Thandachori Eco Resort

Thandachori, Chittagong

by

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Bachelor of Architecture

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DECLARATION

It is hereby declared that

1. The thesis submitted is my/our own original work while completing degree at BRAC University.

2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.

3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.

4. I/We have acknowledged all main sources of help.

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APPROVAL

The project titled “Thandachori Eco Resort” submitted by

[J.M.Rakayet (16308016)]

Of Summer, 2022 has been accepted as satisfactory in partial fulfillment of the requirement for the Bachelor of Architecture degree on April 2022

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Ethics Statement

The whole study was conducted with an ethical competence and integrity in terms of conscious decision making and responsibly acting considering of legal standards as well as social, economic and ecological consequences. While conducting field survey, at first and foremost, consent was taken from each authority to survey their facilities. All the actions such as taking photographs, talking with staff and volunteers were conducted with permission. The field survey was conducted with Beneficence- Do not harm manner. While surveying the child protection facilities, their privacy and dignity was fully respected without interrupting their regular activities like playing and learning. One of the major ethical points followed in this study is to maintain the anonymity and confidentiality in data collection procedure and analysis to respect the law and policy of Child Protection Sector. All the respondents are kept anonymous as well as CFS samples studied in the research are presented with different identification numbers throughout the data analysis and findings. Wherever any intellectual property is used for the purpose of this study, they are given proper credits with proper citation. The whole research is conducted with full objectivity starting from determining the research questions to research findings. The overall research design, data analysis and representation are carried out regardless any bias and inclination.

Title

This paper is a study on the Thandachori Eco Resort, thandachori Fotehabad, Chittagong

Abstract

This paper discusses the role of an eco-resort at thandachori, in Chittagong. In the past decade ecotourism has gain a wide demand and popularity in the tourism industry. Reason behind this demand is to reconnect with the nature and take a break from the regular life from this concrete jungle. Thandachori is enrich with natural resource and diverse biota. The aim of the study to do a design of an eco-resort which will coherence with terrain untainted nature. In order to create such responsive environment, the main focuses to reduce carbon footprint and explore sustainable design solution. Which will have a low carbon footprint that is not very harmful to the environment.

Key word – Ecology, Ecotourism, Sustainable Design,

Acknowledgement

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L.I.F.T	low income flood-proof technology

Chapter 1-Introduction

1.1 Introduction to the Project

An eco-resort can be described as a logging facility that have minimum impact on the environment while preserving the ecology. It is also intended to be an environment friendly design which has a very sustainable and responsive logging that also has improved structure that has very little effect on the environment. An ecological resort is thus one that is fully integrated into the environment without damaging it, so it is a lodging facility that takes steps to reduce its carbon footprint while giving back to its local community.

This project "Thandachori Eco Resort" is planned to be built in Thandachhori, Chittagong within a site area of 20 acres. The client of the project is Chittagong City Corporation and the entire project will be funded by them. This project will offer possibilities for the people of Chittagong to take a break from the monotonous city life and reconnect with the vast nature. This low carbon footprint project will address some of the major concert such sustainability, biodiversity, climatic conditions and ecological balance but also will provide the calm and surreal natural experience to the people of this busy port city. the recreational facilities of the project will help in integrating people with nature through experiential activities. Along with promoting a healthy environment and creating environmental awareness to this great port city.

1.2 Project Rationale

Chittagong being the second largest city in Bangladesh however do not have enough natural enrich resort to fill the need of the city. A natural resort like place is almost nonexistence in the city an eco-rest will benefit greatly the people of the city and will show path to future development of the city. Chittagong also lacks recreational spaces where people can engage in experiential activities all the while enjoying the nature. It is unfortunate that in spite of being rich in culture and nature, the city doesn't get much exposure due to lack of proper space and opportunity.

Despite thandachori being closer to the city it is still far enough for people to fell the change of environment and forget about the busy life of the environment. The site is perfect for truism and have all the environmental aspect, along the diverse biota. This is a whole new experience. An eco-resort is a project that ties the string between such ecologically rich environmental setting and tourism while promising to keep the site's natural condition intact.

1.3 Aim of the project

The purpose of this project is to design resort which is environmentally responsive and will have very little negative impact on the naturally enrich site of thandachori. This ecological condition can be achieve by reducing carbon foot print and preserving the natural resource of thandachori. This can happen by achieving several steps which will contribute the success of the sustainable resort design. Such as water environment treatment, atmospheric environment treatment, solid waste pollution prevention, natural conservation of bio diversified. growth of plants, passive lighting, using eco-friendly materials consuming less energy. Tish understanding will improve the design and ensure the built from will damage the ecosystem.

1.4 Project summary

Project Name- Resort and Tourist Complex

Location- Thamdachori, Fatehabab, Chittagong

Client- City Corporation

Site Area- 18-19 acer

Total Build Area Including Road and Pavement -9 Acer.

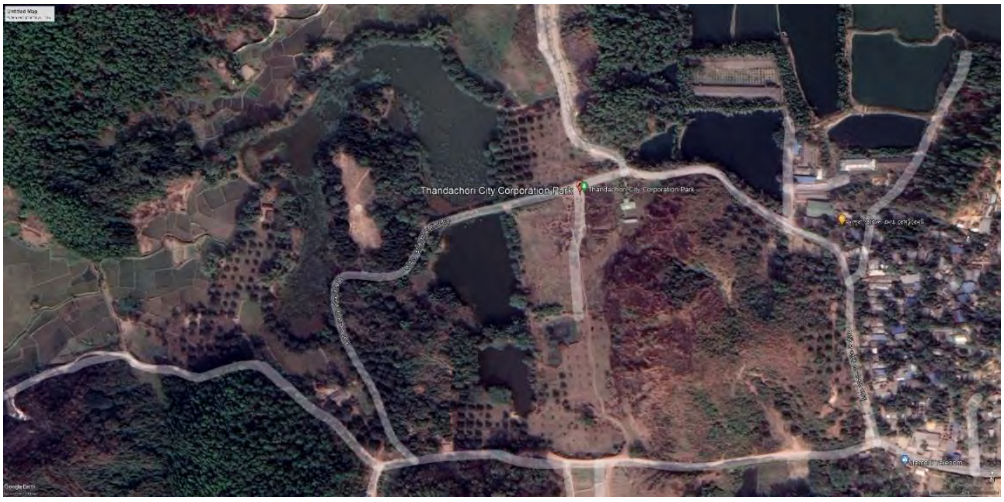
Site Force- Small Hill and Pond (manmade)

- A very well-known Tourist spot.

Site Negative Force – There is a chemical Factory and the site is enclosed, no one without permission

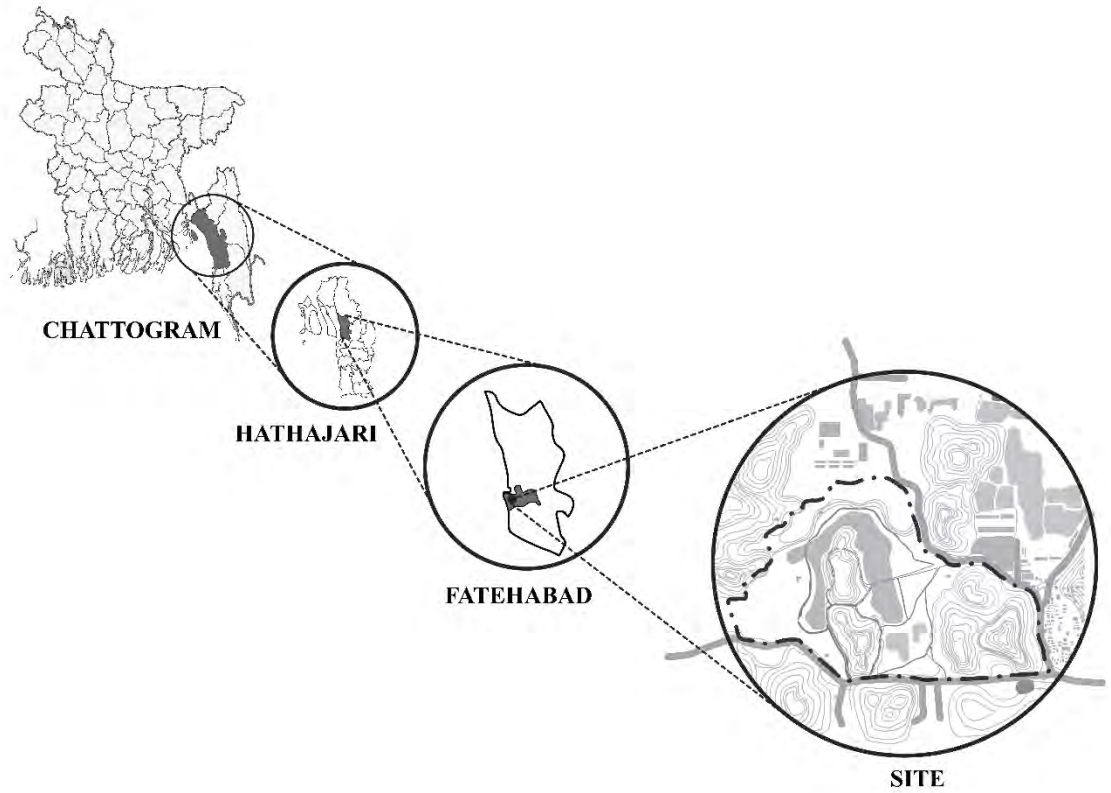
cannot enter.

Figure 1: site



(Source: Google Earth)

Figure 2: site location



(Source: Google Earth and Bangladesh map)

Chapter 2. Literature Review

Ecosystem provide a large number of resource and service to living being, also ecosystem is one of the main essential components that human kind needs to survive in the world. It also plays a major role in our economy. The basic component that the ecosystem provides us is water, air, food, and all the other essentials that we need to stay alive. However, people are adjusting the ecosystem to meet their need and that is damaging the balance of ecosystem, this now become a global issue. The considerable risks of ecological degradation might decrease the future well being of humanity. At present our socioeconomic progress is not sustainable due to lack of the capacity of the biosphere to provide the ecological services that we depend on. Irreversible ecological changes, such as extinctions and species invasions, are now the primary concern. (Briassoulis, H. 2002). Several change will be mandatory in order to sustain the well being of human, such as ecological management, production system.

2.1 Ecosystem and sustainable development

Environment may be a sub-discipline of biological science and a portion of natural science that ponders how organisms associated with one another and inside their physical environment. Ecosystem administrations are the changed benefits that people unreservedly pick up from the normal environment and properly-functioning biological systems.
These administrations basically incorporate agro ecosystems, Timbrel and environments, meadow biological systems and sea-going biological systems. Unmistakable benefits incorporate supplies of nourishment and freshwater, surge moderation and changes to water quality while less unmistakable benefits incorporate commitments to cultures.

Environment administrations are gathered into 3 wide categories:

-Provisioning amenities: food source, fabric, hereditary assets, biogenic minerals, energy etc.

- Regulating amenities: environment guideline, squander decay, refinement of water and air, bug and infectious prevention and so on.

- Social amenities: recreational, otherworldly and social encounters that incorporates ecological utilize of nature for devout values, open air sports etc.

Sustainable development is the guideline for meeting human improvement objectives while at the same time supporting the capacity of regular frameworks to give the normal assets and biological system administrations on which the economy and society depend. Human societies have been failing to attain or retain this process of sustainable development for various reasons. Factors like loss of biodiversity, scarcity of natural resources, climate change have been placing the human societies under stress for the last couple of decades. Human utilization is separating more normal assets than can be recharged by biological systems have convey manageability an enormous intimidation for our people in the future. Even though the nature is resilient and it does regenerate, there are limits to what can be extracted (Geoffrey, W.1997).

2.2 Definition of resort

Resort is place where people generally go for recreation, relaxation or pleasure. It provides rest and recreational facilities, vacationer's wants - lodging, entertainments, sports, restaurants, shopping etc.

Mill gave the definition of resort, in his book, "Resorts: Management and Operation", in there, he said, and resort has expanded to include any facility that provides recreation and entertainment in combination with lodging and meal (p.478).

2.3 Elements of the Resort

Essentially, resort has two facilities.

- Housing, food and beverage service: lodging facilities with food service is the main one

- Recreational facilities: with lodging system it also has recreational facilities for retreat service

2.4 History of Resort

Osterer (2005), characterize the historical backdrop of resort in three stages, these are

Roman Domain: Shower The beginning of resort followed at the second century B.C. to the public showers of Rome. At first showers were little and isolated by sexual orientations. Gradually this bath became larger and it permitted for both genders. At the mean time it started to take fees for entry. Then it includes lodging and food. Eventually add other facilities like snacks, library, gym, lounge, shop, and all the facilities were used as health and social mottoes.

Europe: Mass Follows Class Resort was first developed in Belgium in 1326 and now this is called Spa. The meaning of spa is fountain. Colin le Loup was an iron master; he was very sick and he cannot bath in the iron-rich water. For this reason, he opened a shelter in Belgium. At first this place was introduced as resort but later this is known as Spa. Spa and resorts were very much popular at the time of King Charles II, for this popularity he visited there in 1600s. English spa center include dancing and gambling. Another good option of spa is they offer medical treatment. They also supply water which was rich in mineral. These are another because of its popularity. In 1800 Swiss report industry was developed. The aim of this resort to give private

facilities to the prosperous people. Now a day's people can visit a resort within a one day but it was not possible at that time. AT that time travel was not simple, people have to spend lots of money, and they stay there in a long period of time. Hotel Baur au Lac, built in Zurich, was first introduced to the viewers to see the scenic view. People went Switzers resorts at the time of summer, in her skiing and gambling both are very famous.

2.5 Types of Resort

According to the World of Resorts: from Development to Management Resorts could be different type on basis of

- By seasonality: summer resort, winter resort, year-round resort. In Bangladesh year-round resorts are suitable because of the climate of the country.
- By designation: spa resort, theme park resort, beach resort, boot camp resort, fishing resort etc.
- By size: depending on the room a resort could be different
- By Location: urban resort, beach resort, lake resort, riverside resort, island resort, desert resort, mountain resort, rainforest resort, etc. There are also different types of resort like, floating resort, mix used resort, theme resorts too (p.372).

2.6 Difference Between Resort and Hotel

Khoshal (2015) mentioned in his paper that hotel and resort both serves as temporary basis lodging and meal system but both are different in fundamentals. Hotel is a place which offers lodging and meal. Location of hotels is in busy sites, close to stations, airports, commercial centers. Hotel is meant for short stay but it could be long depending on purpose (Para 6-9)

Resort is a place which provides recreation, relaxation opportunities along with lodging and meals. Resorts are located in or near the nature. There could be some attractions like beach, cave, and mountains. Hotel is a part of resort with entertainment (swimming, fishing, Para sailing), sports, boating, and relaxation (spa, sauna) facilities (para4-5, 8-10)

Figure 3: Difference Between Resort and Hotel

(WWW.DIFFERENTCEBETWEEN.COM)

..2.7 Eco-resort

A resort by and large implies a self-contained commercial foundation that tries to supply most of a vacationer's needs, such as food, drink, lodging, sports, amusement, and shopping, on the premises. An eco resort can be characterized as naturally maintainable resort whose facilities are aiming to have a negligible affect on the nearby environment. One of the interpretations of the term environment incorporates "defense and security of nature and environment", an ecological resort is in this way one that's completely coordinates into the environment without harming it and benefitting the maintainable development of the tourism industry. An eco-resort must as a rule meet a few criteria such as reliance on the characteristic environment, ecological supportability, arrangement of natural preparing programs and joining of cultural considerations.

2.8 Design standards and guidelines for eco-resort development

The design guidelines of an eco-resort comprise of both architectural and non-architectural interventions and strategies that help maximize the emission of carbon foot print (Early, K. 2011). Those suggest the followings:

1-Minimum use of energy consuming and pollutant machines

2-Maximum use of renewable energies especially solar storage with water

3-Reduction of environmental pollution resulted from use of fossil fuels

4-Reduction of the need to finite energies for heating and cooling

5-Ensuring natural ventilation (fresh-air exchange system)

6- Grey water recycling and waste management

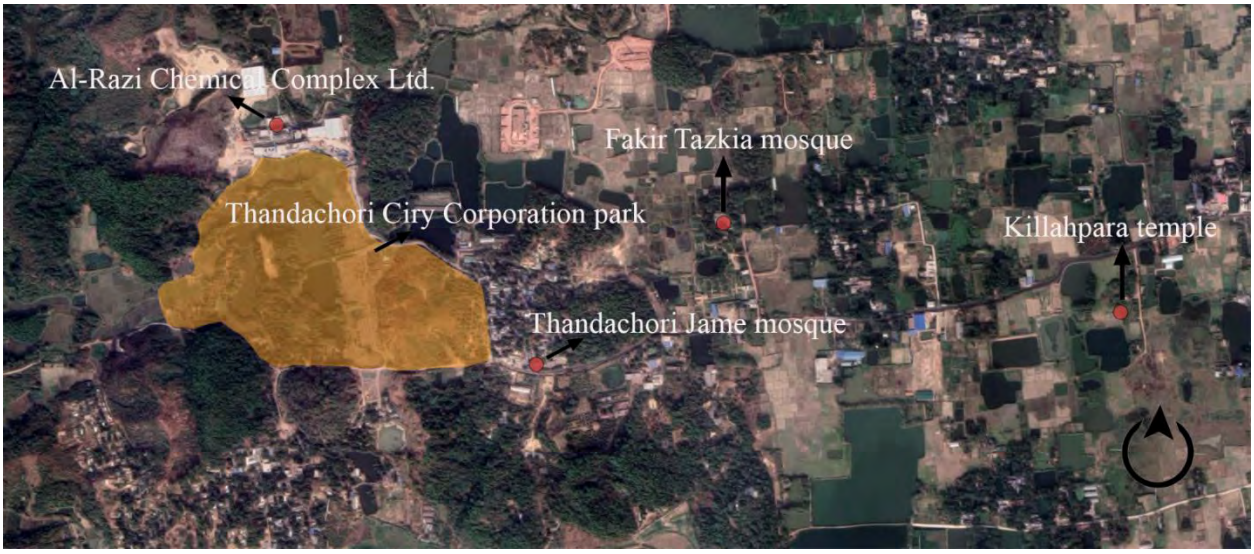
Chapter 3: Site Appraisal

The site location of this project is Thndachori, Hathazari Upazila word no. 1, Chittagong. The site is surrounded by lush greeneries, pond, and hills. The natural beauty of the site is scurrile. The quiet and breath-taking beauty of Thandachori is so great that it has become a common place for them to gather and take a break from the busy life of the city.

3.1 Site surroundings

The site is enriched nature. Mostly hill and lush green dense forestation. There is quite a lot of water bodies. The notable landmarks are Tazkia mosque, Killahpara temple, Thandachori jame mosque and Al-Razi chemical complex.

Figure 4: key location



(Source: Google Earth)

3.2 Site surroundings Orientation

North: At the north of the site has a chemical factory, named Al-Razi chemical complex Lid. This factory belongs to smart group. The north-east of the site has dense forest and water body

East: At the east of the site has a residential area and the road to enter the site. This is the primary road to entre the site.

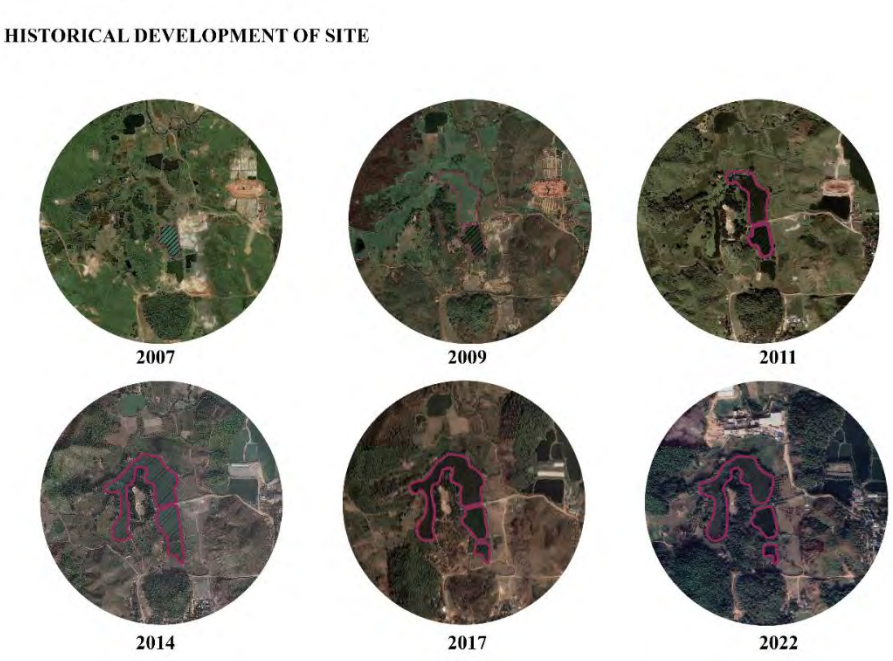
South: At the south of the there is large hill and the second road to enter the site. However, is road is not fully develop yet. South-west of the site has land Owen by Salma group.

West: west of the site has large hill and green forest.

3.3 Historical development of the site

The site originally was not as enriched in environmental facilities as it is today. It was once mostly a barren land with hills and hillocks. Over the years it has been nurtured with care and dedication by the city corporation to shape an ecological hub. A large component of the planation in the site is man-made, so is the lake which is placed in the center of the site. The aim of Chittagong City Corporation was to create a biodiverse area that enhances the ecosystem of the site. Their interventions have made the site ecologically extra developed than it originally was

Figure 5: Historical development of the site



(Source: Google Earth)

3.4 Historical development of the site surrounding

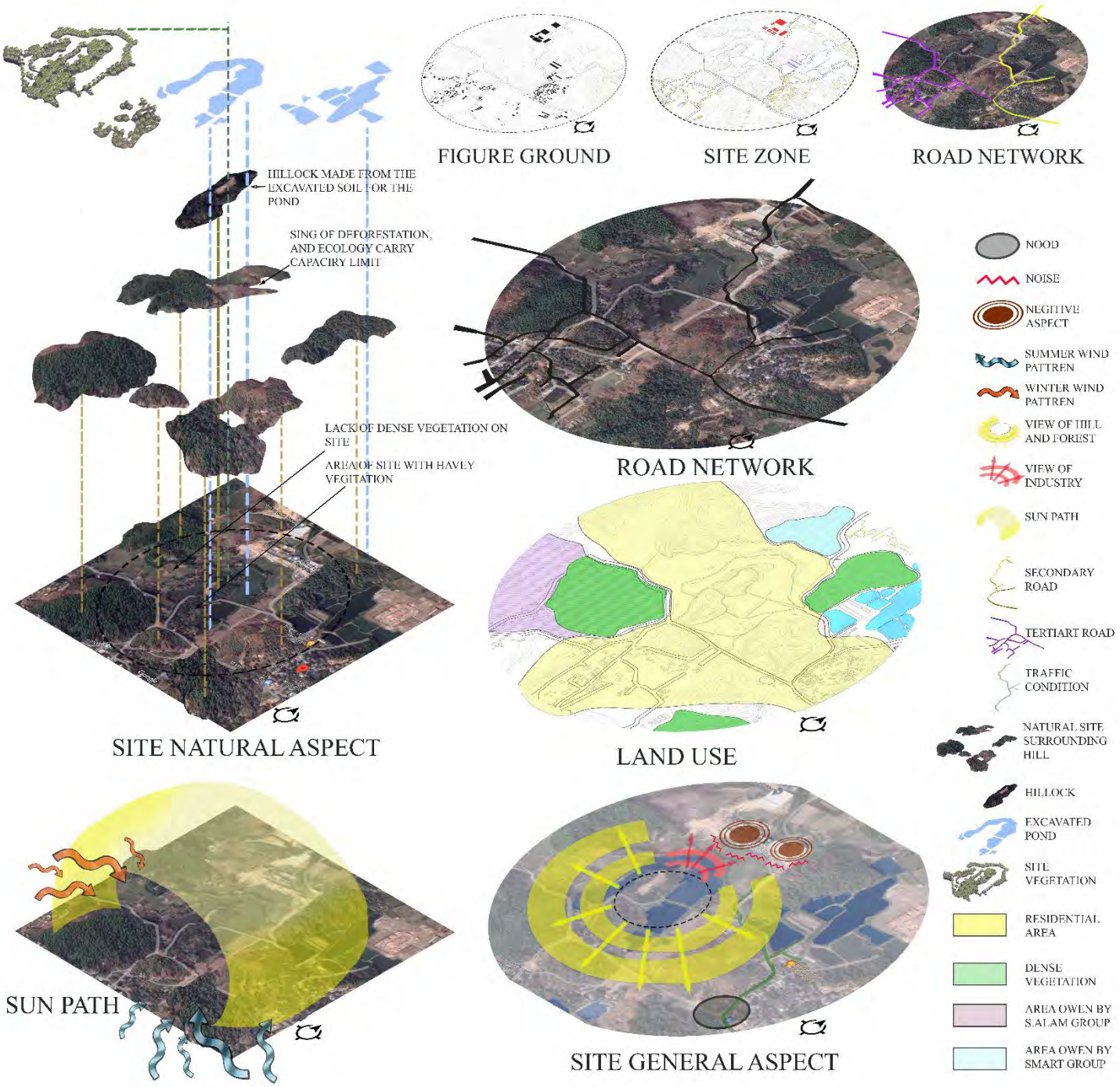
The site is in Hathazari word no.1. Which has recently become part of the city corporation. Hathazari was always a under develop area. However, through out the years made a significant development. Hathazari word no1 always had a cluster of build area. As the years pass this small cluster of build area has expand. And started to live in Hathazari, forming community. started agro. Many community-based building are in hathazari, such as mosque market and haat bazar, temple, madrasa e.t.c

Figure 6: Historical development of the site surrounding

(Source: Google Earth)

3.5 Site Analysis

Figure 7: Site Analysis



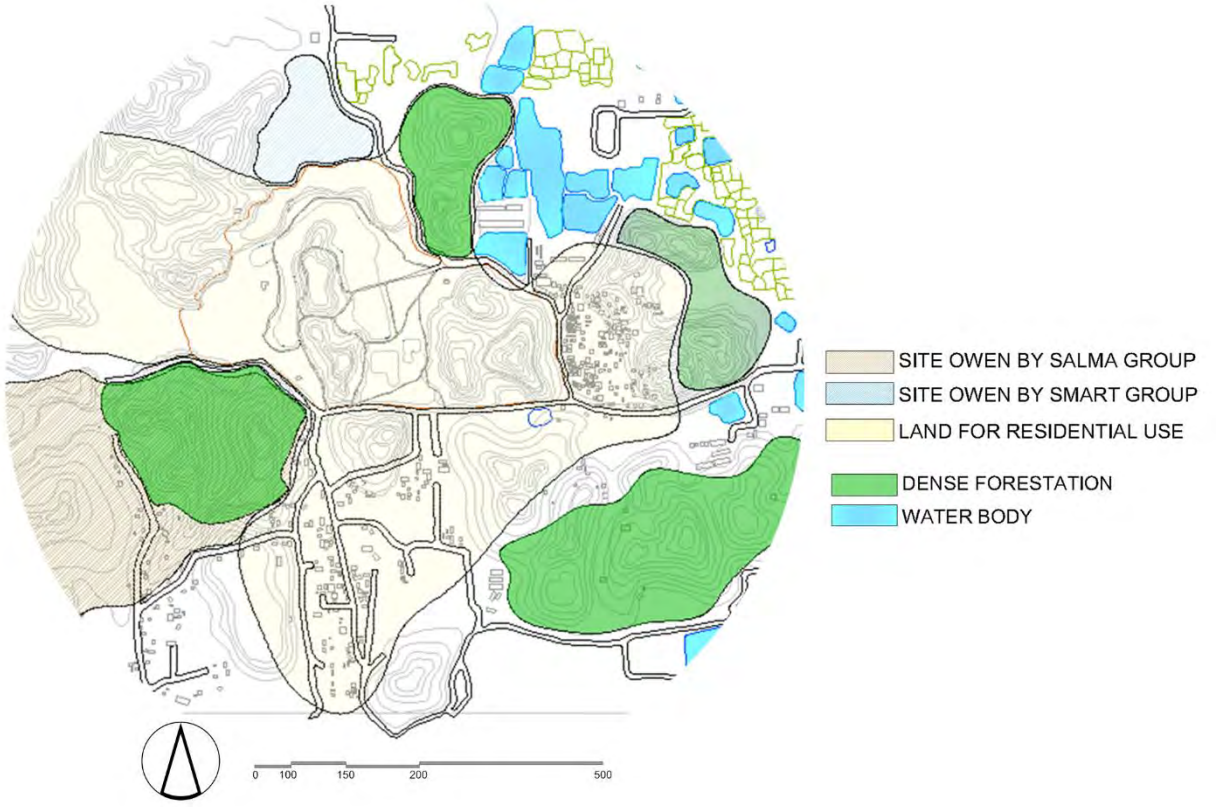
(Source: Open Street view map and map collected from digital survey Bangladesh Survey and Interview of local and Google map and open street view)

3.6 Land-use Pattern of the Surroundings

The surrounding of the site is mostly densely occupied by forest and hill and hill rock. Only notable trace of land use pattern near by the site is residential. These residents are mostly day laborer and lower-income group. Excluding the residences there are two properties near the site owned by two very famous private group named as S.Alam group and Smart group. Both privet groups have their own plan for the land. Beside them most of the land is Owen by the Chittagong city corporation. Smart group build a electro-chemical industry on the plot, named Al-Raze. The plot own by the S.Alam group has plan to build a power plant for future development. Both side of the main road named as Fakir Takia road is covered by lush green and field, with a small cluster of settlement here and there.

Very little mixed use and commercial land use where detected near the main road. This road act as the main supporting facilities for the people of hathazari word no.1, where the site is located. The main road has many important community based infostructure like, Fateyabad College, Fateyabad post office, Chowdhuryhat bazar, Chowdhuryhat mosque and Chowdhuryhat nursing home.

Figure 8: Land-use pattern of the immediate site surrounding



(Source: Open Street view map and map collected from digital survey Bangladesh)

3.7 Accessibility and Connectivity

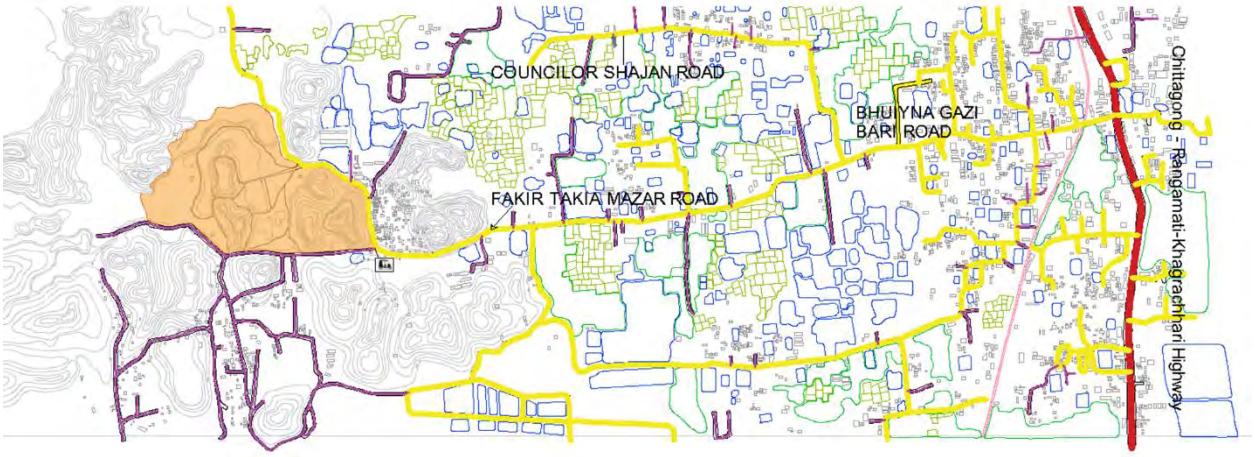
The main accessible point of the site is through a secondary road (Fakir takia mazar road) which connect to the primary road (Chittagong- Rangamati- Khagrachari highway). Only motorized vehicle such as buses, truck, car, taxis are permitted in the main road. The primary road leads from Bara dighir par to Fateyabad. This secondary road ends near the private plat of S.Alam group. There is a auto stand there, from that place rest of the area can be explored by foot. Including the road that leads to the site. Some of the pedestrian walkways around the site have been there for a

long time whereas some were made for the conveniences of the people living around the site. One of the man-made walkways leads to the site and that walkway divide the site pond in half.

Figure 9: Accessibility and Connectivity

(Source: Open Street view map and map collected from digital survey Bangladesh)

Figure 10: Accessibility and Connectivity



(Source: Open Street view map and map collected from digital survey Bangladesh)

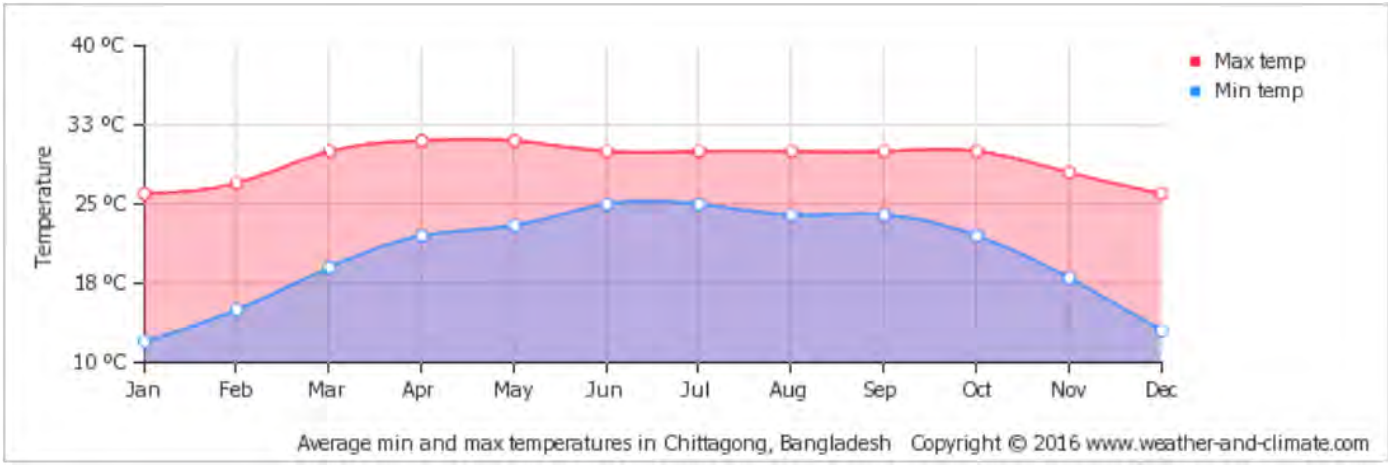
Figure 11: Accessibility and Connectivity B

(Source: Open Street view map and map collected from digital survey Bangladesh)

3.8 Climatic Conditions

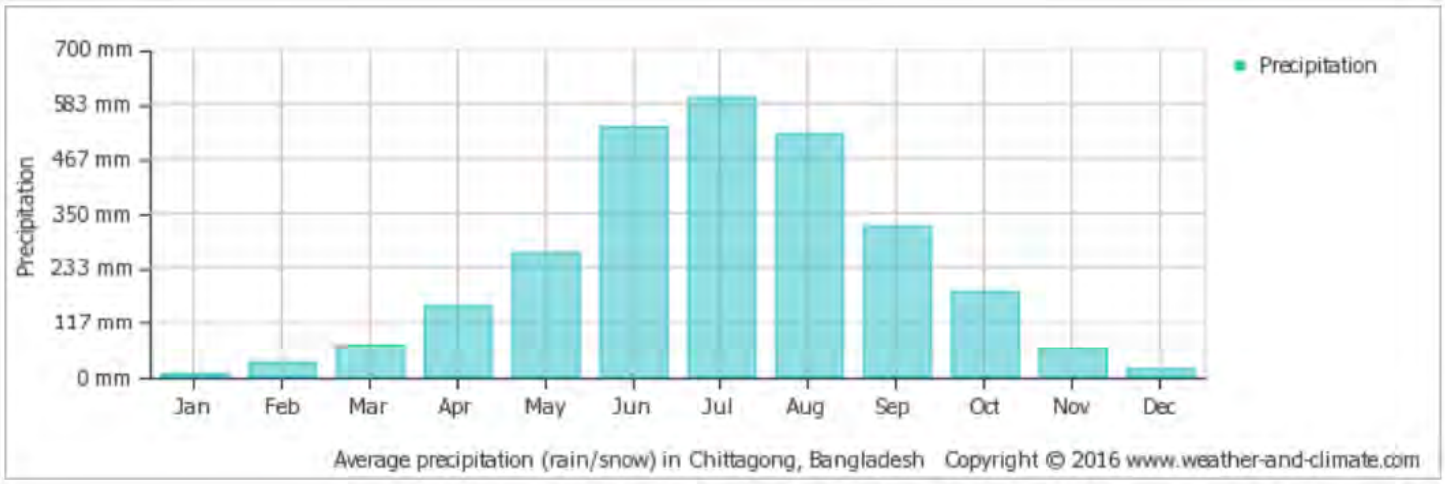
Chittagong weather is classified as tropical monsoon climate. November to March is the dry and cool season. April to May which is very hot and humid as per the pre-monsoon. From June to October is very sunny and monsoon monsoon, which is very worm, cloudy and wet. The climatic condition of the site is significantly similar to the climatic condition of the entire city. On an average the rainy season or the rain prevails during April to October. April is the highest temperature month beside that all year around temperature is moderate. December and January comparatively have a dry and cold weather and it is the wettest in the month of July.

Figure 12: Average minimum and maximum temperature of the year



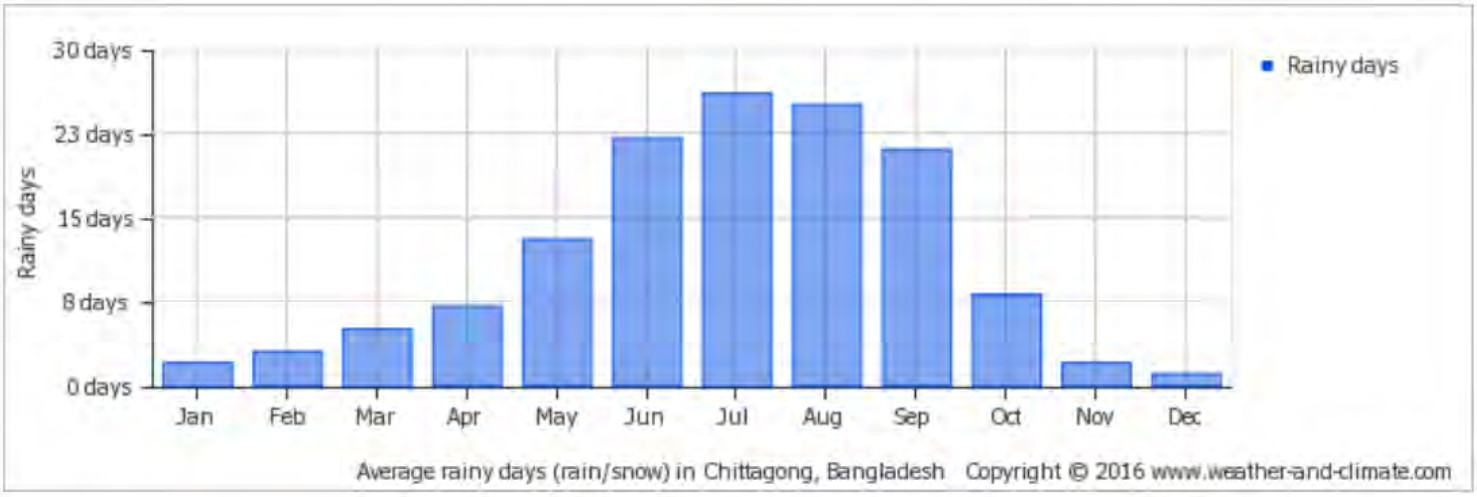
(Source: Bangladesh meteorological department)

Figure 13: Average monthly precipitation of the year



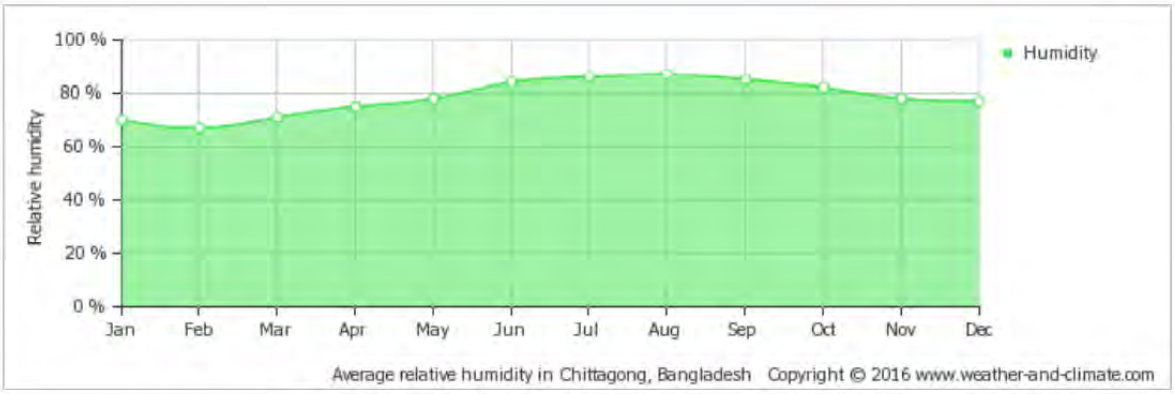
(Source: Bangladesh meteorological department)

Figure 14: Average monthly rainy days in Chittagong



(Source: Bangladesh meteorological department)

Figure 15: Average humidity of the year



(Source: Bangladesh meteorological department)

This climate condition knowledge can be use in the project through design solutions by contracting shading elements for the summer and fall. Rainwater management system for the fall in order to avoid water clogging.

3.9 Climatic Conditions Hathazari upazila

The diagram below shows the climate condition of Hathazari upazila.

Figure 16: climate condition of Hathazari upazila May 2020.

Hathazari Upazila Weather In May 2020

Historical Data for May 2020 in Hathazari Upazila, Bangladesh

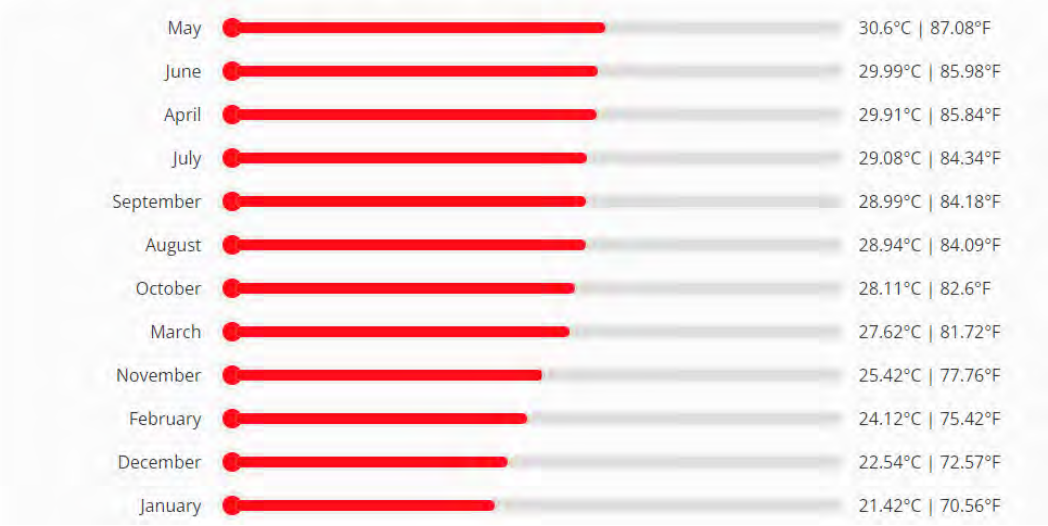
Summary 2020 May Go

Temperature	Max	Average	Min	
Max Temperature	34.81°C (94.66°F)	31.84°C (89.31°F)	29.69°C (85.44°F)	
Avg Temperature	31.74°C (89.13°F)	30.32°C (86.58°F)	27.65°C (81.77°F)	
Min Temperature	28.67°C (83.61°F)	26.89°C (80.4°F)	20.48°C (68.86°F)	
Dew Point	Max	Average	Min	
Dew Point	25.6°C (78.08°F)	24.81°C (76.66°F)	21.5°C (70.7°F)	
Precipitation	Max	Average	Min	Sum
Precipitation	44.64mm | 1.76in	5.41mm | 0.21in	0.0mm | 0in	167.82mm | 6.61in
Snowdepth	0.0mm | 0in	0.0mm | 0in	0.0mm | 0in	0.0mm | 0in
Wind	Max	Average	Min	
Wind	34.81kmh | 21.63mph	17.31kmh | 10.76mph	9.22kmh | 5.73mph	
Gust Wind	56.31kmh | 34.99mph	24.61kmh | 15.29mph	11.26kmh | 7.0mph	
Sea Level Pressure	Max	Average	Min	
Sea Level Pressure	44.64mb	5.41mb	0.0mb	

(Source: weather and climate BD)

Figure 17: climate condition of Hathazari upazila May 2020

Hathazari Upazila Temperature by Month

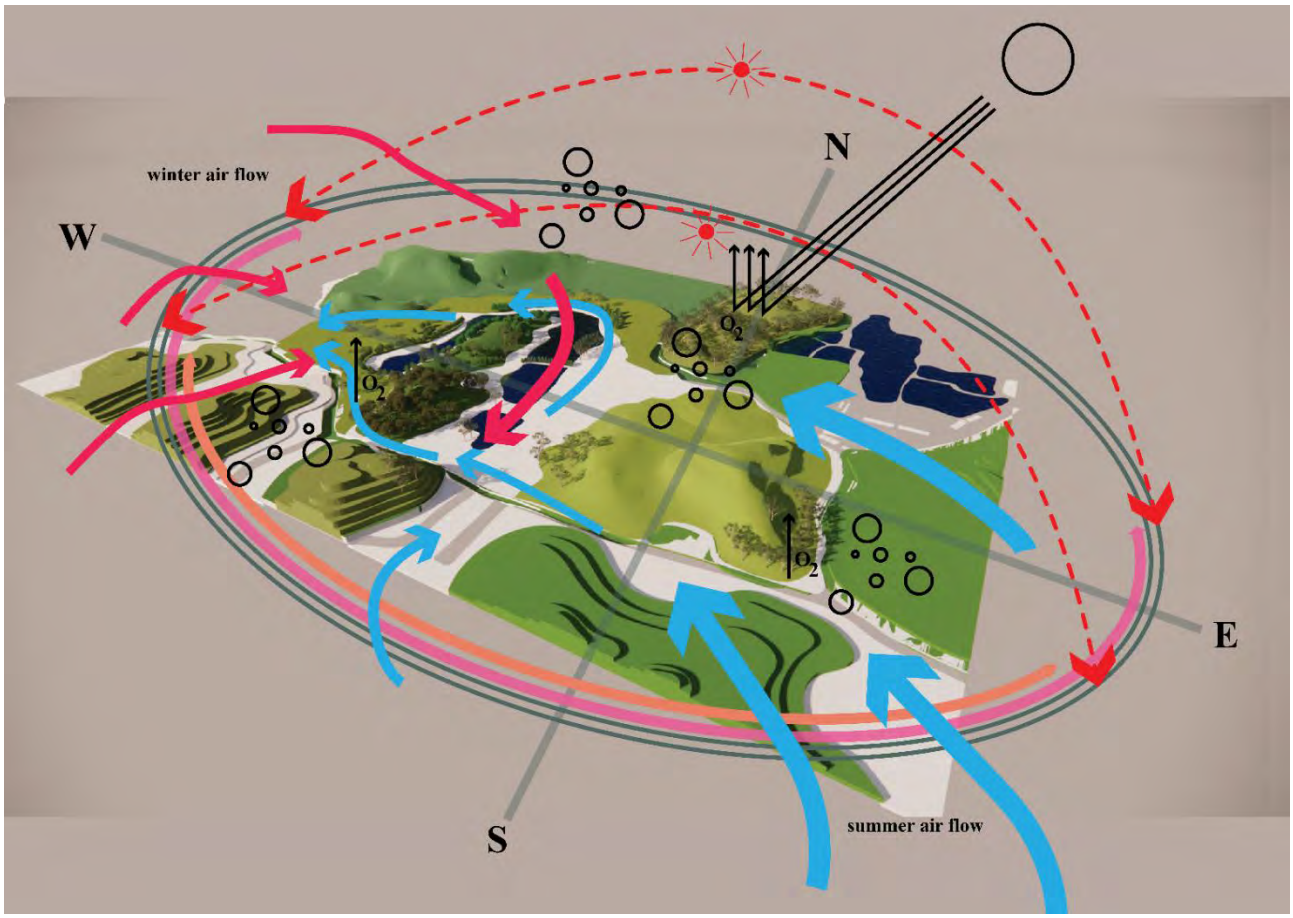


(Source: weather and climate BD)

3.10 Site microclimate

The maximum average temperature of the site is 34 C and the minimum average temperature is 20 C. The wind. Flows generally from South-East during Summer and from North-West during winter. In the site there is hill located In the south-east side, and there is also a man-made hillock at the center of the site. When the wind flows from the South-east Conner and blows over the hills get hinder by the hill and circulate all over the site (during summer) The same scenario happens during winter from the north-west. The manmade pond at the center of the site helps the drainage system so that the site does not gets overflow by water.

Figure 18: site microclimate



(Source: Author)

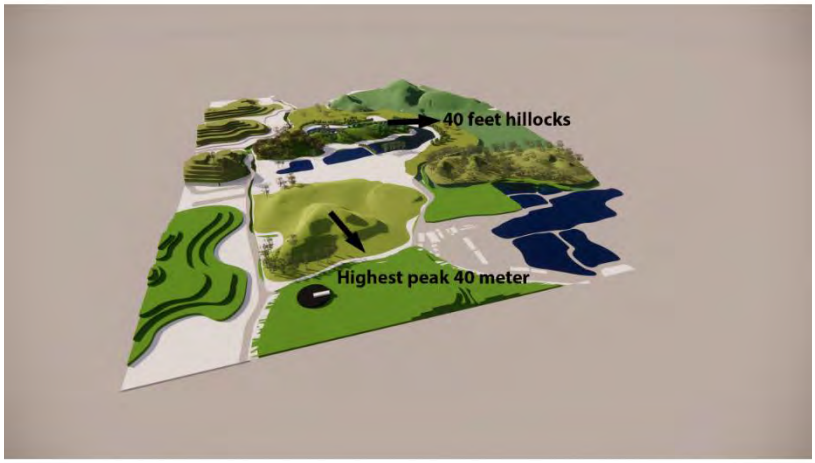
3.11 Socio-Cultural and Economic Contexts

The settlement near the site consist of lower to lower middle-income group of people. Most of the day Laboure with average income of 700 to 1000 taka. Scattered cluster of settlement can be found within 2km of the site. The socio-economic status of the site surrounding imply that the use of the will heavily depends on the people from the city which is only 50 minutes of travel distance with average traffic. The lack and need of such category of tourism in Chittagong is bound to have visitors from all around the main city (both for short stay and daily visits). Beside that one of the main targets of this project is draw attention to people of different cities from all over the country and abroad to flourish the truism industry in Bangladesh.

3.12 Geographical Characteristics of the Site

The site is enriched with natural properties and diverse. The topography of the site consists of hill, hillocks, green land (both low and high), water bodies and dense forest. The largest hill surrounds the site from the north western part and the rest of the two hills are inside the site. One of the hills is located near the main entrance of the site (south-eastern side) and the highest peak of 40 meters. the other hill is the center of the site and the peaks of 15 meter, and this hill is surrounded by a U-shaped pond. This are the only high land the site rest of the land is mostly flat. The pond has a depth of 40 feet.

Figure 19: site hill and hillocks Hight



(Source: Open Street view map and map collected from digital survey Bangladesh)

Located at the elevation of 0 meter. Hathazari upazila has a tropical monsoon climate. The geographical characteristics of the site climate is given below

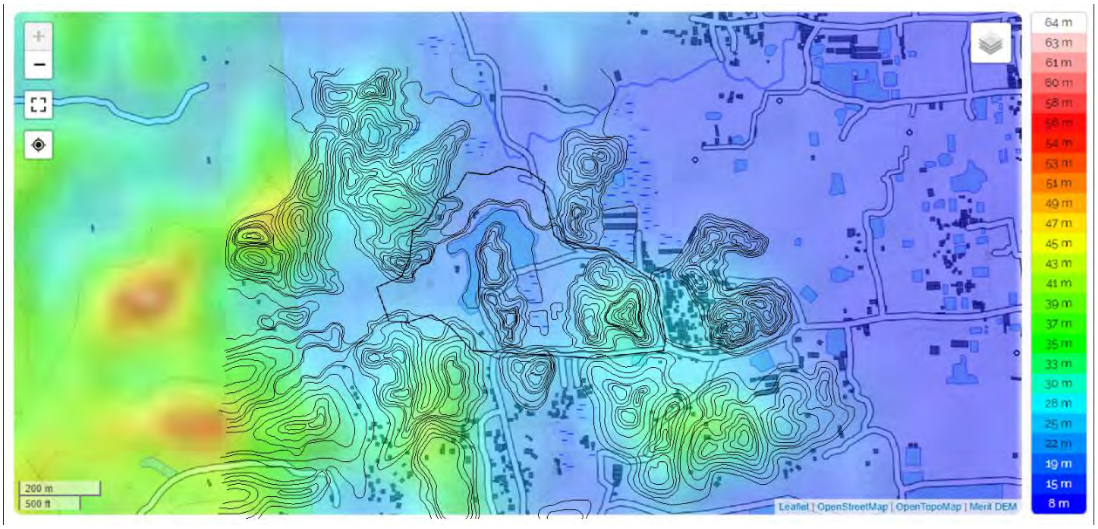
Figure 20: site Geographical information

Country	Bangladesh
City	Chittagong
Longitude	91.8074586
Latitude	22.5084634
Attitude/Elevation	Nonem (0ft)
Local time	Thursday 20:37
Annual high temperature	29.77°C (85.59°F)
Annual low temperature	23.47°C (74.25°F)
Average annual precip.	141.98mm (5.59in)
Warmest month	May (32.79°C / 91.02°F)
Coldest Month	January (16.25°C / 61.25°F)
Wettest Month	July (454.17mm / 17.88in)
Driest Month	December (2.05mm / 0.08in)
Number of days with rainfall (≥ 1.0 mm)	159.55 days (43.71%)
Days with no rain	205.45 days (56.29%)
Humidity	78.18%

(Source: weather and climate BD)

The site topography is mostly flat, with a very minor change in the terrain. Site is also located at the base of the hill station. To the west of the begins the hill station where the topography changes drastically. Because of that the site only have few hills inside.

Figure 21: site topography

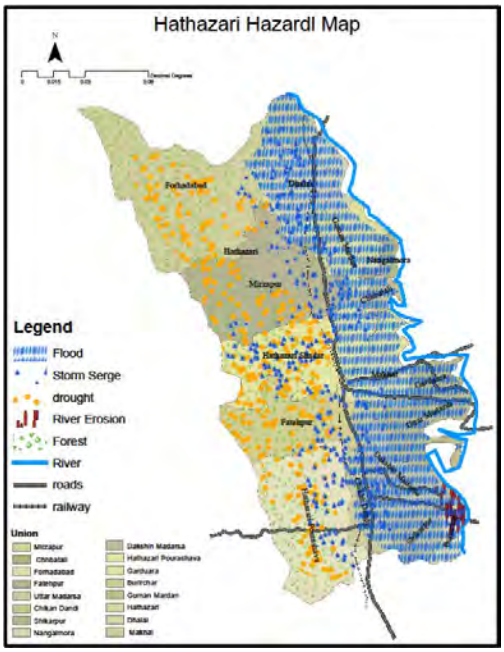


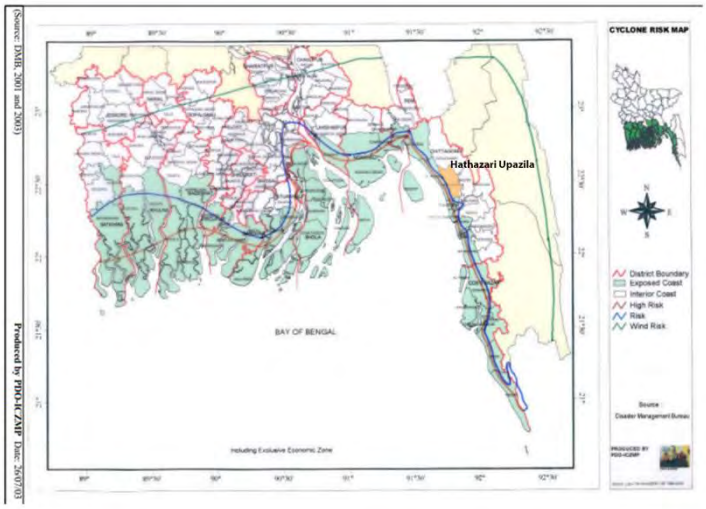
(Source: GeoDesh)

3.12 Disaster management

Chittagong is one of the most disaster-prone area in Bangladesh due to being in the cost of Bay of Bangal. The rick of getting hit by a cyclone and tsunami is always there. However, site location is Hathazari upazila and it is 20 km away from the coastal area. Furthermore, there is a hill station track dividing the site from the seaside, the highest peak of this hill station is 79 meters. so, the site is quite safe from any type of cyclone, and does not fall into the risk line. Since is the site located on the base of the hill station at Hathazari upazila fotheahabead where the hill is not so tall. Most of the hill is still untouched therefore land slide and rockslide are not happening any time soon. Couse rockslide occurs when hills get excavated. The site is 10 km away from the Halda river. The terrain of the site is on a higher elevation than the terrine of the Halda river. For that reason, the site do not overflow during the heaviest downpour and do not get any floor. During the summer it is drought prone area.

Figure 22: Hathazari hazard map





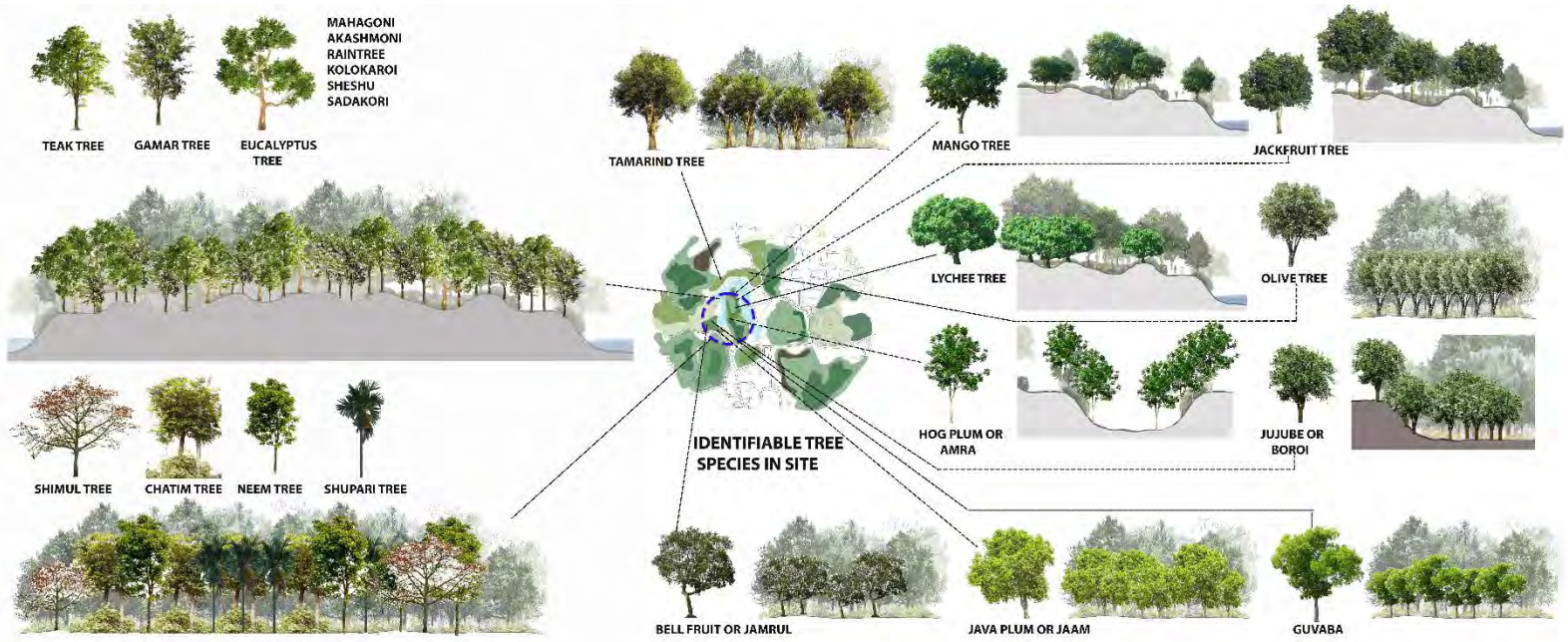
(Source: Development of Disaster Management Plan at Upazila Level

Program Development Office for Integrated Coastal Zone Management Plan (PDO-ICZMP)

3.13 Site Vegetation

The site is full of lots of tree and small shrubs of various kind. Chittrogram City Corporation also planted a large amount of tree in the site. Most of them lay at the center of the site and the north to north-west and west has a large amount of tree. Among all the found in the site few has medicinal value and most of the is fruit tree. There is also tree which is very well known for strong wood which can be used for construction.

Figure 23 Site vegetation map (tree)


MAHAGONI
AKASHMONI
RAINTREE
KOLOKAROI
SHESHU
SADAKORI
TEAK TREE
GAMAR TREE
EUCALYPTUS TREE
TAMARIND TREE
MANGO TREE
JACKFRUIT TREE
LYCHEE TREE
OLIVE TREE
HOG PLUM OR AMRA
JUJUBE OR BOROI
IDENTIFIABLE TREE SPECIES IN SITE
SHIMUL TREE
CHATIM TREE
NEEM TREE
SHUPARI TREE
BELL FRUIT OR JAMRUL
JAVA PLUM OR JAAM
GUVABA

(Source: Author)

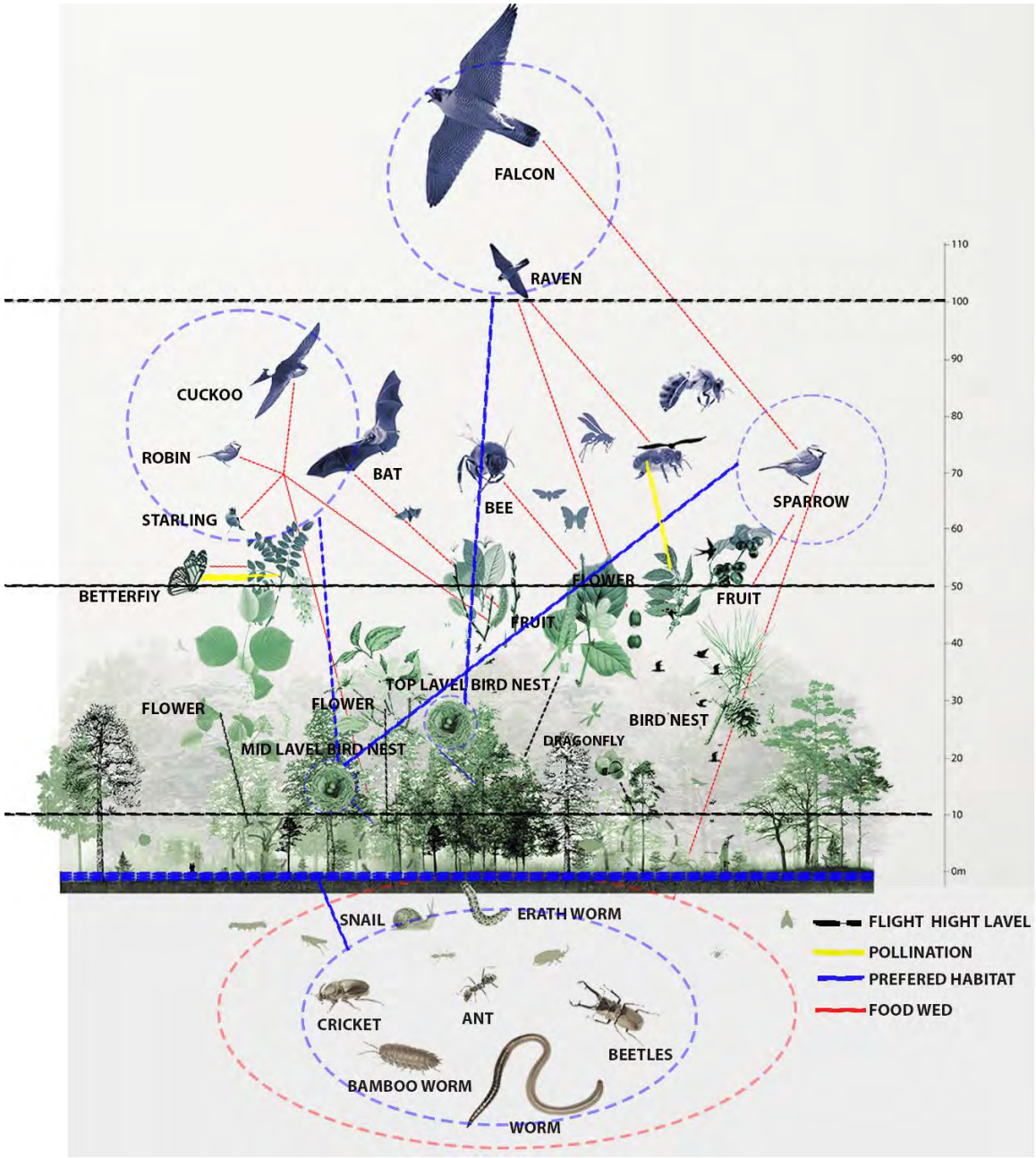
3.14 Site Ecology

Site has a lot of movement of animal and birds. Same of these animal and bird has made their home in the site, they are the permanent resident of the site. Furthermore, hathazari upozilla has a large bio diversity. So naturally a lot of wild lite came and go to site as they like. Animal and bird are simple creature and have a few needs. Since Thandachori city corporation park has a lot of tree and the surrounding also have few dense green forest wild animal and birds find plenty of food in the site. This is one of the mail reasons why a lot of animal and bird can be found in the site. Also, the pond has lot of fish as well. Which was done by the Chittrogram City Corporation. Over all the site has a tremendous ecological value. Which is a rear things to find this days in a sub urban area. Due to having a such a large bio diversity, there are lots of food chain and food wed can be found in the site.

Figure 24 Site habitat location

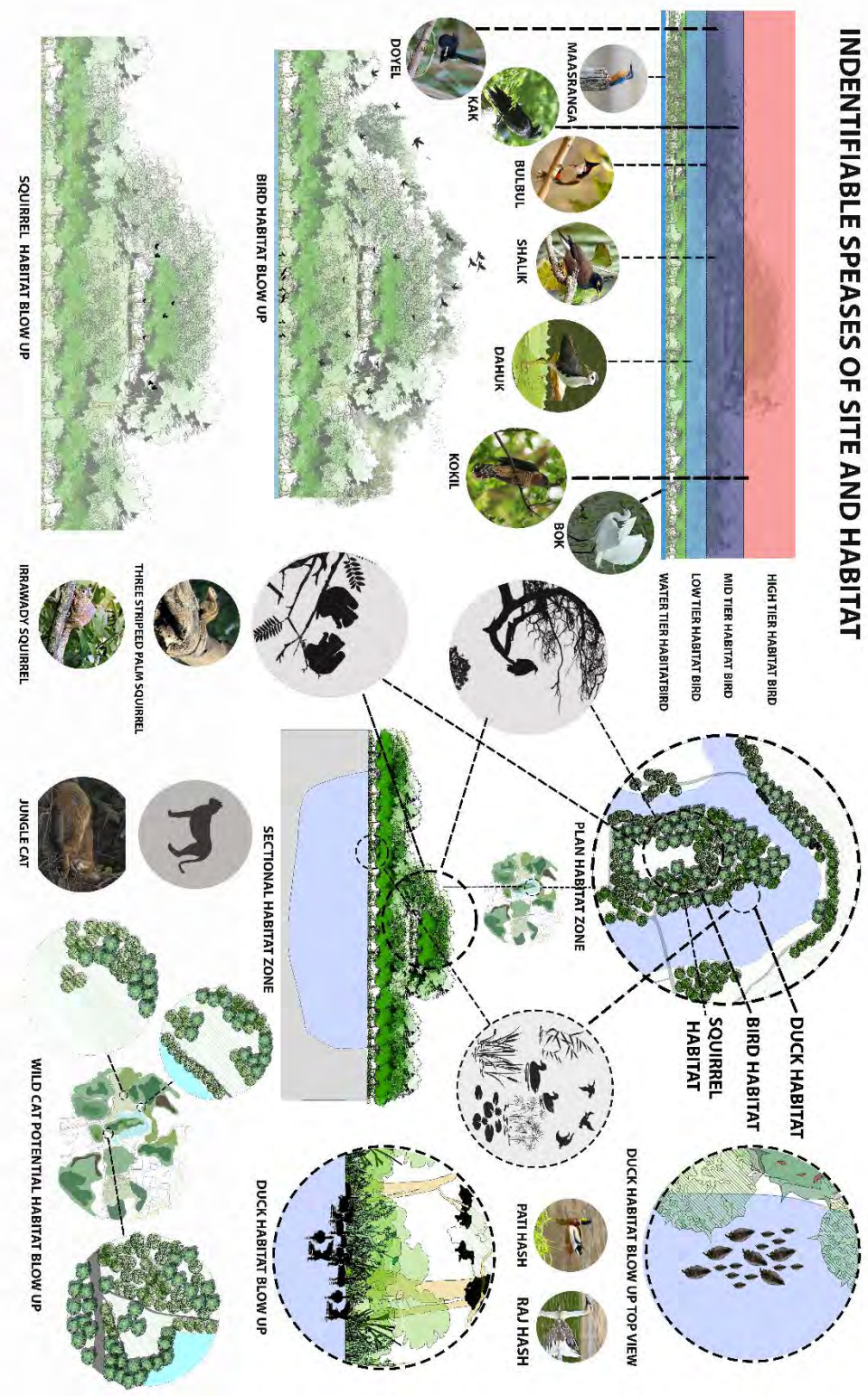
(Source: Author)

Figure 25 food web



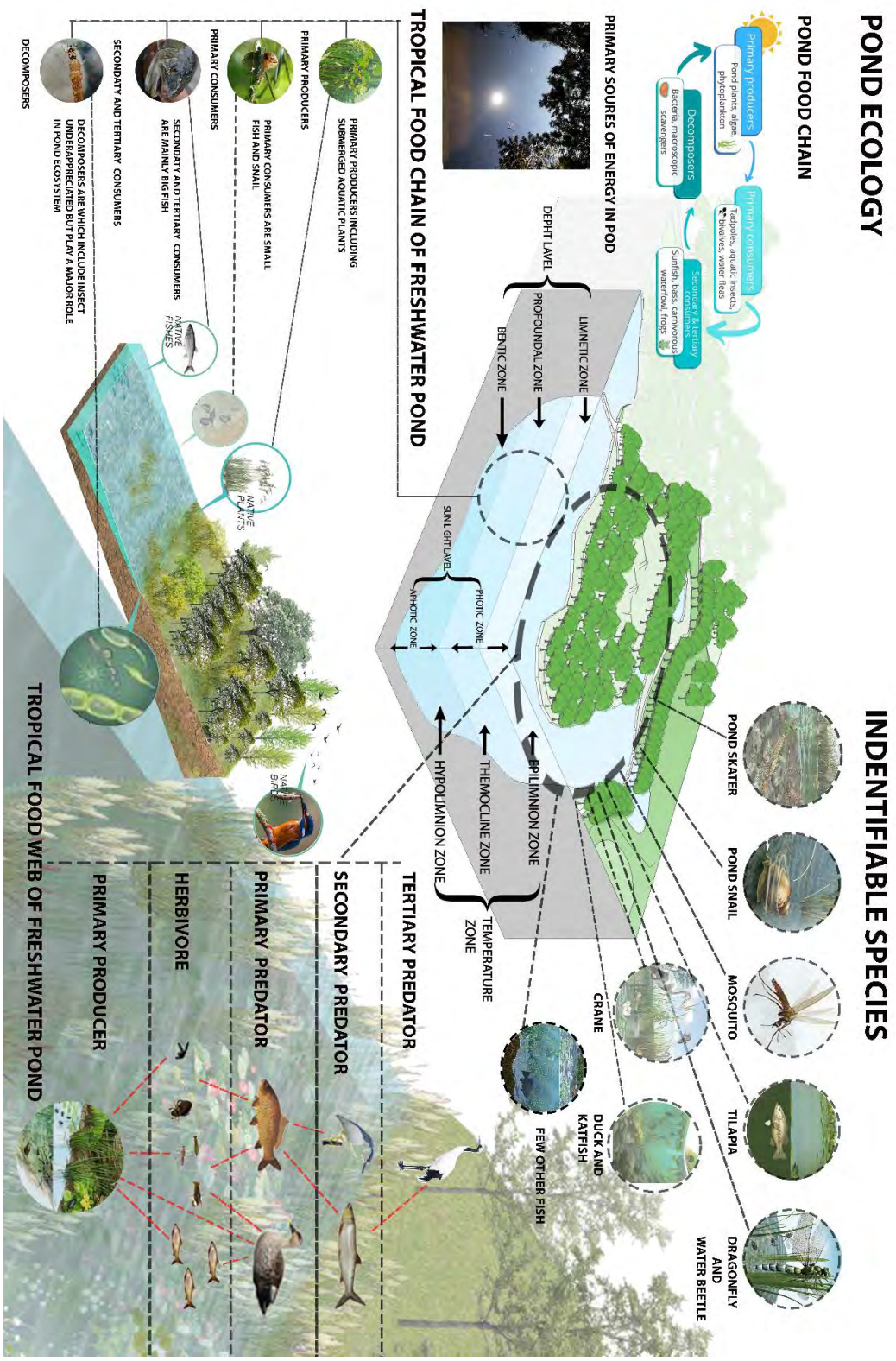
(Source: Author)

Figure 26 Site animal activity location and land ecology



(Source: Author)

Figure 27 Site pond ecology



(Source: Author)

Figure 28 Site wildlife profile

SITE ANIMAL PROFILE

Three Striped Palm Squirrel

Native Name	:	Kathberali
Phylum	:	Chordata
Class	:	Mammalia
Diet	:	Omnivores
Habitat Preference	:	Trees
Region	:	Mixed ever green forest

Irrawaddy Squirrel

Native Name	:	Dhusor Kathberali
Phylum	:	Chordata
Class	:	Mammalia
Diet	:	Herbivorous
Habitat Preference	:	wodd land, mixed agricultural area, lower mountaneous area
Region	:	Mixed tropical forest

Jungle Cat

Native Name	:	Bon beral
Phylum	:	Chordata
Class	:	Mammalia
Diet	:	Carnivorous
Habitat Preference	:	Places with adequate water and vegetation
Region	:	South-east Asia

Kingfisher

Native Name	:	Machranga
Phylum	:	Chordata
Class	:	Aves
Diet	:	Fish, Invertebrates
Habitat Preference	:	Places with adequate water and vegetation
Region	:	Wooded Tropical Area

Bulbul

Native Name	:	Bulbuli
Phylum	:	Chordata
Class	:	Aves
Diet	:	Insects, flower nectar frugivorous
Habitat Preference	:	Garden, forest
Region	:	Tropical and sub tropical Area

Oriental Magpie Robin

Native Name	:	Doyel
Phylum	:	Chordata
Class	:	Aves
Diet	:	Insectivorous
Habitat Preference	:	open wood land and cultivated area
Region	:	Resident breeder

House Crow

Native Name	:	Kak
Phylum	:	Chordata
Class	:	Aves
Diet	:	Omnivores
Habitat Preference	:	Tree
Region	:	Tropical and Sub tropical region

Starling

Native Name	:	Shalik
Phylum	:	Chordata
Class	:	Aves
Diet	:	Omnivorous
Habitat Preference	:	Evergreen forest
Region	:	All over the world

The White breasted water hen

Native Name	:	Dahuk
Phylum	:	Chordata
Class	:	Aves
Diet	:	Insectivorous
Habitat Preference	:	Marshes and plain land
Region	:	Tropical and sub tropical Asia

Oriental Koel

Native Name	:	Kokil
Phylum	:	Chordata
Class	:	Aves
Diet	:	Insectivorous
Habitat Preference	:	Marshes and plain land
Region	:	Tropical and sub tropical region

Heron

Native Name	:	Bok
Phylum	:	Chordata
Class	:	Aves
Diet	:	Carnivorous
Habitat Preference	:	wetland, marsh land, pond
Region	:	All over the world

Swan

Native Name	:	Raj has
Phylum	:	Chordata
Class	:	Aves
Diet	:	Pond weed,seeds, insect, worms and snails
Habitat Preference	:	Fresh and sea water
Region	:	All over the world

Snail

Native Name	:	Shamuk
Phylum	:	Mollusca
Class	:	Gastropoda
Diet	:	Decaying organic matter
Habitat Preference	:	Water and wet land
Region	:	Forest, river banks, garden, some urban area

The Asian Stinging Catfish

Native Name	:	Shing machh
Phylum	:	Chordata
Class	:	Actinopterygil
Diet	:	Aquatic macrophytes, algea
Habitat Preference	:	Ponds, ditches, swamps
Region	:	Southeast Asia

Cichlid

Native Name	:	Tilapia
Phylum	:	Chordata
Class	:	Actinopterygil
Diet	:	aqatic macro phytes, algal
Habitat Preference	:	Fresh Water
Region	:	native to nile river basin

(Source: Author and animal, bird and fish encyclopedia)

Chapter 4: Program Appraisal

The accompanying part examines the given projects for Eco Resort and Tourist Complex. The given program predominantly comprises of authoritative offices, convenience, sporting offices, eating offices and supporting offices. Be that as it may, the projects have been overhauled to accomplish the most extreme effectiveness of a space according to contextual analysis, guidelines and site study.

4.1 Administrative facilities

The managerial offices at first didn't comprise of bookkeeper's office and deals and promoting chiefs' office. To run a hotel the monetary perspectives should be observed under a bookkeeper's management, deals and advertising division vital for the business area of the venture to work is as well. Notwithstanding, the designated number of local area expert has been diminished from 6 to 4 as there are relatively few touristic exercises for them to direct. The quantity of gathering rooms has likewise been diminished from 10 to 4 as just predetermined number of individuals from authoritative division will involve those spaces for meeting.

	Administrative Facilities	Number of units	Number of users	Area per unit (in sft)	Total area (in sft)
1	Reception lobby	1	35	900	900
2	Luggage room	1		250	250
3	GMA office	1	1	350	350
4	GMC office	1	2	270	270
5	Tour guide’s office	2	5	500	1000
6	Accountant’s office	2	2	250	500
7	Meeting rooms	5		270	1350
8	Sales and marketing manager’s office	1	2	250	250
9	Prayer room	1	15	150	150
10	Security guard room	1		120	120
11	Storage	1	1	350	350
12	Medical services	1		600	600
13	Toilet	3	4	150	450
				Subtotal	6450

4.2 Accommodation

The given rundown of projects just had choices of three assortment of houses and extravagance suites for the visitors who will come for a short stay. In any case, the financial parts of Bangladesh propose that it is important to have fancy and select twin spaces for the hotel to be open and reasonable to a wide scope of client bunches from everywhere the nation and the city Chittagong itself. Anyway, the quantities of servants and their convenience for 20 rooms have been recommended based on housekeeping range front of a hotel. A servant tidies up roughly 14-18 rooms for every shift and a hotel of 100 rooms in this manner require 8/10 maids.

	Accommodation	Number of units	Number of User	Area pre units (in sft)	Total area (in sft)
1	Single bed cottage	16	16	400	6400
2	Double bed cottage	52	104	600	31200
3	Luxury suites	8	2	1100	8800
4	Stuff Quarter	18	18	300	5400
				Subtotal	51800

4.3 Supporting recreational facilities for guests

These are the capacities open to just the visitors remaining in the retreat. Sporting capacities like Karaoke relax and VR relax have been added to give diversion to changing age bunches visiting the retreat. Offices like pool with a pool bar and a badminton court with kids play zone are likewise accessible.

	Facilities for visitor	Number of units	Number of User	Area pre units (in sft)	Total area (in sft)
1	Multipurpose hall	1	400	3000	3000
2	Swimming pool and supporting facilities	1	200	1000	1000
3	Indoor game room	2	150	1500	3000
4	Fitness center and spa	4	300	2000	8000
5	Library	1	100	1000	1000
6	Zen garden	1	50	1500	1500
7	Garden area	1	300	4000	4000
				Subtotal	21500

4.4 Dining facilities

Since the principle feasting corridor will be open to visitors just, its ability has been diminished from 250 to 150 clients relying upon the quantity of rooms and visitors. An extra squeeze bar has been added to the projects.

	Dining facilities	Number of units	Number of users	Area per unit (in sft)	Total area (in sft)
1	Main dining hall	2	150	5000	5000
2	Buffet serving area	1		550	550
3	Juice and coffee bar	1	120	2000	2000
4	Cafe	2	80	1200	2400
5	Kitchen	1	25	2250	2250
6	Chef's room	1	2	400	400
7	Pantry and storage	1		350	350
				Subtotal	12950

4.5 Services

Lodging security and reconnaissance office has been added to the given rundown of projects.

	Services	Number of units	Number of users	Area per unit (in sft)	Total area (in sft)
1	Mechanical facilities	1		7000	7000
2	Telecommunication room	1	2	550	550
3	Laundry and dry-cleaning service	1	5	550	550
4	Hotel security and surveillance	1	2	350	350
				Subtotal	8450

The ground total of built area = 101150 sft

Chapter 5: Case Study Appraisal

A case study is a process of researching into a project and documenting through writings, sketches, diagrams, and photos. To understand the various aspects of designing and constructing a building one must consider learning from other people's mistakes. It helps to understand the processes of researching a project to gain knowledge about that particular project. It helps in intense observation of methods, characteristics, standards etc. and assists in understanding the functional, contextual and ideological aspects of a design. Case study means a stranding point of a project which makes the work easer. It is not necessary that the building we choose for our case study should be the true representation of our project. The main purpose is to research and understand the concepts that an architect has used while designing that project and how it worked, and our aim should be to learn from its perfections as well as from its mistakes too while adding our creativity.

5.1 Z9 Resort

- Architect: Dersyn Studio
- Location: Kanchanaburi, Mueang Kanchanaburi District, Kanchanaburi, Thailand
- Site Area: 3100.0 sqm
- Category: Sustainability
- Project year: 2017

Rationale: To study methods of approaching a design for minimizing its carbon foot print all the while respecting the topographic characteristics of the site

Image 1: Bird view of Z9 Resort

(Source: ArchDaily)

5.1.1 Environment and microclimate

Mueang Kanchanaburi is the capital district of Kanchanaburi Province in central Thailand. Kanchanaburi is the third largest province of Thailand and a great natural place of beauty. The site of the resort is located right beside Srinakarin Dam on Tambon Tha Kradan road. The Erawan national park's seven tiered waterfalls and mountains are about 15km away from the site and is one of the popular tourist attractions among the tourists. The main climate of this place is very similar to the rest of the central Thailand. The month with the highest temperature is April (38.2°C) and the month with the lowest is during the coldest month of December (19.6°C). October is the highest humid month and the average humidity is 80%.March is lost humid month with average humidity 60%.Junuary is the driest month and monsoon is the wettest month. The climate is basically hot and humid.

5.1.2 Form and function

According to the existing site contexts of Z9 Resort which are lake-side and hill-side area, "architectural of the mountain hug" will be used as the key concept of the holistic resort designing as well as its space planning.

Resort's guess can easily see this simple curve from the outer surface of most of the Z9's building. This simple curve also creates the main form and space of each building from the lobby to the private floating units. While the curve lines represent the natural lake-side context the lobby is designed based on lunar direction that allows guests to enjoy the scenic sunrise and sunset. The architecture has a compelling curvilinear roof which is extendible. It has tremendous harmony with nature. The main service zone is on the land visibly separated from the resorts and the floating resorts on the water have a view of the mountains on one side and lake on the other. This separation was intended to secure privacy for the guests while they enjoy the serenity of the nature.

Image 2: Curvilinear roof of the resort

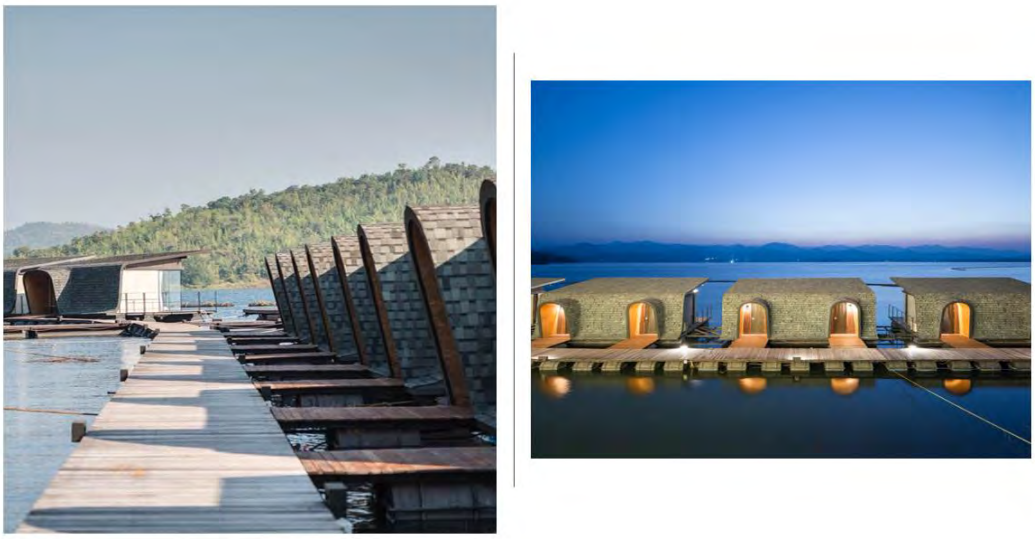


Figure 29: Zoning of Z9 Resort

(Source: ArchDaily)

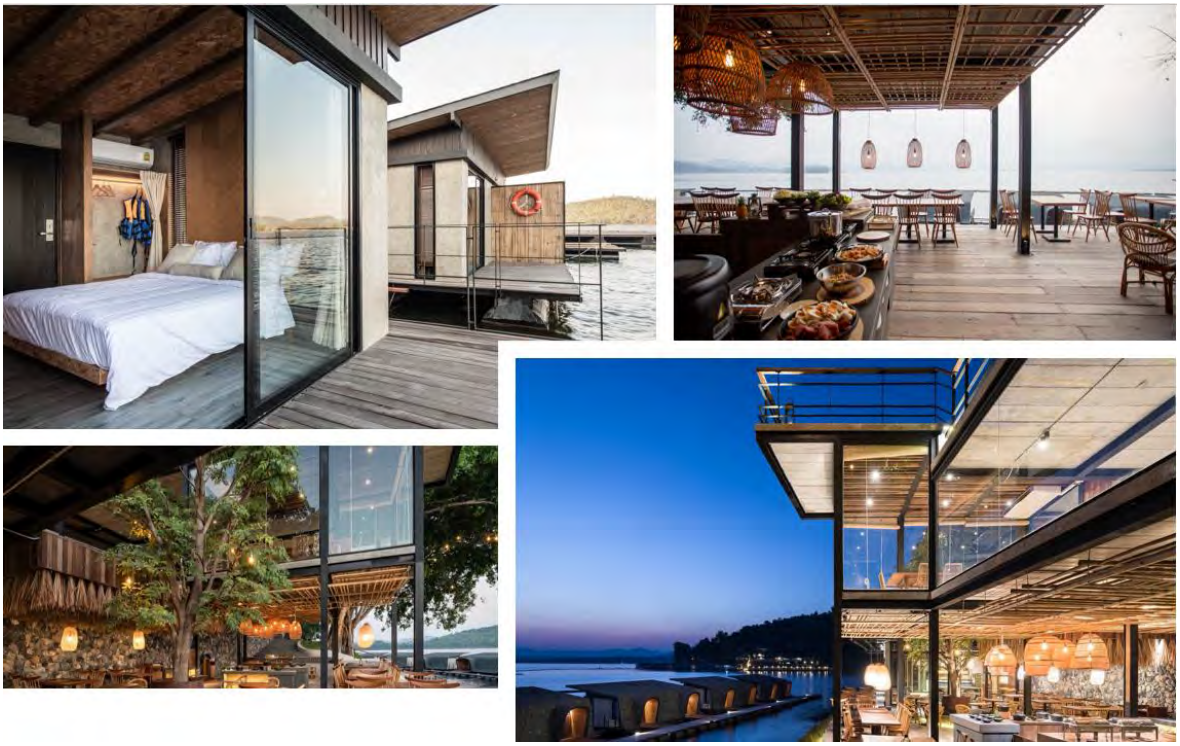
5.1.3 Design details

This resort is designed and built on the slope topography. Each area of Z9 Resort has designed and built based on the existing slope, existing footing of the old resort and existing trees as much as possible. Z9 has very good unique master plan so that none of its area is blocked by another area. On the other hand, it has private floating units which is built on the lower lake side. The design covers all area without hampering the scenic view. The design of Z9 is based on "3R" concept (reduce reuse and recycle) and applied through unique construction techniques. The Light-weight structure such as steel structure was used to build this resort Steel structure promotes eco-friendly outcome in many ways for instance the wider span which means less on-ground touching and can be adjusted to suit with the existing footing,

faster and cleaner construction in comparison with concrete structure. Although guess can see the concrete structure in some part of the resort for example concrete roof deck. However, this concrete roof deck built by casting some concrete on the pre-cast concrete flooring. This means construction time can be reduced and less cement water wasted into the soil. Cement water of construction sites is harmful for plants. That is why most of the time it destroys the existing plant and trees.

Sustainable design approaches based on the 3R (Reuse, Reduce and Recycle) concept have been used in this project in many ways. Reuse concept was achieved by using wood from the previously existing resort before this resort was rebuilt. The old wood was used for resort decorations. OSB Board which has been used as the ceiling material was also another aspect of the reuse concept. This is because the OSB Boards used there were created by compressing layers of wood flakes. Secondly, very few site contour adjustments were applied in the site to create as less environmental footprint as possible. This helped in the reduction of adverse effects on the topography of the site. Thirdly large wood were used for furniture and water treatment was applied before drainage into the lake.

Image 3: Design details of the resort



(Source: ArchDaily)

5.1.4 Structural details

The lobby, as the very first arrival area of resort's guess, plays the important role in demonstrating the relationship of "the most famous painting and its frame" in many ways. The walk-way inside the lobby area, the lighting design and installation details work together and create the "catwalk" like atmosphere. When resort's guess walkthrough the walkway of the lobby and reach the end of the walkway, they will see the stunning view of the gorgeous lake with some mountain as the background. appropriate

use of materials and its nature-oriented structure. Each building ensures natural ventilation and proper light. Light-weight structure like steel structure was used to build this resort. Steel structure promote eco-friendly outcome in many ways. For instance, the more extensive range which implies less on-ground contacting and can be changed 27 to suit with the current balance, quicker and cleaner development in correlation with substantial construction.

Figure 30: Structural details

(Source: ArchDaily)

Image 4: Design details of the resort

(Source: ArchDaily)

5.2 Dali Munwood Lakeside Resort Hotel

- Architect: Init Design Office

- Location: Dali, Yunan, China
- Site Area: 1000 sqm
- Category: Extension
- Project year: 2015
- Rationale: To study the connection between the resort and the environmental amenities of the site.

Image 5: Perspective of Dali Munwood Resort

(Source: ArchDaily)

5.2.1 Environment and micro climate

Dali lies on high plateau which is about 2,300 feet from Guanyin Hollow. Sweeping views of the Cangshan Mountains and Erhai Lake are featured. The climate of Dali is a subtropical highland monsoon climate. The site is located in west road, Erhai Lake, which is known as

the smallest natural village around Erhai Lake. The village is surrounded by the unique landscape of Haixi wetland that offers a pristine view of clear blue sky, lake and waterfalls and with willow catkins seen fluttering everywhere. The village is beautiful and quiet with five or six resorts along the shoreline, Munwood Lakeside Resort being one of them. This resort is mainly an expanded and reconstructed version of a rentable farm house that was transformed from an area of 300 sqm to 1000 sqm.

5.2.2 User behavior and requirements

The team of architects working in the extension of this project rearranged the functional spaces of the two original buildings and wanted to make sure that this project would serve and welcome users of all group from around the site. There was a boundary of stone walls separating the surrounding neighbors completely from the resort. The boundary wall wasn't completely eliminated but rather treated in some places to create sitting spots for passersby. Multi-level public spaces were also created inside the resort to establish a relationship between the guests and Erhai Lake from multi dimensions, without the guests having to interfere with each other. The separation in levels of spaces make sure the guests enjoy the lake view in solitude.

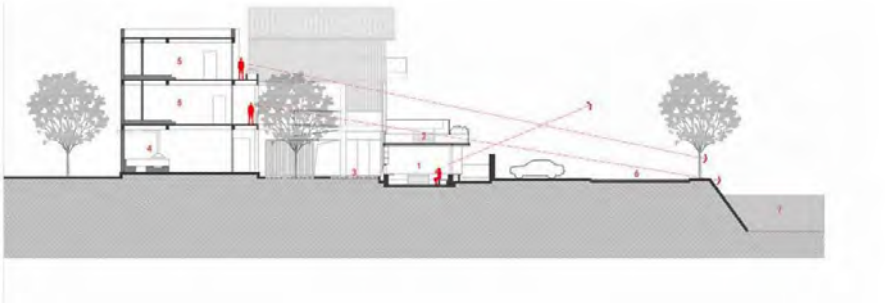
Image 6: Boundary wall turned into sitting spots

(Source: ArchDaily)

5.2.3 Site planning and landscape detailing

To cross the front road was the troublesome aspect of the design. To go across the front street and partake in the Erhai Lake intently. The street isolating the structure from the lake was very hard to manage. Which is the reason a half sinking public space was intended to make a connection. Space beneath the parcel assists make a mental connection with the water the platform built on the space established a more direct relationship with the Erhai Lake and being made in steel structure it stood out uniquely 30 from the main body. Moreover, the building on the right side of the platform was kept open to give the resort a lighter look from the roadside among all the thick surrounding houses.

Figure 31: Section of the resort showing the interactive platform that links the resort and the water body



(Source: ArchDaily)

5.2.4 Design details

One of the important considerations of this project was to take full advantage of the local climate through introducing solar hot water system. This initiative helped saving both water and energy. Recycling water was particularly a major concern of the project since the municipal sewage pipe network did not function properly. This dysfunctional pipe system caused both wastage and scarcity of water. The architects managed to set a 10 ton water treatment system to purify and reuse grey water for landscape. To create awareness and portray a responsible attitude towards natural environment they set up the display window of the water system at the main entrance of the hotel. Furthermore, to convey the idea of environmental protection and preservation design to the guests a one-hundred-year old tea tree was planted in the heart of water courtyard.

Image 7: A hundred-year-old tree planted in the heart of water courtyard

(Source: ArchDaily)

5.2.5 Horizontal and vertical circulation

Vertical circulation like stairs are not only used to go to one floor from another but also used to go the terraces and decks designed at multiple levels. The stairs make it easier to see the levels visually and help go from one level to another. However, the horizontal circulation is kept quite minimum in the first floor, it only leads to the rooms and one public terrace from the stairs.

Figure 32: Vertical and horizontal circulation of the plans

(Source: ArchDaily)

5.2.6 Structural details

The structure of the resort focuses on the relationship between modern and traditional architectures. Low technology was one of the strategic approaches, it means to select the regular structure and construction system but under the restriction of cost and local construction conditions. However, the contemporary expression of the resort was achieved with plain materials by employing stone walls in frame system which also creates an opportunity to

approach the local artisans. Reuse of old materials like local dismantled woods were used in indoor furniture furnishings and as internal structural elements (beams).

Image 8: Structural details: Use of recycled woods

(Source: ArchDaily)

5.3 Naman Retreat and Spa Resort

- Architect: MIA Design Studio
- Location: Da Nang, Da Nang, Vietnam
- Site Area: 1600 sqm
- Category: Retreat and spa
- Project year: 2015
- Rationale: To study the flow of natural ventilation and the integration of green spaces within the building.

Image 9: Perspective of Naman Resort

(Source: ArchDaily)

5.3.1 Environment and microclimate

The Naman Retreat resort stretches hundreds of meters on Da Nang beach , Vietnam – one of the six most beautiful beaches in the world. The world-famous Hoi An Ancient Town is just moments away, whilst the resort gives easy access to Danang City, The Marble Mountains, Ba Na Hills entertainment and the World Heritage Sites of My Son Sanctuary and the Imperial City of Hue. The climate of this site is generally tropical.

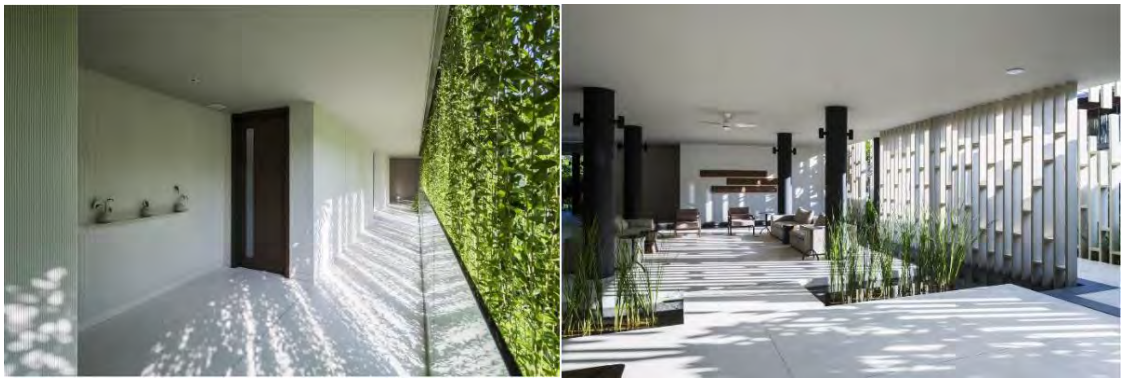
With an average high-temperature of 22.5°C (72.5°F) and an average low-temperature of 19.3°C (66.7°F), January is the coldest month in Da Nang, Vietnam. While dry season lasts from February-August, monsoons are possible in the wet season of September-January. November is the month with the most rainfall in Da Nang.

5.3.2 Design details

Naman Retreat flawlessly mixes immortal Vietnamese legacy and culture with rich present-day solace. Great conventional bamboo engineering and perfect insides, combined with valid Vietnamese friendliness makes an extraordinary retreat insight. Its 102 large rooms and villas have open-plan bathrooms with walk-in rain showers, and decor that combines natural materials with an elegant neutral palette. It has private dive pools and profound drenching tubs, and most

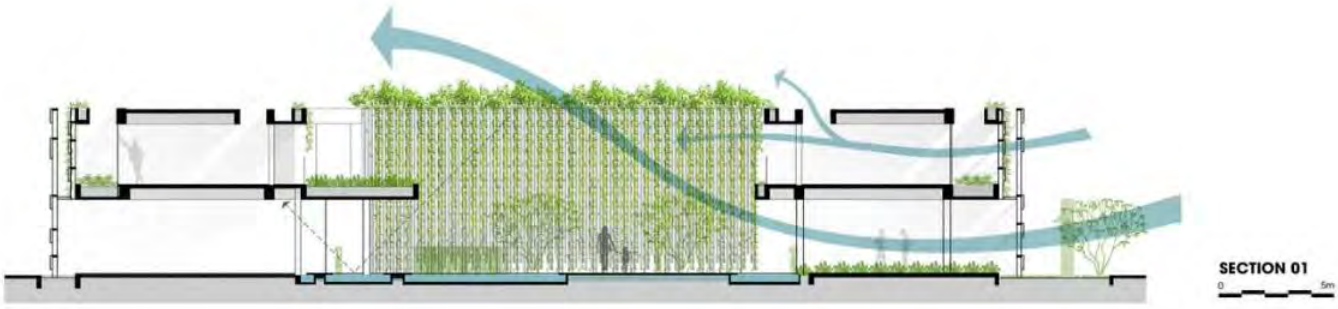
additionally have huge living regions with full kitchens. The spa is housed in a lovely independent structure, and the wellness place offers free yoga and judo classes. The pools -- one of which has an infinity-edge overlooking the beach -- are gorgeous and relaxing. The main restaurant serves traditional Vietnamese cuisine, while snacks and smaller bites are available poolside and at the beach. It is an excellent alternative, with free daily spa services, free yoga classes, and contemporary villas with private pools and outdoor living areas. The natural ventilation keeps the building cool the local plants from the vertical garden create a healing environment throughout the entire resort. A beautiful lotas pond and gardens surrounds the lobby of the resort which creates a relaxing platform.

Image 10: Interior perspectives (play of shades and lights)



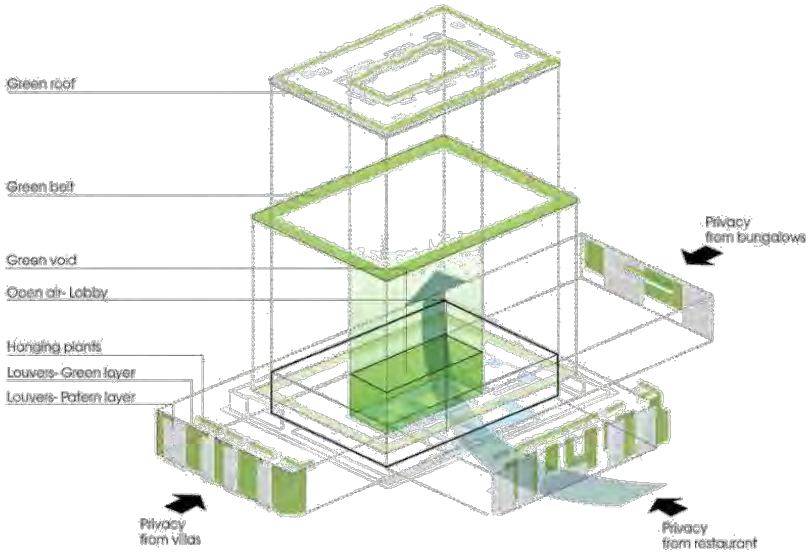
(Source: ArchDaily)

Figure 33: Vertical and horizontal circulation of the plans



(Source: ArchDaily)

Figure 34: Vertical and horizontal circulation of the plans



(Source: ArchDaily)

5.3.3 Horizontal and vertical circulation

The horizontal circulation is like an ambulatory course that surrounds the central courtyard space. It connects all the leisure services of the floor ground to the courtyard and connects the rooms to the double top house in the 2nd floor. The vertical circulation is located in a symmetrical role at each ends of the plan.

Figure 35: Vertical and horizontal circulation in the plans

(Source: ArchDaily)

5.3.4 Structural details

The facade of the resort is composed through white lattice patterns alternated with striking gardens that filter the robust tropical daylight into a exceptional play of mild and shadow on the textured walls. Various flowers are cautiously allotted in the vertical panorama of the facade to structure 38 display screen like elements. The cause of the monitors are to make the inside areas greater breathable

Image 11: Structural details (white lattice work to form screen like elements)

(Source: ArchDaily)

5.4 Sairu Hill Resort

- Architect: DOMUS Architects
- Location: Bandarban, Chiittagong
- Site Area: 12 acres.
- Category: Hill resort
- Project year: 2016
- Rationale: To study the flow of natural ventilation and the integration of green spaces within the building.

Image 12: Perspective of Sairu Hill Resort

(Source: Naila Binte Zakaria, Showcase Magazine, 2017)

5.4.1 Environment and microclimate

Sairu Hill Resort is built at Bandarban in the Chittagong Hill Tracts. It is famous for its herbal splendor and viewed as the heart of Buddhist way of life inside Bangladesh. Bandarban is a district placed in the South-Eastern phase of Bangladesh. The lodge is with ease placed solely 18 km away from the fundamental Bandarban Town, at the Y junction of the street from Bandarban to Chimbuk. It takes about forty minutes to power via this scenic hilly terrain on a avenue that ascends and descends alongside the curves of the hills. This resort has a 360º panoramic view with low drifting clouds from March-September which creates an atmosphere of cohabitation with the clouds. The resort overlooks Shangu River, the Bay of Bengal and the hilly vary alongside the Myanmar border. The Bay of Bengal is seen on the horizon on a clear sunny day. The local weather of Bandarban is normally tropical with an common temperature of 25.9 °C and sizable rainfall most months, with a very brief dry season.

5.4.2 Site planning and landscape details

The idea at the back of designing this cutting-edge hill lodge was once the ‘less is more’ principle. Because of being a hilly region and missing strong chunk of aircraft land, the planning and designing of the lodge was once pretty a difficult task. Thus, the grasp layout was once designed being thoughtful and touchy in the direction of the web site and surroundings. Not solely the present timber have been left untouched however additionally greater flora have been delivered whilst shaping the panorama of the resort. It was once saved into consideration that without maintaining the contours intact the pristine splendor of nature should no longer be broken until it blended with the topography. Even even though the development of Sairu Resort is a touchy response to nature, solely exception to it used to be the driveway. It had to be scrapped and curved out of the hill. Water had to be sourced from a spring nearly 1200 ft under the Resort website online which grew to become out to be hazardous task.

Image 13: Plan of Sairu Hill Resort from bird eye view

(Source: Naila Binte Zakaria, Showcase Magazine, 2017)

5.4.3 Design details

There are five sorts of rooms at Sairu Slope Resort. All rooms are completely cooled, wellfurnished and accompanies private restrooms and galleries. The types of rooms are as follows:

-Premium suites

-Executive suites

-Rooms with Shangu river view

-Rooms with Shangu river view and terrace

-Cottage

The other functions provided by the resort are dining facilities, conference rooms and pool zones. The internal spaces of the resort were designed taking full advantage of the topography to help obtain maximum panoramic views of the hills and river. Because of such panoramic sights of the tall hills and river, every view from the resort is a treat to the eyes. The terraces offer scenic beauty of the cotton clouds floating in the sky. Cottages on the other have beautiful balconies that is surrounded around 80 feet tall old Shimul tree. The 60 feet diameter podium around the Shimul tree is a perfect venue for leisure hangout and conducting various cultural program.

Image 14: Family cottages and the common space that connects t each balcony

Image 15: Design details (use of vernacular materials)

(Source: Naila Binte Zakaria, Showcase Magazine, 2017)

5.4.4 Structure details

To appreciate the topography of the site most of the buildings have been constructed on metal stilts to reduce any trade in the natural contours. To acquire the rustic outlook which seamlessly combination with nature neighborhood substances such as stones and bamboos have been use.

Image 16: Structural details

(Source: Naila Binte Zakaria, Showcase Magazine, 2017)

5.5 L.I.F.T House

Status: Completed 2010

Location: Dhaka, Bangladesh

The LIFT House is a housing solution for flood prone communities. It is an aspiring and innovative house which floats up with rising floodwater and returns to ground as the water level reduces. Here, the architecture adapts to floods. Amphibious architecture is a cost-effective. This evolutionary and safe process has been applied through the design of buoyant foundations

Image 17: Perspective view

(Source: prosunarchitects)

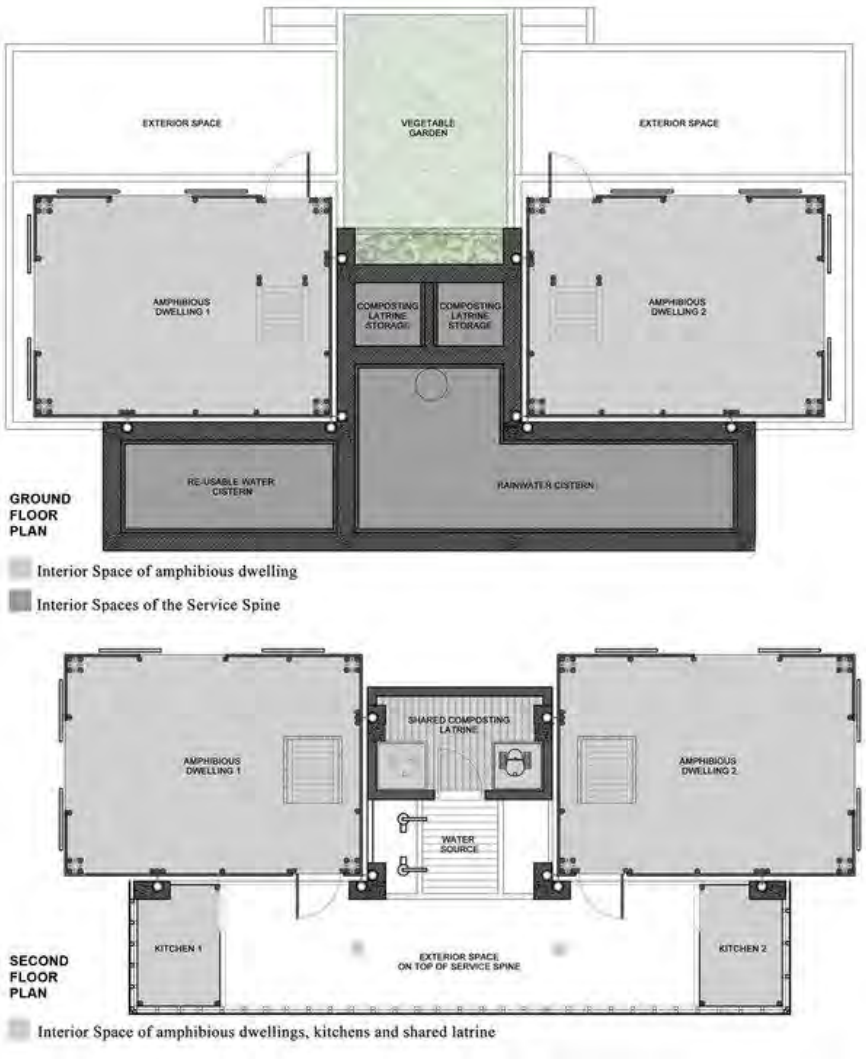
5.5.1 structure details

There are two Sorts of buoyant foundations which were used in the LIFT house such as a hollow ferrocement structure and a bamboo frame filled with empty used plastic bottles. To construct the amphibious unit, watertight ferrocement foundation and bamboo columns were used. Use of abandoned plastic water bottles is an innovative solution which is inexpensive and too good to the environment. This process is not only ecofriendly but also an effective solution of plastic hazards.

Image 18: Structural details

(Source: prosunarchitects)

Figure 36: L.I.F.T house plans



(Source: prosunarchitects)

Chapter 6: Design Consideration

Design consideration is considering a thread that bring out the will and intention of the designer for the project. The purpose of design consideration is to find the solution to that can help the designer to overcome the problems. The following consideration was taken in order to achieve the requirement and goal of the project, which will make the design eco-friendlier for the environment.

6.1 improving environmental

One of the important design considerations was to not to harm any of the environmental amenities. Preserving the biota was one of the important considerations of this design. This can be achieved by understanding and recognize the existing biota of the site and the site surrounding. Biota means the specific type of animal and plant life that resides and functions within a particular region or habitat. The site already as has a large bio diversity and need a similar character of the project in order to retain the environmental values. Like not to use any harmful toxic elements and leave space for the wild life like the one they are used to.

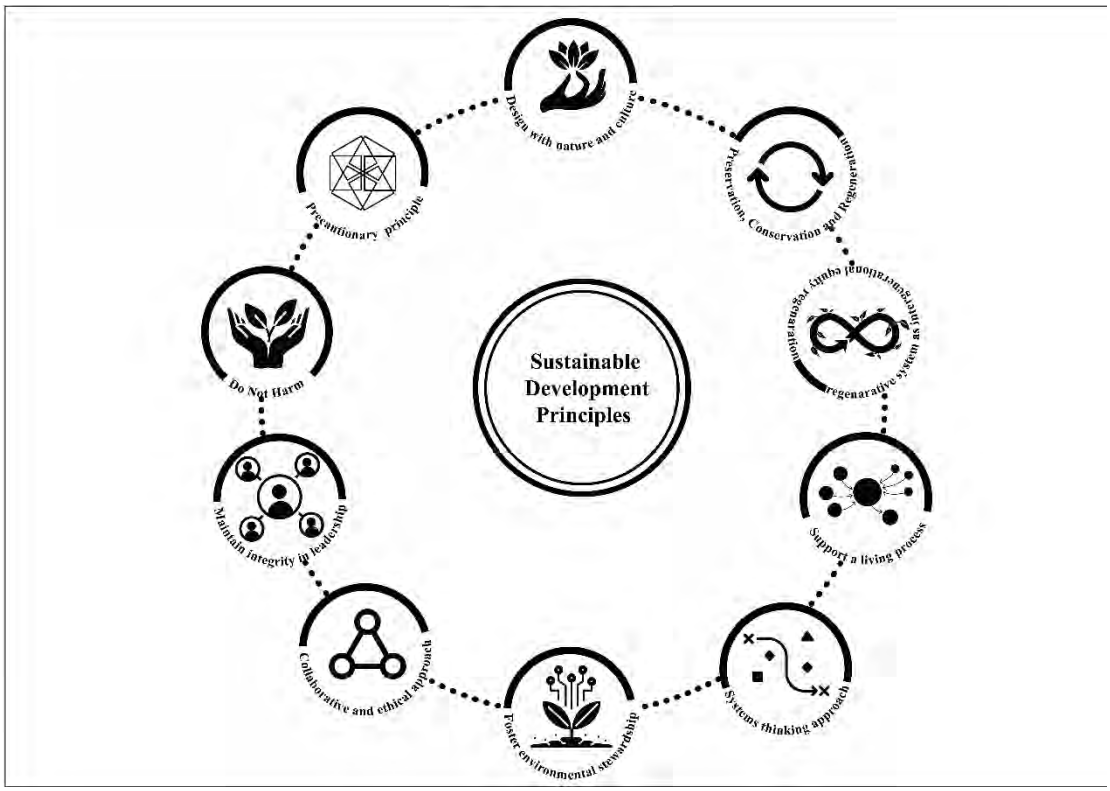
Figure 37: environmental amenities

(Source: Author)

6.2 Sustainable design consideration

Carbon foot print is a major issue, in order to reduce that many considerations was taken. Carbon foot print the release of CO2 the air which caused by a single individual or a community. Like burning too mush fissile fuel. this activity often harms environment and biota, although it not possible to eremite this, but with few guild lines it is possible to offset a lot of it. One of the main considerations was to follow sustainable design principle and the 3-R (reduce, reuse and recycle) method.

Figure 38: Sustainable Development Principal



(Source: Site Planning and Design Handbook)

Figure 39: Sustainable Development Principal

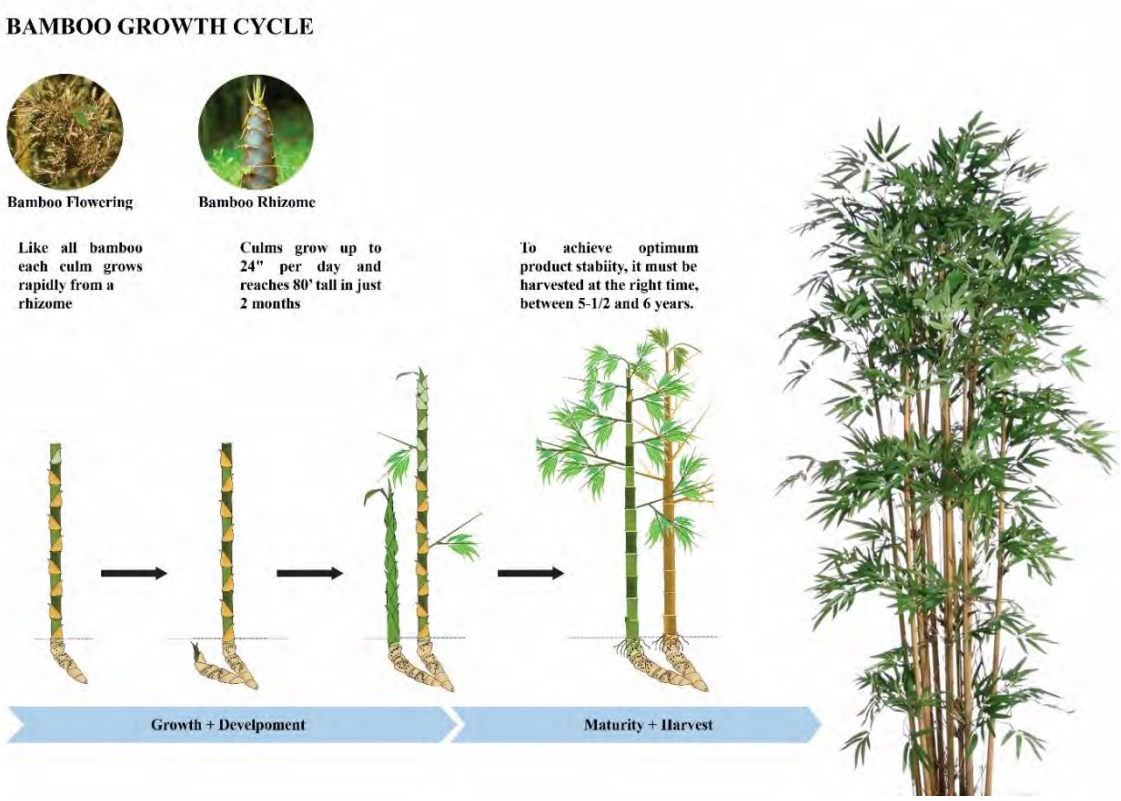
(Source: Site Planning and Design Handbook)

6.2.1 Bamboo construction

One of the key design considerations was to find martial which has low carbon foot print. Bamboo was chosen because it has low carbon foot print and if was locally widely available. Also, since is a type of grass it does not need much care in order to grow. However, the problem with bamboo was unlike brick and concert it was not very strong and durable. Also require a lot of maintains, but it is possible to make bamboo strong and durable and less maintainable through few treatment methods. The treatment which was selected was the soaking method. It is the most cost effect and has a good result. Soaking method is one of the traditional methods. After the that a chemical method was used which is inter nodal injection. Which infill the pocket of the

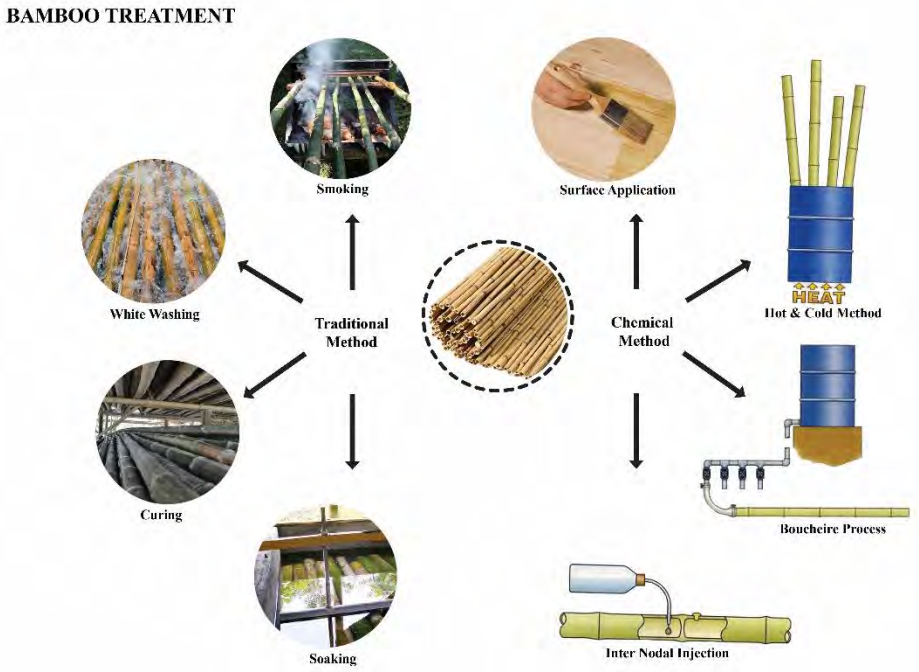
bamboo with air that makes the bamboo stronger and more durable and also less likely to get insect infestation.

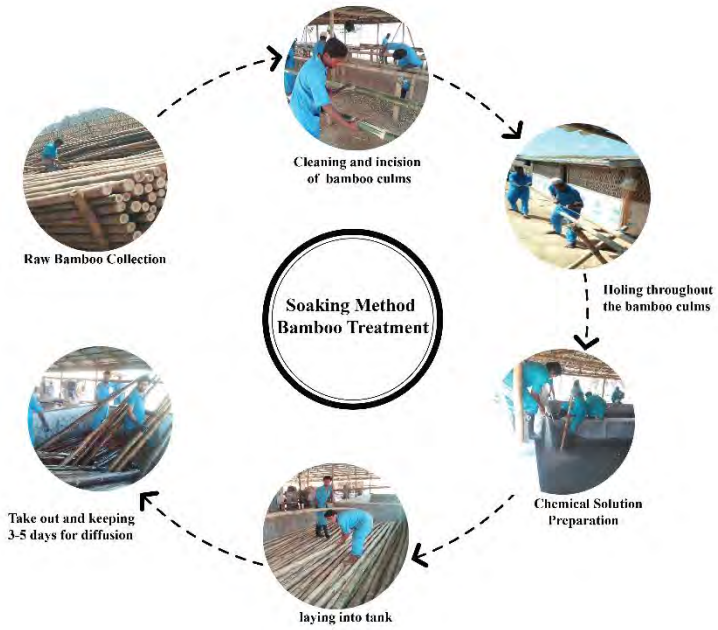
Figure 40: Bamboo growth cycle



(Source: Research Gate)

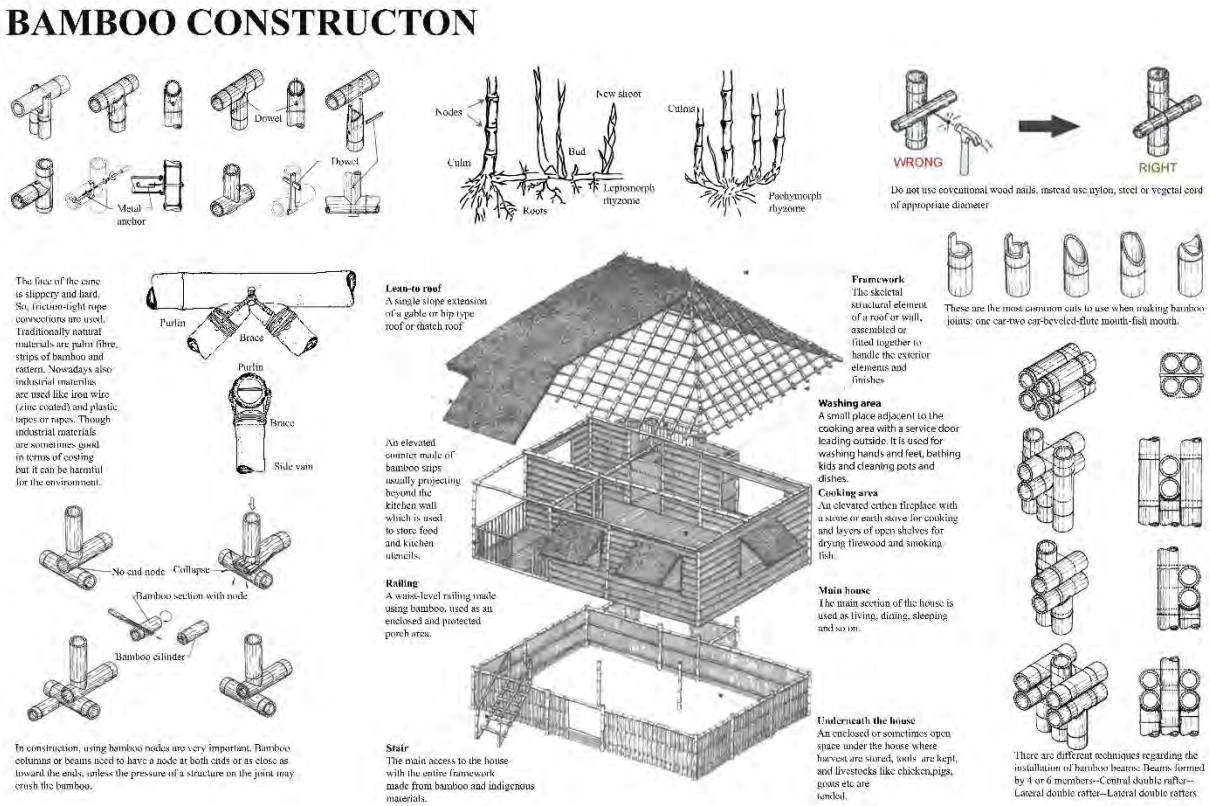
Figure 41: Bamboo treatment





(Source: Academic course)

Figure 42: Bamboo joining method

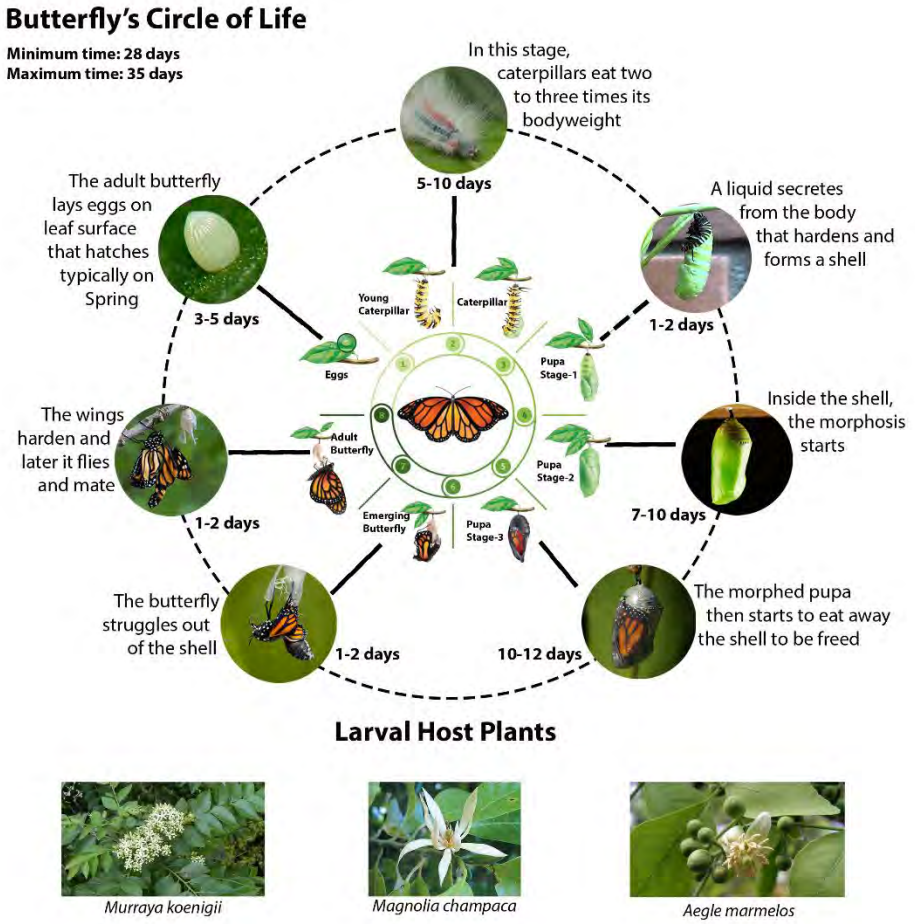


(Source: Academic course, Recherche Gate and author)

6.3 Ecological consideration

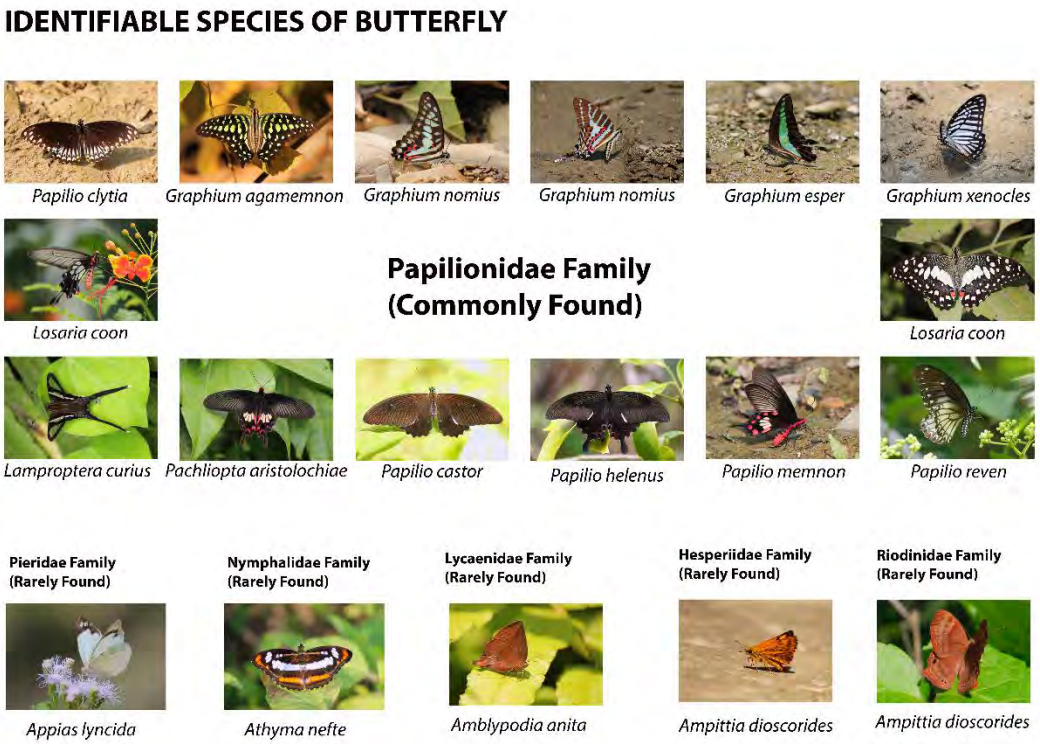
The site already has a existing ecology, habitat, food chain and food web on both land and pond. In order to enhance this ecology pollinator was needed. Pollination increase the amount of food and tree-based product. Also, it maintains the flow of ecological service well. The surround area also has a dense forest so increasing the pollination would benefit all. For pollinator butterfly was selected. Butterfly can play the role of pollinator and also give a visual aesthetic.

Figure 43: butterfly life cycle



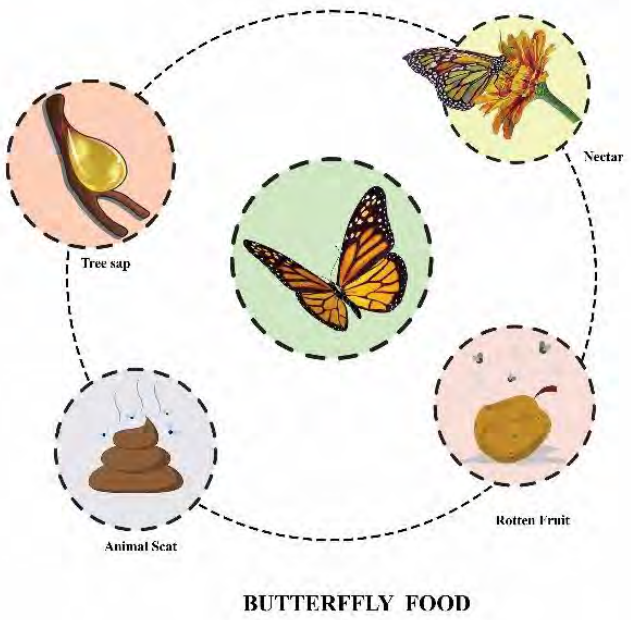
(Source: The Illustrated World Encyclopedia of Butterflies and Moths: A Natural History and Identification Guide)

Figure 44: butterfly Species



(Source: The Illustrated World Encyclopedia of Butterflies and Moths: A Natural History and Identification Guide)

Figure 45: butterfly food cycle



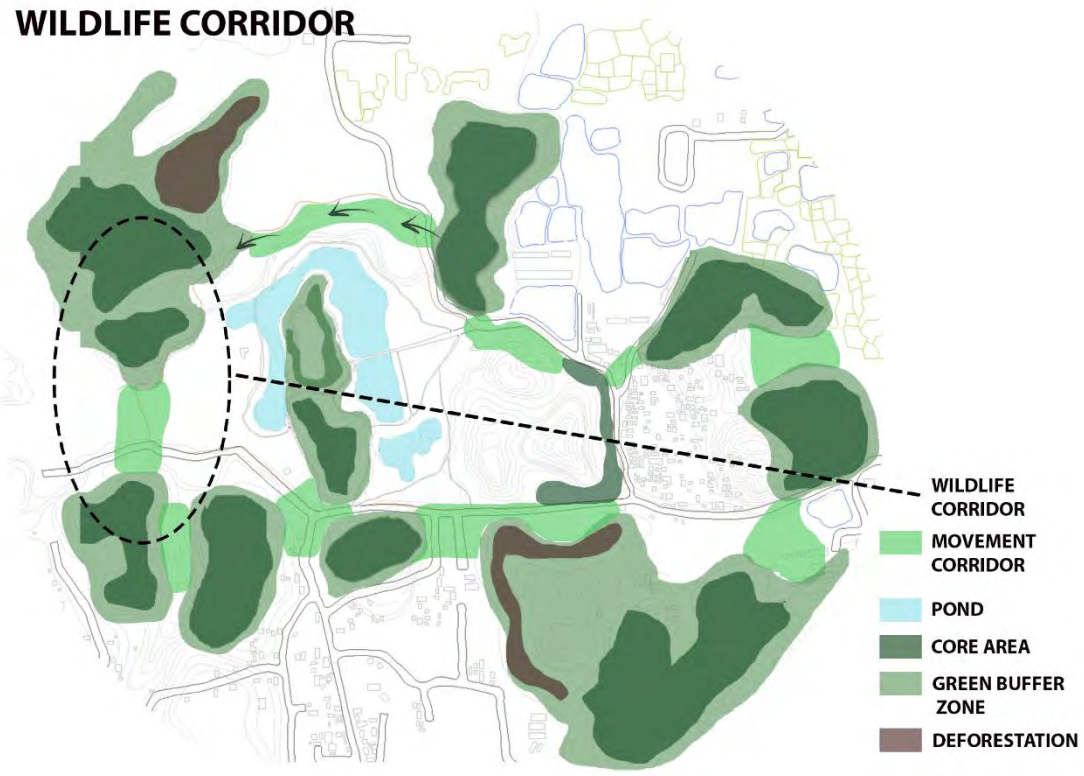
(Source: The Illustrated World Encyclopedia of Butterflies and Moths: A Natural History and Identification Guide)

Chapter 7: Design Development

7.1 Design concept

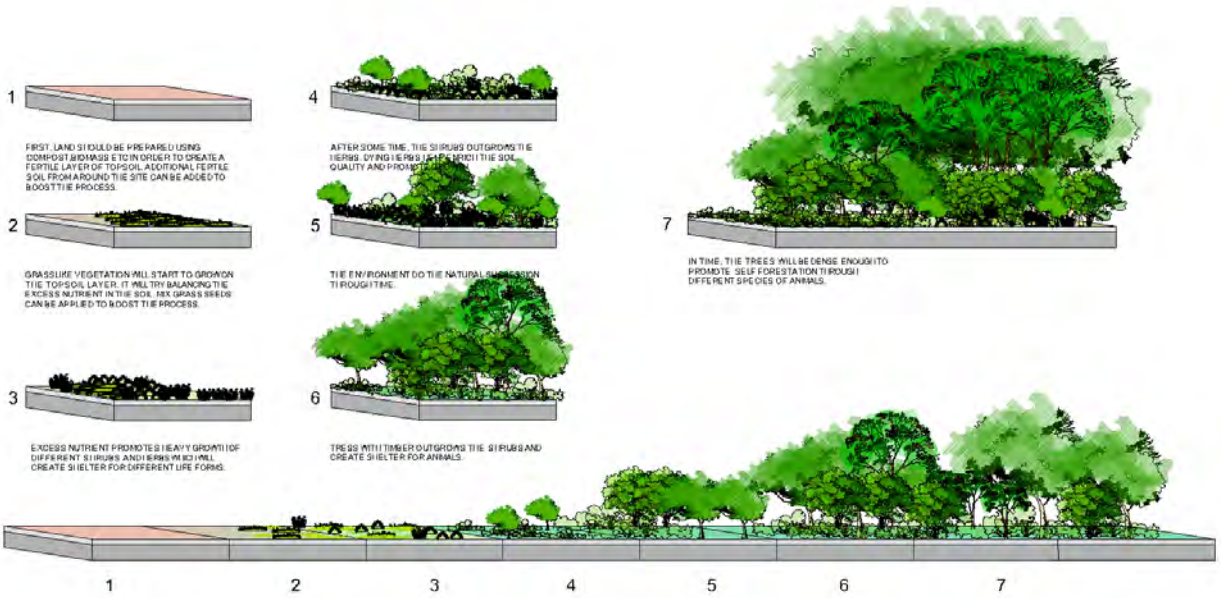
Since the site has a lot of wild life activity and the design consideration were to preserve and enhance the wild life activity. The concert was creating a environment that is not too untimelier to them. Because wild life prefers to stay in their natural environment. Since that is a fact, and in order for them to move around freely I used the ‘wildlife corridor’ as my design concept. Wildlife corridor means ‘a strip of natural/manmade forest connecting populations of wildlife otherwise separated by cultivated land, roads.’ The component of wildlife corridor is core forest, movement habitat corridor. In Wildlife corridor the strip of natural/ manmade forest is called movement corridor. In order to make the wildlife corridor lots of tree was planter. This was done by using forest succession method. Since there was a large verity of tree in the site, and most of them is fruit tree. There is tree that bears fruit on all the season which is going to helpful for the wildlife and the visitor.

Figure 46: wildlife corridor



(Source: eartheclipse)

Figure 47: Forest succession



(Source: Forest Succession Concept and Application)

Figure 48: Seasonal ecological service

(Source: Author)

Figure 49: Zoning

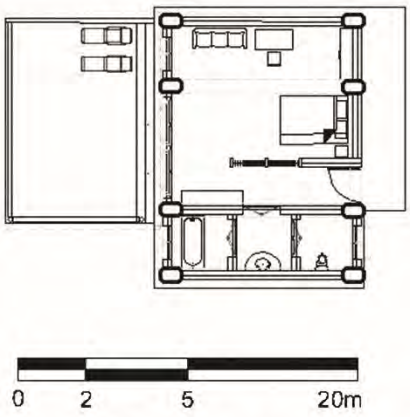
(Source: Author

7.2 Drawing

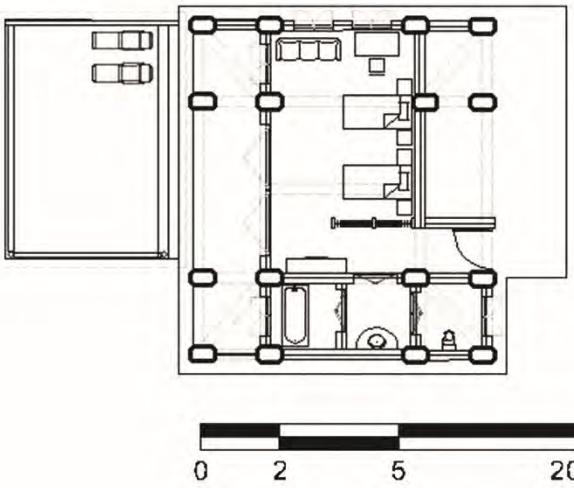
1. Reception
2. Parking
3. Multipurpose hall
4. Dining hall
5. Kitchen
6. Service
7. Recreation hall
8. Zen garden
9. Swimming pool area
10. Indoor games zone
11. Library
12. Forest area
13. Movement corridors
14. Garden Area
15. Factory

MASTER PLAN

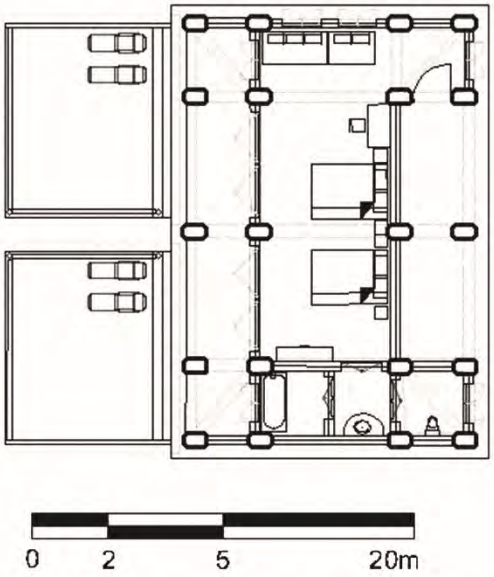
0 50 100 200m



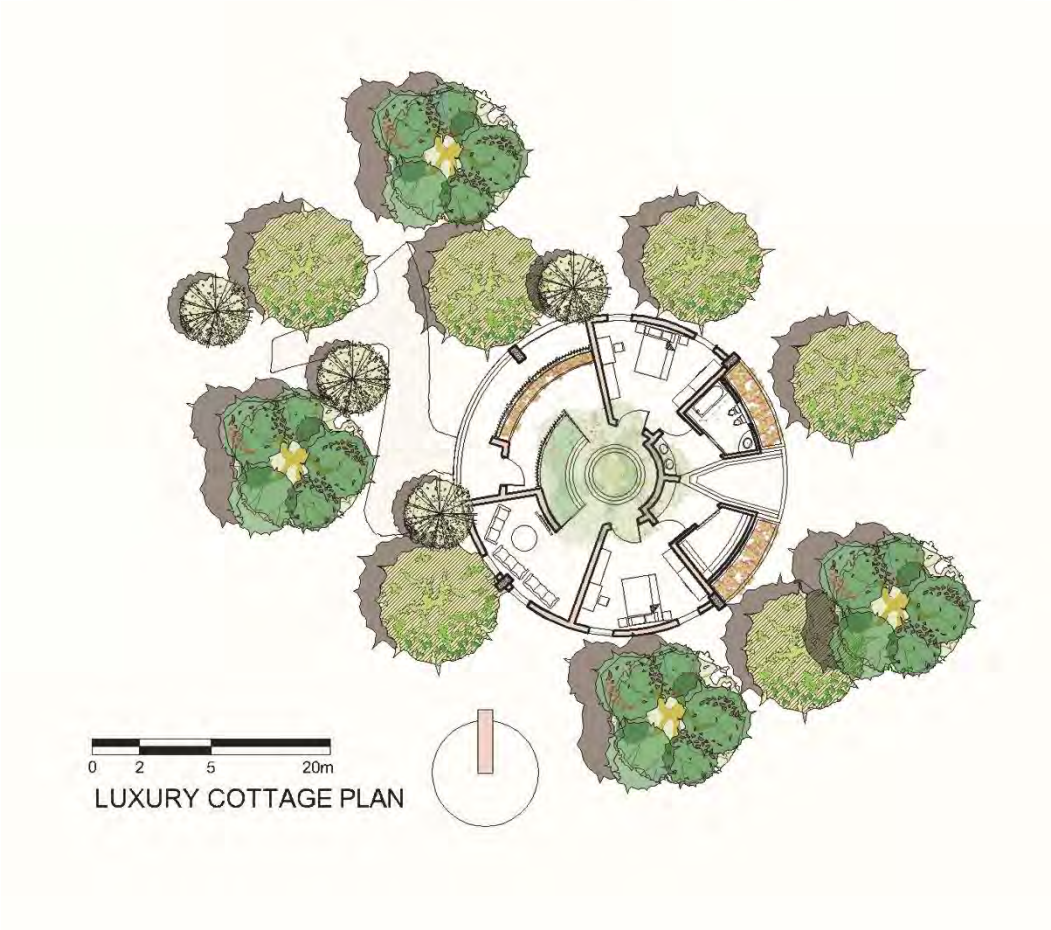
SINGLE BED COTTAGE PALN



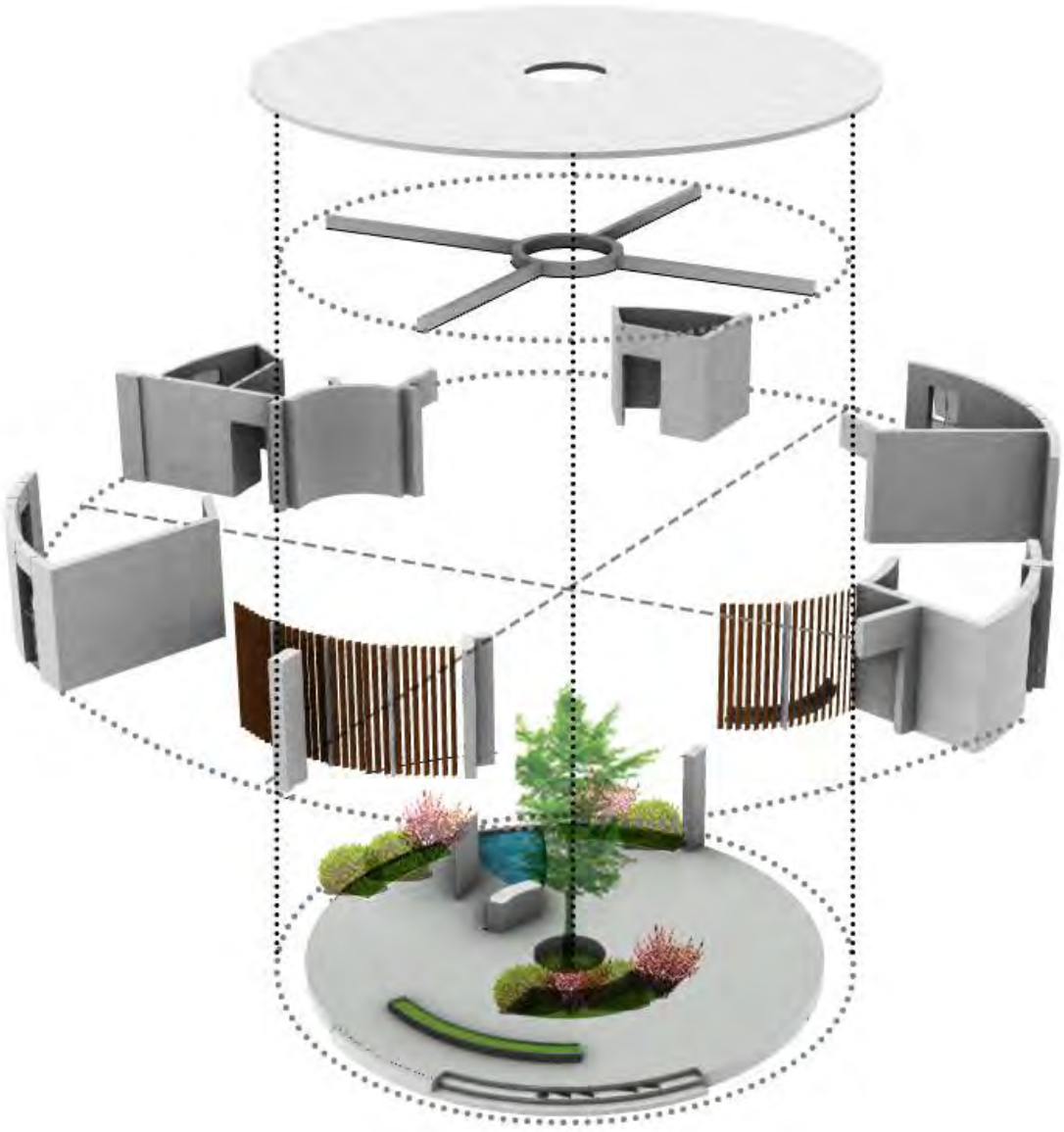
DOUBLE BED COTTAGE PLAN



FAMILY COTTAGE PLAN

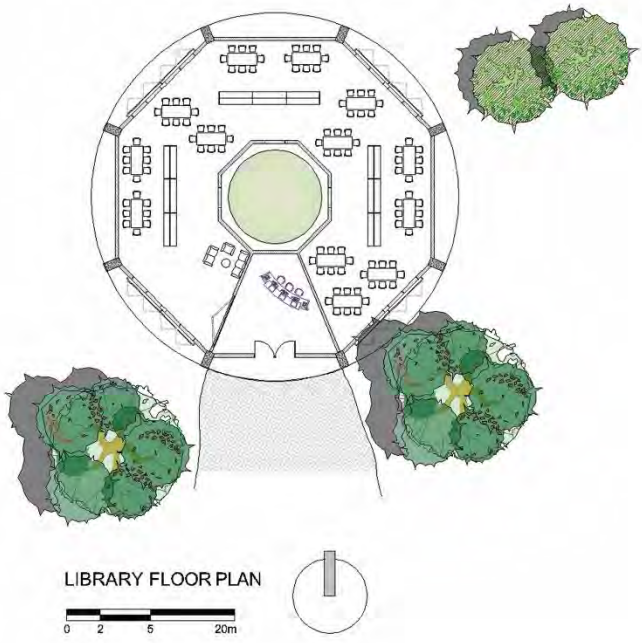


LUXURY COTTAGE PLAN

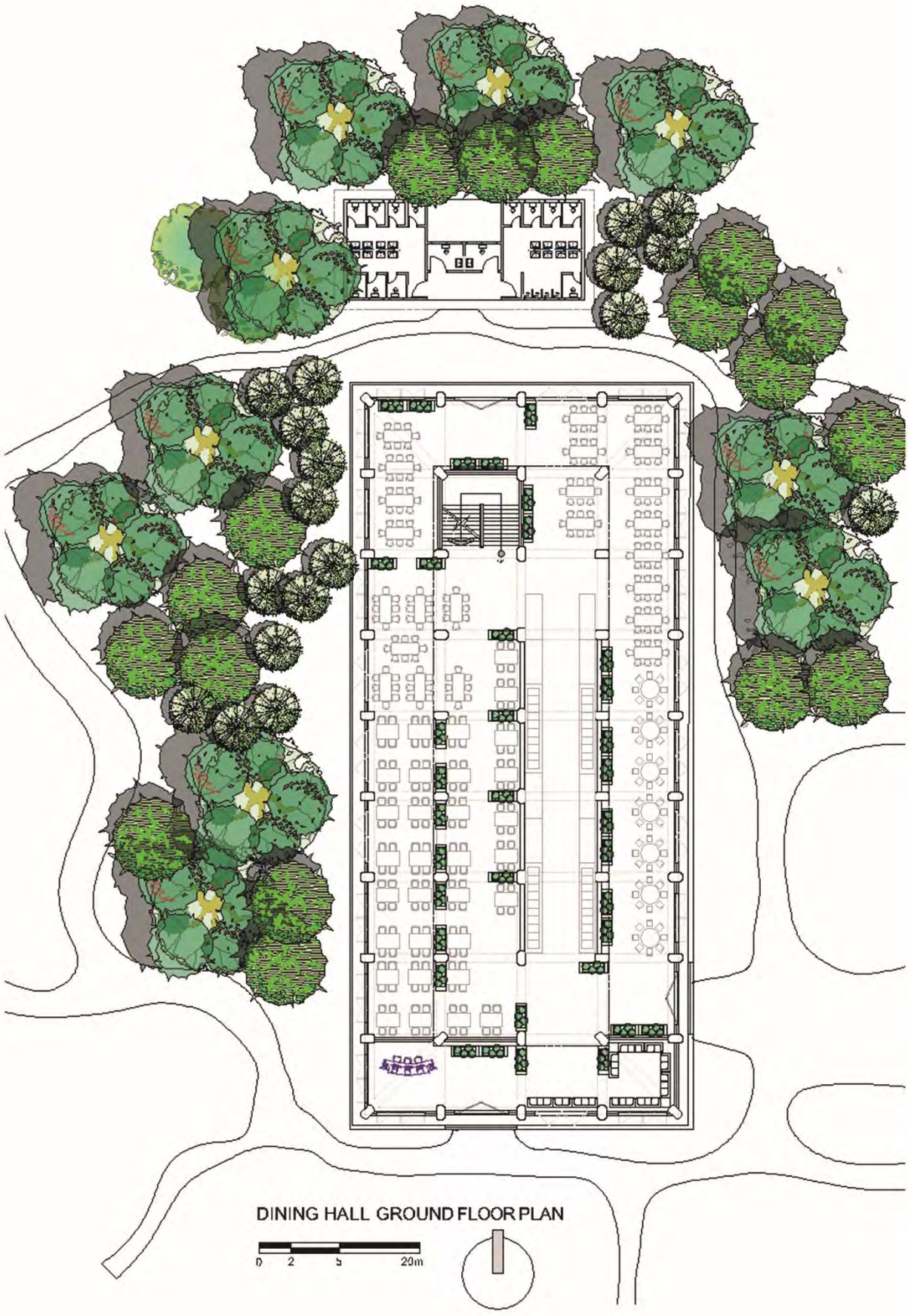


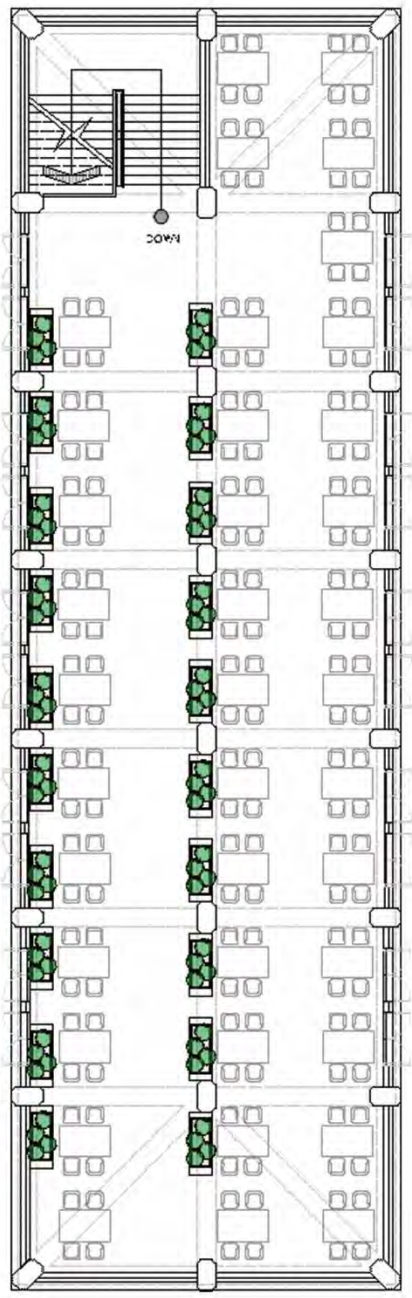
Luxury cottage exploded axonometric view

TOW STORIED COTTAGE PLAN

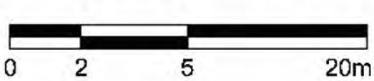


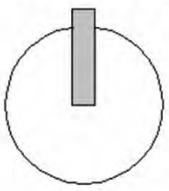
LIBRARY FLOOR PLAN

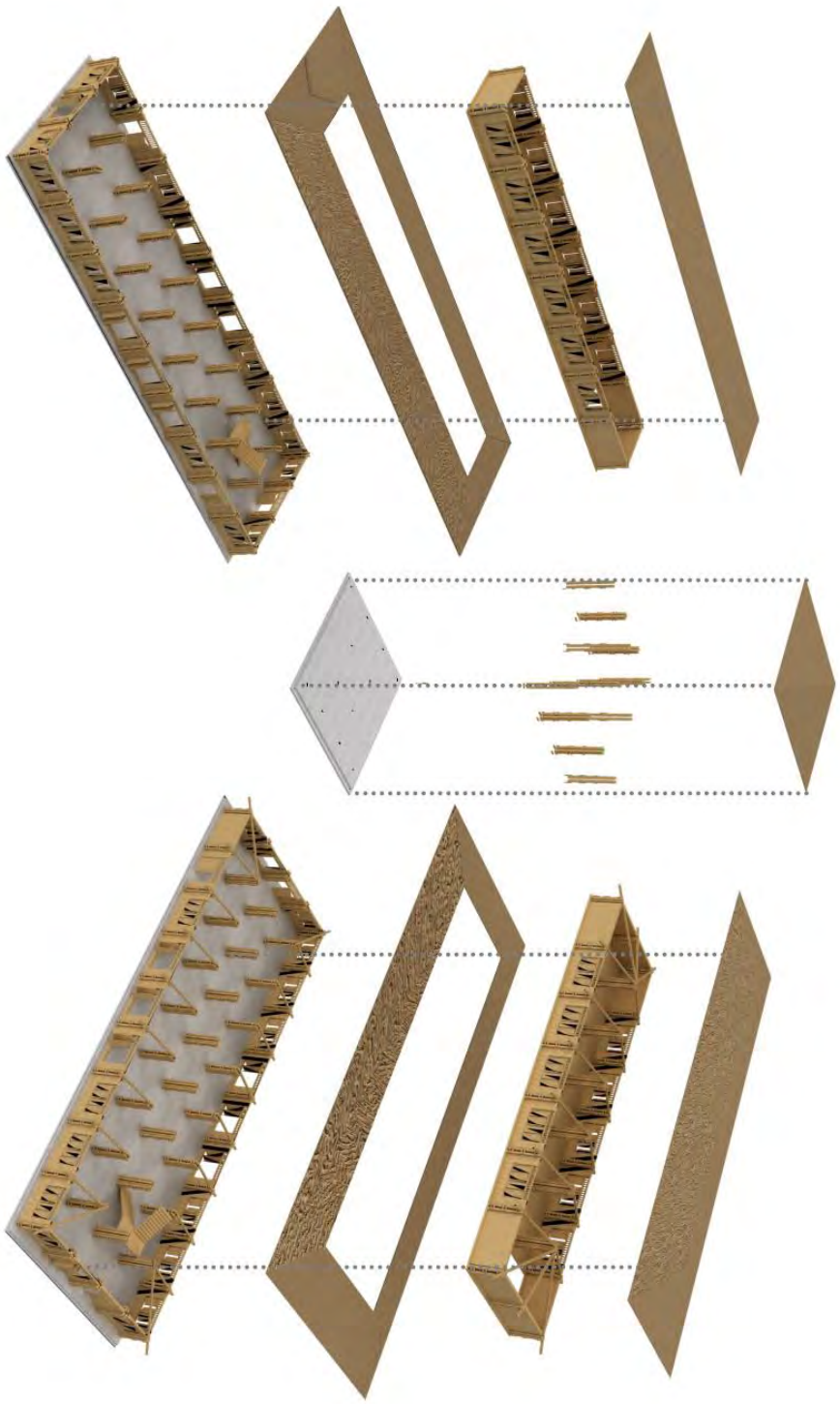

DINING HALL GROUND FLOOR PLAN
0 2 5 20m



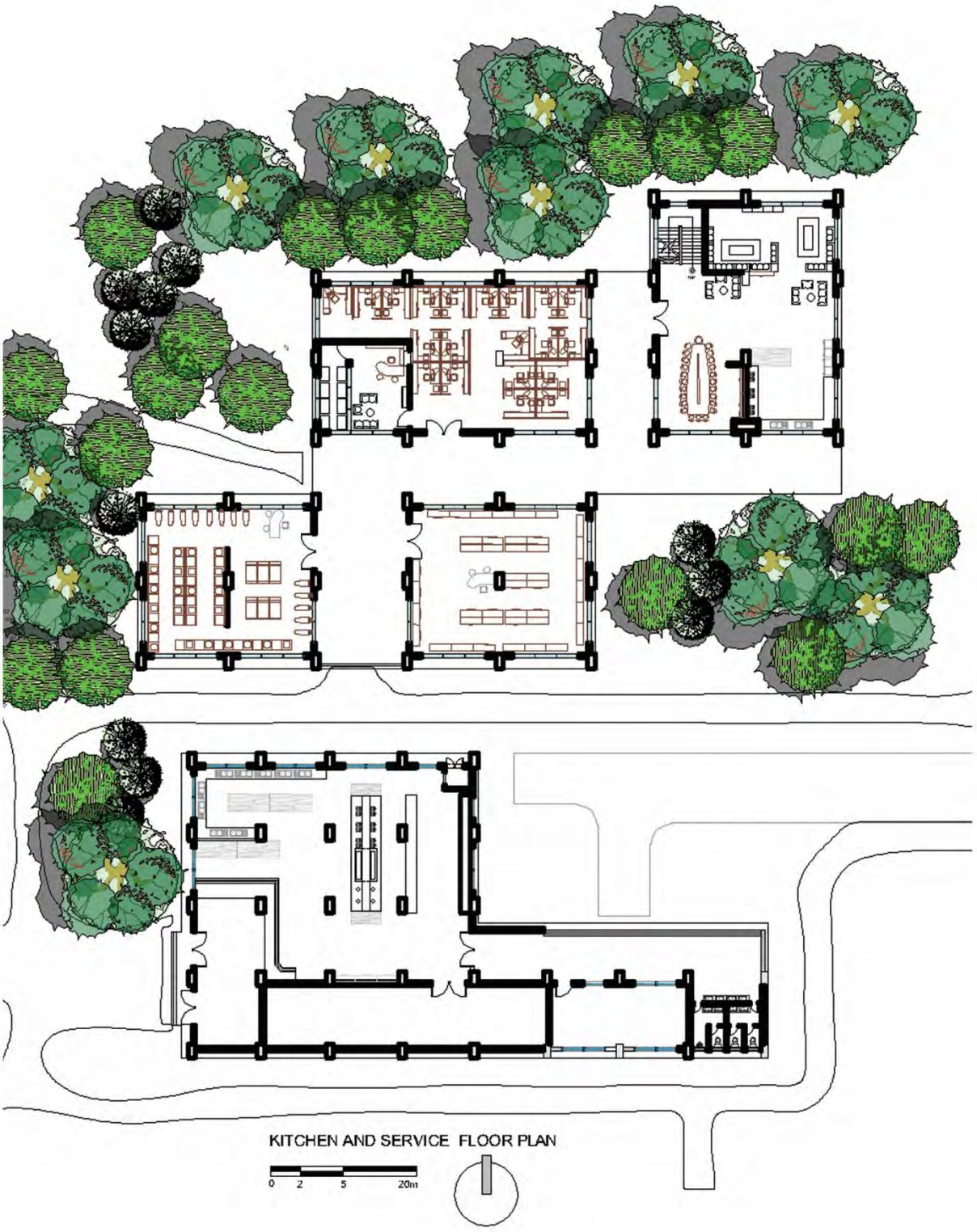
DINING HALL FIRST FLOOR PLAN

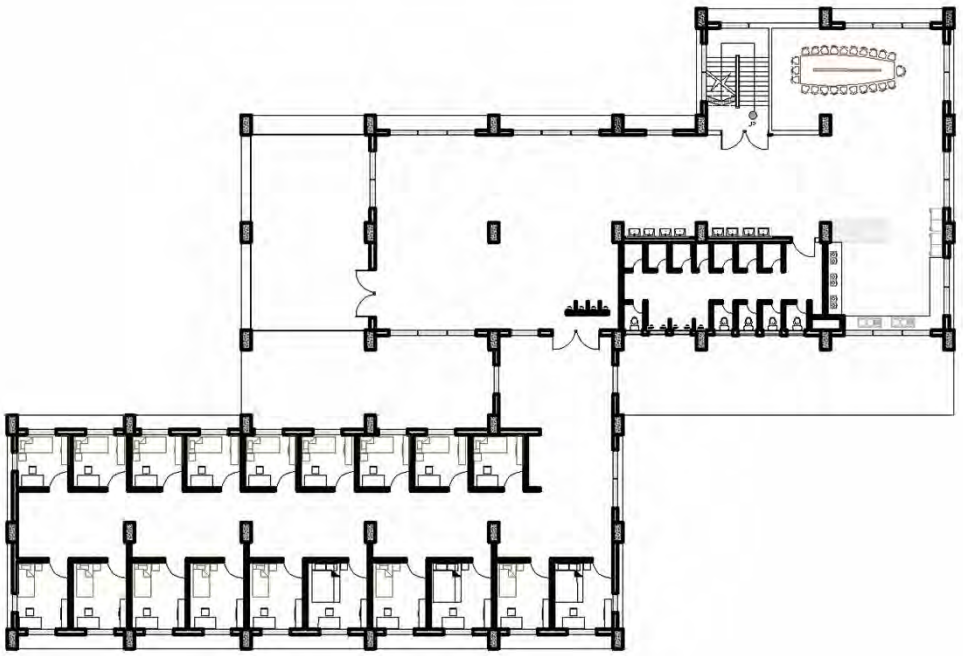






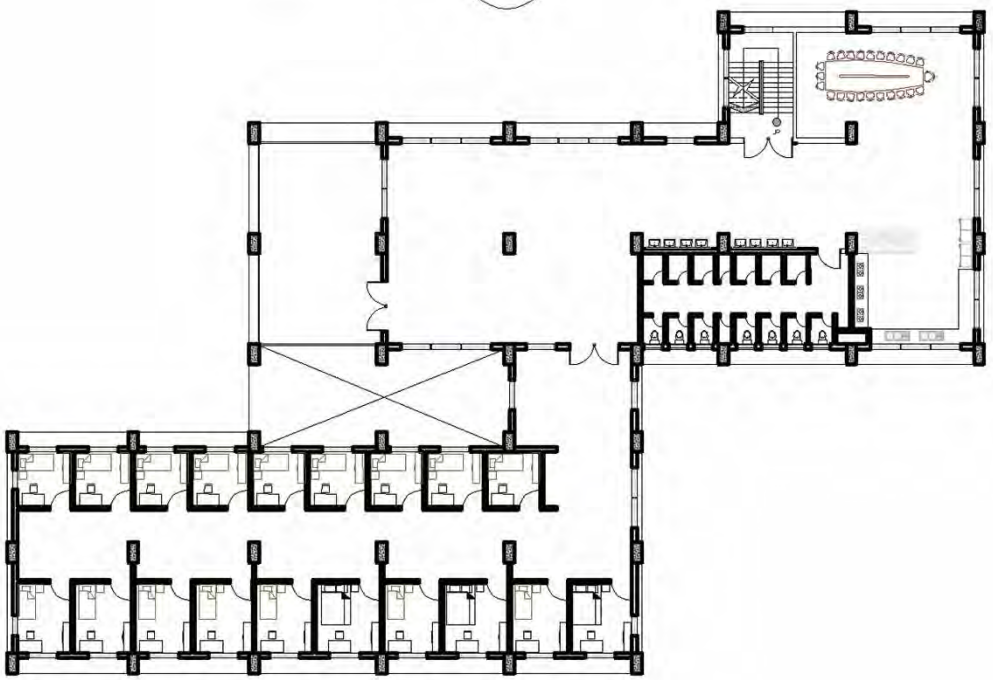
Dining hall exploded axonometric view


KITCHEN AND SERVICE FLOOR PLAN
0 2 5 20m



SERVICE SECOND FLOOR PLAN

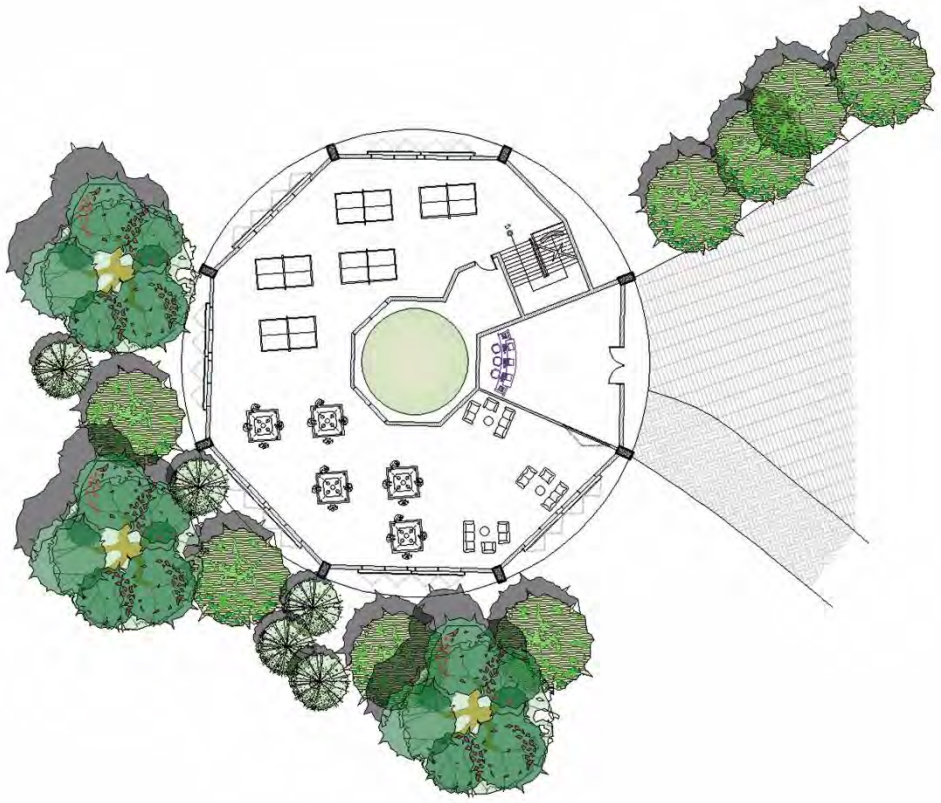
0 2 5 20m



SERVICE FIRST FLOOR PLAN

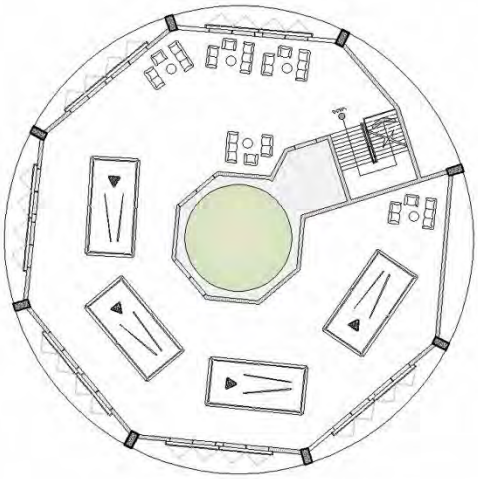
0 2 5 20m

Service exploded axonometric view



INDOOR GAMES ZONE GROUND FLOOR PLAN

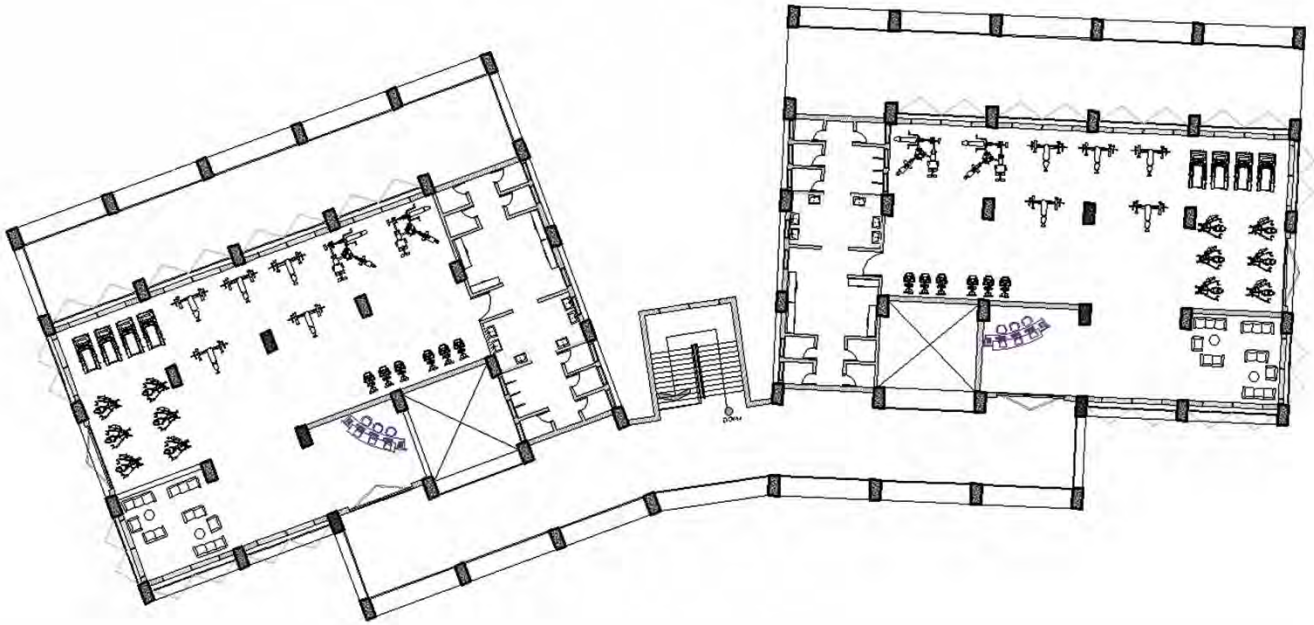
0 2 5 20m



INDOOR GAMES ZONE FIRST FLOOR PLAN

0 2 5 20m

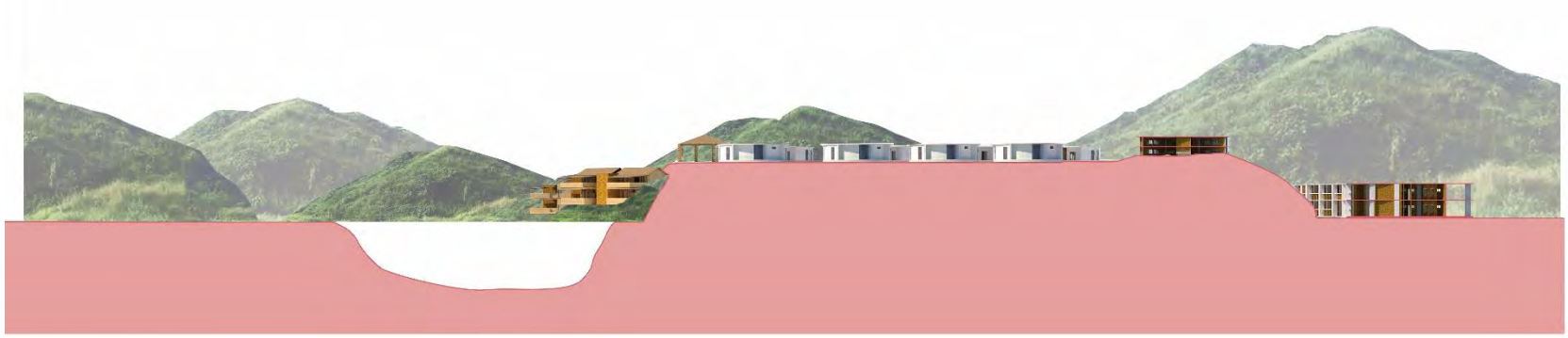
RECREATIONAL HALL GROUND FLOOR PLAN



RECREATIONAL HALL FIRST FLOOR PLAN

0 2 5 20m


RECEPTION AND ADMIN FLOOR PLAN
0
2
5
25m



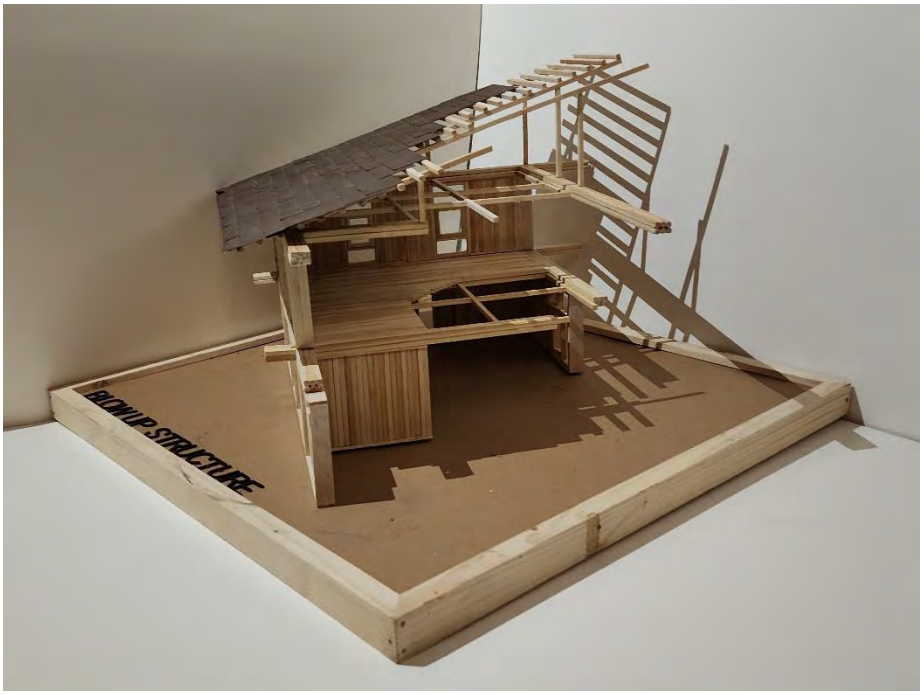
SECTION BB'

SECTION AA'

7.3 Model

SITE MODEL AND ECOLOGICAL INTERVENTION MODEL

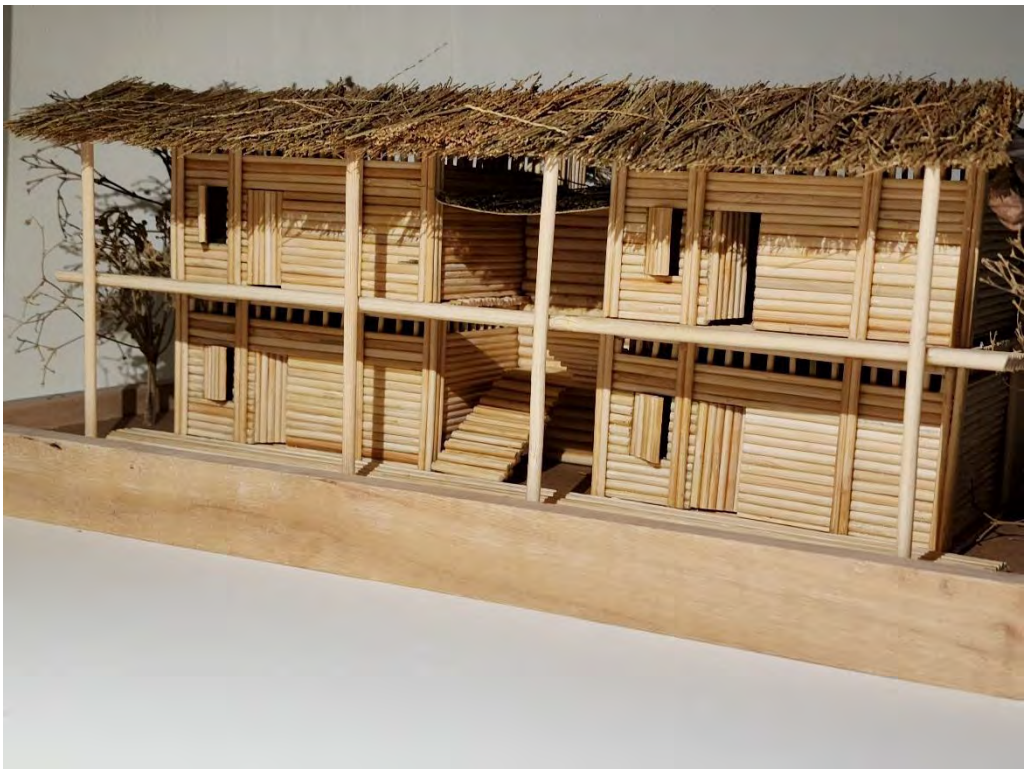
BLOW UP STRUCTURE MODEL

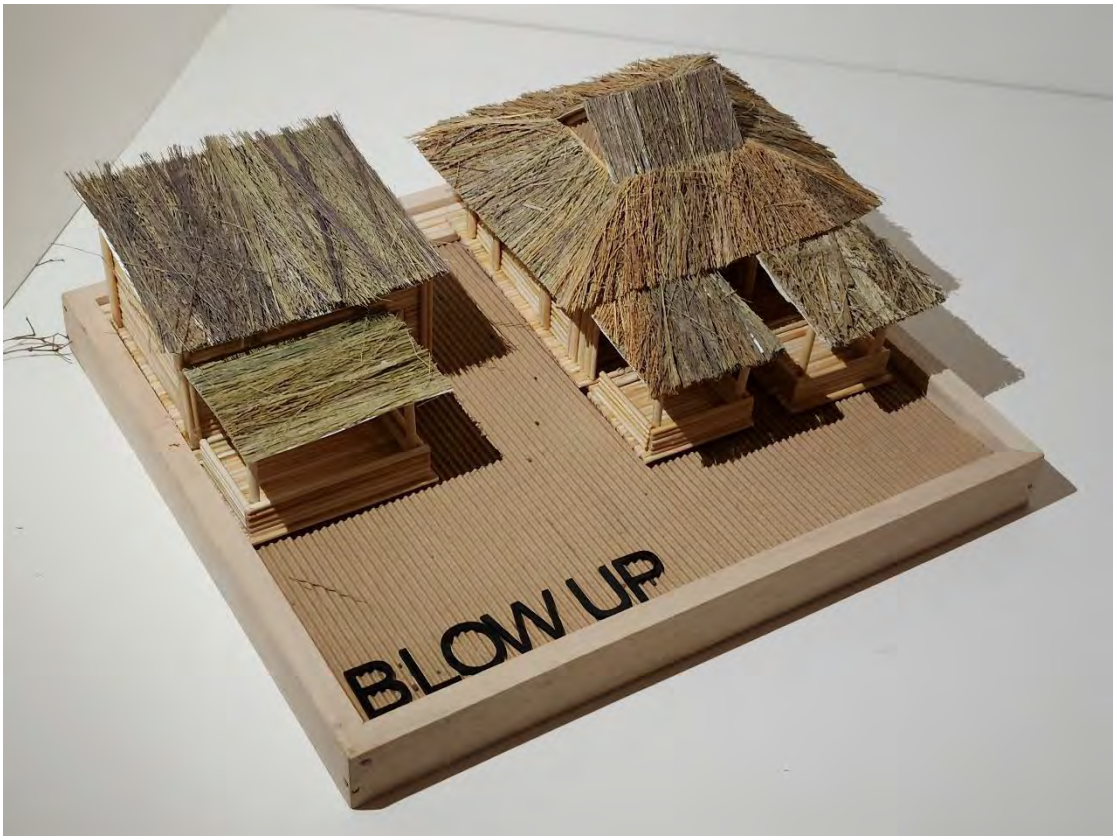



BLOW UP STRUCTURE


BLOW UP STRUCTURE

BLOW UP MODEL




BLOW UP

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