RANGPUR INTERNATIONAL CRICKET STADIUM

By

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A thesis submitted to the Department of Architecture in partial fulfillment of the requirements for the degree of
Bachelor of Architecture

Department of Architecture
Brac University
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Declaration

It is hereby declared that

1. The thesis submitted is my own original work while completing degree at Brac University.
2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

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Approval

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Abstract

The Rangpur International cricket stadium project aims to make the stadium live by featuring supporting public activities in the project. Aiming to respecting existing surroundings and to activate the place on non-match days. Also, for the spectators and the official's international standard facilities and accommodation are included. The concept also seeks a network of pedestrians and separated vehicular access. The both inside stadium and outside stadium activities are designed under in a single shelter that serves both. Public facilities are filled with sports museum, retails shops, indoor games, gymnasium, cafeteria for the locals.

Keywords: Rangpur; Cricket; Stadium; Sports

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List of Acronyms

ODI	One day International
T20	Twenty-Twenty Type Cricket Match
IPL	Indian Premier League
BCB	Bangladesh Cricket Board
ICC	International Cricket Council
UEFA	Union of European Football Association
ETFE	Ethylene Tetrafluoroethylene

Chapter 1

Introduction

1.1 Project Background

Stadium is the place which is consist of field, where sports events occurs. The field is surrounded by tiers of structures which allowed spectators to view the events. The “stadium” originates from the ancient Greece, which is a unit of a distance of 192m used to run a race at that time period. Eventually the name turns to the name of the venue. Since the days of ancient Greece, modern stadium concept has developed considerably depend on the sports, hosting event and the requirements of respective authority.

1.2 Sports

Sports refer to all types of competitive physical activity, which aims to maintain and enhance physical ability through organized participation. It also provides amusement and recreation to the participants as well as the spectators. Sports can be consisting of needing only two competitors to hundreds of contestants; competing as individual or teaming together. Sports are regulated by rules and guidelines, which ensures players safety and balance to the competitors. Sports is a great source of entertainment and amusement. Spectators all around draws huge crowds to sports arena or sports broadcasting events.

1.3 Cricket as a Sport in Bangladesh

Bangladeshi culture has evolved with many several traditional sports such as Kabaddi, Boli khela etc. In the recent times, cricket has gained a huge popularity among the people of this nation. By now it is the most popular sport in Bangladesh and Bangladesh Cricket Team has already achieved a better position among the cricket contestants globally.

1.4 Cricket as a Sport in Bangladesh

The existing Rangpur stadium is old and has not been used for any events since 2011. Which turn both the field and structures to ruins. Also, there are in demand of sports facilities among the country, so the government decided to establish an International Standard stadium to revive the sports enthusiasm to the youth people, and also to create platform for both players and the sports lover of Rangpur. Hence the development of existing Rangpur stadium is proposed.

1.5 Cricket as a Sport in Bangladesh

Project: Rangpur Cricket Stadium

Proposal Department: Youth and Sports Ministry

Implementation Agency: National Sports Council

Client: Government of Bangladesh

Project Implementation Time

Starting date: January, 2020

Ending Date: June, 2024

Site area: 18.3 Acre (approx.)

Site Location: Rangpur Stadium, Rangpur

1.6 Project Objectives

To develop sports quality in Rangpur and its surrounding area

Establish International standard stadium in the existing

Host Different events of Cricket, Football, handball, Basketball, table tennis, gymnastics, marshal art, weight lifting badminton, chess, carom, concert etc.

Introducing Indoor games and Gymnasium for players

1.7 Programs

Stadium of 25,000 People Capacity

- Media Centre and Players Dormitory
- Gymnasium
- Indoor Games

Stadium

- Gallery space
- Pavilion Building
- VIP Facilities
- Restaurants
- Media
- Administration
- Service
- Storage
- Toilet

Players' Lounge

Dressing Room and Locker

Umpire and Officials Facilities

Medical Room

Doctors and Therapists Room

Media Centre

- Press Room
- Press Personnel's Workspace
- TV/ Camera/ Streaming
- Commentary Room
- Interview Room
- Electro Mechanical service room/ control room

Service

Gymnasium

Gym Space

Service

Toilet, Locker, Shower

Chapter 2

Literature Review

2.1 Cricket

The term cricket is variously thought to be derived from the target aimed at and the implement used to defend it. In the former case it is argued that the word is related to German words which mean something related to the wickets. Others believe the word has an English origin. (Farbrother, 2001) The game had started off in England, so the inception of the word is more probable to be coming from an English background.

2.2 Cricket Field

Cricket field has 3 major part the pitch, the boundary and the inner field.

The entire field has to be covered by grass and the play area should be marked. The

'pitch' is marked with comparatively harder and grass less ground in the central area

with stamps in opposite sides (Lynch, 2006). Dimension of cricket field is

2.3 Cricket Pitch

The area of ground between the two set of stumps is called the pitch. It has a length of 22 yards. The surface of pitch is made of clay, it is the main play area of cricket where the batman stands. (Geraint John, Rod Sheard and Ben Vickery, STADIA,2007) The quality of the pitch must be maintained in order to set invulnerable and balanced gameplay.

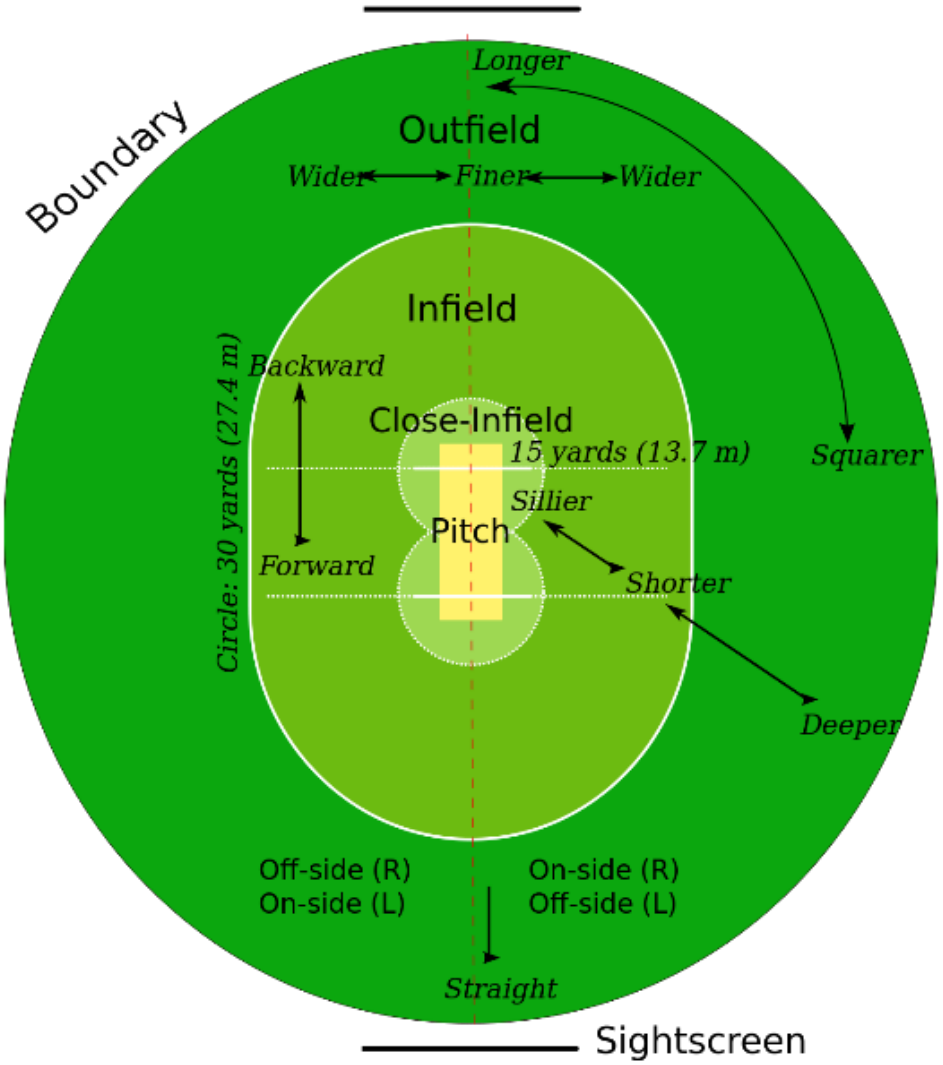


Figure-2 Cricket Field Dimension, source: ICC-Cricket

Figure -1 Cricket Pitch Dimension, Source: ICC-Cricket

2.4 Field Orientation

The cricket pitch orientation is extremely important because the game cannot be played across the direction of the wind due to swing properties of the ball. In order to play along the wind direction, the pitch is oriented in north-south direction, with a maximum deviation up to 15 degree.

2.4.1 PITCH COMPOSITION

The field soil and grass composition should set according to site climate and weather. The whole filed should be covered with grass layers with proper drainage systems embedded. The root system is important as the grass itself. It helps bind soil together for a healthy field.

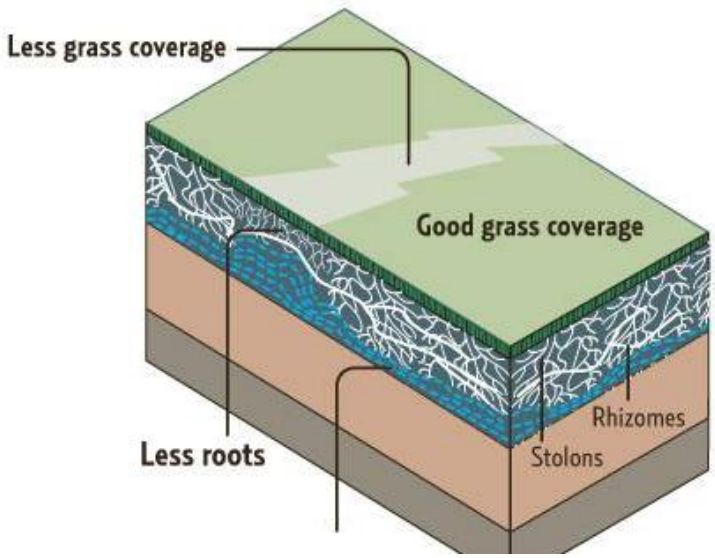


Figure-3 Ground Composition source: haroonrasheed320

The ground of the pitch is made with clay, the pitch should have a minimum level of quality. Consistent bounce of the ball on a pitch will allow Batmen and Bowlers to enjoy the game. Allowing all skills of the game to be rewarded, giving both teams a chance and not relying on the luck. In the end balanced gameplay should achieved.

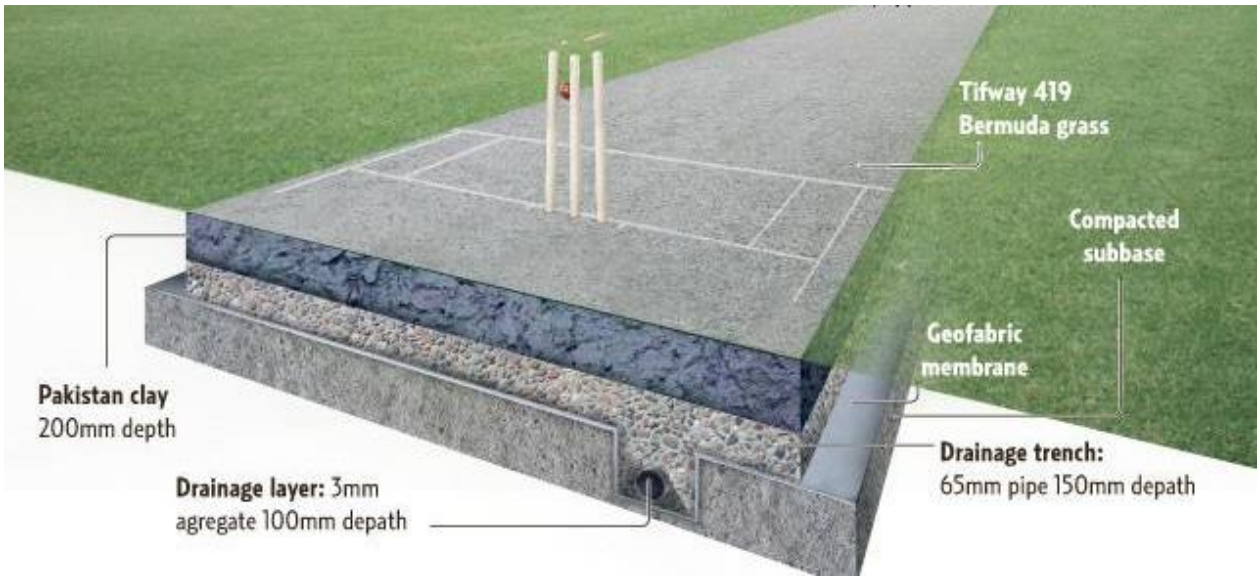


Figure-4 Pitch Composition source: haroonrasheed320

2.4.2 SCOREBOARD

A device that is used for displaying a concurrent record of the score of the game which will be visible to both players and spectators. In recent time a scoreboard is a large display panel which displays a lot more information than scores as well as advertisements.

2.4.3 SCORECARD

Another display board which constantly display the players' names, batting order and respective scores of the players.

Figure-5 Scoreboard and Scorecard, source: espncricinfo.com

2.4.4 SIGHTSCREEN

A sightscreen is a movable structure with a large flat surface. Which is basically a canvas which is placed outside the boundary directly behind either the wickets in order to assist the batsman by enhancing the visibility of the ball. Sightscreens are basically used in day-night games played with white balls. Modern sightscreens have changeable surfaces, which can be change between overs to display advertisements.

2.4.5 UMPIRE

There are Two to four umpires in a match whose function is to ensure that a match is conducted in accordance of the laws and spirit of the game. They also take action according to players subjection on any point of the game. There are usually two field umpire, one third umpire who uses available technologies in situation when field umpires face difficulties to take decisions and a fourth or reserved umpire in case of emergency.

2.5 Geometry of The Stadium

It is ideal that the configuration of the seating areas should be related to the geometry of the stadium. The geometry could be rectangle, circle or oval, however the rectangular form created viewer restriction for the viewers whose seats are located in the corner. Therefore, optimal solution is curve seating all along the field boundary, which allows all spectators with a similar quality of view, unobstructed along the entire length of the pitch. Even the cross section of the seating gallery angle is slightly curved for a better viewing angle for the spectators.

The curve in section is known as the "C-value", The C-value is a variable that defines the quality of the spectator's line of vision over the head of the person in front, commonly known as "the sightline". A critical requirement of any stadium design is to ensure that all the seats provide an excellent view of the entire pitch. Therefore, great care must be taken to optimize the sightlines from every seat. The primary objective is to minimize the distance between the spectators and the action on the pitch and ensure unobstructed views of the whole pitch. Seats which are located at a distance of more than 190m from the pitch or which have impeded sightlines and those are excluded from the capacity count on some major competitions.

$$C = \frac{D\,(N + R)}{D + T} - R$$

C = the C-value

D = the horizontal distance from each individual position to the point of focus (the edge of the pitch)

N= the riser height of each individual row of seats

R = the vertical height between the persons eye level and the point of focus (pitch level)

T = the depth of each individual row of seats

Figure -6 Sightline, source: KPMG sports advisory

2.5.1 SEATING

Seats for spectators must be individual, fixed (e.g. to the floor), separated from one another, shaped, numbered, made of an unbreakable and non-flammable material, and have a backrest of a minimum height of 30cm when measured from the seat.

Each seat should allocate a row and place number, which should be easy to locate using the stadium's signage scheme. Seat numbering should be clearly Visible to enable spectators to find their place as easily and quickly as possible.

Stadium Seating takes the form of individual seats arranged in a series of rows, which are tiered to ensure unobstructed views of the pitch form every single seat. Seats must be comfortable, unbreakable, UV-resisted and fire certified.

Optimal row depth and width are required, it is a challenge to keep balance between capacity requirements and comfort. Primary objective is to adjust the capacity and then emphasis on the comfort. The optimal number of seats in a row is between 25 and 28 (UEFA), the seats should be designed to flip up when not in use as this increases the width of the gangway, also facilitates the maintenance of the stadium after and event.

2.5.2 AISLE WIDTH AND SPACING

Recommended aisle width is 3ft. Spacing of aisles is usually every 14 to 15 seats. Where seating sections abut a wall or railing, the dead-end distance should not exceed 7 seats. The aisle width can increase to allow ease circulation.

2.5.3 CROSSOVERS

Crossover aisles will be needed at one or more location which run horizontally parallel to the seating rows and connect the vertical aisles with vomitorias leading under the seating to exits and promenades. However, crossover width should be between 4 and 6 ft depending upon spacing of vomitorias

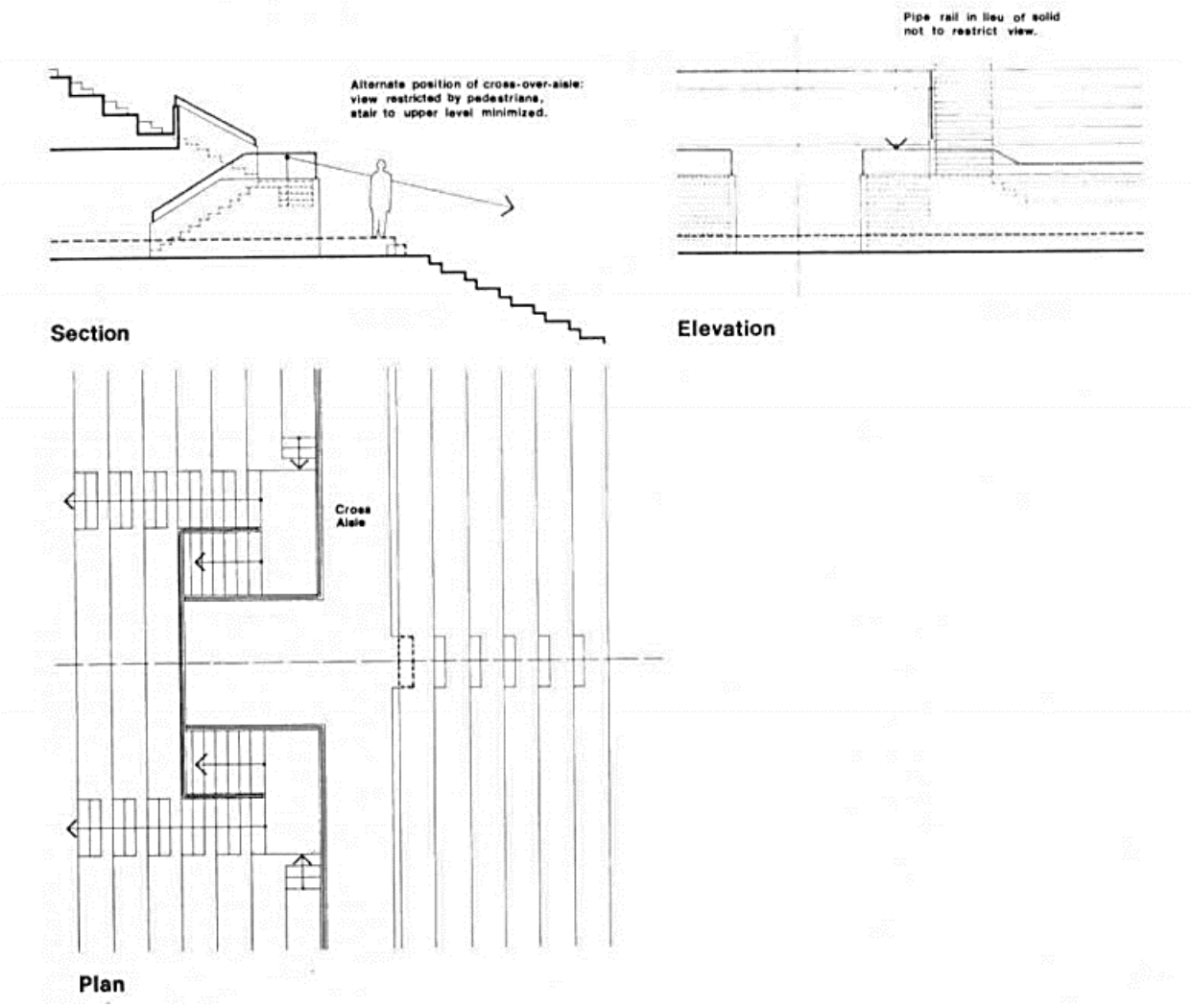


Figure-7 Aisles, crossovers and vomitorias, source: Time Saver Standards

2.6 Crowd Movement

Great care should be taken in the design/planning process to avoid building in situations which will inhibit the smooth flow of spectators through the public circulation spaces and to and from the seating areas. This should be maintaining for normal traffic situations or avoiding panic in emergencies. Activities which involve spectators waiting in line must have sufficient room so that circulation is not blocked behind them.

The entry and exit timing have to be strictly controlled so that the spectators and all other people can be evacuated from the stadium within a limited given time. The standard timing for the emergency exit to safety zones such as the ground level opening is a maximum of 8 minutes. This measurement is made from the basic walking velocities of the people through various modes of circulation like horizontal and vertical circulation.

2.7 Evacuation

Because of spectator's tendency to sports venues in small groups over a period of time, and also to leave simultaneously. Designing and managing safe egress requires much greater care in this factor. The escape time from any seat, in all new constructed stadium must be no more than eight minutes. Assuming spectators move speed along the floor level and ramps at 150m per minute and down stairways 30m per minute. (John, Sheaard, & Vickery, 2007).

Therefore, subdividing the total capacity into smaller units or sector of about 2500 to 3000 spectators allows more easier crowd control and better distribution of other facilities and emergency evacuation.

2.8 Toilet

Toilets and other ablutionary facilities are required for several types of users in stadium. These could be for the public spectators, for the players and the team, for the stuffs and VIP members. The number of WC's required in stadium is 1 WC per 150 male user and 1 WC per 75 female users.

2.9 Media Facilities

Facilities for media are an integral part of stadium design. These facilities involve three main categories of public information and entertainment services- the press (including newspapers and magazines), radio and television. Home team may also have their own media requirements for their team like TV Channel, Websites or streaming services.

For recording, streaming and observation there should be places for cameras and cameraman in various spots all along the stadium. Commentator rooms, interview rooms and other technical requirement for the event is included in these facilities. Therefore, a modern stadium should have enough media facilities to enhance an event.

2.10 Players and Referee Facilities

Both players from the competitive teams and referee must be provided with separate dressing rooms. Each dressing room should be well ventilated, attached with showers, lockers and toilet.

A warm up area must be provided in close proximity to the player dressing room and field of play, which should be as prepared with normal or artificial grass. The referee and players zone must be under high security provision be made with heavy duty material and at no point spectators have no access to the players zone.

2.11 Medical Facilities

Medical room, physiotherapist room, medical supplies and stand by emergency service like ambulance, stretchers must be provided in terms of emergency. The preferable position for these facilities is in the ground floor in proximity distance of the play area. If level changes low ratio ramps or elevators are recommended.

2.12 Lighting and Shading

The shading depth and angle of the gallery spaces are important for comfort and quality of viewing for the spectators. The roof of the stadium provides such facilities to counter the direct sunlight and rainfall. For multitier gallery systems, the upper gallery provides shade to the lower one. The roof structure provides shade for the upper gallery. Usually half of the gallery must be shaded by the upper tier or the roof structure.

All stadiums which hosts night fixtures, general lighting to seating and pedestrian pathways must be provided. Also, the stadium should be able to provide Horizontal Floodlighting luminance of 200 lux, and the warm up area should have 50 lux standard lighting. (Stadium Technical Requirements, NSW, 2017)

2.13 Security Zones

A stadium has five level of security zones, which restricts access to public, and accessible to authorized persons only.

Zone One: The Playing Field all types of access is restricted during gameplay.

Zone Two: The Spectator seating and standing area. This area access is controlled by ticketing system, and the capacity is limited.

Zone Three: The internal concourses, restaurants, souvenir shops etc.

Zone Four: The circulation between the stadium structure and the perimeter fence

Zone Five: The open space outside the perimeter fence

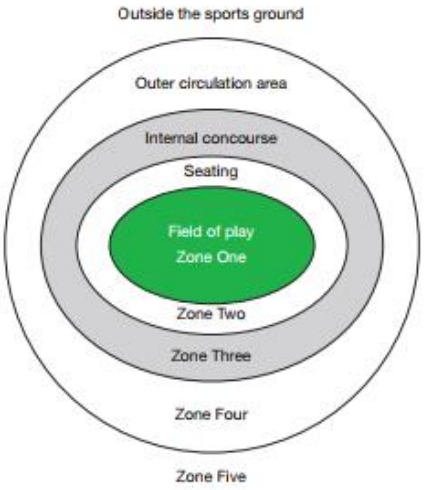


Figure-8 Stadium zones, source: stadia

Chapter 3

Site Analysis

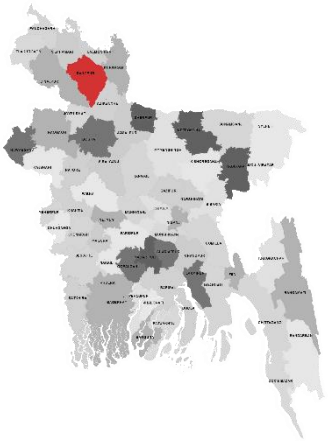
3.1 Site Appraisal

Site for the proposed Rangpur Stadium Complex is the current Rangpur stadium, which is being out of service, so the authorities decided to demolish and built a proper standard stadium in the existing. Site is in Rangpur main city; the location is about 3 km distance from the city center.

Rangpur is one the main cities in Bangladesh, the city is the divisional headquarters of Rangpur Division. The city is the commercial hub for the surrounding districts, it is one the most economic zones in Bangladesh.

3.2 Site Location

The site is located in about 3 km distance from city center. Site is adjacent to Honumantola road, which is about 30 ft wide road, and this is the only road that gives access to the site from south. Site surrounded by resident in the east and north side, in west Rangpur Government College is located, and in south Police Line School and College and Rangpur Cricket garden is located.



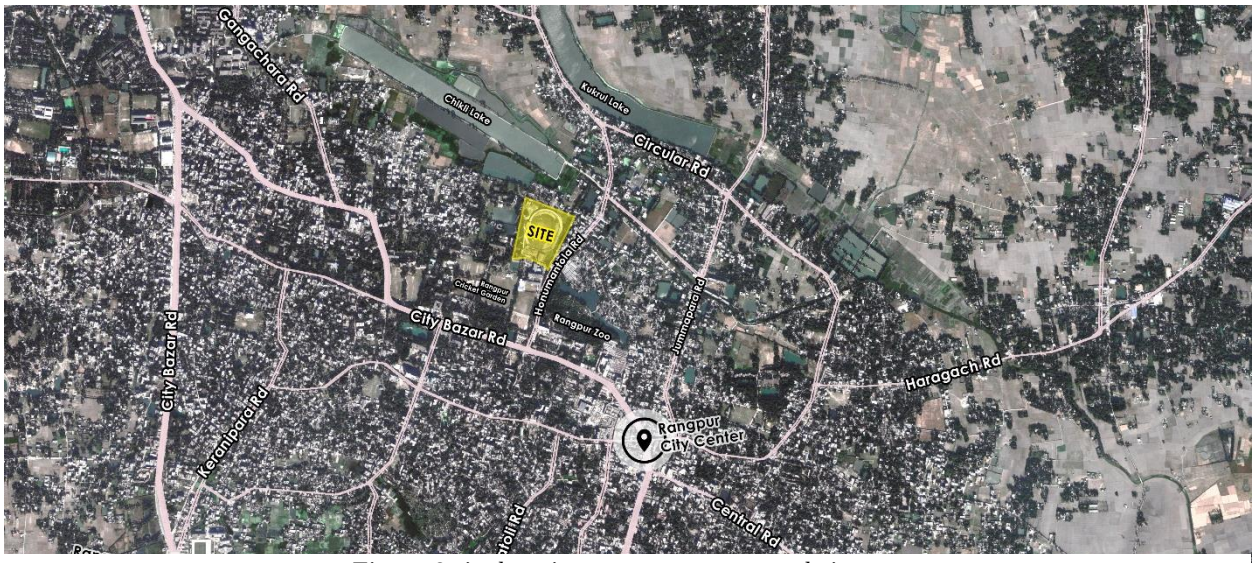
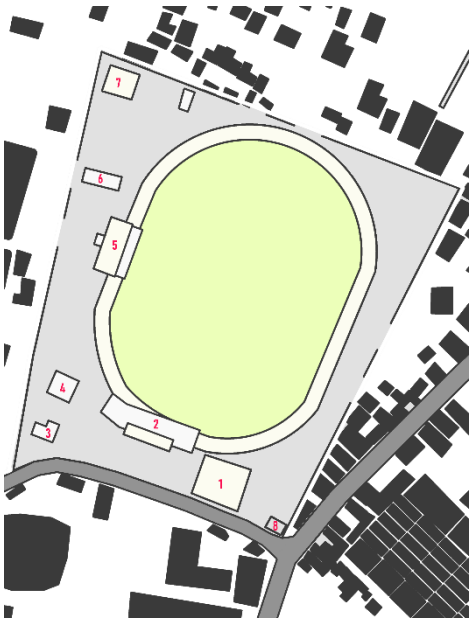


Figure-9 site location *source: google images*



Site area is about 14 acres. Inside site existing old stadium is existed, with few more structures, and they are

1. Gymnasium
2. Gallery
3. Accommodation
4. Club Office
5. Café, Gallery,
6. Admin
7. Shooting Club

Figure-10 Site Images, source: author

3.3 Zones Near Site

The data show that the site is surrounded by mainly residential zones, with adjacent commercial and education zones. In the residential area there are noticeable number of hostels that accommodates students of the nearby areas. Moreover, Rangpur cricket garden is just opposite of the stadium, and Rangpur zoo, Chikli Park Lake, Rangpur Town Hall are in a close distance from the site.

3.4 Road Network

The primary road that leads Rangpur Terminal to Shapla chattar is called Terminal-Shapla road, which is a major active road in the area. From that road Honumantola road towards north leads to the site. Primary road here is about 60 ft wide and the secondary road is about 30ft wide. Major Transportation in the city is Autorickshaws, CNG's, Private Cars, Bi Cycles and

Motor Cycles. No Public Bus route is available in the road. Only Intercity bus runs along the primary and secondary roads.

Travelling to site location from Dhaka is available by Bus, Railway and Airway. There Direct Bus available from Dhaka to Rangpur, and Rangpur Bus terminal is in a 3.4 km distance from the site. Dhaka to Rangpur Railway is also available, and Rangpur Railway station is about 4.8 km distance from the site. However, there is no direct airport in Rangpur, instead Rangpur is served by the Saidpur Airport located 40 km travel distance from the site which will take an hour to travel by car.

3.5 Topography

The entire site and beyond is covered in green and trees are at the perimeter north-western perimeter of the site. Most of site is flat land and has few marsh surfaces. The land height is in the same level with the adjacent road. Moreover, site is facilitated with water supply, electricity, gas and drainage system as the site is located in the main Rangpur city.

3.6 Climate

Rangpur is situated at the northern part of Bangladesh. As a result, Rangpur has a humid subtropical climate. The climate of Rangpur is generally monsoons, high temperature during summer, considerable humidity and heavy rainfall. During winter Rangpur is comparatively cold than the other part of the country. The average temperature in Rangpur is 24.9 °C. The average annual rainfall is 2192 mm (source: en.climate-data.org).

3.6.1 CLIMATE GRAPH

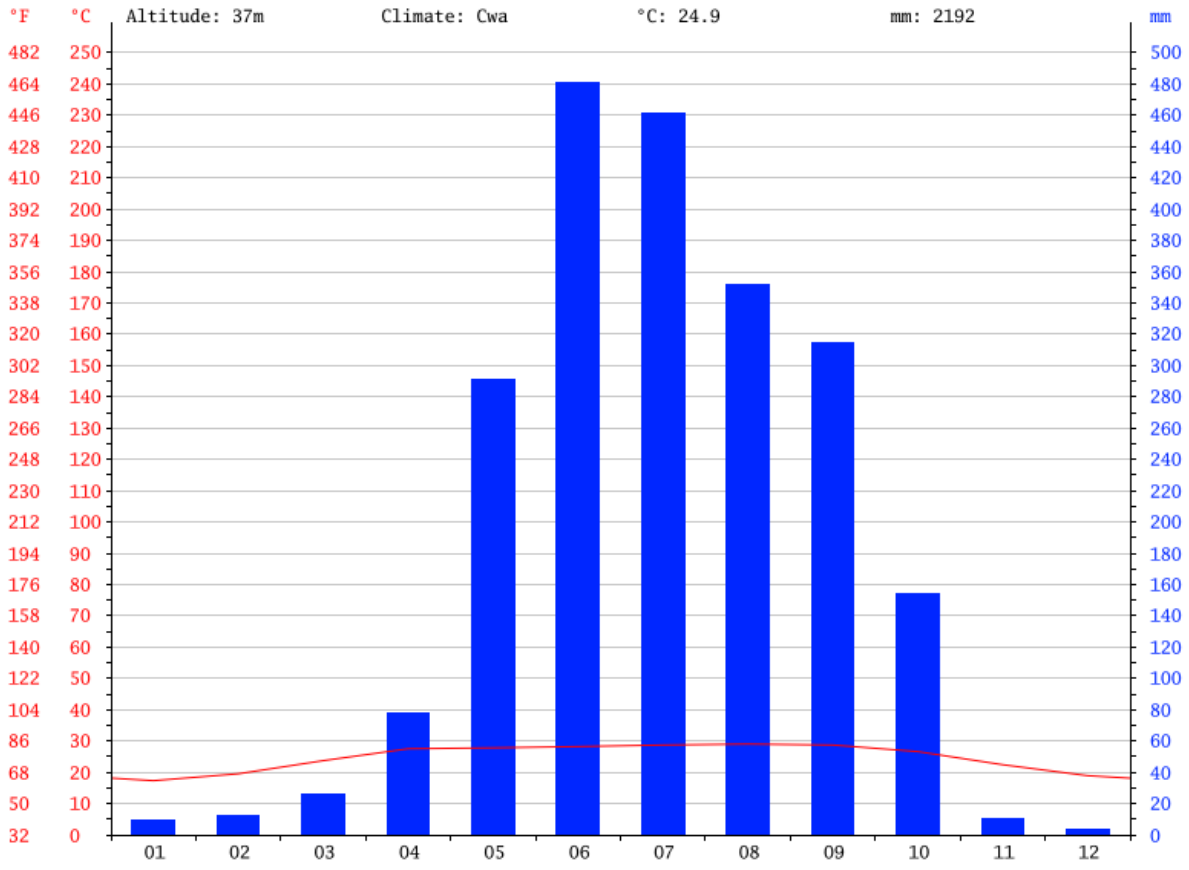


Figure-11 Climate Graph, source: en.climate-data.org

The graph shows that the least amount of rainfall occurs in December which is basically the winter season. The average rainfall in this month is 3mm.The most amount of precipitation occurs in June, with an average of 481 mm.

3.6.2 TEMPERATURE GRAPH

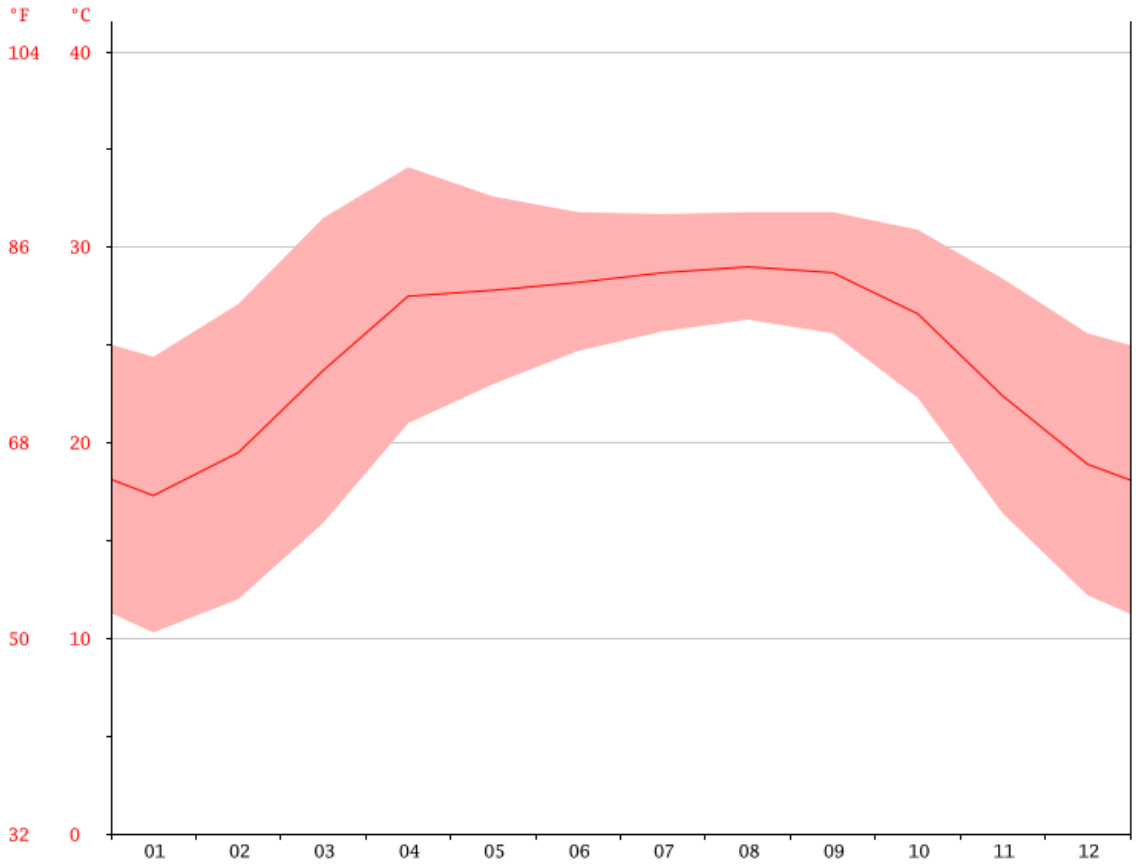


Figure-12 Temperature Graph, source: en.climate-data.org

The temperatures are highest on average in August, and the temperature is about 29-degree Celsius. The lowest average temperatures occur in January, and it is around 17.3-degree Celsius. Due to the high temperature during the summer, Rangpur also has a high humidity count. Although the annual average humidity of Rangpur decreased while the others increased over the past years. From 2001 the average of all the three regions is almost the same, although Rangpur still has highest count among them.

3.6.3 ANNUAL SUN PATH

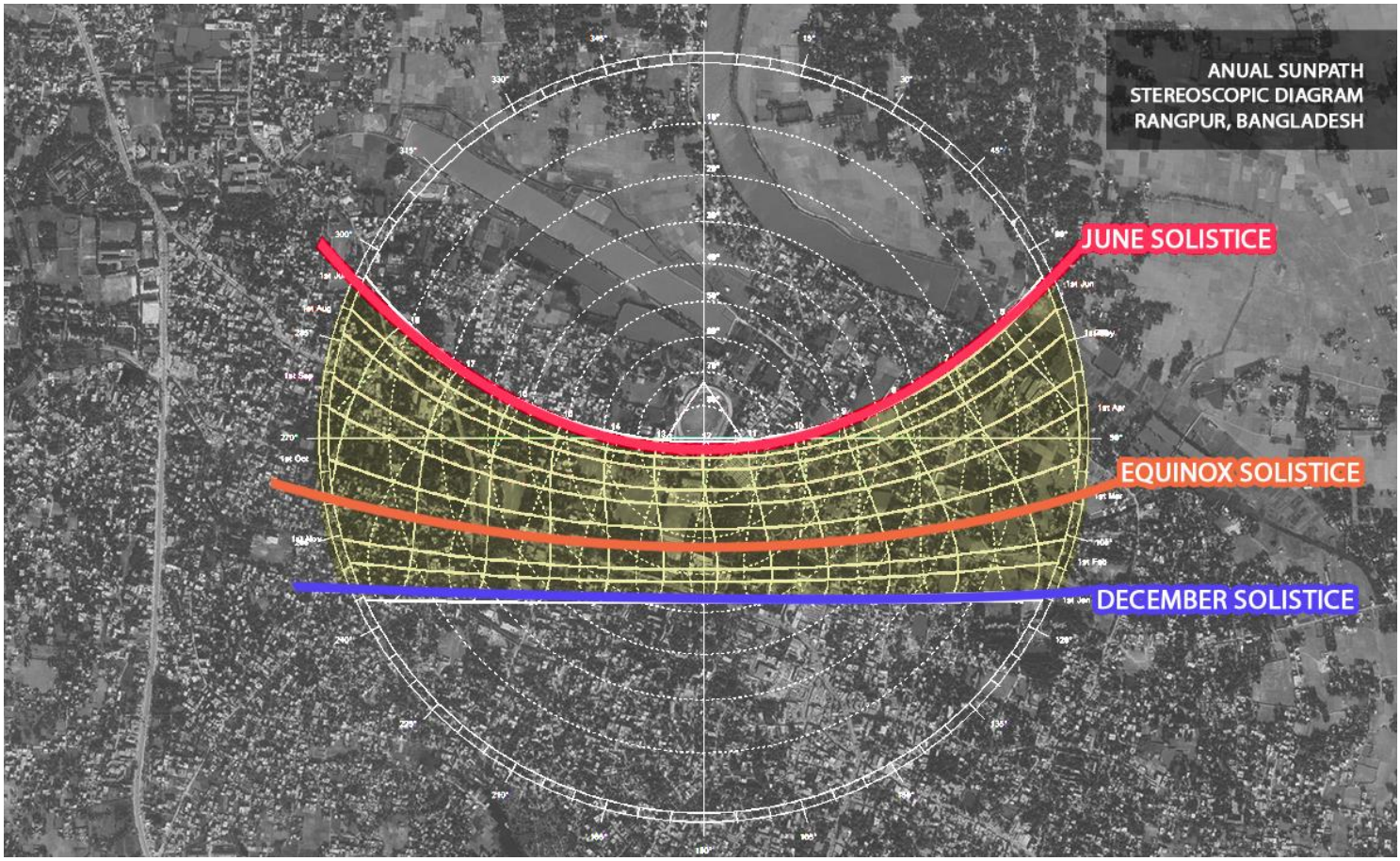


Figure-13 Annual Sun path of Rangpur Division, source: Autodesk Ecotect Analysis, edited by author

The Graphs show the sun path over the site area through out a year, it is shown that the sun angle varies from 60 degree to 115 degree throughout the year. Longest day time is happening in the June solstice and the shortest is in December solstice.

3.6.4 WIND FREQUENCY

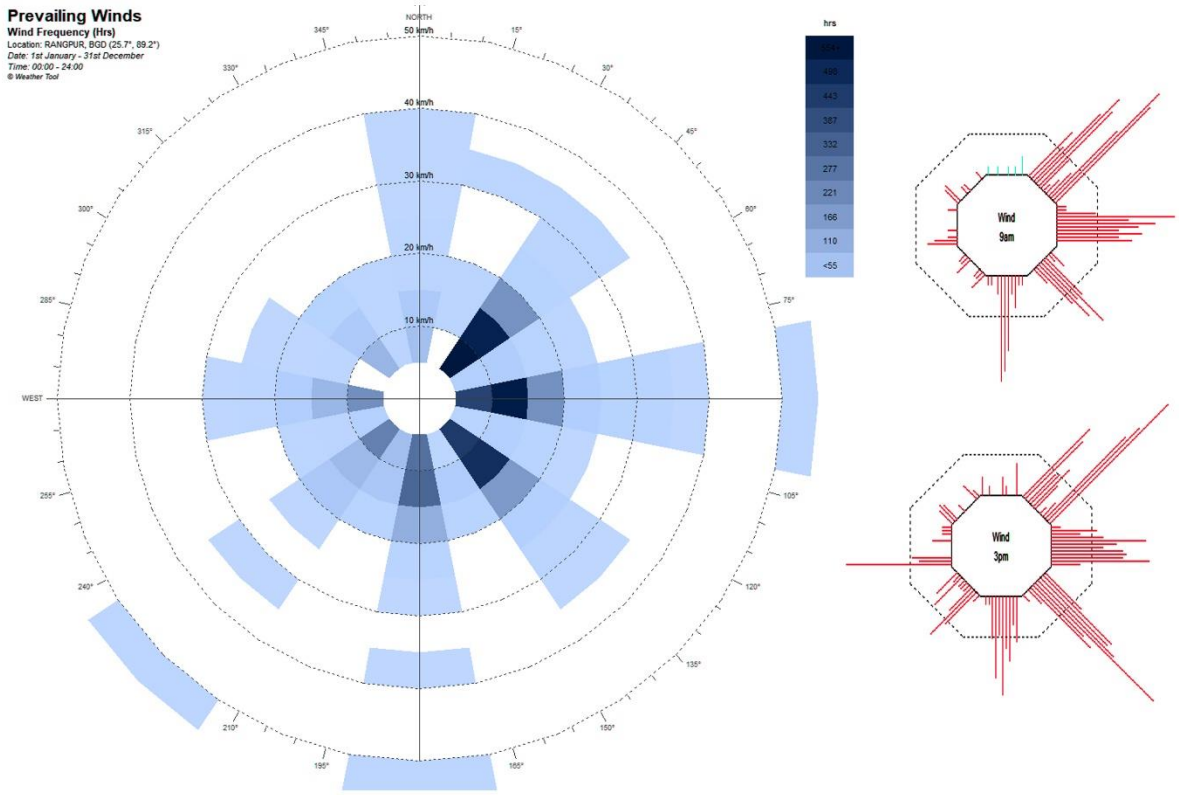


Figure-14 Wind Frequency Diagram, source: Autodesk Ecotect Analysis, edited by author

The chart is of wind frequency on site throughout the year, it shows that the wind pressure on the site is mostly from south and east side, and lowest wind frequency is from west side.

3.7 Swot Analysis

3.7.1 STRENGTH

- The surrounding environment is healthy and is suitable for sporting activities
- As the site is in suburban area, and also has strong environment support, therefore it has very minimal sound and air pollution.
- Facilitated with infrastructure supports like water, electricity, drainage system.

3.7.2 WEAKNESS

- Only one road is connected to the site, and which is about 30 ft wide.
- Climate is a challenge; hot and humid weather is difficult for sports activities outside.

3.7.3 OPPORTUNITIES

- The people of Rangpur will have a government provided sports facilities to enhance the sports culture.
- The site surrounding is supporting the site for a stadium.
- As stadium draws a huge crowd during game play, which may force the city to be developed.

3.7.4 THREAT

- As stadium draws a huge crowd in certain time, which may be excessive for the town, which may impact the city infrastructure.

Chapter 4

Case Studies

4.1 Sylhet International Cricket Stadium

4.1.1 BASIC INFO

Location: Sylhet, Bangladesh

Year: 2017

Architect: Ar. Masudur Rahman Khan **(**Bashat Architects Engineers Ltd.)

4.1.2 CONCEPT

The architect's vision for the project was to develop an architectural vision for the stadium that reflects Sylhet's culture and hold all the ICC standard modern facilities. Some designing criteria includes the conservation of the nature by keeping the existing hillock less disturbed while making it more attractive to the visitors.

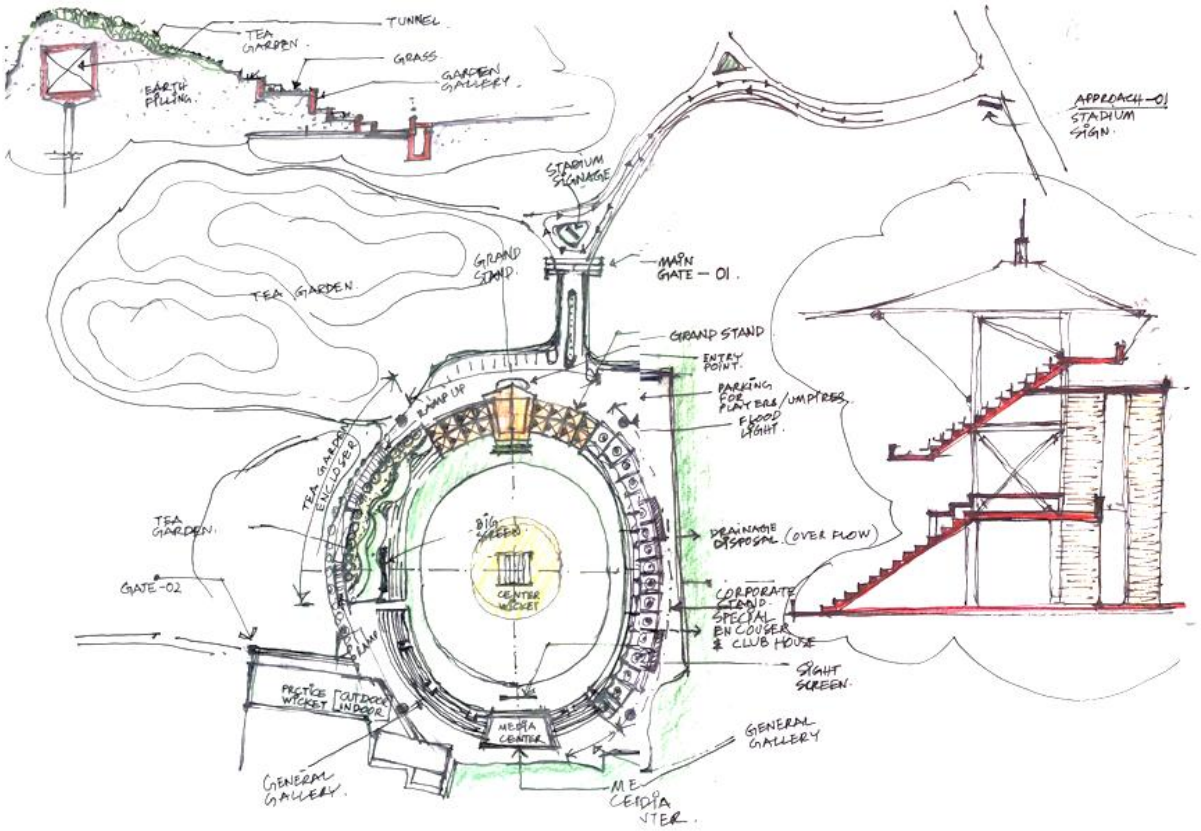


Figure-16Concetpual Sketch, source: Bashat Architects Engineers

At the west, a portion of the hillock was taken under design consideration. It was considered to be covered with a special type of green covers to function as open natural gallery. Some tent structure was also introduced in the design for food outlets. This green gallery gives the spectators a glimpse of the hillock landscape of Sylhet.

Figure-15Green Gallery at Sylhet International Cricket stadium, source: Bashat Architects Engineers

4.1.3 PLAN

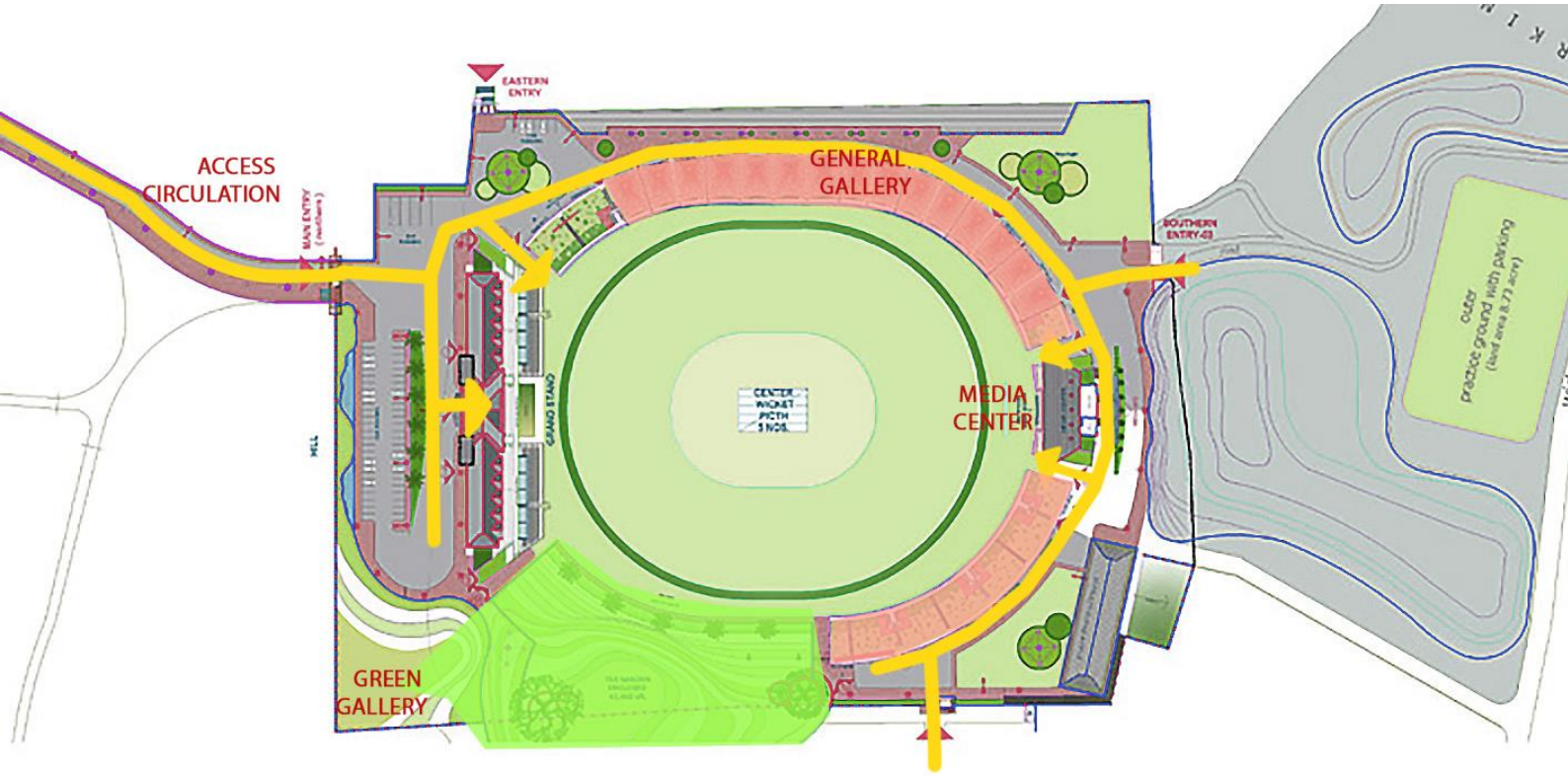


Figure-17 Master Plan, source: Bashat Architects Engineers

The stadium Features, grand stand building with four dressing room for playing teams. Players and match officials' facilities, different hospitality boxes, open gallery for VIP spectators. International Standard Media center (this should situate at the end wicked as per ICC rules). Two storied galleries for general spectators.

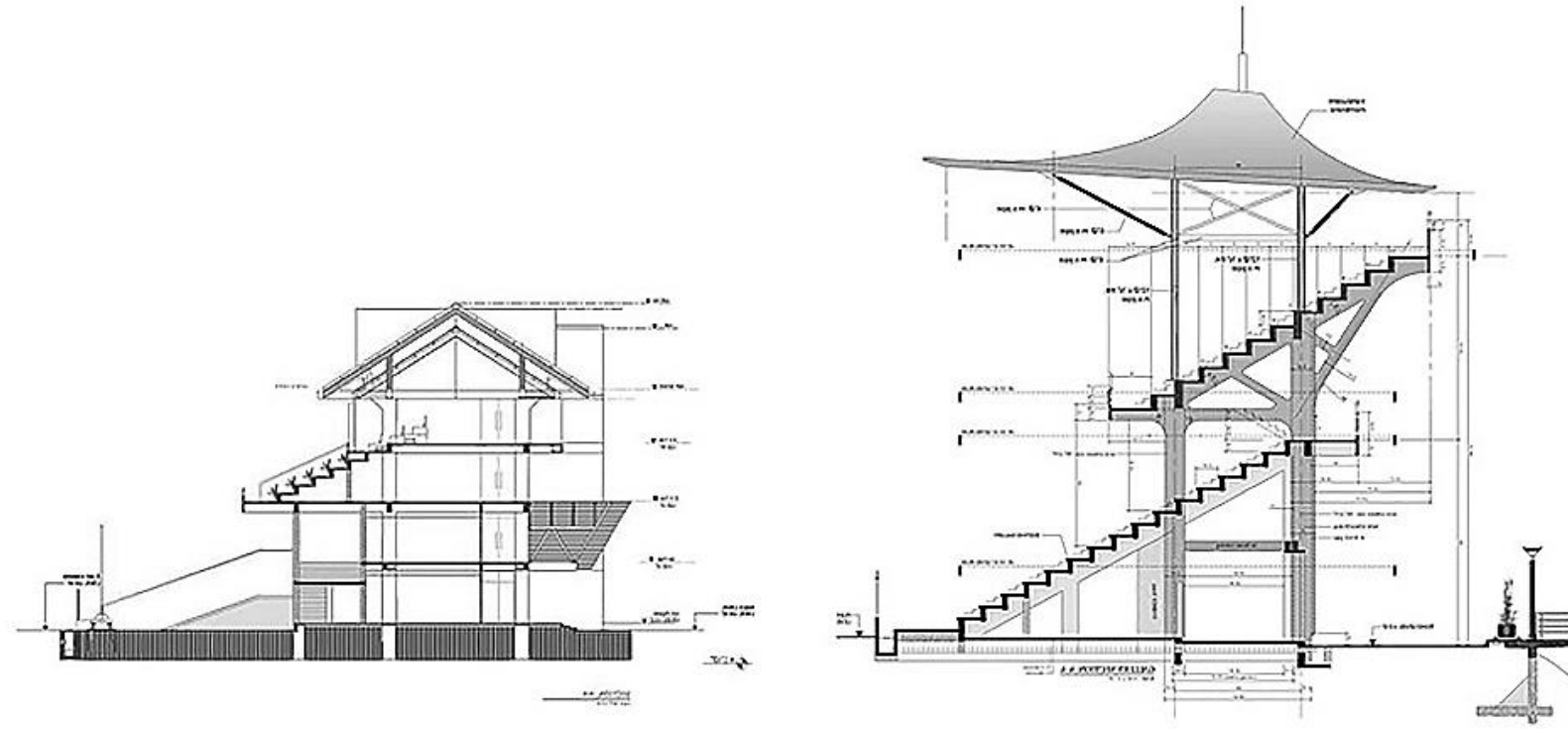


Figure-18 Section view of Gallery, source: Bashat Architects Engineers

Figure-19 Sylhet International Cricket stadium, source: www.dhakatribune.com

4.2 Dehradun Stadium

4.2.1 BASIC INFO

Client: Rajiv Gandhi Cricket Stadium and Sport Complex Society

Location: Uttarakhand, India

Capacity: 25000

This is a multipurpose stadium in the Raipur area of Dehradun, it is the first international standard stadium in the state. The stadium is Afghanistan cricket team’s Home ground.

4.2.2 CONCEPT

Figure-20Aipan art and Stadium Seat Design, source: himalayanbuzz.com

Due to lack of infrastructure in Uttarakhand, players started to moving in different states. To counter such activities the project of the stadium was taken. The construction of the stadium respects the local's tradition and culture. The seats and the façade of the stadium are designed in such a manner that reflects the art of Aipan, a traditional Kumauni art.

Also, the stadium's street side façade is designed in such a way that reflects their local architecture and materials.

4.2.3 Plan

The stadium meets the ICC standard requirements, which includes proper orientation and features of media center and player's officials' facilities.

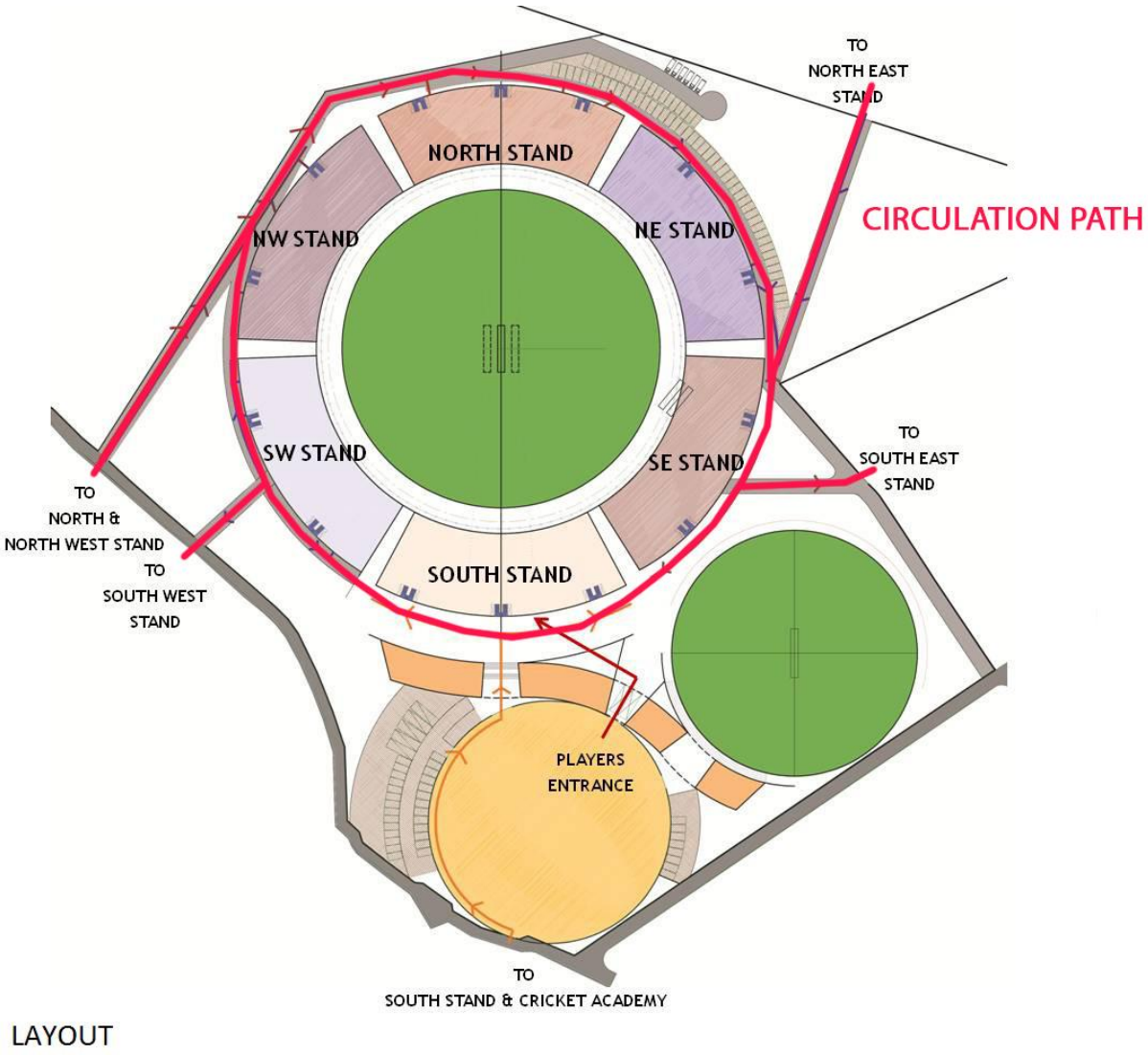


Figure-21Plan, source: pkdas.com

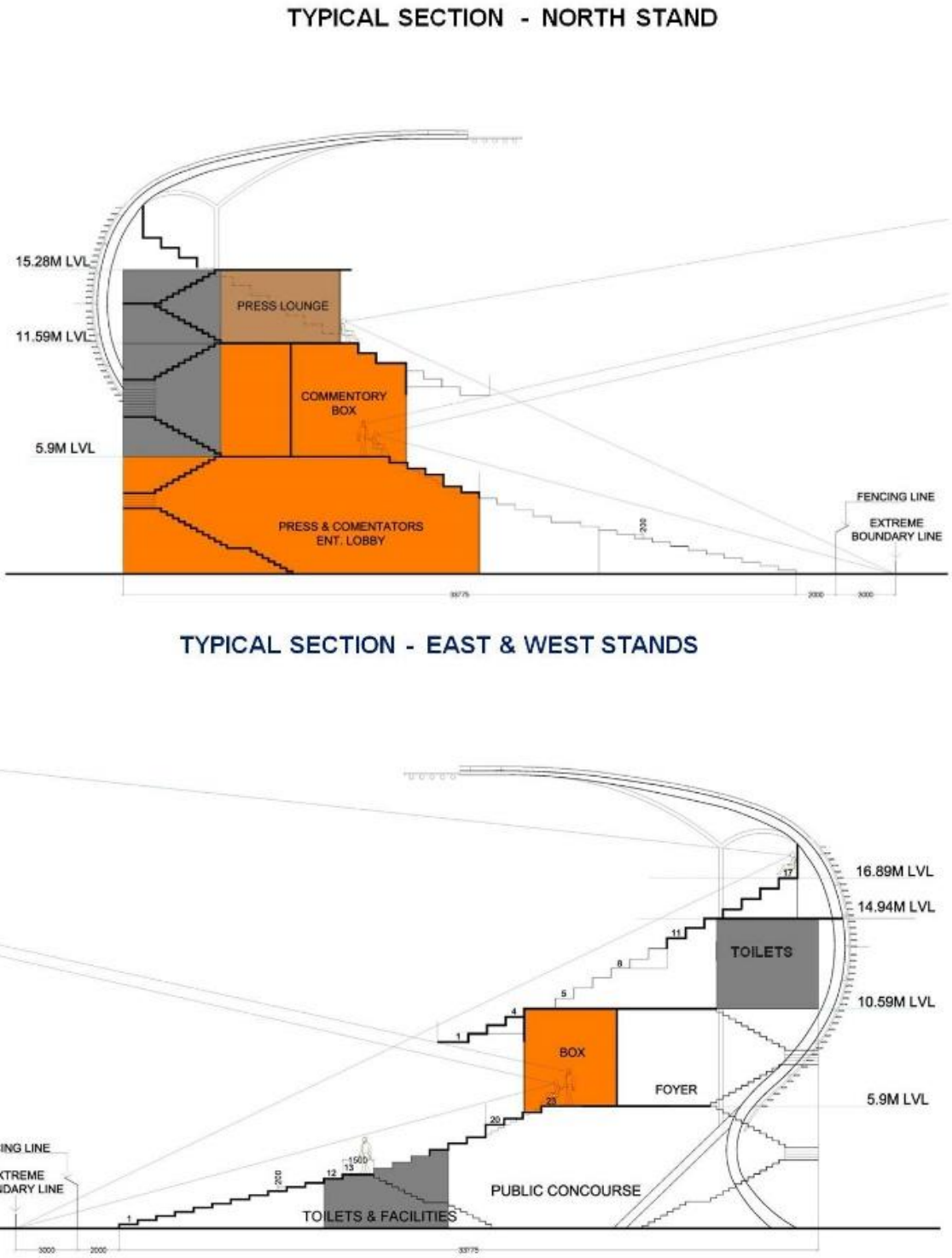


Figure-22 Section Views, source: pkdas.com

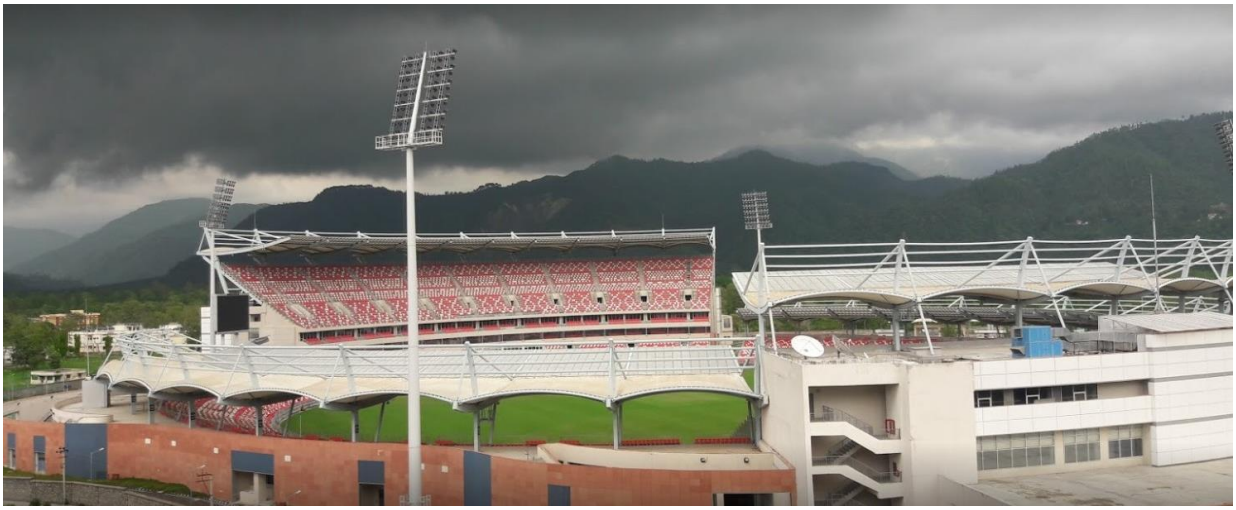


Figure-23 Stadium Images, source: pkdas.com

4.3 Tottenham Hotspur Stadium

4.3.1 BASIC INFO

Location: London, England

Design By: Populous

Capacity: 60,000

Year: 2018

Tottenham Hotspur stadium is the home ground for Tottenham Hotspur club located in north London. It is a multipurpose stadium included facilities for corporates and local sports enthusiasts.

4.3.2 CONCEPT

Tottenham Hotspur set the challenge of revolutionizing modern stadium design. As part of a major regeneration of the area, the Club's vision is to create a thriving and exceptional sports, leisure and entertainment destination in Tottenham; one that delivers a world-class venue capable of hosting two elite football codes; facilities with benefits for the local community; and to create the most intense and atmospheric place to watch football in Europe.

The stadium is the pride for the club and its people. It features a banquet hall, and 180 keys hotel for the fans and visitors, which also includes educational facility for local young people. The master plan of the stadium includes a public square, Tottenham Experience (club shop and club museum), community health center, commercial space, 579 residential units and skywalk experience. The complete project will bring 3,500 jobs in the local area.

4.3.3 DETAIL DRAWINGS

Plan Level 0 Showing Zoning and Circulations

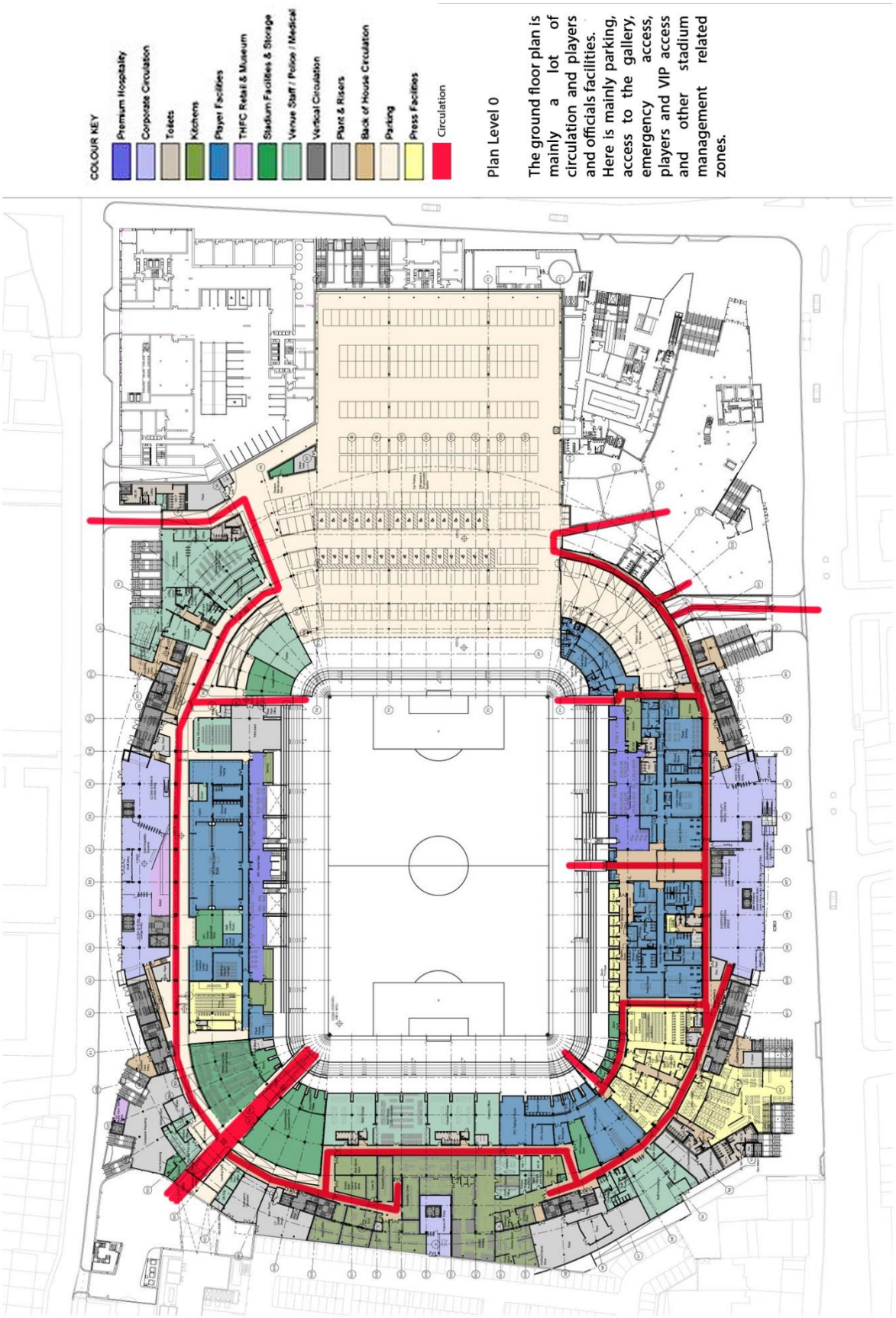
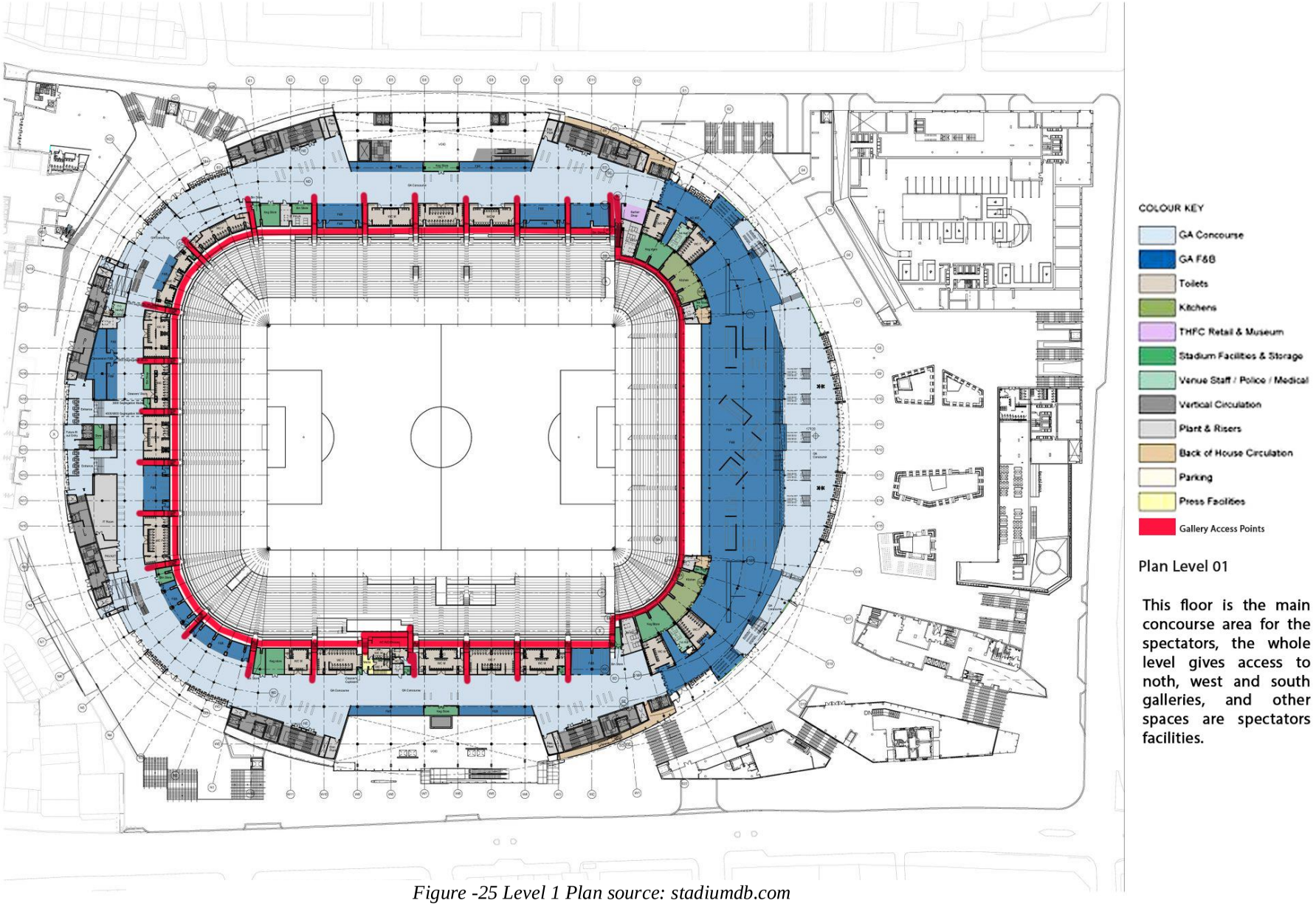


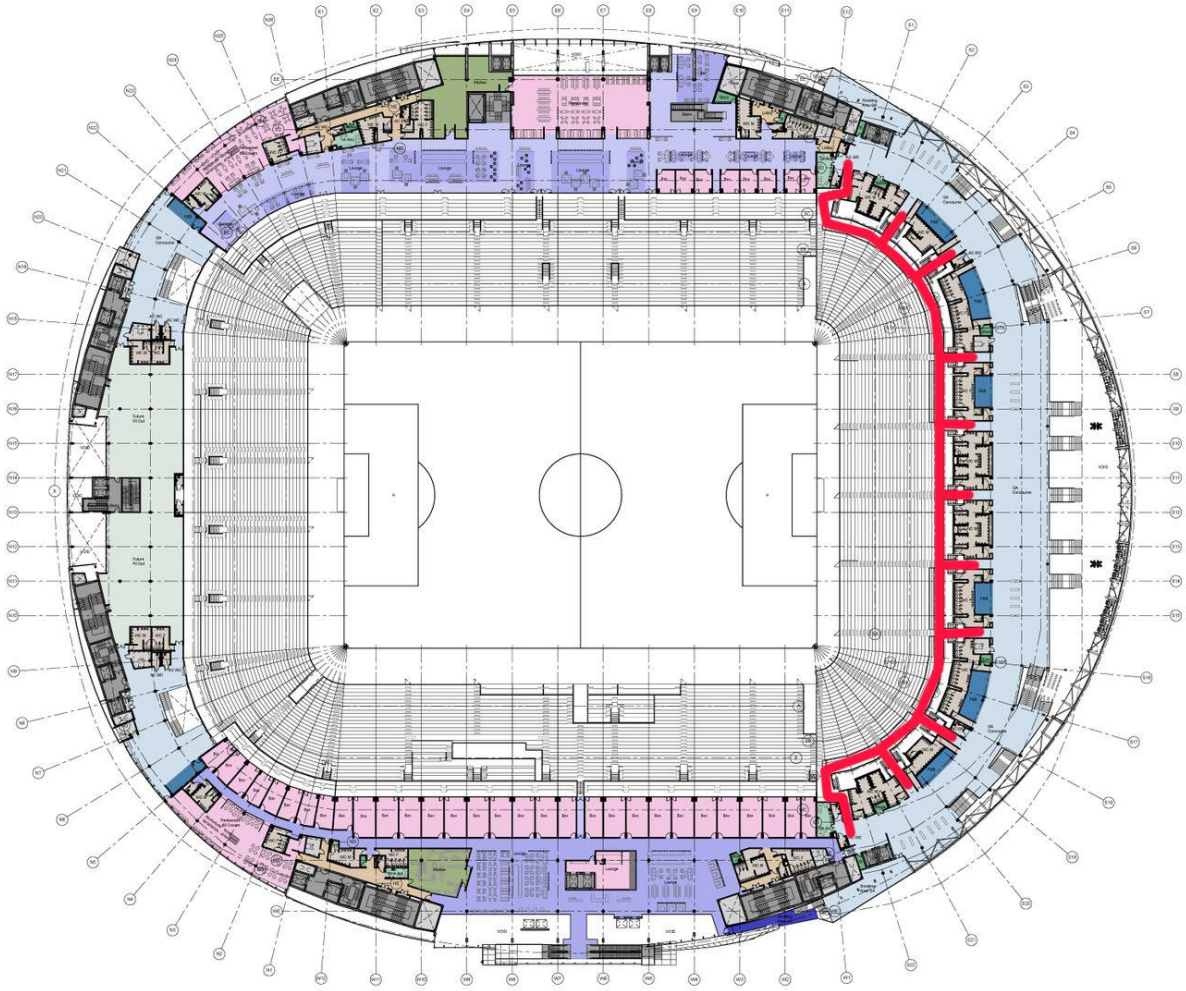
Figure -24 Level 0 plan, source: stadiumdb.com, source: stadiumdb.com



Plan Level 01

This floor is the main concourse area for the spectators, the whole level gives access to noth, west and south galleries, and other spaces are spectators facilities.

Figure -25 Level 1 Plan source: stadiumdb.com



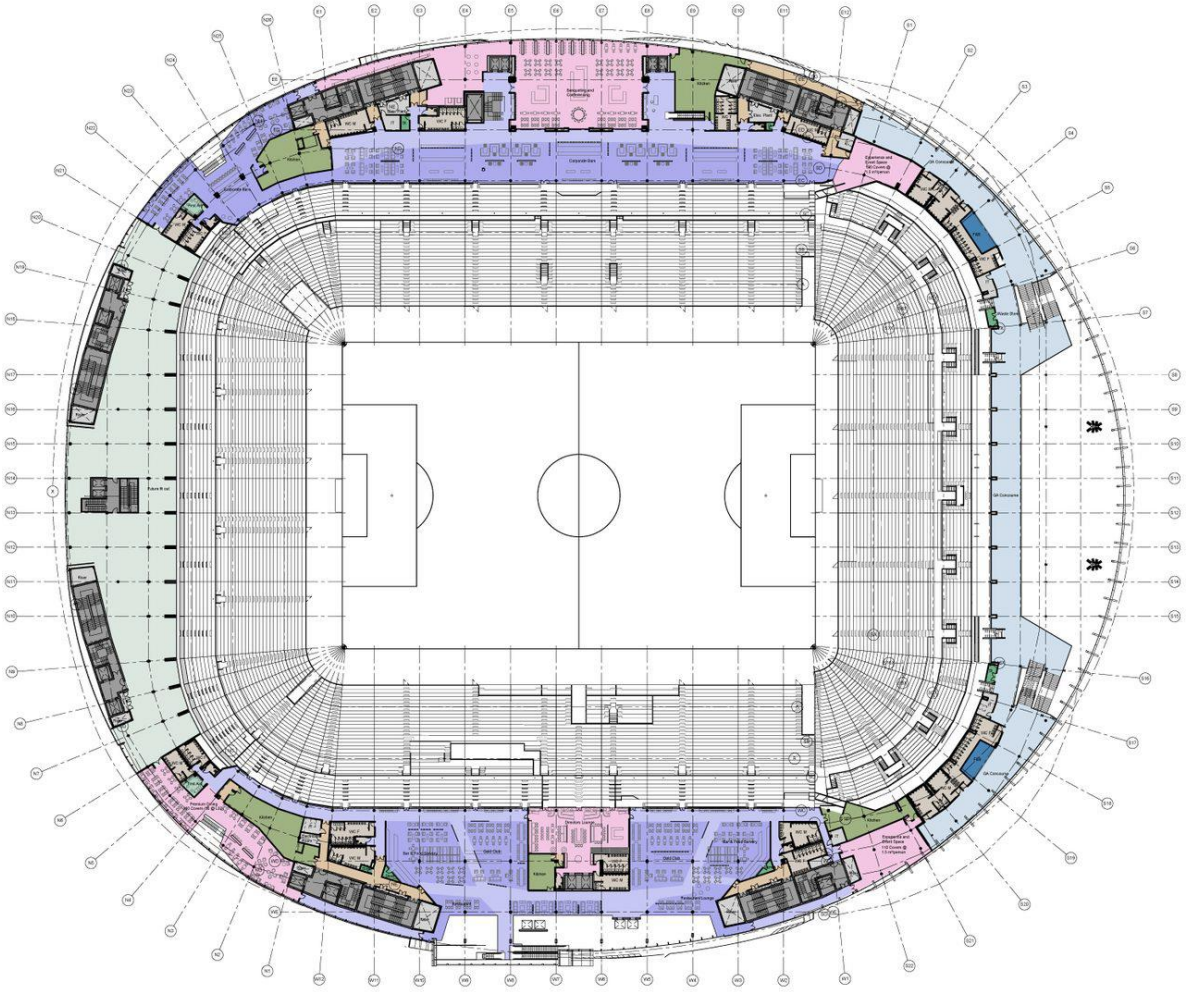
COLOUR KEY

- GA Concourse
- GA F&B
- Corporate Circulation
- Corporate Bars
- Restaurants & Suites
- Toilets
- Kitchens
- Stadium Facilities & Storage
- Venue Staff / Police / Medical
- Vertical Circulation
- Plant & Risers
- Back of House Circulation
- Future fit out
- Hospitality
- Gallery Access Points

Plan Level 02

This floor includs access to east gallery, coporate facilities, fitness area and some VIP facilities.

Figure -26 Level 2 Plan source: stadiumdb.com



COLOUR KEY

- GA Concourse
- GA F&B
- Corporate Circulation
- Corporate Bars
- Restaurants & Suites
- Toilets
- Kitchens
- Stadium Facilities & Storage
- Venue Staff / Police / Medical
- Vertical Circulation
- Plant & Risers
- Back of House Circulation
- Future fit out

Plan level 03

This floor is for corporate facilities and stadium's back of the house.

Figure -27 Level 3 Plan source: stadiumdb.com

Section of Gallery

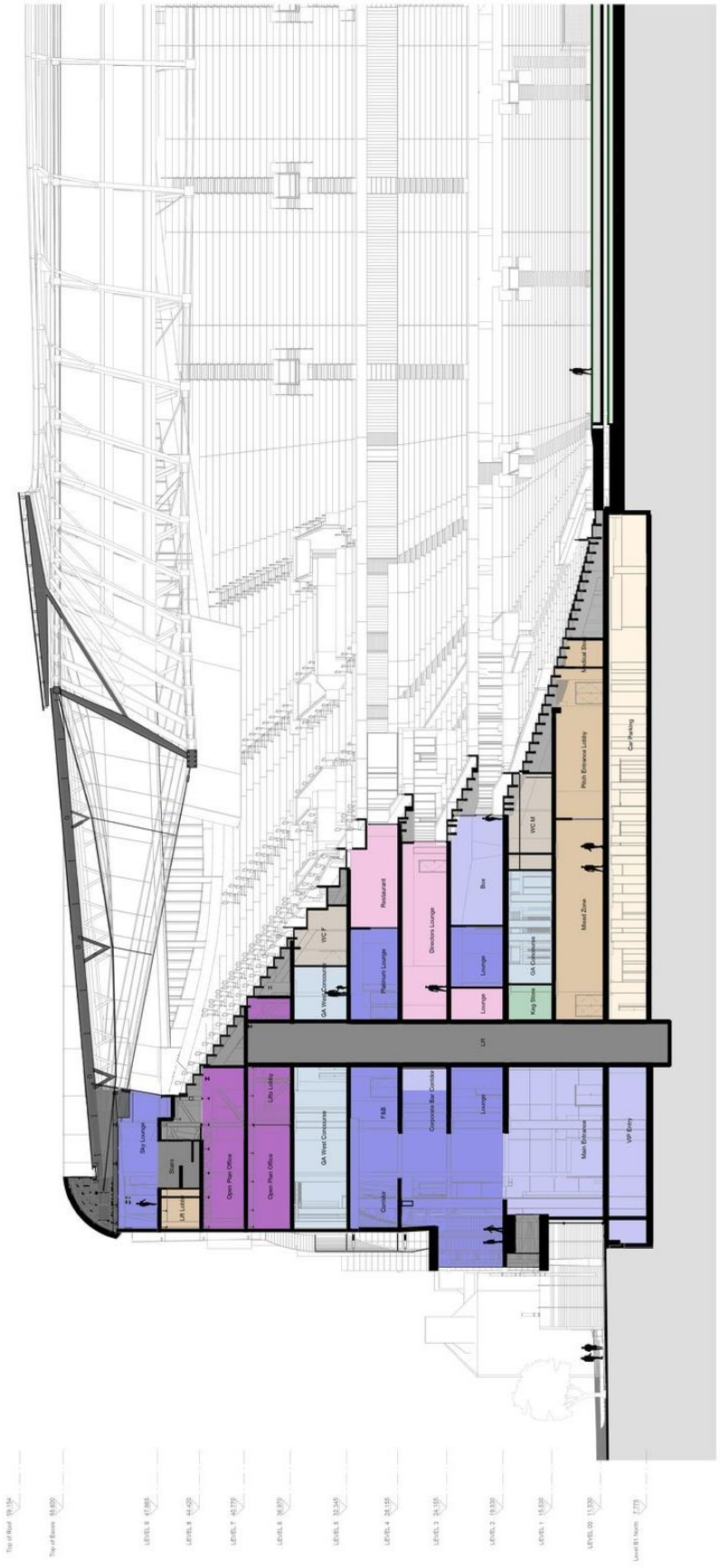


Figure -28 Section View of Gallery, source: stadiumdb.com

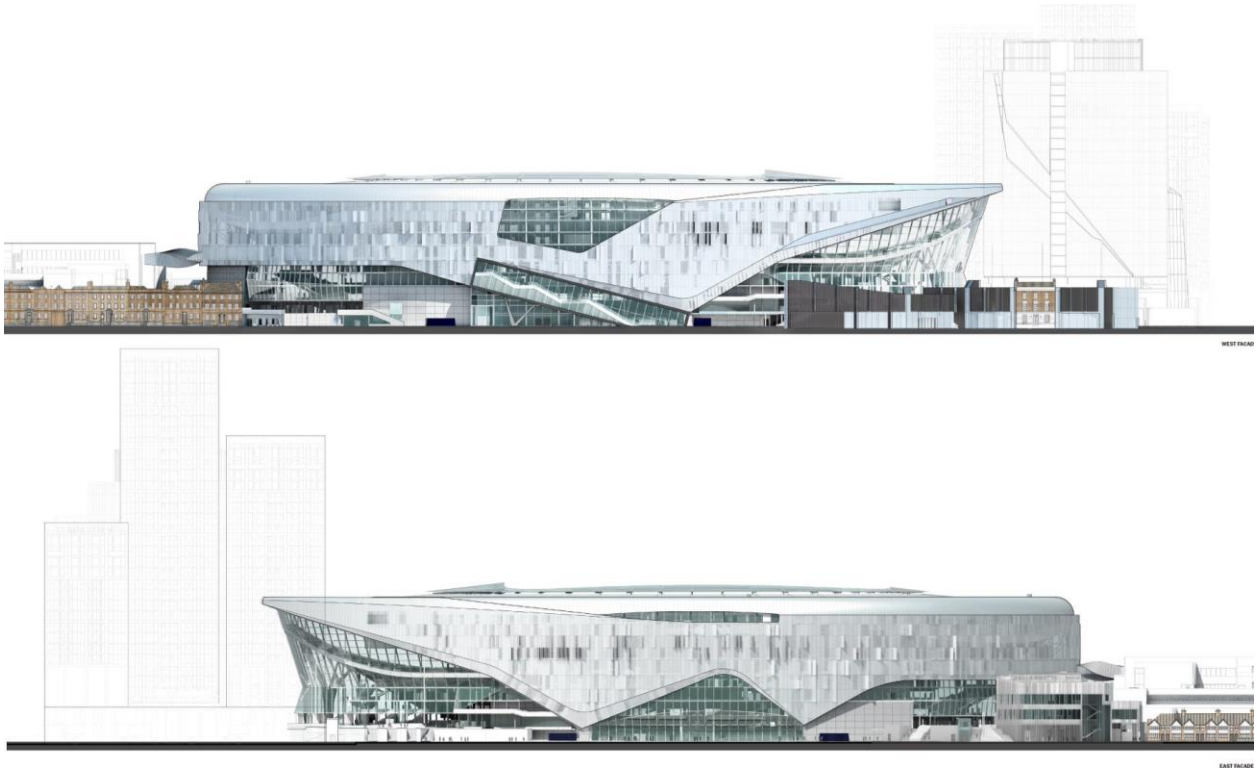


Figure-29 Tottenham Hotspur Stadium, source: stadiumdb.com

Chapter 5

Program Analysis

5.1 Detail Program Chart

Field			
Ground for Cricket		1,38,544	Sft
Gallery Space 30,000 Spectators		1,35,000	Sft
Ticketing 30 nos. approx.	250 each	7,500	Sft
Toilet facilities		7,000	Sft
Pavilion Building Adjoined with Gallery			
Player Lounge	30 Sft per player	840	Sft
Umpires and another Officials lounge		300	Sft
Dressing room and lockers		1000	Sft
Massage room		50	Sft
Shower and Toilet facilities	80 Sft per player	2240	Sft
Medical room		300	Sft
Resident Doctors room		200	Sft

X-Ray room		300	Sft
Gym and Fitness	50 people	10,000	Sft
Circulation		2092	Sft
VIP Facilities			
Private box	30 nos.	9000	Sft
Executive suites	18 nos.	9000	Sft
Club Dining		3672	Sft
Restaurant		2500	Sft
Kitchen		850	Sft
Media Center			
Press Seats	150 nos.	3150	Sft
Commentary room	4 nos.	4000	Sft
TV, Radio, Social Media Streaming	3	3000	Sft
Interview room	2	1200	Sft
Video electronic screen control room		1200	Sft
Ground man room		800	Sft
Equipment room		1500	Sft
Generator room		2000	Sft
Network room		1200	Sft
Air Conditioning Unit		1200	Sft

Stadium Administration			
President’s room		200	Sft
GS room		200	Sft
Staff room		500	Sft
Meeting room		200	Sft
Waiting room		1500	Sft
Event organizer room		300	Sft
Board room		200	Sft
Stadium control room		500	Sft
Archive room		200	Sft
Toilet		400	Sft
Parking			
84 Car parking		10,752	Sft
4 Bus Parking4		1280	Sft

SUBTOTAL CALCULATIONS

Gallery	1,49,500	Sft
Pavilion Building	17,322	Sft
VIP Facilities	25,022	Sft
Media Center	19,250	Sft
Stadium Administration	4,200	Sft
Total Built Area	**2,15,294**	**Sft**

5.2 Zoning

As already mentioned in Chapter 2.13 A stadium has five level of security zones, which restricts access to public, and accessible to authorized persons only.

Zone One: The Playing Field all types of access is restricted during gameplay.

Zone Two: The Spectator seating and standing area. This area access is controlled by ticketing system, and the capacity is limited.

Zone Three: The internal concourses, restaurants, souvenir shops etc.

Zone Four: The circulation between the stadium structure and the perimeter fence

Zone Five: The open space outside the perimeter fence

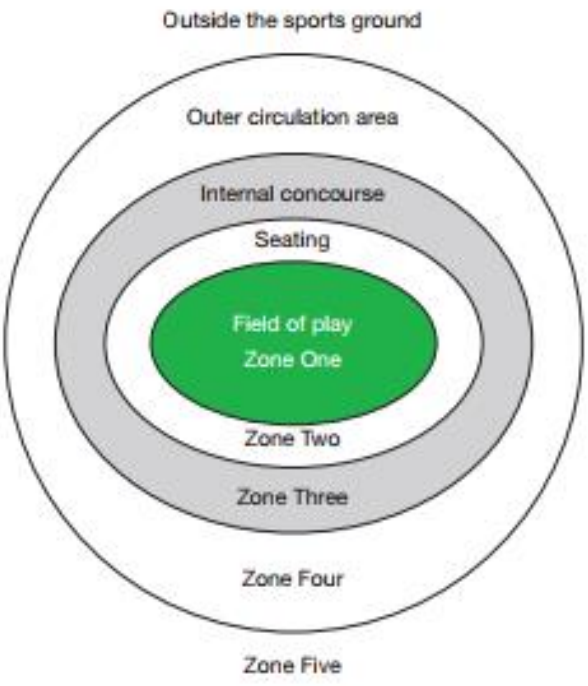


Figure-30 Stadium Zones, source: stadia

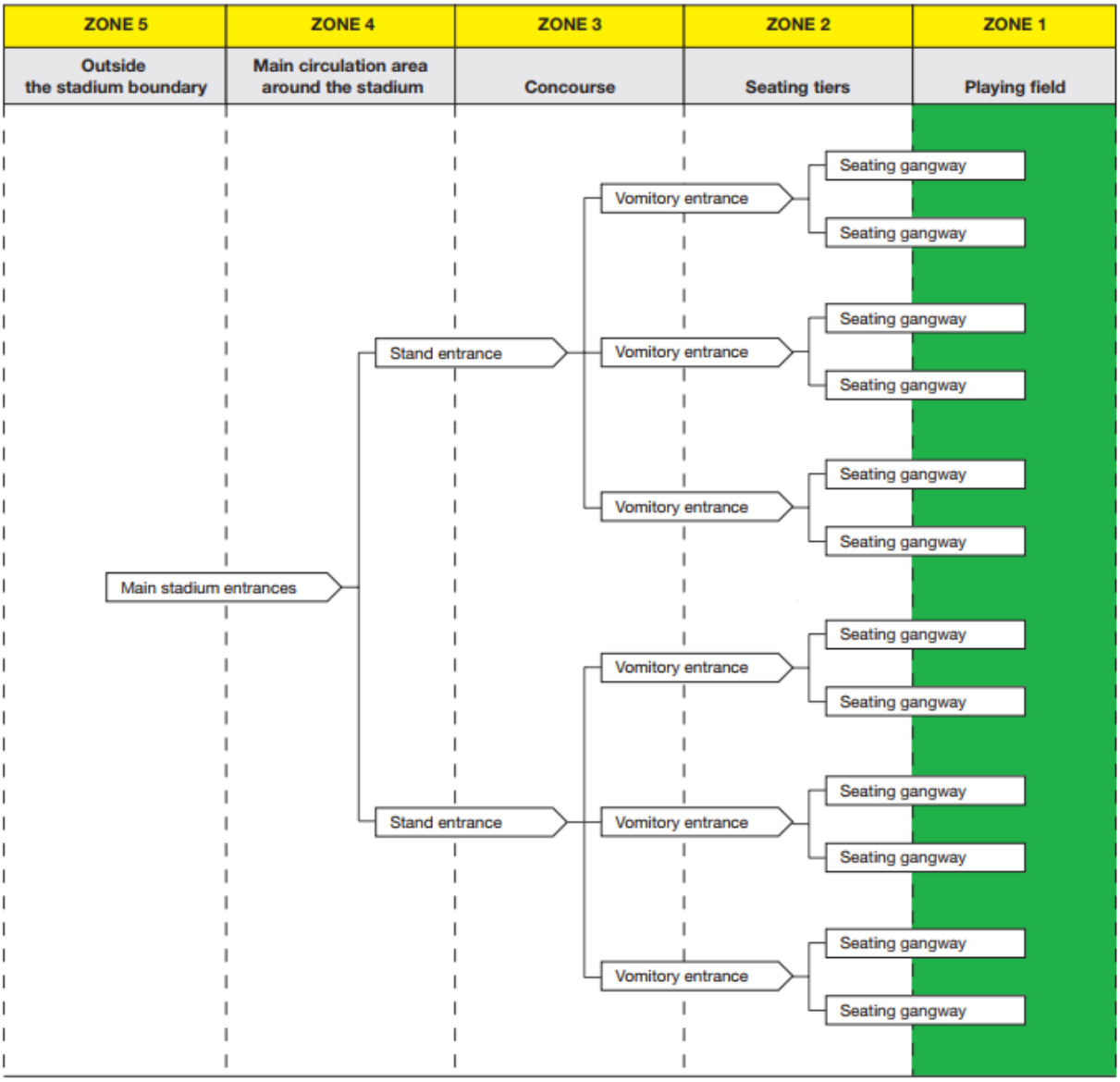


Figure-31 Spectator flow from gate to seat. Movement will be smoothest and safest if the spectator is faced with a sequence of simple choices, as shown, source: stadia.

5.3 Functional Relation

5.3.1 OVERALL FUNCTIONAL LINKAGE

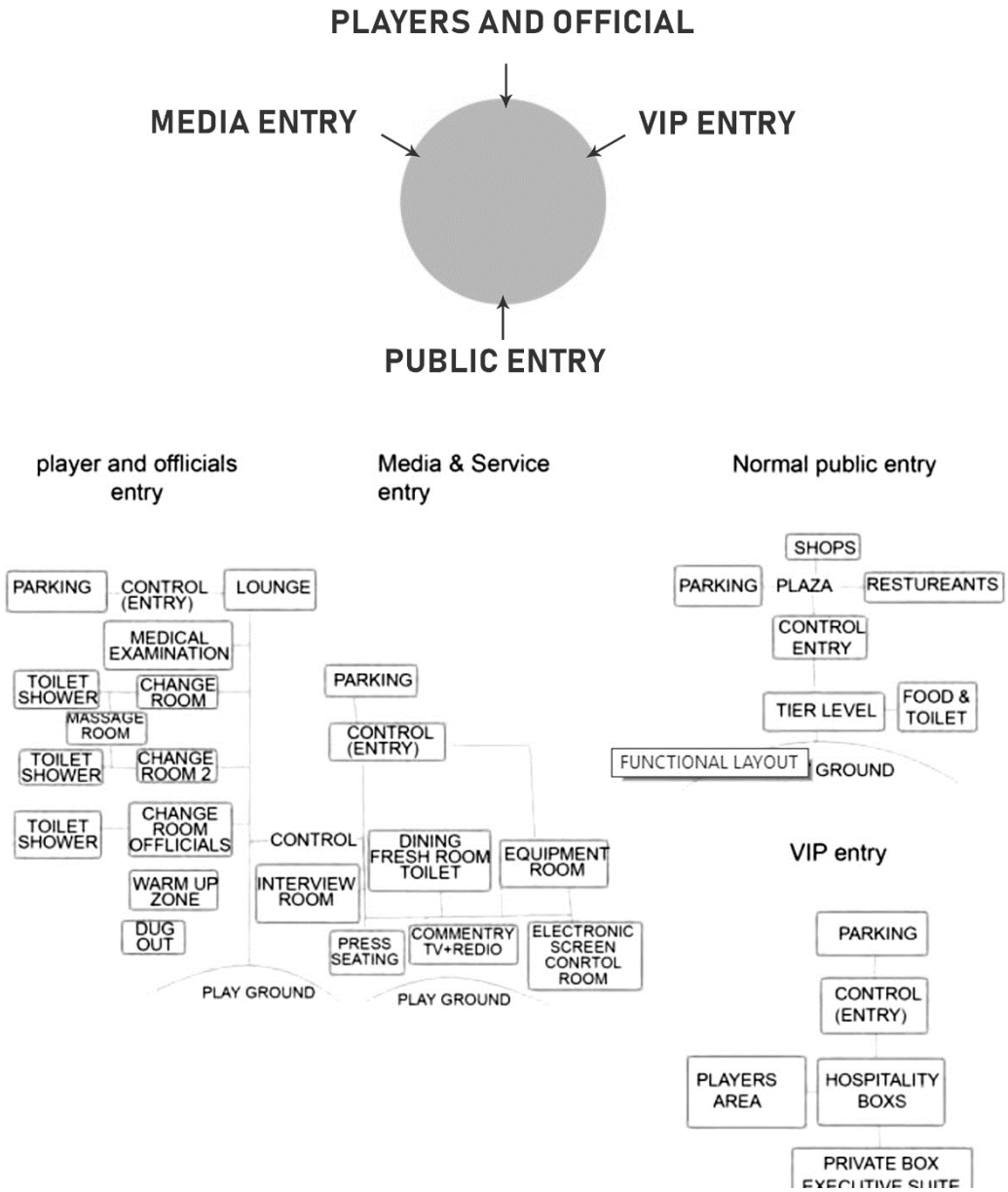


Figure-32 Functional flow of stadium, source: Argha Saha

5.3.2 PLAYERS AND MEDIA

All media facilities should be grouped together on the same side of the stand as the team dressing rooms. It is extremely inconvenient for media representatives to have to cross to the other side of the stadium to attend interviews. This zone of facilities should be close to, and easily accessible from the parking zone for media vehicles. And Players zone is also recommended near to the media. The functional flow and linkage are shown figure 5-4.

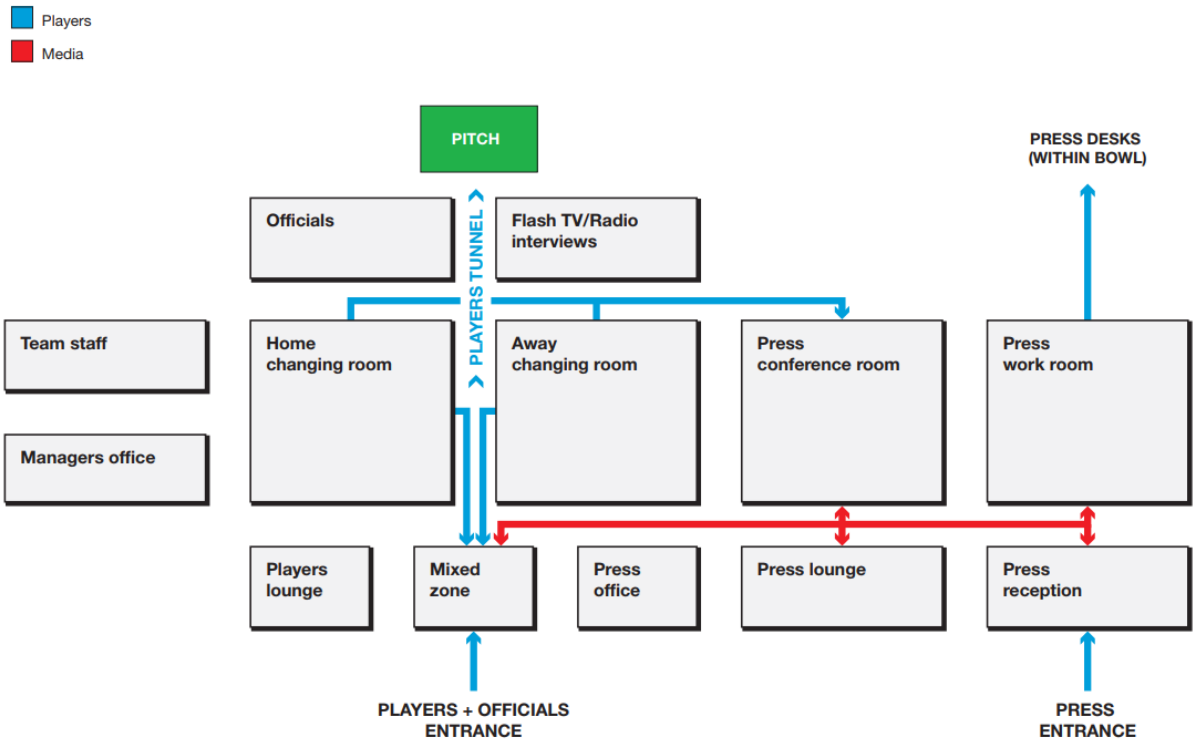


Figure -33 Schematic relationship between players, officials and media facilities, source: stadia

5.3.3 USER TYPES

There are seven Min User groups for a stadium and they are,

- Spectators
- VIP Sponsors
- Players
- Officials Referees
- Media Personnel
- Management Service Personnel
- Event Organizers

Along with then provision must be made for the police and security staff, and emergency services.

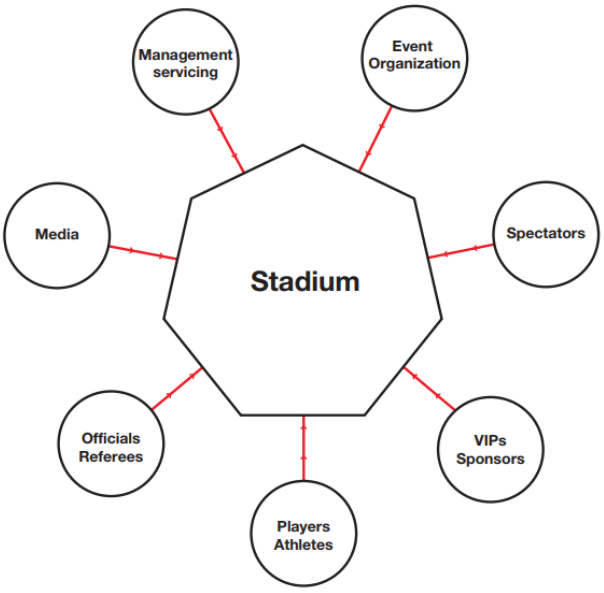


Figure -34Types of user groups in stadium, source: stadia

5.4 Field/ Central Area

Ground area for cricket taking a circle of minimum 46 meter or 151 feet Radius and maximum of 64 feet or 210 feet radius.

Area of Field: $A= \pi r^2$

For 151 feet standard Area = 71,631 sft

For 210 feet maximum standard = 1,38,544 sft

5.5 Gallery Space

Gallery Space 30,000 spectator

Space occupied per person in 4.5 sft (including circulation are)

Total Area required for 30,000 spectators = 1,35,000 sft

5.6 Toilet Requirements

	Urinals	WCs	Wash basins
Male	Minimum of 2 for up to 100, plus 1 for every other 80 males or part thereof	Minimum of 1 for up to 250, plus 1 for every other 500 males or part thereof	1 per WC and 1 per 5 urinals or part thereof
Female	No recommendations	Minimum of 2 for up to 50, 3 for 51 to 100, plus 1 for every other 40 females or part thereof	Minimum of 1, plus 1 per 2 WCs

*Figure**Error! No text of specified style in document.**-35 Toilet Provision, source: stadia*

Total Spectator 30,000;

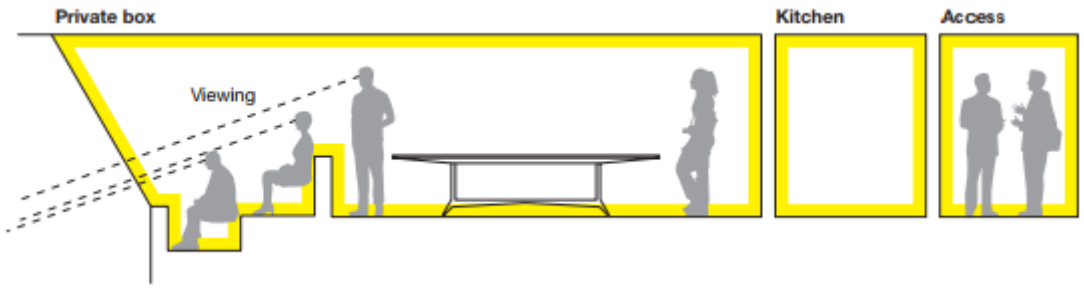
Male (80%) 24,000 Female (20%) 6,000

Male WC required 24000/250 = 96 nos.

Male Urinal Required 24000/100=240

Female WC Required 6000/40= 150 nos.

Area Required per unit WC 20 Sft,



Total = 96*20 + 150 * 20 = 1920 + 3000 + 1968 (40% circulation) = 6888 Sft ~ 7000 Sft

5.7 VIP Facilities

5.7.1 PRIVATE BOX

Private Box required for 2% of capacity

Which is for 600 people. Each box accommodates 10 to 20 people. So, units required is 30. Each private box could include kitchenette.

Per box area = (20 x 8) Sft + 64 Sft circulation + 76 Sft Kitchenette = 300sft

Total area required = 300*30 Sft = 9,000 Sft

5.7.2 EXECUTIVE SUITES

Required for 1% of capacity, which is for 300 people. Each suite accommodates 16 people. So total suites required of 18 nos.

private box source: stadia

Per suite area = (18 x 20) Sft + 128 Sft circulation = 504 ~ 500sft

Total area required = 500 * 18 = 9,000 Sft

5.8 Club Seating and Dining

Required for the 2% of the capacity, which is for 600 people. Table is required for the 30% of the people, so table users are 200 people. Each table is for 6 people. So Total table required is 34 nos.

Restaurant area = 34 x 81 Sft = 2754 Sft, kitchen = 918 Sft

So, Total area = 3672 Sft

5.9 Player Facility

Total player 28 nos.

Changing room 2 nos.

Hanging space for each player 3 ft x 4 ft = 12 Sft. So, Area required = 336 Sft

Massage room required 2, 25 Sft for each.

Washing and toilet facilities is required as 1 position per 3 players. Which is WC = 4, Basins=5, Urinal=6 for each team and shower requirement is 1 for 2 players, which is 14 nos. Which is about 80 Sft per player and total = 2240 Sft.

5.10 Media

Capacity for 150 people. 15sft for each person. Total area = 2250sft + 900sft=3150 Sft.

Commentary room including networking facilities at least 4 booths, each 1000 Sft total= 4000 Sft. TV, Radio, Social Media streaming including networking facilities each 1000 Sft total = 300 Sft.

Interview room 2 nos. 600 Sft each, total = 1200 Sft.

In addition, service room, video electronic screen control room, network room, generator and equipment room are required.

5.11 Parking

Parking is required 1 for every 2150 Sft gross area. As per calculation the whole project consists of about 1,80,000 Sft. So total Parking required is 83.7 ~ 84 nos. Bus Parking Required for teams and media facilities are 4 nos.

Parking area required = (84 x 128) Sft + (320 x 4) Sft = 12,032 Sft

Chapter 6

Design Development

6.1 Concept and Design Considerations

The Design process started keeping in mind the focus of usability of the stadium throughout the year. Apparently, the designated site comprises of all the factors that would have addressed the international standards facilities as well as the local's facilities.

As a stadium draws publics from different distance like the locals, nationals and the international, there will be huge crowd pressure in the site during event days. So, design process starts with defining the access to the site.

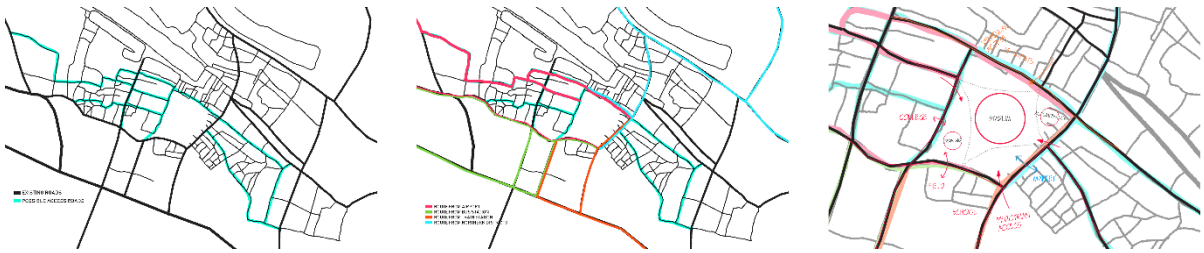


Figure 36 Concept Diagram 1 source: author

Access to the site was defined by the types of people coming from different proximities, the north side road is defined as only vehicular access road because of the adjacent residential area, and the possible incoming access from the Saidpur airport, which tends to be the access of VIP personnel's and the international visitors. Moreover, the west, south and the east adjacent roads are proposed as pedestrian access only during the event days, as these tends to bring the most visitors to the site as well as the visitor are the locals or the users of Bus Terminal and the

Figure 37 Concept Diagram 2 source: author

Railway Station, who are tends to use the public transports. So therefore, the adjacent roads are proposed to be pedestrian only during the event days.

Defining the access, the stadium bowl was located in the site and the defined access was connected surrounded by the stadium bowl. In addition, to make the stadium premises active throughout the year additional functions like Hotel for accommodation, Museum for the visitors, an academy along with indoor games and gymnasium facilities for the local youths, Food Courts and Retails shops for the locals and the visitors are proposed in the design.

Moreover, to split and control the inside stadium spectator's stadium concourse is lifted a level, and the ground level is for the public plaza and functions. Finally, and extended shade is designed both for the inside stadium spectators and the public plaza.

Programs formulated according to the functional flow diagram, design considerations and international standards requirements.

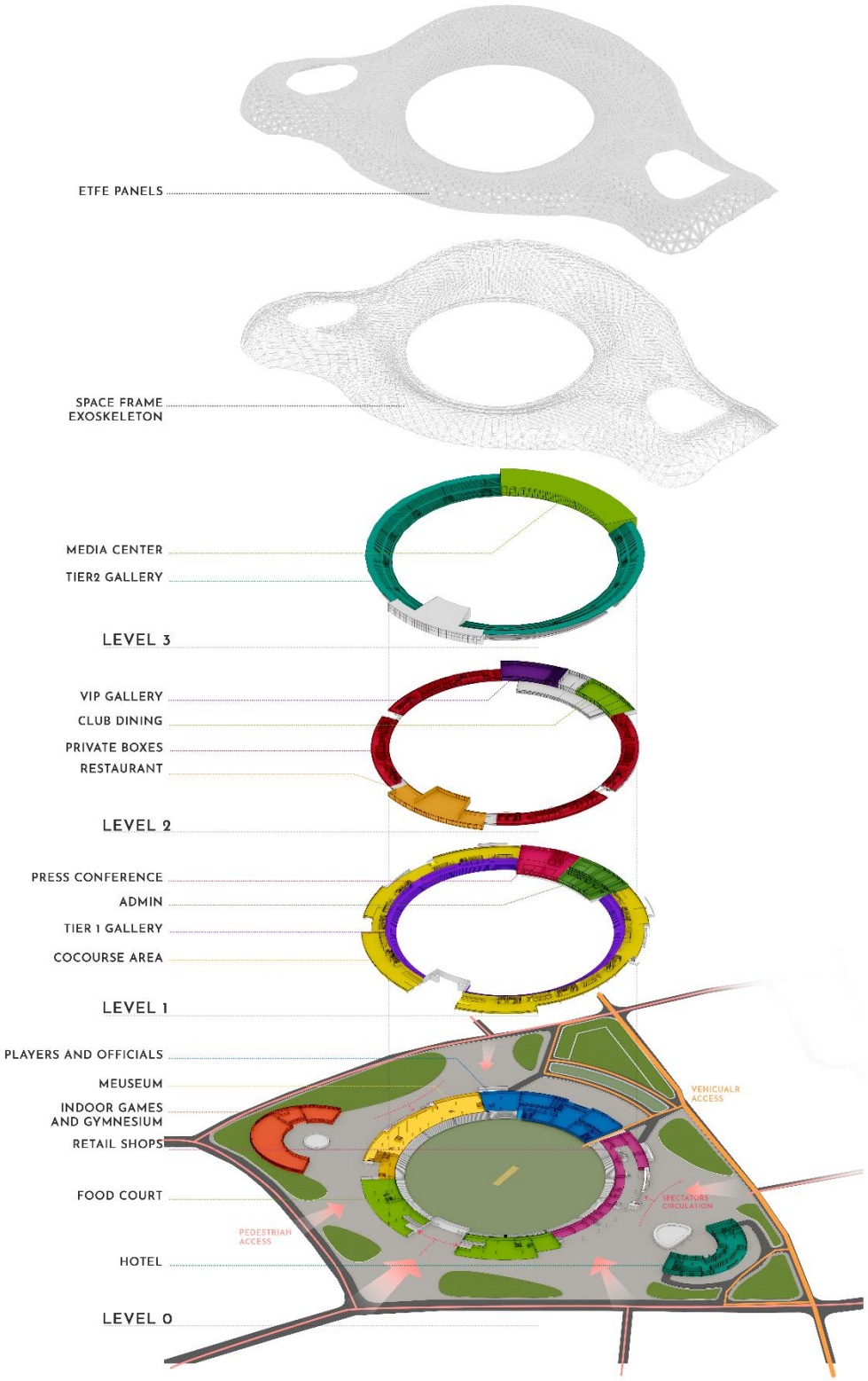


Figure 38 Axonometric Diagram with zoning and circulation source:author

The Stadium is designed in total 3 tier, 2 spectator gallery tier and 1 in between private boxes tier, also in the direction of the end wickets Media center, VIP Lounge, Club Dining and Public Restaurant is designed.

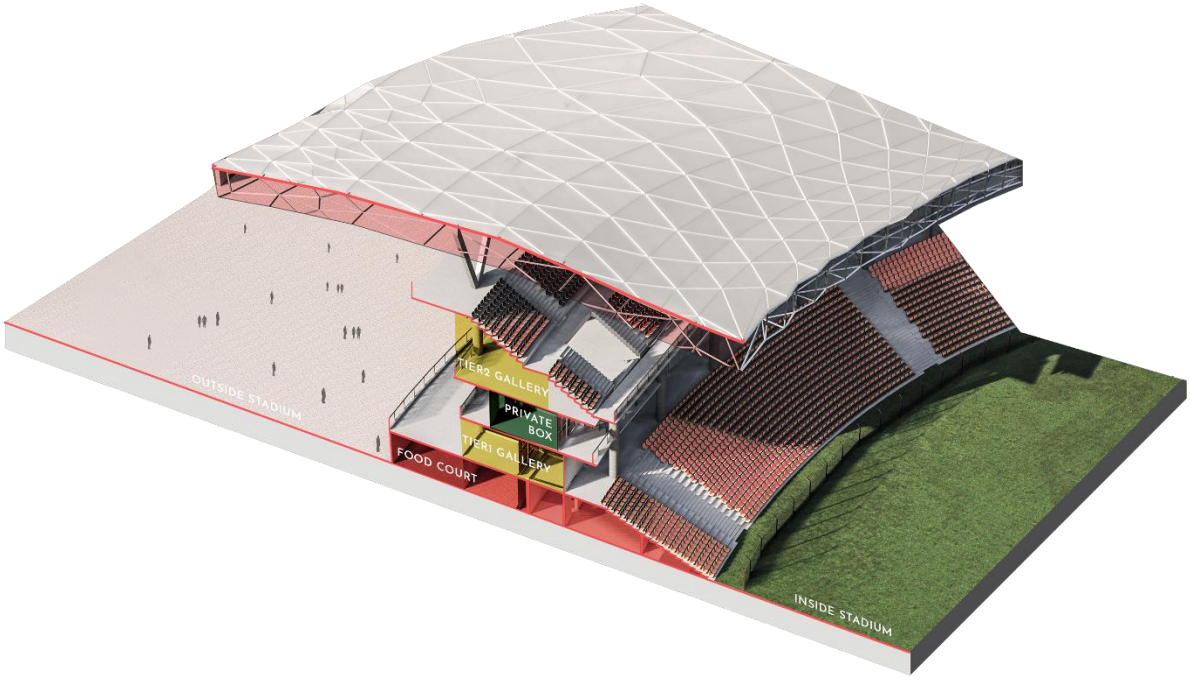


Figure 39 Blowup Section Diagram source: author

6.2 Plans Sections and Elevation

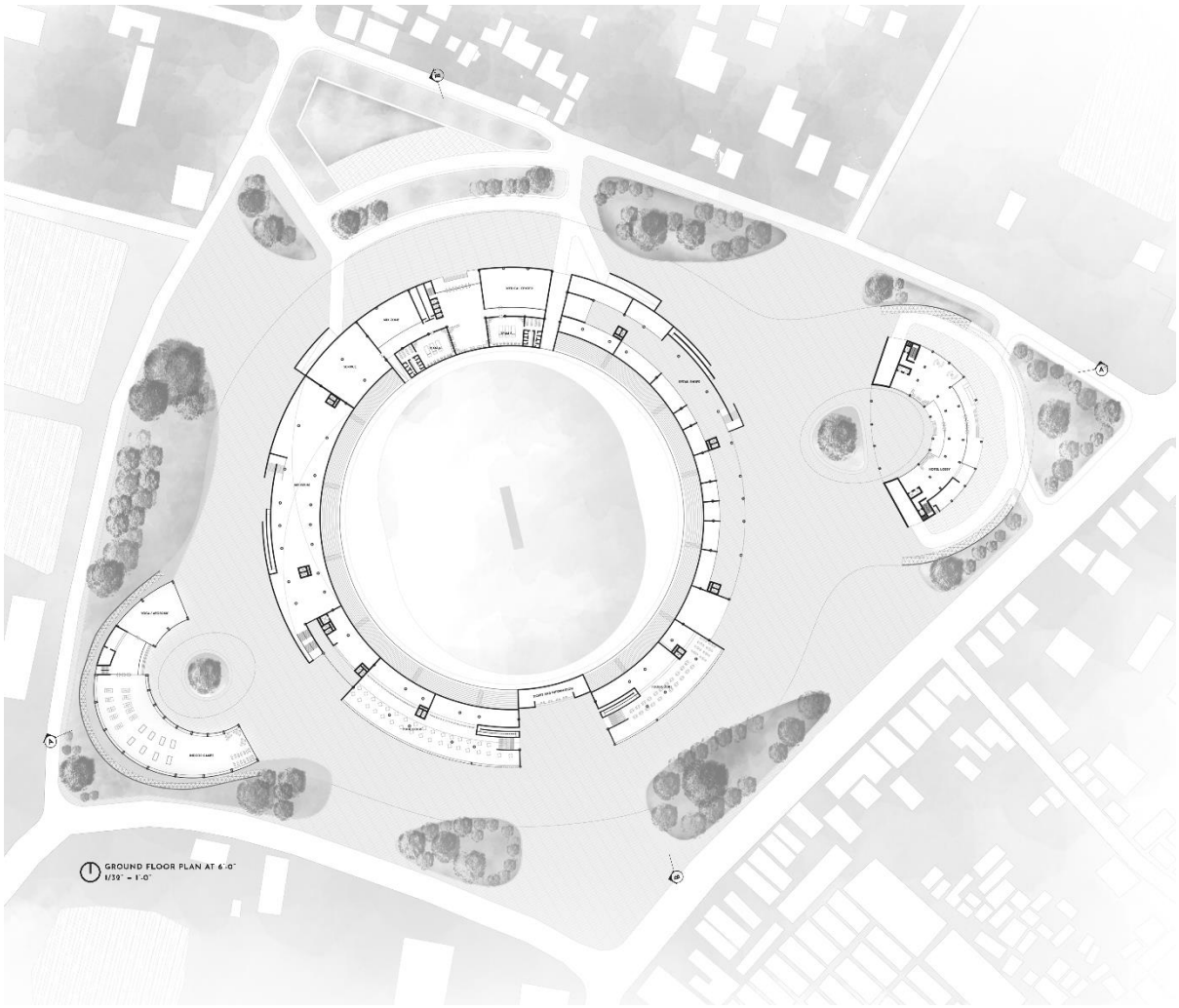


Figure 40 Ground Floor Plan source: author

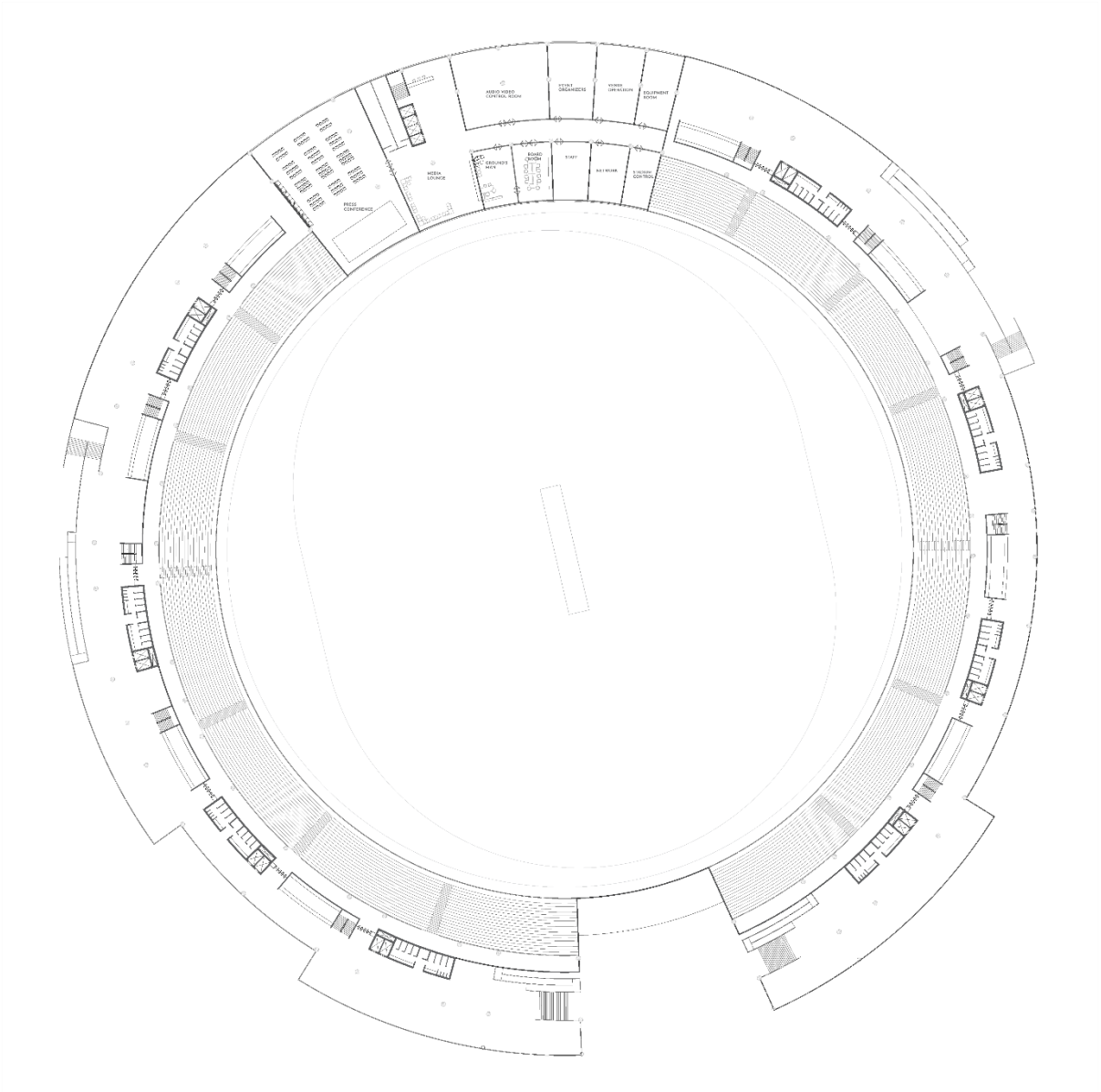


Figure 41 Plan at 12'-0" source: author

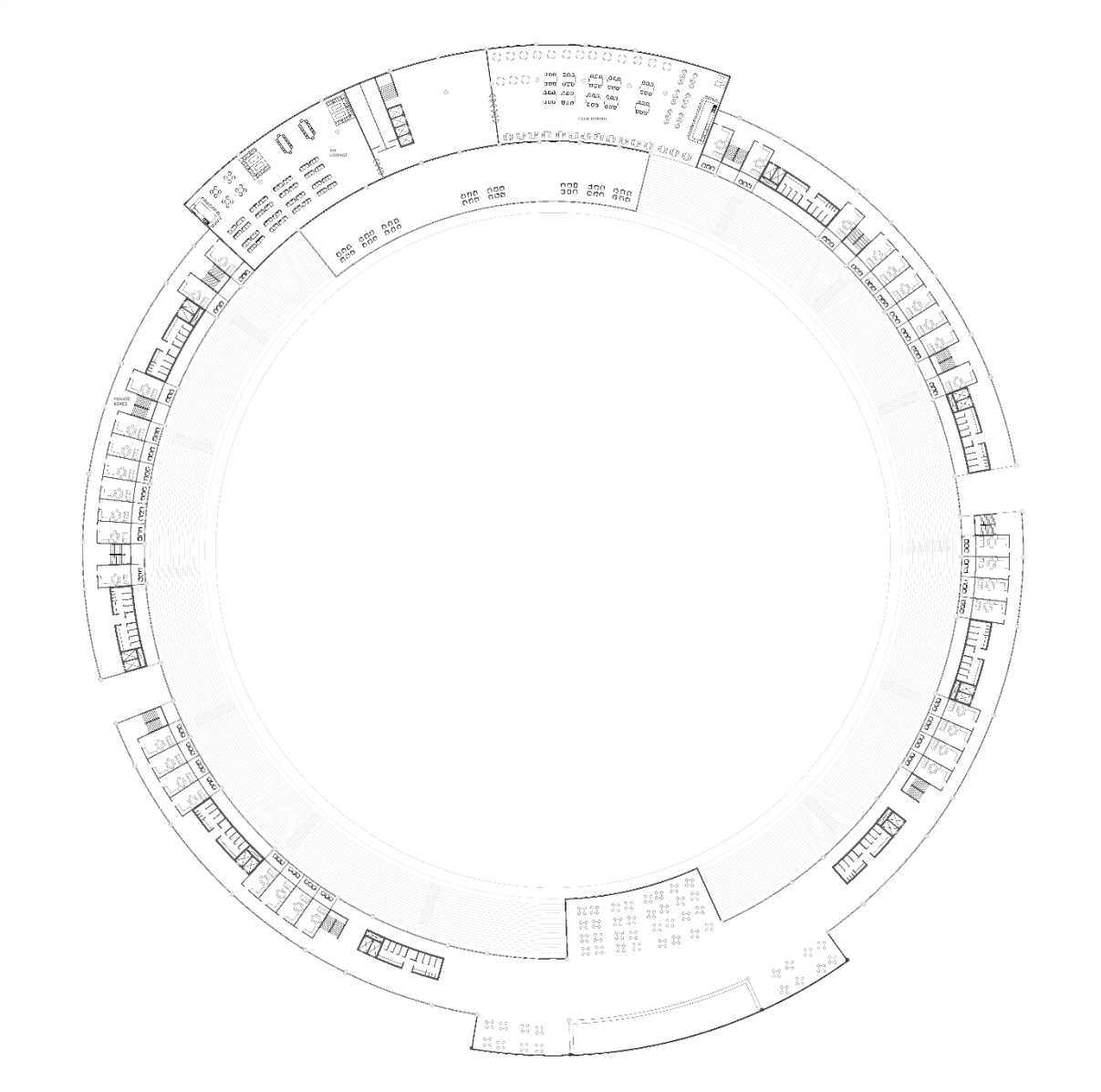


Figure 42 Plan at 24'-0" source: author

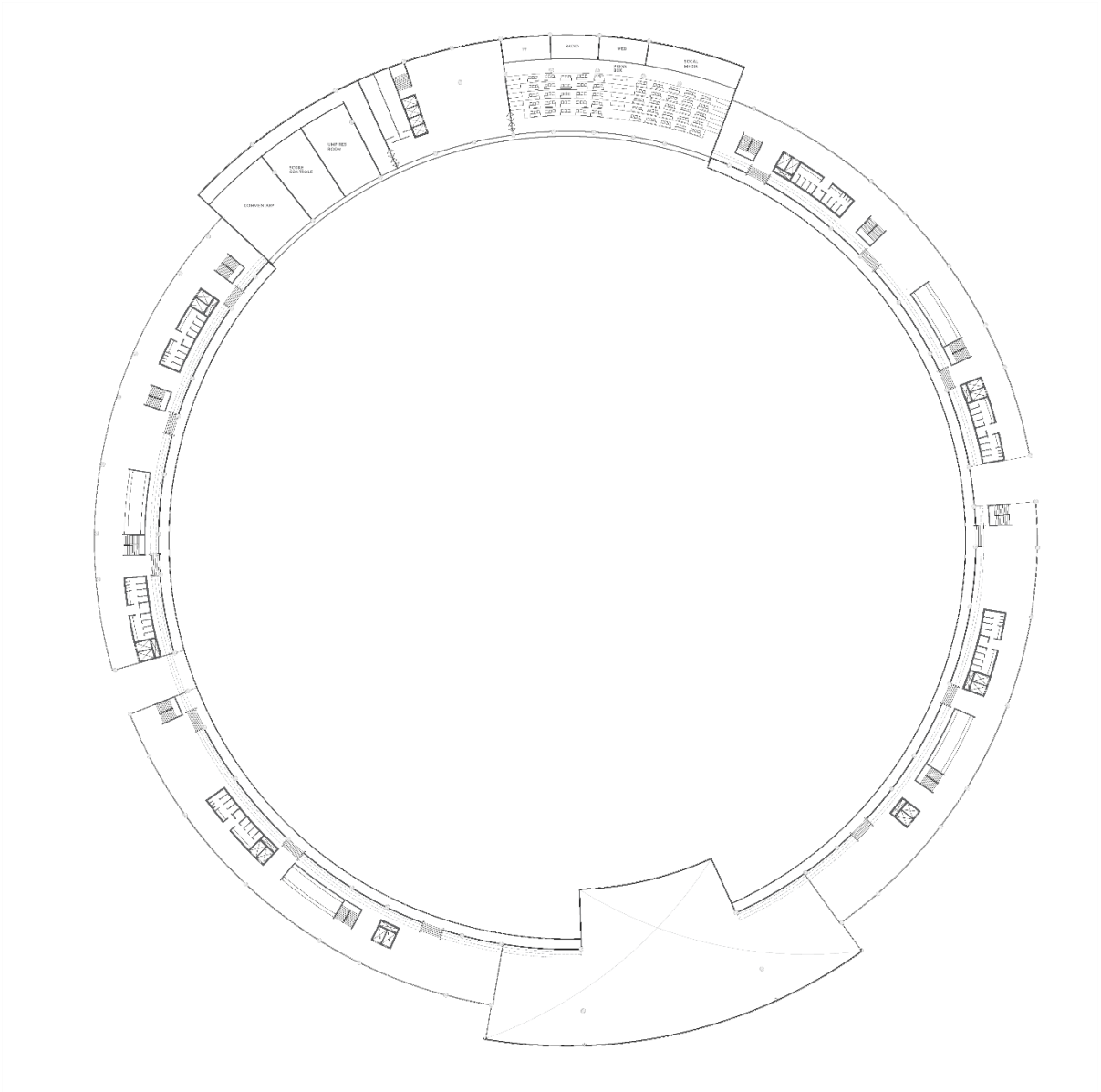


Figure 43 Plan at 36'-0" source: author

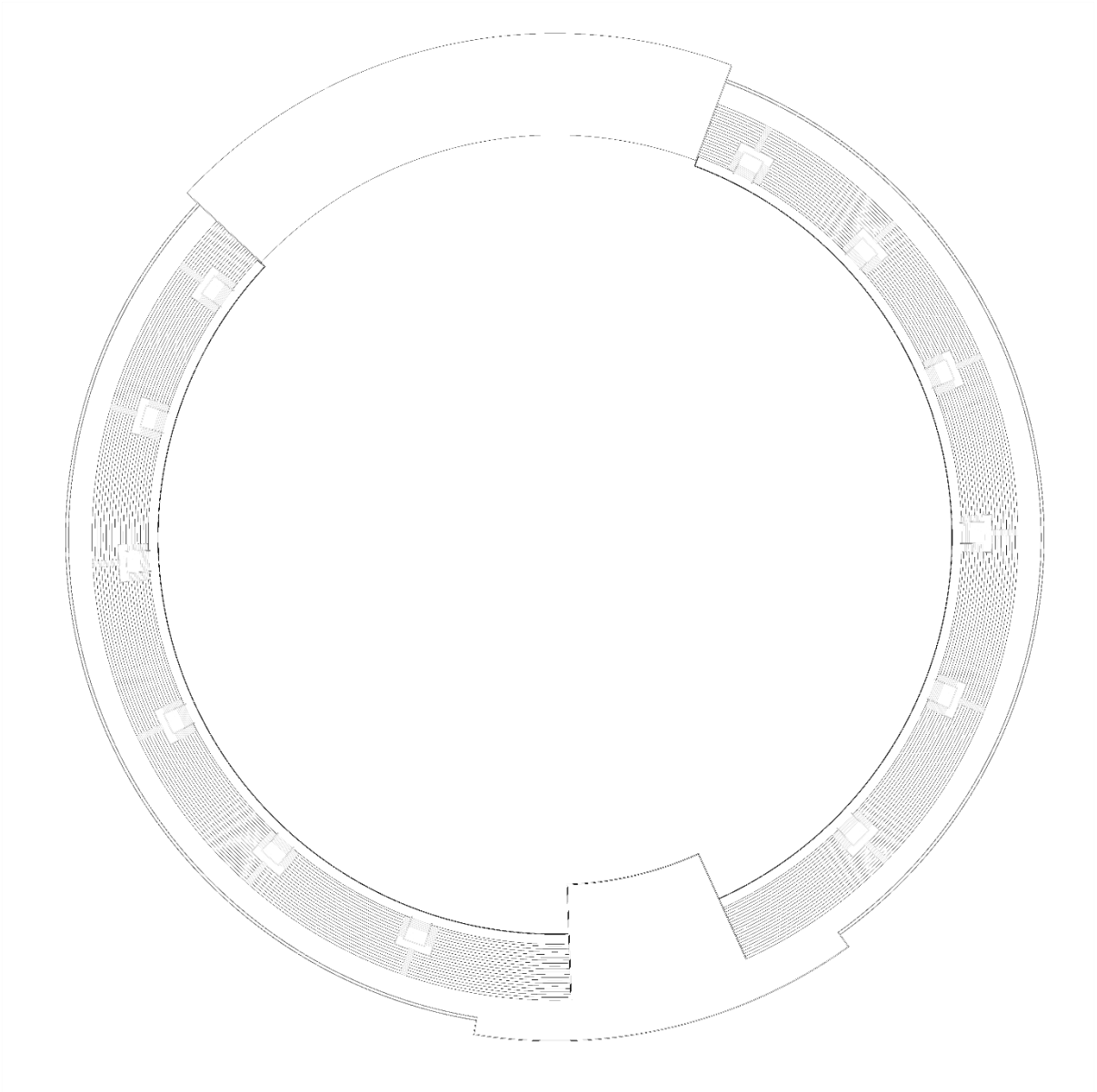


Figure 44 Plan at 54'-0" source: author

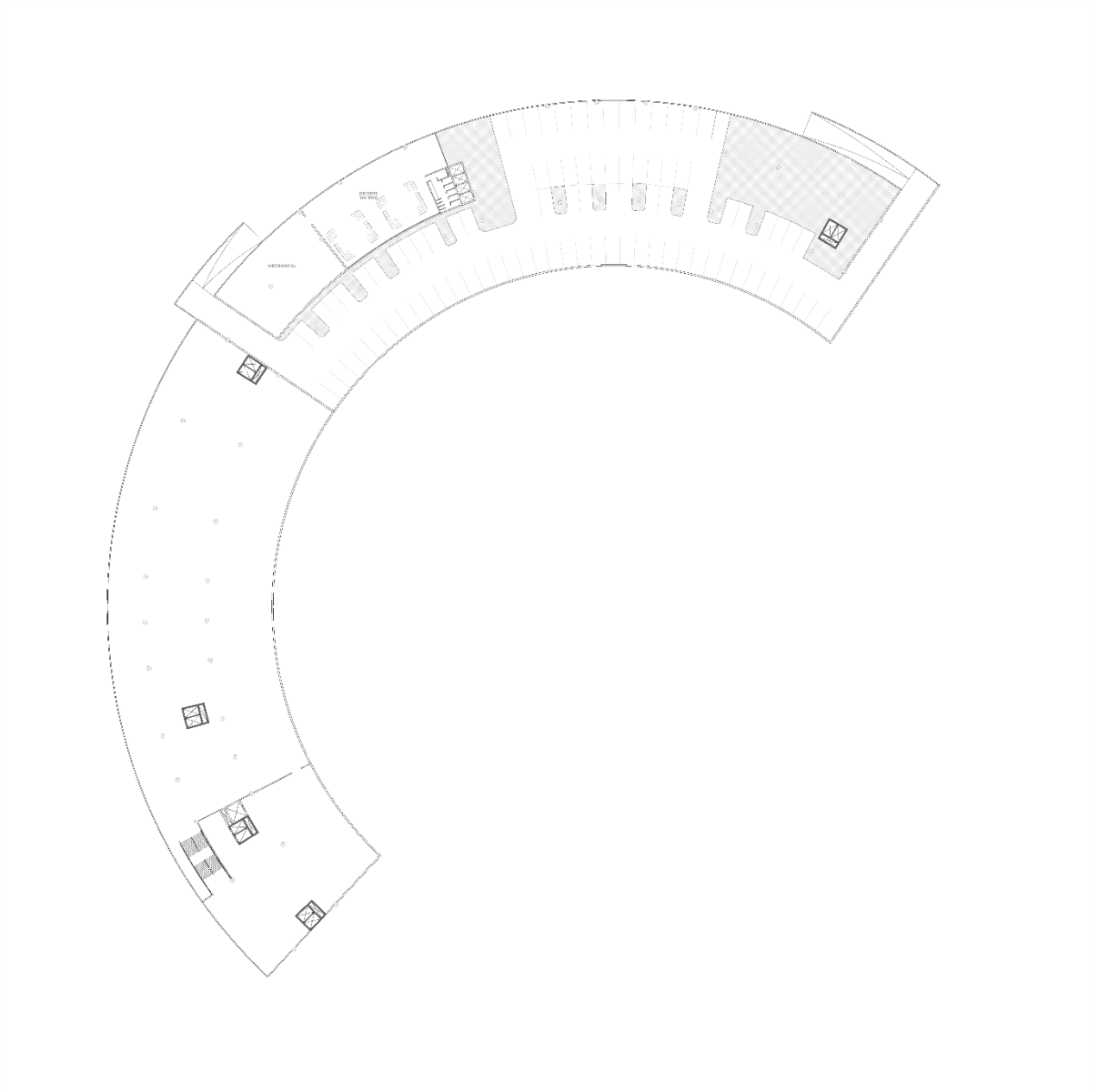


Figure 45 Plan at -6'-0" source: author

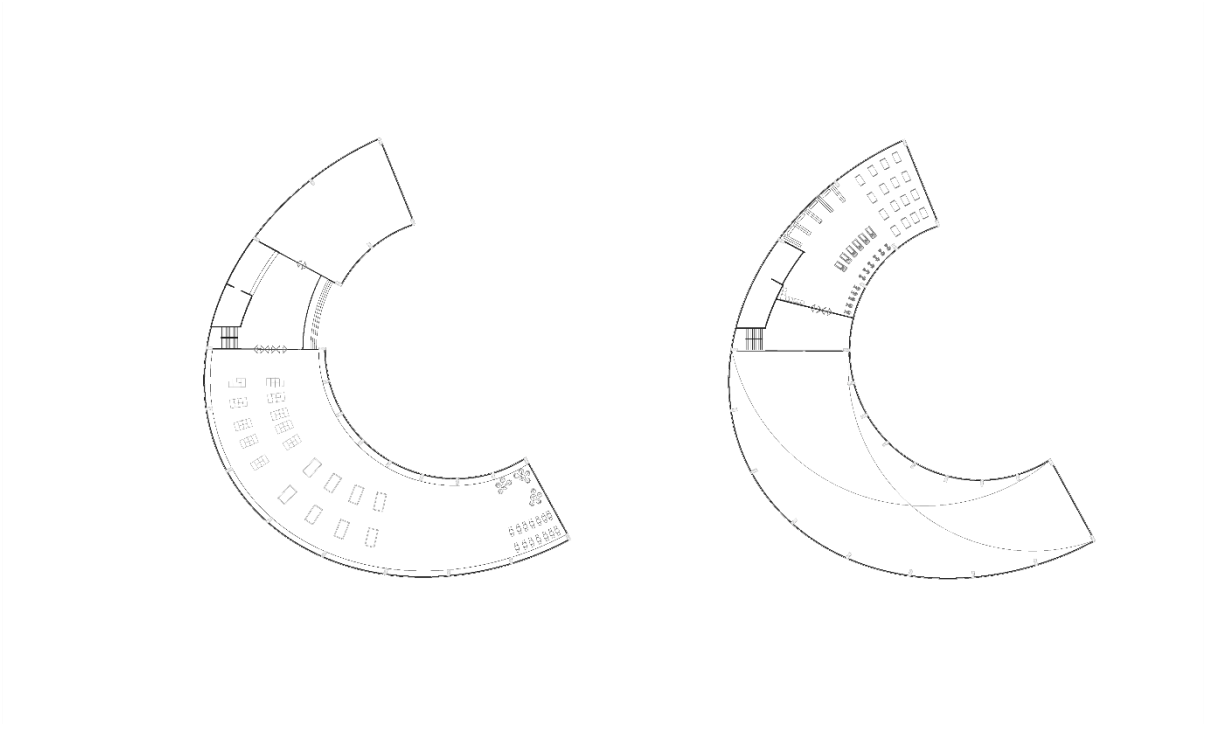


Figure 46 Academy Block Plans source: author

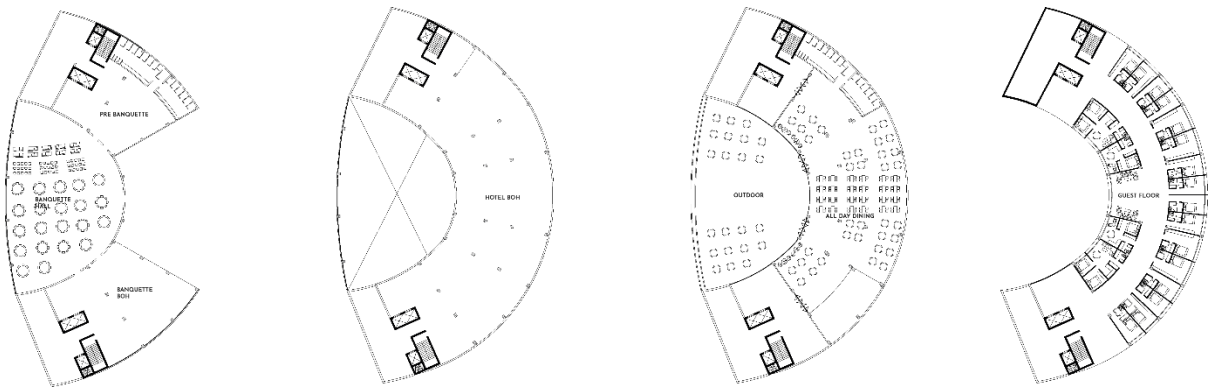


Figure 47 Hotel Block Plans source: author

Figure 49 Longitudinal Section source: author

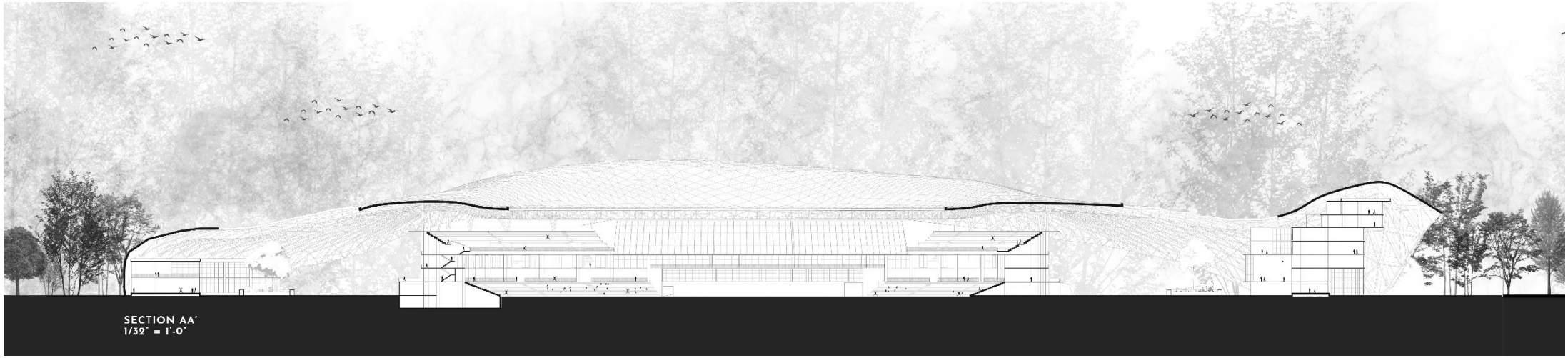


Figure 48 Transverse Section source: author

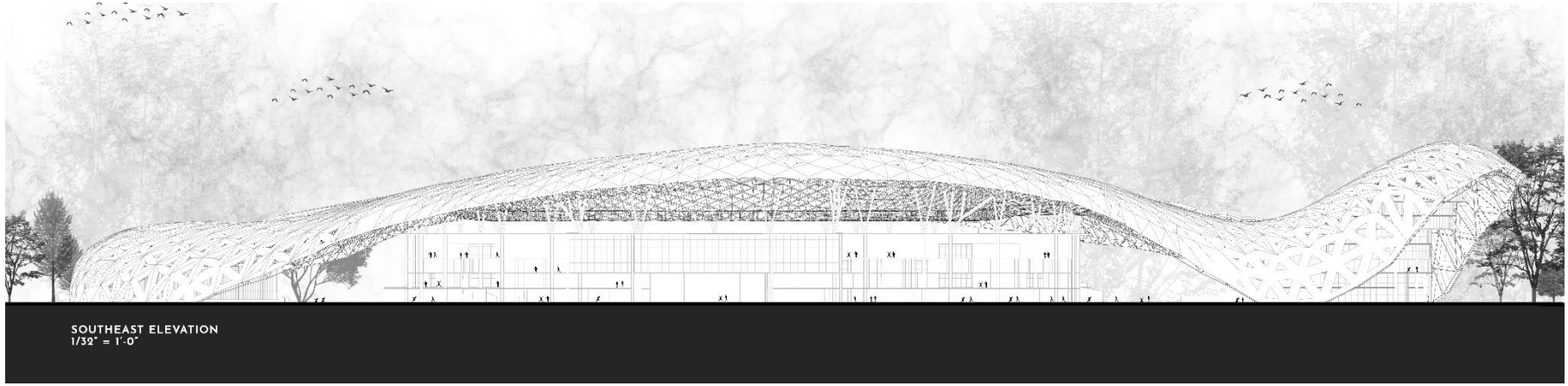
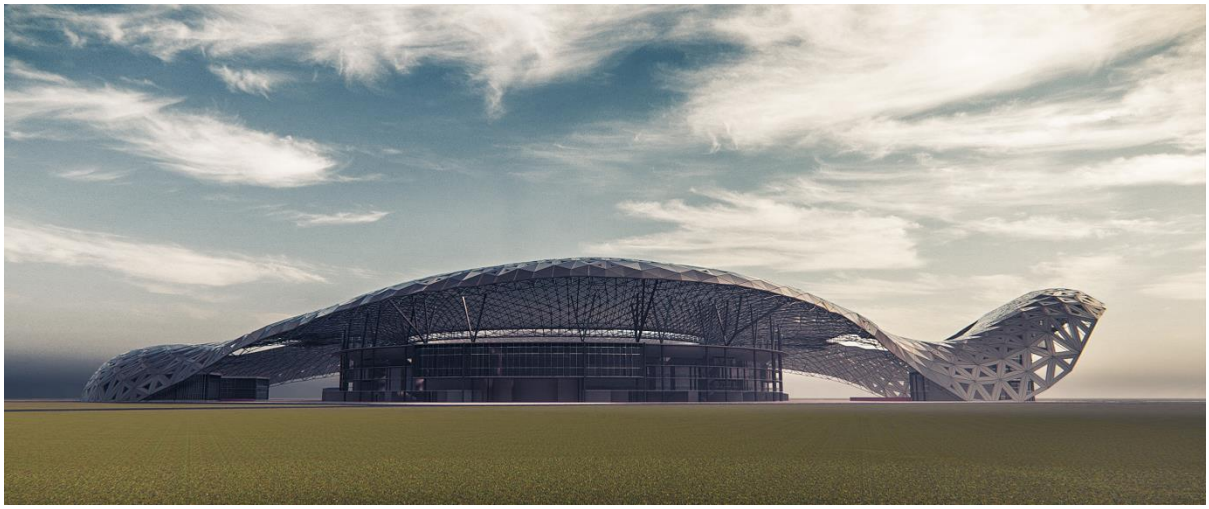
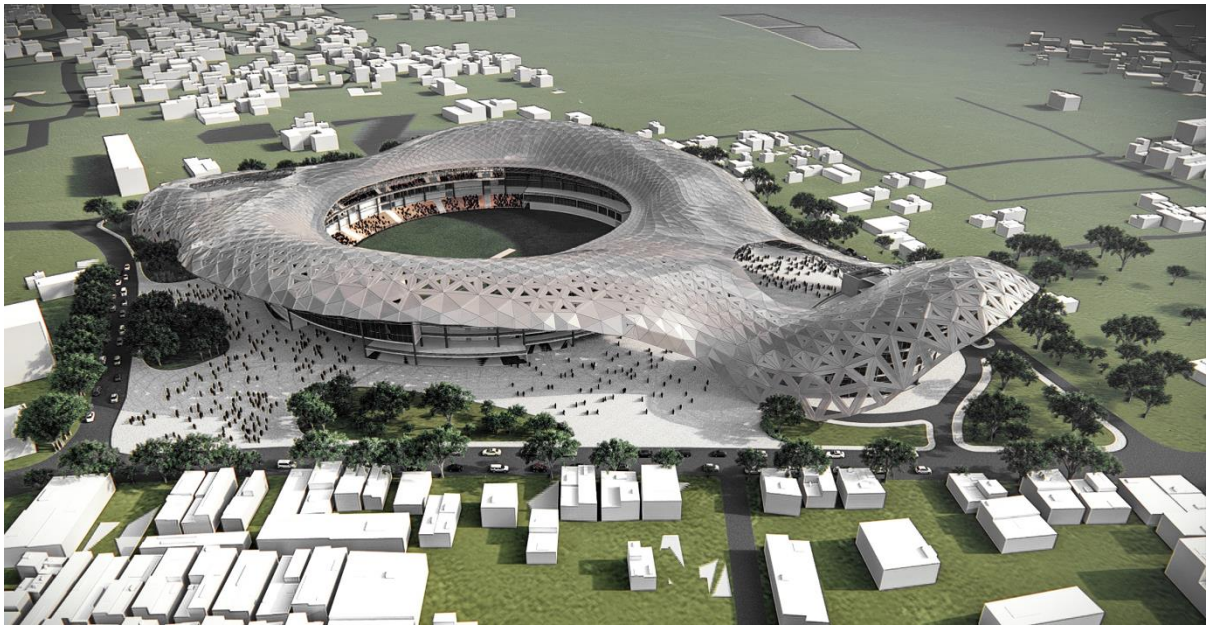
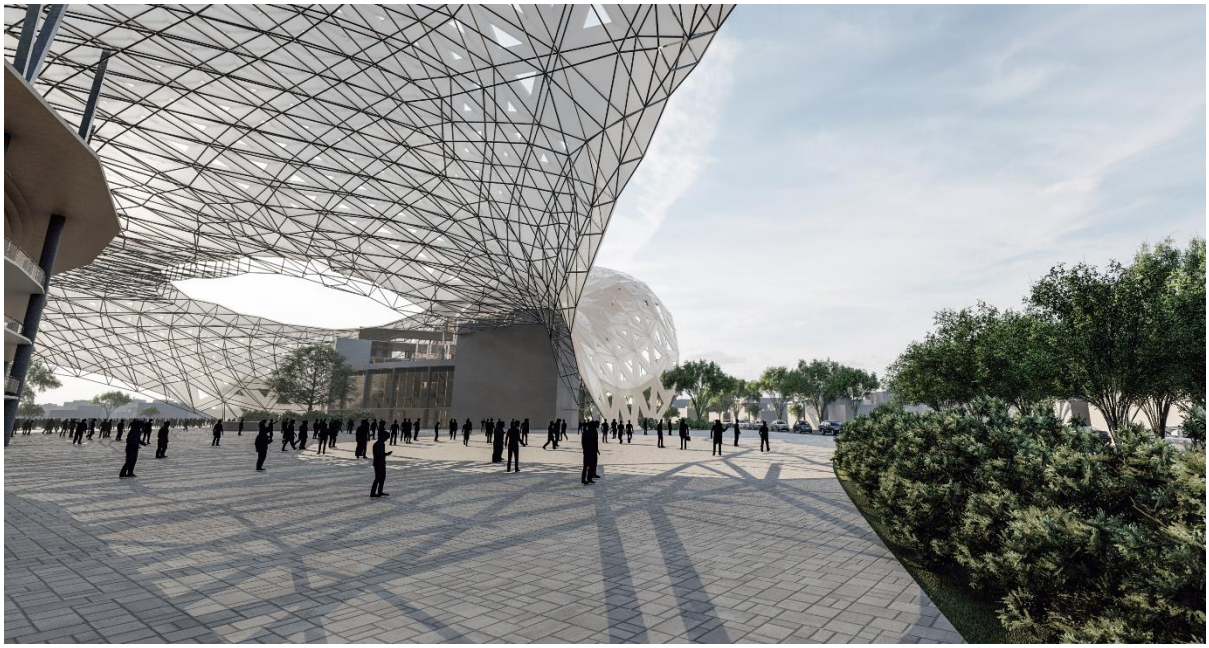


Figure 50 South Elevation source: author

6.3 Perspective Renders







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