

Integrated Sports Complex

Byasi, Bhaktapur-2

By:

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of the requirement for the
Degree of Bachelor of Architecture



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CERTIFICATE

This is to certify that the thesis entitled **INTEGRATED SPORTS COMPLEX at Byasi, Bhaktapur** submitted to the Department of Architecture of Khwopa Engineering College by **Mr. Aayush Manandhar** of Class Roll No. 02 / B.Arch./076 has been declared successful for the partial fulfillment of the academic requirement towards the completion of the degree of Bachelor of Architecture of Purbanchal University.

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1. ABSTRACT

This thesis explores the design of an integrated sports complex that caters to the growing need for inclusive, multifunctional, and community-oriented athletic spaces. The project focuses primarily on indoor sports while integrating complementary outdoor areas to support a holistic sports environment. Through a comprehensive study of site conditions, user needs, climatic considerations, and relevant case studies, the design aims to create a sustainable, accessible, and flexible complex that accommodates diverse users from professional athletes to the local community. The complex is envisioned not only as a venue for physical activity but also as a social and recreational hub that promotes wellness, interaction, and urban vitality. Emphasis is placed on circulation efficiency, zoning of spaces, natural lighting, and ventilation strategies, ensuring functionality alongside architectural expression. This thesis ultimately aims to contribute a thoughtful and context-responsive design that supports physical, social, and environmental well-being.

DECLARATION

I declare that this dissertation entitled has not been previously accepted in the substance for any degree and is not being concurrently submitted in candidature for any degree. I state that this dissertation is the result of my own independent work / investigations except otherwise stated. I hereby give consent for my dissertation, if accepted, to be available for photocopying and except that any references or quotation from my thesis will receive an acknowledgement.

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076 / B.ARCH / 102

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CHAPTER 1: INTRODUCTION

1. BACKGROUND

Sports and physical activities play an important role in keeping people healthy and active. They also help bring communities together and improve the quality of life. In today's world, sports are not just for fun or fitness. They also help build teamwork, confidence, discipline, and a strong community.

In recent decades, the global perception of sports has significantly transformed from being purely recreational to becoming a powerful instrument for health promotion, youth development, and economic growth. Today, sports play a critical role not only in individual physical and mental well-being but also in strengthening social bonds, fostering national pride, and contributing to a country's identity and international presence.

Nepal, like many developing nations, is witnessing a steady rise in interest and participation in sports across various demographics, particularly among the youth. However, this growing enthusiasm is not matched by the quality or availability of sports infrastructure. Traditional open spaces, school playgrounds, and fragmented public fields are no longer sufficient to meet the increasing demand for year-round, multi-sport engagement. Most of these spaces lack safety, standardization, and maintenance, limiting both professional training and recreational participation.

A modern, integrated sports complex is no longer a luxury but a necessity. Such facilities are designed to accommodate a wide range of indoor and outdoor sports, from football and athletics to basketball, swimming, and martial arts, while also providing support spaces like training zones, fitness rooms, administrative offices, and community gathering areas. These environments not only ensure structured physical activity but also foster talent development and prepare athletes for national and international competitions.

Globally, sports infrastructure is recognized as a strategic investment. Major international events like the Olympics, FIFA World Cup, and Asian Games have demonstrated how modern sports facilities can elevate a country's visibility, stimulate tourism, and generate revenue. Additionally, the integration of sustainable and smart technologies—such as rainwater harvesting, solar energy, and accessible design—further enhances the long-term value and environmental impact of such developments.

2. STATUS OF SPORTS INFRASTRUCTURE IN NEPAL

Sports culture in Nepal is growing steadily, especially in cities where media, international games, and national pride have increased interest in sports like football, volleyball, cricket, athletics, and traditional games such as kabaddi. However, even with this rising interest, the country still lacks proper and modern sports facility complexes.

Most of the existing sports grounds are outdated, used for only one purpose, or not maintained well. Many are just school fields or open spaces that are not suitable for hosting different types of sports or advanced training. Additionally, these facilities are not spread equally across the country. Cities like Kathmandu, Pokhara, and Biratnagar have a few better venues, but rural and smaller towns often have little or no access to organized sports areas.

There are only a few sports complexes in Nepal that meet international standards for size, safety, and equipment. This makes it hard for Nepal to train athletes for international competitions or host major events. Furthermore, women, children, and people with disabilities often face more problems because many sports areas are not inclusive or user-friendly.

Public sports grounds usually lack basic features like seating, lighting, proper drainage, changing rooms, or first aid. In many places, open fields are used for multiple purposes, such as community events or animal grazing, which further damages them. There is also a shortage of indoor training centers or dedicated academies, making it hard to train during bad weather, such the rainy season.

3. STATEMENT OF THE PROBLEM

Bhaktapur is known for its cultural heritage, but here lacks modern and well-maintained sports infrastructure to meet the growing needs of youth and local athletes. Despite increasing interest in physical fitness and organized sports, the district does not have a multipurpose sports complex that can serve various age groups, sports types, and community events. Existing facilities are either limited to small playgrounds or are poorly equipped for formal training and competitions.

The absence of a centralized, multi-functional sports complex in Bhaktapur has created a gap between demand and supply of proper sports facilities. This gap leads to fewer opportunities for structured physical activity, especially for students, aspiring athletes, and general youth. Additionally, many residents travel to Kathmandu for better facilities, which limits access for those with time or financial constraints.

This lack of infrastructure has also restricted Bhaktapur's potential to host district-level or regional-level sports events, youth engagement programs, or recreational tourism. Therefore, there is an urgent need for a well-planned and inclusive sports complex in Bhaktapur to promote sports culture, improve accessibility, and support physical and mental well-being of the community.

4. PROJECT JUSTIFICATION

The development of an Integrated Sports Complex in Nepal is justified by the growing need for modern, accessible, and inclusive sports infrastructure that can serve both professional athletes and the general public. As sports culture continues to evolve in the country, with increasing participation in games such as football, cricket, volleyball, and kabaddi, there is a clear gap between the rising demand and the availability of well-equipped, multifunctional venues. This complex aims to bridge that gap by offering facilities that support training, recreation, and competition under one roof. It also addresses the lack of community-centered spaces where people can engage in physical activities and cultural events in a safe, organized, and environmentally sustainable setting. Moreover, the project holds the potential to boost youth development, foster social inclusion, and position Nepal as a destination for sports tourism. By integrating local needs with international design standards, the proposed sports

complex becomes a meaningful contribution to the physical, social, and economic well-being of the nation.

5. OBJECTIVES

- To design a sustainable, multi-functional sports complex that aligns with both international standards and local needs.
- To ensure the design serves recreational users, athletes, students, and event organizers.
- To integrate eco-friendly practices such as solar power, rainwater harvesting, and green landscaping.
- To promote year-round sports participation by including both indoor and outdoor facilities.
- To create a platform for talent identification and athlete development at local, regional, and national levels.
- To encourage community engagement by hosting events, workshops, and festivals that promote a culture of wellness and active living.
- To stimulate local economy by generating employment opportunities and boosting sports tourism.
- To create a multifunctional public space that combines sports, recreation, culture, and learning in a single, connected environment.
- To develop partnerships with local governments, schools, and sports bodies for long-term operation and maintenance.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION:

A sports complex is a multi-functional facility designed to accommodate various athletic, recreational, and community activities. Sports complexes are designed to host training, competitions, and public recreation, providing facilities for athletes, spectators, and the public. They also include amenities like locker rooms, seating areas, restrooms, and parking. These complexes promote fitness, community engagement, and can serve as venues for local, national, or international sporting events.

There are different types of sports complexes based on the activities.

Indoor sports complexes

Built for games played inside, like basketball, badminton, table tennis, and indoor swimming.

Outdoor sports complexes

Designed for outdoor activities and sports like football, cricket, tennis, and track and field, which are played outside.

Multi-purpose sports complex

Includes both indoor and outdoor areas and can host many types of sports in one place.

Recreational sports complexes

Some complexes are built for fun and exercise, called recreational sports complexes, and they have things like gyms, jogging tracks, and playgrounds for the public.

Professional sports complexes

Built to host national or international-level competitions. They are equipped with high-standard infrastructure, seating for spectators, media rooms, and training facilities.

2.1.1 HISTORY OF SPORTS COMPLEX IN GLOBAL CONTEXT

The development of sports complexes has a rich and evolving history that spans centuries. The earliest known example is the Olympia Stadium in Greece, constructed in 776 BC to host the first Olympic Games, highlighting the ancient tradition of organized sports. In 80 AD, the Colosseum in Rome was built as a grand amphitheater for gladiatorial contests and large-scale public sporting events, showcasing the scale and importance of sports in Roman culture.

The 1800s marked the rise of modern sports complexes, with structured stadiums and improved facilities. One early example is Lord's Cricket Ground in the United Kingdom, established in 1814. This period set the foundation for more organized, purpose-built sports venues. By 1896, the Panathenaic Stadium in Greece was renovated for the first modern Olympic Games, reflecting a global resurgence in structured athletic competition.

In 1923, Wembley Stadium in England opened as a major venue for football and multipurpose sports, becoming one of the most iconic stadiums in the world. Between the 1950s and 1970s, the construction of large-scale sports complexes accelerated, with notable examples including Maracanã Stadium in Brazil (1950) and Tokyo National Stadium in Japan (1964), both built for international competitions.

From the 1990s to the present, sports complexes have evolved into smart, technologically advanced structures designed to support multipurpose events. Examples of such innovation include the Beijing National Stadium, built for the 2008 Olympics, and the SoFi Stadium in the United States, completed in 2020. These modern complexes integrate advanced infrastructure, digital connectivity, and sustainability features to enhance both athlete and spectator experiences.



Figure 1: Colosseum



Figure 2: Wembley Stadium



Figure 3: Beijing International Stadium

2.1.2 HISTORY OF SPORTS COMPLEX IN CONTEXT OF NEPAL

The development of sports complexes in Nepal began in 1959 with the construction of Dashrath Stadium in Kathmandu. It was the country's first and largest stadium and became a central venue for national and international sports events. This marked the beginning of organized sports infrastructure in Nepal. In 1982, the government established the National Sports Council (NSC), which played a key role in planning and improving sports facilities throughout the country.

A major turning point came in 1999 when Nepal hosted the 8th South Asian Games (SAG). This event pushed the country to build and upgrade several sports venues in Kathmandu and other regions to meet international standards. It increased awareness about the need for better sports infrastructure.

In 2011, the construction of the TU Cricket Ground in Kirtipur brought Nepal recognition in the cricketing world. It became a home ground for many international and domestic matches, helping to promote cricket among Nepali youth.

The 13th South Asian Games in 2019 was another major event that led to renovations and upgrades of old sports facilities and the construction of new ones in different provinces. Nepal's performance and its ability to host the games successfully showed growth in both sporting ability and infrastructure.

Today, Nepal is working on building sports complexes in all provinces to promote equal access to sports facilities. Projects under the NSC and provincial governments are focused on developing multi-purpose stadiums, training centers, and indoor halls. These efforts aim to support future athletes, host more international events, and encourage youth participation in sports across the country.



Figure 5: Birendra International Sports Complex



Figure 4: Daashrath Rangasala



Figure 6: TU Cricket Stadium

2.1.3 INFLUENCE OF SPORTS IN HUMAN SOCIETY

Sports play a vital role in shaping human society and civilization. They go beyond physical activity to influence social, moral, and economic aspects of life. On a daily basis, sports help individuals connect with one another, fostering unity and cooperation regardless of background, ethnicity, or nationality. They teach important life values such as discipline, integrity, teamwork, respect, and fairness. These qualities contribute to the development of a strong moral character and help individuals become responsible members of society. Sports also have the power to break down social, political, and ethnic barriers, promoting equality and inclusiveness. Participation in sports encourages healthy competition and motivates people to maintain physical fitness, which is essential for a healthy lifestyle. On a larger scale, sports contribute to national pride and can significantly boost a country's economy through tourism, infrastructure development, and the sports industry itself. Furthermore, international sports events foster global unity and cultural exchange. In essence, sports are not just games; they are a powerful social tool that can unite communities, inspire youth, and build a healthier, more harmonious society.

2.2 GENERAL PLANNING REQUIREMENT

2.2.1 LOCATION OF THE SITE

- *Outside of the city core area, avoiding traffic and noise impacts.*
- *location within a reasonable driving distance from the settlement.*
- *sufficient space for future expansion.*



2.2.2 ORIENTATION

Great care must be taken regarding the angle of the playing field in relation to the sun and the prevailing weather conditions. But for the indoor closed stadiums, orientation can be adjusted according to need.

- The playing field should be oriented North-West to South-East to protect players from direct sunlight glare.
- A North-South orientation is often considered ideal, but more advanced studies recommend aligning the field with the average sun angle at mid-afternoon, especially for games held during that time.
- The angle of the playing field should always take into account the sun's path and the prevailing weather.
- Players, spectators, and media representatives should be adequately protected from direct sunlight to ensure comfort and visibility.

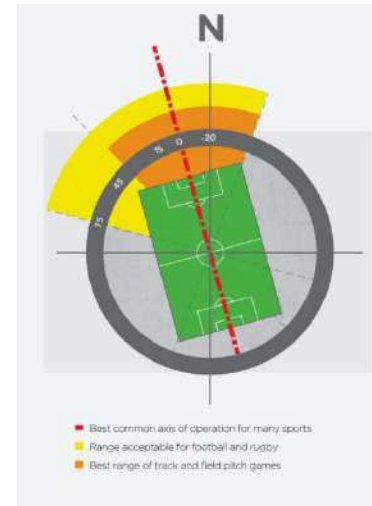


Figure 7: Field of Orientation

SOURCE: (JOHN, 1994)

2.2.3 ZONING

Zoning in a sports complex means dividing the space into different areas for specific purposes to keep everything organized and running smoothly. Proper zoning helps manage traffic flow, enhances user experience, and ensures the complex functions effectively.

Zones found in a sports complex:

- *Zone one: The playing field*
- *Zone two: The spectator seating and standing areas*
- *Zone three: The internal concourses, restaurants, Sbars and other social areas*
- *Zone four: The circulation area between the stadium structure and the perimeter fence*
- *Zone five: The open space outside the perimeter fence.*

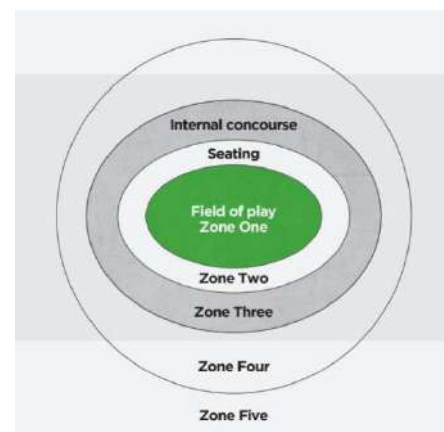


Figure 8: Safety Zone

SOURCE: (JOHN, 1994)

2.2.4 CIRCULATION

Circulation planning design in a sports complex focuses on two main aspects: the **comfort** and **safety** of the occupants.

Comfort:

People should be able to move around the facility easily, whether going to their seats, restrooms, catering facilities, or exits, without feeling lost or confused. The circulation should allow smooth movement without crowding, avoiding steep stairs or sudden level changes that could cause discomfort or accidents.

Safety:

Safety means ensuring all the features that support comfort also function effectively during emergencies, such as fires, violence, or panic situations. Large crowds should be able to evacuate safely and quickly. Well-planned design helps avoid such dangerous situations from arising at all. People should be naturally guided by the design to move where they are supposed to go, especially during emergencies.

ACCESS

Number of Gates

Stadiums usually use two types of entry systems: gates and turnstiles. Gates are cheaper and a more efficient. A 1-meter wide gate can let around 4,000 people in per hour. Turnstiles are slower and more costly, allowing only about 500 to 750 people per hour.

Gate Locations

Where the gates are placed around the stadium depends on three main factors, which might not always work well together. So, it's important to plan early.

- To prevent crowding, gates should be placed evenly around the stadium.
- If there are rival fan groups, they should enter through separate gates to avoid clashes.
- Sometimes, gates are placed closer together to make it easier for security and staff.

Private Entrances

Special entrances are required for players, VIPs, sponsors, media, and directors. These should be located close to a VIP parking area and include a sheltered walkway that leads directly to their seating areas. These entrances must be clearly separated from public gates and should use open gates instead of turnstiles, with a higher level of security staff to ensure smooth and safe access.

Emergency Service Access

Emergency access points are reserved for serious situations such as fires, accidents, or medical emergencies. These gates must be constantly monitored and opened only when truly needed. They should provide a direct connection between the stadium interior and public roads to allow quick, uninterrupted access for emergency vehicles, such as ambulances and fire trucks.

STAIRS

Staircases in the sports complex should ensure smooth movement and safety for both regular use and emergencies, following standards from NBC Nepal and IS 456. Public stairs must be at least 1.5 meters wide, but widths of 2.0–2.5 meters or more are recommended for large crowds. The riser height should be 150–170 mm and the tread depth between 250–300 mm for comfort and safety.

All staircases should have non-slip surfaces, handrails on both sides, and intermediate handrails if wider than 2.4 meters. Proper lighting, ventilation, and emergency signs must be included. Staircases should link key areas such as stands, exits, and VIP zones, and emergency stairs must allow full evacuation within 6–8 minutes.

RAMPS

Ramps in a sports complex must ensure universal accessibility for all users, including persons with disabilities, elderly individuals, and those with injuries. As per NBC 113: Accessible Design and IS 4963, ramps should be provided wherever there are changes in level, especially at entrances, exits, and between seating zones.

The maximum slope should be 1:12 (for every 1 meter of height, at least 12 meters of ramp length), ensuring ease of use. The minimum width should be 1.2 meters, and ramps longer than 9 meters should include landing platforms for rest, measuring at least 1.5 meters in length.

Ramps must have non-slip surfaces, be well-lit, and be equipped with handrails on both sides, placed 850–900 mm above the ramp surface. Curbs or wheel guards at the edge of the ramp are also recommended for safety. Ramps should be located near key circulation areas like main entrances, stands, VIP zones, restrooms, and emergency exits to ensure barrier-free movement throughout the complex.

LIFTS

In accordance with the National Building Code (NBC) of Nepal and universal accessibility standards, the design of the proposed sports complex incorporates inclusive mechanical circulation through the provision of lifts. To ensure ease of access for all users, especially persons with disabilities, lifts will be strategically located near the main entrance and will be accessible from the entrance level itself. As per NBC guidelines, at least one lift shall serve all floors intended for public use, thereby facilitating barrier-free vertical movement throughout the complex. Each lift will be designed to accommodate wheelchair users, requiring a minimum clear door width of 900 mm. The lift car will have an internal dimension of at least 2000 mm in width and 1400 mm in depth, and a clear door opening of not less than 900 mm, as specified by the building control regulations. Additionally, the lifts will include a visual information display system that is suitably color-contrasted to support individuals with visual impairments. These provisions are aimed at creating an inclusive environment in the sports complex that upholds the principles of universal design and ensures safe, dignified, and independent access for all users.

2.3 PARKING

The practice of temporarily leaving a vehicle into a certain location is parking. Parking facilities have become an important consideration in the design of any building complex.

Parking at a sports complex is usually well-organized to handle large numbers of visitors during events. There are different types of parking areas, such as general parking for most visitors, VIP parking for special guests or those who pay extra, and accessible parking for people with disabilities.

Parking required for sports complex:

- **For Changing Rooms:** One parking space (for a car or bike) is required for every 5-10 changing rooms.
- **For Spectators:** One parking space (for a car or bike) is needed for every 10-15 spectators.
- **Bicycle space required: 2.05-2.1m**
- **Motorcycle space required: 2.25m**
- **Car width (minimum): 2.3-2.8m**

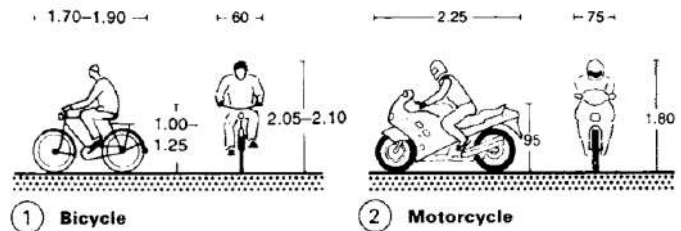


Figure 9: Dimension of Two Wheelers

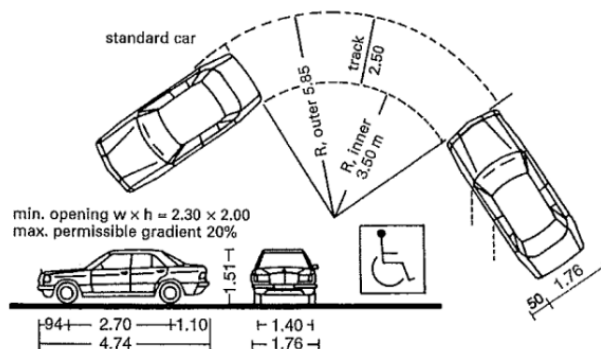


Figure 10: Turning Radius

Ramp slope design:

Slope inclination: 12%

Gradient varies from 6% to 12%.

Ensures smooth vehicle movement on inclines.

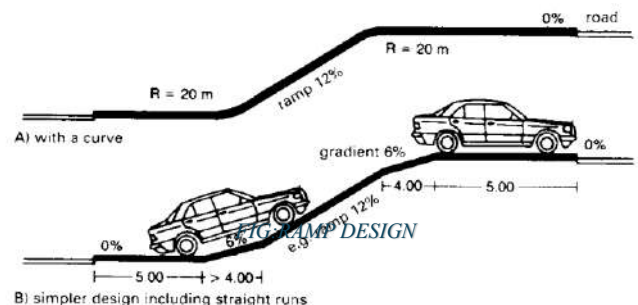


Figure 11: Slope of Ramp

2.4 SPECTATOR REQUIREMENTS

Spectators are essential to the success of any sports facility. The design of their space should focus on safety, comfort, visibility, and services that enhance the viewing experience.

2.4.1 SPECTATOR CAPACITY

The number of seats should be planned based on the type of events, location, and budget. Research must be done to understand the local audience, including their income and interests. Ideally, no seat should be more than 200 feet from the playing area for clear viewing. For large events, a minimum of 30,000 seats is recommended. VIP seating is important for generating revenue and attracting sponsors.

Spectator area - 0.5 sq m/person with circulation.

Depth of seating = 0.85 (0.4 seat + 0.45 circulation)

VIP rooms: Minimum room area of 15m²-20m² for 4-6 persons

2.4.2 ROOF COVER FOR SPECTATORS

All spectator seating areas should be covered with a roof to protect them from the weather. A retractable roof is ideal, as it can be opened when the weather is good and closed during rain or extreme heat. The comfort level should match what people are used to in homes, cars, and workplaces.

2.4.3 SEATING ARRANGEMENT AND COMFORT

All spectators must be seated standing areas or benches are not advised. Seats should balance comfort, safety, durability, and cost. The comfort level depends on how long people will sit during a match. Globally, the trend is to invest more in spectator comfort even if it increases costs.

- Seat width: 450–550mm (18–22 inches) per person.
- Seat depth: 430–500mm (17–20 inches), ensuring sufficient legroom.
- Seat height from floor: 430–460mm (17–18 inches), allowing easy sitting and standing.
- Armrest width: 50–75mm (2–3 inches), if included.
- Row spacing (Seat-to-seat distance):
 - 800–1000mm (31–39 inches) in *VIP or luxury seating*.
 - 750–850mm (29–33 inches) in *standard seating*.
 - 700–750mm (27–29 inches) in *economy or compact seating*.
- 1.2–1.5m (4–5 feet) for major walkways.
- 900mm (3 feet) for secondary aisles.

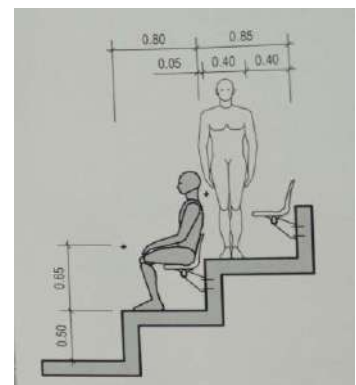


Figure 12: Seating dimension

2.4.4 SIGHTLINES AND VIEWING ANGLES

Spectators should be able to watch the game clearly without needing to stand. The sightline must be calculated to ensure every person sees the playing field without obstruction. Riser heights and seat depths should follow international viewing standards (e.g., “C-value”).

The factors affecting the calculation of the riser height (N) for the seating tier are:

N = riser height

R = height between eye and the 'point of focus' (The point of focus is often the near touchline)

D = horizontal distance from the eye to the point of focus .

C = 'C' value (standard of view)

T = depth of the seating row

(The Guide to Safety at Sports Grounds, published by The Stationery Office, outlines minimum requirements for seat widths and seating row depths).

A worked example to calculate the required riser height for a given 'C' value is given below, using the expression: on the playing field focus Y.

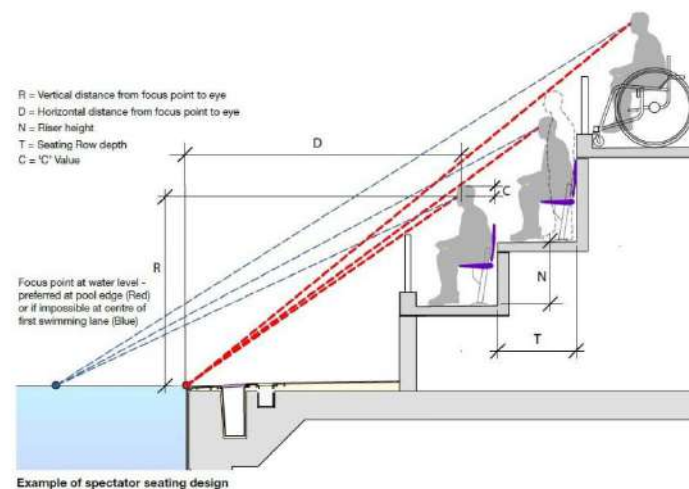


Figure 13: Viewing Standards

SOURCE: JOHN(1994)

Quality of vision is improved by increasing the height of seats above pitch level; and by bringing the seats closer to the pitch.

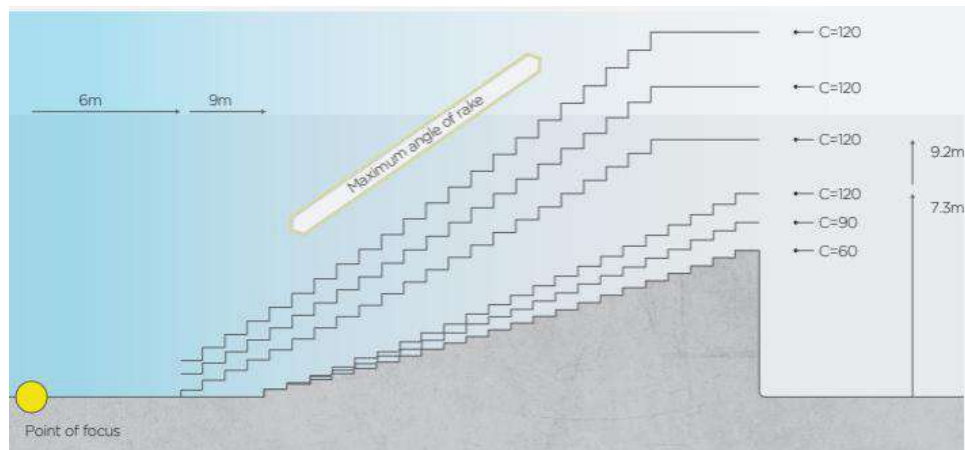


Figure 14:C-value Angles and Slopes of Stairs

2.4.5 SAFETY AND ACCESSIBILITY

Each row must have enough space (at least 400mm seatway; 305mm if the row is small) to allow people to move easily. Wider walkways help with emergency exits, cleaning, and concessions. The design should allow easy movement for emergency responders and people with disabilities.

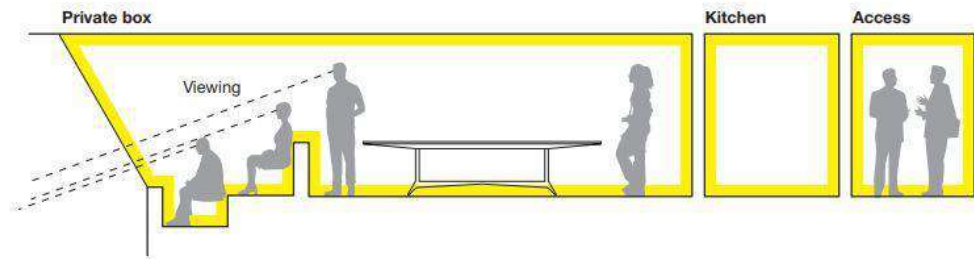
2.4.6 PRIVATE VIEWING AREAS

VIP and corporate boxes should provide good views and comfort. They can be placed behind glass or as open boxes with hospitality areas behind them. The location should consider weather, privacy, and safety.

Type A

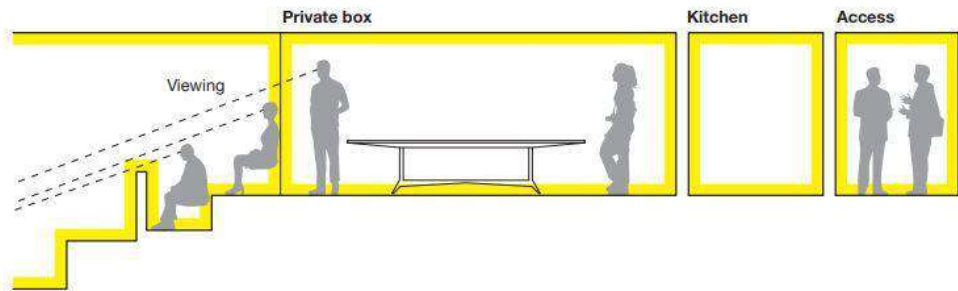
Advantages: Complete privacy and comfort

Disadvantages: Separation from the atmosphere of the ground

**Type B**

Advantages: Privacy maintained but users see event as spectators

Disadvantages: Separation between viewing and dining

**Type C**

Advantages: Flexibility of use

Disadvantages: Users remote from event when using facility

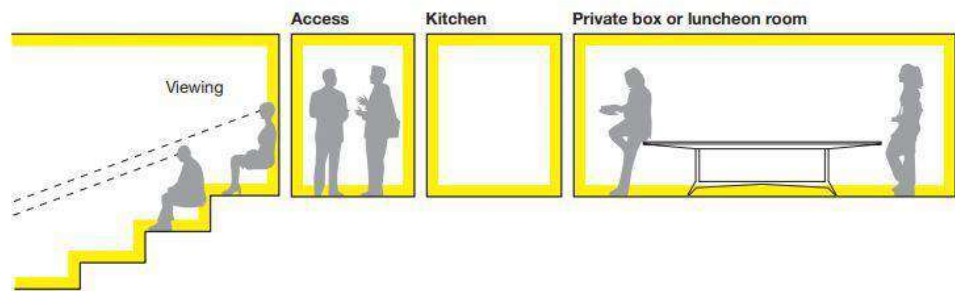


Figure 15: Private Viewing Arrangement

SOURCE : JOHN (1994)

2.4.7 TOILETS AND HYGIENE FACILITIES

Toilets should be provided for both general and special groups of users (e.g., VIPs, women, disabled persons). They must be located close to the seating area and designed for hygiene, ease of use, and regular cleaning.

Table 1: Washroom Provision

	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

2.4.8 ACCESS TO CONCESSIONS

Concession stands (for food and drinks) should be close to seating areas but not block circulation. Wider walkways help spectators easily reach these stalls during breaks. These facilities should be hygienic and able to handle peak-time crowds.

2.4.9 TICKETING SYSTEM

Ticketing should support both physical and digital access. The ticketing system must match the seating layout and include entry points for general, VIP, and differently abled users. Color-coded seats or random seat colors can help reduce the feeling of emptiness during low attendance.

2.5 PLAYER AND OFFICIAL REQUIREMENTS

A well-designed sports complex must provide safe, functional, and comfortable facilities for players and officials. These spaces are essential for preparation, recovery, and match-day operations, and must remain separate from spectator areas to ensure security, privacy, and efficiency.

2.5.1 Access to Playing Area

One of the primary considerations in designing spaces for players and referees is their access to the playing field. This access should be direct, protected, and fully separated from public and media zones. Ideally, each team and the match officials should have individual access routes leading from their changing areas to a central tunnel that opens at the halfway line. In competitive environments where crowd control is a concern, this tunnel must be enclosed and made from fire-resistant materials to ensure the safety of players and referees during entry and exit.

2.5.2 Player Circulation and Corridor Design

Corridors and doorways used by athletes should be wide enough to accommodate team movements, equipment transport, and staff activity without congestion. These circulation routes must be well-ventilated and climate-controlled for comfort, especially in high-use areas. Access to these corridors should be restricted to authorized personnel only, to maintain privacy and order.

2.5.3 Team Dressing Rooms

Each team must be provided with its own dedicated dressing room located close to the private player entry point. These rooms should be spacious, with an approximate area of 150 square meters per team. The space must include benches, lockers or coat rails, and a whiteboard for tactical discussions. Additional provisions such as a mini-fridge, massage or physiotherapy space, intercom or phone access, and adjoining private toilets and showers are essential for supporting athlete needs before and after games.

2.5.4 Coaches' Rooms

Dedicated offices for team coaches must be located near the dressing rooms to allow coordination with players. Each office, with a recommended size of around 24 square meters, should include private lockers, a seating area, workspace, and access to sanitary facilities. These rooms serve as the operational base for strategic planning and team management.

2.5.5 Referee Facilities

Referees require a separate and private space located near the main grandstand, with direct access to the playing field. This area should not be visible or accessible to spectators and must offer personal lockers, toilets, and rest areas to ensure that match officials can prepare and recover in privacy and comfort.

2.5.6 Medical and Doping Control Rooms

A fully equipped medical room is required for handling injuries and emergencies. It should be located near the players' area and designed for fast access by medical personnel. In line with international competition requirements, a doping control room must also be included. This space should be private, hygienic, and comply with health and testing regulations. Both of these areas are critical to the safe operation of a modern sports complex.

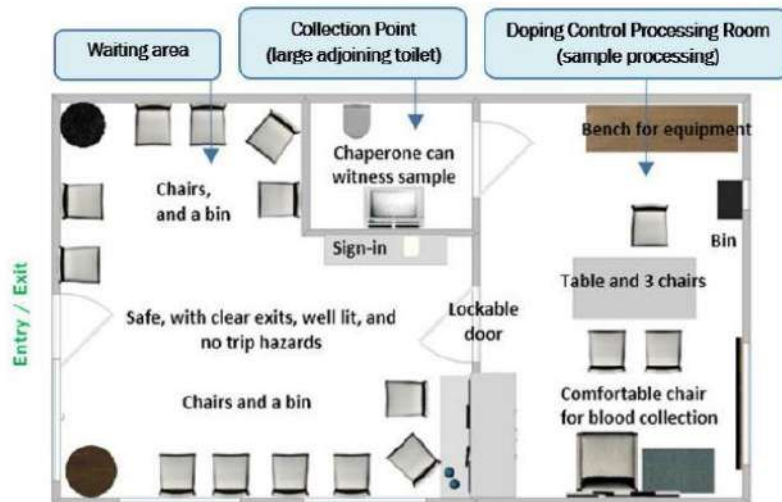


Figure 16: Doping Test Room

2.6 PRESS AND MEDIA FACILITIES

Press and media zones are essential components of modern sports complexes, especially considering the significant influence and income generated through media coverage and broadcasting rights. These spaces are designed to support different types of communication, including newspapers, magazines, radio, and television. The media area should be well-integrated into the stadium layout, providing good views of the playing field and allowing safe, quick access to the press conference rooms and studios. It must be located near the VIP and administrative zones for coordination, yet remain separate from player and spectator circulation paths to avoid congestion or security risks.

Facilities should include press rooms equipped with desks, power and internet connections, soundproofed audio rooms, broadcast booths, and seating for media representatives. Additionally, designated interview or conference areas should be available for post-match discussions, typically with screens and equipment for live or recorded transmissions. These zones must offer a professional environment with comfort, technical support, and visibility, as

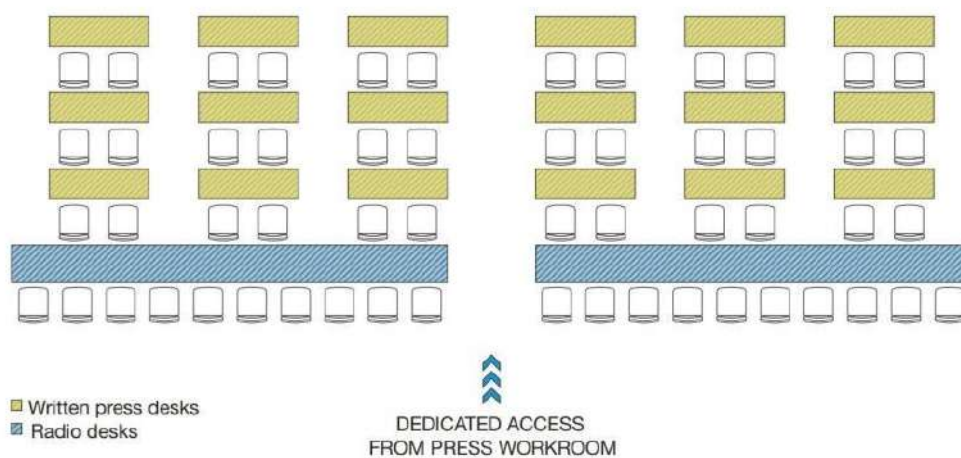


Figure 17: Media Layout

SOURCE : JOHN (1994)

2.7 ROOFING STRUCTURE

The roofing structure of a sports complex is essential for protecting users from weather and enhancing overall functionality. It defines the architectural character of the building and must span large areas without interior columns to ensure clear views and movement. A well-designed roof improves comfort, supports natural ventilation and lighting, and integrates systems like drainage and acoustics. It plays a key role in energy efficiency, durability, and the year-round usability of the facility.

2.7.1 TYPES OF STRUCTURAL SYSTEMS FOR STADIUMS

Stadium roofs require long-span structures to create large, open areas without columns. These systems must be structurally efficient, visually appealing, cost-effective, and responsive to climate. Based on how they behave under loads, these structures are grouped into four types: form-active, vector-active, surface-active, and retractable systems. Each serves different design and functional needs.

2.7.1.1 FORM ACTIVE STRUCTURAL SYSTEM

Form-active systems carry loads using tension or compression in curved forms, without relying on bending. These structures are lightweight, visually expressive, and material-efficient, making them ideal for elegant stadium roof designs. **Its types:**

Cable structure: Cable Structures use steel cables to span long distances in tension. They are flexible and lightweight but require careful detailing and anchoring.



Figure 19: Umakana Yokana Stadium, Japan

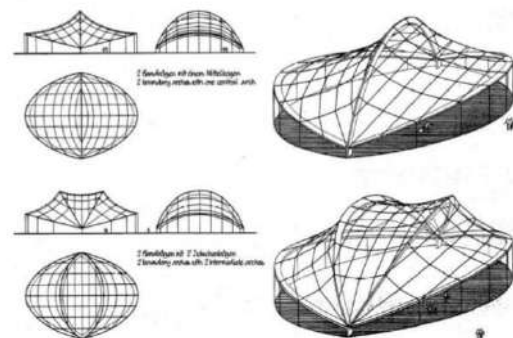


Figure 18: Cable Structure

Tent structure: Tent Structures consist of tensioned fabric membranes supported by rings or masts. They offer a light, translucent, and striking design.

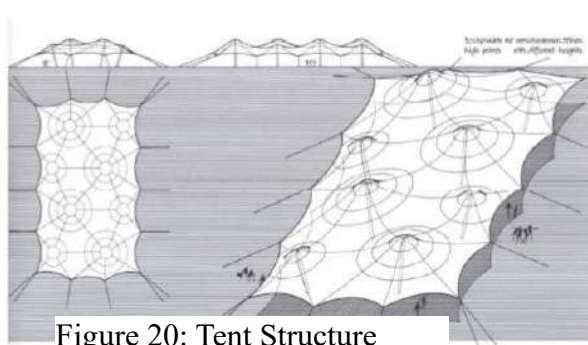


Figure 20: Tent Structure

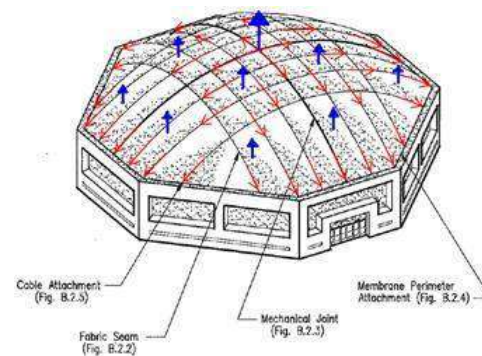


Figure 21: Rajiv Gandhi International Stadium, Lucknow

Pneumatic structure: Pneumatic Structures use air pressure to hold up fabric membranes. While quick to build and cost-effective, they rely entirely on continuous air supply.



Figure 22: Metrodome, Minnesota, US



Arch structure: Arch Structures are curved elements that resist loads through compression. They offer good resistance to wind and efficient long-span coverage.



Figure 24: Taego Stadium, South Korea

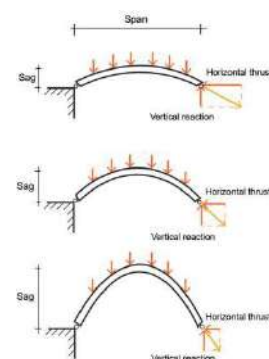


Figure 23: Arch Structure

2.7.1.2 VECTOR ACTIVE STRUCTURAL SYSTEM

Vector-active systems use straight members arranged in triangles to carry loads through both tension and compression. They are known for structural clarity, stability, and flexibility in form. **Its types:**

Flat truss structure: Flat Truss Structures use rigid triangular units to span wide areas efficiently, like in Emirates Stadium.



Figure 25: Emirates Stadium, London

Curved structure: Curved Trusses offer the same benefits with added visual flow.



Figure 27: Singapore Sports Hub, Singapore

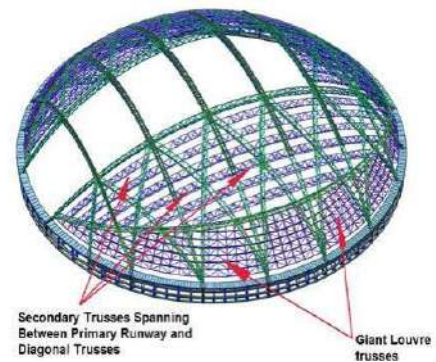
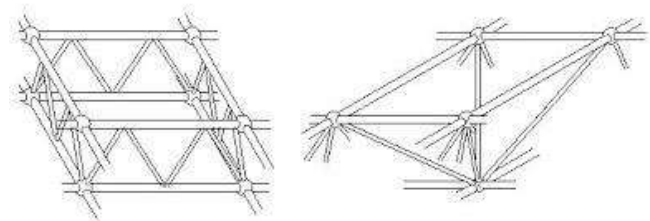


Figure 26: Curved Structure

Space frame structure : Space Frame Structures are 3D trusses that distribute loads in all directions. They are lightweight, modular, and allow for flexible architectural designs.



(b) Plane module; double layer space frame (c) Three dimensional module; double layer space frame

Figure 28:Space Frame Structure

2.7.1.3 SURFACE ACTIVE STRUCTURAL SYSTEM

These systems carry loads using curved or folded surfaces that act like membranes. They offer structural strength and visual identity while using minimal material.**Its types:**

Shell Structure: Shell Structures are thin, curved surfaces like domes or cones that efficiently transfer loads. They are rigid but complex to construction.

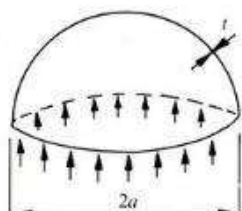


Figure 30:Shell Structure



Figure 29: Palazzetto Dello Sports, Rome

Folded Plate Structure: Folded Plate Structures consist of flat plates joined at angles. They behave like shells and offer strong, angular roof forms with unique visual appeal.

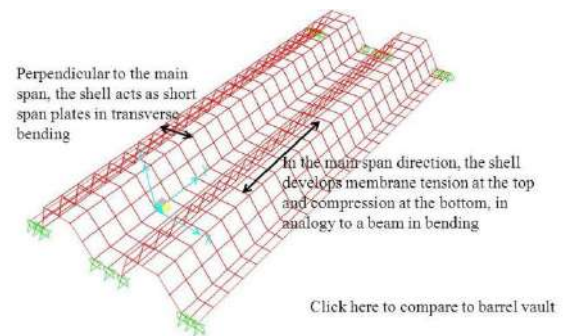


Figure 31: Folded Plate Structure

2.7.1.4 RETRACTABLE STRUCTURAL SYSTEMS

Retractable roof systems are hybrids that allow parts of the roof to move—slide, fold, or rotate—depending on weather or event type. They combine mechanical systems with strong structural design.

Examples like the Mercedes-Benz Stadium, Marlins Park, and Rothenbaum Tennis Arena use retractable systems for flexibility and all-weather use. These structures often include steel frames and membrane covers and enhance both user experience and functionality.



FIG: OPENED ROOF



FIG: CLOSED WITHIN 12 MINUTES

Figure 32: Mercedes Benz Stadium



FIG: OPENED ROOF



Figure 33: Marlins Park, US

CHAPTER 3: CASE STUDY

3.1. NATIONAL CASE STUDY

3.1.1. DASHRATH RANGASALA

3.1.1.1. INTRODUCTION

Dashrath Rangasala, situated in the heart of Kathmandu at Tripureshwor, Dasarath Stadium stands as Nepal's primary venue for sports and public events. It is designed as a comprehensive athletic facility, the complex accommodates numerous indoor and outdoor sporting activities within one cohesive site, making it the country's largest multi-sport infrastructure.

Location: Tripureshwor, Kathmandu, Nepal

Facility Type: National-level Sports Arena

Construction Period: 2026–2034 B.S.

Renovation: Executed in 1997 by architect N. Sangachhe in preparation for the 1999 South Asian Federation (SAF) Games.

Architectural Contributor: Ganesh Bhat

The indoor arena, located in the northeast section of the stadium grounds, includes both the covered hall and administrative facilities. Encompassing around 5 ropanis of land, this hall is equipped with a wooden-floored multipurpose space measuring approximately 25 x 35 meters. The space supports sports such as indoor basketball, volleyball, and badminton, while also being adaptable for martial arts competition. The spectator capacity is estimated at 1000 seats, which falls short of international standards, indicating the need for potential expansion or upgrading in future plans.

3.1.1.2. FUNCTIONAL LAYOUT AND CIRCULATION

The entry to the indoor complex is deliberately kept discreet compared to the main stadium approach, likely due to security zoning and crowd management strategy. There are dual circulation paths: one designated for general visitors and VIPs, and another reserved exclusively for athletes and officials. Athletes' Access: Provided through a ground-level entry point that leads directly to locker rooms and player amenities. VIP and Public Entry: Routed through a formal entrance adjacent to the administration wing, which sits at the forefront of the building. East and West Wings of the facility house key operational spaces such as:

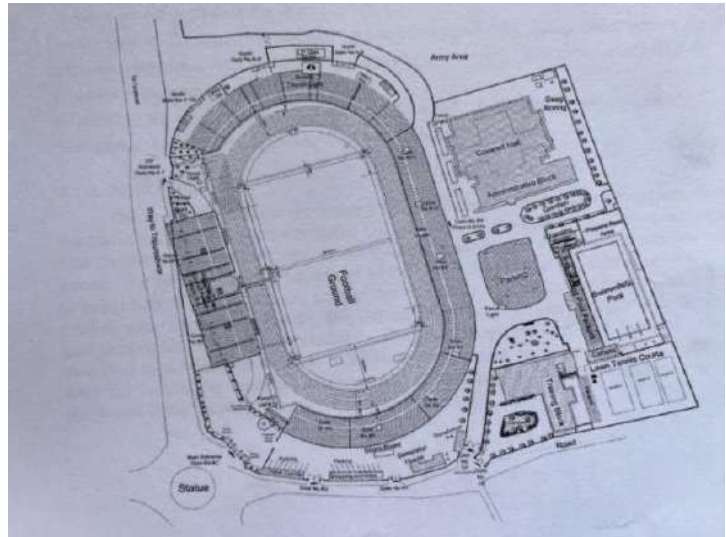


Figure 34: Masterplan of Dashrath Rangasala

- Judging and commentary booths
- Sanitary and service areas

- Staff and technical rooms

The southern zone incorporates the administrative division, facilitating event coordination, management, and security operations. On the northern side beneath the seating parapet, spaces are allocated for athlete preparation, including locker rooms, but these are only active during events. Other specialized service areas include:

- A first aid and medical bay
- A digital control and monitoring center
- A dedicated fitness/gymnasium zone
- Player changing and recovery rooms

The covered hall is a versatile facility designed to accommodate various indoor sports, including basketball, volleyball, and badminton. It is engineered as a flexible, multi-use space that maximizes functionality while ensuring a comfortable viewing experience for spectators. The arena's layout supports multiple sports events simultaneously, making it a key asset within the sports complex.

3.1.1.3. STRUCTURAL DIMENSIONS AND CAPACITY

Arena Height: The internal clearance of the arena is maintained at 48 ft, comfortably exceeding the minimum required 41 ft for standard basketball games, and ensuring ample space for other sports.

Spectator Parapets: General spectators are seated along the longitudinal axis, which optimizes the viewing angle. The hall includes 11 parapets, aligned from north to south, with 4 dedicated VIP rows on an elevated platform.

Total Seating Capacity: The indoor arena can accommodate approximately 1,000 people.

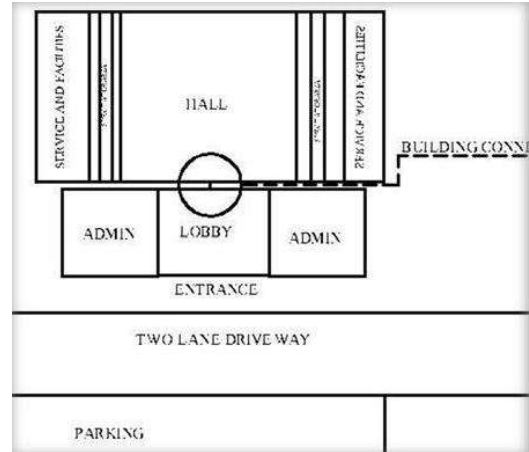


Figure 35: Zoning of Covered Hall



Figure 36: Court of Covered Hall

3.1.1.4 ARCHITECTURAL & FUNCTIONAL FEATURES

Located close to the main stadium, the hall is directly accessible through the administrative building, making it highly integrated within the overall sports infrastructure. It is a multipurpose sports facility equipped with both VIP and general seating areas.

Entrance Layout: The front façade houses administrative offices, while access to the hall and gymnasium is enabled via the rear and lateral sides of the structure.

Support Facilities: The facility includes dedicated changing rooms, restrooms for players and officials, and storage areas for equipment.

Roofing and Lighting: The ceiling rises to about 40 ft at its peak. A system of GI trusses supports the roof, which incorporates translucent sheets for natural daylighting. Additionally, LED artificial lighting and an electronic scoreboard enhance the indoor experience, allowing for night-time and low-light usage.

3.1.1.5 ACCESS AND CIRCULATION

- **Players:** Enter directly from the ground floor through a clearly designated access route.
- **Spectators:** General spectators access their seats from the first-floor level, which links to staircases positioned on the sides.
- **VIPs & VVIPs:** Gain exclusive access through the administration block at the front of the hall, ensuring privacy and convenience.

DESIGN SHORTCOMINGS

One significant limitation is the poorly defined access pathways, especially for spectators. The

entry points are located laterally, making them less visible and congested, as the space between the hall and adjacent stadium is restricted.

3.1.1.6 SPECTATOR AREA

The indoor sports hall can seat up to 1,600 spectators. Seating is arranged along both longer sides of the court. A VIP zone is located at one end of the court, accessible from the administrative block. This VIP section includes a waiting lounge, meeting room, and restrooms. There are two main entry/exit points on each side of the building, each with 5 ft wide doors. These are connected to 4 to 5 ft wide staircases, and 8 ft wide steps guide spectators directly to the stands. Each row of seating is 11 inches

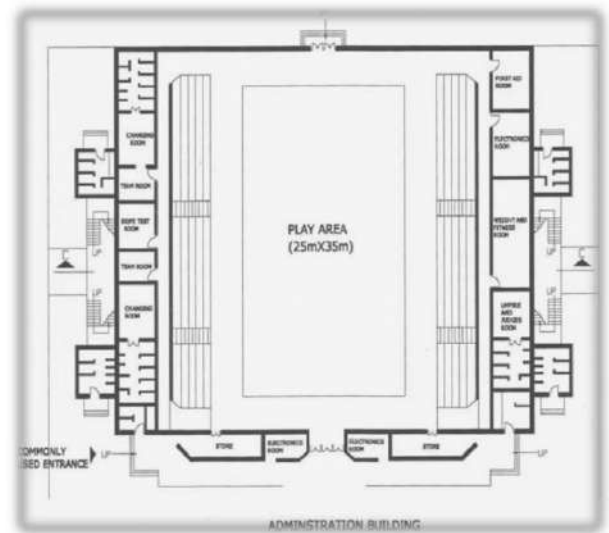


Figure 37:Ground Floor Plan Of Covered Hall

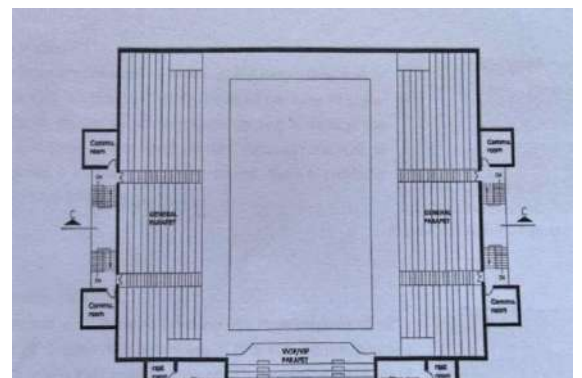


Figure 38: First Floor Plan of Covered Hall

high and 30 inches deep for comfortable viewing. Toilets for spectators are placed outside the main hall for convenience and hygiene.

Toilet Facilities

Men:4 WCs

10 urinals

Ratio: 1 WC per 150 spectators, 1 urinal per 60 spectators

Women:

10 WCs

Ratio: 1 WC per 30 spectators

These ratios are based on standard public toilet guidelines to avoid overcrowding during major events.

Playing/Competition Area

The playing area is 112.5 ft × 67.5 ft, forming a square layout in terms of functional use. This space is flexible and can accommodate:

Volleyball, Basketball, Badminton (multiple courts), Judo, Boxing, Karate, Gymnastics

The flooring should ideally be made of wooden sports flooring or PVC vinyl sports flooring, depending on the type of sports and the budget, to provide safety and proper grip.

Player Facilities

Dedicated changing rooms are available for players participating in various sports. Each gender has a separate area equipped with:

Male Players:

3 toilets (WCs), 3 urinals, 3 showers, 2 washbasins

Female Players:

3 toilets (WCs), 3 showers, 2 washbasins

Additional support rooms provided include:

Umpire Room, First Aid Room, Electronic/Control Room, Fitness Room and Weight Training Area

These are placed under the northern side of the structure for easy access. However, there is no separate changing room for trainees, which might be a design limitation.

3.1.1.7 Lighting

Ribbon windows run along the longer walls of the hall, but many are shaded to minimize sun glare during games. Instead, natural light is brought in through transparent roof sheets, which provide sufficient daylight without causing visibility issues. For night games or cloudy days, the hall is equipped with artificial lighting systems, such as LED floodlights and spotlights placed above the playing area to ensure uniform brightness across the court.

3.1.1.8 Construction

The hall is RCC frame structure with main columns of 18" x 18". The exterior columns are of 9" x 15". Certain portions have load-bearing walls of 18". Beam size is mainly of 18" x 24". Two heavy trusses of 7x 3 support the roof covering over the huge span.

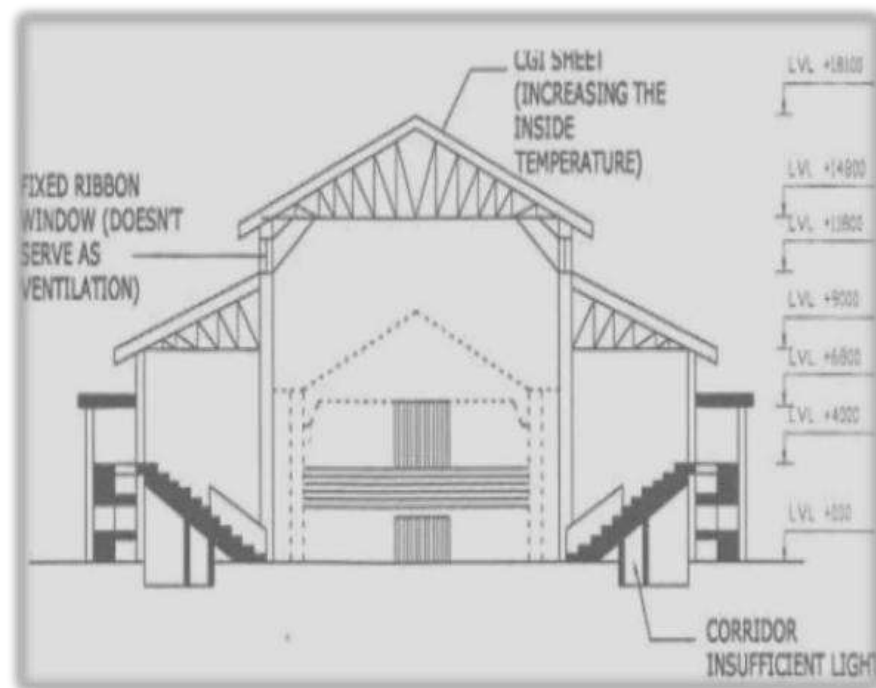


Figure 39: Section of Covered Hall

Parking Services

Two-wheeler and four-wheeler parking is provided with proper driveway around, but the two-wheeler and four-wheeler area is not specified in the parking area.

- Parking space is allotted in the south which spreads over more than 1000sqm. The area is adequate for 5 cars and 5 buses. Separate space is allotted for 2-wheelers with capacity of 100 nos.
- Parking space for VIPs is allocated in the east whereas parking for emergency vehicles is provided in the west.

3.1.1.9 MERITS

Located centrally in Kathmandu, making it highly accessible.

Designed with a bowl-shaped form that offers good visibility from all seats.

Renovated multiple times with added facilities like VIP stands, floodlights, and athletic tracks.

Multi-functional use for sports, concerts, and national events.

Includes essential infrastructure like dressing rooms, press box, and medical rooms.

3.1.1.10 DEMERITS

Poor drainage and grass maintenance cause waterlogging during rains.

Fails to meet international standards due to low-quality pitch and outdated lighting.

Historical safety issues due to narrow exits and poor crowd control.

Insufficient parking and limited pedestrian circulation during large events.

Structural parts remain vulnerable despite renovation, especially after the 2015 earthquake.

3.2. REGIONAL CASE STUDY

3.2.1. SAN WAYAO COMMUNITY SPORTS CENTER , CHEN GDU SHI ,CHINA

3.2.1.1. INTRODUCTION

The San Wayao Community Sports Center, designed by CSWADI and completed in 2015, is located in the DongYuan residential district of Chengdu, China. This facility was developed to provide a communal space for residents of all ages, integrating various sports and recreational amenities within a densely populated urban area.

Location: Chengdu Shi, China

Architects: CSWADI

Area: 11 936 m²

Year: 2015

The San Wayao sports complex is built in a dense urban neighborhood surrounded by old houses, high-rise buildings, and a nearby primary school. Even though the site had limited space, the designers made efficient use of the area to create a vibrant and useful public sports space. The facility includes various indoor and outdoor sports options such as: Swimming pool, Indoor and outdoor fitness centers, Tennis, basketball, squash, and ping pong courts, Billiards and gate ball areas, A children's play area. The overall design is simple and welcoming, with pleasant aesthetics and good lighting for both indoor and outdoor use, making the place feel safe and comfortable for community members of all ages.



Figure 40: San Wayao Community Center, China

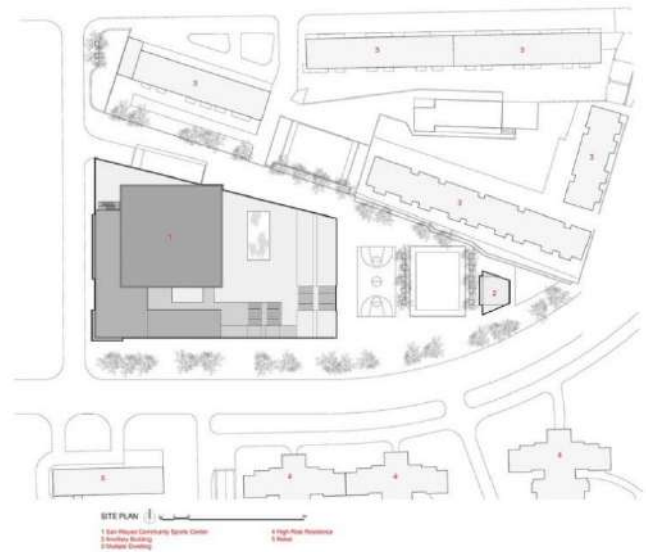


Figure 43: Master plan of San Wayao Community Center

3.2.1.2. DESIGN CONCEPT

The San Wayao Community Sports Center in Chengdu, China, is designed with the concept of integration, accessibility, and multi-functionality, aimed at fostering an active and healthy lifestyle for residents.. Its innovative use of space fosters an inclusive and dynamic urban lifestyle, making it a model for future community sports centers.



Figure 44: Design Concept

3.2.1.3. AREA DIVISION AND ZONING

INDOOR

Swimming Pool

Spa

Table tennis

Badminton

Court

Gym

BillardsTable

Squash

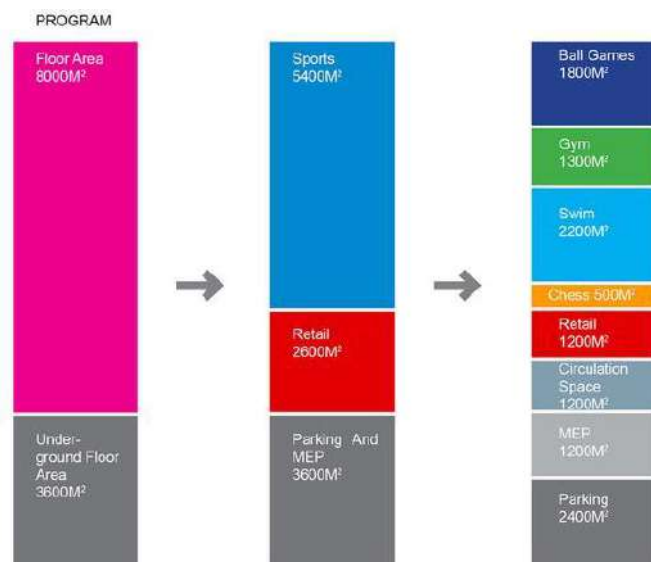
Chess and cards

OUTDOOR

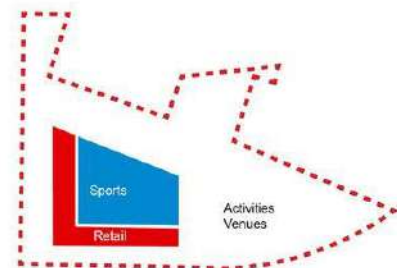
Basketball Court

Gate ball court

Café/Staffdorm



SECTION DIAGRAM



3.2.1.4. CIRCULATION

The southern facade of the building is designed to maximize solar exposure and scenic views, while still maintaining the tiered effect of the stepped green space. The shape of the building tapers towards the eastern exterior, which serves as the primary focal point.

- Universal accessibility – Figure 45: Area Division And Zoning ramps, elevators, and wide pathways for people with disabilities.
- Clear wayfinding – well-marked routes, signage, and directories for ease of movement.
- Emergency exits and fire safety routes – integrated for quick evacuation.
- Separation of pedestrian and vehicular movement to ensure safety.

3.2.1.5. STRUCTURE / SPACE

The connection between the structure and the space in this design exemplifies a harmonious fusion of form and utility. The translucent facade, created by the U-shaped glass panels, highlights the cross-braced structural elements in a subtle manner. The layout of columns and beams creates an expansive, voluminous space that benefits from ample natural illumination. Additionally, every piece of steel used in the structure is meticulously painted to display both its robustness and aesthetic appeal, contributing to the overall grandeur of the space.

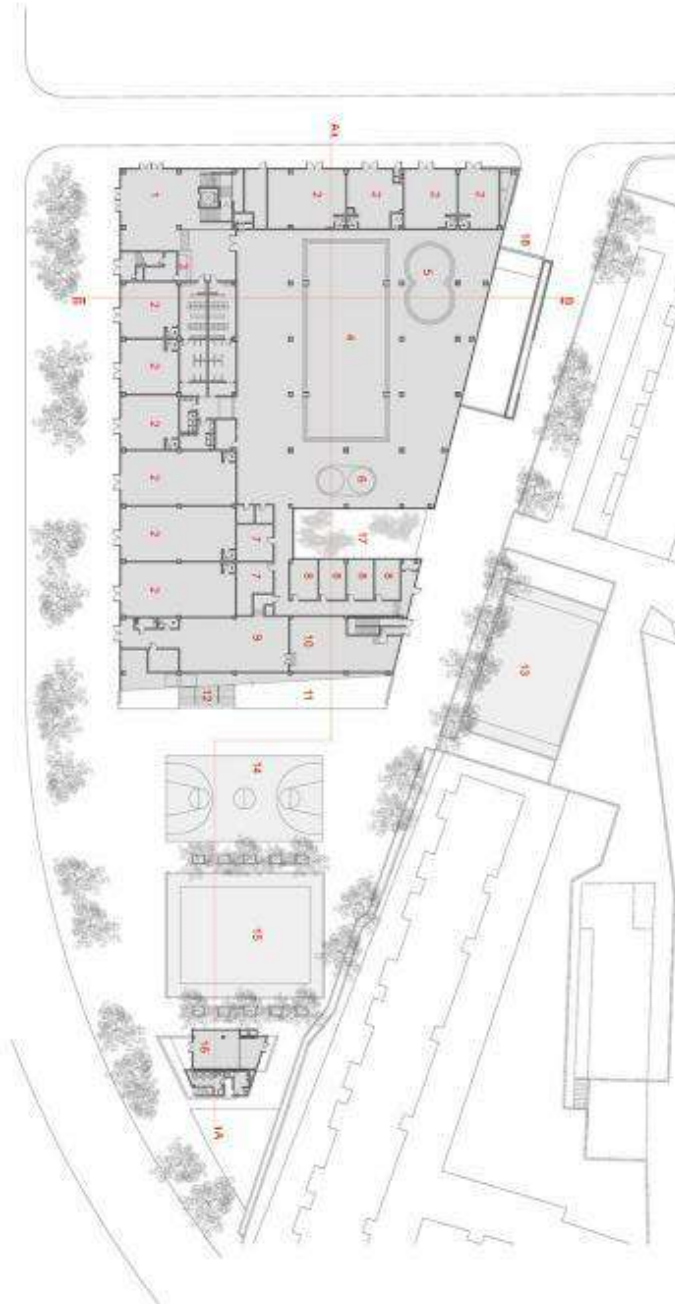


Figure 46: Ground Floor Plan

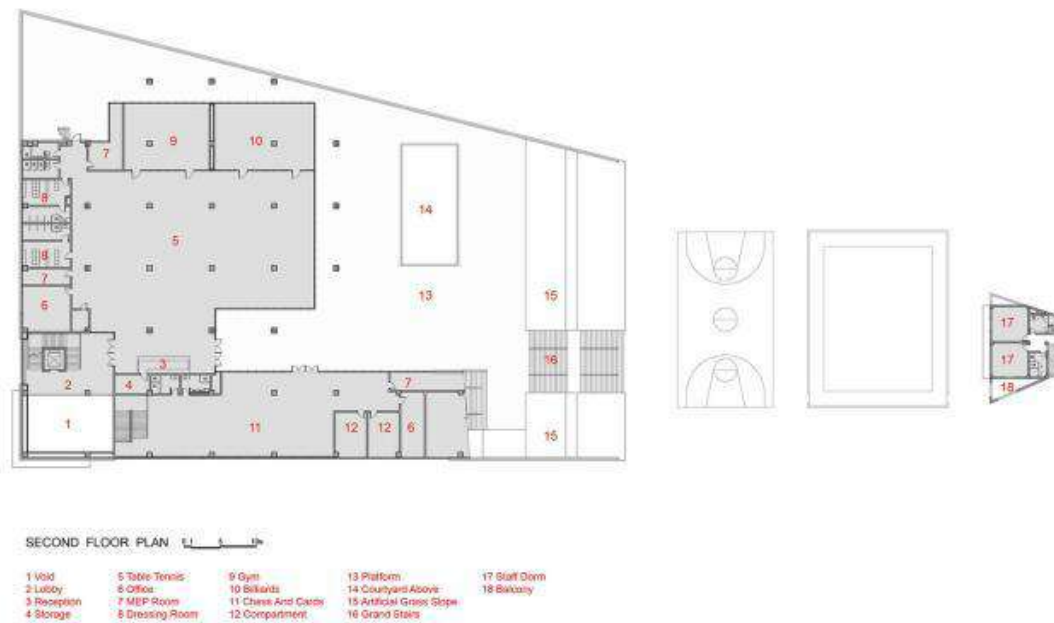


Figure 48: First Floor Plan

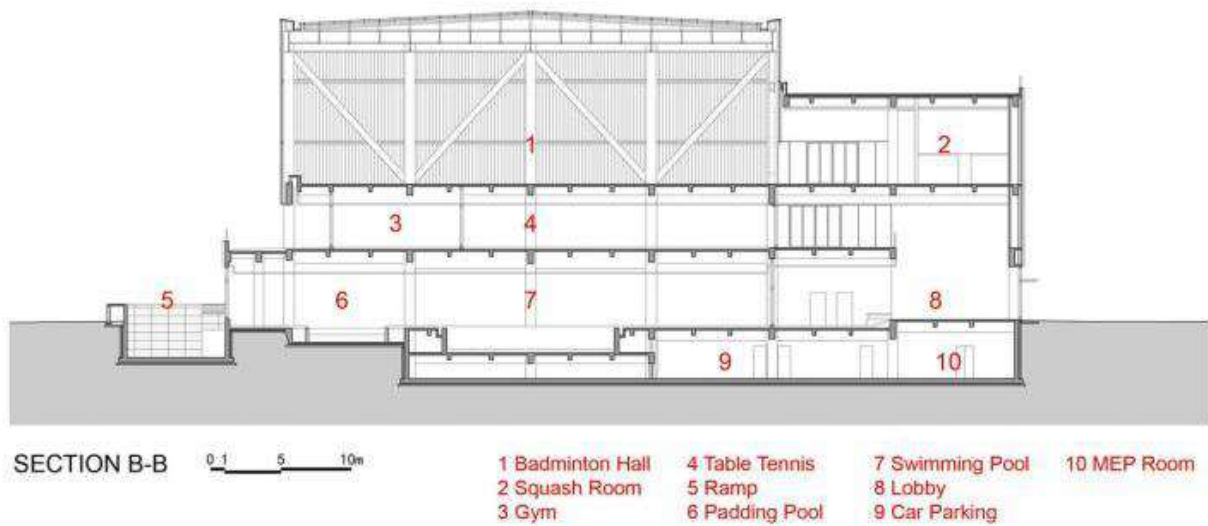


Figure 47: Section

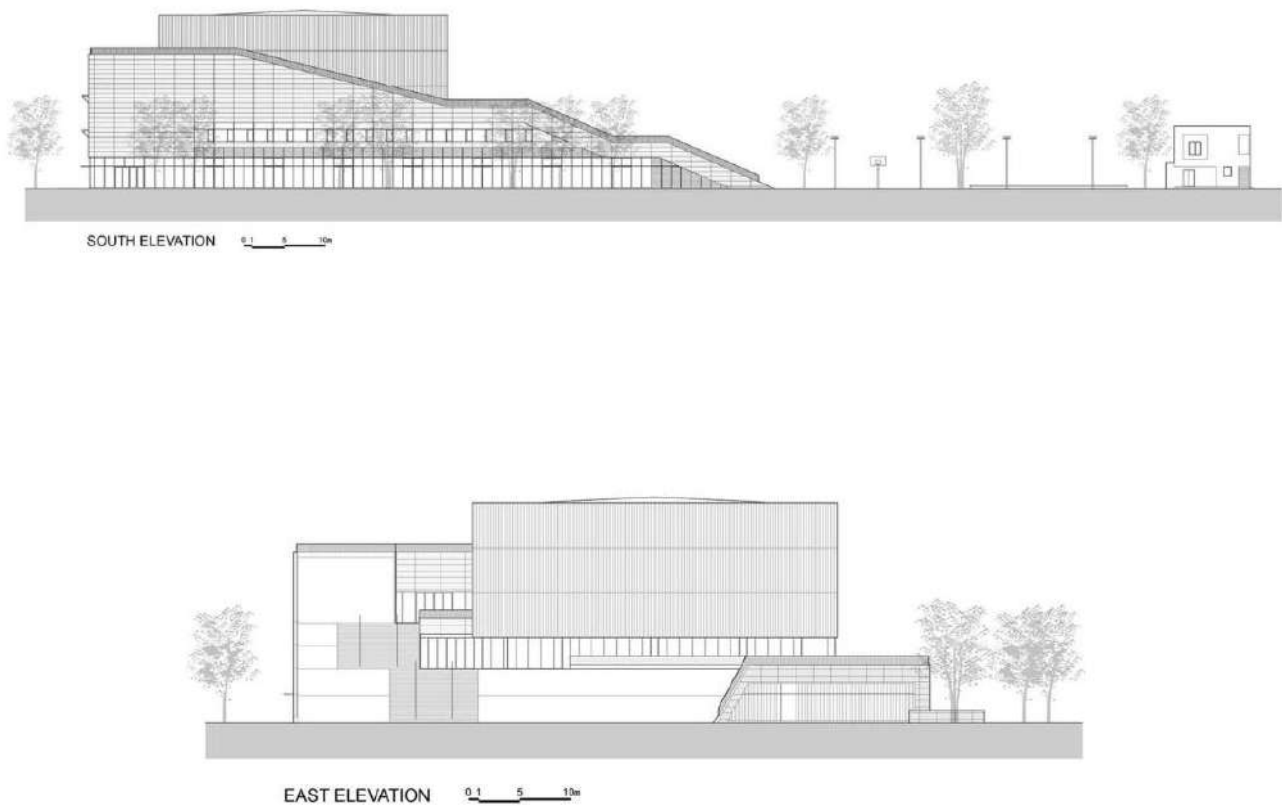


Figure 49:Elevations

3.2.1.6. INFERENCE DRAWN

Based on the analysis of the SAN WAYAO COMMUNITY SPORTS CENTER, the design philosophy of integrating the indoor and outdoor environments can be adopted. Additionally, the idea of vertical zoning, even with the use of steel structures, can be applied. The addition of courtyards to sports complexes not only enhances the aesthetic appeal of the building but also provides a rejuvenating experience to the users. Similar to this sports center, it is essential to ensure that buildings are equipped with proper lighting and ventilation to ensure comfortable and healthy environment for its occupants.

3.2.1.7 MERITS

Blends well with the local village context through low-rise and human-scaled design.

Uses sustainable and eco-friendly materials like recycled timber.

Natural ventilation and daylighting reduce energy consumption.

Multi-purpose halls provide flexible use for community events.

Clear zoning enhances functional circulation (public/private separation).

Barrier-free design ensures accessibility for elderly and disabled.

Promotes social interaction with open spaces, courtyards, and verandas.

Lightweight timber structure is cost-effective and easy to construct.

Prefabricated elements allow fast and efficient construction.

Designed based on community engagement and user needs.

3.2.1.8 DEMERITS

Lightweight structure limits capacity for heavy loads or vertical expansion.

Timber material may require frequent maintenance in humid/rainy climates.

Not suitable for scaling up to larger urban populations.

Open design may cause noise issues and lack of privacy between functions.

Less adaptable to urban or high-density environments.

Limited technological integration for modern digital needs.

Open-air design may be uncomfortable in extreme weather or polluted areas.

Small site limits future spatial or functional expansion

3.3. INTERNATIONAL CASE STUDY

3.3.1. RAVENS CRAIG REGIONAL SPORTS FACILITY, MOTHERWELL, UK

3.3.1.1. INTRODUCTION

Architects: Populous

Location: Ravenscraig, Motherwell, UK

Engineering: Buro Happold (structural, civil, mechanical, electrical)

and public health services)

Client: North Lanarkshire Council /
Sportscotland/ Ravenscraig Ltd / Motherwell
College

Total Cost: £31.3 million

Completion Date: Autumn 2010



Figure 50: Ravenscraig Sports Facility

3.3.1.2. DESIGN CONCEPT

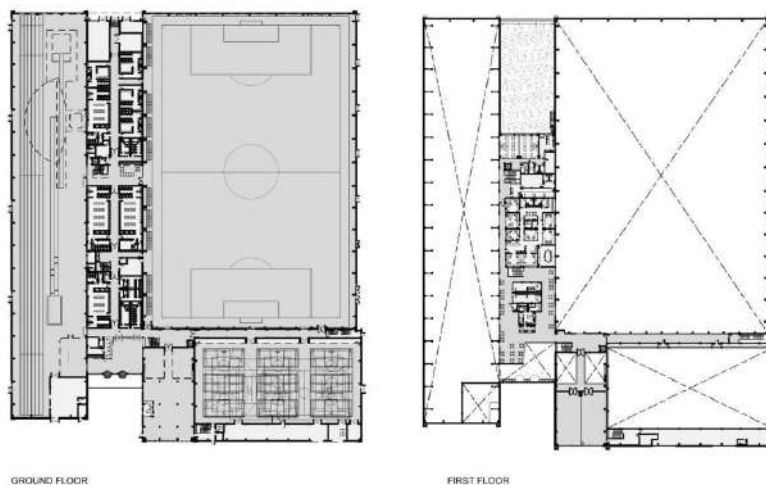


Figure 51: Floor Plans

The Ravenscraig Regional Sports Facility (RRSF) was designed with a multi-functional, community-oriented, and sustainable concept, integrating elite sports training with public accessibility. The key conceptual aspects include:

- Urban Regeneration: Transforms the former Ravenscraig Steelworks into a modern sports hub.
- Multi-Functional Design: Combines elite sports training with community recreation.

- Indoor-Outdoor Integration: Provides year-round access to diverse sports facilities.
- Sustainability Focus:
 - Natural daylight & ventilation to reduce energy use.
 - Rainwater harvesting & LED lighting for efficiency.
- Flexible & Adaptive Spaces:
- Can host sports competitions, fitness programs, and public events.

3.3.1.3. ROOF AND STRUCTURE

ROOF DESIGN

Lightweight, long-span steel roof to accommodate large indoor spaces.

Curved and aerodynamic form for structural efficiency and aesthetic appeal.

Large skylights and translucent panels integrated for natural day lighting.

Weather-resistant materials to withstand Scotland's climate.

STRUCTURAL SYSTEM

Steel frame construction with large-span trusses for column-free interiors.

Precast concrete elements for durability and stability.

High-strength tensile roof supports to reduce structural load.

Sustainable insulation materials to enhance energy efficiency



Figure 52: Steel Frame Construction

3.3.1.4. CIRCULATION

- Separate access points for athletes, spectators, and staff.
- Wide corridors and open layouts for ease of movement.
- Wheelchair-accessible pathways, ramps, and elevators for universal accessibility.
- Parking zones for visitors, teams, and official.

3.3.1.5. MATERIAL

Steel Cladding: Provides a modern industrial aesthetic, referencing the site's steelworks history.

Glass Facades & Curtain Walls:

Maximizes natural daylight for energy efficiency.

Enhances visual transparency between indoor and outdoor spaces.

Precast Concrete Panels: Used for structural durability and weather resistance.

Aluminum Composite Panels: Lightweight, corrosion-resistant, and adds a sleek finish.

Polycarbonate Panels: Used in some areas for translucency, allowing diffused natural light inside.



Figure 53: Elevations



Figure 54: Steel Struss Structure

3.3.1.6. INFERENCE

The Ravenscraig Sports Facility demonstrates how adaptive reuse of industrial land can support urban regeneration through sustainable and inclusive sports infrastructure. Key takeaways include the use of long-span steel structures for flexible, column-free interiors, efficient circulation zoning for diverse user groups, and integration of passive design strategies like day lighting and rainwater harvesting. The facility sets a strong precedent for designing community-oriented, energy-efficient, and multi-functional sports complexes.

3.3.1.7. MERITS

1. Designed with a clear zoning layout separating public, private, and athlete areas for efficient circulation.
2. Features a large-span column-free roof that enhances spatial flexibility for indoor sports.
3. The multi-functional planning integrates elite training with community use in a single cohesive layout.
4. Uses natural daylighting through clerestory and translucent roof panels to reduce energy consumption.
5. Emphasizes urban regeneration by repurposing a former industrial site into a modern sports facility.
6. Compact and efficient floor planning supports simultaneous use of multiple spaces without overlap.
7. The structure uses steel frames and lightweight materials, minimizing structural load and cost.
8. Roof design allows for thermal insulation and acoustic control, improving indoor comfort.
9. Circulation design ensures smooth movement for athletes, staff, and visitors with minimal conflict.
10. Sustainable materials and systems like LED lighting and natural ventilation are integrated into design.

3.3.1.8. DEMERITS

1. High construction cost limits feasibility for replication in low-budget or rural contexts.
2. Large-span roof systems require complex engineering and maintenance over time.
3. The expansive layout demands significant land area, which may not suit urban sites.
4. Some spaces are program-specific and lack adaptability for other functions.
5. Use of high-tech systems increases dependence on skilled management and technical upkeep.
6. The facility's scale can overwhelm community-scale planning, making it less relatable in smaller cities.
7. Interior layout may prioritize elite sports over casual users, affecting community balance.
8. High roof volume may result in inefficient heating or cooling if not properly managed.

CHAPTER 4: SITE ANALYSIS

4.1 INTRODUCTION

Location: Byasi, Bhaktapur

Area: 48365.18 Sq.m. (95-1-0-1.6)

Topography: Flat Land

Present Use: Agricultural Land

Zone: Developing Residential

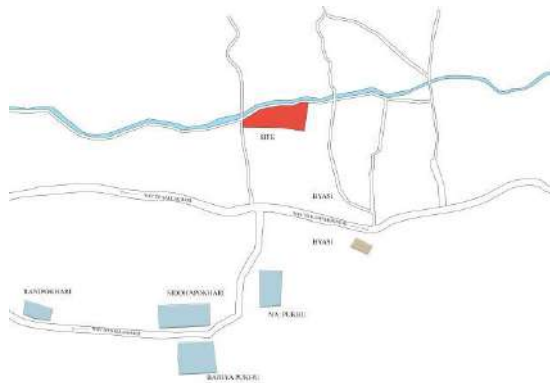


Figure 55:Location Map of Site

4.2 SITE JUSTIFICATION

- The site is located in a peaceful environment, near Kasan river.
- Public transportation is easily accessible within a 5-minute walking distance at Kalo-pati.
- The site is equipped with all primary services, including electricity, communication, and water supply.
- The topography is flat, as it ensures easy accessibility. The site is accessed with 9.6m road at west, 7.7m wide road at north, 5m road at both east and south.
- It is located in a developing residential area with low vehicular traffic.

4.3 APPROACH/ACCESS

- 1200m from Kamalbinayak Chowk
- 1600m from Araniko Highway
- Presence of 9.6m, 7.7m and 5m wide road around the site (excluding footpath).
- Bhaktapur Nagarpalika head office within 300m and durbar square with 550m.
- Tourist bus stop is available inside compound of Bhaktapur Nagarpalika and other bus stop near 800m radius.

4.4 SITE TOPOGRAPHY

The site is regular in shape with approximately flat land. The exact position of the site according

to Google Earth is: 27°40'41"N 85°25'22"

4.5 CLIMATIC CONDITION

The weather condition in Bhaktapur is characterized by a mold and moderate climate.

Hottest month: June with 30°C

Coldest month: December with 7°C

Sun Angle: Summer 84° / Winter 39°

Humidity:

Wind: Mostly South West of Average 5mph

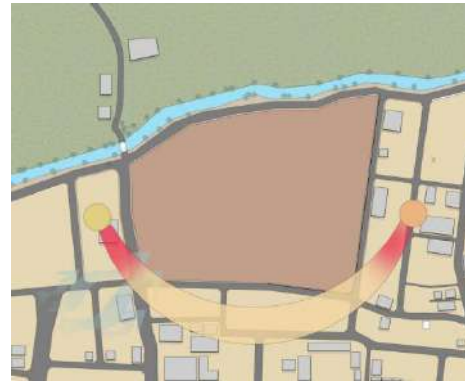


Figure 56: Sunpath Diagram

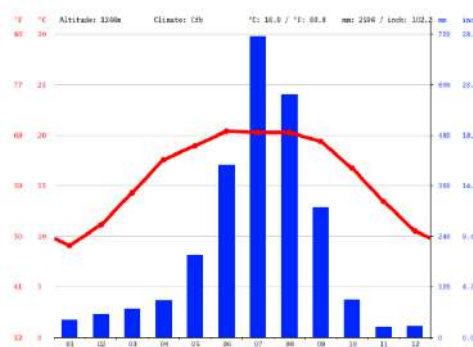


Figure: AVERAGE TEMPERATURE

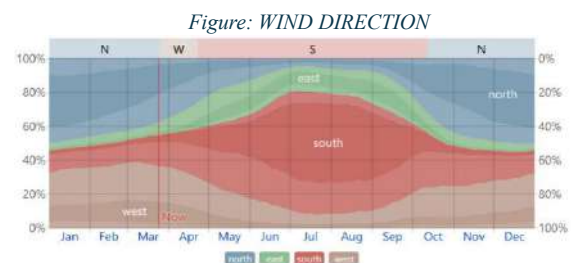


Figure: WIND DIRECTION

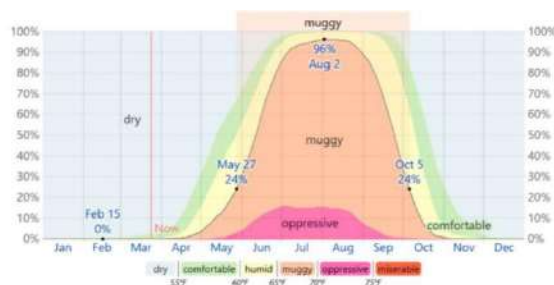


Figure: MOGGY MONTH

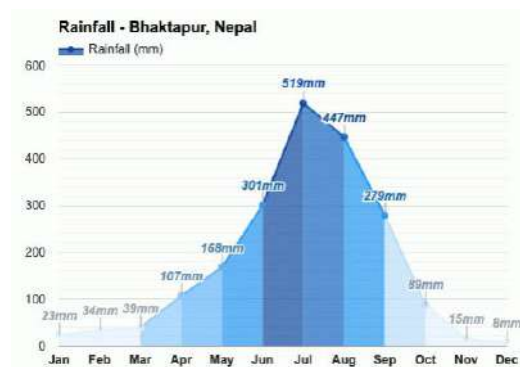


Figure: RAIN DATA

4.6 HEALTH SERVICES

There are many Clinics and Pharmacy near the Site.

Within the 800m form the site there are Bhaktapur Cancer hospital and Bhaktapur Hospital.

4.7 FACILITIES

The site is equipped with essential infrastructure including electricity, water supply, drainage, transportation access, and proximity to hospitals and medical facilities.

4.8 SITE FEATURES AND SURROUNDING

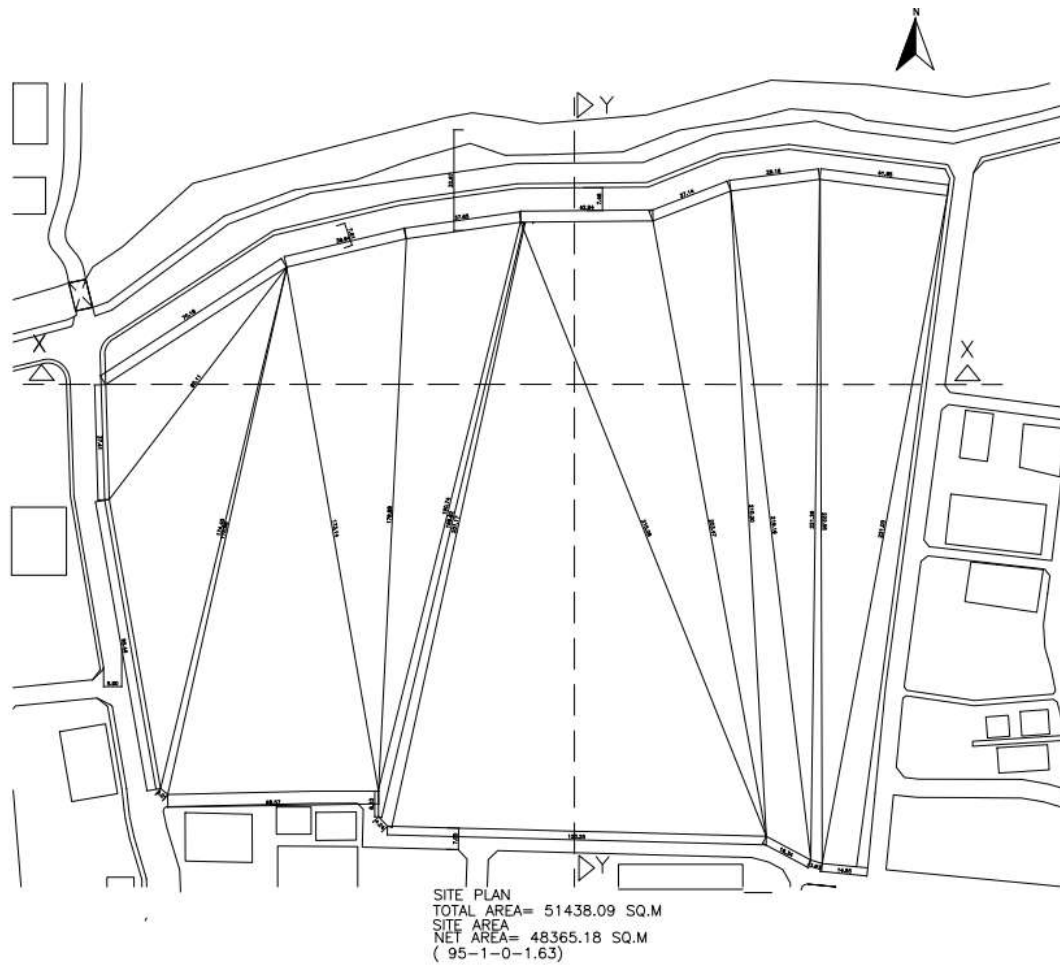


Figure 57: Site Plan



Figure 58: Section At X-X



Figure 59: Section At Y-Y

VIEWS FROM THE SITE



Figure 60: Site Surrounding
Views

4.9 BYLAWS

According to the bye laws of Bhaktapur Municipality, the site lies in the Residential Sub Zone. The prevailing by - laws of the site are:

Ground Coverage : 40% for more than 1-0-0-0

Setback: 2m

Add Stair: < 25m Travel Distance.

Ramp: 1:10

4.10 SWOT ANALYSIS

STRENGTH

- Situated beyond the settlement to prevent any disturbance to the residential area.
- Multiple accessibility through old thimi Duwakot, Araniko highway, Nagarkot
- Multiple ways vehicular access connecting from secondary roads.
- Flat land

WEAKNESS

- The proposed site lacks proper sewage and water management.
- Brick Factories in West and East (Current Situation).

OPPORTUNITY

- Economic opportunities
- Community engagement
- Gradual development of the entire area regarding roads networks, public transportation options and other infrastructures.
- Competition Venue for school and college level

THREAT

- Possibility of flooding from Kasan River.

CHAPTER 5: PROGRAM FORMULATION

5.1 ADMINISTRATIVE BLOCK

Reception: $5.3 \times 4.2 = 22.2$ sq.m

Waiting Area : $6.3 \times 4.2 = 26.5$ sq.m.

Account Section: $6 \times 5 = 30$ sq. m

Meeting Room : $5 \times 7.5 = 37.5$ sq. m

Pantry: $5.7 \times 5 = 37.5$ sq. m

Manager Office (CEO) : $7.3 \times 5 = 36.5$ sq. m

Store Room: $3.5 \times 4 = 14$ sq.m.

Security Head Room: $4.1 \times 4 = 16.4$ sq. m

Store: $3.5 \times 4 = 14$ sq. m

Female Washroom: $4.7 \times 4 = 18.8$ sq.m

Male Washroom: $3 \times 3.4 = 10.2$ sq. M

5.2 TRAINING HALL

Basketball court room : $21 \times 34.2 = 718.2$ sq. m (court size: 15m x 28m)

Store Room: $7 \times 10.7 = 75$ sq.m.

Twaekwando/ Karate Hall Room = 598.5 sq.m (for two court of 10m x 10m)

Female Washroom + Shower and Locker Room: $7 \times 7 = 49$ sq.m

Male Washroom +Shower and Locker Room : $7 \times 7 = 49$ sq.m

5.3. MULTIPURPOSE SPORTS HALL

Hall Area : 2182.4 sq.m

Food Stall: $11.5 \times 14.1 = 162.15$ sq.m

Female Washroom : $11.5 \times 9.7 = 111.6$ sq.m x 2 no. = 223.2 sq.m

Male Washroom : $11.5 \times 10.9 = 125.4$ sq.m x 2 no. = 250.7 sq.m

CCTV Hub : $12.2 \times 11.5 = 140.3$ sq.m

Equipment Store : $12.7 \times 11.5 = 146.1$ sq.m

Store : $11.5 \times 9.7 = 111.5$ sq.m

Team Room : $11.5 \times 18 = 207 \text{ sq.m}$ x 4 no. = 828 sq.m (approximately)

I. Discussion Panel Room

II. Changing Room

III. Coach Room

IV. Meeting Room

V. Shower

VI. Washroom

Doping Test Room : $8.2 \times 4.2 = 34.4 \text{ sq.m}$

Doping Waiting Room : $4.5 \times 3 = 13.5 \text{ sq.m}$

Referee's Room: $4.5 \times 7.9 = 35.6 \text{ sq.m}$

Vip Room: $6.8 \times 5 = 34 \text{ sq.m}$

Conference Room/ Interview Room : $11.5 \times 8 = 92 \text{ sq.m.}$

Media Room: $5.4 \times 5 = 27 \text{ sq.m.}$

Media Control Room : $5.9 \times 6.9 = 40.71 \text{ sq.m}$

Security Room : $8 \times 11.2 = 89.6 \text{ sq.m}$

Medical Room : $5 \times 11.5 = 57.7 \text{ sq.m}$

Staff Room: $11.5 \times 4.1 = 47.2 \text{ sq.m}$

Staff Washroom: $3.4 \times 5.5 \times 2 \text{ no.} = 37.4 \text{ sq.m}$

Staff Changing Room: $8.4 \times 5.9 = 49.6 \text{ sq.m}$

Janitor's Room: $5 \times 11.8 = 59 \text{ sq.m.}$ x 2 no. = 118 sq.m

Service Room: $5 \times 11.8 = 59 \text{ sq.m.}$ x 2 no. = 118 sq.m

Female Washroom: $6.7 \times 10 = 67 \text{ sq.m}$ x 4no. = 268 sq.m

Male Washroom: $6.7 \times 11.2 = 75 \text{ sq.m}$ x 4no. = 300 sq.m

Stall 1 : $4.7 \times 11.4 = 53.58 \text{ sq.m}$ x 2 no. = 107.2 sq.m

Stall 2 : $4.8 \times 22.2 = 106.6 \text{ sq.m}$

Stall 3 : $4.8 \times 14.4 = 69.12 \text{ sq.m}$

Commentary's Room : $8 \times 10.7 = 85.6 \text{ sq.m}$

Vip Spectator Room : $7.8 \times 8.1 = 63.2 \text{ sq.m}$

General Spectator's seating : $4500 \text{ no.} = 2000 \text{ sq.m.}$ (seating per person $= 0.5 \text{ m} \times 0.9 \text{ m} = 0.45 \text{ sq.m}$ approximately required)

5.4 GYM AND CAFETERIA BLOCK

Gym Hall : $28.5 \times 15 = 422.25$ sq.m

Cafeteria : $22.2 \times 17.3 = 384$ sq.m

Kitchen : $6 \times 7.8 = 46.8$ sq.m

Kitchen Store : $6 \times 6 = 36$ sq.m

Dish Washing Room : $3 \times 4.2 = 12.6$ sq.m

Equipment Store Room = $7.7 \times 7 = 53.9$ sq.m

Female Washroom + Shower and Locker Room: $7 \times 7 = 49$ sq.m

Male Washroom + Shower and Locker Room : $7 \times 7 = 49$ sq.m

5.5 BACKUP BUILDING

GROUND FLOOR PLAN

Electrical Panel Hub: $5.9 \times 11.9 = 70.2$ sq.m

Mechanical Panel Hub: $5.7 \times 11.9 = 67.8$ sq.m

Pumbling Panel Hub: $5.9 \times 11.9 = 70.2$ sq.m

Electrical Engineer Room: $3 \times 3.8 = 11.4$ sq.m

Mechanical Engineer Room: $3 \times 3.8 = 11.4$ sq.m

Pumbling Engineer Room: $4.2 \times 5.5 = 23.1$ sq.m

Washroom : $1.5 \times 1 = 1.5$ sq.m x 3 no. = 4.5 sq.m

FIRST FLOOR PLAN

Security Guard's Room: $5.9 \times 5.5 = 32.5$ sq.m

Custodian Room: $5.9 \times 6.1 = 36$ sq.m

Manager Room : $4.2 \times 5.5 = 23.1$ sq.m

Store Room: $3.1 \times 9.9 = 30.7$ sq.m

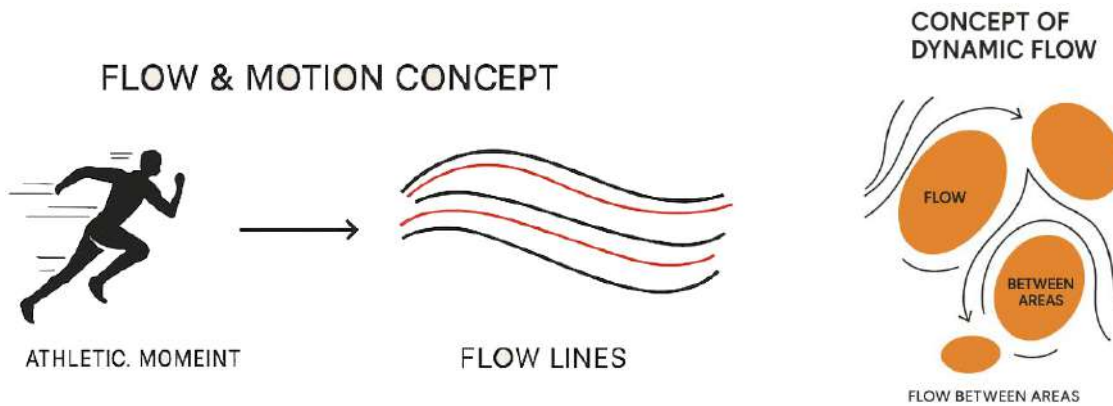
Kitchen : $5.9 \times 12.1 = 71.4$ sq.m

Washroom : $1.5 \times 1 = 1.5$ sq.m x 3 no. = 4.5 sq.m

CHAPTER 6: CONCEPT DEVELOPMENT

6.1 FLOW AND CONNECTIVITY

The idea is to create a dynamic, interconnected sports environment inspired by the movement of athletes and the fluidity of sports. The design will focus on seamless transitions, multi-functional spaces, and biophilic integration.



6.2 CONCEPT DEVELOPMENT STAGES

1. INSPIRATION & THEME

- Inspired by athletic movement, speed, and organic flow.
- Incorporating curves and angular forms to represent different sports dynamics.

2. ZONING & FUNCTIONALITY

- Dividing the complex into three main zones:
 1. Indoor Sports (basketball, badminton)
 2. Outdoor Sports
 3. Recreational & Support Areas (gym, lounges, cafes, spectator seating)
- Ensuring smooth circulation and connectivity between spaces.

3. FORM DEVELOPMENT

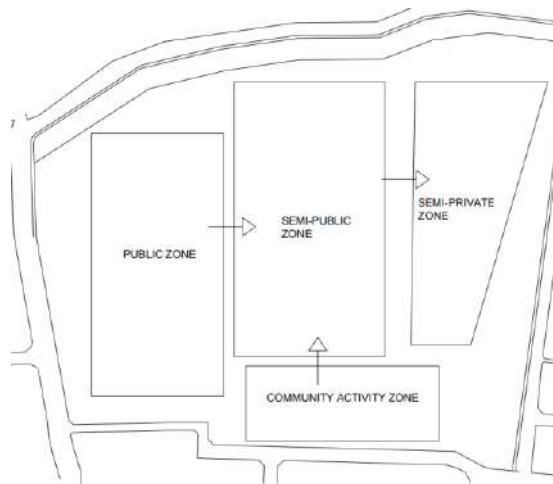
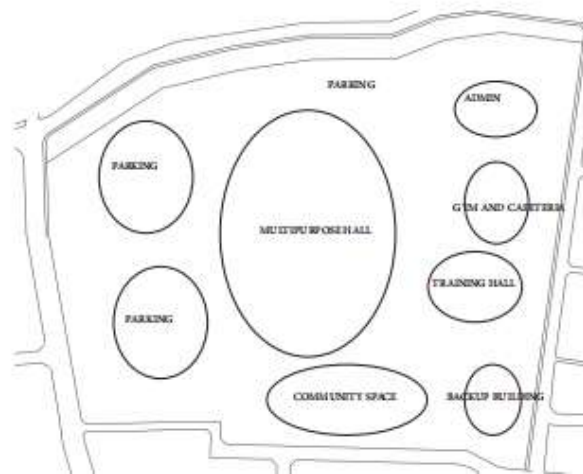
- Start with a rectangular grid for efficiency.
- Deform the grid using parametric curves to allow fluidity and organic flow.
- Use different levels and green terraces for better interaction and sustainability.

4. STRUCTURAL CONSIDERATIONS

- Lightweight tensile roof structures for large spans.
- Open facades for natural ventilation and daylight integration.
- Sustainable materials and green technology (solar panels, rainwater harvesting).

5. USER EXPERIENCE & ACCESSIBILITY

- Wide pedestrian-friendly walkways.
- Integration of universal design for inclusivity.



7.CONCLUSION

The proposal for an Sports Complex in Nepal addresses a critical need for modern, inclusive, and sustainable sports infrastructure that supports both professional and recreational activities. By bringing together a wide range of indoor and outdoor facilities designed with user comfort, community interaction, and environmental responsibility in mind the project aspires to become a model for future development in the country. It aims not only to enhance athletic performance and promote healthy lifestyles but also to foster community engagement, cultural expression, and urban revitalization. The complex is envisioned as more than just a sports venue; it is a social and recreational hub that reflects Nepal's growing aspirations in the fields of sports, wellness, and sustainable urban planning. Through thoughtful design, contextual relevance, and multifunctional use, the Integrated Sports Complex stands as a forward-thinking architectural response to the evolving needs of modern Nepal.

8. REFERENCES

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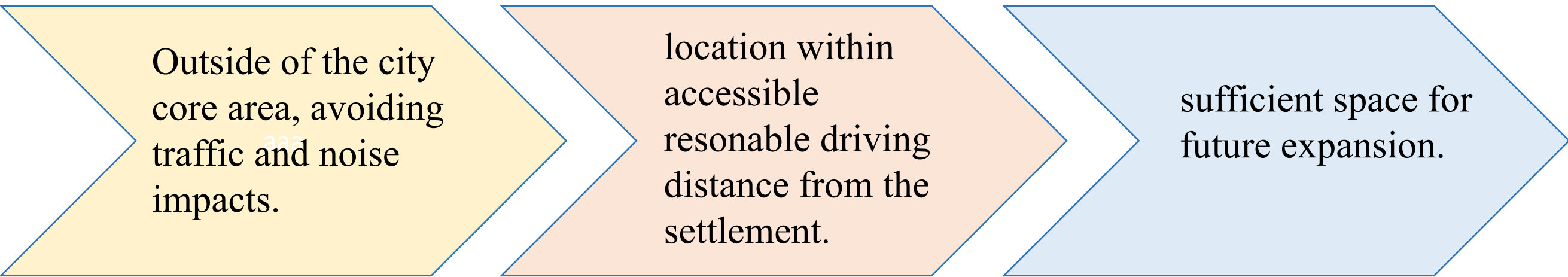
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ANNEX

INTEGRATED SPORTS COMPLEX

A sports complex is a multi-functional facility designed to accommodate various athletic, recreational, and community activities.

LOCATION OF THE SITE



FUNCTION OF SPORTS COMPLEX

A sports complex serves multiple purposes, catering to athletes, fitness enthusiasts, spectators, and communities. Here are its key functions:

1. Hosting Sporting Events
2. Training & Coaching Facilities
3. Promoting Health & Fitness
4. Community & Recreational Use
5. Economic & Tourism Development
6. Multi-Purpose Event Hosting
7. Rehabilitation & Therapy
8. Infrastructure & Urban Development

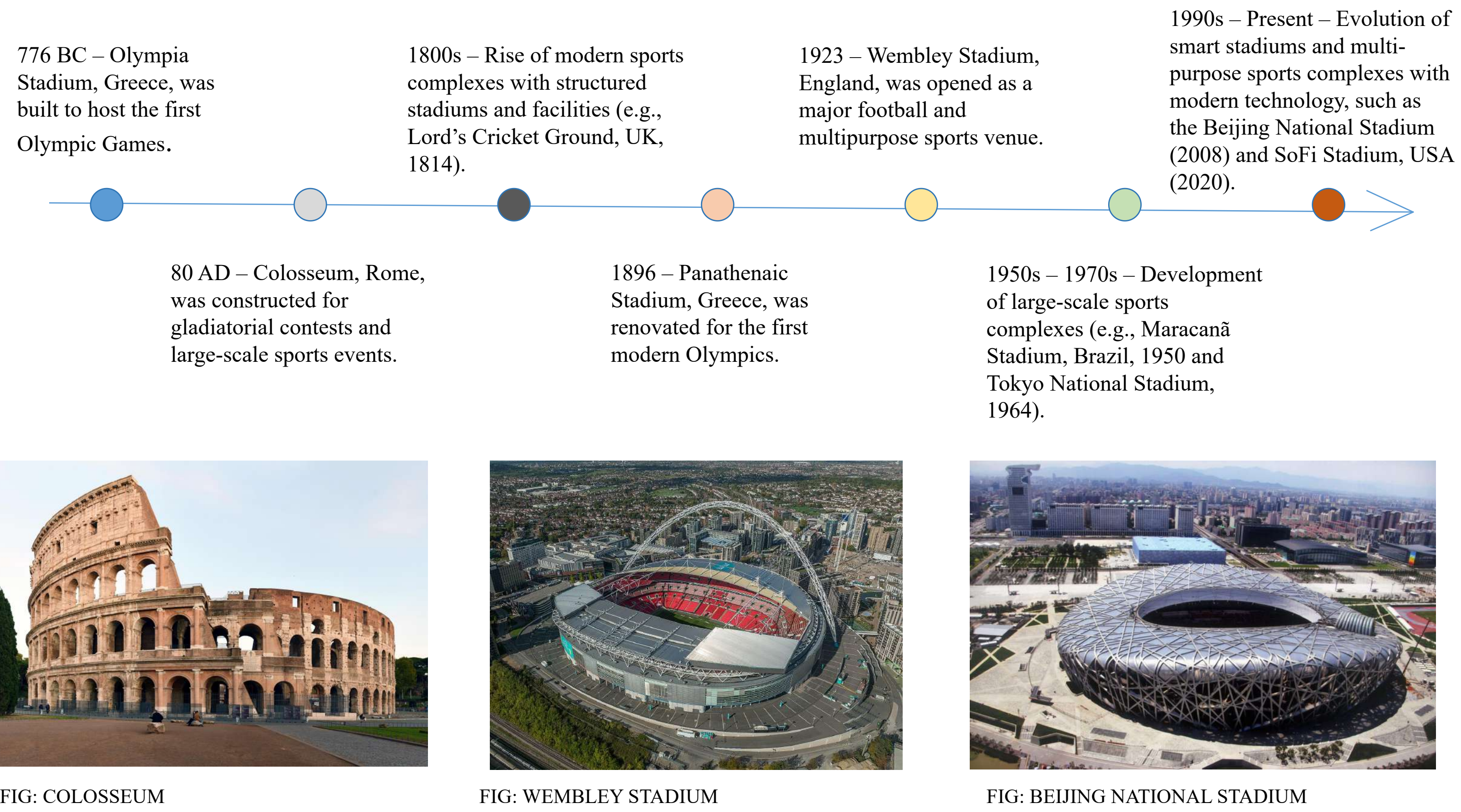


Xiangyang National Sports Center

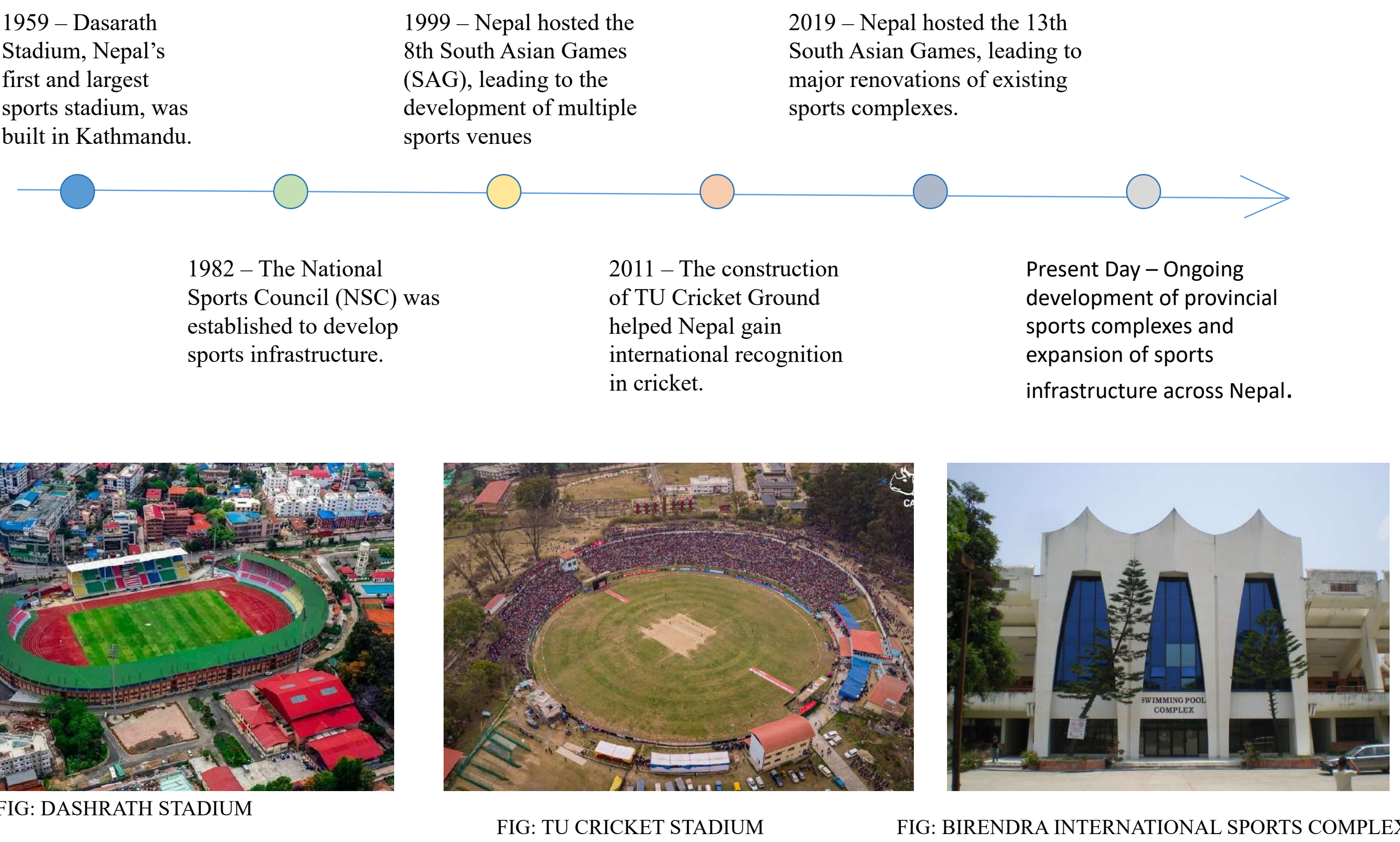
INFLUENCE OF SPORTS IN HUMAN SOCIETY

- It teaches us to make a difference in the world on a daily basis, sports have a particular place in human civilization.
- Integrity and morality are two values that may be learned via participation in sports.
- Sports may transform the foundation of human civilization by teaching a variety of crucial values.
- Participating in sports teaches people that social, political, and ethnic barriers do not exist.
- Sports are important on a personal level because they motivate people to maintain a healthy level of activity.
- Sports are essential for boosting a country's economy.
- The world of sports plays a significant role in building a healthier society by bringing people from all walks of life together.

HISTORY OF SPORTS COMPLEX IN GLOBAL CONTEXT



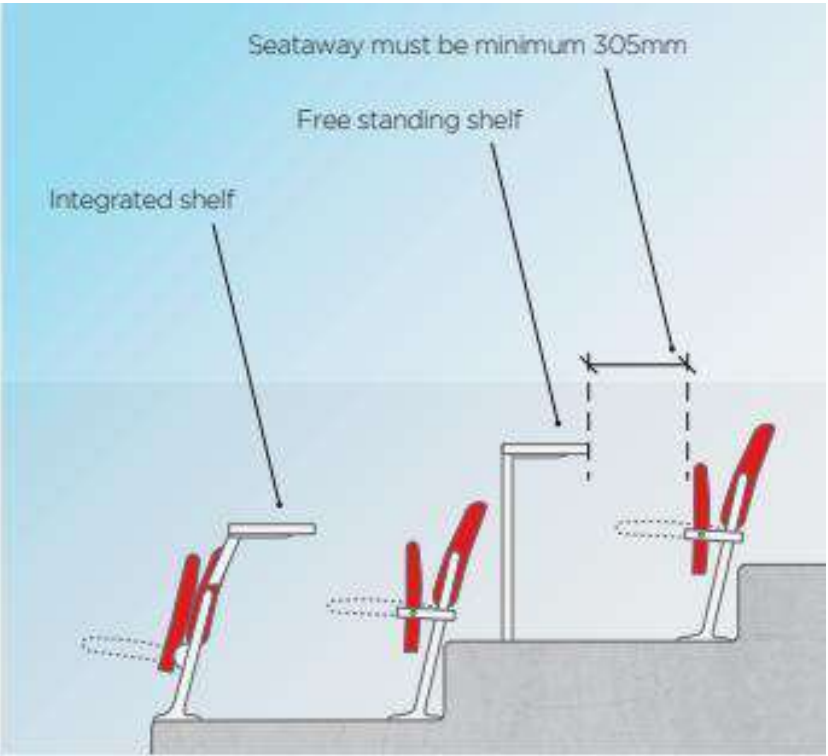
HISTORY OF SPORTS COMPLEX IN CONTEXT OF NEPAL



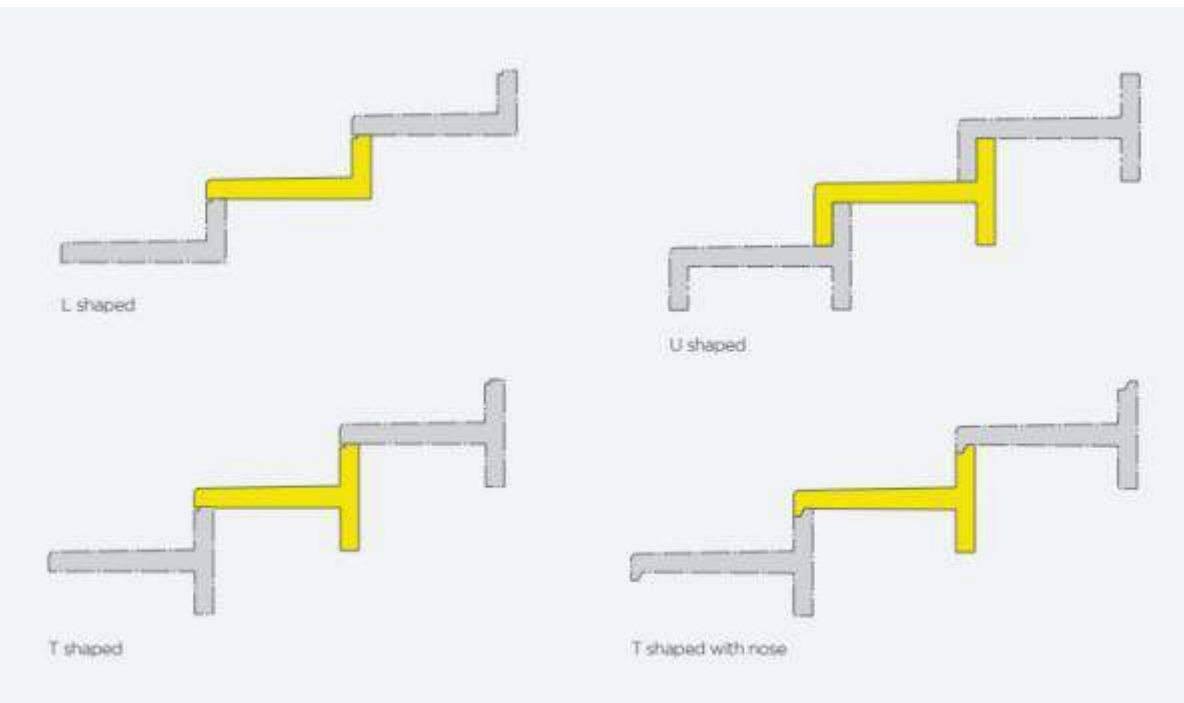
INTEGRATED SPORTS COMPLEX

SEATING AND VIEWING PARAMETERS

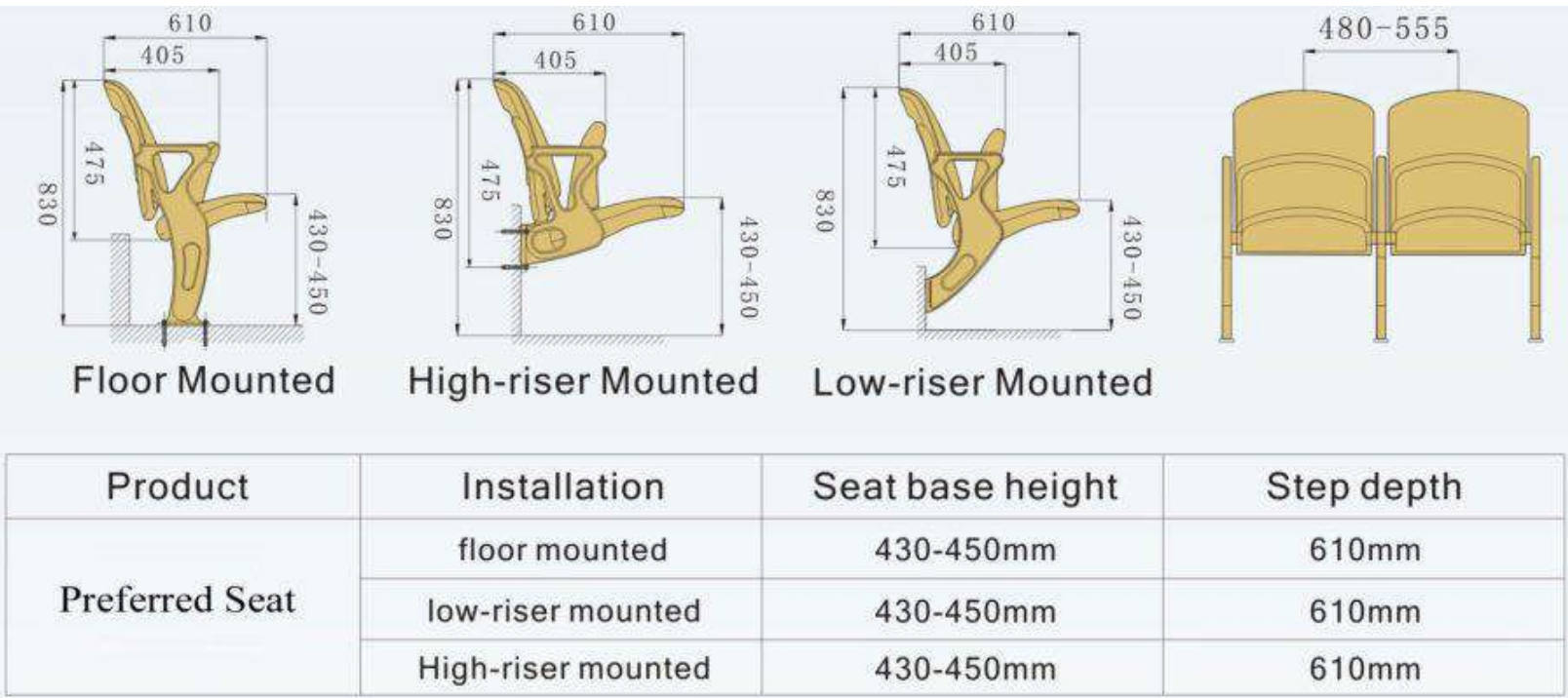
- Seat width: 450–550mm (18–22 inches) per person.
- Seat depth: 430–500mm (17–20 inches), ensuring sufficient legroom.
- Seat height from floor: 430–460mm (17–18 inches), allowing easy sitting and standing.
- Armrest width: 50–75mm (2–3 inches), if included.
- Row spacing (Seat-to-seat distance):
 - 800–1000mm (31–39 inches) in VIP or luxury seating.
 - 750–850mm (29–33 inches) in standard seating.
 - 700–750mm (27–29 inches) in economy or compact seating.
- 1.2–1.5m (4–5 feet) for major walkways.
- 900mm (3 feet) for secondary aisles.



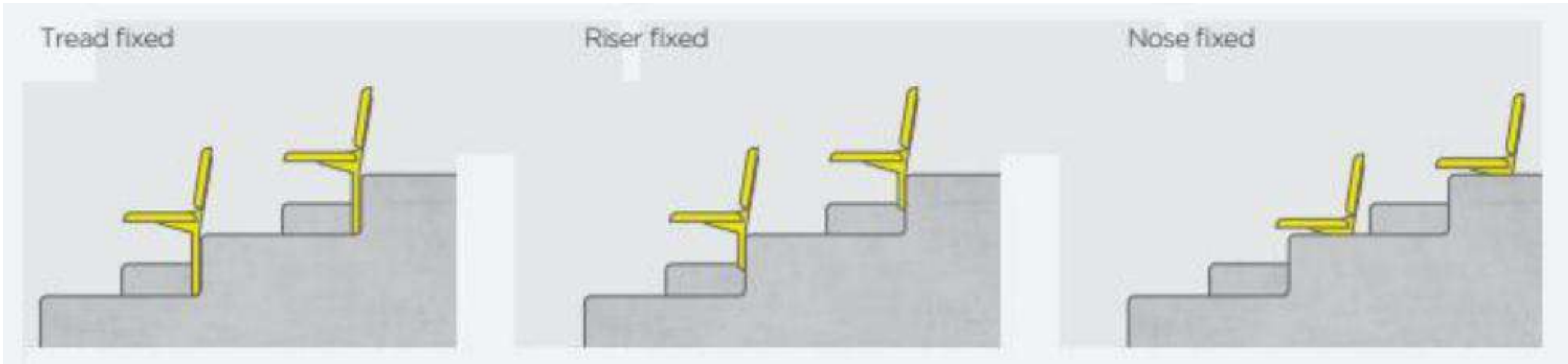
Seats way dimensions



Structures of steps



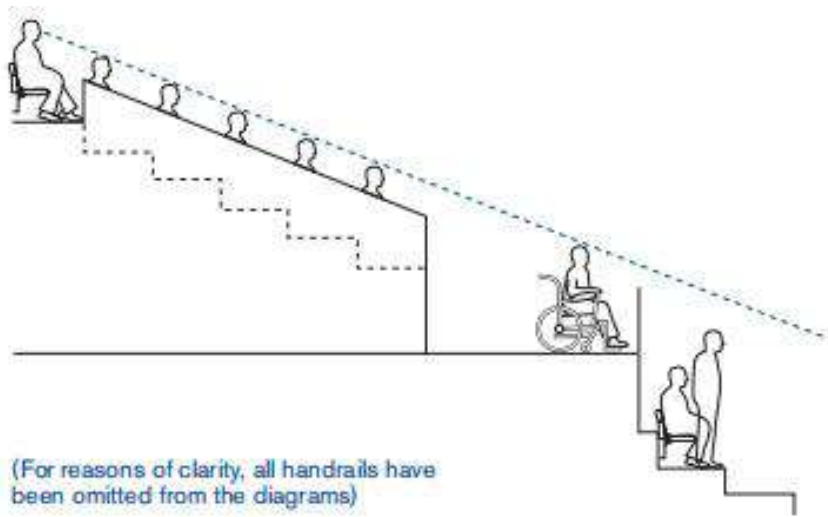
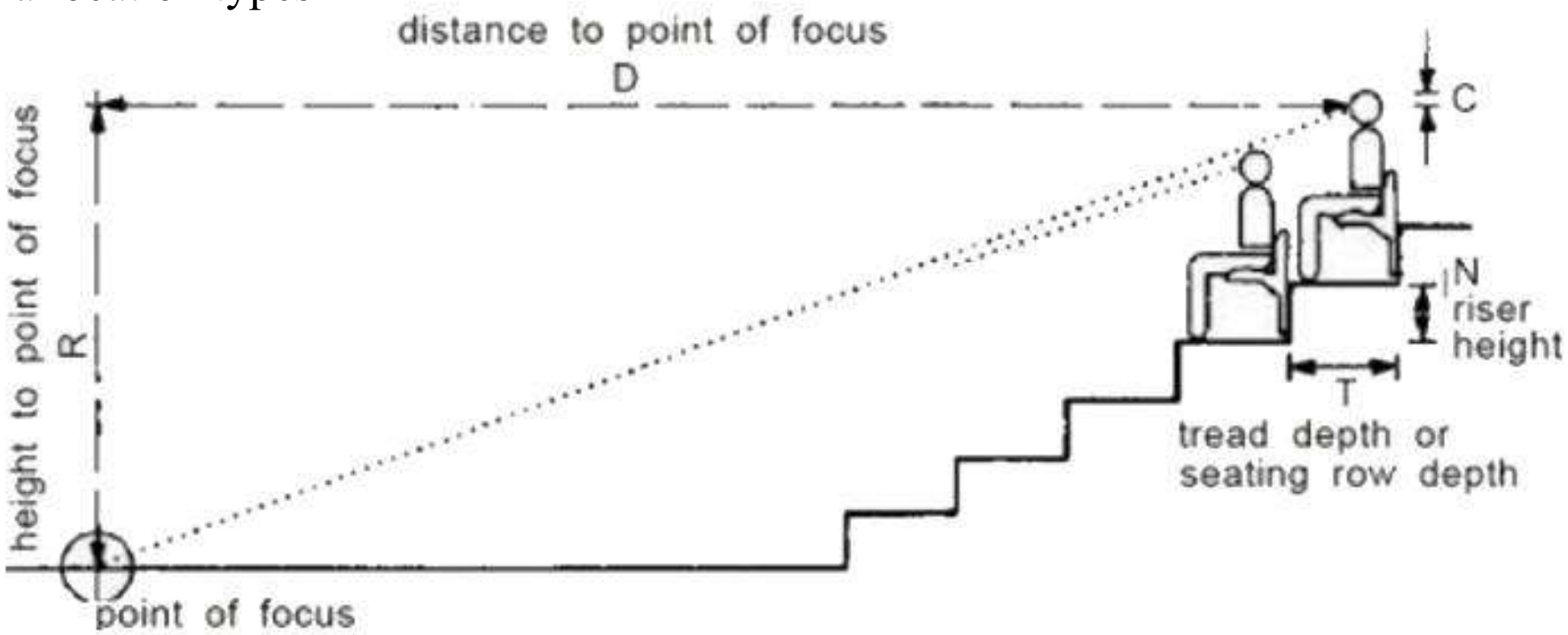
Types of seating



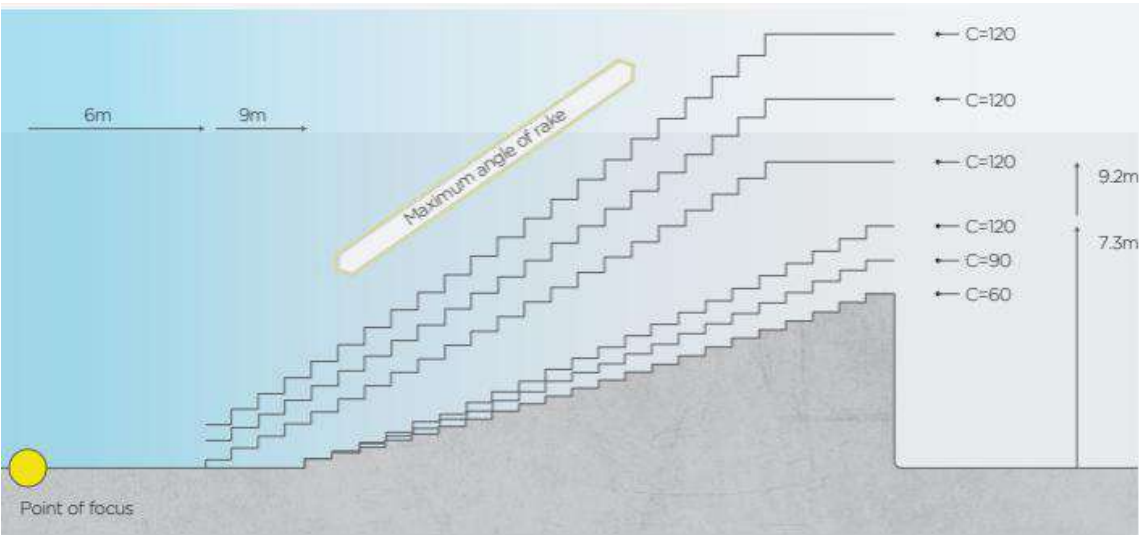
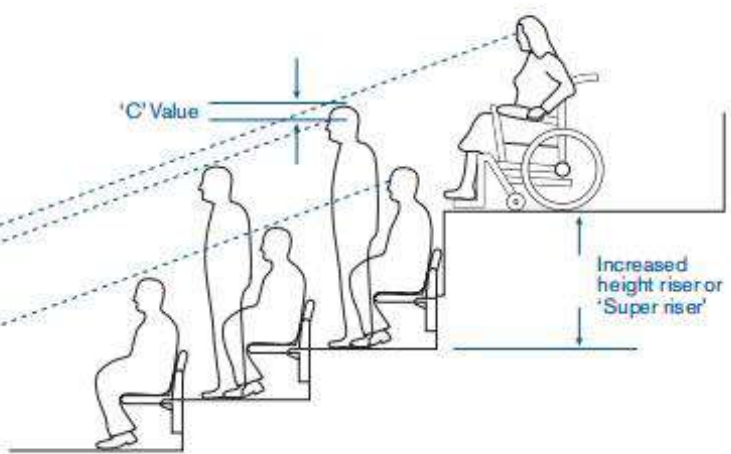
chairs allocation types

$$\text{RISER HEIGHTS(N)} = \frac{(R+C) \times (D+T)}{D} - R$$

Where, N= riser height
R= height between eye and point of focus
C= viewing standard (C-value)
D= distance from eye to point of focus
T= tread depth,i.e. depth of seating row



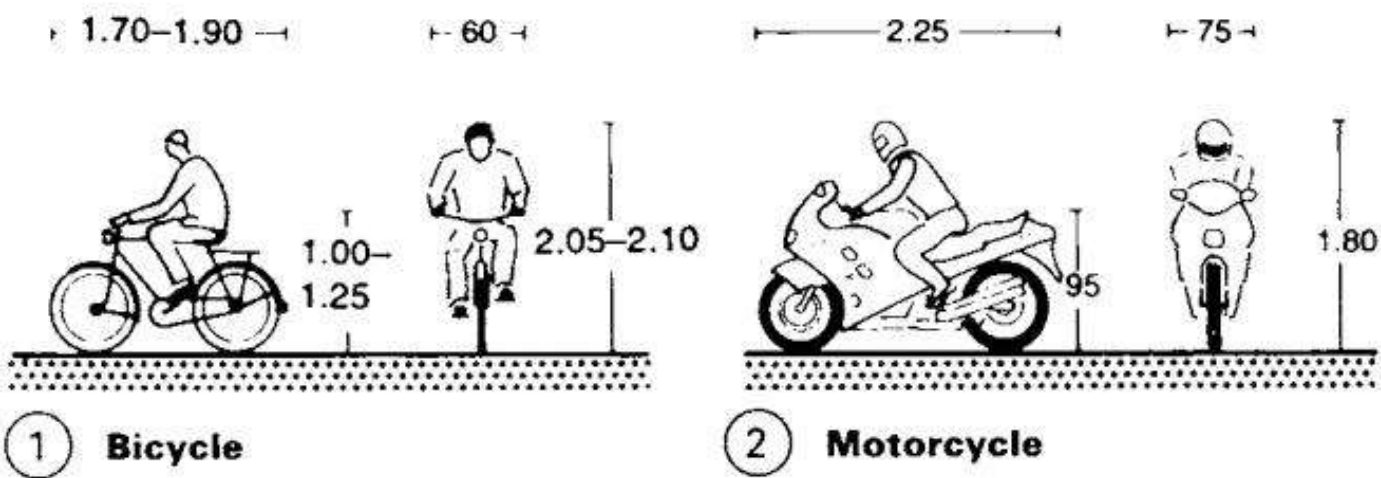
Disabled person seating and viewing angles



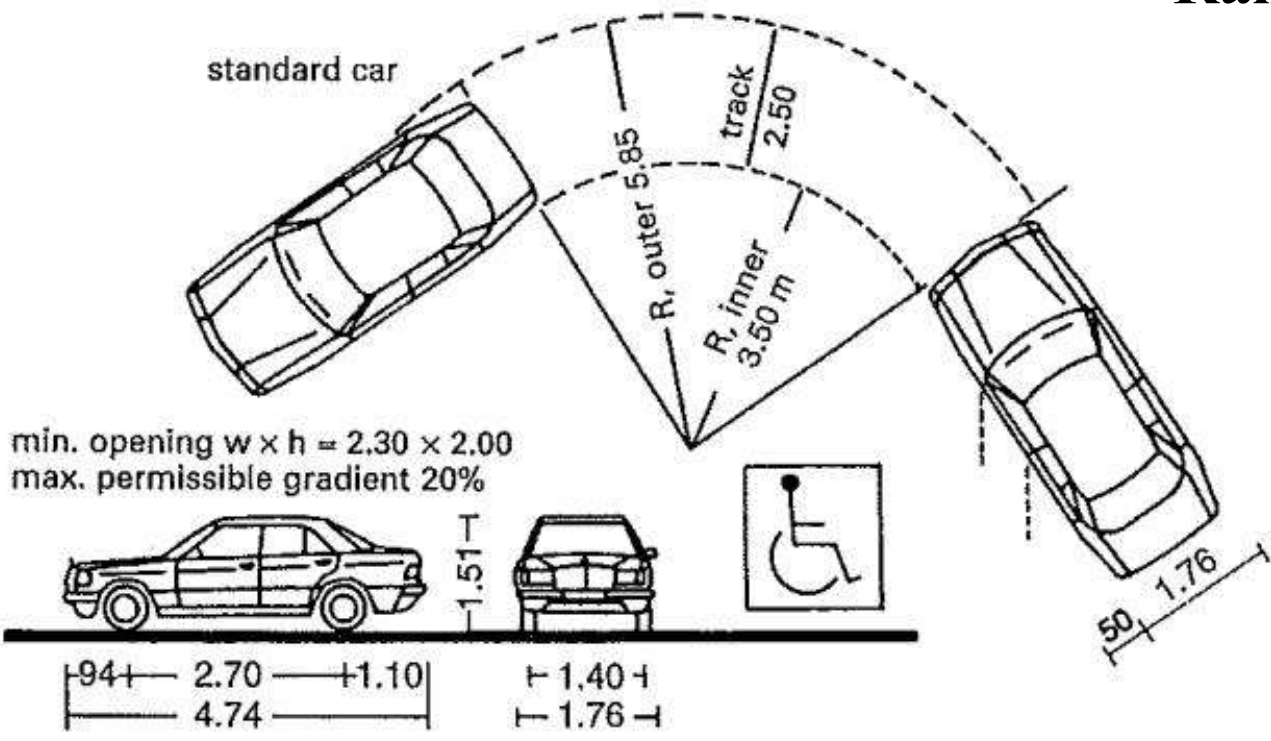
C-value angles and slopes of stairs

PARKING

- **For Changing Rooms:** One parking space (for car or bike) is required for every 5-10 changing rooms.
- **For Spectators:** One parking space (for car or bike) is needed for every 10-15 spectators.
- **Bicycle space required:** 2.05-2.1m
- **Motorcycle space required :**2.25m
- **Car width (minimum):**2.3-2.8m



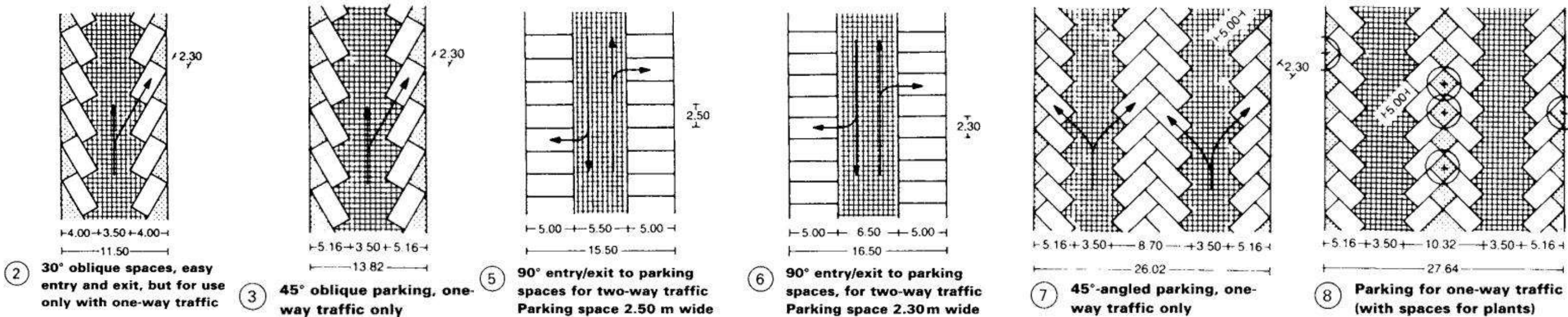
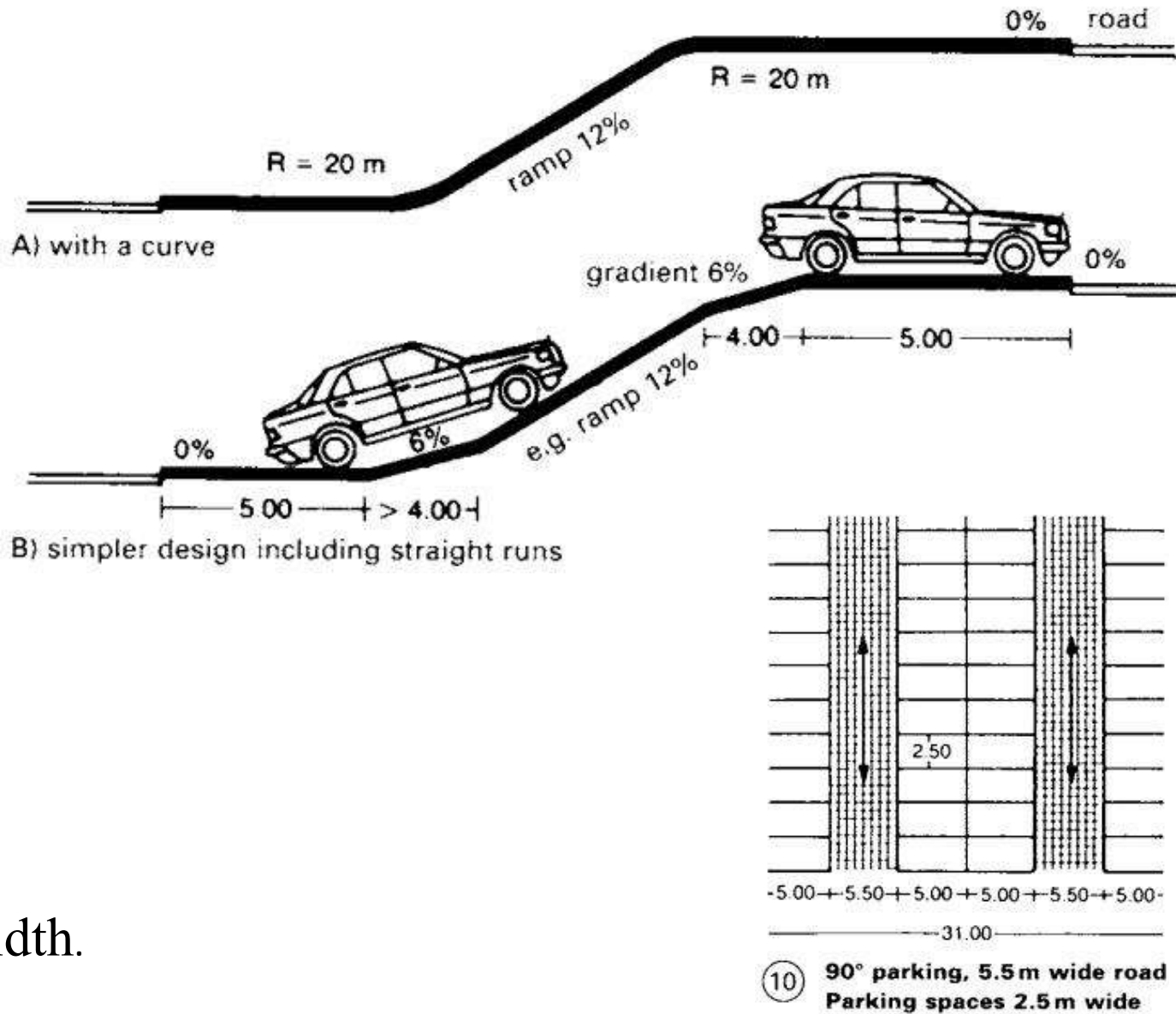
Curved road design:Minimum radius: 20 meters
Smooth transition for vehicles.
Ramp slope design: Slope inclination: 12%
Gradient varies from 6% to 12%.
Ensures smooth vehicle movement on inclines.



WAYS OF PARKING

Different parking layouts with road widths:

- Angled parking (45° & 60°): 13.60 meters wide roads.
- Perpendicular parking (90°): 16.50 meters wide roads.
- Straight parking with divider: 10-16.50 meters road width.



RESTROOM

- 0.01 per visitors
 - 40% for women
 - 20% for men
 - 40% urinals
- 2 WC (woman) & 1WC + 1 urinal (man)
=200 spectators
2 WC (woman) & 1WC + 2 urinal (man)
=Further 100 additions

Exit, Escape routes: 1m side per 150 people (minimum width 0.8m)

CHANGING ROOM AND LOCKER

Ratio up to 1:8
For disable people - 10%
Changing room size -1x1.25 sq m
1x2 sq m (wheelchair user)
2 ladder at distance 23m
One Lifeguard chair per 186 sq m

1. DASHRATH RANGASALA

1.GENERAL INFORMATION

Location : Tripureshwor, Kathmandu, Nepal

Type: National Stadium

Built : 2026 BS – 2034 BS

Renovation : By N.Sangache in 1997 for 1999 SAF games and 2017

Area = 110 ropani

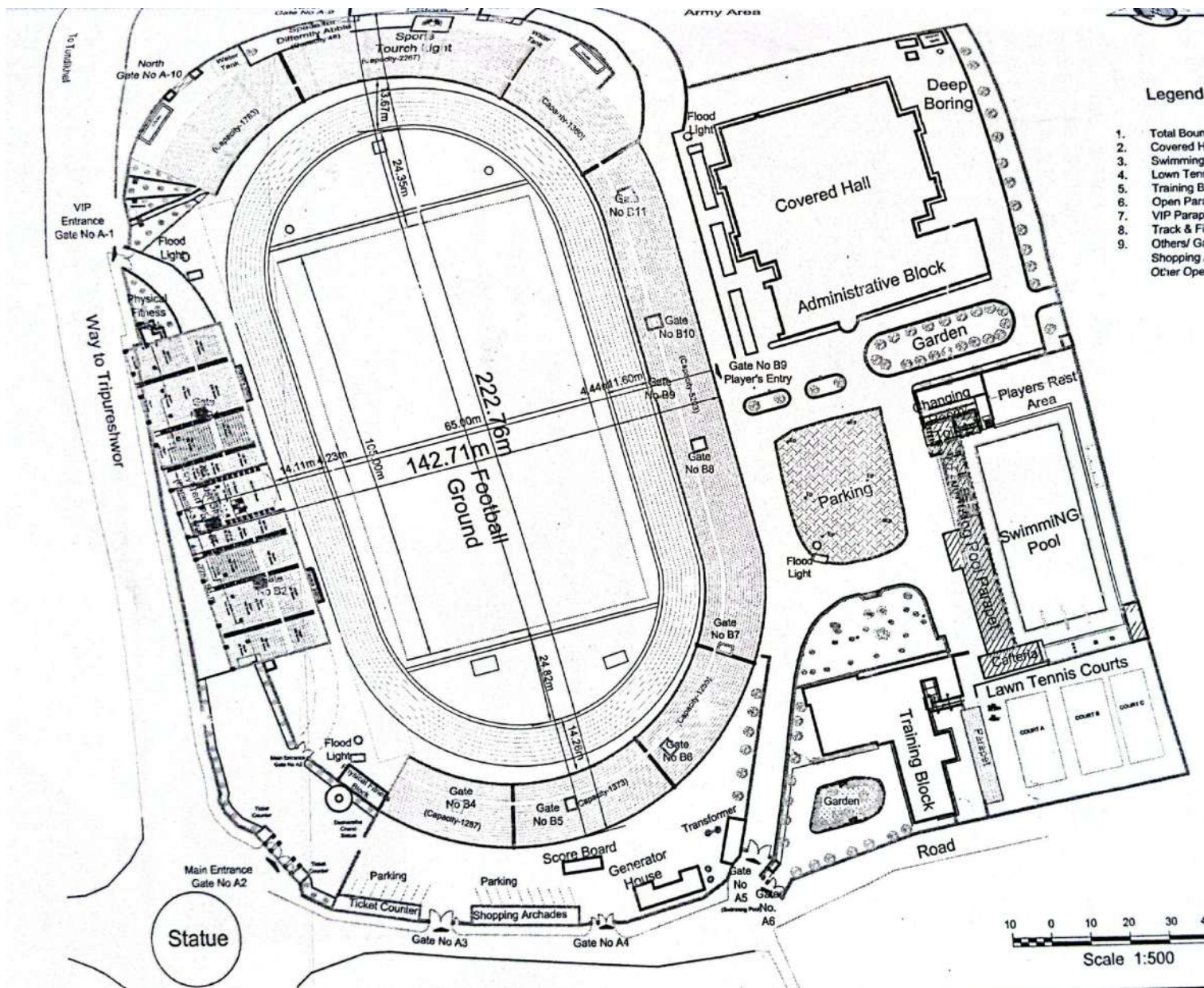


- first biggest complex in Nepal with 20,000 spectator capacity football stadium
- was constructed in 2026B.S
- football stadium was designed by **Er. Bhuwaneshwor Lal Shrestha** and the covered hall, swimming complex and the tennis courts were designed by **Ar. Ganga Dhar Bhatta**

2. MASTER PLAN & ZONING

➤Dasarath Stadium incorporates four major arenas

- The main stadium
- The covered hall
- The swimming pool
- Tennis courts.
- Basketball Court



The covered hall

- It includes :
 - Multi purpose hall
 - Admin block of nepal sports council.
- located at the north – east of the stadium complex
- plan of the hall is simple and symmetrical. It contains indoor hall and designed by Ar. Ganga Dhar Bhatta of wooden floor (25 x 35 sq.m.) for a multipurpose event
- Indoor hall consists of a basketball, volleyball and 3 badminton courts and also used for martial art tournament.
- general stand has a capacity of housing 1000 spectators and 50 VIP which is not sufficient for the international competition.



LIGHTING IN COVERED HALL

- Ribbon windows are provided on the longitudinal wall of the hall, but they are mostly covered because of glare.
- The source of natural lighting is through the transparent sheets used on roof.
- The corridor of covered hall are 2m width.
- The ramp is provided to the main court .



OUTDOOR FACILITIES

The parking area seperated is being used as space for organizing small events.

The 8m road is provided around the main stadium accessing different entry gates to stadium.

The basketball court is provided next to covered , swimmin pool at eastern side of complex and a tennis court.



Swimming pool

- Outdoor swimming pool is located at the eastern part of the complex
- Swimming pool is of international size 25m x 50m with seating parapet on western side of about 500 spectators capacity

Tennis Court

- tennis court are located at the south – east corner of the complex.
- Orientation is along the north- south axis.
- There are three clay courts with 3m clearance around the court.
- Provision of parapet on western part of about 300 spectator’s capacity, which is not enough for international matches.
- Orientation of the parapet is facing east so the heavy west sun is at the back of the spectators.

2.SAN WAYAO COMMUNITY SPORTS CENTER

1.GENERAL INFORMATION

Location: Chengdu Shi, China
Architects: CSWADI
Area: 11936 m²
Year: 2015

The San Wayao Community Sports Center, designed by CSWADI and completed in 2015, is located in the DongYuan residential district of Chengdu, China. This facility was developed to provide a communal space for residents of all ages, integrating various sports and recreational amenities within a densely populated urban area.



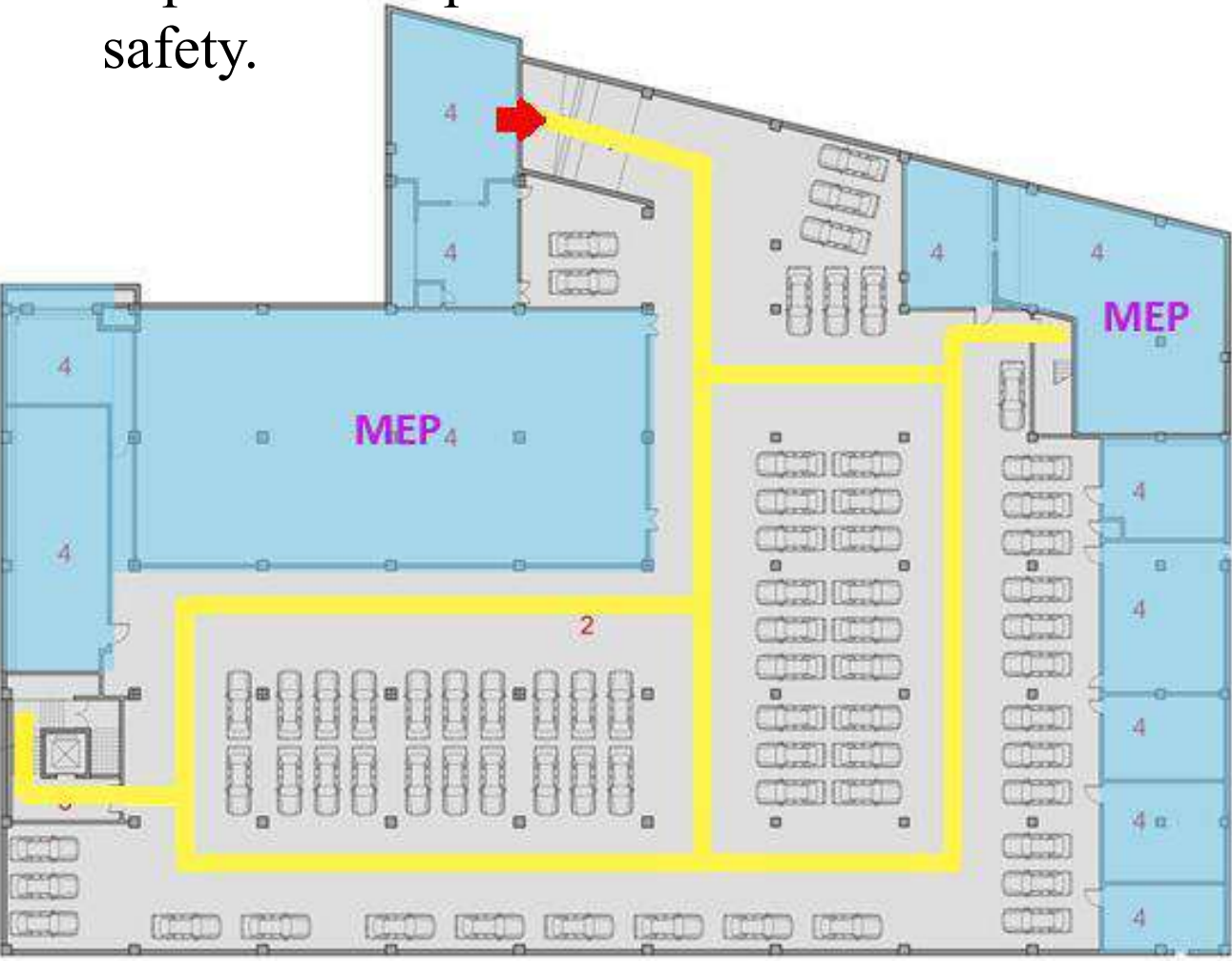
2.CONCEPT

The San Wayao Community Sports Center in Chengdu, China, is designed with the concept of integration, accessibility, and multi-functionality, aimed at fostering an active and healthy lifestyle for residents..

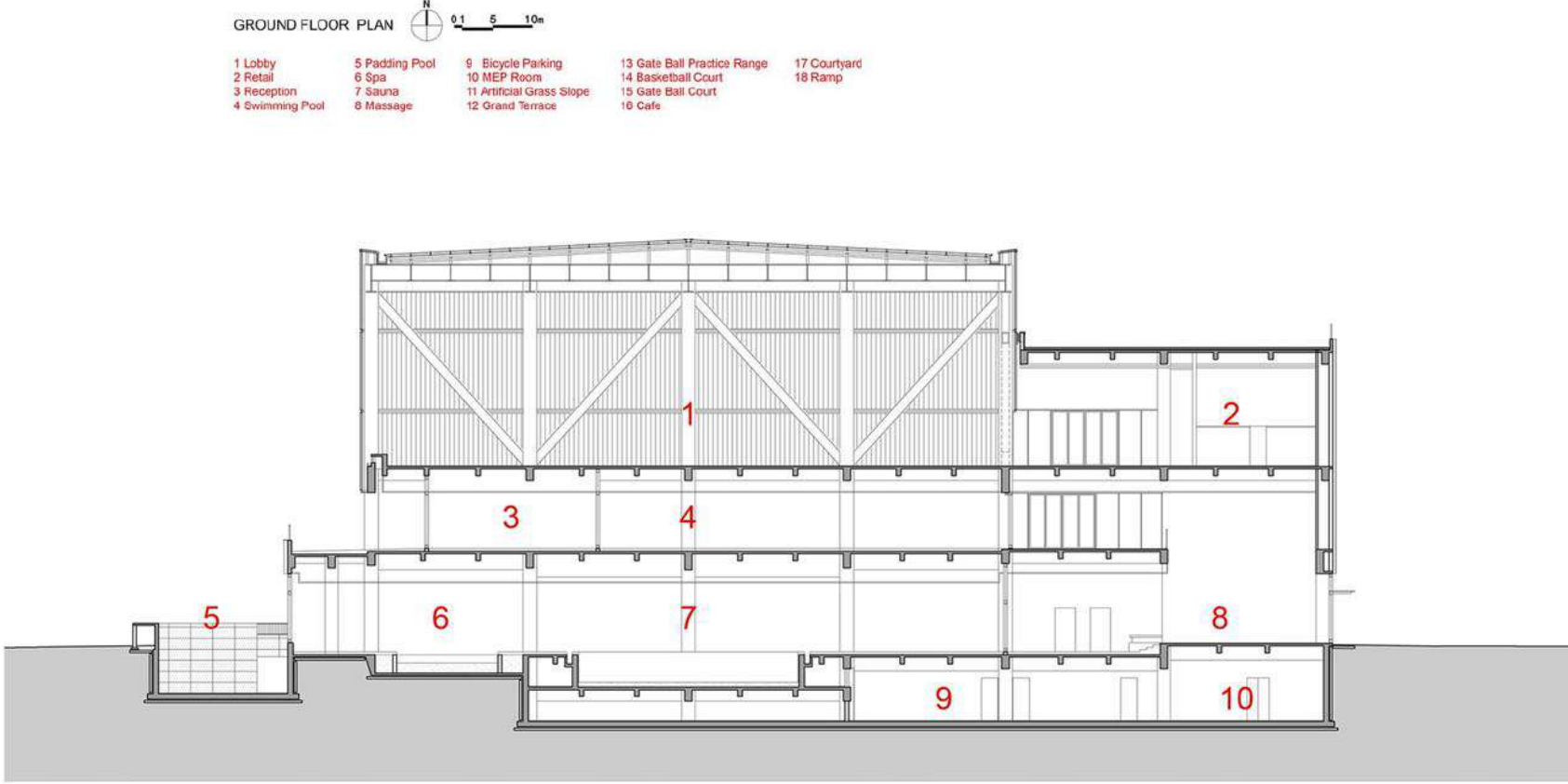
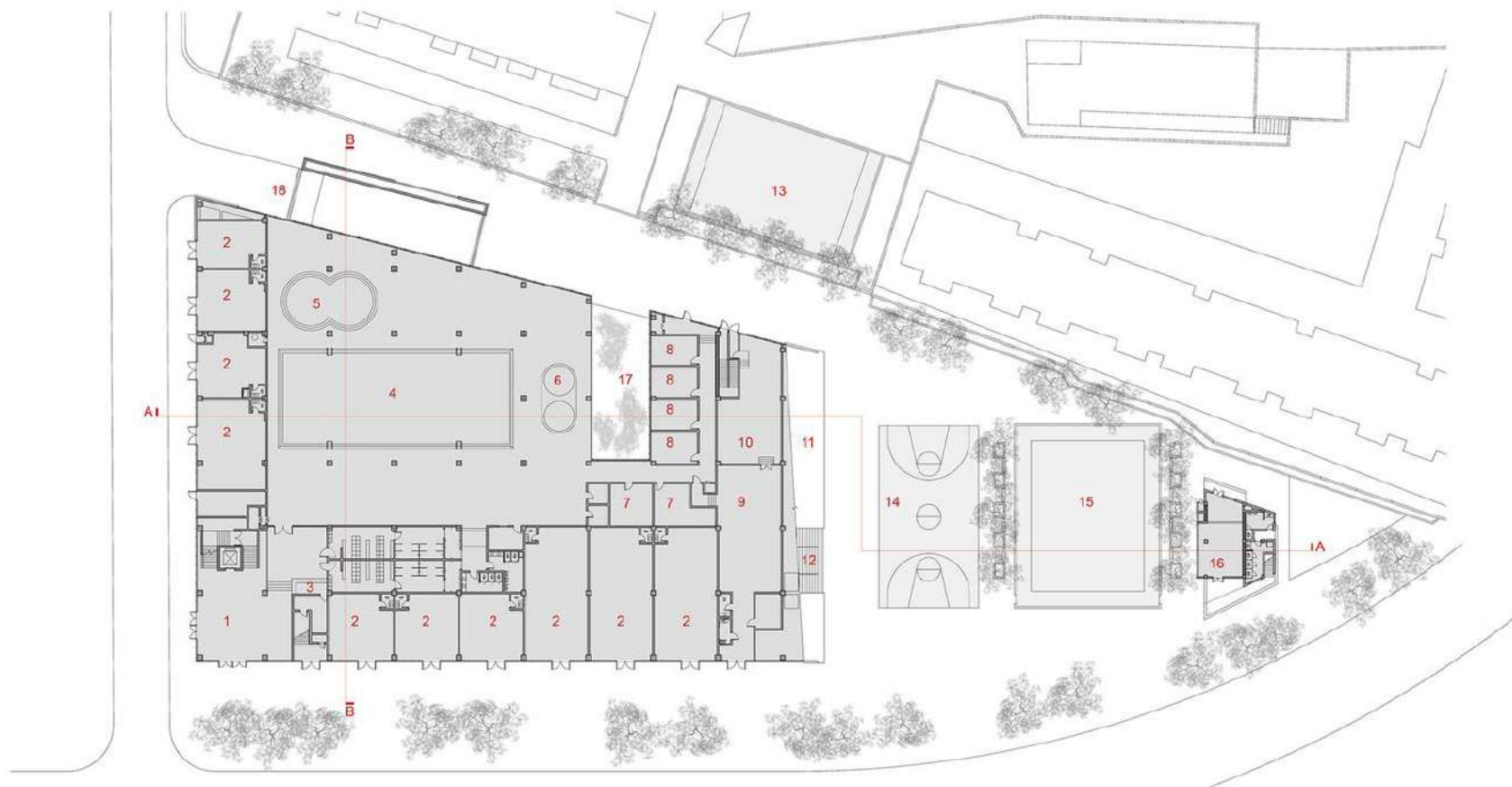
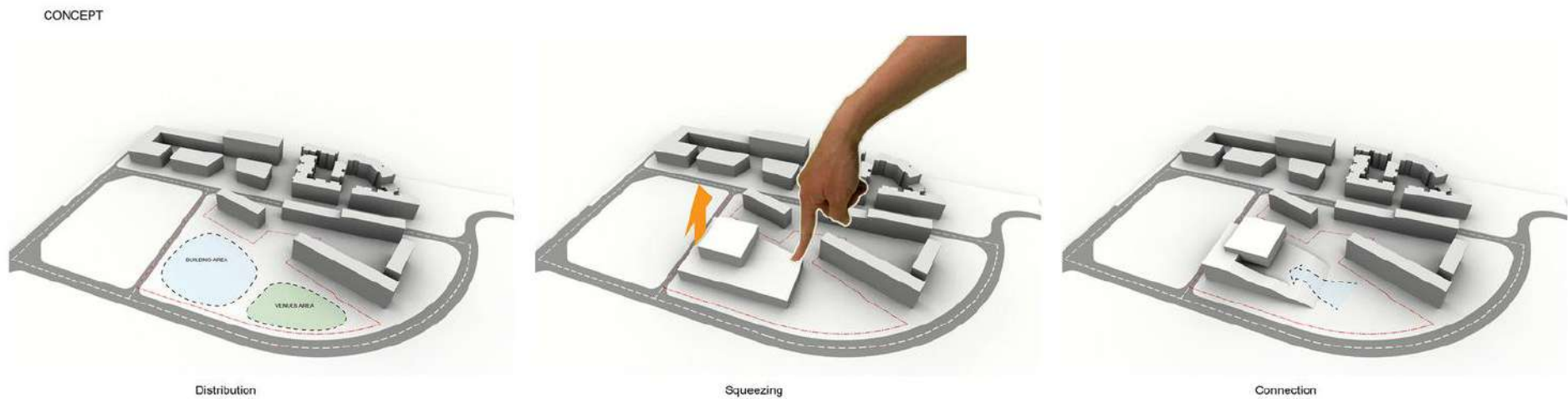
Its innovative use of space fosters an inclusive and dynamic urban lifestyle, making it a model for future community sports centers.

3.CIRCULATION

- Universal accessibility – ramps, elevators, and wide pathways for people with disabilities.
- Clear wayfinding – well-marked routes, signage, and directories for ease of movement.
- Emergency exits and fire safety routes – integrated for quick evacuation.
- Separation of pedestrian and vehicular movement to ensure safety.



BASEMENT FLOOR PLAN
1 Ramp
2 Car Parking
3 Lobby
4 MEP Room
SERVICE AREA
CIRCULATION



SECTION B-B
1 Badminton Hall
2 Squash Room
3 Gym
4 Table Tennis
5 Ramp
6 Padding Pool
7 Swimming Pool
8 Lobby
9 Car Parking
10 MEP Room

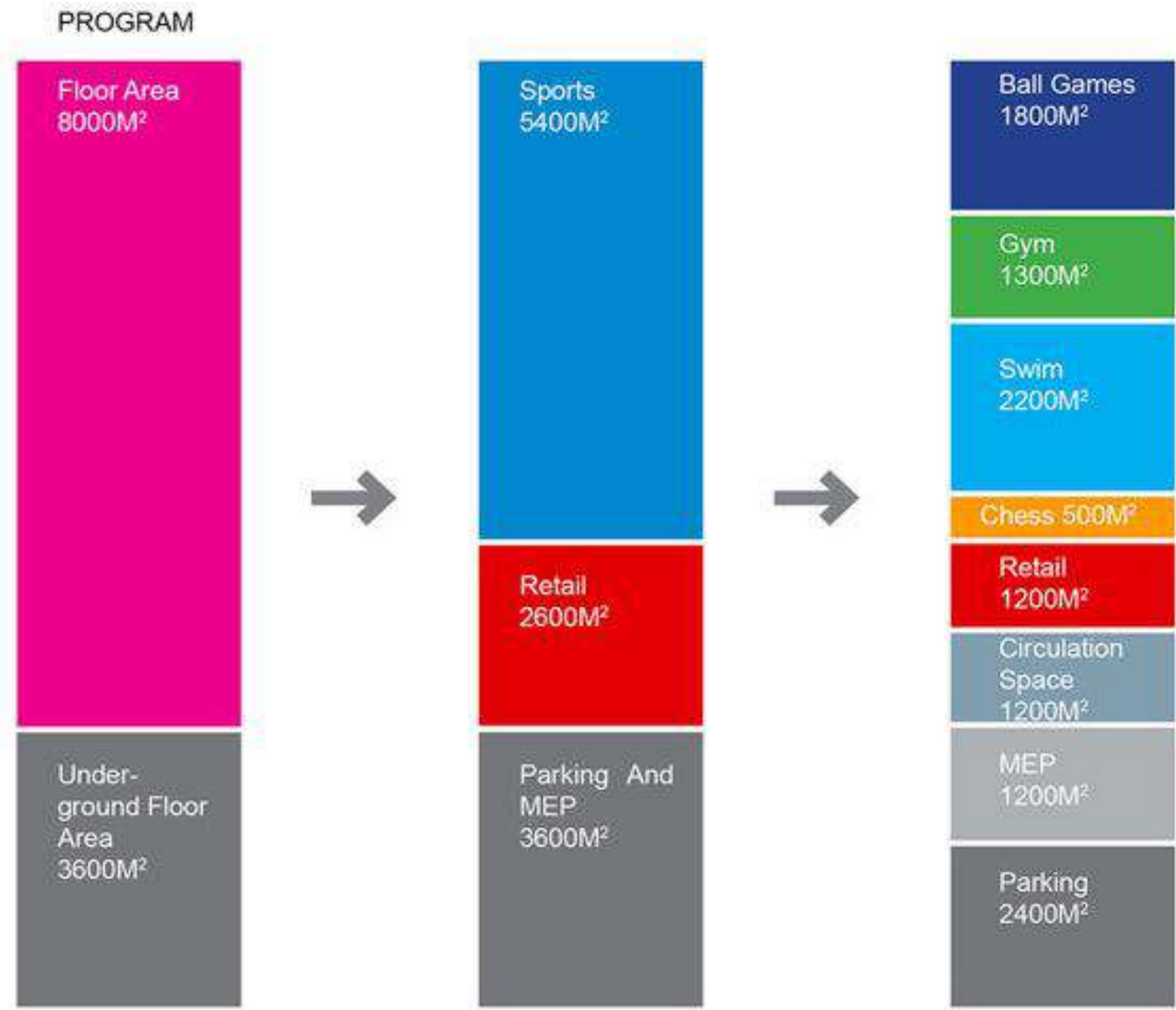
4.AREA DIVISION AND ZONING

INDOOR

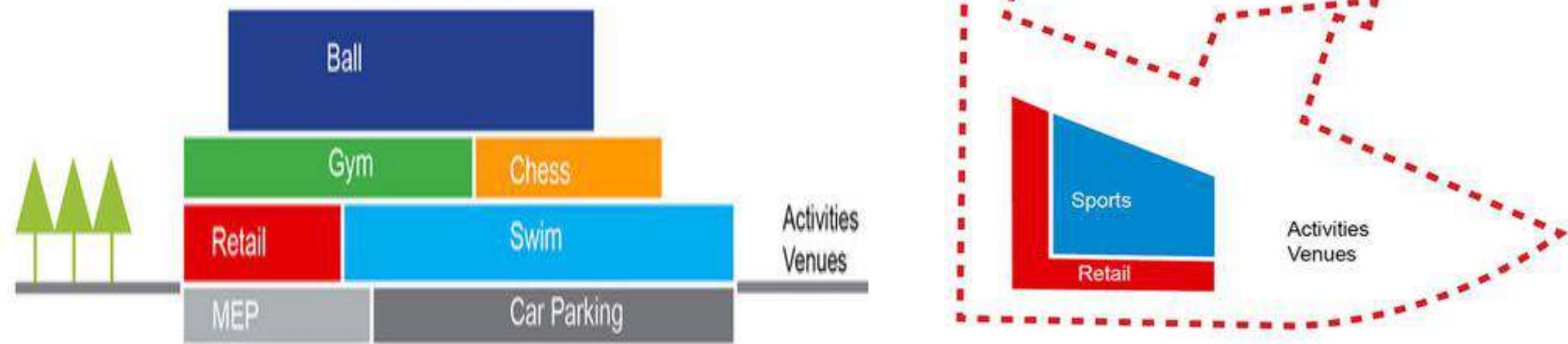
Swimming Pool
Spa
Table tennis
Badminton
Court
Gym
BilliardsTable
Squash
Chess and
cards

OUTDOOR

Basketball Court
Gate ball court
Café/Staff dorm



SECTION DIAGRAM



5.ROOF AND STRUCTURE

- It's a frame structure building.
- Roof span of multifunctional arena is (8 court hall) 24m*22m made up of steel I beam which is further supported by steal columns.
- In the corner of the arena, batter posts replace upright posts in structure which makes the building a floating glow box as a unique sight in community.



3. RAVENSCRAIG REGIONAL SPORTS FACILITY

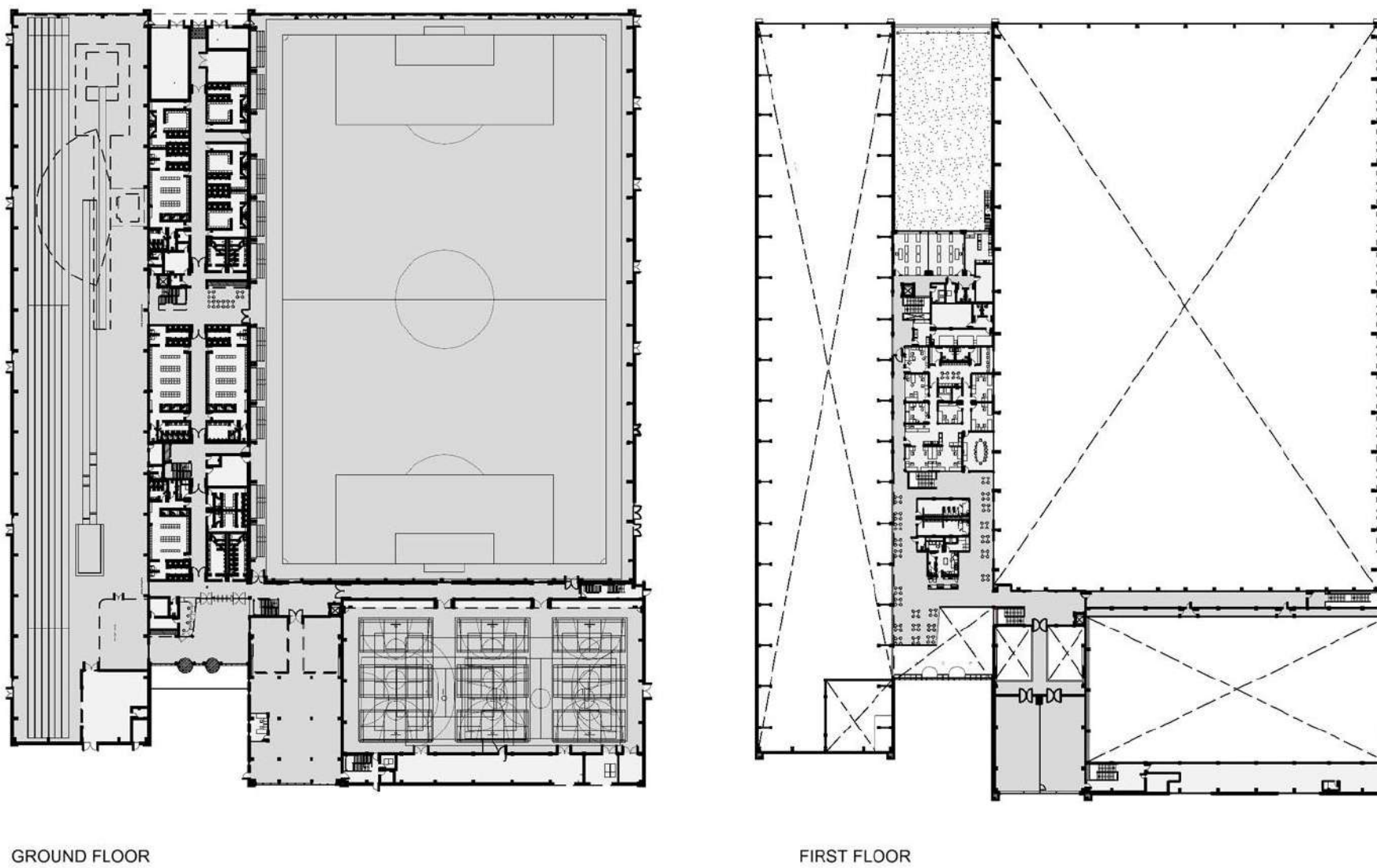
1.GENERAL INFORMATION

Architects: Populous
Location: Ravenscraig, Motherwell, UK
Engineering: Buro Happold (structural, civil, mechanical, electrical and public health services)
Client: North Lanarkshire Council / Sportscotland / Ravenscraig Ltd / Motherwell College
Total Cost: £31.3 million
Completion Date: Autumn 2010

2.CONCEPT

The Ravenscraig Regional Sports Facility (RRSF) was designed with a multi-functional, community-oriented, and sustainable concept, integrating elite sports training with public accessibility. The key conceptual aspects include:

- Urban Regeneration: Transforms the former Ravenscraig Steelworks into a modern sports hub.
- Multi-Functional Design: Combines elite sports training with community recreation.
- Indoor-Outdoor Integration: Provides year-round access to diverse sports facilities.
- Sustainability Focus:
 - Natural daylight & ventilation to reduce energy use.
 - Rainwater harvesting & LED lighting for efficiency.
- Flexible & Adaptive Spaces:
 - Can host sports competitions, fitness programs, and public events.



3.ROOF AND STRUCTURE

1. Roof Design

Lightweight, long-span steel roof to accommodate large indoor spaces.
Curved and aerodynamic form for structural efficiency and aesthetic appeal.
Large skylights and translucent panels integrated for natural daylighting.
Weather-resistant materials to withstand Scotland's climate.

2. Structural System

Steel frame construction with large-span trusses for column-free interiors.
Precast concrete elements for durability and stability.
High-strength tensile roof supports to reduce structural load.
Sustainable insulation materials to enhance energy efficiency.



4.CIRCULATION

- Separate access points for athletes, spectators, and staff.
- Wide corridors and open layouts for ease of movement.
- Wheelchair-accessible pathways, ramps, and elevators for universal accessibility.
- Parking zones for visitors, teams, and officials.

5. MATERIAL

Steel Cladding: Provides a modern industrial aesthetic, referencing the site's steelworks history.

Glass Facades & Curtain Walls:
Maximizes natural daylight for energy efficiency.
Enhances visual transparency between indoor and outdoor spaces.

Precast Concrete Panels: Used for structural durability and weather resistance.

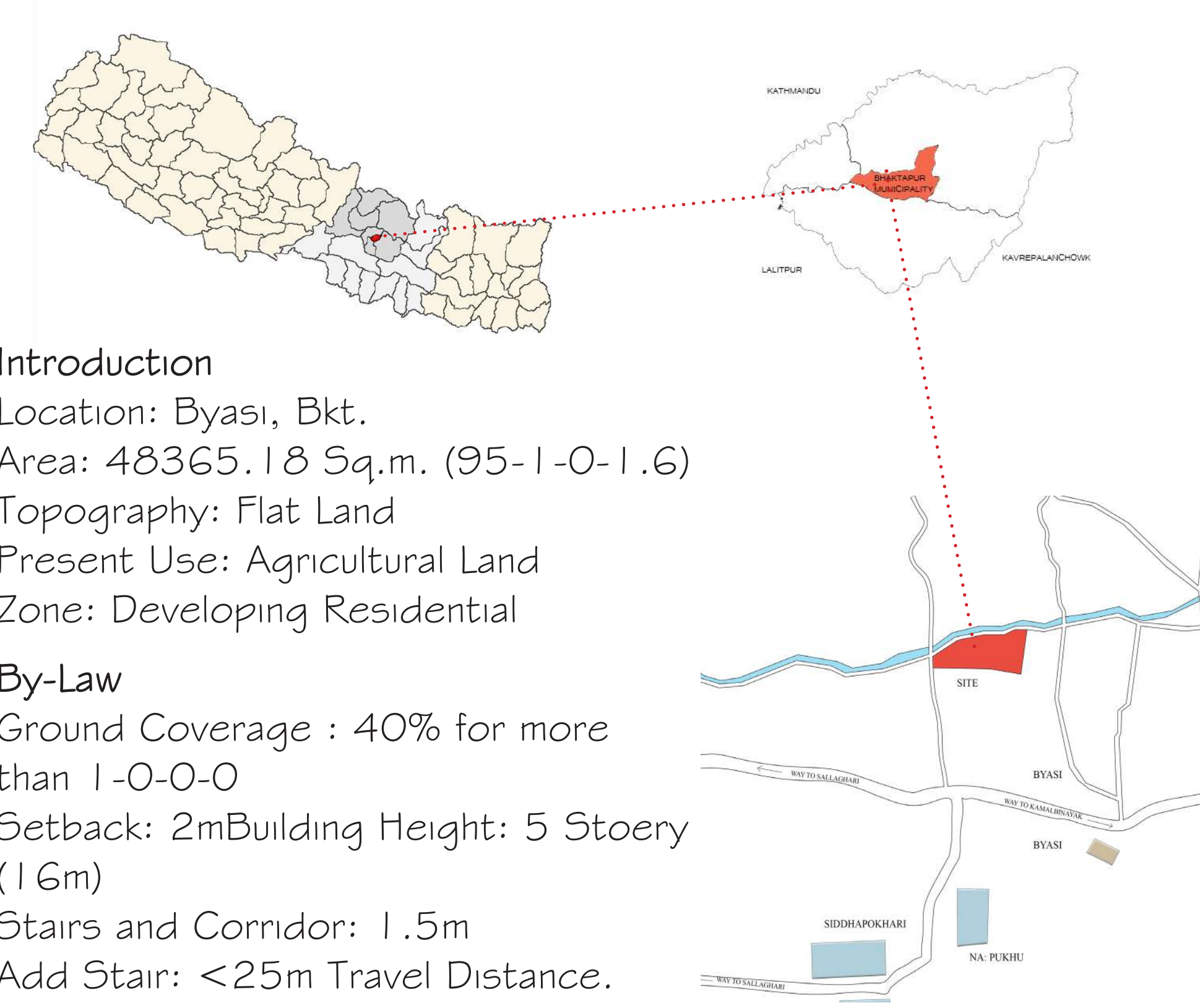
Aluminum Composite Panels: Lightweight, corrosion-resistant, and adds a sleek finish.

Polycarbonate Panels: Used in some areas for translucency, allowing diffused natural light inside.



SITE ANALYSIS

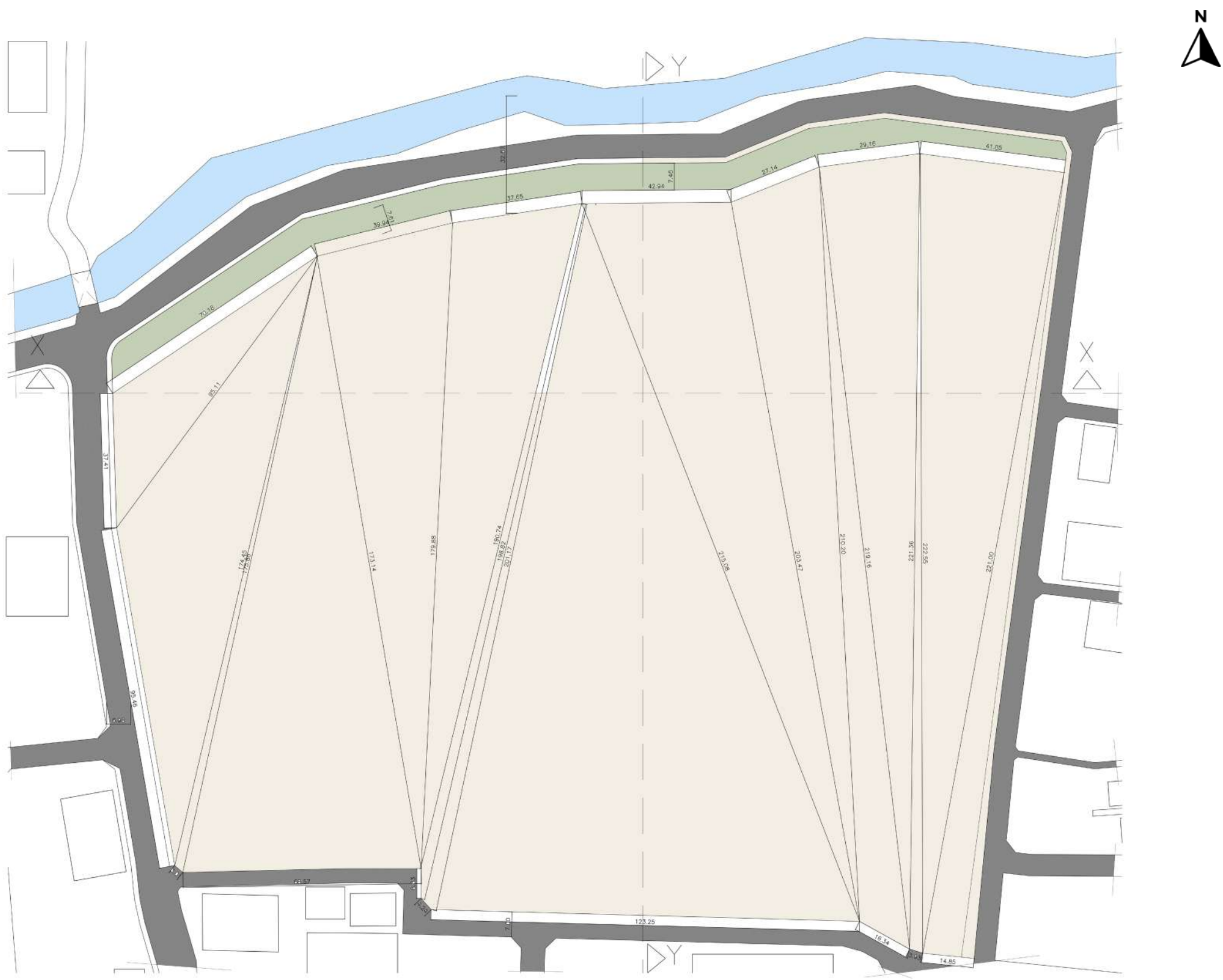
LOCATION



Introduction
Location: Byasi, Bkt.
Area: 48365.18 Sq.m. (95-1-0-1.6)
Topography: Flat Land
Present Use: Agricultural Land
Zone: Developing Residential

By-Law
Ground Coverage : 40% for more than 1-0-0-0
Setback: 2mBuilding Height: 5 Stoery (16m)
Stairs and Corridor: 1.5m
Add Stair: <25m Travel Distance.
Ramp: 1:10
Parking: 10sq.m. in 100sq.m. Builtup

Accessibility
1200m from Kamalbinayak Chowk
1600m from Araniko Highway
Presence of 9.6m,7.7m and 5m wide road around the site (excludindng footpath).
Tourist bus stop inside compound of Bhaktapur Nagarpalika and other bus stop near 800m radius.



SITE PLAN



SUNPATH

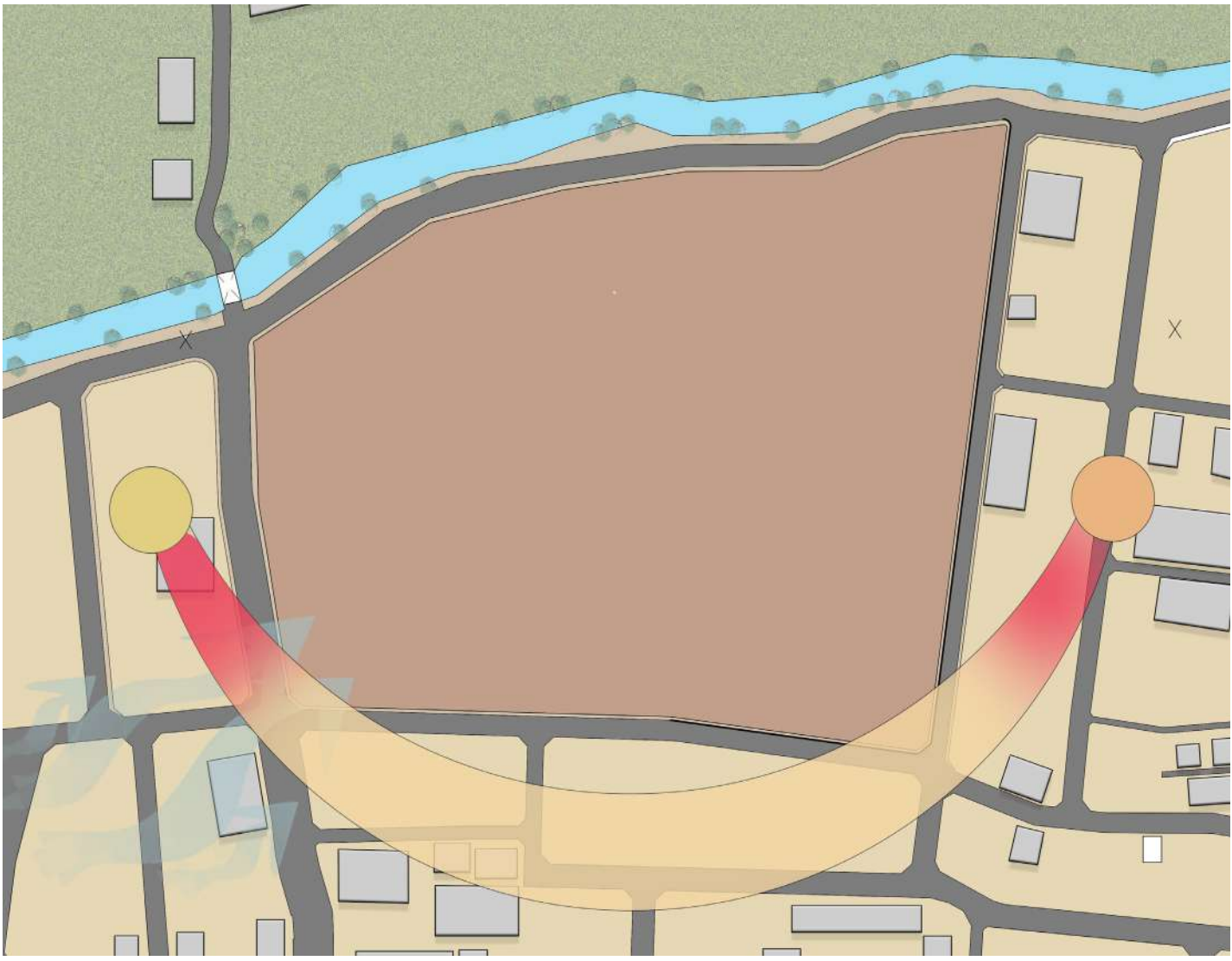


fig: Sunpath Diagram

Strength

Situated beyond the settlement to prevent any disturbance to the residential area.
Multiple ways vehicular
Flat land

Opportunity

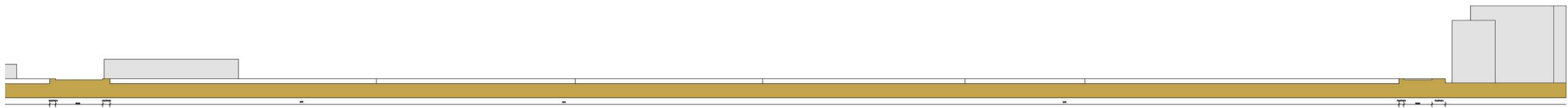
Economic opportunities
Community engagement
Gradual development of the entire area regarding roads, infrastructure, public transportation options and other infrastructures.
Competition Venue for school and college level

Weakness

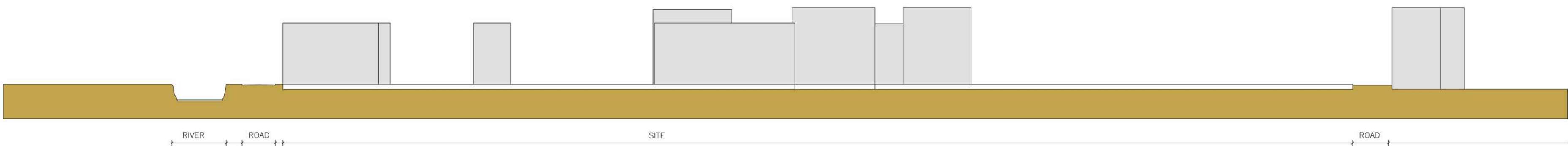
The proposed site lacks proper sewage and water management.
Brick Factories in West and East(Current Situation)

Threat

Possibility of flooding from Kasan River.



SECTION AT X-X



SECTION AT Y-Y

PURBANCHAL UNIVERSITY KHWOPA ENGINEERING COLLEGE DEPARTMENT OF ARCHITECTURE LIBALI, BHAKTAPUR	SUBMITTED BY: AAYUSH MANANDHAR ROLL NO: 760102
	TITLE: SITE ANALYSIS

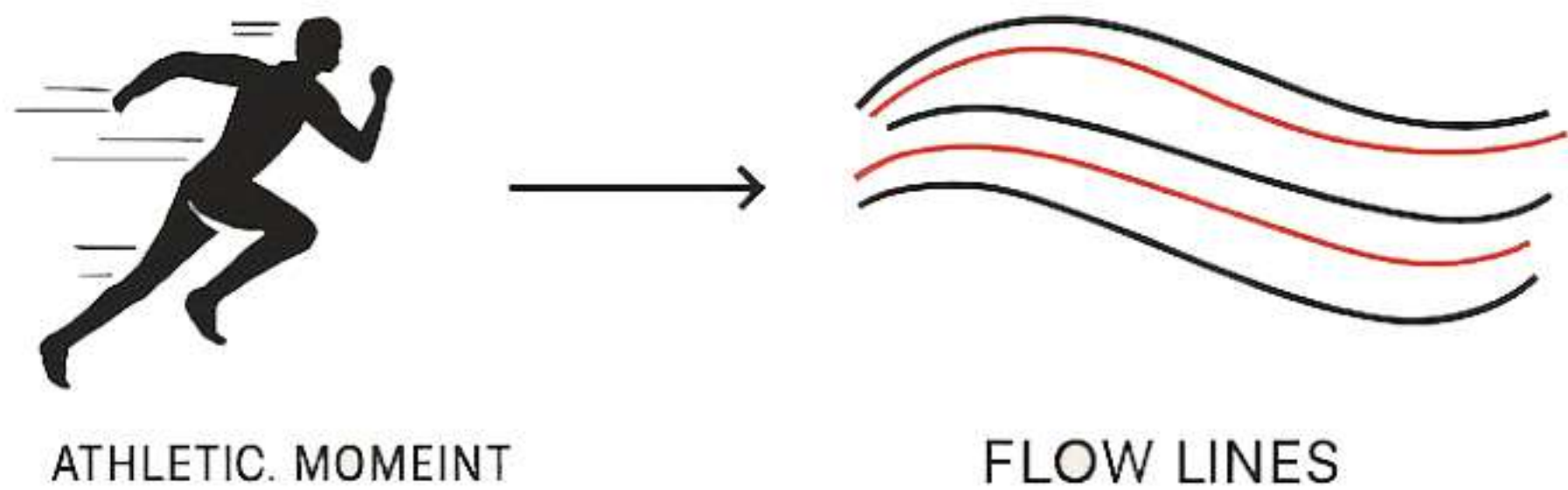
INTEGRATED SPORTS COMPLEX

CONCEPT

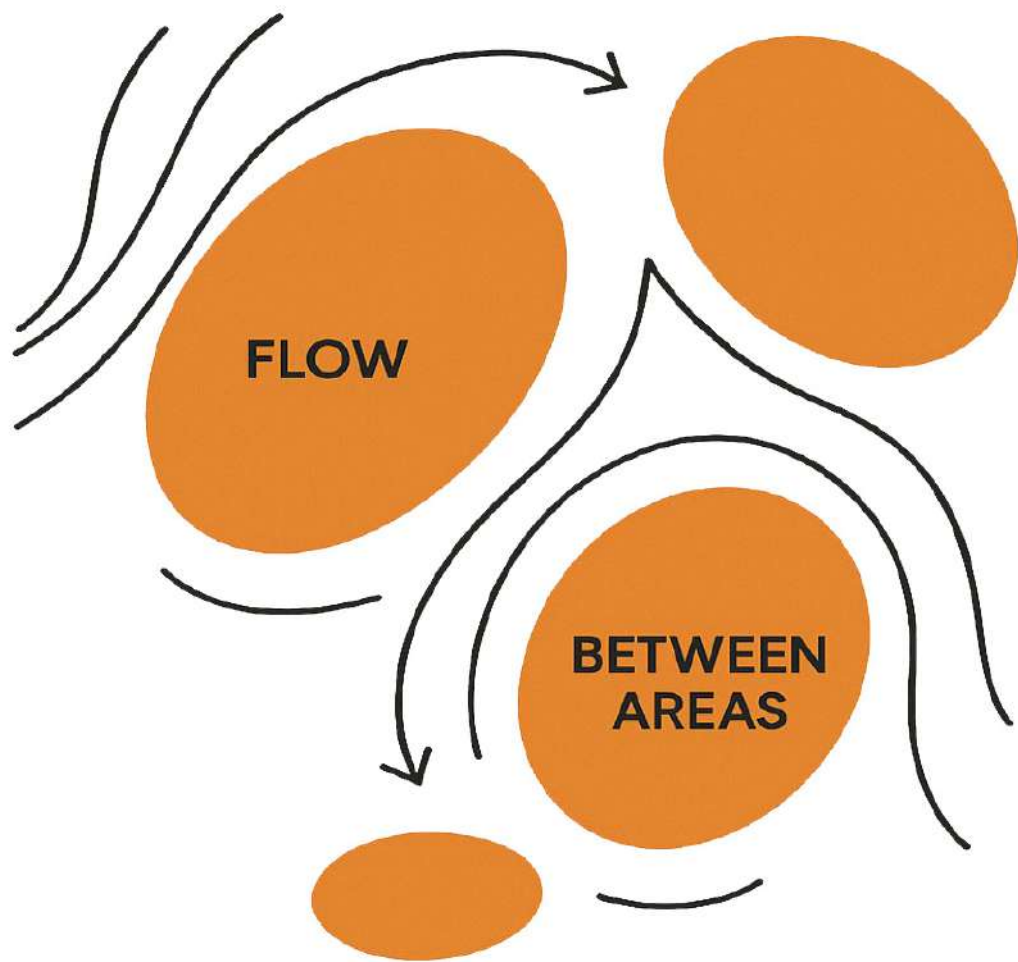
FLOW AND CONNECTIVITY

The idea is to create a dynamic, interconnected sports environment inspired by the movement of athletes and the fluidity of sports. The design will focus on seamless transitions, multi-functional spaces, and biophilic integration.

FLOW & MOTION CONCEPT

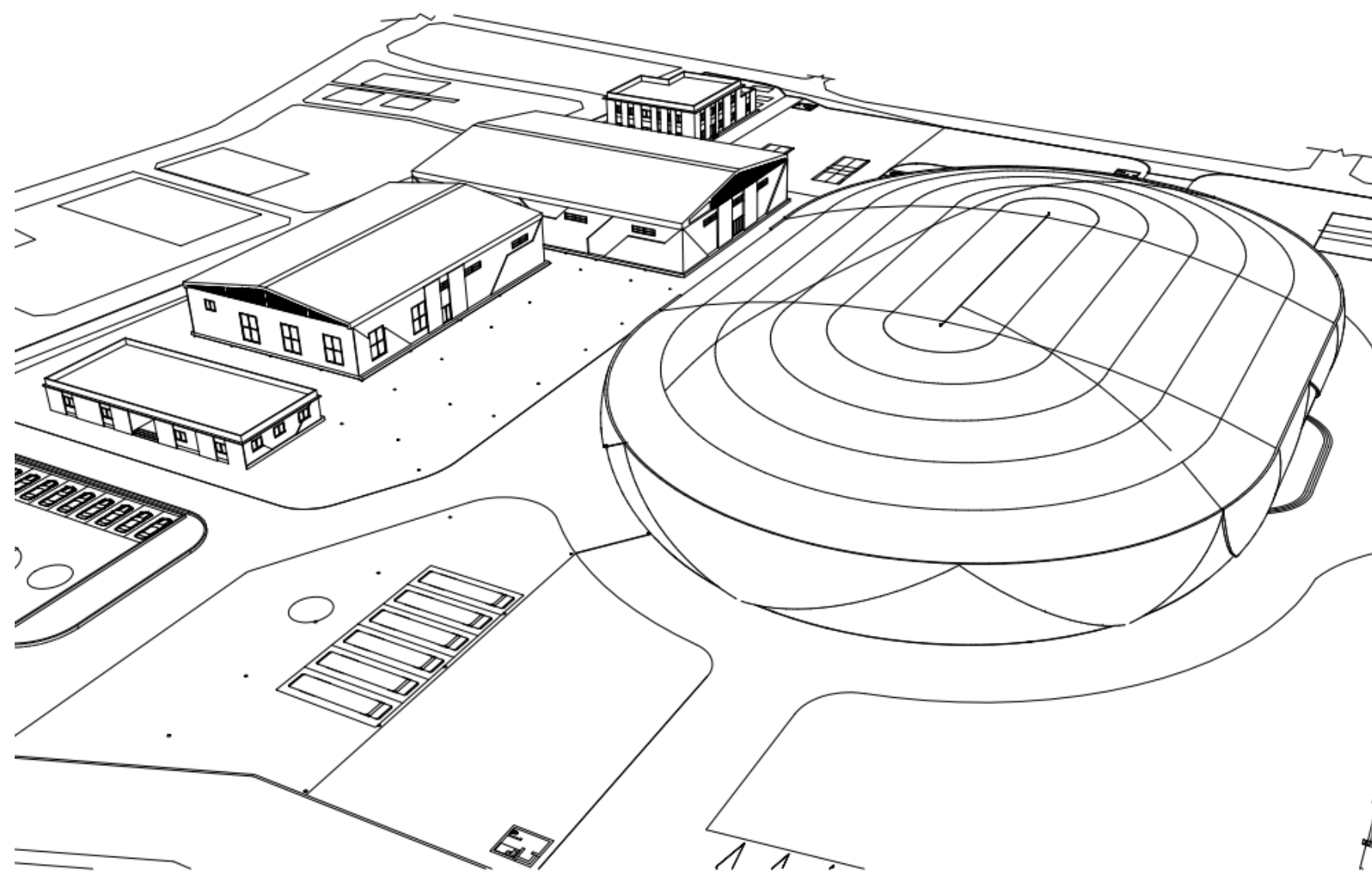
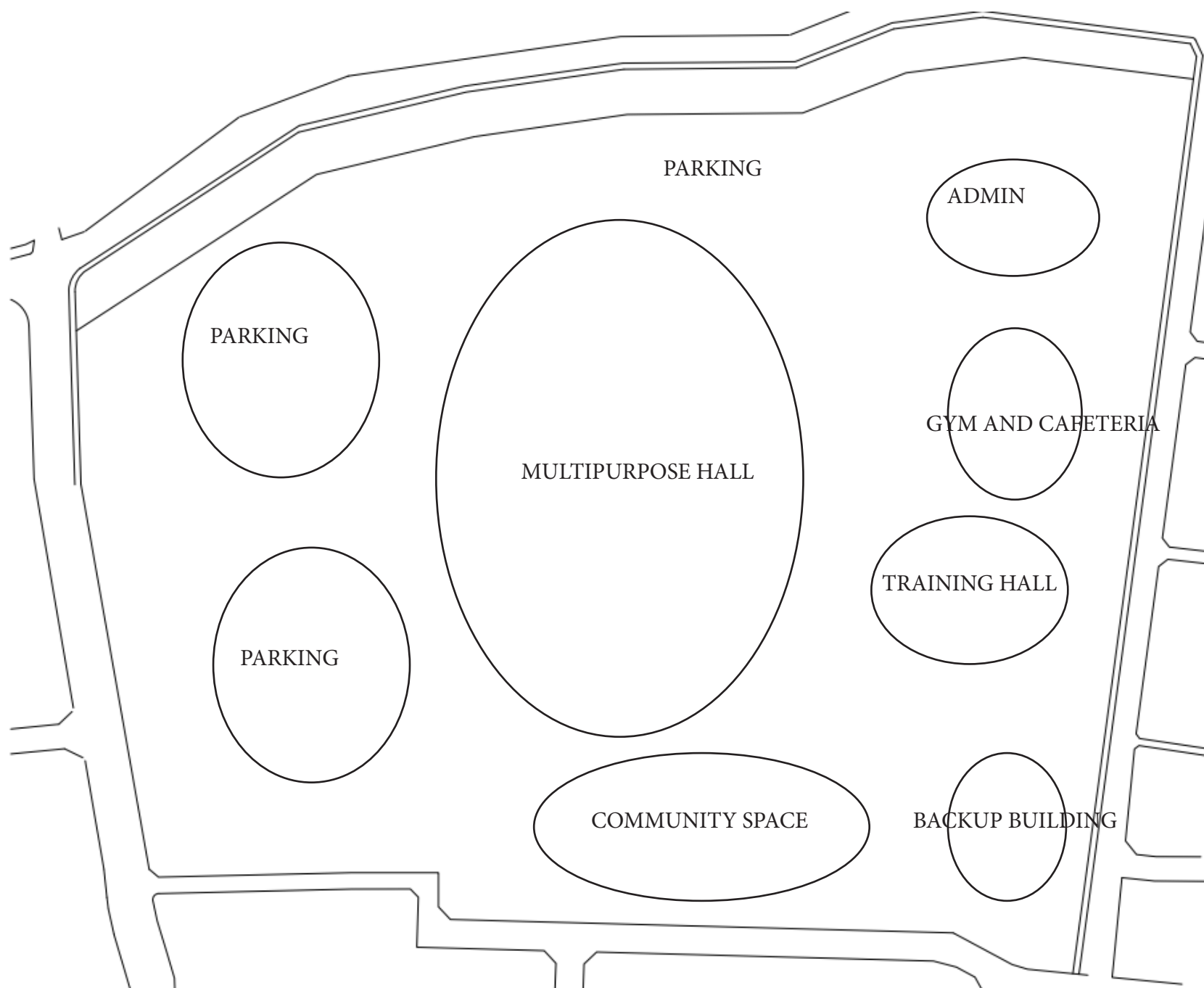
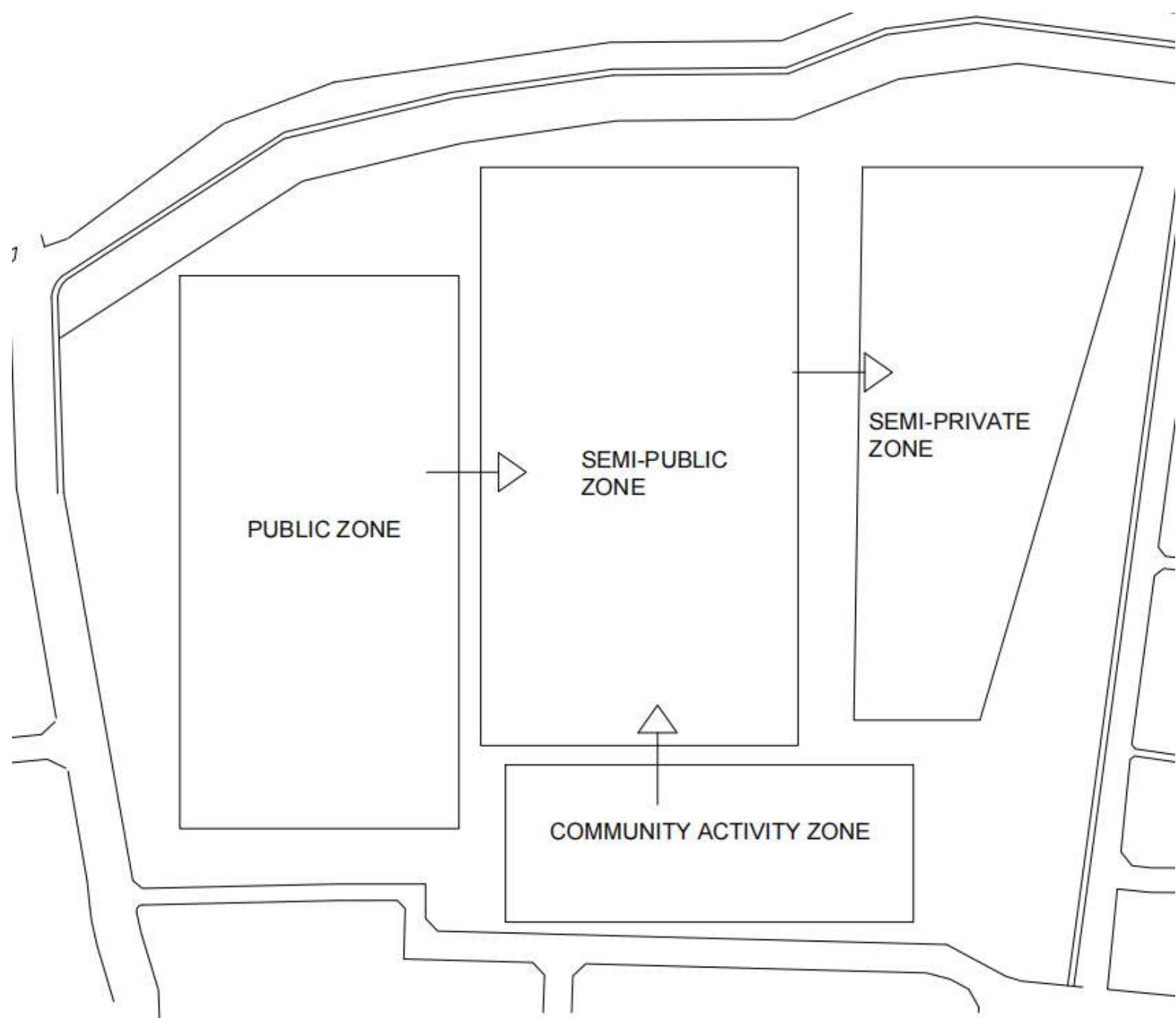
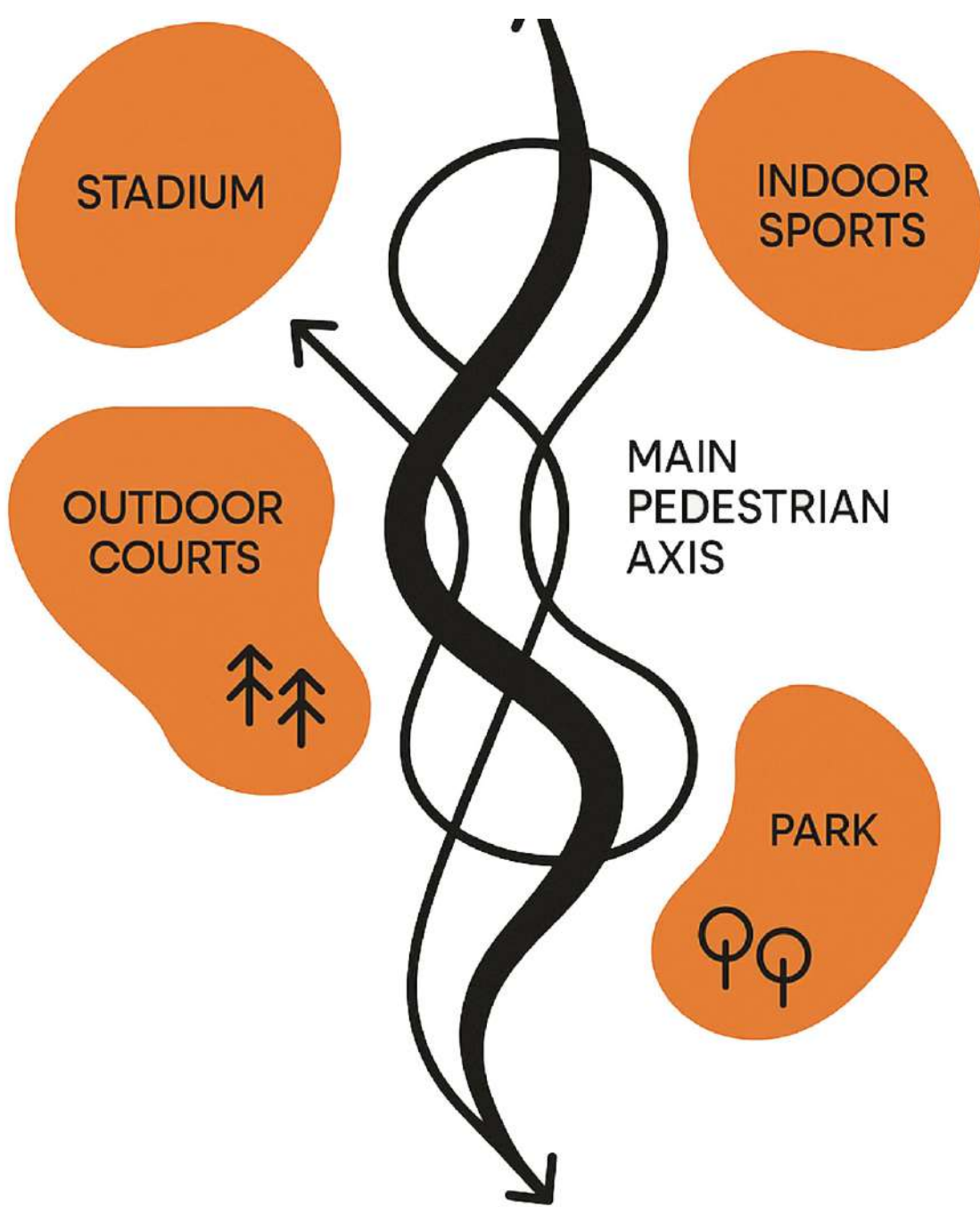


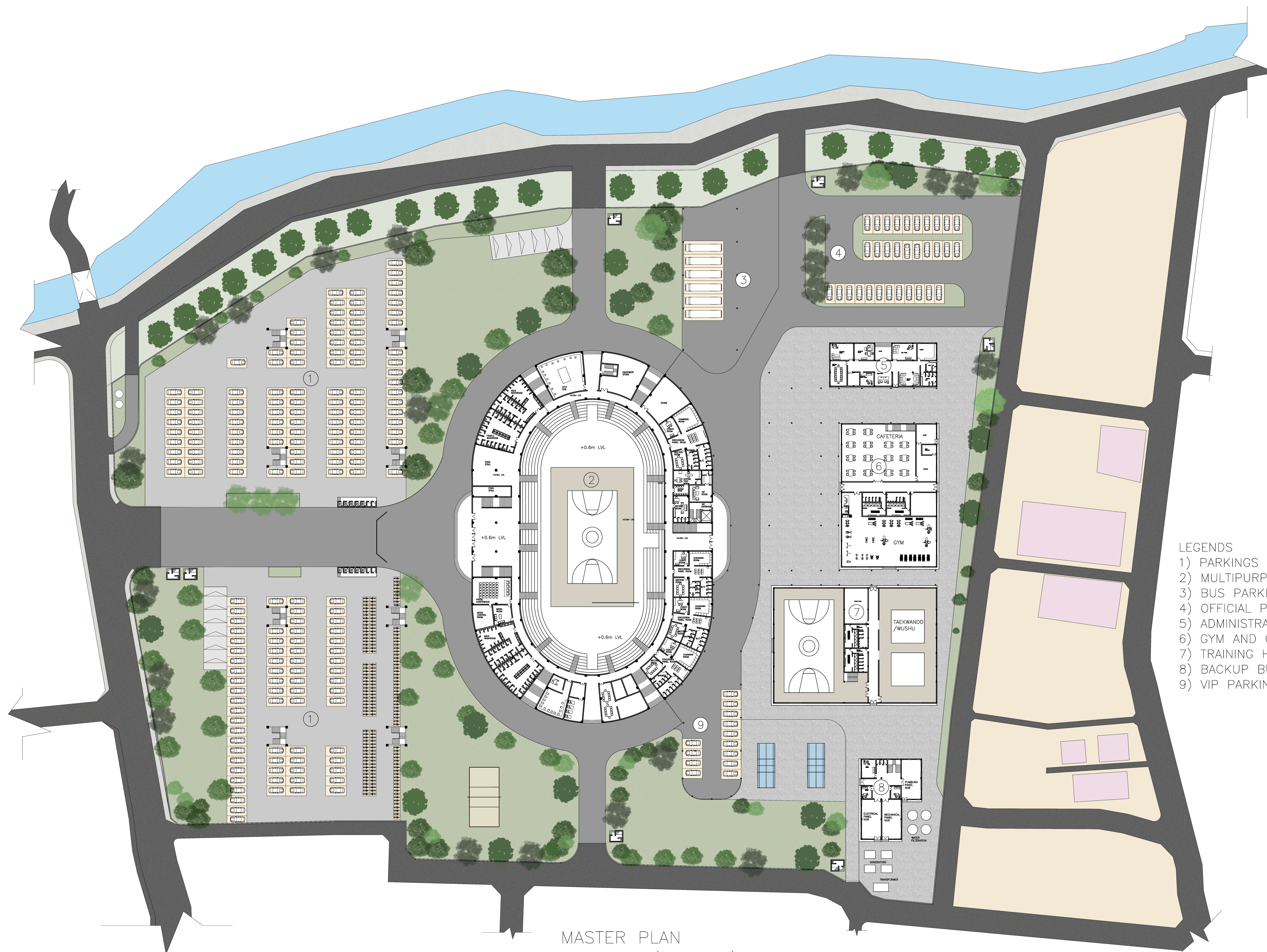
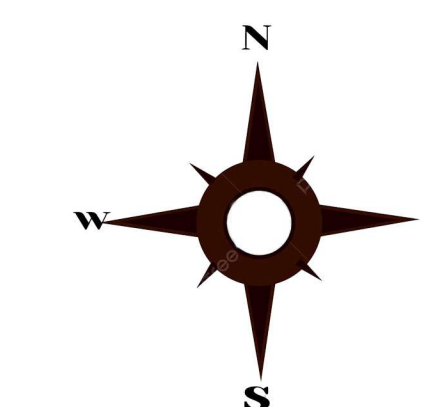
CONCEPT OF DYNAMIC FLOW



FLOW BETWEEN AREAS

Concept Development Stages
Inspired by athletic movement, speed, and organic flow.
Incorporating curves and angular forms to represent different sports dynamics.
Dividing the complex into three main zones:
1. Indoor Sports (basketball, badminton,)
2. Outdoor Sports
3. Recreational & Support Areas (gym, lounges, cafes, spectator seating
Ensuring smooth circulation and connectivity between spaces.
Start with a rectangular grid for efficiency.
Deform the grid using parametric curves to allow fluidity and organic flow.



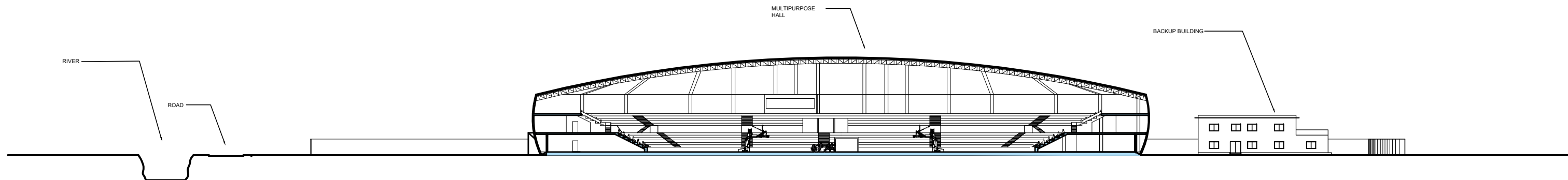


MASTER PLAN

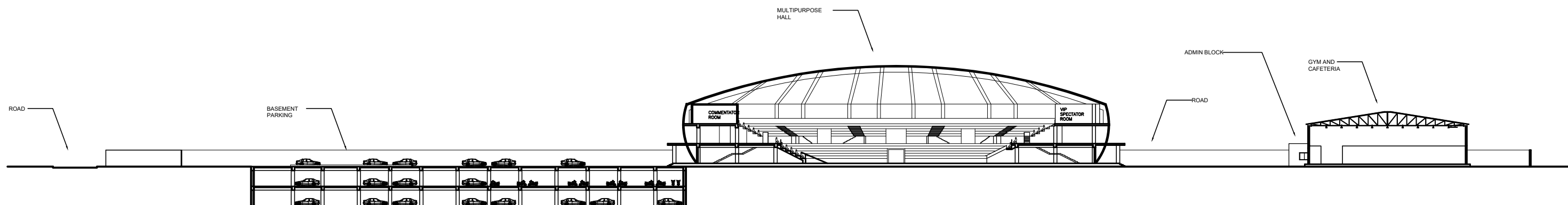
SITE AREA: 48365.18 SQ.M. (95-1-1-1.69)
BUILT UP AREA: 11750.72 SQ.M. (23-1-2-1)

LEGENDS

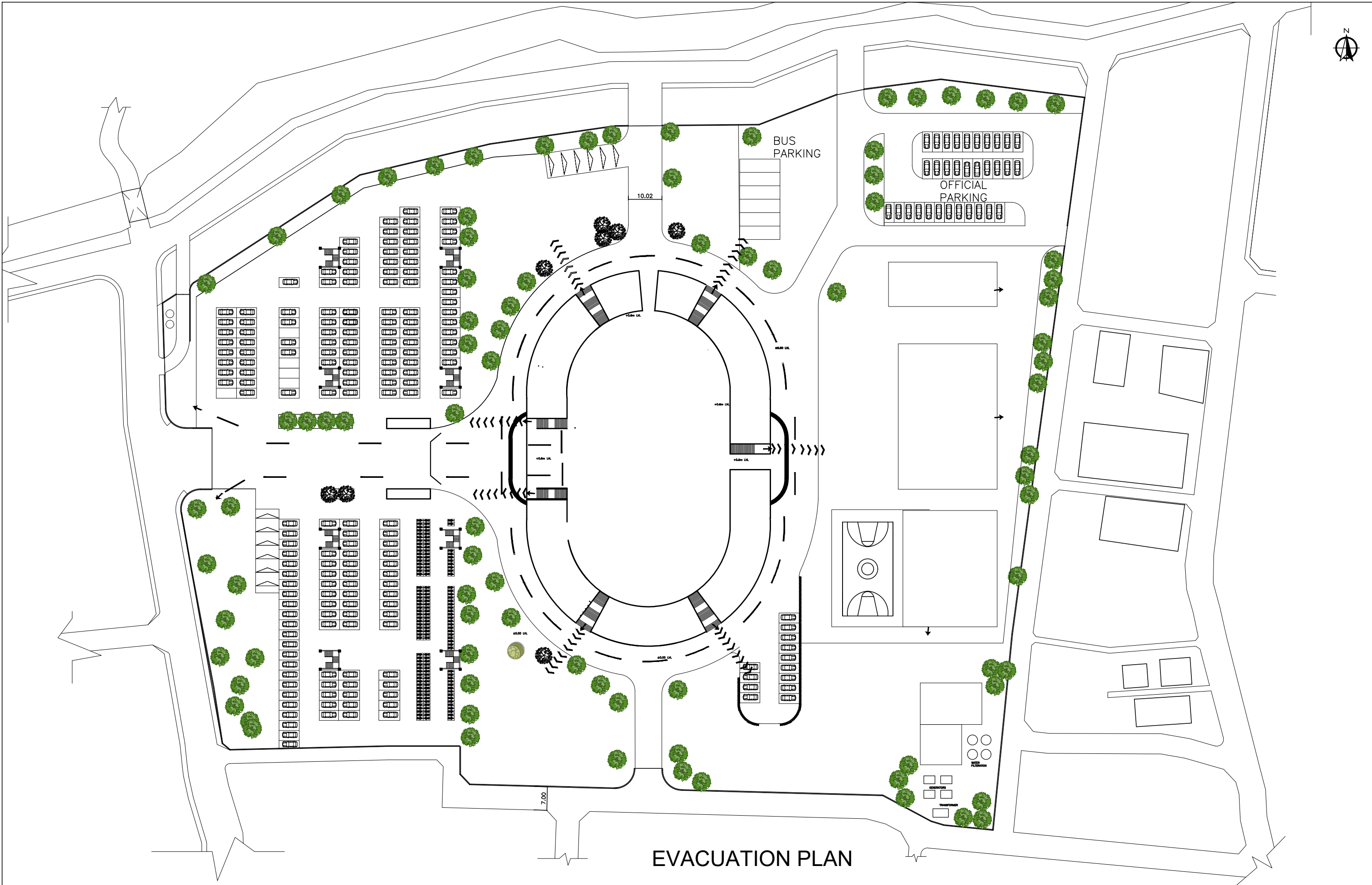
- 1) PARKINGS (SPECTATORS)
- 2) MULTIPURPOSE HALL
- 3) BUS PARKING (PLAYERS AND COACHES)
- 4) OFFICIAL PARKING (OFFICIALS AND STAFF)
- 5) ADMINISTRATIVE BLOCK
- 6) GYM AND CAFETERIA
- 7) TRAINING HALL
- 8) BACKUP BUILDING
- 9) VIP PARKING

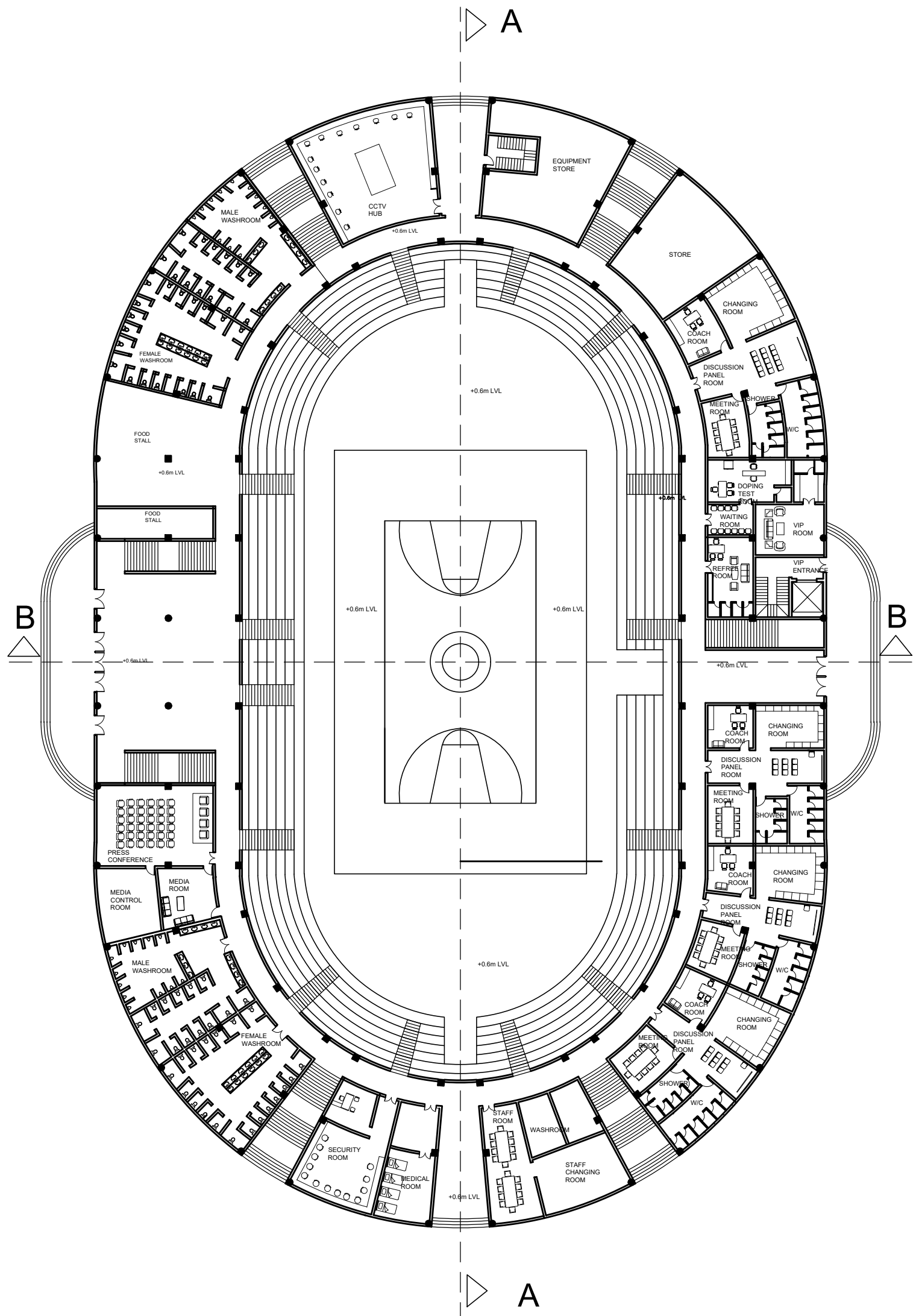


PROFILE SECTION AT A-A

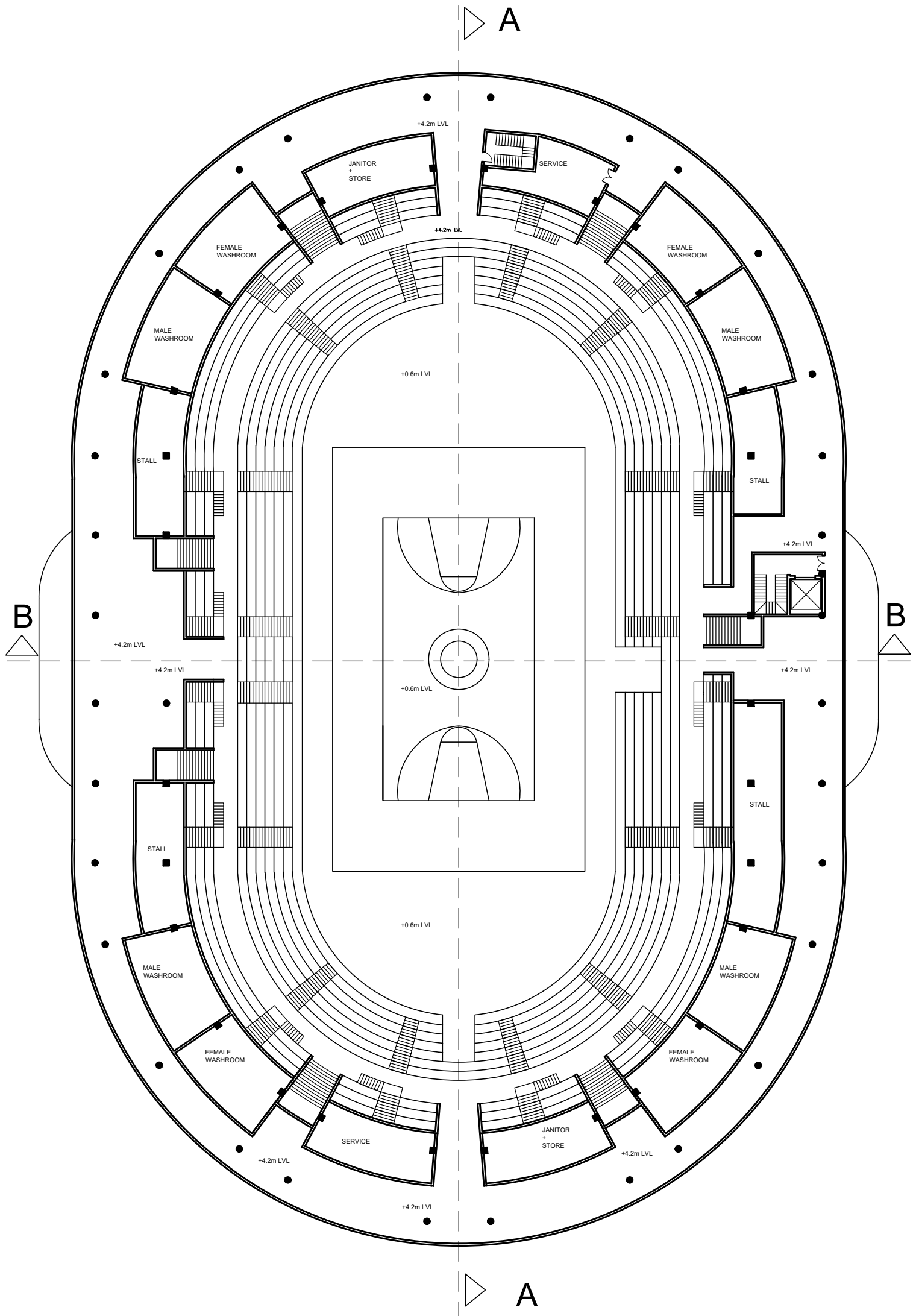


PROFILE SECTION AT B-B

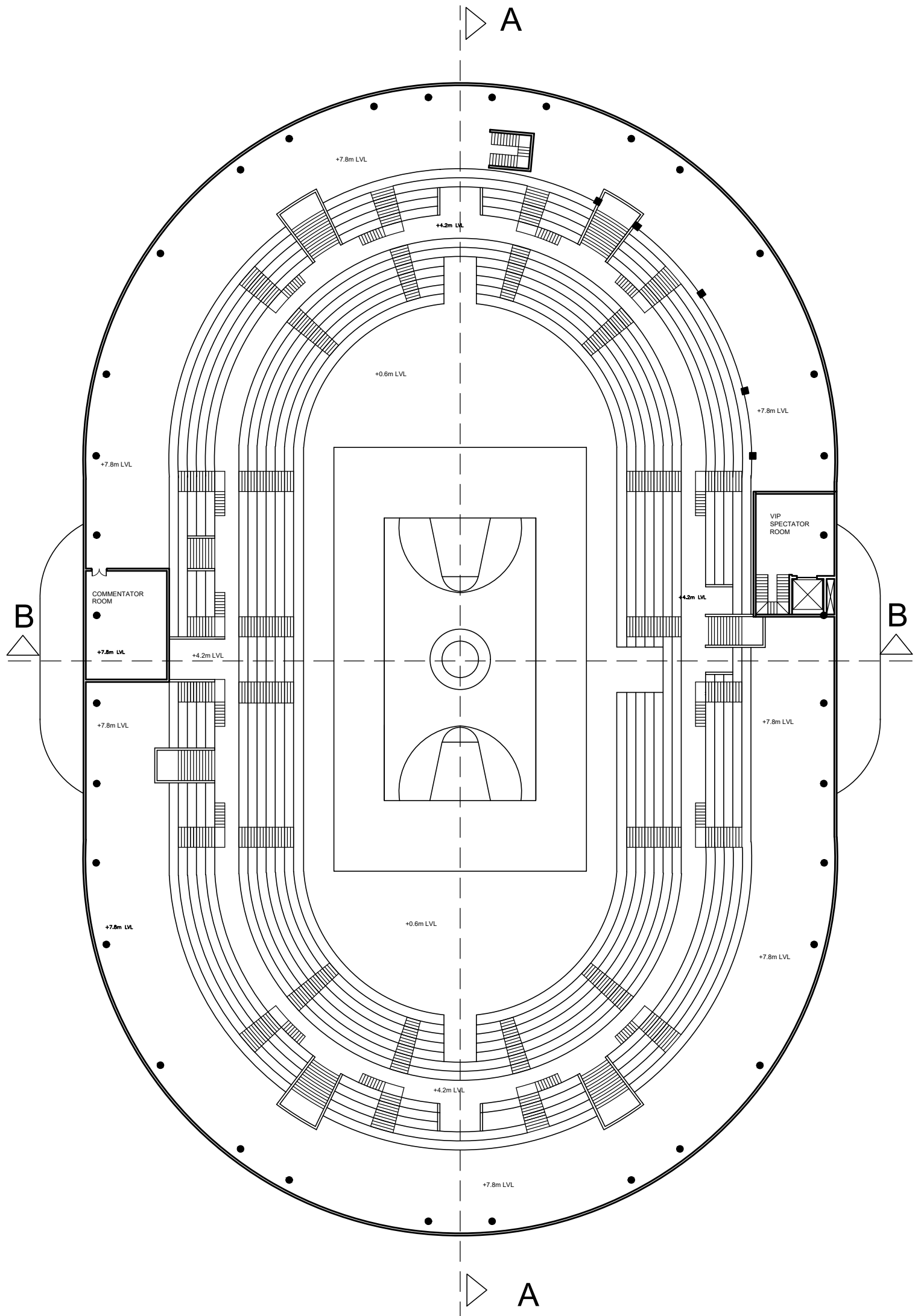




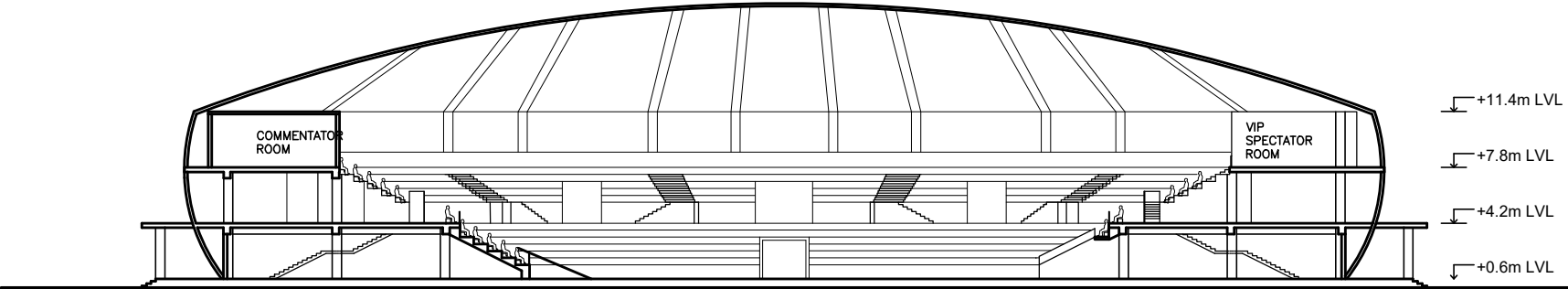
GROUND FLOOR PLAN
AREA : 7269.04 SQ.M.



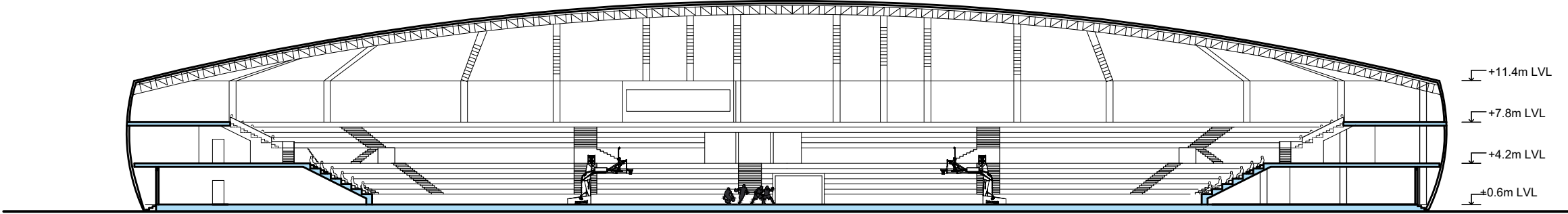
FIRST FLOOR PLAN



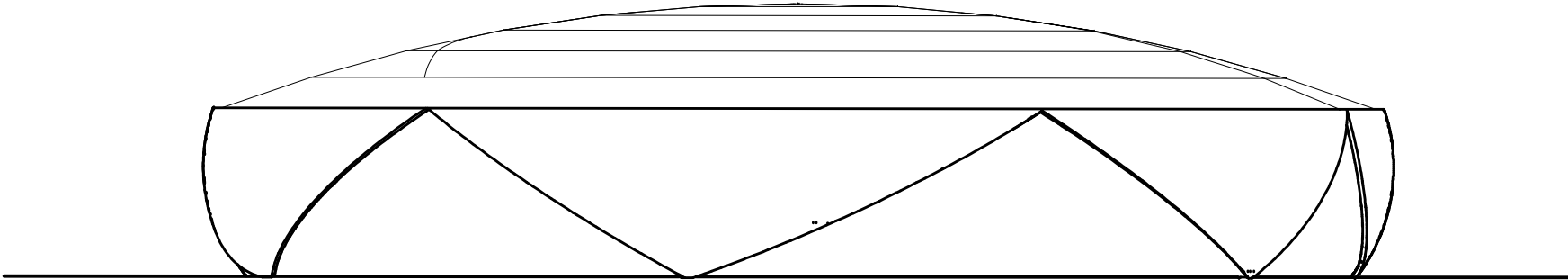
SECOND FLOOR PLAN



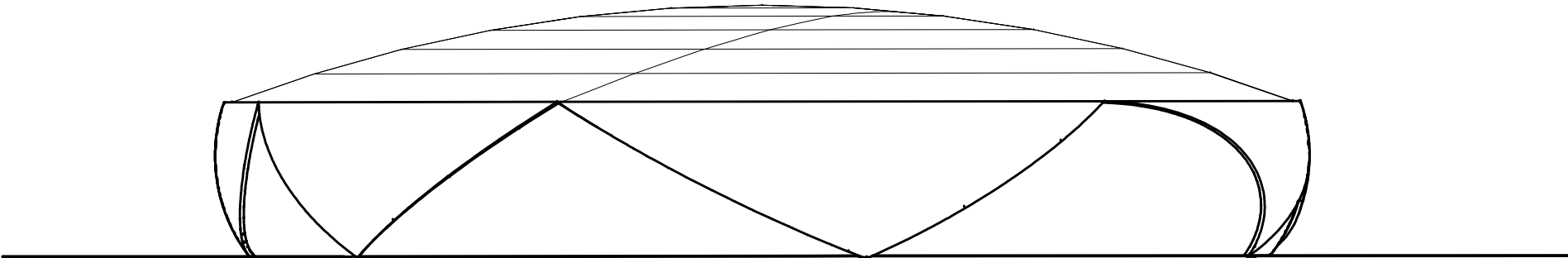
SECTION AT B-B



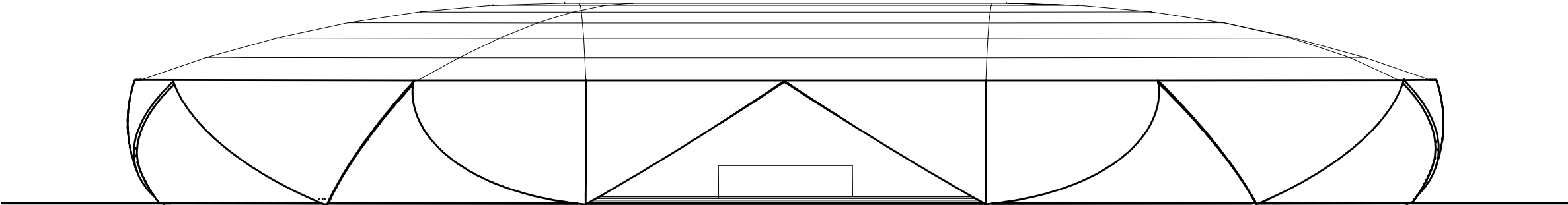
SECTION AT A-A



NORTH ELEVATION



SOUTH ELEVATION

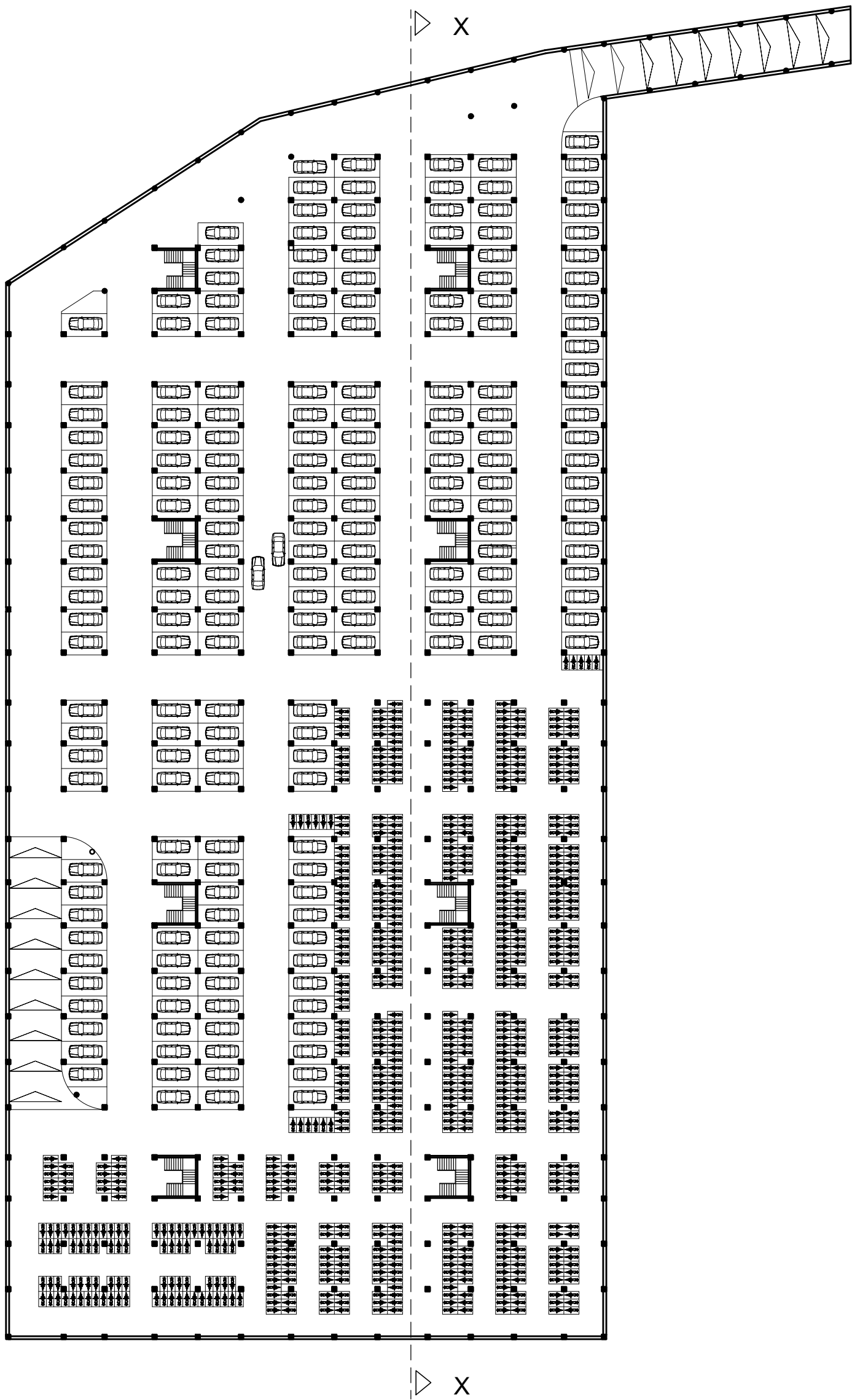


EAST ELEVATION



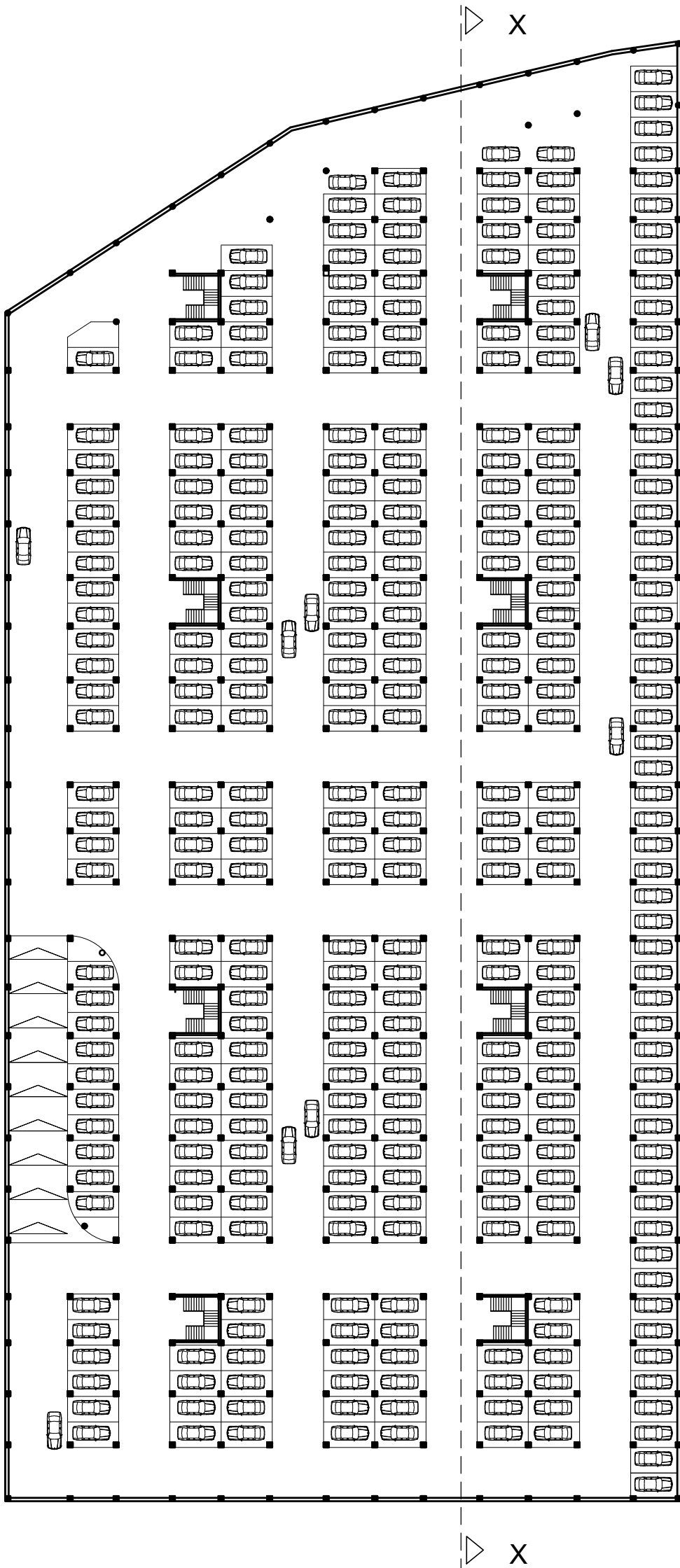
WEST ELEVATION

PURBANCHAL UNIVERSITY KHWOPA ENGINEERING COLLEGE DEPARTMENT OF ARCHITECTURE LIBALI, BHAKTAPUR	SUBJECT: INTREGATED SPORTS COMPLEX	NAME: AAYUSH MANANDHAR	B. ARCH 076 BATCH V/X	
	TITLE: MASTER PLAN	ROLL NO: 760102		
		CHECKED BY:	SCALE: 1 : 450	



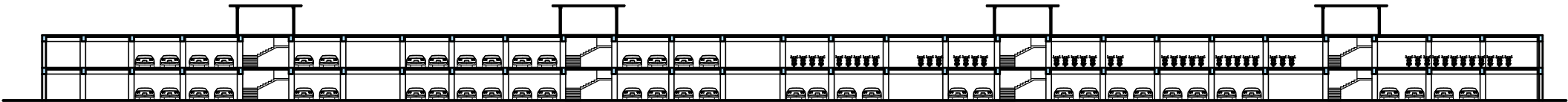
UPPER BASEMENT

NO. OF VEHICLES AT LEVEL -1
BIKES: 693
CAR: 201

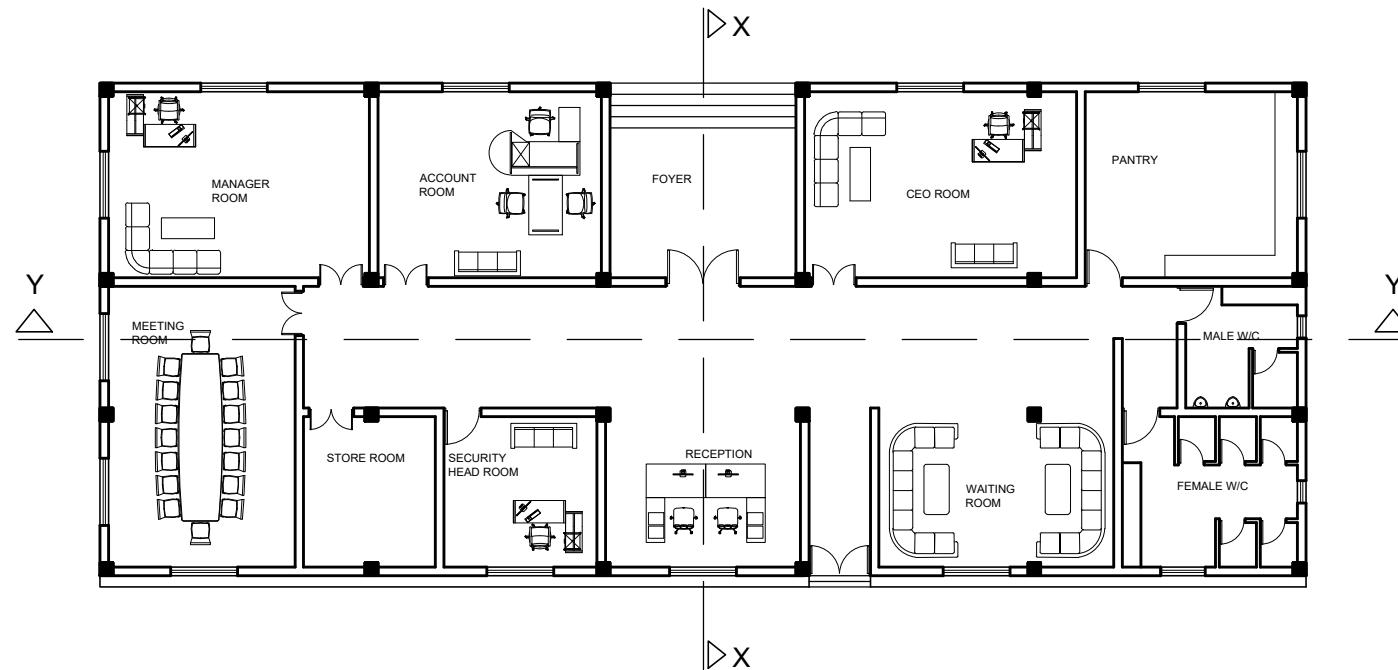


LOWER BASEMENT

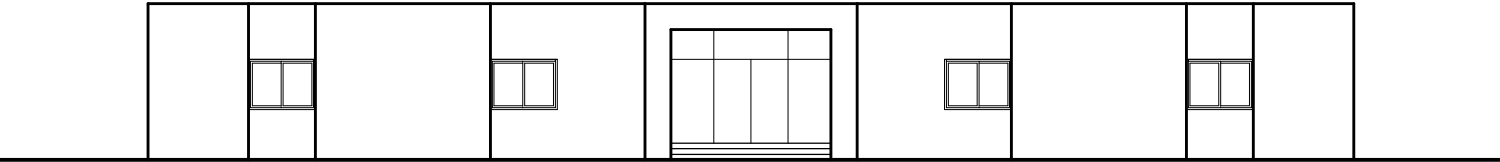
NO. OF VEHICLES AT LEVEL -2
BIKES: 0
CAR: 542



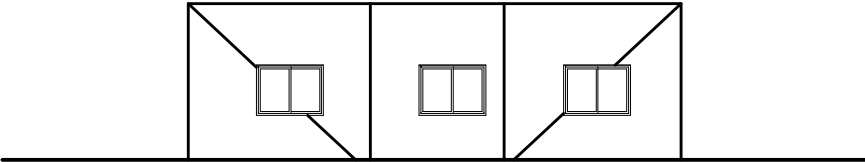
SECTION AT X-X



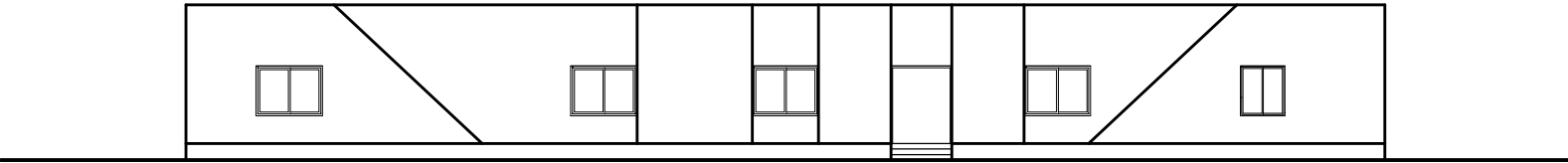
GROUND FLOOR PLAN
AREA: 438.52 SQ.M.



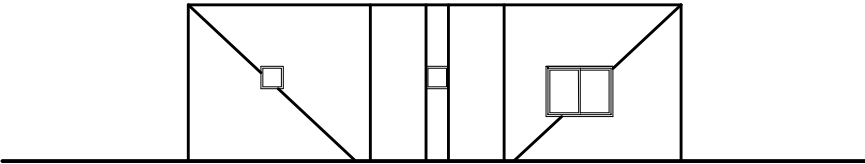
NORTH ELEVATION



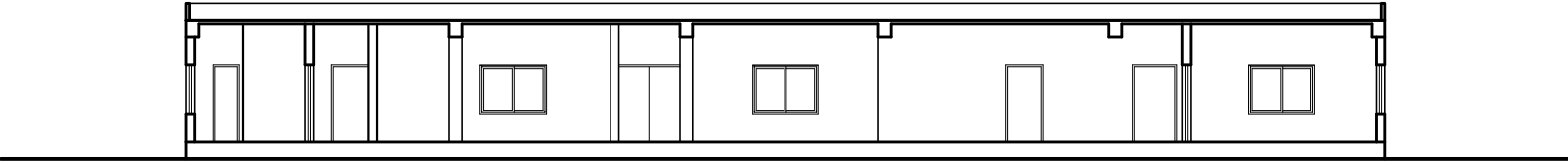
WEST ELEVATION



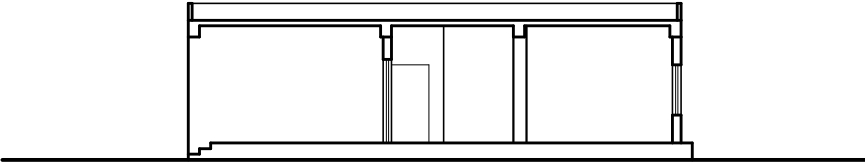
SOUTH ELEVATION



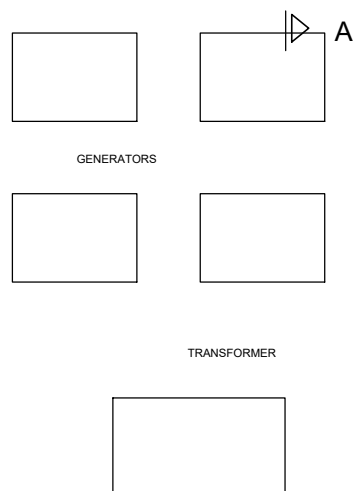
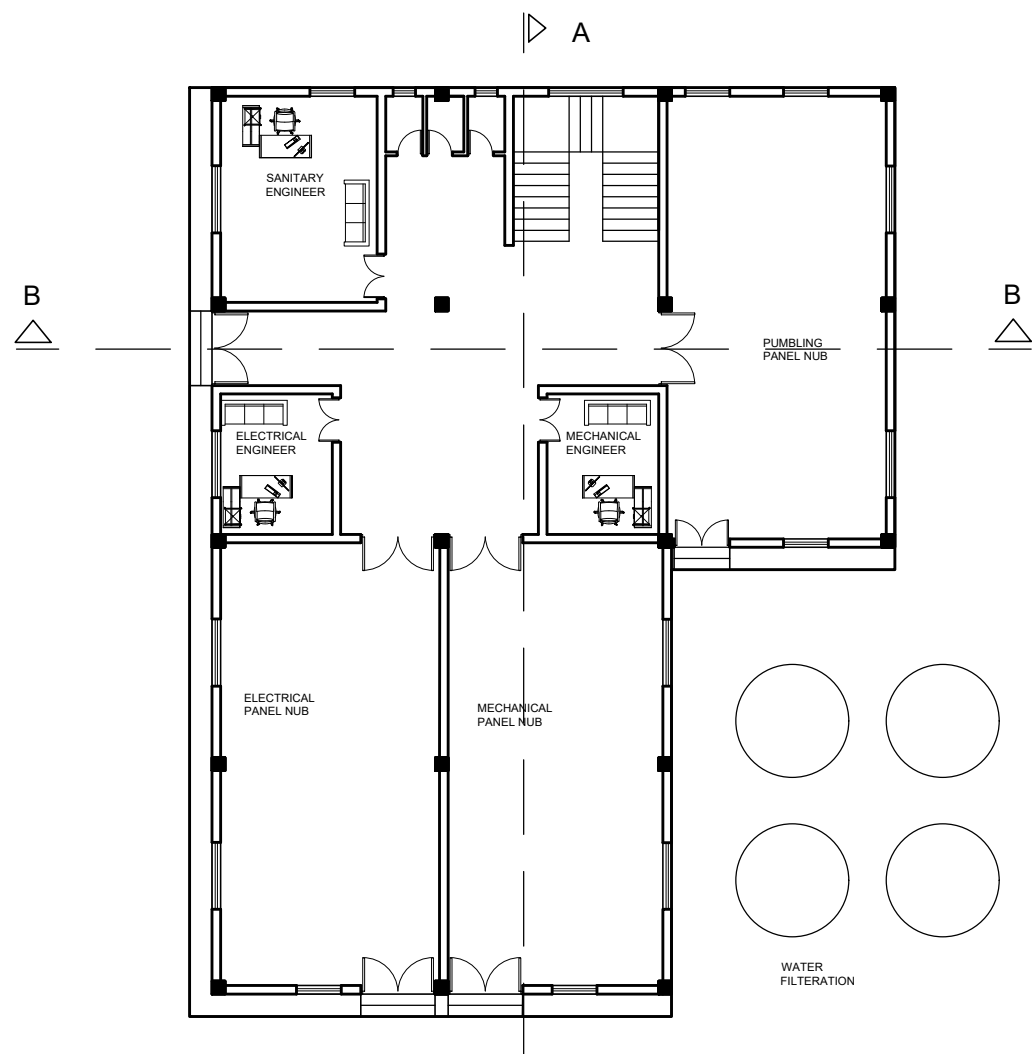
EAST ELEVATION



SECTION AT Y-Y

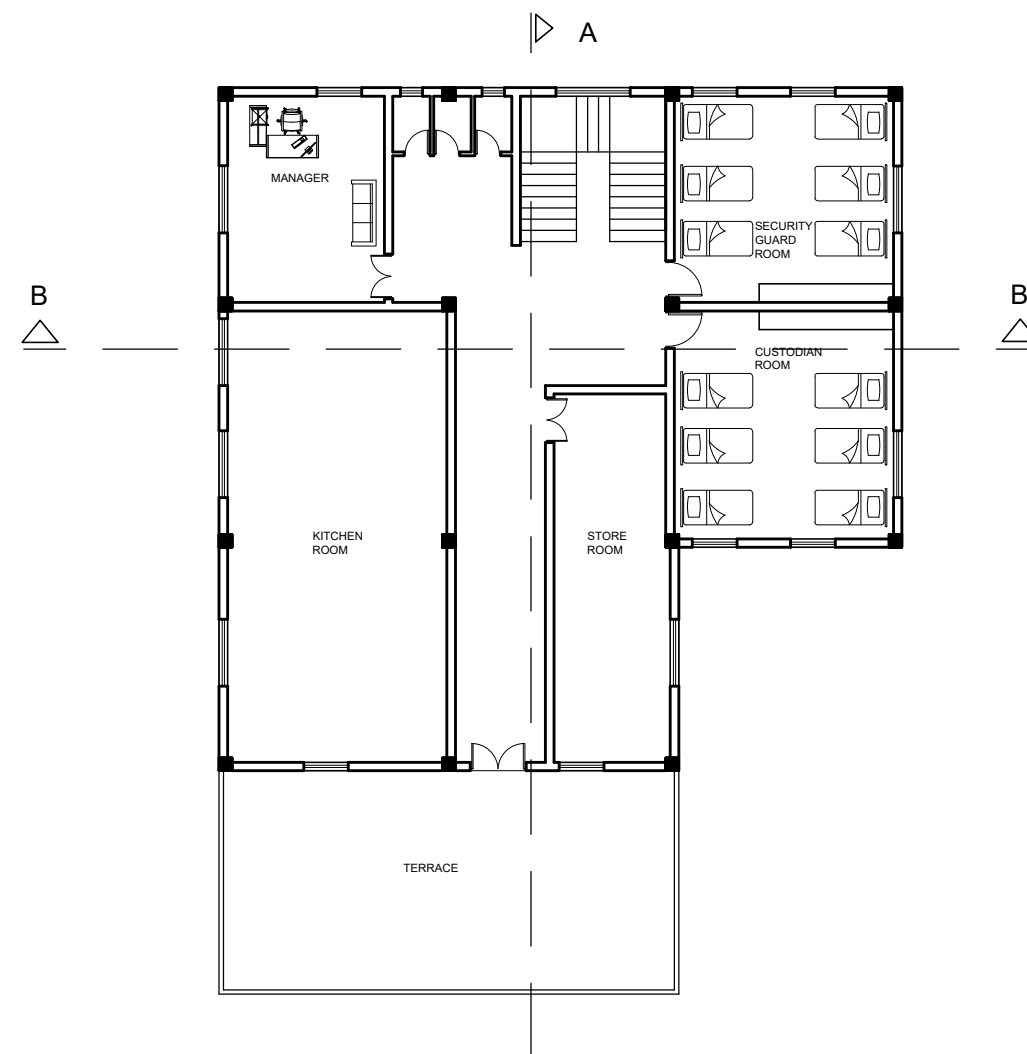


SECTION AT X-X

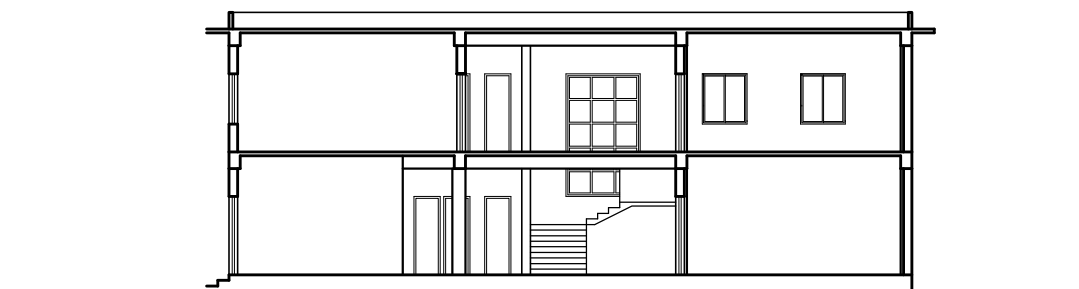


GROUND FLOOR PLAN

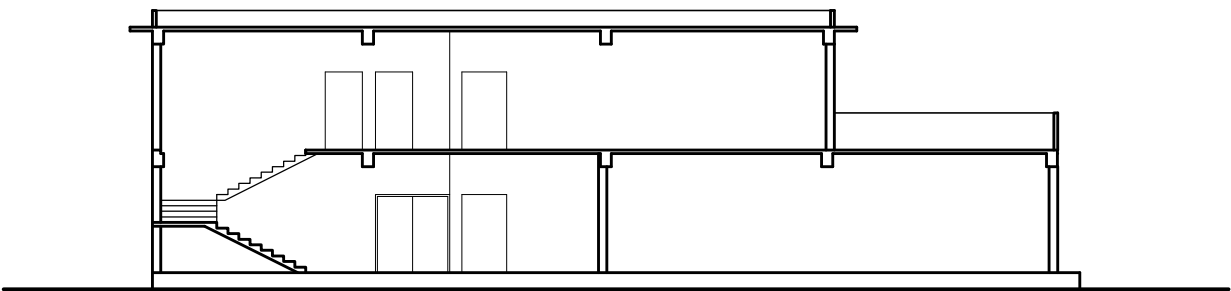
GROUND FLOOR PLAN
AREA: 400.81 SQ.M.



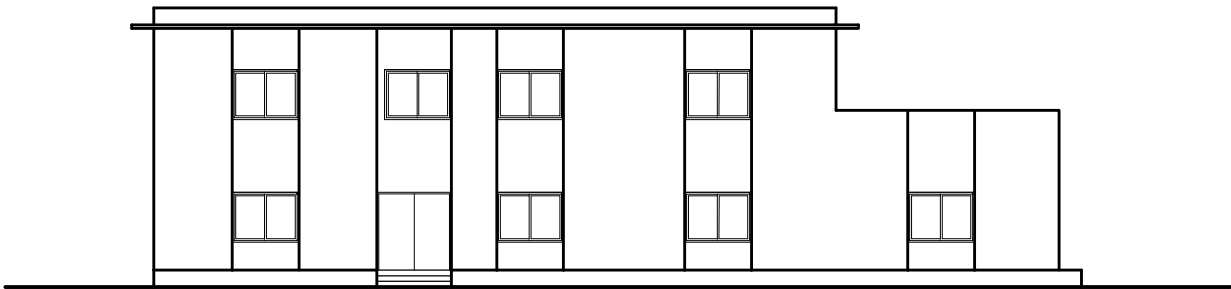
FIRST FLOOR PLAN



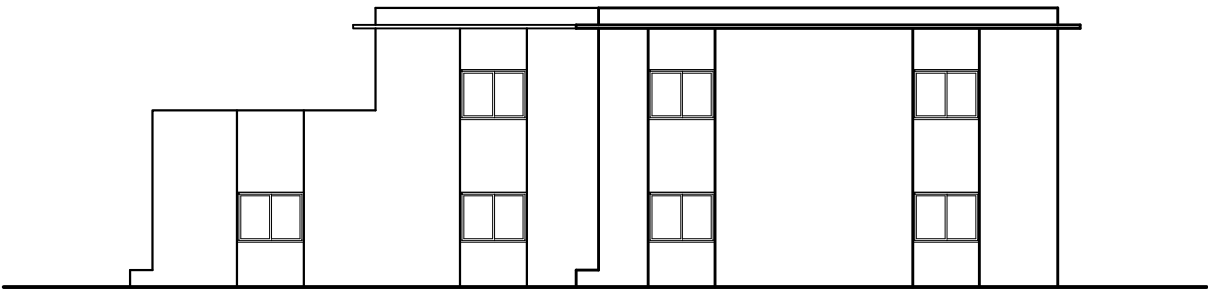
SECTION AT B-B



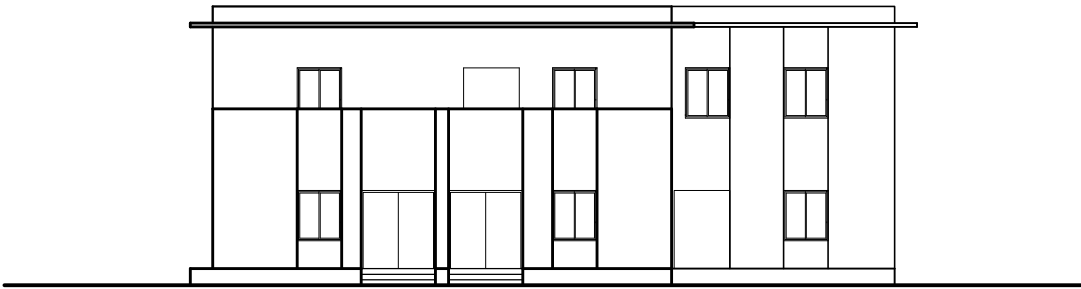
SECTION AT A-A



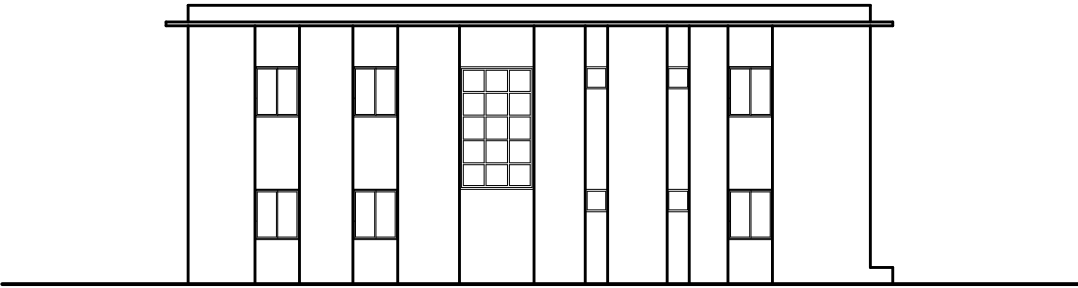
EAST ELEVATION



WEST ELEVATION

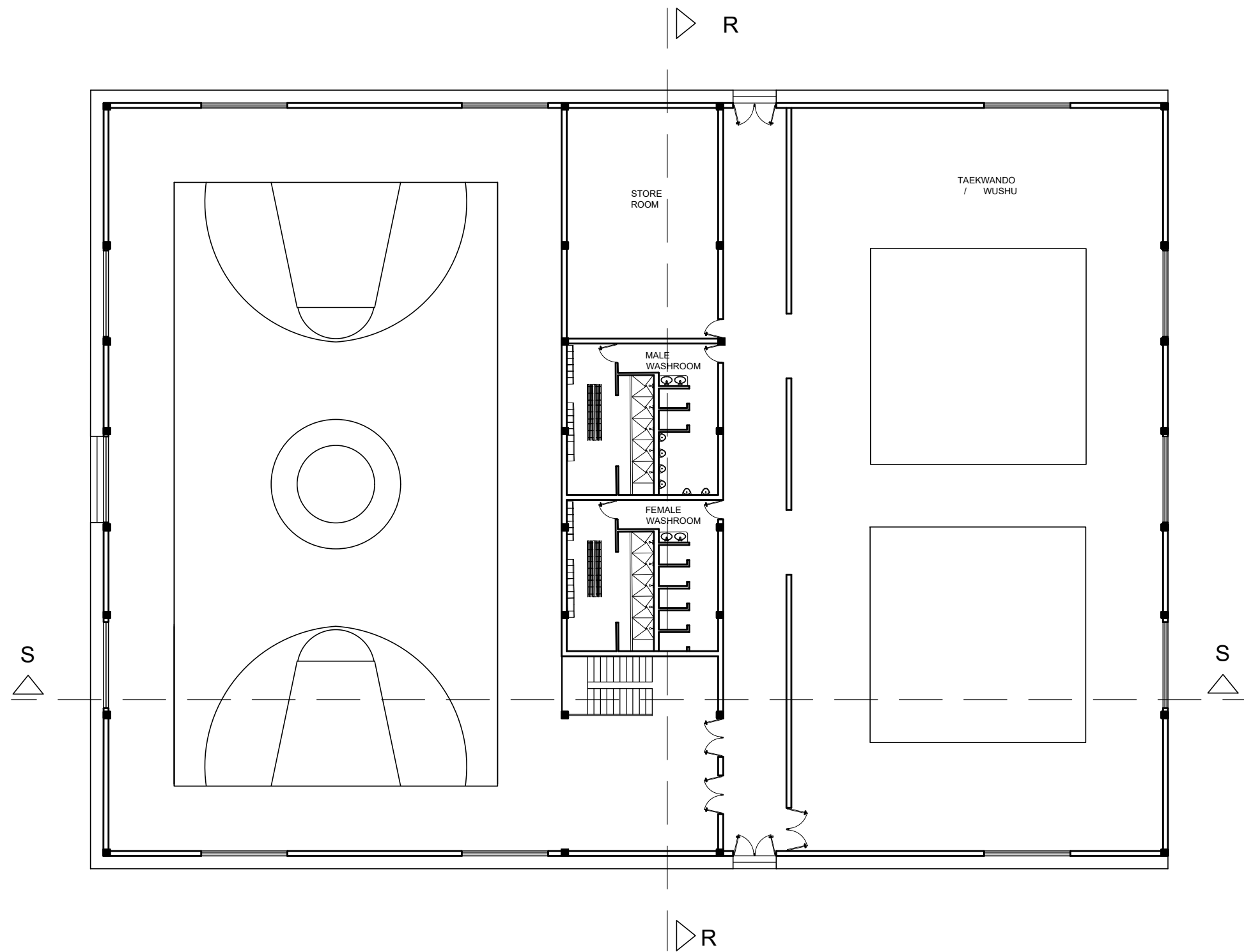


SOUTH ELEVATION

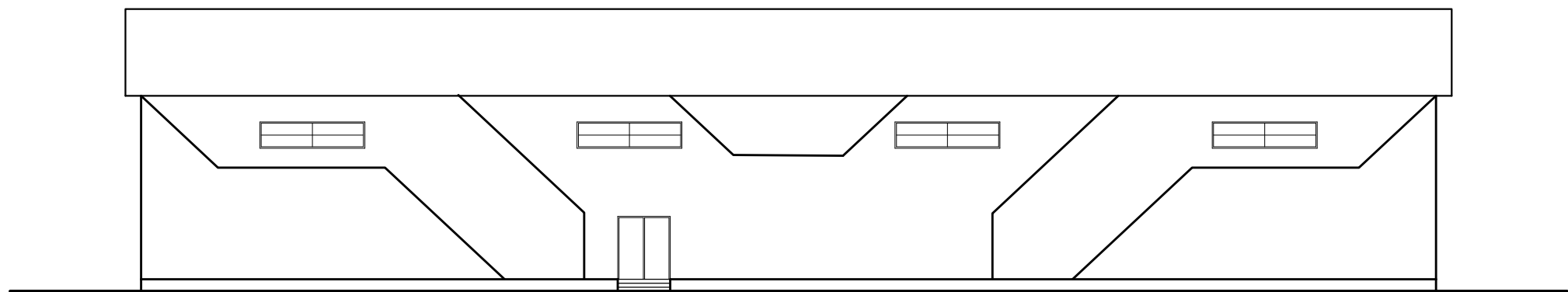


NORTH ELEVATION

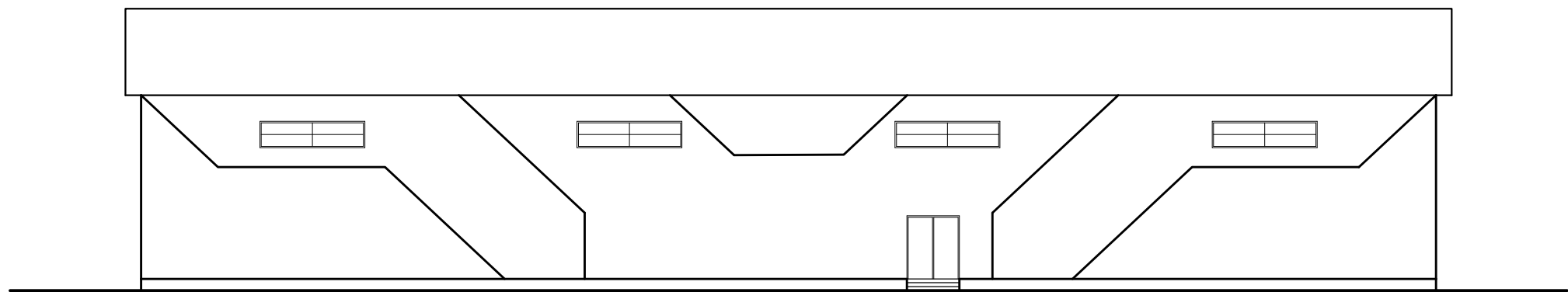
PURBANCHAL UNIVERSITY KHWOPA ENGINEERING COLLEGE DEPARTMENT OF ARCHITECTURE LIBALI, BHAKTAPUR	SUBJECT: INTREGATED SPORTS COMPLEX	NAME: AAYUSH MANANDHAR	B. ARCH 076 BATCH V/X	
	TITLE: MASTER PLAN	ROLL NO: 760102		
		CHECKED BY:	SCALE: 1 : 200	



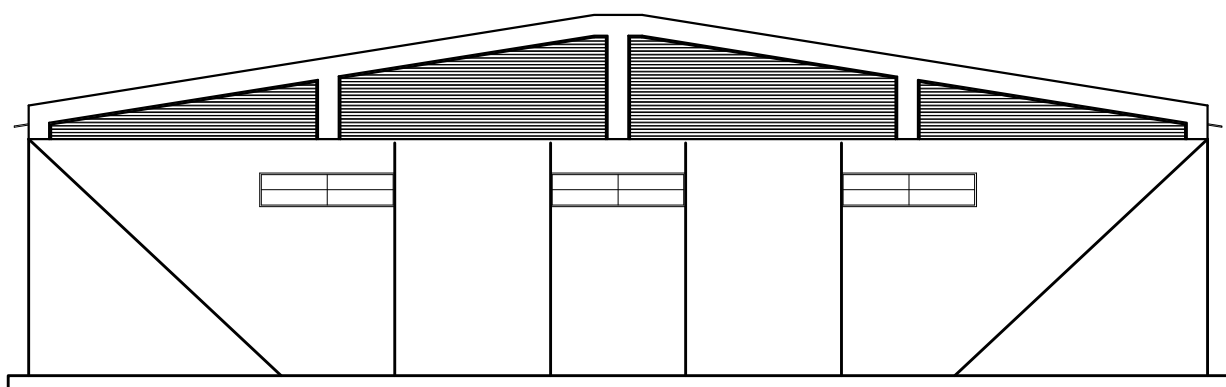
GROUND FLOOR PLAN
AREA: 1804 SQ.M.



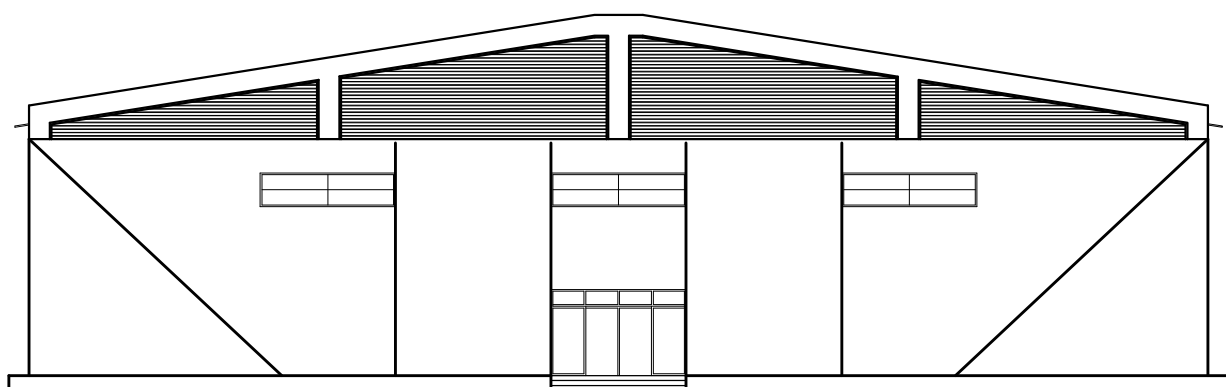
NORTH ELEVATION



SOUTH ELEVATION

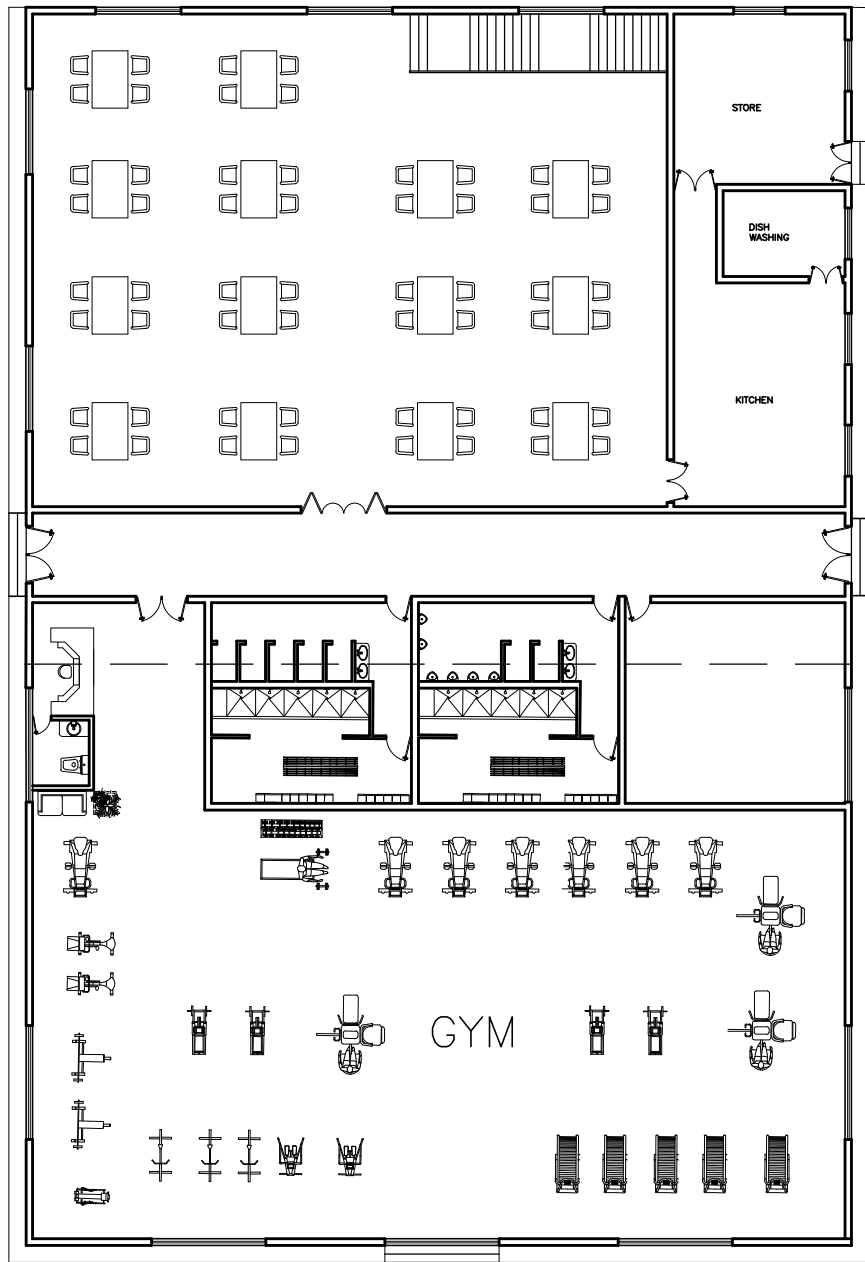


WEST ELEVATION

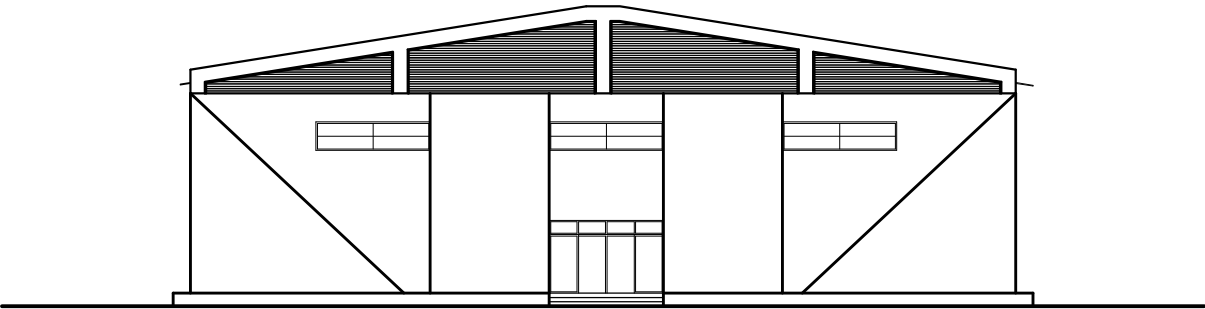


EAST ELEVATION

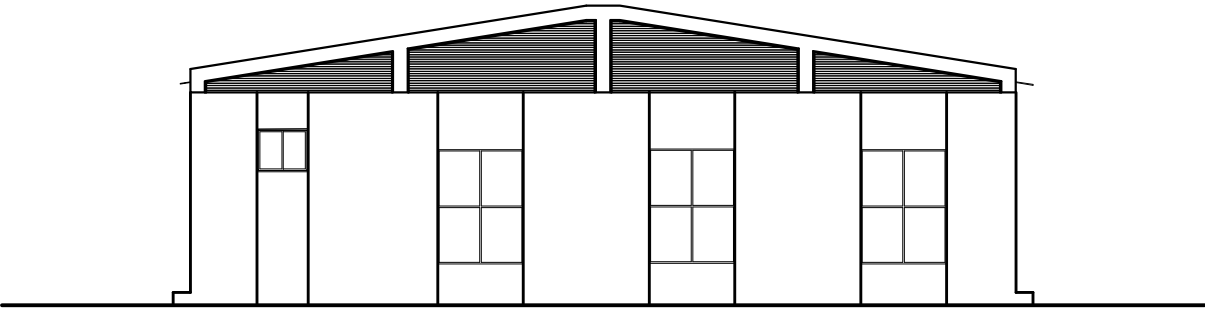
PURBANCHAL UNIVERSITY KHWOPA ENGINEERING COLLEGE DEPARTMENT OF ARCHITECTURE LIBALI, BHAKTAPUR	SUBJECT: INTREGATED SPORTS COMPLEX	NAME: AAYUSH MANANDHAR	B. ARCH 076 BATCH V/X
	TITLE: MASTER PLAN	ROLL NO: 760102	
		CHECKED BY:	SCALE: 1 : 200



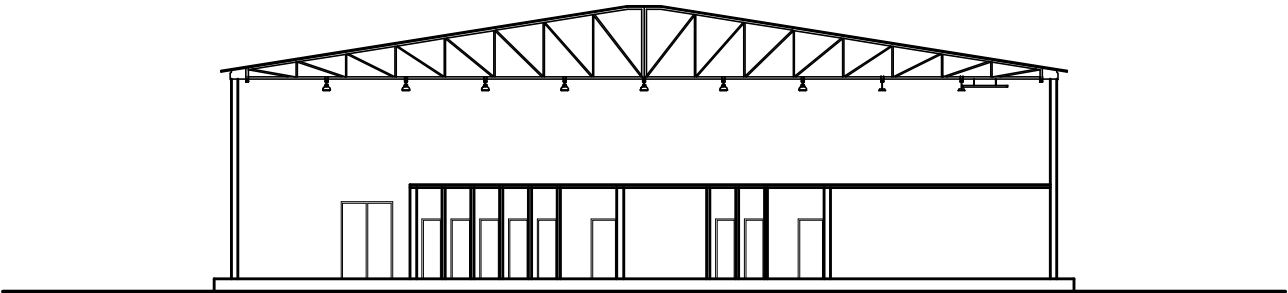
GROUND FLOOR PLAN
AREA: 1323.61 SQ.M.



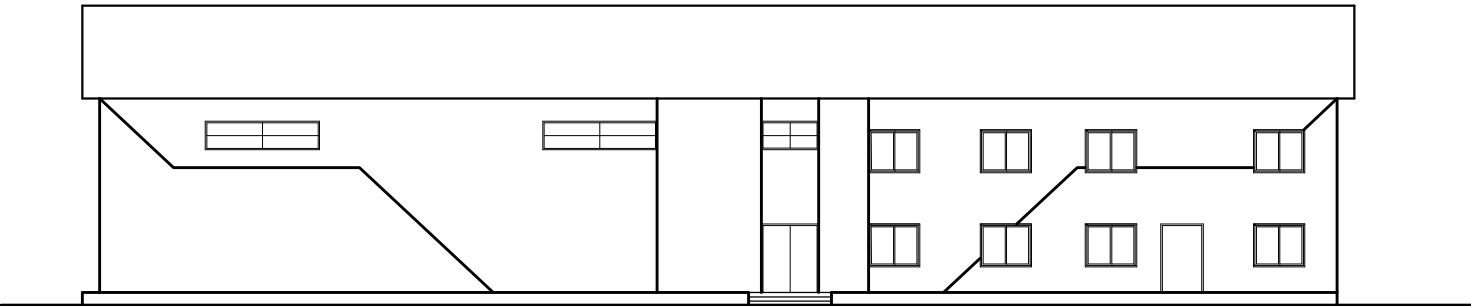
SOUTH ELEVATION



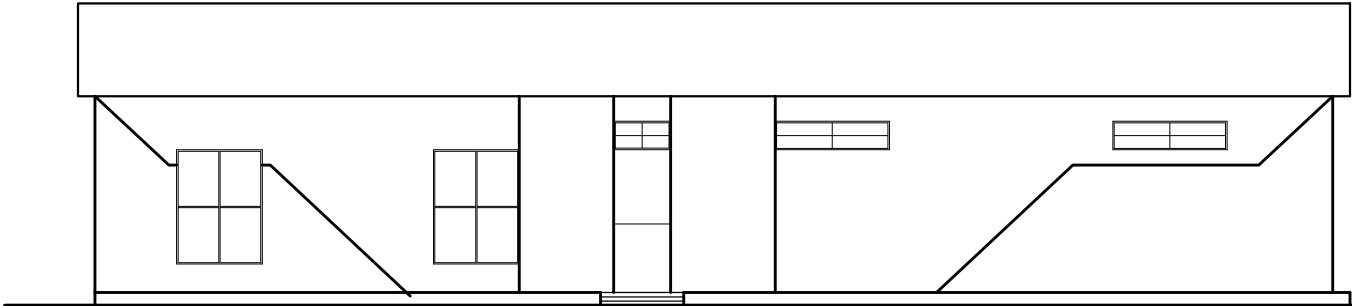
NORTH ELEVATION



SECTION AT T-T



EAST ELEVATION



WEST ELEVATION

3D VIEWS

