ARC 5201 – Thesis Project

Eco Tourism Resort

Chorwad, Gujarat, India

Submitted by:

Himani Thakre

211110214

B.Arch

9th Semester, 5th Year

Under the Guidance of

Dr. Savita S Raje

DEPARTMENT OF ARCHITECTURE AND PLANNING

MAULANA AZAD NATIONAL INSTITUTE OF

TECHNOLOGY BHOPAL (MP)-462003

© MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL – 2025 ALL

RIGHTS RSERVED

DEPARTMENT OF ARCHITECTURE AND PLANNING MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL

CANDIDATE DECLARATION

The Thesis Project in the subject ARC 5201, entitled "Eco Tourism Resort, Chorwad, Gujarat, India", is being submitted in partial fulfilment of the requirement for the award of degree of Bachelor of Architecture by the undersigned for evaluation.
The matter embodied in this project is a record of my own work. If, in future, it is found that the above statement is false, then I have no objection in withdrawal of Bachelor of Architecture Degree awarded to me by the Institute.

Date: 2nd Dec, 2025

Himani Thakre
211110214

RECOMMENDATION

Based on the above declaration of the student, the undersigned recommends that the work submitted by the candidate may be considered for the final end term examination of the subject ARC-5201, Thesis Project.

Date: 2nd Dec, 2025

Dr. Savita S Raje
Thesis Guide

CERTIFICATION OF EXAMINATION

The Bachelor of Architecture Thesis Viva-Voce examination of Ms. Himani Thakre Scholar No.211110214, was held on 2/12/2025.

Dr. Nakul Dhagat
Head of Department

Ar. Vicky Lalramsangi
Thesis Coordinator

ABSTRACT

The thesis explores the design and development of an eco-tourism resort at Chorwad, Gujarat, integrating heritage conservation with sustainable hospitality. The project is centered on the adaptive reuse of the Chorwad Palace, a historically significant coastal landmark, and its transformation into a culturally rooted resort facility. Through a combination of literature review, site analysis, climate assessment, and case studies, the work formulates strategies that balance heritage preservation with modern tourism demands. The proposal emphasizes sustainable practices such as passive design, renewable energy integration, and eco-sensitive landscaping to create a low-impact development that aligns with Coastal Regulation Zone (CRZ) guidelines and Gujarat Tourism Policy 2021–25. The design outcome demonstrates how heritage assets can be revitalized as active contributors to regional identity, community development, and sustainable tourism infrastructure. The project thus positions architecture as a medium that bridges cultural continuity with contemporary hospitality needs, offering a replicable model for coastal tourism development in India.

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my thesis guide, Dr. Savita S. Raje, for her constant guidance, encouragement, and critical insights throughout the course of this project. Her mentorship has been invaluable in shaping both the academic rigor and design direction of this work. I extend my thanks to the faculty members of the Department of Architecture and Planning, MANIT Bhopal, for their valuable feedback and support at various stages of the thesis.

I am also thankful to the Tourism Corporation of Gujarat Limited (TCGL) and other organizations whose documents and reports provided essential references for this study. Special appreciation goes to my peers and friends for their constructive discussions and moral support.

Finally, I am deeply indebted to my family, whose patience, encouragement, and unwavering belief in me have been my strongest source of strength throughout this journey.

TABLE OF CONTENT

Contents

ABSTRACT 4
ACKNOWLEDGEMENT 5
TABLE OF CONTENT 6
LIST OF TABLES 8
LIST OF FIGURES 9
1. DESIGN BRIEF 10
1.1 INTRODUCTION 10
1.2 BACKGROUND 10
1.3 AIM & OBJECTIVES 11
1.4 SCOPE AND LIMITATIONS 11
1.5 METHODOLOGY 12
1.6 BRIEF PROJECT PARTICULARS 12
1.7 SCOPE OF WORK 14
1.7.1 HERITAGE STRUCTURE CONSERVATION 15
1.7.2 RESORT PLANNING AND DESIGN 15
1.7.3 LANDSCAPE DESIGN AND SITE DEVELOPMENT 15
1.7.4 SUSTAINABLE DESIGN INTEGRATION 15
1.7.5 INFRASTRUCTURE AND CIRCULATION PLANNING 15
1.8 SIGNIFICANCE OF THE PROJECT 16
1.9 NEED FOR THE PROJECT 16
2.LITERATURE STUDY 18
2.1 HERITAGE CONTEXT AND RELEVANCE 18
2.2 TOURISM AND REGIONAL OPPORTUNITY 19
2.3. DESIGN GUIDELINES FROM TENDER 20
2.4. CRZ notification 2019 21
2.4.1. CLASSIFICATION OF CRZ AREAS 21
2.4.2. APPLICABILITY TO CHORWAD, GUJARAT 21
2.4.3. NO DEVELOPMENT ZONE (NDZ) GUIDELINES – CRZ-III 22
2.4.4. RESORT DEVELOPMENT IN CRZ-III (ANNEXURE-III) 22
2.4.5. HERITAGE STRUCTURE RESTORATION IN CRZ 24
2.4.6. HIGH TIDE LINE (HTL) & SETBACKS 24
2.4.7. PERMISSIBLE ACTIVITIES IN CRZ-III (BEYOND NDZ) 24
2.4.8. PROCEDURAL REQUIREMENTS FOR CRZ CLEARANCE 25
2.4.9. SUMMARY FOR THESIS 25
2.5 EIA Notification 2006 25

2.5.1. PURPOSE AND SCOPE OF EIA 25
2.5.2. KEY PROJECT REQUIREMENTS & ENVIRONMENTAL CHECKLIST 25
2.5.3 ENVIRONMENTAL MANAGEMENT PLAN (EMP) 26
2.5.4 SITE-SPECIFIC CONSIDERATIONS FOR CHORWAD 26
2.5.5 CONCLUSION: DESIGN IMPLICATIONS 26
2.6 GUJARAT TOURISM POLICY 2021–25 26
2.6.1 OBJECTIVES RELEVANT TO THESIS 26
2.6.2 FINANCIAL INCENTIVES FOR THE PROJECT 27
2.6.3 ELIGIBILITY CRITERIA FOR RESORT PROJECTS 27
2.6.4 LEASE AND LAND SUPPORT 27
2.6.5 RELEVANCE TO THESIS 28
2.7 NEUFERT'S ARCHITECT'S DATA- 4TH EDITION (BOOK, 2012) 28
2.7.1 HOLIDAY/ WEEKEND HOMES 28
2.7.2 SPA 30
2.7.3 SWIMMING POOL 35
2.7.4 CHANGING AREA 37
2.7.5 RESTAURANTS 38
2.7.6. KITCHEN REQUIREMENTS 40
2.7.7 LIBRARY 41
2.7.8 INDOOR SPORTS 43
2.8 INFERENCES FROM LITERATURE STUDY – DESIGN-CENTRIC TABLE 45
3.SITE INVENTORY 47
3.1. PROJECT OVERVIEW 47
3.2 SITE ANALYSIS 58
3.3 CLIMATE ANALYSIS 65
3.4 INFERENCES 72
4.CASE STUDY 76
4.1 AZZARO RESORT & SPA, DIU 76
4.2 HOTEL KOHINOOR , DIU 87
5.DESK APPRAISALS 95
5.1 DUSAI RESORT & SPA, BANGLADESH 95
5.2ANORA BEACH RESORT, CHENNAI ,TAMILNADU 100
5.3 INFERENCES 105
REFRENCES 109

LIST OF TABLES

Table 1 Brief Project Particulars 14

LIST OF FIGURES

Figure 1 Location 10
Figure 2 The Palace of Chorwad 11
Figure 3 Views from Site 16
Figure 4 Dining hall 18
Figure 6 Site Context 18
Figure 5 Replica Building 18

1. DESIGN BRIEF

1.1 INTRODUCTION

The project is located in Chorwad, a historic coastal town in Gujarat, once a princely estate known for its palatial architecture and scenic sea views. The site includes the Chorwad Palace, a heritage structure with significant cultural and architectural value. The Tourism Corporation of Gujarat Ltd. (TCGL) has proposed the redevelopment of this site as a 3-star resort under a Public-Private Partnership (PPP) model on a DBFOT (Design, Build, Finance, Operate, Transfer) basis.

The design brief focuses on restoring the old palace structure and complementing it with thoughtfully designed hospitality infrastructure, including cottages, restaurants, and amenities that uphold heritage aesthetics and sustainability.

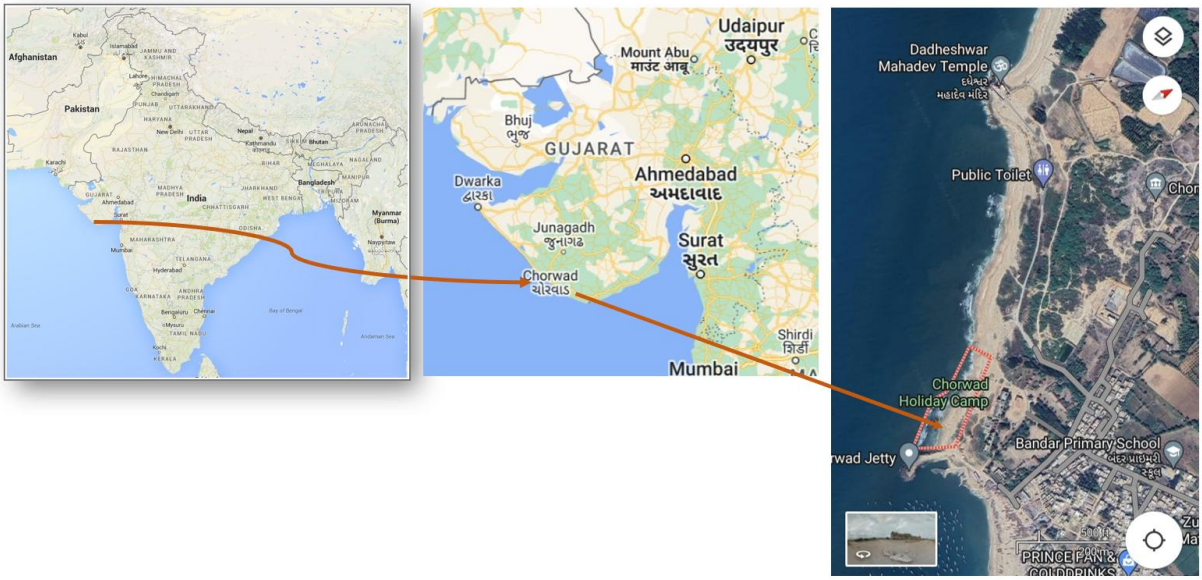


Figure 1 Location

1.2 BACKGROUND

Despite its tourism potential and rich heritage, the site at Chorwad remains underutilized, and the historic palace faces gradual decay due to neglect. There exists a critical need for sensitive development that merges conservation with contemporary resort functions. The challenge lies in creating a viable and sustainable design that preserves historical identity, respects site ecology, and meets modern hospitality standards.



Figure 2 The Palace of Chorwad

1.3 AIM & OBJECTIVES

AIM:
To design a sustainable resort at Chorwad that revitalizes and reuses the existing heritage palace structure, enhancing tourism and cultural preservation.

OBJECTIVES:

- Restore the Chorwad Palace using prudent heritage conservation practices.
- Develop a resort with a minimum of 45 luxury rooms or cottages, aligned with 3-star standards.
- Ensure contextual architecture blending old and new aesthetics.
- Integrate sustainable infrastructure: rainwater harvesting, solid waste management, green landscaping, etc.
- Comply with CRZ regulations, local bylaws, and eco-sensitive coastal norms.

1.4 SCOPE AND LIMITATIONS

SCOPE:

- Adaptive reuse of the existing heritage structure (Old Chorwad Palace).
- Master planning and architectural design of hospitality facilities including:
  - Guest rooms/cottages/tents
  - Multi-cuisine restaurant or café
  - Reception & lobby
  - Parking areas
  - Landscape features
- Infrastructure for internal circulation, lighting, drainage, and services.
- Proposal of optional components: health club, swimming pool, additional rooms.

LIMITATIONS:

- No on-ground archaeological excavation; historical data used from available documentation.
- Financial viability studies beyond the scope of academic work.
- Structural restoration assumptions based on standard conservation practices; detailed retrofitting not included.

1.5 METHODOLOGY

- Site Analysis: Location coordinates (21°00'00.83"N, 70°13'38.17"E), climate, topography, and contextual study.
- Literature Review: Resort design standards, heritage conservation guidelines, CRZ norms.
- Case Studies: Similar projects such as Hotel Kohinoor, Diu and others.
- User Requirements: Zoning for privacy, circulation, views, and comfort.
- Design Process:
  - Zoning and conceptual layout
  - Adaptive reuse strategies for the palace
  - Material palette and architectural vocabulary
  - 3D visualization and technical drawings
- Regulatory Compliance: Coastal regulation zone (CRZ), tourism guidelines, and local bye-laws.

1.6 BRIEF PROJECT PARTICULARS

Brief particulars of the project are as follows:

Sr. No.	Key Information	Details
1.	Project Title	**Development of Resort at Chorwad, Gujarat**
2.	Location	Land admeasuring about **48,100 sq. m.** located on the Chorwad beach, around 3.6 km from the Chorwad city towards the southwest side at 21.8 km from the Chorwad Road Railway station, 29.3 km from Veraval Railway Station and about 41 km from the Keshod Airport and around 106 km from Porbandar Airport. Location: 21.0004158640739, 70.22745634431269 Brief details of the site is placed at Annexure 3.
3.	Estimated Project Cost	**Rs. 19.50 Crores (Rupees Nineteen Crores Fifty Lakhs Only) including the cost towards restoration of the Chorwad Palace**
4.	Minimum Development Obligations	The Concessionaire shall be required to develop the following facilities:

Sr. No.	Key Information	Details
		1. **45 keys** (Luxury Rooms / Cottages / Tents) in 3-Star (or hotel having similar facilities) / Mid-Scale / Budget / Economy Hotel 2. Restaurants (Multi Cuisine Restaurant / Speciality Restaurant / Coffee Shop) – As per requirement 3. Restoration of old building (Old Chorwad Palace) as per prudent restoration practices. o **TCGL has reserved an amount of Rs. 5.00 crore towards restoration of the Chorwad Palace. Concessionaire will be required to restore the building as per prudent practices and will be entitled to get the same amount reimbursed, up to a ceiling of Rs. 5.00 Cr (actual amount spent on restoration or Rs 5.00 Cr, whichever is lower) on initiating Commercial Operation of the Resort.** 4. Reconstruction of other buildings keeping architectural elements similar to the old building. **5.** Provision of car parking to be made as per Local Building Bye-Laws or as directed by TCGL. **6.** Other common and support facilities such as internal roads, streetlights, water harvesting system, solid waste disposal, storm water drainage system, main sewer line, water supply including storage tank(s), transformer, electrical sub-station, green patches etc.
5.	Optional Facilities	• Additional Tents / Cottages / Rooms • Recreational area with Health Club and swimming pool • Any other development with the approval of TCGL
6.	Special Conditions	1. The land shall not be used for the purpose other than tourism related activities and development. 2. Any demolition in the site, has to be pre-approved by TCGL in writing. 3. Clearance under CRZ, if applicable, needs to be obtained by the Concessionaire on its own. 4. TCGL at its discretion shall engage the services of a Conservation Architect, in capacities of Third-Party Agency, for approval of the Conservation Plan submitted by the Concessionaire. The fee to be paid to such an agency shall be shared equally by TCGL and the Concessionaire.

Sr. No.	Key Information	Details
7.	Concession Period	**35 (thirty-five) years (including Compliance and Construction Period) from the date of signing of Agreement,** unless terminated earlier. **A Compliance Period of a maximum of 12 months, from the date of signing of the Concession Agreement, shall be provided to the Preferred Bidder within which all clearances and compliances including but not limited to CRZ clearance shall have to be taken.**
8.	Construction Period	**2 years (24 months).** The above stated time-lines shall become applicable from the Compliance Date.
9.	Consortium	Permitted **Maximum two members including the Lead Member**
10.	Payments to be made by the Preferred Bidder	As a pre-condition of signing of Concession Agreement & Lease Deed: (a) **Construction Performance Security** for an amount equal to 5% of Estimated Project Cost. (b) **Annual Land Lease Rentals**: Re. 1.00 (Rupee One only) per sqm. (c) Fee equivalent to **2% of the Project Cost** (approved as per the terms of GR Resolution no TDC-102007-431-S dated 21st June 2007 issued by Industries and Mines Department) and taxes as applicable (d) Other statutory payments in accordance with the law **Payments on / before COD:** (a) **Total Annual Premium** for the first year of operations in advance (b) **Operation & Maintenance (O&M) Performance Security** for an amount equal to 2% of the Estimated Project Cost. The amount for the Bank Guarantee shall be escalated by 12% (twelve percent) on compounding basis every 3 (three) years.

Table 1 Brief Project Particulars

1.7 SCOPE OF WORK

The scope of this thesis project encompasses the architectural design, site planning, and adaptive reuse strategy for the development of a 3-star resort integrated with the conservation of a heritage palace structure located at Chorwad, Gujarat. The work aims to create a contextual

and functional hospitality space while preserving the cultural integrity and architectural significance of the existing structure.
The key components included in the scope of work are:

1.7.1 HERITAGE STRUCTURE CONSERVATION

- Detailed architectural documentation of the existing palace building.
- Assessment of the condition of the built fabric and proposal for appropriate restoration techniques.
- Adaptive reuse of the heritage structure to house key resort functions such as a reception, museum lounge, specialty restaurant, or gallery space.
- Conservation to be guided by principles of minimum intervention, reversibility, and material authenticity.

1.7.2 RESORT PLANNING AND DESIGN

- Master planning of the entire site, including zoning of built and open spaces.
- Design of a minimum of 45 guest units in the form of cottages, tents, or villas, inspired by local architectural vocabulary and climatic responsiveness.
- Provision of ancillary facilities such as:
  - Multi-cuisine restaurant or café
  - Reception and administrative areas
  - Recreational amenities (health club, spa, swimming pool)
  - Parking facilities for guests and staff

1.7.3 LANDSCAPE DESIGN AND SITE DEVELOPMENT

- Design of outdoor spaces including gardens, courtyards, walkways, decks, and seating areas that enhance the experiential quality of the resort.
- Integration of landscape features that reflect the coastal ecology and local flora.
- Planning of open-to-sky zones for views, ventilation, and community engagement.

1.7.4 SUSTAINABLE DESIGN INTEGRATION

- Incorporation of passive design techniques (orientation, ventilation, shading).
- Use of renewable materials and low-impact construction practices.
- Integration of sustainable infrastructure such as:
  - Solar lighting and water heating systems
  - Rainwater harvesting
  - Waste management and composting
  - Greywater reuse for landscaping

1.7.5 INFRASTRUCTURE AND CIRCULATION PLANNING

- Adherence to Coastal Regulation Zone (CRZ) guidelines, Tourism Corporation of Gujarat norms, and local building bye-laws.
- Consideration of safety norms, accessibility (barrier-free design), and universal design

principles.

This scope of work defines the boundaries and deliverables of the project, providing a comprehensive framework for developing a culturally rooted, environmentally sensitive, and architecturally balanced resort experience in Chorwad.



Figure 3 Views from Site

1.8 SIGNIFICANCE OF THE PROJECT

This project represents a critical intersection between preservation and progress. It explores how architecture can serve as a bridge—reviving neglected historical assets while responding to modern-day functional needs. The outcome will demonstrate a replicable model of coastal resort development with heritage conservation, supporting the Government's vision under initiatives like Amrit Bharat Station Scheme and Dekho Apna Desh.

It aspires to create a culturally immersive and environmentally responsible hospitality destination, showcasing the power of architecture to rejuvenate regional identity and sustainable tourism.

1.9 NEED FOR THE PROJECT

The redevelopment of the Chorwad Palace site into a heritage-integrated resort addresses multiple architectural, cultural, and tourism-based gaps. The following points highlight the relevance and urgency of the project:

1. REVIVING A FORGOTTEN HERITAGE ASSET

The existing palace at Chorwad holds immense historical and architectural value but currently lies neglected. This project seeks to restore and give new purpose to the structure through adaptive reuse.

2. TAPPING UNTAPPED COASTAL TOURISM POTENTIAL

Despite its scenic beauty and heritage backdrop, Chorwad lacks quality tourism infrastructure.

The proposed resort will help unlock the region's potential as a cultural coastal destination.

3. BRIDGING THE HOSPITALITY INFRASTRUCTURE GAP
There is a notable shortage of mid-scale (3-star) resorts along Gujarat's coast. This project addresses the growing need for comfortable, experiential stays that align with eco-cultural tourism.

4. CONSERVATION THROUGH ADAPTIVE REUSE
Instead of treating heritage as static monuments, this project demonstrates how it can be preserved through practical function, creating a model for sustainable conservation.

5. SOCIO-ECONOMIC DEVELOPMENT
The resort will generate employment opportunities for locals (construction, staff, guides, artisans) and boost the local economy through tourism-based revenue.

6. HARMONIZING MODERN COMFORT WITH HISTORIC CONTEXT
The project will explore ways to integrate contemporary amenities (luxury stays, dining, wellness) without compromising the integrity of the heritage site.

7. ENVIRONMENTALLY RESPONSIBLE DEVELOPMENT
By incorporating green building principles, CRZ compliance, and coastal-sensitive design, the project supports long-term environmental sustainability.

8. LANDSCAPE AND REGIONAL IDENTITY ENHANCEMENT
The resort will enhance the site's experiential quality through contextual landscape design, storytelling elements, and celebration of local materials and motifs.

9. EDUCATIONAL AND ARCHITECTURAL SIGNIFICANCE
For academic and professional practice, the project is a comprehensive design problem combining architectural design, heritage conservation, coastal regulation, and sustainable planning.

10. ALIGNMENT WITH GOVERNMENT TOURISM MISSIONS

- Supports national and state tourism initiatives like:
- Dekho Apna Desh
- Swadesh Darshan Scheme
- Amrit Bharat Scheme
  Promoting sustainable regional development and heritage tourism.

2.LITERATURE STUDY

2.1 HERITAGE CONTEXT AND RELEVANCE

- The Chorwad Palace is a 1930s heritage structure, originally the summer home of the Nawab of Junagadh.
- Architectural influences: Italian, Muslim, and Colonial styles.
- The palace offers a strong narrative for adaptive reuse into a hospitality component (e.g., restaurant, gallery, lounge).
- It forms the core identity of the site, and the project must preserve its "ambience and ethos of a royal bygone era."



Figure 6 Site Context



Figure 5 Replica Building



Figure 4 Dining hall

2.2 TOURISM AND REGIONAL OPPORTUNITY

- Chorwad is one of the few untapped coastal tourism locations in Gujarat.
- It is well-connected by air (Keshod), rail (Veraval), and road.
- There's a clear need for a context-sensitive 3-star resort that integrates heritage tourism and ecological design.

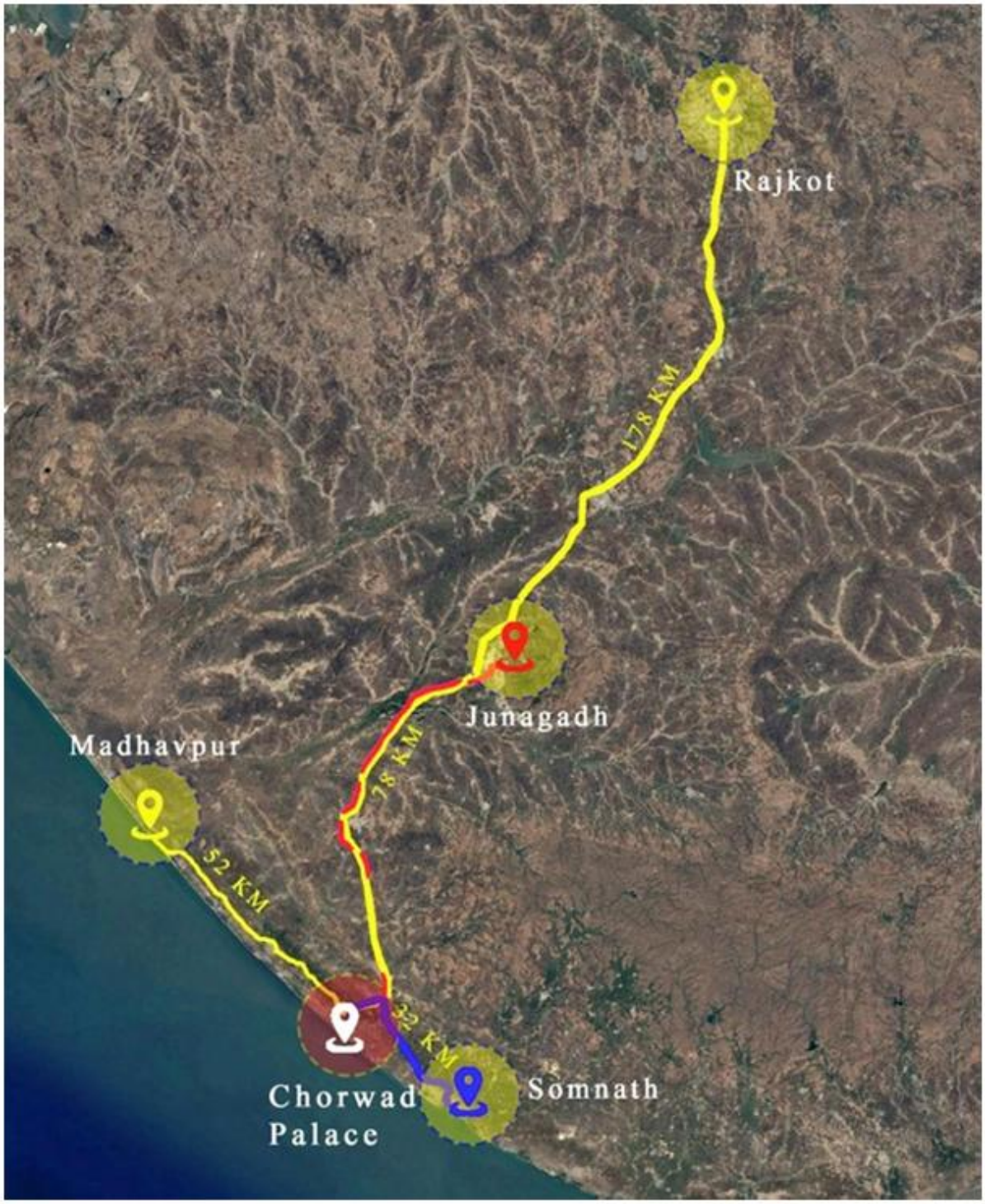


Figure 7 Connectivity to Chorwad Palace

2.3. DESIGN GUIDELINES FROM TENDER

S. No.	Components	Details
1.	Minimum Development Obligations/ Essential Components	**Develop operate and maintain** 1. **45 keys** (Luxury Rooms / Cottages / Tents) in 3-Star (or hotel having similar facilities) / Mid-Scale / Budget / Economy Hotel 2. Restaurants (Multi Cuisine Restaurant / Speciality Restaurant / Coffee Shop) – As per requirement 3. Restoration of old building (Old Chorwad Palace) as per prudent restoration practices. o **TCGL has reserved an amount of Rs. 5.00 crore towards restoration of the Chorwad Palace. We will be required to restore the building as per prudent practices and will be entitled to get the same amount reimbursed, upto a ceiling of Rs. 5.00 Cr (actual amount spent on restoration or Rs 5.00 Cr, whichever is lower) on initiating Commercial Operation of the Resort.** 4. Reconstruction of other buildings keeping architectural elements similar to the old building. 5. Provision of car parking to be made as per Local Building Bye-Laws or as directed by TCGL. 6. Other common and support facilities such as internal roads, streetlights, water harvesting system, solid waste disposal, storm water drainage system, main sewer line, water supply including storage tank(s), transformer, electrical sub-station, green patches etc.
2.	Optional Development	• Additional Tents / Cottages / Rooms • Recreational area with Health Club and swimming pool • Any other development with the approval of TCGL
3.	Prohibited Development and Prohibited Activities	All non-compatible uses as per the laws of Government of India and Government of Gujarat are not permitted.

S. No.	Components	Details
4.	Development Controls/ Guidelines	Applicable building bye laws, Guidelines of Ministry of Tourism, Government of India and all other applicable guidelines including but not limited to **CRZ / ASI** / State Archaeology / **Forest and Environment Department etc.,**
5.	Applicable Permits / Clearances	All the applicable Permits / clearances needs to be obtained by the Concessionaire.

Table 2 Requirements as specified

2.4. CRZ notification 2019

2.4.1. CLASSIFICATION OF CRZ AREAS

CRZ Notification 2019 classifies coastal areas into four zones:

- CRZ-I: Ecologically sensitive areas (e.g., mangroves, turtle nesting grounds, etc.)
- CRZ-II: Developed urban areas close to the shoreline
- CRZ-III: Undeveloped rural areas (most likely your site category)
- CRZ-IV: Aquatic areas (water bodies up to 12 nautical miles seaward)

2.4.2. APPLICABILITY TO CHORWAD, GUJARAT

Given Chorwad is a semi-urban coastal village, your project most likely falls under CRZ-III B, defined for areas with a population density less than 2161 persons/km².

- Setback (NDZ): 200m from HTL must remain a No Development Zone
- Permissible beyond 200m: Tourism infrastructure like 3-star resorts

2.3 CRZ-III:

Land areas that are relatively undisturbed (viz. rural areas, etc.) and those which do not fall under CRZ-II, shall constitute CRZ–III, and CRZ-III shall be further classified into following categories: -

2.3.1 CRZ-III A:

Such densely populated CRZ-III areas, where the population density is more than 2161 per square kilometre as per 2011 census base, shall be designated as CRZ–III A and in CRZ-III A, area up to 50 meters from the HTL on the landward side shall be earmarked as the 'No Development Zone (NDZ)', provided the CZMP as per this notification, framed with due consultative process, have been approved, failing which, a NDZ of 200 meters shall continue to apply.

2.3.2 CRZ-III B:

All other CRZ-III areas with population density of less than 2161 per square kilometre, as per 2011 census base, shall be designated as CRZ-III B and in CRZ-III B, the area up to 200 meters from the HTL on the landward side shall be earmarked as the 'No Development Zone (NDZ)'.

2.3.3:

Land area up to 50 meters from the HTL, or width of the creek whichever is less, along the tidal influenced water bodies in the CRZ III, shall also be earmarked as the NDZ in CRZ III.

Note: The NDZ shall not be applicable in the areas falling within notified Port limits.

Figure 8 Reference 1

2.4.3. NO DEVELOPMENT ZONE (NDZ) GUIDELINES – CRZ-III

NDZ (200m from HTL) prohibits most constructions. However:
ALLOWED:

- Repairs or reconstruction of authorized heritage structures
- Traditional dwellings of fishing communities
- Facilities essential for the public (toilets, roads, water supply)

NOT ALLOWED:

- New construction (except for approved essential amenities)
- Sand mining, discharge of untreated waste

(ii) **Regulation of activities in NDZ:**

Following shall be permissible and regulated in the NDZ:-

(a) No construction shall be permitted within NDZ in CRZ III, except for repairs or reconstruction of existing authorised structure not exceeding existing Floor Space Index, existing plinth area and existing density and for permissible activities under this notification including facilities essential for activities and construction or reconstruction of dwelling units of traditional coastal communities including fisher folk, incorporating necessary disaster management provisions and proper sanitation arrangements.

(b) Agriculture, horticulture, gardens, pastures, parks, playfields and forestry.

(c) Construction of dispensaries, schools, public rain shelter, community toilets, bridges, roads, provision of facilities for water supply, drainage, sewerage, crematoria, cemeteries and electric sub-station which are required for the local inhabitants may be permitted on a case to case basis by Coastal Zone Management Authority (CZMA).

(d) Construction of units or auxiliary thereto for domestic sewage, treatment and disposal with the prior approval of the concerned Pollution Control Board or Committee.

(e) Facilities required for local fishing communities such as fish drying yards, auction halls, net mending yards, traditional boat building yards, ice plant, ice crushing units, fish curing facilities and the like.

(f) Wherever there is a national or State highway passing through the NDZ of CRZ-III areas, temporary tourism facilities such as toilets, change rooms, drinking water facility and temporary shacks can be taken up on the seaward side of the road.

On landward side of such roads in the NDZ, resorts or hotels and associated tourism facilities shall be permitted and such facilities shall, however, be permitted only subject to the incorporation of tourism plan in the approved CZMP as per this notification and the conditions or guidelines at Annexure-III, to this notification as applicable.

(g) Temporary tourism facilities shall be permissible in the NDZ and beaches in the CRZ-III areas and such temporary facilities shall only include shacks, toilets or washrooms, change rooms, shower panels, walk ways constructed using interlocking paver blocks, etc, drinking water facilities, seating arrangements etc., and such facilities shall, however, be permitted only subject to the tourism plan featuring in the approved CZMP as per this notification subject to maintaining a minimum distance of 10 meters from HTL for setting up of such facilities.

Figure 9 Reference 2

2.4.4. RESORT DEVELOPMENT IN CRZ-III (ANNEXURE-III)

For resorts and hotels in CRZ-III, the following guidelines are to be followed:

- Live fencing is permitted but must not block beach access
- No flattening of sand dunes

- FSI shall not exceed 0.33
- Height restricted to 9m, with max G+1 floors
- Groundwater shall not be tapped within 200m from HTL
- Treated waste management mandatory
- Minimum 20m gap between hotels/resorts (min 500m apart)

(i) live fencing and barbed wire fencing with vegetative cover may be allowed around private properties subject to the condition that such fencing shall in no way hamper public access to the beach;

(ii) no flattening of sand dunes shall be carried out;

(iii) no permanent structures for sports facilities shall be permitted except construction of goal posts, net posts and lamp posts;

(iv) construction of basement may be allowed subject to the condition that no objection certification is obtained from the State Ground Water Authority to the effect that such construction will not adversely affect fee flow of groundwater in that area;

(v) the State Ground Water Authority shall take into consideration the guidelines issued by the Central Government before granting such no objection certificate;

(vi) though no construction is allowed in the no development zone for the purposes of calculation of Floor Space Index, the area of entire plot including the portion which falls within the no development zone shall be taken into account;

(vii) the total covered area on all floors shall not exceed 33 per cent of the plot size i.e., the Floor Space Index shall not exceed 0.33 and the open area shall be suitably landscaped with appropriate vegetal cover;

(viii) the construction shall be consistent with the surrounding landscape and local architectural style;

(ix) the overall height of construction up to the highest ridge of the roof, shall not exceed 9 metres and the construction shall not be more than two floors (ground floor plus one upper floor);

(x) groundwater shall not be tapped within 200 metre of the High Tide Line; and within the 200 to 500 metre zone it can be tapped only with the concurrence of the Central or State Ground Water Board;

(xi) extraction of sand, leveling or digging of sandy stretches, except for structural foundation of building or swimming pool, shall not be permitted within 500 metres of the High Tide Line;

(xii) the quality of treated effluents, solid wastes, emissions and noise levels and the like, from the project area must conform to the standards laid down by the competent authorities including the Central or State Pollution Control Board and under the Environment (Protection) Act, 1986 (29 of 1986);

(xiii) necessary arrangements for the treatment of the effluents and solid wastes must be made and it must be ensured that the untreated effluents and solid wastes are not discharged into the water or on the beach; and no effluent or solid waste shall be discharged on the beach;

(xiv) to allow public access to the beach, at least a gap of 20 metres width shall be provided between any two hotels or beach resorts; and in no case shall gaps be less than 500 metres apart; and

(xv) If the project involves diversion of forestland for non-forest purposes, clearance as required under the Forest (Conservation) Act, 1980 (69 of 1980) shall be obtained and the requirements of other Central and State laws as applicable to the project shall be met with; and approval of the State or Union territory Tourism Department shall be obtained.

Note: Construction of beach resorts or hotels shall not be permitted in Ecologically sensitive areas (such as marine parks, mangroves, coral reefs, breeding and spawning grounds of fish, wildlife habitats and such other area as may be notified by the Central Government or State Government or Union territory administrations).

Figure 10 Reference 3

2.4.5. HERITAGE STRUCTURE RESTORATION IN CRZ

For your restoration work on the heritage structure:

- No change in façade, plinth, or exterior architecture
- Interiors can be adapted for functional reuse
- Must follow ASI or State heritage protection rules

1.10 Areas or structures of archaeological importance and heritage value sites:

(i) State Archaeological agencies shall be responsible for conservation and protection of all archaeological structures and heritage sites identified by the Archaeological Survey of India, as per the provisions of the respective Acts, notifications or guidelines.

(ii) No activities that are detrimental to the identified areas or structures of archaeological and heritage value shall be permitted.

(iii) It shall be ensured that these structures or areas are preserved and activities undertaken without changing the façade/plinth of such structures. Such structures could be considered for use in accordance with the relevant norms after undertaking careful designing of the interiors without changing the exterior architectural design of the structure.

Figure 11 Reference 4

2.4.6. HIGH TIDE LINE (HTL) & SETBACKS

- All tourism or construction activities are measured from HTL
- Minimum setback: 200m (CRZ-III B)
- Setback mapping by NCSCM mandatory

2.4.7. PERMISSIBLE ACTIVITIES IN CRZ-III (BEYOND NDZ)

In the 200–500m zone, you may develop:

- Beach resorts (following Annexure-III guidelines)
- Toilets, restaurants, shacks (only as temporary facilities)
- Walking paths and minimal paver walkways

NOT ALLOWED:

- Permanent sports structures
- Forest diversion without MoEF clearance

(iii) **Regulation of activities for CRZ–III areas beyond NDZ:**

(a) Development of vacant plots in designated areas for construction of beach resorts or hotels or tourism development projects subject to the conditions or guidelines at Annexure-III to this notification.

(b) Construction or reconstruction of dwelling units, so long it is within the ambit of traditional rights and customary uses such as existing fishing villages, etc. and building permission for such construction or reconstruction will be subject to local town and country planning rules, with an overall height of construction not exceeding 9 meters and with only two floors (ground + one floor).

(c) The local communities including fishermen may be permitted to facilitate tourism through 'home stay' without changing the plinth area or design or facade of the existing houses.

(d) Construction of public rain shelters, community toilets, water supply drainage, sewerage, roads, bridges, etc.

(iv) Drawing of groundwater and construction related thereto shall be prohibited within 200 meters of HTL except for the use of local communities in areas inhabited by them and in the areas between 200 to 500 meters of the HTL, groundwater withdrawal may be permitted only through manual means from ordinary wells for drinking, horticulture, agriculture and fisheries, etc. where no other source of water is available and restrictions for such drawal may be imposed by the designated Authority by State Government or Union territory Administration in the areas affected by sea water intrusion, however, for horticulture and agriculture purpose, micro irrigation promoted by Government welfare schemes shall be permitted.

Figure 12 Reference 5

2.4.8. PROCEDURAL REQUIREMENTS FOR CRZ CLEARANCE

Before starting construction, you need:

1. Project summary
2. CRZ Map (1:4000 scale) with HTL/LTL overlay
3. Site superimposition on CRZ category
4. Approval from Gujarat SCZMA
5. No Objection Certificate from Pollution Control Board
6. EIA and Risk Assessment (if required)

2.4.9. SUMMARY FOR THESIS

For thesis, ensure:

- Resort is planned beyond 200m HTL (verify actual HTL on CZMP)
- Any temporary tourism structures (like shacks) are within guidelines and 10m setback
- No modification of heritage façade; restoration must respect original architectural elements
- Total FSI < 0.33, height < 9m, only G+1 floors
- Solid and liquid waste management system must meet CPCB norms

2.5 EIA Notification 2006

2.5.1. PURPOSE AND SCOPE OF EIA

- To assess the potential environmental impacts of proposed projects before initiation.
- Applies to Category B projects such as resort development and heritage conservation in coastal zones, especially if CRZ and ecologically sensitive areas are involved.
- Helps ensure sustainable design by enforcing guidelines on land, air, water, waste, and energy usage.

2.5.2. KEY PROJECT REQUIREMENTS & ENVIRONMENTAL CHECKLIST

Your proposed development must address:

- Land Use Compatibility
- Groundwater Use & Drainage Impact
- Wastewater Generation and Disposal
- Vegetation and Biodiversity Disruption
- Cultural/Historical Sensitivity
- Air & Noise Pollution from Construction

- Risk of Soil Erosion or Natural Hazards
- Use of Renewable Energy, Passive Solar Design
- Sewage Treatment Plants & Rainwater Harvesting

1.5. Will the proposal involve alteration of natural drainage systems? (Give details on a contour map showing the natural drainage near the proposed project site)

2.5.3 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

- Construction Stage Controls (dust suppression, noise limits, debris handling)
- Operational Stage Measures (STP, renewable energy integration, solid waste segregation)
- Emergency Protocols (fire safety, medical response, natural calamities)

2.5.4 SITE-SPECIFIC CONSIDERATIONS FOR CHORWAD

- The site is seismically sensitive (Zone III in Gujarat); structural safety and slope analysis are critical.
- Coastal erosion and tidal impact must be considered in resort planning.
- Vegetation buffers can protect biodiversity and act as wind/sand barriers

2.5.5 CONCLUSION: DESIGN IMPLICATIONS

- Ensures compliance with MoEFCC standards
- Supports eco-sensitive architecture
- Enhances the heritage value and sustainability of the Chorwad Resort
- Provides strong justification for planning permissions and stakeholder support

2.6 GUJARAT TOURISM POLICY 2021–25

2.6.1 OBJECTIVES RELEVANT TO THESIS

- Promote sustainable tourism and eco-sensitive development.
- Encourage conservation and adaptive reuse of heritage structures.
- Boost employment and rural development via tourism investment.

STRATEGIES OF THE POLICY

This Policy, "Investment Promotion Incentive Scheme for Tourism Units and Tourism Service Providers 2021-25", embraces the imperative strategies:

Sr. No.	Strategy	Focus
1.	Sustainability	Gujarat has already taken step towards sustainability by adopting the "Sustainable Tourism Criteria for India" of Ministry of Tourism, Government of India. The policy offers financial benefits for Green Building Certification and Global Sustainable Tourism Certifications, purchase of E- Vehicle, and setting up public E-vehicle charging stations.
2	Atithi Devo Bhava	The policy promotes 'ease of doing business' through digital interventions. The digital interventions shall be promoted in facilitating digital payment, booking monument tickets and public transport. It will ensure hassle-free experience to the foreign tourists.
3	Vocal for Local	• The policy offers financial benefits for organizing rural tourism fairs. • It also promotes Gujarat-domiciled tourist guides to be deployed at ASI and state ASI sites. • The seamless digital payment will enhance the visibility and market space of lesser explored Gujarat's art and culture/ handicrafts.
4	Augmenting tourist infrastructure	• The Policy encourages development of facilities and service required for tourist reception including hotels, convention centres, wayside amenities, etc. • The policy also focuses on standard Hygiene and Sanitation, there is financial benefits for the development of separate Standard Pay and Use Toilet blocks as a part of any construction activity
5	Boost to service sector	The policy has provision for, setting up new E-Vehicle charging stations, rural fairs, MICE events etc. The pool of projects and related service sector covered under the policy have the potential to reenergize the entire ecosystem.
6	Ease of Doing Business	Single Window application portal from project registration to disbursement of incentive will be beneficial for the new investors as well as the existing investors with new plan.

2.6.2 FINANCIAL INCENTIVES FOR THE PROJECT

CAPITAL SUBSIDY

- 20% of Eligible Capital Investment for Hotels and Resorts.
- Includes reimbursement of stamp duty, registration fees, and electricity duty for 5 years.

GREEN BUILDING CERTIFICATION SUBSIDY

- Up to ₹10 lakhs or 50% of certification fees for certifications like IGBC, GRIHA, LEED, or GSTC.

2.6.3 ELIGIBILITY CRITERIA FOR RESORT PROJECTS

- Resort must be located in High Priority Destination
- Minimum Capital Investment: ₹1 Cr
- Built-up area valuation: ₹2,125/sq.ft for 3-star category

2.6.4 LEASE AND LAND SUPPORT

The policy also offers support for leasing land from government departments if the project is approved under SLEC or SLIC.

- Up to 30 acres for investments above ₹500 Cr.
- One additional acre for every additional ₹20 Cr investment.

ANNEXURE B: GUIDELINES FOR PRESENTATION - LAND ON LEASE

1. Study of concept plans or preliminary drawings and designs
2. Profile of the applicant and past/previous experience of similar kind of work done
3. The applicant must have sufficient and appropriate sector knowledge and if the applicant is technically sound
4. Verifying the audited financial statements and income tax audit reports of immediately preceding 5 years.
   - A. Financial stability
   - B. Source and the availability of fund
   - C. Assets and investments for analyzing it's adequacy
   - D. Cash flows and liquidity
   - E. Constitution and structure of the applicant – in case of company equity holdings, joint venture, consortium, etc.
   - F. Management representation on future plans of the applicant
5. Obtaining third-party confirmation for its financial credibility
6. Ongoing legal litigations and arbitrations [if any] to which applicant is a party
7. Projections and detailed project report must be obtained to examine it's competency.
8. Terms and conditions of the lease
9. Land must be free from all encumbrances

2.6.5 RELEVANCE TO THESIS

- Promote heritage-based tourism infrastructure.
- Provide eco-sensitive, star-classified, and culturally rooted tourism amenities.
- Tap into the state's incentive mechanisms for private investments.

2.7 NEUFERT'S ARCHITECT'S DATA- 4TH EDITION (BOOK, 2012)

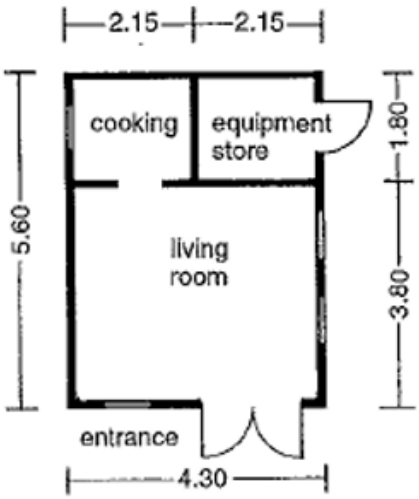
2.7.1 HOLIDAY/ WEEKEND HOMES

General Design Notes

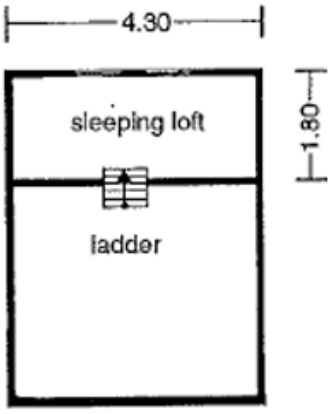
Holiday homes are for temporary holiday accommodation, either for the user or for (paying) guests. They can be single buildings on their own plot or grouped in a holiday park and are subject to the L



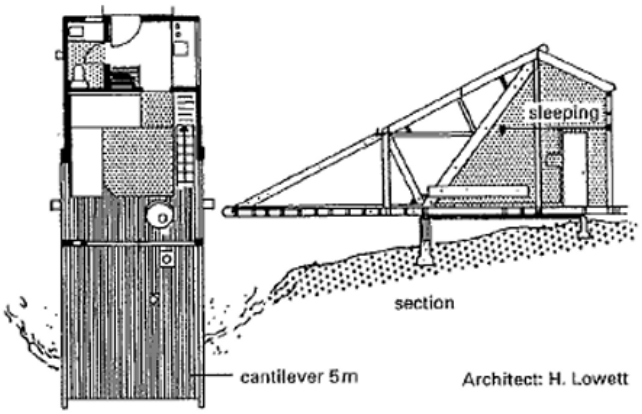
1 Log cabin with sleeping loft



2 Ground floor → 1



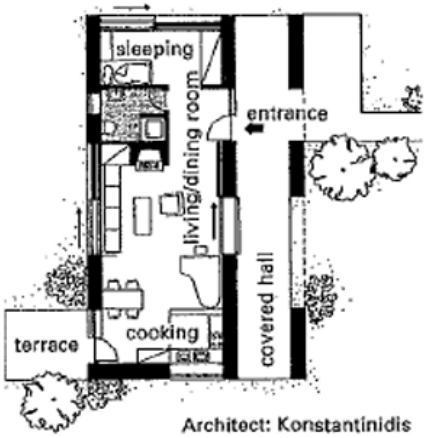
3 First floor → 1



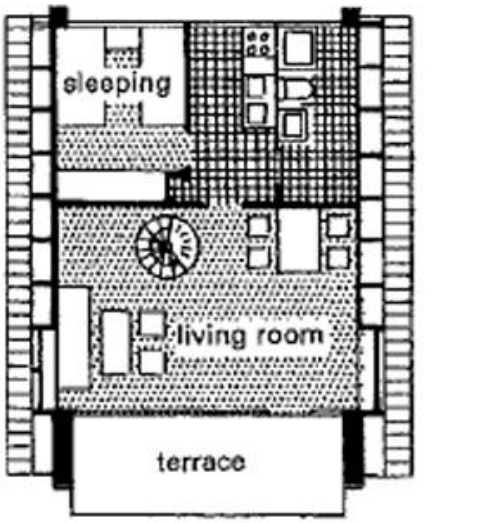
4 Weekend home for four people with 25 m² living area Arch. H. Lowett



5 Holiday home in Belgium

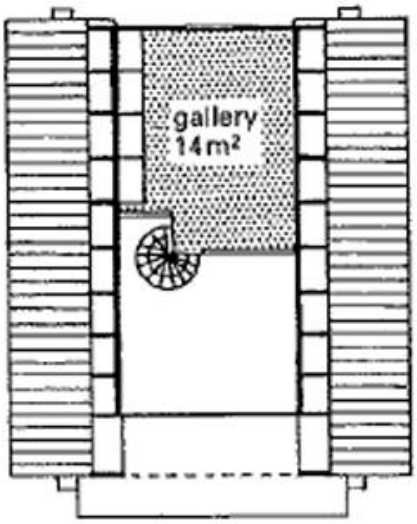


6 Holiday cabin in Greece

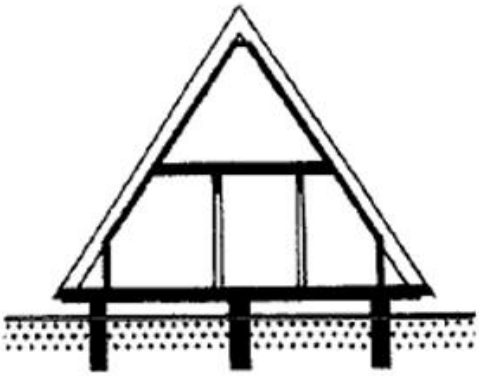


Architects: Immich/Erdenich

7 Weekend home



8 Balcony → 7



9 Section → 7



10 Elevation → 7

2.7.2 SPA

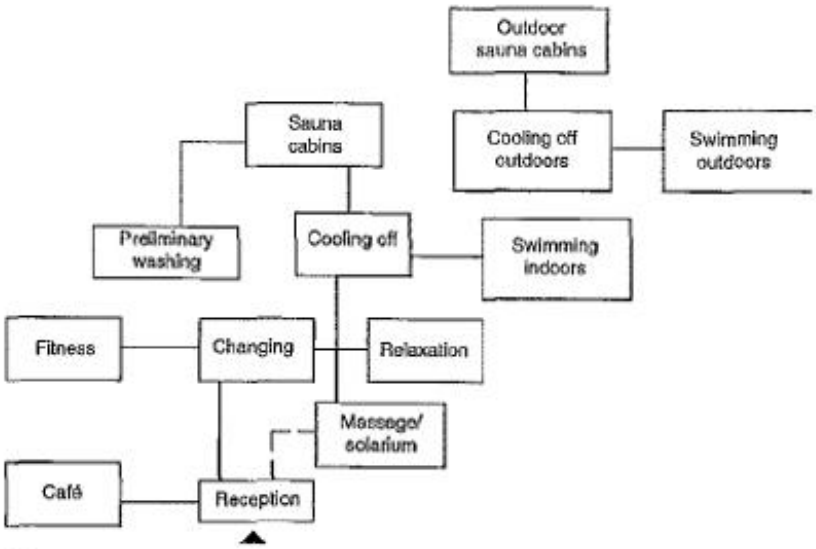
Spa is the general term for health and wellness establishments, which should generally include: sauna facility, massage and solarium, relaxation, fitness and swimming.

SPACES IN SAUNA-

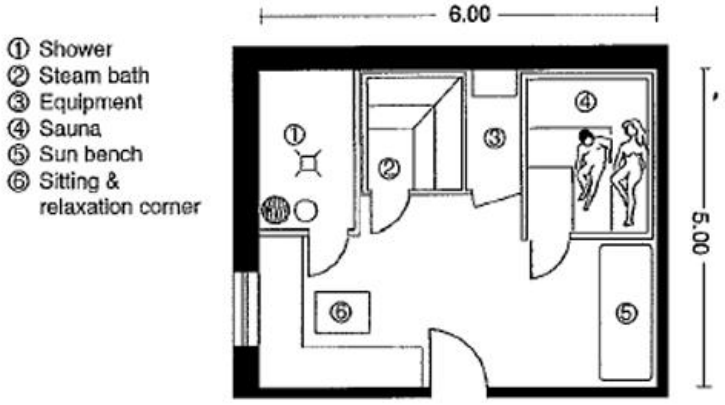
- Changing room
- Shower room with washing facilities
- Sauna cabins
- Rest/relaxation room
- Solarium

SUBSIDIARY ROOMS –

- staff room
- reception
- cash desk
- sanitary facilities for visitors and staff
- Access to swimming areas
- food/drink providers



1 Functional scheme of a sauna



13 Sauna (installed, e.g. in cellar), 30 m², 4–6 people

Size of sauna cabin (m²)	Air supply opening (cm²)	Air extraction opening (cm²)
5	100	70
10	150	105
15	200	140
20	250	175

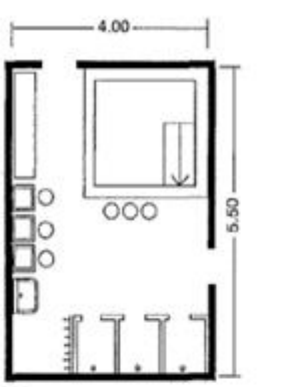
8 Size of ventilation openings in relationship to floor area of sauna cabin (Höckert → refs)

Size	No. sauna places	Type of use
I	2–4	very small or family sauna
II	4–5	family sauna
III	6–10	commercially operated sauna
IV	11–15	large commercially operated sauna

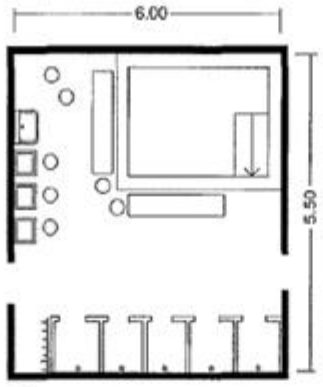
Room type	Size	Average room size (m^2)	Places	Usable area (m^2)
sauna	I	1.0–4.0	2–4	
	II	7.0–11.0	4–5	
	III	12.0–17.0	6–10	
	IV	17.5–21.0	11–15	
cooling room	II	16.0	up to 12	16.0
	III	22.0	up to 12	22.0
	IV	30.5	up to 17	30.5
washing room	II	9.0	up to 8	9.00
	III	12.0	up to 12	12.00
	IV	17.0	up to 17	17.00
changing room	II	16.0	up to 20	12.00
	III	24.0	up to 30	18.00
	IV	34.0	up to 45	20.00
rest room	II	13.2	2–3	10.00
	III	18.0	6	20.00
	IV	27.0	8	30.00

Capacity parameter	Size			
	I	II	III	IV
no. sauna places	2–3	4–5	6–10	11–15
usable area (m^2)	1.7–2.2	2.4–4.0	5.0–10.0	8–13
cabin size (m/place)	1.7–2.3	1.2–1.6	2.0–2.4	1.8–2.0
ceiling height (m)	2.00	2.10	2.40	2.40
in the smallest sauna with 2 seating levels: ceiling height: 1.90 m, min. 1.80 m; clear height above the upper seat: 1.00–1.10 m				

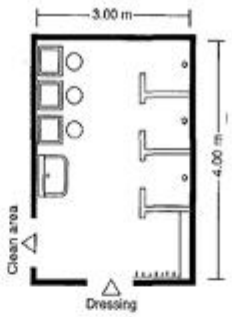
10 Approximate room and space requirements for various sizes of sauna (Höckert



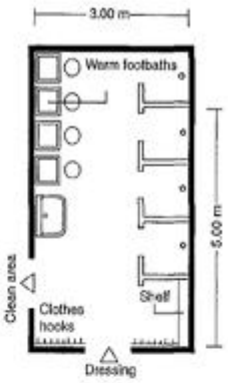
4 Cooling room of size III, approx. 22 m²



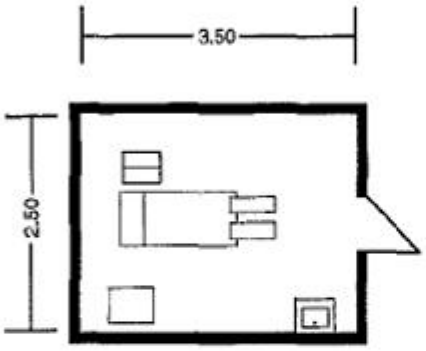
5 Cooling room of size IV, approx. 33 m²



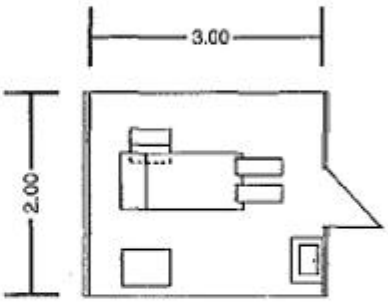
2 Wash room of size III, approx. 12.00 m²



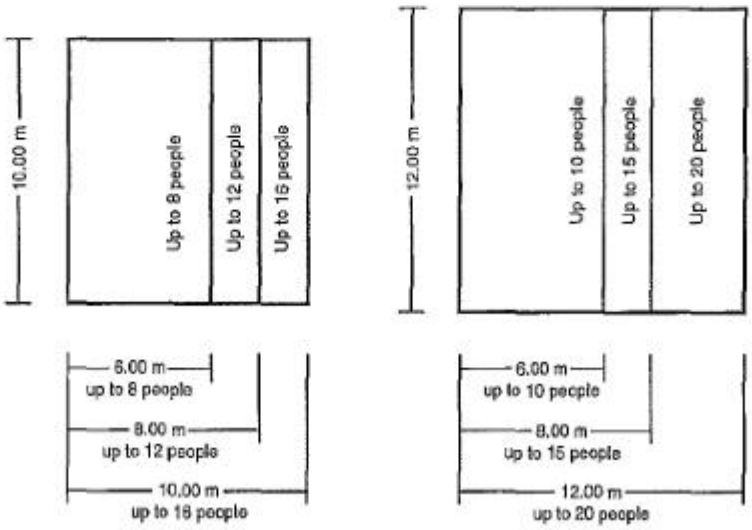
3 Wash room of size IV, approx. 15.00 m²



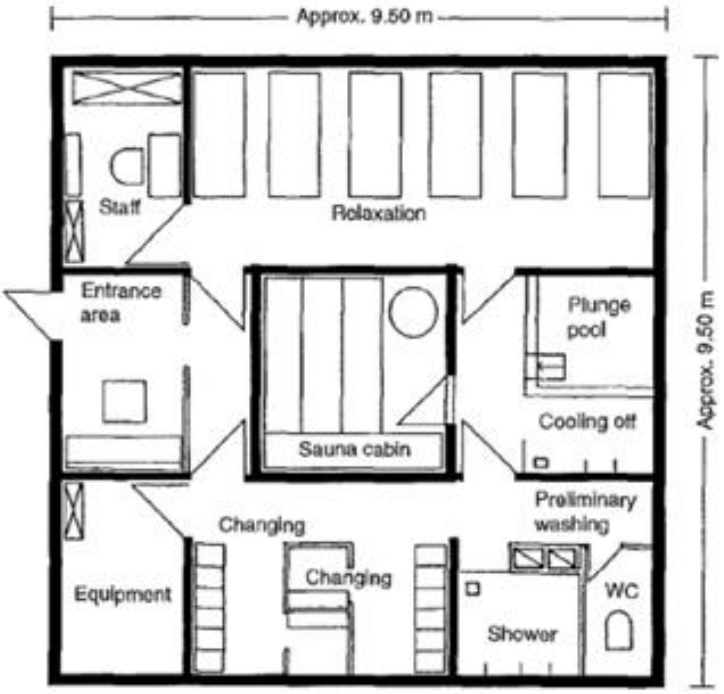
3 Massage room 8.75 m², surrounded by solid walls



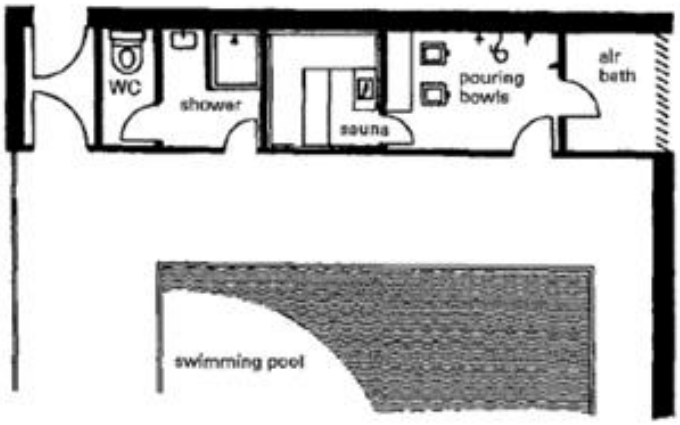
4 Massage compartment 6.00 m², separated by curtains



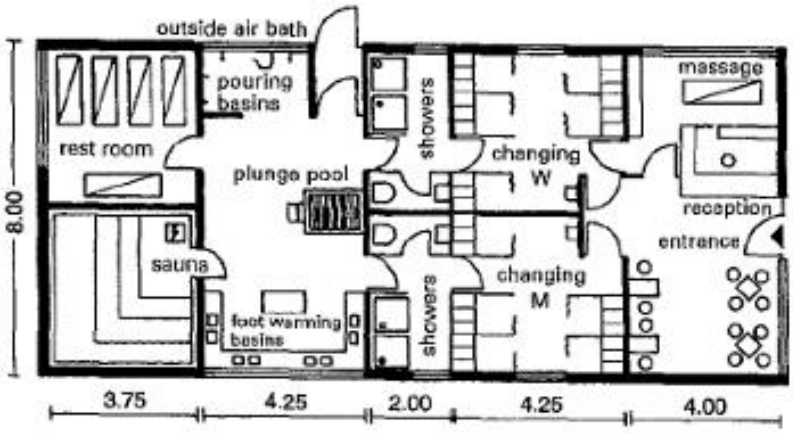
5 Pool sizes for swimming and exercise pools in sauna area (usable capacity)



9 Sauna facility with washing and cooling rooms for about 12 people, approx. 90 m²



10 Sauna and indoor swimming pool



7 Sauna for approx. 30 people

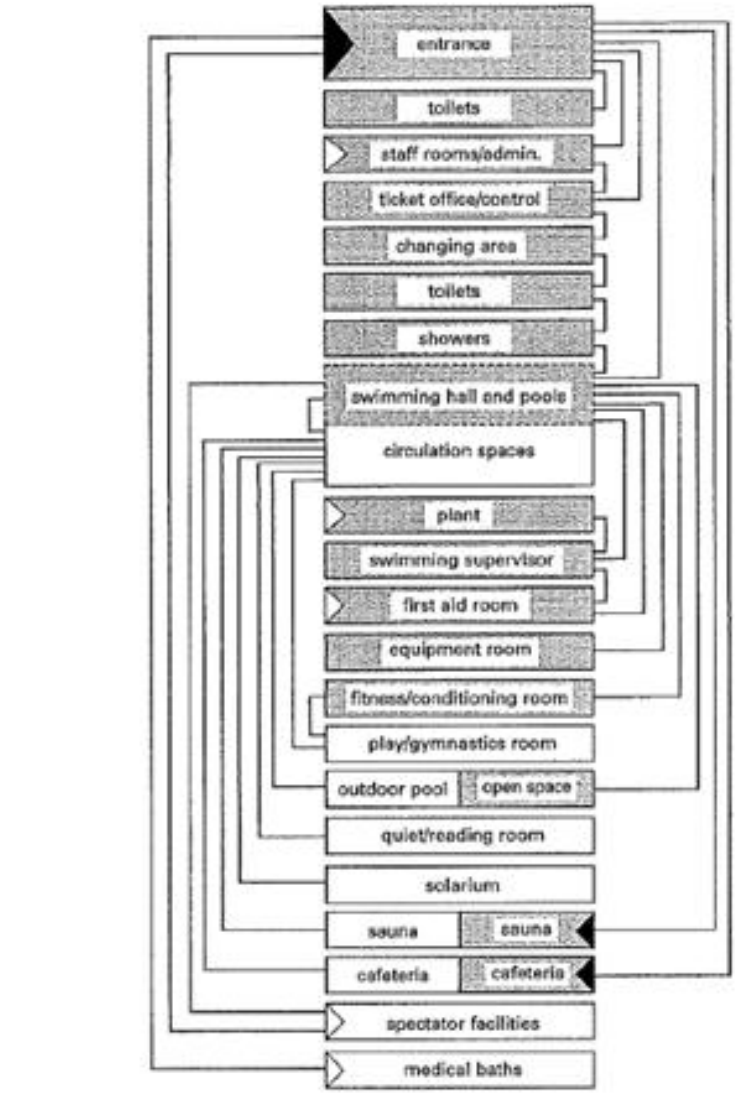
2.7.3 SWIMMING POOL

Darjeeling experiences a cool and temperate climate year-round, with chilly winters and pleasant summers. The cool climate might make outdoor swimming pools less appealing unless they are heated.

- Alternatives: Heated indoor pools or hot tubs may be more practical and attractive to guests in this climate.
- Seasonal Use: Outdoor pools might have limited usability during colder months, reducing their overall value.

FEASIBILITY AND MAINTENANCE

- Water Supply: Darjeeling often faces water shortages, so the availability of water for filling and maintaining the pool is a key concern.
- Energy Use: Heated pools require additional energy, which could conflict with sustainability goals



1 Indoor swimming pool – room relationship scheme

JACUZZI/ HOT TUB-

List of spaces-

- Entrance hall
- Admin
- Staff Rooms
- Changing rooms
- Locker area
- Showers
- Toilets
- Pool
- First Aid Room
- Cafeteria

SUBSIDIARY SPACES

The total water area serves as the basic value for determining the subsidiary rooms.

With leisure pools this value should be supplemented to take additional functions into consideration.

Area in front of entrance: 0.2 m2/m2 of water area.

Entrance hall: floor area 0.15-0.25 m2/m2 of water area, depending on the pool size and the leisure orientation. Also 5 m2 wind lobby, 5 m2 cash desk or automated paying area, 1-2 m2 cleaning room and toilets (1 WC each for ladies and gents).

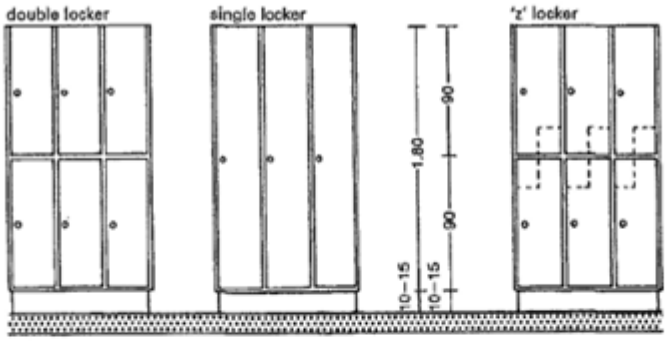
Total water area (WA) (m^2)	Pool types[1]	Example 1		Example 2		Example 3	
		Pool size (m or m^2)	WA (m^2)	Pool size (m or m^2)	WA (m^2)	Pool size (m)	WA (m^2)
1	2	3		4		5	
up to 300	CP PP	10.00 × 25.00 approx. 15	250	—		—	
up to 450	CP NSP PP	10.00 × 25.00 8.00 × 12.50 approx. 20	250 100 20	10.00 × 25.00 8.00 × 12.50 approx. 20	250 125 20	12.50 × 25.00 8.00 × 12.50 approx. 20	313 100 20
up to 600	CP	12.50 × 25.00	313	12.50 × 25.00	313	12.50 × 25.00	313
	NSP DP	8.00 × 12.50	100	8.00 × 16.66	133	8.00 × 12.50 10.60 ×12.50	100 133
	PP	approx. 25	25	approx. 25	25	approx. 25	25
up to 750	CP NSP DP[4]	12.50 × 25.00 8.00 × 12.50 10.60 × 12.50	313 100 133	12.50 × 25.00 8.00 × 16.66 10.60 × 12.50	313 133 133	16.66 × 25.00 8.00 × 16.66 12.50 × 11.75	417 133 147
	PP	approx. 30	30	approx. 30	30	approx. 30	30
up to 800	CP NSP DP[4] PP	16.66 × 25 8.00 × 16.66 12.50 × 11.75 approx. 35	417 133 147 35	16.66 × 25 8.00 × 16.66 16.90 × 11.75 approx. 35	417 133 199 35		

Notes: [1] Abbreviations: PP = paddling pool; NSP = non-swimmer pool; CP = combined pool; DP = diving pool.
In special cases, a swimmers' pool (SP) can be provided instead of a combined pool (CP).
[2] Abbreviations: B = board; P = platform; 1–10 = diving height (m); WA = water area.
[3] Recommended plot sizes
[4] Dimensions under consideration of safety/measurements
Pool size = pool width (diving board side) × pool length in diving direction

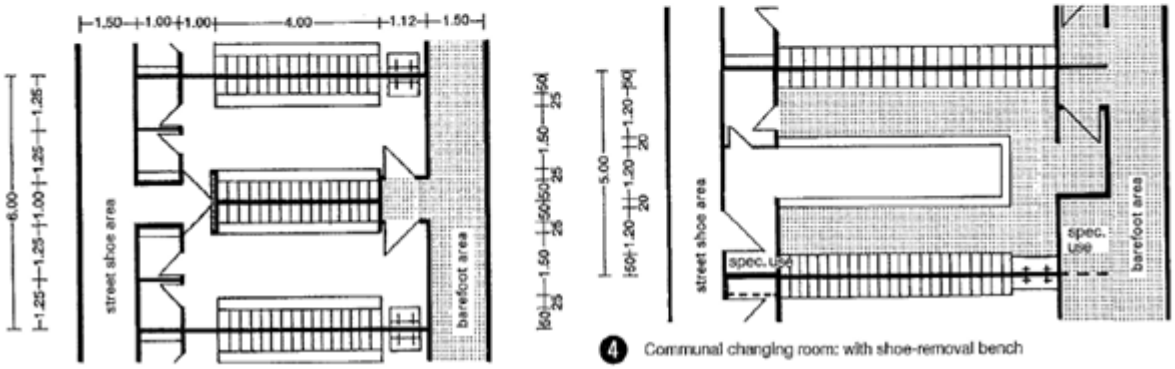
2 Design examples for indoor swimming pools (division of the water area between swimmers and non-swimmers approx. 2:1)

2.7.4 CHANGING AREA

The size of the changing area can be derived from the water area (m2).
Rough estimate for a swimming time of about 1.5 hours: Cloakroom places= 0.3-0.4 m2 water area.
No. changing places: 0.08-0.1 m2 water area, of which 40-50% as cubicles, the rest as changing benches in communal rooms.
Ratio of changing places to clothes lockers 1 :4.
Family or wheelchair cubicles: 10% of the cubicles. No.



8 Clothes lockers: details (examples)

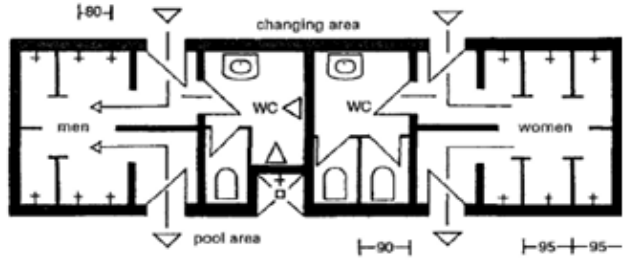


4 Communal changing room: with shoe-removal bench

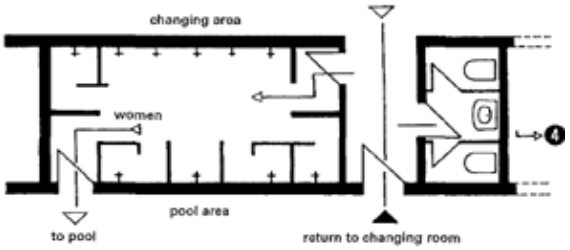
5 Changing area: mixed typo

communal changing places: min. 2; each communal changing place with min. 30 clothes lockers.

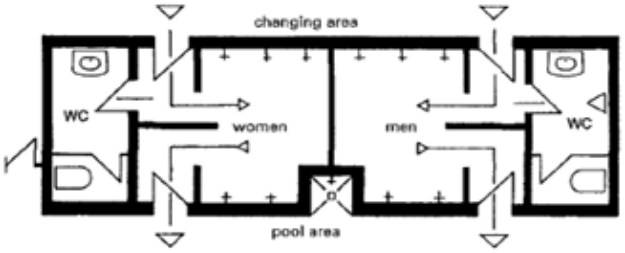
The sanitary facilities include showers and toilets, ladies' and gents separated. Location should be between the changing and the pool areas.
The toilets should be arranged so that, after use and before entering the pool area, the bather has to cross a shower room --> 0 - 0.
A direct route back from the pool area to the changing area is definitely to be recommended.



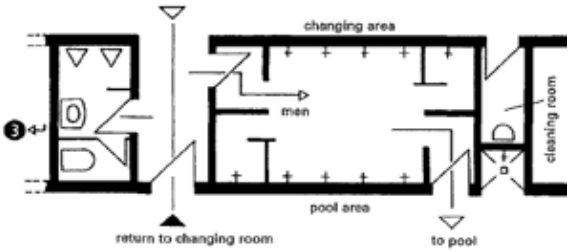
1 Scheme of sanitary facilities



3 Sanitary facilities (example ladies)



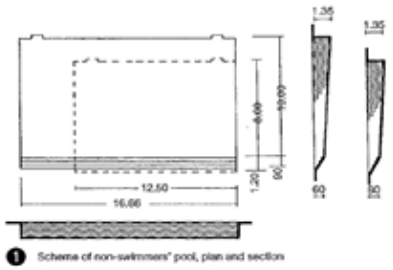
2 Scheme of sanitary facilities with divided shower room



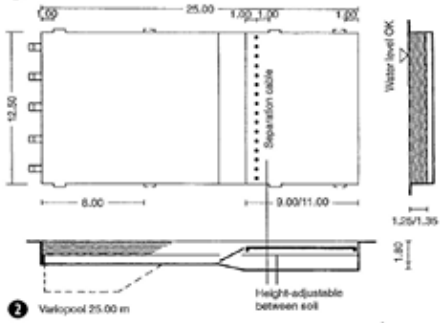
4 Sanitary facilities (example gents)

Pool area

Pool	Width (m)	Length (m)	Water depth, remarks	Min. ceiling height
paddling pool	min.15	25 m²	0.00–0.40/60	2.50 m
non-swimmers' pool → 1	8.00 10.00	12.50 16.66	0.60/0.80 to max. 1.35 m	 3.20 m
combined pool → 2	8.00 10.00 12.50 16.66 21.00 25.00	25.00 50.00 25.00 25.00/50.00	with lifting floor: 0.30–1.80 m in swimmers' section: 1.80 m in diving section: min. water depth 3.80 + 4.50 (5.00) m	 4.00 m



1 Scheme of non-swimmers' pool, plan and section



2 Variopool 25.00 m

2.7.5 RESTAURANTS

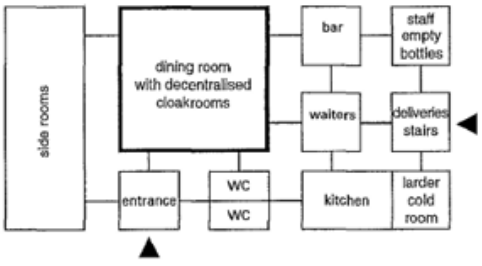
Types of Restaurant and spaces should be determined-

- Dining area
- Kitchen
- Pantry
- Toilets

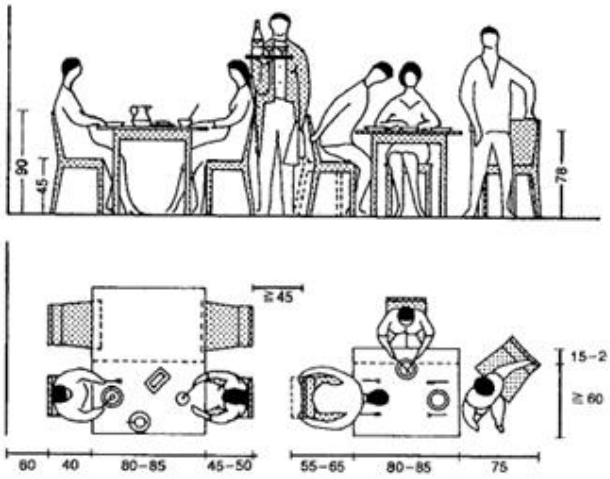
DINING AREA REQUIREMENTS-

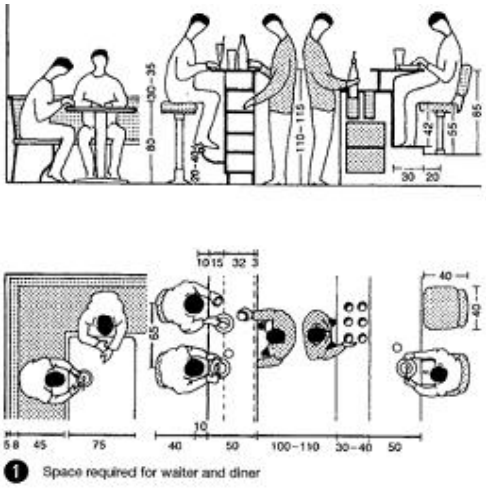
To be able to eat in comfort, one person requires a table area around 60 cm wide and 30–40 cm deep → ❷ – ❹. This provides sufficient distance between adjacent diners. Although an additional 20 cm space in the centre for dishes and large bowls is sometimes desirable, an overall width of 80–85 cm is suitable for a dining table. If the food is served on plates, then 70 cm is sufficient, and for fast food 60 cm table depth.

Distance between table and wall ≧75 cm → ❶, because the chair alone requires a space of 50 cm. If the space between table and wall is also used for access, the distance should be ≧100 cm. Round tables need a little more space, a difference of up to 50 cm.

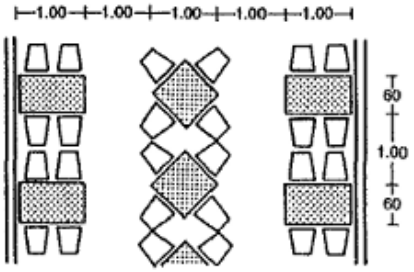


❽ Functional scheme of a small restaurant

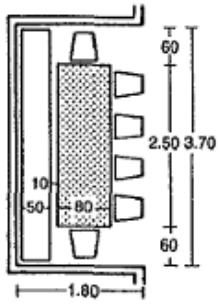




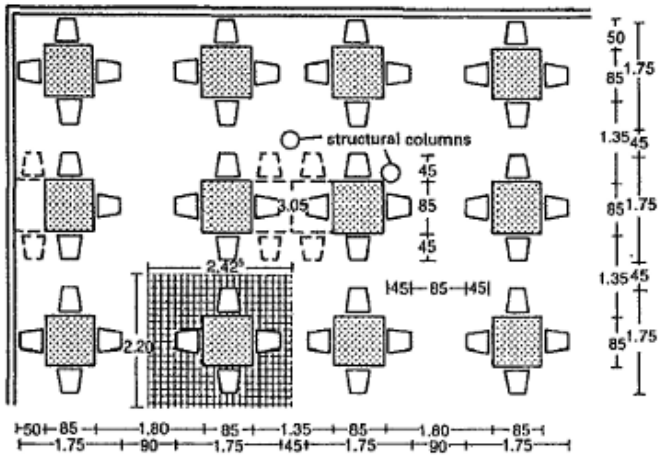
❶ Space required for waiter and diner



❶ Closest seating layout

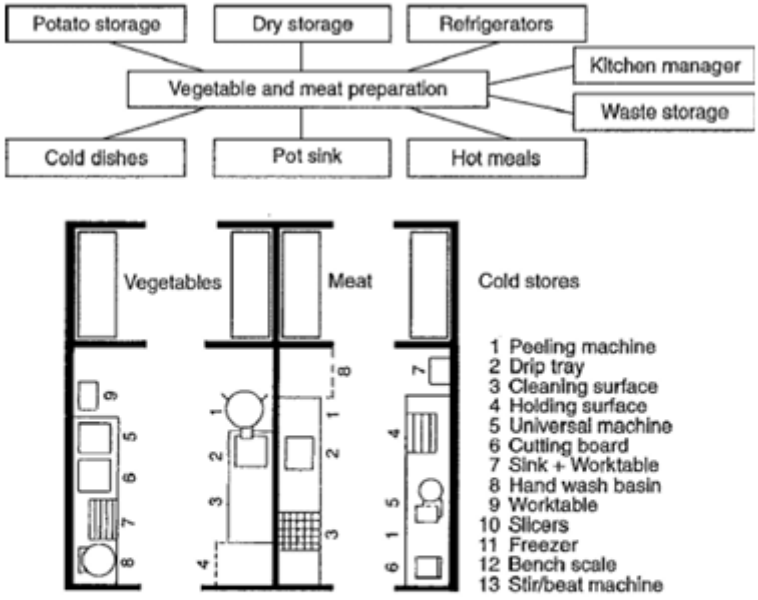


❷ In an alcove



❸ Parallel arrangement of tables

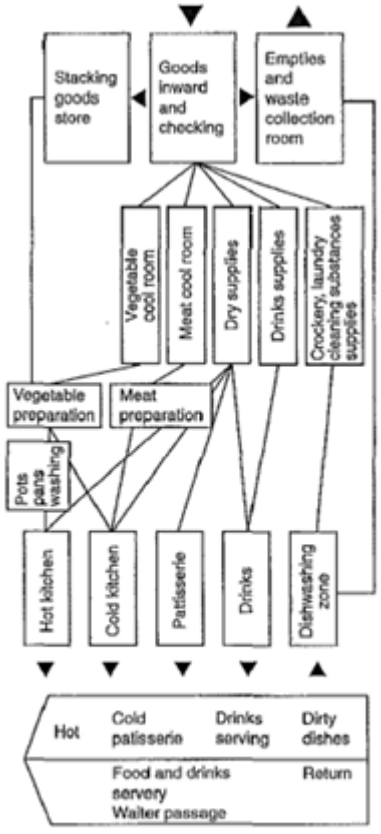
2.7.6. KITCHEN REQUIREMENTS



6 Separate preparation of vegetables and meat



1 Restaurant kitchen: functions



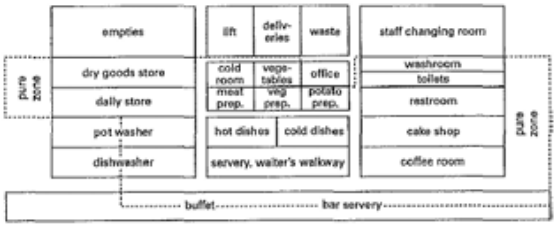
2 Restaurant kitchen: organisation

Seats	80	120	200
goods inward	0.05–0.075	0.05–0.067	0.05–0.06
empties	0.05–0.075	0.05–0.067	0.05–0.06
waste/rubbish	0.05–0.075	0.03–0.050	0.03–0.04
delivery/disposal	0.15–0.225	0.13–0.183	0.13–0.16
cold room meat	0.05–0.075	0.05–0.067	0.04–0.05
cold room fruit and vegetables	0.05–0.075	0.05–0.067	0.04–0.05
cold room dairy products	fridge	0.03–0.05	0.03–0.05
cold room cold service	fridge	fridge	0.02–0.03
cool room drinks	fridge	fridge	0.05–0.07
freezer room	0.05–0.075	0.05–0.067	0.06–0.08
cooled goods delivery	0.15–0.225	0.183–0.25	0.24–0.32
store dry goods	0.15–0.175	0.117–0.13	0.09–0.1
store drinks	0.075–0.1	0.1–0.117	0.08–0.1
store non-food	0.075–0.1	0.067–0.083	0.07–0.08
cooled goods storage	0.3–0.375	0.283–0.33	0.24–0.28
vegetable preparation	0.075–0.1	0.067–0.083	0.04–0.05
meat preparation	0.075–0.1	0.05–0.067	0.04–0.05
fish/poultry preparation	0	0.03–0.05	0.03–0.04
hot kitchen	0.325–0.35	0.217–0.23	0.16–0.18
cold kitchen	0	0.05–0.067	0.04–0.05
patisserie	0	0	0.04–0.05
pot washing	0.05–0.075	0.05–0.067	0.03–0.04
office kitchen manager	0	0	0.03–0.04
kitchen facilities	0.525–0.625	0.47–0.567	0.41–0.5
dishwasher	0.1–0.125	0.1–0.117	0.09–0.1
service/waiter office	0.075–0.1	0.083–0.1	0.07–0.08
dishwasher/office	0.175–0.225	0.183–0.217	0.16–0.18
= Total	1.3–1.675	1.25–1.55	1.18–1.44

❸ Kitchen areas: space required (m^2/seat)

Area	Proportion (%)
goods delivery including inspection and waste storage	10
storage in freezer, cold and dry rooms	20
daily store	
vegetable and salad preparation area	2
cold dishes, desserts	8
patisseries/cakes	8
meat preparation	2
cooking area	8
washing area	10
traffic area	17
staff rooms and office	15
Total	100

❹ Basis for dimensions and space requirements

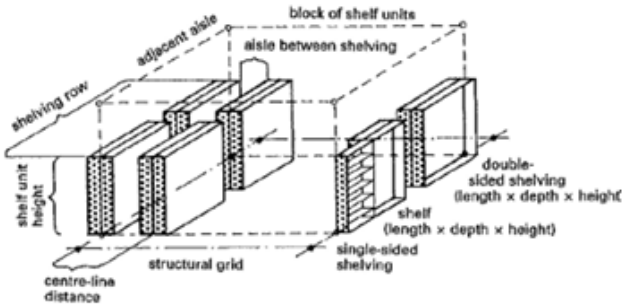


❺ Kitchen areas: classification and relationships of functional areas in clean and unclean zones (If earth-covered vegetables are prepared, this must take place in a separate part of the unclean area!)

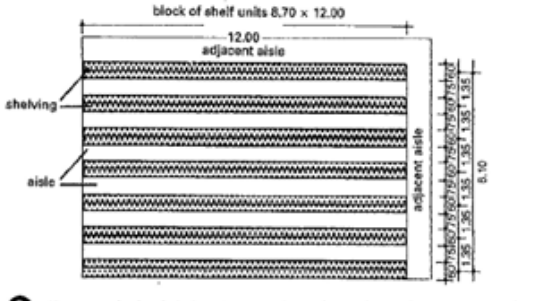
2.7.7 LIBRARY

SPACES

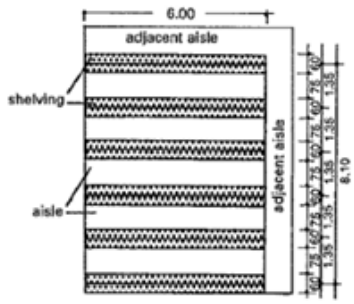
- Reading Area
- Store
- Admin



❶ Unscaled sketch to clarify the terms used in the calculation of areas for stock



❷ Floor area for bookshelves in stacks (stores), which are closed to the public



Area	Centreline distance (m)
store	1.35 (1.20) 1.44
self-service area	1.40 1.70
information area and reading room	1.60 2.00

3 Fl

Structural grid	7.20 m × 7.20 m	7.50 m × 7.50 m	7.80 m × 7.80 m	8.40 m × 8.40 m
n × distance between centre-line (m)	6 × 1.20 5 × 1.44 4 × 1.80	6 × 1.25 5 × 1.50 4 × 1.87	6 × 1.30 5 × 1.56 4 × 1.95	6 × 1.20 4 × 1.40 4 × 1.68

2 Example of standard spacing for usual structural grids

Area	Volumes per shelf
stacks	25–30
self-service area	20–25
information area and reading room	20

3 Volumes per shelf

No. shelves	Standard distance between centre-line (m)							
	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80
4	3.83	3.72	3.62	3.54	3.46	3.39	3.33	3.27
5	4.38	4.24	4.11	4.00	3.90	3.81	3.73	3.65
6	4.93	4.75	4.60	4.46	4.34	4.23	4.13	4.03
7	5.48	5.27	5.09	4.93	4.78	4.65	4.53	4.42
8	6.03	5.79	5.58	5.39	5.22	5.07	4.93	4.80
9	6.58	6.31	6.07	5.85	5.66	5.49	5.33	5.18

4 Live floor loads for various number of shelves and centre-line distances

Vertical shelves n	7	6	5
Max. book height (cm)	25	30	35
Average book depth (cm)	18	20	22
Load per shelf (kN)	0.38	0.51	0.55

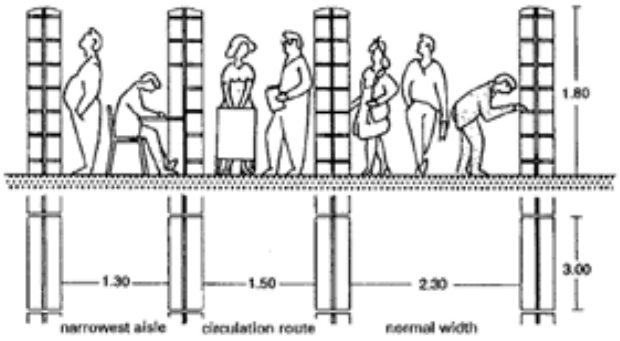
Assuming a format distribution of
25 cm 65%
25–30 cm 25%
30–35 cm 10%
results in a required load assumption of 7.5 kN/m²

5 Floor load assumption for stacks of 7.5 kN/m²

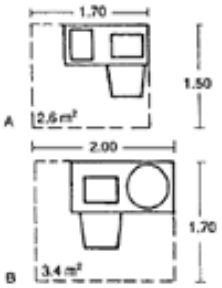
Distance between centreline of double shelves (m)		Volumes/ m standard shelves	Vertical shelves	Volumes/m double shelves	Space needed for 1000 books (m²)	Volumes/ m²
for stores closed to users (additional 20%)	1.20	30	6	360	3.99	250.6
		30	6.5	390	3.68	271.7
		25	6.5	325	4.43	225.7
		30	7	420	3.42	292.3
		25	6	300	4.80	208.3
	1.25	30	6	360	4.16	240.3
		30	6.5	390	3.84	260.4
		25	6.5	325	4.61	216.9
		30	7	420	3.56	280.8
		25	6	300	4.99	200.4
	1.30	30	6	360	4.33	230.9
		30	6.5	390	3.99	250.6
		25	6.5	325	4.80	208.3
		30	7	420	3.70	270.2
		25	6	300	5.19	192.6
	1.35	30	6	360	4.50	222.2
		30	6.5	390	4.15	240.9
		25	6.5	325	4.98	200.8
		30	7	420	3.85	259.7
		25	6	300	5.40	185.1
self-service area (additional 25%)	1.40	30	6	360	4.85	206.1
		30	6.5	390	4.47	223.7
		25	6.5	325	5.17	193.4
		30	7	420	4.16	240.3
		25	6	300	5.82	171.8
		20	5.5	220	7.63	131.0
	1.44	25	6	300	6.00	166.6
		25	5.5	275	6.53	153.1
		20	6	240	7.50	133.3
		20	5.5	220	8.17	122.3
	1.50	25	6	300	6.25	160.0
		25	5.5	275	6.81	146.8
		20	6	240	7.81	128.0
		20	5.5	220	8.51	117.5
reading room area (additional 25%)	1.68	25	6	300	7.00	142.8
		25	5.5	275	7.62	131.2
		20	6	240	8.75	114.2
		20	5.5	220	9.53	104.9
	1.80	20	5.5	220	10.22	97.8
		20	5	200	11.25	88.8
	1.87	20	5.5	220	10.62	94.1
		20	5	200	11.68	85.6
	2.10	20	5.5	220	11.92	83.8
		20	5	200	13.12	76.2
		20	4	160	16.40	60.9

Source: Schweigler

1 Space calculation



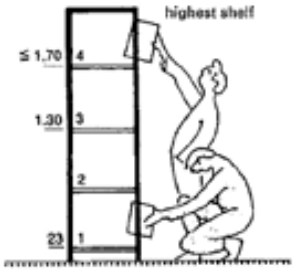
7 Minimum spacing



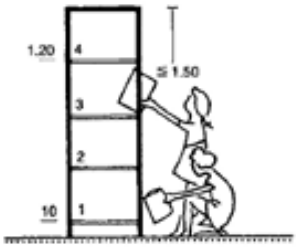
8 Microfiche reader workplace



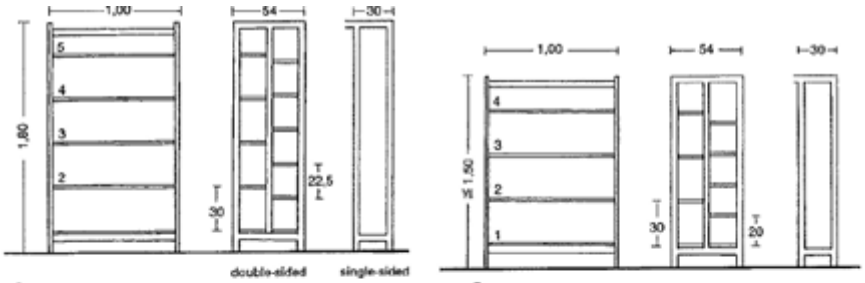
9 Shelf unit, five shelves



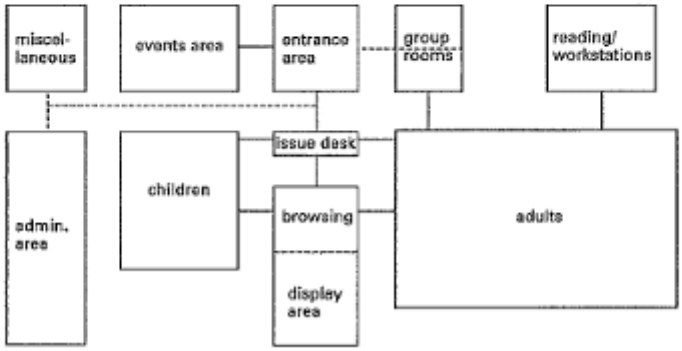
10 Shelf height for schoolchildren



11 Shelf unit, four shelves – small children



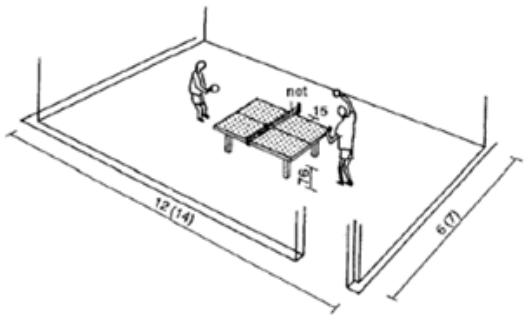
12 Bookshelves for adults 5–6 shelves, for children 4–5 shelves → 11



2 Functional scheme of a medium-sized library

2.7.8 INDOOR SPORTS

- Table Tennis
- Billiards
- Gym



4 Basic dimensions for table tennis

TABLE TENNIS

At championship level takes place only in halls. **Table surface** horizontal, matt green with white border lines.

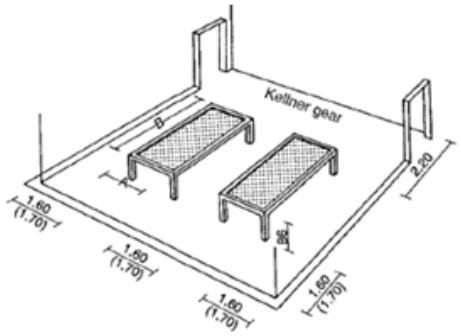
Table area ..... 152.5 × 274 cm
Table height ..... 76 cm
Board thickness ..... ≧2.5 cm
For tables in the open air, fibre cement board 20 mm thick.

Board hardness: so a normal ball bounces 23 cm when dropped from 30 cm
Net length, centre ..... 183 cm
Net height, entire length ..... 15.25 cm
Playing box (formed by canvas screens 60–65 cm high) ≧6 × 12 m, international 7 × 14 m, spectators beyond screen → 5.

Area	Conditioning room			Equipment list
	40 m²	80 m²	200 m²	
A			1	1 hand roller
		2/3*	2	2 biceps station
			3	3 triceps station
		4/5*	4	4 pull-over machine I
			5	5 pull-over machine II
		6/7*	6	6 Latissimus machine I
			7	7 Latissimus machine II
		8	8	8 chest station
		9	9	9 torso station
		10/11*	10	10 hip station I
			11	11 hip station II
		12	12	12 leg station
		13	13	13 foot station
	14 (2 ×)		14 (3 ×)	14 multi-training centre
B			20	20 press apparatus I
			23	23 leg press
		25	25 (2 ×)	25 stomach muscle station
		26	26 (2 ×)	26 pulling machine
			27	27 press-up apparatus
			33	33 Latissimus floor bells
C		43 (4 ×)	43 (10 ×)	43 small disc stand
	46 (2 ×)	46 (2 ×)	46	46 training bench
D	50	50	50 (3 ×)	50 hand dumbbells
	51	51	51 (3 ×)	51 short dumbbells
	52	52	52 (5 ×)	52 short dumbbell stand
			53	53 exercise dumbbell rod
		56		56 press bench
		57	57 (3 ×)	57 sloping bench I
		58		58 sloping bench II
			59	59 all-round bench
		60	60	60 multi-training bench
		61		61 compact dumbbell
		62		62 dumbbell stands
E	70 (3 ×)	70	70 (4 ×)	70 cycle ergometer
	71 (2 ×)	71 (3 ×)	71 (2 ×)	71 rowing machine
	72		72 (2 ×)	72 running belt
	73	73 (2 ×)	73 (3 ×)	73 wall bars
	74	74 (2 ×)	74 (2 ×)	74 press-up bar
	75	75	75	75 stomach muscle board
		78		78 punch ball
	79 (2 ×)	79 (2 ×)	79 (3 ×)	79 expander-impander
	80 (2 ×)	80 (2 ×)	80 (2 ×)	80 skipping rope
	81 (2 ×)	81 (2 ×)	81 (3 ×)	81 Deuser band
	82 (2 ×)	82 (2 ×)	82 (3x)	82 finger dumbbells
	83 (2 ×)	83 (2 ×)	83 (3 ×)	83 Bali machine
		85 (2 ×)	85 (3 ×)	85 hydro-dumbbell
	89	89	89 (2 ×)	89 equipment cupboard

* Apparatus 2 and 3, 4 and 5, 6 and 7, 9 and 10 and are available in very different versions and should therefore be provided to suit the number of dumbbells and weights to be chosen; 7 as well as 10 and 11 can be used for two functions from various manufacturers.

7 Equipment suggestions for fitness rooms



❺ Basic dimensions and spacings for billiards

BILLIARDS

Location of rooms:
First floor or well-lit basement, seldom ground floor.

Space requirement: for the various table sizes → ❺ – ❽.
Common sizes for private purposes .....IV, V and VI
For cafés and clubs..... IV and V
In billiards halls and academies .....I, II and III
Spacing of table sizes I and II from each other.....≧1.70 m
Spacing of table sizes III–V from each other.....≧1.60 m
and, from the wall, a bit more if possible.
At the side where the waiter passes or the spectators stand, correspondingly more space, plus room for chairs, tables, food and drink (→ pp. 174, 175).
Wall mounting for cue rack and rules of the game.
1 cue rack for 12 cues, overall 150 × 75 cm.

Lighting
The smallest possible lights with full and even light distribution onto the playing area. Usual height for light above table: 80 cm

Normal table size (dimensions in cm)		I	II	III	IV	V	VI
internal (playing area)	A	265 × 142[5]	230 × 115	220 × 110	220 × 100	200 × 100	190 × 95
external	B	310 × 167[5]	255 × 140	245 × 135	225 × 125	225 × 125	215 × 120
room		575 × 432[5]	520 × 405	510 × 400	500 × 395	490 × 390	480 × 385
weight (kg)		800	600	550	500	450	350

❽ Usual billiards table sizes

2.8 INFERENCES FROM LITERATURE STUDY – DESIGN-CENTRIC TABLE

ASPECT	LITERATURE STUDY OBSERVATION	INFERENCE FOR CHORWAD DESIGN
Site Planning & Zoning	Cluster/courtyard layout with clear zoning in Dusai & Anora Resort	Use **zoned master plan**: heritage, private cottages, public zones, and service areas separated with landscape
Built Form Typology	Low-rise, scattered built mass (G+1), no monolithic blocks	Opt for **cottage-style G+1 units**; avoid vertical expansion due to CRZ & seismic constraints
Heritage Integration	Adaptive reuse in heritage projects (e.g., Neemrana, Baradari Palace)	Retain palace character; reuse as **cultural or experiential core** (museum, lounge, fine dining)
Architectural Style	Vernacular forms blended with minimal modern interventions	Design in **regional vernacular** – domes, arches, stone + lime details to blend with palace architecture
Materials & Construction	Use of local stone, lime, timber, clay tiles for climate comfort	Use **Kaand limestone, basalt, lime plaster, timber** from site for material continuity and thermal regulation
Orientation & Climate Response	Openings oriented to prevailing wind, shaded verandahs, courtyard-centric design	Orient SW to capture sea breeze; use **courtyards, water bodies, and vegetative screens** for cooling

Landscape Integration	Natural terrain retained; native flora like neem, casuarina, bougainvillea used	Preserve contours; design **buffer landscape** for erosion control & ecological sensitivity
Cultural Identity	Spaces for folk performances, local art displays, traditional décor (Baradari, Anora)	Include **folk activity pavilions, craft walls, mural zones**, local décor in interiors
Spatial Experience	Transitional zones – colonnades, pergolas, decks enhance experiential layering	Add **semi-open passages, shaded decks, breezeways** to connect blocks
User Comfort	Courtyard cooling, cross ventilation, natural lighting prevalent	Incorporate **passive design elements** – high ceilings, louvered windows, jaalis
Accessibility	Resorts lacked ramps/lift access in some cases (Azzaro reviews)	Ensure **universal accessibility** – ramps, anti-skid paths, tactile guides
Eco-Sensitivity	STPs, solar use, RWH tanks common in Anora & Della Resorts	Design with **greywater reuse, solar integration, low-energy lighting**
Tourism Typology	Nature + culture + relaxation offered in good balance	Design for **heritage-tourism, wellness, and eco-nature stays** for diverse user groups
Construction Approach	Modular cabins or prefab in eco-zones to avoid root damage or erosion	Use **lightweight, prefab materials for new cottages** near coastal edges
Regulatory Learning	CRZ compliance maintained through low heights, NDZ setbacks in coastal resorts	Abide by **CRZ-III: Build beyond 200m HTL, max height 9m, 0.33 FSI**, adaptive reuse of heritage structure

3.SITE INVENTORY

3.1. PROJECT OVERVIEW

1.1 PROJECT NAME & LOCATION

- Project Title: Development of Resort at Chorwad, Gujarat
- Location: Chorwad Beach, Junagadh District, Gujarat (approx. 20 km from Veraval, 70 km from Junagadh)
- Site Context: Coastal heritage site on the Arabian Sea, featuring a historic palace, rocky shoreline, and open beachfront.

1.2 PROJECT SCOPE

- Objective: Restoration and adaptive reuse of Chorwad Palace with the development of a luxury beach resort.
- Model: Public–Private Partnership (PPP) on a DBFOT (Design, Build, Finance, Operate, Transfer) basis.
- Concession Period: 35 years from the signing of agreement.
- Construction Period: 24 months after securing all statutory clearances (which must be done within 12 months of signing).

1.3 ESTIMATED COST & FINANCIALS

- Estimated Project Cost: ₹19.50 crore (includes ₹5 crore reserved for palace restoration).
- Reserve Annual Premium: ₹10 lakh/year (for 45 rooms)
- Additional Annual Premium: To be quoted by bidder; total premium = Reserve + Additional
- Annual Lease Rent: ₹1 per sq.m + applicable taxes
- Construction Performance Security: ₹97.50 lakh
- **Operations Performance Guarantee:** ₹39 lakh, escalated by 12% every 3 years
- **One-time State Fee:** 2% of project cost = ₹39 lakh approx.

2. TENDER DETAILS & REGULATIONS

2.1 LAND & LEASE DETAILS

- Ownership: Land leased to developer on “as-is, where-is” basis
- Lease Term: Co-terminus with concession (35 years)
- Lease Rent: ₹1 per sq.m/year + applicable taxes
- Possession: Formal handover after signing lease deed and agreement

2.2 REGULATORY COMPLIANCE

- Applicable Regulations:
- Local building byelaws
- Coastal Regulation Zone (CRZ) norms
- ASI / State Archaeology for heritage conservation
- Forest and Environment clearances (if required)
- All permits and approvals must be obtained by the developer at their own cost.

2.3 MINIMUM DEVELOPMENT OBLIGATIONS

COMPONENT	DESCRIPTION
Accommodation	Minimum 45 luxury rooms/cottages/tents of 3-star or equivalent category
F&B	Multi-cuisine restaurant / specialty restaurant / coffee shop
Heritage Restoration	Restoration of Chorwad Palace (₹5 Cr reserved for reimbursement, subject to documentation and approval)
Reconstruction	Other buildings must retain visual and architectural harmony with the palace
Parking & Infrastructure	As per local bylaws and TCGL direction; includes internal roads, streetlights, STP, water supply, drainage, RWH, solid waste mgmt., etc.

2.4 OPTIONAL DEVELOPMENT PROVISIONS

- Additional rooms, tents or cottages
- Health club, spa, gym, swimming pool
- Any other tourism-related facility approved by TCGL

2.5 PROHIBITED DEVELOPMENT

- Any non-tourism use not permitted by Government of India / Gujarat
- All unlawful activities strictly prohibited on-site

2.6 DOCUMENTATION & APPROVALS

- RESTORATION PLAN DOCUMENTATION:
  Must include architectural drawings, conservation methodology, estimated BOQ with material specs, and certifications from CA and architect.
- OTHER DOCUMENTATION FOR TENDER SUBMISSION:
  Technical bid documents, financials, experience certificates, MoA, PAN, and soft copy in pen drive (as per Form checklist in RFP).

2.7 EVALUATION & SELECTION

- TECHNICAL BID EVALUATION:
  Marks awarded for net worth, turnover, and project concept (which becomes contractually binding).
- FINANCIAL BID EVALUATION:
  Based solely on Additional Annual Premium quote.
- SELECTION BASIS: Highest Total Annual Premium quote after technical qualification.

3. LIST OF SPACES & AREA PROGRAMMING

3.1 MANDATORY SPACES (MINIMUM DEVELOPMENT)

Space	Description
Luxury Rooms / Cottages / Tents	Minimum 45 keys required, 3-star or equivalent category
Restaurant / Dining	Multi-cuisine restaurant or café; flexible per demand

Restored Palace Zones	Adaptive reuse into lobby, reception, suites, lounges, museum or cultural gallery
Internal Roads	Circulation, drop-off, service roads
Parking	As per local building byelaws – both guest and staff parking
Admin Block	Office spaces, reception, staff rooms
Support Services	Electrical substation, STP, water tank, drainage, waste disposal units, fire safety systems
Landscaped Areas	Open green spaces, gardens, buffer areas
Security & Entry Gate	Main gate with security check, CCTV, watchman's cabin

3.2 OPTIONAL / ADDITIONAL FACILITIES (SUGGESTIVE)

Space	Description
Swimming Pool	Outdoor, luxury pool with deck and lounge area
Spa & Wellness Zone	Ayurveda center / massage rooms / meditation area
Banquet / Conference Hall	Indoor event or meeting space (linked with hospitality)
Fitness Centre	Gym, health club
Cultural Pavilion / Amphitheatre	For showcasing local dance, folk music, etc.
Gift Shop / Souvenir Store	For promoting local handicrafts, tourism
Additional Rooms	Tents / eco-cottages / treehouses (subject to approval)

FLORA AND FAUNA

Chorwad, located in the Junagadh district of Gujarat, is a coastal area that experiences a variety of vegetation influenced by its proximity to the Arabian Sea and its location near the Gir Forest.



FLORA (PLANTS)

Name	Image	Season / Growth Pattern
Neem (Azadirachta indica)		Evergreen; flowers in spring (March–May)
Coconut Tree (Cocos nucifera)		Evergreen; fruits year-round, peak summer harvest

Casuarina (Casuarina equisetifolia)		Evergreen; withstands coastal conditions all year
Mango (Mangifera indica)		Deciduous; fruits in summer (April–June)
Acacia (Various species)		Deciduous/Semi-evergreen; dry seasons preferred
Banyan (Ficus benghalensis)		grows year-round
Peepal (Ficus religiosa)		Semi-evergreen; sheds briefly in March
Pandanus (Pandanus tectorius)		Evergreen; thrives in coastal areas year-round
Karanja (Pongamia pinnata)		Deciduous; flowers in late spring/summer

Alexandrian Laurel (Calophyllum inophyllum)		Evergreen; blooms intermittently throughout year
Cerbera manghas		Evergreen; flowers mainly in summer
White Mangrove (Avicennia marina)		Evergreen; thrives in brackish water, year-round
Beach Morning Glory (Ipomoea pes-caprae)		Perennial creeper; flowers year-round
Crinum asiaticum (poison bulb)		Summer or early fall

Indian Aloe (Aloe vera)		Perennial succulent; peak growth in dry season
Bougainvillea (Bougainvillea glabra)		Early summer through fall
Frangipani (plumeria)		Flowering from december to april

FAUNA (ANIMALS)

MARINE LIFE

- **MOLLUSKS**: Pearl oysters and various sea slugs.
- **OCTOPUS**: Known for their unique color-changing abilities.
- **ECHINODERMS:** Starfish, sea cucumbers, and sea urchins.
- **FISH:** Pufferfish, seahorses, stingrays, mudskippers, and a wide array of other finfish. Studies along the Chorwad Coast have documented diverse fish species, including Indian Mackerel (*Rastrelliger kanagurta*).
- **SEA TURTLES:** Endangered species like Green Sea Turtle, Olive Ridley Sea Turtle,

and Leatherback Sea Turtle.

- **SEA SNAKES**: Several species of sea snakes inhabit the coastal waters.
- **MAMMALS:** Dugongs (Sea Cows) and smaller cetaceans like Finless Porpoises and various dolphin species.
- **CORAL:** Coral reefs are present on 42 islands near the Gujarat coast.
- Birds

THE COASTAL WETLANDS AND SANCTUARIES NEAR CHORWAD BEACH ARE EXCELLENT BIRDWATCHING LOCATIONS.

- **WATERFOWL:** Dalmatian Pelican, White-eyed Pochard, and Indian Skimmer.
- **SHOREBIRDS**: Greater Flamingo, Crab Plover, Sandpipers, and other shorebirds.
- **OTHER BIRDS**: Teals, fowls, Ibis, Curlews, Herons, Egrets, Ducks, Pelicans, Storks, Gulls, and Terns.
- **THREATENED BIRD SPECIES**: The Black-necked Stork, a large wading bird.
- **MIGRATORY BIRDS**: **Winter Visitors** (November - March/April):
- **RUDDY SHELDUCK**: A medium-sized waterfowl species.
- **BAR-HEADED GOOSE:** Known for its high-altitude migration over the Himalayas.
- **NORTHERN PINTAIL:** A medium-sized dabbling duck.
- **NORTHERN SHOVELER:** Another duck species that winters in the Indian Subcontinent.
- **COMMON SWALLOW**: Migrates from Europe and Northern Asia to escape the cold.
- **SIBERIAN CRANE**: A notable winter visitor to the Rann of Kutch, which is a coastal region of Gujarat.

SUMMER VISITORS:

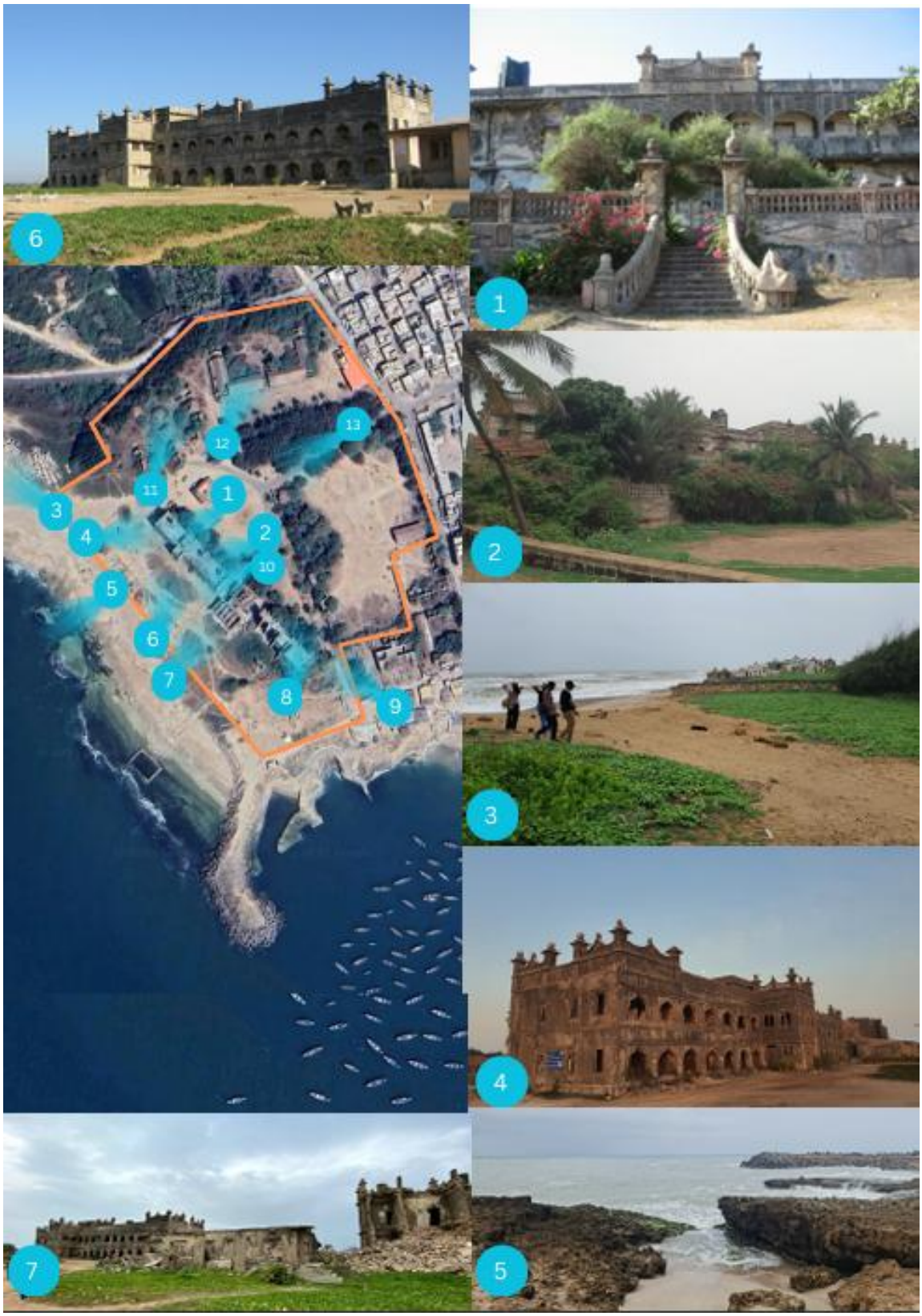
- **BLACK-CROWNED NIGHT HERON**: Migrates from Eastern Europe and Western Asia to the Indian Subcontinent.
- **EURASIAN GOLDEN ORIOLE**: Characterized by its bright yellow plumage.
- **BLUE-TAILED BEE-EATER:** Primarily found in South and Southeast Asian countries and migrates to southern regions after breeding in North and Northwest India

TERRESTRIAL FAUNA

- **MARSH CROCODILES**: Inland wetlands in the Kachchh region, which is somewhat close to the coast, harbor the endangered Marsh Crocodile or Mugger Crocodile (*Crocodylus palustris*).
- **MAMMALS:** Depending on the distance from the coast and the presence of nearby protected areas like Girnar Wildlife Sanctuary, you might also find mammals such as:

  - Nilgai or Blue Bull (*Boselaphus tragocamelus*)
  - Indian Golden Jackal (*Canis aureus indicus*)
  - Indian Grey Wolf (*Canis lupus pallipes*)

- Jungle Cat (*Felis chaus*)
- Mongoose
- Indian Hare




8


9


11


10


12


13

3.2 SITE ANALYSIS

LOCATION & CONTEXT

- **DISTANCE**: Chorwad Beach is about 20–37 km south of Somnath and approximately 20 km from Veraval (Somnath Railway Station)

- **NEARBY INFRASTRUCTURE:** Nearest rail access is Chorwad Road railway station (~6 km). Airports: Rajkot (~180 km) and Diu/Keshod (~40–110 km); road access via Somnath or Veraval on NH-51

- **.HISTORICAL & CULTURAL HIGHLIGHTS**
- Chorwad Palace (Daria Mahal): Built in the 1930s by the Nawab of Junagadh as a summer retreat, featuring a blend of Italian, Muslim, and colonial architecture.

SWOT ANALYSIS

STRENGTHS	**WEAKNESSES**
Very tranquil & scenic, ideal for relaxing	Not safe for swimming; drowning risk reported
Historic charm vis-a-vis palace & heritage	Minimal on-site infrastructure or amenities
Great sunsets/sunrises with natural backdrop	Limited water access; rough tides

OPPORTUNITIES	**THREATS**
Heritage-oriented tourism via palace resort	Safety hazards at sea; official bans previously issued
Local culture exploration & photography	Weather extremes (summer heat, rough monsoon seas)

1. SITE ORIENTATION & SUN PATH

- **LATITUDE**: ~20.9° N
- **SUN PATH**:Summer (June): High solar altitude (~85°); sun rises in NE, sets in NW Winter (Dec): Lower angle (~45–50°); sun rises in SE, sets in SW

2. WIND PATTERNS & VENTILATION

PREVAILING WINDS:
Summer/Monsoon (May–Sept): Strong SW winds (~25–30 km/h)
Winter (Nov–Feb): Mild NE winds (~10–15 km/h)

LANDSCAPE & MICROCLIMATE DESIGN
Use casuarina, palm, neem and other coastal salt-tolerant species as windbreaks.
Create shaded pathways and green buffers to lower ambient heat.

MATERIALS OF CHORWAD PALACE
A full inventory of materials is assembled from the RFP documents, historical descriptions, and the site photographs. The original structure is primarily stone masonry with lime mortar and plaster (as in other Saurashtra palaces). Key materials include:
Stone: The main walls are hewn from local trap (basalt) or similar volcanic rock; lighter Kaand limestone (a yellow-cream limestone) was used for decorative elements, cornices, and carving

LIME MORTAR & PLASTER: Masonry joints and exterior finishes were set with lime-based mortar; surviving surfaces show rough lime plaster typical of period construction.

TIMBER: Wood beams and joists (now largely collapsed) would have supported floors and roof trusses, as in comparable palaces.

ROOFING: The original roof likely had *terra-cotta* tile covering (common in coastal Gujarat). No intact roof survives, but fallen tiles and timber suggest a tiled roof structure.

FINISHES: Luxury interiors included marble, as indicated by reports of "marble bathtubs" in Chorwad Palace. Indeed, one source describes the palace's bathrooms as containing marble tubs and high-end decor Modern ceramic floor and wall tiles are visible in ruined bathrooms (Figure 3), but these are later additions. Windows and doors would have had glazed glass with metal or wooden frames and decorative iron grilles, as was customary.

METALS & GLASS: Iron grills, hinges, and hardware (typical of Muslim-influenced palaces) and glass (for the large arched windows) were also part of the construction.



These conclusions align with what little documentation exists. The Tender/RFP (2024) emphasizes *restoring* the old palace rather than replacing it, implying all original materials (stone, wood, etc.) should be conserved. In absence of a published materials list, the above summary integrates on-site evidence (photos) with period practice. The key takeaway is that Chorwad Palace was built of basalt masonry with Kaand limestone ornament, bound by lime plaster, and finished inside with marble and tile.

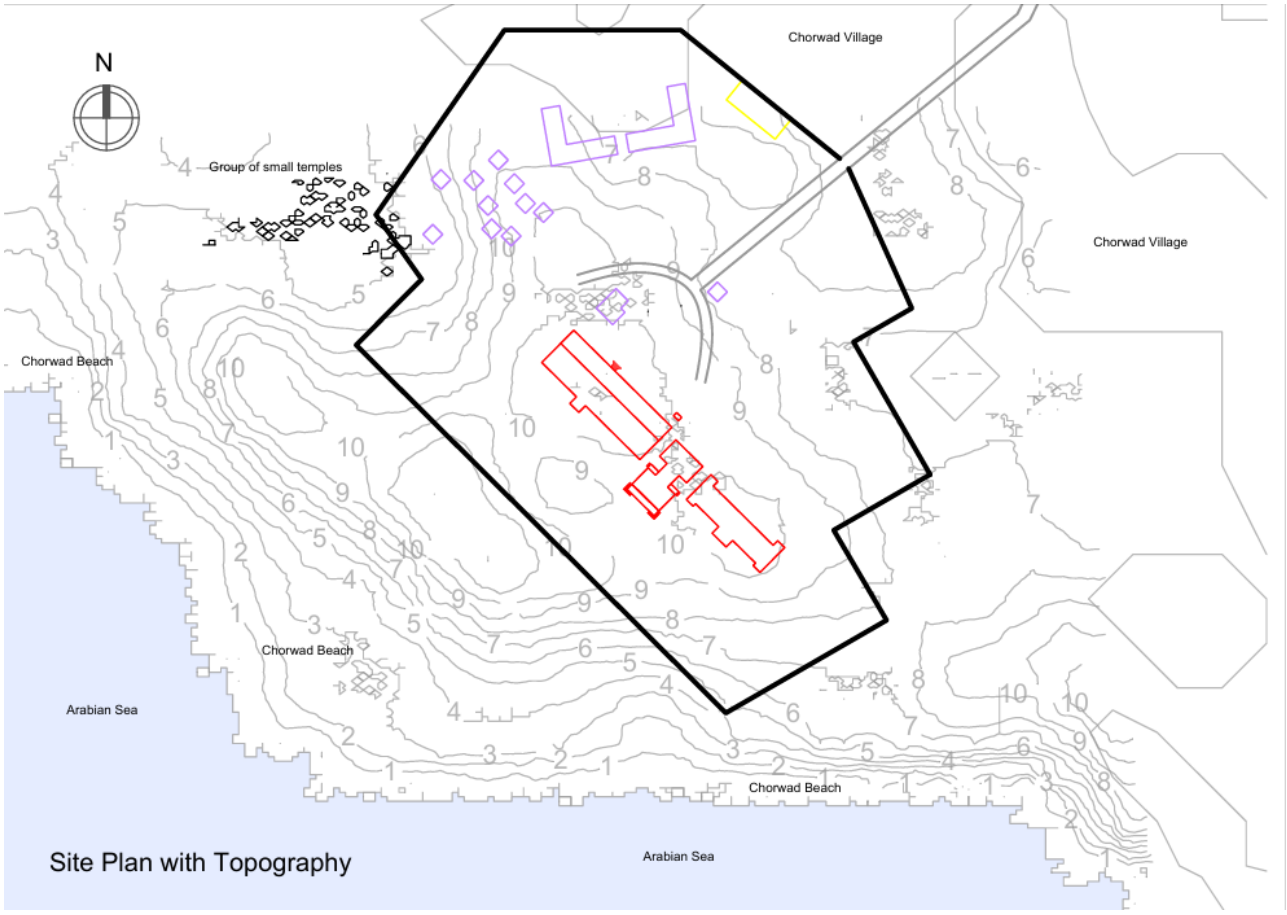


ASPECT	**RECOMMENDATION**
Orientation	SW-facing views, cross-ventilation NE–SW
Sun Protection	Deep overhangs, jaalis, shaded courtyards
Ventilation	Sea breeze harnessing with courtyards & high openings
Materials	Local stone, RCC frame, lime plaster, terracotta roof tiles
Roofing	Sloped (30–45°) or flat with drains, cyclone-tied structures
Drainage	Raised plinths, permeable paving, bioswales
Landscape	Windbreak trees, shaded trails, water features
Style	Fusion of Saurashtra heritage + modern eco-luxury

SITE PLAN

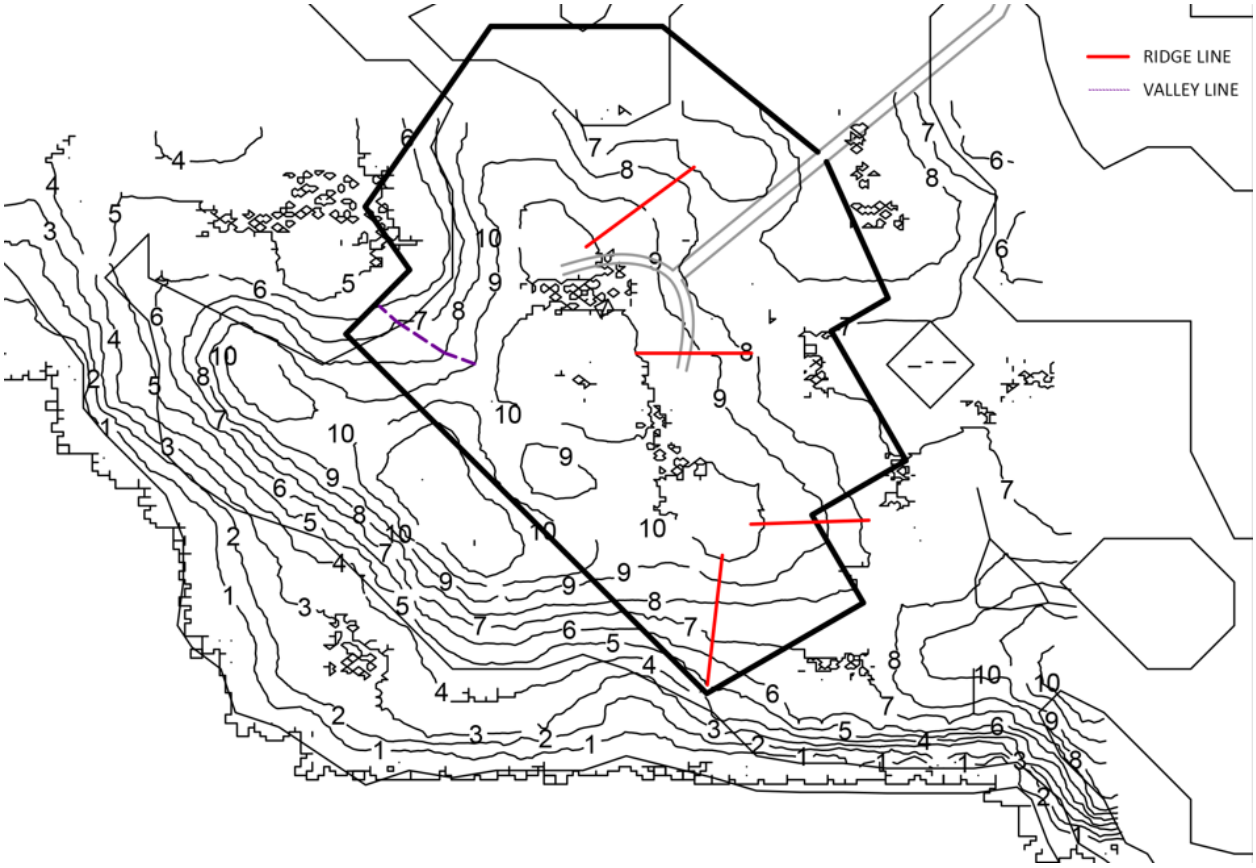


Site Plan

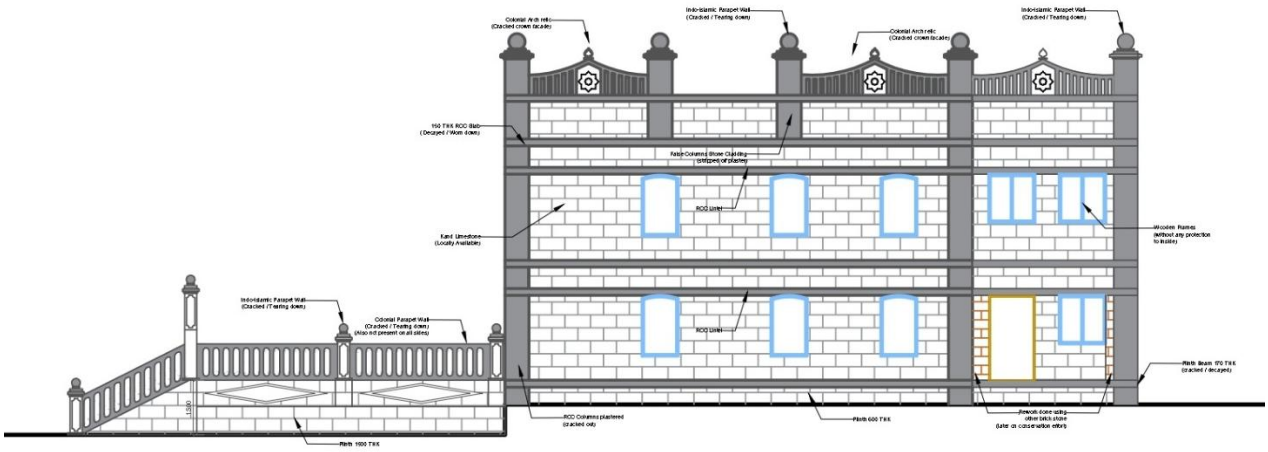


Site Plan with Topography

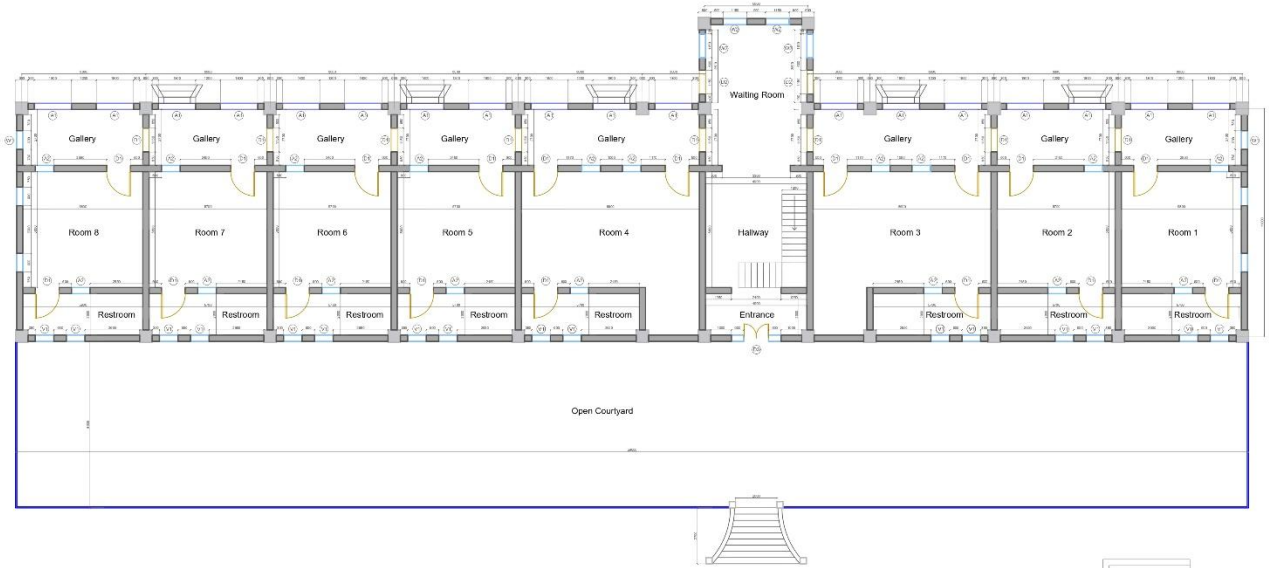
RIDGE & VALEEY

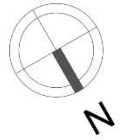


BUILDING DETAILS

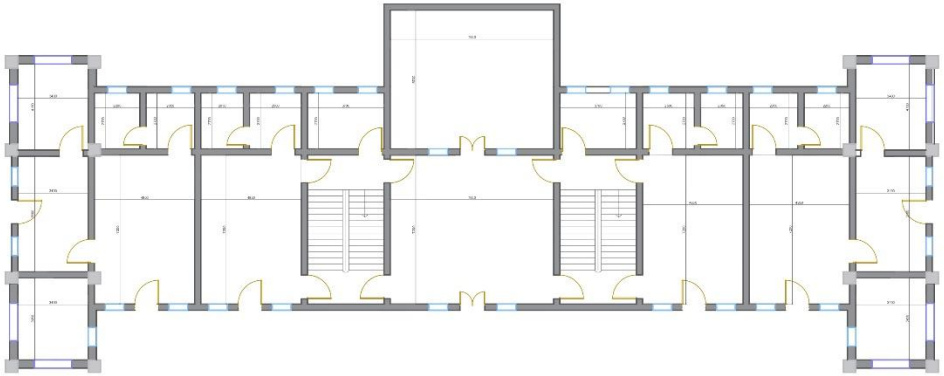


SIDE ELEVATION



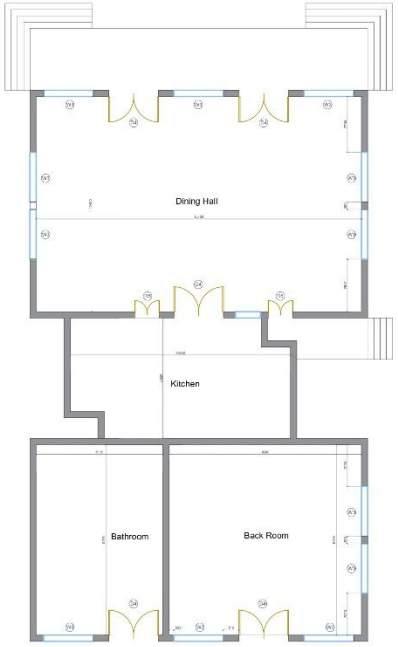


Replica Building

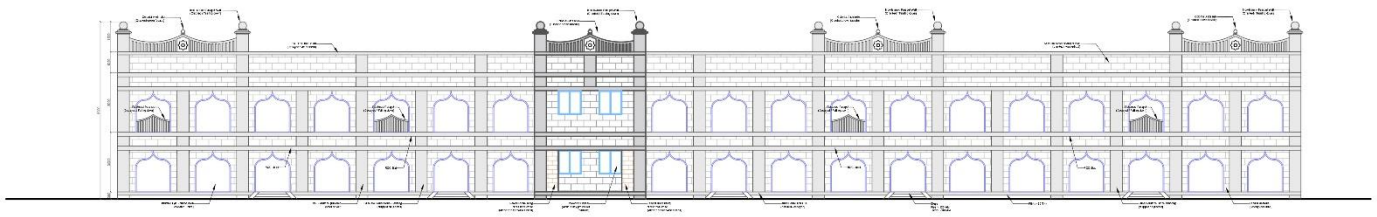


Heritage Building - Palace

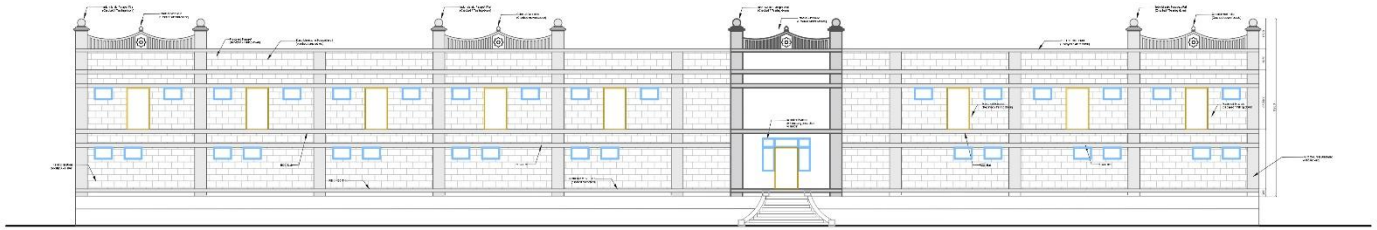




Dining Hall



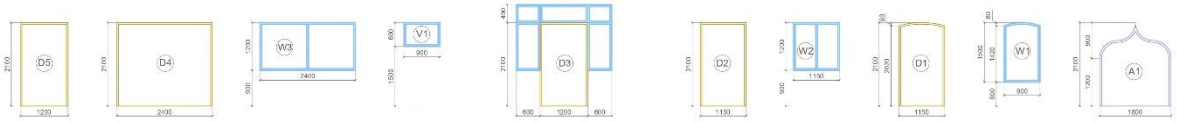
Elevation E1



Elevation E2



Elevation E3



Details

3.3 CLIMATE ANALYSIS

- **Location**: Holiday Home Palace, Chorwad, Gujarat (near Veraval)
- **Latitude/Longitude**: 21.03°N, 70.23°E
- **Climate Zone**: Composite (hot-dry in summer, warm-humid in monsoon, mild winter)

1. TEMPERATURE ANALYSIS

DATA:

- Max Temp: 42.1°C (May)
- Min Temp: 11.9°C (January)
- Mean Temp Range: 22°C (Jan) to 29.9°C (June)

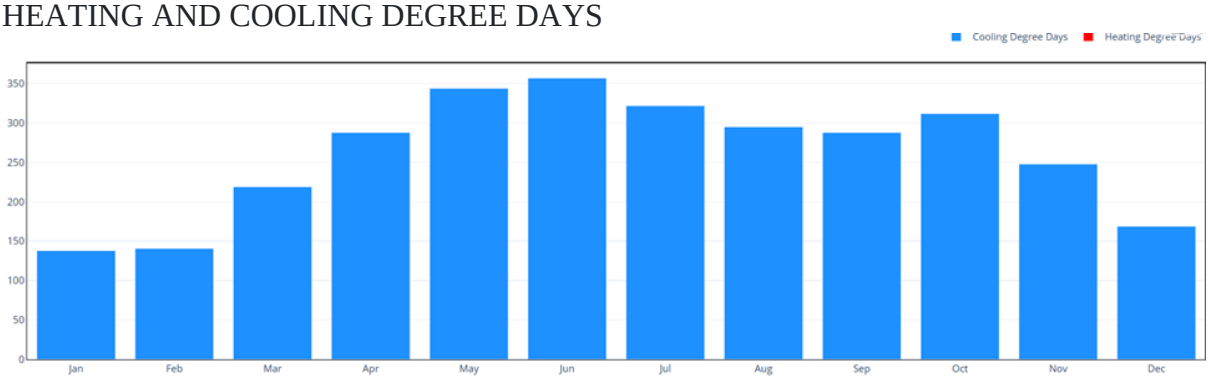
DESIGN CHALLENGES:

- High summer heat (Mar–June) → Thermal discomfort
- Cold nights in Jan → Slight insulation needed
- Large diurnal variation (day-night) in hot months

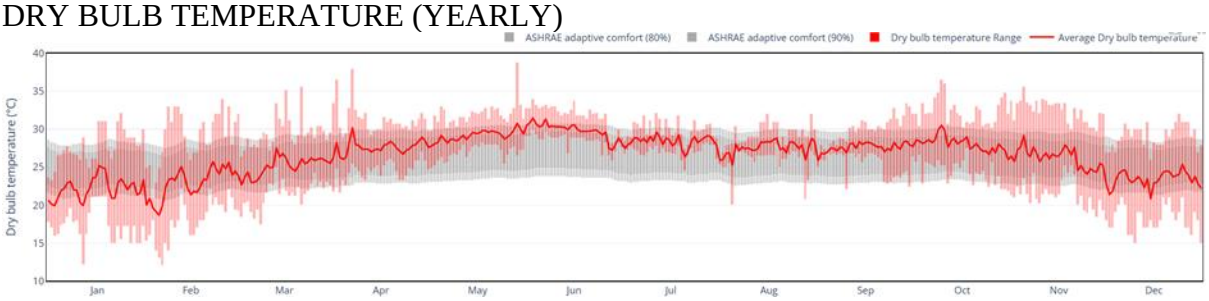
INFERENCES FOR RESORT DESIGN:

- Use thermal mass (stone/brick) for stable indoor temps
- Add roof insulation, light-coloured roofing, ventilated attic
- Courtyards & terraces to enhance night-time cooling
- Double-glazing or shading to reduce heat gain in rooms

HEATING AND COOLING DEGREE DAYS



DRY BULB TEMPERATURE (YEARLY)



WET BULB TEMPERATURE (YEARLY)



DEW POINT TEMPERATURE (YEARLY)



2. HUMIDITY ANALYSIS

- Highest: 89.7% (Aug)
- Lowest: 35% (April)
- Humidity rises from May and peaks in July–Sept

DESIGN CHALLENGES:

- Mold, condensation, mustiness in enclosed spaces during monsoon
- Reduced comfort due to high latent heat

INFERENCES:

- Use cross-ventilation and perforated elements like jaalis
- High ceilings, ventilation shafts
- Use lime plaster, clay, and moisture-wicking materials

HUMIDITY (YEARLY)



3. WIND ANALYSIS

DATA:

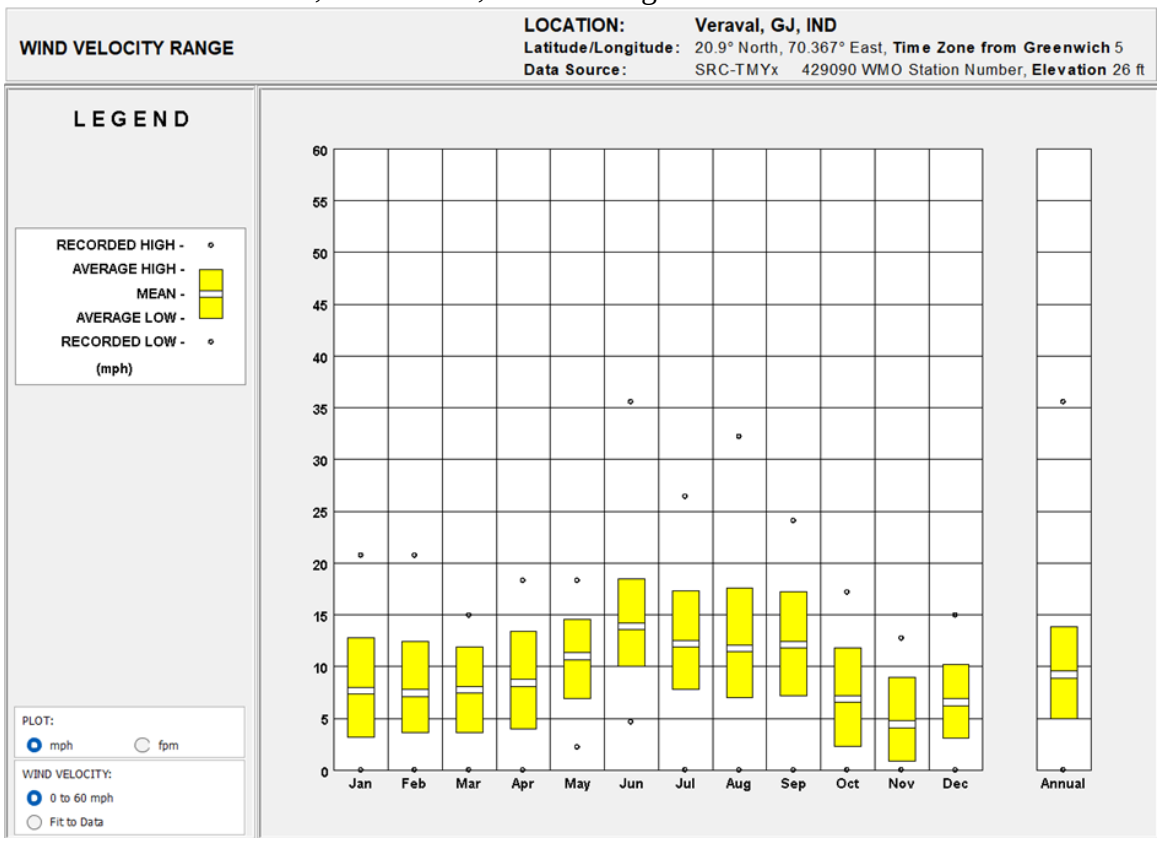
- Summer Wind: SW (Sea breeze)
- Winter Wind: NE (cool, dry)

CHALLENGES:

- Need to optimize natural ventilation in hot/humid months
- Avoid heat loss in winter

INFERENCES:

- Orient courtyards and windows toward SW
- Avoid major openings on NE side in winter
- Use wind towers, vent blocks, louvres for guided air flow



WIND ROSE (ANNUAL + SEASONAL)

OBSERVATIONS:

- Summer: Predominantly SW (favourable for ventilation)
- Winter: NE, drier and cooler

INFERENCES:

- Locate resort lounges, dining areas, verandahs along SW-facing orientations
- Dense planting on NE sides for wind buffering in winter

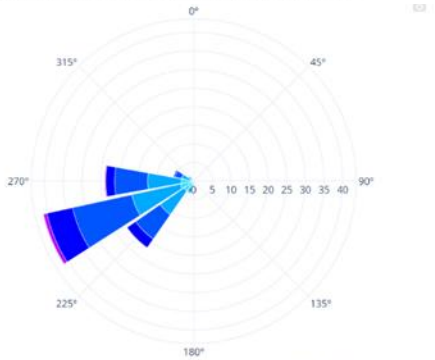
SEASONAL WIND ROSE



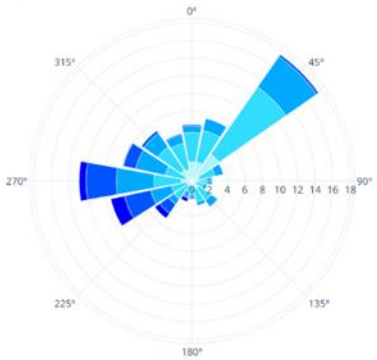
Observations between the months of Dec and Feb between 01:00 hours and 24:00 hours. Selected observations 2160 of 8760, or 24 %. 37 observations have calm winds.



Observations between the months of Mar and May between 01:00 hours and 24:00 hours. Selected observations 2208 of 8760, or 25 %. 21 observations have calm winds.



Observations between the months of Jun and Aug between 01:00 hours and 24:00 hours. Selected observations 2208 of 8760, or 25 %. 12 observations have calm winds.



Observations between the months of Sep and Dec between 01:00 hours and 24:00 hours. Selected observations 2928 of 8760, or 33 %. 88 observations have calm winds.

ANNUAL WIND ROSE





4. RAINFALL AND RAIN DAYS

DATA:

- Total Annual: ~1100 mm (majority in July–Sept)
- Peak Rainfall: July (426 mm)

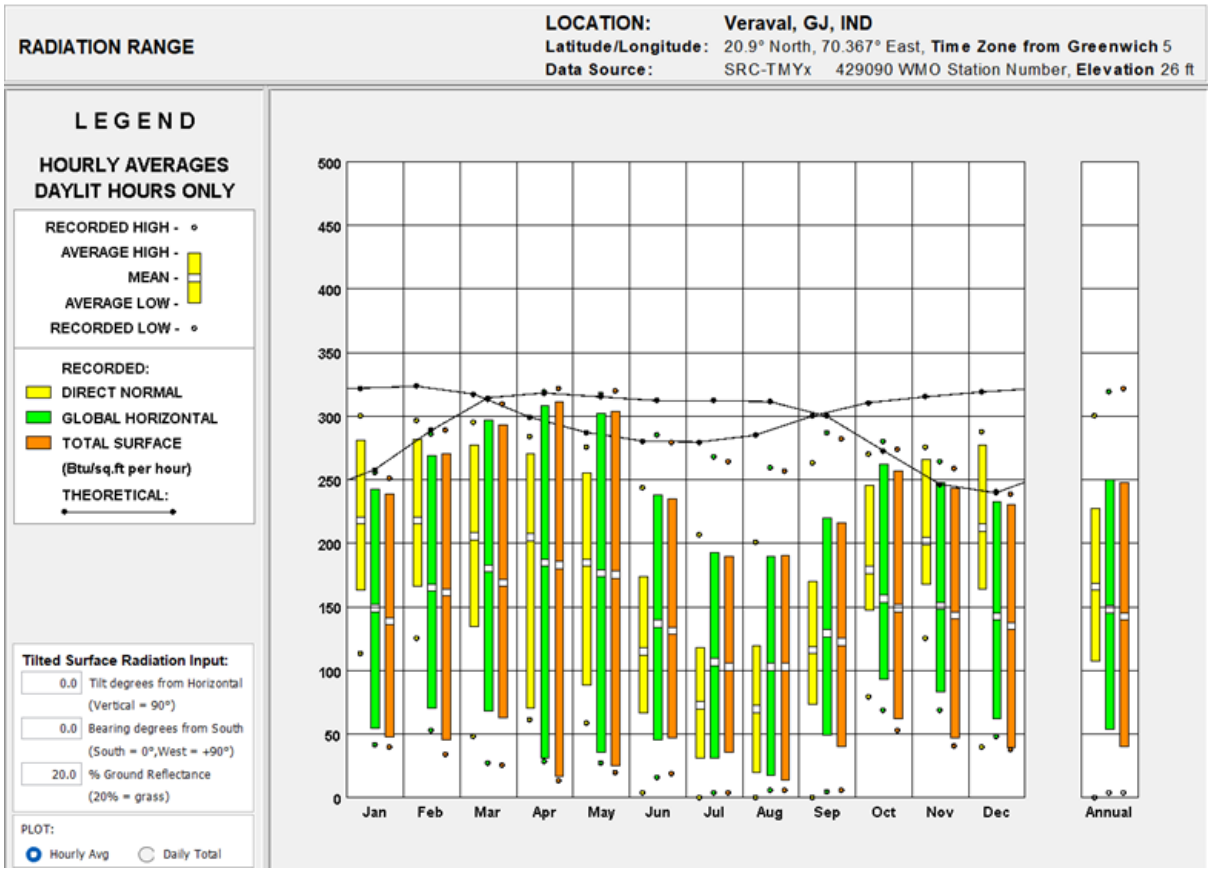
DESIGN CHALLENGES:

- Water stagnation
- Site flooding due to intense short-duration rainfall
- Soil erosion near coastal edges

INFERENCES:

- Sloped roofs, deep overhangs, gutter systems
- Rainwater harvesting tanks for utility use
- Elevated plinths, well-drained paving
- Use gravel channels, bioswales in landscaping

5. SOLAR RADIATION AND SUN PATH



DATA:

- High sun angle in summer
- East & west façades get max exposure
- South walls get low sun angle (winter sun)

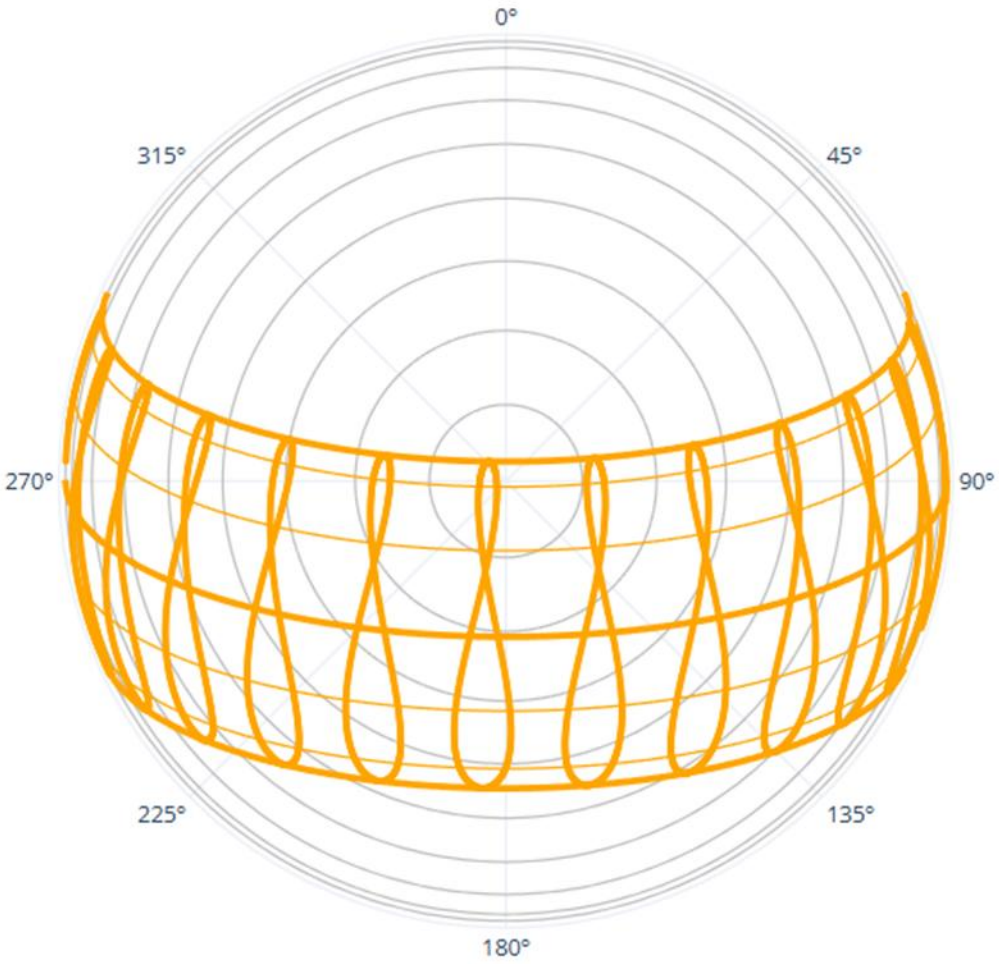
CHALLENGES:

- Overheating on east & west walls
- Need daylighting without heat gain

INFERENCES:

- Horizontal shading (chajjas) on south
- Vertical fins/louvres on east & west
- Integrate light shelves, clerestories, and skylights
- Use solar control glazing or tinted glass

6. SUN PATH



7. CLOUD COVER & SOLAR AVAILABILITY

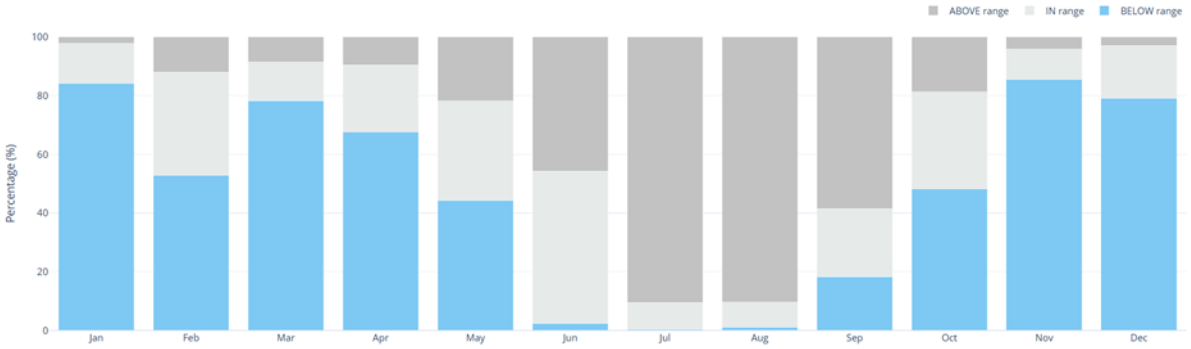
DATA:

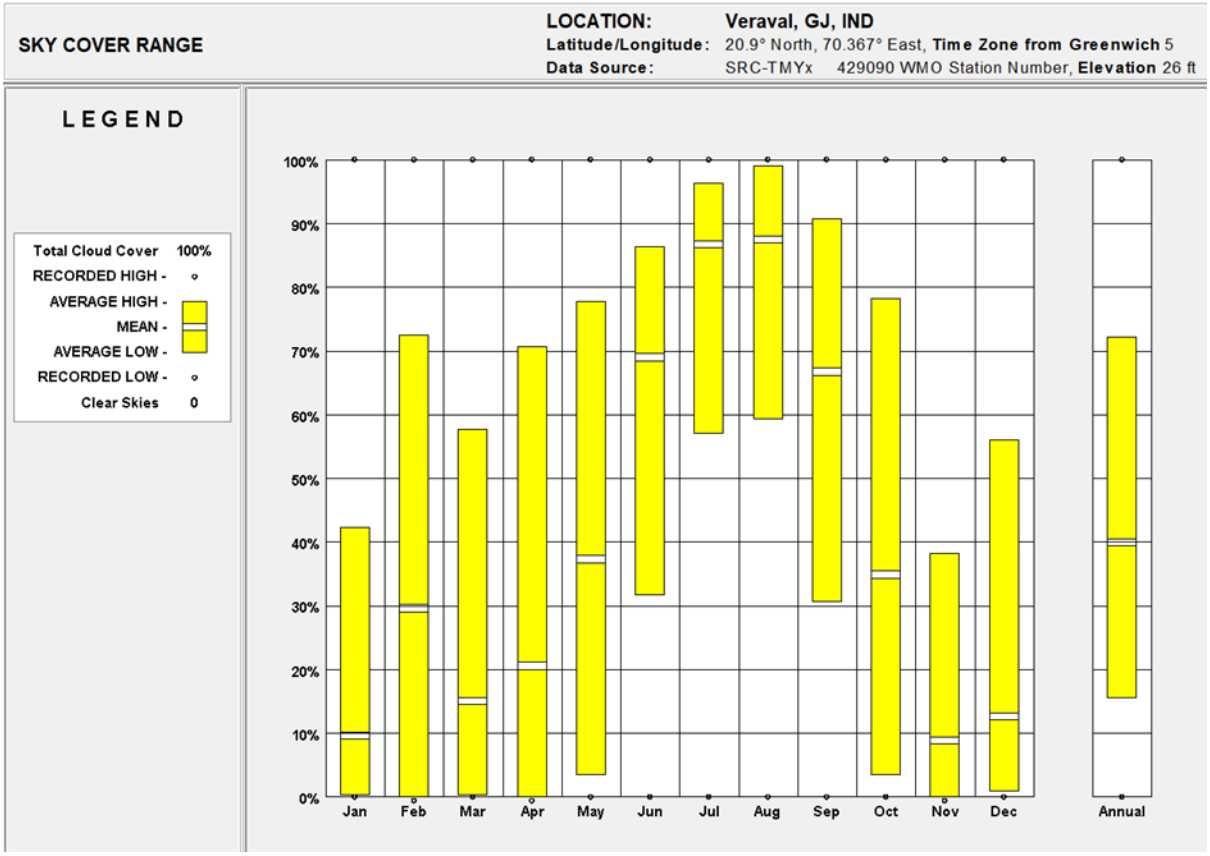
- July–Sept: cloudiest months → Reduced daylight
- Oct–May: mostly sunny

INFERENCES:

- Use **daylight redirecting devices**
- Incorporate **skylights**, **light wells** in shaded zones

CLOUD COVERAGE





MAHONEY TABLE (BASED ON MONTHLY DATA FROM VERAVAL)

Month	Mean (°C)	Temp	RH (%)	Rain	Mahoney Zones	Inferences
Jan	22.23		48.5	No	Comfort (Dry Winter)	Slight heating, open design
Mar–May	25–29.1		70–78	No	Hot-Dry	Thermal mass, courtyards, shade
Jun–Sep	28–29.9		80–89	High	Warm-Humid	Cross ventilation, rain protection

Oct	28.1	74.5	Low	Transition	Combine both strategies
Nov–Dec	23–26	57–58	No	Cool-Dry	Light thermal mass, openable glazing

KEY INFERENCES FOR RESORT DESIGN:

1. Blend of cooling and ventilation strategies across seasons
2. Outdoor-indoor transitions via shaded verandahs and pergolas
3. Maximized cross-ventilation for humid months
4. Rainproof but breathable design in monsoon
5. Use of traditional passive cooling: jaalis, courtyards, water features
6. Materials should be locally sourced, moisture-resistant, and breathable

MAHONEY TABLE-BASED DESIGN GUIDELINES:

Parameter	**Recommendation**
Orientation	Long axis E-W to reduce sun on E/W walls
Openings	Moderate, with shading (louvers/chajjas)
Walls	Heavy (thermal mass) with light finishes
Roofs	Insulated, sloped with overhangs
Courtyards	Yes – shaded, vegetated, with water elements
Rain Response	High plinths, covered walkways, rainwater harvesting
Ventilation	Cross ventilation mandatory in all occupied spaces
Ground Surface	Permeable paving, grass or gravel to prevent runoff
Construction Material	Brick, stone, lime plaster, local laterite

3.4 INFERENCES

1. LOCATION & CONNECTIVITY

OBSERVATION:

- Located on Chorwad Beach, Junagadh district
- 20 km from Veraval, 70 km from Junagadh
- Air access via Keshod (~40 km) or Rajkot (~180 km)
- NH-51 highway nearby

INFERENCE:

- Well-connected for tourism development
- Suitable for 3-star resort clientele (regional + inter-state)
- Good access to logistics for construction, material transport
- Guest access nodes should be defined from highway side

2. HERITAGE CONTEXT

OBSERVATION:

- Site includes Chorwad Palace – a 1930s heritage structure
- Blend of Italian, Muslim, Colonial styles
- Structurally dilapidated but rich in character
- Marble finishes, arched windows, stone masonry

INFERENCE:

- The palace should form the design anchor/core of the resort
- Adaptive reuse: Lobby, heritage lounge, museum, fine dining
- Any additions must respect scale, materiality, and style
- Opportunity to showcase living heritage tourism

3. PHYSICAL SITE FEATURES

OBSERVATION:

- Fronts Arabian Sea; rocky shoreline + open beachfront
- Seismic Zone III; coastal erosion-prone area
- No intact roof in palace, but some original materials remain

INFERENCE:

- Design must accommodate high humidity, salt air, winds
- Use cyclone-tied roofs, lime plaster, wind-resistant vegetation
- Build on raised plinths to mitigate flooding risks
- Shoreline buffer landscape (palm, pandanus, casuarina) necessary

4. SITE STRENGTHS, WEAKNESSES, OPPORTUNITIES & THREATS (SWOT)

ASPECT	INSIGHT
Strengths	Scenic beach, heritage palace, peaceful coastal ambience
Weaknesses	Unsafe for swimming, minimal current infrastructure
Opportunities	Create a coastal heritage resort model with local employment, culture promotion
Threats	Coastal safety hazards, CRZ compliance risks, climate vulnerability (monsoon, erosion)

INFERENCE:

- Use view corridors to the sea
- Keep public recreation away from risky sea edges
- Incorporate CRZ-III compliant siting and height (max G+1, 9 m)

5. CLIMATE CONDITIONS (COMPOSITE ZONE)

PARAMETER	DATA / CONDITION	INFERENCE FOR DESIGN
Max Temp	~42.1°C (May)	Thermal mass (stone), shaded areas, insulation
Min Temp	~11.9°C (Jan)	Night insulation, warm materials
Humidity	35%–89% (peaks in Aug)	Ventilation shafts, anti-mold finishes, high ceilings
Rainfall	~1100 mm/year, peak in July–Sept	Sloped roofs, RWH tanks, bioswales, elevated plinths
Wind Patterns	SW (Summer), NE (Winter)	Orient openings to SW, plant buffers on NE
Sun Path	East/West exposure high	Vertical fins/jalis on E/W, courtyard light wells

MAHONEY TABLE INFERENCE:

- E–W orientation, shaded verandahs, jaalis
- Passive cooling via courtyards, water features, wind flow

6. MATERIAL CHARACTERISTICS (EXISTING PALACE)

MATERIAL	OBSERVATION	INFERENCE FOR NEW DESIGN
Local Basalt	Used for main walls	Can be reused for new walls or landscape edges
Kaand Limestone	For ornamentation	Use for feature walls, signage, plinths
Lime Plaster	Original finishing	Continue for breathability and authenticity
Timber, Terracotta	Used for roof + interiors	Use for warm, tactile finishes
Marble, Glass	Bathroom, arches, interior elements	Restore where possible; use selectively in suites/lobby

7. FAUNA & FLORA CONTEXT

OBSERVATION:

- Diverse flora (neem, casuarina, pandanus, aloe, bougainvillea)
- Marine + migratory birds, endangered species (sea turtles, pelicans)

INFERENCE:

- Avoid night light pollution near shore – protect turtle nesting
- Use native trees for shade, windbreak, and soil stability
- Landscape with seasonal bloom plants for year-round color
- Provide birdwatching pavilions or nature walks as eco-tourism features

8. CRZ & ENVIRONMENTAL COMPLIANCE

OBSERVATION:

- Site likely in CRZ-III B (population density < 2161/km²)
- NDZ = 200m from HTL; resort allowed only beyond this
- Max FSI: 0.33, Max height: 9m (G+1 only)
- No modification to palace facade allowed

INFERENCE:

- Verify HTL on CZMP maps and restrict development beyond 200m line
- Low-rise, spread-out layout (cottage model)
- Landscape and eco-zones in NDZ
- All design must comply with CRZ 2019 + EIA 2006 guidelines

SITE INVENTORY INFERENCE FOR ARCHITECTURAL DESIGN

PARAMETER	DESIGN INFERENCE
Location	Heritage + beach tourism potential, good access from highway/rail/air
Heritage Integration	Palace becomes adaptive core (lobby, lounge, gallery, fine dining)
Climate	Passive cooling, wind harnessing, thermal mass, shading essential
CRZ Regulation	Build beyond 200m, low-rise (G+1), use local/natural materials
Landscape Strategy	Native flora, windbreaks, buffer planting, bird pavilions, RWH
Orientation & Zoning	SW exposure preferred; divide site by heritage, guest, public, service zones
Material Selection	Lime plaster, stone masonry, timber, terracotta for coherence and climate
Tourism Activities	Cultural pavilion, nature trails, sunrise decks, heritage storytelling zones

4.CASE STUDY

4.1 AZZARO RESORT & SPA, DIU

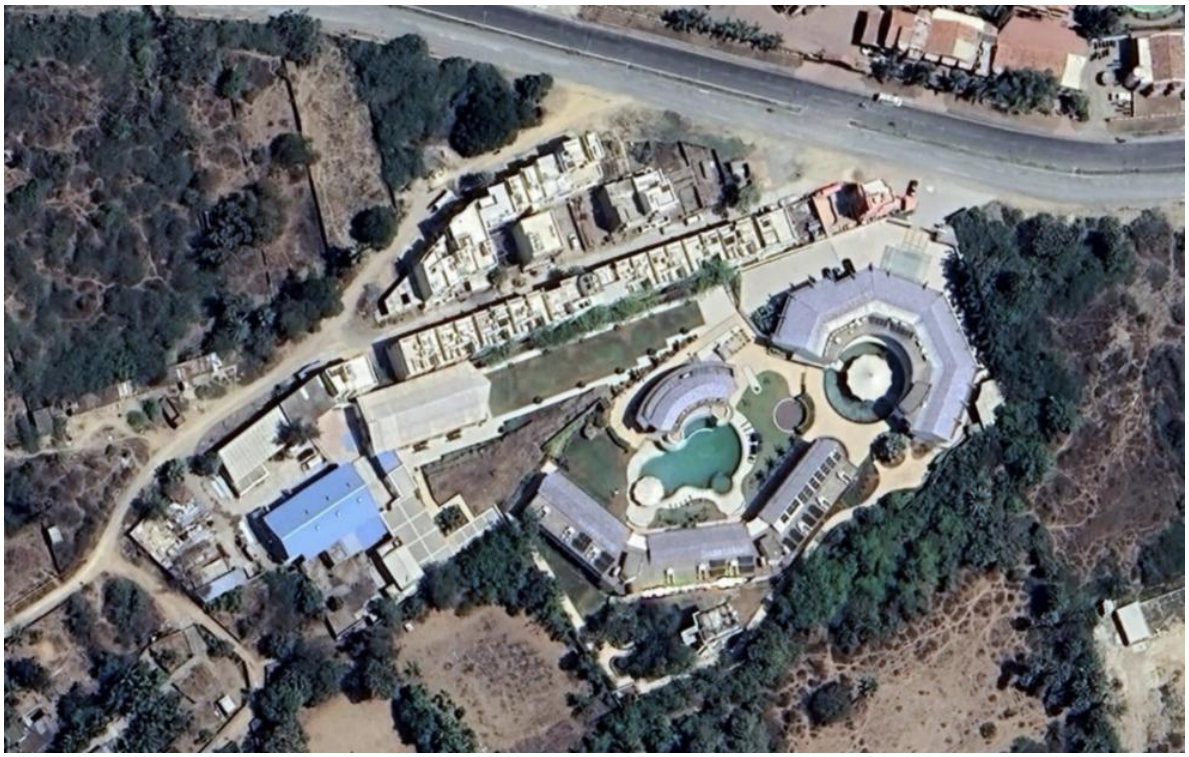
OBJECTIVE OF CASE STUDY:

The objective of this case study is to analyze Azzaro , Diu as a sustainable and culturally responsive hospitality project. It aims to:

- Understand the site context and how the design responds to the coastal environment of Diu.
- Study the architectural planning, spatial organization, and integration of vernacular design elements.
- Evaluate the use of local materials and sustainable practices like natural ventilation and rainwater harvesting.
- Assess the user experience, circulation, and functionality of the resort.
- Explore the project's contribution to local tourism, culture, and economy.

LOCATION:

Azaro, officially known as *Azzaro Resort & Spa*, is located in the coastal town of Diu, which is part of the Union Territory of Dadra and Nagar Haveli and Daman and Diu, India. The resort is situated on Nagoa Beach Road in the Fudam area, directly opposite Hotel Kohinoor. It lies approximately 4 kilometers from Nagoa Beach and around 7 kilometers from the Diu Airport, offering convenient access for tourists. The location is also close to several key attractions such as the Diu Fort, Naida Caves, and Gangeshwar Mahadev Temple, making it a strategically positioned hospitality destination. Its placement near the Arabian Sea provides guests with scenic views and a coastal ambience, ideal for tourism and leisure activities.



HISTORICAL CONTEXT:

Portuguese Legacy: Diu was under Portuguese rule from 1546 to 1961, which left a lasting impact on the island's architecture, culture, and cuisine. The Portuguese influence is evident in structures like Diu Fort, St. Paul's Church, and various other colonial buildings. Azzaro Resort & Spa leverages this historical backdrop, providing guests easy access to explore these historical sites and immerse themselves in the island's unique Indo-Portuguese culture.

CLIMATE:

Diu enjoys a coastal climate influenced by the Arabian Sea.

Temperature:
The weather is generally pleasant throughout the year.
Summer (March-May): Hot with temperatures reaching a maximum of 36°C.
Monsoon (June-September): South-west monsoon brings rain, but not as heavy as nearby South Gujarat. The average rainfall is around 560 mm per year, with July being the wettest month with an average rainfall of 311.68 mm and approximately 16 rainy days. Humidity averages close to 79% in July.
Winter (December-January): Mild with day temperatures around 20°C and nights around 15°C.

WIND:
Diu is windy throughout the year. The average hourly wind speed in Diu experiences extreme seasonal variation. The windiest part of the year lasts for approximately 4 months, from May to September, with average wind speeds of more than 12.4 miles per hour. The windiest month in Diu is July, with an average hourly wind speed of 17.0 miles per hour. The predominant average hourly wind direction in Diu is from the west for most of the year.

TOPOGRAPHY

Diu is a small island located near the coast of Kathiawad, separated from the mainland by a narrow channel or creek.

- ELEVATION: The altitude of Diu is 6 meters above sea level. There are hillocks that reach a maximum height of 30 meters.
- TERRAIN: The topography is generally plain with undulating dips like typical sand-dune deposits.
- COASTAL FEATURES: Diu features several beautiful beaches, cliffs made of limestone, and bays. The beaches are not very deep, making them suitable for swimming and water sports

ACCESSIBILITY:

- By Air: Located just 4–5 km from Diu Airport
- By Train: No railway station in Diu, Nearest station: Veraval Junction (~90 km).
- By Road: Well-connected by state transport and private buses.

PROXIMITY TO ATTRACTIONS:

- Naida Caves – Around 2–3 km, one of the most popular caves on Diu.
- Diu Museum & INS Khukri Memorial – About 2 km away, located centrally in Diu town.

- Diu Fort – Roughly 2.5–3 km, a significant Portuguese-era landmark.
- Nagoa Beach – Approximately 3.6–5.8 km from the resort; less ideal for walking, better accessed via vehicle.

SURROUNDINGS AND CONTEXT:

The resort is surrounded by lush greenery, coconut palms, and lies near Gandhipara Lake and several beaches like Nagoa and Ghoghla, giving it a serene, nature-oriented setting. The proximity to the coast ensures access to sea views, clean air, and a relaxed ambience.









CONCEPT AND DESIGN PHILOSOPHY:

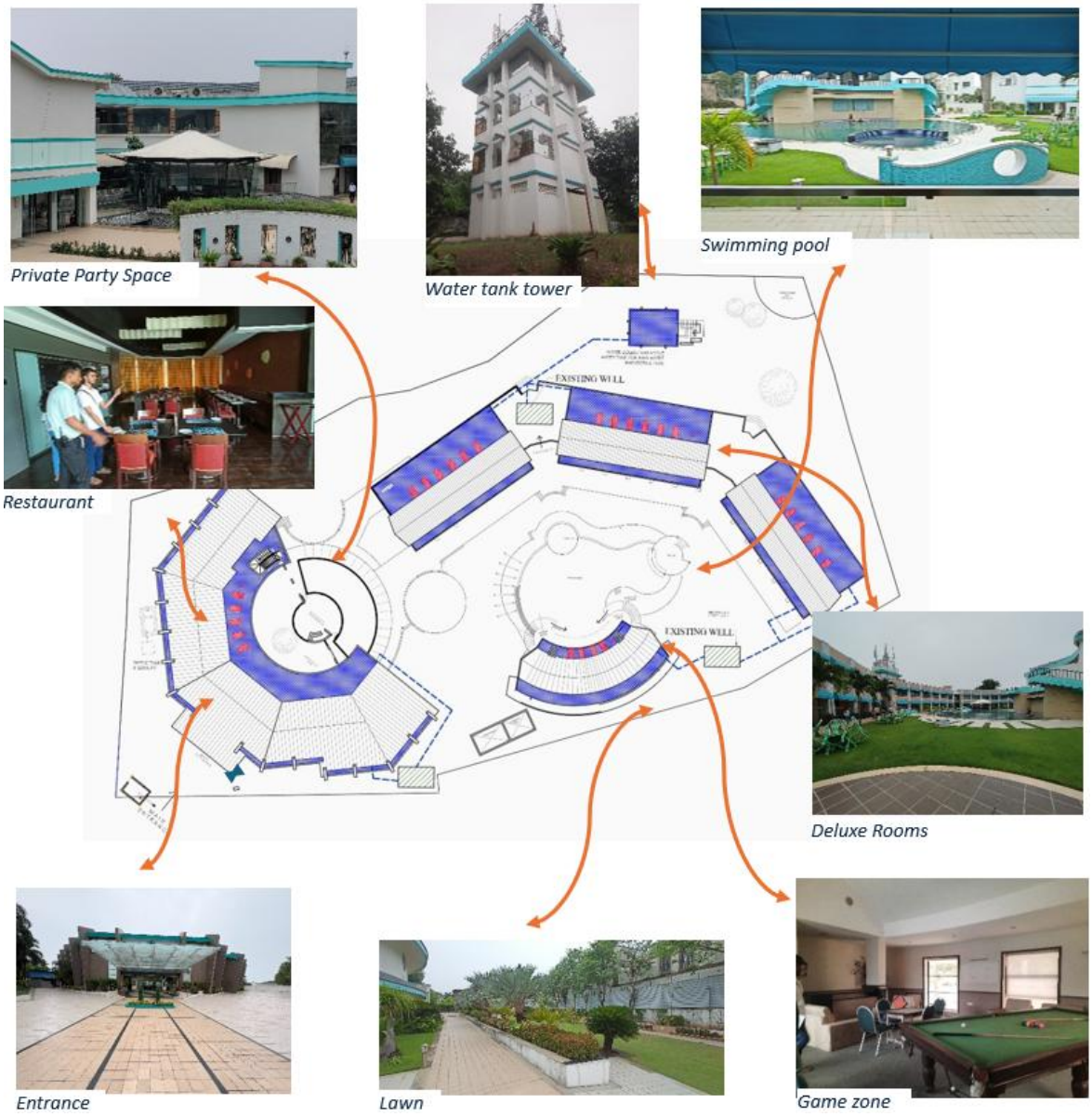
ARCHITECTURAL STYLE

A blend of elements designed to create a luxurious and comfortable experience, drawing on both modern aesthetics and local contextEmbodies Victorian and Colonial architectural styles, characterized by pitched roofs, wooden flooring, period-style furnishings, and intricate detailing. The heritage character is maintained through the restoration of original elements and the use of antique décor.

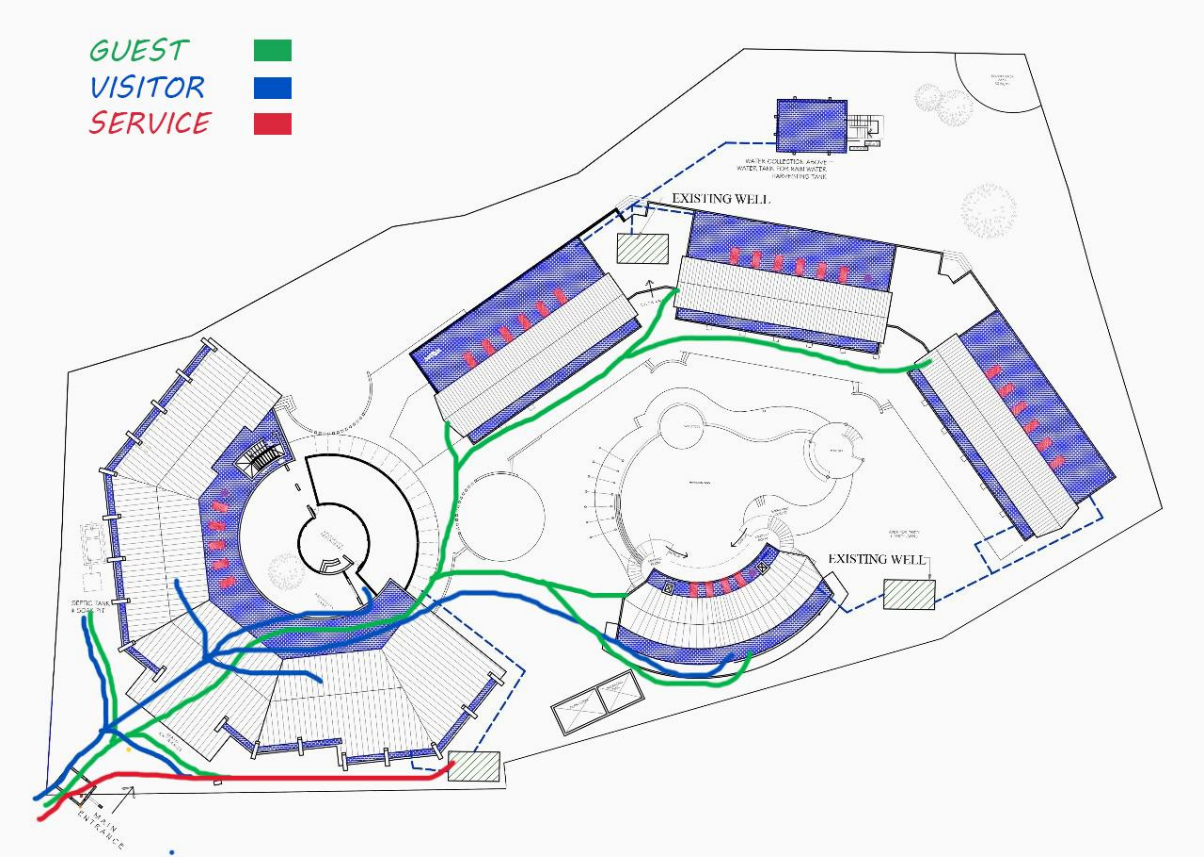
DESIGN THEME

Surrounded by a wide range of green land, Azzaro offers you peaceful, soothing and refreshing view. With gracious hospitality and courteous staff, experience the luxury and make your stay memorable. Every benefit clubbed together, Azzaro in Diu makes in for a perfect beach destination to get away from the hustle of the city.

MASTER PLAN & ZONING



CIRCULATION:



AMENITIES:

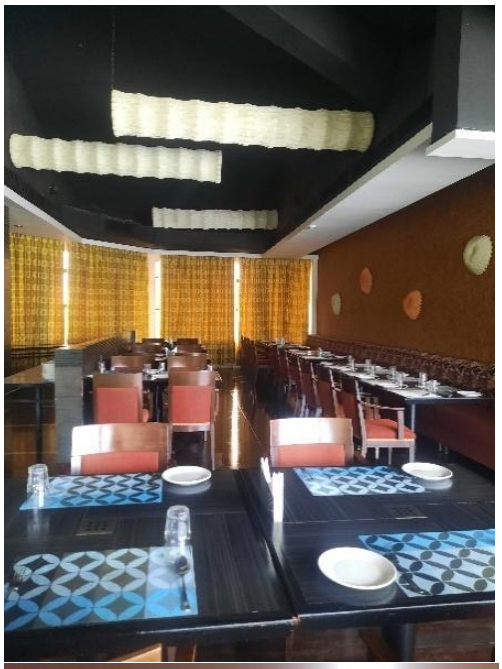
- SWIMMING POOL – Large outdoor pool with sun loungers and poolside service.
- SPA & WELLNESS CENTER – Full-service spa offering massages, therapies, and sauna.
- RESTAURANT & BAR – Multi-cuisine restaurant and a bar serving Indian, continental, and local dishes.
- FREE WI-FI – Available in rooms and public areas.
- PARKING FACILITY – Free private parking for guests.
- FITNESS CENTER – Basic gym equipment available for guest use.

LANDSCAPE DESIGN:

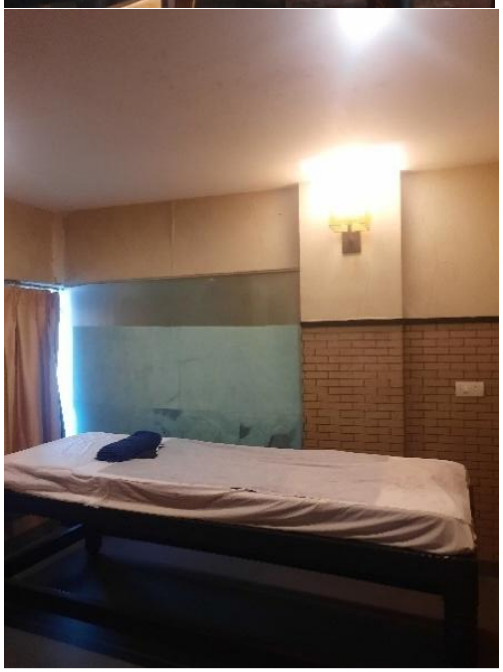
Poolside Landscaping: The swimming pool is a central feature, and the surrounding lawns contribute to its beauty, especially at night with thoughtful lighting. This suggests a deliberate effort to integrate the pool area with the natural surroundings.

ROOM TYPOLOGIES:

- TOTAL ROOMS: There is a total of 38 rooms at the resort.
- ROOM DISTRIBUTION: These 38 rooms are spread across 1 floor.
- CLUB ROYAL ROOMS: There are 36 Club Royal rooms.
- SIZE: Each Club Royal room is 225 sq. ft (21 sq. mt).
- OCCUPANCY: Standard occupancy for a Club Royal room is 2 adults, and 1 extra guest can be accommodated.
- SUITES: There are 2 luxurious suites.
- BEDS: Rooms are equipped with King-sized beds. Some sources also mention the possibility of a sofa-cum-bed.







CONSTRUCTION AND DESIGN FEATURES:

EXTERIOR FEATURES:

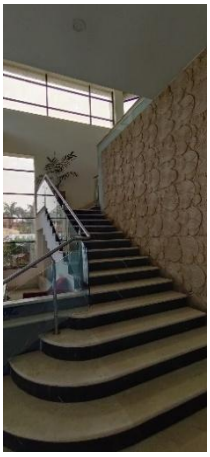
- ARCHITECTURE: Fusion of Portuguese colonial and modern tropical styles.
- STRUCTURE: RCC frame with local stone, brick masonry, and lime plaster.
- ROOFING: Sloped tiled roofs with Mangalore tiles for thermal protection.
- OPEN SPACES: Courtyard layout, verandahs, shaded walkways, and landscaped gardens.
- LANDSCAPING: Native plant species, water features, and paved stone pathways.





INTERIOR FEATURES:

- STYLE: Elegant, minimalist design with natural finishes.
- MATERIALS: Use of wood, terracotta, and stone flooring for warmth and durability.
- FURNITURE: Locally crafted wooden furniture with soft furnishings.
- LIGHTING: Soft ambient lighting with natural daylight emphasis.
- DECOR: Elements of local art, cultural motifs, and traditional crafts.


SUSTAINABLE DESIGN METHOD:

- LOW-RISE CONSTRUCTION: Spreads horizontally rather than vertically, reducing energy load on lifts and elevators (though it lacks lift access).
- NATURAL LIGHTING: Rooms and public areas designed with large windows and open spaces, allowing for maximum daylighting and reduced artificial lighting during the day.
- COURTYARD AND POOL-CENTRIC PLANNING: Central pool and open courtyards enhance natural ventilation and passive cooling, reducing dependence on air conditioning.

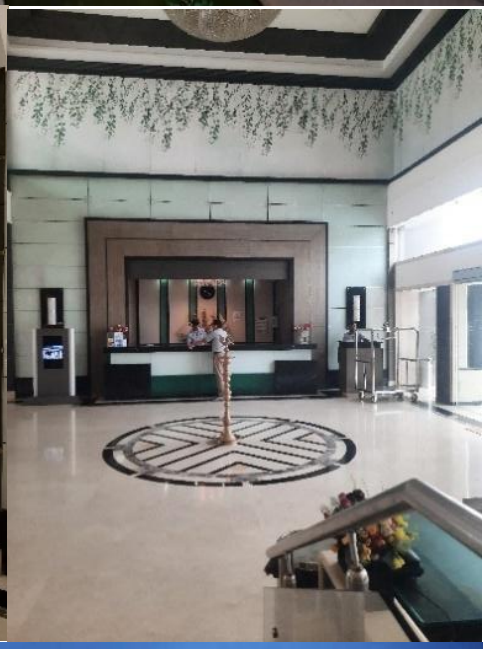
LIGHTING & VENTILATION:

- Large windows, verandahs, and courtyards allow abundant daylight, reducing dependency on artificial lighting during the day.
- Indoors, the resort uses warm, energy-efficient LED lights to create a cozy and inviting atmosphere.
- Rooms and common areas are planned with openings on opposite walls to allow natural airflow, keeping interiors cool without full-time air conditioning.
- Tall ceilings, shaded balconies, and pergolas help regulate temperature and circulate fresh air.











GUEST EXPERIENCE:

- CHECK-IN/OUT: Efficient with express service options.
- RECREATION: Games room, children's play area, tea boutique, library, and fitness center.
- DINING: Multi-cuisine restaurant and in-house bar with ambient settings.

EVENTS:





ENVIRONMENTAL & CULTURAL INTEGRATION:

- Use of locally sourced stone, lime plaster, and terracotta reduces environmental impact and supports sustainability.
- Incorporates native plants and water features, blending built form with the natural surroundings.
- Rainwater harvesting, water-efficient fixtures, and waste segregation contribute to a low ecological footprint.
- Combines Portuguese colonial elements with contemporary design, reflecting Diu's rich heritage.
- Interiors showcase local craftsmanship, handmade furniture, and traditional art.
- The resort offers regional dishes and cultural experiences that connect guests to the local lifestyle.

SWOT ANALYSIS:

STRENGTHS

- Spacious, pool-facing rooms in a well-laid-out resort across ~10 acres, providing a pleasant ambiance and greenery.
- Good food (especially breakfast) and decent hospitality highlighted in several reviews.

WEAKNESSES

- Maintenance issues are common: broken tiles, chipped fittings, mold, leaks, faulty geysers leading to discomfort.
- No lift , but multiple floors, inconvenient for senior guests or families with luggage.

OPPORTUNITIES

- Renovation and improved infrastructure would significantly boost guest satisfaction especially in bathrooms, corridors, and communal spaces.
- Staff training and service upgrades could deliver a more consistent, welcoming experience.
- Expanding menu options, adding seafood or more cuisine variety, would add value. Several reviews cite limited food choices.

THREATS

- Competition from newer, better-maintained resorts in Diu where guests expect higher standards at similar or lower rates.
- High pricing relative to quality leading to poor value perception: many guests felt it's overpriced given current condition.

CASE STUDY INSIGHTS:

- Importance of Long-Term Maintenance-Friendly Design: Choosing weather-resistant materials (especially in humid coastal regions like Diu), and ensure the design allows for easy repair and access to plumbing, electricals, etc.
- Integration of Nature and Built Form: Design should blend built spaces with nature—gardens, water bodies, and open courtyards can create a luxurious yet calm environment.
- Room Orientation & Views Enhance Luxury: Orienting rooms towards best views (sea, garden, pool) using passive design principles (e.g., natural light, cross ventilation).
- Coastal Context Awareness: Using marine-grade materials, and design for wind shading and thermal comfort using pergolas, overhangs, and shaded courtyards.
- Designing for Memory & Identity: Design should reflect local materials, crafts, and architectural language to make it memorable and authentic, vernacular architecture fused with modern luxury (e.g., Portuguese colonial or Saurashtra coastal influences in Diu).

APPLICATION TO THESIS:

- Emphasize cultural identity and environmental consciousness.
- Design multifunctional, user-friendly spaces.
- Adopt detailed sustainability frameworks in resort planning.

4.2 HOTEL KOHINOOR , DIU

OBJECTIVE OF THE CASE STUDY:

The objective of this case study is to analyze the architectural design, spatial planning, and functional aspects of Hotel Kohinoor, Diu, with a focus on its response to climate, cultural integration, and user experience. It aims to evaluate how the resort incorporates sustainable practices, aesthetic appeal, and efficient spatial organization to serve as a successful hospitality model in a coastal context.

LOCATION:

Hotel Kohinoor is situated in the Fudam (Fofrara) area along Nagoa Beach Road on the island of Diu, in the Union Territory of Dadra & Nagar Haveli and Daman & Diu, India. It sits directly opposite Azzaro Resort & Spa, roughly 4 km inland from Nagoa Beach and about 4 km from Diu Fort, offering strategic proximity to major attractions. The property is approximately 6.9–7.7 km from Diu Airport, making it an easy 12-minute drive by car. Located near landmarks such as the Kohinoor Water Park and Gangeshwar Mahadev Temple, the hotel blends accommodation with easy beach and heritage access, suitable for both leisure and pilgrimage visits.



Location, The Kohinoor hotel

HISTORICAL CONTEXT:

Hotel Kohinoor is located in Diu, a former Portuguese colony with a rich maritime and architectural legacy. After Diu's integration into India in 1961, the region gradually developed as a coastal tourism hub. Established in the late 20th century, Hotel Kohinoor reflects this shift, offering modern hospitality while being situated near historical landmarks like Diu Fort and Gangeshwar Temple. Its presence in the Fudam area showcases the town's evolution from a colonial outpost to a growing tourist destination.



The kohinoor Hotel view

OWNER & ARCHITECT:

- OWNER: Yatin Fugro, a Goan entrepreneur and hospitality developer; the property is managed under Hotel Sea-View Pvt. Ltd.
- ARCHITECT: Rudra Natekar – credited with designing the hotel's resort-style ambiance, blending Portuguese/Mediterranean motifs with local craftsmanship and coastal sensitivity.

ACCESSIBILITY:

- BY AIR: Located just 4–5 km from Diu Airport
- BY TRAIN: No railway station in Diu, Nearest station: Veraval Junction (~90 km).
- BY ROAD: Well-connected by state transport and private buses.

PROXIMITY TO ATTRACTIONS:

- NAIDA CAVES – Around 2–3 km, one of the most popular caves on Diu.
- DIU MUSEUM & INS KHUKRI MEMORIAL – About 2 km away, located centrally in Diu town.
- DIU FORT – Roughly 2.5–3 km, a significant Portuguese-era landmark.
- NAGOA BEACH – Approximately 3.6–5.8 km from the resort; less ideal for walking, better accessed via vehicle.

SURROUNDINGS AND CONTEXT:

Hotel Kohinoor is situated in the calm Fudam area of Diu, along Nagoa Beach Road. Surrounded by greenery and low-rise development, it lies close to major attractions like Nagoa Beach, Diu Fort, and Gangeshwar Temple. The setting offers a quiet retreat with easy access to both the natural beauty and historical charm of the island, making it ideal for tourists seeking a balance of relaxation and exploration.







The Kohinoor surroundings

ARCHITECTURAL STYLE:

Hotel Kohinoor features a Portuguese-inspired resort architecture, reflecting Diu's colonial heritage. The design includes arched windows, cream-colored façades, balconies (balcaos), and red-tiled roofs, creating a Mediterranean coastal village feel. The layout emphasizes courtyard planning, open spaces, and a central pool, blending heritage aesthetics with modern comfort and functionality.



Building facade

VERNACULAR ELEMENTS:
Hotel Kohinoor incorporates several vernacular elements inspired by Diu's regional and colonial past. Features such as arched openings, balcaos (covered porches), sloping red-tiled roofs, and locally sourced materials reflect the traditional Portuguese-Goan architectural language. The use of courtyards, natural ventilation, and shaded walkways also aligns with the local climate and cultural context, blending modern resort design with regional identity.

MODERN DESIGN:
While rooted in heritage aesthetics, Hotel Kohinoor incorporates modern design elements to enhance guest comfort and functionality. These include well-planned circulation, spacious interiors, contemporary furnishings, and modern amenities like a swimming pool, banquet hall, and wellness facilities. The architecture subtly balances traditional forms with clean, functional layouts, offering a refined resort experience suited to present-day hospitality standards.

ECO-FRIENDLY PRACTICES:
Hotel Kohinoor adopts several eco-friendly practices to promote sustainability. These include the use of natural ventilation and lighting, landscaped green spaces that reduce heat absorption, and local materials in construction to lower environmental impact. Water-saving fixtures, rainwater harvesting systems, and basic waste segregation measures also contribute to eco-conscious operations, reflecting an effort to harmonize with Diu's sensitive coastal environment.

INSPIRATION:
Hotel Kohinoor draws inspiration from Portuguese colonial architecture and the coastal charm of Diu. The design reflects the island's historical roots, with features like arched windows, balcaos, and red-tiled roofs, reminiscent of traditional Goan and Diu houses. The aim was to create a resort that blends heritage with comfort, offering guests an immersive experience rooted in the local architectural identity.

LUXURY:
Hotel Kohinoor offers a luxurious stay through its spacious rooms, elegant interiors, and premium amenities such as a swimming pool, banquet hall, fine-dining restaurant, and landscaped gardens. The blend of heritage-inspired design with modern comforts creates an upscale resort experience, appealing to both leisure travelers and business guests seeking refined hospitality in a serene coastal setting.




Luxury Rooms

AMENITIES:

GUEST AMENITIES:

- Swimming pool (outdoor) with Jacuzzi for relaxation and recreation
- Splash Water World (on-site water park) and Footloose Discotheque for entertainment
- Casino-style nightlife and party lawn ("Bageecha") accommodating up to ~200–600 people for events and gatherings.



Swimming pool



Lawn

BUSINESS & EVENTS:

- Fully air-conditioned conference hall seating 45–150 people in theatre style.
- Board room for smaller meetings or executive sessions
- Outdoor party lawn "Bageecha", ideal for weddings, social gatherings, or corporate events (200–600 capacity)



Fig 1; Conference room



Fig 2; Conference room

ROOMS & IN-ROOM FACILITIES

- 50 well-furnished guest rooms: Classic Deluxe, Royal Deluxe, Royal Executive, and Suites
- All rooms equipped with air-conditioning, satellite TV, mini-bar, safe, telephone, and free Wi-Fi
- Attached bathrooms with hot and cold running water, complimentary toiletries, and daily housekeeping.

CONSTRUCTION AND DESIGN FEATURES:

- Tiled sloping roofs and canopies to handle coastal rain and heat.
- Centralized layout: buildings arranged around common amenities like the pool and lawns.
- Multiple public amenities: discotheque, water park, spa, banquet hall, and pastry shop.
- Centralized layout: buildings arranged around common amenities like the pool and lawns.

LIGHTING & VENTILATION

NATURAL LIGHTING:

- Large windows and verandahs allow ample daylight into rooms, reducing the need for artificial lighting during the day.
- Courtyards and open corridors are strategically placed to enable light penetration in inner spaces.

ARTIFICIAL LIGHTING:

- Warm-toned lighting in common areas and guest rooms enhances comfort and hospitality.
- Emphasis on ambient lighting in the reception and lounge areas to create a welcoming mood.

VENTILATION DESIGN

PASSIVE VENTILATION:

- Cross-ventilation is achieved through opposite-facing windows and open corridors.
- Traditional courtyard planning encourages air movement within the building, especially in hot and humid climates like Diu.
- The architecture borrows from Portuguese and coastal Indian styles, which favor natural ventilation over air conditioning reliance.

MECHANICAL VENTILATION:

- Air conditioning is used in rooms and banquet halls; however, natural airflow reduces HVAC load, improving energy efficiency.
- Ceiling fans and ventilators support air circulation in semi-open spaces like balconies, dining pavilions, and lobbies.

SUSTAINABILITY METHODS:

- Low-rise bungalow layout reduces energy use (no elevators, less mechanical cooling).
- Courtyard and pool-centric planning promotes natural ventilation and passive cooling.
- Large windows and open balconies support daylighting and reduce reliance on artificial lighting.
- Use of Portuguese colonial design possibly includes locally available materials, minimizing transportation emissions and supporting local craftsmanship.

GUEST EXPERIENCES:

Smooth check-in/out

- ACTIVITIES: Swimming pool & Waterpark
- DINING: Local & global cuisine
- EVENTS: Indoor/outdoor venues for weddings & conferences

EVENTS:



Restaurant in The Kohinoor, Diu



The Kohinoor hotel waterpark, Diu

ENVIRONMENTAL AND CULTURAL INTEGRATION:

- Portuguese-inspired colonial architecture reflects Diu's historical and cultural identity (arches, balconies, pastel façades).
- Event spaces and banquet halls support local cultural events, weddings, and festivals.
- Central swimming pool and open spaces support passive cooling and social interaction
- Low-rise bungalow layout allows better air circulation and reduces energy demand (no elevators needed).

SWOT ANALYSIS:

STRENGTHS

- Portuguese colonial-style architecture creates a culturally rich and attractive ambiance.
- Large landscaped area (3.5 acres) with lush gardens, lawns, and open spaces for events.
- Multiple amenities: swimming pool, discotheque, water park, pastry shop, spa, and banquet hall.

WEAKNESSES

- AGING INFRASTRUCTURE: visible deterioration in bathrooms, rooms, and furnishings.
- POOR MAINTENANCE: broken fixtures, mold issues, and outdated interiors.

OPPORTUNITIES

- Renovation and modernization can revive the property and improve guest satisfaction.
- Sustainability upgrades like solar panels, rainwater harvesting, and waste management can attract eco-conscious travelers.

THREATS

- Strong competition from newer, better-maintained resorts like Azzaro or beachside properties.
- Coastal wear and tear from Diu's saline environment can accelerate property degradation.

CASE STUDY INSIGHTS:

- RESPONDING TO LOCAL CULTURE & CLIMATE: Designed in Portuguese colonial architectural style, with cream-hued façades, moldings, pilasters, trellises, balconies, and pillared porticoes—reflecting Diu's heritage and creating a strong sense of place.

- BUNGALOW TYPOLOGY: Built as single or low-rise bungalow clusters with individual balconies, encouraging privacy while maintaining visual openness around the pool core.
- This low-rise form helps reduce need for elevators, simplifies service circulation, and improves guest accessibility.

- LANDSCAPE & AMENITY INTEGRATION: Spread across 3.5 acres of lush gardens, lawns, and outdoor event spaces—making available not only accommodation, but recreation zones like lawns for 600-person gatherings, a discotheque, water-park, spa, pool, pastry shop, and conference rooms.

APPLICATION TO THESIS

- Emphasize cultural identity and environmental consciousness.
- Design multifunctional, user-friendly spaces.
- Adopt detailed sustainability frameworks in resort planning.

5.DESK APPRAISALS

5.1 DUSAI RESORT & SPA, BANGLADESH

About the site :-

Site Area: 55567.90 sq. m. OR 13.7 Acre.

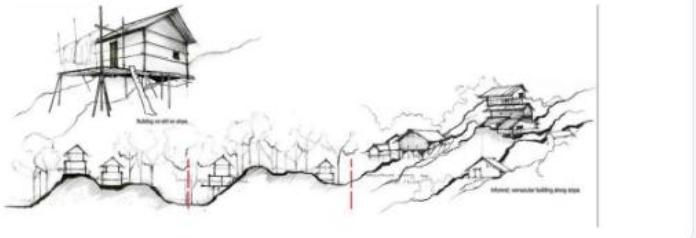
Total built up area of the Project: 11103.42 sq. m.

Dusai Resort & Spa is a destination resort equipped to serve more than 180 guests at a time with guest living facilities of 80 rooms, 3 restaurants, children's playground facilities, swimming pool, spa, convention hall etc . Guestrooms are nested on top of the hillocks while the services and walkways are placed in the valleys.



Existing spaces :-

- Reception Hall Wing
- Convention Centre and Motel Wing
- Main hotel
- 4 Suite Villas
- 5 Deluxe Villas.
- 2 Presidential Villas
- Spa
- 3 Thematic Restaurants
- Boat Station
- Gym
- Parking
- Drivers Dormitory
- Children's Play Are
- Swimming pool
- Guest Maid Dormit
- Mosque
- GM & Executive Quarters
- Staff Accommodation Bldg
- Existing Owners Bungalow
- Golf Lounge And Bar
- Utility Bldg

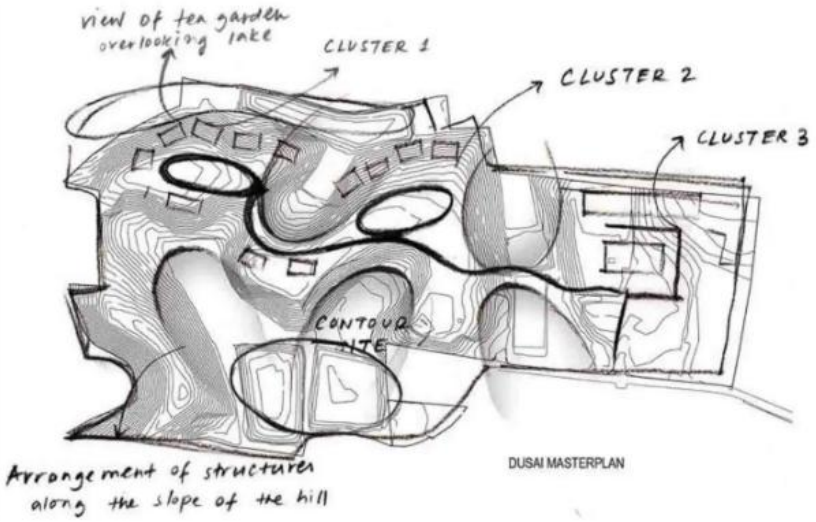




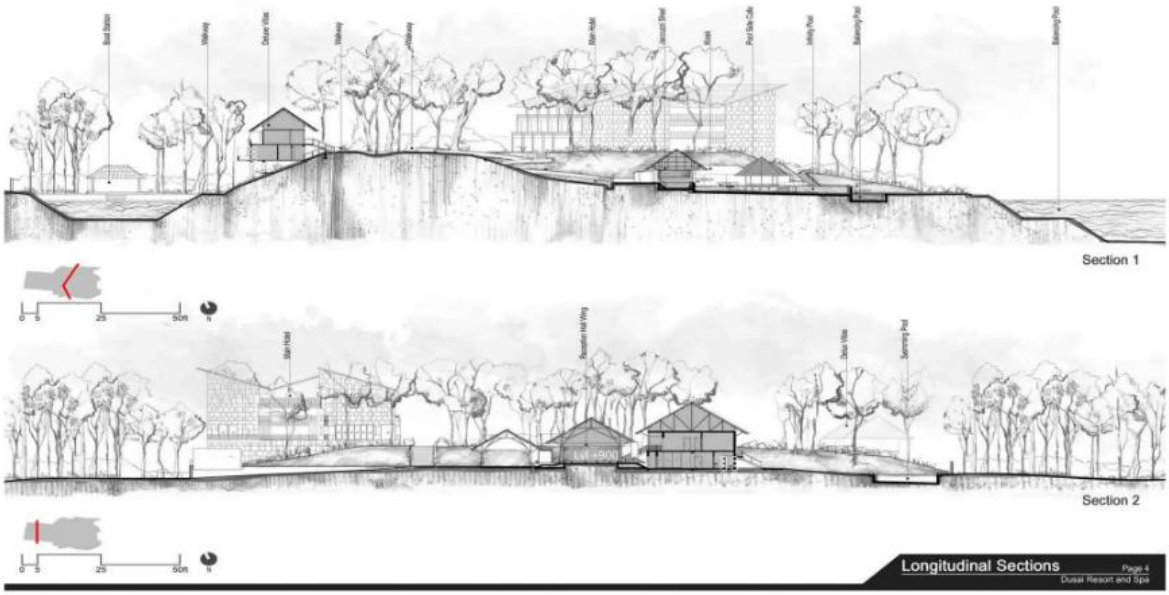
Design Approach :-

Building in Clusters:

- Vernacular architecture in Bangladesh features courtyards and clusters.
- In Dusai, overall planning follows this principal. Varying functions are grouped around courtyards forming clusters.
- Connections between the clusters are made through path ways that follow natural contour.



Site Section:-



Deluxe Villa and Spa Plan:-



Deluxe Villa and Spa Section:-

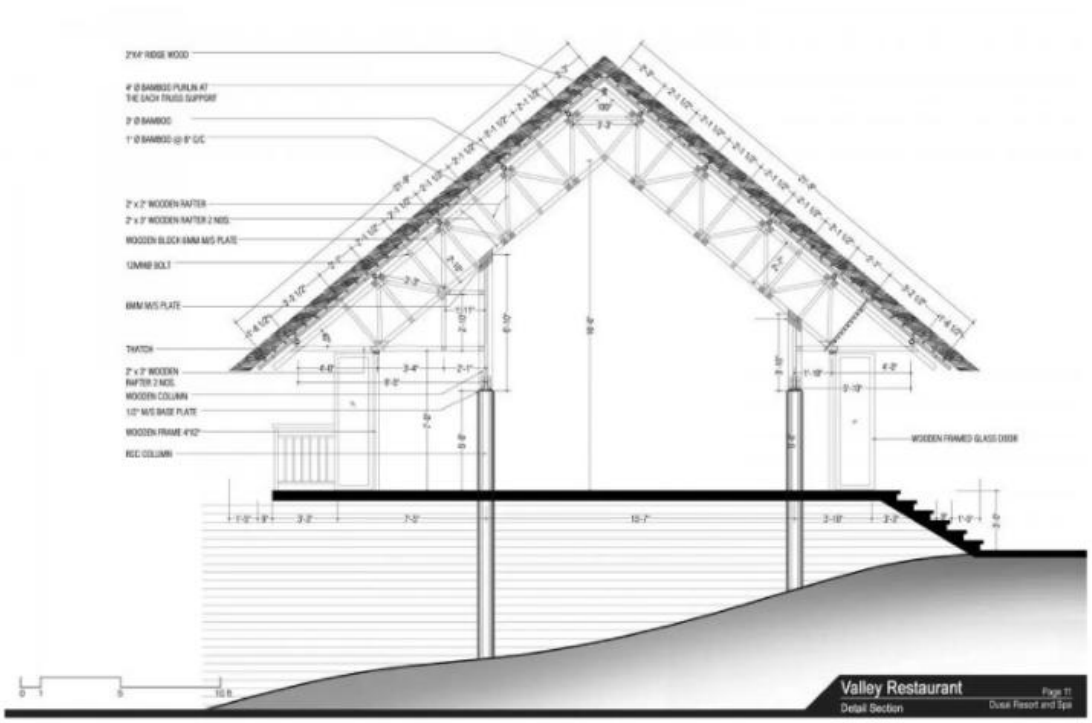


Main Hotel Plan:-



Tea Valley Restaurant Plan: & Elevation-





Materials

- Locally available materials
- Concrete structure infills are comprised of brick walls
- Outdoor facade rendered with fair face cement plaster and indoor facades comprises of regular cement mortar plaster rendered and painted.
- All floors are finished with homogenous matt finished tiles
- Villas have wooden floors.
- General ceilings are cement plastered and finished with paint
- Some parts are dry gypsum plaster finished.

- All the upper floors of the villas and the valley restaurant have exposed roof structure with bamboo & thatch roof ceiling.
- The hand rails grab bars and doors are made with locally acquired aged walnut colored solid wood.
- All out door surfaces are natural finish so that it blends well with the surrounding green nature.
- Pitch roofs are a mix of handmade mud tiles and thatch roof with high pitch varying 24-40 degree slope to withhold the heavy rain during monsoon.

INFERENCES

- Using naturally present landscape features.
- To give the main buildings a better view of the site features .
- Maintaining and preserving the existing landscape.
- Building on slopes
- Building in clusters to keep places accessible

5.2ANORA BEACH RESORT, CHENNAI ,TAMILNADU

Anora Beach Resort

•Location: Kovathur, Chennai, Tamil Nadu
•Year of Completion: October, 2015
•Plot Area: 1.91 acres
•Built-up Area: 2500 sq.m
•Architectural Firm: Webe Design Lab

Anora Beach resort, a 24 suite resort located in Kovathur, Chennai, between Mahabalipuram and Puducherry, India.







Site:

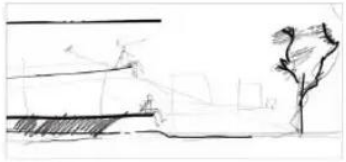


-The site is about 800 metres from the sea.

-The climate is usually hot and humid though the year.

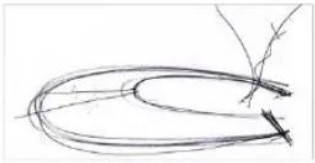
-Recreate the effect of an ocean view on Aland locked site.

-Apart from the suites, the requirement included a conference hall, restaurant and swimming pool.



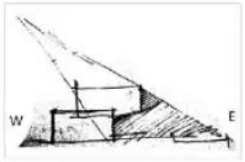
SKETCH 01

Initial sketch showing the decks of the suite room in the form of floating catamarans in the water



SKETCH 02

programs arranged in a radial geometry with the existing palm trees as a central focus



SKETCH 03

extended floor slabs to create shade for the decks through out the day









MASTER PLAN



LEGEND

1.entrance court
2.reception/lobby
3.services
4.wash rooms
5. swimming pool deck
6. swimming pool
7.suite room
8.toilet
9.open shower/Jacuzzi
10.deck
11.party lawn and the existing trees
12.restaurant
13.kitchen
14.waterbody
15.park
16.parking

ANORA BEACH RESORT 03
ECR,Chennai

SUITE MODULE



suite module- ground floor plan



suite module- first floor plan

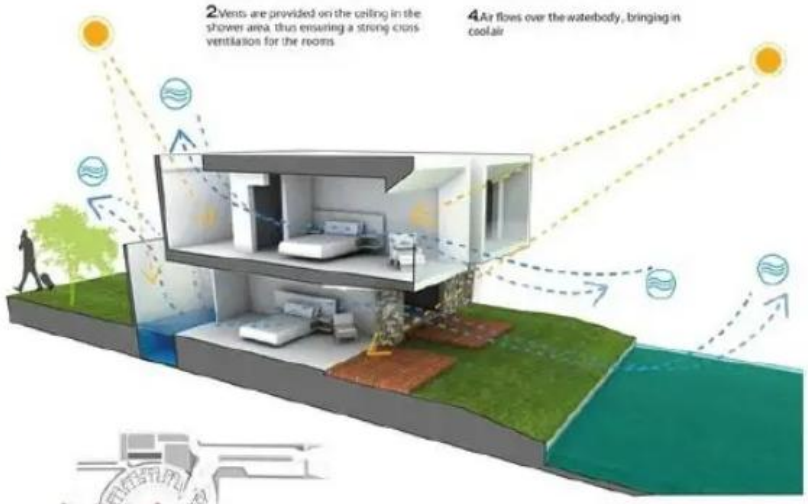
SUSTAINIBILITY

1.A buffer zone separates the main path-way from the individual suites, regulating the temperature of the breeze

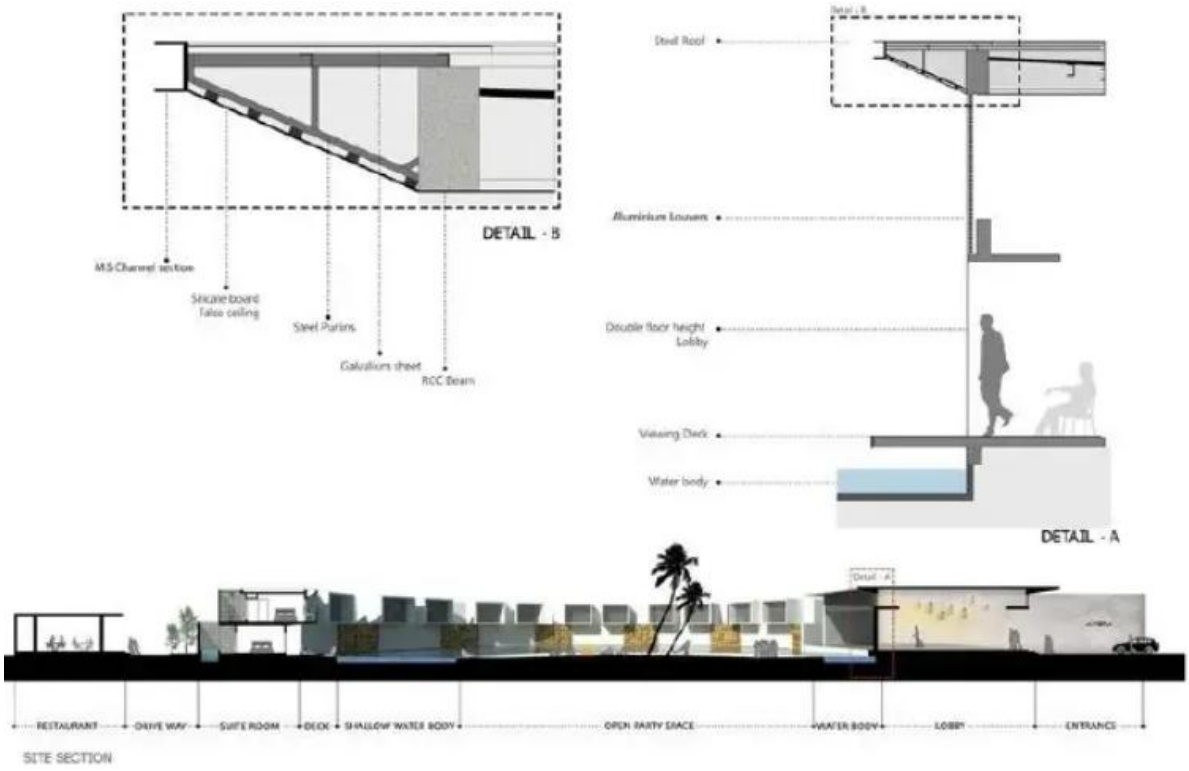
2.Vents are provided on the ceiling in the shower area, thus ensuring a strong cross ventilation for the rooms

3.Both the upper and lower room have large overhangs over the openings to protect the suites from the harsh sunlight

4.Air flows over the waterbody, bringing in cool air



keyplan



Aaranya Farmstay Resort

SITE:



Design Firm: d6thD design studio, Ahmedabad
Location :Bhojde village, Girlion sanctuary, Gujarat, India
Completion : January 2019
Client :Nishant, Dhanajl
Area : 502 m²
Consultants:Local community

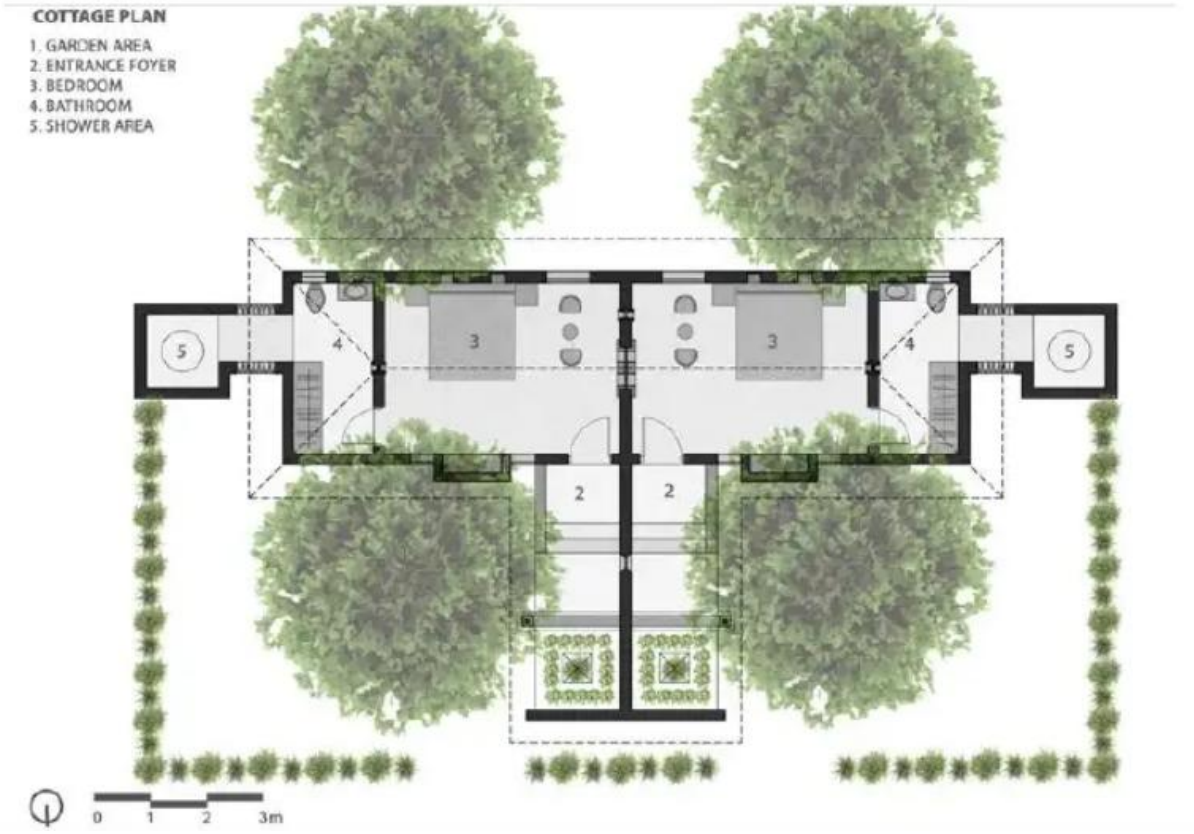




The cottages are planned to meander around the exsting mango trees so that it does not obstruct the existing site conditions.

COTTAGE PLAN

1. GARDEN AREA
2. ENTRANCE FOYER
3. BEDROOM
4. BATHROOM
5. SHOWER AREA



COTTAGE SECTION

1. SITTING SPACE
2. ENTRANCE FOYER
3. BEDROOM





The construction harks back to traditional techniques like sandstone arches and random rubble walls.



Local 'thin' brick columns and terracotta tlled roofs create a semi-open dining area.













5.3 INFERENCES

7. SPATIAL PLANNING & LAYOUT

INFERENCE FROM DUSAI RESORT & ANORA BEACH RESORT:

- Cluster-based planning works well in eco-sensitive, large sites.
- Keep built-up areas limited to ~30-35% to retain open feel.
- Create visual and functional separation between private cottages, public amenities, and service areas.
- Buffer zones (landscape, water bodies, mounds) enhance privacy between guest units

and public paths.

DESIGN ACTION FOR CHORWAD:

- Zone your site into heritage precinct, guest zones, public (restaurant, spa), and service areas.
- Use courtyards, decks, and water bodies to segregate spaces without built barriers.
- Locate spa/wellness zones away from restaurant or children's activity areas to ensure tranquility.

8. ARCHITECTURAL LANGUAGE & MATERIALS

INFERENCE FROM BOTH APPRAISALS:

- Use of local materials like laterite stone, terracotta, and lime plaster complements regional identity and requires less maintenance.
- Sloped roofs with overhangs, verandahs, and shaded colonnades create climate-responsive spaces.

DESIGN ACTION FOR CHORWAD:

- Use Kaand limestone and basalt masonry from the palace's existing palette.
- Employ lime plaster for indoor cooling and reduce VOCs.
- Restore the palace authentically and mirror its aesthetics in new construction using modern methods but traditional detailing.

9. CLIMATE RESPONSIVENESS

INFERENCE FROM BOTH CASE STUDIES:

- Courtyard-centric design provides natural cooling and a central gathering point.
- Orientation aligned with wind and sun paths improves thermal comfort.

DESIGN ACTION FOR CHORWAD:

- Orient main units **NE–SW** to catch sea breeze (SW) in summer.
- Incorporate **light shelves, jalis, skylights**, and pergolas.
- Design with **G+1 height restriction** and ensure sloped roofs to handle 1100 mm monsoon rain.

10. GUEST EXPERIENCE & PROGRAMMATIC ZONING

INFERENCE FROM BOTH RESORTS:

- A well-balanced mix of relaxation (spa, pool), recreation (indoor games), and culture (gallery or pavilion) heightens user experience.
- Cultural integration like local dance spaces, open-air dining, and handicraft shops enhance guest memory.

DESIGN ACTION FOR CHORWAD:

- Convert part of the palace into a gallery + heritage lounge.
- Design semi-open pavilions for coastal dining or yoga sessions with view of the sea.
- Integrate local crafts into furniture, lighting, or interior murals.

11. LANDSCAPE INTEGRATION

INFERENCE:

- Dense native planting (e.g., neem, casuarina) used as windbreaks.
- Natural landscape transitions with water bodies, sand mounds, and creepers for soft edges.

DESIGN ACTION FOR CHORWAD:

- Use beach morning glory, pandanus, coconut, and neem trees for edge planting.
- Avoid hard paved surfaces; opt for cobble/stone + grasscrete for pathways.
- Plan bioswales and gravel beds to manage monsoon runoff.

12. SUSTAINABILITY & ECO INFRASTRUCTURE

INFERENCE FROM ANORA BEACH RESORT:

- Rainwater harvesting, STPs, solar energy, and greywater reuse are integrated.
- Preference for low-rise structures, passive cooling, and local labor.

DESIGN ACTION FOR CHORWAD:

- Use solar panels, low-flow fixtures, and localized waste management units.
- Incorporate modular units for eco cottages using prefab materials that reduce coastal disruption.
- Design for energy independence and local economic benefit by involving local artisans and builders.

13. CAUTIONARY TAKEAWAYS

FROM AZZARO/KOHINOOR DIU REVIEWS:

- Inadequate maintenance and poor service can tarnish brand.
- Lack of accessibility (no lifts in multi-storey buildings) is a usability flaw.

DESIGN PRECAUTIONS:

- Ensure all public spaces are barrier-free and accessible.
- Emphasize easy maintenance and weather-resistant materials in high-humidity coastal climate.
- Use ramp access, anti-skid floors, and shaded connectors for universal design.

DESIGN RECOMMENDATIONS

DESIGN AREA	KEY INFERENCE-BASED DECISION
Zoning	Clear separation: heritage, guest, public, and services
Built Form	Courtyard layout, low-rise (G+1), vernacular material use
Orientation	SW-facing openings, shading on E/W, thermal mass walls
Landscape	Native flora, bioswales, shaded seating, transition buffers
Sustainability	Rainwater harvesting, solar panels, local materials/labor
User Experience	Integrate culture (dance pavilion, local art), scenic views
Heritage Integration	Palace as cultural hub: gallery + fine dining + museum

REFRENCES

file:///C:/Users/ASUS/Desktop/9th%20SEM/THESIS%20DOCUMENTS/TENDER%20DOCUMENT.pdf

244770-4324 Gujarat State Gazetteers Janagadh District (1975) Acc-no-6643.pdf

file:///C:/Users/ASUS/Desktop/9th%20SEM/THESIS%20DOCUMENTS/CRZ%20notification%202019.pdf

file:///C:/Users/ASUS/Desktop/9th%20SEM/THESIS%20DOCUMENTS/EIA-2006.pdf

Gujarat Tourism Policy.pdf

Heritage Conservation Guidelines.pdf

file:///C:/Users/ASUS/Desktop/9th%20SEM/THESIS%20DOCUMENTS/india-national-building-code-nbc-2016-vol-2%20(1).pdf

MOT Hotel_Guidelines_From 19-01-2018.pdf

https://www.slideshare.net/slideshow/case-study-resort-pptxxxxxxxxxxxxxxxxxxx/279383911?from_search=4

https://share.google/GtQCerbD0AYzazx2L