Final Architectural Design Studio

REKA RUPA RUANG

DESIGN OF

TRISIK SEA TURTLE VISITOR CENTER

Sea Turtle Visitor Center in Kulon Progo, DI Yogyakarta Using Ecological Design Approach



Chalid Muhammad Gilang Mahirra
18512158

Supervisor:
Dr.-Ing Putu Ayu P Agustiananda., ST., MA.,

UNIVERSITAS ISLAM INDONESIA

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Arranged by

Chalid Muhammad Gilang Mahirra

Supervisor

Dr.-Ing Putu Ayu P Agustiananda., ST., MA.,

Department of Architecture International Program

Faculty of Civil Engineering and Planning

Universitas Islam Indonesia

2022

Authentication Sheet.

Final Architectural Design Studio Entitled:

Design of Sea Turtle Visitor Center in Kulon Progo,
DI Yogyakarta Using Ecological Design Approach

Student's Full Name	:	Chalid Muhammad Gilang Mahirra
Students Identification	:	18512518
Has been evaluated and agreed on	:	02 May 2023

Supervisor	Jury	Jury
Dr.-Ing Putu Ayu Pramanasari Agustiananda., ST., MA.,	**Ir. Wiryono Raharjo, M.Arch., Ph.D.**	**Arif Budi Sholihah, S.T., M.Sc., Ph.D.**

Acknowledged by

Head of Undergraduate Program in Architecture

Ir. Hanif Budiman, M.T.

PREFACE

Assalamualaikum Wr. Wb.

Praise the presence of Allah SWT, The One and Only God for the abundance of grace, His gift, and His power so the preparation of the Final Architectural Design Studio report titled "Design of Sea Turtle Visitor Center in Kulon Progo, DI Yogyakarta Using Ecological Design Strategies" can be completed. The author realizes that the process of drafting and implementing of this report can be done inseparable from the support of many parties, therefore the author wants to express appreciation and gratitude to:

1. Allah SWT for his blessings and permission so that the Author always be given guidance and easiness in the process of finishing her Final Project.
2. Author's family who provide support, prayers, and support in time of need.
3. Dr-Ing.Putu Ayu Pramanasari Agustiananda, S.T, M.A as supervisors in author's final thesis that been providing with wonderful feedback
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The author is aware that this work has still been far from perfect. Therefore, all constructive criticism and suggestions for the perfection of this undergraduate final project are expected. Hopefully this final project can help increase knowledge and experience for readers and become a reference also learning materials.

Yogyakarta, 02 May 2023

Author,



Chalid Muhammad Gilang Mahirra

STATEMENT OF AUTHENTICITY

By signing this form, I :

Stident's Name	: **Chalid Muhammad Gilang Mahirra**
Stident's identification Number	: **18512158**
Study Program	: **Architecture (IP)**
Faculty	: **Faculty of Civil Engineering and Planning**
University	: **Universitas Islam Indonesia**

state that all parts of the thesis work / final project entitled:

Design of Sea Turtle Visit Center in Kulon Progo, DI Yogyakarta Using Ecological Design Strategies

As a work of author's idea with input from supervisor and juries except the work mentioned in the reference and there is no help from any other party either in whole or in part in the process of making it. The final result of this work was handed over to the Department of Architecture, Islamic University of Indonesia for use for educational and publication purposes, but the intellectual property rights are still owned by the author.

Yogyakarta, 0 December 2022

Author,



Chalid Muhammad Gilang Mahirra

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DESIGN PREMISE

Trisik Beach is one of the tourist beaches in Kulon Progo, DIY. Since the 90s, beach tourism has had its ups and downs. At first, this beach was a fishing village. Gradually, tourism on this beach has increased with the existence of a fish auction place located on one part of the beach. But in 2008, abrasion devoured the prosperity of this beach tourism. In 2018, the community revived Trisik Beach tourism with the development of a lagoon and various conservation activities making this beach a Conservation-Based Ecotourism. However, for the same reason, the facilities and infrastructure that have been built are affected by abrasion and are eventually damaged and abandoned in 2022.

The decline in Trisik Beach tourism is very unfortunate. This beach actually has many advantages. This beach is passed by the southern route to YIA (New Airport). The location of this beach is also adjacent to Muara Progo. On this beach, there is also one of only 3 turtle conservation places in Yogyakarta. Unfortunately, the development of facilities and infrastructure on this beach cannot withstand the frequent coastal abrasion.

This Sea Turtles Visitor Center is designed to improve the quality of Trisik Beach tourism while still maintaining the Sea Turtles' habitat in the area. The design provides facilities that involve the locals in reserving Sea Turtles as well as educating the tourist about Sea Turtles and their importance. It hopes to improve wider communities' awareness of turtle preservation activities.

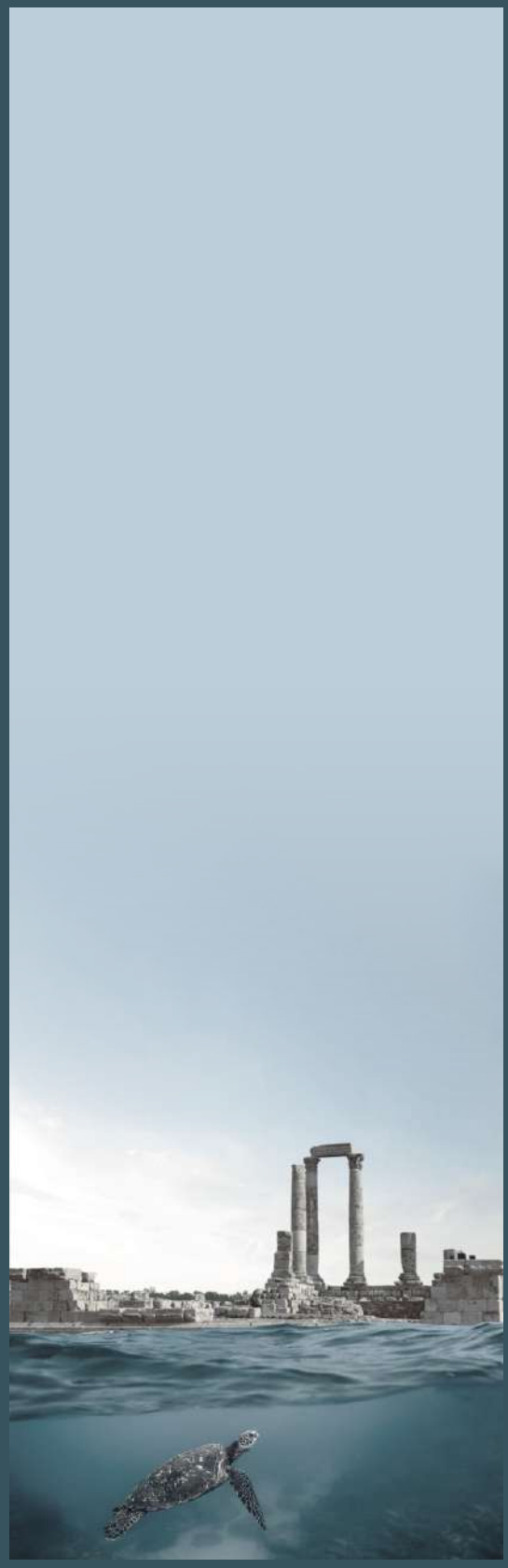


Figure 1. Illustration of Issues in Trisik Beach
Source: Creative Common 0, Illustrated by Writers, 2022

INTRODUCTION

A DISTRICT WEST OF PROGO RIVER . ABRASION BURIED KULON PROGO BY WATER .TRISIK BEACH IS IN RUIN! . SEA TURTLES VS ABRASION . KNOWING THE CUTENESS NAMED SEA TURTLE . AN ATTEMPT OF IMPROVING KULON PROGO TOURISM . THE REVIVAL OF TRISIK BEACH TOURISM . MIND MAP . PROBLEM FORMULATION . DESIGN METHOD . DESIGN FRAMEWORK . ORIGINALITY AND NOVELTY

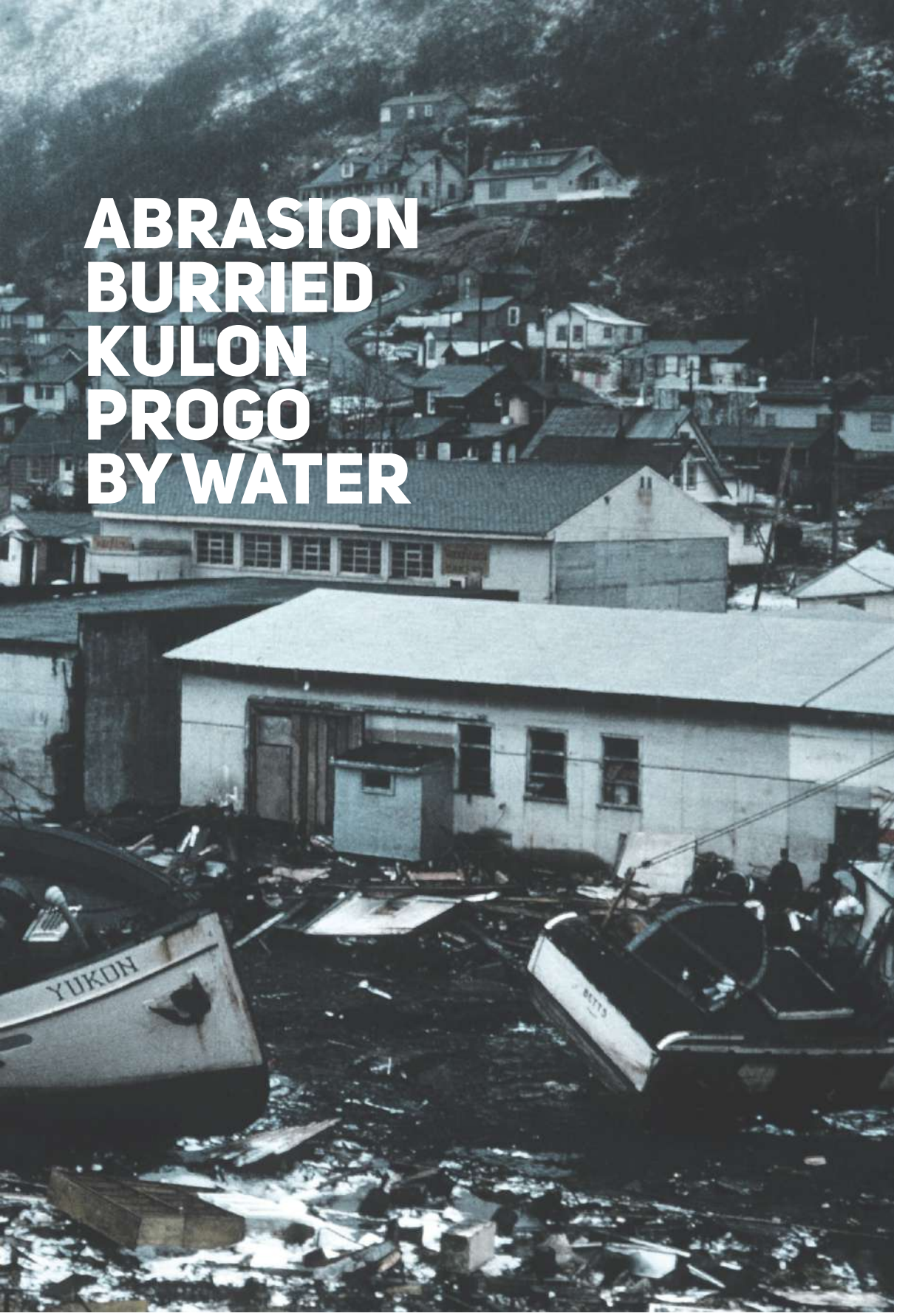


A DISTRICT WEST OF PROGO RIVER

The year is 1674, Keraton Mataram is attacked by Trunojoyo, a nobleman from Maduran who is well known for his rebellion against the Mataram Sultanate in Java. This attack caused damage all over the palace and forced its leader, Amangkurat I to flee. In 1677, Amangkurat I died in Tegal while on the run. In the same year, his descendant, Raden Mas Rahmat take over his place as Amangkurat II.

To anticipate a follow-up attack by Trunojoyo's followers, Amangkurat II asked the Regent of Ponorogo to cover the palace with the help of the Warok army. This strategy resulted in the arrest and later death sentence of Tronojoyo who had difficulty penetrating the palace. By their service to the crown, the remaining Warok army is given a palace to facilitate the defense of the Keraton Mataram. This palace is called Kulon Ponorogo (Translated: West of Ponorogo) and was later known as Kulon Progo. The name Kulon Progo itself comes from the Javanese Language which means this district is located on the west of the Progo River.

Figure 2. Photo of Progo River
Source: Creative Common 0



ABRASION BURRIED KULON PROGO BY WATER

Kulon Progo is located in the Special Region of Yogyakarta (DIY). This regency is bordered by Sleman and Bantul Regencies in the East, the Indian Ocean in the South, Purworejo Regency in the West, and Magelang regency in the North. Being side by side with the Indian Ocean, there are several beaches located there. Just to name a few, there are Imorenggo, Trisik, Bugle, Bidara, Mlarangan Asrii, Pleret, Cubung Jangkang, Raziman, Karangwuni, Glagah, Congot, Kadilangu, Mendit Beach. However, the existence of these beaches is in danger of disappearing one by one due to abrasion.

Figure 3. Illustration of City After a Flood
Source: Creative Common 0

There are several cases of abrasion throughout the Kulon Progo's coastline. In 13 January 2013, Tropical storm Narelle hits Kulon progo. This storm caused a high tide in the south sea and as a result, It erodes the south coast of Kulon Progo from Congot Beach to Trisik Beach. The previously gently sloping coast became steeper after the abrasion occurred. In this event, several shops and public facilities were in a bring of collapse, also the steep coast makes it difficult for fishermen to go to sea.

In 2016, several cases appeared. In May, there were big waves that caused abrasion along Bugel Beach's coastline. It damaged 1 and swept away 2 boats that belonged to the fisherman. The wave also damaged a lighthouse foundation making it prone to collapse. Not to mention there are several walls which are already broken.

2013



Figure 4. Illustration of a Big Waves
Source: Creative Common 0

MAY, 2016



Figure 5. Wrecked Ship Result from the Big Waves
Source: https://daerah.sindonews.com/berita/1111278/189/dua-perahu-nelayan-hilang-disapu-ombak-besar

JUNE, 2016



Figure 6. Illustration of Trees Getting Soaked in Water
Source: Creative Common 0

AUGUST, 2018



Figure 7. Photo of Road Collapsed
Source: https://jogja.tribunnews.com/2018/08/08/abrasi-gerus-jalan-penghubung-wisata-pantai-glagah-congot

In June, a rising tidal wave caused abrasion for 10 meters. That wave soaks part of the agricultural area in Bugel Beach. Several watermelon and melon trees get submerged in the process. Horticultural farmers in the area are estimated to suffer a loss of 1 billion rupiah. Not only the agricultural area but the cypress trees along the shoreline was also affected. Whereas, the cypress system is used to prevent abrasion. With the disappearance of the abrasion control, the residents' housing is threatened with being washed away at a distance of fewer than 10 meters from the beach.

In August 2018, the road connecting Glagah and Congot Beach collapsed. The road was usually used by tourist cars and trucks transporting shrimp harvested from ponds. More or less 40 meters of the road collapsed as deep as 3 meters. This is caused by high waves that continue to erode the road from the end of July.

NOVEMBER, 2020

In late 2020, another giant wave hit Kulon Progo seashore, specifically Glagah beach. These four meters height wave submerged the coast for around 7 meters. This is devastating because several public facilities are located near the seashore. At least three local shops, a parking lot, and two bathrooms are damaged permanently due to this event. It is estimated that the locals suffer a loss of up to tens of millions of Rupiah.

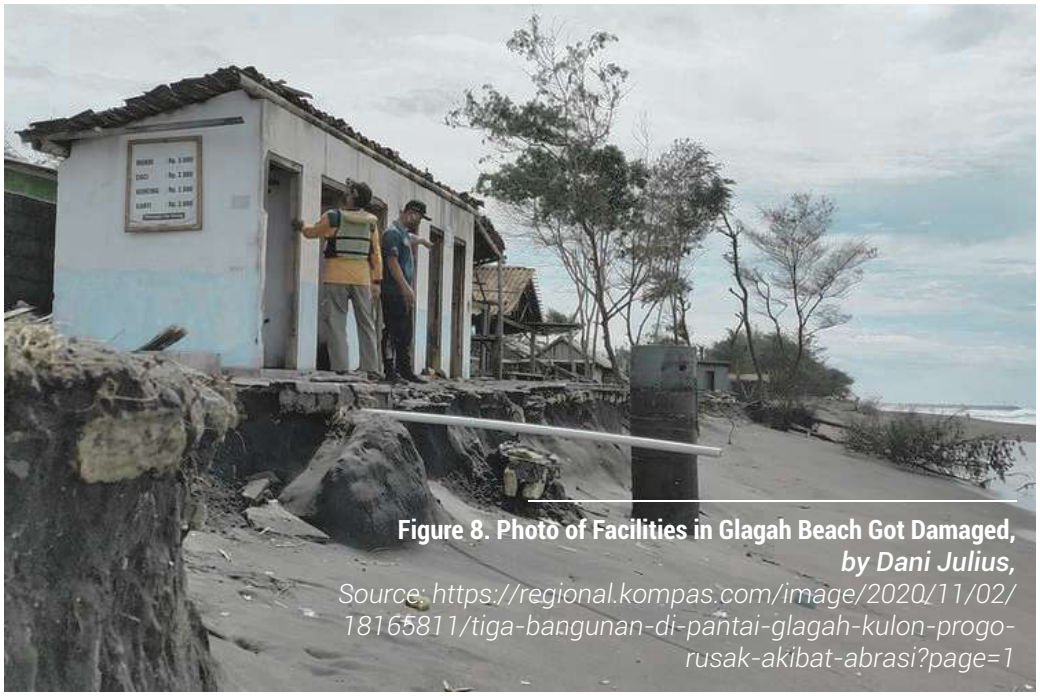


Figure 8. Photo of Facilities in Glagah Beach Got Damaged, *by Dani Julius,*
Source: https://regional.kompas.com/image/2020/11/02/18165811/tiga-bangunan-di-pantai-glagah-kulon-progo-rusak-akibat-abrasi?page=1

OCTOBER, 2021

About a year after the previous incident the disaster of abrasion hit Trisik Beach. This time, part of the fish market there becomes the victim. This event doesn't just happen overnight, in fact, several big waves hit the seashore night after night and day after day. As a result, gradually these waves eat up the land underneath the fish market's storage facility.



Figure 9. Photo of Trisik Beach Fish Market Taken in 2021 by Hafit Yudi Suprobo
Source: https://jogjapolitan.harianjogja.com/read/2021/10/22/514/1086203/abrasi-begini-potret-mengerikan-bangunan-tpi-di-pantai-trisik-yang-menggantung



TRISIK BEACH IS IN RUIN!

Figure 10. Ruins of a Building Located on Trisik Beach Taken in September 2022, *Source: Writers, 2022*

Trisik Beach was once a fishing village. In the 90s, tourism activities began to grow in this place, with their peak in the 2000s. This fishing activity was the main attraction of the beach. Unfortunately, since 2008, natural conditions had resulted in the decline of the prestige of Trisik Beach.

In 2018, attractions and tourist facilities at Trisik Beach had been revived. This was done by utilizing a lagoon which is located tens of meters from the beach. Several facilities and infrastructure such as water attractions, kids pool, and shops were built around the lagoon.

Unfortunately, the issues of abrasion haven't been dealt with. This beach kept being hit by high waves time and time again. By the time of 2022, this revived tourist attraction is now long gone, resulting in yet another decline in its visitors.

Figure 11. Several Facilities and Building Abandoned in Trisik Beach,
Source: Writers, 2022















SEA TURTLES VS ABRASION



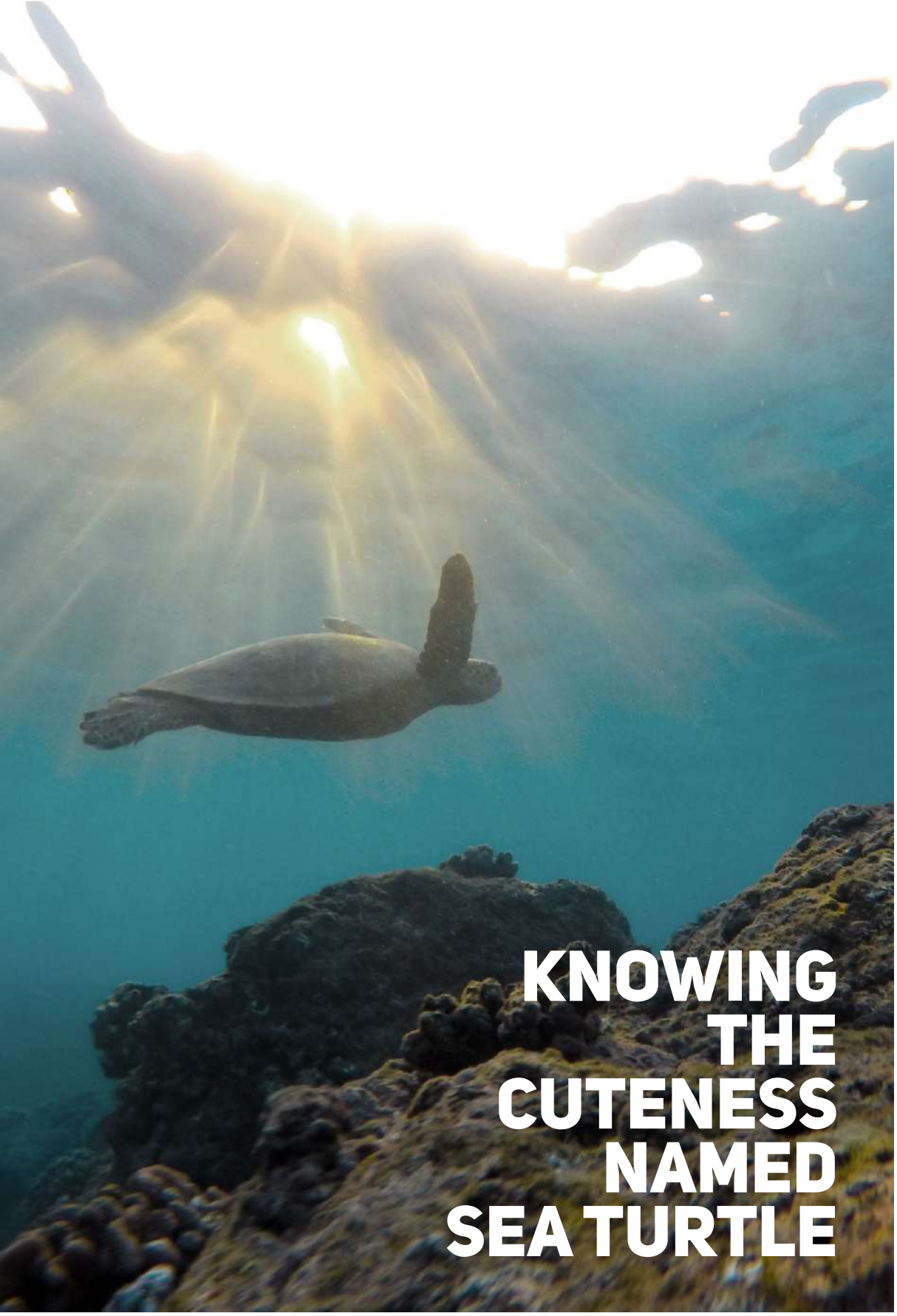
At Trisik Beach there is a sea turtle conservation which is managed by Kelompok Konservasi Penyu Abadi. However, this conservation site is threatened to be relocated. The sea turtle hatchery in this conservation area continues to be eroded by abrasion. The location used to be 1 kilometer from the seashore. As of August 30, 2022, abrasion has made it to become 5 meters from the seashore. If the abrasion continues, it is threatened to soak the sea turtle hatchery in 2 to 3 months.

Even though the sea turtle hatchery hasn't been swept away by the abrasion, there is a decrease in the number of sea turtles hatched. In 2021 hatchlings will reach about 6,700, while in 2022 it decreased to only around 1,800. According to the Conservation group's leader, it may be caused by the drop in temperature.

Figure 12. Photo of Sea Turtles at a Beach
Source: Creative Common 0



Figure 13. Existing Sea Turtle Conservation Condition, *Source: Writer, 2022*



KNOWING THE CUTENESS NAMED SEA TURTLE

Sea turtles are these hard-shelled air-breathing reptiles that can be found throughout the world's oceans. These creatures come in many sizes, shapes, and colors. Their jaws do not include teeth, instead, they have modified "beaks" that are better suited for their diet. They hear through eardrums that are covered by their skin and are best at low-frequency hearing. Their sense of smell and underwater visions are remarkably good, though they are nearsighted when not in the water.

For at least 100 million years of their existence, sea turtles have traveled a vast distance covering the world's oceans. Though these migratory species regularly come ashore to nest or bask, sea turtles spend most of their lives in the oceans and bring balance into the marine habitats. However, these sea creatures are now struggling to survive. In the last 200 years, human activities have brought sea turtles into the bring of existence. This is largely due to human activities on this planet's ocean and beaches. Not to mention that one of these activities are human's over-exploitation of the slaughter of sea turtles' meat, egg, skin, and shells which are now banned.

Figure 14. Photo of Sea Turtles
Source: Creative Common 0



Figure15. Photo of a Sea Turtles Swimming
Source: Creative Common 0

There are only 7 living species of sea turtles left known to men. There are Loggerhead, Green Turtle, Leatherback, Hawksbill, Kemp's Ridley, Olive Ridley, and Flatback. Each species have their own distinct shape. Their mouth and jaws are formed based on the food they ate.

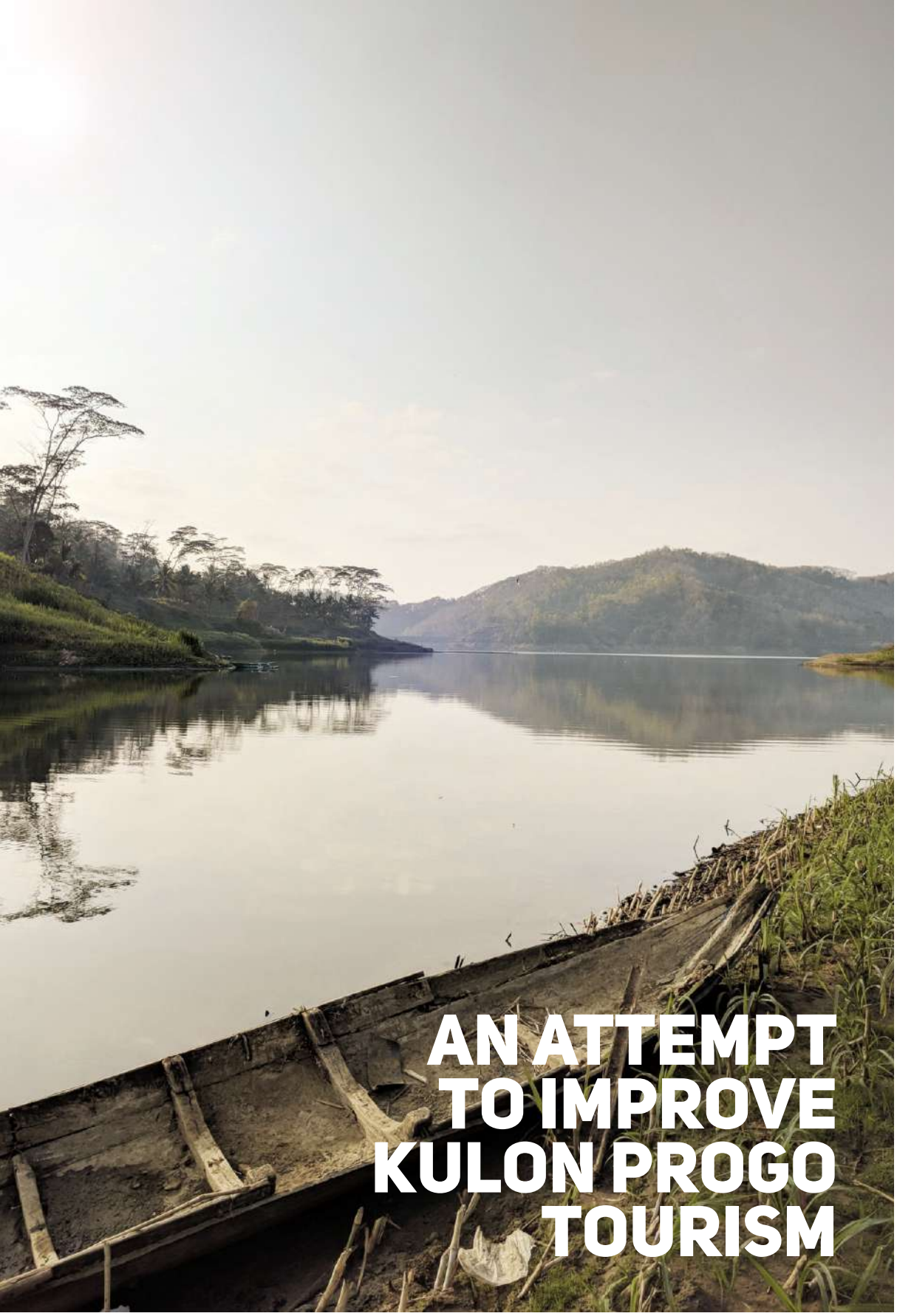
There are 4 types of sea turtles that often land on the beaches of the Special Region of Yogyakarta. They are Hawksbill, Olive Ridley, Green Turtle, and Leatherback. These sea turtles landed around Pelangi Beach, Samas Beach, Gua Cemara Beach and Pandansimo Beach, Trisik Beach, Congot Beach, and Drini Beach .

Sea turtles spend most of their time submerged when they are at sea. Because of this, sea turtles are creatures that are difficult to study. Even though there are many things about their behavior still unknown. There are some insights into their daily activities and some of their behavior.

It's believed that the courtship and mating of sea turtles are mostly done during a limited "receptive" period before the female's nesting appearance. After that, only female comes to the shore to nest. There is not much information about how sea turtles choose the location to nest. However, the typical nesting location may reflect the existing condition of centuries ago. Coastal erosion, artificial lighting, and beach greenery may impact on the future nesting patterns of sea turtles.

Nesting occurs mostly during the night. The female sea turtles come ashore and carefully scout for a spot to nest. However, sometimes when the female comes ashore, she may decide not to nest and go back. This is known as "false crawl". It can occur naturally, but it can also be caused by artificial lighting or the presence of people.

Sea turtles begin to lay eggs after they finish digging for the egg chamber. When sea turtles begin to lay eggs, they may leave their chamber if they feel in danger. When they finish laying their eggs, they will bury these eggs and disguise their nest. Once the nest is completely hidden, the female will goes back to the sea to rest for another nesting at the end of the season or before starting the migration. Once a female sea turtle left her nest, she will not come back to it again.



AN ATTEMPT TO IMPROVE KULON PROGO TOURISM

Yogyakarta is known as one of the tourist destination cities in Indonesia. There are a lot of destinations for tourists there. These include highlands areas surrounding Mount Merapi; the shopping district in Malioboro; cultural recreations surrounding Keraton Hadiningrat; Beach recreation along the southern sea; temples spreading across the city; and many others.

To facilitate accommodation from and to the Special Region of Yogyakarta (DIY), the government has just inaugurated its international airport located in Temon District, Kulon Progo. This airport is known as Yogyakarta International Airport (YIA). However, Kulon Progo can be considered far from the city center in Yogyakarta. Thus, the government is in the process of repairing roads from urban areas to YIA airport. In addition, the Ministry of PUPR is in the process of building infrastructure to support aviation activities.

Figure 16. Photo of Kulon Progo's Nature
Source: Creative Common 0

After YIA was inaugurated on August 28, 2020, economic growth in Kulon Progo Regency has increased. Quoted from CNBC Indonesia, Handy Heryudhitiawan as Secretary of PT Angkasa Pura I said that economic growth in Kulon Progo Regency as of 2020 rose to 11.3%. On the other hand, this development is still hampered by the Covid-19 pandemic, which began in 2020.

The development of YIA has then put as one of the backgrounds to the government plan to improve the quality of the south coast tourism area back in 2017. This plan mentioned how the government will improve tourism in Pantai Selatan (PANSELA) which includes the area surrounding Bantul - Kulon Progo. In the future, the government will provide more facilities and infrastructure to support the development of these tourist attractions. In 2025, the government plan to develop PANSELA to become a world-class sustainable culture and eco-beach destination.

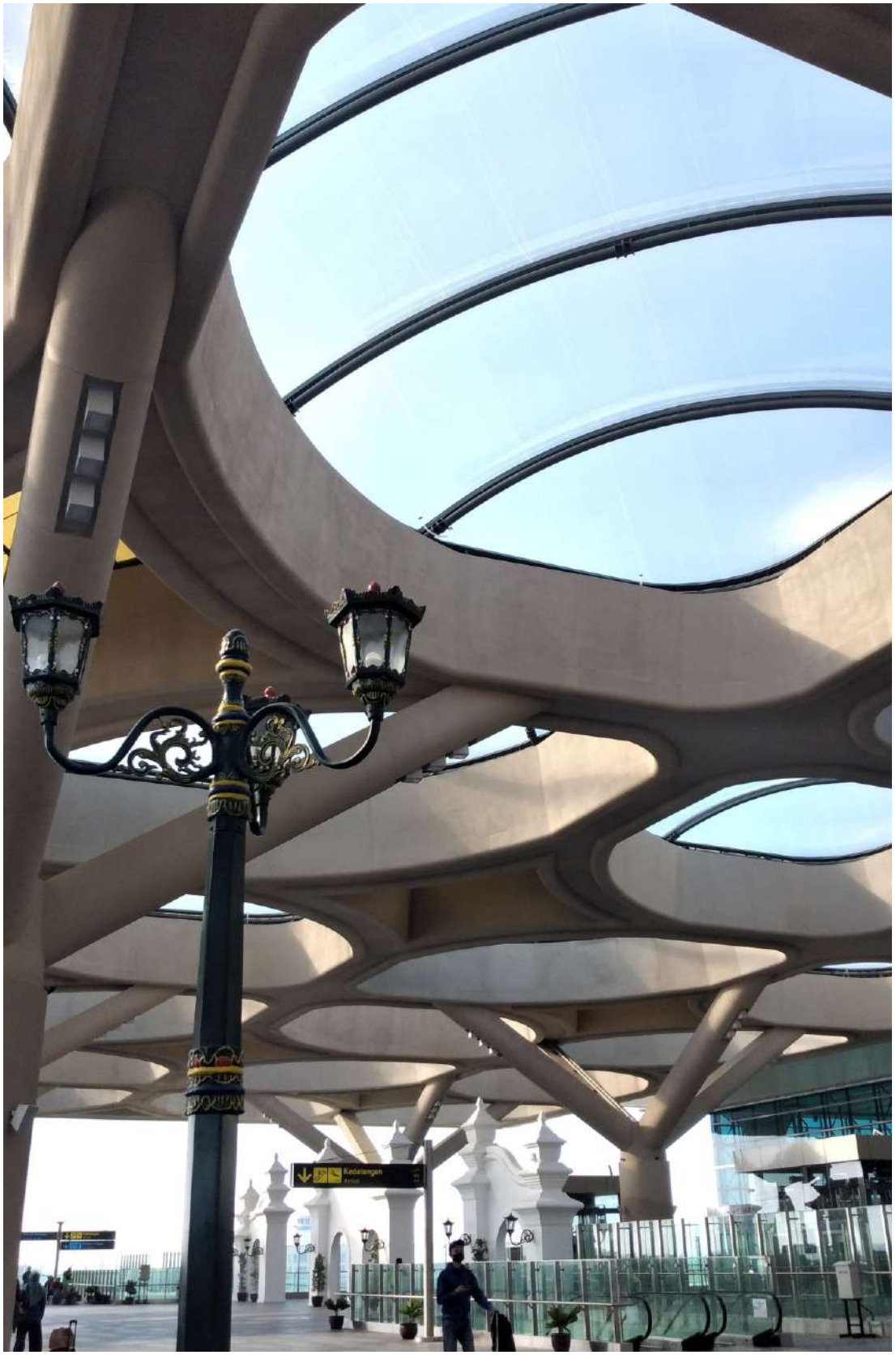


Figure 17. New Yogyakarta International Airport
Source: Creative Common 0



THE REVIVAL OF TRISIK BEACH TOURISM

Figure 18. Photo of Trisik Beach
Source: Writer, 2022

Trisik Beach is one of the beach tourism destinations in the PANSELA area which is the quietest compared to the surrounding beaches. In fact, this beach has a fairly high tourism potential. On this beach, there is a fish auction place, turtle conservation, and a lagoon, and don't forget the location of the beach which is next to the mouth of the Progo River.

There are actually several efforts that have been made to increase visits to Trisik Beach. One of these efforts is the development of tourism in the context of "conservation-based

Number of Tourist Visits to Tourist Destinations on the *Pantai Selatan* According to the 2015 DIY Tourism Office Statistics Data

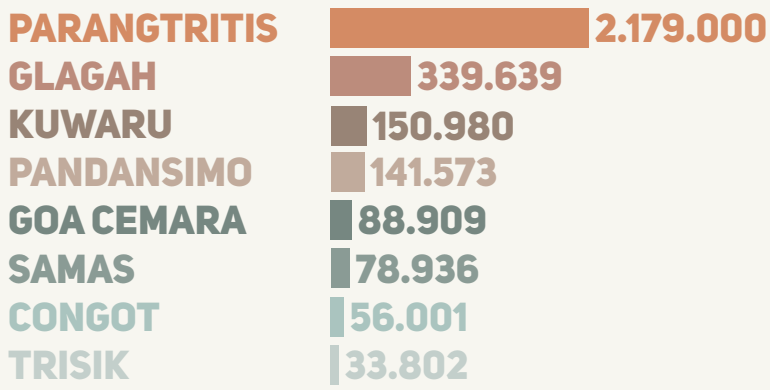


Figure 19. Chart of Tourist Visitation on *Pantai Selatan*
Data Source: DIY Tourism Office Statistics Data, 2015

ecotourism" in 2018. However, abrasion and high waves continue to hit this beach, until finally the facilities and tourism that were built are damaged and are now abandoned in 2022.

The development of Trisik Beach tourism are included in the Preparation of Master Plans and Detailed Plans for National Tourism Strategic Areas (KSPN) for the South Coast (PANSELA) that held by the Special Region of Yogyakarta (DIY) tourism office. This plan includes the development of new tourist attractions, conservation-based tourism attraction development, participation of local communities in the development of tourism productive enterprises, etc.

GOVERNMENT PLAN FOR TRISIK BEACH

STRATEGY	PROGRAM	SUCCESS INDICATOR
Development of new tourist attractions (new products) in the context of diversifying tourism products to encourage equity and regional growth.	Development and Construction of AERO CITY – Glagah Tourism Attraction and so on (new hub, facility center, accommodation, and urban tourism).	The construction of facilities, the increasing number of visits by foreign tourists and foreign tourists, the opening of new job opportunities in the tourism sector, the connection of Kulon Progo tourism with other sub-regions and its surroundings.
	Development and Development of Agro-Coastal Tourism Village Attractions: a. Dragon Fruit Agrotourism; b. Modern Fish Market.	The construction of facilities, increasing the entrepreneurial spirit of the local community, maintaining the sustainability of the rural environment, increasing tourist visits.
Development of revitalization of undeveloped tourist attractions based on preservation, protection, development, and utilization.	Revitalization and development of attractive turtle conservation areas.	The achievement of environmentally friendly tourism management, the maintenance of environmental sustainability, the added value of the area, the increasing value of environmental quality.
Develop and increase the potential, participation, and capacity of local community/community resources in developing tourism productive businesses.	Increasing community participation in planning, implementing and supervising tourism programs.	Formulation of local community involvement rules



Figure 20. Photo of Trisik Beach
Source: Writer, 2022

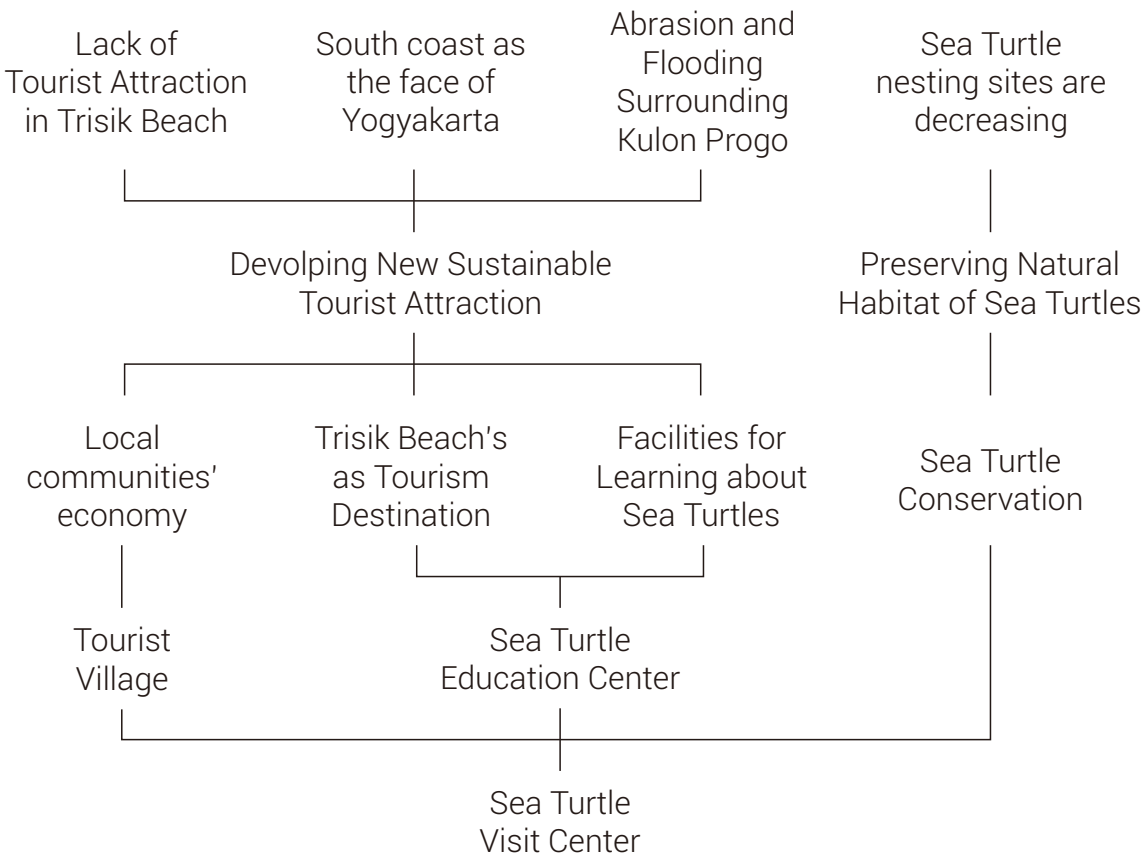
MIND MAPPING

ISSUE

CONTEXT

ANALYSIS

HYPHOTHESES



Implement ecological design approach to integrate between tourism and conservation

Design Sea Turtles Visitor Center in Trisik Beach by using ecological design approach can improve the tourism quality, increase locals' economy, and preserving sea turtles habitat.

PROBLEM FORMULATION

General Problem

How to design a sea turtle visitor center in Trisik Beach that can integrate between conservation and visitor center by using ecological design approach?

Specific Design Problem

1. How to design a visitor center that can integrate between spaces for visitors and spaces for sea turtles?
2. How to design a sea turtle conservation site that preserve sea turtles' wild animal nature?
3. How to design structure that can withstand abrasion and flooding?
4. How to design an architecture that can become a transition between tourist village and conservation-based tourism

Design Goals

1. Design a visitor center that can integrate between spaces for visitors and spaces for sea turtles.
2. Design a sea turtle conservation site that preserve sea turtles' wild animal nature
3. Design a structure that can withstand abrasion and flooding.
4. Design an architecture that can become a transition between tourist village and conservation-based tourism

PROBLEM MAPPING

Non-Architectural Issues

1. Abrasion and flooding that often occurs along the coast located in Kulon Progo.
2. The government's plan to make the south coast the face of the Yogyakarta.
3. Lack of Tourist Attraction at Trisik Beach, Kulon Progo.
4. The decrease of Sea Turtle Nesting Habitat

Architectural Issues

1. The government's plan to build sea turtles conservation site and museum.
2. The need to relocate Turtle hatchery in Trisik Beach

Design Problem

How to design a sea turtle visitor center in Trisik Beach that can integrate between conservation and visitor center by using ecological design approach?

Specific Design Problems

1. Design a visitor center that can integrate between spaces for visitors and spaces for sea turtles.
2. Design a sea turtle conservation site that preserve sea turtles' wild animal nature
3. Design a structure that can withstand abrasion and flooding.
4. Design an architecture that can become a transition between agrotourism village and conservation-based tourism

DESIGN METHOD

DATA COLLECTION METHOD

To get the proper information regarding the data to design Sea Turtle Sanctuary in Trisik Beach, this research gathers its data by collecting data from primary and secondary sources.

A. Primary Data Collection

The primary data collection method is done by obtaining the data directly from the source. The data gathering is done by visiting Pantai Trisik. The location data was gathered by conducting observation and interviews regarding the site conditions, current tourism activities, and the Sea Turtles Conservation condition.

B. Secondary Data Collection

The secondary data collection method is conducted by researching sources and theories regarding sea turtles conservation and museum typology; preventive architecture measurements against coastal abrasion; and architectural approaches that are relevant to the design.

DATA ANALYSIS METHOD

Analysis method conducted for designing conservation center in Trisik Beach is done by using Micro and Macro analysis.

A. Macro Analysis

Macro analysis is done to obtain information regarding urgent issues in Kulon Progo.

B. Micro Analysis.

The micro-analysis is done by analyzing the site and its relation with the surrounding.

DESIGN APPROACH METHOD

The design approach is used as the basis for building design. Information obtained through conducting a literature study in the form of:

1. Design a visitor center that can integrate between spaces for visitors and spaces for sea turtles.
2. Design a sea turtle conservation site that preserve sea turtles' wild animal nature
3. Design a structure that can withstand abrasion and flooding.
4. Design an architecture that can become a transition between agrotourism village and conservation-based tourism

DESIGN FRAMEWORK

GENERAL PROBLEM	How to design a sea turtle visitor center in Trisik Beach that can integrate between conservation and visitor center by using ecological design approach?
SPECIFIC DESIGN PROBLEM	1. How to design a visitor center that can integrate between spaces for visitors and spaces for sea turtles? 2. How to design a sea turtle conservation site that preserve sea turtles' wild animal nature? 3. How to design structure that can withstand abrasion and flooding? 4. How to design an architecture that can become a transition between agrotourism village and conservation-based tourism?
LITERATURE STUDY	Ecological Architecture - Sea Turtle Conservation Coastal Building - Abrasion Resistant Structure
SYNTHETIS	Room Programming - Circulation - Building Form - Building Structure

EXCELLENCY ORIGINALITY AND NOVELTY

The design of the conservation center is not a new thing. It has been done by some parties. However, the issues and focus of this project differ from those of previous parties' projects. Here are some of the previous projects:

1 *Taman Penyu Sukamade: Pusat Konservasi dan Edukasi Penyu dengan Pendekatan Arsitektur Osing Banyuwangi*

Approach: *Osing*

Author: *Author*

Year: *2017*

Similarities: *Typology*

Differences: *Approach and Location*

2 Perancangan Rumah Susun Nelayan Di Kawasan Pesisir Bintaro Lombok Dengan Pendekatan Arsitektur Ekologis

Approach: *Ecological*

Author: *Lalu Muhamad Gantara Ranusman*

Year: 2019

Similarities: *Approach and Shoreline Location*

Differences: *Building Typology, Location, Type of Disaster Risk*

3 Perencanaan Pengembangan Kawasan Konservasi Penyu Di Pesisir Selatan Sebagai Wisata Edukasi Dengan Pendekatan Arsitektur Ekologi

Approach: *Ecological*

Author: *Dhela Khayrati Ihza*

Year: *2021*

Similarities: *Approach*

Differences: *Typology and Location*

DESIGN PROBLEM SEEKING

GALUR SUB-DISTRICT, KULON PROGO

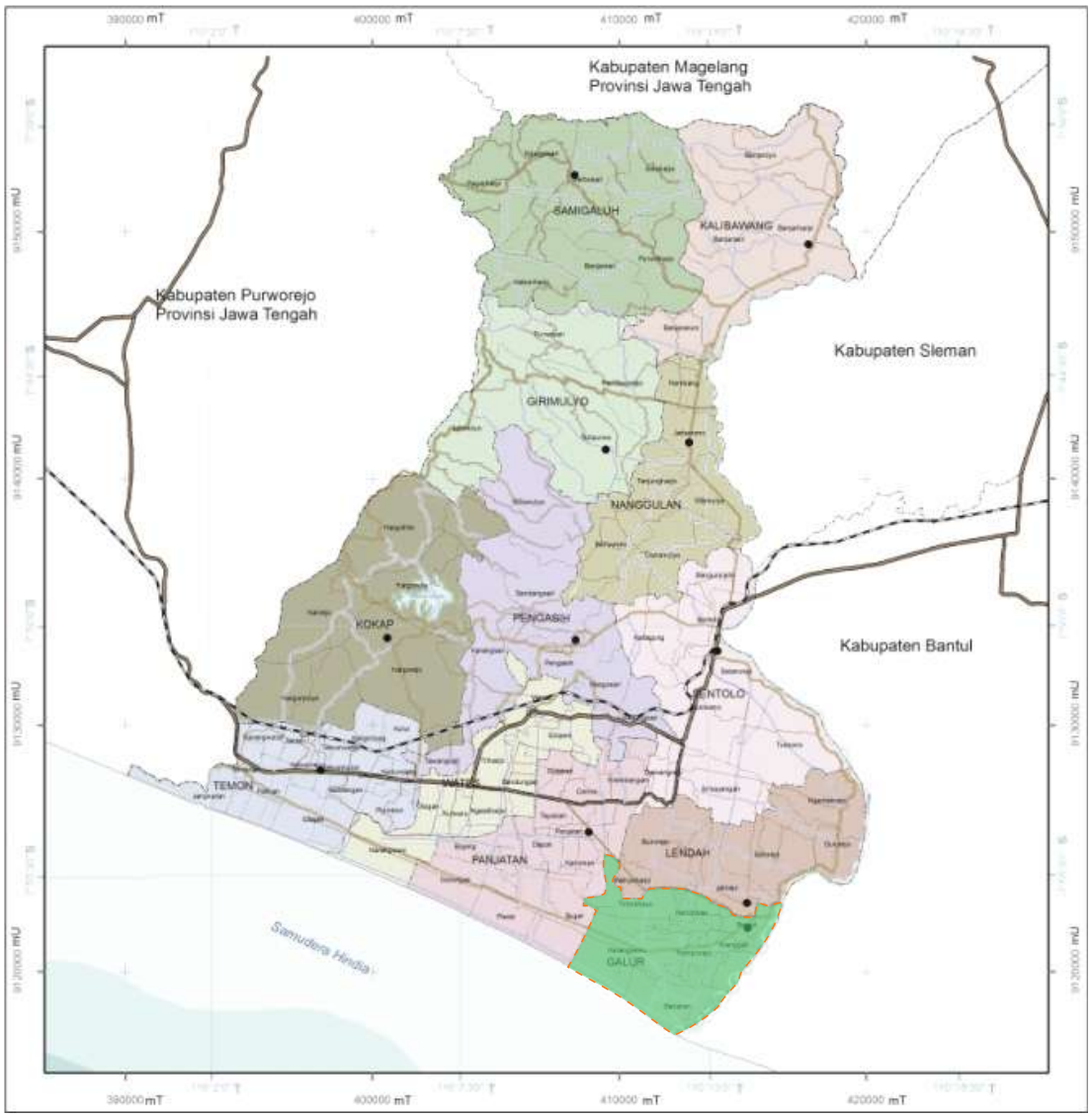


Figure 21. Map of Kulon Progo
Source: https://peta-hd.com/peta-kabupaten-kulon-progo/

Kapanewon Galur is a Sub-district located in the most South East of Kulon Progo District. This sub-district has an area of 3,291.24 ha, consisting of 7 villages, namely: Karangsewu, Banaran, Kranggan, Nomporejo, Brosot, Pandowan, and Tirtorahayu. These 7 villages are divided into 75 hamlets, 148 RW and 311 RT.

The territorial boundaries of the *Kapanewon* Galur are as follows:

1. To the **North** is Lendah Sub-District
2. To the **East** is Panjatan Sub-District
3. To the **South** is Indonesian Ocean
4. To the **West** is Bantul District of the Special Region of Yogyakarta

BANARAN VILLAGE



Banaran is one of the villages in the Galur sub-district. This village is located next to the estuary of Kali Progo. Most of these villages are used for nature reserves, agricultural areas, and coastal areas. On the coast, there is a fishing settlement that was once one of the tourist attractions of the village.

Most of this village area only has a fairly narrow access. Rural roads can only be traversed by 1 or 2 motorbikes, while some of the main roads are in rough condition. Also considering the location adjacent to the beach, the airspeed in this area is relatively high compared to other areas in Yogyakarta.

Figure 22. Map of Danaran Village
Source: Google Maps

FISH AUCTION PLACE



SEA TURTLE RESERVE



ABANDONED TRISIK LAGOON



RICE FIELDS

TRISIK BEACH

Galur

Kulon Progo

Bantaran

SITE ANALYSIS STUDY

SURROUNDING CONDITION

RICE FIELDS

RICE FIELDS

RESIDENTIAL AREA

SITE AREA

PENCAK SILAT ORGANIZATION HALL



COASTAL SHE-OAK PLANTING AREA



Figure 23. Map of Trisk Beach's Surrounding
Source: Openstreetmaps.com, google maps, and writers (accessed September, 2022) Processed by Writers



SITE ANALYSIS STUDY

MACRO ANALYSIS

Figure 24. Map of Trisk Beach's Surrounding
Source: Openstreetmaps.com & googlemaps (accessed September, 2022) Processed by Writers

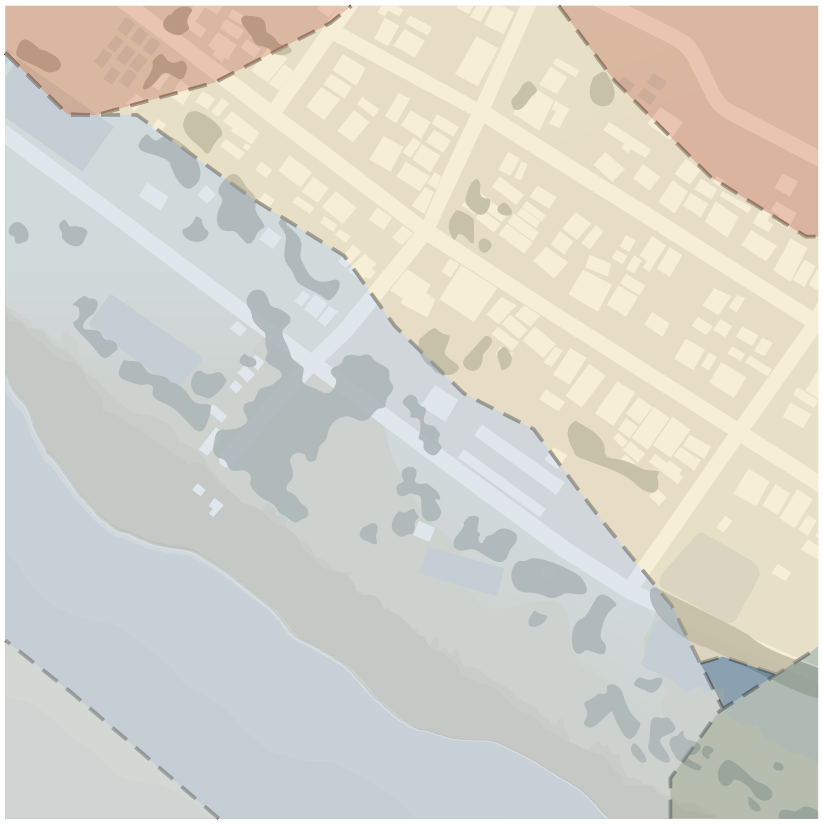
NOTES

1 Sea Turtle Conservation
2 Entrance Gate
3 Vacant Land
4 *Pencak Silat* Hall
5 Car Parking
6 Abandoned Kids Pool
7 Motorcycle Parking
8 Abandoned Lagoon

Street & Building
Residential Area
Body of Water
Vegetation
Dry Sand
Wet Sand

The site is located in Trisik Beach, specifically near Trisik Beach Lagoon which now has been abandoned. There are several existing tourism facilities that are already existing nearby the site. These facilities are mostly built semi-permanently or constructed as semi-open space.

BUILDING CODES



NOTES

Spatial Pattern: SHORELINES SETBACK
Spatial Pattern: RURAL SETTLEMENT
Spatial Pattern: ASHORE FISHERIES
Spatial Pattern: NATURAL RESERVATION
Spatial Pattern: RURAL SETTLEMENT

BUILDING COVERAGE: 60%

BUILDING COVERAGE: 1.8X

GREEN AREA: 30%

BUILDING HEIGHT: 3STORIES

Figure 25. Map of Trisk Beach's Building Codes
Source: Openstreetmaps.com & intantaruberinfo.jogjaprov.go.id (accessed September, 2022) Processed by Writers


Golek Unto Club
606,84 m
"TMJ36" BAKUL IWAK
Pusat Perbelanjaan
Toko Buah "Atha Buah Cemerlang"
Jl. Ngbisan
"Dimas Jaya" Pakan dan Obat Udang
100,00 m
Aneka Ikan+ Udang Yu Muss
Tutup sementara
Kelontong Ragil
500,00 m
Penyu Abadi
Psht pesisir selatan 36
Jl. Ngbisan
200,00 m
Pantai Trisik
Kolam Renang Trisik
400,00 m
LAGUNA PANTAI TRISIK
wisata trisik
300,00 m
Total Area:
22.592,48 m²

Figure 26. Map of Site Area
Source: googlemaps

Figure 27. Photo of Existing Building on Site Area
Source: Writers, 2022

The site is chosen mainly to accommodate the activity of sea turtle conservation. It is selected with the consideration of its access to the beach so that it can reserve the sea turtles' natural habitat. It was also chosen since it needs direct access to the main road considering the tourism function that this project has.

The site is located in the shoreline setback area and settlements area. This will be perfect for the project to be a transition point between the 2 site functions. It will help protect the residential areas against flooding, as well as protect the sea turtles habitat from artificial lighting and human interference.

On the block, the presence of buildings is not as dense are the nearby blocks, especially the ones near the shorelines. Therefore, the need to demolish structures can be minimized. Moreover, most of the building function as shops and tourism facilities, which this project will provide later on.

EXISTING BUILDINGS








SITE ANALYSIS STUDY

EXISTING SEA TURTLES CONSERVATION



At the location, there is already an existing Sea Turtle Conservation. The existing facilities are located inside the purposed site. However, this conservation is issued to be relocated sooner or later. It is due to its location that at risk of being swept away by the abrasion. And considering its location that is on the shoreline setback, relocation is in fact necessary.

In the existing building, there are 3 main functions that are provided for the visitors. They are the education room, discussion room, and rearing area. These functions are placed in a separate semi-permanent building with a larger open space in the middle.

Figure 28. Map of New and Existing Site Location
Source: Writers, 2022

EXISTING SEA SURTLES CONSERVATION

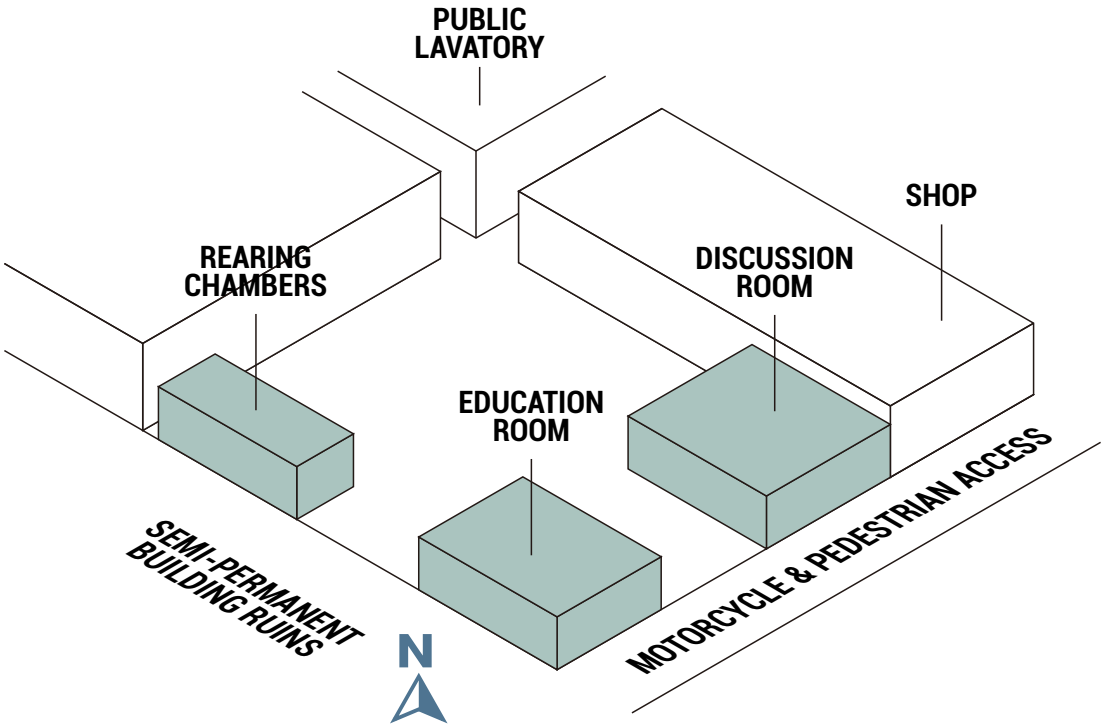








Figure 29. Image and Photo of Existing Sea Turtle Conservation
Source: Writers, 2022



SITE ANALYSIS STUDY

CLIMATE CONTEXT

Figure 30. Climate Context
Source: Writers, 2022

LITERATURE STUDIES

LITERATURE STUDY

ECOLOGICAL ARCHITECTURE

Ecological architecture is a way to design in a way that strengthens the bond between nature and culture. Ecological design can be defined as any design that minimizes any destructive impact on the environment by integrating itself with the living environment. This means an ecological design needs to respect biodiversity, minimize the depletion of resources, preserve nutrient and water cycles, maintain the quality of surrounding habitats, and take into account all prerequisites regarding human and ecosystem wellness.

Ecological design is a form of response to the environmental crisis design dimension. The word "design" does not necessarily mean that it is a form of style. In fact, it is a form of involvement and alliance with nature. It provides frameworks that are relevant for designing landscapes, buildings, regions, and systems for renewable and unrenewable sources.

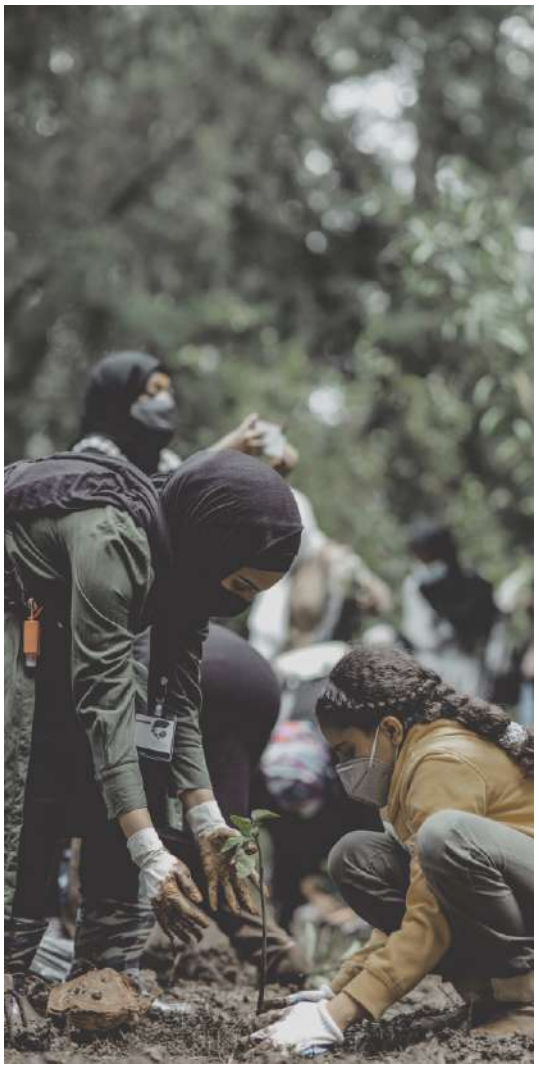


Figure 31. Photo of People Planting in a Forest
Source: Creative Common 0



ECOLOGICAL DESIGN STRATEGIES

There are 3 critical strategies for addressing loss in environmental conditions, they are conservation, regeneration, and stewardship.

A. Conservation

Conservation strategy measures include recycling materials, building denser communities to preserve agricultural land, adding insulation, and designing efficient car fuel. Based on those examples, it can be seen that conservation assumes that damage has been done, and this strategy only use to minimize the damage. In conclusion, conservation on its own cannot achieve sustainability since it still implicates an annual deficit of natural resources.

B. Regeneration

Regeneration can be directly translated into the process of repair and renewal of living tissues. Ecological design help regenerate the wounded world caused by designs that are environmentally insensitive. The regeneration strategy works on the development of natural capital capacities through the act of active restoration involving weaken ecosystems and communities. In a way, regeneration offers healing and renewal that provides a way to harmonize culture with nature. It not only preserves and keeps but also restores what has been lost.

C. Stewardship

Stewardship is a strategy that provides quality care in the relationship between people and other living organisms and the environment. It maintains natural resources by using and investing in natural resources wisely. If conservation translated into spending natural resources more slowly, and regeneration is the development of natural capital, stewardship is the wisdom to focus more on future sustainability rather than using the natural resource.

Figure 32. Photo of Natural Urban Setting
Source: Creative Common 0



Figure 33. Photo of Building in Natural Landscape
Source: Creative Common 0

The mindful ecological design allows a great decrease in energy use and material flows so that people can get back to integrating themself into their surrounding ecological environment. If the size and composition of wastes can be managed to adjust to the ecosystem's abilities to tolerate them, the relationship between culture and nature can be developed into a positive symbiotic. If nature is let do the work, the ecosystem may flourish to purify and reclaim waste, fix the climate, provide food, or prevent flooding.

Ecological design is developed based on the context of specific places. It is a form of response to the particular condition of a place. It may respond to soils, vegetation, animals, climate, topography, water flows, or people. The design attempt to adapt a solution to be more fitting to the local condition and context so that it can replace matter, energy and waste. It is a win-win solution that matches biodiversity with cultural diversity rather than compromising either or both biological and cultural diversity.

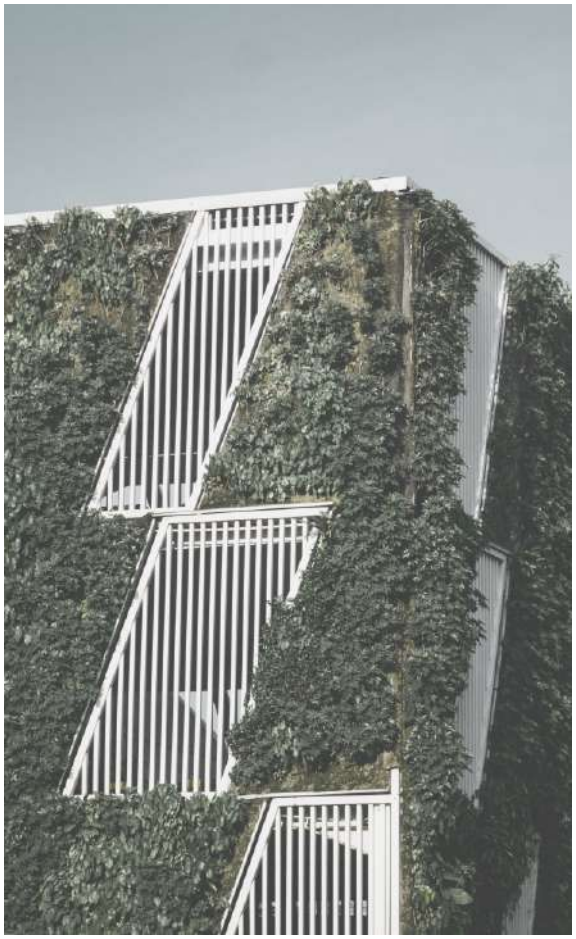


Figure 34. Photo of Green Building Skin near Avian Office Tower, Surabaya, Indonesia
Source: Creative Common 0

ECOLOGICAL DESIGN PRINCIPLE

Ecological design has 5 main principles. These principles will help to develop an integration between ecology and design. These 5 principles are:

A. Solutions that Grow from Place

Ecological design starts by having a deep understanding of a particular place. This approach is intended to be small-scale and more direct. It responds to both the local environment and people. If the connection between people and the place is achieved, the possibility of inhabiting a place without destroying it is not impossible.

B. Ecological Accounting that Informs Design

Find out the impact of the existing and proposed design on the environment. Doing it will help determine the proper solution based on ecological design.

C. Design with Nature

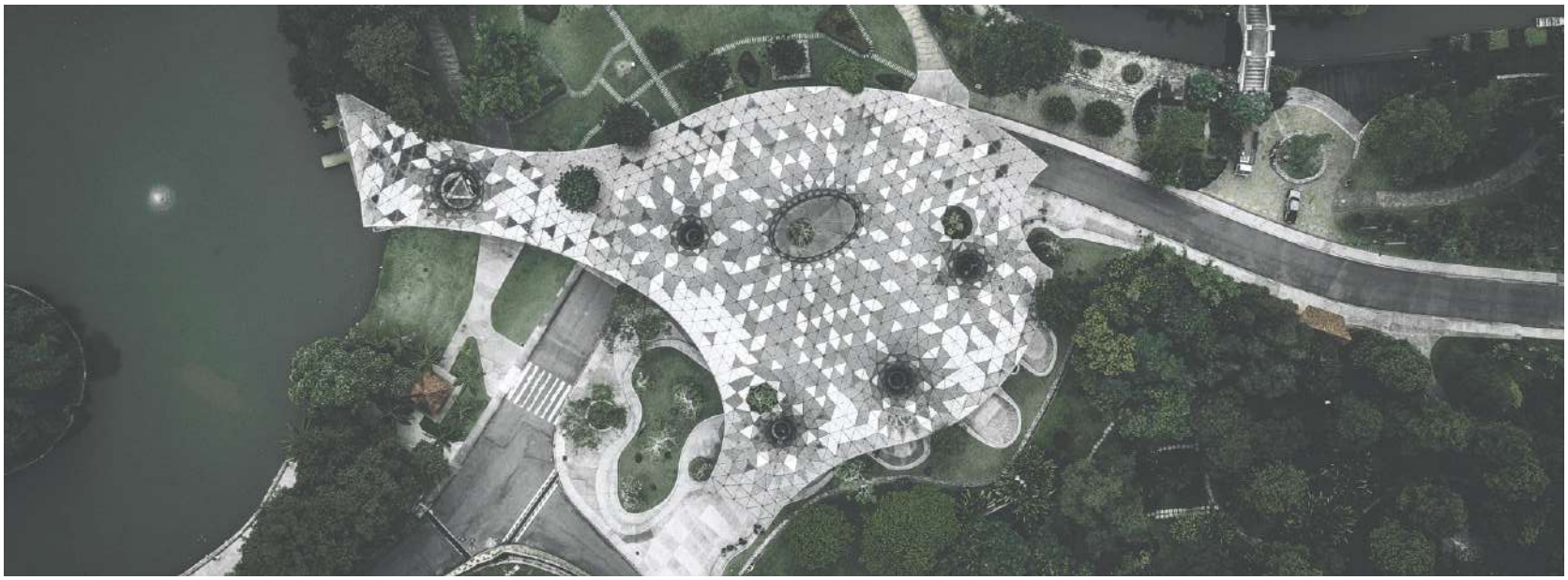
Understanding the processes and patterns that are favorable to the environment can help reduce the ecological impact of a design dramatically. Designing with nature means that the most ecological solution will prove beneficial in the long run. It will favorable for the people and ecosystems.

D. Everyone is a Designer

In the design process, every opinion matters. Honor the specific insight that everyone brings. In creating an ecological design, everyone plays the role of both participant and designer.

E. Make Nature Visible

Degraded environments develop people's ignorance of the need for nature and people's potential of learning. Showing natural cycles and processes in the design will help to make the environment back to life. Efficient design is a design that helps to remind the communities about their place within nature.



From 5 mentioned principles, there are 2 particular principles that are suitable for integrating people into a sea turtle sanctuary. These 2 principles are:

Figure 35. Photo of Perdana Botanical Gardens, Kuala Lumpur, Malaysia
Source: Creative Common 0

DESIGNING WITH NATURE

Ecological design is a result of engagement between people and nature. It finds a new context for design on the basis of nature's integrity. Here the design is based on the coevolution between nature and culture. The design integrates itself into an existing structure that improve the life, the flows, and the processes within it. In doing so, the design should fit itself to the materials' flow to its environmental carrying capacity, conserve habitats that are critical, and respect the existing pattern that is responsible for the environment's survival.

In ecological design, there is a strategy to reduce the harmful impacts by taking into account the health precondition for each level. This design strategy is called 'designing with nature. It purposes a sustainable partnership between people and nature that give advantages to both people and the ecosystem.

Designing with nature means that a design should not just imitate nature in an abstract sense, but also participate in improving it. Ecological designs are created within an ecosystem to fill out an existing structure that improves life, flows, and processes within it.

MAKE NATURE VISIBLE

In de-natured places such as malls, apartment buildings, or cities, the processes of ecology and technology are invisible from people's everyday awareness. It does not reveal how technology is interconnected with nature and supports people. If nature were made to be visible again, people's mindsets would be clarified. It will show how everyday life and how technology has their consequences and relation to the natural world.

A Design should grow people's awareness, and make us humble with nature. Ecological design will guide people on how ecological and technological processes are done. It favors technologies that are transparent and shows their consequences. It brings people to the wider living community; shows people the patterns of wind and rain, where the foods are coming from, and how the life cycles of materials that people use.

Making nature visible suggests a new type of aesthetic in which the built environment explicitly teaches people about the possibility of relationships between culture, nature, and design. It expresses an approach that is expressed visually and can be directly experienced. This aesthetic is known as visual ecology. It is an approach that prefers designed environments that:

A. help us see and become more aware of the abstractions we superimpose on the land;

B. make complex natural processes visible and understandable;

C. unmask systems and processes that remain hidden from view;

D. emphasize our unrecognized connections to nature.

ECOLOGICAL DESIGN PARAMETERS

Based on the previous description, these principles can be developed into parameters that are suitable for this study. These parameters are:

A. Designing with Nature

1. Design should minimize negative impact on the environments;

2. Design should give positive impact for both people and nature;

3. Design should fit itself to existing natural patterns.

B. Make Nature Visible

1. Design should be able to explicitly educate people;

2. Design should favor technology and nature process transparently;



LITERATURE STUDY

JAVANESE ARCHITECTURE LANDSCAPE

The Special Region of Yogyakarta or usually referred to as only "Yogyakarta" is located in Java, Indonesia. Since it is located in Java, there are a lot of historical events that influence the current architectural style of building in Yogyakarta. One of the examples of this is the entry of Islam Religion to Java and the existence of the Mataram Empire which indirectly influence Islamic architecture in Yogyakarta. Not only Islamic Architecture, but there are also traditional, Chinese, and colonial architectures.

In this study, the site will be located on Kulon Progo's seashore. In the location, the regional architectures implemented are mostly Javanese Architecture. Therefore, this literature review will focus on: Javanese Architecture and Traditional Landscape Architecture.

Figure 36. Photo of BNI Building, Special Region of Yogyakarta, Indonesia
Source: Creative Common 0



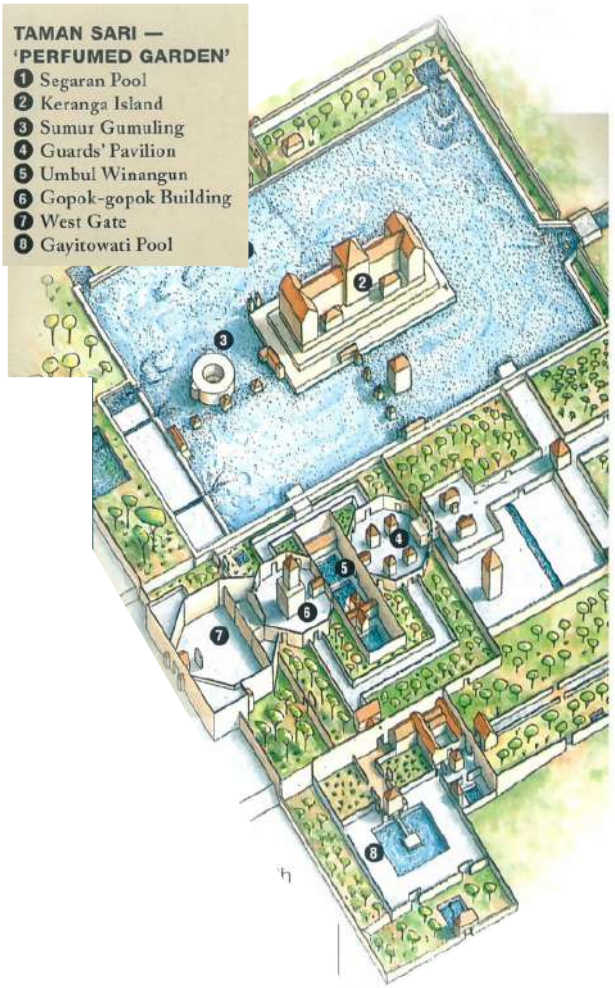


Figure 37. Image and Photo of *Taman Sari* Plan
Source: Creative Commons 0, Tjahjono, G. (1998)

Traditional Javanese Landscape

Several important concepts of gardens in Indonesia can be found in every ancient literature of Javanese culture. In the pre-Islamic text, gardens are symbolizing the existence of a higher plane in which nature, humans, and gods co-existed in unity. All elements of a garden are revolves around the Javanese cultural perception of gardens. In general, Javanese culture interprets gardens as the adjacent between 2 basic elements, namely: earth and water.

In Yogyakarta, there is a renowned garden named *Taman Sari* (Translated: 'Perfumed Garden). *Taman Sari* is arranged by a sequence of courtyards that layout from east to west and is accompanied by several pools of different sizes. Most of these courtyards were planted with decorative vegetation.

In the *Taman Sari* area, The largest pool is named *Segaran* (Translated: 'Sea'). Compared to the other pools, the size of this pool is tremendous. In the middle of this pool, there is a building on top of a ground platform that consists of a multi-story within it. Beside the main building, there is a cylindrical shaped structure that has galleries in it.

TYPOLOGY STUDY

SEA TURTLE CONSERVATION

TECHNICAL MONITORING AND NATURAL HATCHING OF EGGS

A. Sea Turtle Monitoring



Figure 38. Flow Chart of Sea Turtle Stages
Data Source: Direktorat konservasi dan taman nasional laut, accessed through: https://www.ifish.id/e-library/library/recource/25.%20Technical%20guidelines%20for%20the%20management%20of%20turtle%20conservation.pdf

Sea turtle nesting happen during rainy season. To carry out sea turtle conservation activities, it is necessary to understand the stages of the sea turtle egg-laying process. In this process, there are stages where the sea turtle should not be disturbed by observers at all. The following is a schematic of the stages in the turtle nesting process.

This turtle nesting process takes varying between 1-11 hours. The length of this process depends on the type of turtle, the level of disturbance, and the physical condition of the beach. In steps 1-7, the turtle is in a sensitive state. In this phase, the turtle should not be disturbed in the form of light, movement, or touch. In steps 7, 10, and 11, the turtle's sensitivity level is at a moderate state. Dim light (except for the head area) and light touch can be tolerated by turtles. In Steps 8 and 9, the turtle sensitivity level is relatively low compared to other phases.

B. Safeguarding Sea Turtle Nests and Hatching Eggs Naturally

After the nesting process is complete, the conservation party intervenes to ensure the safety of the nest of the sea turtle eggs. Then several steps are taken to help the sea turtle eggs hatch naturally. These steps are:

1) Fencing of nests with labels explaining nest number, sea turtle species, and egg laying date

2) Routine monitoring of the nests of the turtle eggs.

3) The release of hatchlings that have hatched directly at night until the early hours of the morning.

4) Calculation of the number of eggs and hatchlings that have successfully hatched.



BREEDING TECHNIQUE

In addition to supporting sea turtle conservation efforts, sea turtle breeding activities can also be held for several special purposes, such as education, research, and tourism, so that a number of semi-natural hatchlings can be set aside for breeding. The main function of permitted sea turtle breeding is to preserve sea turtle populations that are already threatened with extinction. However, breeding activities can also be carried out for special purposes such as education, research, and tourism.

In sea turtle conservation, breeding is carried out with the main aim of increasing the life expectancy of the turtles that are raised. Captive breeding is carried out on only a small number of hatchlings that hatch semi-naturally. Technically, sea turtle breeding activities can be divided into 4 stages, namely:

A. Relocation

The eggs are relocated after the mother turtle returns to the sea. This relocation was carried out with the aim of moving the hatchery location from natural to semi-natural. In semi-natural hatcheries, turtle eggs are planted in holes under the same conditions as the original nest, which is about 60-100cm deep and 20cm in diameter. These holes are then covered with moist sand.

B. Semi-Natural Incubation

Semi-natural hatching of sea turtle eggs should be done in areas that are not affected by the highest tides (supratidal). At the hatching location, holes are arranged regularly. Around these holes, a fence is installed surrounding them.

Semi-natural hatching of turtle eggs can also be done in a container. However, hatching in this way has drawbacks. If done continuously, the balance of the turtle population can be affected. This happens because the incubation temperature can affect the sex of the hatchlings.

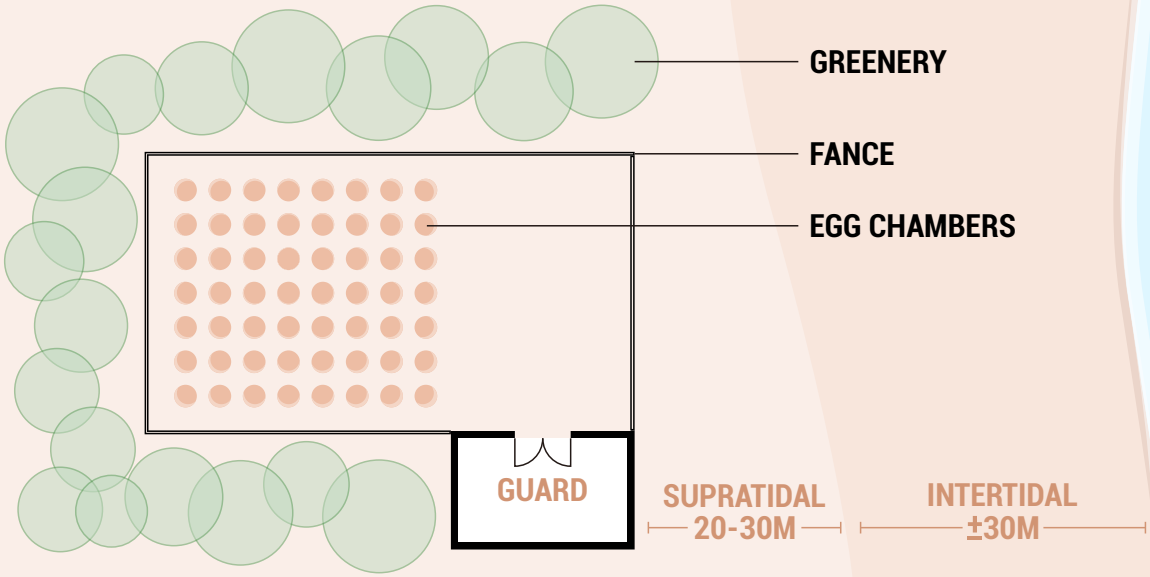


Figure 39. Design of Sea Turtle Semi-Natural Incubation Area
Data Source: Direktorat konservasi dan taman nasional laut, Processed by Writers

C. Rearing

This rearing process is carried out until hatchlings become young or adult sea turtles. This rearing process is carried out, especially for hatchlings that have had physical disabilities since birth. As in the incubation period, rearing of turtle hatchlings is also carried out on the beach in the supratidal section.

The maintenance process begins by moving the hatchlings to the rearing tank. The tubs are usually made of fiber or ceramic with a rectangular or circular shape. Given the ability of hatchlings that cannot swim, the height of the tub is made to range from 5-10 cm deep. In these tanks, the recommended water temperature is 25°C.

During rearing, hatchlings are fed regularly. If there are hatchlings that are sick, the hatchlings are separated from the group so as not to infect others. Self-feeding is carried out 2 times a day with a lot of 10-20% of their body weight. The feeding process is done by moving the hatchlings to smaller containers. Each container is filled with 25 hatchlings.

The condition of the water in the maintenance tank must always be considered. The maintenance tank must include running water with the replacement of the tub water being done twice a day after eating. A schematic of the water circulation system can be seen in the following figure.

D. Release

The release of the hatchlings is carried out after the hatchlings have successfully hatched either through natural or artificial means. The release of hatchlings is carried out at night until the early hours of the morning around 19.00-05.30 WIB. This is done to prevent the hatchlings from being eaten by predators.

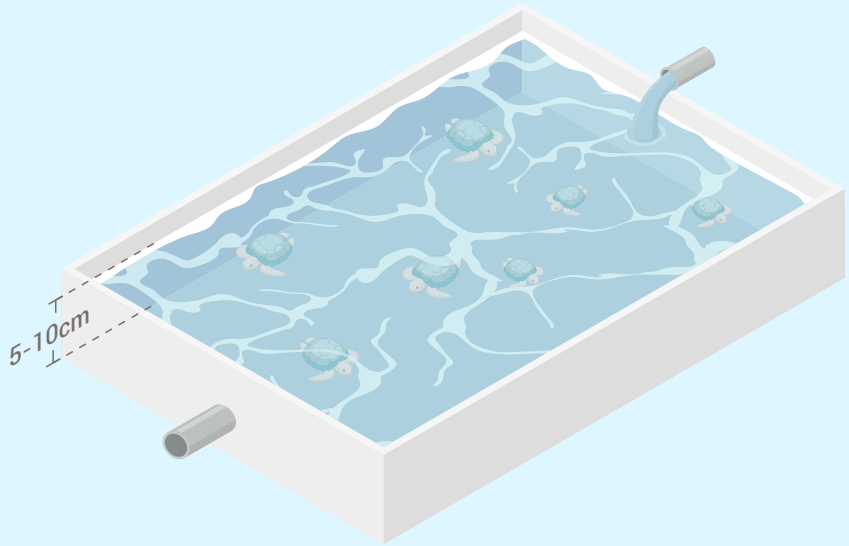


Figure 40. Design Example of Sea Turtle Rearing Area

Data Source: Direktorat konservasi dan taman nasional laut, Processed by Writers

SEA TURTLE-BASED TOURISM MANAGEMENT TECHNIQUES

The following are the technical management of turtle-based tourism:

A. Designing a regional spatial plan with a minimum function of a management office and a sea turtle information center; nesting location; semi-natural hatchery location; hatchling rearing locations; and location of hatchling release.

B. Sea turtle-based tourism has vegetation suitable for sea turtle habitats. The use of building materials is prioritized using sturdy natural materials such as wood, trunks, thatched roofs, etc. While the factory building materials are used to a minimum.

C. Sea turtle-based tourism must pay attention to the convenience of sea turtles to lay their eggs. Please avoid activities that may disturb sea turtles.

SEA TURTLE-BASED TOURISM:

MINIMUM SPATIAL REQUIREMENTS

1. Management office
2. Sea turtle information center;
3. Nesting location (Can be separated);
4. Semi-natural hatchery location;
5. Hatchling rearing locations;
6. and location of hatchling release.

VEGETATION

In designing a sea turtle based tourism, the area should includes vegetation that suitable for sea turtle habitats. A few examples of these are:

1. Live oak;
2. Cabbage palms;
3. Wild coffee;
4. Coral bean; and
5. Several species of ferns.

MATERIALS

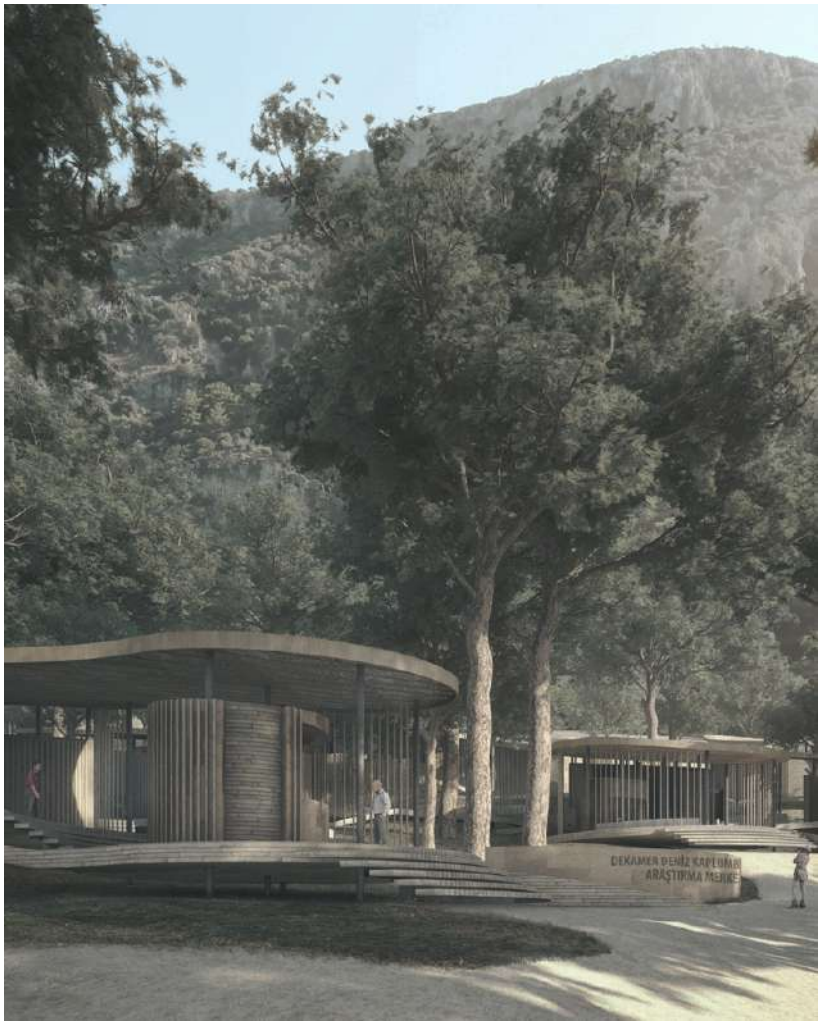
Buildings/Structures that are built in the area should prioritized using sturdy natural materials, such as: woods, rocks, and adobe.

PRECEDENT STUDIES



PRECEDENT STUDY

RESEARCH & REHABILITATION CENTER FOR SEA TURTLES



This project is a national competition held by the Ministry of Environment and Urbanisation of Turkey. It is intended to create a Research, Rescue, and Rehabilitation Center for the Sea Turtles in Iztuzu Beach. The 1st place winner of this competition is KAAT Architects. The design is intended to help raise awareness and produce a negative carbon footprint.

Iztuzu beach is one of the most protected beaches in Southern Turkey for its importance. Here, the winning

Location: Muğla, Turkey

Client: Ministry of Environment & Urbanisation of Turkey

Architects: KAAT ARCHITECTS

Program: Research Facility

Type : National Competition

Area: 978 m²

Project Year: 2019

design creates interventions that consider all forms of life as well as the natural and cultural elements of the surrounding landscape. The design is done by aiming to preserve the richness of the environmental context.

Since there are no construction is allowed in the first 50 meters of the shoreline, the architecture is set up in a dense woodland behind that area. Here, KAAT Architects' purpose of having an architecture that will be integrated well with the existing condition. The shapes and placement of the building mess are done by mimicking the shape of puddles left over from the beach waves. It is recalling a natural phenomenon called "crown shyness" in which on top of trees do not touch others in order to survive.

The architecture is separated into 5 main functions, they are Rehabilitation Center, Visitor Center, Administrative Area, Supportive Areas, Volunteer (Additional Staff) Area. Here the rehabilitation center includes examination, x-ray, laboratory, operation, intensive care, and necropsy room. As for the visitor center, it includes receptionist, museum, closed exhibition, and presentation room.

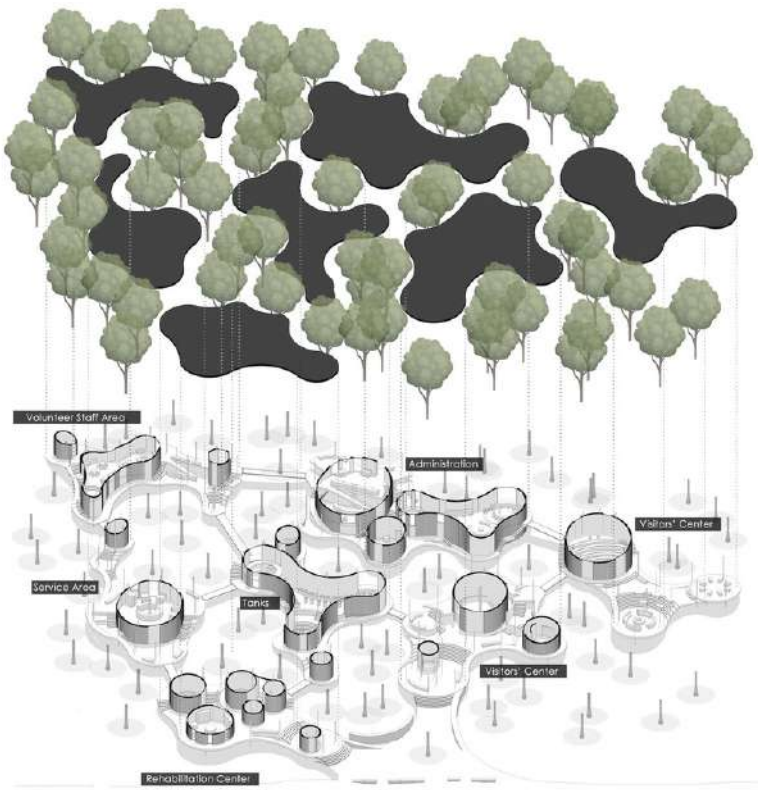
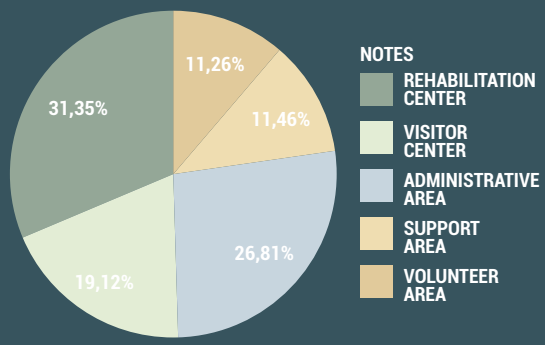


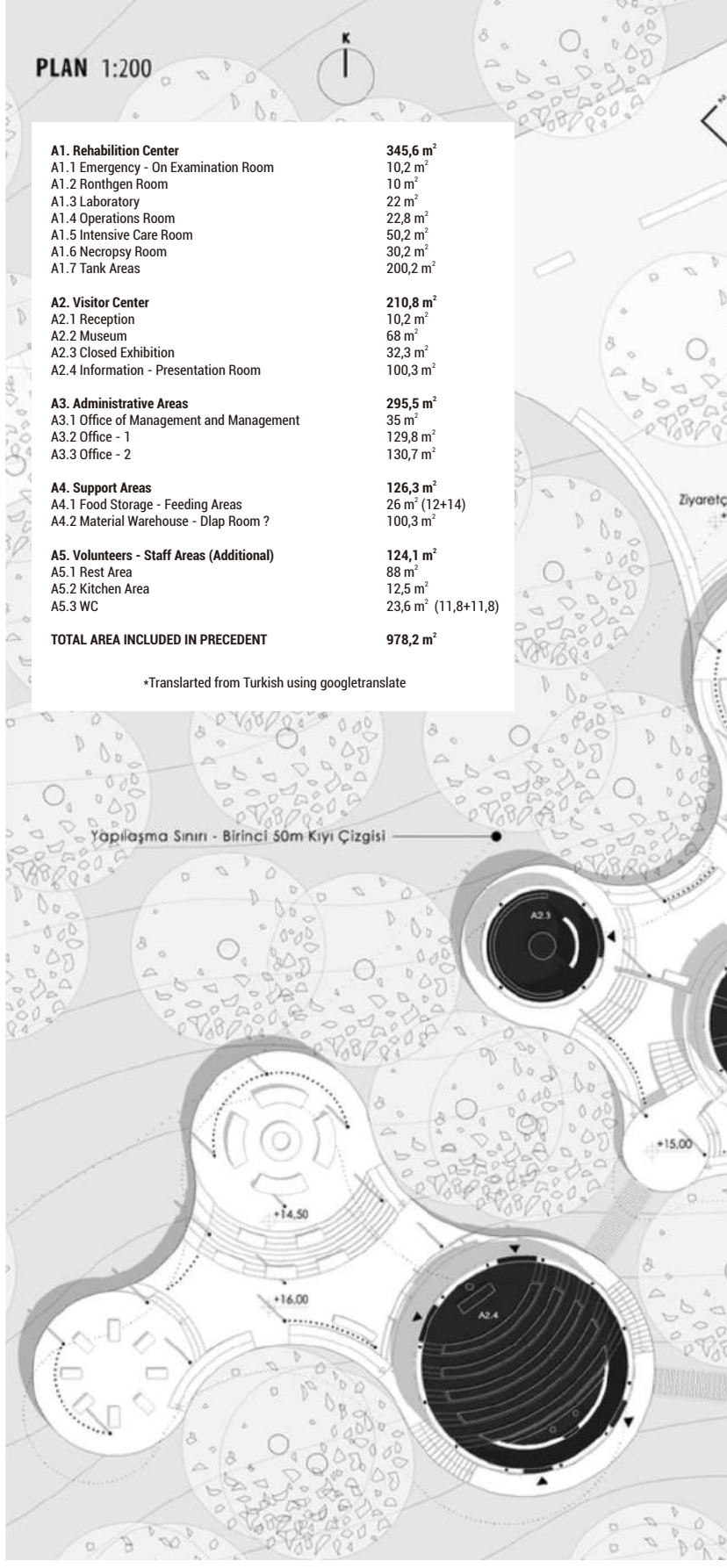
Figure 41. Images of Research & Rehabilitation Center For Sea Turtles
All images are provided by Archdaily.com
Source: https://www.archdaily.com/930651/kaat-architects-to-design-research-and-rehabilitation-center-for-sea-turtles

SPATIAL ARRANGEMENTS

This architecture provides more complex spatial programming than the basic requirements provided in the typology study. Here, the educational recreation focuses more on research & rehabilitation of sea turtles. The detail of the distribution can be seen below.

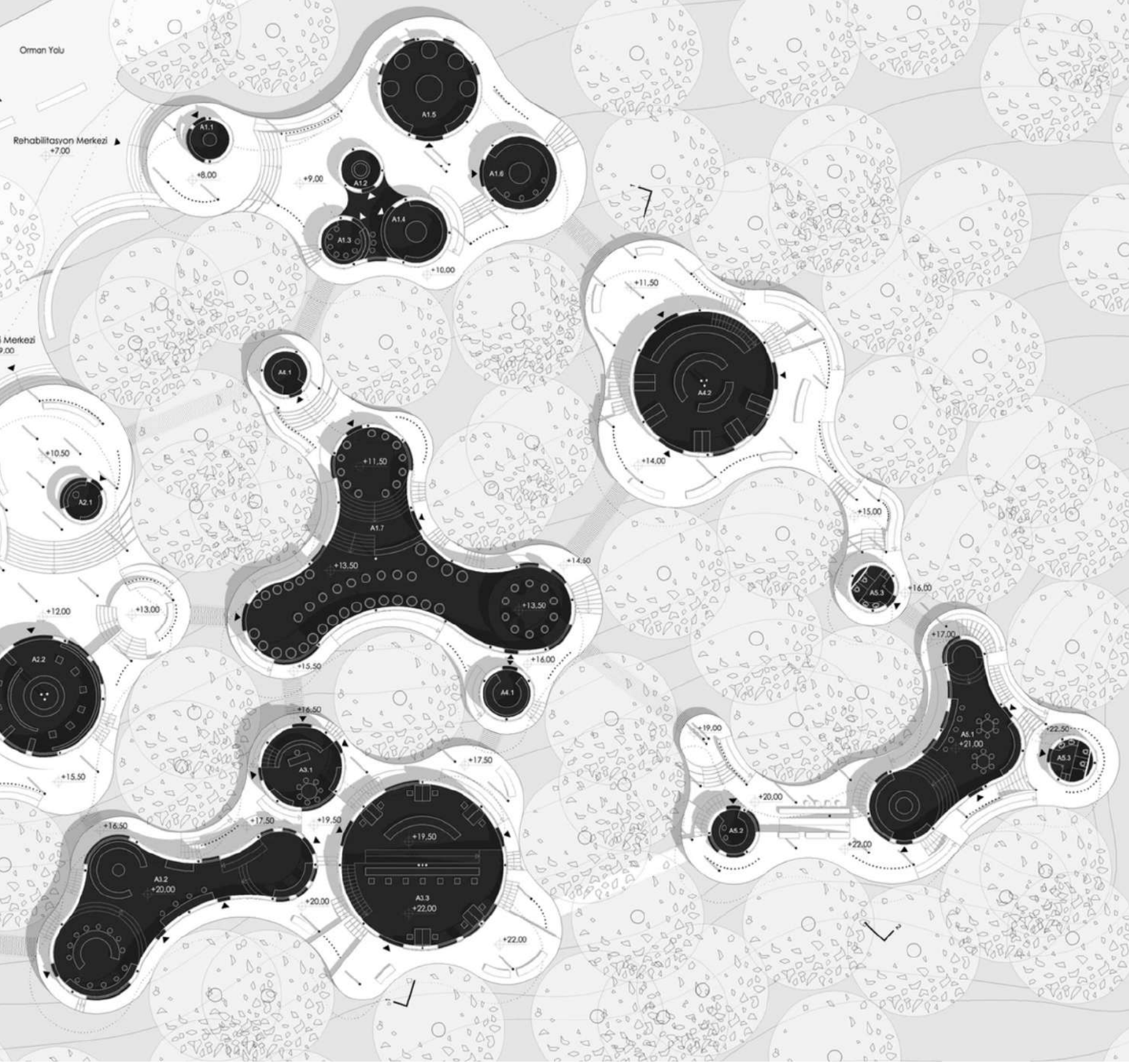


Additionally, the architecture integrated itself into nature by arranging its spatial layout to mimic a natural phenomenon of how trees in a forest don't intersect with each other. To enhance the approach further, the buildings use stilt structures as their foundation to have a less destructive impact on the environment.



A1. Rehabilition Center	**345,6 m²**
A1.1 Emergency - On Examination Room	10,2 m²
A1.2 Ronthgen Room	10 m²
A1.3 Laboratory	22 m²
A1.4 Operations Room	22,8 m²
A1.5 Intensive Care Room	50,2 m²
A1.6 Necropsy Room	30,2 m²
A1.7 Tank Areas	200,2 m²
A2. Visitor Center	**210,8 m²**
A2.1 Reception	10,2 m²
A2.2 Museum	68 m²
A2.3 Closed Exhibition	32,3 m²
A2.4 Information - Presentation Room	100,3 m²
A3. Administrative Areas	**295,5 m²**
A3.1 Office of Management and Management	35 m²
A3.2 Office - 1	129,8 m²
A3.3 Office - 2	130,7 m²
A4. Support Areas	**126,3 m²**
A4.1 Food Storage - Feeding Areas	26 m² (12+14)
A4.2 Material Warehouse - Dlap Room ?	100,3 m²
A5. Volunteers - Staff Areas (Additional)	**124,1 m²**
A5.1 Rest Area	88 m²
A5.2 Kitchen Area	12,5 m²
A5.3 WC	23,6 m² (11,8+11,8)
TOTAL AREA INCLUDED IN PRECEDENT	**978,2 m²**

*Translarted from Turkish using googletranslate


Orman Yolu
Rehabilitasyon Merkezi
+7.00
+8.00
+9.00
+10.00
+11.50
+14.00
+15.00
+16.00
+10.50
+12.00
+13.00
+13.50
+14.50
+15.50
+16.50
+17.50
+19.00
+20.00
+22.00
+17.00
+19.50
+21.00
+22.50
A1.1
A1.2
A1.3
A1.4
A1.5
A1.6
A1.7
A2.1
A2.2
A3.1
A3.2
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A4.1
A4.2
A5.1
A5.2
A5.3

PRECEDENT STUDY

TURTLE SANCTUARY AT KALBA MANGROVE RESERVE



Location : Sharjah, United Arab Emirates

Clients: Sharjah's Environmental Protected Areas Authority (EPAA)

Architects: Hopkins Architects

Project Year : 2021

Program: Aquarium & Research Center

Photographs : Marc Goodwin

The project is located in the most sensitive and biodiverse nature conservation. It is an aquarium and research facility that is intended to rehabilitate turtles and rearing endangered species of birds. Additionally, the facility will also give education and facilities for visitors to improve their awareness and engagement in programs related to conservation.

The architecture consists of 7 interconnected pods with outdoor areas that provide views of the mangrove forests and mountains. The facilities provided by the architecture include aquaria, exhibition areas, visitor amenities, staff offices, veterinary facilities, classrooms, gift



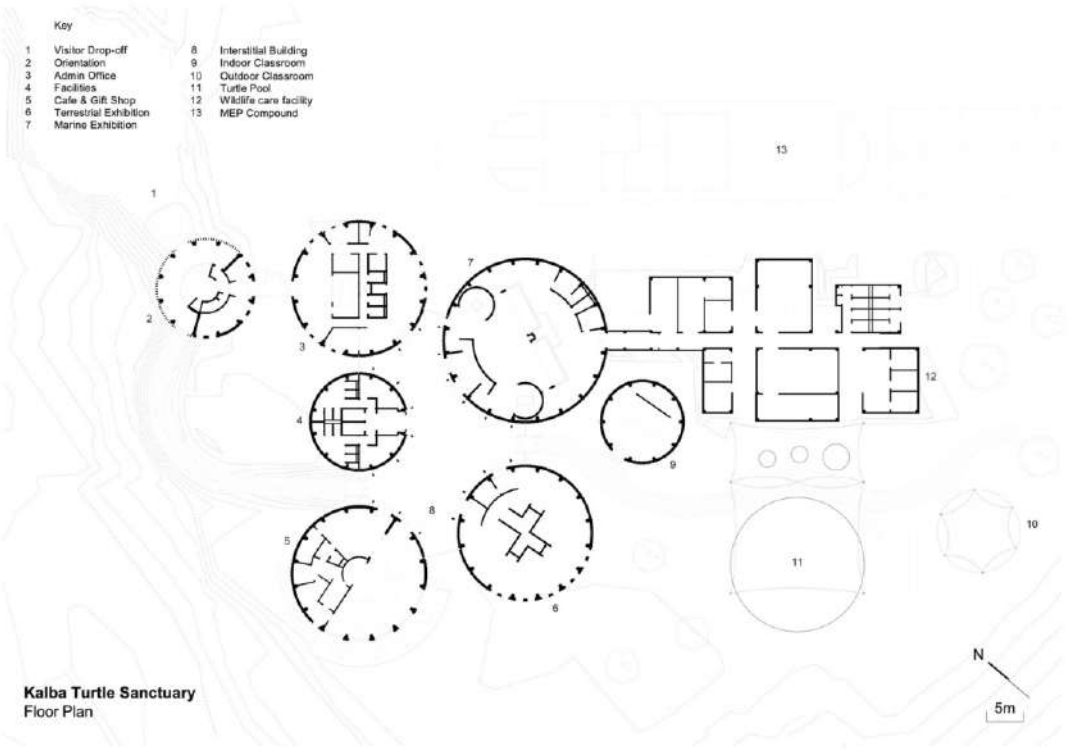
Figure 42. Images of Turtle Sanctuary
All images are provided by Archdaily.com
Source:
https://www.archdaily.com/961350/turtle-sanctuary-at-kalba-mangrove-reserve-hopkins-architects





shops, and a café. There is a nature trail that guides the visitors to explore the rich biodiversity of the site.

The pods are shaped using biomimetics inspired by urchin exoskeletons. They are constructed using pre-fabricated concrete structures in order to minimize the impact of the site condition. The precast concrete shells, ribs, and in-situ foundation discs of these pods provide an isolated thermal mass across their floors walls, and roofs.



FACILITIES & CONSTRUCTION

Turtle Sanctuary at Kalba Mangrove Reserve implements the function as research and rehabilitaion center as well as a place for education. The facilities provided here are:

1. Aquaria;
2. Exhibition areas;
3. Visitor emenities;
4. Staff offices;
5. Veterinary facilities;
6. Classroom;
7. Gift shop;
8. Café.

This architecture minimize the impact of the site condition using biomimetics inspired by urchin exoskeleton and constructed using pre-fabricated concrete. However, this project lock up the inhabitant by using the aquarium, which can be considered a cons.

PRECEDENT STUDY

ECHO OF THE SEA



Location: Rongcheng Ailian Bay Scenic Area

Architects: Tongyi Architects

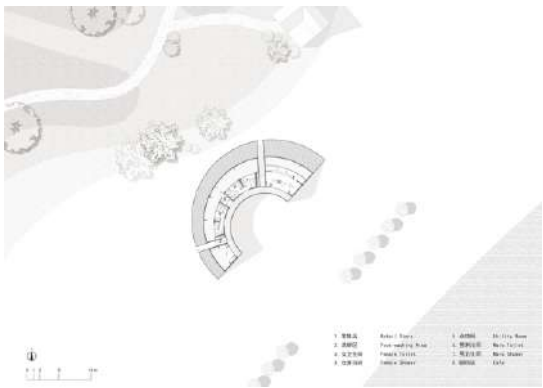
Area: 509 m²

Project Year: 2021

Program: Café & Retail

Photographs: ZUZO VISION

The architecture is located on a very popular beach with nearby residents and tourists. The primary entry point of the design is its response to its surrounding environment and natural elements. The design aims to provide a satisfying basic service function while affecting the natural landscape as less as possible. Here the consideration of the design is to bring balance between "hidden" and "explicit" and also "external scale" and "internal space".





The building was shaped to resemble the shape of a shell. Since the building is visible from all angles, it has 2 types of facades. The facade facing the land consists of a small dune that extends from the ground. This facade is created to blend well into the beach. As for the facade facing the sea, it responded by having curved glass that reflects the vastness of the sea.



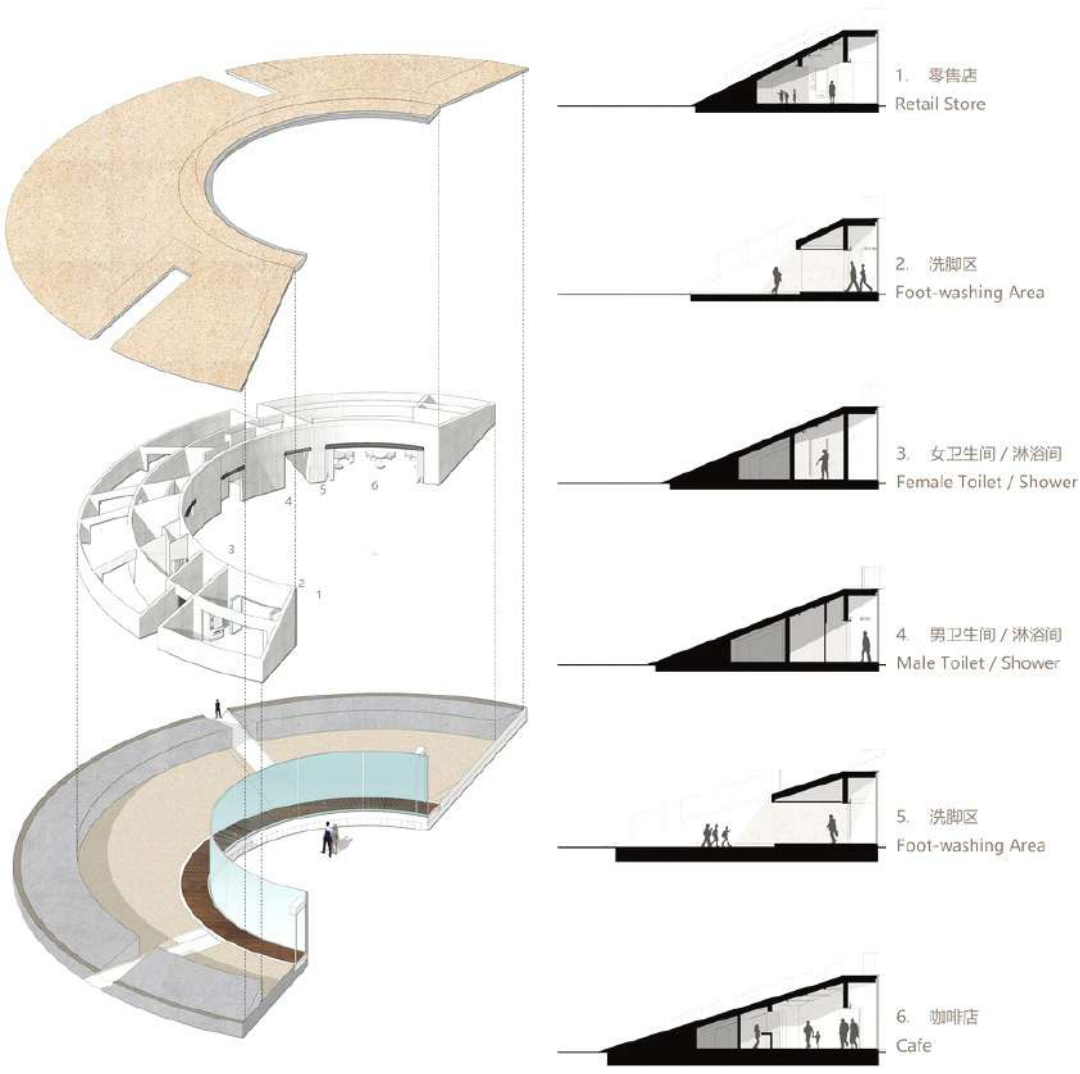


Figure 43. Images of Echo of the Sea
All images are provided by Archdaily.com
Source: https://www.archdaily.com/984566/echo-of-the-sea-tongyi-architects?ad_source=search&ad_medium=projects_tab

BLENDING WITH NATURE

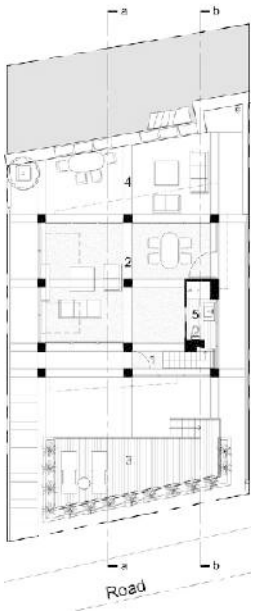
Echo of The Sea at Rongcheng Ailian Bay Scenic Area provides a great space experience by creating a blending between the building and the nature. It considerate the balance of the visible and the hidden of architectural elements. With shell building form, this architecture consist of seamless dune facade that facing the land and curved glass facade that facing the sea which also reflect the vastness of the sea.

PRECEDENT STUDY

TSUNAMI HOUSE

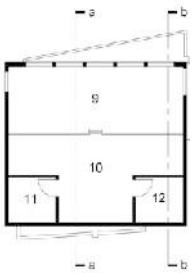


The tsunami house is an architecture located close to a body of water located at the northern end of Camaro Island. The architecture takes the form of a 291 m² waterfront home. The building has 3 floors with the ground floor functioning as a "flood room", the 1st floor as the main living area, and the 2nd-floor used as a loft, mech, and storage.





Main Level
887 sf



Upper Level
198 sf

Notes:
1. Entry
2. Flood room
3. Raised sun deck
4. Water side patio
5. Bathroom
6. Kitchen
7. Dining / living
8. Bedroom
9. Open to below
10. Loft
11. Mech
12. Storage

Location: Camano Island, Washington

Architects: Designs Northwest Architect

Area: 291 m²

Project Year: 2014

Program: House

Photographs: Lucas Henning

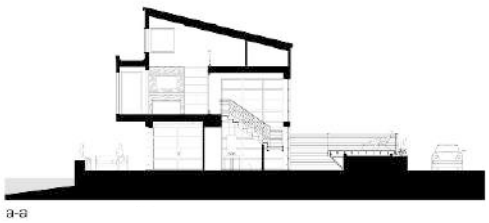






The building is believed to be able to sustain tsunami waves which the area is susceptible to. The basic idea is to let the waves pass through the ground floor. This is where the name of the "flood room" comes from and why the living area is located on the 1st floor. The ground floor is used as a multipurpose space with a minimal number of furniture. The ground floor is designed using glass doors that can be opened to the water of the body in front of it. In the event of a storm surge, the walls are designed to be able to break away.

The building's strength comes from its structure. In the context of this architecture, the structure is designed to be able to withstand high-velocity tsunami waves. It is designed by maximising the structural strength by using concrete walls, columns, and beams. This structure is then placed on a concrete pad foundation. The idea is to create a structure as rigid and lightweight as possible. In an event of a tsunami, the building structure will move with the waves but its structure will still remain intact.



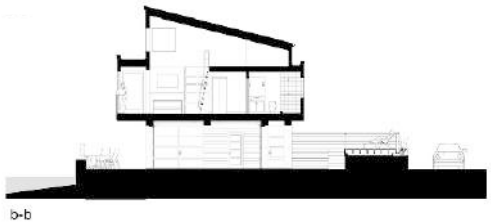


Figure 44. Images of Tsunami House
All images are provided by Archdaily.com
Source: https://www.archdaily.com/464506/tsunami-house-designs-northwest-architect?ad_source=search&ad_medium=projects_tab

STRUCTURES

There are several principles that help this precedent to withstand tsunami waves and other related disaster. They are:

1. Having a rigid structure;
2. Using pad foundation;
3. Generating an 'expendable' space that allows water to flow through the building;
4. Maximising structural strength and minimizing weight;

However, by having an 'expendable' space, the sustainability of this approach is questionable.



PRECEDENT STUDY

AMPHIBIOUS HOUSE

Location: Buckinghamshire, UK
Architects: baca Architect
Area: 225 m²
Project Year: 2014
Program: House
Photos: baca Architect

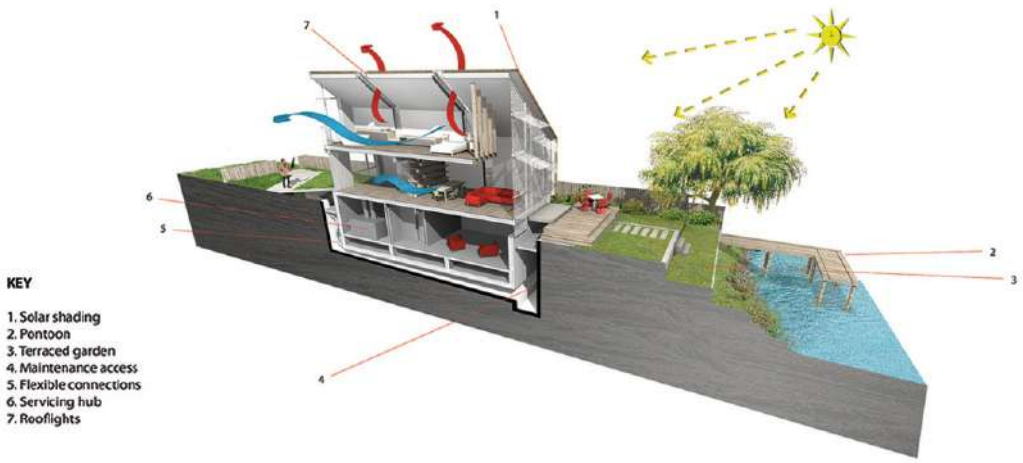
It is known as the "British first Amphibious House". The architecture is located in a small residential area on the River Thames. In the area, most of the houses are built in the 50s using stilt structures to raise the building about 1 meter off the ground and protect them from flooding. However, these only protect the building from regular flooding. In extreme conditions, the house should be elevated 2,5 meters off the ground to be protected from floods. Here is where the idea of the amphibious house comes in.

The basic idea of the architecture is for it to rest on the ground when there are not any floods and the grounds are dry. When there is a flood, however, the building will float at the same level of it. The building sits on a floating base that is barely visible from the outside. This means that the system is strong enough to make the 225 m² house with a building coverage of 90 m².

The landscape is designed to act as a warning system for the occupants about natural flooding. To do that, the landscape is designed to be intuitive for the occupants. The terraces of the building are set at different heights. This is done so that when floods will occurred, the water will fill in the



Figure 45. Images of Amphibious House
All images are provided by architect baca
Source: https://www.baca.uk.com/amphibioushouse.html



landscape incrementally before reaching a dangerous level. There are 3 levels of the designs. The lowest terrace is planted with reeds and shrubs. Above that, there is the lawn. And at the highest level is the terrace that is just below the living rooms. This different height of landscape helps to improve the building's recovery from floods. It provides a dry area as the water level is decreasing. The plantation also helps to reduce the degree of saltation of the dock.

This amphibious system hasbeen tested artificially during construction. In that test, the house is able to be elevated for half a meter. And between Late 2019 and early 2020, there are several winter flooding occurred, and the house continuous to elevate and fall without much problem.

STRUCTURES

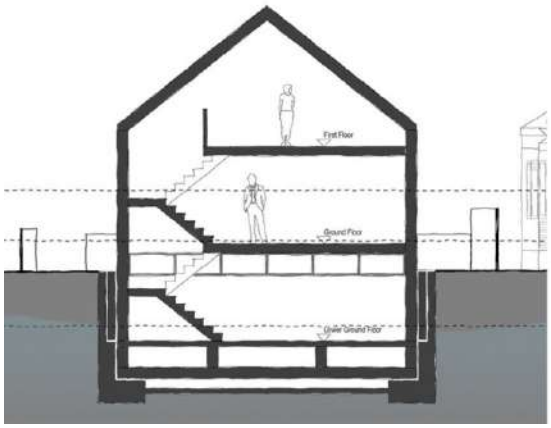
The architecture has sustained several floods in its lifetime. The architect makes it happen by applying the concept of amphibious design. Several principles of that applied here are:

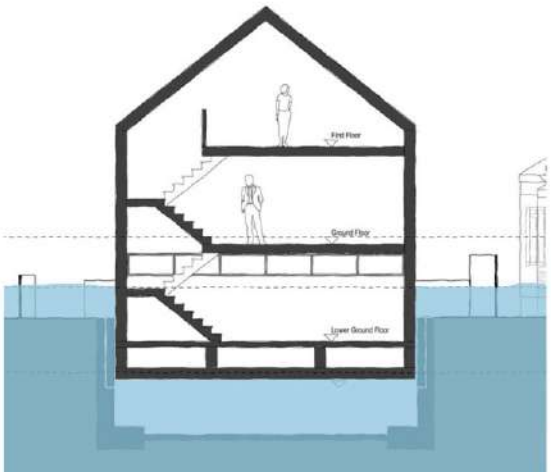
1. Using floating base that will make the building to float during floods;

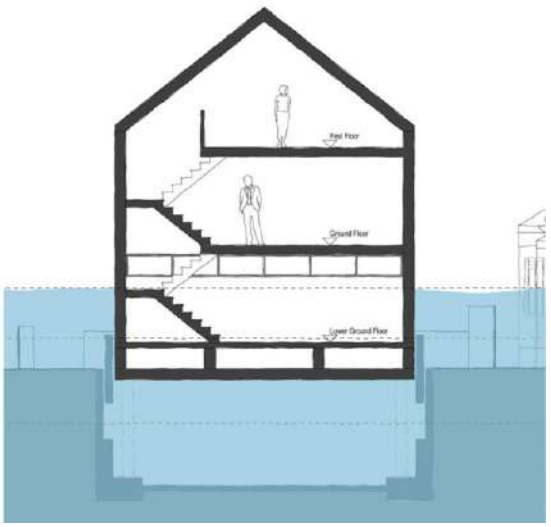
2. Using 3 level of terraces to help recovery against flood;

3. Using vegetation to reduce water saltation;

4. Using intuitive design to help raise occupant awareness against flood.









PRECEDENT STUDY

WASIT NATURAL RESERVE VISITOR CENTRE

Location: Sharjah, United Arab Emirates

Architects: X Architects

Area: 2534 m²

Project Year: 2016

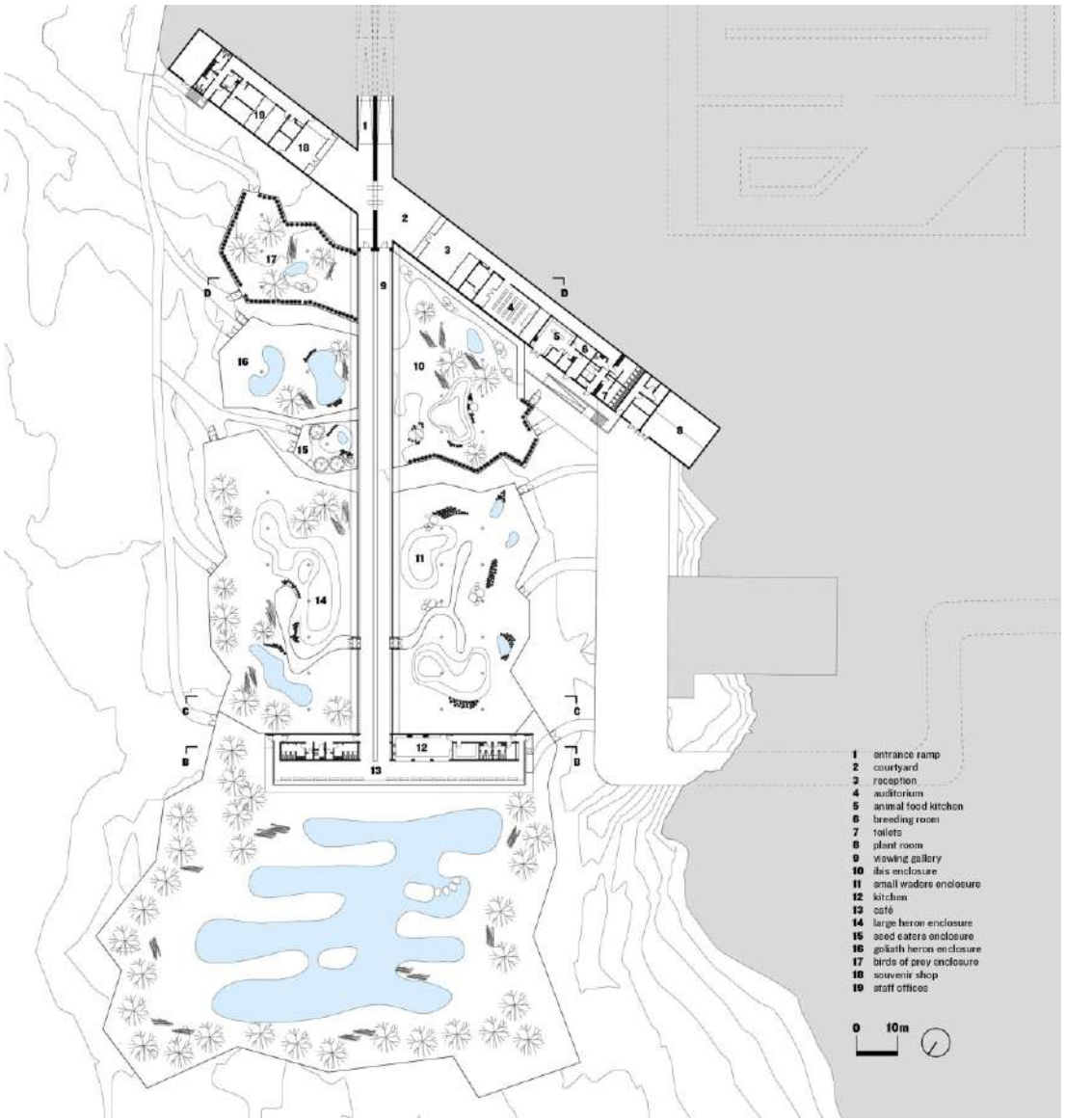
Program: Visitor Center

Photographs: Nelson Garrido

This project is designed by transforming a wastewater and rubbish dump into a Natural Reserve Visitors Center. The rehabilitation started in 2005 and finished in 2016. During that time, more or less 40.000 m2 of rubbish was removed and 35.000 trees were re-panted. The land was healed from toxic chemicals. With this effort, Wasit Natural Reserve (WNR) is now home to 350 species of birds.

The facility incorporates a wetland visitor center that is established on-site. This visitor center is protecting the environmental condition. It also educates visitors regarding the richness of the wetland ecosystem as well as provides information about the birds that are frequently in the area and other wetlands.







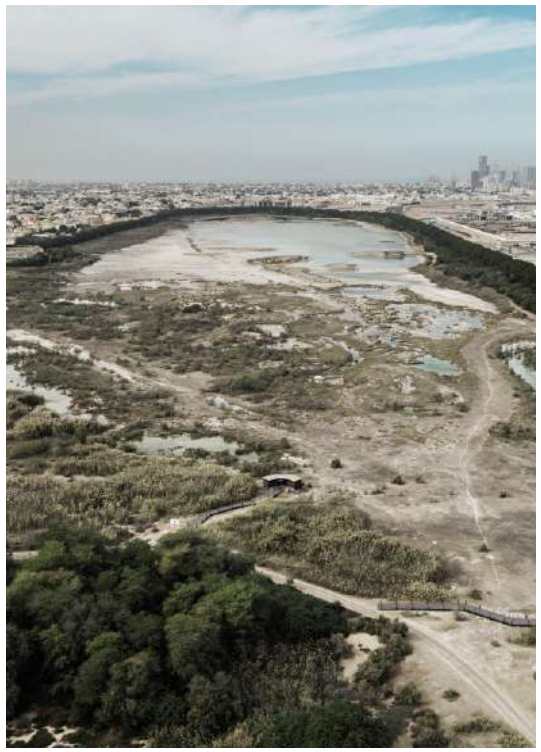


Figure 46. Images of Amphibious House
All images are provided by archdaily.com
Source: https://www.archdaily.com/784055/wasit-natural-reserve-visitor-centre-x-architects

REGENERATION

Wasit Natural Reserve Visitor Center intent to rehabillitate the land from toxic chemicals by recycling the dump and waste into visitor center and re-planted trees. This architecture enrich the wetland ecosystem and facilitate wetland visitor center as well as a place for education about the birds that frequently in the area.



PRECEDENT STUDY

MONARTO SAFARI PARK VISITOR CENTRE

Location: Adelaide, Australia

Architects: INTRO., Studio-Gram

Project Year: 2022

Program: Safari Park

Photos: INTRO.

"A place that connects people with wildlife to support their ongoing protection."

The architecture is a gateway that portrays the connection between people and the environment. The heart of this architecture is a communal space that presents the visitor with the traditional African and native habitats in Africa. It shows a glance into the vast surrounding of the Safari Park while providing protection to the visitor from the tough weather conditions. The architecture serves as a tease of what experience is to come.



Figure 47. Images of Monarto Safari Park
All images are provided by archdaily.com
Source: https://www.archdaily.com/984139/monarto-safari-park-visitor-centre-intro

The architecture is formed by combining 2 diverse shapes. There is a convergence of 2 circular shapes on top of each other representing how the indigenous intertwine with each other and also the embodiment of African culture that embodies the connection between people with the land, plants, and animals; and the subtle iconic expression of forms that invite the visitors' engagements, interpretations, and discussions.



The architecture is a statement of how conservation can be started when people with deep respect for nature are on the outside of their profound experience. It serves as a place to experience the transition from Australia to Africa in an iconic and memorable way. The visitors will learn to appreciate more about nature through their experience in the Monarto Safari Park and become their ambassadors.



TRANSITIONAL EXPERIENCE

This project shows the relationship between people and nature. It attempted to teach people through experience and architecture by representing both environment and people without leaving out one or the other. This show how the design can be considered an ecological one. However, the architecture doesn't yet integrate the people with their nature, instead, it harnesses the restriction between natural and de-natural places to become a literal gateway to guide people to a transitional experience.

LITERATURE, TYPOLOGY & PRECEDENT STUDY
SUMMARY

SPATIAL REQUIREMENTS FOR SEA TURTLE FACILITIES

From the information gathered, it can be formulated the spatial requirements distribution of the sea turtles facility. This data can later be adapted for this study.

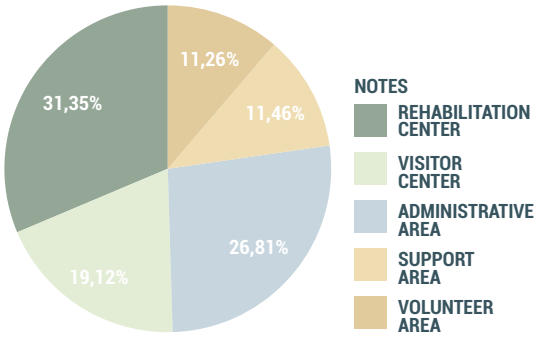


Figure 48. Design Example of Sea Turtle Rearing Area
Data Source: KAAT Architect, Processed by Writers, 2022

Additionally, there is a list of rooms that are required by the Ministry of Maritime Affairs and Fisheries of the Republic of Indonesia. The minimum rooms required for conservation-based tourism are:

1. management office and a sea turtle information center;
2. spawning location;
3. semi-natural hatchery location;
4. hatchling rearing locations;
5. and location of hatchling release.

These areas should prioritize strong natural building materials and provide vegetations that are suitable for sea turtles' habitat.

ECOLOGICAL DESIGN

In regards to design ecologically, there are certain parameters that need to be followed in order to achieve the bond between nature and culture. These parameters are:

A. Designing with Nature

1. Design should minimize negative impact on the environments;
2. Design should give positive impact for both people and nature;
3. Design should fit itself to existing natural patterns.

B. Make Nature Visible

1. Design should be able to explicitly educate people;
2. Design should favor technology and nature process transparently;

BUILDING NEAR BODY OF WATER

There are several risks that come when building near a body of water. There are tsunamis, storms, high tides, floods, etc. In an event where the water will flow to the part of the building, the structure needs to sustain the weight of the water while draining the water elsewhere. From the precedents, it can be learned that the basic idea of flood resistance design is to let the water come through below the building. It can be done by either having lightweight material that can make the building flood or by creating some sort of tunnel and letting the water flow pass through.

DESIGN ISSUE MAP

ISSUE

Lack of Tourist Attraction in Trisik Beach

South coast as the face of Yogyakarta

Abrasion and Flooding Surrounding Kulon Progo

Sea Turtle nesting sites are decreasing

Devolping New Sustainable Tourist Attraction

Preserving Natural Habitat of Sea Turtles

CONTEXT

Local communities' economy

Trisik Beach's as Tourism Destination

Facilities for Learning about Sea Turtles

Sea Turtle Conservation

Tourist Village

Sea Turtle Education Center

Sea Turtle Visit Center

GENERAL PROBLEM

How to design a sea turtle visitor center in Trisik Beach that can integrate between conservation and visitor center by using ecological design approach?

DESIGN THEME

ECOLOGICAL APPROACH

DESIGN ANALYSIS

SPATIAL REQUIREMENTS

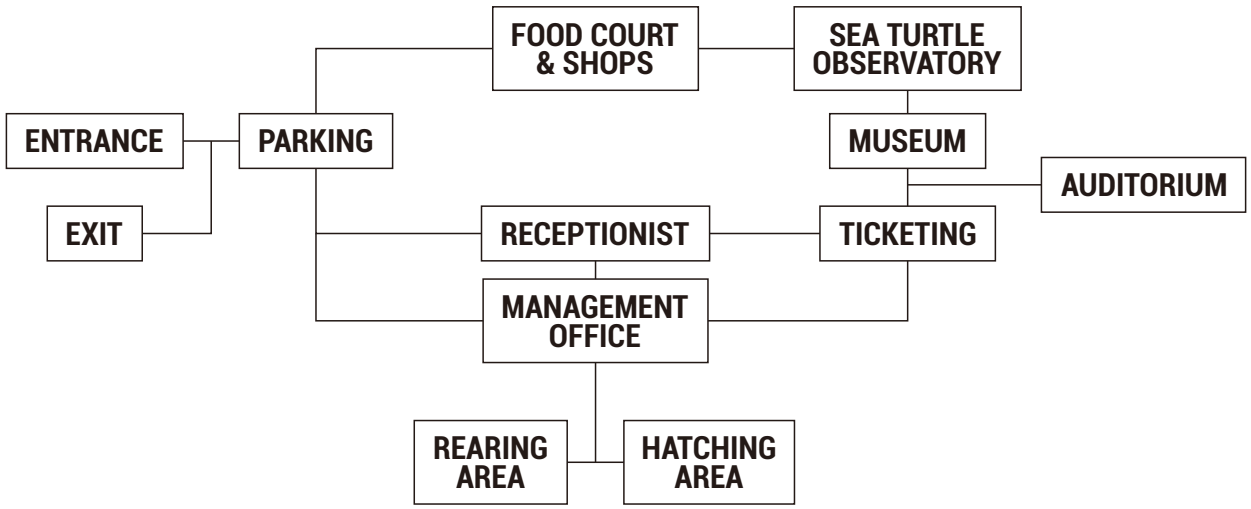
ROOMS	PRIVACY	CHARACTERS	SPECIFIC REQUIREMENTS
CONSERVATION			Sea Turtle Vegetation
Management Office	Private	Productive, Comfortable	-
Hatching Area	Private	Open, Secure	Above Supratidal Area
Rearing Area	Semi-Private	Natural, Secure	Above Supratidal Area; Consistent Waterflow
VISITOR CENTER			Sea Turtle Vegetation
Receptionist	Public	Welcoming	-
Ticketing	Public	Tidy, Intuitive	-
Museum	Public	Engaging, Inspiring	-
Lecture Hall	Semi-Private	Isolated, Conducive	-
Observatory	Public	Inspiring, Intuitive	Undisturbing
RESCUE & REHABILITATION			Sea Turtle Vegetation; Self-Closing Door; Temperature & Air Quality Control; Sanitary; Visually Inoffensive
Surgery Room	Private	Isolated, Conducive	Surgical lighting; Pre-surgical Room; Separated Airflow
Exam Room	Private	Conducive	-
Intensive Care Room	Private	Conducive, Easy Access	Padded or Protected
Necropsy	Private	Isolated, Bright	Separated Airflow
Laboratory	Semi-Private	Collaborative	Refrigerator Storage
Isolation Room	Private	Natural, Comfortable	Separated Airflow
Sleeping Loft	Private	Easy Access, Comfortable	-
Veterinary Office	Private	Productive, Comfortable	Provide Small Library with Soft & Hard copy

ROOMS	PRIVACY	CHARACTERS	SPECIFIC REQUIREMENTS
COMMERCIAL			Managed by Locals; Access to the Village
Giftshop	Public	Inviting, Attractive	
Restaurant	Public	Inviting, Attractive	
SERVICE			-
Restroom	Public	Private, Comfortable	-
Lounge	Public	Relaxing	-
Prayers Room	Public	Dim, Inspiring	Qibla Orientation
Gathering Space	Public	Relaxing, Flexible, Open	-
Janitor Room	Private	Accessible, Comfortable	-
Pantry	Private	Comfortable	-

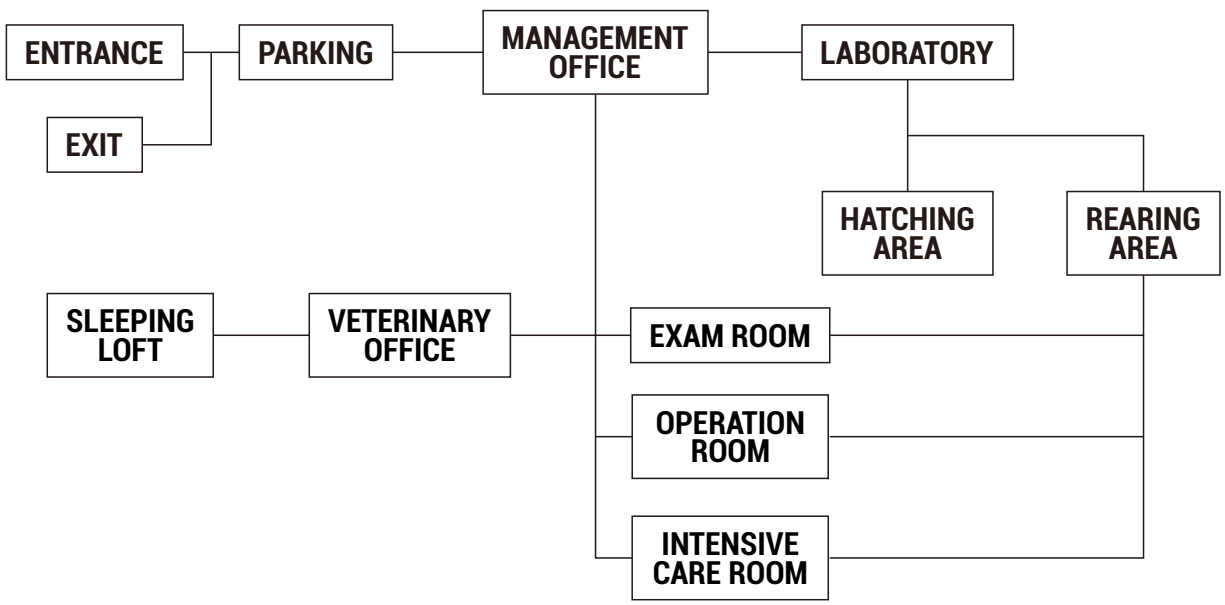
Figure 49. Table of Room Requirements
Source: Writers, 2022

USER FLOW

MANAGEMENT & STAFF



RESEARCHER & VETERINARIAN



USER FLOW

PUBLIC

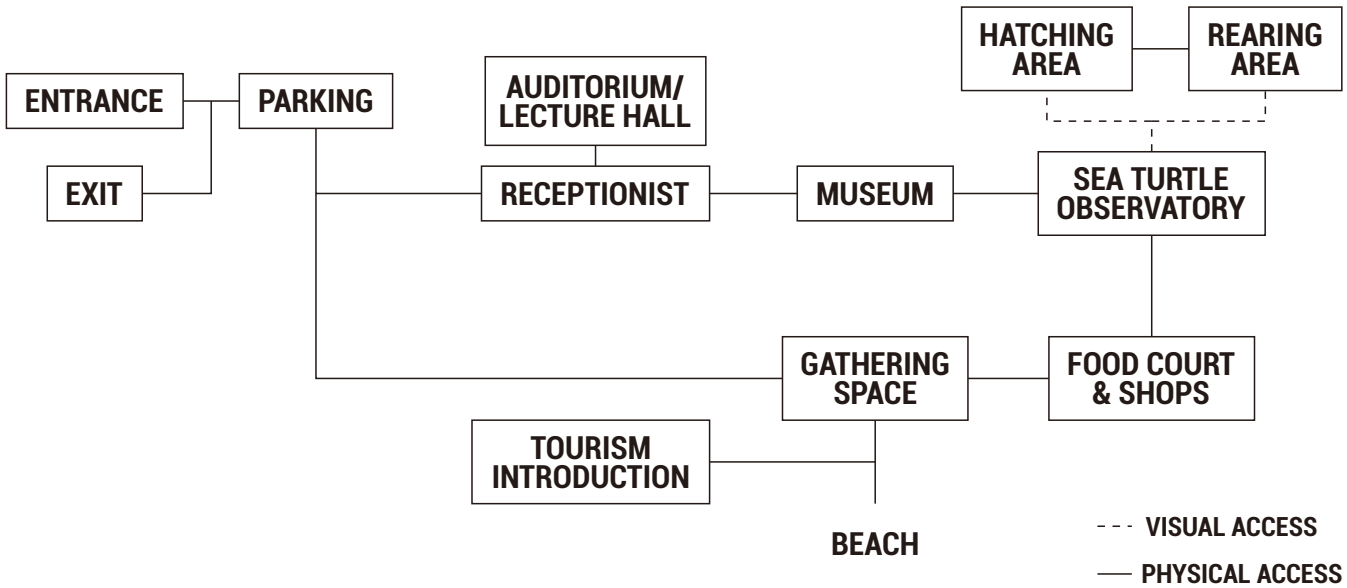


Figure 50. User Flow Diagram
Source: Writers, 2022

ZONING



Figure 51. Zoning
Source: Writers, 2022

BUILDING MASS TRANSFORMATION

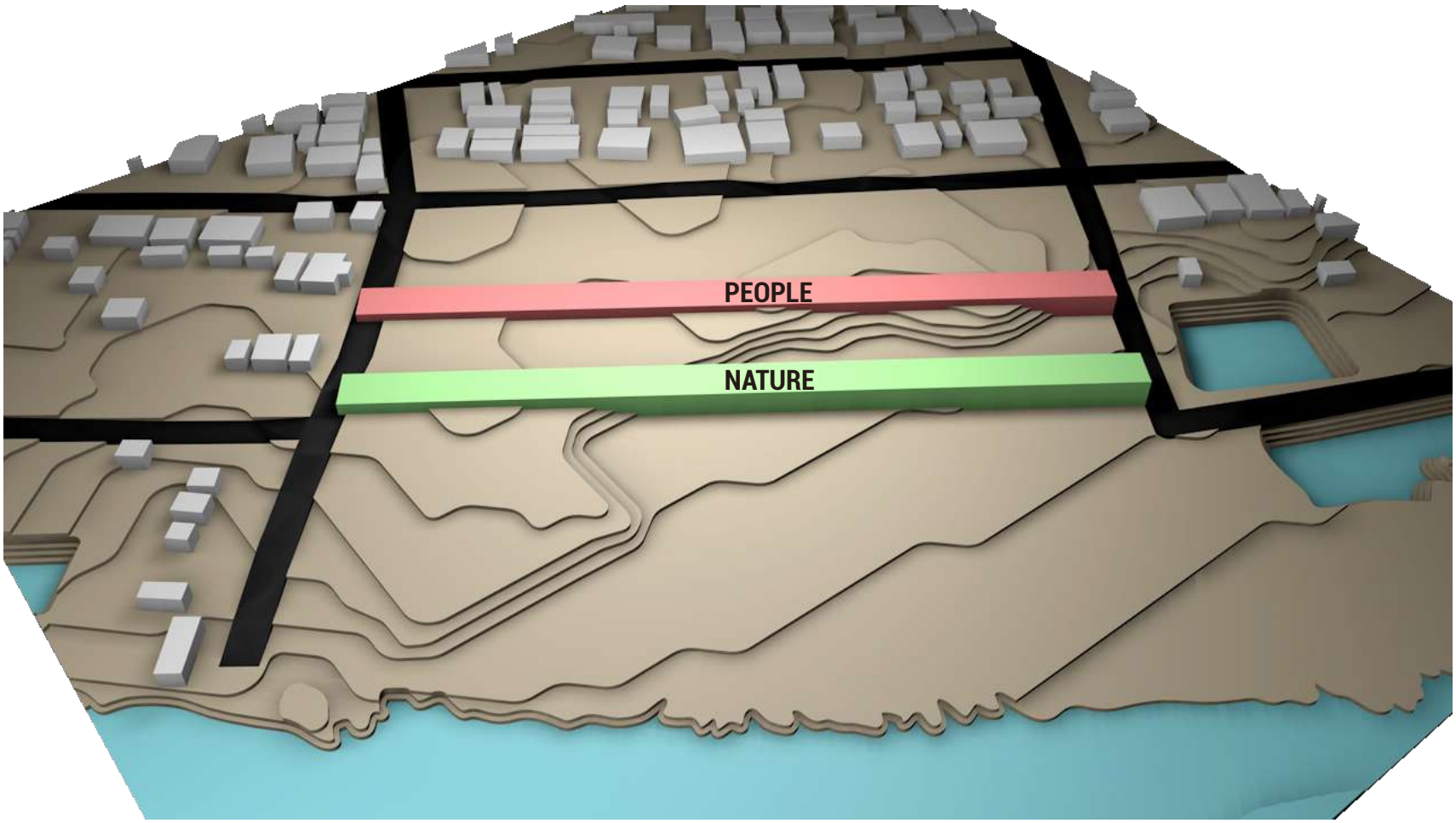


Figure 52. Alternative Building Mass Transformation
Source: Writers, 2022

In this modern world, more often than not, we see ourselves as an entity that is separated from nature. We see people and nature as parallel lines. We exist together but never once connect with one another. I mean, we couldn't literally talk to them or us even though it is clear that where we stand we always are part of a larger ecosystem that includes any form of the natural environment.

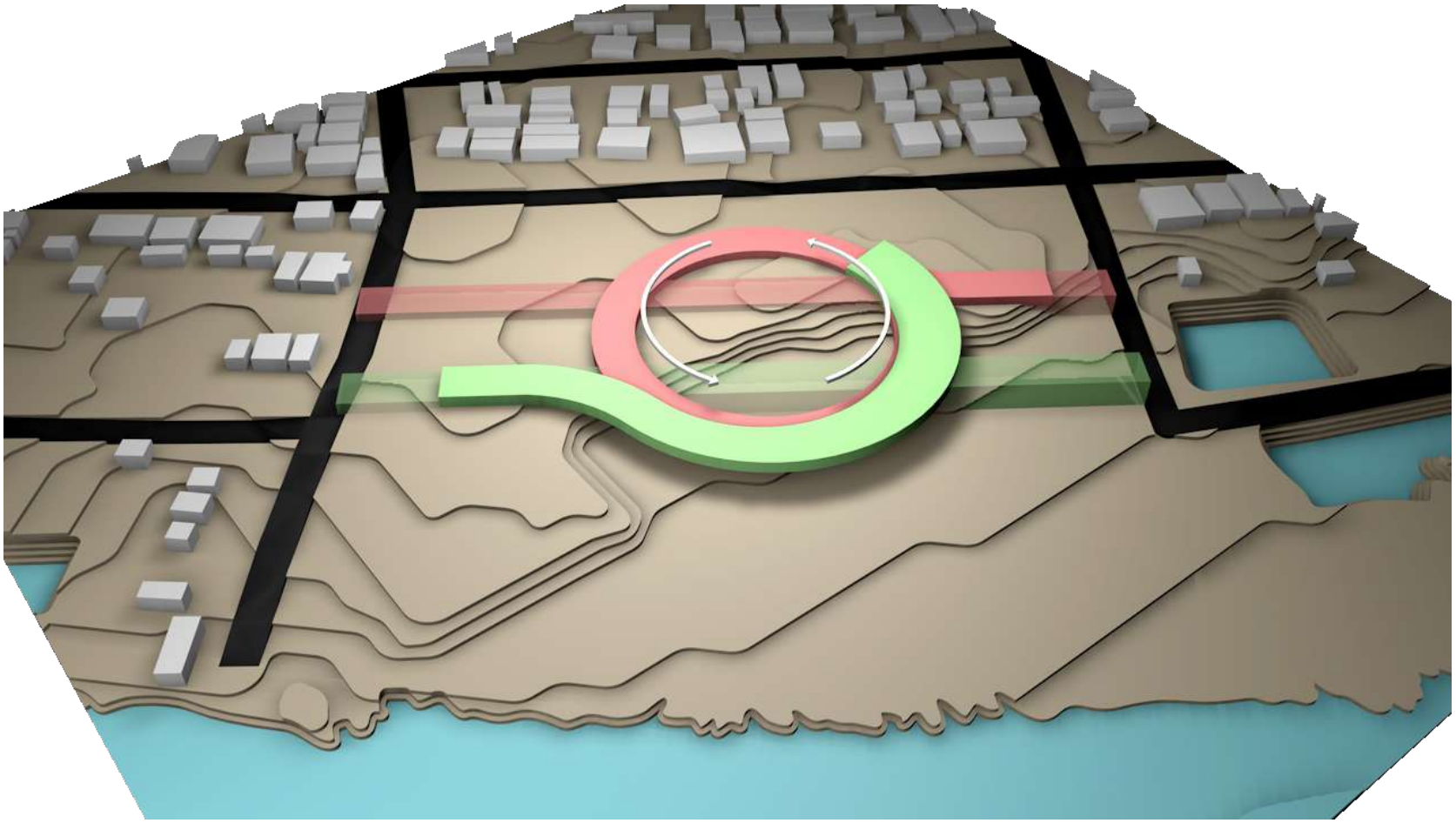
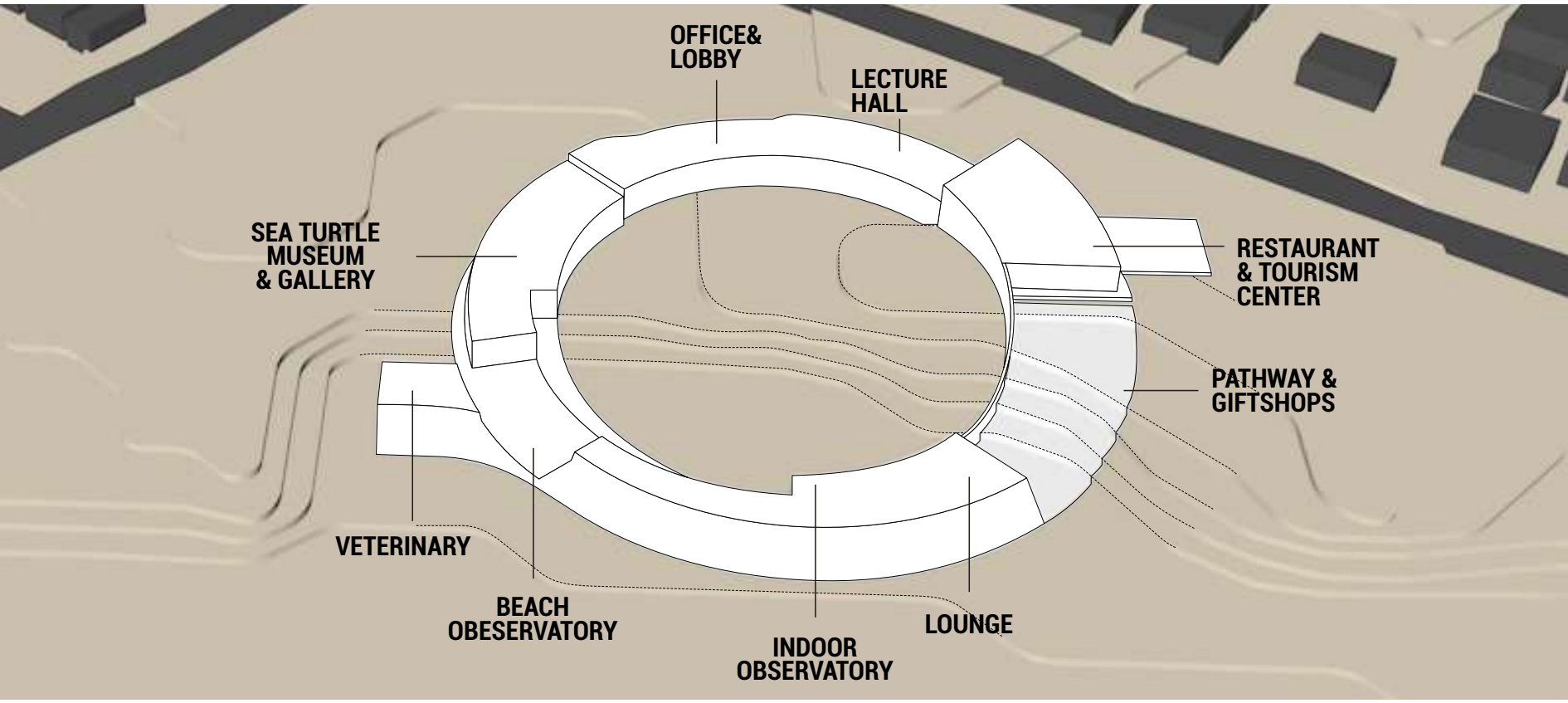


Figure 53. Alternative Building Mass Transformation 2
Source: Writers, 2022

So, let's remind ourself to where we come from, let's change these kind of thinkings. Let's disturb these lines, because in doing so, we may just 'solve' our environmental problems. Our relatability to nature has made us in a way contionue to destroy it. Which in the long run will obviously harm us. So, lets combine them. In fact lets show the people how this combination is beneficial to us. Let's show that if we do good to the nature, that they will provide even better greatness to us.

VISITOR CENTRE SPATIAL FLOW



Empathy is the ability to understand and share the feelings of another. It develop in a person started from they are a child. Inspired by one of the precedent that intended to teach the visitors to be a green ambassador as they leave the facility, this facilities tried to retold the development of empathy to make the visitor more empathetic or even compassionate toward the sea turtles.

The development of empathy started from how a child started to take their perspective in society. There are 5 steps of this:

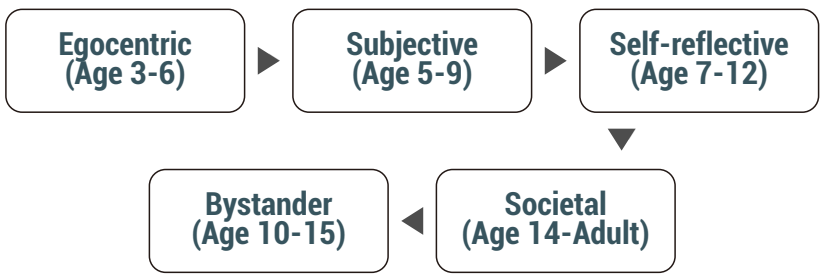


Figure 54. Alternative Spatial Flow Chart
Source: Writers, 2022

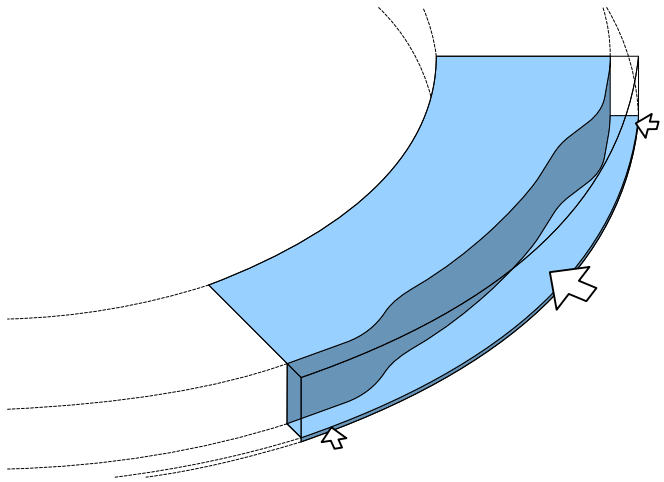
ALTERNATIVE VISITOR CENTRE SPATIAL FLOW

EGOCENTRIC

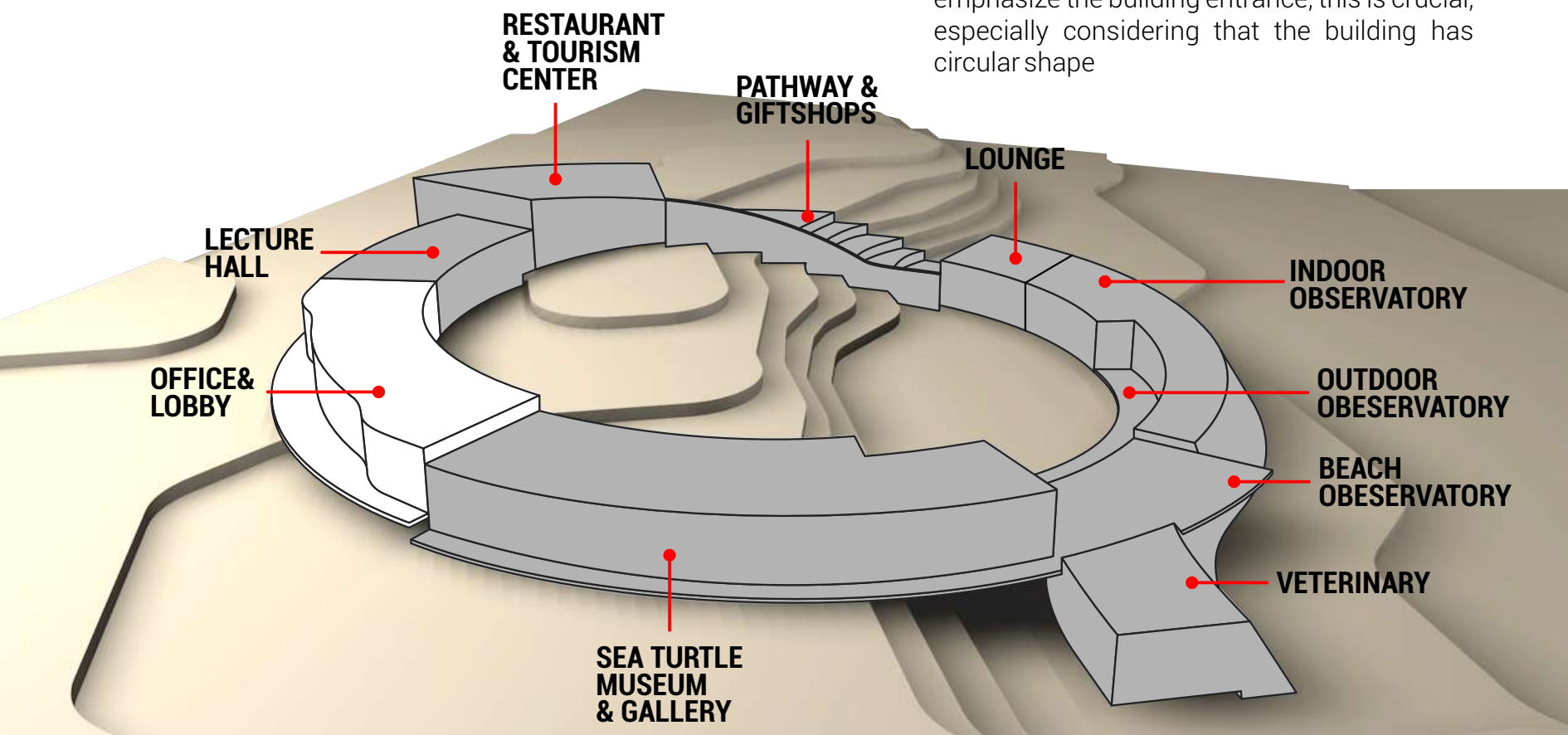
Entering the Facility

It is a condition where one recognized their feelings and thought are disparate amongst individuals. Meanwhile, the subject still finds it difficult to distinguish between the individual.

In this project, the this egocentric state represented by blending the building facade into the natural environment surrounding it. This is done by using natural material of woods and the use of green roof.



Building Mass is pushed backwards to emphasize the building entrance, this is crucial, especially considering that the building has circular shape



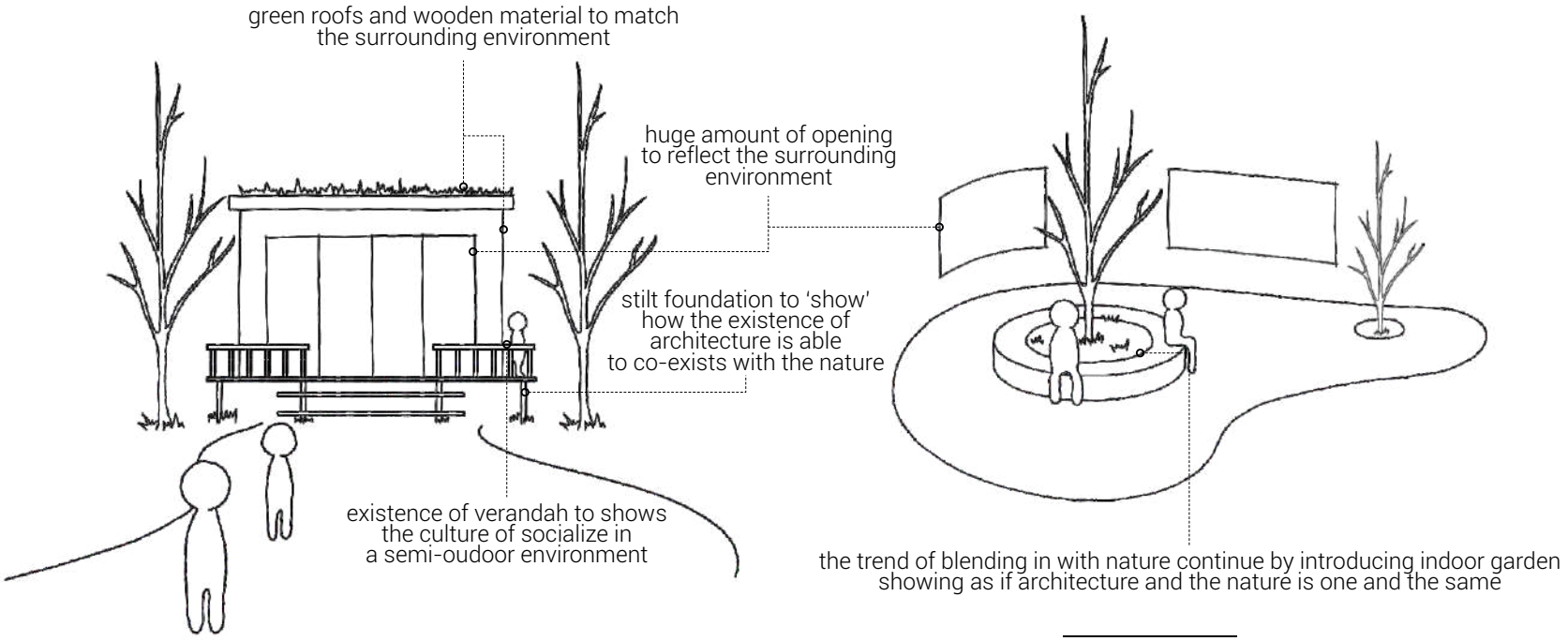


Figure 55. Alternative Egocentric Concept
Source: Writers, 2022

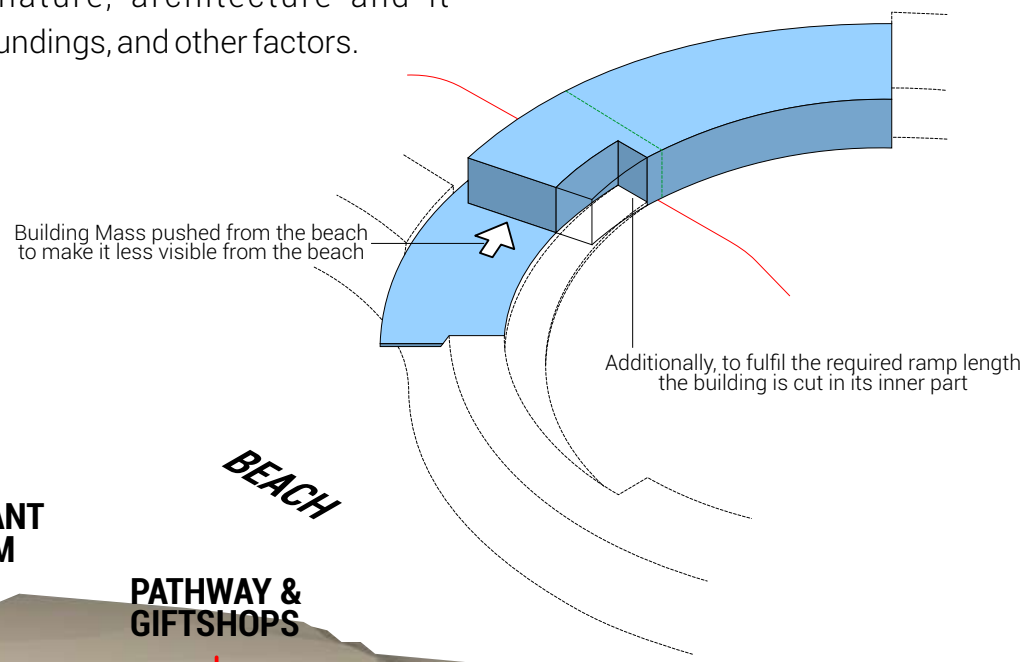
ALTERNATIVE VISITOR CENTRE SPATIAL FLOW

SUBJECTIVE

Sea Turtle Museum

Children are aware that individuals may view things differently as a result of having access to various types of information. Moreover, the youngster might assume that those diverse perspectives may occur because of various information they get. But at some points, children still believe that their opinions are correct.

By presenting natural and artificial materials in the warm and cool color tones, this condition may enhance the contrast between human and nature, architecture and it surroundings, and other factors.



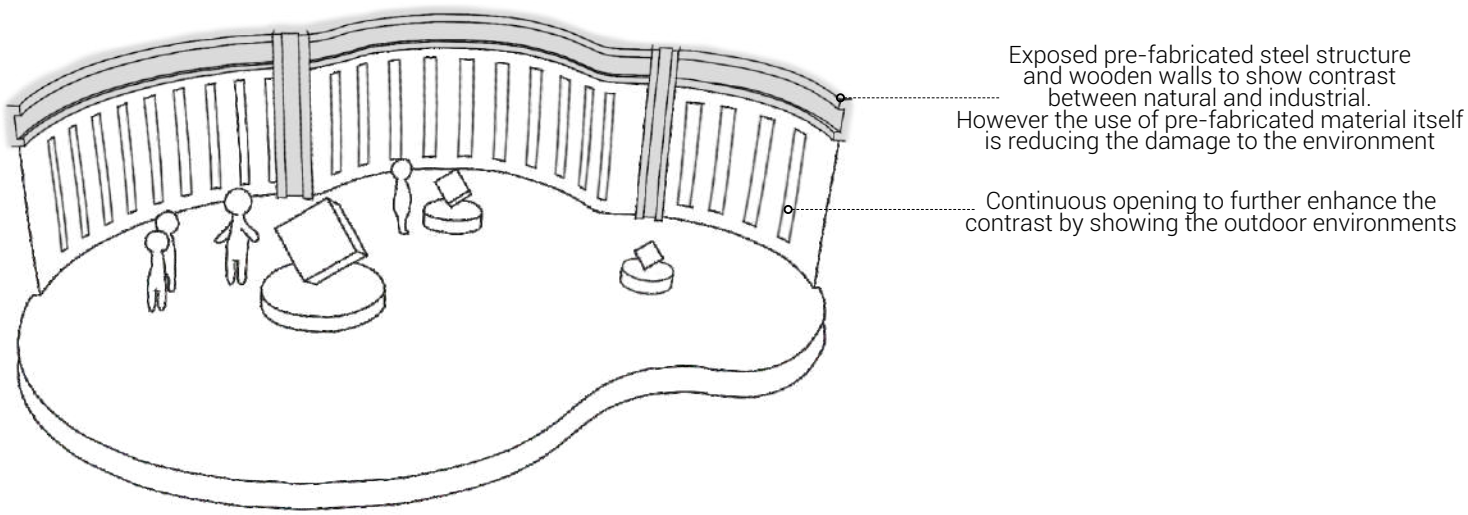


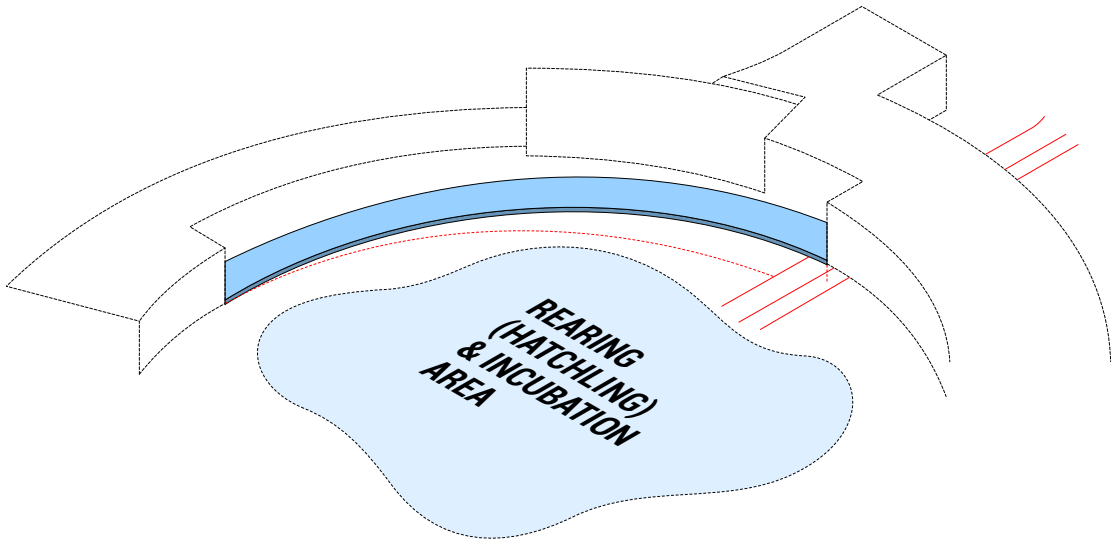
Figure 56. Alternative Subjective Concept
Source: Writers, 2022

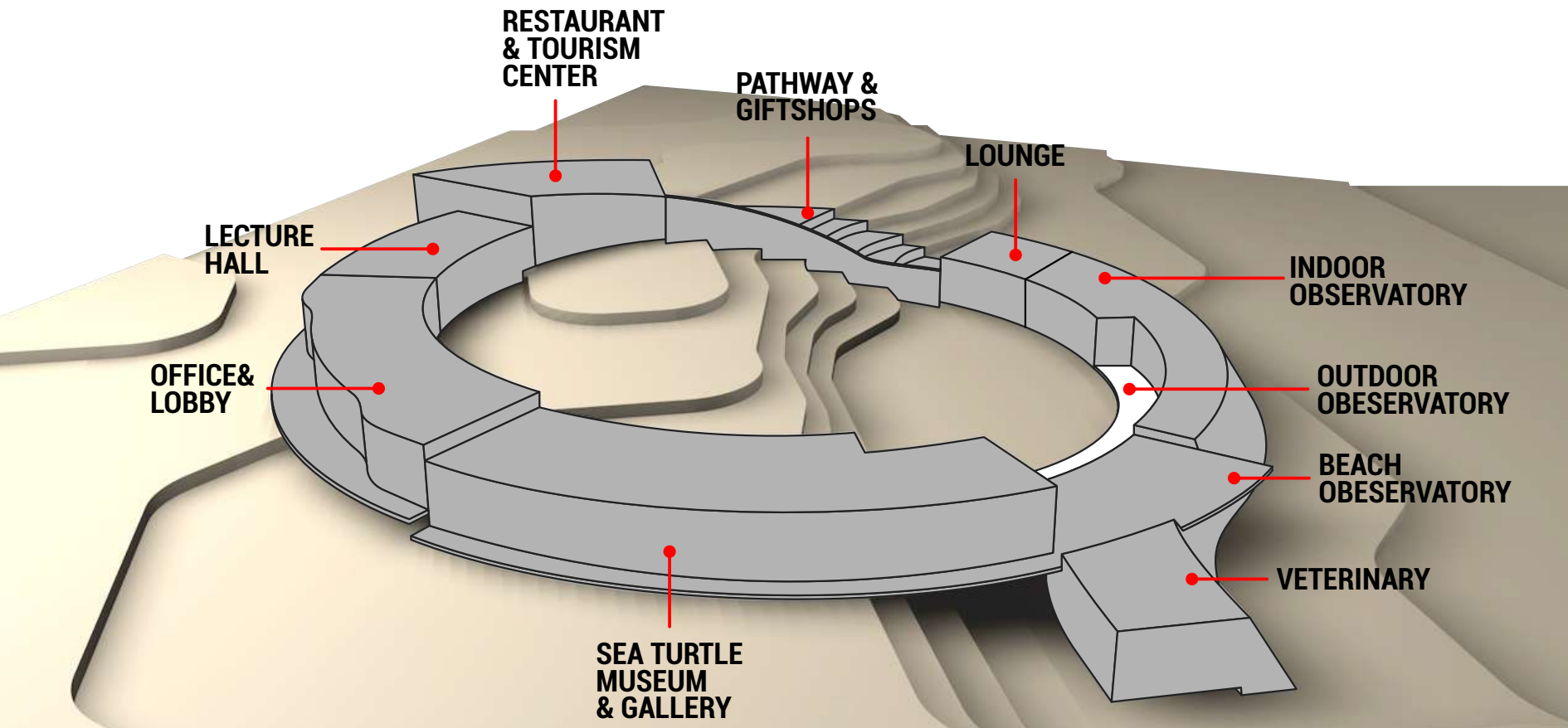
At the subjective stage, visitors are invited to explore information about turtles in general. From the exploration of this museum, visitors will get to know turtles at the surface level. The museum uses an open layout to free visitors to explore. Here, visitors can vaguely see the turtle habitat from the small openings on the side of the building. The hope is that this will increase the curiosity of visitors about the environment outside of their own. This 'curiosity' is one of the first steps to increase their empathy.

ALTERNATIVE VISITOR CENTRE SPATIAL FLOW

SELF-REFLECTIVE

Outdoor Observatory





Everyone can have a different perspective, but any differences can also be justified based on the given situation. Children can observe the ideas, feelings, and behavior from the perspective of another person when they attempt to put themselves in someone else's shoes. Children realize that other people can do the same thing. As a result, they are able to consider multiple viewpoints from both their own perspective and another person's point of view, allowing them to weigh the benefits and drawbacks of each perspective. Knowing what is lacking can encourage children to consider various perspectives at the same time.

At this stage, visitors are invited to get out of their 'comfort zone'.

them to experience the life of sea turtles on land. Visitors are invited out of the building and walk on the ramp and see the turtles being conserved. It is hoped that visitors will be able to understand more about the differences in their lives and increase their empathy for sea turtles.

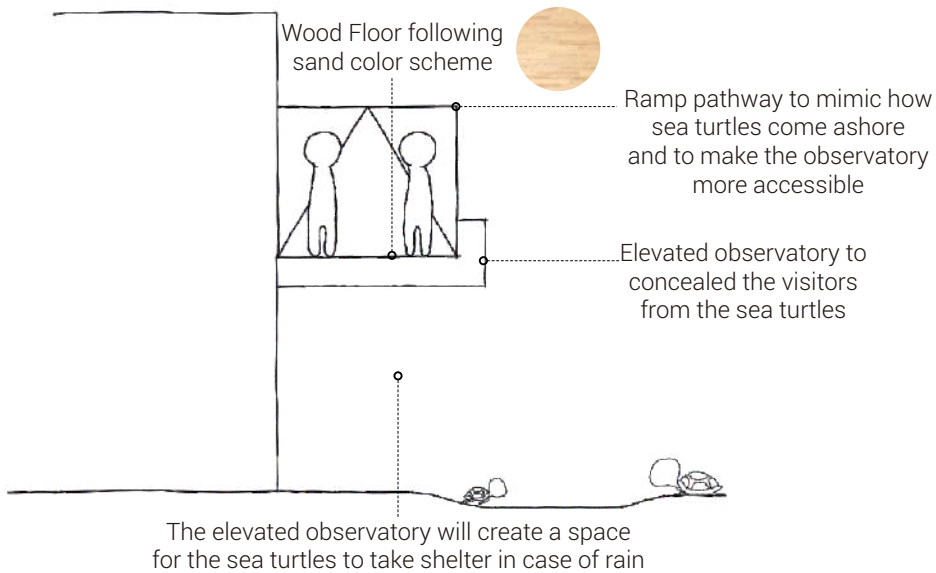


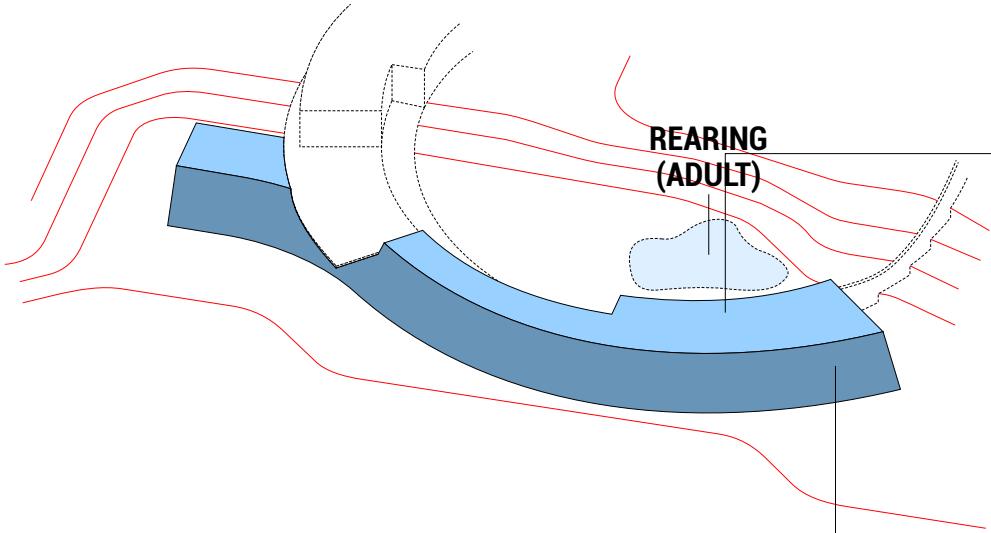
Figure 57. Alternative Self-Reflective Concept
Source: Writers, 2022

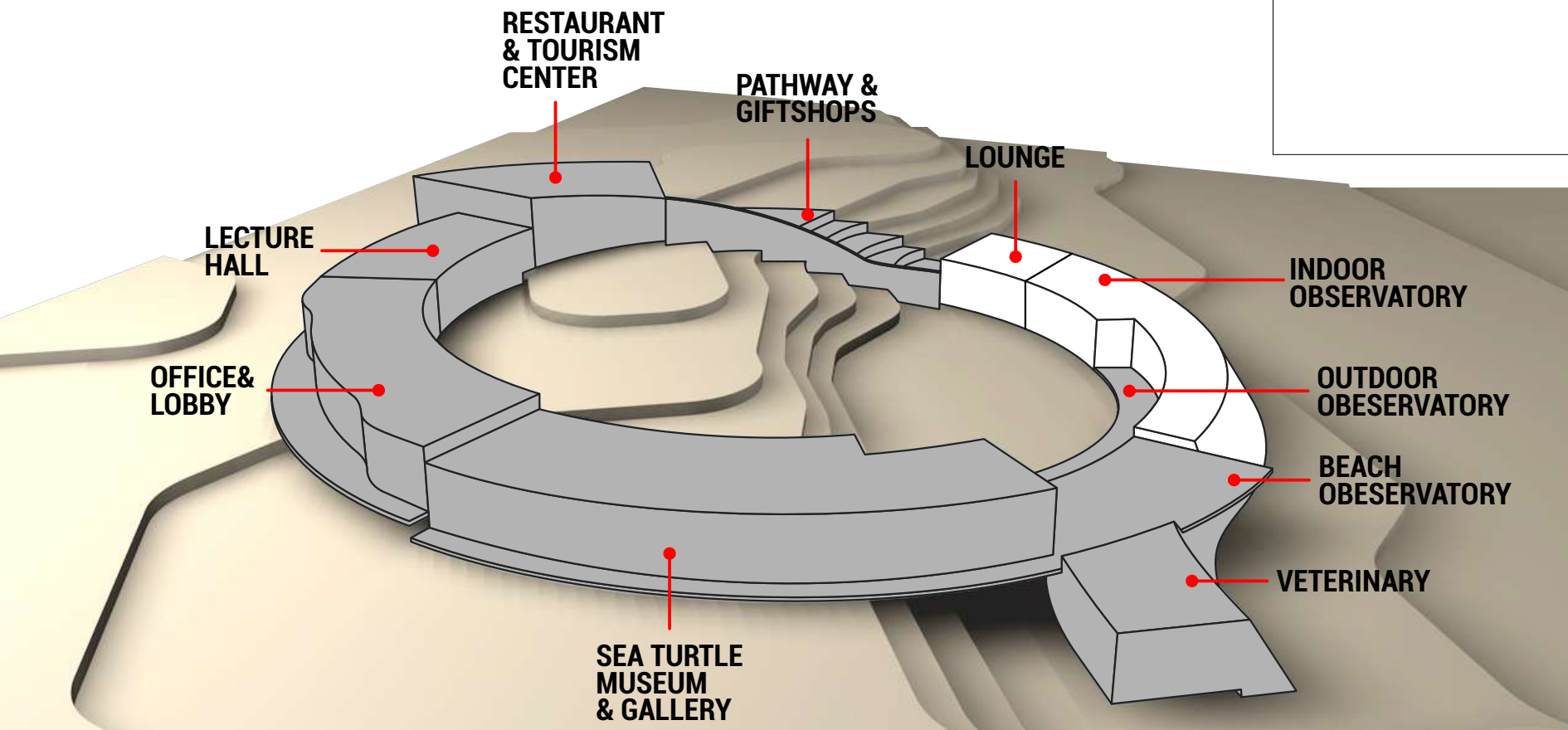
ALTERNATIVE VISITOR CENTRE SPATIAL FLOW

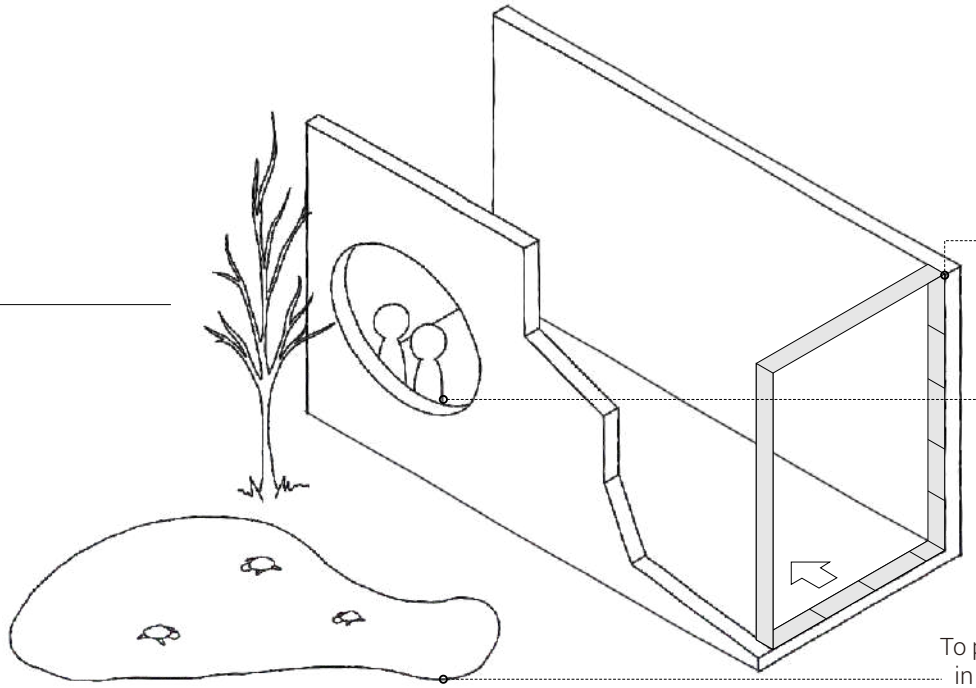
BYSTANDER

Indoor Observatory

Children may picture how themselves and the others could appear to a third, unbiased party by stepping outside of a two-person context. They have a comprehensive view of everything and are aware that everyone has a unique perspective.









By using plank woods as cladding that arranged in the similar direction for the ceiling, walls, and floor; the design create a continuous patterns that creates unity and represent the idea of 'bigger picture'

The visitors are put in a corridor to observe the conservation activities such as the sea turtles incubation and rearing

To put the nature first, rather than confine the hatchling in chambers as the conventional ways, the hatchling are grown in an open environment with still having walls surrounding the area for safety.

Adapting amphibious house's foundation into stilt foundation rather than planted one

Sand dune to disguise the building from the sea; to function as water breaker; and to help with water absorption in case of a flood

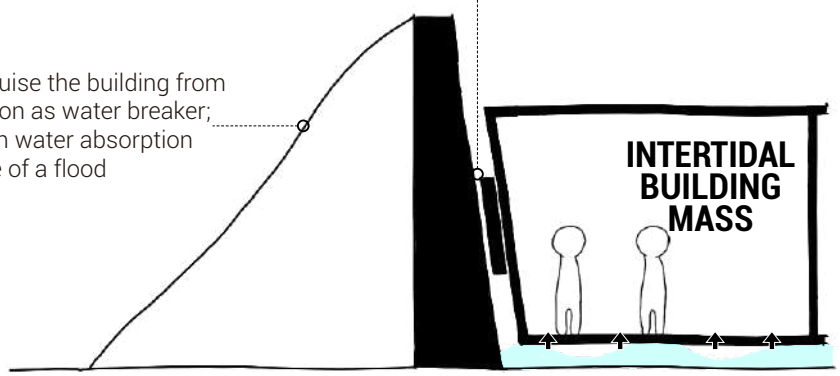


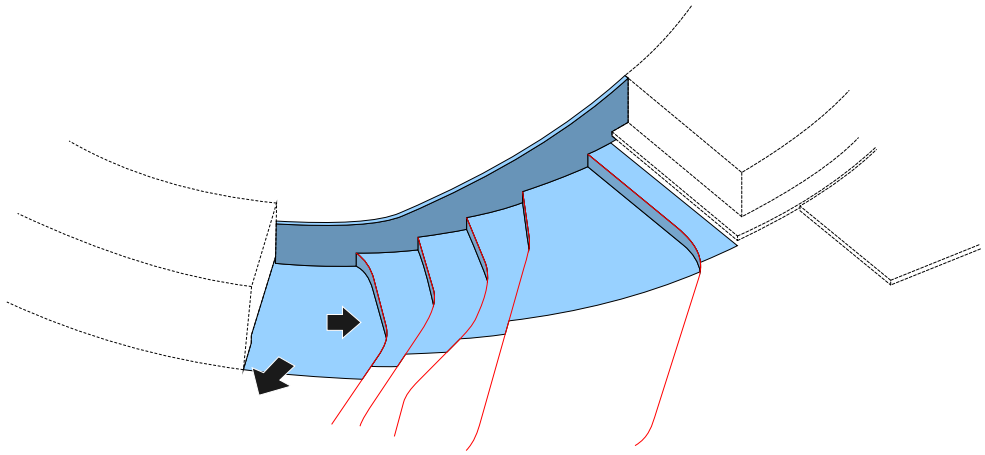
Figure 58. Alternative Bystander Concept
Source: Writers, 2022

ALTERNATIVE VISITOR CENTRE SPATIAL FLOW

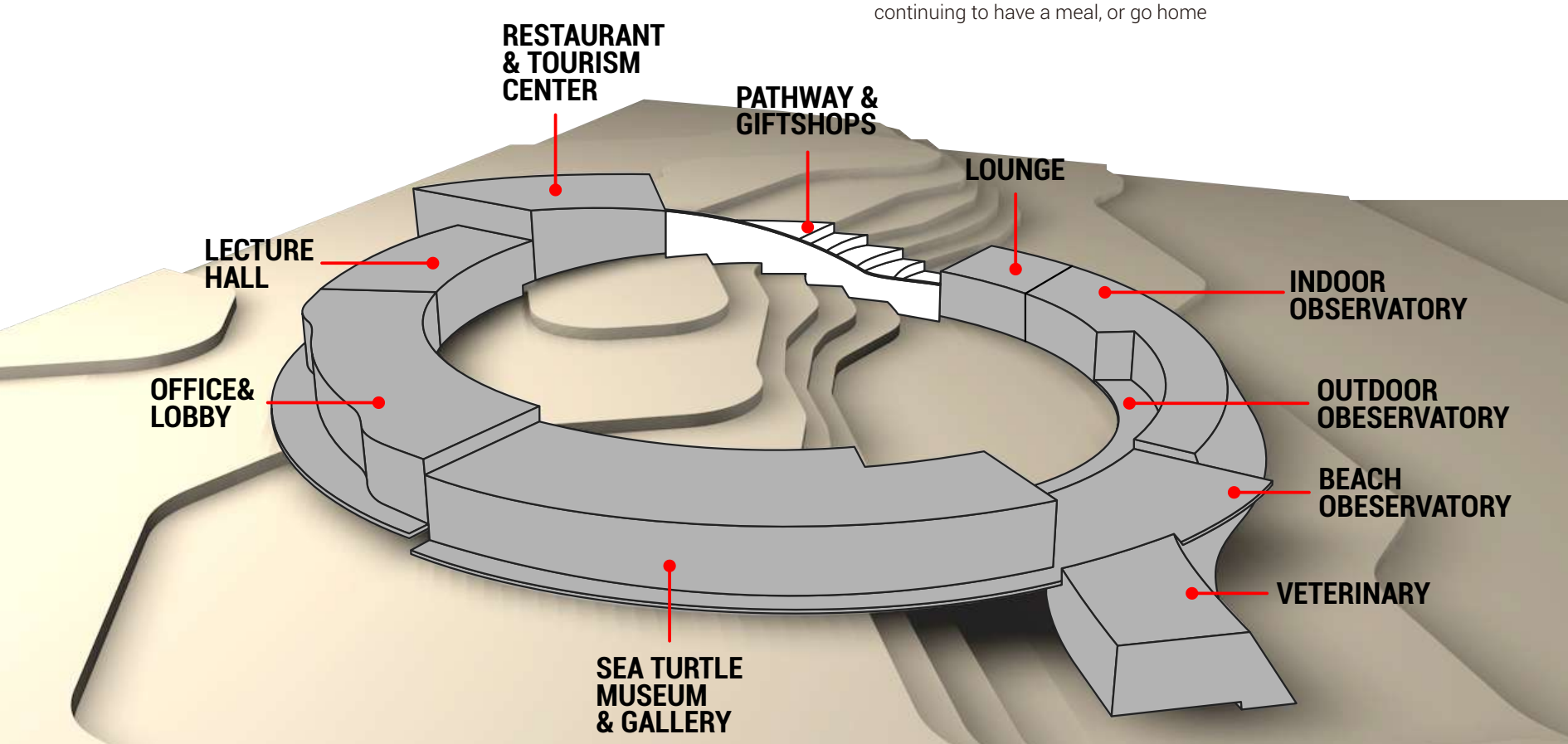
SOCIETAL

End of Tour

People are aware that one or more systems of wider social values can have an influence on taking a third-party perspective. One may comprehend that certain values are desirable and others are undesirable. However, people prefer to view perspective that is informed by desirable values.



At the end of the tour, the area are left open to give visitors option to explore the beach, continuing to have a meal, or go home



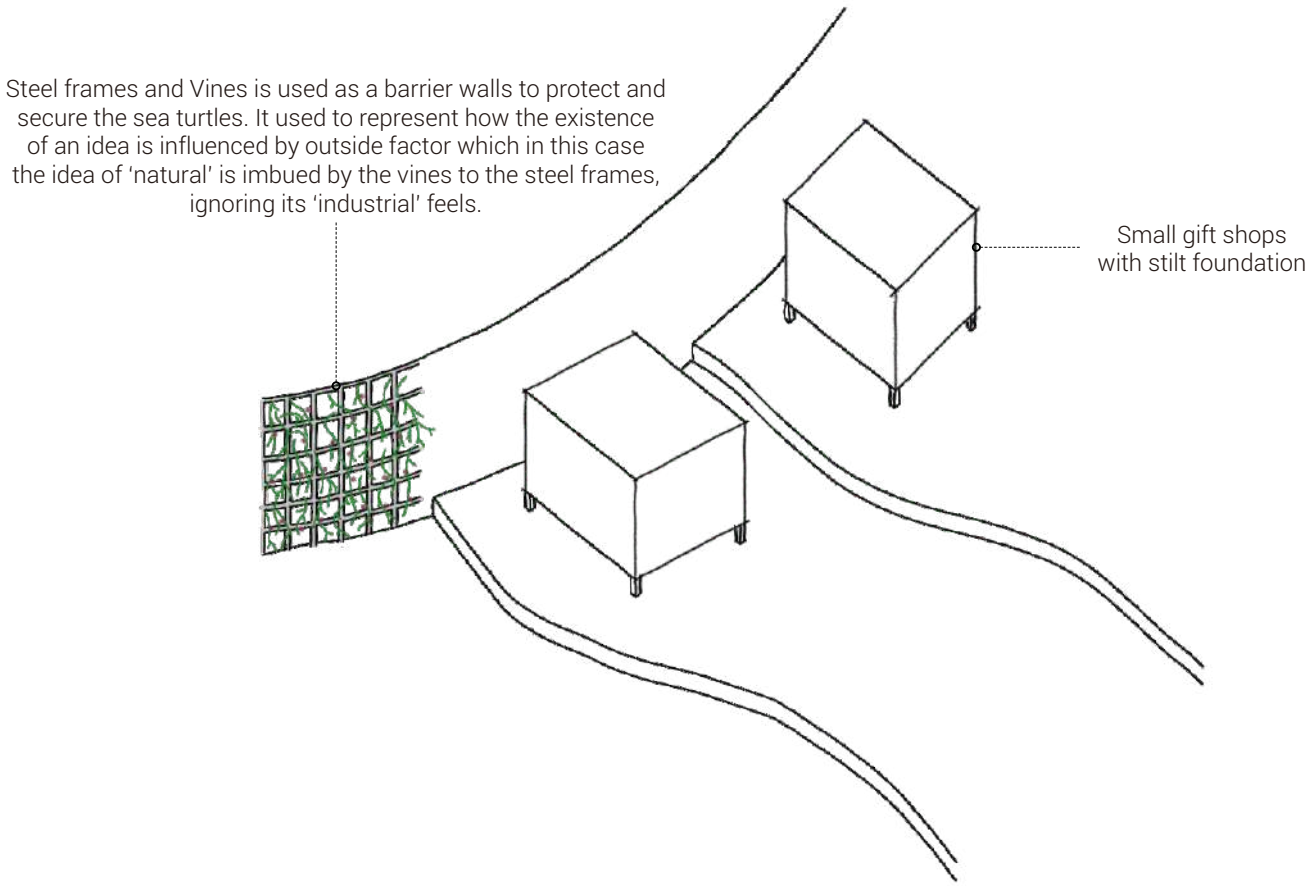


Figure 59. Alternative Societal Concept
Source: Writers, 2022

STRUCTURAL CONCEPT

Intertidal Structure

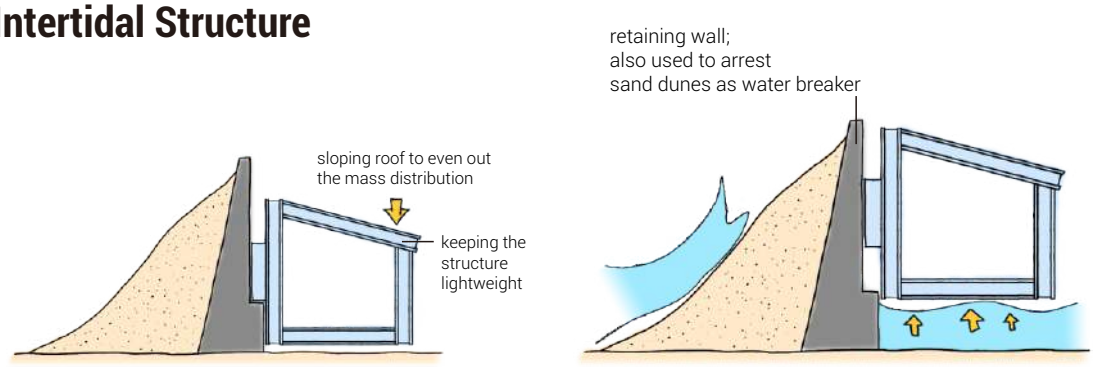


Figure 60. Alternative Structural Concept
Data Source: Writers, 2022

The site is separated into 2 areas based on the condition of the waves; Supratidal and Intertidal. Intertidal location is nearer to the shoreline and most often than not lower than the former. This makes the intertidal locations more prone to get hit by tidal waves and floods. Therefore, in the intertidal areas, there will be needed special structure that can help the building to sustain these conditions.

Fortunately, there is a precedent that has been able to deal with these sorts of problems. A building can be created using amphibious structures to let the building able to float during a flood. However, this structure is not speaking ecology since the foundation of the structure will occupy a big chunk of the land and make it harder to absorb water.

This design is purposing an adaptation of this amphibious structure. Rather than having the foundation planted on the ground, the side foundation will be applied by resting the building on a retaining wall. However, the existence of retaining walls may still not be worth the damage that they cause to the environment. Therefore the retaining wall will also be used as a water breaker. It is applied by resting sand dunes on the other side of the retaining walls. Doing so, the retaining wall structure will not only protect the building but also protect the sea turtle conservation site that is located near the intertidal building location.

Using the purposed design, the building weight should be kept lightweight and able to resist water damage. Therefore, the building would be better constructed using a prefabricated lightweight steel structure. And considering how it will use a one-sided foundation, the building mass will be arranged with the side that is far from the foundation to be shorter. It is intended to distribute the weight of the building better.

As for the supratidal area, the risk of tidal waves is not as high but definitely still exists. Therefore, In the area, the building should be built using a stilted structure. Other overall better for the environment, the terraced land will help with water absorption in case of a flood.

BUILDING MASS TRANSFORMATION

DESIGN THAT FIT ITSELF INTO THE EXISTING NATURAL PATTERNS

People have a role that needs to be fulfilled in a natural setting so that harmony between both can be achieved. This refers to the human role as a 'Khalifah' that revolves around Islamic teaching. This role taught Muslims to be representative of their God on Earth. Moreover, one of the parts of this role is to prosper and protect nature. Ecological Architecture helps people to fulfill this role. Furthermore, it helps people to fit themself into the existing natural environment.

In this modern world, more often than not, people see themselves as an entity that is separated from nature. People see themselves and nature as parallel lines. They exist together but never once connect with one another. People couldn't literally talk to nature or nature to people. Even though it is clear where people stand, they always are part of a larger ecosystem that includes any form of the natural environment.

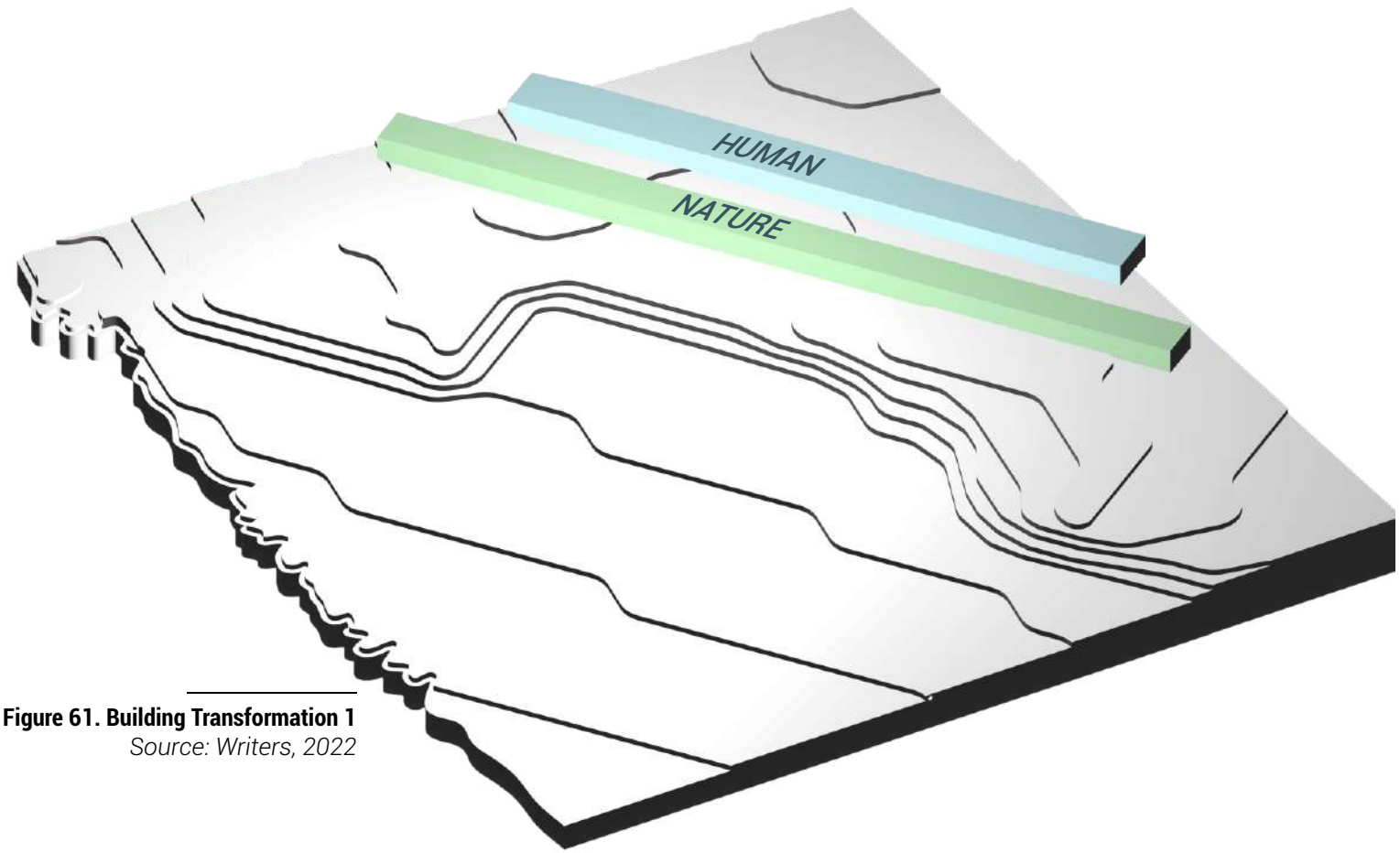


Figure 61. Building Transformation 1
Source: Writers, 2022

So, let's remind people of where they come from, and let's change the idea that separates people and nature. Let's disturb these lines. Because doing so, may just 'solve' environmental problems. The dependency of people on nature has made them in a way continue to destroy it. This dependency will become a relatability that will harm the people in the long run. As an Ecological design is a design that can 'teach', let's represent it by combining both lines that represent people and nature. Let's make the combination beneficial to the people, as well as to nature. Let's show people that if they treat nature well, it will provide even better greatness for them.

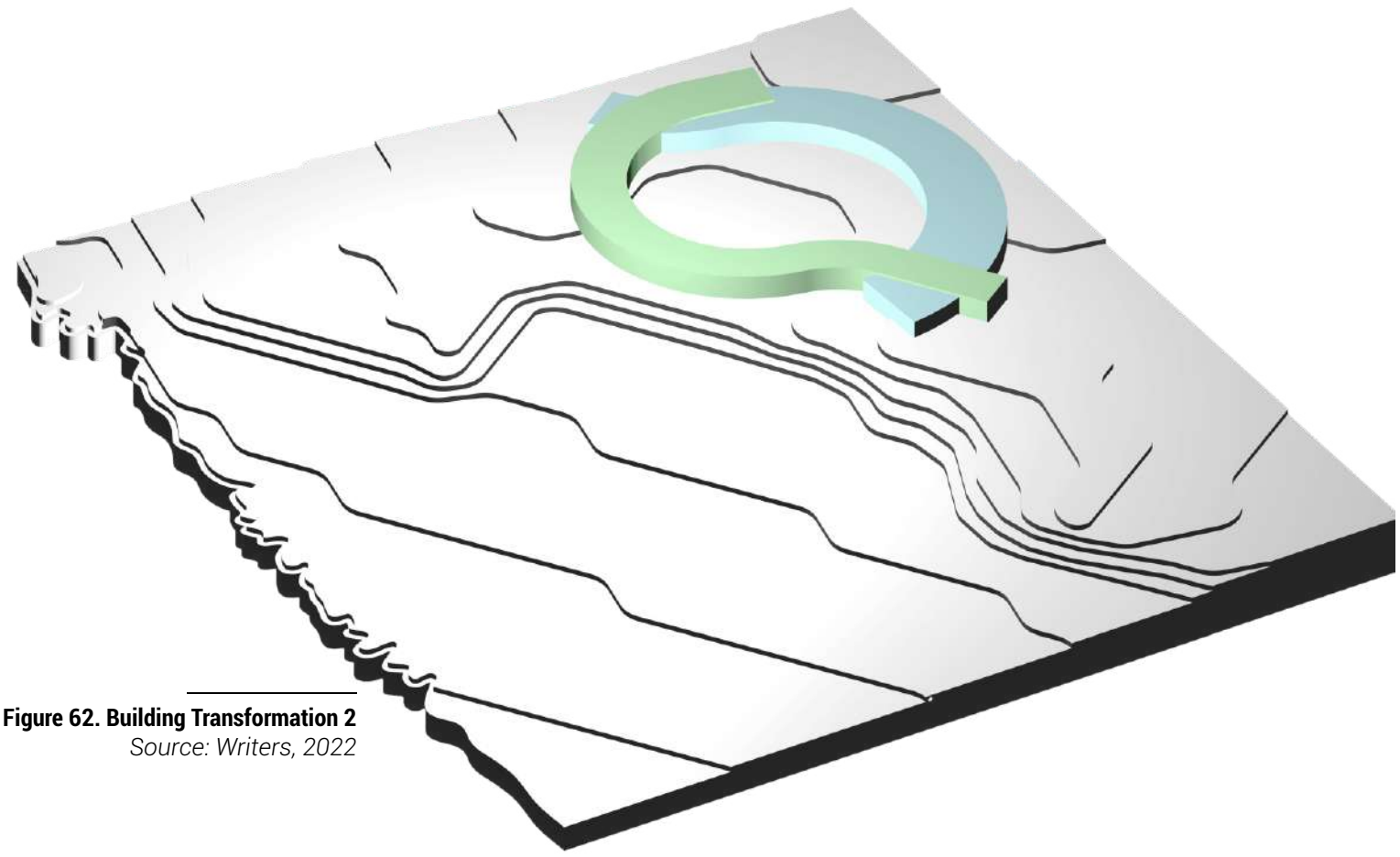


Figure 62. Building Transformation 2
Source: Writers, 2022

In this alternative, the masses will show the main idea of connection by intersecting these 'lines' that represent people and nature vertically. Each 'line' will function to provide a different function. The 'line' that represent human will accommodate the facility of the visitor center. The 'line' that represents nature will function as a place where activities in regard to protecting some form of nature are conducted. Both of the masses mentioned will circle a landscape that will be used as the main function of the project, namely sea turtle conservation. Doing so, represent how the correlation between people and nature can be beneficial for the greater good.

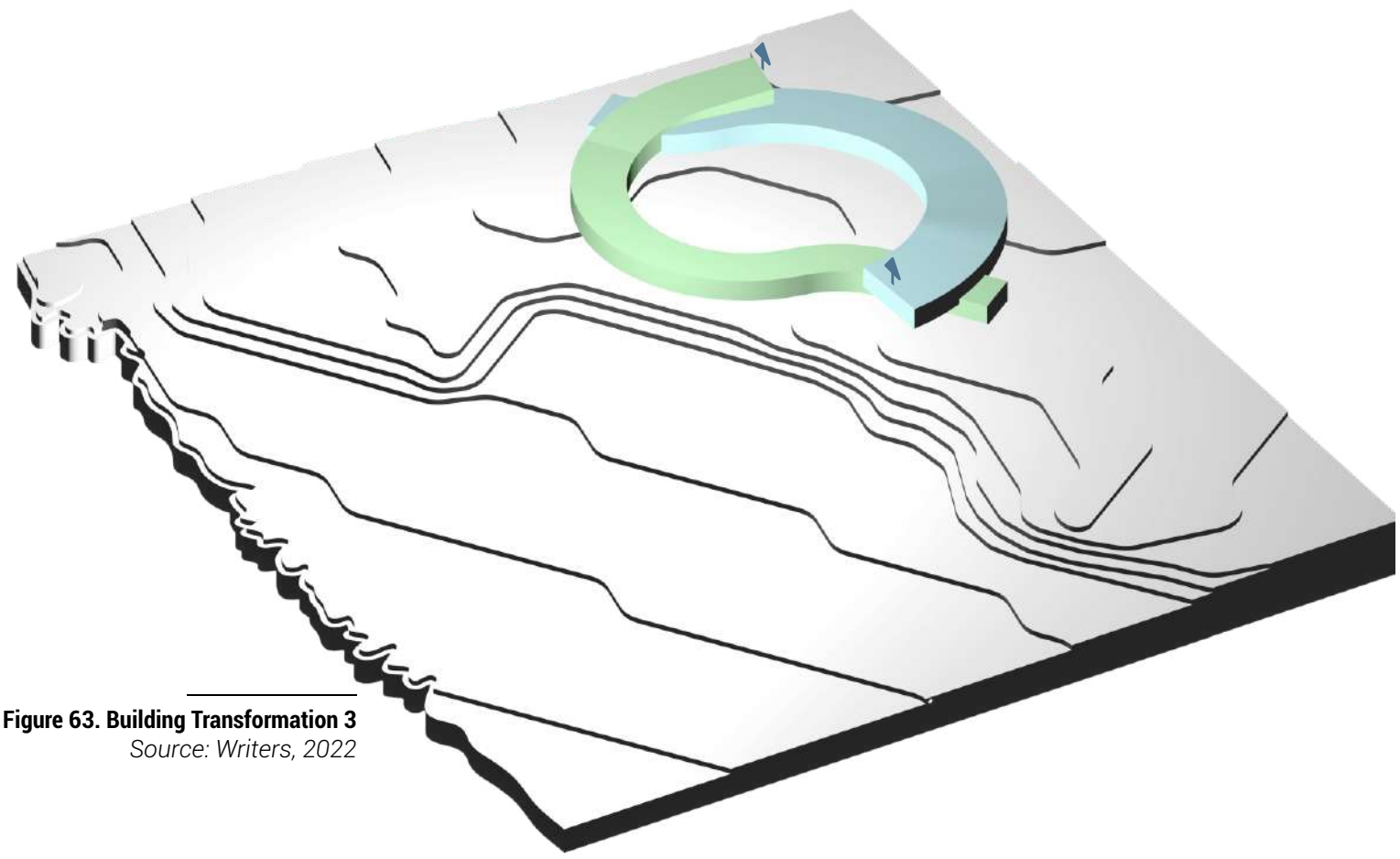
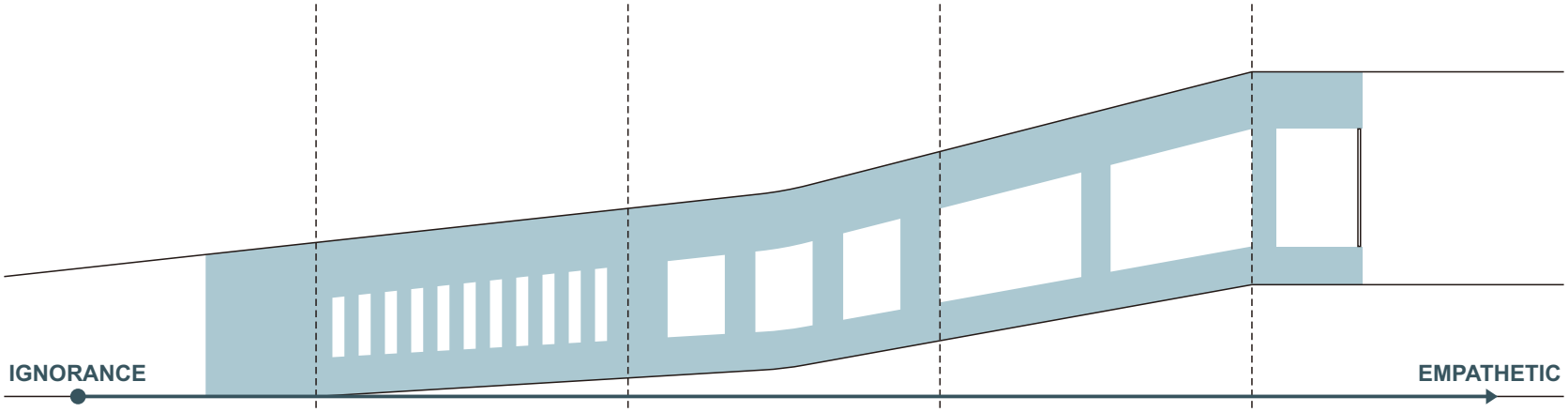


Figure 63. Building Transformation 3
Source: Writers, 2022

ECOLOGICAL CONCEPT

VISITOR CENTRE SPATIAL FLOW

DESIGN THAT EDUCATES: DEVELOPING EMPHATY



Egocentric
(Age 3-6)

It is a condition where one recognized their feelings but still finds it difficult to distinguish between the individual.

Subjective
(Age 5-9)

In this condition, individuals may view other perspectives, but they still believe that their opinions are the correct one.

Self-reflective
(Age 7-12)

The Individual can observe the ideas, feelings, and behavior from the perspective of another person when they attempt to put themselves in someone else's shoes.

Bystander
(Age 10-15)

A person may picture how themselves and others could appear to a third, unbiased party by stepping outside of a two-person context.

Societal
(Age 14-Adult)

People are aware that one or more systems of wider social values can have an influence on taking a third-party perspective.

In a broader meaning, ecological design is a way for people to fit themselves into a natural environment. Ryn and Cowan (1996) mention that ecological design needs to guide people to better understand the connection between culture, nature, and design. By showing nature and its process in the design, it will able to grow awareness of the people. To do this, the design will refer back to one of the precedents used for this project namely the Monarto Safari Park Visitor Centre.

The design will show the connection between natural culture and humans as a way to become an ambassador for the natural environment. To be more specific

about the context, the project will educate people using architecture and make them more compassionate toward sea turtles. Moreover, after doing the sea turtle educational tour, they can become sea turtle ambassadors.

Empathy is the ability to understand and share the feelings of another. As for compassion, it is the concern for the sufferings or misfortunes of others. One of the bases of developing empathy in a person is their perspective of their living environment. The development of empathy started from a child until they are adults. This development can be separated into 5 main stages.

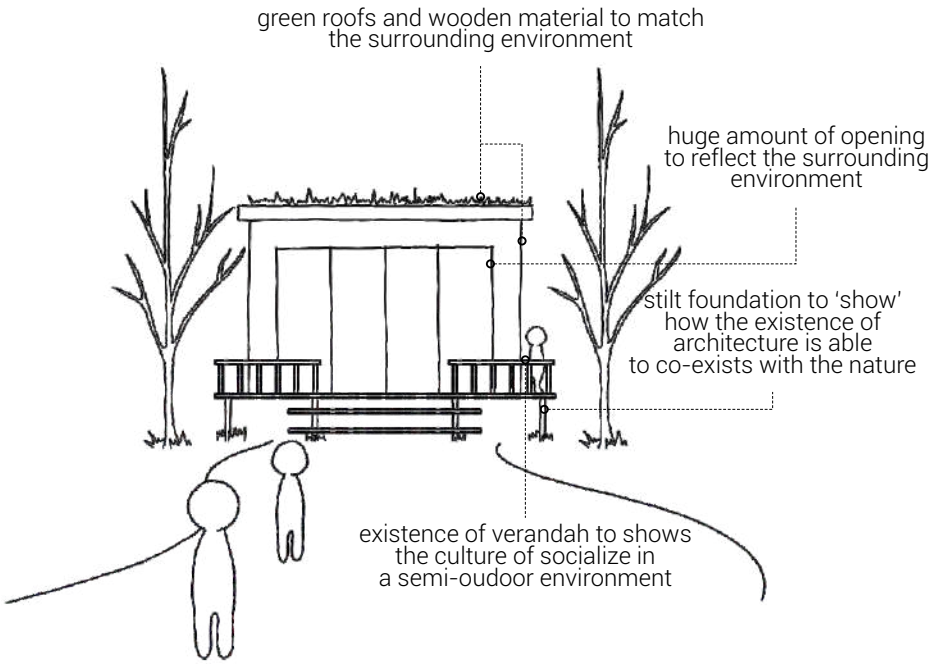
Figure 64. Spatial Flow Concept
Source: Writers, 2022

VISITOR CENTRE SPATIAL FLOW

DESIGN THAT EDUCATES: 1ST STATE, EGOCENTRIC

It is a condition where one recognized their feelings and thought are disparate amongst individuals. Meanwhile, the subject still finds it difficult to distinguish between the individual.

Before starting to develop empathy, a baseline should be defined so that all visitors have at least a similar understanding. This baseline is created by representing the egocentric state that shows how a building and environment can be treated as one and the same. This is done by blending the building, especially the facade, with the surrounding environment. The blending is shown by using green roofs, stilt foundations, and huge openings. The use of green roofs and huge openings is referring to how an ecological design favors transparent technology that can directly teach the visitors.



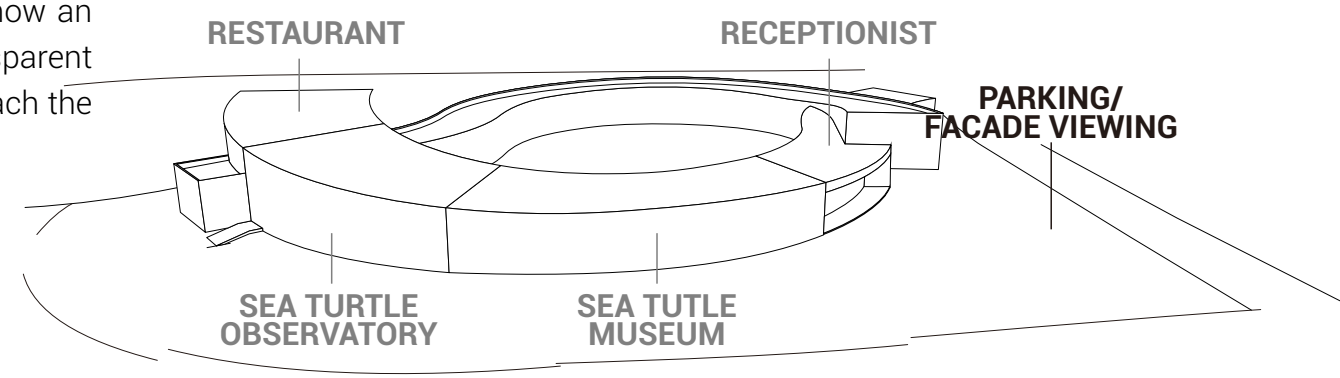
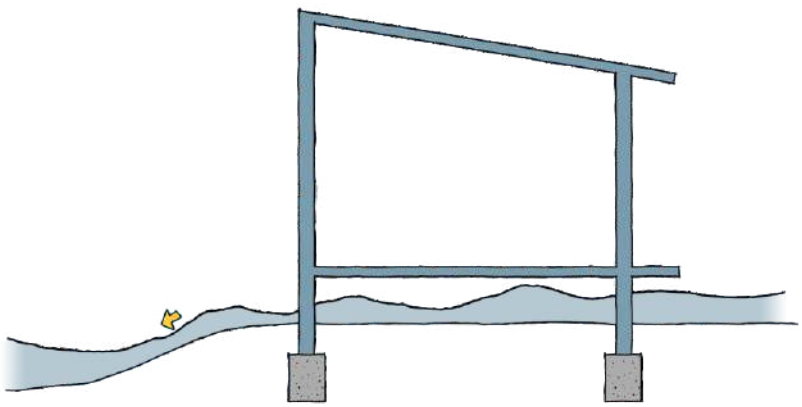


Figure 65. Egocentric Concept
Source: Writers, 2022

STILT FOUNDATION: MINIMIZING NEGATIVE IMPACT ON THE ENVIRONMENT

One of the most harmful things to the environment is the existence of buildings. However, the negative impact of a building can be minimized. Stilt foundation is one way to do it. Stilt foundation refers to pile or pedestal foundations that are used for elevated buildings that are usually implemented on a building located in a coastal area or an area that is prone to flooding.

A building stands on a foundation. This foundation is usually placed underneath the earth's surface making the building sit covering all the ground surface of the building area. Elevating the building will minimize the ecological footprint. This means that the ground that otherwise will use for the building to stand can still function as a drainage. Not to mention, by having the building mass elevated, the wind and water flow will be less disturbed compared to the building that is directly placed above the ground.



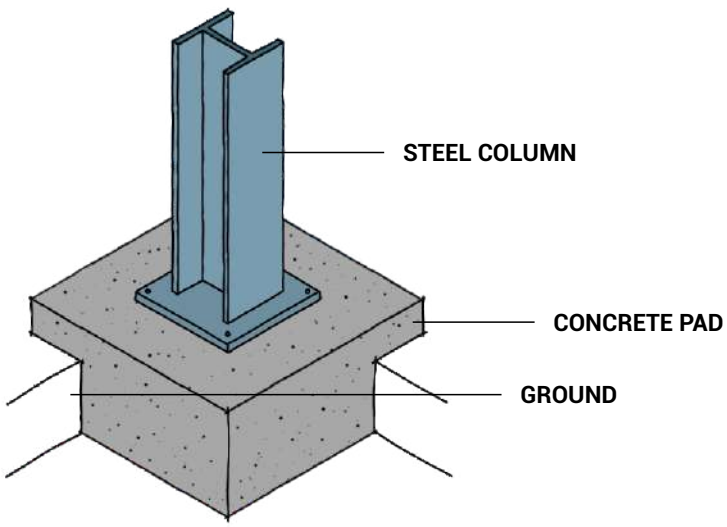


Figure 66. Stilt Foundation Concept
Source: Writers, 2022

VISITOR CENTRE SPATIAL FLOW

DESIGN THAT EDUCATES: 2ND STATE, SUBJECTIVE

Children are aware that individuals may view things differently as a result of having access to various types of information. Moreover, the youngster might assume that those diverse perspectives may occur because of various information they get. But at some points, children still believe that their opinions are correct.

To encourage the visitors to go to the next step, the visitor will encounter a semi-closed partition wall that reveals and tease the next destination, which is the museum. The reason to do this is so that it can intrigue the visitor, giving them a sense of curiosity. The sense of curiosity itself plays a big role in developing empathy in a person.

The pertation wall will use glass and wood to completely separate the area. This is mainly done to give it the sense of a 'checkpoint' when they enter the museum. Wooden material is chosen to introduce warmth that is given by its color. This sense of warmth is used to show and to ensure the harmless in learning.

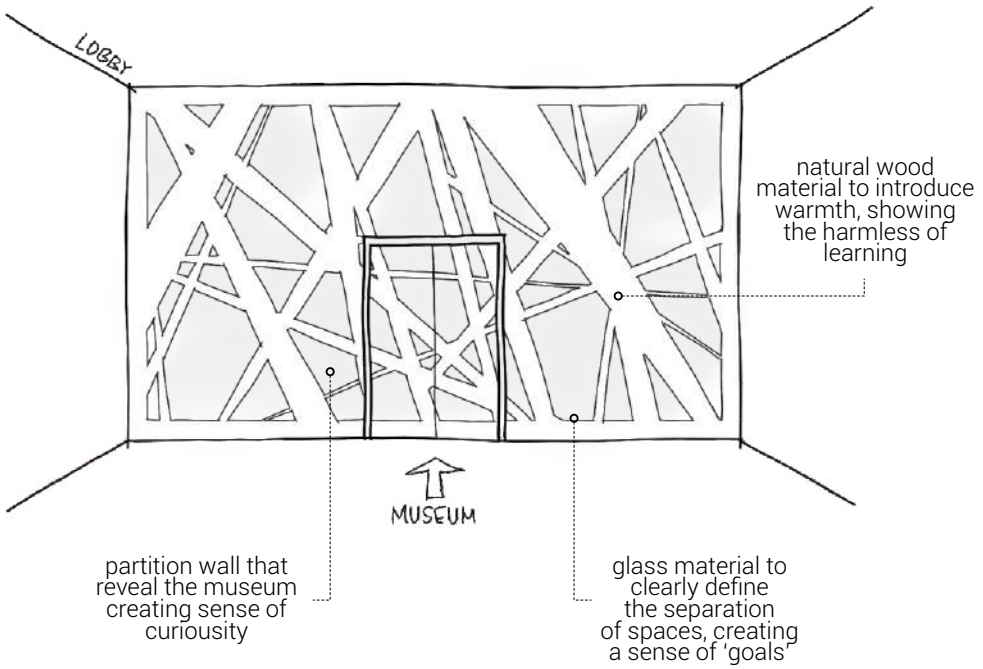
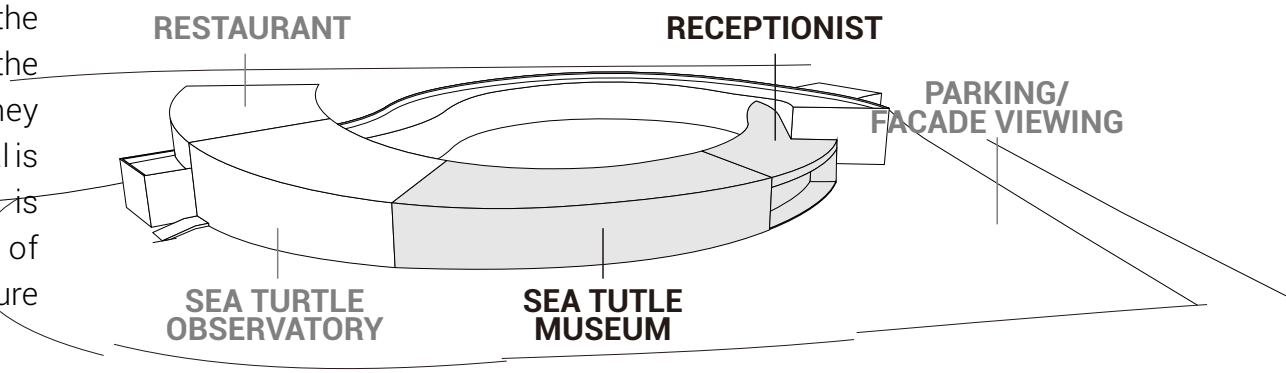


Figure 67. Societal Concept
Data Source: Writers, 2022



CREATING CURIOUSITY: DESIGN THAT EDUCATES

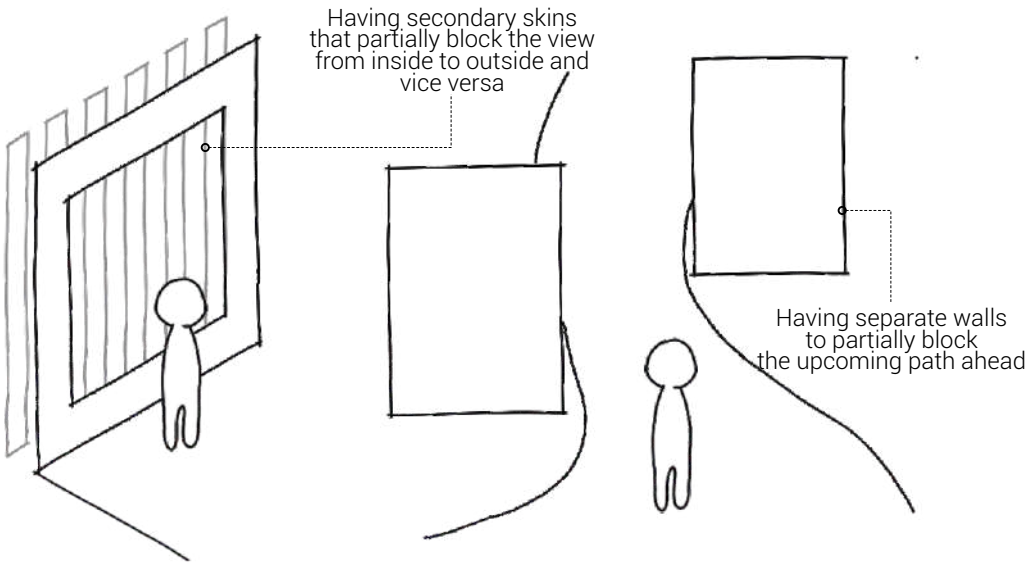


Figure 68. Envelope and Separation Wall Concept
Source: Writers, 2022

According to research by David Beswick in Curiosity: Beyond the Killing of Cats (n.d.), curiosity is the creating, maintaining, and resolving process of conceptual conflicts. These conflicts depend on the difference between the stimulus of the environment with each individual's experience. Architecture uses this curiosity to bind people with an environment through engagement.

Curiosity can be formed by using framed views that create a sense of wonder (Curiosity: Beyond the Killing of Cats, n.d.). It is also can be generated by creating architectural elements that partially seen, Intense lighting at the end of paths, space depth, and multiple levels of height (Lesmes and Hellberg, n.d.). In this project, curiosity is generated using Interior walls and building skins that partially show the upcoming architecture elements.

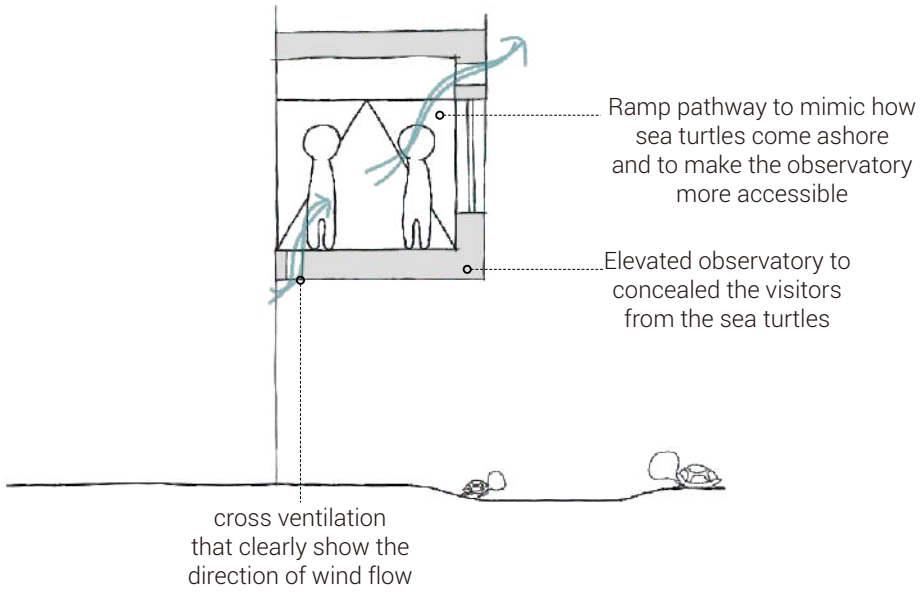
ECOLOGICAL CONCEPT

VISITOR CENTRE SPATIAL FLOW

DESIGN THAT EDUCATES: 3RD STATE, SELF-REFLECTIVE

Children can observe the ideas, feelings, and behavior from the perspective of another person when they attempt to put themselves in someone else's shoes. As a result, they are able to consider multiple viewpoints from both their own perspective and another person's point of view, allowing them to weigh the benefits and drawbacks of each perspective.

The observatory area will give the visitor the time to observe the sea turtle. Using their base understanding of sea turtles from the museum, the visitor is encouraged to experience how sea turtles nest by having ramp and sand-colored flooring. This experience is done to make them feel more relatable toward the sea turtle. By making the visitor more relatable, they will understand more about sea turtles and be more empathetic towards them.



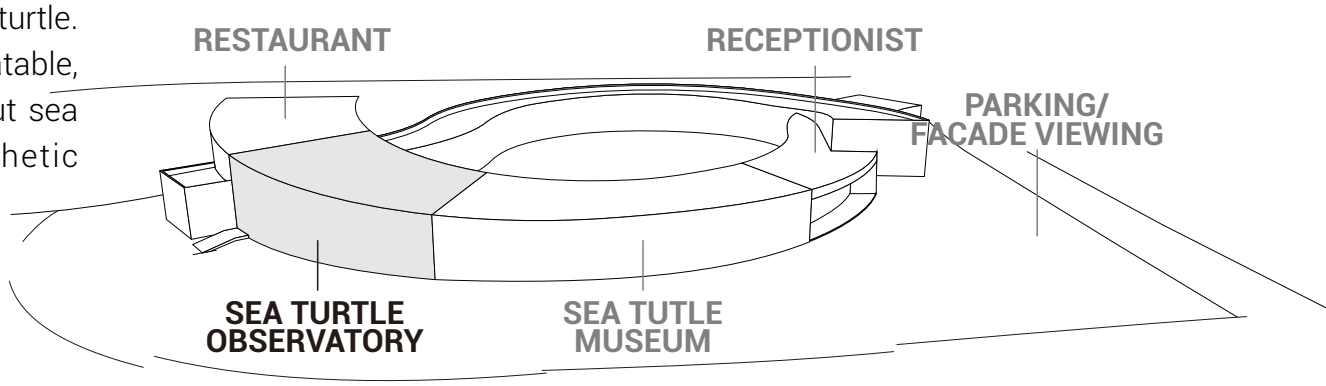


Figure 69. Self-Reflective Concept
Source: Writers, 2022

CROSS VENTILATION: DESIGN THAT EDUCATES

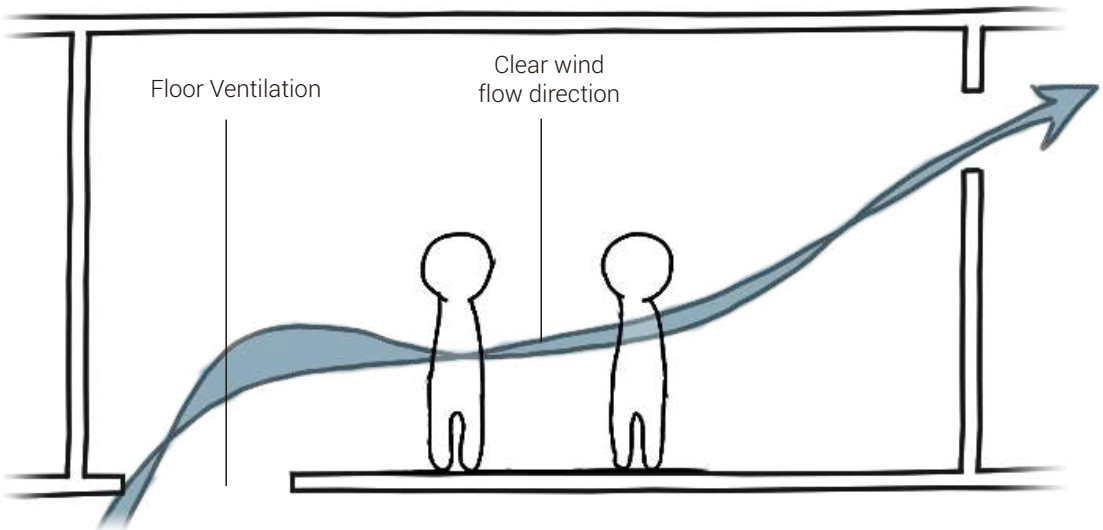


Figure 70. Cross Ventilation Concept
Source: Writers, 2022

In addition to the visual experience, the user will also experience using their skins. In an ecological design, it is common to 'show' a natural process of wind and water flow, natural lighting, thermal control, etc. In the observatory area, the user will be presented with how the wind flow; how the building is ventilated by having cross ventilation as a transparent technology; and how the speed of the wind will increase the higher they go.

To show clearly the wind direction, one of the openings will be located underneath the building (on the slab). This decision is made to take advantage of the stilt foundation that the building has. By having one of the openings underneath, the direction of the wind flow can be felt clearly by the visitors. This experience itself chosen in the observatory considering how it is the only part of the building that is elevated enough without any restriction below (compared to other parts of the building).

ECOLOGICAL CONCEPT

VISITOR CENTRE SPATIAL FLOW

DESIGN THAT EDUCATES: 4TH STATE, BYSTANDER

Children may picture how themselves and others could appear to a third, unbiased party by stepping outside of a two-person context. They have a comprehensive view of everything and are aware that everyone has a unique perspective.

In continuation of the previous state, this state also happens in the observatory area. The sloping slab gives them a view as they move further and higher. The wider view gives them a sense of purpose and encourages their movements. As they go higher, they can see more about how conservation activities in the facility are conducted.

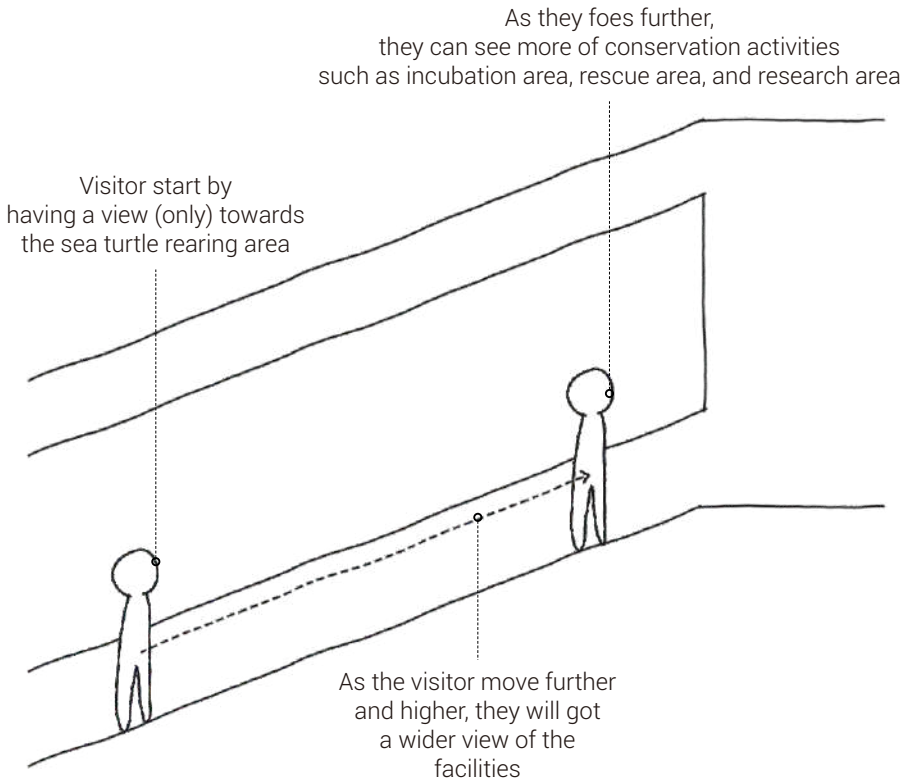
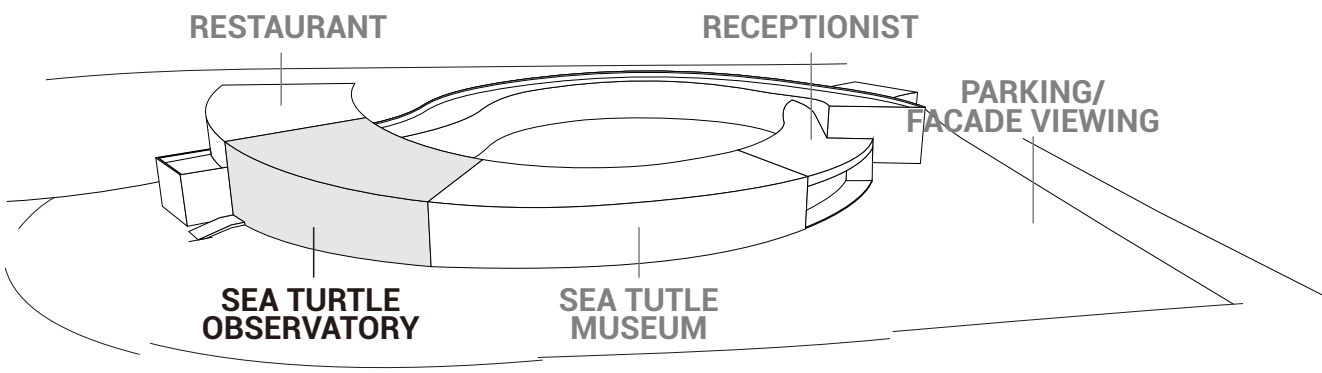


Figure 71. Bystander Concept
Source: Writers, 2022

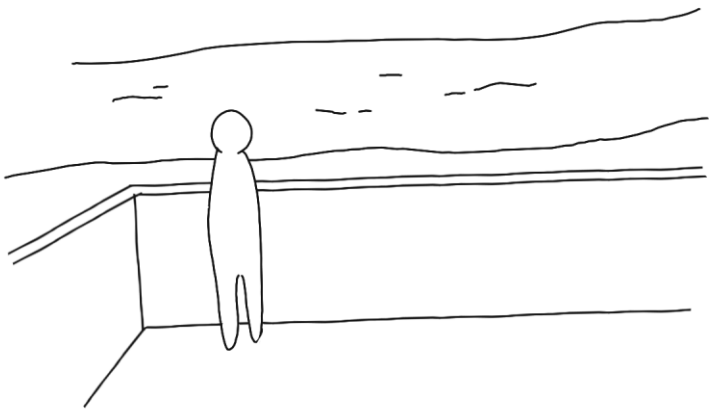


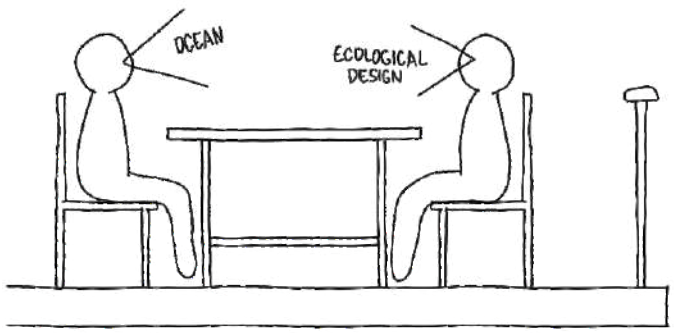
VISITOR CENTRE SPATIAL FLOW

DESIGN THAT EDUCATES: 5TH STATE, SOCIETAL

People are aware that one or more systems of wider social values can have an influence on taking a third-party perspective. One may comprehend that certain values are desirable and others are undesirable. However, people prefer to view a perspective that is informed by desirable values.

In the last state, the tour is finally finished. The visitors are rewarded for their learning by having a place to rest. The mentioned resting area comes in the form of a restaurant. Here, they can see wider and clear views of nature, especially the sea. This will give them a sense of closure. From the restaurant, the visitors can still explore if they choose to. There is access to the rooftop area where they can appreciate how the building is influenced by the nature and how it shaped the building style.





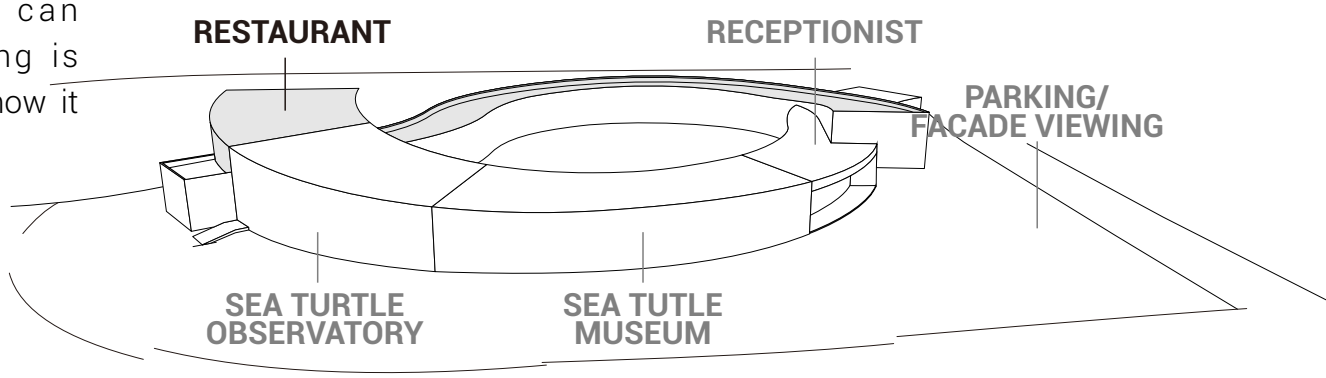
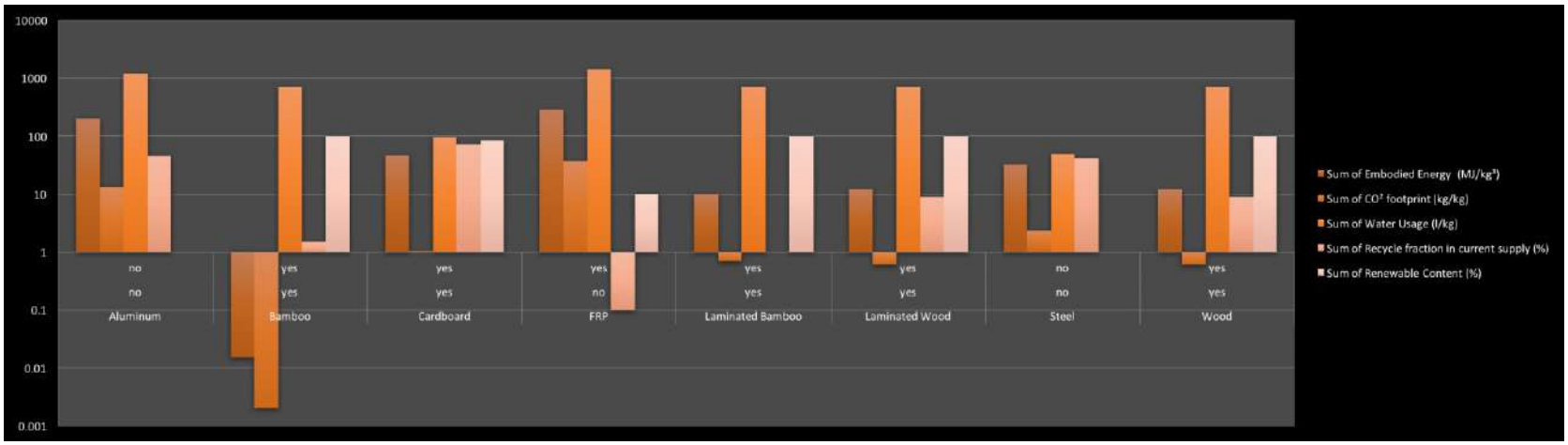


Figure 72. Societal Concept
Source: Writers, 2022

ECOLOGICAL MATERIALS

ATTEMPT ON MINIMIZING NEGATIVE IMPACT ON THE ENVIRONMENT



Bica et al (2009) explains that from an ecological angle, the existence of a building dealt the most damage to the environment. However, there are several ways to minimize the damage dealt to the environment, and one of them is by using ecological materials. Building materials can be considered ecological if they met certain criteria. These criteria are:

1. Healthy

Material can be considered ecological if it is healthy for the users. It should have at least 4 of these properties: a. Does not include any components that are toxic or any sort of pollutant; b. Does not produce noise; c. not radioactive; d. Secure from electromagnetism. The detail of the health value of several materials can be seen in the chart above. Additionally, it also includes the factor of carbon footprint, embodied energy, and the percentage of residue usage; which will be discussed in more detail.

2. Minimum Carbon Footprint

In constructing an architectural project, materials need to be produced and delivered to the project's location. Carbon footprint is the total amount produced by this action. In the GBCI's greenhouse parameters, the control of carbon footprint is done by having the location of material origin and manufacturer within a maximum of 1,000 km radius.

3. Minimum Embodied Energy

Embodied energy is the total energy that is used to produce a material. The term 'produce' not only refers to the energy used in the factory but includes the history of all the fabrications done until it becomes a finished product.

Figure 73. Table of Material Health Performance
Source: Borges, 2017

4. Reuse of Residues

In an ecological design, the use of natural materials is preferable. However, natural material is not always determined as the most ecological. As mentioned before, rubble resulting from demolition can be harmful to the environment. The use of these 'rubles' or residues can be beneficial for the environment, even if the materials are not even natural. GBCI's green ship mentions how it would be better in a project to use at least 10-20% of material residues from the overall material.

5. Recyclable and Reusable (at least once)

Demolition is one of the most damaging parts of a building's life cycle. A demolition produces rubble from materials that might damage the environment. The ecological design pays close attention to the overall building cycle. This means the important part of building materials is not only in construction and operation but also after they are done being used and demolished. Ecological material makes sure that the rubble produced by the demolition will impact the environment less by at least being reusable once.

6. High Insulation Qualities

Insulation qualities refer to the energy that will be required for creating thermal comfort in a building. It is how an ecological material can isolate the heat or non-heat inside a building. Insulation properties are shown by R-value. It measures how a material able to resist heat transfer between spaces.

7. Beneficial to the environment

In Ecological Design, a building should be able to give a positive impact on the environment. This parameter closely indicates the existence of vegetation that is mostly related to microclimate control. GBCI (Green Building Council Indonesia) mention the use of green roof. In the GBCI's Green Building parameter, green roofs are mainly used for dealing with microclimate and dealing with heat island effects. According to it, the appropriate minimum coverage of a green roof is at least 50% of the total roof area (excluding the roof for mechanical and electrical).

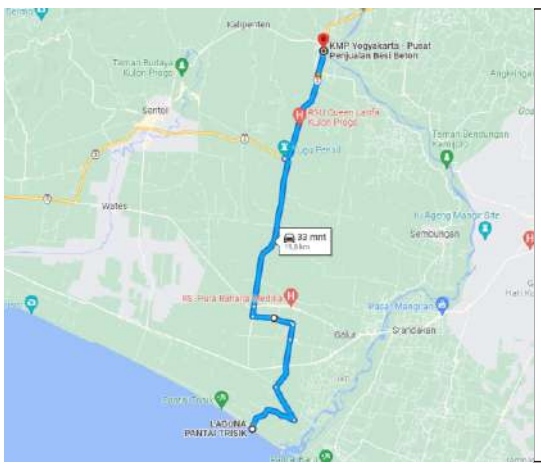
Lightweight Materials

Lightweight Materials	Health Performance
Alumunium	Poor
Bamboo	Excellent
Cardboard	Excellent
FRP	Poor
Laminated Bamboo	Excellent
Laminated Wood	Excellent
Steel	Good
Wood	Excellent

Figure 74. Table of Material Health Performance
Source: Borges, 2017

To determine whether or not a material is healthy or not, this project will refer to research done by Borges (2017). This criteria of 'health' not only mention the health criteria but also Embodied Energy and the reuse of residues. The table above will be used as the main criteria to choose the lightweight materials that will be used to construct the building, especially for the structure and building envelope. From here, the lightweight material used and its application are:

1. Steel (Pre-fabricated)



Steel is chosen considering how it can compete in both structural and health performance among other lightweight materials. Its strength and elasticity help better to deal with sea waves' impact that happens periodically on site. Additionally, steel is usually produced by recycling other steel, thus it is can be considered a great option to choose as an ecological material.

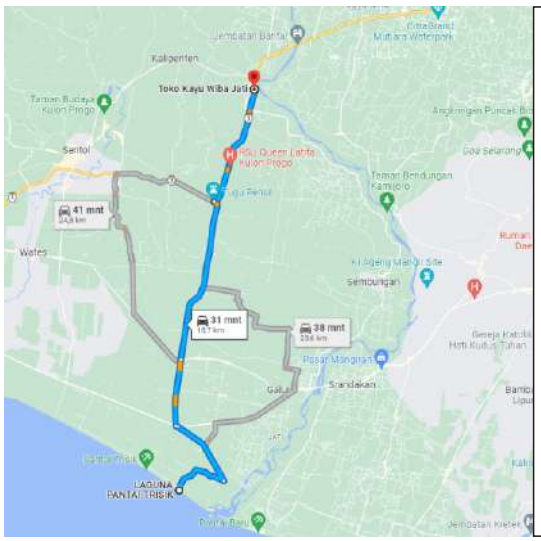
Applications: Structure & Slab

Health Performance: Good

Shopping Distance: 19,8 Km

Reusability: Directly disassembled, Melted down to be reused

2. Laminated Timber (Pre-fabricated)

	Laminated timber is created using natural material making it a great health performance. As an engineered material, laminated timber has great durability and structural performance. However, the structural strength of laminated timber itself is not as high as steel structure. Thus, it will be a great option to use as walls and flooring materials.	**Applications:** Wall & Flooring **Health Performance:** Excellent **Shopping Distance:** 18,7 Km **Reusability:** Reused into cross-laminated timber) and glulam (glue-laminated timber

3. Timber

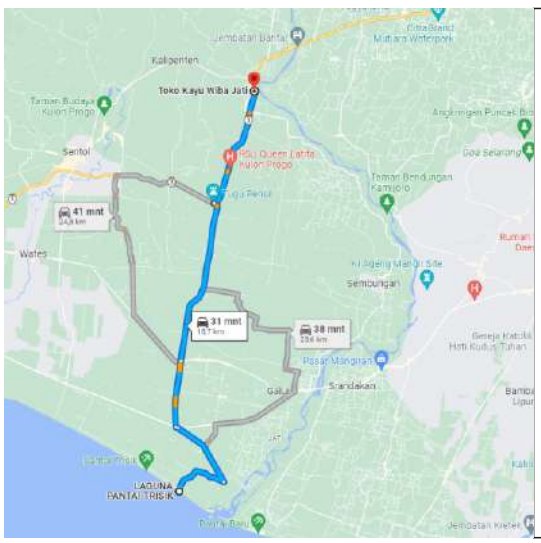
	Timber is a cheaper option than laminated timber. It has better health performance but reduced structural strength. Timber will be used on building components that do not directly impact the building's strength, such as the building's secondary skin.	**Applications:** Secondary Skin **Health Performance:** Excellent **Shopping Distance:** 18,7 Km **Reusability:** Reused into cross-laminated timber) and glulam (glue-laminated timber

Figure 75. Table of Material
Data Source: Googlemap processed by Writer

Recycled Material

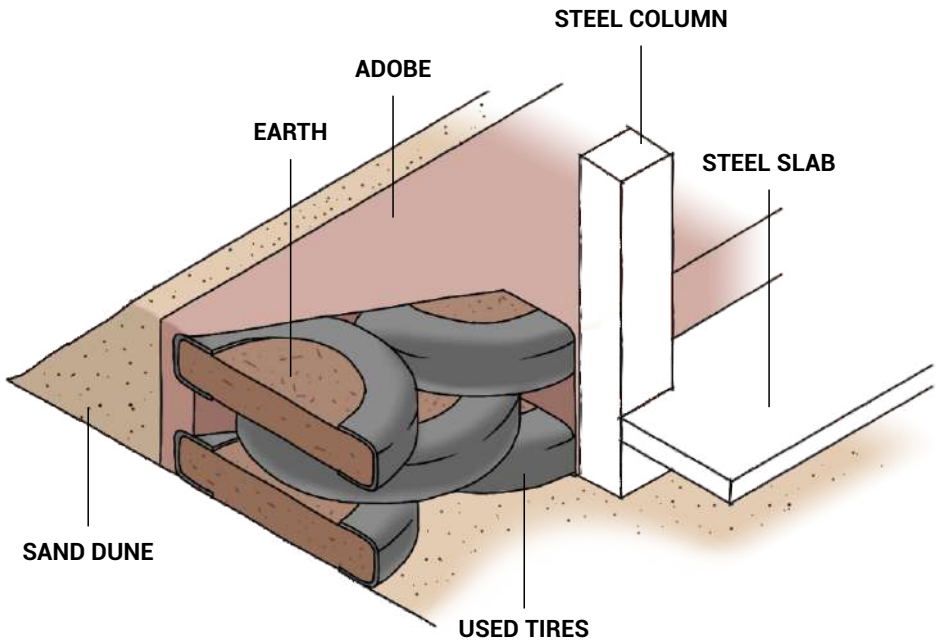
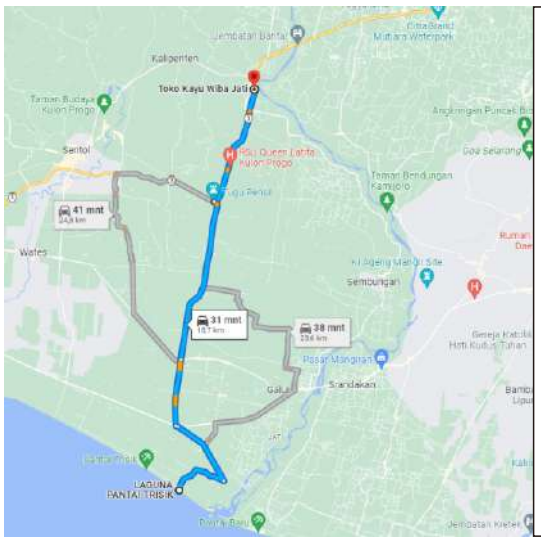


Figure 76. Retaining Wall Concept
Source: Writer

In an ecological design, the use of natural materials is preferable. However, natural material is not always determined as the most ecological. As mentioned before, rubble resulting from demolition can be harmful to the environment. The use of these 'rubles' or residues can be beneficial for the environment, even if the materials are not even natural.

Here, the building will make use of recycled materials as retaining walls. These retaining walls will hold sand dunes to conceal the building from the shoreline so that the sea turtle can comfortably nest on the beach without feeling disturbed. Additionally, the sand dunes and retaining wall will function as wind and water breakers, in incase of high tides.

1. Used Tires

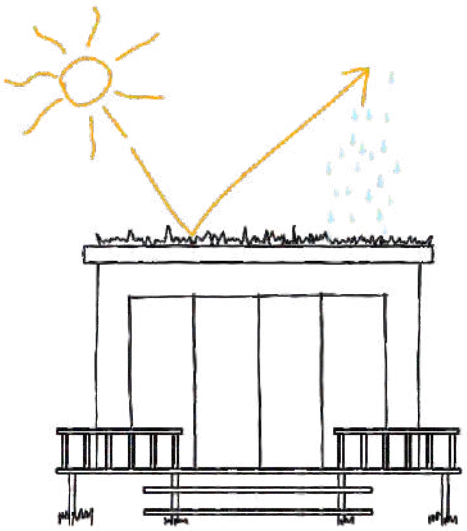
	The development of transportation in Indonesia continues to grow. This development resulted in used tires having the potential to pollute the environment because they cannot be decomposed naturally. These used tires can be used as a retaining wall because they are strong, elastic, and durable.	**4. Used Tires** **Applications:** Retaining Wall **Shopping Distance:** 24,5 Km **Post-building:** -

2. Adobe

ONSITE	Adobe is used to cement the used tires together and covers them. If used alone, adobe has a poor performance against water and external force. However, by combining adobe with used tires, the strength of the tires characteristic are imbued into the adobe making it less vulnerable to external forces.	**5. Adobe** **Applications:** Retaining Wall **Shopping Distance:** 24,3 Km **Post-building:** Crushed back into earth and become a fertilizer.

Figure 77. Recycle Material Concept
Source: Writer

Green Roof: Bring Benefit to the Environment



An ecological design has to give positive impacts on both people and nature. There are many benefits of using a green roof. Looking into the benefit to the people, this technology boosts the thermal performance of the building. This means, using a green roof will enhance the thermal comfort of the people inside of the building. Using a green roof also improves the drainage system of the building. This means that using a green roof can also help to deal with floating, which is one of the risks that the site has.

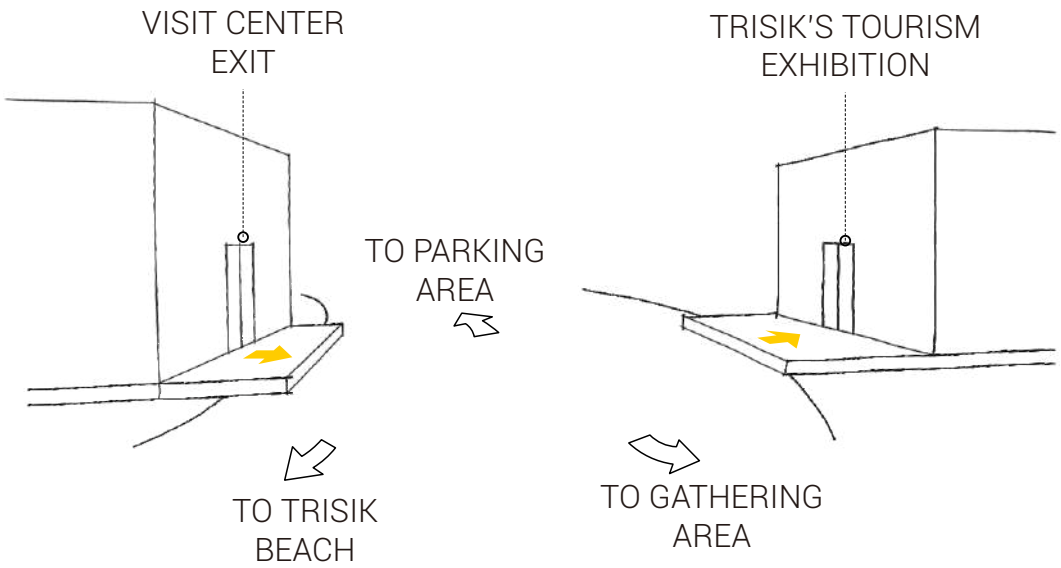
A green roof is beneficial for nature as it is for the people. It can help out the environment deal with global warming. This is because the plantation on the roof function as carbon capture. Photosynthesis help to convert carbon dioxide in the air into oxygen. Additionally, the plantation will improve the macroclimate by reducing the heat of the surrounding environment. This is because plants absorb roughly 50% of sunlight and reflect 30% of it. Lastly, it improves the biodiversity of the surrounding, since it promotes the habitat of birds, butterflies, and insects.

Figure 78. Green Roof Concept
Source: Writer

ECOLOGICAL CONCEPT

AGROTOURISM INTRODUCTION

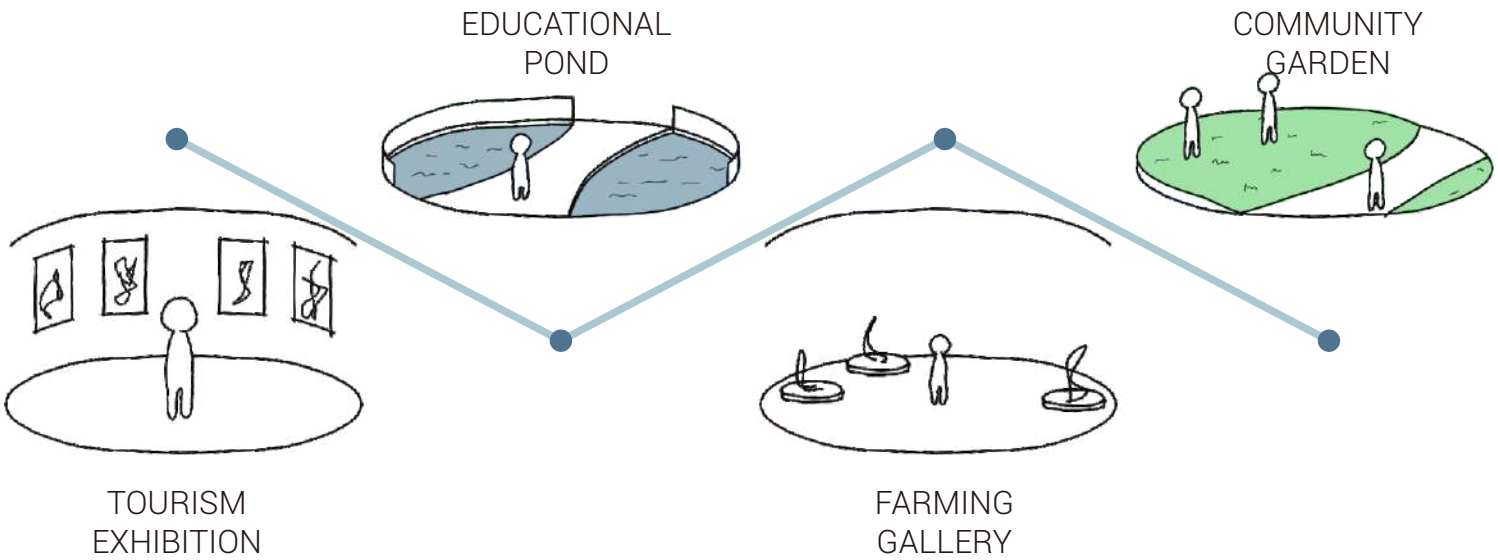
GIVING POSITIVE IMPACT FOR PEOPLE AND NATURE



To better appreciate the history of Trisik village, the project will facilitate a place to introduce village tourism in the surrounding area. This introductory is located between the potential place for agrotourism and the sea turtle visit center. It will provide space for a tourism exhibition, an educational pond, a farming gallery, and a community garden & nursery area.

After visitor finishes their sea turtle tour, they will exit through the Giftshop located on the ground floor. When they exit the main building, they will directly face the tourism exhibition with expectations of creating curiosity about what kind of function that provided there. However, since the agrotourism tour isn't part of the main tour, before the facility there will be an open area to access the beach, gathering area, and parking area. Additionally, the function will be managed by the local, considering how the government plan to involve the local community to take part in business along the Yogyakarta coastline.

Figure 79. Agrotourism Location Concept
Source: Writer



1. Tourism Exhibition

Trisik had a long history of ups and downs regarding tourism since the 1990s. By itself, it gives Trisik an interesting story to tell. The first part of the tour function to hook the visitor's curiosity by showing how the village has battled abrasion and flooding. It is also will show how Trisik village has been developing from a meer village into a fishing village and having its tourism grow into what exists right now.

2. Educational Pond

In agrotourism, usually, a tour starts by having a farm animal on display. However, considering the unique location of the site, an educational pond is more appropriate as one of the starting points of the tour. Not only for the visitors to learn, but the pond will help provides food for the conserved sea turtle by cultivating crab and shrimp.

3. Farming Gallery

Before transitioning into agrotourism, there will be a small gallery to help better grasp the basic understanding of the upcoming tourism like how the previous tour was delivered.

4. Community Gardern & Plant Nursery Area

The community garden is located at the end of the introductory. It is cultivated and managed by the community. It functions as the point of interest for both visitors as well as the Trisik community. Its unique location between the introductory and the residential area makes it perfect as a main interaction between the two.

Figure 80. Agrotourism Spatial Flow Concept
Source: Writer

ECOLOGICAL CONCEPT

CONSERVATION AREA

GIVING POSITIVE IMPACT FOR PEOPLE AND NATURE

Sea turtles spent most of their time at the sea. However, it is not uncommon for them to come ashore and stay in the supra-tidal zone, which is their land habitat. Since sea turtles have a strong homing instinct, it is important for sea turtle conservation to accommodate a place that the sea turtle will be familiarized with.

The temperature of the eggs specifies the type of sexes of the eggs. This is why a semi-natural incubation is much preferable to the artificial one. The location characteristic of sea turtle hatcheries' is created semi-natural by growing tropical plants such as ferns, palms, and fir trees. Vegetation acts as a shader for the incubation location to keep changing its temperature so that the hatchling will have their gender distributed properly. Hence, the terrarium miniature is established.

Not only to provide shading but the introduction of several parts of the sea turtle habitat as a way to educate the visitors on how sea turtles live. Moreover, the conservation area will be provided with pathways that directly lead to the rescue area for treatment, feeding, and monitoring.

DESIGN RESULT

REGULATION COMPLIANCE

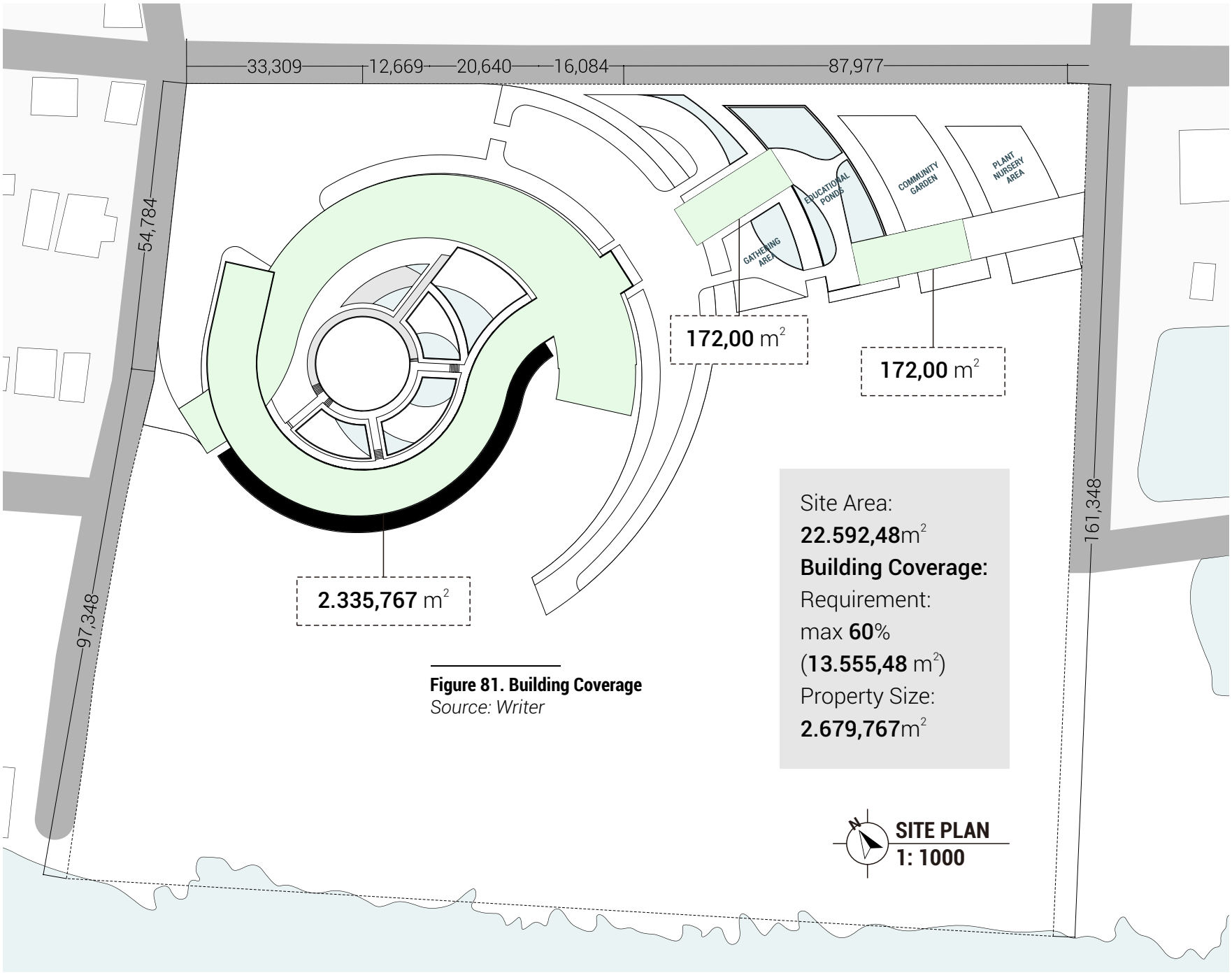


Figure 81. Building Coverage
Source: Writer

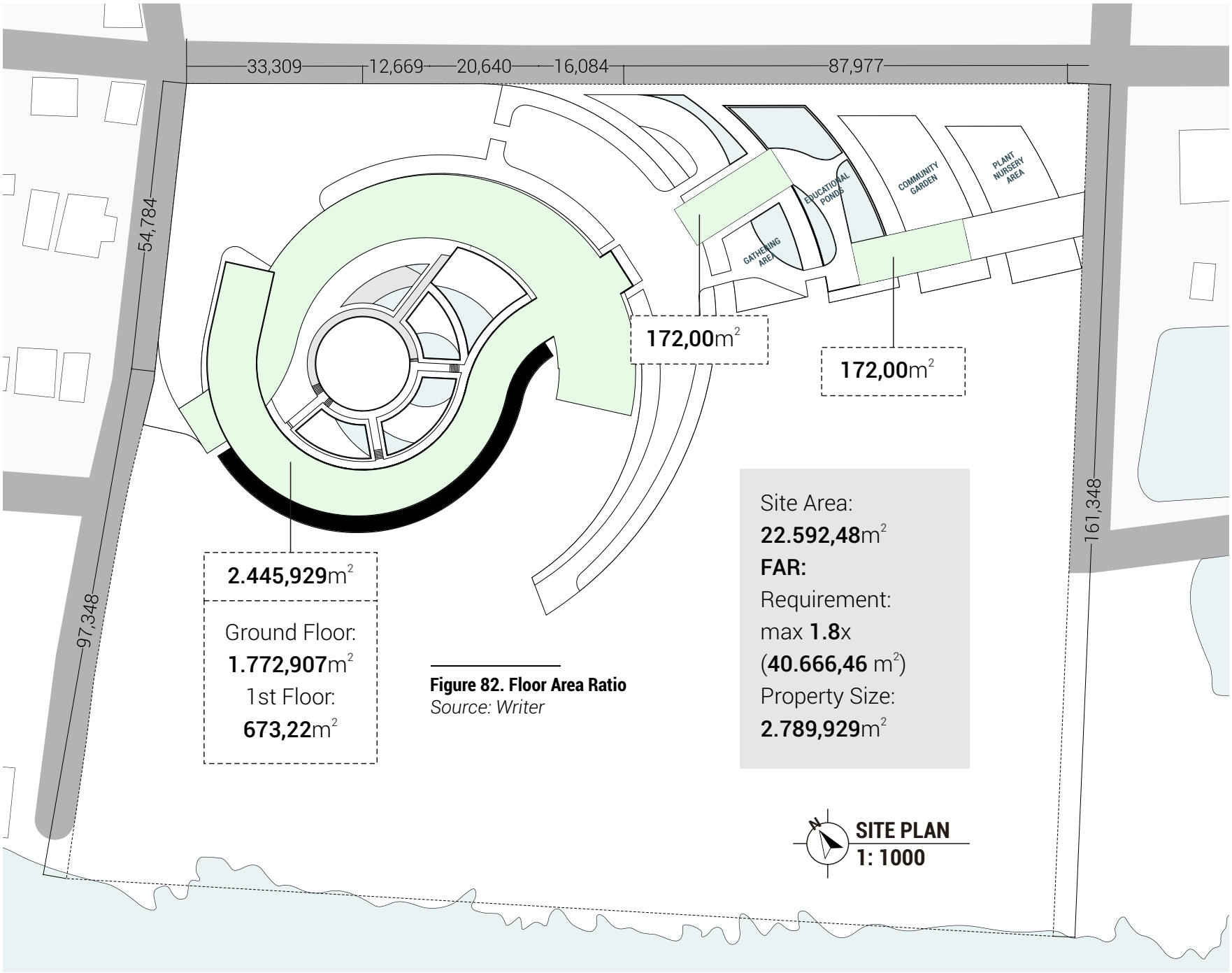


Figure 82. Floor Area Ratio
Source: Writer

SPACE PROGRAM

FACILITIES	ROOM NAME	STANDARD	CAPACITY	TOTAL AREA	PERCENTAGE
CONSERVATION AREA	Lobby	4 m2/person	30	120 m^2	56%
	Lecture Hall	1,05 m2/person	100	105 m^2	
	Gallery & Museum	4 m2/person	60	240 m^2	
	Gallery Storage	Fixed	2	16 m^2	
	Observatory	3 m2/person	80	240 m^2	
	Restaurant	2,4 m2/person	100	240 m^2	
	Kitchen	Fixed	6	27 m^2	
	Gift Shop	4 m2/person	25	100 m^2	
	Gift Shop Storage	Fixed	4	40 m^2	
	Circulation			276 m^2	
	Total			1404 m^2	
RESCUE AREA	Office Lobby	4 m2/person	6	24 m^2	31%
	Manager Office	10 m2/person	1	10 m^2	
	Main Office	4 m2/person	20	60 m^2	
	Veterinary Office	4 m2/person	10	40 m^2	
	Apprentice Office	4 m2/person	20	80 m^2	
	Exam Room	Fixed	4	30 m^2	
	Intensive Care	Fixed	4	30 m^2	
	Surgery	Fixed	4	38 m^2	
	Medicine Storage	4 m2/person	6	36 m^2	
	Sleeping Loft	8 m2/person	4	32 m^2	
	Laboratory 1	6-10 m2/person	8	48 m^2	
	Laboratory 2	6-10 m2/person	10	60 m^2	
	Circulation			312 m^2	
	Total			780 m^2	
SERVICE	Toilet	3 m2/person	12	36 m^2	4%
	Praying Room	2 m2/person	18	36 m^2	
	Ablution	1,5 m2/person	6	9 m^2	
	Janitor Room	Fixed	2	4,5 m^2	
	Circulation			12,5 m^2	
	Total			98 m^2	
TOURISM INTRODUCTION	Tourism Exhibition	4 m2/person	22	88 m^2	9%
	Farming Gallery	4 m2/person	22	88 m^2	
	Circulation			44 m^2	
	Total			220 m^2	

Figure 83. Space Program
Source: Writer

Scale 1:1000

SITEPLAN

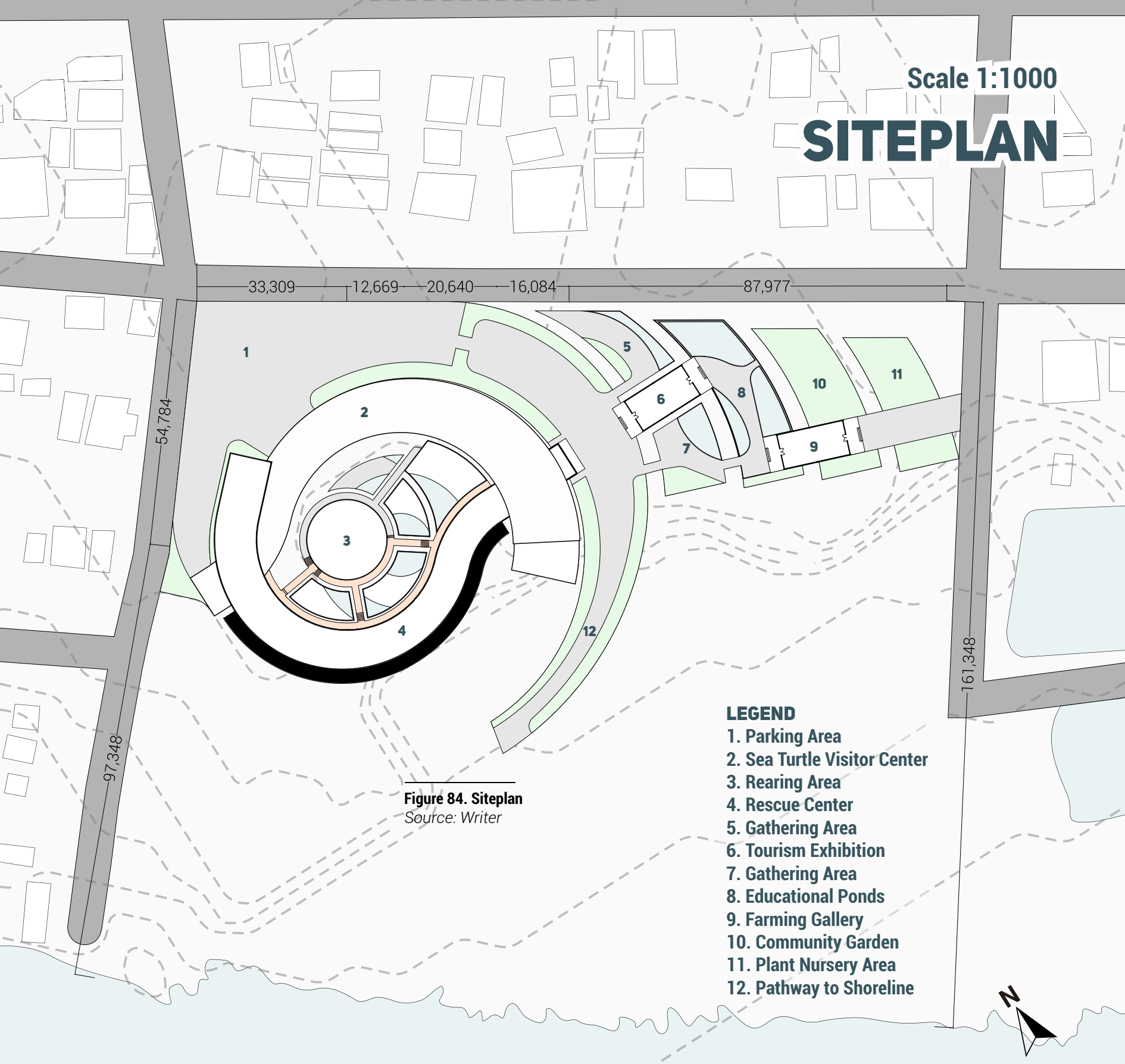


Figure 84. Siteplan
Source: Writer

Scale 1:1000

LANDSCAPE PLAN

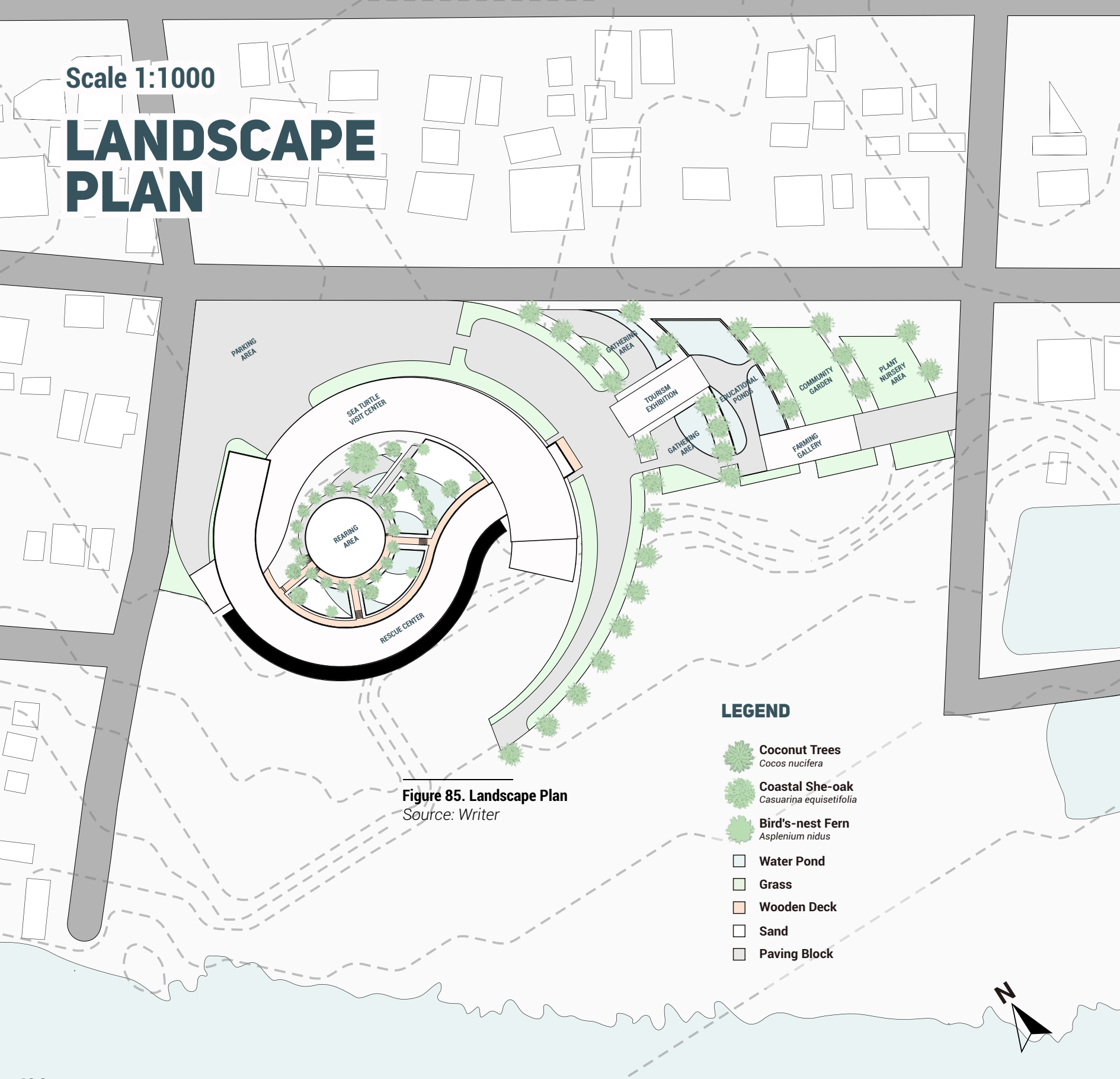


Figure 85. Landscape Plan
Source: Writer

Scale 1:500

GROUND FLOOR PLAN

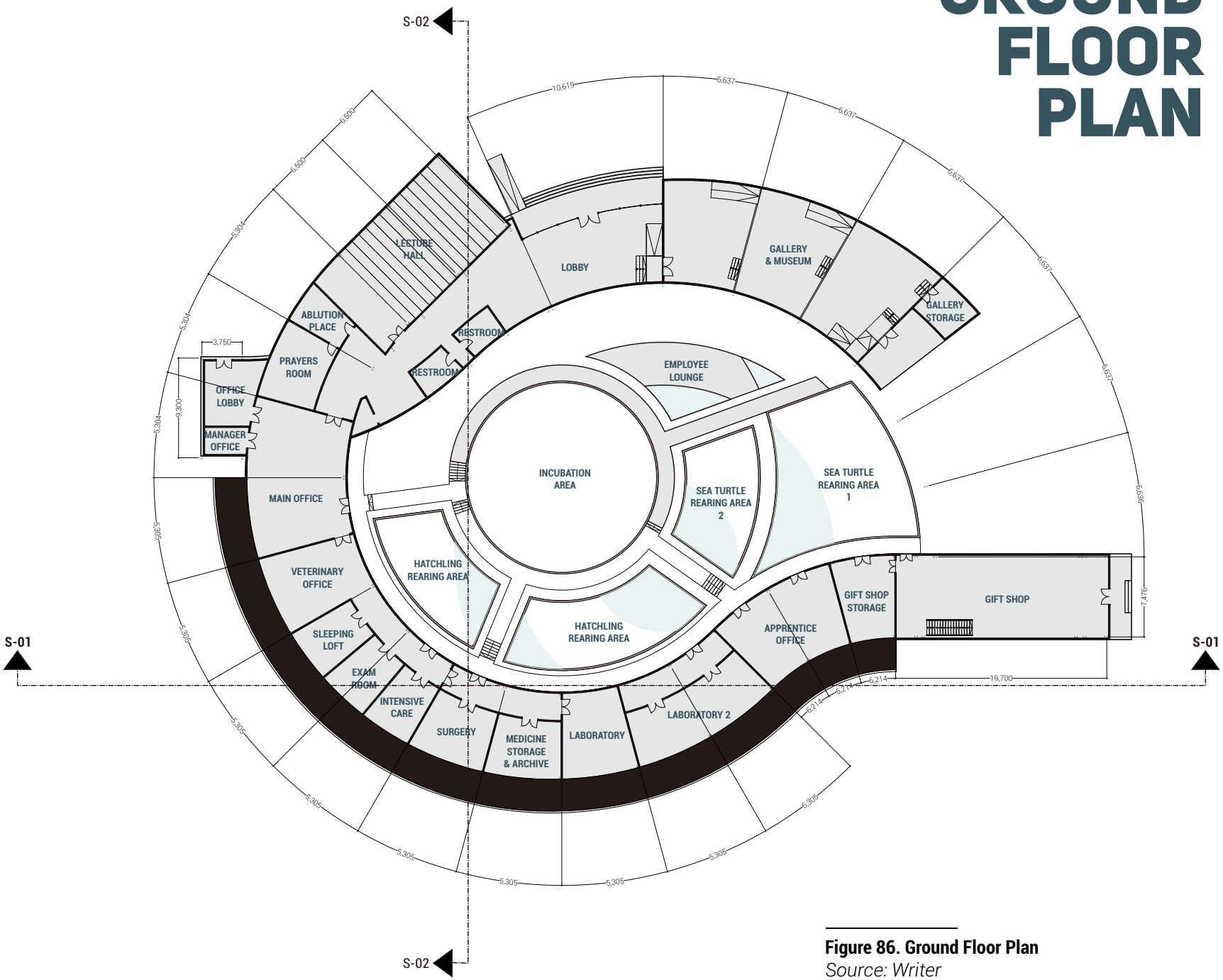


Figure 86. Ground Floor Plan
Source: Writer

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Scale 1:500

1ST FLOOR PLAN

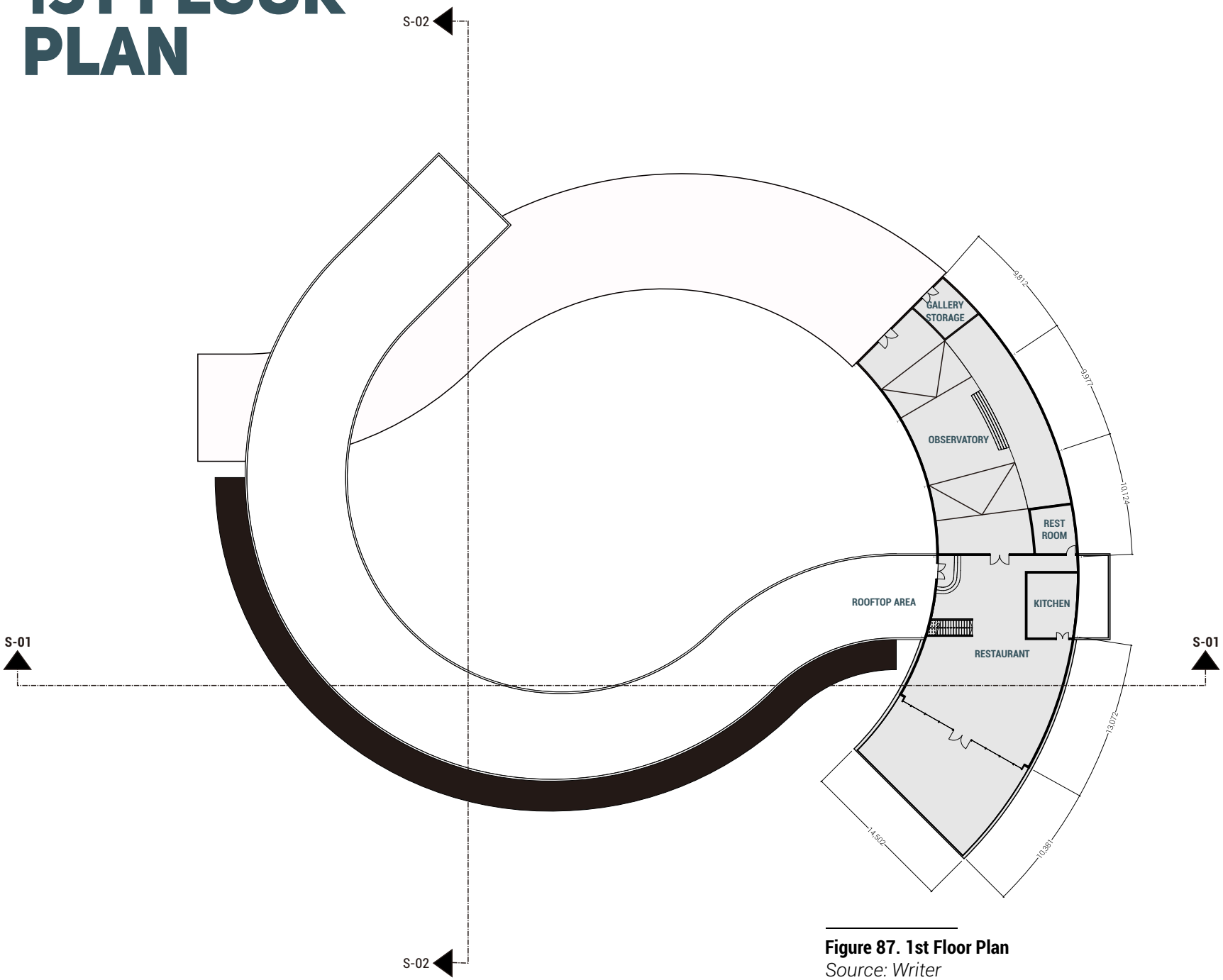


Figure 87. 1st Floor Plan
Source: Writer

Not at Scale

SITE ELEVATION



NORTH ELEVATION



EAST ELEVATION



SOUTH ELEVATION



WEST ELEVATION

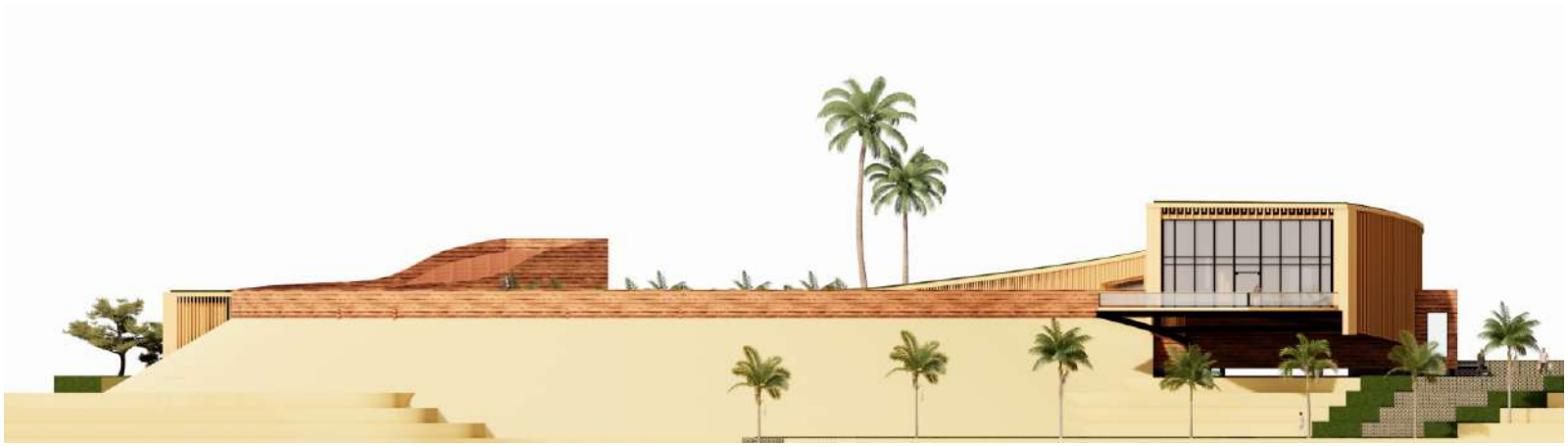
Figure 88. Site Elevation
Source: Writer

Not at Scale

BUILDING ELEVATION



NORTH ELEVATION



SOUTH ELEVATION

Figure 89. Building Elevation 1
Source: Writer



EAST ELEVATION



WEST ELEVATION

Figure 90. Building Elevation 2
Source: Writer

1:500

SITE SECTION

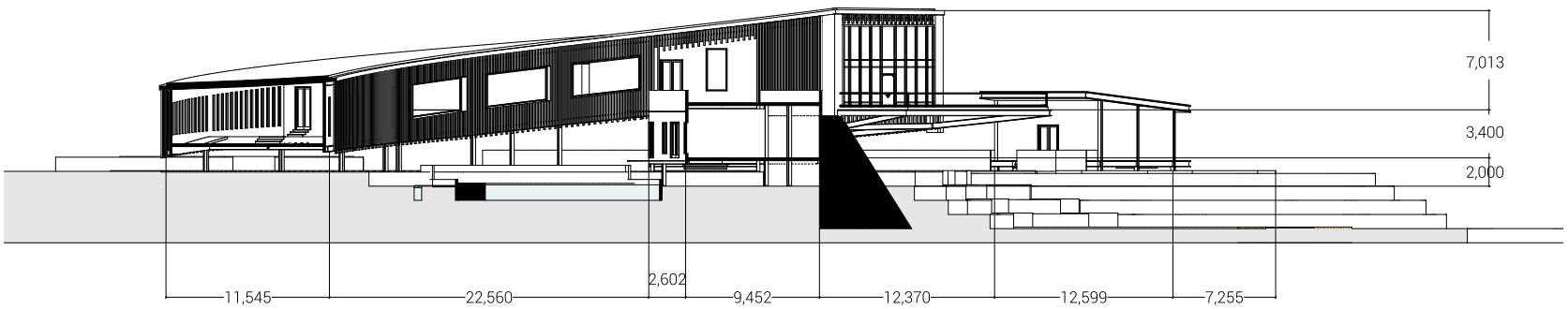


Figure 91. Site Section
Source: Writer

1:500

BUILDING SECTION

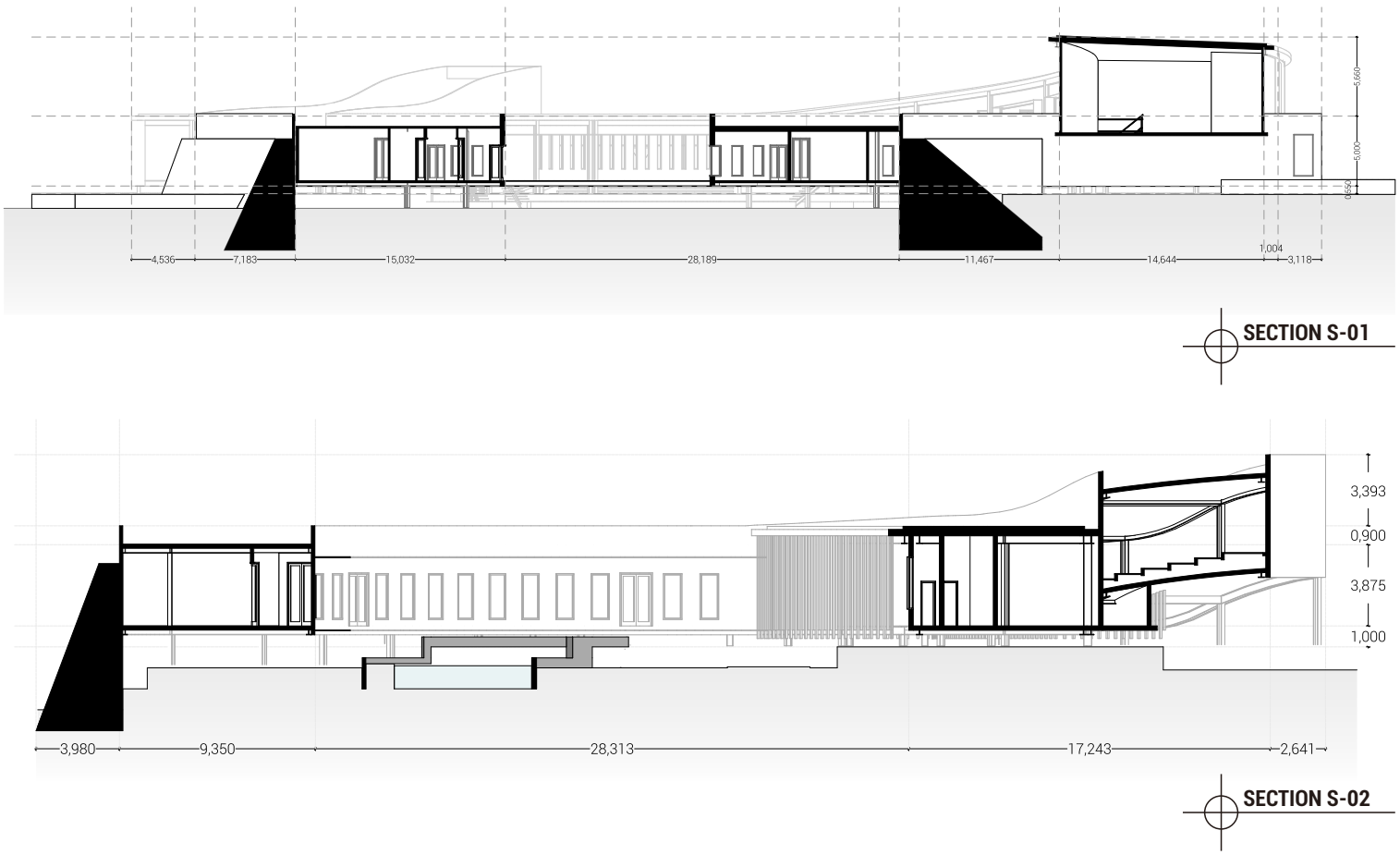


Figure 92. Building Section
Source: Writer

Not at Scale

STRUCTURAL SYSTEM DESIGN

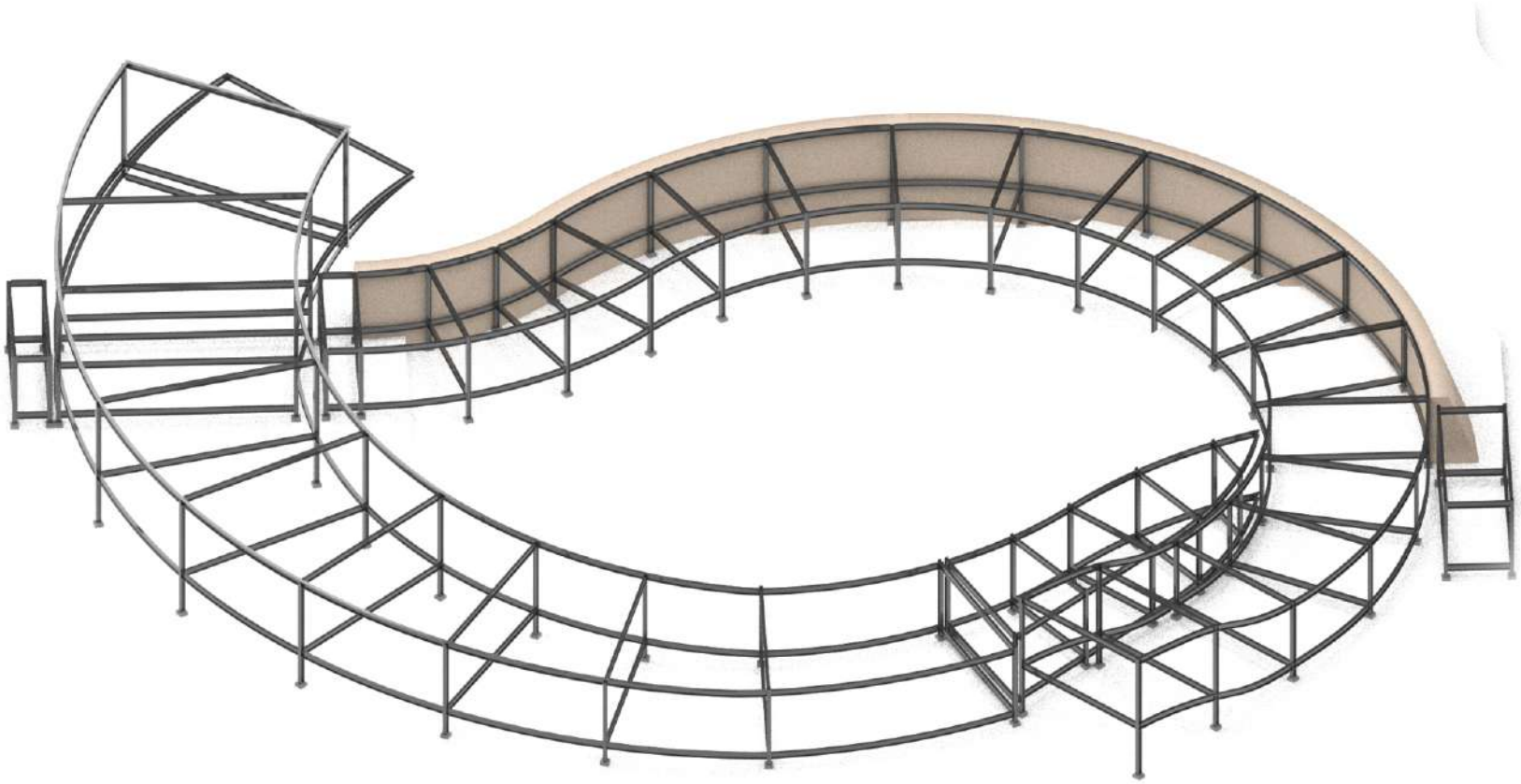


Figure 93. Structural System
Source: Writer

Considering the complexity of the form, the column and beam structure is designed to be split into 3 parts.

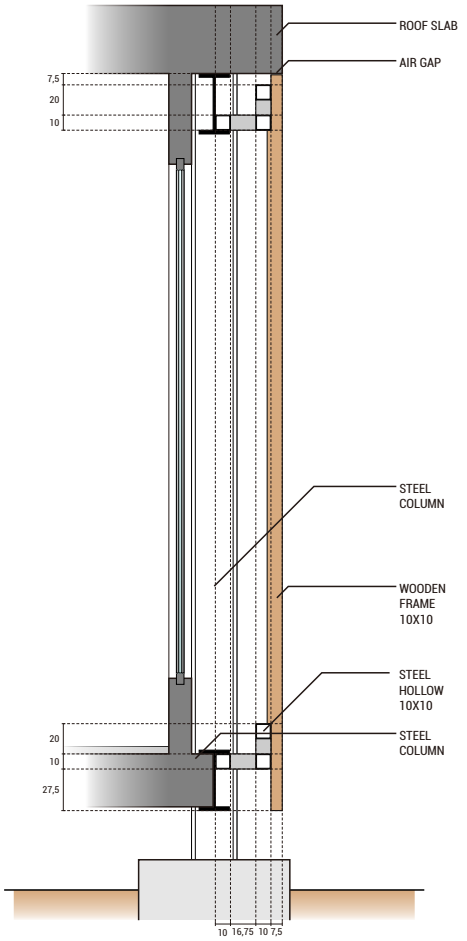
1:50

SECONDARY SKIN DETAILS

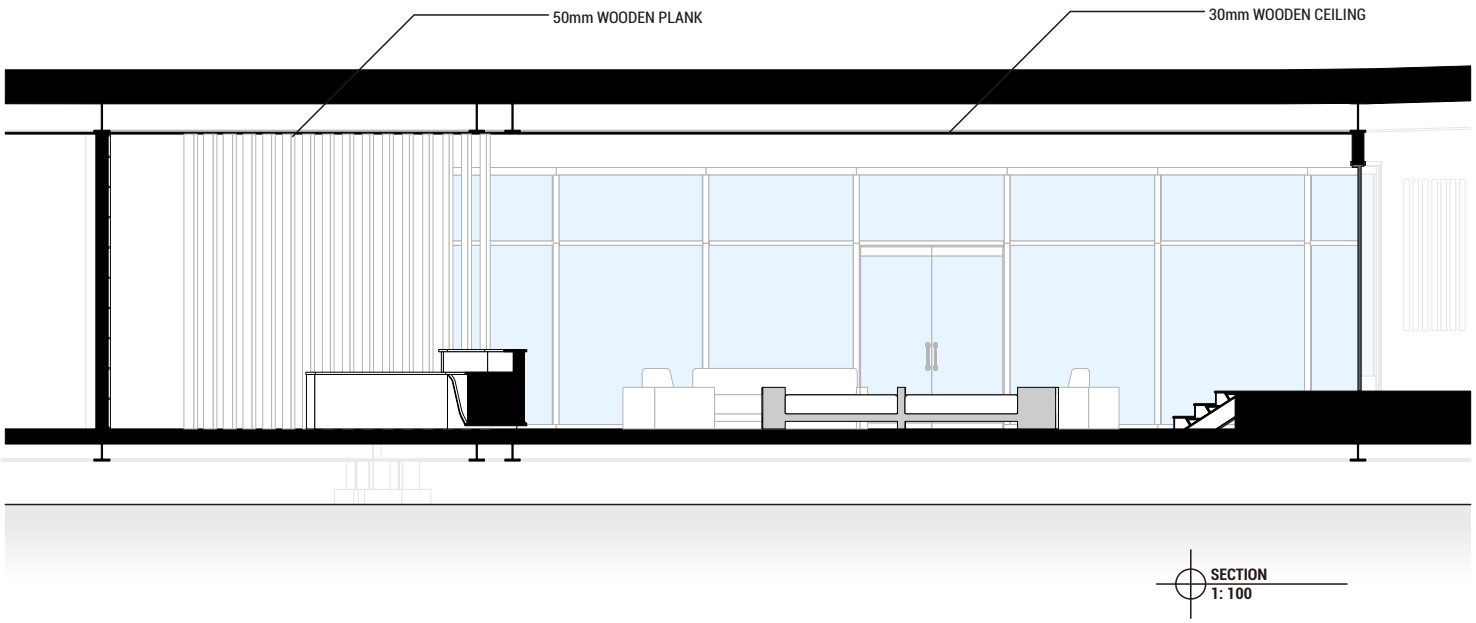


The building is designed to have vertical patterned wood to enhance the elevated building looks. This pattern continued throughout the building to partially block the view through the outside, except for the observatory and restaurant.

Figure 94. Building Skin
Source: Writer



LOBBY



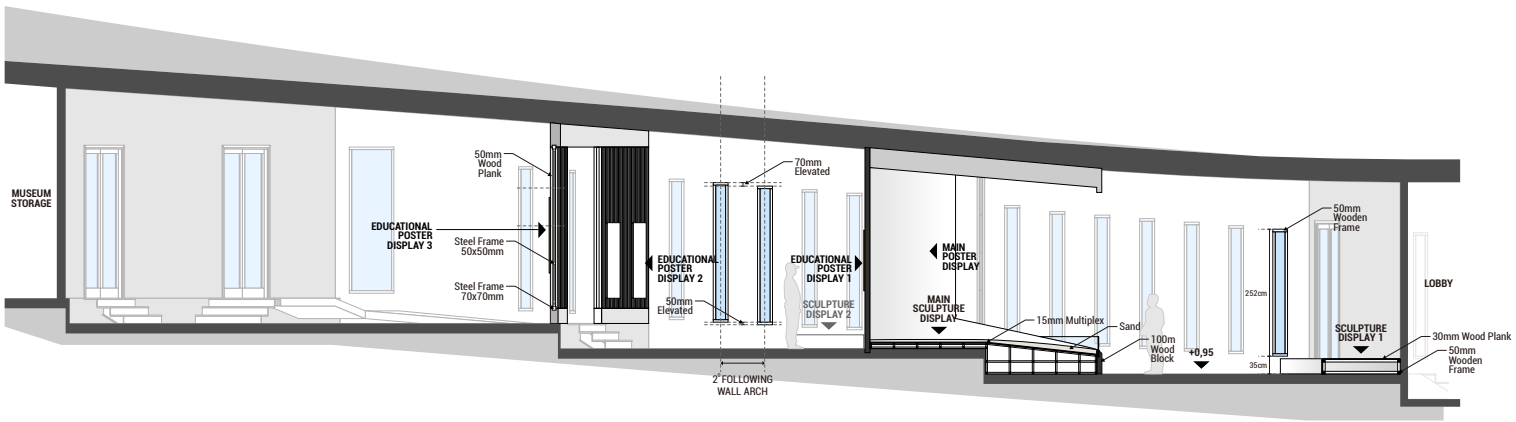




The appearance of the building facade is continued to the lobby by providing extra greenery on receptionist walls and surrounding the furniture. The view to the conservation area is limited by thigh windows and building skins.

Figure 95. Lobby Interior
Source: Writer

MUSEUM & GALLERY



SECTION
1: 150

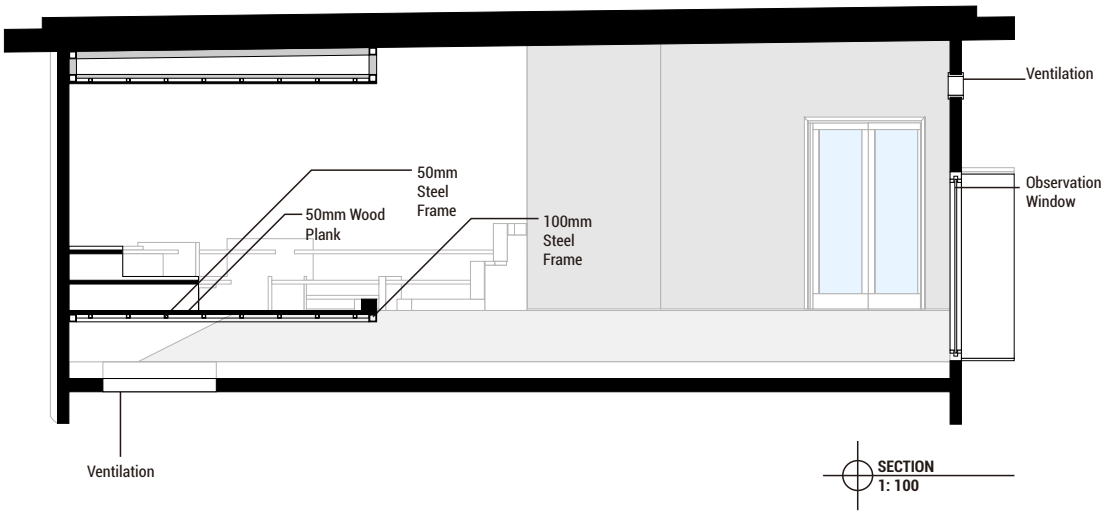




Inside the museum, the concept of creating curiosity is further enhanced by allowing the visitor to visually see part of the upcoming tours by using vertical pattern partition walls. The view is a bit enhanced than the lobby by having stepped level. However, the windows are covered by the building skin to still make the visitor guess.

Figure 96. Museum Interior
Source: Writer

OBSERVATORY





1st Window



2nd Window



3rd Window



Figure 97. Observatory Interior
Source: Writer

The observatory was designed to have different heights in mind. It consists of 3 different levels and ramps in between. The collection of vegetation is being re-introduced in the lounge to show the possibility of connection between nature and architecture.

RESTAURANT





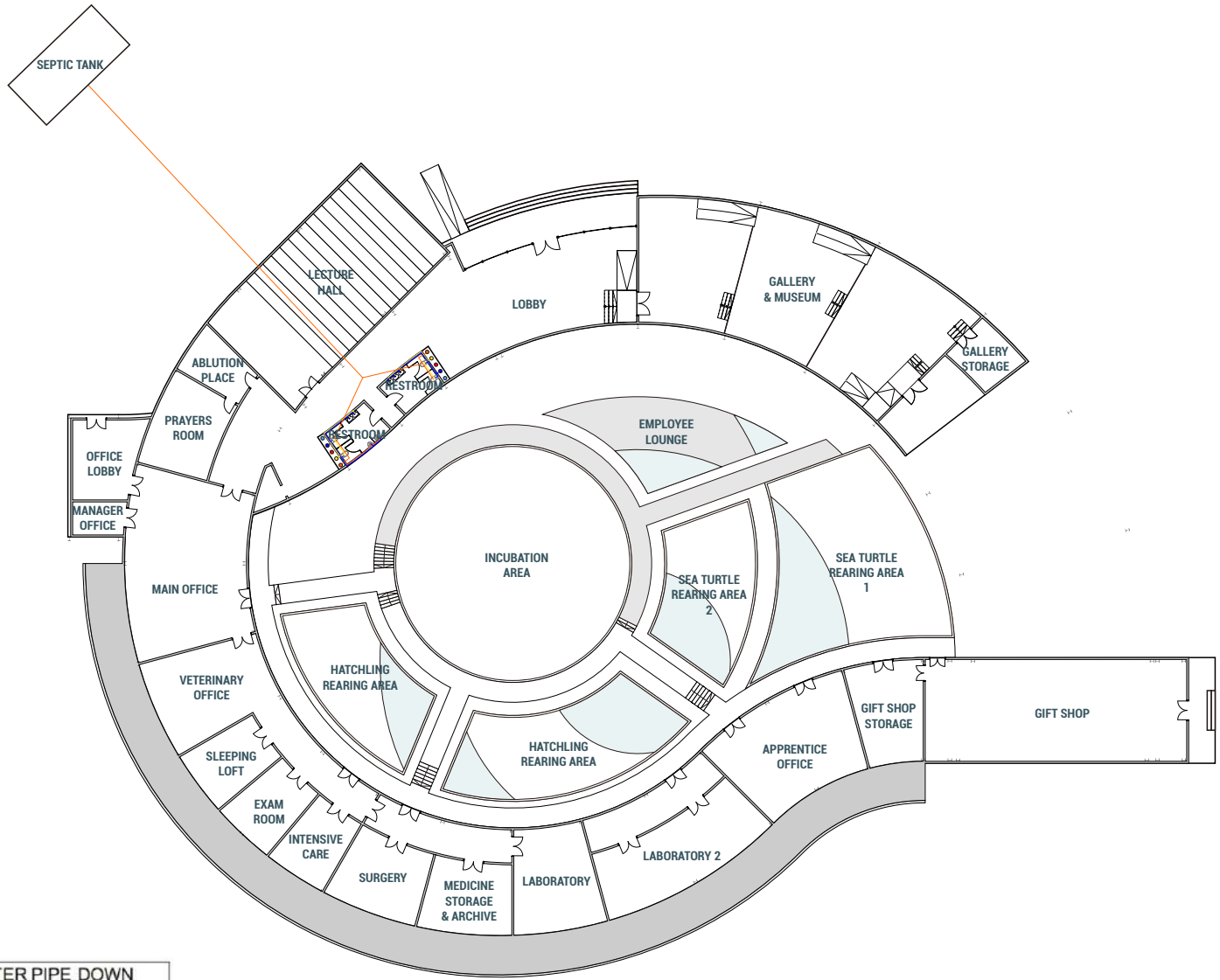


The restaurant is design to maximise the view to the shoreline. The trend of having combination of metal wood is continued to the space giving it continuation from the first entering the building. Here the visitor can access rooftop observatory to continue explore the building or go down to the giftshop and exit.

Figure 98. Restaurant Interior
Source: Writer

1:500

SANITATION PLAN GROUND FLOOR

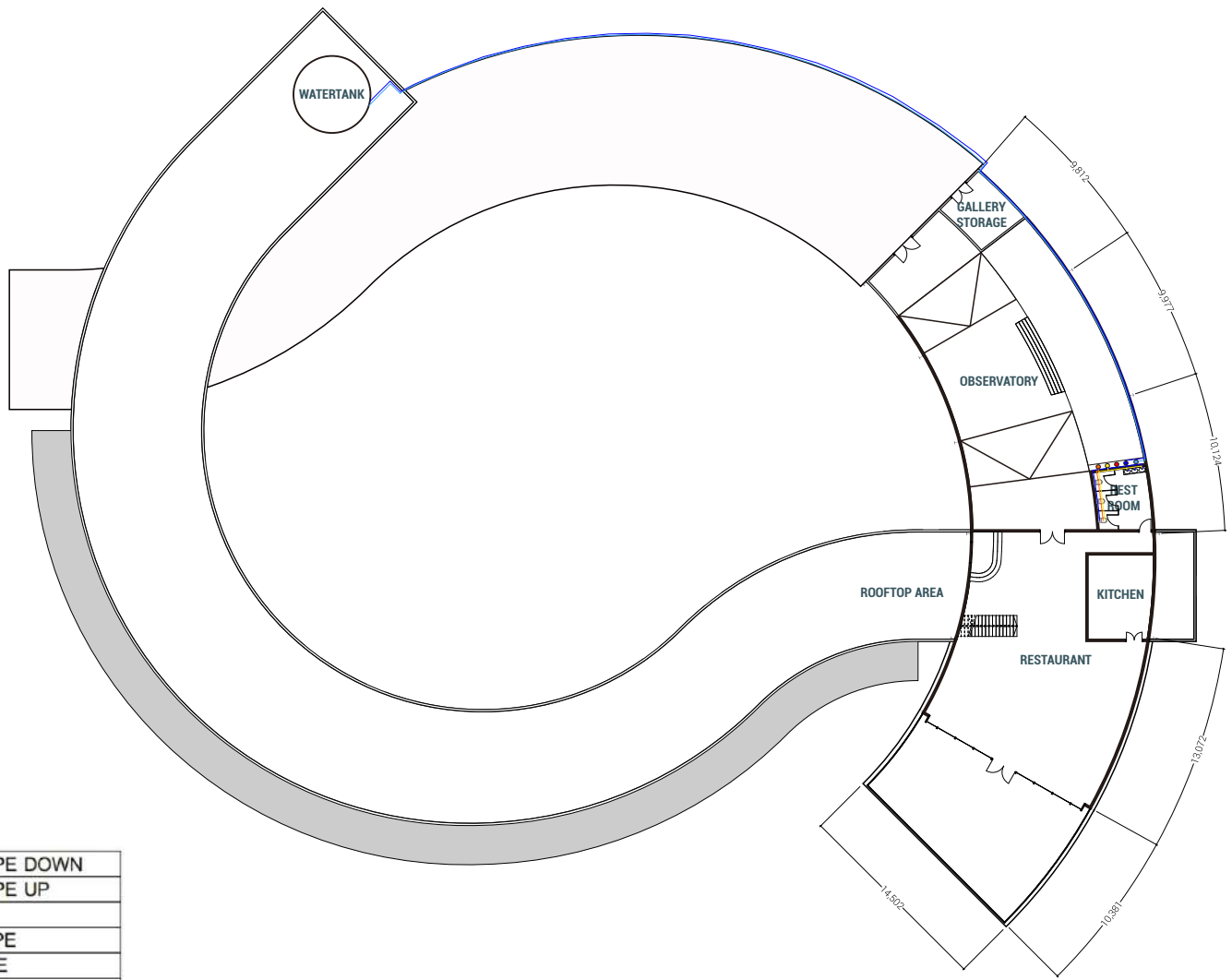


	CLEAN WATER PIPE DOWN
	CLEAN WATER PIPE UP
	HYDRANT PIPE
	BLACK WATER PIPE
	GREY WATER PIPE
	WATER FIXTURE
	DRAINAGE
	WATER PUMP DISTRIBUTION
	CLEAN WATER DISTRIBUTION
	BLACK WATER LINE
	GREY WATER LINE

Figure 99. Ground Floor Sanitation Plan
Source: Writer

1:500

SANITATION PLAN 1ST FLOOR



	CLEAN WATER PIPE DOWN
	CLEAN WATER PIPE UP
	HYDRANT PIPE
	BLACK WATER PIPE
	GREY WATER PIPE
	WATER FIXTURE
	DRAINAGE
	WATER PUMP DISTRIBUTION
	CLEAN WATER DISTRIBUTION
	BLACK WATER LINE
	GREY WATER LINE

Figure 100. 1st Floor Sanitation Plan
Source: Writer

1:500

HVAC PLAN GROUND FLOOR

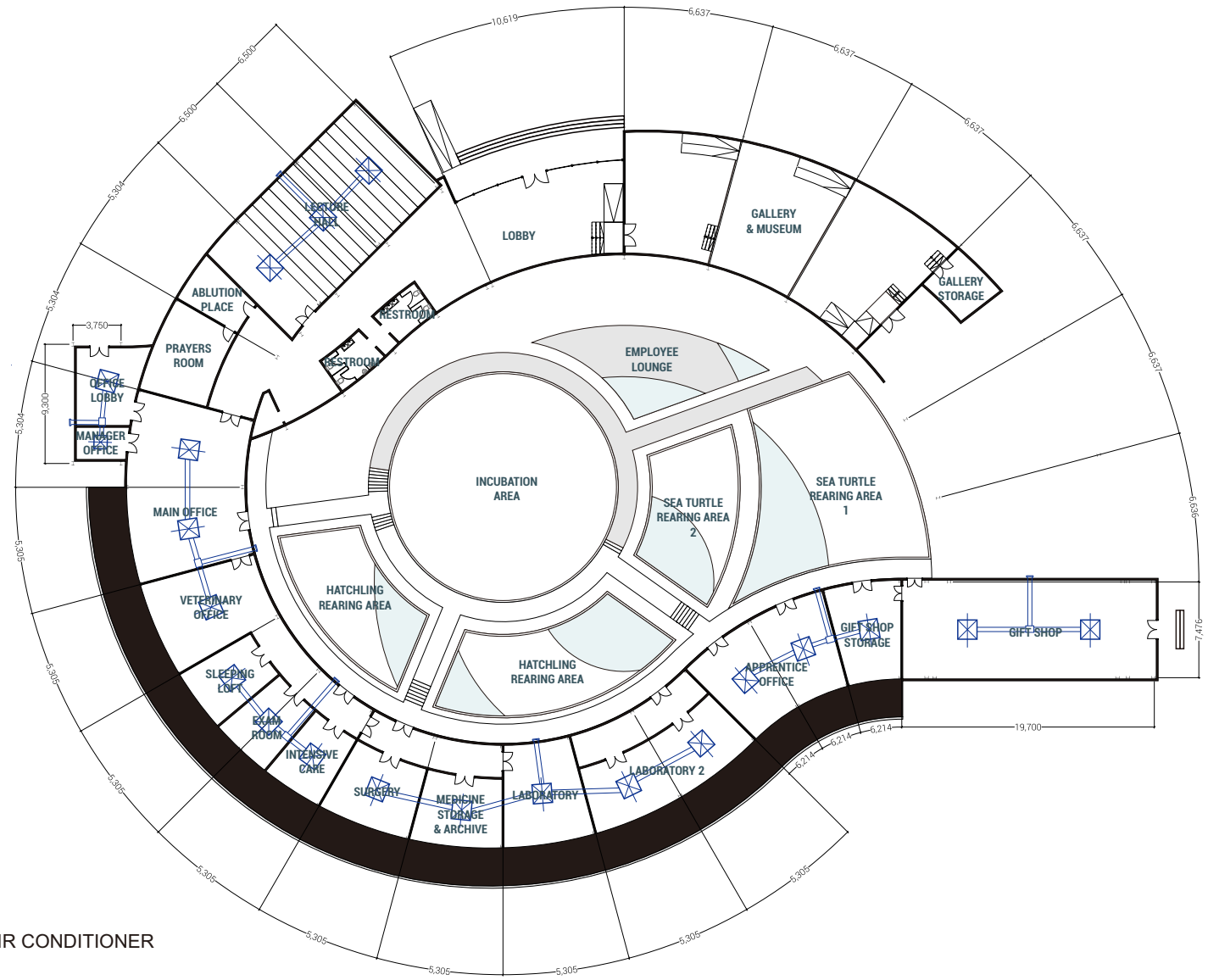
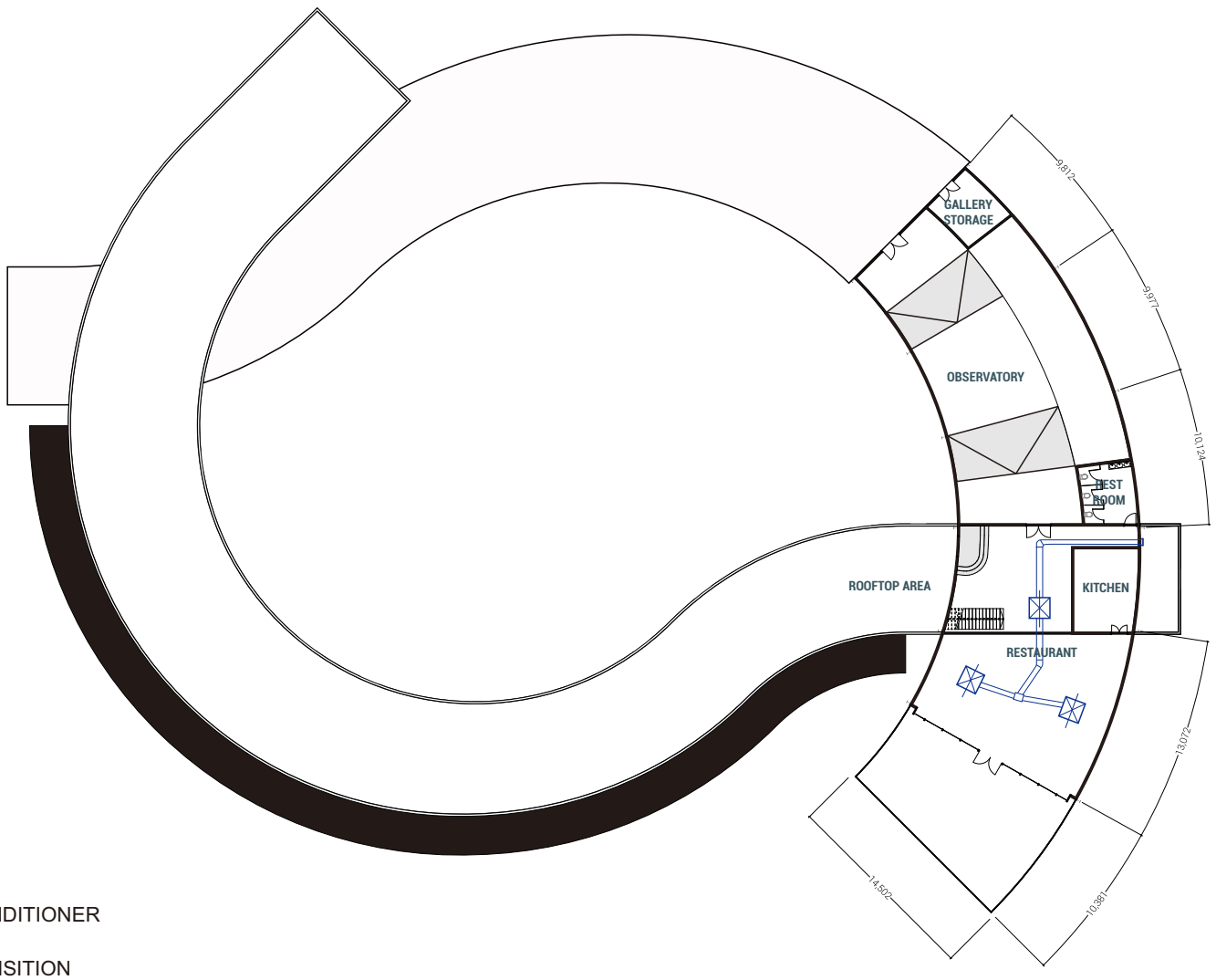


Figure 101. Ground Floor HVAC Plan
Source: Writer

1:500

HVAC PLAN 1ST FLOOR



AIR CONDITIONER

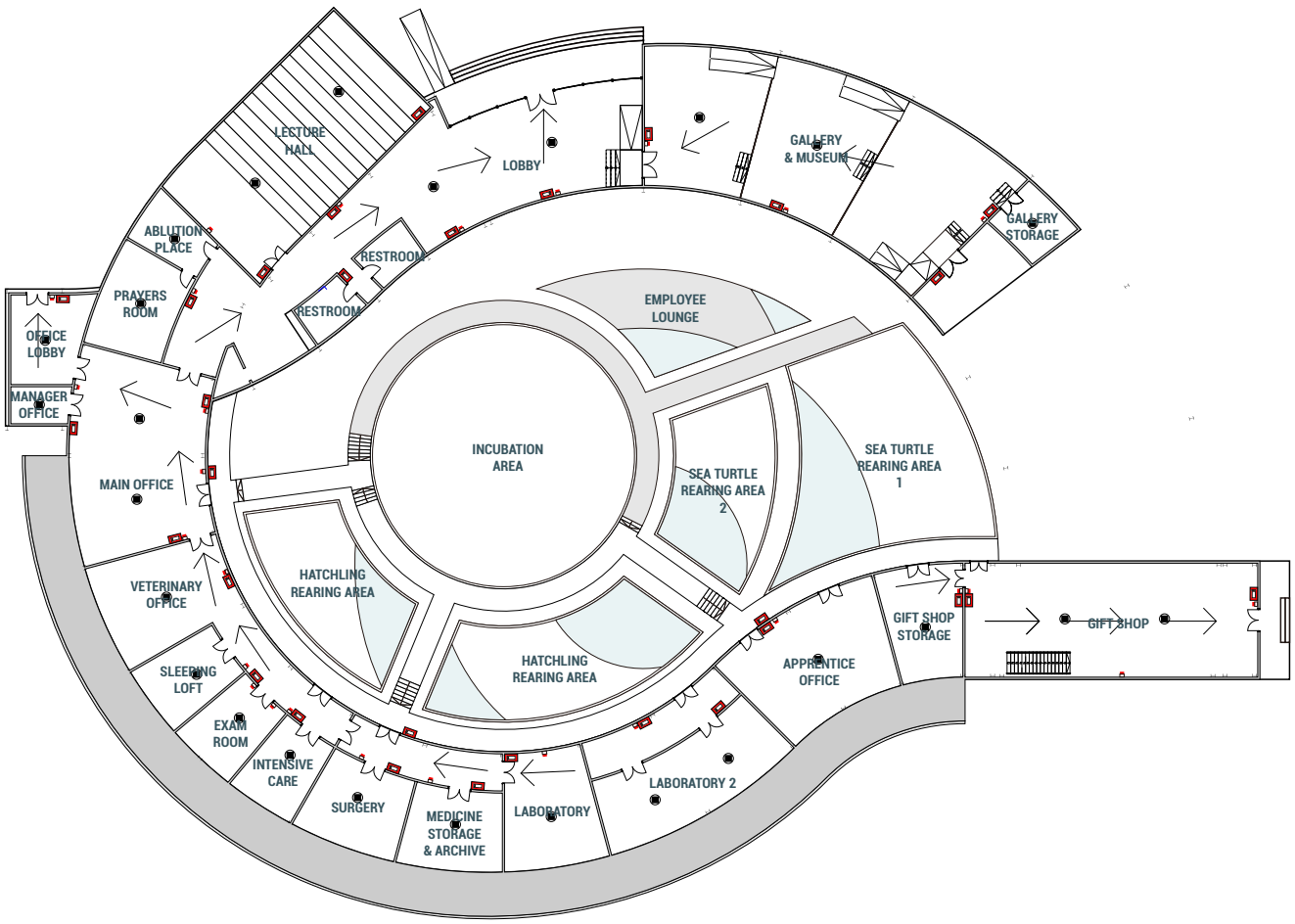
TRANSITION

TAKE OFF

Figure 102. 1st Floor HVAC Plan
Source: Writer

1:500

FIRE FIGHTING GROUND FLOOR



→	EVACUATION ROUTE
	FIRE ALARM
	SMOKE DETECTOR
	FIRE EXTINGUISHER

Figure 103. Ground Floor Fire Fighting Plan
Source: Writer

1:500

FIRE FIGHTING 1ST FLOOR

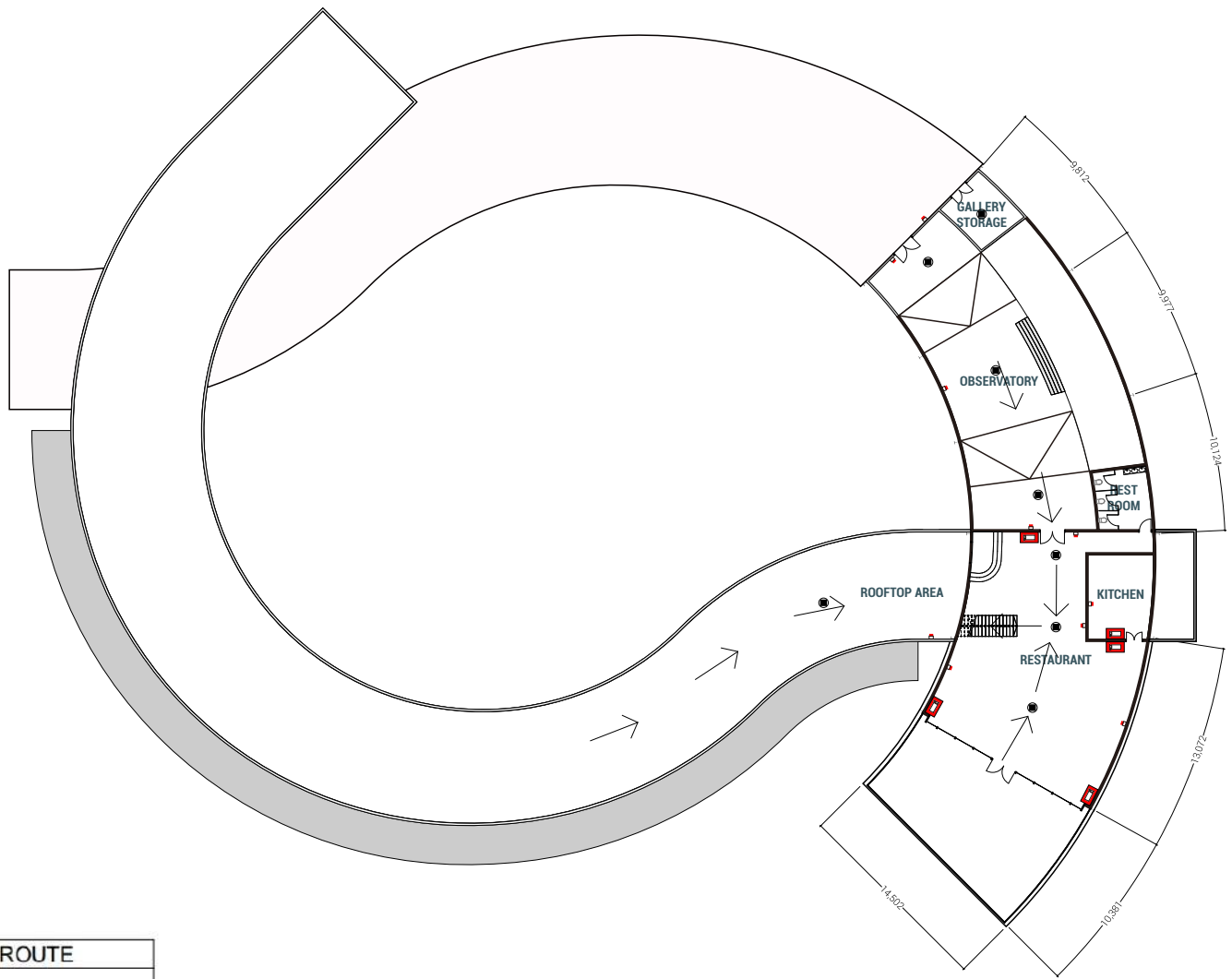
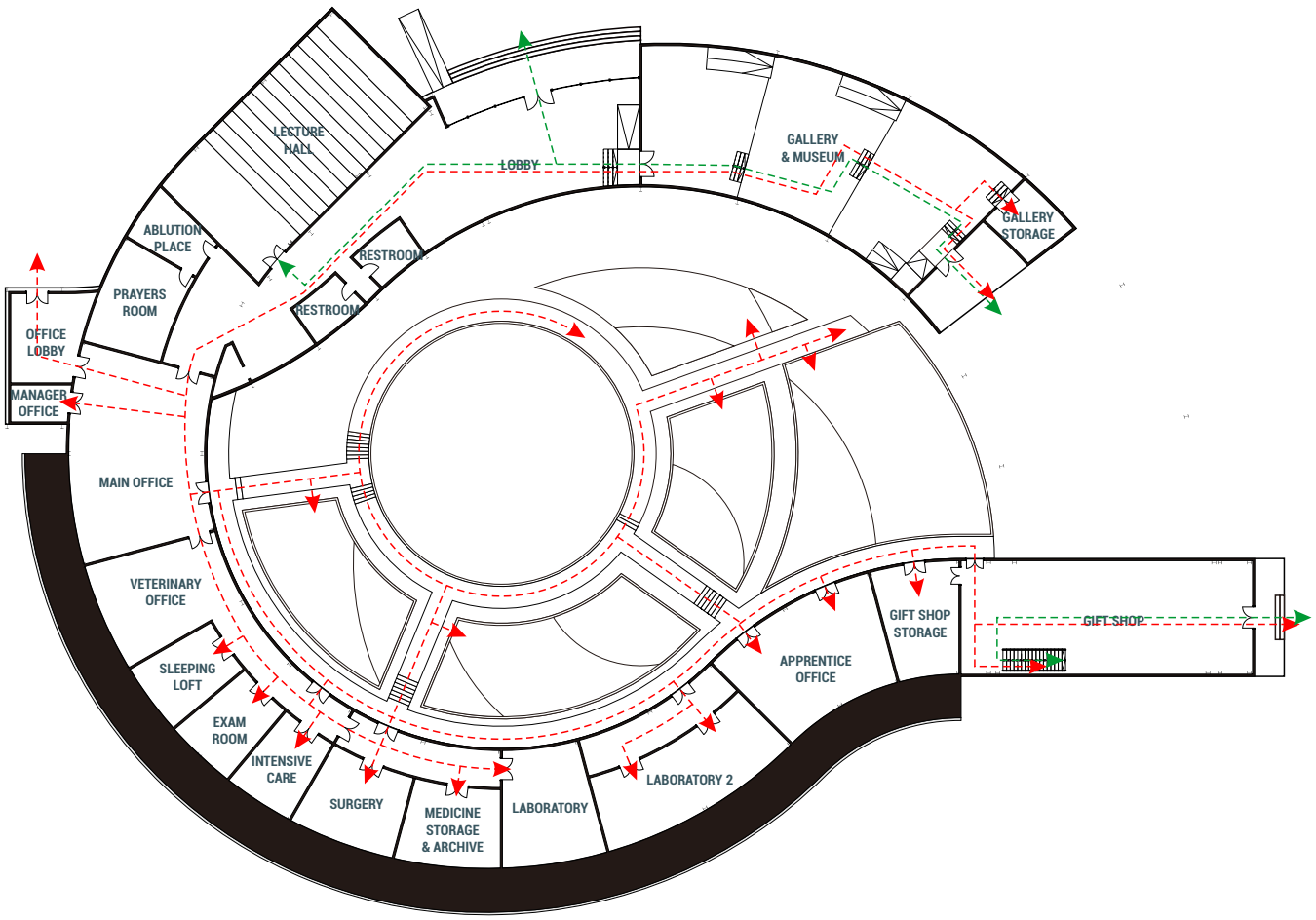


Figure 104. 1st Floor Fire Fighting Plan
Source: Writer

1:500

CIRCULATION PLAN GROUND FLOOR



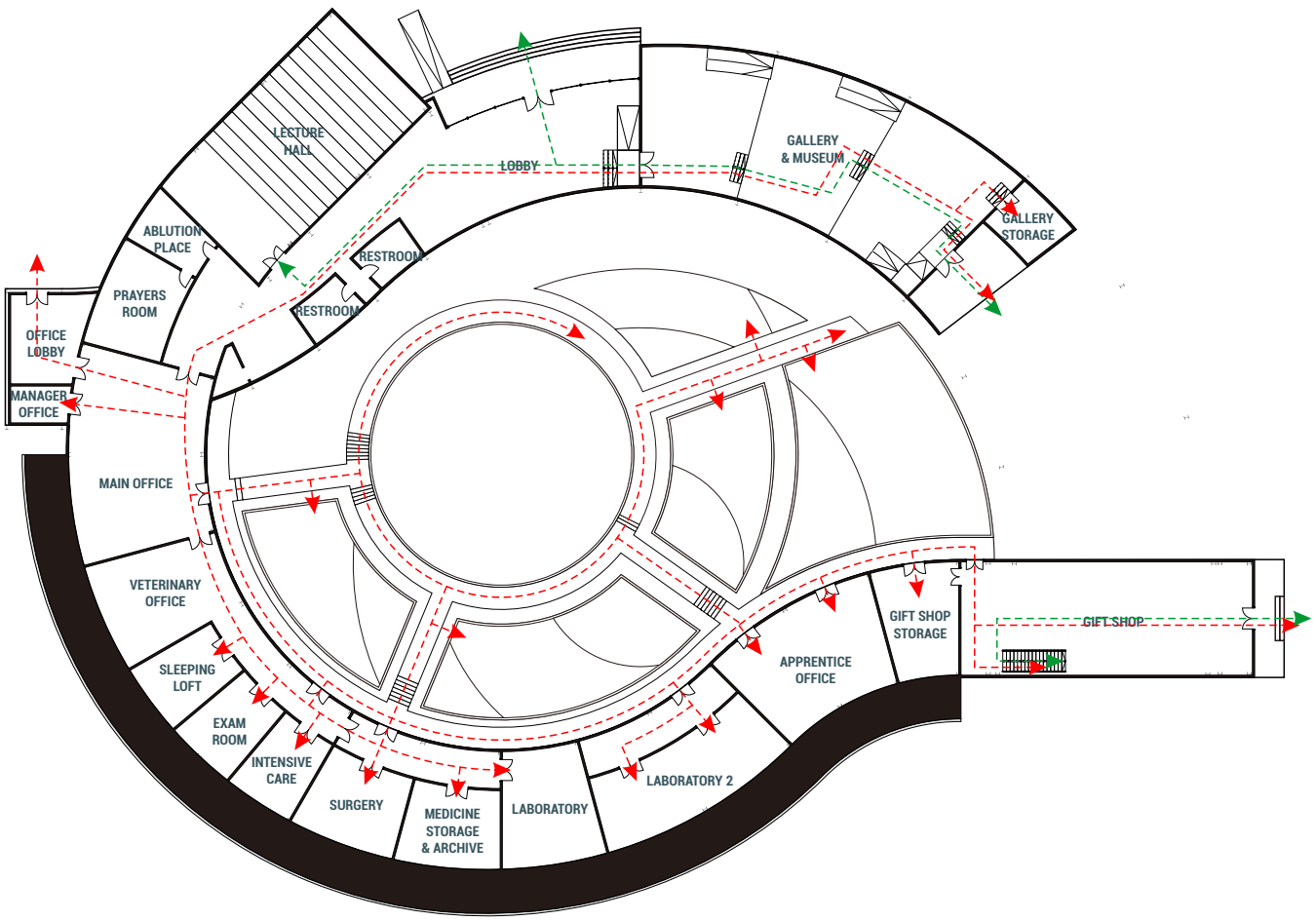
VISITOR CIRCULATION

EMPLOYEE CIRCULATION

Figure 105. Ground Floor Circulation Plan
Source: Writer

1:500

CIRCULATION PLAN 1ST FLOOR



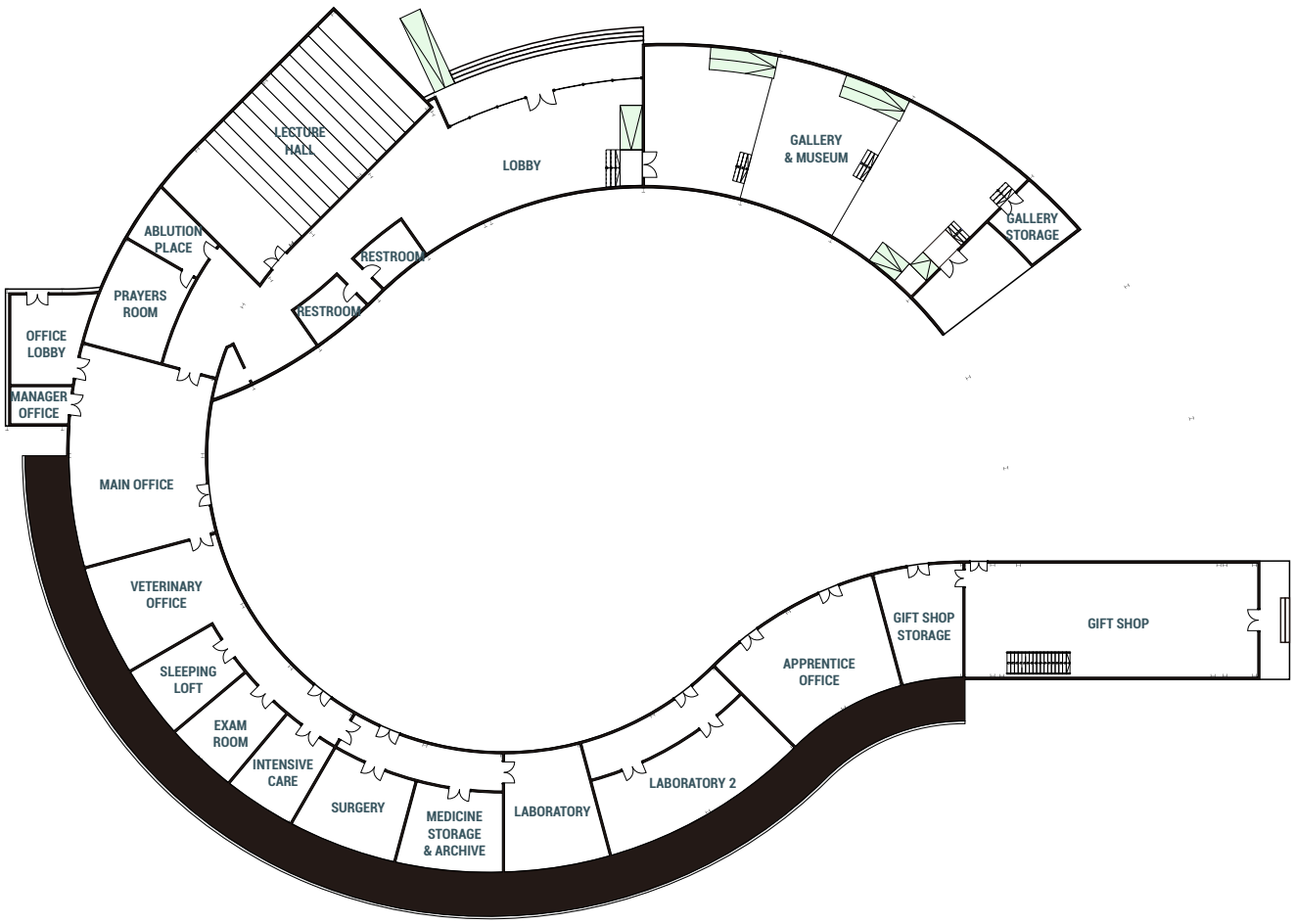
VISITOR CIRCULATION

EMPLOYEE CIRCULATION

Figure 106. 1st Circulation Plan
Source: Writer

1:500

BARRIER FREE PLAN GROUND FLOOR



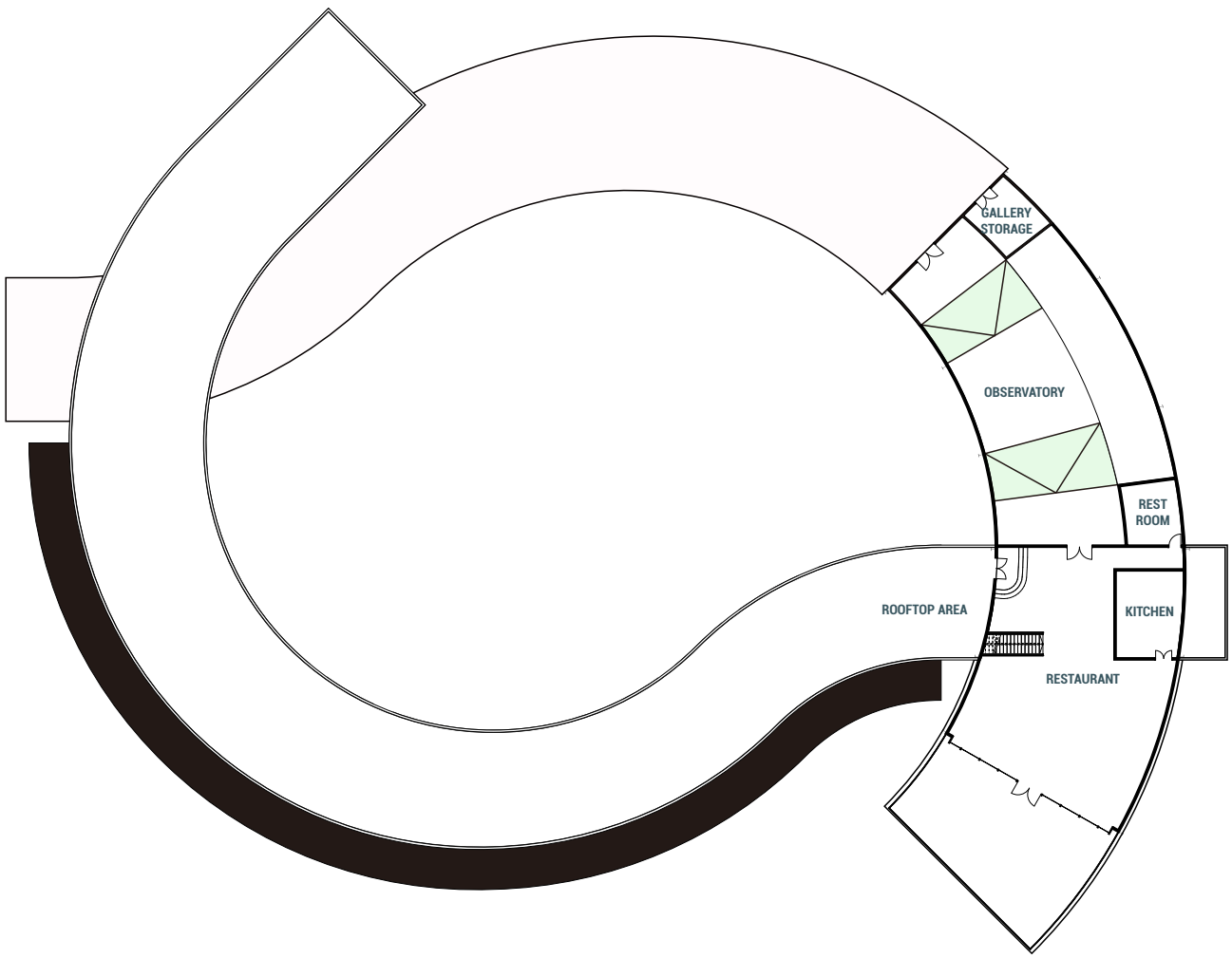
STRAIGHT RAMP

CIRCULAR RAMP

Figure 107. Ground Floor Barrier Free Plan
Source: Writer

1:500

BARRIER FREE PLAN 1ST FLOOR

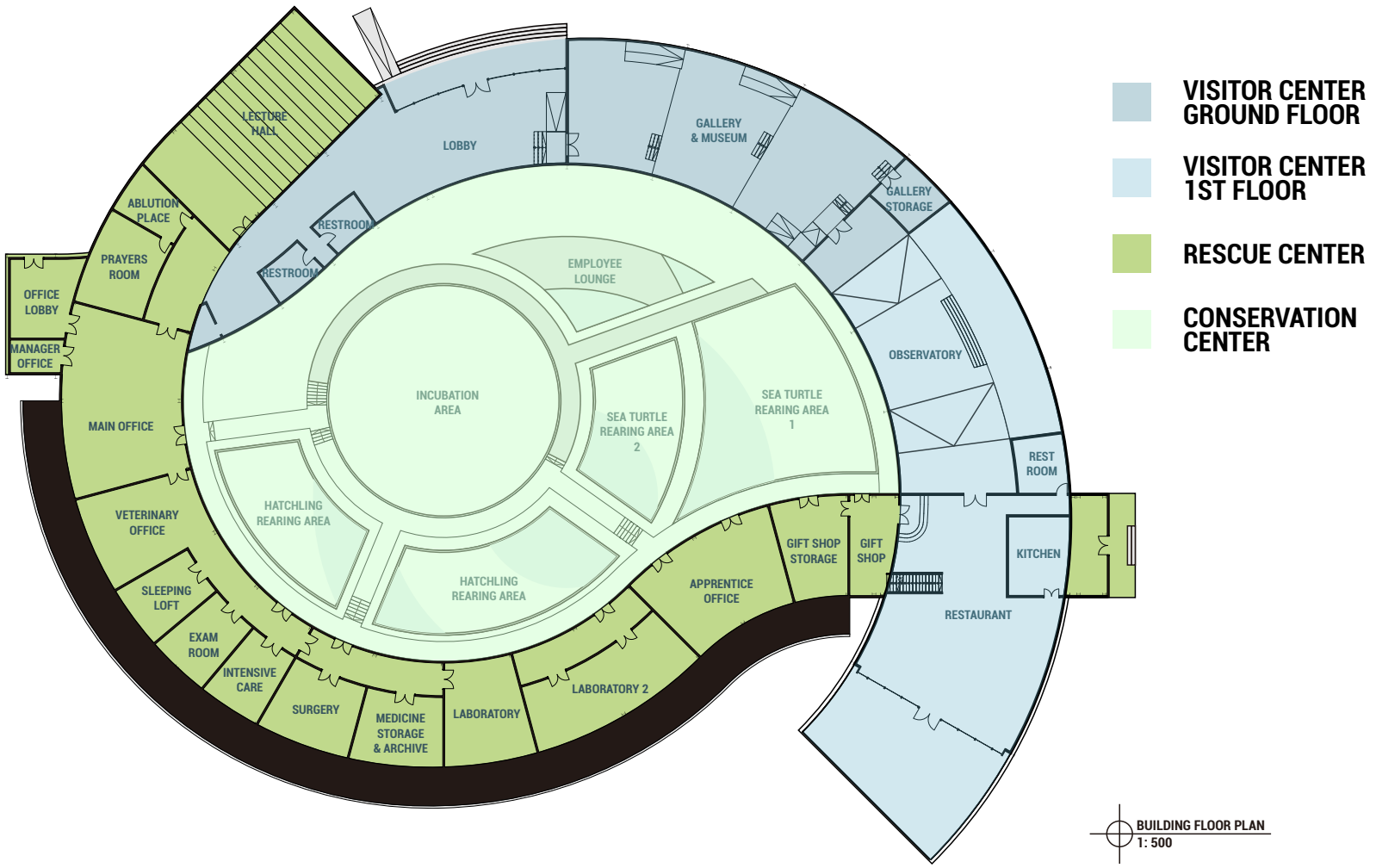


STRAIGHT RAMP

CIRCULAR RAMP

Figure 108. 1st Barrier Free Plan
Source: Writer

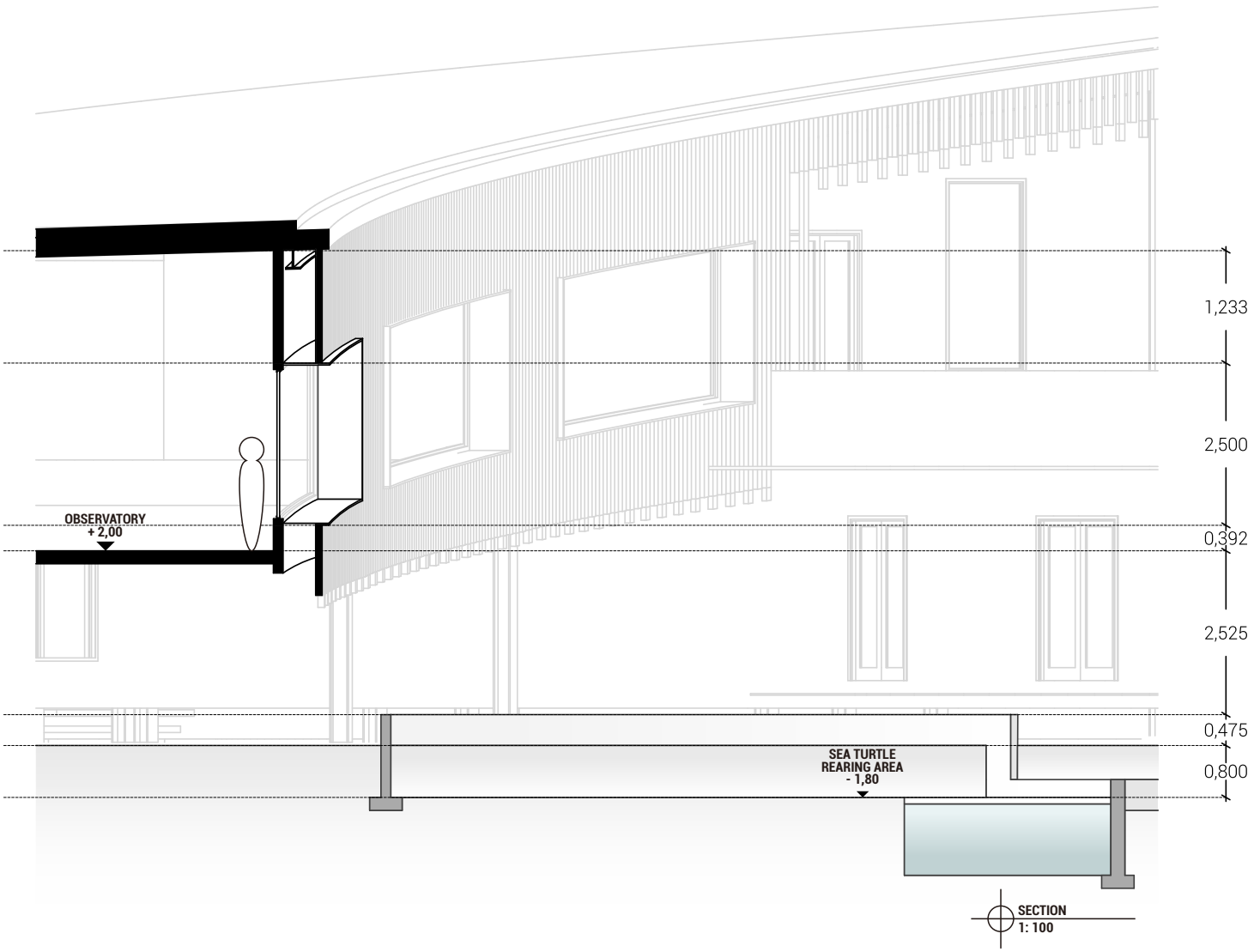
VISITOR AND SEA TURTLE SPACE INTEGRATION



To integrate space between sea turtle conservation and visitor center, the building is separated into 3 main areas: visitor area, conservation area, and rescue area. The visitor area is located on the north near the entrance, and the rescue area is located near the shoreline on the south. The rescue and visitor area are designed to circle the conservation area limiting its access from the outside.

Figure 109. Building Zones
Source: Writer

PRESERVING SEA TURTLES WILD ANIMAL NATURE



As the only place where the visitor can 'interact' with the sea turtles, the observatory area is designed to have elevation to better distance the visitors and the sea turtles in terms of visual and audio.

Figure 110. Observatory Section
Source: Writer

SPECIFIC DESIGN SOLUTION

ABRASION AND FLOOD RESISTANT STRUCTURE

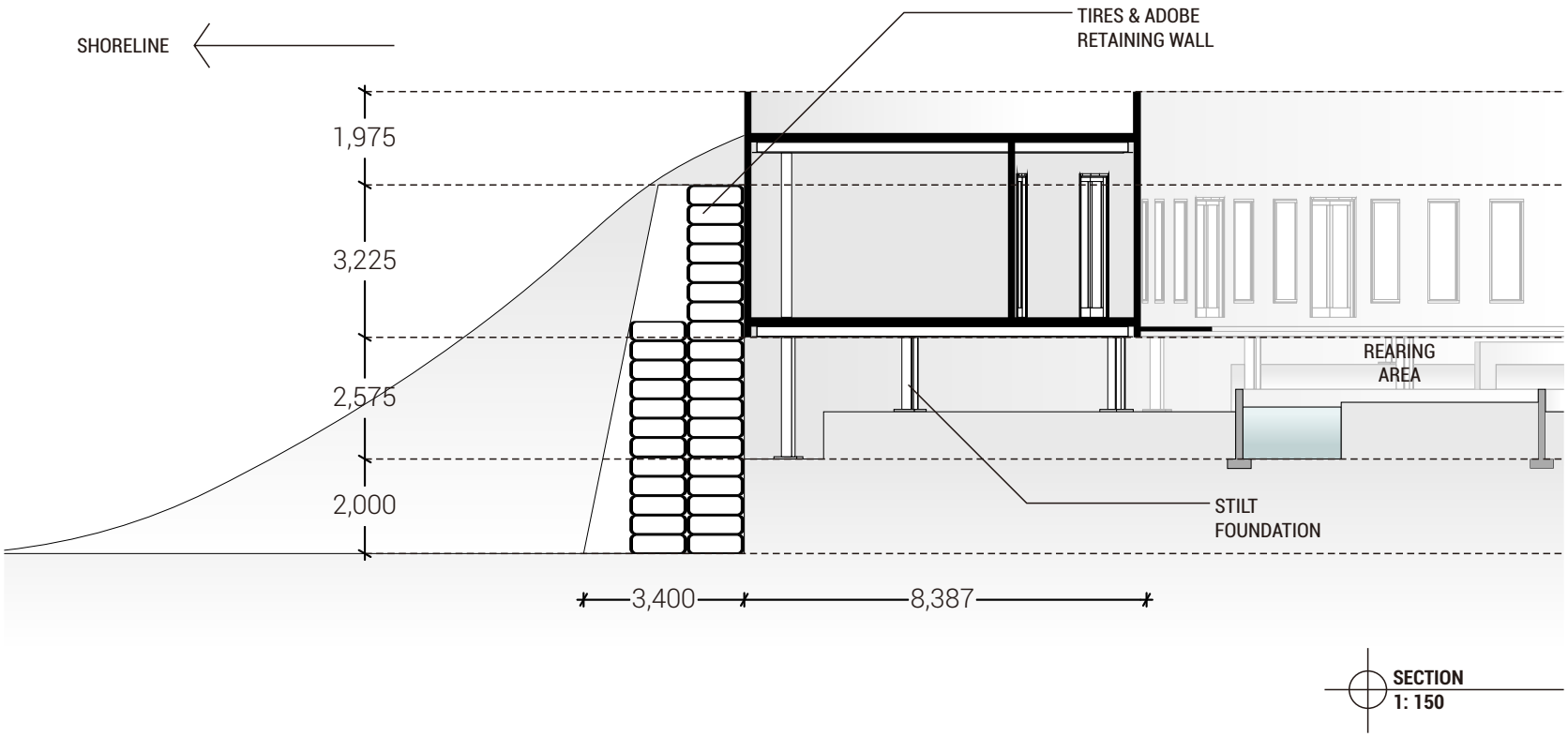


Figure 111. Structure Section
Source: Writer

The building will use a stilt foundation as its structure. This is chosen to minimize the building footprint and allow the ground to still function as drainage. Additionally, it also will allow the water and wind flow to be less disturbed.

On the South part facing the shoreline, there also will be sand dunes that are held by retaining walls to function as a water breaker in case of high tides. These sand dunes also function to protect the rearing area, as well as preserve the natural view on the shoreline for the sea turtle.

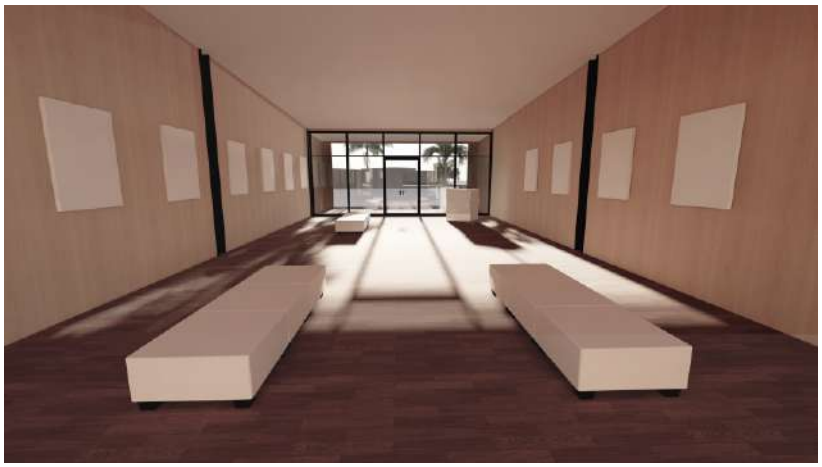
TRANSITION BETWEEN AGROTOURISM AND CONSERVATION-BASED



To connect the Agrotourism potential on-site, there will be an agrotourism introduction between the visitor center and the agrotourism. It will provide a tourism exhibition, educational pond, farming gallery, community garden, and plant nursery area.

Figure 112. Tourism Introduction
Source: Writer

1. TOURISM EXHIBITION



The first part of the tour function to hook the visitor's curiosity by showing how the village has battled abrasion and flooding.

2. EDUCATIONAL POND



After going through the Trisik Village exhibition, the visitors will go through an educational pond of crab and shrimp that will provide food for the sea turtle.

Figure 113. Tourism Introduction Interior 1
Source: Writer

3. FARMING GALLERY



Similar to the visitor center, before entering the agrotourism there will be a farming gallery that provides basic information regarding agriculture.

4. COMMUNITY GARDEN & PLANT NURSERY AREA



To create an engagement of the locals, right in the center of agrotourism potential, agrotourism introduction, and the residential area, there will be a community garden for the locals to grow plantations as a community.

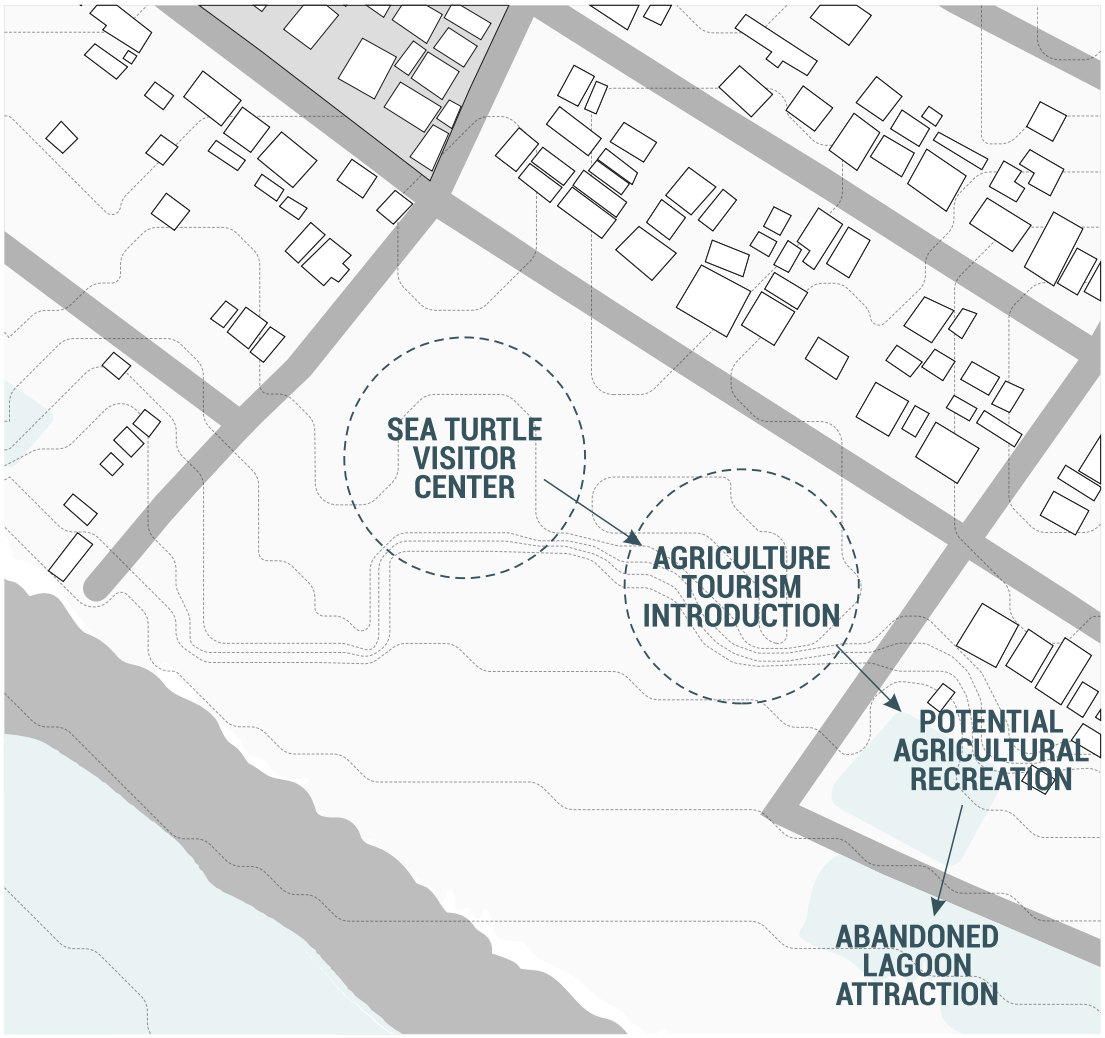
Figure 114. Tourism Introduction Interior 2
Source: Writer

DESIGN EVALUATION

DESIGN EVALUATION 1

CONTROLLING CROWD

CREATING ADDITIONAL FACILITIES





In regard to controlling the number of visitors, there should be additional tourist destinations to separate the concentration of the visitor. Near the site, there is already an existing lagoon recreation. However, the mentioned lagoon recreation facility is currently abandoned. Not to mention, the beach itself is open to the public.

The project plan is to revive Trisik's tourism as a whole gradually. First by creating a new destination as a way to attract new people as well as those who have visited. As the prestige of Trisik come back to light, the development of agricultural potential as a tourism development will start. As well as the repairment of the existing lagoon. With that said, there will be additional recreation developed onsite.

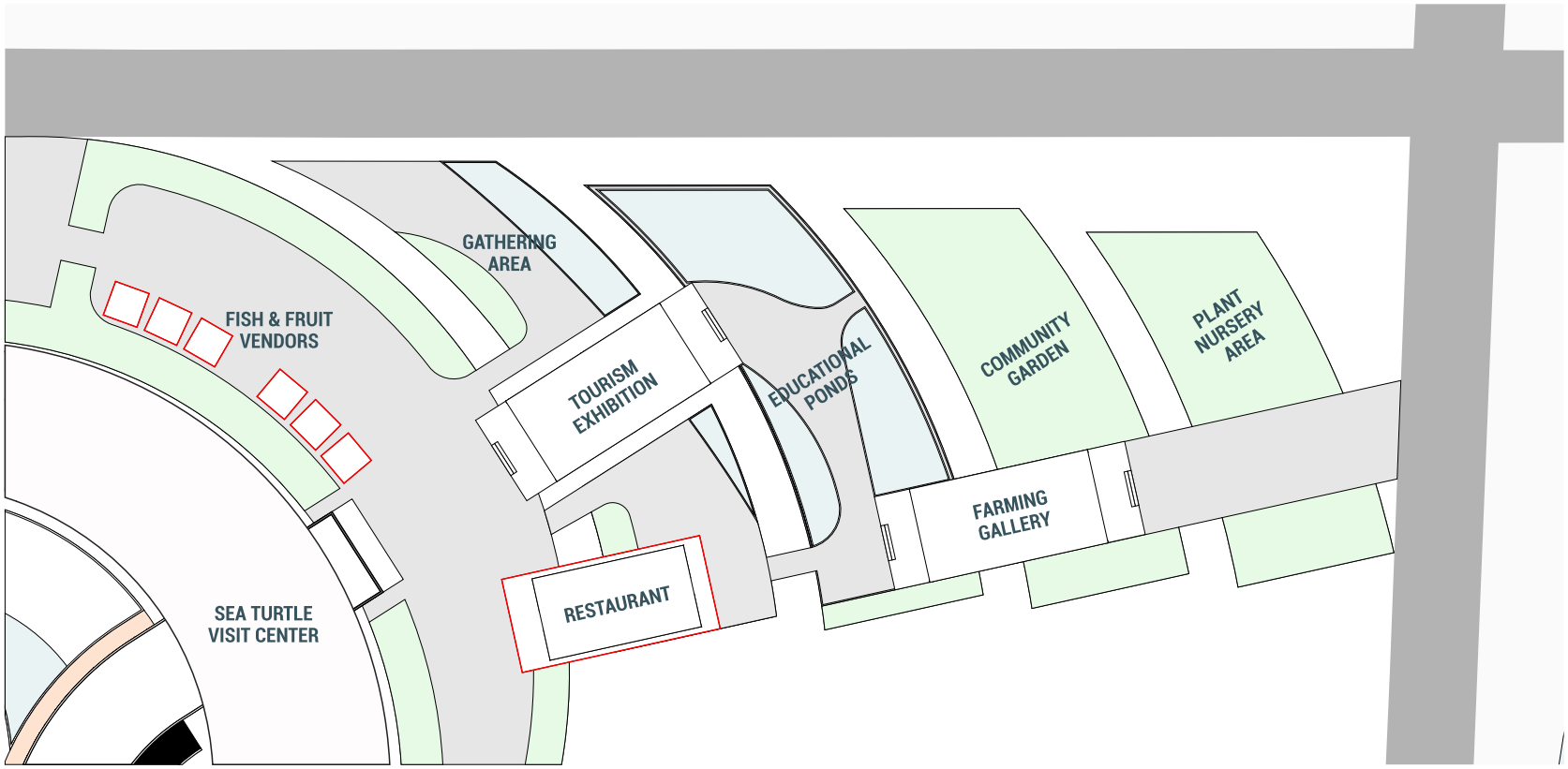


Figure 115. Additional Recreation
Source: Writer

Since it is most likely for people to experience the museum once, it is important to still attract recurring visitors. Therefore, the restaurant will be moved from the main tour to outside. Additionally, there will be smaller semi-permanent shops intended for the locals to sell fresh fish and agricultural products.

DETAILING SITE PLAN

DETAILING PARKING AREA & DEFINING SUPERTIDAL AREA

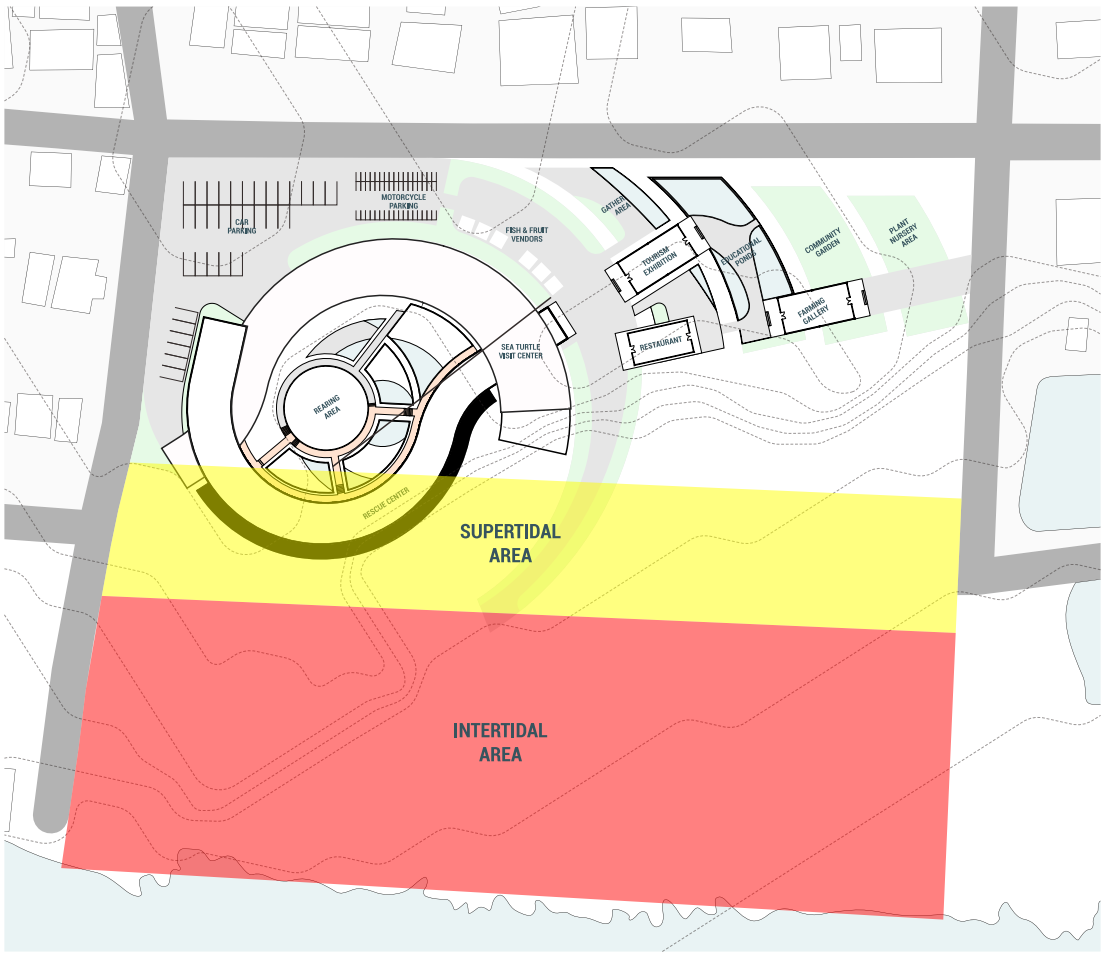


Figure 116. Site Plan Detailing
Source: Writer

In the site plan beside, the parking area is more defined. It showing the separation between the motorcycle and car parking area. Additionally, the intertidal and supertidal area are layered into the site plan. This layer intended to show the risk of high tides to the building and conservation area.

ADDING FACILITIES

ADDING RESTROOM & PANTRY FOR EMPLOYEE

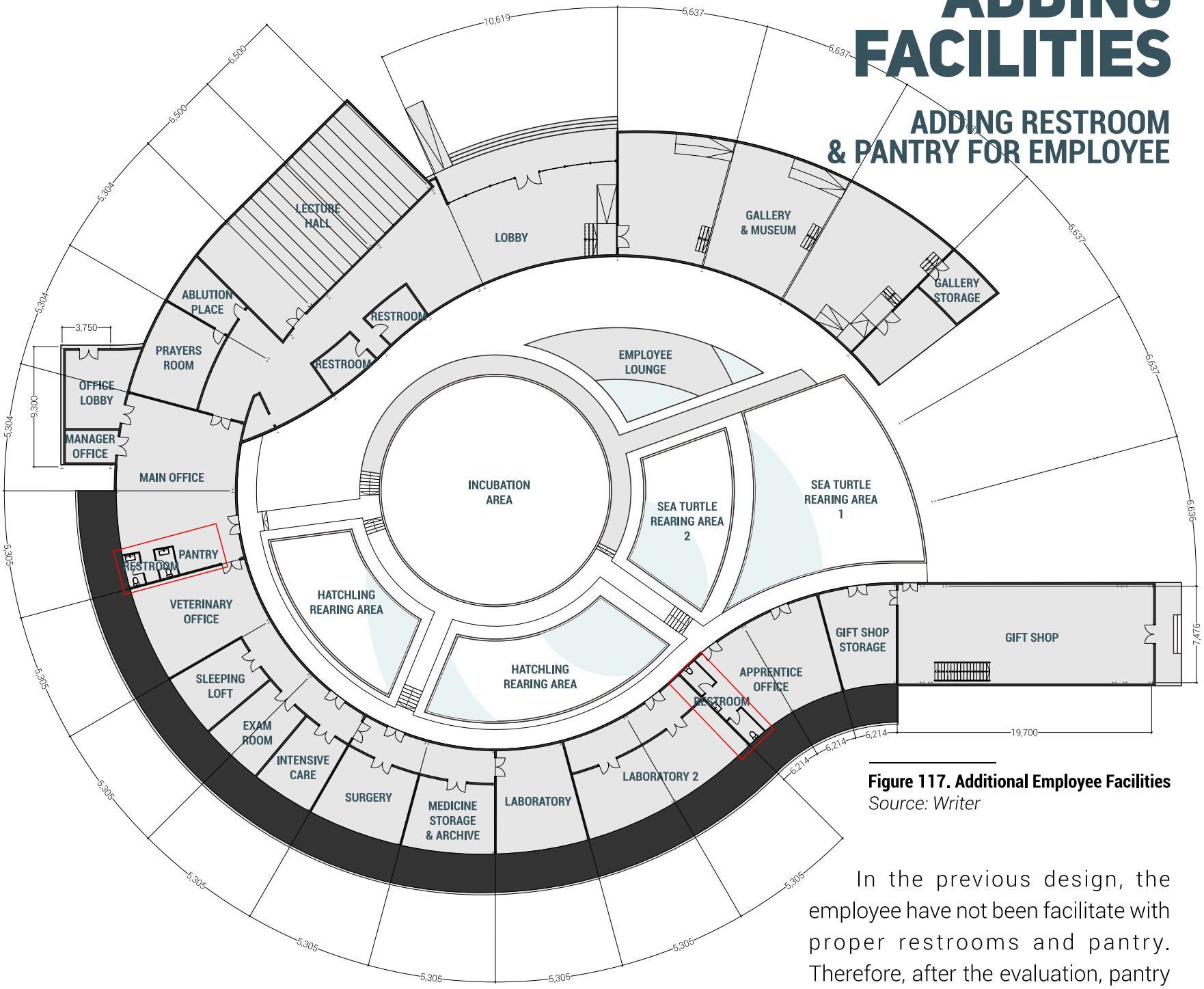


Figure 117. Additional Employee Facilities
Source: Writer

In the previous design, the employee have not been facilitate with proper restrooms and pantry. Therefore, after the evaluation, pantry and restroom is added in both the main office and apprentice office.

DESIGN EVALUATION 4

END OF THE TOUR

ADDING INTIMACY WITH TURTLE & MOVING THE RESTAURANT

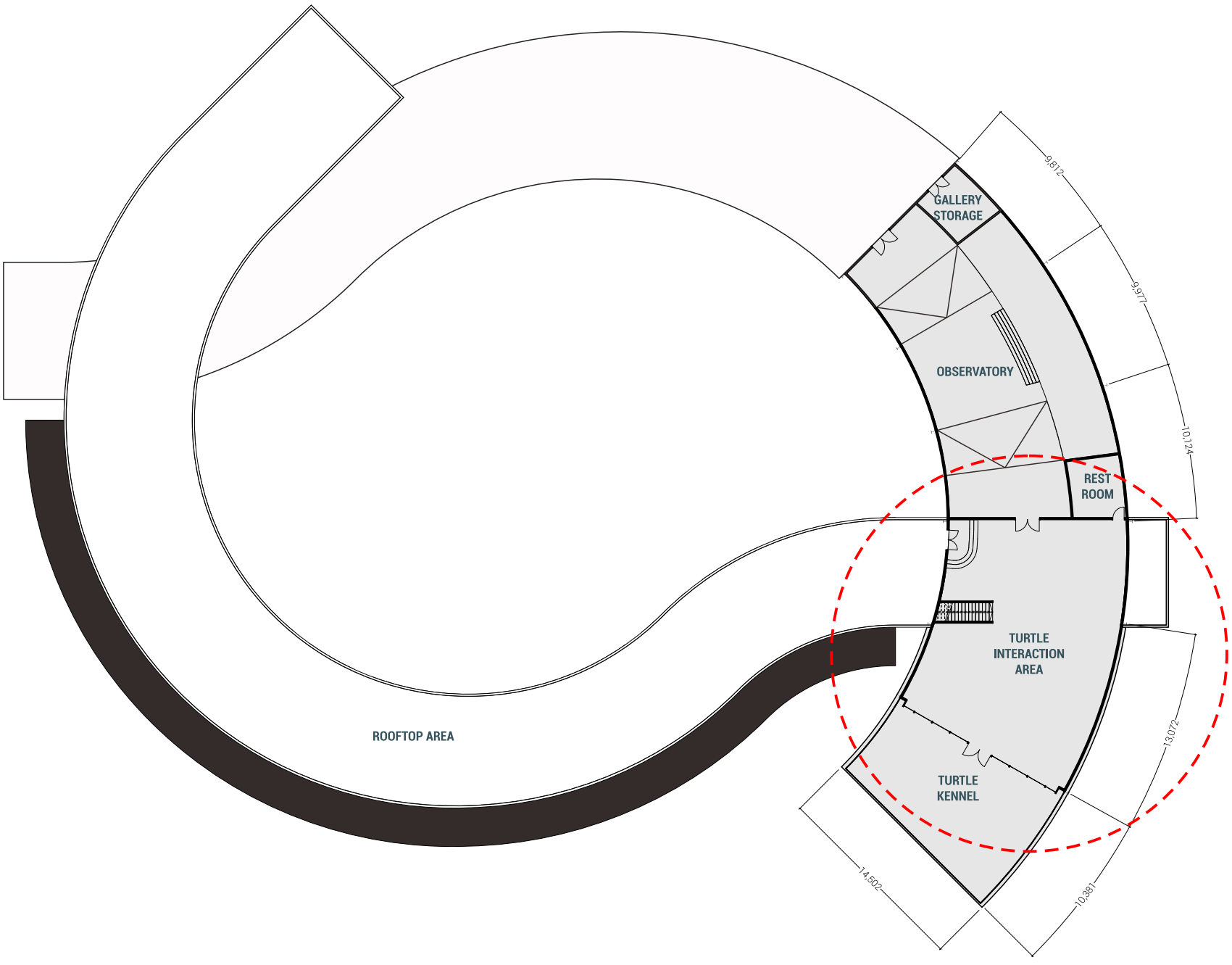




Figure 118. Turtle Interaction Area
Source: Writer

To better fulfill the visitor experience, the last part of the tour is changed from the restaurant to the turtle interaction area. This space is located at the end part of the building. Since interaction between people without licenses with a sea turtle is forbidden, the space will interact with a variety of turtles species that are not endangered instead. When the tour is currently off, the turtle will be kept outside of the building.

DESIGN EVALUATION 5

CONCRETE VS ADOBE

DEFINING THE ADVANTAGES OF USING EARTH-RAMMED TIRES



Figure 119. Photo of Used Tires
Source: Creative Common CC0

Earth-rammed tires have good fire-resistance and insulation property (Zhenzhen et al, 2011). Considering the high temperature of beach area, this material is a great fit. Compared to concrete, they stay much cooler during the day and warmth disolve more slowly during the night ("Adobe/cob Vs. Concrete", 2018).

Referring to research done by research team from UniSA in (Sadauskas, 2022), Earth-rammed tires are as strong as concrete and "extremely resilient". Additionally, in case of high external force such as earthquake, earth-rammed tires have an ability to maintain its form after impact.

GREEN ROOF MAINTANANCE

GIVING CONSIDERATION ON MAINTAINING GREEN ROOF

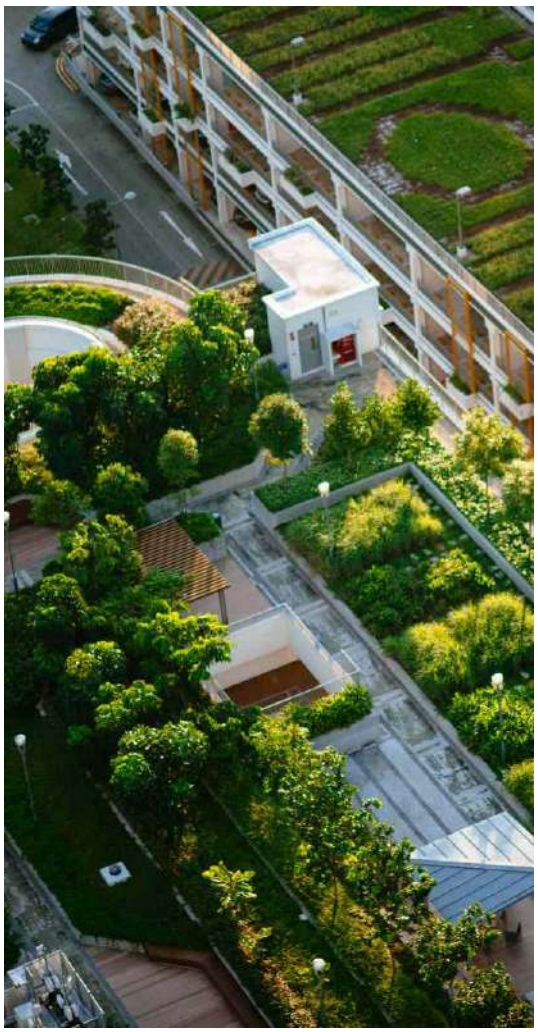


Figure 120. Photo of Green Roof
Source: Creative Common CC0

In this project, an Extensive Green Roof will be used to minimize the need for maintenance. This type of Green Roof uses semi-fertile soil media. By using a planting medium with a thickness of only 15 cm, this type of green roof does not facilitate special human activities on it (Rahman, 2020). In terms of green roof operation, some maintenance is required. There are several activities in green roof maintenance, namely (Hapsari, 2015):

1. Fertilizer and Watering

To minimize the load on the roof, the soil layer on the green roof usually tends to be thin. Therefore, regular fertilization is needed in plants. The fertilizer used is an easily decomposed fertilizer. Because the green roof on the project has a slope on the roof, an additional irrigation system is needed for irrigation problems.

2. Trimming

A green roof does not grow as fast as plants in general. However, regular trimming is still needed for plants on green roofs.

3. Membrane Layer

On the green roof, there is a layer of the membrane. This membrane layer requires routine checking and periodic replacement.

4. Pest Control

Even though it is located at a high altitude, the roof garden remains a target for pests such as insects and rats. In the operation of a green roof, regular checks and treatments are required.

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ATTACHMENTS

Direktorat Perpustakaan Universitas Islam Indonesia
Gedung Moh. Hatta
Jl. Kaliurang Km 14,5 Yogyakarta 55584
T. (0274) 88444 e xt.2301
F. (0274) 88444 p sw.2091
E. perpustakaan@uii.ac.id
W. library.uii.ac.id

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Assalamualaikum Wr. Wb.

Dengan ini, menerangkan Bahwa:

Nama	: Chalid Muhammad Gilang Mahirra
Nomor Mahasiswa	: 18512158
Pembimbing	: Dr.-Ing Putu Ayu P Agustiananda., ST., MA.,
Fakultas / Prodi	: Teknik Sipil dan Perencanaan/ Architecture International Program
Judul Karya Ilmiah	: PERANCANGAN PUSAT PENGUNJUK PENYU DI KULON PROGO, DI YOGYAKARTA MENGGUNAKAN PENDEKATAN DESAIN EKOLOGI

Karya ilmiah yang bersangkutan di atas telah melalui proses cek plagiasi menggunakan **Turnitin** dengan hasil kemiripan (*similarity*) sebesar **4 (Empat) %.**

Demikian Surat Keterangan ini dibuat untuk dapat dipergunakan sebagaimana mestinya.

Wassalamualaikum Wr. Wb.

Yogyakarta, 12/23/2022
Direktur

UNIVERSITAS ISLAM INDONESIA
DIREKTORAT PERPUSTAKAAN
YOGYAKARTA

Muhammad Jamil, SIP.

ECOLOGICAL ARCHITECTURE

SEA TURTLE VISITOR & RESCUE CENTER

Trisik Beach is one of the tourist beaches in Kulon Progo, DIY. Since the 90s, beach tourism has had its ups and downs. At first, this beach was a fishing village. Gradually, tourism on this beach has increased with the existence of a fish auction place located on one part of the beach. But in 2008, abrasion devoured the prosperity of this beach tourism. In 2018, the community revived Trisik Beach tourism with the development of a lagoon and various conservation activities making this beach a Conservation-Based Ecotourism. However, for the same reason, the facilities and infrastructure that have been built are affected by abrasion and are eventually damaged and abandoned in 2022.

The decline in Trisik Beach tourism is very unfortunate. This beach actually has many advantages. This beach is passed by the southern route to YIA (New Airport). The location of this beach is also adjacent to Muara Progo. On this beach, there is also one of only 3 turtle conservation places in Yogyakarta. Unfortunately, the development of facilities and infrastructure on this beach cannot withstand the frequent coastal abrasion.

This Sea Turtles Visitor Center is designed to improve the quality of Trisik Beach tourism while still maintaining the Sea Turtles' habitat in the area. The design provides facilities that involve the locals in reserving Sea Turtles as well as educating the tourist about Sea Turtles and their importance. It hopes to improve wider communities' awareness of turtle preservation activities.



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Design of Sea Turtle Visitor Center in Kulon Progo, DI Yogyakarta
Using Ecological Design Strategies

Design by
Chalid Mahirra | 1851258
and Supervised by
Dr.-Ing Putu Ayu P Agustiananda., ST., MA.,

Jury 1
Arif Budi Sholihah, ST.,M.Sc.,Ph.D
Jury 2
Ir. Wiryono Raharjo, M.Arch., Ph.D.

BACKGROUND
CONTEXT | **OVERVIEW**



SOUTH COAST AS THE FACE OF YOGYAKARTA

There is a plan of the government to make the South coast the face of Yogyakarta. Specifically, on Trisik beach, the plan is to develop a sea turtle conservation area and an agro-coastal tourism village.



ABRASION AND FLOODING SURROUNDING KULON PROGO

Kulon Progo is located in the Special Region of Yogyakarta and is bordered by the Indian Ocean in the South. There are several beaches located there. However, the existence of these beaches is in danger of disappearing one by one due to abrasion. There are also several cases throughout the year that show how abrasion has damaged the Kulon Progo's Beaches.



LACK OF TOURIST ATTRACTION IN TRISIK BEACH

There are actually several efforts that have been made to increase visits to Trisik Beach. One of these efforts is the development of tourism in the context of "conservation-based ecotourism" in 2018. However, abrasion and high waves continue to hit this beach, until finally the facilities and tourism that were built are damaged and are now abandoned in 2022.



SEA TURTLE NESTING SITE ARE DECREASING

At Trisik Beach there is a sea turtle conservation which is managed by Kelompok Konservasi Penyu Abadi. However, this conservation site is threatened to be relocated. The sea turtle hatchery in this conservation area continues to be eroded by abrasion.

BACKGROUND
CONTEXT | **SITE LOCATION**



Total Area:
22.592,48 m²

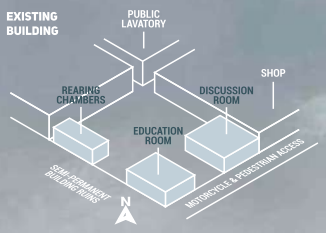
NOTES
1 Sea Turtle Conservation
2 Entrance Gate
3 Vacant Land
4 *Pencak Silat* Hall
5 Car Parking
6 Abandoned Kids Pool
7 Motorcycle Parking
8 Abandoned Lagoon

The site is located in Trisik Beach, specifically near Trisik Beach Lagoon which now has been abandoned. There are several existing tourism facilities that are already existing nearby the site. These facilities are mostly built semi-permanently or constructed as semi-open space.

REGULATION

BUILDING COVERAGE:
60%
GREEN AREA:
30%
BUILDING COVERAGE:
1.8X
BUILDING HEIGHT:
3STORIES

EXISTING BUILDING



In the existing building, there are 3 main functions that are provided for the visitors. They are the education room, discussion room, and rearing area. These functions are placed in a separate semi-permanent building with a larger open space in the middle.



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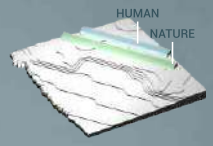
Jury 1
Arif Budi Sholihah, ST.,M.Sc.,Ph.D
Jury 2
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ECOLOGICAL

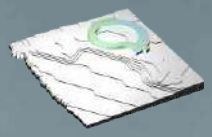
CONCEPT | BUILDING MASS

DESIGN THAT FIT ITSELF INTO THE EXISTING NATURAL PATTERNS

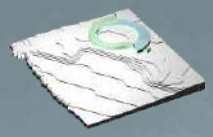
People have a role that needs to be fulfilled in a natural setting so that harmony between both can be achieved. This refers to the human role as a 'Khalifah' that revolves around Islamic teaching. This role taught Muslims to be representative of their God on Earth. Moreover, one of the parts of this role is to prosper and protect nature. Ecological Architecture helps people to fulfill this role. Furthermore, it helps people to fit themself into the existing natural environment.



In this modern world, more often than not, people see themselves as an entity that is separated from nature. People see themselves and nature as parallel lines. They exist together but never once connect with one another.



To remind people of where they come from, the design tries to disturb these lines that separate both. As an Ecological design is a design that can 'teach', let's represent it by combining both lines that represent people and nature and show people that if they treat nature well, it will provide even better greatness for them.



Each 'line' will function to provide a different function. The 'line' that represent human will accommodate the facility of the visitor center and The 'line' that represents nature will facilitate conservation activities. Both of the masses mentioned will circle a landscape that will be used as the sea turtle conservation to show the correlation between people and nature can be beneficial for the greater good.

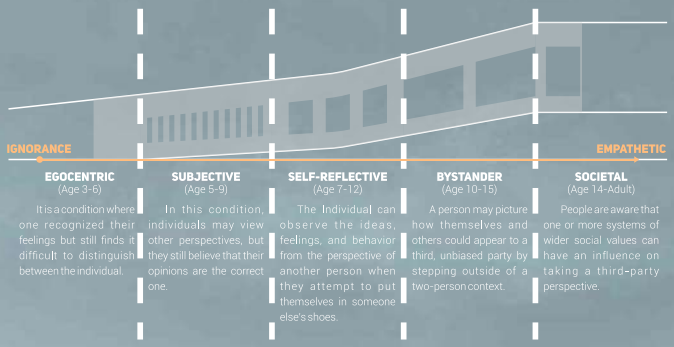
ECOLOGICAL

CONCEPT | SPATIAL FLOW

DESIGN THAT EDUCATES: DEVELOPING EMPHATY

The design will show the connection between nature, culture, and humans as a way to become an ambassador for the natural environment. To be more specific about the context, the project will educate people using architecture and make them more compassionate toward sea turtles. To do this the project takes a look into the development of empathy in a person.

One of the bases of developing empathy in a person is their perspective of their living environment. The development of empathy started from a child until they are adults. This development can be separated into 5 main stages. The project uses these stages as a basis to develop visitor empathy. It is represented by having a higher and wider view of the surrounding area the more they go inside the building.





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DESIGN | SEA TURTLE TOUR

DESIGN THAT EDUCATES: DEVELOPING EMPHATY



1. EGOCENTRIC



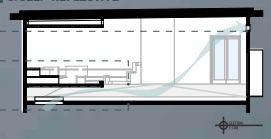
Before starting to develop empathy, a baseline should be defined so that all visitors have at least a similar understanding. This baseline is created by representing the egocentric state that shows how a building and environment can be treated as one and the same.

2. SUBJECTIVE



To encourage the visitors to go to the next step, the visitor will encounter a semi-closed partition wall that reveals and tease the next destination, which is the museum. The reason to do this is so that it can intrigue the visitor, giving them a sense of curiosity. The sense of curiosity itself plays a big role in developing empathy in a person.

3. SELF-REFLECTIVE



The observatory area will give the visitor the time to observe the sea turtle. Using their base understanding of sea turtles from the museum, the visitor is encouraged to experience how sea turtles nest by having ramp.

4. BYSTANDER



1st Window



2nd Window



3rd Window

In continuation of the previous state, this state also happens in the observatory area. The sloping slab gives them a view as they move further and higher. The wider view gives them a sense of purpose and encourages their movements. As they go higher, they can see more about how conservation activities in the facility are conducted.

5. SOCIETAL





In the last state, the tour is finally finished. The visitors are rewarded for their learning by having a place to rest. The mentioned resting area comes in the form of a restaurant. Here, they can see wider and clear views of nature, especially the sea. This will give them a sense of closure. From the restaurant, the visitors can still explore if they choose to. There is access to the rooftop area where they can appreciate how the building is influenced by the nature and how it shaped the building style.



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DESIGN | AGROTOURISM INTRODUCTION

DESIGN THAT BENEFICIAL FOR PEOPLE AND NATURE



To better appreciate the history of Trisik village, the project will facilitate a place to introduce village tourism in the surrounding area. This introductory is located between the potential place for agrotourism and the sea turtle visit center. It will provide space for a tourism exhibition, an educational pond, a farming gallery, and a community garden & nursery area.

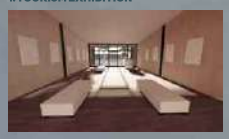


AERIAL



ENTRANCE

1. TOURISM EXHIBITION



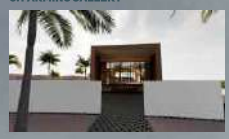
Trisik had a long history of ups and downs regarding tourism since the 1990s. By itself, it gives Trisik an interesting story to tell. The first part of the tour function to hook the visitor's curiosity by showing how the village has battled abrasion and flooding.

2. EDUCATIONAL POND



In agrotourism, usually, a tour starts by having a farm animal on display. However, considering the unique location of the site, an educational pond is more appropriate as one of the starting points of the tour. Not only for the visitors to learn, but the pond will help provides food for the conserved sea turtle by cultivating crab and shrimp.

3. FARMING GALLERY



Before transitioning into agrotourism, there will be a small gallery to help better grasp the basic understanding of the upcoming tourism like how the previous tour was delivered.

4. COMMUNITY GARDEN & PLANT NURSERY AREA



The community garden is located at the end of the introductory. It is cultivated and managed by the community. It functions as the point of interest for both visitors as well as the Trisik community. Its unique location between the introductory and the residential area makes it perfect as a main interaction between the two.

ECOLOGICAL

DESIGN | CONSERVATION AREA

DESIGN THAT BENEFICIAL FOR PEOPLE AND NATURE



The temperature of the eggs specifies the type of sexes of the eggs. This is why a semi-natural incubation is much preferable to the artificial one. The location characteristic of sea turtle hatcheries' is created semi-natural by growing tropical plants such as ferns, palms, and fir trees. Vegetation acts as a shader for the incubation location to keep changing its temperature so that the hatchling will have their gender distributed properly. Hence, the terrarium miniature is established. Additionally, sea turtles have a strong homing instinct, it is important for sea turtle conservation to accommodate a place that the sea turtle will be familiarized with.

Not only to provide shading but the introduction of several parts of the sea turtle habitat as a way to educate the visitors on how sea turtles live. Moreover, the conservation area will be provided with pathways that directly lead to the rescue area for treatment, feeding, and monitoring.



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ECOLOGICAL
DESIGN | MATERIALS
ATTEMPT ON MINIMIZING NEGATIVE IMPACT ON THE ENVIRONMENT

ECOLOGICAL MATERIAL CRITERIA:

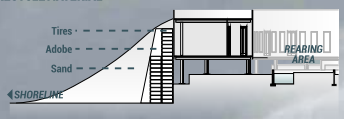
1. Healthy
2. Minimum Carbon Footprint
3. Minimum Embodied Energy
4. Reuse of Residues
5. Recyclable and Reusable (at least once)
6. High Insulation Qualities
7. Beneficial to the environment

LIGHTWEIGHT MATERIAL



Lightweight material is chosen based on their health performance, the use of embodied energy and residues, insulation quality, and its availability surrounding the site (carbon footprint). The application of each material determined by how they relate to their health and structural performance.

RECYCLE MATERIAL



Here, the building will make use of recycled materials as retaining walls. These retaining walls will hold sand dunes to conceal the building from the shoreline so that the sea turtle can comfortably nest on the beach without feeling disturbed. Additionally, the sand dunes and retaining wall will function as wind and water breakers, in incase of high tides.

BENEFICIAL TO ENVIRONMENT:
GREEN ROOF



Referring to GBCI's Green building Parameter, in order to help deal with microclimate it needs to have at least 50% of its roof constructed using a green roof. In this project, from the more or less 2.020m2 total roof area, roughly 1078 m2 of it is using a green roof as its coverage. Converted into percentages, the green roof area covers 53% of the total roof coverage.

ECOLOGICAL
DESIGN | STILT FOUNDATION
ATTEMPT ON MINIMIZING NEGATIVE IMPACT ON THE ENVIRONMENT



A building stands on a foundation. This foundation is usually placed underneath the earth's surface making the building sit covering all the ground surface of the building area. Elevating the building will minimize the ecological footprint. This means that the ground that otherwise will use for the building to stand can still function as a drainage. Not to mention, by having the building mass elevated, the wind and water flow will be less disturbed compared to the building that is directly placed above the ground.



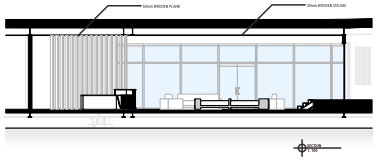
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INTERIOR
DESIGN | **LOBBY**

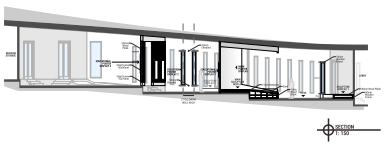




The appearance of the building facade is continued to the lobby by providing extra greenery on receptionist walls and surrounding the furniture. The view to the conservation area is limited by thigh windows and building skins.

INTERIOR
DESIGN | **MUSEUM & GALLERY**

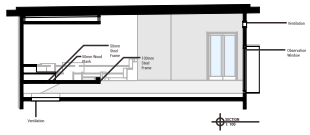




Inside the museum, the concept of creating curiosity is further enhanced by allowing the visitor to visually see part of the upcoming tours by using vertical pattern partition walls. The view is a bit enhanced than the lobby by having stepped level. However, the windows are covered by the building skin to still make the visitor guess.

INTERIOR
DESIGN | **OBSERVATORY**





The observatory was designed to have different heights in mind. It consists of 3 different levels and ramps in between. The collection of vegetation is being re-introduced in the lounge to show the possibility of connection between nature and architecture.

INTERIOR
DESIGN | **RESTAURANT**



OUTDOOR EATING AREA



INDOOR EATING AREA 1



INDOOR EATING AREA 2

The restaurant is design to maximise the view to the shoreline. The trend of having combination of metal wood is continued to the space giving it continuation from the first entering the building. Here the visitor can access rooftop observatory to continue explore the building or go down to the giftshop and exit.



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