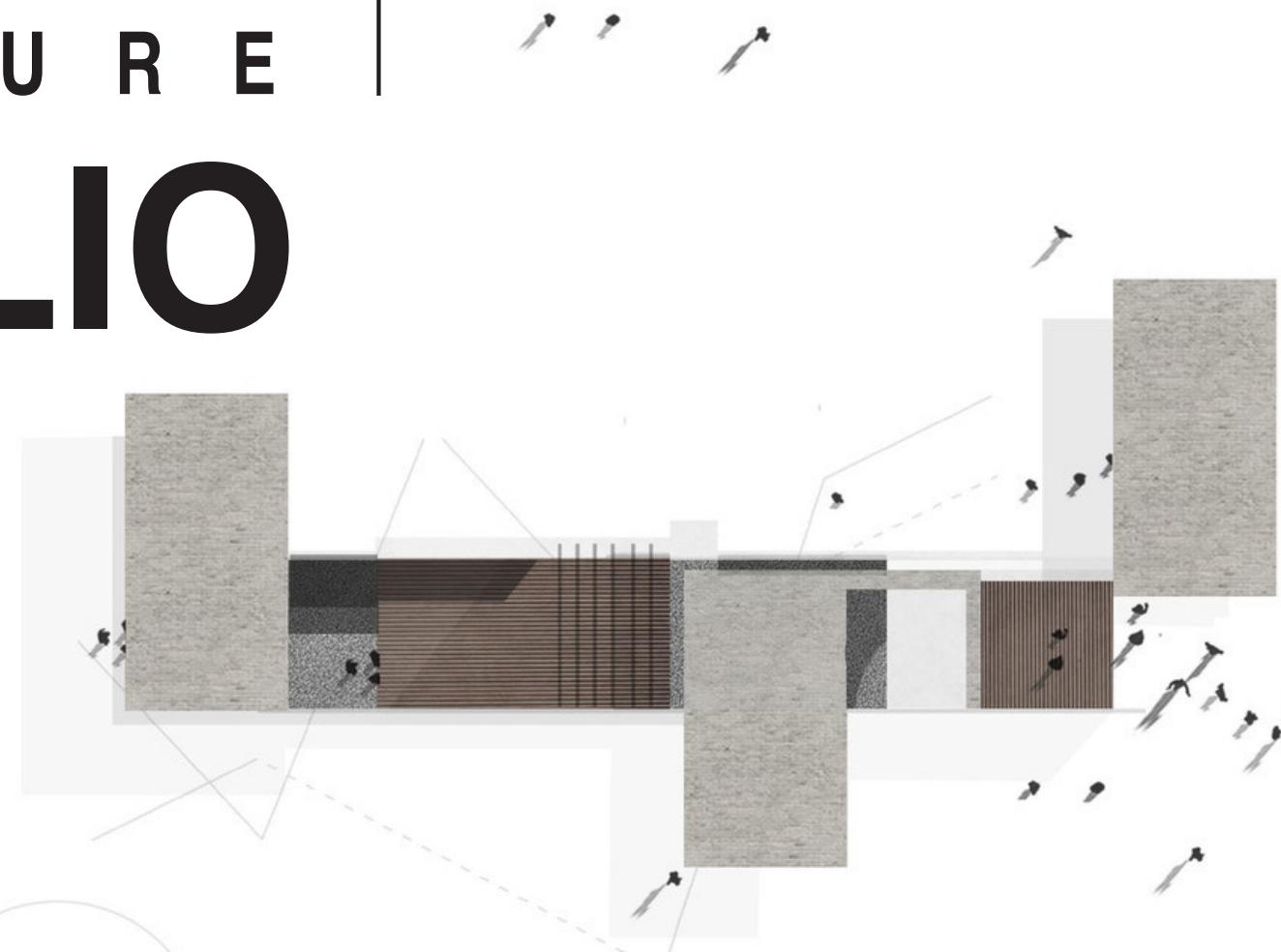


A R C H I T E C T U R E  
**PORTFOLIO**

2019 - 2024

Fang (Frank) Sun  
B.S. in Architecture (UVA) 2019-23  
Master of Architecture (UPenn) 2024-27 (Expected)

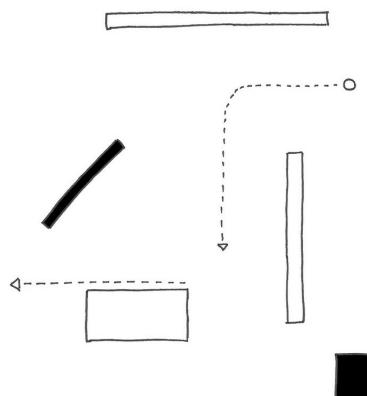


# PROLOGUE

My approach to architectural design is a combination of logic, creativity, and passion. I firmly believe in the transformative power of architecture, not just as a tool for solving social issues but as a beacon of humanistic values. Architecture, from my perspective, transcends beyond mere functionality or aesthetic appeal; it is a sanctuary where safety, health, and happiness converge.

This portfolio illustrates designs in a wide range of scales. It ranges from intricate bridge designs to the expansive layout of cities. Each project navigates a delicate balance between practicality and innovation, reflecting a forward-thinking mindset. The works presented address a spectrum of contemporary challenges - urban flooding, spatial fragmentation, vehicular congestion, and the evolving complexities of future urban living.

In each design, I strive to carve a path which not only solves these issues but also lays the groundwork for a more harmonious and sustainable future.



# PROJECTS

- 01** Welcome Center of Columbia University  
*Visioning Climate Resilience and Sustainability in a High-density Urban Site*  
Fall 2021
- 02** "Reborn": A Mixed-use Building at the University of Virginia (UVA)  
*Experimenting Architectural Intervention on the Spatial Separation of the Built Environment*  
Spring 2022
- 03** A Renovated Bridge in an Old Water Town  
*Bridging Humans and Vehicles*  
Summer 2022
- 04** An Aggregatable Collective for Industrial Settlement  
*Exploring Architectural Growth with Modular Design*  
Fall 2022
- 05** Arctic Brewscape  
*A Beer Spa with Harmonious Fusion of Iceland's Culture and Modern Amenities*  
Fall 2023
- 06** Lightwood House  
*An Entity Construction for Stay and Rest*  
Summer 2021
- 07** Leisure Pavilion  
*A Parametric Design Test for Light and Tangible Material*  
Summer 2020
- 08** Bamboo Valley  
*A Renovation Project to Find the Beauty in Nanjing Ancient Town by HandSketch*  
Winter 2020
- 09** Professional Works (Selected)  
*Work Samples Developed While Employed Full-Time (STUDIOS Architecture) Post-Graduation*  
Summer 2023 - Now

## 01 **Welcome Center of Columbia University**

*Visioning Climate Resilience and Sustainability in a High-density Urban Site*

Studio Work

Instructor: Peter Waldman

Individual Work

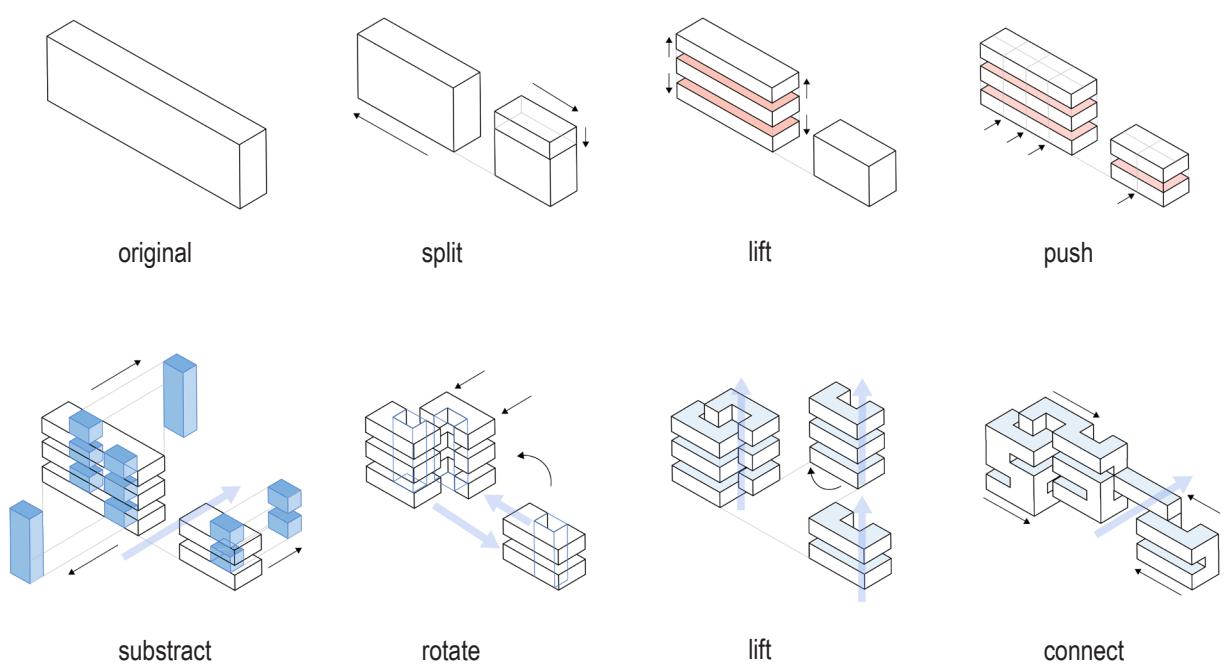
Fall 2021

This project aims to explore how to incorporate **sustainable development** into a building located in one of the busiest regions in the world.

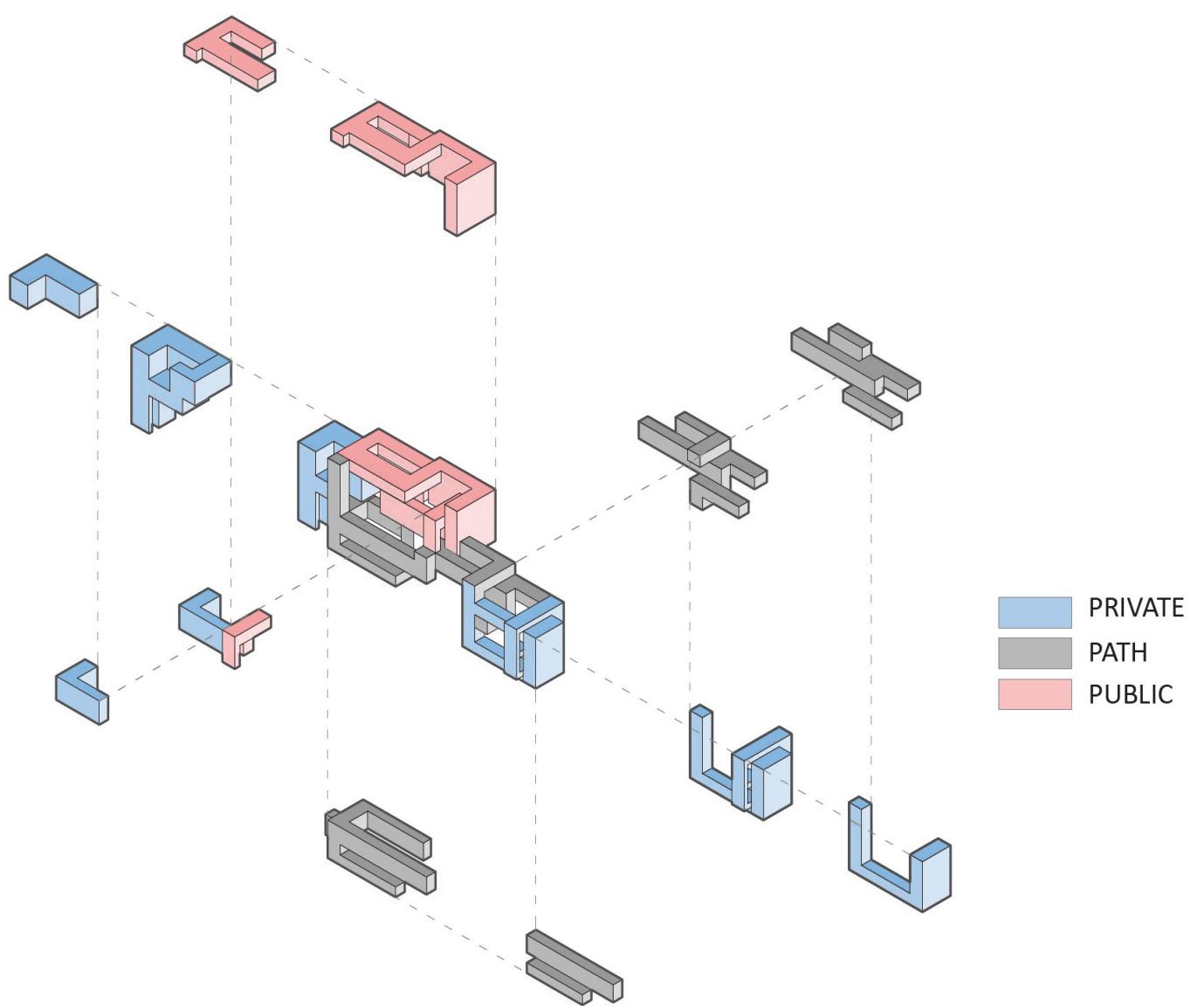
Due to climate changes, the Hudson River will overflow its banks and flood in Manhattan within the next twenty to thirty years. Therefore, the Welcome Center is designed with a higher base level to reduce flooding vulnerability. In order to improve **space efficiency and lower energy waste**, meeting rooms, study rooms, libraries, auditoriums and exhibition galleries are incorporated into this building to fulfill different visitors' needs.

This design first splits the module into two pieces, and then alters the shape by using **interlocking in both two and three dimensions**, which enables the building to expand from the Columbia University site to W 125th Street and connect with the park in the south end. The elongation of the building implies architecture's potential to grow and ultimately solve environmental problems by reducing unnecessary waste of space.

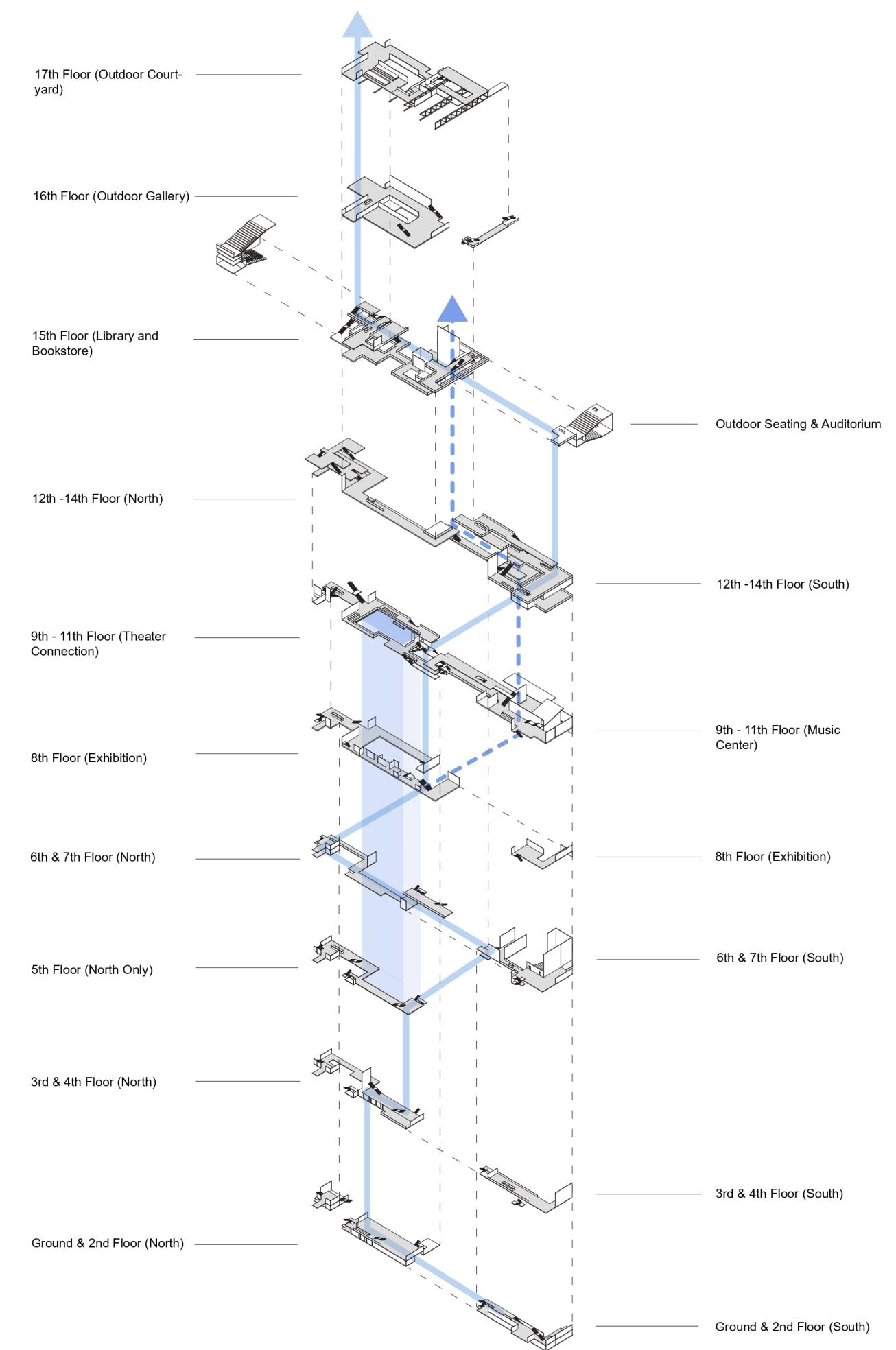




Form Analysis Diagram

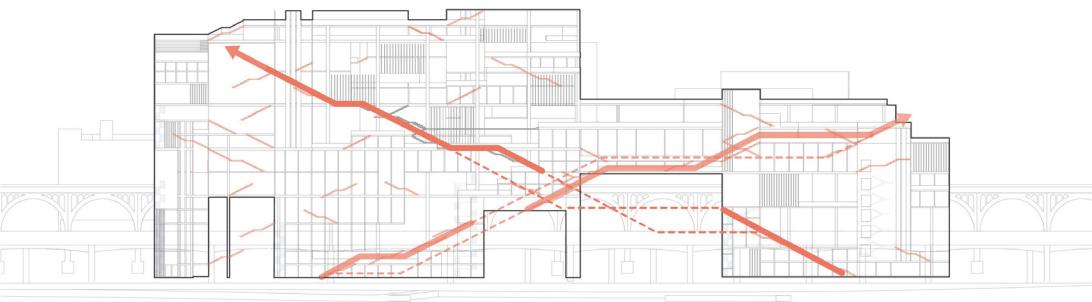
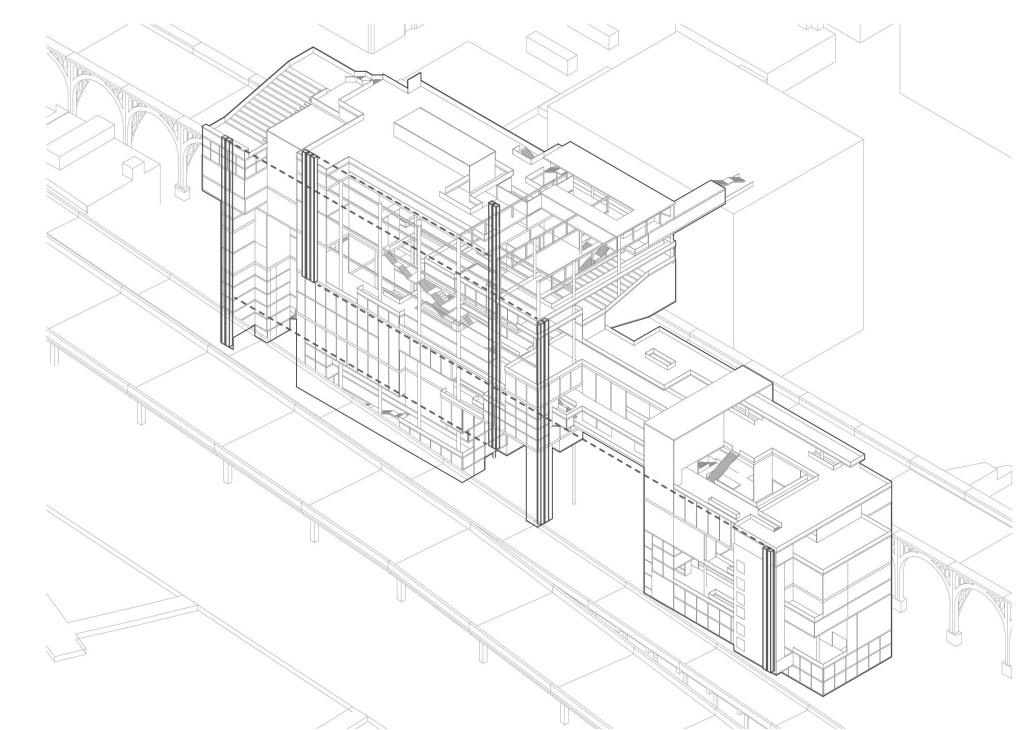
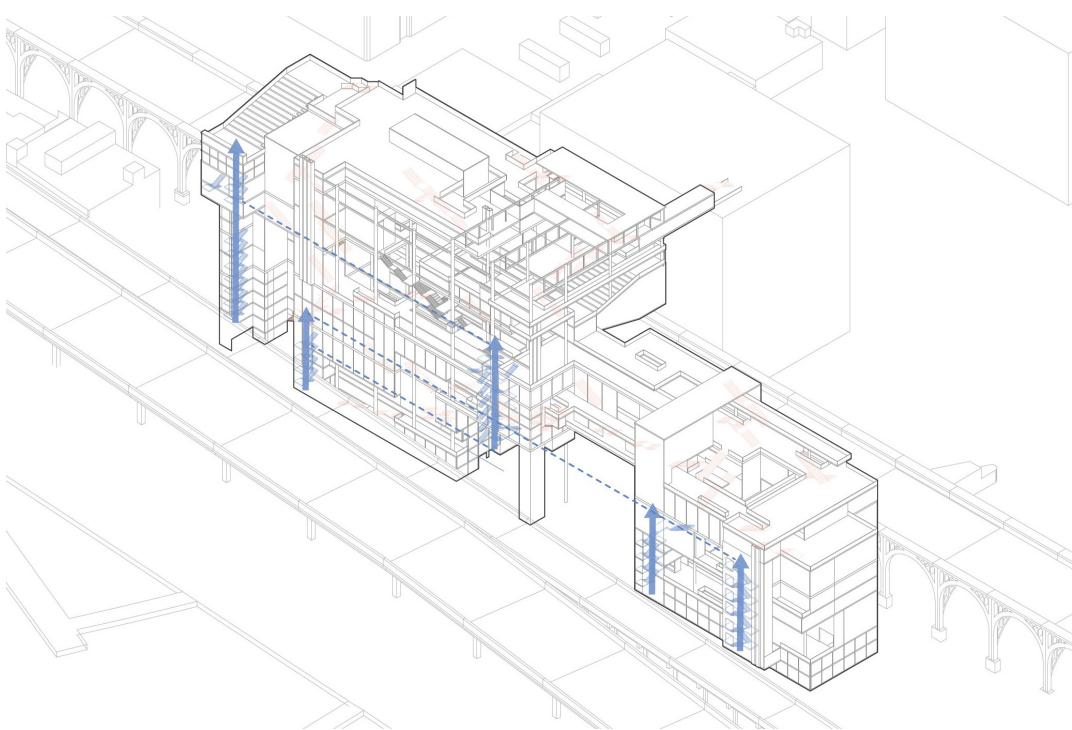
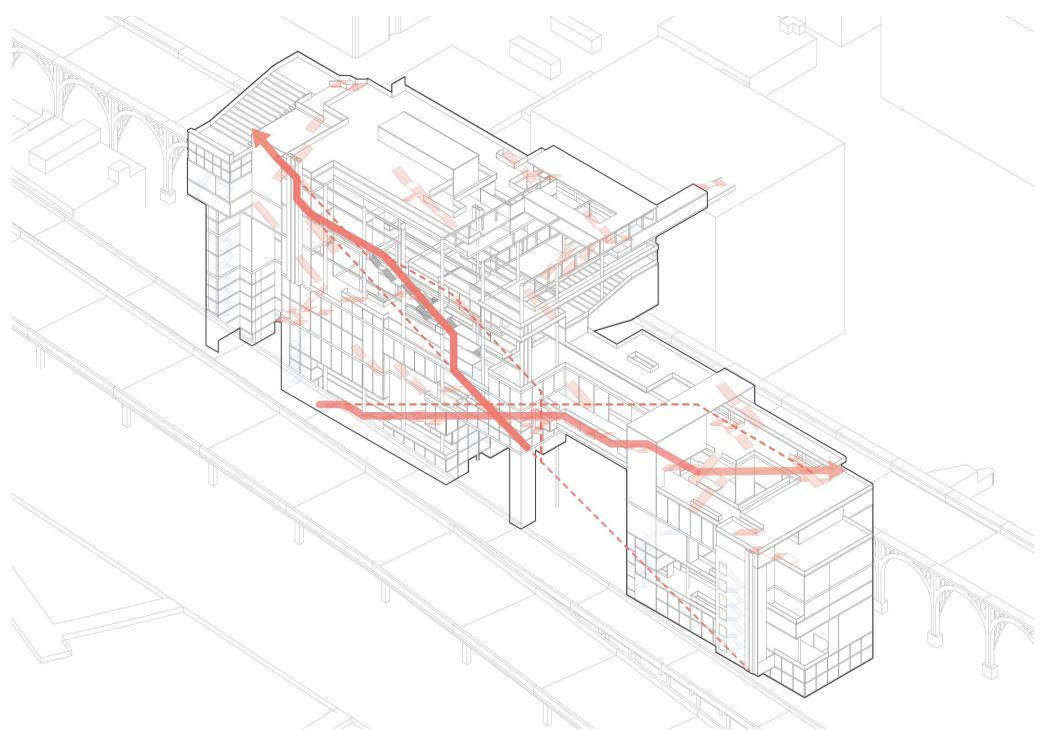


Function Analysis Diagram

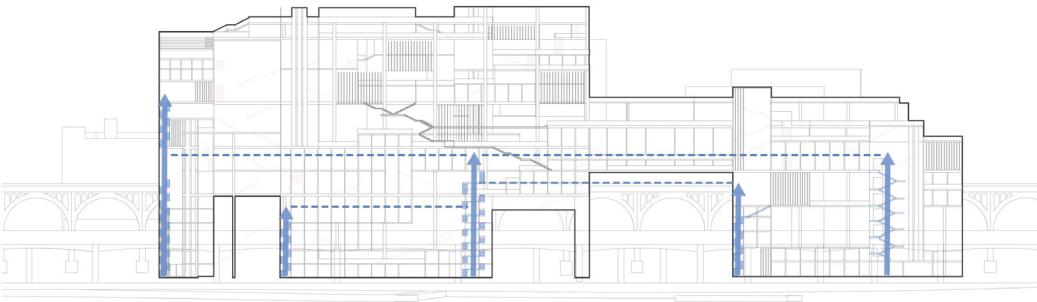


Exploded Axonometric Diagram

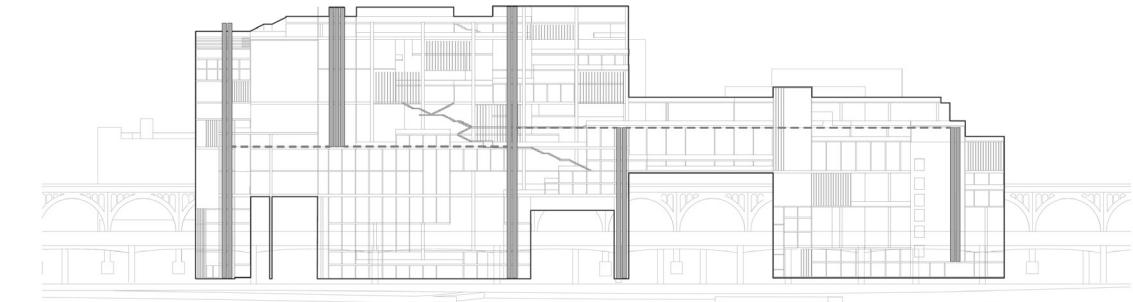
## Circulation Analysis Diagrams



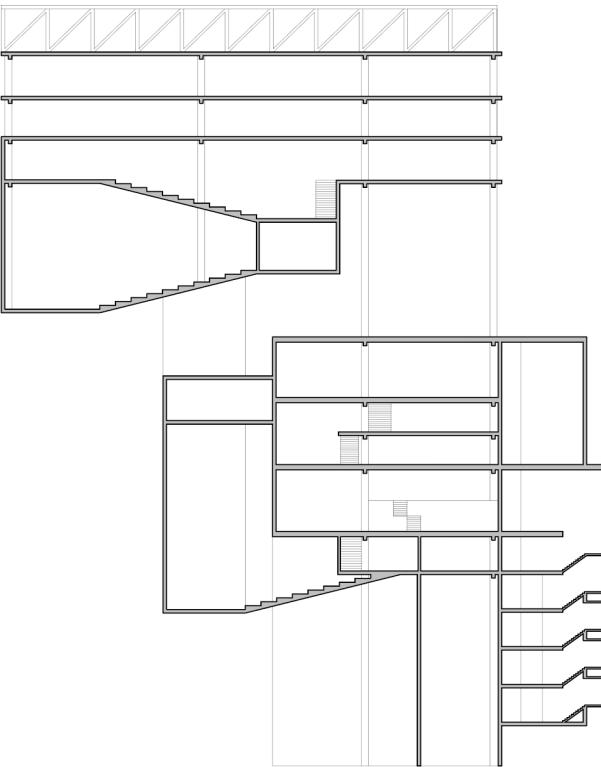
Primary Circulation with Straight Stairs



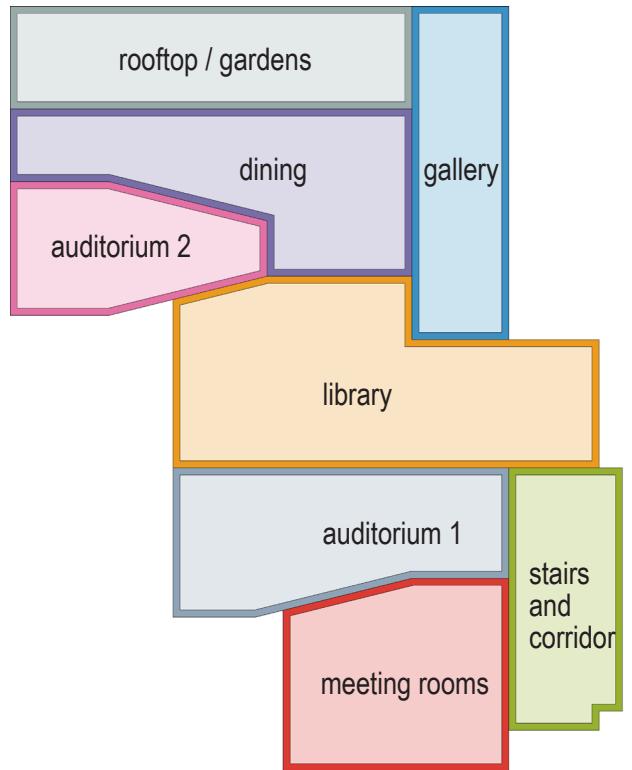
Secondary Circulation with U-Shaped Firestairs



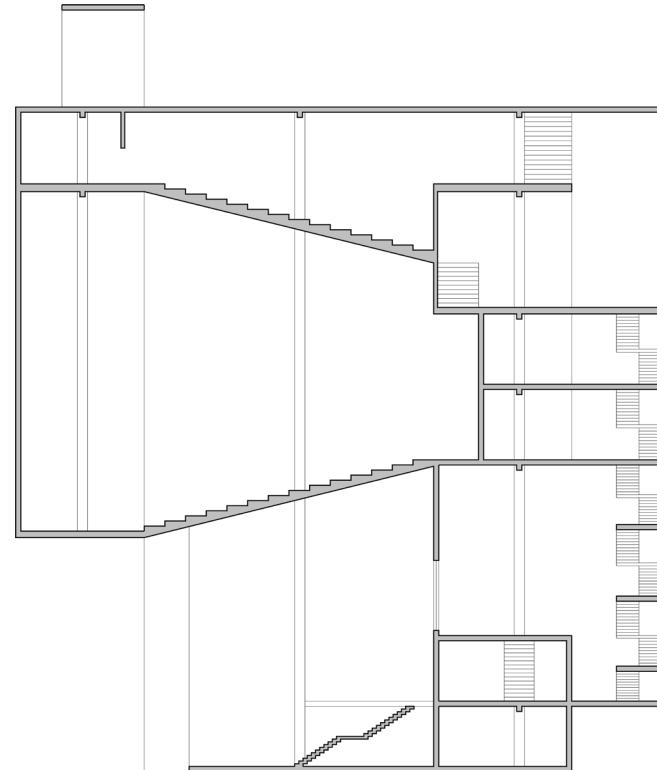
Tertiary Circulation with Elevators



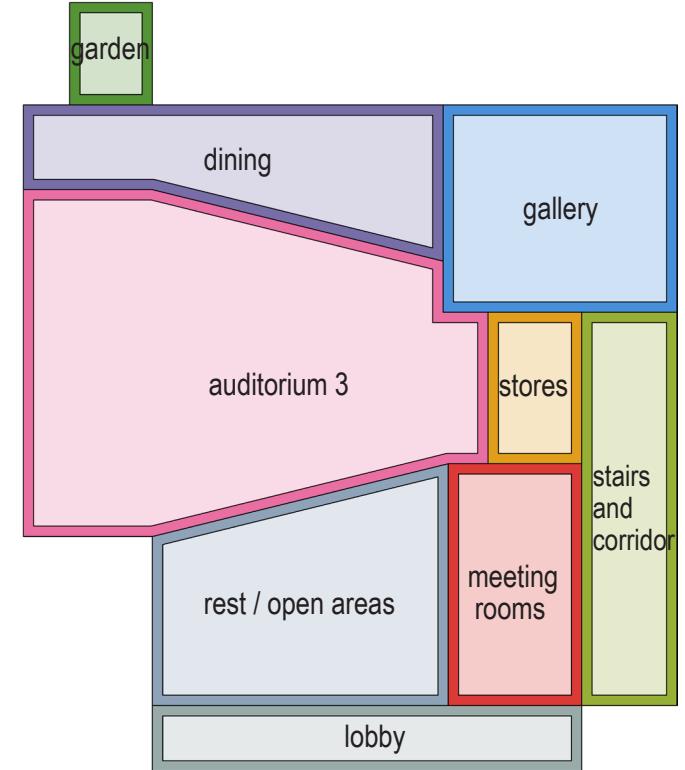
Short Section 1



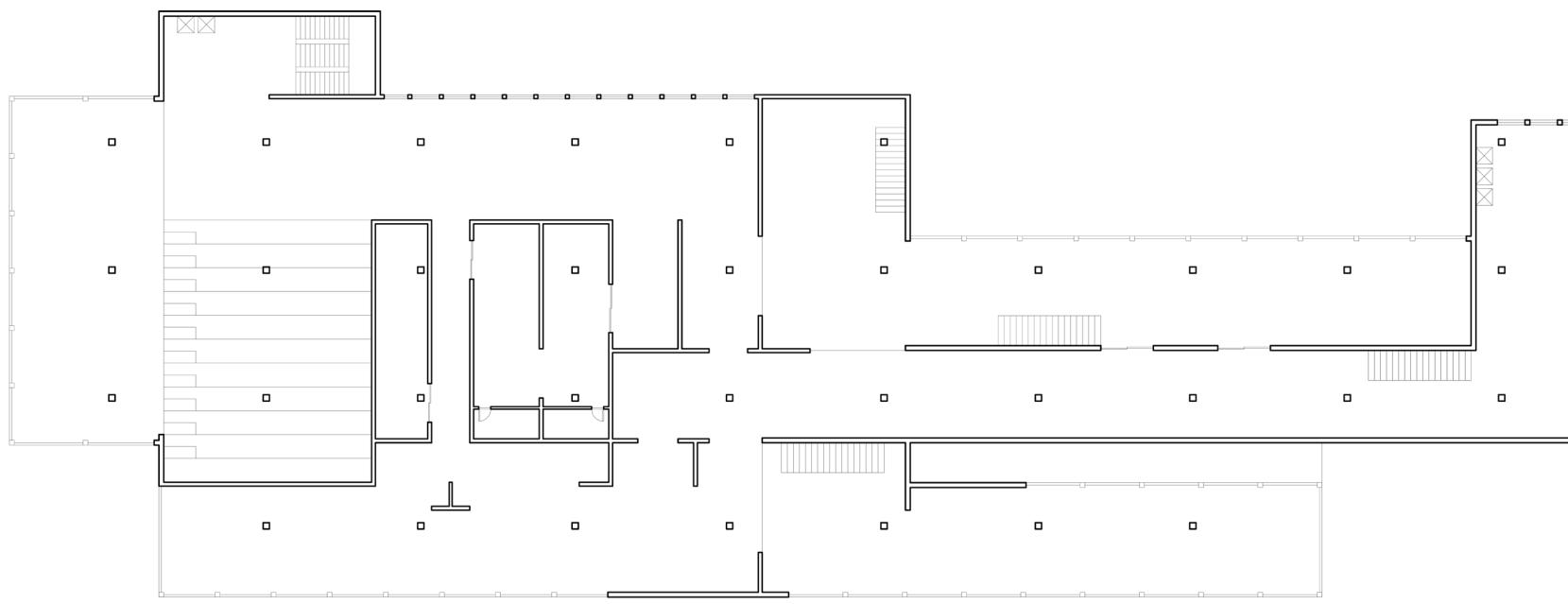
Function Diagram 1



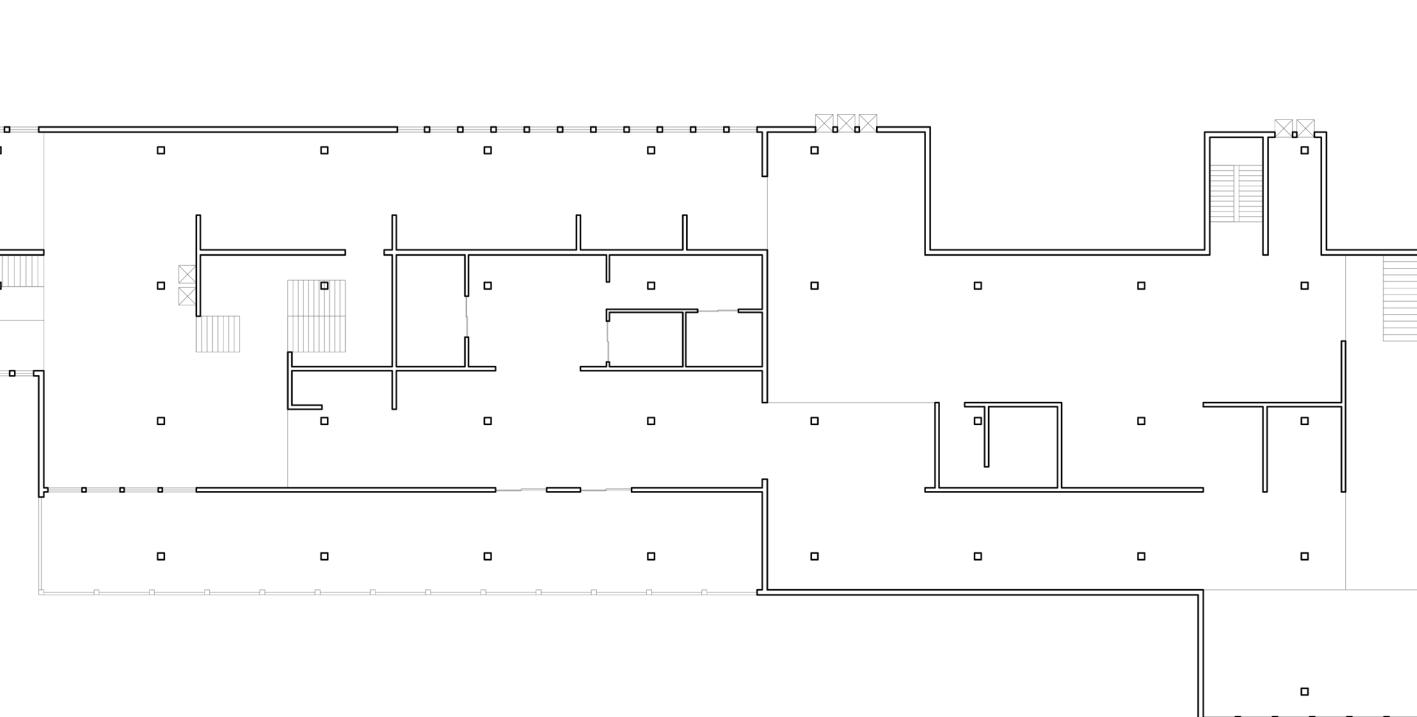
Short Section 2



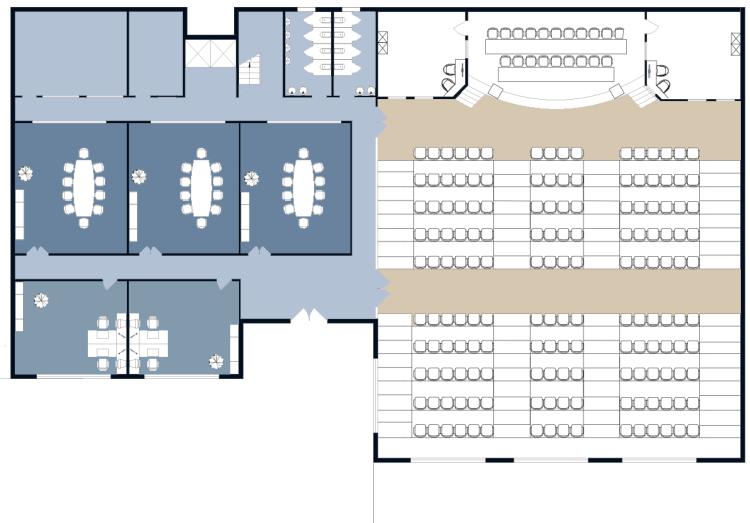
Function Diagram 2



Level 12 Master Plan



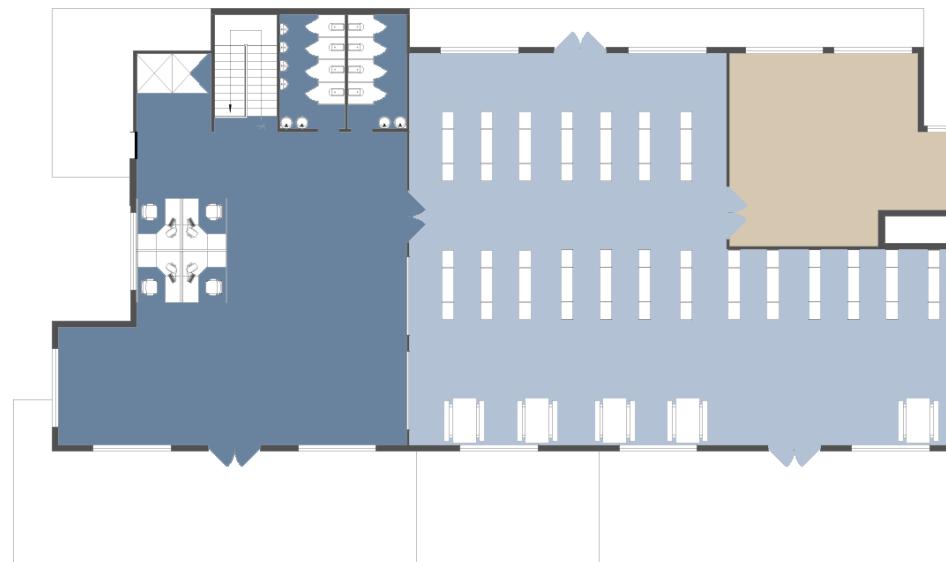
## Detailed Plans (1"=20')



Auditorium 3

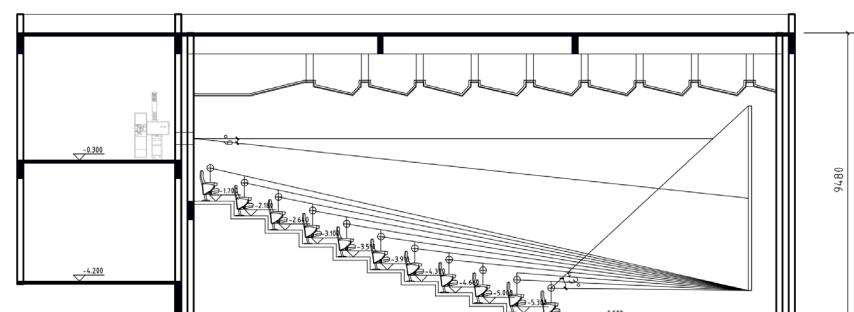


Library

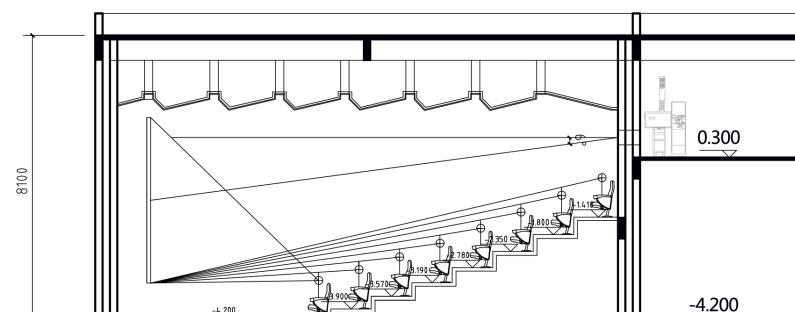


Dining Area

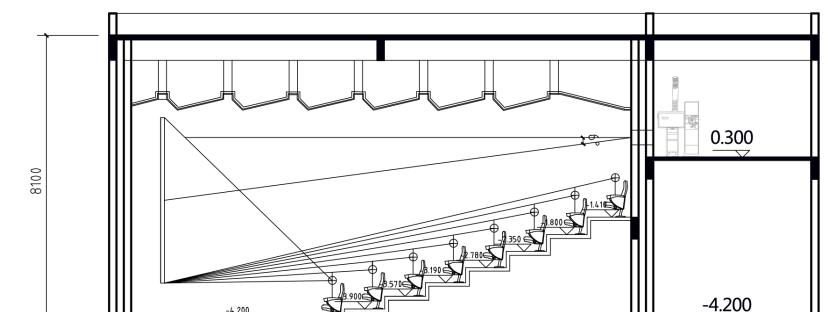
## Auditorium Type Analysis (1"=16')



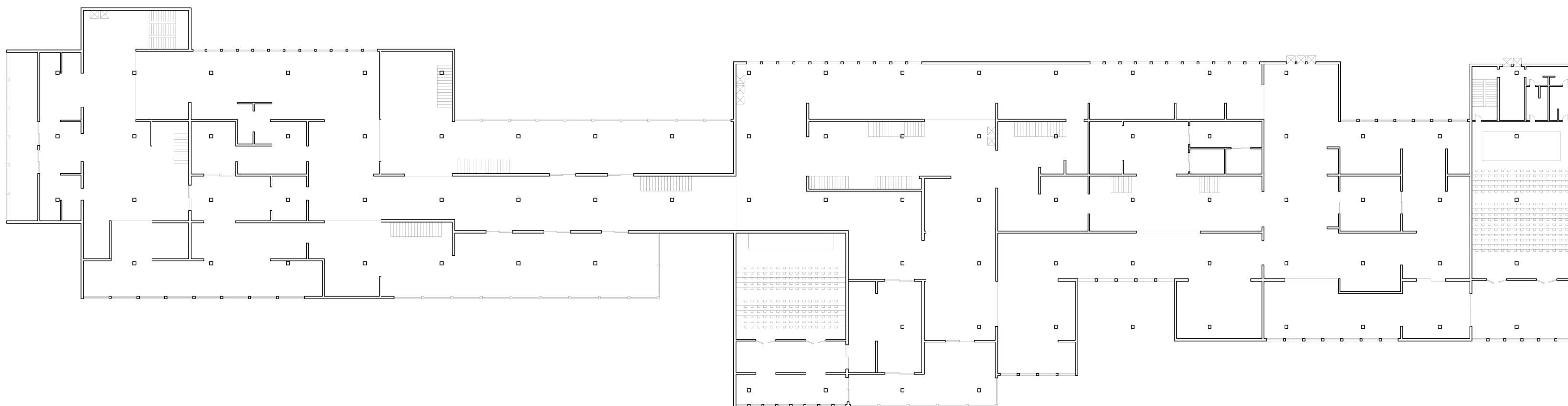
Auditorium 3 or 2



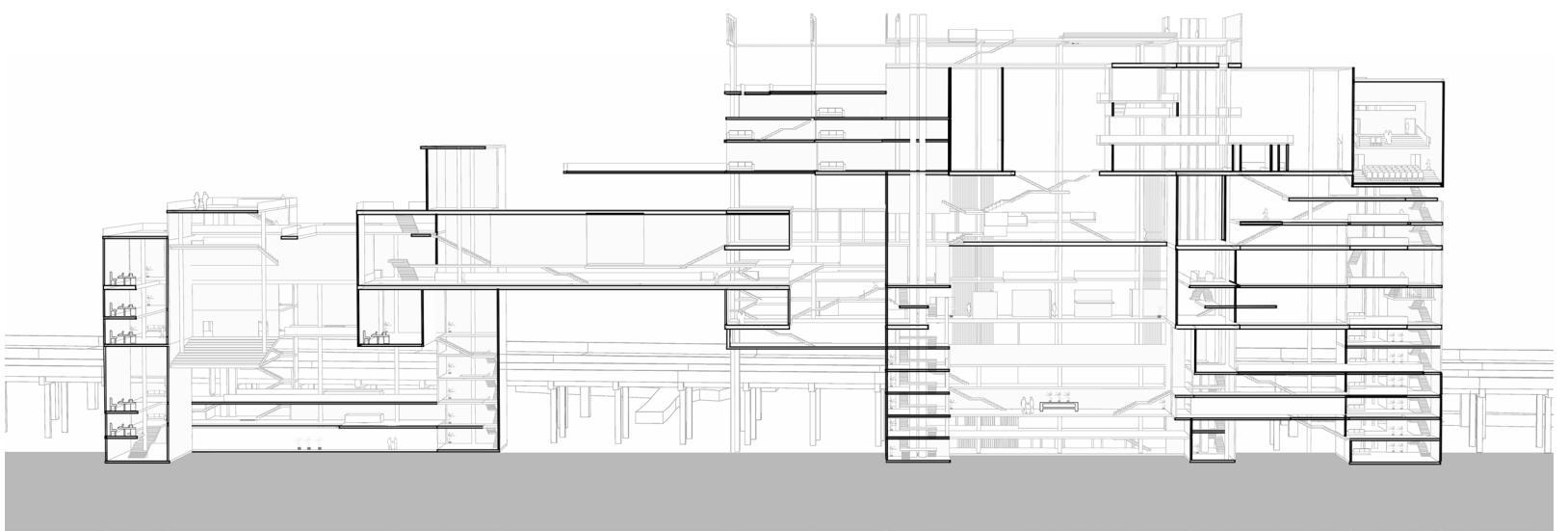
Auditorium 3 or 1



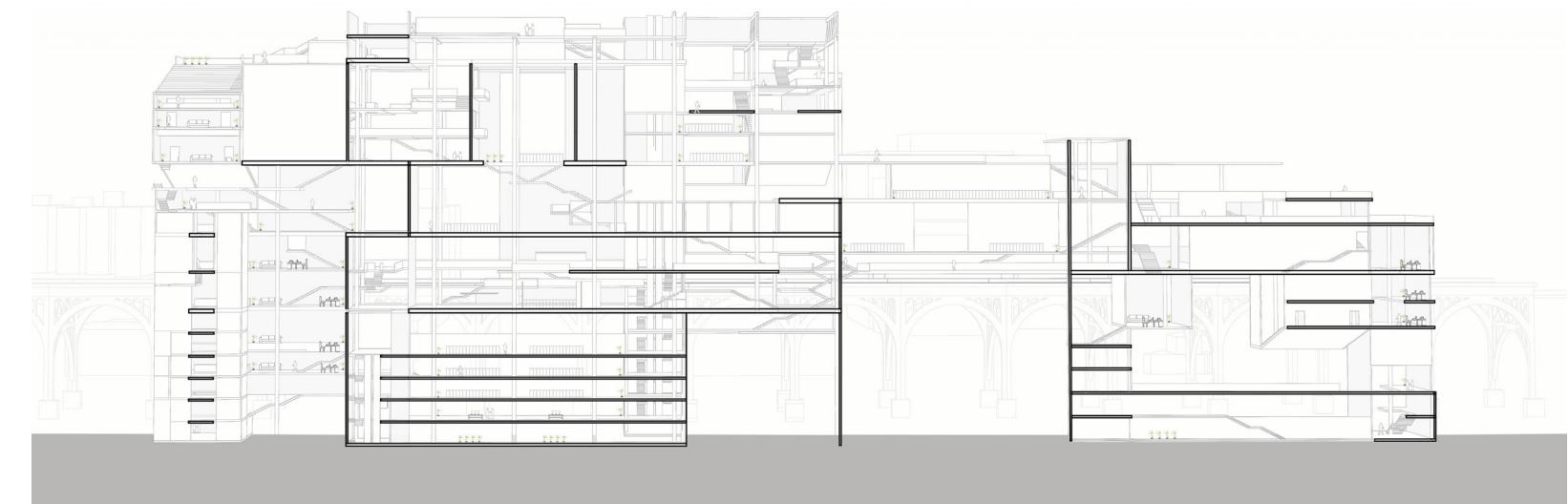
Auditorium 2 or 1



Level 06 Master Plan



Linear Section from Campus



Linear Section from the Hudson River



View from the Hudson River



View from Drivers on Highway

## 02

### **"Reborn": A Mixed-use Building at the University of Virginia**

Experimenting Architectural Intervention on the Spatial Separation of the Built Environment

Studio Work

Instructor: Schaeffer Somers

Individual Work

Spring 2022

The active railway cutting through UVA's campus **weakens the connections** between the North and South grounds of UVA. This project, designed to be located at Lambeth (North Grounds), is dedicated to changing this situation.

To restore the connections for the grounds, a **skyline walkway over the rail** is used to connect the main campus, Carr's Hill Field and Nameless Field. The building includes **collective commons** on the base section (1-4 floors) and **student-faculty housing** on the top section (5-7 floors). The form and shape are generated to ensure potential entrances on the site.

On each floor, a **half-floor** is added to allow people to look down and enjoy the beauty of "flows" inside the building. The central courtyard **introduces water** from Dell to Lambeth, which will flow around the railway and finally gather at the center and become **the major supply** for people living in the dorms of the building.

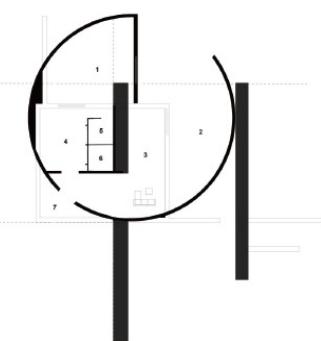
Last but not least, this building is named "Reborn" because it is "rebornable". For every level above, the future constructor can **follow the similar pattern** as what it has for now, so when there are more residents, no extra design or new materials will be considered.



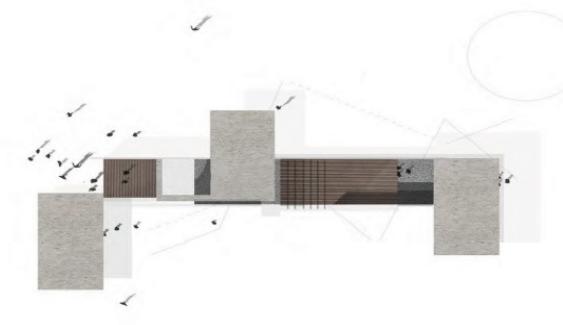
## Form Analysis (by Collage)



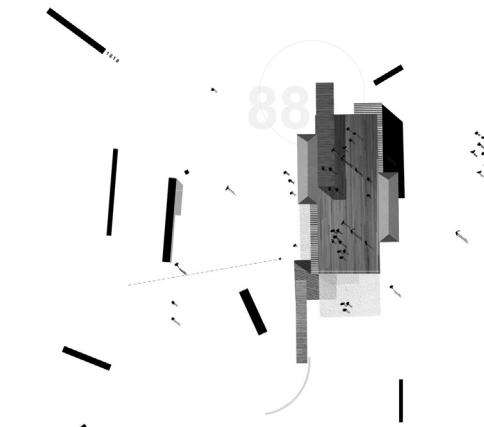
Drone Image



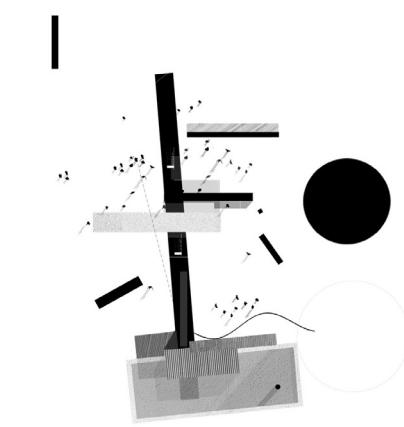
Circle Analysis



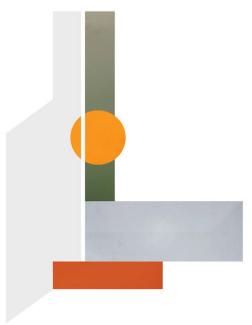
Block Analysis (Straight Line)



Line Combination Analysis 1

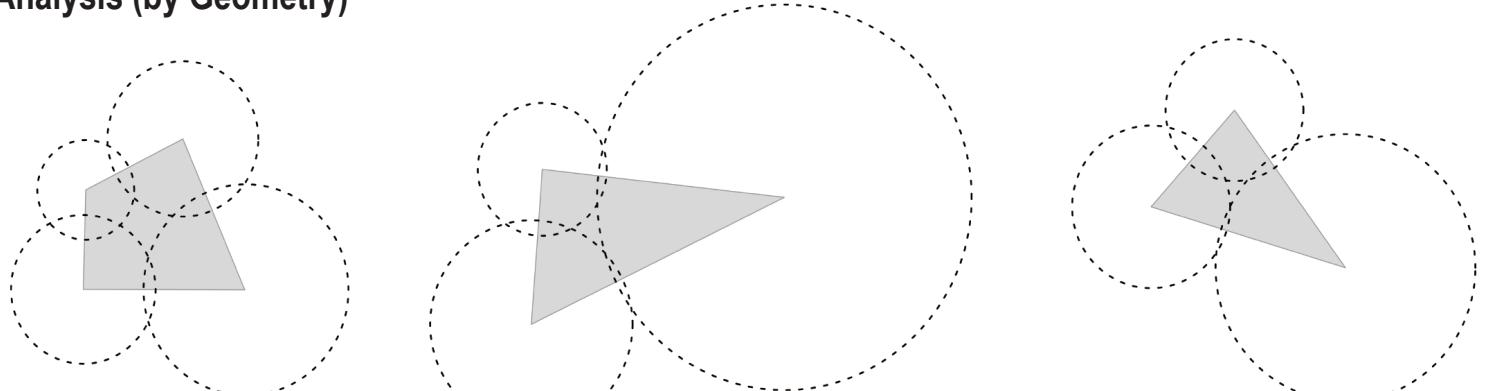


Line Combination Analysis 2



Geometry Analysis  
(Extract Ideas from Previous Steps)

## Form Analysis (by Geometry)

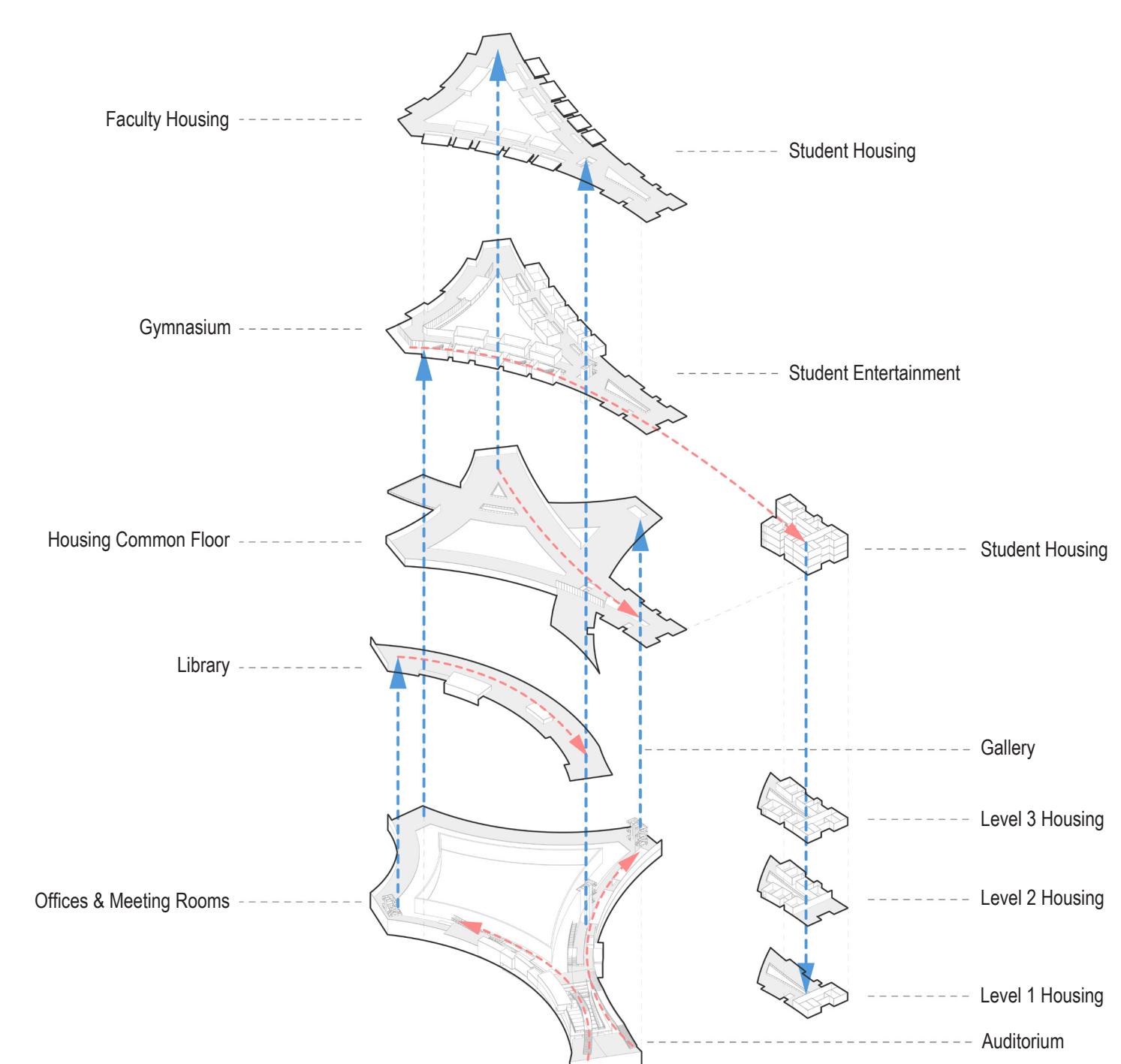
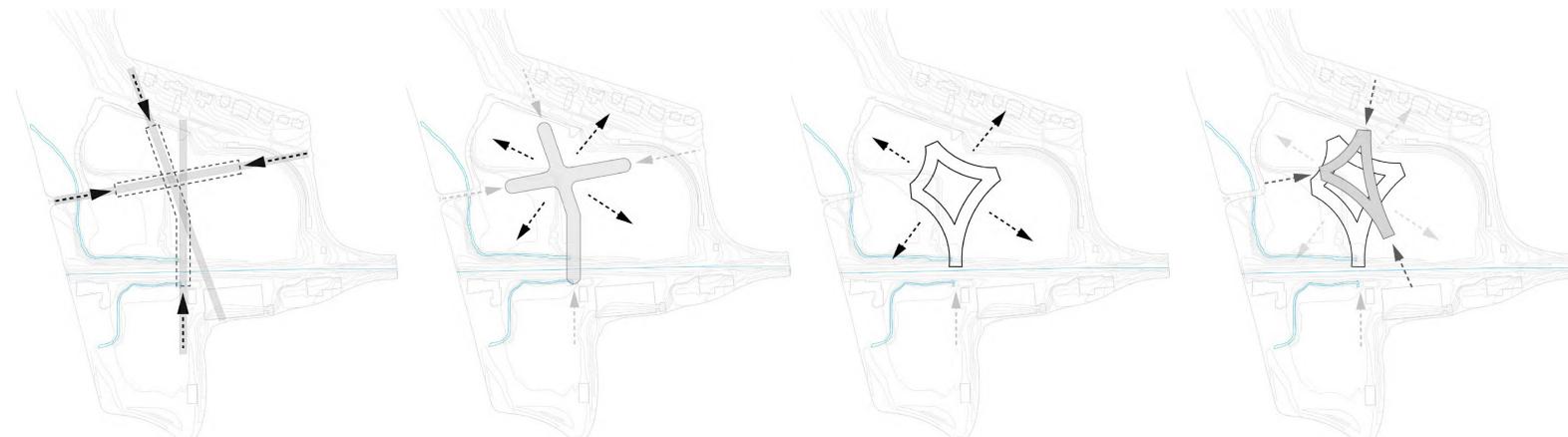


push

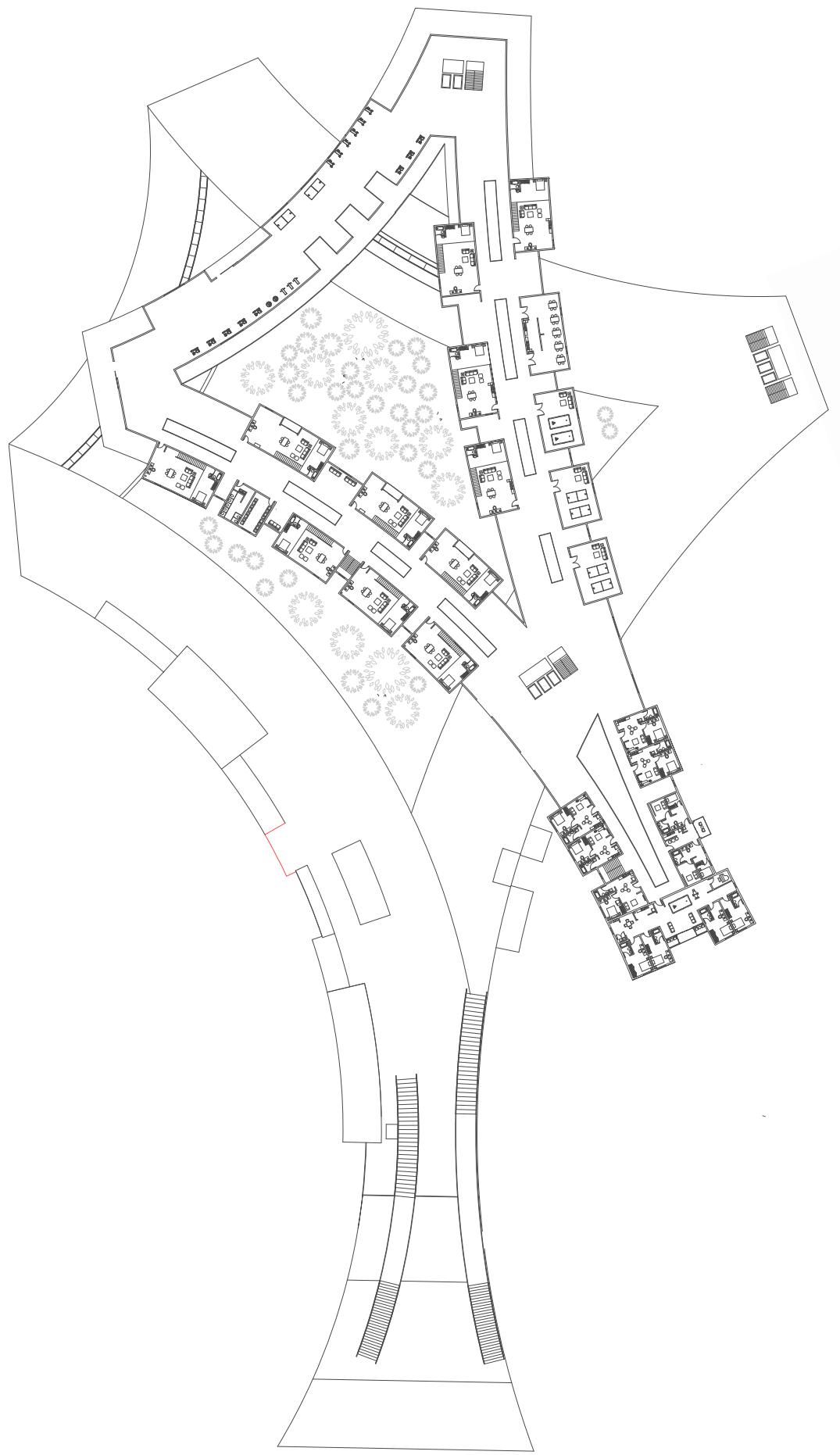
pull

drag

push and shear



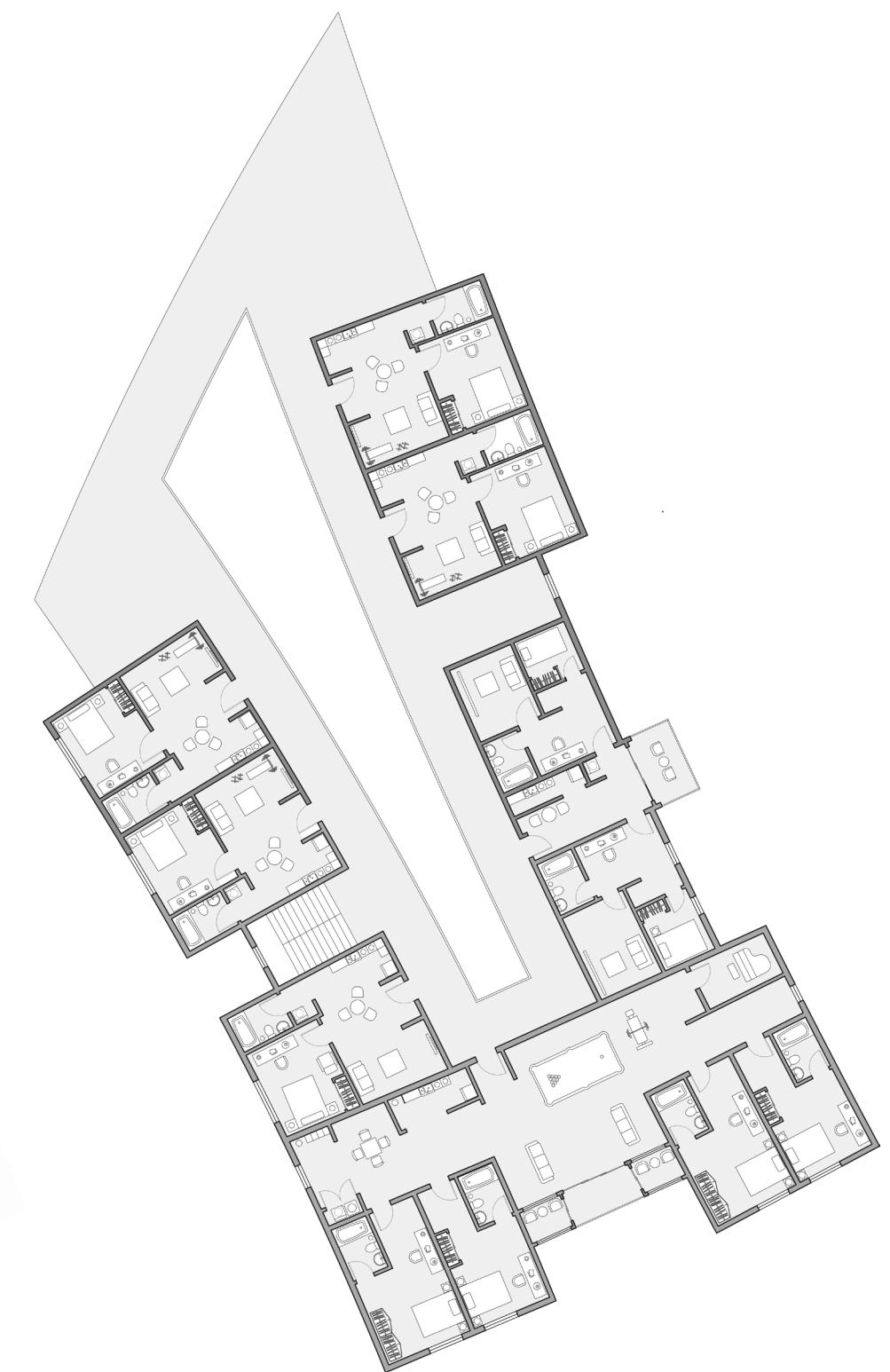
Exploded Axonometric Diagram



Master Plan on Level 3



Enlarged Plan for the Northeast Wing

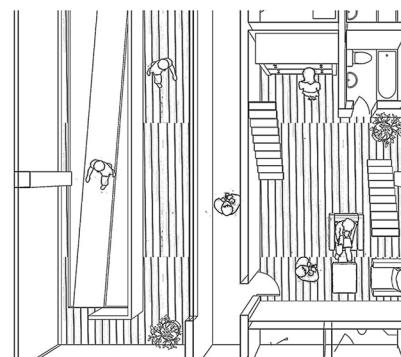


Enlarged Plan for the Faculty Housing Floor

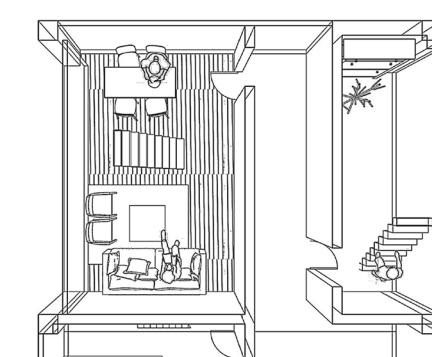
## Detailed Housing Plans



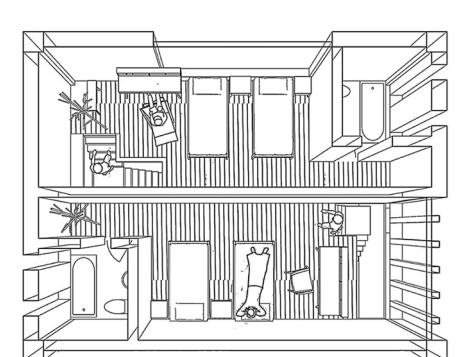
Student Housing



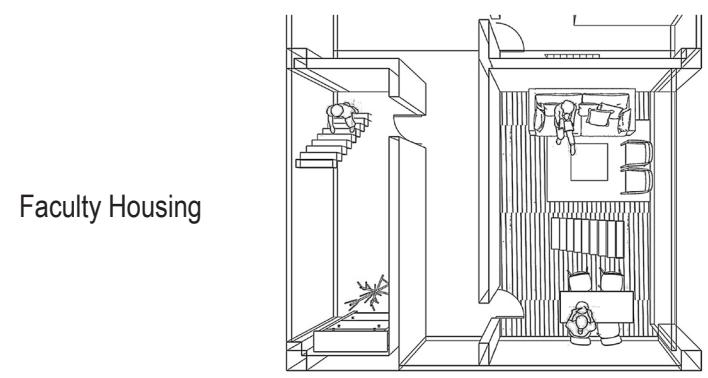
Type 2



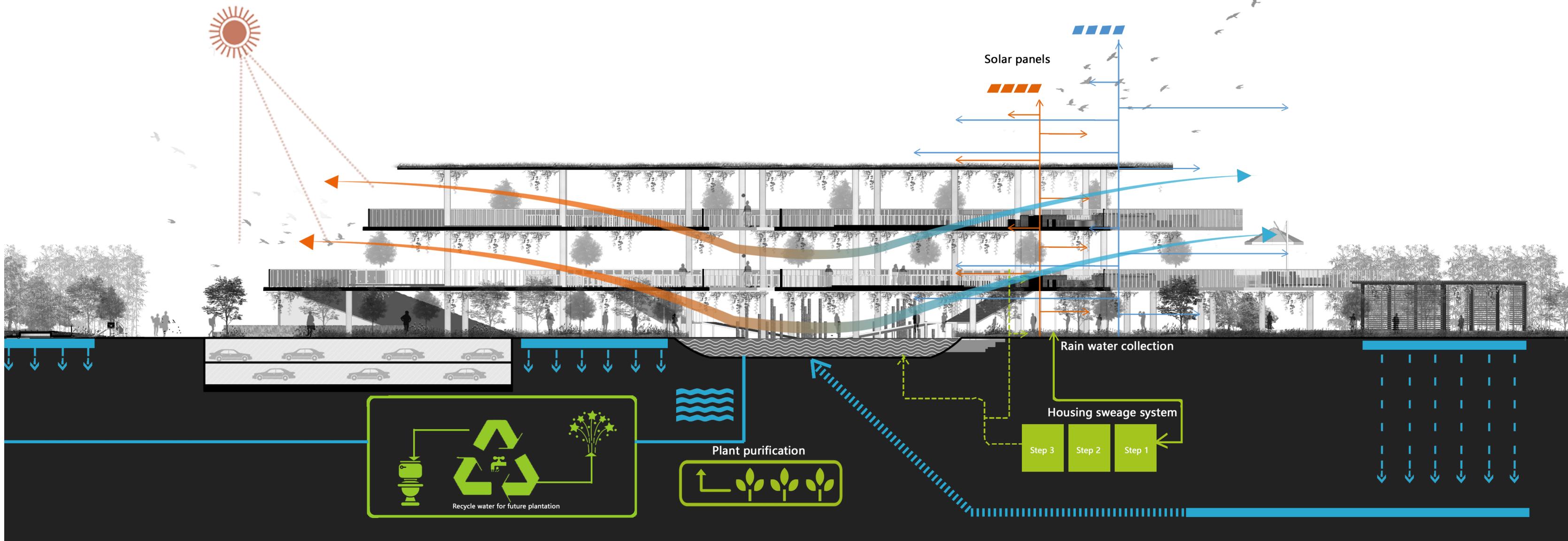
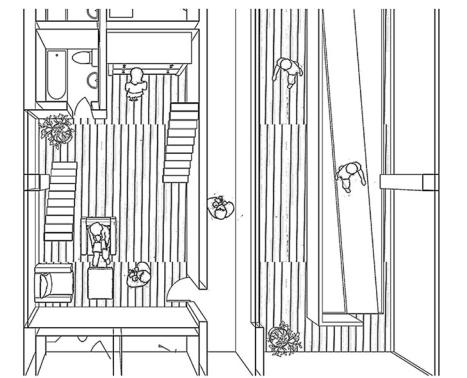
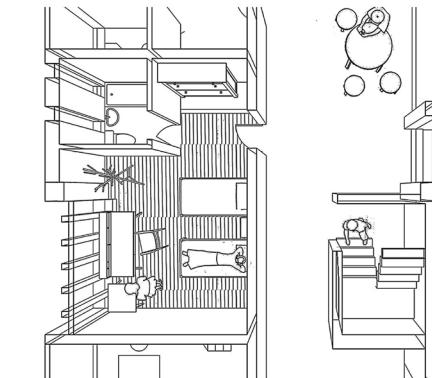
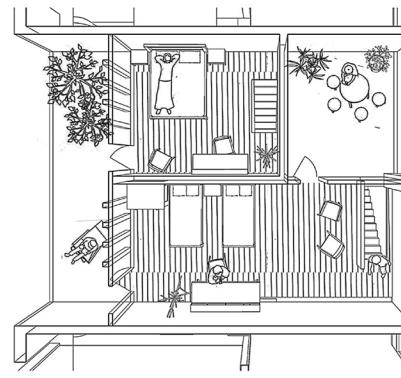
Type 3



Type 4



Faculty Housing



Elevation with Ecological Analysis

## Rendered Images



Central Courtyard



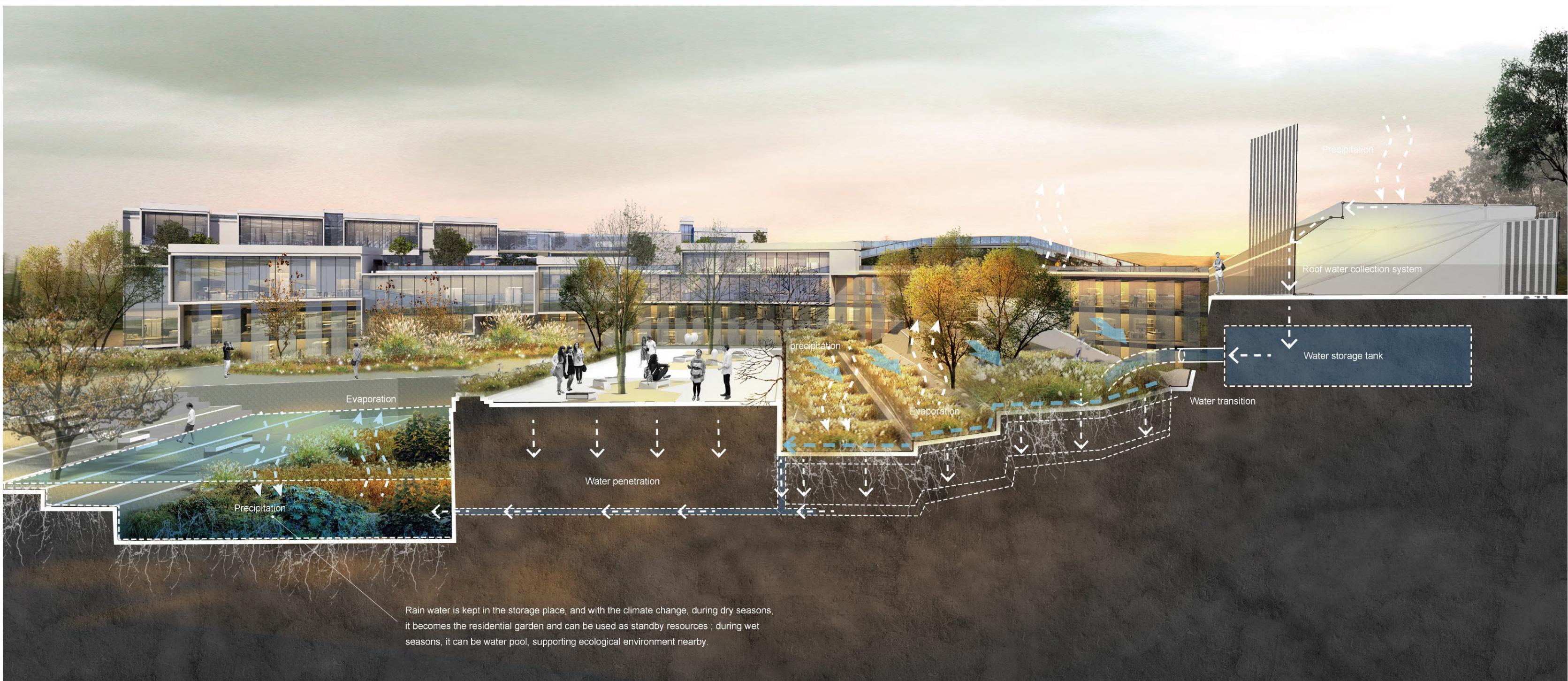
Birdeye View



Entrance to the Second Level



Fitness Center



Long Section With Designed Water Storage and Reuse System

### 03

## A Renovated Bridge in an Old Water Town

Bridging Humans and Vehicles

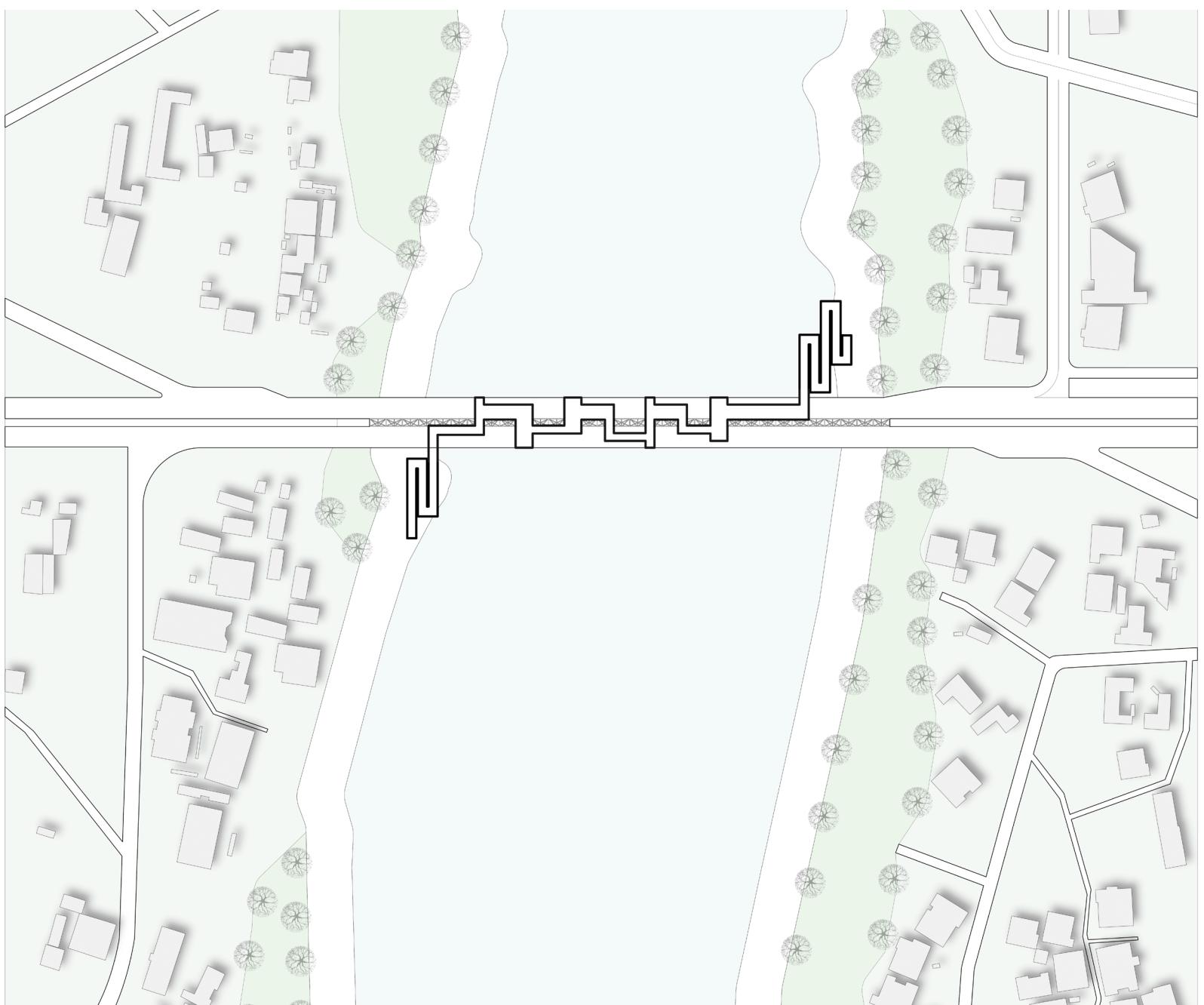
Instructor: Lifeng Lin  
Individual Work  
Fall 2022

Traditionally, a bridge is a **simple connection system** to make two sides meet. However, a modern bridge can be more sophisticated.

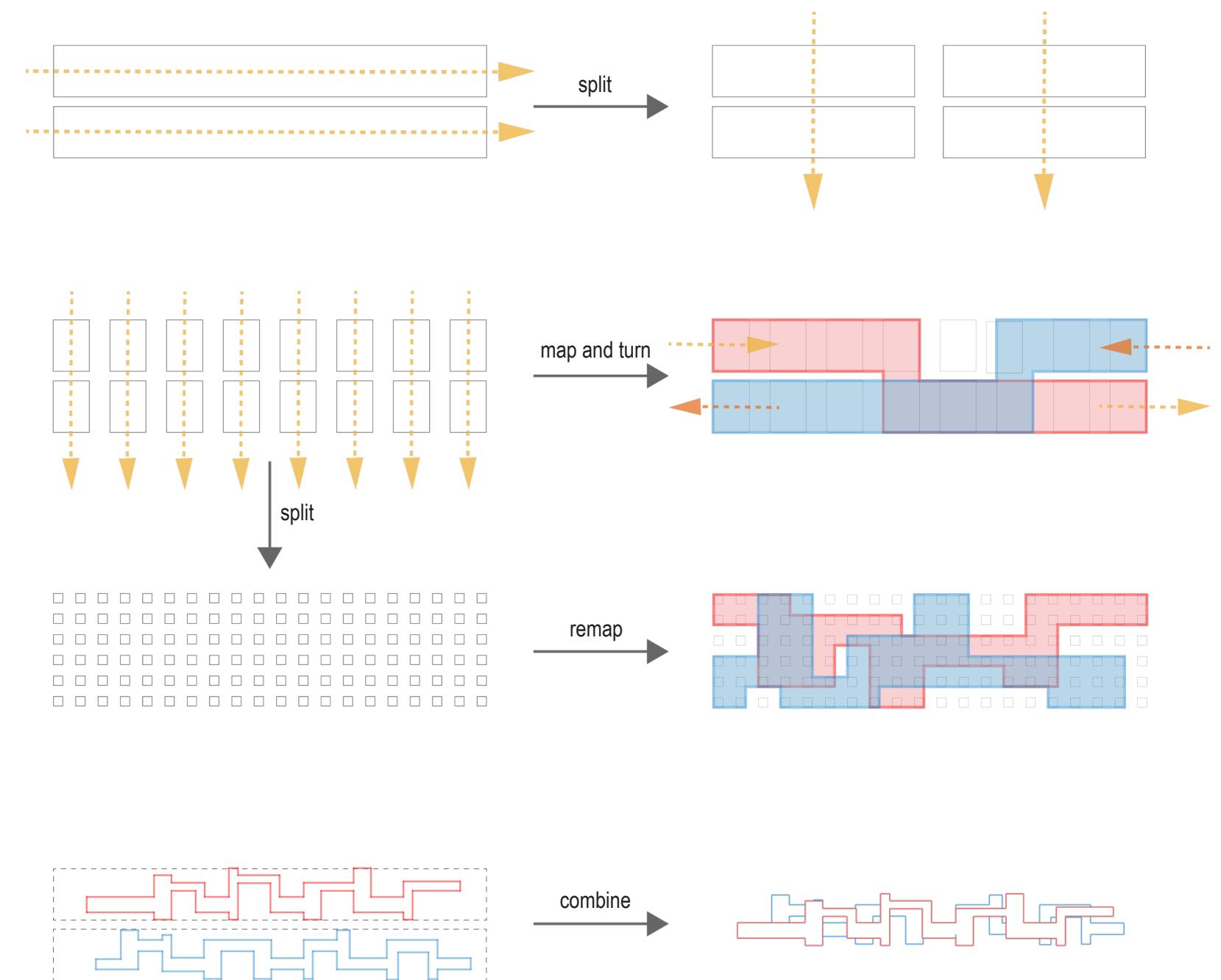
Spanning over the Yongxin River , the 150-meter bridge takes the shape of a zipper to allow both vehicles and pedestrians to pass conveniently and thus **ease traffic pressure**. The walkable aisles are above and below the driveway, and **pedestrians can go up and down** through connected stairs. The lower aisle is mainly for passing, while the upper aisle is designed to accommodate small shops. At both ends of the bridge, there are **ramps, stairs and elevators** so that pedestrians can directly go up to the aisles from the shore.

The entire bridge is supported by a **mesh steel frame structure**. The middle part of the structure can carry the vertical force of the three floors, and extend the beam from the center to **achieve the effect of horizontal support** at the same time.

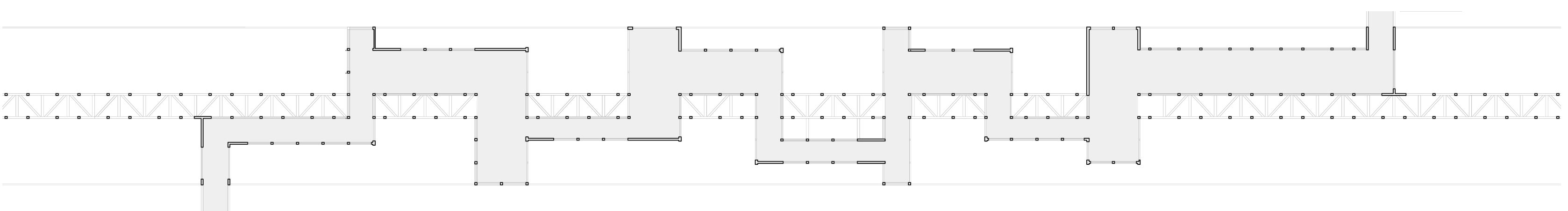




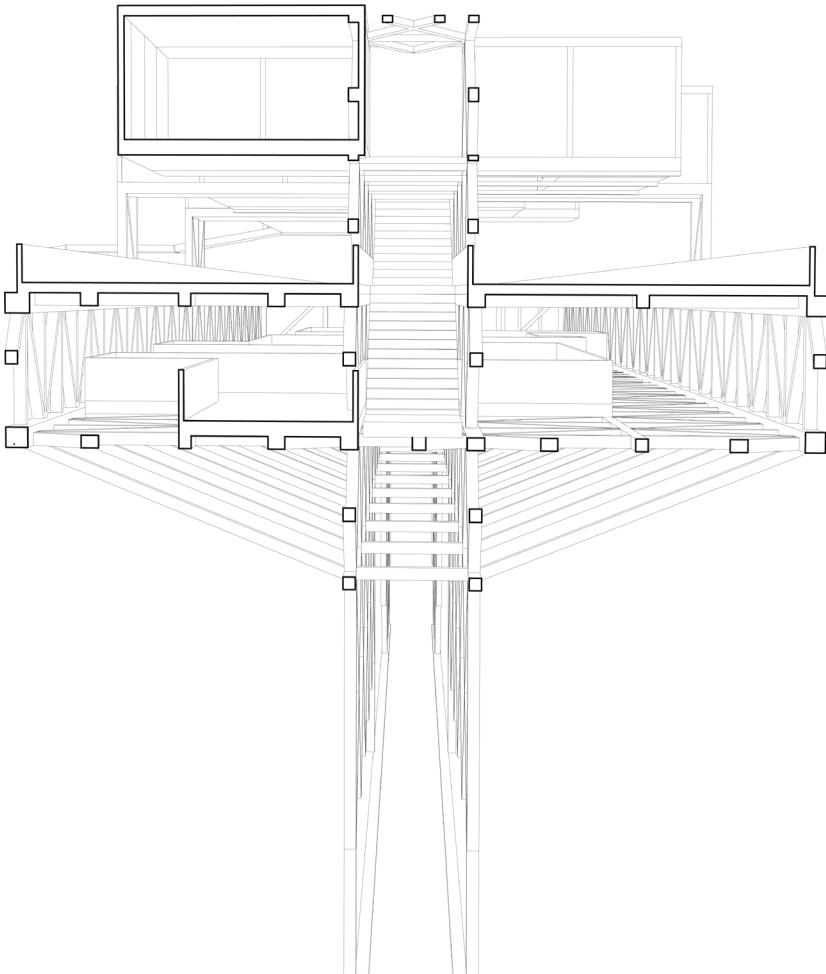
Site Plan



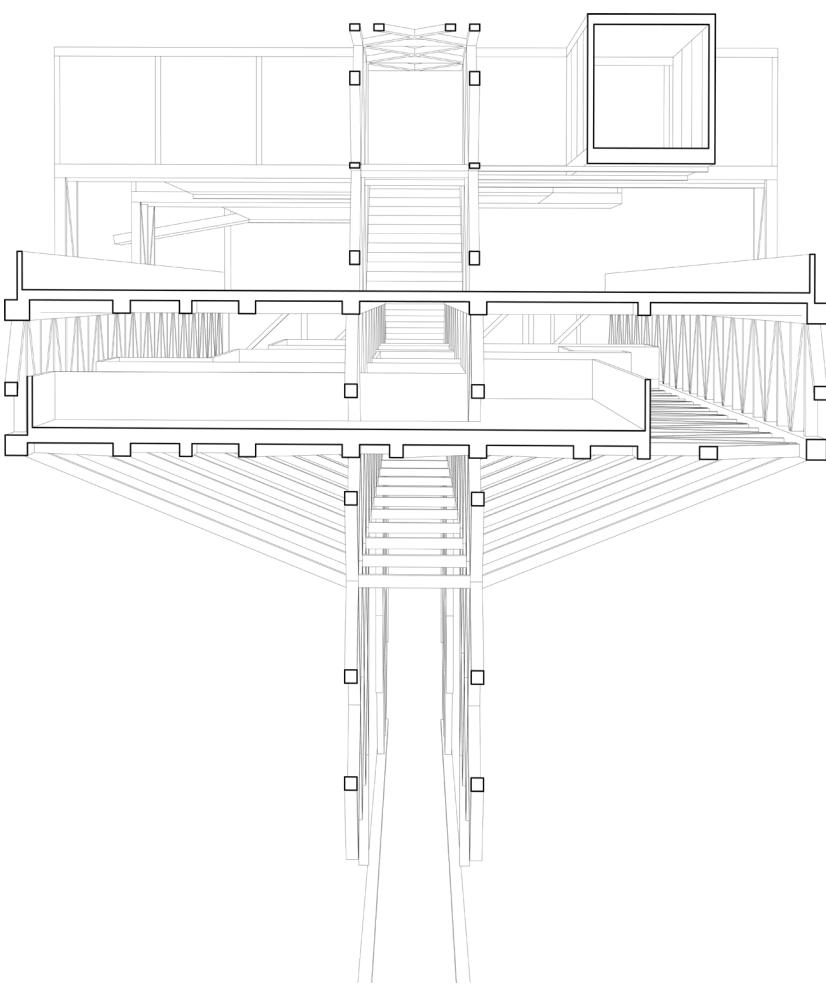
Form Analysis



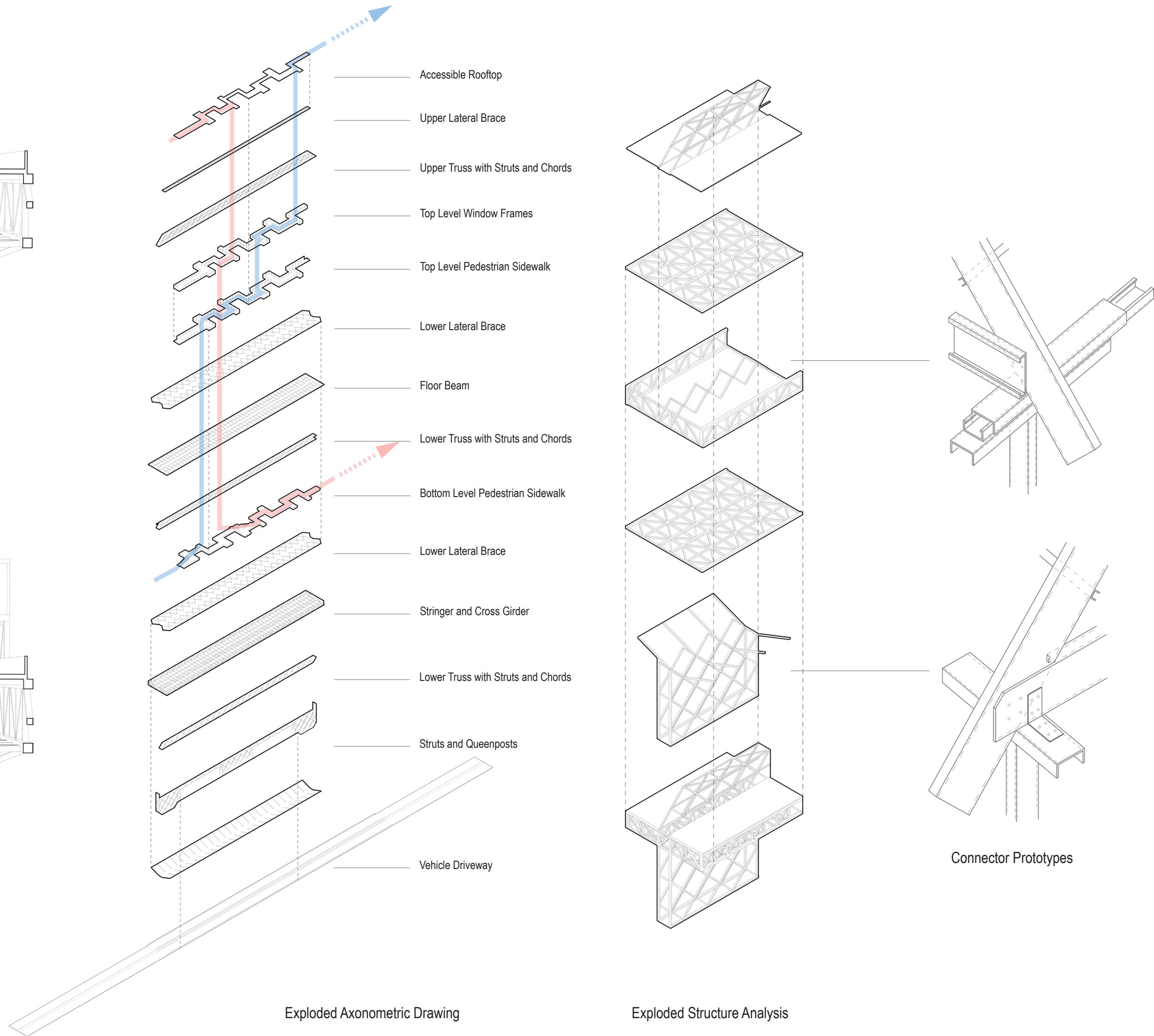
Upper Sidewalk Level Master Plan

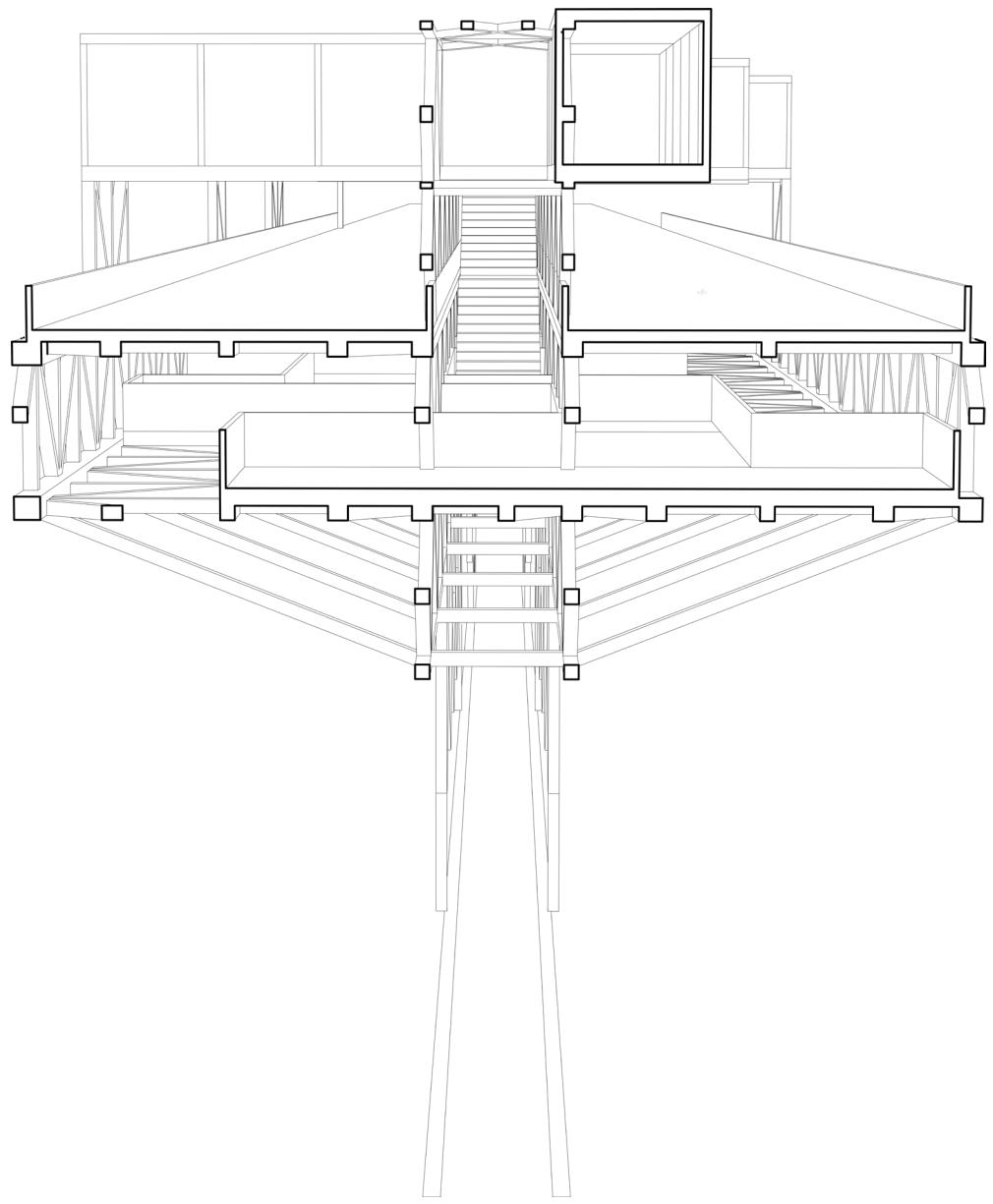


West End Section 1

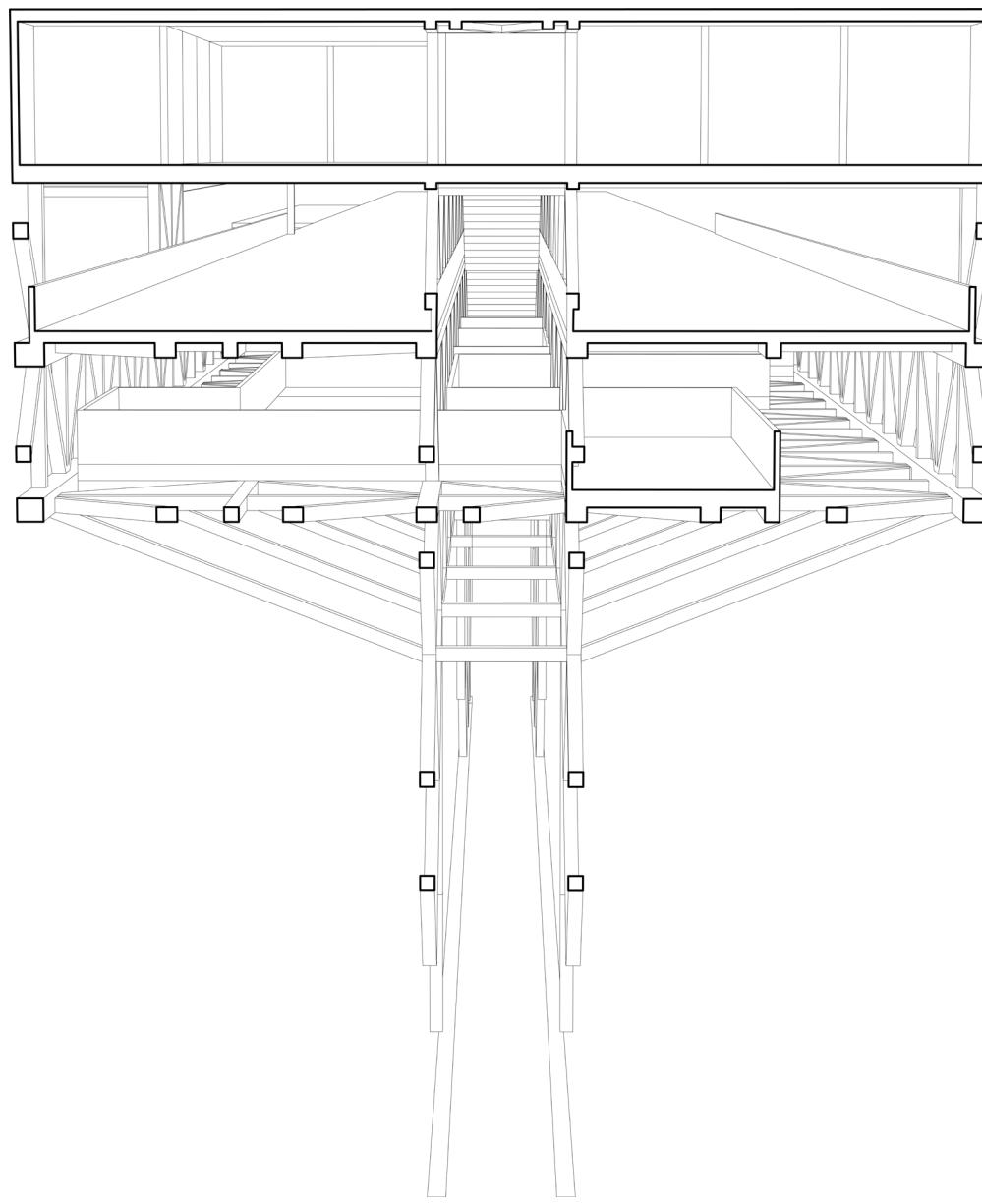


West End Section 2

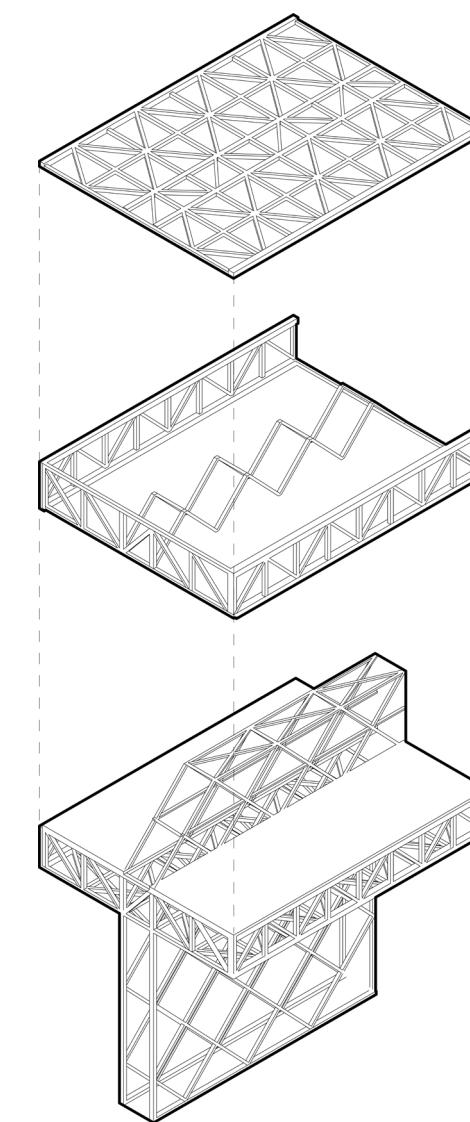




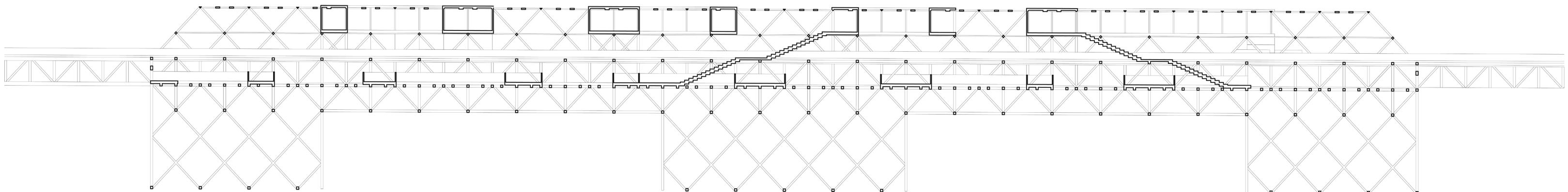
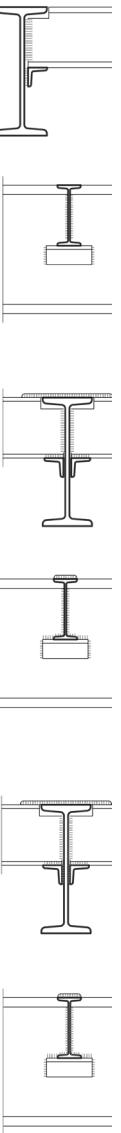
East End Section 1



East End Section 2



I-Beam Structure Prototypes



Linear Section

## Rendering Images



Traffic Lane View (a)



Traffic Lane View (b)



Overall Structure View



Commercial Space in Sidewalk



## 04

### **An Aggregable Collective for Industrial Settlement**

Exploring Architectural Growth with Discrete Design

Instructor: Meizi Li

Teammate: Fenghua Lin

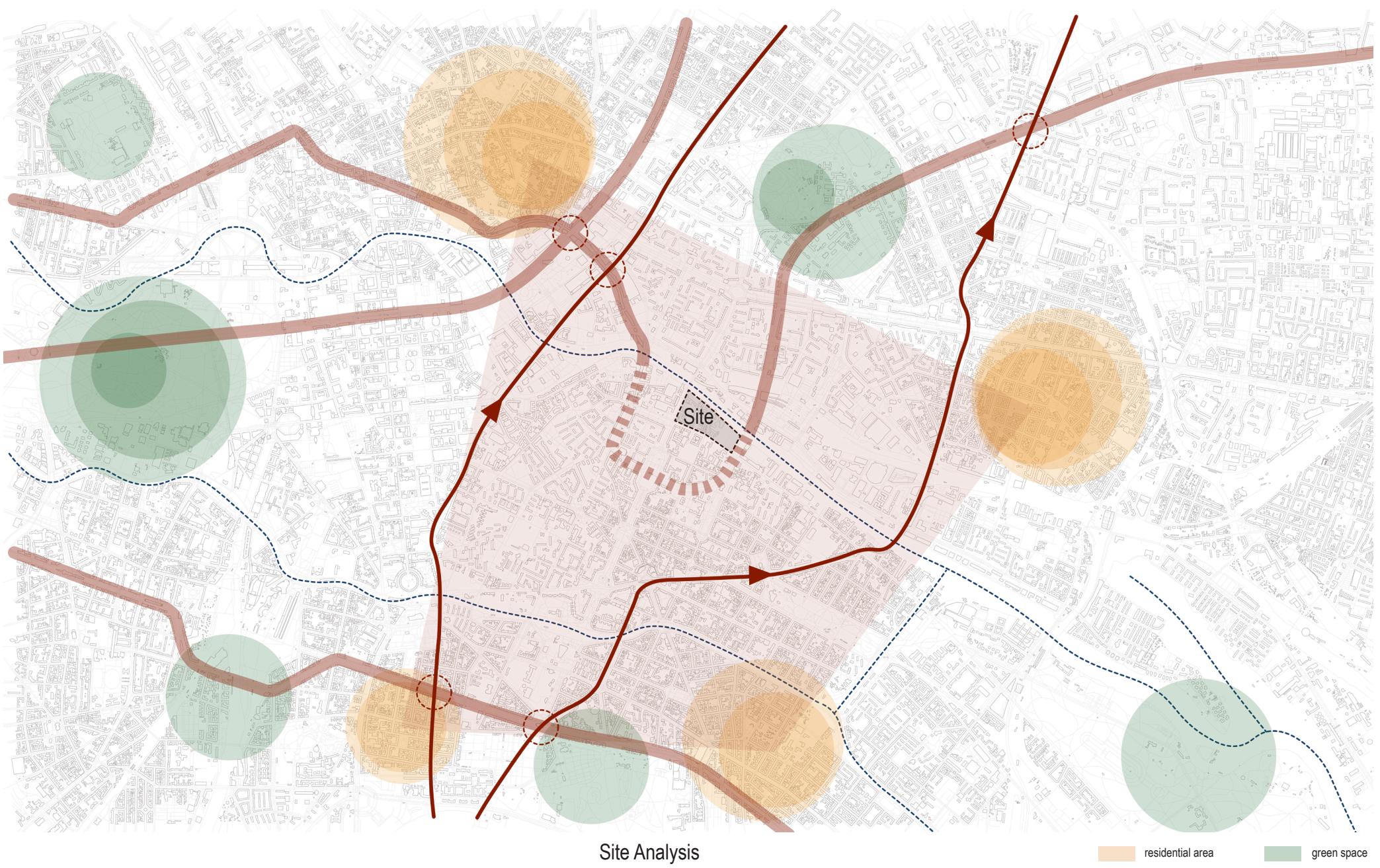
Fall 2022

As a wall is constructed by bricks, an architecture/community could be **aggregated by parts**.

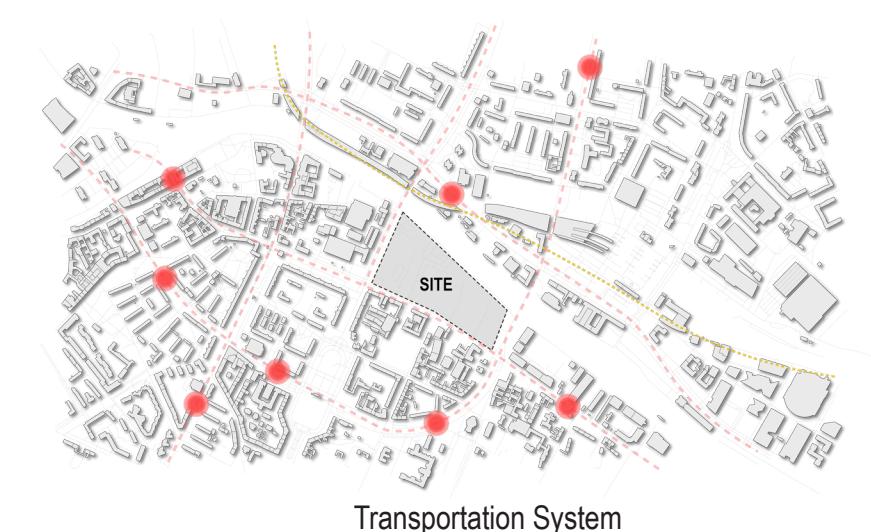
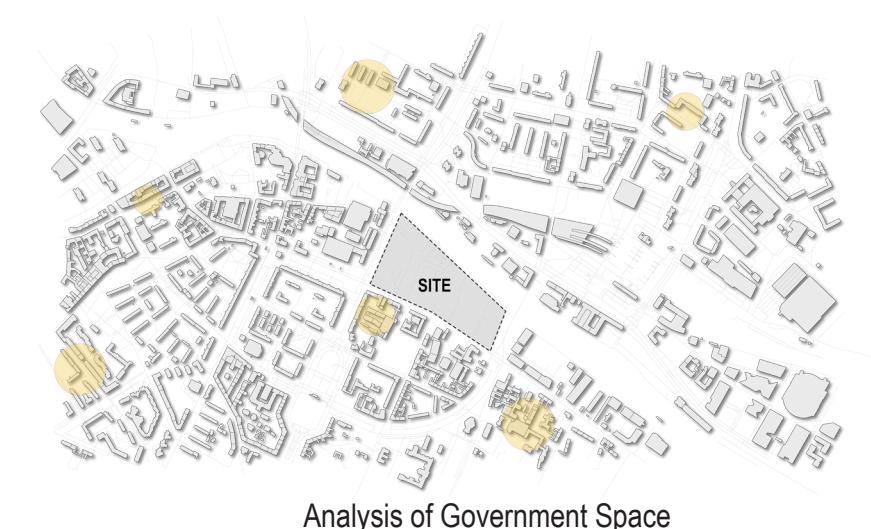
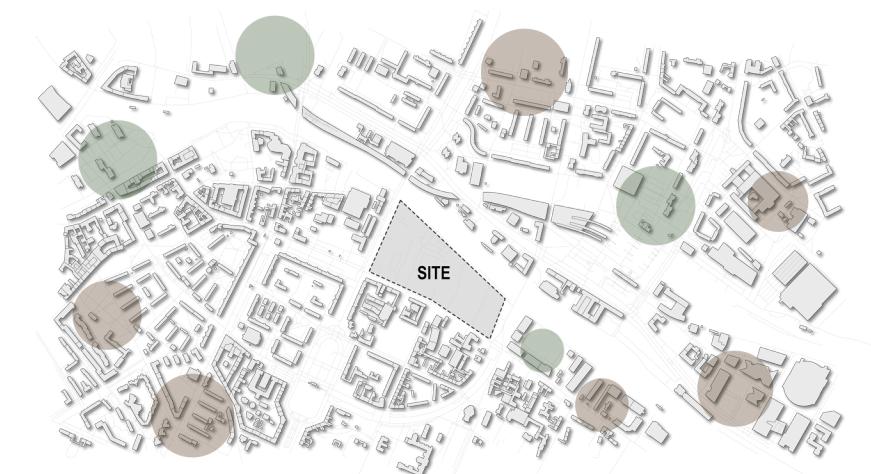
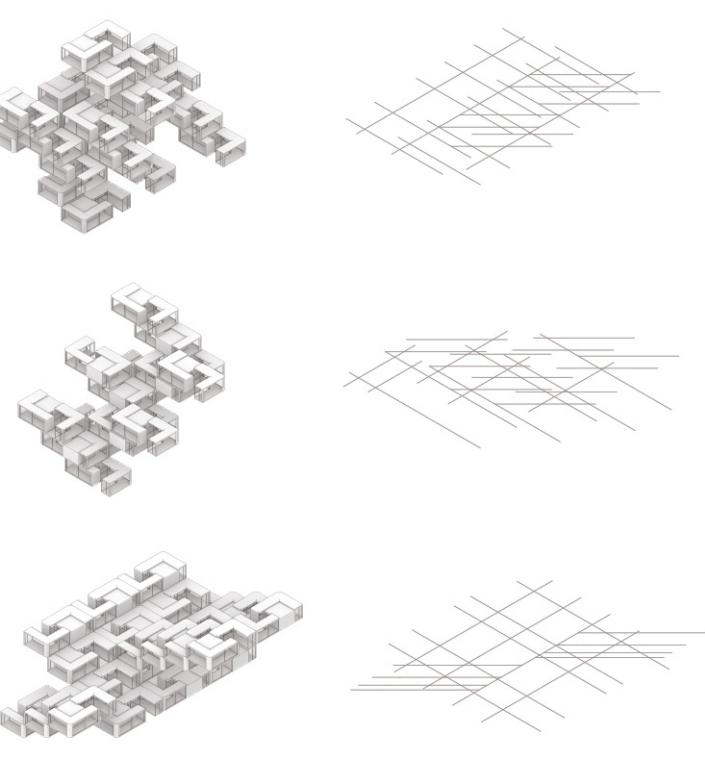
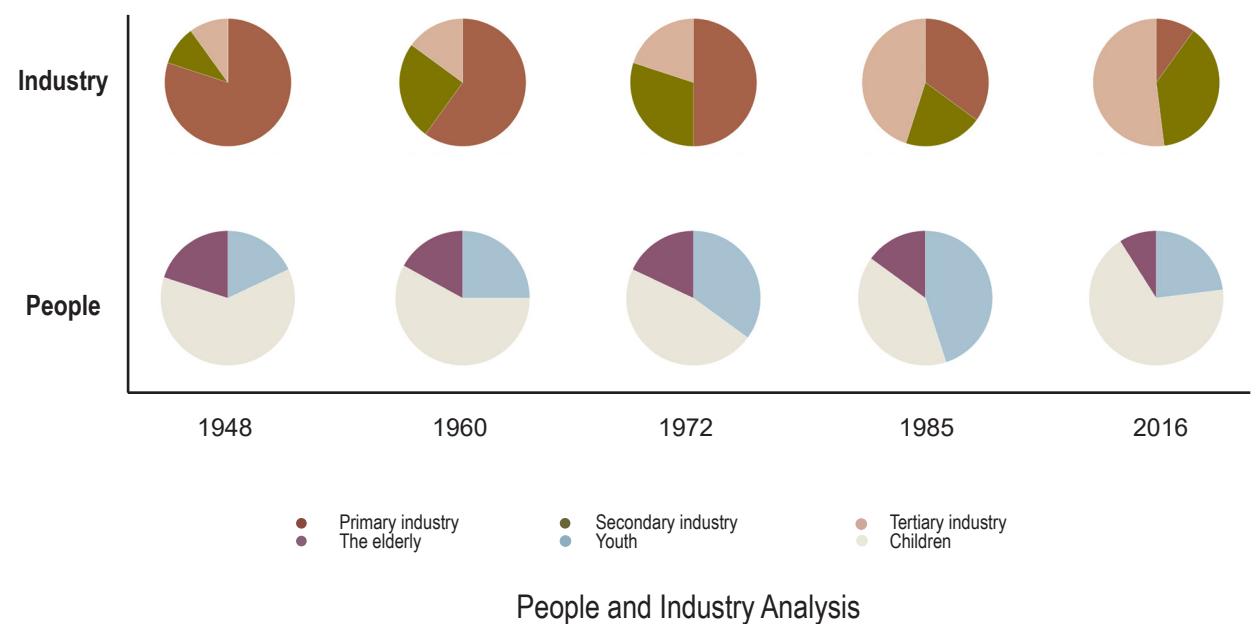
This design site is located around an industrial park in Berlin, Germany. The location is chosen to incorporate the industrial park into a more **compact, multi-functional** building cluster that can “grow.” In this design, basic discrete spaces include apartments, offices, power plants and laboratories, and shared discrete spaces include learning areas and transportation areas.

The prototype of this project can be **extracted, arranged, and augmented** through **parametric operation** to generate a whole city as well as an innovative urban life mode. Their flexibility and inclusiveness allow them to fit into **different city vibes** and promote social interactions.



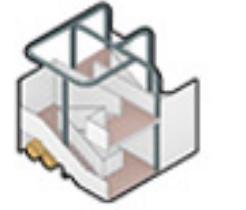


With the continuous development of the German economy and industry, the industrial form is slowly transforming, and more young people are moving in and settling in, creating different residential zones.





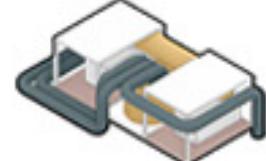
**Assembly 1 (100 units)**



Connection: 25



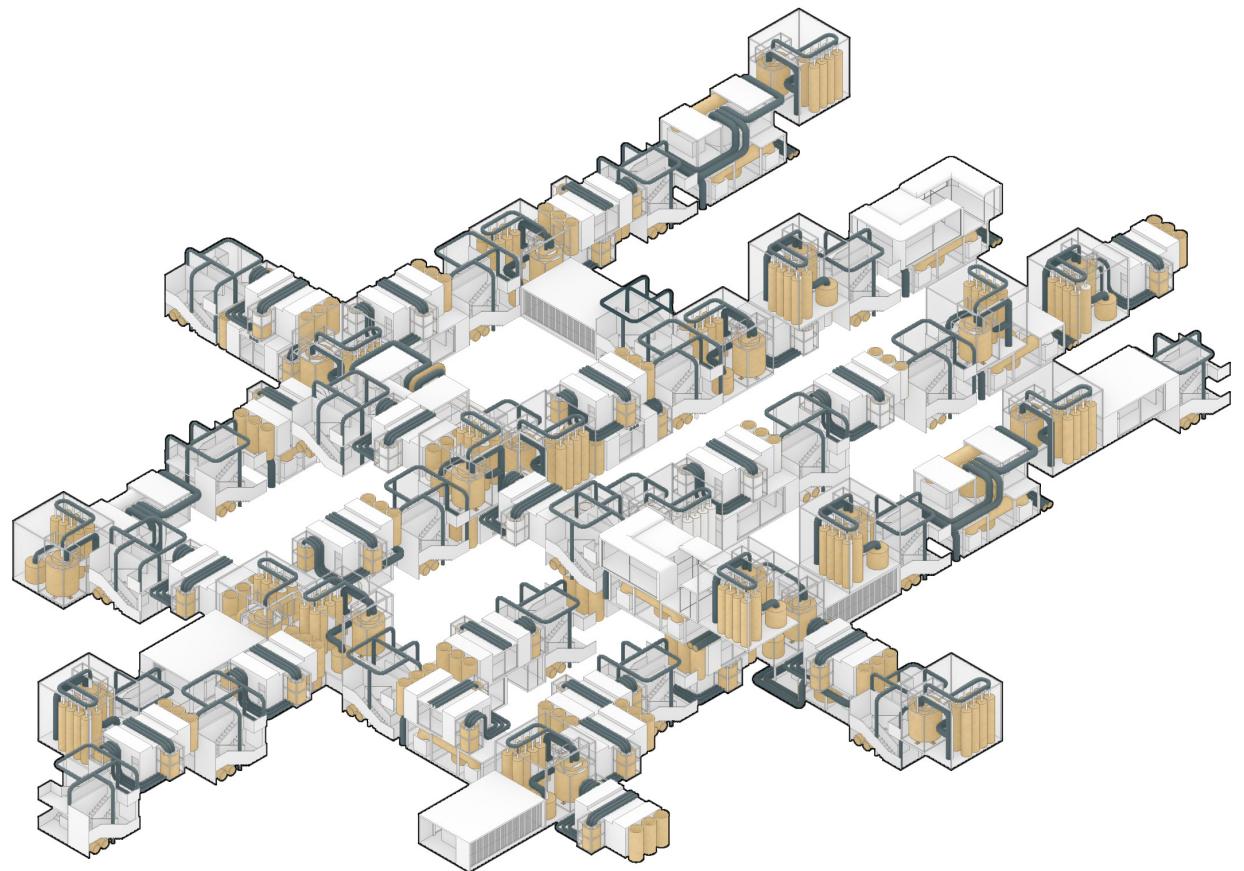
Private: 18



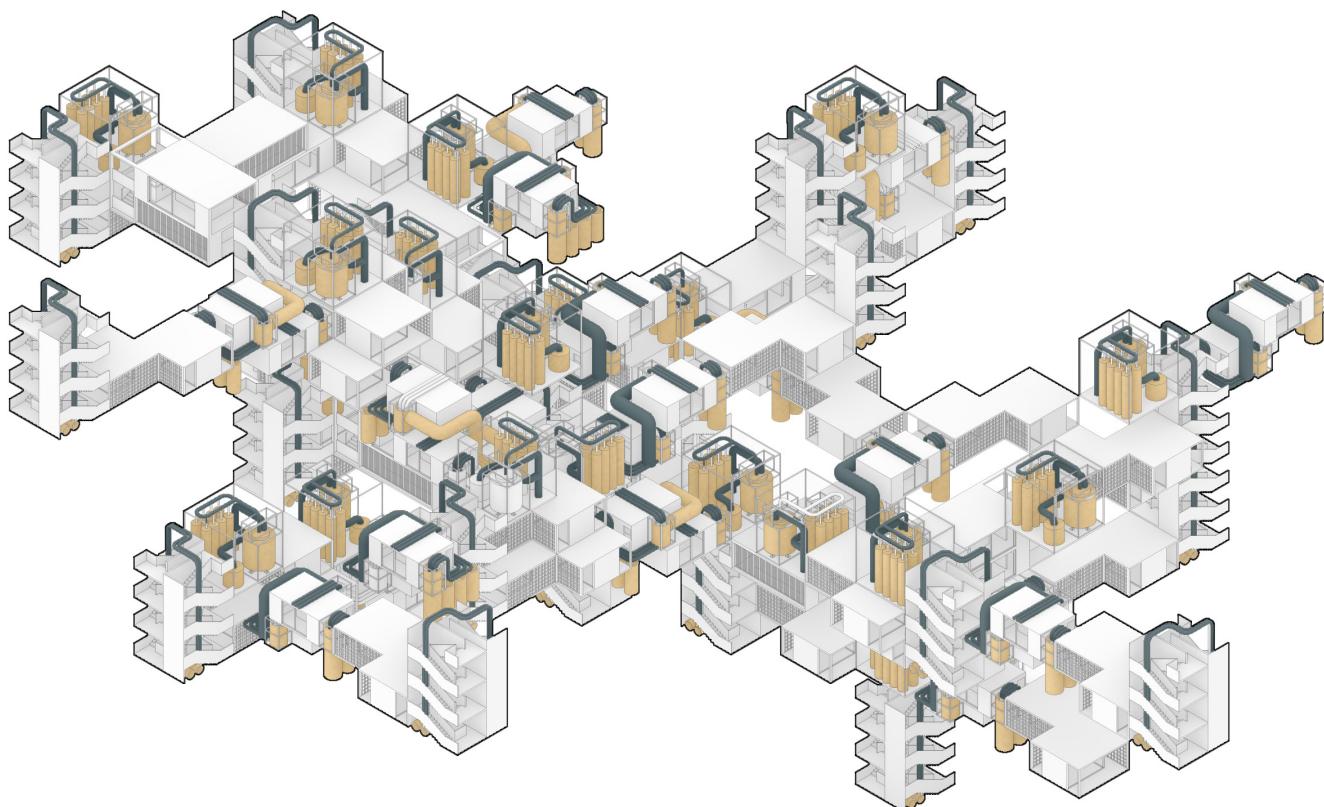
Public: 19



Public: 18



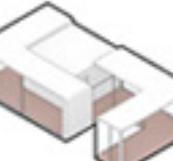
**Assembly 2 (100 units)**



Connection: 22



Private: 31



Public: 25

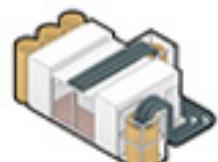


Public: 22

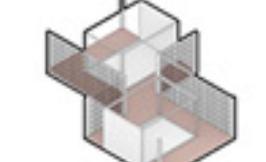
**Assembly 3 (100 units)**



Connection: 23



Private: 17

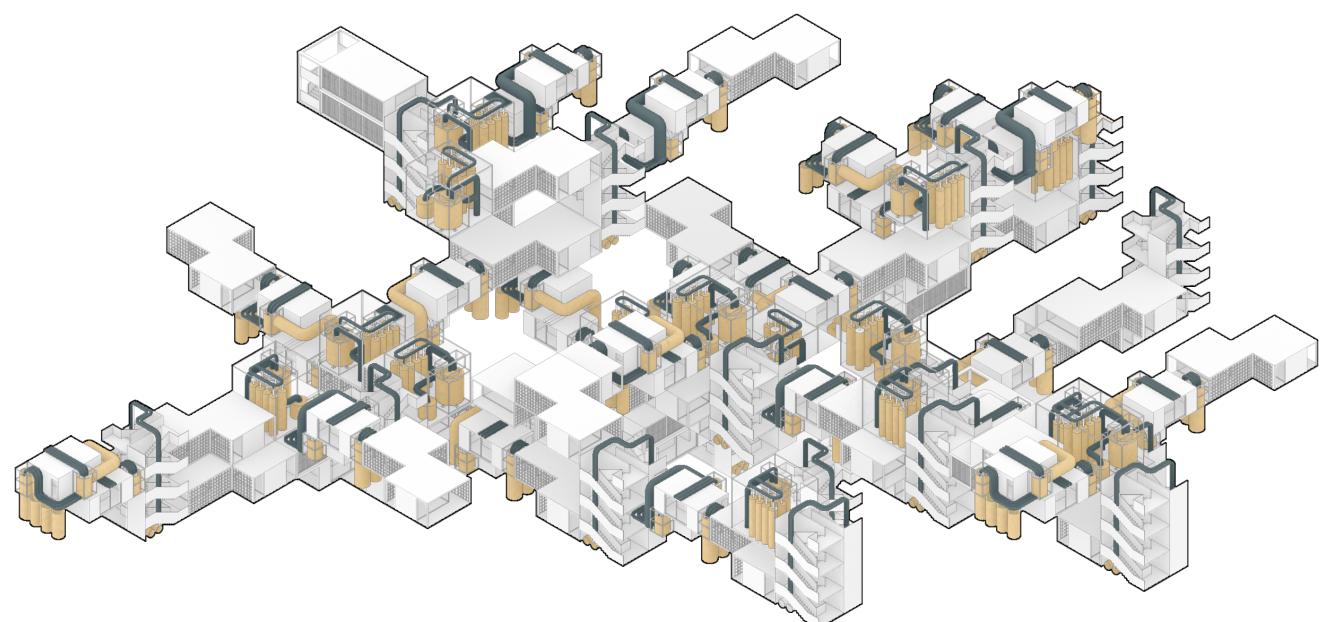


Public: 29

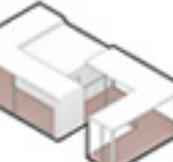


Public: 31

**Assembly 4 (100 units)**



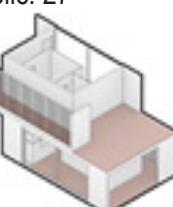
Connection: 16



Public: 23



Public: 27



Private: 34

## Rendering Images



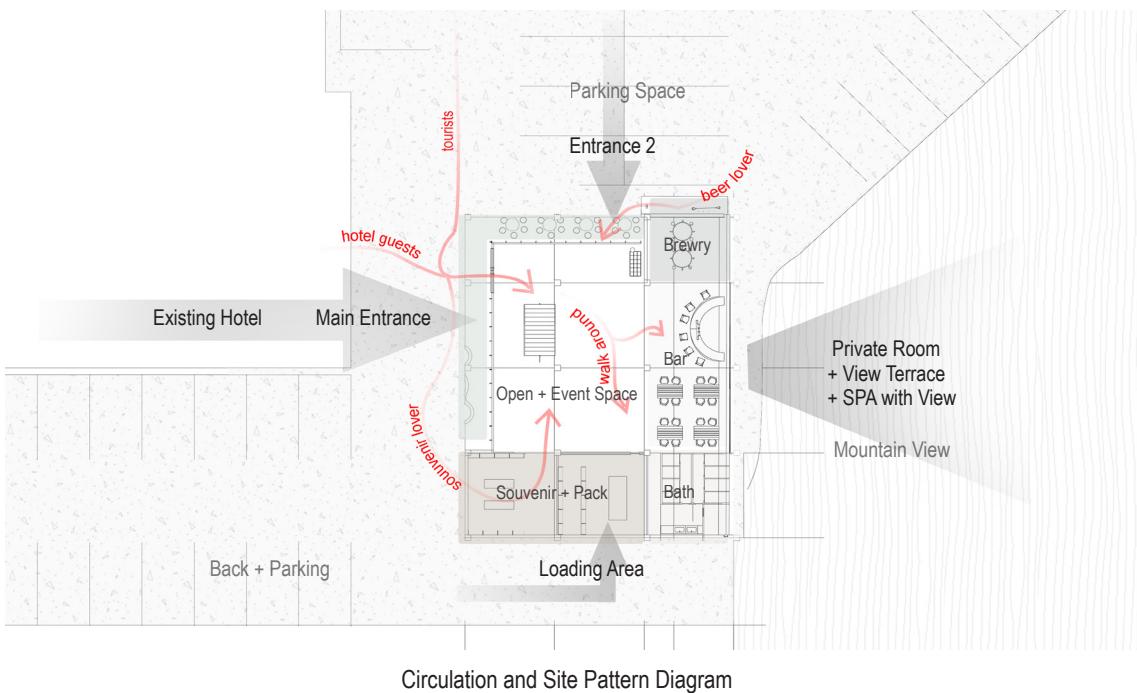
05

## Arctic Brewscape

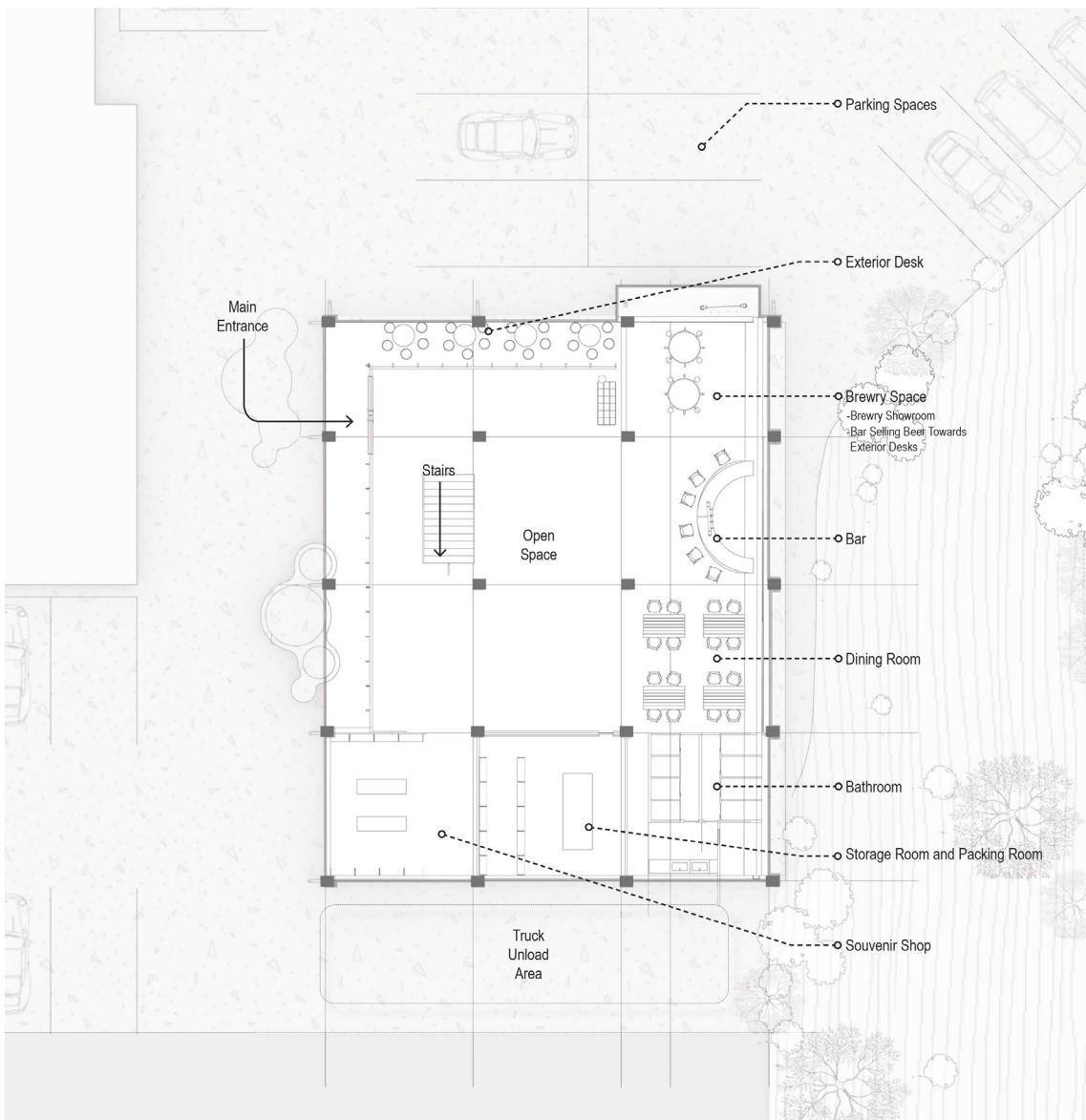
A Beer Spa with Harmonious Fusion of Iceland's Culture and Modern Amenities

Individual Work (Buildner International Architecture Competition)

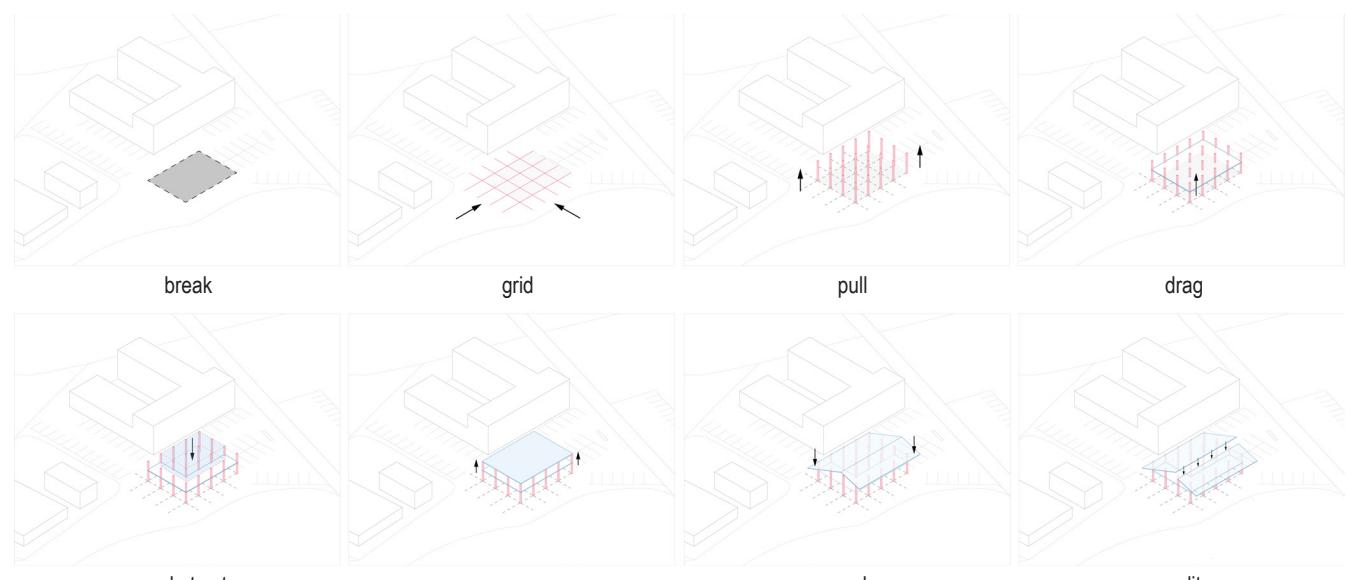
Fall 2023



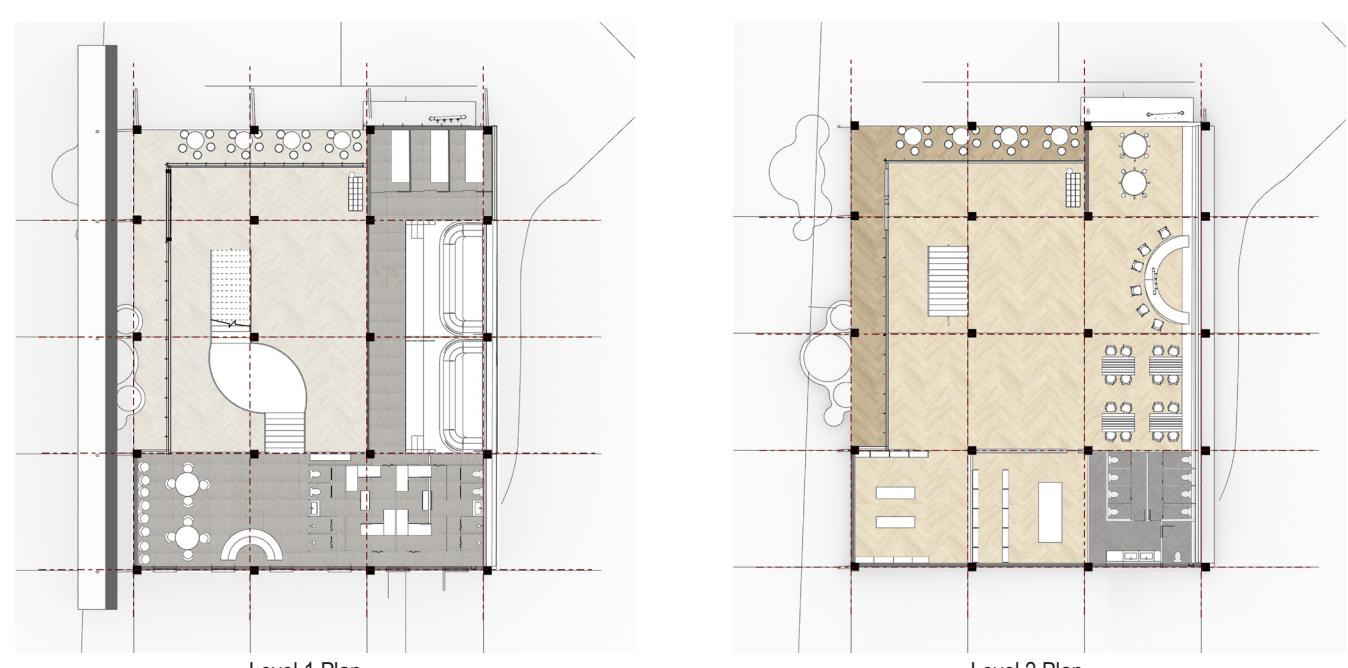
Circulation and Site Pattern Diagram



Site Plan

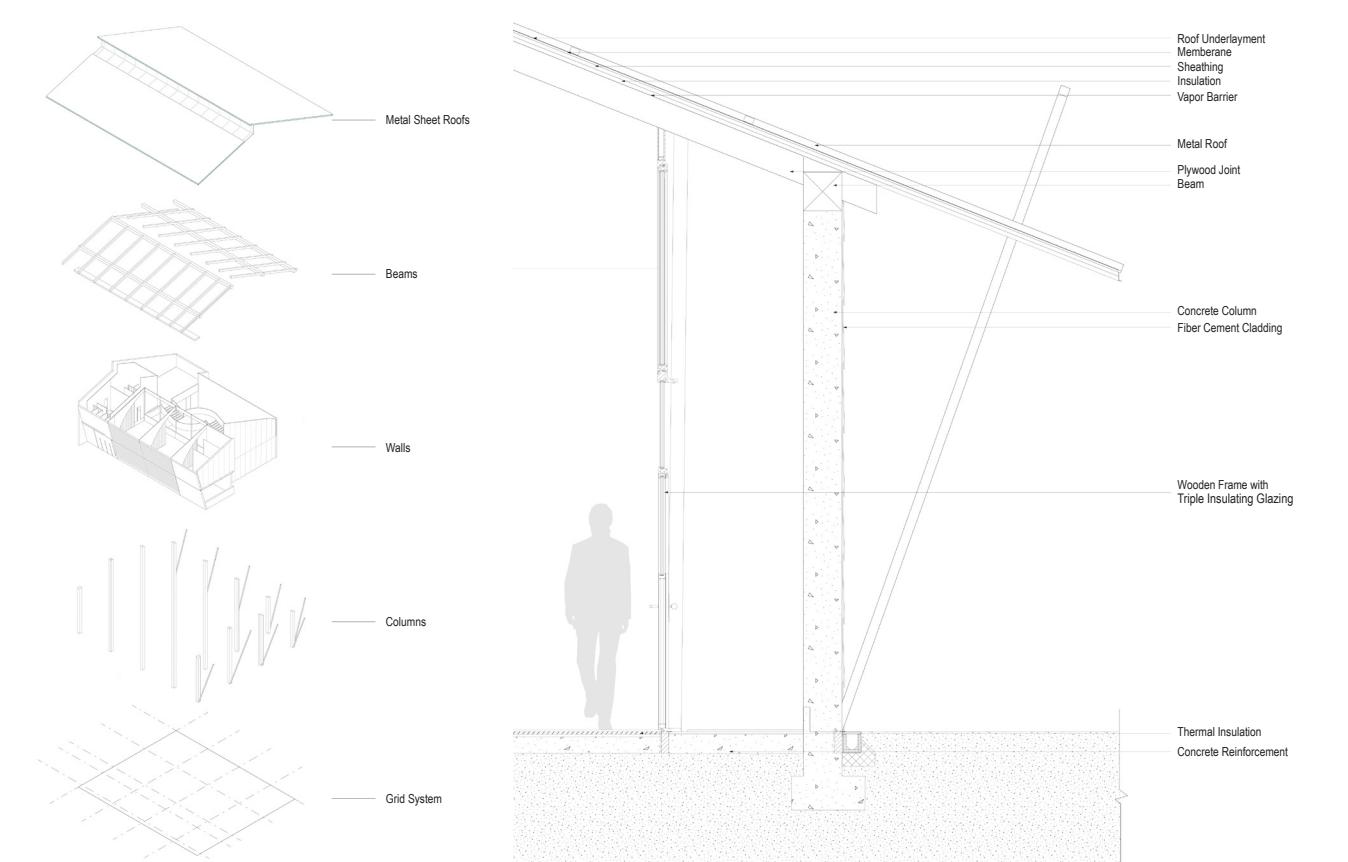


Exploded Structural Diagram



Level 1 Plan

Level 2 Plan



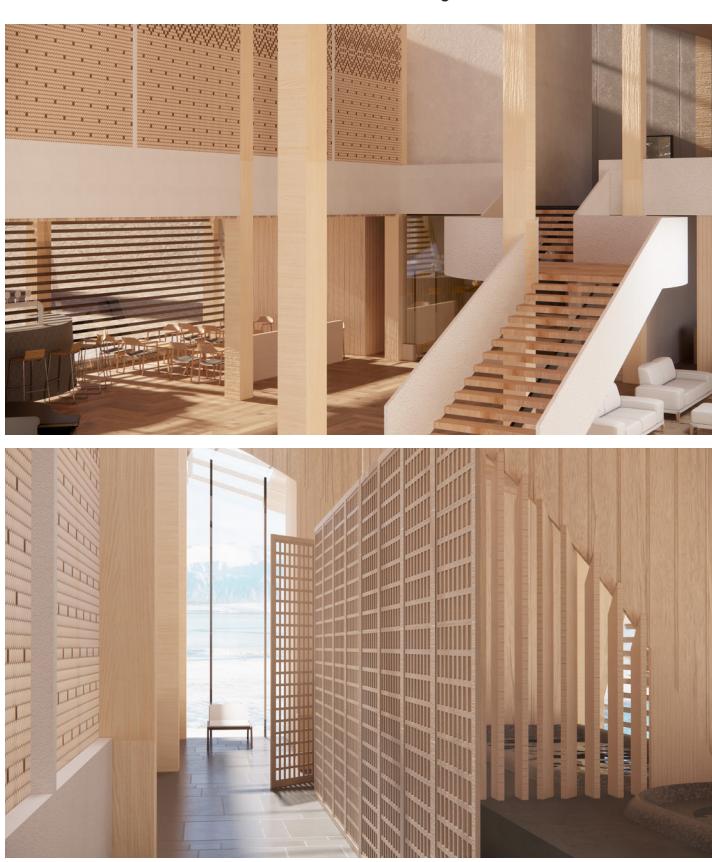
Wall Section Detail



Interior Renderings



Exterior Renderings



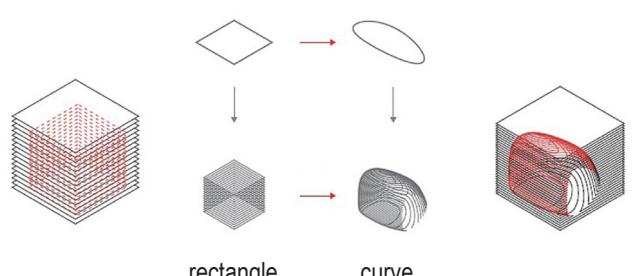
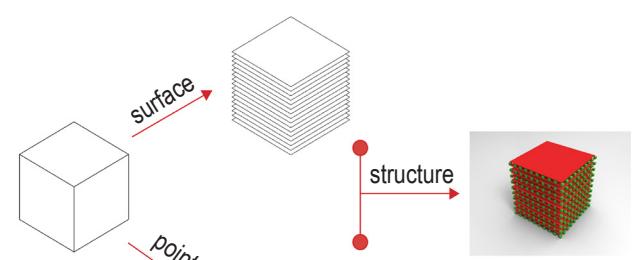
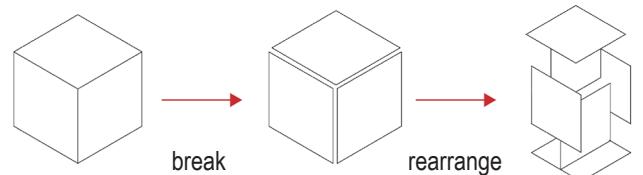
**Lightwood House**

An Entity Construction for Stay and Rest

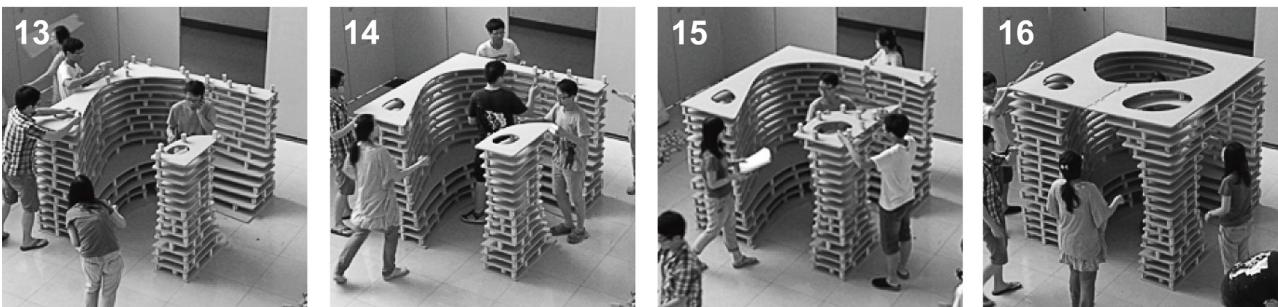
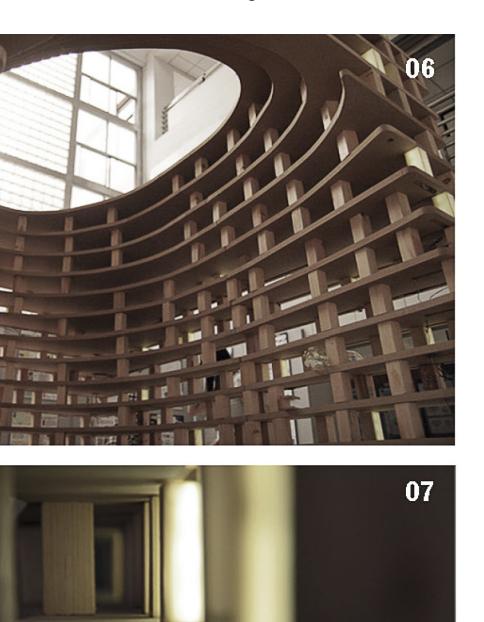
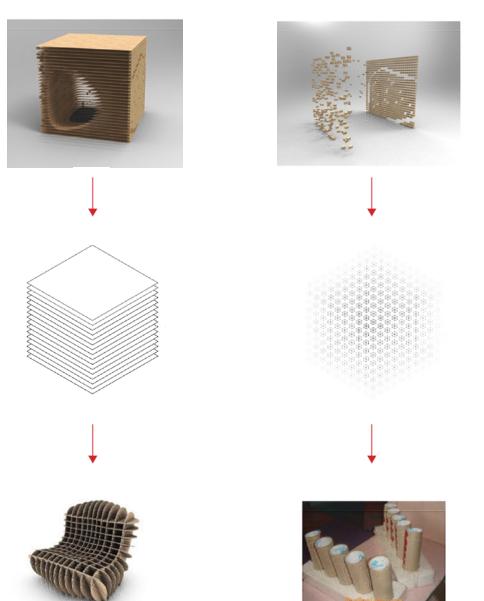
Instructor: Hua Wu, Lei Zhang

Internship Group Project (Responsibility: designed and programmed the scripts for model, and assembled the model)

Summer 2021



form logic



Wood Board

LED Lighting Boxes

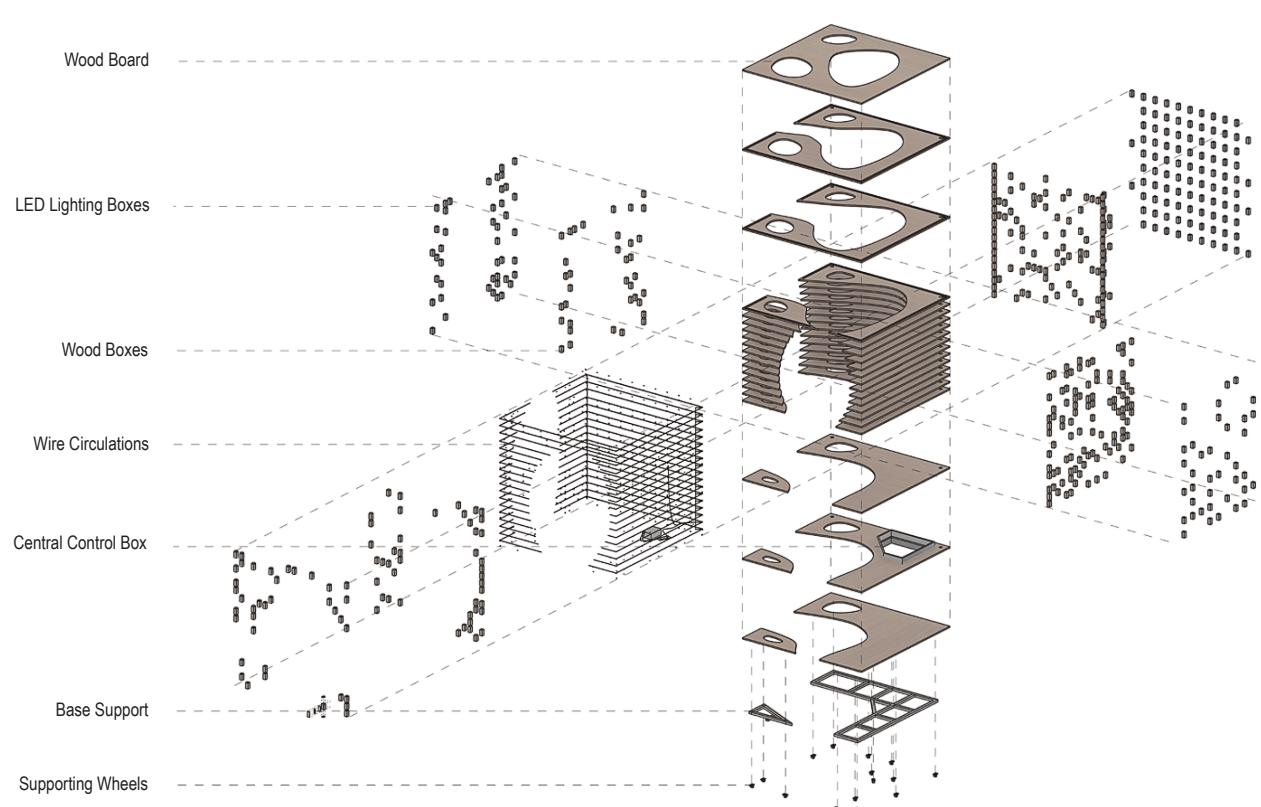
Wood Boxes

Wire Circulations

Central Control Box

Base Support

Supporting Wheels



07

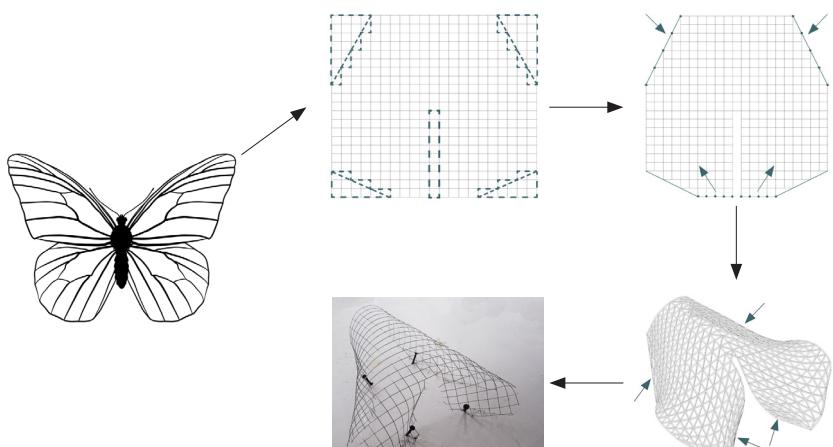
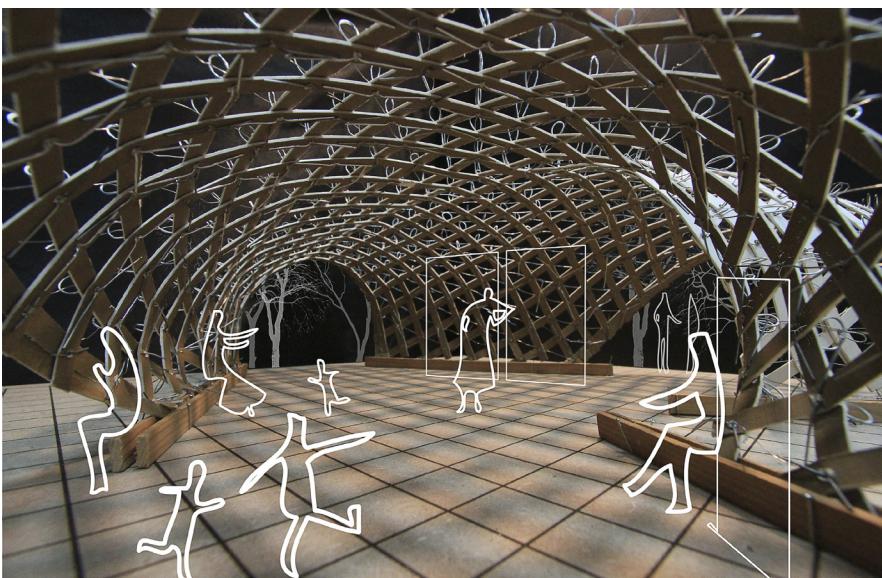
# Leisure Pavilion

A Parametric Design Test for Light and Tangible Material

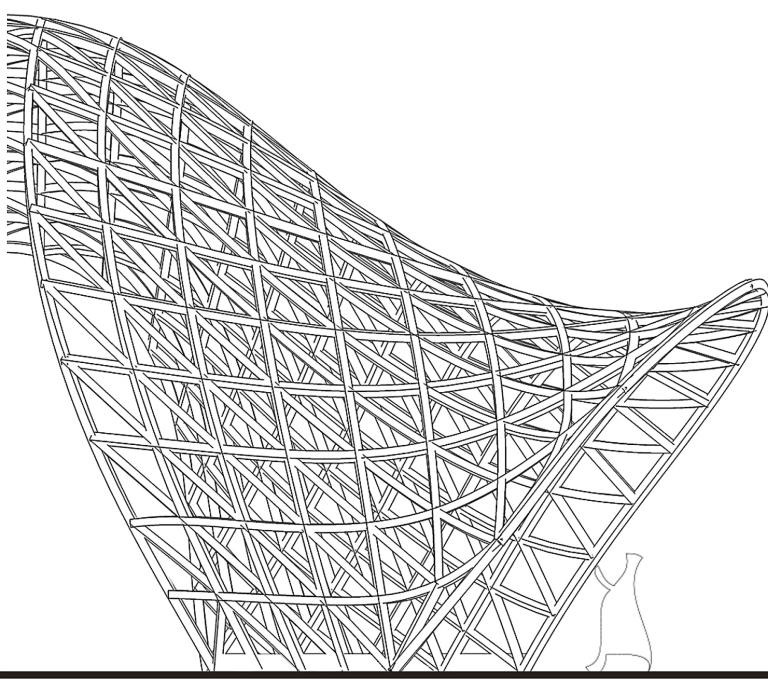
Instructor: Li Chen, Niya Jones

Individual Work

Summer 2020

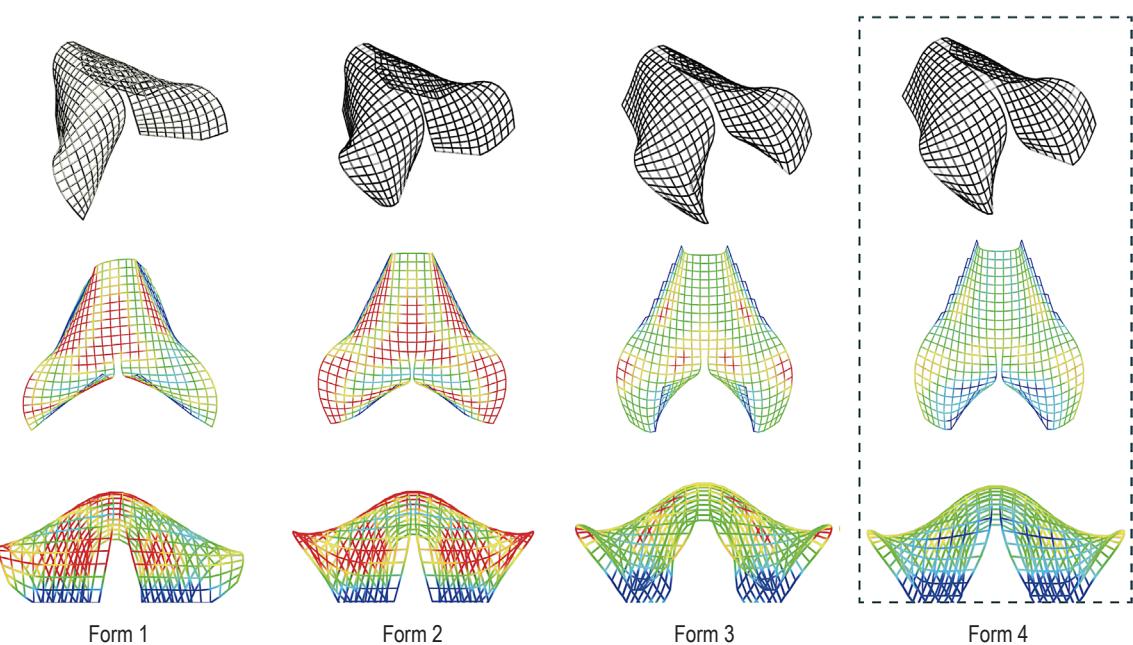


Form Analysis

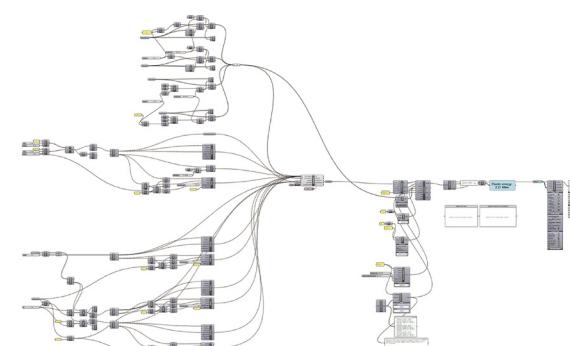


Zoom in Elevation

## Mechanical Analysis 1



## Grasshopper Scripts



## Display Legend

|  |       |  |       |  |      |
|--|-------|--|-------|--|------|
|  | <1cm  |  | 2-3cm |  | >4cm |
|  | 1-2cm |  | 3-4cm |  |      |

Fitness: Displacement (cm)

Loads: Gravity & Line= 1KN/m

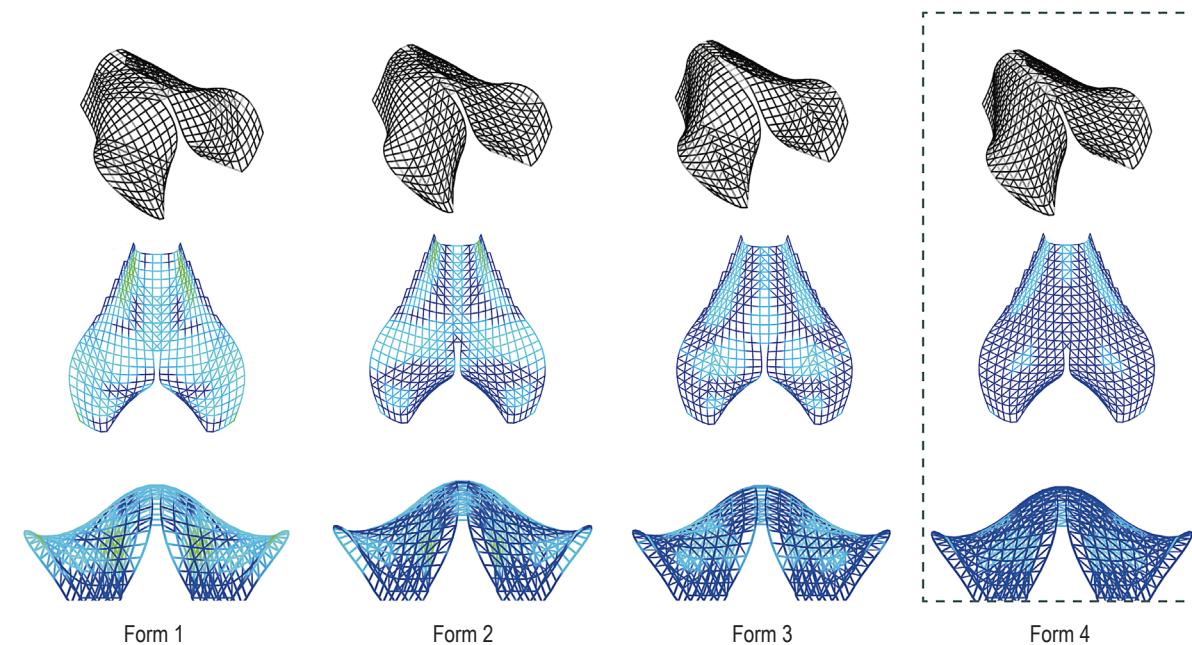
Support Points: 4 Choosen Lines around with 5,5,5,5 points.

Material Selection: Wood E:1050 [kN/cm<sup>2</sup>]

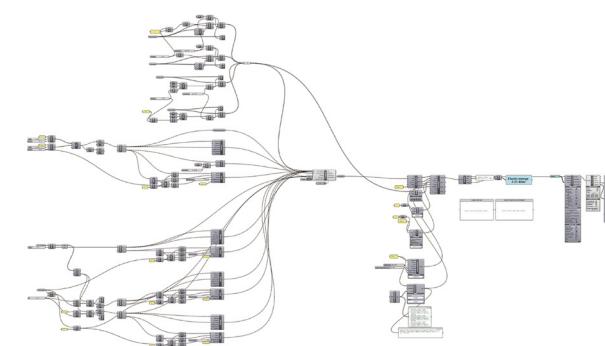
Beam Cross Section: Square 5\*6cm

Bracing Cross Section: Square 5\*4cm

## Mechanical Analysis 2



## Grasshopper Scripts



## Display Legend

|  |       |  |       |  |      |
|--|-------|--|-------|--|------|
|  | <1cm  |  | 2-3cm |  | >4cm |
|  | 1-2cm |  | 3-4cm |  |      |

Fitness: Displacement (cm)

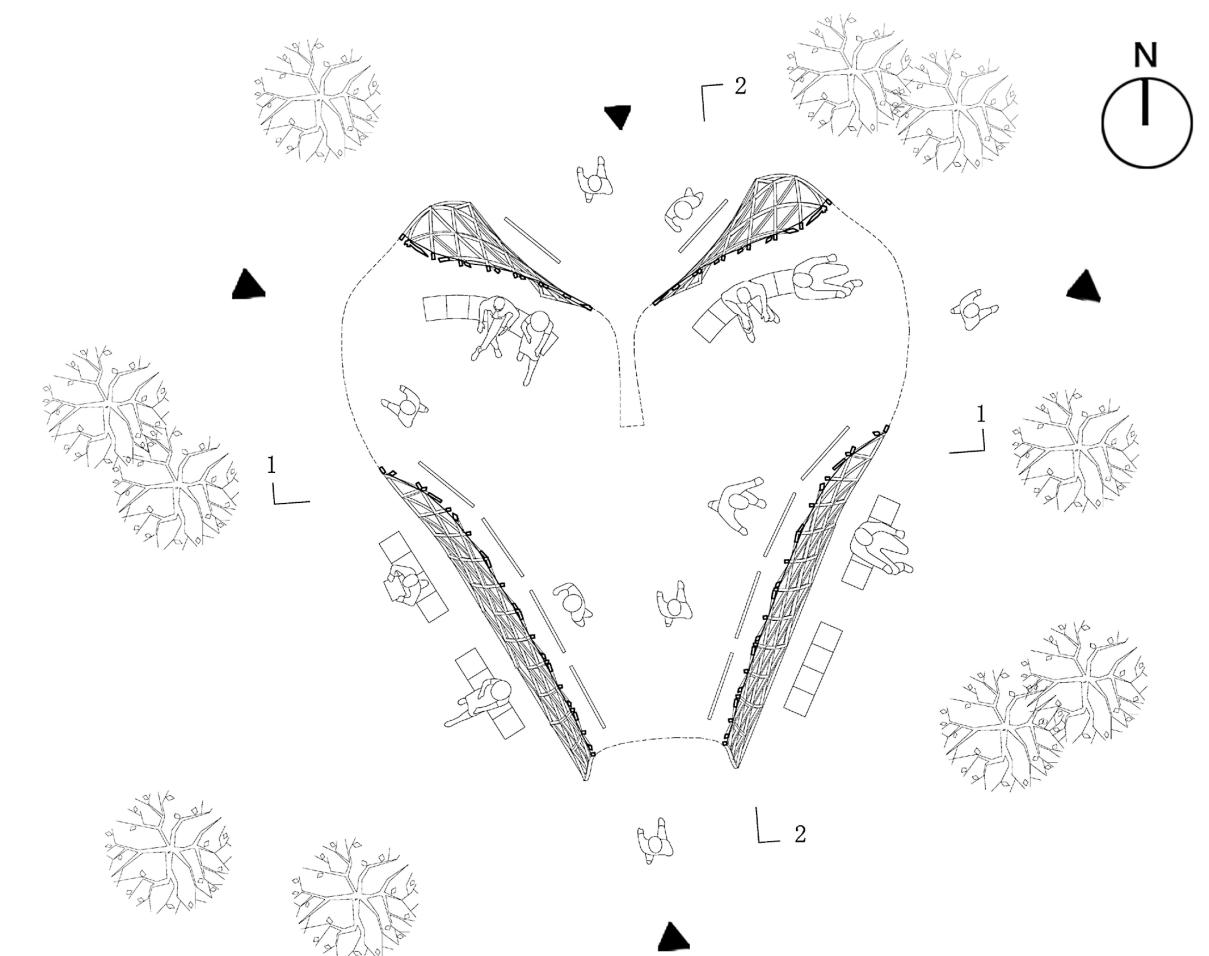
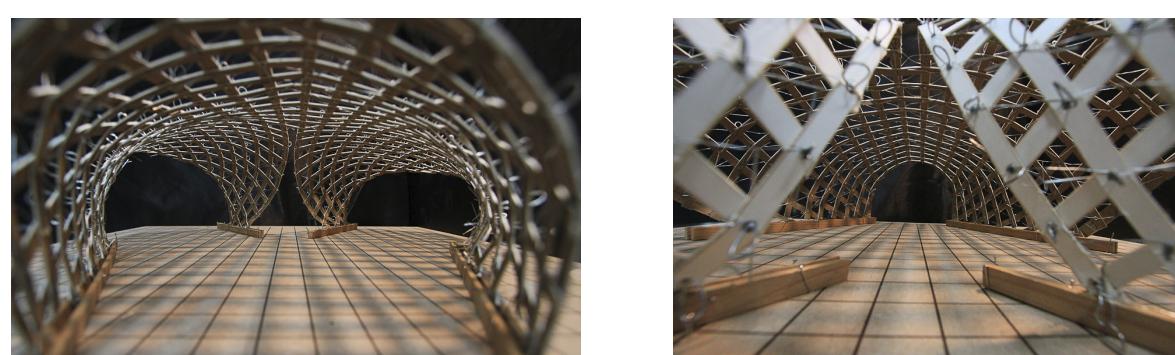
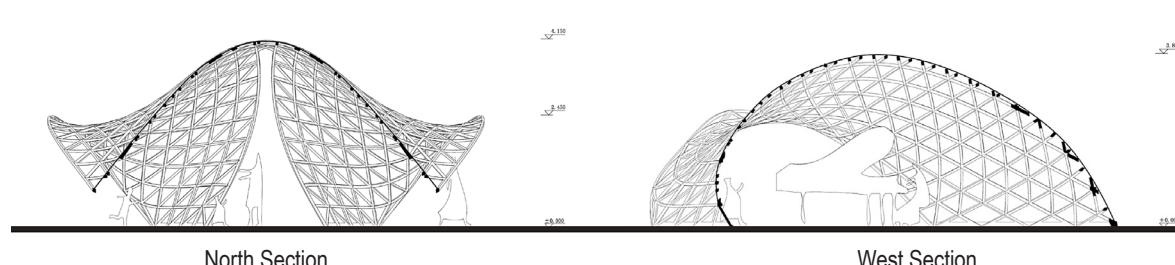
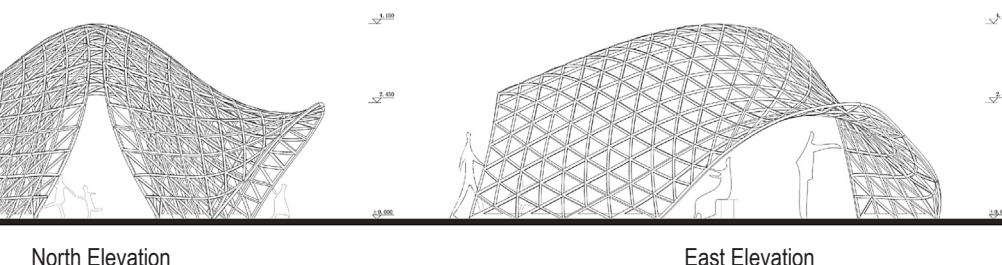
Loads: Gravity & Line= 1KN/m

Support Points: 4 Choosen Lines around with 5,5,5,5 points.

Material Selection: Wood E:1050 [kN/cm<sup>2</sup>]

Beam Cross Section: Square 5\*6cm

Bracing Cross Section: Square 5\*4cm



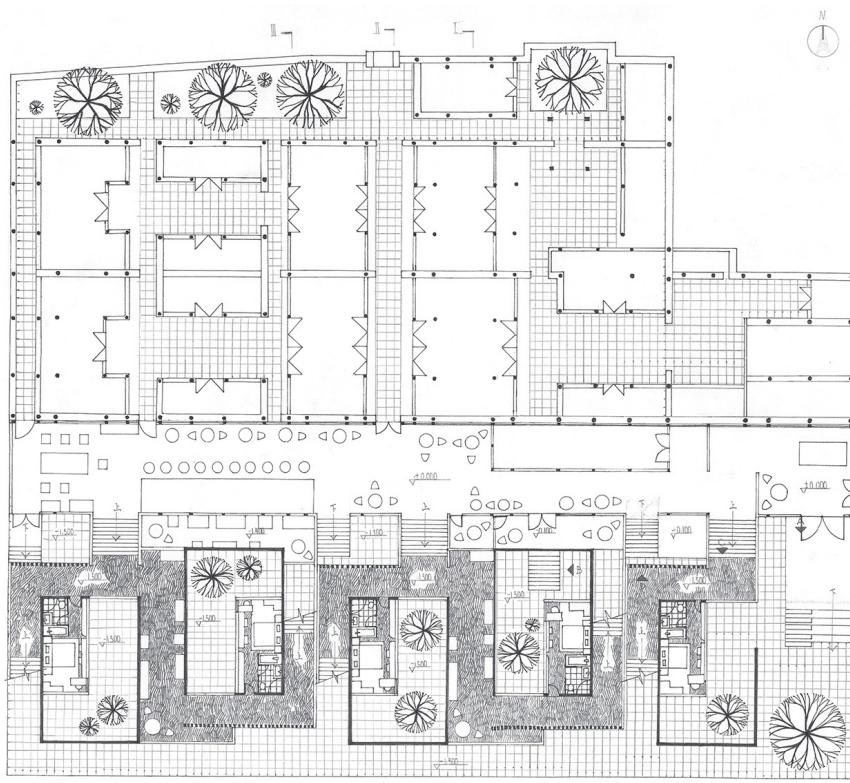
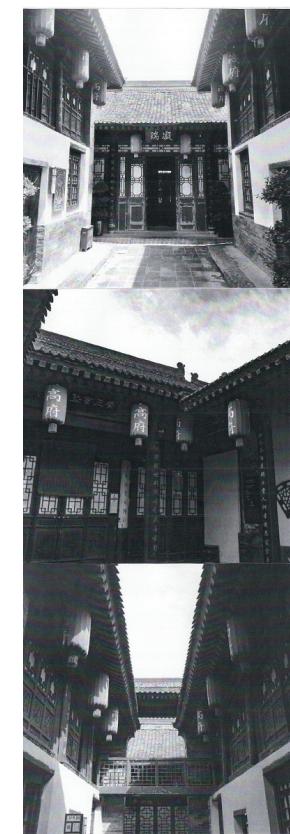
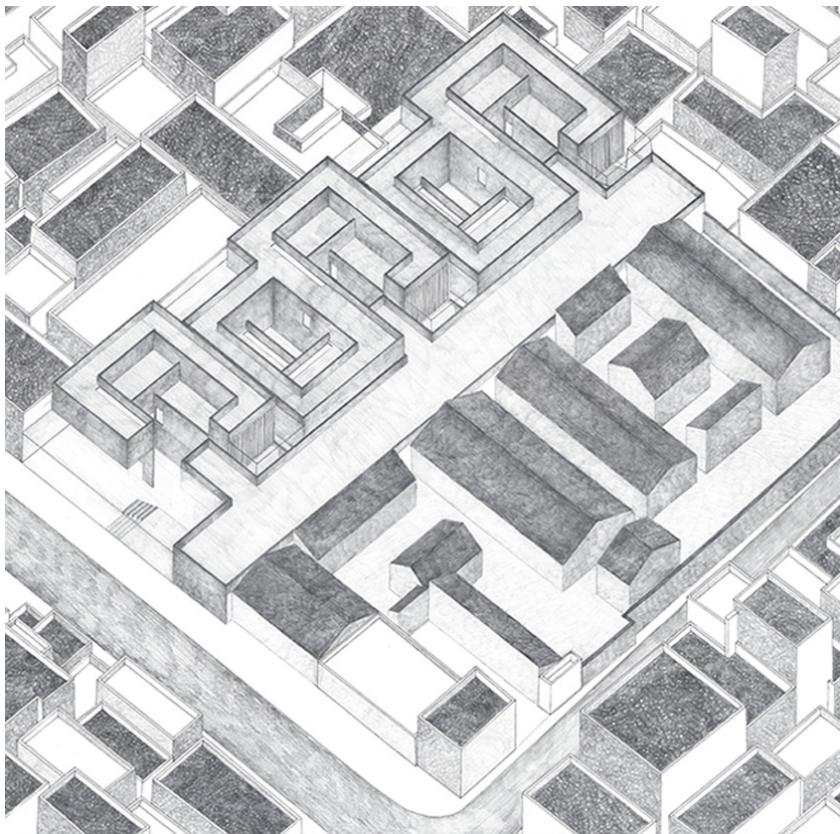
**Bamboo Valley**

A Renovation Project to Find the Beauty in Nanjing Ancient Town by HandSketch

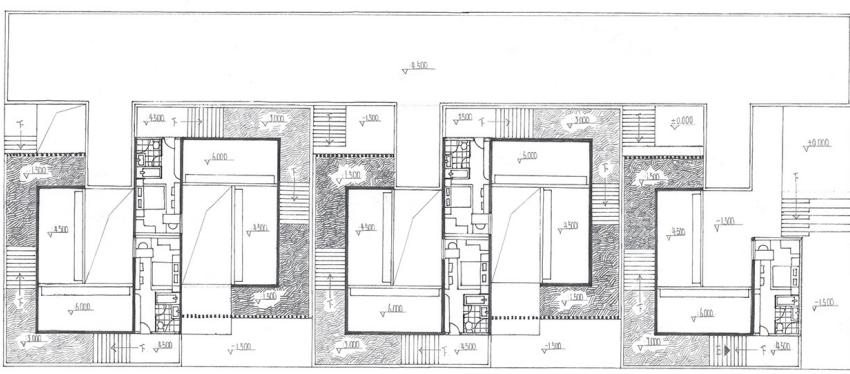
Instructor: Huan Sun

Individual Work

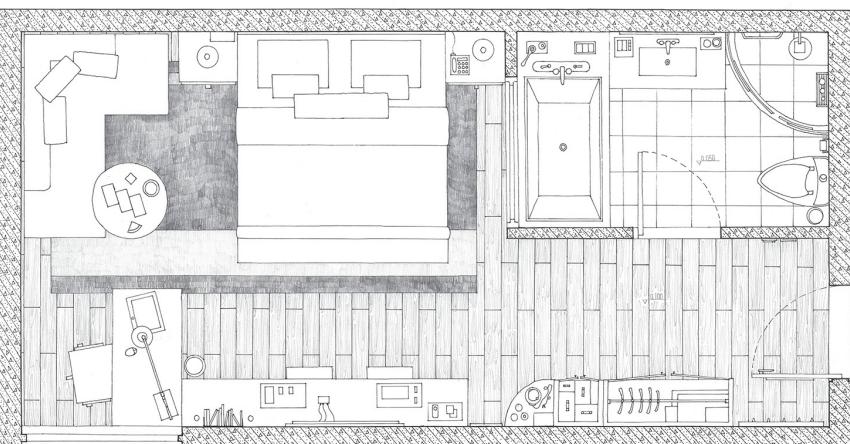
Winter 2020



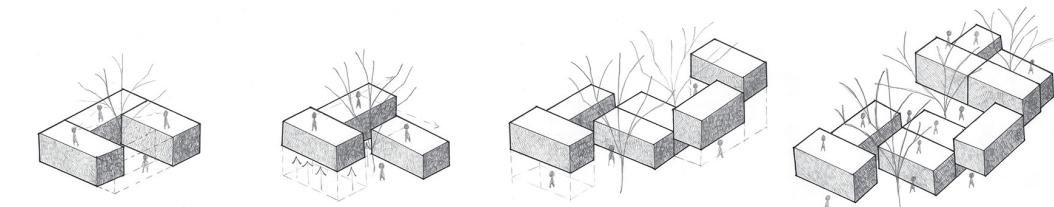
Level 1 Plan



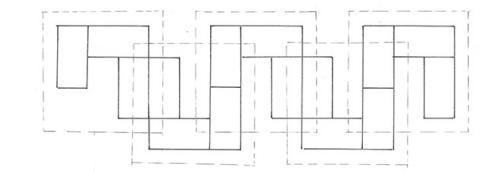
Level 2 Plan



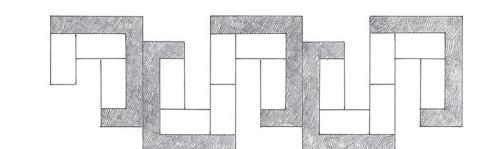
Guest Room Enlarged Plan



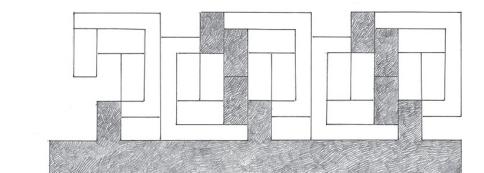
Form Analysis



Guest Rooms Layout



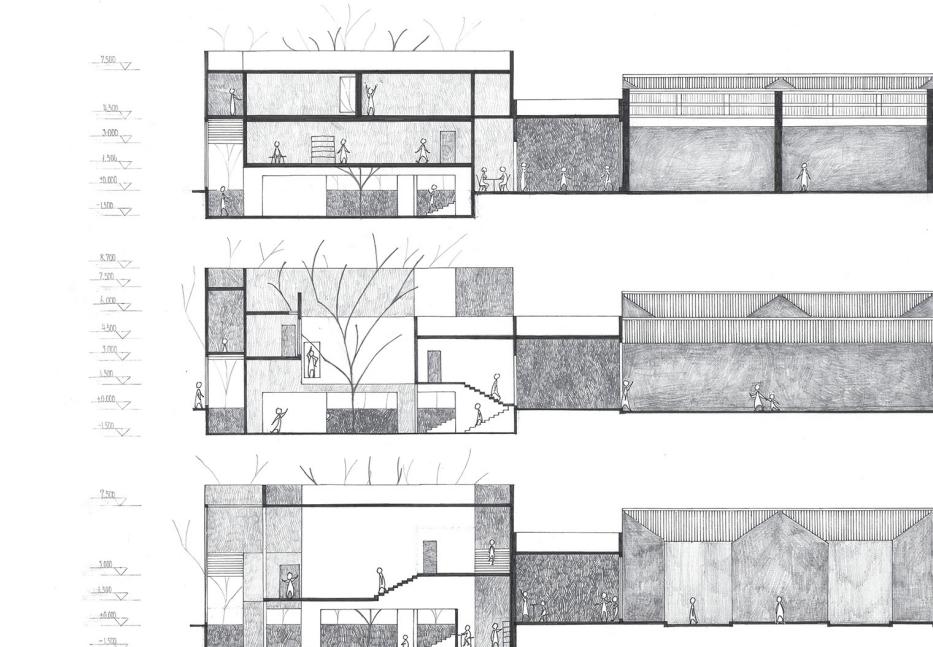
Corridor Layout



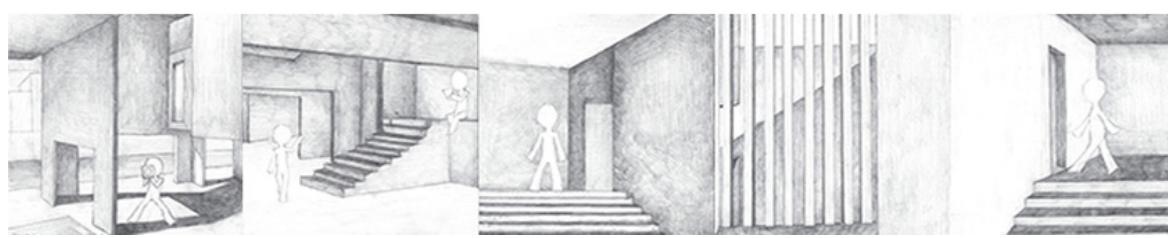
Public Space Layout



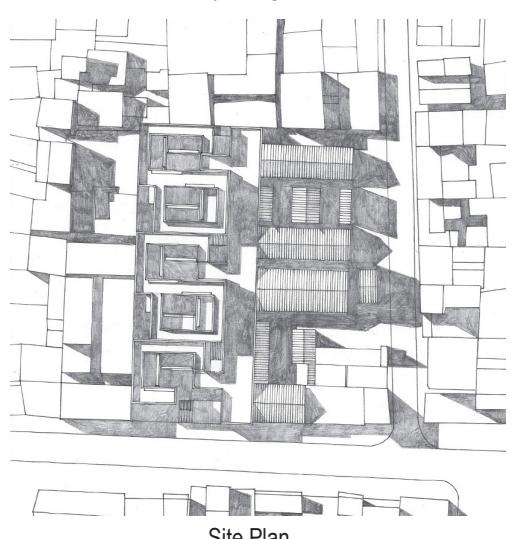
Section Analysis 1-4



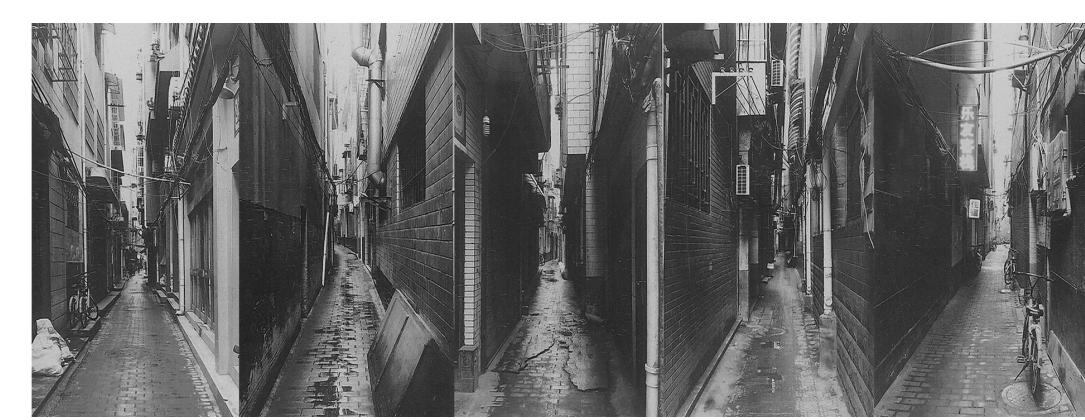
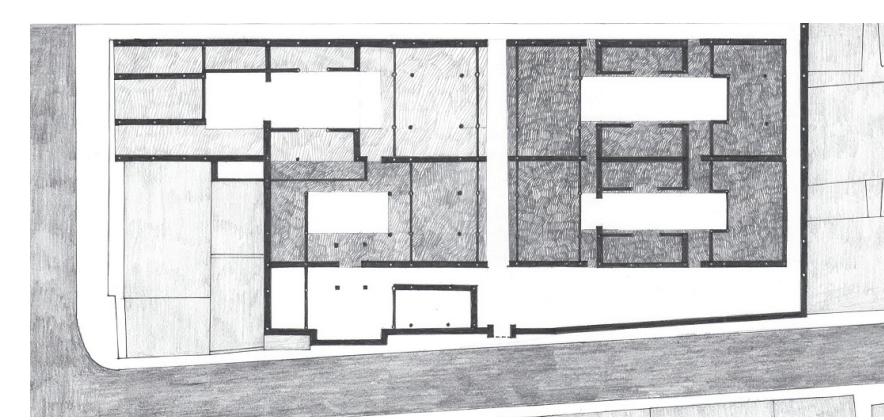
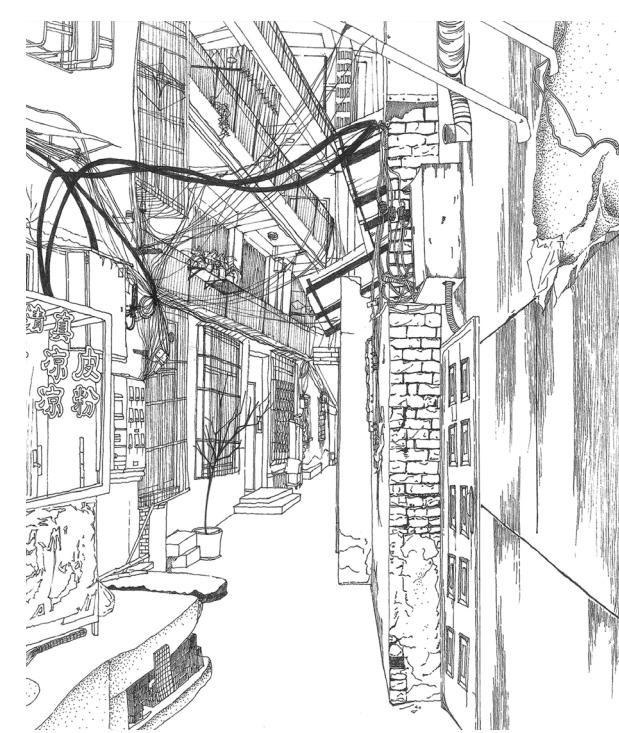
Sections 1-3



Preliminary Design Sketch



Site Plan



## Professional Work (Selected)

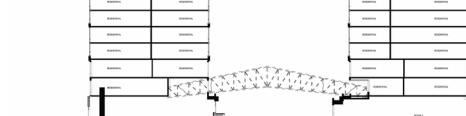
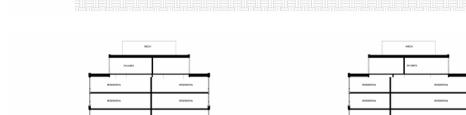
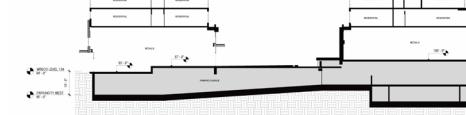
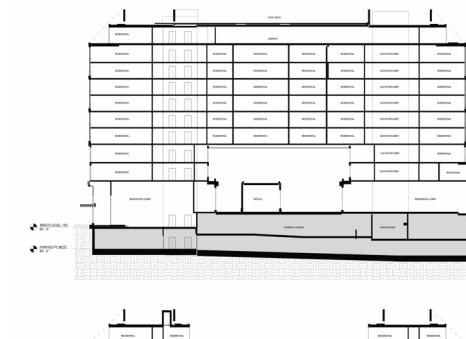
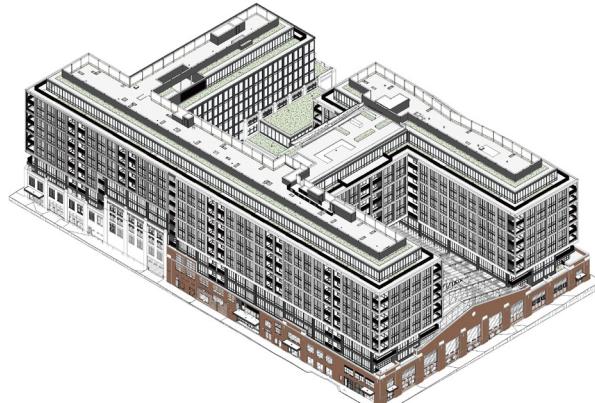
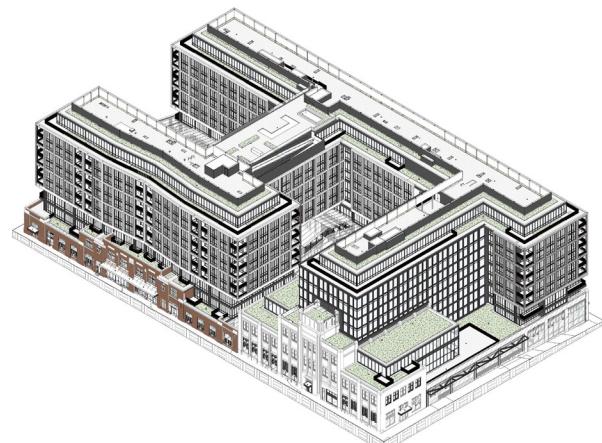
Work Samples Developed While Employed Full-Time (STUDIOS Architecture) Post-Graduation

Responsibility: fixed models, drew completed plans for typical levels, drew sections, rendered images, created wall and window studies; created concept studies, created analysis diagrams and sections, rendered images

Summer 2023 - Now

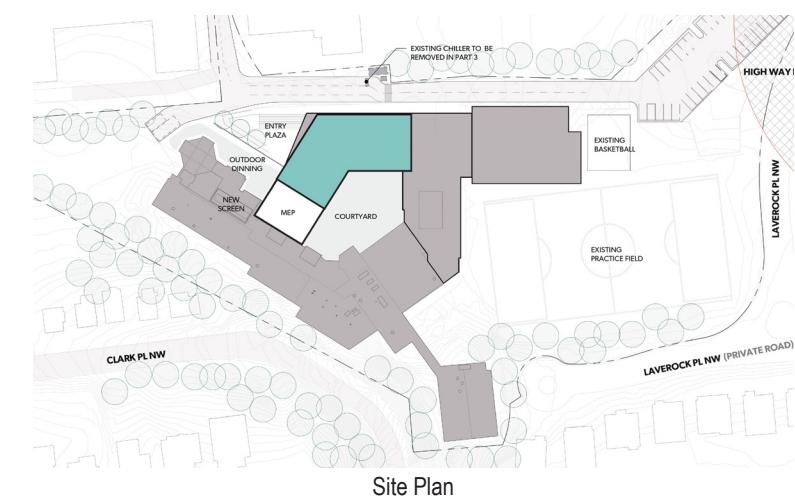


Overall Plan for Level 2

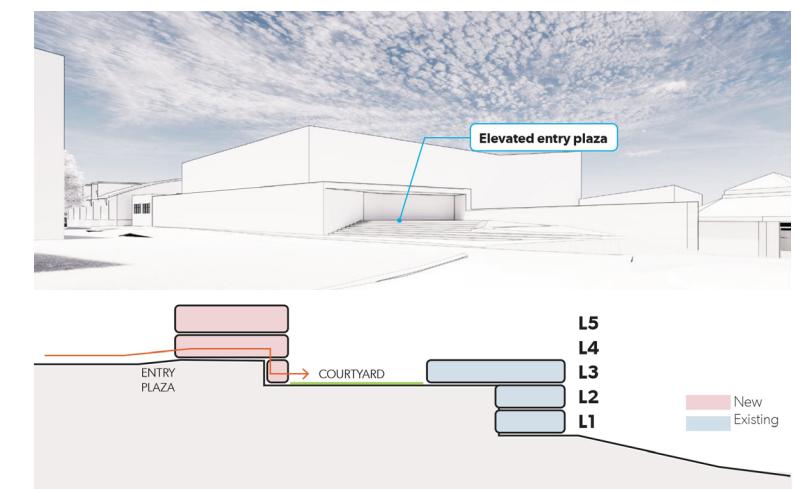


Building Sections

Elevation (Window Type)



Site Plan



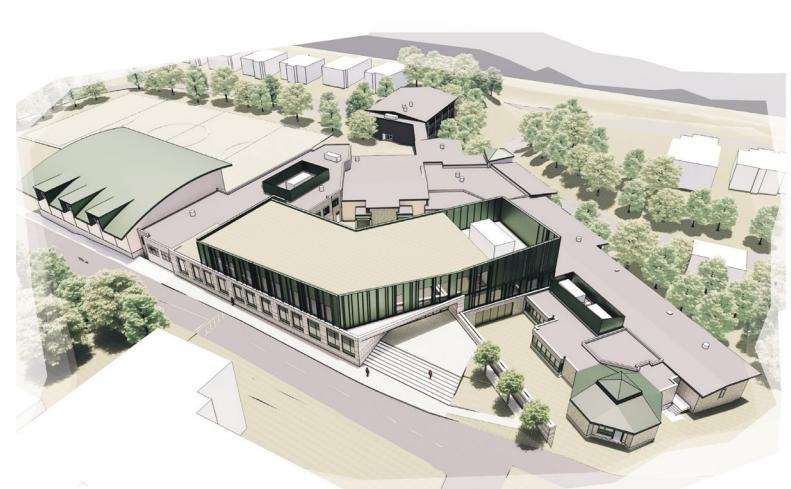
Massing Development Diagram (SD Phase)



Existing Rendering



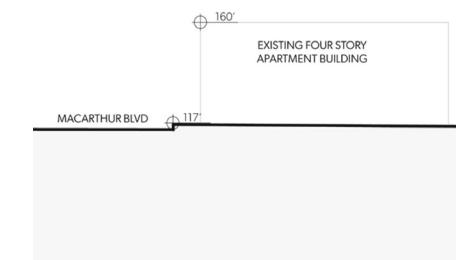
Planning Development



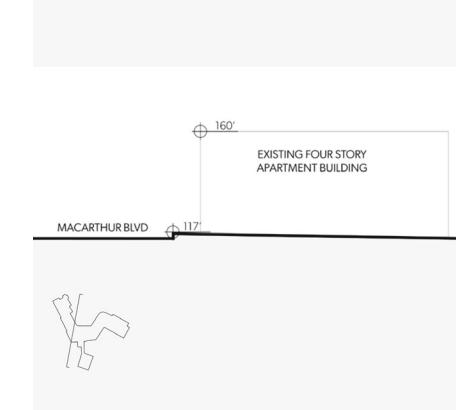
Massing Development Rendering (SD Phase)



SD Development Rendering



Existing Section



Proposed Section