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3 Star Resort

Chorwad, Gujarat, India

Dec, 2025

3 STAR RESORT

Chorwad, Gujarat, India

BACHELOR OF ARCHITECTURE

BY

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DEPARTMENT OF ARCHITECTURE AND PLANNING

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL

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ARC 511 – Thesis Project

3 Star Resort

Chorwad, Gujarat, India

Submitted by:

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B. ARCH
9th Semester, 5th Year

UNDER THE GUIDANCE OF

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DEPARTMENT OF ARCHITECTURE AND PLANNING

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CANDIDATE DECLARATION

The Thesis Project in the subject ARC 511, entitled "**3 Star 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: 1st – 2nd Dec, 2025

Tanisha Gupta
211110237

RECOMMENDATION

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

Date: 1st – 2nd Dec, 2025

Dr. Alka Bharat
Thesis Guide

CERTIFICATION OF EXAMINATION

The Bachelor of Architecture Thesis Viva-Voce examination of Ms. Tanisha Gupta Scholar No.211110237, was held on 1/12/2025 to 2/12/25.

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ABSTRACT

The project focuses on the development of a 3-Star Beach Resort at Chorwad, Gujarat, located along the Arabian Sea in the Junagadh District. The site offers a unique blend of coastal heritage, scenic landscapes, and tourism potential, owing to the presence of the historic Chorwad Palace and its proximity to destinations such as Somnath and Gir National Park. The resort aims to redefine hospitality by integrating architecture with the natural coastal setting, enhancing the tourist experience while preserving the regional identity. Contextual planning, and environmentally responsive strategies form the foundation of the project. The proposal envisions a resort that promotes leisure, tourism, and economic growth in the region while maintaining harmony with the environment and local culture.

ACKNOWLEDGMENT

I would like to express my sincere appreciation for the support and encouragement I have received during the development of this project. This work has been made possible through the guidance and academic resources provided by the Department of Architecture and Planning, MANIT, Bhopal, which offered a constructive environment for research and design.

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CHAPTER 1

INTRODUCTION

OVERVIEW

Chorwad Palace, located along the Arabian Sea in Veraval, Gujarat, is a prominent historical landmark built in Indo-European style. Though once a summer retreat for royalty, the palace has suffered neglect over time. This project aims at the restoration and conservation of Chorwad Palace as a heritage and cultural core, while developing a sustainable coastal resort with newly designed cottages and amenities on the surrounding site. The integration of adaptive reuse, sustainable tourism, and traditional design principles will offer an immersive heritage-driven experience for visitors.

1.1 BACKGROUND

Heritage coastal buildings across India face threats from time, climate, and modern neglect. Chorwad Palace, with its regal past and seafront presence, offers unique potential for heritage-led tourism. However, its fragile condition and lack of adaptive programming limit its current usability.

In parallel, Gujarat's coastline, rich in biodiversity and tourism potential, lacks resort developments that sensitively combine heritage conservation with sustainable coastal hospitality. The palace and its adjoining land provide a valuable opportunity to restore built heritage while creating an eco-sensitive, culturally rich resort through newly designed cottages and public spaces.

1.2 PROBLEM STATEMENT

Despite Chorwad Palace's architectural significance and scenic coastal location, it remains underutilized and physically deteriorating. There is an absence of initiatives that combine historical preservation with eco-tourism in this region. Additionally, existing resorts near coastal zones often disregard local materials, heritage context, and environmental sustainability.

There is a need for a sensitive restoration plan for the palace alongside a climate-responsive, culturally integrated resort master plan that provides modern comfort without compromising heritage integrity or coastal ecology.

1.3 AIM & OBJECTIVES

Aim:

To restore Chorwad Palace as a heritage landmark and design a new eco-tourism resort through vernacular, sustainable architecture that supports cultural tourism and community development.

Objectives:

- Restore Chorwad Palace using traditional techniques and preserve architectural features.
- Design new resort cottages and facilities within the site respecting heritage and coastal climate.
- Use local materials and zero-kilometre philosophy for minimal carbon impact.
- Integrate passive design strategies for ventilation, thermal comfort, and shading.
- Include coastal protection measures and climate resilience in layout and landscape.
- Curate user experiences around heritage tours, local cuisine, wellness, and crafts.

1.4 SCOPE AND LIMITATIONS

Scope:

- Restoration of Chorwad Palace façade, interiors, and public areas.
- Site planning and design of independent resort cottages, spa, dining, and activity zones.
- Landscape design reflecting local ecology and heritage symbolism.
- Integration of rainwater harvesting, renewable energy, and solid waste systems.
- Creating a visitor loop combining history, leisure, and wellness experiences.

Limitations:

- Construction and budget constraints not included.
- Execution may depend on government approvals, coastal regulations (CRZ), and funding.
- Detailed financial feasibility and operations are beyond scope.

1.5 METHODOLOGY

- **Historical study:** Chorwad Palace (archives, gazetteers, material mapping).
- **Site analysis**: Wind, salt spray, sun path, topography, views, and coastal risks.
- **Literature review:** Literature review of resort design, adaptive reuse, and coastal construction.
- **Case studies:** heritage coastal resorts (Goa, Kerala, Neemrana).
- **User profiling:** for different tourist types (heritage, wellness).
- **Design development**: zoning, climate integration, spatial programming.
- **Sustainability strategy**: materials, energy systems, water, and waste design.

1.6 NEED FOR THE STUDY

- Chorwad Palace remains underrecognized and is degrading due to neglect.
- Gujarat lacks examples of restored palaces functioning as cultural tourism hubs.
- Growing demand for experiential resorts blending local culture with comfort.
- Opportunity to set a benchmark for integrating heritage with eco-tourism.

1.7 SIGNIFICANCE OF THE PROJECT

- Revives an important historical monument through architectural conservation.
- Establishes a model for sensitive resort development near coastal heritage sites.
- Encourages local employment and craft revival through on-site cultural programming.
- Showcases sustainable coastal planning adaptable to similar heritage contexts.
- Enhances regional identity and puts Chorwad back on the cultural tourism map.

CHAPTER 2

DESIGN BRIEF

OVERVIEW

3-Star Beach Resort at Chorwad, Gujarat, lies on the Arabian Sea and offers a unique coastal heritage setting characterized by the historic Chorwad Palace, a rocky shoreline, and stretches of open sandy beachfront. Its strategic location provides significant tourism potential, as it is surrounded by cultural and natural attractions, including the Somnath Temple and Gir National Park. The combination of heritage elements, natural beauty, and connectivity makes the site ideal for developing a sustainable and experiential beach resort which foster both relaxation and cultural exchange.

2.1 PROJECT DETAILS

- **Project Title:** Development of Resort at Chorwad, Gujarat
- **Proposing agency:** Tourism Corporation of Gujarat Limited (TGCL)
- **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 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:

2.2 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 signing of agreement.
- **Construction Period:** 24 months after securing all statutory clearances (which must be done within 12 months of signing).

2.3 TENDER DETAILS

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.

2.3.1 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

2.3.2 Regulatory Compliance

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

2.3.3 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.

2.3.4 Optional Development Provisions

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

2.3.5 Prohibited Development

- Any non-tourism development not permitted by Government of India / Gujarat

2.4 LIST OF SPACES & AREA PROGRAMMING

2.4.1 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

2.4.2 **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)

CHAPTER 3

LITERATURE REVIEW

OVERVIEW

This review examines literature on resort design, focusing on architectural principles, sustainability, guest experience, and cultural integration. It defines the research scope around functional design, eco-friendly practices, and luxury tourism. By analyzing journals, hospitality studies, and case studies, it establishes a conceptual framework to guide design decisions, ensuring alignment with current trends and best practices.

3.1 GUJARAT TOURISM / CRZ GUIDELINES FOR BEACH RESORT DEVELOPMENT

Requirement	Norm
Setback from HTL	≥ 200 m (or hazard line), no construction within LTL–HTL
Plot size	≥ 0.4 ha
Floor Space Index	≤ 0.33
Max height / Floors	≤ 9 m; up to 2 floors
Groundwater use	Forbidden within 200 m; permitted 200–500 m w/ NOC
Sand work	No extraction/leveling within 500 m
Waste management	Must meet standards; no discharge to beach
Public access	≥ 20 m gap between properties; min 500 m spacing
Sensitive areas	Construction prohibited
Approvals	GCZMA clearance; Tourism Dept approval; Forest Act if needed

Setback and Development Zone

No construction allowed within 200 m landward from the High Tide Line (HTL) or between the Low Tide Line and HTL.

Plot & Built-Up Limits

- Minimum plot size must be ≥ 0.4 ha (~4,000 m²).
- Floor Space Index (FSI) max = 0.33; total covered area on all floors ≤ 33% of the plot. Open spaces must be landscaped with vegetation.

Height & Floors

Maximum height: up to 9 m to roof ridge, with no more than two floors (ground + one upper)

Architecture & Environment

- Design should mesh with the surrounding landscape and local architectural style.
- No flattening of sand dunes.
- Live fences or barbed wire fencing with plants may be allowed, provided no obstruction to public beach access.

Groundwater & Sand Extraction

- No groundwater tapping within 200 m of HTL. Between 200–500 m zone, tapping only with approval of the State/Central Ground Water Authority.
- No sand extraction, levelling, or digging on sandy stretches (except structural foundations or a pool) within 500 m of HTL .

Waste & Pollution Control

- Must meet applicable effluent, solid waste, emissions, and noise standards.
- No untreated effluents or solids discharged into waters or on the beach. Treatment systems are mandatory.

Public Access & Spacing

Maintain at least 20 m wide public access gap between any two resorts or hotels, and ensure minimum spacing of 500 m between properties.

3.2 EXISTING GUIDELINES FOR 3-STAR PROVISION OF HOTELS IN INDIA

BEDROOM SIZE REQUIREMENTS

The minimum bedroom sizes (excluding bathroom) for each star category are as follows:

- 3-Star Hotels: Minimum of 130 sq. ft.
- For single occupancy rooms, the size may be a minimum of 90 sq. ft.

LIFT REQUIREMENTS

Hotels are required to provide **2+ hour fire-rated lifts** if their building height exceeds:

- Ground floor + two additional floors
- This is a necessary (N) requirement for all star categories (1-Star to 5-Star Deluxe)

Note: If the design is G+1 or G+2, providing a lift is optional but still strongly recommended for accessibility.

ACCESSIBILITY PROVISIONS

Dedicated Accessible Rooms

Hotels must provide at least one room specifically designed for differently abled guests. The room should include:

- Suitable low-height furniture
- Low peephole and clothes hangers
- Audible and visual (blinking light) alarm system
- Accessible bathroom with proper fittings

Ramps and Access

- Ramps with anti-slip surfaces must be provided at entrances.
- Minimum door width: 1 meter to ensure wheelchair access.
- Free accessibility must be ensured in all public areas and at least one restaurant in 5-Star and 5-Star Deluxe hotels.

Accessible Public Restrooms

- Must include a minimum door width of 1 meter
- Must be wheelchair accessible
- Include a low-height urinal (maximum 24”) with grab bars

SAFETY AND FIRE PRECAUTIONS

Fire Exit Signage

- **Fire exit signs** must be installed on all guest floors
- Must be **connected to emergency or backup power**
- This is a **necessary (N)** requirement

Smoke Detectors

- Smoke detectors must be installed in all rooms
- Can be battery-operated

Fire and Emergency Notices

- Fire safety instructions and emergency procedures must be displayed behind the room door

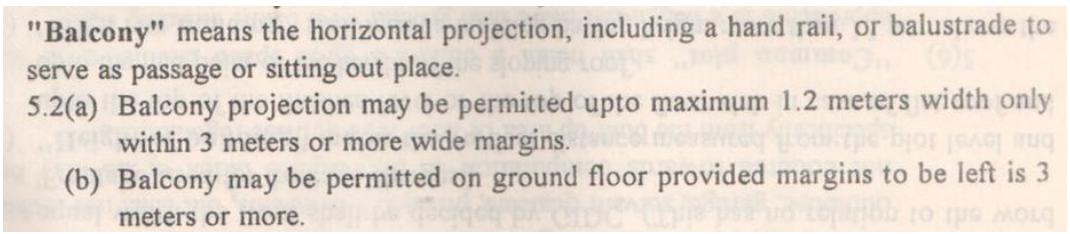
Window and curtain requirements

- All guest room windows must have opaque curtains or screening
- Blackout curtains are mandatory in 4-Star, 5-Star, and 5-Star Deluxe hotels

Water supply

- Hotels must provide hot and cold running water, available 24 hours a day

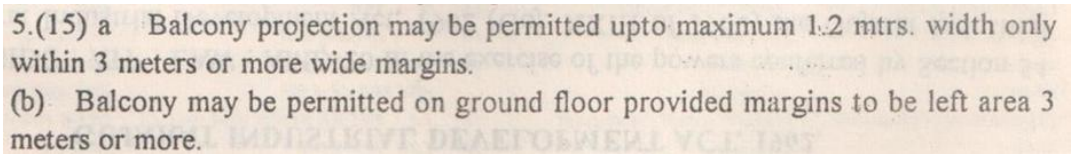
BALCONY



"**Balcony**" means the horizontal projection, including a hand rail, or balustrade to serve as passage or sitting out place.

5.2(a) Balcony projection may be permitted upto maximum 1.2 meters width only within 3 meters or more wide margins.

(b) Balcony may be permitted on ground floor provided margins to be left is 3 meters or more.



5.(15) a Balcony projection may be permitted upto maximum 1.2 mtrs. width only within 3 meters or more wide margins.

(b) Balcony may be permitted on ground floor provided margins to be left area 3 meters or more.

PLINTH

The plinth height should not be less than 45cm.

WIDTH OF LAY OUT ROAD

For Industrial and commercial Development :

Road length	Width of roads
Up to 150 mtrs.	9.0 mtrs.
Above 150 mtrs. & uptot 300 mtrs.	12.0 mtrs.
Above 300 mtrs. & upto 1000 mtrs.	14.0 mtrs.
Above 1000 mtrs.	20.0 mtrs.

6(2) The shape of the plot, the junction of the roads curves at the corners shall be designed as directed by GIDC.

6(3) In case of Termination of internal road or roads. 13.5 mtr. diameter turning circle or 12 mtrs. turning T shal be enfored.

6(4) There shall be minimum 4.5 mtr. distance between two detached structures open to sky in caso of residential and industrial development and 6 mtr. cleart distance between two detached structure. open to sky in case of commercial development.

FLOOR SPACE INDEX (FSI)

9(1) For residetial and industrial development, the maximum permissible floor space index (FSI) of a building unit shall be 1.6 for law rise building. Maximum built up area on any floor for law rise building shall be 50% of the area of building unit for industrial and 40% for residential and commercial purpose. For commercial development, the maximum permissible floor space index for low rise buiding shall be 1.6.

9(2) Height of Building :- The maximum height shall not be more than 13. mtrs, for building with solid plinth and 15 mtrs. for building on stilts clear from the plot level to the top of the building. In case of building for mdustrial purpose, height of more than 13 meters may be permitted of required for industrial purpose and approved by Factory Inspector.

ROAD SIDE MARGINS

Marginal distance between two detached structures

For residential development	4.5 mtr.
For industrial development	4.5 mtr.
For commercial development	6.0 mtr.

TREE PLANTATION

(i) Building unit having 1000 sq. mtrs. and more area at the rate of 3 trees for every 200 sq. mtrs. of building unit, for all uses, shall have to be planted on the site plan/layout plan and also has to be maintained the same.

COASTAL ZONE MANAGEMENT PLAN

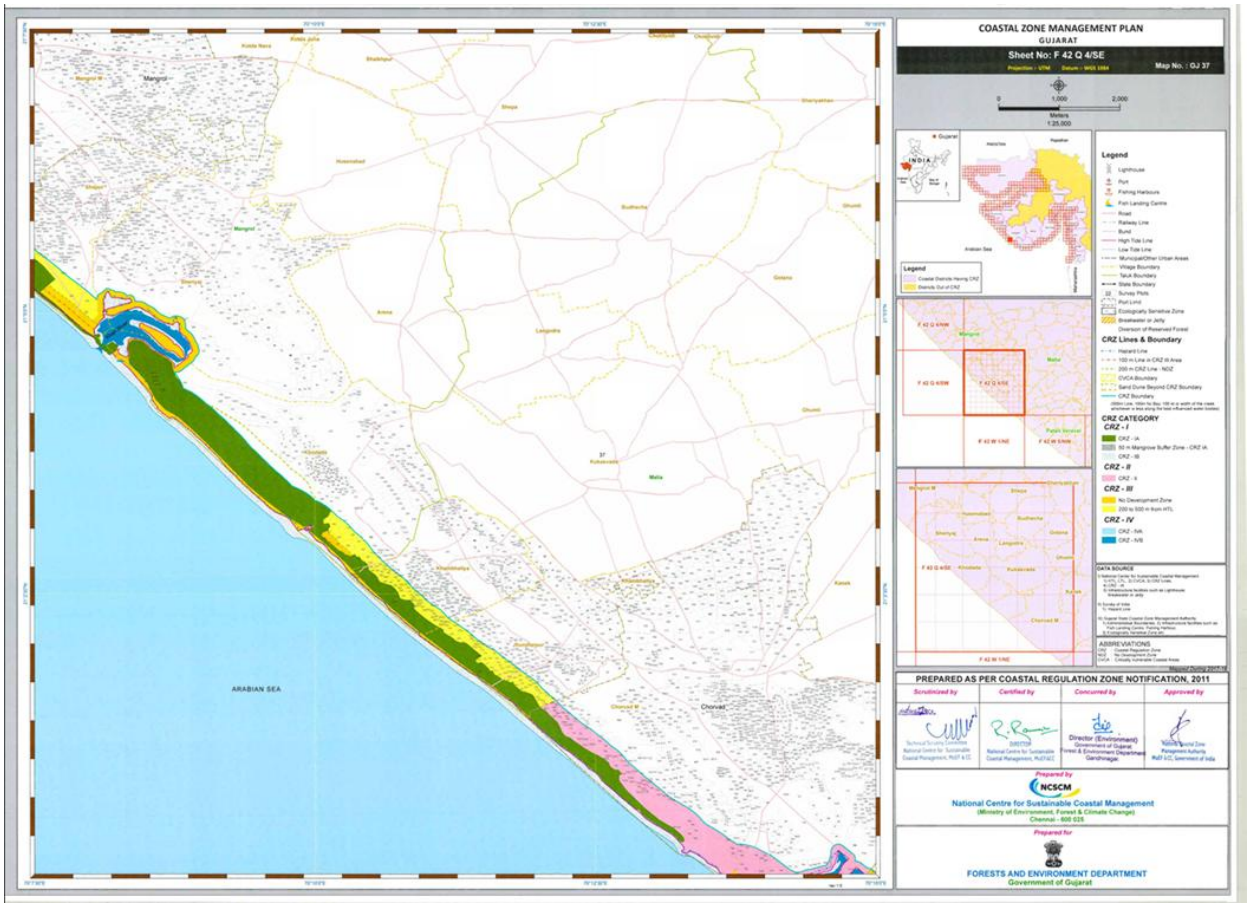


Figure 1 CMZ management plan

Category-II (CRZ-II) :

The areas that have already been developed upto or close to the shore-line. For this purpose, "developed area" is referred to as that area within the municipal limits or in other legally designated urban areas which is already substantially built up and which has been provided with drainage and approach roads and other infrastructural facilities, such as water supply and sewerage mains.

CRZ-II

(i) Buildings shall be permitted neither on the seaward side of the existing road (or roads proposed in the approved Coastal Zone Management Plan of the area) nor on seaward side of existing authorised structures. Buildings permitted on the landward side of the existing and proposed roads/existing authorised structures shall be subject to the existing local Town and Country Planning Regulations including the existing norms of FSI/FAR.

(ii) Reconstruction of the authorised buildings to be permitted subject with the existing FSI/FAR norms and without change in the existing use.

(iii) The design and construction of buildings shall be consistent with the surrounding landscape and local architectural style.

COMPOUND WALL

22(1) Compound Wall : The height of compound wall shall not exceed 2 mtrs. from road level and where height exceeding the above is provided spacial approval of Managing Director GIDC shall be obtained.

HEIGHT OF FLOOR

17(1) The minimum height of floors in a building measured from floor finish to bottom of the lowest structural member at any point shall be 2.8 mtrs. for residential development and 3 mtrs. for commercial development.

17(2) For dining space, verandah, bath room, corridor, puja room, coal room, passage, stair cabin and pump room the minimum height shall be 2 mtrs.

17(3) The maximum floor height shall not exceed 3.6 mtr.s for residential development, 4 mtrs. for industrial development and 3.60 mtrs. for commercial development. Also refer section 22. But this limit on height may be relaxed for industrial structures if required by industrial process subject to the fire fighting provision being made as per national building code in 17(4) the loft at a minimum height of 2 mtrs. not exceeding 1/ 4th of the area of room may be allowed in any room in residential development. In

PARKING

	Type of Use	Parking space required	Remarks.
2.	Cinema theater, Public assembly hall, auditorium, stadium etc.	1 sq.mtr. per seat.	50% of the total parking space requirements shall be reserved for cars.
3.	Commercial and business establishments including business office, bank, hostel, guest house, restaurant, institutional building and health facilities including hospital and nursing homes etc.	30% of maximum permissible FSI. Note: l) The parking space so required shall be provided excluding required marginal space and built up area with solid plinth subject to other regulation, 2)20% of the parking space required at the ground level shall be exclusively earmarked for visitors.	50% of the total parking space requirements shall be reserved for cars.
4.	Community buildings such as community hall/marriage hall/community wadi/recreational club/and religious building, party not, club house etc.	50% of Building Unit.	50% of the total parking space requirements shall be reserved for cars.

Parking reserved to the visitors shall be provided on ground level only.

21(2) The parking layout shall fulfill the following conditions, namely:-

(i) The minimum width of access to the street from parking space shall be 3.0 meters.

(ii) The car parking space shall have two independent accesses leading to street if its area capacity excees 300 sq.mtrs.

(iii) If the parking space is not provide at street level, the gradient of ram pleading to parking space shall not be more than 1 meter over a horizontal distance of 7 meters.

(iv) Clear heading of 2.8 mts shall be provided on every access leading to parking space and at any point in parking

STAIR, LOBBIES & CORRIDORS

In case residential commercial and in public building the width of lobbies or crorridors in a building unit shall be as under.

(i) Minimum clear width corridors shall be 1 mtr. up to 3 mtr. length and for every additional length of 3 mtrs or part thereof, the width of corridors shall be increased by 15 cms. and upto a maximum of 2.5 mtrs.

(ii) The clear width of common stair shall not be less than 1.2 mtrs. Stair case upto 0.9 mtr. minimum width may be permited in single occupational residential bunglow/ apartment.

(iii) Minimum Stair width for more than six units tenaments on each floor shall be 1.5 mtrs.

(iv) The stair case shall be so located that it shall he within accessible distance of not more than 15 mtr. from any entrance of unit.

(v) Cantilever staircase of width upto 0.9 meters may be permitted in minimum 3 meters width margins in residential building.

VENTILATION

20(1) Every room in residential building should be constructed such that the same shall have for the purpose of ventilation.

A window or windows and/or ventilators clear of such frames, opening directly into an interior or exterior open air space or into an open verandah or gallery abutting on such open air spaces having an opening of not less than 1/10th of floor area of the room or an aggregate opening of door opening on outside open space. windows and ventilations of not less than 1/7th of the floor area of the room or kitchen.

RAINWATER HARVESTING SYSTEM

Percolating well and Rainwater Harvesting System:

For the area of building unit above 500 sq.mtr. and up to 1500 sq.mtr., the owner/developer shall carryout water harvesting system as specified by the authority.

In case where the area of building unit exceeds 1500 sq.mtr. and upto 4000 sq.mtr. owner/developer has to provide/construct percolating well with rain water harvesting system in building unit and at the rate of one percolating well for every 4000 sq.mtr. or part thereof building unit.

(I) Conservation and Harvesting of Rain Water in Building:

Having Plinth built up area of 750 sq. mtrs. or more, every such building shall be provided with required facilities and infrastructure for conservation and harvesting of rain water viz;

(ii) Percolation Pits:

The ground surface around the building shall have percolation pit or bore as recommended by competent authority within the building site, or bore recharge. Such pits shall be filled with small pebbles or brick jelly or river sand and covered with perforated concrete slabs.

(iii) Terrace Water Collection:

The terrace may be connected to a sump or well bore through a filtering tank by PVC pipe as recommended by Competent Authority. A valve system shall be incorporated to enable the first part of the rain water collected to be discharged out to the solid if it is dirty.

(iv) Open ground:

(i) whenever there is open ground a portion of top solid should be removed and replaced with river sand to allow slow percolation of rain water.

(ii) Any other methods proved to be effective in conservation and harvesting of rain water may be adopted in each and every construction taken up.

GENERAL DEVELOPMENT CONTROL REGULATIONS

PLINTH:

Buildings are permitted to have a hollow plinth at the ground level, with a maximum clear height of 3.5 metres and a minimum of 0.30 metres from the finished ground level to the finished first floor level.

CLEARANCE HEIGHT:

- All habitable spaces must have a minimum height of 2.9 metres between finished floor levels.
- Circulation and service spaces (e.g., verandahs, bathrooms, passages, stair cabins, store rooms) must have a minimum clear height of 2.1 metres.
- Basements used exclusively for parking must maintain a minimum clear height of 2.8 metres and a maximum of 4.5 metres, though greater height may be allowed for mechanical parking systems.
- Hollow plinths for parking must have a maximum clear height of 3.5 metres.

MEZZANINE AND LOFT:

- Mezzanine floors are permitted with a minimum clear height of 2.1 metres and an area not exceeding 30% of the enclosed space. Lofts, with a maximum height of 1.2 metres, are also permitted under similar conditions.

RAMPS:

- Vehicular Ramps: For cars, a minimum ramp width of 3.0 metres and a minimum inner curve radius of 3.0 metres are specified. For trucks, these are 6.0 metres and 4.0 metres respectively. The maximum slope of any ramp is 1:7. A level platform of at least 4.5 metres in length is required at the end of ramps at ground and basement levels. A minimum clear height of 2.6 metres must be maintained throughout.

STAIRCASES:

- The dimensions (minimum flight width, tread, and riser) for staircases depend on the building's use and height. Escape routes leading to basements must have the same width as those used for exit and adhere to Fire Prevention and Life Safety Measure Regulations–2016.

RAILINGS:

- A parapet/railing of at least 1.15 metres in height from the finished floor level is required at all accessible edges, such as roof edges, staircases, terraces, and balconies.

PAVING:

- A minimum of 50% of the total open space (including marginal open spaces and common plots) in a building unit can be paved, with the remainder designed for rainwater recharge.

ACCESS PATH:

- The access path from the building unit entry to the building entry or plinth must have a minimum width of 1.8 metres with one user curve. For people with disability, the ramped path must incorporate guiding tiles and materials (conspicuously different in colour, material, or brightness to adjoining ground surfaces) and have a non-slip surface traverseable by a wheelchair user.

DOOR REQUIREMENTS:

- For internal doors of non-detached/semi-detached dwellings, at least one entrance must be accessible by people with a disability. The clear opening of the entrance door must be 900mm, with a level difference at the threshold not exceeding 12mm. Door handles and locks should be located between 900–1000mm above the floor.

VENTILATION:

- All habitable rooms require adequate ventilation from open or semi-open spaces (minimum 1/10th of the floor area), with aggregate openings of at least 1/7th of the room's floor area. Windows should compensate for any deficiency. Basements and all bathrooms/water closets also require adequate ventilation.

AIR-CONDITIONING:

- Air-conditioning in common areas like lobby, restaurants and verandahs, particularly those open to nature, may not be mandatory for nature-oriented hotels and resorts.

PARKING

PARKING STANDARDS AND REQUIREMENTS

Cars:

- Minimum Dimension: Each car parking space must have a minimum dimension of 2.5 metres × 5.0 metres.
- Access/Exit Lanes: Parking spaces should be connected to the street via an access/exit lane. The minimum width for a single-sided parking lane is 3 metres, while for double-sided parking, it is 6.6 metres.

Two-Wheelers:

- Minimum Dimension: Each two-wheeler parking space must have a minimum dimension of 0.90 metres × 2.0 metres.
- Access/Exit Lanes: The minimum width of the access/exit lane connecting to the street is 2.0 metres.
- Clear Height: A minimum clear height of 2.6 metres must be maintained at all points.

Trucks:

- Minimum Dimension: When truck parking is required, each space must have a minimum dimension of 4.0 metres × 10.0 metres.
- Access/Exit Lanes: The minimum width of the access/exit lane is 6.0 metres.

Parking for People with Disability:

- Mandatory Requirement: Parking for people with disability is required for all buildings, societies except detached and semi-detached dwelling units.

- Number of Spaces: A minimum of two accessible car parking spaces must be provided for every 25 car parking spaces or less.
- Bay and Transfer Lane: The space must have a minimum bay width of 3.6 metres to the side transfer lane, which can be shared by two successive parking bays.
- Location: Accessible parking bays must be located within 30 metres from the main building entrance.

Basement Parking:

- Basement: Basements can be exclusively used for parking. They must have a minimum clear height of 2.8 metres and a maximum of 4.5 metres, though greater height may be allowed for mechanical parking systems. If a basement is used for utilities or services, it must meet all relevant building code standards.
- Public and Private Garages: The regulations define both private garages (for parking) and public garages (operated for gain, for repairing, servicing, hiring, selling, or exhibiting vehicles).

Mixed Development:

- Mixed Development: In mixed-use developments, loading and unloading spaces are required as part of the application process.
    a) One space of 3.5 metres × 7.5 metres must be provided for every 1000 sq m of carpet area or part thereof.
    b) Ramp Widths: Ramps leading to loading and unloading spaces must have a minimum width of 6.0 metres and can also be used for general parking access.
    c) Location: These spaces are permitted on the ground level or in the first basement and are considered part of the overall parking area.

Environmental Management:

- Rainwater Harvesting: Mandatory for all buildings with ground coverage of 80 sq.mt and above, with specific systems (percolation pit/bore recharge or percolating well) depending on the building unit area.
- Greywater Recycling: Mandatory for "Hospitality: Hotels, Lodges, Guest houses" with a built-up area exceeding 10,000 sq.mt. This includes provisions for a recycling plant, separate plumbing, and the use of treated water for non-potable purposes (e.g., toilet flushing, gardening). The recycled water quality must conform to non-potable standards and be tested every six months.
- Solar Water Heating System: Mandatory for "Hospitality: Hotels, Lodges, Guest houses" with a built-up area exceeding 2,000 sq.mt.
- Tree Plantation: Building units larger than 100 sq.mt must provide a minimum of three trees for every 200 sq.mt area or part thereof. Trees should be shade-giving and must not obstruct fire fighting vehicles. A tree plantation deposit may be required

3.3 INDIAN NATIONAL TRUST FOR ART AND CULTURAL HERITAGE (INTACH)

CONSERVATION OBJECTIVES

Adaptive Reuse

The re-use of historic buildings and neighbourhoods is economically sensible. It is an effective strategy to conserve architectural heritage, particularly by using traditional craftspeople in the process. Such re-use distinguishes between preservation as an ideal on the one hand and, on the other, the goal to prolong the useful life of architectural heritage by retaining as much (and not necessarily, all) of the surviving evidence as a vestigial presence.

Priority must be accorded to retaining the continuity of original functions. Any new use must be introduced only after studying its effect on the local context and must conform to the carrying capacity and vulnerability of the architectural heritage. All changes to the original fabric should be preceded and followed by comprehensive documentation. Additions and alterations must respect the coherence of the whole, and must, to the extent possible, engage traditional materials, skills and knowledge in the process.

When it becomes necessary to modernise and comprehensively alter the original internal functional characteristics of the building or site, its external image must be retained. At the outset, the local community must be made aware of the changes envisaged and explained the benefits to be derived.

Restoration/ Replication/ Rebuilding

Restoration is an appropriate conservation strategy to reinstate the integrity or complete the fractured 'whole' of the architectural heritage/ site. It must aim to convey the meaning of the heritage in the most effective manner. It may include reassembling of displaced and dismembered components of the structure and conjectural building or replacement of missing or severely deteriorated parts of the fabric. Invariably, restoration work must be preceded and followed by comprehensive documentation in order to base interventions on informed understanding of the resource and its context, and in conformity with contemporary practices of local craftspeople.

In consonance with traditional ideals, replication can be accepted as an appropriate strategy not only to conserve unprotected historic buildings, but especially if such replication encourages historic ways of building.

At the urban level, the objective of rebuilding historic structures should be to enhance the visual and experiential quality of the built environment, thereby providing a local distinctiveness to contest the homogenising influence of globalisation.

In addition, reconstruction/ rebuilding can provide the impetus to develop a parallel market for local buildings materials and new opportunities for the use of alternative systems of building.

Reconstruction based on minimal physical evidence is appropriate where it is supported by the knowledge of local craftspeople, including folklore, beliefs, myths and legends, rituals, customs, oral

traditions, etc. The objective of this practice must be to interpret the original meanings of the resource in the contemporary context and reinforce its bond with society.

Employment generation

Conservation strategy must focus on the potential for employing local raj mistris, labour and materials because this will prolong the economic viability of traditional ways of building. In conditions of resource scarcity, the use of architectural heritage can provide an alternate and more economic strategy to meet contemporary needs as well.

Local material and traditional technology

The use of local materials and traditional technologies must invariably be preferred. Their choice must be based on the availability of traditional knowledge systems. Modern substitutes should be considered only after their use is proven efficient and judicious and must not compromise the integrity and continuity of local building traditions.

It is necessary to recognise that the use of certain traditional building materials may be inadvisable on account of the damage this can cause to the natural ecological systems. Thus, the use of shell lime in coastal areas and wood generally may need to be judicially substituted with alternate materials.

Integrated conservation

Conservation of architectural heritage and sites must be integrated with the social and economic aspirations of society. Conservation-oriented development must be the preferred strategy for social and economic progress. This necessitates the formation of multi-disciplinary teams to undertake integrated conservation projects. Since social aspirations are diverse and often at odds with each other, the conservation team must include social workers to facilitate dialogue and decision-making.

Sustainability

The objective of conservation should be to sustain the building and/or the traditional skill and knowledge system of building. In this context, continuity must be seen as evolving over time. The test of its validity must be the positive contribution it makes to the quality of life of the local community.

Selection criteria

Although interrelated, the following three key attributes will determine whether a property is worthy of listing:

- Historic significance
- Historic integrity
- Historic context

One or more of these attributes need to be present in a building to make it worthy of listing.

Historic significance

Historic significance refers to the importance of a property to the history, architecture, archaeology, engineering or culture of a community, region or nation. In selecting a building, particular attention should be paid to the following:

- Association with events, activities or patterns.
- Association with important persons, including ordinary people who have made significant contribution to India's living heritage.
- Distinctive physical characteristics of design, construction or form, representing the work of a master craftsperson.
- Potential to yield important information, such as socio-economic history. Railway stations, town halls, clubs, markets, water works etc. are examples of such sites
- Technological innovation represented. For example: dams, bridges, etc.
- Town planning features such as squares, streets, avenues, etc. For example: Rajpath in New Delhi.

Historic integrity

Historic integrity refers to the property's historic identity, evidenced by the survival of physical characteristics and significant elements that existed during the property's historic period. The "original" identity includes changes and additions over historic time.

Historic integrity enables a property to illustrate significant aspects of its past. Not only must a property resemble its historic appearance, but it must also retain original materials, design features and aspects of construction dating from the period when it attained significance.

Historic integrity also relates to intangible values such as the building or site's cultural associations and traditions.

Historic context

Historic context refers to information about historic trends and properties grouped by an important theme in the history of a community, region or nation during a particular period of time.

Knowledge of historic context enables the public to understand a historic property as a product of its time.

Precincts or properties with multiple owners

A historic building complex may comprise of numerous ancillary structures besides the main

structure. Each structure of the complex must be documented on individual proformas. For example, Jahangir Mahal, Diwan-i-Aam, Diwan-i-Khas and Moti Masjid all form part of the Agra Fort complex but are also individual buildings in their own right and, as such, must be documented individually.

Methodology

The determination of significance is the key component of methodology. All conservation decisions follow from the level of significance that is assigned to a building or site.

Listing work is comprised of two phases:

- Background research
- Field work

Background research

Before commencing actual fieldwork, the lister should gather basic information from various sources including gazetteers, travel books and other specialised books containing information about the architecture and history of the area to be listed and documented. This work could be done in university libraries, the ASI, the National Museum, the Central Secretariat, the respective State Secretariats, Institutes of Advanced Studies and Schools of Planning andArchitecture. In a given area, local experts and university scholars are resource persons who could also provide required guidance and help.

Background research helps to ensure that no important structure or representative style of building is left out of the list. It enables the identification of historic areas, historic development of the area, significant events in the area and important persons associated with the area. In some well-documented areas, distinctive physical characteristics of design, construction or form of building resource can also be identified.

Field work

First and foremost it is necessary to carry out a field survey to identify the buildings and the areas to be listed. Following this, a detailed physical inspection of the property and dialogues with appropriate local people such as the owners of the property, area residents, local panchayats, etc. need to be undertaken. By physically inspecting the property the lister can gather information regarding the physical fabric of the building, such as physical characteristics, period of construction, etc. that need to be cross-checked with the literature survey. By conducting a dialogue with area residents, the lister can determine the changes to the property over time, ownership details, historic function and activities, association with events and persons and the role of the property in local, regional or national history.

When gathering information, the lister must be mindful of proforma requirements (Article 5.12). The proforma is, first of all, a record of the property at the time of listing and consists of current name; historic or other name(s), location, approach and accessibility, current ownership, historic usage, and present use.

Claims of historic significance and integrity should be supported with descriptions of special features, state of preservation, relevant dates, etc.

Mapping of vernacular architecture and historic settlements

The major shortcoming of the current list of legally protected architectural heritage is that it does not recognise vernacular architecture and historic settlements as categories of heritage worthy of being conserved. The listing of unprotected architectural heritage and sites must, therefore, include this category. An example of such an inclusive document is INTACH's "Listing of Built Heritage of Delhi" published in 1999.

Sacred sites must be dealt with due sensitivity and knowledge of the local social and cultural imperatives governing their sanctity. Listing must record such characteristics associated with these sites.

Detailed format for all the structures

Information for each building or site should be recorded as per INTACH's standard format as described below.

- Each proforma must contain information about listers and reviewers. Listing must be carried out by or under the supervision of experienced conservation architects.
- At least one photograph of the property/ building should be recorded for identification purposes. All significant elements of the property also need to be photographed. All photographs should be properly catalogued.
- A conceptual plan (if available, a measured drawing) should be given for each building/ area listed.
- Any additional information related to or affecting the built heritage of the city/town/region documented and its conservation should be included as appendices, for example: laws and regulations on planning and conservation, etc.
- A glossary should be provided explaining the technical and the special words used must be provided. For example: "Imambara - a shrine/ religious structure of Shia Muslims".
- A bibliography of all books, publications, articles and unpublished work must be provided. The uniform format should be followed throughout.

Grading

The primary objective of listing is to record extant architectural heritage and sites. But the outcome of this process should invariably be to grade the listed heritage into a hierarchical series. This process must be undertaken in a rigorous and transparent manner by a multi-disciplinary team of experts whose recommendations should be available for public scrutiny. The importance of this process cannot be underestimated because its results determine subsequent conservation decisions. Such hierarchical categorisation facilitates the prioritisation of decisions relating to the future of architectural heritage and sites.

This Charter recommends that buildings and sites be classified as Grade I*, I, II and III in descending order of importance.

Grade-I	Grade-I	Grade-I
(A) Definition : Heritage Grade-I comprises buildings and precincts of national or historic importance, embodying excellence in architectural style, design, technology and material usage and/or aesthetics; they may be associated with a great historic event, personality, movement or institution. They have been and are the prime landmarks of the region. All natural sites shall fall within Grade-I.	Heritage Grade-II (A&B) comprises of buildings and precincts of regional or local importance possessing special architectural or aesthetic merit, or cultural or historical significance though of a lower scale than Heritage Grade-I. They are local landmarks, which contribute to the image and identity of the region. They may be the work of master craftsmen or may be models of proportion and ornamentation or designed to suit a particular climate.	Heritage Grade-III comprises building and precincts of importance for townscape; that evoke architectural, aesthetic, or sociological interest through not as much as in Heritage Grade-II. These contribute to determine the character of the locality and can be representative of lifestyle of a particular community or region and may also be distinguished by setting , or special character of the façade and uniformity of height, width and scale.
(B) Objective: Heritage Grade-I richly deserves careful preservation.	Heritage Grade-II deserves intelligent conservation	Heritage Grade-II deserves intelligent conservation (though on a lesser scale than Grade-II and special protection to unique features and attributes).

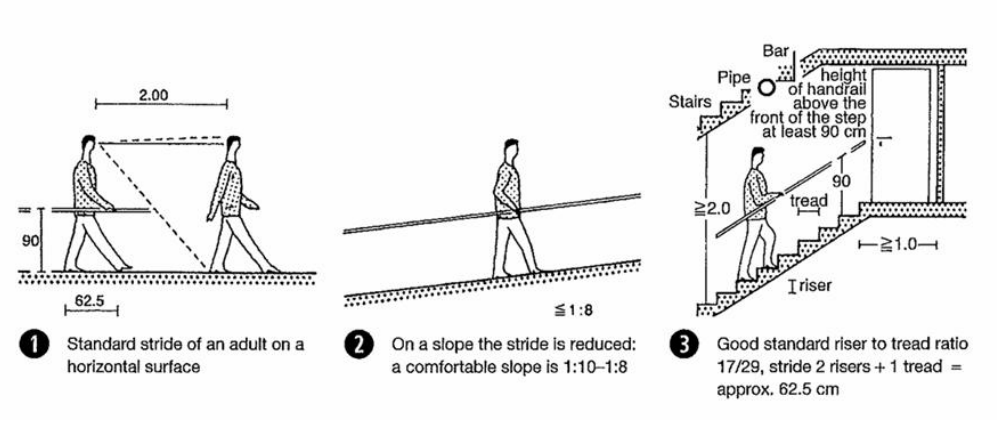
(C) Scope for Changes: No interventions be permitted either on exterior or interior of the heritage building or natural features unless it is necessary in the interest of strengthening and prolonging the life of the buildings/or precincts or any part or features thereof. For this purpose, absolutely essential and minimum changes would be allowed and they must be in conformity with the original.	Grade-II(A) : Internal changes and adaptive re-use may by and large be allowed but subject to strict scrutiny. Care would be taken to ensure the conservation of all special aspects for which it is included in Heritage Grade-II. Grade-II (B) : In addition to the above, extension or additional building in the same plot or compound could in certain circumstances, be allowed provided that the extension / additional building is in harmony with (and does not detract from) the existing heritage building(s) or precincts especially in terms of height and façade.	
(D) Procedure: Development permission for the changes would be given on the advice of the Heritage Conservation Committee.	Development permission for the changes would be given on the advice of the Heritage Conservation Committee.	Development permission for changes would be given on the advice of the Heritage Conservation Committee.
(E) Vistas / Surrounding Development : All development in areas surrounding Heritage Grade-I shall be regulated and controlled, ensuring that it does not mar the grandeur of, or view from Heritage Grade-I.	All development in areas surrounding Heritage Grade-II shall be regulated and controlled, ensuring that it does not mar the grandeur of, or view from Heritage Grade-II	All development in areas surrounding Heritage Grade-III shall be regulated and controlled, ensuring that it does not mar the grandeur of, or view from Heritage Grade-III.

Buildings and sites classified as Grade I*, I and II should be conserved in accordance with the provisions of official and legal manuals of practice (for example, ASI's Works Manual). Some Grade II buildings, however, and all other listed buildings and sites, i.e. Grade III, may be conserved in accordance with principles enunciated in this Charter (Article 2.6). The decision to apply the principles enunciated in this Charter to Grade II buildings must invariably be based on the concurrence of the Advisory Committees of INTACH (Article 7.2.5).

The process of listing should be constantly upgraded and the list updated in keeping with the availability of fresh information, financial and material resources, advances in technology and developments in the understanding of architectural heritage and its constituents.

3.4 NEUFERT ARCHITECTS DATA

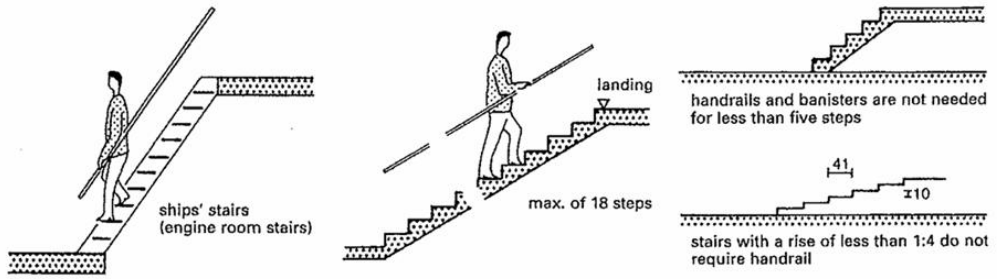
Stairs



1 Standard stride of an adult on a horizontal surface

2 On a slope the stride is reduced: a comfortable slope is 1:10–1:8

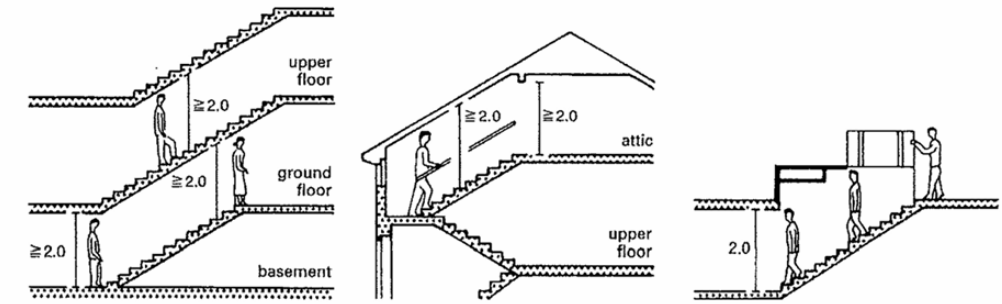
3 Good standard riser to tread ratio 17/29, stride 2 risers + 1 tread = approx. 62.5 cm



4 Ladder-type stairs with handrail

5 Normal stairs 17/29, landing after max. 18 steps for legally essential stairs. Prestigious-style stairs can climb up to a 4 m storey height without a landing.

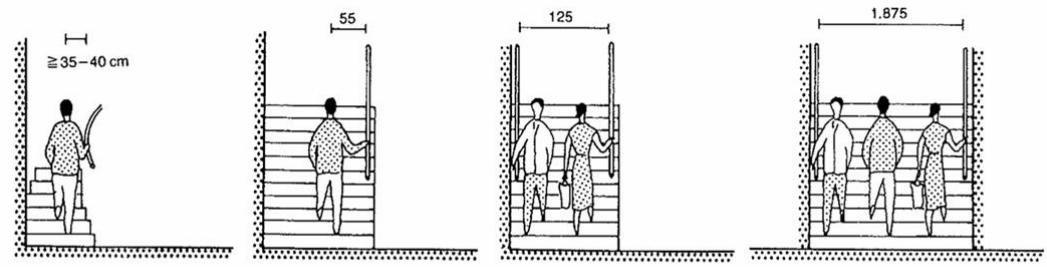
6 Stairs without a handrail



7 Correctly superimposed stairs save space

8 If rafters and beams are arranged in the direction of the stairs, this saves space and expensive trimmers

9 Covered entrances to cellars necks and trapdoors are to be avoided; but the arrangement shown here has advantages and is safe



10 For winding stairs, the distance of the walking line to the inner cheek is 35–40 cm

11 For straight stairs, the distance of the walking line to the handrail is 55 cm

12 Stairs on which two people can pass

13 ≧width for three people

Type of hotels

According to the classification system of the German Hotel and Inn Association (DEHOGA), there are five categories, essentially determined by the room's size and features:

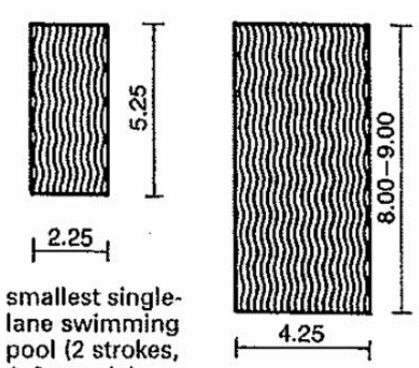
- 1 Star (Tourist): single room 8m2 , double room 12m2 (minimum area for 75% of the hotel rooms, without bathroom), bed, wardrobe, seat, washbasin in the room, reception as a separate area
- Stars (Standard): as before, but single room 12 m2, double room 16 m2 (minimum area for 75% of the hotel rooms, including bathroom and corridor), bathroom in room (for 70% of hotel rooms), seat per bed, colour television (in 70% of the hotel rooms)
- Stars (Comfort): as before, but single room 14 m2, double room 18 m2 (minimum area, see above), bathroom in room (for all rooms in the hotel), telephone, reception area with seating for group, independent reception
- Stars (First Class): as before, but single room 16 m2, double room 22 m2 (minimum area, see above), minibar, armchair/couch with coffee table, lobby with seating and drinks service
- Stars (Luxury): as before, but single room 18m2, double room 26m2, (minimum size, see above), 2% of the hotel rooms as suites (at least two), each with an armchair/sofa per bed, additional washbasin in double rooms and suites, additional colour television in suites, reception lobby.

Swimming pools

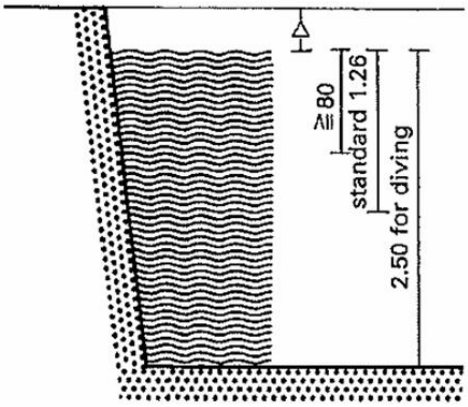
Size: Lane width 2.25 m, stroke length approx. 1.50 m, plus body length: 4 strokes = 8 m length. Water depth: chin height for the smallest adult, not the children! Difference between pool depth/ water depth. depends on the type of extractor system.

Types of pool:

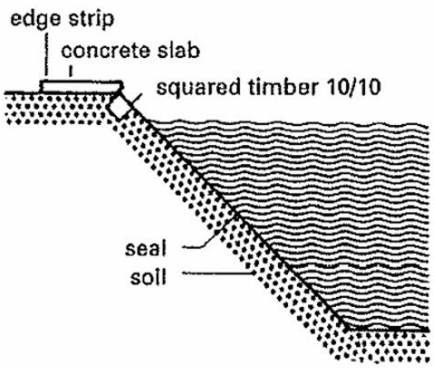
- Normal foil pool (foil = waterproof surface) on masonry-bearing construction, concrete, steel (also above ground) or sunk into ground. Polyester pools, seldom locally produced, mostly with pre fabricated elements, are generally not self-supporting. Lean concrete backfilling is necessary.
- Watertight concrete pool (two-sided in situ concrete, shotcrete with formwork for one side, pre-cast concrete elements); surface mostly ceramic or glass mosaic, occasionally paint (chlorine rubber, cement paint).



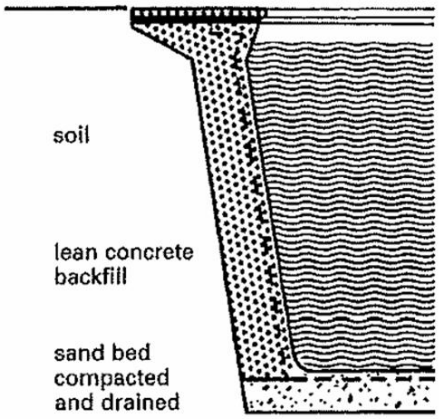
2 Pool sizes



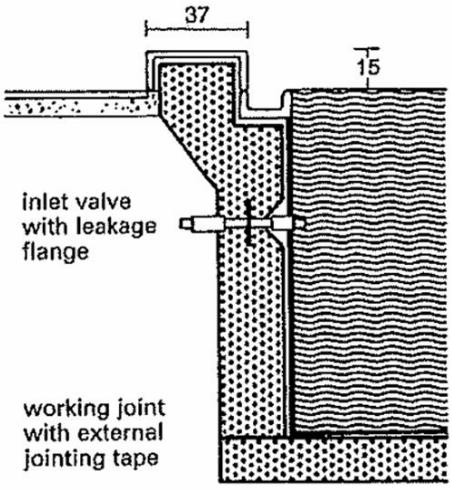
3 Pool depth



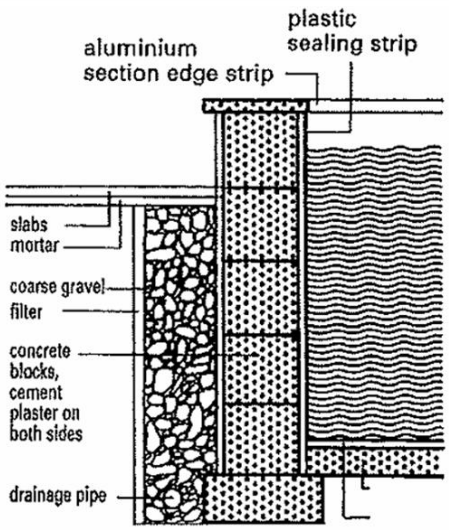
4 Sloping pool with foil; edge formed by timber beam



5 Single-skin prefabricated polyester pool



6 Reinforced concrete pool: simple version with Wiesbaden channel



7 Masonry pool with drainage

Water	Season			Additional months	
temp.	4 Months	5 Months	6 Months	5th Month	6th Month
22°C	1.25/6.5	1.33/7.2	1.55/7.8	1.65/7.2	2.65/7.8
23°C	1.50/7.2	1.70/7.9	2.00/8.5	2.50/7.9	3.50/8.5
24°C	2.08/7.9	2.26/8.6	2.66/9.2	2.98/8.6	4.66/9.2
25°C	2.60/8.5	2.80/9.3	3.20/9.8	3.60/9.5	5.25/9.8
26°C	3.50/9.2	3.75/10.0	4.00/10.5	4.75/10.0	5.25/10.5

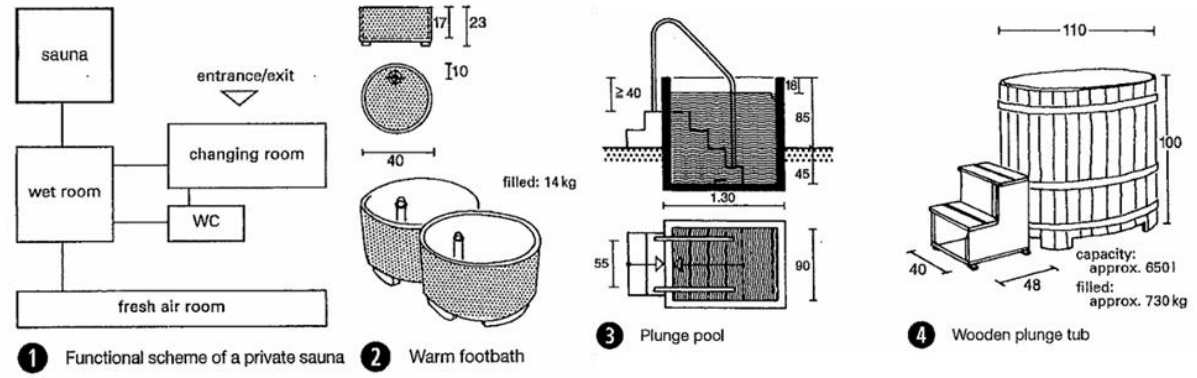
8 Heat loss of an outdoor pool (average/maximum) in kWh/m²d according to measurements by energy company RWE. Special influences are not considered, e.g. considerable heat loss of public pools (hotel pool etc.) through the use of heated pool water for filter back-flushing (up to 1.5 kW/m²d or 1300 kcal/m²d).

Spa

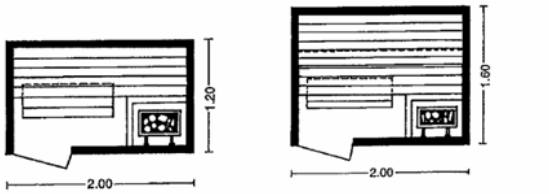
Free-standing sauna cabins or facilities (e.g. in the garden) are normally constructed of spruce in log cabin style, and are either self-built or bought pre-fabricated. The log cabins are available in various versions, either as sauna cabins. or also with shower and changing or relaxation room. There are also sauna cabins available as prefabricated or kit elements for installation in existing rooms.

Sauna stove: Sauna cabins for installation usually have electric stoves (which require a three-phase supply above a certain size), while log cabin types mostly have solid fuel stoves (which require a chimney).

Plunge pool-max. depth 1.20 m. An important part of a proper sauna, a (warm) footbath with a seat are required.

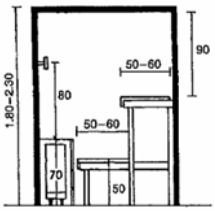


1 Functional scheme of a private sauna 2 Warm footbath 3 Plunge pool 4 Wooden plunge tub

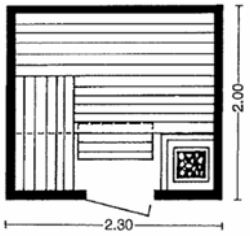


5 Sauna cabin: one person lying or two sitting

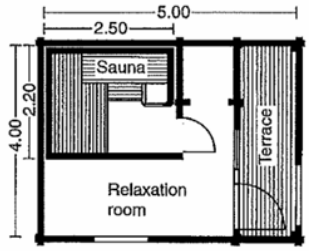
6 Sauna cabin: two people lying or three sitting



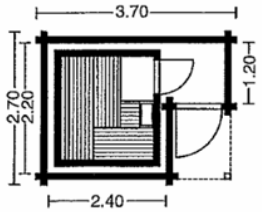
7 Cross-section



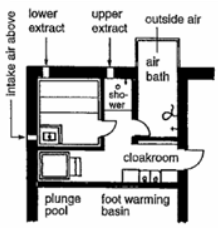
8 Sauna cabin: three people lying or five sitting



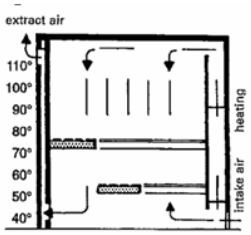
9 Sauna constructed as log cabin



10 Sauna cabin constructed as log cabin

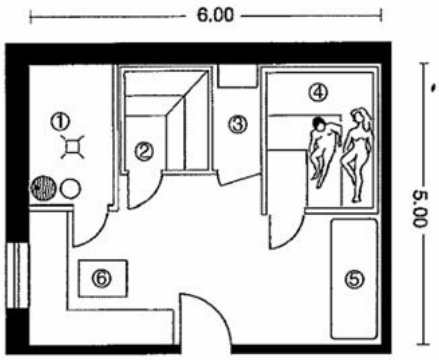


11 House sauna



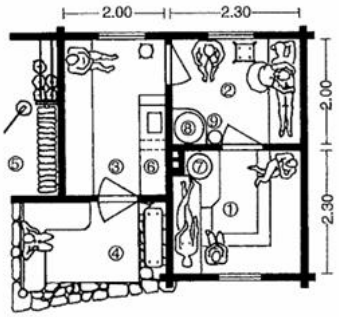
12 Cross-section of sauna with indirect heating (Bemberg)

① Shower
② Steam bath
③ Equipment
④ Sauna
⑤ Sun bench
⑥ Sitting & relaxation corner



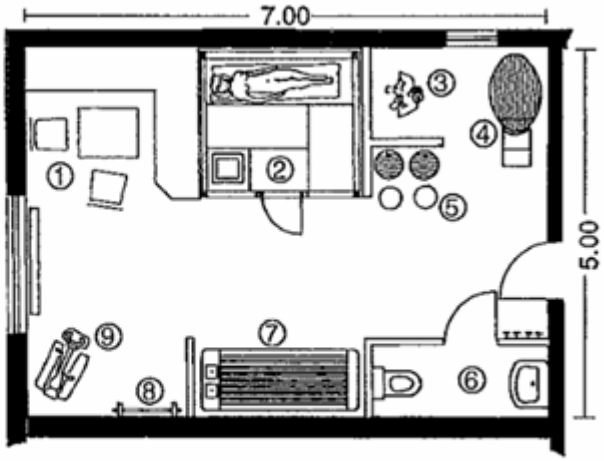
13 Sauna (installed, e.g. in cellar), 30 m², 4–6 people

① Sauna cabin
② Massage & washing room
③ Changing room
④ Veranda
⑤ Wood pile
⑥ Cubboard
⑦ Heating oven
⑧ Water kettle
⑨ Water tub



14 Sauna

① Sitting & relaxing corner
② Sauna cabin
③ Shower
④ Plunge pool
⑤ Footbath
⑥ WC
⑦ Sun bench
⑧ Wall bars
⑨ Ergometer



15 Sauna, 35 m², 4–6 people, sauna cabin as built-in element

Parking facility

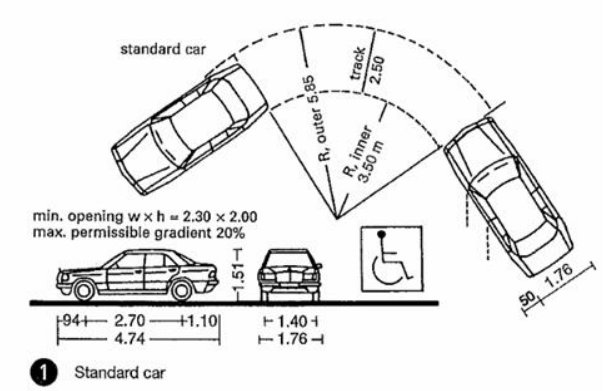
Vehicle turning

Type of vehicle	External dimensions						
	Length	Wheelbase	Overhang length		Width	Height	External turning circle radius
			Front	Back			
	[m]	[m]	[m]	[m]	[m]	[m]	[m]
Bicycle	1.90				0.60	1.00	
Moped	1.80				0.60	1.00	
Motorcycle	2.20				0.70	1.00	
Car	4.74	2.70	0.94	1.10	1.76	1.51	5.85
HGVs:							
Van/campervan	6.89	3.95	0.96	1.98	2.17	2.70	7.35
HGV (2 axles)	9.46	5.20	1.40	2.86	2.29	3.80	9.77
HGV (3 axles)[1)]	10.10	5.30[1)]	1.48	3.32	2.50[4)]	3.80	10.05
HGVs with trailer:	18.71						
Towing vehicle (3 axles)[1)]	9.70	5.28[1)]	1.50	2.92	2.50[4)]	4.00	10.30
Trailer (2 axles)	7.45	4.84	1.35[3)]	1.26	2.50	4.00	10.30
Articulated HGVs:	16.50						
Tractor unit (2 axles)	6.08	3.80	1.43	0.85	2.50[4)]	4.00	7.90
Semi-trailer (3 axles)[1)]	13.61	7.75[1)] 1.61	4.25	2.50	4.00	7.90	
Buses:							
Coach, bus	12.00	5.80	2.85	3.35	2.50[4)]	3.70[6)]	10.50
Coach, bus[2)]	13.70	6.35[2)]	2.87	4.48	2.50[4)]	3.70[6)]	11.25
Coach, bus[2)]	14.95	6.95[2)]	3.10	4.90	2.50[4)]	3.70[6)]	11.95
Articulated bus	18.75	5.98/5.99	2.65	3.37	2.50[4)]	2.95	11.80
Refuse collection vehicles:							
2 axles (2 Mü)	9.03	4.60	1.35	3.08	2.50[4)]	3.55	9.40
3 axles (3 Mü)	9.90	4.77[1)]	1.53	3.60	2.50[4)]	3.55	10.25
3 axles (3 MüN)[2)]	9.95	3.90	1.35	4.70	2.50[4)]	3.55	8.60
Highest values permitted in Germany:							
HGV	12.00						
Trailer	12.00				2.55[4)5)]	4.00[6)]	12.50
HGV with trailer	18.75						
Articulated HGV	16.50						
Articulated bus	18.00						

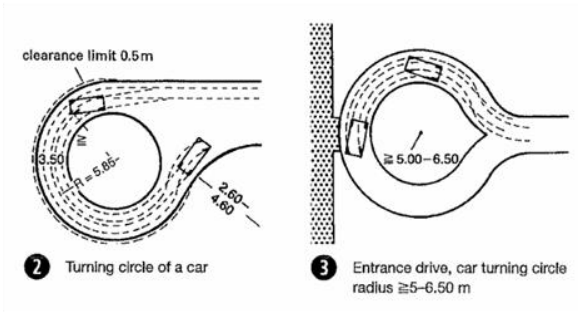
Notes: [1)] for vehicles with 3 axles, the rear tandem axle is integrated to a middle axle
[2)] for 3-axle vehicles with a trailing axle, the wheelbase corresponds to the distance between the front axle and the forward axle of the rear tandem axle
[3)] without tow bar length
[4)] without external mirror
[5)] additional equipment for air-conditioned HGVs up to 2.60 m
[6)] as double-decker bus 4.00 m

10 Basic vehicle data → p. 397–398

Figure 2 Vehicle dimensions1



1 Standard car



2 Turning circle of a car

3 Entrance drive, car turning circle radius ≧5–6.50 m

Type of vehicle	External dimensions						
	Length	Wheelbase	Overhang length		Width	Height	External turning circle radius
			Front	Back			
	[m]	[m]	[m]	[m]	[m]	[m]	[m]
Bicycle	1.90				0.60	1.00	
Moped	1.80				0.60	1.00	
Motorcycle	2.20				0.70	1.00	
Car	4.74	2.70	0.94	1.10	1.76	1.51	5.85
HGVs:							
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[3] without tow bar length
[4] without external mirror
[5] additional equipment for air-conditioned HGVs up to 2.60 m
[6] as double-decker bus 4.00 m

10 Basic vehicle data → p. 397–398

Figure 3 Vehicle dimensions2

CHAPTER 4

SITE INVENTORY

OVERVIEW

A site inventory overview is crucial in the planning and design phase of a resort project, providing a comprehensive understanding of the site's characteristics and context. Conducting a thorough site inventory allows for informed decision-making, effective design solutions, and an understanding of how the site interacts with its natural, built, and cultural environment.



Figure 4 Site visit group photo

SITE INVENTORY



Figure 5 Site Plan

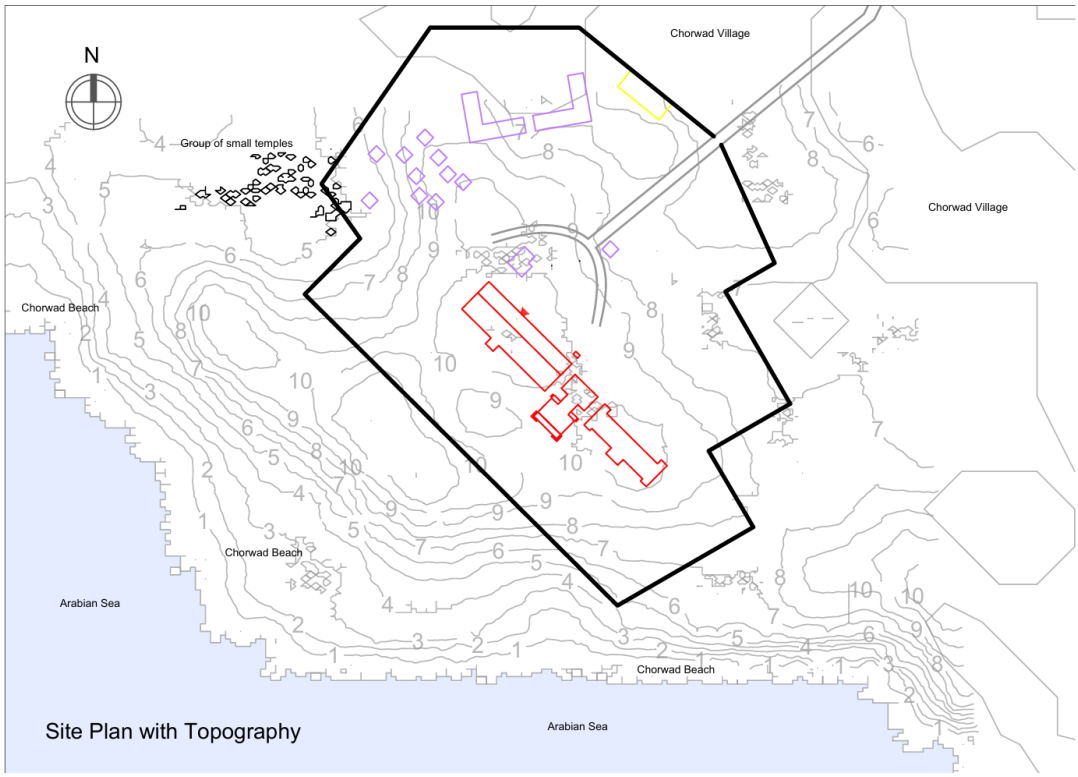
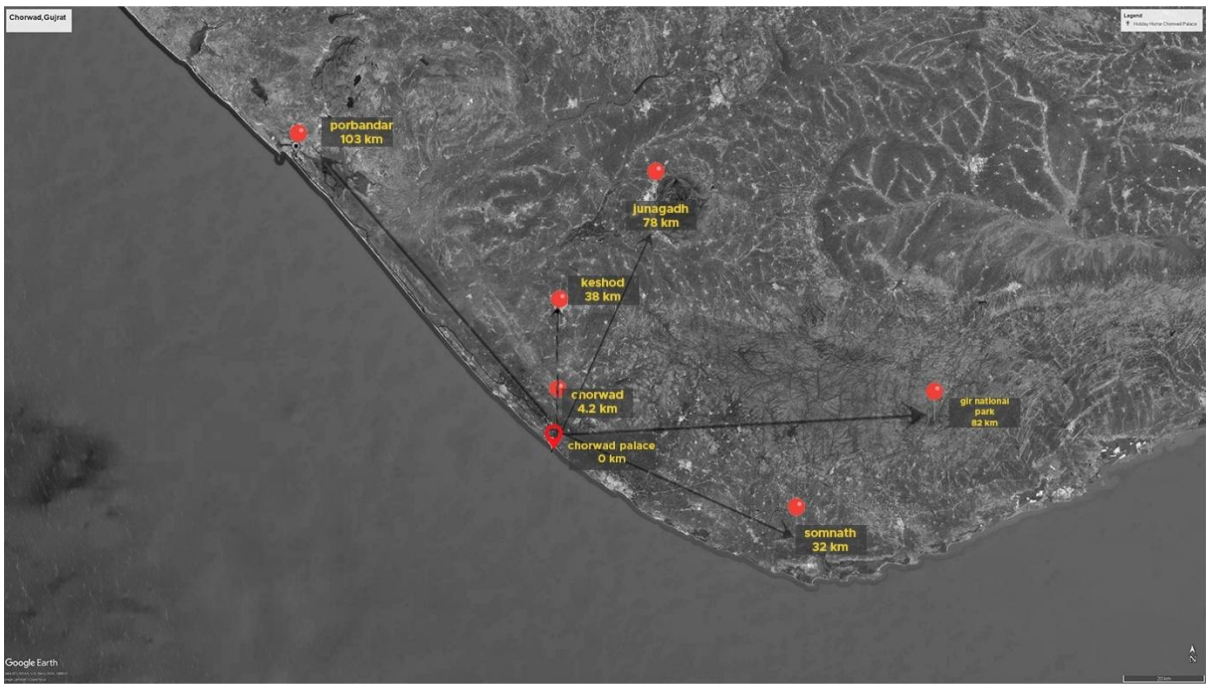


Figure 6 Site topography

1. LOCATION & CONTEXT

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





2. 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





3. HISTORICAL & CULTURAL HIGHLIGHTS

Chorwad Palace—often referred to as the Summer Palace or Daria Mahal—was built in 1930 by Nawab Muhammad Mahabat Khanji III, the ruler of Junagadh, as his coastal summer retreat on the shores of the Arabian Sea in Chorwad, Junagadh district, Gujarat. Constructed around 1928–1930, the palace blends Italian, Muslim, and colonial architectural styles, featuring lofty arched windows, balconies, projecting verandas, landscaped gardens and walkways perfect for seaside promenades.



Originally the exclusive pleasure palace of the Nawab and his entourage, complete with facilities to host royal banquets, horse stables, and lavish displays of luxury, the palace later became the central facility of a government-run beach resort developed by the Tourism Corporation of Gujarat Ltd (TCGL) in the 1970s. It was intended as India's only **beach palace resort**—a singular destination that combined heritage architecture with seaside relaxation.



By the late 2000s, the resort and palace were already described as **dilapidated**. Reports indicated that the palace porch had collapsed, while precious **Belgian chandeliers, Italian furniture, and antique décor** were stolen or vandalized. The adjoining TCGL cottages and support facilities, meant to host beach tourists, also became unusable due to decay and lack of upkeep. Even basic infrastructure such as pathways, gardens, and lighting were left in poor condition, discouraging visitors and creating an image of abandonment.





DOCUMENTATION OF BEACH RESORT

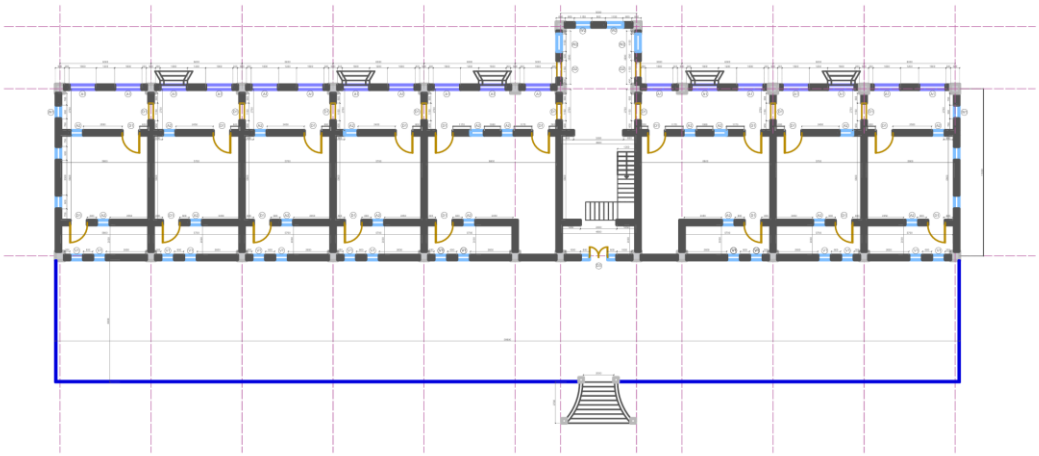


Figure 7 PLAN OF BEACH RESORT



Figure 8 ELEVATION (FRONT SIDE)

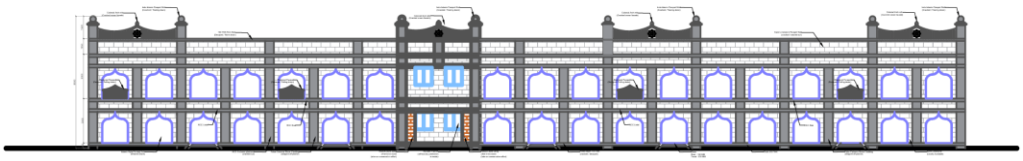


Figure 9 ELEVATION (BEACH SIDE)

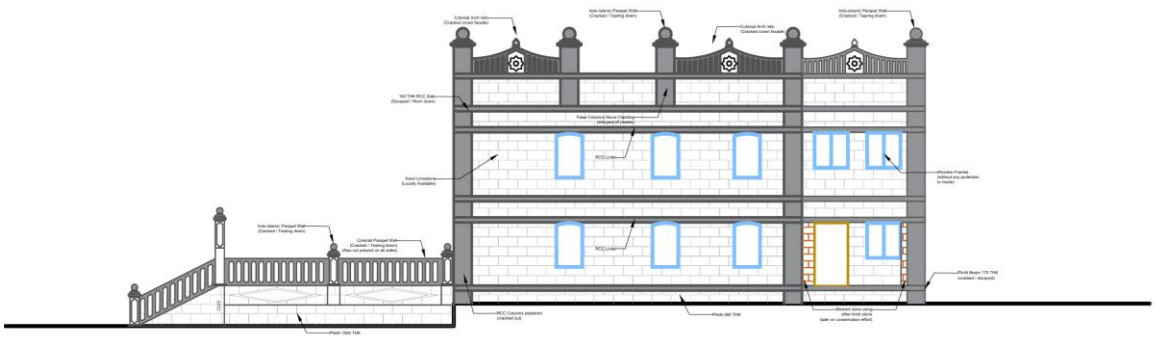


Figure 10 SECTION OF BEACH RESORT

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**

4. 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)

5. 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

6. 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)

7. 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.

8. FLORA & FAUNA

A. 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

B. <u>Fauna (animals)</u>

a) 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.

b) Birds

- 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):
    1. Ruddy Shelduck: A medium-sized waterfowl species.
    2. Bar-headed Goose: Known for its high-altitude migration over the Himalayas.
    3. Northern Pintail: A medium-sized dabbling duck.
    4. Northern Shoveler: Another duck species that winters in the Indian Subcontinent.
    5. Common Swallow: Migrates from Europe and Northern Asia to escape the cold.
    6. Siberian Crane: A notable winter visitor to the Rann of Kutch, which is a coastal region of Gujarat.
    7. 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

c) 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:
    1. Nilgai or Blue Bull (*Boselaphus tragocamelus*)
    2. Indian Golden Jackal (*Canis aureus indicus*)
    3. Indian Grey Wolf (*Canis lupus pallipes*)
    4. Jungle Cat (*Felis chaus*)
    5. Mongoose
    6. Indian Hare

CLIMATE ANALYSIS

VERAVAL (25Km from CHORWAD)

- **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)

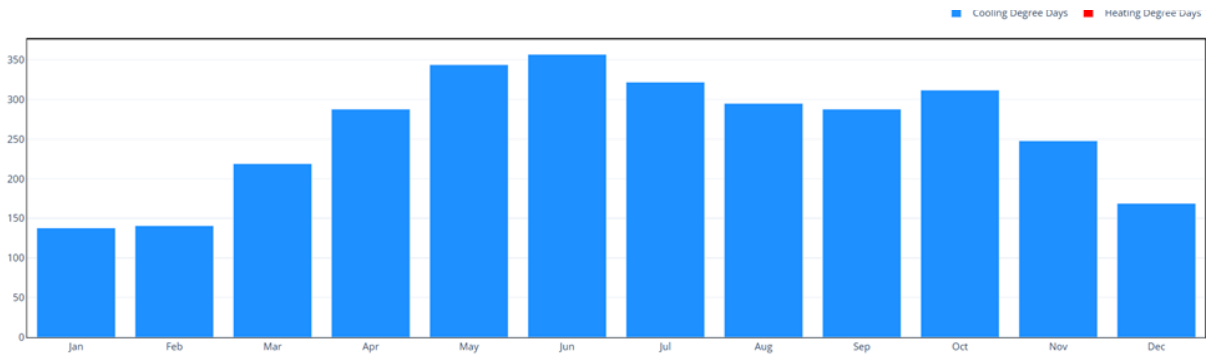
Design Challenges:

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

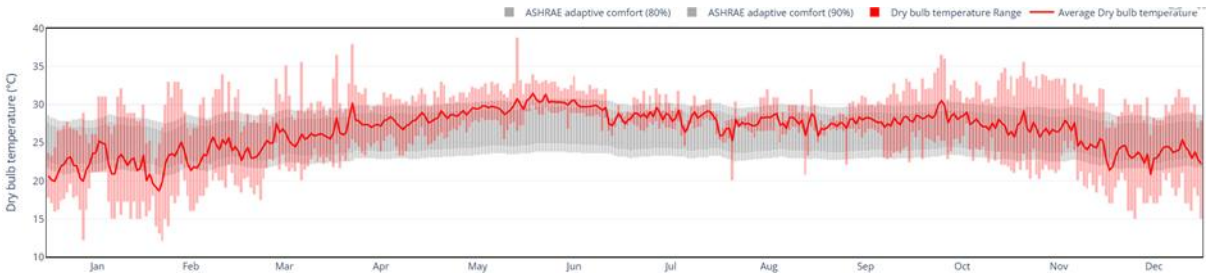
Inferences for Resort Design:

a) Use thermal mass (stone/brick) for stable indoor temps
b) Add roof insulation, light-coloured roofing, ventilated attic
c) Courtyards & terraces to enhance night-time cooling
d) 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

a) **Highest**: 89.7% (Aug)
b) **Lowest**: 35% (April)
c) 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)

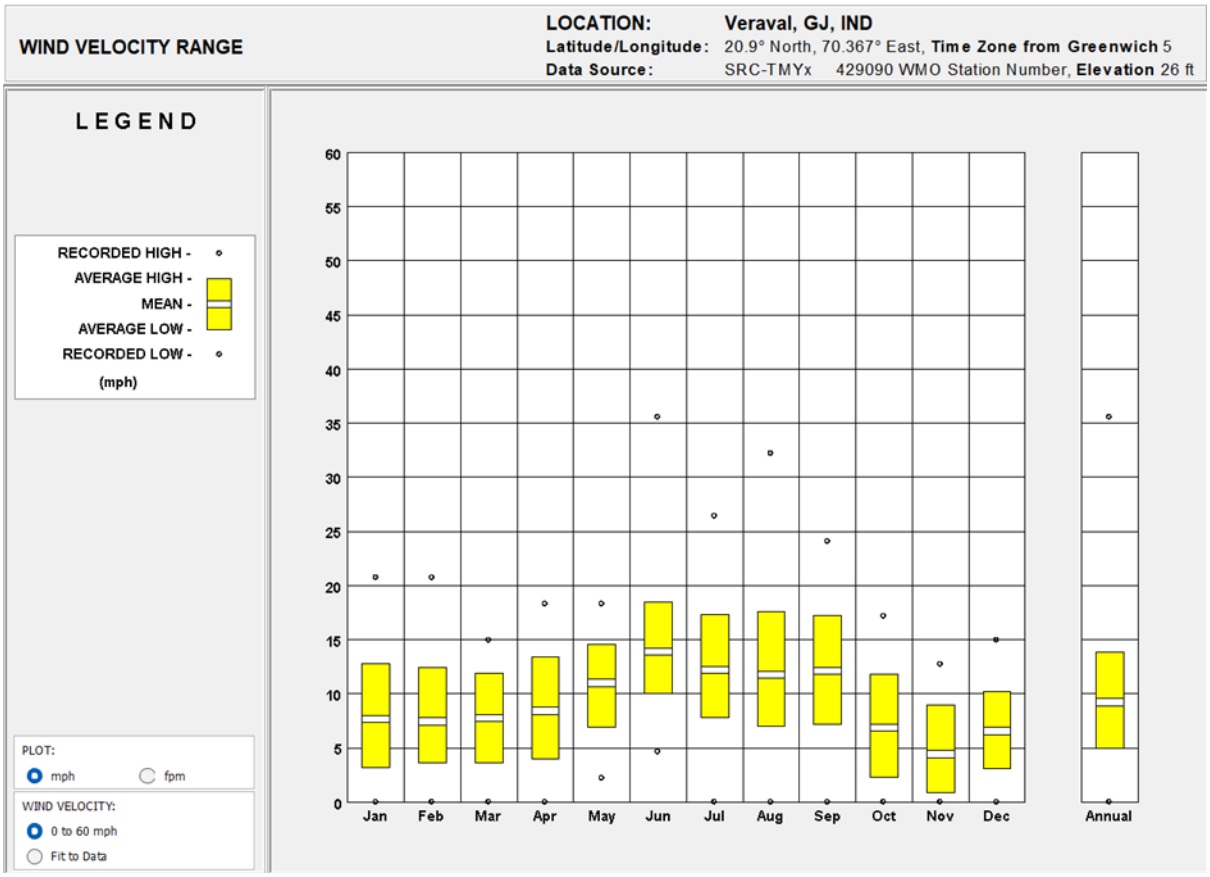
Challenges:

- 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)

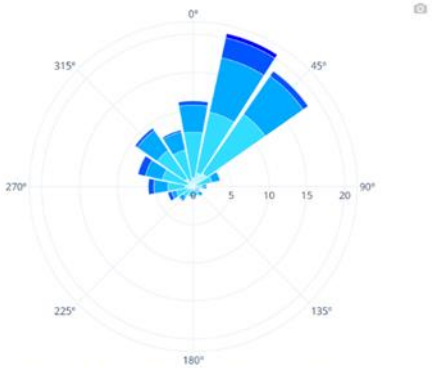
Observations:

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

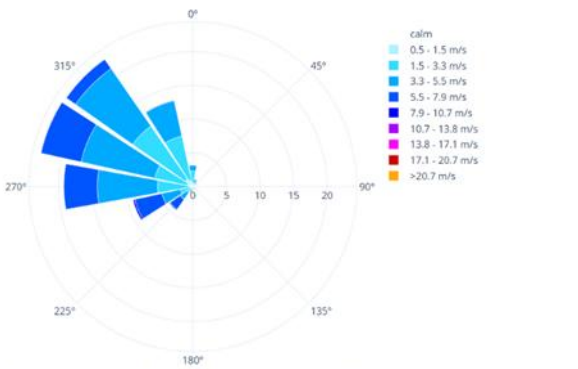
Inferences:

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

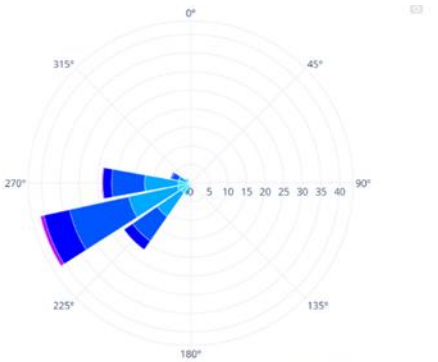
SEASONAL WIND ROSE



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.

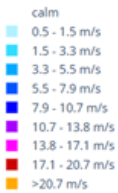


Observations between the months of Jun and Aug between 01:00 hours and 24:00 hours. Selected observations 2208 of 8760, or 25 %. 12 observations have calm winds.



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.





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:

a) Sloped roofs, deep overhangs, gutter systems
b) Rainwater harvesting tanks for utility use
c) Elevated plinths, well-drained paving
d) 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)

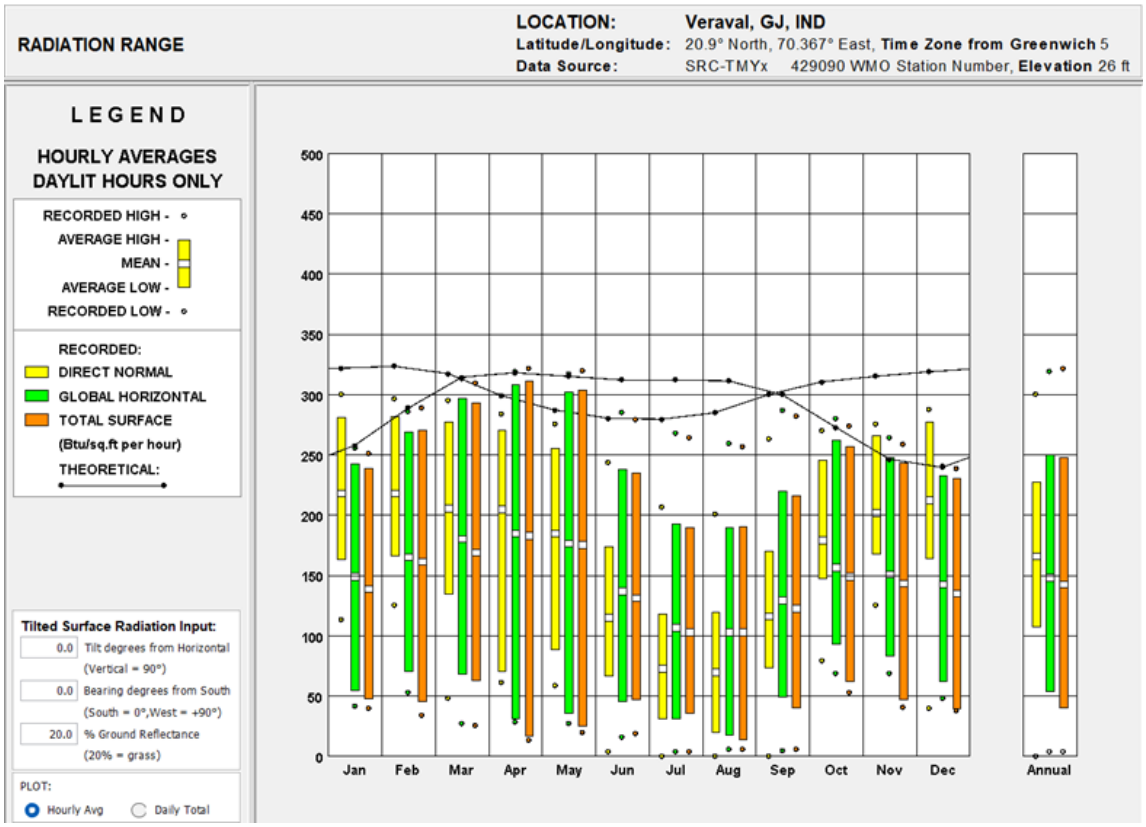
Challenges:

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

Inferences:

a) Horizontal shading (chajjas) on south
b) Vertical fins/louvres on east & west
c) Integrate light shelves, clerestories, and skylights

Use solar control glazing or tinted glass



SUN PATH

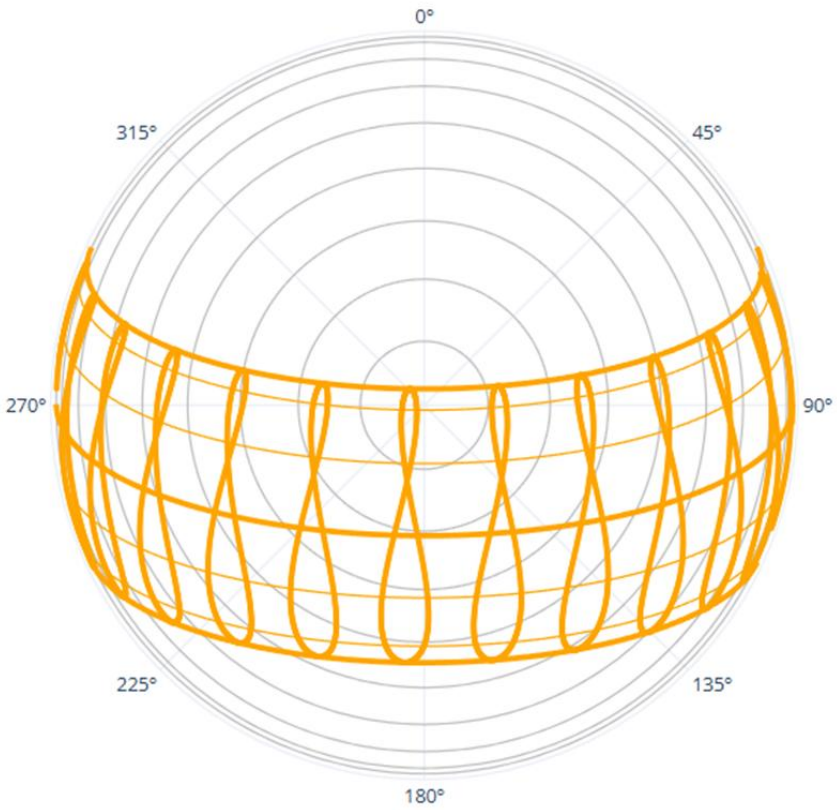


Figure 11 Sun path

6. CLOUD COVER & SOLAR AVAILABILITY

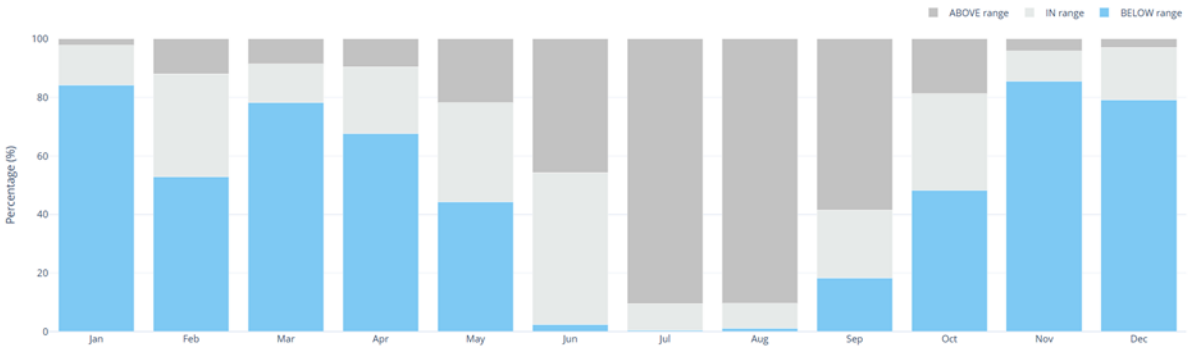
Data:

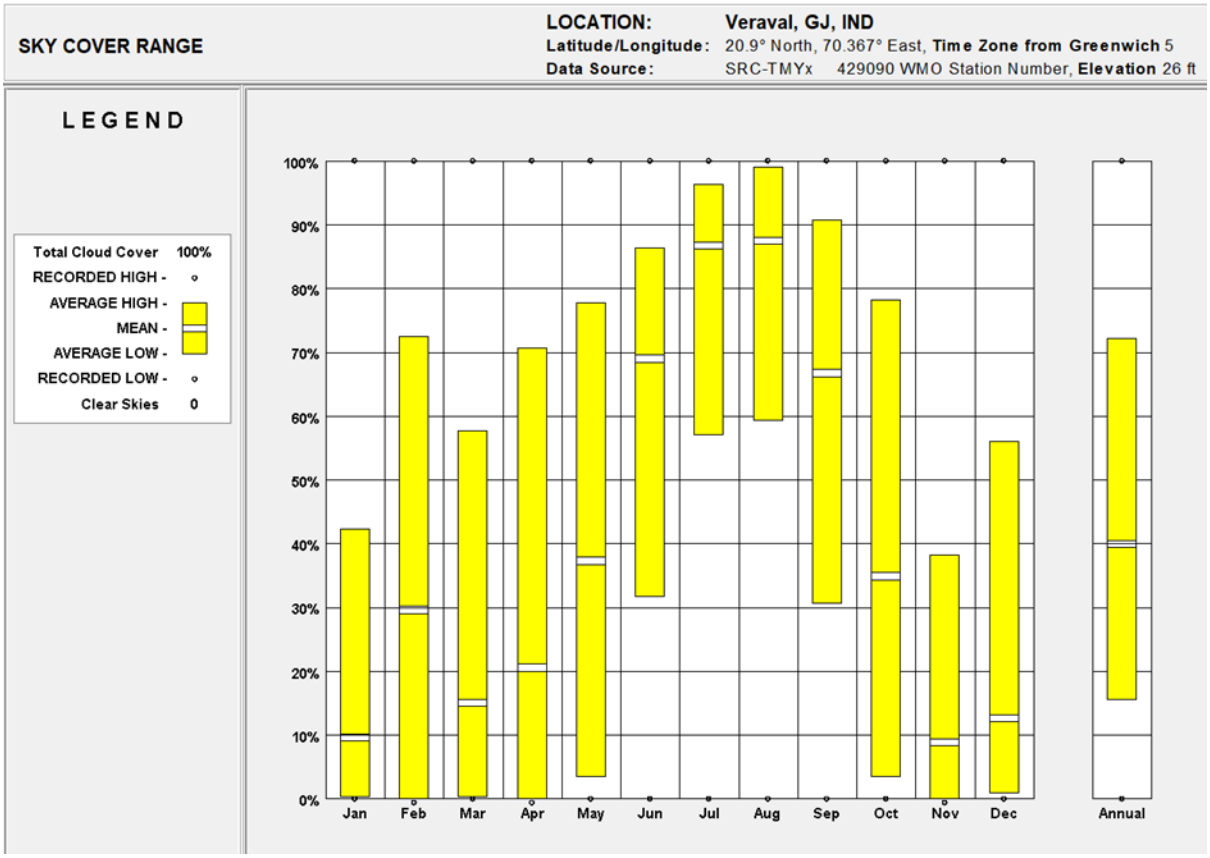
- July–Sept: cloudiest months → Reduced daylight
- Oct–May: mostly sunny

Inferences:

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

CLOUD COVERAGE





MAHONEY TABLE (Based on Monthly Data from Veraval)

Month	Mean Temp (°C)	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

DRAINAGE ANALYSIS

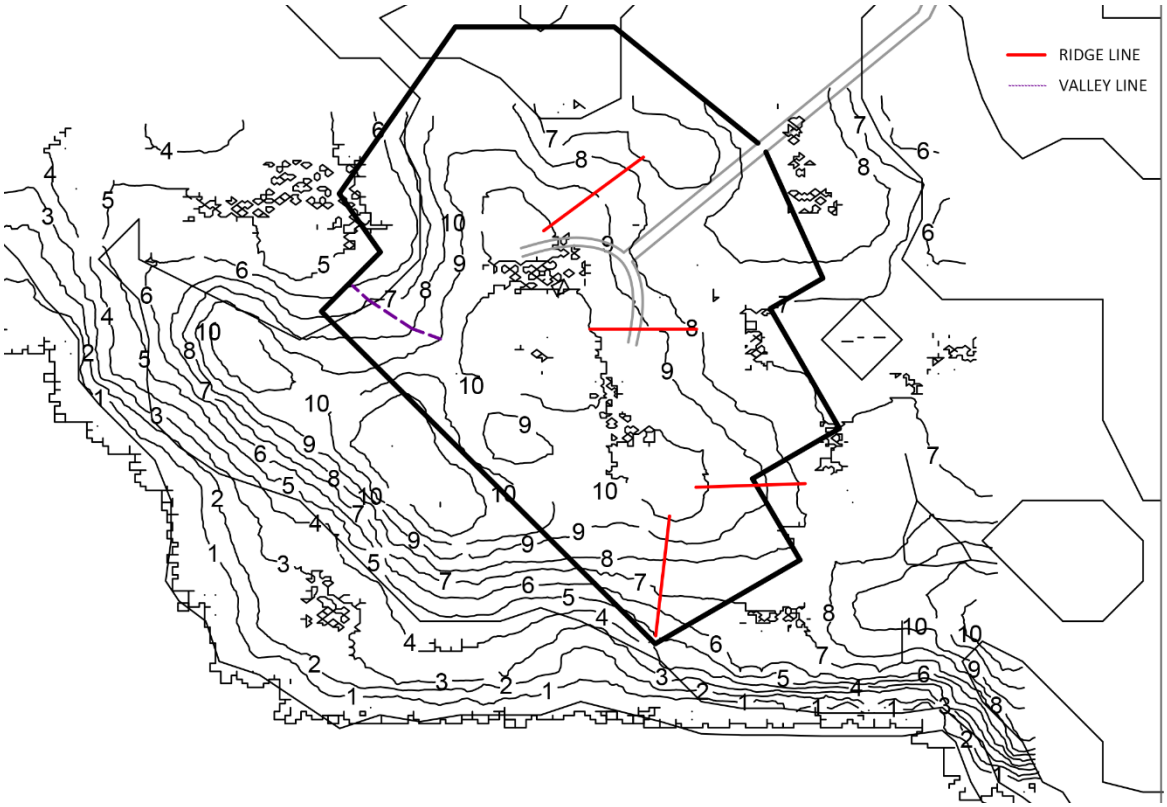


Figure 12 Drainage analysis

SITE PHOTOS















CHAPTER 5

CASE STUDY & DESK APPRAISALS

OVERVIEW

This chapter analyses four case studies- Kohinoor Resort, Azzaro Resort,- chosen for their beachside locations, climatic responsiveness and integration of historical buildings/elements. Key aspects like site planning, architectural character, climate responsiveness, cultural integration and service planning were studied, providing valuable insights for designing a beachside resort in Chorwad.

CASE STUDY

5.1 KOHINOOR RESORT, DIU



Figure 13 Kohinoor beach resort

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

1. **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.

2. **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

1. **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.
2. **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 include**s 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**

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

- **Weaknesses**

1. **Aging infrastructure:** visible deterioration in bathrooms, rooms, and furnishings.
2. **Poor maintenance:** broken fixtures, mold issues, and outdated interiors.

- **Opportunities**

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

- **Threats**

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

CASE STUDY INSIGHTS:

1. **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.
2. **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.
3. **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.

5.2 AZZARO RESORT, DIU



Figure 14 Azzaro resort

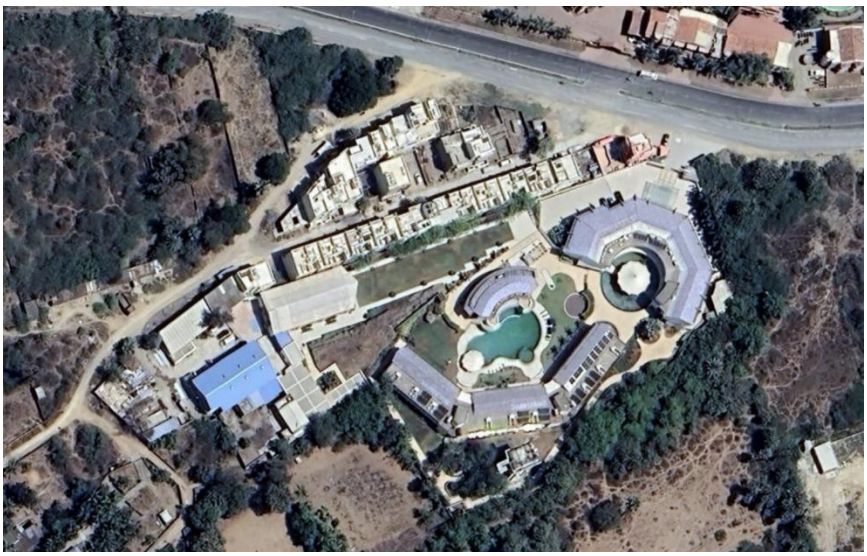
OBJECTIVE OF CASE STUDY:

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

1. Understand the site context and how the design responds to the coastal environment of Diu.
2. Study the architectural planning, spatial organization, and integration of vernacular design elements.
3. Evaluate the use of local materials and sustainable practices like natural ventilation and rainwater harvesting.
4. Assess the user experience, circulation, and functionality of the resort.
5. 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.

1. **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.

2. **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.

3. **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.






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.

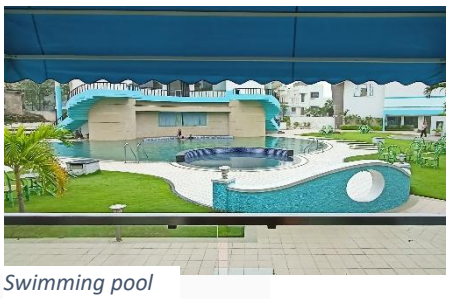
MASTER PLAN AND ZONING



Private Party Space



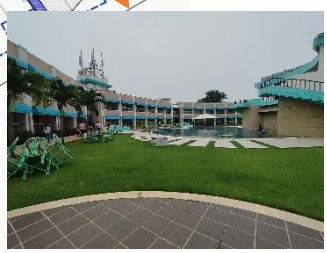
Water tank tower



Swimming pool



Restaurant



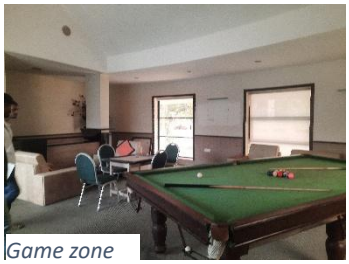
Deluxe Rooms



Entrance

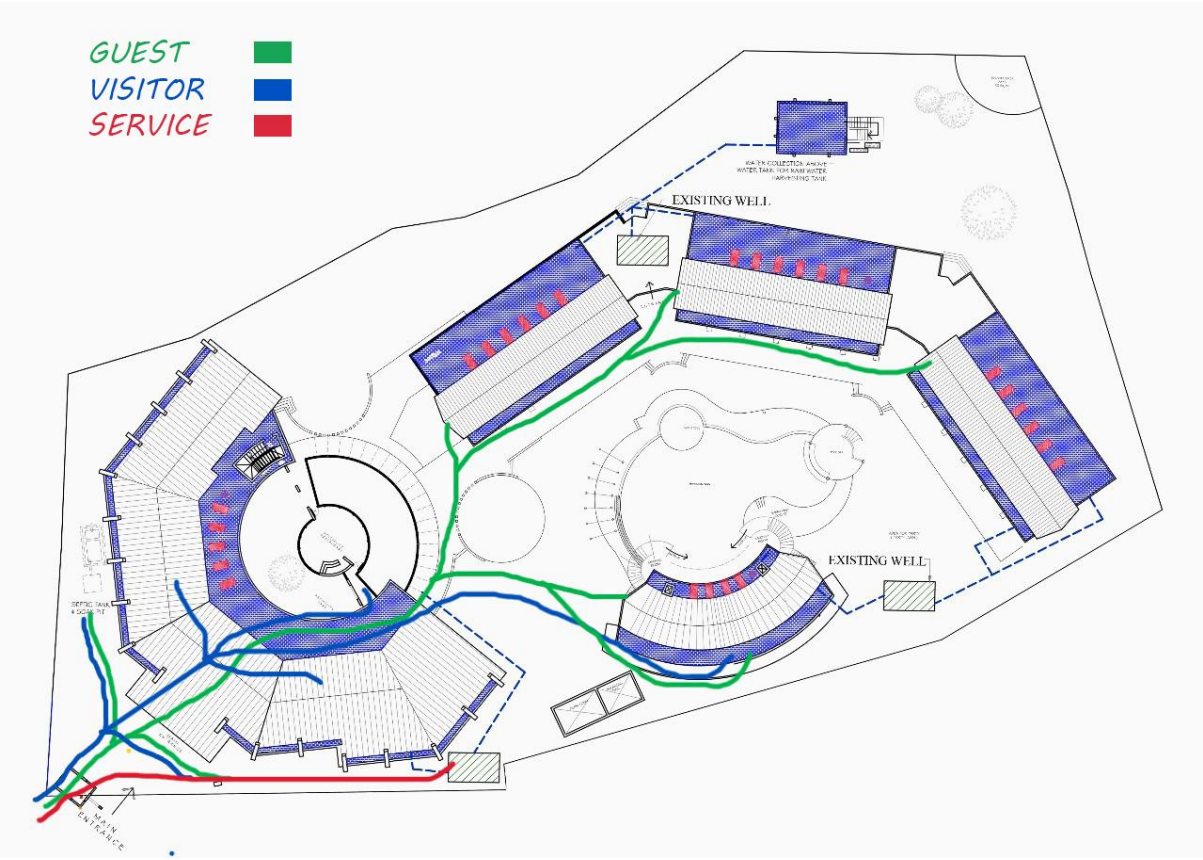


Lawn



Game zone

CIRCULATION:



AMENITIES:

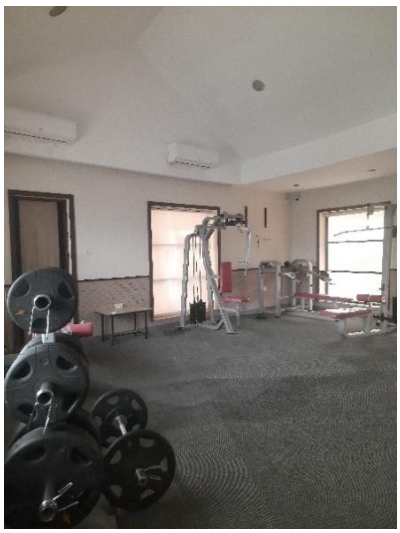
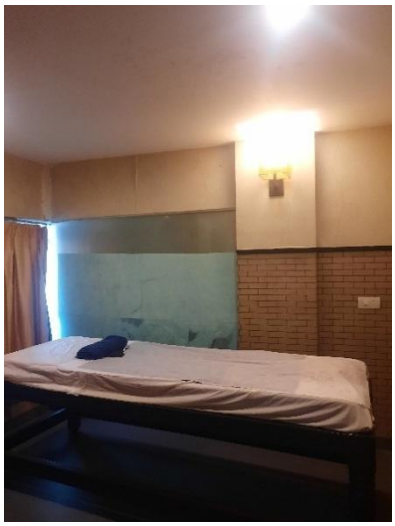
- **Swimming Pool –** Large outdoor pool with sun loungers and poolside service.
- **Spa & Wellness Center** – Full-service spa offering massages, therapies, and sauna.
- **Restaurant & Bar** – Multi-cuisine restaurant and a bar serving Indian, continental, and local dishes.
- **Free Wi-Fi** – Available 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.



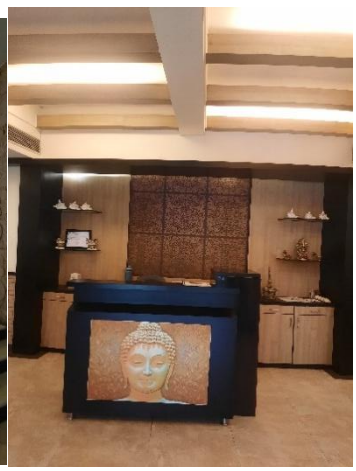


Interior Features:

- **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:

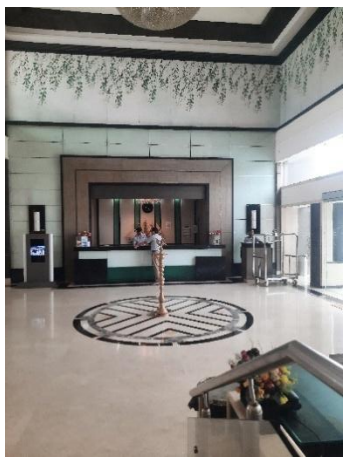
- **Low-Rise Construction:** Spreads horizontally rather than vertically, reducing energy load on lifts and elevators (though it lacks lift access).
- **Natural Lighting:** Rooms and public areas designed with large windows and open spaces, allowing for maximum daylighting and reduced artificial lighting 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:

1. **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.

2. **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.
3. **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.
4. **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.

DESK APPRAISAL

5.3 HERITAGE VILLAGE RESORT MANESAR

5.3.1 INTRODUCTION

- **Project Name:** Heritage Village Resort & Spa
- **Location:** NH-8, Manesar, Gurugram, Haryana (near Rajasthan-Haryana border)
- **Architectural Style:** Rajasthani Haveli-style with Mughal and Rajputana influences
- **Built-up Area: Approx.** 12 acres
- **Client:** Select Hotels Group
- **Design Typology:** Resort and Spa (Heritage Hospitality)
- **Climate Zone:** Composite climate (hot summers, cold winters)
- **Architect** - Ar. Madhav Naik
- **Client** - Sita Travels
- **Engineer** - Ashwani Sharma
- **Year of Construction** - 1995



Figure 15 Heritage Village resort



5.3.2 Historical Context & Condition Before Restoration

- **Original construction** dates to **1995**, conceived as a modern resort inspired by Rajasthani haveli architecture.

  In early years, the building exhibited aged finishes, outdated interiors and landscaping that required revitalization by **2023**. The original "heritage-style" façade and motifs had weathered and lacked modern systems and amenities.

5.3.3 Background & Concept

- The resort is inspired by **traditional Rajasthani havelis**, combining **adaptive reuse** of vernacular elements with modern hospitality standards.
- The concept revolves around **recreating the experience of a royal haveli** for urban tourists, while **integrating modern comforts** like spas, pools, banquet halls.
- Although not a direct reuse of a historical structure, the design is a **reinterpretation and revival** of Rajasthani heritage through *architectural storytelling*.







5.3.4 <u>Site Planning</u>

- The site is laid out like a **traditional palace precinct**:
    - Entry through a **grand arched gate**
    - Linear and axial movement leading to a **central courtyard**
    - Radiating rooms around courtyards (like old havelis)

- Zoning:

  - **Public zone**: reception, lobby, banquet, restaurant
  - **Semi-public**: gardens, pool, bar
  - **Private**: guest rooms, spa, suites

5.3.5 LOCATION AND APPROACH

This palatial resort is conveniently located on:



•Approximately 40mins drive from Delhi's international airport.

•It is far from the madding crowds.

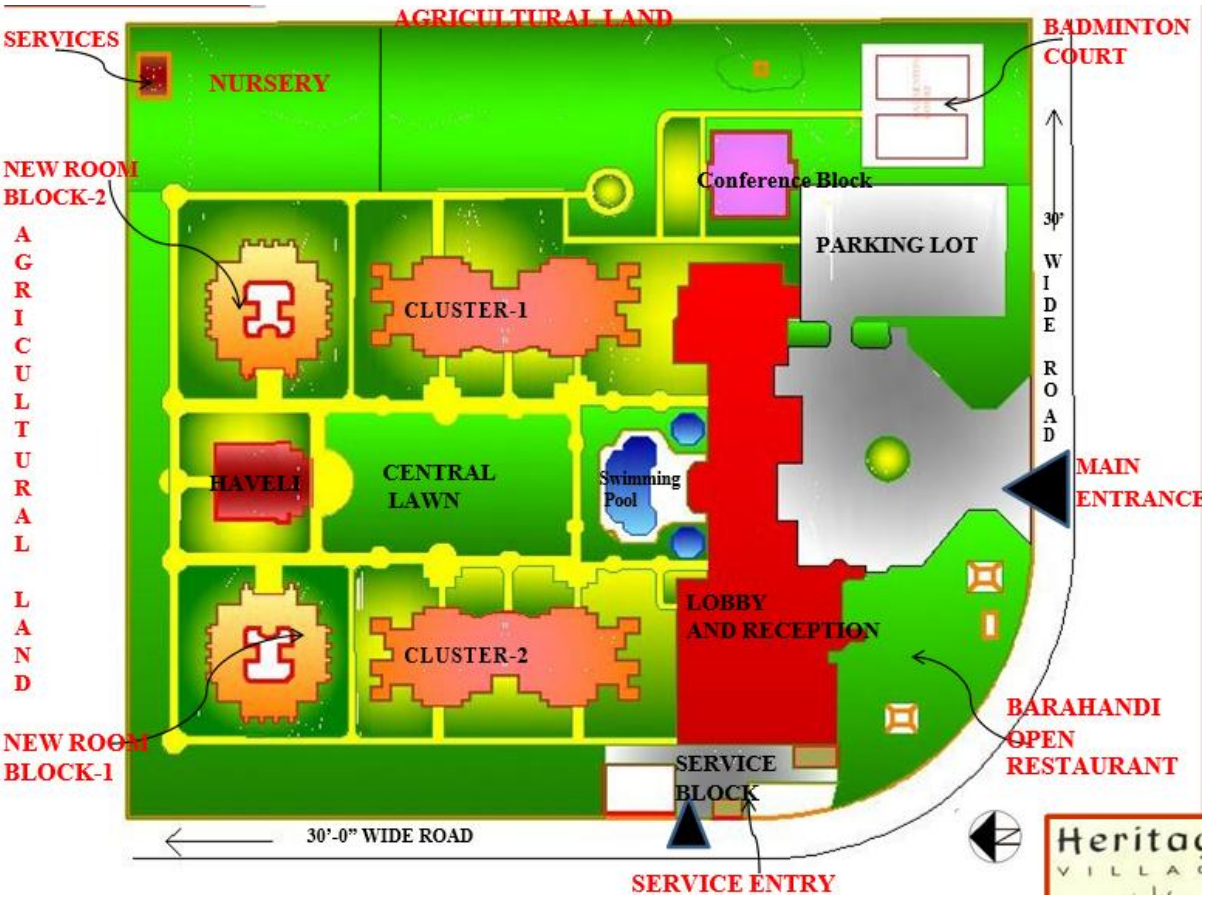
•Its peaceful ambiance is perfect for a relaxing holiday.

CLIMATE:

Moderate Temp. ,5 – 30C – winters, 35 – 40C - summers

TOPOGRAPHY: Flat

5.3.6 SITE PLANNING



- The site is laid out like a **traditional palace precinct**:
    a) Entry through a **grand arched gate**
    b) Linear and axial movement leading to a **central courtyard**
    c) Radiating rooms around courtyards (like old havelis)
    d) Zoning:
        - **Public zone**: reception, lobby, banquet, restaurant
        - **Semi-public**: gardens, pool, bar
        - **Private**: guest rooms, spa, suites

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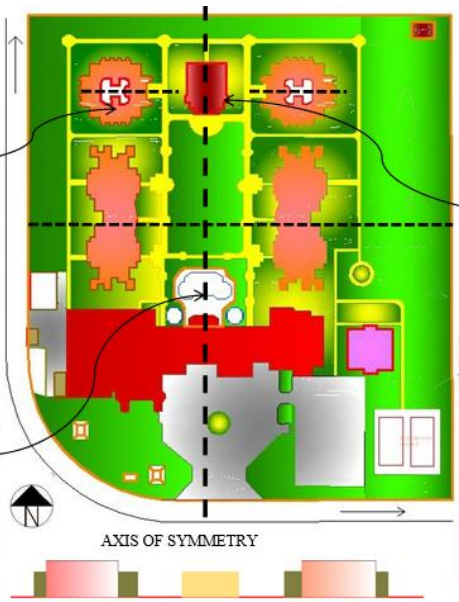
PLANNING CONCEPTS

•The concept of courtyard planning has been used by arranging the rooms in a cluster around a courtyard.



•Rooms are flanked on both sides of the central landscaped court creating a feeling of being close to nature.





•Hindu Methodolgy to be shown in the resort by using all the elements of Hindu character like Koisks , Jharokas , domes



•The feel of privacy as well as space for social interaction has been provided.



•The site is divided into different zones like

•Public areas
•Private areas
•Semi –private areas
•Service areas
•Recreational areas.

•PLANNING IS DONE ON THE PRINCIPLE OF SYMMETRY.
•PRIVATE AREAS ARE PLACED REAR SO THAT PRIVACY IS MAINTAINED THERE.

SITE LAYOUT



•NEW GUEST ROOM BLOCKS
AREA=7219SQ.FT. EACH



CENTRAL LAWN
AREA=17774SQ.FT



THE FRONT BLOCK
AREA=31321SQ.FT.





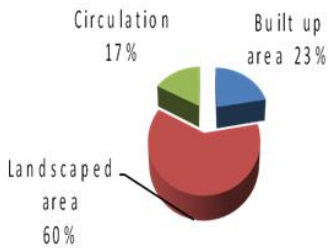
HAWELI.
AREA=3568SQ.FT.



ROOM CLUSTER:
AREA=11508SF.FT EACH.

BUILT UP AND OPEN SPACE RELATIONSHIP

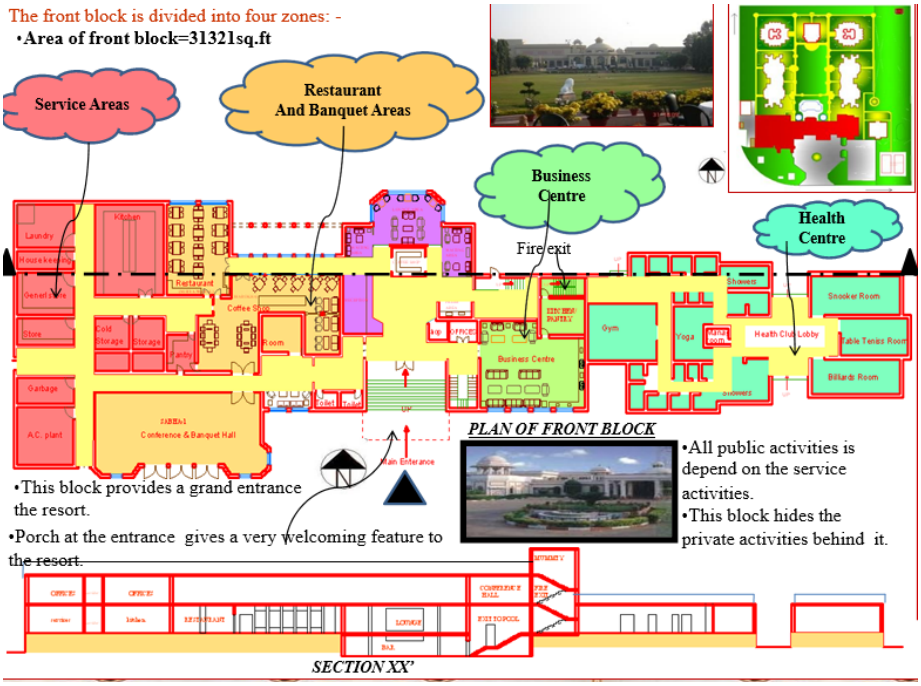
•This beautiful eco-friendly resort is set amidst green, spacious lawns spread over 12 sprawling acres.
•Floor Area ratio is 0.34



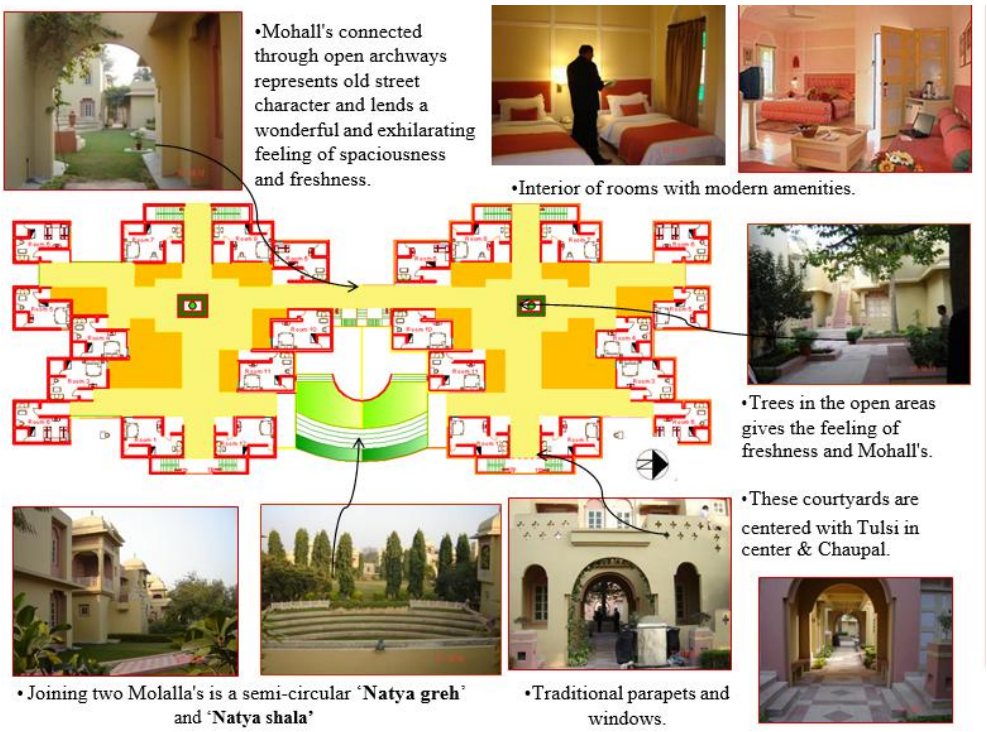
ORIENTATION OF BUILDING

•The orientation of the building is along the north-south, axis.
•Building Blocks are placed with consideration of wind movement.

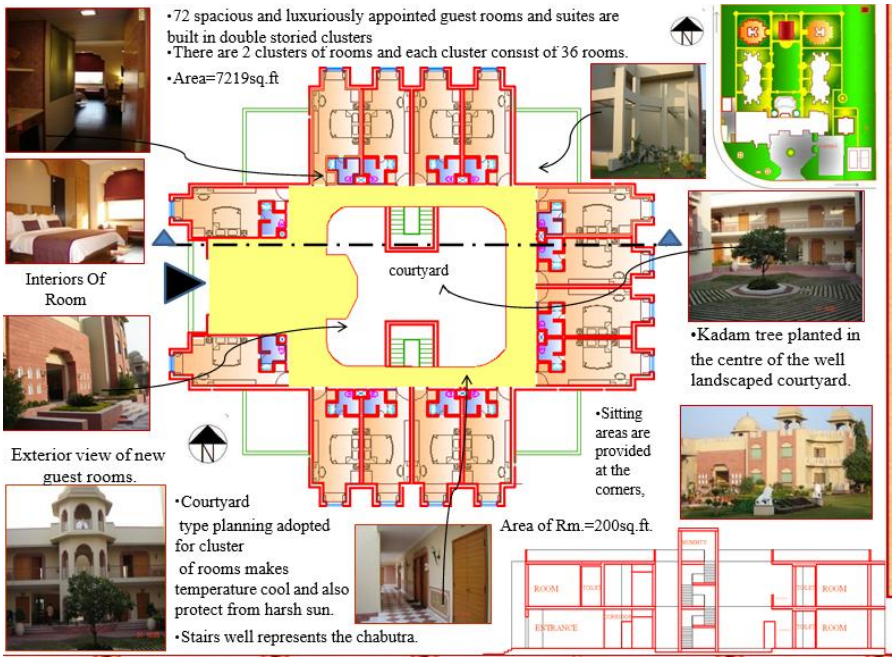
FRONT BLOCK



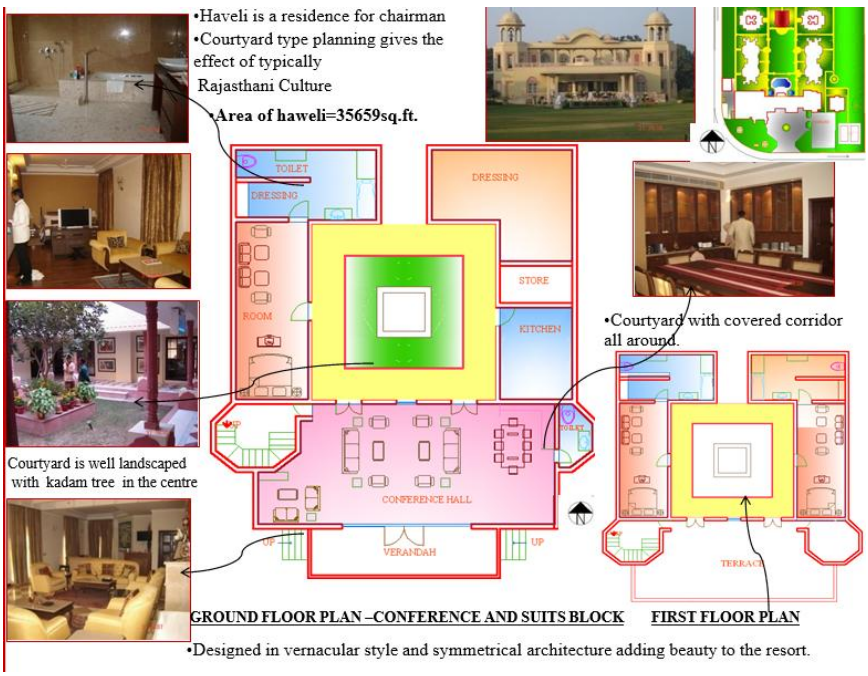
GUEST ROOMS



GUEST ROOMS (NEW ROOM BLOCK)



HAWELI



ARCHITECTURAL FEATURES

Feature	Description
Facade	Sandstone plaster finish, chhatris, domes, jharokhas
Openings	Traditional wooden carved doors, arched windows with jaalis
Roofs	Flat with projected parapets, small domes and towers
Courtyards	Central landscaped courtyards for ventilation and gathering
Materials	Lime plaster, red sandstone, marble, terracotta tiles
Structural System	RCC frame structure with cladding and detailing in heritage style

SUSTAINABILITY & CLIMATE RESPONSIVENESS

- Thick walls and small windows for insulation against heat
- Jaali work and inner courtyards for passive cooling
- Shaded arcades and verandahs
- Use of local materials reduces transportation energy
- Integration of natural vegetation and native landscape

INTERIOR DESIGN

- Use of Rajasthani motifs and frescoes
- Furniture made from reclaimed wood and metal
- Handcrafted textiles, block prints, and artwork
- Lighting in traditional lantern and diya styles with modern amenities

ROOM TYPOLOGY

DELUX SUITES 59 sq m

- Sleeps 3
- 1 King Bed

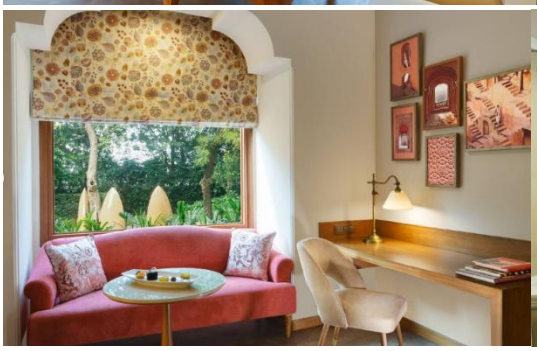


FAMILY SUITE , 2 BEDROOM

- Sleeps 4
- 2 King Beds



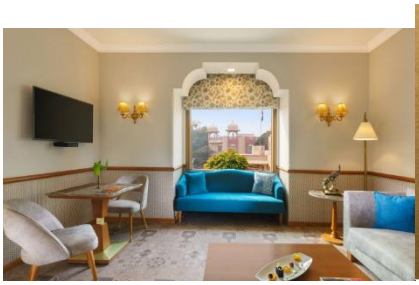





HERITAGE SUITE (FIRST FLOOR)

- 49 sq m
- Sleeps 3
- 1 King BED






HERITAGE SUITE (GROUND FLOOR)

- 49 sq m
- Sleeps 3
- 1 King Bed







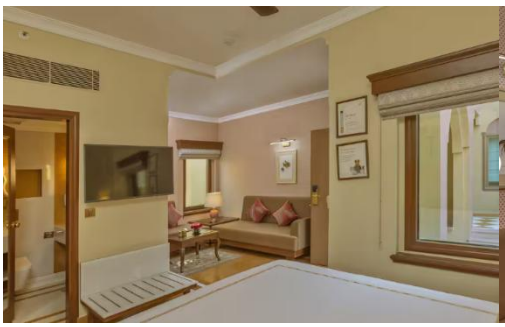
DELUXE ROOM, 1 KING BED, GARDEN VIEW

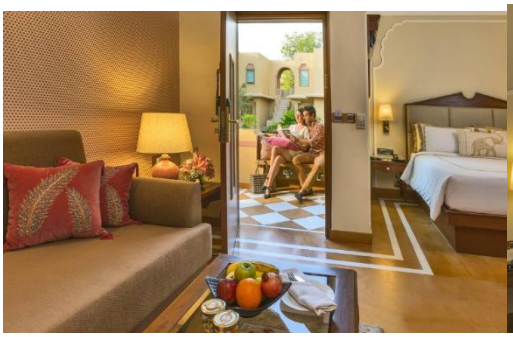
- **30 sq m**
- **Sleeps 3**
- **1 King Bed**




HERITAGE SUPERIOR ROOM

- **30 sq m**
- **Sleeps 3**
- **1 King Bed OR 2 Single Beds**






RECREATIONAL ACTIVITIES





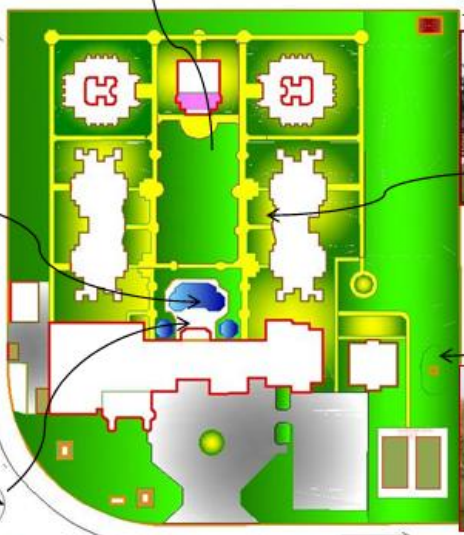
•The central lush green lawn in approximately 34,000 sq. ft. in size.
•It is used for outdoor events like weddings, receptions and banquet.

•The pool has different levels with different water depths to cater to a variety of age groups of people.

•Swimming pool with an adjoining children's pool.



•It has a swimming pool just behind the main block and facing the central lawn





•Open air theatre is provided for a capacity of 50 persons.

Playing area for kids.





•Sitouts are provided in the lawn



POOL- BAR.
•The level of the pool has been raised to improve privacy.



•INDOOR AND OUTDOOR GAMES

•A **good play area** for children & also a jogging track are also provided.



•Recreational activities segregate in the whole resort increases the interaction in the resort

SERVICES

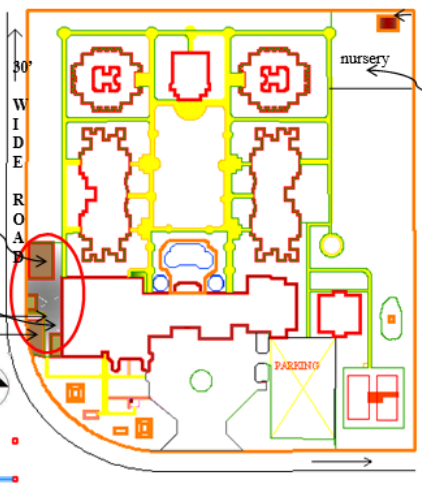


•For fire fighting, two pump rooms have been provided on the either side of the resort.



water treatment plant

SERVICE ENTRY

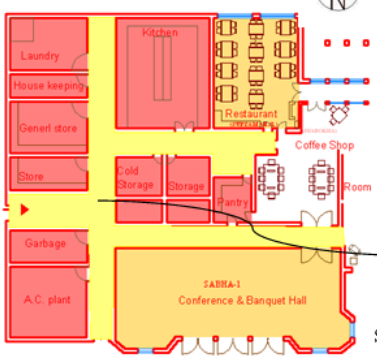


Pump room



•The water treatment is done with the help of an underground treatment plant and then the treated water is use for irrigation purpose.

•Laundry, housekeeping, general store, an A.C. Plant, cold storage, kitchen , pantry etc Are the components of the service zone.



•The service zone is provide on the left side of the restaurant and also has a separate entry from a 30' wide road running along the boundary wall of the resort on the west side.



Service Corridor



RESTORATION & ADAPTIVE REUSE PROCESS

Renovation Timeline

- A phased **comprehensive restoration** occurred over two seasons—from **May 2023 to September 2024**—followed by final detailing into **2025** hoteltalk.in+1Hotelier India+1.

- The aim: preserve **heritage aesthetics** while injecting **modern luxury**, sustainability, and experiential value.

Key Intervention Zones & Strategies

Zone	Restoration Approach
Entrance & Lobby	Re-imagined foyer with elaborate arches, new reception desk, rich fresco-style plaster and Indian motifs to evoke regal haveli arrival
Banquet Halls	The "Sabha" and "Utsav" halls re-dressed with floral Chitrakari, lapis-blue/red ochre palettes, and gilded Rajput-style detailing for palace-like interiors.
Restaurants	Introduction of **Suvarna Mahal** (Rajasthani-Saracenic styling) and **Mama Miso** (modern Pan-Asian décor), both blending tradition with contemporary luxury.
Guest Rooms	80 rooms fully refurbished—maintaining spatial clusters ("mohalla" format) but updating finishes, furnishings, fittings, lighting, linens and HVAC systems
Landscape & Pool	Redesigned gardens, axial pathways, new lotus ponds and lawn layouts; signature **surface-flow swimming pool** with lapis-blue tiles and modern lighting.
Event Zones	Created new **Shikar Bagh** (Jodhpur-style tented pavilion) and **Baradari Pavilion** with cusped Saracenic arches for intimate events.

Materials Used in Restoration

- **Local sandstone and lime-based plaster** for façades and Chitrakari motifs, preserving traditional Rajasthani palette (ochre, sienna, lapis blue).
- **Hand-carved woodwork and jaali screens** in interiors and arcades, revived via local artisans.
- **Ceramic lapis-blue glazed tiles** for pool surface and water features.

- **Brass leaf and Chitrakari paints** for banquet and lobby murals.
- **Reclaimed wood beams and antique-style furniture**, textiles in block-print and heritage motifs.
- **Modern materials integrated discreetly**: RCC frame, concealed HVAC ducts, LED lighting, solar-ready systems, modern plumbing and IT infrastructure.

Visual Comparison: Before vs. After

- *Before renovation*: While architecturally appealing, the resort showed faded finishes, dated colors, worn gardens, and functional limitations in services and landscaping.
- *After renovation*: As seen in images above, the façade, entrance courtyard, pool edge and lawns are crisp and revitalized; interiors glow with vivid heritage detailing; event lawns read as curated heritage precincts with monumental pavilions.
- Architecture: Rich, polished "heritage" presence—entrance, facades, domes, arcs redone to look regal and fresh.
- Interiors & F&B: High-luxury dining venues (Suvarna Mahal, Mama Miso), updated banquet halls, modern rooms with heritage charm.
- Garden & pool: Redesigned axial gardens; shimmering lapis-blue pool; new event lawns and tent zones.

Restoration & Revamp Strategies

A. Zoning & Spatial Reconfiguration

- **Entrance & Lobby**: Completely redesigned to evoke palatial arrival—with frescoed arches, handcrafted motifs, and new reception layout.
- **Banquets & F&B**: Revamped halls infused with Chitrakari, lapis-painted detailing, and dual-themed dining spaces (e.g. Suvarna Mahal, Mama Miso).
- **Guest Rooms**: Redesigned in "mohalla" clusters to preserve traditional layout while upgrading finishes, linens, climate control, and lighting.
- **Garden & Pool**: Redesigned axial gardens, lotus ponds, and lapis-blue water features; resurfaced pool with glazed tiles, improved lighting.
- **Event Lawns & Pavilions**: Added new marquee spaces like Shikar Bagh and Baradari Pavilion, featuring cusped arches and Saracenic detailing.

Before vs After: Condition Summary

Aspect	Before Restoration	After Restoration
Architecture	Faded plaster, muted details, aging facades	Rich hues, crisp jharokhas, domes and arches bright and ornate
Interiors	Functional but dated furnishings and finishes	Luxe heritage-themed banquet halls and updated guest rooms
Landscape	Mature but underused lawns, pool slightly aged	Formal axial gardens, lotus ponds, re-tiled pool, curated lawns
Services	Older HVAC, lighting, amenities	Modern systems with heritage appearance, improved functionality
User Experience	Decent but waning appeal	Elevated luxury and authenticity with storytelling spaces

Significance & Architectural Learning Points

- The project exemplifies **adaptive reuse of style rather than structure**—preserving identity while implementing modern systems.
- Use of **authentic materials and local craftsmanship** keeps cultural integrity intact.
- Successful **integration of climate-responsive design** (courtyards, shaded façades, passive cooling) and modern comfort.
- The layered **zoning—from public to private** via banquets → restaurants → rooms → spa and gardens—echoes the spatial hierarchy of historical palaces.
- It demonstrates how restoration can be **experiential and narrative-driven**, not just preservative.



Image 1 (Top left) likely shows the older, less-highlighted facade or courtyard before renovation.



Image 2 (Top right) captures an improved aerial view (pool and lawns) from around 2021 or earlier.



Image 3 (Bottom left) represents updated exterior elevation and landscaping after renovation.



Image 4 (Bottom right) depicts the refreshed entrance or night façade with pronounced lighting and heritage detailing.

INFERENCES

•This palatial resort offers discerning guests a perfect blend of old world charm and modern amenities.

•The building expresses the traditional Indian architecture, and further an influence of Rajasthani architecture in it's buildings.

•Various traditional building elements and materials have been used.

•.Central facilities located right at the center not only serve the stay-in guests but also visitors.

•Service entry is very convenient and efficient because of it's location.

•There is a clear distinction between public, semi-public and private areas.

•The resort fulfills all the requirements of a tourist complex and has been very efficiently designed.

•Circulation pattern is also well defined and efficient.

•Swimming pool is centrally located and no separate bath house and changing rooms have been provided, due to which guests have to cross the public circulation areas and health club for changing.

•Sometimes the parking space also seems inadequate.

Traditional elements like Koisks. Jharokha binds the different structures in a visual sequence.

5.4 KOVALAM BEACH RESORT

INTRODUCTION

HOTEL CLASS: FIVE STAR DELUXE

- Overlooking the beach is the hotel with 100 guest rooms. Here in order to preserve the natural beauty of the site, the facilities are built into the hill slopes.
- Accommodates 300 guests, Center for massages and yoga, Water sport etc.
- The master plan does not concentrate all the facilities in one area, but generate a large number of potential growth points, thus allowing a more flexible response to future demands.
- The restaurant, lounge, pool, main kitchen, entrance etc. are on the top floor.

The architect uses vernacular materials and opens the structure up to the views beyond. The master plan therefore does not concentrate all the facilities in one area, but generates a larger number of potential growth points, thus allowing a more flexible response to future demands. Throughout the project. the construction IS in traditional vernacular of Kerala: viz, white plastered walls with red tiled roofs; other pavilions consist of light bamboo chhatris with coir matting on the floor and local Kerala handicrafts.

Slope gradient- 1m rise in 2.9m

- **PLACE:** Kovalam,Thiruvananthapuram
- **Building owner :** Kerala Tourism Development Corporation.
- **Year of consrtuction :** first phase completed in 1974 Architect : Ar.Charles Correa,Charles Correa Associates,Mumbai.
- **Managing Trust** : The leela palaces,hotels and resorts
- **LOCATION** Country State District City Region:India :Kerala :Thiruvananthapuram :Thiruvananthapuram :Kovalam
- **APPROACH & LINKAGES** By air Nearest Airport By rail Nearest railway station By road NH- 47 Trivandrum Bypass road Nearest Bus Station From Trivandrum city centre, International Airport 15 km, Trivandrum Central 16 Km

- **AREA** :Thirty five acres including hotel ,convention centre and the additional cottages .

- **SITE APPROACH:** Oblique entrance from NH byepass road lending an angular orientation of the frontal portion of the hotel.

- **ACCESSIBITLITY:**

1. Ten metre wide single entry and exit for guests at the eastern side.
2. Two 7.5 metre service entry roads one at south east side and at north side.

- **SITE SLOPE:.** Sloping of the site is along south-west direction. The same has been utilized for the amphitheatre.

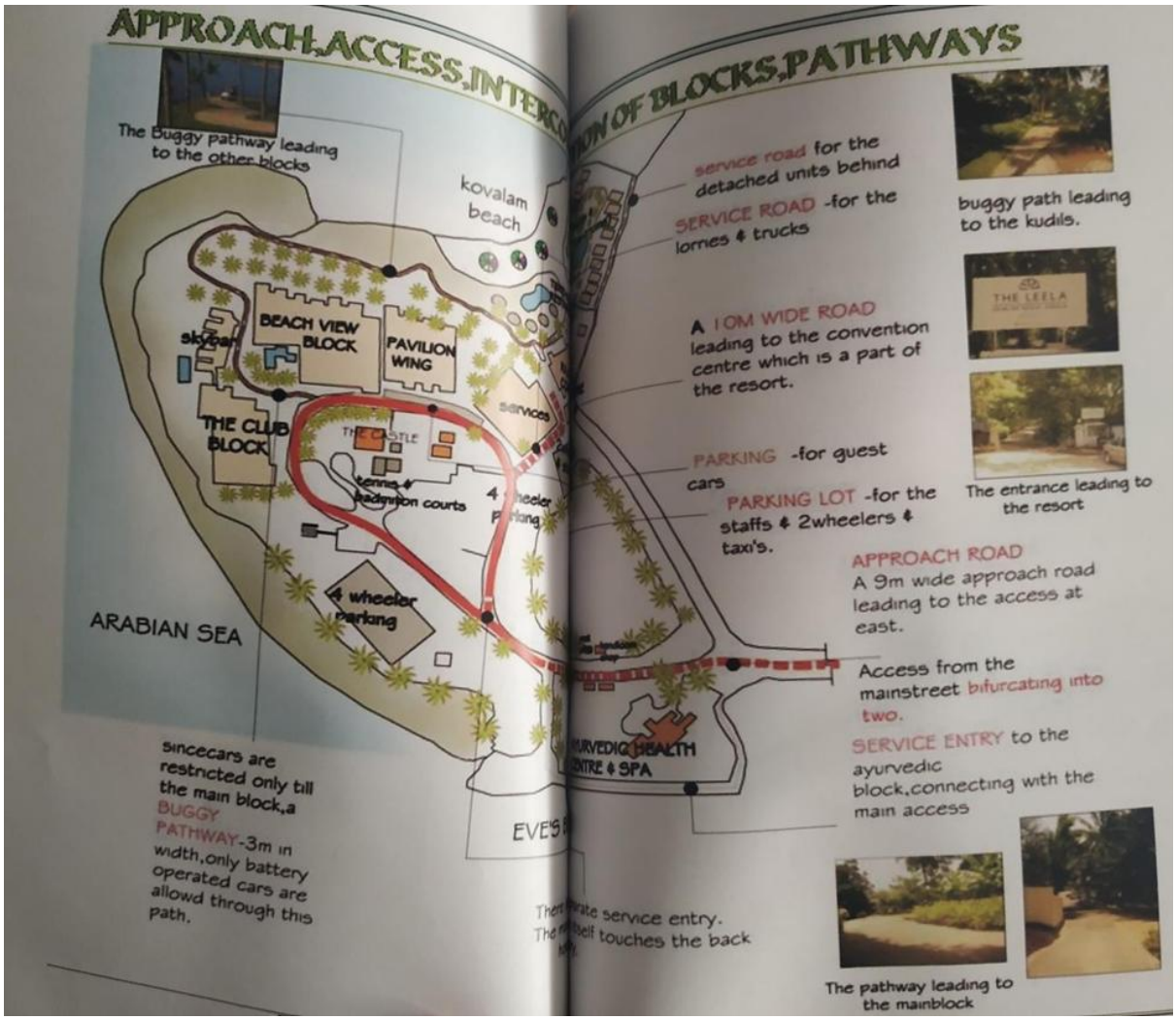




Figure 16 Kovalam beach resort



CONFIGURATION OF ROOMS

The Guest rooms come in 3 configurations-:

1. On the edge of the beach hidden under the palm trees. They are suites for longer stay with cooking facilities etc.

2. Overlooking the beach there are 100 guests rooms. Here the facilities are such that every room gets its own private sundeck..

3. Between these two are private detach housing units.



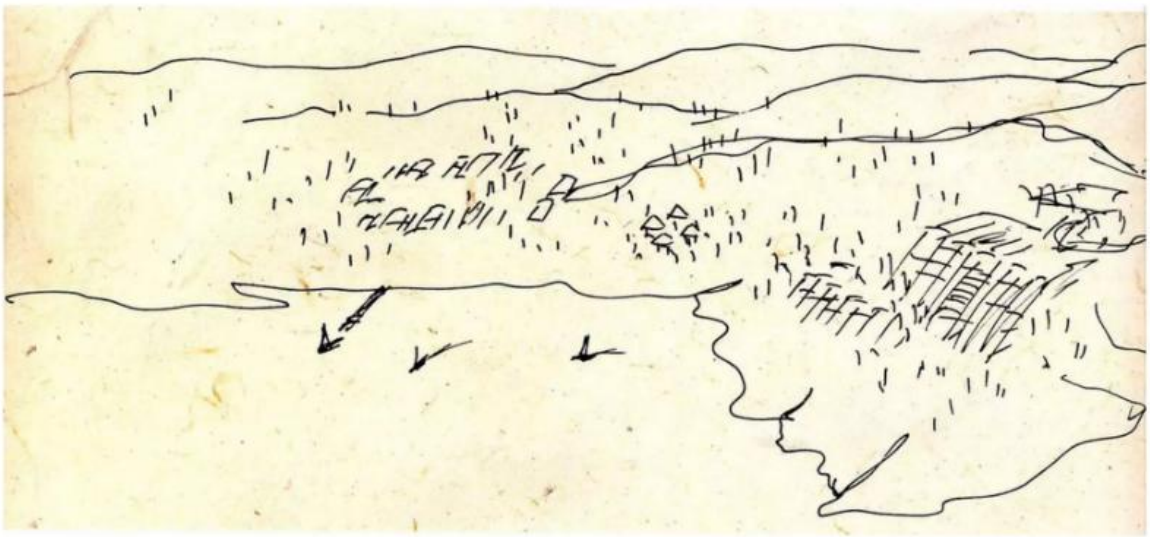


BASIC CONCEPT

a) Vernacular style
b) -Plastered Walls
c) A -Red Tiled Roofs
d) -Bamboo Chhatries
e) -Coir Mat Floors
f) -Local Handicrafts

In Charles correa's own words "at the deep structural level climatic condition, culture and its expressions, its rights and rituals.In itself climate is the source of myth:thus the metaphysical quantities attributed to open to sky in the cultures of india



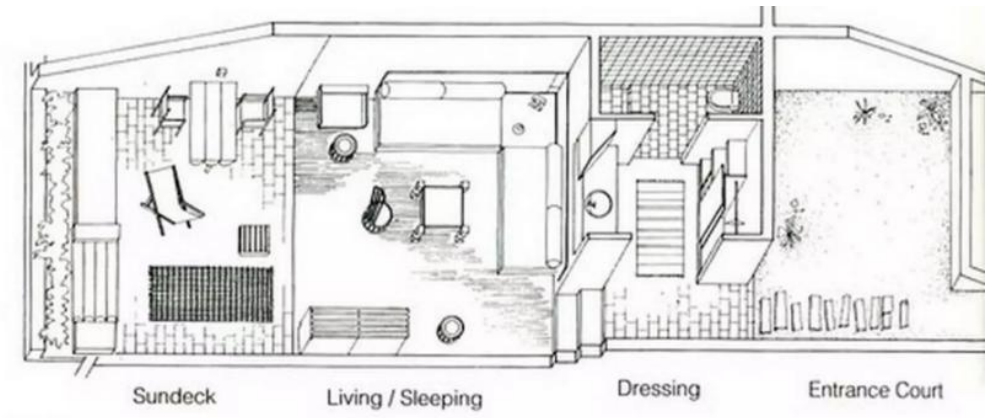


Concept sketch by Correa of Kovalam Beach Resort Source- Charles Correa Book, 1997,



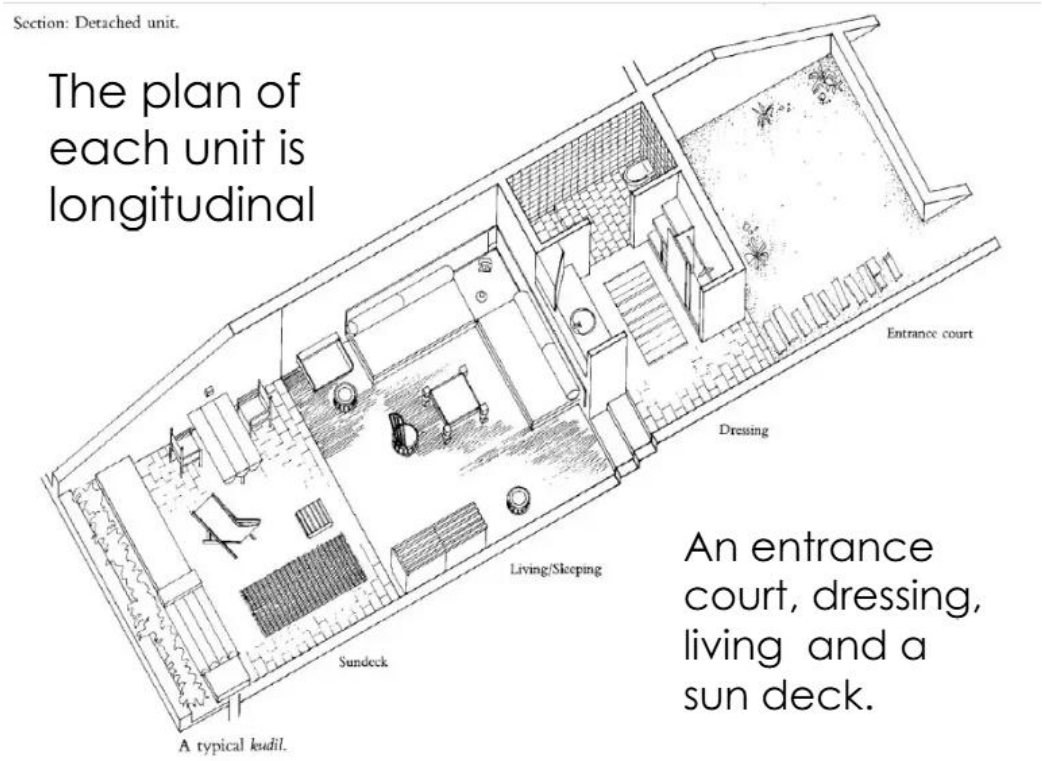
View of the resort from the beach, Source- Charles Correa Book, 1997

Exploiting the limitations of the site, Correa designed 3 room configurations- the kudils, at the edge of the beach, whi designed for longer stays and featured its own cooking space. The main hotel is layered above, around 100 guest roor overlooking the sea, while detached units are placed between the kudils, at higher densities.

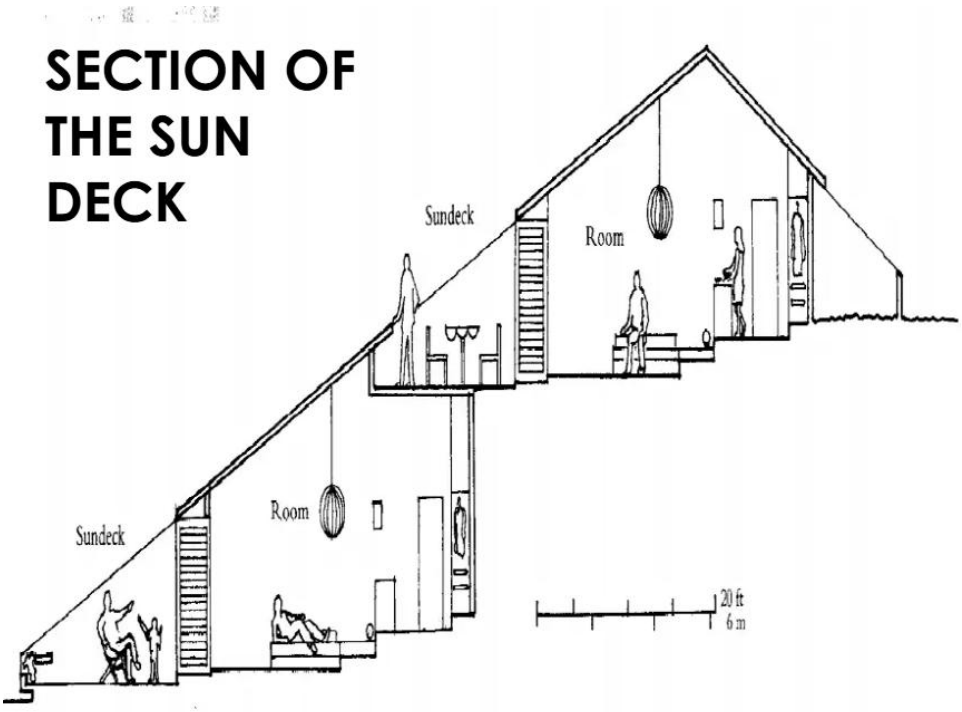


Kudil unit

Kudil Unit Design, Source- Charles Correa Book, 1997Kudil Unit Design, Source- Charles Correa Book



Though at first glance the unit may be very simple, its brilliance is seen in the section of the entire structu Here, each unit below is countersunk with the unit on top, creating privacy for the inner part of the room, the sundeck is flushed into the massive sloped surface- giving a view of the beach. With this pragmatic technique, Correa can provide 100 rooms with a stunning view and an abundance of natural light and ventilation.



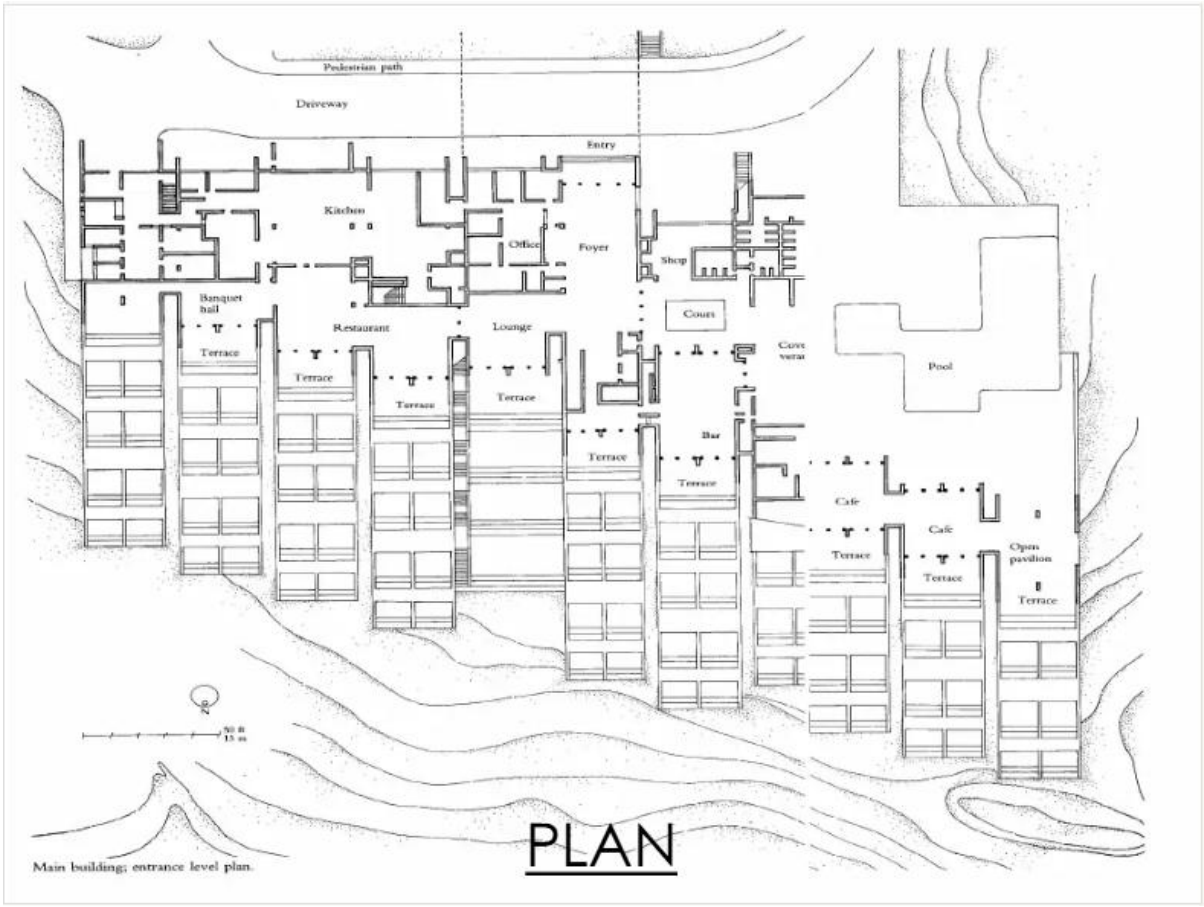
Section through the hotel rooms, Source- Charles Correa Book, 1997

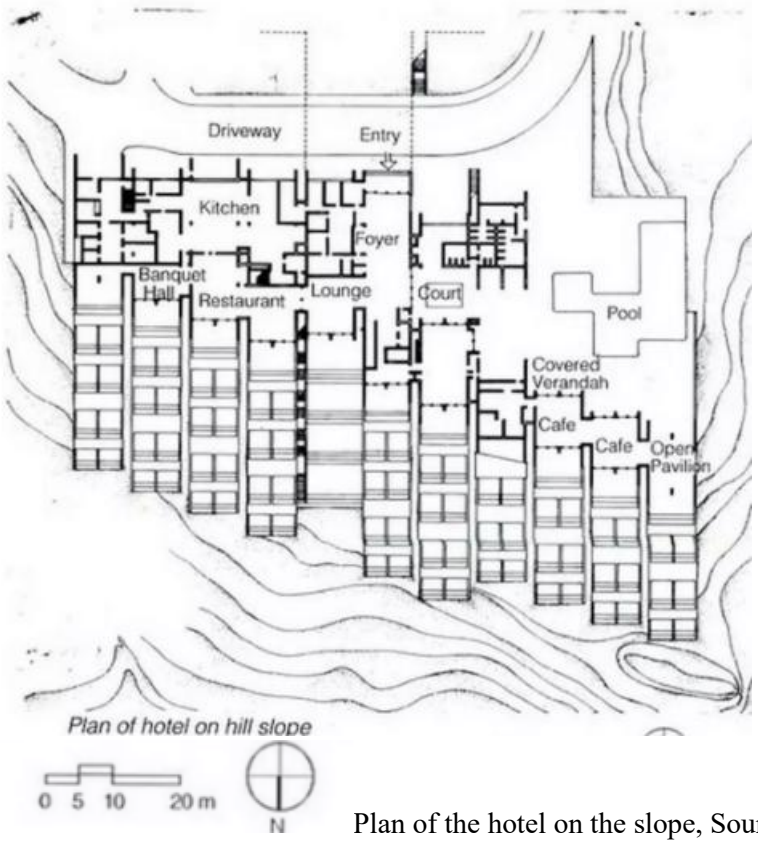
Section through detached units. Every room has its own individual terrace for sunbathing and relaxing, counter-sunk into the stepped-back sections, so as to provide privacy for the guests.



WHAT IS SUNDECK?



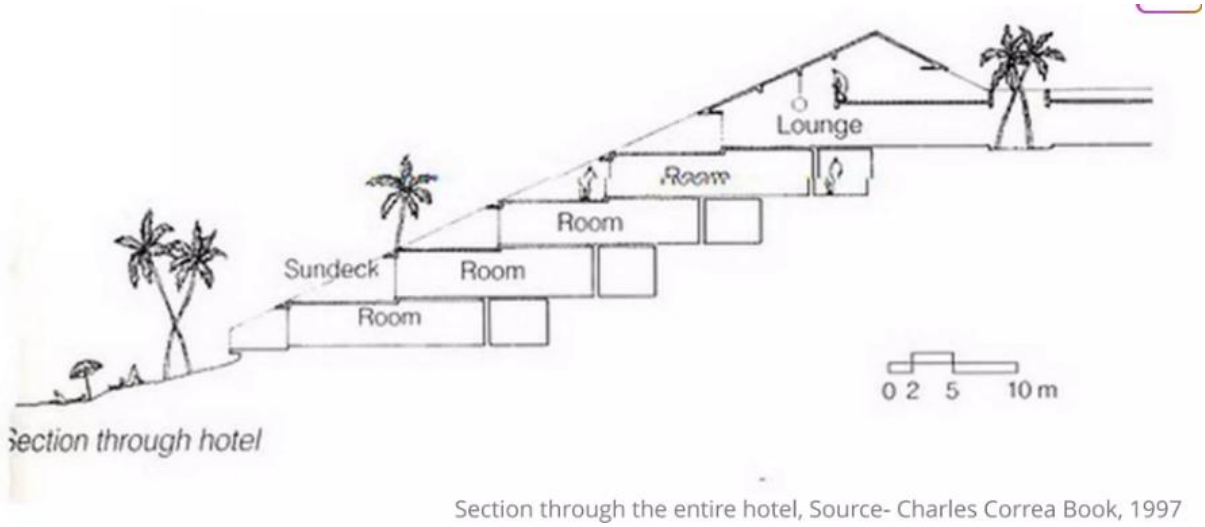




Plan of the hotel on the slope, Source-Charles Correa Book, 1997

Utilizing the contours to his advantage, Correa's resourcefulness doesn't end here.

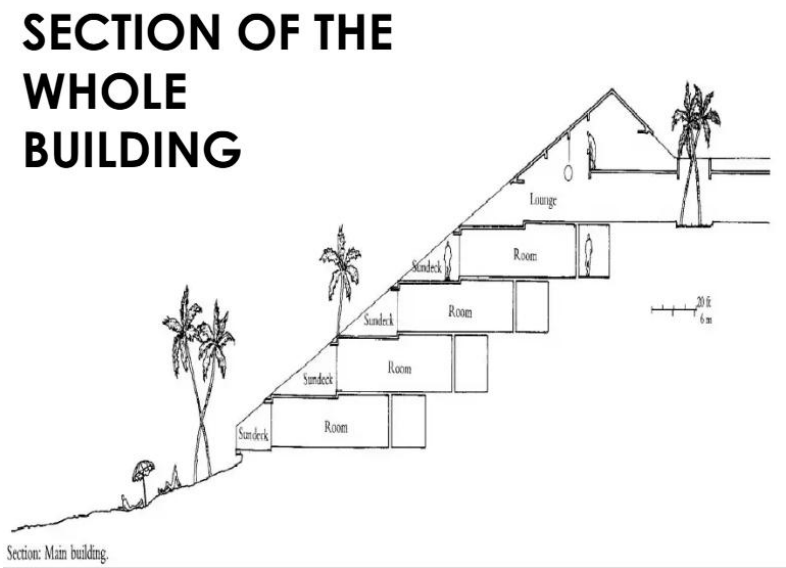
The master plan is a plan worth studying for the dexterity shown in effectively zoning circulation, activities, and spaces without compromising on the view or overall aesthetic borrowed from Kerala's vernacular architecture. From the driveway and entry is the central buffer that is the restaurant's foyer, which leads to the lounge and rooms. The lounge extends into the restaurant and kitchen on the East, whereas the West has a covered verandah and pool. In overview, these 4 spaces are united by an undivided floor plate that once again exploits the view of the sea.



Section through the entire hotel, Source- Charles Correa Book, 1997

Building into the slopes, Correa not only utilizes the view and flush into the natural slope but manages to blend into the thick green that has been retained on site. The simple element of a framed view being a constant feature gave rise to an underappreciated structure, one that can be regarded as one of the best in Correa's attempt to link the built and unbuilt. Chosen by many architects as a concept relying on the natural topography and contextual gravitas, a certain mastery has been observed in this massive structure.

This section shows how the structure negotiates the slope in a respectful manner. Correa has build into the slope, i.e. the outer reaches of the slope creates sundecks, and the rooms itself have been cut into the hill. He has used the slopè to create the various stories of the resort. The rooms are accessed from the interior of the slope, and then open out towards the view of the sea.



Mangalore tiles have been used to make the roofs. The roofs form a uniform slope on the facade, leaving only the sundecks exposed. Functionally, this pyramid-like structure also allows each room to be well ventilated and well-lit while providing a view towards the sea.

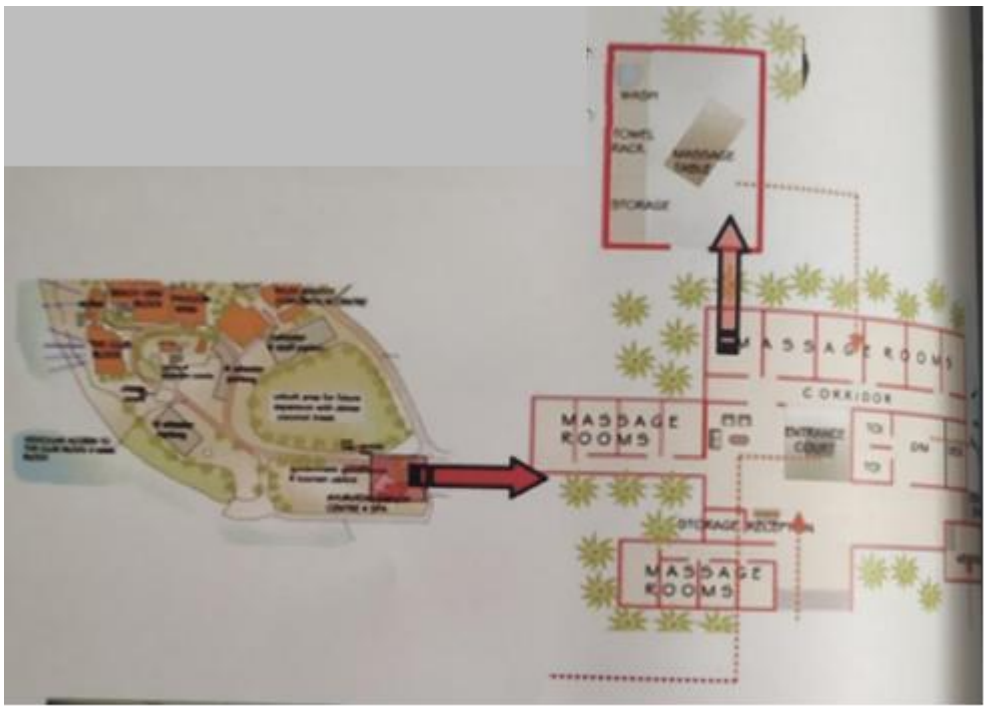
AYURVEDIC HEALTHCARE CENTRE

This block is placed right near the entrance of the site for easy access of the visitors from outside _Quite for from the accommodation zone.

There is a gym & yoga & meditation hall which has an excellent view over the eve's beach

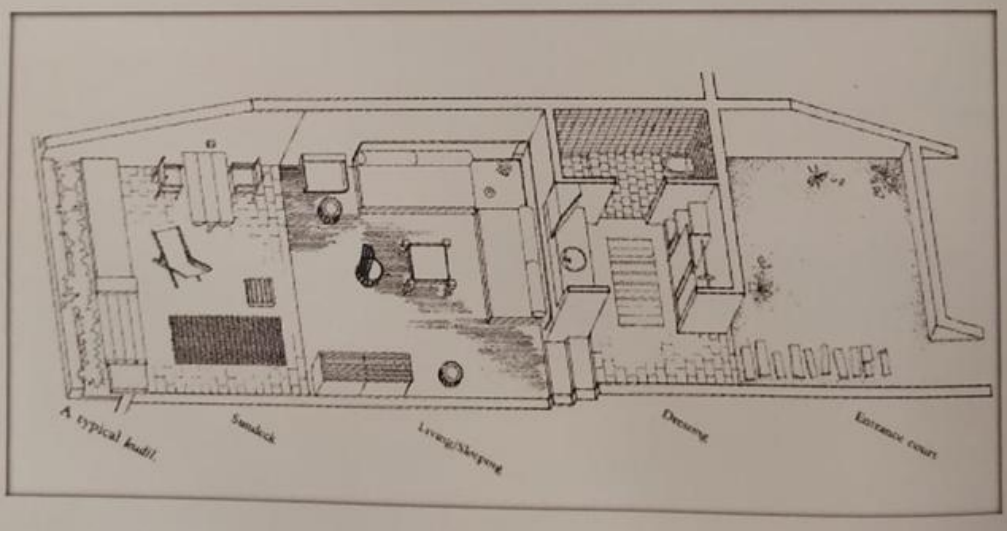
This ayurveciic centre has a health club, including the beauty salon as well as massage , spa & sauna facilities etc. This blocked is placed right at the entrance of the site for e access.

Each massage room was equipped with a massage table, in uol showers with garden view- as a healing space.


MASSAGE ROOMS
CORRIDOR
MASSAGE ROOMS
MASSAGE ROOMS

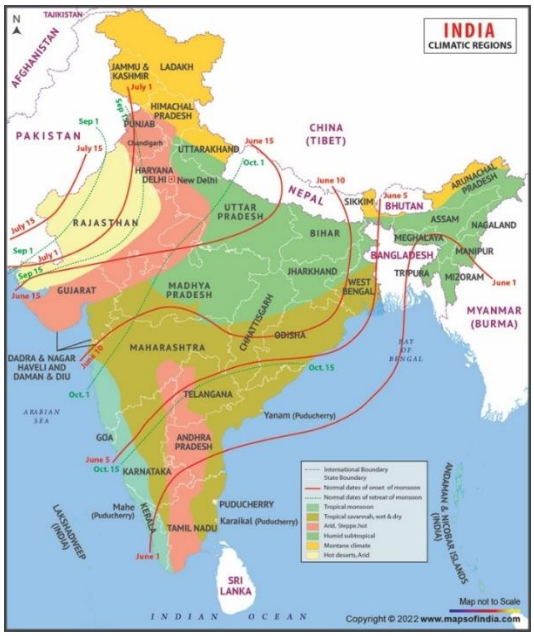
ROOMS/COTTAGES

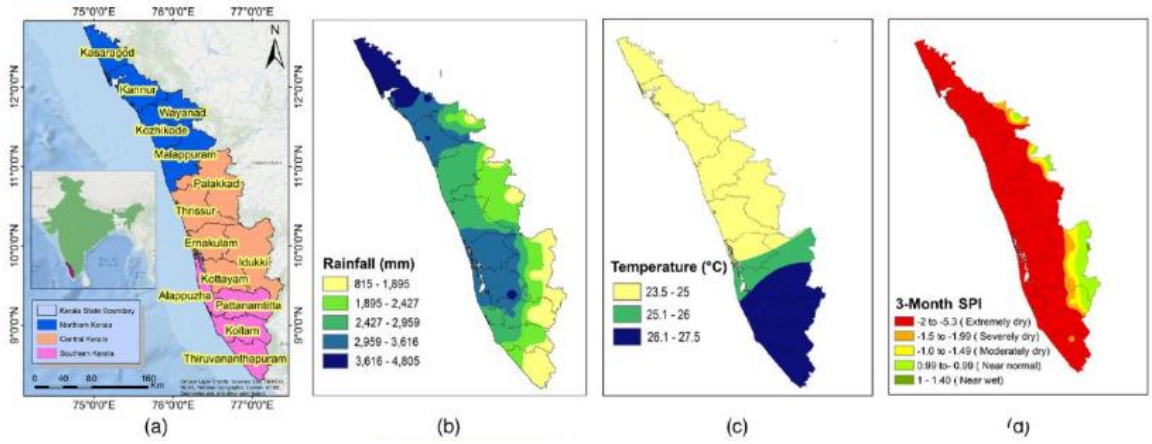
TYPE	AREA	LOCATION	VIEW
THE ROYAL CLUB			
Presidential Suite	140 sq m	The Club	Ocean
Duplex Suite	120 sq m	The Club	Ocean
Club Suite	72 sq m	The Club	
Club Room	36 sq m	The Club	Ocean
GUEST ROOMS			
Garden View	44 sq m	Near beach	Garden
Beach View	46 sq m	Main Block	Beach



TROPICAL MONSOON

- Mainly found in regions with warm or high temperatures.
- The tropical wet monsoon climate is seen in Indian coastal states of Kerala, southern Assam and the Western Ghats, Andaman and Nicobar Islands, and Lakshadweep islands.
- The above-listed places experience moderate to high-temperature conditions throughout the year.
- These areas receive an annual rainfall of 2,000 mm ranging within the months of May to November.
- The driest of the months in these regions range from December to March.





CLIMATIC CONTEXT: KERALA COAST

- Located along the humid, tropical coast of Kerala, Kovalam experiences **mean annual temperatures between 25–27 °C**, with **120–140 rainy days per year** during the Southwest monsoon.

- Such a climate demands architecture that manages **heat, humidity, ventilation**, and **heavy rainfall** through passive means.

  Climatic Design Analysis: Kovalam Resort by Charles Correa

  1. Terraced Massing & Sloped Sep-back Layout

  The resort is carved into the hill slope—guest rooms cascade downward toward the sea, each with its own private sundeck. This stepped geometry ensures **privacy**, maximum **sea views**, and **cross-ventilation**, while minimizing heat gain
  Illustrated in the section and site-plan drawings (top-left & bottom-right images).

  2. Open-to-Sky Spaces & Undivided Floorplate

  Public areas such as the lounge, restaurant, and pool deck are aligned on a continuous floorplate—framing views of the sea and allowing natural airflow, daylight, and climatic buffering
  Visible in the plan and section drawings (top-right).

  3. Vernacular Materiality: Climate-Responsive Palette

  The buildings use **white-plastered walls** (to reflect heat), **deep-sloping red-tiled roofs** (for rain resilience and shading), and **bamboo chhatris with coir mat flooring** (for lightweight pavilions) – all hallmarks of Kerala vernacular architecture
  Top-right and bottom-left images highlight roof lines and the bamboo chhatri elements.

  4. Passive Ventilation & Thermal Comfort

  The resort eschews sealed glass façades in favor of **open frames and verandahs**, letting in breezes from the Arabian Sea. Rooms open to sundecks and external passages, promoting **stack ventilation** and reducing reliance on mechanical cooling

Climatic Design Strategies

Strategy	Description
Terraced design	Rooms stepped into slope with private terraces & sea views
Open spaces	Undivided public floor plate with uninterrupted flow & ventilation
Local materials	White plaster + clay tiles + bamboo & coir reduce heat and blend contextually

No sealed glazing	Open frames, verandahs, and sundecks for passive cooling and breezes
Rain and sun control	Deep overhangs and pitched roofs to shield interiors from monsoon and sun

BUILDING MATERIAL

- The major materials used are Laterite stone, Granite stone for foundations, Wood, Clay roof tiles and Bamboo.

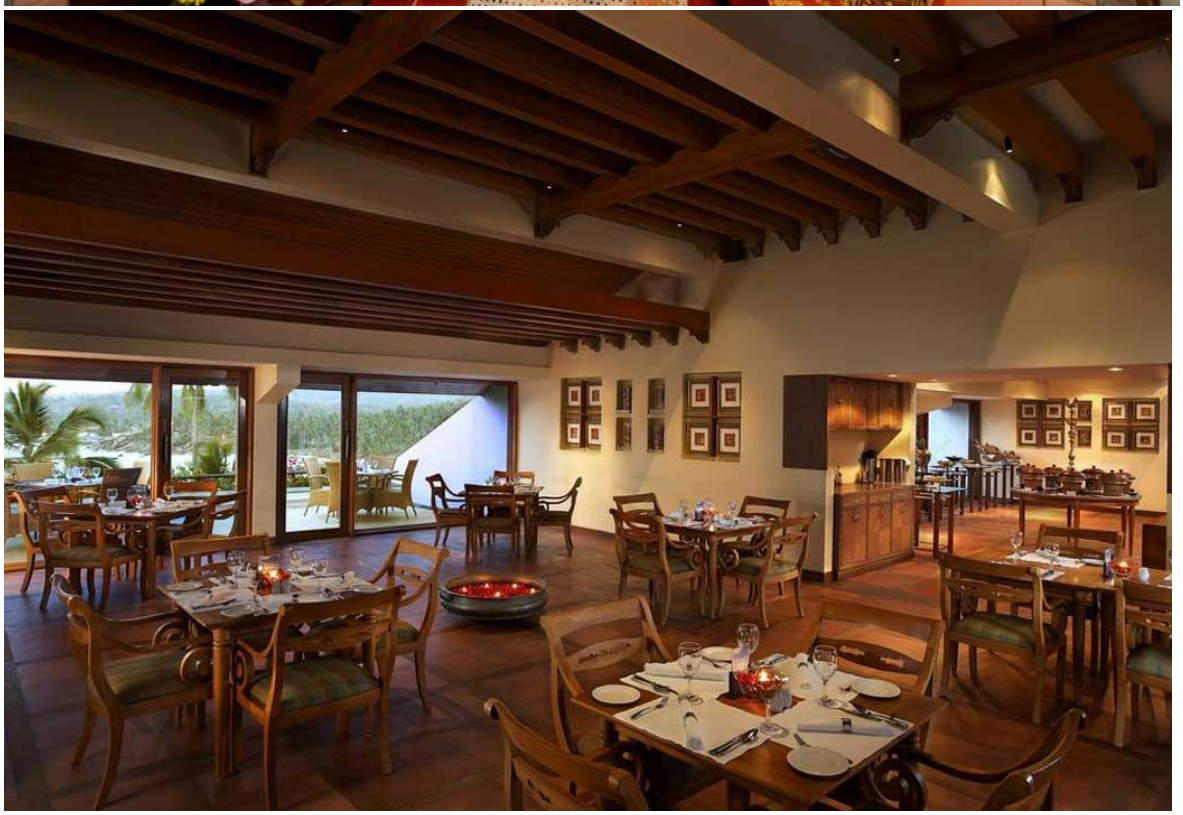
- All these materials are locally available thus they have low embodied energy due to its minimum transportation.

- The Mud mortar is used as a building element and mud is Used for making wall, clay tiles, etc



INTERIOR







ROOFING SYSTEM

- Classical Kerala architecture incorporates a bamboo frame topped with thatch or shingled terracotta tiles.

- Structurally the roof is supported by the pillars on walls resting on a plinth which is raised from the ground. This affords protection against dampness and insects in the tropical climate

- The roofline projects out to shade the walls from rain and sun and also creates large shadows preventing direct sunlight on the home's walls.

- These steeped roof helps in rainwater discharge as heavy rains is one of the important concerns.





FLOORING & MATERIAL PALETTE

- **Local, vernacular construction**: The resort heavily uses traditional Kerala materials—**white plastered walls**, **Mangalore-tiled red roofs**, and **coir mat flooring in bamboo chhatris** (small pavilions)—integrating regional craftsmanship throughout

- **Coir matting on floors**: Particularly within bamboo pavilion structures (chhatris), coir mats soften the space, reflect local handicraft heritage, and enhance thermal and tactile comfort

- **Outdoor terraces & sundecks**: Guest rooms are set into the sloping site as stepped interlocking volumes, each with its own private **sundeck**. These are part of the architectural plan, embedded into the slope with minimal wall enclosures, promoting natural ventilation and views

- **Functional zoning & ambience**: While guest room flooring is mainly traditional (plaster, tile, coir), public areas—like the entry foyer, lounge, and covered verandah with pool—lie seamlessly on an **undivided floor plate**, emphasizing climate-responsive, open-to-sky design



WINDOWS

Charles Correa's design *is firmly rooted in Kerala's vernacular architecture*, emphasizing **natural ventilation, climatic response, and openness** throughout. That means:

- Guest rooms and verandahs are openly framed toward the sea and gardens, using minimal **glass or enclosed windows**, favoring natural sightlines and airflow instead

- That said, in more enclosed public indoor areas (like the spa, administrative buildings, or massage pavilions), traditional **wooden or glazed windows** would be present—likely utilizing local hardwoods (like teak or rosewood) with slatted or grilled details as seen in vernacular Kerala architecture

These windows typically:

- Offer **excellent natural ventilation** (casement or hinged designs with shutters or grills to let breeze in while keeping rain out).

- Are made from **weather-resistant regional hardwoods**.

- Are often styled with **louvers or lattice shutters** arranged for airflow while preserving privacy and minimal distortion of the view—aesthetic priority in Correa's work.

Architectural Windows & Openings: Key Observations

1. Open-Framed Casement-Like Windows

The image from Wikimedia Commons (**open windows**) shows recessed openings with wooden frames and shuttered panels—likely made from local hardwood—designed to optimize **cross-ventilation and daylight**, while minimizing dependence on glass

2. Sheltered Windows Beneath Tiled Roofs

Side views of the stepped guest-room blocks reveal windows tucked beneath the deep overhangs of red Mangalore-tiled roofs. This arrangement allows airflow while shading interiors from direct sun exposure and monsoon rain

3. Balconies & Sundecks with Minimal Enclosure

The views through balcony openings (e.g. image 5) emphasize wide, open apertures facing the landscape, framed by horizontal beams and railings—suggesting a design that privileges visual openness over enclosed glazing

4. Monolithic Openings & Climatic Response

Overall the openings are simple, often without glass—but equipped with louvers or wooden shutters. Correa's approach favors cross-ventilation and passive cooling, with minimal enclosed window units, in line with Kerala vernacular wisdom

Summary Table: Window Features at Kovalam Resort

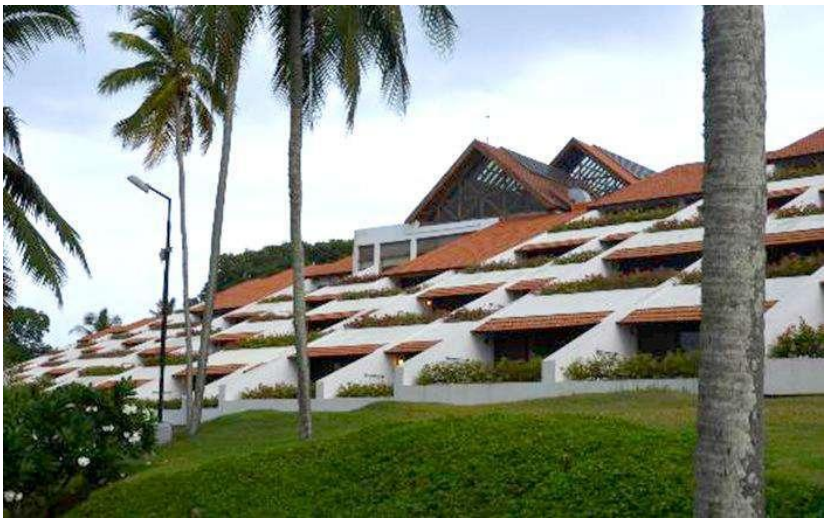
Feature	Description
Absence of Glass	Few or no sealed glass windows—open frames with louvers/shutters ensure airflow and daylight while avoiding hermetic enclosures
Wooden Louvers/Shutters	Local hardwood frames (likely teak or rosewood) used for operable screens, balancing ventilation with rain protection and privacy
Shaded Recesses	Windows set under deep overhangs of the tile roof to shield interiors from heat and seasonal rainfall
Visual Connection	Large framed apertures facing the landscape allow uninterrupted sea views and integrate interior and exterior spaces
Passive Design Principles	Every window acts as a climate-adaptive element—ventilation, daylight, and thermal control all unified in the architectural system

Why It Matters

- **Climate-First Philosophy**: Correa rejected ubiquitous glass facades, instead underlining that "form follows climate" through passive ventilation and sun control strategies

- **Vernacular Integration**: Use of regional materials and traditional forms (white plaster, red tile, operable wooden openings) ties the architecture to Kerala's cultural heritage





INFERENCES

- Accommodates 300 guests , centers for massages and yoga.
- · The facilities are deployed in the manner which would create a critical mass for each activity and at a time open up several strategic points on the site so as to increase future growth options.
- The master plan there fore does not concentrate all the facilities in one area , but generate a large number of potential growth points, thus allowing a more flexible response to future demands
- The guest rooms come in 3 configurations : beach view, garden view and club suites
- Overlooking the beach there are 100 guests rooms. Here the facilities are such that every room gets its own private sundeck.
- Construction is in traditional vernacular of kerala-: plaster walls with red tiled roofs.
- Other pavilion consists of little bamboo chhatris with coir matins on the floor and local kerala handicrafts.
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