

Urban Stadia : Integrating Stadium Design

Large Community space with Mixed - Use Building



THESIS BRIEF

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SAL SCHOOL OF ARCHITECTURE

In Antiquity, sports weren't solely Associate in Nursing recreation for the people, however a lot of how to achieve political support and pay respect to the Gods. At this early level of civilisation, man looked for an area to perform in, a place where crowds could amass and assimilate to be part of some thing larger than themselves. Hence the first stadiums were born.

The British brought soccer in India within the 19th century. The club got acknowledge in 1911 when it became the first Indian team to raise the IFA defend. The national football team was also quite successful until the 1970s, qualifying for Olympic championships and the FIFA World Cup. The team qualified for the 1950 World Cup final in Brazil, but could not appear as they still played in their bare feet at that time. The Indian team additionally won the 1951 and 1962 Asian Games gold awards in football. In 1956 the Indian team completed fourth at the Melbourne Olympics.

Football has never been a trendy sport throughout India. For most of the century, the Indian sports scene had dominated by hockey. In the later part of the century, cricket been popular. Football is still prevalent in West Bengal, Goa, and Kerala, West Bengal, Mizoram, Meghalaya, Manipur, and Sikkim. Still, the national football games organized in Salt Lake Stadium, Kolkata, which is the biggest arena in Asian. Even today, players from these regions form the backbone of the Indian National side With youngsters like Sunil Chhetri, and the veteran presence of Bhatia, the future of Indian football looks bright. Albeit Indian Football is going to ascend from its remains, Lack of quality football stadiums is a problem for India, considering the advantages of the game for the country, each economically and politically. As we know, Indian football does not get the opportunity at the national level because of a Lack of political support and facilities.

The game in India administered by the All India Football Federation (AIFF) based in Dwarka near Delhi, which is related to the regional Asian soccer Confederation, additionally on the worldwide body FIFA. Better framework of city, opportunities and training will urge the more youthful age to take up the sport of football and exceed expectations in it worldwide and at exactly that point, would we be able to seek after a greatly improved world positioning.

The standard of Indian football (looked at all around the world) is poor- the national team is positioned past 100th spot on the world, and is said to battle to meet all requirements for both the World Cup and the Asian Cup. Some portion of this has been put down to the absence of chances for legitimate preparing and development of players in the nation. The situation demands that Ahmedabad. Being the industrial hub of Gujarat should have a state of the art football stadium associate degreed connected infrastructure which might be an epitome for the success of the notorious game everywhere the country. an it's something which can be an inspiration for the generations to come.

Aims & Objectives

Design intent:

- The primary intention is to design an iconic and futuristic stadium following the international standards that can be an inspiration to every person.
- The idea is to provide international standard iconic sports and community facility that reflects the spirit of football as a sport.
- To promote and enhance the prospects of sports.
- To provide for all citizens, a variety of enjoyable opportunities through physical activities.
- To train young people in various disciplines of sports.

Sub - Objectives:

- Integrated stadium complex
- Iconic stadium
- Futuristic and sustainable design
- Multifunctional facilities for year-round activities

Methodology

- Research on the condition of football infrastructure in the country and the Ahmedabad city
- Conduct national and international case studies
- Choose a feasible site and lead a point by point site analysis
- Design a suitable arena with the learning

CASE STUDY

The Narrative of the Theoretical Aspect

Kansas City's Arrowhead and Kauffman Stadiums, showing the area of impact that two stadiums can have together, when not integrated into the urban environment.



San Francisco Giants AT&T Stadium, a good example of stadium design integration into its site.



A design typology that has a lot of success in creating lively and functional urban environments is mixed-use buildings. They are able to fulfill many of the needs around them such as residential spaces, office spaces, and retail spaces, so the building is always being used and that is all being accomplished with one building's worth of space, which is very beneficial to dense, urban environments.

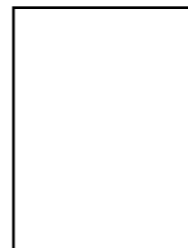
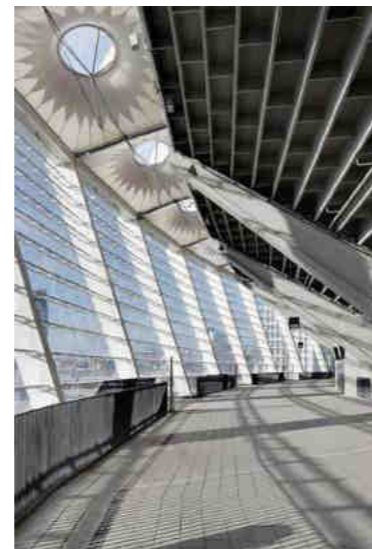
Olympic Stadium

GMP (Gerkan, Marg und Partner) Kiev, Ukraine



Seating Capacity: 68,000

- 40 gates allow the 68,000 possible spectators to enter into the primarily glass and steel structure.
- The seating areas are placed further from the pitch than many other fields in order to accommodate the Olympic-sized track around the soccer pitch.
- With the renovation, box seats were brought into the design on the west stand, a plaza to the west of the stadium, a garage below it, and a park that has been landscaped.
- The entrance for VIP's is served through the lobby of a hotel that is adjacent to the structure.
- The upper section of seats is surrounded by an exoskeleton created by 80 slim columns made of steel. These columns stand 42 feet high above the concrete and support the roof of the stadium that is designed like a bike wheel, where the spokes tie a tension ring in the center of the roof to a couple of rings on the perimeter of the stadium that serve as compression agents. There are screens made of glass that give the circulation spaces shelter and tie all of the structural elements together into one cohesive unit.
- The roof is made of PTFE (glass-coated textile) material that is reinforced by panels that are star-shaped at the locations of the skylights. Flying masts support the domed skylights. The roof contains 640 of these skylights.
- The VIP entrance to the stadium, is an Italian style of architecture.



California Memorial Stadium and Simpson Center for Student-Athlete High Performance

HNTB Architecture and STUDIOS Architecture
Berkeley, California



Size: 454,000 sq. ft.
Seating Capacity: 63,000

- The feature that attracted the fans the most to the renovation was the area they have to congregate before the games on the acre-and-a-half plaza.
- Even with the stadium's size of over 450,000 sq. ft., the stadium nestles nicely into the university's campus, running right along one of the school's main streets, Piedmont Avenue.
- The stadium has incredible views of San Francisco to the west.
- The concrete structure of the stadium borrows heavily from past coliseum and amphitheater designs.
- One of the largest features that is included in the portion of the stadium underground was the Simpson Center for student-athlete performance, whose entrance was located between two substantial walls made of concrete and limestone.
- The 145,000 sq. ft. center sky-lit training center has an amazingly open feel to it.



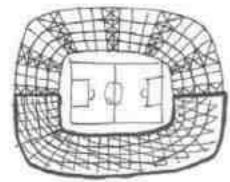
Allianz arena

Herzog & de Meuron Architect
Munich, Germany

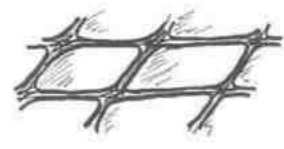


Seating Capacity : 75,000

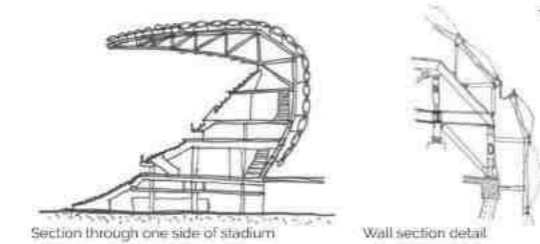
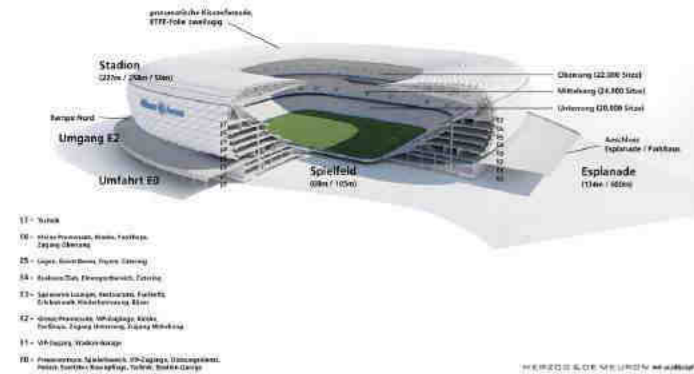
- The building gives motivation in the structure it receives as a arena.
- The characterizing highlight, the air filled plastic “balloons” that ring the arena, give the arena and notorious nearness that has become a Landmark popular the world over.
- The facade is illuminated by LED lighting and takes the shade of the national team that is playing that specific night, changing the outside into stunning red, blue or white that strengthens the supporters filling in and sets the mood for the rest of the event.
- The Allianz Arena volumetry has a monolithic aspect, which refers to Colosseum.
- The accesses were meticulously thought out at the Allianz Arena to ensure a perfect flow of people and vehicles.
- The complex designed around the stadium that will encompass this space would include parks, and mixed use development.
- The Allianz Arena has seven different levels, which divide players, press, VIP, staff, security and the general public.



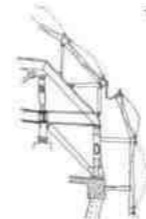
Roof structure + bracing



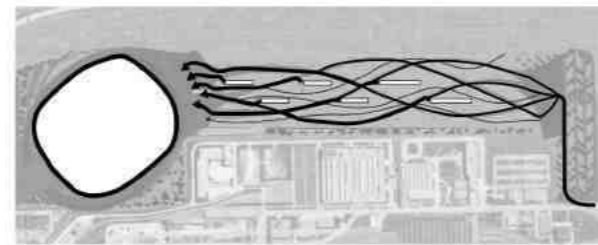
Facade detail



Section through one side of stadium



Wall section detail



The Beijing National Stadium

Herzog & de Meuron Architect
Beijing, China

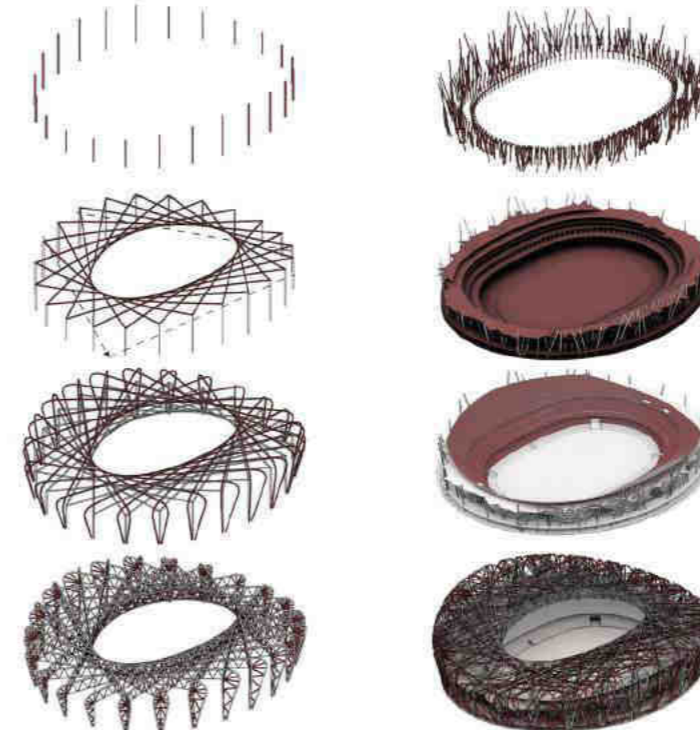


Seating Capacity: 80,000-91,000

- Known universally as the “Bird’s Nest”

CONCEPT :

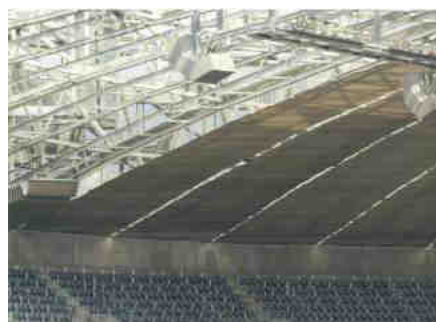
- Inspired by Chinese- style pottery
- Chinese-style pottery with similar pattern- Chinese likes thing to appear irregular, but underneath there are very clear rules.
- Circular shape represent heaven but described as bird nest.



- The Beijing National Stadium also referred to as the Bird's Nest Stadium took five years to complete and was constructed using 42,000 tons of steel, making it the largest steel structure in the world.
- The design is revolving on the nests of birds, not solely aesthetically but also at a structural level.
- The entire structure, visible from the skin, mirrors the branches of the nests that operating along side one another achieve out of the question resistance to the elements.
- The facade is open, a roof covering fabricated from single-layer ETFE membranes stretched between the steelwork sections protects the spectators from wind and rain.
- The team relied heavily on parametric style software system.
- This helped to figure out the sightlines, the bowl geometry, airflow to keep the grass in good condition, seismic studies and the design of the external envelope.

Comfort

The Allianz Arena provides exquisite comfort for users. The internal circulation is made by elevators and escalators, in addition to conventional stairs and The restaurants have been positioned at strategic points and provide incredible views of the arena's interior.

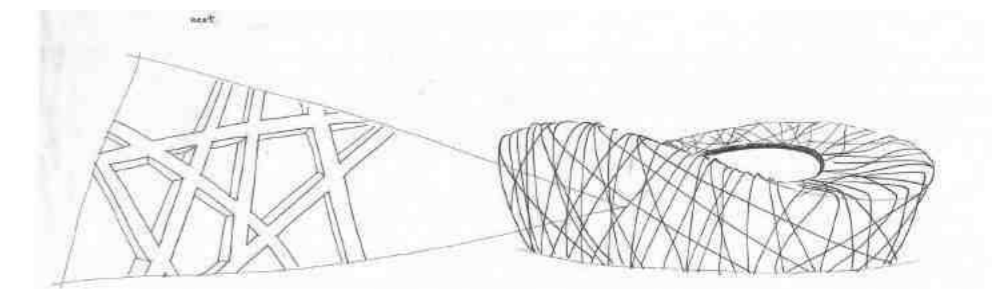


Retractable ceiling extended.



Retractable ceiling collected.

the retractable lining ceiling, which allows shading the grandstands when necessary.



Stadium Merdeka

Stanley Edward Jewkes Architect

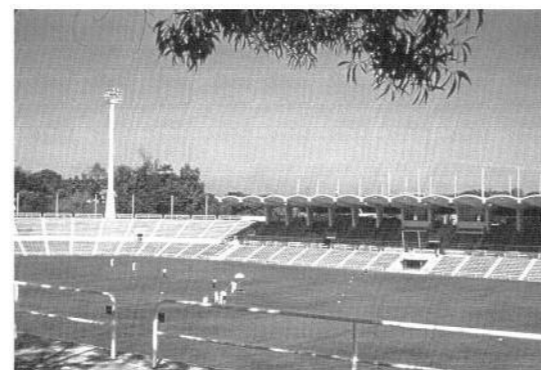
Kuala Lumpur, Malaysia



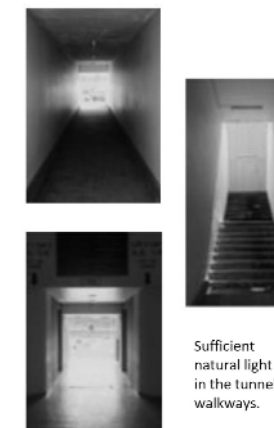
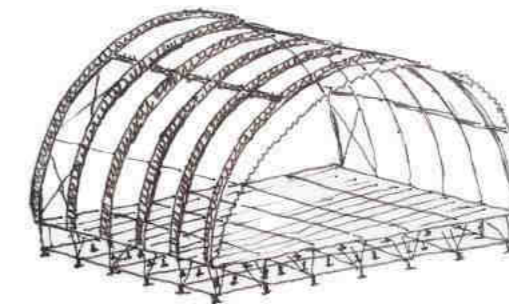
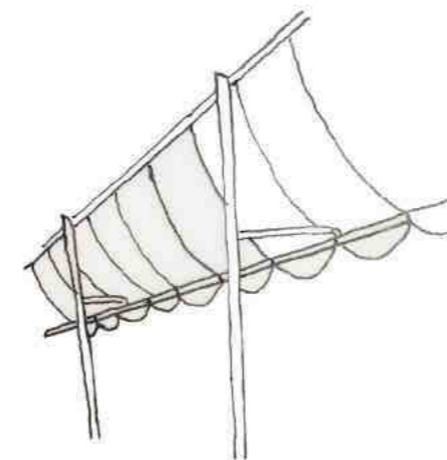
- The arena is placed just about a number of the outstanding design, that area unit which negara, chin woo sports stadium and others.
- It contains a direct panorama read of kuala lumpur city centre.
- Stadium was constructed, many types of recreation, concerns and sporting events were held from totally different countries and associates.
- Stanley Edward Jewkes who became the architect who designed Stadium Merdeka applied various innovation rule and capacities when planning Stadium Merdeka at some phase in the timeframe with time requirements.



ARCHITECTURAL STYLE



POST MEDICA MODERNISME



Sufficient natural light in the tunnel walkways.

- **ARCHITECTURAL ELEMENTS ROOF** : Roofs are created in an exceedingly large choice of type, flat, pitched, vaulted, domed, or in mixtures as determined by technical economic or aesthetic concerns.
- **NATURAL LIGHT AND VENTILATION** : Due to its alfresco structure, it directs a lot of penetration of daylight into the area that isn't absolutely exposed, as an example are going to be the tunnel walkways as the light will be a guide for the visitors to the seating areas.
- **CONCRETE SEMICIRCULAR ARC ROOF** : The roof is shaped as reputation of semi-circular Arch that stretches with a length of 10 metres.
- **CONCRETE STAIR WITH NET PATTERNED** : The outside steps has less painterly worth that is finished by having clean pattern hatched on the steps of concrete vacant steps.

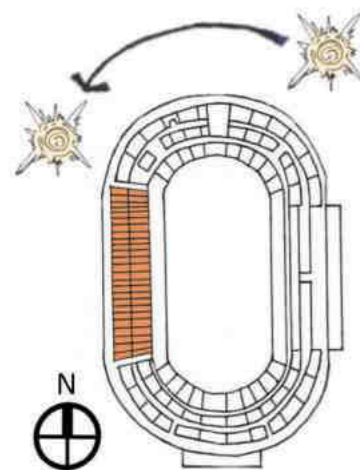
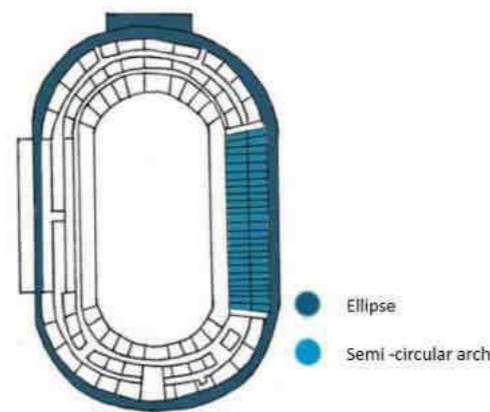
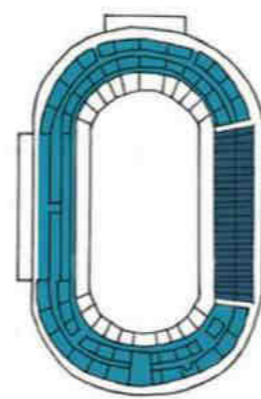


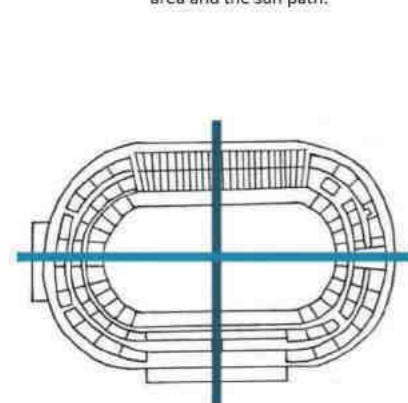
Diagram above indicate the shaded area and the sun path.



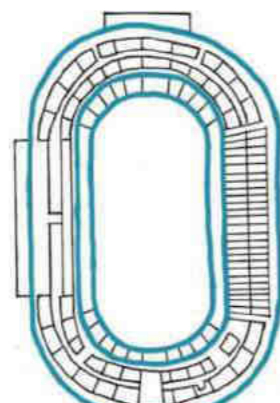
● Ellipse
● Semi-circular arch



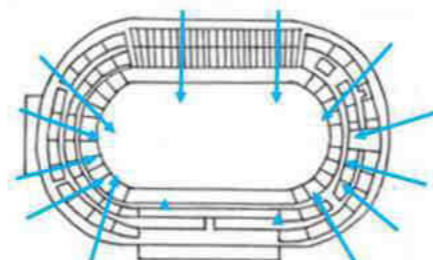
● Intermediate space
● Public space



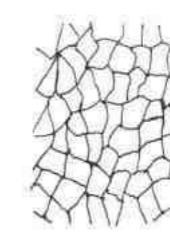
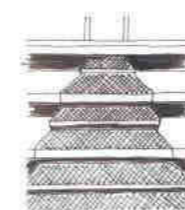
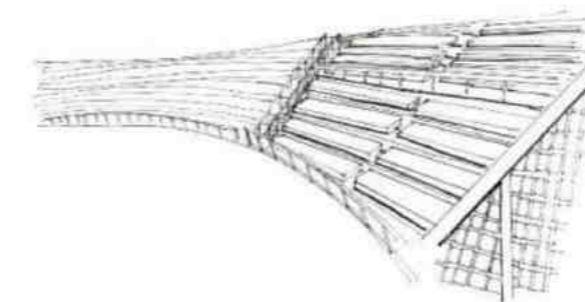
The horizontal and vertical axis that is being drawn through the building



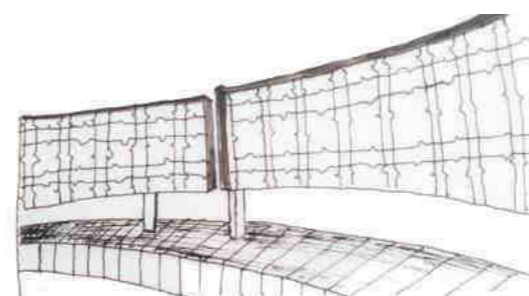
Configuration of repetitive overlapping elements



14 tunnel walkways that are accessible to the seating area.



The highlights of Brutalist architecture that were applied was use of fortified solid which is a raw material. Exposed concrete development utilized for stair, tiles and ground surface of the arena. The arena also used rough heavy form stone, concrete, stucco and glass materials on its outside. The explanation of utilizing this sort of materials around the time is to demonstrate that reality the character of the surface that can be seen is the utmost important. Among the qualities and highlight of local influence incorporated into the concept is utilized of Islamic geometrical patterns which serves as a reminder for people of their spiritual history and utilized as a representation for information. Other than that, dynamic shading, for example, red, green and yellow were utilized and thinks about the uniqueness of the particular culture in Malaysia which is giving a significance in the Islamic architecture. Next the utilized of shading green represented boundless bounty of paradise and the gifts guaranteed by a caring creator and his boundless capacity to give and Nourish life. The utilization of orange shading is an image of sovereignty, respectability or bounty.

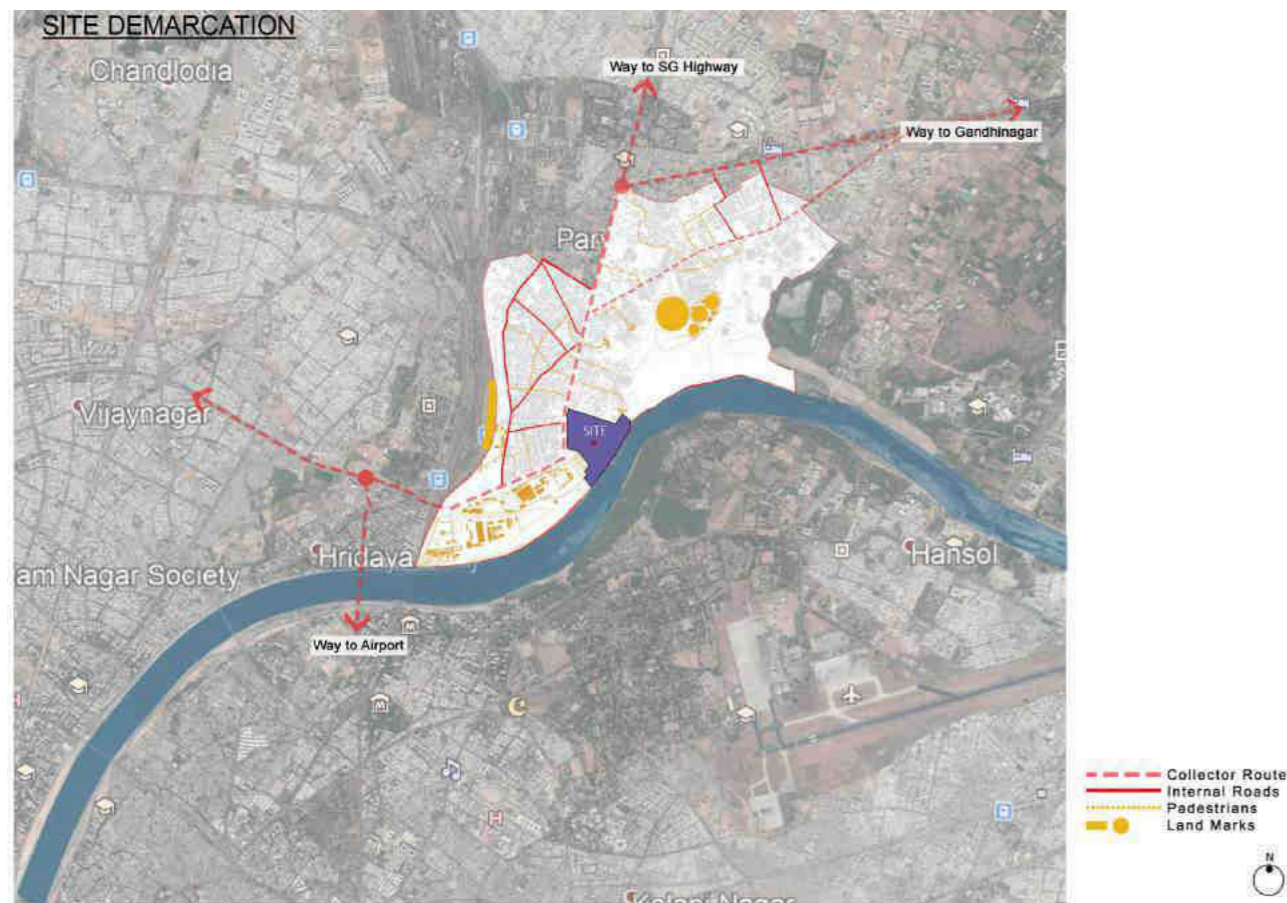


The usage of colour for the infrastrucur

SITE ANALYSIS

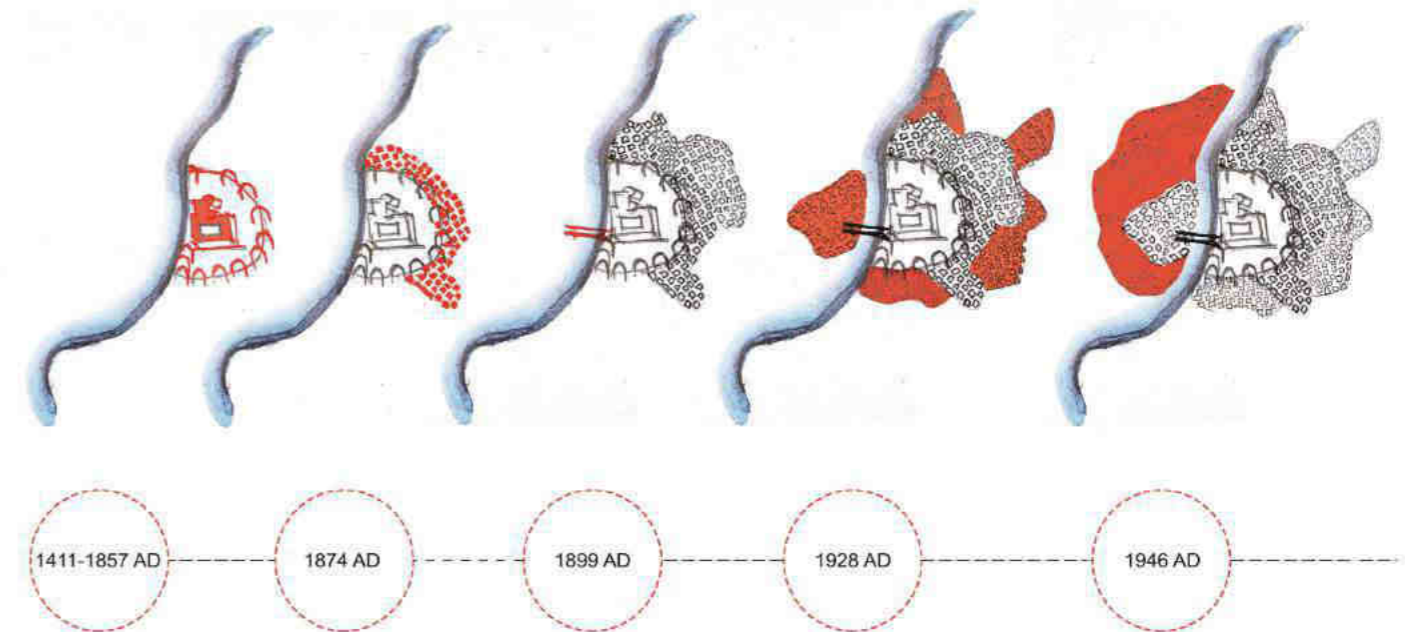
Site

Located at Sabarmati river bank of Ahmedabad. The Site has been chosen for various reasons and aims in mind, which should be achieved for its functions. The primary reason is easy transportation connection which can help reduce the load from the heart of the city. Availability of the social infrastructure i.e. residential facilities around which gives a walkable distance to the workplace. The Site is adjacent to cities power and water facilities also. Thus the aim is to diversify the culture, create public spaces, develop riverfront and a unique identity on site.

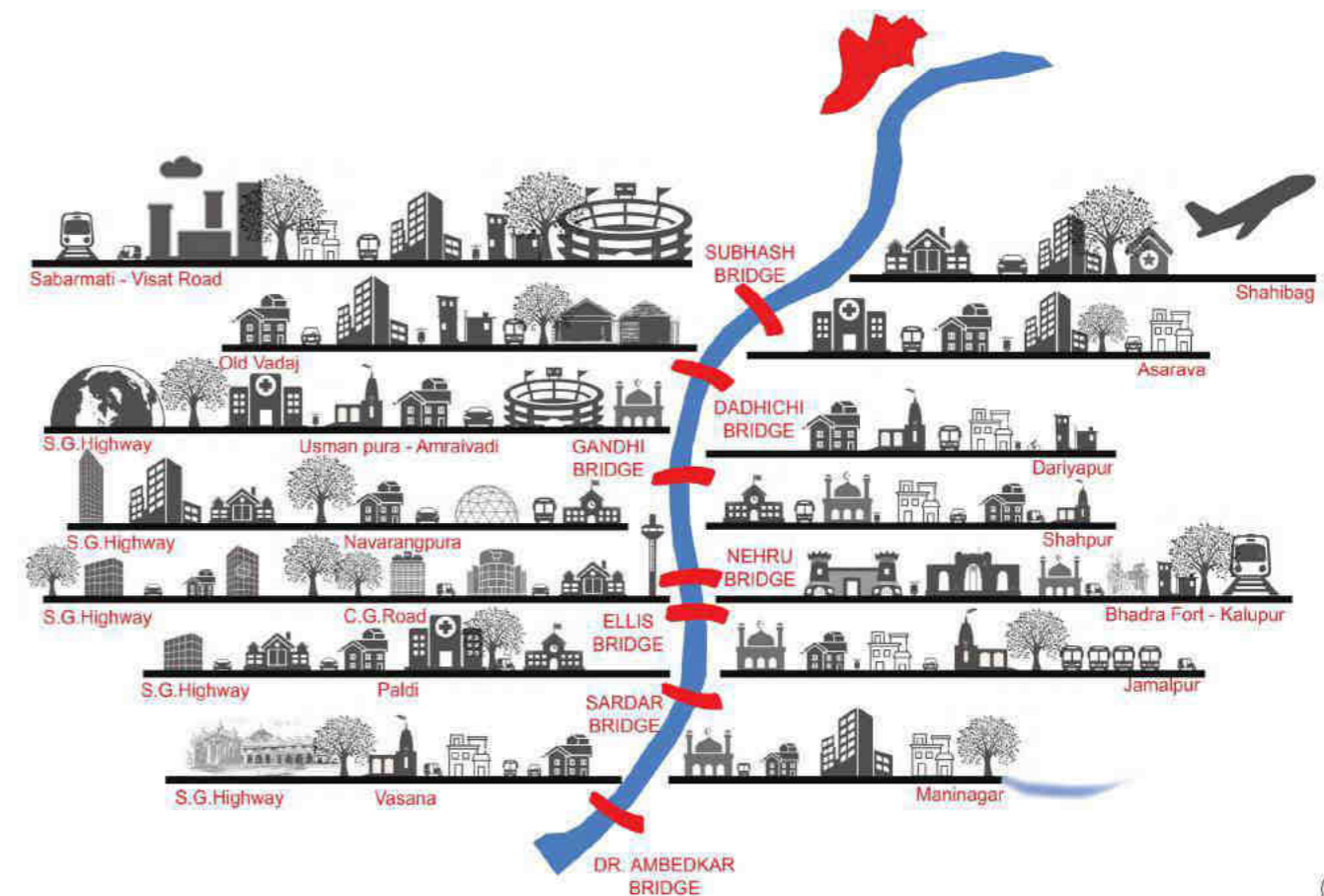


- Easy connection to transportation system i.e. BRTS and Metro and SVP International Airport is near by.
- Easy access to main road and public transportation.
- Torrent power in vicinity.
- Due to Ahmedabad-patan highway, area is getting developed.
- It is surrounded by a large residential neighbourhood.
- Large amount of open space.
- Public Spaces needs to be increased like (squares or Chowk).
- Availability of social infrastructure for public amenities.
- Easy of living, Workplace, Living, Social infrastructure- walkable distance.
- Diversified culture.
- River- edge needs to be developed.
- The site is adjacent to the Sabarmati Water supply.
- Sports Complexes Gives place unique identity.
- The burden on the heart of the city needs to be lowered and shifted to the edges of the city.

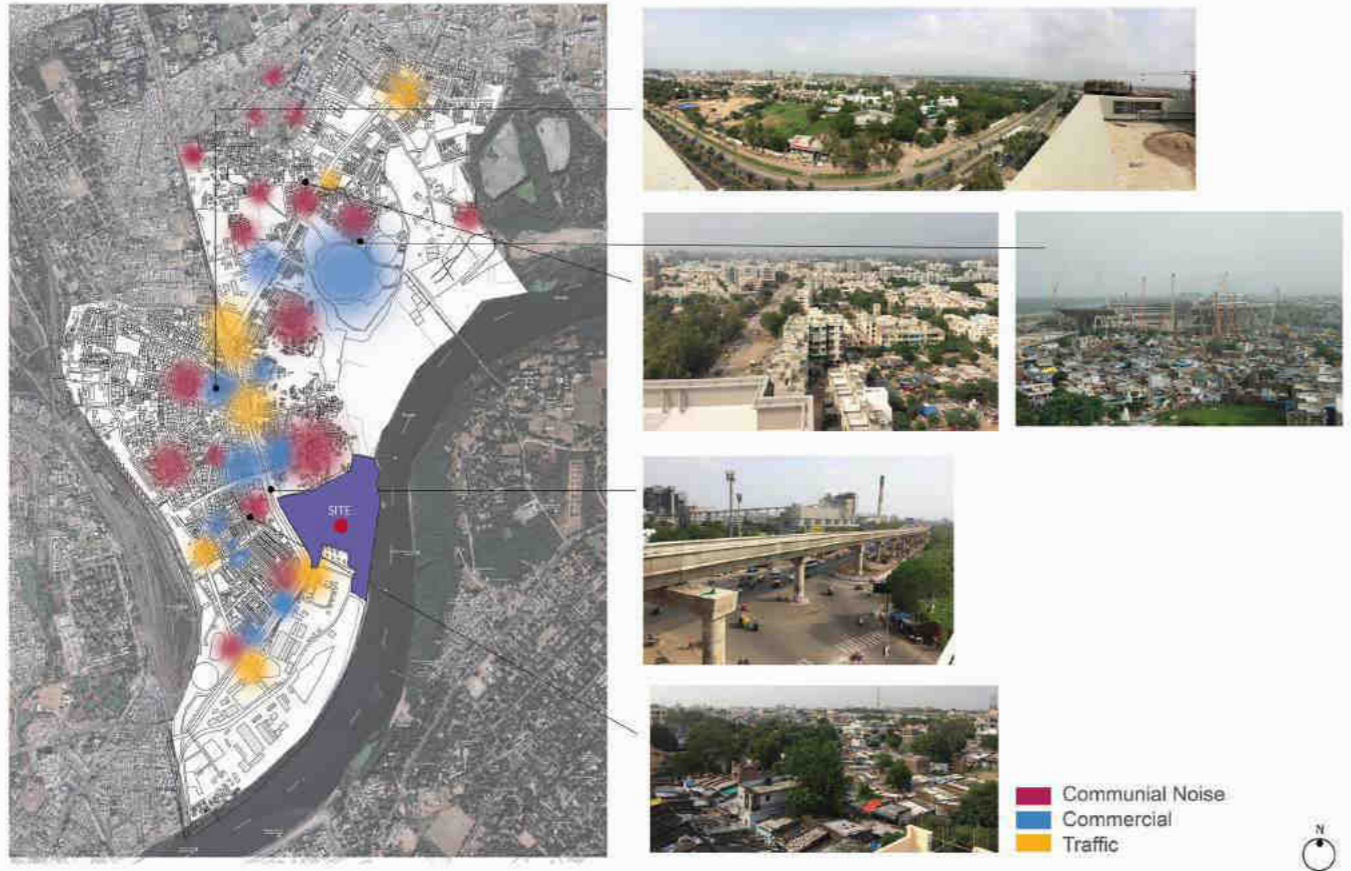
EVOLUTION OF AHMEDABAD



CITY IMAGE



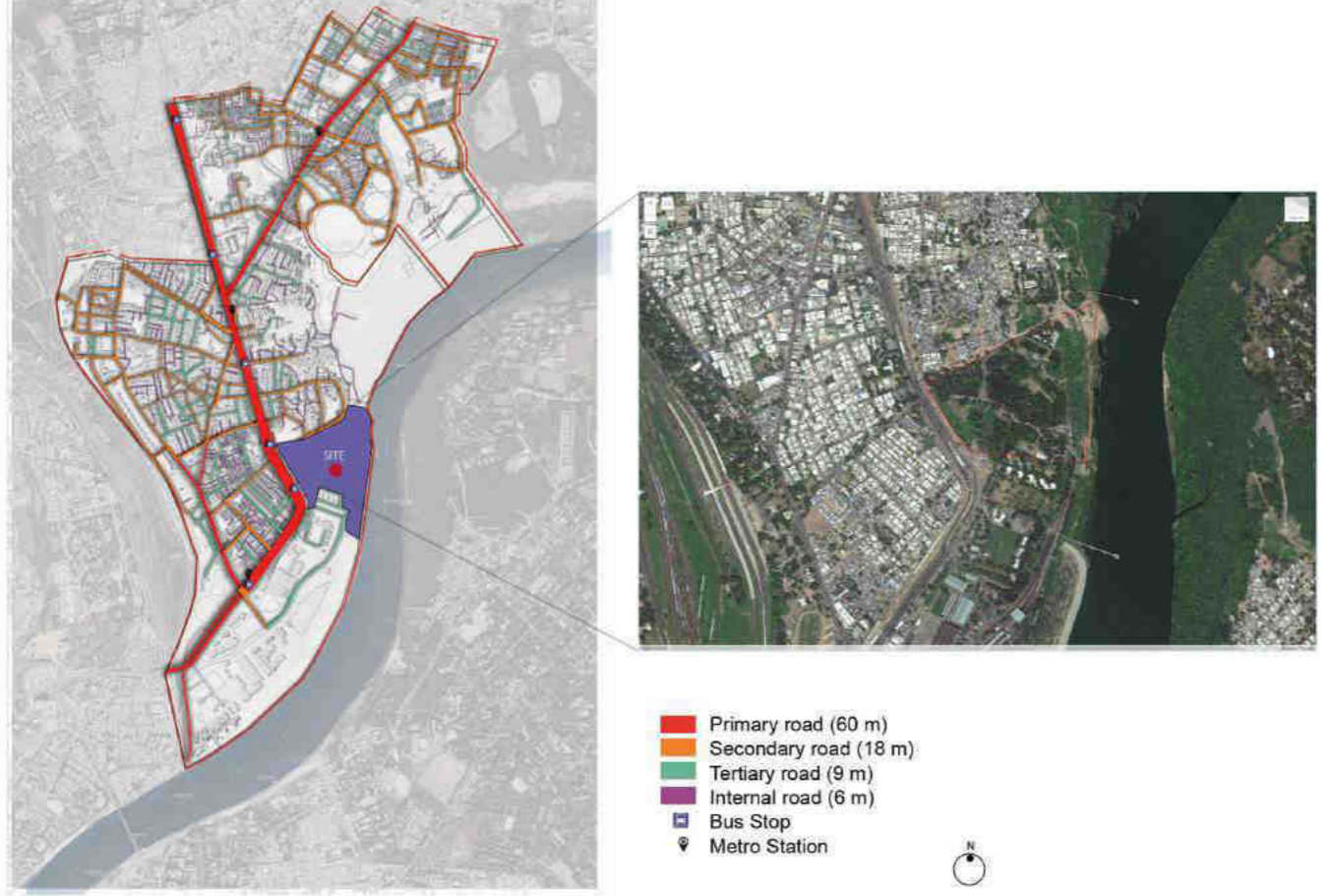
SENSES
NOISE & SOUND



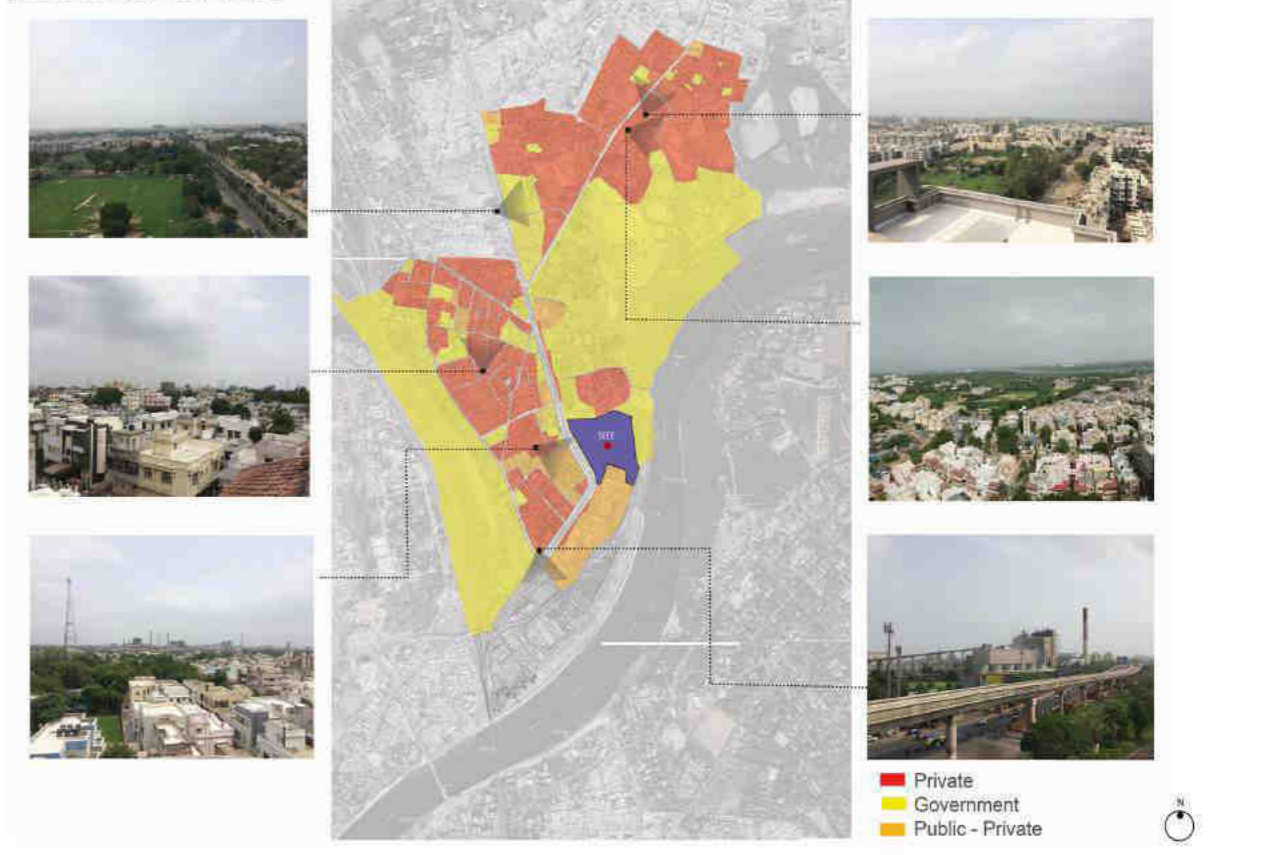
ADVANTAGES OF THE SITE



ROAD NETWORKS



OWNERSHIP MAPPING

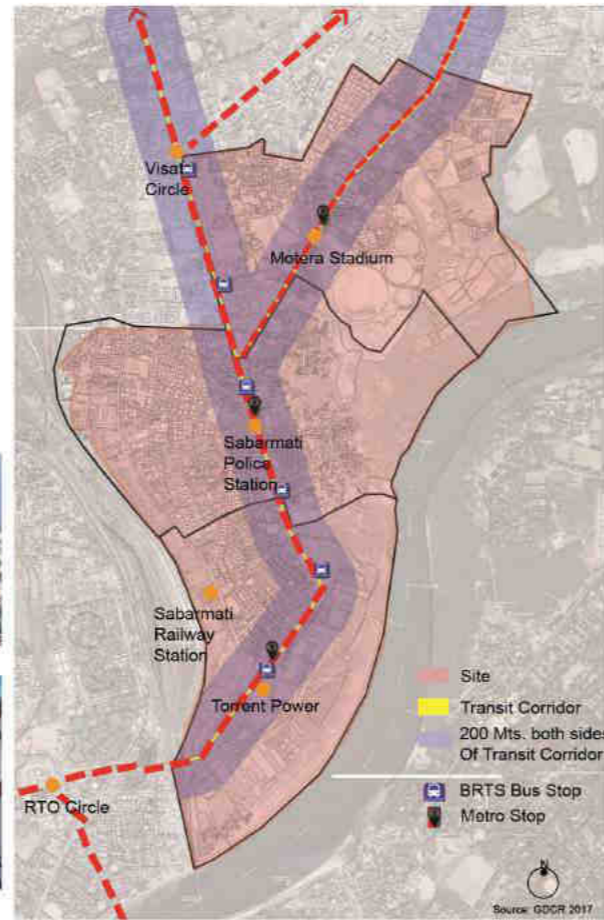


REGULATIONS & OPPORTUNITY

WARD	SABARMATI
ZONE	AHMEDABAD WEST
AUTHORITY	AHMEDABAD MUNICIPAL CORPORATION
CONCEPTUALISED USE ZONE	SMART CITY & TOZ

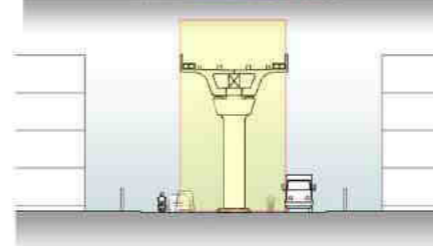
- SMART CITY & TOZ IS PERMISSIBLE IN RESIDENTIAL, COMMERCIAL & RECREATION ZONE

TOD IS NOT PERMITTED:

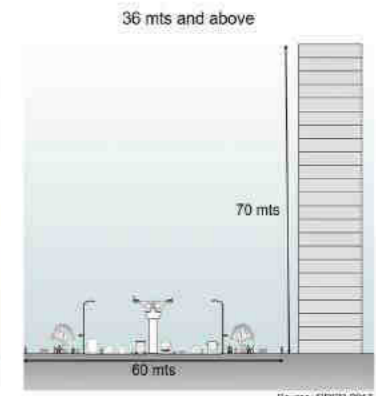
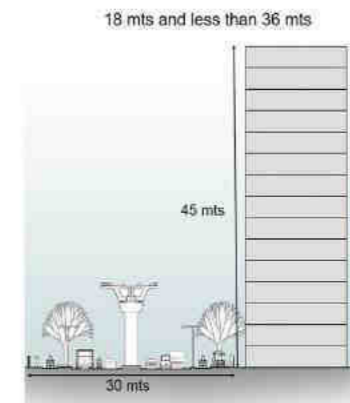
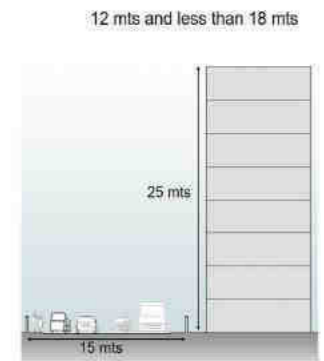
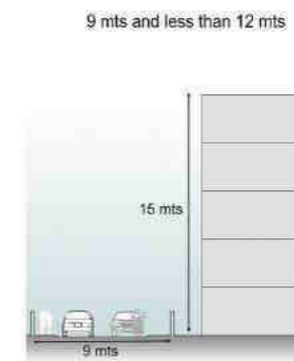


REGULATIONS

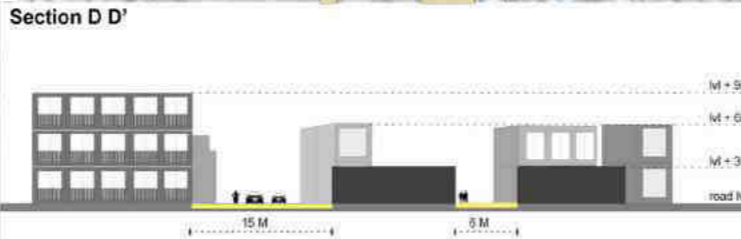
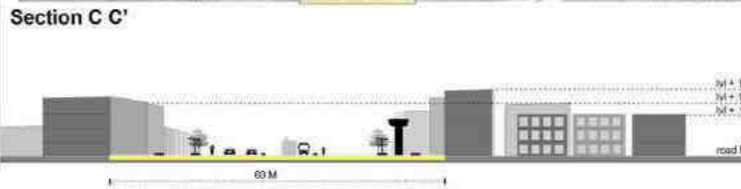
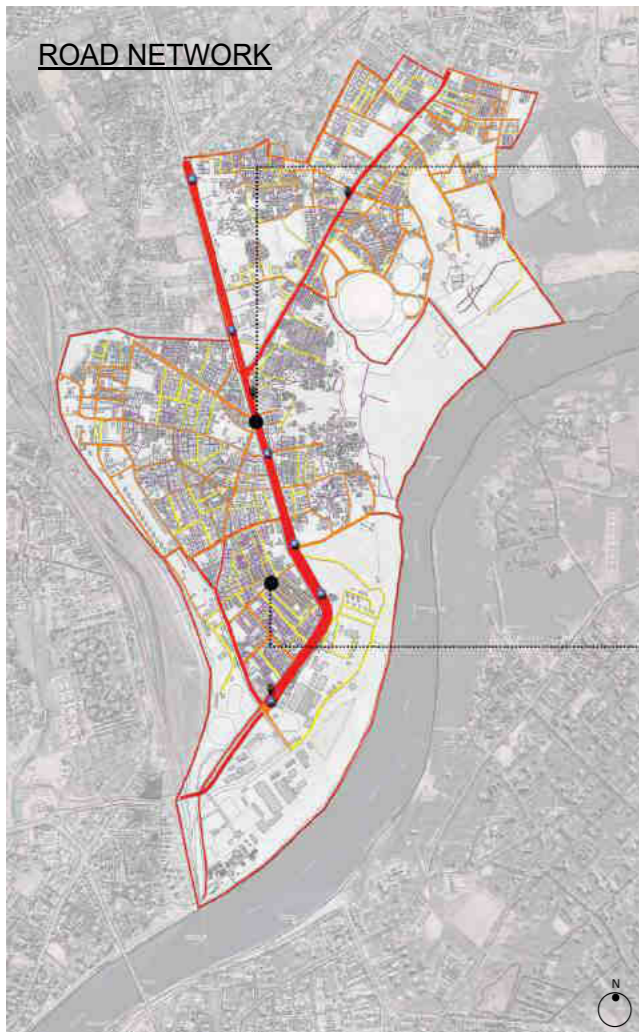
FLOOR SPACE INDEX



ROAD WIDTH AND HEIGHT



ROAD NETWORK



REGULATIONS

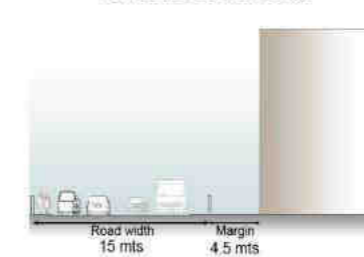
FLOOR SPACE INDEX



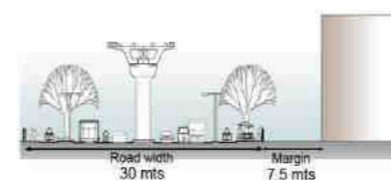
Above 9 mts and less than 15 mts



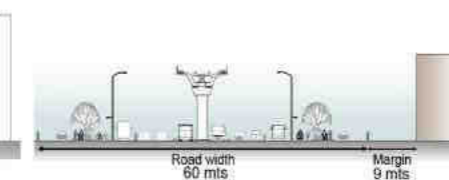
15 mts and less than 18 mts



30 mts and less than 36 mts



36 mts and above



ROAD WIDTH AND PERMISSIBLE USES

9 mts and less than 12 mts

- Residential
- Commercial
- Shopping Malls
- Schools
- Religious
- Community Hall

12 mts and less than 18 mts

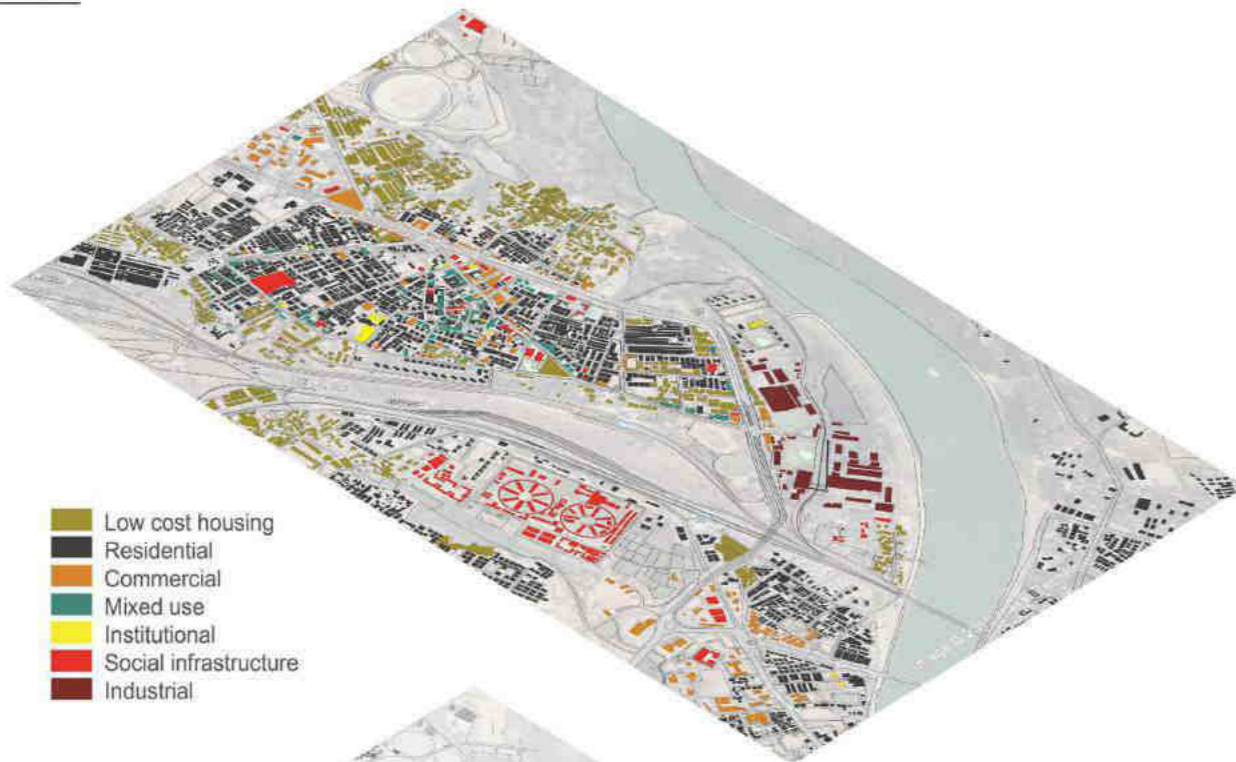
- Residential
- Commercial
- Shopping Malls
- Schools
- Community Hall
- Temporary Use
- Public Institutional

30 mts and more

- Residential
- Commercial
- Shopping malls
- Colleges
- Community Hall
- Theatres, Cinema Halls
- Exhibition Hall
- Party Plots
- Institutional
- Hospitality
- Service Establishment
- Storage
- Transport
- Sports and Leisure
- Temporary Use
- Recreation
- Public Institutional

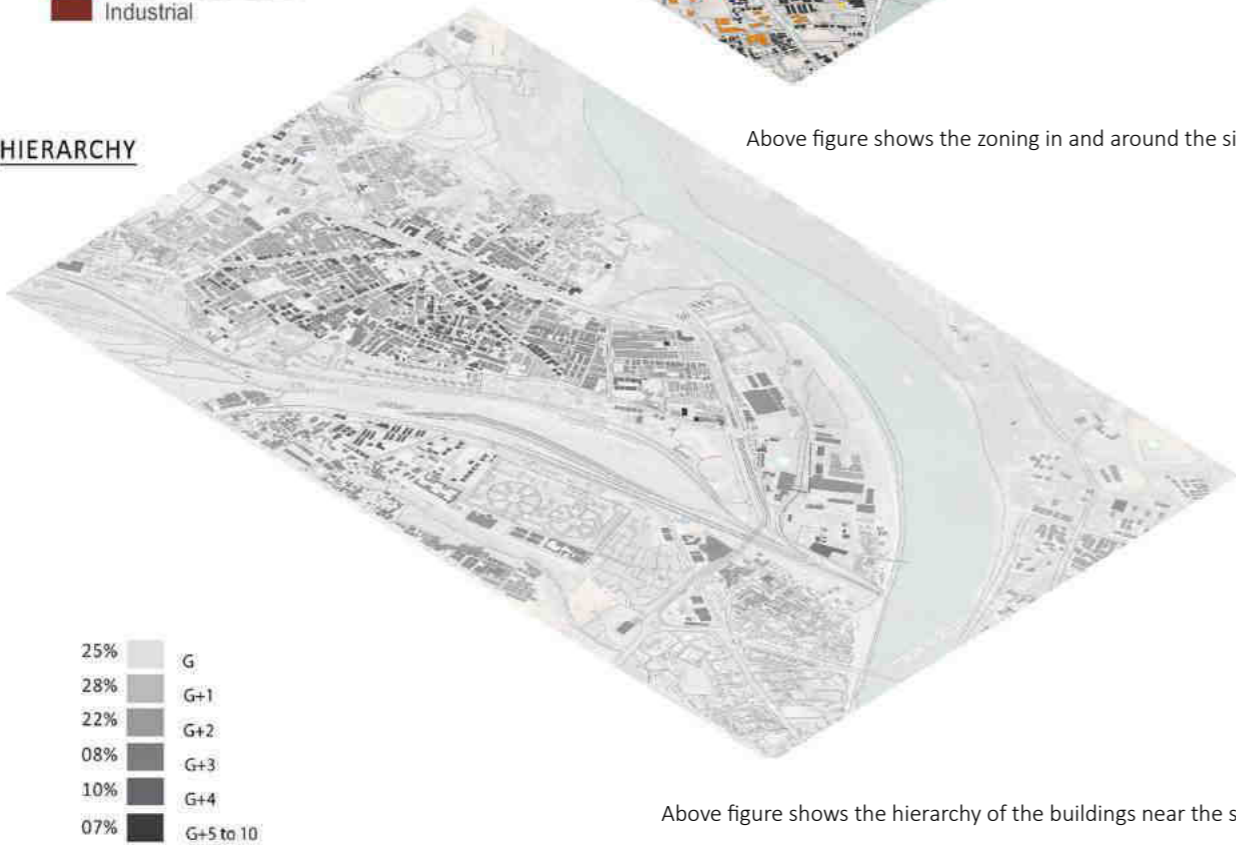
Source: GDCR 2017

LAND USE



Above figure shows the zoning in and around the site.

HIERARCHY



Above figure shows the hierarchy of the buildings near the site.

LAND USE AND HEIRARCHY

SWOT
Precinct 3



Part 1 - Dense Societies



Easy Access to Highway



Key Plan

Strength



Easy connectivity between railway and torrent power



Easy connection to transportation system i.e. BRTS and Metro.



More flow of commuters because of Railway Station



Easy access to BRT and MRT



Torrent Power in vicinity

Weakness



Noise pollution created by Power station, as well as railways



Nuisance



Less educational institute

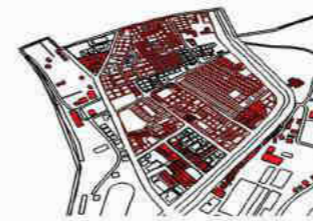


No Signage



No market in vicinity

SWOT
Precinct 3



Part 1 - Dense Societies



Easy Access to Highway



Key Plan

Opportunities



Incorporating buffer zone and green spaces



re-developing chawl areas



job opportunities can be developed.



Encouraging user-friendly pedestrian circulation

Threats



Unable to displace torrent power or use its land



Conflicts



Air Pollution



Mismanagement due to rush



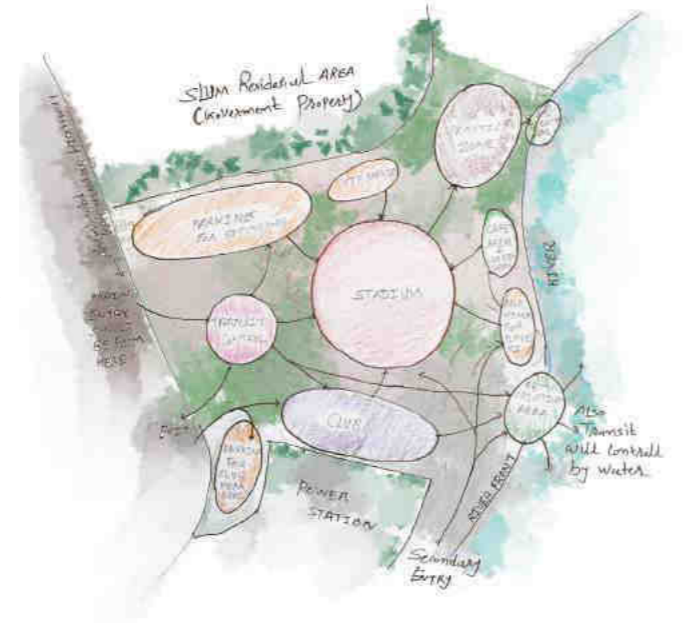
High Fares

Conceptual Thinking

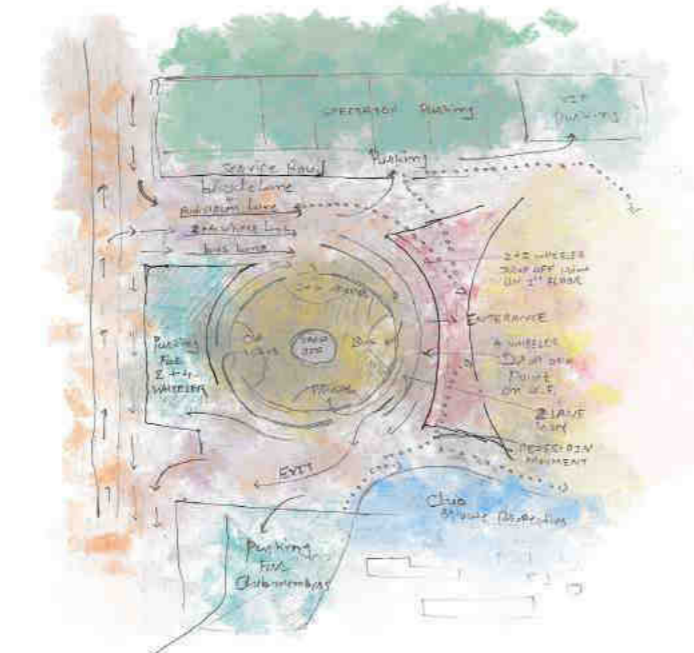


Diagram from initial concept

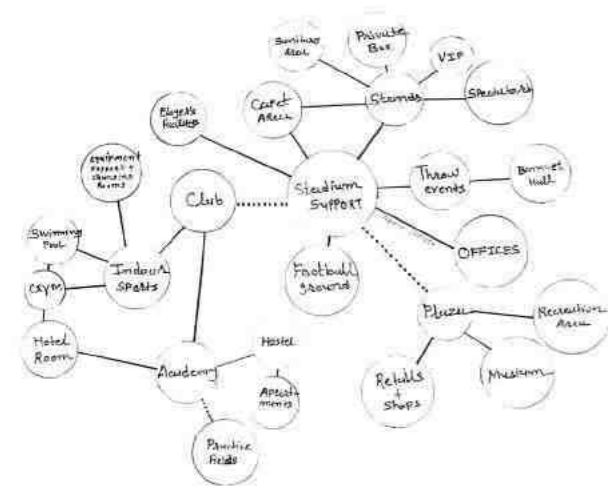
2. This diagram gave more clear understanding about the placement of function on site while considering the circulation and vehicular and pedestrian movement.



3. Above diagram, represent the kind of circulations to be planned. This includes the bicycle lane, pedestrian walkways, heavy and light vehicular movements as well as their parking. Such planned circulations helps creating a smooth traffic flow all over the site.

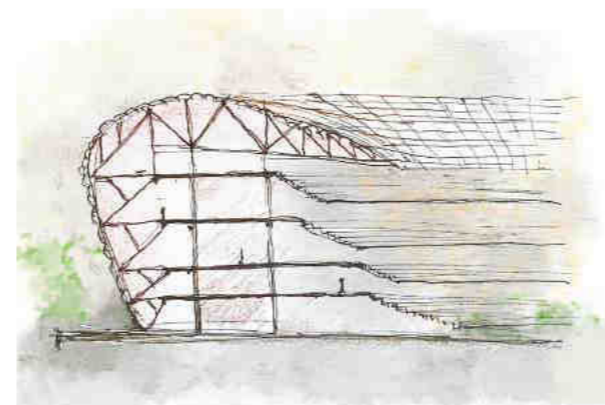


The organization of these sports demands a formalized degree of Indian Sports for providing viable infrastructure. It is important to understand that if the ground in front of river front is transformed into infrastructure based facility, it would formalize the system of Sports making them more sophisticated which would be a strong break for the traditional sports to public entertainment, leisure or recreational hub. Sports are more influential than inspirational. Observing a game with the exact game science is considered an art in cases of these game. This observations help to increase the game in many ways. A thought of designing a sports stadium for these observers or audience can be intervened. There is an idea to abstract the historical evolution of these sports and formulate them for the people and by the people. So an observation stadium will cater both the sides of these games.

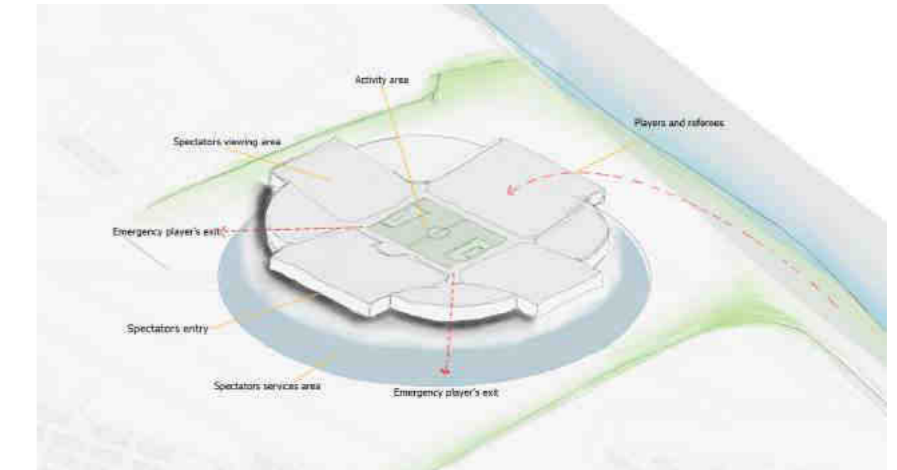
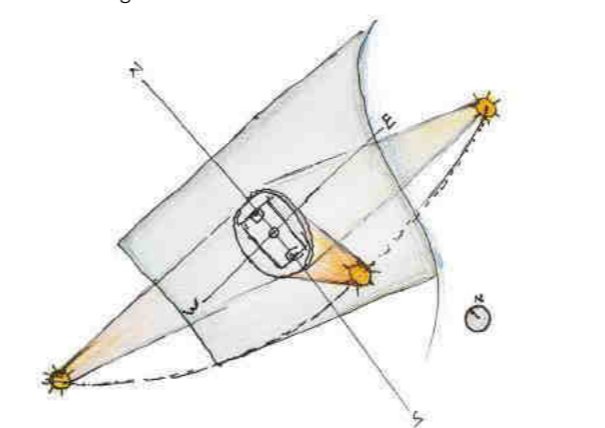


1. Above diagram illustrates the interrelationship between the various functions. The bubble diagram helped in getting a basic understanding of programs, areas for the function and their placement on site.

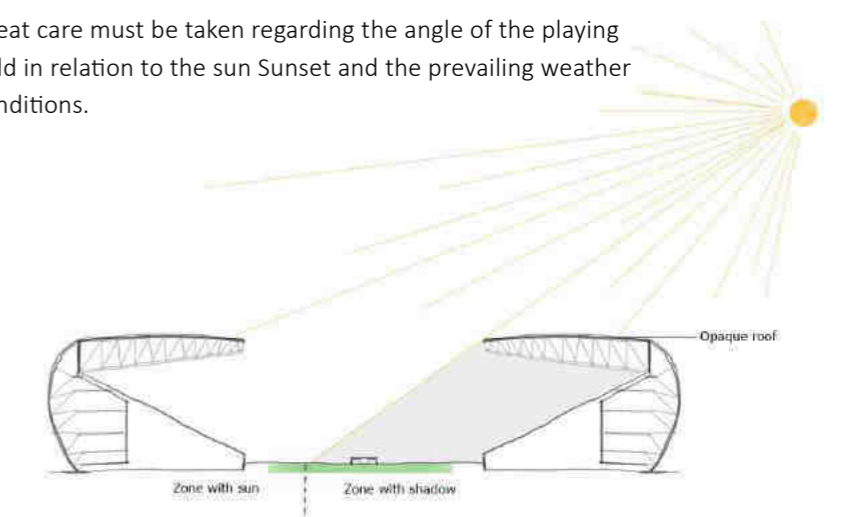
4. Conceptual sketch showing the building structural system in section.



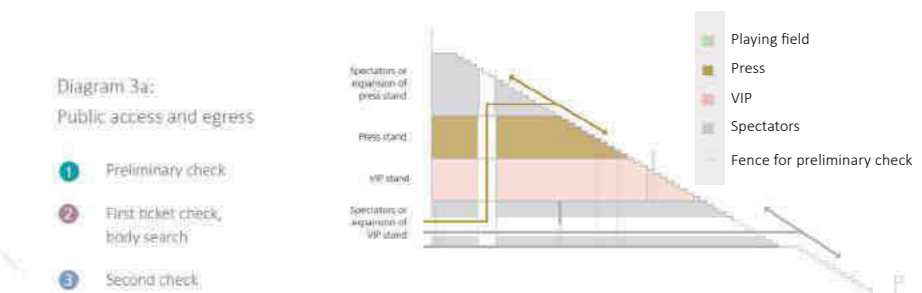
5. Plan showing the basic orientation of the building considering the sun path diagram to improve the energy efficiency of the building.



Great care must be taken regarding the angle of the playing field in relation to the sun. Sunset and the prevailing weather conditions.



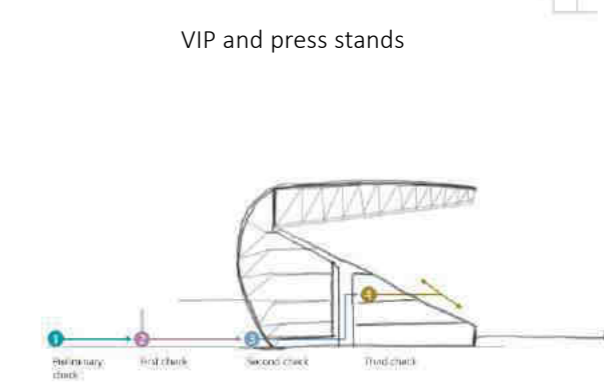
Solution for avoiding shadow on playing area during the match



VIP and press stands

Diagram 3a: Public access and egress

- 1 Preliminary check
- 2 First ticket check, body search
- 3 Second check
- 4 Third check
- VIP stand
- Stands for 25,000 spectators
- Media stand
- Emergency exits for ambulances, fire engines and police vehicles



Stadium checks

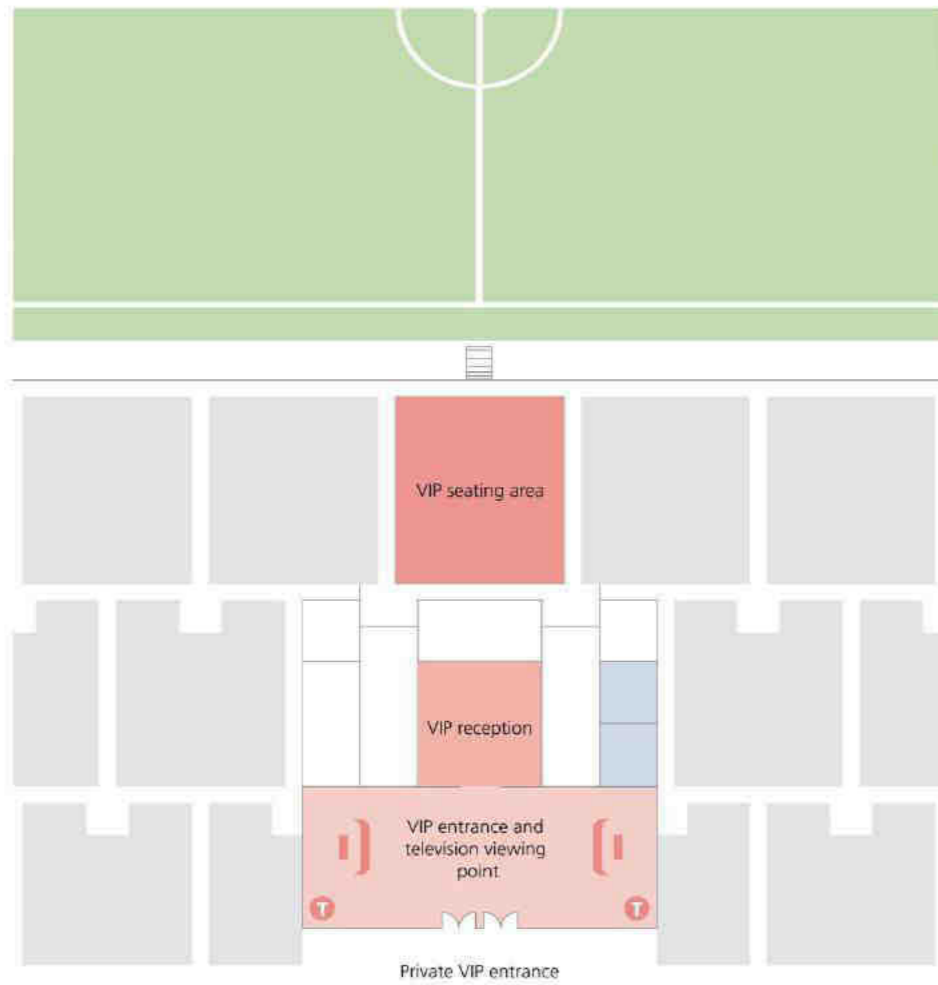


Diagram 7a:
VIP seating area

- T Telephone
- Toilet
- Spectators' area

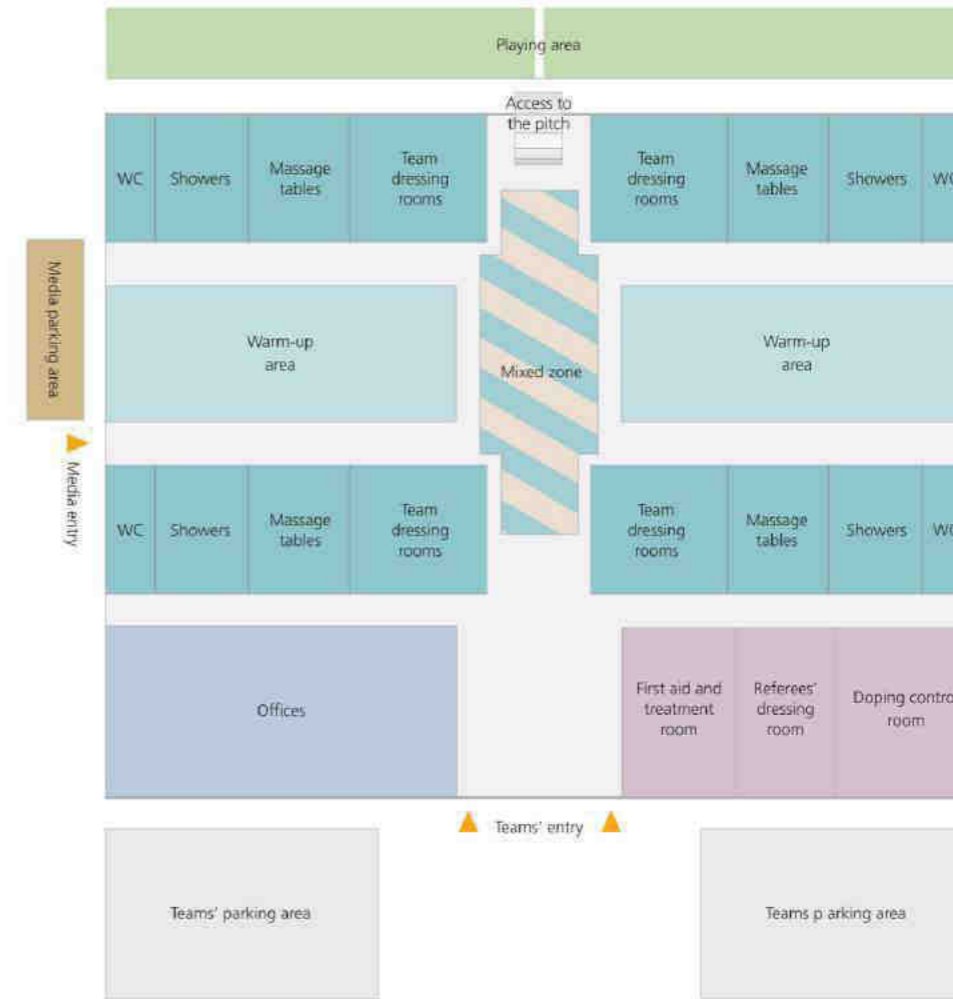
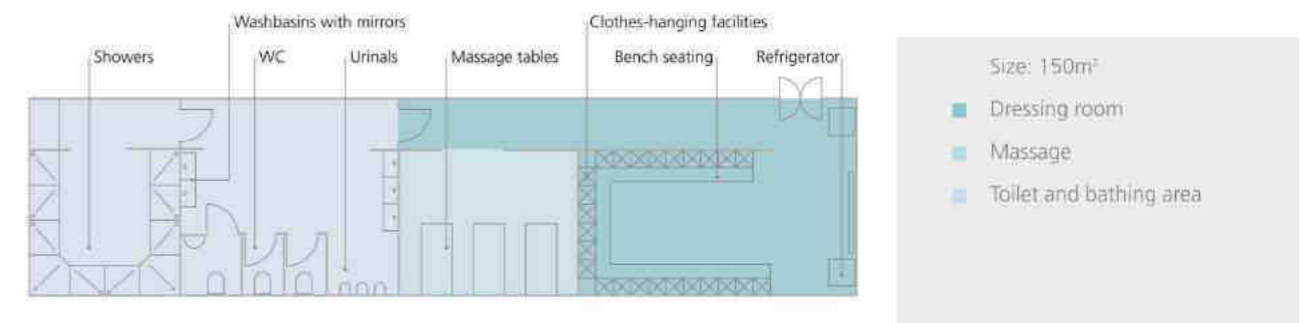


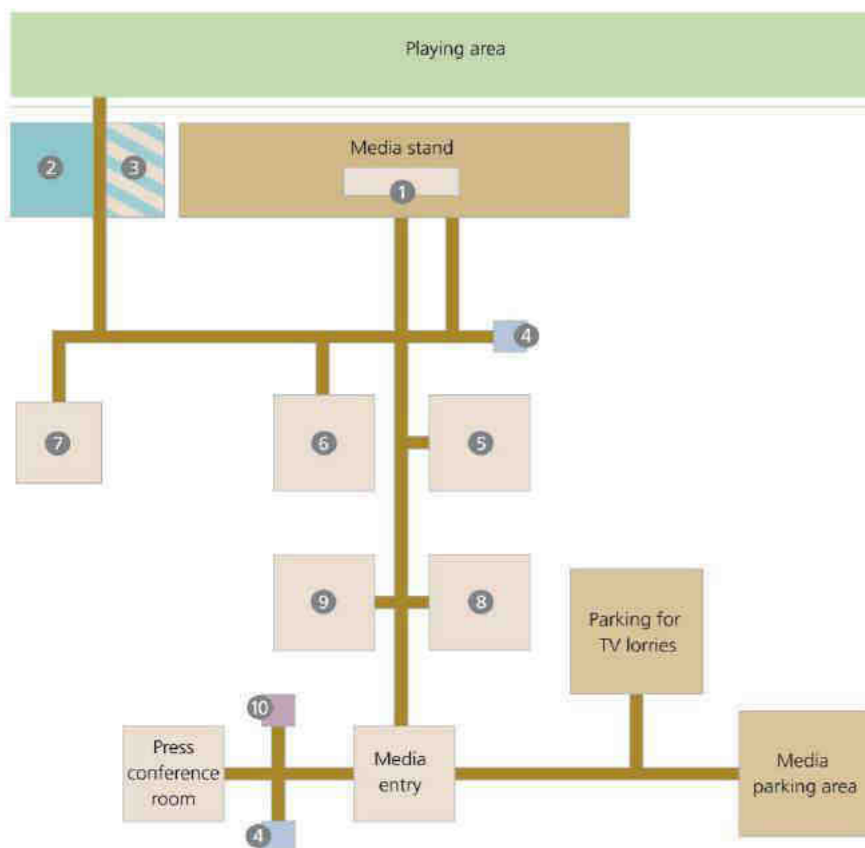
Diagram 8c:
Media areas

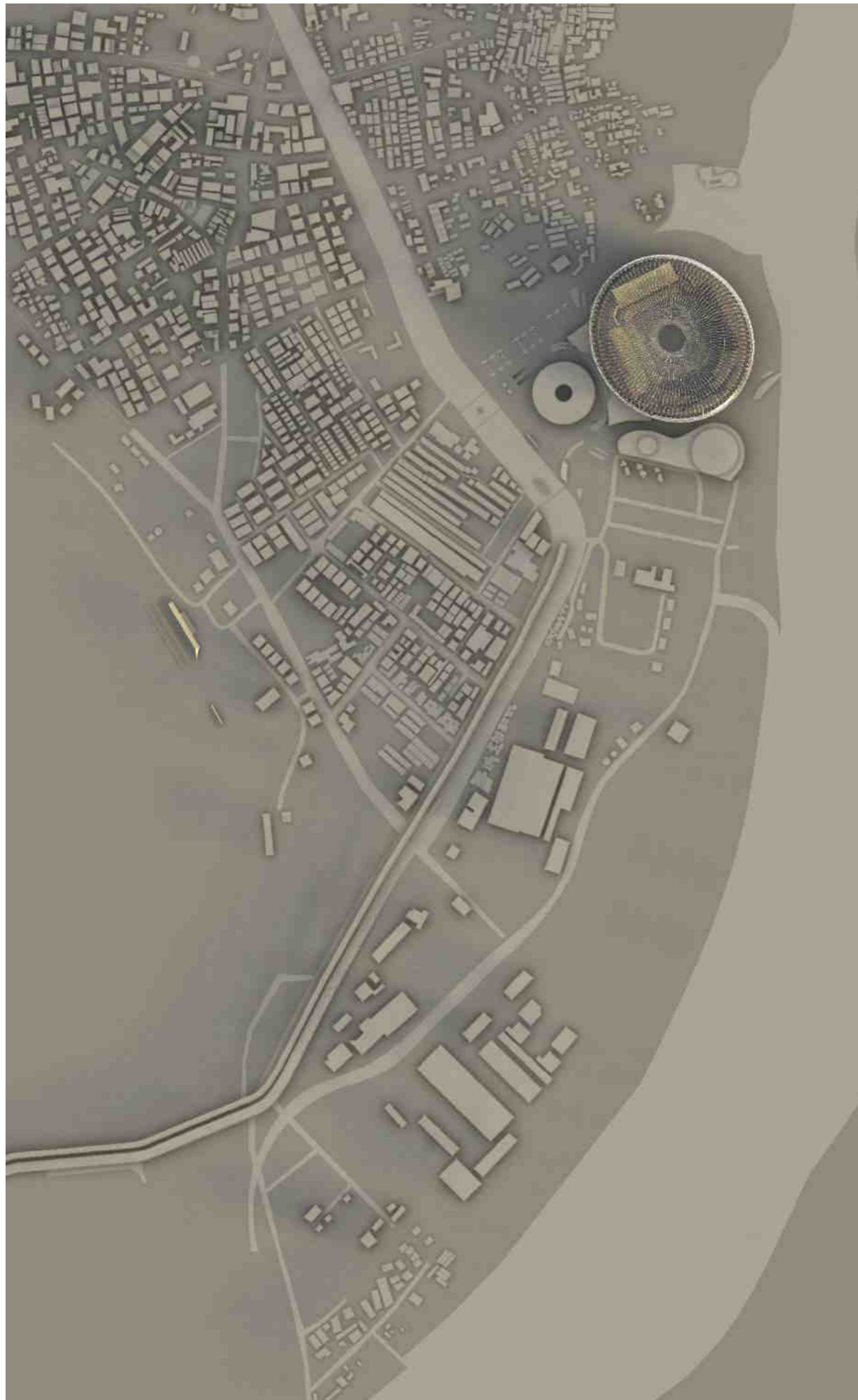
- 1 TV/radio commentators' cabins
- 2 Team's dressing room
- 3 Mixed zone
- 4 WC
- 5 Media working area
- 6 TV control centre
- 7 Photographers' working area
- 8 Telephone operators
- 9 Telecommunication facilities (telephones, fax, internet)
- 10 Bar

The route between the various dressing rooms, the emergency vehicle location and the playing area should be accessible without the obstruction of stairs, changes in level, or sudden bends or turns that would make the route difficult to navigate with a stretcher carrying an injured player.



Toilet and sanitary facilities: should be immediately adjacent to, and with direct private access from, the dressing room. Each room should have a minimum of: 10 showers, 5 washbasins with mirrors, 1 foot basin, 1 sink for cleaning boots, 3 urinals, 3 WCs (seats), 2 electric shaving points and 2 hair dryers.



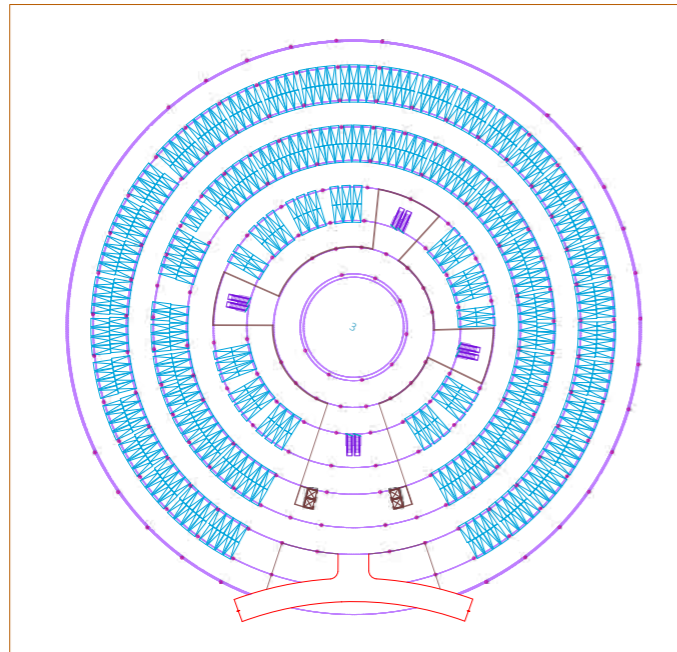


The image showing a bird view of the Arena with an urban context.

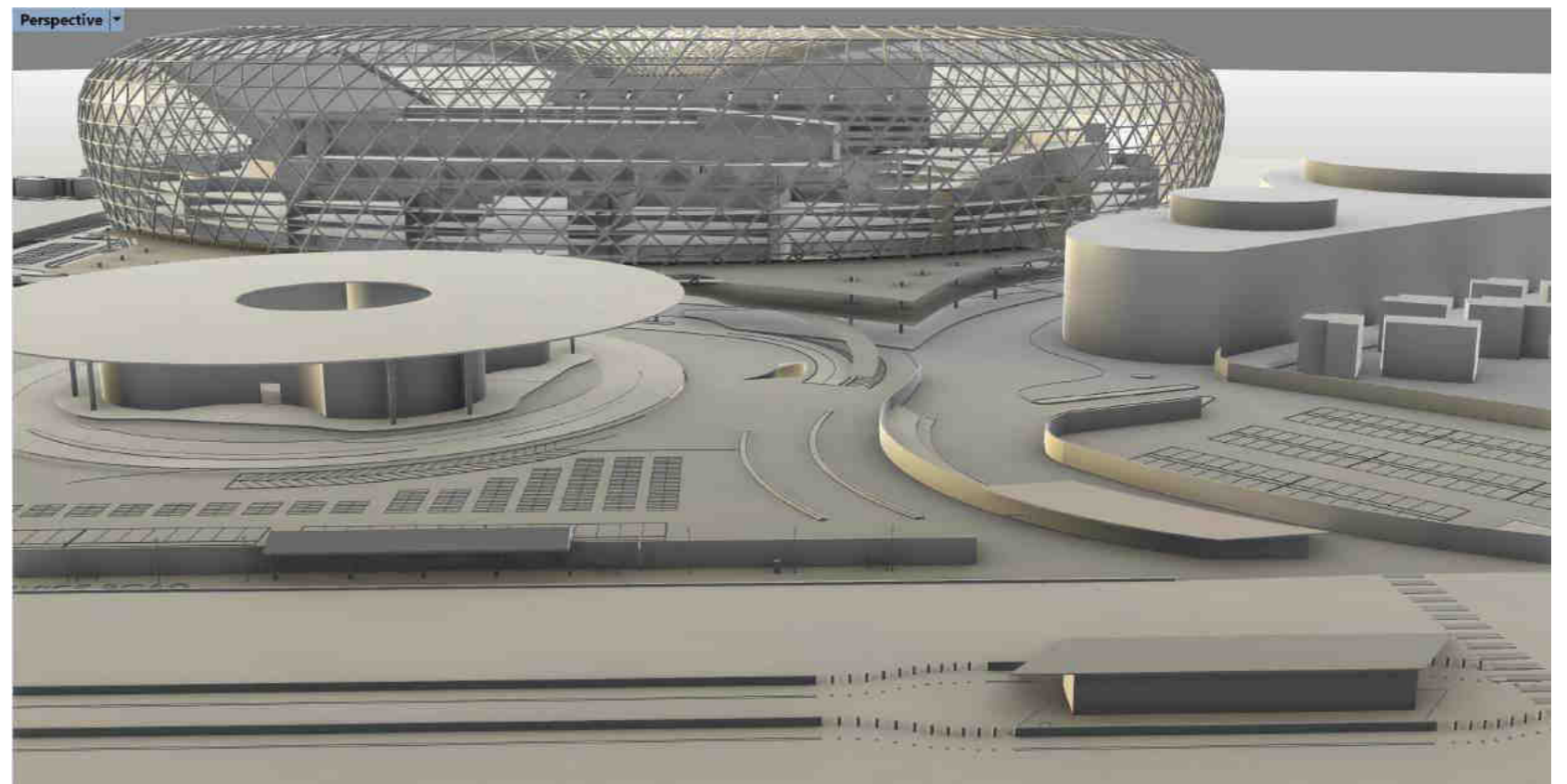
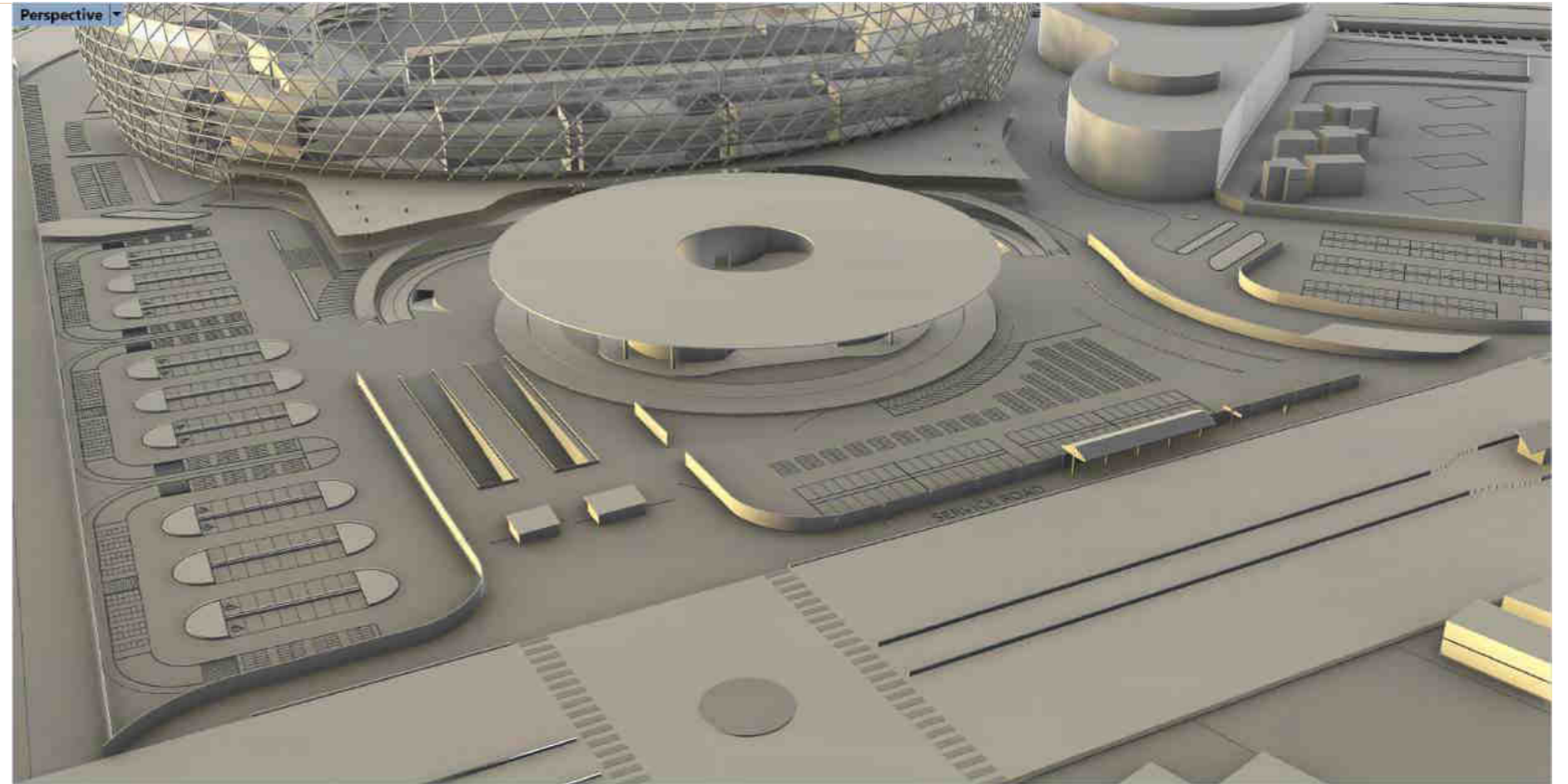
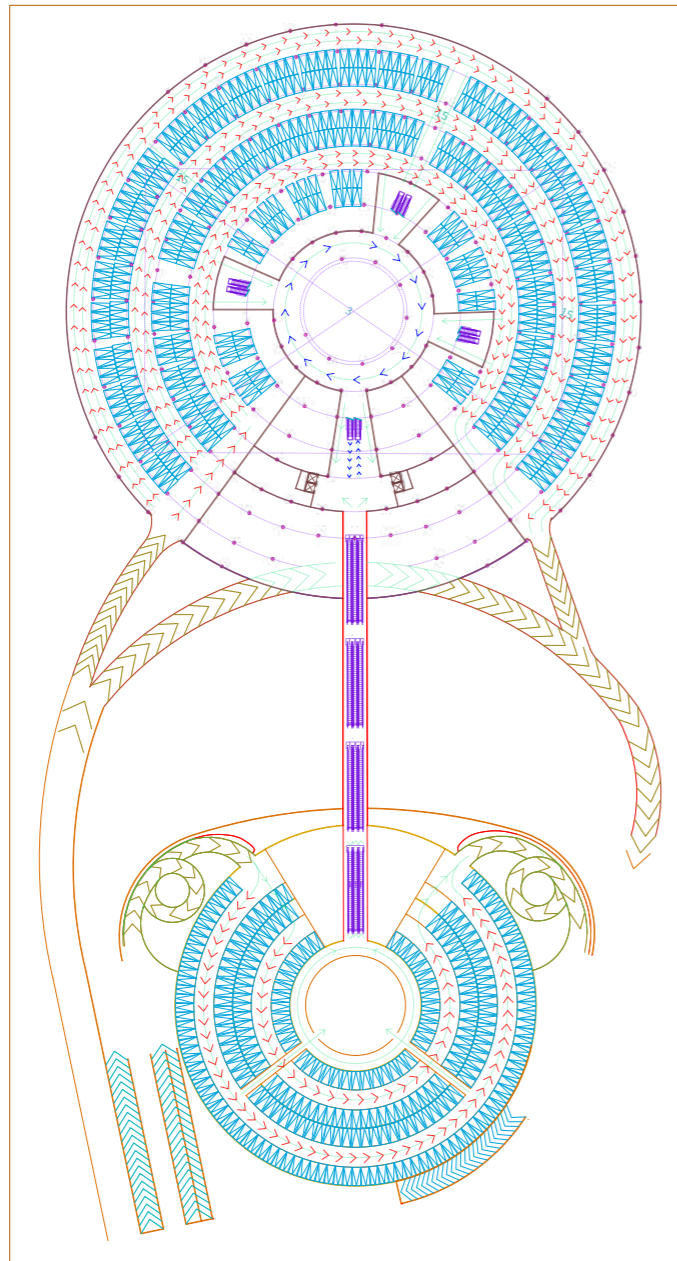


The diagram is showing the playgrounds of Arena, supportive infrastructure and scenery.

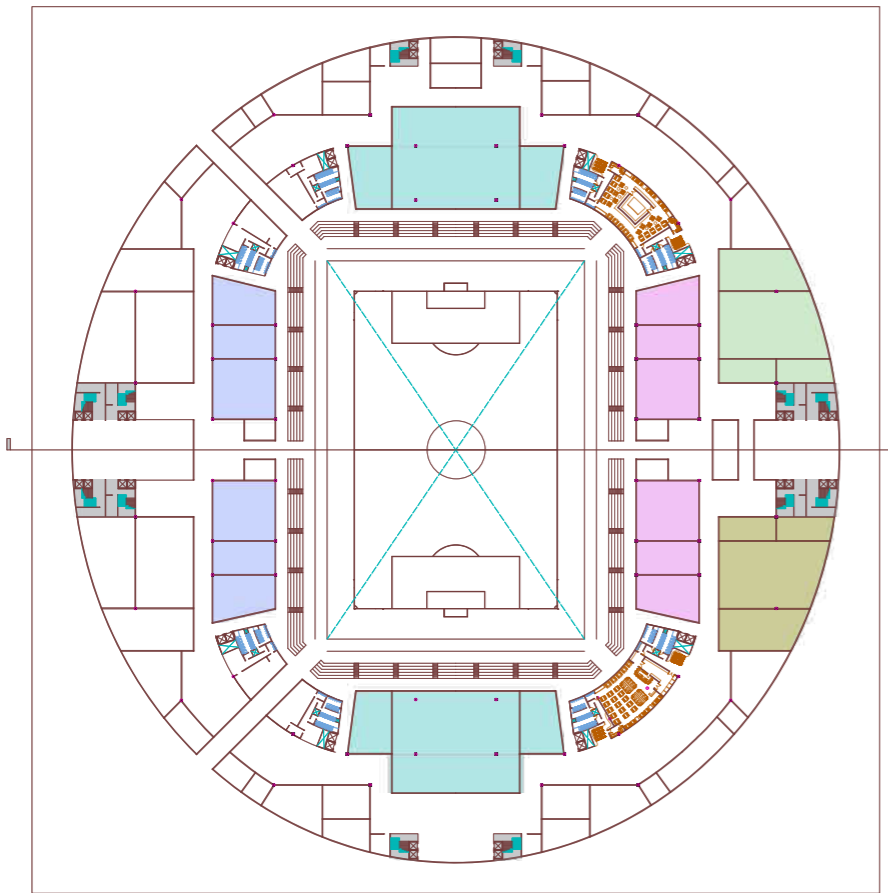
BASEMENT SECOND FLOOR PLAN



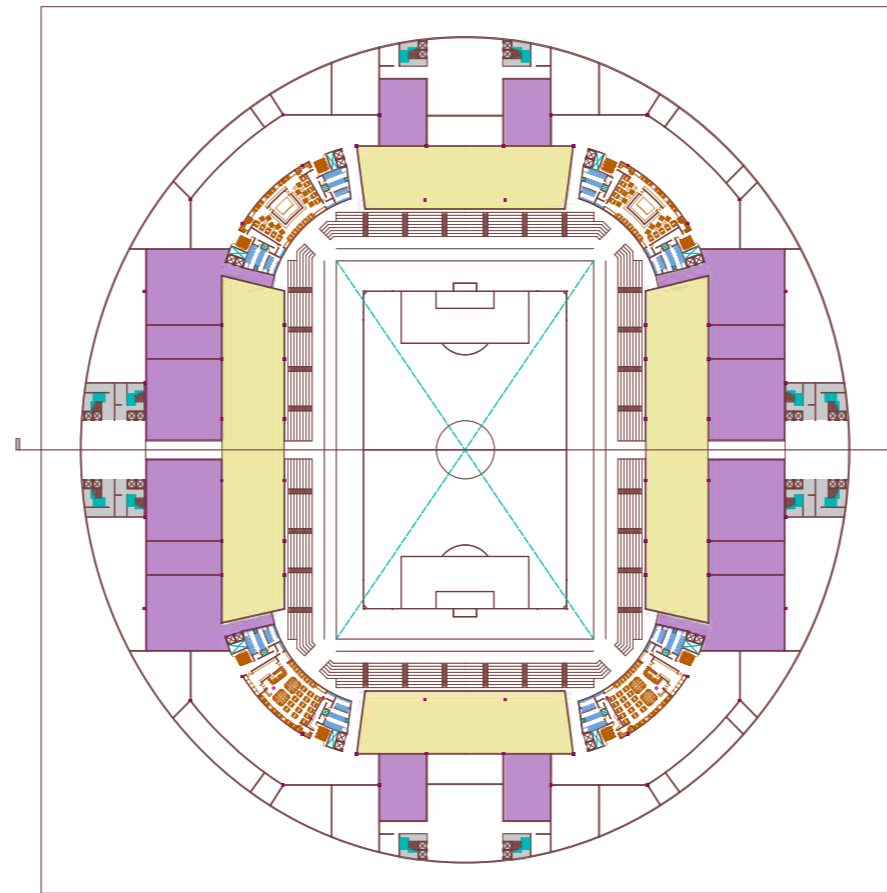
BASEMENT FIRST FLOOR PLAN



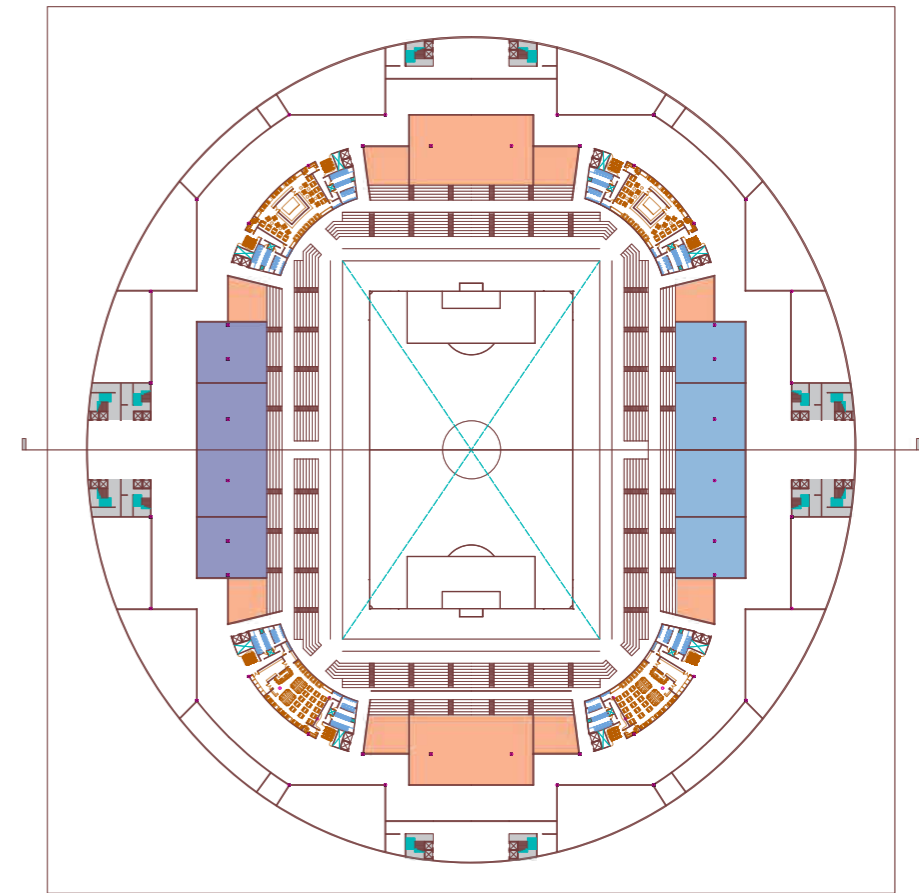
Both view are showing the transportation- system on the site.



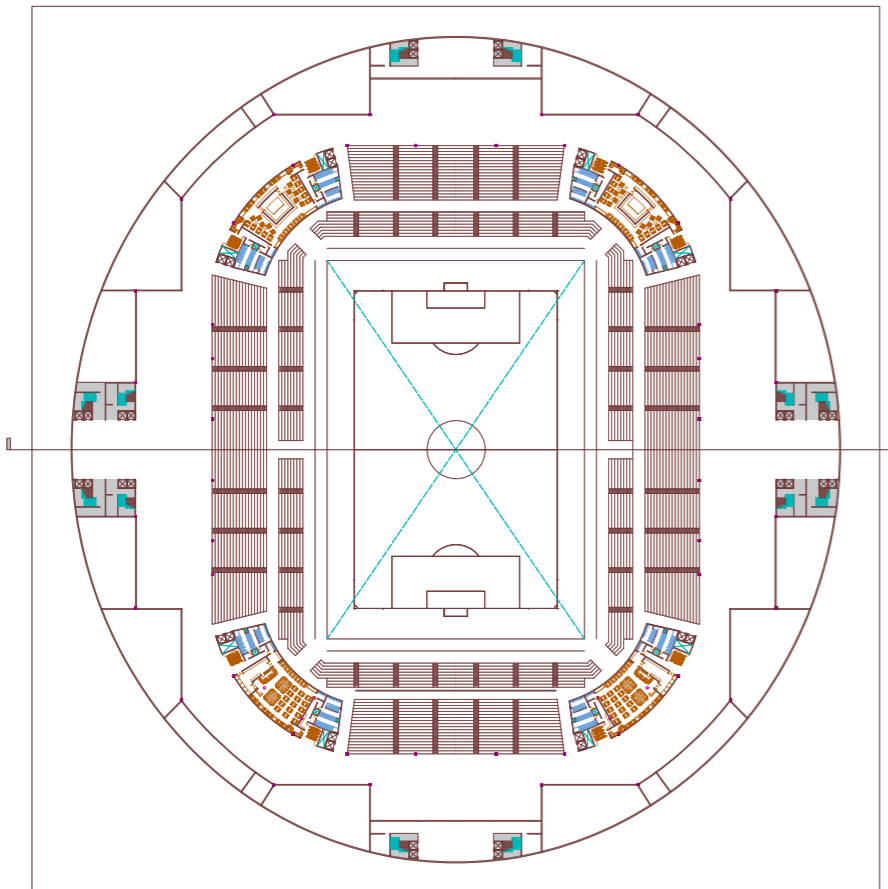
GROUND FLOOR PLAN



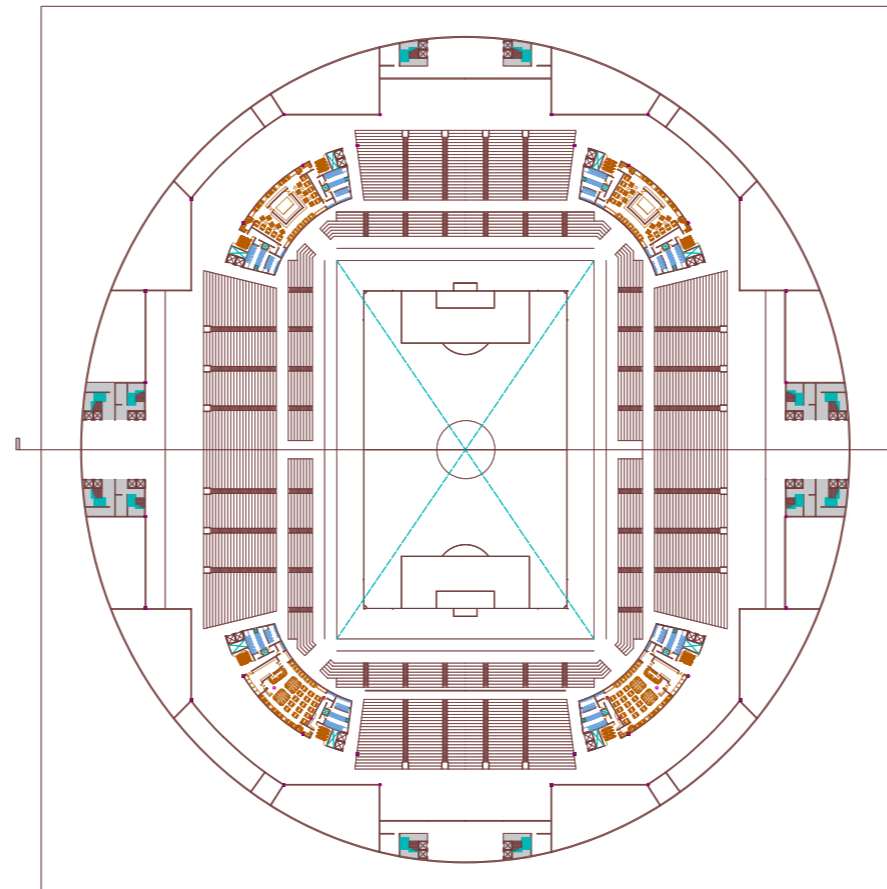
FIRST FLOOR PLAN



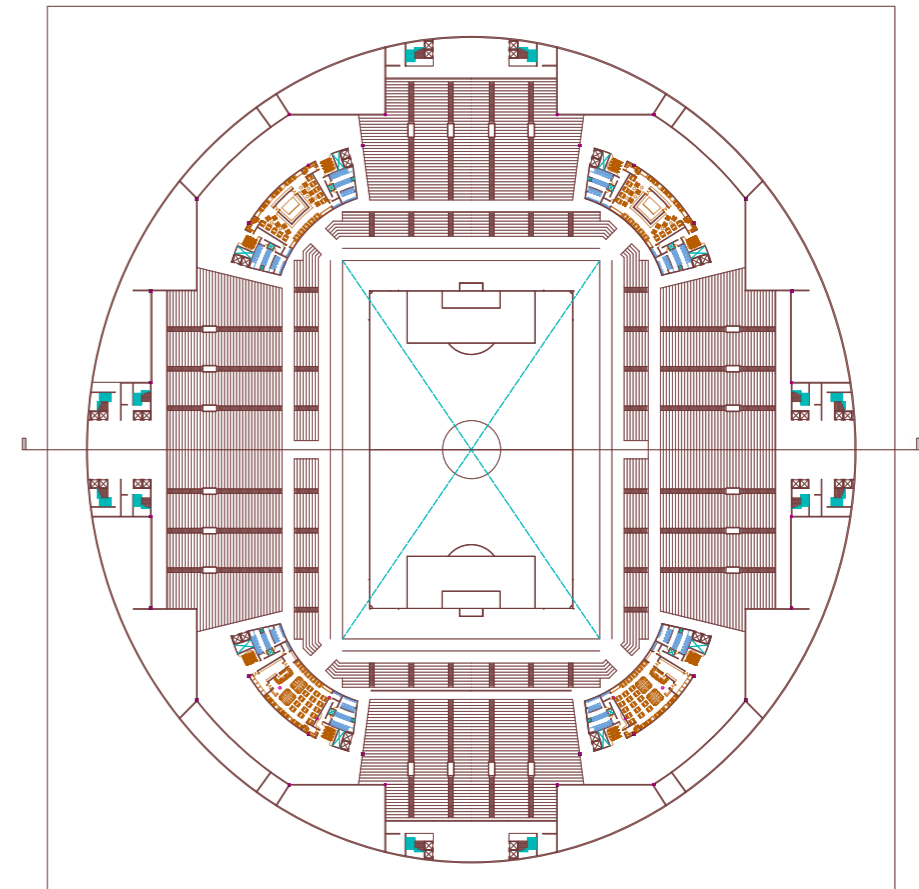
SECOND FLOOR PLAN



THIRD FLOOR PLAN



FOURTH FLOOR PLAN

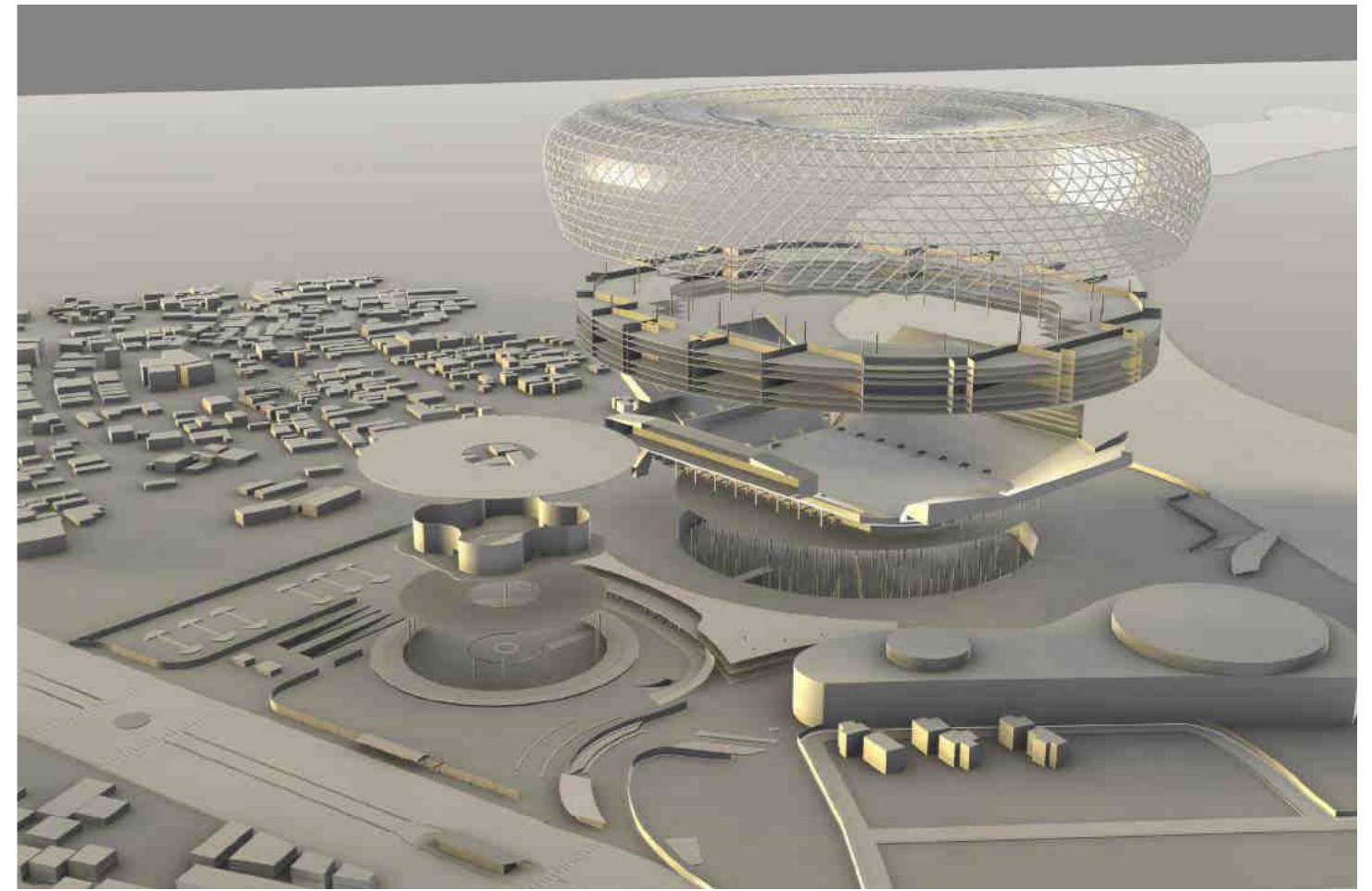
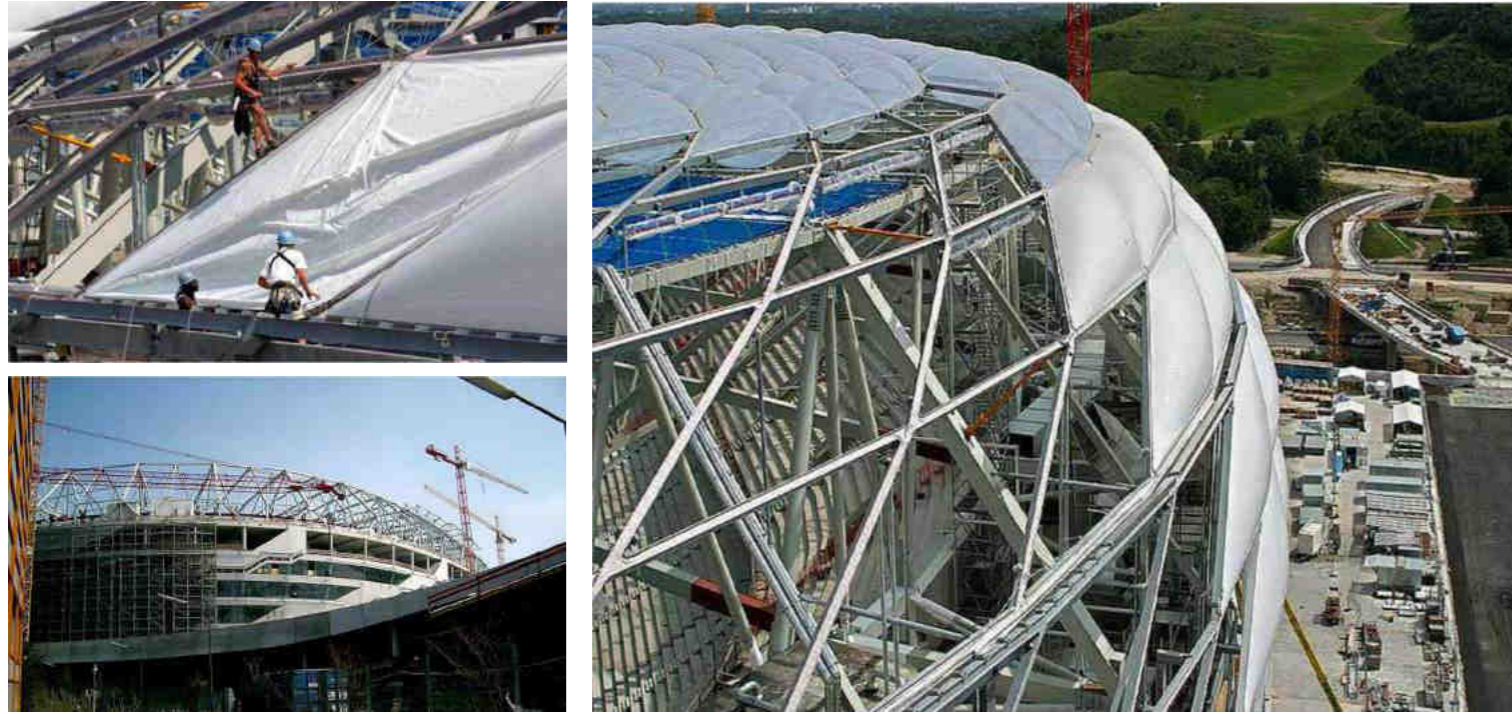


FIFTH FLOOR PLAN

- VIP/VVIP Area
- Player's Area
- Spectator's Area
- Media + Commentator Area
- Vertical circulation
- Offices
- Indoor halls
- Technical Area
- Private Boxes



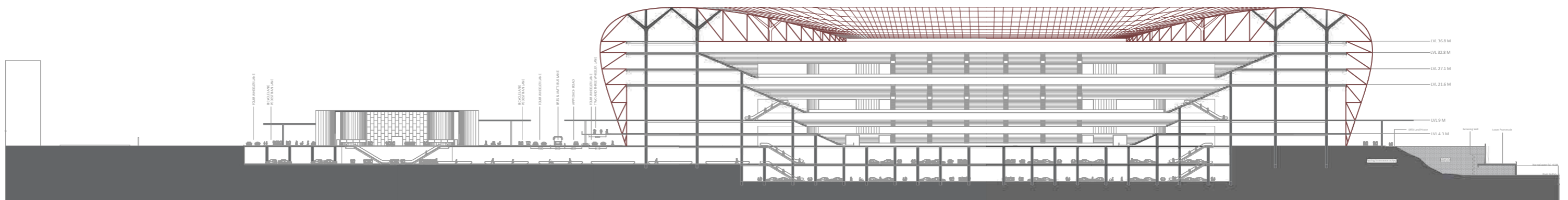
The roof uses an intricate system of steel beams and pillars of different sizes. The master beams are arranged like the braces of a bicycle wheel, forming a strong and light structure. It is a composite of diamond-shaped cushioned shells attached to a metal grid. The material is 98% translucent, allowing natural light reaching the grass. After installation, the panels are inflated with air through air pumps placed at the top of the building. The air is pumped to the panels through tubes, and fans keep constant pressure inside them.



Material and Technical Investigation

Wall assembly the order of assembly for the stadium's facade and structure begins in the structural members of the plinth and Stadium seating bowl. The seating bowl is compressed of precast concrete L planks to which the seats are bolted. Concrete precast beams and columns support this seating bowl. The plinth's structure is compressed of precast columns supporting a waffle slab. This allows a longer span for the spaces below the plinth.

The skin of the arena made of the ETFE membrane boards is appended to the steel space frame structure utilizing a series of Steel angle components. The space frame itself is compressed of round steel hollow core tubes. The stadium loudspeaker system is attached to the space frame's second inner-most ring. A sports lighting system ring the stadium, also attached to steel hollow tubes.

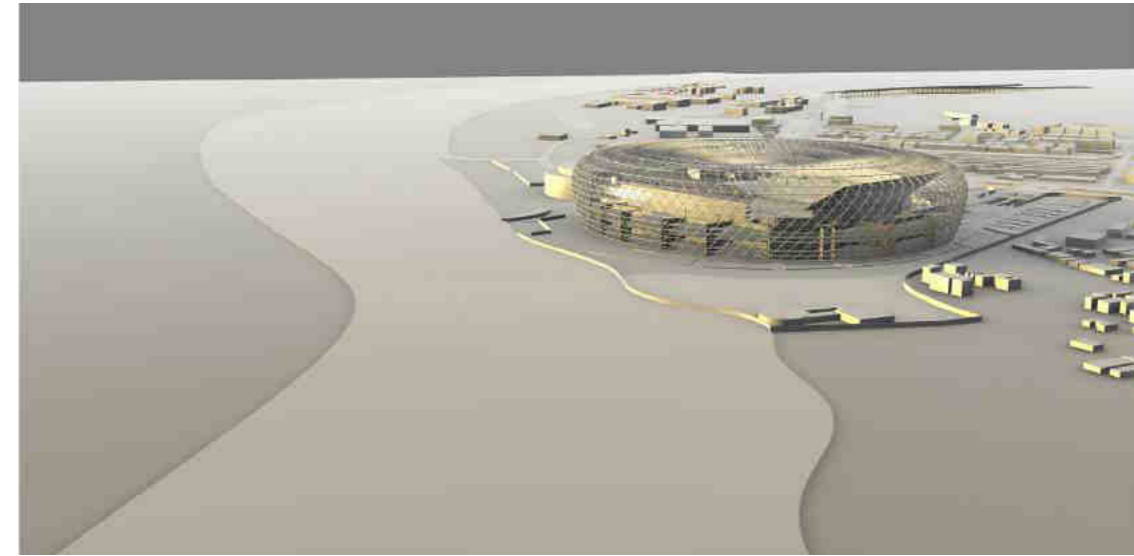


Section illustrates functional, technical, and structural resolutions.

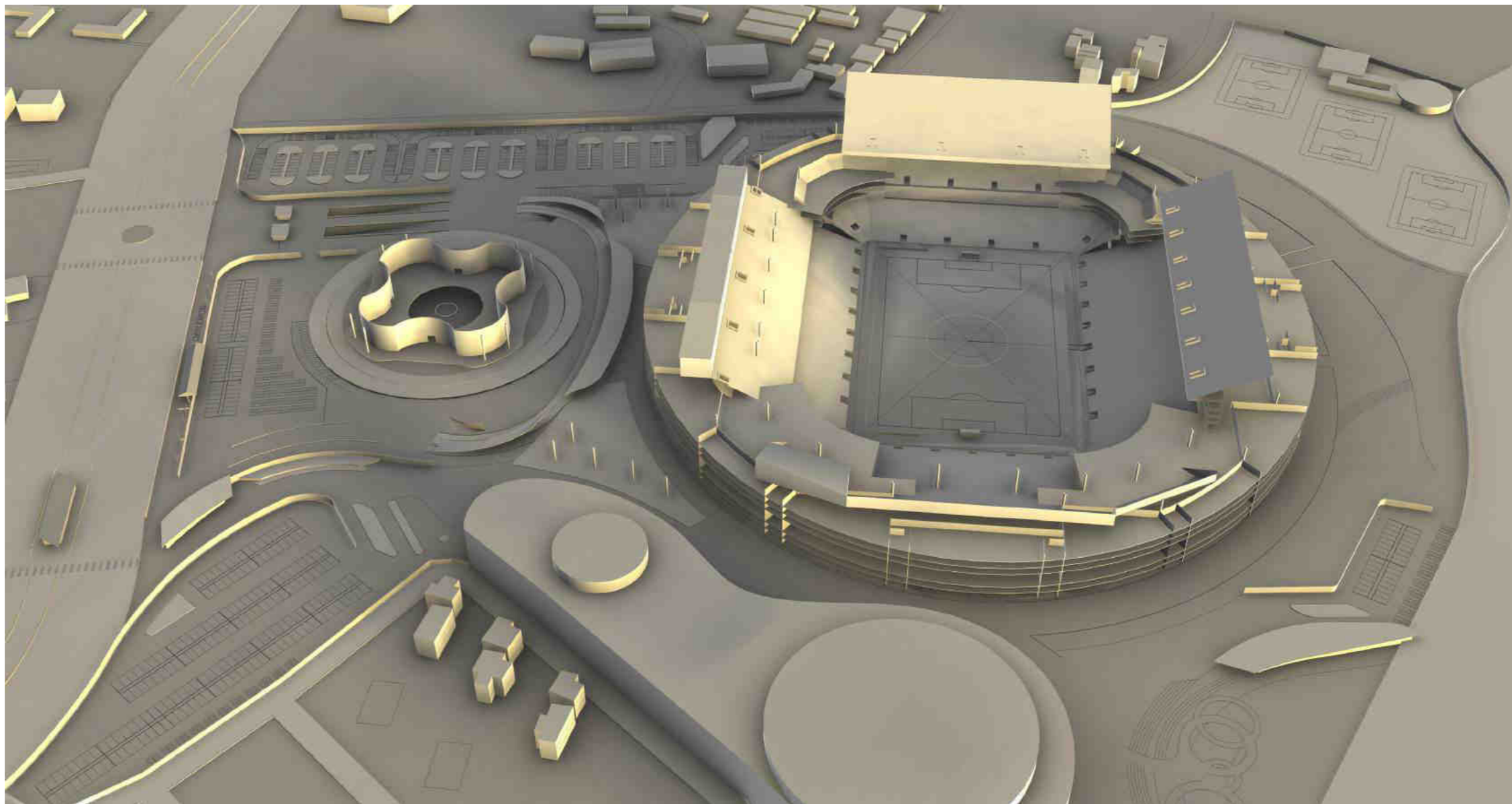




The play ground with 25,000 seating capacity.



A view from the river.



The isolated 3D model, demonstrates the circulation and the co-ordination of function of a level solutions for a better understanding of the project.

Thank you

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