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Ferry terminal and tourism hub at Mumbai.
(Revitalizing Princess dock)

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1. Abstract -

It is a very known fact that Mumbai city lacks sufficient public open spaces and recreational amenities for its huge population. Except Marine drive and Haji Ali no other space gives a sense of openness in the city. However only 1/3rd of Mumbai's coastline is accessible to the public, 1/3rd (along the eastern coast) belongs to MbPT, is walled off from the public.

The eastern waterfront has a much lower population density than the rest of the island cities and has numerous underutilized and defunct docks. Redevelopment of these docks to provide public open spaces, public amenities, transport facilities and affordable housing can provide some relief to the congested city of Mumbai.

Keywords: **Ferry terminal, tourism hub,**

Introduction

Water transport is a very cheap yet effective, time saving alternative for travelling. The existing services connect Mumbai to the neighboring harbors of JNPT, mora, Karanja, Mandwa, Rewas and Dharamtar. There are chances where we could connect places like Ulwe, Panvel, Vashi and Nerul to Mumbai through water. These ferries would be serving the daily commuters which would eventually make their travel time less and travel easier. But there are opportunities to boost the tourism sector as well. The defunct docks and harbors along the eastern coast of Mumbai, though now are unused, are still a valuable infrastructure of the city and could be used for purposes that could benefit the city – like ferry terminals, cruise terminals, recreational boating harbors (water transport). I wanted to do something that would benefit people – connect people through means of water – the transport thus coming into picture. Studying further into the current scenario of water transport between Navi Mumbai and Mumbai helped me identify the problems faced by the people – mainly the commuters. This led me to explore how mainland and Mumbai could be efficiently connected – and what could I do to ease the life of commuters as well as how could I create employment opportunities? This helped me derive my topic for dissertation – Ferry and tourism hub at Mumbai.

My proposal is likely to have benefits such as increased tourism in Mumbai and surrounding coastal regions. Creating a visual connection to Navi Mumbai and the hinterland is also an objective.

Figure 1 – Identified terminal locations Source - Author. (June 2021) *Terminal locations.* Retrieved in June 2021 from https://www.google.co.in/maps

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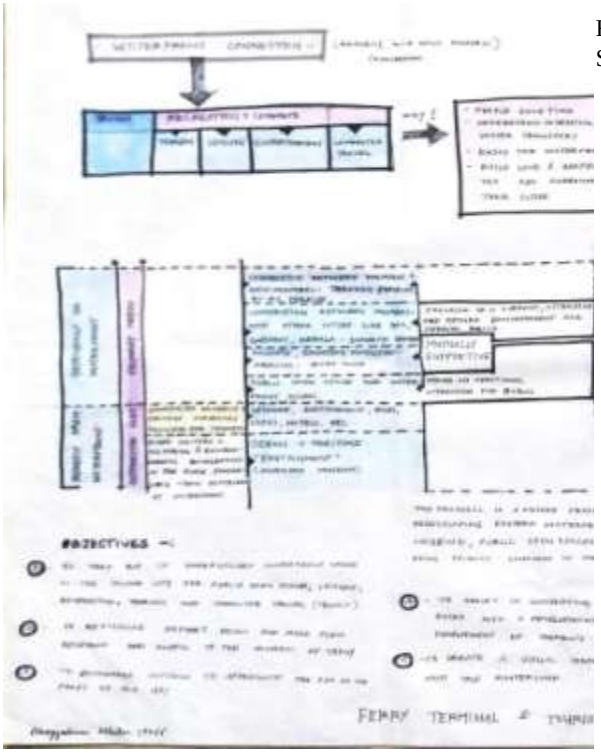

Figure 2 –Aims and Objectives of the project
Source - Author

2. Background study –

History of the Mumbai port –

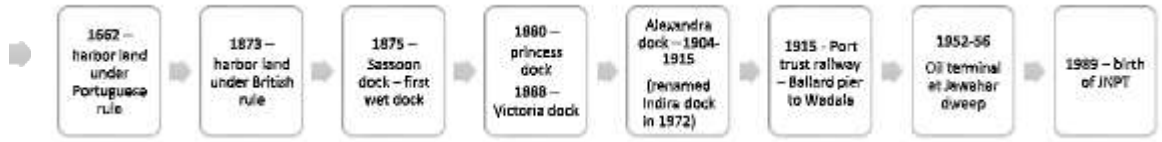

Figure 3 – Chronology of development Source - Special planning authority - MUMBAI PORT TRUST. (December 2018) *DRAFT REPORT ON PLANNING PROPOSALS.* Retrieved in June 2021 from https://mumbaiport.gov.in/

Being one of the oldest ports in India, the Mumbai port was proving to be structurally inadequate to meet the requirements of modern cargo handling. Shallowness of the channel, congestion of roads and railways through the Mumbai city linking the port to its hinterland, as well as labor problems, including over-manning, were among the major problems ailing the Mumbai Port in the pre-reform days. As a result, the Port was simply incapable of handling the expanding volume of modern cargo directed to the west coast and there was an urgent need for a new port in the Mumbai region, which eventually led to the birth of JNPT in 1989. MbPT has since then, diversified to activities such as oil bunkering, export of car, etc... At present, MbPT without reducing the port activities, is concentrating more on tourism and water transport related activities such as International Cruise Terminal, Domestic Cruise Terminal, RO PAX Terminal and Marina. Mumbai Port envisages to become a major cruise destination of India.

Growth of the city -

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Figure 4 -Mercantile town and port established

Figure 5 -Industrial city and port expansion

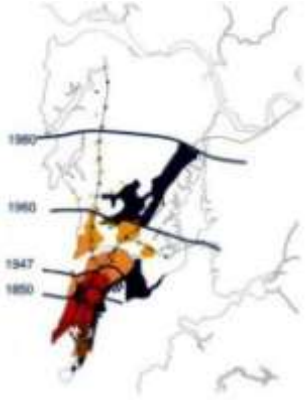

Figure 6 - Expansion of industries in suburbs

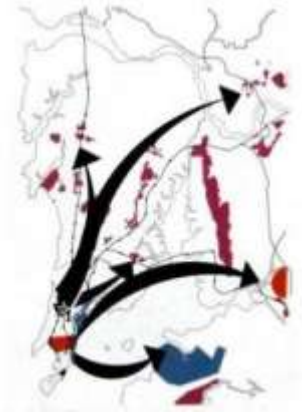

Figure 7 -Shifting of industries and decline of port activity

Figure 8- While the harbour line railway forms principal means of access to the site, it forms a barrier, cutting off the waterfront from the rest of the city.

Background study - Existing domestic cruise terminal on site - Mumbai

- Existing domestic cruise terminal - Mumbai
- March 2018 – renovation completed
- 21 October 2018 – inauguration of DCT
- Part of the prestigious eastern waterfront development project
- Project under Mumbai port trust
- Currently – cruise ship Angriya under operation – alternate day cruises to Goa
- Next to Bhaucha Dhakka - Victoria dock
- Dilapidated structure – transformed to DCT

- Total site area 1.75 hectare (17500 sqm)
- Building area – 650 sqm
- Terminal building houses facilities for cafeteria, restaurant and terminal facilities.
- In future services of water taxis and catamarans will be started.
- Neighbouring old structure to be transformed into RO-PAX terminal and marina.
- Seafront restaurants and commercial development.
- Future plans to connect Karnataka, Kerala and Gujarat to Mumbai through waterways.

Background study - Existing ro-pax terminal on site - Mumbai -

- M2M Ferries Private Limited (M2M Ferries) connects Mumbai and Mandwa.
- They operate a modern, efficient and comfortable service between these two key locations in Maharashtra.
- M2M Ferries with the support of the Maharashtra Maritime Board and Mumbai Port Trust has redefined Mumbai's waterways by the only world class Roll-On-Roll-Off- Passenger (Ro-Pax for short) Ferry service in the country.
- Their service cuts the usual travel time from 5 hours by road (111km) to just 1 hour by sea (19km) and provides all weather year-round connectivity.
- M2M-1, the Ro-Pax Ferry operates between Ferry Wharf (Bhaucha Dhakka) in Mumbai and Mandwa Jetty in Raigad seven days a week throughout the year.
- They provide cost-effective and efficient waterway connectivity for passenger and vehicle movement (cars, motorbikes, cycles and buses).
- The Ro-pax is the key driver in improving accessibility to the Raigad region whilst lowering pollution and road congestion. Access to popular Konkan destinations like Alibaug, Kihim, Kashid, Murud has been facilitated due to this service.
- Capacity – 500 passengers, 150 vehicles
- Vehicles permitted – buses, cars, motorcycles and cycles
- Passenger amenities – open air seating, ac lounge, sanitized washrooms, designated pet areas, refreshment service and bar areas, motorized wheel chair assistance.

The potential of the project –

- Decongesting the city and improving its environment, and opening new spaces for the mobility of goods and people.
- Using the nodal location of the waterfront to connect the island city of Mumbai to its twin city across the harbour, Navi Mumbai, through realignment of the regional axes of economy, transport and communication.

The complexities –

- Waterfront sustainability in the context of the Mumbai estuary: reclamation in the face of sea level rise, flooding and monsoons.
- Pollution of the eastern waterfront and destruction of marine ecology.
- Social equity; rights of the people who are currently living in the docklands and working in Mumbai's informal economy.
- Potential of the waterfront as a new public space for Mumbai.
- Provision of affordable housing.
- Historic preservation of the dockland fabric and local histories.
- Transportation infrastructure to connect the eastern waterfront with the rest of the sity and Navi Mumbai across the harbour.

3. Introduction –

The aim of this dissertation is to study and utilize the potential offered by the eastern waterfront for public access while re-orienting the perception of the region with regard to the city's geography and physical form. Similarly, the potential for connectivity using water transport could offer the much-needed transformation of mobility within the region. The two primary requirements, which are both directly dependent on the waterfront, are:

1) Commuter travel, leisure travel, sailing, yachting facilities.
2) Public open spaces with waterfront access.

These requirements are symbiotic since the public spaces provide a vibrant, active and secure environment for boats; and also form added attractions and features of interest for the public.

Other uses that benefit from the waterfront location and views have been included to support the primary functions. (Open air Amphitheatre, Multipurpose halls and event bays, etc.)

Ocean and maritime 'edutainment' (in the form a maritime museum) would give visitors a historical and environmental background; and can help the public relate and reconnect with the Eastern Waterfront, which has been cut off from the public for so many years; thus, enhancing their experience at the waterfront.

Restaurants, bars, cafes and hotels would generate revenue for the waterfront, to support maintenance of the open spaces and public amenities. They would draw in more people to the waterfront, maintaining a lively atmosphere throughout the day.

Objectives of the project –

- To make use of underutilized waterfront spaces in the island city for transit services, public open spaces and recreation areas.
- To revitalize the defunct docks and make them relevant to the Mumbai city of today.
- To encourage citizens to appreciate the sea as an asset of the city.
- To assist in converting princess dock into a development node for the overall development of Mumbai's eastern waterfront development.
- To create a visual connection to Navi Mumbai and the hinterland.
- To boost tourism and create new activity and thus increase employment opportunities.

Ferry terminal, Domestic cruise terminal and RO-Pax terminal –

- Create efficient terminals that facilitate the ferries, domestic cruises, and ro-ro ferries.
- The terminal buildings will have the required infrastructure and amenities for smooth operation of the ferries and cruises.
- Unlike the existing facility, I aim to create a tourism hub and not just a terminal, which will serve commuters and tourists alike.
- Furthermore, resiliency and sustainability are the two factors that would be incorporated in the terminal building.
- To encourage water transport as a safe and reliable means of commuting towards Navi Mumbai, and also towards other major tourist destinations like Goa, Kerala, Sri Lanka etc.

Yacht harbour /Marina –

- To provide safe shelter, storage, related services and facilities for recreational boats.

- To bridge the large demand supply gap for yachting facilities in Mumbai.
- To encourage sailing as a recreational activity and a sport.
- To enliven the waterfront by having activity on water, in addition to that on land.

Yacht club –

- To bring sailing to beginners interested in learning the sport.
- To provide a platform for professional sailors to race and compete.
- To allow people who do not own their own sailing boats, to sail using the yacht club 's boats.
  To provide a venue for sailing enthusiast to meet and share their experiences. To promote sailing as a sport.

Public spaces and promenades –

- To increase social interaction at the waterfront.
- To create pedestrian and cyclist routes around the waterfront, that are pleasant and comfortable for people to walk or cycle along.
- To connect the different areas of waterfront.
    - To increase socio-cultural value of the waterfront.

Restaurants –

- To draw large number of locals as well as tourists to the waterfront.
- To enliven the waterfront.
- To create a source of revenue for the waterfront.
    - Restaurants, cafes, bars and eateries – for local, tourists.

Maritime museum –

- To collect, store, conserve, research and present information, artefacts etc. related to maritime history of Bombay.
- To entertain as well as educate visitors on the maritime history of Bombay (fishing, trade and industry, defence transport, recreation / leisure) and the present-day maritime activity in the city (fishing, communities, navy, coast guard, port trust, recreational yachting, water transport possibilities.)
- To maintain a library and a resource center for researchers.
- To allow visitors to have a vantage point of view of the Mumbai harbor, port and hinterland.

Office element –

- To accommodate the administration offices of the waterfront.
- To serve for the administrative needs of the transit terminals.
- To accommodate marina maintenance and service company offices.
- To accommodate yacht company offices and showrooms.

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4. Case study conclusions –

Kochi water metro (Kochi, Kerala, India)

Figure 9 – Proposed routes map Source – Kochi metro rail limited. (August 2018) *Kochi water metro Project report*. Retrieved in August 2021 from http://environmentclearance.nic.in

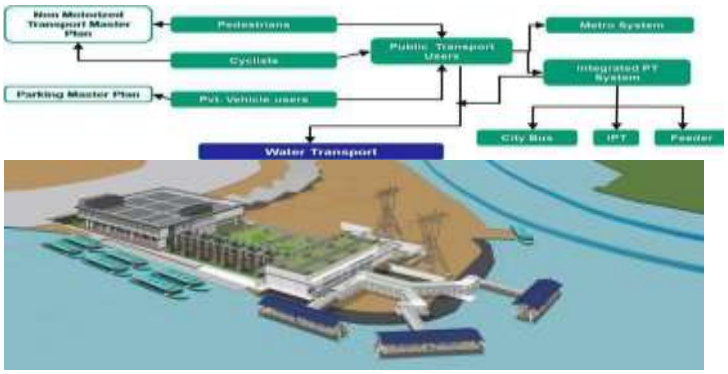

Figure 10 – Proposed Vytilla terminal. Source- Kochi metro rail limited. (22 January 2021) *Kochi water metro Project.* Retrieved in August 2021 from http://mohua.gov.in

In conclusion, the benefits of Kochi water metro can be summed up as follows –

- Better connectivity to islands
- Decongestion on roads
- Increased Tourism potential
- Reduced travel time and increased reliability
- Inter- modal connectivity
- Passenger centric terminals and boats
- Green and Clean mobility Corridor
- Socio-economic development of islands
- Enhanced employment opportunities
- First of its kind with 78 Nos of battery-operated fleet under one umbrella
- No Via duct required
- Different set of safety/statutory rules & regulations
- Flexibility to reach interior islands
- Travelling experience through scenic waterways
- Limited flexibility to accommodate higher number of passengers
- Higher safety precautions /regulations
- Additional operating conditions like current, weather, waves, weed, siltation etc.

Brisbane ferry terminal, (Brisbane, Australia)

Figure 11 –exploded axonometric view. Source- World architects. (November 7, 2017) *Cox architecture.* Retrieved in August 2021 from https://www.world-architects.com

Conclusions -

Boundaries were pushed across every element of design to make these modern and elegant terminals synonymous with Brisbane's forward-looking attitude to public transport and essentially create an art series feature for the river city.

The design enhances commuters' experience of, and connection to, the city's key feature – its river. The terminals are integrated and linked across eight socially and environmentally different landscapes, and passengers can return to using ferry transport shortly after a flood.

The result is an elegant flood resilient design for Brisbane City Council's public transport infrastructure and something that can adopted by any ferry terminal network around the world, particularly those subject to flooding.

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Yokohama passenger terminal, Japan –

- example of tourist friendly terminal.
- interior spaces are barrier free.
- special features of the design.
- engineering is advanced.

The Yokohama passenger terminal is a perfect

Its unique architecture is very welcoming and the

The plaza provided on the rooftop is one of the

The technology used in terms of architecture and

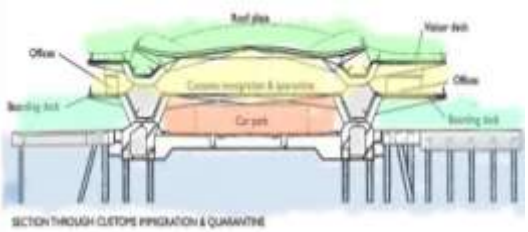

Figure 12 – Section through departure and arrival hall. Source- David Langdon. (October 17, 2018) *AD Classics: Yokohama International Passenger Terminal / Foreign Office Architects (FOA).* Retrieved in September 2021 from https://www.archdaily.com/

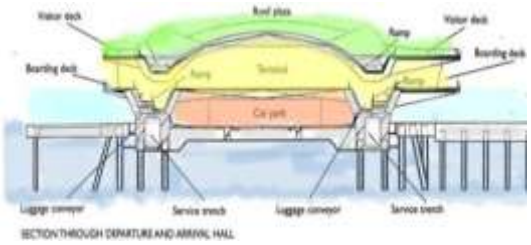

Figure 13 – Section through customs immigration and quarantine. Source- David Langdon. (October 17, 2018) *AD Classics: Yokohama International Passenger Terminal / Foreign Office Architects (FOA).* Retrieved in September 2021 from https://www.archdaily.com/

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Comparative analysis and conclusion from case studies -

	Kochi ferry terminal	**Brisbane ferry terminal**	**Yokohama passenger terminal**
Location	India	Australia	Japan
Type of ferries handled	Small passenger water taxis & catamarans	Medium sized passenger ferries	Medium to large sized ferries and cruises
Type of water body	Kerala Backwaters	Brisbane river	Tokyo Bay
Climatic conditions	Hot and humid	Humid subtropical	Temperate
Height of the structure	2 – 3 storey structures	Single story structure	3-4 storey structure
Basement	No	No	Yes (parking)
Scale of the building	Small scale	Small scale	Large scale
Capacity of handling passengers	Medium (200 – 300)	Small (100 -200)	Large (800-1000)
Arrival departure facilities	No separate hall for arrival and departure	No separate hall for arrival and departure	Separate halls for arrival and departure
Check in check out facilities	Is provided at terminal	Is provided at terminal	Is provided at terminal
Baggage facilities	No dedicated facility	Dedicated facility	Dedicated facility
Landscape features	Not much area dedicated to landscape	Not much area dedicated to landscape	Area dedicated to landscape
Other areas	No other amenities on the site	No other amenities on the site	Multipurpose halls, event bays provided
Transportation to the city	Water taxi part of an integrated transport system	Buses from terminal to the city	Buses from terminal to the city
Sustainable features	Features incorporated	Features incorporated	Features incorporated
Resiliency in structure	No	Yes	Yes

Figure 14 – Comparative analysis of case studies source – author

5. Literature reviews –

Tides of Time – book review

- Book written by M.V. Kamath

This review is based on the book – Tides of Time, written by M.V. Kamath and co-authored by Mrinal Kulkarni. This book is published by the Mumbai Port Trust.

Introduction of the author –

The book – Tides of Time was written by M.V. Kamath. M.V. Kamath was an Indian journalist and broadcasting executive and the chairman of Prasar Bharati. He had also written numerous books and was conferred with the Padma Bhushan award in 2004. Mrinal Kulkarni is a sociologist and an independent researcher.

Summary –

The book gives an overview of the growth of the port city of Mumbai – from a small village with fishing as the primary occupation to becoming a premier center of trade and commerce for the country. The development of the country has influenced the growth of the country as well as the city to a large scale. Ship building activities became prominent in these areas. But there came various hindrances such as exploitation of docks, wars, famines, floods, recessions, strikes – which tried and hampered the development of the ports, but nonetheless the port survived these setbacks. This book places a special emphasis on the unionization of dock labor at the height of nationalist movement which brought uniformity in the labor management relations. This book covers all the major milestones in the development of the Port, as well as gives insight into the unknown history of Mumbai.

Just as Mumbai is believed to be a congregation of 7 islands, the book also throws light on development of the port through 7 chapters namely – 1. The silent islands rise from slumber, 2. Under the wings of the East India Company (1668-1858), 3. Evolution in shipyards and ship buildings, 4. Bombay – the new gateway to India, 5. Carving a city from the swamps, 6. Unionization takes root, 7. Boost in port traffic on anvil.

The first chapter – The silent islands rise from slumber – talks about the formation and evolution of the islands, the condition before habitation took place, how trade relations emerged, etc. The chapter mentions about the earliest inhabitants on the islands – the Kolis, who were hardy fishermen who went about living on these ignored islands.

The second chapter – Under the wings of the East India Company (1668-1858) – gives readers an idea of how development of the ignored islands took place under the rule of Britishers. Bombay was planned with fortifications, boundaries got defined, administration came into picture and all this was carried out by governor Gerald Aungier – who was a good administrator. The Parsis – Wadias sharpened their ship building skills during this time.

The third chapter - Evolution in shipyards and ship buildings – explains how the Britishers felt a need for a dock and set out to build a dry dock to facilitate the ship activity. The chapter mentions the chronology of dock building – wet and dry docks. The chapter also talks about the development of ship building activity.

The fourth chapter - Bombay – the new gateway to India – this chapter throws light on how the then Bombay became an important trade center – and became the new identity of India. The development that took place between 1885 to 1945 played a great role in formation of Bombay port trust.

The fifth chapter - Carving a city from the swamps – this section talks about the process of reclamation of land by the Bombay trust – and how Bombay trust became the largest land owners in Bombay. It talks about the modernization taking place and how Bombay port took over most of the ports in India in terms of cargo handling.

The sixth chapter - Unionization takes root – this chapter talks about the process of unionization of the dock labor in 1931 when the Gandhi led - Nationalist movement was at its height. The discussions regarding conferring the BPT (Bombay port trust) an autonomous status.

The final chapter - Boost in port traffic on anvil – demonstrates the problems faced by Mumbai port in terms of traffic in cargo handling and how port activities had to shifted to neighbouring islands. The chapter also talks about the measures taken by the MbPT to revive the Portland to regain ascendancy over other ports.

Conclusions –

It can be concluded that the city of Mumbai – and the Portland with its glorious history has played a major role in shaping the economy of the country. The Mumbai port trust has been functional as Bombay Port trust right before independence – facilitating trade, transportation and cargo handling and continued to serve the country with its services till date. The institution has largely impacted the transportation as well as created employment opportunities – making Mumbai an important point on the world map. This book helped me understand about the chronological order in which the Portland was developed.

Research paper review –

Coastal Tourism: Opportunity and Sustainability

- Research paper written by Tuhin Ghosh

This review is based on the research paper – Coastal Tourism: Opportunity and sustainability written by Tuhin Ghosh. This research paper was published in the Journal of Sustainable development on December 1,2011. This research paper was received by the journal on August 29,2011 and accepted on October 14,2011.

Introduction of the author –

Tuhin Ghosh currently holds the position of Director at the school of oceanographic studies at Jadavpur university. Tuhin has expertise in coastal geomorphology, ICZM, disaster management, climate impacts, adaptation strategies, and human migration. He was the Lead Author of IPCC Special Report on Ocean and Cryosphere Chapter 4: Sea Level Rise and Implications for Low Lying Islands, Coasts and Communities. He has also invited as a Lead Author on Urban Climate Science in UCCRN ARC3.0. He was the India Lead of 'ESPA-Delta', Belmont Forum 'Deltas' and 'DECCMA' project, and currently ongoing 'Living Deltas' Hub.

Keywords – coastal tourism, sustainability, environmental destruction, sustainable strategies

Summary –

The research paper talks about the tourism opportunities that coastal areas provide compared to any other geological landform. This observation is based on the fact that the various elements namely the water, wind, sand and sunlight provide a lively experience to the tourists, and this experience depends on the location of the coast as well. The research paper also on the problems arising due to the over exploitation of the coasts. The battle between social and natural elements with human intervention are resulting in environmental destruction. Holistic approach needs to be taken, sustainable strategies to be applied to bring in the element of sustainability into coastal tourism.

Various problems that are faced due to increasing coastal tourism need to be catered. These problems are created due to tremendous pressure on the local resources which are unable to cater to the ever-increasing needs. Land degradation and land use change are among these problems. Shoreline development which constitutes port and resort development sometimes tends to change the sediment flow pattern causing disturbances in natural system if not planned properly. On the other hand, it is also necessary that the local people benefit from the ventures near the coast as well. This brings in the element of social and cultural sustainability. Steps in this direction are taken – for example the United Nations Convention on the Law of the Sea, Agenda 21, Convention on Biological Diversity, Convention Concerning the Protection of the World Cultural and Natural Heritage.

The insights derived from the above research paper can be surely applied while designing a ferry terminal whose primary intention is facilitate transportation through waters and secondarily to serve as a tourism hub for the city.

6. Architectural intervention – Conclusion –

The aim of this dissertation project is to bridge the gap between Mumbai and Navi Mumbai, to create a transport hub along the sea – to ease the life of everyday commuters like me – and also to explore the tourism in the islands across the main land thus creating employment opportunities. With upcoming projects like the NMIA, a need of a multimodal transport system mainly focusing on water transport can help to reduce the travelling time and thus benefit people from Navi Mumbai and the mainland alike.

- To create an efficient terminal that facilitates the ferries as well as domestic cruises further providing spaces like ro-pax terminals, marinas, yacht clubs, restaurants, museum, etc.
- The terminal building will have the required infrastructure and amenities for smooth operation of the ferries and cruises.
- Furthermore, resiliency and sustainability are the two factors that would be incorporated in the terminal building.
- To make use of underutilized waterfront spaces in the island city for transit services, public open spaces and recreation areas.
- To revitalize the defunct docks and make them relevant to the Mumbai city of today.
- To encourage citizens to appreciate the sea as an asset of the city.
- To assist in converting princess dock into a development node for the overall development of Mumbai's eastern waterfront development.
- To create a visual connection to Navi Mumbai and the hinterland.
- To boost tourism and create new activity and thus increase employment opportunities.

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