

PLANNING FOR TOURISM DEVELOPMENT IN A TOWN: A CASE STUDY OF OMKARESHWAR, MADHYA PRADESH

Bachelor of Planning

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**PLANNING FOR TOURISM DEVELOPMENT IN A TOWN: A
CASE STUDY OF OMKARESHWAR, MADHYA PRADESH
PLANNING THESIS**

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DECLARATION

I **RAGHAVENDRA PARIHAR** Scholar No **2211002127** hereby declare that the thesis titled Planning for Tourism Development in a town Case study of Omkareshwar Madya Pradesh submitted by me in partial fulfilment for the award of degree of Bachelor of Planning, at Maulana Azad National Institute of Technology, Bhopal, India, is a record of Bonafide work carried out by me. The matter/result embodied in this thesis has not been submitted to any other University or Institute for the award of any degree or diploma.



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CERTIFICATE

This is to certify that the declaration made by **RAGHAVENDRA PARIHAR** is true to the best of my knowledge and that the student has worked under my guidance for one semester in preparing this thesis.

RECOMMENDED



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ACCEPTED

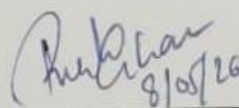

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ABSTRACT

This study, titled *“Planning for Tourism Development in a Town: A Case Study of Omkareshwar, Madhya Pradesh,”* aims to analyze the existing tourism scenario in Omkareshwar and propose a comprehensive planning-based framework for organized and sustainable tourism development. Omkareshwar, being one of the twelve Jyotirlingas of Lord Shiva, holds immense religious significance and attracts a large number of pilgrims and tourists throughout the year. However, increasing tourist inflow has resulted in multiple urban challenges such as traffic congestion, unplanned development, inadequate infrastructure, environmental degradation, and excessive pressure on riverfront and ghat areas. The study utilizes both primary and secondary data sources. Primary data has been collected through tourist surveys, field observations, and infrastructure assessments, while secondary data includes government reports, master plans, census data, and satellite imagery. Analytical techniques such as percentage analysis, trend analysis, and GIS-based spatial analysis have been employed to examine tourist behaviour, infrastructure distribution, congestion zones, and service gaps. The findings indicate that tourism in Omkareshwar is predominantly pilgrimage-oriented, with a majority of visitors undertaking short-duration trips. The town’s internal road network is narrow and inefficient in handling high tourist volumes, and parking facilities are severely inadequate. Basic public amenities such as toilets, drinking water, and information systems are insufficient, particularly during peak seasons. Additionally, overcrowding in temple and ghat areas, along with poor waste management practices, has resulted in increasing environmental stress. To address these challenges, the study proposes a set of planning interventions including the development of a ropeway system, peripheral parking, pedestrianization of core areas, riverfront and ghat revitalization, smart waste management systems, emergency services, and digital information infrastructure. Advanced planning tools such as GIS-based Multi-Criteria Evaluation (MCE) have been applied to identify priority intervention zones and support data-driven decision-making. The study concludes that a holistic, integrated, and sustainable planning approach is essential for improving the tourism experience, enhancing infrastructure efficiency, and preserving the environmental and cultural integrity of Omkareshwar. The proposed framework can also serve as a reference model for similar pilgrimage towns facing challenges of increasing tourist pressure and unplanned growth.

सारांश (सार)

यह अध्ययन “**Planning for Tourism Development in a Town: A Case Study of Omkareshwar, Madhya Pradesh**” पर आधारित है, जिसका उद्देश्य ओंकारेश्वर में पर्यटन विकास की वर्तमान स्थिति का विश्लेषण करना तथा एक समग्र एवं योजनाबद्ध पर्यटन विकास रूपरेखा प्रस्तुत करना है। ओंकारेश्वर, जो कि भगवान शिव के बारह ज्योतिर्लिंगों में से एक है, धार्मिक दृष्टि से अत्यंत महत्वपूर्ण स्थल है और यहाँ वर्ष भर बड़ी संख्या में श्रद्धालु एवं पर्यटक आते हैं। बढ़ते पर्यटन दबाव के कारण नगर में यातायात जाम, अव्यवस्थित विकास, अपर्याप्त आधारभूत सुविधाएँ, पर्यावरणीय क्षरण तथा घाट क्षेत्रों पर अत्यधिक दबाव जैसी समस्याएँ उत्पन्न हो रही हैं। अध्ययन में प्राथमिक एवं द्वितीयक दोनों प्रकार के आँकड़ों का उपयोग किया गया है। प्राथमिक आँकड़े पर्यटक सर्वेक्षण, फील्ड अवलोकन तथा अवसंरचना सर्वेक्षण के माध्यम से एकत्र किए गए, जबकि द्वितीयक आँकड़े सरकारी रिपोर्ट, मास्टर प्लान, जनगणना तथा उपग्रह चित्रों से प्राप्त किए गए। विश्लेषण के लिए प्रतिशत विश्लेषण, प्रवृत्ति विश्लेषण तथा GIS आधारित स्थानिक विश्लेषण तकनीकों का उपयोग किया गया, जिससे पर्यटन गतिविधियों का वितरण, भीड़भाड़ वाले क्षेत्र, तथा अवसंरचना की कमी वाले स्थानों की पहचान की जा सके। अध्ययन के परिणामों से यह स्पष्ट होता है कि ओंकारेश्वर में पर्यटन मुख्यतः धार्मिक गतिविधियों पर केंद्रित है, जहाँ अधिकांश पर्यटक अल्प अवधि के लिए आते हैं। नगर की आंतरिक सड़कें संकरी हैं, पार्किंग की व्यवस्था अपर्याप्त है तथा सार्वजनिक सुविधाएँ जैसे शौचालय, पेयजल और सूचना प्रणाली पर्याप्त नहीं हैं। घाटों और मंदिर क्षेत्र में अत्यधिक भीड़भाड़ तथा ठोस अपशिष्ट प्रबंधन की कमी से पर्यावरणीय दबाव बढ़ रहा है। इन समस्याओं के समाधान हेतु अध्ययन में विभिन्न योजना आधारित प्रस्ताव प्रस्तुत किए गए हैं, जिनमें रोपवे प्रणाली, परिधीय पार्किंग, पैदल मार्ग विकास, घाटों का पुनर्विकास, स्मार्ट अपशिष्ट प्रबंधन, आपातकालीन सेवाएँ तथा डिजिटल सूचना प्रणाली शामिल हैं। साथ ही GIS आधारित Multi-Criteria Evaluation (MCE) जैसे आधुनिक उपकरणों का उपयोग कर उच्च प्राथमिकता वाले क्षेत्रों की पहचान कर योजनाओं को अधिक प्रभावी बनाया गया है। अध्ययन का निष्कर्ष यह दर्शाता है कि ओंकारेश्वर में पर्यटन विकास के लिए एक एकीकृत, डेटा-आधारित तथा सतत योजना दृष्टिकोण आवश्यक है, जिससे पर्यटकों के अनुभव में सुधार हो, स्थानीय अर्थव्यवस्था को बढ़ावा मिले तथा पर्यावरणीय संतुलन बनाए रखा जा सके। यह अध्ययन न केवल ओंकारेश्वर के लिए बल्कि अन्य धार्मिक पर्यटन स्थलों के लिए भी एक संदर्भ मॉडल के रूप में उपयोगी सिद्ध हो सकता है।

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Chapter:1

1. Background

Tourism has emerged as a significant driver of socio-economic development, particularly in culturally rich and religiously significant towns across India. The sector contributes substantially to employment generation, regional development, and infrastructure improvement. According to the World Travel and Tourism Council, tourism contributed approximately 7–9% to India's GDP (direct and indirect) in recent years, highlighting its growing economic importance. Within this sector, pilgrimage tourism forms a dominant segment, accounting for a major share of domestic tourist movement, with millions of visitors traveling annually to religious destinations such as Varanasi, Tirupati, and Omkareshwar. However, the rapid and often unregulated growth of tourism in such towns presents multiple challenges. High tourist inflow especially during peak seasons, festivals, and religious events places significant pressure on urban infrastructure, including transportation networks, sanitation systems, water supply, and solid waste management. In many cases, the absence of integrated planning results in traffic congestion, overcrowding of public spaces, environmental degradation, and declining visitor experience, along with disruptions to local livelihoods and community life. Therefore, there is an urgent need to adopt a sustainable and planning-oriented approach that balances tourism growth with environmental conservation and urban livability.

2. Introduction

Omkareshwar, located in the Khandwa district of Madhya Pradesh, is one of the twelve sacred Jyotirlingas of Lord Shiva, making it a prominent pilgrimage destination in India. The town is uniquely situated on a mandhata-shaped island (Om-shaped) in the Narmada River, which enhances its religious symbolism and attracts a continuous flow of devotees throughout the year. The presence of the Omkareshwar Temple and nearby Mamleshwar Temple further intensifies the concentration of religious activities within a compact geographical area. The town receives an estimated 40–50 lakh (4–5 million) tourists annually, with numbers significantly rising during major festivals such as Mahashivratri, Shravan month, and Kartik Purnima. Recent developments, including the proposed Statue of Oneness (Adi Shankaracharya) and improved regional connectivity, are expected to further increase tourist footfall in the coming years. While this growth presents economic opportunities, it also exacerbates existing challenges related to land scarcity, mobility, and environmental stress. Physically, Omkareshwar is constrained by its island geography, steep terrain, and surrounding forested hills, limiting the scope for horizontal urban expansion. As a result, most tourist activities are concentrated along ghats, temple precincts, and narrow internal pathways, leading to severe congestion and inefficiencies in movement. Additionally, the town faces issues such as inadequate parking facilities, unregulated street vending, lack of pedestrian infrastructure, insufficient sanitation facilities, and pressure on river ecology due to waste disposal and ritual activities. To address such challenges, the Government of India has launched initiatives like the PRASHAD Scheme and the Swadesh Darshan Scheme, which focus on pilgrimage site development, infrastructure enhancement, and heritage conservation. Additionally, the Madhya Pradesh Tourism Policy emphasizes sustainable tourism, improved accessibility, and destination management. Despite these policy interventions, tourism development in Omkareshwar has largely been fragmented and reactive, lacking a comprehensive integration of spatial planning, infrastructure provision, and environmental management.

There is a clear disconnect between policy objectives and ground-level implementation, resulting in inefficient land use patterns and underdeveloped support infrastructure. Therefore,

this study aims to bridge this gap by proposing a planning-based framework for tourism development in Omkareshwar. It seeks to integrate urban planning principles, GIS-based spatial analysis, infrastructure assessment, and sustainable development strategies to create a balanced approach that enhances tourist experience while preserving the town's ecological integrity and socio-cultural fabric.

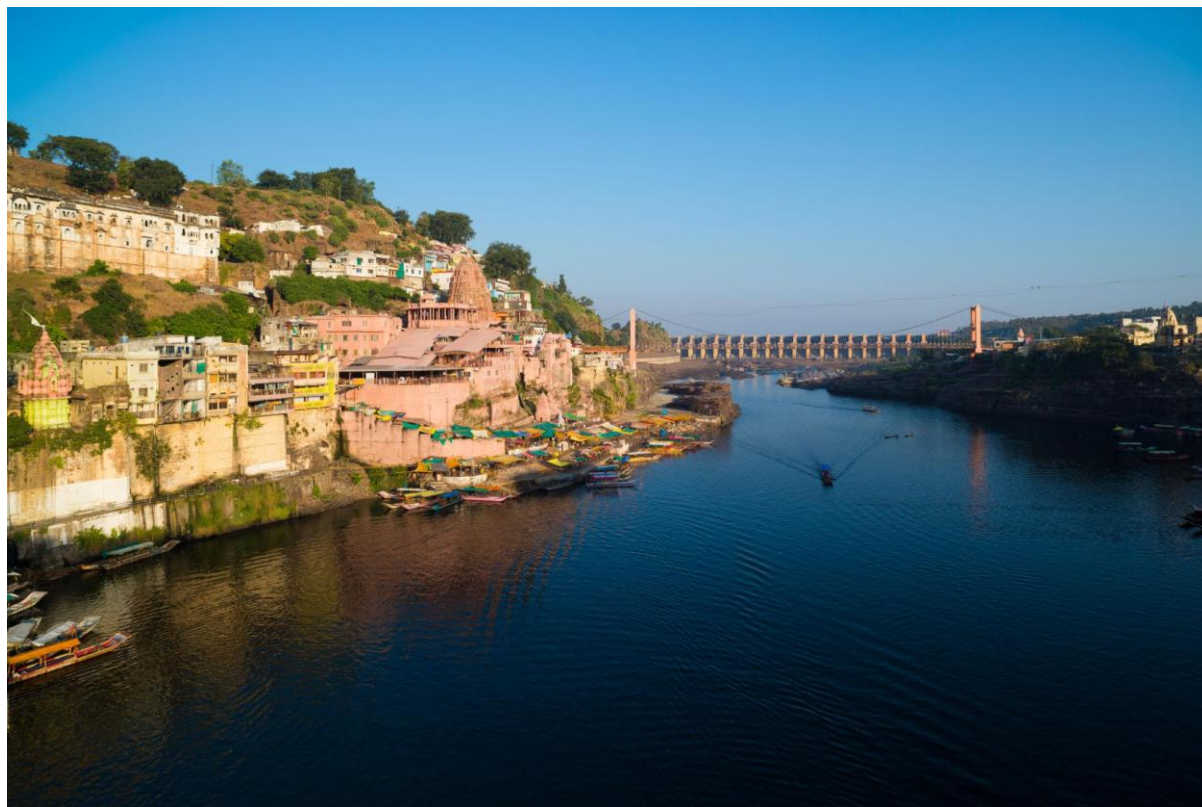


Figure 1 Omkareshwar Image

3. Aim of the Study

Omkareshwar, one of the twelve sacred Jyotirlinga shrines in India, occupies a position of profound religious and cultural significance within the national pilgrimage circuit. The town draws an ever-increasing volume of devotees, tourists, and spiritual seekers throughout the year, placing substantial and often unmanageable pressure on its physical infrastructure, spatial organization, and environmental systems. Despite its religious prominence, Omkareshwar has largely evolved without the benefit of a coherent, planning-led developmental vision, resulting in a settlement pattern characterized by organic growth, infrastructural inadequacy, and spatial inefficiency. This study aims to critically analyze the existing tourism scenario of Omkareshwar in its totality encompassing visitor patterns, infrastructure capacity, spatial organization, and service delivery and to propose a comprehensive, planning-based framework that enables organized, inclusive, and sustainable tourism development. The study seeks to move beyond descriptive analysis toward prescriptive planning, offering strategically grounded recommendations that are responsive to the town's unique socio-cultural identity and its functional demands as a high-footfall pilgrimage destination. By situating the inquiry within the broader discourse of heritage tourism planning, carrying capacity management, and sustainable urban development, this study aspires to serve as a planning reference that can

meaningfully improve the quality of experience for tourists and pilgrims alike, while simultaneously strengthening the long-term functional efficiency and environmental resilience of the town.

4. Objectives of the Study

Objective 1: To assess the existing tourism profile of Omkareshwar

This objective seeks to establish a thorough empirical understanding of the current state of tourism in Omkareshwar by systematically analyzing visitor inflow, seasonal fluctuations, peak pilgrimage periods, and the demographic and behavioral characteristics of tourists and pilgrims. The assessment extends to examining patterns of visitation including duration of stay, primary purpose of visit, mode of travel, and expenditure behavior in order to construct a detailed demand-side profile of the destination. Such a foundational analysis is essential to any planning exercise, as it reveals the magnitude and nature of pressure that tourism activity exerts on the town's infrastructure and public spaces, and enables the identification of critical periods during which service provision and spatial management are most severely tested.

Objective 2: To examine the current tourism infrastructure and facilities

This objective aims to undertake a systematic evaluation of the availability, physical condition, functional adequacy, and spatial distribution of tourism-supporting infrastructure within Omkareshwar. The scope of this examination encompasses accommodation stock, internal and external transport connectivity, parking provisions, public sanitation facilities, potable water supply, waste management systems, and ancillary tourist services. By mapping the gap between existing infrastructure capacity and actual tourist demand, this objective seeks to identify critical deficiencies that compromise visitor satisfaction and destination quality. From a planning standpoint, understanding infrastructure gaps is a prerequisite for formulating targeted interventions that are proportionate to need and aligned with the principles of equitable and efficient service delivery.

Objective 3: To evaluate the spatial distribution of tourism-related activities and land uses

This objective focuses on analyzing the spatial configuration of tourism activity across the town, with particular attention to identifying zones of high tourist concentration, points of pedestrian and vehicular congestion, commercial activity clusters, encroachment-affected corridors, and areas that remain underutilized or spatially neglected. Through land-use analysis and spatial mapping, the objective seeks to illuminate the underlying patterns of movement, activity concentration, and land-use conflict that define the town's current functional landscape. This spatial understanding is critical to planning-led interventions, as it enables the formulation of zoning strategies, circulation improvements, and land-use reorganization measures that are grounded in empirical spatial evidence rather than conjecture.

Objective 4: To propose planning and design strategies for tourism development

Drawing upon the findings of the preceding objectives, this objective aims to develop a coherent set of planning and design strategies that address the identified challenges of accessibility, congestion, inadequate infrastructure, and poor visitor experience in a holistic and integrated manner. The proposed strategies are intended to operate across multiple scales from

macro-level land-use and zoning recommendations to micro-level public realm design interventions ensuring that the framework is both comprehensive and actionable. Particular emphasis is placed on promoting organized tourist movement, enhancing the quality and legibility of public spaces, strengthening the destination's service infrastructure, and ensuring that development is guided by principles of cultural sensitivity, environmental sustainability, and long-term spatial resilience. The overarching goal is to reposition Omkareshwar as a well-managed, experientially rich, and sustainably functioning pilgrimage destination.

5. Major Planning Problems in Omkareshwar

Omkareshwar functions as a significant node within India's sacred pilgrimage geography, its identity anchored in the venerated Omkareshwar Jyotirlinga Temple and the broader spiritual landscape formed by the Narmada River, the parikrama path, and the surrounding ghats. The convergence of deep religious significance with rapidly growing tourist inflow has created a complex set of planning challenges that span the physical, environmental, spatial, and institutional dimensions of the town's development. The following planning problems have been identified through preliminary observation and secondary data review, and collectively underscore the urgency of a structured, planning-led response.

5.1. Traffic Congestion and Mobility Constraints

A critical issue identified in Omkareshwar is the severe mismatch between the town's existing road infrastructure and the volume of vehicular and pedestrian traffic it is required to accommodate. The internal street network, largely inherited from the pre-modern settlement morphology, is characterized by narrow, irregular carriageways that were never designed to handle motorized traffic at the scale now encountered during peak seasons and major religious festivals. The absence of a structured traffic circulation hierarchy, the lack of dedicated pedestrian corridors, and the unresolved conflict between moving vehicles, stationary vendors, and pilgrim movement collectively produce conditions of chronic congestion in the town's core areas. These mobility constraints have cascading implications for accessibility, emergency response, visitor safety, and the overall quality of the pilgrimage experience, and represent one of the most urgent areas requiring planning intervention.

5.2. Overcrowding in Core Temple and Ghat Areas

The spatial environs of the Omkareshwar Jyotirlinga Temple, the principal ghats, and the parikrama circumambulation route constitute the functional and spiritual heart of the town, and it is precisely these areas that bear the most intense concentration of visitor activity. In the absence of systematic crowd flow management, defined pedestrian channeling, and regulated access protocols, these zones routinely experience levels of footfall that far exceed their comfortable or safe capacity. The resulting overcrowding not only diminishes the quality of the pilgrimage experience reducing what ought to be a contemplative and spiritually significant journey to a physically taxing ordeal but also raises serious public safety concerns during periods of peak congregation. From a planning perspective, this problem reflects the absence of carrying capacity assessment and the failure to design public spaces with crowd dynamics and behavioral flow in mind.

5.3. Unplanned Commercial Development and Encroachments

The commercial landscape of Omkareshwar has evolved in an entirely organic and largely unregulated manner, shaped by the economic logic of proximity to pilgrimage routes rather

than by any coordinated planning framework. Informal street vending, the proliferation of temporary stalls, and the unauthorized extension of shop frontages have progressively encroached upon pedestrian pathways, public open spaces, and transitional zones between sacred and commercial areas. This pattern of encroachment creates multidimensional planning problems: it restricts pedestrian movement, generates visual disorder that is incongruous with the town's sacred character, intensifies land-use conflicts between commercial and civic functions, and impedes the implementation of any systematic upgrading of public infrastructure. The absence of designated vending zones, enforceable land-use regulations, and hawker management policies has allowed these conditions to become deeply entrenched, making remediation increasingly complex.

5.4. Inadequate Public Infrastructure and Amenities

The provision of basic public infrastructure and visitor amenities in Omkareshwar is significantly deficient relative to the scale and diversity of tourist and pilgrim demand. Sanitation facilities including public toilets, handwashing stations, and waste disposal points are insufficient in number, poorly located, and often inadequately maintained, resulting in visible hygiene deficits that are particularly acute during peak seasons. Similarly, the supply of potable drinking water at accessible locations along pilgrimage routes and ghat areas remains unreliable. Seating, shading, and rest infrastructure for elderly and differently-abled visitors is almost entirely absent. Compounding these deficiencies is the near-total lack of a systematic wayfinding and tourist information system: signage is sparse, inconsistent, and poorly placed, leaving first-time visitors without adequate orientation support. Collectively, these gaps in basic amenity provision reflect an infrastructure delivery framework that has failed to keep pace with visitor growth, and constitute a significant barrier to improving destination quality and inclusivity.

5.5. Parking Management Issues

The management of vehicular parking represents a significant and structurally unresolved planning problem in Omkareshwar. The town currently lacks dedicated off-street parking facilities of adequate capacity, compelling a large proportion of visiting vehicles to park informally along internal roads and approach corridors. This on-street parking behavior effectively reduces the functional width of already narrow carriageways, exacerbating traffic congestion and creating hazardous conditions for pedestrians. The absence of strategically located peripheral parking nodes, combined with the lack of any organized last-mile connectivity system linking parking areas to the temple and ghat precinct, means that visitors are incentivized to drive as close to the core as possible a pattern that directly intensifies congestion in the most sensitive and densely occupied areas of the town. Resolving this problem requires not only the provision of additional parking infrastructure but a rethinking of the town's overall vehicular access strategy.

5.6. Environmental Pressure and Riverfront Stress

As a pilgrimage settlement defined by its relationship with the Narmada River, Omkareshwar's ecological health is inseparable from its identity as a sacred destination. However, the combination of high tourist volumes, inadequate solid waste management systems, and insufficient drainage infrastructure has resulted in measurable and growing environmental stress along the riverfront, ghats, and surrounding natural landscape. The accumulation of solid waste including religious offerings, plastic packaging, and food waste along the riverbanks

degrades both the aesthetic quality and ecological integrity of the environment. Inadequate drainage and open defecation in the absence of sufficient sanitation infrastructure further contribute to water quality deterioration. These environmental pressures not only pose public health risks but also threaten the intrinsic character of the destination, undermining the very sacred and natural qualities that motivate visitation in the first place.

5.7. Lack of Integrated and Sustainable Tourism Planning

Perhaps the most fundamental and overarching planning problem in Omkareshwar is the absence of an integrated, long-term tourism development framework that coordinates physical planning, infrastructure investment, stakeholder management, and environmental stewardship within a unified strategic vision. Development in the town has proceeded in a reactive and piecemeal manner, driven by immediate pressures rather than anticipatory planning. There are no clearly defined zoning regulations governing land use in the tourism precinct, no formally established carrying capacity thresholds for key sites, and limited institutional coordination between local bodies, tourism authorities, and heritage conservation agencies. This planning vacuum has resulted in a pattern of development that is internally contradictory simultaneously under-serving basic visitor needs while permitting environmentally and spatially damaging growth. Addressing this structural deficit requires the formulation of a comprehensive tourism planning framework that is grounded in sustainability principles, responsive to the town's cultural heritage, and capable of guiding development in a manner that is both organized and adaptive over time.

6. Study Area

Omkareshwar is one of India's most revered pilgrimage destinations, recognized across the country as the site of one of the twelve sacred Jyotirlinga shrines dedicated to Lord Shiva. The town is administratively located within the Khandwa district of Madhya Pradesh and is situated at approximately 77 kilometres from Indore, which serves as the nearest major metropolitan centre and primary gateway for regional connectivity. The town is accessible by road via State Highway networks linking it to Indore, Khandwa, and other regional centres, and enjoys reasonable connectivity that facilitates the movement of a large and diverse visitor population throughout the year. Its location within the culturally and geographically significant Narmada River valley further amplifies its importance as both a religious and ecological destination. What renders Omkareshwar physically distinctive and planning-analytically significant is its rare geographical configuration. The town is situated on a naturally formed island created by the bifurcation and reconvergence of the Narmada River, a landform that bears a striking resemblance to the sacred Hindu symbol *Om*, from which the town derives its name. This island, locally referred to as Mandhata, constitutes the historic and spiritual core of the settlement, housing the principal temple complex, ghats, and the parikrama circumambulation path. Development has extended beyond the island onto the adjoining mainland, where approach infrastructure, parking areas, commercial establishments, and residential uses are concentrated. This dual-zone settlement structure an island core and a mainland periphery fundamentally shapes the spatial logic of tourism activity, movement patterns, and infrastructure distribution within the town. The physical constraints imposed by the island geography are of direct planning consequence. The limited extent of developable land, the dependence on bridge crossings for access, and the concentration of high-intensity

activity within a confined spatial envelope collectively generate conditions of spatial pressure that are difficult to manage without deliberate planning intervention. The Narmada River, while being the defining feature of the town's sacred identity, simultaneously functions as a geographic boundary that restricts expansion and concentrates visitor activity within vulnerable zones. For the purposes of this study, the defined study area encompasses the municipal limits of Omkareshwar along with functionally significant tourism-influenced zones extending beyond the administrative boundary. This includes the island temple precinct, riverfront ghat areas, the parikrama path, primary and secondary approach roads, designated and informal parking areas, commercial streets, and tourist service zones on the mainland. This delineation ensures that the study captures the full spatial extent of tourism activity and its associated planning implications, providing an adequate basis for infrastructure assessment, spatial analysis, and the formulation of planning proposals.

6.1 Map of Omkareshwar

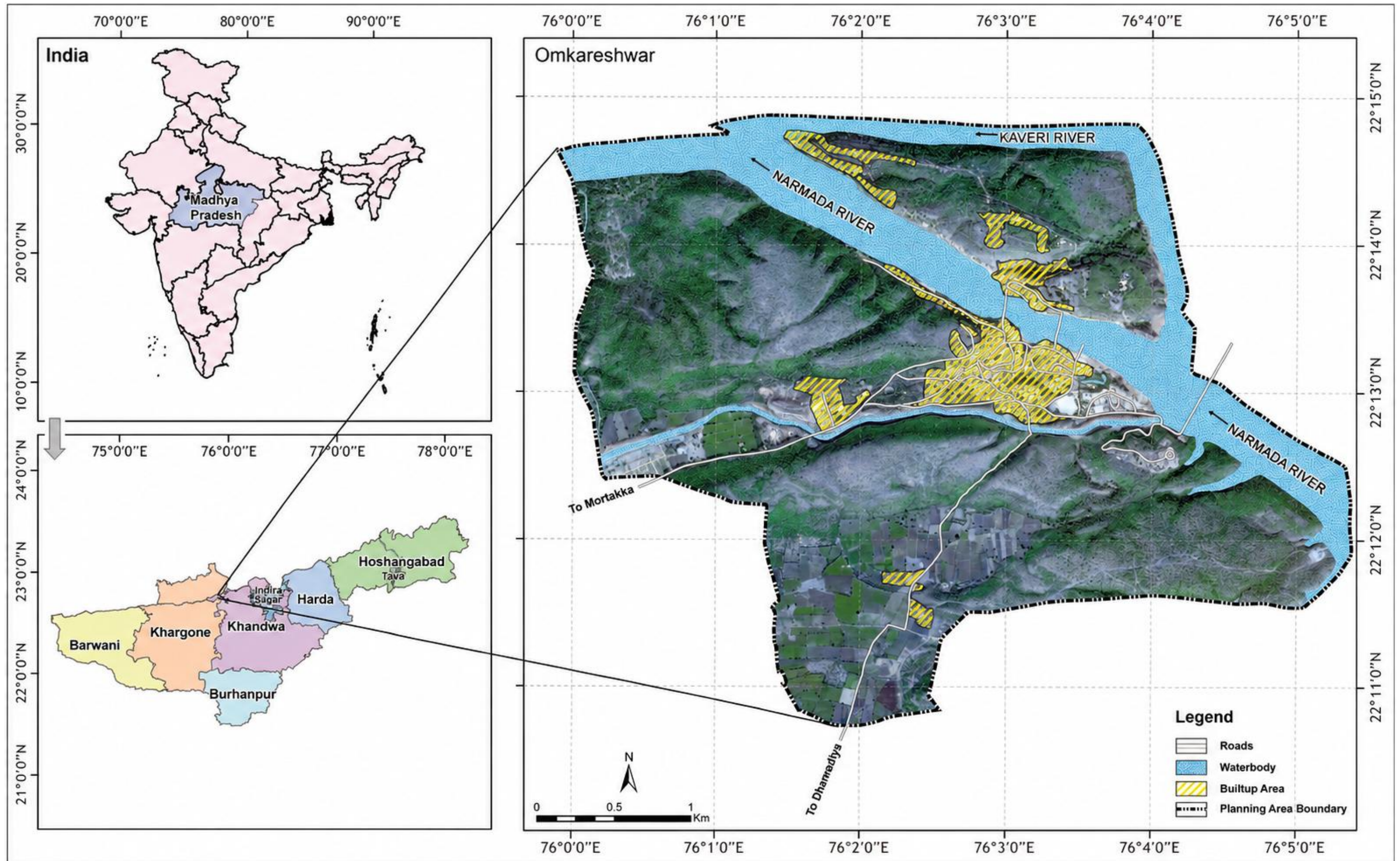


Figure 2 Regional Location Map of Omkareshwar

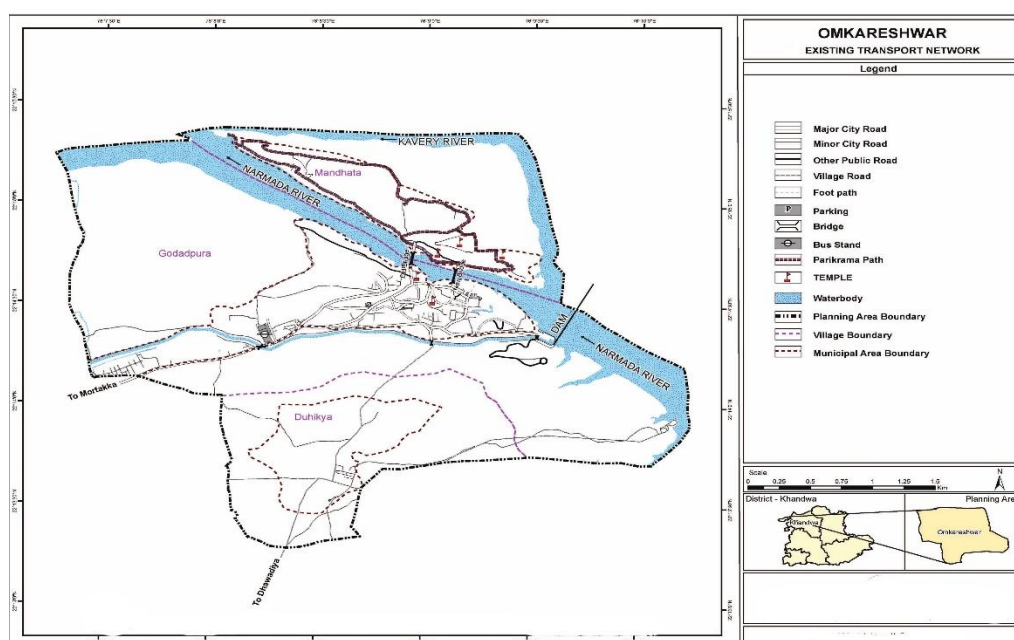


Figure 3 Existing Transport Network Map, Omkareshwar

The regional location map presented in Figure 2 provides a three-tiered spatial orientation of the study area, progressing from the national scale situating Madhya Pradesh within the map of India to the district scale, identifying Khandwa district within the state, and finally to the local planning scale, depicting the physical extent of Omkareshwar's planning area. This hierarchical representation is essential to establishing the geographic context of the study and enables the reader to appreciate the town's regional connectivity and its position within the broader pilgrimage and tourism circuit of central India. The satellite imagery base at the local scale clearly reveals the island morphology of Mandhata, the surrounding water bodies formed by the Narmada and Kaveri rivers, and the distribution of built-up areas concentrated along accessible terrain. The planning area boundary delineated in the map defines the spatial scope within which all subsequent analyses are conducted. The existing transport network map, presented in Figure 3, provides a detailed spatial representation of the road hierarchy, pedestrian infrastructure, and key tourism-related nodes within the planning area. The map distinguishes between major city roads, minor city roads, other public roads, village roads, and footpaths, offering a legible picture of the town's circulation framework. Significant features marked include the location of parking areas, the bridge connecting the mainland to the Mandhata island, the bus stand, and the parikrama path the sacred circumambulation route that encircles the island and constitutes one of the most heavily traversed pedestrian corridors in the town. The surrounding villages of Godadpura and Duhlikya are also identified, reflecting the broader settlement context within the planning boundary. This map serves as a critical planning reference, revealing the limited road hierarchy available to manage high tourist volumes, the spatial relationship between access infrastructure and key pilgrimage nodes, and the structural vulnerabilities of a settlement whose primary access is mediated through a single bridge crossing.

7. Methodology

The methodology adopted in this study is designed to be systematic, multi-layered, and analytically rigorous, drawing upon established methods in urban and tourism planning research to address the complex and multidimensional nature of the planning challenges in Omkareshwar. The research framework integrates primary field-based investigation, secondary data compilation, and GIS-supported spatial analysis within a structured sequential process, progressing from data collection and empirical observation through analytical interpretation to the formulation of planning and design proposals. This combined approach is considered appropriate given the nature of the study, which requires both an understanding of quantitative patterns such as visitor volumes, infrastructure counts, and spatial distributions and qualitative assessments of experiential quality, spatial organization, and planning adequacy. The methodology is directly aligned with the four research objectives, ensuring that each stage of the research process generates findings that contribute to a specific dimension of the overall analytical framework.

Structure of the Research Process:—The research process is organized into four broad sequential stages. This structured approach ensures methodological coherence and enables findings from different analytical streams to be meaningfully integrated into a unified planning response.

Stage I — Data Collection: The first stage involves the collection of primary and secondary data pertaining to tourism patterns, infrastructure conditions, spatial organization, and policy context. Primary data is gathered through structured field surveys, stakeholder interviews, and direct observation, while secondary data is sourced from government reports, census records, tourism statistics, and existing planning documents relevant to Omkareshwar.

Stage II — Data Processing and Analysis: The second stage involves the processing and analysis of this data using statistical, spatial, and qualitative techniques. GIS tools are employed to map land use patterns, identify congestion zones, delineate activity nodes and movement hotspots, and assess the spatial distribution of infrastructure across the study area.

Stage III — Synthesis and Problem Identification: The third stage synthesizes the analytical findings to identify key planning problems, spatial deficiencies, and development opportunities. This includes an assessment of infrastructure gaps, visitor management challenges, congestion patterns during peak pilgrimage seasons, and inadequacies in public space provision and accessibility.

Stage IV — Planning and Design Proposals: The fourth and final stage translates these findings into a set of planning and design proposals constituting the study's principal output. Proposals address mobility improvement, infrastructure enhancement, public space development, and sustainable tourism planning, each grounded in the evidence generated

A comprehensive review of existing literature forms the theoretical foundation of the study. This encompasses tourism planning concepts, pilgrimage tourism studies with particular reference to comparable sacred destinations in India, and relevant government policies and reports pertaining to heritage site management, religious tourism, and urban infrastructure. The literature review enables the study to situate its findings within a broader academic and policy context and to draw upon proven planning frameworks applicable to Omkareshwar's conditions.

An analysis of the tourism profile of Omkareshwar is undertaken to understand the nature, scale, and pattern of visitor flows to the destination. This includes an examination of tourist inflow volumes and seasonality, visitor characteristics such as origin, purpose of visit, length of stay, and mode of travel, and the identification of peak periods and the pressures they generate on local infrastructure and public spaces. This component provides the empirical basis for understanding carrying capacity constraints and for calibrating the scale of proposed interventions. Spatial analysis constitutes a central methodological component of the study, employing GIS-based tools to produce a systematic mapping of land use patterns, activity nodes and hotspots of tourist concentration, and congestion and movement patterns across the study area. The spatial analysis reveals the geographic distribution of tourism-related pressures and identifies areas of functional conflict, spatial inefficiency, and infrastructure deficit, directly informing the spatial logic of the planning proposals. A structured assessment of existing infrastructure is conducted to evaluate the adequacy of accommodation facilities, transport and parking provisions, and public amenities in relation to current and projected visitor demand. The assessment identifies capacity shortfalls, condition deficiencies, and locational mismatches that contribute to poor visitor experience and environmental stress, thereby establishing a clear evidence base for infrastructure upgrading and expansion proposals. Building upon the preceding analytical components, a systematic identification of planning issues is carried out, focusing on infrastructure gaps, congestion zones, and management problems. This stage employs both field-based observation and data analysis to document the specific nature and spatial extent of each identified problem, ensuring that subsequent proposals are responsive to actual conditions on the ground rather than generalized assumptions. The final component of the methodological framework involves the formulation of planning and design proposals informed by all preceding stages of analysis. Proposals are organized under four strategic themes: mobility improvement, infrastructure enhancement, public space development, and sustainable tourism planning. Each proposal is grounded in the evidence base generated through the study and is oriented towards improving the quality, resilience, and sustainability of tourism at Omkareshwar. Taken together, the components of this methodology constitute a coherent and integrated research framework that is both empirically grounded and planning-oriented. The approach ensures that the study generates not only a rigorous analysis of existing conditions at Omkareshwar but also a practically actionable set of recommendations capable of informing the preparation of a comprehensive tourism development plan for this significant pilgrimage destination.

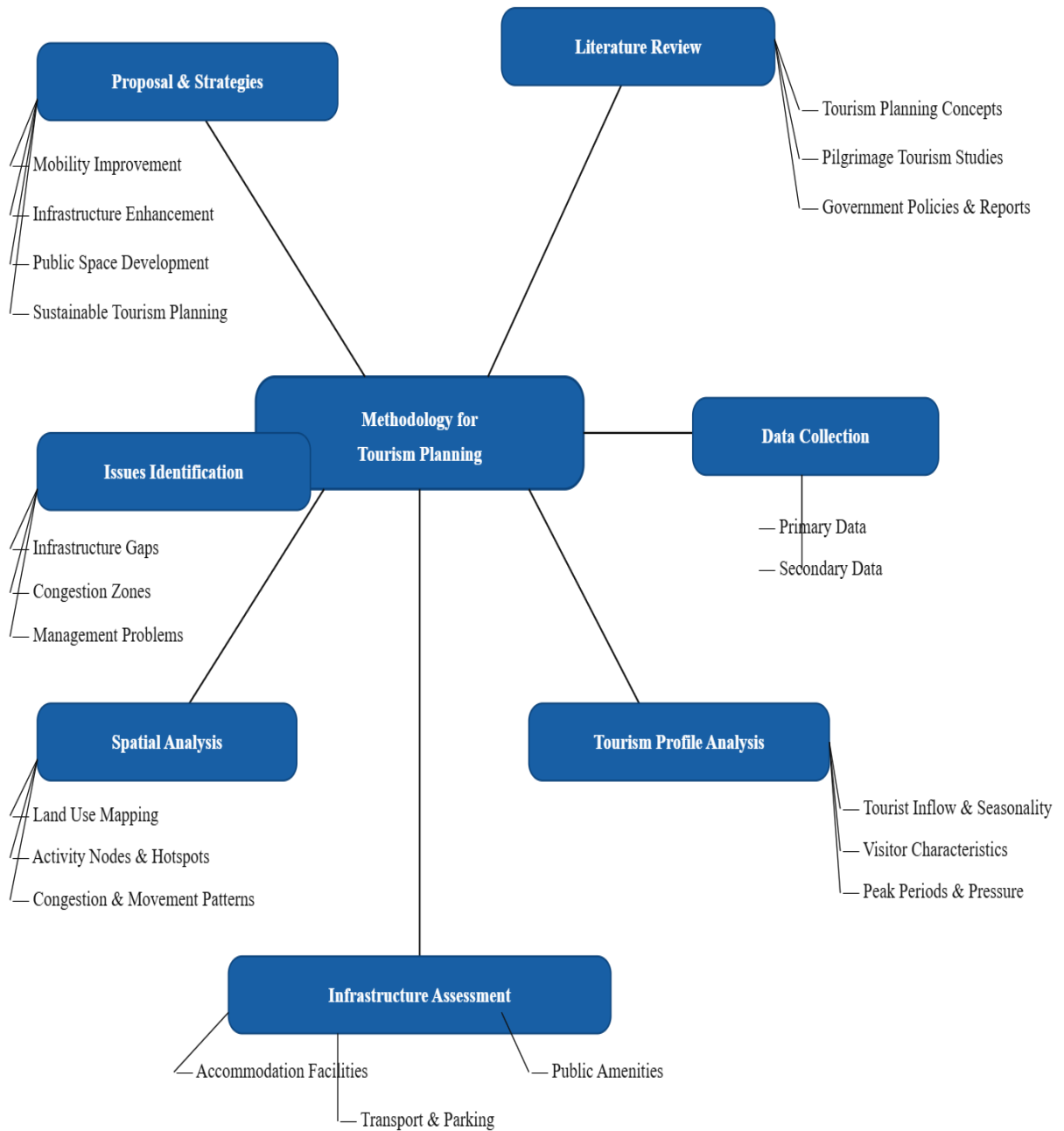


Figure 4 Methodology Flowchart

7.1 Data Requirements

A. Primary Data

Primary data constitutes the empirical foundation of this study, providing direct, first-hand evidence of existing conditions in Omkareshwar that cannot be adequately captured through secondary sources alone. The collection of primary data is organized across four principal methods, each targeting a specific dimension of the study's analytical requirements. Tourist surveys form the first and most substantive component of primary data collection. Structured

questionnaire-based surveys are administered to tourists and pilgrims at key locations within the town including the temple precinct, ghat areas, commercial streets, and points of entry to gather data on visitor inflow characteristics, travel behaviour, and experiential assessments. The survey instrument is designed to capture information relating to the visitor's origin, mode of travel, frequency of visit, primary purpose, duration of stay, accommodation preferences, expenditure patterns, and overall satisfaction with available facilities and services. This demand-side data is essential to constructing an accurate tourism profile of the destination and to identifying the specific service and infrastructure expectations of the visitor population. Field observation constitutes the second primary data collection method and serves as an indispensable complement to survey-based data. Systematic and structured field observations are conducted across the study area during both peak and off-peak periods to document on-ground conditions relating to tourist movement patterns, spatial congestion, activity clustering, informal vendor encroachment, and the actual use of public spaces and facilities. Observational data captures the dynamic, real-time functioning of the town in ways that statistical data cannot, providing planners with a nuanced understanding of the spatial behaviour of visitors and the functional performance of infrastructure under varying conditions of demand. Infrastructure inventory surveys form the third component, involving the systematic documentation and condition assessment of all tourism-related physical infrastructure within the study area. This includes accommodation establishments categorized by type and capacity, public sanitation facilities, drinking water supply points, signage and wayfinding systems, parking areas, rest areas, and tourist information infrastructure. Each facility is recorded in terms of its location, physical condition, functional status, and apparent adequacy relative to observed visitor demand. This inventory provides the empirical basis for the infrastructure gap analysis undertaken in a subsequent stage of the research. Traffic and pedestrian movement observations constitute the fourth method, focused on understanding the nature and intensity of vehicular and pedestrian flows along the town's principal access corridors, internal roads, and pilgrimage routes. Observations identify major conflict points between vehicles, pedestrians, and informal street activities, and document the spatial extents of congestion during peak periods. This data directly informs the mobility and circulation analysis and supports the formulation of traffic management and pedestrian prioritization proposals.

B. Secondary Data

Secondary data provides the broader contextual, statistical, and policy framework within which the primary findings are interpreted and planning proposals are developed. Tourism statistics sourced from the Madhya Pradesh Tourism Development Corporation, District Tourism Office, and local municipal records furnish historical visitor arrival data, seasonal trend patterns, and year-on-year growth trajectories. This longitudinal data enables the study to contextualize current observations within a longer-term pattern of tourism growth, providing a more robust basis for demand estimation and infrastructure planning. Planning documents including the Master Plan and Development Plan for Omkareshwar, municipal records, and any existing tourism development proposals are reviewed to understand the current regulatory framework, existing land-use designations, and previously identified planning priorities. This review serves the dual purpose of informing the study's proposals with knowledge of existing planning intentions and identifying the degree to which current conditions deviate from planned outcomes. National and state-level tourism policy documents, including schemes under the Ministry of Tourism and the Madhya Pradesh Tourism Policy, are similarly reviewed to ensure that the study's recommendations are aligned with prevailing policy directions and funding

frameworks. Census of India data is utilized to understand the resident population composition, demographic characteristics, and settlement patterns of Omkareshwar, providing necessary context for understanding the relationship between the permanent population and the transient tourist population, and for assessing the distributional equity of infrastructure provision across resident and visitor communities.

C. GIS and Spatial Data

GIS and remote sensing data constitute the spatial backbone of the study's analytical framework, enabling the visualization, measurement, and interpretation of spatial patterns that are central to the research objectives. Base map data including administrative boundaries delineating the planning area and municipal limits, road network shapefiles, water body extents, and cadastral boundaries is sourced from official agencies including the Survey of India, the National Remote Sensing Centre (NRSC), and municipal records, and is processed within ArcGIS 10.8 for all spatial operations. High-resolution satellite imagery, drawn from open-access sources including Landsat and Sentinel datasets as well as NRSC's Bhuvan platform, is used for land use–land cover classification and change analysis, enabling the identification of built-up areas, open spaces, vegetation cover, and water bodies within the planning area. Topographical data including elevation contours and slope information derived through Digital Elevation Model (DEM) analysis is used to understand the influence of terrain on accessibility, drainage patterns, and the potential for future development within the constrained island and riverfront geography. This spatial dataset supports a range of analytical operations including thematic mapping, proximity and buffer analysis, and accessibility modeling, all of which are described in the following section.

7.2 Analysis Techniques

The analysis of collected data employs a combination of quantitative, qualitative, and GIS-based spatial techniques, each selected for its appropriateness to the specific analytical task it is required to address. Tourist survey data is analyzed using descriptive statistical methods, including frequency distribution, percentage analysis, and trend analysis, to characterize visitor profiles, identify dominant travel behavior patterns, and quantify seasonal demand variations. These statistical outputs are presented through tabular and graphical representations to facilitate clear communication of findings and support comparative interpretation across visitor categories and time periods. GIS-based spatial analysis forms the methodological core of the study's spatial dimension. Thematic mapping is used to represent the distribution of tourism facilities, land uses, and activity zones across the study area, providing a cartographic basis for spatial interpretation and planning decision-making. Buffer analysis is applied to assess the proximity of key tourism nodes such as the temple complex, ghats, and parking areas — to supporting infrastructure and public amenities, identifying zones of service deficit and spatial mismatch. Proximity analysis is used to evaluate the accessibility of tourist facilities from major points of entry and circulation routes, revealing areas where access is constrained by distance or physical barriers. Network analysis of the existing road and pedestrian infrastructure informed by the transport network map enables the assessment of movement efficiency, identification of bottleneck locations, and evaluation of alternative circulation configurations. Gap analysis is applied to the infrastructure inventory data to systematically compare existing facility provision against normative standards and observed demand,

generating a clear and evidence-based account of infrastructure deficiencies. Field observations are analyzed qualitatively through systematic coding and thematic interpretation, drawing upon established frameworks in environmental behavior and visitor experience research to assess the quality of public spaces, the legibility of the town's spatial structure, and the adequacy of crowd and circulation management. The synthesis of findings across these analytical streams is undertaken through an integrated planning analysis that identifies priority intervention areas and forms the basis for the study's planning proposals.

8. Expected Outcomes

The outcomes anticipated from this study span multiple dimensions of planning knowledge and practical utility, collectively contributing to a more informed, evidence-based approach to tourism development in omkareshwar. At the foundational level, the study is expected to produce a comprehensive and rigorously documented tourism profile of the town encompassing quantified visitor inflow data, seasonal demand patterns, visitor behavioural characteristics, and a clear articulation of the gap between current service provision and actual visitor needs. This profile will constitute a valuable baseline reference for future planning and policy decisions related to tourism in the town. The GIS-based spatial analysis is expected to generate a suite of thematic maps and spatial analytical outputs that visually and quantitatively characterize the distribution of tourism activity across the study area. These outputs will delineate high-pressure tourism zones, map congestion-prone corridors and nodes, illustrate infrastructure distribution and accessibility patterns, and identify underutilized spaces with potential for planned tourism development. Such cartographic outputs are of direct utility to urban planners, local bodies, and tourism authorities, providing a spatial decision-support tool that can guide investment prioritization and land-use management. The planning and design proposals developed as the study's primary output are expected to offer a structured and actionable framework for tourism development in Omkareshwar. These proposals will address the full spectrum of identified planning challenges including mobility and circulation management, public amenity enhancement, commercial activity organization, environmental management along the riverfront, and the establishment of a coherent land-use framework for the tourism precinct. The proposals are anticipated to be spatially specific, phased where appropriate, and grounded in principles of sustainability, cultural sensitivity, and inclusive design. Beyond their direct applicability to Omkareshwar, the planning framework developed through this study is expected to serve as a transferable reference model for other pilgrimage and heritage tourism towns across India that face analogous challenges of managing increasing visitor pressure within constrained and culturally significant spatial environments.

9. Limitations of the Study

Every research undertaking is necessarily conducted within a set of practical, methodological, and contextual constraints that define the boundaries of its claims and the scope of its applicability. This study is no exception, and the following limitations are acknowledged in the interest of methodological transparency and scholarly integrity. The scope of the study is confined to planning-level analysis and does not extend to detailed architectural design, structural engineering assessment, or project implementation planning. While the proposed planning strategies are spatially grounded and practically oriented, their translation into project-level detail would require additional specialized expertise and resources beyond the scope of a thesis investigation at this level. The availability and granularity of tourism-related

statistical data at the town level presents a significant constraint. Official tourist arrival records are often aggregated at the district or regional level and may not accurately reflect visitation patterns specific to Omkareshwar. This limits the precision of demand estimation and restricts the capacity for rigorous quantitative forecasting of future visitor growth. The study acknowledges this data limitation and calibrates its analytical claims accordingly. The primary data collection, including field surveys, infrastructure inventories, and observational studies, is conducted within a defined and temporally limited study period. Given the pronounced seasonal variation in tourist inflow characteristic of pilgrimage destinations with visitor volumes fluctuating dramatically between festival periods and ordinary days data collected during a specific window may not fully represent the entire range of conditions experienced at the destination across the annual cycle. The study seeks to mitigate this limitation through the incorporation of secondary temporal data, though some degree of seasonal incompleteness in the primary dataset remains an acknowledged constraint. The GIS-based spatial analysis is subject to the resolution and currency limitations of available base maps and satellite imagery. Micro-level spatial interpretations particularly in densely built areas of the island core where street-level detail is critical may be constrained by the available image resolution. Similarly, any temporal gap between the acquisition date of satellite imagery and the period of field investigation may introduce minor inconsistencies between spatial data and observed ground conditions. The study focuses exclusively on the defined planning area of Omkareshwar and does not extend to a detailed analysis of regional tourism linkages, inter-destination movement patterns, or the wider pilgrimage circuit within which Omkareshwar is embedded. Such regional analysis, while potentially valuable for strategic tourism planning at a higher scale, falls outside the spatial scope of this investigation. Finally, considerations of financial feasibility, institutional capacity, implementation phasing, and stakeholder governance all of which are critical to the eventual realization of planning proposals are acknowledged as important but are beyond the analytical scope of this study, which focuses on the formulation rather than the operationalization of the planning framework.

Chapter:-2

Section 2.1 Literature Review

2.1.1. Case Study: A Geospatial Approach to Enhance

Religious tourism constitutes one of the most demographically significant and spatially intensive forms of tourism activity in the Indian subcontinent. As a nation that is home to an extraordinary plurality of faith traditions, sacred geographies, and pilgrimage circuits, India witnesses the movement of hundreds of millions of pilgrims annually across destinations ranging from Himalayan shrines to riverfront temple towns and coastal sacred sites. This phenomenon, while representing an immense cultural asset and economic driver, simultaneously imposes considerable and often unsustainable pressure upon the physical infrastructure, spatial organization, and environmental systems of the destinations that receive these visitor flows. The challenges that emerge from this pressure encompassing road network overload, inadequate public sanitation, deficient wayfinding systems, insufficient parking infrastructure, and the erosion of ghat and riverfront environments are well-documented across the literature on Indian pilgrimage destinations, and constitute a planning problem of national significance. The limitations of conventional, intuition-driven approaches to tourism infrastructure planning have become increasingly apparent as the scale and complexity of these challenges have grown. Reactive, piecemeal responses to infrastructural deficiencies characterized by ad hoc improvements to isolated facilities without reference to the spatial system as a whole have consistently proven inadequate to the task of managing the cumulative impacts of mass religious tourism. In this context, the application of geospatial technologies, and particularly Geographic Information Systems, represents a paradigmatic shift toward evidence-based, spatially precise, and analytically rigorous planning practice. GIS offers planners the capacity to visualize, measure, and interpret the spatial distribution of infrastructure conditions, accessibility deficiencies, and visitor pressure across a study area with a level of resolution and objectivity that qualitative methods alone cannot provide. This section of the literature review critically examines a GIS-based Multi-Criteria Evaluation framework that has been applied to Ujjain city in Madhya Pradesh one of India's most prominent pilgrimage destinations and the host city of the Kumbh Mela, one of the largest human gatherings on earth as a methodologically instructive and contextually relevant model for the planning and management of religious tourism infrastructure. Ujjain shares several fundamental characteristics with Omkareshwar: both are river-based pilgrimage destinations in Madhya Pradesh; both are defined by the centrality of ghats, temple precincts, and circumambulation routes to the spatial organization of the pilgrimage experience; and both experience intense, seasonally concentrated tourist inflows that place severe pressure on infrastructure of limited capacity. The review proceeds through a systematic examination of the study's methodological architecture, its infrastructure parameter framework, its spatial analysis techniques, and its planning outputs, before critically evaluating its contributions and limitations and establishing its relevance to the present study.

2.1.2. Methodological Framework and Analytical Design

The reviewed study adopts a GIS-based Multi-Criteria Evaluation model as its principal analytical instrument, a methodological choice that reflects a theoretically sophisticated understanding of the multi-dimensional nature of tourism infrastructure performance. The

conceptual foundation of Multi-Criteria Evaluation rests upon the recognition that the adequacy of a built environment particularly one required to serve the complex and varied needs of a large and diverse pilgrimage population cannot be meaningfully assessed through any single indicator in isolation. Infrastructure performance is inherently composite: a destination may possess well-maintained road connections while suffering from critically deficient sanitation facilities; ghat areas may be physically accessible while lacking adequate lighting, emergency services, or crowd management infrastructure. A planning framework that evaluates these parameters independently, without integrating their interactions into a holistic spatial assessment, risks producing recommendations that address isolated symptoms while leaving the underlying systemic deficiencies unresolved. The GIS-MCE model addresses this limitation by combining multiple spatial and non-spatial parameters within a unified analytical framework, weighting each according to its relative importance to the overall tourism experience, and producing composite spatial scores that reflect the cumulative infrastructure performance of each location within the study area. The methodology integrates four core analytical techniques: GIS mapping and spatial analysis, which provides the cartographic and computational infrastructure for all spatial operations; Multi-Criteria Evaluation, which structures the assessment of multiple parameters into a coherent evaluative hierarchy; Weighted Overlay Analysis, which translates the MCE framework into spatially explicit composite scores through GIS raster operations; and Accessibility Audit-Based Scoring, which ensures that field-based assessments are conducted against a standardized and consistently applied evaluative rubric. The integration of these techniques produces an analytical framework that is simultaneously quantitatively rigorous, spatially precise, and practically actionable qualities that are essential for planning research intended to inform real-world infrastructure investment decisions.

2.1.3. Infrastructure Parameter Framework

A foundational contribution of the reviewed study is its systematic identification and operationalization of thirteen infrastructure parameters as the basis for evaluation. These parameters are reproduced and elaborated below, as they constitute the evaluative framework against which conditions in Ujjain and, by adaptation, in Omkareshwar are assessed.

Parameter No.	Infrastructure Parameter	Planning Domain	Relevance to Pilgrimage Context
1	Road Condition	Mobility & Access	Primary determinant of vehicular access to temple and ghat areas
2	Parking Facilities	Mobility & Access	Management of vehicle accumulation at pilgrimage nodes
3	Public Toilets	Sanitation & Hygiene	Critical for high-footfall areas; directly affects visitor comfort
4	Drinking Water Availability	Public Health	Essential service along extended pilgrimage routes
5	Ghats Accessibility	Accessibility & Inclusion	Key ritual space; must accommodate diverse physical abilities
6	Temple Approach Roads	Mobility & Access	Pedestrian-vehicular conflict zone; requires prioritization

7	Street Lighting	Safety & Security	Enables safe movement during early morning and evening rituals
8	Crowd Management Spaces	Safety & Spatial Organization	Prevention of stampede risk in high-density congregation areas
9	Public Transport Connectivity	Mobility & Sustainability	Reduces private vehicle dependency; improves regional access
10	Waste Management Systems	Environmental Management	Critical for riverfront and ghat area ecological integrity
11	Signage and Wayfinding	Visitor Experience	Orientation support for first-time visitors in complex spatial environments
12	Emergency Services	Safety & Resilience	Response capacity during peak congregation events
13	Accommodation Density	Tourism Economy	Reflects capacity to retain visitors and support overnight tourism

Table 1 Weightage parameter

These thirteen parameters collectively represent a comprehensive and destination-sensitive inventory of the physical and service infrastructure that constitutes the functional environment of a pilgrimage destination. It is analytically significant that the parameter set extends beyond the conventional urban infrastructure categories — roads, water, sanitation — to encompass elements that are specifically characteristic of the pilgrimage experience, including ghat accessibility, crowd management spaces, and temple approach roads. This destination-specific adaptation of the evaluation framework reflects a methodological maturity that is essential for planning research in the religious tourism domain, where generic urban infrastructure frameworks are often inadequate to capture the full spectrum of visitor needs and spatial dynamics.

The study further incorporates a disability-inclusive assessment dimension, recognizing that elderly pilgrims and persons with physical disabilities constitute a demographically significant and disproportionately vulnerable share of the religious tourism population. This incorporation situates the analytical framework within the established theoretical tradition of Universal Design and Accessibility Planning principles that assert the right of all users, regardless of physical capacity, to access the built environment without discrimination or undue difficulty. In the context of pilgrimage destinations, where the sacred rituals of bathing, circumambulation, and temple worship often involve physically demanding movement through complex and irregular spatial environments, the application of universal design principles to infrastructure assessment is not merely a matter of social equity but a fundamental prerequisite of functional planning adequacy.

2.1.4. Field Survey Methodology and Standardized Scoring System

The primary data collection phase of the reviewed study is structured around a systematic field survey in which each of the thirteen identified parameters is assessed at locations distributed across the study area. To ensure methodological consistency and to enable comparative analysis across different spatial zones, the study employs a standardized three-point scoring system, as detailed in the following table.

Parameter Condition	Score Assigned	Planning Interpretation
Poor	1	Immediate intervention required; significant deficiency impacting visitor safety or experience
Average	2	Moderate adequacy; improvement needed to meet acceptable service standards
Good	3	Satisfactory condition; maintenance and incremental upgrading sufficient

Table 2 Score assigned

This scoring rubric, while necessarily involving a degree of evaluative simplification, provides the quantitative foundation upon which the subsequent weighted overlay analysis is constructed. The conversion of qualitative field observations into numerical scores enables the integration of parameter assessments into the GIS analytical framework, transforming ground-level empirical data into spatially analyzable quantitative information. The three-tier scale represents a pragmatic balance between methodological rigor and fieldwork operability: a more granular scale might capture finer distinctions in infrastructure condition but would simultaneously introduce greater inter-rater variability and reduce the consistency of comparative assessments across locations.

2.1.5. GIS-Based Spatial Analysis and Layer Construction

The spatial analysis component of the reviewed study is built upon a multi-layered GIS architecture in which discrete spatial data layers are created for each category of infrastructure and tourism activity. The principal layers constructed include road network mapping, delineating the hierarchy and spatial extent of vehicular and pedestrian routes; temple zone mapping, identifying the spatial boundaries and approach corridors of the primary pilgrimage sites; ghat location mapping, documenting the distribution and accessibility characteristics of riverfront ritual spaces; and parking area mapping, recording the location, capacity, and operational status of vehicular parking facilities. A particularly innovative methodological element of the study is its adoption of a grid-based spatial analysis approach, in which the study area is subdivided into a regular spatial grid and each grid cell is evaluated against the scored infrastructure parameters. This methodology enables a micro-level spatial assessment that transcends the limitations of zone-based or corridor-based analysis, allowing the identification of highly localized problem areas individual blocks or street segments that might otherwise be obscured within broader spatial aggregations. The grid-based approach is especially valuable in the context of pilgrimage destinations, where infrastructure conditions can vary dramatically over short distances as one moves from well-serviced approach roads to under-served inner lanes or riverfront areas.

2.1.6. Multi-Criteria Evaluation and Weighted Overlay Analysis

The weighted overlay analysis constitutes the methodological core of the GIS-MCE framework, translating the multi-parameter field assessment data into spatially differentiated composite scores through a structured GIS raster operation. The process involves three sequential computational steps: the conversion of vector-based field data into raster layers, enabling the application of uniform spatial operations across the study area; the application of parameter-specific weights to each raster layer, reflecting the relative planning importance of each infrastructure dimension; and the use of GIS spatial tools to calculate composite scores for each grid cell by summing the weighted raster values across all parameter layers.

The weight distribution applied in the reviewed study is reproduced and elaborated in the following table, with additional interpretive commentary reflecting their planning rationale.

Infrastructure Parameter	Weight Assigned	Percentage of Total Weight (approximate)	Planning Rationale
Road Connectivity	10	20.8%	Primary determinant of accessibility for all visitor categories; most spatially pervasive infrastructure element
Parking Facilities	9	18.75%	Direct driver of vehicular congestion in core areas; strongly influences traffic management outcomes
Public Toilets	8	16.7%	Critical hygiene infrastructure; deficiency has immediate and visible impact on visitor experience
Waste Management	8	16.7%	Environmental integrity of riverfront and ghat areas; public health implications
Street Lighting	5	10.4%	Safety enabler for dawn and dusk ritual activity; secondary to access and sanitation
Remaining Parameters (8)	8 (combined)	16.65%	Contextually important but lower planning priority relative to core access and sanitation parameters

Table 3 Weight distribution

The weighting hierarchy embedded in this distribution reflects a planning-informed prioritization that accords greatest importance to infrastructure elements most directly implicated in the management of visitor access and the maintenance of basic public health and safety standards. Road connectivity and parking receive the highest combined weighting — reflecting the recognition that mobility infrastructure failures have the most pervasive and cascading effects on the overall functioning of the destination — while parameters such as street lighting, though important, are accorded lower weights consistent with their secondary role in the planning priority hierarchy.

2.1.7. Infrastructure Priority Map — Output and Planning Utility

The culminating output of the weighted overlay analysis is the Infrastructure Priority Map, which spatially represents the composite infrastructure scores derived from the GIS-MCE process across the entire study area. This map categorizes the study area into three broad planning categories: high-priority intervention zones, characterized by low composite scores indicating severe and widespread infrastructure deficiency; moderately developed areas, where infrastructure conditions are partially adequate but require targeted improvement; and well-developed regions, where existing infrastructure is assessed as broadly satisfactory and requires primarily maintenance-level investment. The planning utility of this output is considerable. By providing a spatially explicit and empirically grounded representation of infrastructure

performance variation across the destination, the Infrastructure Priority Map enables planners and policymakers to move beyond reactive, crisis-driven responses to infrastructure failures and toward a proactive, evidence-based allocation of development resources. Areas identified as high priority are thereby flagged for concentrated and immediate planning attention, with the composite score data providing a basis for sequencing interventions and justifying investment decisions to funding authorities. This aligns the GIS-MCE framework with the principles of rational comprehensive planning and evidence-based governance, both of which emphasize the importance of systematic analysis and transparent decision criteria in the allocation of public resources.

2.1.8. Key Findings and Critical Evaluation

The reviewed study's principal finding that the integration of GIS with Multi-Criteria Evaluation provides a systematic, objective, and spatially precise framework for tourism infrastructure assessment is well-supported by its methodological design and analytical outputs. The framework's capacity to combine spatial and non-spatial data within a unified evaluative structure represents a genuine methodological contribution to the field of religious tourism planning, enabling a level of analytical comprehensiveness that neither purely spatial nor purely attribute-based approaches can independently achieve. The study also demonstrates that accessibility-focused planning incorporating disability-inclusive assessment criteria and weighting infrastructure elements that directly affect the mobility of vulnerable visitor groups significantly enhances the equity orientation of the resulting planning recommendations. However, a critical reading of the study reveals certain methodological limitations that warrant acknowledgment. The three-point scoring scale, while operationally practical, introduces a degree of assessor subjectivity that is difficult to fully control, and the absence of a detailed account of the weighting rationale whether weights were derived from expert consultation, Delphi processes, or normative planning standards leaves the weighting methodology partially open to critique. Furthermore, the study's application to Ujjain's relatively open urban geography does not fully address the additional planning complexity introduced by extreme spatial constraint, a condition that is definitionally characteristic of Omkareshwar's island-based settlement morphology.

2.1.9. Theoretical Connections and Planning Framework Alignment

The GIS-MCE framework reviewed in this study draws upon and reinforces several established planning theories. Its emphasis on data-driven, spatially explicit decision-making aligns with the principles of Smart City and GIS-based Planning, which advocate for the integration of spatial data technologies into urban governance to enhance transparency and analytical rigor. The accessibility audit component resonates with Universal Design theory, while the weighted overlay methodology reflects the rational planning tradition's commitment to systematic, criterion-based evaluation of alternatives. The framework's potential application to sustainable tourism management connects to the principles of Sustainable Tourism Development, particularly in its attention to environmental infrastructure waste management and sanitation as integral components of destination quality.

2.1.10. Relevance to the Present Study of Omkareshwar and Conclusion

The methodology and findings of the Ujjain GIS-MCE study are of direct, substantial, and multi-dimensional relevance to the present study of Omkareshwar. The two destinations share fundamental planning characteristics river-based sacred geography in Madhya Pradesh, intense

seasonal tourist inflow, infrastructure deficiency across mobility, sanitation, and public amenity domains, and the centrality of ghats and temple precincts to the spatial organization of the pilgrimage experience that make the methodological adaptation of the GIS-MCE framework from Ujjain to Omkareshwar not merely plausible but analytically compelling. The thirteen-parameter evaluation framework offers a directly applicable structure for infrastructure assessment in Omkareshwar, requiring adaptation primarily to incorporate parameters of particular relevance to the island setting including bridge accessibility, riverfront condition, and the specific constraints of the parikrama path. The Infrastructure Priority Map, as an analytical output, has the potential to provide Omkareshwar's planning and administrative authorities with a spatially differentiated and empirically grounded tool for investment prioritization that is currently entirely absent from the town's planning apparatus. The reviewed case study thus provides the present research with both a methodological model and a theoretical justification for its GIS-based analytical approach, and its findings collectively support the study's argument that sustainable, inclusive, and effective tourism development in Omkareshwar requires a shift from reactive infrastructure management to proactive, evidence-based spatial planning.

Section 2.2: Review of Related Literature

A systematic review of existing academic literature has been undertaken to establish the theoretical and empirical foundation of the present study. The reviewed studies span a range of geographical contexts — including Indian pilgrimage cities such as Ujjain, Mathura-Vrindavan, and Tarapith, as well as international urban tourism settings in Central Europe and China — thereby providing both nationally grounded and globally comparative perspectives on the planning challenges associated with religious and heritage tourism destinations. The studies have been selected on the basis of their relevance to the core themes of this research, namely pedestrian accessibility and crowd management, spatial transformation driven by pilgrimage tourism, strategic tourism planning policy, visitor experience and inclusive infrastructure design, and the socio-economic dimensions of tourism-led development.

The purpose of this review is not merely to catalogue existing knowledge but to critically synthesize methodological approaches, identify patterns and contradictions across findings, and establish a coherent intellectual foundation upon which the analytical framework of the present study is constructed. Each reviewed study has been evaluated against seven parameters: the title and authorship of the work, the geographical study area, the key planning focus, the methodology employed, the principal findings, the planning inference drawn in relation to the objectives of the present study, and the overall relevance to the Omkareshwar context. These parameters are summarized in the comparative literature review matrix presented in Table 2.1 below, which serves as a structured reference for the thematic discussion that follows.

Table :4 Comparative Literature Review Matrix

Title of the Paper	Author(s) & Year	Study Area	Key Focus	Methodology Used	Key Findings	Planning Inference (linked to objectives)	Relevance to Study
A walk accessibility-based approach to assess crowd management in mass religious gatherings	Karthika, Kedar, & Verma (2022)	Ujjain (Kumbh Mela), India	Crowd management, walk accessibility, and pedestrian route choices in religious gatherings.	Space Syntax, GIS, Network Analysis using pedestrian velocity data.	Pedestrian route choice is dictated by visual accessibility and angularity; temporary road closures heavily strain alternate paths due to complex trip-chaining by pilgrims.	GIS-based network analysis can map pedestrian flows around ghats and temples, enabling proactive route diversion and pedestrian-centric spatial planning (Links to Obj 2, 4, 5).	High: Provides a robust GIS methodology to resolve pedestrian congestion in a neighboring riverfront temple town.
Pilgrimage, state rescaling practices and production of space: A case of Mathura-Vrindavan	Singh (2025)	Mathura-Vrindavan, India	Impact of continuous pilgrim flows and state branding on the production of urban space, real estate, and built form.	Ethnography, Policy Analysis, Visual Documentation.	Pilgrimage acts as a catalyst for chaotic urbanization, driving unregulated real estate expansion and stressing civic amenities, leading to a patchwork of traditional and modern infill.	Demands integrated zoning and land-use strategies to regulate real estate speculation and separate heavy commercial/residential expansion from the sacred core (Links to Obj 1, 2, 4).	High: Highlights the urbanization and land-use challenges driven by the "ritual economy," vital for framing spatial strategies.
Considering urban tourism in strategic spatial planning	Klepej & Marot (2024)	10 Central European Cities	Responsiveness of strategic spatial planning to the rapid growth of urban tourism.	Policy analysis, descriptive statistics, responsiveness theory.	Strategic spatial planning documents are insufficiently responsive to tourism growth and lack strategic, cross-sectoral measures to steer sustainable development.	Tourism cannot be managed as an isolated sector; it must be structurally embedded into the town's overarching spatial master plan to ensure resilience and functional efficiency (Links to Obj 4).	High: Provides international theoretical justification for proposing a formalized, spatial planning-based framework over ad-hoc management.
City Walk thematic evaluation and optimization strategy based	Cheng, Z., & Buranaut, I. (2025)	Kunming, China	The key focus of the sources is the systematic evaluation and optimization of "City Walk" urban	IPA-Kano Model, Questionnaire Survey	Identifying gaps in tourist satisfaction regarding transit, signage, and street shops; emphasizes spatial equity and inclusive design	Assessing the tourism profile reveals that high tourist flows consistently exacerbate key issues like congestion and	Provides a framework for evaluating pedestrian infrastructure, crowd mobility, and

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on tourist experience			tourism routes to enhance the tourist experience and promote sustainable urban development			poor accessibility, particularly in traditional street layouts	the balance of heritage preservation vs. modern amenities in historical/pilgrimage t
Tourism as a livelihood development strategy: a study of Tarapith Temple Town, West Bengal	Masud Rana Mondal, 2020	Tarapith Temple Town, West Bengal, India	Effects of tourism on local livelihood, job distribution, socio-economic disparity, and standard of living	Exploratory study; household/market surveys (stratified random sampling); Principal Component Analysis (asset holdings); Logistic regression (local perceptions)	Tourism increases per capita expenditure by 35.94% and improves water/power infrastructure, but creates "enclave tourism" where outsiders dominate high-paying jobs; increased pollution and congestion are noted	Infrastructure and spatial planning must prioritize social equity alongside tourist upgrades (Objective 3); frameworks must proactively mitigate pollution and congestion caused by tourist influx (Objective 4)	Highlights the duality of pilgrimage infrastructure serving tourists vs. locals; vital for evaluating existing infrastructure gaps and socio-economic planning in Omkareshwar.
A walk accessibility-based approach to assess crowd management in mass religious gatherings	Karthika, Kedar, & Verma (2022)	Ujjain (Kumbh Mela), India	Crowd management, walk accessibility, and pedestrian route choices in religious gatherings.	Space Syntax, GIS, Network Analysis using pedestrian velocity data.	Pedestrian route choice is dictated by visual accessibility and angularity; temporary road closures heavily strain alternate paths due to complex trip-chaining by pilgrims.	GIS-based network analysis can map pedestrian flows around ghats and temples, enabling proactive route diversion and pedestrian-centric spatial planning (Links to Obj 2, 4, 5).	High: Provides a robust GIS methodology to resolve pedestrian congestion in a neighboring riverfront temple town.
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Table 4: Comparative Review of Selected Literature on Religious Tourism, Spatial Planning, and Infrastructure Management

The literature synthesized in Table 4 reveals several consistent and cross-cutting themes that collectively inform the methodological design and analytical orientation of the present study. A critical observation across the reviewed studies is that religious tourism, regardless of geographical context, generates a characteristic cluster of spatial planning challenges including pedestrian-vehicular conflict, infrastructure deficiency in high-footfall zones, unregulated commercial encroachment, and the marginalization of resident communities in tourism-driven development that cannot be adequately addressed through sectoral or reactive planning approaches. The literature collectively argues, across diverse methodological traditions ranging from GIS-based spatial analysis and Space Syntax to ethnography and policy responsiveness theory, that effective management of religious tourism destinations requires integrated, evidence-based, and spatially grounded planning frameworks that embed tourism within the broader structure of urban development strategy. The following section presents a detailed thematic analysis of the reviewed literature, drawing upon the comparative insights of Table 4 to develop a structured and critically engaged discussion of the key planning themes, theoretical frameworks, and research gaps that underpin the present study of Omkareshwar.

Chapter 3

3.1 Data analysis and Interpretation

The analytical framework employed in this chapter is structured to systematically interrogate the tourism dynamics of Omkareshwar, a significant pilgrimage settlement located along the banks of the Narmada River in Madhya Pradesh, India. The overarching objective of the analysis is to translate raw empirical data into actionable urban planning insights, addressing the structural challenges that arise from the intersection of religious tourism, demographic pressure, and inadequate physical infrastructure. The data analyzed in this chapter is derived from two primary sources: secondary data obtained from official tourism records for the year 2025, and primary survey data collected through structured questionnaires administered to a representative sample of visitors and residents. The analysis proceeds along a dual axis. The first axis interrogates macro-level tourism patterns through secondary data, examining monthly visitor inflow, festival-based footfall concentration, and the typological distribution of tourist visits. The second axis engages with micro-level visitor perceptions through primary survey data, covering demographic profiles, travel behavior, infrastructure assessment, environmental conditions, and experiential quality. Together, these two analytical streams offer a comprehensive and multi-scalar understanding of the urban challenges confronting Omkareshwar as a heritage pilgrimage destination. From a methodological standpoint, the data has been organized into structured tabular and graphical formats to facilitate cross-variable interpretation. Descriptive statistical analysis was employed to quantify the distribution of responses across key variables, while graphical representations including line graphs, bar charts, and pie charts have been utilized to communicate patterns and proportional distributions effectively. Where applicable, planning implications have been drawn directly from the empirical findings, ensuring that the analysis is not merely descriptive but is oriented toward evidence-based urban intervention.

3.1.1 Secondary Data Analysis

Secondary data pertaining to tourism inflow at Omkareshwar was systematically collated from official sources including the Madhya Pradesh Tourism Development Corporation records and local municipal data for the year 2025. The dataset was organized across three analytical dimensions: monthly tourist inflow, festival-based footfall, and tourist type distribution, each of which is examined in detail in the subsections below. These dimensions collectively illuminate the temporal rhythm of tourism in Omkareshwar, revealing a pattern that is simultaneously cyclical, festival-driven, and heavily concentrated on specific days and occasions. Such a pattern carries significant implications for infrastructure sizing, crowd management planning, and the economic sustainability of local service providers.

3.1.2 Monthly Tourist Inflow Analysis



Figure 5– Monthly Tourist Flow (Jan–Dec 2025)

The monthly tourist inflow data recorded at Omkareshwar for the calendar year 2025 reveals a markedly non-uniform temporal distribution of visitors, characterised by sharp peaks that correspond with major religious observances and equally pronounced troughs during intervening periods. An analysis of the twelve-month cycle discloses that visitation patterns are not random but are instead structured around the Hindu liturgical calendar, particularly those festivals and sacred months associated with the worship of Lord Shiva. The aggregate annual footfall is estimated at approximately 40 lakh (4,000,000) visitors, placing Omkareshwar among the most frequented Jyotirlinga pilgrimage sites in central India. This figure, while significant in absolute terms, acquires deeper analytical value only when disaggregated into monthly intervals, since the uneven temporal spread of visitors has direct and measurable consequences for infrastructure loading, resource allocation, and environmental sustainability at the site. The most conspicuous feature of the annual distribution is the dominant peak recorded in February, when visitor arrivals surge to approximately 5,30,000 the highest monthly figure observed in the entire annual cycle. This pronounced concentration of pilgrimage activity in February is directly and unambiguously attributable to the celebration of Mahashivratri, one of the most sacred occasions in the Shaivite devotional tradition. Mahashivratri, which typically falls on the fourteenth night of the dark fortnight in the month of Phalguna, draws an extraordinary convergence of pilgrims from across Madhya Pradesh, Maharashtra, Rajasthan, and beyond. The month of February thus represents the most intensive demand period for Omkareshwar's civic and religious infrastructure, placing maximum concurrent stress on hospitality services, sanitation systems, public transport networks, and crowd management mechanisms. The magnitude of this single-month surge — constituting approximately 13.25 percent of the total annual inflow underscores the degree to which visitation demand is concentrated around a single ceremonial event. Following the February peak, a secondary but nonetheless substantial surge in pilgrimage activity is observed during the months of July and August, with recorded visitor counts of approximately 4,70,000 and 4,80,000 respectively. This bimodal secondary peak corresponds to the Shravan month (Shraavana) in the Hindu lunar calendar, a period traditionally regarded as the most auspicious

for the veneration of Lord Shiva. During Shravan, which spans roughly from mid-July to mid-August in the Gregorian calendar, millions of devotees undertake ritual fasts, conduct Rudrabhishek ceremonies, and undertake arduous journeys to Shiva pilgrimage centres across the subcontinent. The two-month sustained elevation in visitor volumes collectively accounting for approximately 23.75 percent of the annual inflow is analytically significant because it demonstrates that pilgrimage demand at Omkareshwar is not episodic but rather sustained over an extended ritual window. From a planning standpoint, this implies that service delivery systems must be calibrated not merely for single-day or weekend surges but for a protracted high-demand phase lasting eight to nine consecutive weeks. A tertiary peak is discernible in October, where visitor arrivals recover to approximately 4,70,000 after a modest decline in September (approximately 4,10,000). This autumnal resurgence in pilgrimage activity aligns with the cluster of pan-Indian festivals including Navratri, Dussehra, and Diwali, which collectively animate religious travel and cultural mobility across much of the subcontinent during this period. While the October peak is less dramatic than those observed in February and July–August, its magnitude is nonetheless substantial and warrants commensurate preparedness on the part of site management authorities. The months of January and March register visitor volumes in the range of 3,60,000 and 3,80,000 respectively, representing transitional periods between the February peak and the trough months of the pre-monsoon season. June, positioned at the onset of the monsoon, records a relative plateau at approximately 3,40,000, suggesting that while rainfall does reduce absolute visitor numbers, the religious significance of the site sustains a residual baseline of pilgrimage activity even during climatically adverse conditions. Conversely, the months of April, May, and December record the lowest inflow figures in the annual cycle, with approximate visitor counts of 2,90,000, 2,80,000, and 2,50,000 respectively. The suppression of tourist activity in April and May is principally attributable to the severe thermal conditions prevailing across the Nimar region of Madhya Pradesh, where ambient temperatures frequently exceed 42 degrees Celsius during peak summer, rendering outdoor pilgrimage activity physically arduous and potentially hazardous for elderly and infirm visitors. The nadir in December, recording the lowest monthly visitor count in the dataset at approximately 2,50,000, reflects the conspicuous absence of major Shaivite festivals during this month, combined with the constraints of the winter agricultural season in the primary source catchment areas. These off-season months, while representing troughs in visitor flow, simultaneously constitute windows of opportunity for the undertaking of infrastructure rehabilitation, deferred maintenance, and capacity enhancement works at the site. Viewed in aggregate, the monthly distribution at Omkareshwar conforms to what may be characterised as a bimodal-asymmetric pilgrimage demand curve, wherein a dominant primary peak (February) and a more sustained secondary plateau (July–August) together account for a disproportionate share of annual visitor inflow. The ratio between the peak month (February, 5,30,000) and the trough month (December, 2,50,000) stands at approximately 2.12:1, indicating that peak-period demand is more than double that of the off-season—a variability coefficient that carries profound implications for infrastructure dimensioning and service capacity planning. Any planning framework premised on average monthly demand (approximately 3,33,000 visitors per month) would systematically underestimate peak-period requirements by a margin of approximately 59 percent, thereby generating critical service deficits precisely during those periods of highest public visibility and reputational significance for the pilgrimage destination. It is essential, however, to acknowledge the inherent methodological limitations of monthly headcount data as a

standalone instrument of tourism analysis. The dataset, as currently constituted, does not differentiate between same-day visitors and overnight tourists, does not capture intra-month temporal distribution of arrivals (including the concentration of visitors on specific festival days within a given month), and does not record the spatial routing of pilgrims within the site precincts. Furthermore, official enumeration figures for pilgrimage sites of this nature are frequently subject to estimation uncertainty, particularly during festival periods when the informal, decentralised, and often spontaneous character of pilgrimage mobility renders systematic counting operationally difficult. Crowd density estimates based on aerial photography, vehicular entry point counts, accommodation occupancy records, and digital footprint data from mobile networks would collectively contribute to a more granular, triangulated, and methodologically robust portrait of visitor volumes. Future iterations of this data collection exercise should therefore integrate these complementary methodologies to overcome the limitations inherent in reliance upon a single enumeration source, and thereby provide the empirical foundation for evidence-based planning of pilgrimage tourism infrastructure at Omkareshwar.

3.1.3 Festival Footfall Analysis

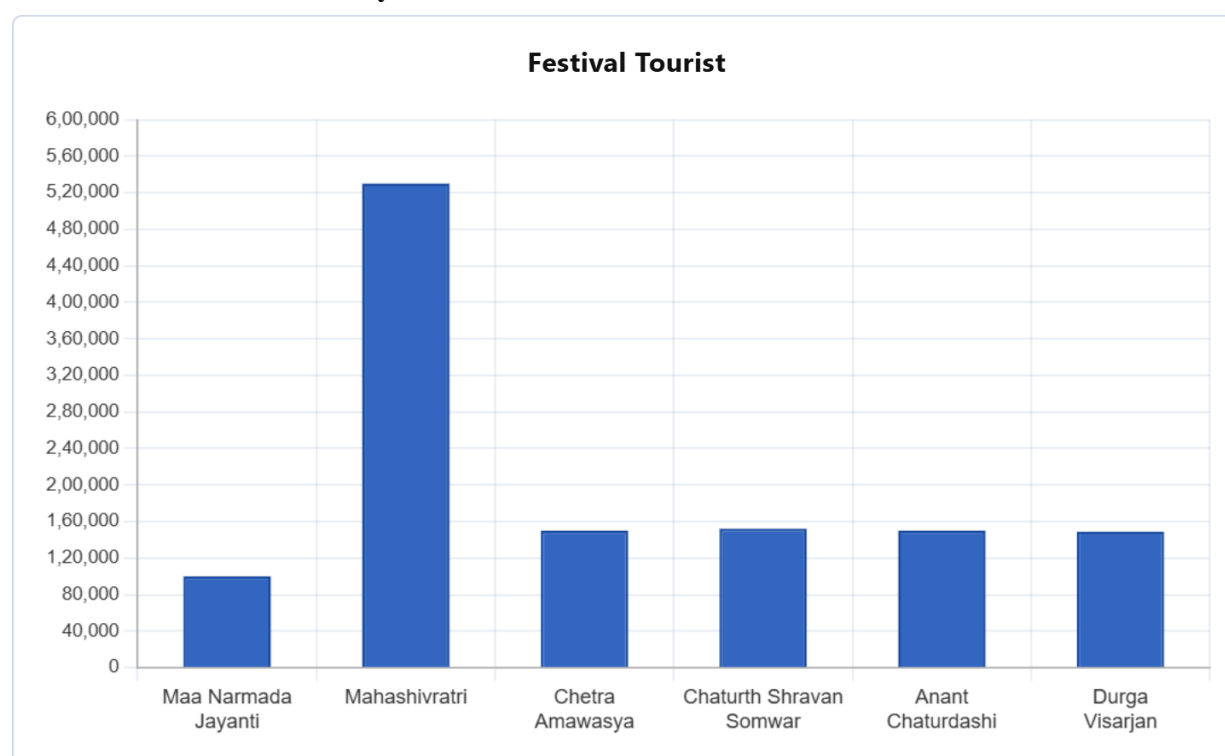


Figure 6 Festival Tourist Footfall

The festival-wise footfall analysis at Omkareshwar presents a compelling portrait of concentrated, event-driven pilgrimage tourism that poses significant and recurring challenges for urban infrastructure management. Data drawn from the 2025 visitor enumeration records indicates that five major festivals, namely Mahashivratri, Chetra Amavasya, Chaturth Shravan Somwar, Anant Chaturdashi, and Durga Visarjan, each attract visitor volumes in the range of 1,49,000 to 1,52,000, with the cluster average approximating 1,50,000 visitors per event. This

remarkable degree of uniformity in festival-wise footfall magnitude across ritually and calendrically distinct observances is a noteworthy empirical finding. It suggests that Omkareshwar commands a consistently high and stable level of religious significance across multiple devotional traditions and sectarian streams within the broader Hindu liturgical framework, rather than being dependent upon a single flagship event for the bulk of its annual pilgrimage traffic. A particularly significant trend discernible in this dataset is the acute temporal compression of visitor demand during festival periods. Unlike tourism in leisure, heritage, or recreational destinations where visitor arrivals are distributed across multiple days, weeks, or even seasons, pilgrimage festivals at Omkareshwar concentrate upwards of 1,50,000 visitors within a window of 24 to 48 hours. This creates an intensity of localised demand that is orders of magnitude higher than the average daily visitor load of approximately 10,900 persons estimated from the annual aggregate of 40 lakh visitors spread across 365 days. This phenomenon, which may be analytically characterised as demand surging, carries severe physical and logistical consequences. The road network, parking infrastructure, riverfront ghat spaces, sanitation facilities, and drinking water distribution systems are simultaneously subjected to instantaneous peak loads that far exceed their designed capacities, resulting in systemic service failures precisely during those moments of highest public visibility and reputational exposure for the pilgrimage destination. The case of Maa Narmada Jayanti warrants separate and careful consideration. With a recorded footfall of approximately 1,00,000 visitors, this festival occupies a comparatively lower position in the festival-wise distribution, registering a footfall approximately 33 percent below the cluster average of the other five major festivals. This relative differential may reflect the festival's comparatively limited recognition within the pan-regional Hindu religious calendar beyond the Narmada river basin, or it may be attributable to its scheduling coinciding with periods when competing religious observances or adverse seasonal conditions reduce the propensity for long-distance pilgrimage travel. Notwithstanding these considerations, a concentrated inflow of 1,00,000 visitors within a compressed 24 to 48 hour window remains a substantial and non-trivial planning challenge by any objective metric of urban carrying capacity. From the standpoint of urban and infrastructure planning, the festival footfall dataset makes a compelling empirical case for the development and institutionalisation of a Temporary Event Management Plan for Omkareshwar. Such a framework, designed as a pre-emptive and scalable operational protocol, would be activated in advance of each major festival event to systematically deploy temporary sanitation infrastructure, demarcated pedestrian crowd channels, vehicular diversion and parking management routes, and medical first-response stations at strategic nodes within the pilgrimage precinct. A critical planning advantage that distinguishes festival-driven pilgrimage surges from other forms of unscheduled mass gatherings is the high degree of calendrical predictability of these events. The recurrence of these festivals on astronomically determined or liturgically fixed dates each year affords planning agencies the opportunity to transition from reactive crisis management to anticipatory, evidence-based operational preparedness. In this context, the establishment of a permanent Event Infrastructure Reserve at Omkareshwar, comprising portable sanitation units, mobile water tankers, modular crowd-control barriers, and temporary wayfinding and signage systems, would constitute a fiscally prudent and operationally rational investment relative to the cumulative infrastructure stress and civic service failure costs generated annually by unmanaged festival-period demand surges.

3.1.4 Tourist Distribution Analysis

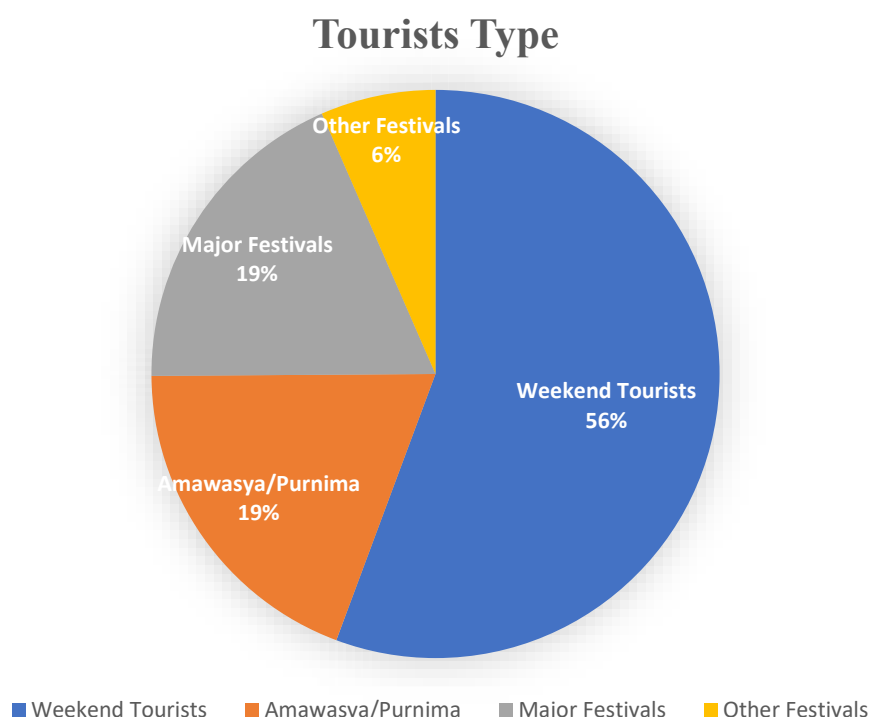


Figure 7 Tourist type distribution

The tourist distribution data, as represented in the pie chart, reveals an important structural feature of tourism in Omkareshwar that is frequently overlooked in conventional destination analyses: the primacy of routine, non-festival tourism as the baseline demand condition. Weekend tourists constitute the single largest category of visitors, accounting for 56% of all visits. This finding is analytically significant because it demonstrates that Omkareshwar is not merely a festival destination that experiences episodic visitation; rather, it functions as a continuously active pilgrimage site that sustains a substantial weekly visitor load independent of major religious events. Amavasya (new moon) and Purnima (full moon) days each attract a religiously motivated cohort of visitors, collectively contributing 19% of total visits. In the Hindu religious tradition, these lunar dates are considered particularly auspicious for ancestral rites (pitru tarpan) and Shivalinga worship, and Omkareshwar as a Jyotirlinga site is a preferred destination for such observances. The regularity of these lunar events occurring twice per month throughout the year ensures that the town's infrastructure must be prepared for a predictable fortnightly surge in visitor activity, even in the absence of a formal festival designation. Major festivals contribute 19% of total visits, while other festivals account for the remaining 6%. When considered in aggregate, the data indicates that festival-driven visitation (inclusive of Amavasya/Purnima) accounts for approximately 44% of total visitor traffic, while routine weekend tourism accounts for the majority. This suggests that while festivals generate the most intense and visible demand peaks, the cumulative burden on infrastructure from routine weekly tourism is equally, if not more, significant from a long-term planning perspective. A planning strategy that focuses exclusively on festival management, while neglecting the routine provision of quality sanitation, parking, and pedestrian infrastructure for weekend visitors, will fail to address the foundational challenges of sustainable pilgrimage tourism management in Omkareshwar.

3.2 Primary Survey Data Analysis

The primary survey was conducted through the administration of structured questionnaires to a purposively selected sample of visitors at Omkareshwar. The survey instrument was designed to elicit information across seven thematic domains: (i) demographic characteristics of respondents; (ii) travel behavior and visit patterns; (iii) assessment of transport and accessibility infrastructure; (iv) evaluation of tourist facilities and essential services; (v) perceptions of environmental quality; (vi) experiential assessment including safety, hospitality, and social impact; and (vii) prioritization of infrastructure improvement needs. The findings from each domain are analyzed in detail in the following subsections, with planning implications drawn at each analytical stage.

3.2.1 Demographic Profile of Respondents

Respondent Age Group (%)

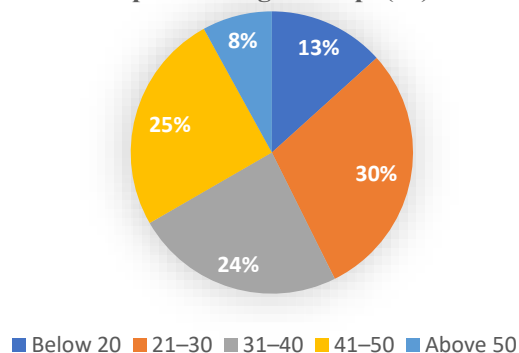


Figure 8 Respondent Age

Respondent Gender (%)

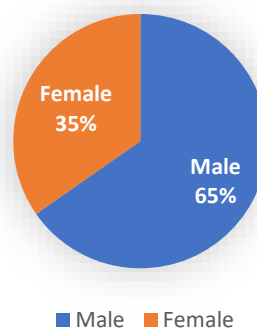


Figure 9 Respondent Gender

Respondent Occupation (%)

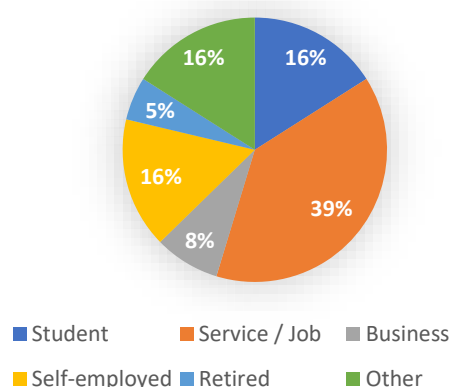


Figure 10 Respondent Occupation

Respondent Residence (%)

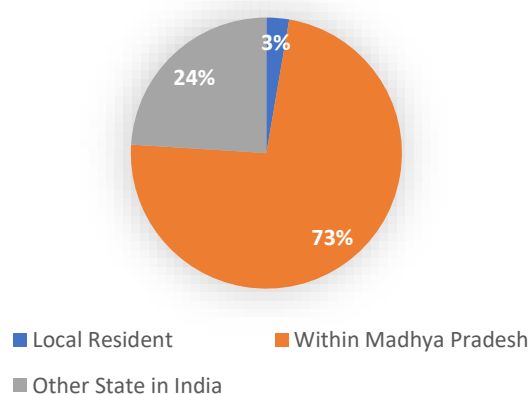


Figure 11 Respondent Residence

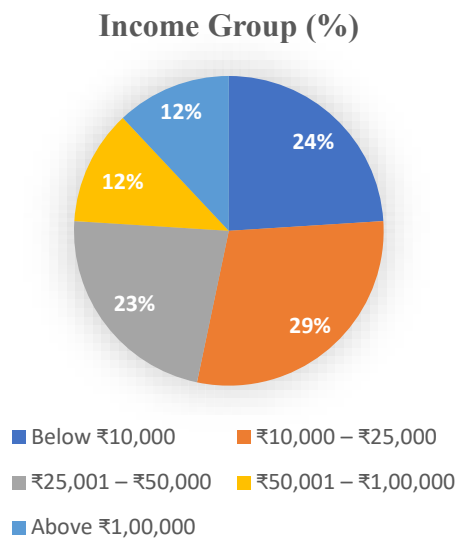


Figure 12 Respondent Income Group

The demographic profile of survey respondents provides a foundational framework for understanding the characteristics and needs of Omkareshwar's visitor base. The age distribution reveals that 79% of respondents fall within the 21–50 age bracket, with the 21–30 cohort constituting the single largest age group at 30%, followed by the 41–50 cohort at 25% and the 31–40 cohort at 24%. This concentration of young and middle-aged visitors is characteristic of physically active pilgrimage destinations that involve walking, ghat descents, and ritual bathing activities that favor visitors with higher physical mobility. From a planning

standpoint, this age profile suggests that infrastructure must be capable of handling large volumes of physically active visitors, while simultaneously ensuring that universal accessibility provisions are in place for the smaller but non-negligible proportion of older and differently-abled pilgrims. Geographically, the data indicates that Omkareshwar draws from a wide and regionally diverse catchment area. Approximately 73% of respondents originate from within Madhya Pradesh, while 24% arrive from other states in India. The local resident proportion constitutes a mere 3% of respondents, confirming that the survey sample is predominantly composed of out-of-town visitors the primary target population for infrastructure and service provision assessments. The significant out-of-state visitor proportion (24%) underscores the national-level religious significance of Omkareshwar as one of the twelve Jyotirlinga shrines and has direct implications for tourist information services, wayfinding infrastructure, and multilingual signage. The gender distribution, with males constituting 65.3% of respondents, reflects a pattern commonly observed in Indian pilgrimage contexts, where male-led household religious travel remains more prevalent. However, the female visitor proportion of 35% is substantive and warrants dedicated attention to gender-sensitive infrastructure planning specifically the adequacy, safety, and cleanliness of women's toilet facilities at the ghats and in public spaces. The occupation distribution, dominated by salaried workers (38.7%), indicates a visitor base with constrained time availability, which correlates with the short-duration visit pattern observed in the travel behavior data analyzed subsequently. The income distribution data reveals a structurally important economic characteristic of the visitor base: 53% of respondents report a monthly household income below ₹25,000, placing them in the lower-to-middle income bracket. A further 23% fall within the ₹25,001–₹50,000 range. Only 24% of visitors report incomes above ₹50,000 per month. This income profile directly governs the price sensitivity of visitors and the economic viability of infrastructure financing models. It indicates that fee-based tourism services such as paid parking, cloak room charges, or entrance levies must be calibrated to very modest price points to remain accessible to the majority of the visitor base. It also suggests that public subsidy of basic amenities such as toilets, drinking water, and shaded rest areas is economically justified,

as market provision of these services at cost-recovery rates would be unaffordable for a majority of visitors.

3.2.2 Travel Characteristics and Visitor Behaviour

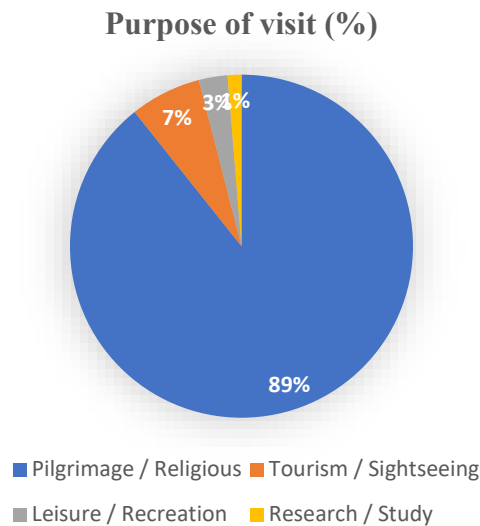


Figure 13 Purpose of visit

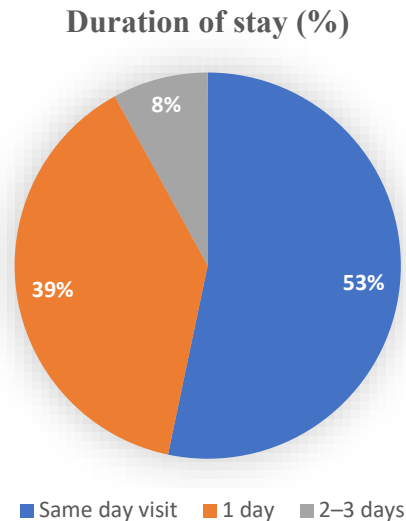


Figure 14 Duration of stay

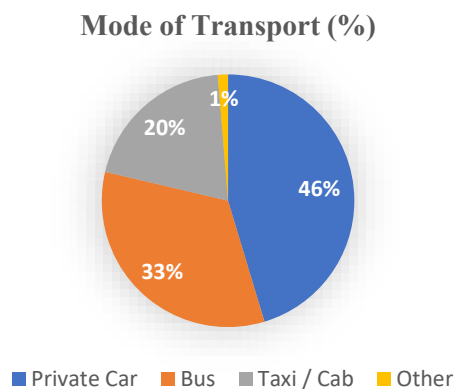


Figure 15 Mode Of Transport

The travel behavior data unequivocally establishes Omkareshwar's identity as a mono-functional religious destination. An overwhelming 89.3% of respondents identify pilgrimage or religious activity as their primary purpose of visit, with tourism, sightseeing, and leisure together accounting for only 10% of visits. This near-exclusive dominance of religious motivation has profound implications for urban planning, as it means that the temporal patterns, spatial behaviors, and service expectations of visitors are shaped almost entirely by religious ritual schedules rather than leisure preferences. Visitors

arrive to perform specific rites Shivalinga darshan, Narmada parikrama, ghat rituals and their spatial footprint within the town is largely confined to the route from the entry point to the sacred core. A critical finding for economic development planning is the dominance of very short-duration visits. The data reveals that 53% of respondents complete their visit within the same day, while an additional 39% stay for one day. Consequently, 92% of visitors spend 24 hours or less in Omkareshwar. Overnight stays of two to three days are reported by only 8% of respondents. This 'day-tripper' pattern has severe economic consequences: with the majority of visitors departing before nightfall, expenditure on accommodation, evening dining, and secondary tourism activities is minimal. The economic multiplier effect of tourism whereby visitor spending circulates through local supply chains is substantially curtailed by the brevity of stays. This economic leakage is compounded by the income profile analyzed above, which predisposes visitors toward minimal discretionary spending. The modal choice data indicates

that private vehicles are the primary mode of transport for 45.3% of respondents, followed by public buses at 33.3%. This heavy reliance on private vehicles in a physically constrained town with narrow approach roads and limited flat land for parking is the proximate cause of the traffic congestion and parking crises documented in the infrastructure assessment. The lack of adequate intercept parking facilities at the town periphery, combined with the absence of a reliable shuttle service connecting the parking areas to the sacred core, forces private vehicles deep into the town's interior, exacerbating congestion at the most sensitive nodes. The 33.3% public bus users represent a potentially expandable segment that could be leveraged through improved bus frequency, dedicated bus bays, and last-mile connectivity improvements to reduce private vehicle pressure.

3.2.3 Infrastructure and Urban Accessibility Assessment

Parking Availability (%)

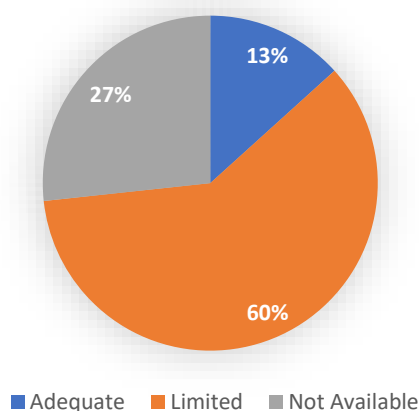


Figure 16 Parking Availability Pie chart

Road Connectivity (%)

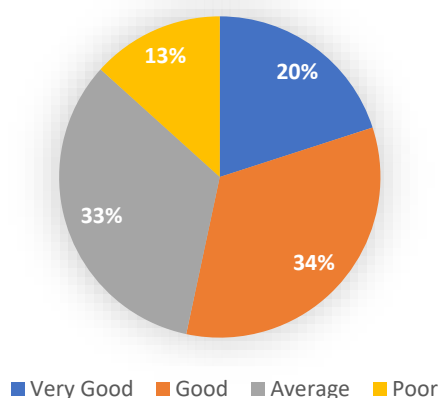


Figure 17 Road Connectivity Piechart

Ease Of Movement (%)

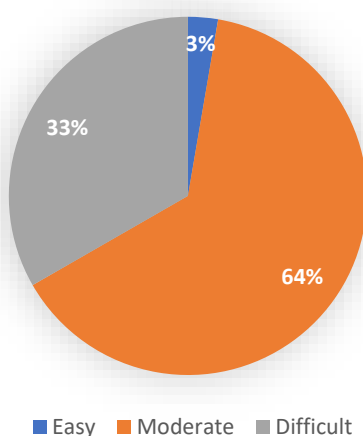


Figure 18 Ease Of Movement Pie Chart

Internal Public Transport Availability (%)

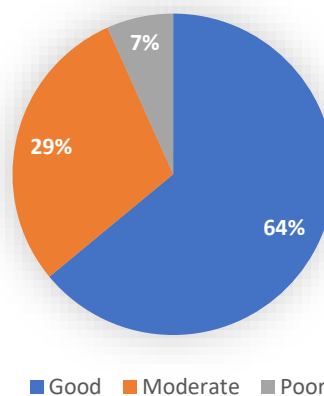
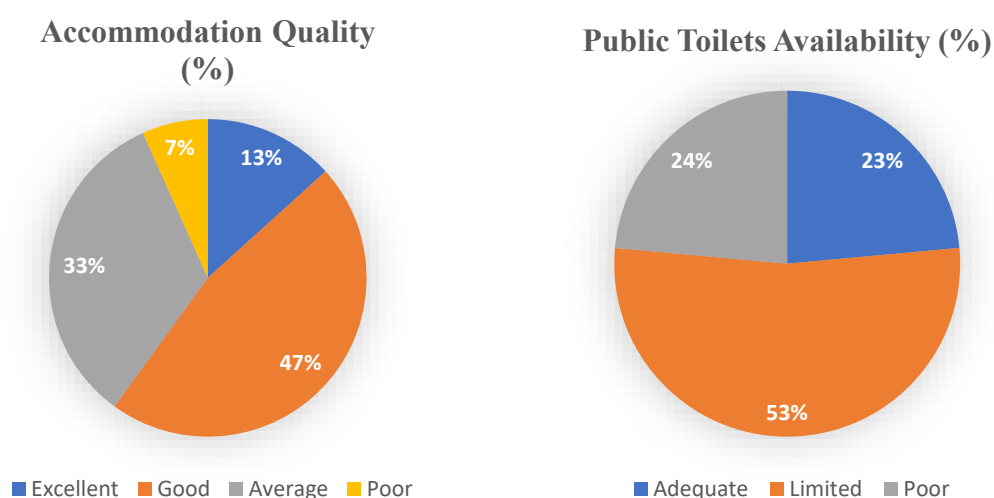


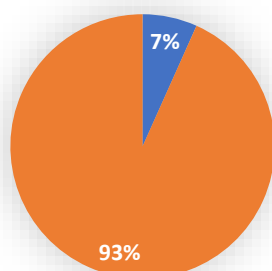
Figure 19 Internal Public Transport Pie Chart

The infrastructure and accessibility assessment data reveals a spatially differentiated performance profile that can be conceptualized as a 'funnel crisis': the external approach to Omkareshwar is moderately functional, but the town's internal mobility network collapses under the pressure of visitor demand. Road connectivity to the town is rated as Very Good or Good by 54% of respondents, while an additional 33% rate it as Average suggesting that the regional highway and road network connecting Omkareshwar to major urban centers is performing adequately. This finding is consistent with recent infrastructure investments in Madhya Pradesh's religious tourism connectivity, including the Narmada Expressway project and road widening schemes on key approach corridors. However, the situation deteriorates dramatically when the analysis shifts to internal mobility. Parking availability is rated as Adequate by only 13% of respondents, while 60% report Limited availability and 27% indicate that parking is Not Available at all. In aggregate, 87% of visitors experience parking as an inadequate service a finding that constitutes a near-total infrastructure failure for a destination that serves hundreds of thousands of private vehicle arrivals per year. This parking deficit has cascading consequences: vehicles are parked on approach roads, at ghat edges, and in narrow lanes, reducing effective road widths and creating pedestrian hazards. Ease of internal movement further confirms the crisis, with only 3% of respondents finding it Easy, while 64% describe it as Moderate and 33% as Difficult. Thus, 97% of visitors experience some degree of constraint in their internal mobility a finding that points to systemic deficiencies in pedestrian pathway design, the width of internal lanes, and the management of vehicle-pedestrian conflicts. The data indicates that the problem is not the absence of internal public transport, which 64% of respondents rate as Good; rather, it is the physical road and pathway infrastructure that is inadequate to support smooth movement. This analytical pivot is critical: the planning response must prioritize spatial reconfiguration pedestrianization of core zones, dedicated pedestrian pathways to the ghats, and the creation of intercept parking nodes at the urban periphery rather than simply increasing the fleet of transport vehicles.

3.2.4 Evaluation of Tourist Facilities and Essential Services

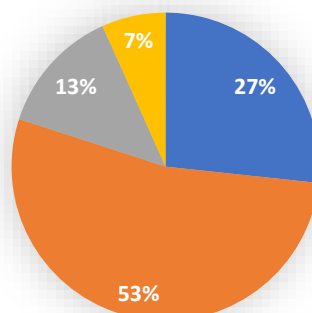


Drinking Water Availability (%)



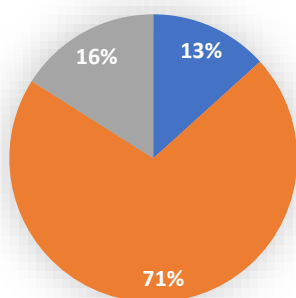
■ Limited ■ Poor

Food Facilities Available (%)



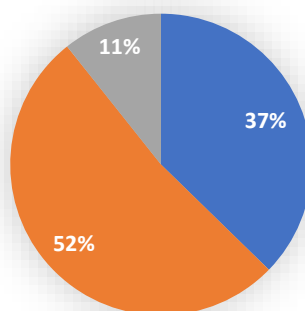
■ Excellent ■ Good ■ Average ■ Poor

Tourist Information Centre (%)



■ Adequate ■ Limited ■ Not Available

Signage & Direction (%)



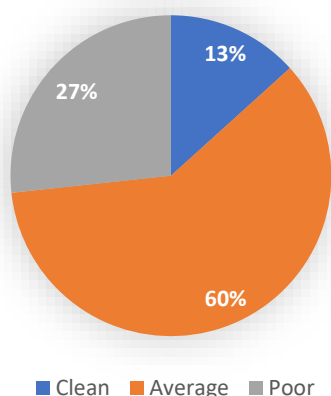
■ Adequate ■ Limited ■ Poor

The tourist facilities assessment reveals a stark and analytically significant bifurcation in service quality between privately provided commercial services and publicly managed utilities. This 'Public-Private Gap' constitutes one of the most important planning findings of the entire survey, with direct implications for the role of the urban local body in destination management. Services delivered primarily by the private sector food (80% Good or Excellent) and accommodation (60% Good or Excellent) record relatively high satisfaction scores, reflecting the market responsiveness of commercial operators to visitor demand. In sharp contrast, publicly managed utilities are in a state of critical failure. Drinking water availability is rated as Poor by 93% of respondents, with a further 7% rating it as merely Limited meaning that not a single respondent rates it as Adequate. This constitutes an absolute infrastructure failure of the highest order for a destination that receives lakhs of visitors annually, many of whom travel long distances in warm weather and engage in physically demanding pilgrimage activities. The health implications of inadequate drinking water provision dehydration, heat exhaustion, and waterborne disease risk are severe and represent an unacceptable public health failure at a site of national religious importance. Public toilet availability fares only marginally better, with 53% rating it as Limited and 24% as Poor meaning that 77% of respondents consider toilet facilities to be inadequate. For a destination where 89% of visitors arrive for religious

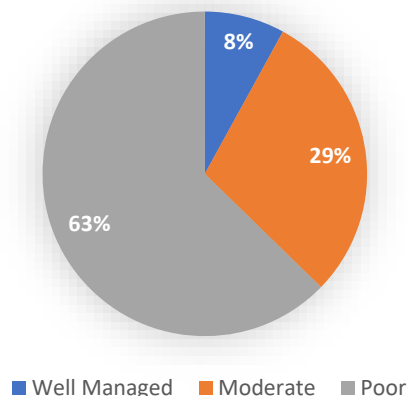
observances that include ritual bathing and extended time at the ghats, the absence of clean, adequately provisioned sanitation infrastructure is both a public health crisis and a visitor experience failure. The inadequacy of women's toilet facilities in particular is a critical gender-equity concern that requires targeted intervention. The tourist information infrastructure is similarly deficient: 71% of respondents rate the Tourist Information Centre as Limited, while 16% indicate it is Not Available. Given that 73% of visitors originate from outside Madhya Pradesh, the absence of an effective information hub represents a systemic failure in the destination's visitor orientation system. Similarly, 52% find signage to be Limited and 11% rate it as Poor, meaning 63% of visitors struggle with wayfinding an unacceptable situation for a heritage pilgrimage site of national importance. A comprehensive signage master plan, implemented in Hindi, English, and potentially regional languages, combined with a functional Tourist Information Centre staffed with trained personnel and equipped with digital information resources, would represent a high-impact, relatively low-cost intervention to address these deficiencies.

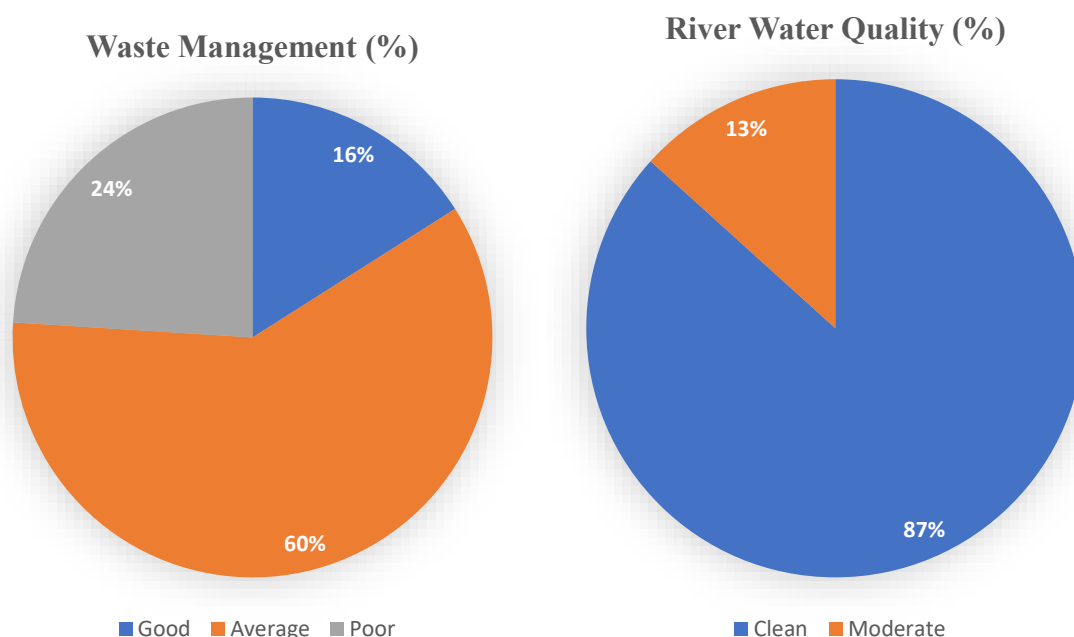
3.2.5 Environmental Quality and Management Assessment

Ghats Cleanliness (%)



Crowd Management (%)

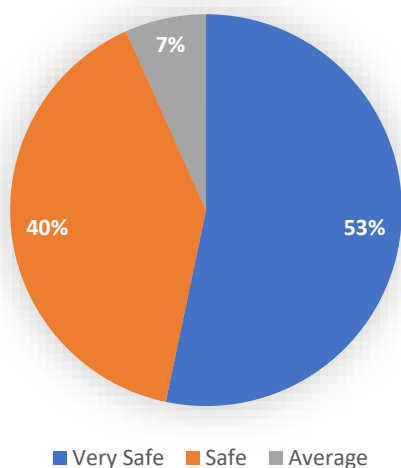




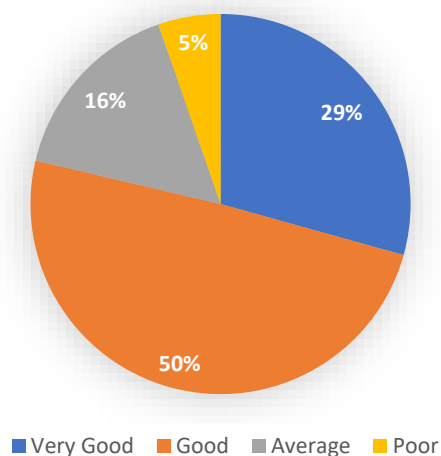
The environmental quality assessment data presents a paradox that is analytically revealing and carries important implications for environmental communication and intervention strategy. On one hand, 86.7% of respondents perceive the Narmada River water as Clean a finding that reflects the deep spiritual reverence with which the river is regarded in Hindu tradition and the attribution of its purity to divine rather than physical characteristics. On the other hand, the surrounding urban environment receives deeply negative evaluations: 80% of respondents rate general cleanliness as Average or Poor, while 86.7% rate ghat cleanliness the sacred riverbank interface as Average or Poor, with 60% specifically rating it as Poor. This cognitive dissonance the simultaneous perception of spiritual purity and physical neglect is a phenomenon that has been documented in pilgrimage geographies globally and represents a critical challenge for environmental communication. For planners, it suggests that interventions must prioritize the most 'visible' and 'tangible' aspects of environmental quality, particularly at the ghat edges and approach paths, where the disconnect between spiritual expectation and physical reality is most acutely experienced by visitors. The contrast between the pristine river and the littered surroundings is, in effect, a visual indictment of the urban management systems in Omkareshwar. Waste management is rated as Poor by 24% of respondents and Average by 60%, with only 16% finding it Good. This means that 84% of visitors find waste management to be inadequate a finding consistent with the visible evidence of litter accumulation at the ghats, in market areas, and along approach roads. The absence of an adequate network of solid waste bins, the irregular frequency of waste collection, and the lack of citizen awareness and behavioural norms regarding waste disposal in sacred spaces combine to produce this outcome. Crowd management is rated as Poor by 63% of respondents, with only 8% rating it as Well Managed reflecting the near-total absence of structured crowd flow management protocols during peak periods.

3.2.6 Visitor Experience, Safety, and Social Impact Perception

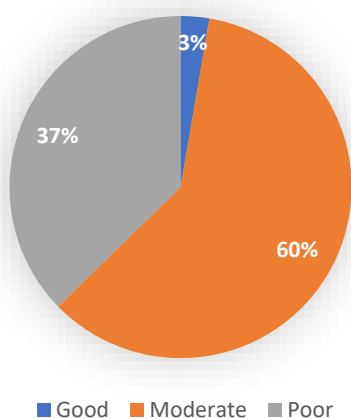
Safety level (%)



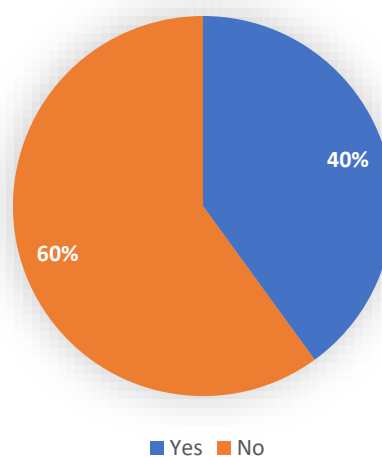
Hospitality level (%)



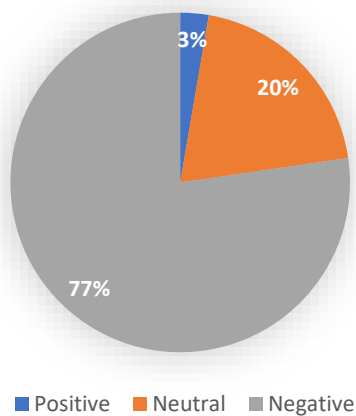
Medical & Emergency Services (%)



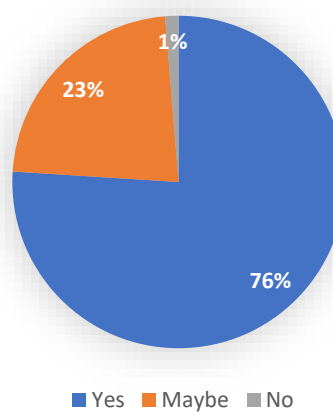
Overcrowding Observed (%)



Impact On Environment (%)



Recommendation (%)



The visitor experience and social perception data reveals a destination that is operating on the strength of its intangible assets spiritual significance, local hospitality, and personal safety while its physical and environmental management systems are approaching systemic failure. Safety is perceived positively by 93.3% of respondents (53% Very Safe, 40% Safe), reflecting the generally peaceful social environment of Omkareshwar and the visible presence of local security and police personnel during peak periods. Hospitality is rated positively by 78.6% of respondents, affirming the traditional virtue of pilgrim hospitality (atithi devo bhava) that characterizes the social ethos of temple towns across India. The high recommendation rate 76% of respondents would recommend Omkareshwar to others, with a further 23% indicating 'maybe' is a measure of overall destination satisfaction that, at first glance, appears inconsistent with the severe infrastructure deficiencies documented in earlier analytical sections. This apparent inconsistency is explained by the spiritual motivation underlying visitation: for a pilgrim, the religious experience of darshan at a Jyotirlinga shrine and the ritual sanctity of the Narmada is not contingent on the quality of toilet facilities or parking availability. The spiritual 'dividend' of the visit is perceived as being high regardless of the physical discomforts encountered. However, this resilience of visitor satisfaction is not an inexhaustible resource; as infrastructure conditions deteriorate further and competing pilgrimage destinations improve their service quality, the recommendation rate will erode if corrective action is not taken. The data also reveals critical gaps in emergency infrastructure: 63% of respondents rate Medical and Emergency Services as Moderate or Poor. For a destination that hosts hundreds of thousands of visitors including elderly pilgrims and those with pre-existing health conditions during hot and physically demanding festival periods, the inadequacy of medical first-response capacity represents a serious public safety risk. The establishment of a permanent first aid station at the ghat complex, supplemented by mobile medical units during major festivals, is a non-negotiable intervention from a public safety planning stand point. A striking 77% of respondents perceive tourism to have a Negative impact on the local environment a finding that represents an extraordinary level of environmental awareness and concern among the visitor population. Furthermore, 40% explicitly observed overcrowding during their visit. These findings suggest that the town's visitor carrying capacity the maximum number of visitors the physical, environmental, and social systems can accommodate without unacceptable degradation is being exceeded on a regular basis. Urban planners must therefore consider not only the expansion and improvement of infrastructure but also the development of a Visitor Carrying Capacity framework that establishes scientifically derived thresholds for daily and festival-period visitor numbers, backed by enforceable entry management protocols.

3.3 Synthesis: Cross-Cutting Analytical Themes and Planning Implications

A synthesis of the secondary and primary data analyses reveals four overarching analytical themes that define the urban planning challenge in Omkareshwar. First, the theme of 'temporal demand compression' the concentration of massive visitor volumes within very short time windows emerges as the master challenge that links festival management, infrastructure sizing, parking, sanitation, and crowd management into a single integrated problem set. Second, the 'Public-Private Service Gap' identifies the failure of public utility management as the primary driver of visitor dissatisfaction, in a context where commercial services are performing adequately. Third, the theme of 'Carrying Capacity Exceedance' is evident across multiple data dimensions: 97% find internal movement difficult, 87% find parking inadequate, 84% find

waste management poor, 77% perceive negative environmental impact, and 40% observe overcrowding. Collectively, these findings indicate that the current urban infrastructure of Omkareshwar is operating well beyond its functional capacity on a regular basis. Fourth, the 'Intangible Asset Dependency' of the destination the reliance on spiritual experience, safety, and hospitality as the sustaining drivers of visitor satisfaction is both a strength and a vulnerability: a strength in that it provides a buffer against deteriorating physical conditions, and a vulnerability in that it may delay the corrective action needed to prevent irreversible infrastructural and environmental decline. From a planning perspective, the evidence-based priority framework emerging from this analysis is clear: Omkareshwar requires an integrated Urban Tourism Management Plan (UTMP) that simultaneously addresses solid waste management, public sanitation, parking infrastructure, pedestrian circulation, and visitor information systems implemented in a phased, resource-constrained sequence guided by the democratic priorities of the visitor population, and operationalized through strengthened institutional capacity at the level of the Omkareshwar Nagar Panchayat and the Madhya Pradesh Tourism Development Corporation. Such a plan, grounded in the empirical realities documented in this chapter, offers the most viable pathway to sustainable, dignified, and resilient pilgrimage tourism in one of India's most sacred river towns.

3.4. Services Infrastructure Analysis

Service infrastructure analysis plays a critical role in understanding the spatial distribution and adequacy of basic facilities within religious tourism destinations. In highly visited pilgrimage towns such as Omkareshwar, where large volumes of tourists converge within a limited and geographically constrained area, the efficient provision of services becomes essential for ensuring a safe, comfortable, and inclusive experience. The town's unique setting, characterized by a river island, hilly terrain, and concentrated temple activities, further intensifies the need for a systematic evaluation of infrastructure. In this context, a GIS-based service analysis helps in identifying gaps, assessing service efficiency, and supporting evidence-based planning interventions.

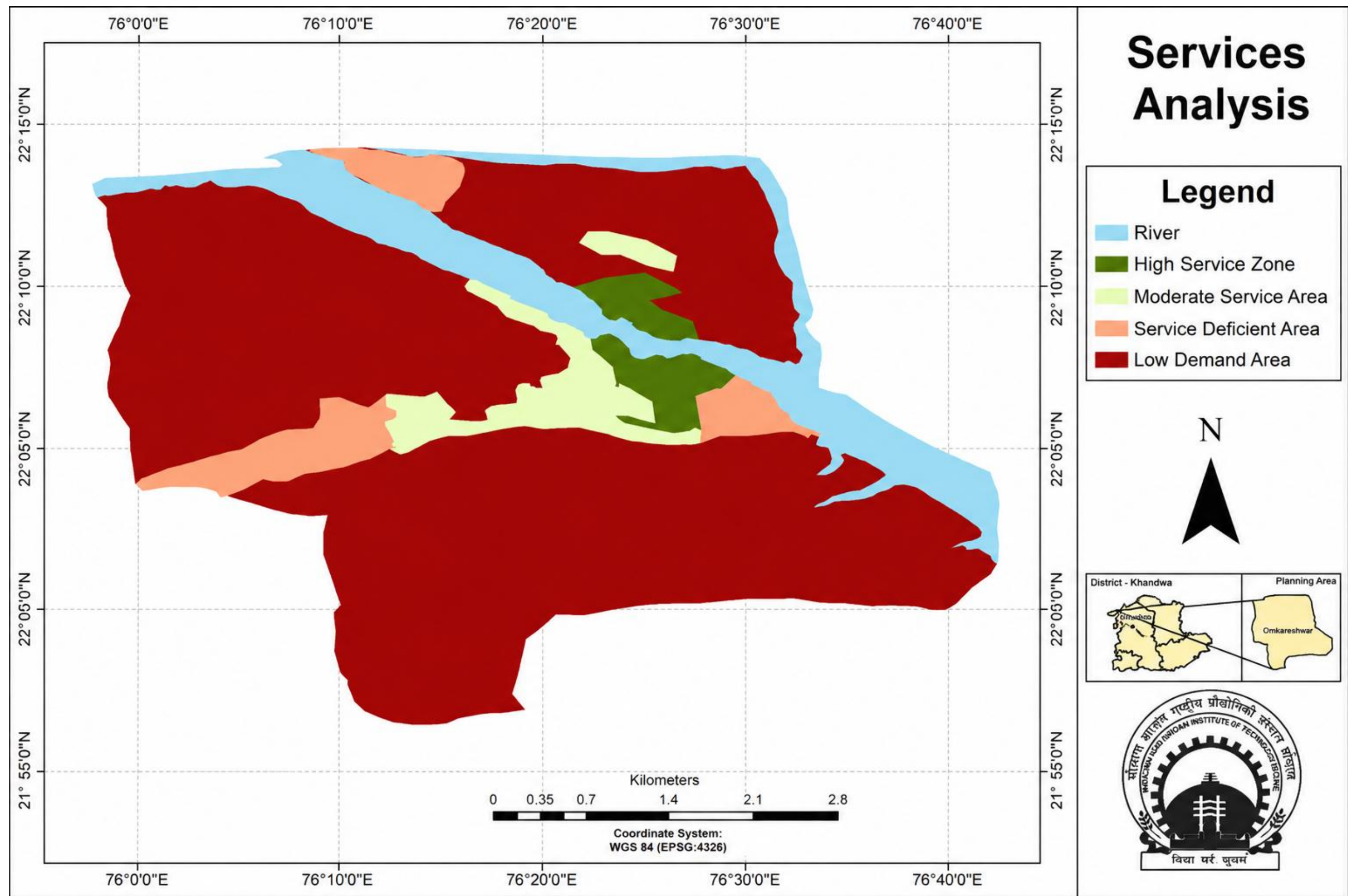


Figure 20 Map Of Services

The analysis has been carried out using a GIS-based weighted overlay method, integrating both spatial and non-spatial data. Primary data was collected through field surveys, supplemented by secondary sources such as satellite imagery, master plans, and digital mapping platforms. Multiple infrastructure parameters were selected to reflect the functional requirements of a pilgrimage town, including parking facilities, public toilets, drinking water availability, road condition, accommodation, emergency services, shaded pedestrian paths, and cleanliness. Each of these parameters was mapped as an individual layer in the GIS environment and assigned scores based on observed conditions. These layers were then combined using a weighted overlay technique to generate a composite service index, which forms the basis of the final service zoning.

Weightage Table data

Theme	Weight (%)	Type	Data Source
Parking Facility	15%	Infrastructure	Field Survey
Public Toilets	15%	Infrastructure	Field Survey
Drinking Water	10%	Infrastructure	Field Survey
Road Condition	10%	Accessibility	Survey / Satellite
Accommodation	15%	Tourism	Master plan Data
Emergency Services	10%	Safety	Google Maps
Shaded Path	10%	Environment	Remote Sensing
Cleanliness	15%	Social	Survey

Table 5 Assigned Weighted Table

The assignment of weights to different parameters was guided by their relative importance in influencing tourist experience and infrastructure performance. Facilities such as parking, public toilets, and cleanliness were given higher weights due to the intense and concentrated tourist footfall near temple areas and ghats. Parking is particularly critical in Omkareshwar, as limited space and high vehicle inflow often lead to congestion. Similarly, sanitation facilities and cleanliness directly affect both public health and the perception of the pilgrimage environment. Moderate weights were assigned to parameters such as drinking water, road condition, and shaded pathways, which contribute to accessibility and comfort, especially considering the hilly terrain and long walking routes. Lower or moderate emphasis on accommodation reflects its spatial concentration in specific zones rather than uniform distribution. The spatial analysis results in the classification of the study area into four distinct service zones. The High Service Zone is concentrated around the core temple area and central activity nodes, where the availability of infrastructure and services is relatively better. These areas exhibit higher

accessibility and cater effectively to dense pedestrian movement. Surrounding this core, the Moderate Service Areas represent zones where basic services are available but require improvement in terms of capacity and quality. The Service Deficient Areas indicate locations with limited infrastructure provision, where critical gaps in facilities such as sanitation, connectivity, and emergency access are evident. The largest portion of the area falls under the Low Demand Zone, primarily consisting of peripheral or less frequented regions with minimal infrastructure presence. The analysis reveals a clear spatial imbalance in service distribution, with a strong concentration of facilities in the central pilgrimage zone and significant deficiencies in surrounding areas. This uneven distribution leads to overcrowding in core areas while underutilizing peripheral zones. Accessibility challenges are further intensified by the terrain, narrow pathways, and unorganized movement patterns, particularly during peak pilgrimage periods. The lack of adequate infrastructure in transition zones between high and low service areas highlights the need for better spatial integration and service expansion. From a planning perspective, this analysis provides a strong basis for identifying priority intervention areas. High-pressure zones require capacity enhancement and better crowd management strategies, while service-deficient areas demand immediate infrastructure development. The findings also suggest the need for decentralization of services to reduce congestion in core areas and improve overall spatial efficiency. Additionally, integrating shaded pathways, improving sanitation facilities, and strengthening emergency response systems can significantly enhance the overall pilgrimage experience. In conclusion, the service analysis demonstrates the effectiveness of GIS-based approaches in evaluating infrastructure performance within a complex religious tourism setting. By combining field data with spatial analysis, the study provides a clear understanding of service gaps and priority areas for intervention. This approach supports the development of inclusive, efficient, and sustainable tourism infrastructure in Omkareshwar, ensuring that both pilgrims and local residents benefit from improved planning and resource allocation.

Chapter 4

4. Brahmapuri Ghat Redevelopment Proposals

4.1 Tourist Footfall Estimation and Ghat Usage Analysis

4.1.1 Need for Ghat Development Planning Justification

The redevelopment of Brahmapuri Ghat is not merely an aesthetic or tourism-enhancement exercise but a planning necessity rooted in public safety, environmental sustainability, and equitable access to religious public space.

4.1.2 Religious Tourism Pressure

Omkareshwar is one of the twelve Jyotirlinga shrines in India and attracts millions of pilgrims annually. The pressure of religious tourism on physical infrastructure particularly the ghats is disproportionate to the level of planned provision. The existing ghat infrastructure was neither designed for nor has been upgraded to serve the current scale of visitation.

- Pilgrimage-driven demand is inelastic: tourists cannot be easily redirected away from ritual sites.
- The concentration of ritual activities (snan, puja, immersion, aarti) in a limited spatial envelope during peak hours creates extreme crowding.
- Without structured interventions, religious tourism pressure will continue to escalate as Omkareshwar gains further prominence as a national pilgrimage destination.

4.1.3 Infrastructural Deficiencies

Field observations and the existing condition photographs of Brahmapuri Ghat reveal acute infrastructure gaps:

Infrastructure Component	Existing Status	Impact
Sanitation / Toilets	Grossly inadequate; few poorly maintained units	Hygiene hazard; discourages female pilgrims
Drinking Water Supply	No permanent dispensing points	Health risk during peak season
Waste Management	No segregated collection system; open littering	River pollution; visual degradation
Emergency / Medical Aid	Absent	Safety risk during crowding incidents
Lighting (Night Use)	Minimal; unsafe after dusk	Restricts night pilgrimage and aarti viewing
Accessibility (Universal)	Steep steps; no ramps or handrails	Excludes elderly, disabled, and infants
Shade / Thermal Comfort	No permanent shade structures	Heat stress; limits dwell time in summer

Table 6 Infrastructure Assessments

4.1.4 Seasonal Overcrowding and Safety Risks

Overcrowding at ghats during festivals such as Karthik Purnima, Makar Sankranti, and Shivratri poses significant safety risks. The absence of crowd management mechanisms, defined entry-exit pathways, and emergency response infrastructure creates conditions for

stampede, drowning accidents, and health emergencies. Planning interventions are therefore imperative from a public safety perspective.

4.1.5 River Ecology Degradation

The unregulated use of the ghat has contributed to the degradation of the Narmada's riverine ecology:

- Ritual immersion of non-biodegradable offerings (plastic, synthetic flowers, thermocol idols) into the river.
- Open defecation and washing along the banks during peak pilgrimage.
- Boat fuel spillage in the absence of designated docking and fuelling zones.
- Absence of a river-edge buffer zone allowing direct vehicular and pedestrian access to the waterline.

4.1.6 Brahmapuri Ghat's Role in the Riverfront System

Brahmapuri Ghat occupies a strategically critical position in the Omkareshwar riverfront hierarchy. It functions as:

- Primary southern-bank access ghat: It is the main embarkation point for the boat crossing to Mandhata Island, where the Omkareshwar Temple is located.
- Visual axis point: The ghat maintains a direct visual connection with the Omkareshwar Temple across the river, giving it both navigational and spiritual significance.
- Overflow relief node: As congestion intensifies at the temple-side ghats, Brahmapuri Ghat serves as the principal relief destination, absorbing excess pilgrimage footfall from the island.
- Community space: The ghat supports local residents' daily activities washing, fishing, social congregation making it a multifunctional riverfront node beyond its tourism role.

4.2. Site Analysis Urban Design Perspective

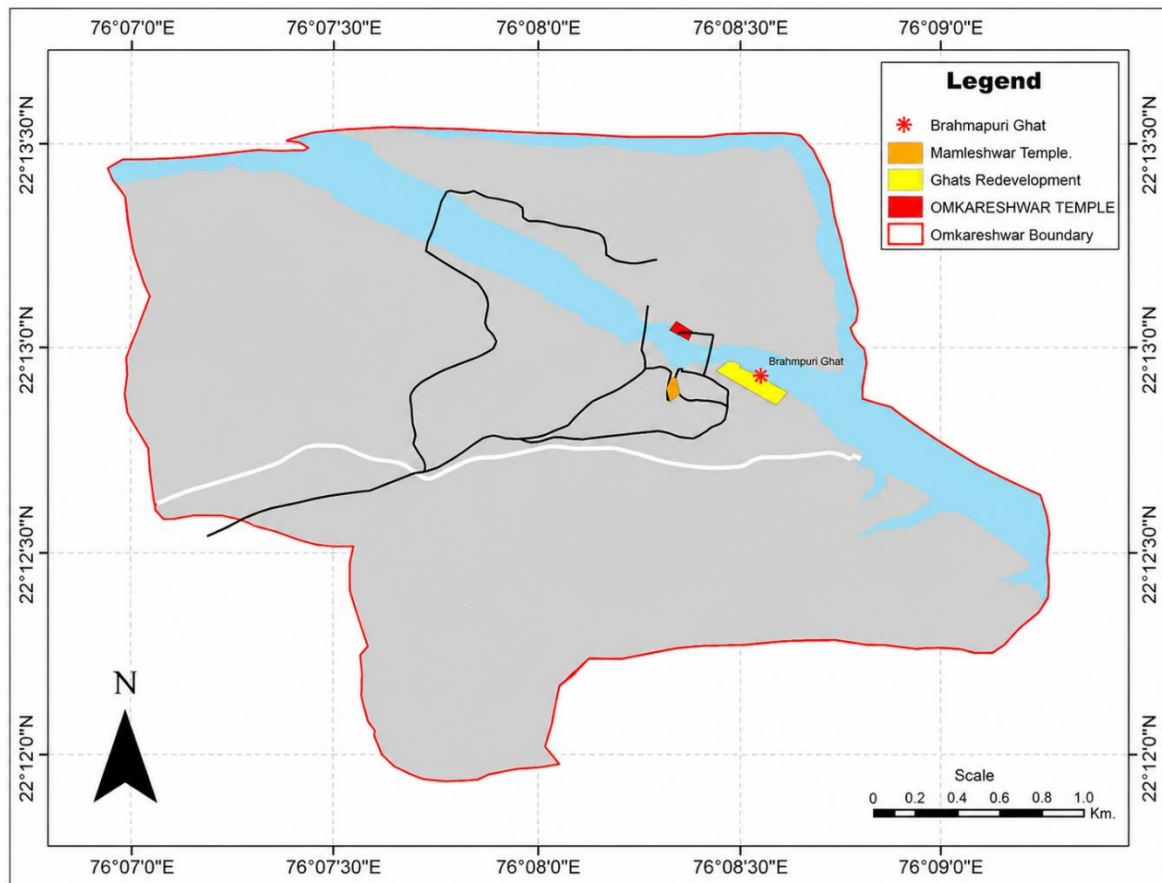


Figure 21 Location Map (Omkareshwar GIS Map) showing Brahmapuri Ghat opposite Mandhata Island, road network, and site boundary.

4.2.1 Location Significance

Brahmapuri Ghat is situated on the southern bank of the Narmada River at the following geographical and spatial coordinates within the urban structure of Omkareshwar:

- Directly opposite the Omkareshwar Jyotirlinga Temple complex on Mandhata Island creating a strong visual and ritual axis.
- Adjacent to the Mamleshwar Temple on the southern bank, reinforcing the site's religious significance.
- The site is located at the convergence of the town's primary road (connecting the main bazaar to the river) and the waterfront, making it the most accessible riverfront node.
- The visual connection across the river places the ghat in a privileged position for aarti viewing, panoramic photography, and spiritual contemplation attributes that are integral to the pilgrim experience.

4.2.2 Accessibility Analysis

Road Connectivity

- The primary vehicular access road connects Brahmapuri Ghat to the main NH-52 corridor and the regional bus terminal.
- The ghat is accessible from the main bazaar area via a pedestrian-dominant street approximately 300–400 metres in length.

- No dedicated parking facility exists in the immediate vicinity, resulting in informal parking along approach roads that constricts pedestrian flow.

Pedestrian Access

- Pilgrims predominantly arrive on foot from the main bazaar, the Mamleshwar Temple, and the bus stand a catchment radius of approximately 500 metres.
- The existing pedestrian path lacks definition, shade, and surface treatment, creating an uncomfortable walking environment during summer months.
- No dedicated pedestrian crossing or signal exists at the road leading to the ghat, creating conflict with through traffic.

Boat Connectivity

- The ghat is the primary boat embarkation point for crossing the Narmada to Mandhata Island a distance of approximately 150–200 metres.
- Boat services operate informally; no structured docking infrastructure, ticketing facility, or queue management system exists.
- During monsoon, high water levels render portions of the ghat and the existing informal boat docks unusable.



Figure 22 Existing Condition Images view of ghat with informal boats and pink canopies; Post-development photograph showing accessible ramps and structured promenade.

4.2.3 Existing Conditions and Constraints

Aspect	Observed Condition	Planning Implication
Encroachments	Informal vendor stalls, boat operators occupy defined areas	Relocation and formalisation required
Informal Vending	Unregulated vending along ghat steps and promenade	Designated vending zones with amenity provisions

Ghat Steps	Steep gradient; uneven stone surfaces; no handrails	Redesign for safe gradient; universal access
Sanitation Facilities	Absent or dysfunctional	New toilet blocks with universal design
Drainage	Surface runoff drains directly into river	Interceptor drains and grey-water management
Boat Docking	Informal mooring at rocky edges	Structured floating docks; safe boarding
Night Infrastructure	No lighting; ghat unsafe post-dusk	Solar-powered lighting system
Waste	Open littering; no bins	Segregated waste collection infrastructure

Table 7 Existing Conditions and Constraints

4.3 Tourist Flow and Movement Analysis

Understanding the movement patterns of tourists and pilgrims through Omkareshwar and specifically at Brahmapuri Ghat is essential for designing an efficient, conflict-free spatial organisation. The analysis below is based on observed pilgrimage behaviour patterns at comparable religious riverfront destinations in India.



Figure 23 Tourist Flow Diagram

4.3.1 Primary Movement Circuits

Circuit A: Pilgrimage Circuit (Dominant)

- Arrival at bus stand / temporary parking → Main bazaar (shopping, flower/puja items) → Brahmapuri Ghat → Ritual snan → Boat to Mandhata Island → Omkareshwar

Temple darshan → Mamleshwar Temple darshan → Return boat → Bazaar → Departure.

- Estimated dwell time at ghat: 45–90 minutes on the outward leg; 20–30 minutes on return.

Circuit B: Day Visitor / Recreational Circuit

- Arrival → Brahmapuri Ghat (viewing, photography, aarti attendance) → Promenade → Mamleshwar Temple → Departure without crossing to the island.
- Estimated dwell time: 1–2 hours.

Circuit C: Local Resident Daily Circuit

- Morning bathing, washing → Evening aarti attendance → Promenade use → Evening social gathering.
- Temporally distributed across morning (6–9 AM) and evening (5–8 PM) peaks.

4.3.2 Conflict Points and Congestion Zones

Location	Nature of Conflict	Peak Period
Ghat Entry Point (Road-edge)	Convergence of pedestrians, vehicles, vendors, auto-rickshaws	All-day; worst 8–11 AM & 4–7 PM
Boat Embarkation Zone	Uncontrolled queuing; pushing; no crowd management	Continuous; peaks at festival days
Upper Ghat Steps (Mid-section)	Bathing/ritual users conflict with through-movement pilgrims	Morning bathing peak 6–10 AM
Lower Ghat (Water Edge)	Informal boat mooring obstructs bathing zone; water-edge safety risk	Continuous
Promenade Spine	No defined path; vendors, worshippers, through-walkers mix	Festival aarti times: 6–8 PM

Table 8 Conflict Points and Congestion Zones

4.3.3 Recommendations for Movement Rationalisation

Entry-Exit Segregation

- Designate separate entry gates on the northern (river-facing) approach for inbound pilgrims and the southern (road-side) approach for exit flows during peak periods.
- Install crowd-control fencing and barriers at the entry to channelise flow and prevent counter-movement conflicts.

Dedicated Pedestrian Pathways

- Establish a 3-metre-wide primary pedestrian spine running from the ghat entry to the boat embarkation zone — clearly surfaced and free of vendor encroachment.
- Secondary loop paths for recreational promenade use, separate from ritual/bathing areas.

Queue Management Zones

- Install a structured queuing system (railing-guided queues, shaded waiting bays) at the boat embarkation point with a minimum waiting capacity of 500 persons.
- Digital display of estimated wait times and boat schedules to manage visitor expectations and reduce crowding stress.

4.4. Planning Proposals for Brahmapuri Ghat Development

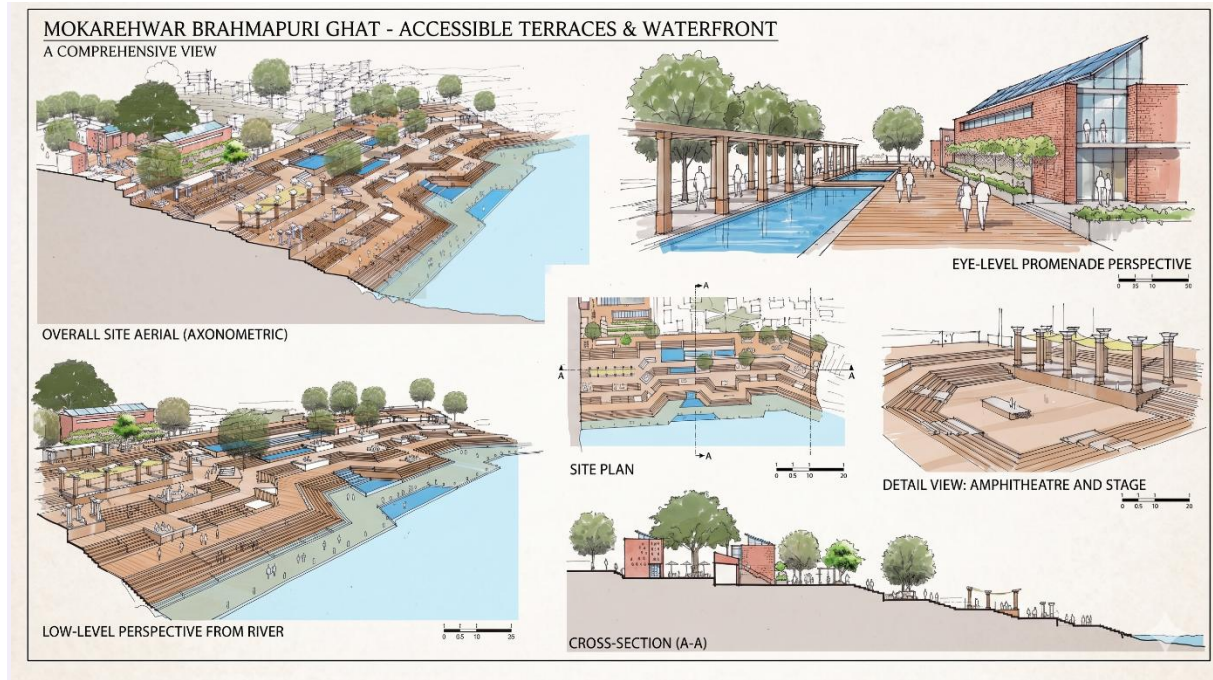


Figure 24: Conceptual Design Views (Image 4) — Overall aerial axonometric, eye-level promenade perspective, amphitheatre detail, site plan, and cross-section.

The redevelopment proposal for Brahmapuri Ghat in Omkareshwar is conceived as a comprehensive and integrated intervention aimed at enhancing the functionality, safety, and experiential quality of the riverfront. The proposal is grounded in the principles of universal accessibility, cultural sensitivity, flood resilience, and sustainable tourism development, ensuring that the ghat responds effectively to both daily usage and peak pilgrimage conditions. These strategies are directly derived from the identified deficiencies in the existing condition analysis and aim to create a balanced interface between human activity and the ecological system of the Narmada River.

4.4.1. Physical Infrastructure

The physical infrastructure interventions focus on improving spatial organization, safety, and user comfort through a carefully structured design approach. The redesign of stepped ghat terraces is central to this proposal, where existing unsafe and steep steps are replaced with a safer gradient of 1:2.5, ensuring ease of movement for all users. A three-tier terrace system is introduced, comprising an upper promenade at +5 metres, a mid-level terrace at +2 metres, and a lower bathing ghat at river level. This hierarchy allows for efficient crowd distribution while maintaining functional segregation between circulation, gathering, and ritual activities. The use

of locally available non-slip materials such as Narmada sandstone and Kota stone enhances durability and safety, particularly under wet conditions, while flood markers at regular intervals provide critical awareness of fluctuating water levels. Seating and gathering spaces are seamlessly integrated into the ghat structure through continuous stone ledges along terrace edges, ensuring both functionality and aesthetic coherence. Additionally, shaded pavilions or chhatris are strategically placed to accommodate small groups, reinforcing the cultural character of the site. Thermal comfort is addressed through a combination of built and natural shading strategies, including pergola structures along the promenade and the plantation of native riparian tree species such as Peepal, Banyan, Neem, and Arjun, which provide long-term environmental benefits. Sanitation and hygiene infrastructure is significantly upgraded through the provision of dedicated changing rooms and toilet facilities for male and female users, designed in accordance with CPHEEO standards and universal accessibility guidelines. The inclusion of ramps, grab bars, and wider cubicles ensures inclusivity, while designated wet zones prevent waterlogging and maintain circulation efficiency. Furthermore, drinking water infrastructure is enhanced through the installation of multiple stainless-steel kiosks supported by potable water supply systems and solar-powered purification units where necessary.

4.4.2 Safety and Emergency Management

Safety and risk mitigation form a critical component of the ghat redevelopment strategy. Continuous stainless-steel handrails are proposed along all steps, ramps, and terrace edges to ensure user stability, particularly near the waterline. The inclusion of double-rail systems caters to both adults and children, while safety bollards are used to restrict access to hazardous zones during high-water conditions. To address water-related risks, two permanently staffed lifeguard stations are proposed at the lower ghat level. These stations are equipped with essential rescue equipment and are strategically positioned to ensure clear visibility across the bathing and boating areas. Surveillance is further strengthened through the installation of an extensive CCTV network covering all major activity zones, with real-time monitoring integrated with local police and emergency response systems. Flood resilience is a key design consideration, with all permanent structures located above the Highest Flood Level (HFL). Lower terraces are intentionally designed as sacrificial elements capable of withstanding periodic inundation, while floating pontoon systems ensure the continued functionality of boat docking areas. Critical infrastructure is elevated above flood levels to prevent damage and ensure uninterrupted service during extreme conditions.

4.4.3. Tourism Infrastructure

The tourism infrastructure component aims to enhance the cultural, visual, and experiential quality of Brahmapuri Ghat, positioning it as a key node within the pilgrimage circuit of Omkareshwar. Viewing decks are introduced along the upper promenade, providing elevated vantage points overlooking Mandhata Island and the Omkareshwar Temple. These decks are designed not only for visual engagement but also as interpretive spaces that communicate the historical and spiritual significance of the site. Cultural and ritual activities are formalized through the development of a dedicated aarti platform at the mid-terrace level, inspired by the iconic Dashashwamedh Ghat. This space is designed to accommodate both participants and observers, facilitating organized and visually impactful religious ceremonies. Additional provisions include designated immersion zones and puja preparation areas, ensuring that ritual

practices are conducted in an orderly and environmentally responsible manner. Interpretation and wayfinding are enhanced through a comprehensive bilingual signage system that provides information on ghat history, river ecology, and safety guidelines. The integration of QR-code-enabled digital platforms further enriches the visitor experience by offering multilingual audio guides. Night-time usability and tourism are supported through a well-designed lighting system, including solar-powered street lights, decorative submersible lighting, and focused illumination of key ritual spaces, creating a safe and vibrant nocturnal environment.

4.4.4. Environmental Measures

Environmental sustainability is embedded within the planning framework to ensure long-term ecological balance and cleanliness of the riverfront. A structured waste management system is proposed, incorporating colour-coded dual bins at regular intervals to facilitate segregation at source. The use of electric carts for waste collection minimizes environmental impact while ensuring operational efficiency, and a centralized waste aggregation point enables systematic integration with municipal disposal systems. The prohibition of single-use plastics within the ghat precinct further reinforces the commitment to environmental protection. In addition, a 10-metre-wide ecological buffer zone is established along the river edge, planted with native vegetation such as Vetiver, Typha, and Arundo donax. This buffer acts as a natural filtration system, reducing surface runoff pollution before it enters the river. Strict regulations on construction within this zone ensure the preservation of the natural riverine ecosystem and maintain the ecological integrity of the Narmada River.

4.5. Tourist Planning Guidelines

The following guidelines constitute the regulatory and management framework for tourist operations at Brahmapuri Ghat. They are derived from established principles of sustainable tourism management and adapted to the specific conditions of a religious riverfront destination.

4.5.1 Carrying Capacity-Based Management

- Establish a site-level carrying capacity of 14,000 persons at any one time (based on 1.0 sq.m. per person over effective usable area).
- Implement a real-time crowd monitoring system using entry counters and CCTV-based headcount algorithms, with automatic alerts when occupancy approaches 70%, 85%, and 100% of safe capacity.
- On peak festival days, implement a timed-entry system with 90-minute slots, controlling inflow through the designated entry gate.
- Display live occupancy status on digital boards at the ghat approach road and at the main bus stand.

4.5.2 Sustainable Tourism Principles

- Promote heritage interpretation and environmental education through the signage and audio-guide system to foster a sense of stewardship among visitors.
- Develop a visitor code of conduct prominently displayed in Hindi, English, and regional languages.

- Integrate local livelihood — licensed vendors, boat operators, pujaris — into the formal ghat management system to ensure economic benefit flows to the local community.
- Monitor river water quality at bi-weekly intervals and publish results transparently; trigger corrective action protocols when parameters exceed permissible limits.

4.5.3 Universal Accessibility

User Group	Specific Need	Design Response
Elderly pilgrims	Difficulty with steep steps; need for rest points	Gentle ramps (1:12 max gradient); seating every 20 m
Persons with disabilities	Wheelchair access to river edge; accessible sanitation	Ramped access to lower terrace; accessible toilets
Women pilgrims	Privacy for changing; safety; adequate sanitation	Separate changing rooms; increased female toilet ratio
Children	Safety near water edge; fall prevention	Child-height railings; no-entry zones near waterline
Non-swimmers	Risk of drowning in ritual bathing zone	Demarcated shallow-entry zone; lifeguard coverage

Table 9 Universal Accessibility

4.5.4 Crowd Management Strategies

- Deploy trained crowd management personnel (ghat sevakas) at peak hours, stationed at entry, boat dock, and key terrace nodes.
- Coordinate with district administration for VIP and VVIP pilgrim management during major festivals to prevent special-access misuse that worsens congestion.
- Establish a command and control centre with real-time situational awareness for coordinated emergency response.
- Conduct pre-festival mock drills (evacuation, medical emergency response) with all stakeholders.

4.5.5 How Proposals Improve Tourist Experience and Spatial Distribution

The proposed interventions are designed to produce measurable improvements in the pilgrim experience and the spatial distribution of tourist pressure across the Omkareshwar riverfront:

- Improved physical infrastructure (ramps, seating, shade, toilets) directly enhances comfort and prolongs positive dwell time.
- Structured aarti and ritual spaces create signature experiences that give Brahmapuri Ghat its own identity, attracting visitors who might otherwise only use the island-side ghats.
- Night-time lighting and cultural programming extend the active period of the ghat beyond daylight hours, distributing temporal pressure.
- Enhanced boat dock infrastructure increases the frequency and safety of river crossings, reducing queuing pressure at peak periods.
- By improving the capacity and attractiveness of Brahmapuri Ghat, the proposals serve as a deliberate de-congestion strategy for the main temple-side ghats on Mandhata Island.

4.6. Capacity-Based Zoning of Brahmapuri Ghat

The 22,065 sq.m. site is proposed to be organised into four functional zones, each calibrated to its specific use intensity, design requirements, and carrying capacity contribution.

Zone	Description	Proposed Area (sq.m.)	% of Total	Capacity (persons @ 1 sq.m.)	Key Elements
Active Zone (Bathing & Rituals)	Lower and mid terrace; primary ritual activity; highest intensity use	6,000	27.2%	4,000 (bathing zones; safety buffer applied)	Ghat steps, bathing platforms, aarti mandap, immersion zone, lifeguard stations
Passive Zone (Sitting & Viewing)	Upper promenade; shaded seating; viewing decks; contemplative spaces	7,500	34.0%	5,000	Viewing decks, seating ledges, pergolas, interpretive panels, landscaping
Service Zone (Infrastructure & Vendors)	Rear and side of site; toilets, changing rooms, admin office, licensed vendor stalls, waste collection	4,065	18.4%	~500 (functional; not for visitor capacity)	Toilet blocks, changing rooms, water kiosks, e-garbage point, management office, vendor kiosks
Circulation Zone (Pathways & Transition)	All primary and secondary movement spines; entry plaza; queue management areas; ramps	4,500	20.4%	4,500 (in transit)	Primary pedestrian spine, ramps, entry plaza, boat dock approach, crowd control barriers

Total Site Capacity Summary

Active Zone: 4,000 persons

Passive Zone: 5,000 persons

Circulation Zone: 4,500 persons (in transit)

Service Zone: 500 persons (functional staff and users)

TOTAL SAFE HOLDING CAPACITY: ~14,000 persons at any one time

Note: These figures represent safe concurrent occupancy. Daily throughput is significantly higher given a dwell time of 1–1.5 hours per visitor group.

4.7. Expected Outcomes of the Development Proposals

The implementation of the proposed planning framework for Brahmapuri Ghat is expected to generate the following measurable and qualitative outcomes:

Outcome Area	Expected Outcome	Measurement Indicator
Tourist Handling Capacity	Safe concurrent capacity raised from an estimated 5,000–6,000 (current unmanaged) to 14,000 persons through structured zoning and crowd management	Occupancy monitoring data; incident reports
Congestion Reduction	A 30–40% reduction in congestion-related complaints and incidents at the main temple-side ghats, as Brahmapuri Ghat absorbs redistributed pilgrim flow	Visitor satisfaction surveys; police incident logs
Safety and Hygiene	Zero drowning incidents in the bathing zone; 80%+ user satisfaction with sanitation facilities	Annual safety audit; post-visit surveys
Accessibility	100% of ghat facilities accessible to persons with mobility limitations through ramp and universal design provision	Universal design compliance audit
Environmental Quality	River water quality improvement within the ghat zone; 90%+ solid waste diversion from the river	Bi-weekly water quality monitoring; waste audit
Night Tourism	Extension of active visitor period to 10 PM during festival seasons; 20%+ increase in evening visitors	Footfall counting at evening hours
Cultural Experience	Regular structured aarti ceremonies accommodating 500+ observers; increased satisfaction with cultural programming	Visitor experience surveys; event attendance
Local Economy	Formalisation of 50–80 vendor livelihoods; structured boat operator licensing	Vendor registration data; operator income surveys

The planning framework presented in this chapter constitutes a comprehensive, evidence-based, and contextually responsive approach to the redevelopment of Brahmapuri Ghat, Omkareshwar. By integrating quantitative carrying capacity analysis with qualitative urban design principles, the framework addresses the ghat's twin roles as a sacred riverfront space and a high-pressure tourism node. The footfall estimation exercise establishes that the ghat is subjected to severe overcrowding during peak festival periods with single-day footfall potentially reaching 40,000–50,000 visitors against a safe holding capacity of approximately 14,000 persons. This asymmetry between demand and capacity is the central planning problem that the proposals are designed to resolve. The four-zone spatial organisation Active, Passive, Service, and Circulation provides a rational framework for segregating conflicting uses, improving safety, and enhancing the quality of the pilgrim experience. The universal design

provisions ensure that the ghat serves as an inclusive public space accessible to all segments of the pilgrimage population, including elderly persons, persons with disabilities, and women pilgrims. The environmental measures—river protection buffer, waste management infrastructure, and eco-friendly material specifications—ensure that the proposed development enhances rather than degrades the ecological integrity of the Narmada riverfront. The flood-resilient design approach ensures the long-term viability of the infrastructure investments in a riverine setting subject to seasonal inundation. From a strategic planning perspective, the development of Brahmapuri Ghat as a well-structured, attractive, and high-capacity destination serves the broader objective of redistributing tourist pressure across the Omkareshwar riverfront system—reducing congestion at the island-side ghats and improving the overall quality of the pilgrimage experience in the town. This framework demonstrates that planned, sensitively designed, and inclusively managed public space interventions at religious riverfronts can simultaneously advance the goals of cultural conservation, sustainable tourism development, public safety, and environmental protection—offering a replicable model for ghat redevelopment across India's pilgrimage towns.

5. Ropeway Proposal

5.1 Feasibility Analysis and Proposal for a Ropeway Mobility System in Omkareshwar

Omkareshwar, situated on the Mandhata Island in the Narmada River in Madhya Pradesh, is a premier religious tourism destination and home to one of the twelve revered Jyotirlingas. Its unique geographical setting—characterized by an island separated from the mainland by the Narmada River and flanked by hilly terrain—creates a highly constrained urban footprint. While the spiritual significance of the Omkareshwar Temple draws millions of pilgrims annually, the town's existing infrastructure struggles to accommodate the influx. The town experiences high tourist congestion, particularly along narrow streets and ghat approaches. Accessibility across the river relies heavily on pedestrian bridges and boats, which act as severe bottlenecks. This pressure is exponentially magnified during seasonal peak loads, such as the holy month of Shravan, Mahashivratri, and weekends, necessitating a robust, high-capacity, and sustainable alternative transport solution.

5.2. Tourist Flow Analysis

An analysis of current tourist footfall indicates a baseline of approximately 40 to 50 lakh visitors annually. Based on this baseline, the daily average footfall is estimated at 10,000 to 12,000 visitors. However, during peak festival days, this load spikes dramatically to 40,000 to 60,000 visitors per day. With the ongoing development of the Statue of Oneness and associated infrastructure, long-term projections suggest this could scale to over 1 crore annual visitors.

Movement Patterns and Bottlenecks:

The primary pilgrim movement follows a linear and constrained path: Mainland Parking Nodes → Pedestrian Suspension Bridges/Boats → River Ghats → Temple Complex → Parikrama Path.

- **Bottlenecks:** The pedestrian bridges and narrow pathway steps leading to the temple are significant choke points. The current infrastructure lacks the carrying capacity for peak loads, leading to extensive queuing, crowd management hazards, and a degraded

visitor experience. The data highlights the urgent need for a high-volume, continuous-flow alternative transport system.

5.3. Need for Ropeway System

Religious tourism towns like Omkareshwar experience intense seasonal pressure over constrained terrain. The introduction of a ropeway system addresses these specific geographic and infrastructural deficits.

- **Terrain Constraints:** The combination of a river crossing and significant elevation changes makes traditional road expansion ecologically destructive and spatially impossible.
- **Reduction in Walking Fatigue:** A large demographic of pilgrims comprises the elderly, children, and differently-abled individuals. A ropeway eliminates the physical strain of climbing steep ghat steps.
- **Time Efficiency:** A ropeway provides continuous transit, drastically reducing the travel time from mainland parking to the temple precinct.
- **Comparative Advantage:**
 - *Roads:* Land-constrained and environmentally intrusive.
 - *Foot Bridges:* High physical exertion, prone to stampede risks during peak flow.
 - *Boats:* Limited capacity, slow, and operationally restricted during monsoon surges.
- **Sustainability:** Ropeways operate on electricity, producing zero direct emissions and requiring minimal ground-level footprint, making them highly suitable for eco-sensitive riverine zones.

5.4. Proposed Ropeway Alignment

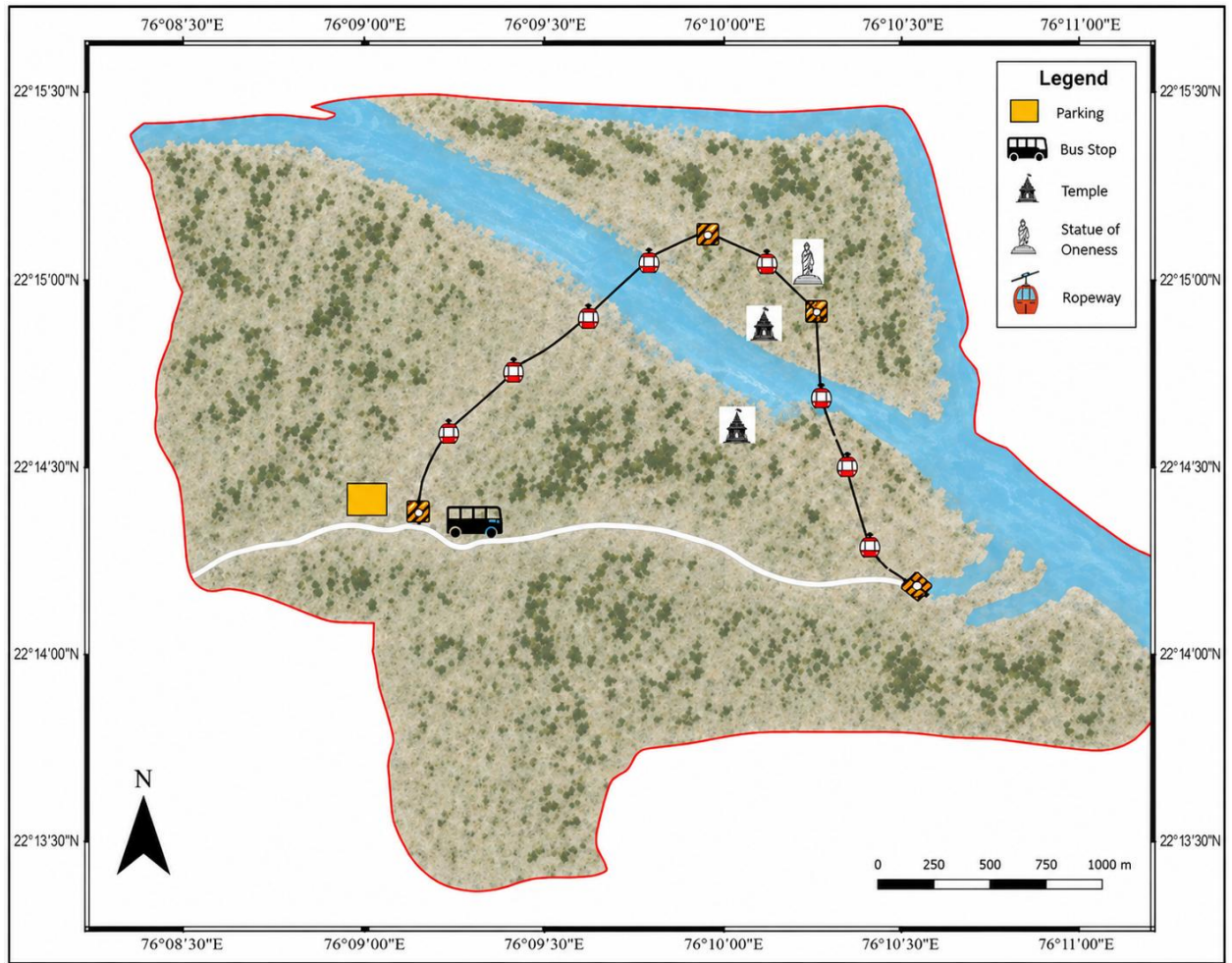


Figure 25 Proposed Ropeway Alignment Map

The proposed ropeway alignment strategically connects critical tourist nodes while minimizing intrusion into dense, historically sensitive built-up areas. The alignment is conceptualized as a continuous loop bridging the mainland and Mandhata Island.

- **Start Point (Entry Node):** Located at the primary mainland parking zone to intercept vehicular traffic before it enters the core town area.
- **Intermediate Node (Optional):** Positioned near a scenic viewpoint or the Statue of Oneness, integrating new tourism infrastructure into the mobility loop.
- **End Point (Terminal Station):** Situated in the vicinity of the Omkareshwar Temple and major ghats, providing direct access to the primary pilgrimage site.
- **Path:** The alignment traverses directly over the Narmada River, avoiding existing residential clusters and preserving the sacred landscape's sanctity.

5.5. Station Planning

The architectural and functional planning of the ropeway stations must handle high-density crowd surges while providing adequate amenities.

- **Base Station (Parking Area):** Designed as an intermodal hub. It must feature expansive, zig-zag queuing systems, digital ticketing kiosks, waiting lounges, and direct integration with bus and private vehicle parking.
- **Intermediate Station (Scenic/Religious Point):** Designed for hop-on/hop-off functionality, allowing tourists to visit secondary attractions without returning to the base.
- **Terminal Station (Near Temple):** A compact, high-efficiency dispersal zone to prevent crowd pooling. It requires clear wayfinding directing pilgrims straight to the temple queue complexes.
- **Universal Design:** All stations must include level boarding, elevators, and ramps to ensure barrier-free access for wheelchair users and the elderly.

5.6. Capacity & Technical Feasibility

To ensure technical viability and adequate load distribution, the system should be designed to capture 20% to 30% of the daily tourist footfall.

- **Technology Specification:** A Monocable Detachable Gondola (MDG) system utilizing 6 to 8-seater cabins is recommended for its continuous boarding capability and high throughput.
- **Capacity:** The system should be engineered for a capacity of 1,000 to 1,500 Passengers Per Hour Per Direction (PPHPD).
- **Operational Efficiency:** Travel time across the river and up the elevation will be reduced from a 30-45 minute arduous walk to a 5-7 minute aerial transit. The continuous frequency (cabins arriving every 15-20 seconds) naturally regulates crowd flow, dispatching pilgrims in manageable batches rather than overwhelming the temple entrance at once.

5.7. Environmental & Visual Impact

Omkareshwar's primary asset is its pristine natural and spiritual environment. The ropeway must be designed as a non-intrusive overlay.

- **Ecological Impact:** Towers must be placed outside the High Flood Level (HFL) of the Narmada River to protect the riverbed ecosystem. The minimal footprint of ropeway pylons limits deforestation and earth-cutting compared to road construction.
- **Visual Intrusion:** To preserve the sacred landscape, the infrastructure should employ eco-sensitive design. Towers and cabins should utilize natural, earthy color palettes (greens, browns, greys) to blend with the hilly backdrop. Cabins should be designed with anti-glare glass to prevent visual disturbances from reflections.

5.8. Economic & Tourism Benefits

The financial outlay for the ropeway is substantial but justified by long-term socio-economic returns.

Estimated Project Cost:

Component	Cost (₹ Cr)
Ropeway system (3.8 km × 140 Cr/km avg)	532 Cr
Stations (6–7 stations)	120 Cr
Towers & civil works	80 Cr
Electrical & mechanical systems	60 Cr
Land + contingency (10–15%)	70 Cr
Total Estimated Cost	~850–900 Cr

- **Economic Boost:** The ropeway transforms transit into a premium tourism experience, generating direct revenue through ticketing.
- **Carrying Capacity:** By effectively managing movement, the town's overall carrying capacity increases, allowing for higher tourist volumes without infrastructure collapse.
- **Local Economy:** Extended visitor stays (facilitated by easier movement to multiple sites) will boost local hospitality, retail, and allied sectors, driving employment generation.

5.9. Integration with Overall Mobility Plan

A ropeway cannot operate in isolation; it must function as a core spine within a broader multimodal mobility master plan.

- **Intermodal Hubs:** The Base Station must seamlessly link with regional transit (intercity buses) and local Last-Mile Connectivity (e-rickshaws).
- **Pedestrian Networks:** The Terminal Station should integrate directly into upgraded, shaded pedestrian pathways leading to the temple and newly redeveloped ghats (e.g., Brahmapuri Ghat).
- **Tri-Modal System:** A holistic mobility loop should be established: tourists can utilize the Ropeway for aerial ascent and primary crossing, Walking tracks for the Parikrama, and Boats for returning along the riverfront, distributing the economic benefits across different transport operators.



Figure 26 Concept photo of Ropeway

The proposed ropeway system serves as a transformative, thesis-driven mobility solution for Omkareshwar, effectively responding to its unique geographical constraints and escalating tourism demands. By offering a sustainable, low-footprint, and highly efficient transit alternative, it drastically reduces surface congestion and the physical burden on pilgrims. Beyond merely bridging a physical gap, it enhances the spiritual and experiential quality of the destination. As an anchor project within a broader multimodal framework, the ropeway is a vital, future-proof intervention for the resilient urban and tourism planning of Omkareshwar.

6. Shaded Parikrama Path & Mobility Enhancement Proposal, Omkareshwar

Religious tourism destinations require carefully planned and efficiently managed mobility systems that ensure comfort, safety, and accessibility for a diverse range of users, including elderly pilgrims, children, and differently-abled individuals. In pilgrimage towns such as Omkareshwar, where annual visitor numbers are significantly high and movement is predominantly pedestrian-based, the quality, continuity, and design of circulation infrastructure play a crucial role in shaping the overall visitor experience. The town's unique geographical characteristics—comprising undulating terrain, steep gradients, and a riverine island setting along the Narmada—combined with extreme climatic conditions, particularly high temperatures and intense solar radiation during summer months, create substantial physical and environmental challenges for pilgrims undertaking the Parikrama. These factors not only affect physical comfort but also influence the duration of stay, movement patterns, and overall satisfaction of visitors. In this context, the proposed intervention of developing a shaded pedestrian network emerges as a critical planning strategy aimed at addressing these challenges holistically. The proposal focuses on enhancing mobility efficiency, improving thermal comfort, and ensuring the availability of essential services such as resting areas, drinking water facilities, and wayfinding systems. By integrating climate-responsive design elements with pedestrian-oriented infrastructure, the intervention seeks to transform the Parikrama route into a safe, comfortable, and spiritually enriching corridor that supports both functional movement and experiential quality. The spatial structure of Omkareshwar is largely defined by its sacred Parikrama route, key religious nodes such as the Mamleshwar Temple, various ghats along the riverfront, and peripheral parking zones that serve as the primary entry points for visitors. These components together form a complex movement network that is currently informal and inefficient. At present, pilgrim movement between these nodes is largely unorganized and lacks a clear hierarchy or designated pathways, often resulting in congestion, overcrowding, and

conflicts between pedestrians and vehicular traffic. Narrow pathways, encroachments by informal vendors, and the absence of proper signage further exacerbate these issues, making navigation difficult for first-time visitors. Moreover, the lack of continuous and dedicated pedestrian infrastructure forces pilgrims to walk through mixed-traffic conditions, increasing the risk of accidents and reducing overall safety. Prolonged exposure to harsh climatic conditions, especially during peak daytime hours, leads to heat stress, fatigue, and discomfort, particularly affecting vulnerable groups such as elderly pilgrims and children. The absence of shaded resting points and essential amenities further compounds these challenges, often resulting in a fragmented and physically exhausting pilgrimage experience. These prevailing conditions clearly highlight the urgent need for a well-structured, climate-responsive, and user-centric mobility solution. The introduction of a shaded Parikrama Path is therefore envisioned as a transformative intervention that organizes movement, enhances safety, and significantly improves the overall quality of the pilgrimage journey while respecting the cultural and spiritual significance of the site.

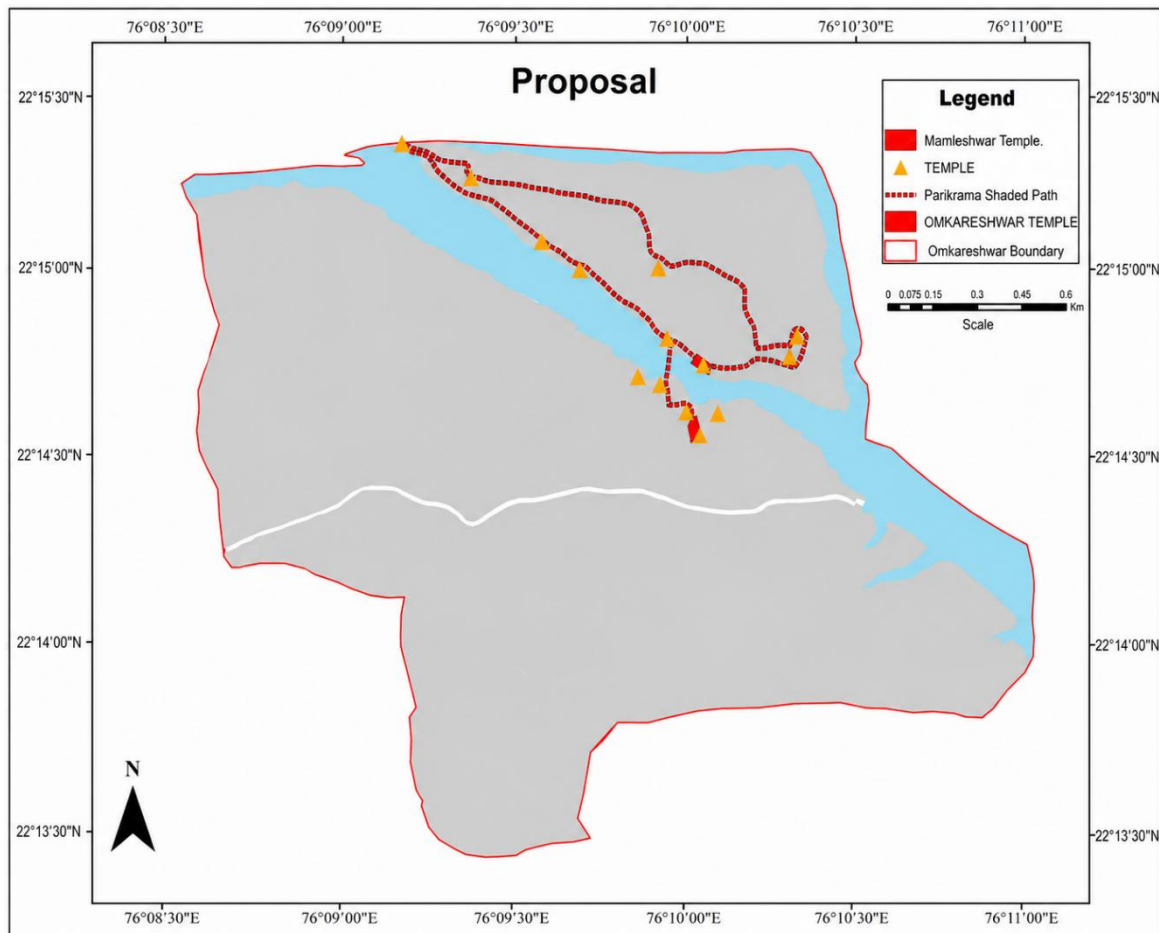


Figure 27 Map of Shaded Parikrama Path

Omkareshwar's spatial structure is defined by its parikrama route, temple nodes such as Mamleshwar Temple, and peripheral parking areas where most visitors arrive. Currently, pilgrim movement between these nodes is largely unorganized, often resulting in congestion and conflicts between pedestrians and vehicles. The absence of continuous pedestrian infrastructure forces users to navigate through mixed-traffic conditions, while prolonged

exposure to harsh weather reduces comfort and accessibility, particularly for elderly visitors. These issues highlight the urgent need for a structured and climate-responsive mobility solution.

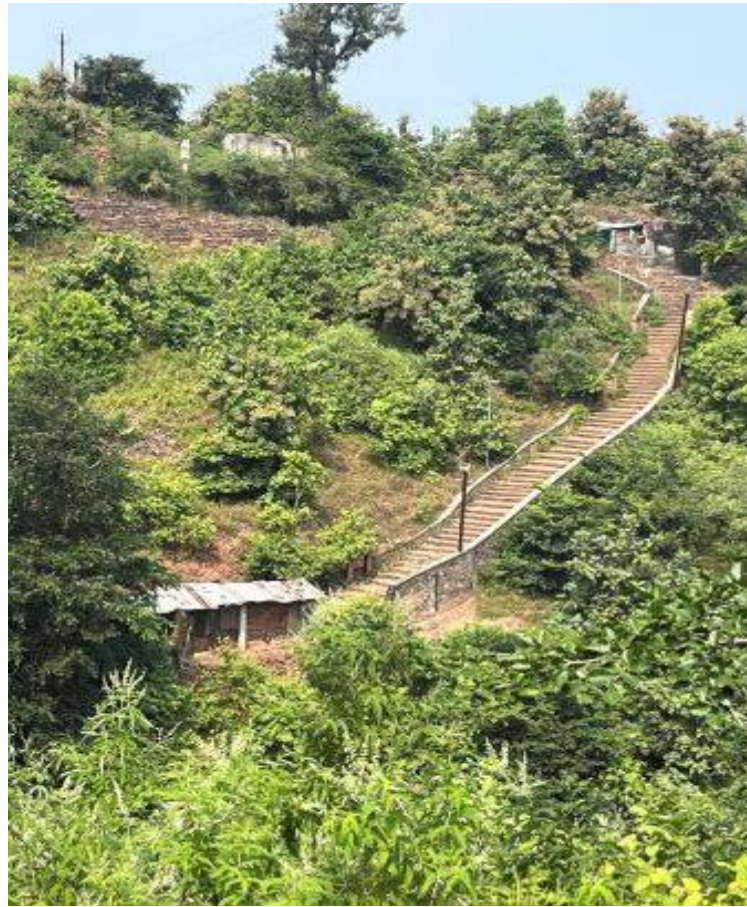


Figure 28 Existing Condition Images

The proposal introduces a continuous shaded pedestrian corridor along the parikrama path, designed to function as a primary movement spine connecting key religious and activity nodes. This corridor links peripheral parking areas to Mamleshwar Temple and other important destinations, ensuring a seamless and safe pedestrian experience. The pathway is complemented by the integration of essential services such as drinking water dispensers, resting areas, and shaded seating spaces. By organizing movement along a defined route, the proposal significantly improves spatial efficiency and reduces user conflicts.

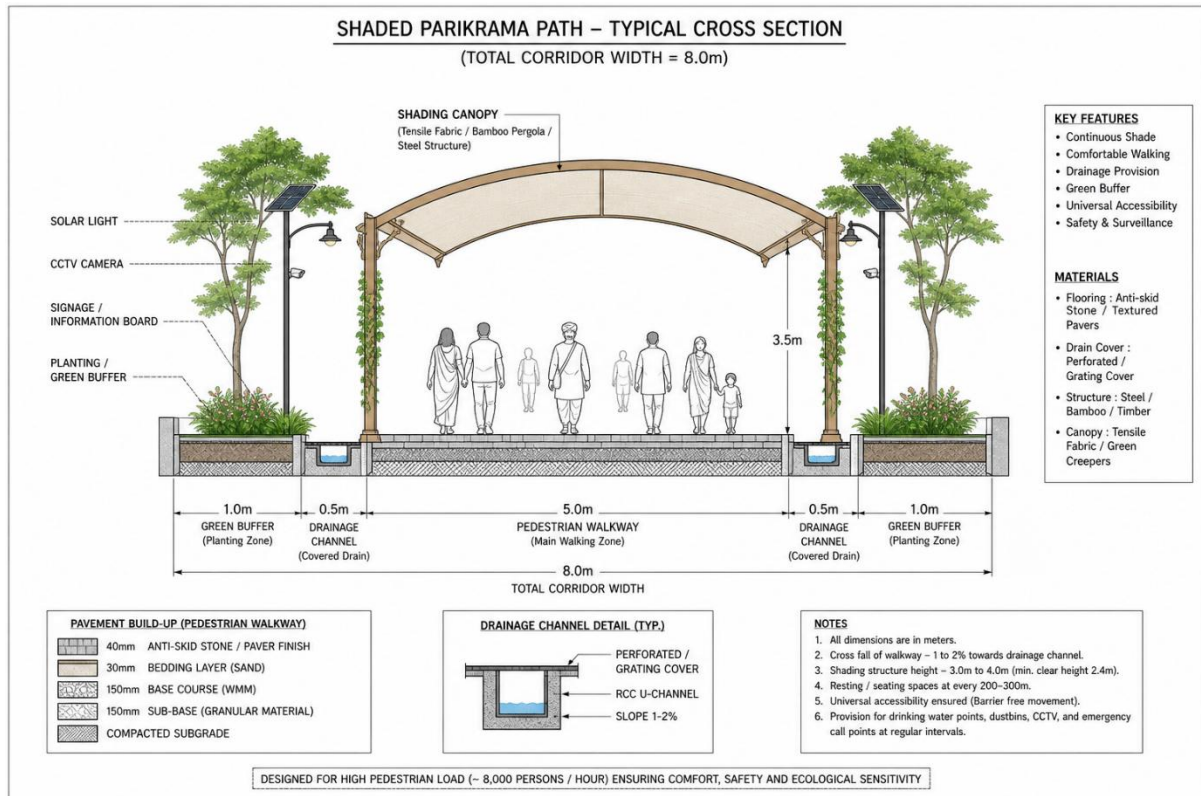


Figure 29 Concept of Shaded Path

The planning rationale for this intervention is rooted in addressing critical on-ground challenges. Unregulated pedestrian movement, exposure to heat, lack of designated walkways, and safety concerns due to vehicular interference are key issues currently affecting the site. The shaded path directly responds to these problems by providing a dedicated, climate-sensitive, and user-friendly pedestrian network. It ensures that movement is both organized and comfortable, thereby enhancing the overall pilgrimage experience. Design considerations for the shaded path have been guided by multiple factors, including high pilgrim footfall, environmental conditions, and topographical constraints. The hilly terrain necessitates careful alignment and gradient management to ensure accessibility, while shading elements such as pergolas and vegetation are incorporated to mitigate heat stress. The pathway is designed to be continuous, safe, and universally accessible, accommodating users of all age groups and physical abilities.



Figure 30 Service Elements (Water Dispenser, etc.)

The benefits of the proposed intervention are significant in terms of both functionality and user experience. Improved walkability and reduced exposure to extreme weather conditions enhance comfort, while the provision of dedicated pedestrian infrastructure increases safety. The shaded corridor also contributes to a more immersive and spiritually enriching experience by allowing pilgrims to move at a comfortable pace within a well-designed environment. Additionally, the proposal promotes inclusive mobility by catering to vulnerable user groups.

Cost Of Project

Parameter	Value
Total Length	7,000 m (7 km)
Cost per meter	₹10,000
Base Cost	₹7 Crore
+20% Contingency	₹1.4 Crore
Final Cost	₹8–9 Crore (Approx.)

From a financial perspective, the estimated cost of the project is approximately ₹8–9 crore for a total length of around 7 km, including construction and contingency provisions. Considering the scale of impact and the number of users benefiting from the intervention, this represents a cost-effective solution for improving urban mobility in a religious tourism context. In planning terms, the proposal supports the principles of sustainable and pedestrian-oriented development. By reducing dependence on vehicular movement and enhancing non-motorized transport infrastructure, it contributes to improved environmental quality and spatial efficiency. The intervention also aligns with broader tourism development goals by strengthening infrastructure while maintaining ecological and cultural sensitivity. The shaded parikrama path proposal represents a low-cost, high-impact intervention that addresses critical mobility challenges in Omkareshwar. By enhancing accessibility, comfort, and service provision, it significantly improves the pilgrim experience while promoting sustainable and inclusive urban development.

7. Circulation & Mobility Plan Proposal and Peripheral Parking , Omkareshwar

Religious tourism towns experience intense mobility pressure due to the concentration of pilgrims, tourists, local residents, service vehicles, and informal activities within compact urban environments. In pilgrimage destinations such as Omkareshwar, circulation planning becomes one of the most critical components of urban management because movement systems directly influence accessibility, safety, tourist experience, and environmental quality. Omkareshwar, being one of the twelve Jyotirlingas of India, attracts a substantial number of pilgrims throughout the year, with visitor numbers increasing significantly during religious festivals, weekends, and auspicious occasions. The town's geographical setting, characterized by its river island morphology, hilly terrain, and limited developable land, further intensifies mobility-related challenges. The existing circulation network within Omkareshwar is highly constrained due to narrow internal streets, mixed land-use patterns, informal vending activities, encroachments, and the absence of a structured vehicular hierarchy. Presently, pedestrians, two-wheelers, auto-rickshaws, private vehicles, buses, and emergency vehicles share the same limited roadway space, resulting in severe congestion and movement conflicts. During peak pilgrimage periods, the internal roads and bridge connections become overcrowded, leading to delays, unsafe pedestrian conditions, and reduced efficiency in movement management. The absence of organized parking infrastructure further aggravates the situation, as vehicles are often parked informally along streets and near temple access routes, reducing effective carriageway width and creating bottlenecks. The mobility challenges in Omkareshwar are not only transportation-related but also directly linked to tourism management, environmental sustainability, and public safety. Excessive vehicular intrusion into the temple core negatively impacts the spiritual environment and reduces the quality of the pilgrimage experience. Moreover, the increasing use of private vehicles has contributed to air pollution, noise generation, and inefficient land utilization within the sensitive religious precinct. Considering these issues, the proposed circulation and mobility plan aims to establish a sustainable, pedestrian-oriented, and organized movement framework for Omkareshwar. The proposal focuses on reducing vehicular congestion in the core temple area through peripheral parking development, controlled traffic movement, e-vehicle-based last-mile connectivity, and enhanced pedestrian infrastructure. The overall planning approach is based on sustainable mobility principles, multimodal integration, and tourism-sensitive urban design.

7.1 Tourist & Pilgrim Footfall Data

Parameter	Estimated Value
Average Annual Tourist Footfall	38–42 lakh visitors/year
Average Daily Visitors (Normal Days)	8,000–12,000 visitors/day
Weekend Footfall	18,000–25,000 visitors/day
Peak Festival Footfall	80,000–1,20,000 visitors/day
Shravan Month Average Daily Visitors	35,000–50,000 visitors/day
Peak Hour Crowd (Morning Darshan)	6,000–8,000 persons/hour

7.2 Existing Circulation Pattern Analysis

The existing circulation pattern of Omkareshwar is primarily radial and organic in nature, developed incrementally over time without a formal mobility structure. The town's circulation system is heavily influenced by the river island configuration and the concentration of major religious activities around the Omkareshwar and Mamleshwar temple precincts. The major regional access to the town is provided through the state highway network connecting Khandwa, Indore, and nearby settlements, while internal movement depends on narrow local roads and pedestrian pathways. At present, the town lacks a clearly defined road hierarchy. Primary roads entering the town gradually transition into narrow mixed-use streets that serve pedestrians, local traffic, commercial activities, and tourist movement simultaneously. The bridge connections act as critical movement corridors, but their limited carrying capacity often results in severe congestion during peak periods. Informal parking along road edges, unauthorized stopping of tourist buses, and unregulated auto-rickshaw operations further reduce the operational efficiency of the road network. Pedestrian movement dominates the temple core area; however, dedicated pedestrian infrastructure is largely absent. Pilgrims are often forced to walk within vehicular corridors, leading to unsafe conditions and frequent movement conflicts. The absence of shaded walkways, organized signage systems, and resting spaces reduces pedestrian comfort, particularly for elderly pilgrims and differently abled visitors. The study also identifies multiple traffic conflict points where major vehicular and pedestrian flows intersect. These conflict zones are primarily located near:

- Temple entry areas
- Bridge access points
- Informal parking clusters
- Market streets
- Ghat access routes

Tourist buses currently enter inner circulation areas due to the absence of designated peripheral holding zones, thereby increasing congestion and reducing maneuverability. Emergency vehicle access is also compromised because of encroachments and irregular roadside activities.

Table Existing Mobility Issues and Impacts

Issue	Location	Impact on Tourists	Planning Concern
Narrow road width	Temple core area	Walking discomfort and congestion	Reduced carrying capacity
Informal parking	Market streets	Traffic obstruction	Poor traffic management
Mixed traffic movement	Internal roads	Safety conflicts	Lack of modal segregation
Absence of pedestrian infrastructure	Temple access routes	Unsafe movement	Poor walkability

Congestion during festivals	Bridge and temple precinct	Delays and overcrowding	Emergency inaccessibility
Lack of organized shuttle system	Peripheral approach roads	Inefficient movement	High private vehicle dependence

7.3 Need for Mobility and Parking Intervention

The need for a comprehensive mobility intervention in Omkareshwar arises from increasing pilgrimage pressure, limited carrying capacity, environmental stress, and declining movement efficiency within the temple precinct. Existing mobility systems are unable to accommodate the growing volume of visitors, especially during peak religious events such as Mahashivratri, Shravan month celebrations, and Kartik fairs. From an urban planning perspective, the present circulation pattern is unsustainable because it prioritizes uncontrolled vehicular access over pedestrian movement. The absence of structured mobility management has resulted in inefficient land utilization, congestion, and poor public realm quality. The concentration of parking and traffic activities near temple zones also reduces the spiritual character of the area and creates visual clutter. From a tourism management perspective, mobility directly influences the quality of visitor experience. Long travel delays, overcrowded streets, and lack of organized movement reduce tourist satisfaction and negatively impact destination image. Poor circulation management can also affect local economic activities by reducing accessibility to commercial areas and ghats. Environmental concerns further justify the intervention. Vehicular emissions within the temple core contribute to deteriorating air quality, while traffic noise disrupts the religious atmosphere. Informal parking and roadside congestion also increase heat absorption and reduce environmental comfort. Public safety concerns are equally significant. Overcrowded circulation routes obstruct emergency vehicle movement and create evacuation challenges during emergencies. Elderly pilgrims, children, and differently abled users are particularly vulnerable due to the absence of dedicated pedestrian infrastructure.

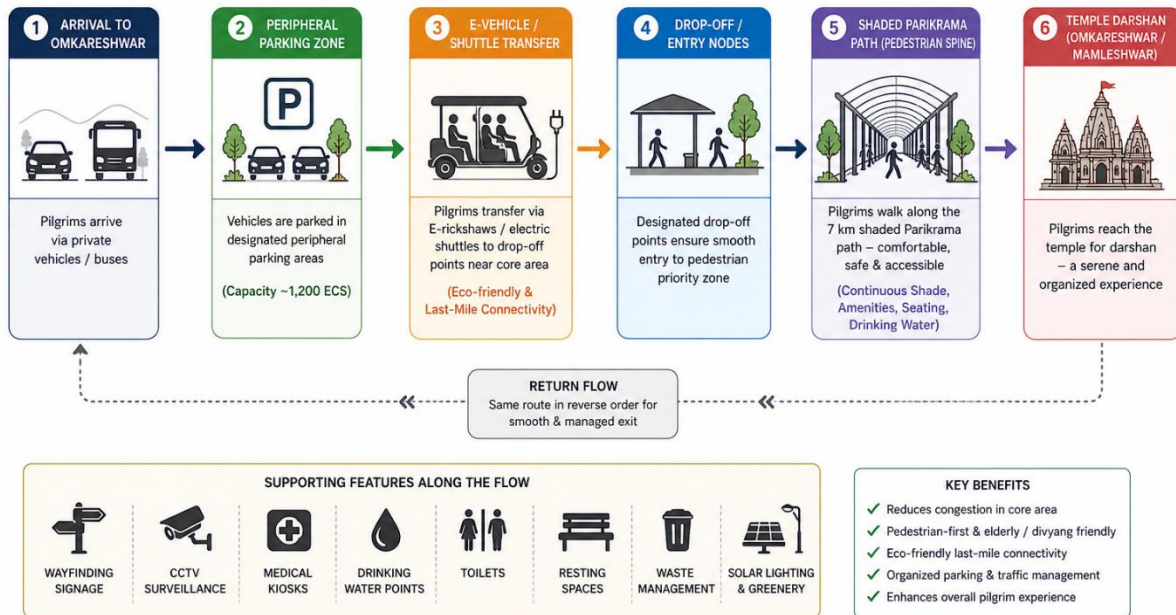
7.4 Proposed Circulation & Mobility Plan

The proposed circulation strategy introduces a hierarchical and multimodal mobility framework aimed at improving movement efficiency, reducing congestion, and creating a pedestrian-priority environment. The proposal restructures mobility into three interconnected systems:

1. Peripheral vehicular movement
2. E-vehicle-based internal circulation
3. Dedicated pedestrian pathways

PILGRIM MOBILITY FLOW CHART – OMKARESHWAR

Seamless, Sustainable & Pedestrian-First Movement



The proposal discourages private vehicle entry into the core temple area and redirects incoming traffic toward designated peripheral parking zones. These parking zones act as mobility interchange nodes where visitors transition from private vehicles to e-rickshaws, shuttle systems, or pedestrian routes. The proposed e-vehicle circulation network forms the backbone of last-mile connectivity within the town. Battery-operated e-rickshaws are proposed due to their compact size, maneuverability, and environmental compatibility with narrow streets. These vehicles connect peripheral parking areas with major religious destinations such as Omkareshwar Temple and Mamleshwar Temple. The circulation proposal also introduces a pedestrian-priority zone around the temple precinct where vehicular movement is either restricted or highly controlled. This intervention significantly improves pedestrian safety and enhances the spiritual environment of the town.

Additional mobility management strategies include:

- One-way circulation loops
- Dedicated drop-off zones
- Emergency access corridors
- Smart wayfinding systems
- Mobility zoning
- Crowd dispersal management

Table Components of Proposed Mobility Plan

Component	Description	Planning Objective	Expected Benefit
Peripheral parking	Parking outside temple core	Reduce congestion	Improved circulation
E-vehicle shuttle	Battery-operated last-mile service	Sustainable mobility	Reduced emissions
Pedestrian priority zone	Restricted vehicular access	Improve walkability	Enhanced pilgrim comfort
Dedicated pilgrim pathways	Continuous shaded pathways	Safe pedestrian movement	Better accessibility
Wayfinding system	Directional signage and information	Improve navigation	Reduced confusion
Emergency corridor	Reserved emergency access	Public safety	Faster response time

7.5 Peripheral Parking Proposal

The peripheral parking proposal is one of the most significant components of the circulation strategy. The proposal aims to shift parking demand away from the congested temple core toward designated parking areas located along the town periphery. This approach minimizes vehicular intrusion into sensitive pedestrian zones and creates a more organized mobility environment.

The proposed parking locations were selected based on:

- Land availability
- Proximity to major approach roads
- Accessibility to temple nodes
- Shuttle connectivity potential
- Minimum environmental impact

The parking infrastructure is designed to accommodate multiple vehicle categories including:

- Tourist buses
- Cars
- Two-wheelers
- Service vehicles

- VIP vehicles

Provision for future multi-level parking structures may also be considered depending on future tourist growth projections.

Table Proposed Parking Infrastructure

Parking Type	Capacity	Area Requirement	User Category
Bus parking	40–50 buses	Large surface parking	Tourist buses
Car parking	700–800 cars	Standard parking bays	Pilgrims and tourists
Two-wheeler parking	800–1000 vehicles	Compact parking zone	Local users
VIP parking	50 vehicles	Controlled access parking	Officials/VIP visitors
Service vehicle parking	30 vehicles	Utility/service zone	Maintenance vehicles



Figure 31 Conceptual parking plan

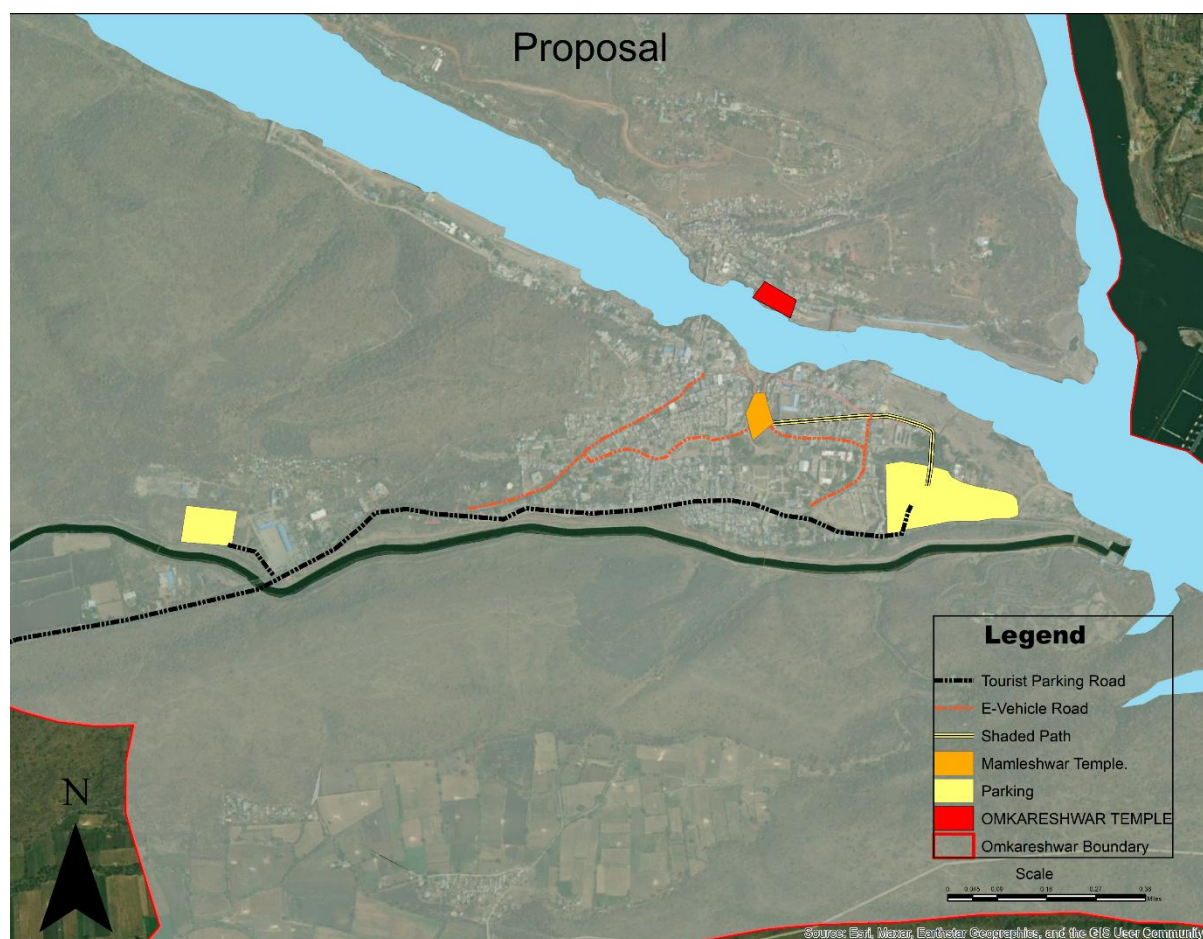


Figure 32 Circulation Proposal Map and Parking Proposal

The map illustrates the proposed integrated circulation and mobility framework prepared for Omkareshwar with the objective of improving pilgrimage movement, reducing congestion within the temple core, and promoting a pedestrian-oriented and sustainable transport system. The proposal introduces a hierarchical circulation structure consisting of peripheral vehicular movement, eco-friendly internal transport, and dedicated pedestrian infrastructure. The planning concept is primarily based on restricting unnecessary vehicular entry into the congested temple precinct and shifting parking and traffic management functions toward the outer edge of the settlement. This approach improves mobility efficiency while preserving the spiritual and environmental character of the pilgrimage town.

Chapter 5 Conclusion

The present study, *“Planning for Tourism Development in a Town: A Case Study of Omkareshwar, Madhya Pradesh,”* successfully achieves its primary objective of analyzing the existing tourism scenario and formulating a comprehensive, planning-based framework for sustainable development. Through a combination of primary surveys, field observations, and GIS-based spatial analysis, the research provides a detailed understanding of the complex interplay between tourism demand, infrastructure capacity, and environmental constraints in Omkareshwar. The study establishes that tourism in the town is predominantly pilgrimage-oriented, characterized by short-duration visits, high seasonal fluctuations, and intense pressure on specific nodes such as temple precincts and ghats. The findings clearly highlight that the town’s unique geographical context—being a river island surrounded by hilly terrain significantly restricts spatial expansion and intensifies the concentration of activities. This results in critical challenges such as traffic congestion, inadequate parking, poor internal circulation, and severe pedestrian–vehicular conflict. Furthermore, the assessment of infrastructure and services reveals a stark imbalance between demand and supply, particularly in essential public amenities such as toilets, drinking water, waste management, and information systems. The study also identifies a “public-private gap,” where private services such as accommodation and food perform relatively well, while public infrastructure remains inadequate, thereby affecting overall user experience and environmental quality. Environmental analysis underscores the growing stress on the Narmada riverfront and ghat areas due to poor waste management and overcrowding. Despite the strong spiritual perception of the river, the physical condition of surrounding spaces reflects neglect and declining environmental quality. The study further reveals that while the town benefits from high levels of perceived safety and hospitality, its carrying capacity is being exceeded, leading to negative environmental impacts and reduced long-term sustainability. In response to these challenges, the study proposes a set of integrated planning interventions aimed at improving mobility, infrastructure, and overall tourism management. Key proposals such as peripheral parking systems, pedestrianization of core areas, ropeway connectivity, shaded pedestrian pathways, ghat redevelopment, and smart waste management collectively address the identified gaps. The application of GIS-based Multi-Criteria Evaluation (MCE) and weighted overlay analysis strengthens the planning approach by enabling the identification of priority intervention zones and ensuring data-driven decision-making. From a planning perspective, the study demonstrates significant practical relevance by linking spatial analysis with actionable strategies. It emphasizes the need for decentralized infrastructure provision, improved circulation systems, and enhanced service accessibility to reduce congestion in core areas and promote balanced development. The proposed framework also aligns with principles of sustainable tourism by integrating environmental conservation, user comfort, and cultural sensitivity. Importantly, the focus on pedestrian-friendly infrastructure and last-mile connectivity reflects a shift towards inclusive and human-centric urban design in pilgrimage towns. Looking forward, the study highlights the necessity for institutional coordination, phased implementation, and continuous monitoring to ensure the effectiveness of proposed interventions. Future scope lies in incorporating detailed carrying capacity assessments, smart technologies for real-time crowd management, and stronger policy integration at regional and state levels. Additionally, expanding tourism beyond core religious activities through cultural and experiential planning can help increase the duration of stay and enhance local economic benefits. The study establishes that sustainable tourism development in Omkareshwar requires

a holistic and integrated planning approach that responds to its unique geographical constraints, high pilgrimage pressure, and infrastructural limitations. By addressing critical service gaps, improving mobility systems, and enhancing environmental management, the proposed framework contributes towards creating a more organized, accessible, and resilient pilgrimage destination. The insights derived from this research not only support the future planning of Omkareshwar but also offer a replicable model for other religious towns facing similar challenges.

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