

CHUAN LIU

Selected Works 2015-2023

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Project Mary - Bonnet Lot 5 Development

a Virgin + TRAVEL + LEISURE project

Bonnet Lot 5 Final Concept Package - 30

Team Project at Relativity Architects, Role: Exterior and Fenestration Design. Physical model on massing study. Site plan and Floor plate drawing
Final Concept Deliverable Package
Duration: 2023.08-2023.11

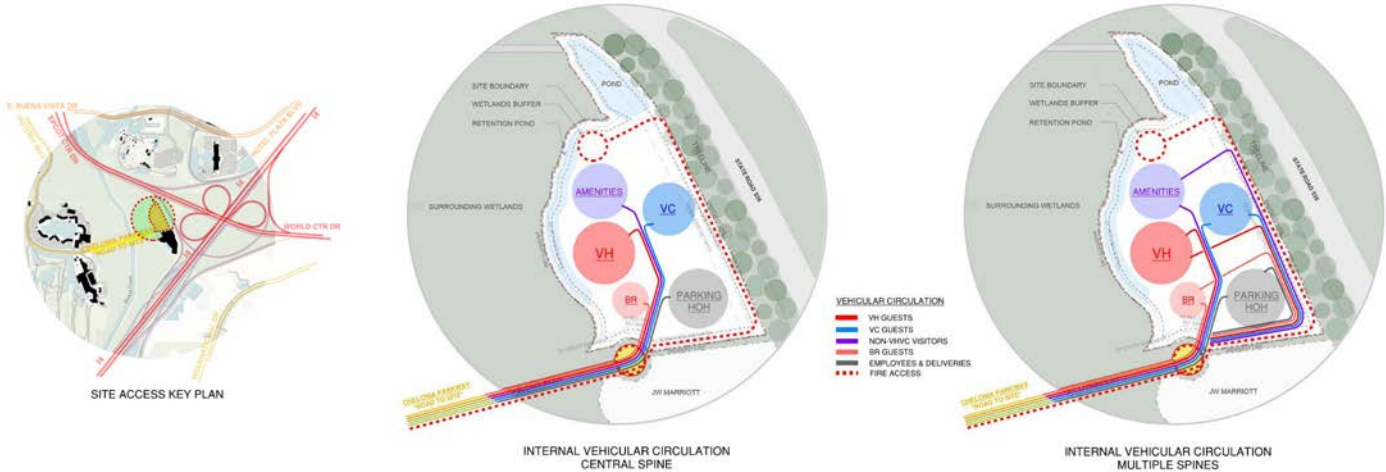
The Bonnet Lot 5 development is the first in a new series of collaborative resort projects between Travel+Leisure and Virgin Hotels. Lot 5 is ideally located in the Bonnet Creek Development; a 70-acre resort development located in the Orlando metro area just outside of Bay Lake, FL. Bonnet Lot 5 is bordered on the south by a J.W. Marriott Resort, a protected nature preserve to the West, and Epcot Drive to the North and East.

The program consists of a 250 club membership keys development, with an additional 350 hotel keys, and a wealth of amenities shared between the two program elements. Additional amenities are exclusive to either the Hotel or the Membership Club.

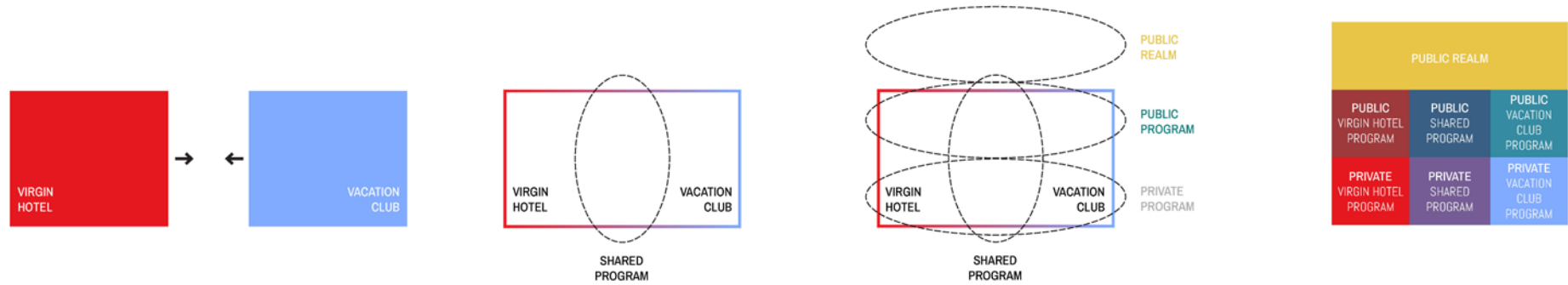
■ Area Diagram + Location Overview



■ Vehicular Circulation Diagram



■ Program Analysis



STEP 1 Virgin Hotel & Vacation Club are two distinguishable entities

STEP 2 They are enjoined in one campus and share programs

STEP 3 The nature of the shared programs are studied & further categorized based on access

STEP 4 Designated program typologies

- PRIVATE PROGRAM

 - Virgin Hotel Guests
 - Vacation Club Members
 - Staff
- PUBLIC PROGRAM

 - Virgin Hotel Guests
 - Vacation Club Members
 - Visitors
 - Staff
- PUBLIC REALM

 - Virgin Hotel Guests
 - Vacation Club Members
 - Visitors
 - Staff

■ Podium Amenity Dispersion Diagram

PROGRAM LIST

- A. Gathering Spaces**
Ballrooms, Meeting Rooms, & Prefunction Areas
Commons Co-op (Business Center / Library)

B. Gathering Spaces HOH

C. Commons Club
Funny Library (Coffee Shop) / Gourmet Cafe
Commons Club Bar / Lounge
Shaig Room (Private Dining / Function Room)
Commons Club Kitchen
Signature / Second Restaurant

D. Hotel Public Areas
Junction, Concierge, & Lounge
Retail

E. Club Public Areas
Junction, Concierge, & Lounge

F. Club F/B & Public Areas
Living Room / Open Kitchen / Bar
Board Room / Work Space / Library
Pool Grille & Bar
Owner's Bar & Lounge
Rockstar Bar & Lounge

G. Amenities
The Spa (Revival)
The Salon & Nail Spa
The Gym

H. Family Area
Family Pool Bar & Grill
Children & Youth Center

I. Hotel Food / Beverage HOH
Commons Club HOH
Amenities HOH
Family Area HOH
Food / Beverage Storage

J. Club Food / Beverage HOH

K. Hotel Housekeeping & Laundry

L. Club Unit Housekeeping Support

M. Delivery / Support
Engineering & Maintenance
Security, Purchasing, & Receiving
Truck Dock Area

N. MEP (Projected)
- O. Hotel Admin**
Hotel Exec, Front, Support Offices, & Tech.
People Services & Teammate Areas

P. Club Admin
Front & Support Offices
Staff Facilities

Q. Sales Center

R. Night Life / Entertainment
Rooftop Bar / Lounge (Pool)
Adult Pool Bar & Grill

S. Night Life HOH

T. Club Rooftop HOH

U. Club Rooftop Pool Club & Bar

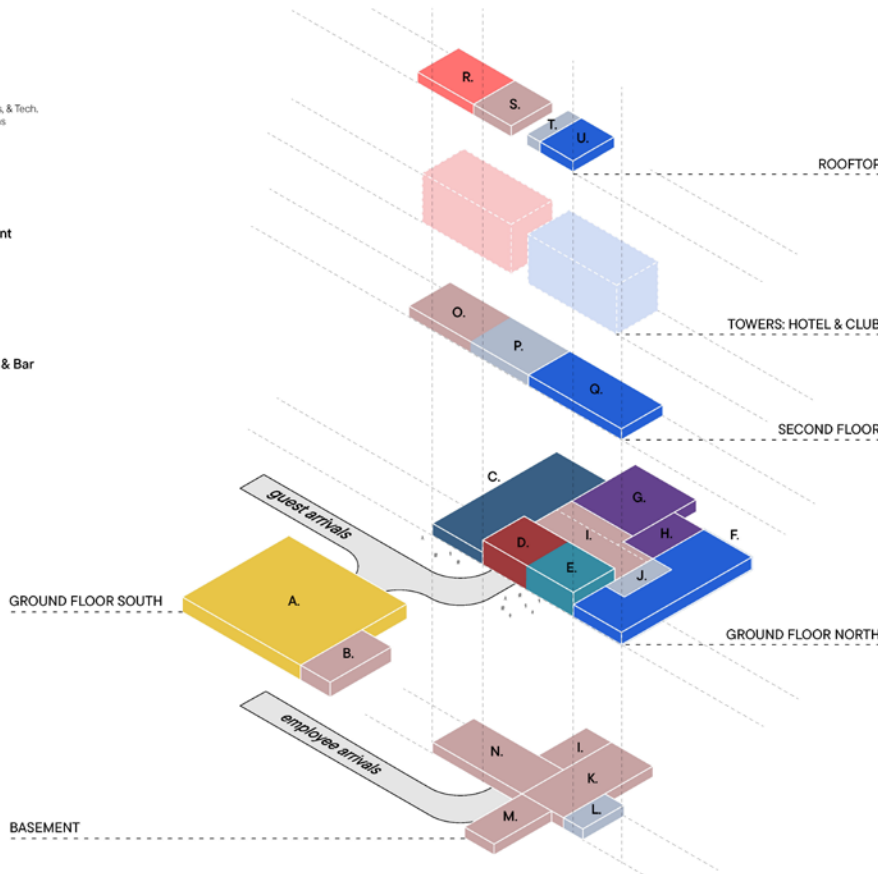
VIRGIN HOTEL

- Private Program
- Private Shared Program
- Public Program
- Public Shared Program
- Heart of House

VACATION CLUB

- Private Program
- Public Program
- Heart of House

- Public Realm
- Parking



■ Site Plan

- 1 Standalone Parking Structure
- 2 Loading Dock
- 3 Porte Cochere
- 4 Fire Turn Around Lane

VIRGIN HOTEL

- 5 Restaurant Patio & Terrace
- 6 Kids Outdoor Play area
- 7 Pool Bar & Grill
- 8 Adult Pool
- 9 Pool
- 10 Pool House Cabanas
- 11 Whirlpool
- 12 Court

VACATION CLUB

- 13 Lounge & Roof Deck
- 14 Living Room Patio
- 15 Rooftop Bar & Pool Deck
- 16 Spa Outdoor Pool & Bar

PUBLIC REALM

- 17 Ballroom
- 18 Outdoor Banquet
- 19 Permanent Art Installation & Patio
- 20 Storm-water Retention Pond
- 21 Bioswale
- 22 Bonnet Creek Walkway
- 23 Grove
- 24 Fire pits
- 25 Pavilions



■ Lower Podium Level Plan



■ Main Entrance Level Plan



■ Upper Podium Level Plan



■ Typical Hotel Floor Plate

- King Chamber
- Queen / Queen Chamber
- Grand Chamber King
- One Bedroom Suite
- Penthouse
- Richard's Flat



■ Typical Club Floor Plate

- Standard 1BR
- Standard 2BR
- Standard 3BR
- Rockstar 1BR
- Rockstar 3BR



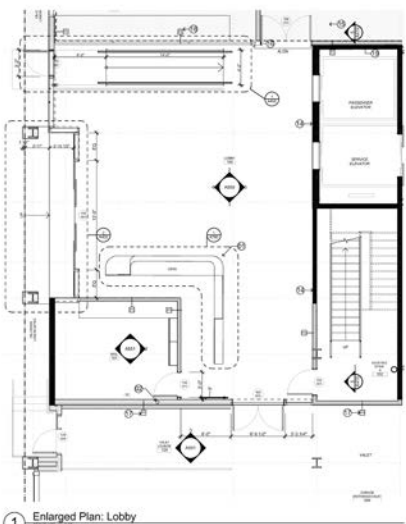
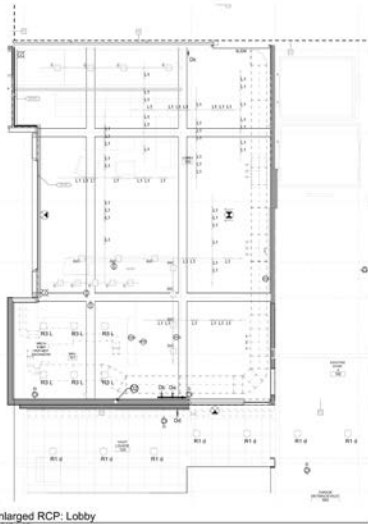
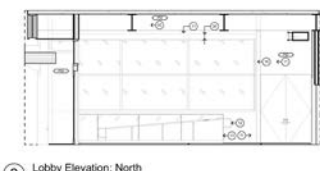
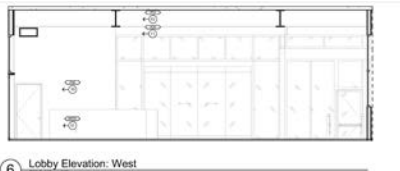
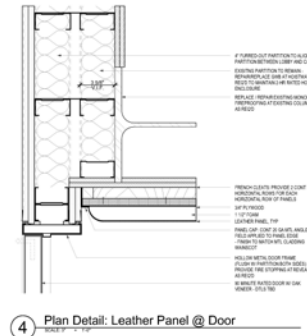
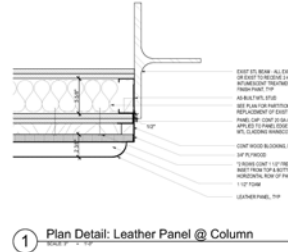
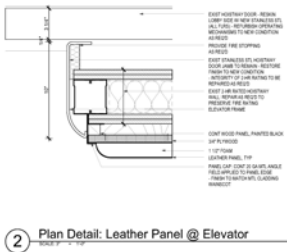
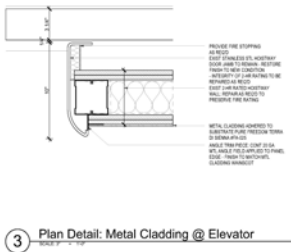


Hillcrest Affordable Housing

Team Project at Relativity Architects, Role: Construction details for section and plan. Site visit for field verification Documentation Phase

Duration: 2023.05-2023.9

Hillcrest Affordable Housing is a multifamily home renovated from a previous office building in Inglewood, Los Angeles. The ongoing construction phase requires detailed drawings corresponding to at-field construction situations. This set specifies construction details at the ground-floor elevator lobby from floor plans, elevations, and a series of section details.

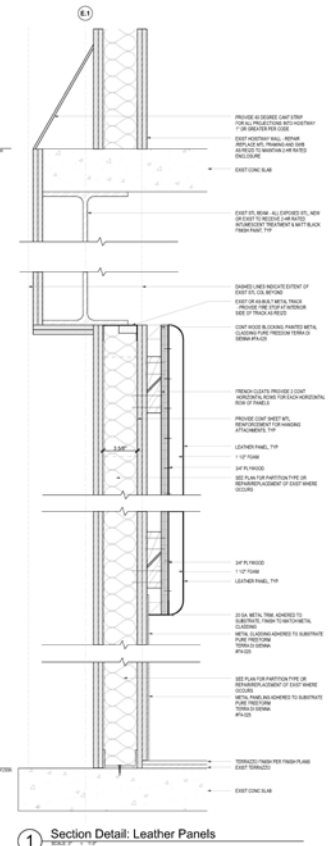
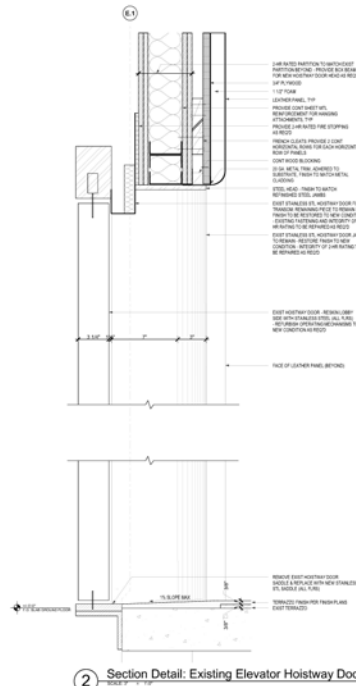


GENERAL NOTES

1. ALL COLUMNS & BEAMS AND EXISTING STEEL, W/1-P.
2. FILL EXISTING CONC. W/ 20% G.C.P. & EXISTING D.O.M. (SEE EXISTING RECORDS)
3. ALL ROAD-BUILDING TRACT ARE NOT NOTED OR SHOWN AS EXISTING ARE NEW CONSTRUCTION.
4. ALL PLUMBING FIXTURES ARE NEW CONSTRUCTION, D.O.M.
5. DIMENSIONS FOR INTERIOR PARTITIONS AND COLUMNS ARE CENTER-TO-CENTER LINE.
6. DIMENSIONS FOR EXTERIOR ARE FACE OF SURFACE TO FACE OF SURFACE.
7. SEE FINISH-R, AND FOR ALL FINISHES.

[illegible][illegible]

NOTE:
ALL EXISTING STEEL, NEW OR EXISTING, TO
BE COAT 2X ANTI-RUST TREATMENT. TO CHANGE
2X IN FIRE RATING & TO RESIST MILD BLACK
IRON OXIDE (RUST).
EXISTING ELEVATOR HOISTWAY AND EXISTING
STAMP ENCLOSURES ARE 2X IN FIRE RATED
ENCLOSURES - REPAIR AS REQUIRED TO
PRESERVE FIRE RATING. P/P
PROVIDE FULL SETS BOOKS OF LEATHER-BIND
AND SUBSTITUTED FOR ORIGINAL - ALL PLANS TO
BE FIRE RETARDANT TREATED

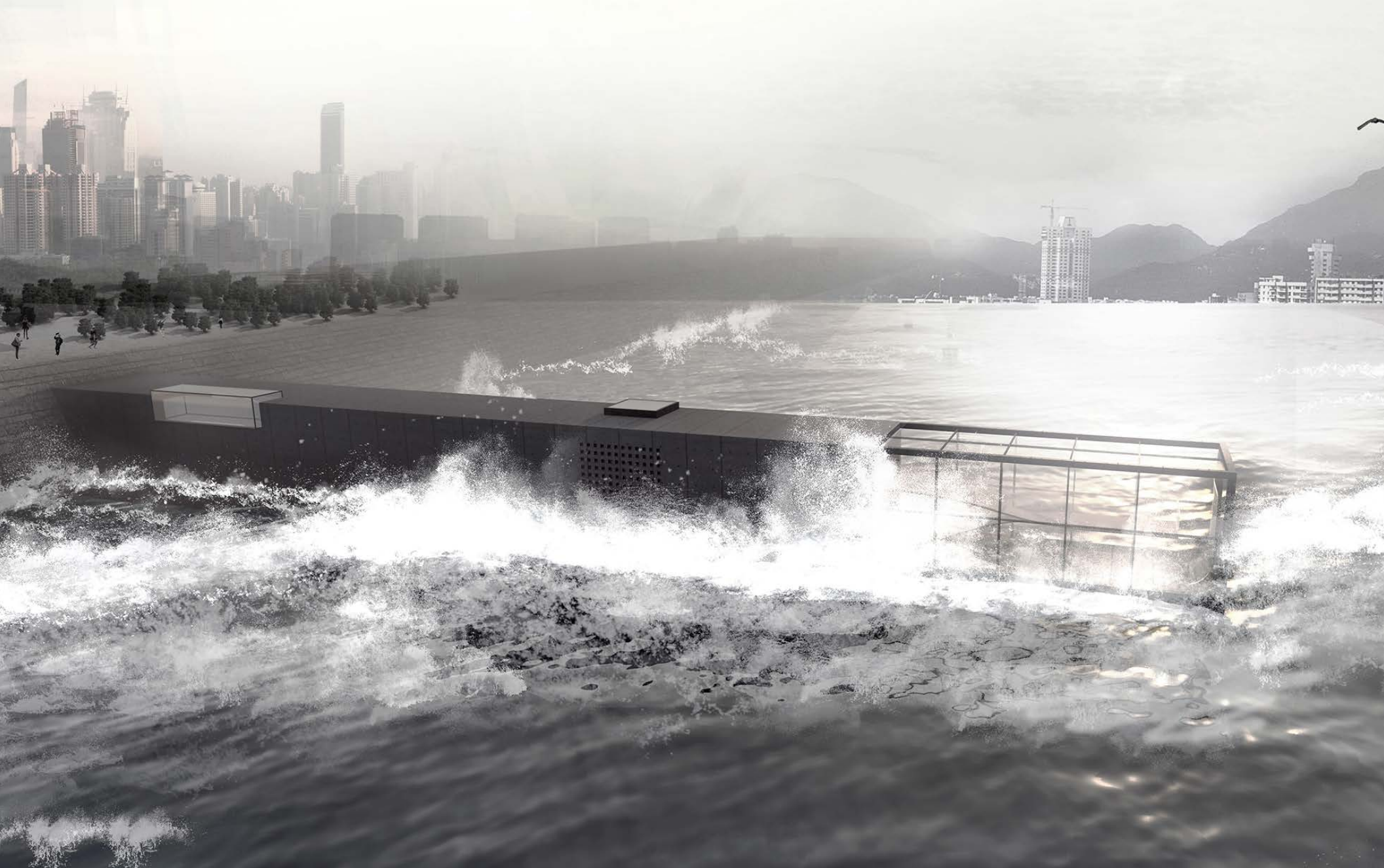


4 Enlarged RCP: Lobby

1 Enlarged Plan: Lobby

2 Section Detail: Existing Elevator Hoistway Door

1 Section Detail: Leather Panels



Rising With The Tide

Team Project, Role: Idea Formation, Floor Plan's Design, Number of Team Members: 4

Second Prize, "Union Cup " International Architecture Competition

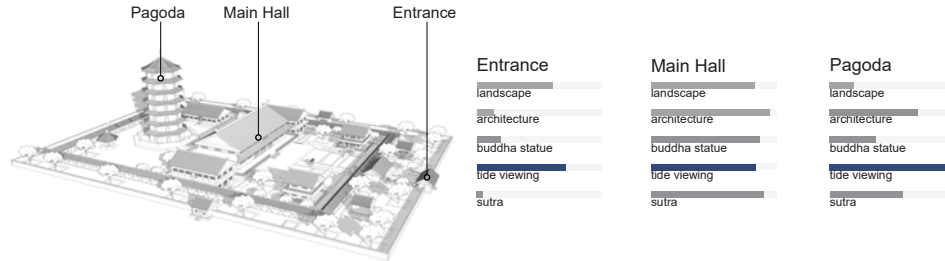
Duration: 2019.03.05-2019.06.20

Haichao Temple, which is close to Qiangtang river, was used to be an ideal place for holding religious activities. But it was burnt down in Qing dynasty. The spectacles of people worshipping and celebrating then disappeared in a sudden. The tradition is now endangered and needs to be preserved.

From the above perspective, Haichao temple can be dissected into three sections: entrance, main hall and pagoda. Each section was designed for different funtions so that visitors could have different experiences while passing from the entrance towards the pagoda. From a field trip inside the temple, our group investiagted one spot in each section and concluded five typical views visitors may find intriguing.

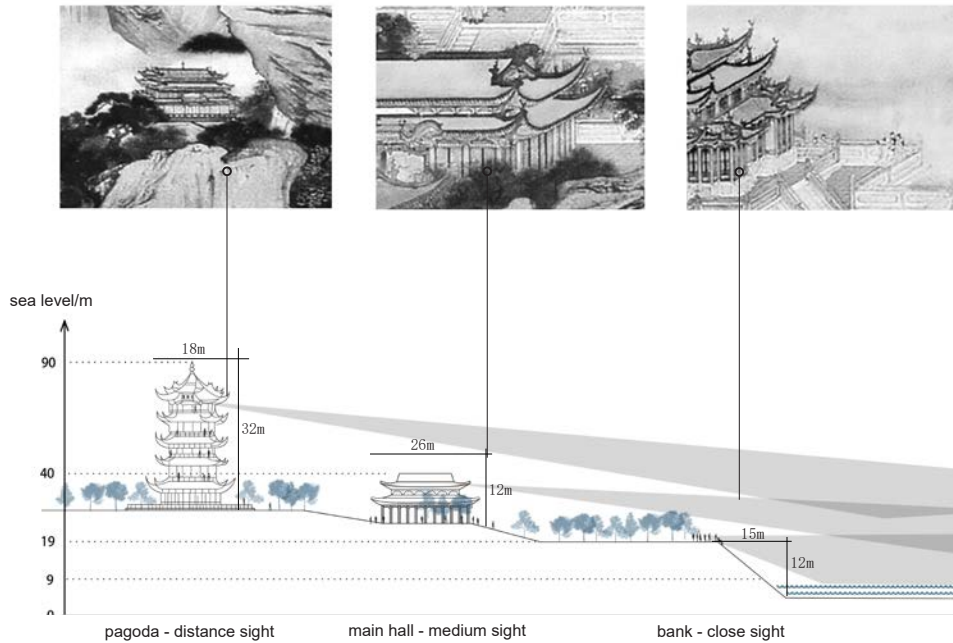
A diagram was maded according to the attractiveness of each spot to obtain the most intriguing view of each section. From the diagram, tide viewing is the top experience of each section, and we learned that tide viewing was the most popular activity at the temple.

■ Analysis of Haichao Temple



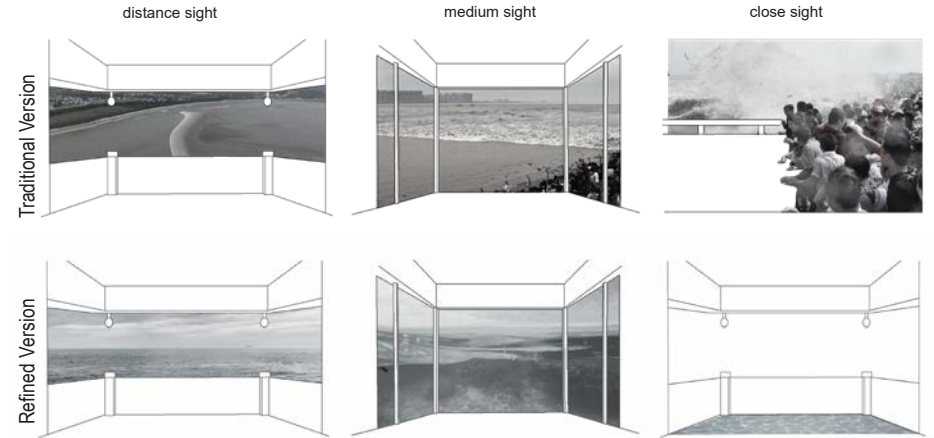
Perspective of Haichao Temple

■ Analysis of Viewing Angle



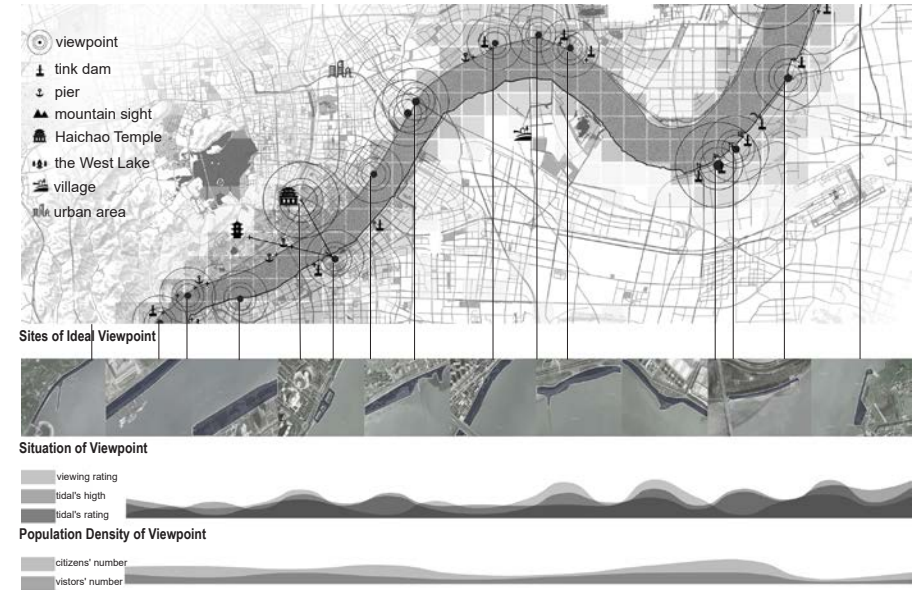
After analyzing Haichao Temple, we found out that the temple is an ideal place for tide viewing. Each spot in the temple can provide visitors a distinctive experience of viewing tides. We then set tide viewing as a major feature of our design. From the analyses of viewing angles, three viewing points are concluded—from distance sight to close sight.

■ Evolution of Viewing Angle



Three ideal viewing angles were concluded: distance sight, medium sight and close sight. The three sights were integrated into our design, providing visitors beholding the scenes in the interior space of the new spaces. Vistors can then obtain different feelings when passing through a series of scenes.

■ Analysis of Location Selection



To bring visitors exciting experiences of viewing tides, we selected several spots that are locations of tink dams and can be renovated into perfect sites for viewing tides.

Types of Tides

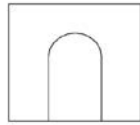


■ Evolution of Space Organization



Transforming Mountain Gate

The mountain gate is the entrance of the temple, which separates the inside and outside.



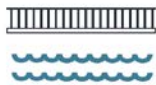
Transforming Pavilion

Pavilion is the place for visitors to rest and meditate.



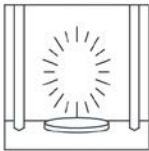
Transforming Water Bridge

Water bridge is the place before entering the main hall, a place for people to purify the soul.



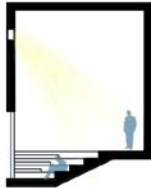
Transforming Main Hall

Main hall is the place for visitors to pray. It is the spiritual acme of the whole series.



Transforming Lecture Hall

Lecture Hall is a learning and thinking room for visitors to sit on steps to meditate.

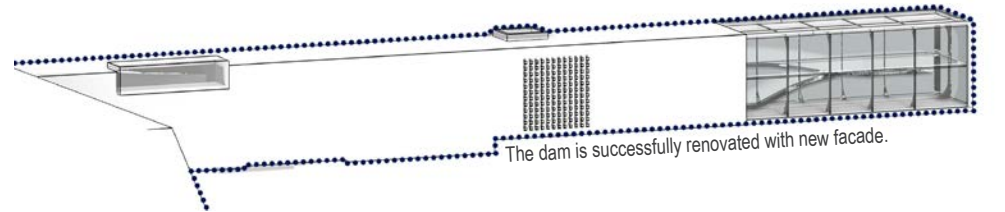
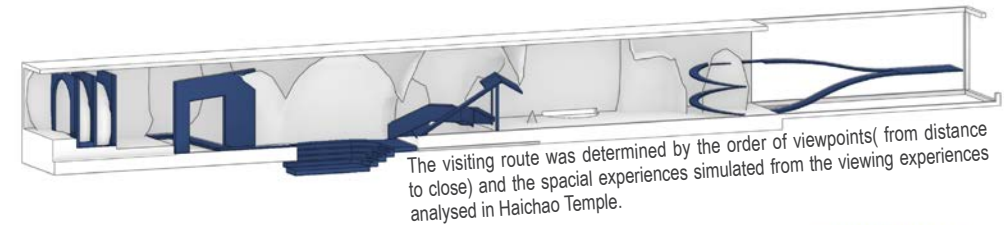
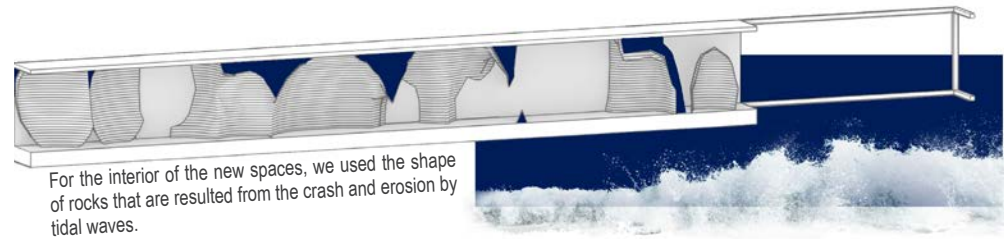
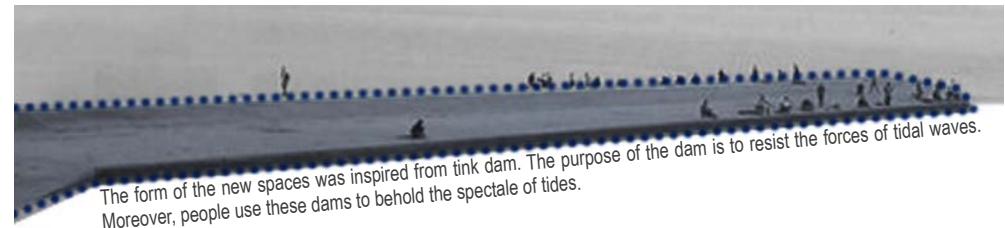


Transforming Pagoda

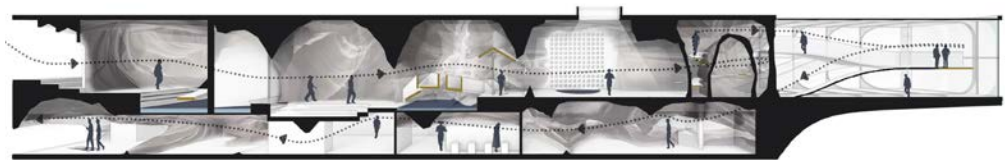
Among the spatial experiences, Pagoda is the acme of the temple. Visitors ascend via spiral stairs to the top floor to behold the amazing view.



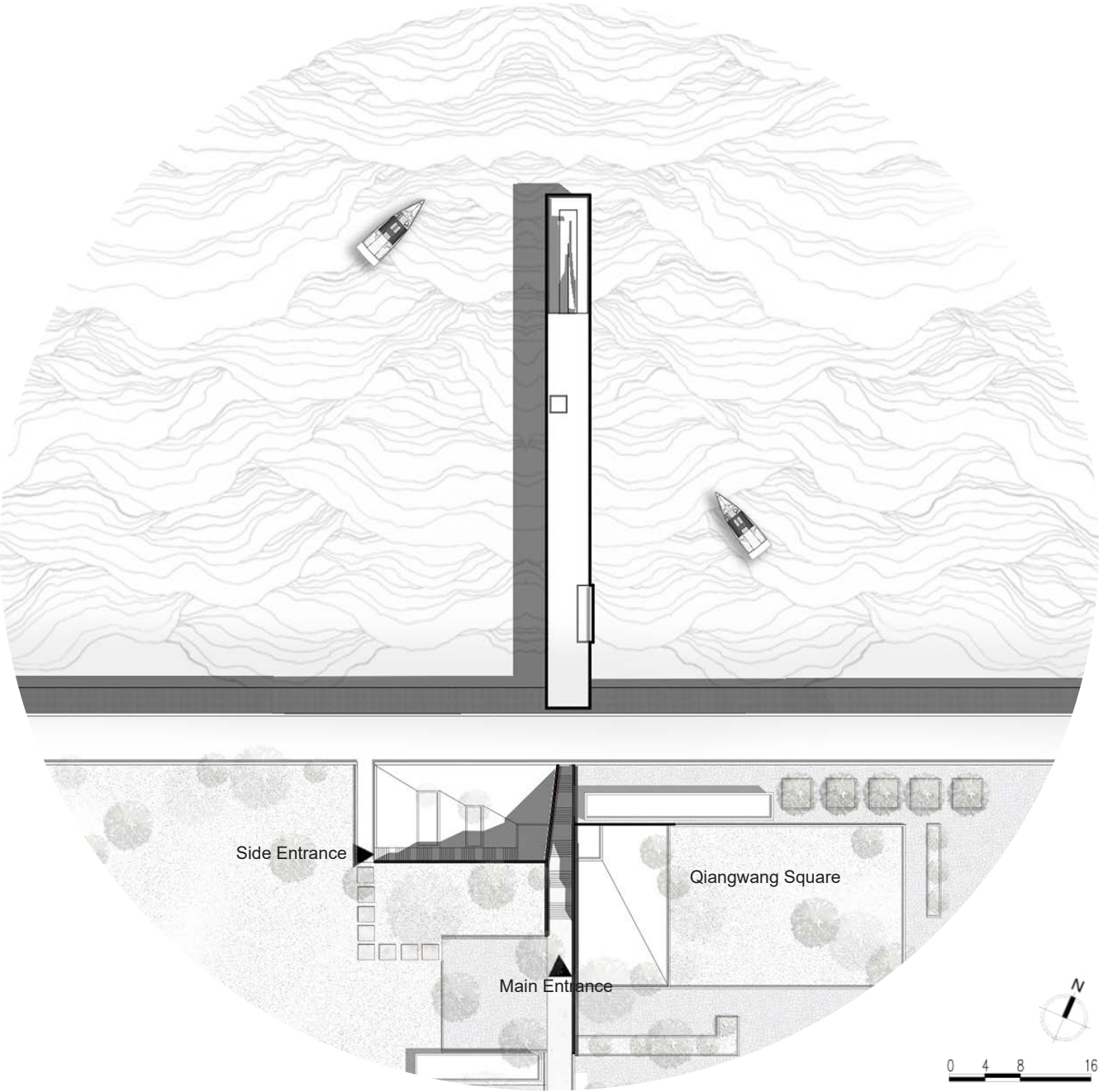
■ Evolution of Space Organization



■ Section Perspective

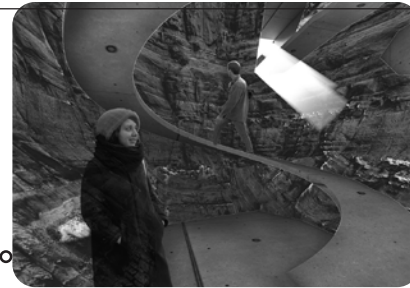
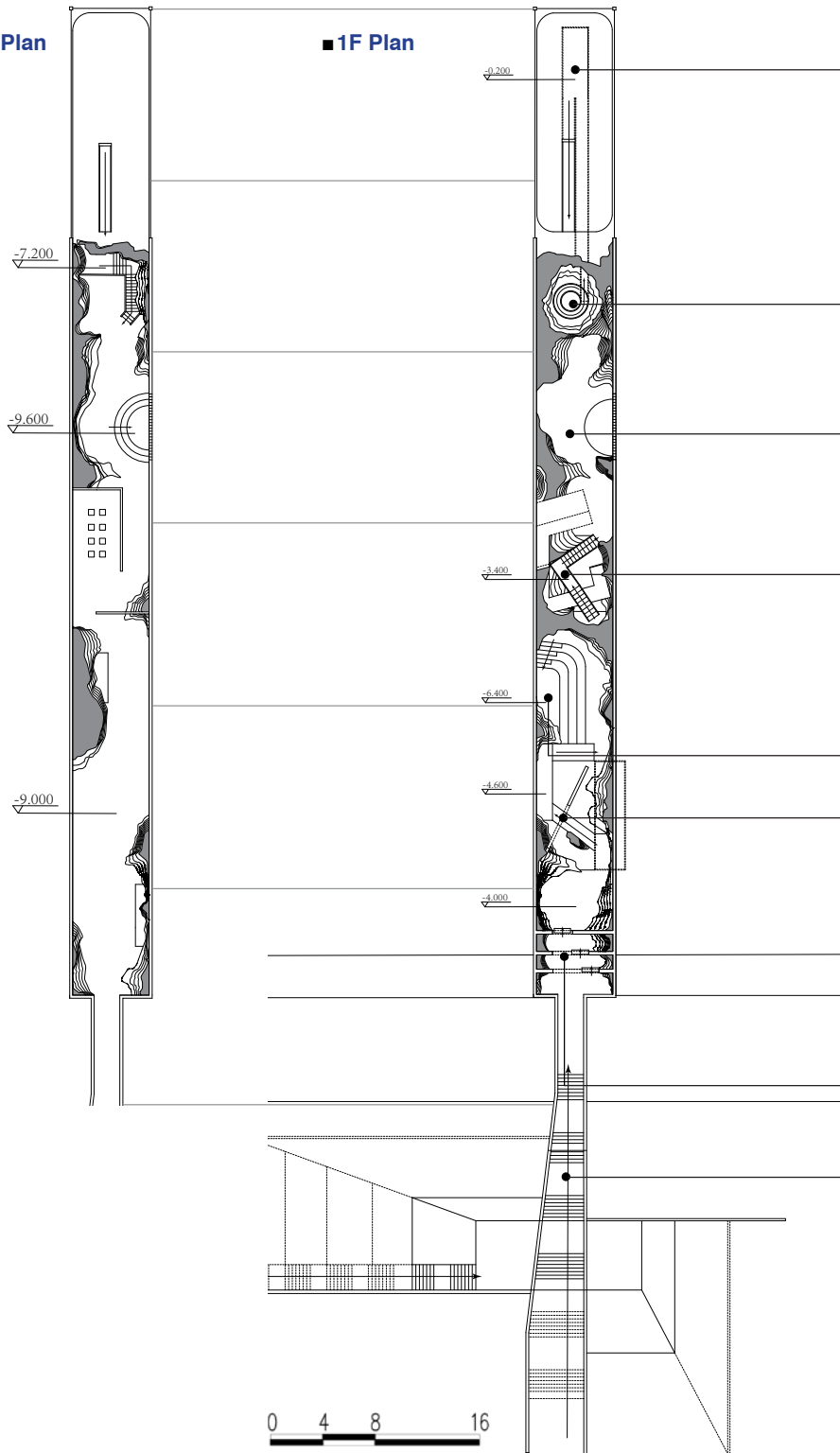


■ Site Plan

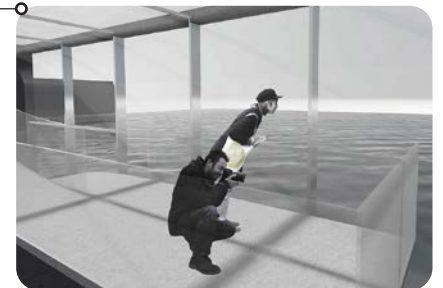


■ -1F Plan

■ 1F Plan



Ascend in Spiral - This point marks the start of the spiral stair, ascending to the top for the view.



The Acme of Tides - This point is the closest place to watch the tide.



Pacing in the Pavilion - Visitors step into the pavilion to meditate and get prepared for the coming scenes.



Buddha Light Hall - Visitors will watch the tide from a sequence of square holes.



Down by the Creek - The narrow path floats on the water giving visitors a mysterious vibe.



Meditate with Sutra - Stair is desinged for visitors to get closser to the water to meditate.



Escape from the Bustle - The decending path to entrance brings serenity from the city's bustle.



Step into the Gate - While approaching the entrance, visitors will pass through a series of gates to enter the body of the dam.



The acme of the whole series located at the end of the dam, which is the closest viewpoint to behold the tidal wave. Here, visitors can have an intimate contact with the river. The all-glass structure make it possible to view directions.

When there is no tidal wave, visitors can experience the magnificence of the surface of the river. Moreover, visitors can behold sunrises as well as sunsets when the weather is good.



Green Space 2.0

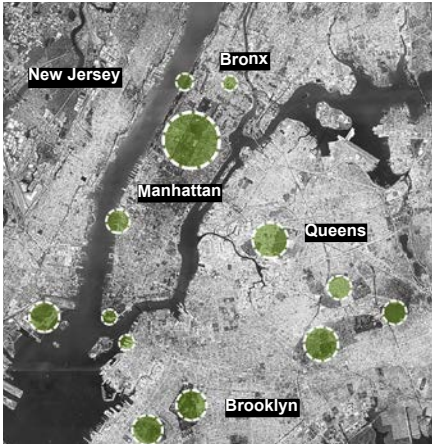
School project: high-rise design, Independent work.

Duration: 2018.09.15-2018.11.18

Green space is an indispensable part in urban area for citizens, especially workers. However, green space is scarce in most cities. Citizens have to go to suburbs on weekends to relieve. To provide urban residents with a reachable green space, I combine high-rise office building with green space for workers to unwind.



■ Green Space Distribution of New York

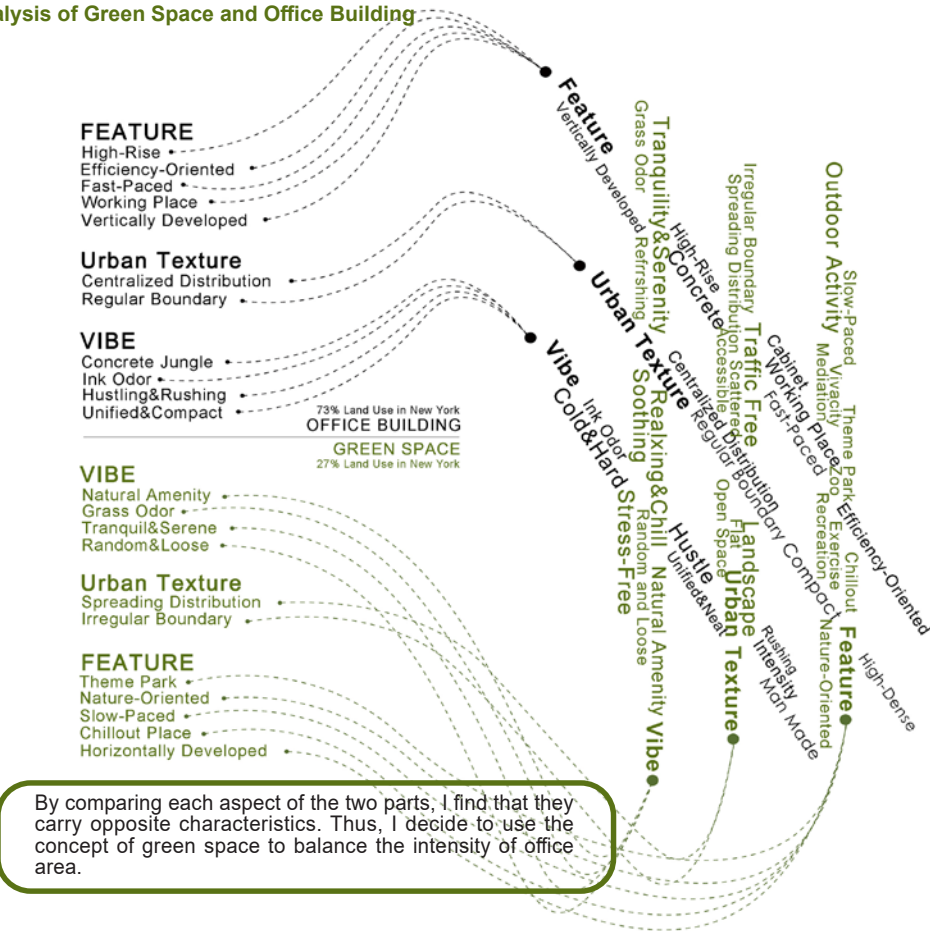


■ Office Building Distribution of New York



As a business center, New York has a high percentage of green spaces. From the analysis of distribution of green space and office building, I find an overlapping relationship of the two parts, indicating the importance of green space towards office area.

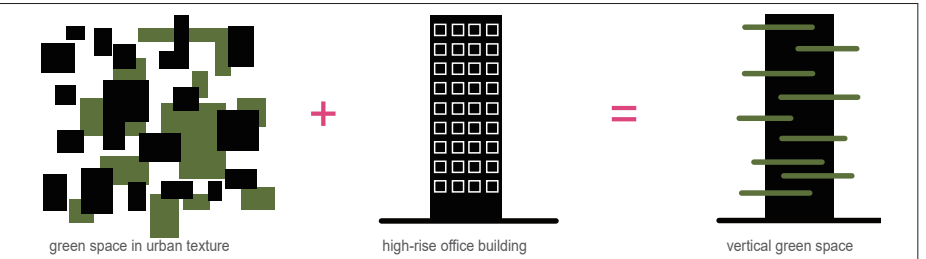
■ Analysis of Green Space and Office Building



■ Idea Formation

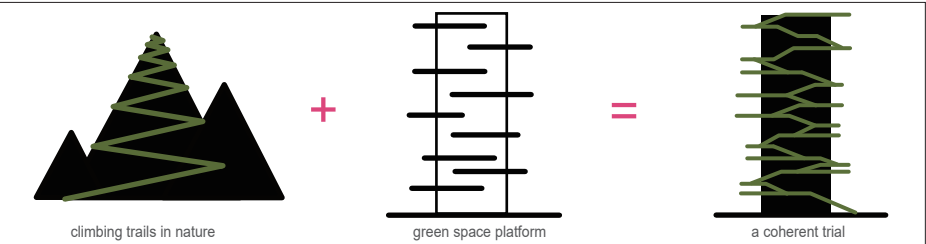
By comparing the two parts, I find them carrying some opposite characteristics. Thus, I decided to use the concept of Green Space to balance the intensity of office spaces.

1. Insert Green Space into High-rise Office Building



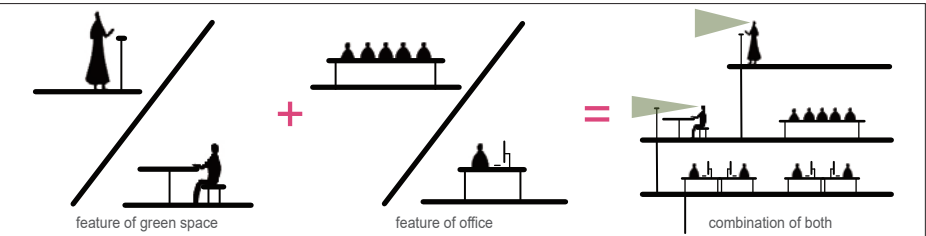
Because land resources are precious in urban area, I proposed to insert green space into office buildings to create more green spaces while improving land utilization.

2. Connect vertical green spaces into a coherent trail



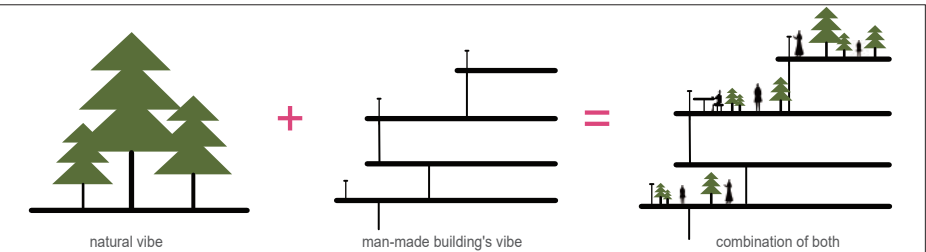
By transforming the element of climbing trail in nature, a new climbing trail for high-rise building was created, which contains platforms and ramps.

3. Combine the feature of green space and office building



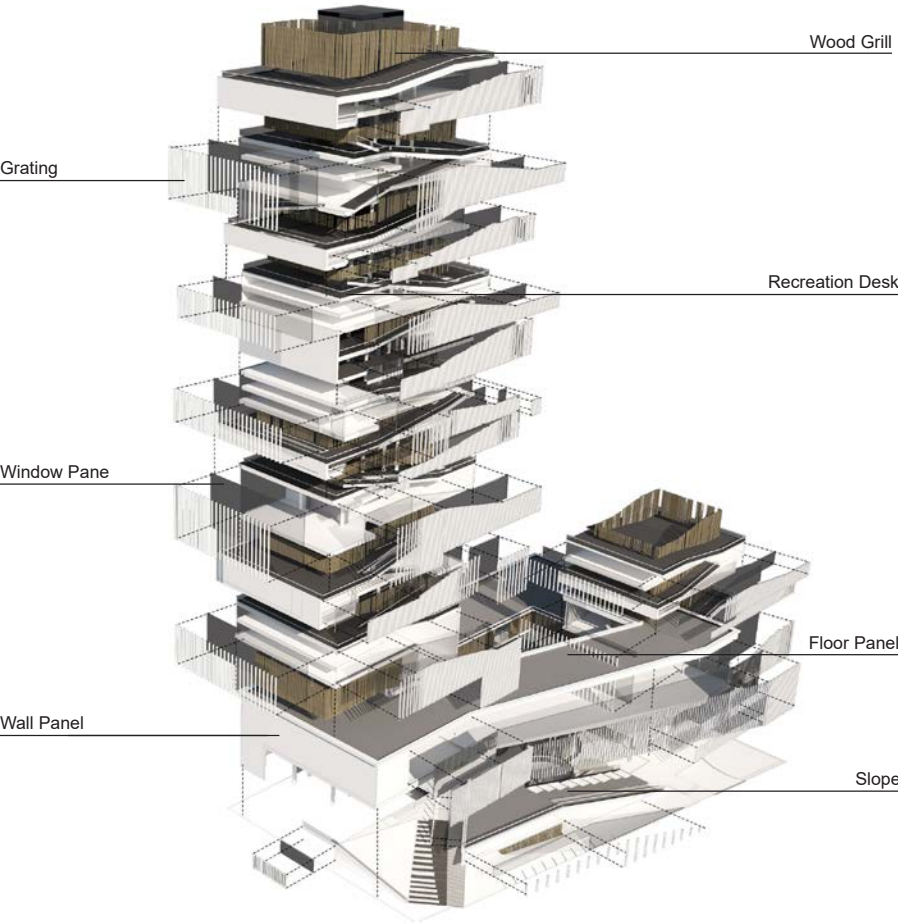
Green space provides a place for people to chill, while an office is for working. In the design, I combined them into one building, which will provide a brand new experience for both chilling and working.

4. Merge the vibe of green space and office building

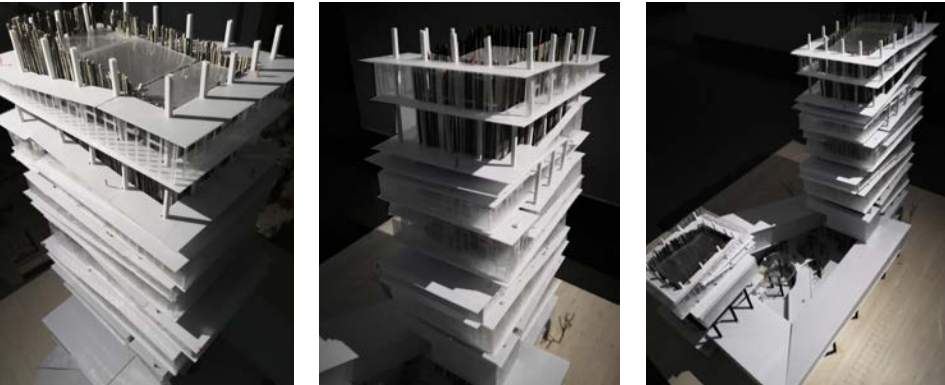


Plant brings a natural vibe to green space while concrete and glass give the distinction for high-rise office building. I merge the two vibes by introducing trees and grass to every outdoor platforms.

■ Major Elements



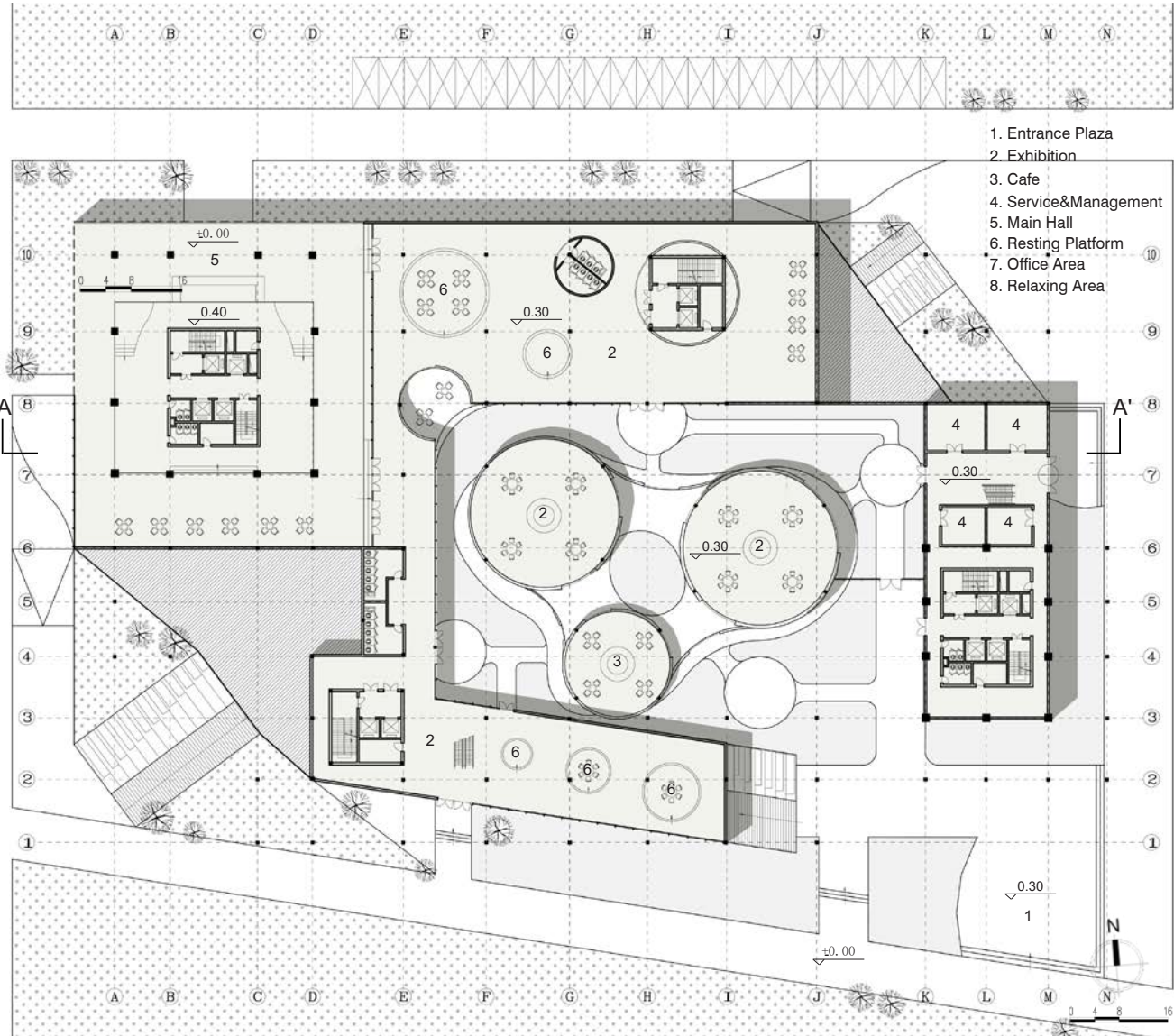
■ Model Photos



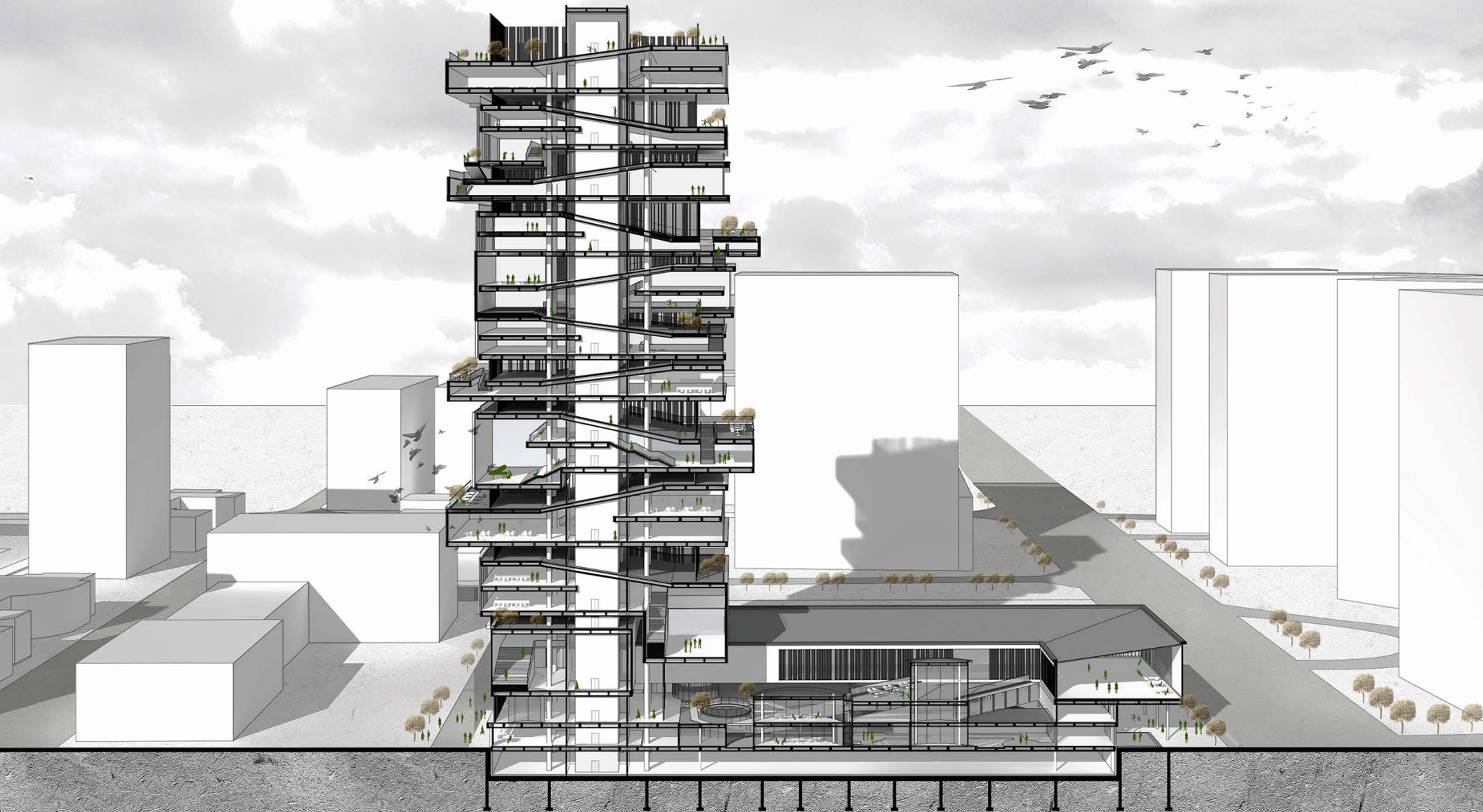
■ Standard Floor Plan



■ Ground Floor Plan



■ A-A Section By designing a trail from the bottom to the top of the building, visitors can find their way to the top and have a good view of the city. Along the way to the top, visitors meander through a continuous green space, which is created to regenerate the vibe of nature. The green space can be accessed by the workers in the building. They can walk outside to the green space to unwind themselves during work breaks.





Utopia for Music Lovers

Architectural Design, Personal Work.

Duration: 2019. 07. 11–2019. 10. 26

Nowadays, music festivals are becoming a symbol of fashion and vigor. However, inconvenience may occur during festivals as well as the sites may face an idle state when festivals are over.

After examining the structure of the music festival, I decided to design an Utopia for music lovers to enjoy the exuberant vibe during festivals and a gathering place at other times.

■ Analysis of Current Site

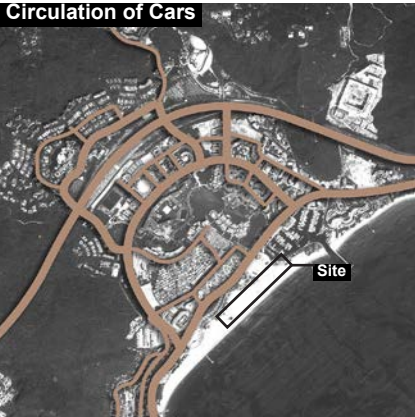
The current site was used to be a holding place for several music festivals. But there are problems that cause inconvenience for music lovers. The site are analyzed to investigate the features of current mode as well as the outlook of utopian mode.

Site Location



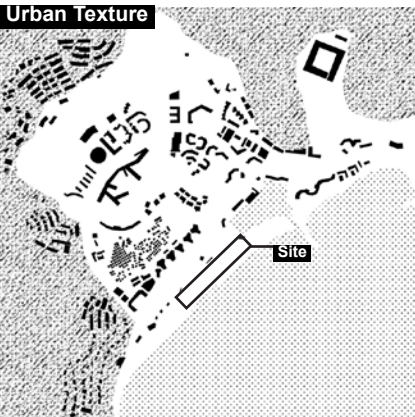
Located at a driving distance from surrounding cities, a permanent site for music lovers is available.

Circulation of Cars



There is no direct traffic for cars to reach the site. Parking lot and roads to the site need to be added to resolve the current inconvenience.

Urban Texture



The outline of the buildings on the site should conform to the surrounding urban texture.

Geographic Situation



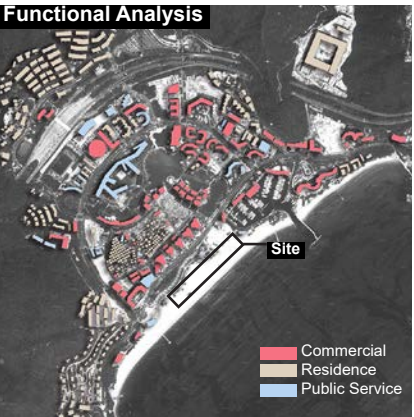
Located at seaside, the site should build up a relationship with the sea, which is ignored in current mode.

Circulation of Pedestrian



There is no clear sign of pedestrians' circulation on the beach. Trails of workers and visitors need to be added to achieve the utopian mode.

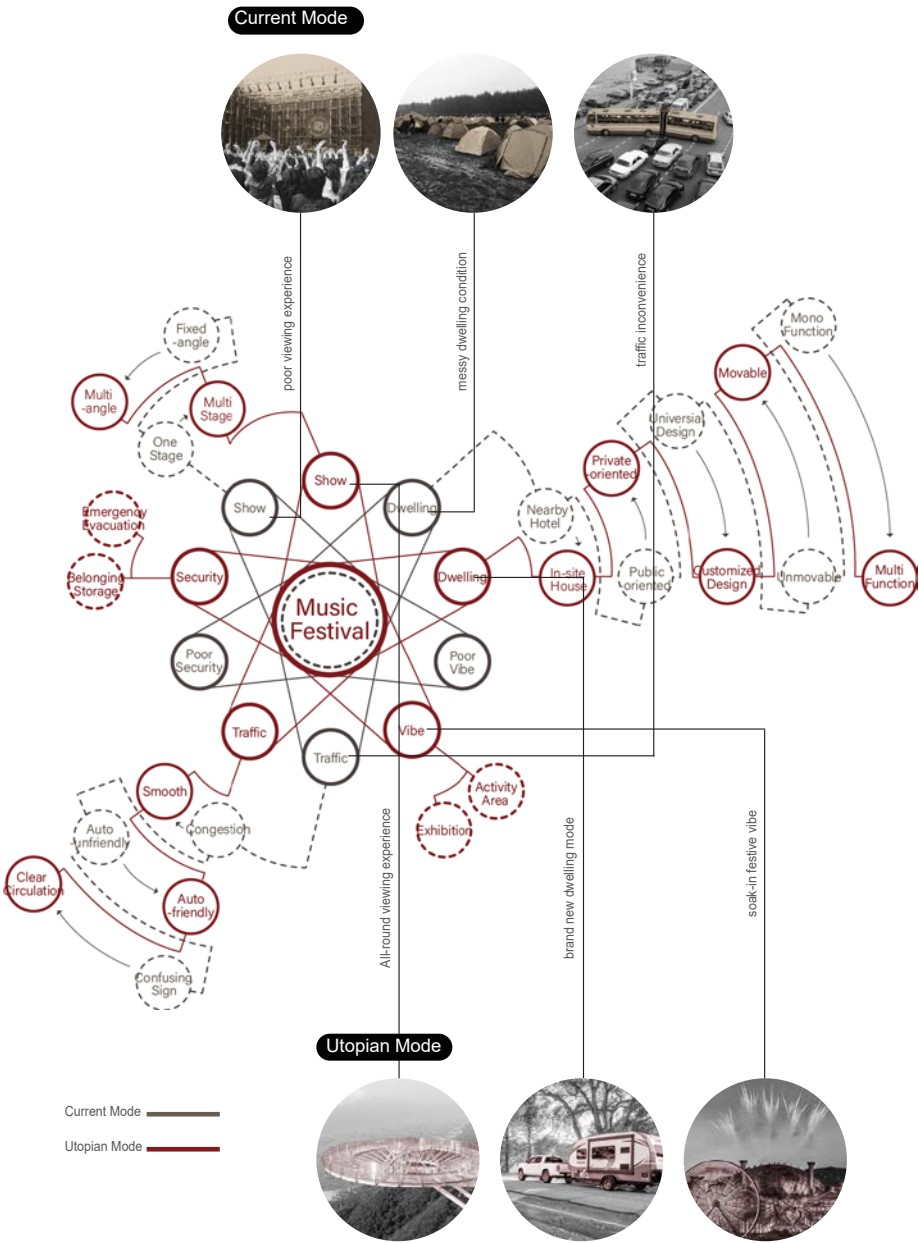
Functional Analysis



Since public service areas are scarce around the site, spaces like library, studio and temporary dwelling space need to be added.

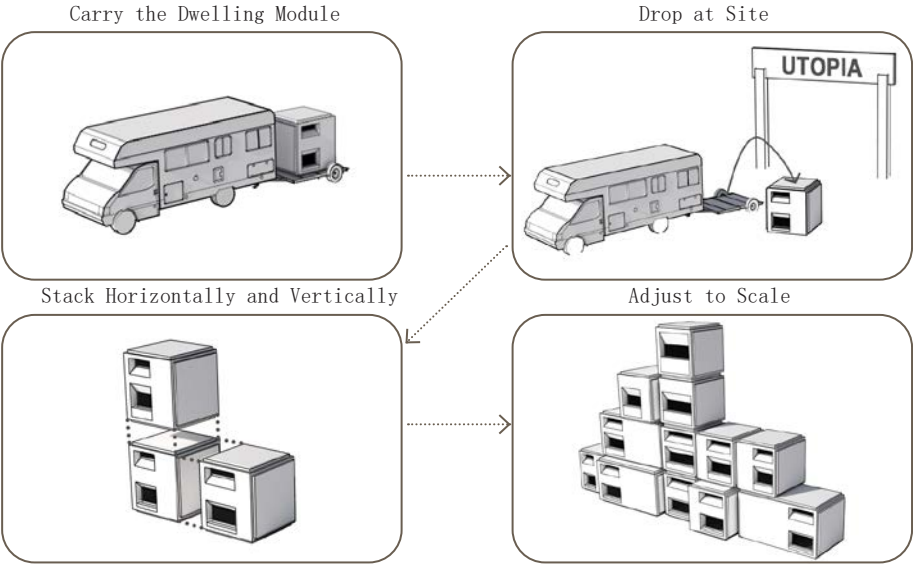
■ Analysis of Music Festival: Current Mode & Utopian Mode

The comparison between current and Utopian modes indicates several key elements of a successful music festival. The result of the analysis will be used as a direction for the design.

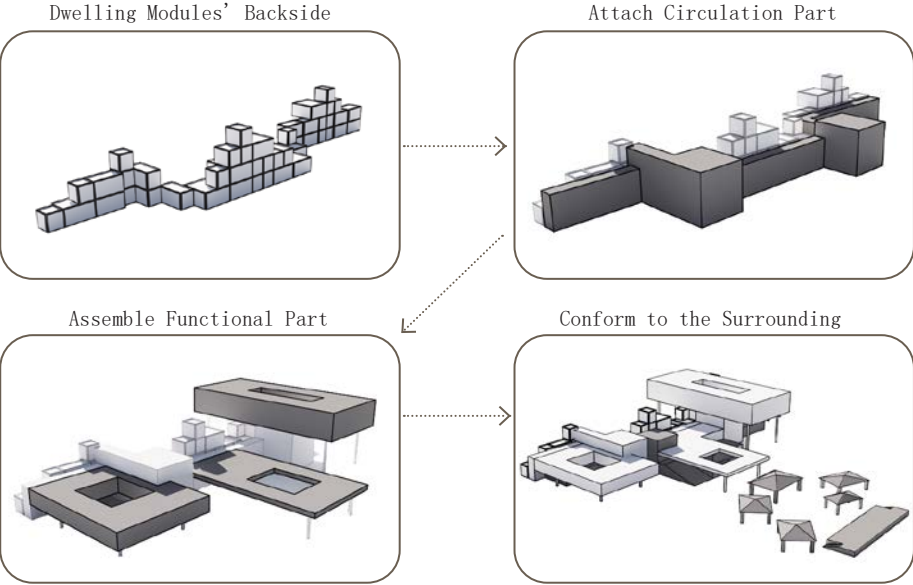


■ Formation of Design Concept

RV culture is rooted in music festival. It was an indispensable part for both audience and marching bands back to the 70s. People carried their stuff to attend music festivals across the states. To build an Utopia for music lovers, a dwelling module is carried by a RV to a site.

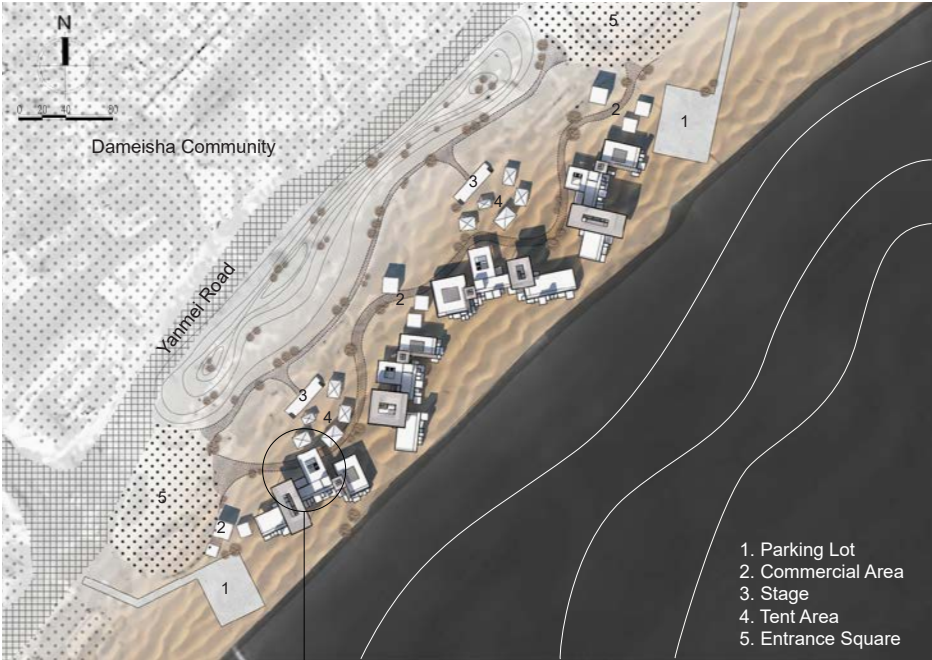


Each module will be attached to the circulation part from the back. This part acts like media for dwellers to enter into the functional part of the building.

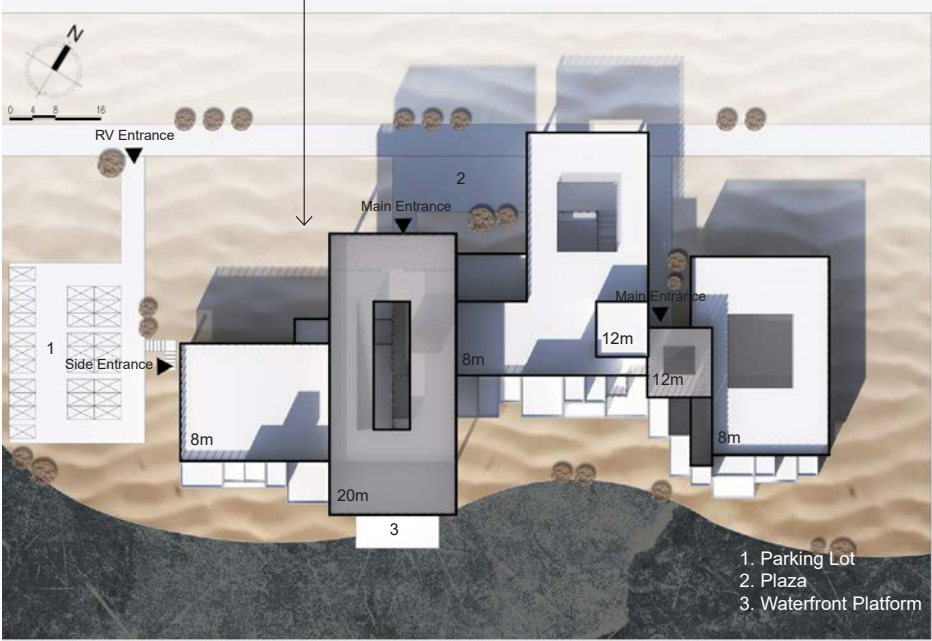


The stage will be added when the music festival starts. People can find their spot from the tent as well as the roof of the building to enjoy the vibe from different angles.

■ Overall Site Plan



■ Unit Site Plan

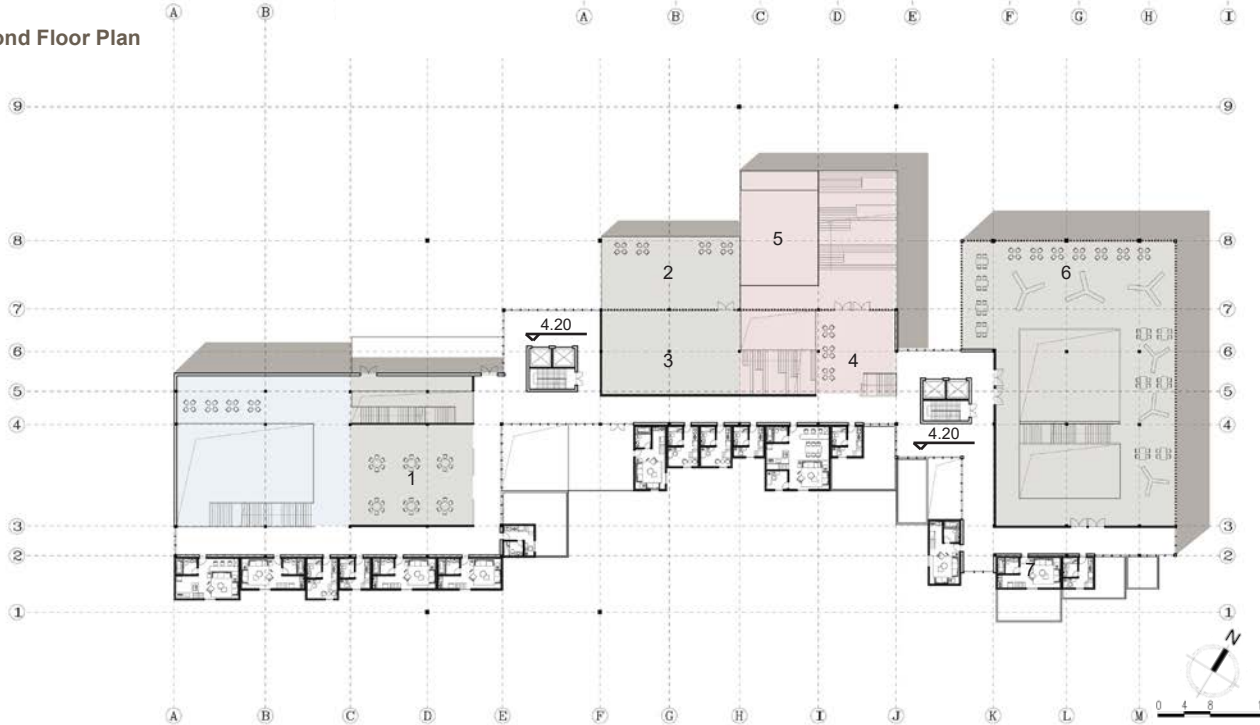


■ Ground Floor Plan



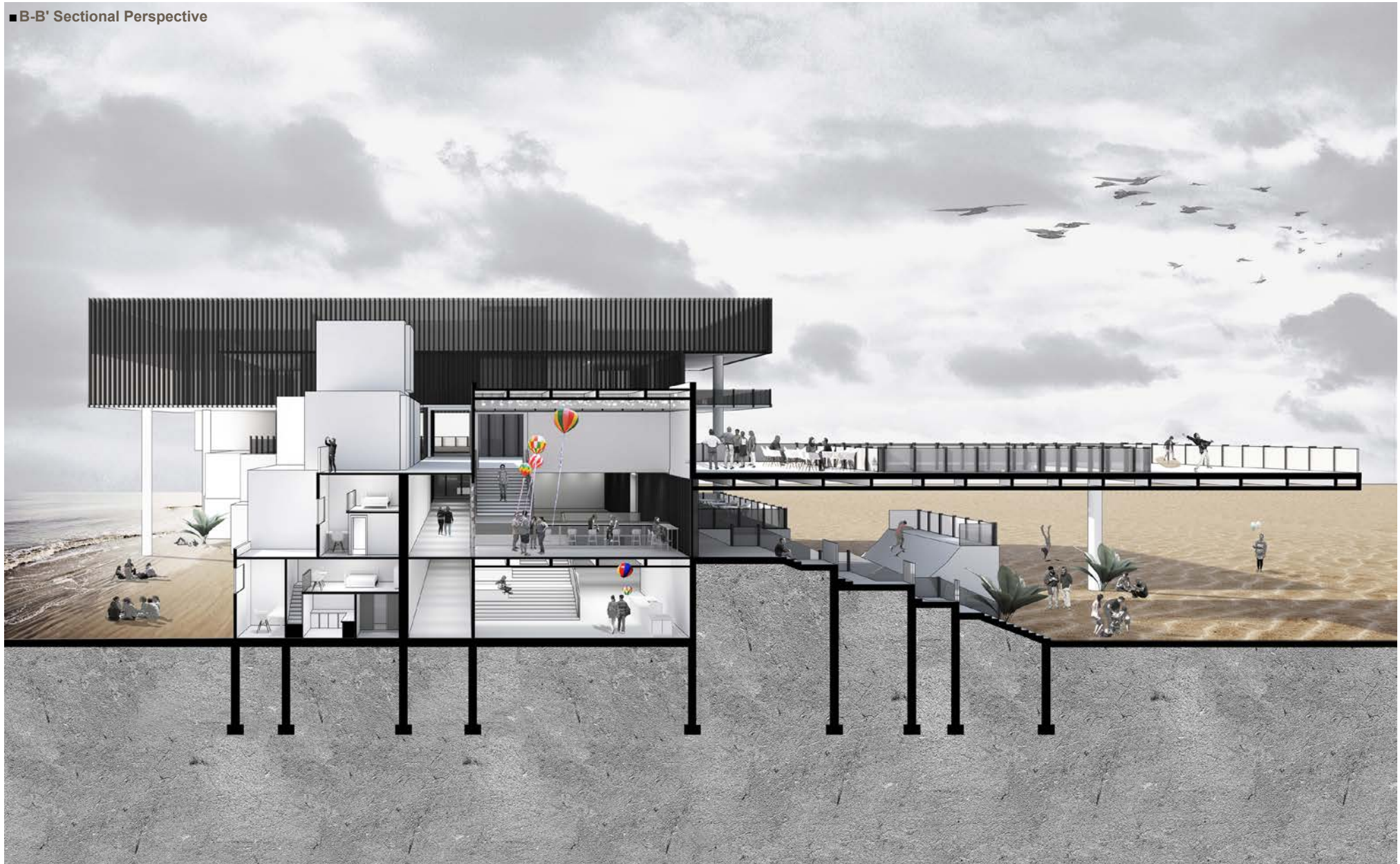
- 1. Cafe
- 2. Ball Room
- 3. Studio
- 4. Gym
- 5. Changing Room
- 6. Check-in Area
- 7. Library
- 8. Dwelling Module

■ Second Floor Plan



- 1. Cafeteria
- 2. Terrace
- 3. Gym
- 4. Relaxing Area
- 5. Skating Slope
- 6. Library
- 7. Dwelling Module

■ B-B' Sectional Perspective



The sectional perspective provides a view into the interior design of the building. It shows the details of dwelling modules, public space and the viewing platform. The rendering depicts a situation when the music festival is being held. Both music lovers and visitors can find their own space during the time. Those who enjoy the vivacity of music and enthusiastic vibe would present themselves at the platform and public space, those who prefer a quiet vibe would stay around the beach to enjoy the holiday. The sections show the space organization, especially the bar and library.



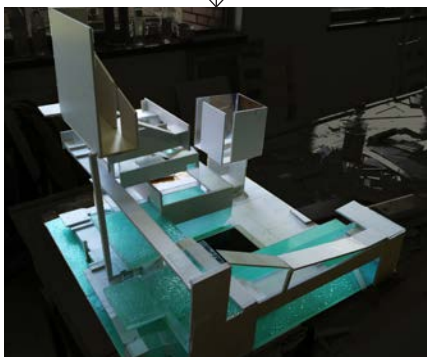
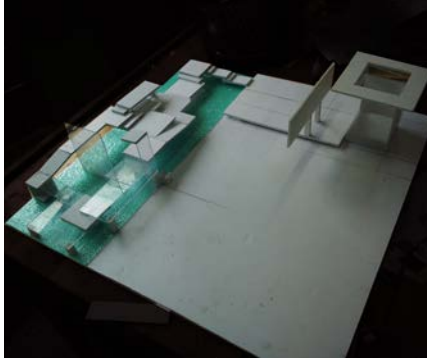
Meandering Trail

School project, Personal work.

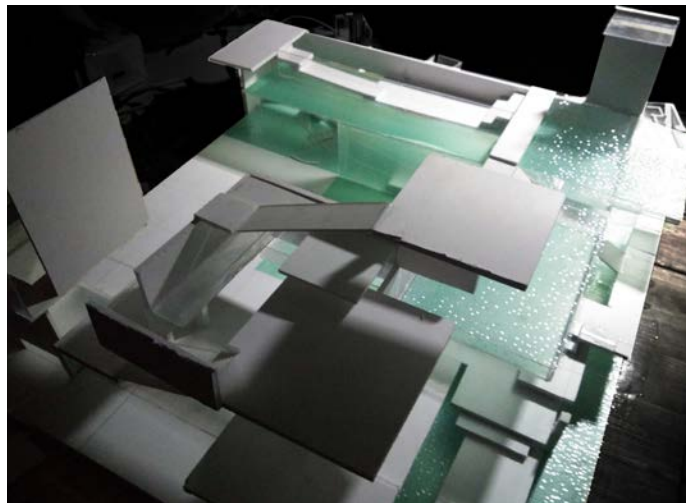
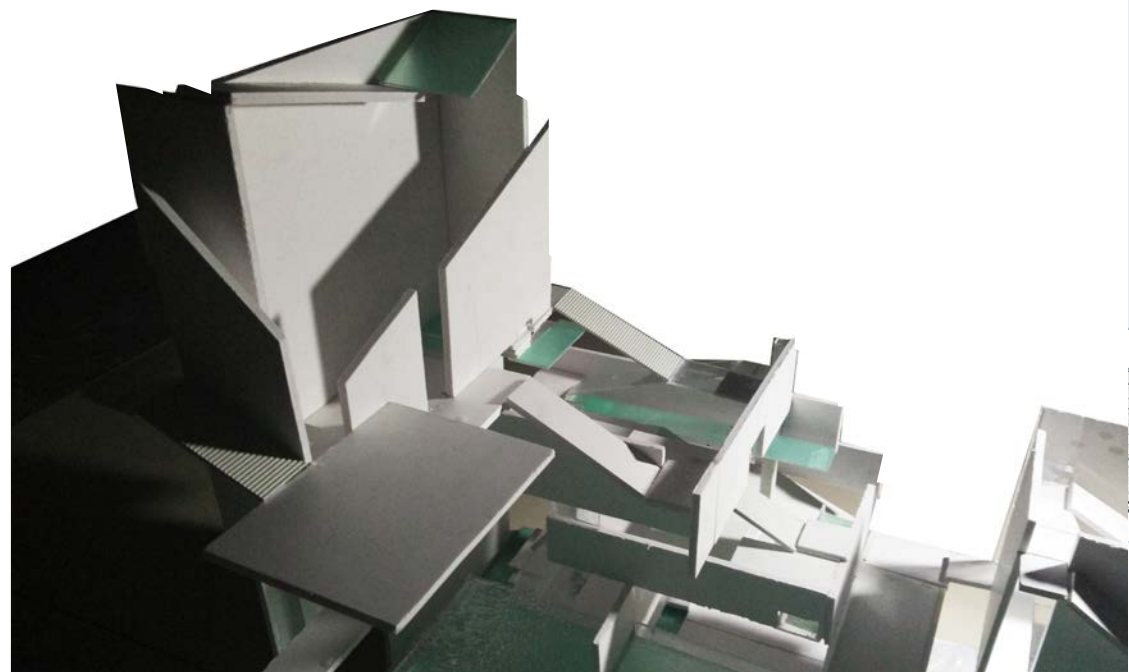
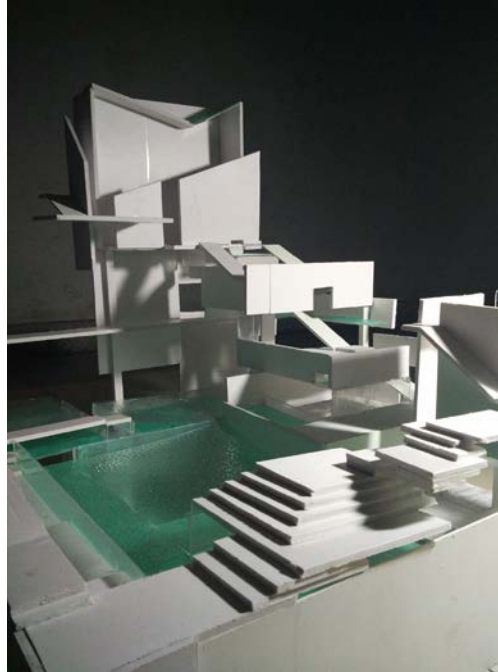
Duration: 2016.04.27-2016.05.27

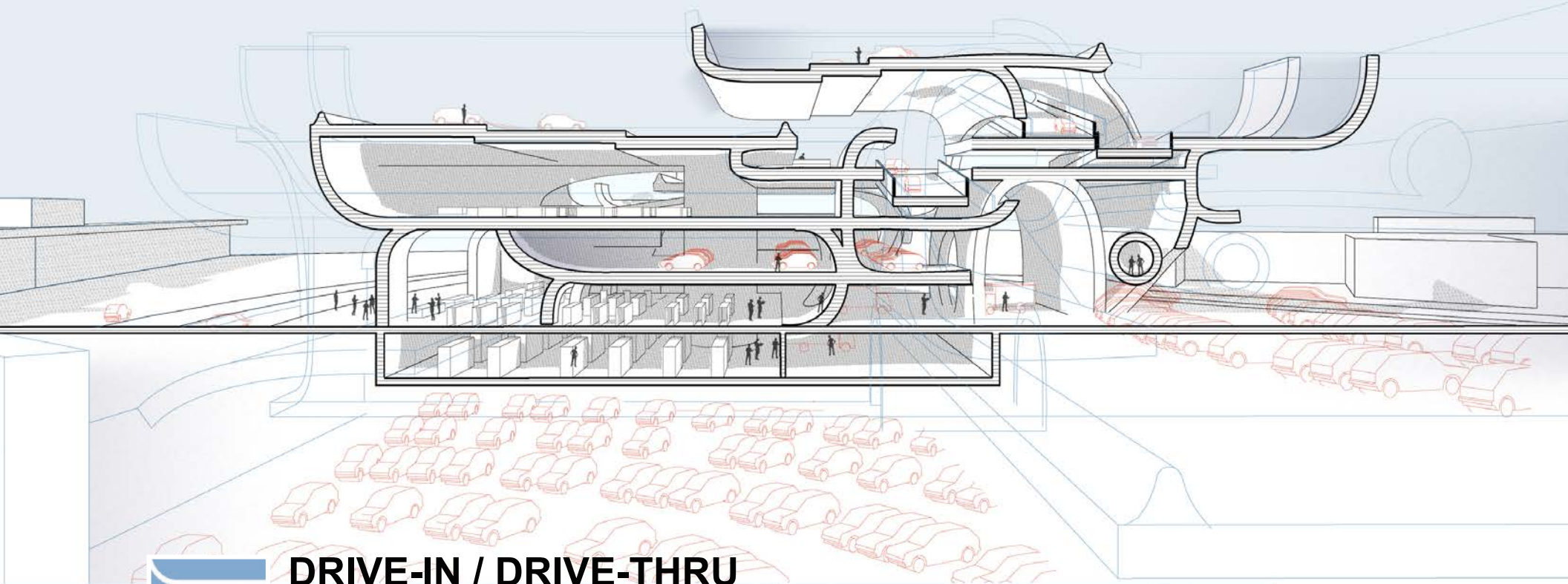
The project is an experimental model attempting to exhibit the space organization by translating a Shanshui painting, which is a traditional Chinese painting especially delineating mountains and streams. Visitors can wander all the way up to the observation deck at the top to have a panoramic view of the site.

■ Progression Photos



■ Final Model Photos





DRIVE-IN / DRIVE-THRU

School project: Drive-in cinema design, Independent work.
Duration: 2021.03.30-2021.06.14

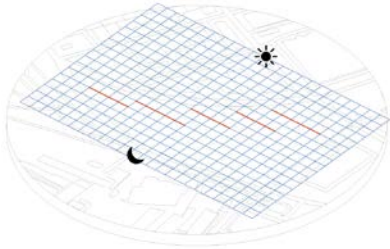
Derived from the mat building strategy, I create a layering system that is comprised of stepped mat surfaces. Those surfaces are oriented based on the grid system in the site as platforms for drive-in cinemas. The serial collapses of platforms make vehicles easier to drive through ramps to each cinema as a coherent circulation.

To support the vertically-oriented platforms, curvilinear structural components are introduced. Those parts are joined according to scale as functional division, screen, and load-resisting members. In section, those iterations create an architectonic alphabet to satisfy specified space conditions.

■ Site Strategy

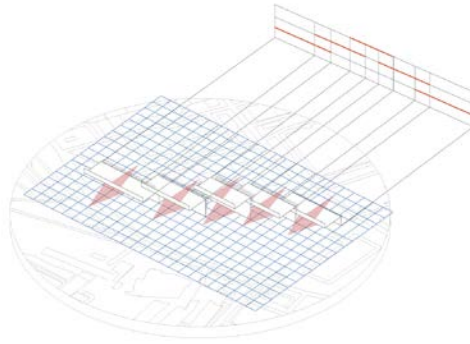
1. Grid & Orientation

Imagine the cinema's screen as structure to create functions and circulations.



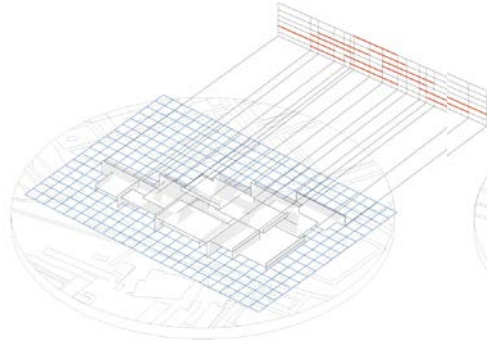
2. Layering & View

Major division line is located by the grid system to determine the basic orientation of functions.



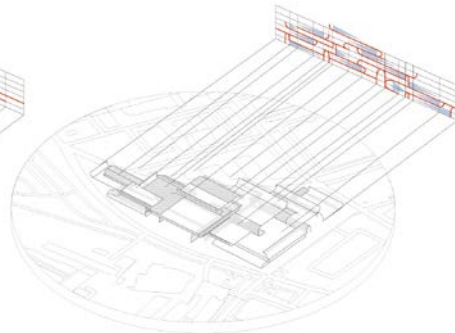
3. Mat Building System

Mat surfaces are positioned in the grid as a serial collapse, providing platforms for cinemas at different levels and directions.



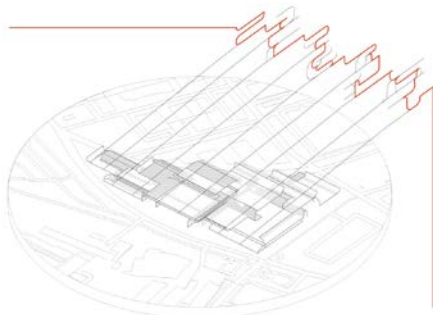
4. Curvilinear Feature as Section

Subdivide the mat surfaces to make the serial collapse more easier for ramps to connect.



5. Architectonic Alphabet

Curvilinear structural components of different scales are joined as functional division, screen and load-resisting members.

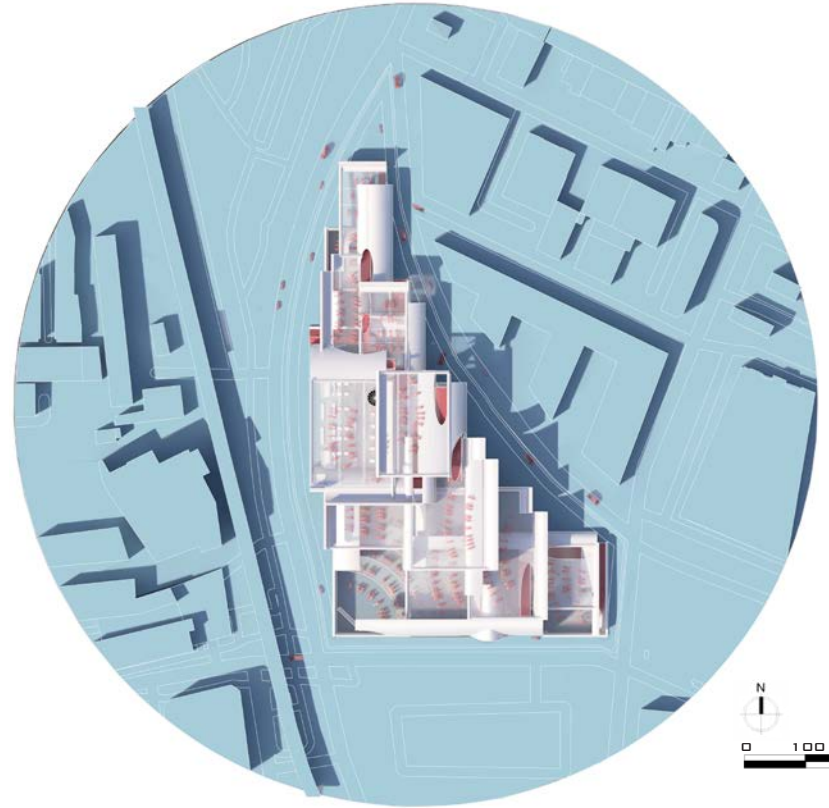


6. Architectonic Alphabet as Axis

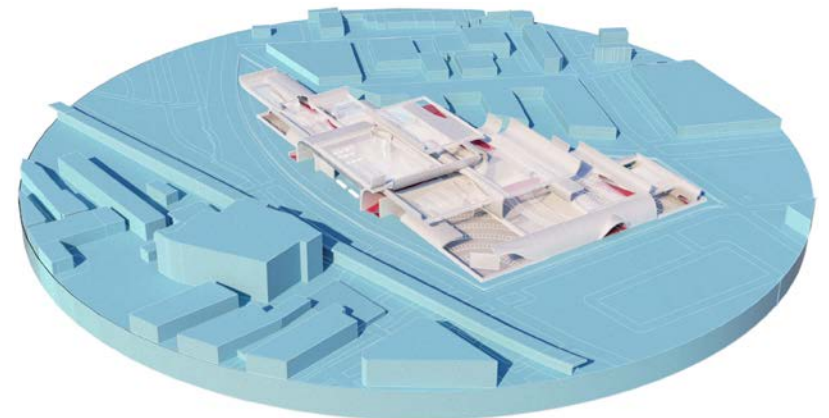
Curvilinear members compose iterations to create an architectonic alphabet for specified space condition.



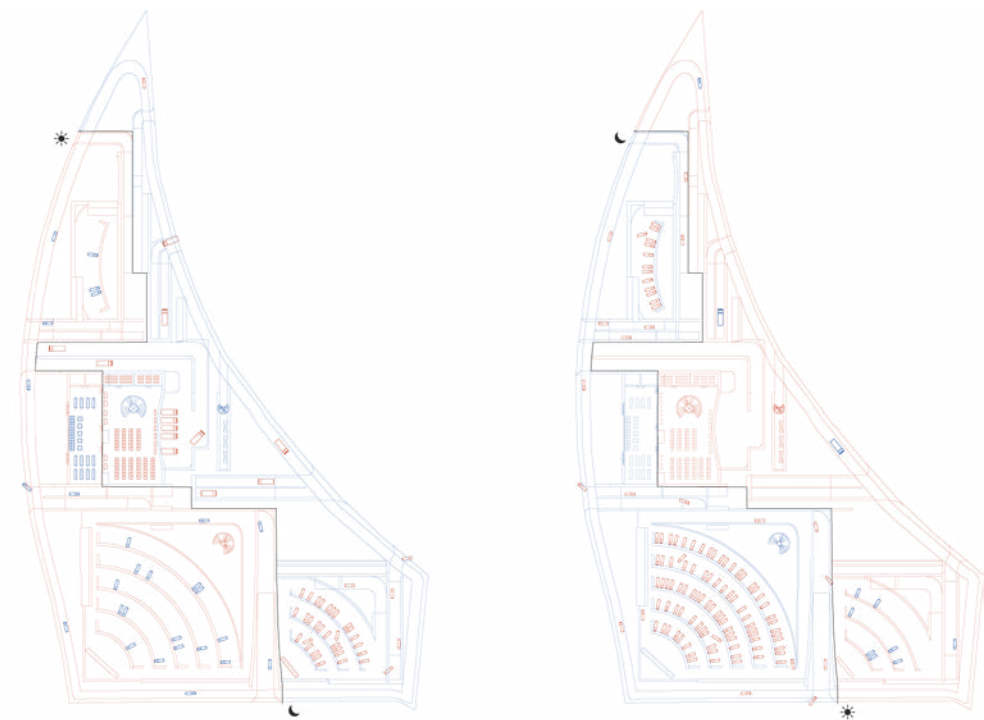
■ Site Plan



■ Site Perspective



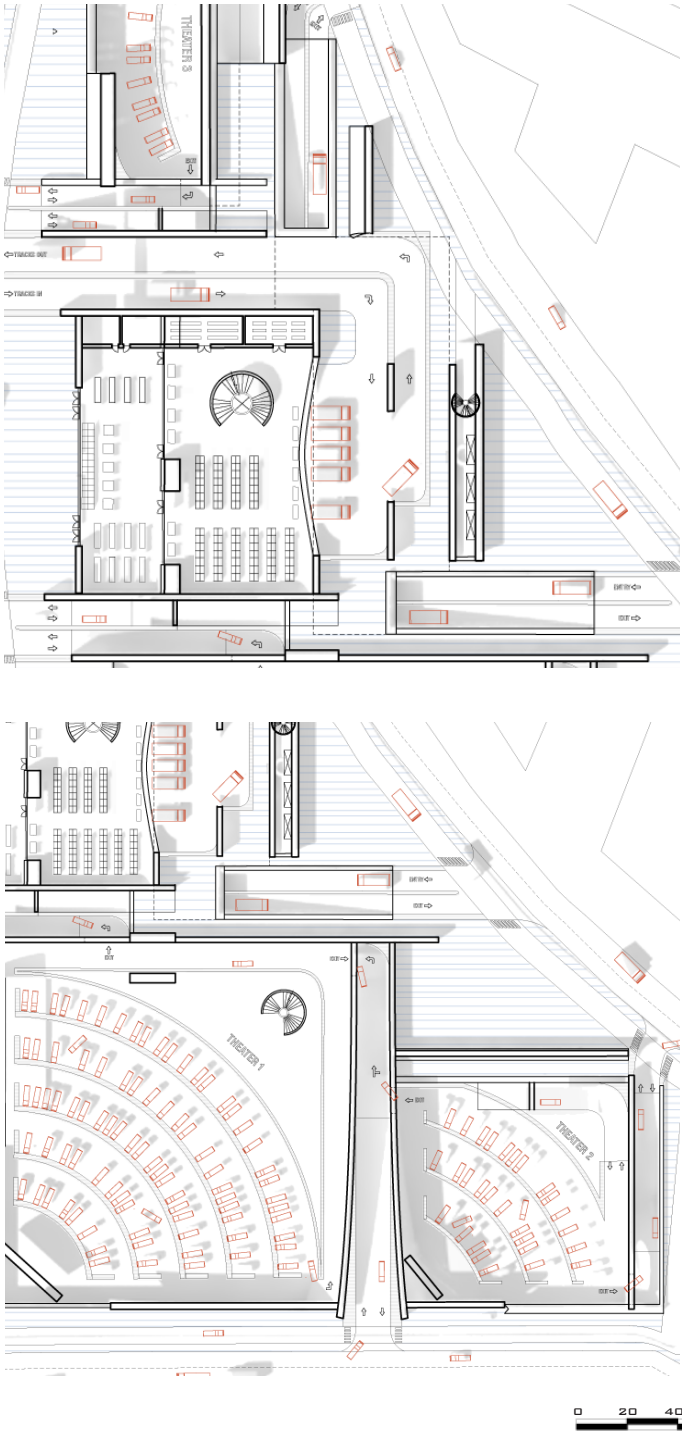
■ Split Plan Diagram

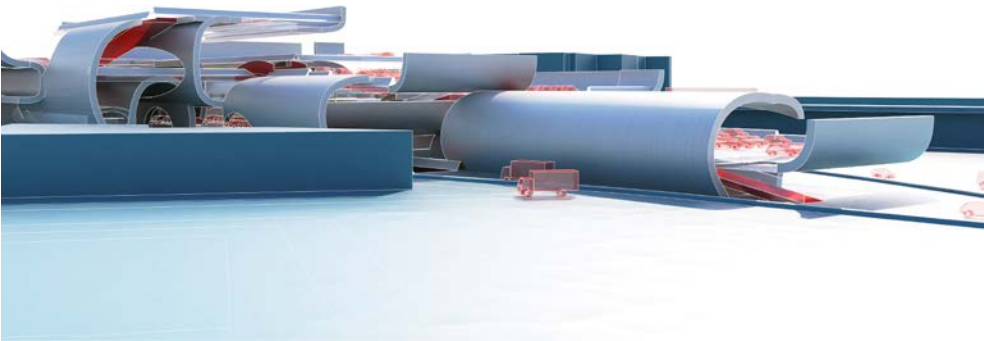
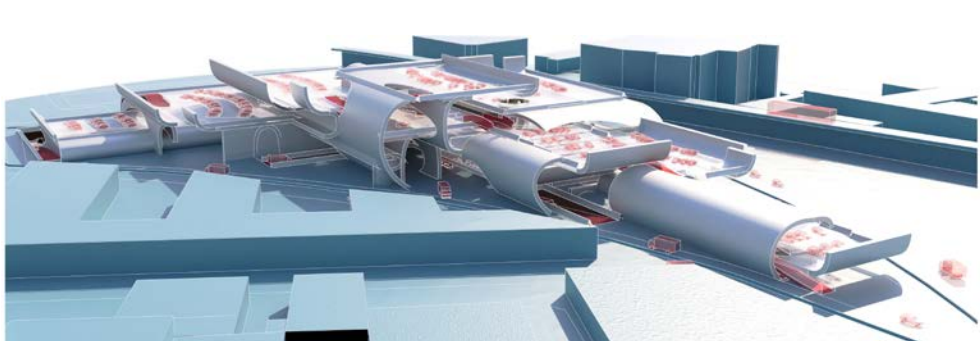
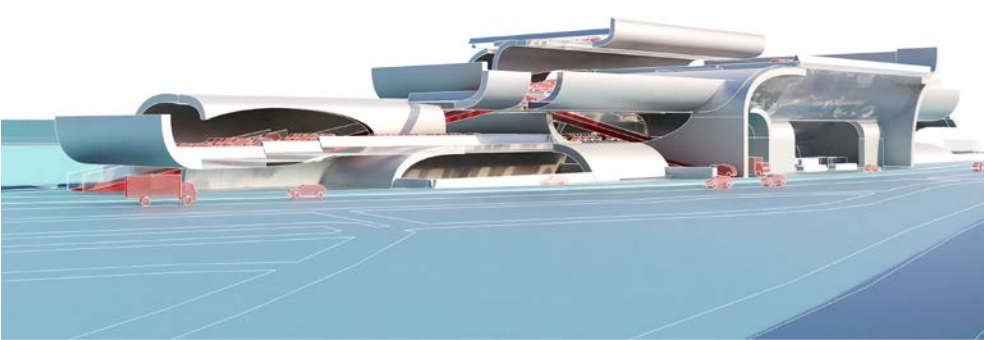
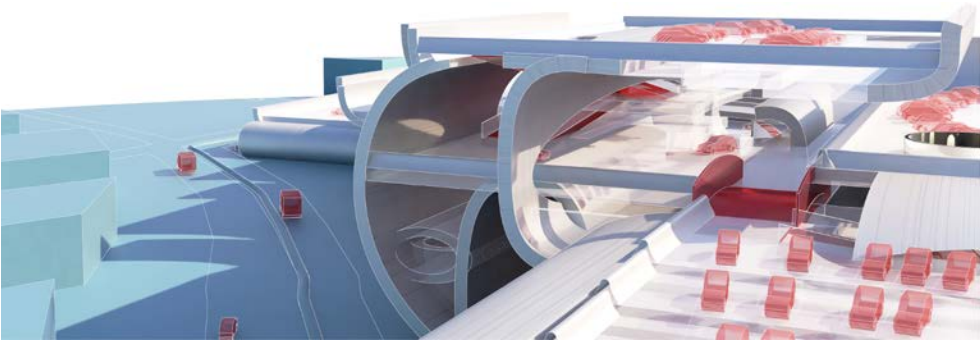


The split plan diagram shows activities of the site in daytime and night on a single plan. Two drawings reverse the day & night areas with a black line distinguishing day and night. Day activities are marked in red when drive-in cinemas remains vacant. Night activities are marked in blue when cinemas are full and food trucks are busy delivering food for the next day's distribution.

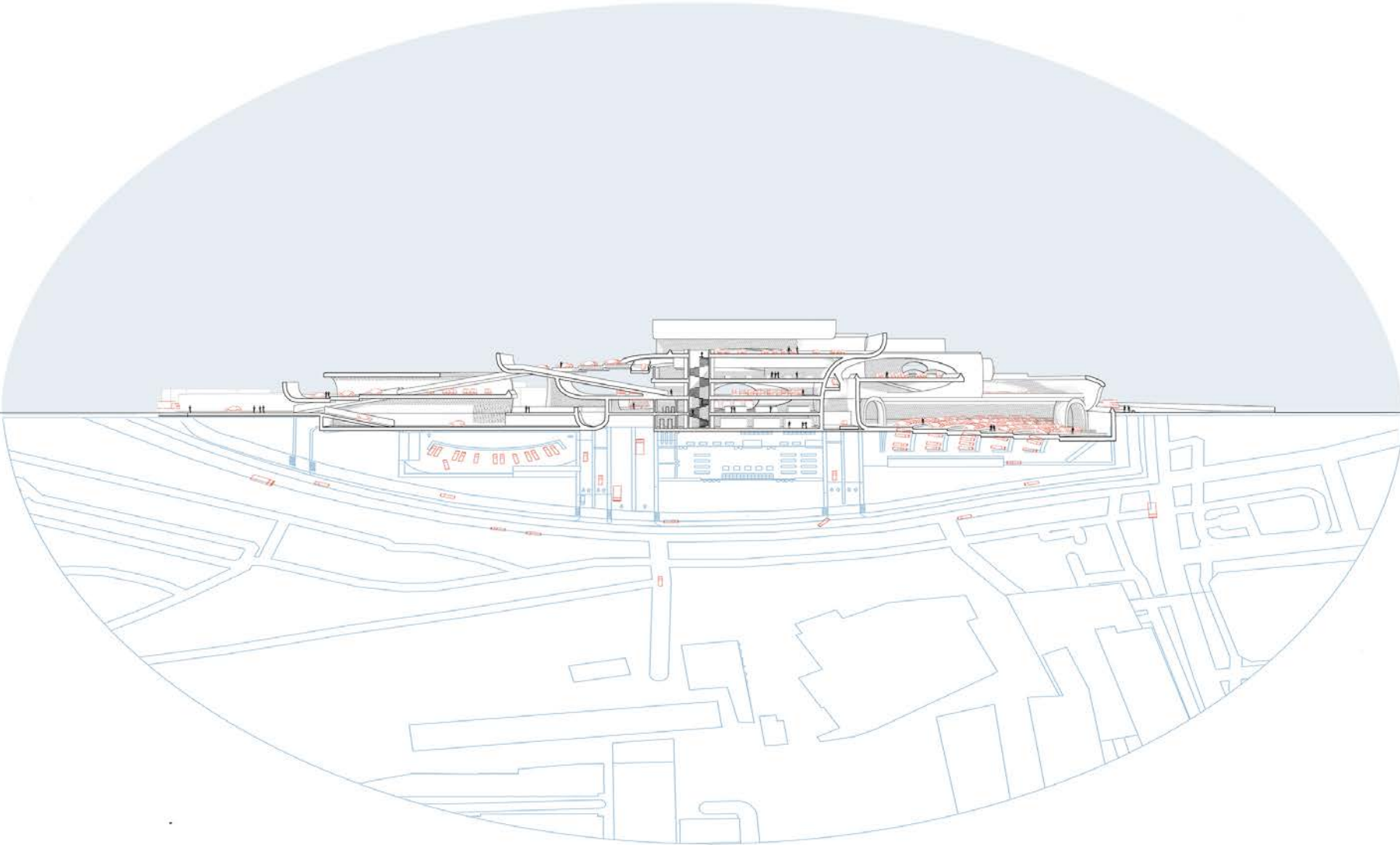
Daytime
Night

■ Detailed Ground Floor Plan





■ Longitudinal Section



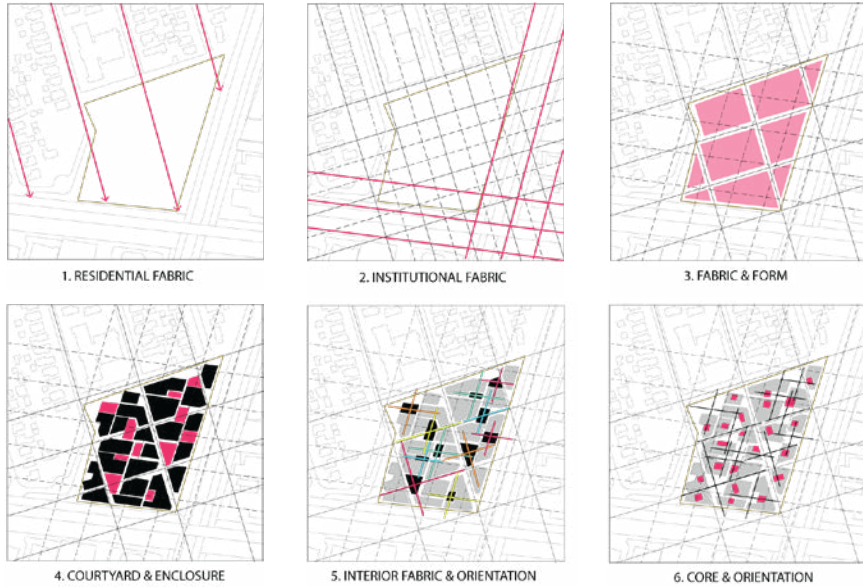


Block Party

School project: Youth Housing Design, Independent work.
Duration: 2021.09.28-2022.01.14

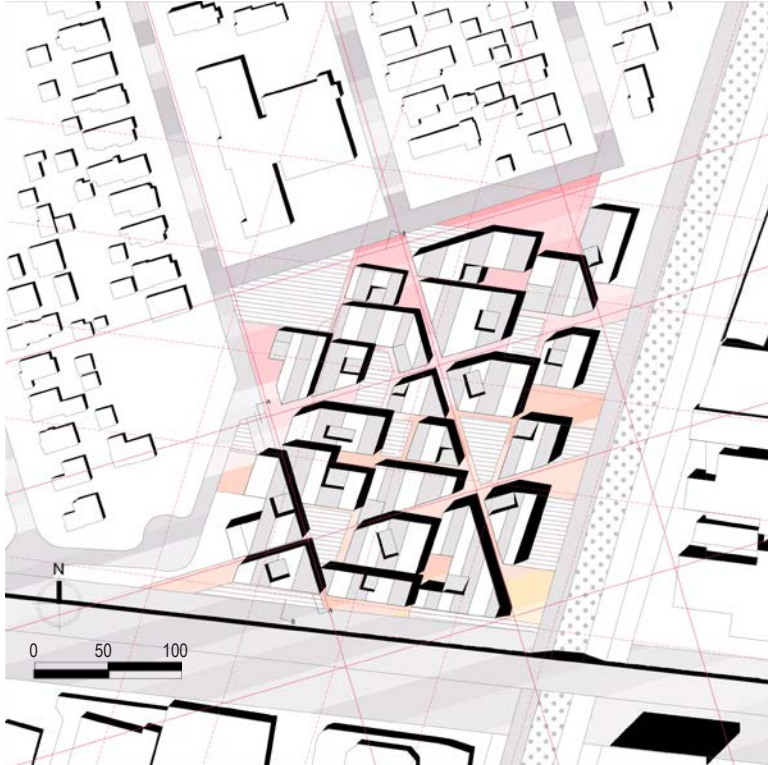
Block party is a youth housing design aiming to build a vibrant community for young tenants and nearby residents. I approach the site by thinking about the surrounding urban fabric, two grid systems are extrapolated including the northern one of residential scale and the southern one of institutional scale. I envisage a matrix on the site by merging the two grid systems while thinking about the infiltrative character of the residential fabric and the dominant spatial layout of the institutional grid. Thus, the site naturally becomes an joint for nearby communities and young tenants coming to the site.

■ Site Strategy



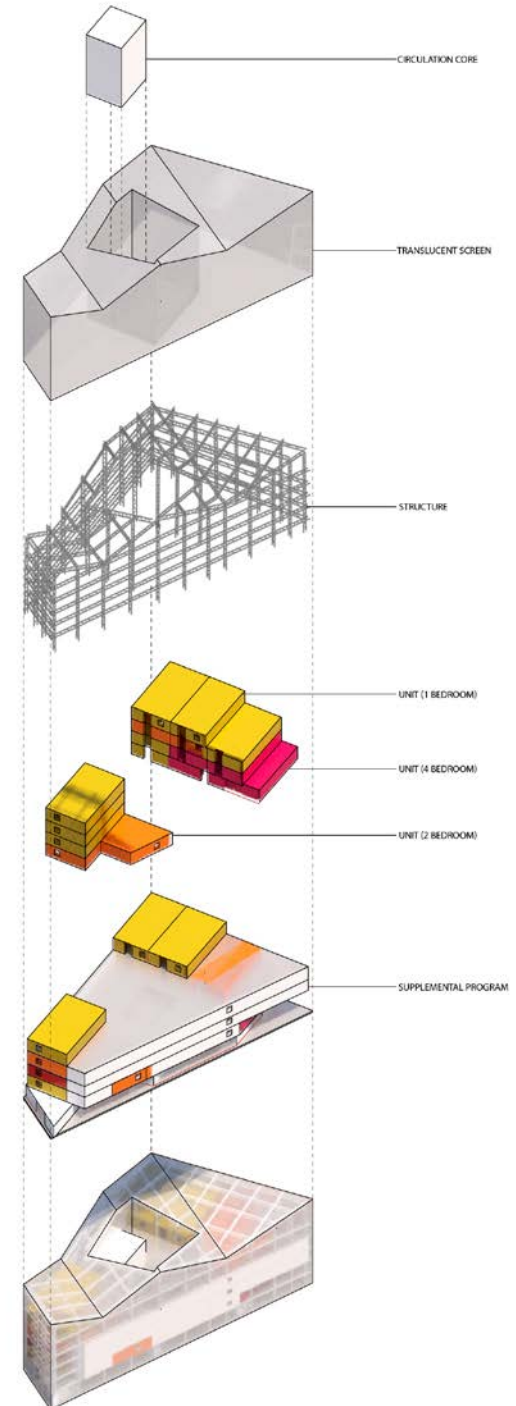
Fabrics of residential and institutional areas are extrapolated as a reference to generate new form from the site. Forms are divided by the grid and courtyards take place as the subtraction of chunks. Then, interior fabric is drawn by the orientation of courtyards, which determine the layout of units and circulation in between.

■ Site Plan

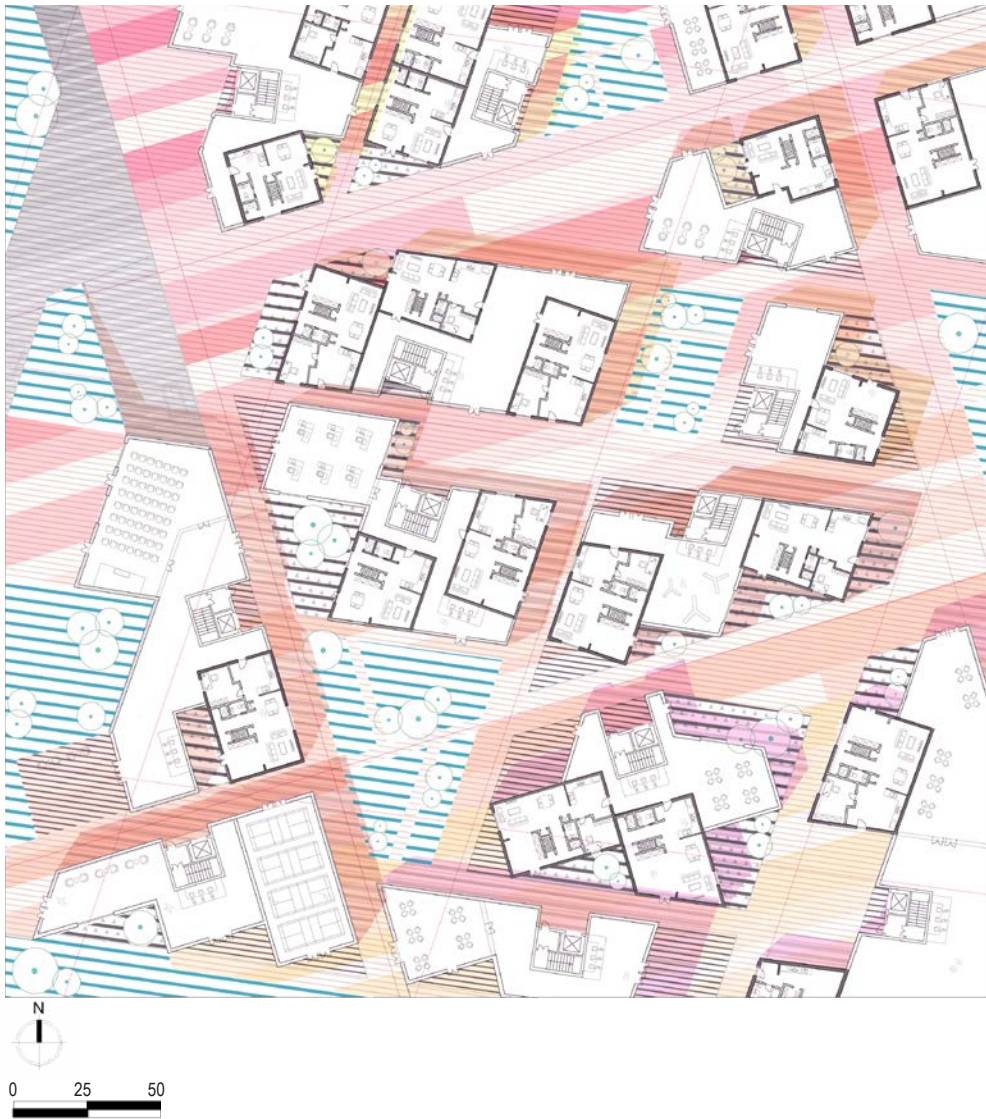


■ Exploded Chunk Model Diagram

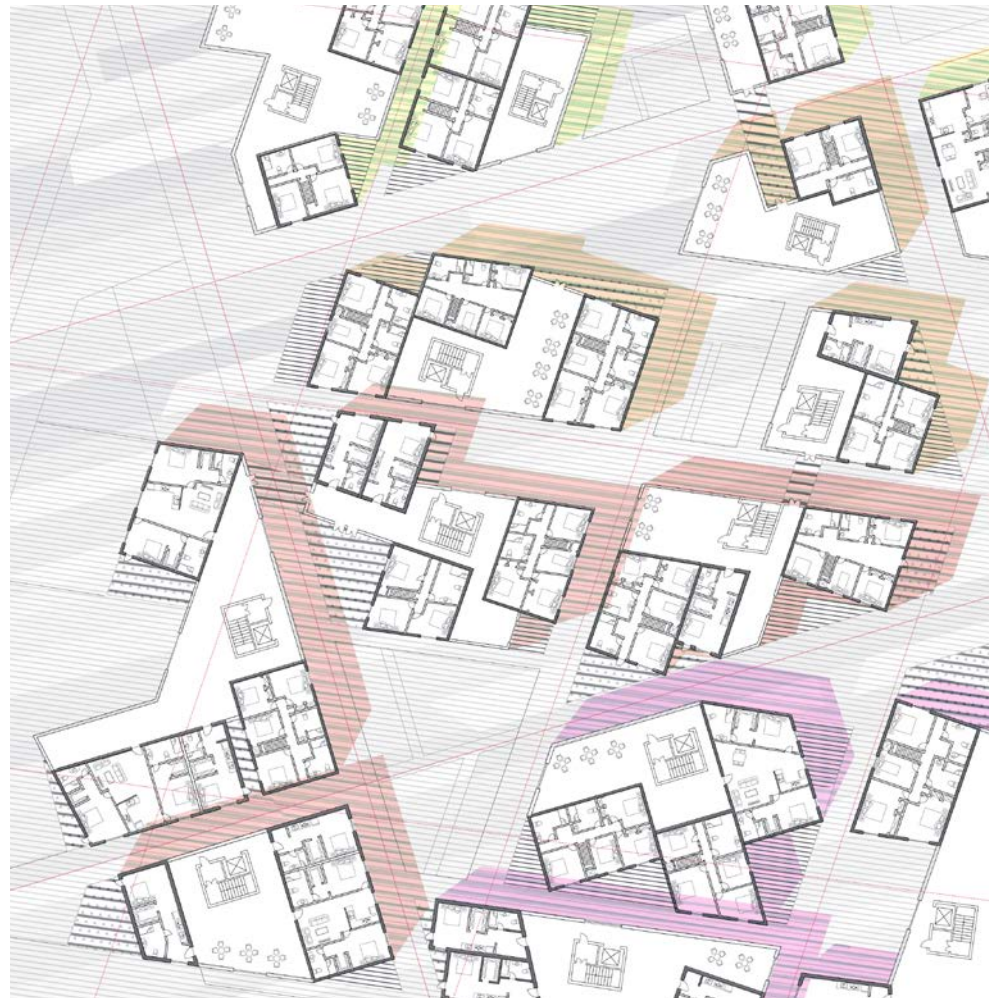
This diagram shows the composition of a single chunk. Inside the screen, units of different sizes are located on each floor surrounding the circulation core in the middle.

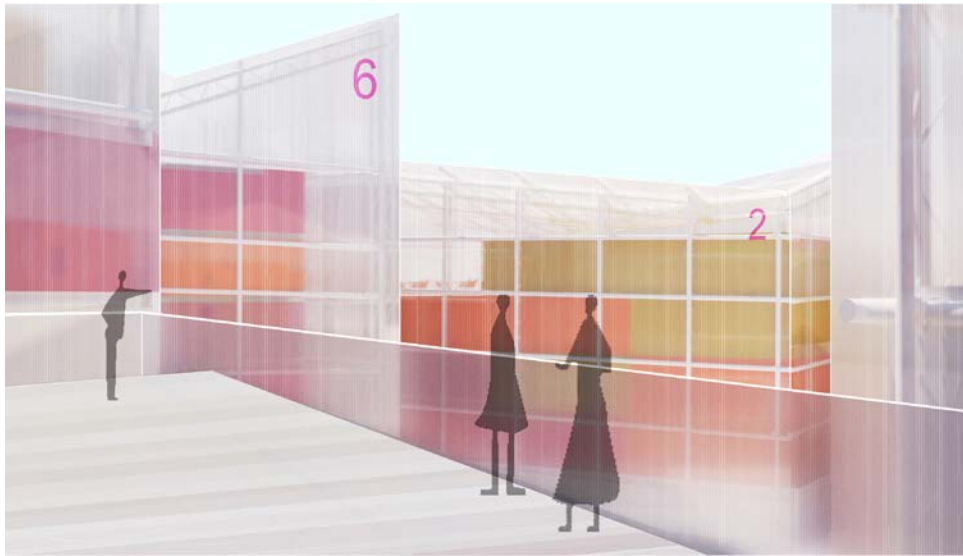
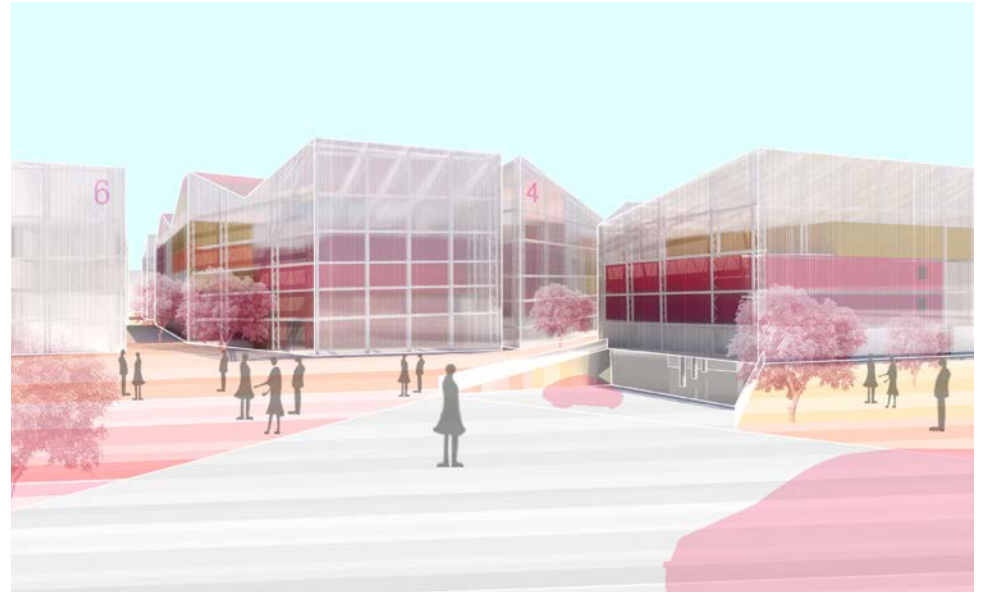
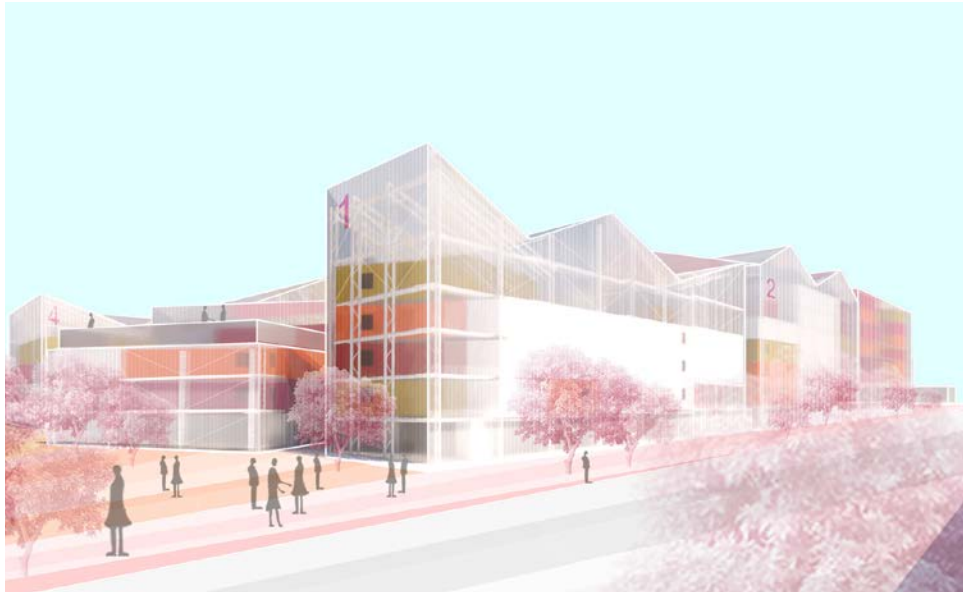


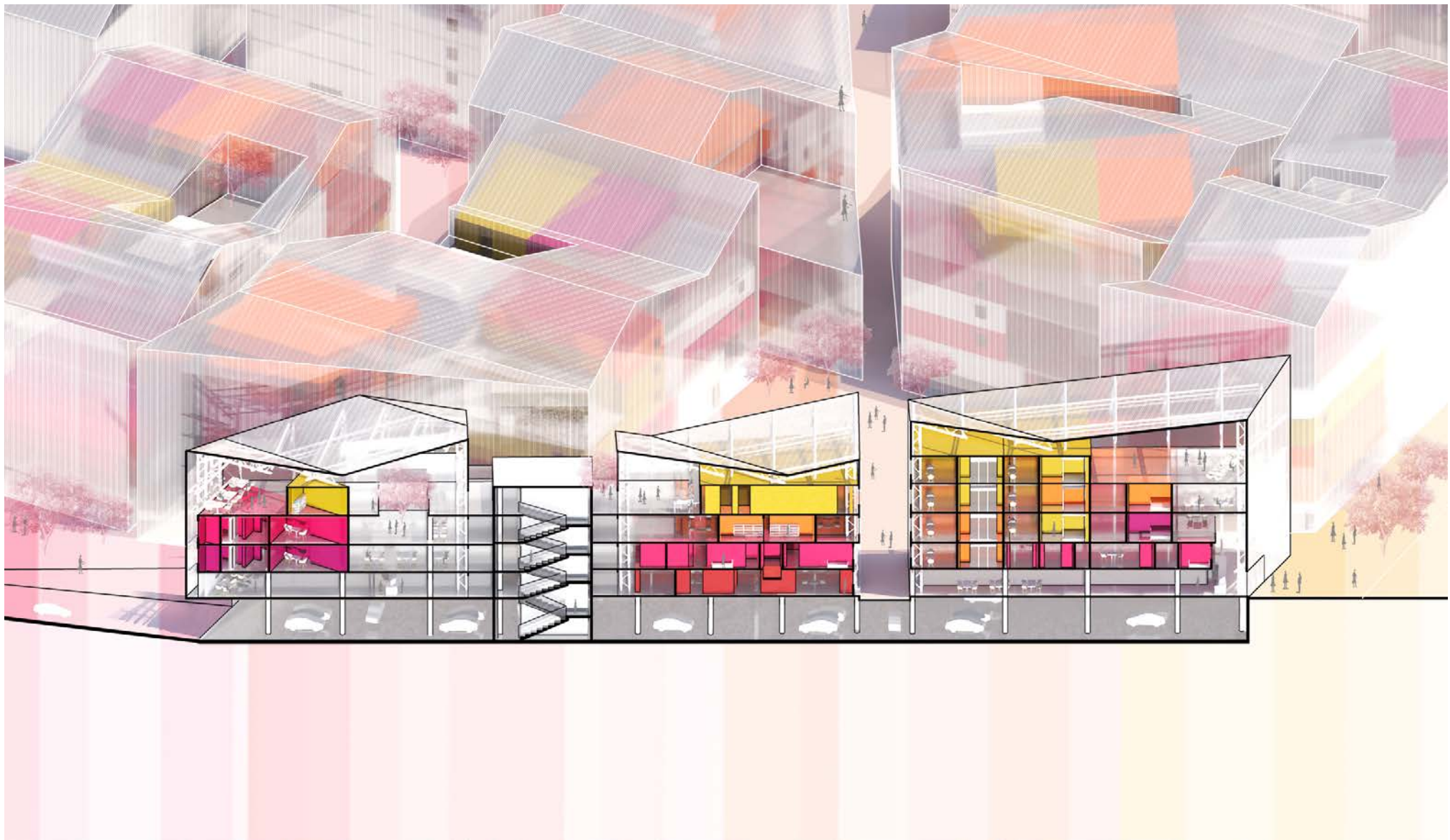
■ Ground Floor Plan



■ Second Floor Plan







■ Section A

Followed by the implementation of hybrid urban core apartment and courtyard, materiality is introduced as an implication of privacy and public between residential unit, outdoor spaces and supportive facilities. Those functional spaces are placed into each block while having different edge conditions, sometimes being wrapped, sometimes extruded, and sometimes overlapped, which blurs the interiority and exteriority.

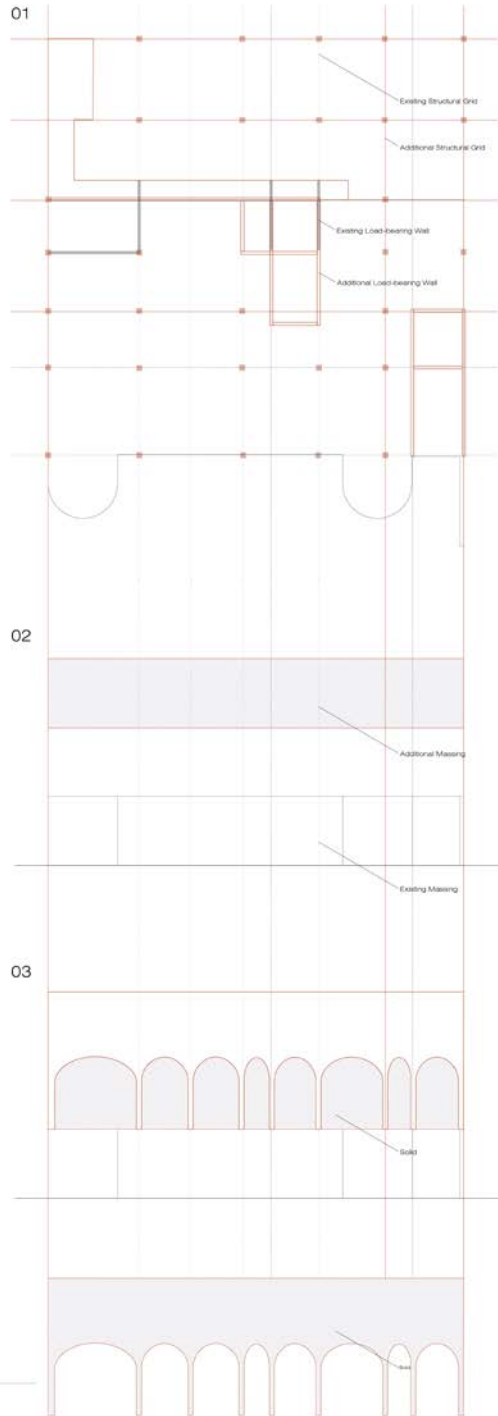


Sunset Arts Collective

Architectural Design, Personal Work.

Instructor: Neil Denari. Duration: 2022.01-2022.06

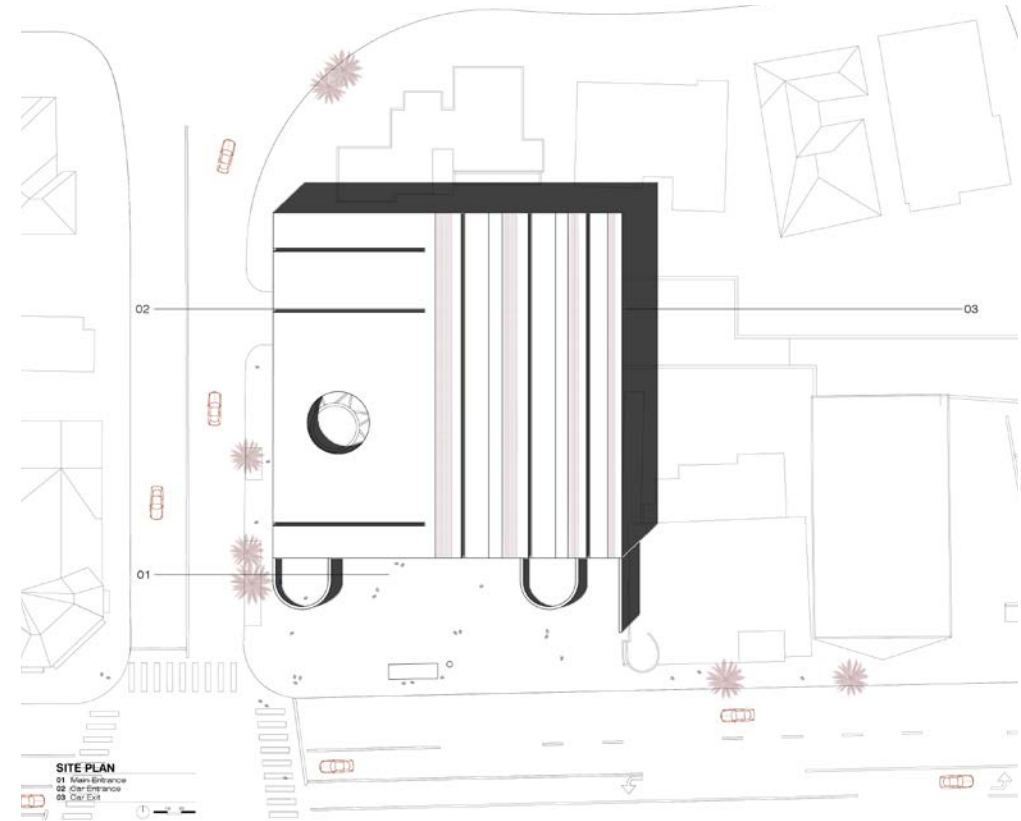
Located along the sunset strip, the vintage 1970s exposed concrete building is served as a bank and also a small public plaza. As an interface to the street, it is both a building and a non-building. The art collective, as an extension of the existing building, would continue the functions as a public corner for both artists and visitors. The existing building is stylistically categorized as Late Modernist/ Brutalism, presented by an exposed concrete horizontal plinth. The abstract platonic forms show the character of poured cast-in-place concrete and the material craftsmanship back to the times. As a continuation of the existing structure, the extension would respect its materiality and design philosophy to bring a historical continuity/discontinuity.

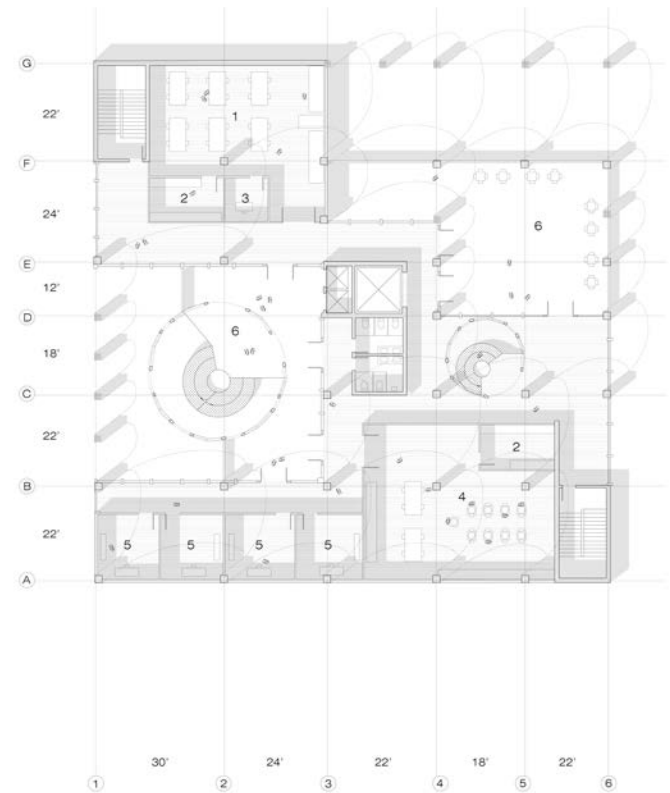
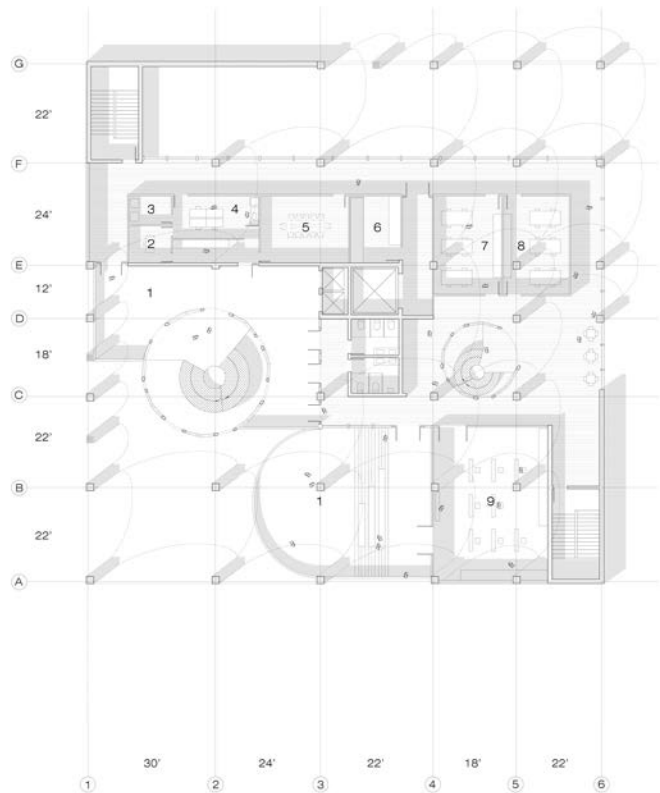
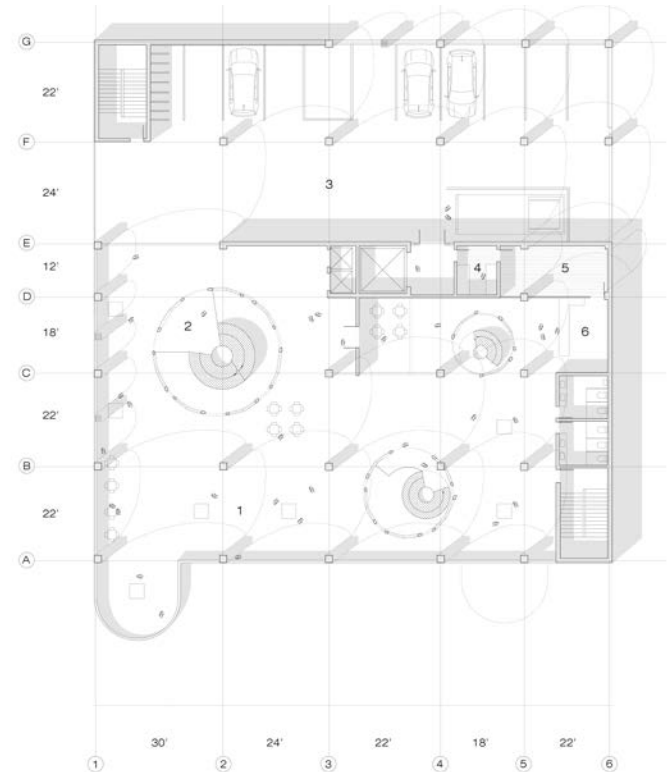
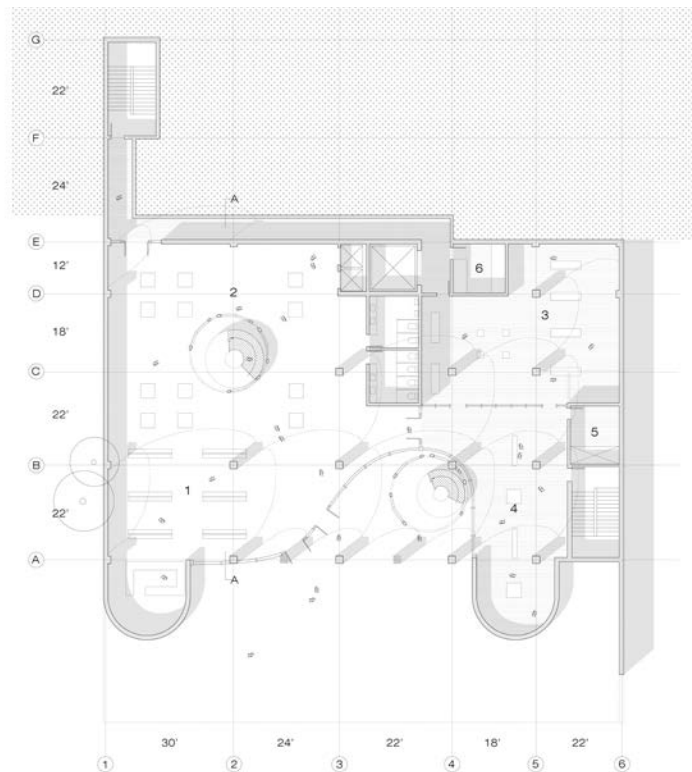


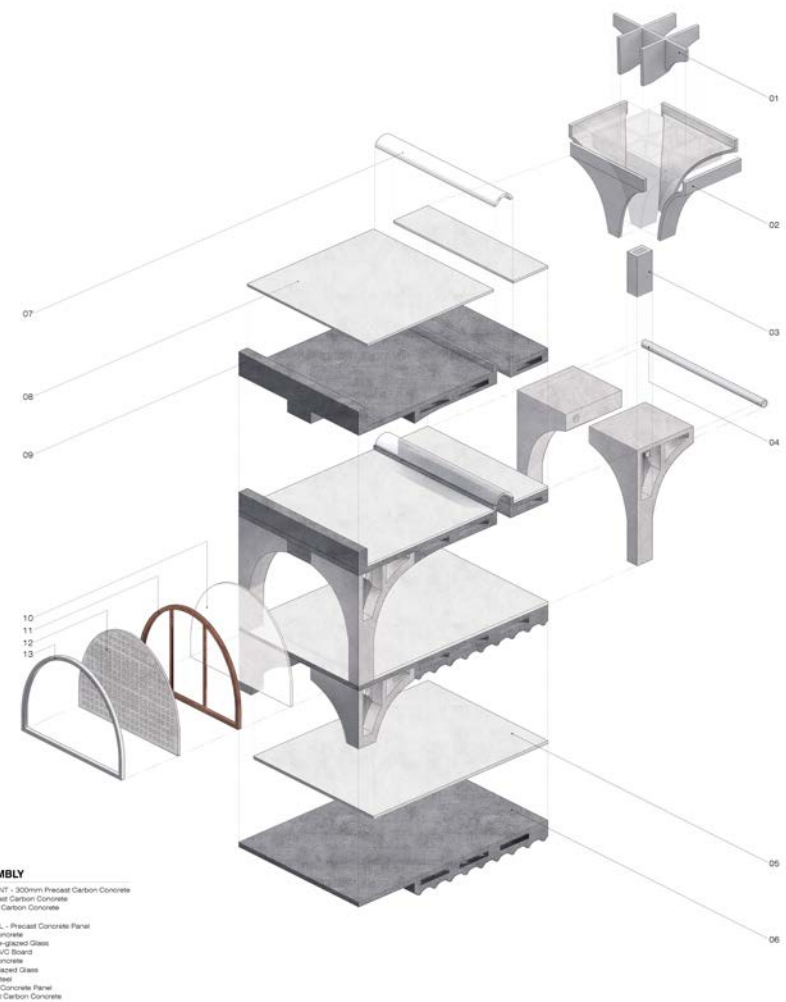
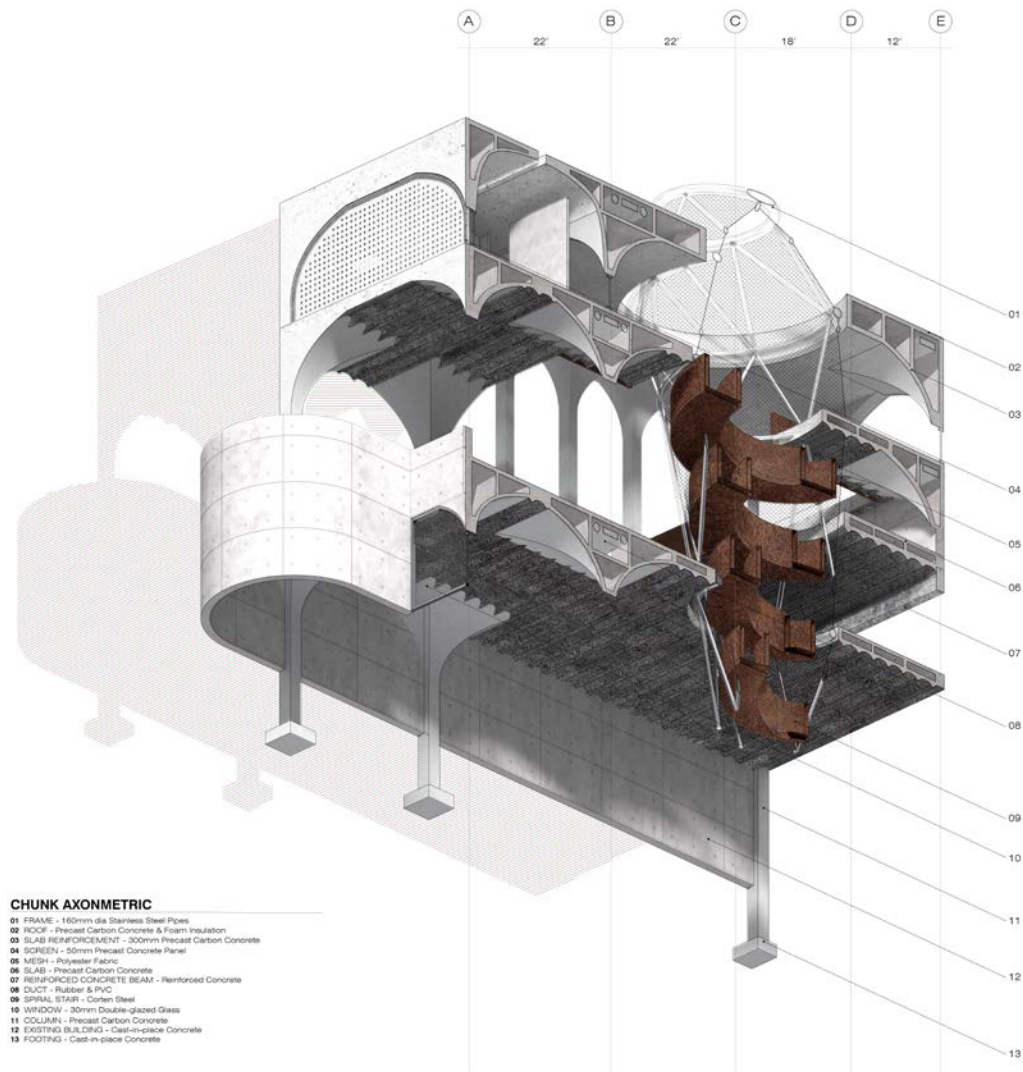
SCHEME LOGIC

- 01 Structural Evolution
- 02 Massing Relationship
- 03 Figure & Ground Relationship

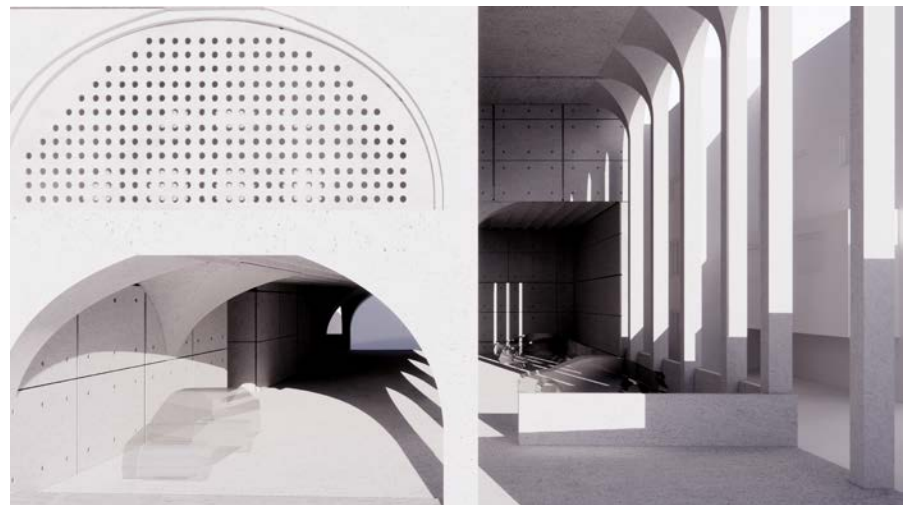
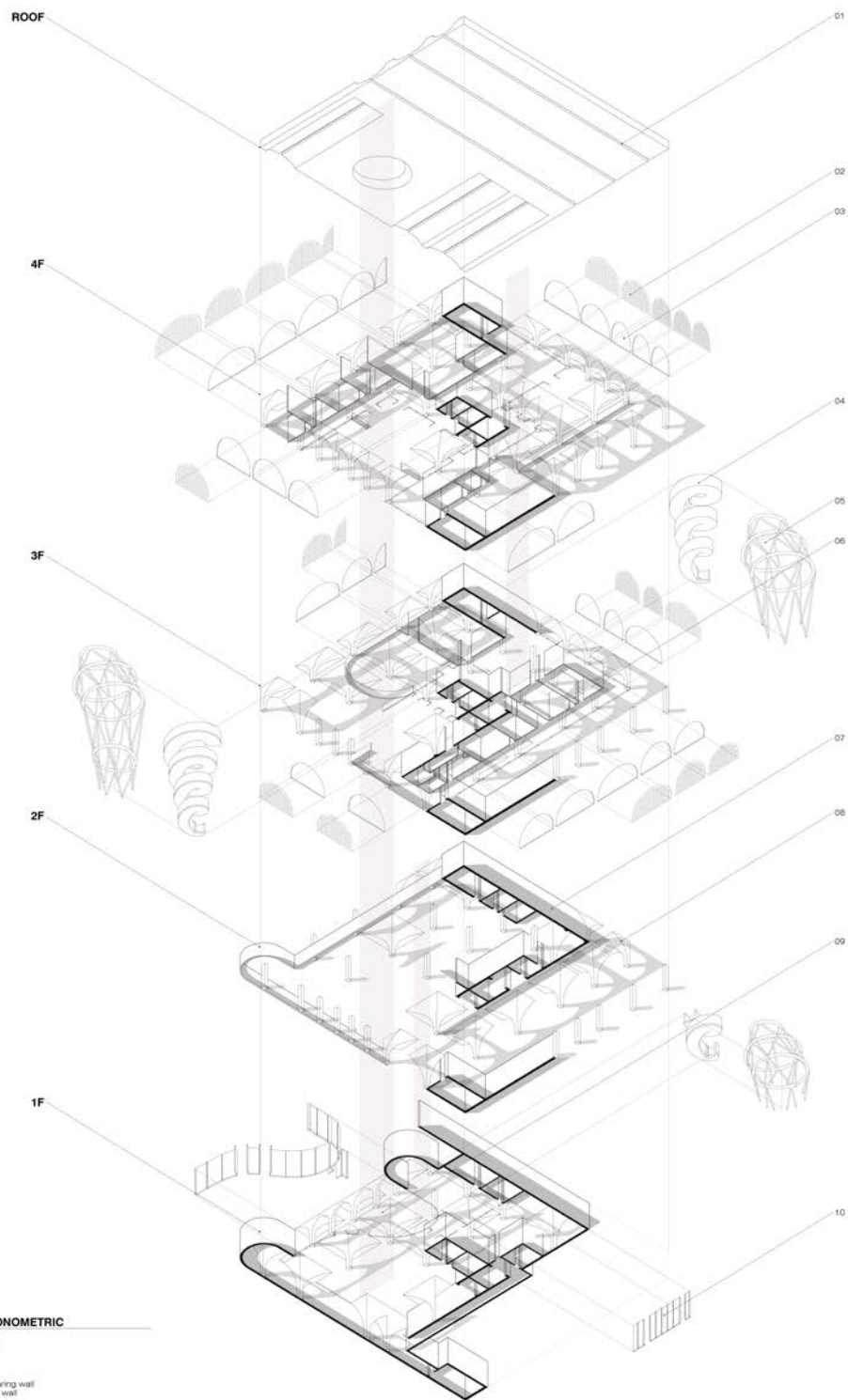
As an addition to the existing building, the extension builds up its structural system based on the existing structural grid. The existing structural system includes a column, load-bearing wall, and slab. The addition would keep using the ideology of the system with concrete structural components as a historical continuity. While the structure and materiality present continuity, they can also show a discontinuity with the everchanging characteristic of the material and the advancement of construction technology.

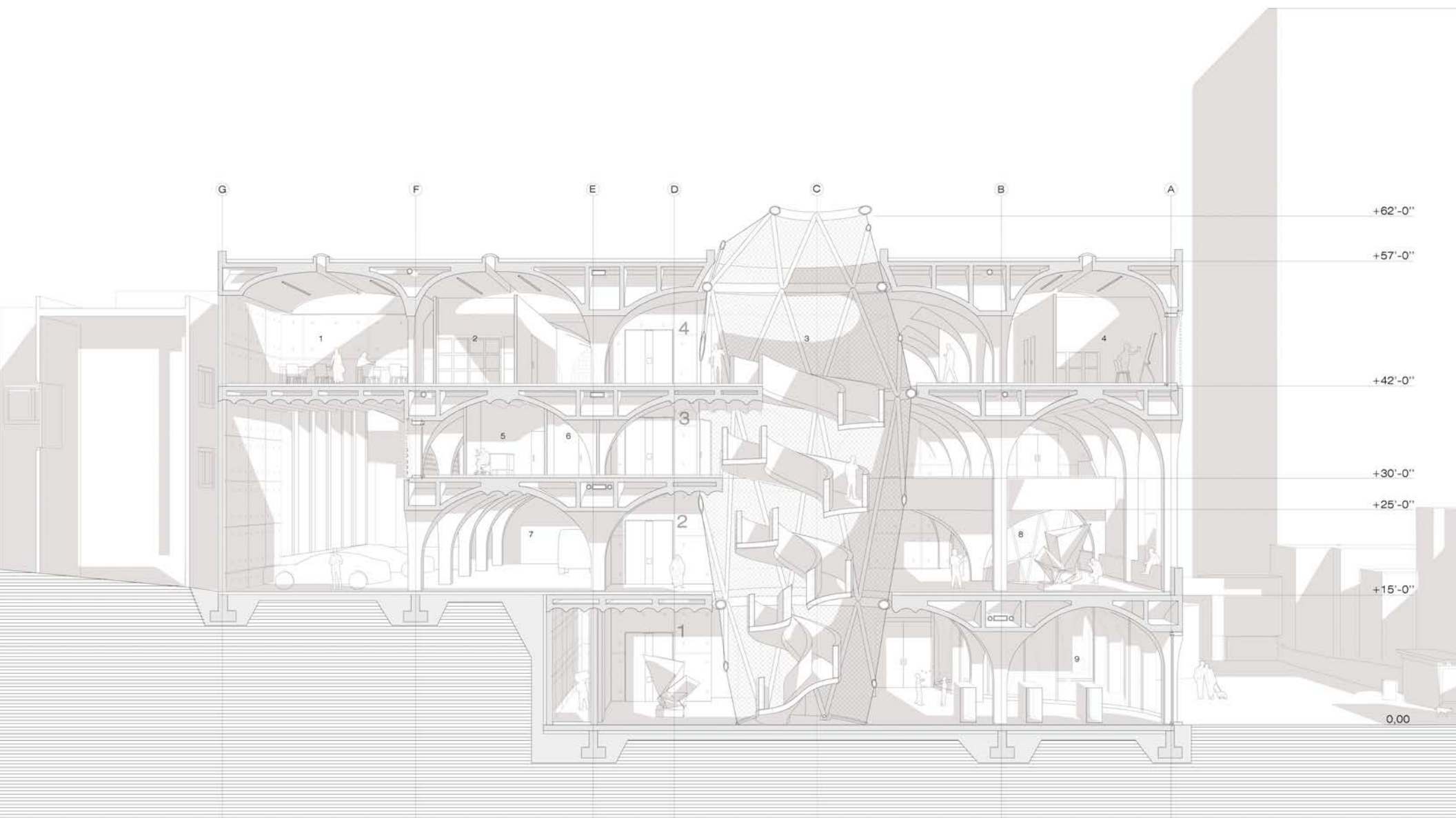






In this way, Pier Luigi Nervi's innovative modular construction method in concrete is used as a reference. The craftsmanship of concrete by using molds gives great flexibility to the forms of the concrete structural component. Moreover, the precast technology made prefabrication technology manageable. To combine Nervi's methodology into my project, vault-like columns and components of different geometries are introduced as an innovative concrete engineering method and the aesthetics of Renaissance architecture. To lighten the concrete structure, carbon concrete is used for precast concrete components to replace reinforced concrete as a construction advancement. Therefore, the vault-like silhouette of the concrete structure would provide a unique figure & ground relationship. The solid & void spaces brought by the program would further the scale of concrete components and allows more design possibilities.





SECTION A

- | | |
|---------------------|---------------------|
| 01 Workshop | 06 Reception Room |
| 02 Storage | 07 Parking |
| 03 Circulation Core | 08 Sculpture Garden |
| 04 Art Studio | 09 Bookstore |
| 05 Office | |





De-Compound

Individual Work

An urban design research based on a study of city problems.

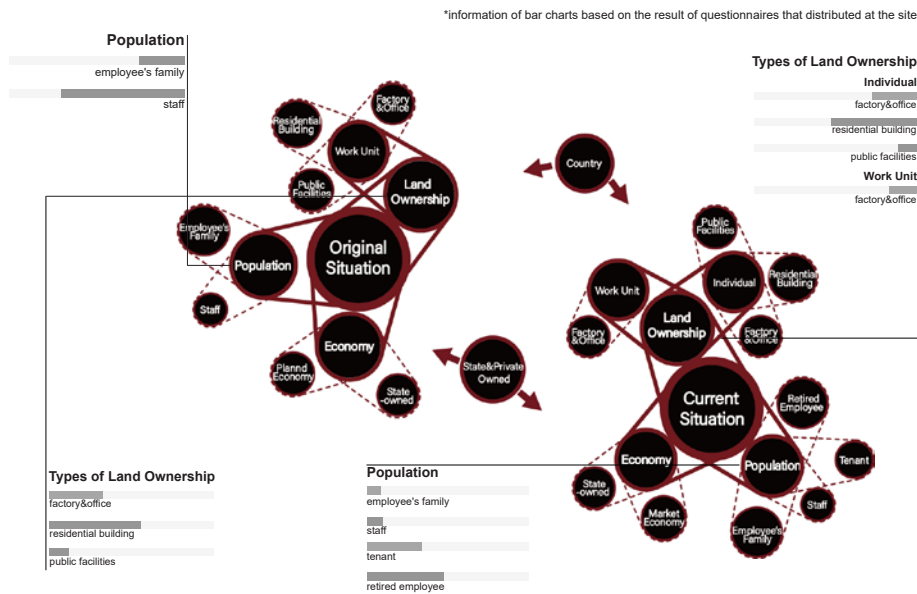
Duration: 2019.5.21-2019.9.27

Compound, an open area enclosed by a fence, was used to be a working and residential unit in China around 1970s. It is the label of planned economy and of great convenience for citizens at that time. However, as the economy mode shifted to market economy, the land ownership as well as the population makeup have changed significantly. Thus, compound is no longer an ideal place for citizen to work and live.

Concerning the inconvenience of Compound existing in modern cities, I initiated an idea to break the boundary of Compound and rethink its relationship with the city. By investigating several Compounds around the city, the concept of "sharing space" is developed to solve the unique problem between compound and the city.

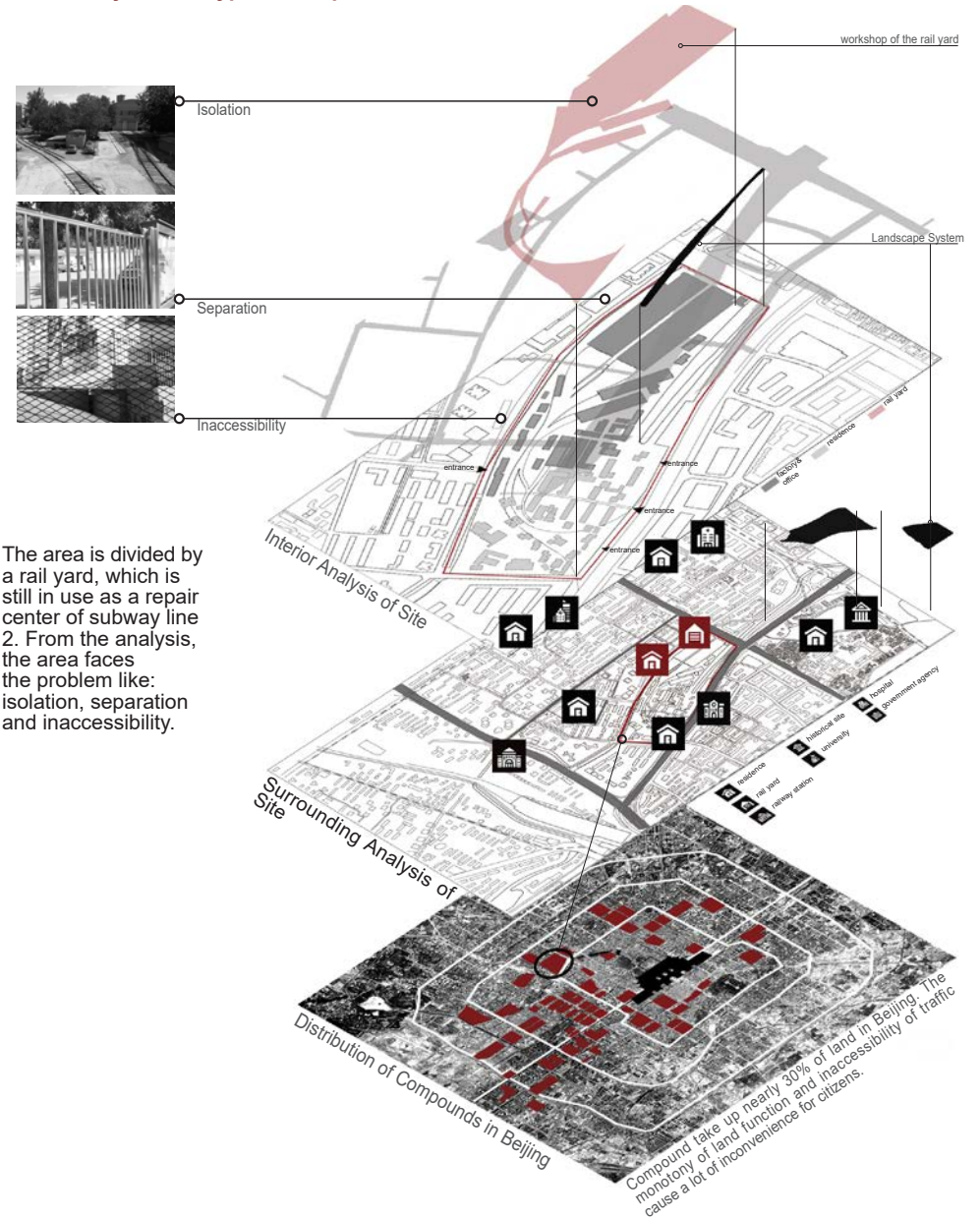
To explain the concept more precisely, a typical Compound, which now functions as a rail yard, is selected in Beijing.

■ Compound: Now and Then



From the diagram, the role of Compounds has changed dramatically for the past 30 years. To meet the needs of current citizen and the types of land, Compounds need to be re-interpreted as a "sharing space" in the city.

■ Site Analysis of a Typical Compound



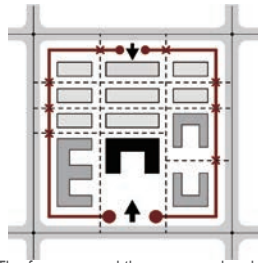
The area is divided by a rail yard, which is still in use as a repair center of subway line 2. From the analysis, the area faces the problem like: isolation, separation and inaccessibility.

■ Introduction of "Sharing Concept"

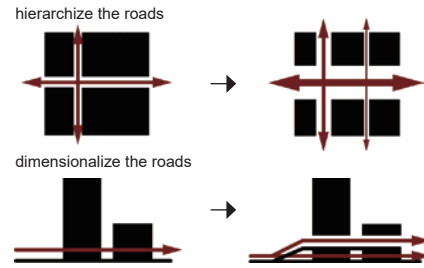
According to the analysis, the shift between now and then brings a problem of existing compound. A prototype of compound is concluded to explain the problem in four aspects.

■ Application of "Sharing Concept"

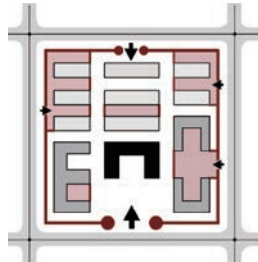
Inconvenient Traffic



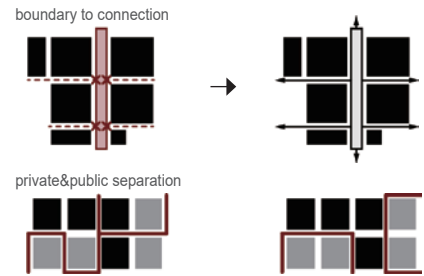
The fence around the compound makes the traffic extremely inconvenient.



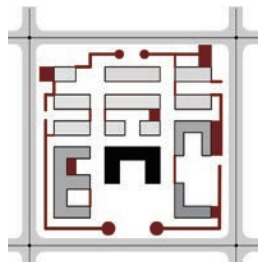
Unreasonable Boundary



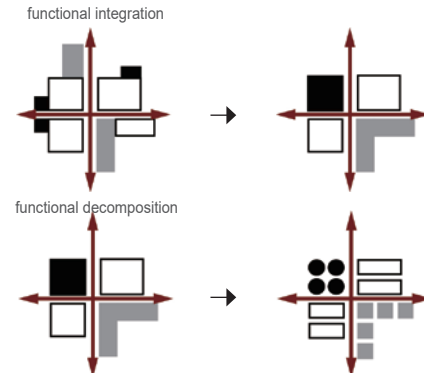
Exterior and interior boundary divide the whole site into several orderless sections.



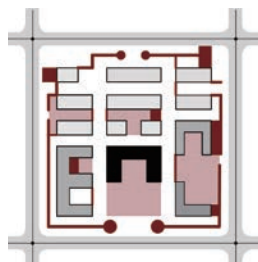
Random Functions



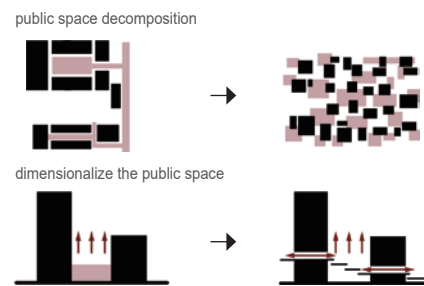
Different type of functions mix together, which is hard to find without guidance.



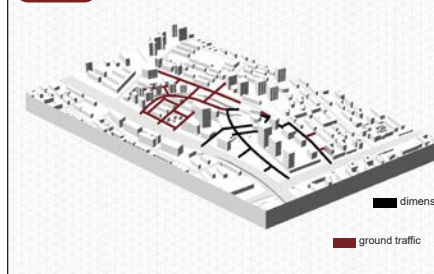
Scarce Public Space



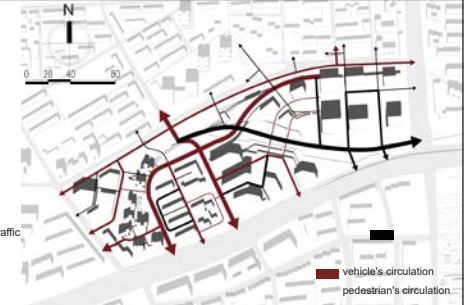
Public spaces in compound are concentratedly positioned and scarce in number.



Step 1 Connection

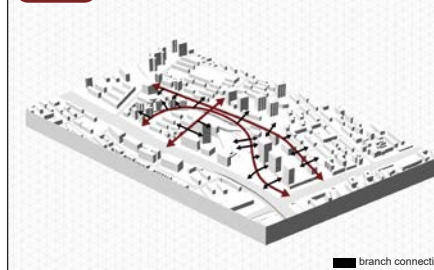


Dimensional traffic is organized on the roof of the workshop.



Three hierarchies are established for both circulations.

Step 2 Rethink the Boundary

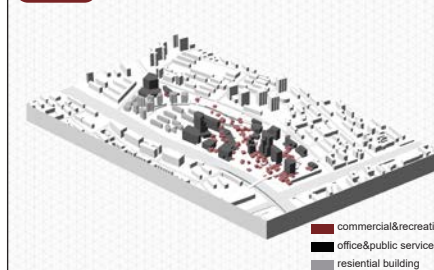


Former boundaries are transformed into major connection.



New boundaries separate private and public spaces.

Step 3 Functional Replacement

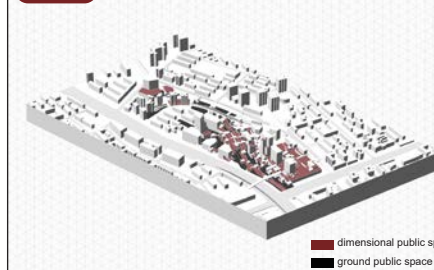


The same function is organized as a cluster.



Similar architectural forms are used for the same function.

Step 4 Public Space Reorganization

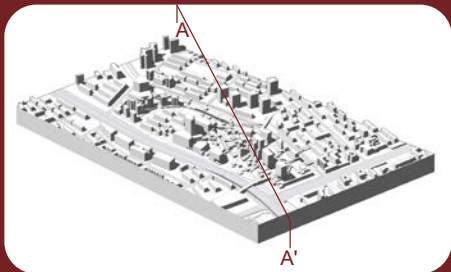


The roof of the workshop is utilized for public space.



Public spaces integrate with recreation areas and landscape.

■ Node Presentation



The position of A-A' section plan is selected according to the height difference and functional diversity, which is shown significantly at the landscape axis.

A-A Section Plan



The area is mainly used for by boutique, stores and restaurants, which are run individually in each cube. Both visitors and residents can find something they like in the area.



The walking trail connect the site with its surrounding area. Thus, the trail can ease the boundary of roads as well as solve the problem of busy traffic.



The area provides scattered public spaces, which solve the problem of scarce public space and ease the boundary of working area and dwelling area.



The spot is mainly served for the workers in the building. Observation desks provide a chance for them to unwind themselves during the work break. They can enjoy the views of the city while chatting with other colleagues.



The area located at the main entrance of the site. It eases the boundary of the site and tears down the boundary between interior and exterior.

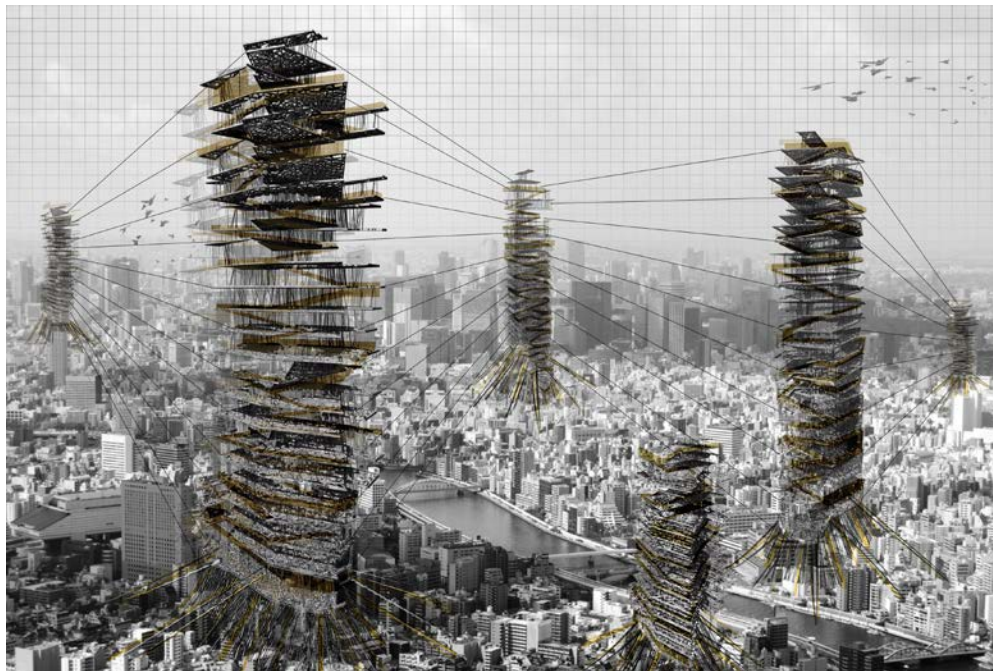




Pipes of AI

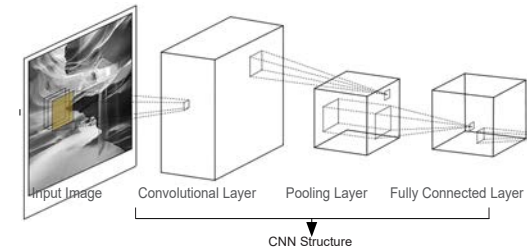
Academic Research, Tutor: Hao Zheng from UPenn, Email: zh hao@design.upenn.edu
Duration: 2019.07.21-2019.08.22

The project taps into the opportunity of Artificial Intelligence as a device for architectural design. As a design tool derived from AI, Style Transfer is an innovative way to generate new images with intervention of style images. Working with other group members, I utilize the tool to generate a series of plans and translate them into three dimensional spaces.

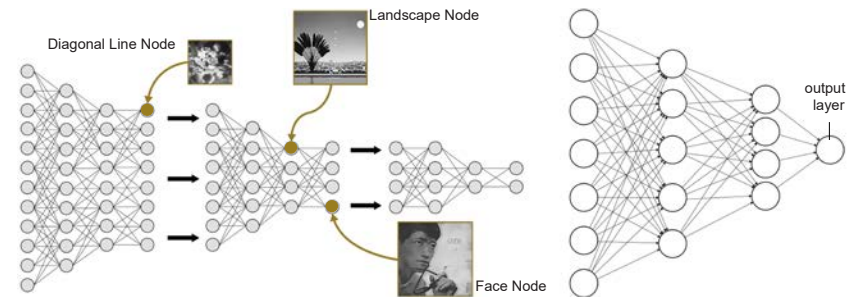


■ Introduction of CNN Structure

Convolutional Neural Networks (CNN) is a class of deep neural networks that are used to analyze visual images. Firstly, the computer reads the image as pixels and represents it as a matrix, which will then be processed by the convolutional layer. The processed file will be sent to the pooling layer, which reduces the number of parameters and calculations in the network. The next layer is the fully connected layer, in which the neurons are fully connected to all activations of the previous layer. Therefore, their activation can be calculated by matrix multiplication followed by offset.



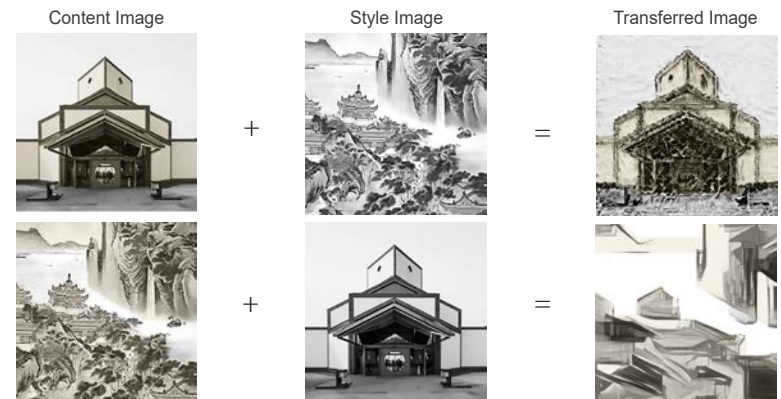
■ Style Deconstruction of Style Transfer Neural Network



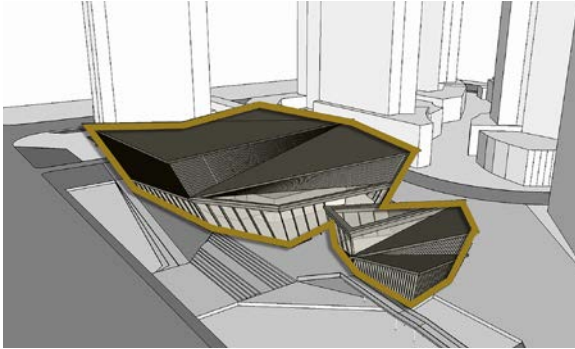
CNN-based Style Transfer is an algorithm for processing digital images or video, using the look or visual style of another image. The process assumes an input image and a sample style image. The input image is fed through the CNN and the network activation is sampled at each convolutional layer.

The content image is then obtained as a resulting output sample. The style image is then fed through the same CNN and the network activation is sampled. These activations are encoded as a matrix representation to represent the "style" of a given style image.

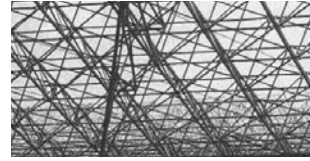
■ Example of Style Transfer



■ Content Image



■ Style Image



I employ floor plans at different heights from my theater design and set them as content images with an image of steel framework as style image. Transferred images are obtained after processing by Style Transfer Neural Network. Style weight works as the variable for controlling how the transferred images affected by the style image.

Content Image

Transferred Image



layer 0; style weight 500



layer 2; style weight 1500



layer 4; style weight 2500



layer 6; style weight 3500



layer 8; style weight 4500



Content Image

Transferred Image



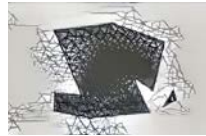
layer 1; style weight 1000



layer 3; style weight 2000



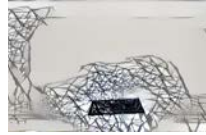
layer 5; style weight 3000



layer 7; style weight 4000



layer 9; style weight 5000



■ Transferred Image Translation

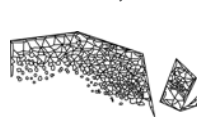
Transferred Image



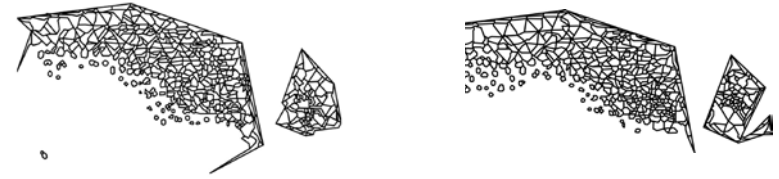
Interior Area



Geometry

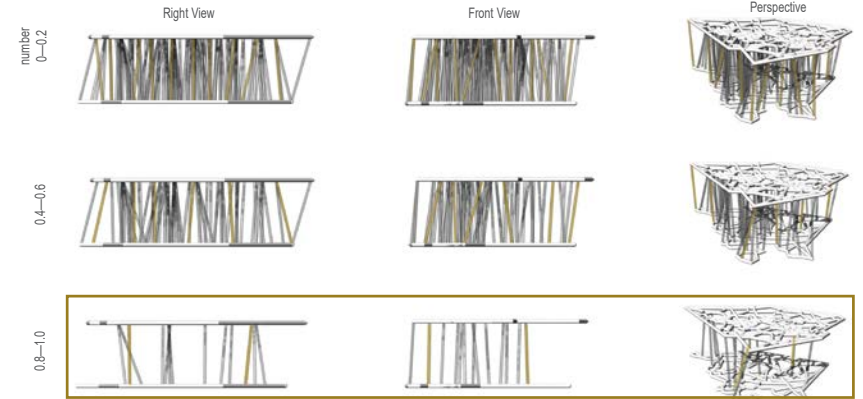


■ Generation Analysis of Vertical Connection



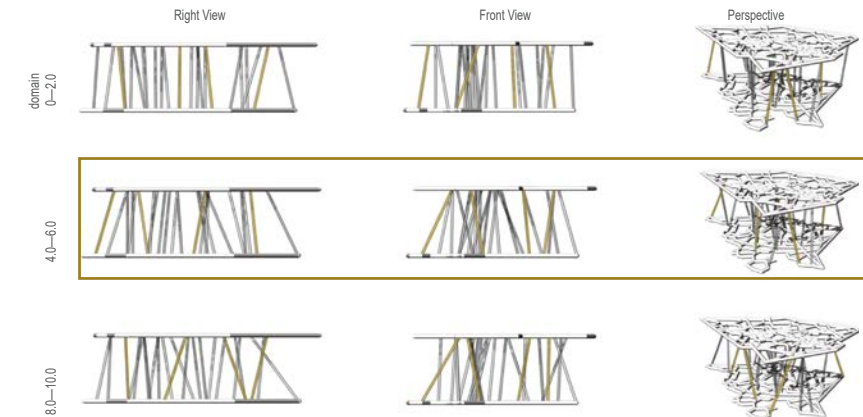
To better illustrate how the vertical connection was generated, I selected two adjacent layers and used a particular part, which is marked on the floor plans, to show the process of generation. By adjusting the input parameters, which represent pipe's number and tilt angle, of two sliders in Grasshopper, two sets of results are obtained. Thus, I select the most suitable one in each set and apply the input parameters in my whole design.

Number of Pipes



By adjusting input number between 0 to 1 on a number slider in Grasshopper, domain 0.8 to 1 presents the most suitable condition for the design.

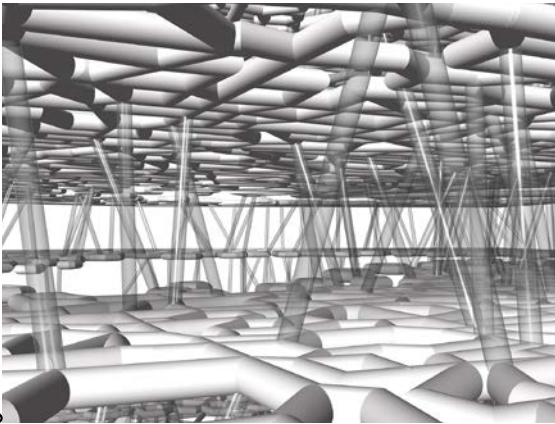
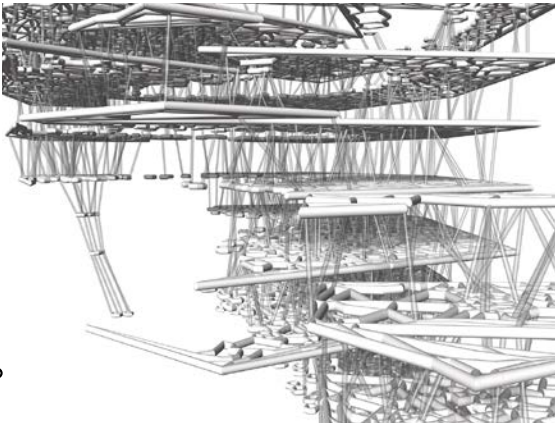
Tilt Angle of Pipes



By adjusting domain between 0 to 10 in a panel, the connection of points on two sides present a series of selections, which are shown by tilt angles of lines. Domain 4.0 to 6.0 presents the most suitable condition.

■ Right Facade

After selecting the tilt angles and degrees of density, I transform generated lines to 3D pipes, which are pillars for the structure. Geometries translated from transferred images are employed as floor plans for new struture. Thus, 2D images generated by Style Transfer are successfully translated into 3D space.



■ Front Facade

