Chapter 04

Design Result & Proof

4.1 FINAL MASSING

3.4.1 Final Massing According to All Consideration Aspect & Concept

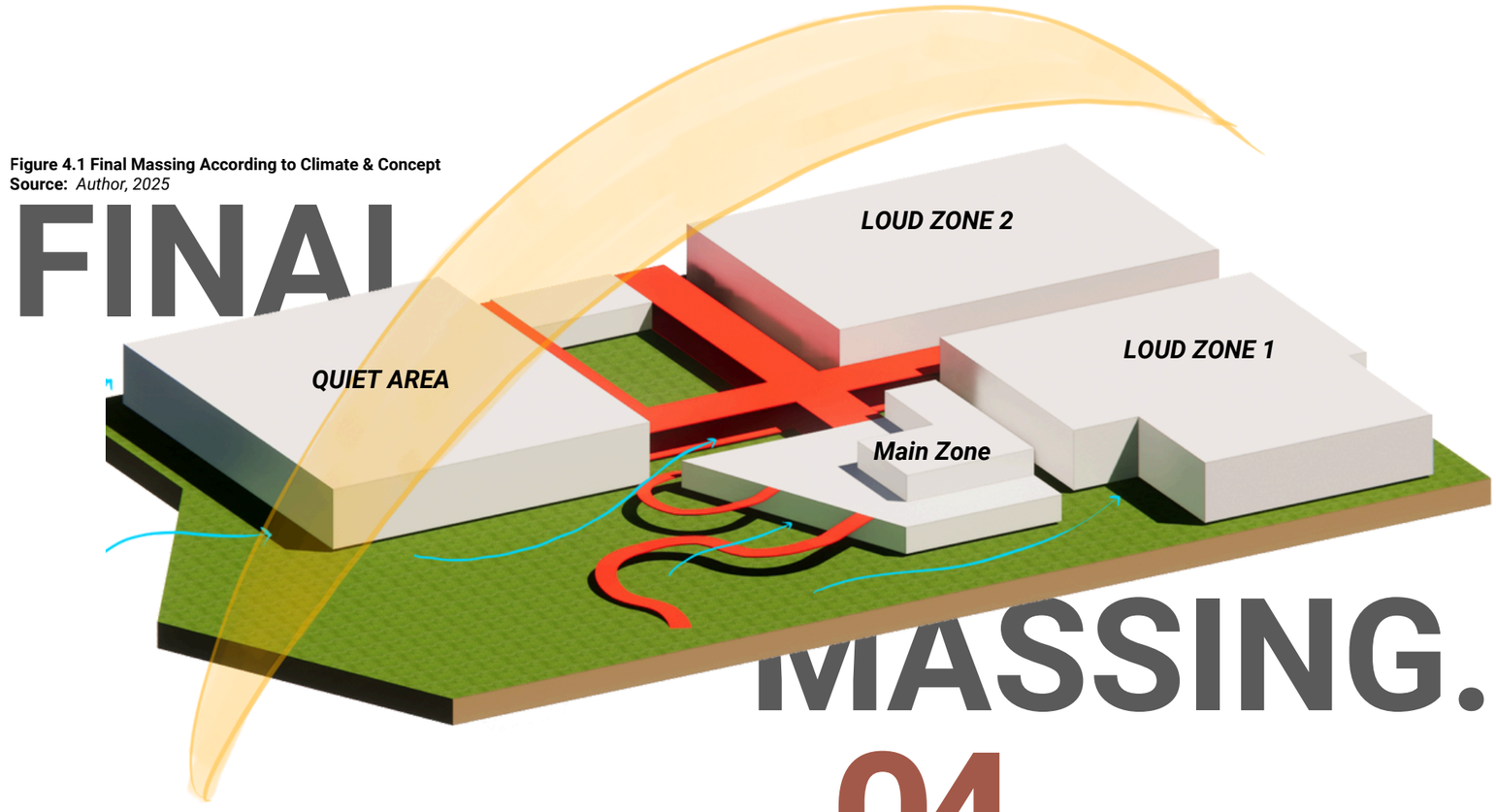
01

Based on the design explorations that have been carried out and reviewing the advantages and disadvantages of each exploration, the final massing is a solution from the consideration of the various aspects that have been discussed. In the aspect of sunlight, each building mass gets equal and sufficient sunlight intensity where there is no building mass with a height that blocks sunlight from entering.

02

With this massing form, each building mass gets enough wind into the building, moreover the wind can pass through to the sport field inside the building directly which requires cool wind comfort to support sports activities. In addition, the building arrangement create gap that allows cross ventilation, therefore that wind circulation between buildings can be renewed at any time.

Figure 4.1 Final Massing According to Climate & Concept
Source: *Author, 2025*



03

In addition, the adjacency between the main zone to each other building mass has a better proximity than the previous exploration, where the distance between the main zone to the building entrance is closer so that it is more efficient in terms of distance. In addition, the placement of the quiet area is more isolated from the loud zone so as to provide a quieter focus..

04

In pedestrian accessibility using the concept of a pedestrian bridge with a circular shape in addition to providing a contrasting shape to the building to emphasize entrance this form provides sloping access so that users are not exhausted in using access. To provide security for users, the pedestrian bridge is equipped with a roof to protect the users form sun heat and rain.

4.1 FINAL MASSING

4.1.2 Final Massing Concept CFD Simulation AIr Circulation Result

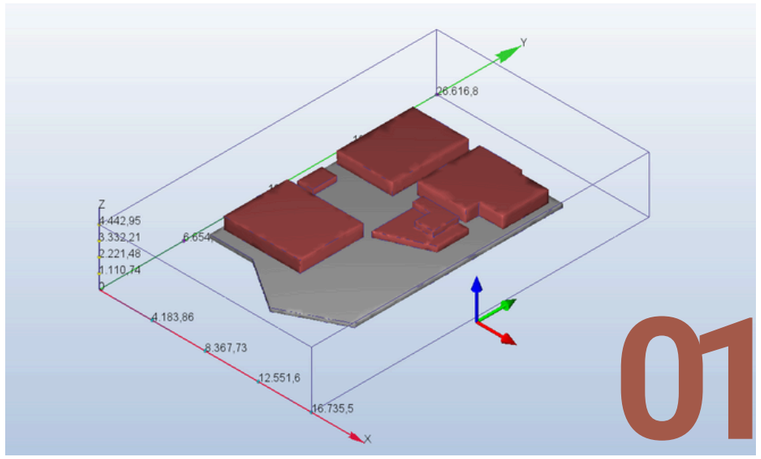


Figure 4.2 Final Building Massing on CFD Simulation
Source: *Author, 2025*

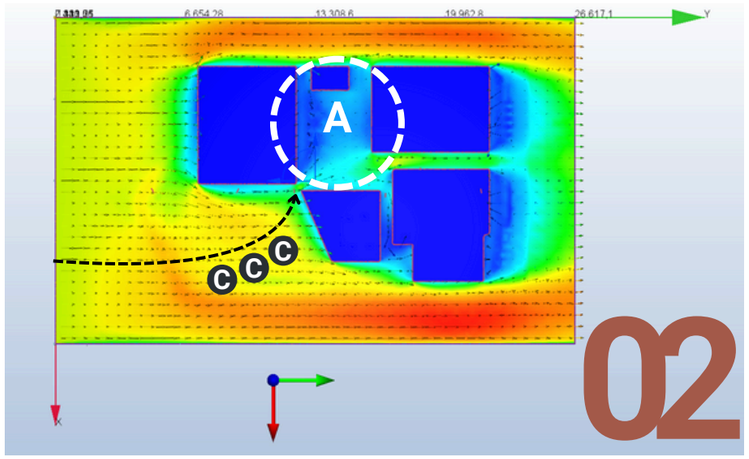


Figure 4.3 CFD Simulation Result on 3 Meters Height
Source: *Author, 2025*

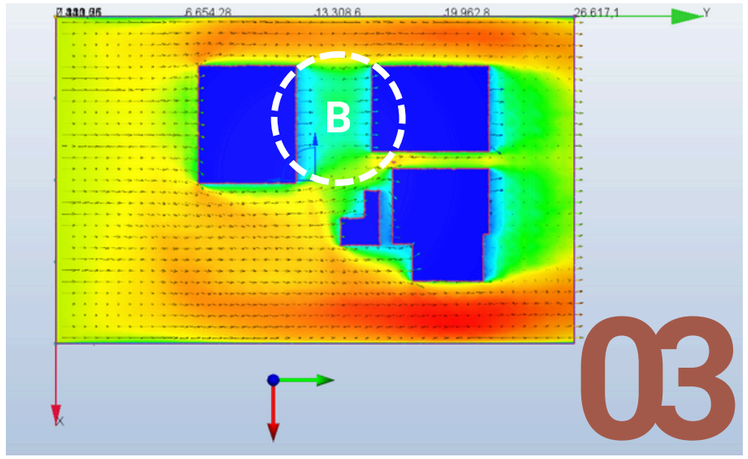
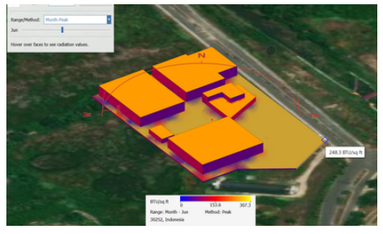
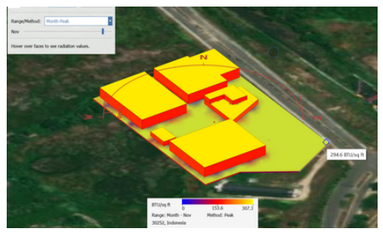
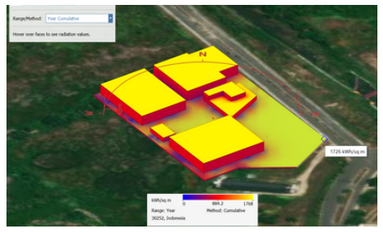


Figure 4.4 CFD Simulation Result on 7 Meters Height
Source: *Author, 2025*

Based on the final mass form, CFD simulation was conducted to analyze the impact of the building mass arrangement on the wind circulation. Seen in Figure 2, the wind simulation is carried out at a height of 3 meters where it can be seen in the circled image, the area gets a fairly low wind speed intensity. However, in Figure 3 with a height of 7 meters, the area gets a fairly strong wind speed. This result is quite good but the wind speed can be slightly increased in that direction to support user comfort where the area functions as a courtyard and communal space for users. One of the efforts that can be made is to put vegetation that directs the wind towards the building gap more as shown in point C.

4.1.3 Final Massing Concept Formit Simulation Solar Radiation Result

Table 4.1 Formit Simulation Result of Final Massing
Source: *Author, 2025*

	JANUARY	JUNE	NOVEMBER	YEARLY
9 AM				
3 PM				

While the Formit simulation to analyze solar radiation on the building surface has no significant difference with the previous exploration. Judging from the simulation results show that in June at 9 am the building area in the South East direction is indicated by a purple color that is more dominant than other months. While at 3 pm, January and November indicate that the building area in the North West direction is indicated with a purple color that is more dominant among other months. Those purple color indicate low solar radiation that hit the building.

4.2 MASTER PLAN

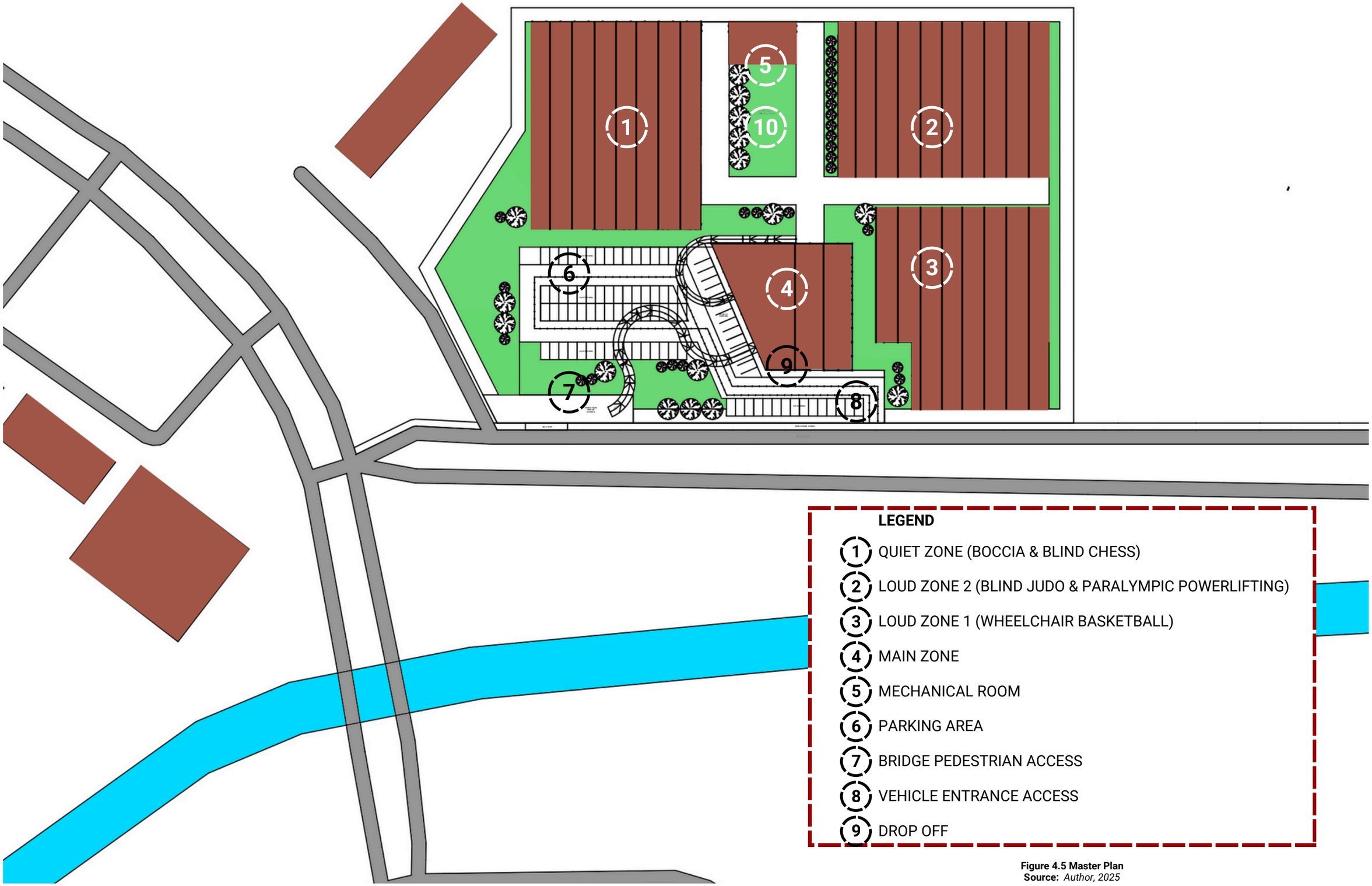


Figure 4.5 Master Plan
Source: *Author, 2025*

4.3 SITE PLAN

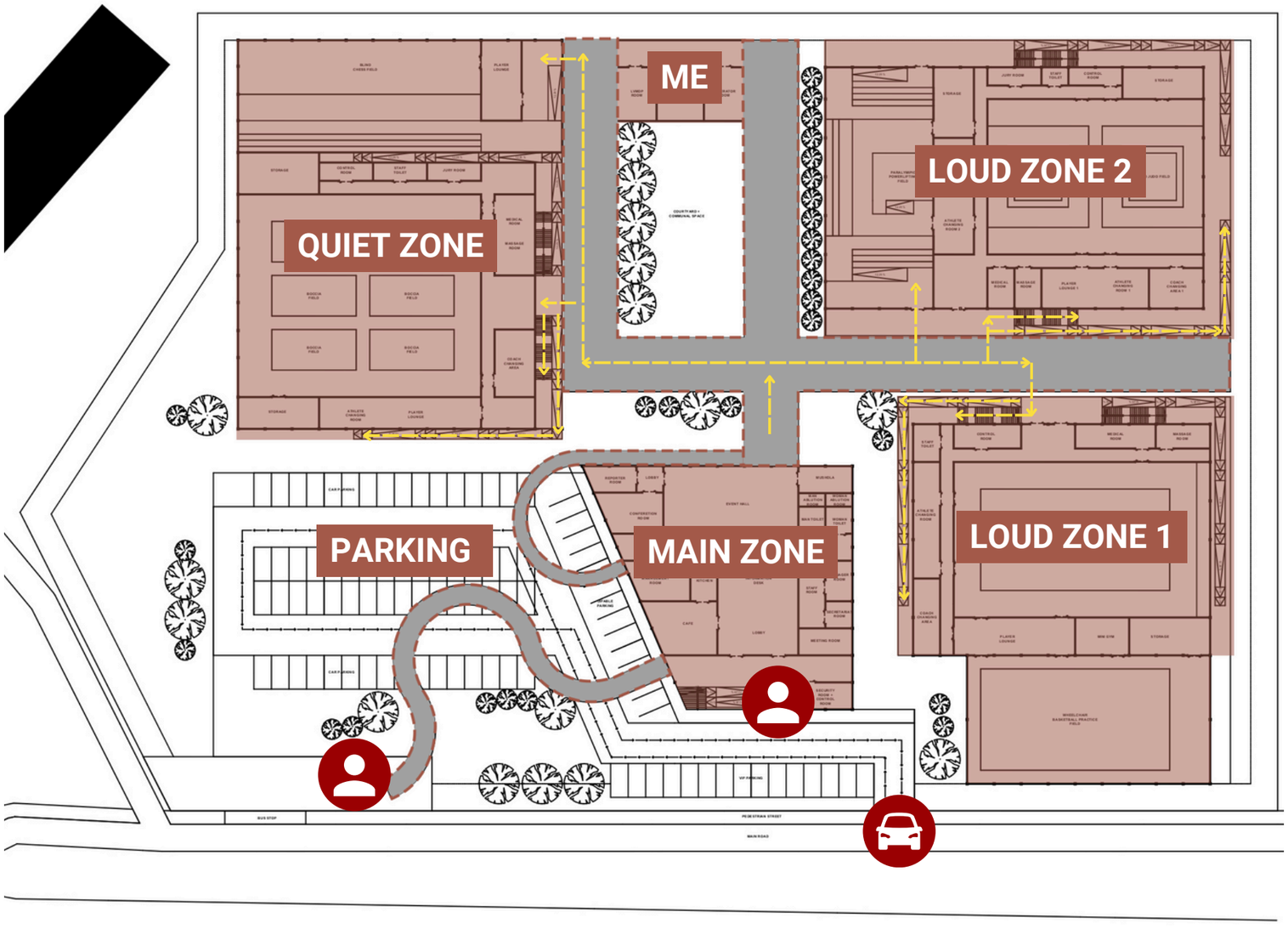


Figure 4.6 Entrance Circulation to Main Building & Sport Zone
Source: *Author, 2025*

4.3.1 Entrance Circulation to Main Building

Pedestrian Access Vehicle Access

Vehicle access circulation is designed to have only one access as an entrance and exit. While pedestrian access is designed to have two accesses, namely using a pedestrian bridge or drop off main entrance. The pedestrian bridge entry access is placed behind the bus stop which aims to prioritize pedestrians so that they are safe and do not need to cross the vehicle road. While access from the main entrance is the drop off point for vehicles.

4.3.2 Entrance Circulation to Sport Fields

Circulation Direction

Access from the main zone to the sport fields (Loud Zone 1, Loud Zone 2, Quiet Zone) is indicated by the direction of the yellow arrow. Each building zone can only be accessed from the main zone which is designed by emphasizing the proximity of accessibility. So as in the picture on the side, the entrance to each building zone is close to the main zone except for the quiet zone on the blind chess field which is placed at the end to emphasize the calm ambiance so that the entrance is further away.

4.4 FLOOR PLAN

4.4.1 Inclusive Accessibility Inside the Building

The spectator tribune area is on the second floor of the building so there are two accesses to the tribune, namely using stairs and ramps. The ramp is designed to circle the building which aims to facilitate the circulation of spectators in and out. In addition, the entrance ramp and exit ramp have different paths.

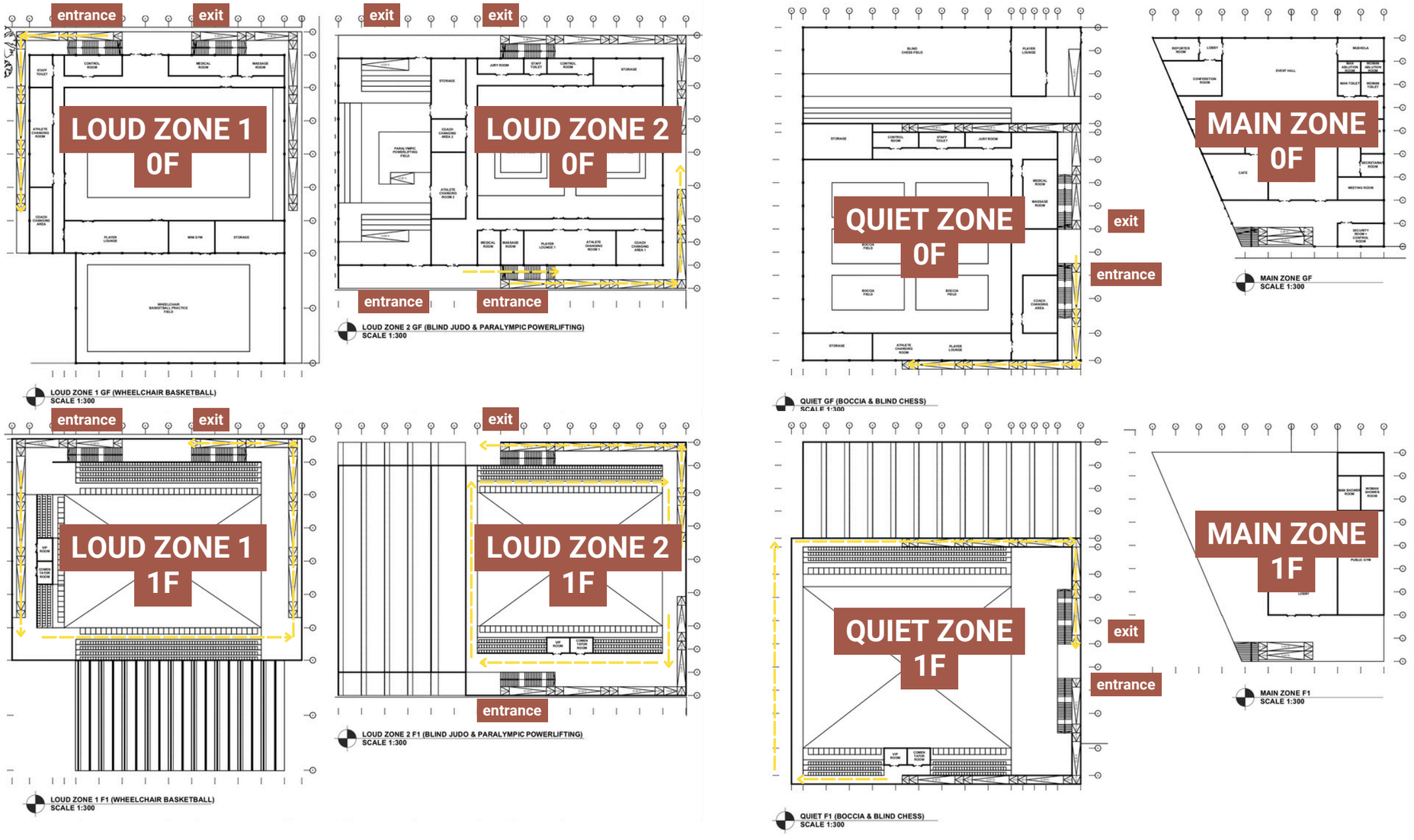
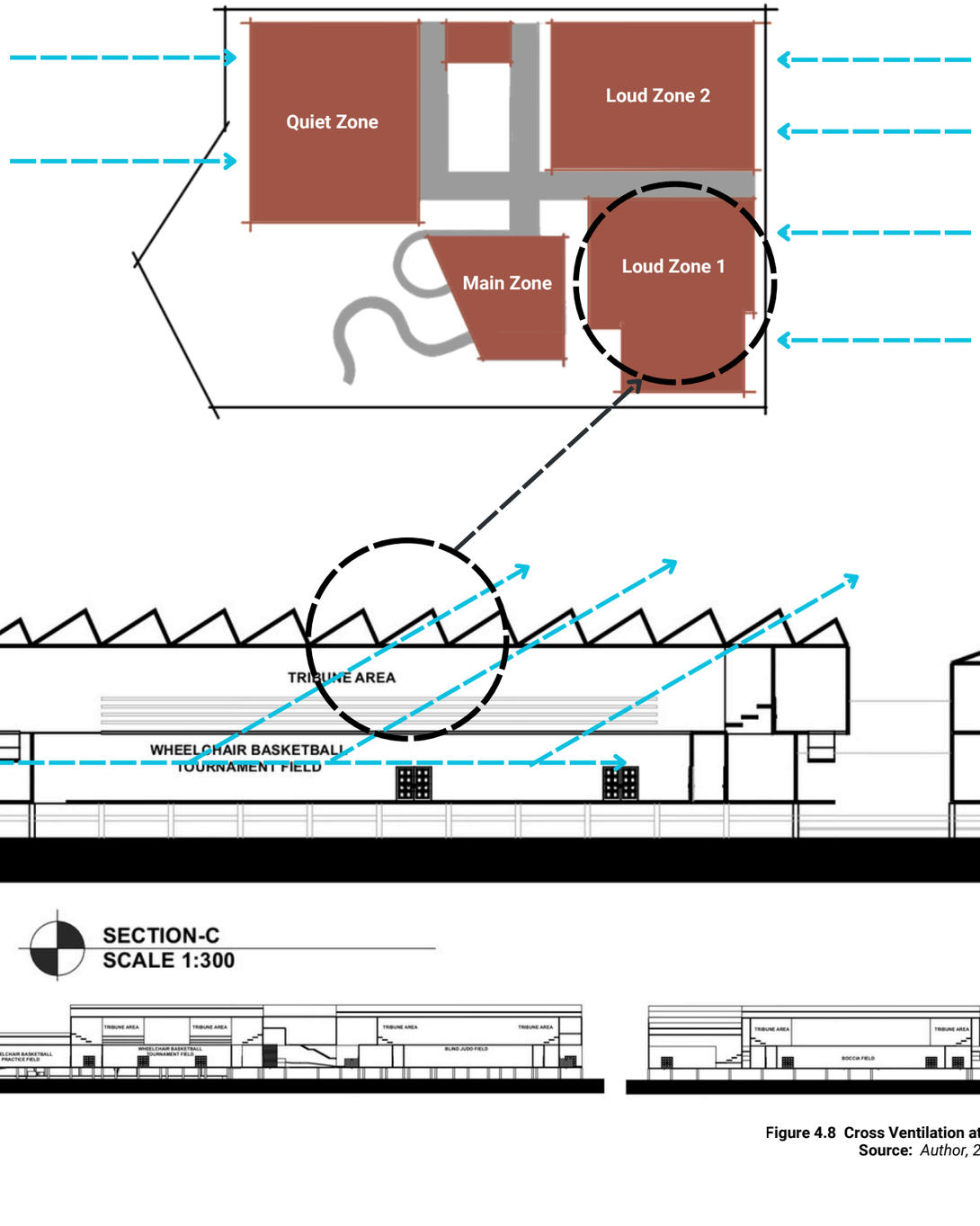


Figure 4.7 Building Floor Plan Inclusive Accessibility
Source: *Author, 2025*

4.5 SECTION



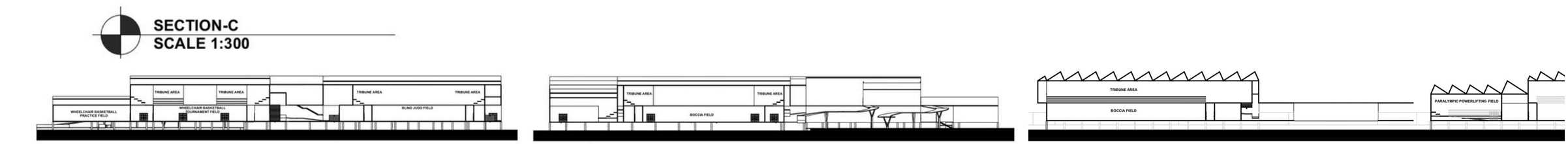
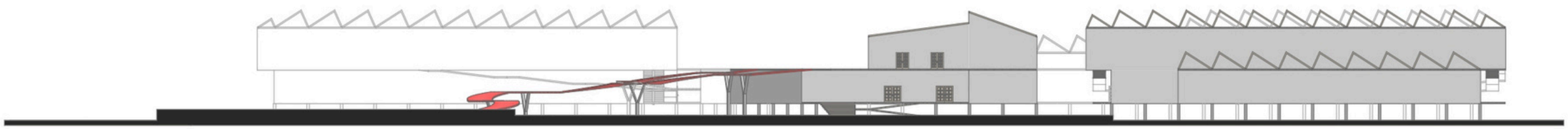


Figure 4.8 Cross Ventilation at Building Section
Source: *Author, 2025*

4.5.1 Cross Ventilation From Opening to Roof

The arrangement of the building mass allows the side of the building to have a strategic opening location to provide openings on the side of the building that gets direct wind. So by utilizing the direction of the wind that enters the room, it will be thrown towards the roof of the building to release hot air.

4.6 ELEVATION

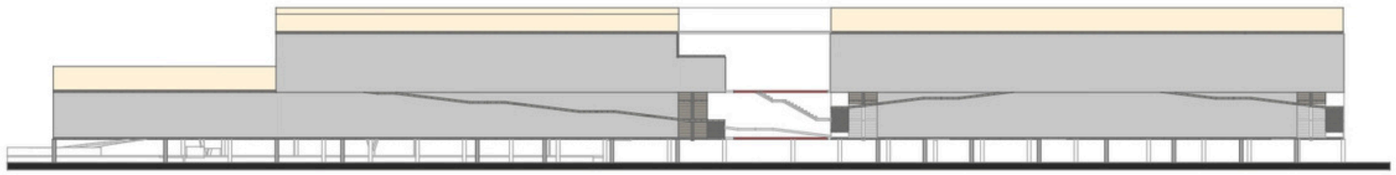


NORTH EAST ELEVATION
SCALE 1:500



SOUTH WEST ELEVATION
SCALE 1:500

NORTH WEST ELEVATION
SCALE 1:500



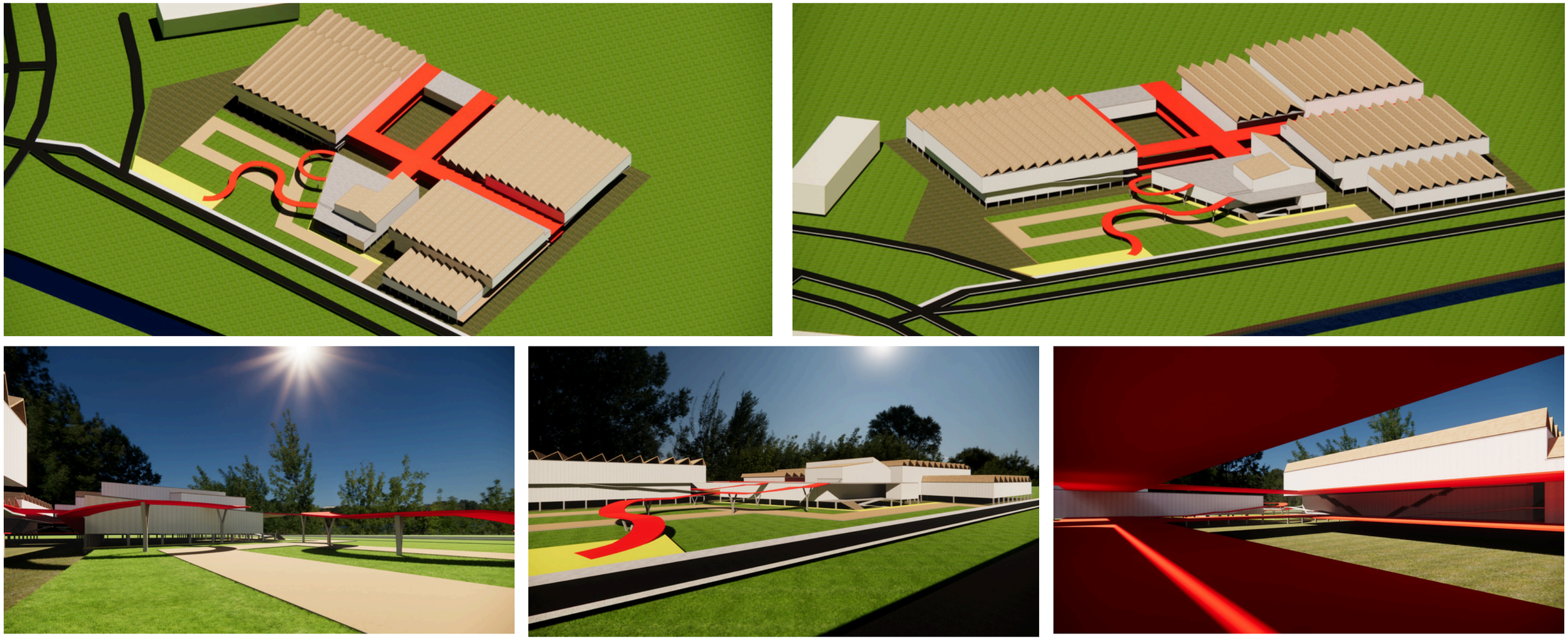
SOUTH EAST ELEVATION
SCALE 1:500



Figure 4.9 Building Elevation
Source: *Author, 2025*

4.7 SCHEMATIC VISUALISATION

4.7.1 Exterior Schematic Visualisation



4.7.2 Interior Schematic Visualisation

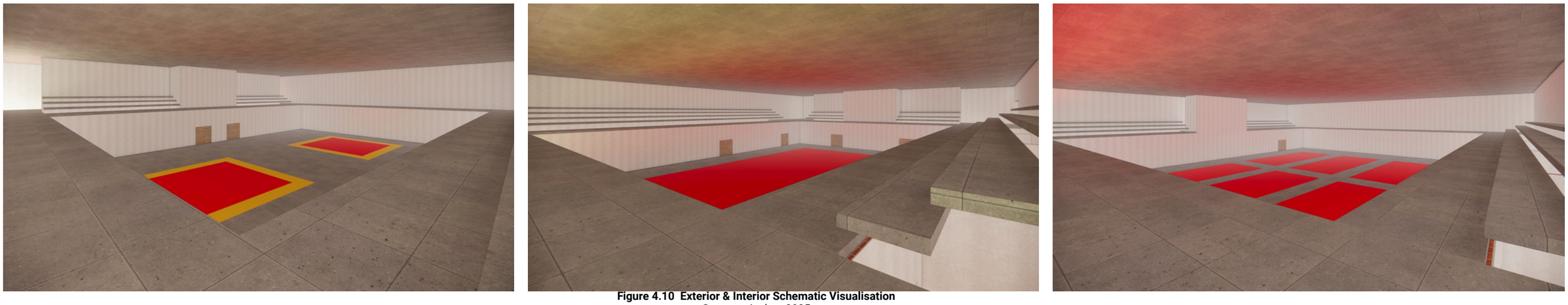


Figure 4.10 Exterior & Interior Schematic Visualisation
Source: *Author, 2025*

Chapter 05

Design Evaluation

5.1 EVALUATION DESIGN NOTES

Table 5.1 Evaluation Design Notes
Source: *Author, 2025*

COMMENTS	POSSIBLE SOLUTIONS
1.ROOF SHAPE • The shape of the roof is to formal and give industrial style • Performance aspect such as passive design and glare should be considered for chosen roof shape	Using a space frame structure that can accommodate wide spans, creating a fun outdoor impression and a more spacious interior impression. Then, the openings in the roof must also avoid direct sunlight. Therefore, adjustments to the shape of the building mass are needed.
2.ROOM FUNCTION INTEGRATION BETWEEN DIFABLE USERS & ORDINARY USERS • Is the each function of the room able to be use by both users? or is there any specific space for each users? • In the spectator tribune, it is necessary to add a couple spectators area / facility specifically for visually impaired users who need a guide to watch the match.	All rooms are designed to be accessible to both difable and general users. Therefore, two types of access are provided: stairs and ramps. The spectator stands/ tribune also features specific areas designed for certain users. Not only for spectators, but also for athletes, the facilities are designed to be accessible to all users, such as the shower area, which is designed to difable standards so that it can be used universally.
3.BUILDING MASS ARRANGEMENT • The masses of each building too compact and close to one and another, which not suitable for passive design concept especially air circulation	Adjustments were made to the size of the site, which was enlarged to allow for better air circulation throughout the building. Then, adjustments were made to soften the building's mass by using an ellipse shape so that the wind direction could be better directed.
4.SPECIFIC MATERIAL • Are there any special materials used, such as tactile materials and their dimensions?	The use of contrasting materials in buildings can serve as architectural guidance. This is achieved through the combination of smooth and embossed textures. Contrasting materials are used in both landscapes and interiors.
5.PARKING ACCESSIBILITY • A centralized parking zone may provide a long distance for users • Can parking zones be distributed in each building mass? so that users can access more closely • There needs to be a fire truck access route to all areas of the building	General parking areas are still centralized in one area, but difable parking is located around the building to provide more efficient access for wheelchair users. Difable parking is designed to be safe from vehicle circulation flow, so that there is special access to the building from the difable parking area. For fire safety, vehicle circulation is designed to encircle the entire site, allowing fire trucks to access all areas.

5.2 DESIGN IMPROVEMENT

5.2.1 The Changes in The Site Size

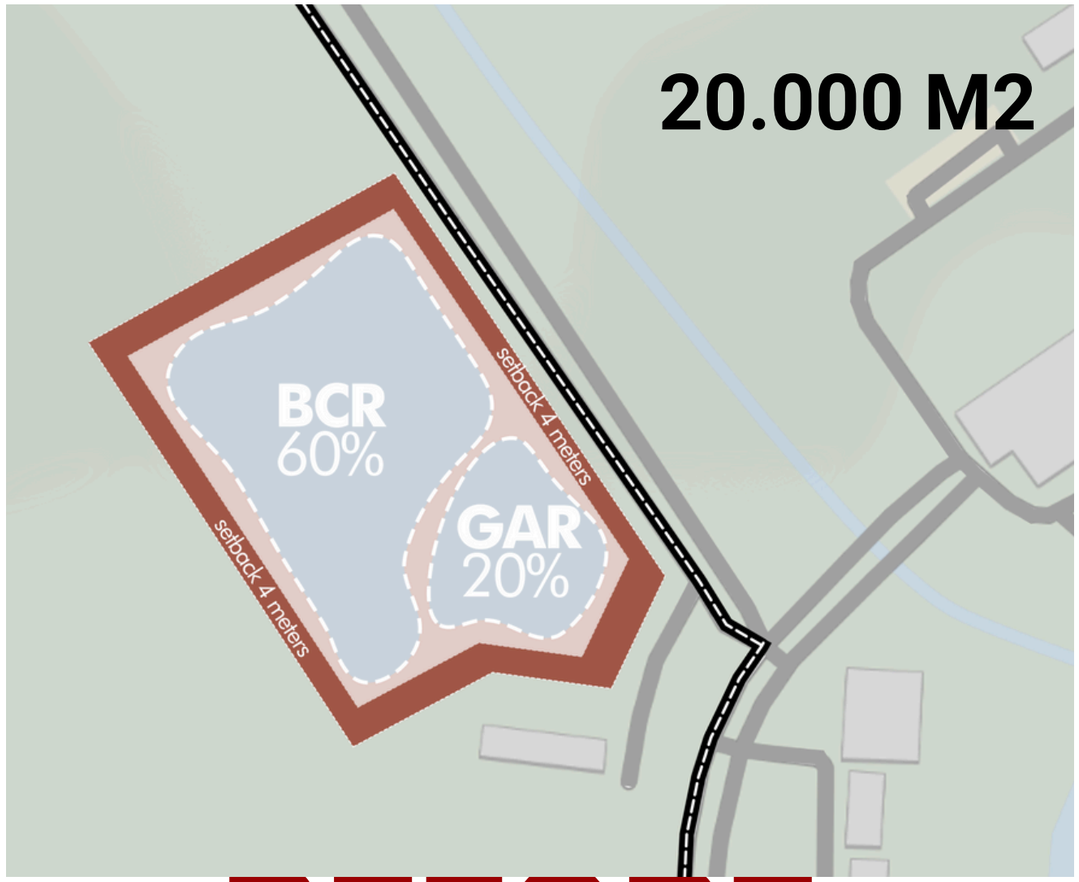


Figure 5.1 Site Size Before
Source: *Author, 2025*

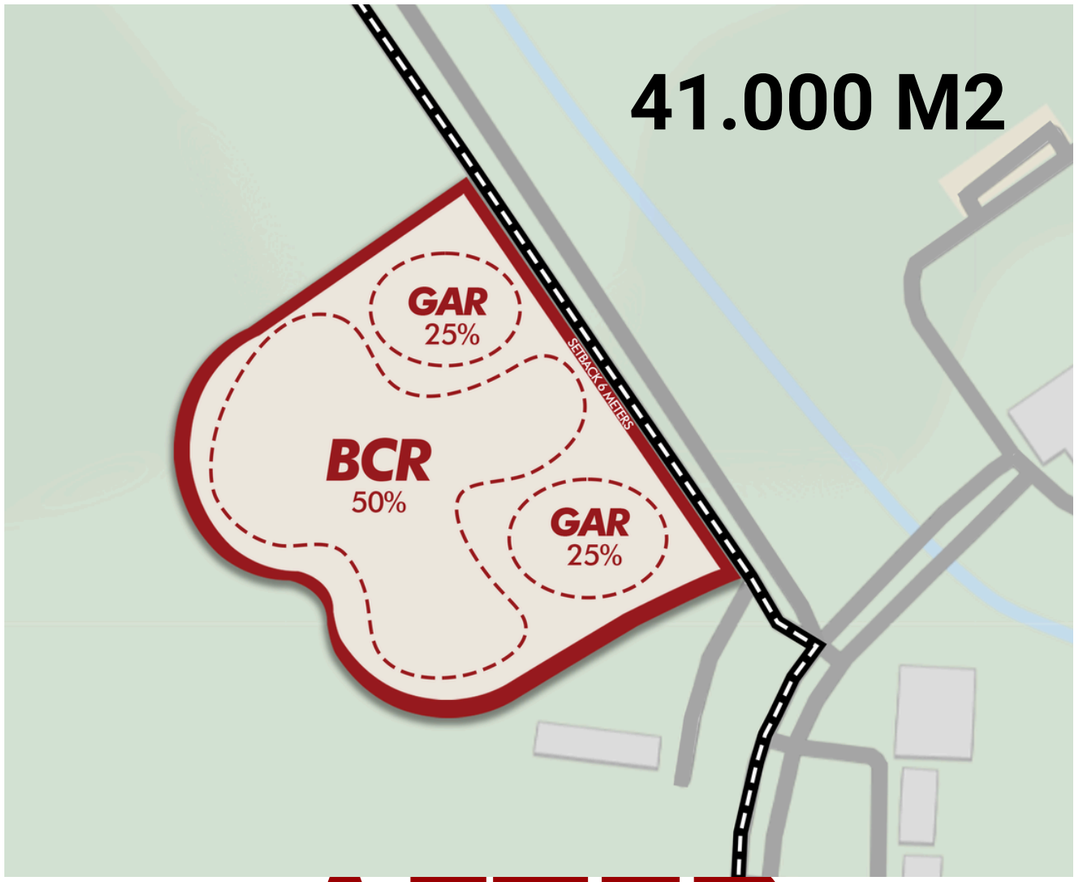


Figure 5.2 Site Size After
Source: *Author, 2025*

Previously, the site was 20,000 m2, but during the design execution, the available land was not suitable for the passive design concept and resulted in buildings that were too dense and close to each other. Furthermore, the BCR ratio of 60% was also one of the factors that made the buildings too dense and lacking in green areas.

As a result, an additional 21,000 m² of site area **was added with a BCR ratio of 50%**. The expansion of the site area was carried out organically according to building mass and space requirements, as there was flexibility in choosing boundaries at the site design. **Thus, the total new site area amounts to 40,000 m².**

5.2 DESIGN IMPROVEMENT

5.2.2 The Changes in Building Mass Shape & Arrangement

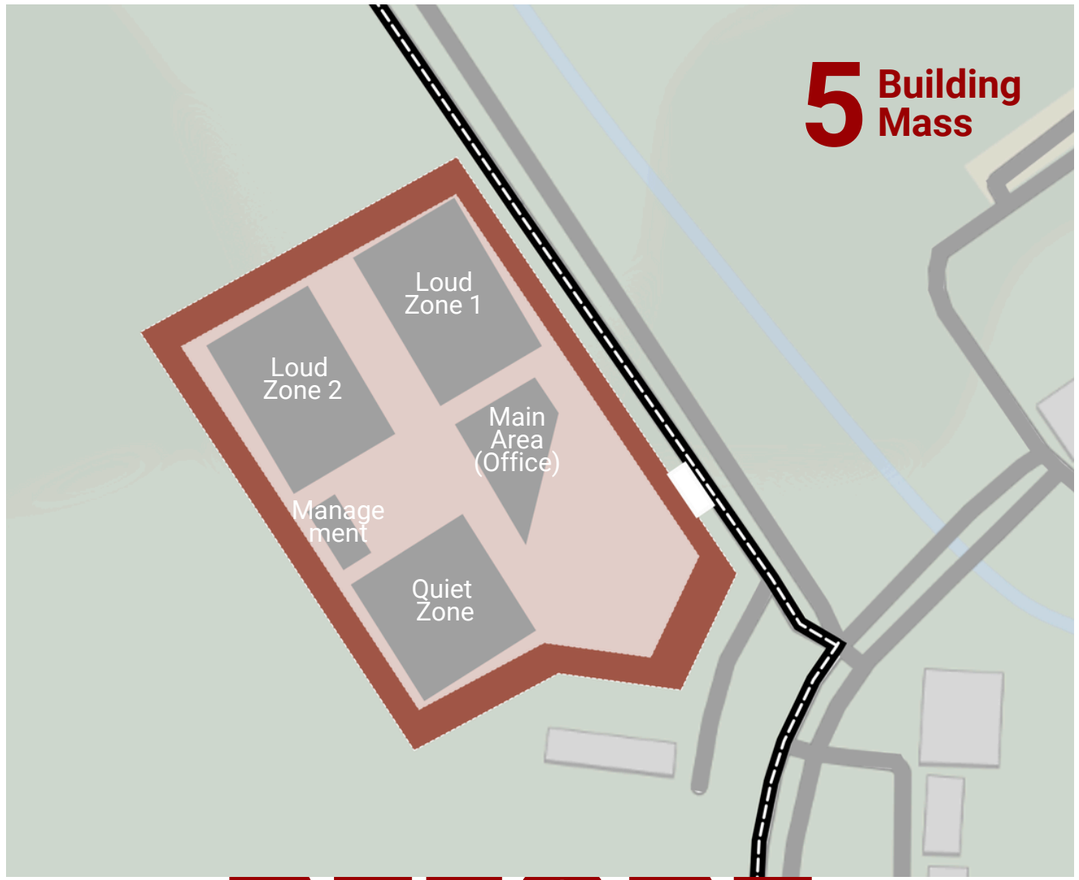


Figure 5.3 Building Mass Before
Source: *Author, 2025*

Previously, the building mass was rigid with a boxy shape and consisted of five building masses. However, this mass was too wasteful of space. The arrangement of the building mass was too rigid and its shape was inefficient in terms of passive design, especially air circulation.



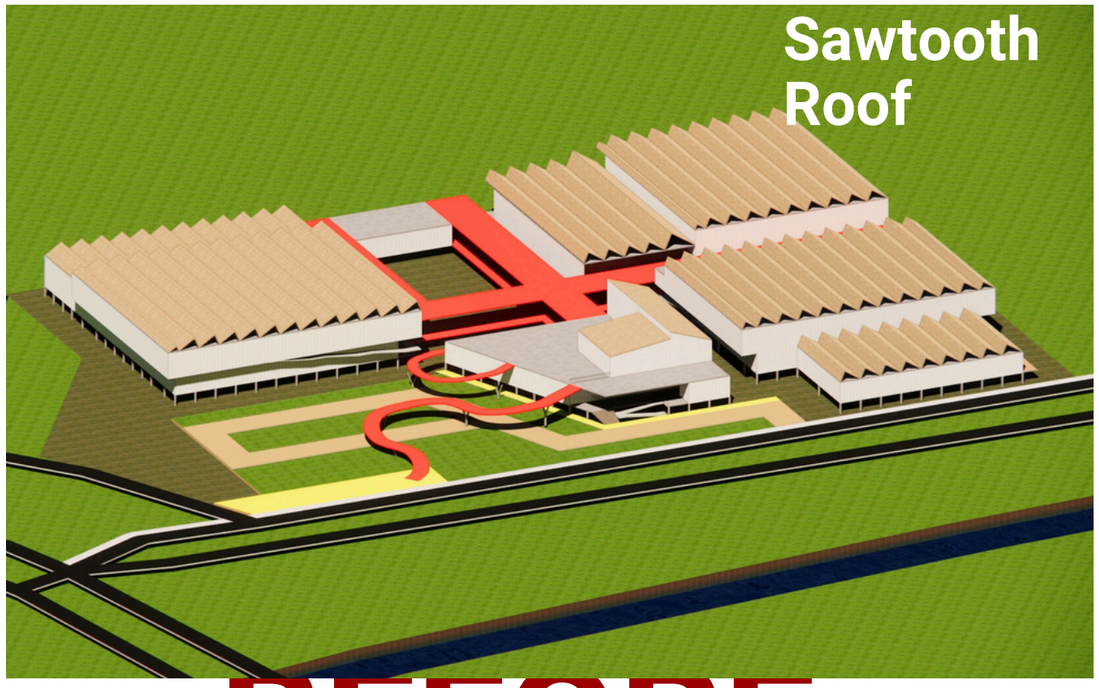
Figure 5.4 Building Mass After
Source: *Author, 2025*

Therefore, simpler and cleaner changes were made to the mass, but still covering all requirements. Support functions such as management and office were combined in the active zone. This allowed for more efficient use of space. Therefore, the mass of the Active Zone building was enlarged to cover all requirements.

The **building mass was also changed to an elliptical shape to facilitate better air circulation throughout the site**, with a total of three more compact masses of different sizes adjusted to the direction of the wind.

5.2 DESIGN IMPROVEMENT

5.2.3 The Changes in Building Roof Structure & Shape



BEFORE

Figure 5.5 Building Roof Shape Before
Source: *Author, 2025*



AFTER

Figure 5.6 Building Roof Shape After
Source: *Author, 2025*

The previous roof design featured a sawtooth roof with a passive design concept that included openings in the roof for sunlight and cross ventilation. However, this shape was too rigid, resembling an industrial design, and was not suitable for implementation in sports buildings. In addition, there were weaknesses in the passive roof design concept, which was difficult to maintain, especially during rain.

The **roof was designed with two different expressions: smooth and embossed.** The Active Zone building has an embossed expression with a higher ratio to show its stronger character as the main building. Meanwhile, the other roofs have a combination of smooth surfaces.

The passive design aspect of the roof is to combine the function of the roof as a facade to block sunlight and reduce wind. Then, openings on the sides of the roof are used to avoid direct sunlight entering the building.

5.2 DESIGN IMPROVEMENT

5.2.4 The Changes in Building Facade

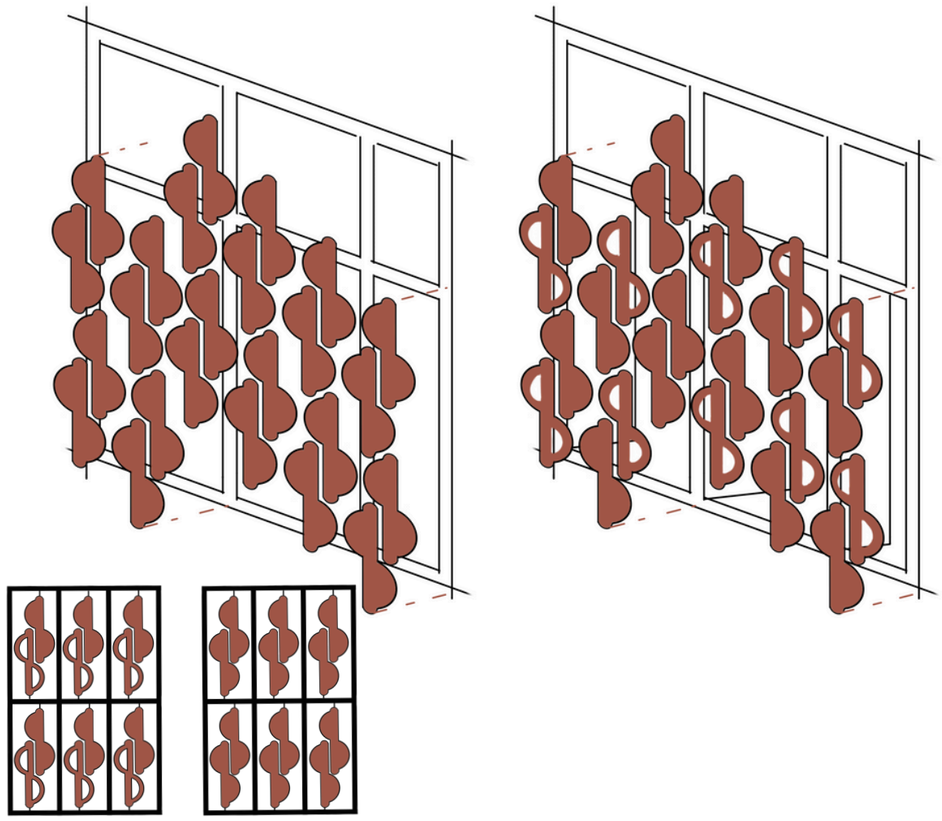


Figure 5.7 Facade Shape Before
Source: *Author, 2025*

In the previous design, the facade used ACP panels adapted from the shape of paving blocks. The facade had two types of panels, void and solid. The solid panels were intended to block sunlight, while the void panels were intended to provide ventilation for the building. In addition, the panels could be rotated according to the direction of the wind.

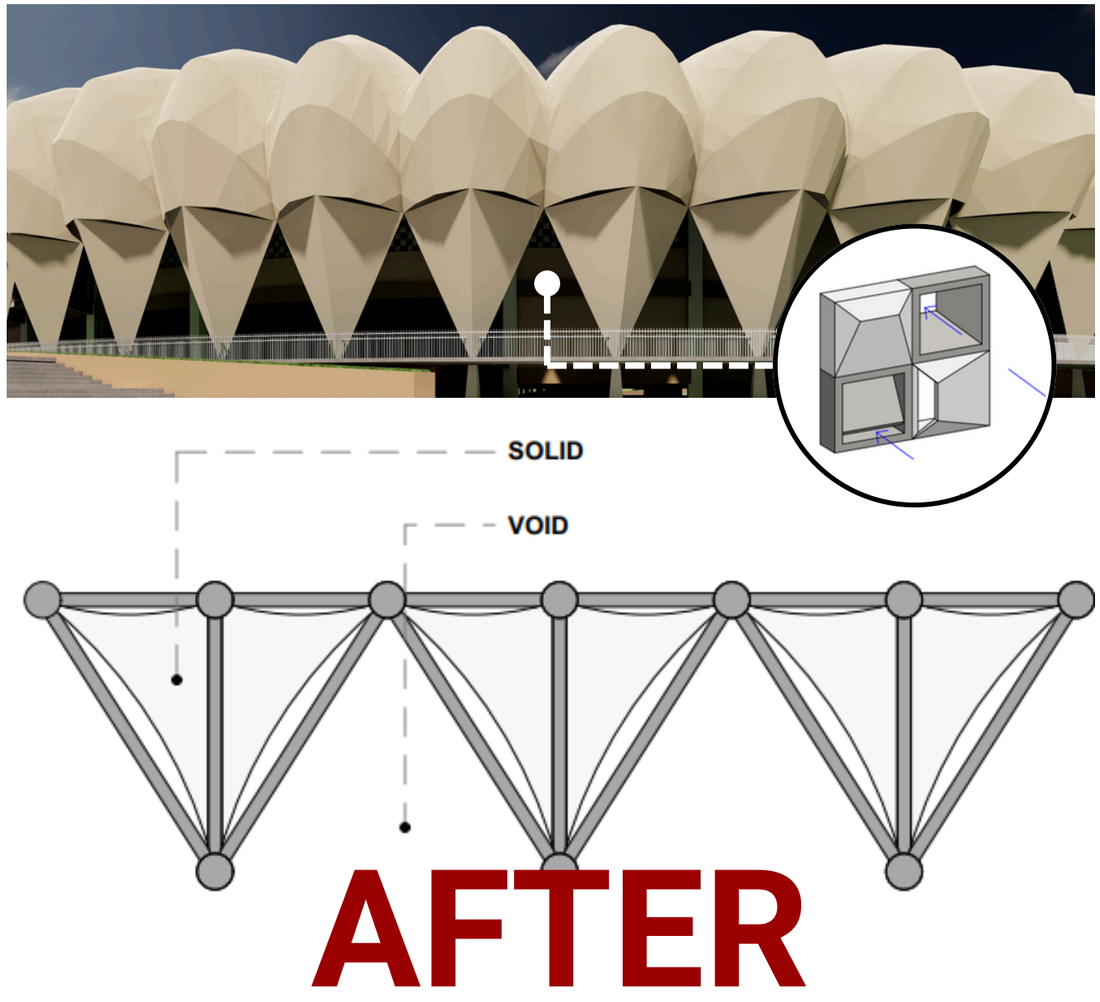


Figure 5.8 Facade Shape After
Source: *Author, 2025*

However, the **facade was changed to be more appropriate to the design context** and blended in with the roof, while still maintaining the original concept. **The facade is formed from the roof structure** covered with tensile material so that it **retains the concept of solid and void.** Behind the main facade is a perforated wall on the building wall that allows a breeze to enter the room, especially on the sports field.

Final Design Development

5.3 FINAL DESIGN DEVELOPMENT

5.3.1 Situation Plan

In the site plan, this site has three main building areas: A is the Active Zone, B is the Quiet Zone, and C is the Power Zone. The three masses of this building have elliptical shapes with different sizes that impact from spatial requirements and passive design aspects.

The area surrounding the building has supporting facilities such as a central parking area, disabled parking, and open spaces with landscaping that are accessible to the public.

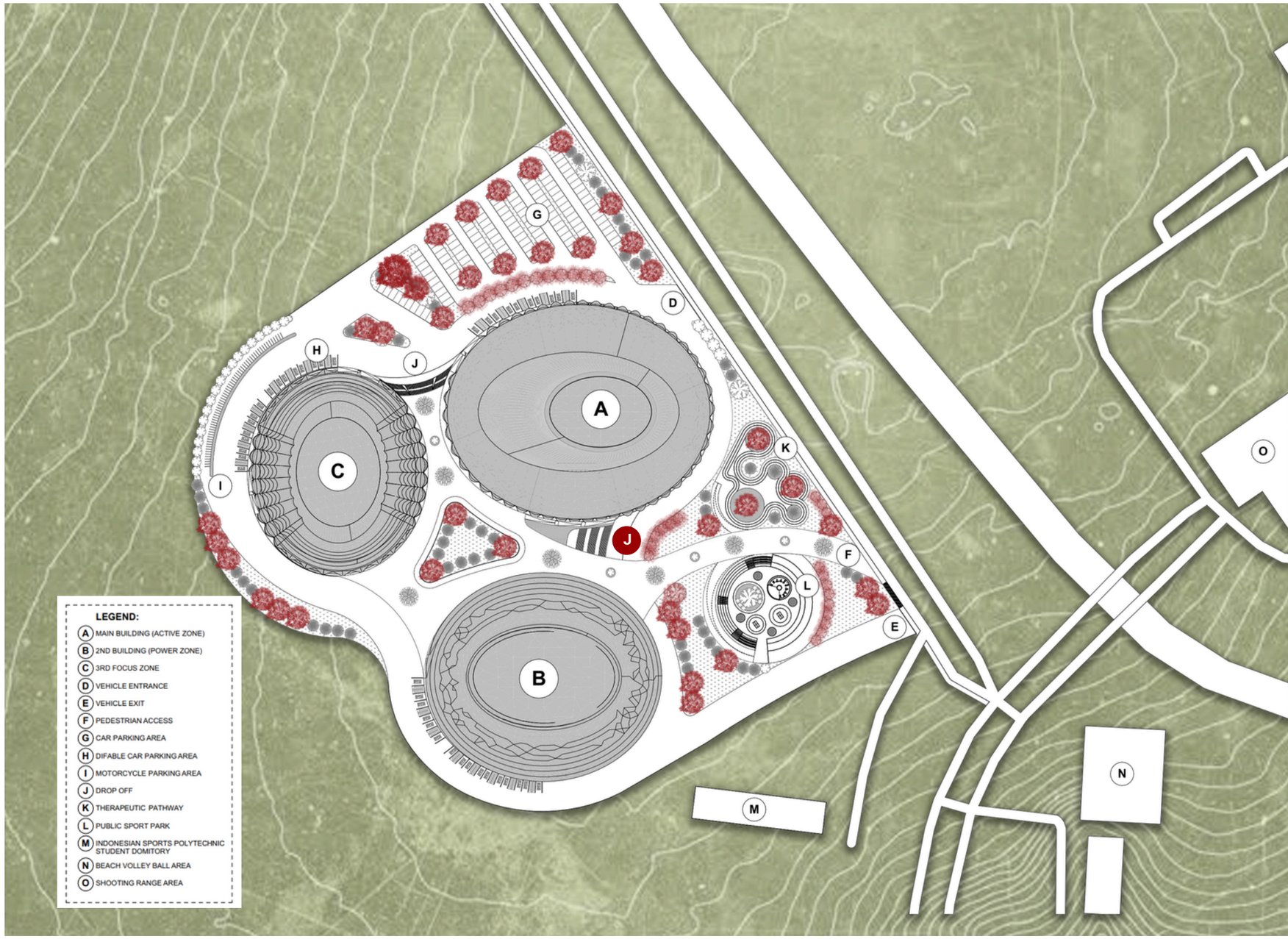


Figure 5.9 Situation Plan
Source: *Author, 2025*

5.3 FINAL DESIGN DEVELOPMENT

5.3.2 Site Plan

The site plan explains the design area, starting from accessibility, the main building, the landscape, and the surrounding conditions. Vehicle access is indicated by the letter D, which is close to the main building. From the vehicle access, there are two drop-off points indicated by the letter J. However, the drop-off point equipped with a ramp is indicated by the red letter J, where there are two access points, stairs and a ramp.

User accessibility is indicated by F with vegetation in the middle of the road to provide shade.

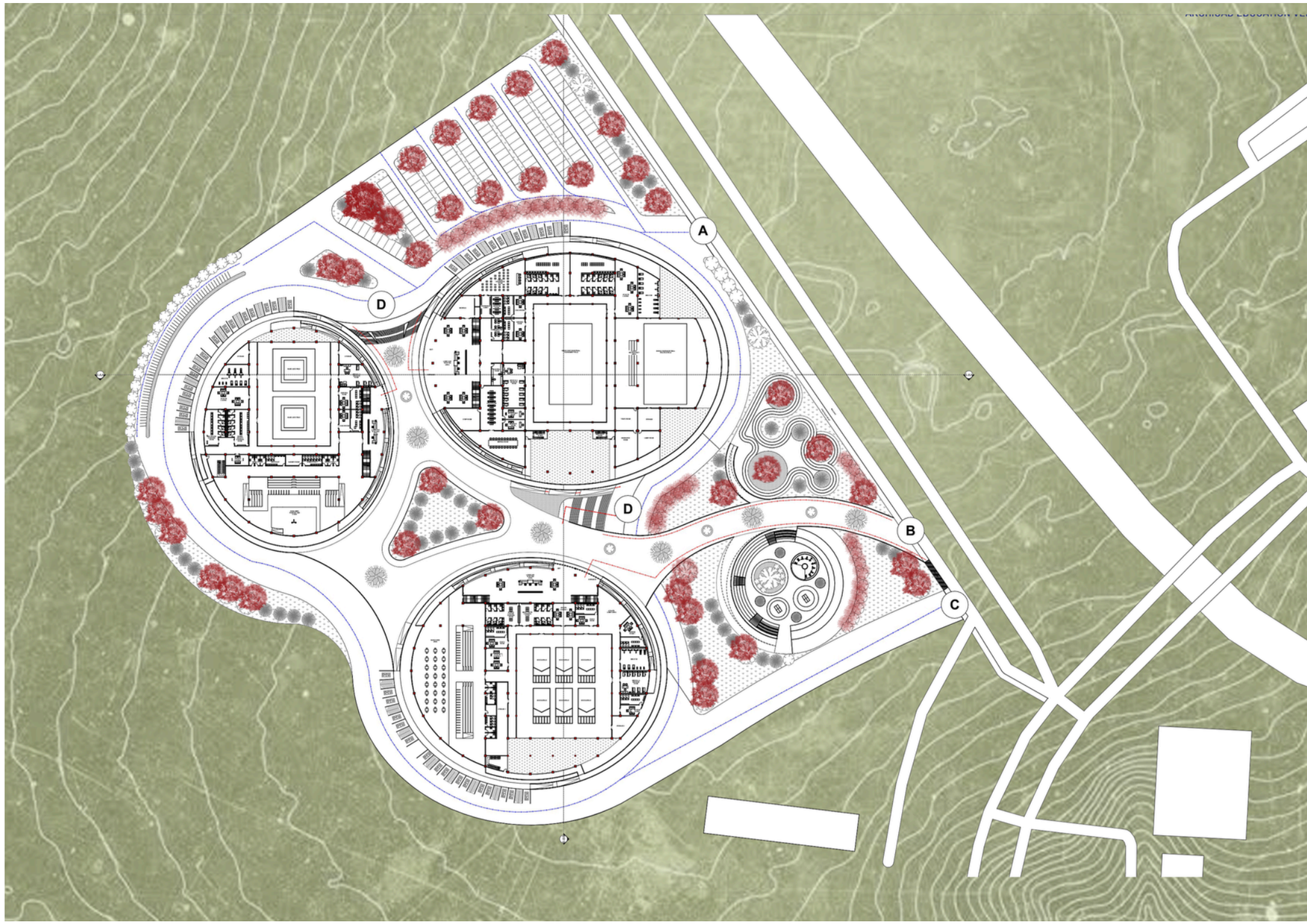


Figure 5.10 SIte Plan
Source: *Author, 2025*

5.3 FINAL DESIGN DEVELOPMENT

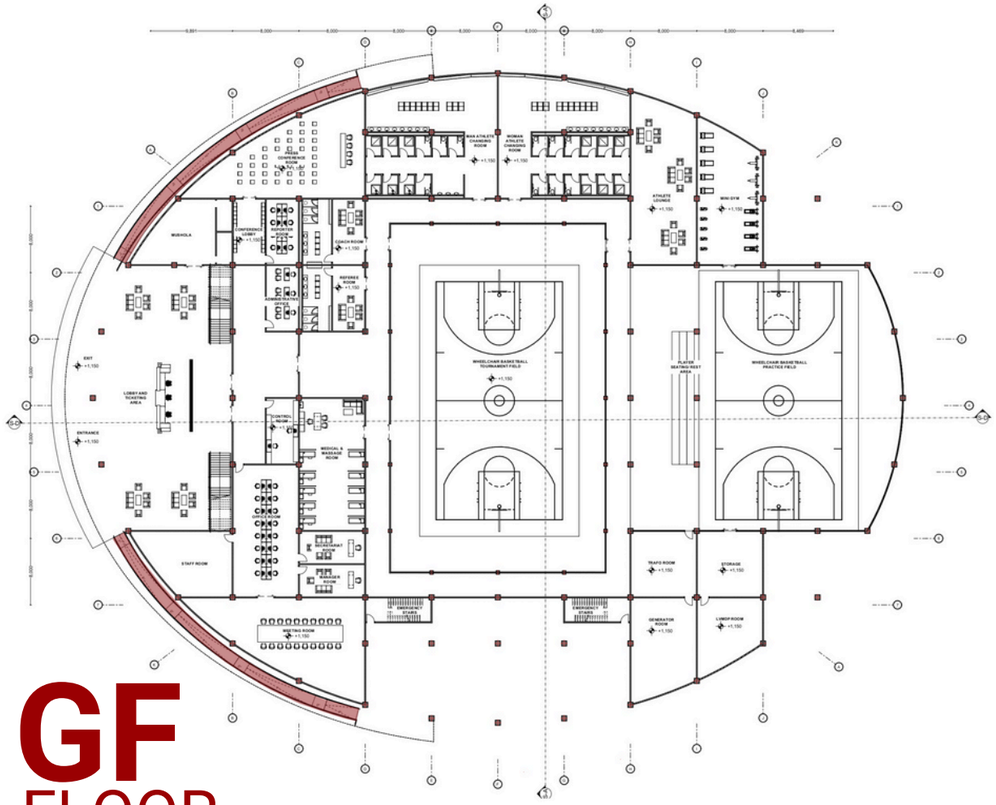


Figure 5.11 Active Zone Floor Plan GF
Source: *Author, 2025*

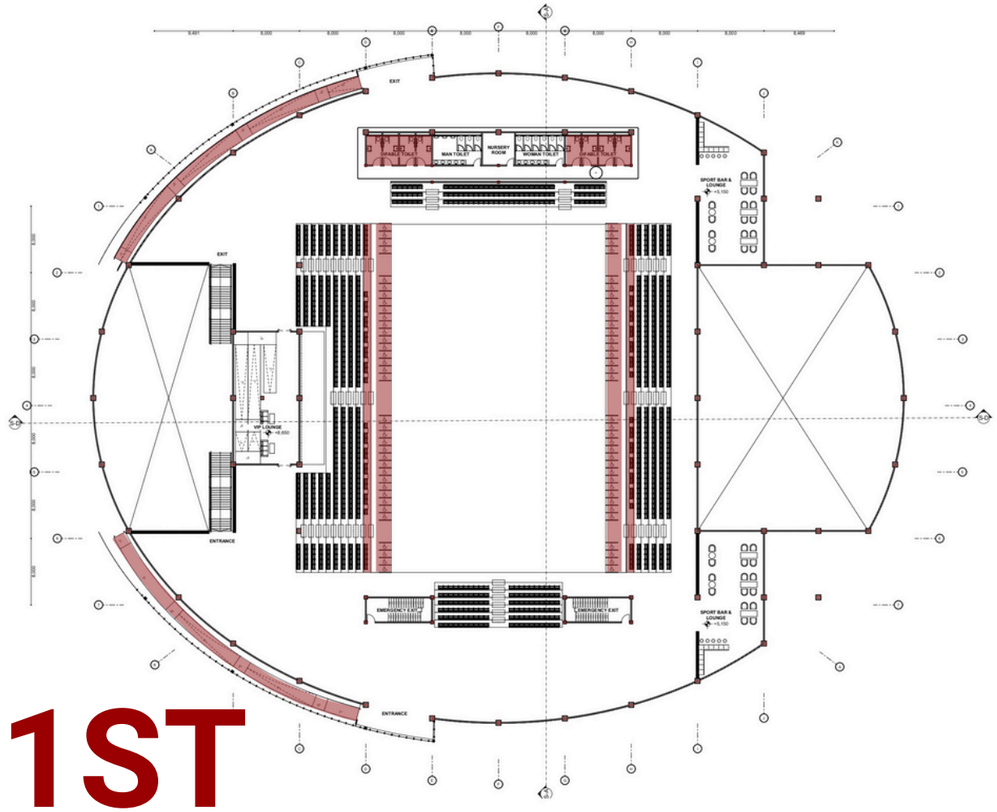


Figure 5.12 Active Zone Floor Plan 1ST Floor
Source: *Author, 2025*

5.3.3 Floor Plan (Active Zone)

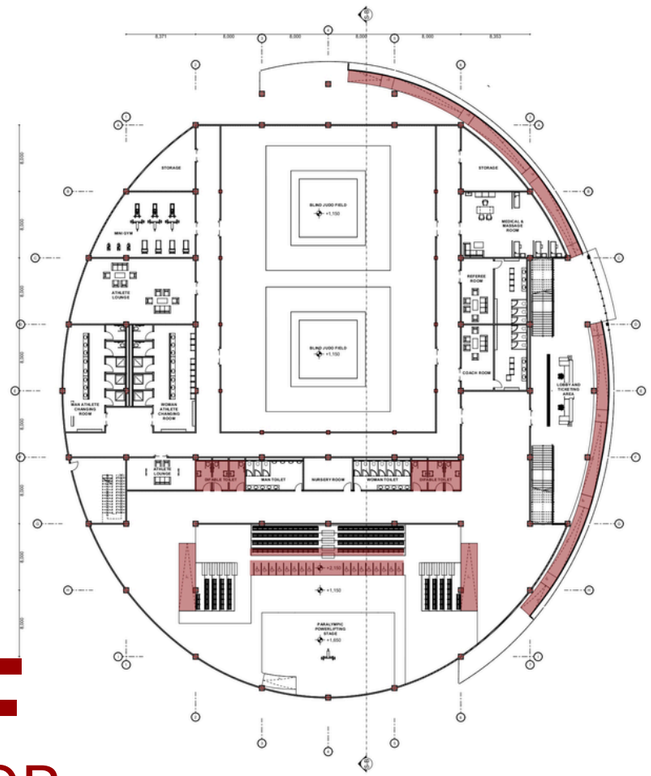
This building consists of a basketball court, which has two courts. One is a competition court and the other is a practice court. There is a difference between the two, in the practice court does not have a tribune area.

Then, difable access uses a ramp that surrounds the building. The spectator facilities in the tribune have a specific area for difable users. It is located at the front of the tribune. The shape of the tribune in this crowd fills every side of the field, forming a rectangle. form

LEGEND:

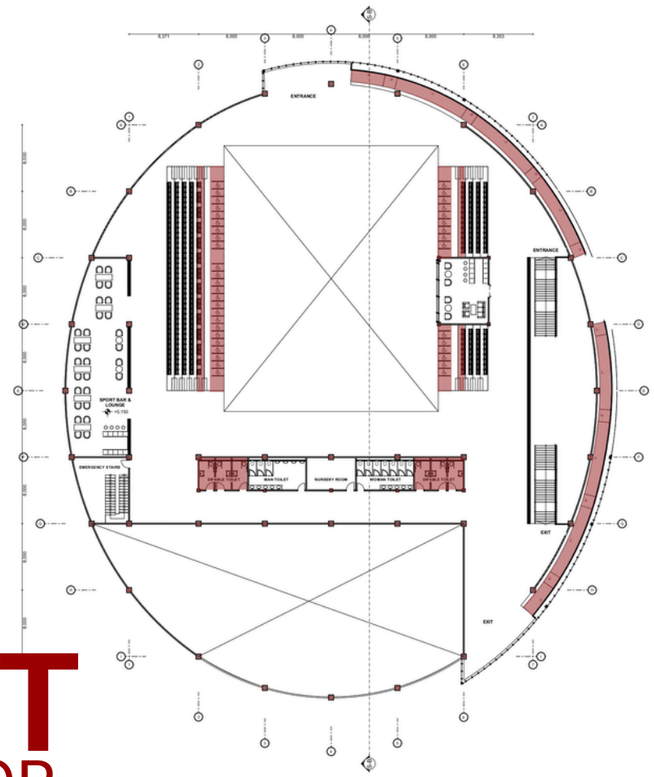
Special facility and accessibility for difable

5.3 FINAL DESIGN DEVELOPMENT



GF FLOOR

Figure 5.13 Power Zone Floor Plan GF
Source: *Author, 2025*



1ST FLOOR

Figure 5.14 Power Zone Floor Plan 1ST Floor
Source: *Author, 2025*

5.3.4 Floor Plan (Power Zone)

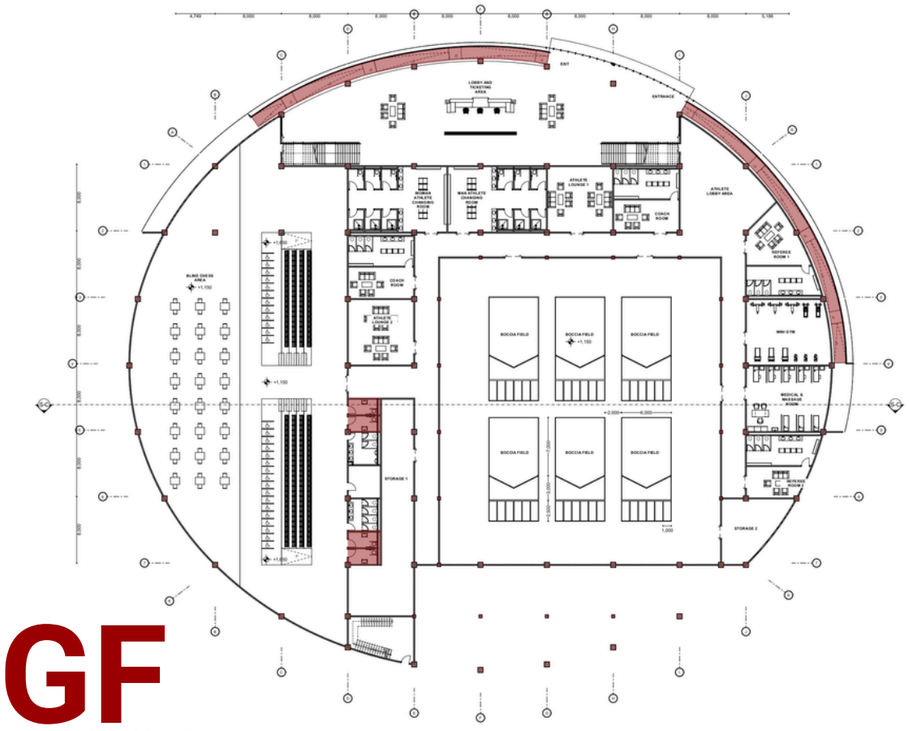
The power zone has two sports branches, blind judo and Paralympic powerlifting. These two sports branches have different entrances for visitors. The blind judo visitor area is located on the 1st floor, while the Paralympic powerlifting visitor area is located on the ground floor.

LEGEND:

Special facility and accessibility for difable

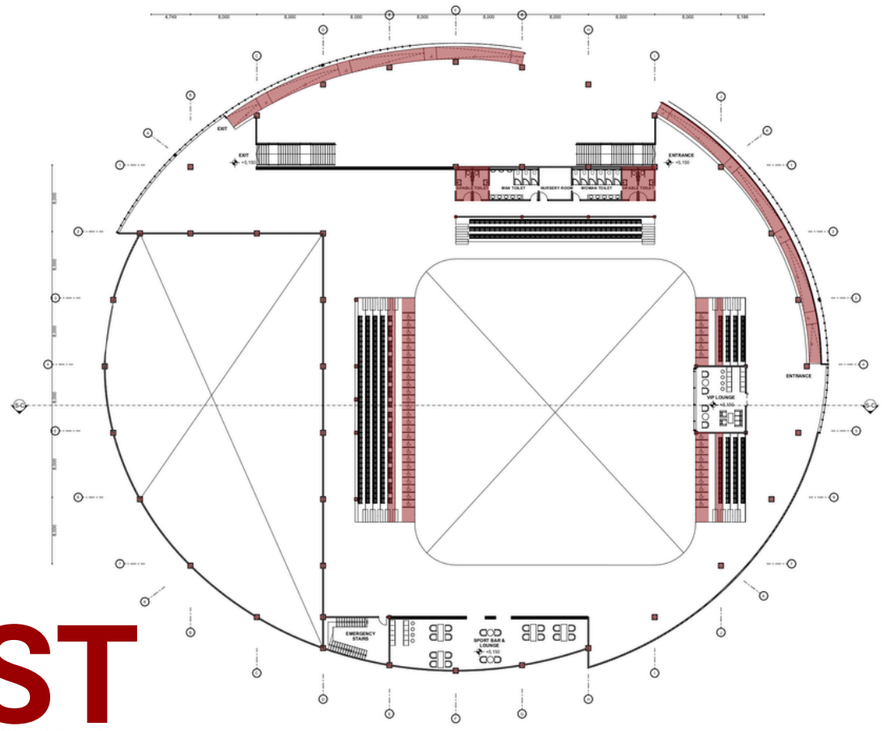
On the 1st floor, the crowd is about the same as before, with a special area for people with disabilities and special facilities for them, such as accessible toilets. The shape of the stands in this crowd only covers two sides, namely the right and left sides of the field.

5.3 FINAL DESIGN DEVELOPMENT



GF FLOOR

Figure 5.15 Quiet Zone Floor Plan GF
Source: *Author, 2025*



1ST FLOOR

Figure 5.16 Quiet Zone Floor Plan 1ST Floor
Source: *Author, 2025*

5.3.5 Floor Plan (Quiet Zone)

The quiet zone juga memiliki dua cabang olahraga yang terdiri dari boccia dan blind chess. Secara tata letak ruang massa ini satu typical dengan massa power zone. Dimana area penonton boccia berada di 1ST sedangkan area penonton blind chess berada di GF.

On the 1st floor, the crowd is about the same as before, with a special area for people with disabilities and special facilities for them, such as accessible toilets. The shape of the tribune in this mass fills three sides of the field, forming a U-shaped tribune.

5.3 FINAL DESIGN DEVELOPMENT

5.3.6 Elevation

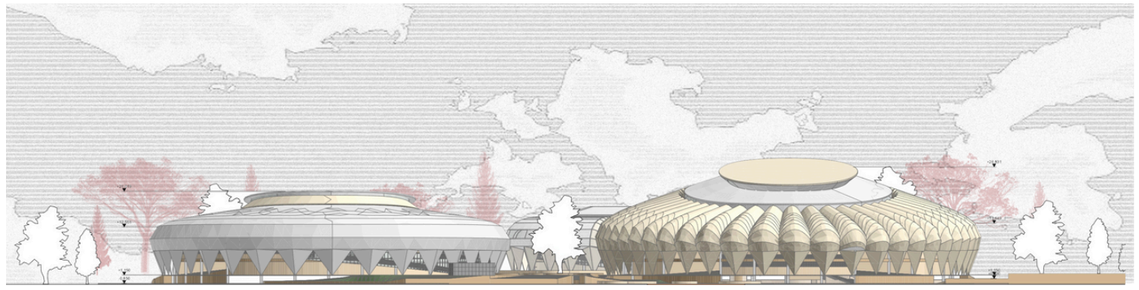


Figure 5.17 East Elevation
Source: *Author, 2025*

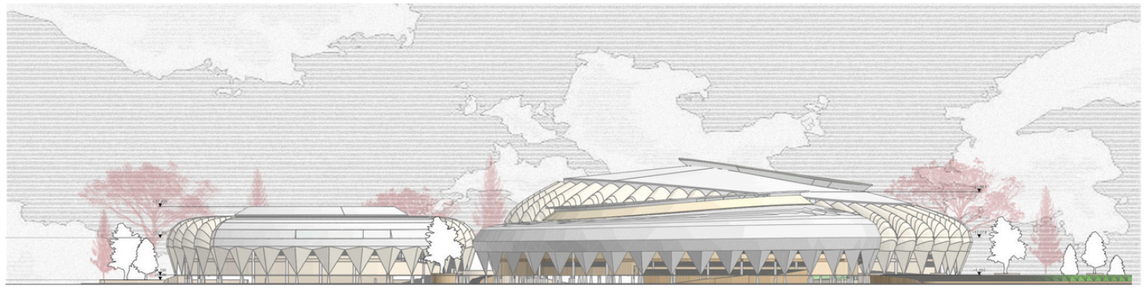


Figure 5.18 South Elevation
Source: *Author, 2025*

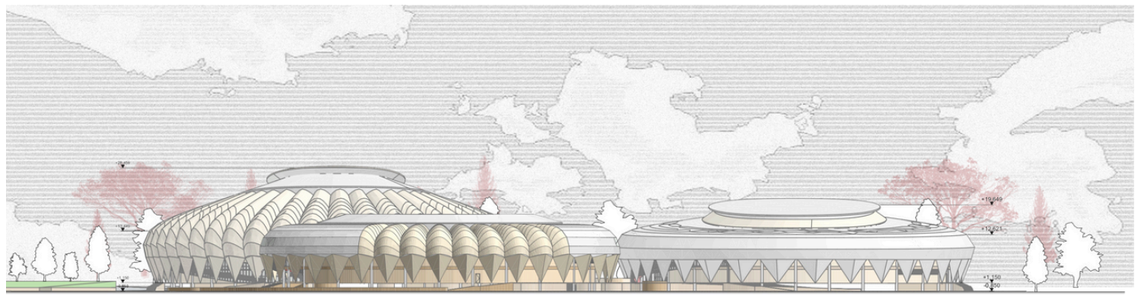


Figure 5.19 West Elevation
Source: *Author, 2025*

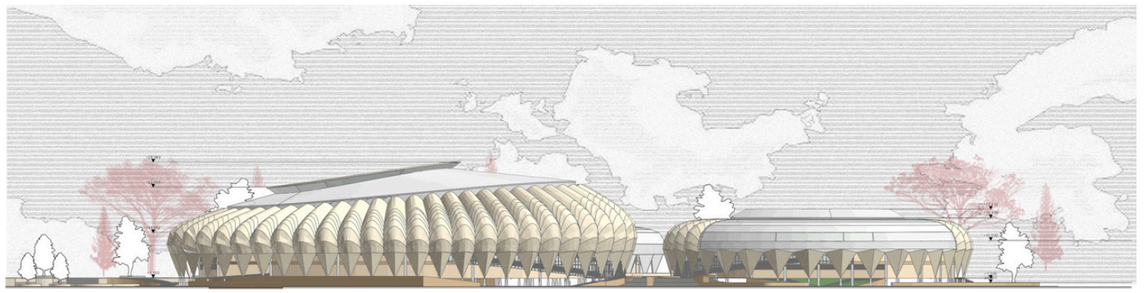


Figure 5.20 North Elevation
Source: *Author, 2025*

5.2 FINAL DESIGN DEVELOPMENT

5.3.7 Site Section

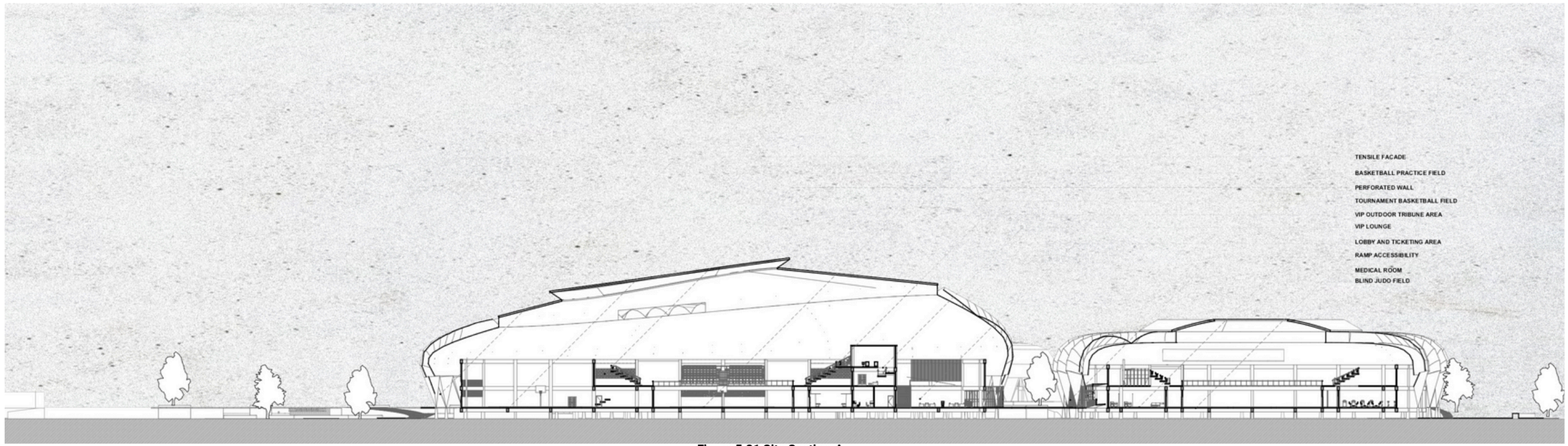


Figure 5.21 Site Section-A
Source: *Author, 2025*

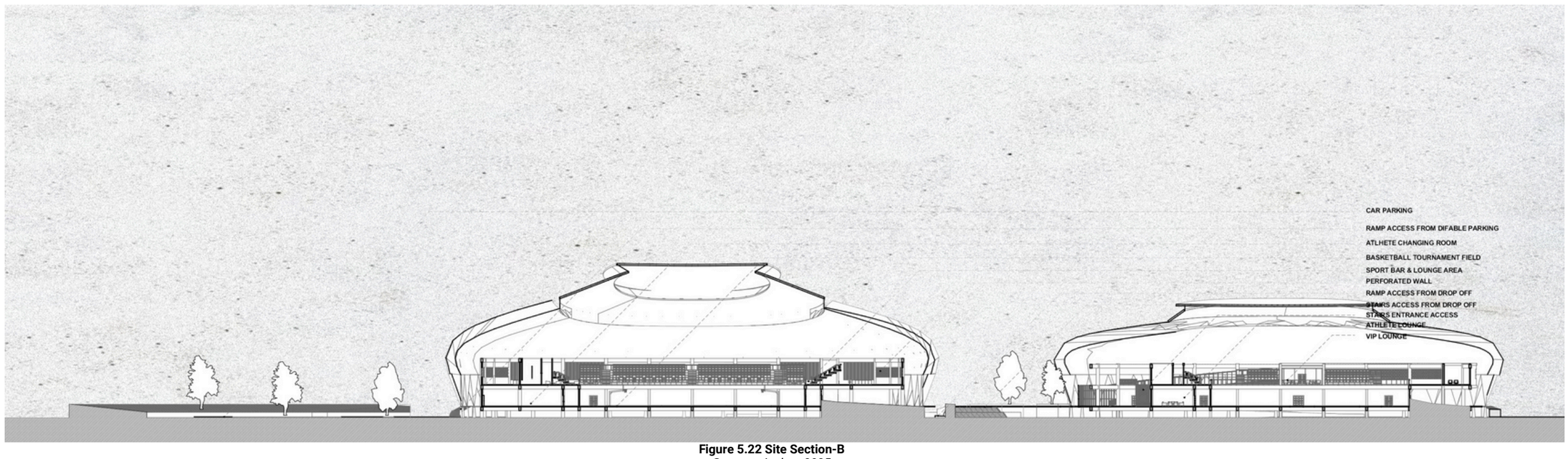
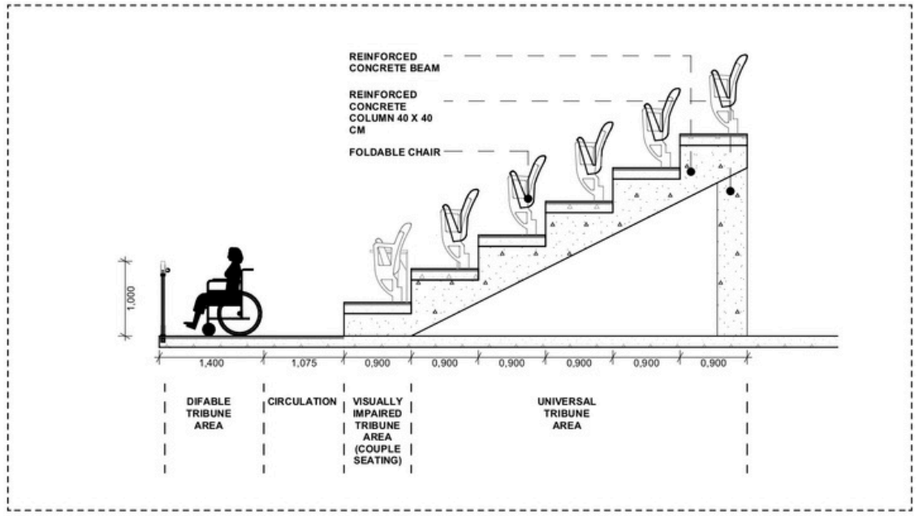
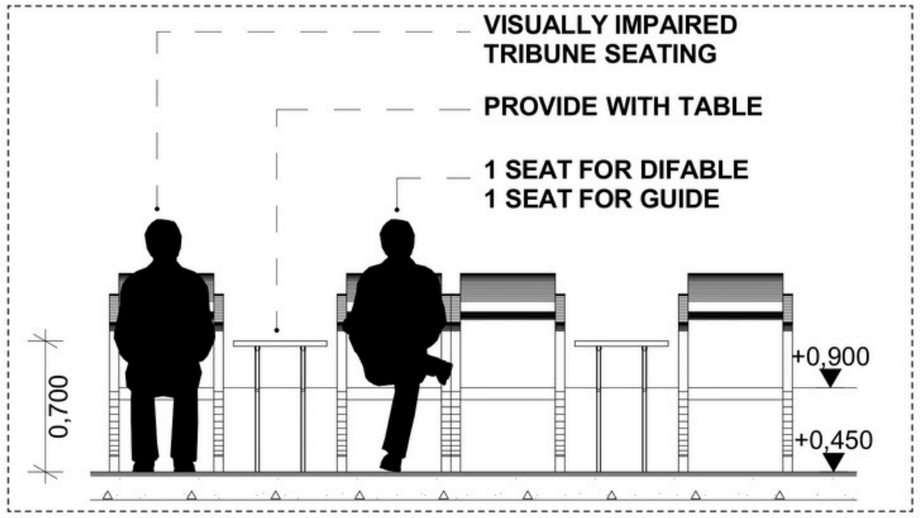


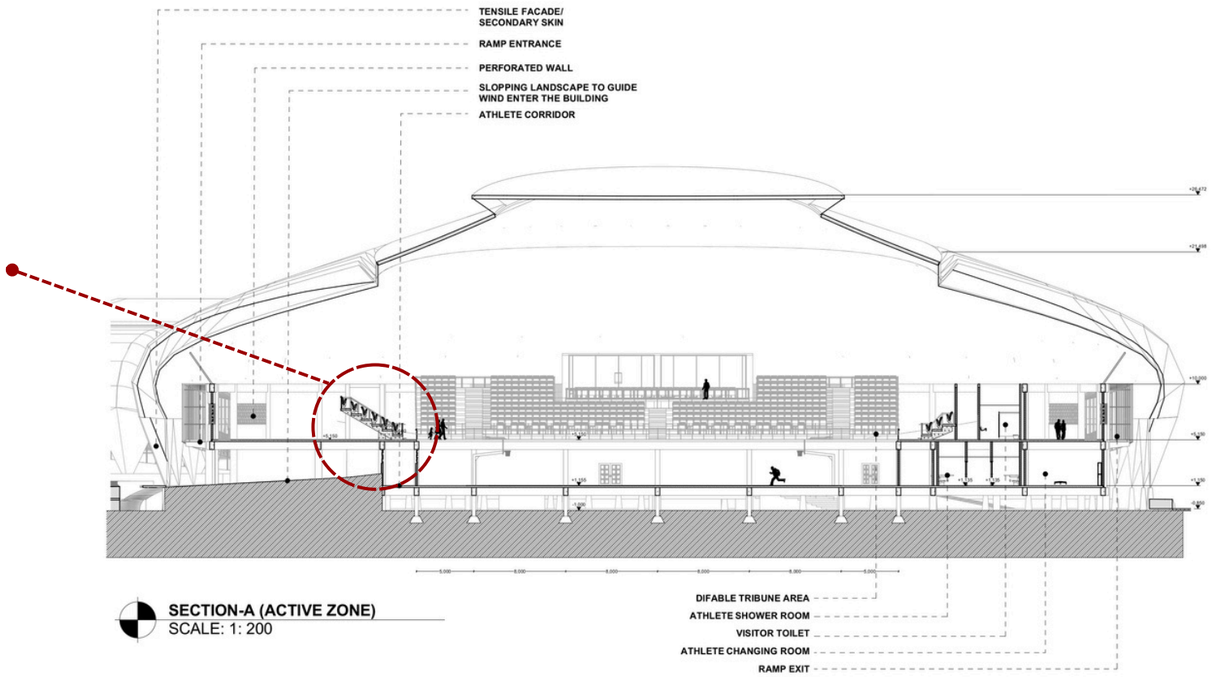
Figure 5.22 Site Section-B
Source: *Author, 2025*



TRIBUNE SEATING SECTION DETAIL
SCALE: 1:20

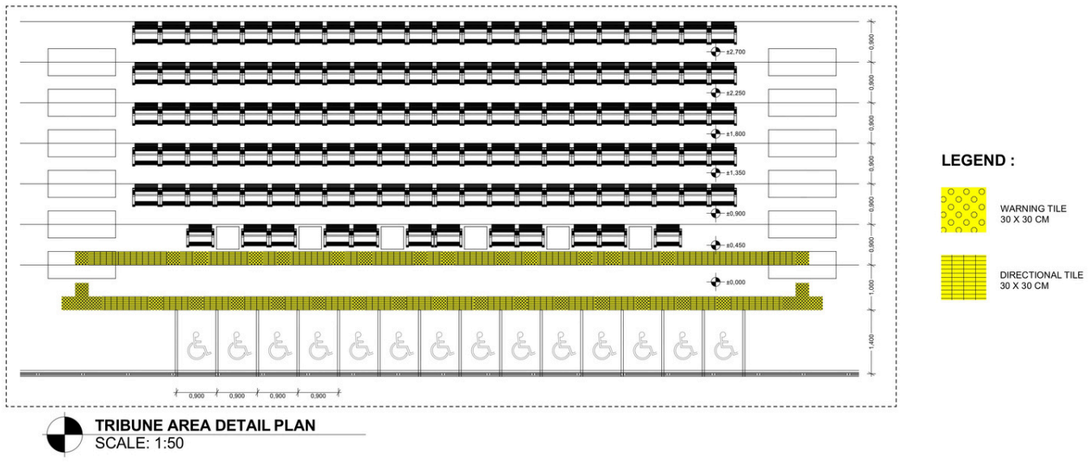


COUPLE TRIBUNE SEATING DETAIL
SCALE: 1:20



SECTION-A (ACTIVE ZONE)
SCALE: 1: 200

Figure 5.23 Section-A & Tribune Detail
Source: *Author, 2025*

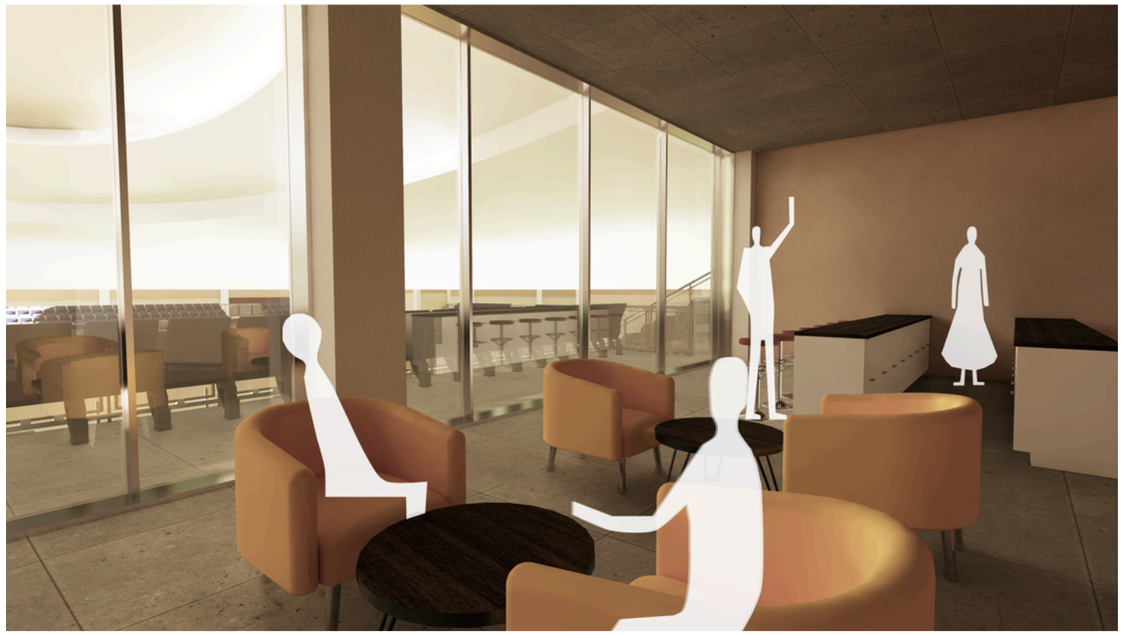


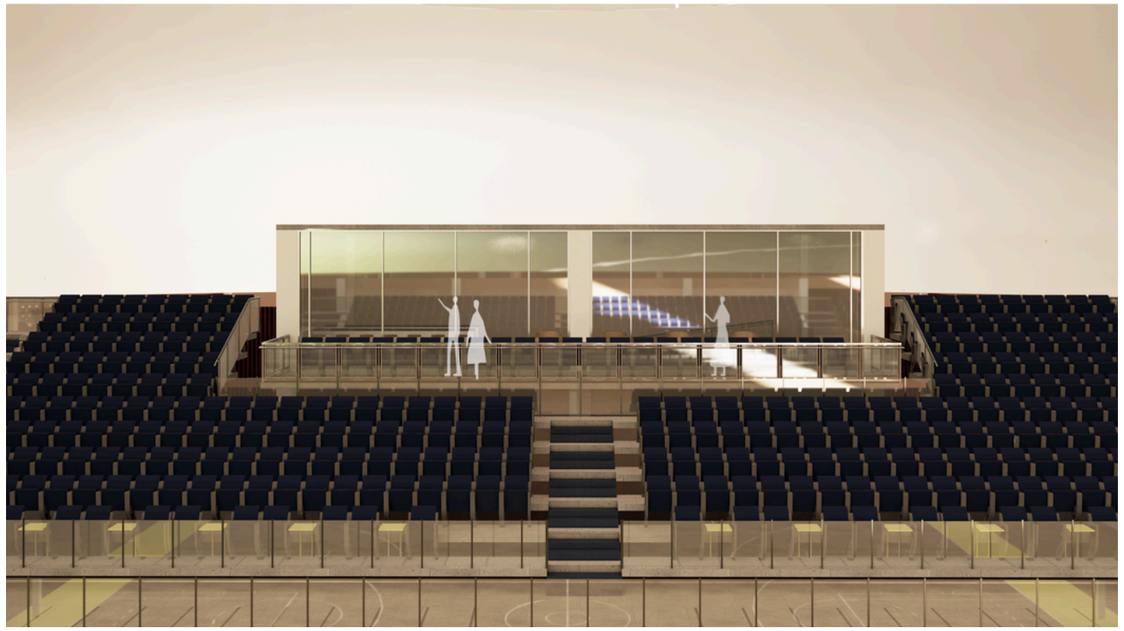
TRIBUNE AREA DETAIL PLAN
SCALE: 1:50

5.3 FINAL DESIGN DEVELOPMENT

5.3.8 Section & Tribune Detail

The spectator stands are divided into three sections, with the ground level reserved for disabled users. The first level is reserved for visually impaired people who need someone to accompany them and provide live commentary on the match, so the stands are designed as couple seating. The second level and above are general stands that can be used by anyone. Access to the stands is facilitated by paving blocks, especially on the ground level and first level.





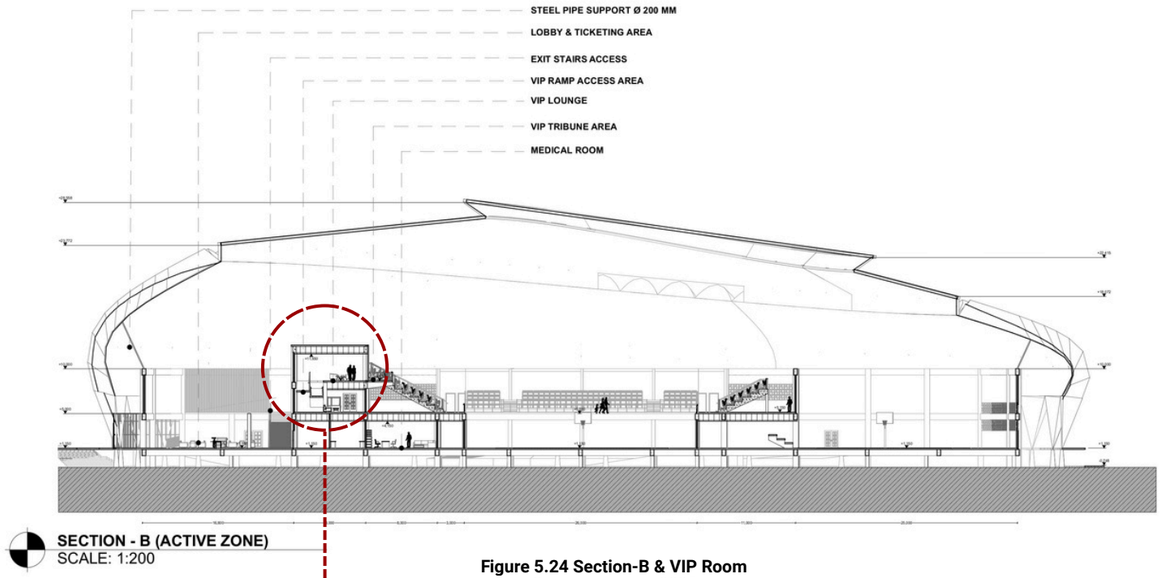
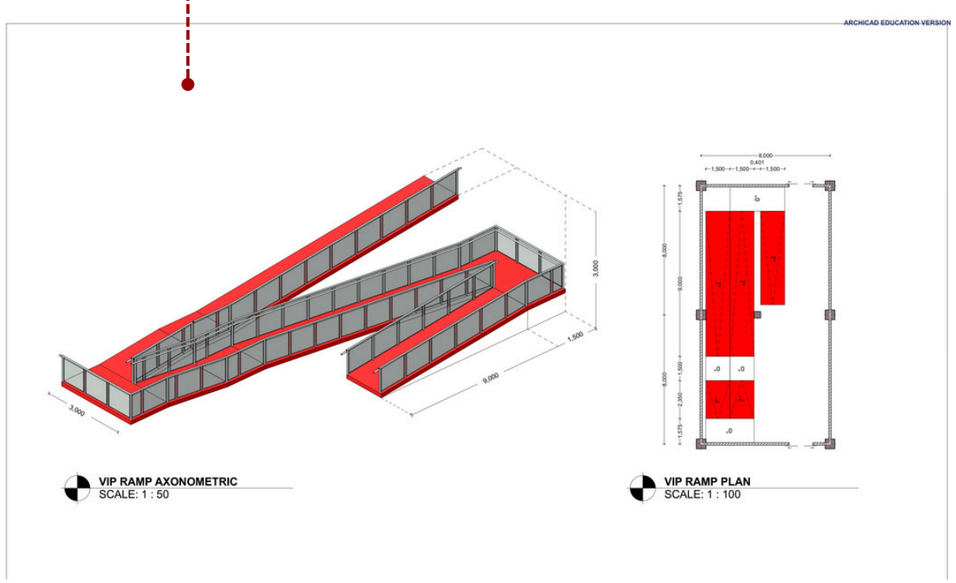


Figure 5.24 Section-B & VIP Room
Source: *Author, 2025*



5.3 FINAL DESIGN DEVELOPMENT

5.3.9 Section & VIP Room Accessibility Detail

The VIP room consists of two areas, first is a lounge where spectators can relax and enjoy a more private space. However, the VIP room also provides tribune area on the outside but has an area that is separate from the tribune area In addition, the VIP room also uses ramp access so that the VIP room is accessible to all visitors.

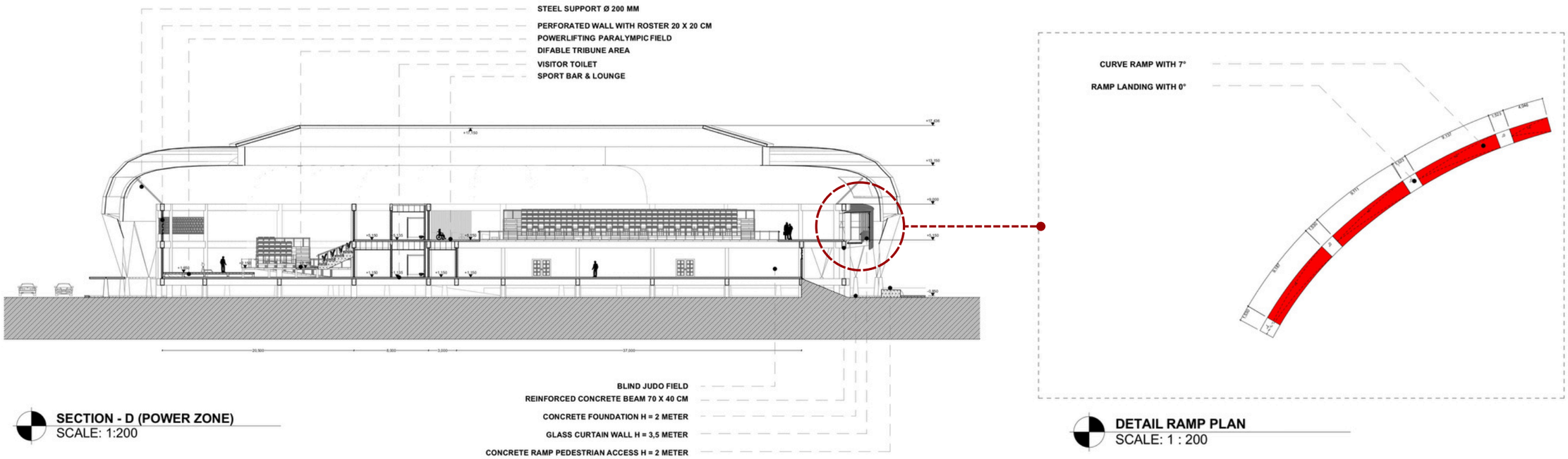
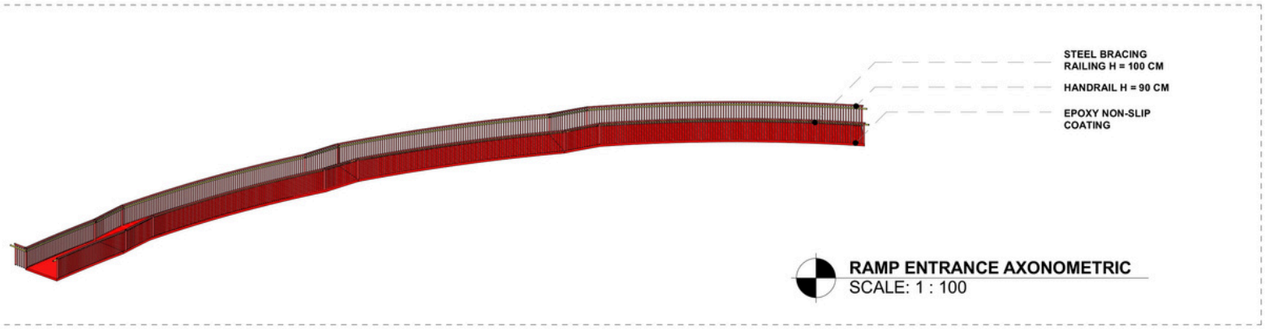


Figure 5.25 Section-C & Ramp Accessibility
Source: *Author, 2025*

5.3 FINAL DESIGN DEVELOPMENT

5.3.10 Section & Ramp Accessibility

Vertical transportation access for difable users is provided by a ramp that surround the building. The ramp has a linear circulation flow, therefore each mass has a ramp entrance and ramp exit. The ramp is also equipped with railings with a height of 100 cm.



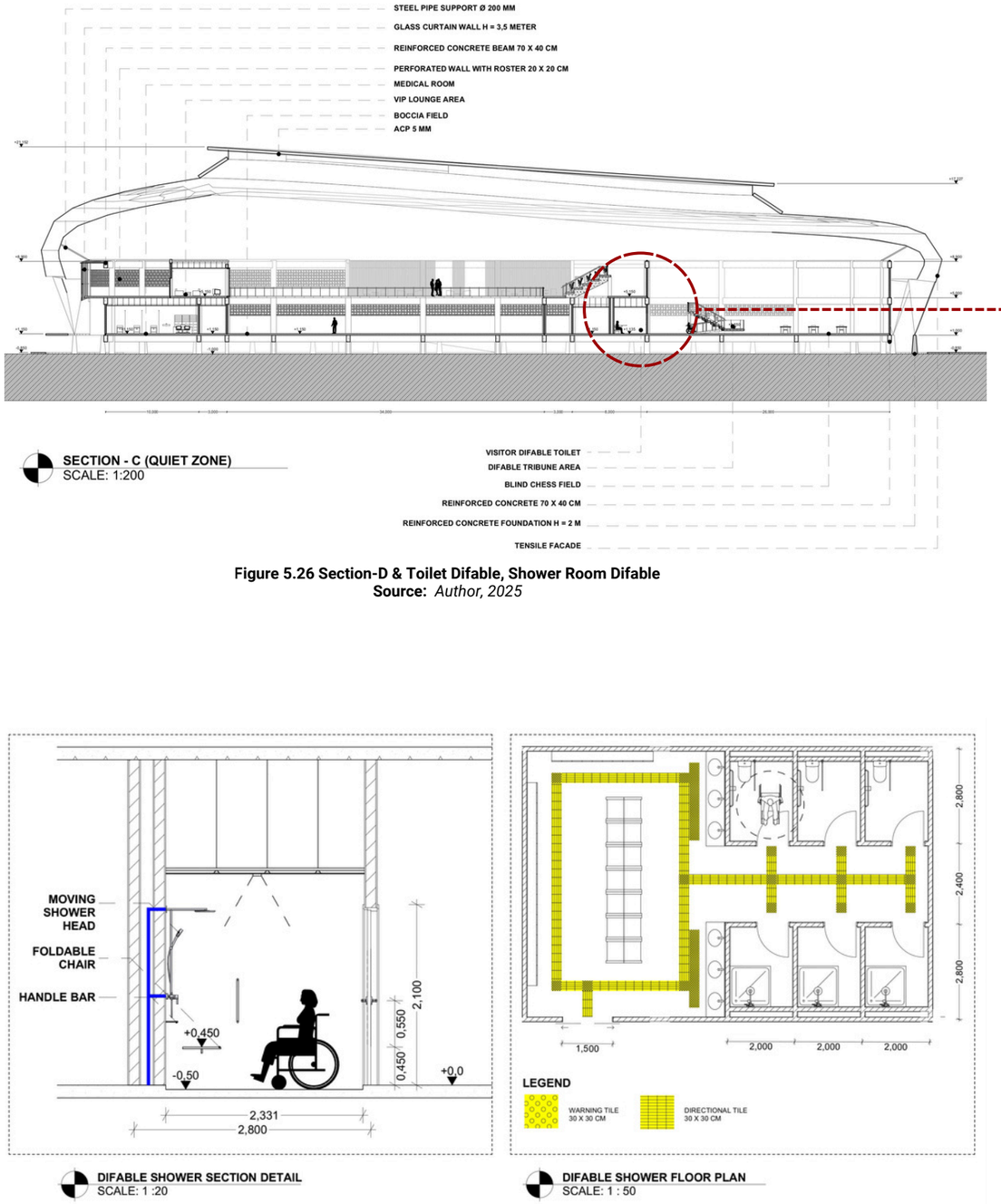


Figure 5.26 Section-D & Toilet Difable, Shower Room Difable
Source: *Author, 2025*



5.3 FINAL DESIGN DEVELOPMENT

5.3.11 Section & Difable Toilet, Shower Room

Universal toilet designs are available in every area, both in the spectator area and the athlete area. In one tribune area, there are at least four difable toilets for visitors. Meanwhile, the athlete shower rooms are designed using difable bathroom standards with a more spacious shower area and several specifications such as folding chairs and hand bars. Inside the athlete shower room, there are also paving blocks that serve as guides.

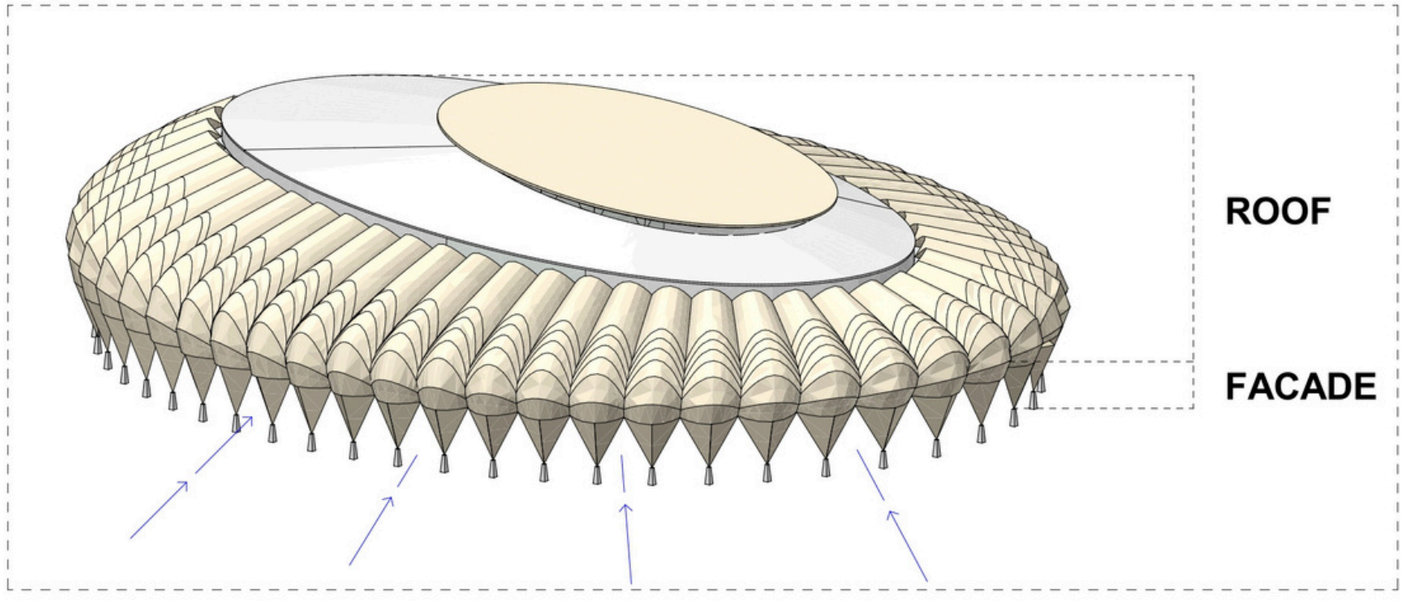
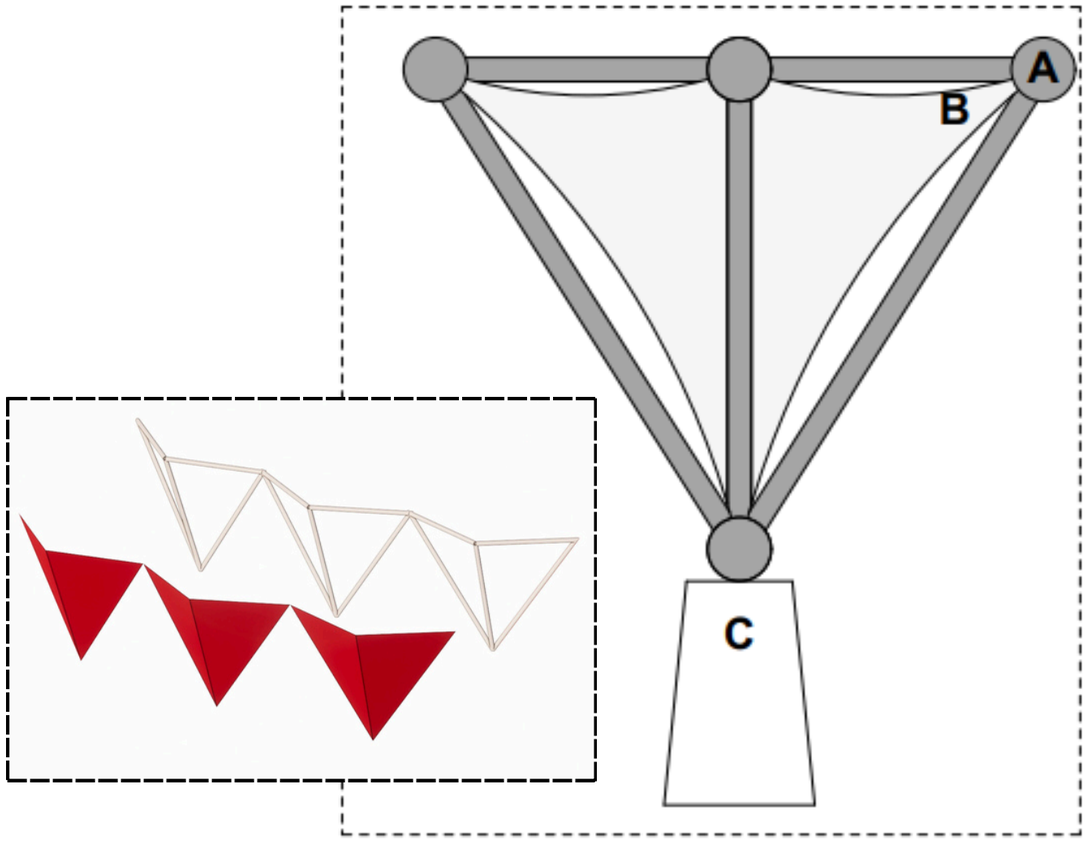


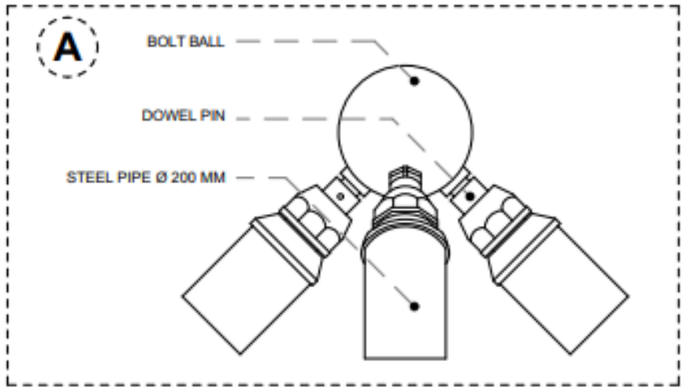
Figure 5.27 Facade Design at Axonometric View
Source: *Author, 2025*

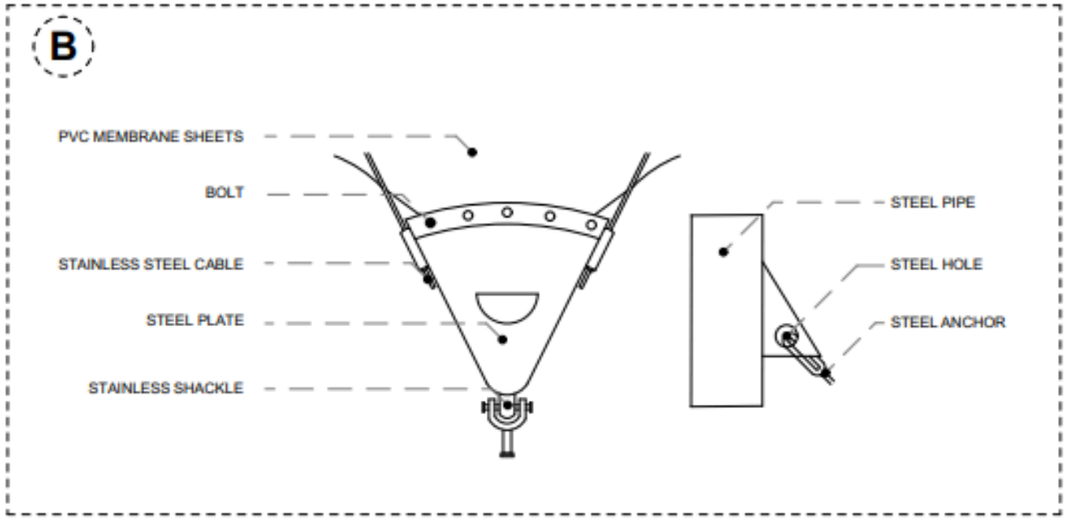
5.3 FINAL DESIGN DEVELOPMENT

5.3.12 Facade Design

The building's facade is shaped based on the roof structure, forming an inverted triangle. The structure is covered with tensile material to create a solid and void facade concept, while still allowing controlled airflow. The use of tensile material on the facade was chosen because it is lightweight and easier to maintain. Additionally, this material is not 100% solid but retains transparency, allowing diffused light to enter the building.







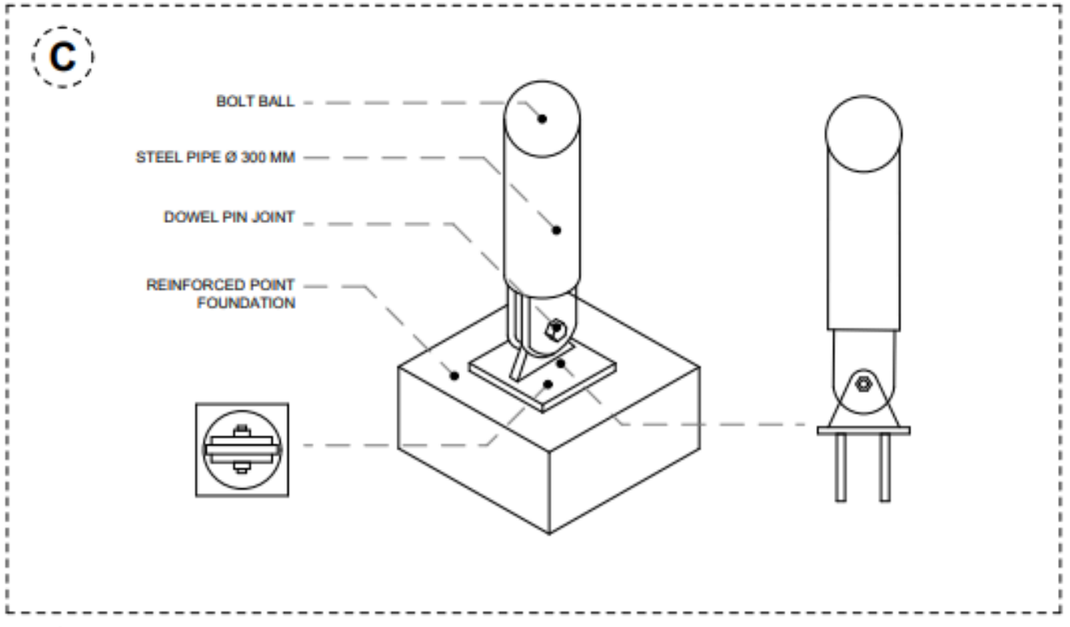


Figure 5.28 Facade Design Construction Detail
Source: *Author, 2025*

5.3 FINAL DESIGN DEVELOPMENT

5.3.12 Facade Design

The facade structure uses space trusses, which are the result of the roof structure being joined together using bolt balls at each corner to form an inverted triangle. Then, tensile material is installed on the structure using steel plates attached to the iron frame of the structure. Finally, the support structure is placed on the foundation points. Therefore each module is arranged in an alternating pattern of solid and void.

5.3 FINAL DESIGN DEVELOPMENT

5.2.13 Facade Design CFD Simulation Result

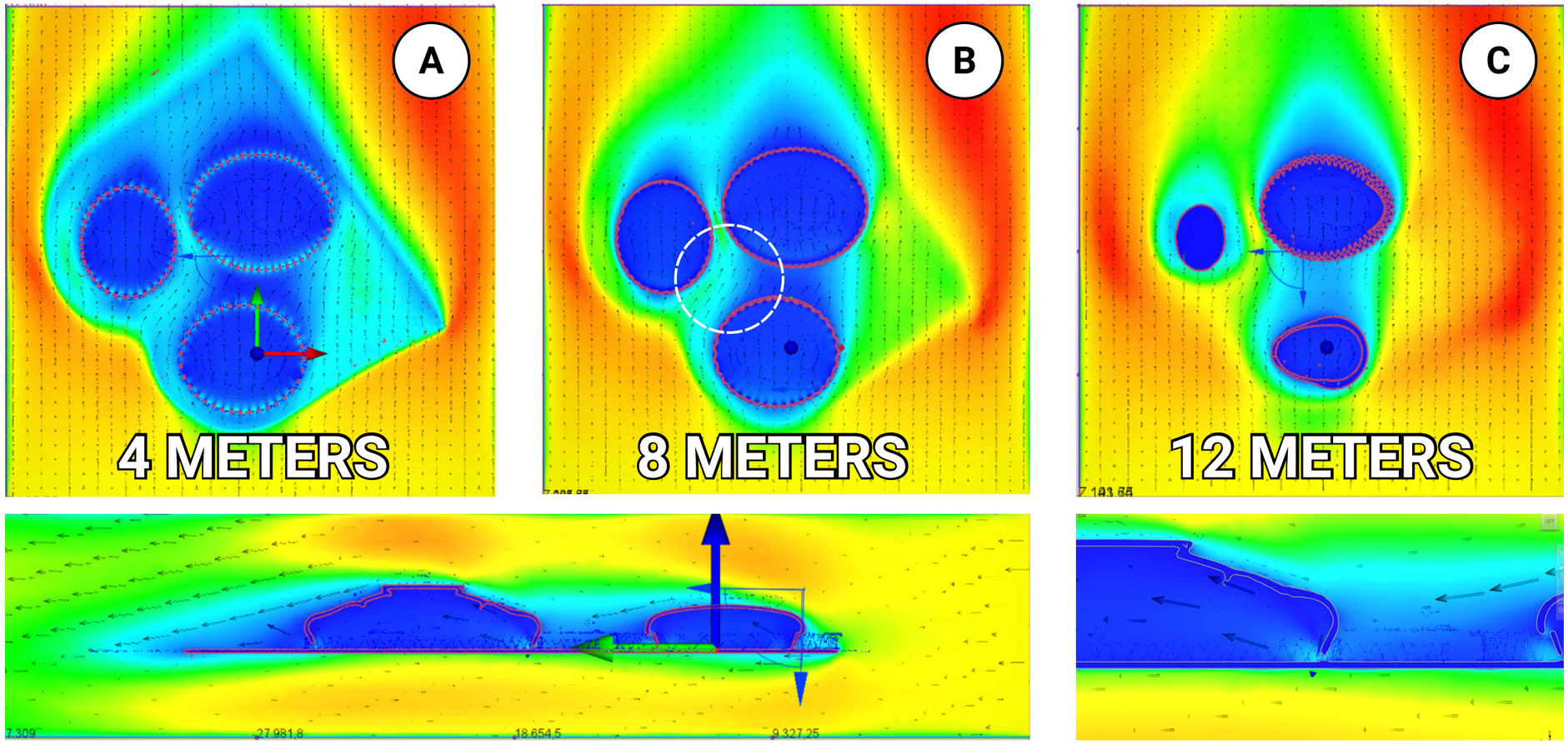
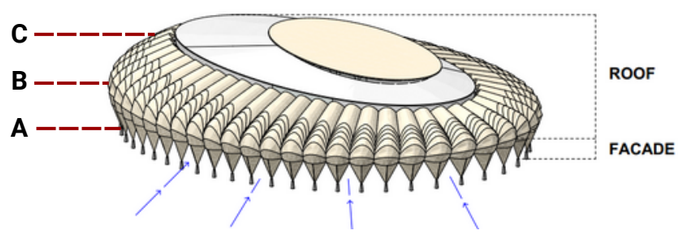
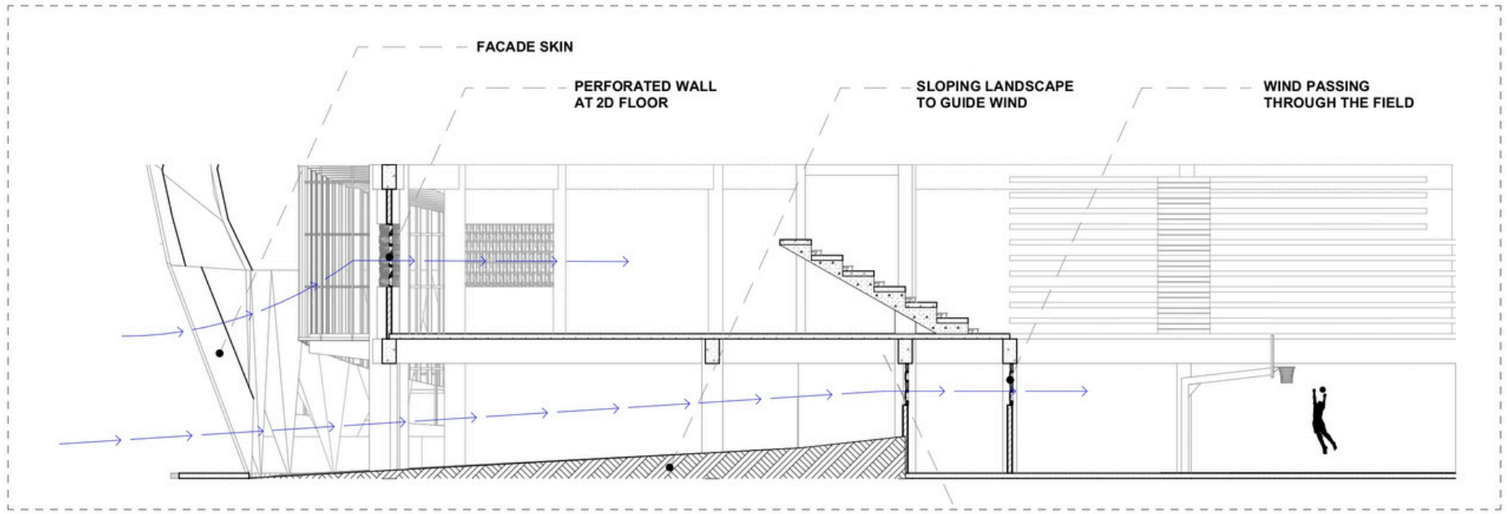


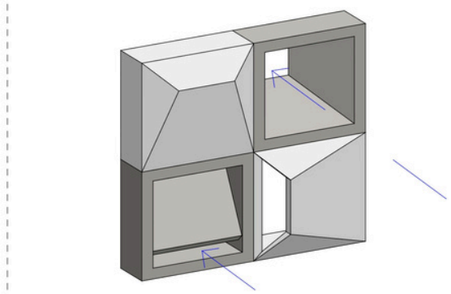
Figure 5.29 Facade Design Simulation on CFD Result
Source: *Author, 2025*

Based on the simulation results at a height of 4 meters, which is part of the building facade, there is wind passing through the gaps in the building facade. Although the wind speed tends to be lower, it is still sufficient to cause wind breeze pass inside the building. The simulation results also show that the elliptical shape of the building is efficient for wind to pass through the gaps between buildings, as shown in Figure B.

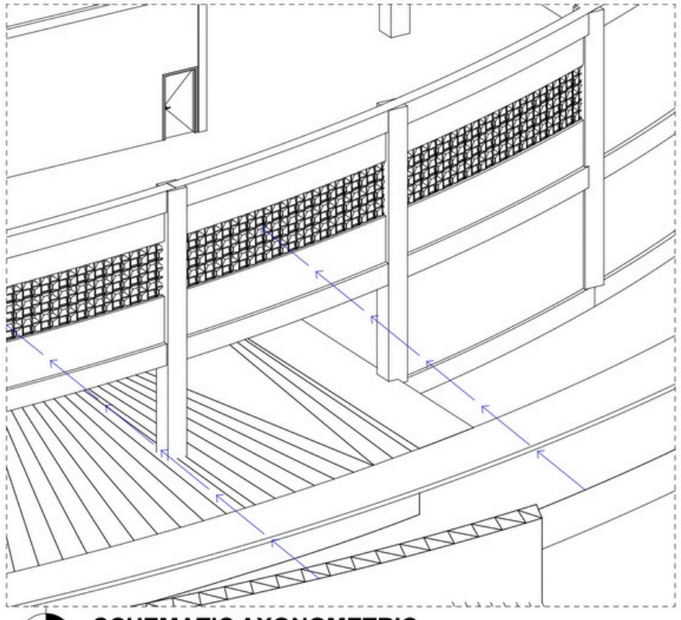




PERFORATED WALL PARSIAL SECTION
SCALE: 1:100



ROSTER PERFORATED DETAIL
SCALE: 1:5



SCHEMATIC AXONOMETRIC
SCALE: 1:100

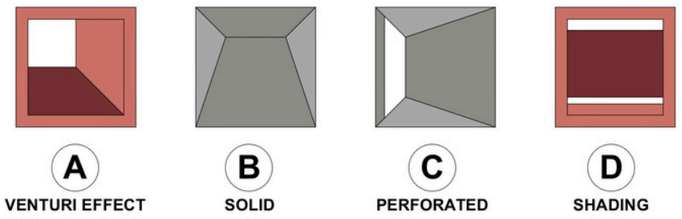
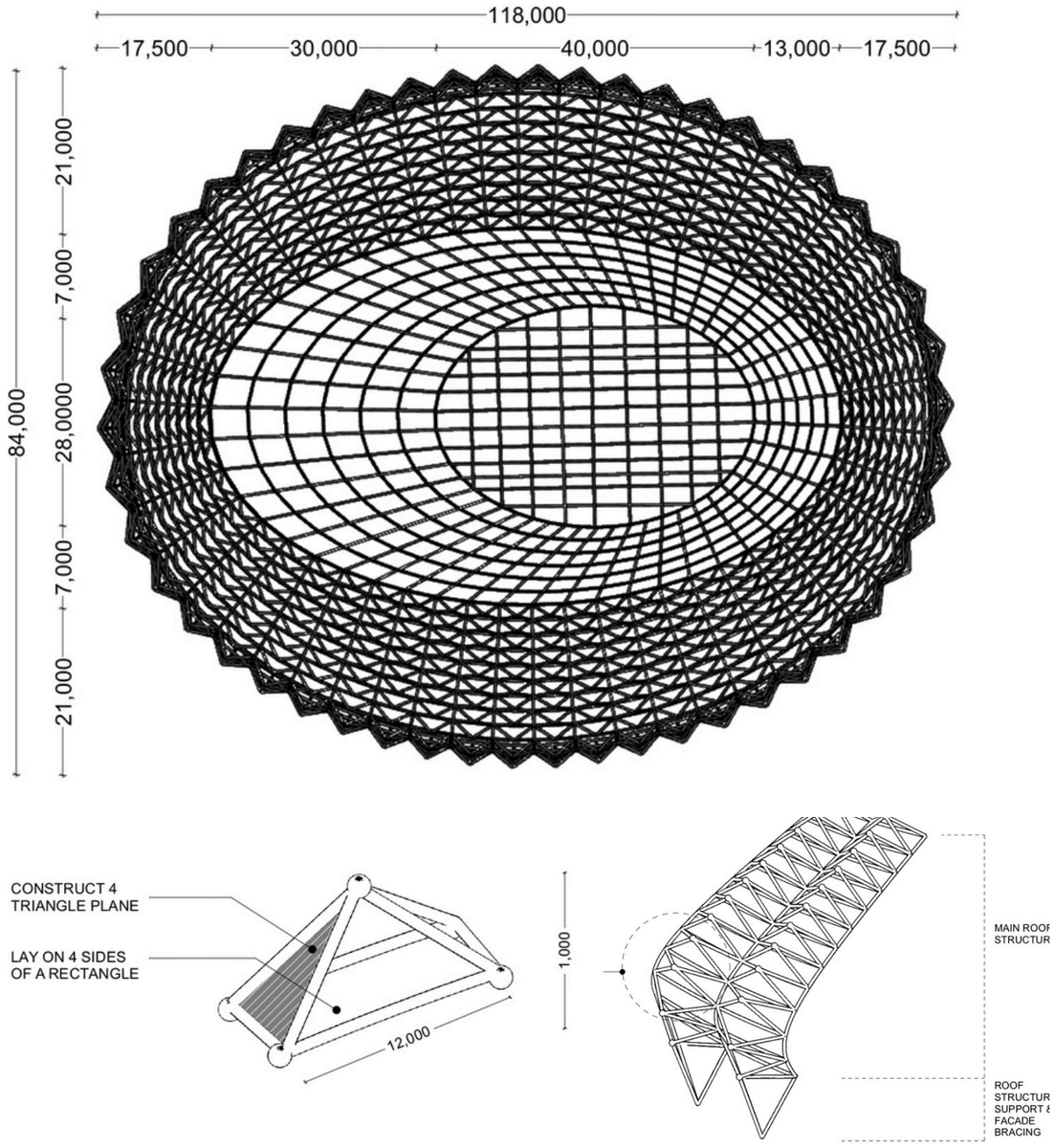


Figure 5.30 Perforated Wall Design Detail
Source: *Author, 2025*

5.3 FINAL DESIGN DEVELOPMENT

5.3.14 Perforated Wall Design

In addition to the use of secondary skin on the facade, the building walls also use perforated walls. The perforated material used is roster with four different shapes for different uses. Perforated walls are installed in areas of the building that are directly exposed to the wind. This allows wind that passes through the secondary skin to also pass through the perforated walls.



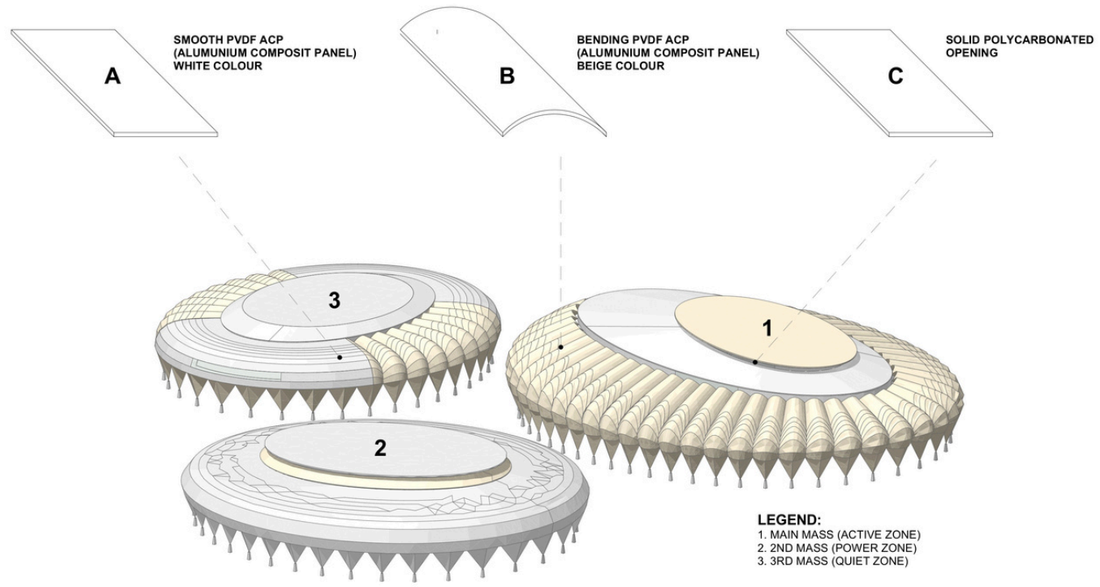


Figure 5.31 Roof Structure Construction
Source: *Author, 2025*

5.3 FINAL DESIGN DEVELOPMENT

5.3.15 Roof & Structure Design

The roof structure uses a space frame that forms triangles, whereby the shape of the roof resulting from the structure can create two different building expressions. Roof panels using ACP can be installed curved to follow the shape of triangular structure pattern, or installed only at the ends of the triangles to produce a smoother surface.

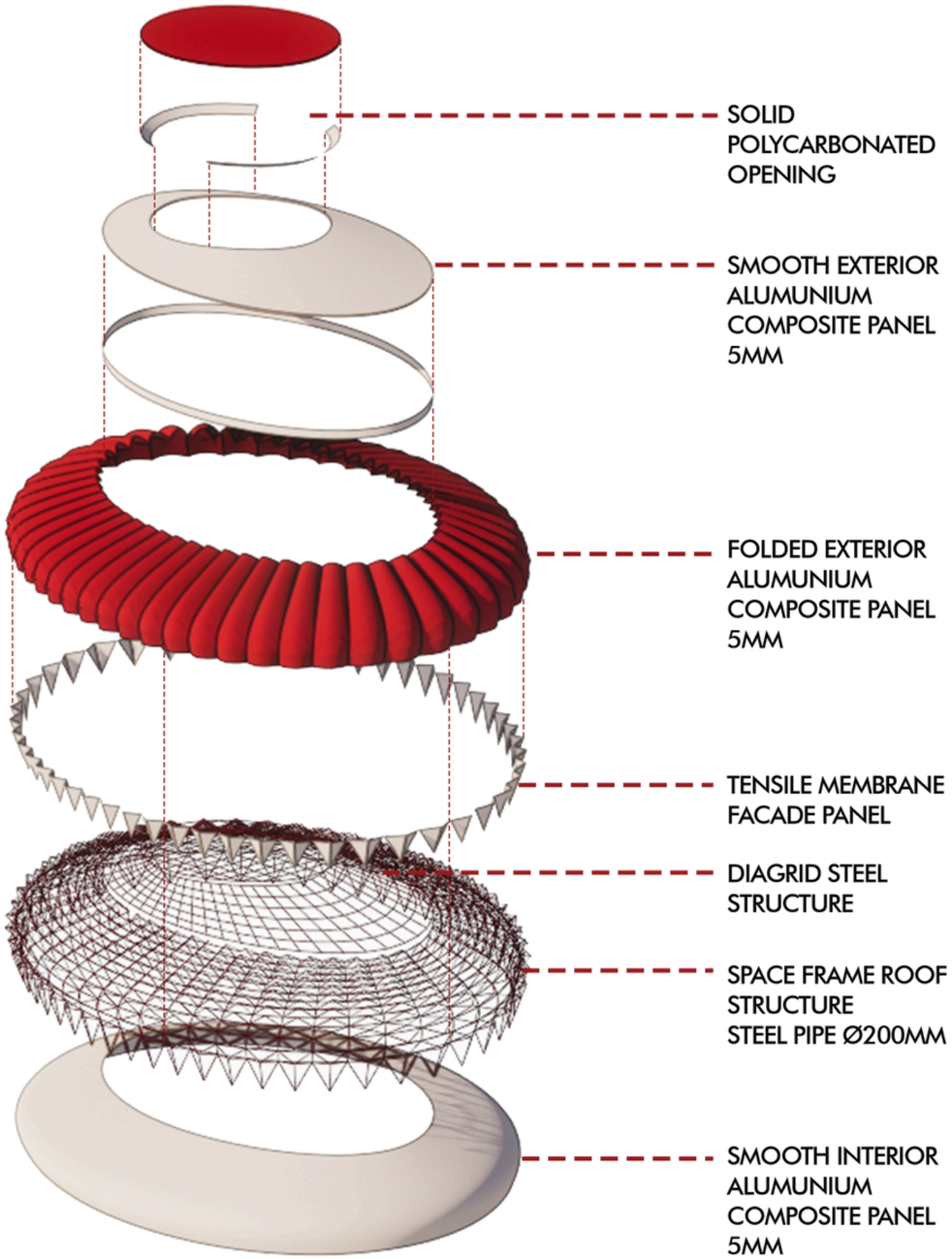
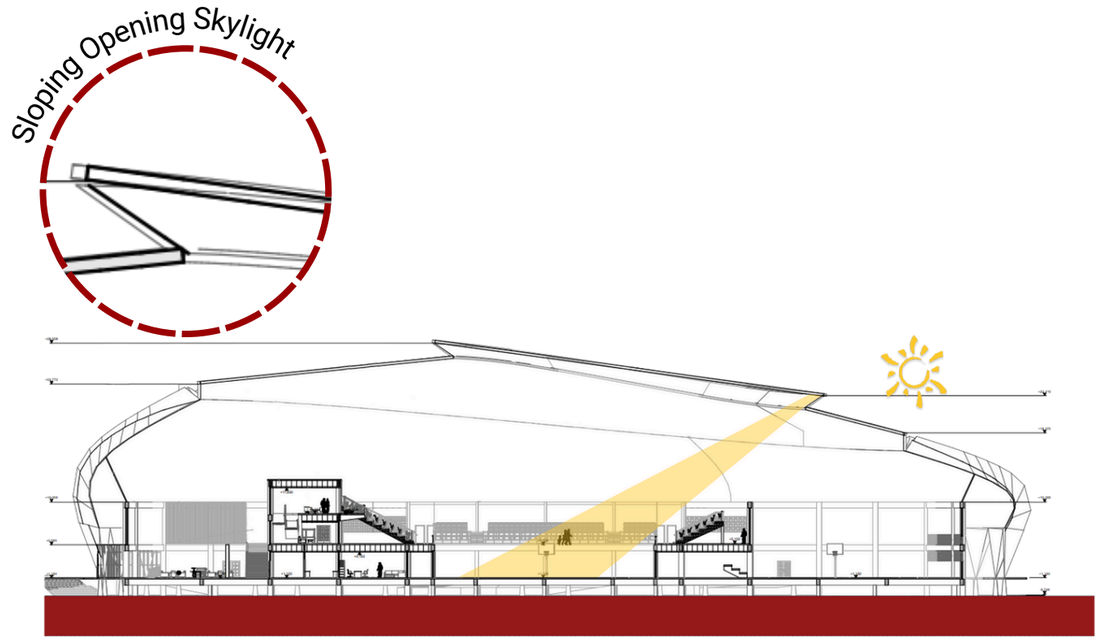


Figure 5.32 Roof Structure Exploded & Opening
Source: *Author, 2025*



5.3 FINAL DESIGN DEVELOPMENT

5.3.15 Roof & Structure Design

There are **openings in the roof that allow natural light to enter the room**. The openings are located on the east and west sides to avoid direct glare on the players on the field. To reduce excessive light entering the building, the **openings are slanted inward to reduce heat entering the building.**

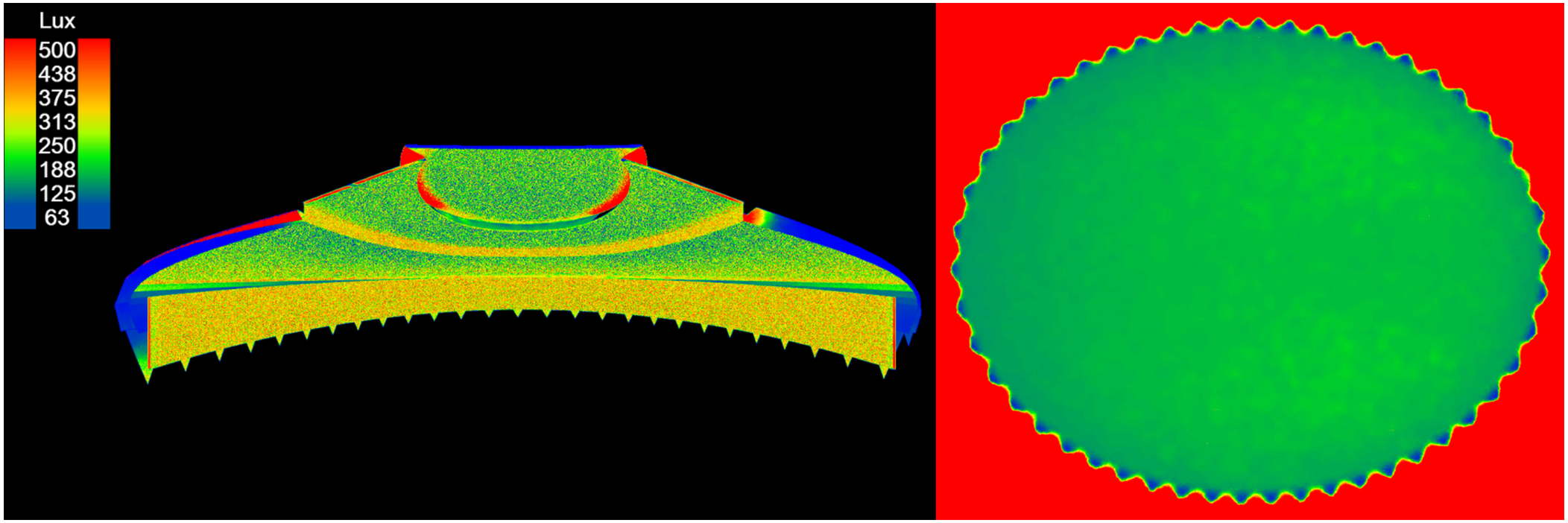
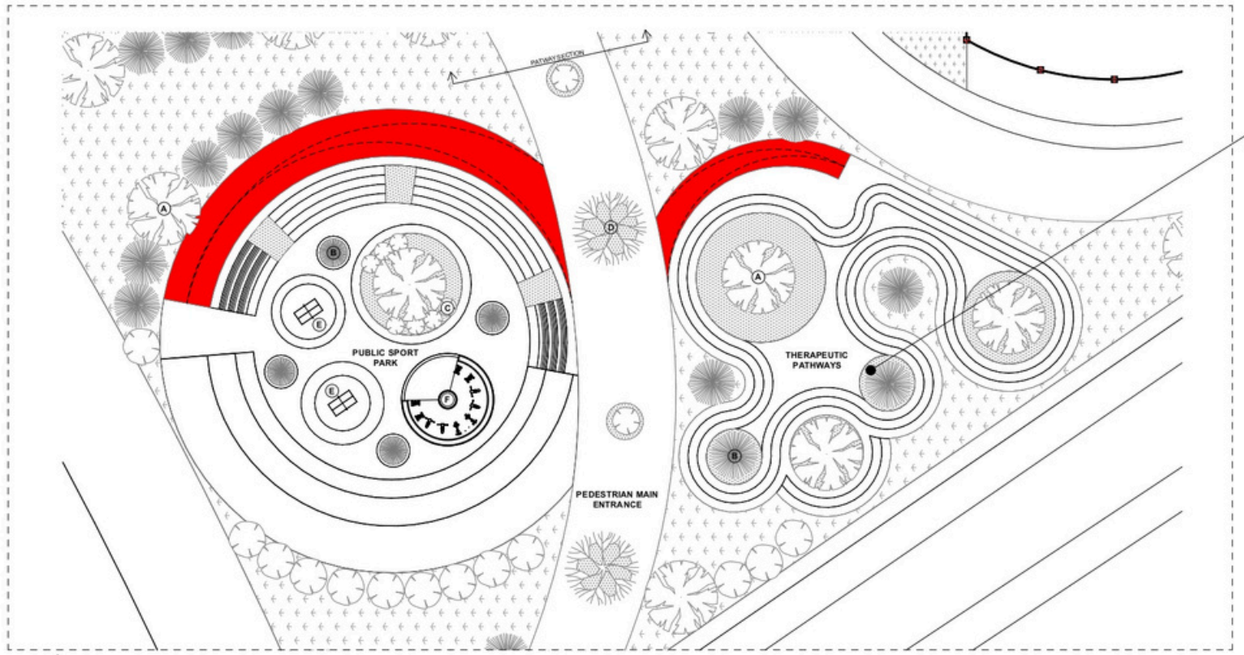


Figure 5.33 Roof Opening Simulation With Velux
Source: *Author, 2025*

5.3 FINAL DESIGN DEVELOPMENT

5.3.16 Roof Opening Simulation With Velux

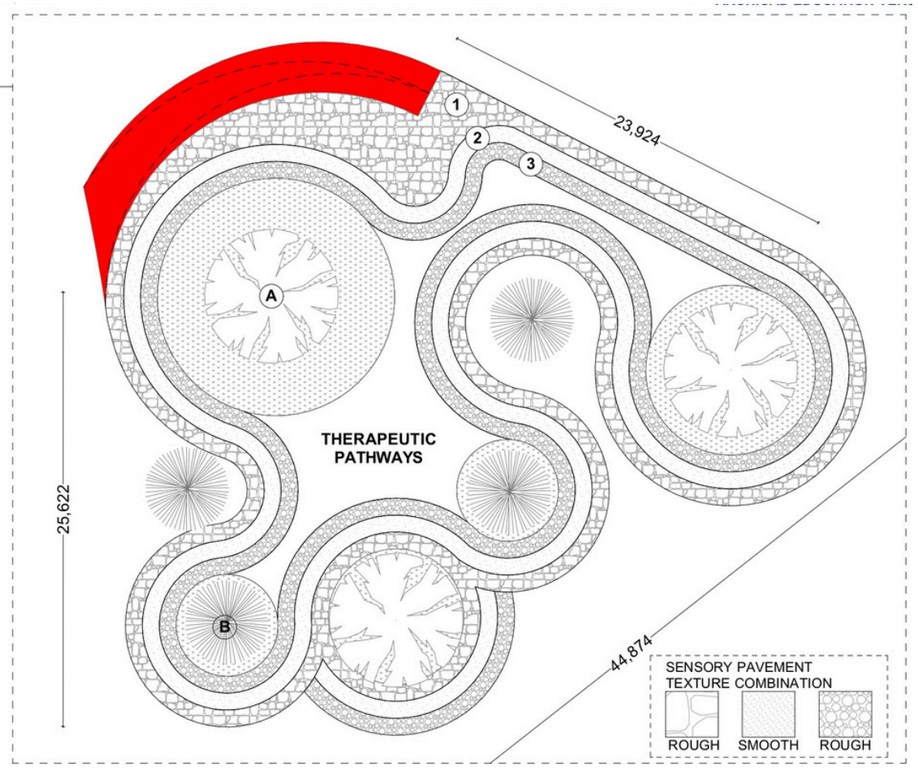
Lighting tests were conducted on the openings in the roof, indicated by green and yellow colors, resulting in a range of 250-350 lux. This lux range is optimal for lighting sports buildings, as specified in SNI 03-3647-1994, which states that sports buildings should optimally have 300 lux.



LANDSCAPE PLAN
SCALE: 1:500

LEGEND:

A	B	C	D	1	2	3
FLAMBOYANT TREE	KIARA PAYUNG TREE	BOXWOOD, ROSEMARY, & LANTANA	TABEBUYA TREE	ANDESIT STONE PAVEMENT W = 1 METER	RUBBER GRANULE SOFT PAVEMENT W = 1 METER	RED GRAVEL PAVEMENT W = 1 METER



THERAPEUTIC PATHWAYSPLAN DETAIL
SCALE: 1:200

5.3 FINAL DESIGN DEVELOPMENT

5.3.17 Inclusive Landscape Design

The landscape area that serves as open space has two functions, a public sports park and therapeutic pathways. The design of the therapeutic pathways incorporates the use of contrasting materials in the landscaping, which aims to provide architectural guidance for users, especially those with visual impairments. This allows users to exercise in a safe area by following the texture patterns.

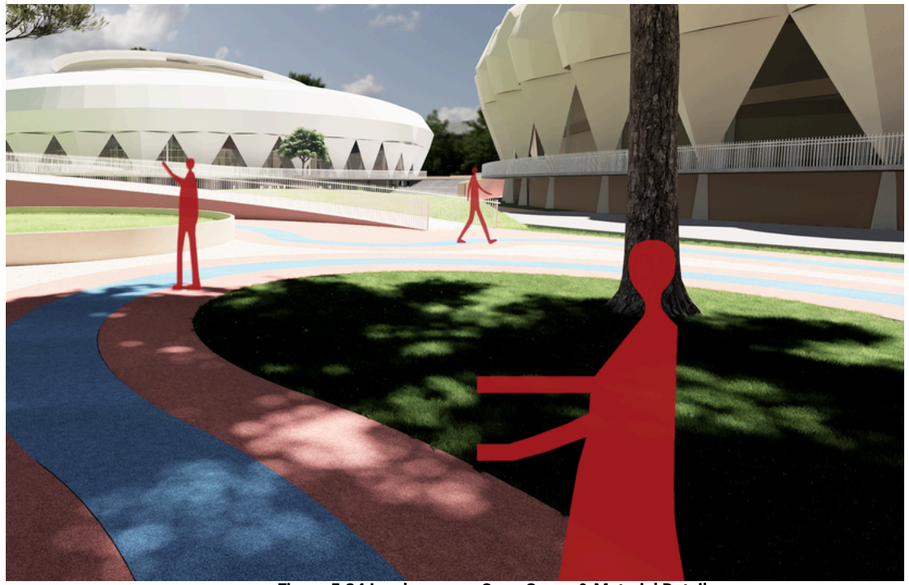


Figure 5.34 Landscape as Open Space & Material Detail
Source: *Author, 2025*

5.3 FINAL DESIGN DEVELOPMENT

5.3.18 Inclusive Texture Material

Specific materials are used on the walls and floors, especially in the athletic rooms, to emphasize inclusivity and accessibility. The **contrasting use of rough and smooth materials** on the walls guides users to each room.

The rough material is placed at a height of 60-120 cm, which is adjusted so that wheelchair users can reach it with their hands. **The rough material pattern is chevron-shaped**, indirectly resembling an arrow pointing to each room. In addition, **embossed Braile Sign** is provided on each side of the door to indicate the type of room.

On the floor, **tactile paving is placed close to the wall** so that users can easily reach the tactile paving/texture guide on the wall. In addition, **different colored lines are used** for each room to make it easier to find the desired room.

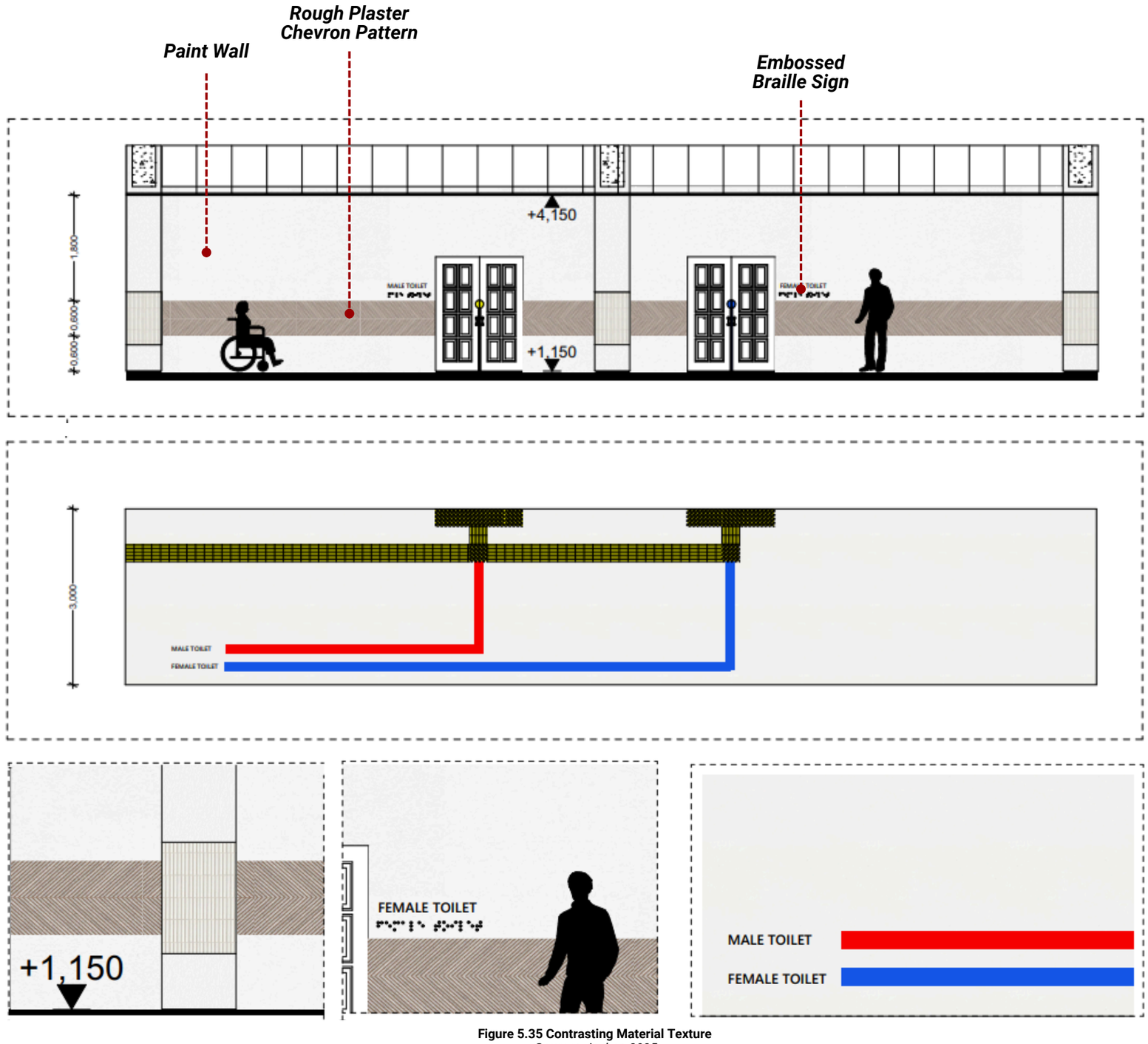
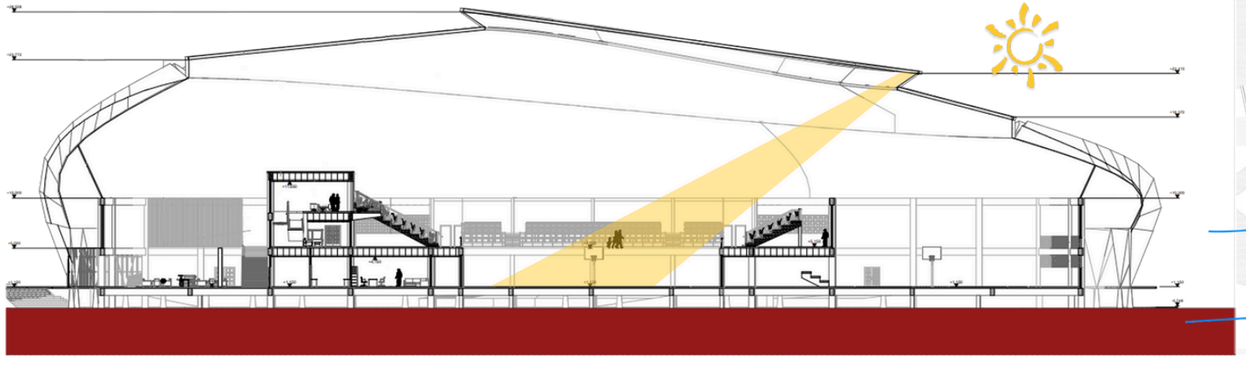
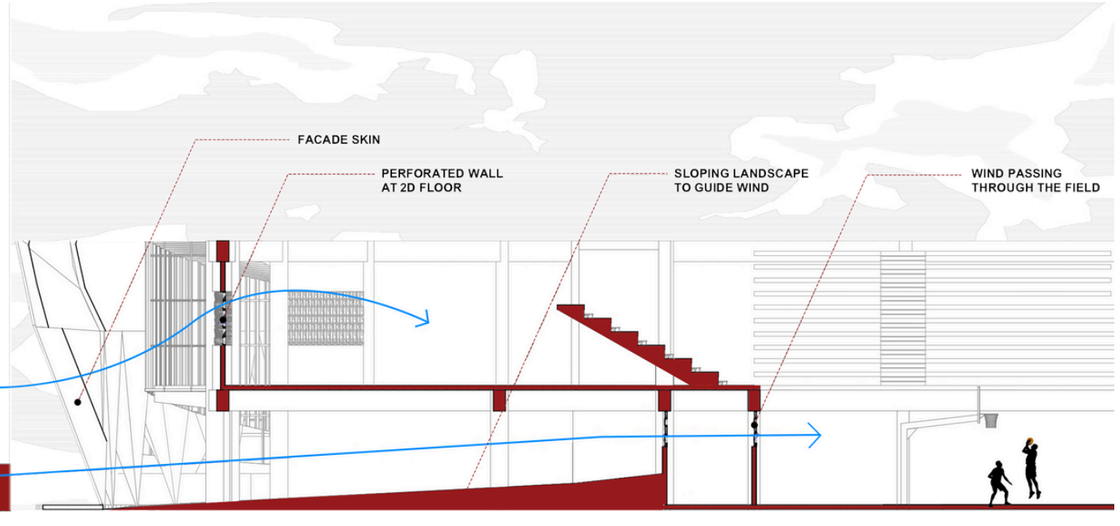


Figure 5.35 Contrasting Material Texture
Source: *Author, 2025*

5.3 FINAL DESIGN DEVELOPMENT

5.3.19 Passive Design Scheme



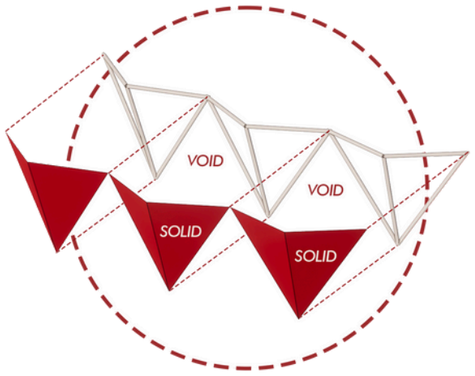


Natural Lighting

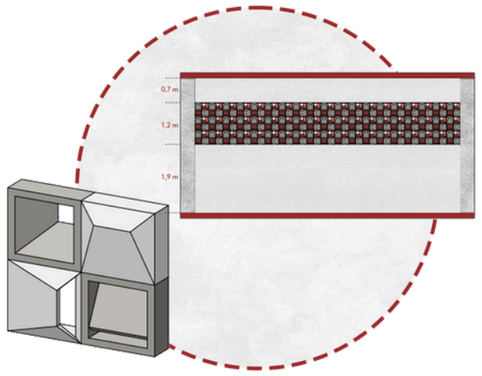
The lighting aspect of the building lies in the openings in the roof, as this provides optimal lighting for the entire space. The ratio of openings in the roof is kept small in order to avoid heat gain in the building.

Natural Ventilation

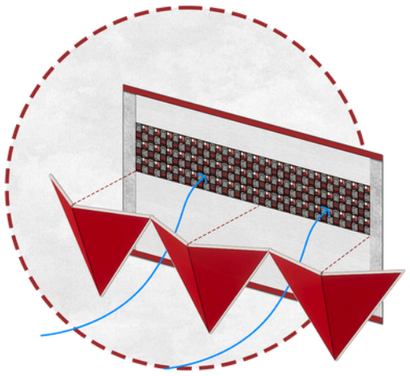
The ventilation aspect of the building uses a double layer, where the first layer uses a secondary skin made of tensile material, and the second layer uses a perforated wall. Thus, the first layer, which consists of a solid secondary skin and larger voids, reduces the ratio of excess wind entering the building. Meanwhile, the second layer, which is a perforated wall, aims to diffuse the wind more smoothly before it enters the building.



First Layer
Secondary Skin With Tensile Material



Second Layer
Perforated Wall With Roster Material



Combination Scheme

Figure 5.36 Passive Design Scheme
Source: *Author, 2025*

5.3 FINAL DESIGN DEVELOPMENT

5.3.20 Foundation Type Distribution

There are four different types of foundations for different purposes. F1 is a square bore pile foundation used as the main structure, while F2 is a triangle bore pile placed on the outer part of the building structure.

Due to the damp soil conditions, buildings constructed on stilts require foundations beneath the ground level, so an F3 structure, which is a lighter footplate foundation, is used. Finally, the F4 structure is a point foundation that supports the roof structure.

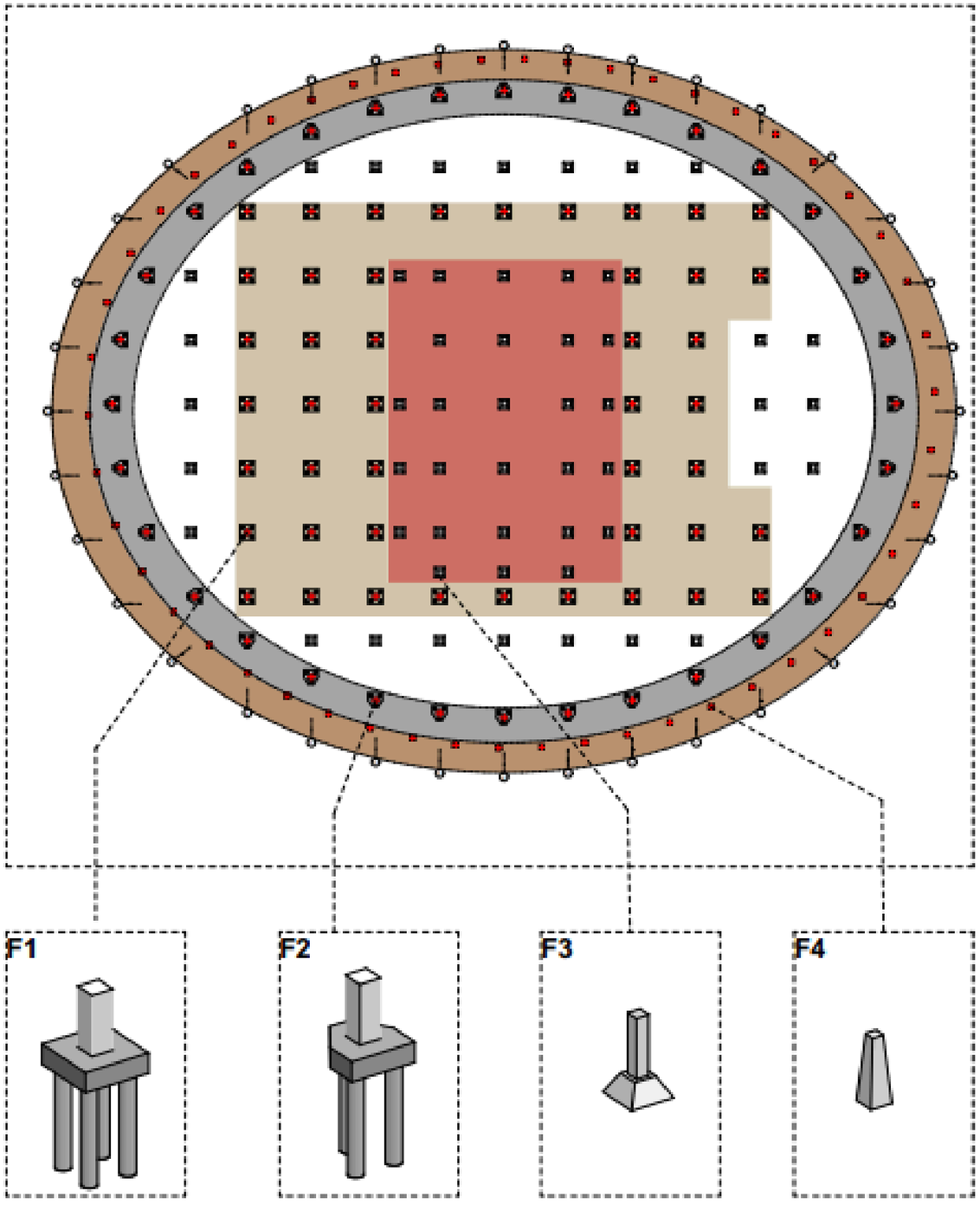
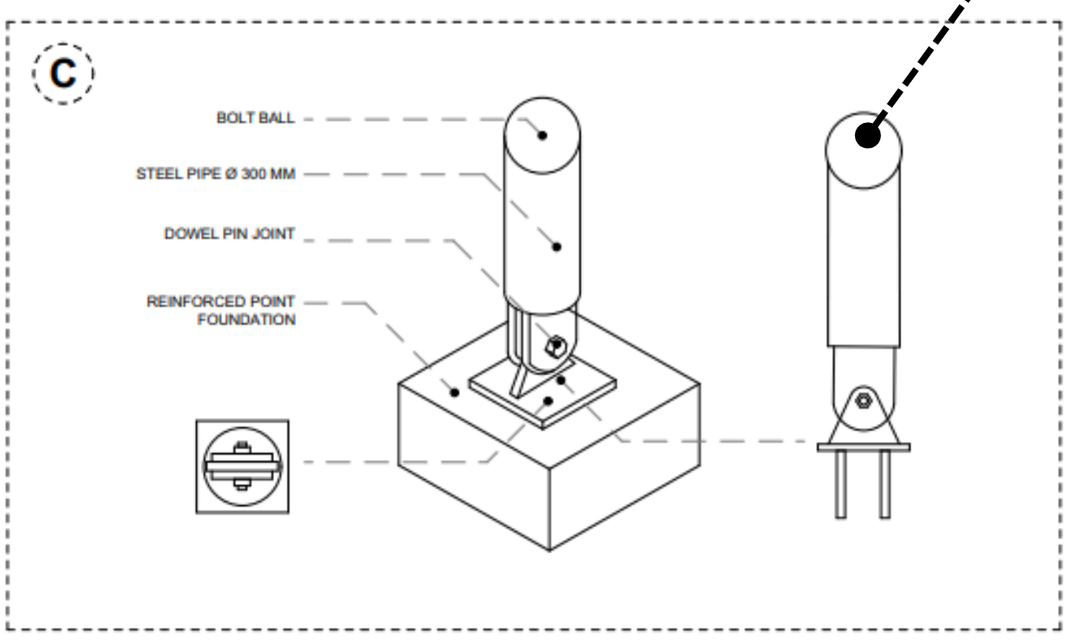


Figure 5.37 Foundation Type
Source: *Author, 2025*

5.3 FINAL DESIGN DEVELOPMENT

5.3.21 Roof Supporting Structure

There is a supporting structure on the roof to reinforce the structure, therefore the steel structure is used to support the space truss to each column of the main structure of the building. With the same joinery mechanism as the facade structure to the foundation. So that the iron pipes are installed into the columns.



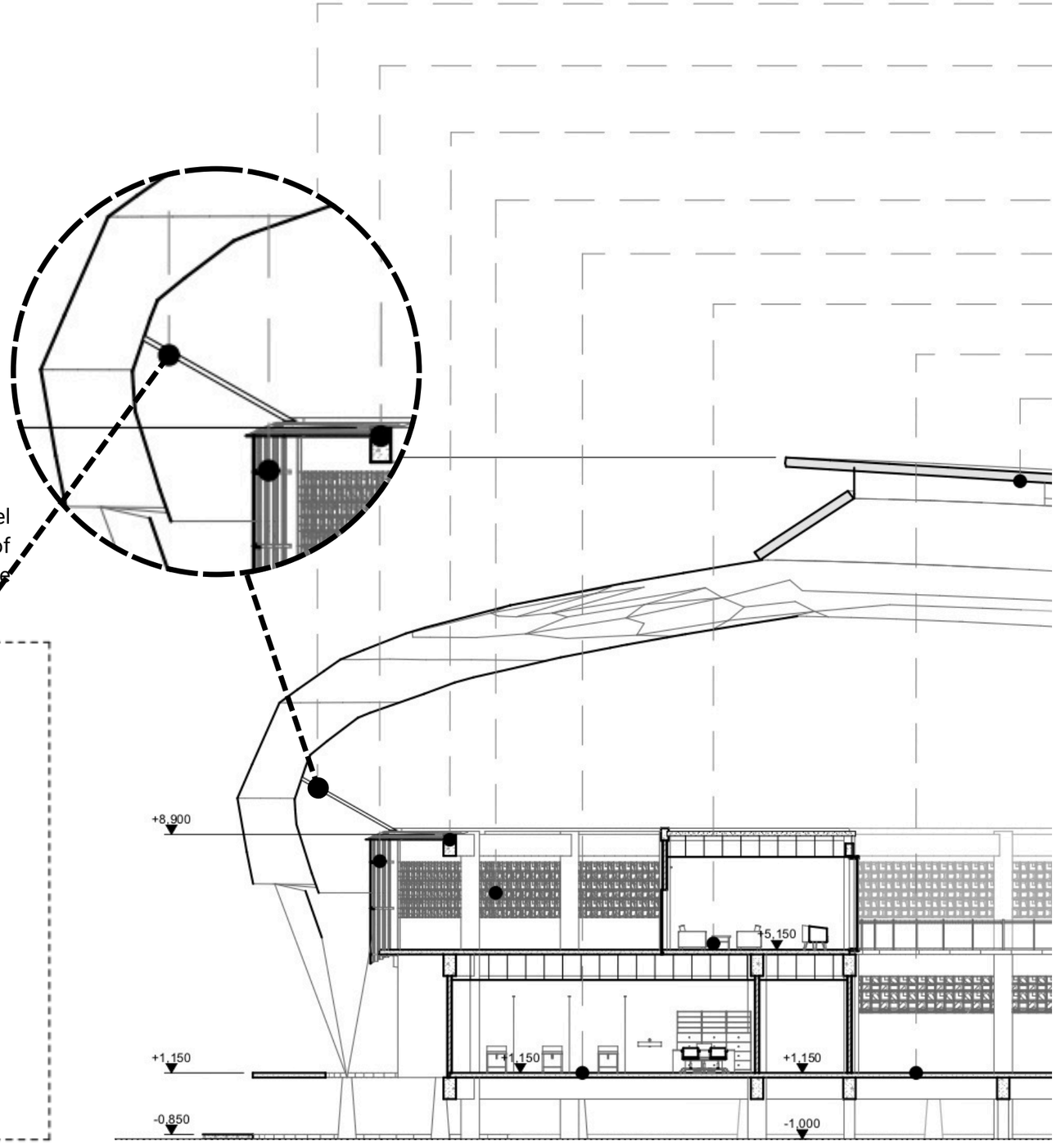


Figure 5.38 Supporting Structure Detail
Source: *Author, 2025*

5.3 FINAL DESIGN DEVELOPMENT

5.3.22 Exterior Visualisation



Figure 5.39 Main Entrance Rendering
Source: *Author, 2025*