

COASTAL COMMUNITY DEVELOPMENT FOR MOOKAIYUR

Thesis

Submitted in partial fulfilment 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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CHENNAI - 600 119

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DEPARTMENT OF ARCHITECTURE BONAFIDE CERTIFICATE

This is to certify that this Dissertation Report is the bonafide work of **Austin Raphael Mascarenhas D (3621013)** who carried out the project entitled "**Coastal community development for Mookaiyur**" under our supervision from January 2021 to June 2021.

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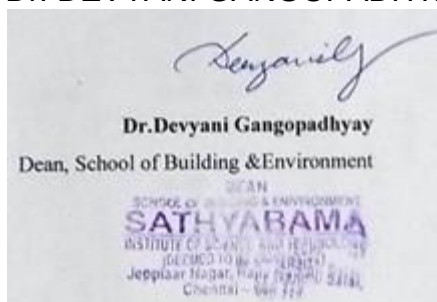
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Submitted for Viva voce Examination held on_____

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1.

DECLARATION

I, Austin Raphael Mascarenhas D hereby declare that the Project Report entitled **“Coastal community development for Mookaiyur”** done by me under the guidance of Ar. Vijendhranath (Internal Guide), Sathyabama Institute of Science and Technology is submitted in partial fulfilment of the requirements for the award of Bachelor of Architecture Degree.

DATE :

PLACE :

SIGNATURE OF THE CANDIDATE

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1 INTRODUCTION

The project aims at developing the livelihood and economy of the local people of mookaiyur by identifying various issues and problems faced and proposing apt solutions to develop the community as a whole

1.1 Aim:

- To build a harbor with advanced facilities and services
- To create an urban catalyst to promote surrounding development
- To build a marine research centre for the Laccadive sea/Indian ocean

1.2 Objective

- To study the existing harbor and give proposals based on what is lacking and what can be added to promote fish trade
- To help improve income and small fishermen and provide job opportunities with the introduction of commercial and industrial fishing
- To build better infrastructure with proper amenities and technology for commercial fishing
- To study the entire town and provide proposals for the betterment of the Mookaiyoor community
- To improve marine research in the Laccadive sea/Indian ocean

1.3 Need and Justification

- Mookaiyoor is the only town in the vicinity with a natural inland water inlet which can be developed
- In the past several years with the help of social media and the internet the community has seen a decent influx of tourists as it has two islands just a few kms off the coast along with a 18th century Gothic revival styled Portuguese church

- Fishing is the primary occupation of the community but there is a high percentage of palm and agro farming as the town is along the banks of the Gundar river

2 ABOUT MOOKAIYUR

Mookaiyur is one of the oldest village amongst the other nearby villages. It has the historical background from the period of Portuguese and before. It has the history of the parava community over century of years. St. James old church also made in the period of Portuguese or before, still it is looking good. The major economical decider of this village is nothing but fishing. The fishermen are the tribes who living more than 500 years here.

Mookkaiyur is a Village in Kadaladi Block in Ramanathapuram District of Tamil Nadu State, India. It is located 47 KM towards west from District headquarters Ramanathapuram. 10 KM from Kadaladi A/C. 558 KM from State capital Chennai. Mookkaiyur Pin code is 623120 and postal head office is Sayalgudi.

2.1 Location

Coordinates: 9°07'48.0"N 78°28'59.5"E

Distance from Major Airports

Chennai : 575 km
Trichy : 229 km Tuticorin : 91 km

Closest railway stations

Ramanathapuram Jn : 64 km
Tuticorin Jn : 70 km

Close by villages:

Kadugusandai (6 KM)



S. Keeranthai (7 KM)

Meenangudi (11 KM)

Kadaladi A/c (11 KM)

M.karisalkulam (11 KM)

Mookkaiyur is surrounded by Mudukulathur Block towards North, Vilathikulam Block towards west, Kamudi Block towards North, Tiruppullani Block towards East.

Paramakudi, Ramanathapuram, Thoothukudi, Aruppukkottai are the nearby Cities to Mookkaiyur. It is near to Laccdiva Sea. There is a chance of humidity in the weather.

2.2 Mookkaiyur Census Details

Mookkaiyur Local Language is Tamil. Mookkaiyur Village Total population is 2660 and number of houses are 567. Female Population is 47.5%. Village literacy rate is 67.9% and the Female Literacy rate is 29.5%.

Census Parameter	Census Data
Total Population	2660
Total No of Houses	567
Female Population %	47.5 % (1264) Total
Literacy rate %	67.9 % (1805)
Female Literacy rate	29.5 % (786) Scheduled
Tribes Population %	0.0 % (0)
Scheduled Caste Population %	11.1 % (295)
Working Population %	46.2 %
Child(0 -6) Population by 2011	315
Girl Child(0 -6) Population % by 2011	44.1 % (139)

Fisher Folk in Mookaiyur Village – Comparison of 2000 & 2010:

In Mookaiyur fishing village as per the Tamil Nadu Fisher Folk Census 2010, the total number of families are 122, with a total population of 595, whereas when compared with 2000 census, the number of families were 128 with a total population of 672. Hence, there is a decrease in population from the year 2000 to 2010. The details of fisher folk population for the year 2000 to 2010 are given

Year	Children (0-17 years)			Adult (18 years and Above)			Total Population			Total Families
	Male	Female	Total	Male	Female	Total	Male	Female	Total	
2000	114	100	214	246	212	458	360	312	672	128
2010	79	106	185	221	189	410	300	295	595	122

Marine Fisher folk by Age Group:

While analyzing the population under different age groups of 0-5, 6-10, 11-17, 18-40, 41-65, and above 65 years of age, it is observed that the maximum population of 298 are within the age group 18 – 40 years and the next highest population of 104 are in the age group 41 – 65 years. The minimum numbers are in the age group of above 65. During 2010, out of the total population of 595 more than 50% of the population are within the age group of 18 – 40 years. The details of marine fisher folk by age group is given

Year	0-5		6-10		11-17		18-40		41-65		Above 65		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
2000*	27		187				341		108		9		360	312
2010	17	22	28	33	34	51	163	135	54	50	4	4	300	295

* For the year 2000, only the total numbers in the age group has been reported in the census 2000, whereas in 2010 census, the number of males & females in each group has been recorded.

Religion and Community – Family wise:

In Mookaiyur fishing village, as per Tamil Nadu Fisher Folk Census 2010, out of 122 families 90 families are Christians and the rest 32 families are Hindus. Among the fisher folk population, 73.8% are Christians and 26.2% are Hindus. The details of Religion and community family wise are given

Year	Religion					Community				
	Hindu	Christian	Muslim	Popula- tion	Total Families	Forward	B.C	M.B.C	S.C	S.T
2000	55	617	0	672	128	0	55	577	40	0
2010	32	90	0	595	122	1	32	87	2	0

Educational status:

During the year 2000, out of the population of 672, the number of literates were only 351 forming 52.2%, whereas during 2010, the number of literates were 556 in the population of 595 and the literacy rate was 93.4%. Hence, the literacy rate has increased considerably in the last decade. The details of Educational Status of Fisher folk of Mookaiyur is given

Year	Primary School	Middle School	High School	Hr.Sec. School	Degree	Others	Total Literate
2000	232	89	16	9	5	0	351
2010	362	107	37	31	18	1	556

Employment Status of Fisher folk:

During the year 2000, 214 fishermen were engaged in sea fishing. In 2010, the number of men who were engaged in sea fishing was 188 and in addition to this 3 men and 4 women were engaged in brackish water fishing. Totally 195 are employed in fishing activities. A reduction in the number of sea fishing fishermen is observed, since many fishermen have migrated to Rameswaram and Pamban for anchoring their boats. The details of Employment status of Fisher folk is given in

Year	Fishing					Fresh Fish Trade		Dried Fish Trade		Processed	
	Sea	Brackish Water		Hand Picking							
		M	F	M	F	M	F	M	F	M	F
2000	214					0	0	0	0	0	0
2010	188	3	4	0	0	0	0	0	1	0	0

Year	Net Making		Allied Activities		Others		Employed in				Self Employe d		Total	
							Govt.		Private					
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
2000	0	0	0	0	30		2		0	0	0	0	246	
2010	0	0	0	0	0	0	1	0	0	0	2	0	194	5

Housing Facilities:

The number of houses in Mookaiyur during the year 2000 was 128, 94 houses were constructed by the Government under the free housing scheme. 10 houses were thatched houses, 20 were tiled houses, and 4 were concrete. During 2010, the number of houses were 117, the number of fishermen families who lived in own houses were 107 and 10 families were living in rented houses. The details of housing facilities in Mookaiyur is given in

Year	Own House	Rented House	Total Houses	Free House		Type of houses				
				Government	Tsunami	Thatched	Tiled	Concrete	Others	Total
2000	128	0	128	94		10	20	4	0	128
2010	107	10	117	28	9	40	12	65	0	117

Fishing crafts:

In Mookaiyur during the year 2000 there were only 29 wooden vallams without engine. During 2010, the number of wooden vallams was 72. Within 10 yearsthere was an increase of 43 boats and all the wooden vallams are with In Board Engine (IBE). The detail of fishing crafts in Mookaiyur village is given

Year	MFB	Wooden Cattamaran			FRP Cattamaran			Wooden Vallam		
		With Engine		WoE	With Engine		WoE	With Engine		WoE
		OBM	IBE		OBM	IBE		OBM	IBE	
2000	0	0	0	0	0	0	0	0	0	29
2010	0	0	0	0	0	0	0	0	72	0

Year	FRB Vallam		WoE	Total Non-Motorised	Total Motorised with		Type of Fuel used crafts wise (in Nos.)	
	With Engine				OBM	IBE	Diesel	Kerosene
	OBM	IBE						
2000	0	0	0	29	0	0	0	0
2010	0	0	0	0	0	72	72	0

Fishing Days & Mode of Fish Marketing:

As per the fisher folk census 2010, 188 fishermen go for daily fishing. Marketing of fish is done as whole sale, retail sale and by auction. Retail sale is done by 70 persons, whole sale is done by 12 persons and auctioning is done by 3 persons. The detail of fishing days in a month and mode of marketing in Mookaiyur village is given in

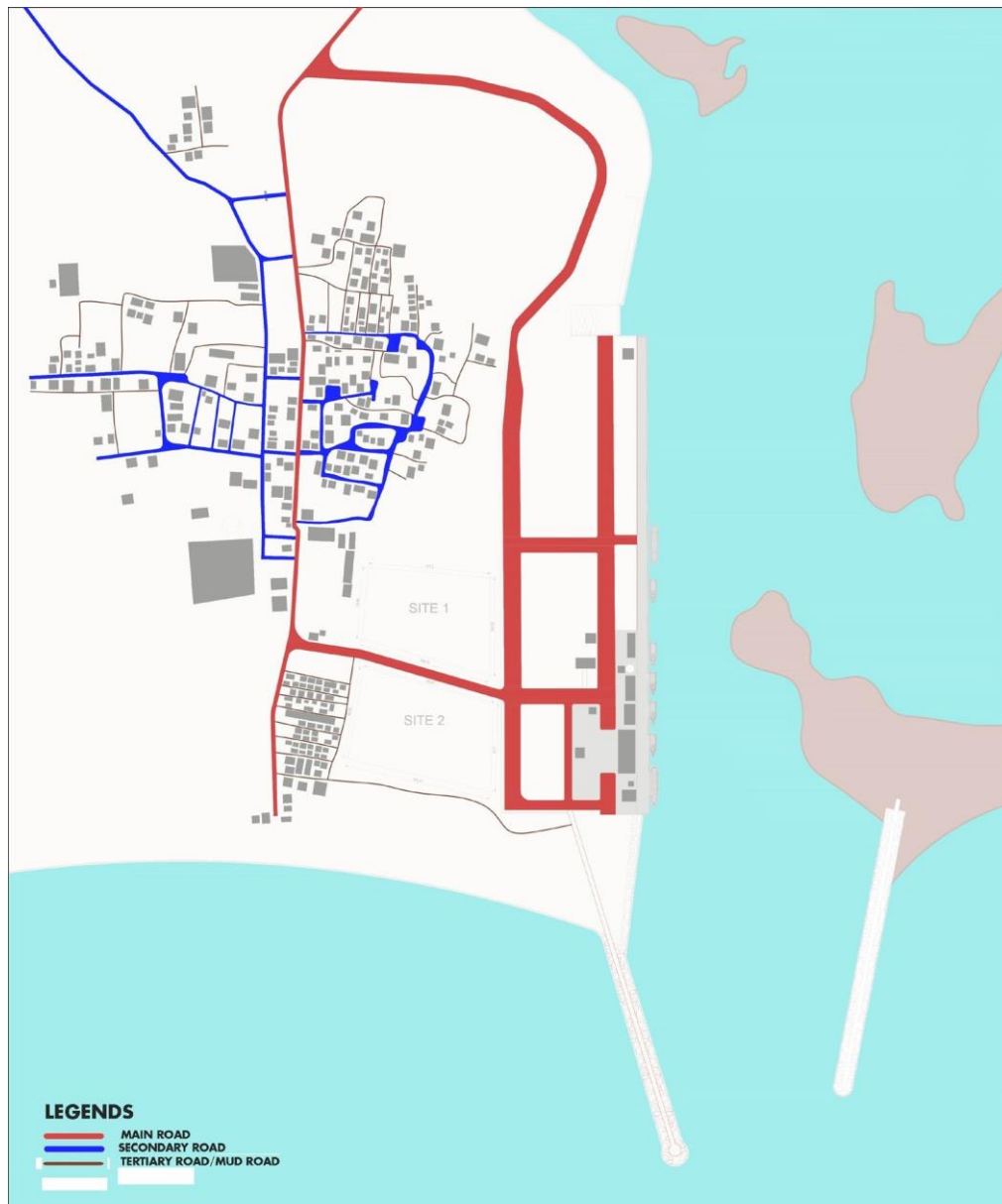
Year	Fishing Days in a Month				Mode of Marketing					
	Single Day	2-5 Days	6-8 Days	Above 8 days	Society	Middle Man	Retail Sale	Whole Sale	Street Vendor	Auction
2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2010	188	0	0	0	0	0	70	12	0	3

NA: Data not available

3 Analysis

3.1 Road hierarchy

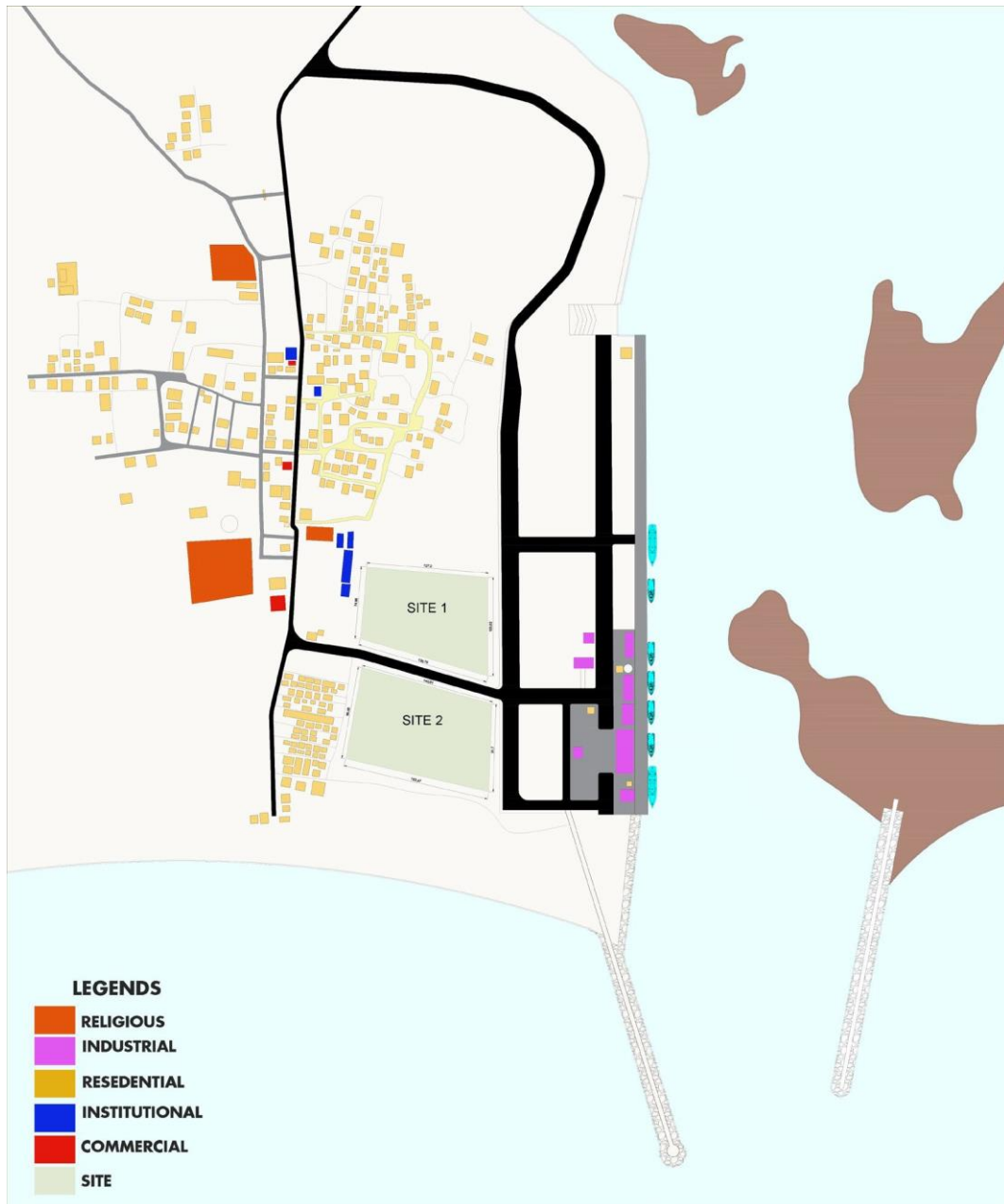
One major road runs through the village that connects it to Sayalgudi. It connects with the newly built harbour which has asphalt roads.



Majority of the roads present are mud roads that is the east-side of the main road .Newer developments emerged on the west-side of the main road and there are sturdy stone roads. Not very vehicle friendly Rest of the roads are just mud paths with no vehicular access.

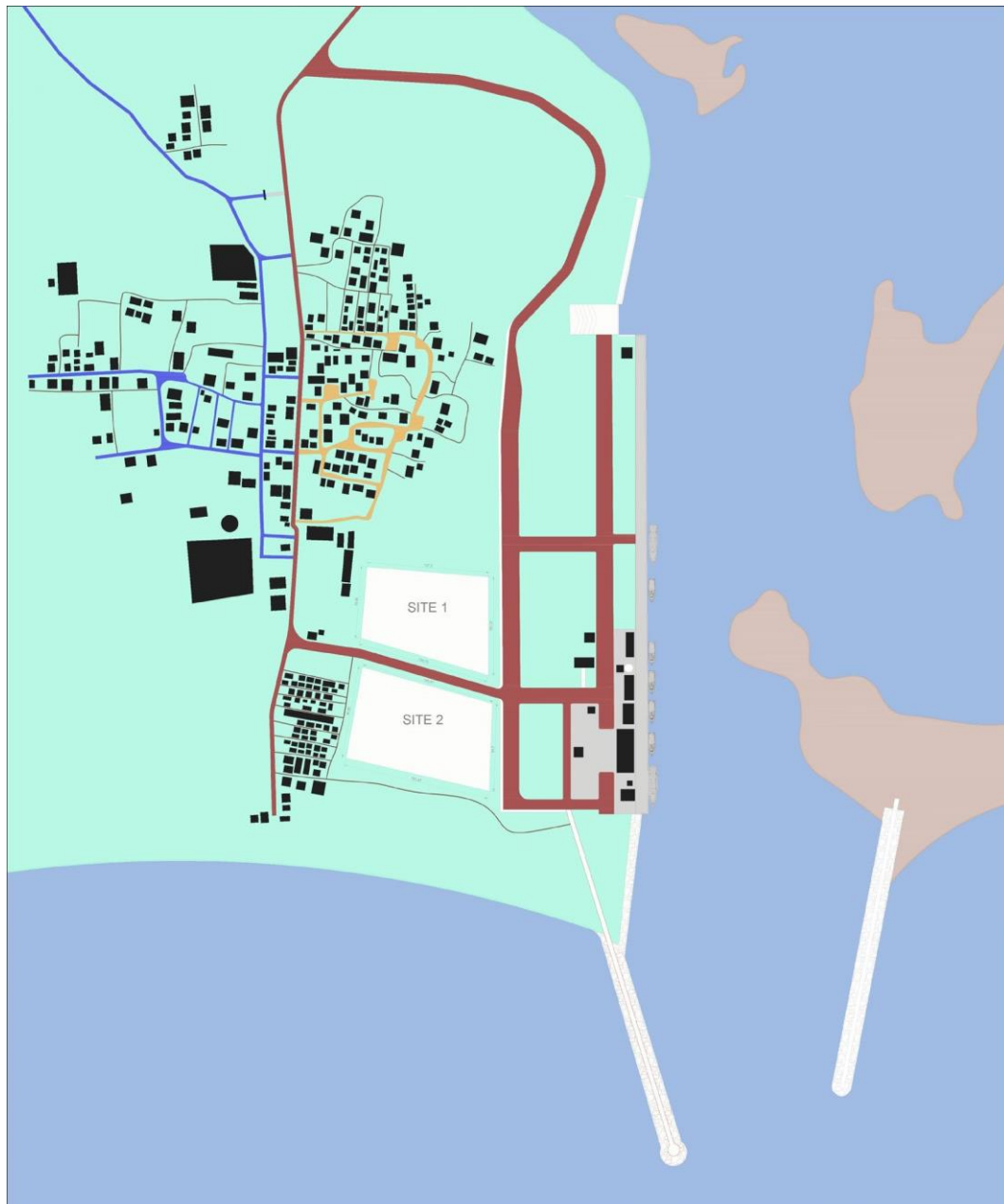
3.2 Land use

More than 90% of the buildings present are residential. 4 stores are present in the town for basic needs. Since the town is predominantly Catholics there are three major churches. One of them is the Yahappa or the St. James church built approximately 350 years ago. This was built during the colonial period in India by the Portuguese settlers. There is one govt school with classes up to std 8th



3.3 Figure and ground

The settlements are clustered organically. The settlements started close to the church and expanded north the percentage of built up are to open space is 11.034%



3.4 Soil profile from town and river bed

Table 1 : Soil profile 1

SOIL BORE LOG PROFILE

PROJECT : Proposed Construction of Fishing Harbor at Mookaiyur, Sayalkudi									
BH NO		MBH 3			DATE OF START			01.10.2013	
SITE		Mookaiyur			DATE OF COMPLETION			02.10.2013	
DIA OF BORING		150 mm			GROUND WATER LEVEL			Seawater (+0.27 m)	
TYPE OF BORING		Rotary (Calyx Rig)			Co-Ordinate		78° 28' 48.92" E & 9° 07' 47.23" N		
Depth below OGL (m)	Soil Profile	Description / Classification of Soil	Depth of Samples Collected (m)	Standard Penetration Test (SPT)				Relative Density / Consistency	
				15	30	45	N		
+ 0.27 m		Seawater							
0.0 - 1.5		Grayish Clay	1.5	0	0	1	1	Very Soft	
1.5 – 3.0		Brown Sand	3.0	2	3	4	7	Loose	
3.0 – 4.5		Grayish Clayey Sand	4.5	2	2	5	7	Loose	
4.5 – 6.0		Brown Sand	6.0	5	8	10	18	Medium Dense	
6.0 – 7.5		Brown Sand	7.5	14	27	33	60	Very Dense	
7.5 – 9.0		Brown Silty Sand	9.0	16	30	34	64	Hard	
9.0 – 10.5		Brown Sand	10.5	16	32	34	66	Very Dense	
10.5 – 12.0		Brown Sand	12.0	19	34	38	72	Very Dense	
12.0 – 13.5		Brown Sand	13.5	24	57 _(13 cm) Rebound		> 100	Very Dense	
13.5 – 15.0		Brown Silty Sand	15.0	36	44	56 _(11 cm)	> 100	Hard	
Borehole Termination Depth is 15.0 m from the River Bed Level									

Table 2 : Soil profile 2

PROJECT : Proposed Construction of Fishing Harbor at Mookaiyur, Sayalkudi								
BH NO		LBH 1		DATE OF START			27.09.2013	
SITE		Mookaiyur		DATE OF COMPLETION			27.09.2013	
DIA OF BORING		150 mm		GROUND WATER LEVEL			0.5 m	
TYPE OF BORING		Rotary (Calyx Rig)		Co-Ordinate	78° 28' 52.52" E & 9° 07' 42.73" N			
Depth below OGL (m)	Soil Profile	Description / Classification of Soil	Depth of Samples Collected (m)	Standard Penetration Test (SPT)				Relative Density / Consistency
				15	30	45	N	
0.0 - 1.5		Grayish Sand	1.5	2	3	5	8	Loose
1.5 – 3.0		Grayish Sand	3.0	3	5	7	12	Medium Dense
3.0 – 4.5		Brown Sand	4.5	3	4	6	10	Medium Dense
4.5 – 60		Brown Sand	6.0	4	5	7	12	Medium Dense
6.0 – 7.5		Brown Sand	7.5	6	16	21	37	Dense
7.5 – 9.0		Brown Sand	9.0	9	10	12	22	Medium Dense
9.0 – 10.5		Brown Sand	10.5	28	36	42	78	Very Dense
10.5 – 12.0		Brown Silty Sand	12.0	19	27	27	54	Hard
12.0 – 13.5		Brown Sand	13.5	31	37	46	83	Very Dense
13.5 – 15.0		Brown Sand	15.0	30	47	50 (10 cm)	> 100	Very Dense
Borehole Termination Depth is 15.0 m from the Existing Ground Level								

3.5 Climatic analysis

3.5.1 Average temperatures and precipitation

The “mean daily maximum” (solid red line) shows the maximum temperature of an average day for every month for 9.14°N 78.47°E. Likewise, “mean daily minimum” (solid blue line) shows the average minimum temperature. Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years. For vacation planning, you can expect the mean temperatures, and be prepared for hotter and colder days. Wind speeds are not displayed per default, but can be enabled at the bottom of the graph.

The precipitation chart is useful to plan for seasonal effects such as monsoon climate in India or wet season in Africa. Monthly precipitations above 150mm are mostly wet, below 30mm mostly dry. Note: Simulated precipitation amounts in tropical regions and complex terrain tend to be lower than local measurements.

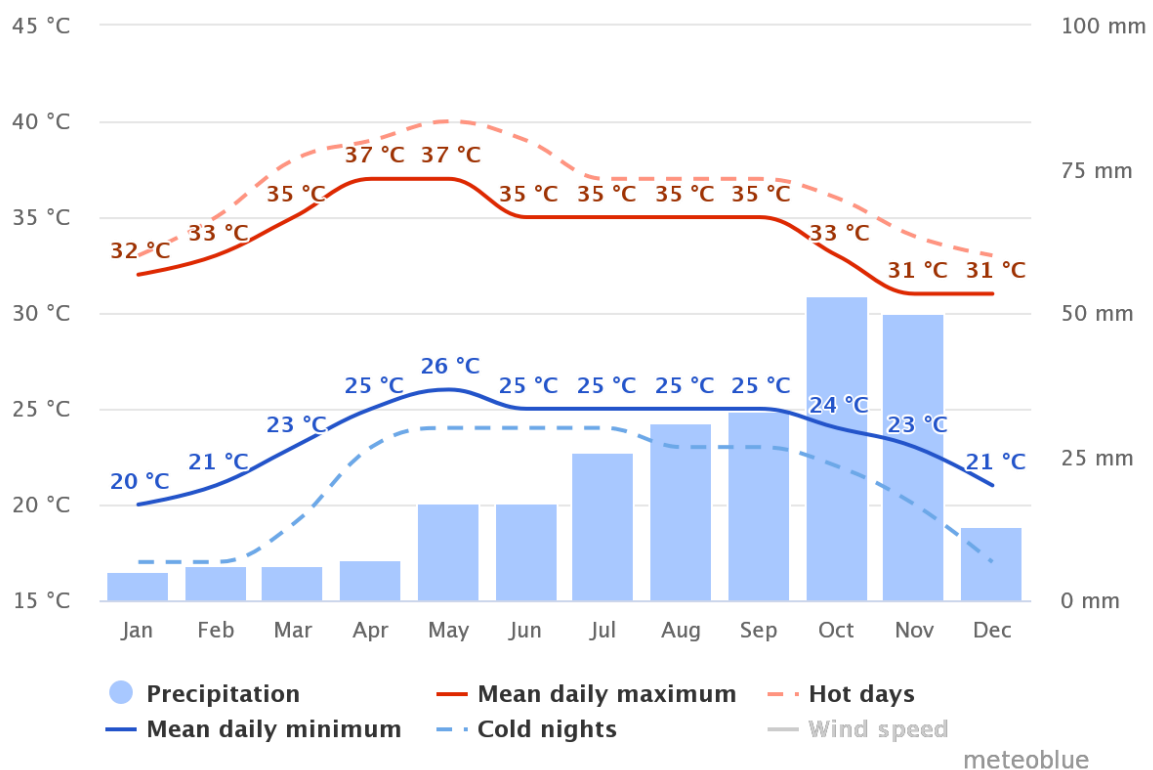


Figure 6 : Average temperatures and precipitation

3.5.2 Precipitation amounts

The precipitation diagram for 9.14°N 78.47°E shows on how many days per month, certain precipitation amounts are reached. In tropical and monsoon climates, the amounts may be underestimated.

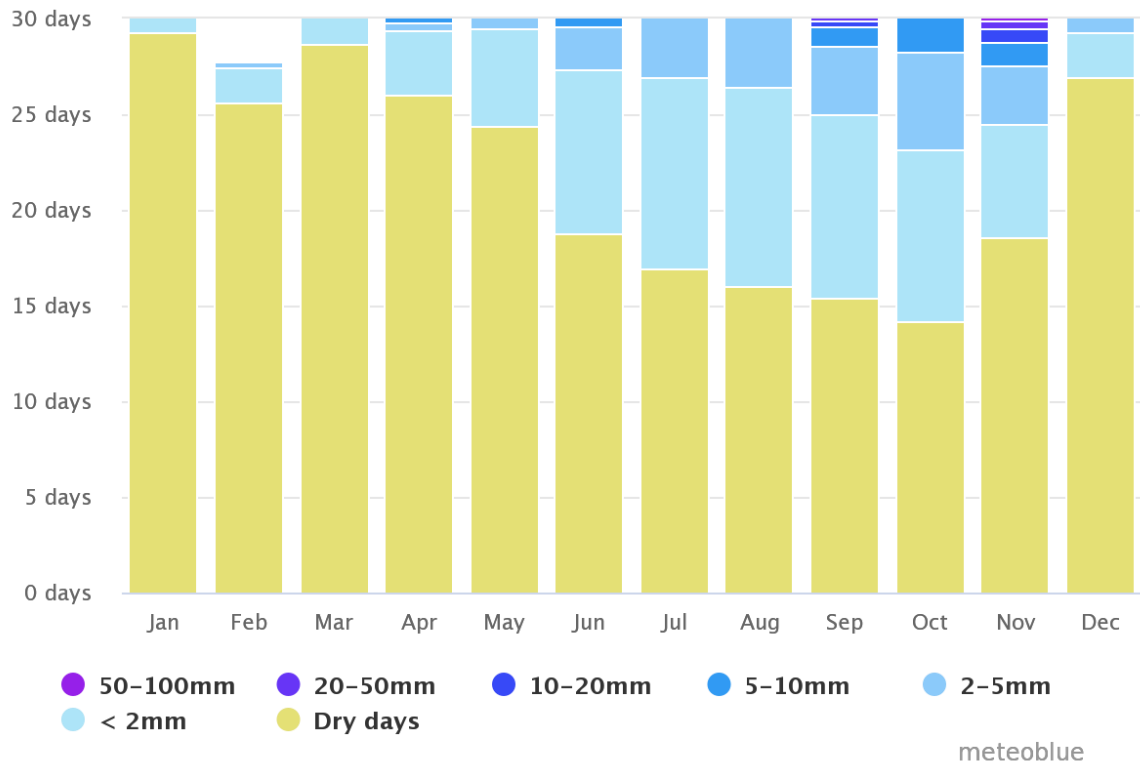


Figure 7 : Precipitation amounts

3.5.3 Cloudy, sunny, and precipitation days

The graph shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as partly cloudy and with more than 80% as overcast. While Reykjavík on Iceland has mostly cloudy days, Sossusvlei in the Namib Desert is one of the sunniest places on earth.

Note: In tropical climates like in Malaysia or Indonesia the number of precipitation days may be overestimated by a factor up to 2.

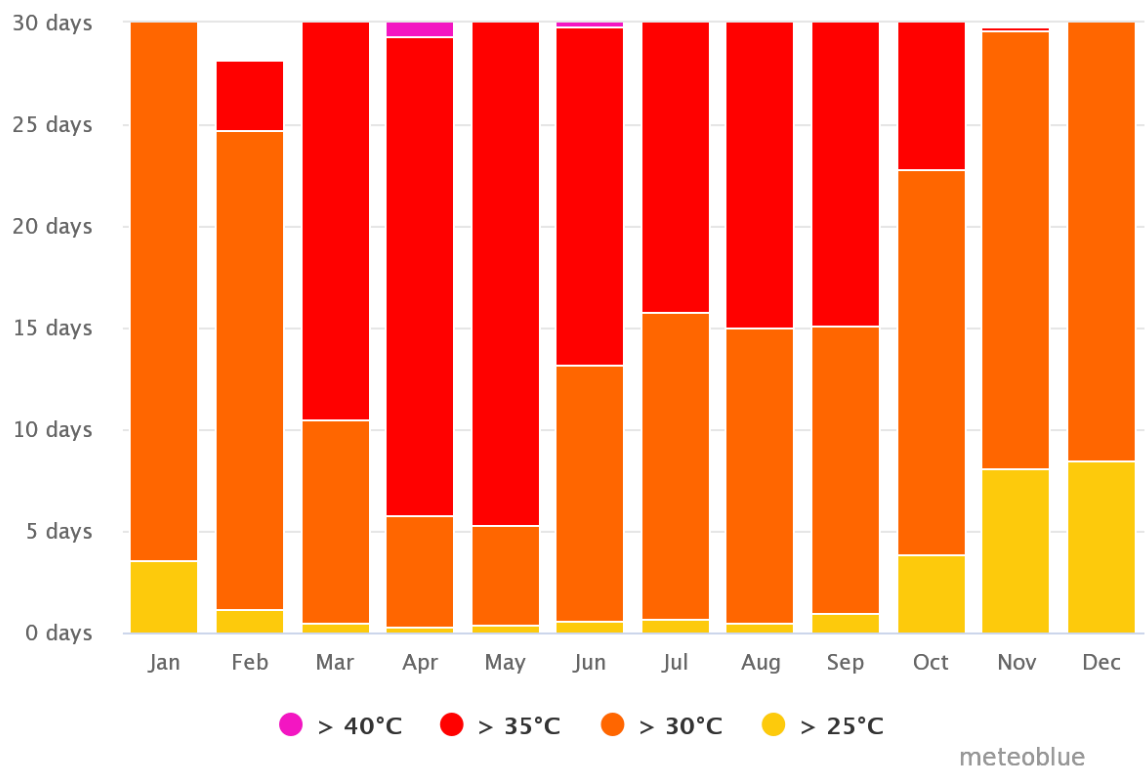
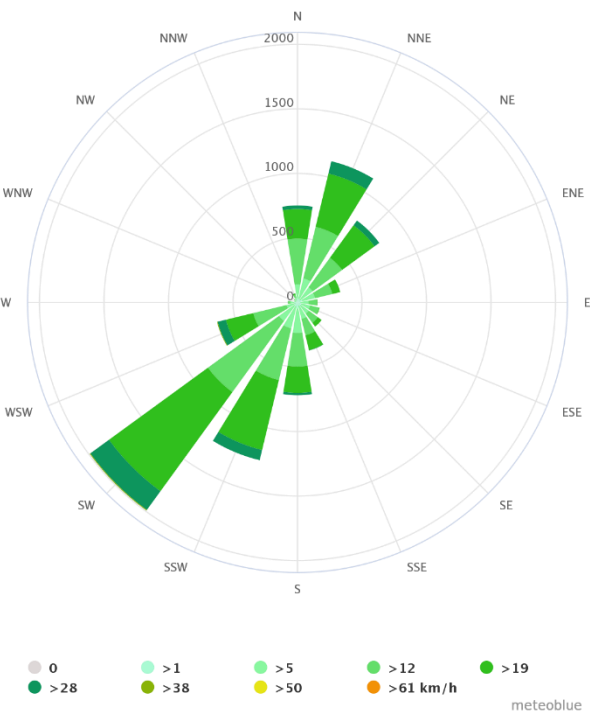


Figure 8 : Cloudy, sunny, and precipitation days

3.5.4 Wind

The diagram for 9.14°N 78.47°E shows the days per month, during which the wind reaches a certain speed. An interesting example is the Tibetan Plateau, where the monsoon creates steady strong winds from December to April, and calm winds from June to October.

The wind rose for 9.14°N 78.47°E shows how many hours per year the wind blows from the indicated direction. Example SW: Wind is blowing from South-West (SW) to North-East (NE). Cape Horn, the southernmost land point of South America, has a characteristic strong west-wind, which makes crossings from East to West very difficult especially for sailing boats.



3.6 Trade analysis

The tables give a detailed analysis on the variety of the fish caught and sold by the two different types of vessels i.e. the vallams and the mechanized trawlers

Table 3 : Mechanised boat data

Fishing pattern and the season

MECHANISED FISHING BOAT												
Details	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Fishing Season	NORMAL SEASON			BAN PERIOD		GOOD SEASON		POOR SEASON			NORMAL SEASON	
Variety of fish	1) Oil Sardine 2) Caranx 3) Baracudda 4) Rays 5) Cat fish 6) Silver bellies 7) Sardine 8) Pomfret 9) Seer fish 10) Mullet 11) Scaeinids 12) Prawn 13) Crab			Boat repair and maintenance		1) Prawn 2) Crab 3) Squid 4) Silver bellies 5) Sardine 6) Goat fish 7) Pomfret 8) Keeli 9) Soovaarai		1) Prawn 2) Crab 3) Squid 4) Silver bellies 5) Sardine 6) Goat fish 7) Pomfret 8) Keeli 9) Soovaarai				
Fish Availability / catch	1) Oil Sardine 1 to 4 ton 2) Caranx 10 to 100 Kg. 3) Scaeinids 200 to 300 Kg. 4) Prawn 20 to 45 Kg. 5) Crab 5 to 10 Kg.			Boat repair and maintenance		1) Prawn 50 to 150 Kg. 2) Crab 10 to 50 Kg. 3) Squid 25 to 100 Kg.		1) Prawn 50 to 100 Kg. 2) Crab 10 to 30 Kg. 3) Squid 25 to 60 Kg.				
Fish prices – Rs. per Kg.	1) Oil Sardine Rs.3 to 5/- 2) Scaeinids Rs.20 to 25/- 3) Caranx Rs.60 to 100/- 4) Baracudda Rs.60 to 100/- 5) Mullet Rs.40 to 60/- 6) Prawn (headless) Rs.200 to 250/-			Boat repair and maintenance		1) Prawn Rs.200 to 250/- 2) Crab Rs.80 to 100/- 3) Squid Rs.200 to 300/-		1) Prawn Rs.200 to 250/- 2) Crab Rs.80 to 100/- 3) Squid Rs.200 to 300/-				

Table 4 : Wooden Vallam data

WOODEN VALLAM (with Inboard Engine)				
Fishing Season	GOOD SEASON	Fishing ban period for MFB, hence only crabs and lobster nets are used by Vallam fishermen	NORMAL SEASON	POOR SEASON
Variety of fish	1) Big size Seer fish 2) Ribbon fish 3) Mullet 4) Baracudda 5) Sardine 6) Thadiyan and Cola	1) Crab 2) Lobster	1) Small size seer fish 2) Ribbon fish 3) Caranx 4) Katta 5) Sardine	1) Small size seer fish 2) Ribbon fish 3) Caranx 4) Katta 5) Sardine
Fish Availability / catch	1) Seer fish 1 to 10 Kg. 2) Ribbon fish 1 to 40 Kg. 3) Mullet 10 to 30 Kg. 4) Baracudda 1 to 10 No. 5) Sardine 20 to 100 Kg. 6) Thadiyan and Cola	1) Crab 20 to 30 Kg. 2) Lobster 2 to 10 Kg.	1) Seer fish 50 to 100 Kg. 2) Ribbon fish 50 to 100 Kg. 3) Caranx 50 Kg. 4) Katta 50 Kg. 5) Sardine 100 Kg.	1) Small seer 20 to 50 Kg. 2) Ribbon fish 20 to 50 Kg. 3) Caranx 30 Kg. 4) Katta 30 Kg. 5) Sardine 100 Kg.
Fish prices – Rs. per Kg.	1) Seer fish Rs.180 to 200/- 2) Ribbon fish 60 to 80/- 3) Mullet 30 to 50 4) Baracudda 150 to 180 5) Sardine 10 to 20/- 5) Thadiyan 10 to 20/- 6) Cola 3 to 4/-	1) Crab Rs.110 to 140/- 2) Lobster Rs.2700 to 3000/-	1) Seer fish Rs.100 to 120/- 2) Ribbon fish 40 to 50/- 3) Caranx 70 to 80/- 4) Katta 50 to 60/- 5) Sardine 7 to 12/-	1) Small seer Rs.170 to 180/- 2) Ribbon fish 60 to 70/- 3) Caranx 80 to 90/- 4) Katta 60 to 70/- 5) Sardine 10 to 15/-

Table 5 : Stakeholder details

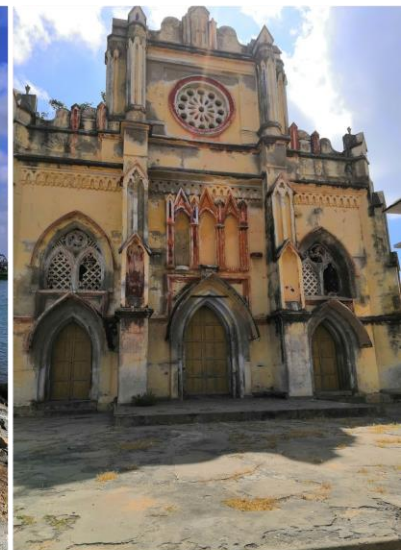
Fisheries Stakeholder Matrix in Ramanathapuram district

Sl. No	Stakeholder/ common interest group	Key Characteristics	The District they belong	Relative size of Stakeholder Groups.
Producers/Fishers				
1	Mechanised Boat Fishermen (trawlers)	They are Deep Sea Fishers; use trawl nets; specific days only possible for fishing; high investment and high income; fishing with crews and labour.	Ervadi, Kilakarai, Mandapam, Pamban, Rameshwaram, & M.V.Pattinam	1500-2000 Numbers
2	Traditional Crafts Fishermen	They are catching the fish at a minimum distance; all days they are going for fishing; less investment and medium income.	These traditional crafts fishermen exists all the 180 villages in this district.	12000 Numbers
3	Crew Members in Mechanised boat & Traditional Boat	They are not having own crafts; just work as labour; do not have any investment; getting the income/share based on the catch; in lean period they go for other labour works.	These crew members are found living in all the 180 villages in this district.	35000 Numbers
4	Sea Weed cultivator	Family activity; women also involve in this activities near the sea shore	These seaweed cultivator are living in 12 villages (Vedhalai, Pamban, Vadakadu, Olaikuda and nearby villages)	7000 Numbers
5	Sea Shore Fishers	They are doing fishing near sea shore seasonally; rest of the period they work as crew in mechanized and traditional boat.	They are living in 16 villages	2000 Numbers
6	Sea weed collectors	Only 6 months they are involved in this activity; women's involvement is high	They are living in 40 villages	11000 Numbers.
7	Ornamental Fish Collectors	Based on the demand they are doing the activity seasonally.	They are living in 7 villages (S.M.Valasai, Ervadi, Thirupalaikudi & Periyapattinam)	200 Numbers
8	Sea shell and Sea Cucumber collectors	They carry out these activities seasonally and migrate from place to place	They are living in 20 Villages	5000 Numbers

Table 6 : Distribution

Post-Harvest & Marketing				
1	Export Companies	Procuring huge volume of fish; doing processing work; producing co-products by value addition; deciding the price for the catch of the fishermen; they can assess the quality of the fish and export to some other places.	Ramanathapuram, Mandapam, Rameshwaram, Thondi, Ervadi and Kilakarai.	20 export companies exist all over this district.
2	Agent/ Traders	They are agents for export companies and giving advance to the fishermen and in turn they produce fish. They also get agent commissions; they belong to various communities.	They are in 100 villages in this district.	500 Numbers.
3	Local Vendors	They are fishermen getting money from the outside agents and giving advance to the fishermen; they are selling all varieties offish throughout the fishing districts.	They are living in all 185 villages in this district.	1200 Numbers.
4	Small Vendors	They are investing 500-1000 Rs per day to procure export and local varieties.	They are living in all 185 villages in this district.	1000 Numbers.
5	Head Load vendors/ Cycle vendors.	Men are carrying and selling the fish with the help of two wheelers; women are carrying and selling the fish with head loading; they are selling the fish in the nearby villages.	They are living in all 185 villages in this district.	600 Numbers.
6	Auction Persons	They are doing auction for all kinds of fish except the export varieties, they don't have investment and getting commissions.	They are living in all 185 villages in this district.	1000 Numbers.
7	Dry Fish producers/ Marketing.	Mainly women are involving in this activity. Some woman are doing wholesale business and others vend fish	They are living in all 185 villages in this district.	3000 Numbers.
8	By-Catch from trawlers(Sangaayam) Vendors	Only doing in the places where the mechanised boats (Trawler) fishing is available. They are drying it and sell to the outside traders.	They are in all 7 villages in this district	250 Numbers

3.7 Site images



3.8 Limitations

- Due to cell phone towers situated only near the harbor, communication within the town premises is close to nothing
- Any form of groceries or fresh produce has to purchase from Sayalgudi
- Due to the deviation from the original harbor design the breakwaters do not serve its sole purpose and is a complete failure
- 32 fishing trawlers were allocated for mookaiyur but due to unfavorable harbor conditions only 10 remain and rest are sent elsewhere
- With the growing of the harbor there is very less parking space
- Beach is not properly maintained even with a steady influx of tourists on the weekend
- Since only one main road is properly made with asphalt the town is not vehicle friendly since majority of the roads are just mud roads. Since soil type is loose to very loose; vehicle movement is not favorable
- Even with a big fishing harbor there is no proper fish market except the auction area and due to this there is up to a 15% wastage of seafood due to spoilage

3.9 Features and opportunities

- The three islands that are off the coast of Mookaiyur can be used to promote ecotourism and nature walks
- The 17th century Portuguese church is properly restores will serve as a vital point of attraction
- Many pre independence houses which are in ruins can be restored and be used as places of tourist interest
- If the necessary corrections are done in the harbor Mookaiyur will serve as one of the biggest fishing harbors in South TN after Tutuicorin
- With proper amenities the village will once again flourish and become a beacon in the ramanad district
- The Pavalapaarai project or the coral reef reclamation project is underway and this will help in restoring coral reefs along the Mookaiyur coast and will form a beautiful sight

3.10 Proposed project regulations

Since the project is proposed in the CRZ area, project would require the CRZ clearance

- As per the CRZ notification of 6th January 2011, facilities requiring water front i.e. Wharf, Conveyer system, loading/unloading system, quays, slipways, bridges etc., are permitted for the port project and the approval has to be obtained as prescribed in the said notification.
- Application for CRZ clearance will be submitted to State Coastal Zone Management Authority (SCZMA)
- MoEF will accord CRZ clearance to the project on recommendation of SCZMA

3.10.1 CRZ regulations

Though no Construction is allowed in the no development zone for the purposes of calculation of floor space Index, the area of entire plot is including the portion which falls within the no development zone shall be taken into account.

FOR CRZ-II:-

The areas that have been developed up to or close to the shore line.

Explanation:- From the purposes of the expression developed area is referred to as that area within the existing legally designated urban areas which are substantially built up and has been provided with drainage and approach roads and other infrastructural facilities, such as water supply and sewerage mains.

CR-II:-

- i. Building shall be permitted only on the landward side of the existing road, or on the landward side of the existing authorized structures;
- ii. Buildings permitted on the landward side of the existing authorized structures shall be subject to the existing local town and country planning regulations including the existing norms of Floor Area ratio; Provided that no permission for construction of building shall be given on landward of any new roads which are constructed on the seaward side of an existing road:

- iii. Reconstruction of authorized buildings to be permitted subject with the existing Floor Area Ratio Norms and without change in present.

4 Literature study

4.1 Veraval fishing harbour, Gujrat

Veraval is located in suaratra zone of Gujarat in India. As Gujarat is privilege of having 1600 kms of coastal line, but fishing industry has not developed here so far.

Veraval fishing harbour is located near south-east part of the varaval. Connectivity between harbour and the city is by road only. Connection with respect to state is through rail, road only. The harbour is developed in 1980.



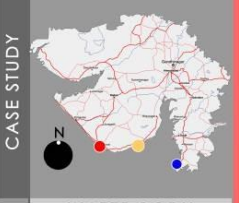
4.1.1 Boat making activity:

The harbour have a boat making unit on it. This unit design develop boats as well as they provide maintenance too. There is so many other activity happening throughout the year.

Now, let's understand the exchange system its time period. This chart represent the system of the harbour in simplify manner how the boat reacts in the harbour. There is 2 main activity in the harbour which can defines the all trading activity. Exchange pause. The main trading activity and all trading supportive activity can relate to exchange. (I.e. exchange of humans (fishermen), exchange of fish, exchange of tools, equipment, utility, etc. There are some supportive activity must have on the harbour like cold storage, ice factory, wood

works, fishnet mending shed, auction hall, etc. To make trading easy, fast and reliable. The harbour should be able to facilitate all the fish trading related activity in its campus.

4.1.2 Comparison:

CASE STUDY		VERAVAL PORT	MADHWAD BAY	UMBERGAON BAY
				
		HIRAN RIVER	BHOGAVO RIVER	TUMB RIVER
WATER BODY		HIRAN RIVER	BHOGAVO RIVER	TUMB RIVER
DEPTH OF SEA BED		11.0-12.2 MT.	10.0-12.0 MT.	11.0-12.5 MT.
MOONSOON		MAY 15 - SEPT 18	MAY 15 - SEPT 18	MAY 15 - SEPT 18
HIGH TIDE (MHLW)		2.20 MT	2.40 MT	2.50 MT
LOW TIDE (MLLW) (MSL 0.00 MT.)		-1.20 MT.	-1.50 MT.	-1.20 MT.
TYPE OF FISHES		26	26	32
TYPE OF SEA-FOOD		2	2	2
CATCHMENT AREA		20-50 NAU.MILE 300-450 NAU.MILE	20-50 NAU.MILE 200-300 NAU.MILE	20-50 NAU.MILE 400-500 NAU.MILE
BOATS				
TRAWLERS		354	136	420
GILLNETTER		44	22	56
IBM/OBM		1184	423	760
FISHERMEN		11,300	2,300	7,200
SUPPLY AREA		SAURASTRA,AHMDABAD, OVER SEAS	DIU,BHAVNAGAR,RAJKOT	S.GUJARAT, D&NH, MUMBAI
CATCH / MONTH		12,600 M.T.	1,542 M.T.	5,081 M.T.
AVG.PROFIT/MONTH		64.08 CR.(INR)	6.98 CR.(INR)	23.01 CR.(INR)
DOCK YARD		YES	YES	NO
MARKET		YES	NO	NO
FUEL STATION		YES	YES	NO
MAINTAINANCE		YES	NO	NO
MANUFACTURING		YES	NO	NO

(* AS PER GUJARAT MERITIME BOARD 2013)

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Table 7 : Comparison table

4.1.3 Opportunity

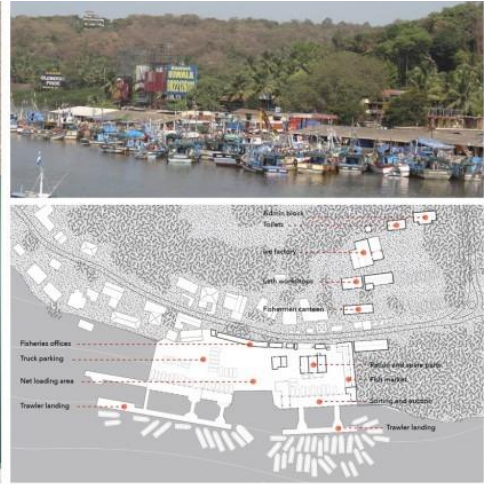
- Creating small structure in such a large campus will distribute site activity lower down the conjunction.
- Having all the basic utility in the campus will help fishermen will led to grow supporting small business help generate economy,
- Each space have to be very fine tuned otherwise harbour will start spoiling maintenance become difficult.

4.2 Mandovi fisherman jetty, Goa

The Mandovi Fishermen Jetty and Cooperative can be located beside a dense cluster of busy trawlers on the Mandovi estuary, under the Panjim-Porvorim Bridge, Goa.



Betim, Goa



Existing structure of the Malim Fishermen cooperative

Present Site Condition - What used to be a high functioning fishing jetty with 150 trawlers, a chaotic fish market and a family of supporting economies {net mending sheds and gear shops) scattered in this fishing village, is right now 'fitting-out' in its context of luxury resorts and off- shore casinos dotted on and along the Mandovi.

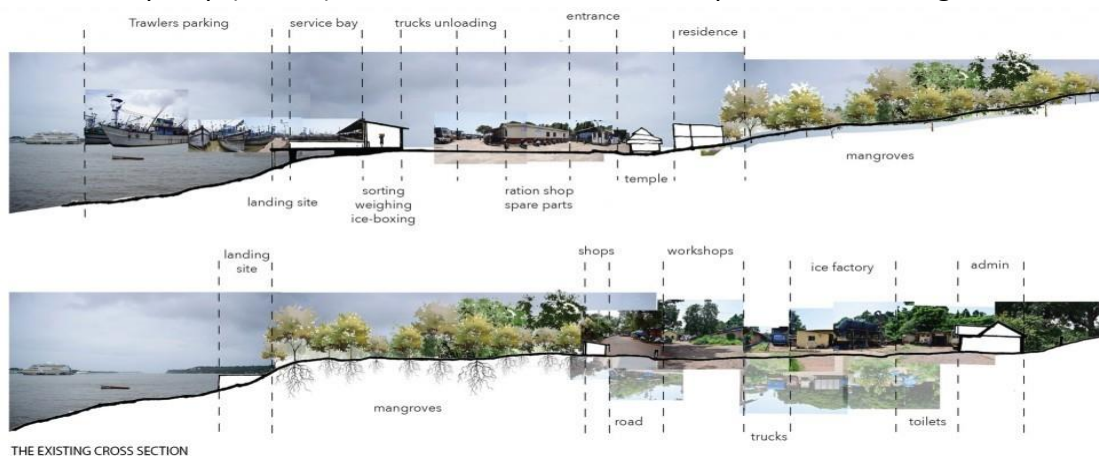
4.2.1 About the port

- Max size of the vessel is 150 m.
- Channel depth is 4.9 m whereas the anchorage depth is 15.5m.
- The cargo pier depths are about 4.9m.
- Malim jetty is seen across the river mondavi, located very close to the Panaji, capital city of Goa.
- There are around 2200 households at malim. 350 trawlers are operating from the jetty, through many of the trawlers stay away Malim.

- Total fishing population is around 8000 at Malim, of which active fisherman are 4500.

4.2.2 Facilities on the Port

- 139 meters fisherman jetties
- Auction sheds (2 no's)
- Workshops (2 no's)
- Office for fisheries society
- Canteen facility
- HSD pump (2 no's)
- Overhead reservoir for water supply
- 181 Net mending shed
- Parking space for vehicle
- Toilet
- Illuminated facilities
- Ice plant / cold storage



4.2.3 Tourism factor effect

This gradual encroachment has led to many fishermen shifting to the tourism sector to make up for the fall in income and inability to survive the competition and has caused many such social and economic issues. Right now the site has lost its rigor in functioning, with the western half of the site bought by Deltin Royale.

4.2.4 Challenge

The challenge for the fishermen right now is to survive in this competition with the tourism sector.

4.2.5 Opportunity

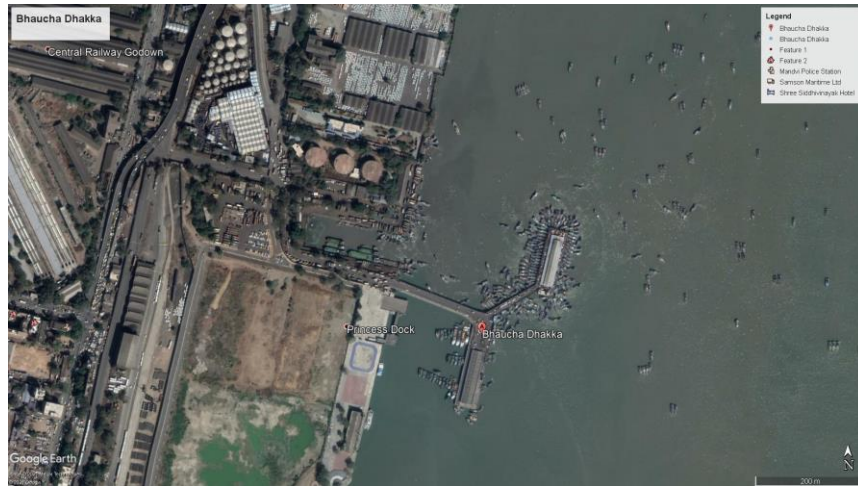
The project builds around the idea to restore this dynamic, energetic character and functioning of the Mandovi jetty, by adding a layer of reinforcements, in the form of a series of dining decks run by the local fishermen and their families, as an extension to the same cooperative. This diversion

would run parallel to the fishing activity on the jetty, with controlled overlap in the movement patterns of both these diverse functions, complementing the working of both.

4.3 Bhaucha Dhakka, Mumbai

4.3.1 About the port

- The new jetty for fish landing is an extension of the old bhaucha Dhakka which is used as a passenger jetty of Mumbai harbor.
- The jetty is guarded by the port trust officials and comprises a small bus depot and a large, tin roofed shed under which a handful of tea and refreshment stalls.
- The depth of the port is 11.1 meters.
- Adjacent to the wharf is another jetty where local fishermen have been docking their boats for decades.
- A small bridge connects the mainland with the jetty and facilities like diesel pump, auction hall etc. are available for the vessels using the harbor.
- Fish is often put straight onto the pier concrete and splashed with harbor water for better appearance before sale.
- Designated auction area is not always used for the auctioning.
- Fish is sold straight from the pier concrete.
- Unrelated traffic in the auctioning area causes auctioning to be too long.
- The pier is highly contaminated due to unwanted human activities and is used for auctioning and for packaging fish for transport.



4.3.2 Location

Ferry Wharf (also called as Bhaucha Dhakka) is a wharf along the Thane creek, along the coast of Dockyard road on the Eastern seafront of Mumbai, the capital of the Indian state of Maharashtra.

4.3.3 History

- It is first wet dock in 1841 for the convenience of the passengers and incoming ships to load, embark and berth.
- The new ferry wharf was constructed to accommodate the additional trawlers from Gujarat and to provide facilities for fish landings.
- The harbor was commissioned in April 1980.
- The wharf serves as the port for numerous fishermen who bring in their daily catch.
- Ferry service links up JNPT, Uran to the east and jetty of Mumbai to the south.
- It is essential a jetty for ferries going every hour to MORA and REWAS.

4.3.4 Strength:

- Steady supply of fish for our grow-out (raw materials).
- Hatchery own fish, feed and grow in unpolluted water of fishing bay.
- Use of cutting-edge feeding and growing technologies.
- Well-programmed production system.
- Preserved quality in the processing system.

4.3.5 Weaknesses:

- High price image
- Big sizes
- Production scheduling
- New products
- Customization
- Volume considerations
- Packaging
- High import taxes on equipment & packaging material
- Lack of supplier
- Limited design
- Expensive
- Compliance with mandatory labeling

4.4 Marga fish market, Goa

4.4.1 About

The Newly renovated fish market looks to be state-of-the-art. There are stainless steel stands to keep the fish on. These are easier to clean than the stands that were previously used. Thermopolis ice-boxes are out as each vendor now has an insulated fish storage box. The flooring has been done with vitrified tiles and the drainage system in the market has been improved.

4.4.2 Highlights

- Natural light and ventilation
- Traditional style fish market
- Proper water supply and drainage supply
- Insulated fish storage box
- Stainless steel stands
- Odorless fish market
- Washing and Cutting Fish counter is provided exactly
- Opposite fish Market
- Separate water taps on every counter

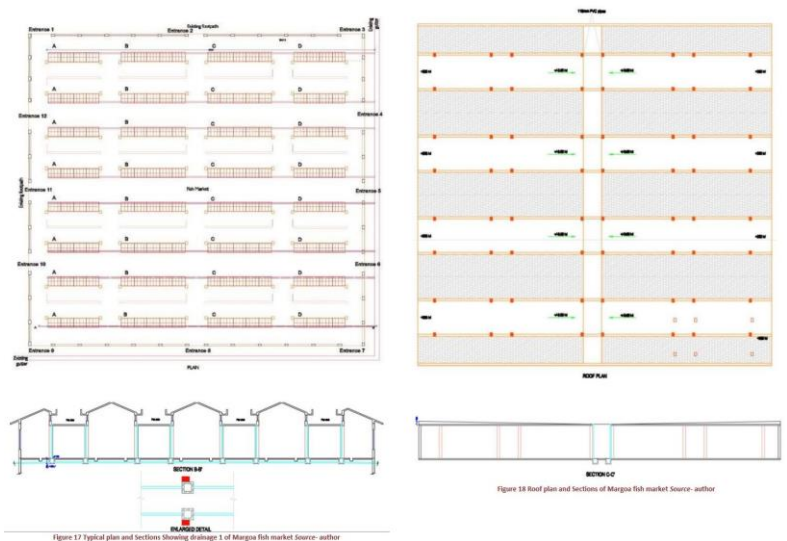


Figure 17 Typical plan and sections showing drainage 1 of Marga fish market Source- author

Figure 18 Roof plan and sections of Marga fish market Source- author

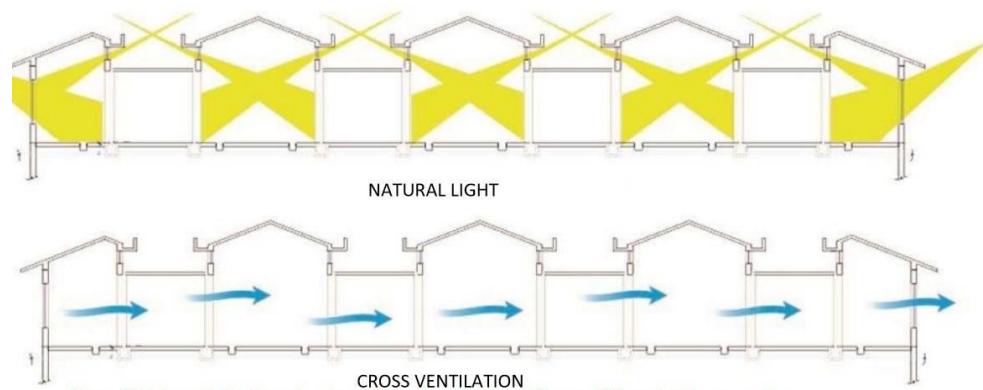


Figure 19 Schematic Sections showing light and ventilation of Margoa fish market Source- author

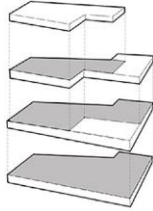
4.5 NOAA Southwest Fisheries Science Centre

The NOAA Southwest Fisheries Science Center was recently completed by a Gould Evans-led design team, creating a world-class facility that will help recruit talented scientists and support ongoing research for the conservation and management of the region's living marine resources. The LEED Gold certified building represents a site-specific approach to sustainable design, with architectural features that set a local benchmark for energy efficiency and connect scientists to the environment they are so dedicated to preserving.

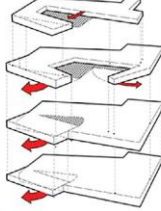
For a building dedicated to marine ecosystem health, sustainable design was critical. However, laboratories consume about five times more energy per square foot than a typical office building. To offset this, the building has narrow floor plates that permit daylight to permeate the spaces, fan-assisted natural ventilation, and high-efficiency equipment and lighting. The green roof has been planted with a variety of native species, including coastal chaparral and sage. Solar shading on the west- and south-facing windows contribute to reducing the building's cooling loads to 69% less than that required by ASHRAE 90.1-2004 standard. A large photovoltaic array on the roof offsets 7% of the building's energy needs: equivalent to the energy that would power 40 typical houses in the region. Altogether, these features reduce projected energy use by 33% compared to similar buildings.

DESIGN AND PROGRAM

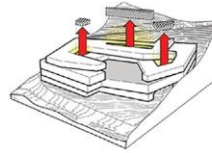
The modern facility is broken down into smaller structures clustered in "villages" no more than two stories in height. The smaller elements are organized around atrium courtyards. These are the centers of activity that enable researchers to connect for impromptu meetings. The courts and patios take full advantage of the mild climate and promote natural ventilation.



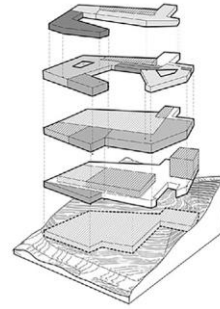
BLOCK OUT PROGRAM
We stacked the program to fit it on the site, with the more "daylight intensive" programs on the top.



OPEN UP TO VIEWS
The floor levels were offset to allow daylight and natural ventilation in. The angles were determined by orienting to views.



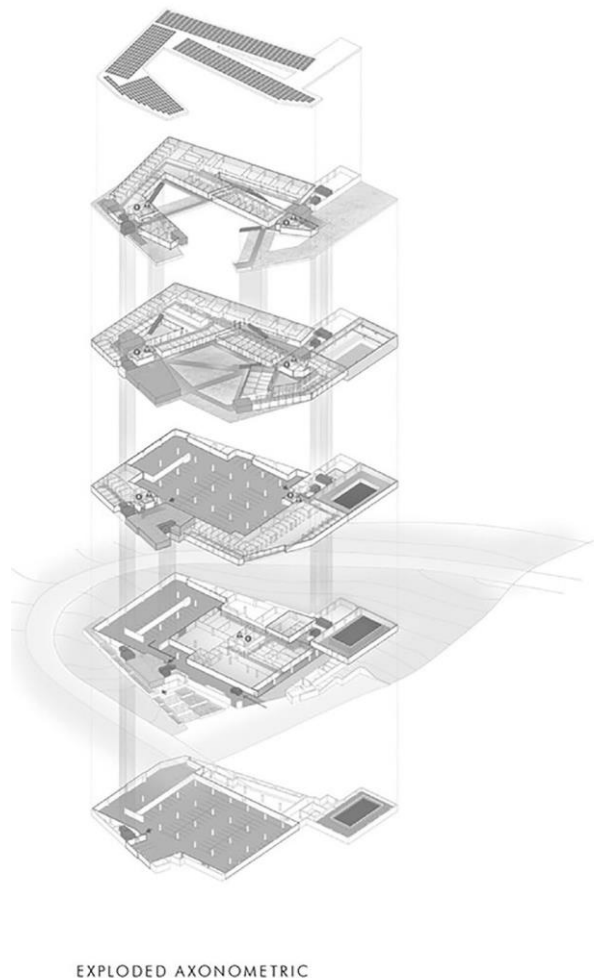
OPEN UP TO LIGHT
Open courtyards are cut into the middle of the offices.



PROGRAM
7 User Groups
275 People
202 Cars

4.6 UNC Coastal Studies Institute / Clark Nexsen

The mission of the UNC Coastal Studies Institute is to be a model of sustainability through its architecture, building systems, and through the research it conducts. The facility provides a venue for inter-institutional collaboration and offers a new national resource for coastal education. The building was designed to minimize its impact on the land, but to also anchor itself to the place – an existing landscape of fragile wetlands and waterways. The building's form is a simple bent bar elevated above the land. The form was derived from the site by orienting the long face of the bar to the south and bending it to align with and capture a view down an existing canal. It hovers over a concrete plinth which raises the ground floor above the 100 year flood plain.



The harsh and severe coastal environment provided inspiration for the building's design as well as an opportunity to create a facility that encourages interaction among the students, faculty, and the public. Organized into three levels, all public spaces are concentrated on the lower floors while the private research spaces are on the upper floor. The ground floor is primarily open to the outside to create large, covered outdoor educational spaces and to allow panoramic views of the sound and wetlands. The levels are connected by a three story lobby space and a pair of steel and cable rail stairs which touch the ground.

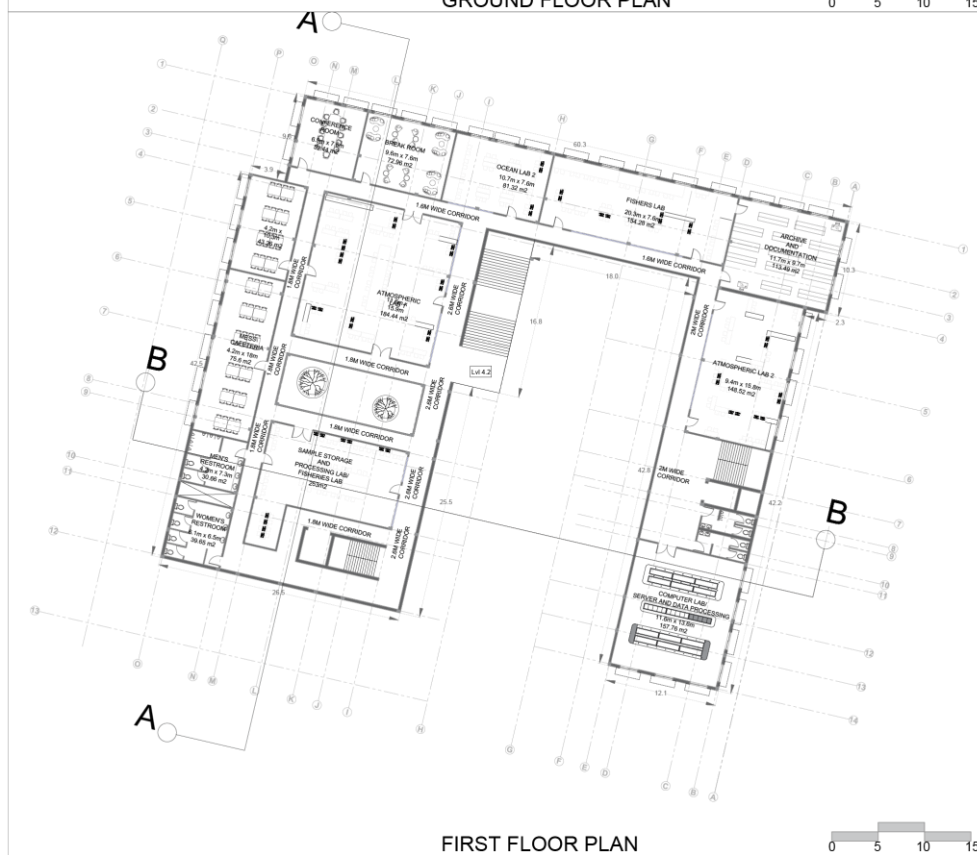
5 Design

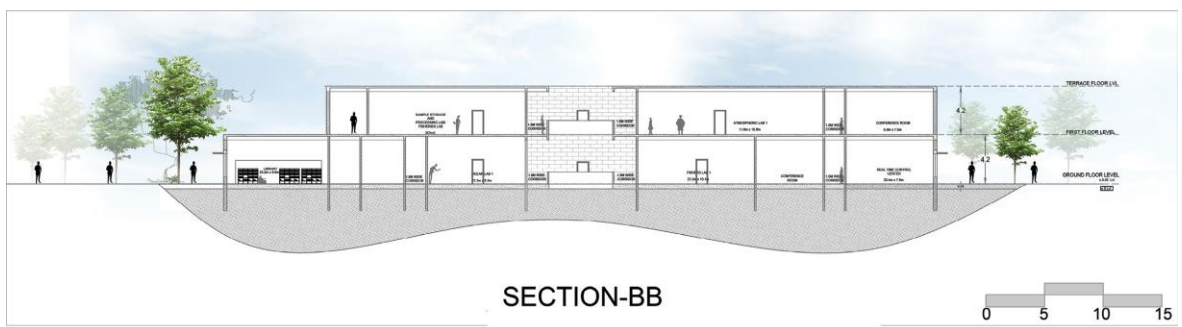
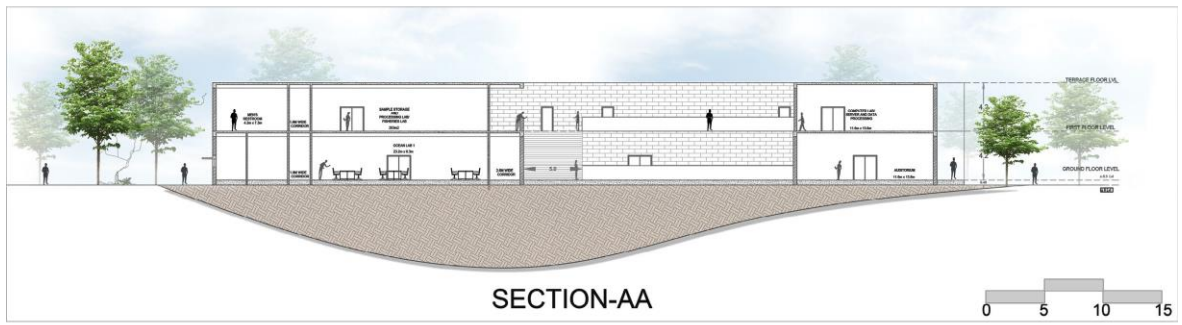
5.1 Masterplan

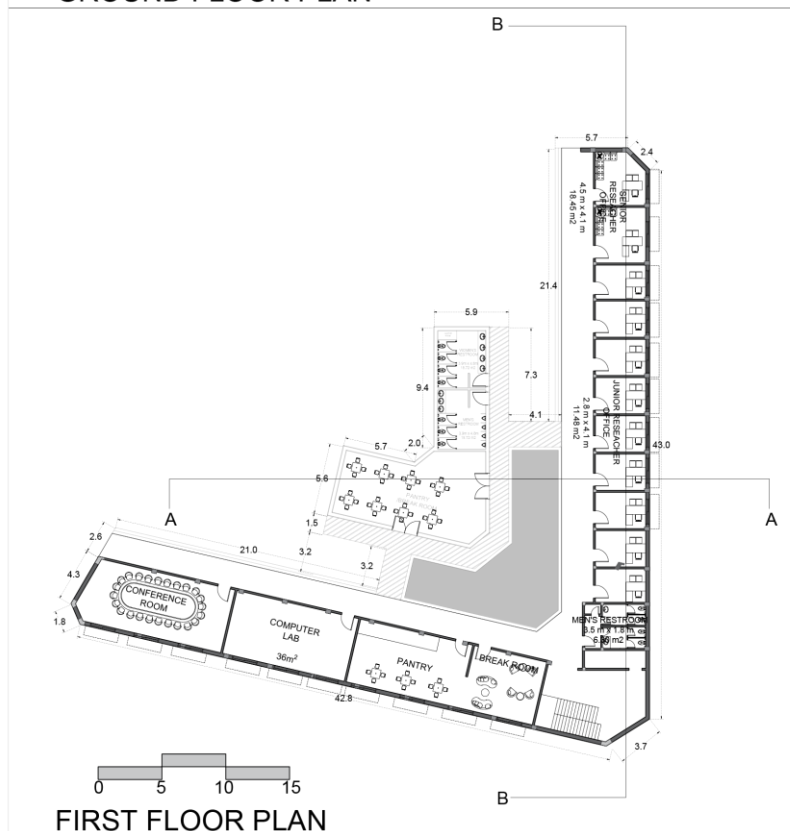
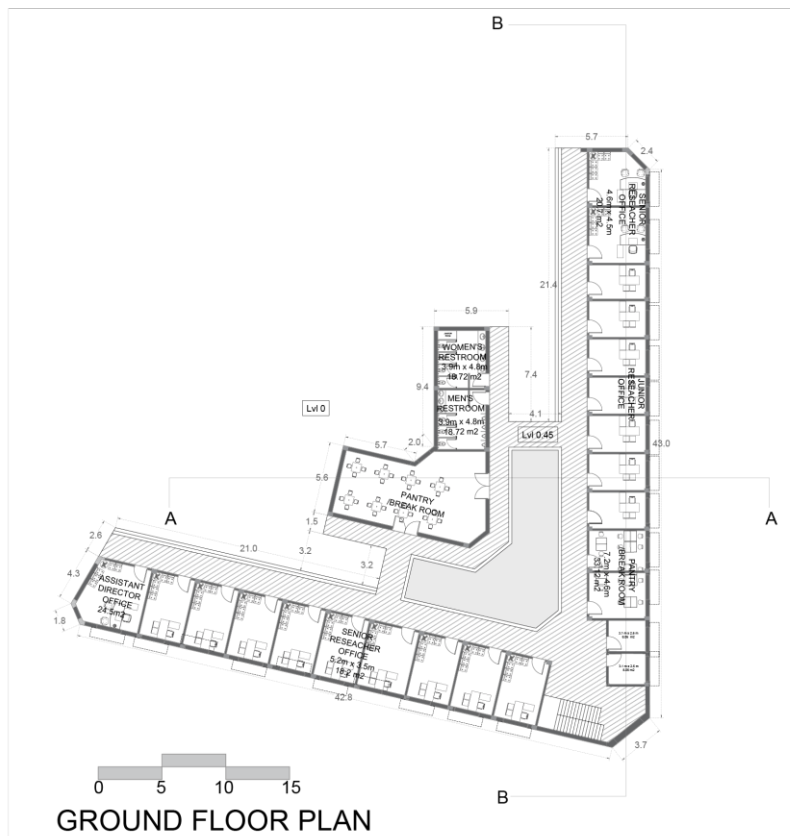


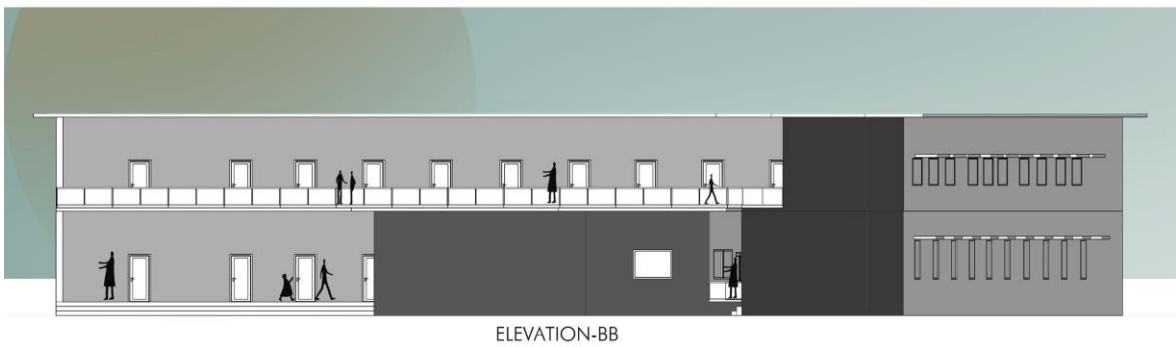
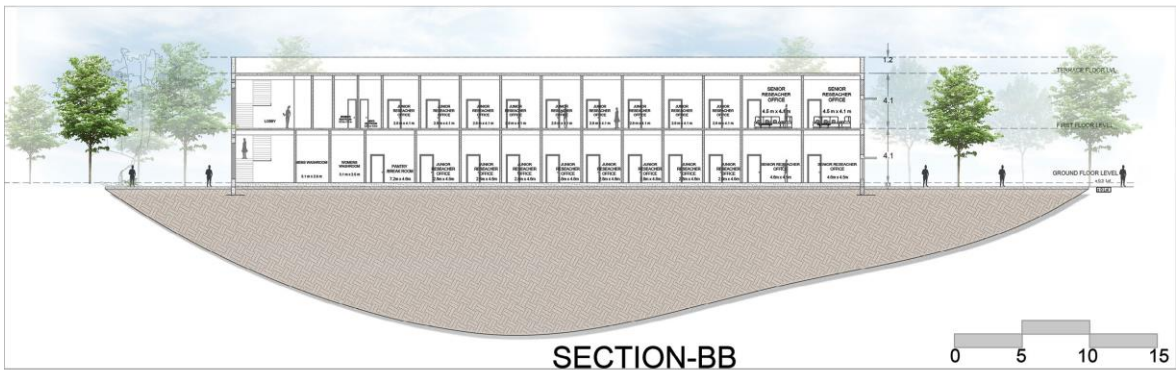
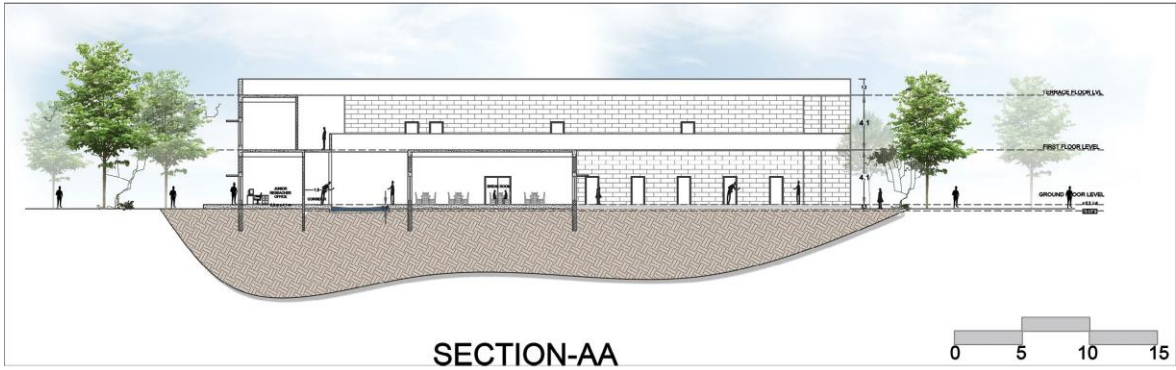
5.2 Research Centre



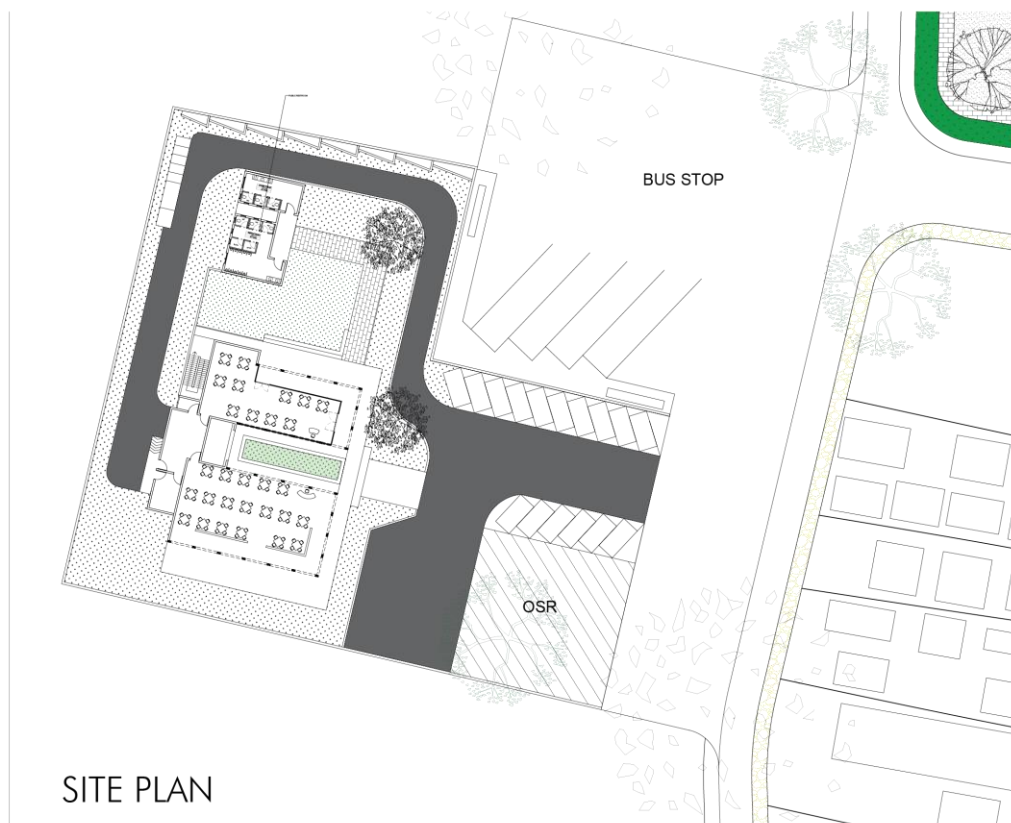


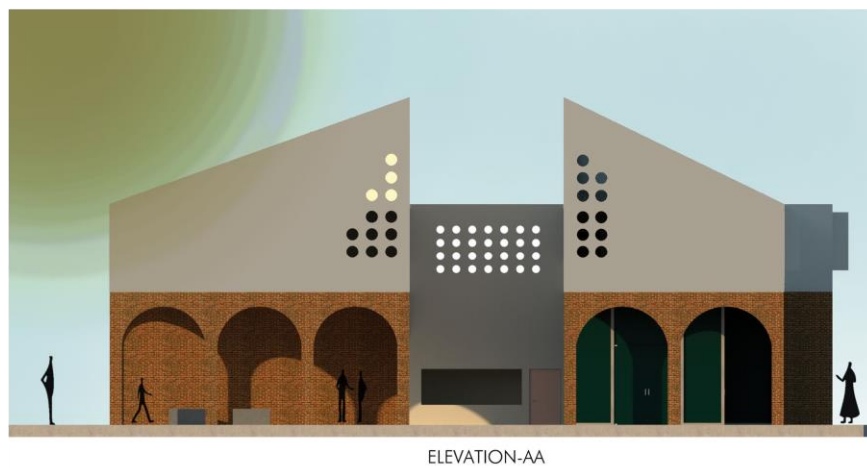
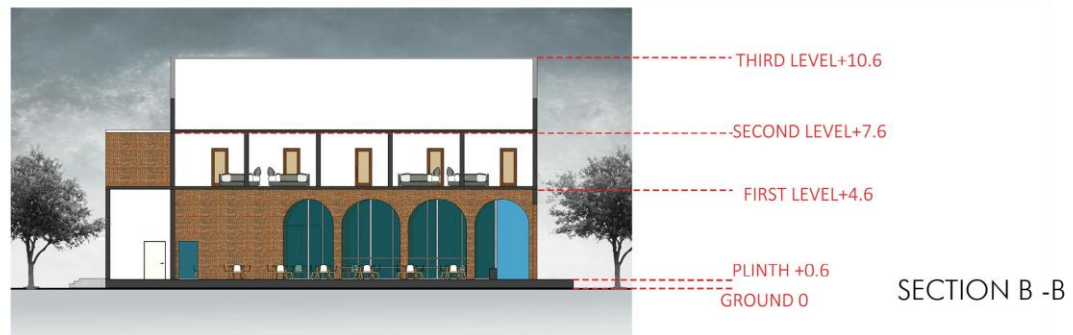
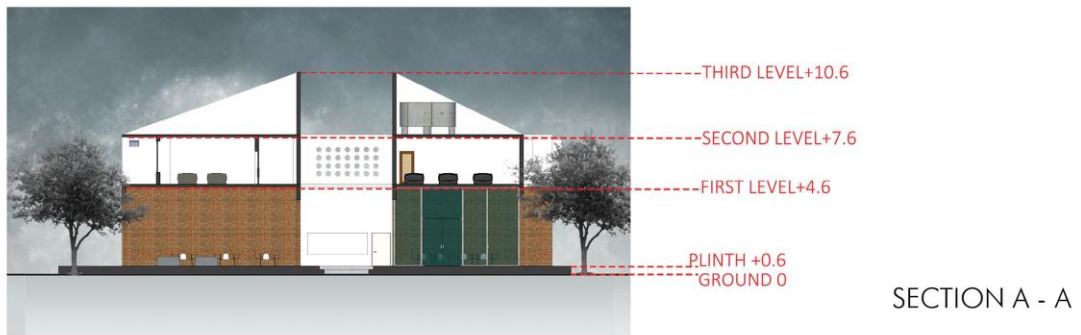




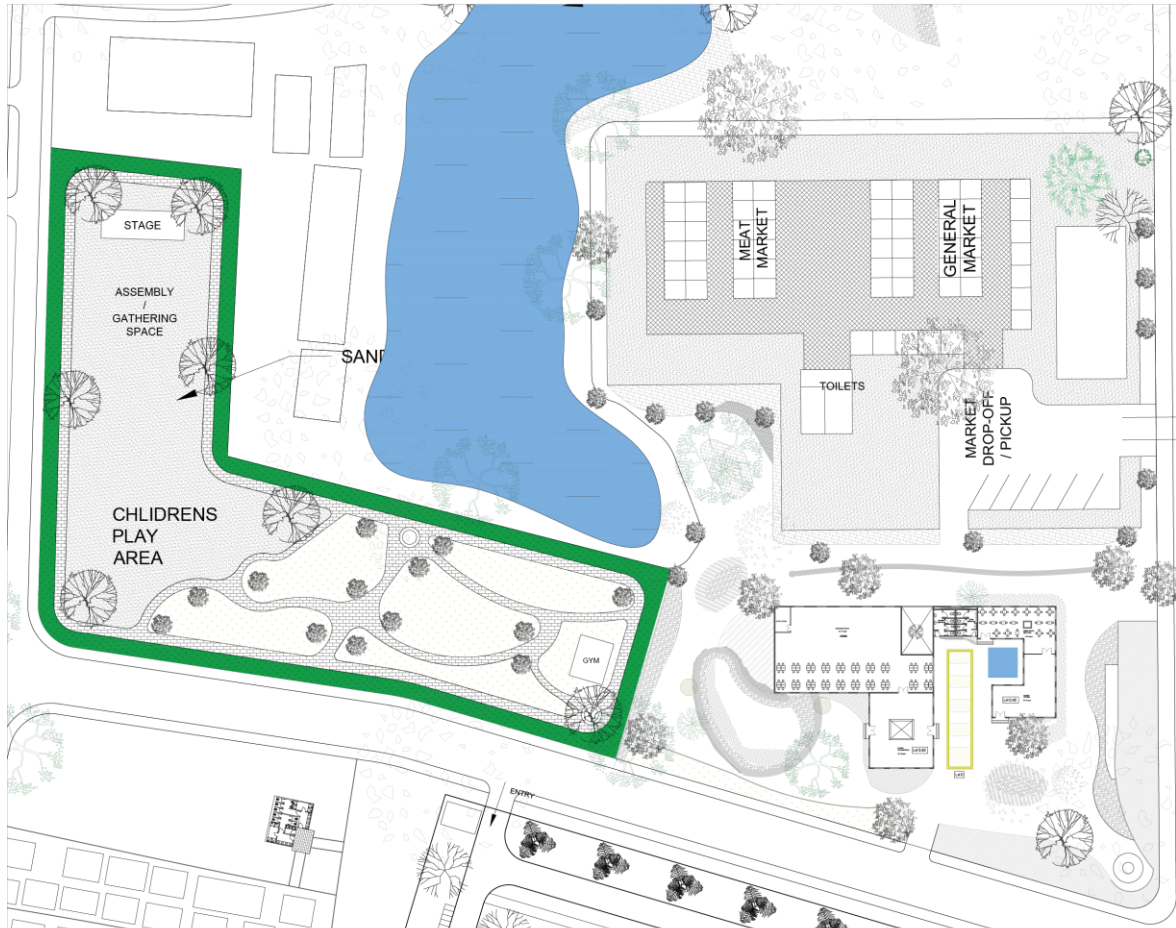


5.3 Tourist centre

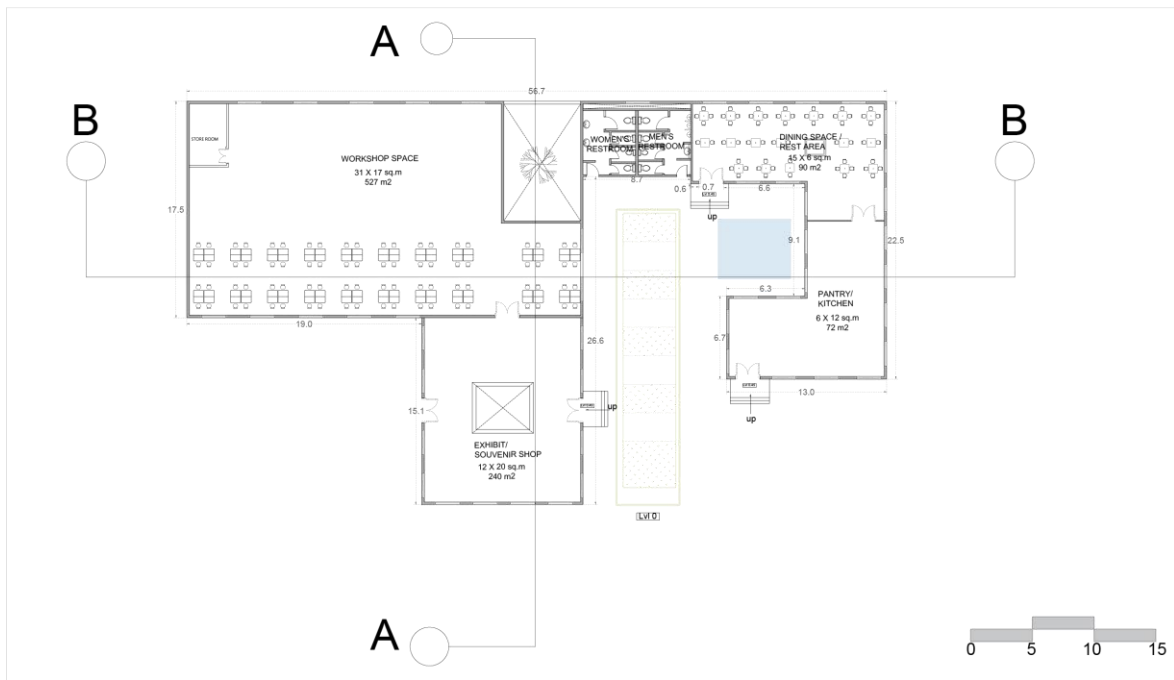




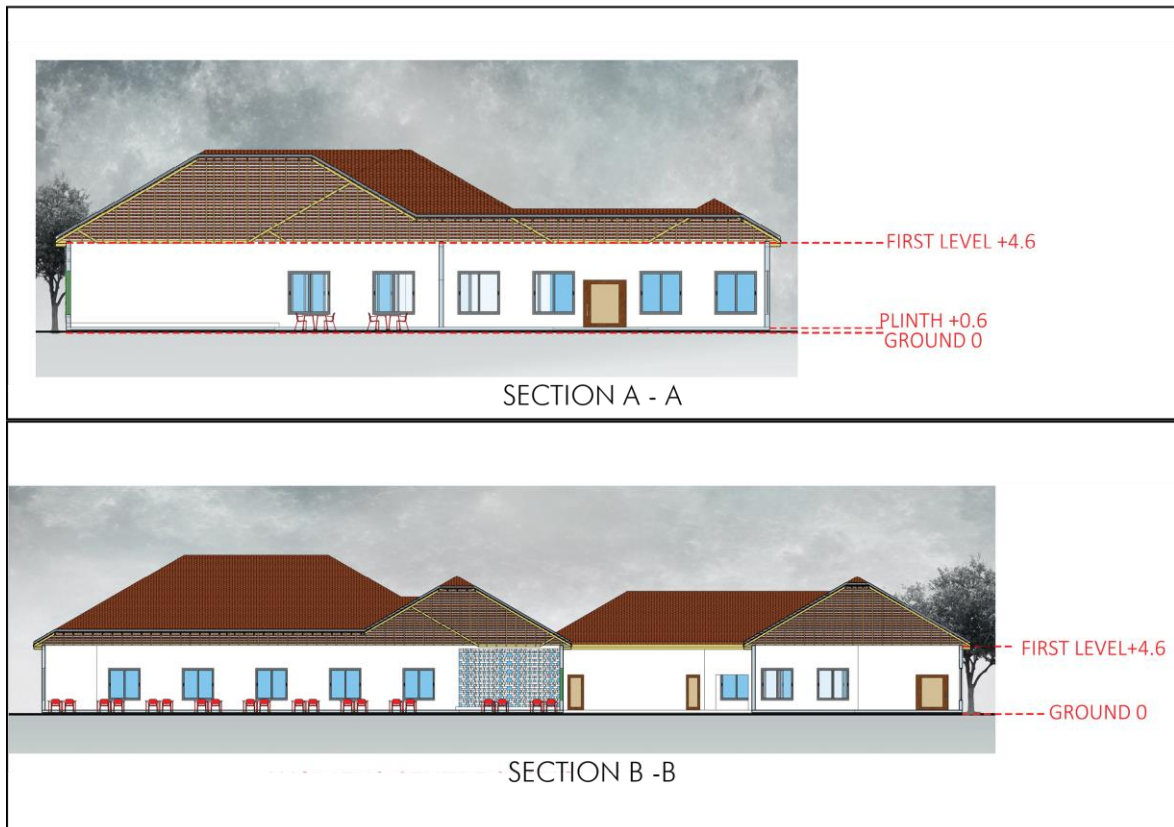
5.4 Gathering space, women centre and Market



GATHERING AREA, WOMEN CENTER AND MARKET SITE
PLAN



WOMEN CENTER



5.4.1 Renders

