

MARITIME ACADEMY

A THESIS

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Architecture degree

By

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DEPARTMENT OF ARCHITECTURE

SCHOOL OF BUILDING AND ENVIRONMENT

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY) Accredited

With Grade “A” by NAAC

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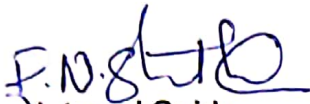
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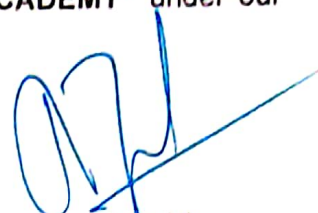
This is to certify that Thesis Report is the bonafide work of **MOHAMED SHAKIR (39210047)** who carried out the Thesis entitled "**MARITIME ACADEMY**" under our supervision from December 2023 to May 2024.


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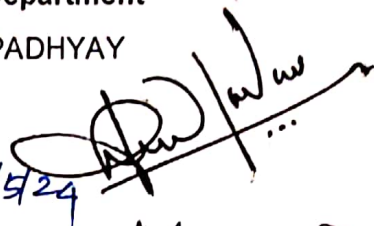
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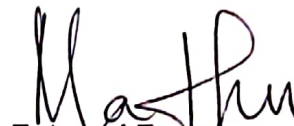
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DECLARATION

I, **MOHAMED SHAKIR** hereby declare that the Thesis Report entitled "Maritime Academy", done by me under the guidance of **Ar.Shruthi Natarajan** (Internal Guide), **Ar.Esther Kiruba Jebakumar Clifford** (Internal Review Member) and **Ar.Tahaer Zoyab** (External Guide) Sathyabama Institute of Science and Technology is submitted in partial fulfillment of the requirements for the award of Bachelor of Architecture Degree.

DATE: 23/5/24.

PLACE: CHENNAI



SIGNATURE OF THE CANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to the Board of Management of **Sathyabama Institute of Science and Technology** for their kind encouragement in doing this Thesis and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr.Devyani Gangopadhyay**, Dean and Head of the Department, School of Building and Environment, Our Design Chair **Ar.Sarath**, Thesis Coordinator **Ar.Gopiraj** and **Ar.Guruji** for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Thesis Internal guide **Ar.Shruthi Natarajan**, Internal Review member **Ar.Esther Kiruba Jebakumar Clifford** and External Guide **Ar.Tahaer Zoyab** their guidance, suggestions and constant encouragement which paved the way for the successful completion of my Thesis work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **Department of Architecture**, all my family members and also colleagues helpful in many ways for completion of the Thesis.

MOHAMED SHAKIR

THESIS SYNOPSIS

This thesis presents the design of a Maritime Academy located in the vibrant and culturally rich region of Goa. The project is not just a theoretical proposal but a live one, aimed at addressing the real-world need for such an institution in the area.

The Maritime Academy is of significant importance due to Goa's strategic location along the Arabian Sea. The academy will serve as a hub for maritime education, fostering the growth of the maritime industry in the region. It will provide students with the skills and knowledge necessary to excel in maritime professions, contributing to the local economy and the nation's maritime sector.

Given the increasing global focus on maritime trade and security, the relevance of such an academy cannot be overstated. It can provide students with the skills and knowledge necessary to excel in maritime professions, contributing to the local economy and the nation's maritime sector. The academy can offer several advantages. It can help meet the growing demand for skilled professionals in the maritime industry. It can also contribute to the local economy by attracting students from other regions

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CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

This thesis explores the design of a Maritime Academy located in the culturally rich and strategically important region of Goa. The project is a live proposal aimed at addressing the real-world need for such an institution in the area. The design of the academy is rooted in the principles of climate-responsive architecture, harmonizing with Goa's tropical climate to enhance comfort while reducing environmental impact. The project holds significant relevance due to the increasing global focus on maritime trade and security, and it offers several advantages by meeting the growing demand for skilled professionals in the maritime industry. This thesis serves as a model for future developments, demonstrating how architecture can harmonize with its environment while meeting the needs of its users..

1.2 NEED OF THE PROJECT

Goa, with its extensive coastline and strategic location along the Arabian Sea, is a prime location for a Maritime Academy. The academy can leverage this location for practical training and research. The maritime industry is growing globally with increasing focus on maritime trade and security. There is a rising demand for skilled professionals in this sector. The academy can help meet this demand by providing quality education and training in maritime professions. The maritime industry is growing globally with increasing focus on maritime trade and security. There is a rising demand for skilled professionals in this sector. The academy can help meet this demand by providing quality education and training in maritime professions.

1.2 AIM AND OBJECTIVE

The primary aim of this project is to design a Maritime Academy that provides a conducive learning environment for students, integrates with the local climate and culture, and contributes to the growth of the maritime industry.

1.3 OBJECTIVE

Educational Excellence: To provide a state-of-the-art facility that fosters educational excellence in maritime professions.

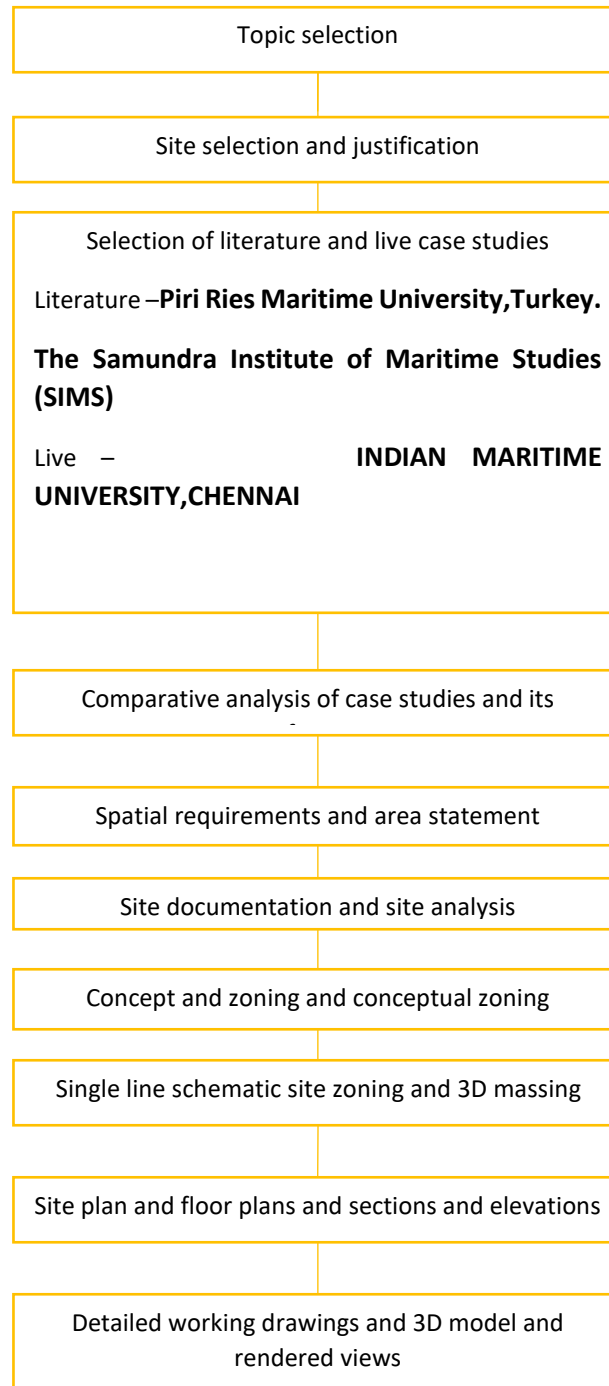
Climate-Responsive Design: To design a structure that responds to Goa's tropical climate, enhancing comfort while reducing environmental impact.

Community Integration: To create spaces that promote interaction and community building among students.

Cultural Integration: To design a structure that respects and integrates with the local culture and architectural heritage.

Industry Growth: To contribute to the growth of the maritime industry by producing skilled professionals.

1.4 METHEDODOLOGY



1.5 MARITIME ACADEMY

A Maritime Academy is a specialized educational institution that focuses on various aspects of maritime transportation and related technologies. These academies prepare students for careers as merchant marine officers and in other maritime professions. They typically offer intensive courses rather than academic degrees, focusing on a mix of classroom-based learning and hands-on training.

Difference between an Academy and an Institution Both “academy” and “institution” can be used to describe a place of learning, but they have subtle differences. An academy typically refers to a school or institution that focuses on a specific discipline or area of study². On the other hand, an institution is a broader term that can encompass a range of educational organizations.

How is a Maritime Academy different from other Institutions? Maritime academies differ from other institutions in their focus on maritime transportation and related technologies. They prepare individuals to become Merchant Marine, Armed Forces intermodal transportation officers. Unlike traditional colleges, maritime academies often offer more specialized and focused programs, catering to specific industries or professions.

Relevance of Maritime Academies Maritime academies play a crucial role in the maritime industry by providing skilled professionals. With the increasing global focus on maritime trade and security, the relevance of such academies is significant. They contribute to the growth of the maritime industry and the economy by producing skilled professionals.

Advantages of Studying at a Maritime Academy Studying at a maritime academy offers several advantages. It provides specialized knowledge and skills that are highly valued in the maritime industry. The hands-on training prepares students for the practical challenges they will face in their careers. Furthermore, maritime academies often have strong links with the maritime industry, providing students with opportunities for internships and jobs.

Challenges and Opportunities in Maritime Education While maritime education offers numerous opportunities, it also presents certain challenges. The maritime industry is constantly evolving with technological advancements and regulatory changes. Maritime education needs to keep pace with these changes. At the same time, the growing focus on sustainability and climate change presents new opportunities for innovation in maritime education.

1.6 DESIGN ASPECTS

Strategic Layout: The layout of the campus should be designed to facilitate easy movement and interaction. Buildings should be strategically placed to create a cohesive and functional campus environment. For instance, academic blocks could be centrally located, with hostels and recreational facilities surrounding them. This not only ensures easy accessibility but also fosters a sense of community.

Climate-Responsive Design: Given Goa's tropical climate, the design should respond to local climatic conditions. This could involve strategies for managing heat and sunlight, promoting natural ventilation, and using materials that help keep interiors cool. For instance, buildings could be oriented to take advantage of prevailing wind directions and sun paths.

Community Spaces: Spaces for interaction and community building, such as courtyards and common areas, should be integral parts of the design. These spaces can enhance the learning environment and foster a sense of community among students. They can also serve as venues for various campus events and activities.

Sustainability: Sustainable design principles should be incorporated into the campus design. This could involve energy-efficient buildings, water conservation strategies, and the use of sustainable materials. For instance, rainwater harvesting systems could be integrated into the design to conserve water.

Integration with the Surroundings: The design should integrate well with the surrounding environment. This includes considering the site's topography, vegetation, and views. For instance, buildings could be designed to offer views of the sea, enhancing the maritime feel of the academy.

Flexibility: The design should allow for flexibility to accommodate future growth and changes in educational needs. Buildings should be designed in a way that allows for easy modifications and expansions.

1.7 MARITIME INDUSTRY

Maritime Industry globally can broadly classified into technical and commercial sectors.

The technical and commercial area comprises of sub-sectors as mentioned below:

- | | |
|--|------------------------|
| -Shipping | -Shipping Logistics |
| -Ports Operation | -Coastal Operations |
| -Maritime infrastructure | -Fisheries/aquaculture |
| -Onshore Energy | -Mining |
| -Maritime Law | -Ship Management |
| -Crewing Services | -Business Services |
| -Chartering-Surveying | -Contracting |
| -Other Regulatory aspects like policy, | -environment |
| -safety, etc. | |

Technical Commercial A strong case for establishment of an apex institute for maritime research, education and training in the country due to following reasons:

- Lack of educational institutes focused on commercial aspects of maritime education.-High manpower demand supply gap especially in the commercial areas of the maritime sector.
- High importance of the maritime sector to growth of country's economy.
- Sagar Mala Initiative to boost maritime economy.-Prowess of the State in the maritime sector with its long coastline, lions share in national sea cargo handling and high employment generation potential.

Major Centre of Excellence in Maritime Education in India

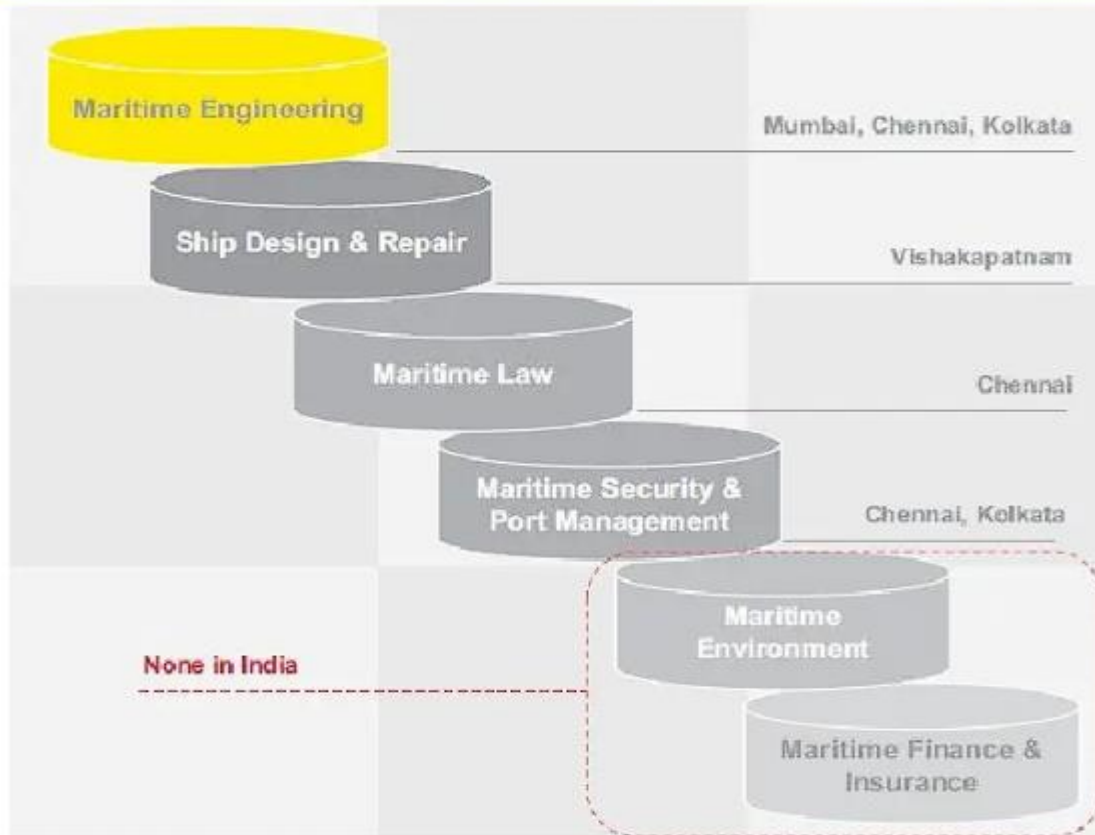


Figure 1 Maritime Education in India



Figure 2 Port

Simulator Training:-

This training includes practicing in a simulator room which has its screen at 270 degrees to give a proper experience of on ship and other cargo handling practices are also conducted.



Figure 3 Simulator Training

Rescue Training:-

Rescue training includes a practical training session in swimmingpool to train the students for any kind of rescuing that might take place in the task given.



Figure 4 Rescue Training

Firefighting Training:-

It includes practical training for fire fighting by practically creating the situation and training the students to deal with these situations.



Figure 5 Fire Training

Cargo handling Training:-

There are live modules of cargo tank built for practice sessions of cargo handling, their loading and unloading for the students.



Figure 6 Cargo Handling

Workshop:-

Various parts of ships are brought in here and their maintenance and training for their repairing is conducted here for the students.



Figure 7 Workshop

1.8 REQUEST FOR PROPOSAL



Figure 8 RFP

CHAPTER 2: LITERATURE CASE STUDIES

2.1 PIRI REIS MARITIME UNIVERSITY, TURKEY



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Plate 1 Piri reis University Case study

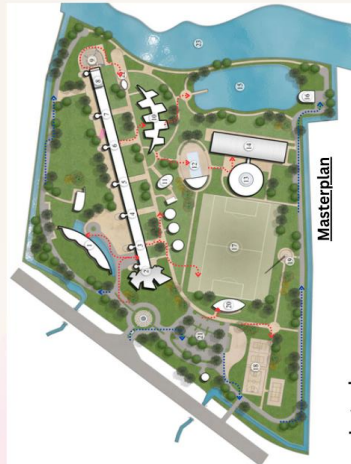
2.2 SAMUNDRA INSTITUTE OF MARITIME STUDIES,MUMBAI

The Samundra Institute of Maritime Studies (SIMS)

- Architect : Prof. Christopher Benninger
- Location: Mumbai-Pune ,India
- Area: 21,500 sqm
- Year: 2007

The campus is a green and modern maritime training center designed by Christopher Charles Benninger, a renowned architect and urban planner. It was established by Executive Ship Management, a Singapore-based ship management company, to train seafarers in pre-sea and post-sea courses.

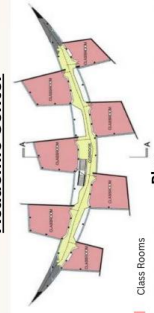
PLAN ANALYSIS:



Legend

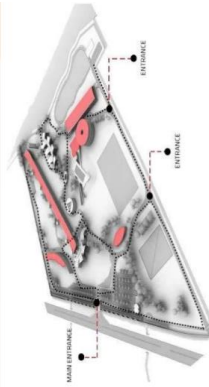
1. Administration
2. Canteen
3. Hostel - 1
4. Hostel - 2
5. Hostel - 3
6. Hostel - 4
7. Hostel - 5
8. Auditorium
9. Amphitheatre
10. Academic
11. Toilet
12. Swimming Pool
13. Maritime Sciences
14. Workshop
15. Late
16. Ship in Campus
17. Playground
18. Outdoor Sports
19. Mast
20. Utilities
21. Parking
22. Water Tank
23. Indrayani River

Academic Center



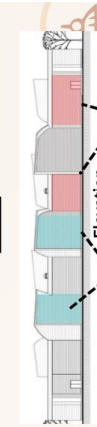
- Appears like floating on grass.
- Sea carpet are held into visual pattern by the landmark water tower axial pathways.
- Classrooms with independent courtyard. Shaded entry louvered southern facade 2 storied (14 classrooms).

Accessibility

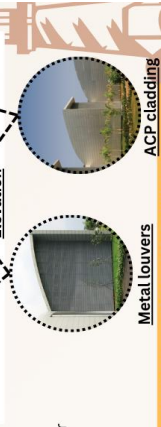


The accessibility to the site is from the old-mumbai hung high way which the main entrance is located in, also there are 2 other entrances located in the mumbai pandharpur road and there are SIMS catering center near the buildings.

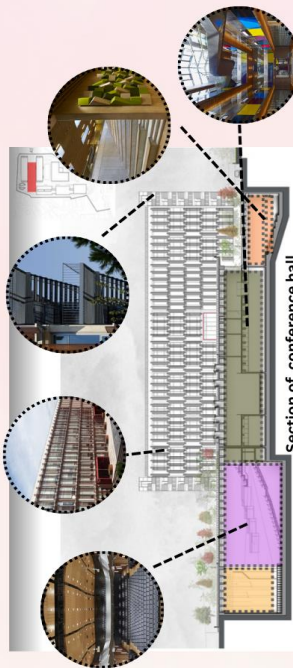
Section



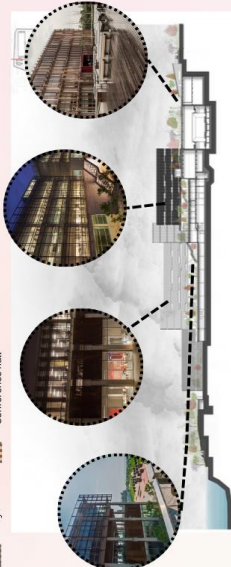
Elevation



Metal louvers
ACP cladding



- Auditorium
- Foyer
- Stage
- Conference hall



Site Section



Social Sustainability in the project is fulfilled by inter-action occurred due to linking the campus by public residence in the district through the pedestrian way in the coast line area.

Economic Sustainability in the project is fulfilled by producing the building from its own needs of electric energy that is used for cooling and heating the campus, also reuse of recycled water (grey water).

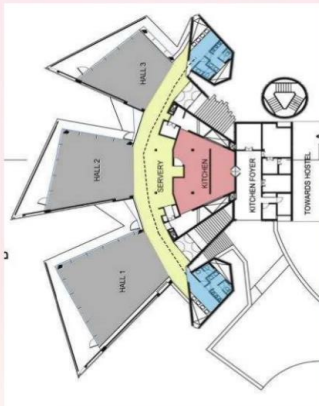
Environmental sustainability is fulfilled by usage of eco-friendly materials during entire construction process. According to the environmental materials policy of Sera Yapi, during the construction all materials were purchased from local suppliers.

Notable Aspects:

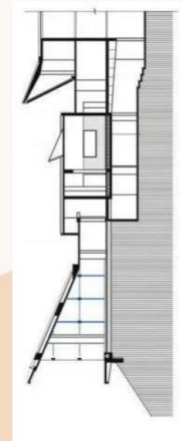
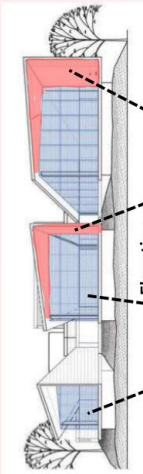
- **Design and Layout:** The campus consists of eight interconnected blocks covering a 60,000 sqm area. The design concept, termed "Neta" (meaning neat, safe, efficient), is reflected in the use of brutal materials and functional simplicity.
- **Public Spaces:** The university is designed to create open-air public spaces among blocks, fostering interaction among students and academic staff.
- **Efficient Use of Natural Elements:** The layout efficiently utilizes sunlight and protects inner courtyards from severe winds.
- **Sustainability:** The university has earned a BREEAM "very good" certificate for its sustainability principles.

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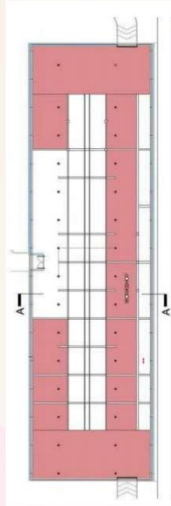
Catering center



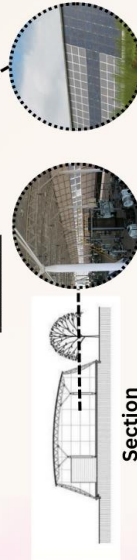
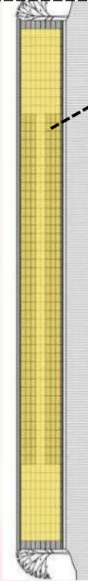
- Relief mural of: life in sky, life in water, life in land.
- Aluminum louvers keep the bright sun off of the fenestration.
- The three dining halls are glass prisms facing north.



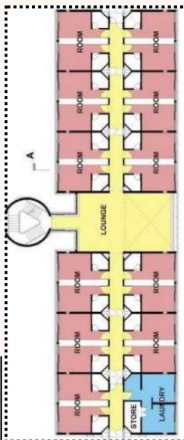
Workshop



- 90m long workshop.
- Generates 90 KN per day.
- Spanned by steel truss.
- 3000 ft long photovoltaic solar wall.



Student hostel

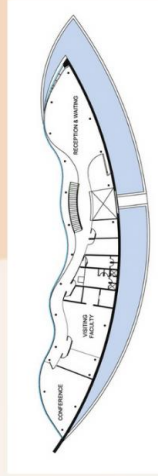


- 250m long hostel
- Endless corridor
- Silo like stairs
- Aluminium louvered facade allows natural Ventilation & day light, while blocking the sun Hence they act as air conditioning system



Section

Admin



- Photovoltaic cells in southern facade
- Both translucent & opaque Like Indian jaalis
- Waves in northern side, Entry of northern light
- Wavy glass atrium Library



Elevation



Notable Aspects:

- **Sustainable Energy:** The institute's design focuses on sustainable energy. The administrative building is oriented to exploit ambient northern light and generates electricity of 30kv through photovoltaic cells on the south-facing facade.
- **Maritime Workshop:** The maritime workshop is a sustainably driven building with a photovoltaic wall on its south facade that generates electricity upto 90kv.
- **Student Residences:** The student residences are shaped in the form of a longship and elevated on concrete pylons. They are connected by a **canteen** on one end and an **amphitheater** on the other.
- **Ecologically Conscious Architecture:** The institute stands as a testament to the possibilities of sustainable energy and ecologically conscious architecture in educational institutions.

2.3 INDIAN MARITIME UNIVERSITY, CHENNAI

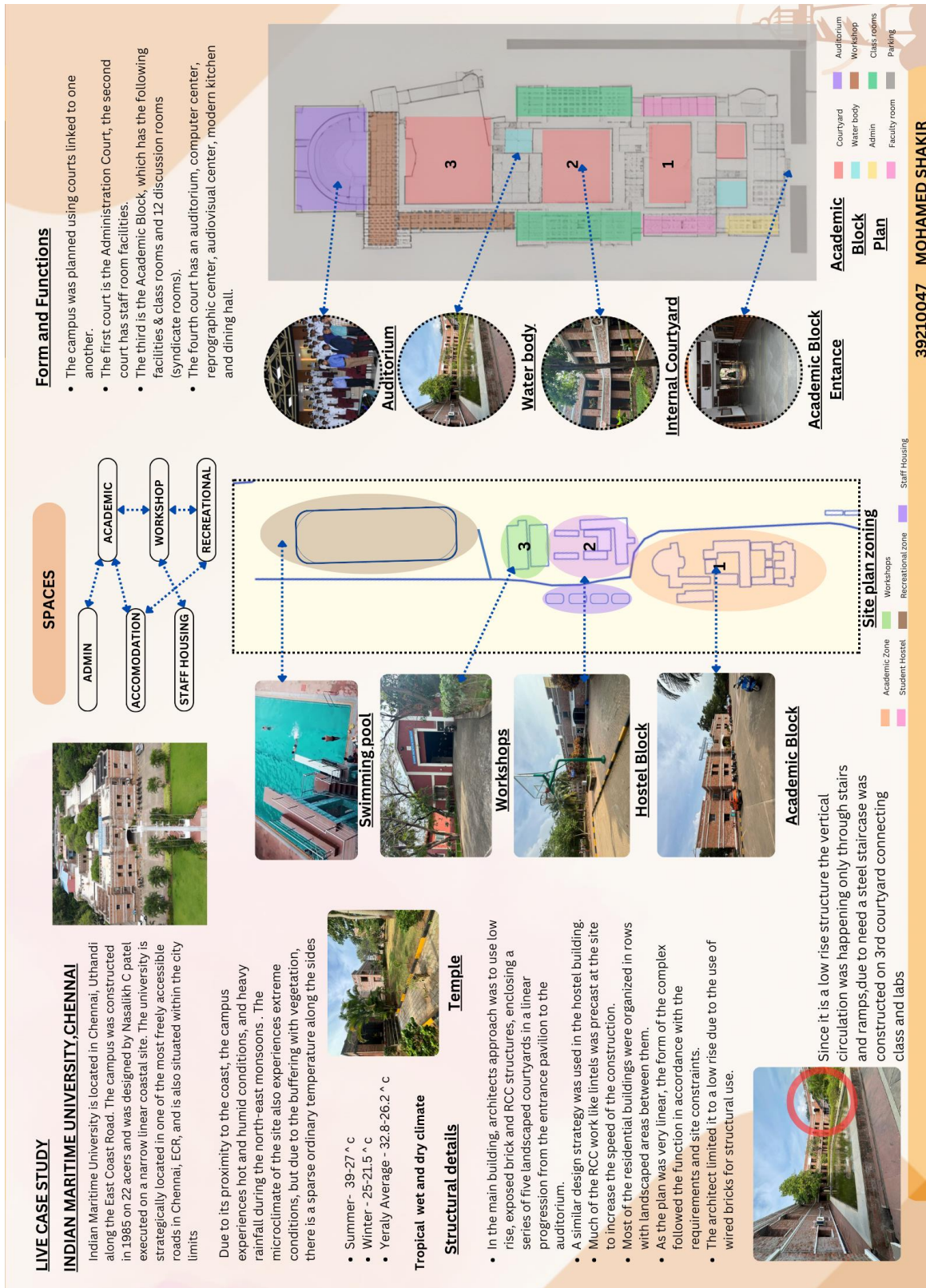
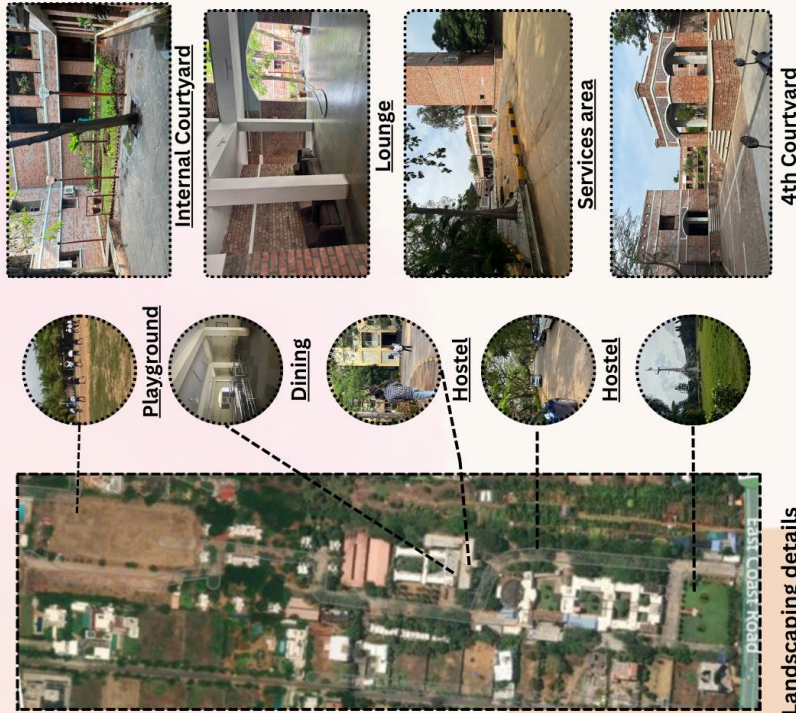


Plate 4 IMU Case Study LIVE

Building Services

- **Water & drainage:** A nearby well is used to pump water into an underground sump and is later pumped to the overhead tank (1,20,000L capacity)
- **Air conditioning:** Window AC and split AC are used in library and admin blocks. Classrooms use natural air circulation. The auditorium is centralized AC. Water bodies were provided to improve the micro-climate of the surroundings in classroom areas.
- **Electricity:** Power is transmitted to site from the power station through a substation located inside the site and then transferred to the blocks.



Landscaping details

Indian Maritime University campus is well landscaped with very few trees planned inside the courts. The water body in the fourth court helps to improve the microclimate of the area. The site overall is well shaded with trees creating a buffer zone from vehicular noise and pollution from the main highway. The courts act as interaction spaces inside the campus

Factors	Piri Reis Maritime University	Samundra Institute of Maritime Studies	Chennai Maritime University
Location	Istanbul, Turkey	Lonavala, Maharashtra, India	Chennai, Tamil Nadu, India
Sustainability	Generates 45% of its own electric energy	Employs solar photovoltaic panels and solar heating panels and generates more than 100kv electricity	Used courtyards and waterbodies to reduce the energy consumption
Materials	Uses perforated 100% recyclable non-mercuric corten steel plates	Used ACP, glass, and Aluminium	Exposed bricks are mainly used
Space Planning	60,000 sqm covered area in eight interconnected blocks	2,00,000 sqm covered with 5 blocks	80,000 sqm covered with 5 zones
Architectural Design	"Neta" meaning "neat, safe, efficient" projected as the design concept keyword	Designed to be a state-of-the-art, world-class green campus.	Designed using vernacular ideas and courtyards
Energy Efficiency	Generates 45% of its own electric energy	Employs solar photovoltaic panels and solar heating panels	Energy Consumption reduced using passive cooling methods
Waste Management	Implemented waste management and minimization measures	Through standard garbage disposal methods	Through standard garbage disposal methods
Water Management	Uses a system that reuses natural resources and minimizes water use	Has a water collection pool and a system of canals and water management devices	A nearby well is used to pump water into an underground sump later pumped to the overhead tank (1,20,000L capacity)
Environmental aspects	"Green Campus" that uses renewable energy and sustainable practices.	Campus plan devised to regenerate the subterranean aquifer system. This helps in recharging and sustaining the micro-environment and biodiversity of the campus	The water body in the fourth court helps to improve the microclimate of the area. The site overall is well shaded with trees creating a buffer zones.
Educational Programs	Offers programs in Maritime Transportation and Management	Offers pre-sea and post-sea training for candidates ranging from cadets to masters of ships	Offers undergraduate and postgraduate programs in Maritime Studies

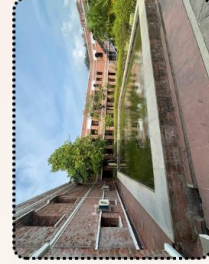
Comparative Analysis



Recyclable materials on facade



Solar panels mounted on walls



water bodies used on courtyards

In conclusion, Piri Reis Maritime University, Samundra Institute of Maritime Studies, and Chennai Maritime University all demonstrate a strong commitment to sustainability and environmental consciousness in their design and operation. Each university has its unique strengths: Piri Reis for its energy efficiency and use of recyclable materials, Samundra for its solar energy utilization and water management, and Chennai Maritime for its passive cooling methods and reducing energy consumption. Despite the differences in location and resources, all three universities are paving the way for sustainable practices in maritime education.

3.1 STANDARDS

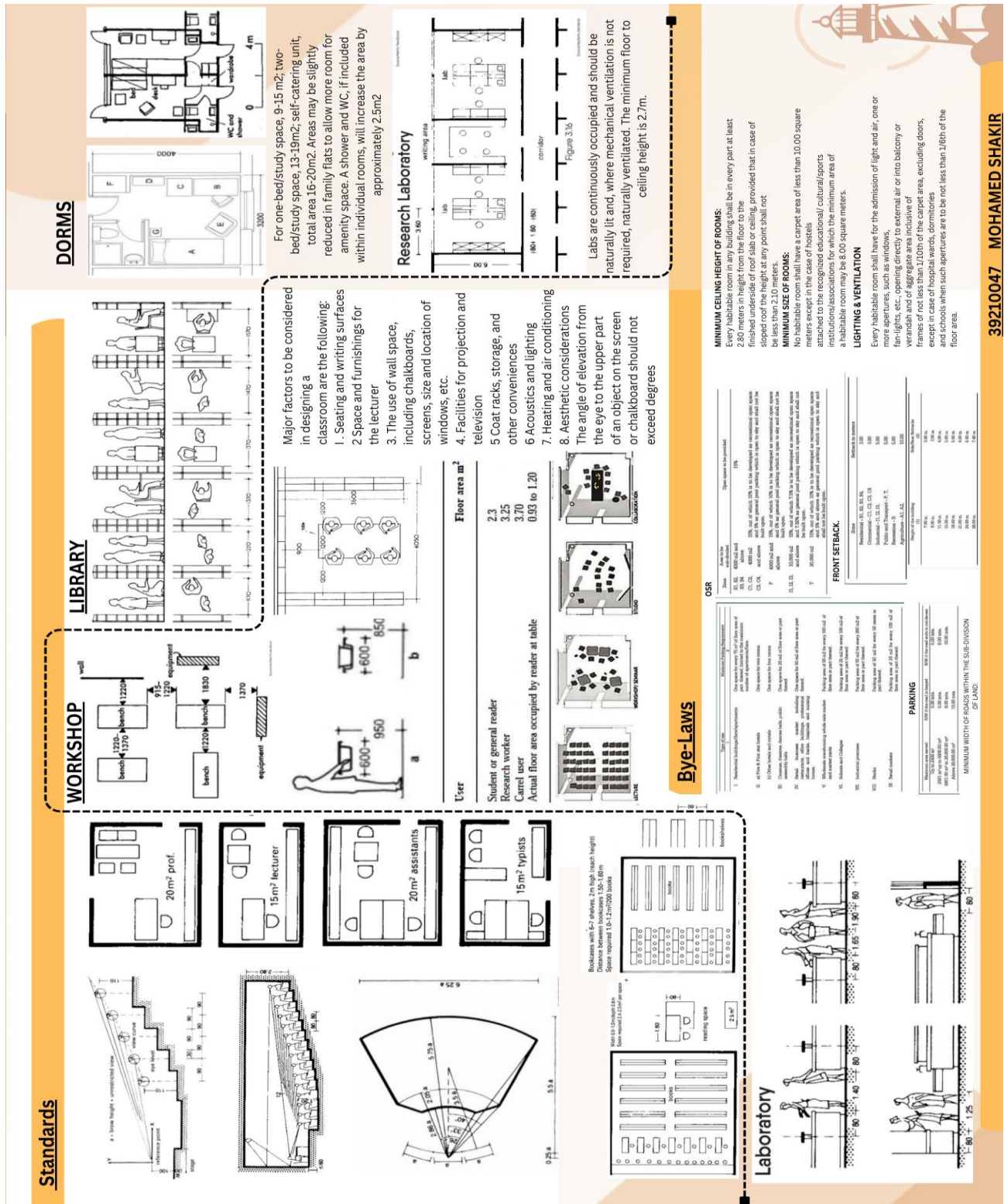


Plate 6 Standards

CHAPTER 4: SITE STUDY AND ANALYSIS

4.1 SITE STUDY



Figure 10 Site Location and surroundings



Figure 9 Goa university

Site location:

Goa, india

Latitude:15°27'26"N

Longitude: 73°49'44"E

Location:

Taleigao Plateau,Tiswadi,North Goa

Area:

55000 sqm

About site

The blue pins indicating educational institutions suggest that the site is in an educational zone, which could be beneficial for creating an academic community and collaboration opportunities. The coastal proximity and the surrounding environment make it a suitable location for a Maritime Academy, offering both practical advantages and a conducive learning atmosphere. Remember to consider the local regulations, environmental impact, and community integration when developing the site

North:

There is a dense cluster of buildings of goa university. This proximity to developed areas could provide easy access to amenities and services for the academy.

East:

The eastern side features a mix of vegetation and open land with scattered structures. This natural setting could offer a serene environment for the academy and potential space for expansion or outdoor activities..

South:

The southern boundary is adjacent to a body of water, part of the Zuari river. With an apartment complex inbetween

West:

More areas with vegetation and some buildings are spread out over the terrain. This side may offer a quieter setting for the academy, away from the busier northern side.

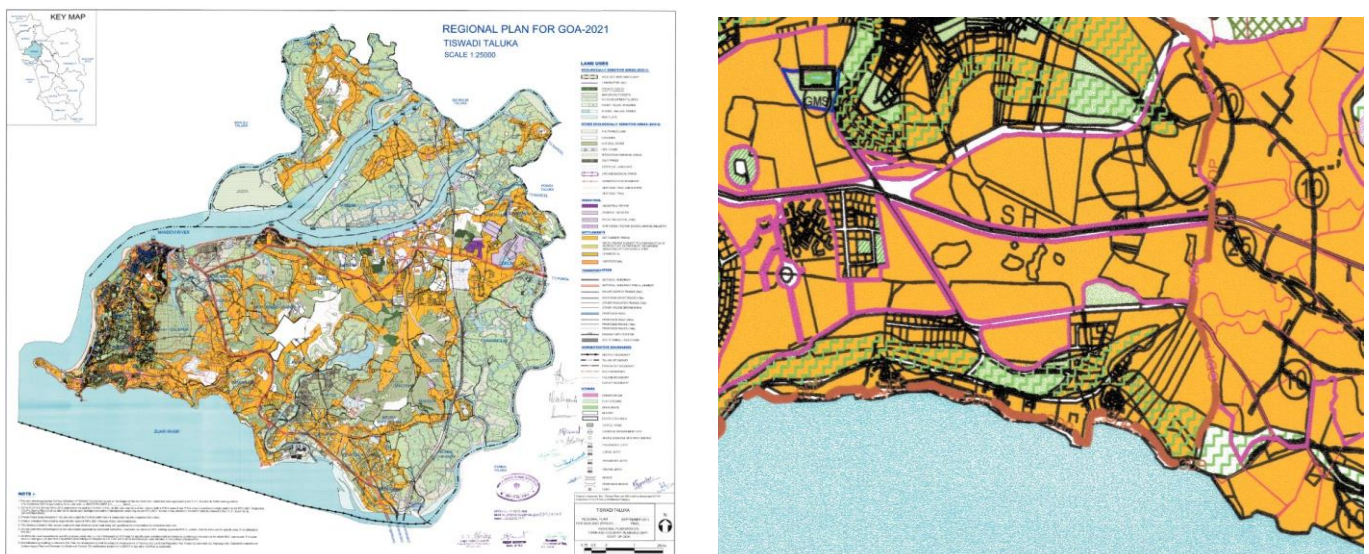


Figure 11 Land Use Map

4.2 SITE JUSTIFICATION

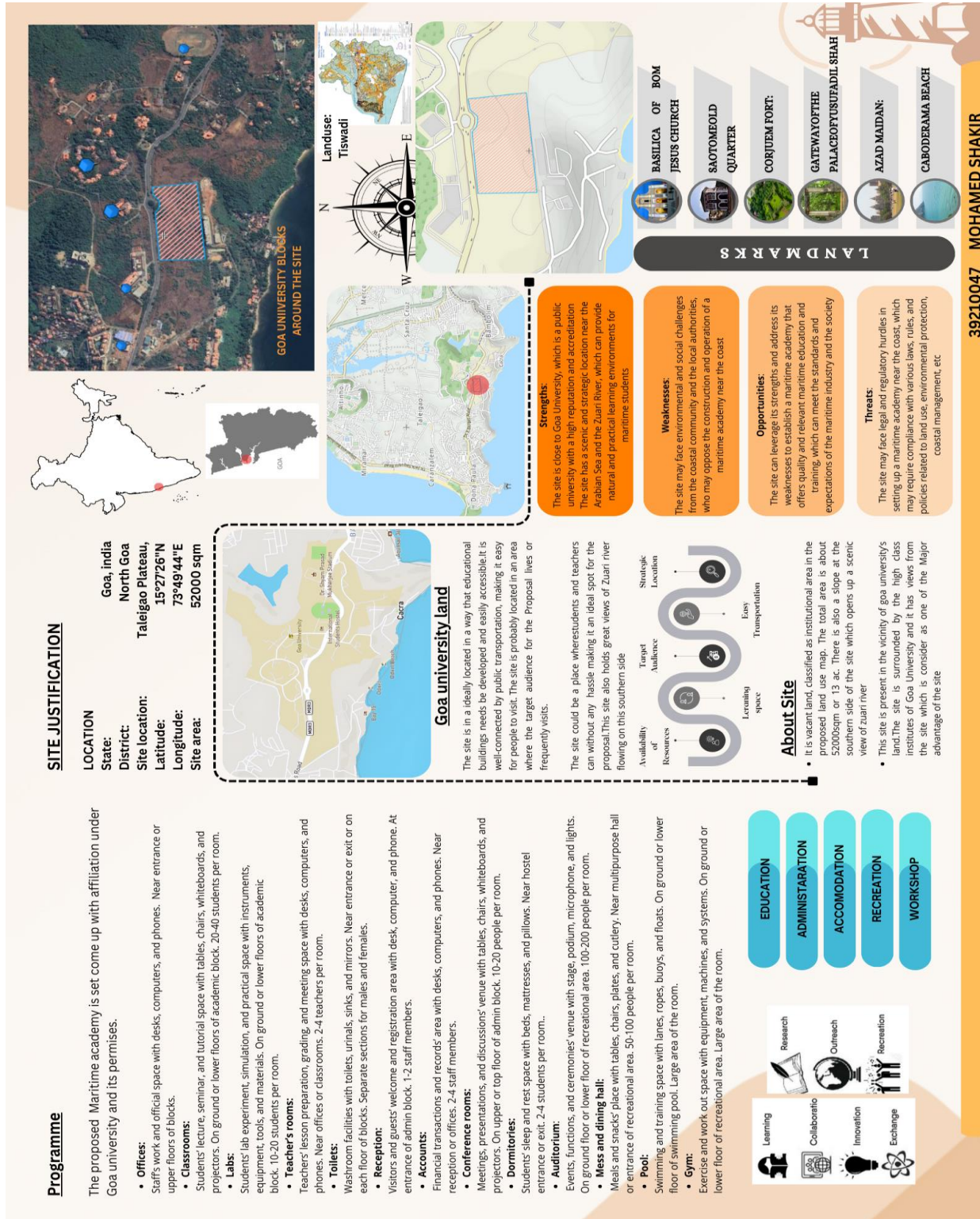


Plate 7 Site Justification

4.3 SITE ANALYSIS

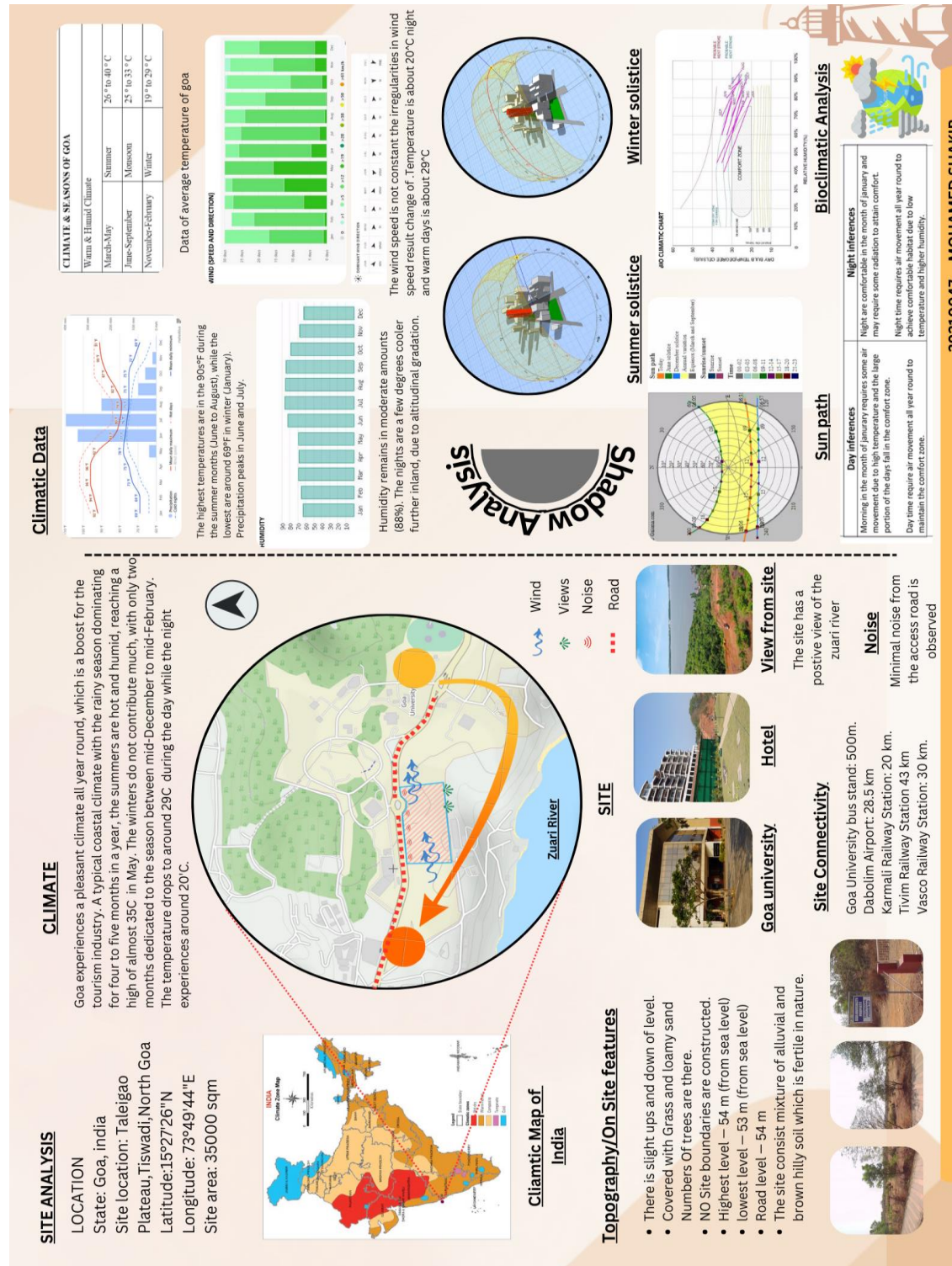
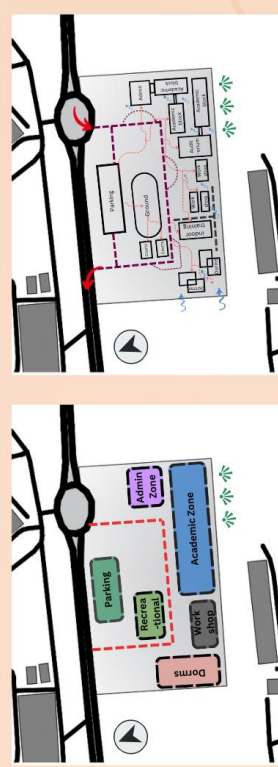
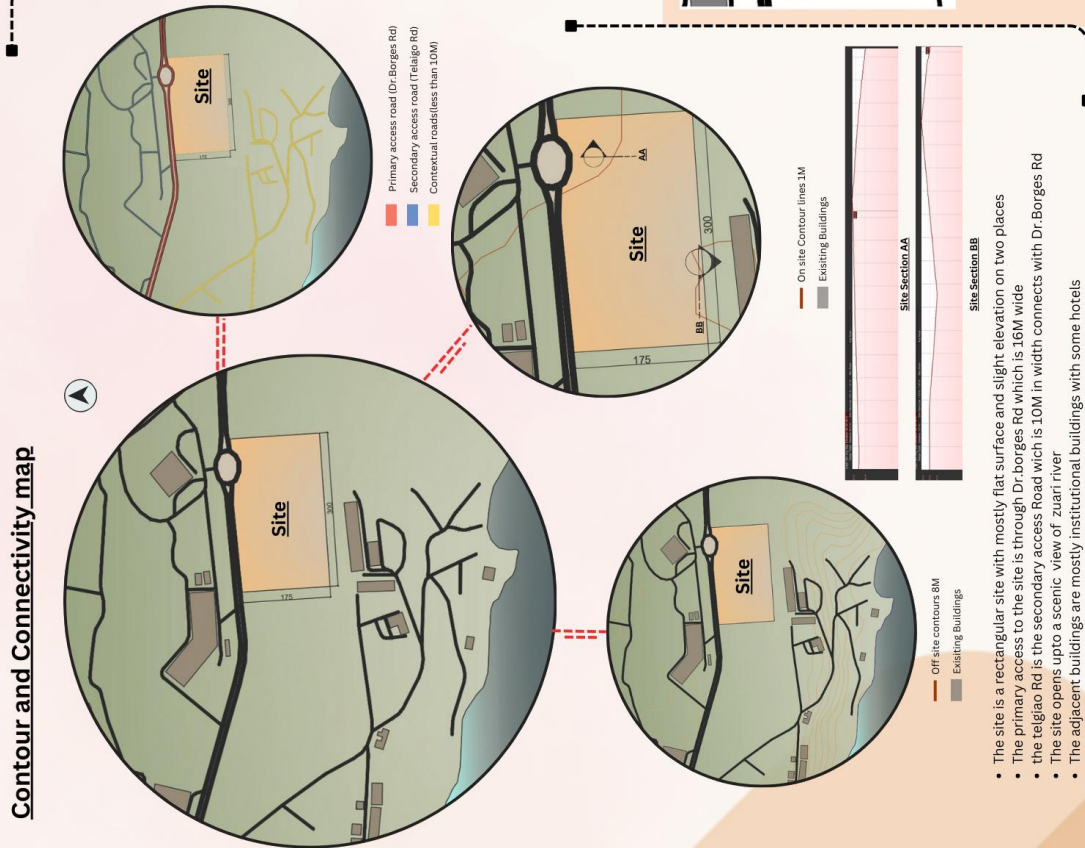


Plate 8 Site Analysis

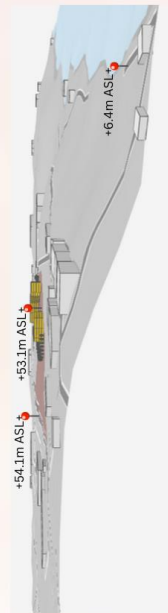
Contour and Connectivity map



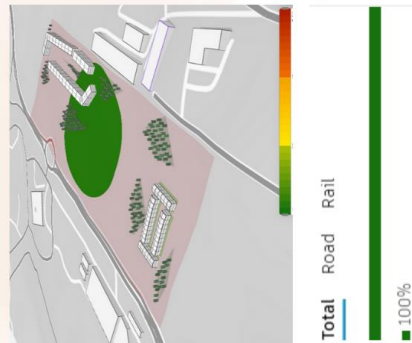
- The site is a rectangular site with mostly flat surface and slight elevation on two places
- The primary access to the site is through Dr. Borges Rd which is 16M wide
- The Telgaio Rd is the secondary access Road which is 10M in width connects with Dr. Borges Rd
- The site opens up to a scenic view of Zuari river
- The adjacent buildings are mostly institutional buildings with some hotels

Analysis&Inference

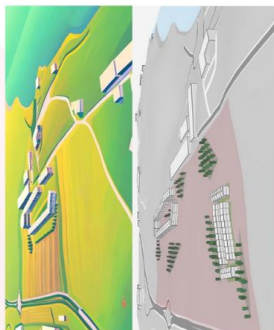
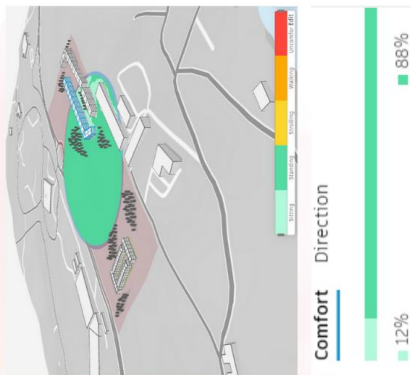
This analysis was run on AutodeskForma to analyse site and builtforms efficiency



Site Section



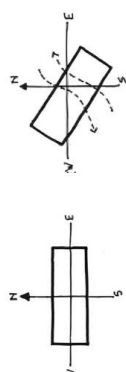
Site 3D view



Conclusion from Analysis

- **Layout:** Long axis east-west Orientation north and south.
- **Spacing:** Open spacing protection from winds.
- **Size of openings:** Medium: 25-40%
- **Position Of openings:** In North and South walls at body height.
- **Walls and Floors:** Max. G+2 floors and thick walls for thermal heat gain
- **Roofs :** Light and well insulated
- **Rain protection:** Provide adequate rain water drainage.

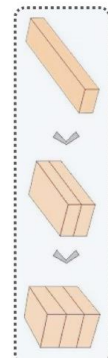
SUN ORIENTATION



- The best orientation is longer sides facing north and south directions to protect from the solar radiations.
- The east and west sides should be shaded by shading devices.

- Elongating the settlement in a line across the prevailing wind direction gives low resistance to air movement and is therefore the ideal solution.
- Cross-ventilation acts more effective in interior spaces by enlarging the openings of the internal partitions and by providing free passage, courtyards, verandah, etc

WIND ORIENTATION



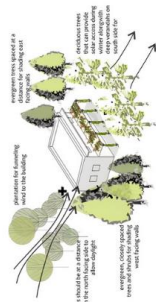
- Large surface areas are preferred to compact buildings. This favours ventilation and heat emission at nighttime.
- Two or three floors are recommended as taller buildings have too much radiant heat and also obstruct air flow to neighbouring buildings

FORM AND ORIENTATION

- To increase the cross-ventilation large openings can be designed.
- An increase of the glass area to 30% will increase the room cooling power needed by 30%-50% and facades to the west are most affected.



OPENING AND SHADING DEVICES

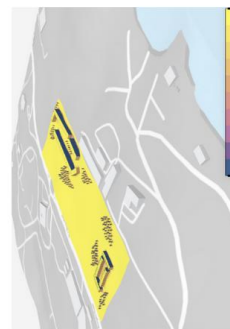


- A low cost solution for creating a shading device is by providing vegetation rich environment, creating a micro climate. They are designed in such a way that it does not hinder the air movement.

SURROUNDINGS AND VEGETATION

39210047 MOHAMED SHAKIR

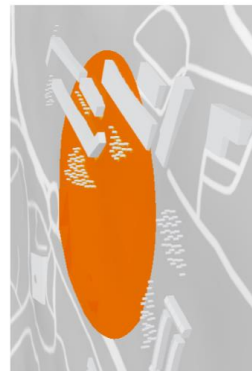
Noise analysis



Solar analysis

Thermal analysis

Wind analysis



CHAPTER 5: ARCHITECTURAL DESIGN

5.1 SPATIAL REQUIREMENTS

Carback

Zone S1, S2, S3, S4 & C1, C2, C3, C4;

ering Homoeopathicals or Doctor's Clinic, with in patient wards, cultural, educational and an institutions in main use and their administrative offices in the centre building; roved that the plots have an area of more than 500 sq.m and a coverage of 15.00 m; and roved further that the plots should be accessible by a road having a minimum width of 6.00 m.

/FAR

an additional FAR upto 20% of the permissible FAR may be granted with the approval of the Government, for linal institutions recognized by the Education Department/Chau University/University Grant Commission/All India ne of Technical Education/Higher Educational Technical Education of Government of Goa, as provided in Annexure-

TABLE 5(A)			
Sl. No.	Group of Occupancy	Permitted Gross Area (sq. m)	Maximum Gross Area (sq. m)
1	Residential	22.5	11.2
2	Commercial	22.5	11.2
3	Industrial	22.5	11.2
4	Assembly	300	150
5	Public	300	150
6	Commercial	300	150
7	Industrial	300	150
8	Public	300	150
9	Residential	22.5	11.2

Fire travel distance

Occupand load

REA STATEMENT

ACADEMIC SECTION			
ock 1	Area sq.m	Units	Total area
laby	50	1	50
ss rooms	80	10	800
ss rooms for chartwork	100	2	200
cture hall	100	2	200
lains room	10	1	10
aff room	75	1	75
rary	240	1	240
ilets	25	2	50
Total Area			1625
50% for circulation & services			800
Total			2425

Plate 11 Area statement

Administration			
Directors office with toilet	Area sq.m	Units	Total area
Meeting room	30	1	30
Dean office	50	2	100
Reception	30	1	30
lobby/Waiting lounge	25	1	25
Accounts section	60	1	60
Printer room	25	1	25
Store room	15	1	15
Toilets	25	2	50
Total Area			360
50% for circulation & services			160
Total			520

Workshops & sims			
Mechanical workshop	Area sq.m	Units	Total area
Electrical workshop	300	1	300
Simulators	300	1	300
computer lab	50	4	200
toilets	300	1	300
Total Area			1150
50% for circulation & services			550
Total			1700

Accommodation			
Lobby	Area sq.m	Units	Total area
Warden room	50	1	50
office	30	8	240
Rooms+Toilets	20	4	80
Dining	30	120	3600
Kitchen	200	1	200
Store room	75	1	75
Total Area			4285
10% for circulation & services			430
Total			4715

Auditorium			
Lobby	Area sq.m	Units	Total area
pantry	175	1	175
admin	15	1	15
office	15	1	15
seating area	500	1	500
projector room	30	1	30
sound & light control	15	1	15
Green room	30	2	60
AHU	50	1	50
Store room	40	1	40
Toilets	30	4	120
Total Area			1035
50% for circulation & services			500
Total			1535

Recreational Spaces			
Spaces	Area sq.m	Units	Total area
Amphitheatre	450	1	450
Swimming pool	350	1	350
Volleyball court	170	1	170
Basketball court	435	1	435
Football/Cricket and Parade ground	6000	1	6000
Gym	400	1	400
Locker	50	2	100
Toilets	25	2	50
Total Area			7955

Spaces			
Parking	Area sq.m	Units	Total area
	18	150	2700
Builtup			13550 sqm
Open spaces			10380 sqm
Gross total			23880

5.2 CONCEPT

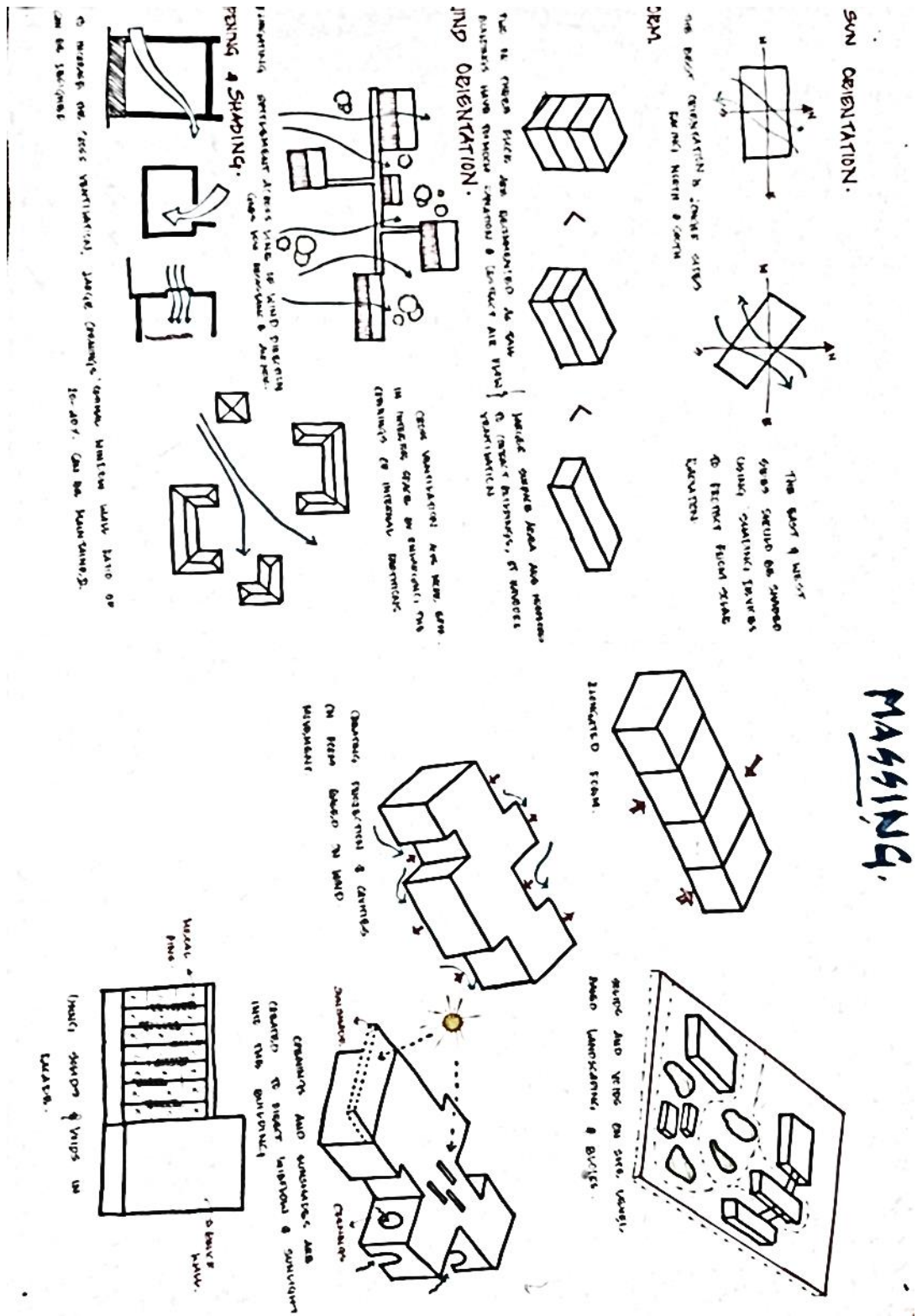


Plate 13 Concept

5.3 ZONING

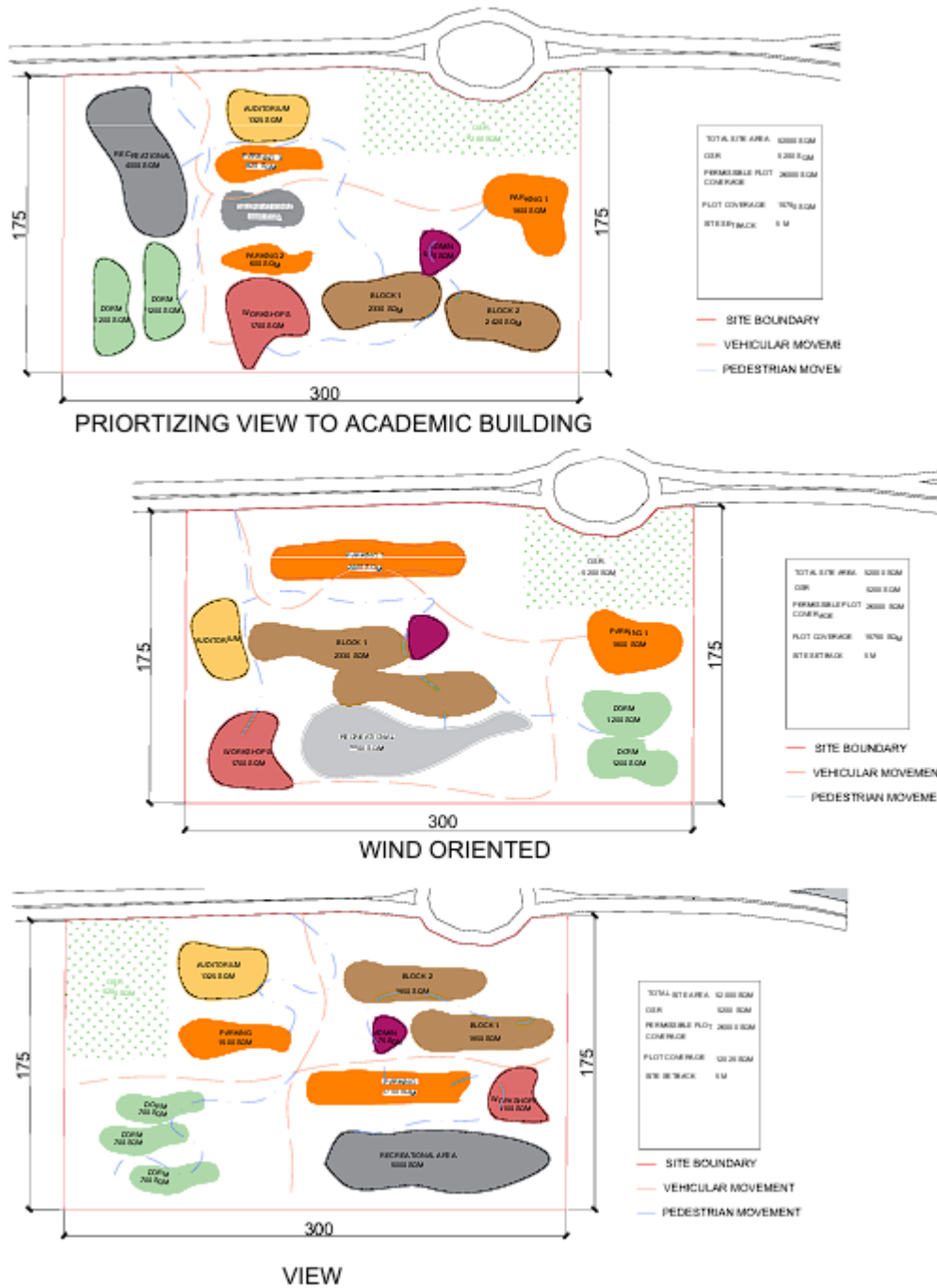


Plate 14 zoning 1

5.4 SITE PLAN

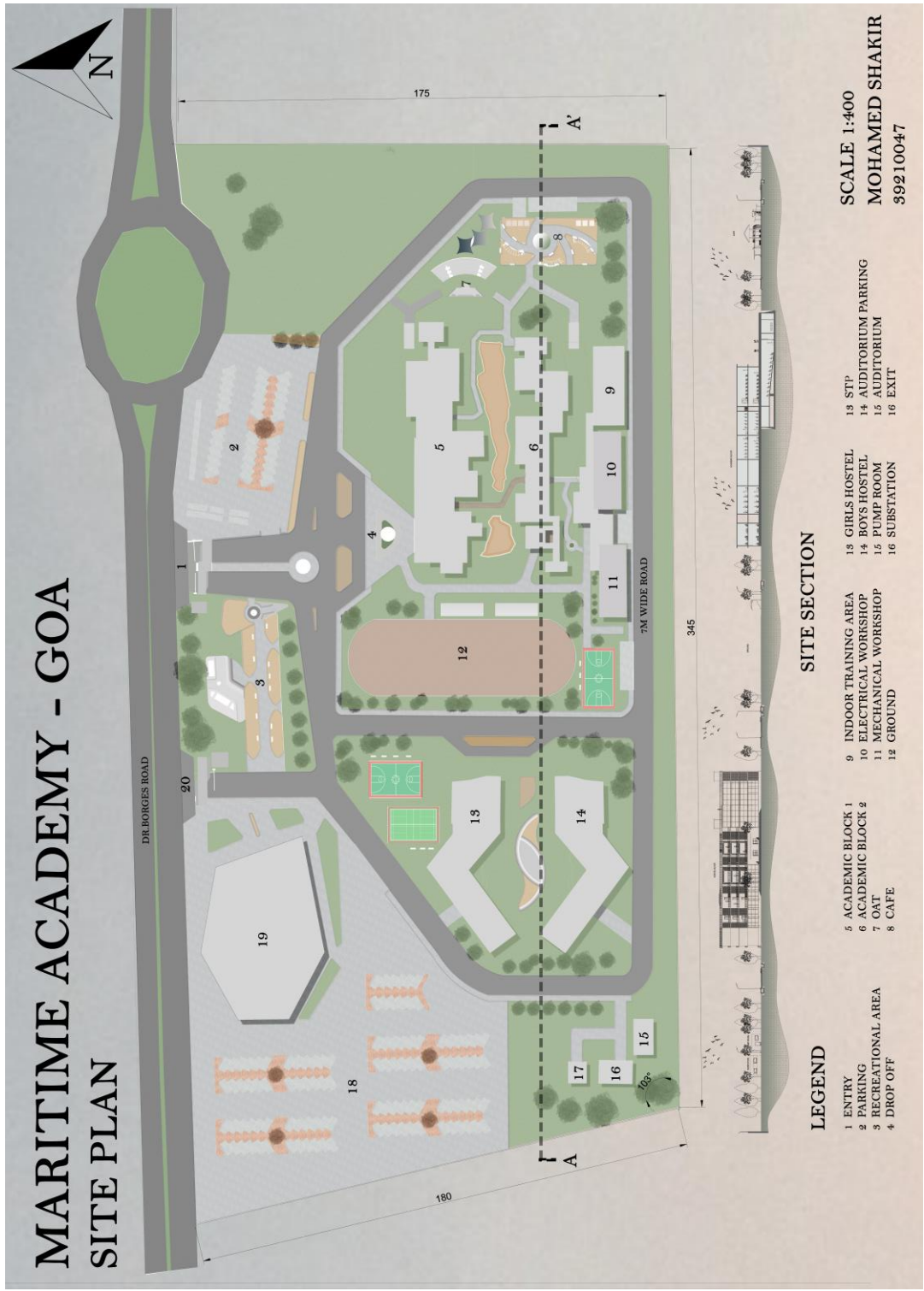


Plate 16 Site plan

5.5 ACADEMIC BLOCK

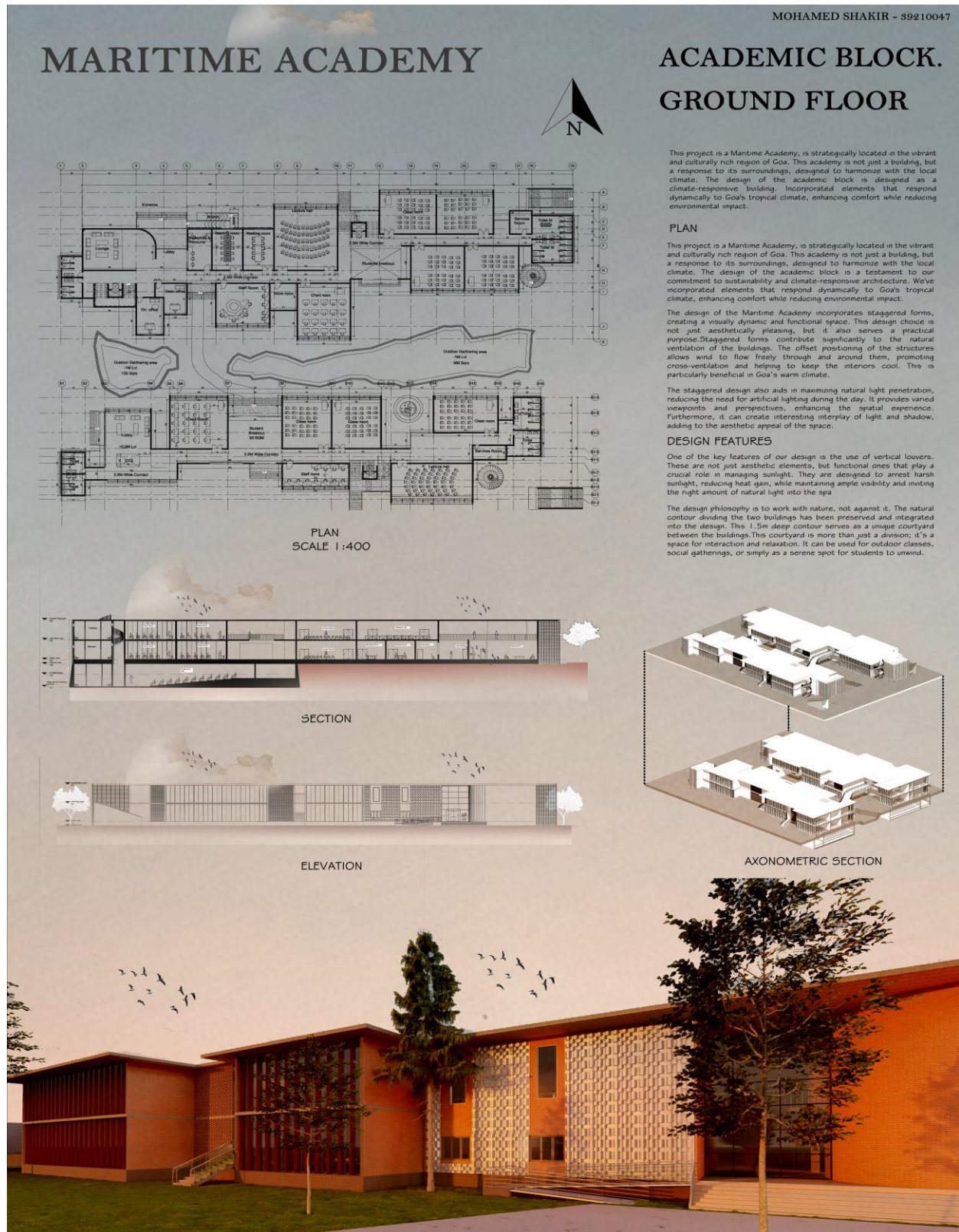
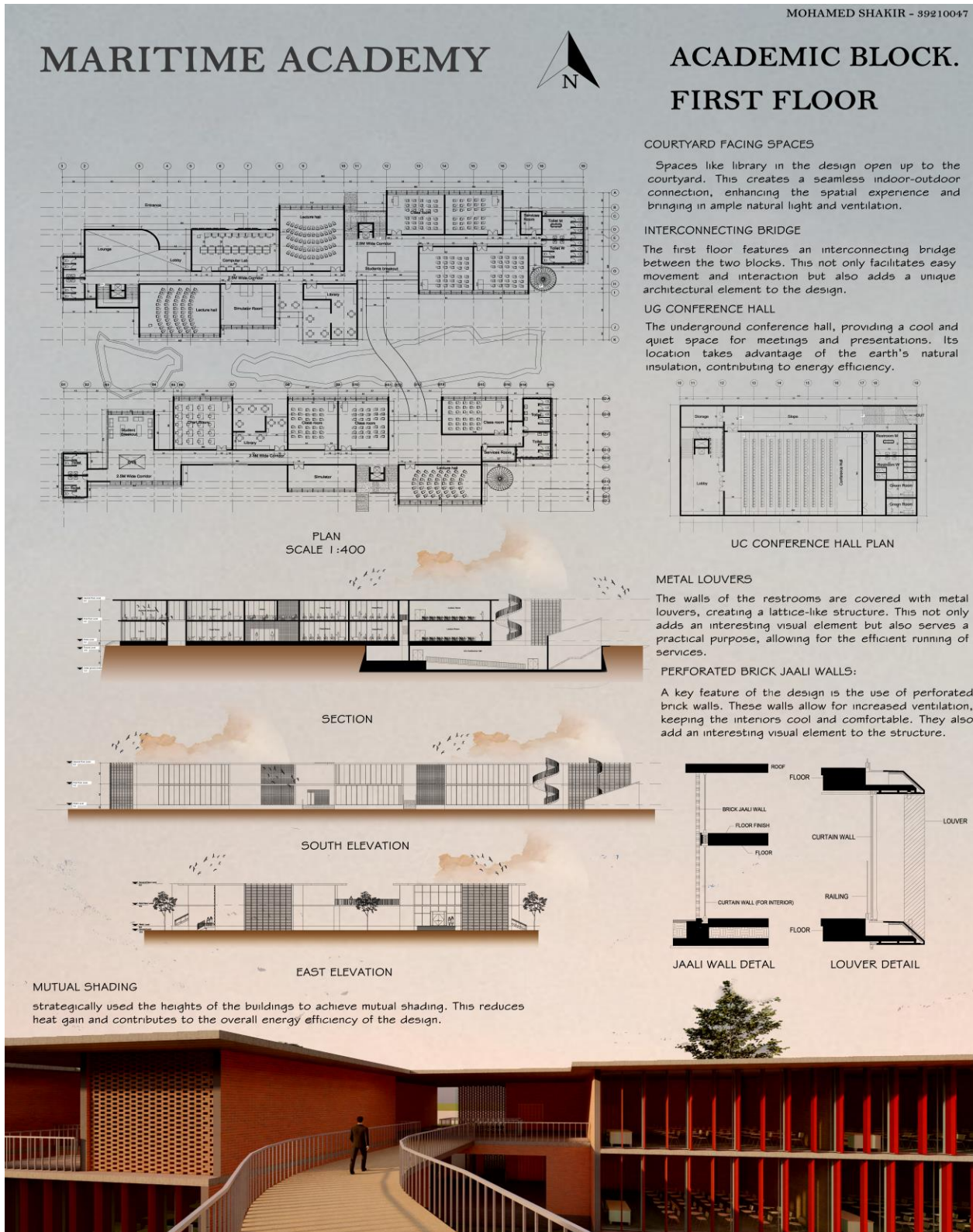


Plate 17 Academic Block 1

5.6 ACADEMIC BLOCK 2



5.7 HOSTEL BLOCK

MOHAMED SHAKIR - 39210047

MARITIME ACADEMY

HOSTEL BLOCK

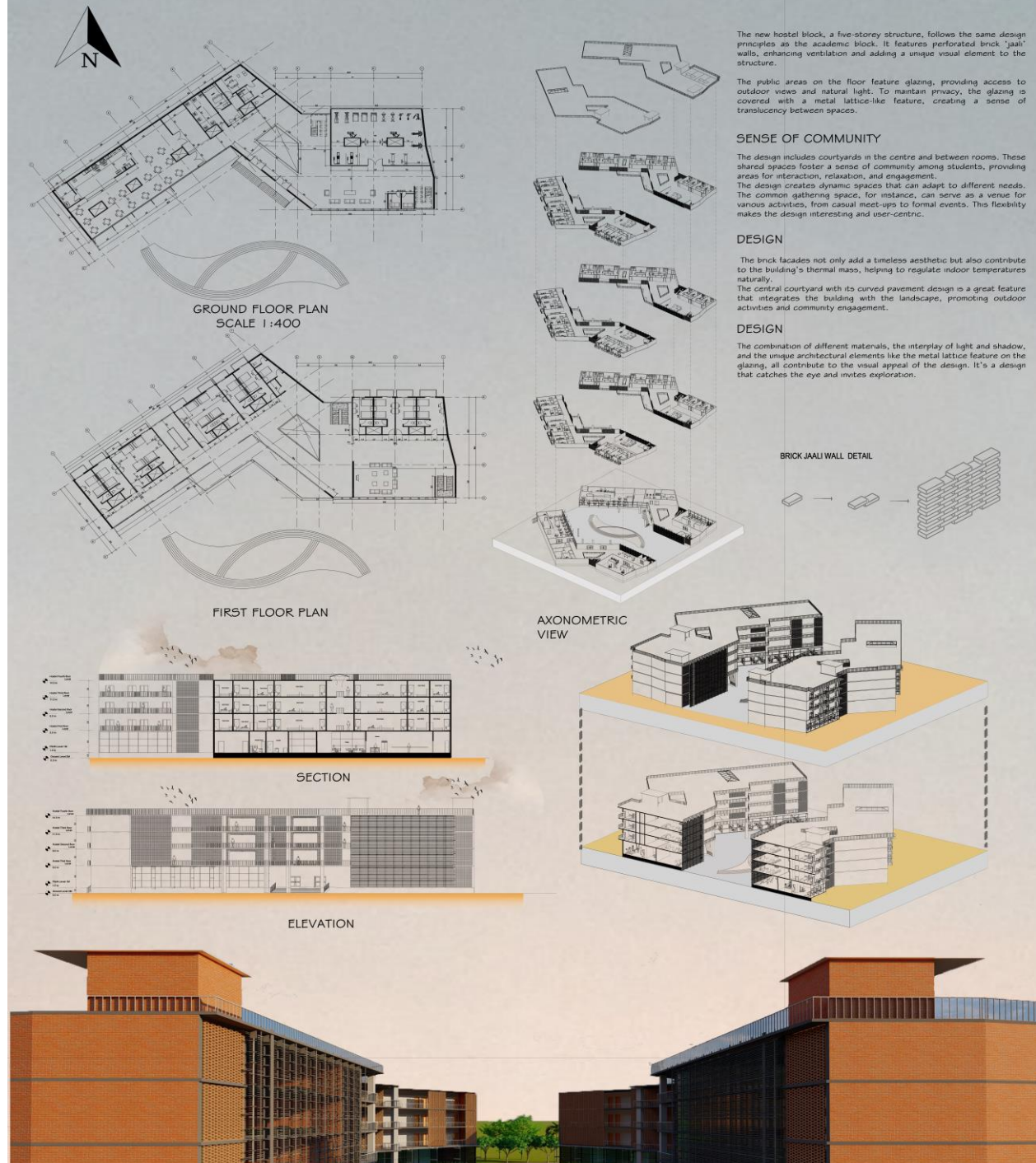
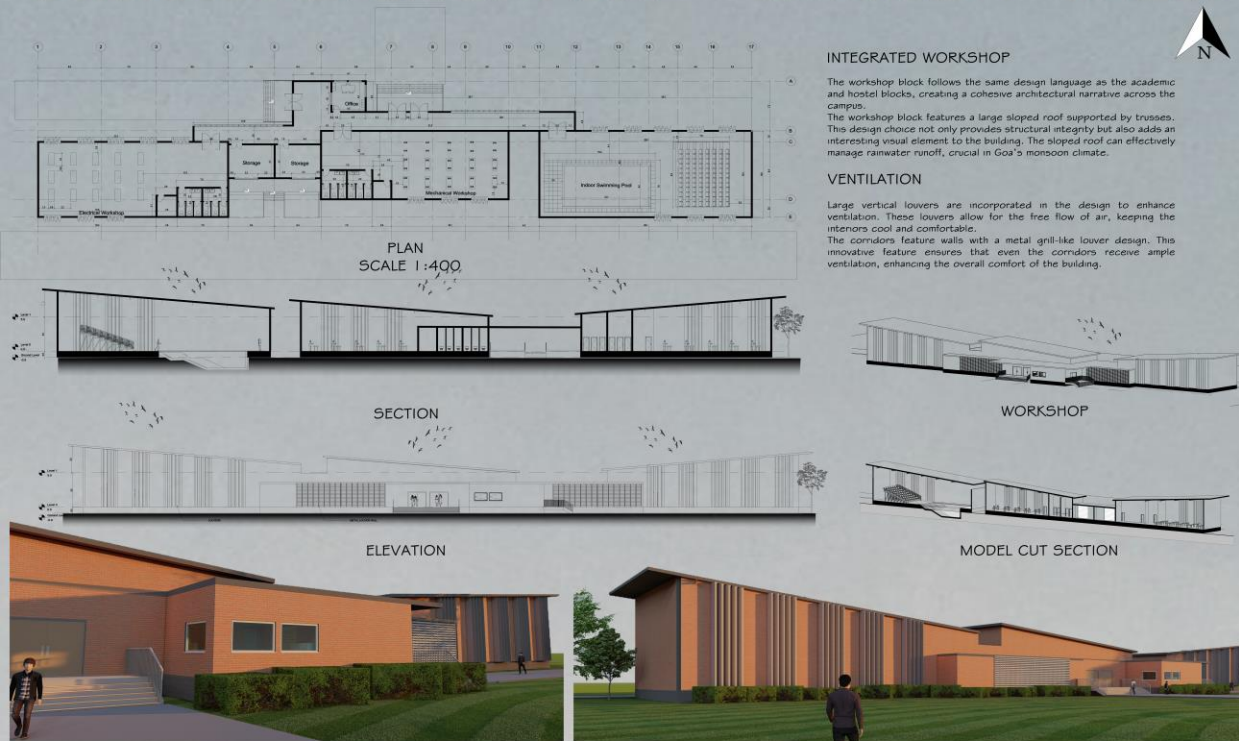


Plate 19 Hostel block

5.8 WORKSHOP & AUDITORIUM BLOCK

MOHAMED SHAKIR - 39210047

MARITIME ACADEMY WORKSHOP BLOCK



AUDITORIUM

The auditorium, positioned near the road, serves as a visual landmark for the campus. Its design deviates from the rest of the structures, creating a unique identity that draws attention and invites exploration. The auditorium, positioned near the road, serves as a visual landmark for the campus. Its design deviates from the rest of the structures, creating a unique identity that draws attention and invites exploration.

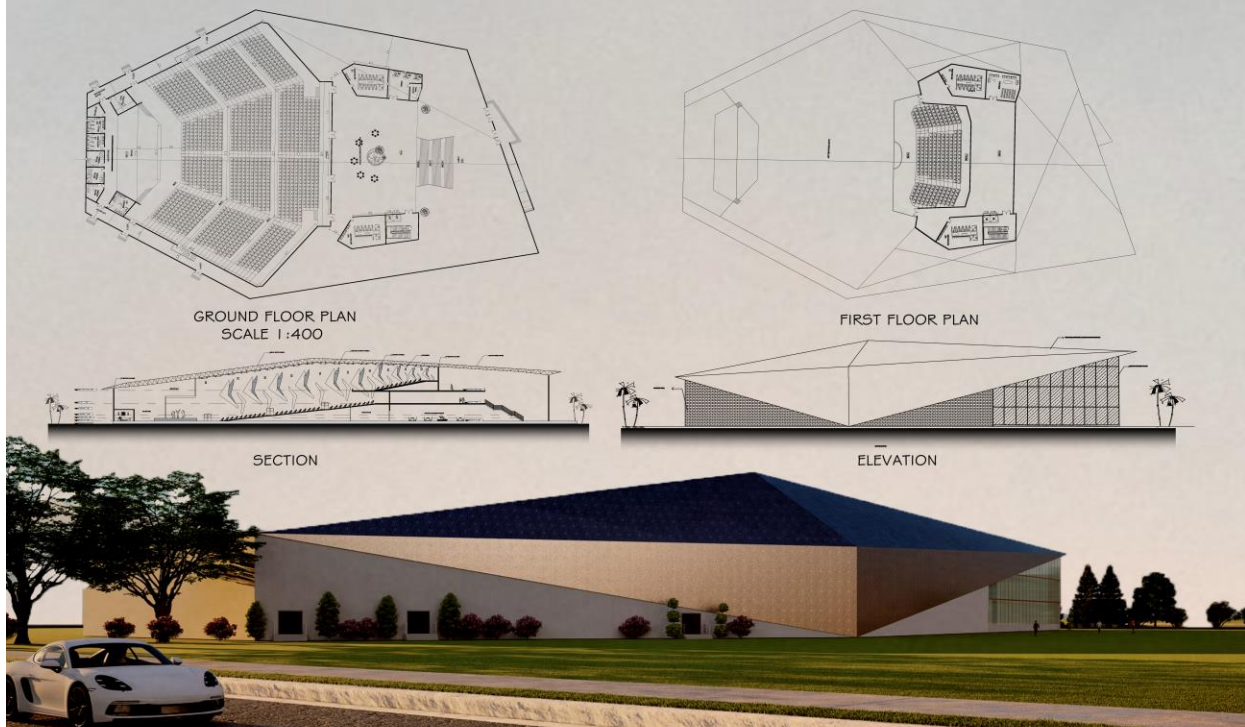


Plate 20 Workshop and Auditorium

CHAPTER 6: REFERENCE

A, Kreatif Architects, Cemal Emden, Yercekim Architectural Photography • Pin Reis Maritime University. (2017),

Retrieved from Divisare: <https://divisare.com/projects/281021-kreatif-architects-cemal-emden-yercekim-architectural-photography-piri-reis-maritime-university>

Piri Reis Maritime University / Kreatif Architects. (2017). Retrieved from ArchDaily: <http://www.archdaily.com/584142/piri-reis-maritime-university-kreatif-architects>

Piri Reis Maritime University • Projects | Sera Group • We Love to Build. (2017). Retrieved from Sera.com.tr: http://www.sera.com.tr/pn_piri-reis-maritime-universitesi-p22.php

Piri Reis Üniversitesi. Yecil Kampüsü, (2017). Retrieved from Piri Reis University: <https://www.pirireis.edu.tr/ve-sil-kampus>

SAMAUNDRA Main Campus | Ongreening. (2017). Retrieved from Ongreening.com: [http://www.ongreening.com](http://www.ongreening.com/en/projects/1146)

com/en/projects/1146

Swegon - Piri Reis Marine University, Istanbul. (2017). Retrieved from Swegon.com: [http://www.swegon.com](http://www.swegon.com/en-ij/sair-innovation/international-references/hospitals-laboratories/piri-reis-marine-university)

com/en-ij/sair-innovation/international-references/hospitals-laboratories/piri-reis-marine-university

Neufert, E, Neufert P. & Kister, J. (2012), Architects data DRAWING STUDIOS Chichester, West Sussex. UK: Wiley-Blackwell.

Neufert, Neufert, P. & Kister J. (2012), Architects data, MULTI-STOREY INDUSTRIAL BUILDING. Chichester, West Sussex, UK: Wiley-Blackwell.

Neufert, E. Neufert P. & Kister, J. Architects data WORKSHOPS-WOOD WORKING, Chichester, West Sussex, UK: Wiley-Blackwell.