

Warattha Kangwanwongsakul IB.arch

# ARCHITECTURE PORTFOLIO

Selected Works  
2016-2019

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## PERSONAL DETAILS

Warattha Kangwanwongsakul

Birth Date : 21 August 1996  
Nationality : Thai  
Address: : Ideo Sathorn Taksin Condo-  
minium 138 Thanon Krung Thon Buri, Khlong  
Ton Sai, Khlong San, Bangkok 10600

## SKILLS

**Scripting**  
Grasshopper

**3D modeling**  
Rhinoceros  
Sketchup  
MAYA

**Rendering**  
Vray  
Lumion

**Drawing & Presentation**  
AutoCAD  
Photoshop  
Illustrator  
Indesign

## LANGUAGE

Thai (Native)  
English (Proficiency)

## INTEREST

Architecture, Urban Planning, Tectonic, Art,  
Mathematic, Computation, Philosophy, Music

## EDUCATION

**Department of Architecture, B. Arch** 2014-2019  
Faculty of Architecture , Chulalongkorn University (Bangkok, Thailand)

**Triam Udom Suksa School (Bangkok, Thailand)** 2011-2013  
Science-Mathematics Program

## WORK EXPERIENCE

**Architectural Design Internship** 2018  
Jun Igarashi Architects , Sappora-shi, Hokkaido, Japan  
Schematic Design, CAD drawing, 3D Modeling, Model making

**Architectural Design Internship** 2018  
Architects 110 Co.,Ltd. , Bangkok, Thailand  
Schematic Design, 3D Modeling, Construction details drawing

**Architectural Design Internship** 2017  
East architect Co., Ltd. , Bangkok, Thailand  
Construction details drawing, Schematic Design, 3D Modeling

## ACADEMIC EXPERIENCE

**Computational Design Workshop** 2018  
Desiresynthesis & Wecosystem, Bangkok, Thailand

**Architectural Design Workshop** 2018  
Collaboration with École Nationale Supérieure D'architecture de Versailles (ENSAV)  
Paris, France

**Architectural Design & Ethnography Workshop** 2017  
Collaboration with National University of Mendalu, Czech Republic  
Bangkok, Thailand

**Architectural Design & Cross cultural Workshop** 2017  
Collaboration with National University of Laos  
Vientiane, Laos

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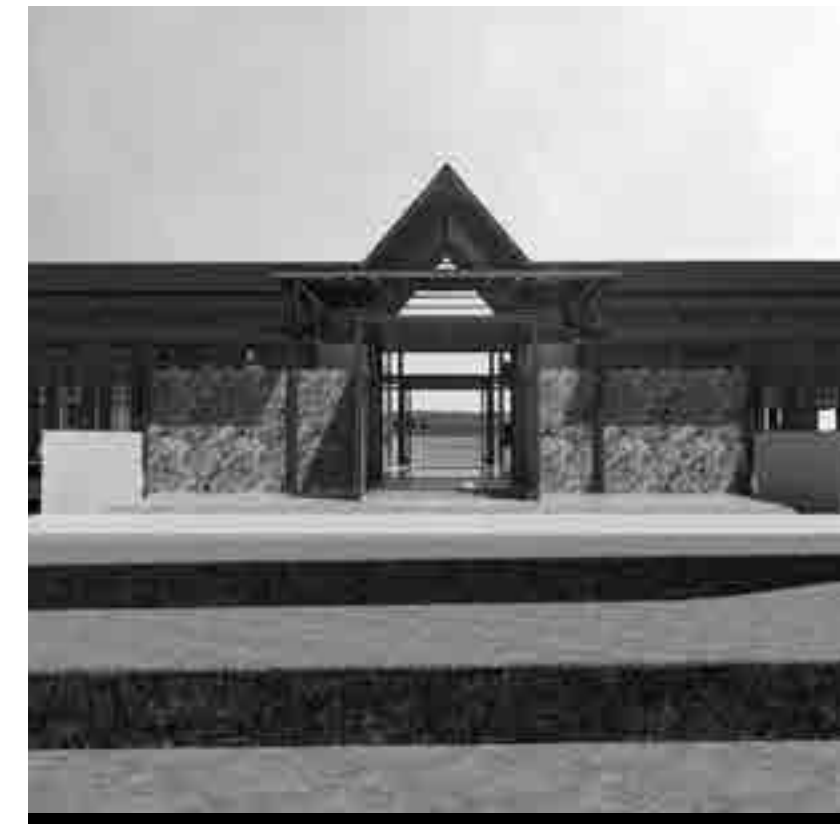
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# MUANG THAI LIFE ASSURANCE HEADQUARTER

Year: 2019 (Thesis)  
 Location: 250 Rachadapisek Rd  
 Huay Khwang, Bangkok  
 Programme: Headquarter  
 Area: 115,509 m<sup>2</sup>

The project started with the question ; how high-rise building provides truly well-being conditions and environments for its users?

In spite of the fact that office workers spend an average 8 hours a day in high-rise office, spatial qualities, environments and behaviours of the users affect the quality of life of office workers directly. The high-rise building typology with its usable spaces high up from the ground often causes lack of natural proximity, of physical movements which is the causes of both mental and physical issues such as the so-called office syndromes and burnout.

The project is the headquarter of two associated companies : Muang Thai Life Assurance and Muang Thai Insurance. It is the rebuilt of existing parking building in Muang Thai site to support continuous expanding of employees due to its high growth rate. Main concerns of the project is to extrapolate environments which provide well-being conditions for its users and truly reflect climate condition while enhancing interaction between different divisions for better coordination. The project aims to alleviate the explicit problems

found in high-rise typology in both physical and mental terms ; lack of natural proximity causing stress of office workers, lack of physical linkage between floors causing avoidance of coordination , insufficient movements of office workers causing office syndromes.

The counteraction of the problems mentioned previously are to provide sufficient outdoor spaces with natural ventilation and trees which can be accessed with ease not only by elevators, providing physical linkage between floors to encourage coordination and interaction between different divisions, providing active environments to encourage physical movements of office workers.



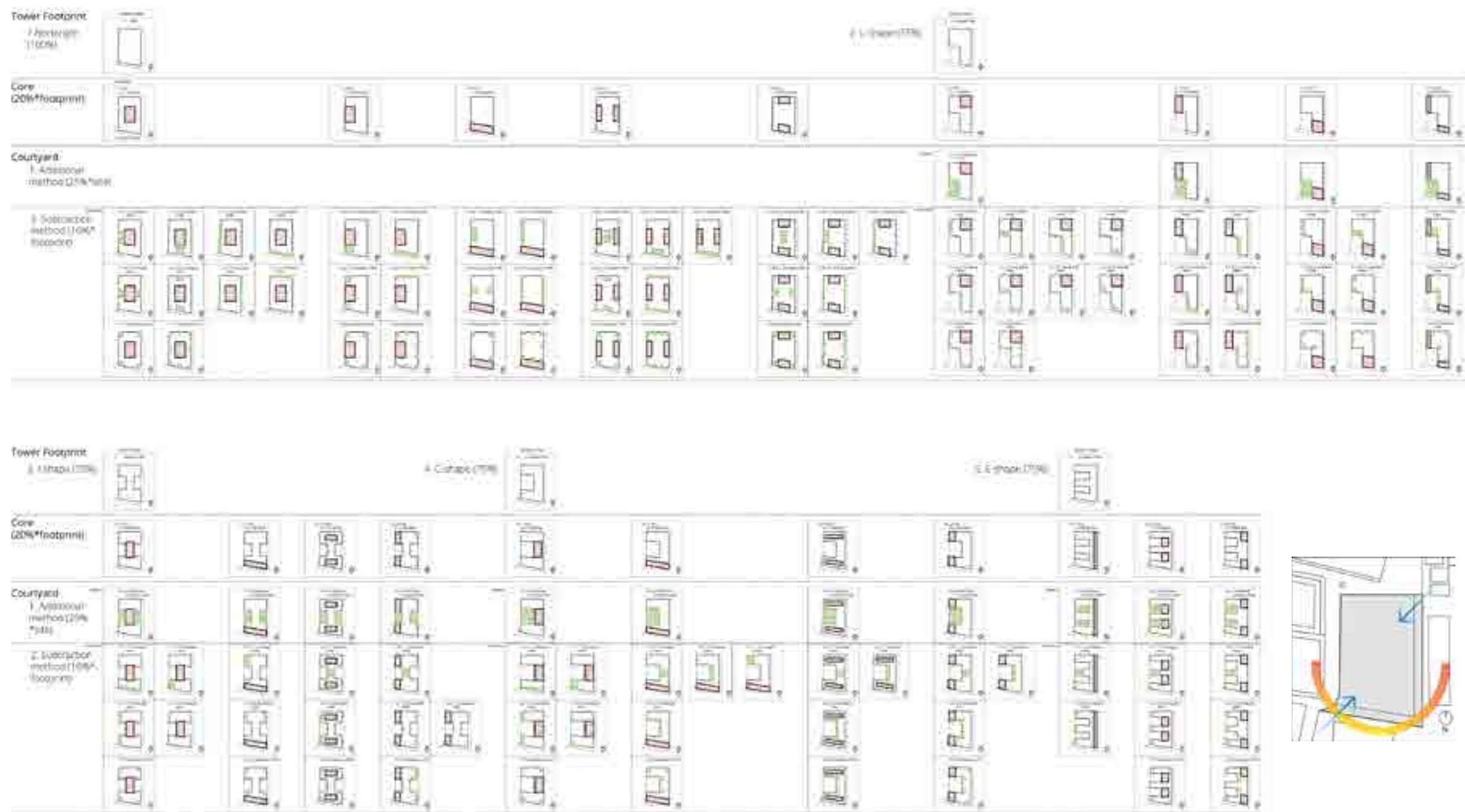
fig.1 Indicates road systems, circulation from public transportation and on-site circulations.

## Research

The summary of research about well-being and productivity in office related to architectural design.



## Algorithmic process of zoning



The algorithmic procedure of zoning is in 3 steps 1. Building footprint 2. Core setting 3. Courtyard setting & composition. Its setting related to sun and wind direction. The condition of choosing is 1. heat optimization 2. spatial efficiency 3. quality of views 4. structural efficiency 5. approach 6. rhetoric value

Mean Radiant Temperature (MRT)  $\propto$  Surface area

Surface area  $\propto$  Building's perimeter

| Geometry             | Area (fixed factor) | Perimeter |
|----------------------|---------------------|-----------|
| Equilateral Triangle | 100 m <sup>2</sup>  | 45.59 m   |
| Square               | 100 m <sup>2</sup>  | 40 m      |
| Pentagon             | 100 m <sup>2</sup>  | 38.12 m   |
| Hexagon              | 100 m <sup>2</sup>  | 37.22 m   |
| Octagon              | 100 m <sup>2</sup>  | 36.41 m   |
| Tetradecagon         | 100 m <sup>2</sup>  | 35.75 m   |
| Circle               | 100 m <sup>2</sup>  | 35.45 m   |

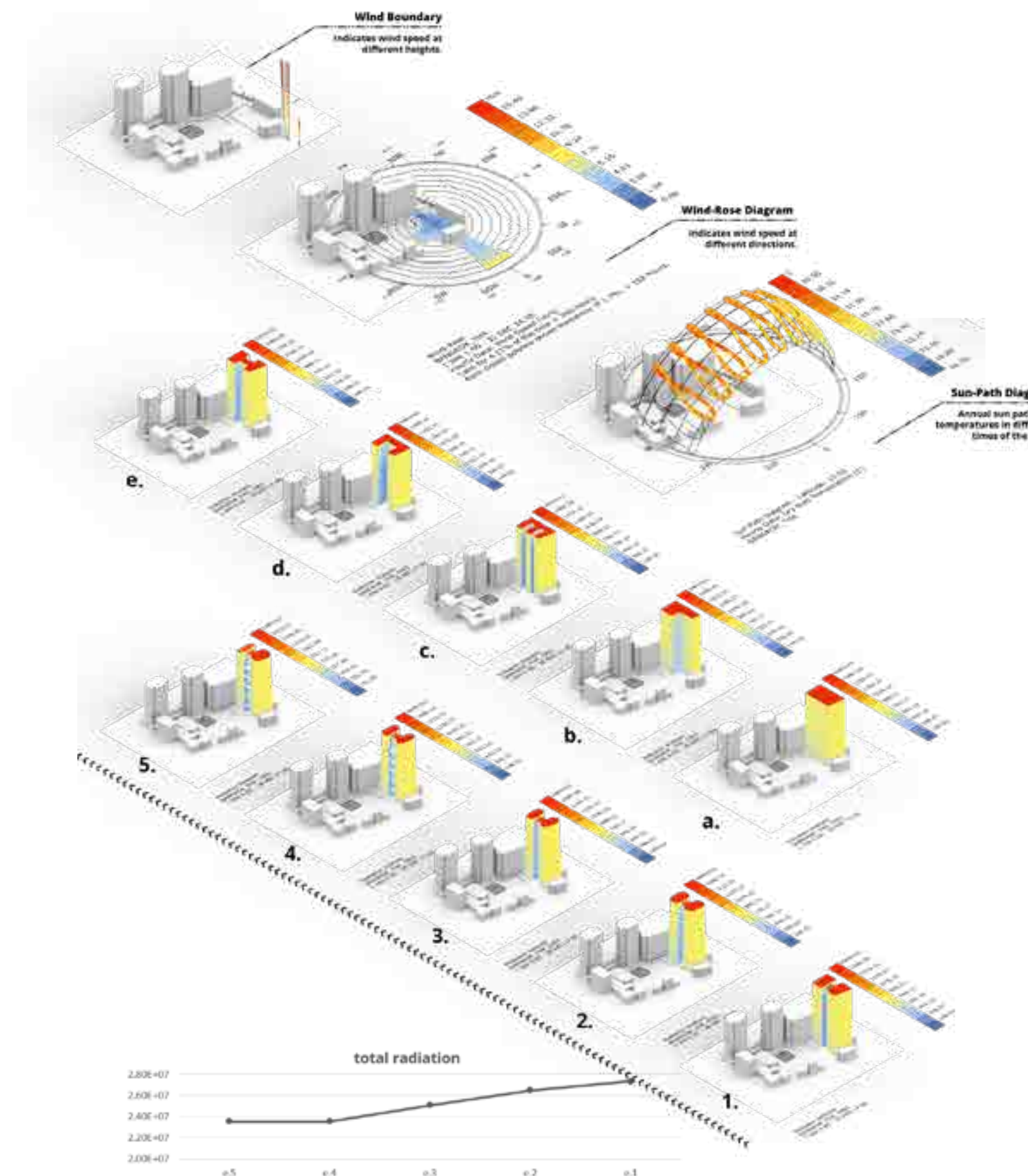
fig.1 Comparison of the area and perimeter of various equilateral geometries. Despite the fixed factor : area, the perimeter of each geometries are different. The observation is made : the more sides of the geometry, the less its perimeter.

### Mean Radiant Temperature (MRT)

$$T_{mr} = T_1A_1 + T_2A_2 + \dots + T_NA_N / (A_1 + A_2 + \dots + A_N)$$

$T_{mr}$  = mean radiant temperature, °R  
 $T_N$  = surface temperature of surface N, °R (calculated or measured)  
 $A_N$  = area of surface

The mean radiant temperature (MRT) indicates the collective heat in building, the less MRT, the more energy saved in HVAC system. From fig.1, with the area as a fixed factor, circle is the geometry with the less perimeter, meaning circle planned building has the less Energy Use intensity (EUI).



## Analysis & Strategy

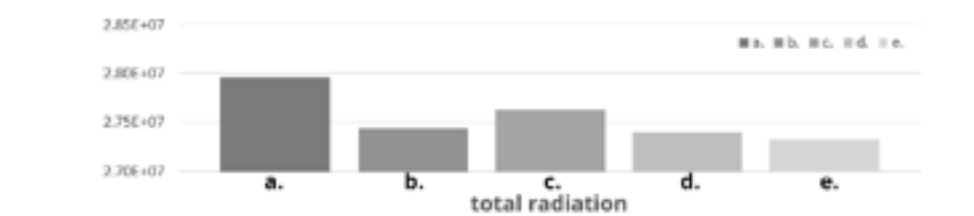
### Climatic condition 1 : Sun path, Sun radiation & Temperature.

To achieve thermal comfort in high-rise building, climatic conditions such as sun and wind must be concerned. Thailand is located in the northern hemisphere thus the sun orbit is in south direction in 8 months/year. The sun radiation from the west side in the afternoon is very high. Therefore the setting of the building must be treated with the consideration of high temperature from west and south directions.

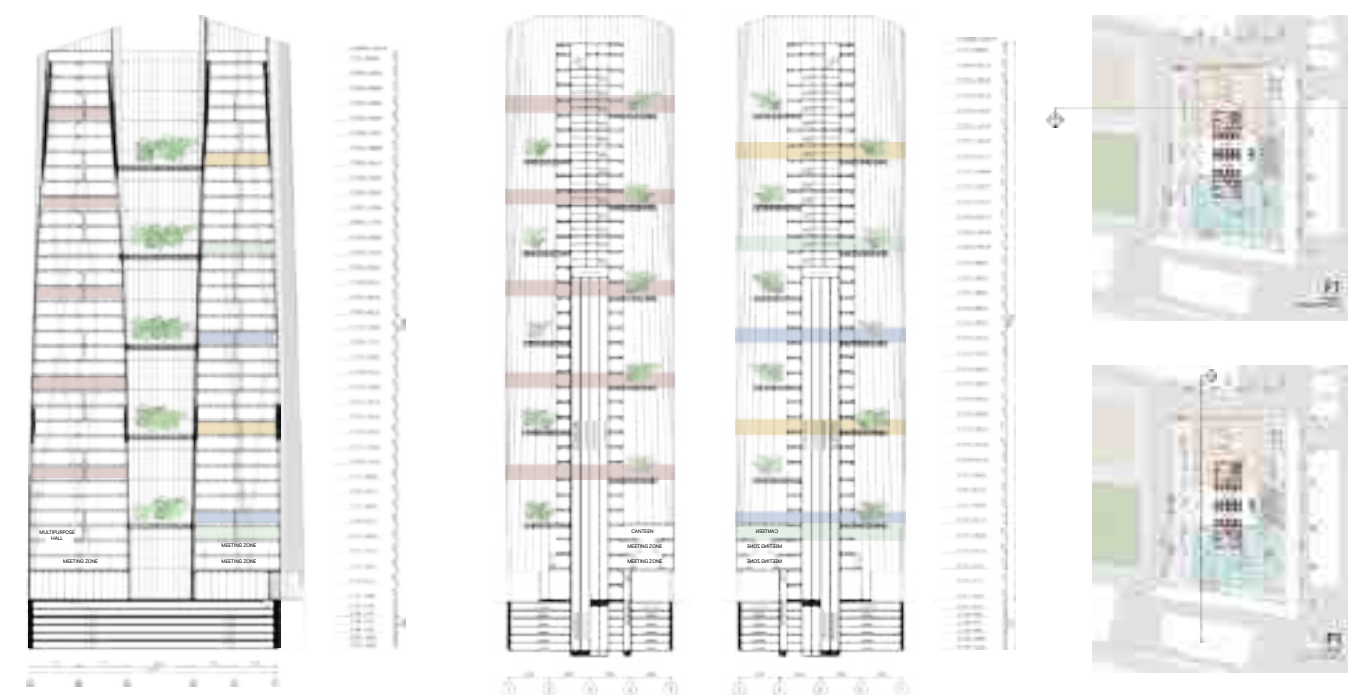
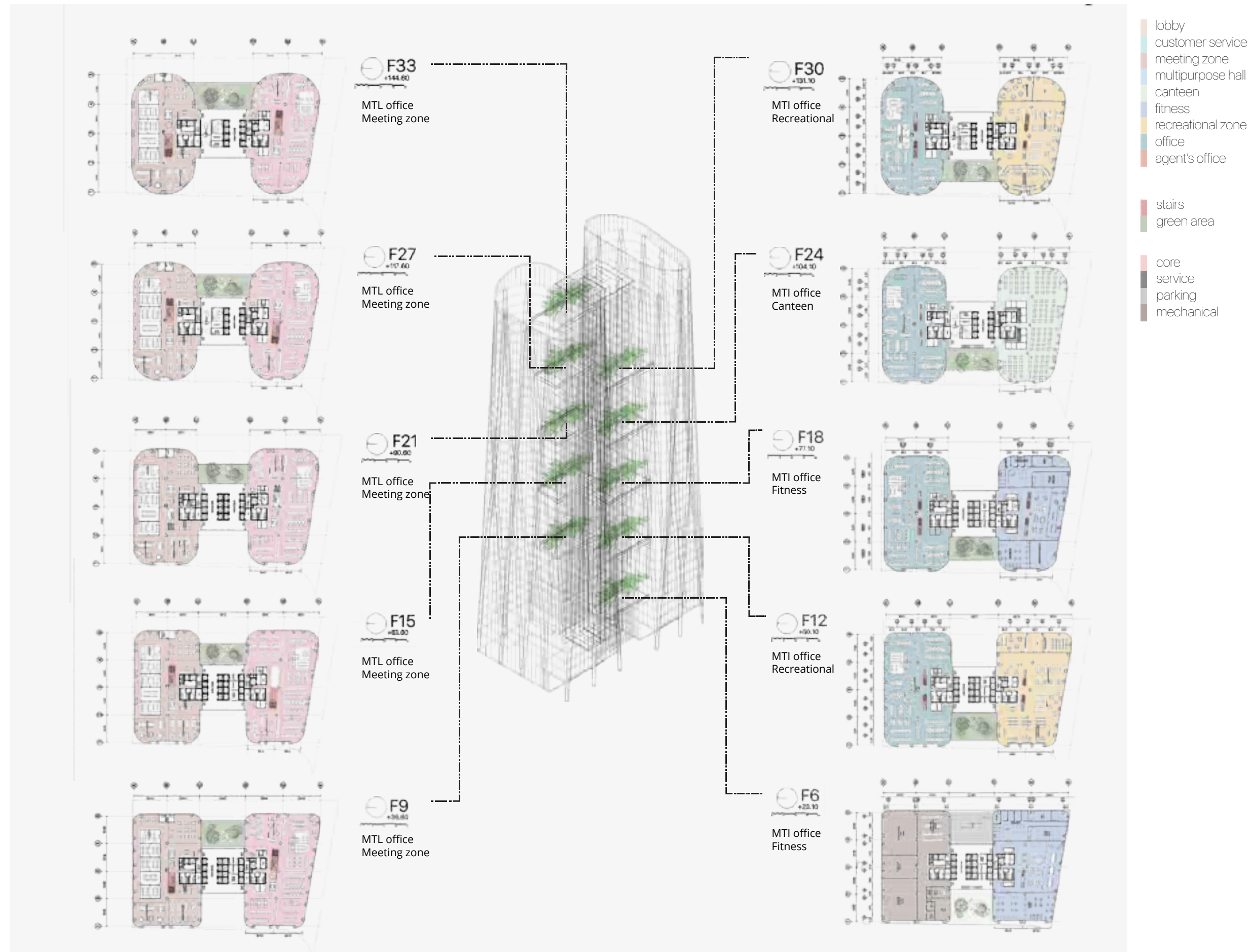
Despite the fact that the longitudinal side of the site facing west direction, the schematic planning was made in concern with the aims to reduce the building's surface in west direction.

### Climatic condition 2 : Wind loads.

The higher the building, the greater the velocities of wind. To reduce direct wind load striking high-rise building, various methods were founded.



Combining two considerations of sun and wind. The morphing method was chosen. From the base with lower wind loads and less sun radiation, the I-scheme with the perimeter of the site was chosen to maximise GFAs, the quadragon at the base is gradually transform into the oval shape at the top reducing higher wind loads and sun radiation (base on the research of the geometry with less perimeter).



### Biophilia & Views

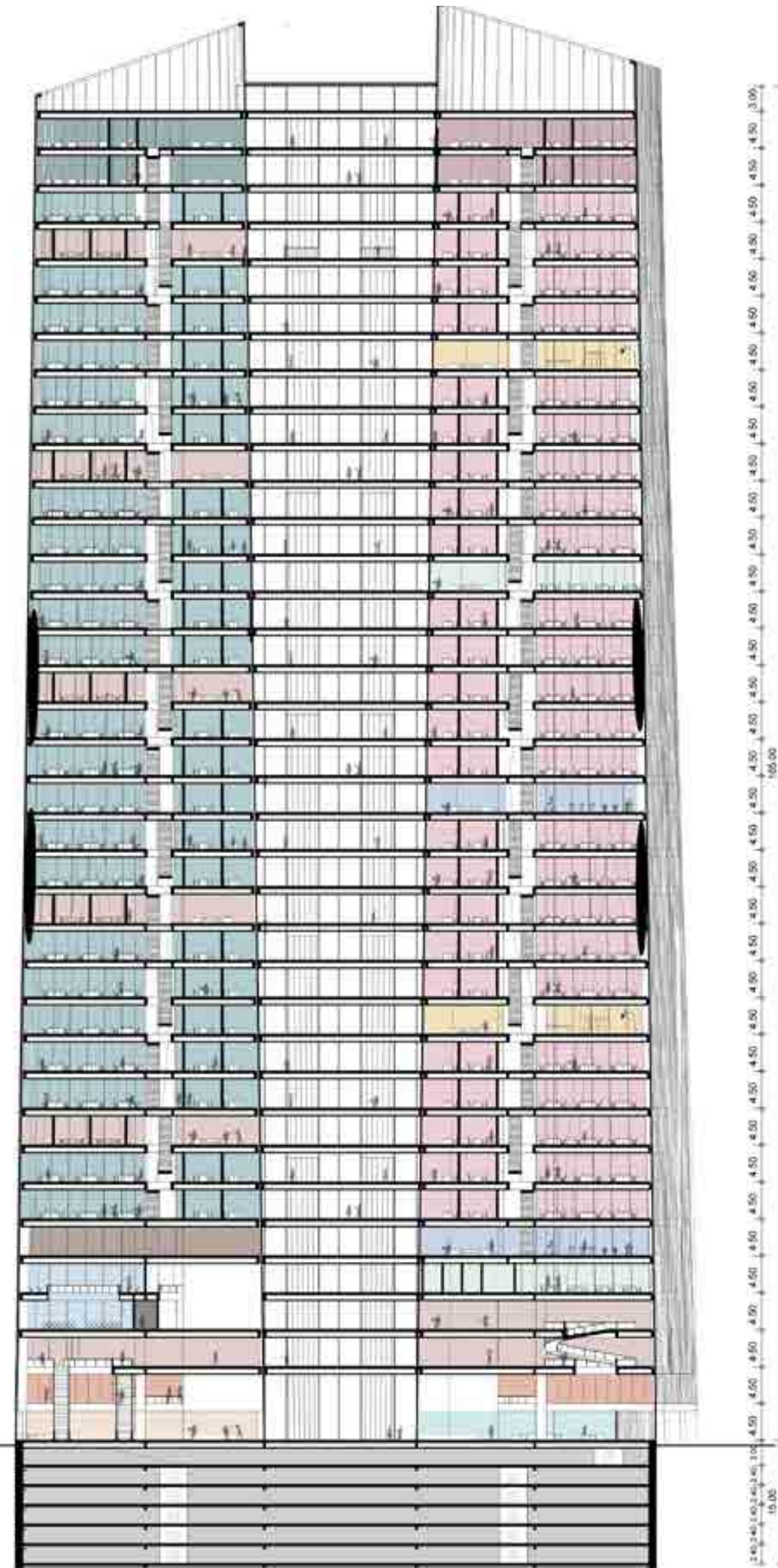
Courtyards are placed in every 3 floors shifted between the east and west side. They are located between 2 sectors thus trees views are visible in every parts of the building. The courtyards in the west-east sides also act as heat insulations for the building.

### Location & Access to Amenities

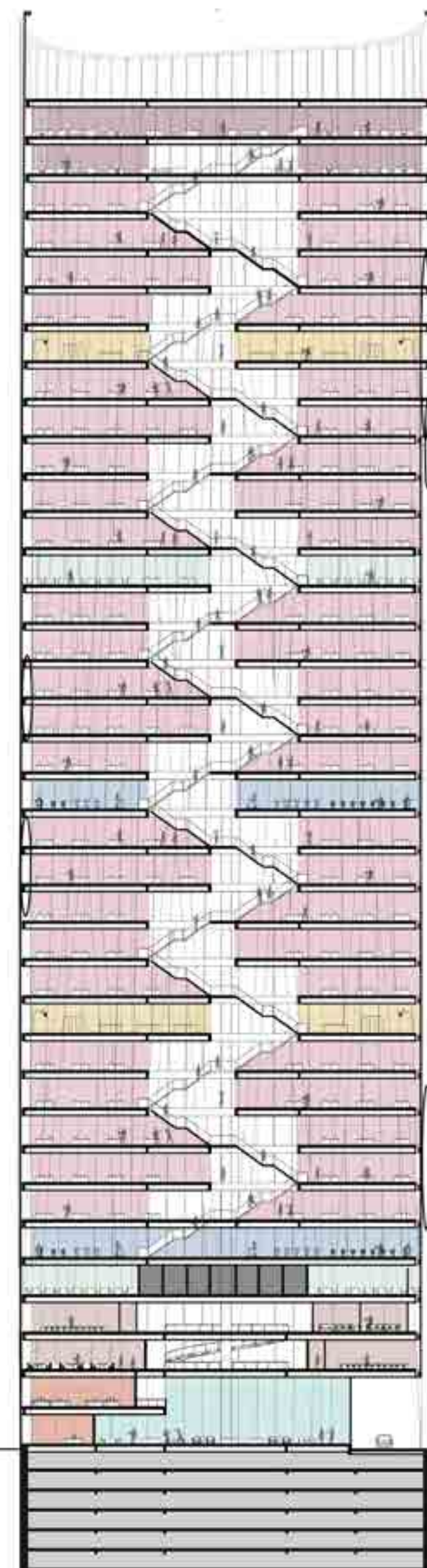
Instead of placing formal meeting room on each floors like in typical office building, the meeting rooms are combined and are placed in every 6 floors accessing from office floors by stairs (the furthest vertical distance human still want to walk is 3 floors) to encourage physical movements of employees and encourage interaction between different divisions.

## Tower

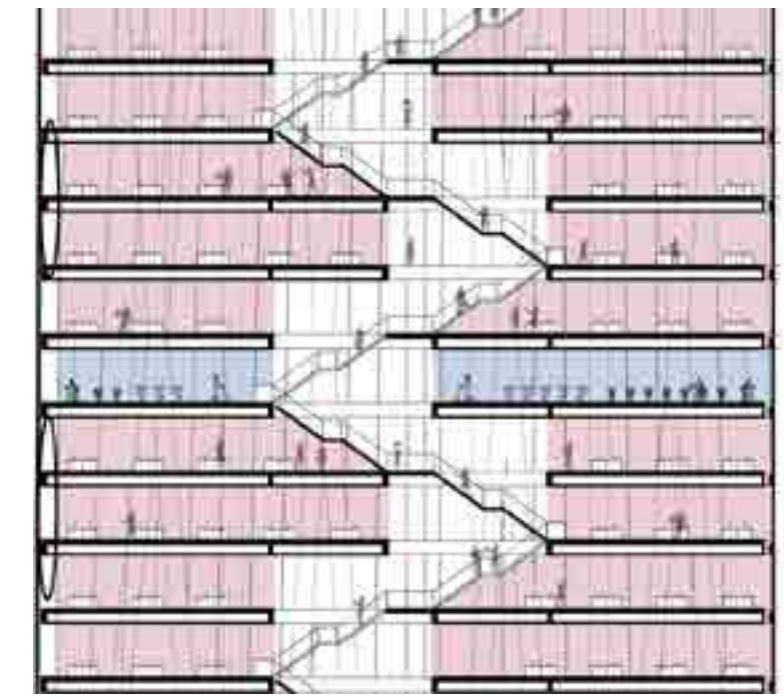
- lobby
- customer service
- meeting zone
- multipurpose hall
- canteen
- fitness
- recreational zone
- MTL's office
- agent's office
- stars
- green area
- core
- service
- parking
- mechanical



ROOF +162.90  
 F3 +162.60  
 F36 +158.10  
 F35 +153.60  
 F34 +149.10  
 F33 +144.60  
 F32 +140.10  
 F31 +135.60  
 F30 +131.10  
 F29 +126.60  
 F28 +122.10  
 F27 +117.60  
 F26 +113.10  
 F25 +108.60  
 F24 +104.10  
 F23 +99.60  
 F22 +95.10  
 F21 +90.60  
 F20 +86.10  
 F19 +81.60  
 F18 +77.10  
 F17 +72.60  
 F16 +68.10  
 F15 +63.60  
 F14 +59.10  
 F13 +54.60  
 F12 +50.10  
 F11 +45.60  
 F10 +41.10  
 F9 +36.60  
 F8 +32.10  
 F7 +27.60  
 F6 +23.10  
 F5 +18.60  
 F4 +14.10  
 F3 +9.60  
 F2 +5.10  
 F1 +0.60  
 B1 -2.40  
 B2 -4.80  
 B3 -7.20  
 B4 -9.60  
 B5 -12.00  
 B6 -14.40



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 B4 -9.60  
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 B6 -14.40



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 F14 +59.10



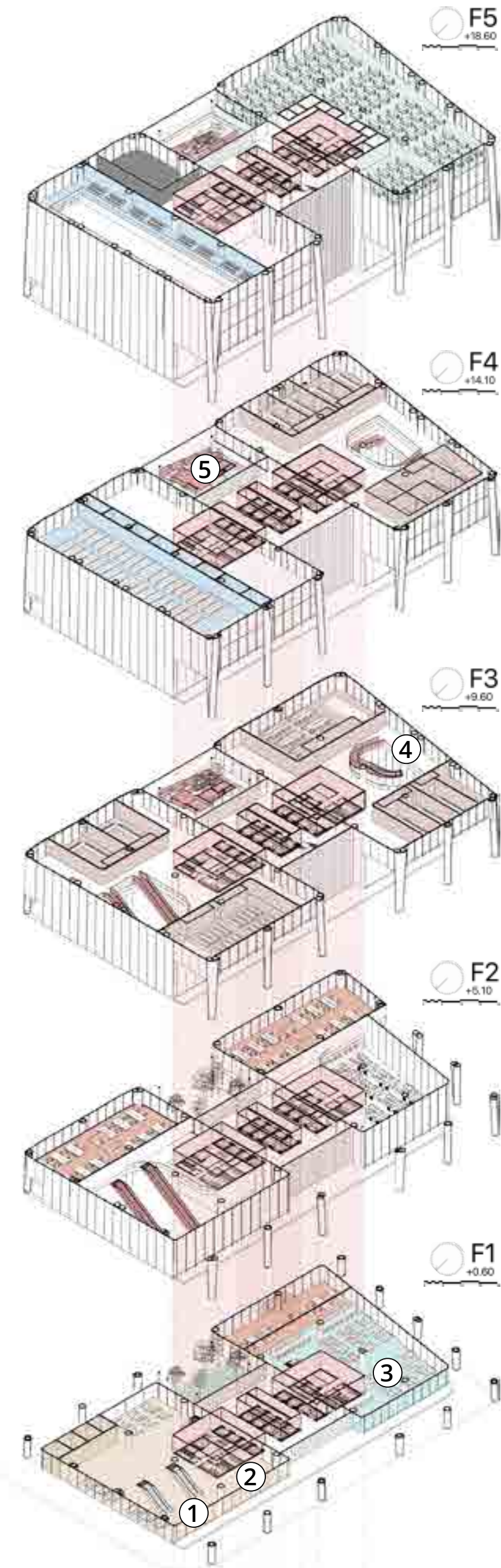
Collaborative environment, physical movement and cooperation between different divisions in high-rise office.

In typical high-rise office, the only active vertical circulation is elevator which waste high energy consumption and doesn't provide active/ interactive environment (Imagine sticking in the movable steel box while trying not to awkwardly stare at others). Each floors don't have any physical connection, thus collaboration between different divisions in the organization is almost diminished unless if it's necessary. Therefore the project aims to provide physical connection between floors using stairs which are placed in the middle of each floor plan for the ease of access. From working zones, the stairs are nearer than the elevators.

In physical term, the use of stairs encourages physical movements which is to solve the lack of movement causing office syndrome and other illnesses. In mental term, the void connecting each floors provides active environment, visual interaction between different divisions reinforcing engagement in the organization towards unity.

**Podium**  
(Public/Semi-public)

- lobby
  - customer service
  - meeting zone
  - multipurpose hall
  - canteen
  - fitness
  - recreational zone
  - MTL's office
  - MTL's office
  - agent's office
- stairs
  - green area
- core
  - service
  - parking
  - mechanical



**Scenarios**



◀1



◀2



◀3



◀4



◀5

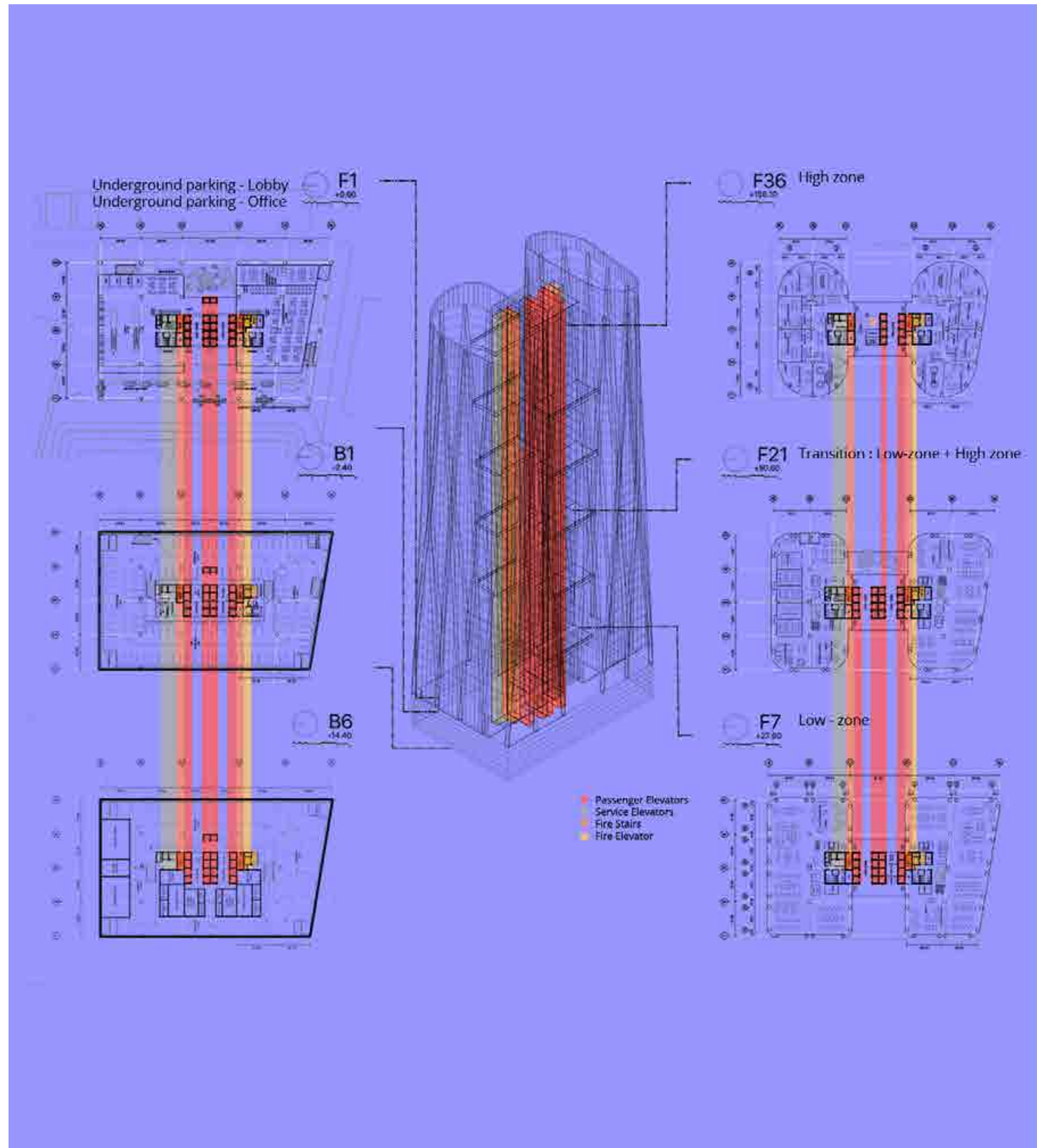
**1,2 Lobby** - The lobby consists of seats, cafe, mart and patisserie. The advice/transaction of insurance would take place there. On the second floor locate Muang Thai Insurance's agent office with its private stairs to circulate to the first floor in order to service clients with ease. The escalator connects to the third floor which is located various types of meeting rooms.

**3 Customer service** - The customer service consists of seats and customer service office. The advice of insurance/life assurance program would take place there. On the second floor locate Muang Thai Life Assurance's agent office with its private stairs to circulate to the first floor in order to service clients with ease. The stairs on the third-fourth floor (meeting zone) is visible through the void to provide active environment, the void provides 17.10 m. height atrium adding more negative space in volume to the customer service.

**4 Meeting zone** - From lobby to meeting zone, users would take escalator on the first floor to third floor then use stairs to the fourth floor. The stairs connect meeting rooms and multipurpose hall on the third-fourth floor.

**5 Multipurpose stairs (Semi-outdoor)** - On the third-fifth floor in the east side of the building locates multipurpose stairs with natural ventilated space. The stairs can be used for either circulation or prefuntional area for meeting room, it connects all semi-public space such as meeting zone, multipurpose hall and canteen altogether.

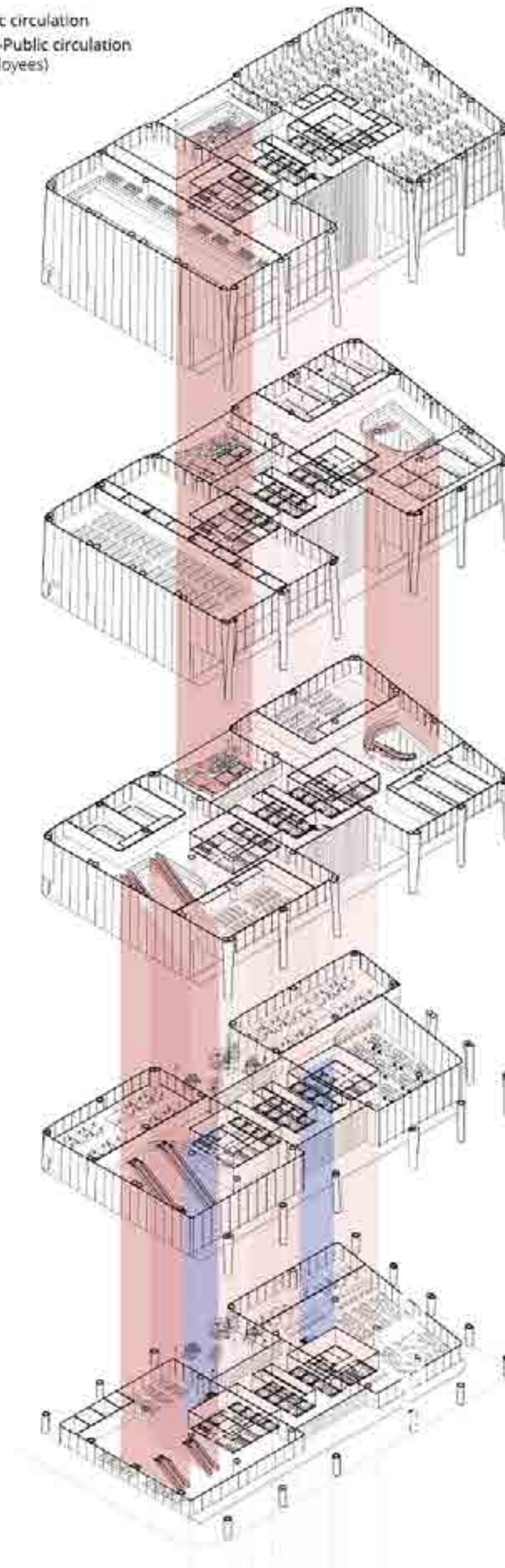




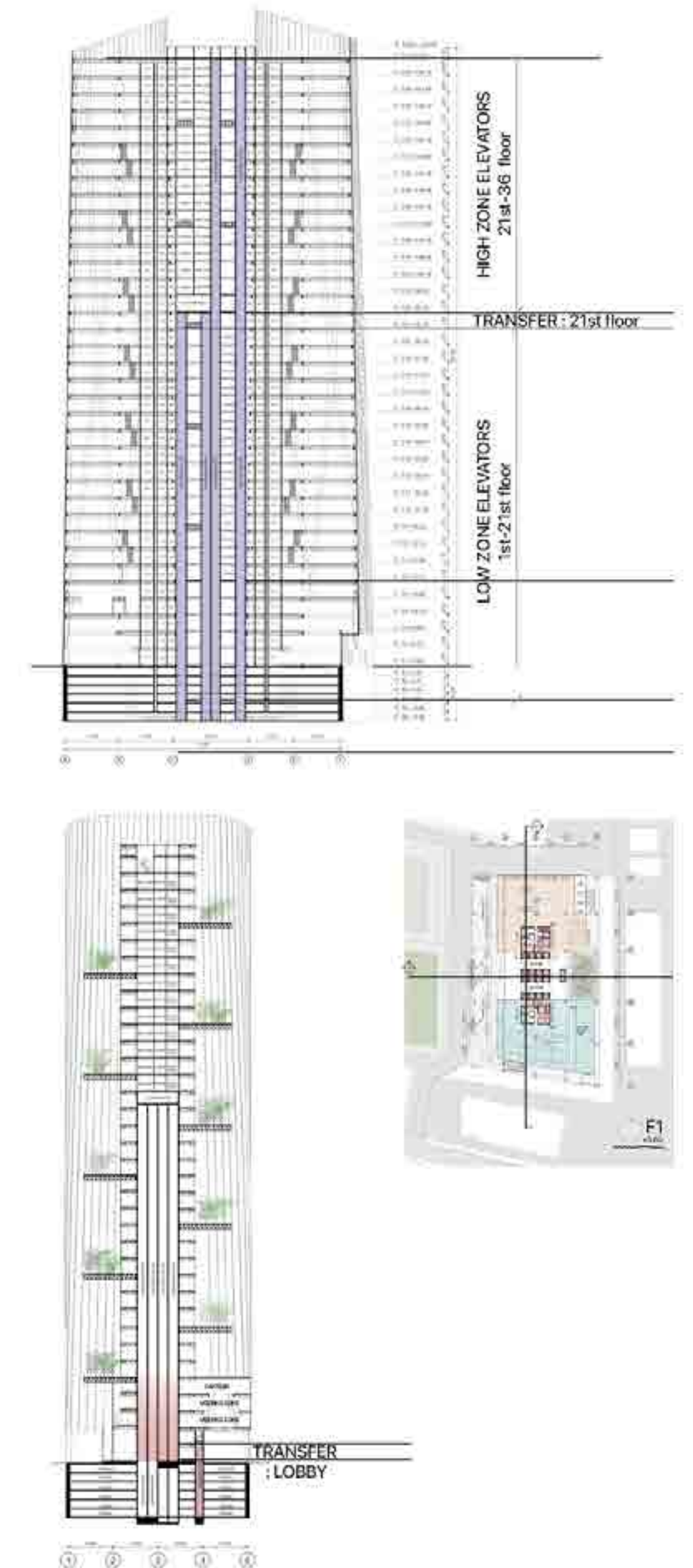
## Vertical Circulation

- Escalator & Stairs

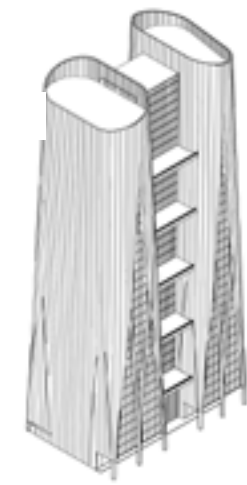
Public circulation  
Semi-Public circulation (Employees)



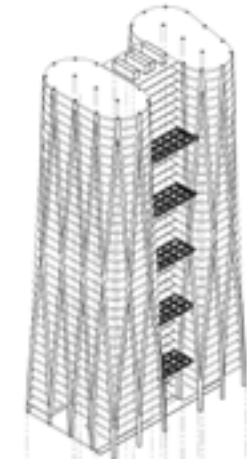
- Elevators



Structural diagram



ISOMETRIC



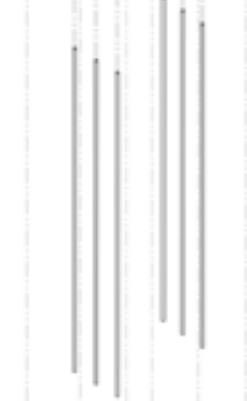
SKIN-EXPOSED

Exposing skins (Glass + curtain wall) to reveal underlying various types of structures.



SHEAR WALL

RC load bearing wall depth = 0.30 m.



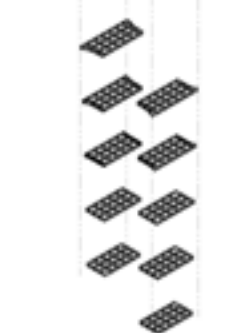
INTERNAL COLUMNS

Composite steel tubes : diameter = 1.20 m.



EXTERNAL COLUMNS

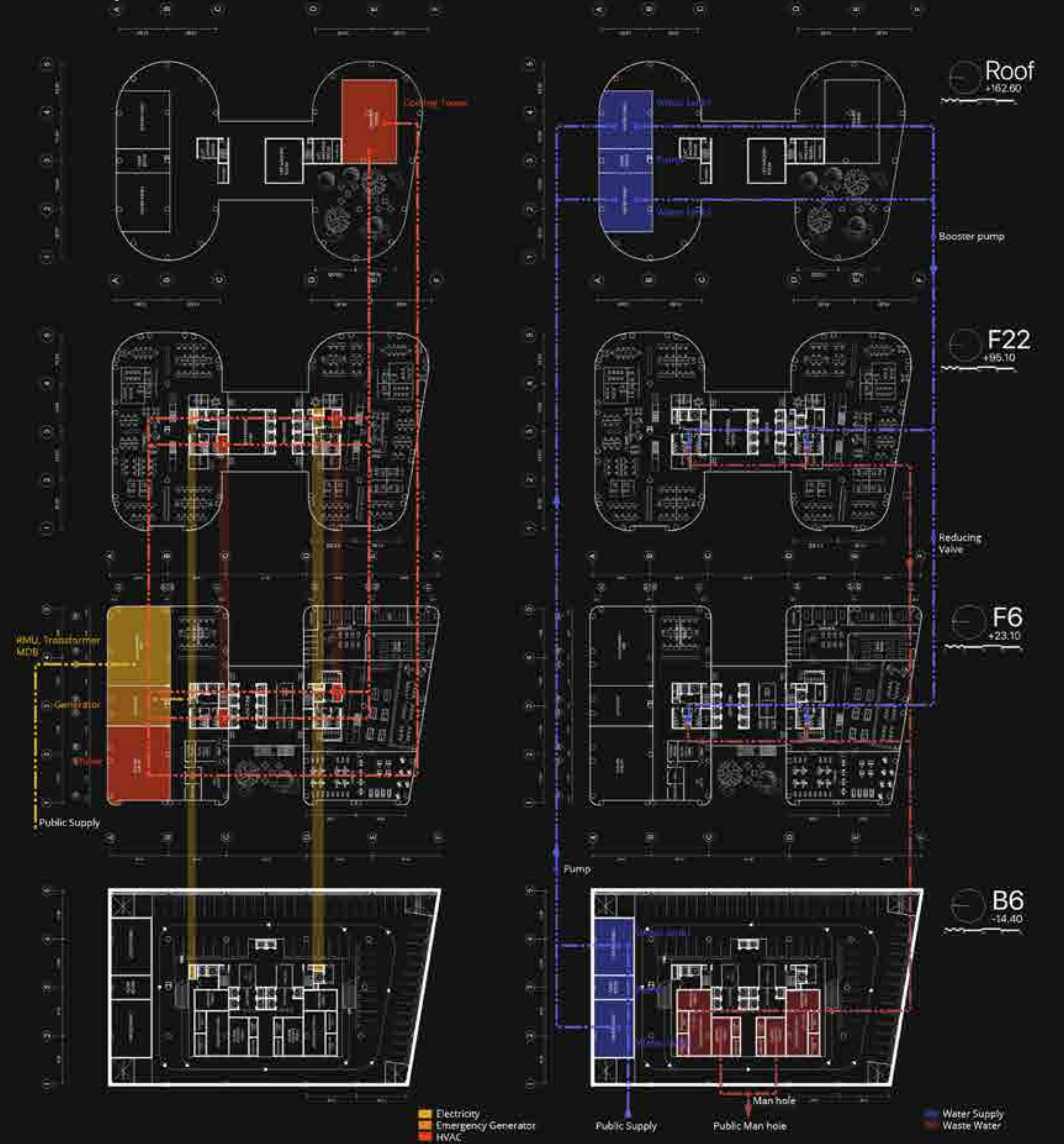
Composite steel tubes : diameter = 1.20 m.



TRUSS STRUCTURE

Grid patterned steel trusses : depth = 1.50 m.

Mechanical system



Electricity & Air condition Diagram

Water Supply & Waste/Soil Diagram



## SiamSpark

**Year:** 2018  
**Location:** block I J K, SiamSquare  
**Programme:** mixed used , rental office  
**Area:** 522,600 m<sup>2</sup>

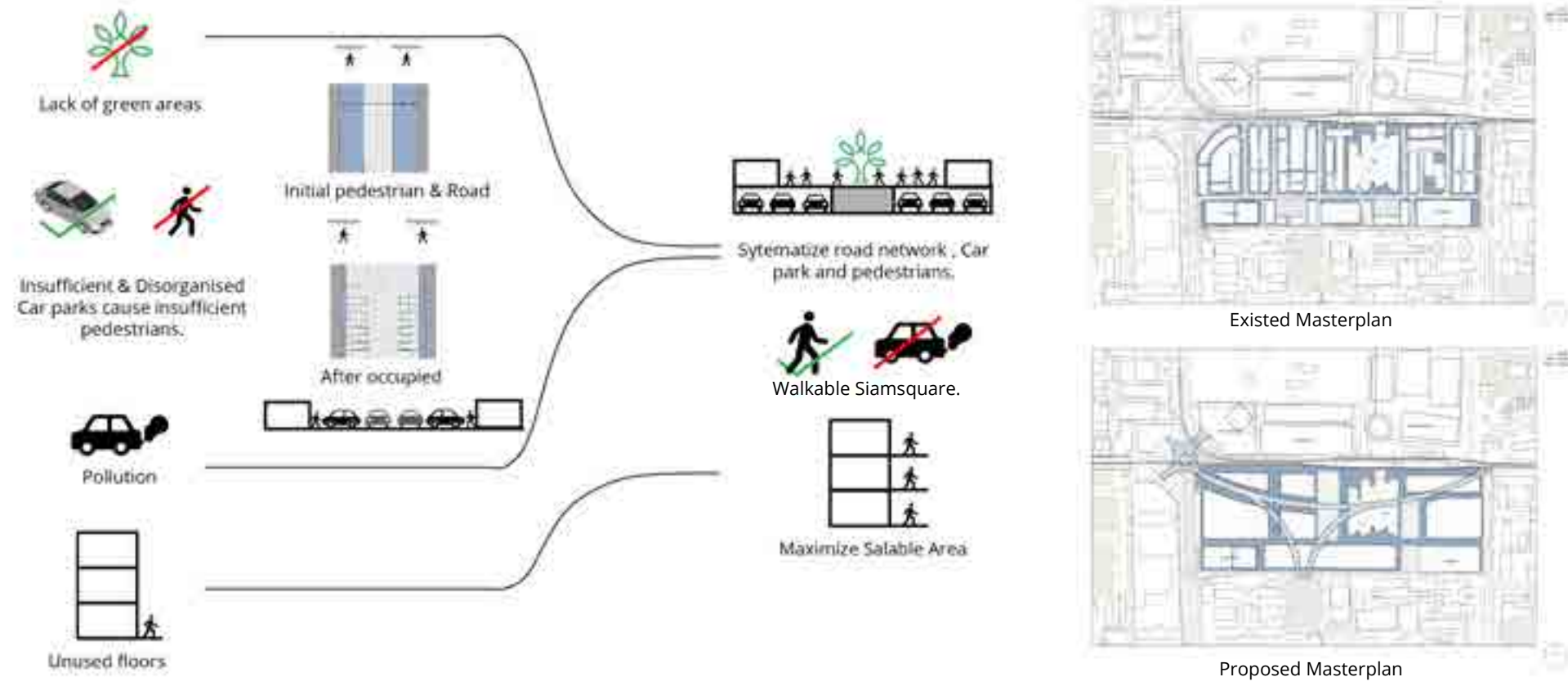
SiamSpark is an office mixed used building consists of shopping venue, incubator and rental office. It is located between Siamkit building, the center of tutorial school and SiamScape, the next center of tutorial schools. The vision here is to turns these 3 blocks into the treasure of education. We aim to preserve the education along with fun for every genders or ages, to be the incubator for fresh ideas and to support the connection between students and entrepreneurs for sharing new ideas and informations.

To make these ideas work, we make a new model that is an incubator for people who want to grow their knowledge and commune. It consists of library, mediatheque, workshop space, exhibition hall and mini-auditorium for people who want to learn, communicate, perform and show their works to the world. To destroy the boundary between students and adults, we combine these incubators with the office building to strengthen the connection between ages and to provide the spaces that everyone can comes to learn.

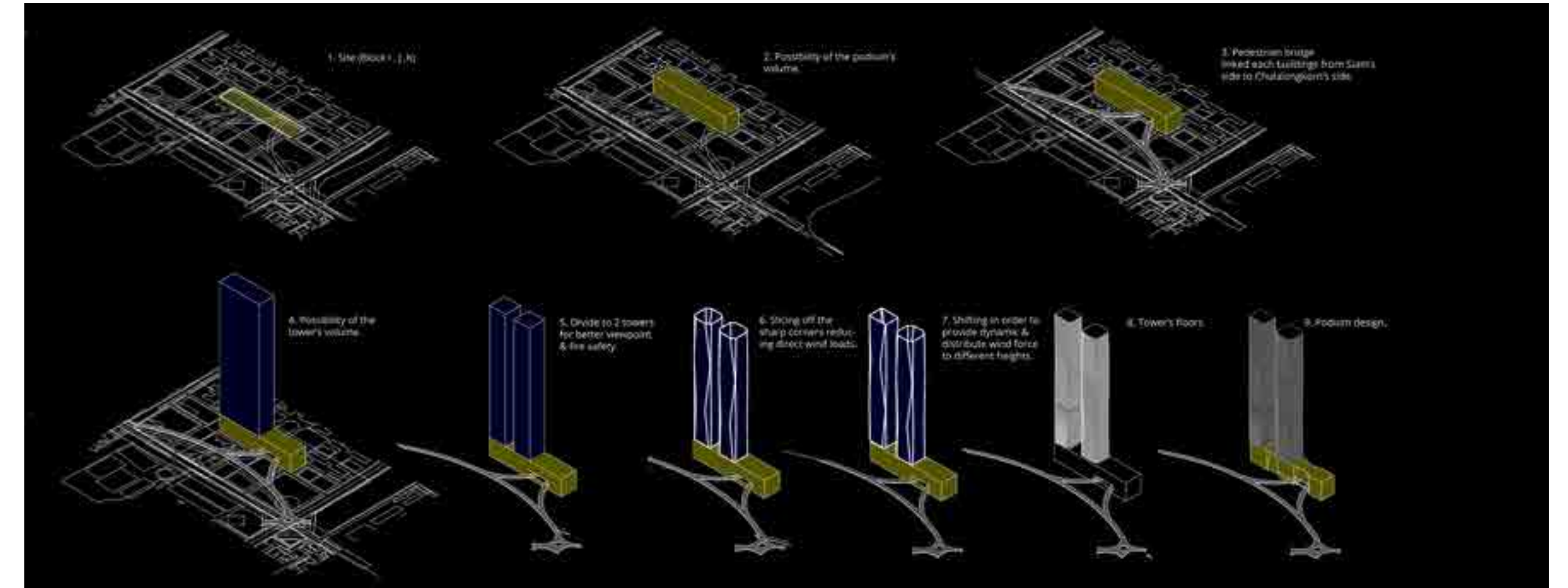
The Gross floor area is 522600 m<sup>2</sup>, combine of podium and two towers. The podium area is 82,600 m<sup>2</sup> mixed used functions of shopping venue and incubator. The area per tower is 220,000 m<sup>2</sup> which are grade A renta offices for start up and companies.

Group project by  
Warattha Kangwanwongsakul  
Patchaya Potiratsombat  
Raksith Olankitvanich

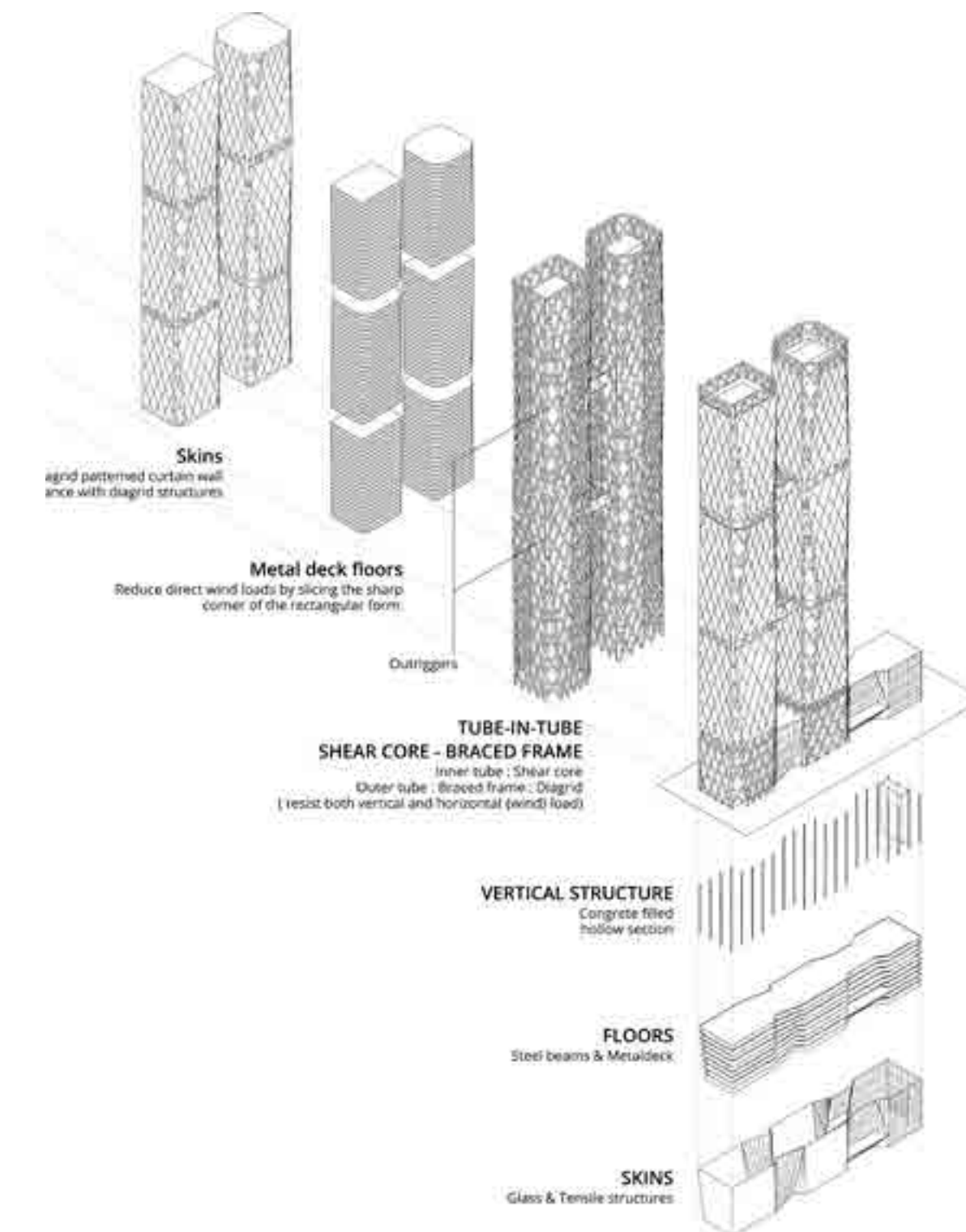
## ANALYSIS & STRATEGY



## PROCESS



## STRUCTURAL DIAGRAM

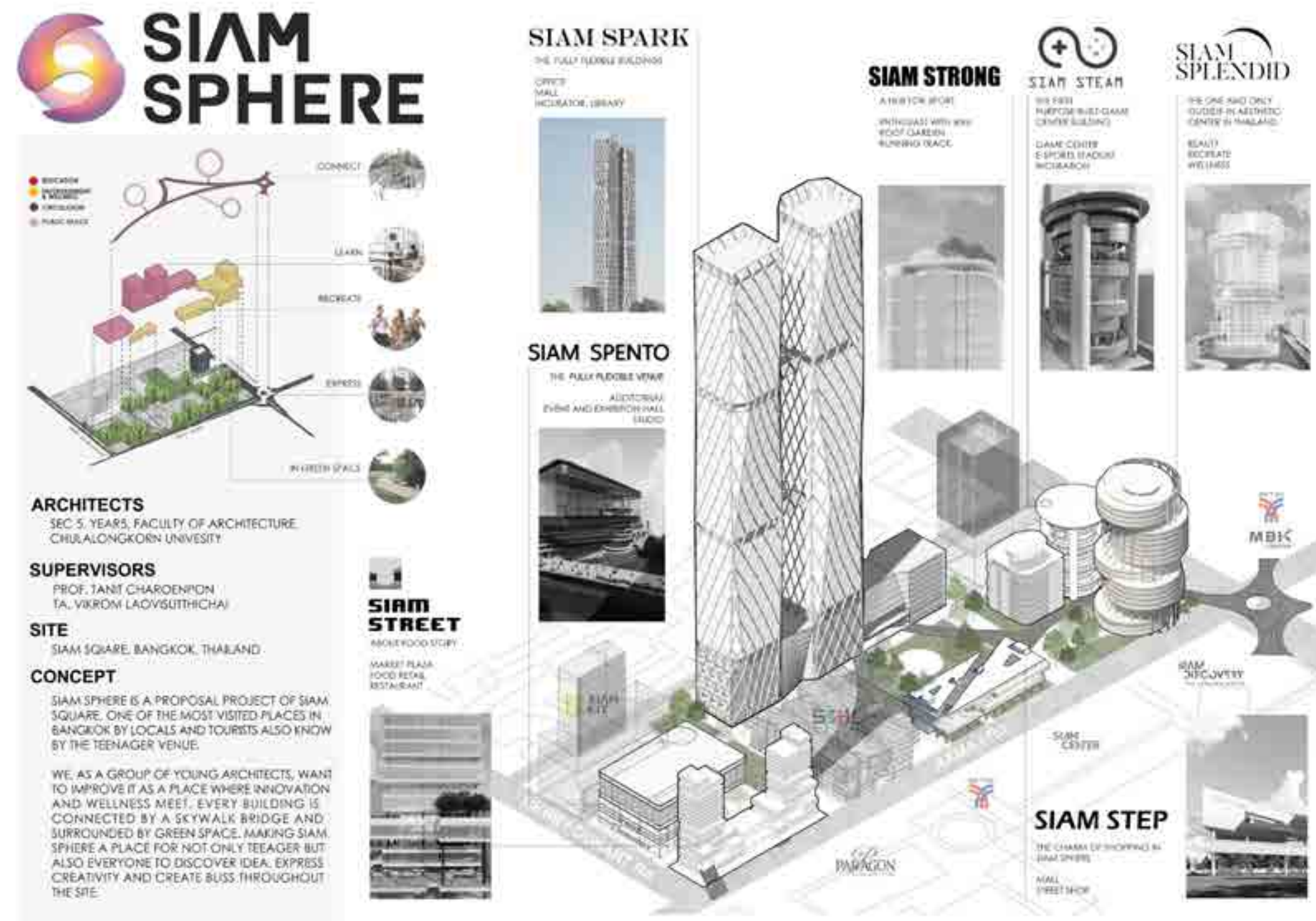


Siamspark is located at block 1JK of Siam Square which is in between Siam Square and Chulalongkorn university. The building is served as a transition from Siam Square to Chulalongkorn by the pedestrian on the third floor.

Surrounded by two tutorial centers on the east and west side, the initial proposal is to create an incubator for students to learn by both medias and doing and provide meeting spaces between entrepreneurs/businesspersons and students.

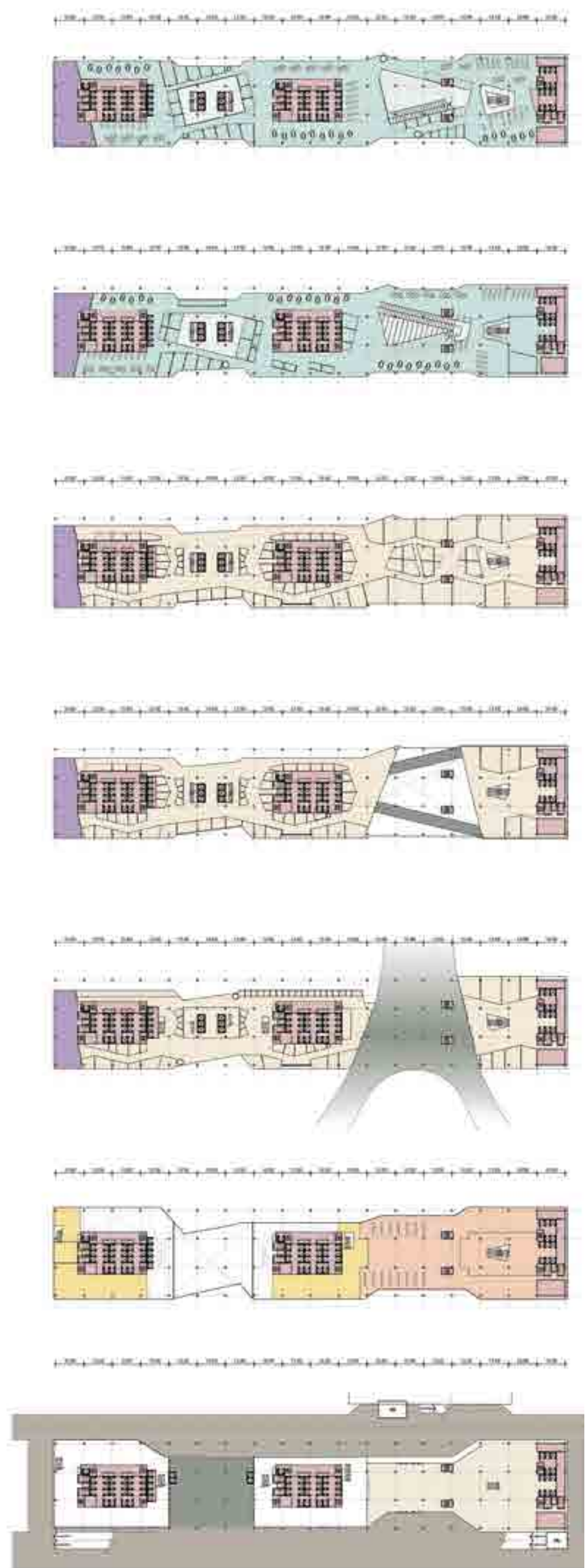
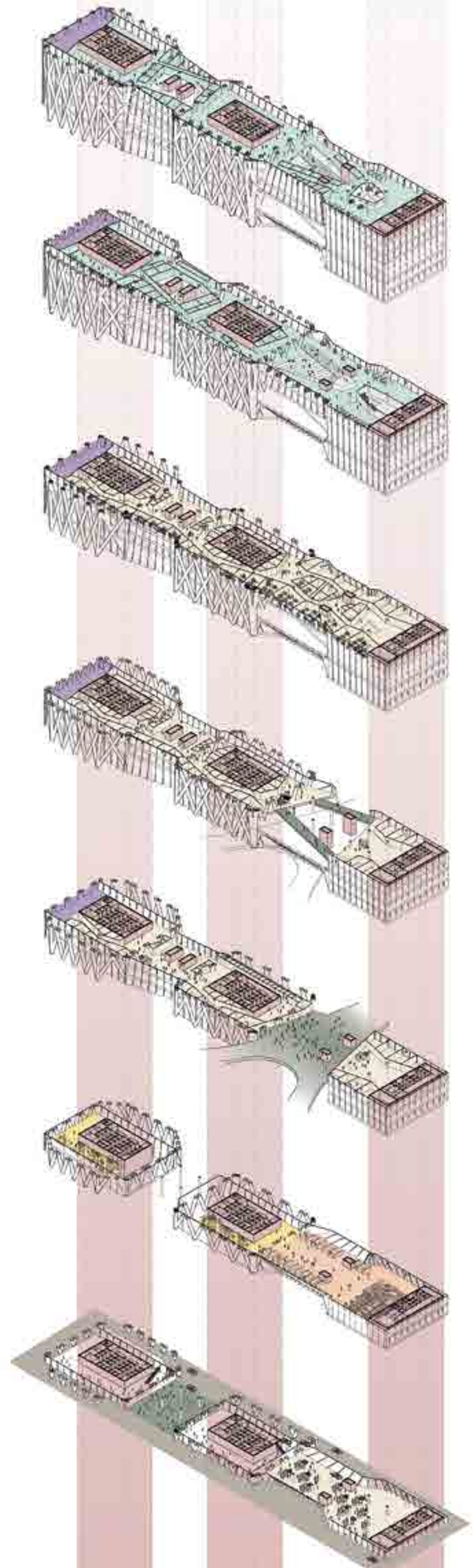
Following the university business incubator (UBI) model in supporting the entrepreneurial development in Thailand. The university business incubator (UBI) is defined as an incubator set up by the university to provide office space, equipment, mentoring services as well as other administrative supports to assist the formation of new ventures.

According to the calculated buildable area, the 100 floors rental office can be constructed to be the new landmark for Siam Square. Despite its height of \_ m, diagrid structural system was chosen with reducing sharp corner as a wind resistance along with consideration of aesthetic in proportion.



Group Project : Isometric of Siam Square.

7th floor  
 6th floor  
 5th floor  
 4th floor  
 3rd floor  
 2nd floor  
 1st floor



Collaborative environment between entrepreneur & students

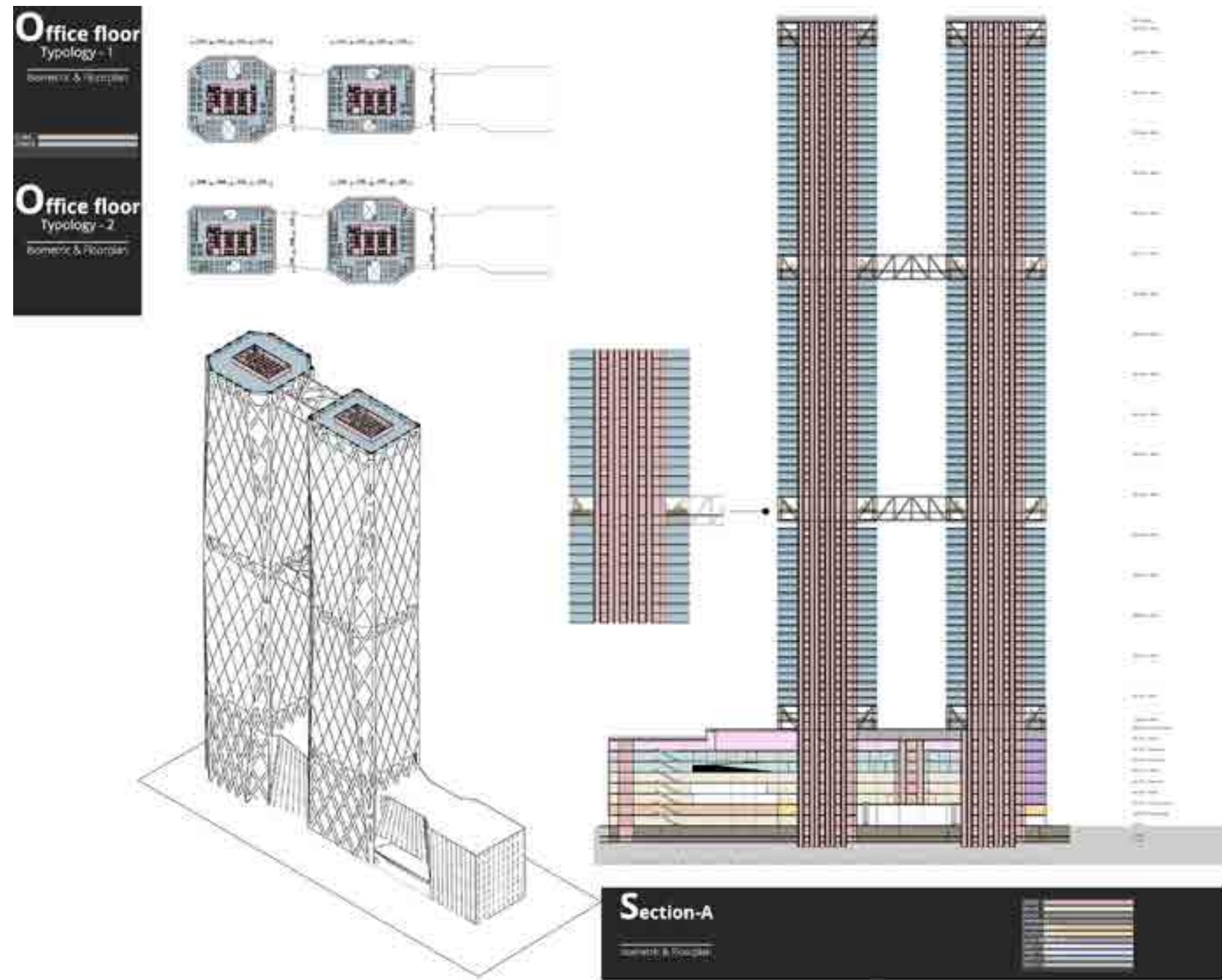
According to the idea of providing a place where ideas and investors can meet, the podium of SiamSpark aims to serve students by provide creative atmosphere for learning (its functions are consisted of library, mediatheque, workshop space, exhibition hall and mini-auditorium) while the rental office tower is a place for entrepreneurs/businesspersons/investors.



The podium also aims to support the needs of twin towers above which has an area of 220,000 m2 per tower which can be considered as a medium size community. Therefore the podium also consists of supported functions mainly in food such as supermarket, marts, restaurants, cafe and retails.

The linkage from pedestrain bridge on the third floor was decided to be a plaza , the fully flexible/adaptable space for every kind of users. For instances, students can perform shows, hold an exhibition while entrepreneurs who work on the tower can come see their works and support them.

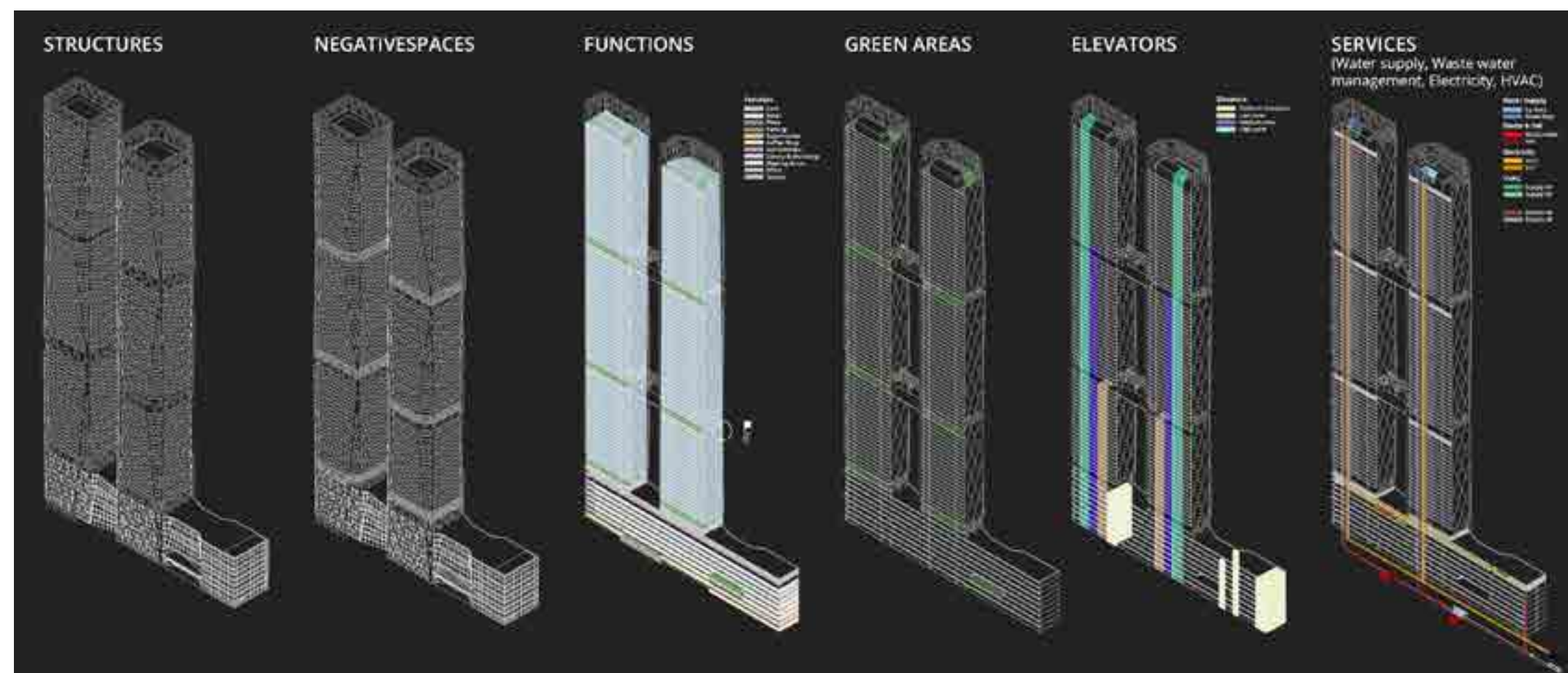


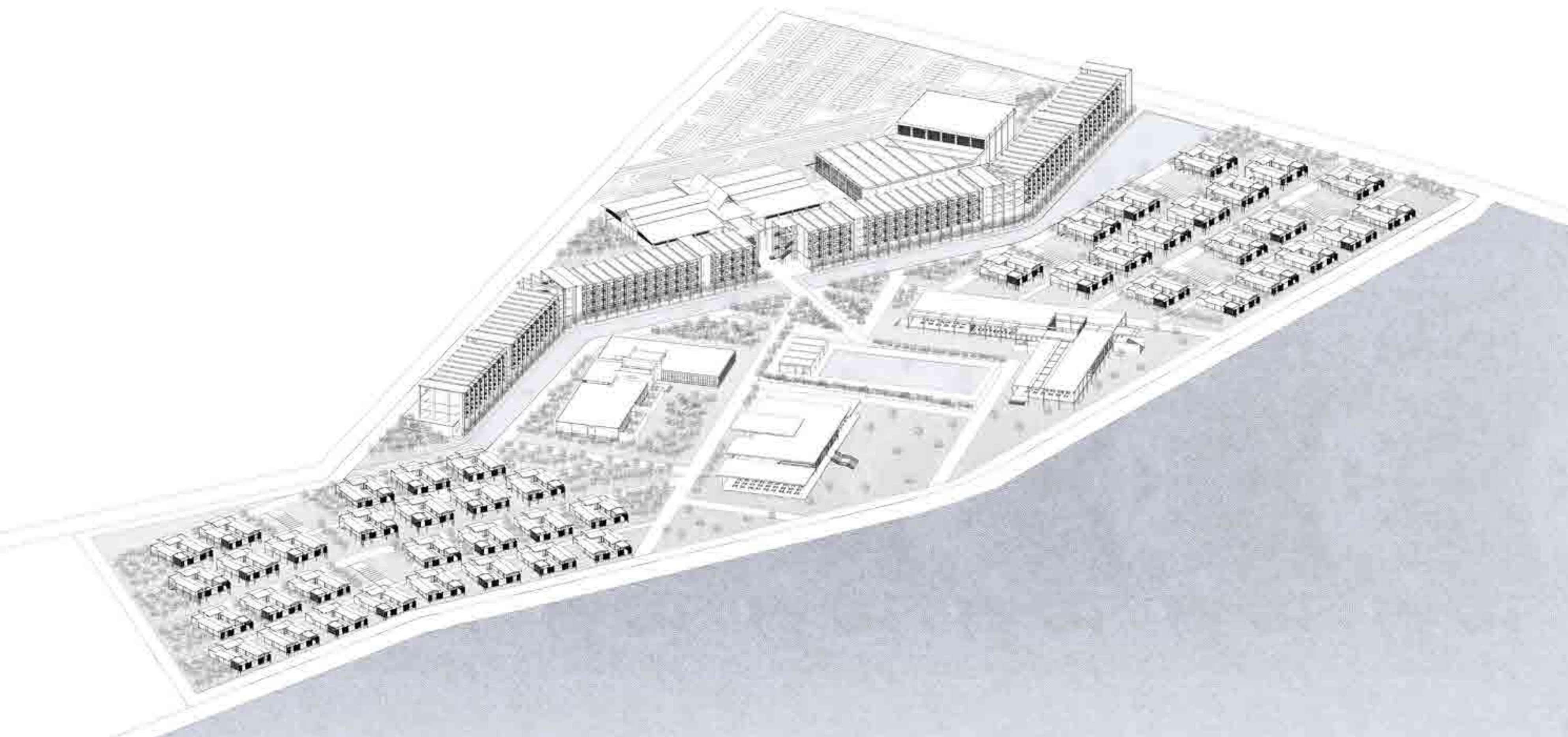


The floor to floor height of 4.5 m can be constructed mezzaine floor in addition to the fixed structure depends on the choice of tenants to provide connectivity between each floors.

The outrigger trusses and belt trusses were placed at each three divisions of the tower's height to fasten the diagrid structures together and adding more resistance to horizontal wind loads.

On each outrigger floors located gardens for tenants to rest or having an informal meeting. It also located sky bridges to connect two towers for both the purpose of providing interaction between tenants and in case of fire emergency.





## KHAOYHAI RESORT AND SPA

**Year:** 2017 (Year4 studio design)  
**Location:** Khaoyhai, Nakhon Rachsima  
**Programme:** Resort & Hotel  
**Area:** 120,000 m<sup>2</sup>

Located on the shore adjacent to Suppradu reservoir in the south, the site already has abundance natural elements such as water, stone and myriad trees sitting on its mild-slope terrain. With the given context the project aims to provide the escape place from the chaos in urban life and remind guests of how nature can heal souls by adjacent the relationship between human - artifacts and nature.

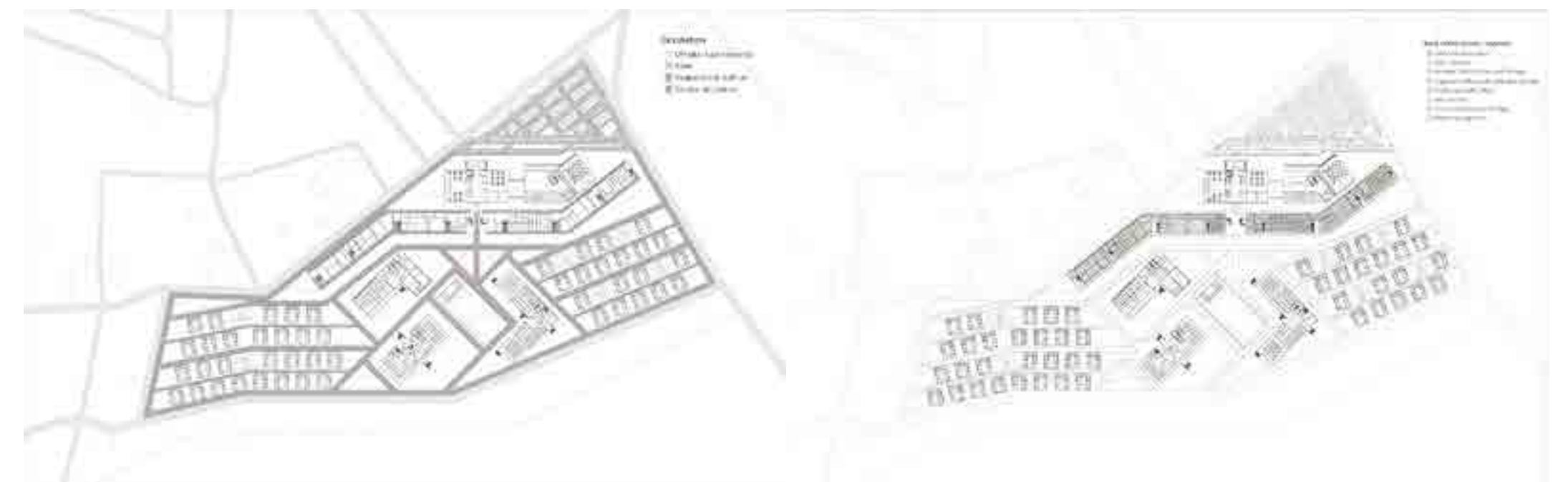
With its existed mild-slope terrain dropped gradually towards the reservoir, I decided to keep its existed contour in its original condition as much as possible thus guests can circulate through the slope and perceive the authentic sense of "hill" which is the characteristic of Khaoyhai. With the site's direction pointed towards the reservoir, each buildings can get the view of the reservoir by the articulation in heights.

I decided to separate the facilities into several buildings and oriented them in different angles related to the site's axis thus the guests can circulate through the facilities enjoying their "little journey" and speculating the reservoir from different directions.



Contour

Figure-Ground



Circulation

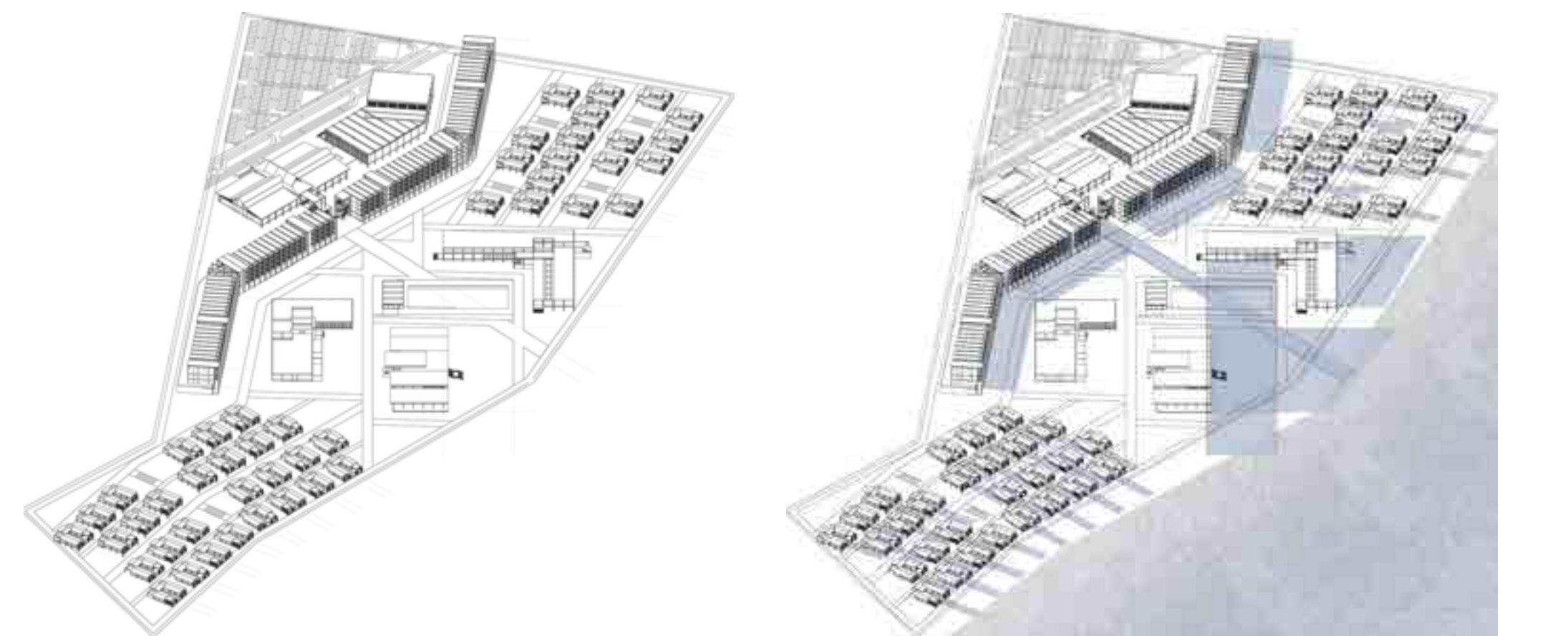
Back of the house



SEC-A ; The articulation in heights indicates aspect from the lobby towards the reservoir.



SEC-B ; The articulation in heights indicates aspect from the hotel and villas toward the reservoir.



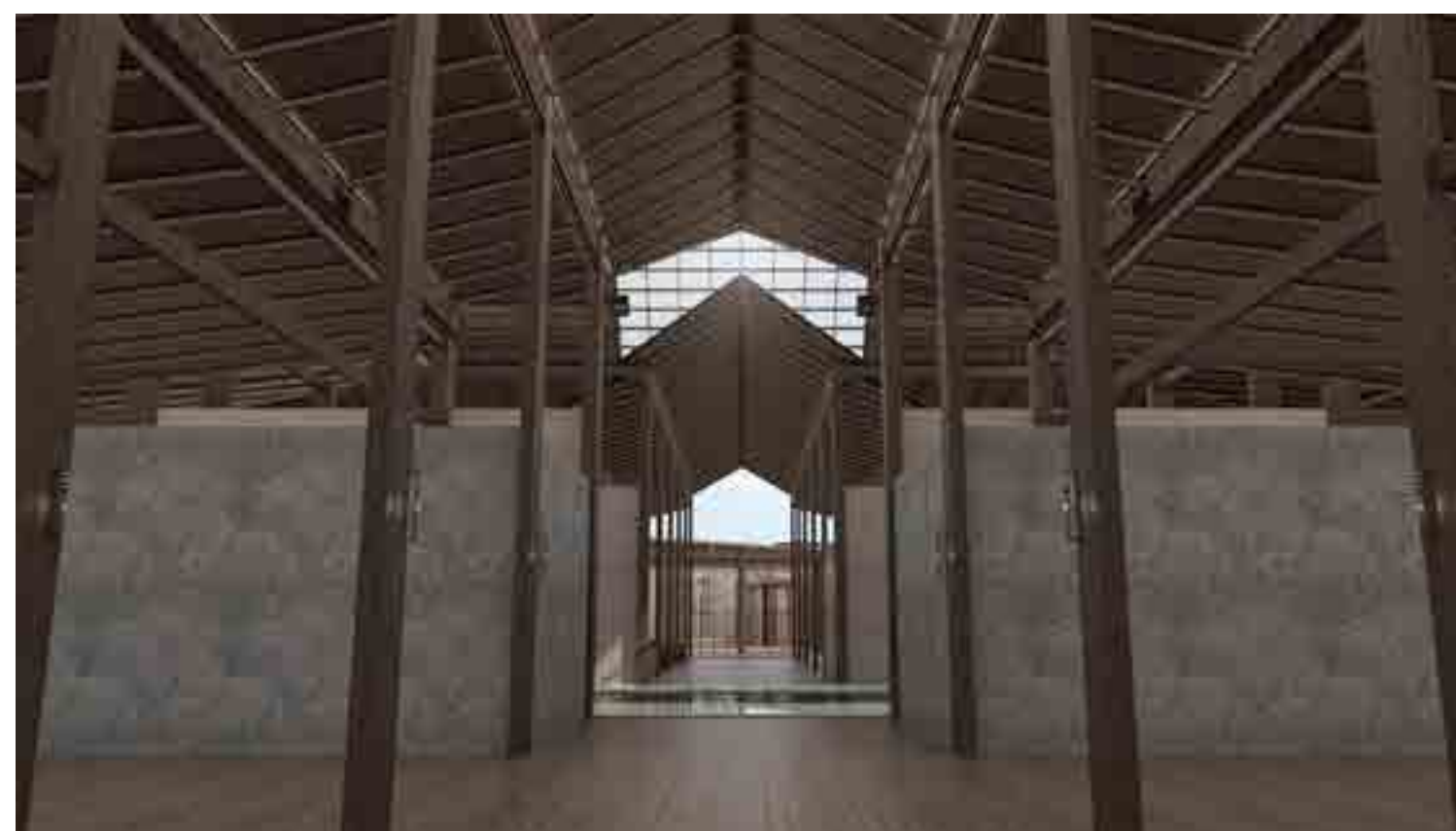
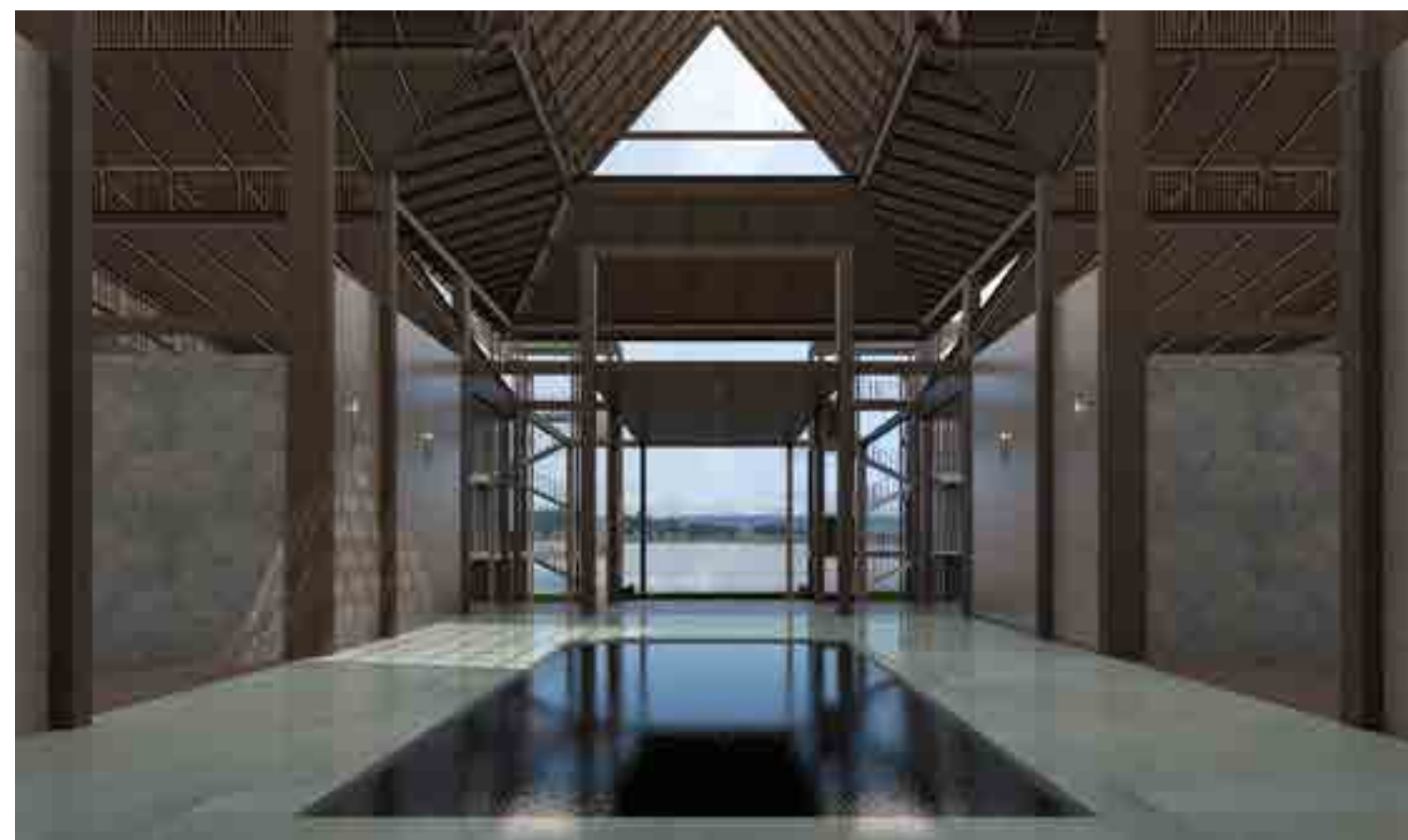
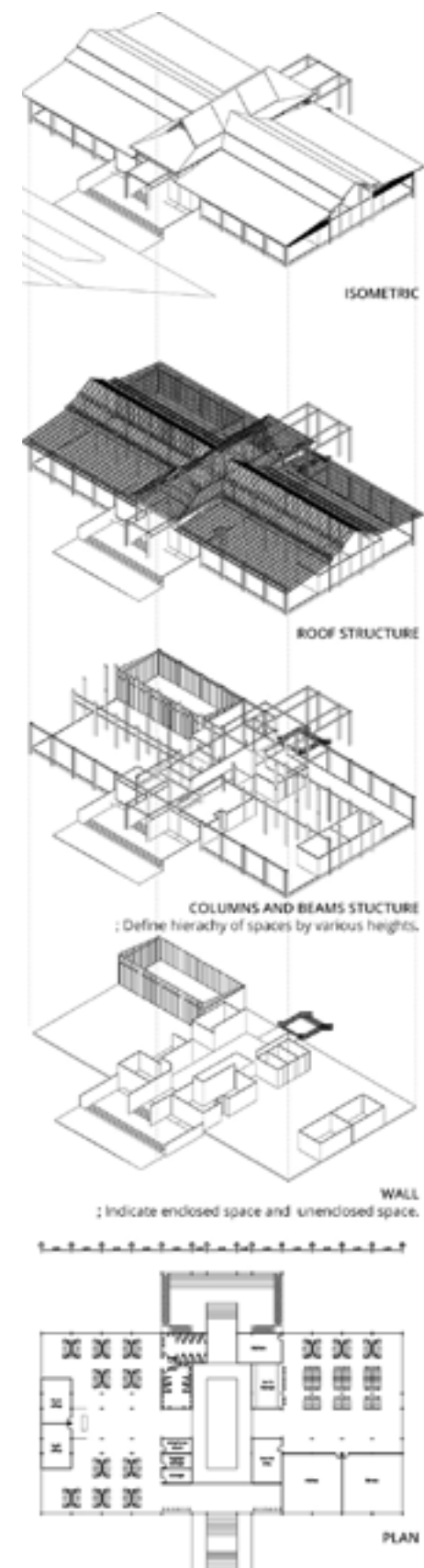
Volume

Aspect

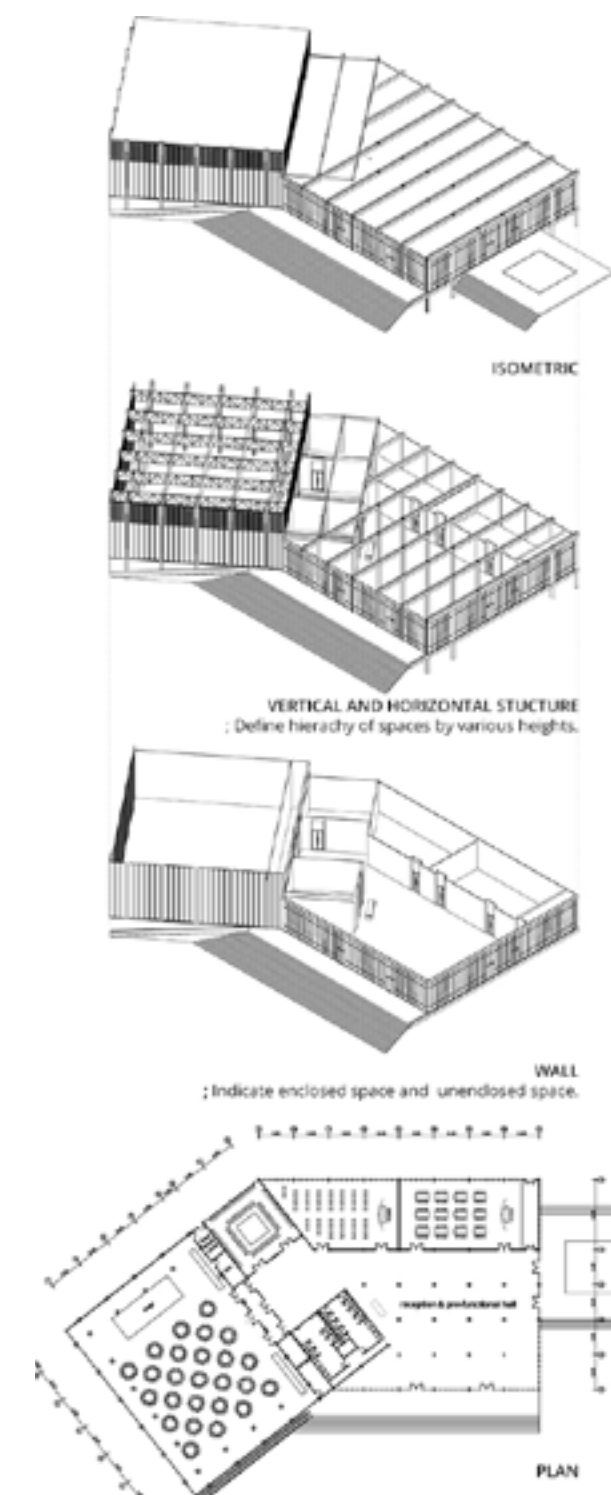




1 Lobby



2 Banquet hall



1 Lobby

Despite its function - welcoming guests, the lobby was interpreted as both the space which gives first impression to the guests and the transition - "the gate" through other facilities. It provides natural ventilated space using collective knowledge of passive design found in Thai vernacular architecture. Its three layers roof covers the space which was defined its hierarchy by its heights - creating the gap between each layers and therefore let hot air that collected in the floor flow out of the building and let the cool air in. Its gable shaped roof also provides another benefit of water drainage.

Its axis in the middle of the plan is pointed towards the reservoir thus guests

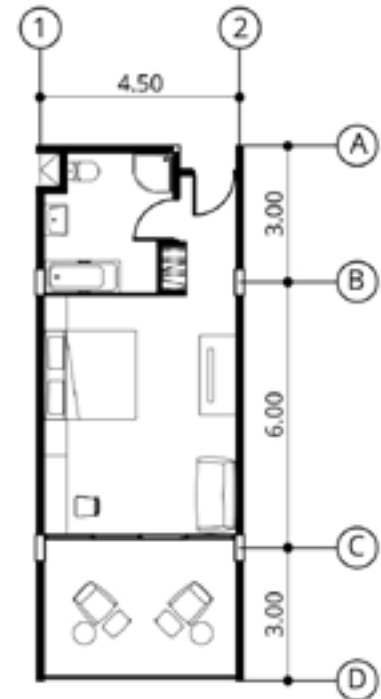
can perceive the characteristic of the site - water, mountains and trees.

2 Banquet hall

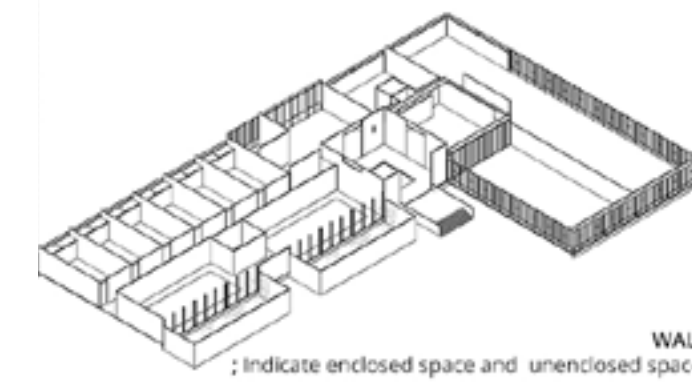
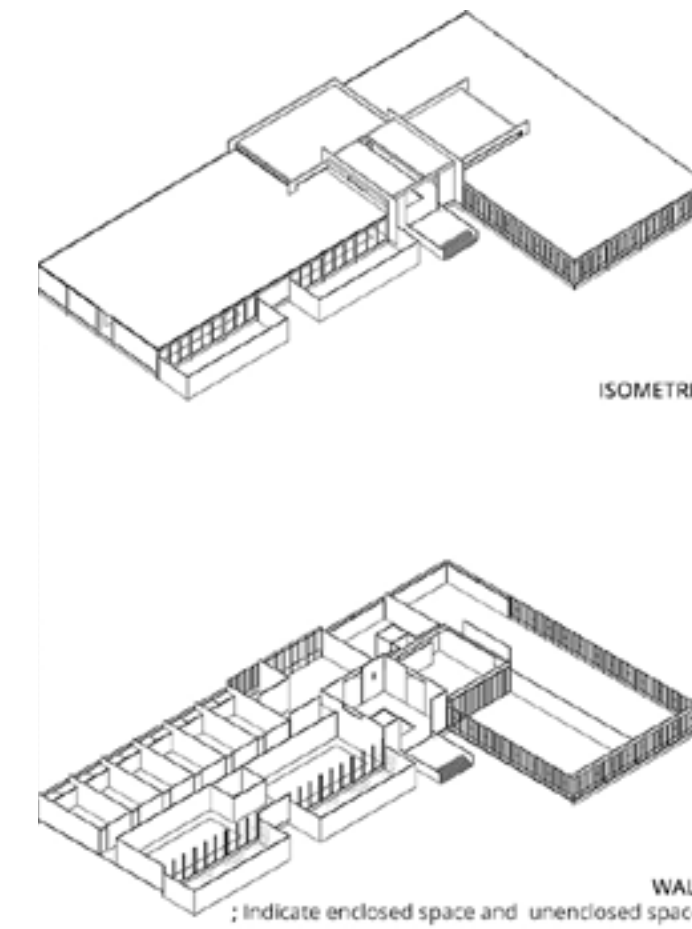
The banquet hall should be accessed with ease so visitors who aren't the guests of the resort can come to the banquet hall without passing through other facilities. Its form is composed by two axis - lobby's axis and hotel's axis with the interlocking technique. Its structures can be specified in two systems - columns and beams (which reinforce prefunctioned hall, 3 meeting rooms and toilets - and trussed structures (which reinforce the banquet hall).



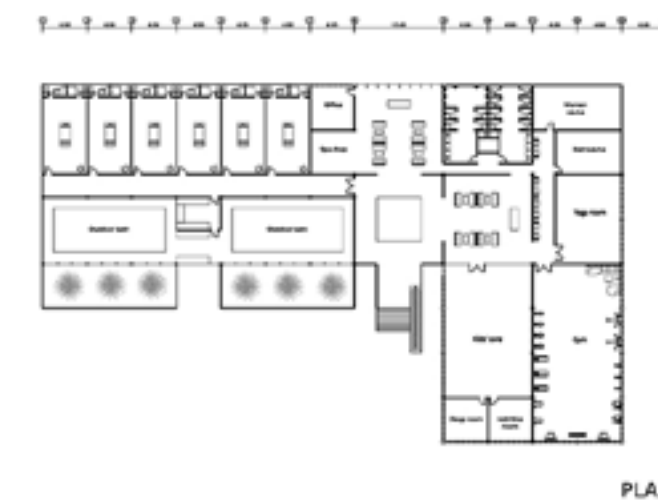
3 Hotel



4 Spa



WALL  
; Indicate enclosed space and unenclosed space.



3 Hotel

The hotel was articulated from 2 axis - the site's northern perimeter axis and the axis parallel to lobby with its units' balcony expose to the reservoir. The ground floor locate the Back of the house which is near other facilities in order to service the other facilities with ease. On the second floor locate the hotel's units on one level height above other facilities and villas thus guests can look over the other buildings toward the reservoir.

4 Spa

The spa building consists of spa and fitness. I specify its functions into two characters - introvert and extrovert. The fitness is the one with the extroverted character thus guests can enjoy outside views while exercising. In contrast, the spa is the one with the introvert character thus guests can cherish their privacy. The spa wing consists of 6 spa units and outdoor bath. The outdoor bath's guests get the tree view inside of the wall while bathing.

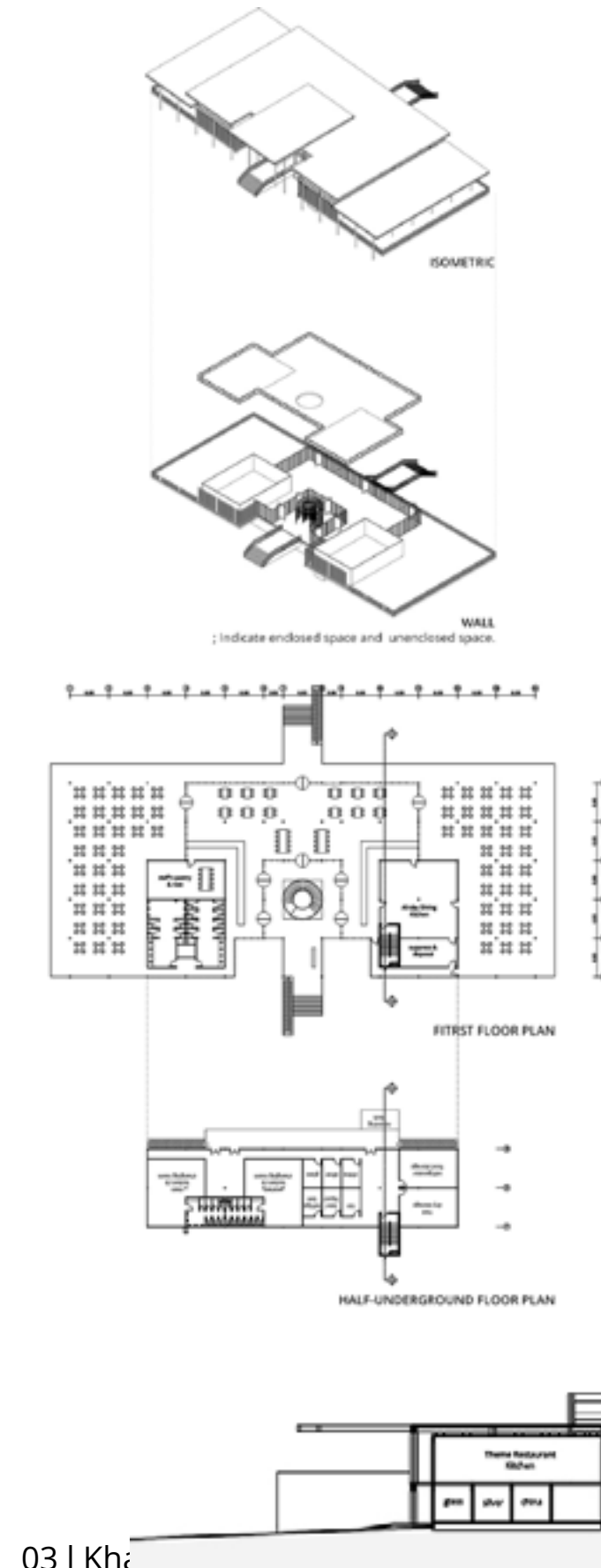




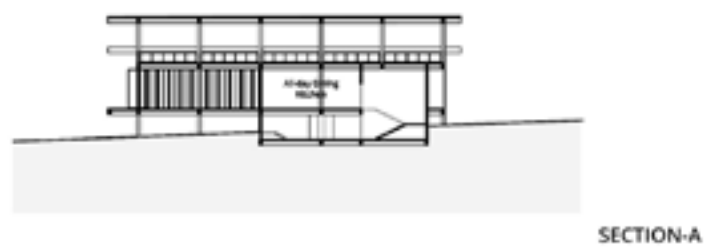
5 All-day dining



6 Themed restaurant



• All-day dining section

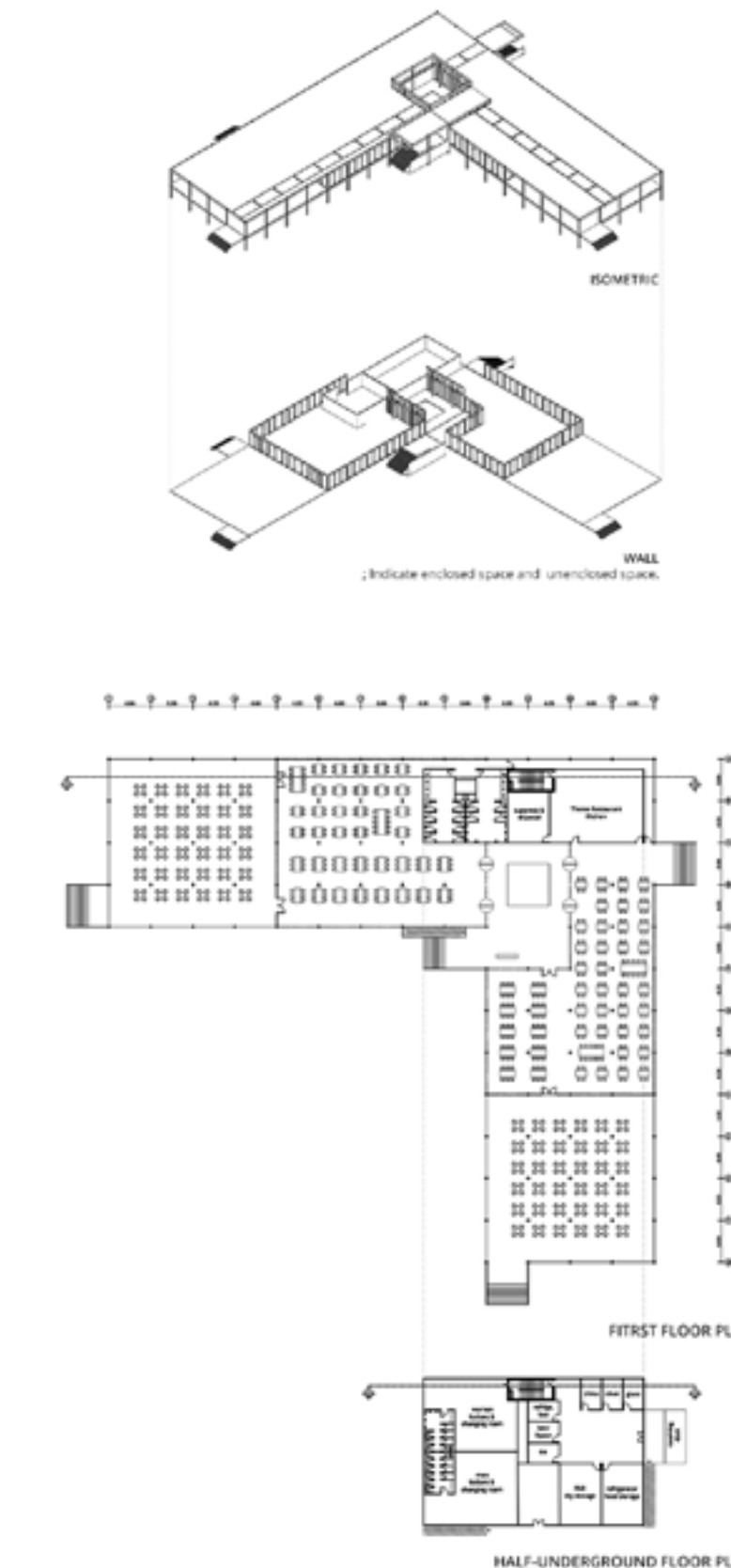


• Themed restaurant section

3 All-day dining  
4 Themed restaurant

All-day dining and themed restaurant have correlated concept and system. According to its extroverted character, their longitudinal side should face the reservoir in order to expose the spectacular view of the existed reservoir, mountain and trees.

They both have 3 main functions ; dining, kitchen and staff utility. Exploting the contour of the site, each building's staff utility is embed half-onground-underground to conceal its body from the eyes of users while providing easy access to staffs. Both have stairs which connect to the first floor's kitchen.

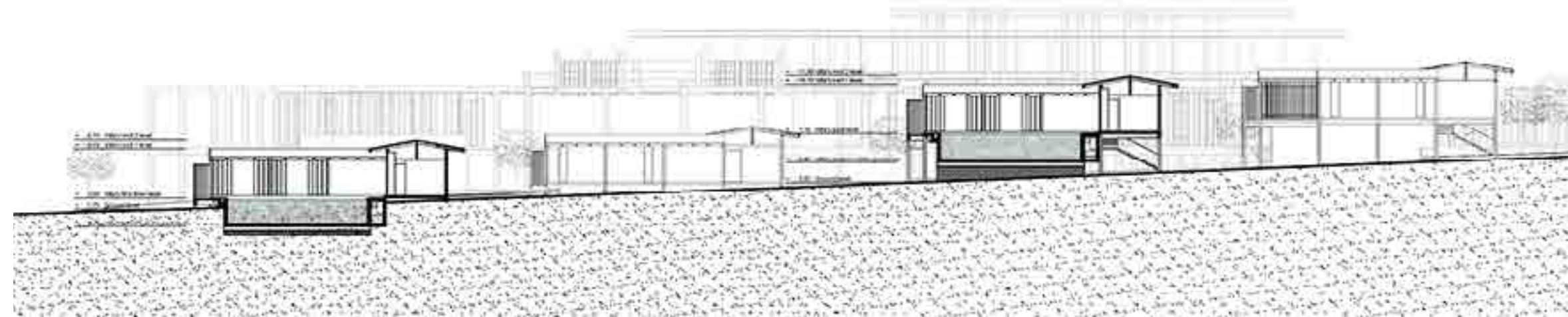




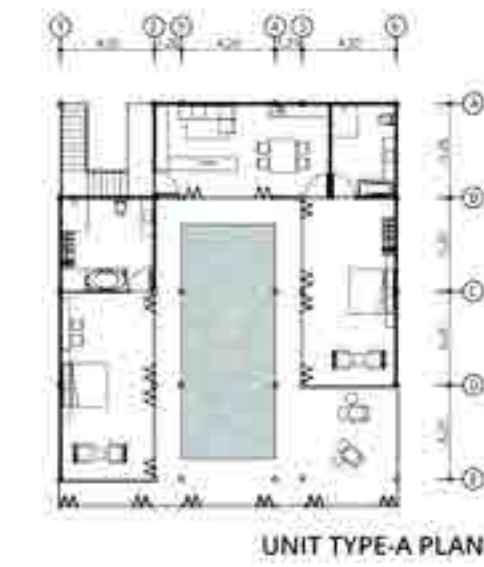
**8 Villas**

All 47 villas were shifted in both plan and section with its direction point towards the reservoir thus the aspect from the living room are 2 layers of water - the pool and the reservoir. The plan was divided into three zones with the pool in the middle. Living room

and two bedrooms have glass folding doors which connect to the middle corridor, when it's opened, boundaries between inside and outside are blurred turning the rooms into a large open space. When it's closed, the boundaries are set when guests want to have privacy or HVAC. Main materials are wood and stone to reduce carbon emission in construction and correspond to the site's existed materials.



**8 Villas**



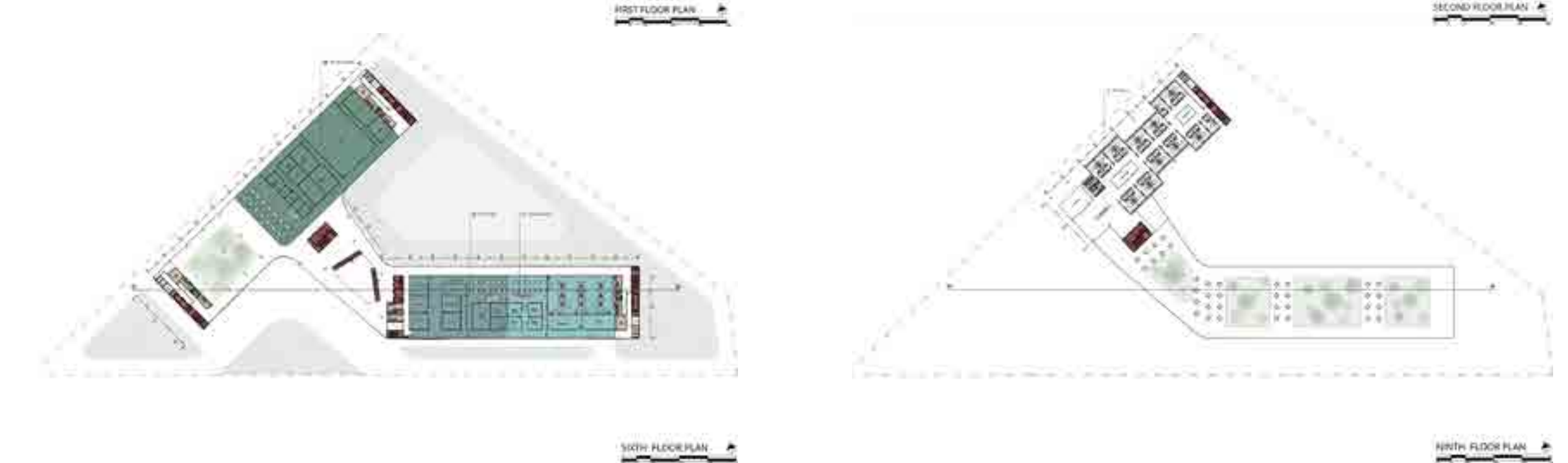
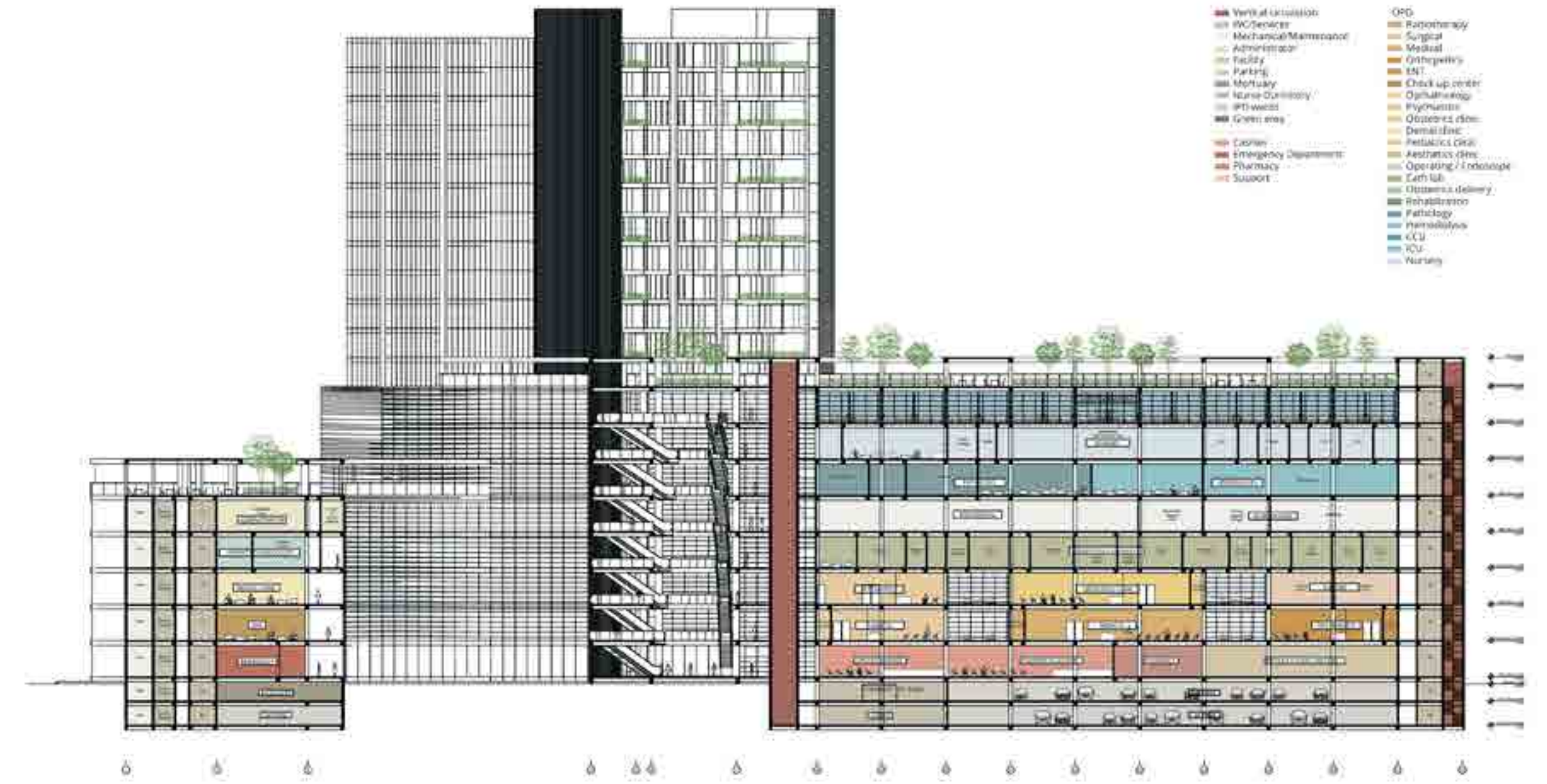


# GENERAL HOSPITAL

**Year:** 2017 (Year 4 studio design)  
**Location:** Ngamwongwan, Bangkok  
**Programme:** Hospital  
**Area:** 16,000 m<sup>2</sup>

According to the complexity of functions in hospital, the project aims to systematize its functions in the perspicuous way possible thus patients can circulate through each functions without getting lost ( which is the most founded problem in hospital and can be resolved by the architectural management).

Moreover, the project also aims to encourage patients to get better by environment. Good environment is one of the factor leads to good mental health. What mean by "good environment" leads to nature. Despite its benefits in scientific aspect, it also benefits human in psychological aspect. Studies have shown that patients with views of trees out their windows heal faster and with less complications. Children with ADHD show fewer symptoms when they have access to nature. Exposure to trees and nature aids concentration by reducing mental fatigue.



The setting of the hospital was adjusting in coherence with the triangular edge of the site. Instead of combining the negative space into one insignificant large space, I decided to divide them into two appropriated size space to be two green sustainable spaces - two gardens with two characteristics - exposed and enclosed.

In term of functions management - the emergency room can be accessed with ease from the main drop-off in case of emergency, patients can enter the emergency room independently at night without passing through other functions.

On the sixth floor located roof garden adjacent to the rehabilitation for both rehabilitative patients doing rehab and OPD patients. On the ninth floor located the other roof garden, despite its intention to mainly serve IPD patients, OPD patients can access to the garden by passenger elevators.

The IPD ward is articulated in two systems according to levels of illness of the patients - Bed-ridden patients

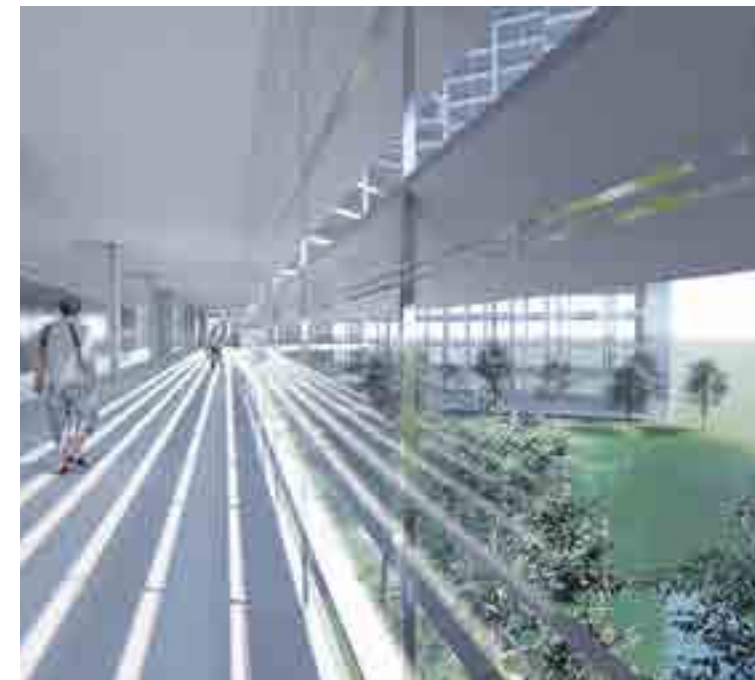
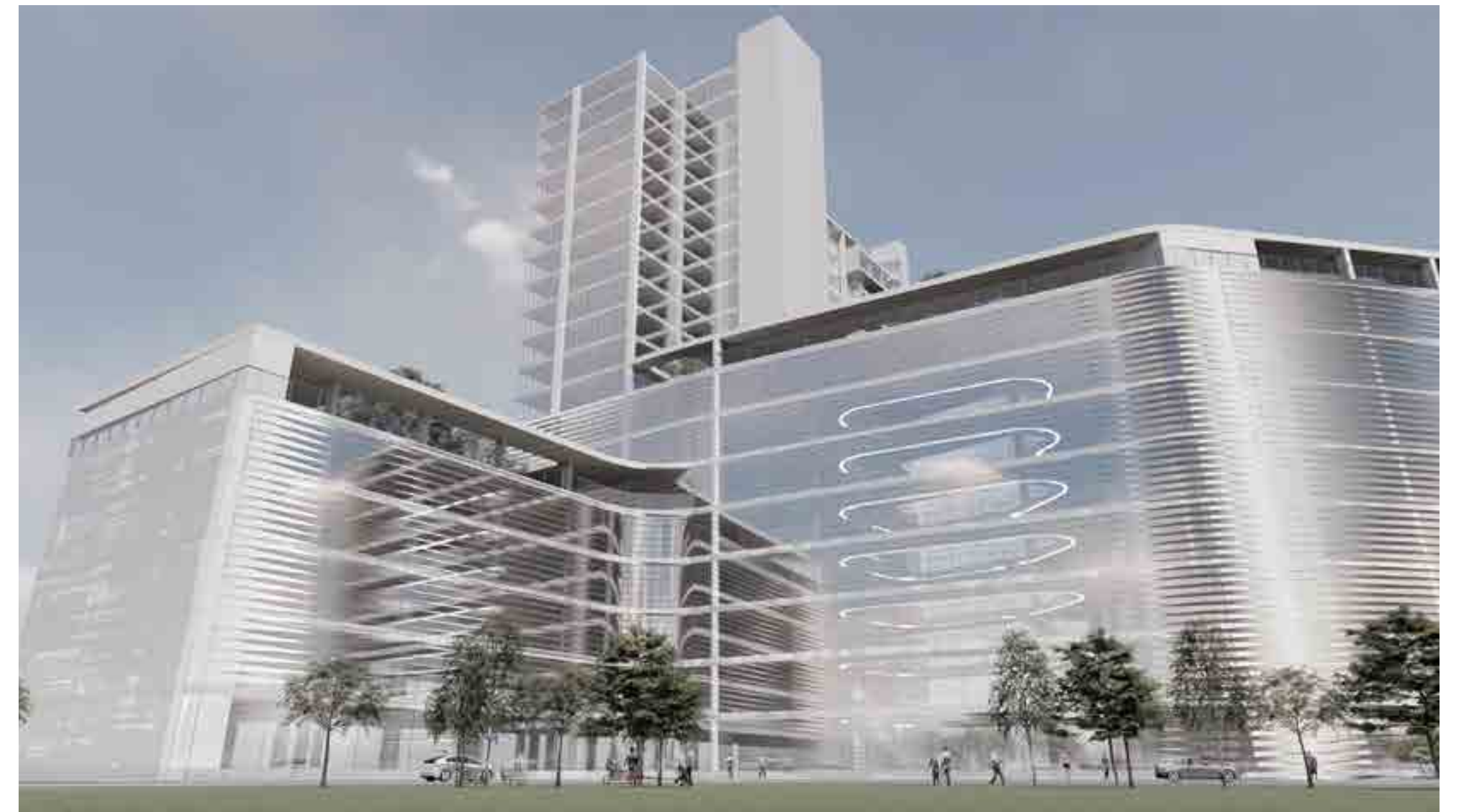
and general IPD patients. The bed-ridden patients need deeper level of care from nurses while the general IPD patients need good environments to be cured faster as I mentioned previously. The bed-ridden patients' ward is arranged with the nurse station and nurse lounge at the center thus nurses can service the patients in a facile manner while the general IPD ward is placed on top of the first one in order to get space for plantations.





The exposed garden at the front of the site adjacent to the main road gives the impression of welcoming rather than encompassing and also acts as a buffer of pollution and the crowdedness from the road while the enclosed garden gives more private senses according to its setting which is enclosed by the building from the road.

The central hall is a transitional space between each wings, it also acts as a point of reference to prevent patients from getting lost





## THAI EMBASSY IN VIENTIANE

**Year:** 2017 (Year 3 studio design)  
**Location:** Vientiane, Laos  
**Programme:** Embassy  
**Area:** 3,000 m<sup>2</sup>

In spite of its modern functions of embassy (offices, exhibition space, ambassador's parlor, meeting rooms, banquet hall and services), the embassy's appearance should represent the country's identity. There came a question, What is Thai architectural identity? and How that can be interpreted and reconstructed in the context of 21st century contemporary society we all live in?

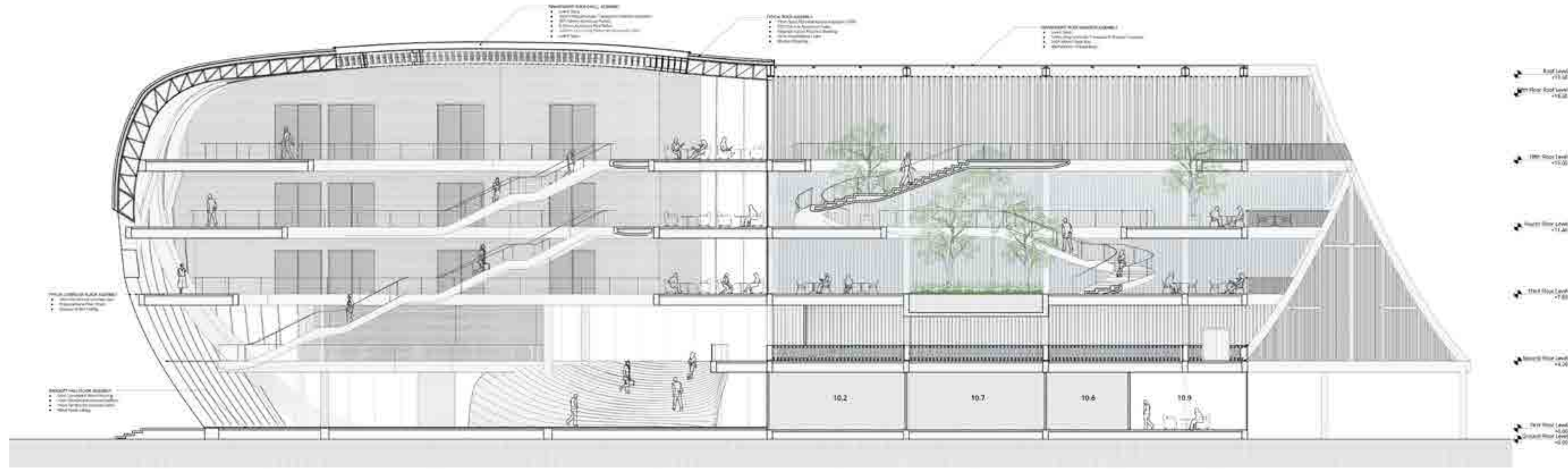
In our era with the rapidly increased technology in construction, is it our responsibility of us as an architect to express and highlight the achievement of constructional technology? Woven with a glimpse of the past, creating the building which is the landmark in time of our era. Therefore, fluidity came into the picture, is fluidity the answer, expressing the liberation of ideas and representing the achievement of constructional technology in the 21st century era?

The project aims to create different types of space for different types of users : visitors, guests, employees and staffs. All types of space must be created in the consideration of propriety and delight.

Moreover, the idea is to ensure that each scenes experiences by users are embed with the echo of the past. In spite of seeking an image in coherence with the aesthetics of the new millennium, the bases and foundations of my project respond to the traditional architecture of Thailand.

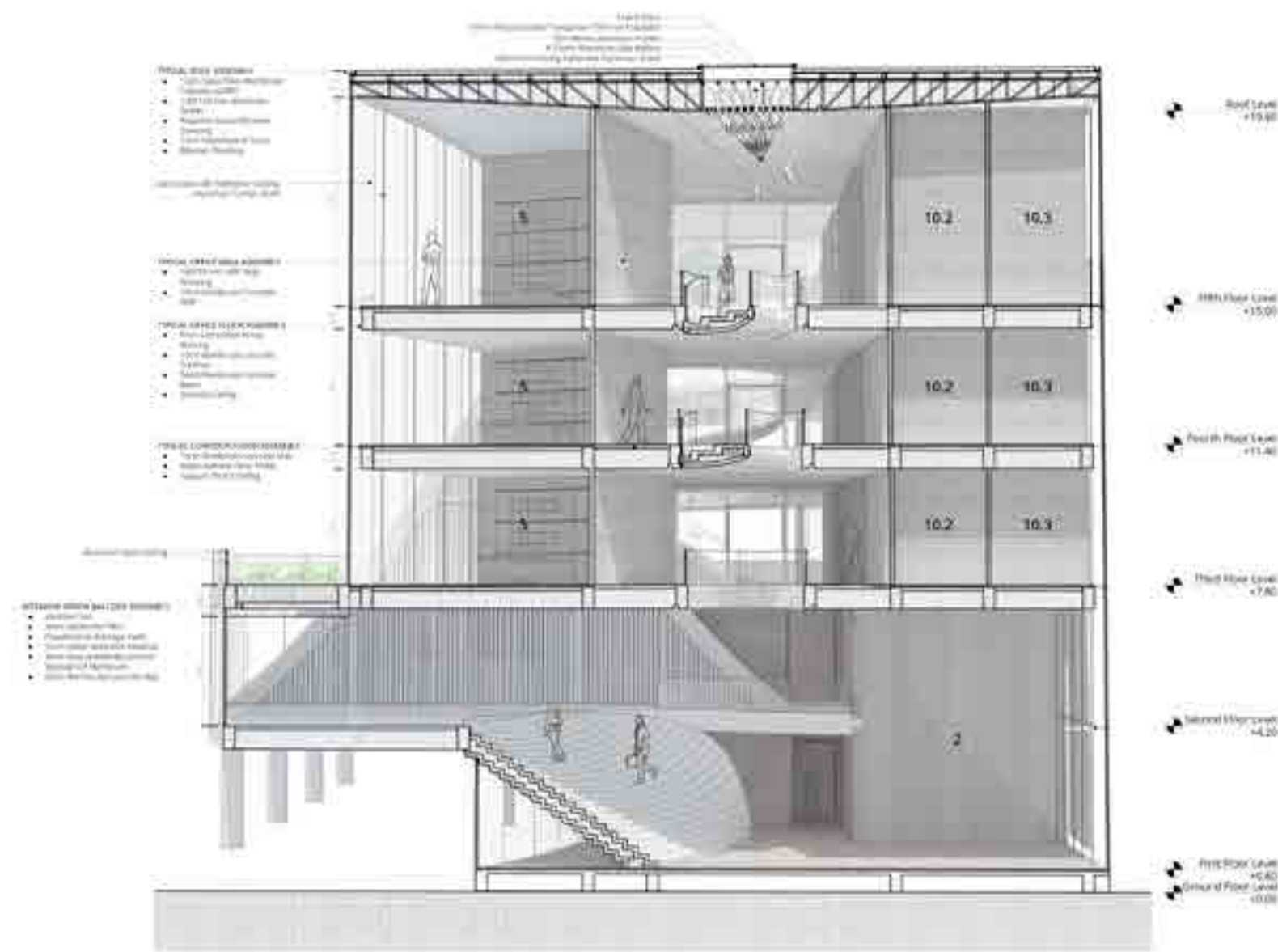






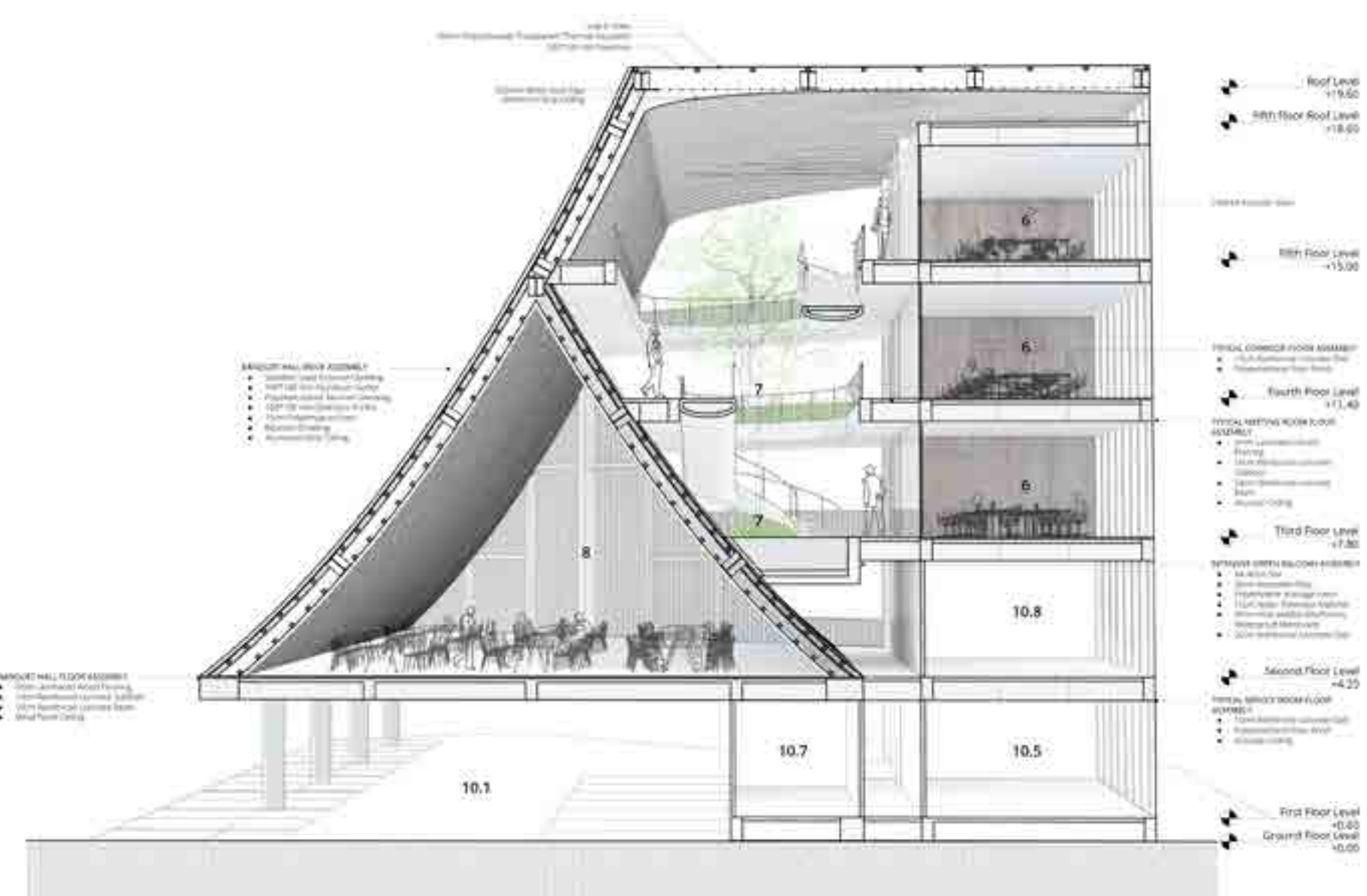
• SECTION - C

Indicates how each functions are arranged and connected. It shows 2 coherent wings of the building, the north wing comprises lobby, exhibition hall, Thai room and ambassador's parlor, offices and informal meeting space which is a transition to either outdoor garden or the south wing which locate semi-indoor garden. The south wing comprises meeting room, informal meeting space and semi-outdoor garden.



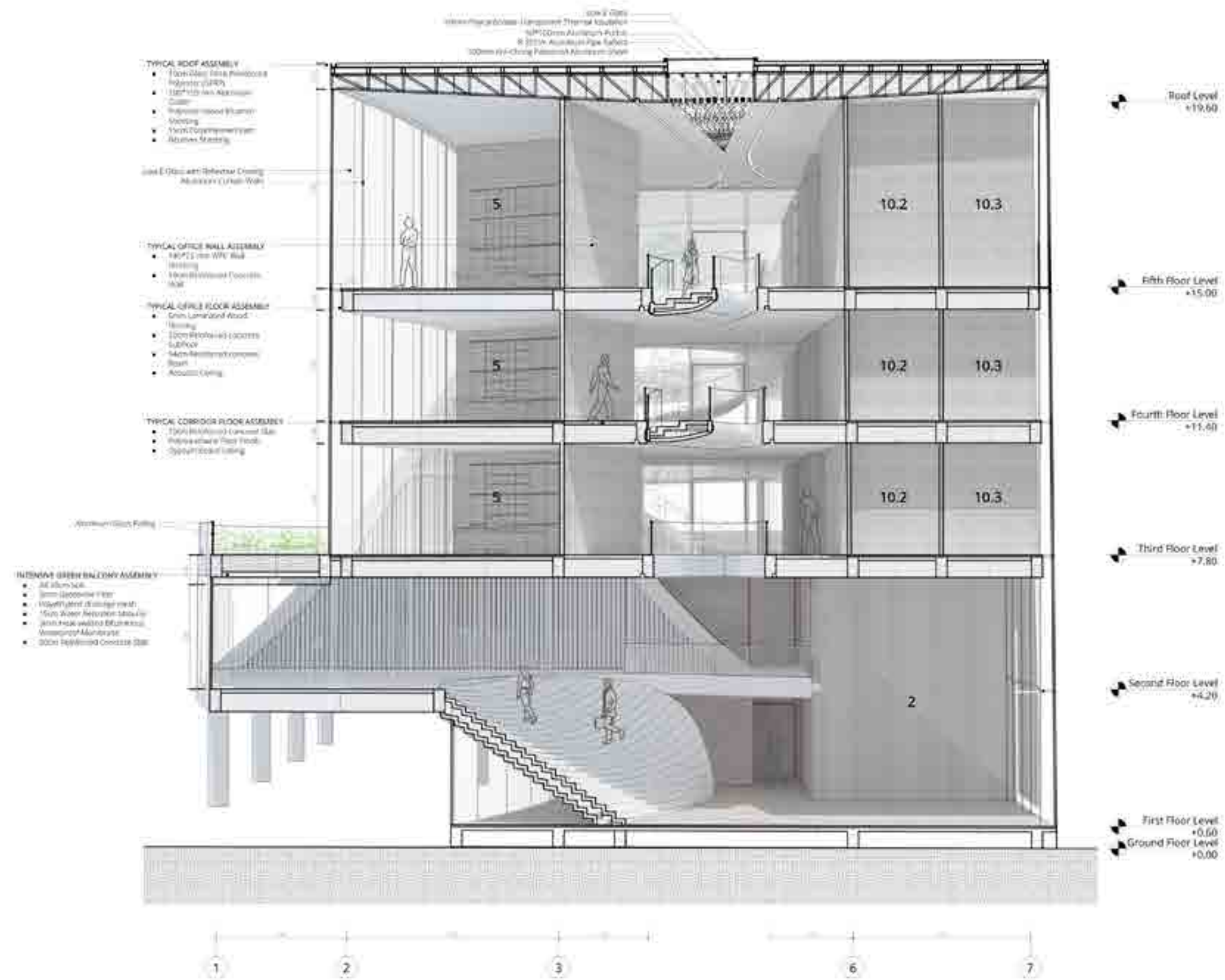
• SECTION - A

Indicates the north wing which is located 5 levels height atrium. The atrium has skylight in the middle which was made to exploit the benefit of natural light. In functional aspects, the first floor of the atrium consists of lobby, exhibition hall, showcase space and large stairs which connect to prefunction area of banquet hall on the second floor. Aside from that, the second floor in the north wing consists of Thai room and ambassador's parlor. On the third to fifth floor in the north wing located offices, informal meeting areas, pantries, storages and maid's room. Each floors are connected by stairs to encourage physical movements of employees.



• SECTION - B

Indicates the south wing which can be perceived in 2 parts, banquet hall and meeting zone. The banquet hall on the second floor represent Thai architectural identity by the use of catenary curve in its form. The meeting zone on the third to fifth floor consists of semi-outdoor garden which is adjacent to meeting rooms. On the west side of the first and second floor located services and mechanical rooms. The kitchen was placed on the west side adjacent to the banquet hall because of the ease in service.



**ATRIUM : LOBBY, EXHIBITION HALL, OUTDOOR GARDEN, OFFICES**

The large space on the first floor is lobby and exhibition hall which can host different type of exhibition or installation flexibly. Visitors can access to banquet hall, prefunctional area, Thai room or ambassador's parlor by the large stairs which is locate at the back.

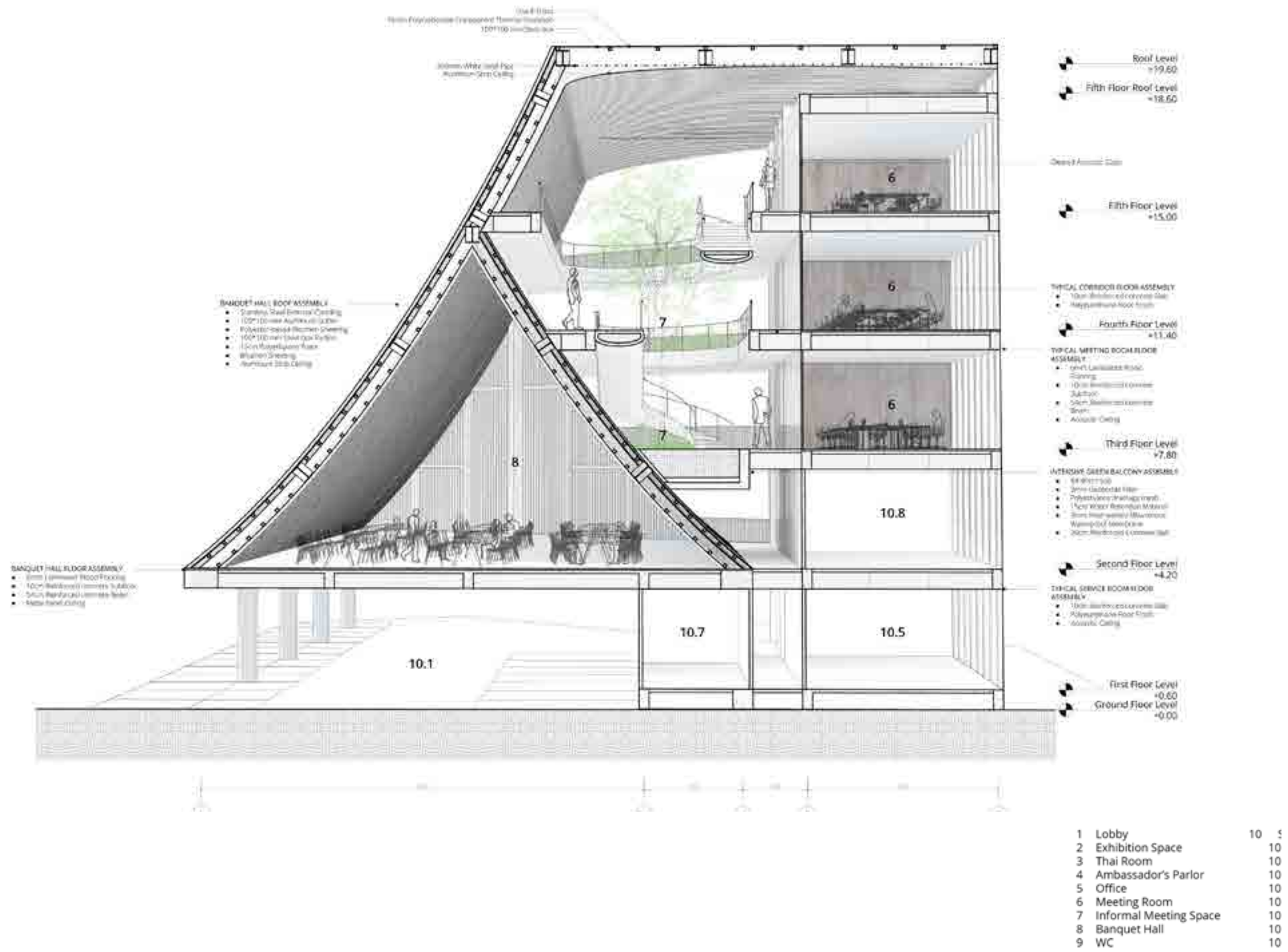
Unlike typical office, each floors are physically connected by stairs to encourage physical movements of employees in order to prevent lack of movement which causes diseases such as office syndrome. Its location can be accessed easier than elevator to mentally incentivise employees prefer using stairs than elevator.

Outdoor garden is located on 3rd floor, can be accessed through informal meeting areas. In spite of its environmental virtues it also

act as an insulation and shading device for offices.

I decided to exploit the benefit of natural sunlight. Typical employees normally spend 8 hrs a day indoor, in spite of their choice to spend time outdoor during the break relaxing under the real sky, the harsh sunlight in Vientiane obstruct those desires completely. Therefore I decide to make skylight thus the sky and natural sunlight can be seen indoor. But the heat still needed to be treated delicately. Thus the skylight is composed of 3 main layers of insulate materials (excluding its structure) : 2 layers of insulated glass and 1 layer of perforated aluminium. The last insulation is performed in Kra-chung pattern to perpetuate Thai pattern and represent Thai identity.





**SOUTH WING : BANQUET HALL, SEMI-OUTDOOR GARDEN, MEETING ROOMS**

The south wing consists of 2 parts, banquet hall and meeting zone. The banquet hall on the second floor represent Thai architectural identity by the use of catenary curve in its form. The meeting zone on the third to fifth floor consists of semi-outdoor garden which is adjacent to meeting rooms. The excessive heat comes with sunlight was treated by the use of materials in 3 layers ; 2 layers of insulated glass resisting excessive heat and rain while remaining transparent and 1 layer of stripped aluminium as shading devices.

The semi-outdoor garden can be adapted flexibly according to its users. Natural ventilation can freely flow through the garden creating sense of naturalness to employees.

On the west side of the first and second floor located services and mechanical rooms. The kitchen was placed on the west side adjacent to the banquet hall because of the ease in service.





## PRUKSA REAL ESTATE LOW-RISE CONDOMINIUM

**Year:** 2016 (Year 3 studio design)  
**Location:** Chokechai 4 Road, Ladprao, Bangkok  
**Programme:** Low-rise condominium  
**Area:** 8,000 m<sup>2</sup>

The programme was given by Pruksa real estate to design low-rise condominium which consists of 144 residential units/ retails/ swimming pools and 64 cars parking. The objective of this design is to establish well being conditions for the residents physically and mentally.

According to the study of "Well-being concepts" by CDC. What to be considered as "well being conditions" can be clarify and differentiate in 9 aspects, some of them are too personal to be encouraged by design. Hence, I select 6 aspects to be the main considerations of the project including

- Physical well-being.
- Social well-being.
- Development and activity.
- Emotional well-being.
- Psychological well-being.
- Engaging activities and work.

Therefore, these considerations can be interpret in several ways. During the architectural execution, discursive strategies appeared. One strategy in this project can be related to different well-being conditions. For example, biophilic design can be turned into execution by adding more green spaces which reinforces all-encompassing three considerations including physical, emotional and psychological well-being.



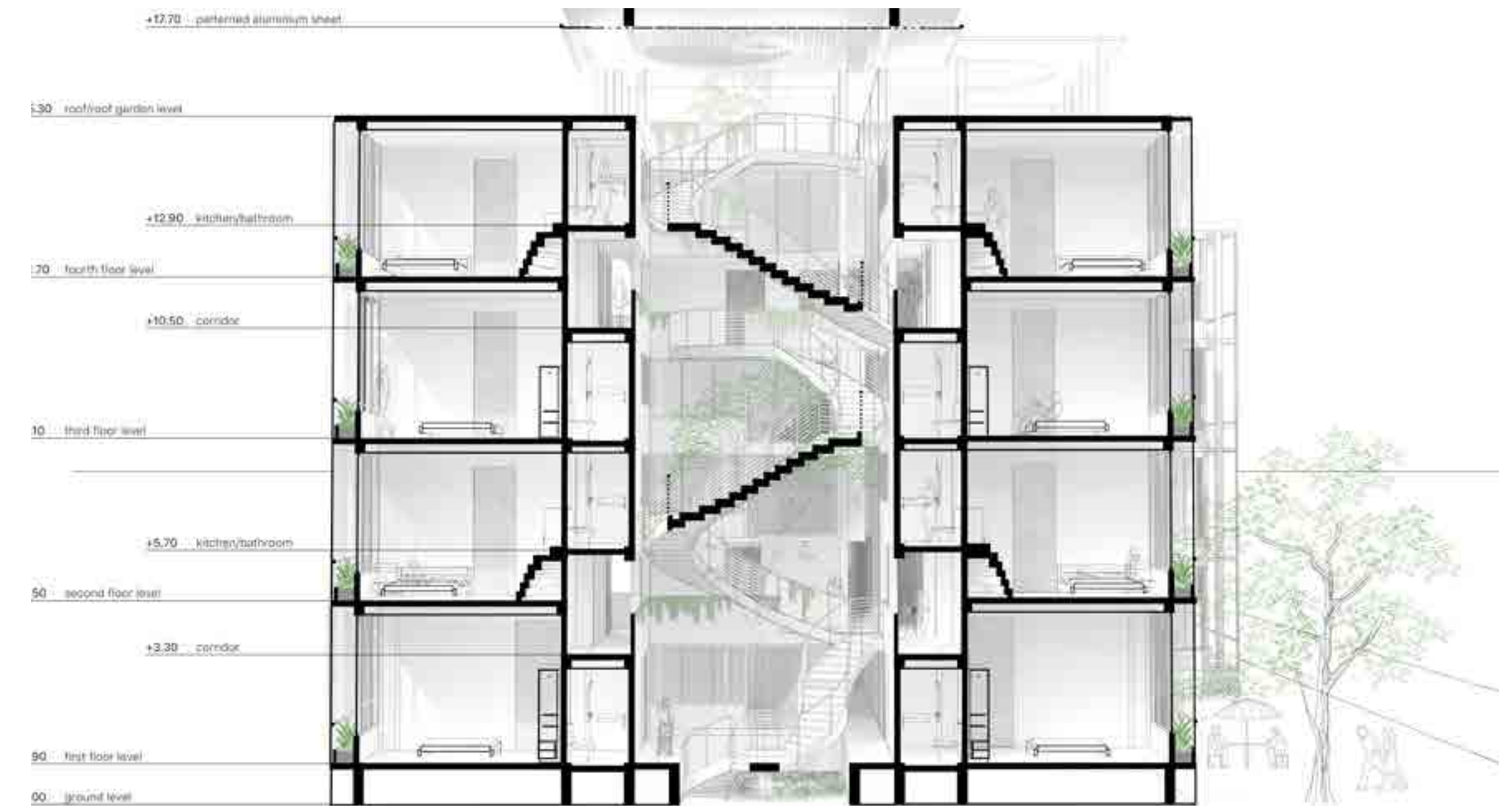
### STRATEGY

This diagram shows the process of selecting/ dividing and shifting. The long rectangle space is divided to 3 parts, shifting to create dynamic in both landscape and views then sub-shifting the units into two clusters with centered green spaces and corridors.

### CIRCULATION

Each types of circulation has it own benefits. But the one that reinforce the considerations of the project the most is centered corridor. It provides centered shared space which can be adapted to be all-encompassing green space (for physical, emotional and psychological well-being), flexible space for communications (for social well-being, engaging activities and work) and main stairs (Physical well-being).

Therefore, this type of circulation wastes large amount of corridor area thus there have to be the answer to solved that problem.

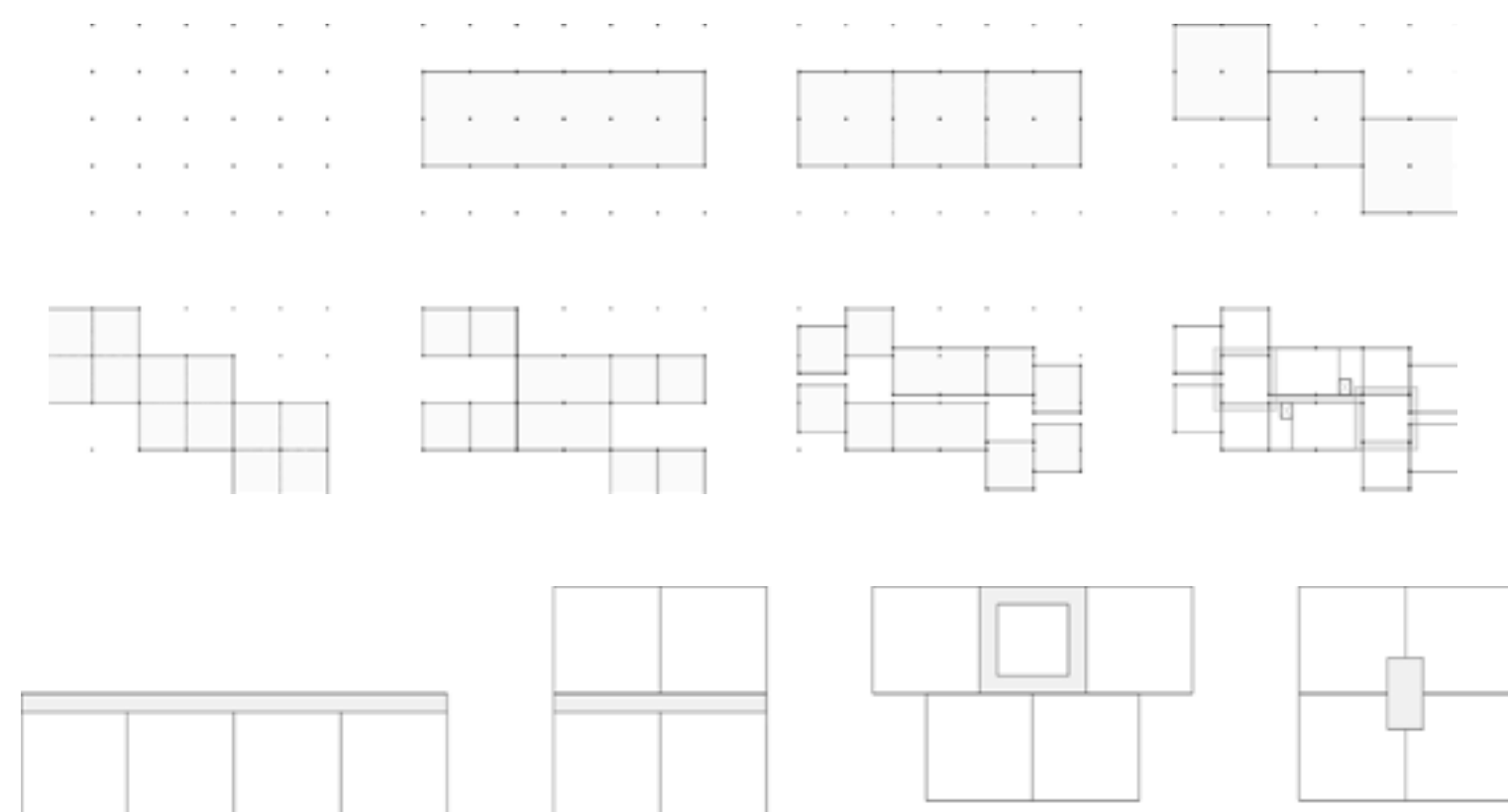


Each functions of each unit have different heights, services consist of kitchen and bathroom have the floor to floor height of 2.4m while living spaces consist of living room and bedroom have floor to floor height of 3.6m. The different heights stacking each others to be main corridors.

In the period of the so-called Russian Constructivism, OSA group architect Morsei Ginzburg had designed Narkomfin building, a block of flat which has genuinely "shared" corridor. There are five inhabited floors, but only two corridors on second and Fifth level (an apartment split between third and second level connects to the second floor corridor, etc.) and maximum the use of spaces to 100%.

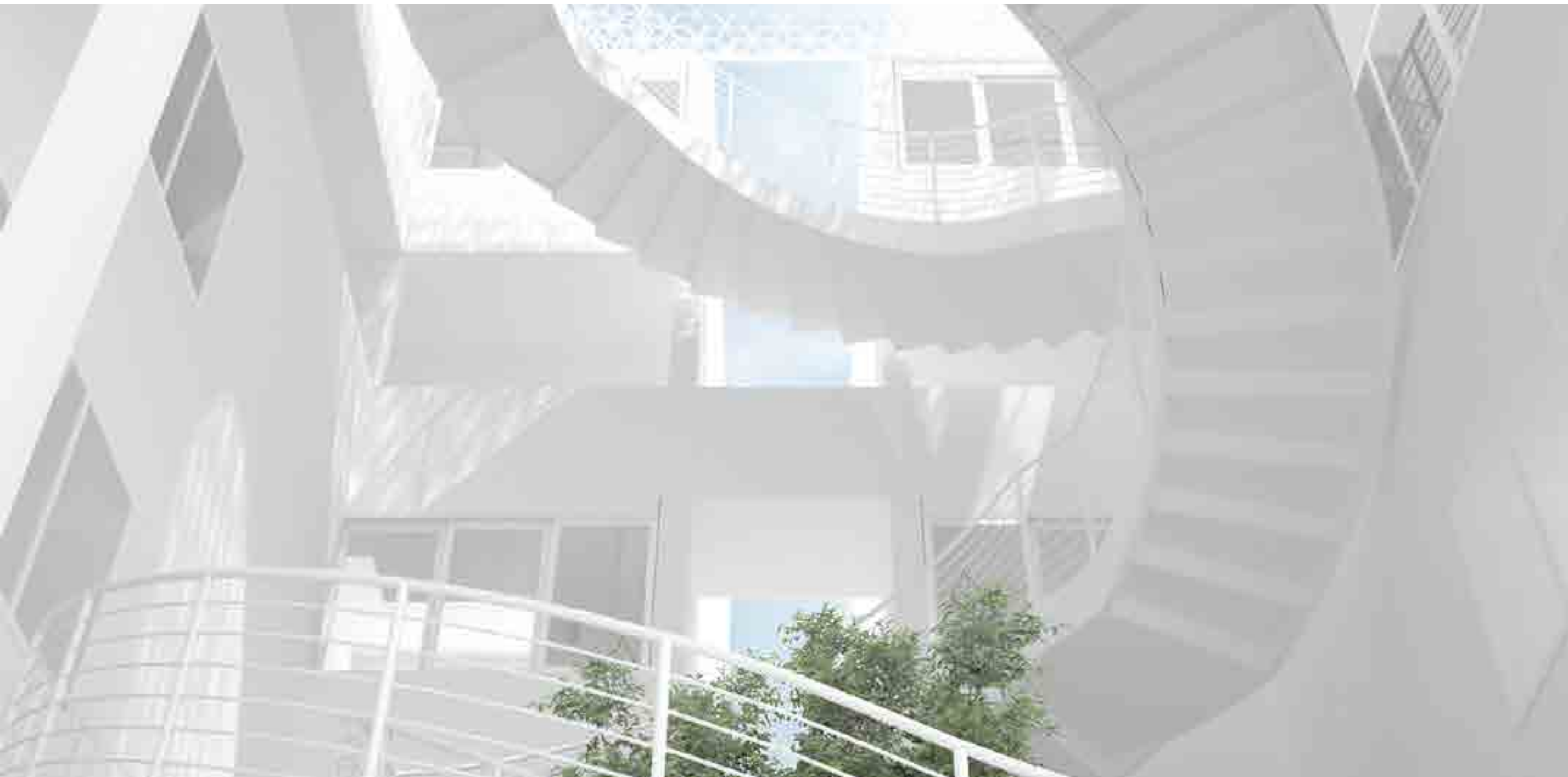
The main concept is not to see the corridor as an added space from units anymore, but to see it as a negative spaces of the whole picture, transform to methods by subtracting the whole spaces vertically. This concept can lessen the corridor areas by 25% of typical centered corridor (first floor's units which contain no steps should be provided for disable residents) while providing the benefits of centered corridor and encouraging physical activities of residents by walking up/down the steps to get into the room. (except first floor units for disable residents).

Moreover, this method makes it enables for the units to have windows at the corridor's side while remain private. The residents can cook without smells flowed into living



- |  |  |   |   |
|--|--|---|---|
| <p>Single corridor</p> <ul style="list-style-type: none"> <li>- provide views /natural lights and ventilation along the corridor.</li> <li>- maximum corridor area = nx</li> </ul> | <p>Double corridor</p> <ul style="list-style-type: none"> <li>- corridor's brightness depends on artificial light.</li> <li>- less ventilation flows along the corridor.</li> <li>- less corridor area = nx/2</li> </ul> | <p>Centered corridor</p> <ul style="list-style-type: none"> <li>- provide views /natural lights and ventilation along the corridor.</li> <li>- centered shared space for residents.</li> <li>- medium corridor area = (n-1)x</li> </ul> | <p>Centered corridor (with vertical circulation in the middle)</p> <ul style="list-style-type: none"> <li>- corridor's brightness depends on artificial light.</li> <li>- no ventilation flows along the corridor.</li> <li>- minimum corridor area = (n-1)x</li> </ul> |
|--|--|---|---|

(n = number of units , x = corridor side's length of the unit)



**PHYSICAL, EMOTIONAL AND PSYCHOLOGICAL CONSIDERATIONS  
: SECURE AND ENCOURAGING PHYSICAL ACTIVITIES AND ACTIVE ENVIRONMENT.**

The big spiral stairs was placed in the centered of the cluster to be the main vertical circulation. *From both entrances at the both end of the building the sequence of actions gradually flow from (outside) walking up the steps/ ramps into the lobby (indoor) -- going through secure door by keycard -- going outside again, this time surrounded by trees and natural light which is resembled the glare as a result of the patterned aluminium roof and transparent polycarbonate sheet which act as a filter. -- seeing big spiral stairs going up in layers -- walking up the spiral stairs, surrounded by light and shadow -- and getting to the corridor -- opening your room's door -- walking up/down the small stairs -- and finally, arriving to your own living room. Then you realise why don't you take the elevator..*

Three considerations of this project are showed in the story. First, physical well-being consideration turns to execution by the frequent use of stairs - main spiral stairs and small private stairs of each room. From the entrance (after passing secure door) residents arrive to the spiral stairs before the elevator. (see isometric&plan pg..) And the glare-like light from above are so much more seductive than walk along the corridor and take elevator. As a result of the purpose to encourage the use of stairs rather than elevator physically it has to play with human's frequent unconcious mind psychologically.

Second, emotional and psychological well-being consideration turn to execution by biophilic design. The centered shared space is located trees and bushes, up above residents can see the sky and surrounded by filtered sunlight but not its heat, the void at both the entrances provide quite huge amount of natural ventilation.

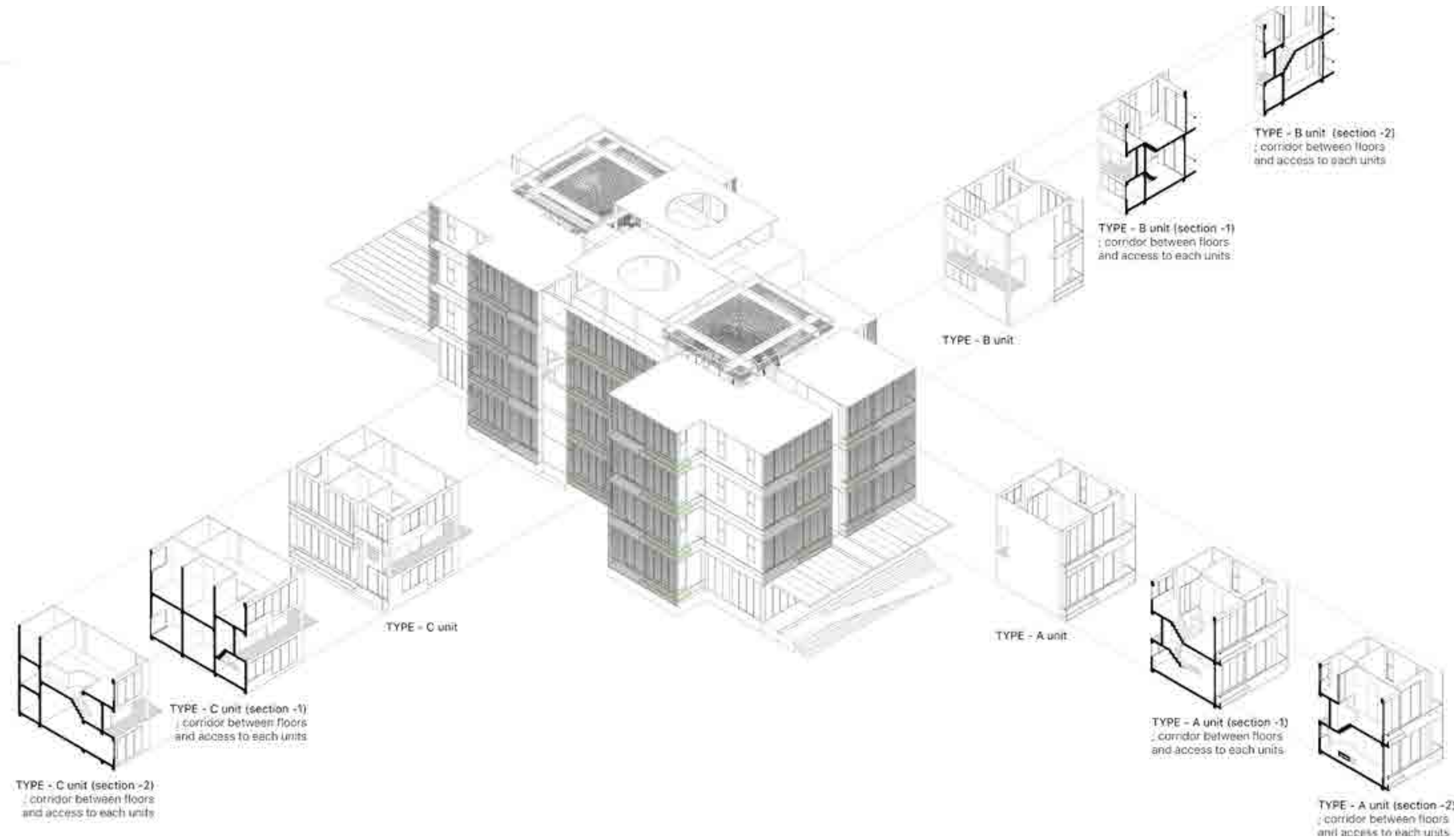
Moreover, emotional and psychological well-being can be interpret to the emotional security of the residents. Nowadays in Thailand, there have been so many crimes occur in condominium. I think one of the supplement reason related to design that make the crime easier to commit is most condominiums in Thailand have long narrow double corridor, corridor on each floors can't be seen from any others. This type of corridor give a feeling of seclusion. The chance of two or more people passing each others on the corridor is rarely. Therefore, crime can be occurred easier and unseen. Thus centered corridor can solve this problem psychologically.

According to the concept of "eyes on the street", the centered corridor and vertical circulation (spiral stairs) can be seen from other floors' corridors and dining room of each units. This overt feeling prevent criminal from commit a crime psychologically.

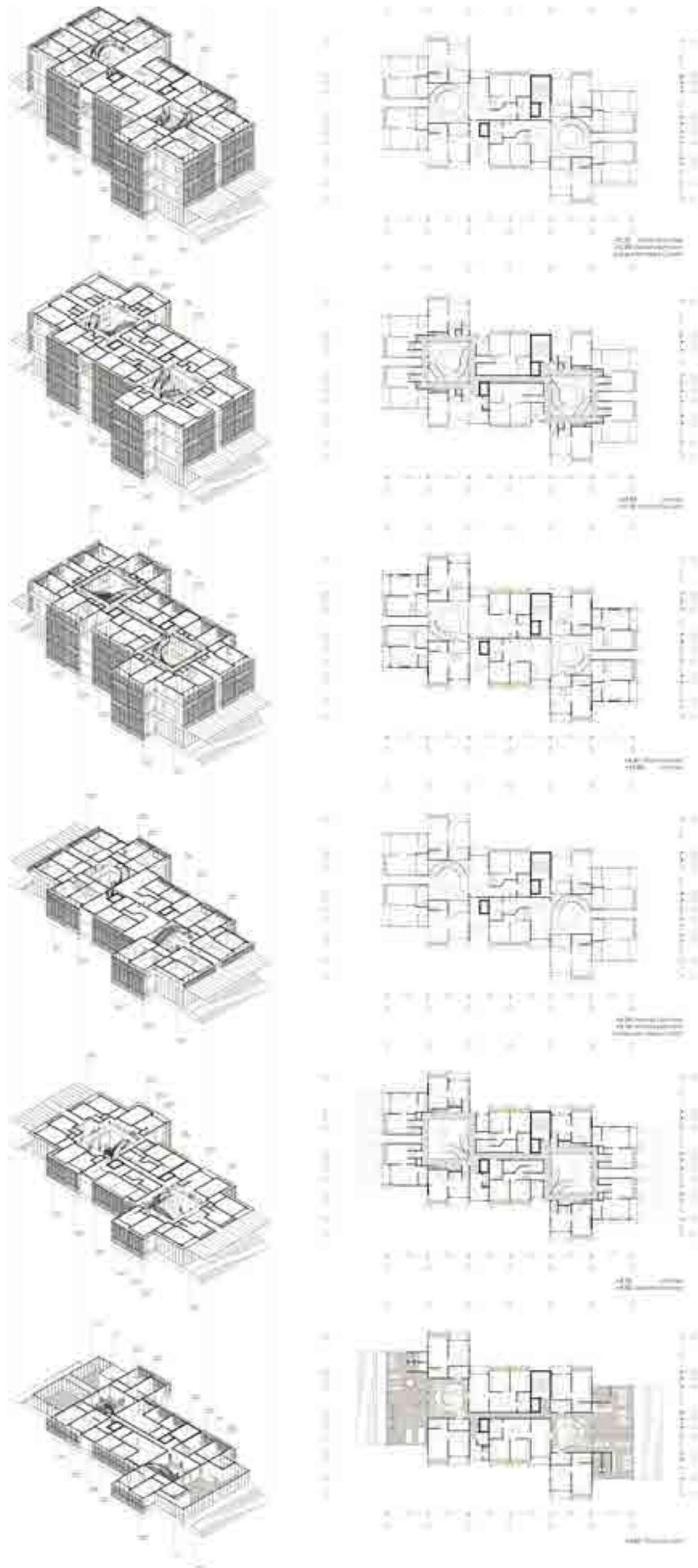




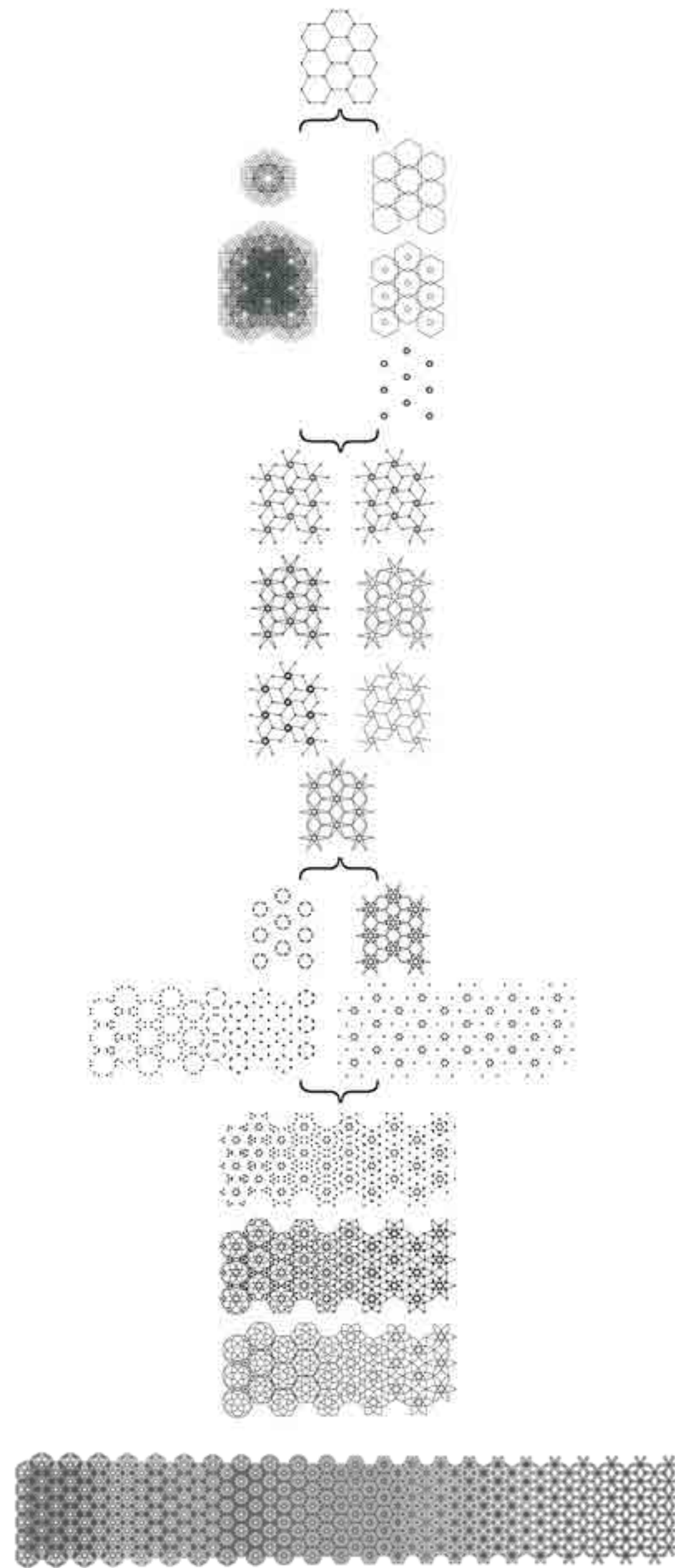
• unit's section: shows how different unit types are subtracted.



• isometric & plan at different heights.



• PATTERN STUDY



**FLEXIBLE CONTROL OF LIGHT/WIND AND LEVEL OF PRIVACY.**

Thailand has a tropical climate. It's mostly sunny all year long thus filter is almost necessary. Therefore I design facade sets 0.50 m from the outer columns to filtered heavy sunlight. My consideration is the facade have to be porous so to let the wind flow freely into the room, filtered the sunlight and not so revealing to keep privacy for the residents. The facade have to be flexible so residents can choose wheter to open/ close or stay in between depend on the amounts of sunlight/wind and level of privacy they

want.  
The facade establish the effects of light like in its natural form, the beams of light. From the bottom (which is the place where bushes is planted) to the top, the density transform from low to high, from most to less revealing. The hexagon was chosen to be the starting points then gradually transform to establish the effects that resemble beams as much as possible.



• isometric of the unit : shows the alternative ways of using the folding facade. Residents can control the amount of light/wind or level of privacy they want.









## HOUSE X

Year: 2017  
Programme: Experimental,  
Housing  
Area: 576 m<sup>2</sup>

This is the experimental project focused on physical properties of sunlight. The project aims to indicate different properties of sunlight including dispersion, absorption, reflection, refraction and polarization and how it can be shown in the building.

The project began with what is the variations of the physical properties of sunlight, which are the materials that can display the light properties, how it can be displayed by architectural compositions and what shapes or forms will properties of light can be displayed.

The only constraint in the program is the house dimension have to be 12\*12\*12 m<sup>3</sup>.

RESEARCH ON VARIOUS PHYSICAL PROPERTIES OF LIGHT > MATERIAL ATTRIBUTES > MATERIAL SELECTION

**PHYSICAL PROPERTIES OF LIGHT**

**DISPERSION**

**PRISM SELECTION**  
**equilateral prism** - dispersion:  
 disperse white light into its component colours.

**CASE STUDY**  
**Peter Erskine, Erskine Solar Spectrum art.**  
 Erskine's solar art light shaft contains many pyramid prism to disperse white light

**DISPERSION IN AN ARCHITECTURAL/SCULPTURAL TERM.**

clear story glass - positive sunlight  
 convex mirror - scatter the spectrum of light from prism.  
 prism light shaft structure  
 prism light shaft  
 alternative: mix with another effects.

PHYSICAL PROPERTIES OF LIGHT

Light is electromagnetic radiation within a certain portion of the electromagnetic spectrum. The word usually refers to visible light, which is the visible spectrum that is visible to the human eye and is responsible for the sense of sight. - CIE (1987). International Lighting Vocabulary

.By the International Lighting Vocabulary, the definition of light is: "Any radiation capable of causing a visual sensation directly." The main source of light on Earth is the Sun. Sunlight contains of many physical properties. In this project, I choose some of them which can be seen clearly by an eyes to

**LIGHTING EXPERIMENT** : Experimenting how physical properties of light can be indicated by forms / arrangements / material attributes.



PHYSICAL PROPERTIES OF LIGHT : HUMAN SCALE <> VOXEL FORM

: OVERALL <> COMPOSITION & ZONING  
 : MICROSCALE <> SKIN STUDY ; the composition

of faces

**PROPERTIES OF LIGHT : HUMAN SCALE <> UNIT FORM**

**FORM STUDY**  
 pyramid  
 cube  
 combine cube & pyramid

**UNIT FORM DIAGRAM**

I started with unit form due to the perception of light in human scale.

The unit has the property of cube - 6 sides.  
 And the property of pyramid - composed by the triangular form.

the cube has 6 sides, 6 faces  
 the rectangle based pyramid has 5 sides, 5 faces  
 the triangle based pyramid has 4 sides, 4 faces  
 beside them, the unit has **6 sides, 8 faces**.

The left and right side of the unit have two faces which compose an acute angle, so just one side of the unit can expose the properties of light in an interesting way different than the way we used to. So users (mainly me and my family) can enjoy the different perception of space through light and shadow.

**PROPERTIES OF LIGHT : OVERALL <> SETTING**

**SETTING**

my main material is sunlight, I use the existing sunlight to make the most benefits to the users inside the building, so I focused on the light effects that appeared "inside" my house and the effect that appeared outside is a bonus. Therefore, I make a light void in an architectural term which is to subtracted the middle core of the 12x12 m outline.

**PROPERTIES OF LIGHT : HUMAN SCALE <> SKIN STUDY**

**LIGHT VOID > THE CONNECTION BETWEEN THE SKINS.**

horizontal composing  
 vertical composing  
 adding structure  
 structure + skin

light void setting  
 connection between the outer skin <-> the inner skin  
 vertical connections  
 diagonal connections

**REFRACTION**

concave mirror  
 light reflected and converges at focal point. will be a great source of heat in the building > x

convex mirror  
 light reflected and scattered around the building > /  
 \* more noticing to the eyes if control the light shaft.

**REFLECTION**

concave lens  
 light refracted and scattered around the building > /

convex lens  
 light refracted and converged at focal point. will be a great source of heat in the building > x

**MIRROR**

**REFRACTION IN AN ARCHITECTURAL/SCULPTURAL TERM.**

materials : convex mirror and concave lens

algorithm : refraction > ?

effects

**REFLECTION IN AN ARCHITECTURAL TERM.**

materials : flat mirrors

algorithm : reflection > ?

effects

**POLARIZATION**

Light Passing Through Crossed Polarizers  
 Polarizer 1 (Vertical)  
 Polarizer 2 (Horizontal)  
 Incident Beam (Unpolarized)  
 Transmitted Light (None)

**ABSORPTION**

materials : glass with dichoric finishing or "dichoric glass"

**POLARIZATION IN AN ARCHITECTURAL TERM.**

materials : clear glass and aluminium panel

aluminium panel  
 clear glass

algorithm : polarization > ?

effects

**ABSORPTION IN AN ARCHITECTURAL TERM.**

materials : school glass

algorithm : absorption > ?

effects

**PROPERTIES OF LIGHT : HUMAN SCALE <> SKIN STUDY**

**SKIN STUDY FOR ONE SIDE PLANE / 2 FACES**

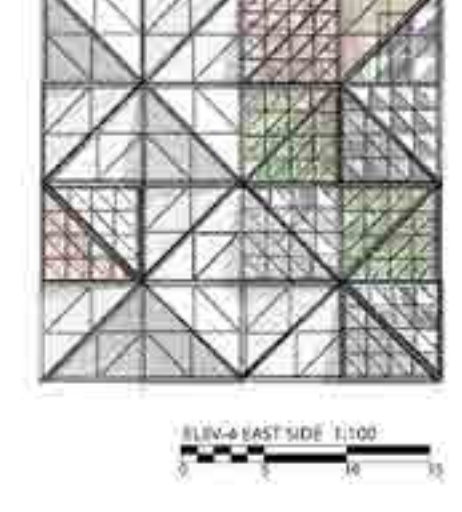
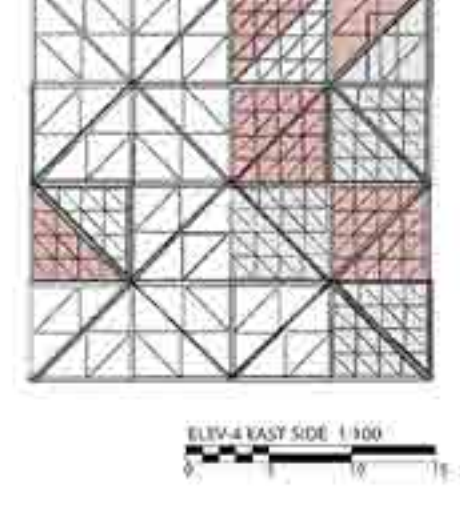
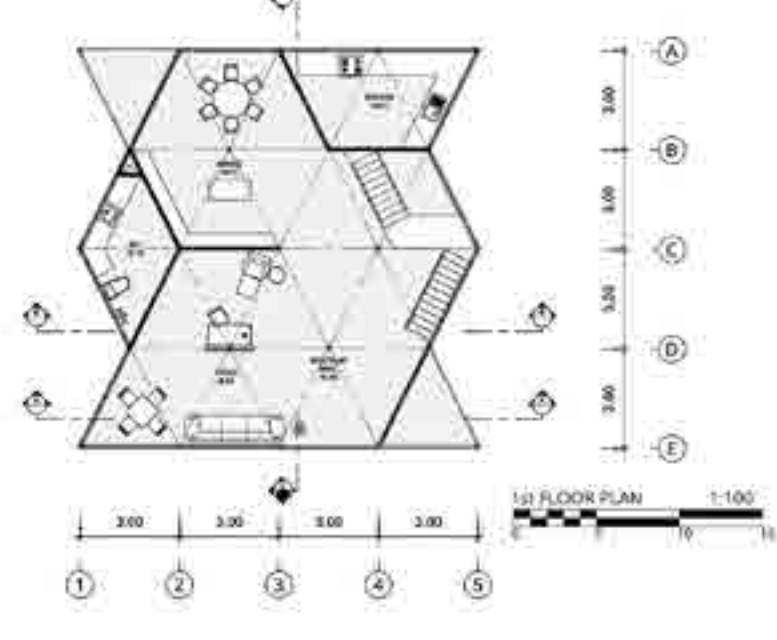
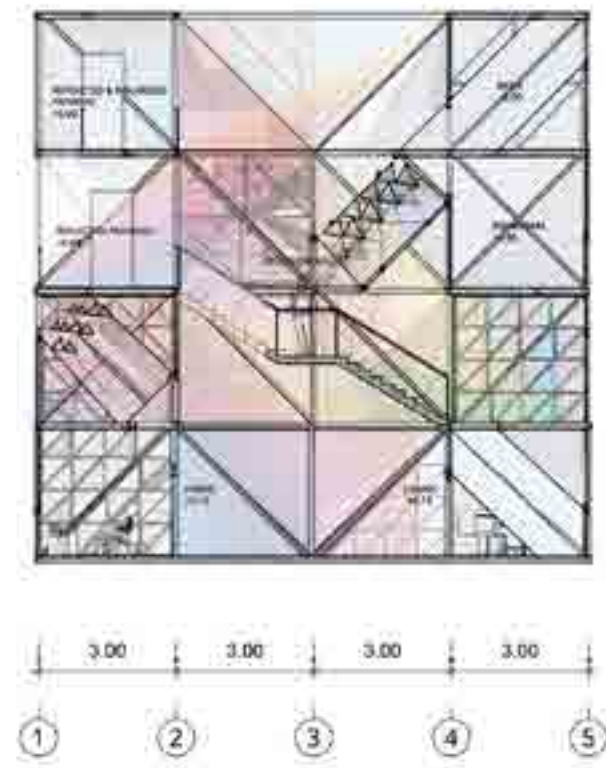
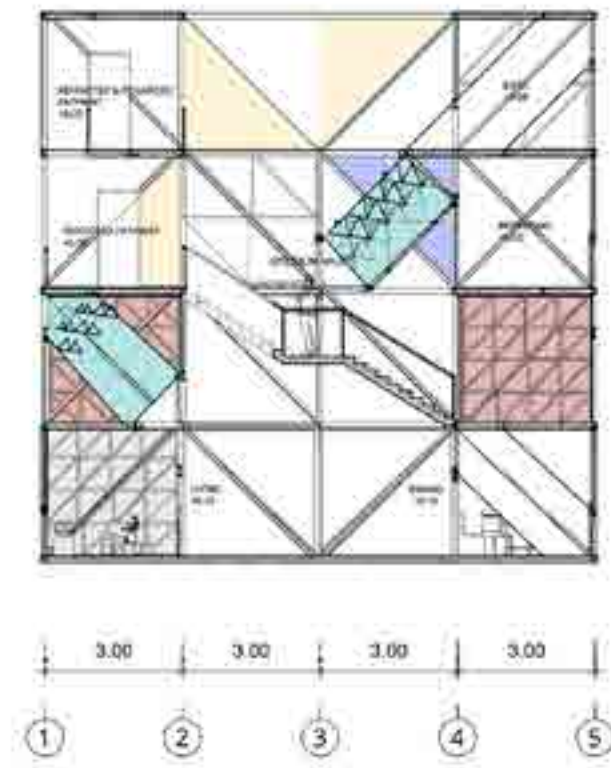
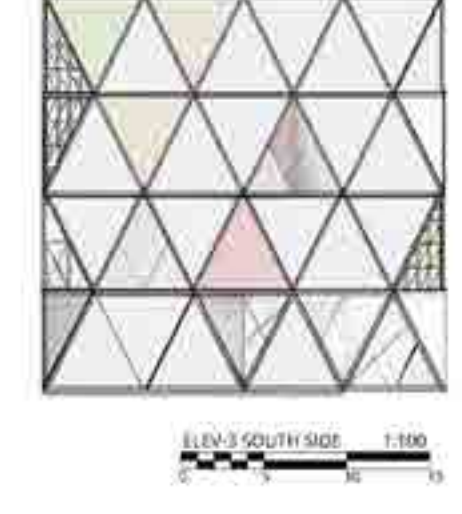
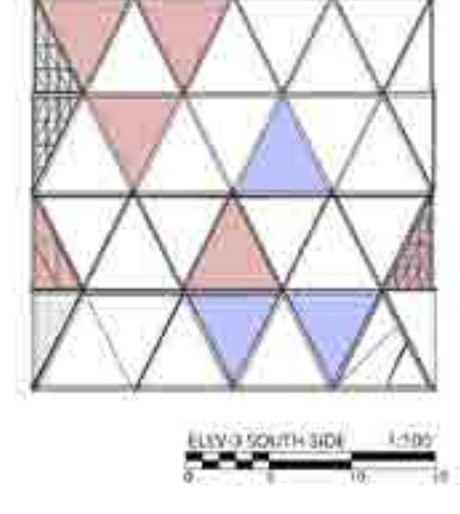
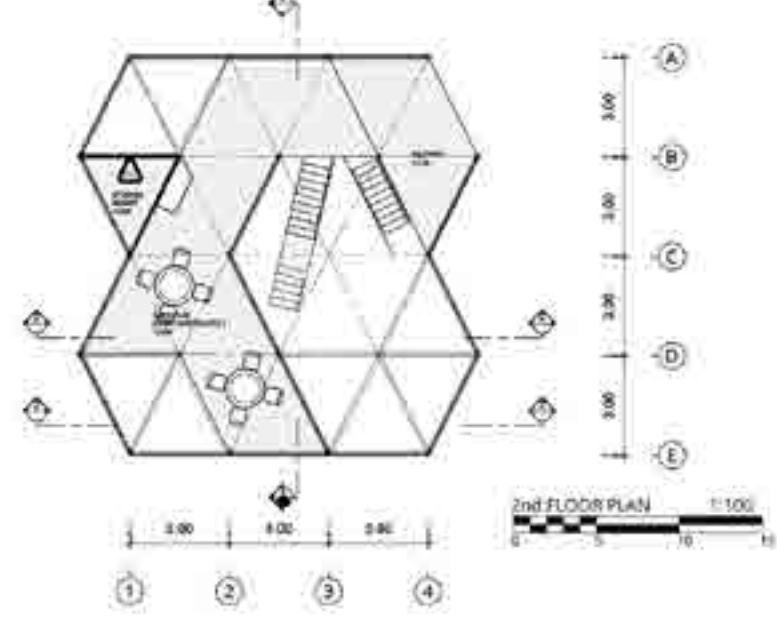
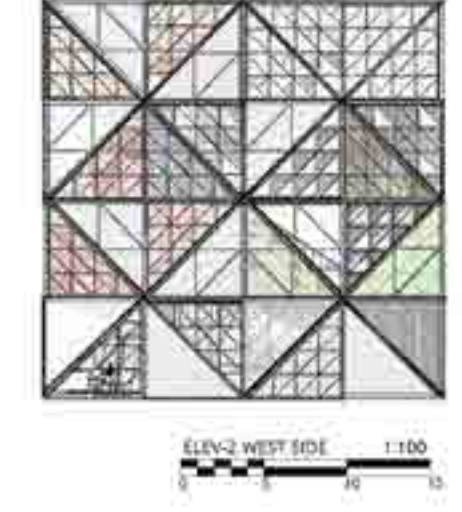
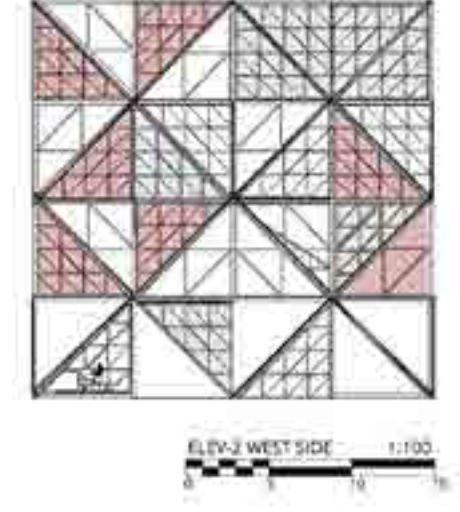
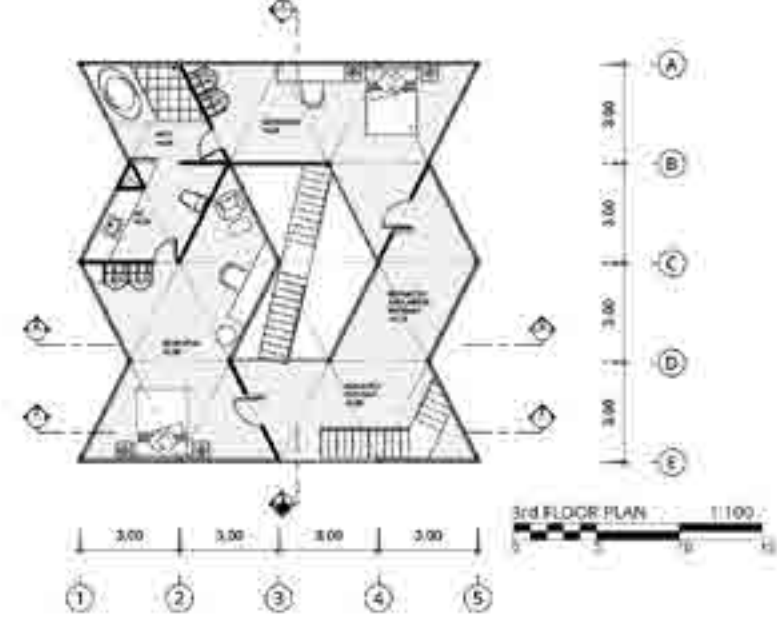
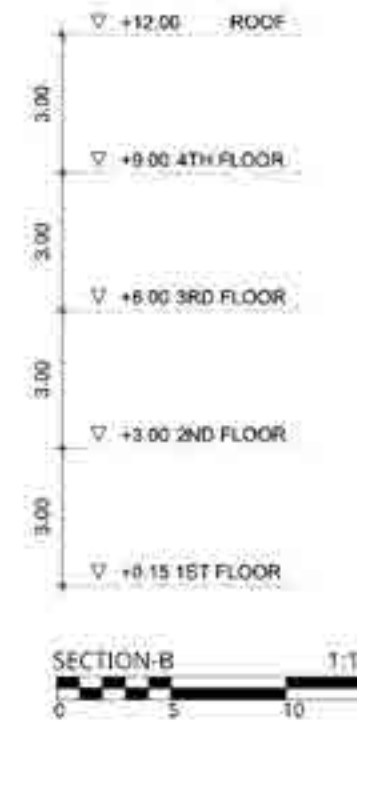
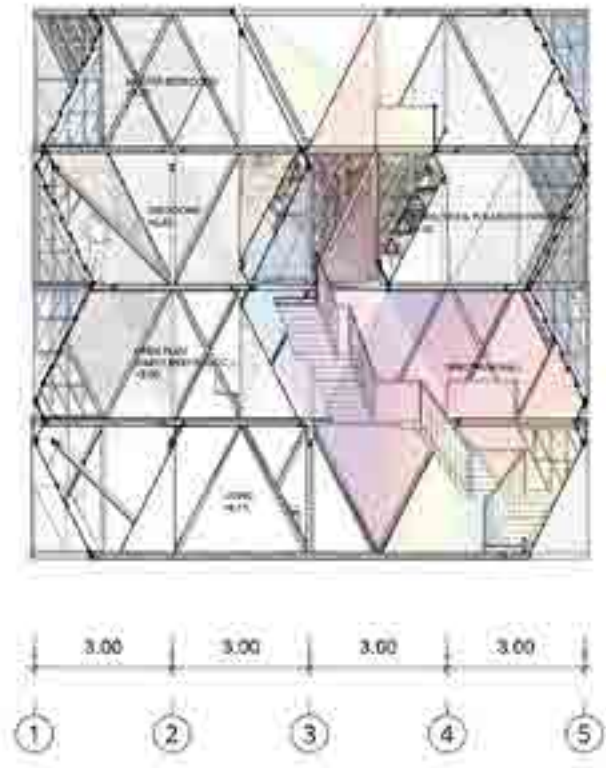
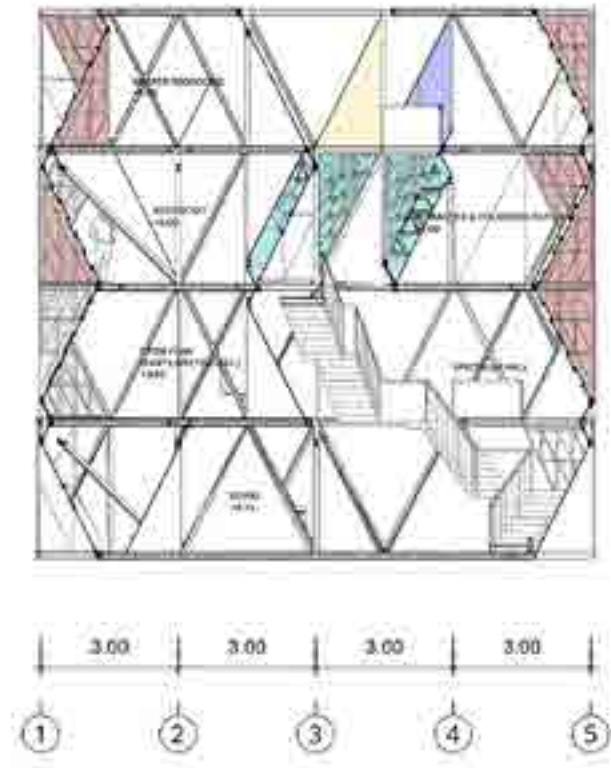
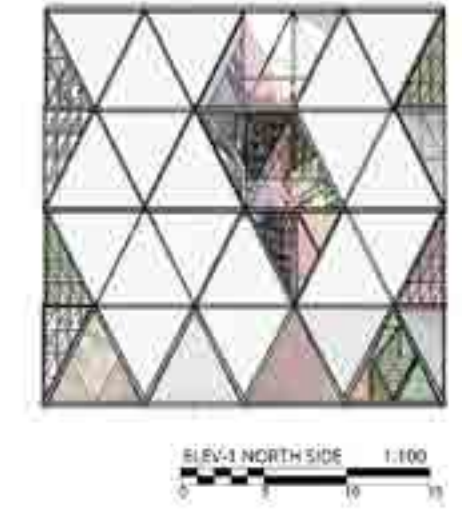
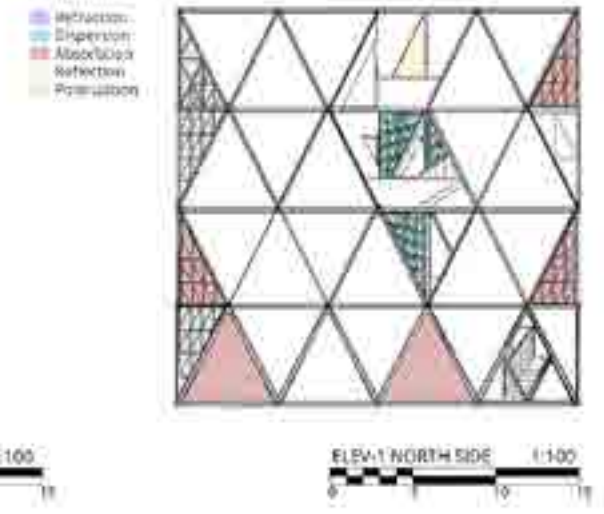
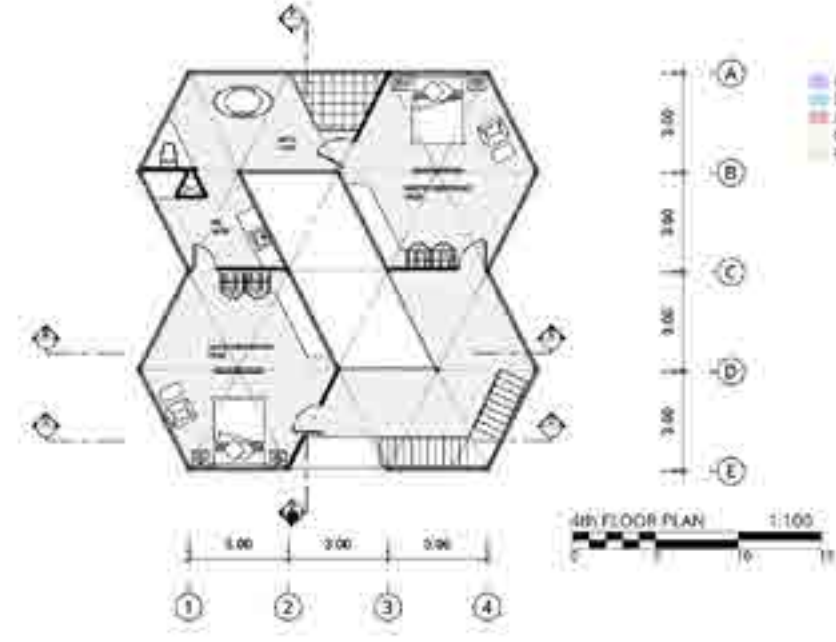
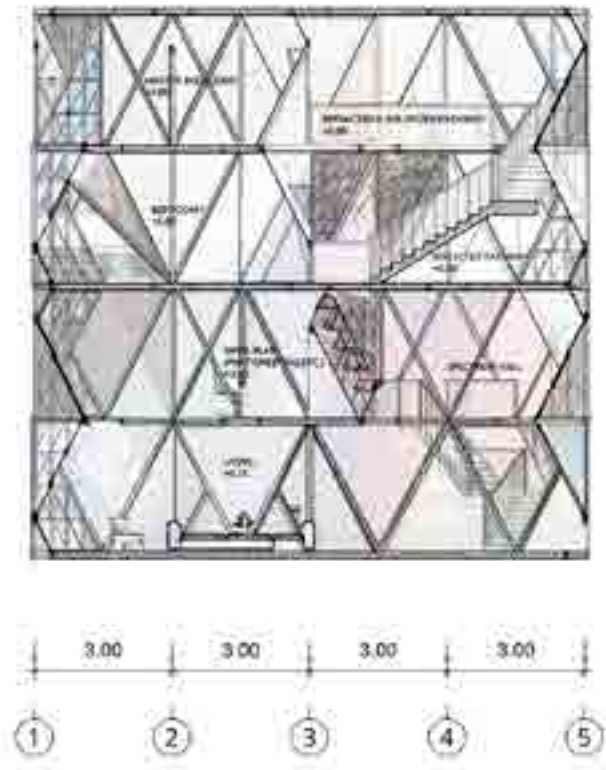
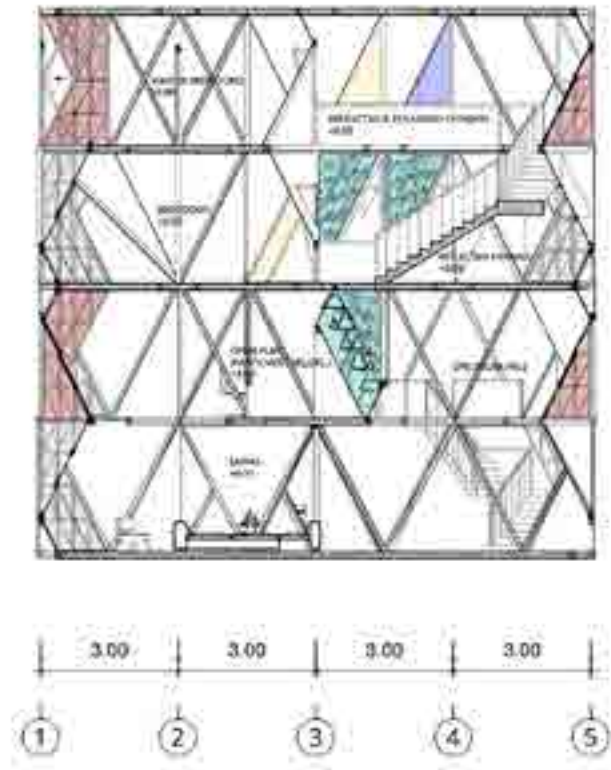
COMPOSE THE TWO - FACES SKINS IN HORIZONTAL DIRECTION  
 COMPOSE THE TWO - FACES SKINS IN VERTICAL DIRECTION

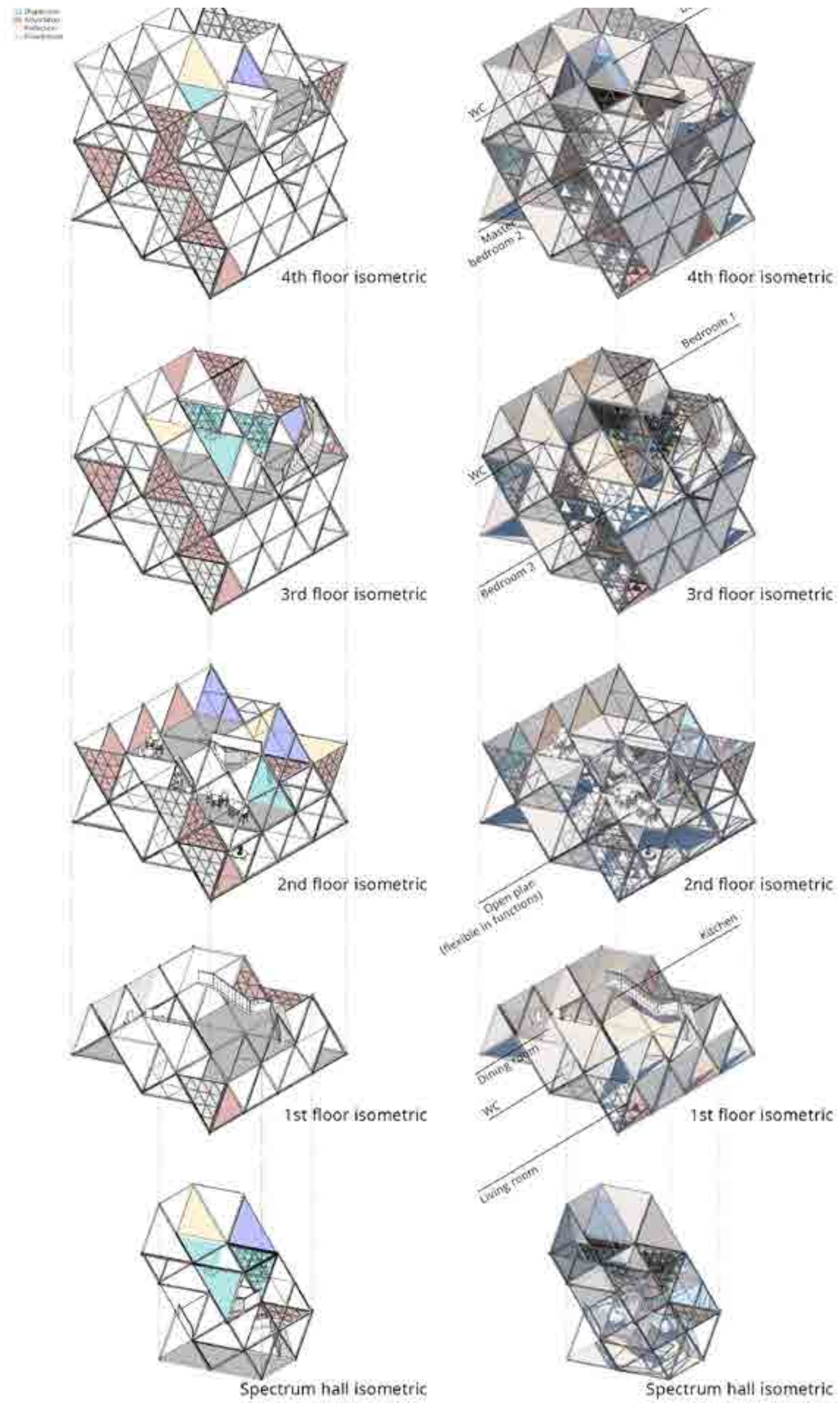
TRIANGULAR VOXEL

The only form that can disperse light into spectrum is prism. Despite the attributes of prism, the triangular voxel constitute of 8 triangular faces was created. Regarding to the only constraint and the voxel design, the house is constituted by 3\*3\*3m3 triangular voxels.

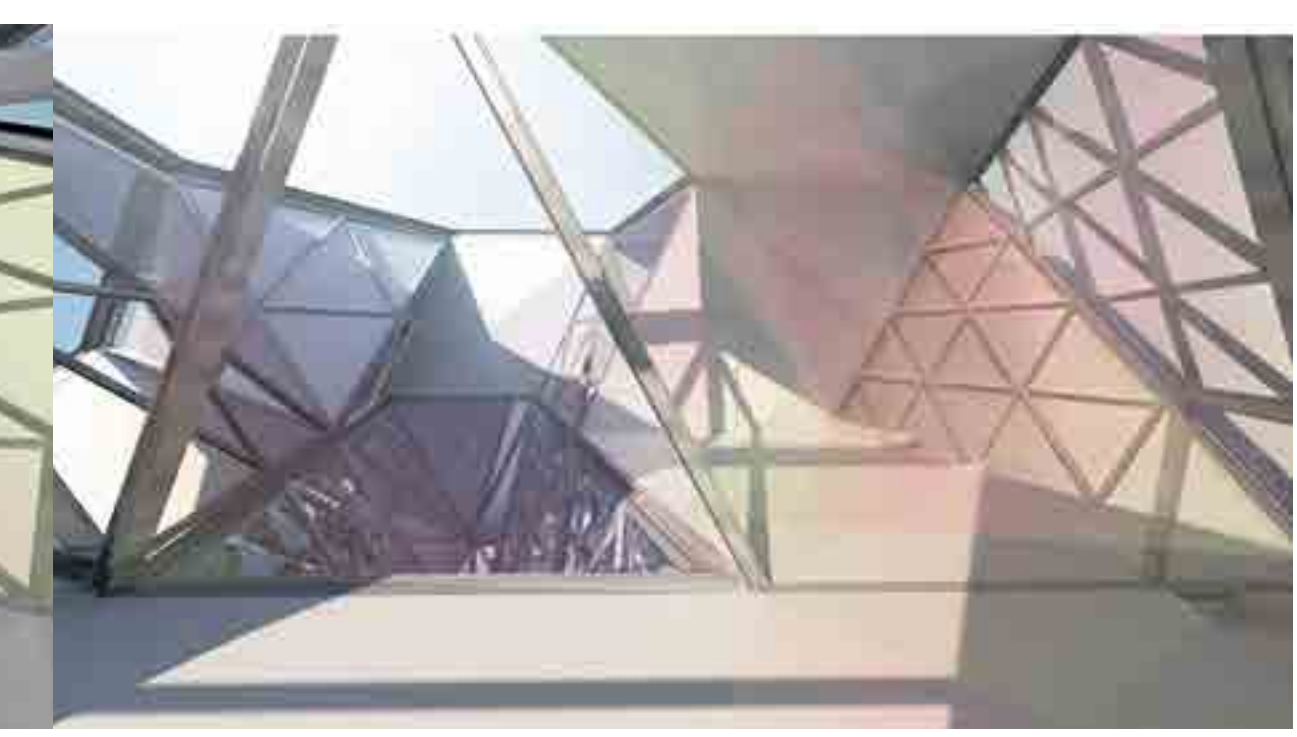
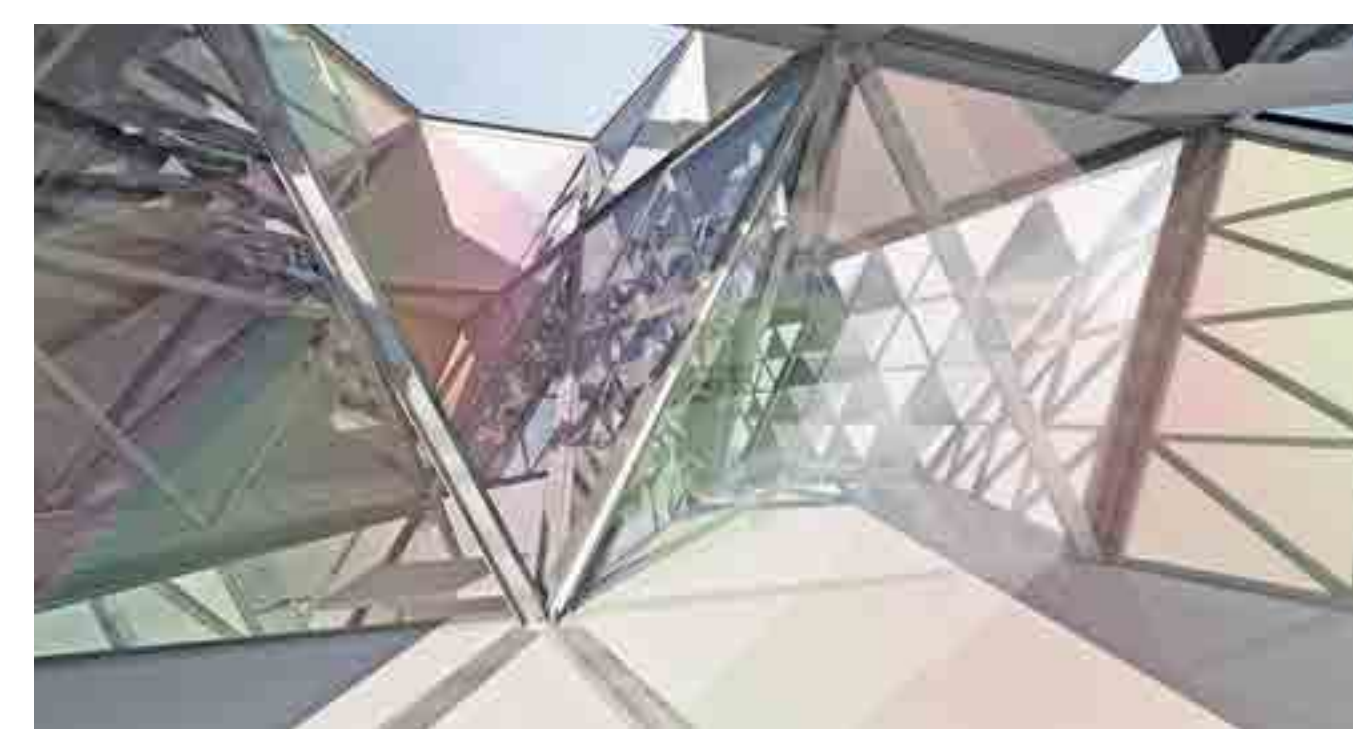
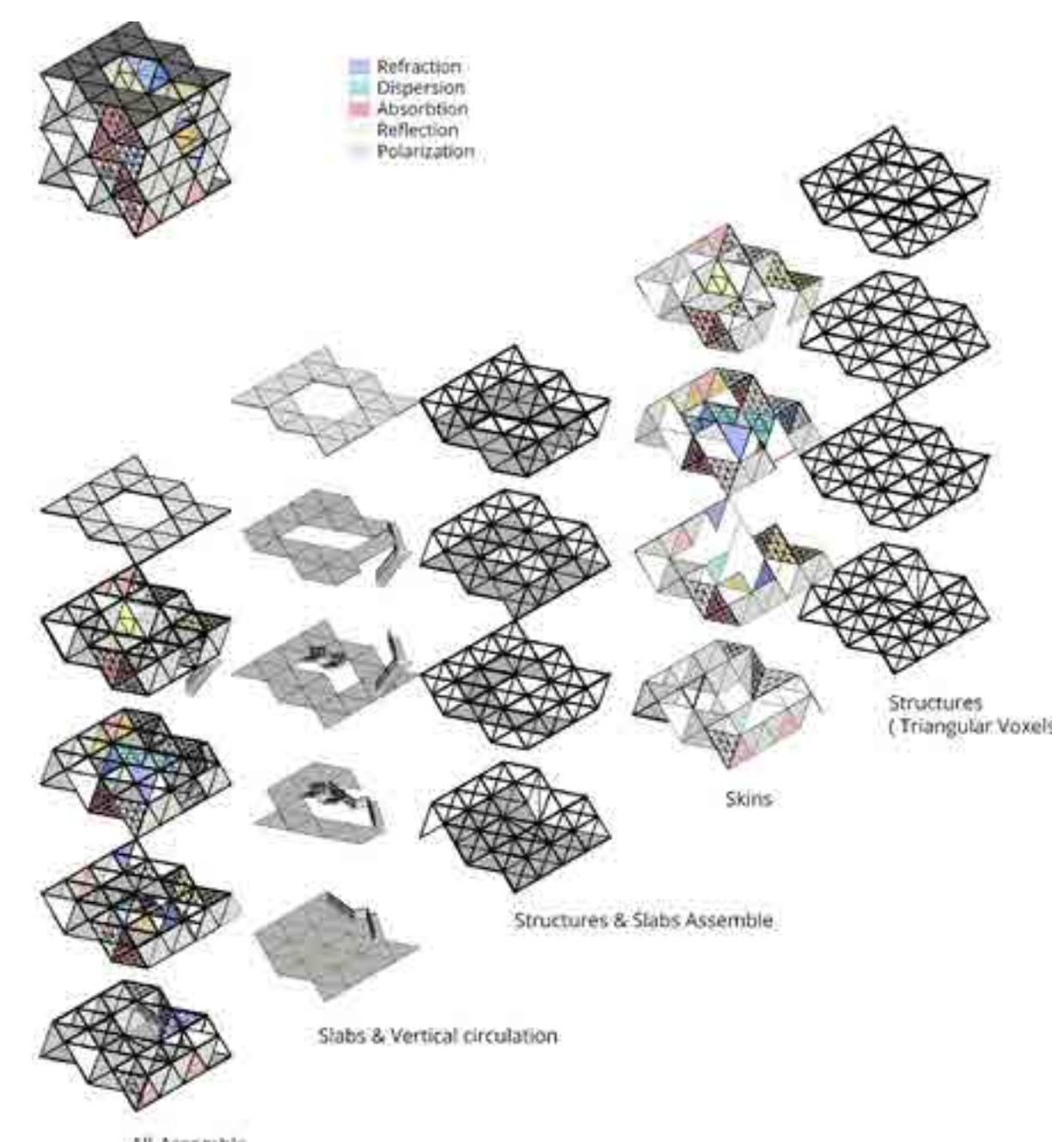
The voxel has its own structures in each modulars thus it can be prefabricated then assemble on site with ease.

- Refraction
- Dispersion
- Absorption
- Reflection
- Polarization





**Spectrum hall**  
: Indicating how light reflected by reflected material (high reflectivity glass) through dispersed material (prism) and display spectrum through the hall.





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