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Warangal, Telangana, India

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International Convention Centre

Warangal, Telangana, India

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DEPARTMENT OF ARCHITECTURE AND PLANNING

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UNDER THE GUIDANCE OF

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DEPARTMENT OF ARCHITECTURE AND PLANNING

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CANDIDATE DECLARATION

The Thesis Project in the subject ARC 511, entitled "**International Convention Centre, Warangal, India"**, is being submitted in partial fulfilment of the requirement for the award of degree of Bachelor of Architecture by the undersigned for evaluation.

The matter embodied in this project is a record of my own work. If, in future, it is found that the above statement is false, then I have no objection in withdrawal of Bachelor of Architecture Degree awarded to me by the Institute.

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RECOMMENDATION

Based on the above declaration of the student, the undersigned recommends that the work submitted by the candidate may be considered for the final end term examination of the subject ARC-511, Thesis Project.

Date: 1st – 2nd Dec, 2025 **Dr. Sonia Taneja**
Thesis Guide

CERTIFICATION OF EXAMINATION

The Bachelor of Architecture Thesis Viva-Voce examination of Mr/Ms Pranav S Parle, Scholar No.211110216, was held on 1/12/2025 to 2/12/25.

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ABSTRACT

This report outlines the architectural proposal for the Warangal International Convention Centre (WICC) located in Warangal, Telangana. Developed under a Public-Private Partnership, the project aims to establish an integrated MICE facility that harmonizes international functional standards with the region's distinct Kakatiya heritage. The study utilizes a comprehensive methodology, including site inventory analysis, regulatory review, and comparative case studies of major Indian convention centers. The resulting design framework proposes a sustainable, acoustically optimized complex intended to serve as a strategic economic catalyst and urban landmark for Warangal.

ACKNOWLEDGMENT

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Firstly, I thank and express my solicit gratitude to Dr. Sonia Taneja ma'am, for her kind co-operation and encouragement which helped me in completion of this project.

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1.1 Project Overview

1.1.1 Introduction

This design brief delineates the fundamental parameters for the proposed Warangal International Convention Centre (WICC) cum 3-Star Hotel, slated for development at IT Park Madikonda, Warangal, Telangana, India. The project is envisioned under a Public-Private Partnership (PPP) framework, with the Telangana State Industrial Infrastructure Corporation Limited (TSIIC) serving as the designated Authority. The facility is intended to function as an Integrated Meetings, Incentives, Conferences, and Exhibitions (MICE) complex, offering comprehensive services encompassing business, entertainment, and hospitality. This development is projected to significantly contribute to the economic growth and tourism potential of the Telangana State..

1.1.2 Aim

The primary aim of this project is to establish a state-of-the-art Warangal International Convention Centre (WICC) coupled with a 3-Star Hotel at IT Park Madikonda, Warangal. This development seeks to cater to the growing demand for MICE and hospitality facilities in the region, fostering economic development and promoting tourism in Telangana.

1.1.3 Objective

The key objectives for the Warangal International Convention Centre (WICC) cum 3-Star Hotel project include:

a) To establish a convention center with a capacity of 2,500 PAX, alongside essential supporting amenities such as exhibition areas, various meeting rooms, and business centers.

b) To develop a 3-star business hotel with approximately 150 keys to provide accommodation for convention attendees and other visitors.

c) To integrate entertainment and food & beverage (F&B) facilities to offer a comprehensive experience for users.

d) To provide adequate car parking as per the prevailing development control regulations (GO 168).

1.2 Proposing Agency (infrastructure, 2022)

The proposing agency for the Development of Warangal International Convention Centre (WICC) cum 3-Star Hotel is the **Telangana State Industrial Infrastructure Corporation Limited (TSIIC)**. TSIIC was formed in 1973 by GO No: 831 dated September 10, 1973, issued by the Government of Telangana, with a core objective of providing integrated industrial infrastructure development for the state.

LETTER OF INVITATION

To:

<Name and Address of the Purchaser of the Request for Proposal Document>

Subject: **Invitation for Submission of Bid for 'Warangal International Convention Centre (WICC) cum 3-Star Hotel @ IT Park Madikonda, Warangal, Telangana on Public Private Partnership (PPP) Mode Under IALA Warangal'.**

Dear Madam / Sir,

We, the Telangana State Industrial Infrastructure Corporation Limited under our core objective of providing integrated infrastructure development for the state of Telangana, envisage the need to undertake development of Warangal International Convention Centre (WICC) on approximately 10 acres (40,468 sq. m.) of land located at Madikonda, Warangal, Telangana, India, on PPP Mode.

The Project is envisaged to be a Warangal International Convention Centre (WICC) cum 3-Star Hotel @ IT Park Madikonda, which is proposed to be developed at Madikonda, Warangal, Telangana, involving private developers.

We have earmarked about 10 acres (40,468 sq. m.)of land for the Project, which is envisaged to be an Warangal International Convention Centre (WICC) cum 3-Star Hotel @ IT Park Madikonda along with other support facilities. This Request for Proposal (the "RFP") document is for the Project, which is being proposed on approximately 10 acres (40,468 sq. m.) of land with about 200,000 sq. ft. of built-up area and corresponding car parking area.

We are pleased to invite you to participate in the bidding process and partner with the Government of Telangana in developing the proposed Warangal International Convention Centre (WICC) cum 3-Star Hotel @ IT Park Madikonda, Warangal, Telangana on Public Private Partnership (PPP) Mode Under IALA Warangal and contribute to the growth of the State of Telangana. This RFP document comprises of three volumes:

1. Volume 1: Instruction to the Bidders
2. Volume 2: Development Agreement
3. Volume 3: Project Information Memorandum

Please feel free to contact us if you need any clarifications and/or additional information.

Yours faithfully,
for Telangana State Industrial Infrastructure Corporation Limited

Vice Chairman & Managing Director

1.3 Site Details

Name of the Project: Warangal International Convention Centre (WICC) cum 3-Star Hotel @

IT Park Madikonda, Warangal, Telangana on Public Private Partnership (PPP) Mode Under IALA Warangal.

Location: Sy. No. 1791/ 1, Madikonda Kakatiya Textile park, Warangal Byp Rd, Madikonda, Telangana

District: Warangal(U)

Site Area: ~10 acres (40,468 sq. m.)

Primary Access Road: NH163

1.3.1 Minimum Development Obligations

1.3.1.1 Area Program

Following table presents the Minimum Development Obligations for the Project.
(infrastructure, 2022)

Sl. No.	Description	Area In sq.ft	
A	**Convention Centre (2,500 Pax)**	**50,000**	sq. ft.
I	Convention cum Exhibition area	30,000	sq. ft.
II	Small Meeting rooms	2,000	sq. ft.
III	Large Meeting rooms	5,000	sq. ft.
IV	Business Centre	5,000	sq. ft.
V	Pre-function and Circulation Spaces	8,000	sq. ft.
B	**Business Hotel (150 Keys)**	**150,000**	sq.ft
C	**Entertainment and F&B**	**50,000**	sq. ft.
	Total	**250,000**	sq. ft.
D	**Parking**	As per GO 168	Surface Parking

The selected bidder is permissible to develop over and above the minimum development obligations as per section 3.1 of this document.

1.3.1.2 List of Positive Activities

a) Ball Rooms
b) Meeting Rooms
c) Multi-level Car Parking
d) Business Centres/ Commercial Office

e) Exhibition Area
f) Convention Centre
g) Retail
h) F&B
i) Hotel
j) Service Apartment/ Dormitories
k) Cultural Centers

1.3.2 Project Cost Estimate

The project cost (excluding upfront development premium and annual rent during (infrastructure, 2022) construction payable to TSIIC) is estimated to be ~ Rs. 175 Crores. The table below provides indicative break-up of the estimated Project Cost:

Particulars	Unit Cost (Rs. per sq. ft.)	Total Project Cost (Rs. Crores)
MICE (International Standard Convention Centre)	~ 6,430	~ 32.15
Business Hotel (150 Keys)	~ 6,607	~ 99.10
Entertainment and F&B	~ 4,620	~ 23.10
Total Development Cost		**~ 154.35**
Interest Cost		~ 20.65
Total Project Cost		**~175.00**

**. The assessment of actual costs, however, will have to be made by the Bidders.

2. LITERATURE REVIEW

2.1 Introduction

This literature survey delves into the rich artistic, artisanal, and cultural heritage of Warangal, Telangana, aiming to provide a foundational understanding for an architectural design project focused on a convention center. As a city steeped in the legacy of the Kakatiya dynasty, Warangal boasts a distinctive cultural identity expressed through its visual and performing arts, intricate crafts, vibrant festivals, and unique architectural lexicon. While traditional knowledge systems and historical influences offer a profound wellspring of inspiration, the integration of these elements into contemporary architectural forms, particularly large-scale public infrastructure like convention centers, presents a nuanced design challenge. This survey synthesizes information on Warangal's prominent traditional and burgeoning contemporary art forms, the intricate details of its renowned crafts such as Warangal Durries and Pembarthi Metal Crafts, and the profound influence of its cultural heritage, including significant festivals and the enduring impact of the Kakatiya era. Furthermore, it meticulously examines the distinctive architectural styles, motifs, and decorative elements characteristic of the region, alongside the application of locally sourced materials and traditional construction methods. Although explicit examples of the direct incorporation of these specific cultural narratives into modern convention center architecture within Warangal or comparable regions remain less documented, this

comprehensive overview aims to equip designers with the necessary insights to respectfully and innovatively weave Warangal's unique cultural tapestry into a contemporary architectural statement.

2.2 Project Vision

The Warangal International Convention Centre (WICC) project is conceived as a significant urban development, encompassing a state-of-the-art convention center and an accompanying three-star hotel. This ambitious undertaking is slated for development through a Request for Proposal (RFP) and Public-Private Partnership (PPP) mode. This initiative is a cornerstone of the Telangana government's broader vision to transform Warangal, the state's second-largest city, into a prominent hub for Information Technology (IT) and other industries, ultimately elevating its status to a city of international standards. This project directly addresses the long-cherished aspiration of Warangal's populace for a world-class convention facility, drawing parallels to successful projects like HICC (Hyderabad International Convention Centre) & HITEX International Convention Centre in Madhapur.

2.3 Purpose

The project's primary objective is to demonstrate a comprehensive understanding of contemporary convention center design principles and the rich architectural heritage of Warangal. A crucial aim is to identify existing knowledge gaps and establish a robust conceptual framework for integrating traditional architectural elements into the modern design of the WICC. This process will directly inform the subsequent methodology and detailed research design for the project's architectural development.

2.4 Scope

This review comprehensively compiles functional, technological, and sustainable design requirements relevant to international-standard convention centers. Simultaneously, it thoroughly examines the Kakatiya architectural legacy of Warangal and Madikonda, analyzing its distinctive elements, construction techniques, and environmental adaptations. The review will subsequently critically assess the potential for meaningful integration of this local heritage into the modern design of the Warangal International Convention Center (WICC).

2.5 Architectural Heritage Of Warangal

2.5.1 Historical Overview

Warangal, also recognized as Orugallu, served as the capital of the Kakatiya dynasty from 1163 to 1323 CE. The reign of King Pratap Rudradeva II (1289-1309 AD) is widely regarded as a "golden age" for the region. During the Kakatiya period, Warangal was lauded as the "foremost city within the Telugu region."The Kakatiyas played a pivotal role in unifying Telugu cultures, evidenced by the construction of approximately 5,000 irrigation tanks, a significant number of which remain operational today. Furthermore, they developed a distinctive architectural style.Currently, Warangal's historical landmarks, including Warangal Fort, Thousand Pillar Temple, and Ramappa Temple, hold designations as UNESCO World Heritage Sites or are on the tentative list, thereby establishing it as a prominent cultural and tourist destination. It is also integrated into India's HRIDAY scheme.Warangal's historical standing as the Kakatiya capital, its characterization as a "golden age," and the adoption of the Kakatiya Kala Thoranam as Telangana's emblem underscore its central importance to the state's cultural and political identity. This rich historical legacy provides a unique foundational narrative for the WICC, distinguishing it and fostering a profound sense of cultural pride

2.5.2 Strategic Importance for Warangal

The WICC in Madikonda IT Park is vital for Warangal's IT and tourism growth, addressing a shortage of high-quality hospitality infrastructure. Its location in an existing IT SEZ, home to companies like Cyient and Tech Mahindra, positions it as a crucial asset for supporting the tech industry and diversifying Warangal's economy. The WICC is a strategic urban development tool designed to stimulate and sustain economic diversification, with its success tied to Warangal's ambition to become a globally recognized IT and tourism destination. Its architectural design should reflect this catalytic role, projecting progress and connectivity while remaining culturally relevant. (warangal, n.d.)

2.5.3 Distinctive Architectural Monuments & Features

The Kakatiya dynasty left an indelible mark on Warangal's landscape through its distinctive architectural monuments, which showcase a fusion of Dravidian and Nagara Bhumija styles, often influenced by Vesara or Chalukya architecture (wikipedia, n.d.)



Figure 1 Warangal Fort

Warangal Fort: Built between the 13th and 15th centuries AD, this formidable fort features a unique, multilayered defense system of earthen embankment, mud, and stone walls. The central zone contains the ruins of the grand Swayambhusiva temple, known for its four monumental, 10-meter-high (33 ft) Kakatiya Kala Thoranam or Warangal Gates. Each gate has twin pillars with angled brackets supporting a large lintel, intricately carved with "lotus buds, looped garlands, mythical animals, and birds with foliated tails." The absence of religious symbols is thought to have aided their preservation. The fort's defensive walls, made of large granite stones fitted without mortar, were exceptionally difficult to breach. (wikipedia, n.d.)



Figure 2 Thousand Pillar Temple

Thousand Pillar Temple (Rudreswara Temple): Constructed in 1163 AD by Rudra Deva on the slopes of Hanamakonda hill, this temple exemplifies Kakatiya architecture. Originally named 'Trikuta' for its dedication to Lord Shiva, Lord Vishnu, and Lord Sun, only the Shivalinga remains. It is renowned for the ornate workmanship on its *garbhagruha* doorways, artistic pillar detailing, and charming ceiling. A highlight is the monolithic Nandi, a granite masterpiece noted for its ornamentation, intricate patterns, precise workmanship, and unique velvet-like polish. The temple's star-shaped base and richly carved pillars also show Chalukyan and Hoysala influences.



Figure 3 Ramappa Temple

Ramappa Temple (Rudreswara Temple): The 13th-century Kakatiya-style Hindu temple in Palampet, a UNESCO World Heritage Site since July 25, 2021, was constructed over 40 years starting in 1213 AD. Renowned for its intricate carvings, ornate shrines, and a unique "sandbox technique" foundation, it notably survived a 17th-century earthquake. Its lightweight *gopura* bricks float on water, demonstrating advanced scientific ingenuity. The temple's figurines depict a "kaleidoscopic pattern of life" through human, animal, and celestial forms. It is potentially India's only temple named after its chief sculptor, Ramappa. (wikipedia, n.d.)



Figure 4 Kakatiya Kala Thoranam

Kakatiya Kala Thoranam: In addition to its architectural significance at the Warangal Fort, this arch is officially incorporated as the Emblem of Telangana, symbolizing "Bangaru Telangana" (Golden Telangana). Its design, featuring twin pillars, angled brackets, and intricate, non-religious carvings, renders it a potent symbol for cultural integration.

Kakatiya architecture, seen in Warangal Fort, Thousand Pillar Temple, and Ramappa Temple, combines intricate carvings, advanced engineering, and practical features. Non-religious iconography on the Kala Thoranam suggests broader symbolism. Kakatiya design blends art, innovation, and environmental awareness, offering both utility and symbolism. The WICC can draw inspiration from visual motifs like Kala Thoranam and lotus patterns, and structural principles for sustainable, climate-responsive, and ingenious contemporary design, creating a globally relevant yet locally connected character.

2.5.4 Traditional Building Materials, Techniques & Environmental Adaptations

The Kakatiyas demonstrated remarkable adaptability in their construction, utilizing both stone and bricks depending on the geographical location and specific structural requirements. Their architectural practices incorporated sophisticated techniques and inherent environmental adaptations that remain relevant for contemporary sustainable design.

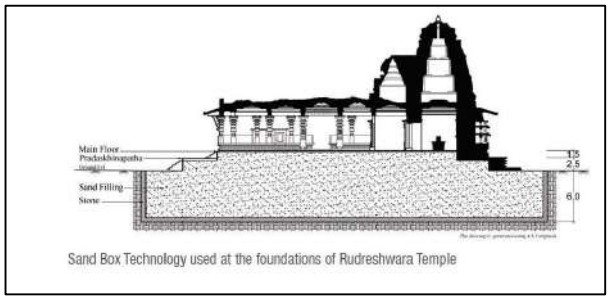

Figure 5 Sandbox Technology of Ramappa Temple

- **Sandbox Technology:** A hallmark of Kakatiya engineering, this unique foundation technique was notably employed in the Ramappa Temple. It involved stacking stones on a deep sand foundation (3m deep), which provided exceptional structural stability and remarkable resilience

against seismic activity, allowing the temple to survive a 17th-century earthquake with minor damages.

- **Floating Bricks:** Used for the *Vimana* (tower) of the Ramappa Temple, these bricks possess an incredibly low density (0.9g/cu.cm), less than that of water, achieved by incorporating lightweight materials like sawdust. This innovation speaks volumes about their scientific ingenuity in creating lightweight yet durable construction elements.
- **Black Basalt:** Despite being one of the hardest stones to carve, black basalt was extensively used for the intricate sculptures and detailing in Kakatiya temples, showcasing the extraordinary mastery and craftsmanship of the artisans of that era.
- **Traditional Indian Climate Adaptations:** Drawing from broader traditional Indian architectural principles, many of which are applicable to the Deccan region, the Kakatiyas and their predecessors utilized:
  - **Courtyards:** Integrated as central elements in building layouts, courtyards facilitated natural cooling through convection, provided sheltered spaces from hot winds, and allowed inhabitants to bask in the sun during winters. They also served as vital social and gathering spaces.
  - **Sloped Roofs with Verandas:** Pitched roofs, often covered with local materials like Mangalore tiles, were designed to efficiently divert heavy rainwater during monsoon seasons. Coupled with verandas, these roofs also provided generous interior heights and created intermediate, welcoming spaces that blurred the boundary between indoor and outdoor environments, reflecting Indian hospitality.
  - **Shading Systems (Jaalis, Chajjas/Jharokhas):** Latticed screens (*jaalis*) and overhanging eaves (*chajjas* or *jharokhas*) were ingenious passive cooling devices. They regulated airflow, blocked harsh sunlight, and created intricate light patterns, significantly reducing the need for artificial cooling.
  - **Locally Available, Eco-friendly Materials:** Traditional Indian construction inherently embraced sustainability by utilizing locally available, natural, and eco-friendly materials such as mud, bamboo, and stone, ensuring harmony with the immediate environment.
  - **Non-Cluttered, Open Layouts:** Traditional homes often featured open layouts that emphasized visual and spatial clarity, allowing areas to flow seamlessly while maintaining functional segmentation and privacy. This approach created a sense of spaciousness and promoted mental calm.

Kakatiya architectural practices, including "sandbox technology," "floating bricks," and traditional climate adaptations, offer a sophisticated and time-tested blueprint for climate-responsive, resource-efficient, and seismically resilient design. Integrating these historical principles with modern materials and construction methods, such as contemporary *jaalis* for passive cooling or water features inspired by traditional *tanks* for microclimate regulation, would enable the WICC to achieve high sustainability benchmarks. This approach would also deeply root the WICC in local heritage, positioning it as a model for culturally integrated, environmentally responsible, and structurally resilient large-scale developments in India.

2.6 Prevailing Arts & Craft

Warangal and the broader Telangana region are known for several distinct art and craft forms that can be infused into the convention center's interior and exterior design.

- **Warangal Dhurries:**
    - **History:** Traces its origins to the Mughal era, inspired by Jainamaaz (prayer rugs). Primarily woven by the Padmasali community.
    - **Characteristics:** Known for geometric and angular patterns, though floral and tribal motifs are also common. Red and blue are dominant colors, balanced with neutral hues.
    - **Materials:** Primarily cotton, with occasional use of wool, jute, linen, viscose, or polyester.
    - **Application:**
        - **Flooring:** Commission custom-designed Warangal dhurries for specific areas, or integrate their patterns into floor tiling or carpet designs.
        - **Wall Coverings/Art:** Large-scale dhurrie-inspired textile art can adorn walls.
        - **Textile Elements:** Use dhurrie patterns and color palettes for upholstery, cushions, or room dividers in lounges and breakout areas.



Figure 6 Warangal Dhurries

- **Pembarthi Brassware:**
    - **Location:** Pembarthi village, about 65 km from Warangal.
    - **Characteristics:** Exquisite brassware, artifacts, and metal objects, known for intricate carvings and filigree work on fine sheets of brass. Historically, it included idols, Koranic carvings, and later shifted to home decor items.
    - **Application:**
        - **Decorative Elements:** Commission brass sculptures, wall hangings, or decorative panels for lobbies, reception areas, or specific function rooms.
        - **Lighting Fixtures:** Design bespoke light fixtures incorporating brass filigree patterns.
        - **Furniture Accents:** Integrate brass inlay or detailing into furniture pieces.



Figure 7 Craftsman working on Pembarthi Brassware

- **Cheriyal Scroll Paintings:**

- **Characteristics:** Stylized religious cloth-scroll paintings, rich in local motifs, depicting stories from Indian mythology. Painted in a narrative, comic-strip format. Characterized by vibrant colors, distinct facial features, and traditional attire.
- **Application:**
  - **Mural Art:** Commission large-scale Cheriyal-style murals for feature walls, depicting local legends or cultural narratives.
  - **Art Installations:** Display original or reproduction Cheriyal scrolls as art pieces.
  - **Graphics and Signage:** Use the distinct visual style of Cheriyal paintings for wayfinding graphics or informational displays within the convention center.



Figure 8 A Cheriyal Scroll Painting

Figure 9

- **Nirmal Paintings:**
  - **Location:** Nirmal town, though influenced by Mughal patronage and later brought to Hyderabad.
  - **Characteristics:** Traditional art scenes from Hindu epics (Ramayana, Mahabharata). Influenced by Ajanta, Kangra, and Mughal miniatures. Uses indigenous colors derived from herbs, gum, vegetable dyes, and minerals, with a familiar gold color.
  - **Application:**
    - **Fine Art Displays:** Feature Nirmal paintings in art galleries or prominent display areas.
    - **Accent Panels:** Use smaller, framed Nirmal art pieces as decorative accents in meeting rooms or VIP lounges.



Figure 10 Nirmal Painting of Krishna & Radha

- **Bidri Craft (While more associated with Bidar, Karnataka, it has historical ties to Deccan region and is sometimes mentioned in Warangal context):**
    - **Characteristics:** A metal handicraft from Bidar, Karnataka. Involves inlaying silver or brass on a black-coated zinc-copper alloy.
    - **Application (if deemed appropriate for regional connection):**
        - **Tableware/Decor:** Showcase bidriware as decorative items in dining areas or gift shops.

Architectural Accents: Using bidri-inspired patterns in metal screens or decorative inserts.

2.7 Culture & Performing Arts

Warangal's cultural landscape extends to various performing arts and traditions that can be reflected in the convention center's programming and atmosphere.



Figure 11Perini Sivatandavam

- **Perini Sivatandavam:**
    - **History:** An ancient dance form that emerged during the Kakatiya rule, known as the 'dance of warriors.' Revived by Nataraja Ramakrishna, inspired by sculptures in Ramappa Temple.

- **Application:**
    - **Performance Space:** Design flexible performance spaces (e.g., in the main auditorium or outdoor amphitheatres) suitable for traditional dance forms.
    - **Artistic Interpretations:** Commission sculptures or artistic interpretations of Perini dancers for lobbies or outdoor plazas.



Figure 12 Burra Katha

- **Storytelling Traditions (Oggu Kathalu, Burra Katha, Patam Katha):**
    - **Characteristics:** Oral narrative traditions, often accompanied by music and simple props. They convey mythological, folk, or contemporary stories.
    - **Application:**
        - **Acoustics and Seating:** Design spaces that facilitate intimate storytelling sessions or public performances, focusing on good acoustics and comfortable, perhaps tiered, seating.
        - **Informal Gathering Spaces:** Create informal "storytelling corners" with traditional seating arrangements.
        - **Interactive Displays:** Digital or static displays explaining these art forms, perhaps with audio snippets.



Figure 13 Bathukamma Festival

- **Bathukamma Festival:**

- **Characteristics:** A vibrant floral festival celebrated by women in Telangana, particularly during Navaratri. Women create floral arrangements (Bathukamma) and sing traditional hymns.
- **Application:**
  - **Landscaping:** Incorporate local flowering plants and design gardens that evoke the spirit of Bathukamma.

Art Installations: Commission contemporary art pieces inspired by the floral motifs and geometric patterns of Bathukamma.

2.8 Socio-Economic & Environmental Impact

2.8.1 Economic Impact and Urban Development

Convention centers significantly drive economic growth, creating jobs and boosting local businesses through direct spending and multiplier effects. For example, the Lynnwood Convention Center generated over $25.3 million in economic impact in 2017. India's Meetings, Incentives, Conferences, and Exhibitions (MICE) sector offers substantial potential but has been underutilized due to facility and policy gaps. However, government support and infrastructure investments are driving growth, with the Indian MICE market projected to reach USD 14.62 billion by 2032 (18% CAGR from 2025). The WICC in Warangal is poised to capitalize on this growth, aiding the city's economic diversification.

2.8.2 Social Benefits and Community Engagement

Beyond their economic impact, convention centers foster social cohesion and provide community benefits by hosting diverse functions, from local meetings to cultural events. They serve as central hubs for connection, learning, and celebration, enriching the social fabric. Revenue generated by these centers funds essential community assets like schools and parks. Furthermore, their operating entities often demonstrate strong community involvement through volunteering, donations, and food contributions. Convention centers also prove critical in disaster response, as seen in their conversion to temporary hospitals during COVID-19. The WICC can similarly enhance Warangal residents' quality of life and civic pride.

2.8.3 Environmental Impact Assessment and Mitigation Strategies

Impact Assessment: Large-scale urban development projects, such as convention centers, require rigorous Environmental Impact Assessments (EIAs) and, for projects near heritage sites, Heritage Impact Assessments (HIAs). (Brigade, n.d.)

Environmental Impact Mitigation: Large event venues inherently generate significant environmental impacts due to substantial energy and water consumption and extensive waste generation. Comprehensive strategies are essential to mitigate these impacts:

i. **Impact Reduction:** Proactive measures to reduce, mitigate, or compensate for social and environmental impacts from construction and operation.

ii. **Sustainable Sourcing & Waste Management:** Selecting sustainable materials, minimizing single-use items, promoting reusables, and partnering with eco-conscious vendors.

iii. **Energy & Water Efficiency:** Implementing intelligent facade systems, utilizing solar energy, efficient water heating, and optimizing HVAC systems.

iv. **Sustainable Transportation:** Encouraging public transport, optimizing delivery routes, prioritizing rail, and using electric vehicles.

v. **Carbon Offsetting:** Partnering with local carbon offset programs for unavoidable emissions.

2.9 Convention Centre

A large civic building or group of buildings designed for conventions, industrial shows, and the like, having large unobstructed exhibit areas and often including conference rooms, hotel accommodations, restaurants, and other facilities. A convention center is generally defined as any property used in connection with a convention or meeting center, or similar facility, including auditoriums, exhibition halls, facilities for food preparation and serving, parking facilities, and administrative offices. A number of states have passed legislation enabling public funding to be used for convention centers in an effort to attract tourism and businesses to the local economy.

The term Convention is widely used in much discipline. A '**Convention**' word in general can be defined as

- A large formal assembly of a group with common interests, such as a political party or trade union
- The persons attending such an assembly
- (U.S. politics) an assembly of delegates of one party to select candidates for office
- (Diplomacy) an international agreement second only to a treaty in formality
- A telecommunications convention
- Any agreement, compact, or contract
- The most widely accepted or established view of what is thought to be proper behavior, good taste etc.

Convention – A large meeting of member of profession, a political party, etc.

Center- A place or an area where a lot of people live, a place where a lot of business and cultural activity takes place

- A convention centre is a large building that is designed to hold a convention where individuals and groups gather to promote and share common interests.
- A convention centre is designed, in most cases, for the purpose of conducting meetings, rallies, or seminars. It may also be adapted for specific events; such is appearances by well-known speakers or musicians. In some cases, meetings or other events take place in centres or buildings not specifically designed for conventions, but large enough to accommodate attendees.
- Convention centres receive guests from local, national and international markets. The various market segments that visit these facilities are dictated by the types of events that are hosted.

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2.10 Functional Requirements & International Practices

International convention centers prioritize productivity, meeting global standards for design, facilities, and sustainability, often guided by IACC. (IACC, n.d.) (Brigade, n.d.)

Category	Requirement/Standard	Description and Significance
Main Conference Hall	Minimum 93m² (1,000 sq ft) unobstructed space; Flexible seating capacity	Essential for accommodating diverse event formats and large plenary sessions, maximizing versatility.
Breakout Rooms	Minimum 3 additional, in proximity to main hall	Facilitates concurrent sessions, workshops, and smaller group discussions, enhancing event programming.
Acoustics	>45 NIC (Noise Isolation Class) for adjoining walls; <35 BNC (Background Noise Criteria); RT <1.2 seconds; Built-in sound systems for rooms >93m²	Ensures speech intelligibility, minimizes distractions from adjacent spaces, and provides clear audio for presentations.
Lighting	In-room control, 500-700 lux at table-top; Zoned dimming for rooms >93m²; Maximize natural light	Optimizes visual comfort, reduces eye strain, and allows for adaptable ambiance for various event types.
Technology Infrastructure	High-speed wired/Wi-Fi; Smart building systems; 4K LED screens; 3D presentation tools; Cybersecurity tools; Virtual venue tours	Critical for seamless event delivery, enhanced attendee engagement, operational efficiency, and future adaptability.
Ancillary Business Services	Fully staffed business center; Printers, laptops, digital media, copying services	Supports organizers and attendees with essential administrative and technical needs, ensuring smooth operations.
Spatial Flexibility	Movable partitions; Modular/reconfigurable furniture; Mobile staging; Convertible floor systems	Allows rapid transformation of spaces for diverse event layouts, maximizing utilization and minimizing setup times.
Environmental Control	In-room climate controls; Optimal temperature (68-76°F); Proper airflow/ventilation	Ensures attendee comfort and focus, contributing to a productive and healthy environment.

Accessibility & Circulation	Convenient location; Clear wayfinding; Proximity to restrooms/breakrooms; Segregation of public/service areas	Enhances user experience, minimizes congestion, and ensures efficient flow of people and materials.

2.11 Flexible & Adaptive Spatial Planning for diverse Activities

a. Convention centers have evolved from basic structures to sophisticated, dynamic, and flexible venues to host diverse events.

b. Adaptable spatial programming is crucial in contemporary design, allowing for rapid reconfiguration.

i. **Movable Partitions:** Operable walls subdivide or combine large halls.

ii. **Modular Seating:** Reconfigurable furniture, including chairs and tables on castors, allows for quick layout changes (e.g., theater, classroom, banquet). Automated telescopic tiered seating (e.g., HICC) enhances this.

iii. **Mobile Staging:** Flexible adjustments to presentation areas are possible.

iv. **Convertible Floor Systems:** Mechanical systems (e.g., GALA Systems at Swiss Tech Convention Center) transform auditoriums to flat ballroom floors.

v. **Column-less Structures:** Large-span lattice frame structures (e.g., BIEC) provide maximal layout flexibility and unobstructed spaces.

c. Effective lighting design defines zones, directs attention, and alters ambiance, transitioning spaces from business-oriented to romantic or theatrical.

d. "Long-term adaptability" and "minimizing setup times" directly link design flexibility to operational efficiency, market competitiveness, and financial viability.

e. The capacity to host a broader array of events with quick turnovers increases revenue potential.

f. A highly flexible and adaptive design for WICC is essential for maximizing utilization and revenue, accommodating a wide spectrum of events with minimal downtime.

g. Initial investment in advanced flexible systems (automated operable walls, reconfigurable seating, integrated lighting controls) is projected to yield long-term benefits.

h. Benefits include enhanced market appeal, reduced operational costs, and the ability to adapt to evolving event formats like hybrid events, ensuring WICC's competitiveness and relevance for decades.

2.12 Major Design Considerations

2.12.1 Access And Entrance

- Separate access is required for visitors, staff, goods and service vehicles and emergency

requirements. It is usually desirable to provide alternative entry for public which is independent from that used by conference visitors. This not only facilitates management and security, but also enables two or congress events or exhibitions to be run independently in parallel.

- Easily identifiable entrance and exit, and clear external signage, which may need to be illuminated.
- Sufficient unloading/loading space to accommodate multiple events.
- Level ground floor with loading docks of sufficient size for all services including client vehicles. Large coach drops off and collection points adjacent to main entrance, with sufficient turning space and height, accessible under cover.
- Doors of sufficient width and height or demountable/retractable walls to permit truck access (trucks delivering exhibit and staging equipment pose particular problems).
- Floor loadings to permit truck access.
- Easily identifiable and weather protected entrance and reception area for attendees. Clearly identified disabled access.
- In larger venues, security systems and monitoring at loading docks. Separate entry for venue staff.
- Storage space (for several days) for pre-congress consignments including exhibitors' displays materials.

2.12.2 Access For the Disabled

Specific provisions include allocation of parking spaces, identification of routes, provision of ramps, toilets and facilities designed for wheelchair and other disabled users in each main area.

2.12.3 Parking

Coach parking bays off street.

Sufficient undercover parking for attendees.

All parking, including venue staff parking, should be secure. Direct access to venue lobby.

Clear directions for exiting car park.

Parking requirements for cars and other vehicles will depend on some extent on the proximity and conditions for use of alternative facilities, such as municipal car parks, as well as on the availability of public transport.

2.12.4 Service Vehicles

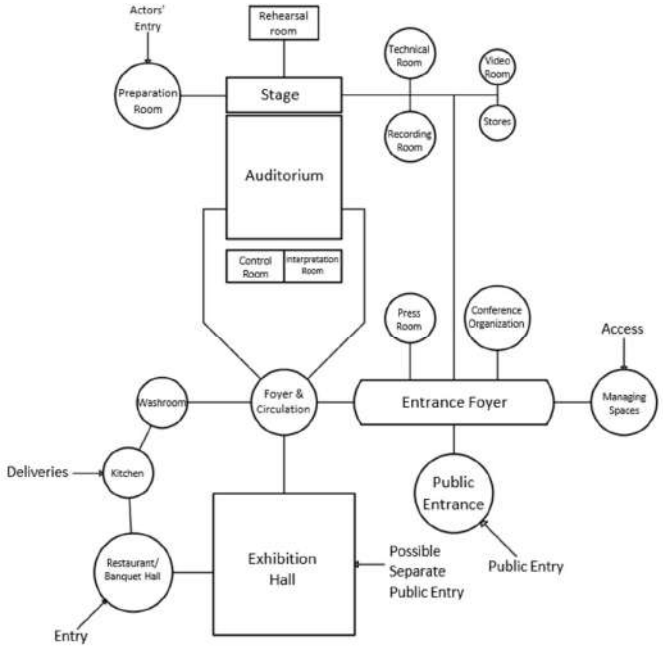
- Plenty of space for parking while unloading/loading goods and equipment with a dedicated car park for vehicles delivering goods or equipment.
- Parking for trucks with sufficient height and turning space where staging, audio visual or other equipment needs to be packed in or out within short period of time.
- Long-term parking for trucks used for transporting production equipment and exhibitors' displays.

2.12.5 Horizontal And Vertical Arrangements

- The single floor organization provides easy access among the rooms and between the conference areas and other functional elements. This plan imposes few structural or mechanical constraints, permits total freedom in the planning of the rooms, allows for access from the refreshment break areas to outdoor terraces and patios.
- Vertical stacking of auditoria and/or main halls is more economical in the use of land, and enables space below tiered floors to be more efficiently used. Unit costs of construction are higher and vertical transportation of people and goods may present difficulties

2.12.6 Circulation

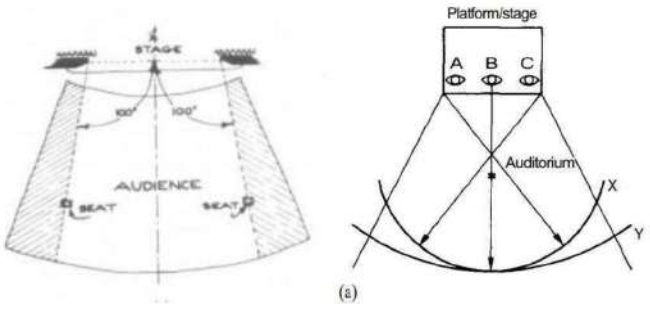
- Linear arrangement of spaces with beginning, middle and end.
- A loop where the essentially linear storyline leads naturally back to the beginning.
- An arrangement of core and satellites where each theme or detailed treatment of a subject leads back to a central introductory or orientational areas.
- A more complex scheme combining linear, loop and core-satellite arrangement of spaces.
- Comb which refers to a circulation pattern in which there is a main circulation path and optional alcoves which a visitor may enter or bypass. (Neufert)



2.12.7 2.13 Auditorium Design

The auditorium is the heart of building, where the primary activity of experiencing and presenting performances take place. Audience seating is arranged to view the stage and the stage is a platform from which the performer can be communicate to the audience. The relationship between the two is very crucial for the success of convention centers. Mostly auditorium is designed to fulfill no of purposes. The objective of designer will be to use 100% usage of space. Auditorium should be designed in such a way that every member should be able to see and hear the performance of stage.

The three-dimensional volume of an auditorium is conditioned by the need for all members of the audience to be able to see the whole of the platform or stage: and to hear the actor, singer, musician or speaker. Seating density, floor rake and seating layout are partly determined by this, partly to give the audience an appropriate level of comfort and essentially to ensure a means of escape in an emergency. Fire, within the time required by safety considerations and by legislation. (Neufert)

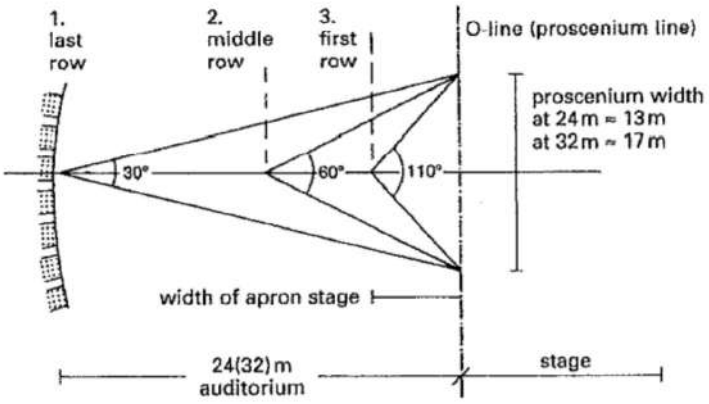


2.13.1 Audience Requirements

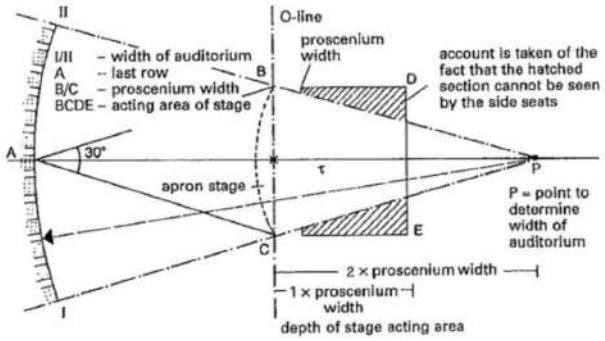
Every member of the audience should be able to see and hear clearly whatever is happening on every part of the stage or platform. The greater the encirclement of the audience of the platform or stage, the more people can be accommodated within the aural and visual limitations up to 180° encirclement. With a full encirclement, the distance from the platform or stage is restricted to six rows. (Neufert)

Proportions of the auditorium these are derived from the psychological awareness and angle of view of the spectator, or the requirement for a good view from all seats. Options are:

1. Good view, without moving head, but light eye movements of approx. 30°.
2. Good view with slight head movements and light eye movements of approx. 60°.
3. Max. Awareness angle without head movement approx. 110°, i.e., all actions in the field are 'in view'. Outside this field, there is uncertainty, because 'something' is out of view.
4. Full head and shoulder movement allows an angle of view of 360°.



7 Proportions of traditional auditorium plan



8 Auditorium width

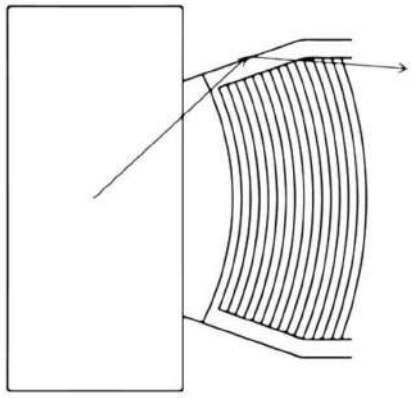
5. Proportions of the classic auditorium Opera, multi-purpose theatre, and traditional playhouse -7 0: distance of the furthest row from the start of the stage should not exceed: -

Playhouse, max. 24 m (max. distance for the recognition of facial expressions);

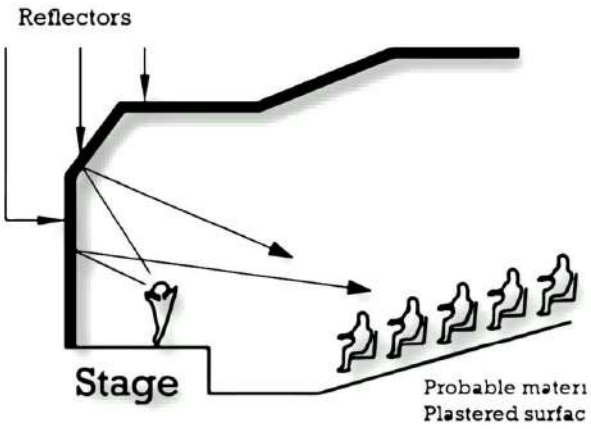
Opera, 32 m (large movements are still recognisable).

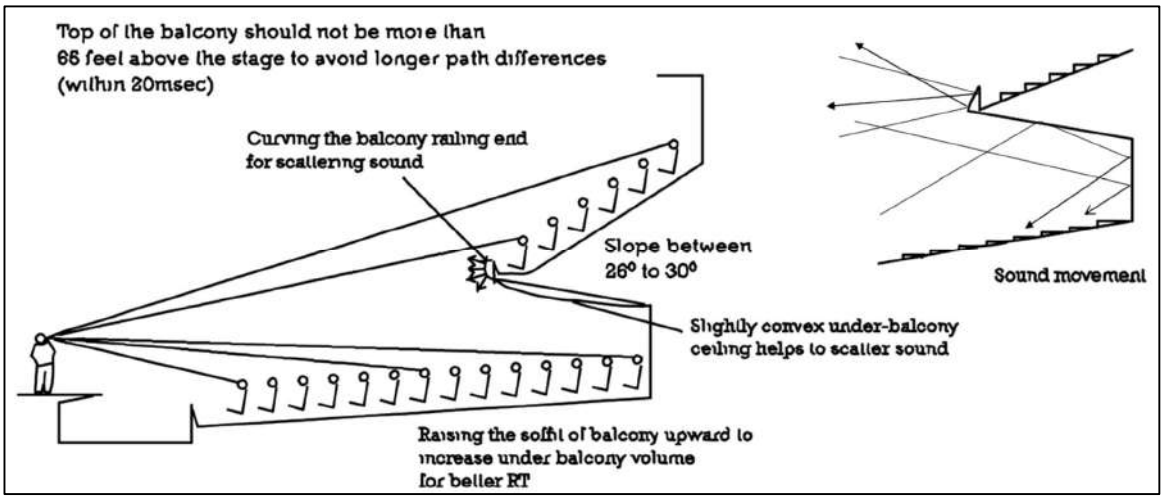
Auditorium width is determined by the spectators at the side being able to see the stage adequately -8.

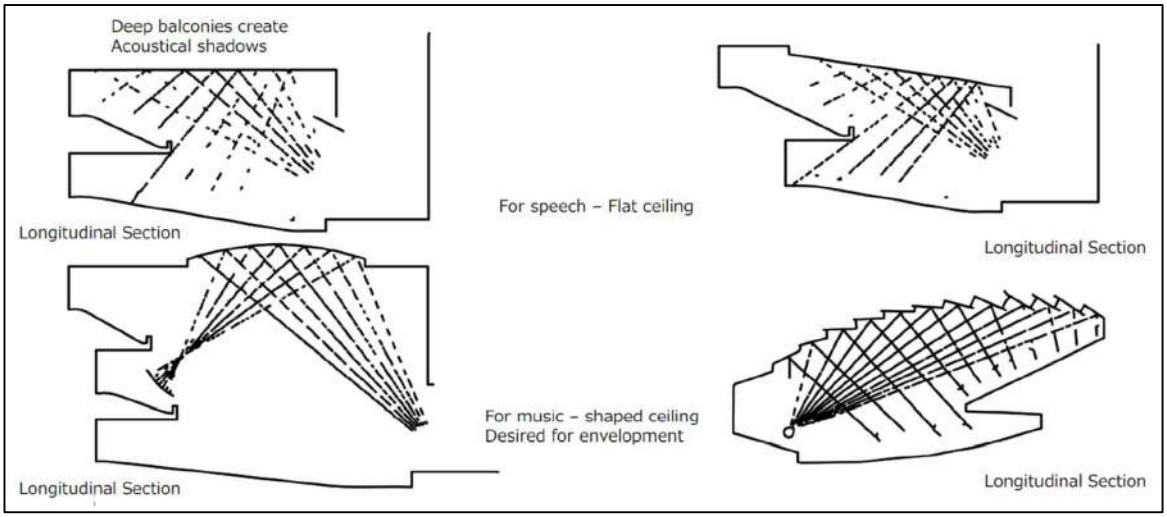
The theatre situation is fundamentally one of the relationships between the performers and the audience. The audience wants to hear and see the show without distraction and in comfort and safety, as stated, but its ultimate objective in attending the show is to receive the utmost sensory stimulation toward the maximum emotional and intellectual experience. (Neufert)

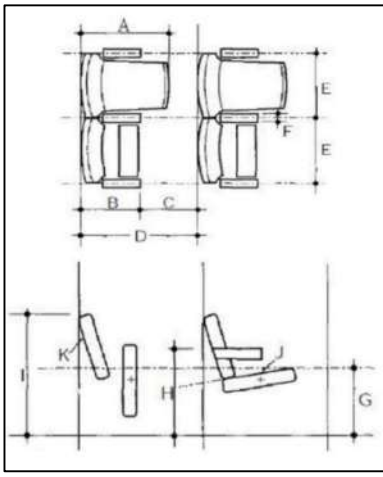


Angled side wall allows better side wall reflection


Reflectors
Stage
Probable materi
Plastered surfac


Top of the balcony should not be more than
66 feet above the stage to avoid longer path differences
(within 20msec)
Curving the balcony railing end
for scattering sound
Slope between
26° to 30°
Slightly convex under-balcony
ceiling helps to scatter sound
Raising the soffit of balcony upward to
increase under balcony volume
for better RT
Sound movement


Deep balconies create
Acoustical shadows
Longitudinal Section
For speech – Flat ceiling
Longitudinal Section
For music – shaped ceiling
Desired for envelopment
Longitudinal Section
Longitudinal Section

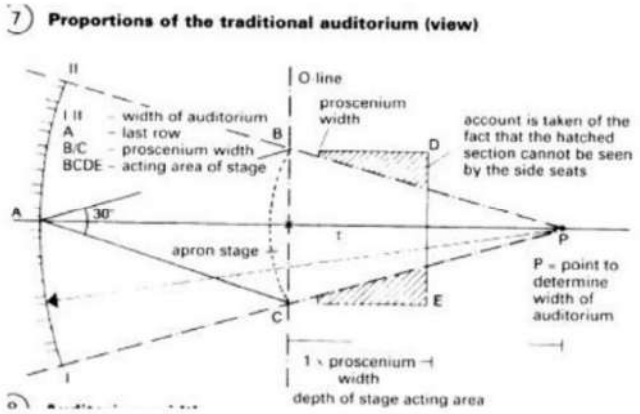


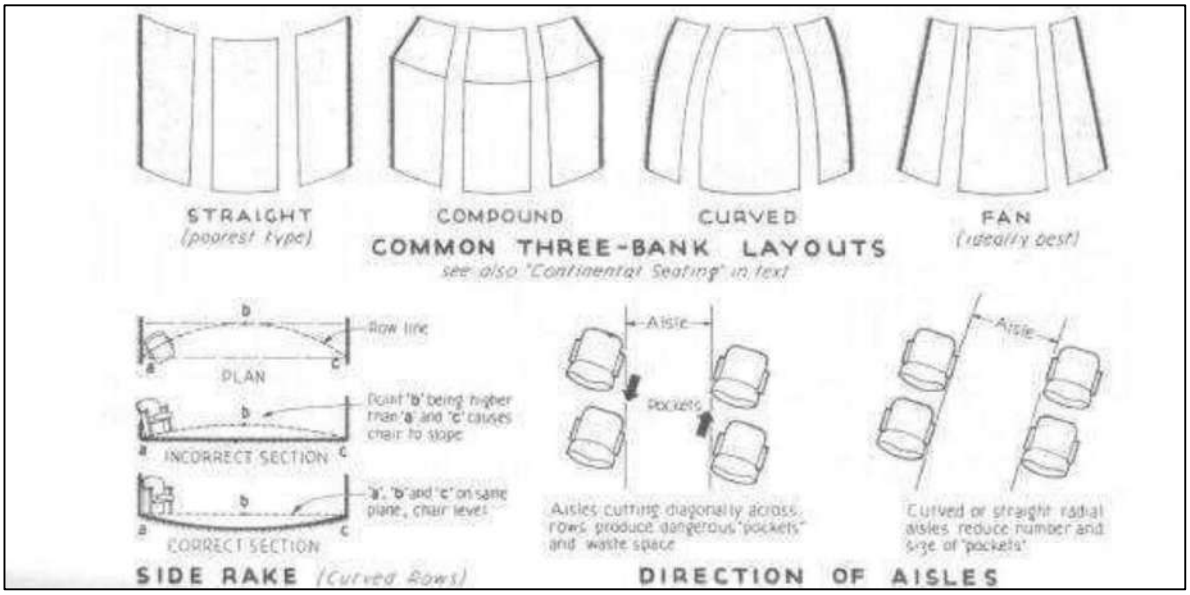
Dimension	Description	Minimum(mm)	Maximum(mm)	Drawnn as
A	Overall seat depth	600	720	650
B	Tipped seat depth	425	500	450
C	Seatway	305	-	400
D	Back to back seat spacing	760	-	850
E	Seat width for seat with arms	500	750	525
F	Annrest height	50	-	50
G	Seat height	430	450	440
H	Armrest height	600		600
I	Seatback height	800	850	800
J	Seat inclination	17	9	7
K	Back inclination	15	20	15

Table 1 : Dimension of auditorium seats

Visual Limitations

- For drama= 20m
- For Opera= 30m
- For dance= 20m
- For conference = 20m

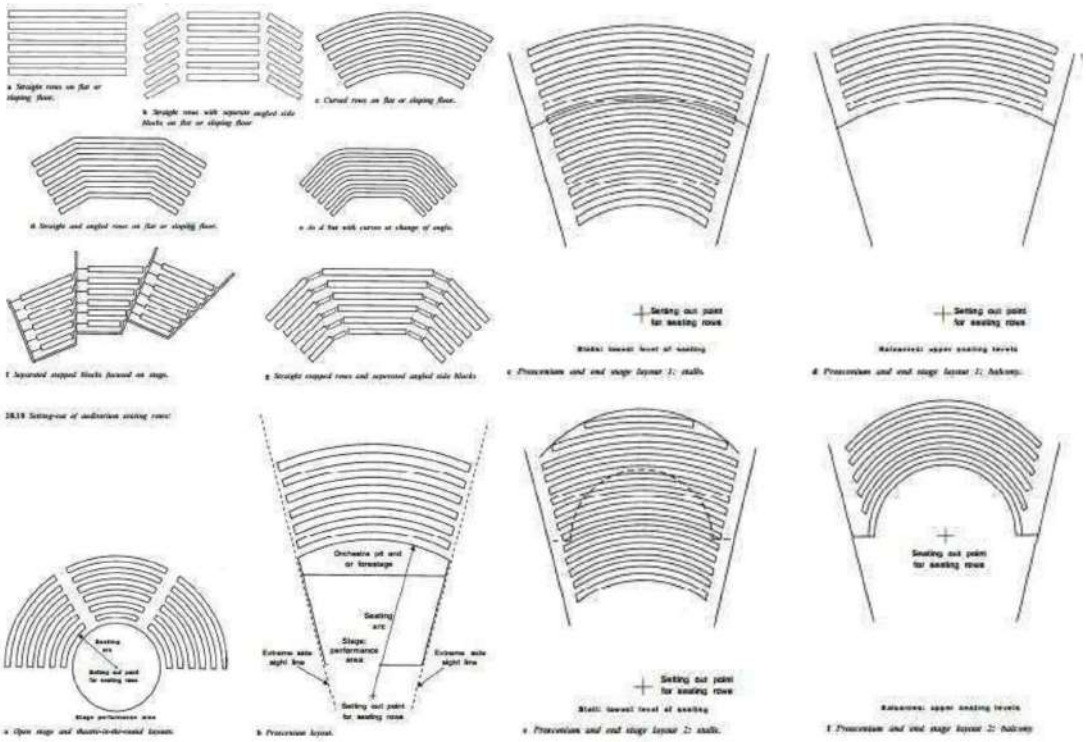




2.13.2 Seating

With traditional seating, the maximum number is 22 if there are gangways at both ends of the row, and 11 for gangways at one end. Rows with more than 22 seats are permitted if the audience is not thereby imperiled.

- minimum Dimension of seating with arms =500mm Without arms =450mm
- Seat height = 430-450 mm
- Angle of inclination= 7-9 degree with horizontal Back Height = 800-850mm
- Angle of inclination = 15-20 degree
- Seat Depth= 600-720 mm, reduced to 425-500mm when the seat is tipped Other Factors affecting seating is,
- Acoustics: Upholstery to satisfy the acoustic requirements, usually the level of absorbency when unoccupied
- Ventilation & heating: Air supply or extract under a seat
- Upholstery: Thickness of padding should provide comfort & avoid fatigue, material of
- padding and finish must satisfy fire regulations



Seating geometry

Seating is usually laid out in straight or curved rows focused toward the platform or stage. Further forms are the angled row, straight row with the curved change of direction, and straight rows within emphasised blocks of seats.

Seating density

Seats with arms and tippable seat can occupy a space as small as 500 mm wide with a how-to-row dimension of 760 mm: but can be as large as 750 mm wide by 1400 mm. The area per seat therefore varies between 0.38 m² and 3.05 m².

Row to row spacing

Spacing is controlled by the clearway between the leading edge of the seat and the rear of the back of the seat in front. For traditional seating, the minimum clearway for people to pass along the row is 300mm and this dimension increases with the number of seats in a row. For continental seating the clearway is not less than 400 mm and not more than 500 mm.

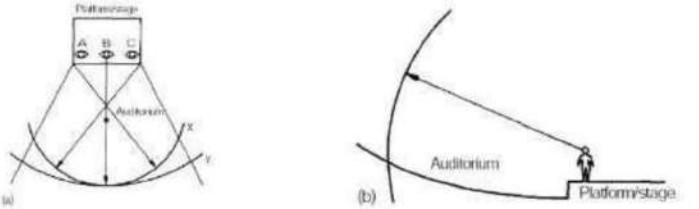


Figure 5: Visual and aural limitations: (a) Plan: for a performer at centre stage B there is an arc Y beyond which visual and aural perceptions are impaired. However, for performers nearer the sides of the stage at A and C produce more restrictive curves X. (b) Section: Similarly, visual and aural limits in section also set an arc centred on the performer.

Gangways

As gangways are essential to escape routes, their widths are determined by the number of seats served. The minimum is 1100 mm. They can be ramped up to 10%. If the seating rake is steeper, gangways must-have steps extending the full width and these must have consistent treads and risers in each run.

2.13.3 Sightline

Horizontal sightlines

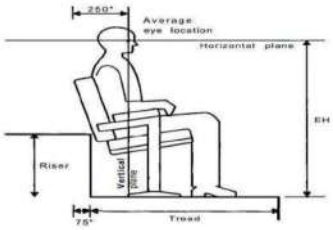
It is obtained from spectator's psychological perception & viewing angle.

- Good view without head movement= 30 degree
- Good view with head movement = 60 degree
- Maximum perception angle = 110 degree
- With full head & shoulder movement= 360 degree

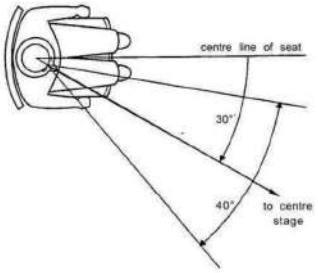
So, fan shape less than 100 degree is preferable due to Sightlines & Acoustic reason in Auditorium.

Vertical sightlines

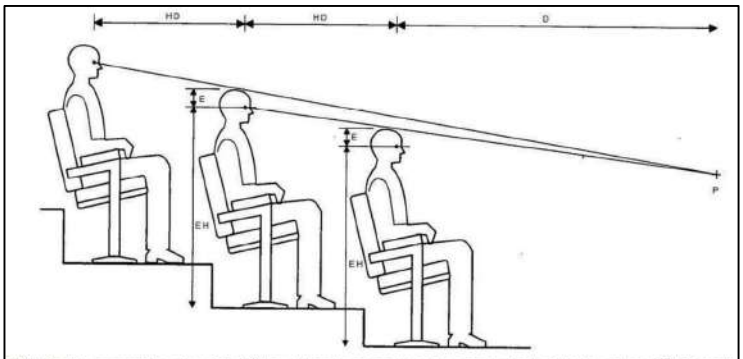
The longitudinal section is a parabolic stepped floor as a theoretical rake produced by the sightline calculation. This gives every member of the audience similar viewing conditions. This may be reduced to a single angle or series of angles when applied as described the rake will also be steep. This is satisfactory for a single tier of seating with no balconies and is especially appropriate for open-stage formats.



20.22 *Position of eye in relation to seat and stepped floor. Dimensions vary according to upholstery thickness, and inclinations of both seat and back. Working dimensions are starred **



20.25 a *The maximum comfortable amount the head can be turned from the seat centreline is 30°.*



20.21 *Graphic representation of vertical sightlines, P lowest and nearest point on stage clearly visible by audience, HD horizontal distance between eyes in successive audience rows, EH average audience eye height above floor, E height between eye and top of head, D distance from eye of person in front row to P*

2.13.4 Writing Surface

Conference use may require a writing surface for note-taking. The writing surface may be: A tablet fixed to each seat or A fixed table with fixed pivoting or sliding seat.

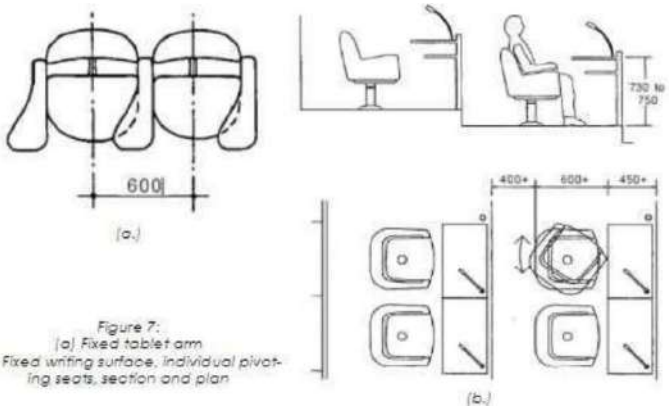


Figure 7:
(a) Fixed tablet arm
(b) Fixed writing surface, individual pivoting seats, section and plan

3. DEVELOPMENT NORMS

3.1.1 3.1 MOS and Ground Coverage

6. INSTITUTIONAL (medical), ASSEMBLY PUBLIC BUILDINGS AND PUBLIC OFFICE COMPLEXES:

1. Maximum permissible FAR : Refer relevant statement.
2. Building Requirements and setbacks upto 10 mtrs. building height.

Plot area (Sq.mts.)	Max. Cov	Setbacks for Office buildings		Setbacks for Other buildings	
		Front	Remaining sides	Front	Remaining sides
a) Below 500	As per min.building setbacks	6.00	4.50	9.00	6.00
b) 500 – 2000	50%	6.00	4.50	9.00	6.00
c) 2000 & above	1000 sq.mts. or 40% whichever is higher	6.00	4.50	9.00	6.00

(3) for above category of buildings above 10 mtrs. height:
In addition to the setbacks prescribed above there shall be an increase of 1.0 mtrs. on all sides for every increase of 3.0 mtrs. height of building above 10 mtrs.

4. PARKING:

Type of Building	One vehicular parking space of 20 sq.mts. area for every
a) Institutional (Medical)	20 beds
b) Government or semi-public buildings	100 sq.mts. builtup area or fraction thereof

Figure 14 Maximum Ground Coverage and M.O.S

3.2 Maximum Permissible FAR

4. SITE AND BUILDINGS REQUIREMENTS:

4.1 MAXIMUM PERMISSIBLE FLOOR AREA RATIO (F.A.R.)

For Residential, Commercial, Institutional and other non-industrial buildings, and for different areas are as follows:
TABLE FOR F.A.R.

Statement	**Plot Size Sq.mts**	**Proposed Road Width as per Notified Master Plan Plan/Zonal Development Plan**			
		Below 12 mts.	**12 to 18 mts.**	**18 mts. and above**	**Max.height in mts.**
For Hyd,VSP Mpl.Corp. & Gaddiannaram G.P.	Below 200	1.00	1.25	1.25	10 (no stilt)
	200 to below 1000	1.00	1.25	1.33	15 *
	1000 to below 2000	1.25	1.33	1.50	**
	2000 & above	1.25	1.50	1.75	**
Statement	**Plot Size Sq.mts**	**Proposed Road Width as per Notified Master Plan Plan/Zonal Development Plan**			
		Below 12 mts.	**12 to 18 mts.**	**18 mts. and above**	**Max.height in mts.**
For Municipalities within UDA areas of HUDA, TUDA,KUDA,VUDA, VGTUDA, SSUDA	200 to below 1000	1.25	1.33	1.50	15 *
	1000 to below 2000	1.33	1.40	1.60	**
	2000 & above	1.40	1.50	1.75	**
For Gram Panchayats falling within UDA areas of HUDA, TUDA,KUDA,VUDA, VGTUDA, SSSUDA	Below 200	1.25	1.25	1.33	10 (no stilt)
	200 to below 1000	1.40	1.50	1.60	15 *
	1000 to below 2000	1.50	1.60	1.70	**
	2000 & above	1.75	1.85	2.00	**

Figure 15 Max. F.A.R

In the case of Commercial / Institutional buildings the gross F.A.R. shall be calculated by adding 35% of the prescribed F.A.R.

Common areas shall include:

(a) Air-conditioning plant room, electrical transformer cabin, pump house.

(b) Watchman booth, garbage shaft

(c) Corridors, Staircase, lift blocks

(d) Balconies

The width of Balcony shall not be more than 1.2 mtrs if the building set back is 4 mtrs. If building set back is 5 mtrs. and above the maximum width can be 1.5 metres.

3.3 Electrical Lines

(c) **Electrical Lines**

(i) In case of sites in the vicinity of High Tension Electricity Transmission Lines besides taking other safety precautions, a minimum safety distance (both vertical and horizontal) of 3m shall be maintained between the building and the High Tension Electricity Lines and 1.5m shall be maintained between the building and the Low Tension Electricity Lines.

(ii) In case of Electricity Tower lines, the land all along below the tower line shall be developed as green belt to an extent of the width of tower base and on either side of green belt there shall be a minimum of 10m wide roads or as defined in the Master Plan.

3.4 Central Courtyard

12. BUILDINGS WITH CENTRAL COURTYARD FOR COMMERCIAL USE:

(a) 'U' type commercial buildings with central courtyard are allowed with a minimum plot area of 2000sq.m with the following conditions:

(b) The Front setback shall be as per Table-III of rule-5 & Table-IV of rule-7 for Non High Rise & High Rise buildings respectively.

(c) The minimum open space / setback on sides and rear except front, shall be

(i) 2m for building height up to 15m;

(ii) 3m for building height up to 18m;

(iii) 7m in case of high rise buildings up to 30m height and buildings coming under purview of Andhra Pradesh Fire Services Act-1999.

(d) The area so saved is transferred to the central area / space or court yard;

(e) The depth of such courtyard shall be at least 50% of the average building depth and the minimum width shall be 10m.

3.5 Restrictions On Projections Allowed In Mandatory Open Spaces

Only the following Projections shall be allowed in the mandatory open spaces / setbacks / interior open spaces:

(i) No balcony projections or corridor shall be permitted beyond the setbacks i.e., projecting within the mandatory open spaces in case of non-high rise buildings. These, if provided for, shall be set back as per the minimum (rules)

mandatory open spaces and the setback shall be clear from the edge of the balcony or corridor.

(ii) Cornice, Chajjas / weather shades only of width not exceeding 60cm shall be allowed in the mandatory setbacks.

(iii) In case of plots more than 300 sq m:

a. Sump, septic tank, well may be allowed in the rear and side open spaces. These shall need to be setback at least 1.5 m from the property or boundary line of the plot.

b. Parking sheds, generator room may be allowed in the rear and side open spaces.

c. In the front setback only a security guard booth of 2 sqm

The height of these accessory buildings shall not be more than 2.50 m and shall not occupy more than 1/4th of the plot width.

3.6 Building Requirements for High-Rise Building

(x) The minimum abutting road width and all round open space / setback for High Rise Building / Complex shall be as follows:

TABLE – IV

Height of building (in meters)		Minimum abutting road width required (in meters)	Minimum all-round open space on remaining sides (in meters) *
above	**Up to**		
1	**2**	**3**	**4**
-	21	12	7
21	24	12	8
24	27	18	9
27	30	18	10
30	35	24	11
35	40	24	12
40	45	24	13
45	50	30	14
50	55	30	16
After 55m 0.5m additional setback for every 5m of height shall be insisted			

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that portion.

3 The area of openings as given in (a) to (d) above shall be increased by 25 percent in the case of a kitchen [*see* **12.3.3**(d)].

21 ELECTRICAL AND ALLIED INSTALLATIONS (INCLUDING LIGHTNING PROTECTION OF BUILDINGS AND SOLAR ENERGY UTILIZATION)

21.1 For requirements regarding electrical installations in buildings including lightning protection of buildings, reference shall be made to Part 8 'Building Services

21.2.1 *Solar Photovoltaic Power Generation System*

All plots having size 500 m^2 and above shall install solar photovoltaic power generation system. This should also be encouraged for plots smaller than 500 m^2. The power generated may be used for in-house utilization or for transfer to the grid. The Authority shall have required provisions in the building bye-laws and mechanism for required clearances and approvals. The Authority shall also specify minimum generation requirement. The following may be used as a guide:

Sl No.	*Building Type*	*Plot Size*	*Generation Requirement*
(1)	(2)	(3)	(4)
i)	Residential (Plotted houses)	100 m^2 and above	1 kWp or 5 percent of connected load, whichever is higher
ii)	Residential (Group housing)	All sizes	Minimum 5 percent of connected load
iii)	Business, educational buildings having connected load of 30 kW and above	500 m^2 and above	5 kWp or 5 percent of connected load, whichever is higher
iv)	Mercantile, hotels, motels, assembly, industrial and institutional buildings	500 m^2 and above	for buildings having connected load of: a) *50-1 000 kW* — 10 kWp or 5 percent of connected load whichever is higher b) *Above 1 000 kW* — 50 kWp or 5 percent of connected load whichever is higher

Figure 16 Norms for Solar Power Installation

3.6.1 Ventilation Shaft

For ventilating the spaces for water closets and bathrooms, if not opening on the front side, rear and interior open spaces, shall open on the ventilation shaft, the size, of which shall not be less than the values given below: (NBC)

Table 4.5 Size of Ventilation Shaft

Height of Building (m)	Size of ventilation shaft (sq m)	Minimum size of shaft (m)
Upto 10.0	1.2	0.9
Upto 12.0	2.8	1.2
Upto 18.0	4.0	1.5
Upto 24.0	5.4	1.8
Upto 30.0	8.0	2.4
Above 30.0	9.0	3.0

Figure 17 Size of Shaft

- For buildings above 30.0 m. height, mechanical ventilation system shall be hustled besides the provision of minimum ventilation shaft
- For fully air-conditioned residential buildings for lodging purposes, the ventilation shaft need not be insisted upon, provided the air-conditioning system works in an uninterrupted manner also, provided there is an alternative source of power supply. However, it is not mandatory in case of buildings where ventilation is mechanized.

Interior Open Space for Light and Ventilation

- The whole or part of one side of one or more rooms intended for human habitation and not abutting on either the front, rear or side open spaces shall abut on an interior open space

whose minimum width in all directions shall be 3.0 m in case of buildings not more than 15 m 17.5 m (with stilts) in height, and in case of buildings above 15 m/ 17.5 m (with stilts) it shall have mandatory mechanical ventilation in addition.

- Sunken Courtyard
- Skylight

3.6.2 Fire Escapes Or External Stairs

- Fire escape shall not be taken into account while calculating the number of staircases for a building.
- All fire escapes shall be directly connected to the ground.
- Entrance to the fire escape shall be separate and remote from internal staircase.
- The route to fire escape shall be free of obstructions at all times except the doorway leading to the fire escape which shall have the required fire resistance.
- Fire escape shall be constructed of non-combustible materials.
- Fire escape stairs shall have straight flight not less than 125 cm wide with 25 cm treads and risers not more than 19 cm.
- Handrails shall be at a height not less than 100 cm.
- Fire escape staircase in the mercantile, business, assembly, hotel buildings above 24 m. height shall be a fire toder and in such a case width of the same shall not be less than the width of the main staircase. No combustible material shall be allowed in the fire tower. (NBC)

3.6.3 Fire Escapes Or External Stairs

Following details shall apply for a fire lift in addition to above requirements:

- To enable fire service personnel to reach the upper floors with the minimum delay, one or more of the lifts shall be so designed so as to be available for the exclusive use of the fireman in an emergency and be directly accessible to every dwelling/lettable floor space on each floor.
- The lift shall have a floor area of not less than 1.4 sq.mt. It shall have a loading capacity of not less than 545 kg. (8 persons lift) with automatic closing doors. (NBC)
- The electric supply shall be on a separate service from electric supply mains in a building and the cables run in a route safe from fire, that is within a lift shaft. Lights and fans in the elevator having wooden panelling or sheet steel construction shall be operated on 24-volt supply
- In case of failure of normal electric supply, it shall automatically switch over to the alternate supply. For apartment houses, this changeover of supply could be done through manually operated changeover switch. Alliteratively, the lift should be so wired that in case of power failure, it comes down at the ground level and comes to stand still with door open.

3.6.4 Service Ducts/Refuge Chute

Service duct shall be enclosed by walls and door, if any, of 2 hours fire rating. If ducts are larger than 10 sq m. the floor should seal them, but provide suitable opening for the pipes to pass through, with the gaps sealed.

3.6.5 Electrical Services

Electrical Services shall conform to the following:

- The electric distribution cables/wiring shall be laid in a separate duct shall be sealed at every floor with non-combustible material having the same fire resistance as that of the duct. Low and medium voltage wiring running in shaft and in false ceiling shall run in separate conduits.
- Water mains, telephone wires, inter-com lines, gas pipes or any other service lines shall not be laid in ducts for electric cables.
- Separate conduits for water pumps, lifts, staircases and corridor lighting and blowers for pressuring system shall be directly from the main switch panel and these circuits shall be laid in separate conduit pipes, so that fire in one circuit will not affect the others. Master switches controlling essential service circuits shall be clearly labelled.

3.6.6 Air-Conditioning

Air-Conditioning should conform to the following:

- Escape routes like staircase, common corridors, lift lobbies: etc. should not be used as return air passage.
- The ducting should be constructed of metal in accordance with BIS 655:196
- Wherever the ducts pass through fire walls or floor, the opening around the ducts should be sealed with fire resisting material of same rating as of walls/floors.
- Metallic ducts should be used even for the return air instead of space above the false ceiling.
- The material used for insulating the duct system (inside outside) should be of flame resistant (IS 4355: 1977) and non-conductor of heat.
- Area more than 750 sq m. on individual floor should be segregated by a firewall and automatic fire dampers for isolation should be provided

3.6.7 Fire Dampers

These shall be located in air ducts and retum air ducts passages at the following points:

- At the fire separation wall
- Where ducts/passages enter the central vertical shaft
- Where the ducts pass through floors
- At the inlet of supply air duct and the return air duct of each compartment on every floor.

The dampers shall operate automatically and shall simultaneously switch off the air- handling fans. Manual operation facilities shall also be provided.

3.7 Means of Escape

3.1.2 3.7.1 Travel Distance

The maximum travel distance from seat to exit within the auditorium is determined by the need to evacuate from each level of the auditorium within 2% minutes. For traditional seating the maximum travel distance is 18 m meo sured from the gangway, for continental seating 15 m from any seat.

Exits:

From each level of the auditorium two separate exits must be provided for the first 500 seats with an additional exit for each further 250 seats.

Stairs:

Staircase fights should have at past two risers and not more than 16. Al treads should be 275 mm and risers 180 mm.

Ramps:

Wheelchair users should be provided with flat or ramped escape routes which may be separate from other routes. Ramps should not be longer than 4.5 m or steeper than 8.5%

Number of people	Minimum total exit widths (m)
upto 200	2.2
201-300	2.4
301-400	2.8
401-500	3.2
751-1000	6.4
1001-2000	14.4

3.7.2 Conference Rooms

Fire safety norms by the National Building Code of India

Every building shall be so constructed, equipped, maintained and operated as to avoid undue danger to the life and safety of the occupants from fire, smoke, fumes, or panic during the time period necessary for escape.

General Exit Requirements

An exit may be a doorway; to an internal staircase, or external staircase, or terrace(s), which have access to the street, or to the roof of a building or a refuge area. All exits shall provide continuous means of egress to the exterior of a building or to an exterior open space leading to a street.

Capacity of exits

In an assembly building (convention center), the capacity per storey per unit width of exit of stairways, ramps and doors is 40,50 and 60 respectively.

Doorways

No exit doorway shall be less than 1000 mm in width except assembly build ings where door width shall be not less than 2000 mm. Doorways shall be not less than 2000 mm in height.

Stairways and ramps

The minimum width of tread shall be 300 mm and the maximum height of riser shall be 150 mm for assembly buildings.

The minimum width for a staircase shall be 2m.

The minimum headroom in a passage under the landing of a staircase and under the staircase shall be 2.2 m.

The slope of a ramp shall not exceed 1 in 10. In certain cases steeper slopes maybe permitted but in no case greater than 1 in 8.

Horizontal exits

For buildings more than 24 m in height, refuge area of 15 m² or an area equivalent to 0.3 m² per person to accommodate the occupants of two consecutive floors.

3.8 Norms

3.16 Socio – cultural facilities

Table 3.15 Development Controls for Socio- Cultural Facilities

Sl.No	Category	Maximum			Other Controls
		Ground Coverage	FAR	Height	
1.	a. Multipurpose Community Hall. b. Banquet hall	30% 30%	1.20 1.20	26m 26m	1. Parking standard @3.0ECS/100sq m of floor area. 2. Other controls related to basements etc. are given at end of this chapter.
2.	a. Community Recreational Club. b. Recreational Club	30% 25%	1.20	26m	Parking standard @2ECS/100sq.m of floor area.
3.	Socio- cultural activities such as auditorium, music, dance & drama centre/mediation & spiritual centre etc.	35%	1.20	26m	1. Parking standard @ 2ECS/100sq.m of floor area. 2. A proper scheme for visitors parking and parking adequacy statement shall be prepared taking into consideration large number of visitors.
4.	Exhibition cum Fair Ground	20%	0.20	26m	Subject to statutory clearances.
5.	Science centre	30%	1.20	NR,	Parking standard @2ECS.
6.	International Convention Centre	30%	1.20	Subject to approval of AAI, Fire Department and other statutory bodies	Parking standard @2ECS.

Notes:

i.In case of community recreational clubs, 0.50 FAR shall be admissible on the area beyond 2000 sqm.

ii.In the open area apart from outdoor games/sport facilities, swimming pool would be permissible upto an area of 300sqm. Free from ground coverage.

iii.Basement within the ground envelope shall be allowed for parking, stilt floor for parking is permissible.

iv.30% of basement area for services, storage shall not be counted in FAR.

Sl. No.	Height of the Building (m.)	Exterior open spaces to be left on all sides in m. (front rear and sides in each plot) As per prescribed set backs
1	10	3
2	15	5
3	18	6
4	21	7
5	24	8
6	27	9
7	30	10
8	35	11
9	40	12
10	45	13
11	50	14
12	55 and above	16

Note: *On sides where no habitable rooms face, a minimum space of 9.0 m. shall be left for heights above 27.0 m.*

Sl. No.	Sanitary Unit	For Public		For Staff	
		Male	Female	Male	Female
1	Water Closet (W.C.)	One for 200 persons upto 400 persons. For over 400 persons, add at the rate of 1 per 250 persons or part thereof	Four for 100 persons upto 200 persons. For over 200 persons, add at the rate of 1 per 50 persons or part thereof	One for 1-15 persons. Two for 16-35 persons.	Two for 1-12 persons. Four for 13-25 persons, add at the rate of 1 per 6 persons.
2	Ablution Taps	One in each W.C.	One in each W.C.	One in each W.C	One in each W.C
3	Urinals	One for 50 persons or part thereof	--	Nil upto 6 persons One for 7-20 persons Two for 21-45 persons	--
4	Wash Basins	One for every 200 persons or part thereof. For over 400 persons, add at the rate of 1 per 250 persons or part thereof.	One for every 200 persons or part thereof. For over 200 persons, add at the rate of 1 per 150 persons or part thereof	One for 1-15 persons Two for 16-35	One for 1-12 persons Two for 13-25 persons
5	Cleaner's Sink	One per floor, minimum			
6	Drinking Water Fountain	One per 100 persons or part thereof			
7	Shower/Bath	As per trade requirements			

Sl. No.	Sanitary Unit	For Public		For Staff	
		Male	Female	Male	Female
1.	Water Closet (W.C.)	One per 50 seats upto 200 seats. For over 200 seats, add at the rate of 1 per 100 seats or part thereof	One per 25 seats upto 200 seats. For over 200 seats, add at the rate of 1 per 50 seats or part thereof	1 for 15 persons. 2 for 16-35 persons. 3 for 36-65 persons. 4 for 66-100 persons.	2 per 1-12 persons. 4 for 13-25 persons. 6 for 26-40 persons. 8 for 41-57 persons. 10 for 58-77 persons. 12 for 78-100 persons.
2.	Ablution Taps	One in each W.C.	One in each W.C.	One in each W.C.	One in each W.C.
3.	Urinals	One for 50 persons or part thereof	--	Nil upto 6 persons. 1 for 7-20 persons. 2 for 21-45 persons. 3 for 46-70 persons. 4 for 71-100 persons.	--
4.	Wash Basins	One for every water closet			
5.	Kitchen Sinks & Dish Washer	One per each Kitchen			
6.	Service Sink	One in the restaurant			

Water requirement and facilities:

Water requirement for the facility may be worked out and enough storage for ½ day operation is to be kept in storage. The pans must be of Pour Flush (PF) design i.e., with a steep slope. Traps should be of a 20 mm water seal. (Use of 50 mm water seal traps will require more water for flushing.) If toilet is to be linked to city sewer, a master trap must be provided at the sewer connection.

3.8.2 Site Development

Level of the roads, access paths and parking areas shall be described in the plan along with specification of the materials.

Access Path/Walk Way

Access path from plot entry and surface parking to building entrance shall be minimum of 1800 mm wide having even surface without any steps.

Parking

For parking of vehicles of differently-abled people, the following provisions shall apply:

Surface parking for two car spaces shall be provided near entrance for the physically differently-abled persons with maximum travel distance of 30.0 m. from building entrance.

The width of parking bay shall be minimum 3.6 meter.

The information stating that the space is reserved for wheel chair users shall be conspicuously displayed.

Guiding floor materials shall be provided or a device, which guides visually impaired persons with audible signals, or other devices, which serves the same purpose, shall be provided.

Building requirements

The specified facilities in buildings for differently abled persons shall be as follows:

Approach to plinth level

Every building should have at least one entrance accessible to the differently abled and shall be indicated by proper signage. This entrance shall be approached through a ramp together with the stepped entry.

Ramped Approach

Stepped Approach

Exit/Entrance Door

Entrance Landing

Corridor connecting the entrance/ exit for the differently abled

The corridor connecting the entrance/exit for differently abled leading directly outdoors to a place where information concerning the overall use of the specified building can be provided to visually impaired persons either by a person or by signs, shall be provided as follows:

Guiding floor materials shall be provided or device that emits sound to guide visually impaired persons.

The minimum width shall be 1500mm.

In case there is a difference of level, slope ways shall be provided with a slope of 1:12.

Stair-ways

One of the stair-ways near the entrance/exit for the differently abled shall have the following provisions:

The minimum width shall be 1350 mm.

Height of the riser shall not be more than 150 mm and width of the tread 300mum. The steps shall not have abrupt (square) nosing.

Maximum number of risers on a flight shall be limited to 12.

Handrails shall be provided on both sides and shall extend 300 mm on the top and bottom of each flight of steps.

Lifts

Wherever lift is required as per bye-laws. Provision of at least one lift shall be made for the wheel chair user with the following cage dimensions of lift recommended for passenger lift of 13 person's capacity of NBC 2005. BIS. Section 4.9.3 Table no.

Desirable Lift size

Clear internal width 1100 mm

Clear internal depth 2000 mm

Entrance door width 900 mm

Toilets

One special W.C. in a set of toilets shall be provided for the use of differently abled with essential provision of washbasin near the entrance for the differently abled.

The minimum size shall be 1500 mm x 1750 mm.

Minimum clear opening of the door shall be 900mm and the door shall swing out.

Suitable arrangement of vertical horizontal handrails with 50mm clearance from wall shall be made in the toilet.

The W.C. seat shall be 500mm from the floor.

Harvesting provisions in various Building categories:

All buildings in a city contribute to the rainwater runoff during the monsoon and hence such runoff can be harvested for water reuse recharge.

The indicative provisions of rainwater harvesting in various buildings types are:

Rain Water Harvesting Provisions for Open spaces in cities

Table 9.1 Provisions for Rainwater harvesting by building types

Category / Use	Area of Plot (sq.m.)	Provisions to be made	Other conditions
Residential Plotted Houses			
New Proposals	100 and above	Construction of Rain Water Harvesting Structure.	Shall have emphasis on both storage and reuse.
Group Housing			
New Proposals	All plot sizes	i. Construction of Rain Water Harvesting Structure. ii. Concrete paving to be avoided and permeable materials are to be used for all open parking spaces.	Should indicate the system of Strom Water Drainage, Rain Water Harvesting Structure and Recharging Well
Public and semi public buildings			
All Proposals	All plot sizes	i. Shall have Rain Water Harvesting Structure and storage ii. Shall have Recharge pits	Shall have emphasis on both storage and reuse.
Commercial / Mixed use			
All Proposals	All plot sizes	i. Construction of Rain Water Harvesting Structure. ii. Soft landscape provisions and open spaces with Percolation pits. iii. Common treatment plant to be made part of the integrated development, funded by sale of commercial space.	Should indicate the system of Strom Water Drainage, Rain Water Harvesting Structure and Recharging Well Shall have emphasis on both storage and reuse.
Industrial			
All proposals	All plot sizes	i. Construction of Rain Water Harvesting Structure. ii. Soft landscape provisions and open spaces with Percolation pits. iii. Use of abandoned bore wells for recharging of ground water. iv. Common treatment plant to be made part of the integrated development funded by sale of commercial space.	Should indicate the system of Strom Water Drainage, Rain Water Harvesting Structure and Recharging Well. Provision should be made not to inject contaminated water into recharge structures in industrial areas and care is to be taken to keep such structures away from sewer lines, septic tanks, soak pits, landfill and other sources of contamination.
Other proposals	All plot sizes	Similar as above	Similar as above

*Note: The number of recharge bores to be provided in different plot sizes shall be accordance to Sl No 2 of Table Nos. 14.1 - 14.3 of **Chapter 14**.*

3.8.3 Green Buildings And Sustainability Provisions

Provisions and Applicability

The green building provisions on various plot sizes are indicated in the table below:

Provisions for Sanction

1. Water Conservation and Management

- Rain Water Harvesting
- Low Water Consumption Plumbing Fixtures
- Waste Water Recycle and Reuse
- Reduction of Hardscape

2. Solar Energy Utilization

- Installation of Solar Photovoltaic Panels (detailed at section 10.2.3 below)
- Installation of Solar Assisted Water Heating Systems

3. Energy Efficiency (Concept of passive solar design of buildings)

- Low Energy Consumption Lighting Fixtures (Electrical Appliances - BEE Star and Energy Efficient Appliances)
- Energy Efficiency in HVAC systems.
- Lighting of Common areas by solar energy LED devices.

4. Waste Management

- Segregation of Waste
- Organic Waste Management

5. Roof Top Solar Energy Installations

- Installation of Solar Assisted Water Heating System in Buildings
- No new building in the following categories in which there is a system of installation for supplying hot water shall be built unless the system of the installation is also having an auxiliary solar-assisted water heating system

i)	"Solar Assisted Water Heating System"	A device to heat water using solar energy as heat source.
ii)	"Auxiliary back-up"	Electricity operated or fuel fired boilers/systems to heat water coming out from solar water heating system to meet continuous requirement of hot water.
iii)	"New Building"	Such buildings of above said categories for which construction plans have been submitted to the Authority for clearance.
iv)	"Existing building"	Such buildings, which are licensed to perform their respective business.

Installation of Solar Water Heating System

New Buildings: Clearance of plan for the construction of new buildings of the aforesaid categories shall only be given if they have a provision in the building design itself for an insulated pipeline from the rooftop in the building to various distribution points where hot water is required. The building must have a provision for continuous water supply to the solar water heating system. The building should also have open space on the rooftop. which receives direct sunlight. The load bearing capacity of the roof should at least be 50 kg. per sq m. All new buildings of above said categories must complete installation of solar water heating systems before obtaining necessary license to commence their business.

Existing Buildings: Installation of Solar Assisted Water Heating Systems in the existing building shall be made mandatory at the time of change of use to above said category provided there is a system or installation for supplying hot water.

Capacity:

The capacity of solar water heating system to be installed on the building of different categories shall be decided in consultation with the local bodies. The recommended minimum capacity shall not be less than 25 liters per day for each bathroom and kitchen subject to the condition that maximum of 50% of the total roof area is provided with the system

Specifications:

Installation of Solar Assisted Water Heating Systems shall conform to BIS specification IS 12933. The solar collectors used in the system shall have the BIS certification mark

Auxiliary System:

Wherever hot water requirement is continuous, auxiliary heating arrangement either with electric elements or oil of adequate capacity can be provided.

Sustainable Waste Management

Zero Waste is a concept of waste management and planning approaches that emphasize waste prevention as opposed to end waste management.

The green waste can be converted into fuel cakes, and kitchen waste into manure construction & demolition waste into bricks, plastic waste into oil paper glass and steel back into the same and all residual inert materials can also be converted into bricks. Achieving zero land-fill is more conveniently possible if

Sustainability of Building Materials

Use of Factory made pre-fab/pre-cast and recycled components with Green benefits:

- Panels, hollow slabs, hollow blocks, etc. conservation of materials, less water requirement.
- Fly Ash bricks, Portland Pozzolana cement, Fly ash concrete, phosphor-gypsum- based walling & roofing panels, particle wood recycled use of industrial/ agricultural by-products.
- Fly ash/ AAC (Autoclaved aerated light weight concrete) panels/ CLC (Cellular lightweight concrete) panels- ensures thermal comfort (significant reduction in air conditioning requirement)
- Use of bamboo & rapidly growing plantation timbers- environmental benefits.

4. SITE INVENTORY

4.1.1 Overview

This site inventory includes gathering essential data about a site's existing conditions to guide planning and design decisions. It covers defining the scope, which involves boundaries and key elements such as topography, soil, vegetation, existing structures, and cultural resources. Additional factors like climate patterns, drainage systems, and accessibility are also assessed to identify opportunities and constraints. Data collection methods include observations, measurements, and surveys, with tools like GIS mapping enhancing accuracy and efficiency. The process also includes analyzing and documenting findings to inform decisions, address environmental concerns, comply with regulations, and develop sustainable, context-sensitive designs that maximize the site's potential.

4.2 Site Location

Category	Detail
Project Name	Warangal International Convention Centre (WICC) cum 3-Star Hotel @ IT Park Madikonda, Warangal, Telangana on Public Private Partnership (PPP) Mode Under IALA Warangal.
Nodal Agency	Telangana State Industrial Infrastructure Corporation Limited
Address	Sy. No. 1791/1 of Madikonda (V) in Warangal, Telangana, India.
Coordinates	17.9579087028° N, 79.4459240057° E
Site Area	Approximately 10 acres (40,468 sq. m.)
Primary Access	NH 163
Shape, Terrain	Regular and mostly flat

Building Typology	Assembly Building
Topography	Plain (mostly flat)
Function	Integrated MICE Facility (Convention Centre cum Exhibition Hall, Business Hotel, Entertainment and F&B, and minimum Car Parking)

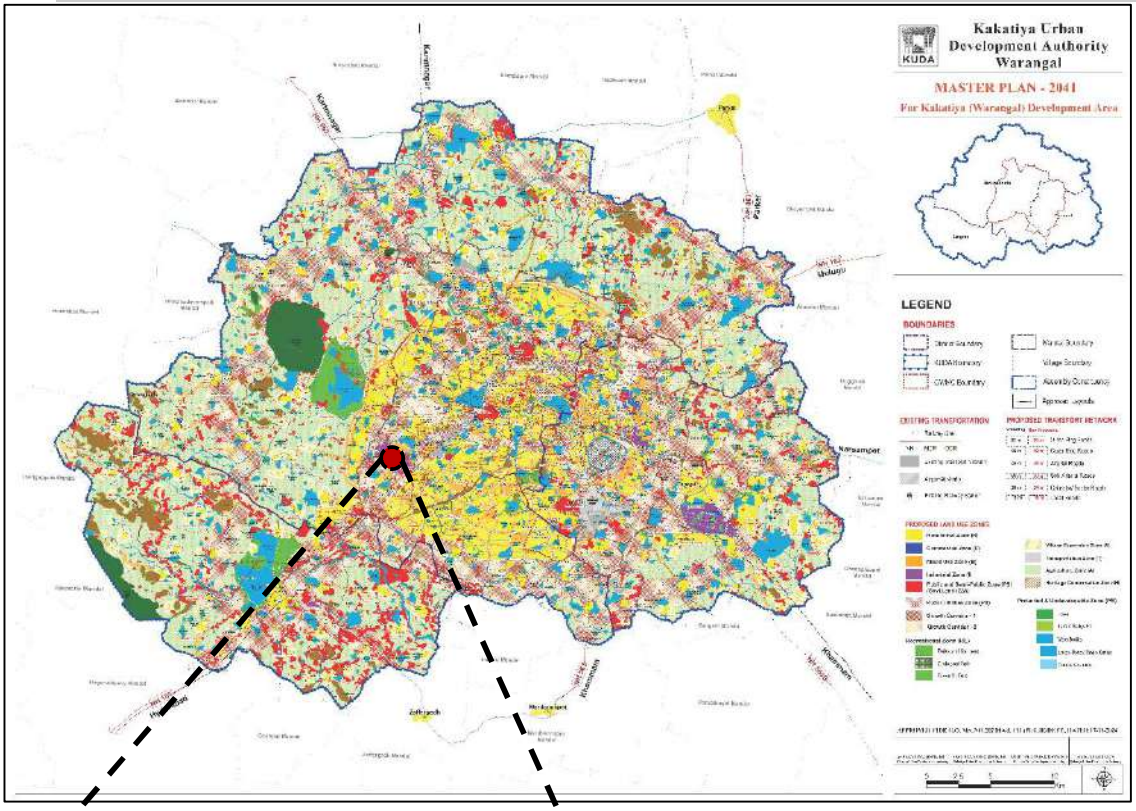


Figure 18 Warangal Masterplan

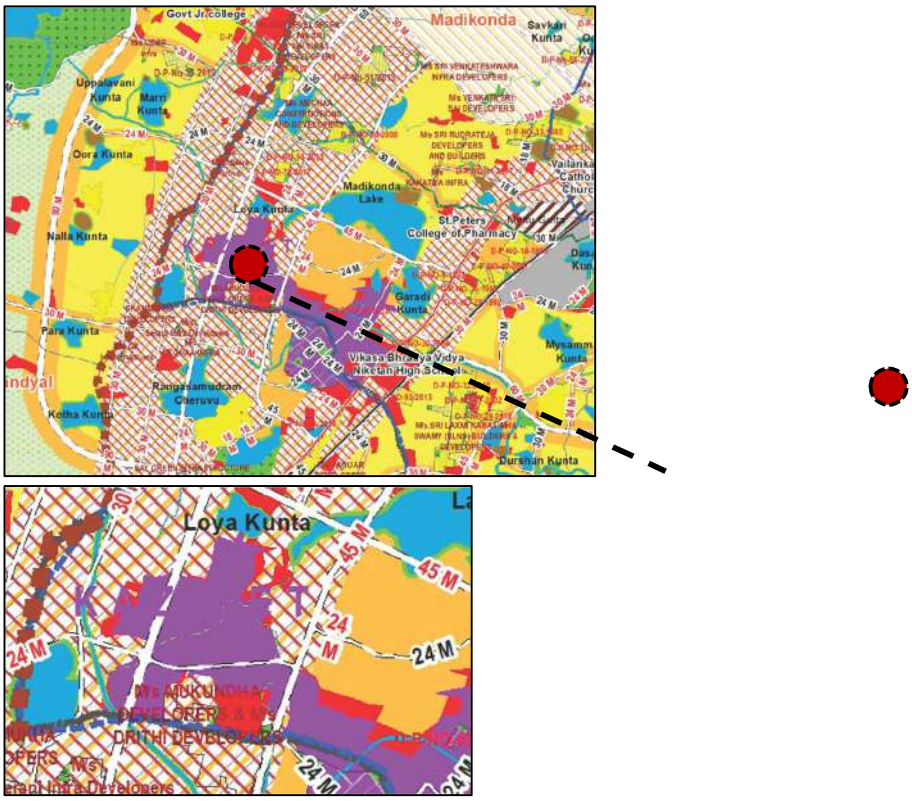


Figure 19 Project Site Location



Figure 20 Google Map location of Site



Figure 21 Site visit group photo

4.3 Existing Site Conditions & Activity



Figure 22 Opposite building of Textile Mill



Figure 23 Site Entrance



Figure 24 Existing Entrance and NH 163



Figure 25 Adjacent paddy fields near site



Figure 26 Existing Site Area i.e Pasture Land





Figure 27 Existing Vegetation of scrubs

4.4 Macro Site Analysis & Proximity

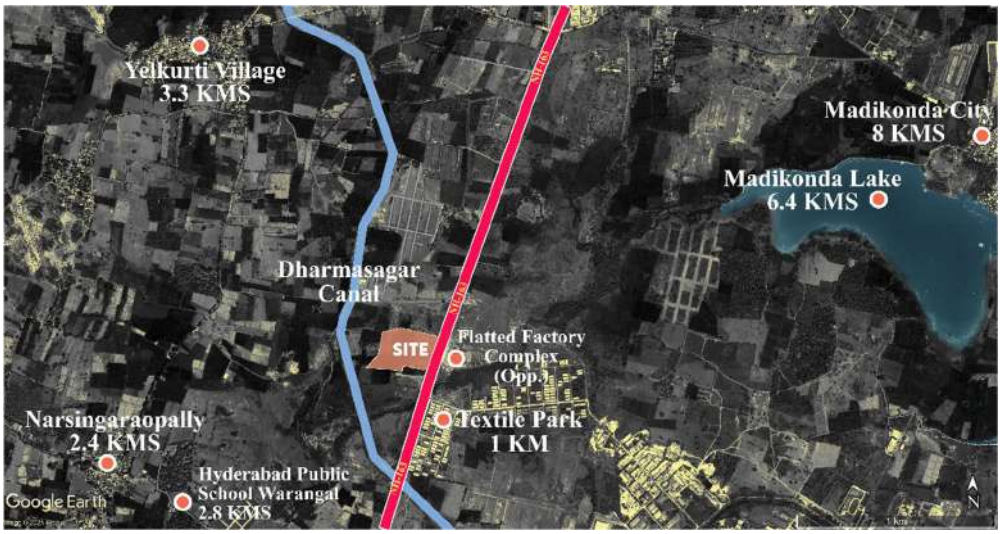


Figure 28 Site Proximity Map

The Warangal International Convention Centre site (17.956° N, 79.446° E) is strategically located opposite Textile Park and adjacent to a Flatted Factory Complex. Hyderabad Public School Warangal is 2.8 km away, and residential clusters like Narsingaraopally (2.4 km) and Yelkurti Village (3.3 km) are nearby. Natural features include the Dharmasagar Canal on the western boundary and Madikonda Lake (6.4 km). The site has direct frontage on NH 163, providing excellent connectivity. Madikonda City is 8 km away, and Kazipet Junction (9 km) is a key transportation hub. This location combines industrial, educational, residential, and natural proximities with strong highway access.

4.5 Micro Site Analysis

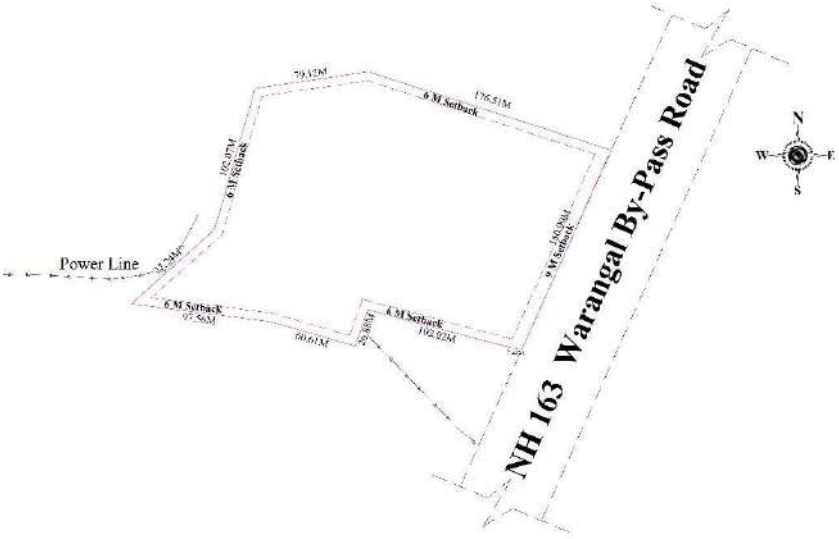


Figure 29 Site Boundary

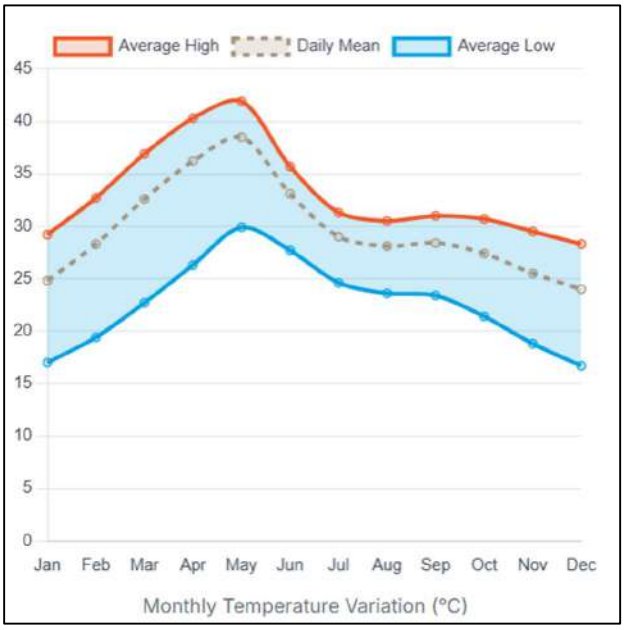
Category	Site Detail	Inferences for Design
Site Area	10 acres (40,468 sqm)	Ample space for the convention center, 3-star hotel, and associated facilities, allowing for comprehensive master planning and zoning.
Setbacks	9m from the front (NH 163), 6m from all remaining sides	These mandatory setbacks will define the buildable area and influence the building footprint and massing. The 9m front setback could provide space for landscaping or a noise buffer.
Contours	Relatively flat; no need for contours	Simplified earthwork and grading, reducing construction costs and time. Facilitates ease of accessibility and movement within the site.
Soil Type	Red chalka soil (55%), black cotton soil (22%), loamy soil (14%), sandy loams (9%)	Requires a detailed geotechnical investigation. Black cotton soil necessitates specialized foundation design (e.g., raft foundations, pile foundations, or ground improvement techniques) to mitigate swelling and shrinking. Different soil types across the site may require varied foundation approaches.
Noise	Major contributor: Highway (NH 163)	Critical design consideration. Implement noise reduction strategies such as: **Building Orientation**: Orienting noise-sensitive areas (hotel rooms, convention halls) away from the highway. **Facade Design:** Using high-performance glazing and solid wall construction on the highway-facing side. **Landscaping:** Incorporating dense vegetation and earth berms as noise buffers. **Noise Barriers:** Potentially designing structural noise barriers along the highway frontage.
Water Services	Major source: Kakatiya Main Canal via Dharmasagar SS Tank and Dharmasagar Canal. Water supply for 8-9 months/year.	Indicates a generally reliable water source. Design should include water storage tanks to ensure continuous supply, especially during potential dry periods (remaining 3-4 months). Water treatment systems may be required depending on raw water quality.
Sewerage System	Warangal Municipal Corporation lacks underground drainage;	Project must incorporate its own on-site sewage treatment plant (STP) and/or a robust septic tank/soak pit system. This requires dedicated land

	individual households use septic tanks/soak pits.	area, careful design for efficient operation, and adherence to environmental discharge norms. Regular maintenance and waste disposal protocols must be planned.
Stormwater Drainage Service	Site has its own stormwater drain adjacent to NH 163 (front side).	Significant advantage for stormwater management. The design can integrate on-site collection and directly discharge into the existing drain, minimizing the need for extensive on-site retention ponds. Requires careful grading and internal drainage network design to channel water effectively.

The 10-acre site offers ample space and flat topography, simplifying construction, though varied soil, especially expansive black cotton soil, demands specialized foundations. Highway noise necessitates sound mitigation. While water is reliable but distant, on-site sewerage treatment is crucial due to absent municipal drainage, though stormwater drainage exists. This breakdown informs the project's design.

4.6 Climatic Analysis

4.5.1 Temperature

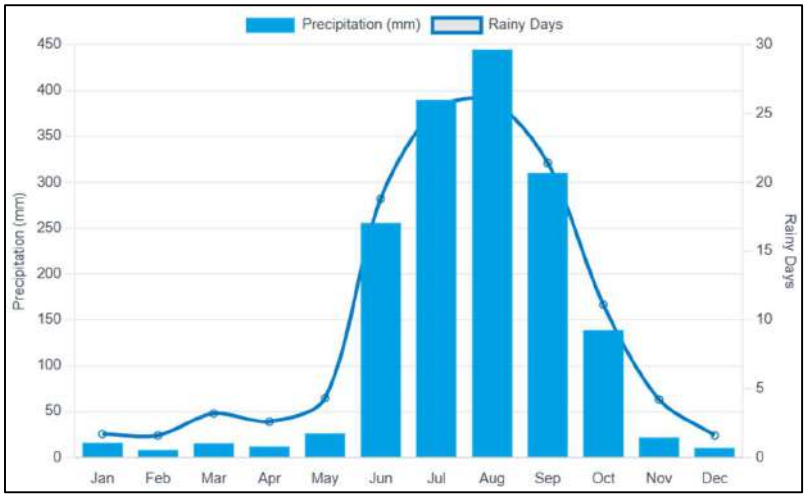


Inferences-Warangal faces consistently high temperatures, with an extreme peak in summer. Cooling is the primary energy demand. However, the significant difference between day and night temperatures presents a key design opportunity.

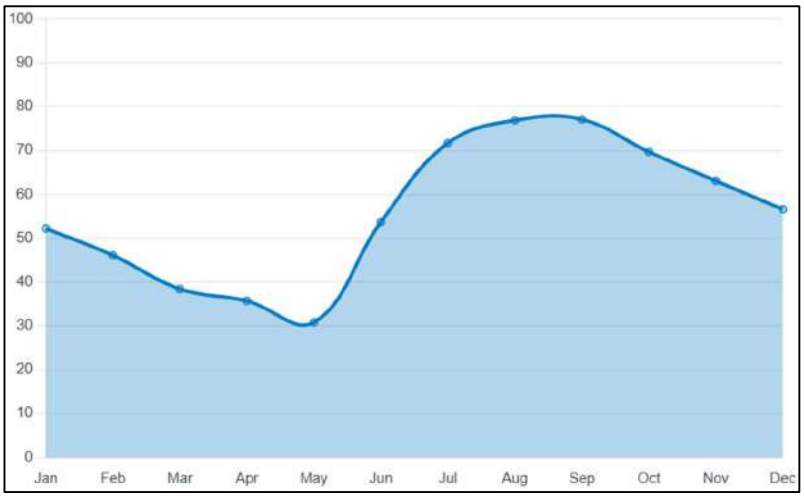
Diurnal Range(10-12°C) Opportunity

This significant daily temperature drop allows for passive cooling strategies like night-purge ventilation, reducing daytime cooling loads.

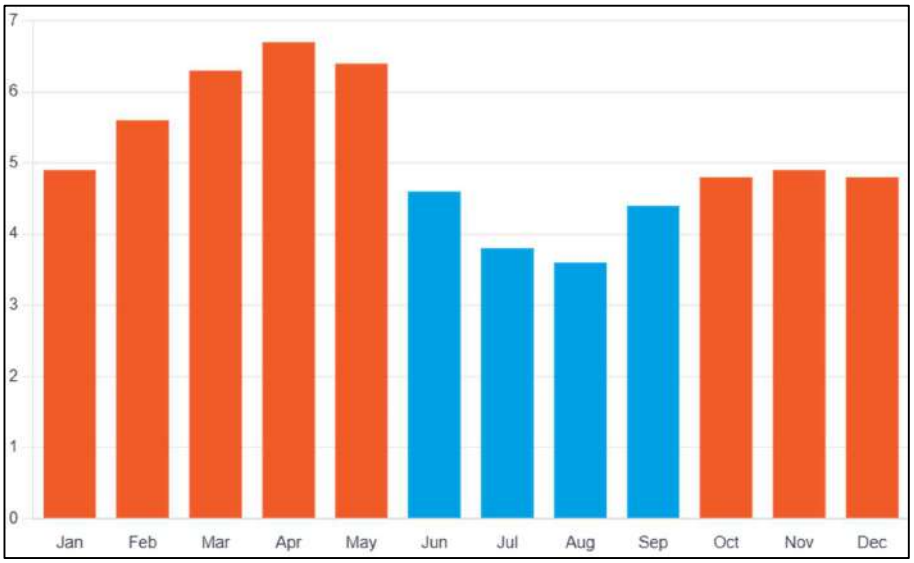
4.5.2 Precipitation



Inferences-From June to September, the climate shifts dramatically to hot and humid, with torrential rainfall. This requires robust water management and strategies to combat high humidity.

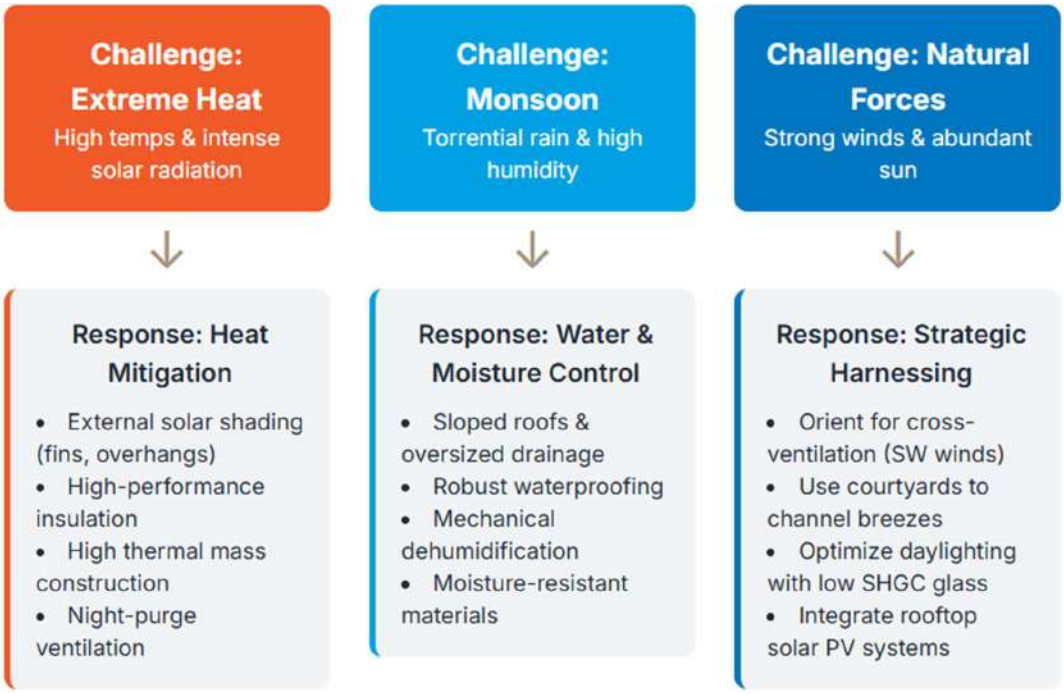


4.5.3 Solar Radiation

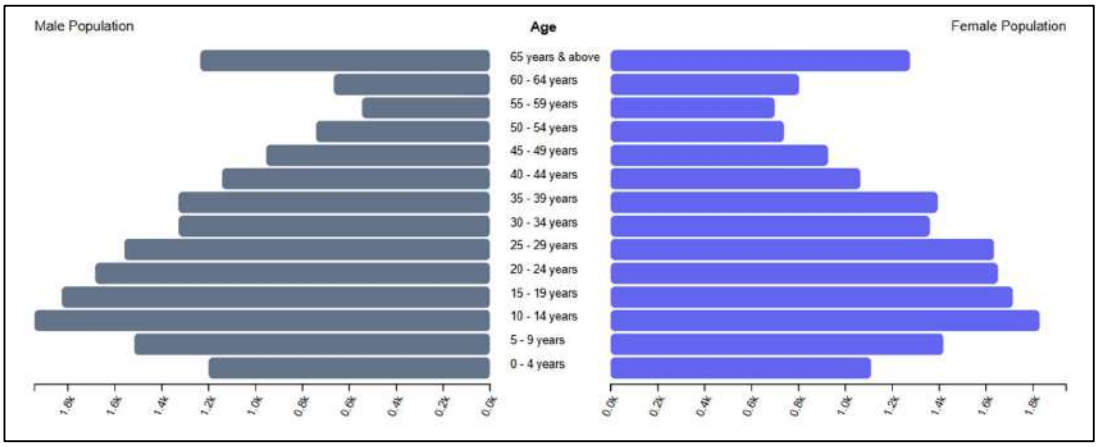


Inferences- Abundant solar radiation and strong seasonal winds present both challenges (heat gain) and opportunities (natural ventilation, renewable energy).

4.5.4 Climate Responsive Design Strategies



4.6 Demographical Analysis



Area (2020)	92.19 km²
Population (2020)	35290
Population Density	382 people per km²
Male Population	17591
Female Population	17699
Nearest airport & distance (Aerial)	Warangal Airport, 17.13 km

5. CASE STUDY (LIVE)

5.1 Case Study I HITEX Exhibition And Convention Center



Location: Hyderabad, India
Owners: Hitex Ace Urban Group
Architects: SEP Architects, Hyderabad
Client: Ace Urban Developers Pvt Ltd
Structural Consultant: Sri Harsha Consulting Engineers Pvt Ltd
Architect: SEP Architects
PEB Contractor: Pennar Industries
Area: 53 Acres,
Cost of Project: 65 Crores at the time of construction, 4th hall: 40 crores
Established: 2003
Design: Modern architecture, functional layout, ***Concept followed : ACE***.
Key Events: Trade fairs, exhibitions, corporate events, cultural programs.
Accessibility: Well-connected by road and public transport.

Amenities: Food courts, Wi-Fi, security, and maintenance services.

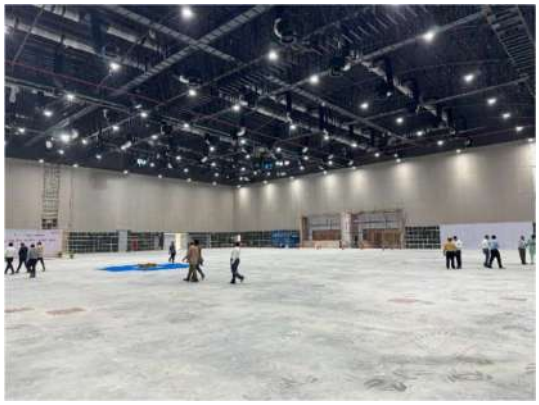
5.1.1 Introduction

HITEX Exhibition and Convention Centre is a renowned destination in Hyderabad, hosting a wide range of events, including corporate conferences, trade fairs, art exhibitions, indoor sports events, music concerts, and grand weddings. It has the capacity to accommodate audiences ranging from small groups

to large crowds, with ample open space for parking. Before the construction of the current convention hall, the centre had three halls, each measuring 48 m x 72 m, with the ability to host ***2,500 people per hall***. The present convention centre, ***Hall No. 4, at HITEX spans 86m x 120m.***

Construction stage vs Present stage





5.1.2 Purpose

- To understand Convention hall requirements and spaces
- Analyze design and functionality
- Study Infrastructure and learn from challenges and solutions

5.1.3 Entrance

The entrance to HITEX stands out with two giant elephant tusks, each 30 feet tall. These impressive structures are more than just decorations; they symbolize strength, success, and the values HITEX holds—warm hospitality, generosity, and a love for India's rich culture. The tusks create a welcoming and memorable first impression, reflecting HITEX's dedication to giving visitors a unique and unforgettable experience.



5.1.4 Entrance Plaza

The Entrance Plaza at HITEX serves as the main entry point, where cabs and vehicles drop off visitors. Customers enter through various gates, with registration counters available for event entry. The structural lattice above the registration desks is used for advertising and event banners.




TREDA
VASAVI
WELCOME TO



Figure 30 Steel Trusses near Entrance

5.1.5 Site Accessibility

- Location: Strategically located in Madhapur, Hyderabad.
- Airport: About 35 km from Rajiv Gandhi International Airport.
- Railway Station: 16 km from Secunderabad Railway Station.
- Metro Station: Close to HITEC City Metro Station, approximately 1.5 km away.
- Bus Connectivity: Well-connected through TSRTC buses.
- Major Roads: Accessible via Outer Ring Road and Hitech City Road.
- Hotels: Surrounded by several 5-star and budget hotels, Beside Novotel.
- Business Hubs: Proximity to HITEC City and financial districts.

5.1.6 SWOT Analysis

Strengths

- Strategic Location: Hitex is situated in Hyderabad, a city with growing economic and industrial importance, making it an attractive destination for conventions and exhibitions.
- State-of-the-Art Infrastructure: The exhibition center boasts modern architecture, with well-designed exhibition halls, amenities, and services, providing a conducive environment for events.
- Adequate Space: With a large exhibition area, Hitex can accommodate various events, from small conferences to large-scale exhibitions.
- Accessibility: The center is well-connected to the city's transportation network, including the international airport, making it easily accessible for visitors.

- Growing Demand: Hyderabad's growing economy, coupled with the increasing demand for convention and exhibition spaces, positions Hitex for potential growth.

Weaknesses

- Limited Accommodation Options: The surrounding area lacks sufficient hotel rooms and accommodation options, which might deter some event organizers.
- Parking and Traffic Concerns: The center's parking facilities might be inadequate during peak events, leading to traffic congestion in the surrounding areas.
- Maintenance and Upgrades: The center's infrastructure and amenities might require regular maintenance and upgrades to stay competitive.

Opportunities

- Growing International Events Market: The increasing demand for international events and conferences presents an opportunity for Hitex to attract high-profile events.
- Diversification of Events: Expanding the range of events hosted at Hitex, such as weddings, concerts, and cultural festivals, can help increase revenue streams.
- Public-Private Partnerships: Collaborations with private companies can provide opportunities for investment, renovation, and expansion of the center's facilities.
- Development of Surrounding Infrastructure: Upcoming infrastructure projects in the surrounding area, such as new hotels and transportation systems, can enhance the center's attractiveness.
- Digital Transformation: Investing in digital technologies, such as virtual and hybrid event platforms, can help Hitex stay competitive and expand its reach.

Threats

- Competition from Other Venues: The presence of other exhibition and convention centers like HICC in Hyderabad might pose a competitive threat to Hitex.
- Economic Downturn: Economic instability or downturns can lead to reduced demand for events and exhibitions, impacting Hitex's revenue.
- Environmental Concerns: Increasing concerns about sustainability and environmental impact might lead to stricter regulations, affecting the center's operations.
- Security Concerns: The risk of security breaches or terrorist threats can impact the center's reputation and deter event organizers.
- Government Policies and Regulations: Changes in government policies, regulations, or taxation can affect the center's operations and profitability.

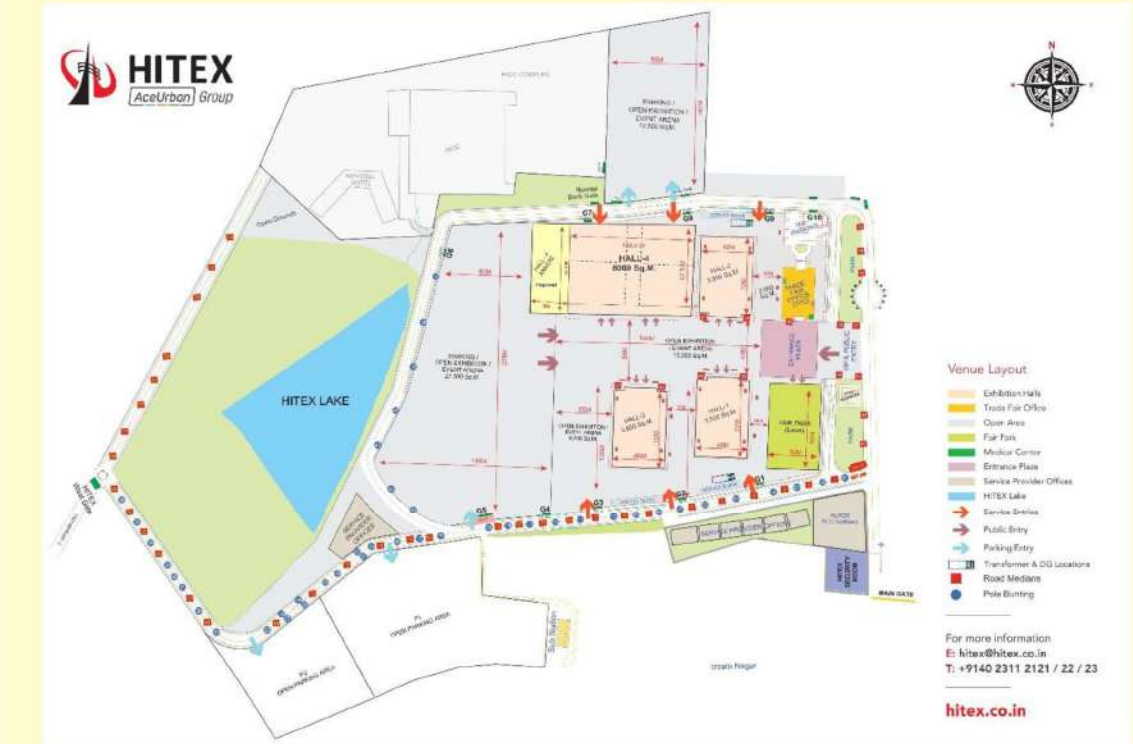


Figure 31 HITEX Site Map

5.1.7 Major Components Of Site

According to needs, the venue offers a flexible seating capacity that can accommodate anywhere from 25 to 25,000 people. The hall offers seating for up to 2000 people in a theatre style, with an additional 1500 people (1000 theatre seating and 500 roundtable seating) in a theatre-cum-roundtable style.
It also has underground wiring for power, water, and internet facilities; a floor loading capacity of 50kN/sq. mt., and five sets of glazed doors for entry and exit.

- Entrance Plaza
- halls: 3 Exhibition/Convention halls and 1 Dedicated Convention Hall,
- Gardens
- Parking
- Hitex Lake
- Service blocks
- Restaurants / Kiosks
- Open exhibition centers
- Trade Fair Office: Mixed use Building used for administrative purposes and Office Leasing.
- Paramedic Center
- ATM
- VIP lounge

5.1.8 Project Program

SPACE	DIMENSIONS	CAPACITY
Hall 1, 2, 3	72m x 48m, 9m Height	1500(Classroom) – 1800(Theatre) Pax
Hall 4 (Main hall)	120m x 68m	6000 Pax
Open Exhibition Area	52,000 sq.m paved area	48000 Pax
Fair Park	5000 sqm	3000 Pax
Parking		3500 Vehicles

HALL 4	CAPACITY	SEATING TYPE
Ruby	200	Classroom Seating (Partitions available)
Topaz	100	Ballroom Seating
Garnet	20	Round Table Seating
Onyx	20	Round Table Seating

SPACE	CAPACITY	SEATING TYPE
Mini Conference room	10 Pax	Round Table Seating
Conference room 1	20 Pax	Round Table Seating
Conference room 2	60 Pax	Classroom Seating
Conference room 3	20 Pax	Round Table Seating
Conference room 4	200 Pax	Can be converted to two 100 Pax rooms with Partition
Conference room 5	200 Pax	Classroom Seating
Media room	20 Pax	Cabins and Desks

Conference rooms interiors





5.1.9 Convention/Exhibition Halls

Halls 1, 2, and 3 at HITEX share the same layout, each with one main customer entrance, one main service entrance, and ten emergency entrances that can also serve as backup service entrances. The doors are 20 feet tall, featuring smaller hinged doors for pedestrian use and large automatic sliding doors for vehicle access inside the halls.

These halls are devoid of columns and optimised for a seamless design. The indoor event space also features a sophisticated ventilation and air circulation system, customizable seating options, and an acoustically equipped hall for larger gatherings.





Seating	Capacity
Classroom seating	1500 pax (each hall)
Theatre Seating	1800 pax (each hall)

Cluster (roundtable) seating	1200
Number of Halls	3789
Hall Size	3500 sqm (each hall)

Column-free design, allowing uninterrupted floor layouts and flexible configurations.

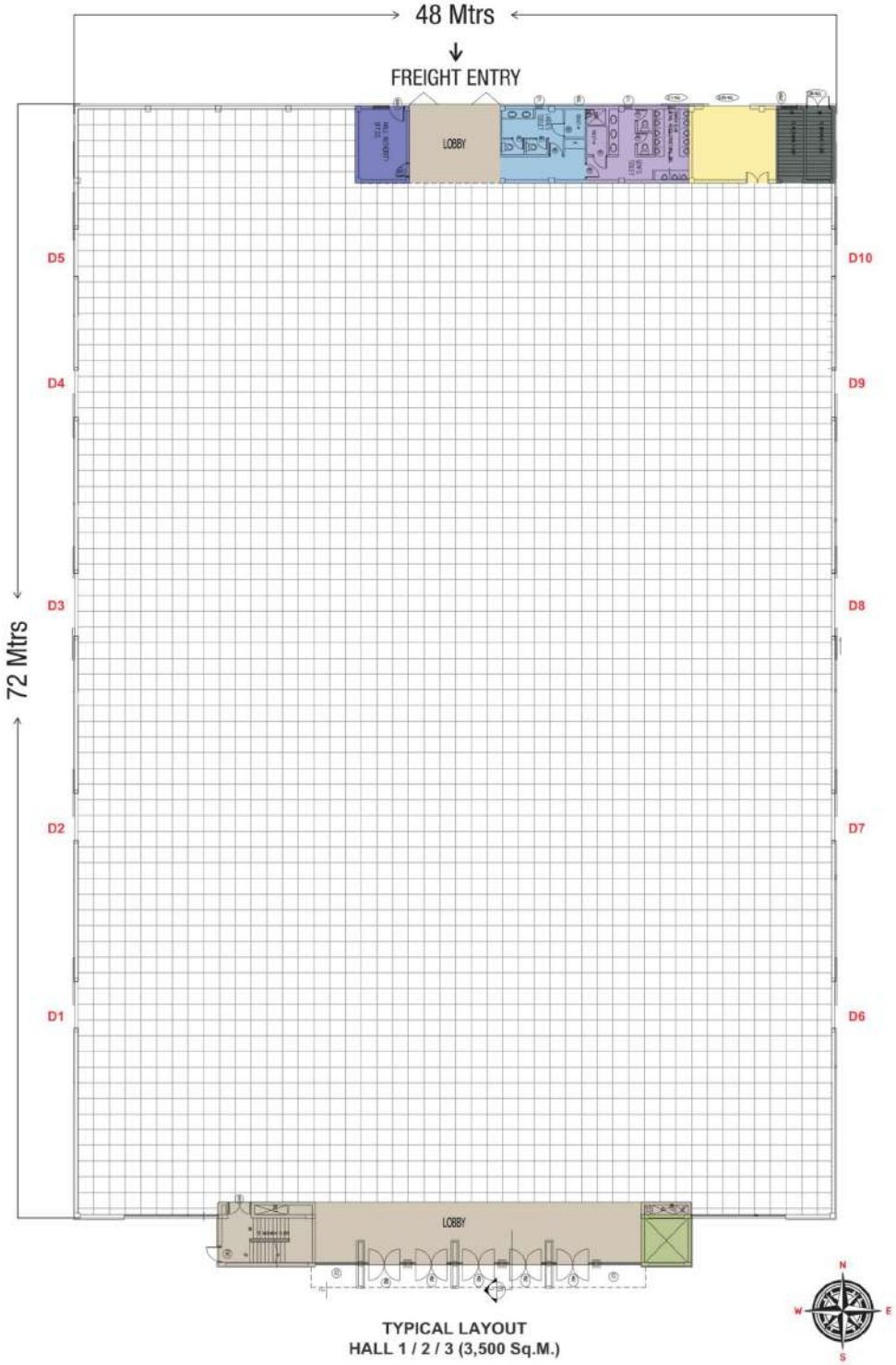
Individual hall sizes range from approximately **3,500 sqm** making them suitable for a variety of events.

High ceilings to accommodate large installations and stage setups.

Equipped with **pre-installed utilities** like water, electricity, internet, and ventilation systems.



Figure 32 Interior of Convention Hall



TYPICAL LAYOUT
HALL 1 / 2 / 3 (3,500 Sq.M.)

The second hall at HITEX is acoustically treated, incorporating absorbers, diffusers in forms of fabric-wrapped panels, foam ceilings, and carpeted floors. In contrast, Halls 1 and 3 remain standard exhibition halls without acoustic treatments.





The electrical services to the halls which will be given to the stalls that get arranged are supplied from an underground cellar, which also houses fire pipelines, HVAC ducts, and serves as storage for excess furniture. The fire services are given through fire extinguishers and hose pipes, Smoke detectors. The HVAC and Sanitary Services are through the separate service block behind every hall.

5.1.10 Amenities

Adequate **power supply** with backup generators.

Options for creating temporary partitions for smaller setups.

Flooring designed to bear heavy loads for industrial exhibits.



5.1.11 Hall 4

Hall No. 4, at HITEX spans 86m x 120m, including a 12m x 120m pre-function area featuring a grand double-height foyer of 6m. The first and second floors are designated for smaller conferences, corporate boardroom meetings, and birthday functions. Beyond the grand foyer, a vast column-free hall measuring 68 m x 120 m with a ceiling height of 12.8 m is designed to accommodate up to 8,000 people. This hall can be divided into four, three or two separate halls, or remain as a single space, using partitions suspended from the roof. At the rear of this hall, a 6 m x 120m MEP service area is planned, along with VIP rooms. The entire facility is fully air-conditioned.

Description	Area
Entire Hall Area	86 x 120
Pre-Function Area	12 x 120
Column-Free Main Hall	68 x 120
MEP Service Area	6 x 120



Figure 33 Hall 4 Interior





5.1.12 Features

Hall 4 can be divided into four separate halls using movable partitions mounted on tracks, with a common lobby in between. Each partition includes doors within specific panels. The structure features rigging points, each capable of holding 1 ton of weight. It is equipped with advanced sound and light systems, including dimmers. HVAC ducts run near the top slab.

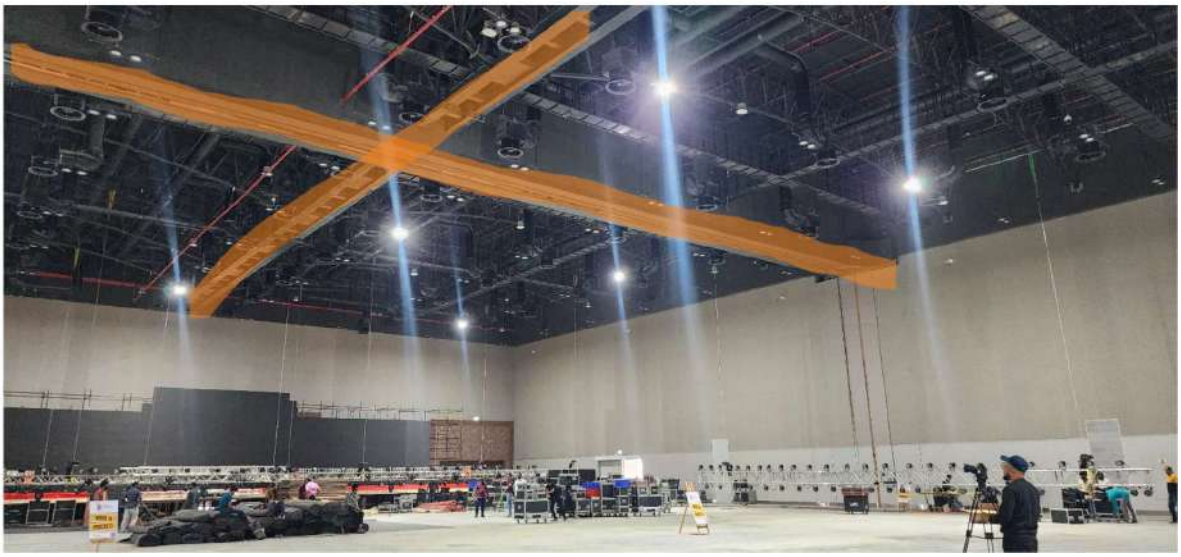
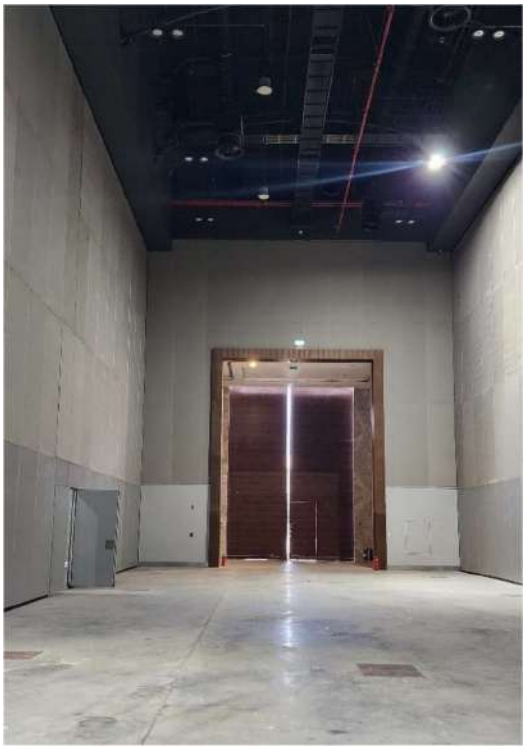


Figure 34 Track for wall panel





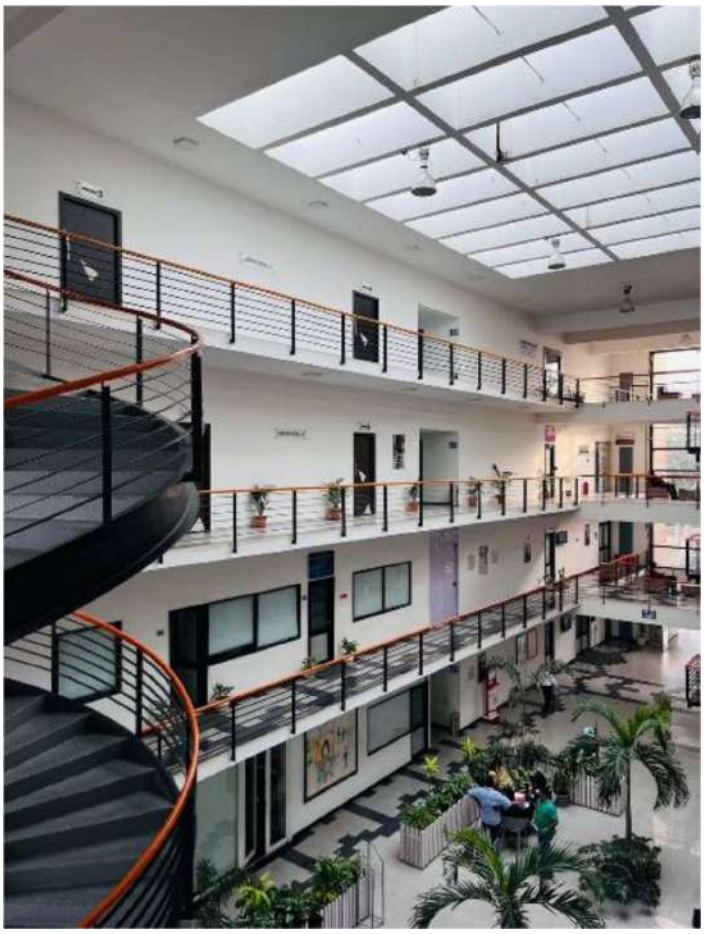
5.1.13 Column Free Main Hall

To design the 68 m column-free space, a steel lattice structure was selected. The bottom had to remain flat to accommodate the partition walls, and these lattices were spaced at 27 m intervals. A single lattice was insufficient for such a large span, so a double lattice with lateral connections was planned to reduce the height of the lattice and control deflection.

Supporting such a large lattice span required columns with significant moment capacity. Balancing the large end moments posed a challenge, so a configuration of four columns on either side was adopted. This design converted the large end moments into axial compression with bending for the inner columns and axial tension with bending for the outer columns. By mounting the lattice on top of the columns, this configuration simplified the structure and allowed for a more economical design.

5.1.14 Administrative Block

The HITEX Administrative Block reflects a design philosophy focused on efficiency, collaboration, and innovation. The incorporation of natural light, ergonomic furniture, and functional spaces ensures a productive work environment



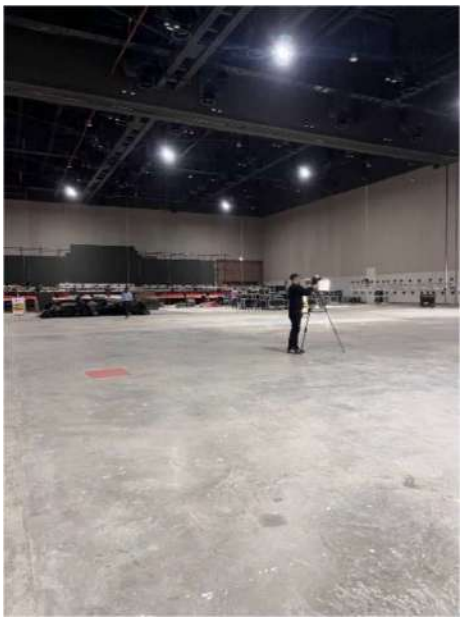
5.1.15 Structural Design

The columns are designed as box columns, constructed with steel plates and filled with concrete for added strength.

The main lattice is a double lattice, standing 3 m high, with lateral connections. The top and bottom chords are UB 457 x 191 x 74, while the vertical and inclined members are SHS 220 x 220 x 6 at the ends and SHS 180 x 180 x 6 in the middle region. The main lattices are spaced at 27 m intervals. To account for erection errors, self-weight deflection (140 mm), and deflection due to partitions (50 mm), an upward camber of 600 mm was provided. Each lattice weighs 120 tonnes, and since it is top-mounted, slotted holes were added longitudinally to the bottom chords to allow for sliding due to the

structure's self-weight. Notably, the lattice slid 30 mm immediately after erection—a crucial consideration when dealing with large spans mounted at the top.

The cross-lattice spans 27 m and is positioned every 5.6 m. This cross lattice is designed as a triangular lattice with a parabolic arch in the longitudinal direction. The lattice members include CHS 114 x 4.5 for the main chords and CHS 88.9 x 4.0 for the inclined sections. This triangular configuration was chosen to handle both longitudinal and lateral bending, as well as to ensure easier erection.





Purlins of size 122 x 61 x 3.6m are placed at intervals of 1380mm centre-to-centre.

All the columns were erected along with tie members. Since the columns were designed as box columns, concrete filling was proposed to increase **stiffness and enhance fire resistance**. The concrete-filled columns also facilitated the top-mounted lattice erection by improving load-bearing capacity, both vertically and laterally, ensuring stability even in the event of side impacts.

5.1.16 Outdoor Event Area

HITEX has a large outdoor arena with five paved display areas and two open grounds for exhibitions, large social events, and gatherings. The open grounds can be used for outdoor exhibitions, while the display areas can be converted into an additional hall. Large exhibits work well on these grounds. Fits a variety of exhibit sizes.

Other open area: Fair Park; that is reserved for exclusive corporate and social events. With its beautifully landscaped gardens, it is perfect for banquets and small gatherings.





Exhibit Sizes
Suitable for exhibits of various sizes
52,000 sq. mt. of paved area
Fair Park
Separate dining area within the park
Seating capacity of 3000 pax
Spread across 5000 sq. mt.

5.1.17 Outdoor Event Area

Other spaces in HITEX include a rooftop cafeteria for staff, a restaurant for client meetings in the trade fair office, two VIP lounges, and two green rooms with attached washrooms. Common washrooms are also available on both sides of Hall 4 on every floor.









1.Cafeteria 2.Vip Lounge room 3. Track for partition entry door 4. Staircase in TFO 5. HVAC Ducts

5.1.18 Challenges

The challenges were significant, starting with the creation of a column-free space measuring 68 m x 120 m. The design also required the ability to divide the hall into four, three or two separate halls using partition walls. These partitions, running both along the length and across the width of the hall, imposed a substantial load of 1.2 tonne per metre, which needed to be suspended from the roof.

Another challenge was the storage of all partition walls in two rooms located at the extreme ends of the hall, with a total load of 120 tonne also suspended from the roof. Additionally, the construction of a 120 m long catwalk presented its own set of complexities.

Anticipating challenges during the erection process, provisions were made to ensure that any potential issues could be addressed to prevent untoward incidents.

5.1.19 Design And Inferences

Hall 4 at HITEX follows the **ACE concept**, used in the textures and paneling of the convention center. This design ensures that every line faces upwards, symbolizing integrity and the aspiration to rise, reflecting a dynamic and uplifting architectural language.

Design and Orientation Features of Hall 4 at HITEX:

- Modular Design: Can be divided into four smaller halls using movable partitions.
- Track System: Partitions hang from tracks for flexibility in space usage.
- Common Lobby: Central lobby created between the divided halls.
- Rigging Points: 140 rigging points, each supporting up to 1 ton, for hanging equipment.

- Advanced Systems: Equipped with modern sound, lighting, and dimming systems.
- Acoustic Treatment: Designed for sound control with absorbers and diffusers.
- HVAC Placement: Ducts are positioned near the top slab for efficient air distribution.
- Conference Rooms: Four acoustically treated rooms on the upper floor, named Onyx and Topaz, with flexible partitions.
- Orientation: North-south alignment to optimize natural light and minimize heat gain.
- HITEX is currently undergoing construction to add **rooftop garden spaces** on Hall 4. These gardens aim to provide a green, relaxing environment for visitors and improve the building's sustainability by enhancing insulation and reducing heat gain

5.2 Case Study II(Live) Kushabhau Thakre Hall (Minto Hall)



Location : Bhopal, India

Owners : Madhya Pradesh Tourism

Built by- The Last of the Four Nawab Begums, Sultan Jehan

Built In: 1909

Renovation Completed in 2018

Principal Architects (Rennovation): Ar. Puneet Sohal

Site Area: 10.6 Acres

Built Up area: 4.6 Acres

Ground Coverage: 1.78 Acres

Cost of Project: 3 lakhs at the time of construction

Renovation Cost: 65 Crore

Established: 1909

Key Events: Government Meetings

Accessibility: Well-connected by road and public transport.

Amenities: Restaurant, Bar, Wi-Fi, security, and Building maintenance system.

Design: Indo-Saracenic with colonial influence



Figure 35 Nawab Begum Sultan Shah Jehan

5.2.1 Introduction

Minto Hall is a historic heritage building located in Bhopal, the capital city of Madhya Pradesh, India. It was built in honor of **Lord Minto**, the then Viceroy of India, by **Nawab Shah Jahan Begum**, the last Begum of Bhopal. The foundation stone was laid on **November 12, 1909**, and the construction was completed by her son, Nawab Hamidullah Khan, in 1933.

The hall is a blend of **Indian and English architectural styles** and was initially intended to serve as a guest house for visiting Europeans. Over the years, it has served various purposes, including being the headquarters of the Bhopal Army and housing Hamidia College until 1946. After India's independence, it became the venue for the State Assembly until 1996.

In recent years, Minto Hall has been restored and now serves as an **international convention center** with a stylish rooftop bar and restaurant. The building stands as a testament to the rich history and cultural heritage of Bhopal.





Figure 36 Minto Hall Before and after renovation

5.2.2 Purpose

- Understanding the design approach at that time
- To compare structure of heritage and modern building
- To understand the laws and design as it is in same state

5.2.3 Entrance

The entrance of Minto Hall in Bhopal is quite impressive, reflecting its historical significance and architectural beauty. The entrance, showcase a blend of Indian and English architectural styles. The grandeur of the entrance sets the tone for the elegance and heritage that the building represents. As we enter, there is a statue of **Kusabhau Thakre**, adding to the grandeur of the entrance, which sets the tone for the elegance and heritage that the building represents.

There is a commemorative wall mounted on a structure with four columns and has a red and beige color scheme, displaying the name of the Minto Hall.



Figure 37 Main entrance



Figure 38 Commemorative wall



Figure 39 Statue of Kusabhau Thakre

5.2.4 Accessibility to the site

- Location: Strategically located on the shore of lower lake, facing the skyline of old Bhopal, Bhopal.
- Airport: About 13.6 km from Raja Bhoj Airport.
- Railway Station: 3.3 km from Bhopal Railway Station and 5.4 km from Rani Kamlapati Railway Station
- Bus Connectivity: Well-connected through buses.
- Major Roads: Accessible via Roshanpura Road and Lower lake Road.
- Hotels: MPT Palash Residency at 1.6 Km.

5.2.5 Major Components Of Site

According to needs, the venue offers a flexible seating capacity that can accommodate anywhere from 1180 people. The hall offers seating for up to 600 people in a theatre style, with an additional of Seminar and meeting rooms.

It also has underground wiring for power, and HVAC System;

- Entrance Plaza
- 2 halls: 2 Seminar Room, 2 Meeting Rooms, 1 Media Room
- Gardens
- Parking
- Service blocks
- Restaurants
- VIP lounge

5.2.6 Architectural Elements

- **Pillars**

  The building features a series of majestic pillars, supporting the arches and providing structural stability.

- **Arches**

  Arched doorways and windows are prominent features of Minto Hall, adding an element of grace and elegance.

- **Domes**

  The dome-shaped roof, a common feature in Islamic architecture, adds a touch of grandeur and magnificence.

- **Ornamentation**

  The building is adorned with intricate carvings and decorative motifs, reflecting the rich artistic traditions of India.

5.2.7 Building Material And Construction

- Minto Hall was built using red sandstone, a durable and aesthetically pleasing material commonly used in Indian architecture.
- The construction process involved skilled craftsmen and artisans who meticulously carved the stone and erected the building with traditional techniques.
- The use of sandstone, combined with the intricate details and skillful craftsmanship, has contributed to the hall's enduring beauty and historical significance.

5.2.8 Project Program

SPACE	CAPACITY
Main hall – Raja Bhoj Hall	600
Nawab Shah Jaha Begum Hall	
Nawab Sultan Jehan Begum Room	50
Nawab Qudsia Begum Room	25
Nawab Hamidullah Hall	133
Nawab Sikander Jehan Room	
Makhanlal Chaturvedi Media Room	
Parking	300 cars

5.2.9 Interiors



Figure 40 Raja Bhoj Hall (Main Hall)



Figure 41 Engraving and carving at ceilings and arches (Raja Bhoj Hall)



Figure 42 Grand Lobby



Figure 43 Nawab Shah Jaha Begum Hall (Secondary Hall)



Figure 44 Nawab Sultan Jehan Begum Room



Figure 45 Nawab Qudsia Begum Room



Figure 46 Nawab Sikandaer Jehan Room



Figure 47 Makhanlal Chaturvedi Media Room

5.2.10 Amenities

- Adequate Power supply with backup generators
- Spaces for small meeting and conferences
- Ground Diffused Chilled Water System

- Acoustic treatment
    - 3 feet thick walls
    - Acoustic Panels
    - Carpets



Figure 48 Ground vents for HVAC

5.2.11 Design Inferences

- Grand Entrance: Design a grand entrance with a large atrium or foyer to create a impressive first impression.
- Modular Exhibition Spaces: Incorporate modular exhibition spaces with flexible layouts to accommodate various event formats.
- Natural Light: Maximize natural light through large windows, skylights, or clerestory windows to reduce energy consumption.
- Cultural Integration: Incorporate local cultural elements, such as traditional architecture, artwork, or landscaping, to reflect the region's heritage.
- Sustainability Features: Incorporate sustainable features, such as rainwater harvesting, solar panels, or green roofs, to reduce environmental impact.
- Advanced Technology: Incorporate advanced technology, such as smart building systems, high-speed internet, or digital signage, to enhance the event experience.
- Accessibility Features: Incorporate accessibility features, such as ramps, elevators, or accessible restrooms, to ensure inclusivity.
- Flexible Meeting Spaces: Design flexible meeting spaces with movable partitions or modular furniture to accommodate various meeting formats.

6. CASE STUDY (DESK APPRAISAL)

6.1 Case Study I Bharat Mandapam



6.1.1 Introduction

Bharat Mandapam, located in Pragati Maidan, New Delhi, is a centerpiece of a sprawling 150-acre complex known for hosting prestigious events. The redevelopment of Pragati Maidan was initiated to replace the iconic Hall of Nations with a modern, world-class convention facility. The government justified this transformation as essential for creating a state-of-the-art venue capable of hosting high-profile global events, including the G20 summit.

Now spread across 123 acres, Bharat Mandapam is a cutting-edge Integrated Exhibition-cum-Convention Centre (IECC). Its design reflects India's aspirations for global prominence, combining advanced infrastructure with eco-friendly features. The venue serves as a hub for international exhibitions, conferences, and cultural events.

6.1.2 History

The Hall of Nations and Hall of Industries at Pragati Maidan were designed by architect Raj Rewal and engineer Mahendra Raj in 1972. The ITPO, however, which comes under the Union Ministry of Commerce, had decided to tear down these building as a part of a larger overhaul of the Pragati Maidan area to make way for more 'modern', 'state of the art' buildings.



Location	New Delhi
Owners	Govt. of India
Architects	ARCOP Associates Pvt. Ltd & Aedas
Client	India Trade Promotion Organisation (ITPO)
Contractor	NBCC & Shapoorji Pallonji Pvt. Ltd
Area	123 acres (497763 sqm)
Cost of Project	2700 crores
Redevelopment	2017-2023
Landuse Type	Recreational

6.1.3 SWOT Analysis

Strengths:

- Iconic Landmark: Bharat Mandapam is a modern symbol of Indian architecture, showcasing the country's rich cultural heritage.

- State-of-the-Art Facilities: The convention center boasts advanced materials and technology, making it an ideal venue for international exhibitions and conferences.
- Strategic Location: Located in the heart of New Delhi, Bharat Mandapam is easily accessible and offers stunning views of the city.

Weaknesses:

- Limited Parking: The convention center's parking facilities may not be sufficient to accommodate large events.
- Dependence on Government Events: Bharat Mandapam's success may be heavily reliant on government-organized events and conferences.

Opportunities:

- Growing Demand for Convention Centers: India's growing economy and increasing global presence create a high demand for world-class convention centers like Bharat Mandapam.
- Cultural and Tourism Events: The convention center can host cultural and tourism events, showcasing India's rich heritage and promoting tourism.

Threats:

- Competition from Other Convention Centers: Bharat Mandapam faces competition from other convention centers in India and abroad.
- Economic Downturn: Economic downturns or global economic instability may impact the demand for convention centers and events.

6.1.4 Conceptual And Design Approach

The concept of Bharat Mandapam draws heavily from India's rich cultural heritage, combined with contemporary architectural practices. The name "Bharat Mandapam" itself is indicative of its purpose – a 'mandapam' in Indian tradition refers to a pillared outdoor hall used for public rituals and gatherings. The design seeks to capture the essence of this traditional structure, reinterpreting it for a modern context.

Bharat Mandapam is envisioned as a vibrant and inclusive space that celebrates India's rich cultural diversity. The design aims to create an iconic landmark that showcases the country's heritage, while also providing a modern and functional space for various events and exhibitions.

Design Principles

- Cultural Narrative: Incorporate elements of Indian culture, history, and mythology into the design.

- Sustainability: Use eco-friendly materials, energy-efficient systems, and sustainable design practices.
- Flexibility: Design flexible spaces that can accommodate various events, exhibitions, and conferences.
- Inclusivity: Ensure accessibility and inclusivity for all visitors, regardless of age, ability, or cultural background.

Key Design Elements

- Mandapam: A grand, intricately designed entrance that reflects Indian architectural traditions.
- The Atrium: A spacious, naturally lit atrium that serves as a central hub for the complex.
- Exhibition Spaces: Flexible, modular exhibition spaces that can be customized for various events.
- Cultural Zones: Themed areas that showcase India's diverse cultural heritage, such as art, music, and cuisine.
- Sustainable Landscaping: Lush, sustainable landscaping that incorporates native plant species and efficient irrigation systems.

Technical Specifications

- Gross Floor Area: 50,000 sqm
- Seating Capacity: 5,000 (auditorium), 10,000 (exhibition spaces)
- Parking: 1,500 cars, 500 bicycles
- Sustainability Features: Solar panels, rainwater harvesting, energy-efficient systems

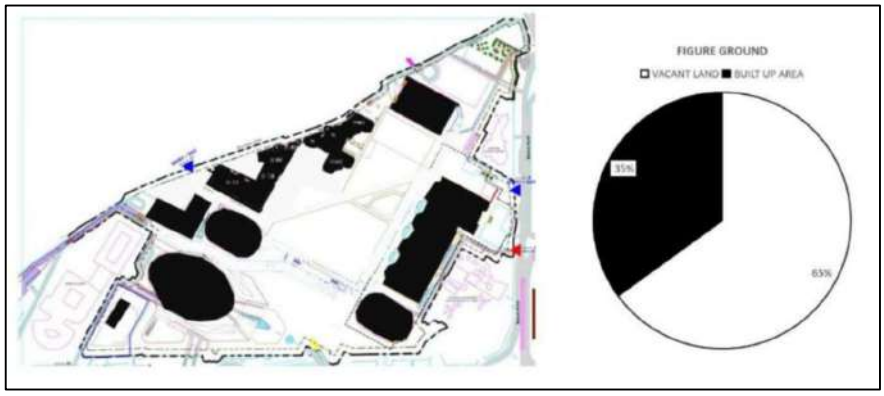


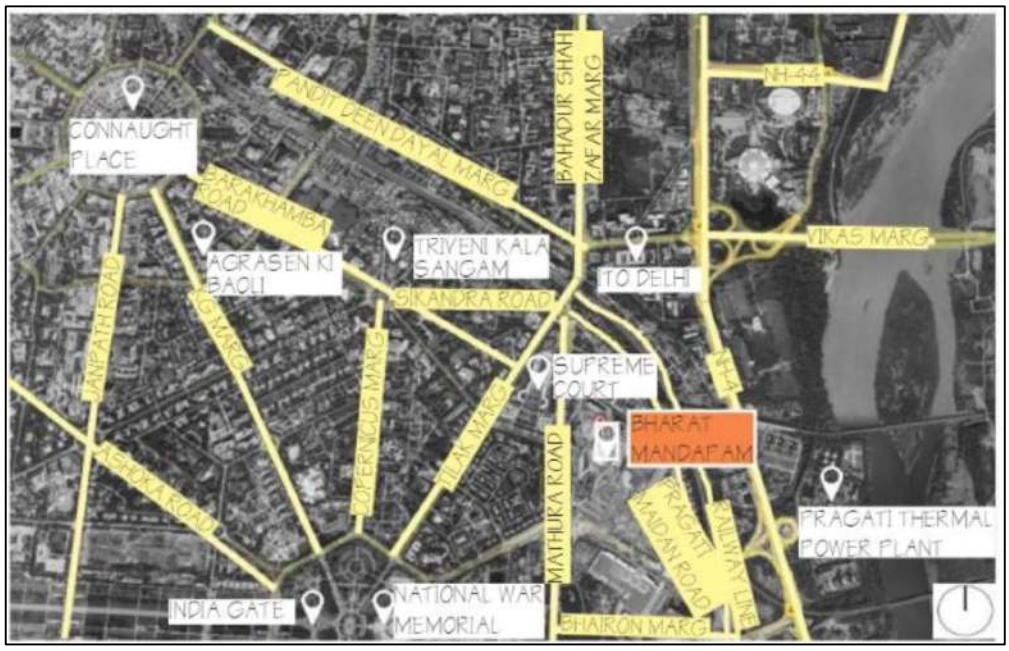
This conceptual approach provides a foundation for designing Bharat Mandapam as a vibrant, inclusive, and sustainable space that celebrates India's rich cultural diversity.

The façade of Bharat Mandapam is a modern interpretation of the traditional Indian temple architecture, with intricate patterns and motifs that are derived from various Indian art forms. The use of locally sourced materials and sustainable construction practices are key elements of the design, contributing to the building's LEED certification.

6.1.5 Proximity

- Airport: 18kms from Delhi Airport
- Railway station: 3.9kms from New Delhi Railway Station
- Bus: 13km from ISBT Kashmere Gate
- Metro: 26km from Airport to Supreme court metro station



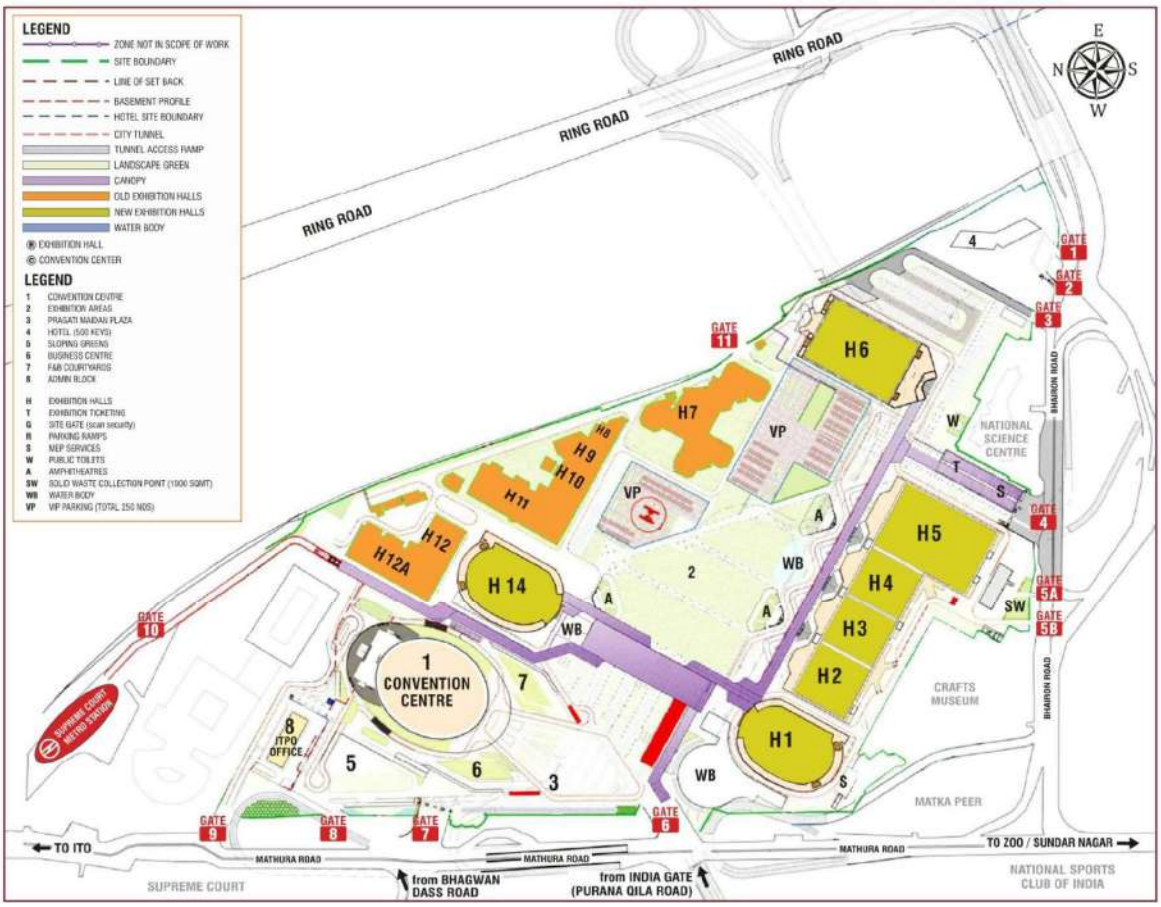


6.1.6 Site Components

The site expands over 150 acres consists of several elements of IECC

- 14 Exhibition blocks
- Convention center
- Amphitheatres
- Office Building
- 1 Helipad
- Admin Block
- 1 Hotel (500 rooms)
- Open spaces

Total number of Gates to the whole campus is 11 which connect the site to its surroundings.



6.1.7 Components Of Convention Centre

Level 1 - Ground Floor

Floor to floor Height: 5.4m

Spaces:

1 Premium meeting room

2 Pre-function area

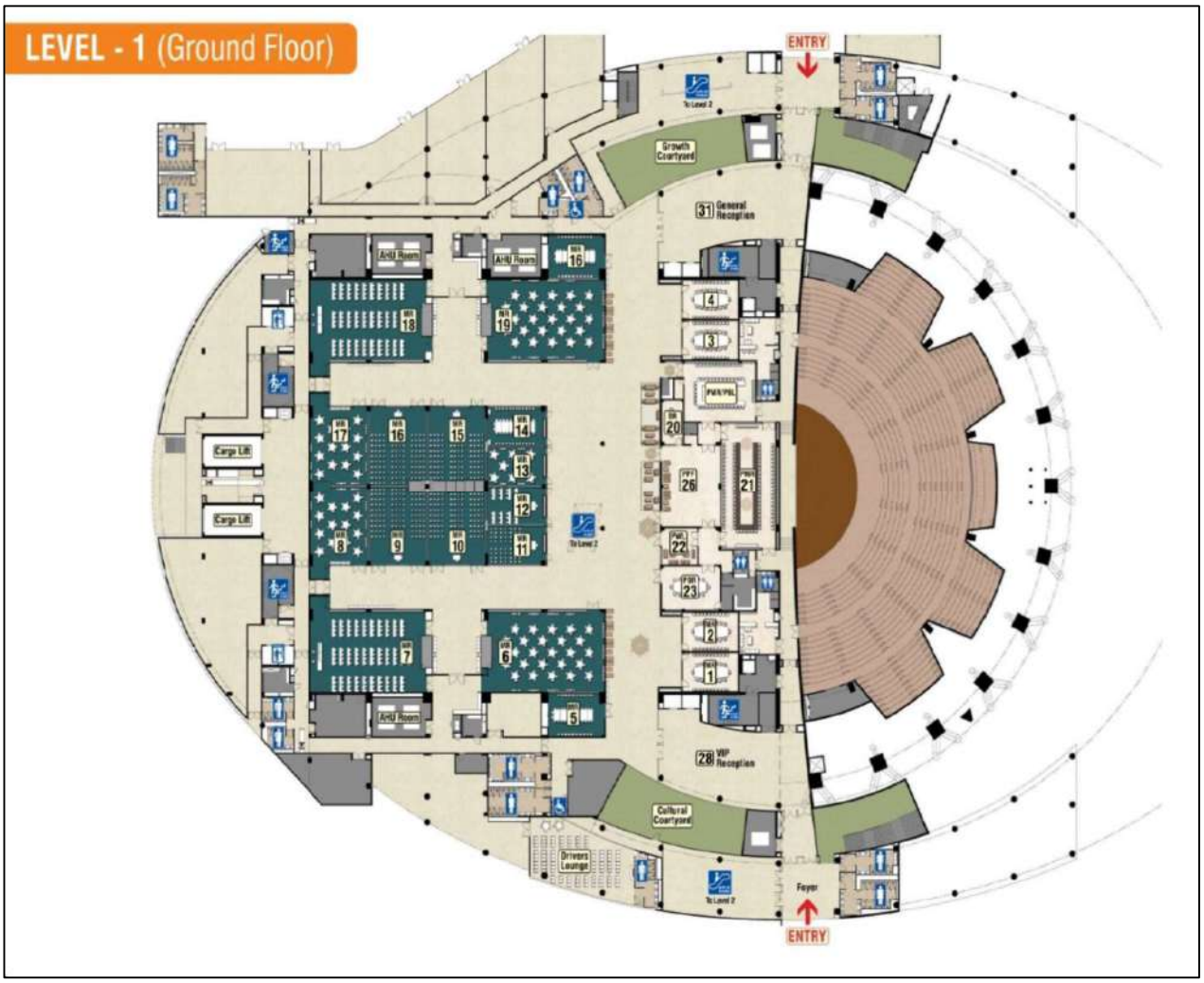
3 Waiting Lounge

4 Dining Hall

5 20 Meeting Rooms

6 Courtyards

7 Drivers' Lounge


LEVEL - 1 (Ground Floor)
ENTRY
Growth Courtyard
31 General Reception
AHU Room
AHU Room
Cargo Lift
Cargo Lift
28 VIP Reception
Cultural Courtyard
Drivers Lounge
Foyer
ENTRY

Sr No.	Description	Capacity (in pax)	Floor Area (in sqm)	L	B
	Premium Complex				
1	Premium Meeting room -1	100	197	9.7	20.3
2	Premium Meeting room -2	50	121	12.7	9.5
3	Breakout Room		28	3.9	7.1
4	Premium Pre-function		132	10.1	13.1
5	Premium Waiting Lounge		39	6.3	6.1
6	Premium Dining Hall		36	10.5	7.2
	Meeting Complex				
1	Meeting Room - 1	36	61	9.7	6.3
2	Meeting Room - 2	50	61	9.7	6.3
3	Meeting Room - 3	50	61	9.7	6.3
4	Meeting Room - 4	50	61	9.7	6.3
5	Meeting Room - 5	36	72	10.4	6.9
6	Meeting Room - 6	200	258	20.2	12.7
7	Meeting Room - 7	200	121	20.2	12.7
8	Meeting Room - 8	100	121	10.4	11.6
9	Meeting Room - 9	100	111	7.4	9.8
10	Meeting Room - 10	100	111	11.4	9.8
11	Meeting Room - 11	50	111	10.1	6.3
12	Meeting Room - 12	50	64	10.2	6.3
13	Meeting Room - 13	50	64	10.1	6.3
14	Meeting Room - 14	50	60	9.6	6.3
15	Meeting Room - 15	100	115	10.3	11.2
16	Meeting Room - 16	100	119	10.3	11.6
17	Meeting Room - 17	100	121	10.4	11.6
18	Meeting Room - 18	200	273	21	13
19	Meeting Room - 19	200	276	21.2	13
20	Meeting Room - 20	50	276	21.2	13
	Support Facilities				
1	VIP & General Receptions		381		
2	Help Desk		482		
3	Cultural Courtyard				
4	Growth Courtyard				
5	Pre-Function		2229		
6	Business Centre				
7	F&B Courtyard				

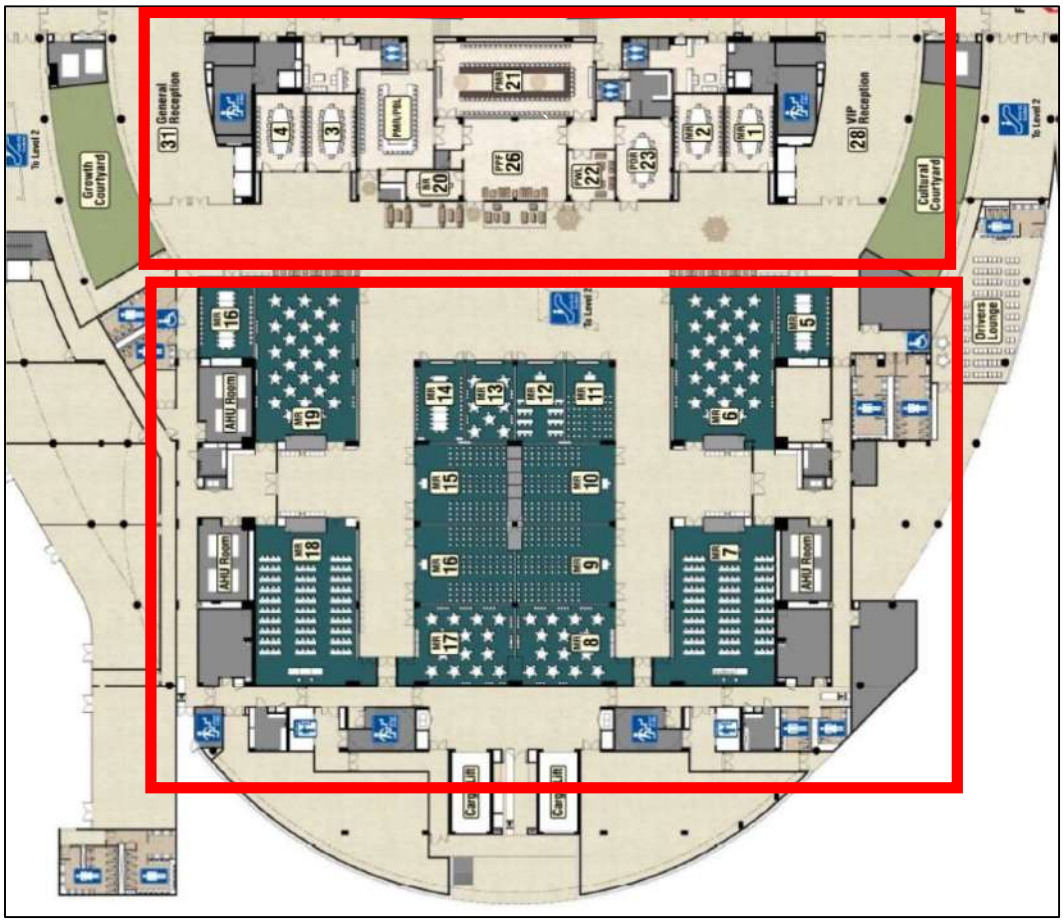
6.1.8 Meeting Rooms

Capacity: 50, 100, 200

No. of Rooms: 20

Supporting Spaces: VIP Reception, General Reception, 2 Courtyards, Storage, 1 Drivers' waiting room, 5 staircases (4 normal, 1 fire), 6 Washrooms, 2 escalators, 1 escalator (G-1), 2 lifts.

Services: LV shafts, AHU Rooms







Level 2 – Podium Level

Floor to floor Height: 9m

Spaces:

1 Summit rooms

2 Auditorium

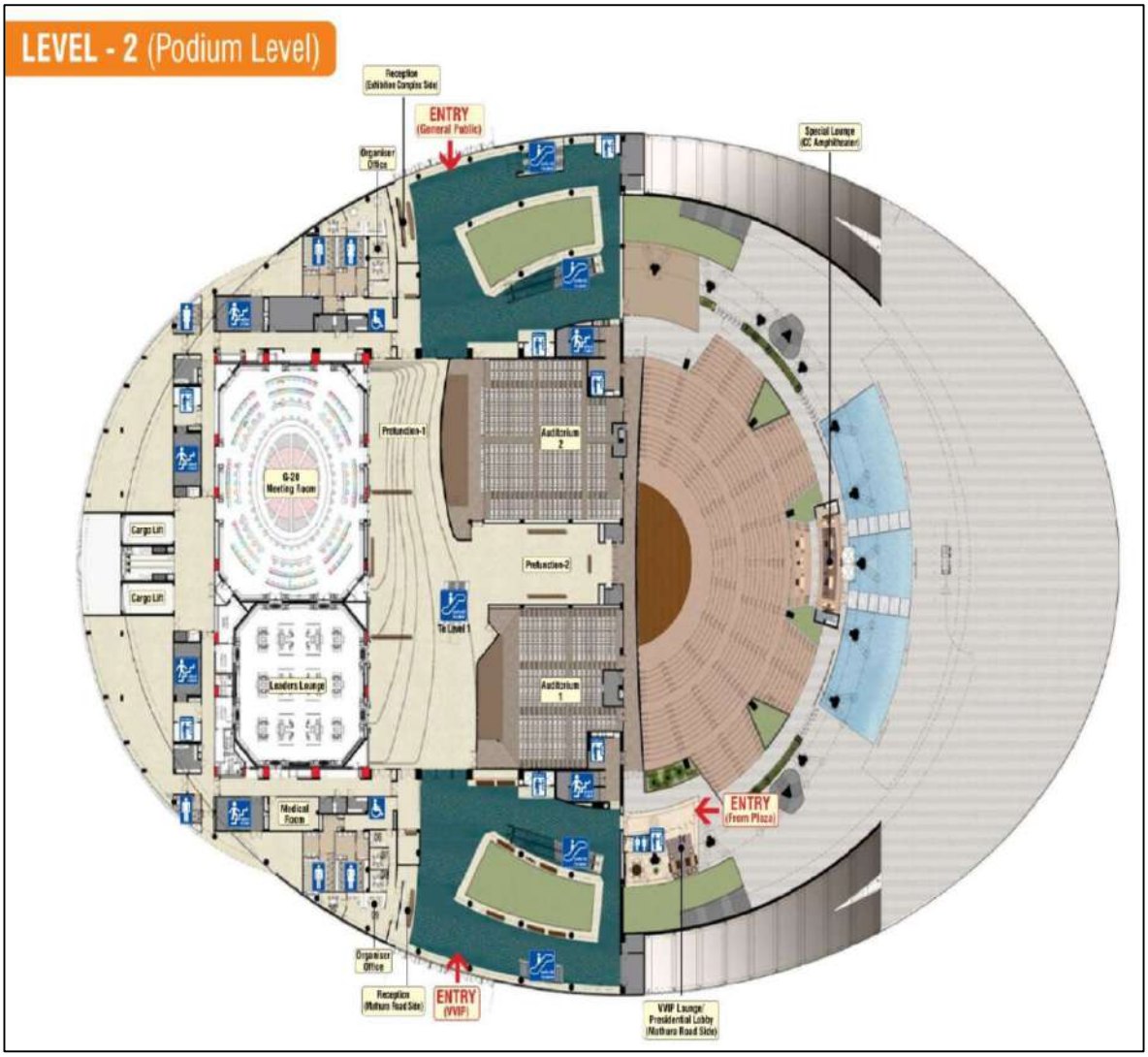
3 Retreat Lounge

4 Tea House

5 Medical Room

6 Cloak room

7 Amphitheatre



Sr No.	Description	Capacity (in pax)	Floor Area (in sqm)	L	B
	Premium Complex				
1	G20 Summit room		1153	38.6	29.9
2	Leader's Lounge		702	26.5	26.5

3	L2 WIP Room		101	14.4	7
	Meeting Complex				
1	Auditorium -1	574	992	37.3	26.6
2	Auditorium -2	821	793	29.8	26.6
	Amphitheatre (Open-Air)				
1	Amphitheatre	3000	2250	66.5	118
2	Jewel Box		76	16.6	4.5
	Support Facilities				
1	Retreat Lounge		350	37.6	9.3
2	Tea House		350	37.6	9.3
3	Medical Room		56	5.4	10.3
4	VIP & General Receptions				
5	Pre-function Areas				
6	Cloak Room				

6.1.9 Auditorium-1

Area: 992 sqm.

Capacity: The auditorium can accommodate 574 people.

Seating: 3 tiers, 18 aisles, 10 rows each, staggered fixed seating.

Supporting Spaces: 2 Organiser Offices, 2 Pre-function areas, 1 Reception, Storage, Staircase lobby, 4 Washrooms, 2 escalators, 1 escalator (G-1), 5 lifts.

Services: LV shafts, Electrical Shaft.



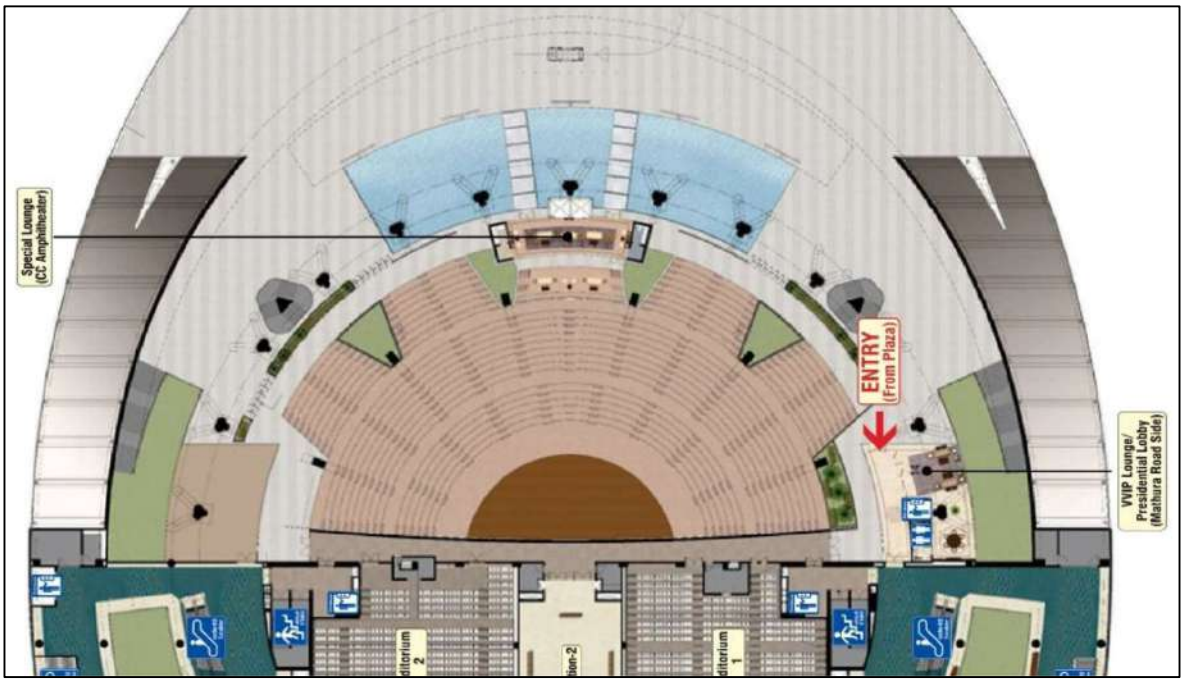




6.1.10 Amphitheatre

Area: 2250 sqm.
Capacity: The auditorium can accommodate 3000 people.
Features: Its an open air Amphitheatre with drop off zone nearby.

Supporting Spaces: Special Lounge, VIP Lounge, 4 Washrooms, 3 lifts (2 normal, 1 VIP). 4 staircases (2 standard, 2 fire)



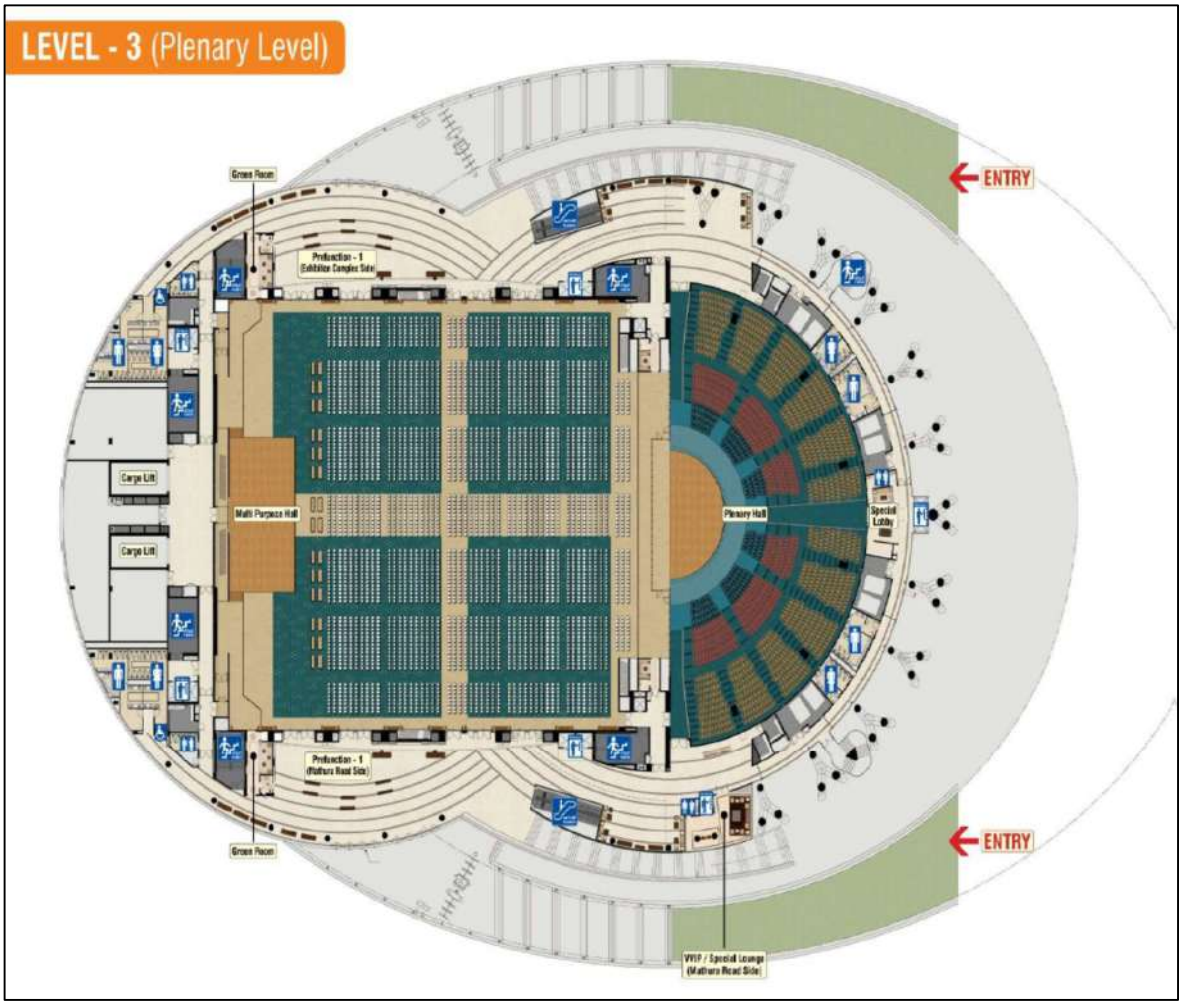


Level 3 – Plenary Level

Floor to floor Height: Plenary Hall 9.5 to 14m

Spaces:

1. Plenary Hall
2. Multipurpose Hall
3. VVIP Lounge
4. Special Lobby



Sr No.	Description	Capacity (in pax)	Floor Area (in sqm)	L	B
	Multi-Functional and Plenary Hall				
1	Plenary Hall	3000	1985	71.5	36 (rd)
2	Multi-purpose Hall	4000	4884	74	66.7
	Support Facilities				
1	VVIP Lounge		80	12	6.7
2	Special Lobby (Plenary)		80	8.2	9.8
3	Pre-function Area				
4	Reception				

6.1.11 Plenary Hall

Area: 1985 sqm.

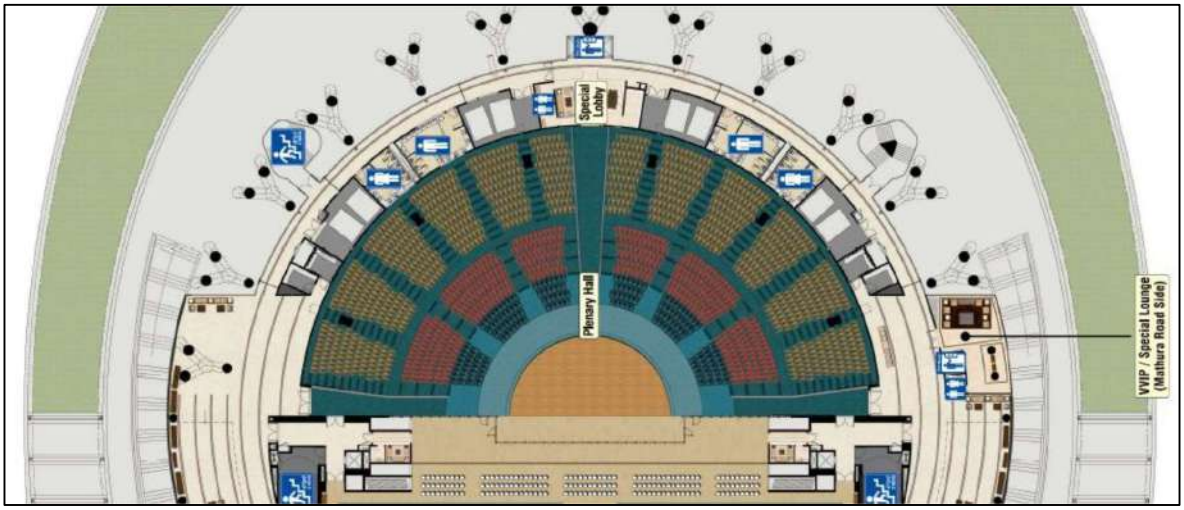
Capacity: The plenary hall can accommodate 3,000 people

Seating: 3 tiers, 18 aisles, 10 rows each, staggered fixed seating.

Features: Air conditioning, Modern AV and IT systems, Hydraulic stage, Live audience polling facility, and Interpreter rooms for multilingual events.

Supporting Spaces: 1 VVIP Lounge, 1 Special Lobby, 1 Waiting lounge, Storage, Interpreter room, 4 Washrooms, 2 Green rooms, 4 staircases (2 standard, 2 fire) and 2 lifts.

Services: LV shafts, Electrical Shaft, Control room, Movable panel storage.







6.1.12 Multipurpose Hall

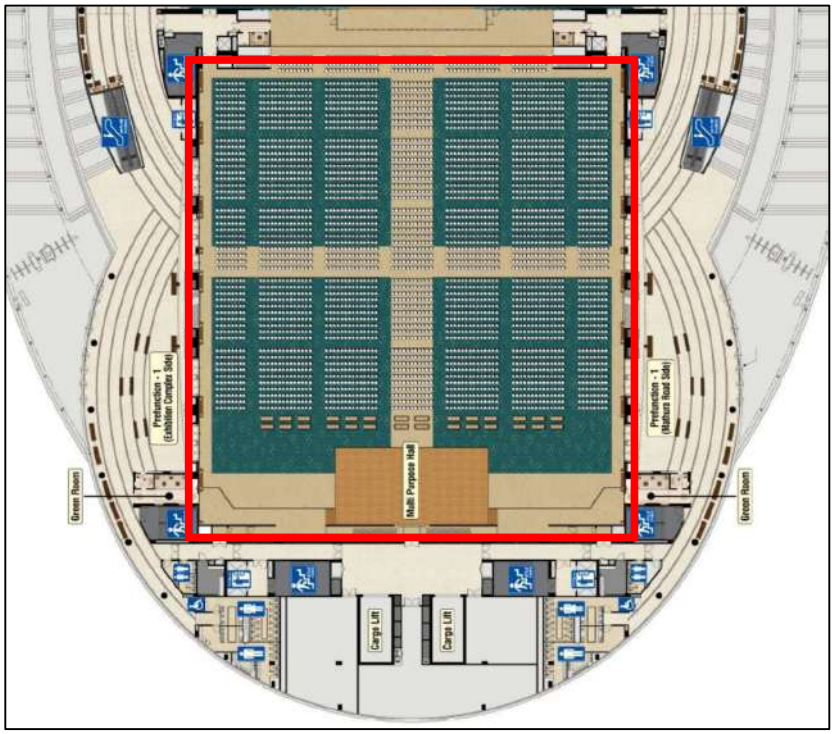
Area: 4884 sqm.

Capacity: The plenary hall can accommodate 4,000 people

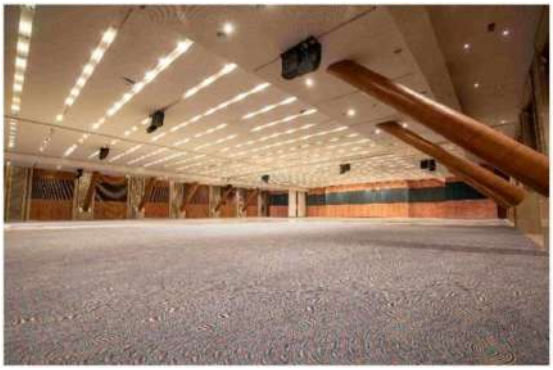
Features: Air conditioning, Modern AV and IT systems, Hydraulic stage, Live audience polling facility, and Interpreter rooms for multilingual events.

Supporting Areas: 2 Pre-function areas, 2 Green rooms, 6 staircases, 2 Escalators, 2 Cargo Lifts, 4 lifts, 6 Washrooms.

Services: LV shafts, Electrical Shaft, Movable panel storage, 36m of door openings (2.4m each)





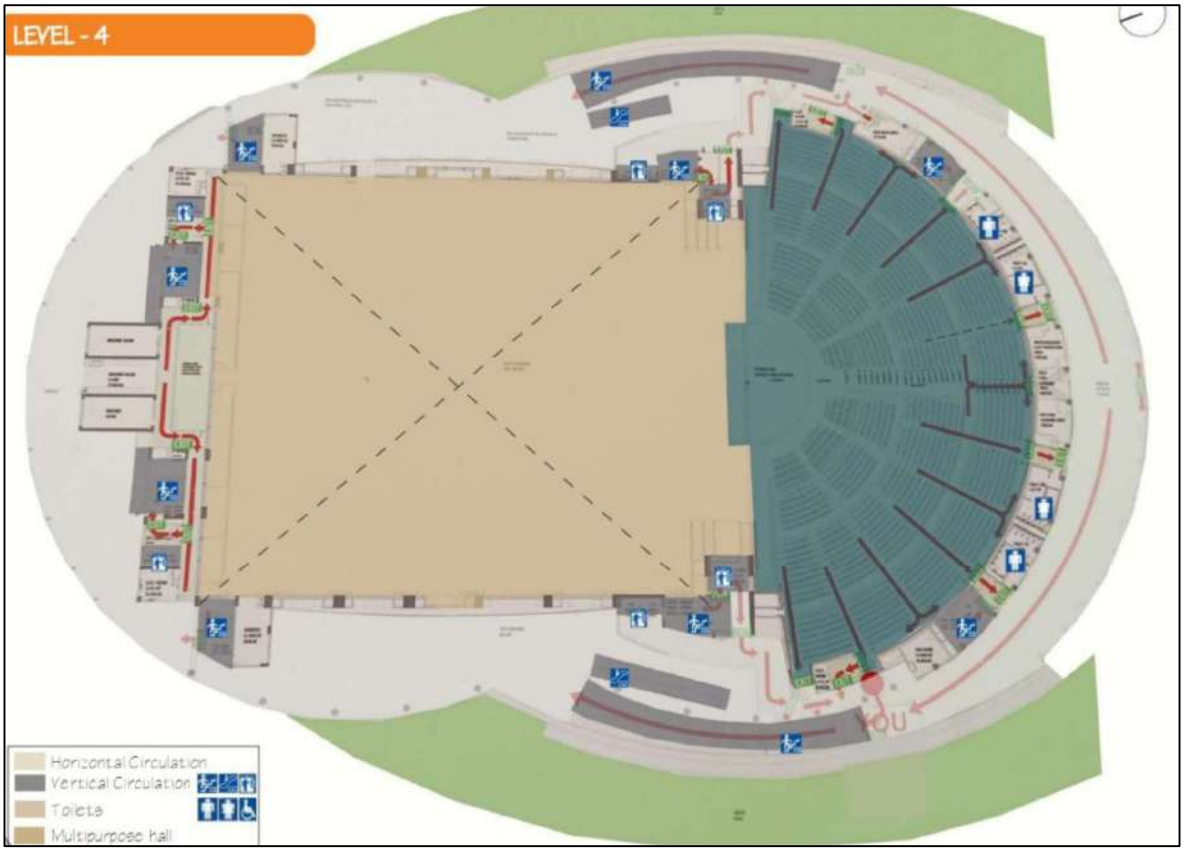


Level 4

Spaces:

1. Double heighted Multipurpose Hall

2. Interpreter room

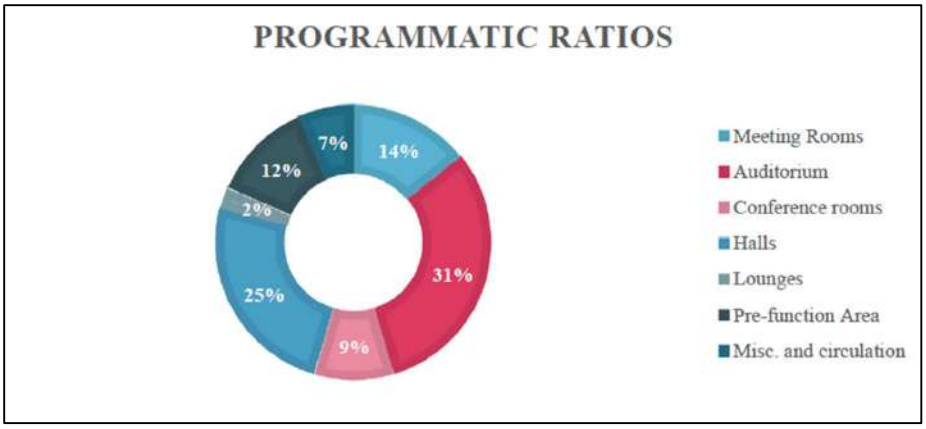


Features: Double Heighted Plenary Hall maximizing the capacity and view, Double Heighted Multi-purpose hall, Washrooms and special Lobby. Green roof contributing to sustainability efforts.

6.1.13 Inferences

Percentage share of Spaces in a convention centre

Sr. No.	Spaces	Total Area (in sqm)
1	Meeting Rooms	2835
2	Auditoriums	6176
3	Conference rooms	1855
4	Halls	4884
5	Lounges	490
6	Pre-function Area	2361
7	Misc. and circulation	1305



Area per person in different types of spaces

Spaces	Area per person (in sqm.)	Optimal Range
Meeting Rooms	**1.402**	**1.5**
Auditorium	**0.835**	**0.9-1.1**
Halls	**1.221**	**0.55-0.74**

6.2 Case Study II Yashobhoomi India International Expo Convention Centre (IICC Dwarka)

Location	Dwarka, New Delhi
Architect	B. V. Doshi.
Area	12 acres



6.2.1 Introduction

Yashobhoomi Convention Centre, also known as India International Convention & Expo Centre (IICC), is a landmark project situated in Dwarka, New Delhi. It stands as one of India's most ambitious infrastructure endeavours, aimed at positioning the country as a global hub for conferences, exhibitions, and business events.

This state-of-the-art facility not only serves as a venue for large-scale events but also symbolizes India's growing prowess in the global MICE (Meetings, Incentives, Conferences, and Exhibitions) industry.

6.2.2 Concept And Approach

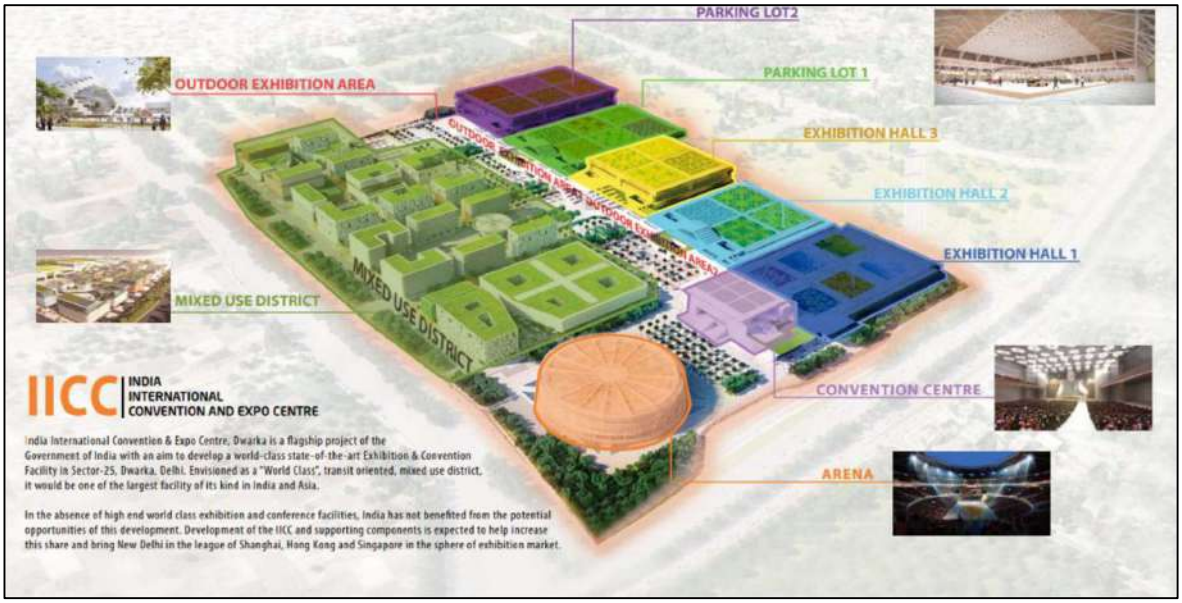
The design and development of Yashobhoomi Convention Centre were driven by a holistic vision to blend modern architectural practices with India's cultural heritage. The concept focuses on creating a world-class convention and exhibition space that is both functional and symbolic of India's economic growth and cultural diversity.

The architectural approach is characterized by its emphasis on sustainability, flexibility, and technological integration. The design incorporates green building principles, aiming for a **LEED Platinum certification**. This is achieved through energy-efficient systems, water conservation strategies, and the use of locally sourced materials.

A critical aspect of the conceptual design is the centre's ability to host a wide variety of events, ranging from international conferences to large-scale exhibitions, concerts, and cultural events. The architecture is flexible, with spaces that can be easily adapted to different configurations and event types.

6.2.3 Proximities

- 11 Kms from Indra Gandhi International Airport
- 23 Kms from Connaught Place
- 26 Kms from New Delhi Railways Station
- 16 Kms from Gurugram
- Serviced by Public Transports (Buses, Cabs, Metros)



6.2.4 Accessibility

- Adjacent to Dwarka Express for easy road access
- Connected via NH-8 and Urban Extension Road-II (UER-II)


New Delhi
Metro Station
newdelhi
(Dwarka-NewDelhi-Noida)
DWARKA EXPWAY
Delhi Jaipur Railway Line
(Dwarka-Airport-NewDelhi)
noida
Delhi Blue Line Metro
AEROCITY
HOTELS
Wave City
Center Noida
YASHOBHOOMI
Sector 21
Metro
Station
Airport Metro
Express
INDIRA GANDHI
INTERNATIONAL AIRPORT
3
2
New underpass
approach road
1
Airport Metro
Express
UER II (Urban Extension Road II)
National HighAway-8
To Gurgaon
Bijwasan railway
Station
gurgaon



Figure 49 Yashobhoomi Site Plan

Exhibition Halls Mixed Use District Foyer Convention Centre

6.2.5 Spatial Planning

The Master Plan structures the project in two differential sectors. It leaves the fairgrounds and Convention area to the West and

The development of mixed use (Hotels, Offices, Retail Areas) to the East.

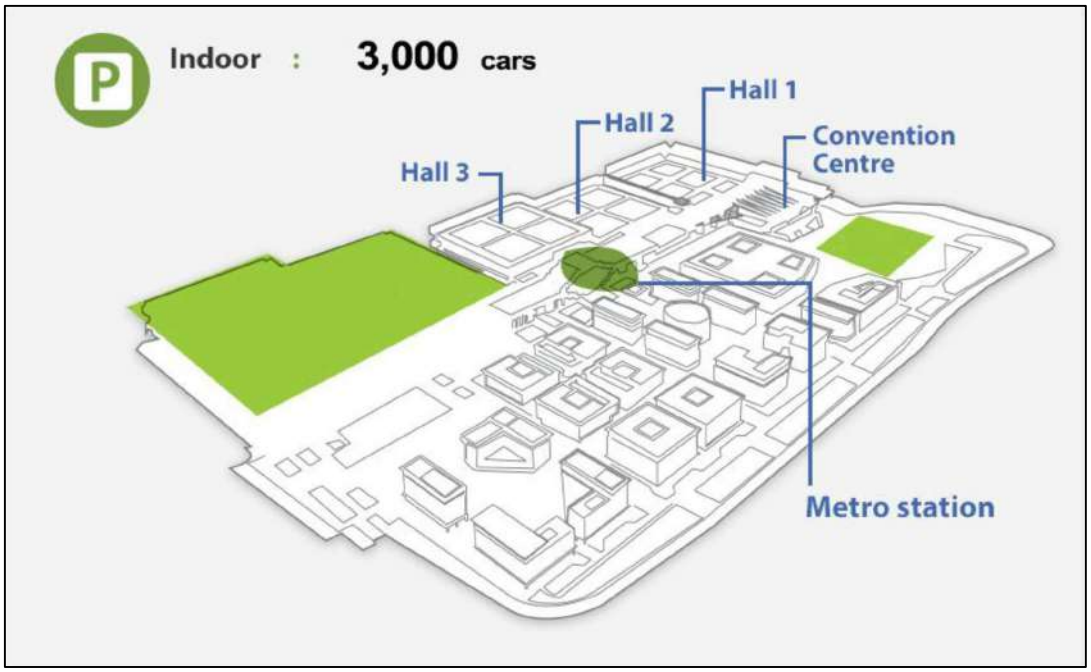


Figure 50 Spatial Arrangement of Areas



Figure 51 Positions of Exhibition Halls

6.2.6 Convention Hall

Area	73000 sqm
No. of Floors	8
No. of Convention rooms	15
Capacity of Main Auditorium	6000 pax
Capacity of Grand Ballroom	25000 pax
No. of Meeting rooms	13
Total Capacity	11000

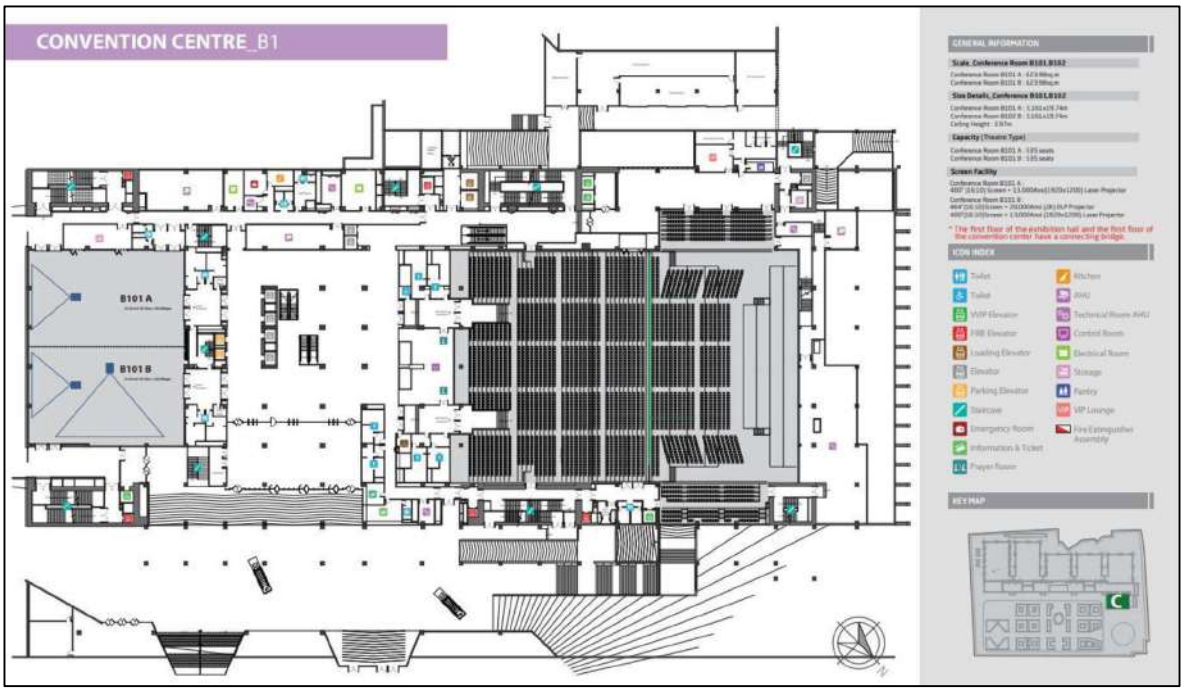


Figure 52 Convention Centre floor plan

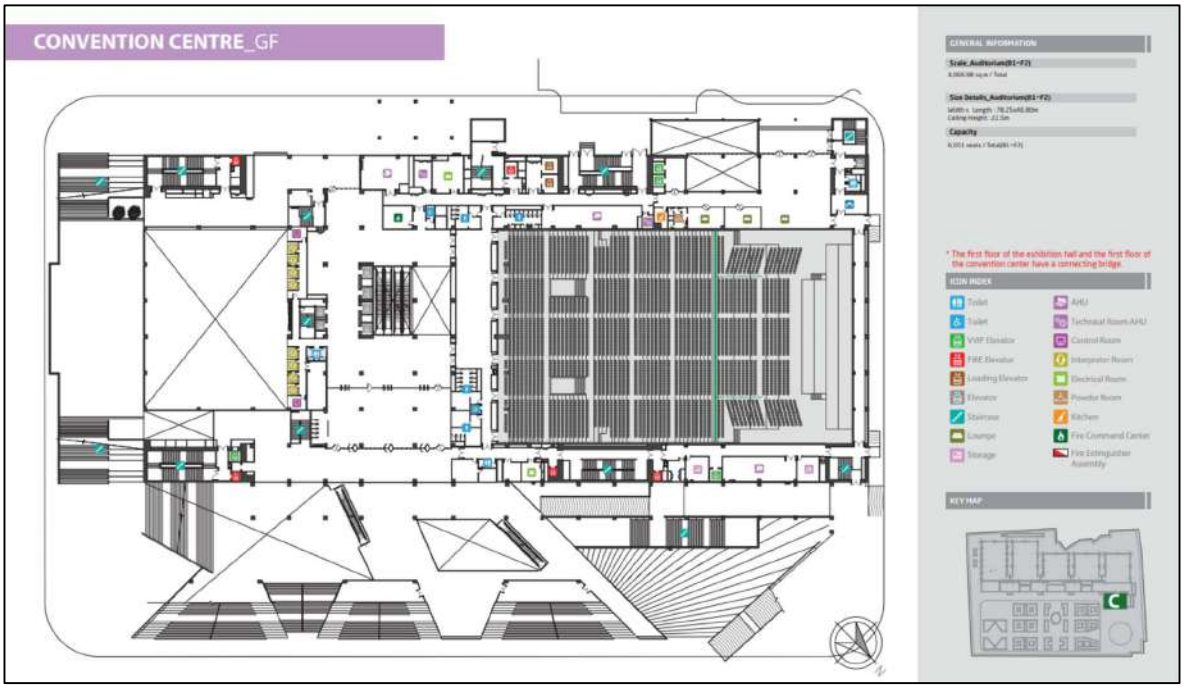


Figure 53 Convention Centre ground floor plan

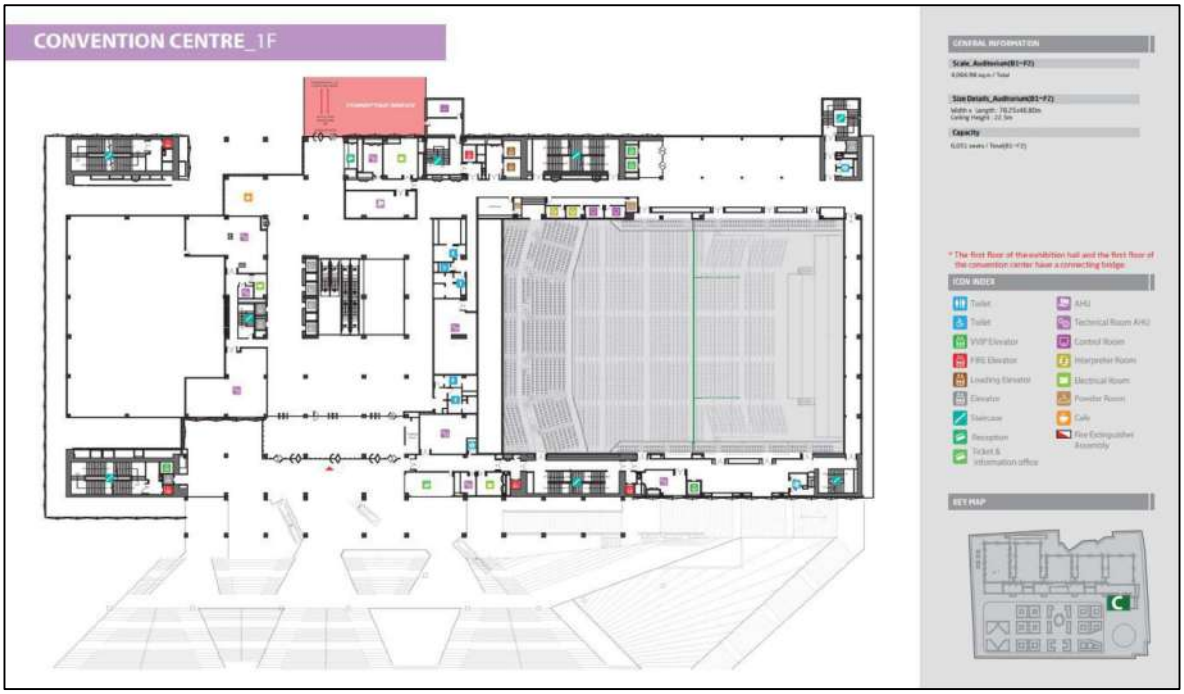


Figure 54 Convention Centre first floor plan

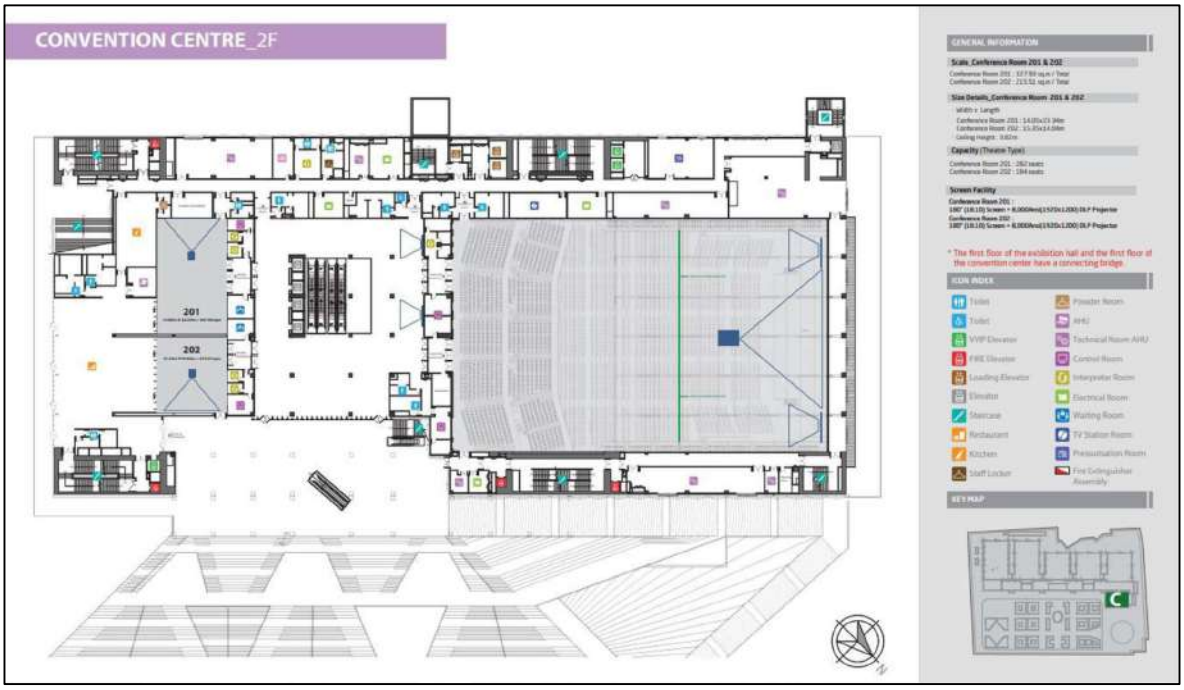


Figure 55 Convention Centre second floor plan

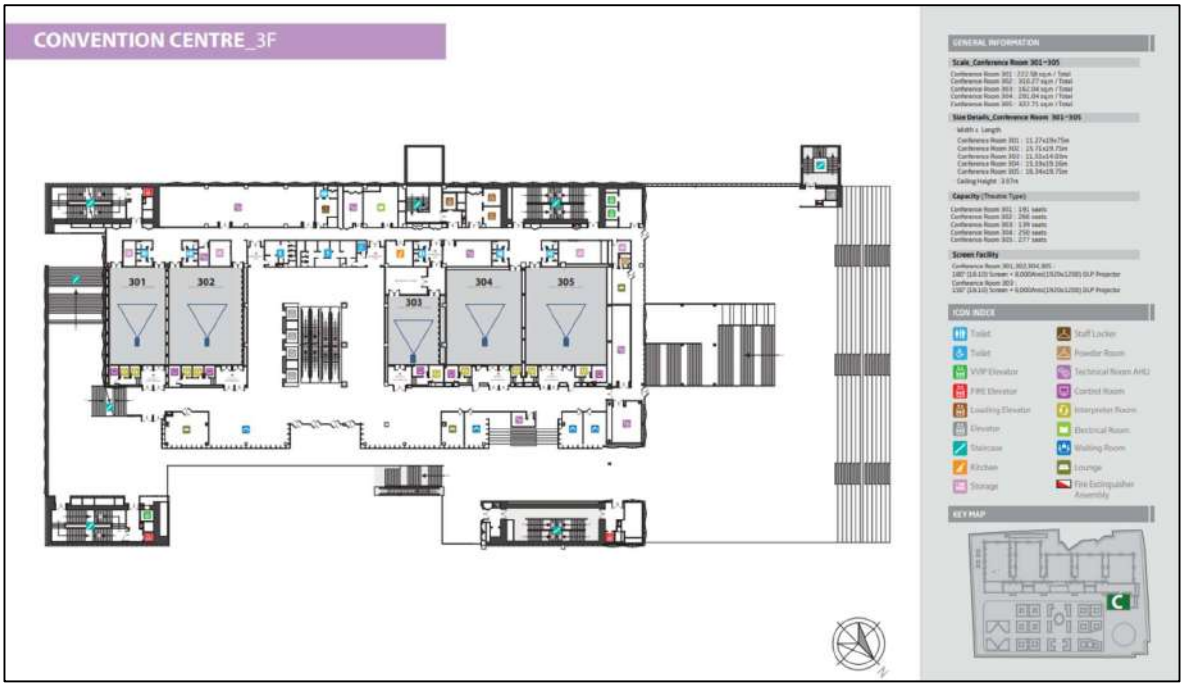


Figure 56 Convention Centre third floor plan

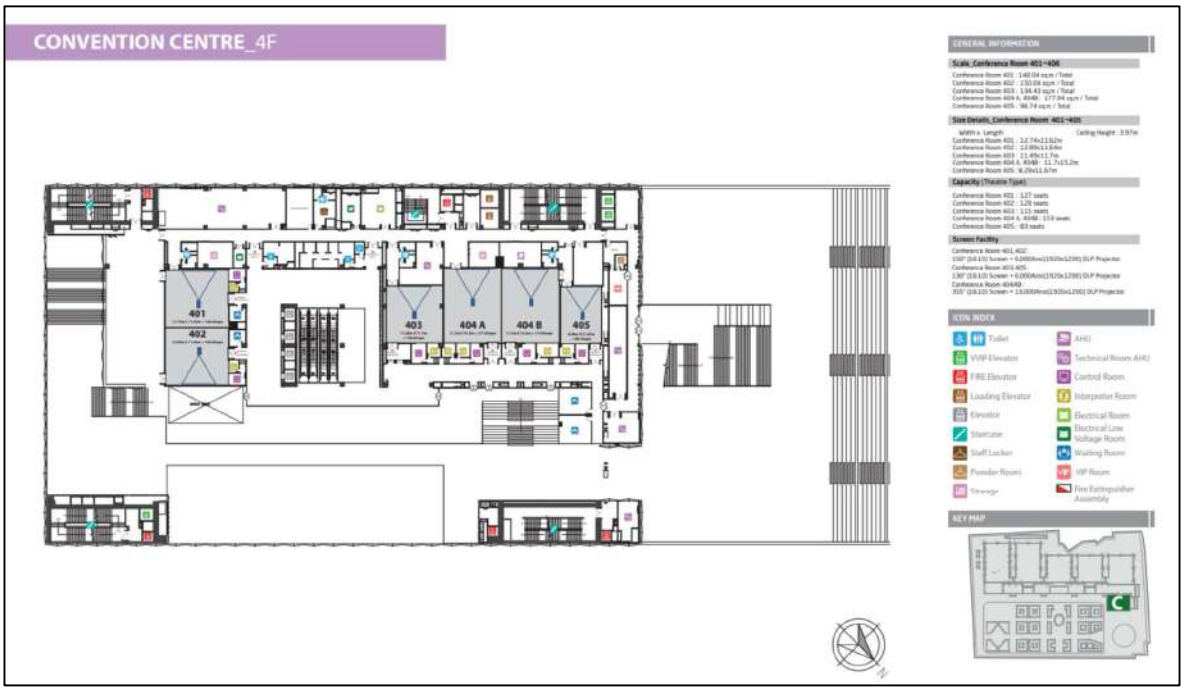


Figure 57 Convention Centre fourth floor plan

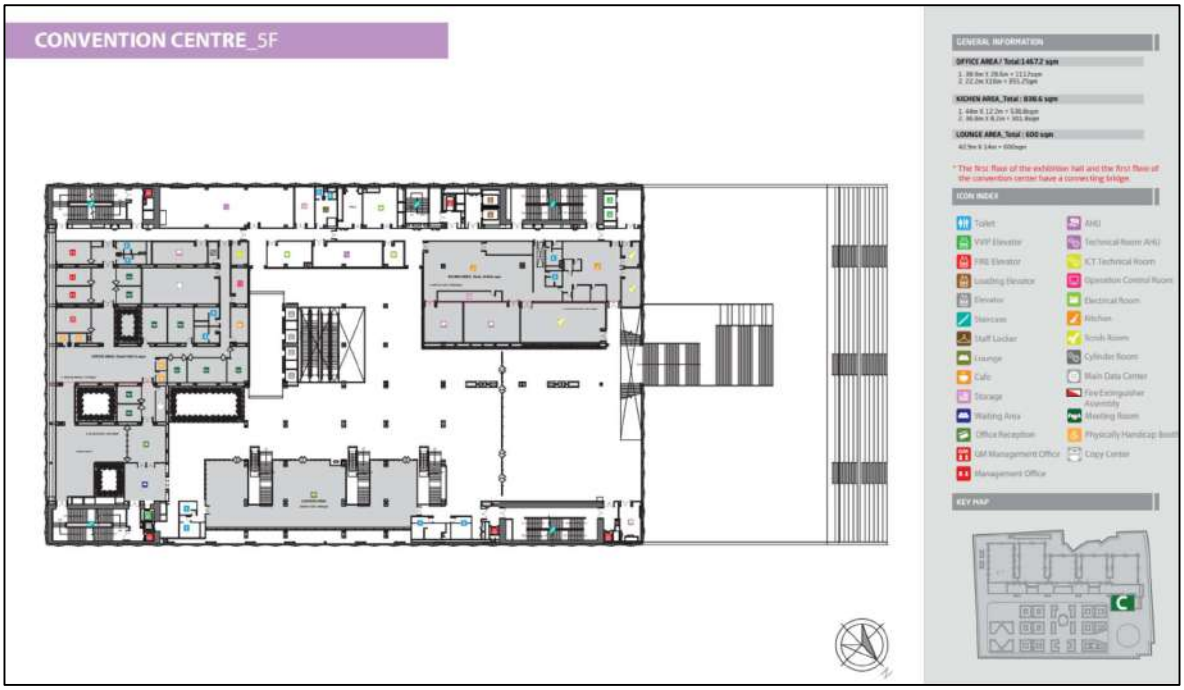


Figure 58 Convention Centre fifth floor plan

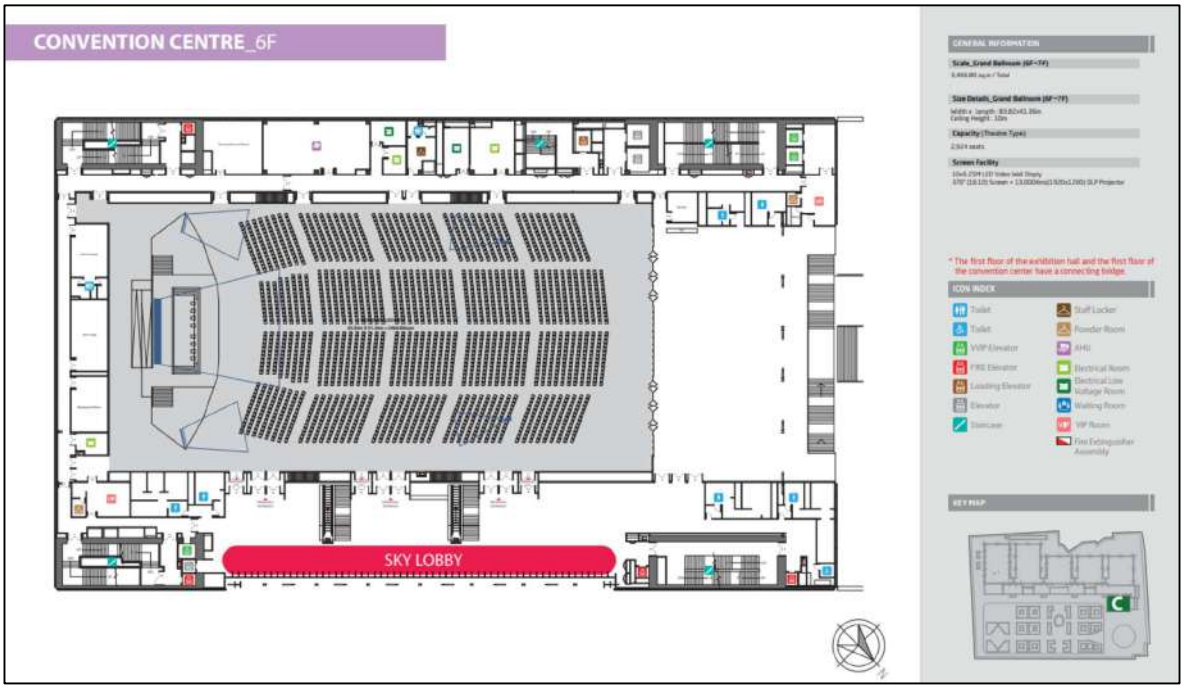


Figure 59 Convention Centre sixth floor plan

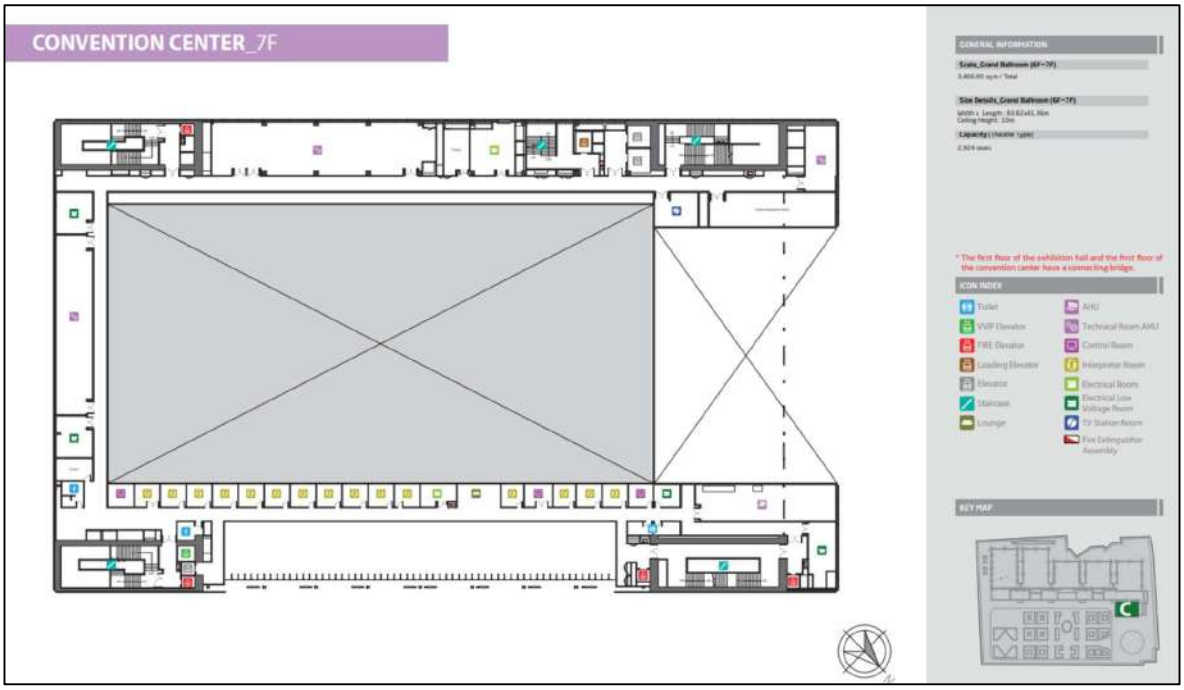


Figure 60 Convention Centre seventh floor plan

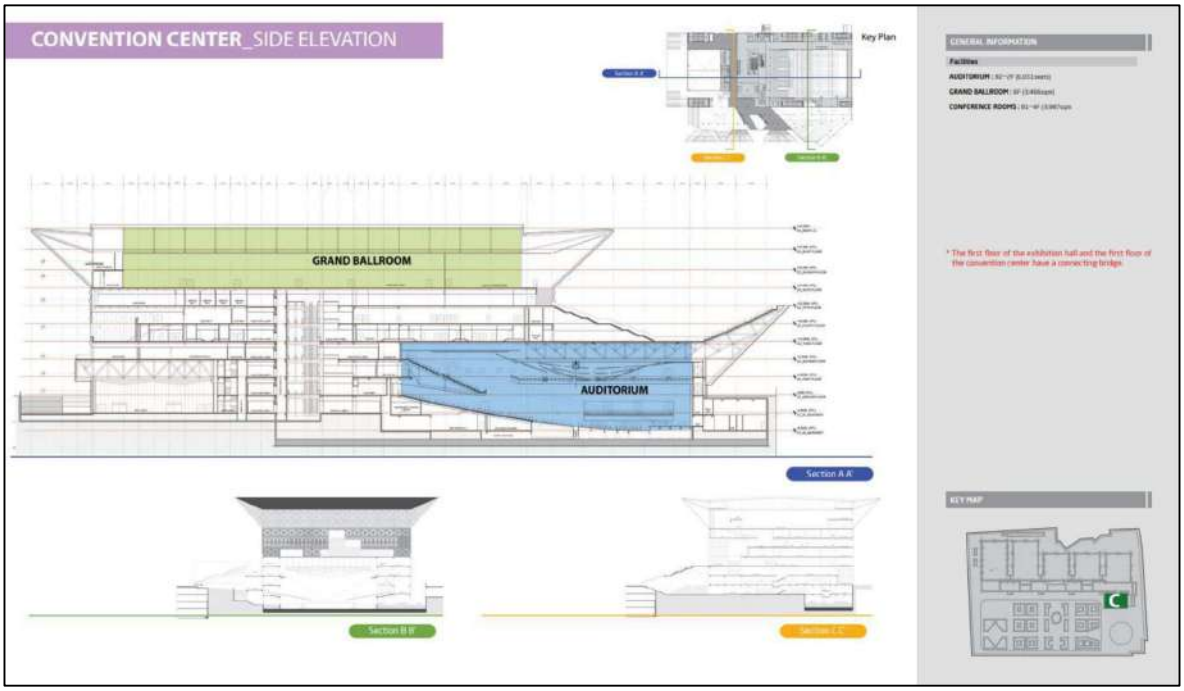
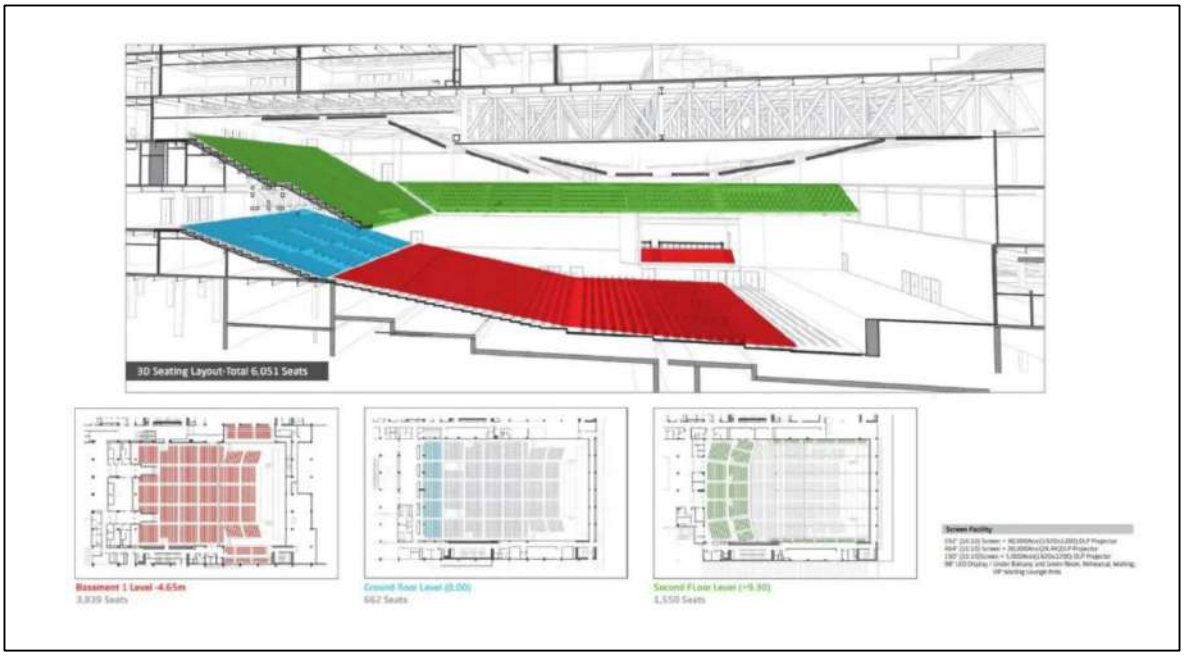


Figure 61 Convention Centre side elevation

6.2.7 Auditorium



It is the core of the complex and it's equipped with a seating capacity of around 6000 people.

Other Features:

1. LED Media Façade on both interior and exterior sides
2. Decoration inspired by Indian Culture
3. Terrazzo floors, metal sound absorbers, lit-up patterned walls

4. Innovative automated seating system (flat floor or tiered seating)

6.2.8 Exhibition Halls

There are 3 Exhibition Halls constructed among a total of 5 Exhibition Halls

5 exhibition halls provide over 240000 sqm of built-up space with additional open exhibition area. Roof is decorated colourful panels and vibrant pattern which defines its character façade opens itself in an arch-like structure welcoming visitor. Each hall is equipped with flexibility to be converted into 4 small halls.

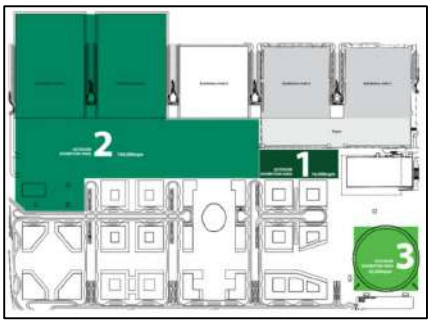


Figure 62 Placement of Rooms

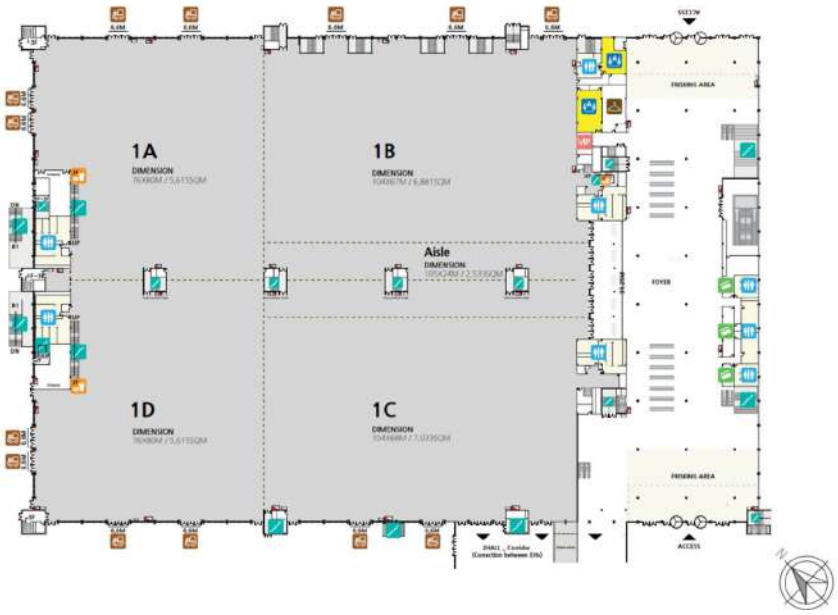


Figure 63 Floor Plan

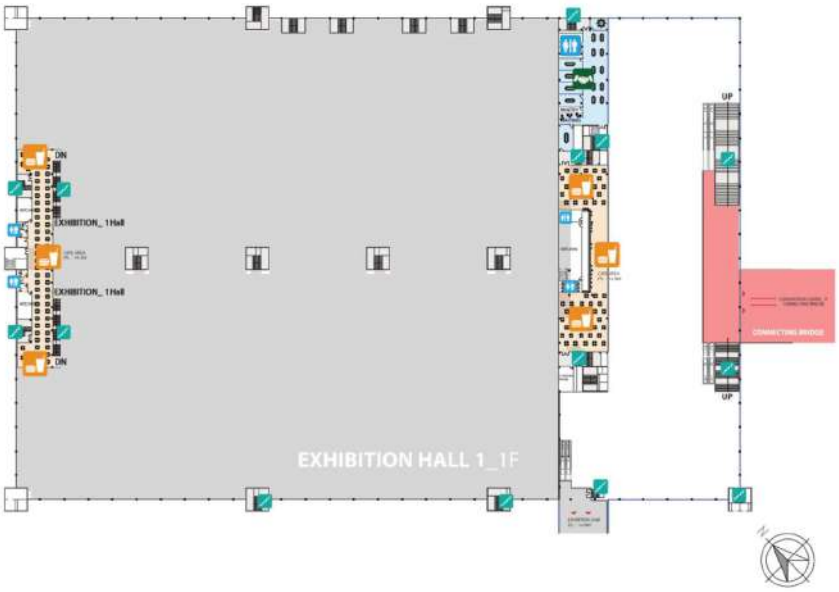


Figure 64 Floor plan

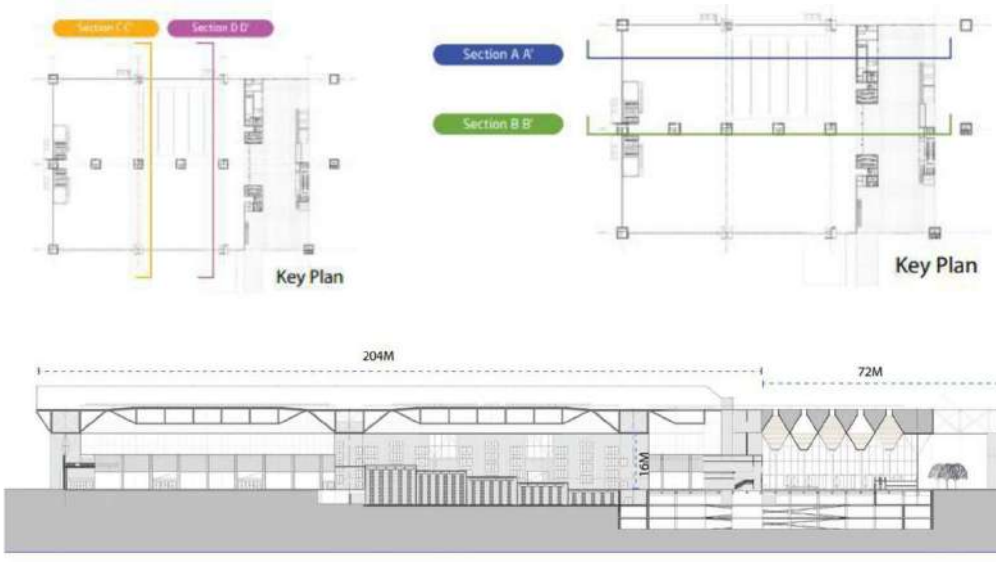


Figure 65 Section AA

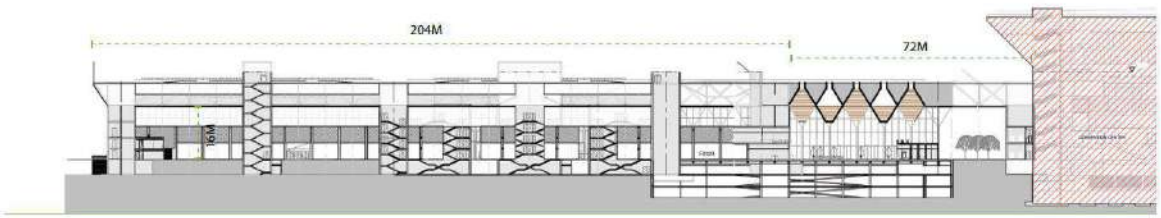


Figure 66 Section BB

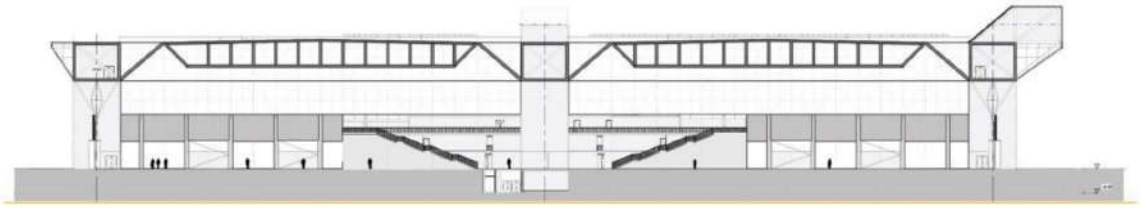


Figure 67 Section CC



Figure 68 Section DD

6.2.9 PARKING

Car Spaces Distribution

Parking is distributed across four basement levels, with a total of 6,294 ECS (Equivalent Car Spaces). These are spread across different facilities including hotels, offices, and retail areas.

A total of 168 preferred car spaces are designated across the four basements, providing convenient parking for specific categories, such as VIP or priority guests.

Various facilities such as retail, hotels, offices, and convention centres have dedicated parking spaces, with retail receiving the largest share, having 1,555 ECS in total.

6.2.10 Inferences

The Yashobhoomi Convention Centre is a landmark in modern Indian architecture, embodying a blend of cutting-edge technology, sustainability, and cultural representation.

Its design and concept underscore the importance of flexible, multi-functional spaces in meeting the demands of a global MICE industry.

The centre not only enhances India's infrastructure capabilities but also serves as a testament to the country's commitment to becoming a major player in the global conference and exhibition landscape.

6.3 Comparative analysis of case studies –

Feature	HITEX, Hyderabad	Minto Hall, Bhopal	Bharat Mandapam, New Delhi	Yashobhoomi, New Delhi

Architectural Style	Modern, functional with an "ACE" concept	Indo-Saracenic with colonial influence	Modern interpretation of traditional Indian temple architecture	Modern, blending with Indian cultural heritage
Key Visual Element	Two giant elephant tusks at the entrance	Majestic pillars, arches, and domes	Intricate patterns and motifs on the façade	Decorated roofs and an arched-like façade
Site Area	53 Acres	10.6 Acres	123 Acres	12 Acres
Main Hall/Capacity	Hall 4: 6,000 people	Raja Bhoj Hall: 600 people	Plenary Hall: 3,000 people; Multipurpose Hall: 4,000 people	Main Auditorium: 6,000 people; Grand Ballroom: 25,000 people
Flexibility	Hall 4 can be divided into smaller halls with partitions	Flexible seating capacity for events	Flexible, modular spaces for various events	Spaces adaptable for different events; exhibition halls divisible
Primary Use	Trade fairs, exhibitions, corporate/	Government meetings, interna	International exhibitions, conferen	Conferences, exhibitions, busines

	cultural events	tional convention center	ces, cultural events (e.g., G20 summit)	s events (MICE industry hub)
Parking	3,500 vehicles	300 cars	1,500 cars, 500 bicycles	3,000 indoor cars , total 6,294 ECS
Sustainability	Adding rooftop gardens to Hall 4 for insulation and heat reduction	N/A (Historic building, focus on restoration)	Solar panels, rainwater harvesting, energy-efficient systems, LEED certification	LEED Platinum certification aim, energy-efficient systems , local materials
Establishment/Renovation	Established: 2003	Established: 1909 , Renovation Completed: 2018	Redevelopment: 2017-2023	On-going development
Inference	Modern, functional design with large, adaptable spaces, suitable for a variety of events,	Historical preservation and adaptive reuse for moder	Aims for global prominence with state-of-the-art, large-scale, and sustainab	Ambitious, large-scale project focused on establishing India as

	and growing towards sustainability.	n convention needs, maintaining cultural identity.	le facilities, reflecting cultural heritage.	a global MICE hub with flexible and sustainable infrastructure.

7. DESIGN PROPOSAL

7.1 Site Plan


CONCERT HALL
HOTEL
MICE COMPLEX
BANQUET HALL
SERVICE EXIT
ENTRY
EXIT
SERVICE EXIT

7.2 Floor Plans

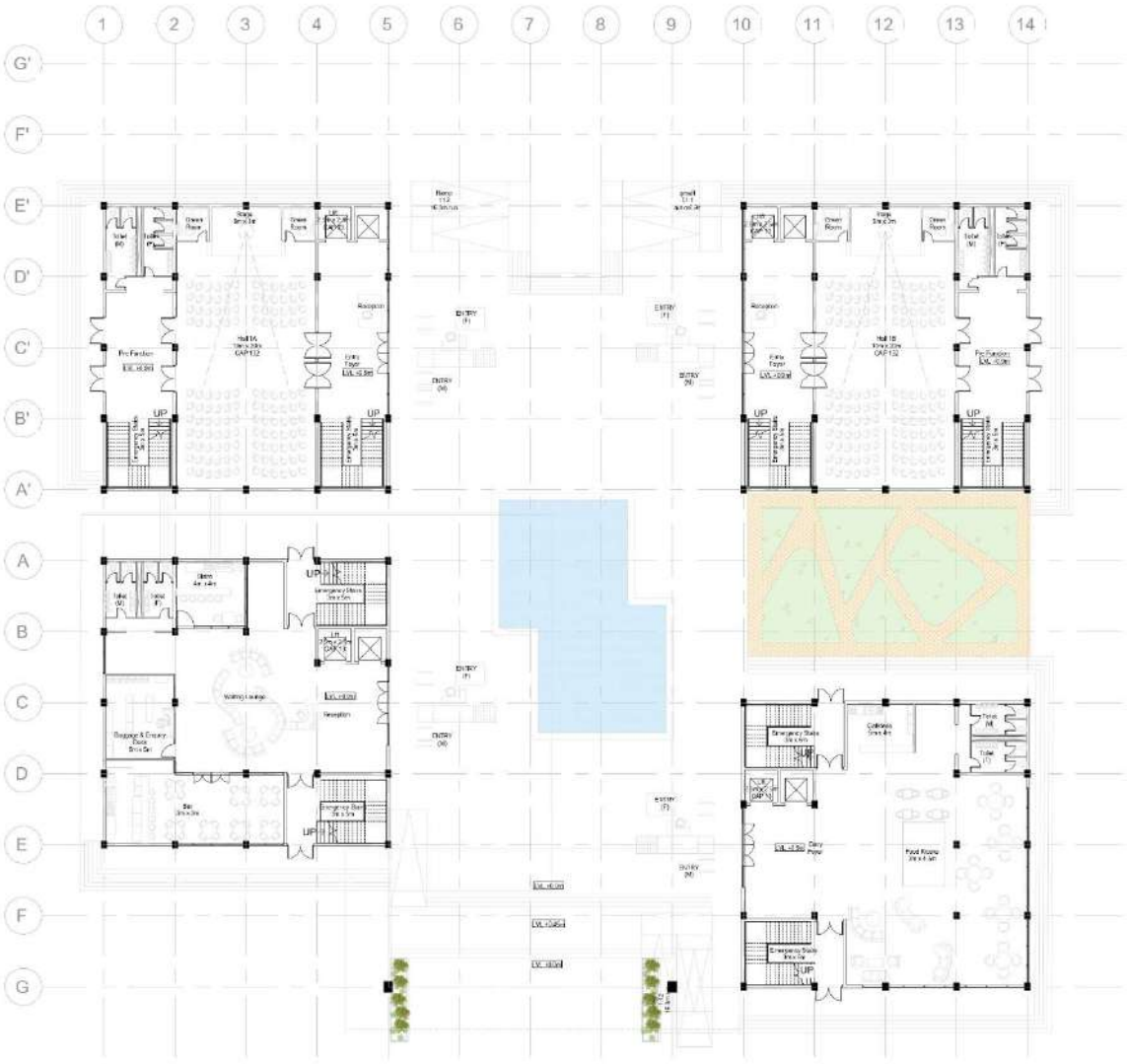


Figure 69: Ground Floor Plan

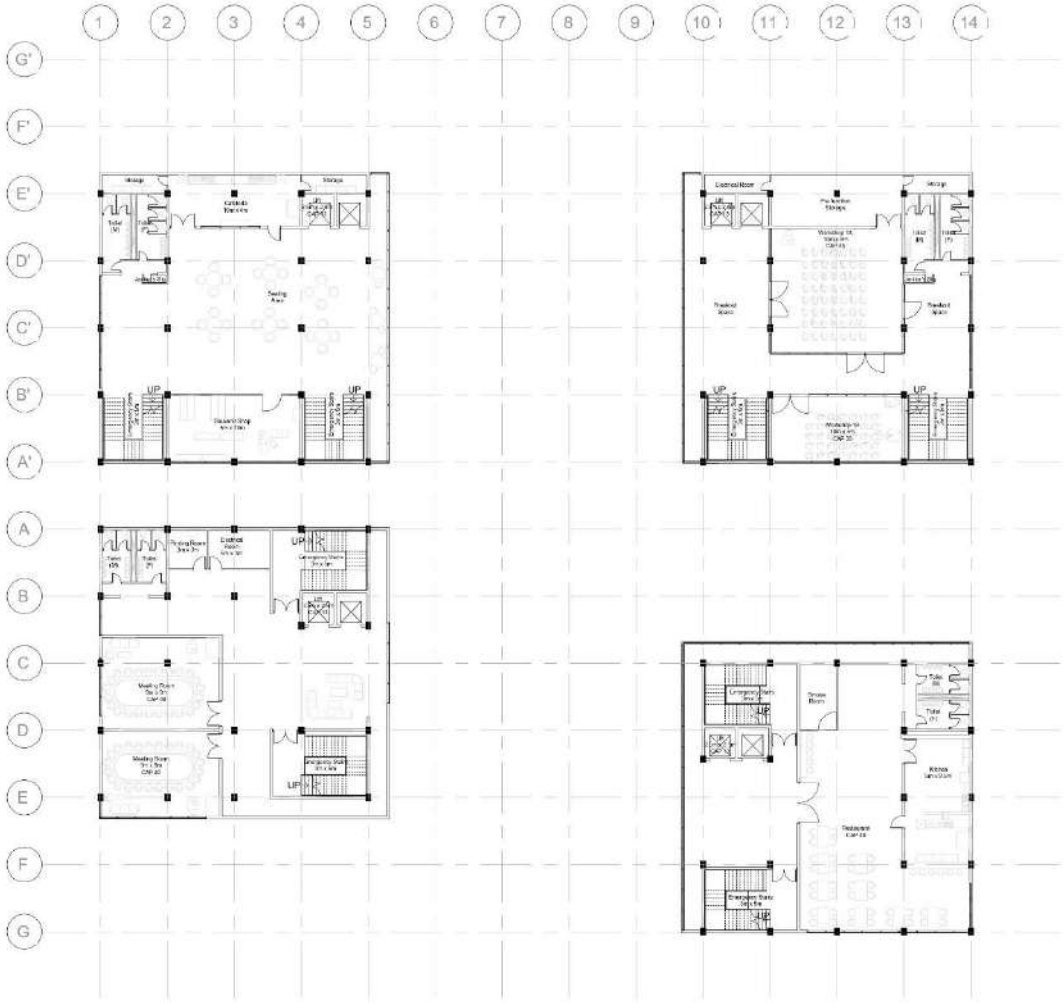


Figure 70:First Floor Plan

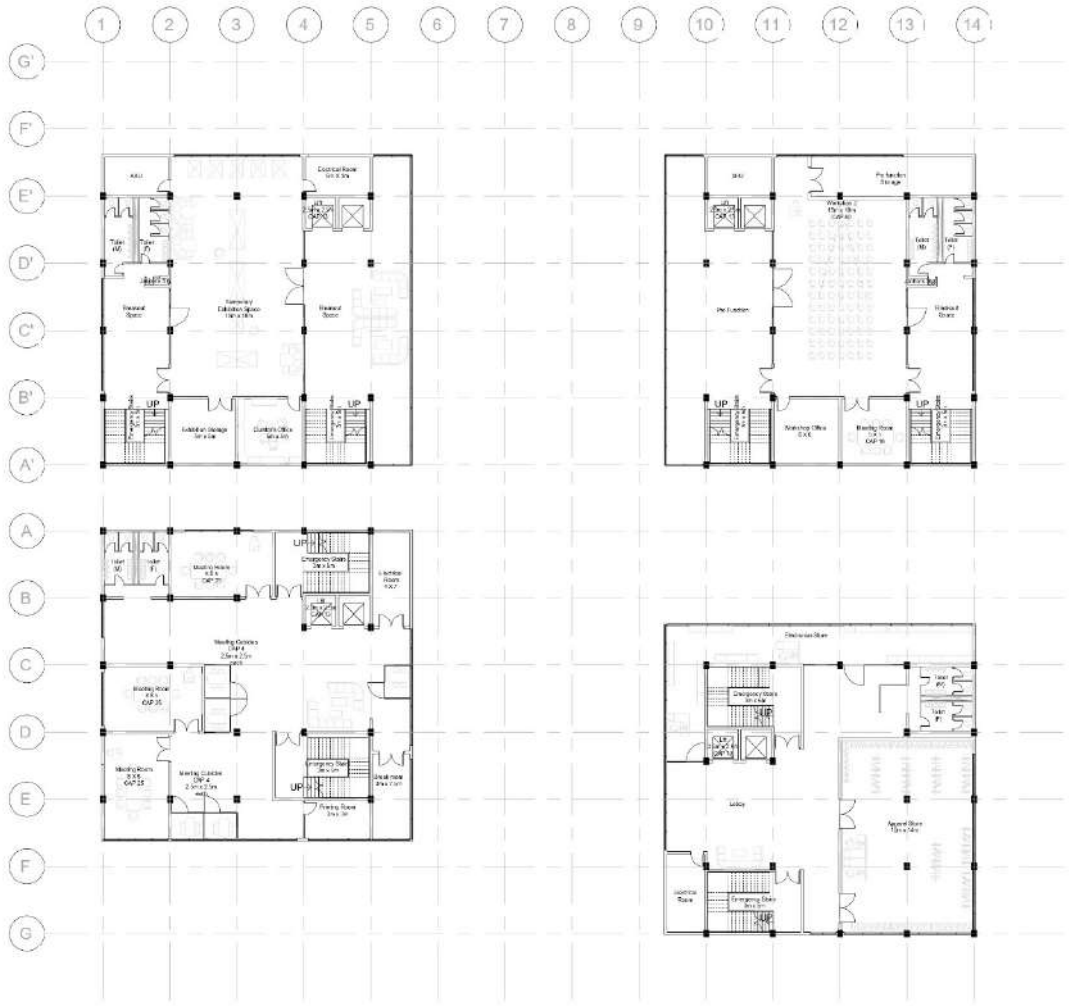


Figure 71:Second Floor Plan

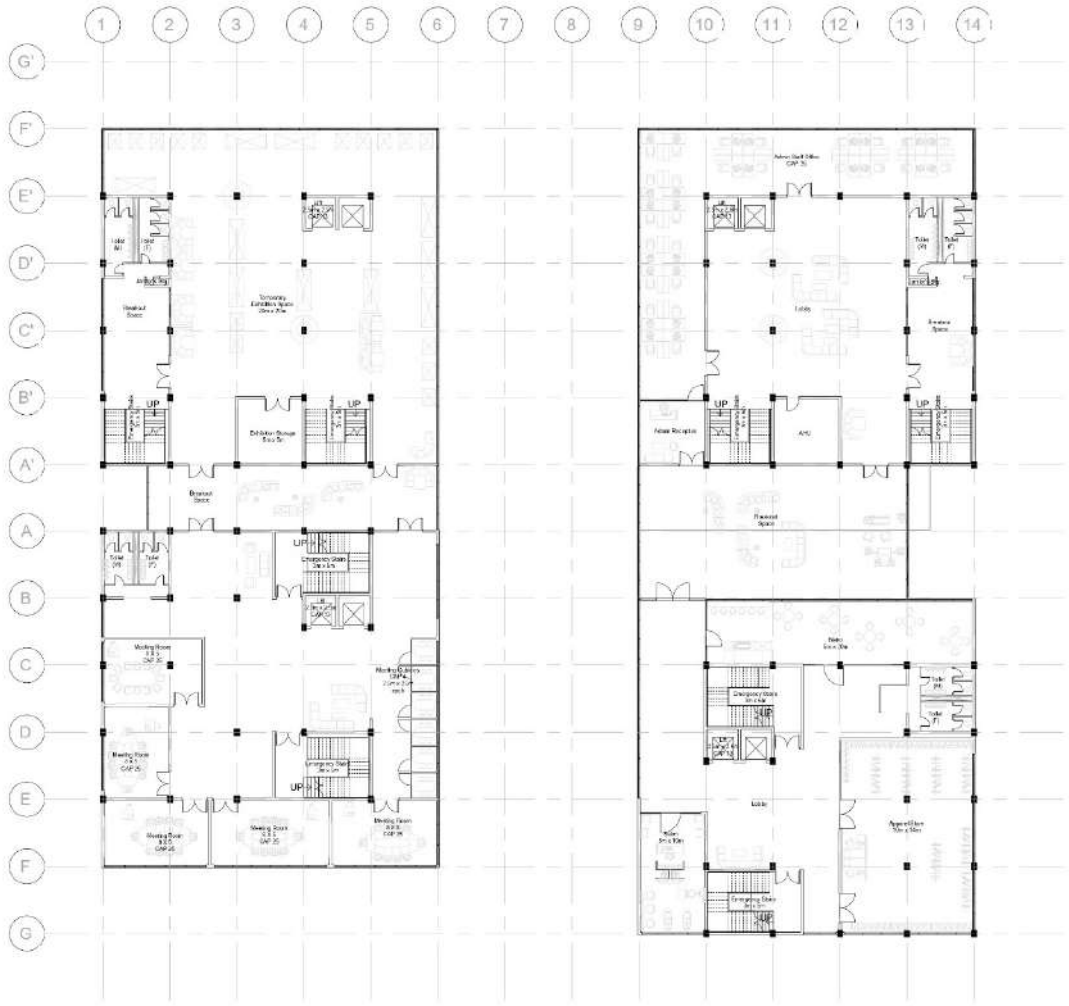


Figure 72: Third Floor Plan

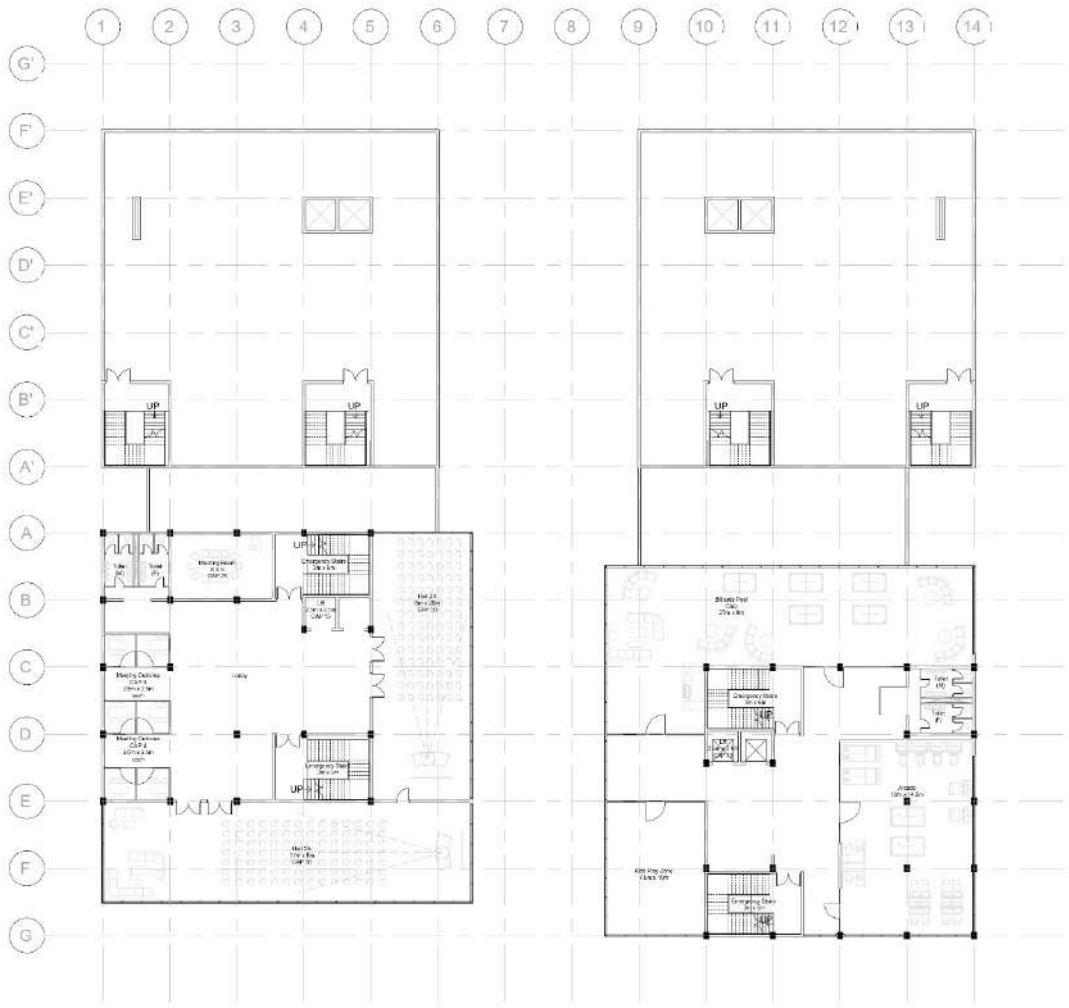


Figure 73: Fourth Floor Plan

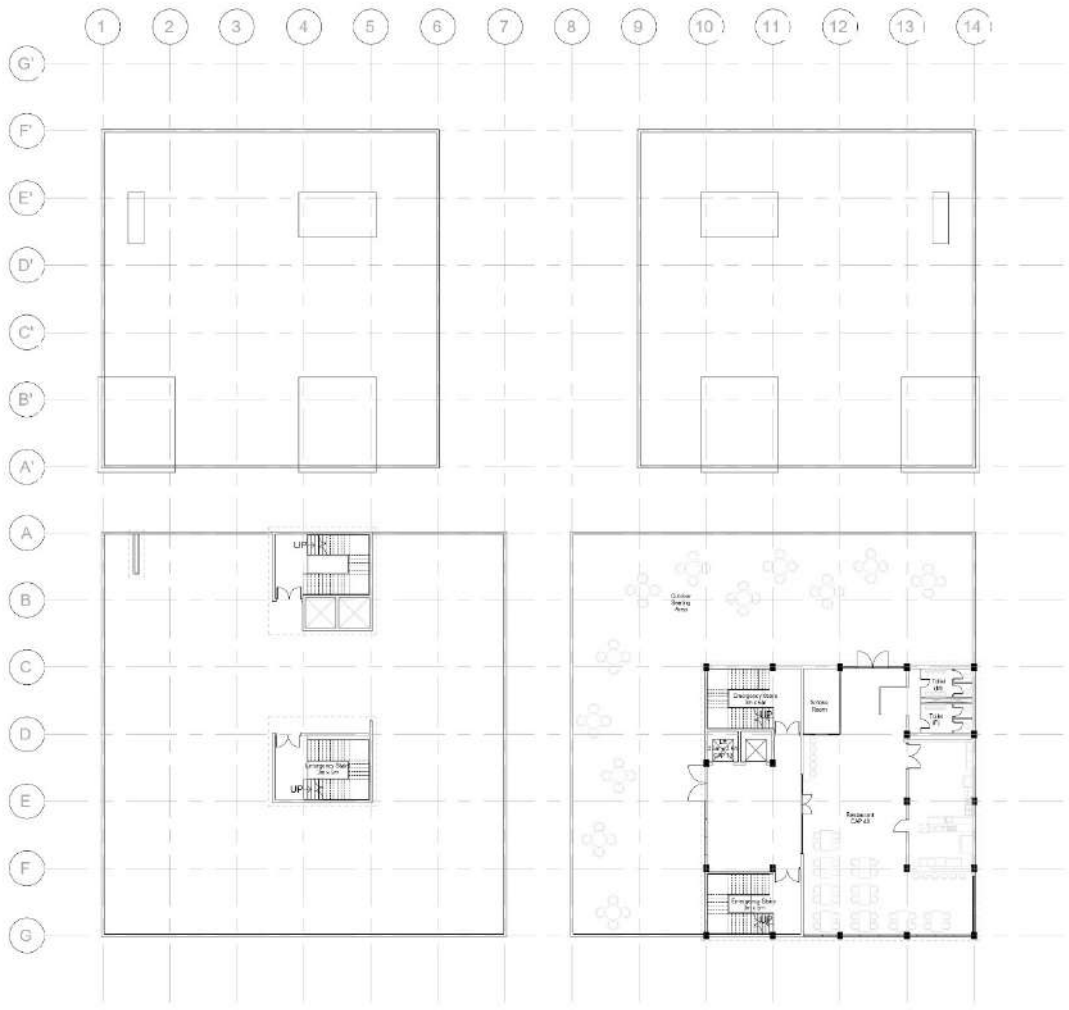


Figure 74: Fifth Floor Plan

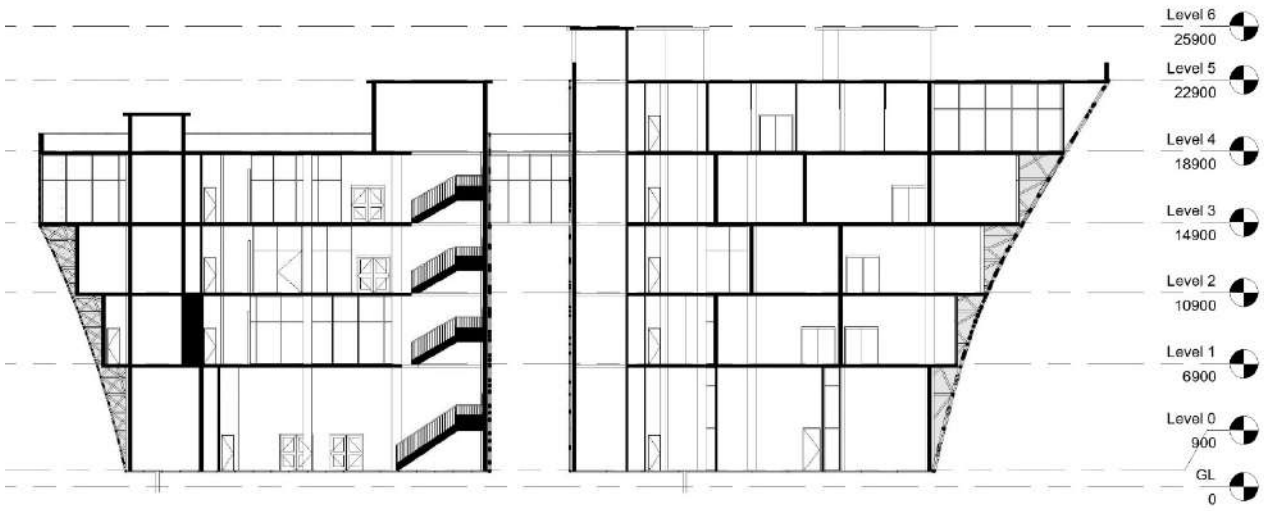


Figure 75:Section AA

References

2016, N. B. (2016). *Indian Standards*.

Brigade. (n.d.). Retrieved from https://www.brigadegroup.com/blog/hospitality/sustainability-in-clubs-and-convention-centers

IACC. (n.d.). *standards*. Retrieved from https://iacconline.org/wp-content/uploads/IACC20Guide20to20Quality20Standards.pdf

infrastructure, T. s. (2022). *Warangal International Convention Centre*.

NBC. (n.d.). *NBC 2016*.

Neufert. (n.d.). Neufert.

rules, T. B. (n.d.).

warangal. (n.d.). Retrieved from https://telanganatoday.com/tsiic-to-construct-a-three-star-hotel-convention-centre-in-warangal

wikipedia. (n.d.). Retrieved from https://en.wikipedia.org/wiki/Warangal

W I C C

WARANGAL INTERNATIONAL CONVENTION CENTRE

Telangana,India

The Warangal International Convention Centre (WICC) is a strategic infrastructure intervention located in the Madikonda IT SEZ, designed to bridge the critical “infrastructure void” in Telangana’s cultural capital.Serves as an urban interceptor and economic catalyst, establishing the missing MICE ecosystem required to transition Warangal from a historical town into a global Tier-II business destination.

SITE ANALYSIS

"THE HEART OF DECCAN"
TELANGANA

INTRODUCTION

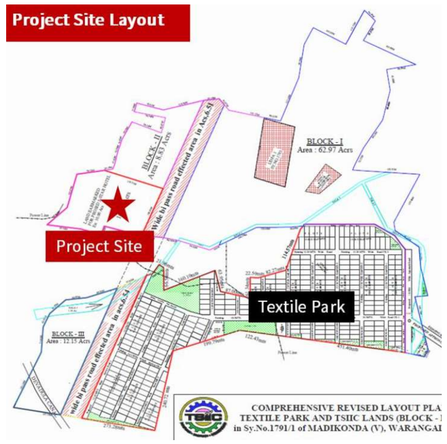
THE DISTRICT- WARANGAL

Warangal district is in the Indian state of Telangana and was the ancient capital of the ***Kakatiya dynasty***, known for its rich history and heritage. The city was formerly called ***Orugallu***, meaning "one stone" in Telugu, referring to the presence of large granite rocks in the area. Key attractions include the Warangal Fort, Thousand Pillar Temple, and Ramappa Temple.





Project Site Layout



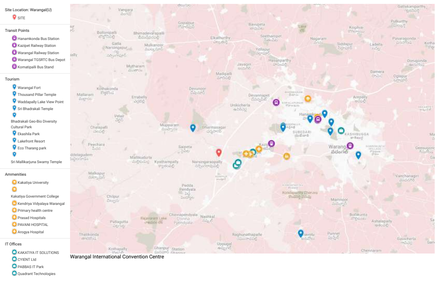
This district has immense cultural significance to Telangana, second only to Hyderabad in significance.

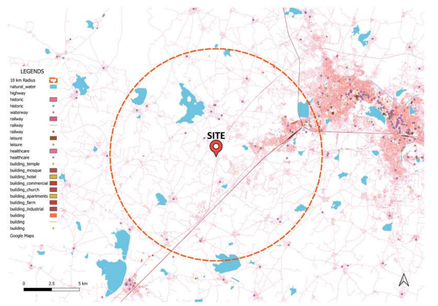
Economy: Historically famous for ***Granite quarrying*** (Black Granite), ***Rice production*** (one of the largest grain markets in Asia), and ***Carpets*** (Warangal Durries).

Modern Identity: Is rapidly evolving into a Tier-II IT Hub, secured by the ***Madikonda IT SEZ*** (Project Site) and educational giants like ***NIT Warangal***.

SITE SURROUNDING

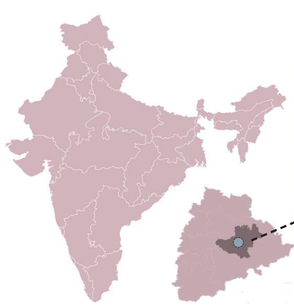
Project Site





SITE DETAILS

Name of the Project: Warangal International Convention Centre (WICC)
Site Area: ~ 10 acres (40,468 sq. m.)
Location: Sy. No. 1791/ 1 of Madikonda (V),Madikonda IT Park (Special Economic Zone)
District: Warangal (U)
Site Coordinates:
Land Use: Public/Semi Public (Converted)
Land Ownership: Telangana State Industrial Infrastructure Corporation (TSIIC)







EXISTING SITE CONDITIONS


Pasture Land


Adjacent paddy fields near site

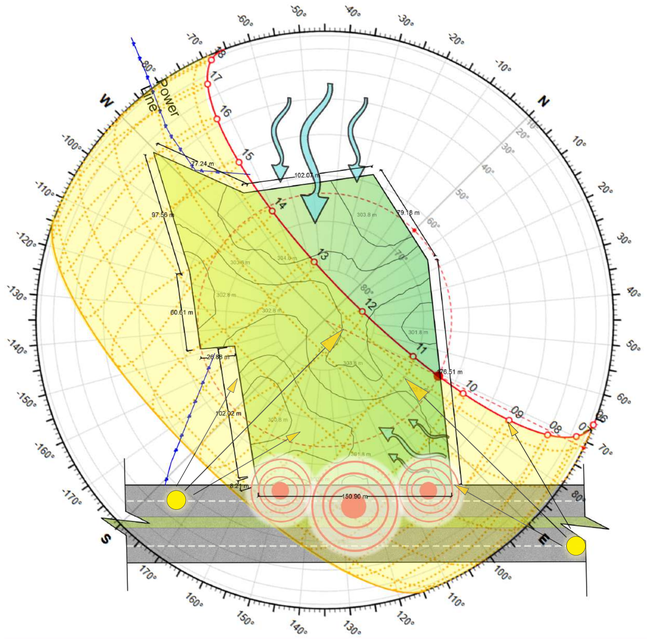

Existing Vegetation of scrubs


Existing Entrance and NH 163


Site Entrance

The 10-acre site offers ample space and flat topography, simplifying construction, though varied soil,
especially expansive black cotton soil, demands specialized foundations. Highway noise necessitates
sound mitigation. While water is reliable but distant, on-site sewerage treatment is crucial due to absent
municipal drainage, though stormwater drainage exists.

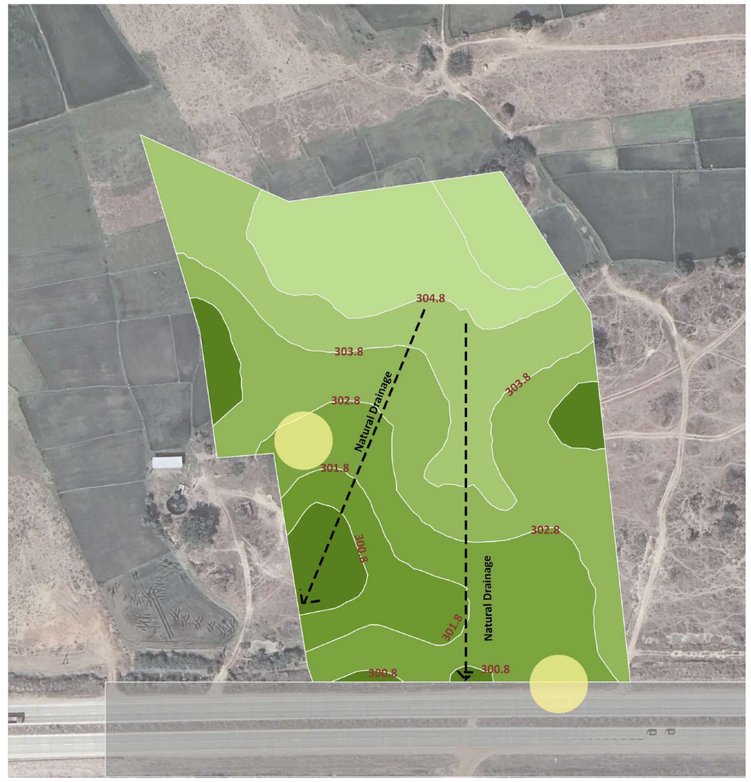
CLIMATOLOGICAL DATA



KEYS

Noise
View
Wind Direction

TOPOGRAPHY

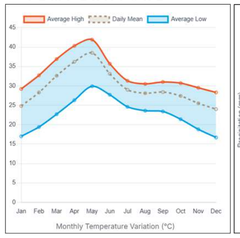


Maximum Contour Level - 304.8m
Minimum Contour Level - 300.8 m
Total Contour Difference- 4m
Slope Gradient <5%

Site Level andRoad Level are equalv

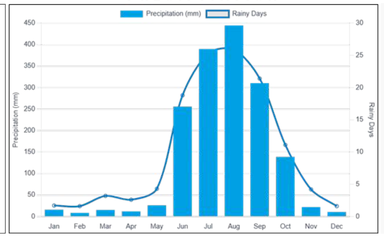
The site is itself levelled and is mostly flat with slope less than 5% thus Levelling won't require high cost.
Whole site drainage should be taken to the lowest contour to utilize gravitaional force rather than mechanical force
The Entry to the site should be given from the connecting road itself through a service lane as the road level and site levels(marked by yellow circle) are equal thereby reducing cost for levelling the access road
Overhead Water Tank should be placed at +304.8 level
Sewage Treatment Plant should be placed at +300.8 level at the far ends of the site

TEMPERATURE



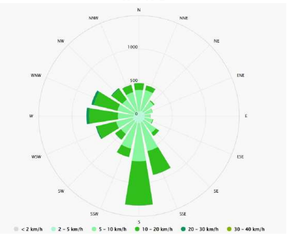
Warangal faces consistently high temperatures, with an extreme peak in summer. Cooling is the primary energy demand hence requires passive cooling design strategies

PRECIPITATION



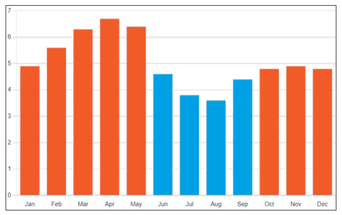
Major precipitation from June to September only and is dry rest of the months hence requires efficient water manangement system throughout the year

WIND

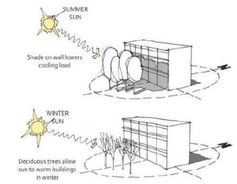


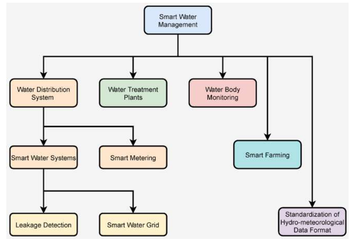
Westward winds predominantly hence building orientation can be made accordingtho these winds to mitigate hot summer winds

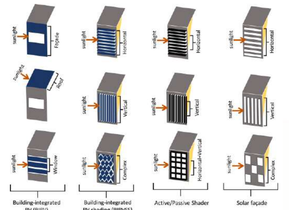
SOLAR HEAT GAIN

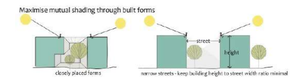


Abundance of solar radiation hence requires design strategies to reduce the overall thermal gain especially during summers











WARANGAL INTERNATIONAL CONVENTION CENTRE

TELANGANA

UNDER THE GUIDANCE OF DR. SONIA TANEJA

PRANAV PARLE
211110216
SECTION B
THESIS PROJECT
ARC 511

CONCEPT

"THE HEART OF DECCAN"
TELANGANA

INTRODUCTION ABOUT CLIMATE RESPONSIVE ARCHITECTURE

Climate-responsive architecture is the design of buildings that adapts to local weather patterns to reduce energy use and environmental impact. It prioritizes passive design strategies like **orientation, shading, and natural ventilation**, using features such as local materials, thick walls, and courtyards to maintain comfortable temperatures year-round. This approach makes buildings more sustainable, resilient, and cost-effective by reducing reliance on artificial energy systems.

HISTORICAL HERITAGE


Temple of shiva at Warangal Fort


Thousand Pillar Temple,Warangal


Ramappa Temple,Warangal

Warangal served as the capital of the illustrious Hindu Shaivite Kakatiya dynasty, which governed this region from the 11th to the 14th century A.D. These Telugu rulers presided over a vast territory, encompassing the Golconda region. The Kakatiyas derived their name from their family deity, Goddess Kakati or Durga. They demonstrated exceptional ingenuity in architecture, literature, and engineering, the grandeur of which endures today in the form of scattered ruins cloaked in striking solemnity. Evidence from inscriptions in Warangal suggests that 'Kakatipura' was an alternative name for Warangal prior to the 12th century, from which the Kakatiya dynasty may have originated. The city is referenced in the travel diaries of Marco Polo, the renowned Italian traveler, who describes Warangal in a manner that reflects the cultural and administrative excellence prevalent during the Kakatiya era. The rulers of the Kakatiya dynasty were formidable warriors who held sway over this region for approximately 200 years. They were ardent patrons of the arts, leaving a significant legacy in their ancient capital and its environs. These Kakatiya kings were prolific builders, during whose reign the Chalukyan style of architecture attained its zenith.



CULTURAL HERITAGE

Warangal Dhurries
History: Traces its origins to the Mughal era, inspired by Jainamaaz (prayer rugs). Primarily woven by the Padmasali community.
Characteristics: Geometric and angular patterns, though floral and tribal motifs are also common. Red and blue are dominant colors, balanced with neutral hues.

Telangana's Bidri Craft
History: Bidri, one of India's iconic metal crafts, is prominent in the region of Bidar, close to Hyderabad.
Characteristics: A metal handicraft from Bidar, Karnataka. Involves inlaying silver or brass on a black-coated zinc-copper alloy.





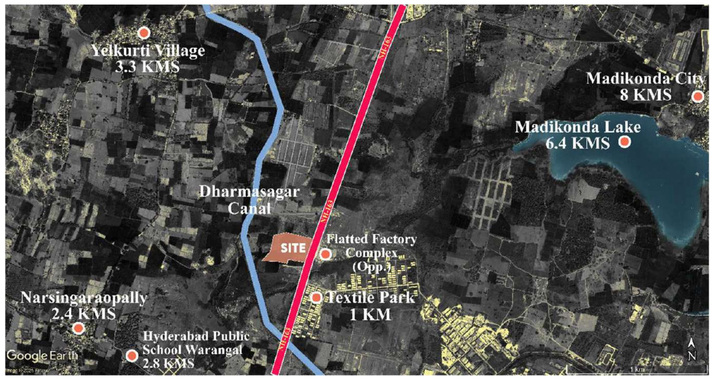




THE PROBLEM

INFRASTRUCTURE VOID

Narrative: Warangal stands at a critical threshold. While rich in heritage and emerging as an IT hub, the city suffers from a disconnect.
It lacks the MICE (Meetings, Incentives, Conferences, Exhibitions) infrastructure required to host the global delegates it aims to attract, forcing a dependency on Hyderabad.
The tourist experience is fragmented, with heritage sites isolated on the periphery.



Response: The site, located strategically at Madikonda on the Hyderabad-Warangal axis (NH 163),acts as an *Urban Interceptor*—a hub that captures business traffic before it leaks out of the city.

THE STRATEGY

ACTIVITY BASED PROGRAMMING

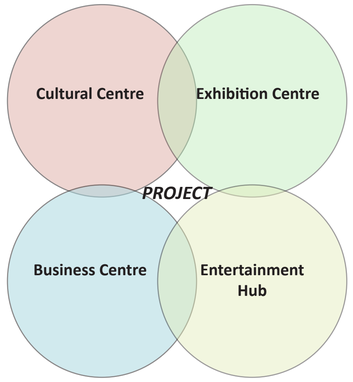
Narrative: To serve the 24/7 dynamic of the IT Park and the seasonal surge of tourism, the project functions are segregated yet interconnected. The project is anchored by central hub for MICE facilties which is divided into four distinct zones:

A Business Centre: High-tech meeting environments

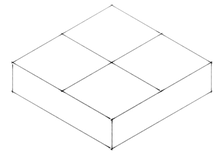
A Cultural Centre: For heritage Integration

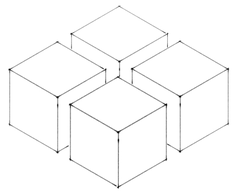
An Exhibition Centre: Large-span flexible space

An Entertainment Hub: For leisure and retail integration



FORM DELVELOPMENT


BASE FORM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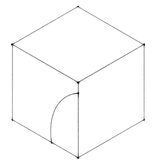
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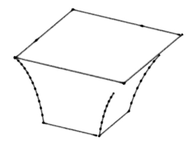
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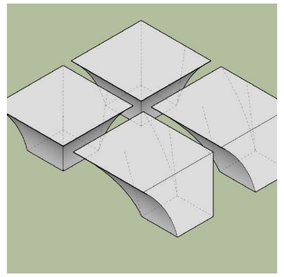
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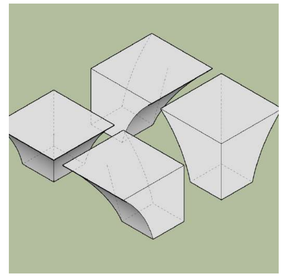
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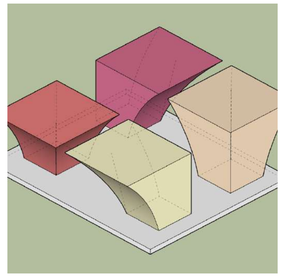
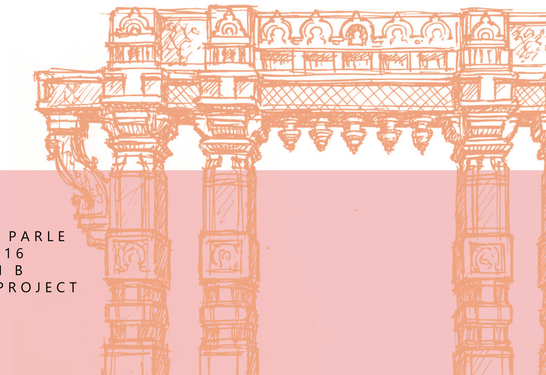

FINAL FORM



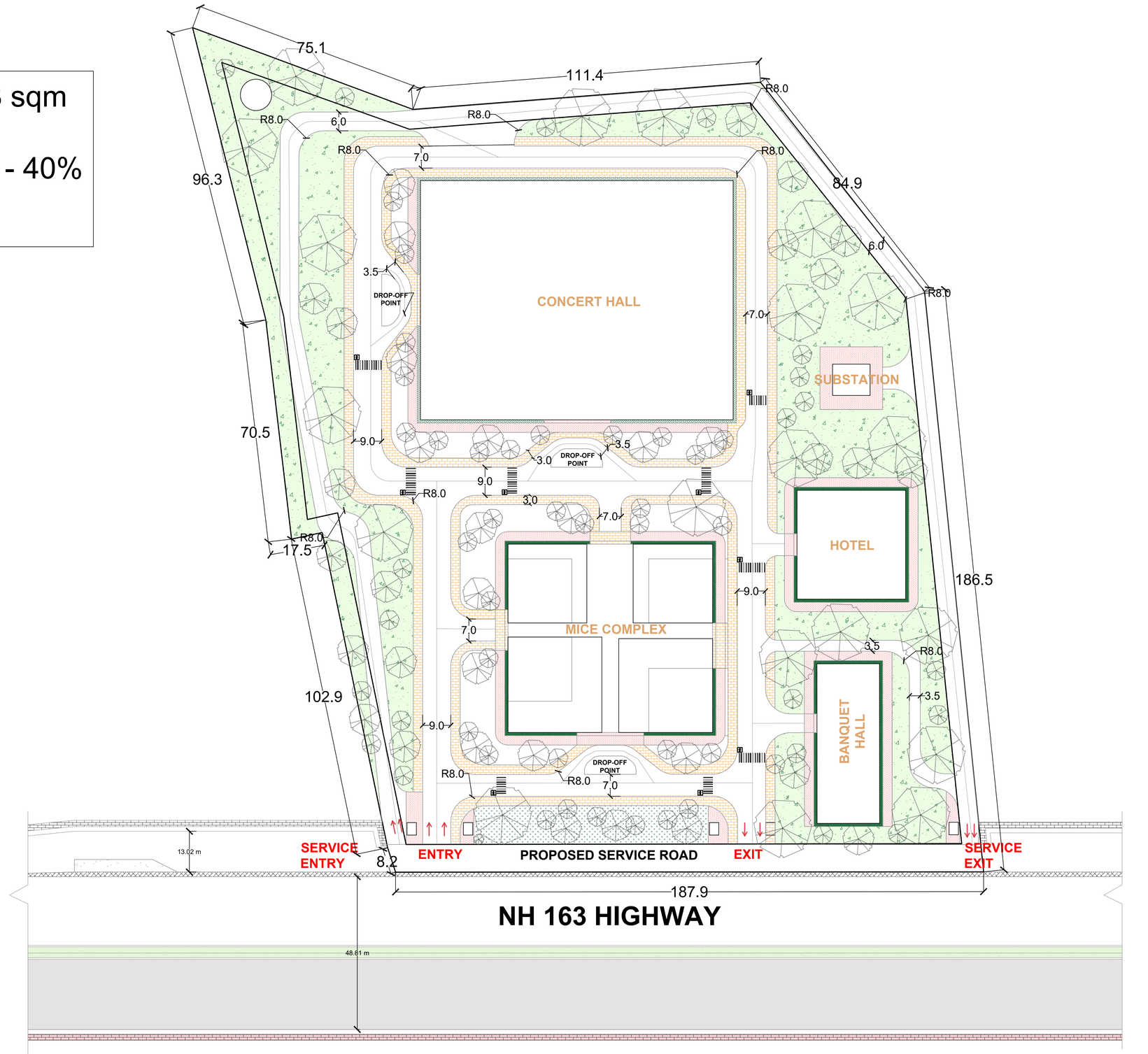
INTERNATIONAL CONVENTION CENTRE WARANGAL

TELANGANA

UNDER THE GUIDANCE OF DR. SONIA TANEJA

PRANAV PARLE
211110216
SECTION B
THESIS PROJECT
ARC 511

Total area- 40468 sqm
FAR - 1.2
Ground coverage - 40%
Actual GC - 33%



Note -
All Dim in meters.
Scale - 1:500

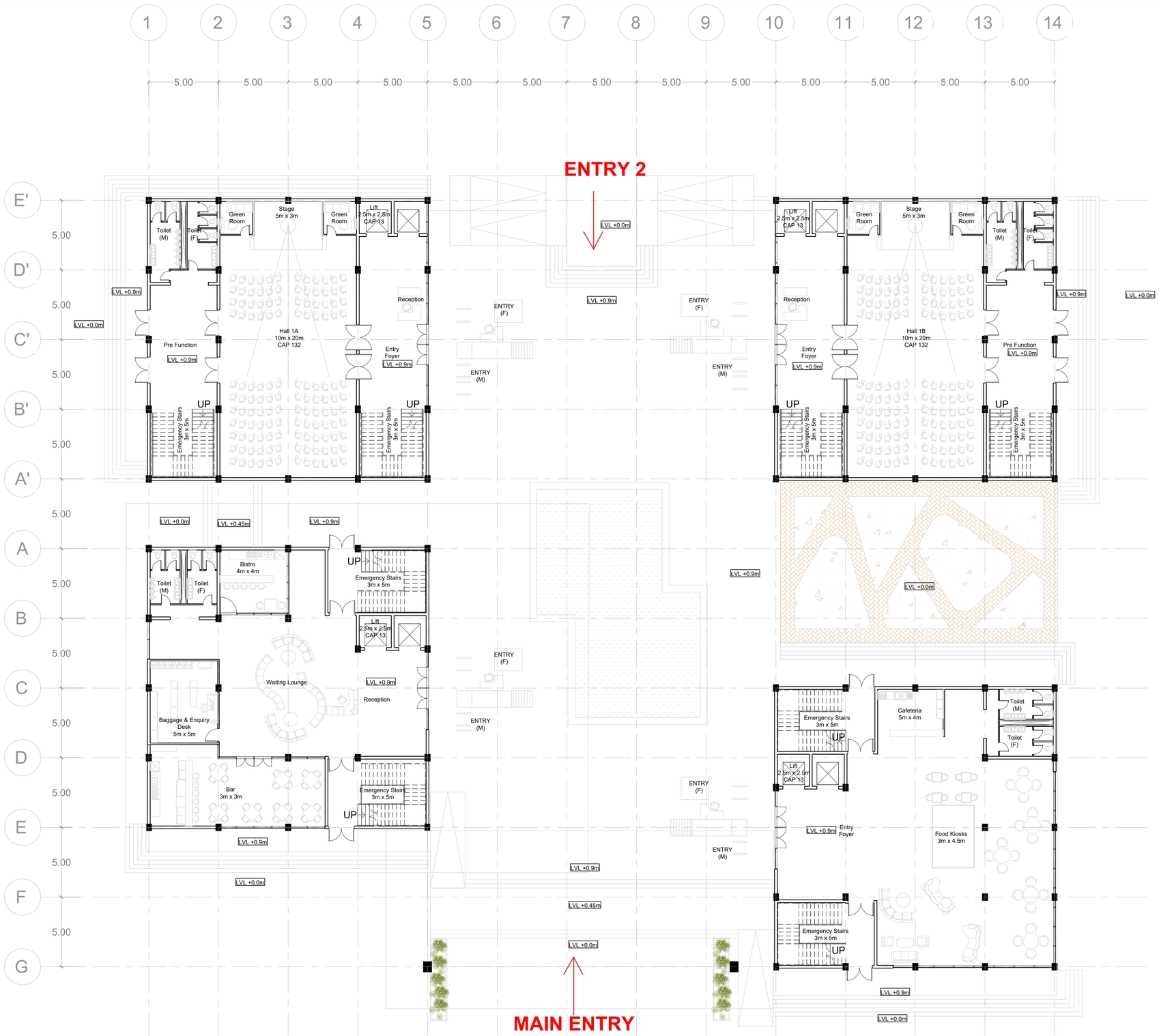
N

SITE PLAN

INTERNATIONAL CONVENTION CENTRE, WARANGAL, TELANGANA

Name - Pranav Parle
Scholar no - 211110216
Thesis ARC 511
Guided by - Dr. Sonia Taneja

Sheet No.



Note -
All Dim in meters.
Scale - 1:100

N

MICE COMPLEX

Ground floor

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Thesis ARC 511
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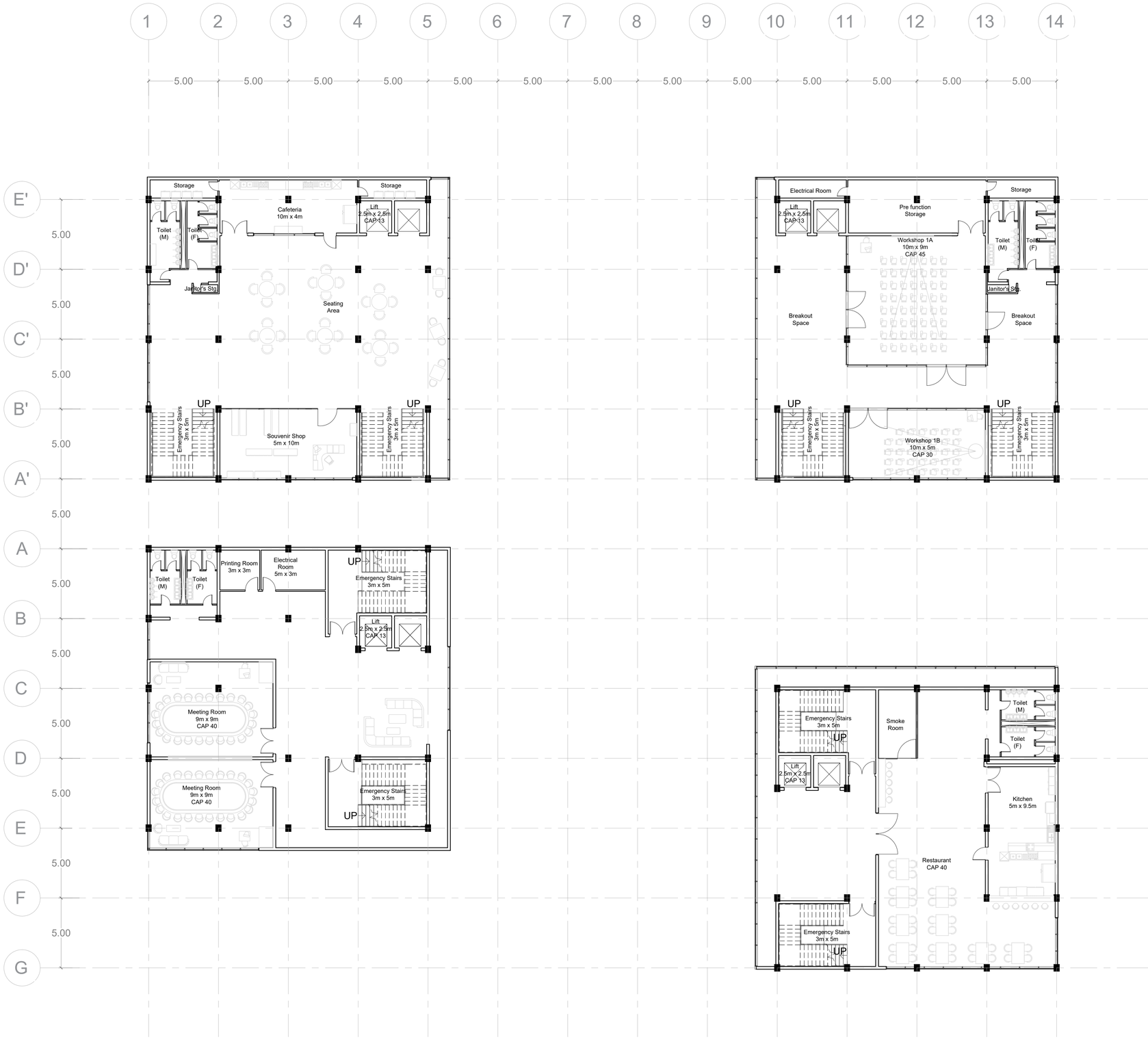
Sheet No.



Note -
All Dim in meters.
Scale - 1:100

N

MICE COMPLEX

First floor

INTERNATIONAL CONVENTION CENTRE, WARANGAL, TELANGANA

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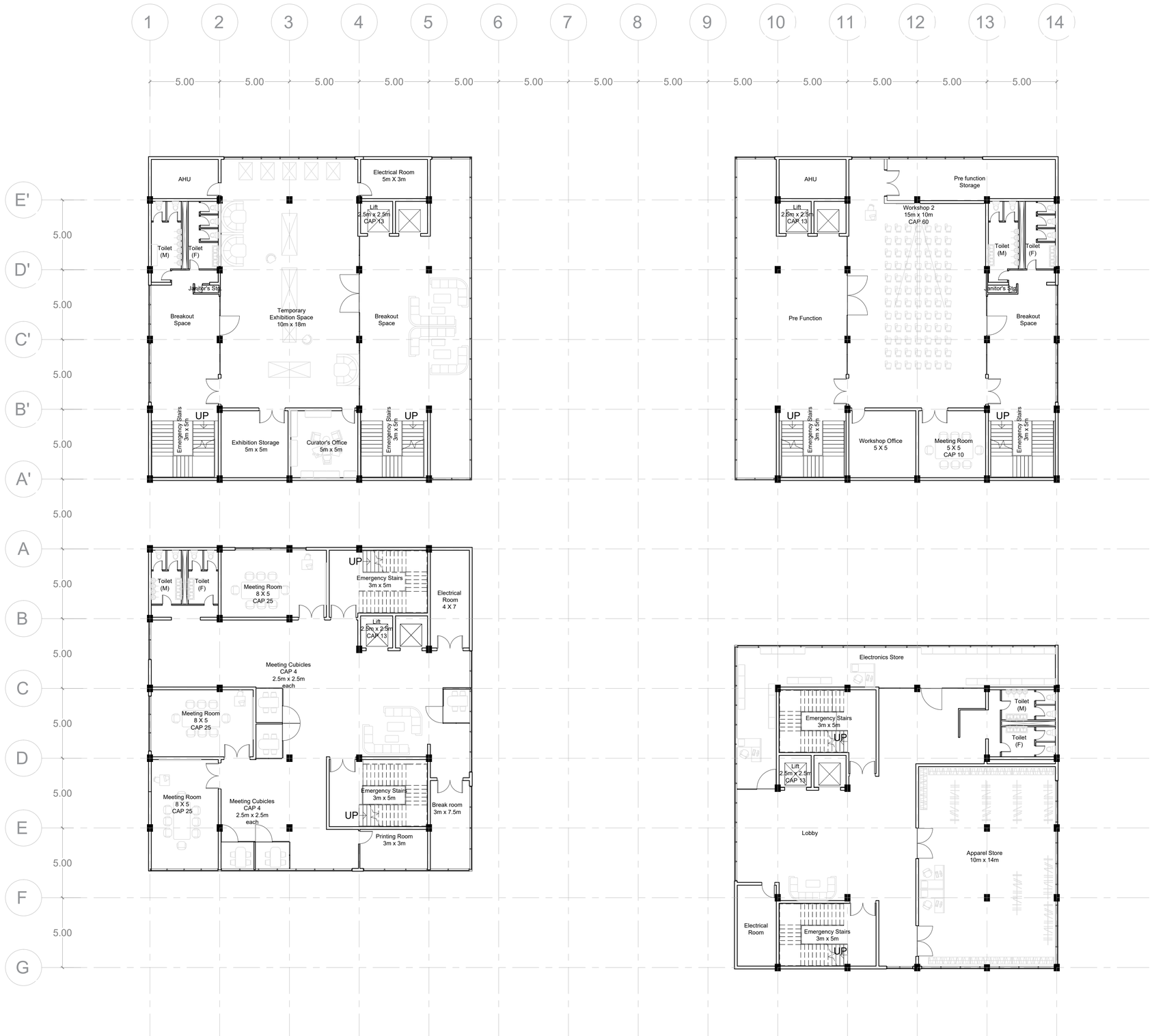
Sheet No.



Note -
All Dim in meters.
Scale - 1:100

N

MICE COMPLEX

Second floor

INTERNATIONAL CONVENTION CENTRE, WARANGAL, TELANGANA

Name - Pranav Parle
Scholar no - 211110216
Thesis ARC 511
Guided by - Dr. Sonia Taneja

Sheet No.



Note -
All Dim in meters.
Scale - 1:100

N

MICE COMPLEX

Third floor

INTERNATIONAL CONVENTION CENTRE, WARANGAL, TELANGANA

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Scholar no - 211110216
Thesis ARC 511
Guided by - Dr. Sonia Taneja

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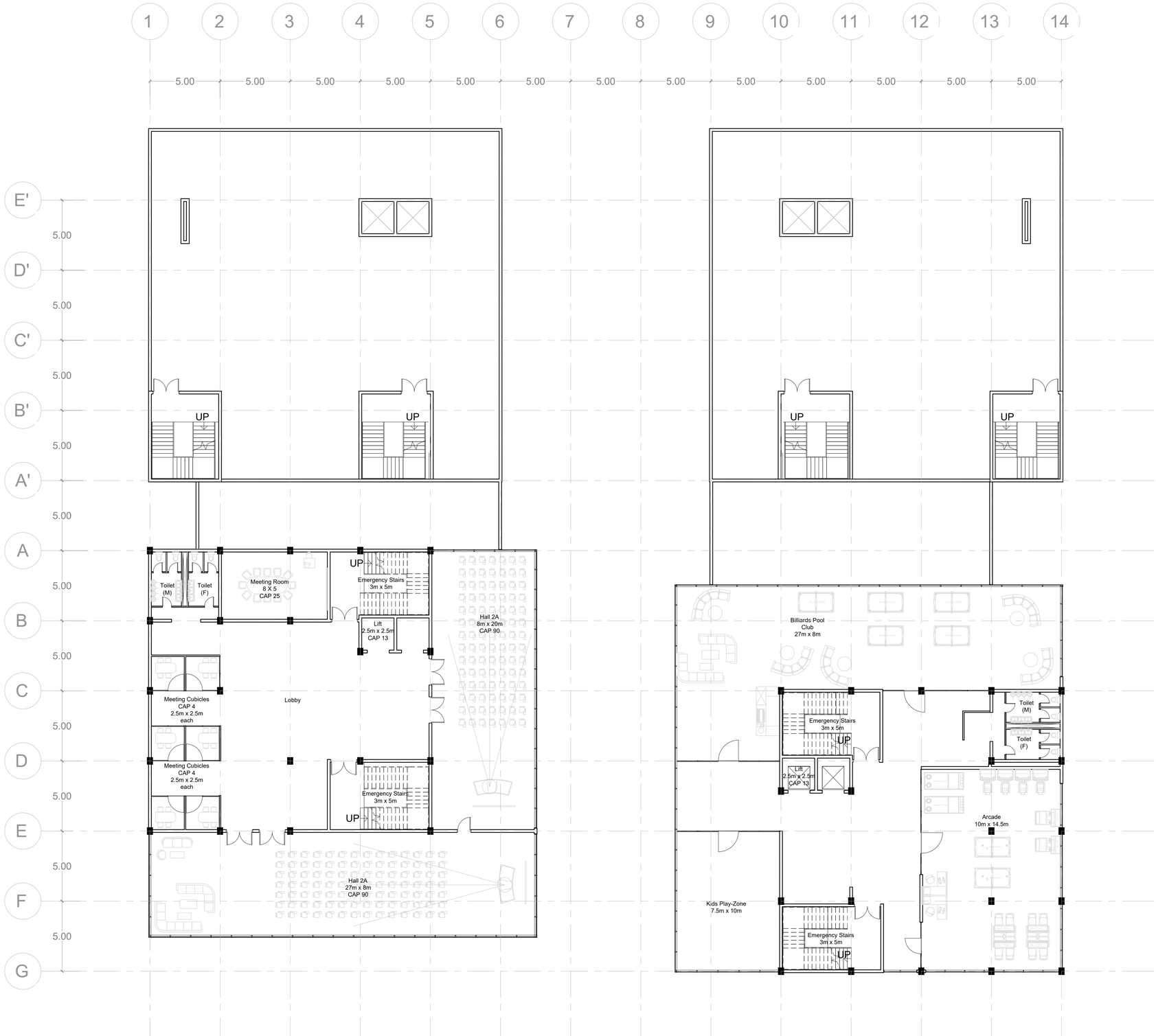

Note -
All Dim in meters.
Scale - 1:100

N

MICE COMPLEX

Fourth floor

INTERNATIONAL CONVENTION CENTRE, WARANGAL, TELANGANA

Name - Pranav Parle
Scholar no - 211110216
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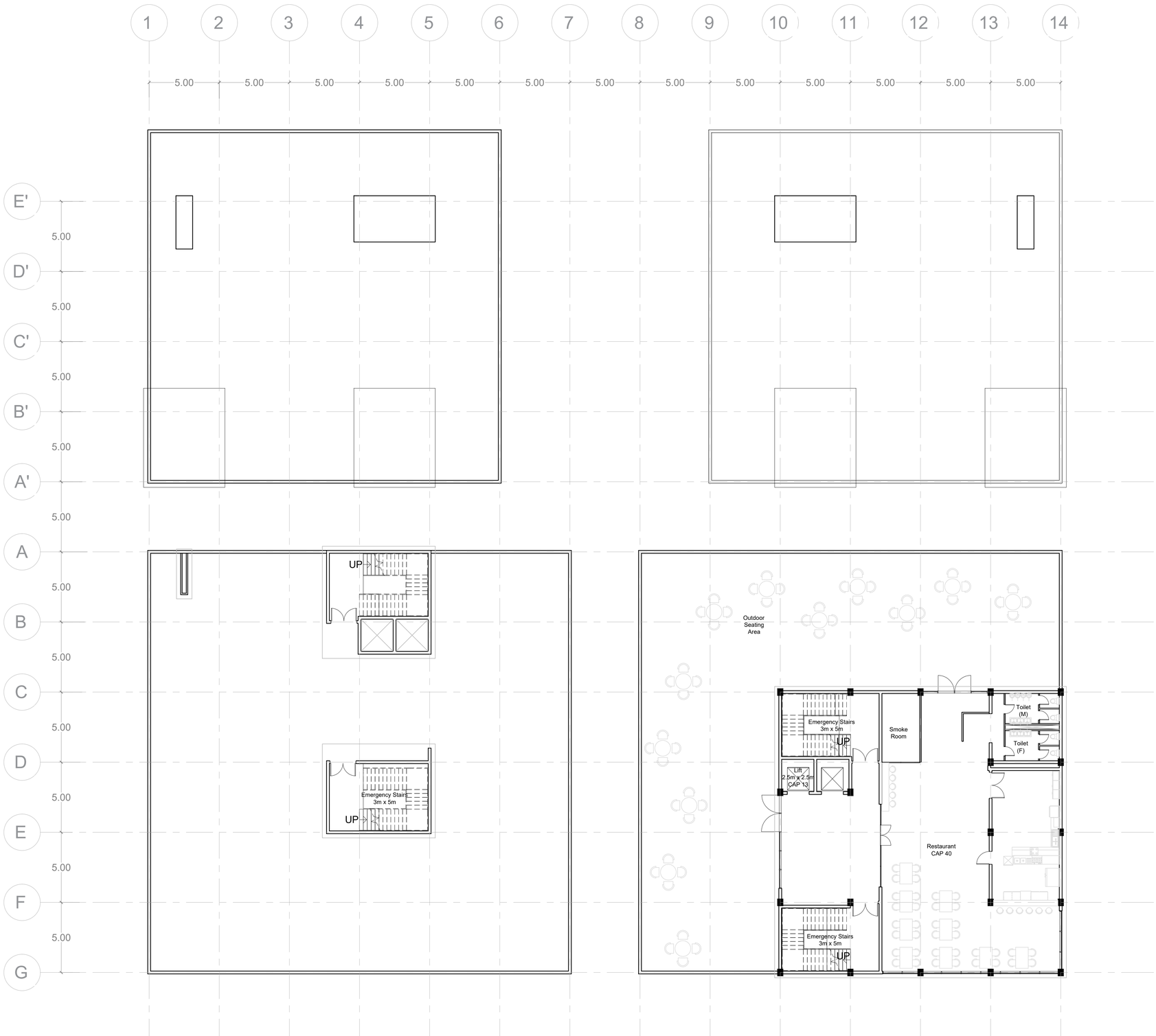
Sheet No.



Note -
All Dim in meters.
Scale - 1:100

N

MICE COMPLEX

Fifth floor

INTERNATIONAL CONVENTION CENTRE, WARANGAL, TELANGANA

Name - Pranav Parle
Scholar no - 211110216
Thesis ARC 511
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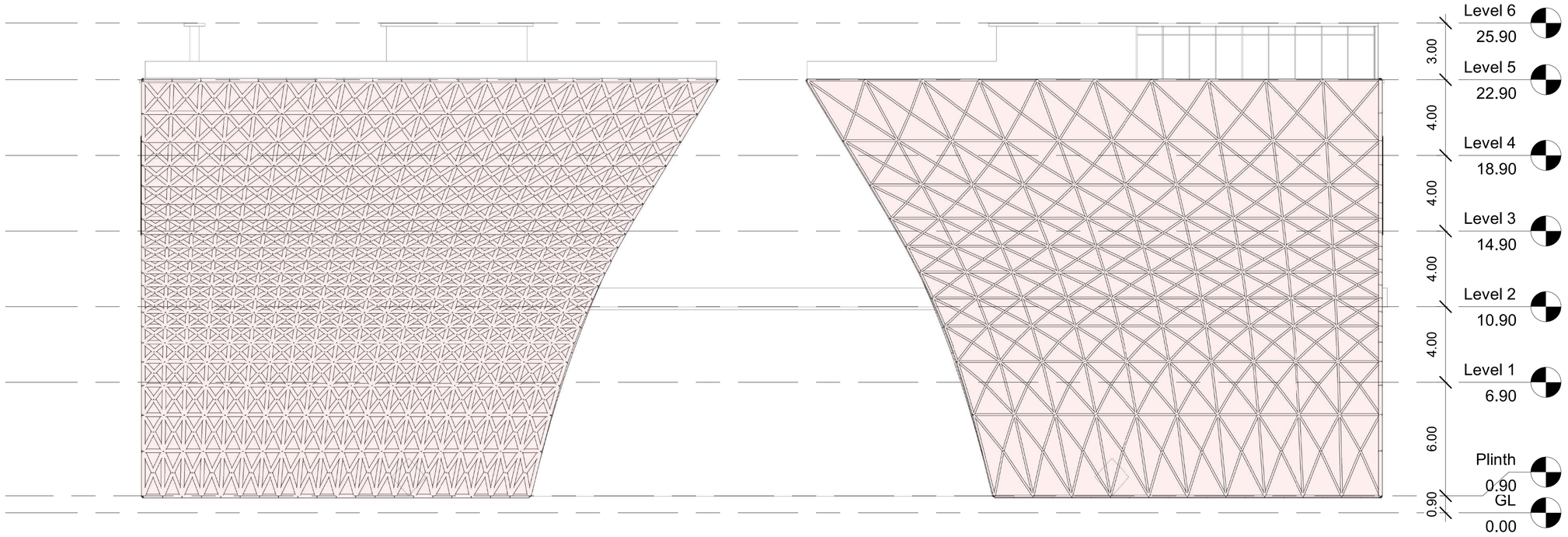
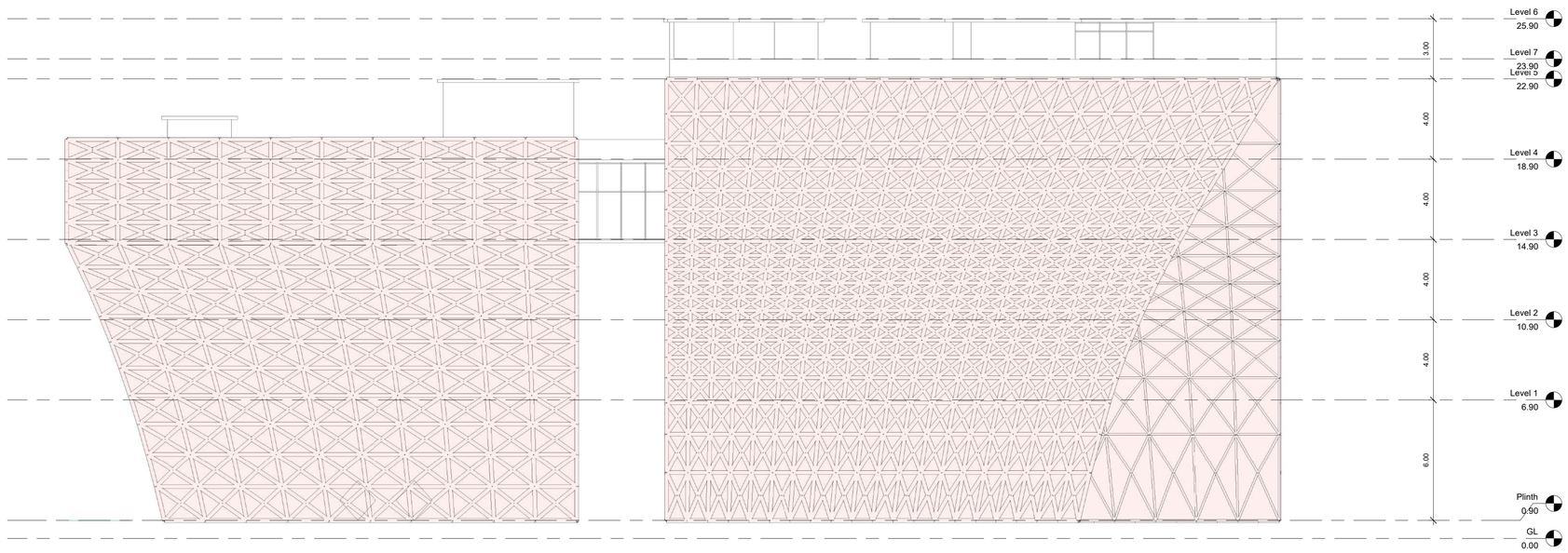
Sheet No.



FRONT ELEVATION



WEST ELEVATION

Note -
All Dim in meters.
Scale - 1:100

N

MICE COMPLEX

Elevations

INTERNATIONAL CONVENTION CENTRE, WARANGAL, TELANGANA

Name - Pranav Parle
Scholar no - 211110216
Thesis ARC 511
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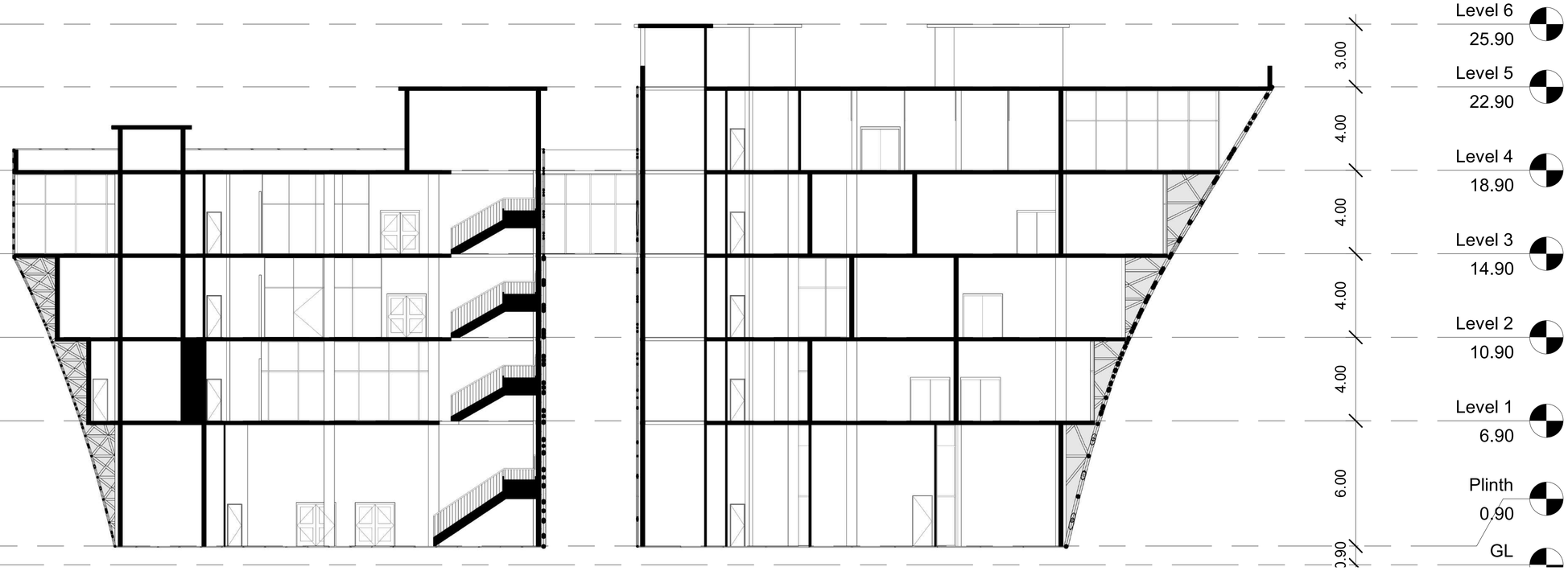
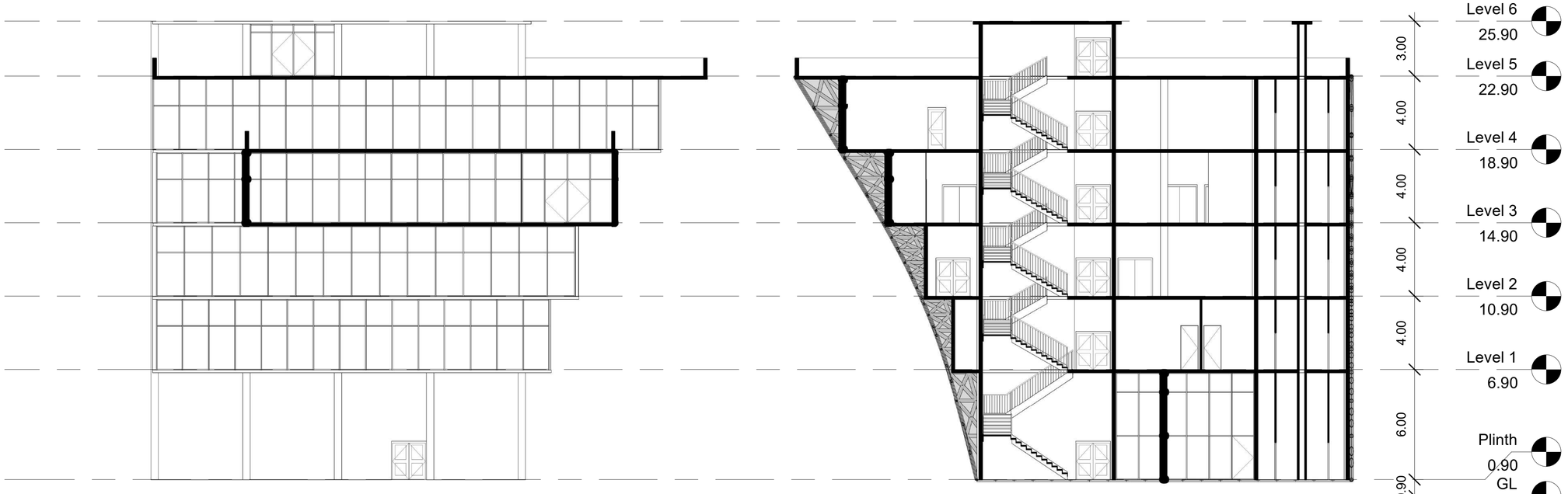
Sheet No.



SECTION AA



SECTION BB

Note -
All Dim in meters.
Scale - 1:100

N

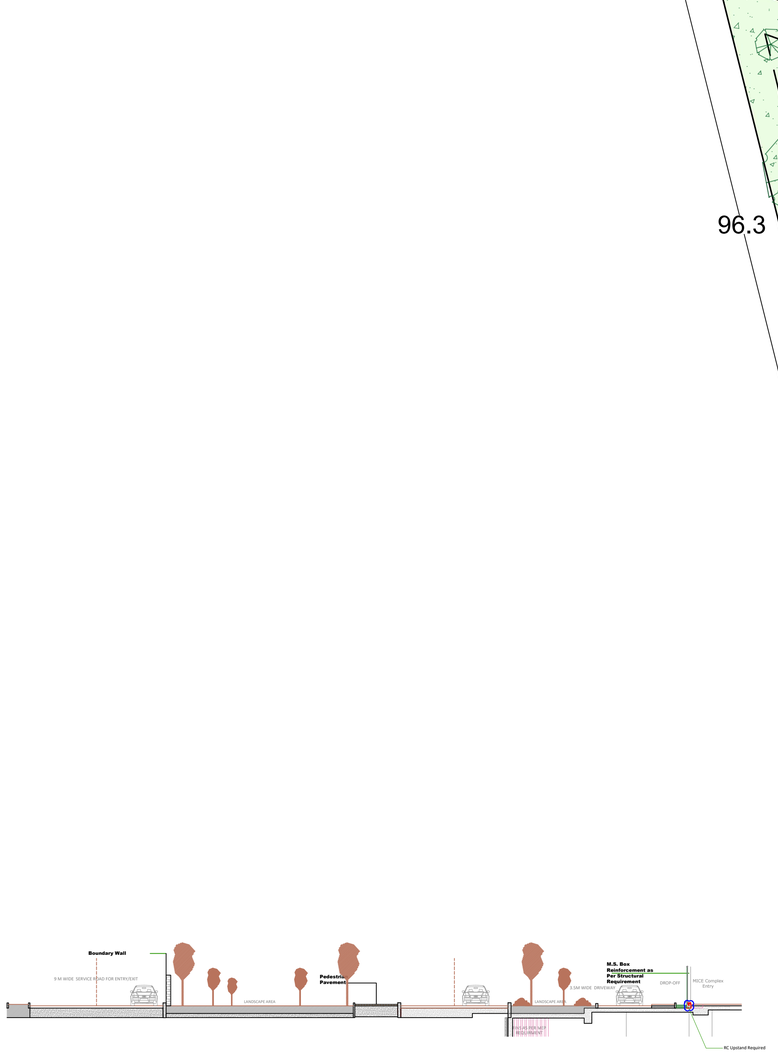
MICE COMPLEX

Sections

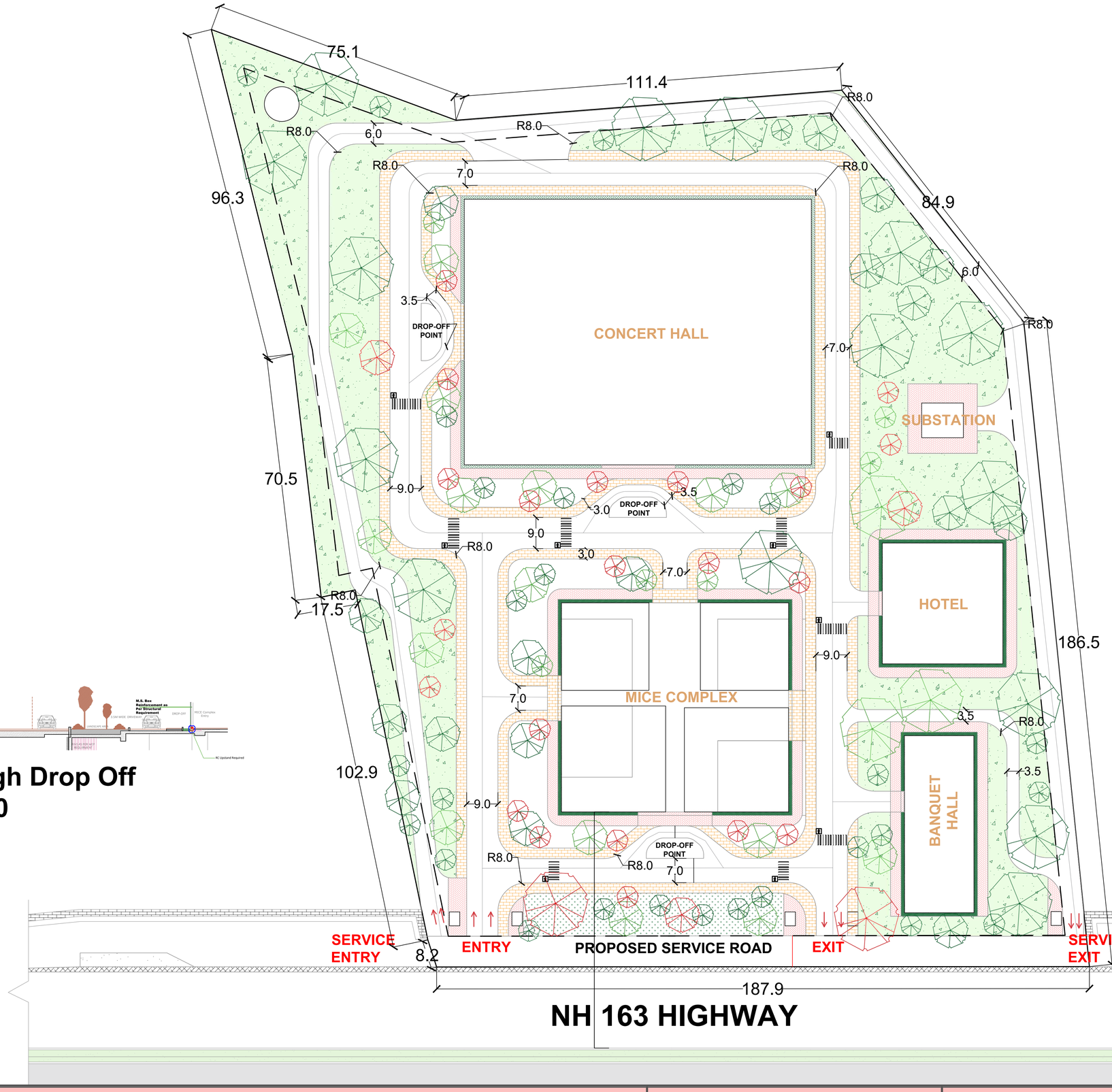
INTERNATIONAL CONVENTION CENTRE, WARANGAL, TELANGANA

Name - Pranav Parle
Scholar no - 211110216
Thesis ARC 511
Guided by - Dr. Sonia Taneja

Sheet No.



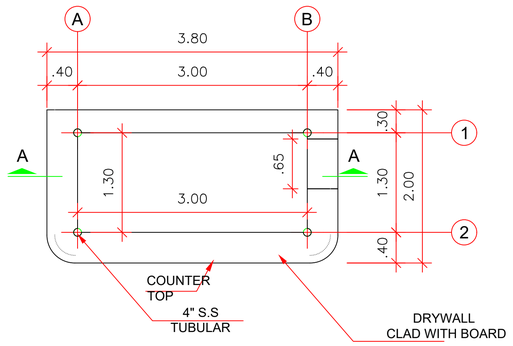
Section Through Drop Off
1:200



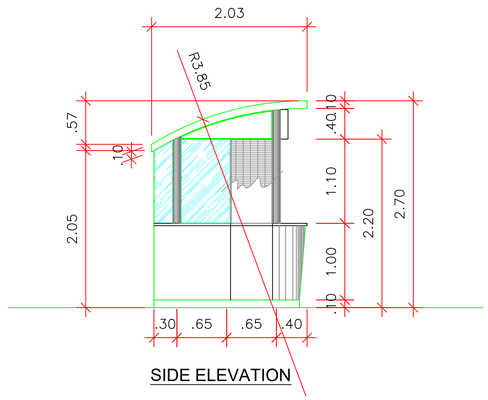
LEGENDS

- Evergreen Species
- Ornamental Species
- Fragrant Species

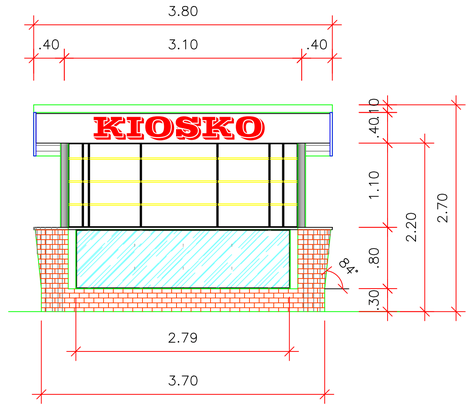
Note - All Dim in meters. Scale - 1:500	N	**LANDSCAPING DETAILS**	INTERNATIONAL CONVENTION CENTRE, WARANGAL, TELANGANA	**Name** - Pranav Parle **Scholar no** - 211110216 Thesis ARC 511 **Guided by** - Dr. Sonia Taneja	Sheet No.



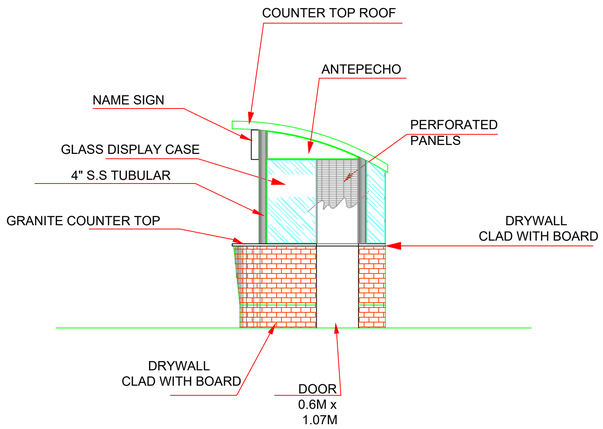
PLAN



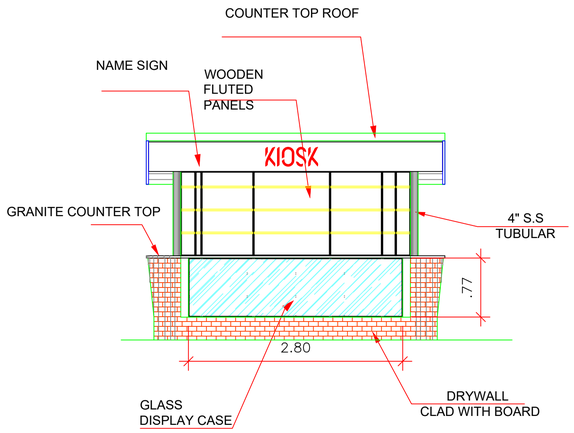
SIDE ELEVATION



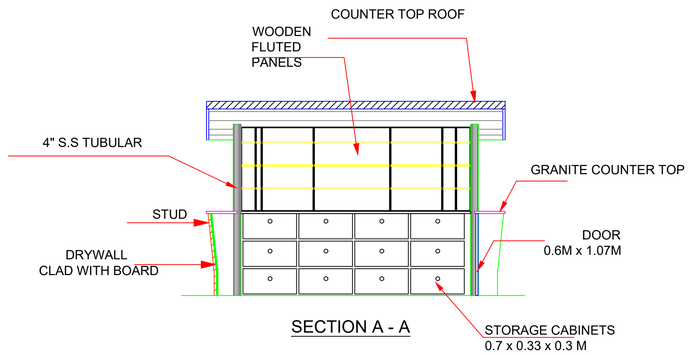
FRONT ELEVATION



FINISHING DETAILS



FINISHING DETAILS



SECTION A - A



RENDER

Note -
All Dim in meters.
Scale - 1:100

N

INTERIOR DETAILS
COFFEE KIOSK

INTERNATIONAL CONVENTION CENTRE, WARANGAL, TELANGANA

Name - Pranav Parle
Scholar no - 211110216
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