Reimagining Cricket Stadium as Multi-Functional Urban Spaces Integrating Public Life in BHEL Township Bhopal

Shruti M. Margade[1], Ar. Shruti Likhitkar[2]
[1]*Student, Sipna School of Planning and Architecture, Amravati, India*
[2]*Professor, Sipna School of Planning and Architecture, Amravati, India*

***Abstract*—The contemporary evolution of sports infrastructure demands a shift from single-use stadiums to multifunctional urban assets. This research explores how cricket stadiums can be reimagined as dynamic public spaces that foster social, cultural, and economic activity. Using the BHEL Township as a case study, the paper proposes a framework for integrating a cricket stadium into everyday urban life. The study investigates spatial strategies, urban integration, and programmatic layering to transform stadiums into active civic hubs rather than event-based infrastructures.**

***Index Terms*—Cricket Stadium, Architecture, Bhopal, Design.**

I. INTRODUCTION

Cricket stadiums in India have traditionally functioned as mono-functional venues, activated only during matches. However, increasing urban density and land scarcity necessitate multi-functional use of large-scale infrastructure.

The BHEL Township—a planned industrial township with residential, institutional, and recreational facilities—presents an opportunity to rethink underutilized land and sports infrastructure into a vibrant public realm. The township spans approximately 20 km² and already includes parks, community facilities, and social infrastructure.

II. AIM

To develop a design framework for transforming cricket stadiums into multi-functional urban spaces that integrate public life within township environments.

III. OBJECTIVES

- To study the limitations of conventional stadium design
- To explore models of multi-use sports infrastructure
- To analyze urban conditions of BHEL Township
- To propose spatial strategies for integration of public life
- To enhance social interaction, accessibility, and economic viability

IV. SCOPE

The scope of this research is focused on reimagining cricket stadiums as multi-functional urban spaces that extend beyond sports infrastructure and actively contribute to public life within township environments. The study specifically examines the potential of integrating recreational, social, cultural, and commercial functions within a cricket stadium development in the BHEL Township, Bhopal.

The research includes the analysis of existing stadium typologies, urban design principles, and case studies of integrated sports complexes to understand how stadiums can function as year-round public destinations. It further investigates the urban structure, land-use patterns, mobility systems, and community needs of the BHEL Township to identify opportunities for redevelopment and public engagement.

V. METHODOLOGY

The methodology adopted for this research is based on a qualitative and design-oriented approach that combines literature study, case study analysis, site investigation, and conceptual design development. The study aims to understand how cricket stadiums can evolve into multi-functional urban spaces that integrate public life within township environments.

1. Research Approach

The research follows a sequential methodology consisting of:

- Literature review
- Case study analysis
- Site analysis
- Comparative evaluation
- Conceptual framework development
- Design proposal formulation

2. Literature Study

The first stage involves reviewing existing literature related to:

- Evolution of stadium architecture
- Multi-functional sports infrastructure
- Urban public spaces and placemaking
- Township planning principles
- Integrated recreational developments

Research papers, journals, books, online articles, and architectural publications are referred to in order to establish theoretical understanding and identify contemporary trends in stadium design

3. Case Study Analysis

Relevant national and international case studies are analyzed to understand:

- Spatial organization
- Public integration strategies
- Circulation systems
- Mixed-use programming
- Economic and social activation

The case studies help identify successful design principles that can be adapted to the context of BHEL Township, Bhopal.

Parameters considered include:

- Accessibility
- Land-use integration
- User engagement
- Open space planning
- Functional zoning
- Sustainability features

4. Site Analysis

The selected site at BHEL Township, Bhopal is studied through:

- Existing land-use analysis
- Connectivity and circulation mapping
- Climatic conditions
- Green cover and open spaces
- Existing infrastructure and public amenities
- Demographic and community patterns

The analysis helps in identifying the strengths, weaknesses, opportunities, and constraints of the site.

5. Comparative Study

A comparative analysis is conducted between conventional stadium models and contemporary multi-functional sports complexes to evaluate:

- Efficiency of land utilization
- Public accessibility
- Urban integration
- Revenue generation potential
- Community engagement

This comparison establishes the need for transforming mono-functional stadiums into active urban infrastructures.

6. Concept Development

Based on the findings from literature studies, case studies, and site analysis, a conceptual framework is developed focusing on:

- Stadium as an urban catalyst
- Layered zoning systems
- Radial circulation networks
- Permeable public edges
- Landscape integration
- Multi-level public interaction spaces

Conceptual diagrams and zoning strategies are prepared to support the design approach.

7. Design Proposal

The final stage includes preparation of a conceptual master plan for the proposed cricket stadium development in BHEL Township. The proposal integrates:

- Sports infrastructure

- Public plazas and parks
- Commercial and cultural activities
- Pedestrian and cycling networks
- Community-oriented recreational spaces

The design proposal demonstrates how stadium infrastructure can function as a vibrant urban node throughout the year.

8. Outcome of Research

The methodology aims to generate:

- A strategic framework for multi-functional stadium planning
- Urban design guidelines for integrating public life with sports infrastructure
- A conceptual redevelopment model for BHEL Township, Bhopal
- Recommendations for future stadium developments in urban India

VI. BASIC AMENITIES IN TOURIST PLACES

Following are the major basic amenities taken into consideration in this research:

1. Sanitation Facilities

Sanitation facilities include public toilets and washrooms which are required for hygiene and maintenance of public health. It is required that enough sanitary installations are available in the destination place, especially when large crowds are expected.

2. Drinking Water Facility

Access to clean drinking water is very important for tourists. There should be enough water points available for tourists' consumption

3. Parking Facility

Parking facility is a must-have facility to facilitate the movement of vehicles in and out of the destination. It is important for reducing congestion.

4. Seating Arrangements

The purpose of seating arrangement is to create resting areas for visitors including old and families. It is one of the factors that enhance visitor's experiences.

5. Signage System

The sign system includes direction boards and information signs to facilitate the movement and navigation of visitors through the destination site.

6. Accessibility

Accessibility entails creating a destination site where tourists of all sorts can move freely and comfortably.

VII. LITERATURE REVIEW

7.1. Evolution of Stadium Design

Modern stadiums are transitioning from isolated structures to urban anchors. Large-scale developments such as sports districts demonstrate integration of stadiums with public landscapes and community amenities. For instance, sports precincts in India are being planned as urban parks combined with event infrastructure, promoting year-round.

7.2. Multi-Functional Sports Complexes

Examples like the Bharat Heavy Electrical Ltd Sports Complex show early forms of multi-purpose usage, hosting cricket, football, and other sports. However, these lack integration with daily urban life.

Similarly, large sports complexes in Bhopal combine multiple facilities (athletics, hockey, indoor sports), indicating a trend toward programmatic diversity.

7.3. Urban Design and Public Realm Integration

Contemporary urban design emphasizes:

- Walkability
- Mixed-use programming
- Open public spaces
- Social interaction zones

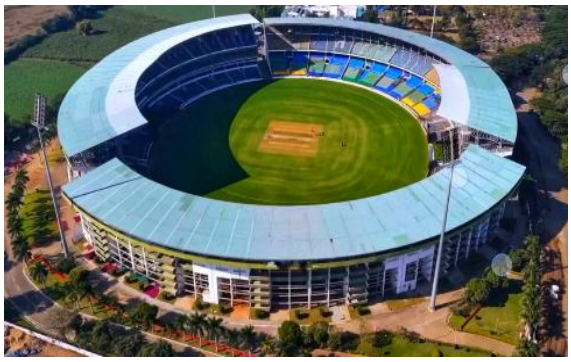
Township models demonstrate how integrated planning can create self-sufficient communities with shared public infrastructure.

VIII. CASE STUDY

A. Vidarbha Cricket Association Stadium, Nagpur, Maharashtra, India.

8.1 Live Case Study: Vidarbha Cricket Association Stadium
The Vidarbha Cricket Association Stadium, located at Jamtha, Nagpur, is a contemporary cricket stadium designed by Shashi Prabhu and inaugurated in 2008. Spread across approximately 33 acres with a seating capacity of around 45,000 spectators, the stadium demonstrates the evolution of sports infrastructure from conventional venues to integrated public facilities.

8.2 Relevance to the Research
The case study highlights how modern cricket stadiums can function as multi-functional urban spaces through the integration of hospitality, recreation, and public-oriented amenities. It supports the research objective of transforming stadiums into active civic hubs connected with everyday urban life.



8.3 Architectural and Planning Features
Key features include:

- Suspended roof structure with unobstructed viewing
- Multiple seating tiers and organized circulation
- Corporate boxes, media facilities, and player amenities
- Efficient crowd movement through radial planning

These planning strategies provide useful references for the proposed stadium development in BHEL Township.

8.4 Public Amenities and Multi-Functional Use Apart from cricket facilities, the stadium includes:

- Clubhouse and recreation spaces
- Restaurants and food courts
- Swimming pool and gymnasium
- Indoor sports facilities

These functions promote year-round activity and increase public engagement beyond match days.\

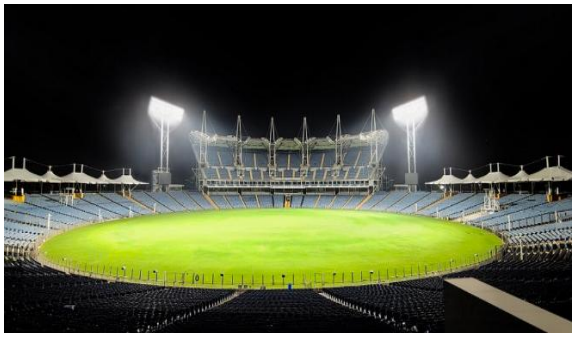
8.5 Circulation and Accessibility The stadium incorporates:

- Multiple entry gates
- Segregated parking systems
- Dedicated circulation for VIPs, media, and public users
- Public transport connectivity

This demonstrates the importance of accessibility and mobility planning in large sports infrastructures.

8.6 Inference
The VCA Stadium successfully combines sports infrastructure with supporting public amenities; however, its activity remains largely event-based. The proposed BHEL Township stadium aims to further strengthen daily public interaction through open spaces, cultural zones, commercial activities, and community-centered urban integration.

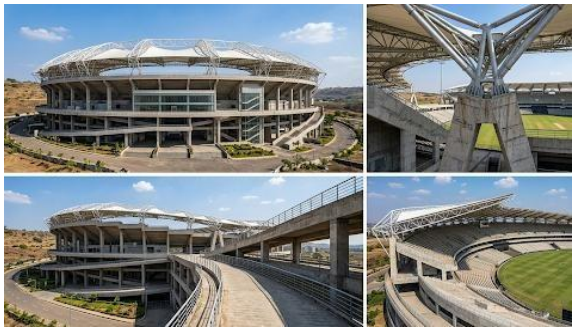
B. Maharashtra Cricket Association Pune, Maharashtra, India.



8.1 Live Case Study: Maharashtra Cricket Association Stadium
The Maharashtra Cricket Association (MCA) Stadium, located at Gahunje, Pune, is a significant example of contemporary cricket stadium design that combines advanced infrastructure, spectator comfort, and environmental integration. Designed by Hopkins Architects, the stadium has a seating capacity of approximately 55,000 spectators and occupies a site area of about 68,655sq.m.

8.2 Relevance to the Research

The stadium demonstrates how modern sports infrastructure can evolve into a multi-functional public environment through improved accessibility, recreational facilities, and integrated urban planning. The project supports the idea of transforming cricket stadiums into active urban spaces that remain functional beyond sporting events.



8.3 Architectural and Planning Features

The stadium incorporates:

- Deep terraced bowl seating with uninterrupted sightlines
- Lightweight tensile membrane roof structure
- Two-tier seating arrangement
- Earthquake-resistant steel-frame system
- Functional separation of pavilion and media zones

The circular geometry and radial planning create efficient circulation and organized crowd movement, which are important spatial strategies for the proposed BHEL Township stadium.

8.4 Public Amenities and Multi-Functional Use

The MCA Stadium includes several public-oriented facilities such as:

- Food courts and beverage stalls
- Accessible design for differently abled users
- Clubhouse and recreational facilities
- Automated turnstiles and security systems
- Museum and visitor experiences

These functions contribute to year-round public engagement and improve the stadium's role as a social and recreational destination rather than only a match venue.

8.5 Sustainability and Site Integration

The stadium demonstrates environmentally responsive design through:

- Efficient drainage systems
- Sand-based turf for quick water management
- Integration with surrounding landscape and hills
- Durable and fire-resistant construction materials

This reflects the importance of landscape integration and sustainable infrastructure in large-scale sports developments.

8.6 Circulation and Accessibility

The project incorporates:

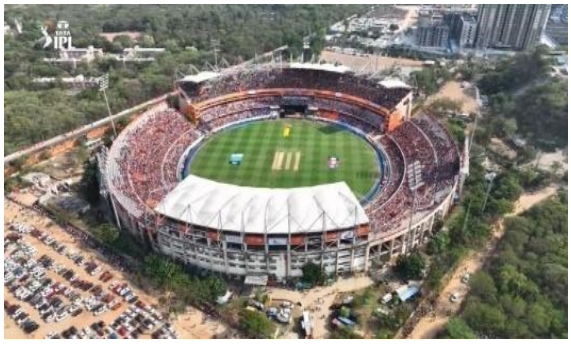
- Multiple entry gates and organized parking systems
- Separate circulation for VIPs and general spectators
- Connectivity to major city roads and transport networks
- Location within a non-congested development zone

These mobility strategies highlight the significance of accessibility and traffic management in designing public sports infrastructure.

8.7 Inference

The MCA Stadium successfully integrates structural innovation, spectator facilities, and environmental responsiveness. However, its activity remains largely centered around event days. The proposed BHEL Township stadium aims to extend this approach further by incorporating public plazas, cultural spaces, mixed-use activities, and community-oriented landscapes that activate the site throughout the year.

C. Rajiv Gandhi International Cricket Stadium, Uppal, Hyderabad, Telangana, India.



1. Relevance to the Research

The BHEL Township case study is relevant to the research as it demonstrates the potential of transforming sports infrastructure into an integrated urban public space. The township's existing

residential, recreational, and institutional framework provides an ideal setting for developing a cricket stadium that supports community interaction, economic activity, and year-round public engagement rather than functioning only during sports events.

2.Architectural and Planning Features

The proposed framework positions the stadium as a central urban node connected with surrounding public spaces through radial planning. The design follows a layered zoning system:

- Inner Core: Cricket stadium and seating
- Middle Ring: Indoor sports and semi-public facilities
- Outer Ring: Parks, plazas, and commercial zones

The proposal also emphasizes permeable edges, landscape-oriented planning, radial circulation, and mixed-use integration to create a seamless relationship between sports infrastructure and everyday urban life.

3. Public Amenities and Multi-Functional Use

The proposal transforms the stadium into a multifunctional civic destination by integrating:

- Public plazas and parks
- Food courts and retail streets
- Exhibition galleries and amphitheaters
- Jogging and cycling tracks
- Community gathering and recreational spaces

The stadium supports sports, cultural activities, recreation, commerce, and public events, ensuring continuous activation and increased community participation throughout the year.

4. Sustainability and Site Integration

The design promotes sustainable urban development through:

- Green corridors and landscaped open spaces
- Water-sensitive planning and rainwater management
- Adaptive reuse of underutilized township land
- Walkable and environmentally responsive public spaces

The proposal integrates harmoniously with the existing township structure while enhancing environmental quality and reducing urban heat island effects.

5. Circulation and Accessibility

The framework prioritizes pedestrian-friendly and accessible movement systems through:

- Wide shaded walkways
- Dedicated cycle tracks
- Radial circulation networks
- Public transport connectivity
- Event-based traffic management strategies

The design ensures smooth connectivity between stadium functions, public spaces, and township infrastructure while encouraging barrier-free accessibility for all users.

6. Inference

The study concludes that cricket stadiums can evolve into multifunctional urban infrastructures that actively contribute to social, economic, and environmental development. By integrating sports, recreation, commerce, and public spaces, the proposal demonstrates how stadiums can become year-round civic destinations that strengthen community life, urban identity, and sustainable township development.

IX. CONCLUSION

In conclusion, this research demonstrates that cricket stadiums must transition from isolated event venues into multifunctional urban anchors. Analysis of the MCA, Rajiv Gandhi, and VCA stadiums reveals that integrating diverse programs—including clubhouses, commercial event spaces, and public-oriented amenities —ensures year-round activation. Structural innovations, such as MCA's tensile membrane and VCA's suspended roof, enhance the spectator experience while supporting complex urban needs. By adopting radial circulation and layered zoning, these structures become sustainable civic nodes. Ultimately, this framework reimagines stadiums as vibrant public spaces that strengthen community identity and economic viability within township environments.

ACKNOWLEDGMENT

I would like to express my sincere gratitude to Sipna School of Planning and Architecture, Amravati, for providing me with the opportunity and resources to undertake this research study.

I am deeply thankful to Prof. Shruti Likhitkar for their valuable guidance, academic support, and continuous encouragement throughout the course of this research. Their insights and suggestions have greatly contributed to the successful completion of this work. I also extend my gratitude to all those who directly or indirectly supported me during this study and helped me learn and grow.

REFERENCES

[1] https://en.wikipedia.org/wiki/Maharashtra_Cricket_Association_Stadium
[2] https://www.vca.co.in/pages/history-of-vca
[3] https://www.bcci.tv/
[4] https://www.espncricinfo.com/cricket-grounds/rajiv-gandhi-international-stadium-uppal-hyderabad-58142
[5] https://www.espncricinfo.com/cricket-grounds/country/india-6
[6] https://en.wikipedia.org/wiki/List_of_international_cricket_grounds_in_India
[7] https://www.iplt20.com/venues
[8] https://en.wikipedia.org/wiki/BHEL_Township,_Bhopal
[9] https://en.wikipedia.org/wiki/BHEL_Township,_Bhopal
[10] https://www.accuweather.com/en/in/bhopal/204408/weather-forecast/204408
[11] https://krishisanskriti.org/vol_image/03Jul201501071018.pdf
[12] https://en.wikipedia.org/wiki/Bhopal
[13] https://grokipedia.com/page/bhel_township_bhopal
[14] https://www.scribd.com/document/575127824/LITERATURE-STUDY-OF-CRICKET-STADIUM
[15] https://issuu.com/akhilmanikyam/docs/international_cricket_stadium_-_akhil_manikyam_-_p/s/20901621
[16] https://en.wikipedia.org/wiki/BHEL_Township%2C_Bhopal?utm_source=chatgpt.com
[17] (Arch https://www.archdaily.com/1039076/bdp-cox-architecture-and-collage-design-unveil-a-sports-district-around-the-worlds-largest-stadium-in-india Daily).
[18] https://en.wikipedia.org/wiki/Bharat_Heavy_Electrical_Ltd_Sports_Complex?utm_source=chatgpt.com
[19] https://en.wikipedia.org/wiki/Bharat_Heavy_Electrical_Ltd_Sports_Complex?utm_source=chatgpt.com
[20] https://inidesignstudio.com/portfolio/bhopal sports-complex/?utm_source=chatgpt.com
[21] https://www.ccba.in/project/lodha belmondo?utm_source=chatgpt.com
[22] https://www.ccba.in/project/lodha-belmondo?utm_source=chatgpt.com
[23] https://www.facebook.com/Indiancricketstadiums/posts/vca-stadium-nagpur-is-getting-ready-to-host-the-odi-match-scheduled-to-host-on-6/1130637272395657/
[24] https://www.facebook.com/Indiancricketstadiums/posts/drone-view-of-beautiful-rajiv-gandhi-international-cricket-stadium-%EF%B8%8F-it-looks-bi/1178076700985047/