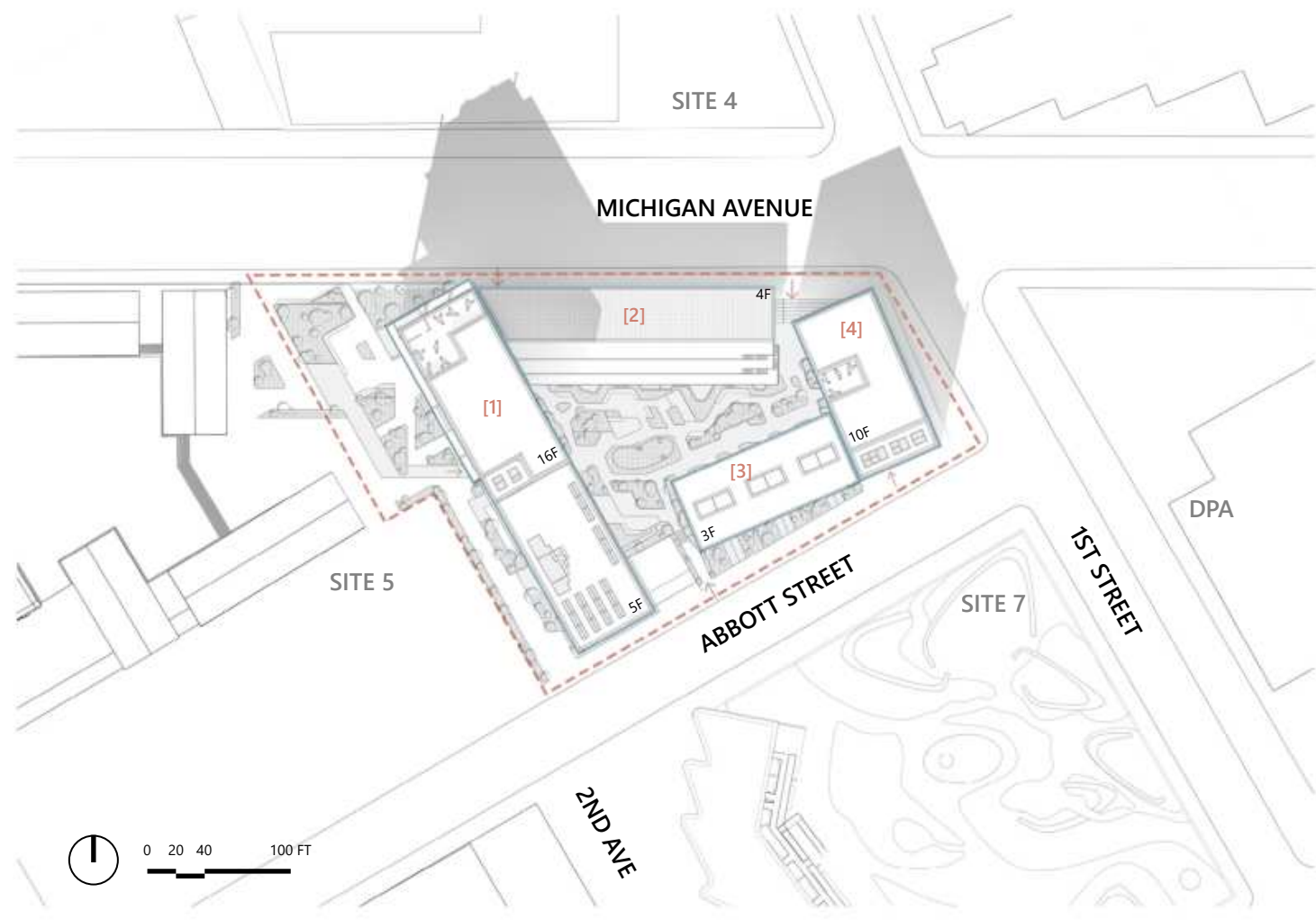
PROGRAMS

Site Area: 78,060 sq ft (1.79 acres)
 Total Gross Floor Area (GFA): 343,565 sq ft
 FAR: 4.4
 Building Footprint: 64,445 sq ft

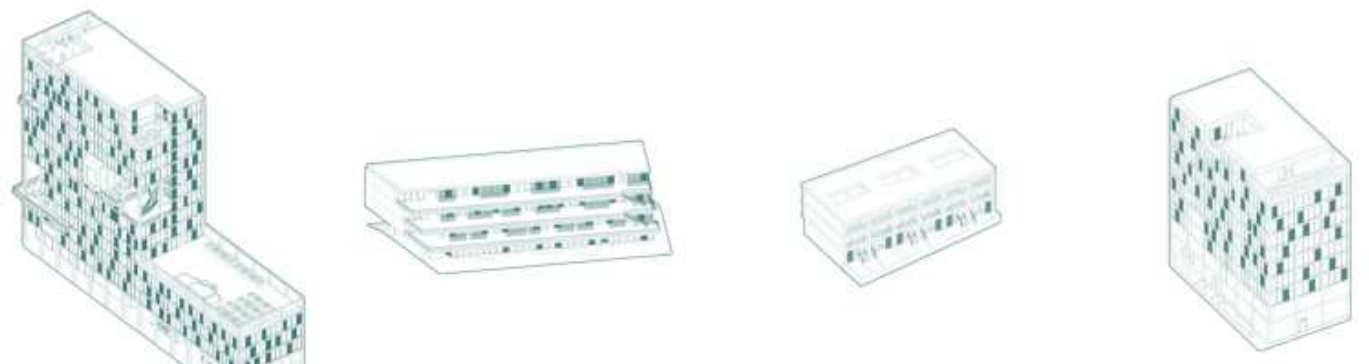
Lot Coverage Percentage: 82.56%
 Building Height: 184 ft
 Unit Count: 256
 Parking Space: 47



SITE PLAN



BUILDING TOPOLOGY



[1] TOWER A

[2] TERRACE

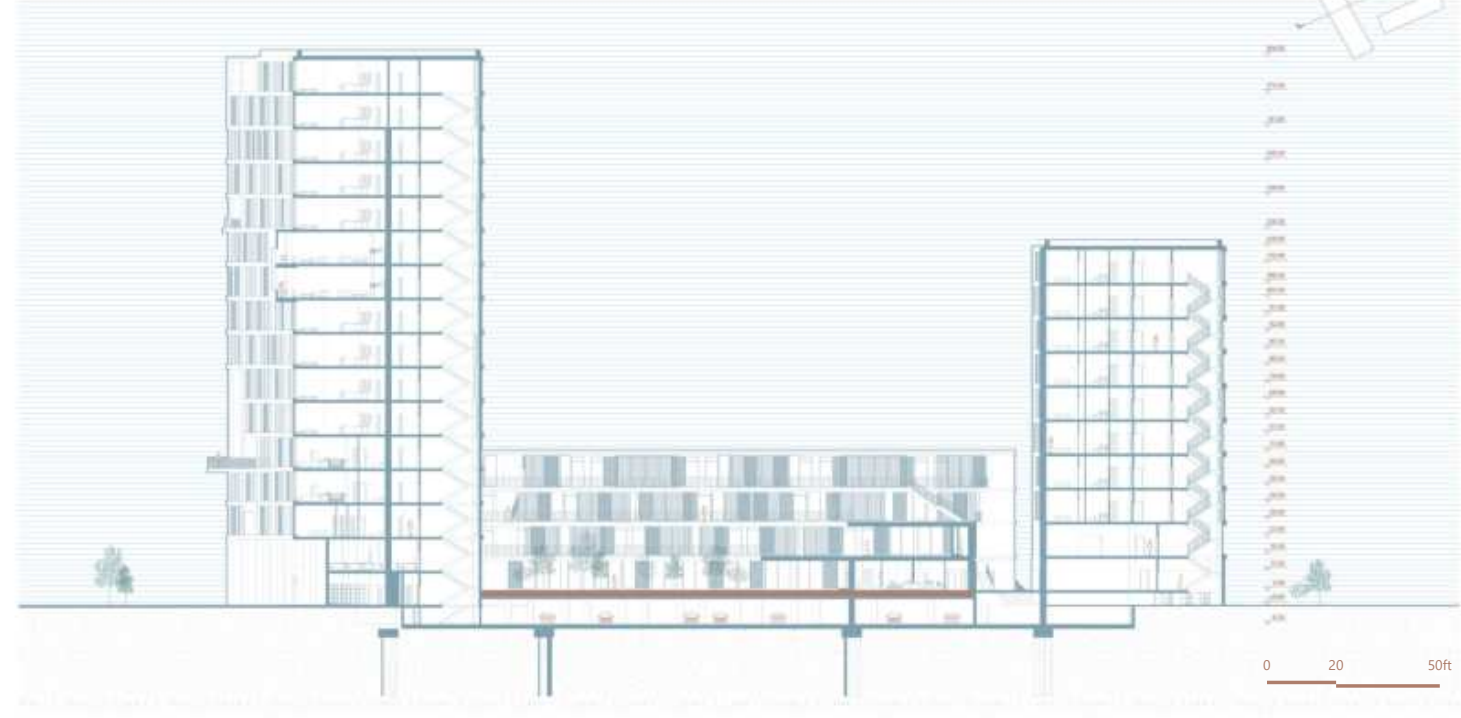
[3] TOWNHOUSE

[4] TOWER B

VIEW FROM ABBOTT STREET



SITE SECTION

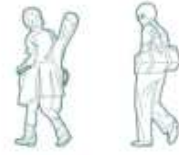


UNIT TYPOLOGY

TOWER A+B

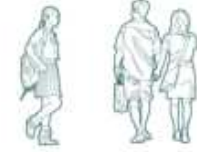


STUDIO



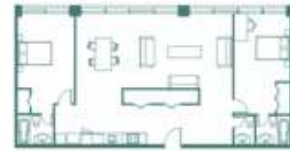
Area: 500 sf
User: Students/Single Individuals/
Creative individuals

1B1B



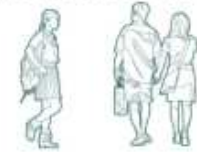
Area: 600 sf
User: Students/Single Individuals/
Young Couples

2B2B



Area: 1250 sf
User: Students/Small Families/
Families with Elderly Parents

1B1B



Area: 600 sf
User: Students/Single Individuals/
Young Couples

3B3B



Area: 1600 sf
User: Shared Living/ Larger
Families/ Multi-Generations

TOWNHOUSE



Area: 3000 sf
User: Larger Families/ Multi-
Generations

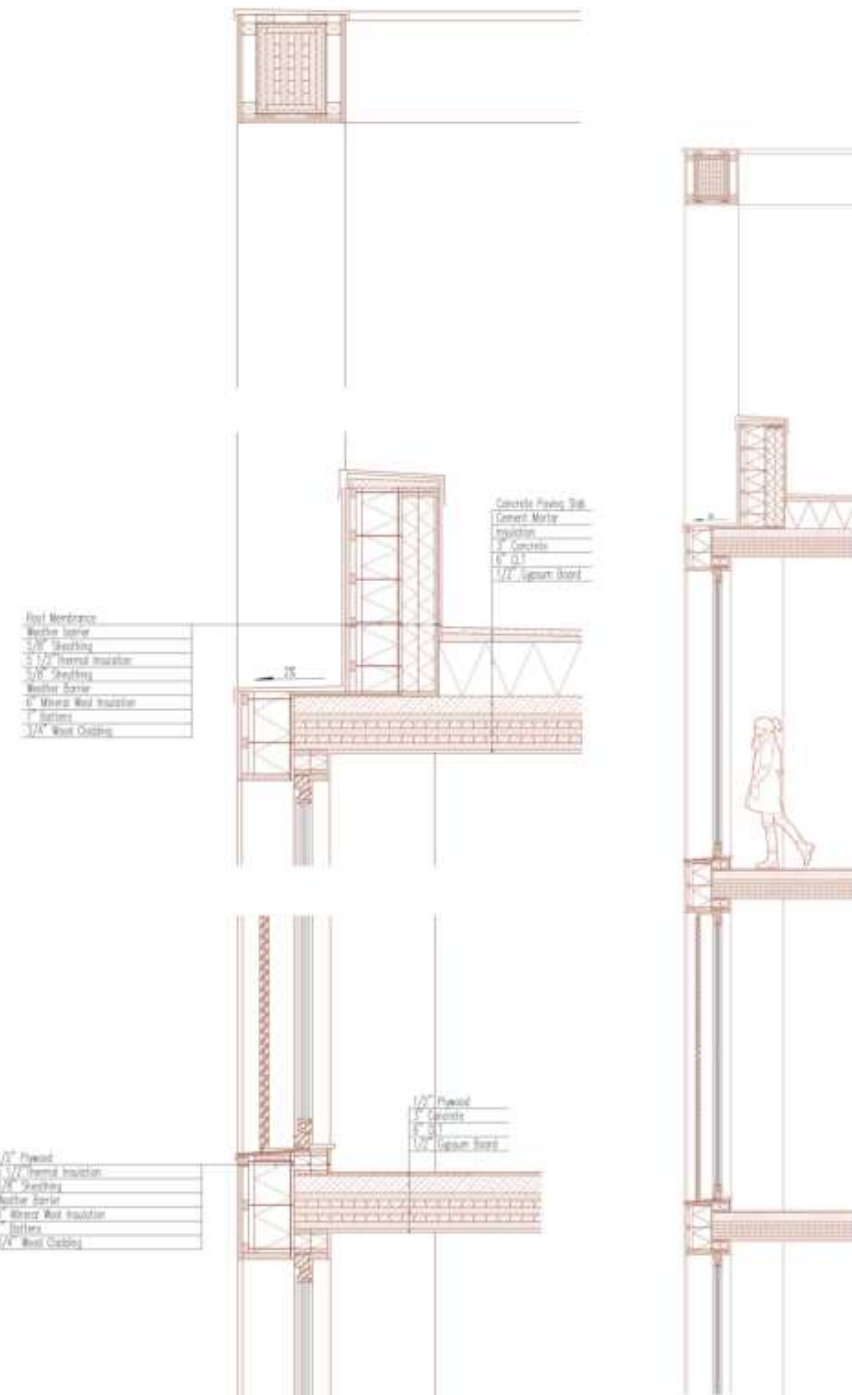
TERRACE



TOWNHOUSE



TOWER 1 FACADE DETAILED SECTION



3/8"=1'

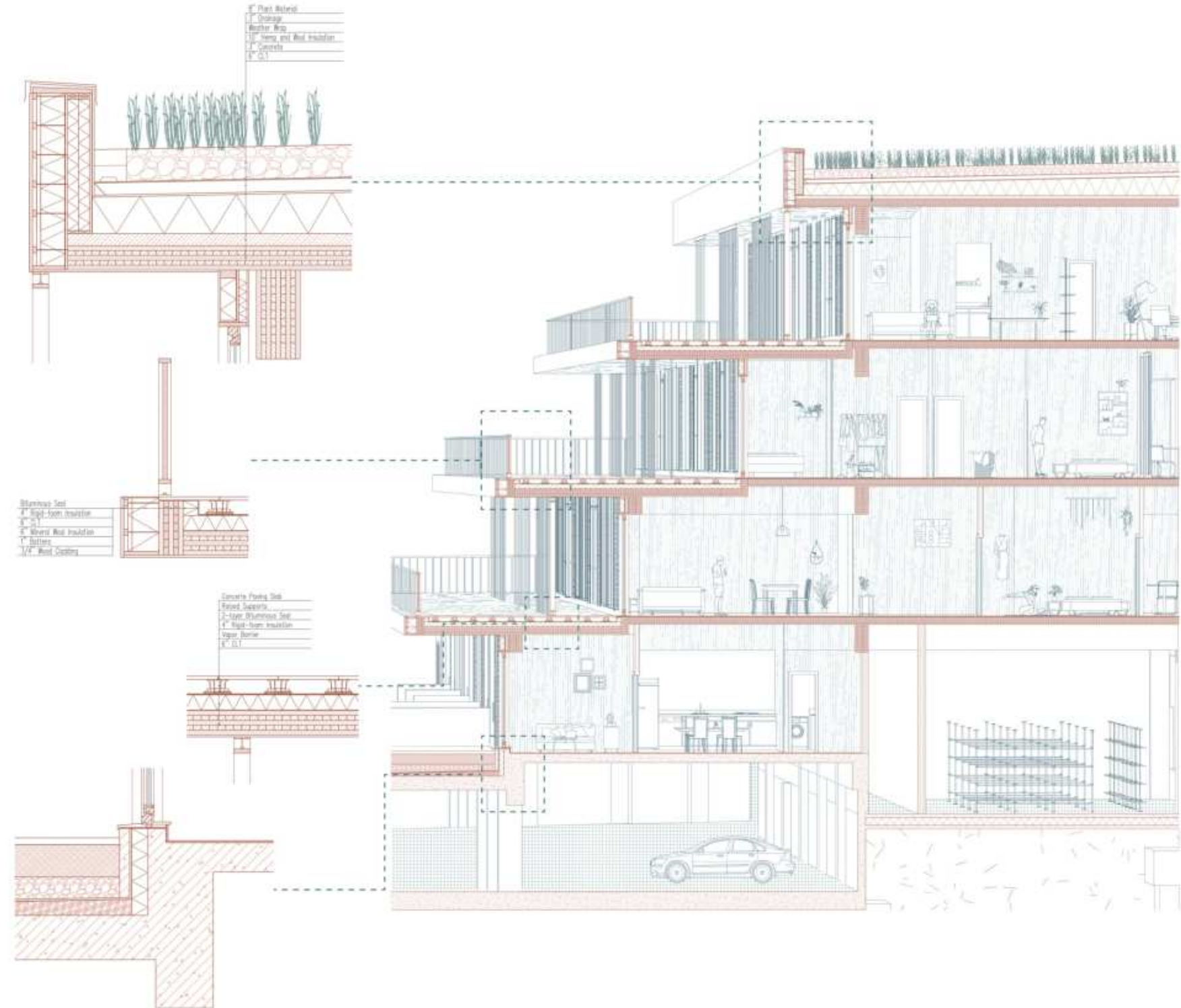
3/16"=1'



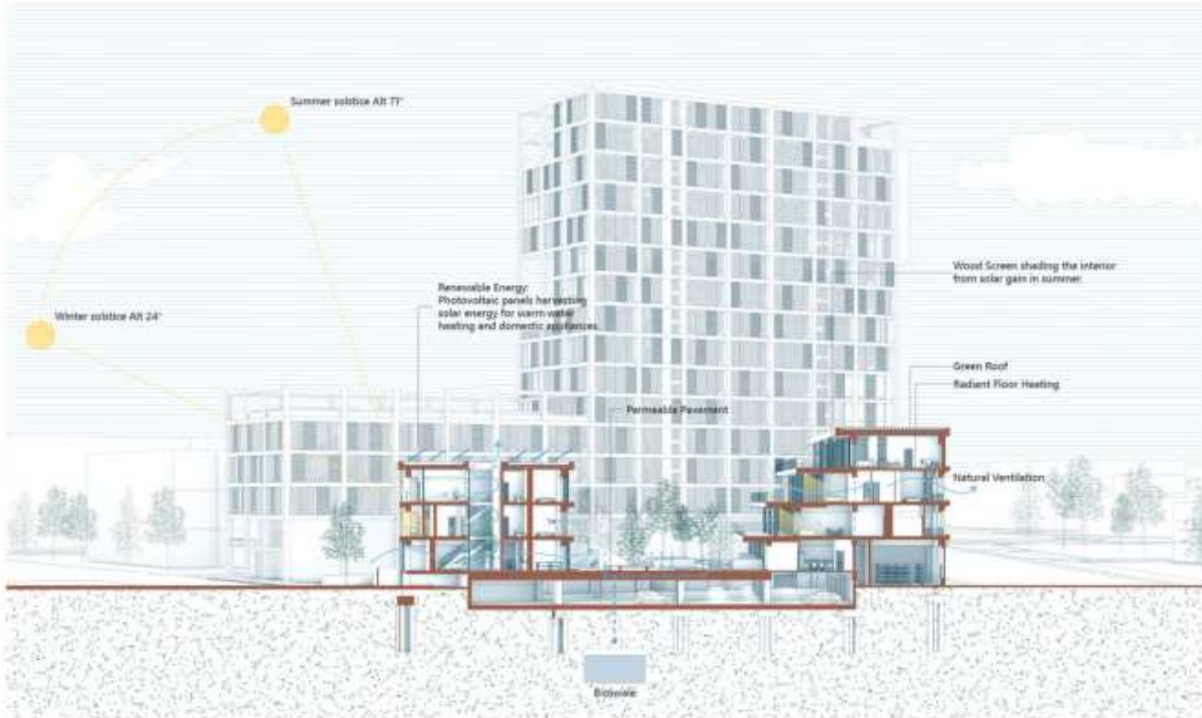
VIEW FROM COURTYARD



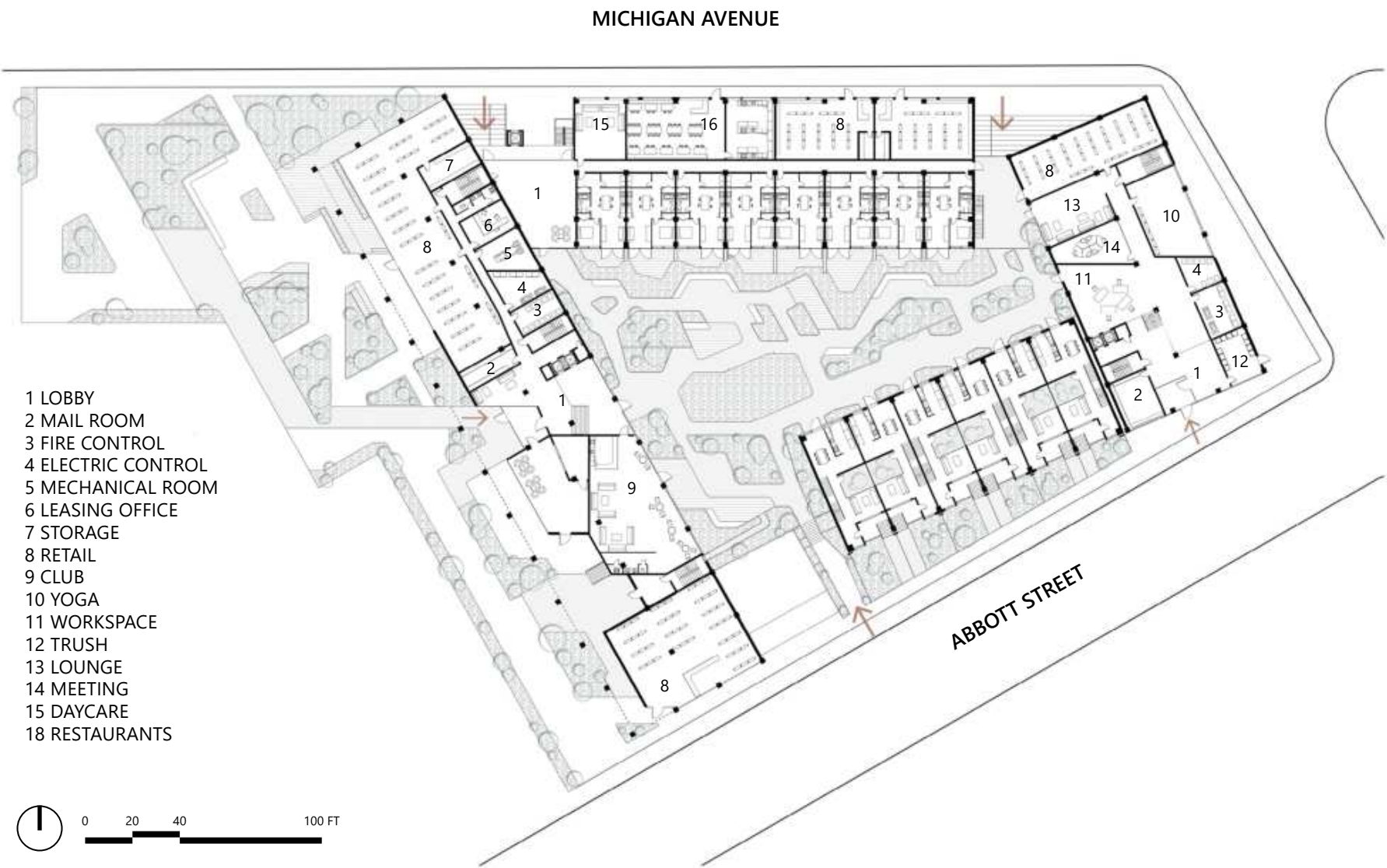
TERRACE FACADE DETAILED SECTION



ENVIRONMENTAL SYSTEM

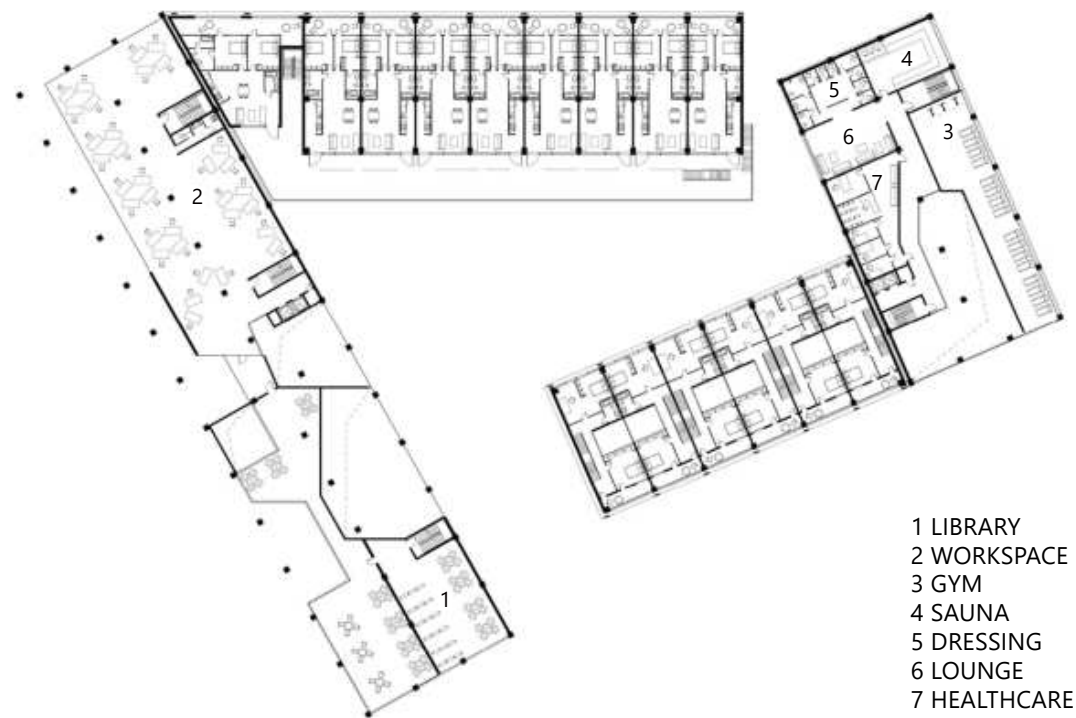


FLOOR PLAN



- 1 LOBBY
- 2 MAIL ROOM
- 3 FIRE CONTROL
- 4 ELECTRIC CONTROL
- 5 MECHANICAL ROOM
- 6 LEASING OFFICE
- 7 STORAGE
- 8 RETAIL
- 9 CLUB
- 10 YOGA
- 11 WORKSPACE
- 12 TRUSH
- 13 LOUNGE
- 14 MEETING
- 15 DAYCARE
- 18 RESTAURANTS

FLOOR PLAN-GROUND FLOOR

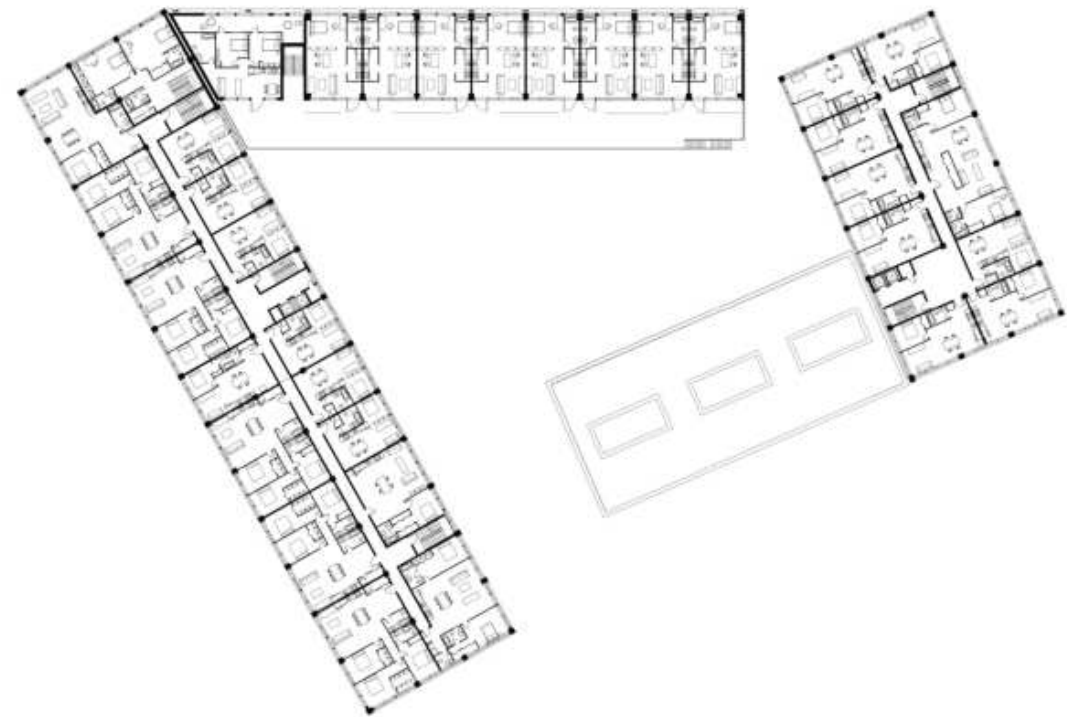


- 1 LIBRARY
- 2 WORKSPACE
- 3 GYM
- 4 SAUNA
- 5 DRESSING
- 6 LOUNGE
- 7 HEALTHCARE

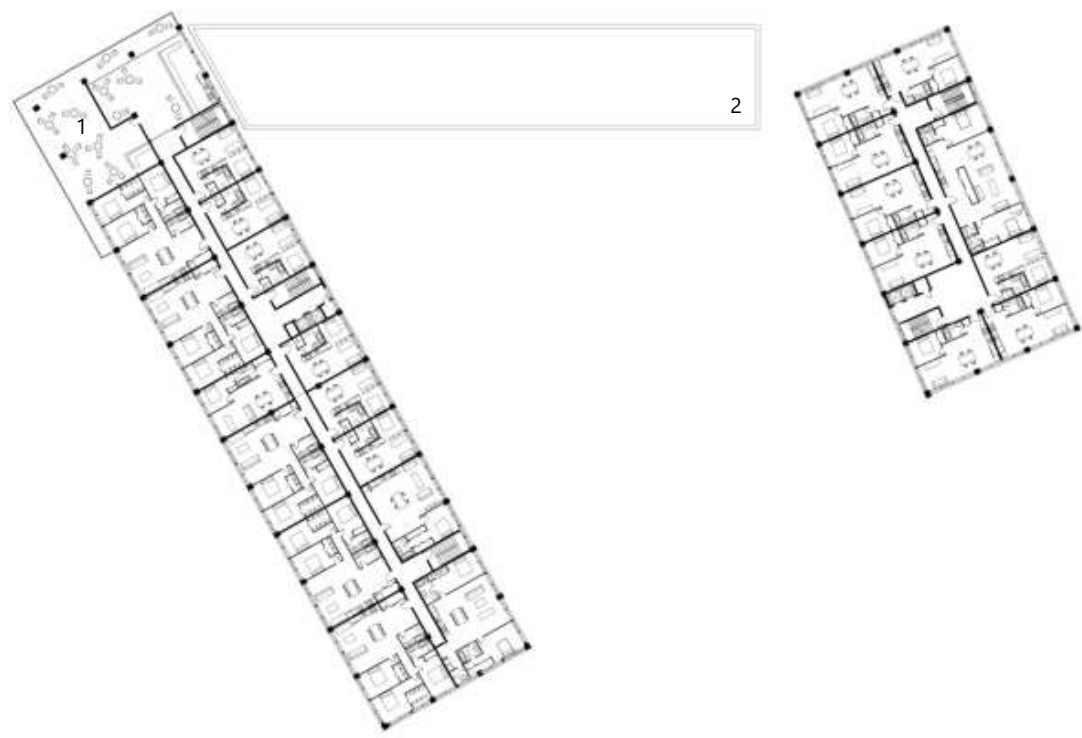
FLOOR PLAN-LEVEL 2



FLOOR PLAN-LEVEL 3

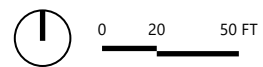


FLOOR PLAN-LEVEL 4



FLOOR PLAN-LEVEL 5

1 CAFE
2 GREENROOF



GREENWAY VIEW FROM BUILDING ENTRANCE



VIEW FROM TERRACE





02

BOYNE FALLS SKI RESORT

High Performance Building Design, 2024

Elective Course

University of Michigan

Site: Boyne Falls, Michigan

Instructor: Lars Junghans

Design Software: Revit, Grasshopper(Ladybug),
AutoCAD, Adobe Suite, Lumion

This project explores the integration of sustainable materials and energy-efficient strategies to create a high-performance ski hotel in Boyne Falls, North Michigan (Climate Zone 6A).

Sustainable & Energy-Efficient Solutions

- Hemp wool insulation for high thermal efficiency and reduced embodied carbon.
- South-facing angled balconies to maximize sunlight exposure and thermal comfort.
- CLT + concrete core on the ground floor for stability, with lightweight stick-frame construction on upper floors to reduce structural load and material use.

Passive Design & Energy Systems

- PV panels & high-efficiency HVAC systems minimize energy consumption.
- Air-to-water VRF heat pumps & mechanical ventilation ensure optimal indoor climate control across all seasons.

Integration & User Experience

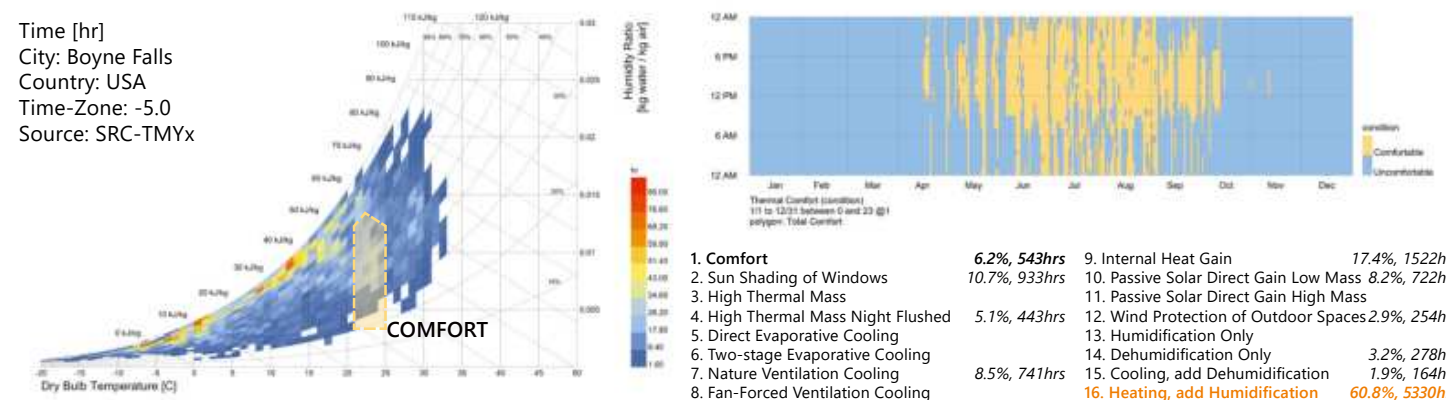
- Public terraces and communal spaces enhance guest experience and strengthen indoor-outdoor connectivity.
- Wood cladding blends the hotel into its natural surroundings.

SITE LOCATION



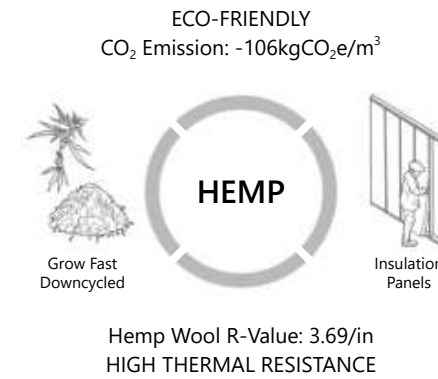
PSYCHROMETRIC CHART

Time [hr]
 City: Boyne Falls
 Country: USA
 Time-Zone: -5.0
 Source: SRC-TMYx

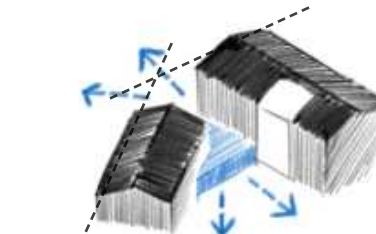


CLIMATE ZONE: 6A

Design Strategies in Psychrometric Chart:
HEATING 60.8%



Determine the building's orientation based on the slope and ski trails' direction to achieve the best views.



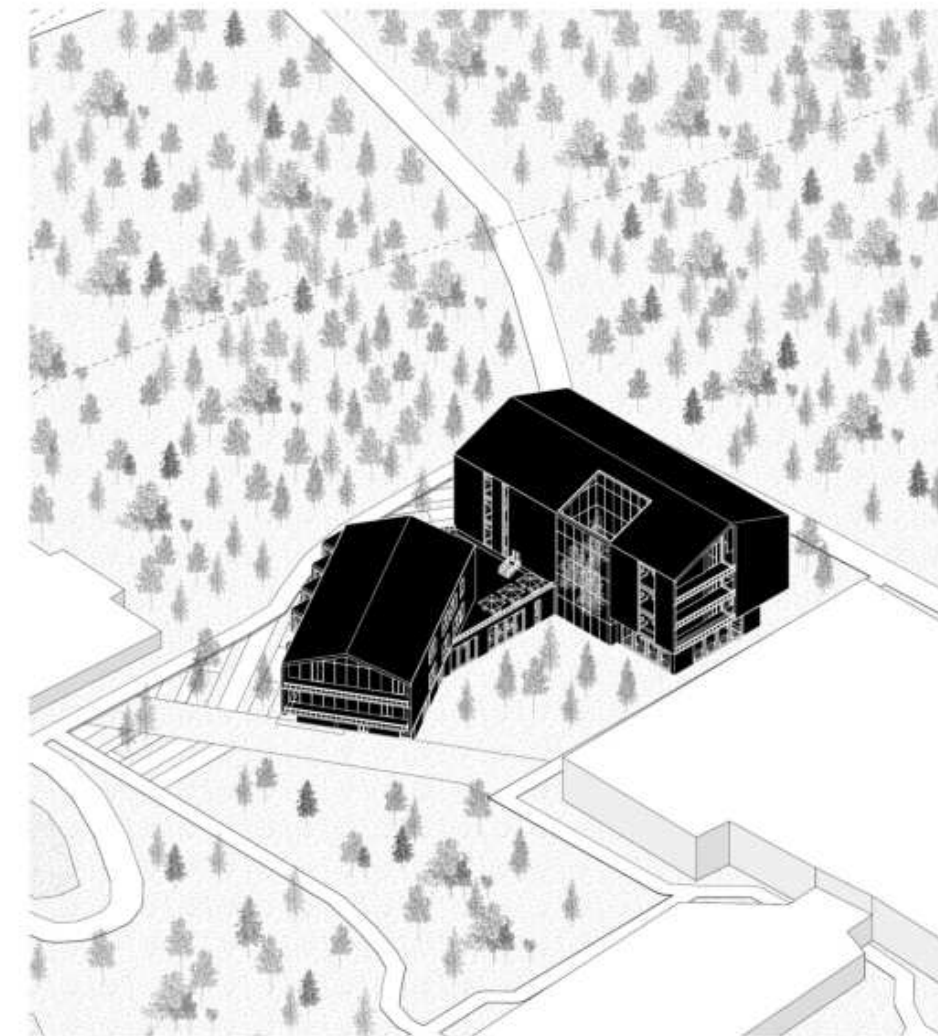
The winter garden offers a year-round space to enjoy natural light and greenery.



The winter garden offers a year-round space to enjoy natural light and greenery.



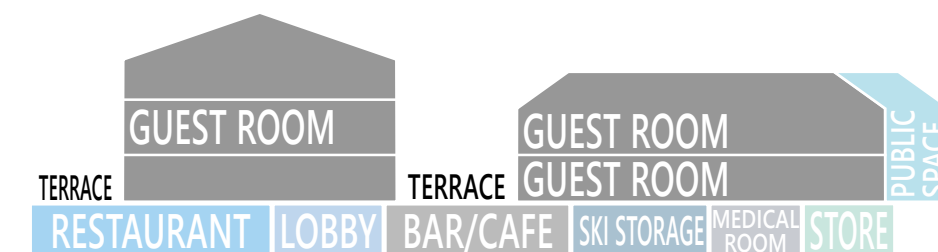
SITE AXON



Floor Area of Project: 68330 FT²
 Volume of Project: 1110256 FT³
 Number of Floors: 4
 Height of Project: 60 FT

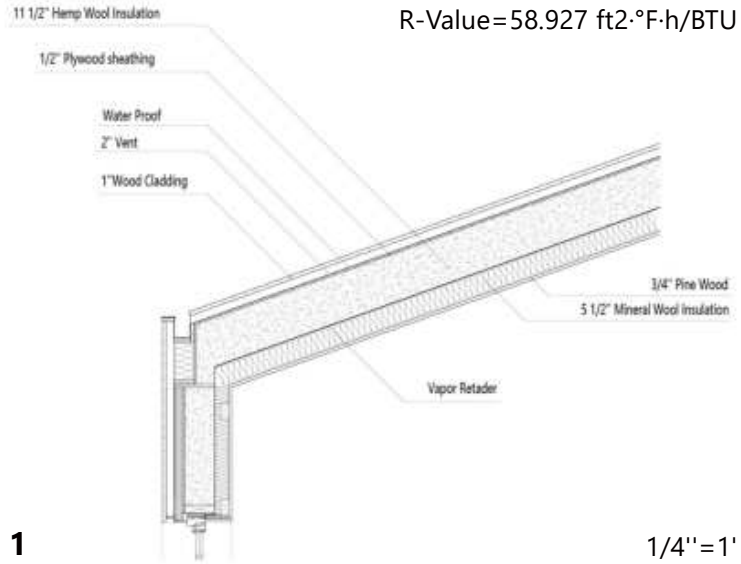
Orientation: 19.8° to South
 Roof Area: 26519 FT²
 Area to ground: 20858 FT²

PROGRAMS



ROOF CONSTRUCTION DETAIL

R-Value=58.927 ft²·°F·h/BTU

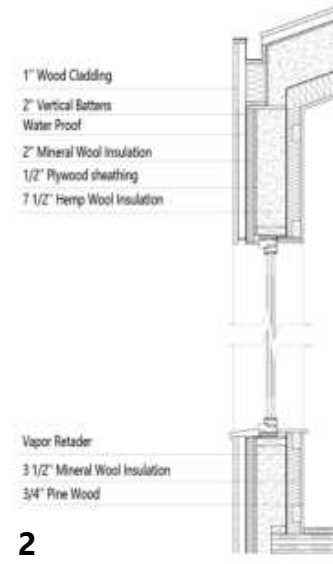


1
PERSPECTIVE SECTION

1/4"=1'

WALL CONSTRUCTION DETAIL

R-Value=45.235 ft²·°F·h/BTU

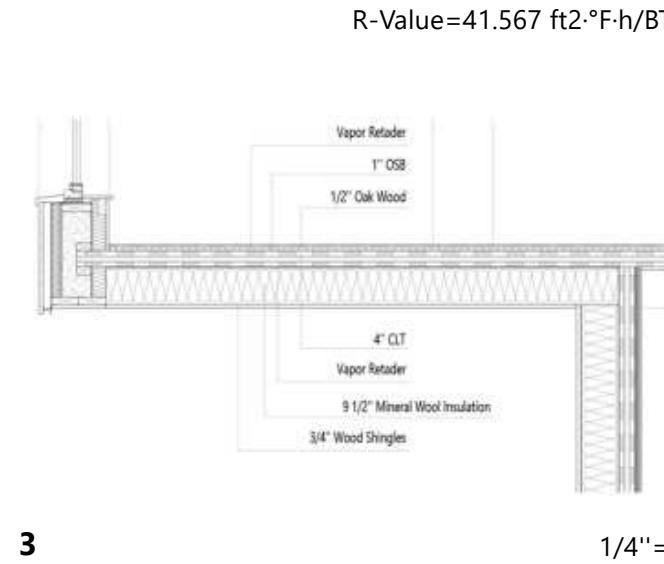


2

1/4"=1'

FLOOR CONSTRUCTION DETAIL

R-Value=41.567 ft²·°F·h/BTU



3

1/4"=1'

ACTIVE SYSTEMS

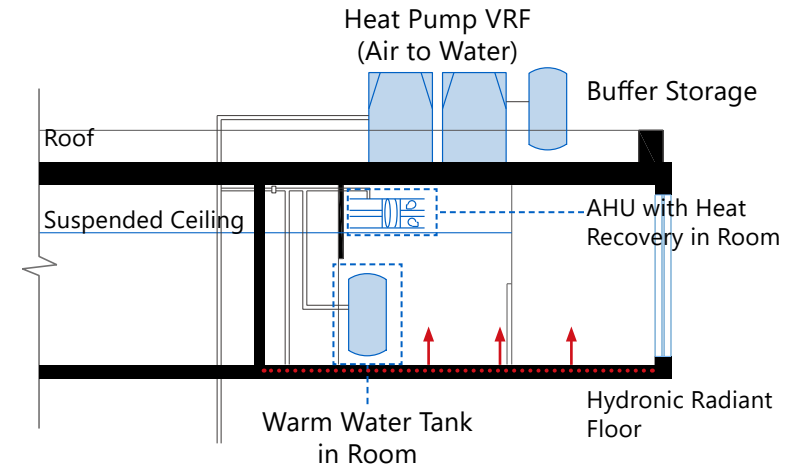
AIR HANDLING

Mech. Vent (Energy Ex.)

HEATING/COOLING UNIT

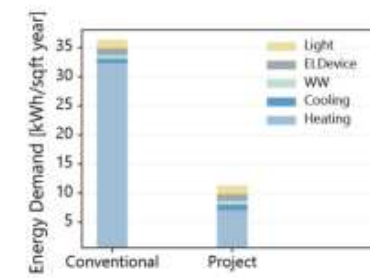
Heat Pump (air-water) VRF

Air to Water VRF

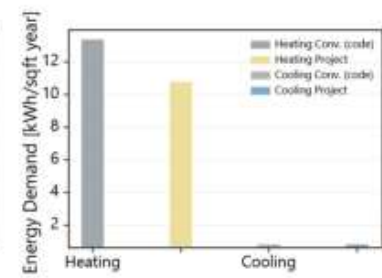


ENERGY DEMAND & LCA RESULT

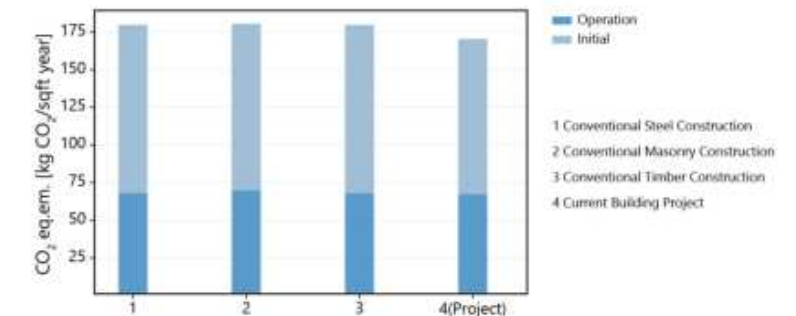
PRIMARY ENERGY DEMAND



USE ENERGY DEMAND



LIFE CYCLE ASSESSMENT 20 YEARS





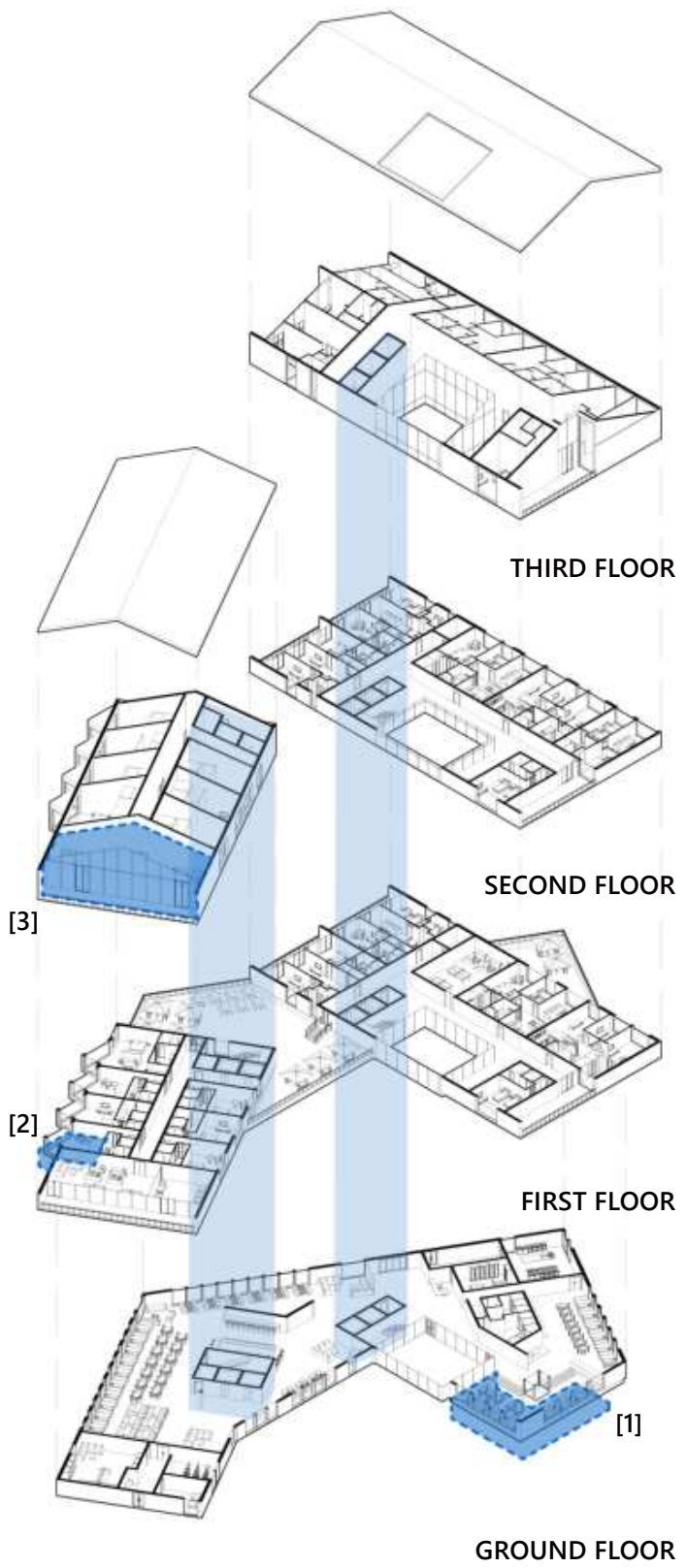
[1] RESTAURANT



[2] GUEST ROOM



[3] PUBLIC ACTIVITY ROOM



THIRD FLOOR

SECOND FLOOR

FIRST FLOOR

GROUND FLOOR





03

LUMIVUE CINEMA

Movie Theater Design, 2023

Academic Studio

University of Michigan

Site: Downtown, Ann Arbor

Instructor: Charlie O'Geen

Design Software: Rhino, Grasshopper(Truss, Glass Blocks, Perforated Panels), Adobe Suite, Lumion

This movie theater in downtown Ann Arbor explores how materials define space and create meaningful experiences. The design uses light as a material, with a perforated metal and glass block facade that filters light to shape different atmospheres throughout the building.

Light & Material Defining Space

- Light acts as an architectural element, shaping the atmosphere and guiding movement through the building.
- The facade filters and directs light, differentiating spaces and creating unique visual experiences.

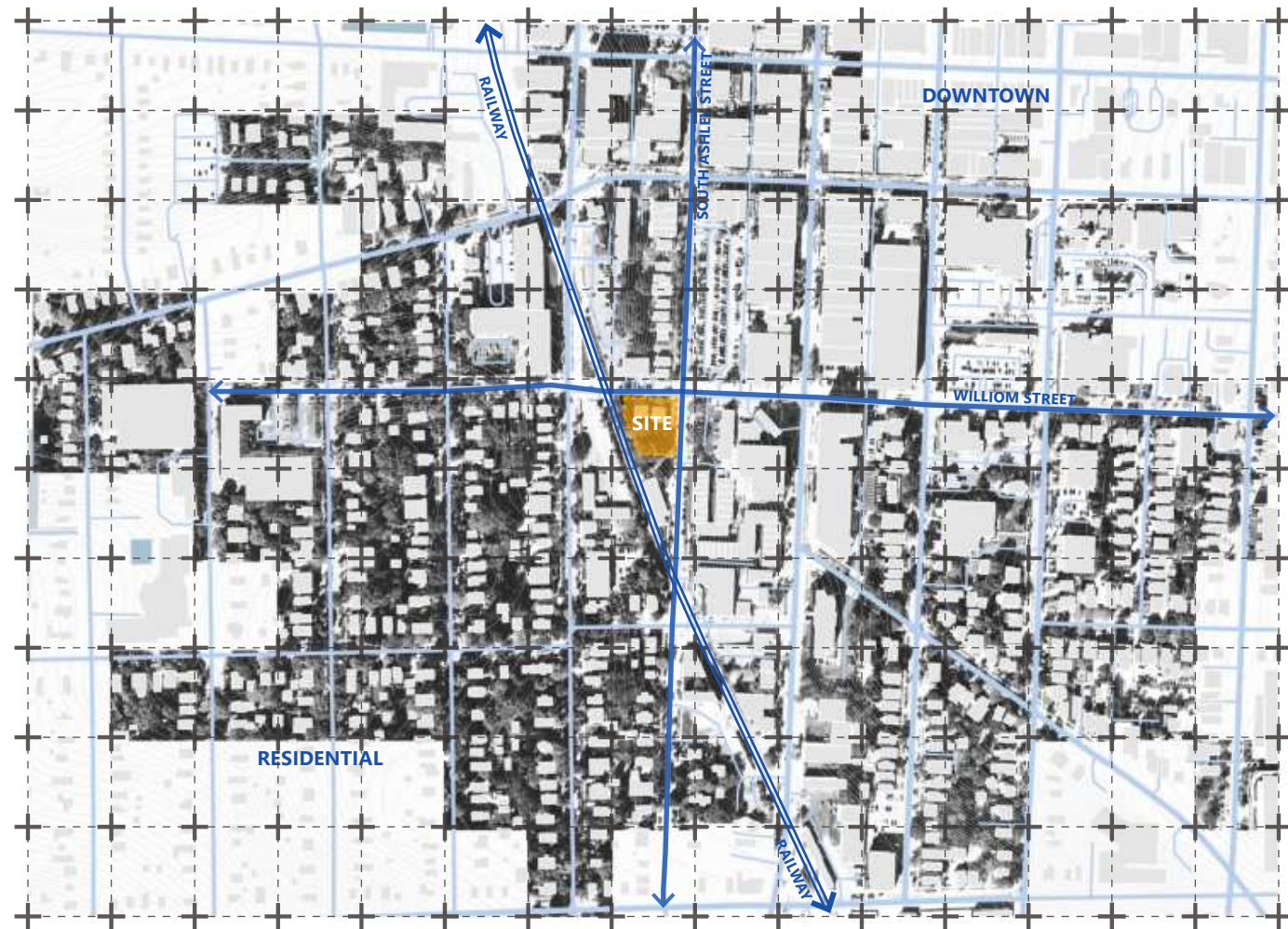
Light-Filtering Facade & Transparency

- A dual-layer system of perforated metal panels and glass blocks regulates light exposure, transparency, and opacity.
- Translucent skins around solid volumes create a dynamic contrast, enriching the visual and spatial experience.

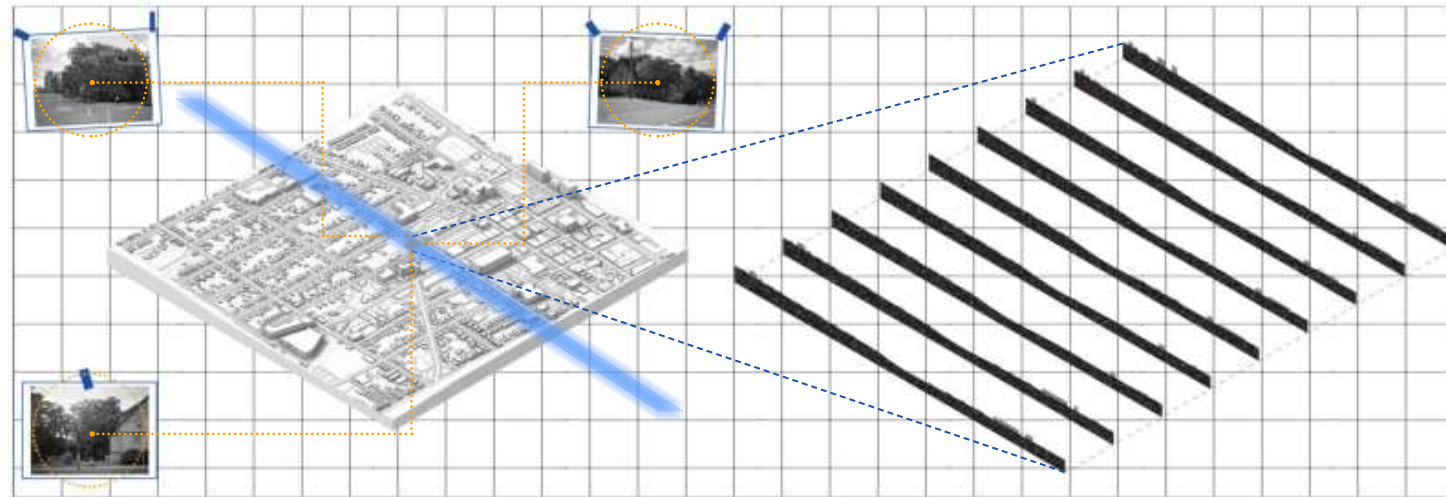
Urban Integration & Massing

- Elevated the northern volume to establish a welcoming and accessible space for public engagement.
- Designed an open-air cinema and semi-public entrance to encourage interaction between the theater and its surroundings.

SITE STATUS



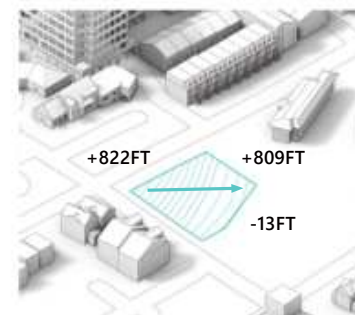
SITE SECTION



DESIGN GENERATION



1. Site: 400 S Ashley St, Ann Arbor, MI 48103



2. Use contour lines to divide the site.



3. Create ramps for circulation and public spaces.



4. Extrude the main volumes.



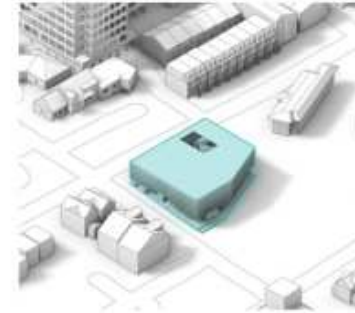
5. Add supporting structure.



6. Introduce plinth and atriums.

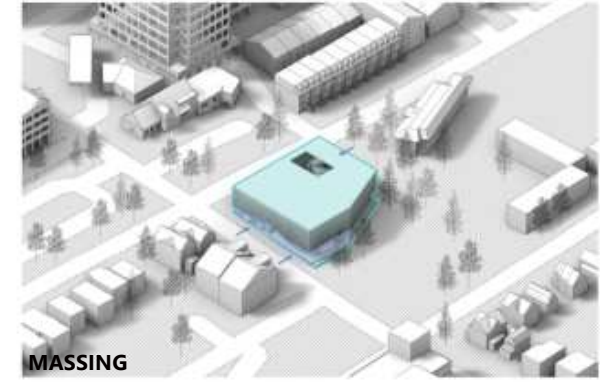
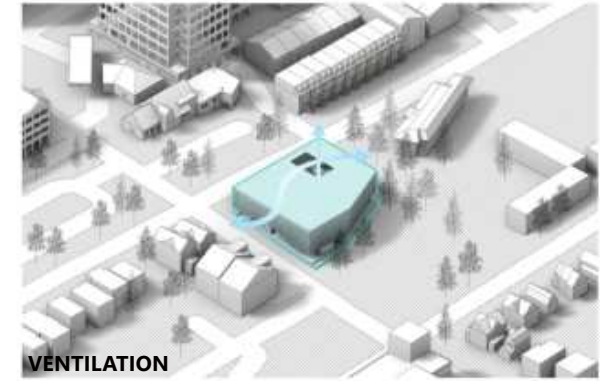
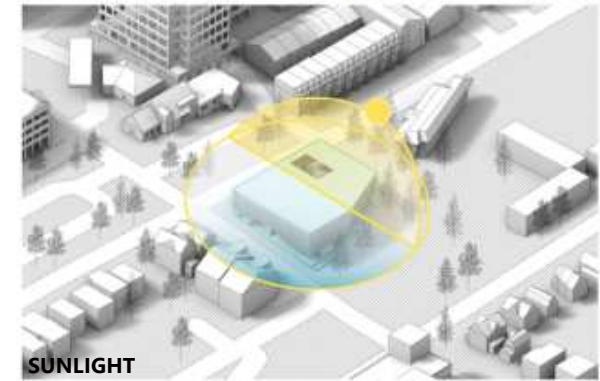
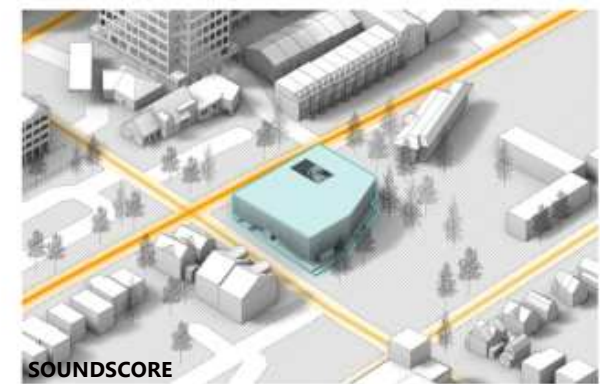


7. Introduce the spaces for cinema.

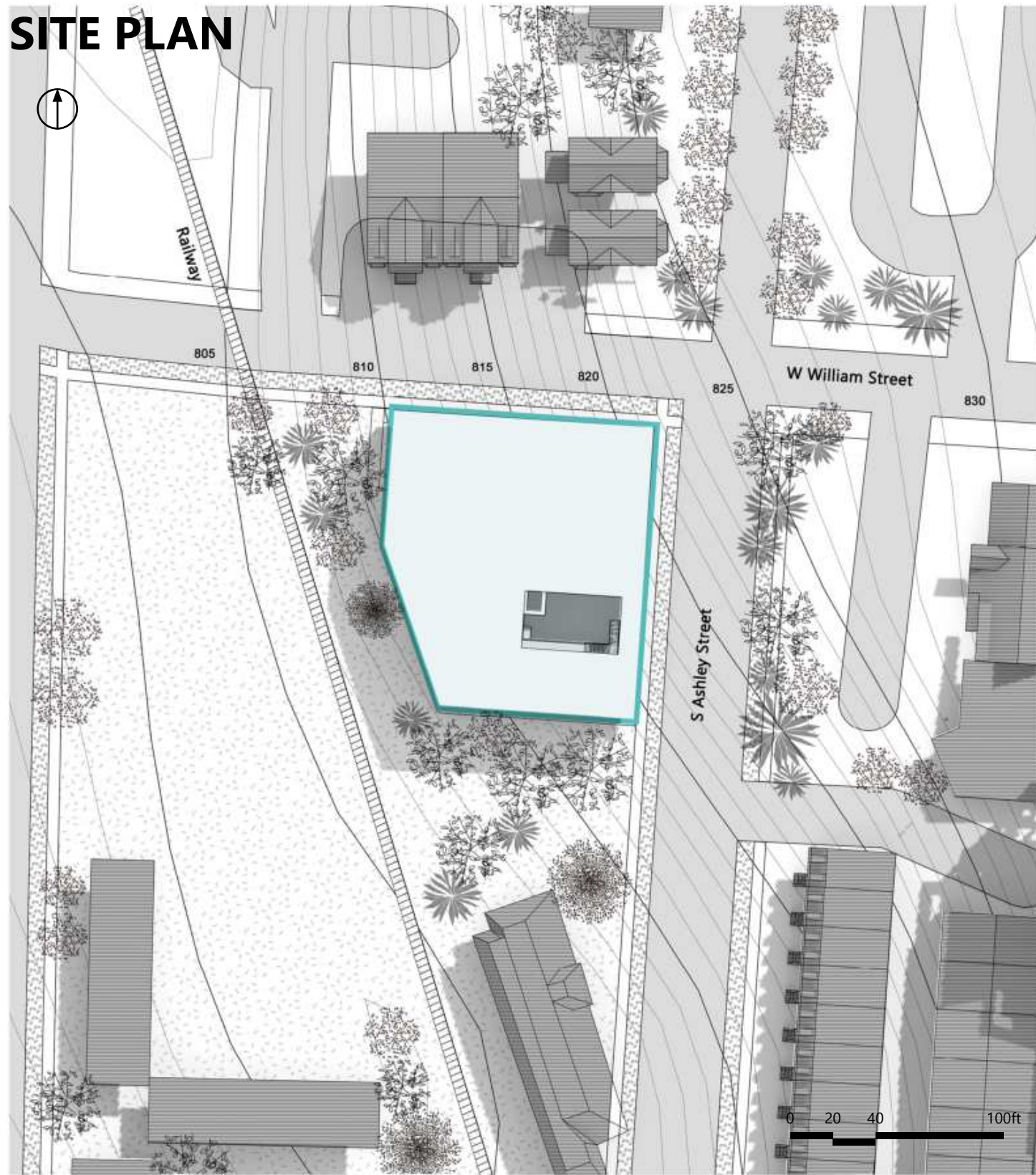


8. Incorporate a light-filtering exterior facade.

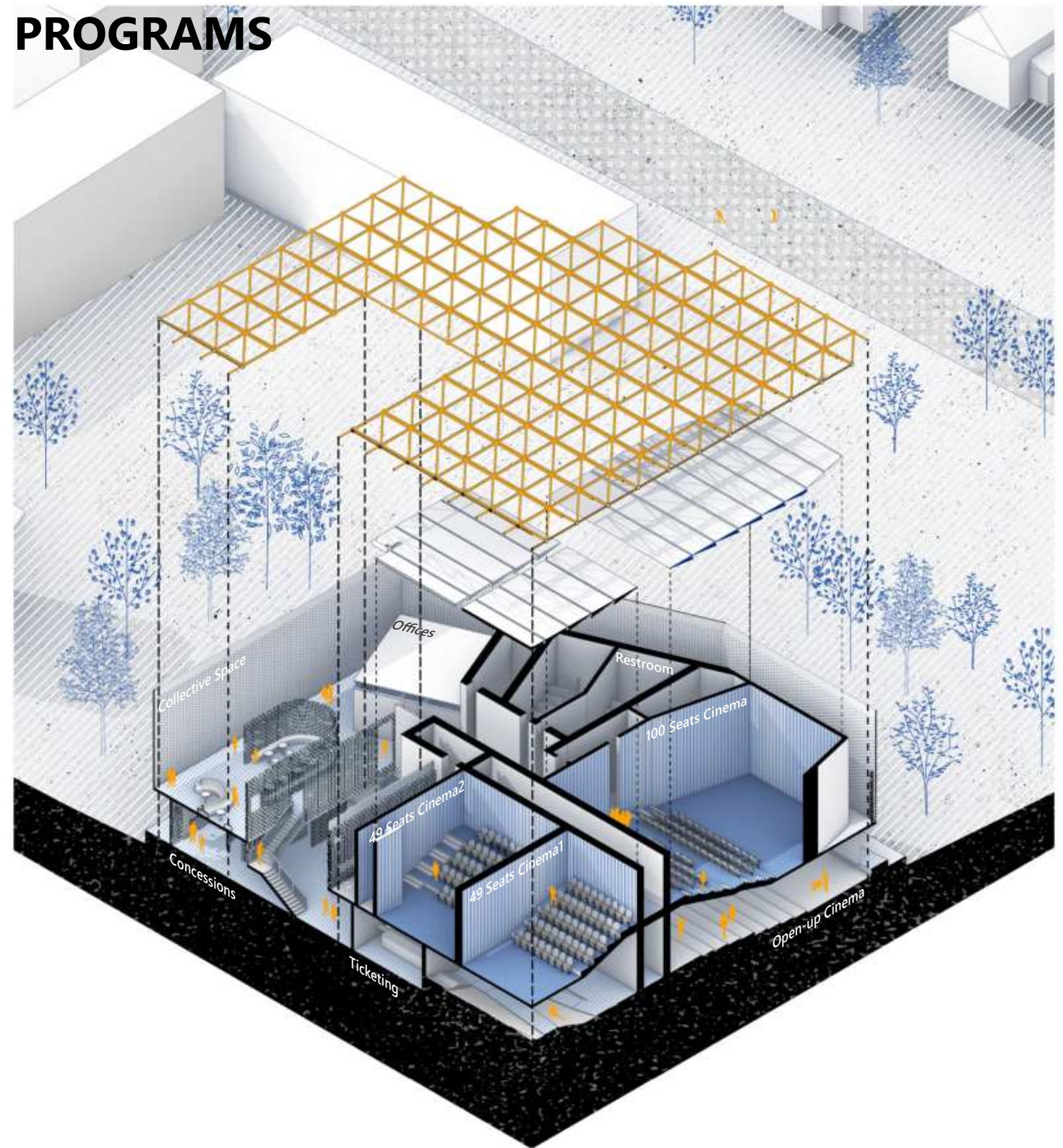
DESIGN ANALYSIS



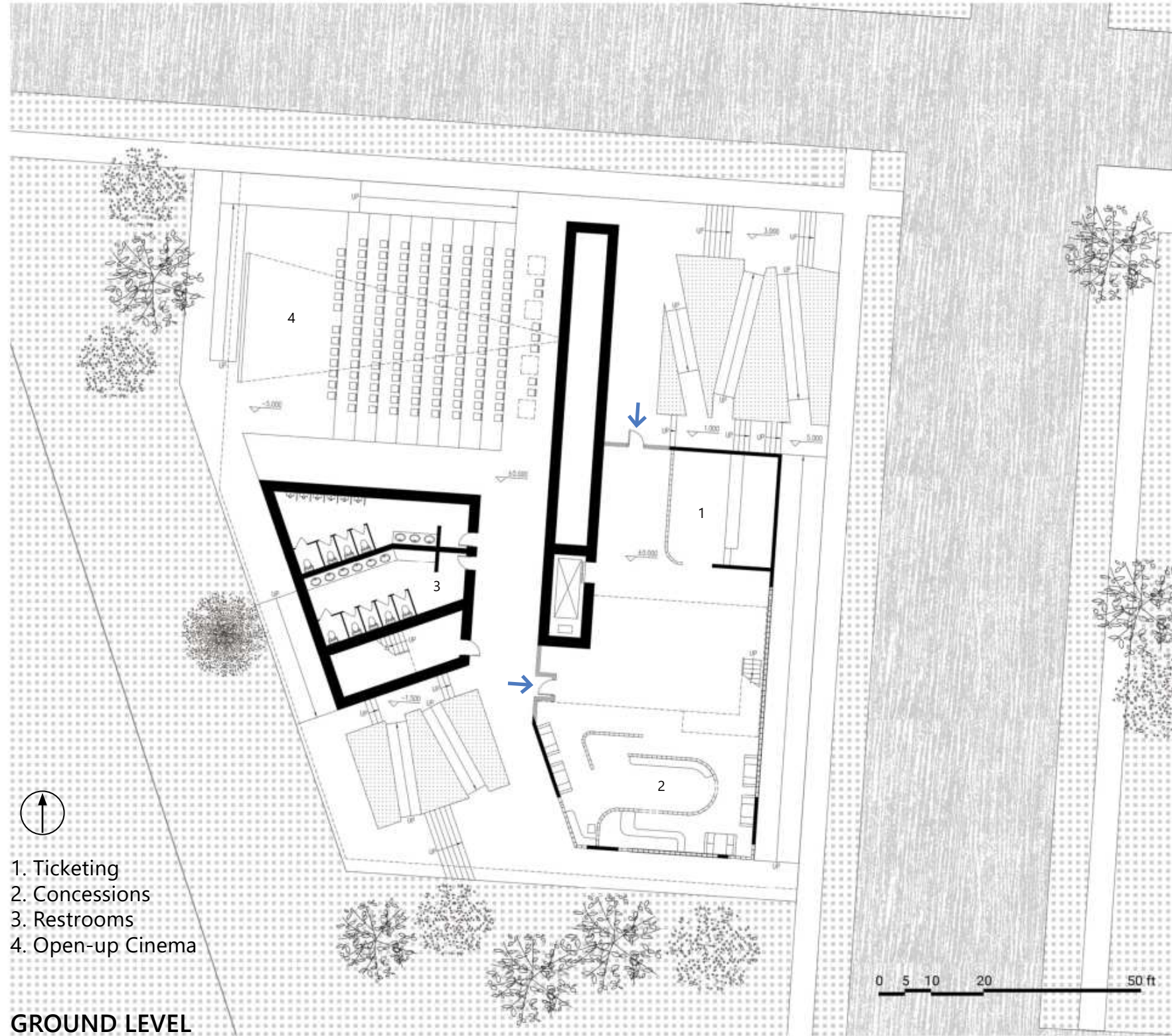
SITE PLAN



PROGRAMS

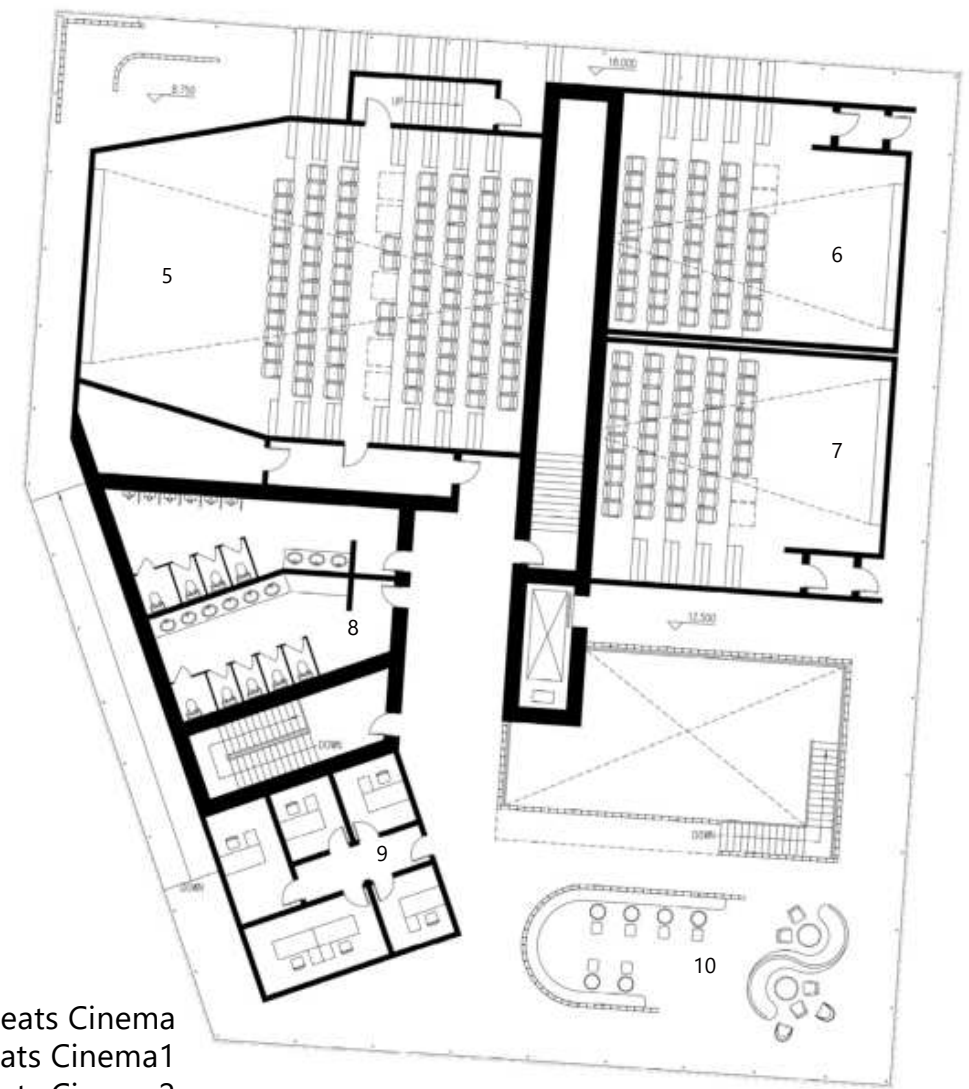


FLOOR PLAN



- 1. Ticketing
- 2. Concessions
- 3. Restrooms
- 4. Open-up Cinema

GROUND LEVEL



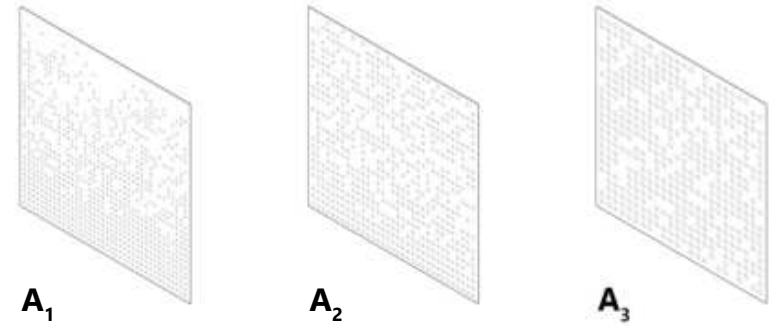
- 5. 100 Seats Cinema
- 6. 49 Seats Cinema1
- 7. 49 Seats Cinema2
- 8. Restrooms
- 9. Offices
- 10. Collective Space

FIRST LEVEL



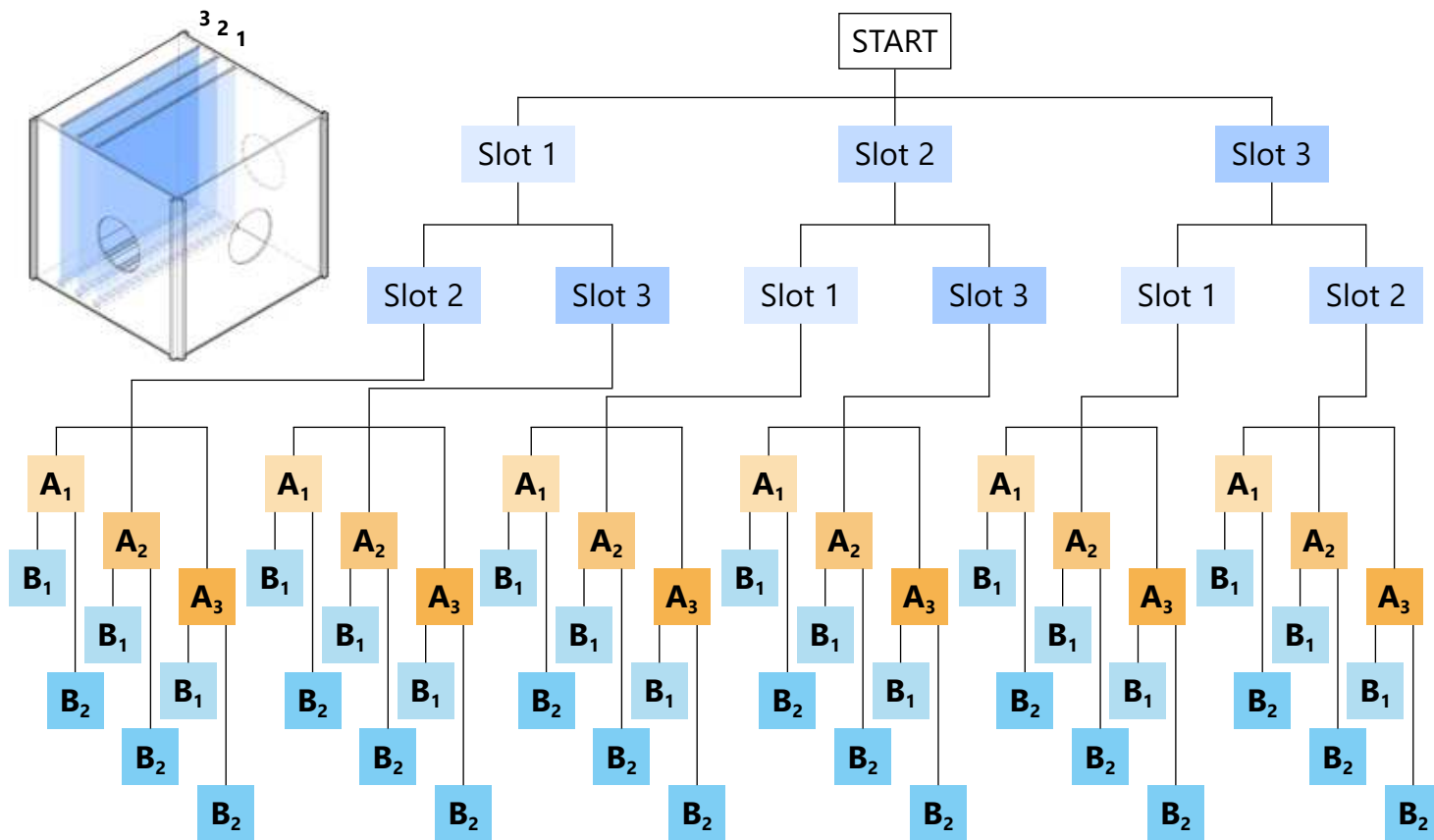
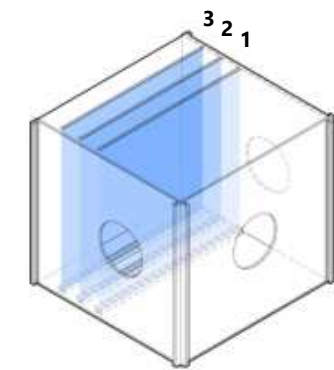
CONCEPT-MATERIAL TEST

PERFORATED PANELS (CHIPBOARD)



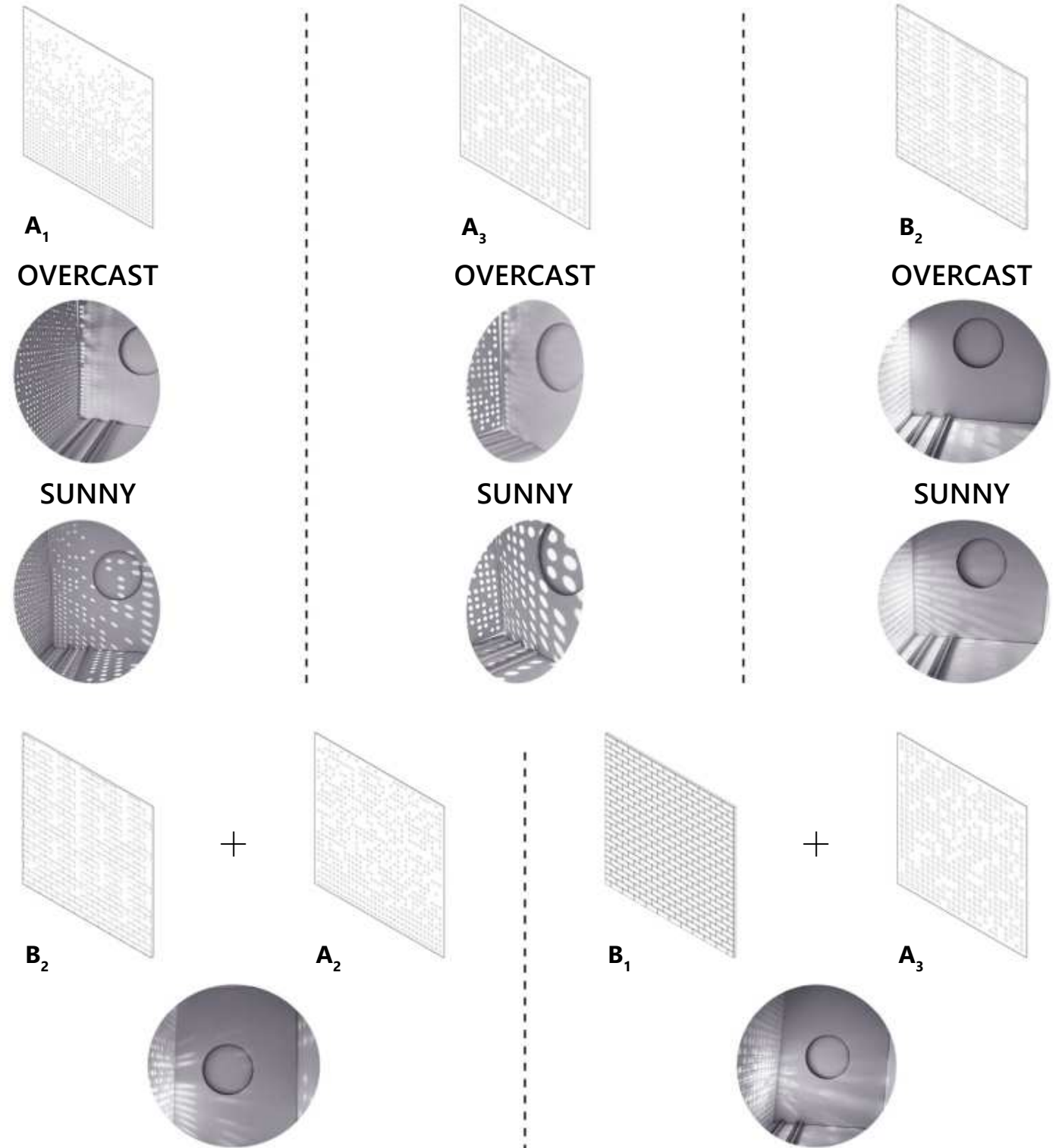
Size of the holes: Small → Large
Density of the holes: High → Low

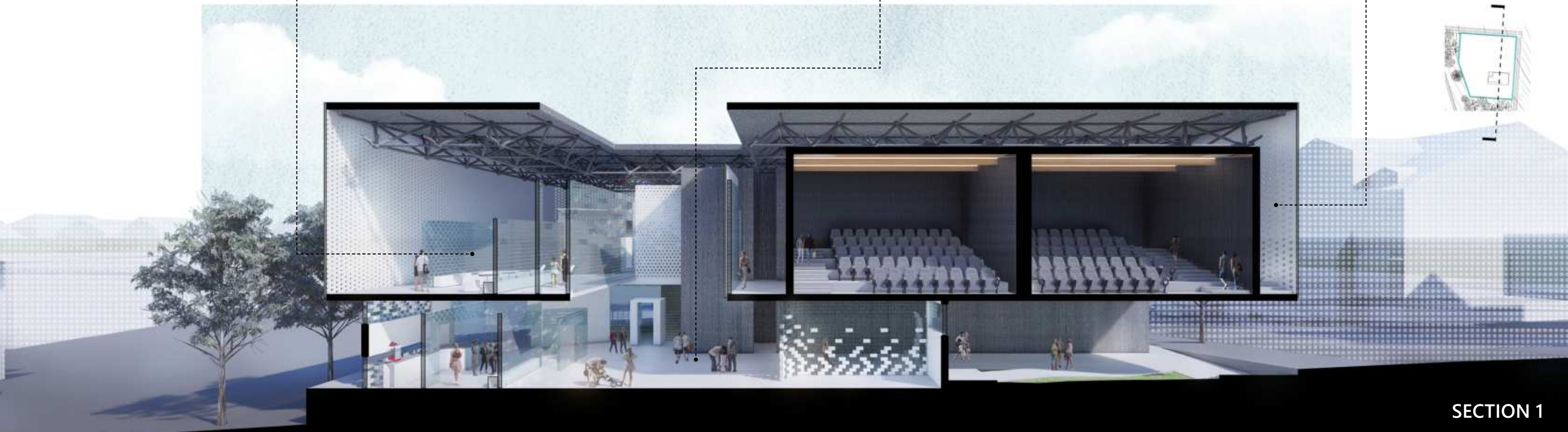
LIGHT BOX



In the Material Test, a lightbox created to observe the different light patterns caused by sunlight passing through light filter panels from various directions. The top of the box has several slots where you can insert any panels to observe the different effects of perforated plates and glass blocks when combined in different orders, placed at different depths, or placed individually.

LIGHT PATTERNS







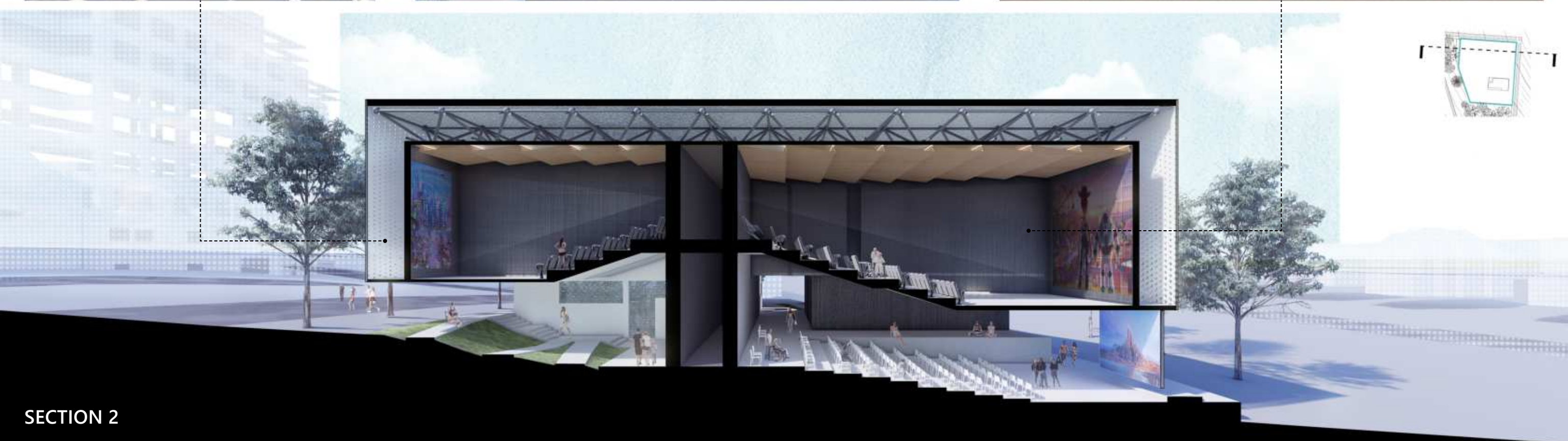
HALLWAY



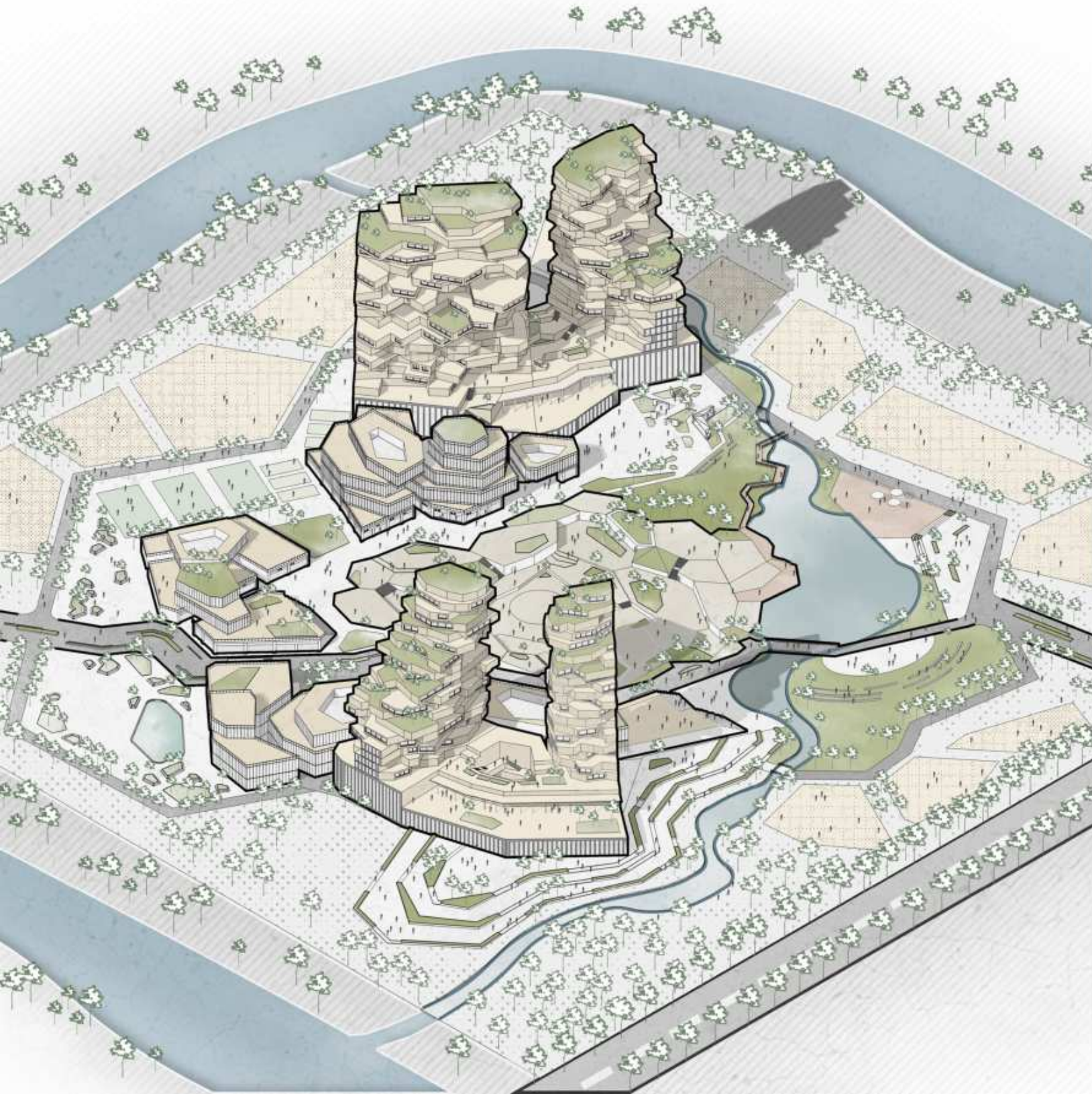
CONCESSIONS



CINEMA



SECTION 2



04

MULTIVERSE—THE MOON AND SIXPENCE

Future Urban Design, 2020
Design Competition (Group Work)

Site: Tianjin, China
Design Software: Rhino, Grasshopper (Design Process), Adobe Suite, Lumion

This urban design proposal reimagines Yangliuqing's southern islet as a connected, efficient, and diverse community. Using Grasshopper and Python, we optimized circulation and spatial organization, ensuring seamless connectivity and efficient land use.

Parametric Design & Computational Planning

- Used Grasshopper and Python to analyze circulation patterns, optimizing road networks and spatial layout.
- Applied Voronoi diagrams with Genetic Algorithm to divide the site and Dijkstra Algorithm to generate efficient road networks and river paths.

Sustainable & Human-Centered Integration

- Preserved farmland while modernizing urban life, balancing growth with tradition.
- Mixed-use layout places residential areas in the 2nd & 4th quadrants, public spaces in the 1st & 3rd, optimizing sunlight, wind, and transit access.

Blending Urban & Rural Lifestyles

- Perimeter farmland supports local food production and agricultural traditions.
- Balcony gardens and rooftop greenspaces encourage small-scale urban farming and self-sufficiency.

LOCATION ANALYSIS



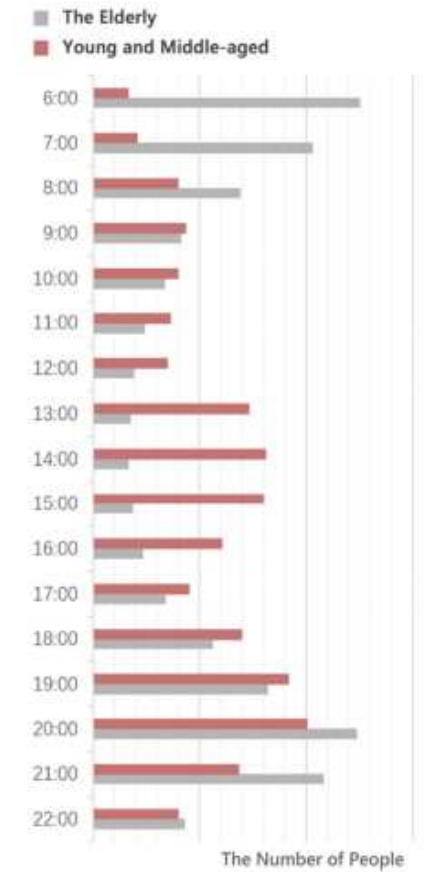
AGE STRUTURE



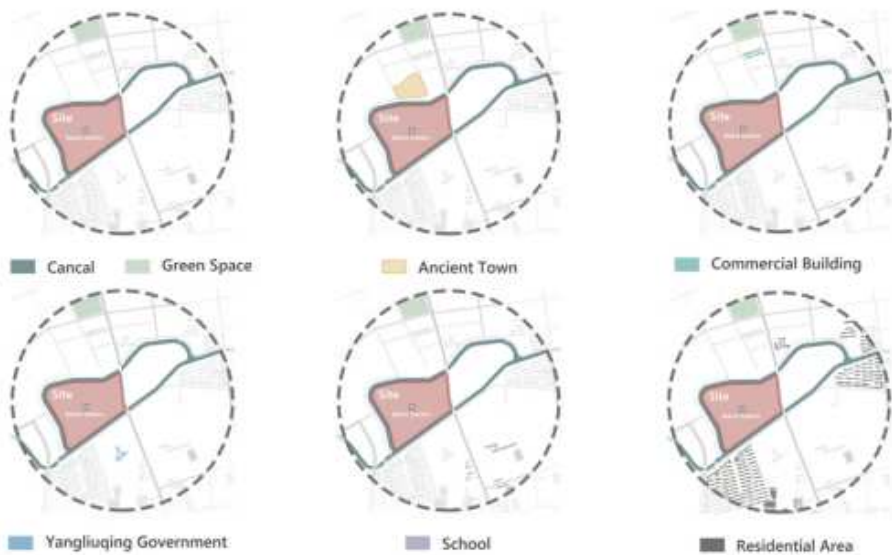
ACTIVITIES



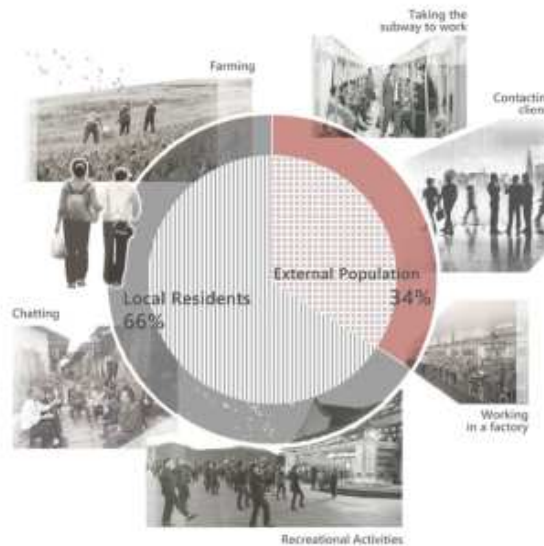
TIME TREND



SITE ANALYSIS

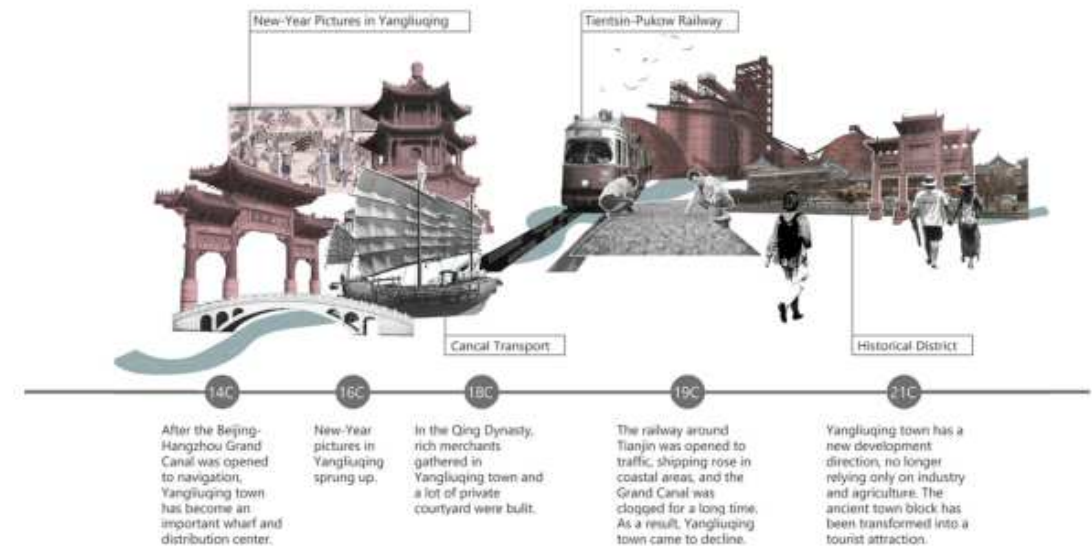


DOMICILE PLACE ANALYSIS



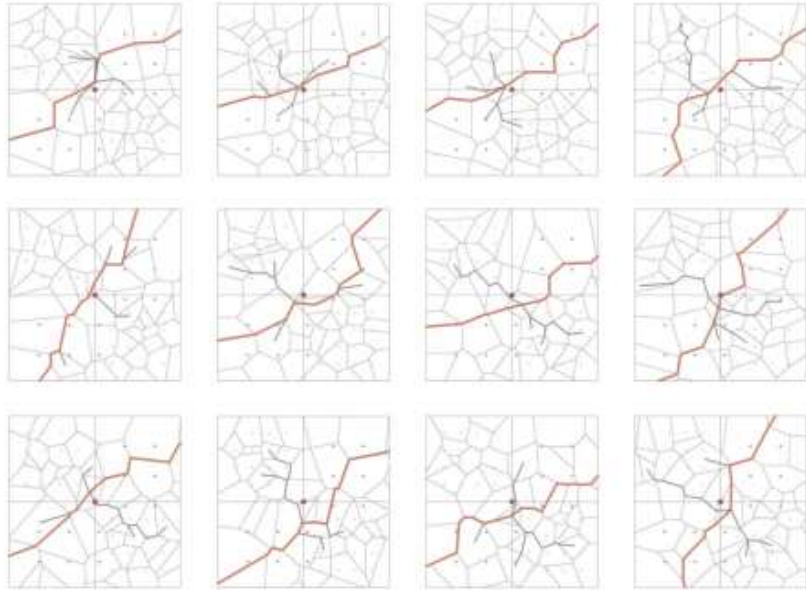
The metropolitan outskirts communities like this project are in mixture of urban and suburban system. They are complicated in popularity composition, followed with cultural conflicts and integration. Therefore, various space forms are demanded to meet the need of people from different backgrounds.

THE HISTORY OF YANGLIUQING



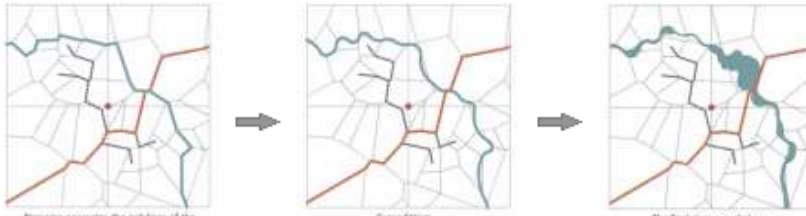
DESIGN THINKING

The site is located in an islet which is on the south of the ancient town of Yangliuqing. We divided the site into 4 quadrants. The entrance and the exit are on the southwest and northeast of the site. In consideration of directions of the wind in summer and winter; illumination and the metro station, the residential buildings are located in the 2,4 quadrant, the public buildings in the 1,3 quadrant. Then the program divided the site by the location of points and Voronoi diagram with Genetic Algorithm.



CHOSEN PROJECT

FORMATION OF THE RIVER MORPHOLOGY

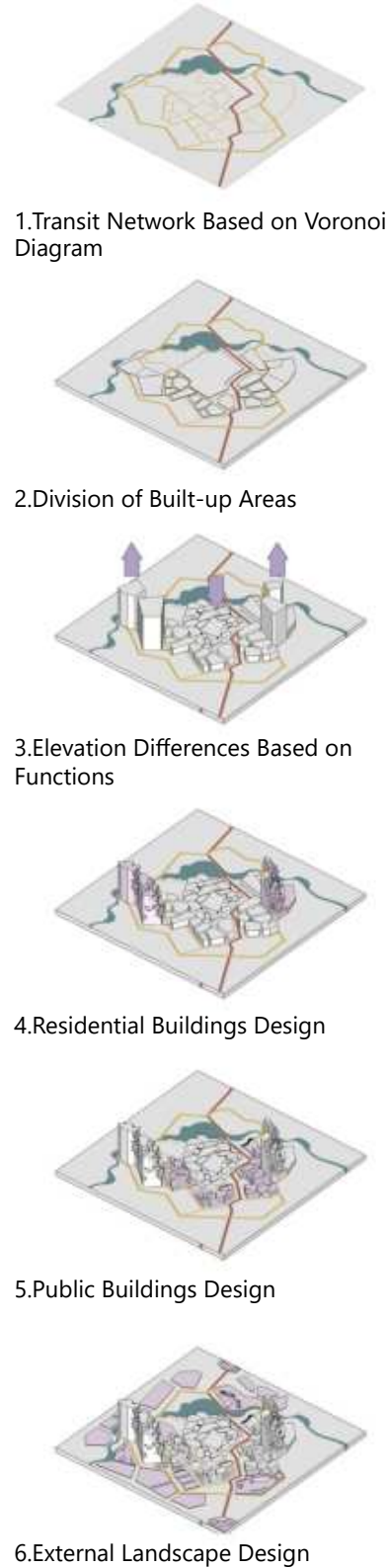


PROGRAMS



- Axis
- - - - Branches
- Metro Station
- Residential Areas
- Public Buildings

DESIGN GENERATION



1. Transit Network Based on Voronoi Diagram

2. Division of Built-up Areas

3. Elevation Differences Based on Functions

4. Residential Buildings Design

5. Public Buildings Design

6. External Landscape Design

SITE PLAN



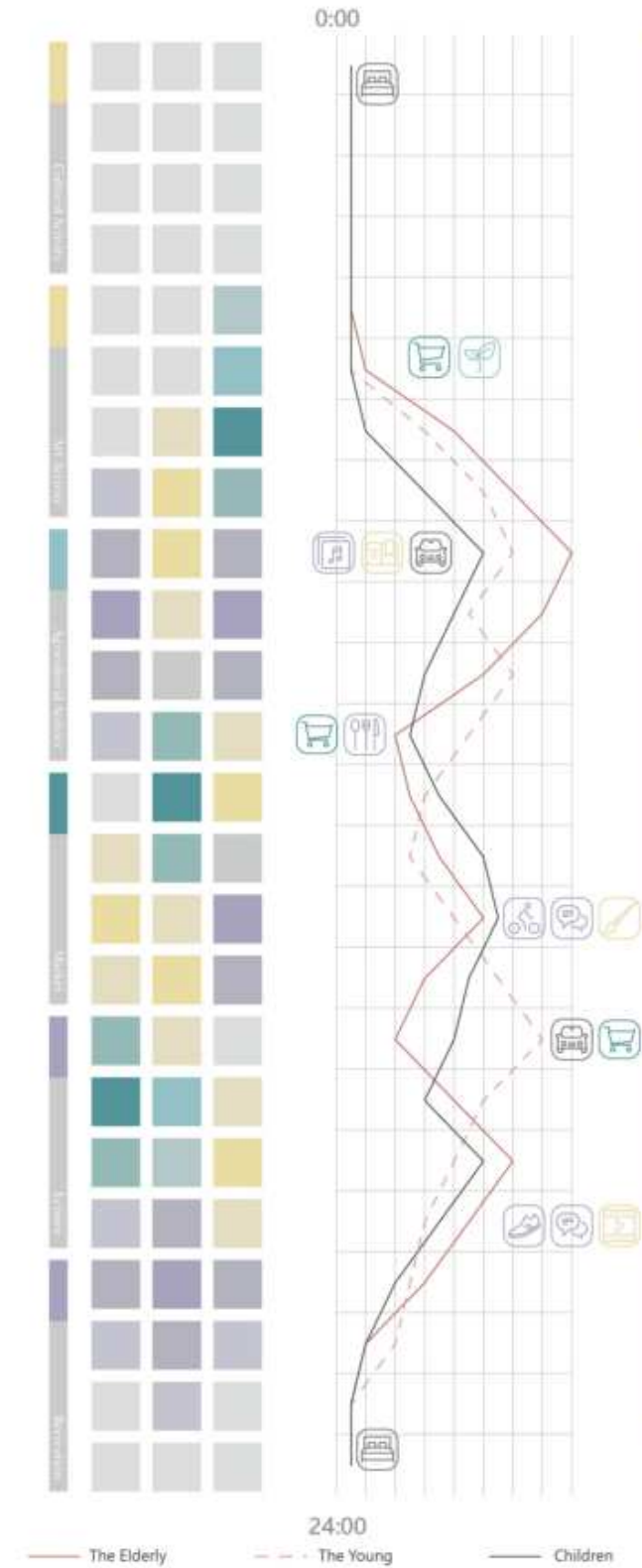
- ① Sunken Plaza
- ② Residential Buildings
- ③ Tennis Court
- ④ Basketball Court
- ⑤ Planetarium and Bookstore
- ⑥ Art Gallery
- ⑦ Cultural Center
- ⑧ Shopping Center
- ⑨ Agricultural Plantation Experience Pavilion
- ⑩ Events Plaza
- ⑪ Therapeutic Garden
- ⑫ Waterfront Modern Trestle
- ⑬ Open-air Theater
- ⑭ Farmland
- ⑮ Entrance Plaza
- ⑯ Main Road

The grocery stores are located in buildings on the edge of the sunken plaza.

The community service center and the nursing home are located in the podiums of the residential buildings. There is a roof garden in the residential area. In addition, every family can plant on the balcony.

The farmland is distributed on the edge of the site.

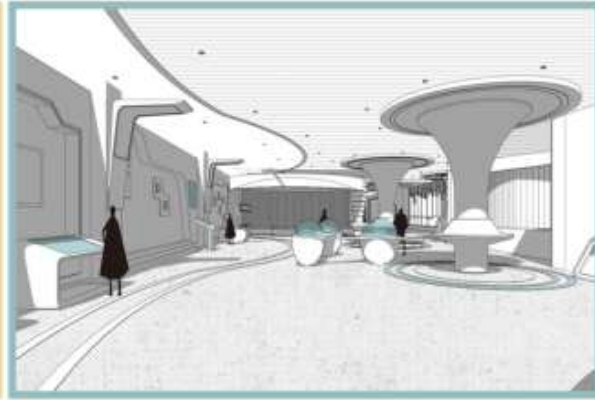
CUSTOMIZED ROUTES



SPACES



Theater



Agricultural Plantation Experience Pavilion



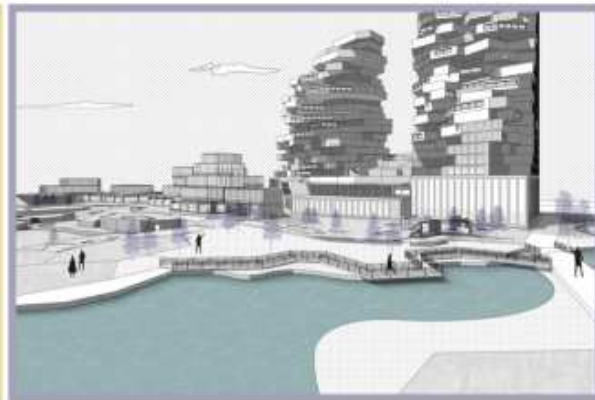
Bookstore



Grocery Store



Art Gallery



Waterfront Space

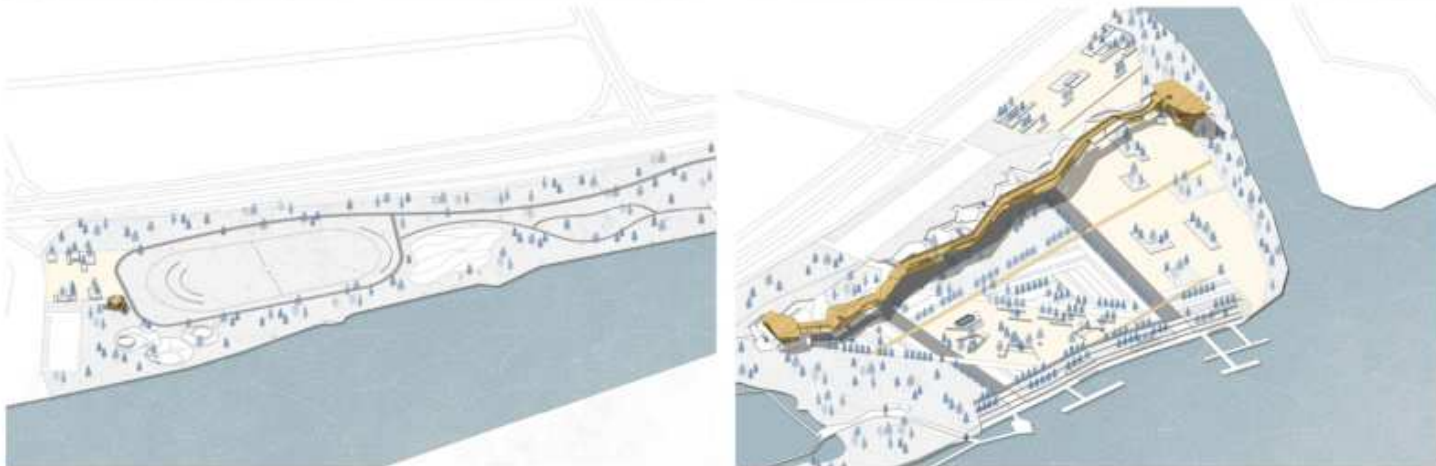
PROGRAMS



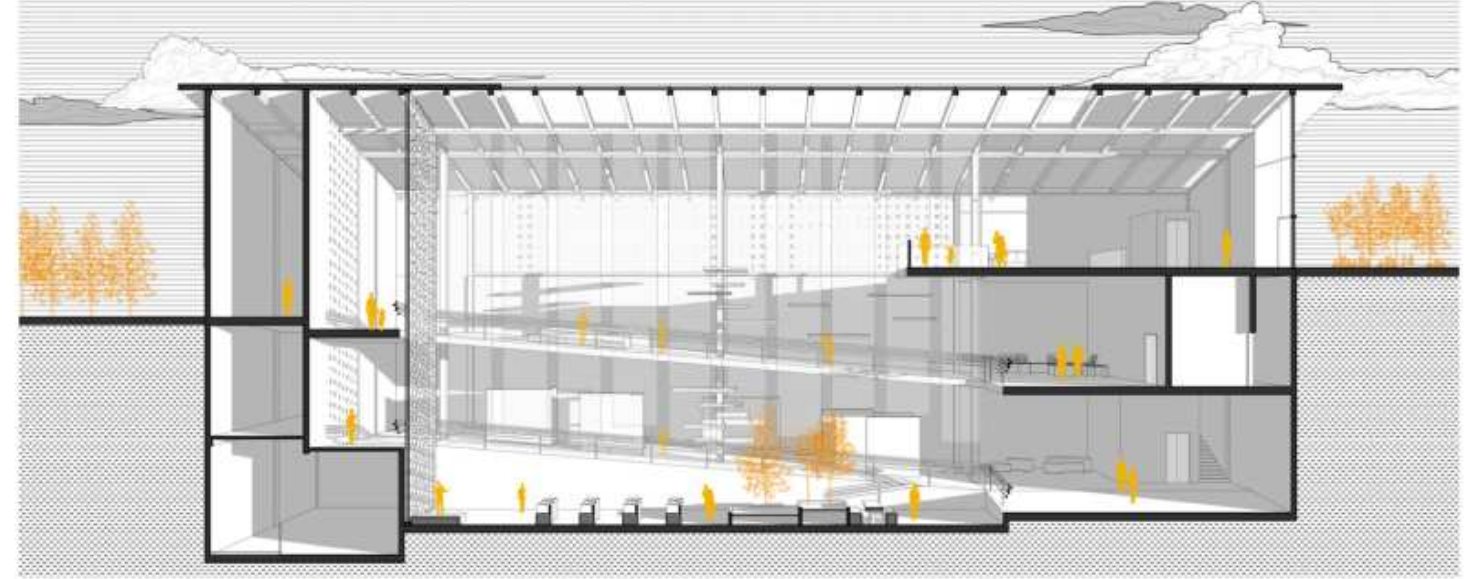


OTHER WORKS

The Biological-breath Corner
Wetland Park Design, 2020

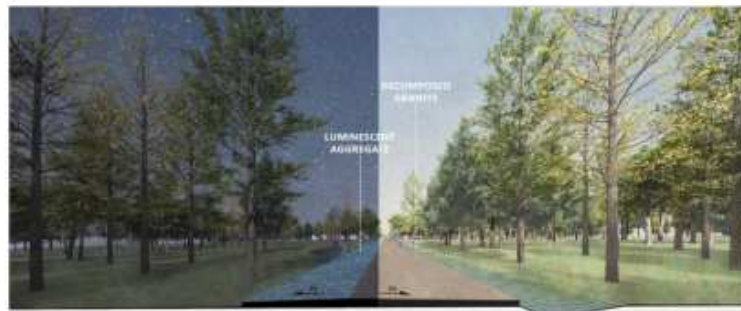


The Planning and Design of Yuyao Ceramic Kiln
Undergraduate Thesis, 2021



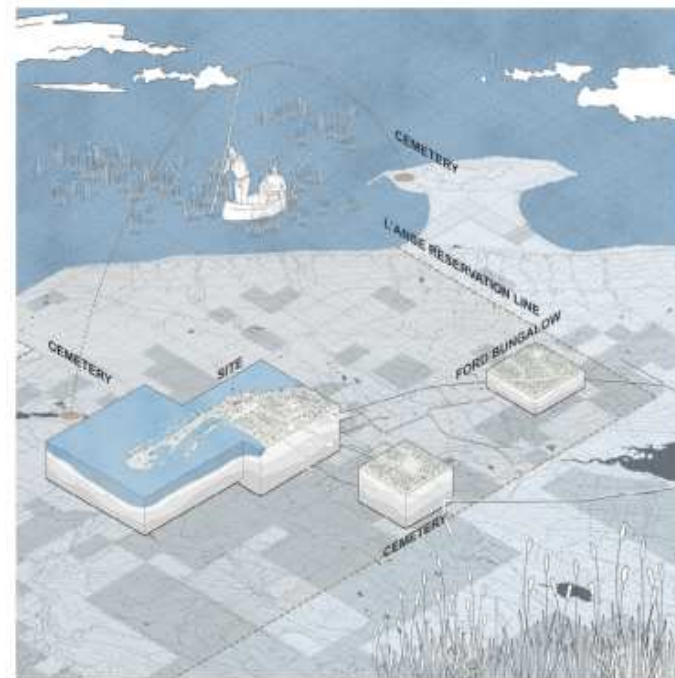
OTHER WORKS

Keneenaw Bay-Afterworlds Memorial Design
Propositions Studio, 2024



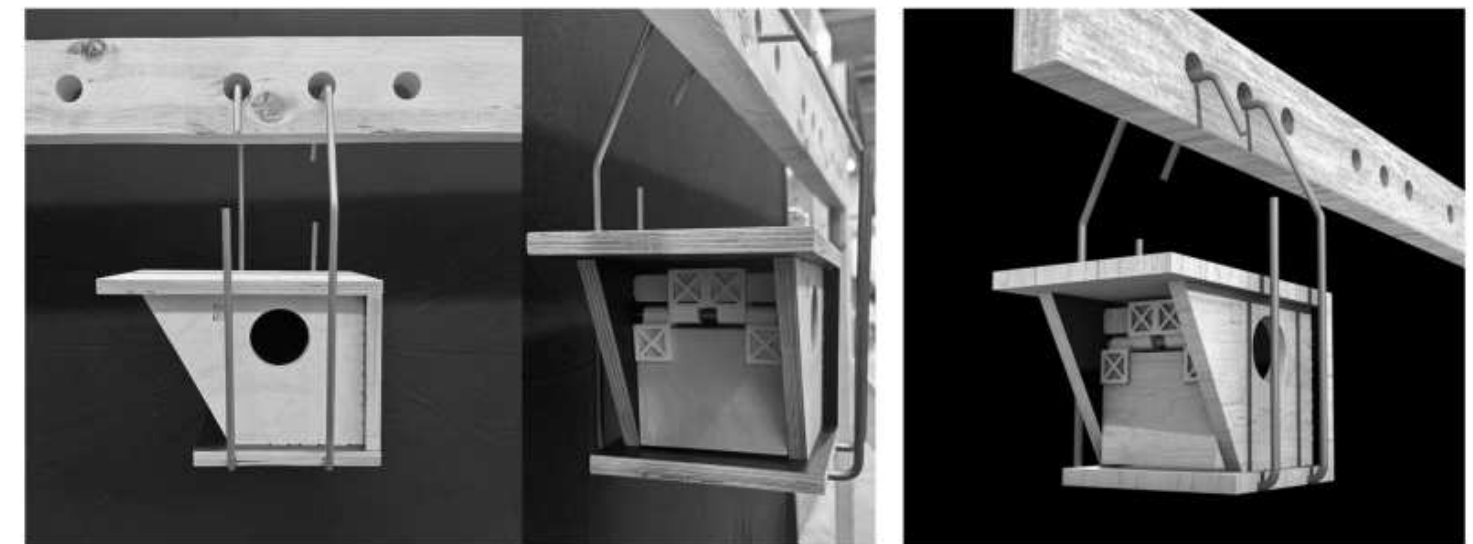
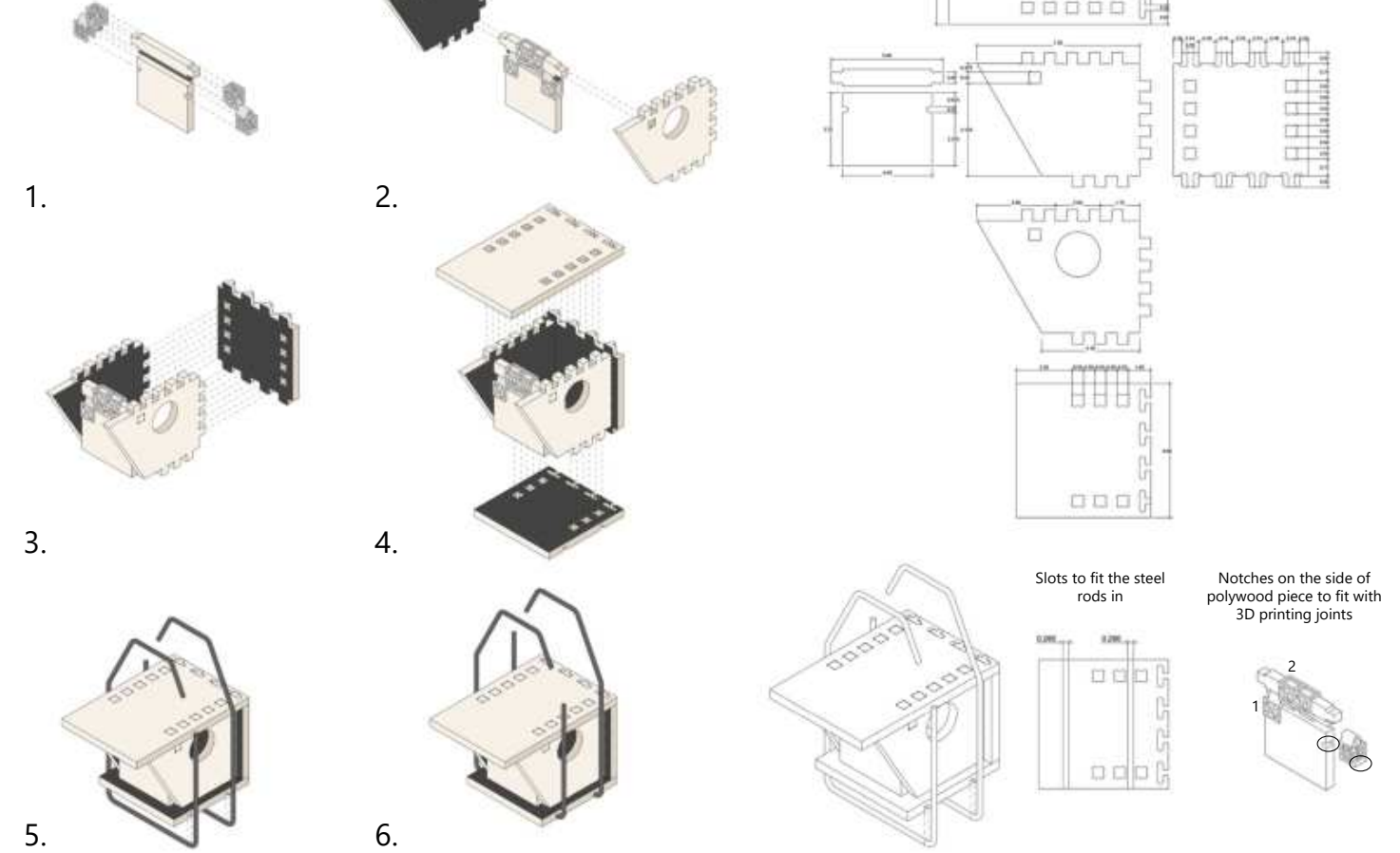
10 ft ACCESSIBLE PATHWAY
LIGHTING
CONCRETE & ASPHALT

10 ft PATHWAY BICYCLE & HOV2+ PARKING
VEGETATED SWALES



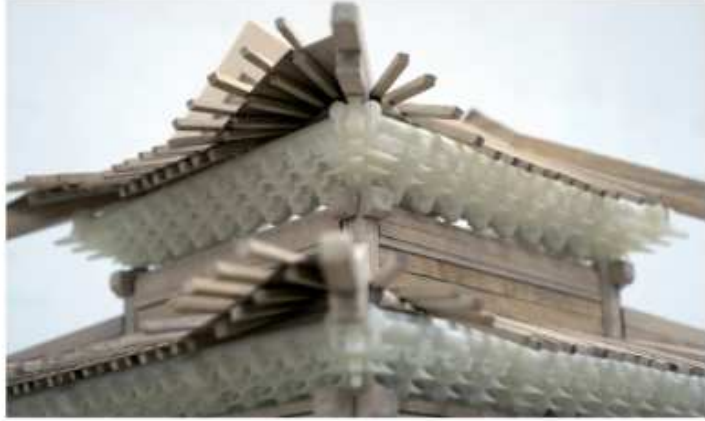
Nest Box Design
Fabrication 2023 (CNC, 3D Printing, Rob Bending)

Assembly Order

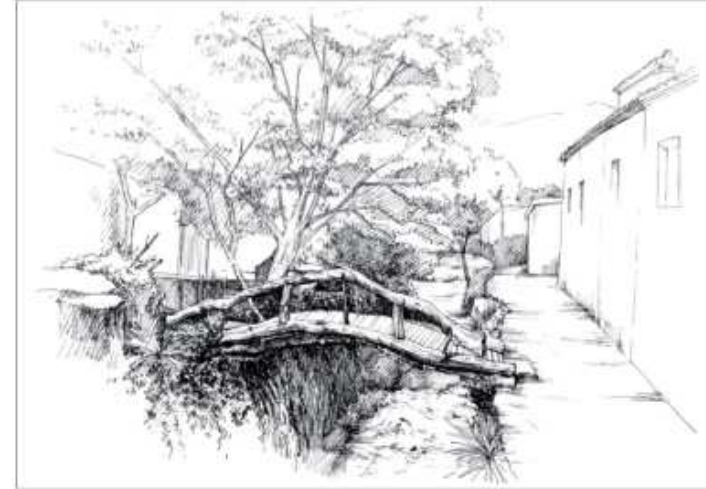
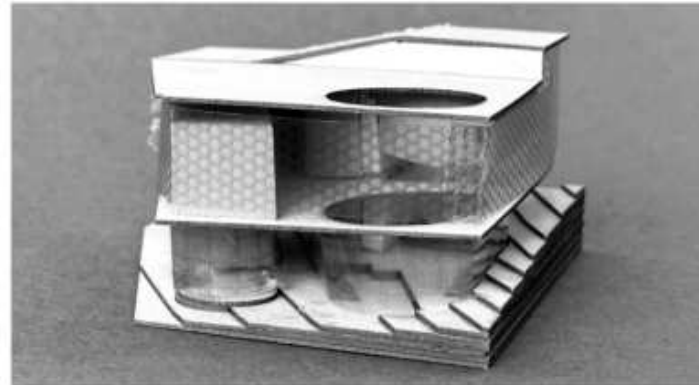
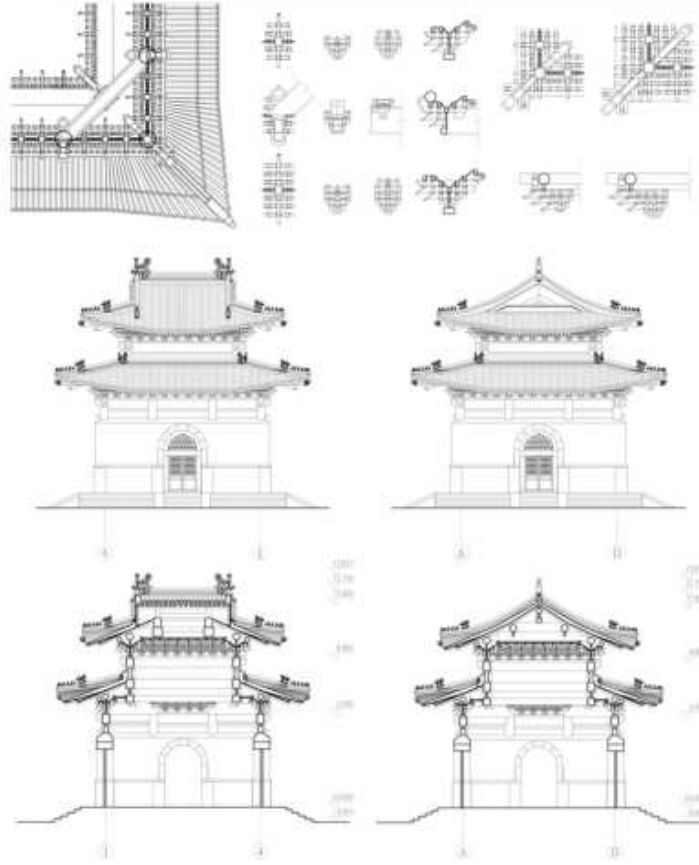
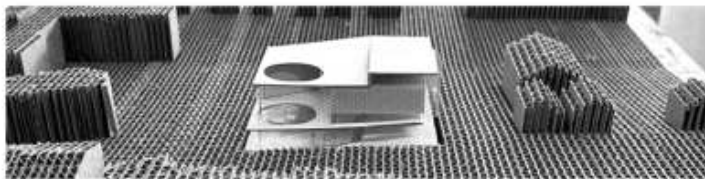
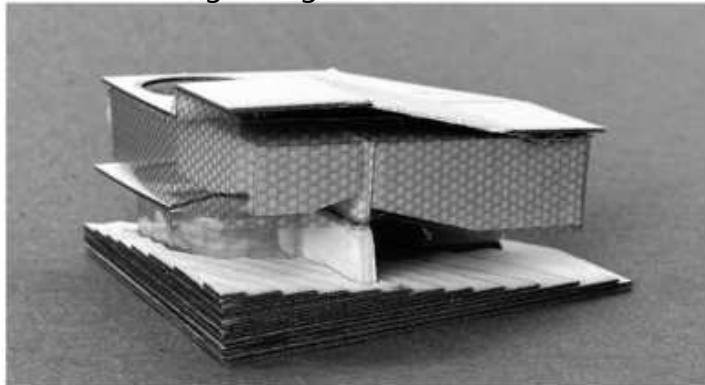


DRAWING & MODEL

Traditional Chinese Architecture Survey Drawing
Pavilion in Western Qing Tomb



Model in Design Progress (Institution Studio)

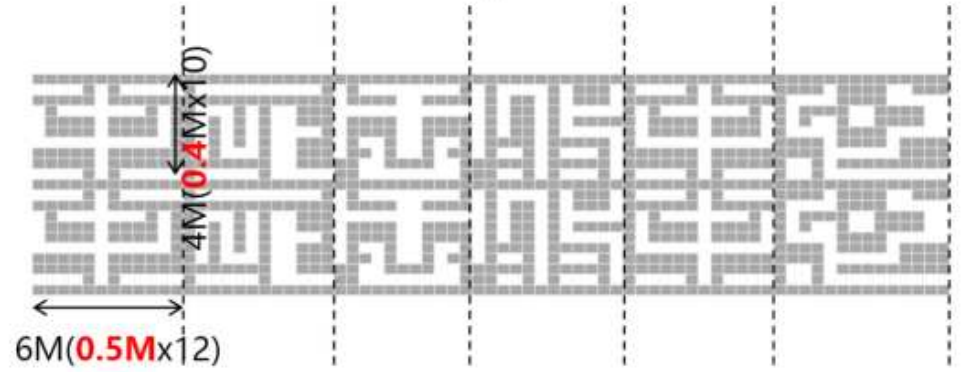
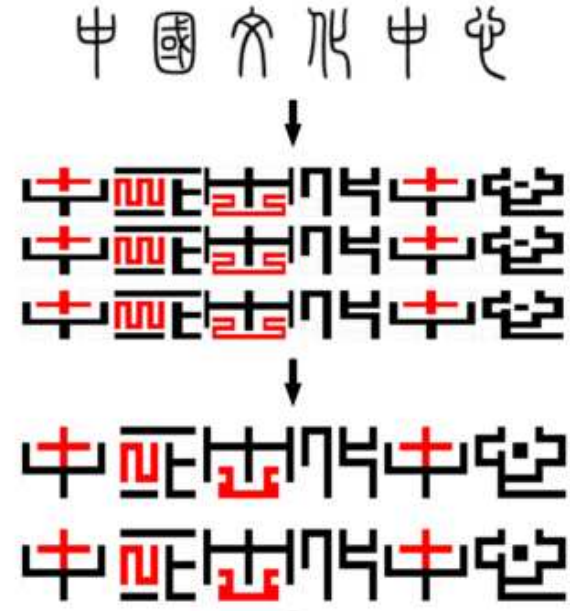
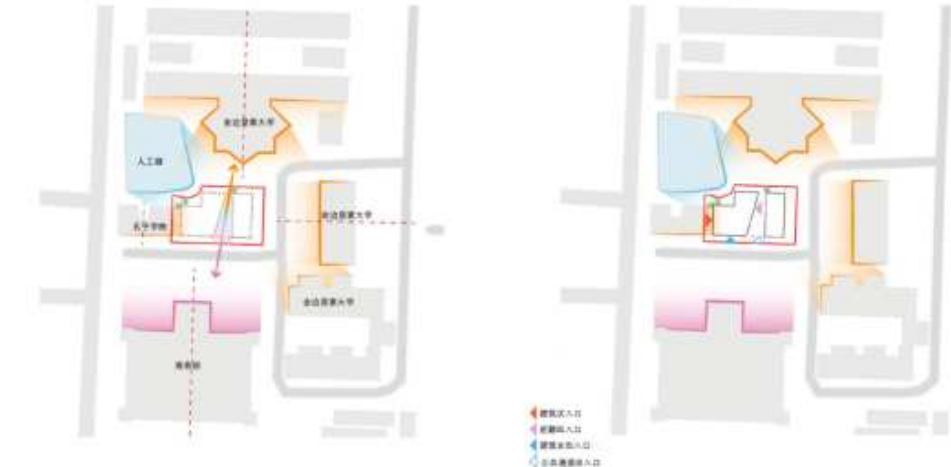


PROFESSIONAL WORK

Work during Internship at RSP

Cambodia Chinese Cultural Center, Phnom Penh

Role: conducted site analysis; produced diagrams, renderings and presentation layout; aided in landscape design; conducted material research and implemented façade design concepts.



PROFESSIONAL WORK

Work during Internship at RSP

Highspeed Railway Station Expansion, Deqing

Role: produced diagrams, plans, renderings and presentation layout; aided in landscape design



Video Rendering by Lumion, Fuzhou

