FINAL ARCHITECTURAL DESIGN STUDIO

Redesign of Fish Processing Center and Market in Kampung Manggar Balikpapan

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UNIVERSITAS ISLAM INDONESIA
INTERNATIONAL UNDERGRADUATE PROGRAM IN ARCHITECTURE
DEPARTMENT of ARCHITECTURE

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Department of Architecture
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2021/2022

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Redesign of Fish Processing Center and Market in Kampung Manggar Balikpapan

I hereby declare that this design work is the result of my own work and is not the result of plagiarism and does not contain any work that has been submitted for a bachelor's degree at a university or has been published by another person, except in writing referred to in this manuscript and mentioned in the list reference. 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, 5th August 2022



Ummi Hanik Esaputri
18512085

AUTHOR'S GREETING

Assalamualaikum wr. wb

Praise and gratitude to Allah SWT who have given His grace and guidance, so that the author can complete his study at the International Program of the Department of Architecture in Universitas Islam Indonesia by completing the Final Architectural Design Studio entitled "Redesign of Fish Processing Center and Market in Kampung Manggar Balikpapan". The author is aware that the process and the implementation of the Final Architectural Design Studio could not be possible without the support of many people. Therefore, the author would like to express his gratitude and appreciation to :

1. Allah SWT for His blessings, mercy, and guidance so that the author can complete and convinced with the whole final studio design process.
2. Drs. Zulkifli M.Si (dad), Neliyati (mom), Muhammad Furqan (brother), Renny Mutiara Agustin (sister), Amalia Kasih Ramadhani (sister) who I respect and care for, who always give encouragement, support, motivation, and compassion.
3. Ir. Wiryono Raharjo, M.Arch, Ph.D as the author's supervisor who has given invaluable time, knowledge, criticism, advice, and patience so that the author could learn new inspiring things from the process in finishing this Final Architectural Design Studio.
4. Dr.-Ing. Ir.Ilya Fadjar Maharika, MA, IAI and Dr. Ir. Revianto Budi Santosa, M.Arch as the Jury Examiner that has given the authour invavluable criticism, advices and helped evaluated the work to have better result.
5. All lecturers, staffs and alumni at the Department of Architecture, Islamic University of Indonesia, who have helped the author and provided references and knowledges that are very useful for the author in completing the design learning process throughout each semester.
6. Hanief Himawan S.Ars as a partner who have given so much time, tremendous supports and help the author to immediately complete the final project in this tough studio time.
7. Aljau, Dinda, Fai, Nabilla, Nadya, Natan, Ocyd, Ranti, Rizka, Shafira, Tyas, Bdur, Daffa, Chalid, Krahus, Rifqi, Sultan, Thirafi, and many other author's classmate that have shared their knowledges and advices with the author, and countless time for the journey as an architecture student in Universitas Islam Indonesia.
8. Dhira, Erin, Ifa, Jovanna, Rania, Rai, Rozza, Tasya, Tiara and other friends of the author who always give support and feelings for has always been strong in the work of this final project.
9. All people that have helped and supported the author along this learning process that have not been mentioned, for their very helpful support and knowledge.
10. Last but not least, I wanna thank me. For always believe in myself, for being brave and patient during the storms. For keep going and still fighting to find hope and light between the darkness.

The author is fully aware that this work has not been fully perfected; far from perfection, in terms of language, drafting, and writing. Therefore, all constructive criticism and suggestions for the perfection are highly expected. Hopefully this report is useful for all who read it, as well as the author in particular.

Waalaikumsalam wr. wb

Yogyakarta, 5th August 2022



Ummi Hanik Esaputri
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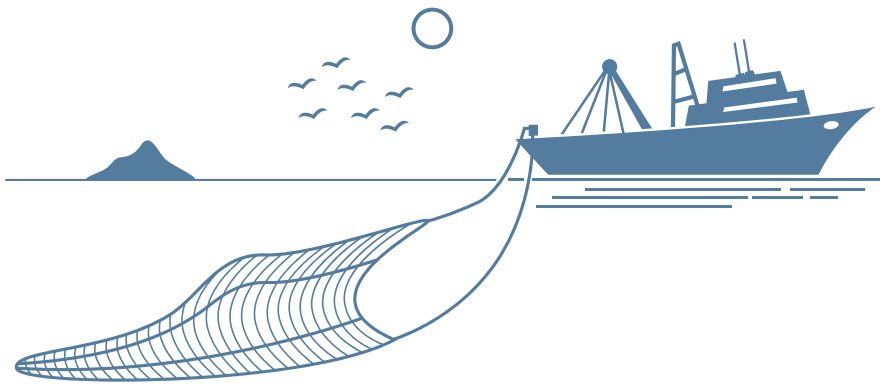
DESIGN PREMISE

The water house on the stage is a traditional form of settlement for residents of fishing villages in many parts of the world. It was a significant past that illustrated the ingenuity of local artisans in solving environmental, economic and social constraints. Indonesia is a maritime country, most Indonesians make a living as fishermen. Every year, fishery production has increased, causing some environmental problems, this is inevitable, and for many people, physical invention is not an option.

Manggar Fisherman Village, was chosen as the location for the design study to test how an understanding of the form of fishery production settlement can inform the architecture for new developments aimed at addressing environmental issues in the fishery production area, improving people's lives, while maintaining the attractiveness of the place, the customs of its people, and responsiveness as architecture. Located in East Balikpapan subdistrict, Balikpapan city, Manggar Fisherman Village is a priority area for the improvement and development of facilities and infrastructure in the Minapolitan area. Being on the list of slums - there has been no organized settlement and environmental issues are beginning to lose their essence.

It is important to understand that the local culture and heritage of the Manggar Fisherman Village acts as Genius Loci to the place and this is always evolving which makes the future culture of this area will be hybird and will produce hybird in the form of domestic architecture by being remodeled by local culture.
The theory of Ecological Water Culture will be a catalyst that can solve problems for the people of Manggar Fisherman Village, especially through seafood production and tourism and can contribute to the sustainable development of a region and country.





01 INTRODUCTION

Coastal city - Fishery - Odor

PRELIMINARY DESIGN

1.1 Background
1.2 Problem Formulation
1.3 Design Method
1.4 Preliminary Design Hypothesis
1.5 Design Framework
1.6 Originality & Novelty



1.1 BACKGROUND



Picture 1.1 Balikpapan (Drone), Source:© Aam Handika / Greenpeace.2018

1.1.1 CITY SURROUNDED BY WATER

Coastal City is an urban area located on the edge of the water (sea, lake, or river), which has open access characteristics and is also multi-functional but is very vulnerable to damage and destruction (Rahmat, 2011).
Its existence on the water's edge makes the Coastal City have direct and indirect influence from land and sea. Thus, the balance of the Coastal City will be significantly influenced by the process of the coastal environment itself. As a city located on the water's edge, Coastal Cities have unique characteristics different from cities based on land areas. Natural resources in Waterfront City, especially those in coastal and marine areas, are dynamic, and the nature of ownership of the sea is a public asset. These things cause this Coastal City to be used for various activities, creating various functions.

Coastal areas play an essential part in supporting sustainable development and improving community welfare. Coastal areas reflect tradition and culture from the physical and visual aspects, locations, and community activities in urban spaces. Even historically, it shows that this coastal area has functioned as a center for community activities because of the various physical and geographical advantages. In many cities in developed countries, the uniqueness of the coastal areas that have been around for decades is preserved to form the region's image and grow into tourist icons.



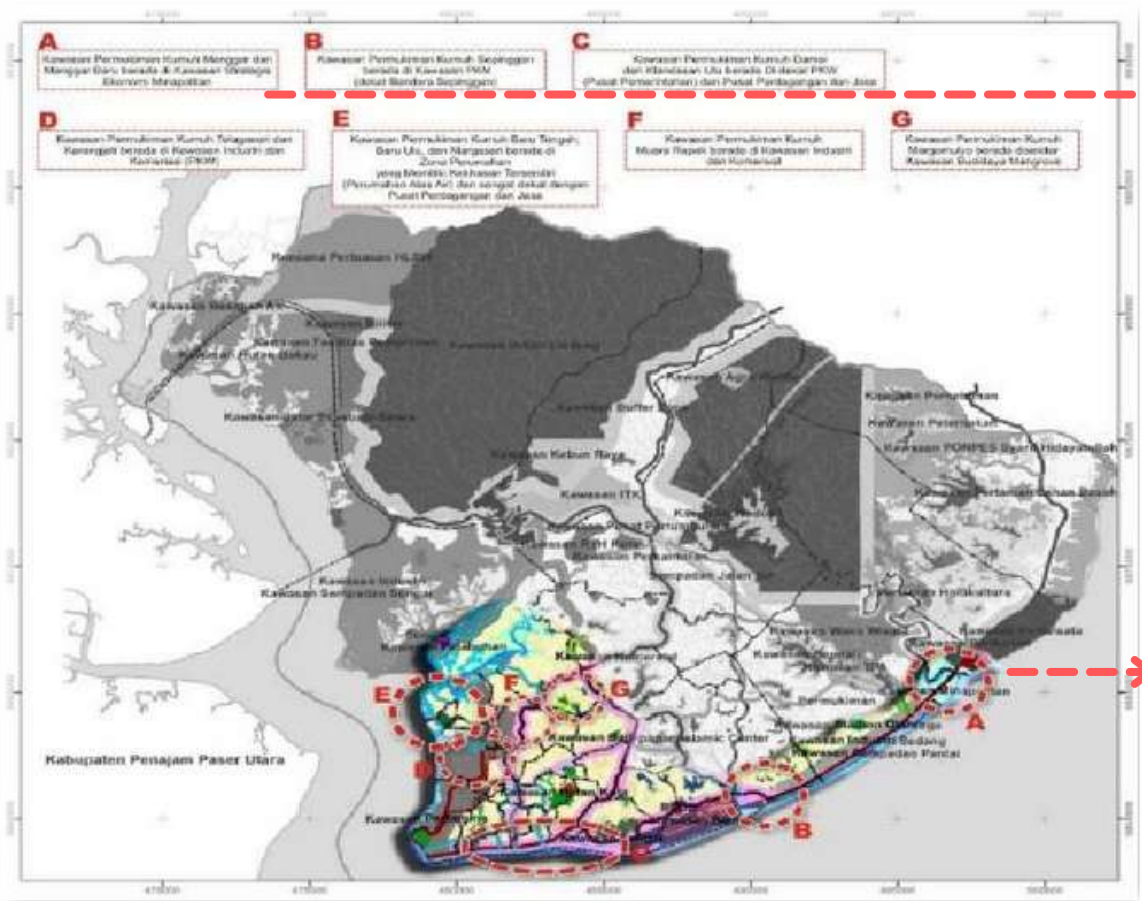
Picture 1.2 Kampung Atas Air Balikpapan, Source: author's document.2022

1.1.2 COASTAL SETTLEMENTS IN BALIKPAPAN

Balikpapan City has an area of 85% hills and 12% in the form of narrow flat areas, especially in watersheds and small coastal rivers. Starting from a fishing village located on the edge of the Makassar Strait in the 19th century, Balikpapan has the potential for renewable resources, especially the potential for fishery resources that have not been utilized optimally. Balikpapan City is the largest fish producer in East Kalimantan Province, with 12,986 tons/year (Adnan, 2010). It shows that the city of Balikpapan has excellent potential in the fisheries and marine sector.

When they hear "village over water," people will focus on two residential areas that have a history in the city of Balikpapan. Among them is Kampung Baru, which is located in the western part of the city of Balikpapan, and Manggar Baru, which is located in the eastern part of the city of Balikpapan. Kampung Baru is right on Balikpapan Bay Beach, where the Klotok Harbor and several special speed boat docks are located.

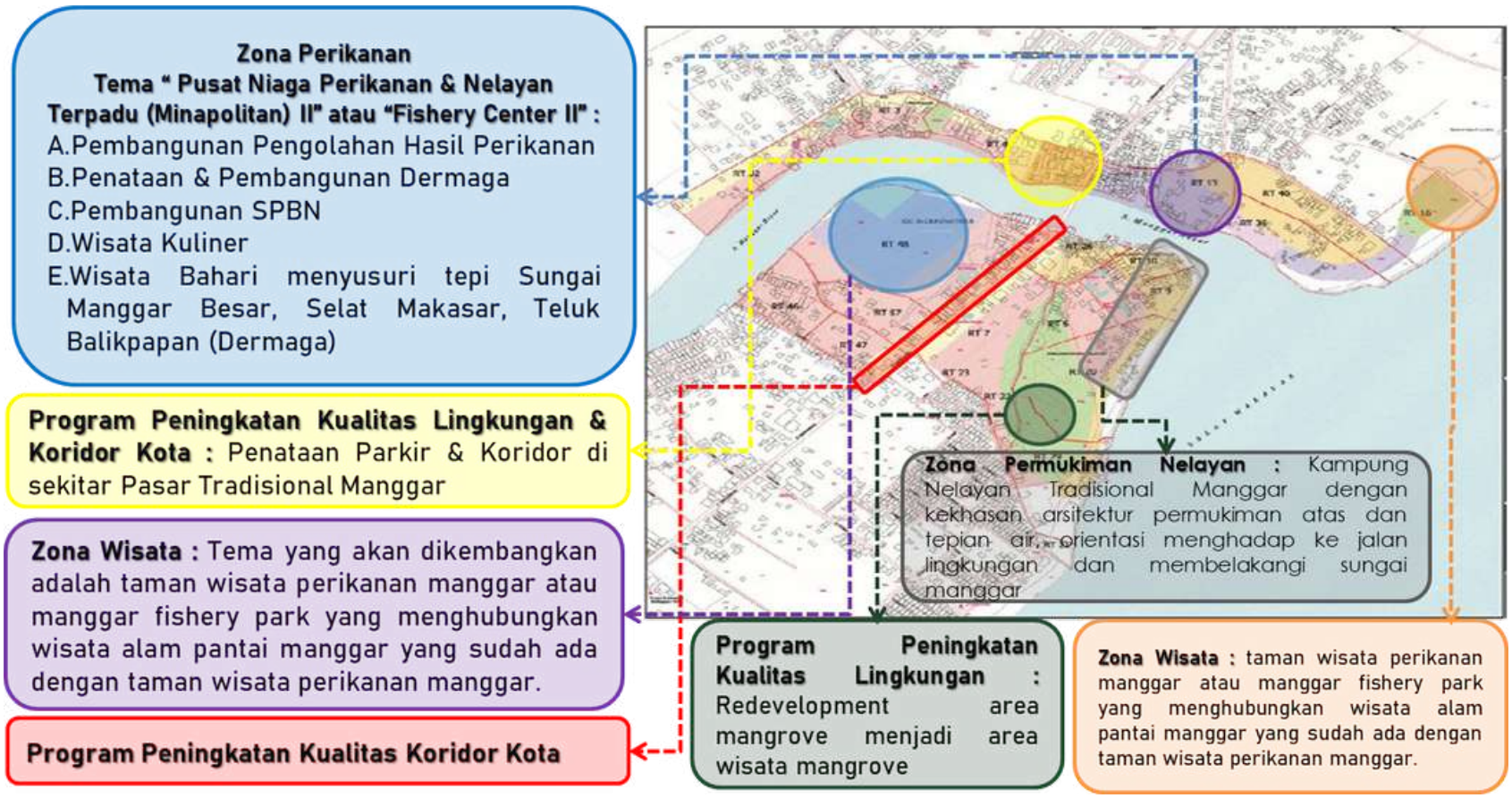
As an industrial area on a scale part of the city area, the Kampung Manggar Baru, grows in groups on the water around the mouth of the Manggar River. Kampung Manggar is one of the traditional settlements protected and preserved in Balikpapan based on the characteristics of the building, economic activities, geographical location, and homogeneity. Based on BPS data from Balikpapan City, Kampung Atas Air Manggar is one of the densest settlements with a population of 45,417 people at the end of 2010. The dominance of the population works as fishermen as much as 21%, which follows its location close to the sea. So that the characteristics of settlements located above the river border have a linear housing pattern, parallel or perpendicular to the shoreline, and smells fishy.



Picture 1.3 Priority Area Location Determination Score
Source: Bappeda Litbang Balikpapan.2020

1.1.3 WHY MANGGAR NEEDS TO BE REVITALIZE?

Based on the Raperda RDTR article 148 paragraph 1 Sub BWP Minapolitan Manggar Baru area is one of the BWP Balikpapan Timur prioritized. Through article 148, paragraph 2, it has been explained that **the area will be planned for improvement and redevelopment of Minapolitan area facilities and infrastructure. It will also support strategic areas in the economic outlook.**



Picture 1.4 Minapolitan Zoning Area. Source: Bappeda Litbang Balikpapan.2020

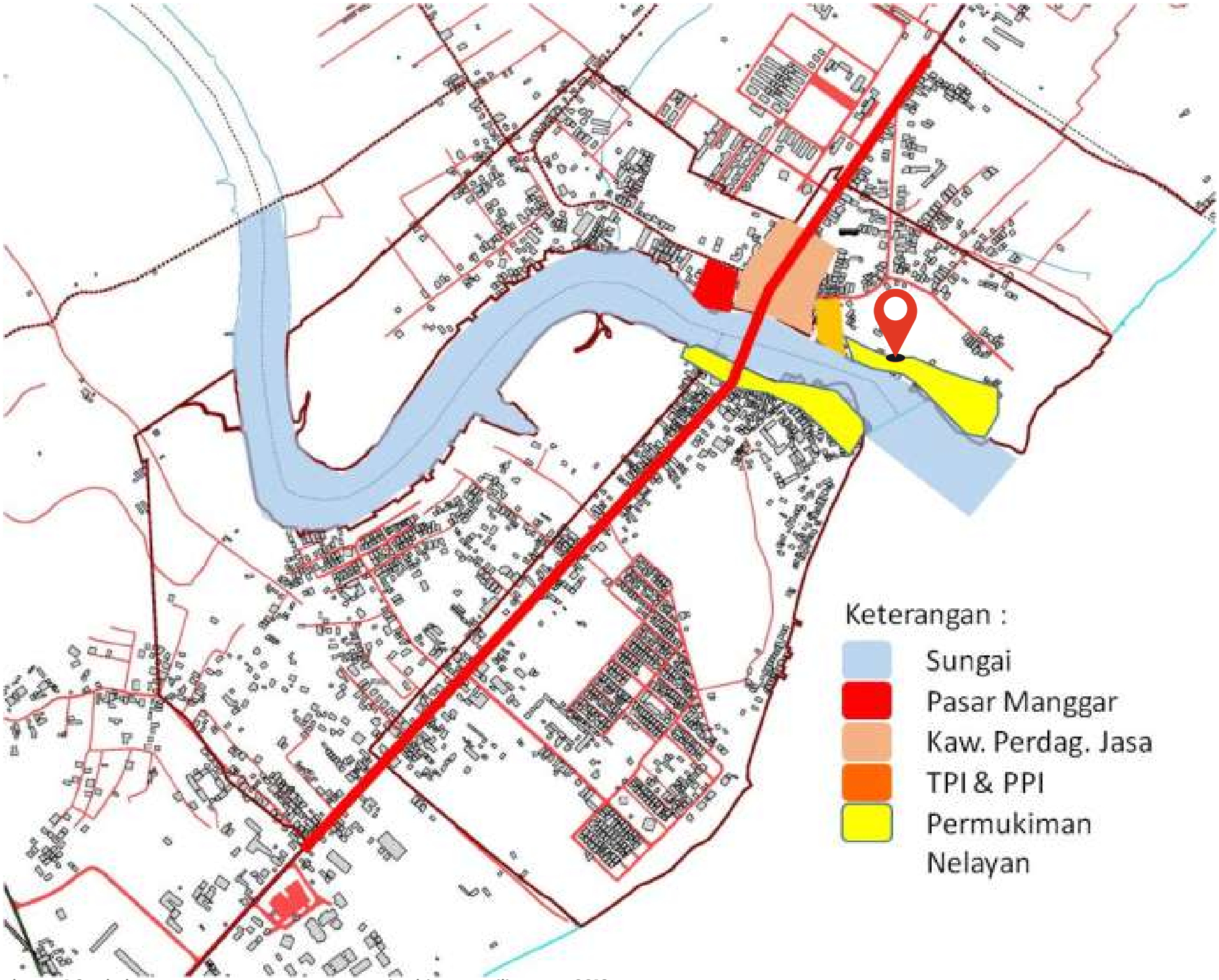
The city of Balikpapan is one of the developing cities due to the potential of fisheries and marine resources, where the city of Balikpapan still has the potential of renewable resources, especially the potential of fishery resources that have not been used optimally.

Based on the regional spatial plan of the City of Balikpapan, the Manggar area is included in the development of the city system, where the development will lead to the Manggar area. The Manggar area is directed to become an area with the main plan function as a coastal tourism area, a light clean industrial area (non-polluting), inland fisheries / ponds, an integrated fishery center area for both aquaculture and capture fisheries, a protected area, a final waste disposal site, and Hajj embarkation.

One of these areas is the Manggar area which has tourism potential that can contribute to local revenue. It can be interpreted that the Manggar area will also be developed into an Integrated Commerce Center. The development of an Integrated Commerce Center is based on Law (UU) No. 31 of 2004 article 25 which states that fishery business includes pre-production, production, processing and marketing. One of the reasons for this potential is the potential of human resources, where the number of fishermen in Balikpapan is 5,591 people with 1,336 boats. The fishing community is a strategic potential to be managed and developed. Build facilities supporting activities for fishermen, such as docks, fish auction sites and fish landing bases, as far as possible not far from their settlements.



Picture 1.5 Fishery Activity. Source: author's document.2022



Picture 1.6 Existing Area Image. Source: Bappeda Litbang Balikpapan.2013

Based on the Balikpapan RDTR, the direction of land use functions in the coastal area of Manggar is for tourism, trade and services, and settlements. In accordance with the existing trends and the main activities developed, the land use on the Manggar coast is quite varied.

1.1.4 FISHERIES AREA FACILITIES



Picture 1.7 Facility Distribution Map. Source: author's document.2022

The area of PPI Manggar is approximately 2,500 m²,
Facilities at PPI Manggar are divided into three classifications, namely:

A. Basic facilities
Basic facilities must be in the development of a PPI area. PPI Manggar has several basic facilities such as mooring docks, shipping lanes, and connecting roads from the port to the neighborhood road or the main road.

B. Functional facilities

Existing facilities at PPI Manggar are the marketing of fishery products such as the presence of TPI, communication, light beacons, clean water and electricity supply, net repair sites, transit seeds, transportation, offices, and block icebreakers.

B. Supporting facilities

Supporting facilities at PPI Manggar include fishermen's meeting bodies as a place for fishermen's guidance, port managers (mess operators, guard posts and integrated service posts, toilets, kiosks, and organizers of government functions, namely fisheries supervisors). To support the development of the Minapolitan area and fishing port, the development of a private fishing port is also being developed which aims to facilitate the supply of marine products such as fish and shrimp from the area to the city of Balikpapan.













Picture 1.8 Manggar Minapolitan Area Accessibility Conditions Source: author's document.2022

1.1.5 CULTURAL CHARACTERISTICS OF FISHERMAN

PRIMARY LIVELIHOOD



The livelihoods of residents are generally seasonal fishers, and they can go to the sea in the dry season while in the rainy season is a period of famine.

SUPPORTING LIVELIHOODS



Not all communities depend on fishing activities, but there are still other fields such as marine tourism business, inter-island transportation, intermediary traders / retail fishers' catches, and other businesses related to the sea and coast. In addition, the majority of the population also work as traders and entrepreneurs. They work not only at sea but also independently in their homes. This phenomenon changes the function of their homes as a place to live and process fish.

FAMILY ROLE



Fishers' wives support the family by doing work such as craft craftsmen, salted fish processors, net pullers, fish baskets and selling food or drinks.

SKILLS



Another characteristic of coastal communities is in the way of managing resources that still use traditional means, local and community structure and activities simply. Although fishers' job is tough, they generally only have simple skills. Most of those working as fishermen are professions passed down by parents, not professionally studied ones.

SOCIAL VALUE



The culture of the coastal community has characteristics that are interrelated with each other. There is intensive social interaction between citizens, characterized by effective face-to-face communication that creates a very close relationship. Builds family relationships based on sympathy. They highlight the nature of gotong-royong and help each other.

1.1.6 FISH PRESERVATION, THE CULTURAL HERITAGE OF FISHERMEN

Fish preservation aims to reduce the water content in the body so that there is no chance for bacteria to multiply. In order to get high-quality preservation results, good treatment is needed during the preservation process, such as: maintaining the cleanliness of the materials and tools used, using fresh fish raw materials, maintaining sanitation and hygiene during the process. (Esti, 2000).

As is known, fish is a very easy product to decay. In general, damage or decay of fish and their processed products can be classified as 1) Biological damage, 2) Enzymatic damage, 3) physical damage, 4) Chemical damage. To avoid decay is done in various ways, one of which is through grinding during the process of salt penetration into the fish's body and the discharge of fluids from the body of the fish due to differences in concentration. The liquid will quickly dissolve the salt crystals or dilute the saline solution. Along with the discharge of fluid from the fish's body, salt particles enter the fish's body. Fish processed by this salting process is called salted fish (Adawyah, 2008).

Fish preservation and processing in Indonesia is one of the important aspects of the growing fisheries industry. In order to produce a good quality final product, it must be known properly the ways of preservation that meet the requirements and consequences caused if not done properly.

One way of preserving fish that many do, namely with salting techniques. Salting is a way of processing fish with the results of products in the form of salted fish. Fishermen have commonly done this method to make fish more durable with traditional techniques. (Azizu, A. 2014)

One form of processed fish is salted fish, where drying salted fish is a fish that has undergone the process of salting and drying. On a national scale, salted fish is one fishery product that has an important position. Almost 65% of fishery products are still processed by grinding. Thus it is not surprising that salted fish are included in the nine staples (Sembako) important for the community's needs (Affrianto and Liviawaty, 1989).

Drying fish or salted fish is still considered one eye in the fish processing industry. It is based on businesses engaged in the field of salted fish distribution still seems to be managed and on a micro-scale, as for meeting the community's needs and tastes that continue to grow. It takes the ability to produce quality products and the existence of stable production continuity in quantities that can meet the market's needs.





Picture 1.9 Illustration of the spread of smell of dried salted fish, Source: author's document.2022

Table 1.1 **Produksi dan Nilai Produksi Perikanan Menurut Sub Sektor di Kota Balikpapan, 2021**

Fishery Production and Production Value by Sub Sector in Balikpapan Municipality, 2021

Source: Food, Agriculture and Fisheries Agency in Balikpapan Municipality

Kecamatan *Subdistrict*	Produksi (Ton) *Production*	Nilai Produksi (000 Rp) *Production Value*
(1)	(2)	(3)
Perikanan Laut *Marine Fisheries*	4 552,80	113 009 378
Perikanan Perairan Umum *Open Water Fisheries*	-	-
Perikanan Darat *Inland Fisheries*	486,24	8 473 323
a. Budidaya Tambak *Brackish Water Pond*	52,47	1 896 097
b. Budidaya Kolam *Fresh Water Pond*	274,17	5 779 226
c. Lainnya *Other*	159,60	798 000

Table 1.2 **Produksi Perikanan Menurut Sub Sektor (Ton) di Kota Balikpapan, Tahun 2017-2021**

Fishery Production by Sub Sector (Ton) in Balikpapan Municipality, 2017-2021

Source: Food, Agriculture and Fisheries Agency in Balikpapan Municipality

Kecamatan *Subdistrict*	2017	2018	2019	2020	2021
(1)	(2)	(3)	(4)	(5)	(6)
Perikanan Laut *Marine Fisheries*	3 831	4 145,05	6 117,63	4 409,23	4 552,80
Perikanan Perairan Umum *Open Water Fisheries*	-	-	-	-	-
Perikanan Darat *Inland Fisheries*	423,4	391,238	287,91	275,49	486,24
a. Budidaya Tambak *Brackish Water Pond*	107,64	186 776	123,62	77,80	274,17
b. Budidaya Kolam *Fresh Water Pond*	299,91	185 147	119,10	119,88	52,47
c. Lainnya *Other*	15,84	19,315	25,10	77,80	159,60

1.1.7 FISH PRODUCTION IN THE LAST FIVE YEARS

In the livestock sector, the Office of Food, Agriculture, and Fisheries noted that in 2021 there were 1.419 beef cattle, 911 goats, 46 buffaloes, and 109 sheep in Balikpapan municipality. In the fisheries sector, marine fisheries provide production of 4.552,80 tons. At the same time, inland fisheries (aquaculture, ponds, and others) produce 486,24 tons. From this production, marine fisheries provide a production value of Rp 113.009 million and inland fisheries of 8.473 million.

Most consist of long-jawed mackerel (214.54 tons) followed by anchovy (118.99 tons) and red snapper fish (106.51 tons), the rest consists of fish, shrimp, crab and squid (Kota Balikpapan Dalam Angka, 2022). It can be concluded that fishery commodities are the most natural products in Balikpapan. It shows that the fisheries sector contributes significantly.



Although marine fish production in the coastal areas of Balikpapan City in 2021 is quite high, long-jawed mackerel, anchovy, and red snapper fish are potential types of fish in Balikpapan city. The production of these fish, if the results are abundant, it needs further processing so that fishermen will not lose due to wasted results. The processing is by trying to become a processed product of preserved fish to last a long time because marine fish easily rot. Ways that can be done include cooling, salting, grinding, fumigation, and canning.



Picture 1.10 Fisherman, Source: author's document.2022

The increasing production of fisheries can trigger high land needs while there are limitations to land development and increased sources and odor spread that disrupt the surrounding environment.

Table 1.3 **Produksi Perikanan Menurut Jenis Ikan di Kota Balikpapan, 2017-2021**

Fishery Production by Kind of Fish in Balikpapan Municipality, 2017-2021

Source: Food, Agriculture and Fisheries Agency in Balikpapan Municipality

Jenis Perikanan *Type of Fisheries*	2017	2018	2019	2020	2021
(1)	(2)	(3)	(4)	(5)	(6)
Ikan	3 831	4 145	5765	4204	
-Mayung	8,17	14,39	19	7,45	38,26
-Merah Bambangan	31,8	32,13	66	91,08	106,51
-Kakap	2,86	11,83	9	0,07	0,18
-Gulama	0,7	-	-	-	-
-Cucut	27,31	26,34	8	3,68	-
-Bawal	21,06	0,62	2	6,67	3,55
-Belanak	-	-	-	-	-
-Kuro	-	-	-	-	-
-Teri	83,5	95,19	46	22,99	118,99
-Kembung	541,48	81,15	77	6,65	214,54
-Ikan Lainnya	3 114,97	3 883	5537	4006	1 439,74
Udang	193,36	196,42	186	150	-
-Udang Windu	20,64	10,81	10	3,47	1,75
-Udang Putih	19,72	19,85	55	72,41	84,97
-Udang Dogol	134,68	13,98	115	61,30	75,78
-Udang Lainnya	-	106,24	6,2	13	0,83
Kepiting	56,22	61,90	6,6	3,06	6,21
Lainnya	36,94	-	36	7,46	-
-Cumi-cumi	36,94	14,63	36	7,46	36,40
-Sotong	-	-	-	-	-

https://balikpapankota.bps.go.id

Based on the Fisheries and Marine Statistics Report of Balikpapan City in 2012, the allocation of capture fishery products is mostly processed into **dried/salted fish, amplang/crackers, and handling of fresh products.**

No.	Jenis Perlakuan	Jumlah (ton)	Jenis Tangkapan
1	Dikonsumsi Segar	-	
2	Pembekuan	2,176.824	Udang Campuran
3	Penggaraman / Pengeringan	438.528	Otek, Sidat (Ose), Alu-Alu (Baracuda), Talang, Selar, Kuwe (Terkulu), Layang, Kakap Merah, Kakap Putih, Kerapu Karang, Hiu, Dencis, Tembang, Kaca (Rucah), Tiko (Rucah), Teri, Peperek (Bete-Bete), Biji Nangka Karang, Gulamah/Tiga Waja/Hambar, Lisong, Tongkol Komo, Cakalang, Kembung, Gabus Laut (Lasutambi), Baronang Batu, Campuran
4	Pemindangan :		
	a. Presto	2.485	
	b. Pepes	4.196	Layang, Kembung, Kepiting
	c. Kukus	19.412	Kepiting, Rajungan
5	Pengasapan	115.198	Sidat (Ose), Hiu, Cakalang
6	Peragian / Fermentasi (Terasi)	0.240	Udang Dogol
7	Penanganan Produk Segar	128.531	Talang, Selar, Kuwe (Terkulu), Layang, Ketamba, Tetengkek (Kaneke), Hiu), Baronang Batu, Cumi, Udang Putih / Jerbung
8	Pengolahan Lainnya :		
	- Amplang / Kerupuk	36.866	Manyung, Otek, Bulan, Lemadang (Salam), Tenggiri, Gabus Laut (Lasutambi) , Cumi, Euchema (Rumput Laut) , Udang Putih / Jerbung, Kepiting
	- Fish stick (Cimi-Cimi)	9.574	Euchema (Rumput Laut), Udang Putih / Jerbung, Kepiting
	- Dendeng	0.039	Kepiting
	- Abon	13.152	Alu-Alu (Baracuda), Tuna, Udang Putih / Jerbung, Kepiting
	- Mie	0.017	Euchema (Rumput Laut)
	- Wafer	0.009	Euchema (Rumput Laut)
	- Brownis	0.009	Euchema (Rumput Laut)
	- Bakso/Tekwan	0.581	Tenggiri
	- Dodol	0.465	Euchema (Rumput Laut)
	- Sirup	0.248	Euchema (Rumput Laut)
	- Kripik	0.175	Euchema (Rumput Laut), Kepiting
	- Pempek	2.470	
	- Otak-Otak	0.120	
	- Pastel	0.557	Kepiting
	- Chips/Crispy	0.045	Euchema (Rumput Laut)
	- Kue Kering	0.092	Euchema (Rumput Laut)
	- Sambal	0.034	
9	Pengalengan	-	
10	Pereduksian / Ekstraksi	-	
11	Pengolahan Surimi / Jelly Ikan	-	
12	Pengolahan Non Konsumsi	754.660	Kulit Udang
	J u m l a h	3,704.528	

Table 5.9. Types of Fish Processing in Balikpapan. Source: Balikpapan City Fisheries and Marine Statistics Report 2012



Picture 1.11 Illustration of the spread of smell of dried salted fish,
Source: author's document.2022

1.1.8 KAMPUNG ATAS AIR MANGGAR AND ITS DISTINCTIVE AROMA

Separated by the Manggar river and connected by the Manggar bridge, we can see how the processing of fishery products is mainly found in residential routes. Activities in the fishing settlements of Kampung Atas Air Manggar are dominated by trade and fish processing. The people's livelihoods on the river banks are fishers and traders of aquatic products. Routine activities carried out outside and inside the area are processing fishery products, bringing fish to the point of drop, storing, and drying fish. Apart from fishers, local people as traders also use public spaces for their daily activities.

With the pungent fishy smell when entering the fishing village in Manggar Baru Village, we can see the activities of the fishers drying the fish. In this place, the center of dried salted fish, there is a wide range of fish dried using traditional tools depending on the hot sun. Some fishermen turn the fish over to dry more quickly and evenly.

Some salty fish have a very pungent smell. For sensitive people, the smell of salted fish is very likely to cause headaches, nausea, and affect emotions. The smell of salted fish from an area impacts the social life of its owner, even affecting product performance, mood and health. In this case, a problem often found from salted fish is irritation of the respiratory tract, skin, and eyes (Media, 2022).

The aroma is often smelled in tourist areas, including Manggar Beach, and disturbs the activities of residents. Of course, it is not comfortable to smell in residential areas and tourist areas. However, the smell becomes common if we enter the traditional market area. **So there needs to be a solution related to the control of unpleasant odors considering the position of Manggar beach, a tourist facility in direct contact with the livelihoods of surrounding fishermen and concerns about public health problems.**



Picture 1.12 Condition of Production Area. Source: author's document.2022

1.1.9 WASTE AS THE MAIN SOURCE OF PRODUCING PUNGENT ODORS

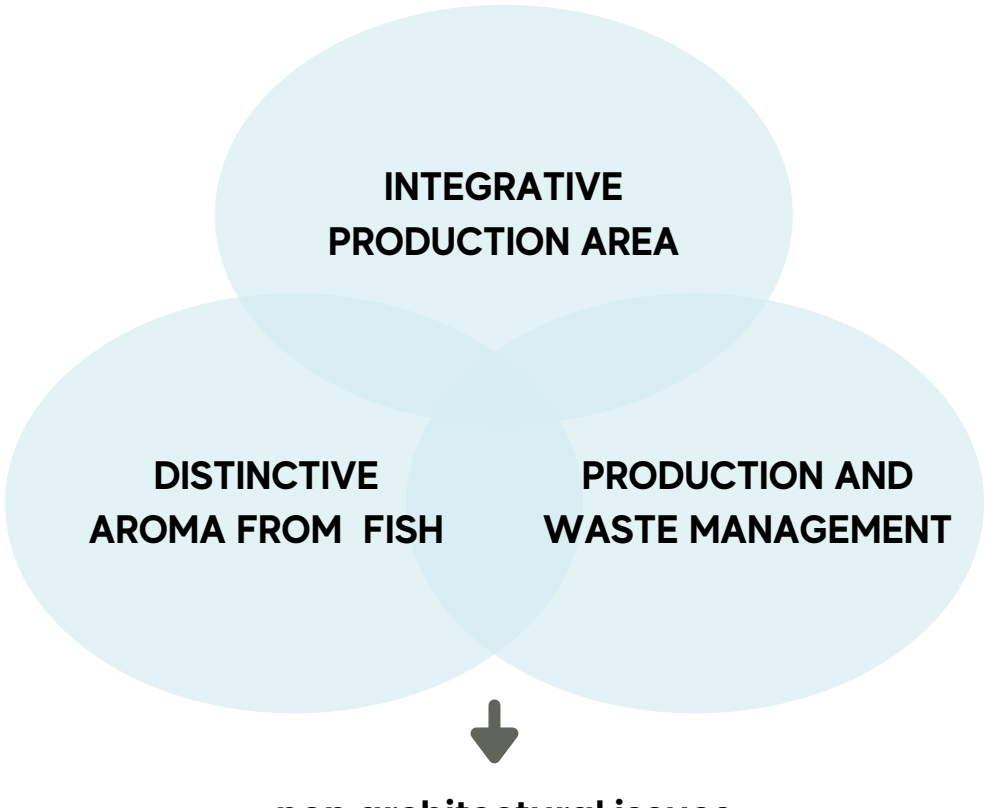
In the production process, the fishery processing industry often produces a large amount of waste. Fishery waste consists of liquid waste and solid waste. Liquid waste is in the form of blood, mucus, and fat, while solid waste is in the form of heads, fins, skin, bones, and scales.

Fish processing waste management in Manggar has not been carried out optimally. The waste produced is left alone and is immediately dumped into the sea without being managed first. Dirty road conditions, dirty-looking sewage drains, and piles of garbage placed on the edge of the drying area, create a very strong stench and a dirty sight. So, it can be concluded that **the cause of the emergence of a pungent odor that disturbs the surroundings comes from fish processing waste which needs to be resolved.**



1.2 PROBLEM FORMULATION

MAP OF PROBLEMATICS



non architectural issues

The increase in fish production is due to the huge potential of fish resources in the sea, fish-eating habits, the development of the fishing industry, and increasing incomes. With this potential, fish processing communities need development land that can accommodate fishery commodities increasing every year.

Drying fish is still considered one eye in the fish processing industry. It is based on businesses engaged in the field of salted fish distribution still seems to be managed and on a micro-scale, as for meeting the community's needs and tastes that continue to grow.

Some fish have a very pungent smell. The smell of salted fish from an area not only interferes but impacts social life and public health, especially in some activities that do not need.

architectural issues

Designing using ecological water culture and integrate the local architectural tradition to the design of fish processing center.

Combining salted fish processing center and market to the architecture and integrate the needs.

Design architecture that responds and controls odors to have a good environmental impact on the surroundings.

BRIAN LAWSON MATRIX

	SYMBOLIC PROBLEM	FORMAL PROBLEM	PRACTICAL PROBLEM	RADICAL PROBLEM
DESIGNER	**Scent, Parts of buildings that are often forgotten** Processing of building design that can pay attention to scent elements both indoors and outdoors will support the harmony of the relationship between the building and its use.	**Intergated Fisheries** The typology that accommodates fishery activities by the local context in terms of architectural forms.	**Achieve Building comfort** The design can meet the needs of the space and provide air comfort to the user.	**Sense of Place Design Feature** Odor control design to reduce air pollution and without removing the typical odor from the salted fish processing process.
CLIENT Balikpapan City Government & Pertamina RU V Balikpapan	**Local Architecture** Designs that deceive the built environment and implemented in local architecture.	**Salted Fish Center** Increase the capacity and quality of fish processing space efficiently.	**Spatial Arrangement** An arrangement that can facilitate the salted fish process and tourism activities.	**Sustainable Tourism** Design that maintains the sustainability of salted fish processing as a means of tourism.
USER Local Residents of Manggar Village & Tourist	**Space Experience** Creating a new space experience to give users a chance.	The spatial quality, especially on thermal, humidity and airflow.	**Local Material** Using materials that do not harm the environment or users.	Normalization of the existence of ecological elements in the daily activities in as fishers settlement
REGULATOR Law (UU) No. 31 of 2004 article 25,	Integration within the Kampung Manggar with fisheries activities and surrounding.	Application of building codes and regulation.	Building process regulation.	**Development of area** One of the areas is the Manggar area which has tourism potential that can contribute to the original income of the region (PAD). Manggar Beach will also be developed into Pusat Niaga Terpadu (PNT) in that framework. PNT development is based on which mentions fisheries business including preproduction, production, processing, and marketing.

Radical : fundamental, related to the main purpose
Practical : associated with production
Formal : proportion, shape, color, texture, etc
Symbolic : associated with the appearance of characters

DESIGN
PROBLEM FORMULATION

1. How do design Fish Processing Center and Market by controlling unpleasant aromas that interfere with tourist activities and integrate with the surrounding environment?
2. How to integrate local architectural traditions with the design of fish processing centers in order to deal with odor problems?

GOALS & OBJECTIVES

GOALS

1. Designing a sustainable salted fish processing center that can integrated with surrounding.
2. Become a reference for the design of fish processing centers in the future.

OBJECTIVES

1. Creating a clear idea of how beneficial fish production center preservation can be for the future development of the coastal area on an urban scale.
2. The project will create an improvement strategy to design fish processing center regarding the impact of the smell.
3. Presenting new tourist destinations that can improve the economy of the community.

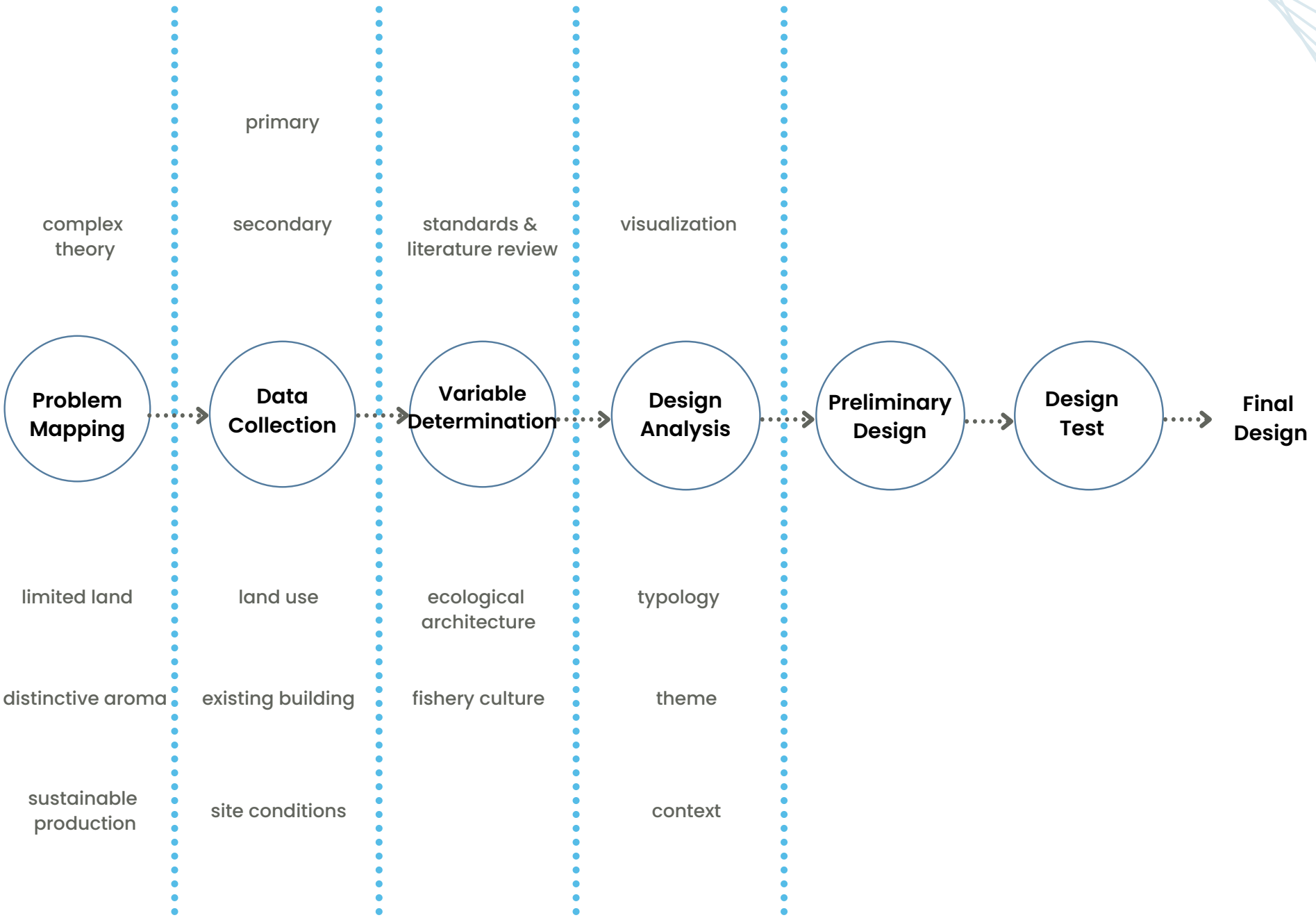
LIMITATIONS OF THE SALTED FISH PROCESSING CENTER DESIGN PROBLEM WITH THE APPLICATION OF ECOLOGICAL WATER CULTURE INCLUDES THE FOLLOWING ASPECTS:

- Ecological Water Culture in design by managing existing buildings and maximizing existing potential through ecological principles and components and considering supporting aspects of water front design.
- The design of how the arrangement of each building is mutually integrated between fisheries production buildings and tourism by processing existing buildings.
- Achieving air control in the environment in response to the needs of surrounding activities with site or building design.

1.3 DESIGN METHOD

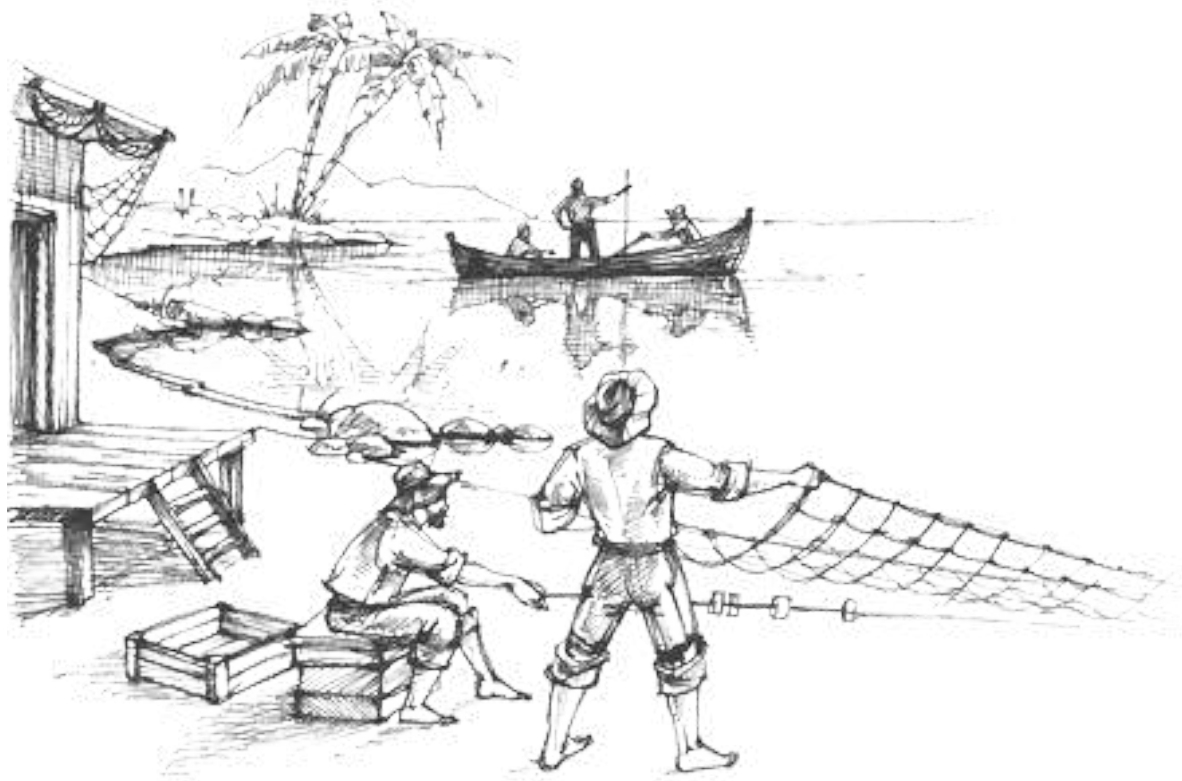
The initial description of the design is a way or stage that is done in a design process, and this method helps to facilitate the design in developing the design idea. In developing the Salted Fish Processing Center, the designer did an initial overview of the design method. The method stage begins with determining the boundary of which the initial proposed site will be designed.

1. **Design Problems** : Identify issues or problems, both micro and macro scale and the potential for the existence of physical functions of the building and site. The formulation of the problem consists of architectural and non-architectural.
2. **Data Collection** : Solving problems and issues can be supported by data collection, both primary and secondary. Primary data were obtained from observations of the existing Kampung Manggar area, which included land use and existing building and site conditions. While the secondary data consists of a study of themes and typologies taken.
3. **Variable Determination** : Determination of the selected variables based on the design theme, namely ecological architecture. This theme was chosen as guidelines in designing and formulating problems.
4. **Design Analysis** : Design analysis is carried out to facilitate in finding design ideas that are in accordance with the typology, theme, and context of kampung Manggar area. There are several design analyses required, including (a) User analysis, (b) Analysis of activity patterns and space needs, (c) Site analysis, (d) Analysis of building regulations, (e) Analysis of region climate data, (f) Analysis of orientation and mass order, (g) Spatial analysis, (h) Landscape analysis, (I) Analysis of the shape and façade of the building.
5. **Preliminary Design** : The initial design is a development of the results of data analysis obtained. In this initial design, the author determines the initial design concept in sketches of design ideas that are then developed into measurable digital images using BIM.
6. **Design Test** : Design testing is carried out after the design is completed. This design test is helpful to determine the suitability of the design with predetermined benchmarks or variables. And the site. The formulation of the problem consists of architectural and non-architectural.
7. Design Development : The initial design that has been tested will be evaluated to be able to be developed into a design that has completeness and follows applicable drawing standards.
8. **Final Design** : The final design is in the form of final technical drawings in a standardized format consisting of site plans, floor plans, views, sections, and drawings of building system plans. The final design is then presented to the supervisor and examiner for further improvement.


complex theory
primary
secondary
standards & literature review
visualization
Problem Mapping
Data Collection
Variable Determination
Design Analysis
Preliminary Design
Design Test
Final Design
limited land
land use
ecological architecture
typology
distinctive aroma
existing building
fishery culture
theme
sustainable production
site conditions
context

1.4 PRELIMINARY DESIGN HYPOTHESIS

The hypothesis obtained is that the fisherman's residence building and salted fish processing are designed to apply ecological principles to achieve the sustainability program, which is a design issue. The design of the fish processing center adapts to the needs and fulfillment of the architectural quality of the building both sustainably to the user, the environment, and the design of this fish processing center and market. Fish processing center has a social space in the form of an area directly integrated with the fish auction and the waterfront, or that is part of the processing unit. This public space is a vital activity for locals and visitor who follow the processing process starting from the ship docking process to production. It can create a new experience for the fishery area.

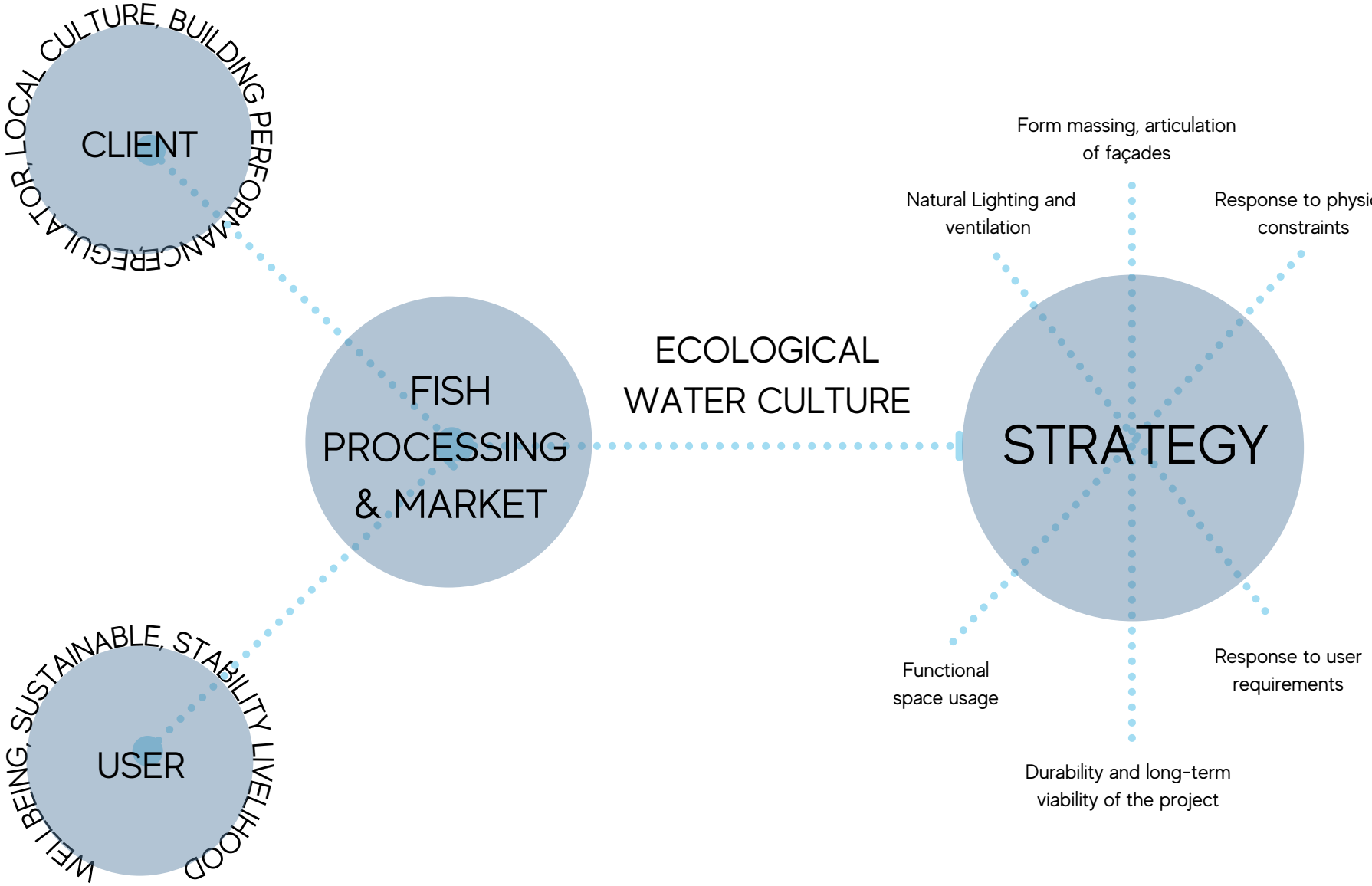


Picture 1.13 Fishery Activity Illustration. Source: shutterstock.com

The Main Program and the importance of Kampung Manggar have been recognized as a fishermen's village in Balikpapan since the 1980s. Recently the increase in fish production has increased as the population increases, stability of production, and fishery culture affect the economy and social wellbeing of the fishers' community.

In order to face this challenge, the brief is initiated to develop the built environment that would serve as a hub and activity center for the fishers in this area. The center operates as a place to do their daily activities as the main program by sustaining their lives and promoting the awareness among the public about the cultural value of the livelihood of fishers.

At a higher level, this center is suggested to become a hub to empower the fisherfolks and be hospitable to both traditional and industries that help the local economy stabilize and grow.



1.5 DESIGN FRAMEWORK



Problem	Hypothesis
How do design Fish Processing Center and Market by controlling unpleasant aromas that interfere with tourist activities and integrate with the surrounding environment?	FIsh Processing Center and Market with Ecological Water Culture Approach - Preserving the traditions and improving fishery activities.
How to integrate local architectural traditions with the design of fish processing centers in order to deal with odor problems?...	Creating a clear idea of how beneficial fish production center preservation can be for the future development of the coastal area on an urban scale.
How the design can accommodate the market and processing activity?	Designing salted fish processing center with strategy : environmental control, odor control and technology development.
	Integrated neighborhood activity as part of urban characteristic in fishery sector.

1.6 ORIGINALITY AND NOVELTY

The Revitalization of the Fish Processing Center and Market with an ecological architectural approach has never been done by any party. Some themes that specifically or indirectly use ecological architecture as an approach can be found. The issues and focus on the project differ from each other from the author's proposed title.. To avoid plagiarism in the process of preparing reports and planning, these are some of the references used:

2.5.1 TEMPAT PELELANGAN DAN PENGOLAHAN IKAN DI MAKASSAR

Approach : Recreative and transparent
Author : Januar Perdana
Publication : 2005
Concept : Transparent
Similarity : Integration with fish processing
Differential : Approach, Location

2.5.2 DESIGN OF HYGIENIC FISH AUCTION BY OPEN BUILDING APPROACH IN SADENG, GUNUNGKIDUL

Approach : Open building
Author : Febriansyah wijaya
Publication : 2020
Concept : Open building, hygiene
Similarity : Fishery development
Differential : Approach, Location

2.5.3 PERANCANGAN PASAR TERAPUNG PADA KAWASAN SIRING SUNGAI MARTAPURA KOTA BANJARMASIN DENGAN PENDEKATAN ECOLOGICAL WATER CULTURE

Approach : Ecology Water Culture
Author : Fadel Wirawan Gunaldi
Publication : 2019
Concept : Contextual, floating architecture
Similarity : Approach, Typology
Differential : Location, Context

2.5.4 PERANCANGAN KAMPUNG DENGAN PENDEKATAN ARSITEKTUR APUNG SEBAGAI SOLUSI TERHADAP KENAIKAN PERMUKAAN AIR LAUT. STUDI KASUS : KAMPUNG BARU BALIKPAPAN BARAT

Approach : Floating Architecture
Author : Hermawan Juliansyah
Publication : 2020
Concept : Floating architecture
Similarity : Typology
Differential : Approach, Location

2.5.5 DESIGN OF TRANSFORMATION FISH MARKET IN PPI TANJUNG LIMAU INTO A THIRD PLACE

Approach : Third place
Author : Rafif Fachriza Zuhdi
Publication : 2021
Concept : Hygiene,
Similarity : Integration with PPI
Differential : Approach, Location

2.5.6 PERANCANGAN HUNIAN VERTIKAL NELAYAN MANGGAR BARU, BALIKPAPAN DENGAN KONSEP NZEB (NEARLY ZERO-ENERGY BUILDING

Approach : Nearly Zero-Energy Building
Author : Fariz Bayu Taufik Azhar
Publication : 2020
Concept : NZEB, Vertical Housing
Similarity : Location Area, Context
Differential : Approaach, Issues



02 PROBLEM AND STUDIES

Problems - Approach - Solving

STUDY

2.1 Study and Analysis of Design Theme
2.2 Fishery Study Activity
2.3 Fish Market Study
2.4 Water Architecture : Traditional Fishery House
2.5 Precedent Study
2.6 Map of Design Issues

2.1 STUDY AND ANALYSIS OF DESIGN THEME

2.1.1 AREA REVITALIZATION

Revitalization is an effort to increase the value of land/areas through redevelopment in an area that can improve the function of the previous area (Permen PU No. 18 of 2010 concerning Guidelines for Area Revitalization).

According to Dep. Kimpraswil (2002), revitalization is a series of efforts to revive areas that tend to die, increase the strategic and significant vitality values of areas that still have potential and or control areas that tend to be chaotic.

Revitalization of an area includes the improvement of physical aspects, economic aspects and social aspects. The revitalization approach must be able to recognize and utilize the potential of the environment. Revitalization itself is not something that is only oriented to the completion of physical beauty, but must also be equipped with an increase in the economy of the community and the introduction of the existing culture.

Revitalization Goals and Objectives :

Revitalization of the area aims to increase the vitality of the built area through urban interventions that are able to create growth and stability of the local economy, integrated with the city system, livable, socially just, culturally and environmentally friendly.

The targets for area revitalization are as follows:

- Increasing regional economic stability through interventions to: a) Increase activities that are able to develop job creation, Increase the number of businesses and business variations as well as regional productivity. b) Stimulating factors that encourage increased regional productivity. c) Reducing the amount of capital moving out of the Zone and increasing investment coming into the Zone.
- Develop a conducive climate for business continuity and certainty.
- Increasing the property value of the area by reducing various external factors that hinder an area so that the property value of the area is in accordance with market value and is conducive to long-term investment.
- The integration of isolated slum areas with the city system in terms of spatial, infrastructure, facilities and economic, social and cultural activities.
- Increasing the quantity and quality of environmental infrastructure such as roads and bridges, clean water, drainage, sanitation and solid waste, as well as regional facilities such as markets, space for industry, informal and formal economic space, social and cultural facilities, and transportation facilities.
- Increasing the completeness of the area's comfort facilities in order to prevent the process of environmental ecological damage.
- The creation of preservation of urban cultural heritage assets by preventing self-destruction and creative-destruction, preserving the type and form of the area, and encouraging the sustainability and growth of local social and cultural traditions.
- Strengthening institutions that are able to manage, maintain and care for the Revitalization Area.
- Institutional strengthening which includes the development of human resources, institutions and regulations/statutory provisions.
- Build awareness and improve local government competencies so that they don't just focus on building new areas

Revitalization Aspects

Revitalization is a complex activity. There are several aspects and several stages needed in implementing the revitalization of an area, namely:

a. Physical Intervention

The image of the area is closely related to the visual condition of the area, especially in attracting activities and visitors, therefore physical intervention needs to be done. Physical intervention begins with physical revitalization activities and is carried out in stages, including repairing and improving the quality and physical condition of buildings, green planning, connecting systems, sign/advertising systems and open space areas (urban realm). Environmental issues (environmental sustainability) also become important, so that physical intervention should also pay attention to the environmental context. Physical planning must still be based on long-term thinking.

b. Economic Rehabilitation

Short-term physical improvement of the area is expected to accommodate informal and formal economic activities (local economic development), so as to be able to provide added value to the urban area. Revitalization which begins with the process of rejuvenating urban artifacts must support the rehabilitation process of economic activities. In the context of revitalization, it is necessary to develop mixed functions that can encourage economic and social activities (new vitality).

c. Social Revitalization

Revitalization of an area will be measurable if it is able to create an interesting environment (interesting), so it is not just a beautiful place. These activities must have a positive impact and can improve the dynamics and social life of the community/citizens (public realms). Urban design and development activities to create a social environment with identity (place making) and this further need to be supported by a good institutional development.

2.1.2 ECOLOGICAL ARCHITECTURE CONCEPT

There are various ways to do with an ecological approach to architectural design, but in general they have the same core. Yeang (2006) defines ecological design as follows: Ecological design, is a bioclimatic design, design with the climate of the locality, and low energy design. Yeang, emphasizing the integration of local ecological conditions, macro and micro climates, site conditions, building programs, design concepts and systems that are responsive to climate, and low energy use, begins with passive design efforts by considering the shape, configuration, faade, orientation buildings, vegetation, natural ventilation, and color. This integration can be achieved through three levels, namely, first, physical integration with the physical characteristics of the local ecology, including soil conditions, topography, groundwater, vegetation, climate, and so on. Second, the integration of systems with natural processes, including: how to use water, treatment and disposal of liquid waste, exhaust systems from buildings and heat release from buildings. Third, the integration of resource use which includes the sustainable use of natural resources.

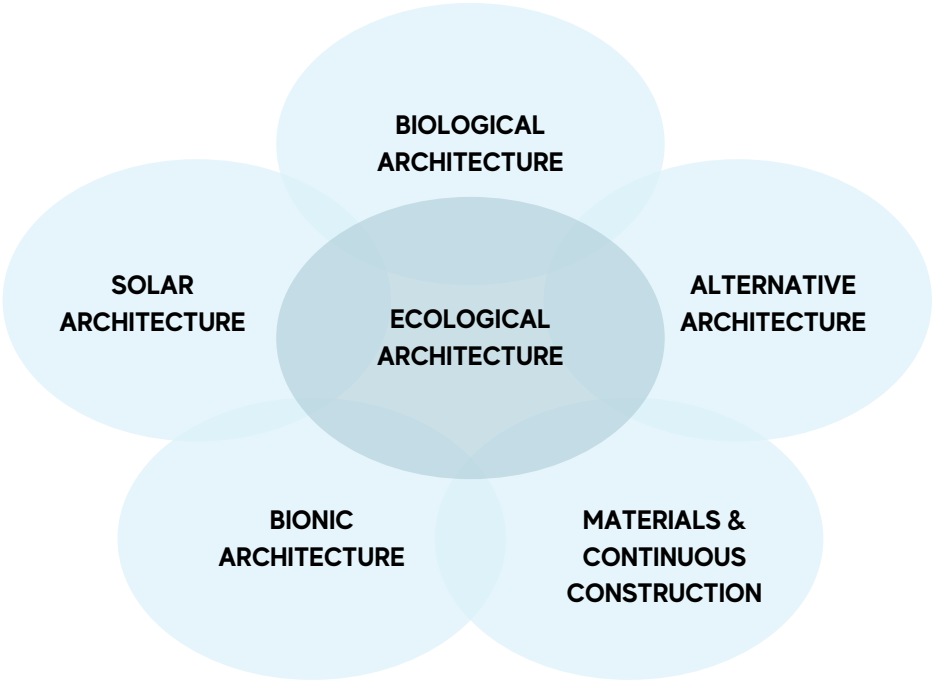
Ecological architecture is the creation of a building or built environment that uses energy, water, and other resources as efficiently as possible, protects the health of residents, increases user productivity, and reduces waste, pollution, and environmental degradation (Heinz. 1998).

The concept of Architectural Ecology is a mixture of environmental science and architectural science-oriented development models concerning the balance of the natural environment and the artificial environment. This concept uses an architectural design approach that combines nature with technology, uses nature as a basis for design, conservation strategies, environmental improvement, and can be applied to produce a form of building, landscaping by applying technology in its design.

The planning and design patterns of Ecological Architecture (Eco-Architecture) are as follows:

1. Architectural elements are as optimal as possible to protect against heat, wind and rain.
2. The intensity of energy contained in the materials used during development should be minimal, in ways:
   a. Attention to the local climate
   b. Substitution, minimization and optimization of non-renewable energy sources
   c. Use of building materials that can be cultivated and save energy
   d. The formation of a complete cycle between the provision and disposal of building materials, energy, or waste is avoided as far as possible.
   e. The use of appropriate humane technology.

Architects are encouraged to use ecological rationale in their decision making. Eco-architecture is not a style. Eco-architecture is a paradigm of how architecture can participate in sustainable development, and how architects make decisions and set priorities. Ecological rationale should be the basis for decision making in architecture.



Picture 2.1 Concept of Holistic Ecological Architecture, Source: Frick and Suskiyanto, 2007

Architect Lehmann presents two ways to establish the basis of ecological thinking, namely **learning from past precedents or vernacular architecture and applying new building technologies.** Lehmann displays the ecological details of vernacular architecture, for example in traditional Japanese architecture using flexible shear walls or stilt house architecture from Southeast Asia. Basic principles such as proper building orientation, roof covering, cross ventilation, must be applied in architecture.

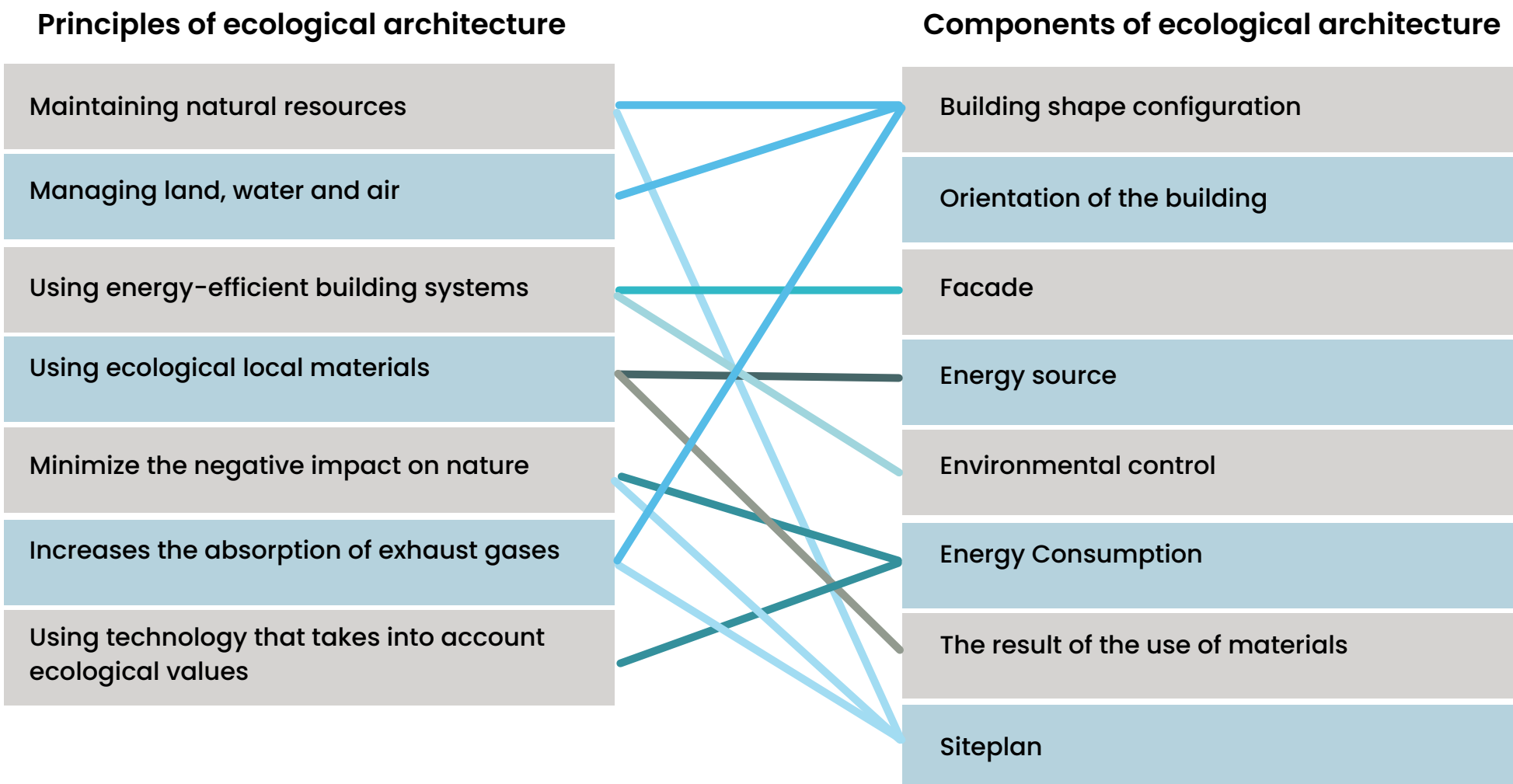
The ecological design prioritizes a design that considers the environmental factors of the site. So that if it is included in the design based on the water culture of the Bugis tribal people in Balikpapan in ancient times, it will further strengthen the design in harmony with the river and sea ecosystems and preserve the traditional Bugis water culture.

To support the application of ecological architecture design to make a positive contribution to the community living on the banks of the river and Manggar beach. Considering the comfort factor and better quality of the living environment, it is necessary to apply design aspects that are designed to have a positive personal effect. Convenience for users also ensures that the design process to restore river culture can be accepted by the surrounding community.

Principles & Aspects

The corresponding theories are those of Frick (2007), Widigdo (2008) and Metallinaou (2006) on Ecological Architecture. Based on the opinions of these experts, at its core, the ecological architectural approach to architecture leads to:
a. Maintaining natural resources.
b. Managing land, water and air
c. Using energy-efficient building systems
d. Using local materials
e. Minimize the negative impact on nature
f. Increases the absorption of exhaust gases
g. Use technology that takes into account ecological values.

The previous principle will be the criteria of ecological architectural approaches to buildings in a way applied to aspects of ecological architecture according to Yeang (1999) This aspect consists of:
a. Building shape configuration
b. Orientation of the building
c. Facades and Openings
d. Energy Sources
e. Energy consumed
f. Environmental Control
g. Material source
h. Material user results
i. Site



Picture 2.2 Application of ecological architecture, Source: Frick (2007), Widigdo (2008), Metallinaou (2006) and Yeang (1999) by the author.2022

2.1.3 WATERFRONT DESIGN

Waterfront design is the concept of developing waterfront areas, be it the shores, rivers or lakes. The definition of "front water" in Indonesian literally means the seaside area, the part of the city with air, the port area (Echols, 2003). Waterfront Development can also be interpreted as a process of development results that have visual and air contact and is part of an effort to develop urban areas whose physical nature is with the air where the form of development of the city's face development occurs in the direction of the waters. According to the director General of Coastal and Small Islands in the Guidelines for Coastal Cities (2006), he stated that the Coastal City is an area located by air and facing the sea, rivers, lakes and the like.

The principle of waterfront city design is the basics of urban or regional planning that incorporates various aspects of consideration and components of water resources into the arrangement to achieve a good urban or regional design.

1. Conservation
This is a development that aims to take advantage of the old area which is on the water's edge where in the current condition there is still potential that can be developed to the fullest.

2. Redevelopment
This type of development is an attempt to revive or revive waterfront areas with different purposes as an important area for the life of urban communities by changing the existing facilities in areas that are used by different capacities.

3. Development
The development of this type is an example of planning that is deliberately formed by creating a waterfront area by looking at the community's need for space in the city by structuring the waterfront area.

From the results of research conducted by the research center and the development of settlements in 1995-2000 saw that the structure of the designation of the coastal city or waterfront city area could be directed at 7 developments, in this design focusing on :



1. Commercial Waterfront
The main criteria for developing commercial areas in coastal cities are:
a. Must be able to attract visitors who will take advantage of the potential of the coastal area as a place for work, shopping and recreation (tourism).
b. Activities are created to remain interesting and comfortable to visit (dynamic)
c. The building must characterize the uniqueness of the local culture and is a means of socializing and doing business (commercial).
d. Maintaining the existence of weak economic groups through the provision of subsidies.
e. The beauty of the physical form (beach profile) of the coastal area is appointed as a pull factor for economic, socio-cultural activities, etc.

2. Cultural, Education, and Environmental Waterfront



The main criteria for its development are:
a. Utilizing the natural potential of the waterfront for research, cultural and conservation activities.
b. Emphasizing on the cleanliness of water bodies and the supply of clean water which is not only for the sake of health but also to attract investors.
c. It is directed to raise awareness and educate the public about the natural wealth of the coast that needs to be preserved and researched.
d. The existence of community culture must be preserved and combined with environmental management supported by awareness of protecting or maintaining the physical integrity of water bodies to be enjoyed and used as a vehicle for education (the presence of diversity of marine life, beach profiles, seabed, mangroves, etc.).
e. It needs to be supported by regional space utilization programs, such as the provision of facilities for religious ritual ceremonies, facilities for research centers related to the specifics of the area, etc.
f. Efforts are needed to regulate/control the functions and uses of water/water bodies.



3. Historical/Herritage Waterfront

The main criteria for its development are:
a. Preservation of historical relics (landscapes, sites, buildings) and/or rehabilitating them for different uses (modern);
b. Controlling new developments that are contradictory to existing developments in order to maintain the character (characteristics) of the city;
c. Programs for utilizing this area's space can take the form of securing beaches with breakwaters to prevent abrasion (protecting historic buildings on the beach), building embankments, polders and pumping to prevent inundation of historic buildings, etc.



5. Residential Waterfront

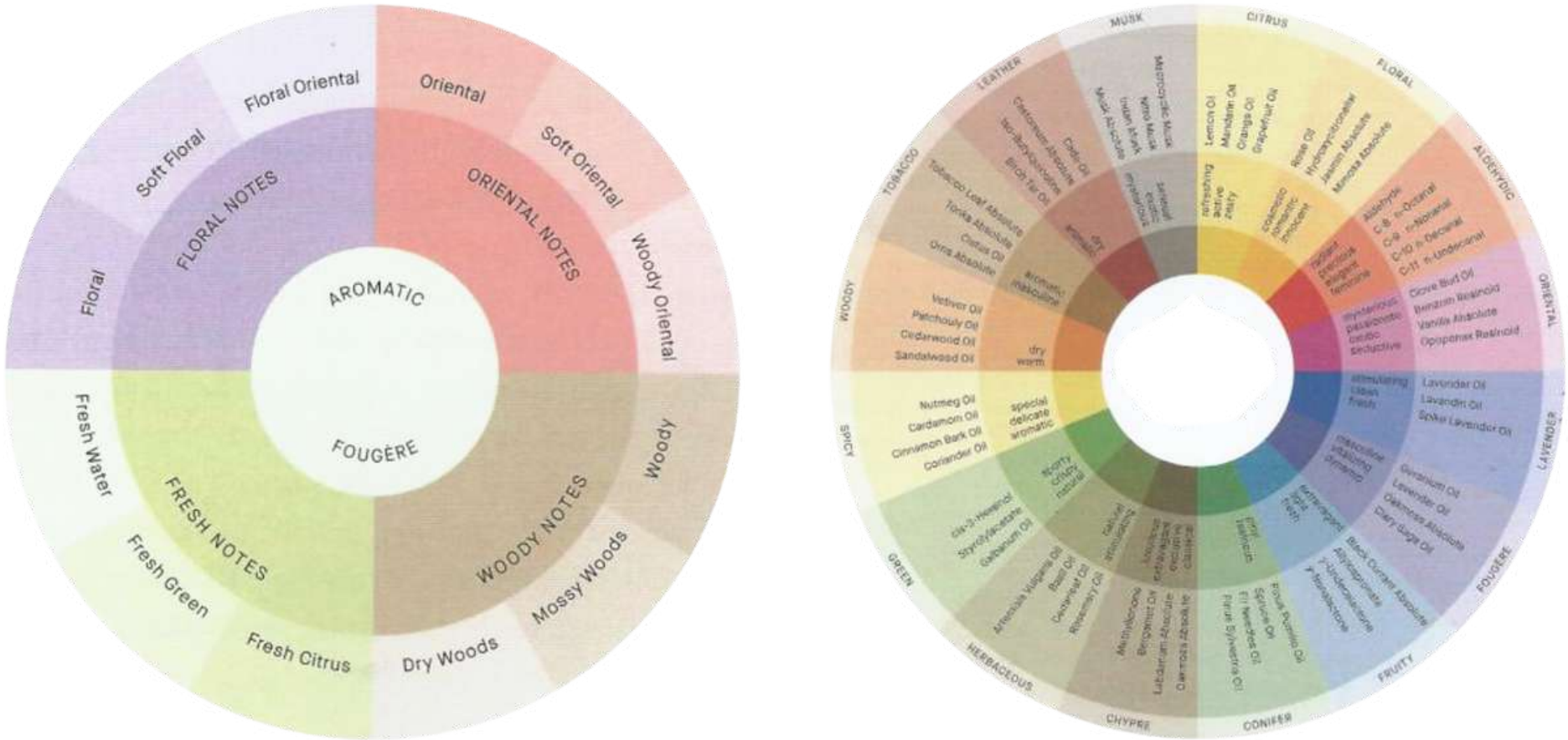
The main criteria for its development are:
a. Preservation of historical relics (landscapes, sites, buildings) and/or rehabilitating them for different uses (modern);
b. Controlling new developments that are contradictory to existing developments in order to maintain the character (characteristics) of the city;
c. Programs for utilizing this area's space can take the form of securing beaches with breakwaters to prevent abrasion (protecting historic buildings on the beach), building embankments, polders and pumping to prevent inundation of historic buildings, etc.

4. Recreational Waterfront



The main criteria for developing recreation/tourism areas in coastal cities are:
a. Utilize the physical condition of the beach for recreational activities (indoor or outdoor).
b. Development is directed along water bodies steadily
maintain open space.
c. Differences in culture and geography are directed to support tourism activities, especially marine tourism.
d. The uniqueness of local architecture can be used commercially to attract visitors.
e. Utilization of the physical condition of the beach for recreational activities/coastal tourism.
ol the functions and uses of water/water bodies.

2.1.4 ODOR SPECIFICATION

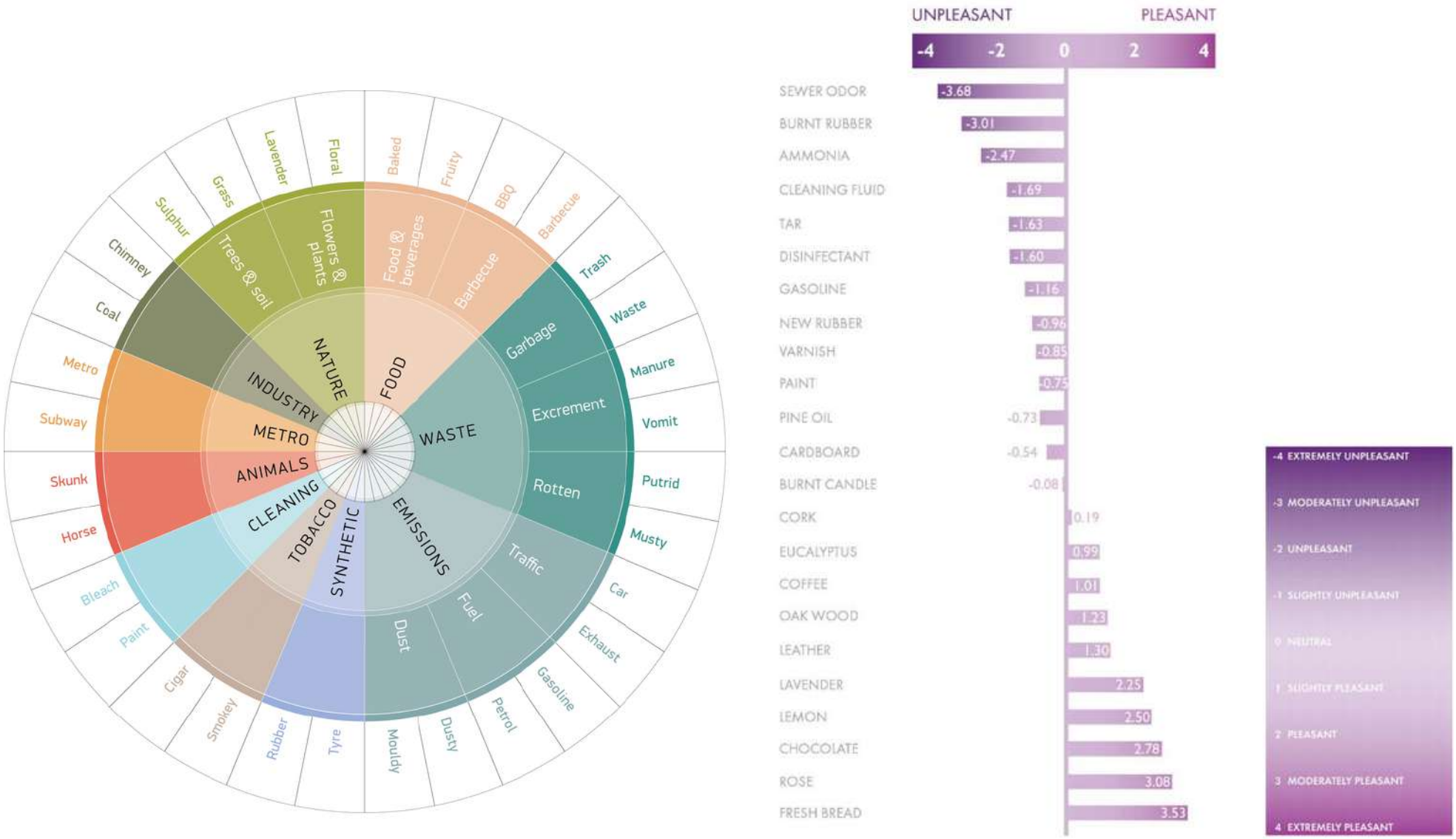


Picture 2.3 Urban Smellscape Aroma Wheel. Source: Aiella, L, McLean, K. Quercia. D, Schifanella, R, 2015.

The objective classification of odors is notoriously difficult, as indicated by the numerous and contradictory systems proposed throughout history. There is no single, comprehensive standard to accomplish a universal standard that removes classification that is universally accepted. This deficiency in classification standards for olfaction is in contrast to odor classifications that industries use to describe its sensory counterparts, such as taste [salty, odorants. Physiologists and psychologists have sweet, etc.) or sound (frequency, pitch, etc.).

To this day, "there is a lack of means to compare a system that includes nine odor types, or Hans and describe odors accurately or estimate their Henning and his Odor Prism, which visualizes degree of similarity with precision" (Kaeppler + Mueller). The fragrance industry has its own interpretation, and the lack of definitive odor classifications for scents, as embodied by the Drom classification system, has created a dependency on Fragrance Wheel, 1911, and the Michael Edwards in Western culture to describe odors by the name of the odorant (orange, musk, etc.).

Given that offensive odors played an essential role in Western architectural history during the Industrial Revolution, it is no surprise that much attention has been paid to the labeling of unpleasant and foul odors. The attempt to classify odors in the built environments can be found in various codes for air quality or air pollution, where the legislation controls odors that are seen as hazardous to public health or comfort. However, there is no policy standard for classifying the odors present within the environment, whether offensive or pleasant.



Picture 2.4 Urban Smellscape Aroma Wheel. Source: Aiella, L, McLean, K. Quercia. D, Schifanella, R, 2015.

In NYC, odor classification exists for civilians to file Odor Complaints with the city via NYC311. In April 2020, the most common odor complaints were Chemical, Vehide Idling, Sewer, Restaurant, and Chlorine (NYC Open Data). An alternative classifying method was developed by Kate Mclean, who created an Urban Smellscape Aroma Wheel as a basis for her urban sensory maps. Unfortunately, the numerous systems have areas that are contradictory to one another. If a universally accepted classification system for odors were developed, greater clarity in communicating and understanding odor qualities would be available and aid in the development and analysis of Scentscapes in architectural practice.

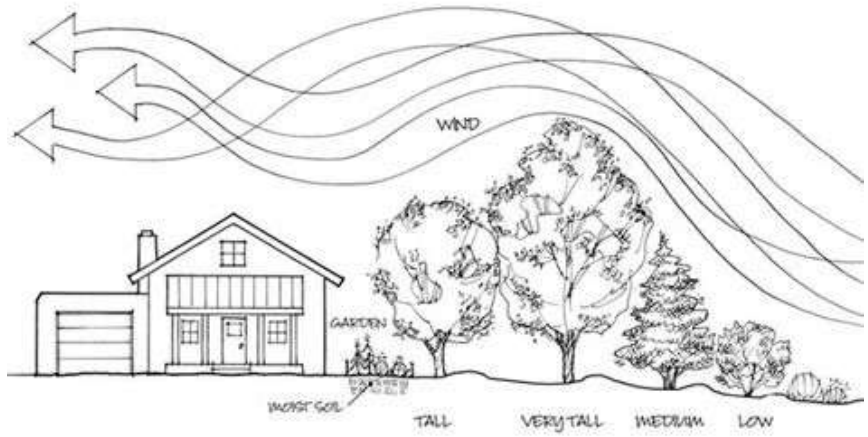
2.1.5 USE OF BUFFERS; AESTHETICS AND ODOR CONTROL IN POULTERY

Architecture with a functional approach has the primary goal of meeting the physical comfort of the user. The need for physical comfort from the user is a stimulus that the human senses can respond to as a form of architecture that is responsive to the environment and how the user interprets it. Architecture responsive to the environment can be influenced by responses from hearing, visual, smell, touch, taste, and feeling (Hall, 1966, Broadbent, 1970 in Ariyanto 2013). One of these aspects that are influenced by the senses is the smell.

Farm buffer can increase the aesthetic value of the surrounding environment with the analogy of a human nose filter as a wind flow control concept to minimize the impact of odors. This design aims to develop a schematic design of a livestock buffer with a design concept from the analogy of a human nose filter that can minimize the impact of odors and increase the aesthetic value of the surrounding environment.

The design of a farm buffer is the design of a barrier that functions as a place for air filtration from the location of the chicken farm and the visual impact caused by the surrounding environment. The physical requirements of laying hens farms contain location determination, allowable spacing, and arrangements for mass layout in the Environmental Code of Practice for Poultry Farms in Western Australia (2004). The physical requirements of this farm buffer will affect the air quality around the farm due to odor pollution caused by livestock activities.

This design phenomenon indicates that the buffer design with issues of technical aspects and types of agricultural buildings is to make the process as a design idea with the expression of buildings that display the reliability of functions as an aesthetic aspect. Odor has a character that is closely related to the gas particles mentioned above, the smell moves to spread (dispersion) and is influenced by the flow of wind and humidity in the air where the farm building stands (Mauskar 2008).



Picture 2.5 Buffers Filter Illustration. Source: Ariyanto, Y., Antaryama, I. G. N., & Setijanti, P.2013

Based on the odor characteristic, especially the odor produced from the livestock process, depending on the characteristics of the wind flow in the area. The principle of wind movement is influenced by temperature, pressure differences, and mass density in the air (Watson, 1992). As described by Ariyanto (2013), Boutet explains that there are three types of airflow: laminar occurs because there are no obstructions around the flow, turbulent or rotating flow occurs. After all, there is a barrier object in front of the random flow direction and unpredictable flow properties, and the third type is separated. Several examples of characteristics of wind flow patterns are influenced by the building mass of a linear building mass arrangement, which allows the occurrence of wind shadows, and a checkerboard mass arrangement, which results in more wind catchment areas in the building than the linear pattern.

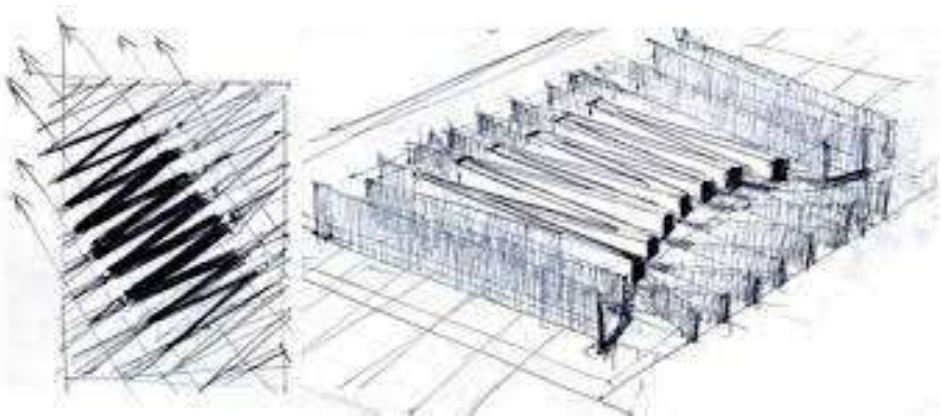
The architecture that acts as an odor controller considers physical and environmental aspects, such as the nose, based on the above theories. The function of the nose is divided into several main functions, namely as an airway, an air conditioning device, an air filter, a sense of smell, sound resonance, helping the speech process, and nasal reflexes (Bodino, 2004). Vegetation and wind movement can affect the spread of air pollution. In order to reduce air pollution, vegetation can be planted perpendicular to the direction of the wind (Grey and Deneke, 1978 in Desianti, 2011). In addition, plantings are also placed around pollution sources with open areas combined with dense barriers.

The filtration process from the analogy of the filter system from the nose is carried out by establishing a large concept based on a line pattern formed from a line perpendicular to the direction of the wind flow with the most frequent intensity. Refers to the literature study, wind characteristics and several types of barriers used to control odors can be connected through the distance of the surrounding building to the farm's location.

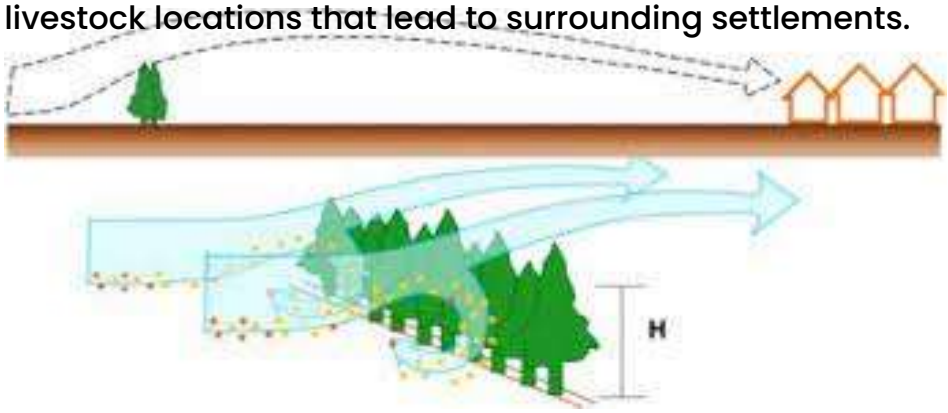
Based on the barrier design process parameter, the mass configuration of the two types of barriers with their effects on control—odor emissions to the environment around the farm. The buffer design process begins with determining the line pattern of the filter concept, the division of zones, and the mass arrangement, which is the reference for the concept of the barrier mass configuration. To achieve this configuration, the minimum distance allowed to use the barrier option with the windbreak function is the outer limit. Namely, the range of wind flow if blown by the windbreak, and the closest distance, namely the distance between the farmland boundary and the outer boundary. This calculation uses the barrier filter function.

Next, mark which areas are included in the zone close to the farmland boundary. From this zone, it has the outermost boundary, which is then elevated to livestock land at the same angle as the direction of the most significant wind flow. An arrow indicates the elevation, and the mark indicates which area uses a barrier with a windbreak function and which part acts as a barrier with a filter. The marking of the two barrier functions also refers to the direction of the prevailing wind flow. Referring to the theory regarding wind characteristics, odor characteristics, and the type of barrier that can reduce odors, a pond will be added to the outer side of the barrier to sterilize the gas contained in odor pollution. By the direction of the wind flow, the pool's position can be determined. For example, if the flow direction is in the same direction, then the pool's position is on the inner side of the barrier so that wind deflection due to the barrier does not bring odor pollution.

In the picture above, it can be explained that the deflection system on the windbreak barrier with a continuous and turbulent flow pattern is used to capture odor gas particles because the gas particles contained in odor pollution have higher specific gravity than oxygen gas. The system also describes a certain distance to avoid the impact of odors, but the wind flow can still be distributed in the surrounding settlements. The design aspect of this barrier has a more specific function. Namely, it is designed to limit and filter the incoming airflow, especially the flow originating from livestock locations that lead to surrounding settlements.



Picture 2.6 Buffer Landscape Illustration, Source: Ariyanto, Y., Antaryama, I. G. N., & Setijanti, P.2013



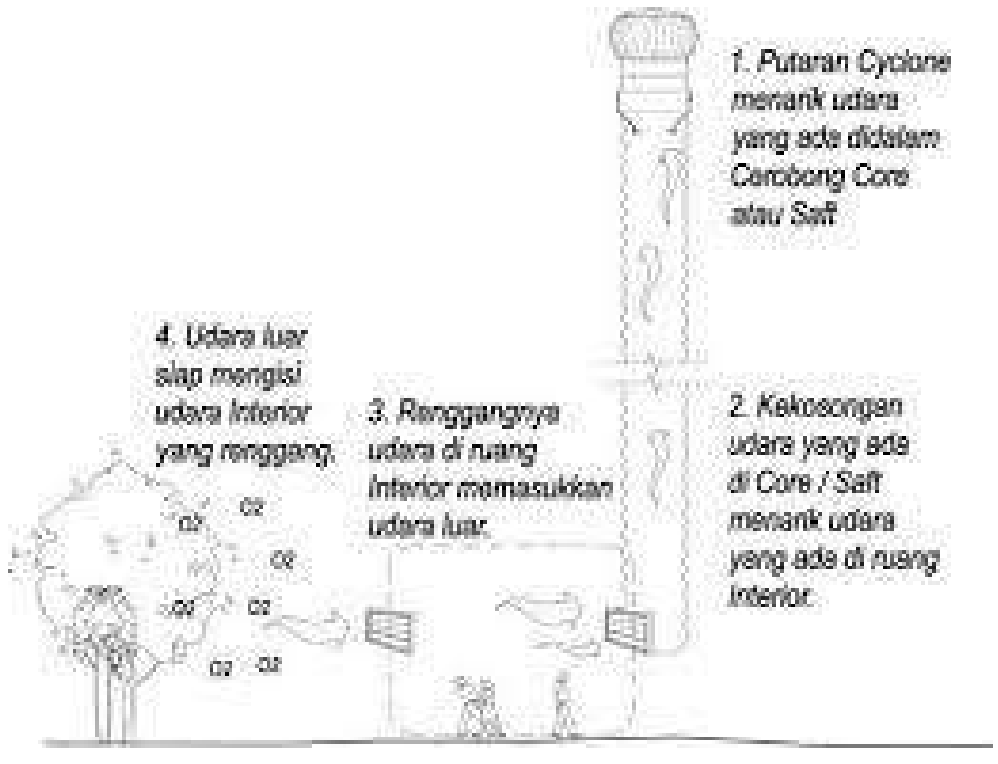
Picture 2.7 Windbreak Illustration, Source: Ariyanto, Y., Antaryama, I. G. N., & Setijanti, P.2013

2.1.7 AIR CONTROL CASE IN THE TOILET OF AT TAUHID TOWER

Wind can be classified as a physiological cooling device. The wind generated by the movement of air is the only thing that makes it possible to realize a passive cooling system, in an area with a hot humid climate. Winds that are rather strong, are often needed in the cooling process, so they can cause comfort. This is feasible in high temperature conditions (Aynsley, 1977). Wind is indeed very useful, it can be proven through the average evaporation of humidity in the air, depending on air movement, therefore the presence of wind flow either in the outside air or in the indoor air is very useful for buildings. The presence of wind is indeed very efficient for creating air exchange in the building, in addition to creating thermal comfort, wind can also function as a repellent for unpleasant odors in the room.

In this study, as a case study is the 13-floor At-Tawhid Tower Building which is located in the Muhammadiyah University Surabaya campus complex. To get rid of unpleasant odors, a cyclone is used as natural ventilation in the toilets of the At Tawhid Tower building which is considered very appropriate. Considering that the use of electricity in high-rise buildings will cost a lot, the presence of a cyclone is expected to reduce the burden of electricity costs on buildings. Because the working principle of the cyclone itself only uses the wind to rotate the existing blades so that they can suck out unpleasant odors in the toilet. In addition, the application of cyclones as ventilation in toilets also supports the Green Architecture movement. Why is that, because the lack of use of electrical energy also reduces the effects of global warming on the earth.

A toilet without an exhaust fan (electrically powered) will cause unpleasant odors and high humidity. This is because there is no optimal ventilation as air exchange so that the air in the toilet will only rotate in the toilet. The closed state of the toilet will cause relatively high humidity, causing a foul odor. As a positive response to the problem of unpleasant odors in the room which also affects existing global warming, an active role is needed in responding to this issue. One of them is by cyclone engineering innovation, besides also acting as a supporter of the ventilation system in green architecture.



Picture 2.8 Natural ventilation with chimney. Source: Gunawan (2010)

2.1.6 FISH DRYING WITH GREENHOUSE EFFECT

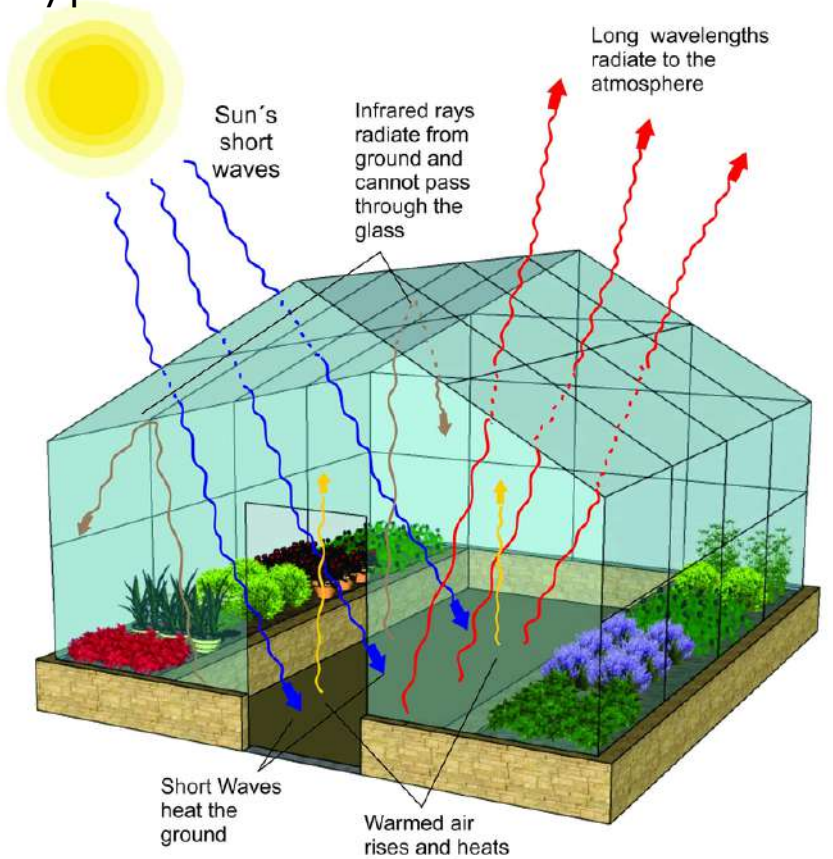
In traditional drying, sunlight is able to penetrate into the cell tissue of the material. While the disadvantages include the drying temperature and humidity cannot be controlled, only takes place when there is sunlight and drying is not constant, it can also increase air pollution for residents around the drying area.

Greenhouse drying was developed in Indonesia in the late 1970s. Basically, a drying greenhouse is a space enclosed by transparent (clear) walls and roof so that sunlight can enter it. The hot air in the room is trapped so that its temperature is higher, higher than the temperature of the air outside. This high temperature is used to accelerate the process of evaporation of water from fish.

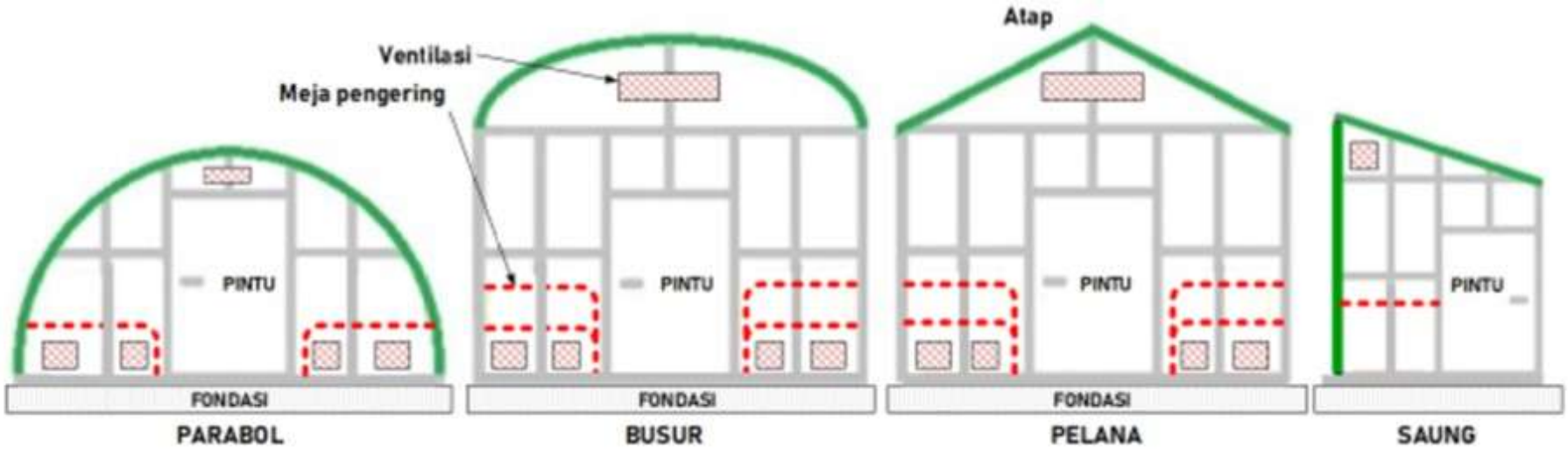
Solar dryers have advantages: they are simple, low cost and do not require a lot of labor. The drying process time with a solar dryer can be reduced by as much as 65% compared to traditional drying using only the sun in the open. With a solar dryer, the dried fish has a better quality.

The greenhouse effect dryer is a solar energy dryer that utilizes the greenhouse effect that occurs due to the transparent cover on the building wall and the absorber plate as a heat collector to increase the air temperature in the drying room. The transparent layer allows shortwave radiation from the sun to enter and hit the building elements. This causes the reflected short wave radiation to turn into a long wave and is trapped in the building because it cannot penetrate the transparent cover so that the temperature inside becomes high.

Solar dryers for fish can be in the form of a greenhouse that takes advantage of the greenhouse effect and can also use a solar collector connected to the drying chamber. The indoor temperature can be increased by the use of black fields. Black fields absorb heat faster. This black layer can be used as a base for fish drying racks and can also be placed on some walls. The black side is placed on the west side in the morning and on the east side in the afternoon. This greenhouse dryer is very useful in improving hygiene. Disturbance of flies, dust contamination, and dirt can be minimized. Another benefit is that during the rainy season, rainwater will not wet the fish and we do not need to move the fish to a shady place.



Picture 2.8 How does green house work?. Source: Adriana (2020)



Picture 2.8 Greenhouse shape for dryer building. Source: Sri Mulato (1999)

The essential components of a greenhouse dryer are the frame, roof and wall coverings, ventilation, drying table and floor that are attached to the foundation. Based on the configuration of the roof shape, greenhouse buildings are divided into 4 types, namely parabolic, arc, saddle and saung. In the parabolic model, the roof truss and dining are one continuous unit. Meanwhile, the design of the saddle and saung model greenhouses has a dining teak and a roof that is not connected continuously. The saung model is similar in design to a half saddle.

The greenhouse construction should be built on a platform foundation about 20 cm from the ground level. The building is protected from the influence of the moist soil surface and standing water. Ceramic floors can increase the absorption of solar radiation in the greenhouse. Another advantage of the black ceramic floor is that it is clean, resists the diffusion of groundwater and stores heat. Cement floors coated with black epoxy paint can be an option for replacing ceramics. Black color has better absorption of solar radiation than other colors.

The radiation catch is directly proportional to the irradiation time. The irradiation time is calculated from sunrise to sunset. The sunshine time in Indonesia is relatively constant, which is 12 hours. The orientation of the greenhouse dryer building should be to the north and south or perpendicular to the apparent path of the sun. The surface of the roof will face more of the sun and get the sun's rays from morning to evening evenly. Greenhouse installations should also be free from the shadows of trees and residential buildings around them.



2.2 FISHERY STUDY ACTIVITY

2.2.1 FISHERY ACTIVITY

Fishing activities carried out by fishing communities in this area have been going on for decades. This can be seen from the length of time the fishing effort has been carried out by the fishermen. The average business time reaches 16 years with a business span of 1 to 50 years. It can be said that the fishermen who live in the Manggar Baru Village are mostly inherited jobs that are passed on from their parents.

In accordance with the character of the environment and its resources, the lives of the coastal fishermen of Balikpapan which are reflected in the fishing communities in Manggar Baru Village are not individual, but are grouped in communal bonds. The main basis of communal ties is the pattern of work relations in exploiting fishery natural resources as an effort to fulfill the necessities of life. The basis of this work pattern then places the factor of capital ownership and fishery business production tools as the main factors for forming social stratification. Naturally, the process of social stratification is then followed by the differentiation of social status and roles as well as a set of specific work rules.

Sailing in the sea

The fishing gear commonly used by fishermen include fish and shrimp dogols, fishing rods, traps, rengge, sodo, and mini purseines. Usually fishermen have more than one fishing gear whose operation is carried out throughout the year. Fishing activities are carried out by fishermen every day, but especially on Fridays, most fishermen are off. Fishing activities carried out by fishermen are generally one day fishing, although there are some fishermen who do this by staying at sea for 3-5 days.

Depositing Catch to Fish Auction Place

Fish auction is an activity in a fish auction place to bring together fish sellers and buyers so that there is a bargain on the price of fish that they mutually agree on. Thus, the fish auction is one of the links in the fish trading system.



2.2.2 FISH PRESERVATION ACTIVITY

Salted fish is one of the fishery commodities that are currently increasingly in demand in the market, because of its high nutritional value and affordable price. Salted fish processing is found in all fishery production centers. All types of fish sizes, sizes, and quality can be processed into salted fish. Therefore, various types sizes, shapes, and qualities of salted fish are found on the market. However, getting good quality salted fish requires several requirements regarding the materials used (fish, salt) and how to process them (Suparno 1992 in Azizu 2014).

Usually the fish that have been caught by fishermen are not sold all to TPI or collectors, there are some fish that are processed into salted fish for their own consumption or increase the selling price. They dry the salted fish in front of the house or on the beach.

According to Suparno (1992), the stages of processing salted fish in general can be described as follows:

- Raw material
  - Large, medium or small fish
  - Salt
- Tools needed:
  - Watertight salting vat
  - The barrel cover is made of boards and weights
  - Knive
  - Scales
  - Plastic basket
  - Drying rack
  - Processing procedure

For large fish (Snapper, mackerel, carp)

- Fresh fish, split the back, remove the entrails and gills
- Wash with clean water so that it is free of blood and mucus, collect in a plastic basket, drain for a while
- After draining weigh
- Weigh the salt, crush as much as 20-25% of the bodyweight of the fish to be salted
- Sprinkle salt to taste in a salting vat, then arrange the fish on a sprinkling of salt, and sprinkle salt again and so on until the fish lies between the two layers of salt.

For medium fish (Bloated, kite, fiscal)

- Fish as far as possible removed the contents of the stomach and gills without splitting the stomach, wash with clean water until free from blood and mucus
- Drain and weigh
- Weigh the salt 15-20% of the net weight of the fish
- Fill the salt into the fish's stomach cavity, then the rest is stirred with the fish in a salting vat. Above the pile of fish is given a cover board and a sufficient load.
- Fish are left in the barrel for 24 hours
- After salting, remove the fish from the barrel and wash it with clean water until it is free of dirt and attached salt
- Drain for a while
- The fish are arranged on a drying rack while stirring occasionally. With good heat the fish dries quickly for 2 days
- Fish that have been packed in crates or bamboo baskets that have been lined with paper and then stored in a cool and dry room.

For small fish (Anchovy)

- Fish are washed with clean water without removing the entrails and gills. Put it in a plastic basket and drain it, then weigh it
- Weigh the salt as much as 5-10% of the weight of the fish to be salted
- Fish and salt are stirred until smooth in a salting vat. The fish are left for 24 hours or until there is an opportunity to dry
- The salted fish are washed as usual, then dried on a drying rack. Drying time 1-2 hours





















Fishers catch fish in the sea. The initial stage of handling fishery products is carried out on fishing vessels during the fishing process. Subsequently, the demolition of catches at fishing ports and auctions at fish auction sites. Fish are sorted by type and weight and then placed in a basket for auction and recorded the transaction results.

Fish caught by fishers are then purchased by collecting merchants. Merchants then resold the fish to wholesalers. Wholesalers then brought the fish from the fish auction site to the big cities. Usually, large traders distribute to large fish processing companies. The company usually processes fish ready to eat or ready to cook. In addition to being brought to large industries specializing in fish processing, large traders also brought fish to be distributed to small traders in the market. Small traders in the market then sell fish at retail to the public. After buying from retail traders, the public can then process fish.



Salted Fish Journey

For the production of salted fish, artisans buy raw materials of fish that are still fresh from fishers. After that, the preparation stage is carried out by separating the scales, bones, and stomach contents, washing thoroughly with seawater, and then putting it in a container.

Fish are soaked in saltwater for 24 hours. This way to keep the quality of the fish fresh. Once enough is enough, fish have gone through grinding and then dried for less than 2-days. Traditional drying equipment also relies on the help of sunlight. The nets also became the base of the fish that was being dried.

Several times the workers flipped through the fish so that it dried thoroughly. The pungent fishy smell has become a daily food. The sun seemed to be their faithful friend. After drying, the fish is moved to be cleaned and then packed. The salted fish is sold and marketed.



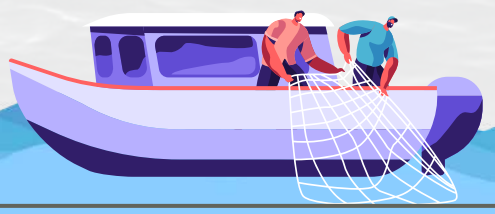


Diagram 2.1 Salted Fish Journey Source: author's document.2022

2.3 FISH MARKET STUDY

2.3.1 FISH MARKET

A market is a place where there are sellers and buyers and the buying and selling of goods take place. The market is divided into traditional markets and modern markets. In traditional markets, buyers can bargain with sellers to get the goods they want to buy. Meanwhile, in the modern market, goods are sold at fixed prices and systematic services (Arianty, 2013).

A fish market is a market used to market fish and other marine products, such as shrimp and squid (Kurniasih, S. 2019). The fish market can be aimed at selling seafood wholesale to other fish traders or retail to individual buyers. Apart from being a place for buying and selling, there are restaurants/food stalls near the fish market that sell processed fish products and other seafood snacks and usually specialize in serving dishes made from fish and seafood. The fish market has been known since ancient times. They serve as a social space where many people can gather and talk about current events and local political activities. Because seafood spoils quickly, fish markets are often found in towns close to the coast. Then after the discovery of ice and simple cooling methods, seafood began to be available in several cities that had good trade routes to the coast. Since refrigeration and rapid transport became available in the 19th and 20th centuries, technically fish markets could be set up in many places. However, modern trade has replaced traditional markets with retail stores such as supermarkets and much of the world's seafood is now sold to consumers in these places, such as most groceries.

There are 2 types of fish traders in TPI, some are fishermen who directly sell their catch, some are collectors who are then sold to various commodities.
Traders are divided into formal and informal. formal are traders who have a place or kiosk to carry out buying and selling activities, while informal are street vendors who are more dynamic and have flexible mobility.



Picture 2.9 Fishers Settlement Typology. Source: author's document.2022

2.3.2 HYGIENIC FISH MARKET DESIGN ELEMENTS

In the design of the Hygienic Fish Market, there are several
healthy market requirements must be met to function optimally and hygienically. The healthy market requirements used are stated in the Decree of the Minister of Health Number 519 of 2008 concerning Guidelines for the Implementation of Healthy Markets.
The design elements used as the basis for designing this fish market building are the arrangement of the trading room, fish sales place, construction, ventilation, lighting in the building aspect, clean water, waste management, and drainage in the sanitation aspect.

Thermal Control

Proper placement of the building against the sun and wind, the shape of the floor plan and construction, and the selection of appropriate materials can lower the room temperature by several degrees without the need for mechanical equipment (Lippsmeier, 1994). Therefore, the design of this fish market uses a thermal control approach to achieve building requirements. There are four design variables in thermal control to optimize thermal performance in buildings: shape, material, openings, and ventilation (Szokolay, 2004). The Building shape is influenced by the ratio of surface area to volume and orientation, the material is influenced by the shading device, the quality of the building envelope and insulation, and the opening is influenced by the position and orientation of the window, the opening mechanism, and the external shading device.

Passive Control

One of the design principles for humid tropical climates is to raise the floor level above ground level to take advantage of wind movement under the building (Szokolay, 2004). Humid tropical climates require continuous air circulation, so it is possible to build stilts where the space under the floor can be used for continuous airflow to reduce humid conditions (Lippsmeier, 1994). Based on these two theories, it can be concluded that the thermal insulation system on this floor is influenced by wind movement, floor height, and the material on the floor construction.

Active Control

Passive thermal control as an effort for human comfort in the fish market design is carried out by applying design variables. However, this fish market also requires special needs to maintain the freshness of the fish. It is necessary to consider active thermal control with air conditioning.
Air conditioning is the treatment of the air in the building, which includes temperature, humidity, wind speed and direction, cleanliness, odor, and distribution to achieve the required conditions (Satwiko, 2009). Air conditioning systems can be classified into air systems, water systems, and air-water systems.

2.4 WATER ARCHITECTURE: TRADITIONAL FISHERY HOUSE

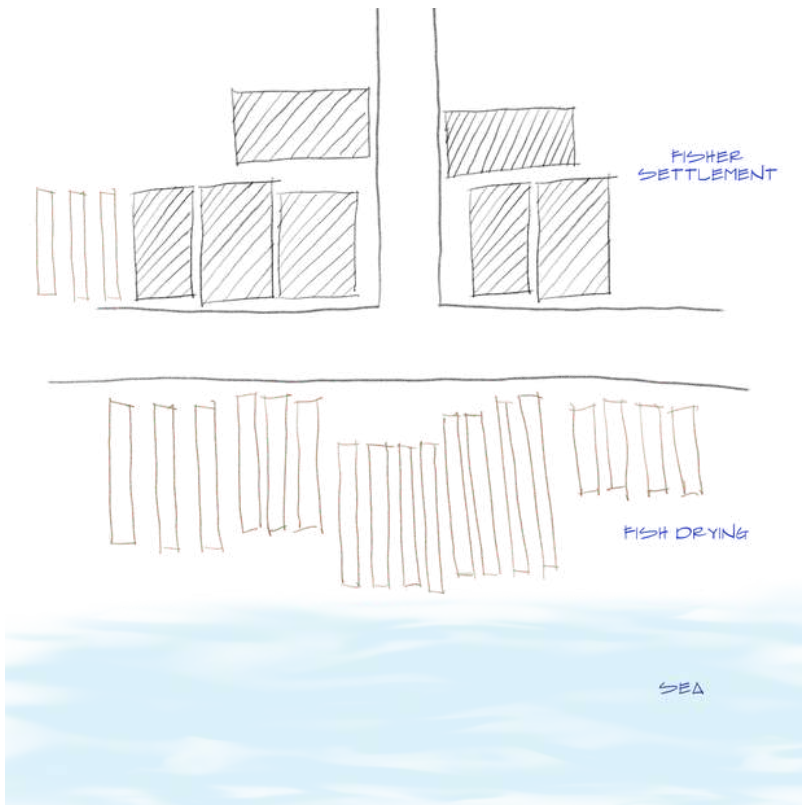
2.4.1 FISHERS SETTLEMENT

A fishing village is a residential area inhabited by most of the population who work as fishermen. The region has a significant difference compared to the village in general because of the movement activities and socio-cultural that is intertwined in it makes the village has its characteristics. So far, fishing villages do not have sufficient facilities and infrastructure to sustain their community. Usually, the fishers' house location is very close to the primary livelihood where trying is the river or beach.

In general, settlement patterns will follow socio-cultural systems based on patterns of human activity. The pattern of fishing village settlements will usually follow the coastline (linear) with conditions that tend to be homogeneous, closed, and develop certain traditions to have the characteristics of settlements. This type of settlement pattern is linear, between residential units throughout the settlement and linearly, there is a place of activity centres, namely boat or dock moorings, fish drying space, and markets.

The characteristics of fishers settlements seen in the pattern of each building mass that directly related to the place of production, waters or sea and the needs of its activities.

The typology of houses or dwellings in the fishing village of Manggar Balikpapan grows organically, namely following the growth of the needs of the community. And people who can adapt to the environment and the limitations of land in the Manggar Balikpapan area, as for some house typologies that have additional space such as storage space for catches, houses that are crowded with each other, stilt houses to prevent flooding do not enter the house because the location is close to the beach. The residential space scheme for the new Manggar fishing village in Balikpapan has its own characteristics because there is additional space in each residence, namely a fish storage room and can also be used as a storage place for fishing gear.



Picture 2.9 Fishers Settlement Typology. Source: author's document.2022

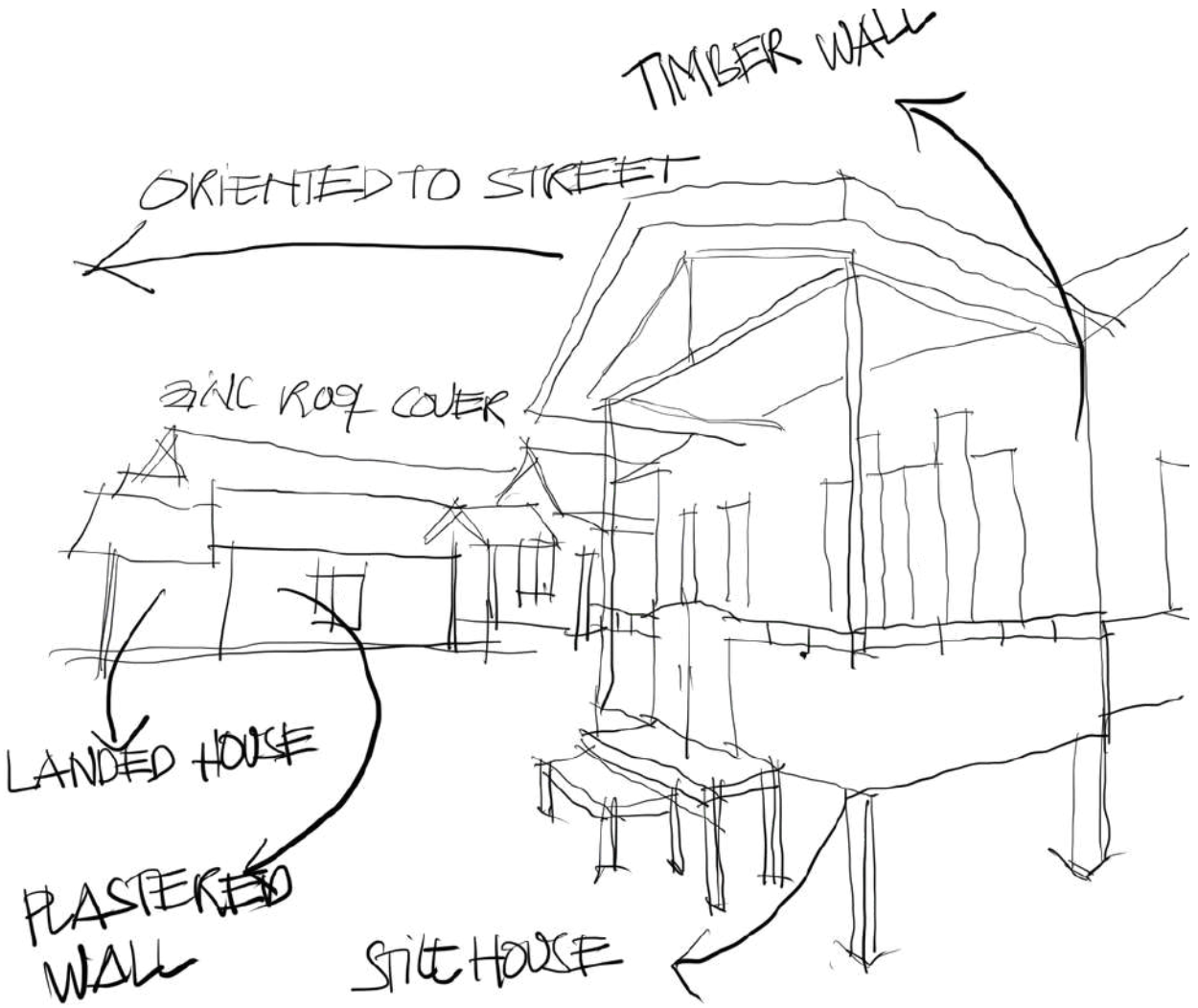
2.4.2 SINGLE LANDED HOUSE

Landed House

Buildings on the mainland are inhabited mostly by residents with livelihoods outside of fishermen's activities with other characteristics:

1. Some stage-shaped most other ordinary buildings whose floor of the building is directly above the ground
2. Construction is mostly permanent

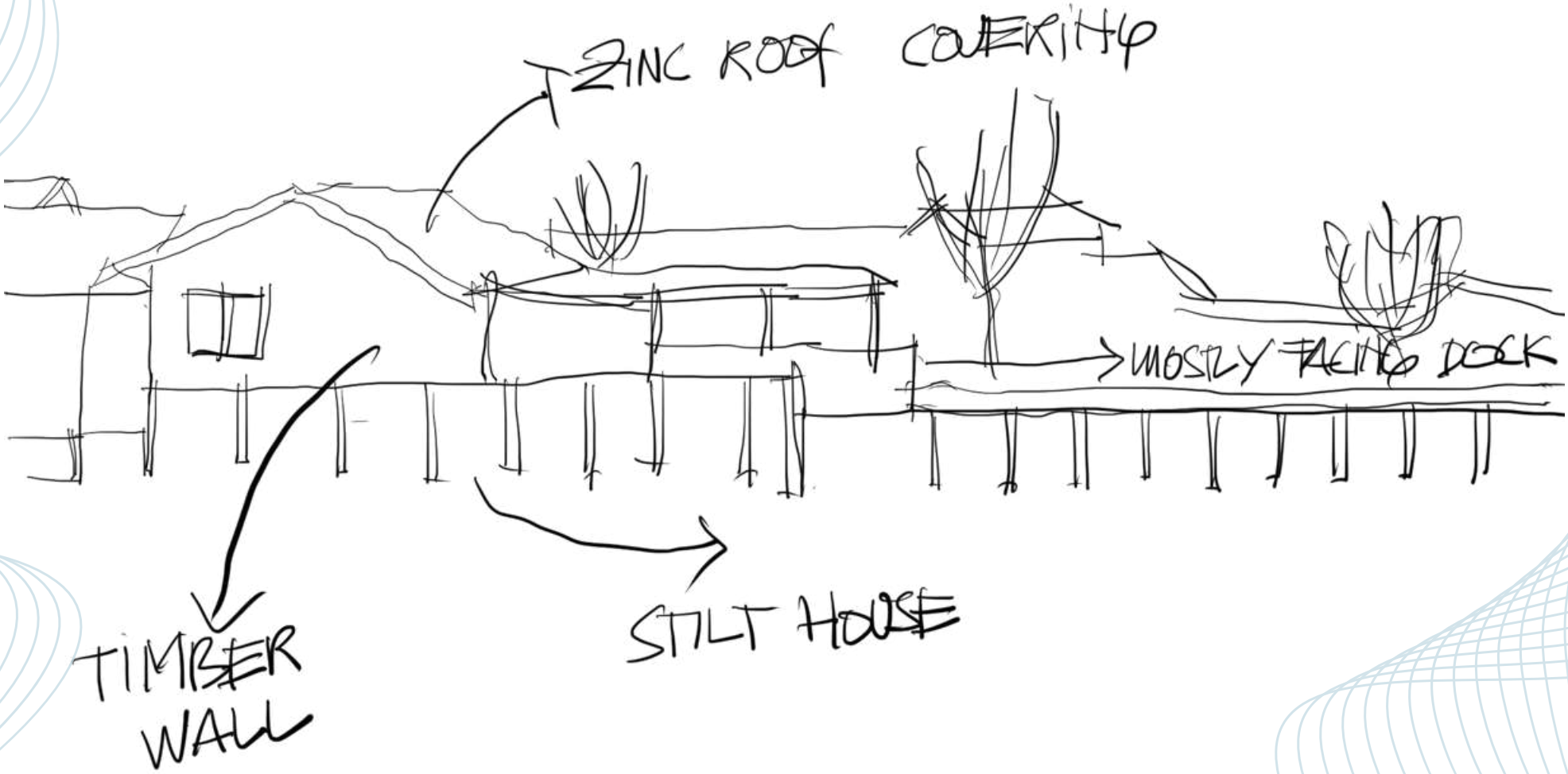
The distance between buildings is relative to the distance between buildings.



Picture 2.10 landed house, Source: author's document.2022

2.4.3 SINGLE STILT HOUSE

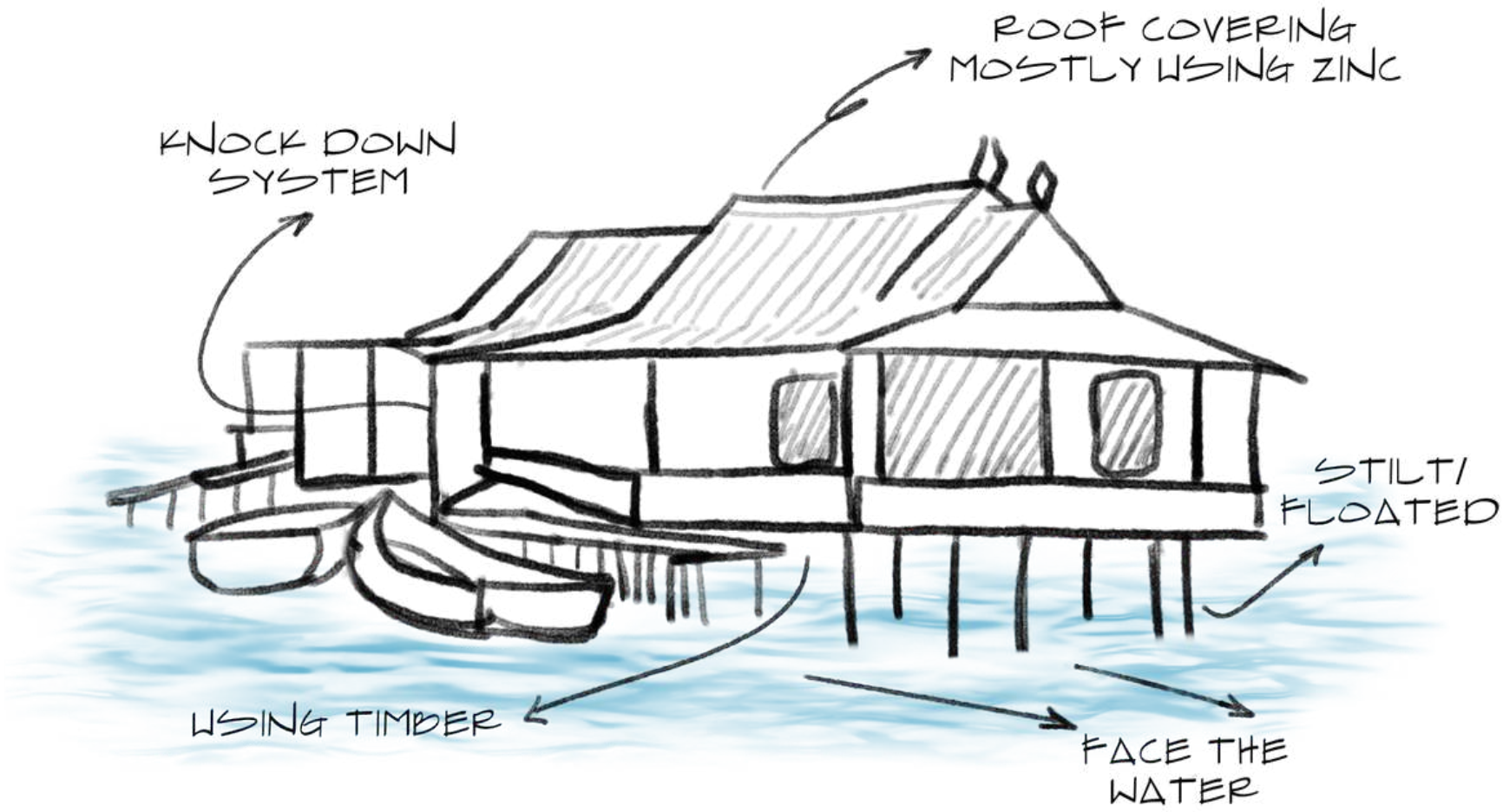
Stilt House
The selection of a high stage house type is none other than
Is a form of response to nature to avoid rising sea levels that change at any time as a disaster response value.



Picture 2.11 Stilt house Source: author's document.2022

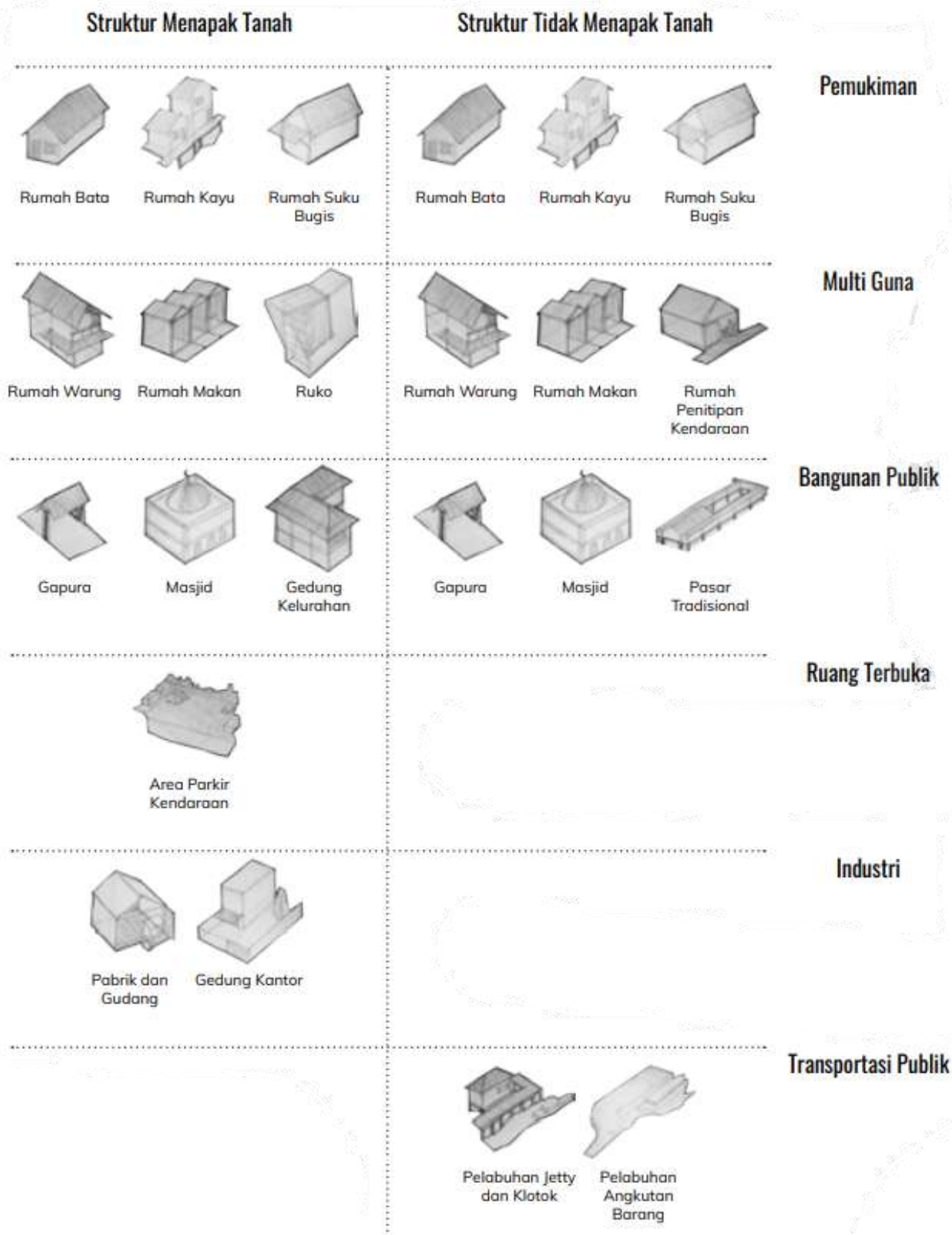
2.4.4 SINGLE FLOATED HOUSE

Floated House
That is the type of building on the water or above the tidal area is mostly inhabited by fishermen or residents whose livelihoods are related to fishermen's activities with characteristics, among others, namely:
1. Shaped stage house
2. Non-permanent construction, usually of wood
3. The distance of buildings with each other, especially those near the territorial waters



Picture 2.12 Stilt house Source: author's document.2022

2.4.5 TYPOLOGY CLASSIFICATION OF THE VILLAGE ON THE WATER



Picture 2.13 Typology Classification of the Village on the Water, Source: Hermawan Juliansyah.2020

2.4.6 PRACTICE OF LOCAL ARCHITECTURE

Most of the residents of Manggar come from Bugis, South Sulawesi, who make a living as fishermen. So that the local architecture is dominated by settlements that adapt the traditional houses of the Bugis tribe. This is one of the historical evidences of the entry of the civilization of the Bugis people to Balikpapan. This traditional house can be recognized by its elongated arrangement, shaped like a stage, and there is additional space beside it.

Bugis traditional houses are generally in the form of stilts, especially in settlements located on the beach, and some of them are located above sea level. Philosophically, Bugis traditional houses are influenced by the understanding of the structure of the cosmos, namely the upper, middle and lower realms.

Upper World (Rakkeang):
As in the understanding of the community of stakeholders (Bugis) that the upper world is the abode of the goddess of rice (Sange-Serri). With this understanding, many Bugis people consider that the top of the house (Rakkeang) is used as a place to store rice or other agricultural products.

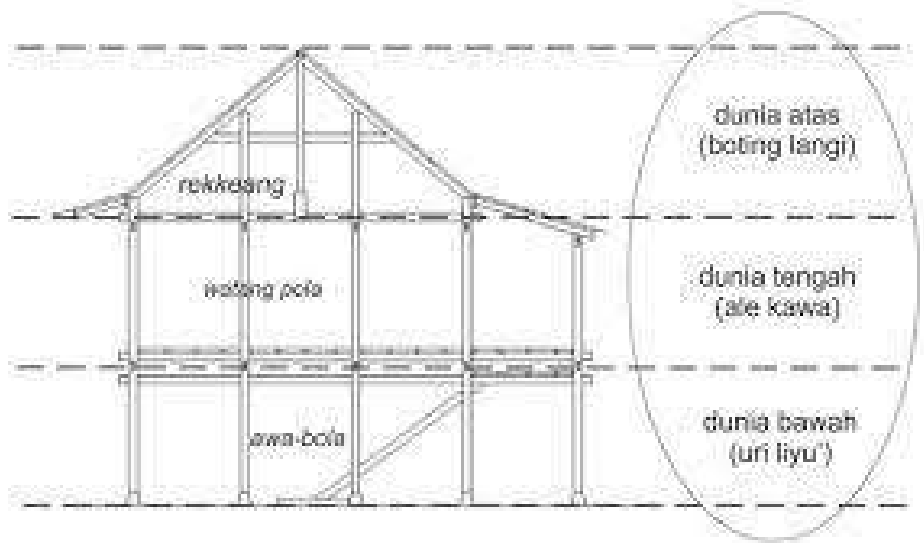
Middle-earth (Ale-Ball):
Life in the human consciousness associated with daily activities.

Underworld (Awa soo/under the house):
In the section under the house, related to the media used to find fortune, this place is used to store agricultural tools, weaving areas, animal cages and a playground for children.

The ability of the Bugis people to build and erect houses on stilts has hardly changed until now. The structural form of a traditional Bugis house is dominated by pillars/columns (aliri) and pegs/purus (pattolo), which are strung together, connected to each other to form a lightweight construction; because it can be installed and dismantled again. Instead, it can be shifted or moved in a group carried.

Pelras (2006), describes that the construction of Bugis stilt houses, the frame is always in the form of the letter "H" which is intertwined between poles (aliri) and pegs/purus (pattolo). Pelras observation above is correct because the appearance of the framework of the Bugis stilt house, the front view or side view resembles the shape of the letter "H", from the layout of the structural framework.

Quoting the gurupenidikan.co.id page in Juliansyah (2020) the Bugis traditional house has three main parts, namely:
• The main pole (alliri). It generally consists of 3 /4 rows so that in total there are 12 bars.
• Fadongko', which is the connector of alliri in each row.
• Fattoppo, which is the part that serves as the top hook of the middle alliri of each row.



Picture 2.14 Bugis Traditional House, Source: Naidah Naing.2019

2.5 PRECEDENT STUDY

2.5.1 Muttrah Fish Market

West of Muscat, on the coast of Gulf of Oman, a new fish market has taken the stand as a new landmark on the waterfront along the lively corniche in Muttrah. The Snøhetta designed Muttrah Fish Market is created to serve as a focal point for the community of Muttrah, while simultaneously functioning as a hub for Oman's thriving fishing industry.

Situated at the heart of Muttrah, on Oman's largest harbor, the new fish market is a tribute to both the past and the future of Oman. The city of Muttrah is known for its long history of commercial trade, its characteristic port, and long-standing fishery traditions. Located close to the city's original fish market, built in 1960, the new market marks a continuity of the region's trade and fishing traditions, while also fulfilling Oman's need to accommodate for the country's growing tourism industry.

Snøhetta (2009-2017)



Picture 2.15 Muttrah Fish Market Source: Designboom.com.2018

PLAYFUL QUALITIES OF LIGHT AND SHADOW

On street level, the new market enhances the public setting by forming a dynamically shaded canopy, organizing the spaces beneath it. It follows the logic of a playful movement of light and shadow built from aluminum fins which provide shade, natural ventilation, and an ephemeral appearance. The complexity of the canopy roof contrasts the simple solidity of the concrete structure below it.

UNITE THE OLD AND NEW

Merging tradition with innovation, the 4.000 square meter fish market is designed to sympathetically unite the old and the new. The generous space creates a public meeting space where local fishermen and worldly tourist from all over the world meet under the same roof.





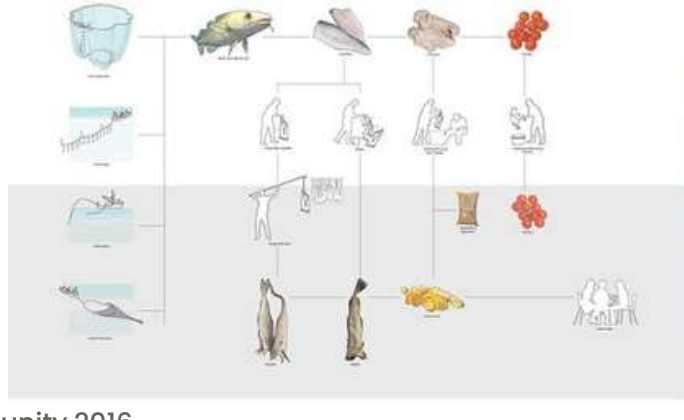


Picture 2.16 Muttrah Fish Market Source: Designboom.2018











Picture 2.17 Lofoten Seasonal FIshery. Source: World Architecture Community.2016

THE LOCAL FISHERMAN CULTURE

Cod fishing has been one of Norway's greatest industries throughout history with local dried stock fish providing Norway with its second largest export over the last one hundred years. Traditionally fisherman have locked to the islands from all over Norway for the cod season and it has sustained a local population of small scale fishermen through the year in the fishing village of Rane. However, recently the situation has cod export businesses and taking away in process and production from the people's hands and to factors as the fishers are industrialized. having a correlating effect on the town of Reine causing community values, traditions and cultural identity to be lost.

RECONNECTION WITH THE PROCESS

The project is design as a linear process spanning the waterfront site. A fishery that steps into the water celebrates the process of deconstructing the cod fish, creating a spectacle to be admired, From here the Cod are hung out to ferment in Re sun to create Stock fish on a huge lattice canopy, taking reference from the local limber hanging structures dotted around the island Accommodation for traveling fishermen soars over the waters edge and snakes back up the landscape to connect with the marketplace and eatery where the stock fish is sold to the public. From here one can enjoy unique experience of being intertwined as part of the process reconnecting the local public with the traditional process.

2.5.2 Lofoten Seasonal Fishery

The demise of the fishing industry as a community initiative has been taking place throughout the Lofoten Islands since the Second World War. However, recently the situation has escalated. Export businesses are taking away the process and production from the people's hands and into corporate factories, this is having a correlating effect on the town of Reine, causing community values, traditions and cultural identity to be lost. This projects is an examination of the opportunity to revitalise the old, small scale industrial community of Reine that breaks the current detrimental cycle of exportation. The goal of the project was to rejuvenate the community through providing the facilities for local fishermen to catch, process and sell their products, in turn reengaging the surrounding community with their cultural heritage.

Taking reference from Lofoten's vernacular the project explores the life of the local fishermen on a collective scale. A fishery that steps into the water celebrates the process of deconstructing the cod while accommodation for traveling fishermen soars over the water's edge traversing the landscape to connect with a marketplace and eatery where the fish is sold to the public. From here one can experience being intertwined as part of the traditional process.



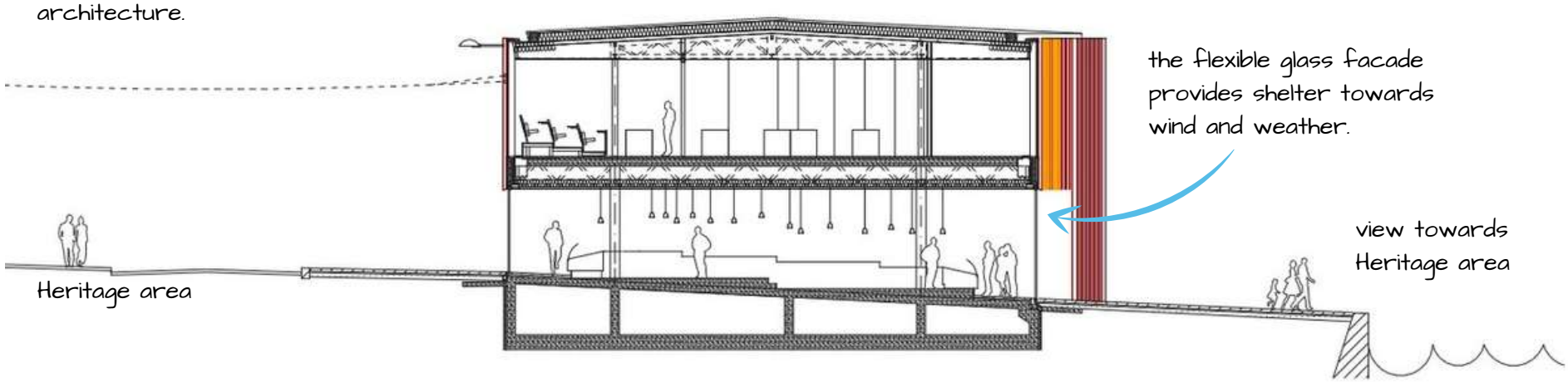
Picture 2.18 Lofoten Seasonal FIshery. Source: World Architecture Community.2016

2.5.3

Fish Market in Bergen

Eder Biesel Arkitekter (2012)

The building shall meet all conceptional urban requirements while blending into the historical context and creating an image for the marketplace through modern architecture.



Instead of just letting it open, they used a transparent glass facade on the ground floor that continues to provide the view of the world cultural heritage Bryggen via the market hall.

As it is a fish market at the centre of the town, they need to control the hygiene of the heritage area.

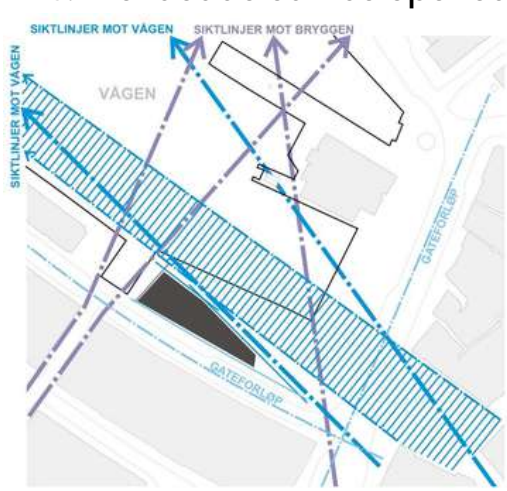
1. Pavement : Granite
2. Glass facade
3. Wooden Louvre

ARCHITECTURAL APPEARANCE

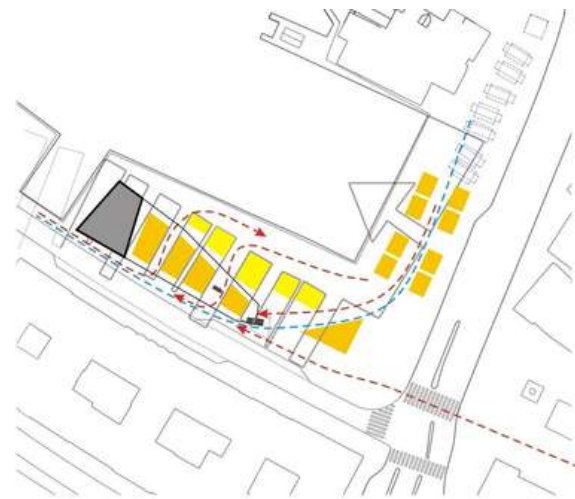
1. Floating construction volume is a roof and creates the protected part of the marketplace
2. The flexible glass facade provides shelter towrds wind and weather
3. The facade can be opened on warm summer days.

BUILDING PROGRAMME

Fish market area, storage space, cold storage and freezer space, production area, wardrobe area, te-strooms, technical unit room, tourist information center.







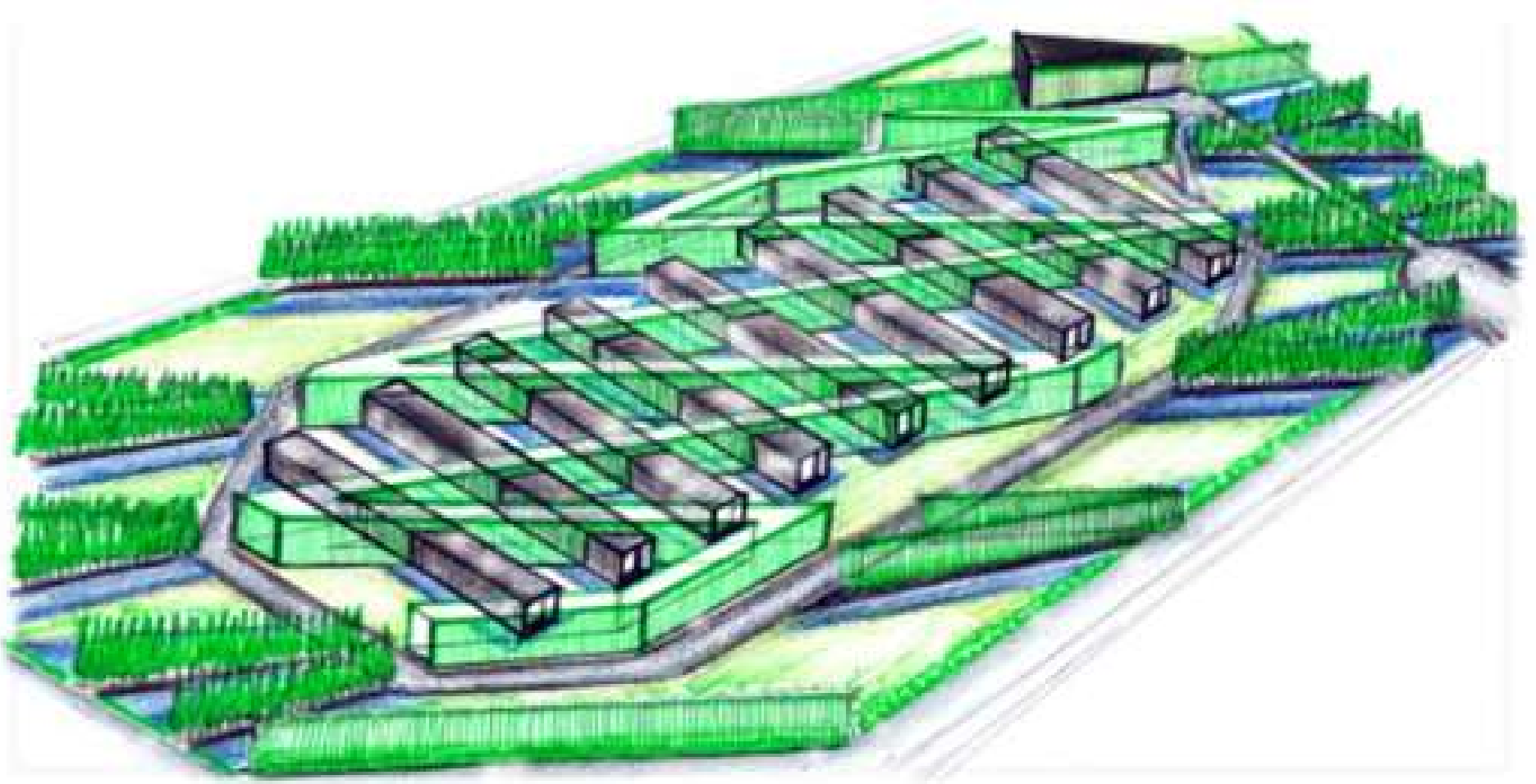
Picture 2.20 Fish Market Bergen. Source:Archdaily.2013

2.5.1

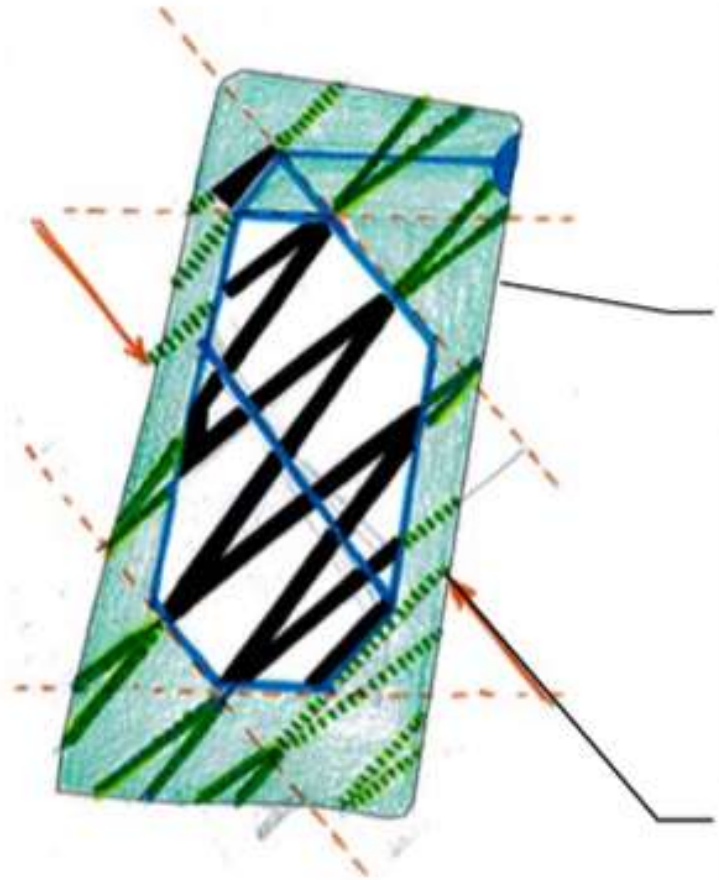
Chicken Farm - Buffer Filter

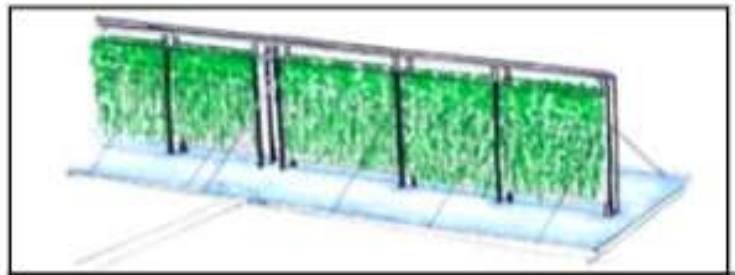
The design that will be raised in the design of this thesis is a buffer of laying hen farming with the analogy of the human nose filter system as odor control so as to increase the aesthetic value of the environment around the farm.
Wind characteristics and some kinds of barriers used to control odors, it can be connected through the distance of the surrounding building with the location of the farm, so that it becomes a parameter in the process of designing this barier is the mass configuration of 2 types of bariers with their effect on the suppression of odor emissions for the environment around the farm.

Ariyanto, Y., Antaryama, I. G. N., & Setijanti (2013)

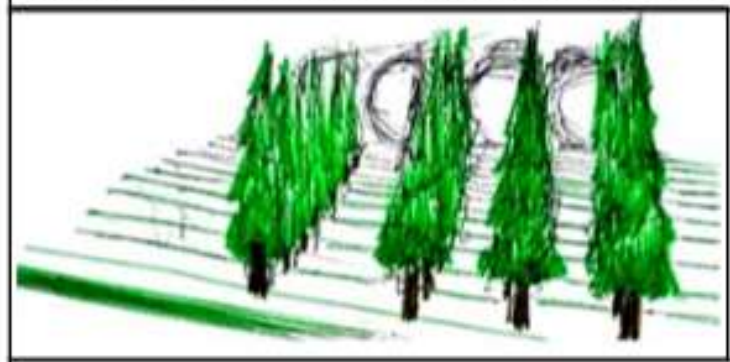


Picture 2.21 Thematic map, Source: author's document.2022

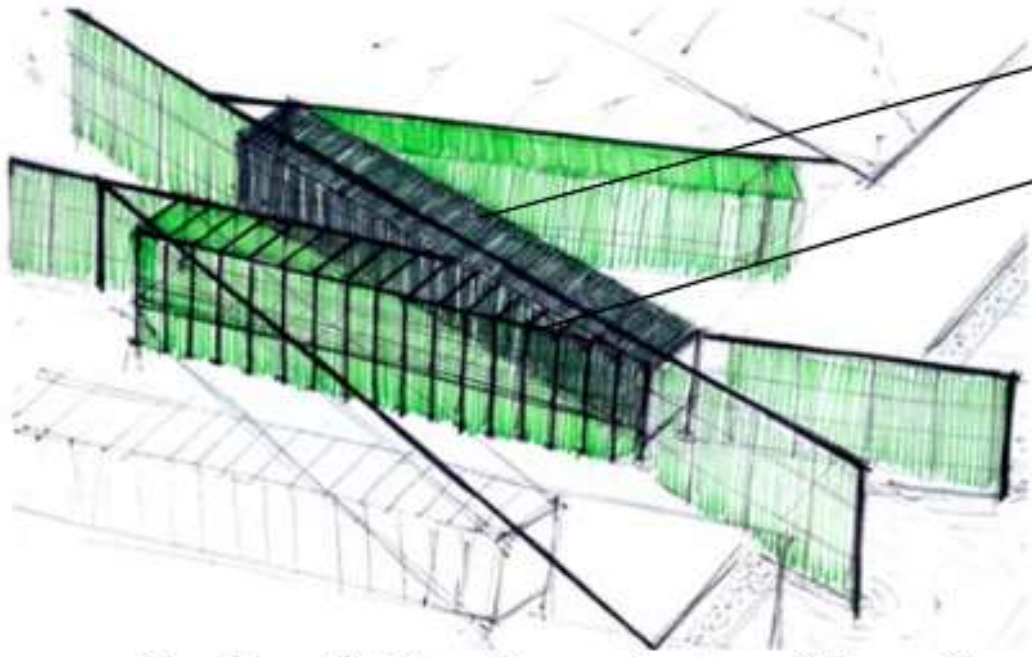




Barier *windbreak* dengan komposisi material rangka terbuat dari besi pipa dan isi dengan jajaran jerami yang dilapisi dengan rambatan tanaman merambat.



Barier filter dengan komposisi material dari jajaran pepohonan konifer, misalnya: cemara.



Picture 2.22 Thematic map, Source: author's document.2022

In the picture above, it can be explained that the deflection system on the windbreak barrier with a continuous and turbulent flow pattern is used to capture odor gas particles because the gas particles contained in odor pollution have a higher specific gravity than oxygen gas. The system also describes a certain distance to avoid the impact of odors but the wind flow can still be distributed in the surrounding settlements. The design aspect of this barrier has a more specific function, namely, it is designed to limit and filter the incoming air flow, especially the flow originating from livestock locations that lead to surrounding settlements.

2.6 MAP OF DESIGN ISSUES

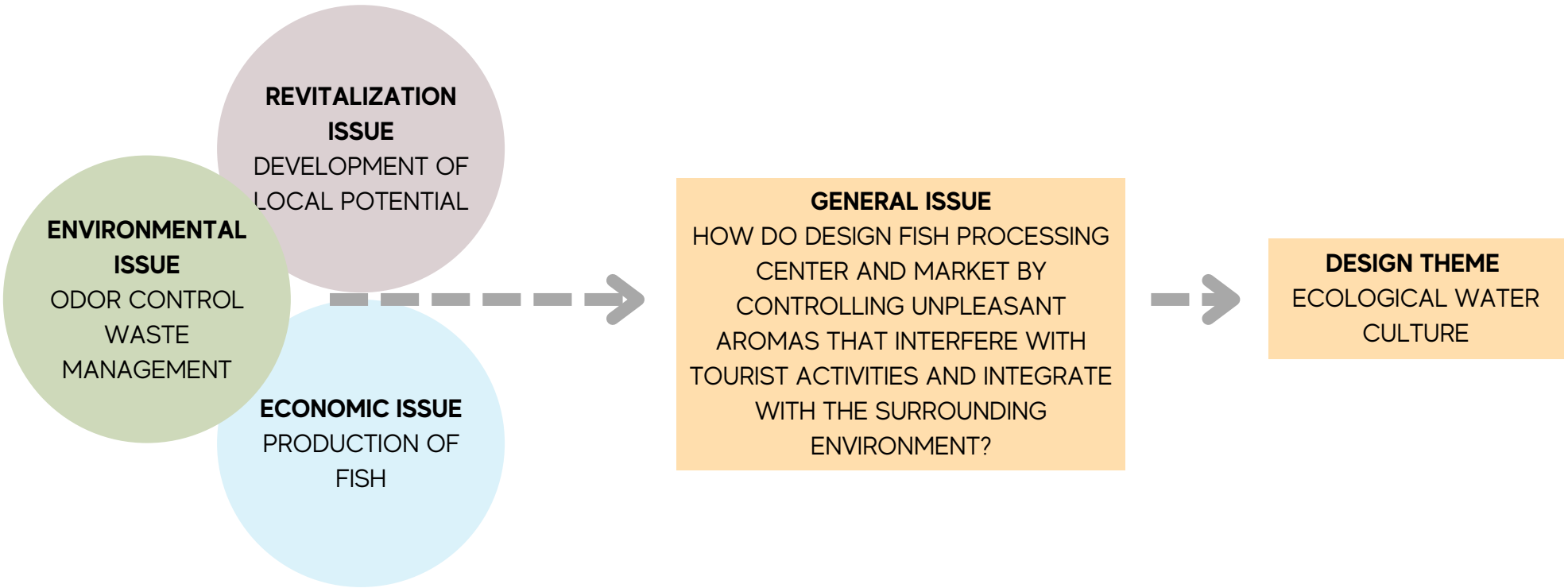
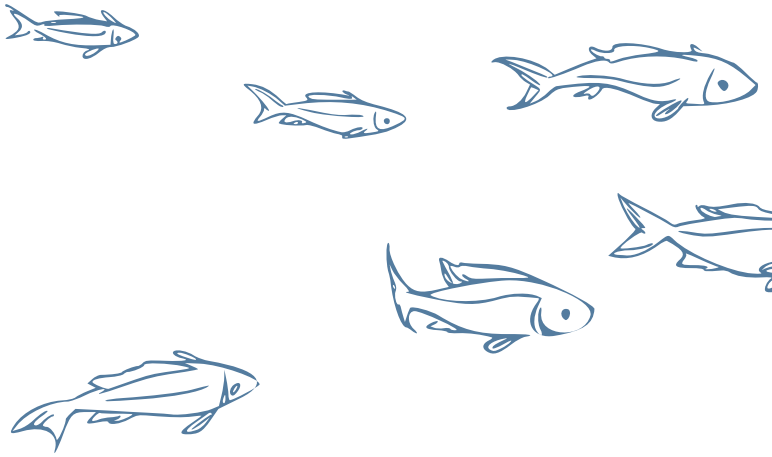


Diagram 2.2 map of design issue, Source: author's document.2022

The main issue of the design of Fish Processing and Market is the ecological water culture approach to overcome the spread of odors from fish processing that have an impact on public around the banks of the Manggar river. The need to design production areas and market that are in accordance with the theme of ecological water culture requires discussion of local culture with the surrounding situation of the area as a responsive design consideration, as well as studies related to themes, namely ecological architecture, traditional architecture, and odor control.



03 DESIGN DEVELOPMENT

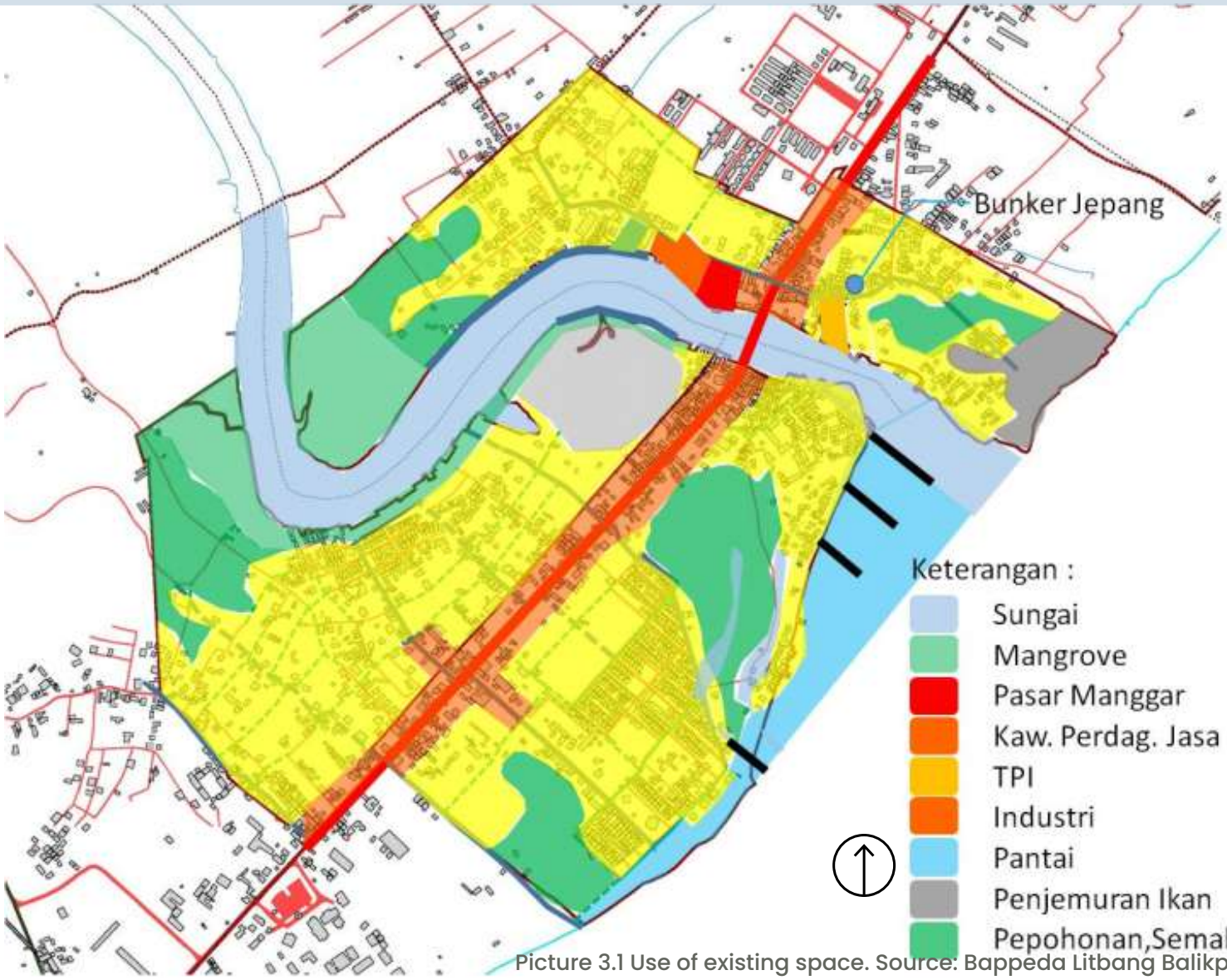
Problems - Approach - Solving

SCHEMATIC

3.1 Location, Site, and Context Analysis
3.2 Design Concept Analysis
3.3 Figurative Design



3.1 LOCATION, SITE AND CONTEXT ANALYSIS



Picture 3.1 Use of existing space. Source: Bappeda Litbang Balikpapan.2013

3.1.1 LOCATION DESCRIPTION

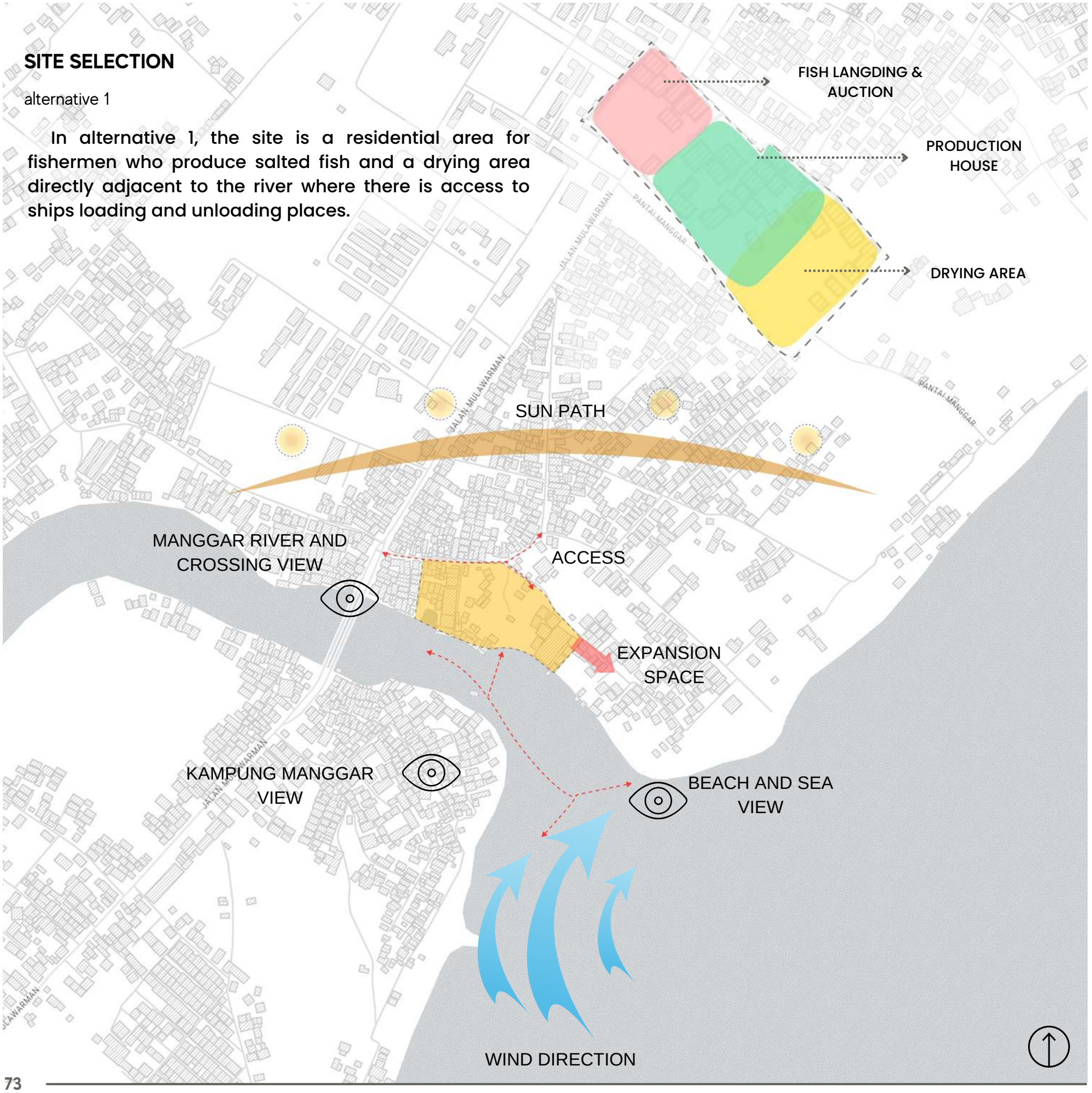
The development zone of the Minapolitan area is located in the Manggar Village, which is around the mouth of the Manggar River, namely in the form of increasing PPI and developing TPI in accordance with its directions as an area for marine aquaculture, aquaculture, and pond cultivation. The existence of the port is also inseparable from the fishing industry in the vicinity, both large-scale industries such as fish processing industries, medium industries and small/household industries that process fishery products on a small scale.

Manggar Baru is located in East Balikpapan District which has a focal point for developing tourism areas. Its location which is very integrated with fishery facilities makes this area has the potential to become a new tourism if further developed. This will have the impact of increasing the intensity of the number of tourists coming to Manggar Baru. So directly, the increase in the number of tourists will accelerate the economic turnover of the surrounding area. However, there are still many things that need to be improved in facilitating tourists such as pedestrians, transportation, and green open spaces.

SITE SELECTION

alternative 1

In alternative 1, the site is a residential area for fishermen who produce salted fish and a drying area directly adjacent to the river where there is access to ships loading and unloading places.

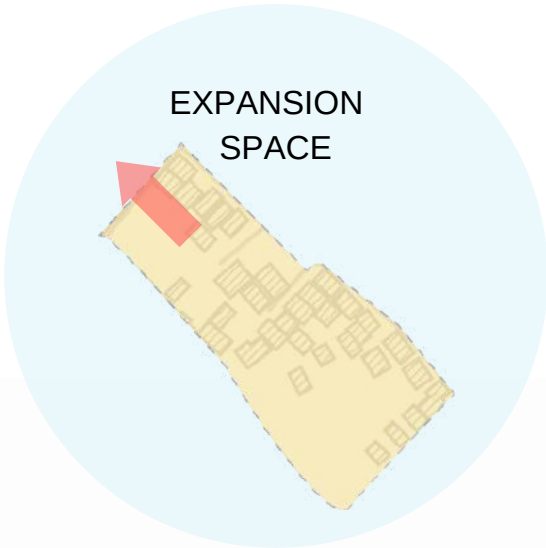


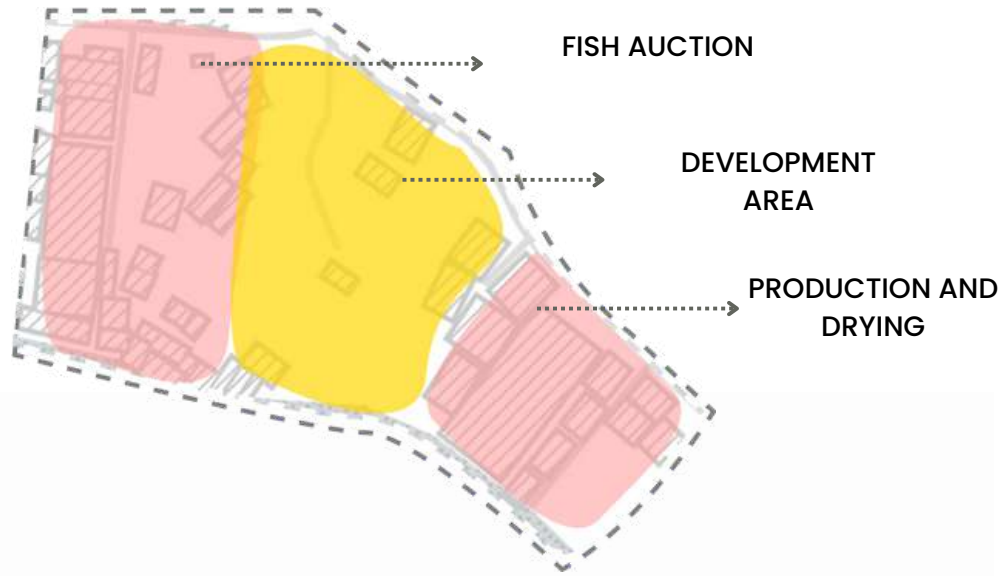
alternative 2

In alternative 2, the site is focusing on residential area for fishermen and drying area as the center of salted fish production.

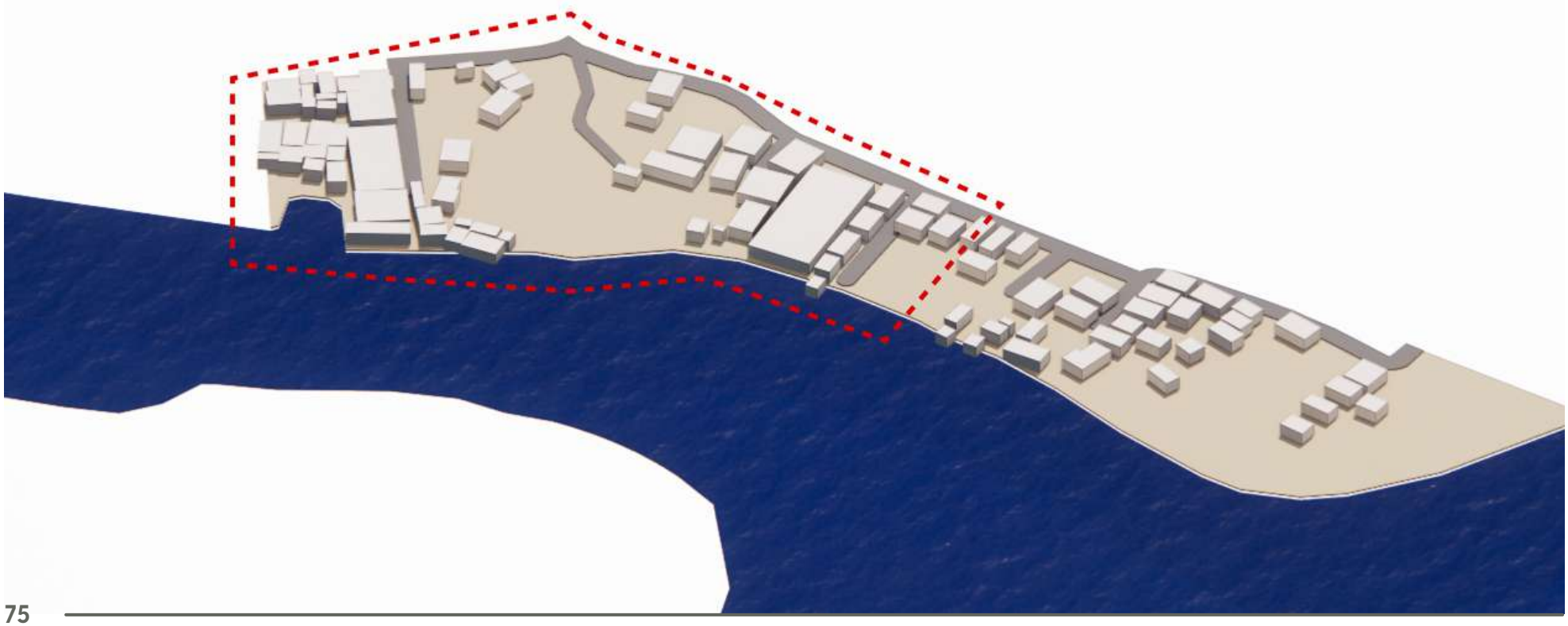


FIGURATIVE SITE SELECTION





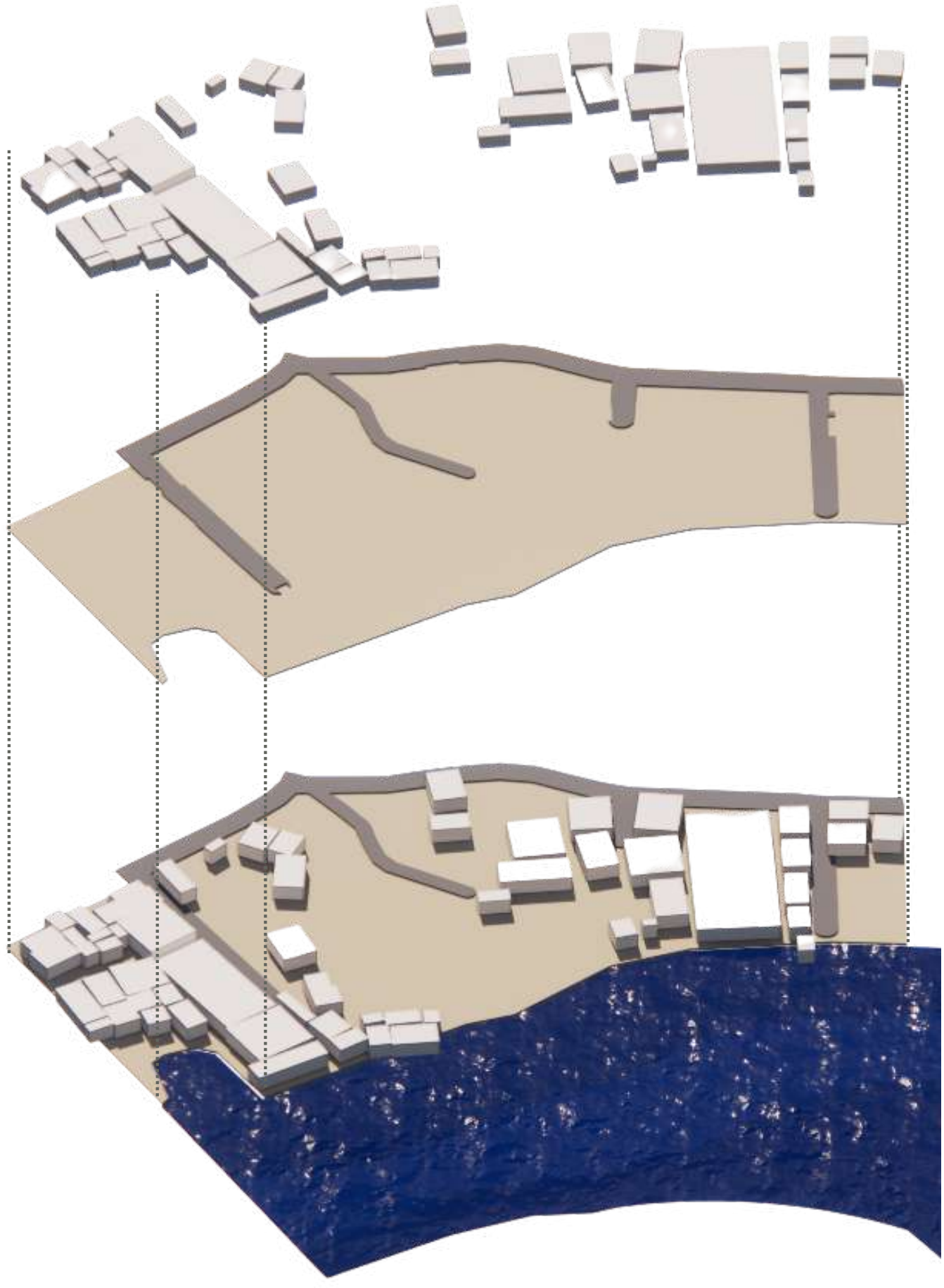
The chosen design site is the first alternative with the expansion of space towards the fish auction place as a connection between production areas, settlements and markets. This area linearly following the flow of fish production and reverse to the market.

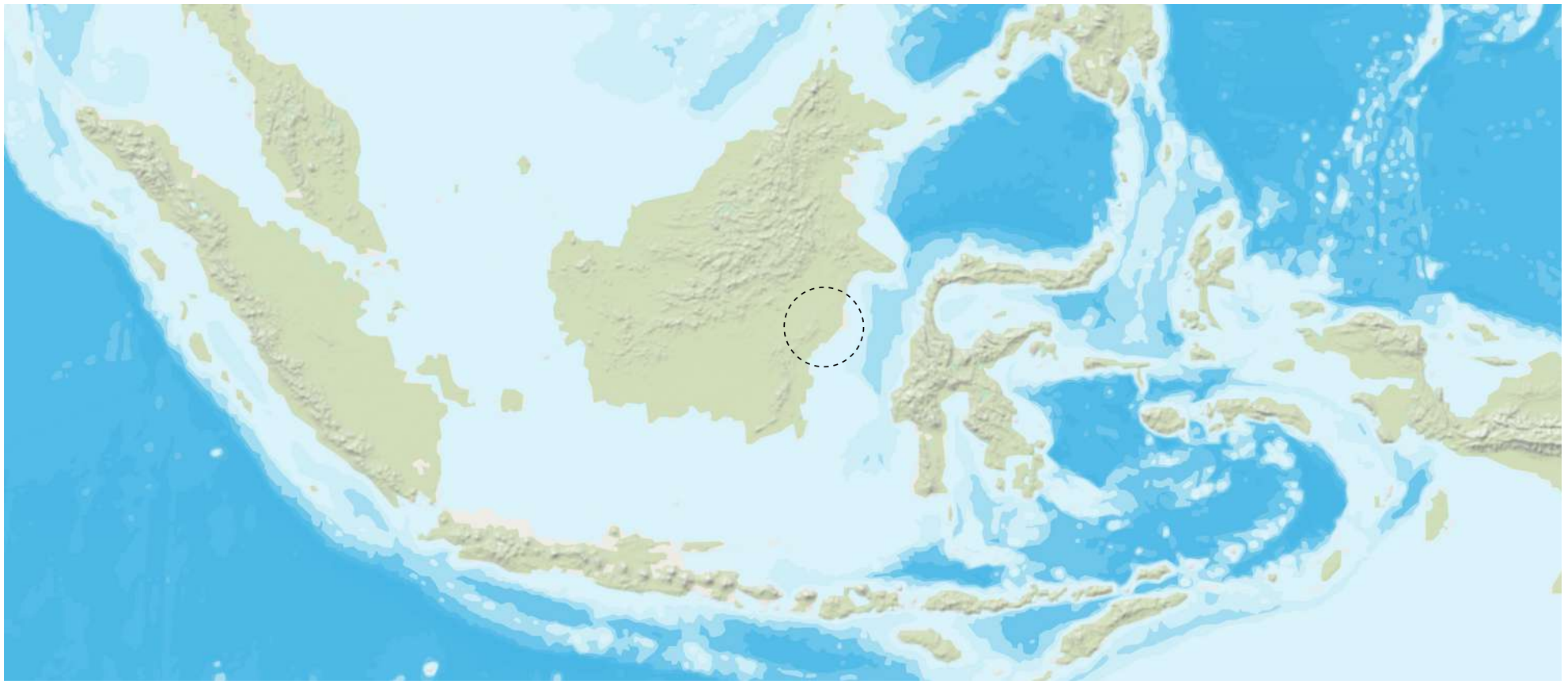


BUILDING BLOCKS

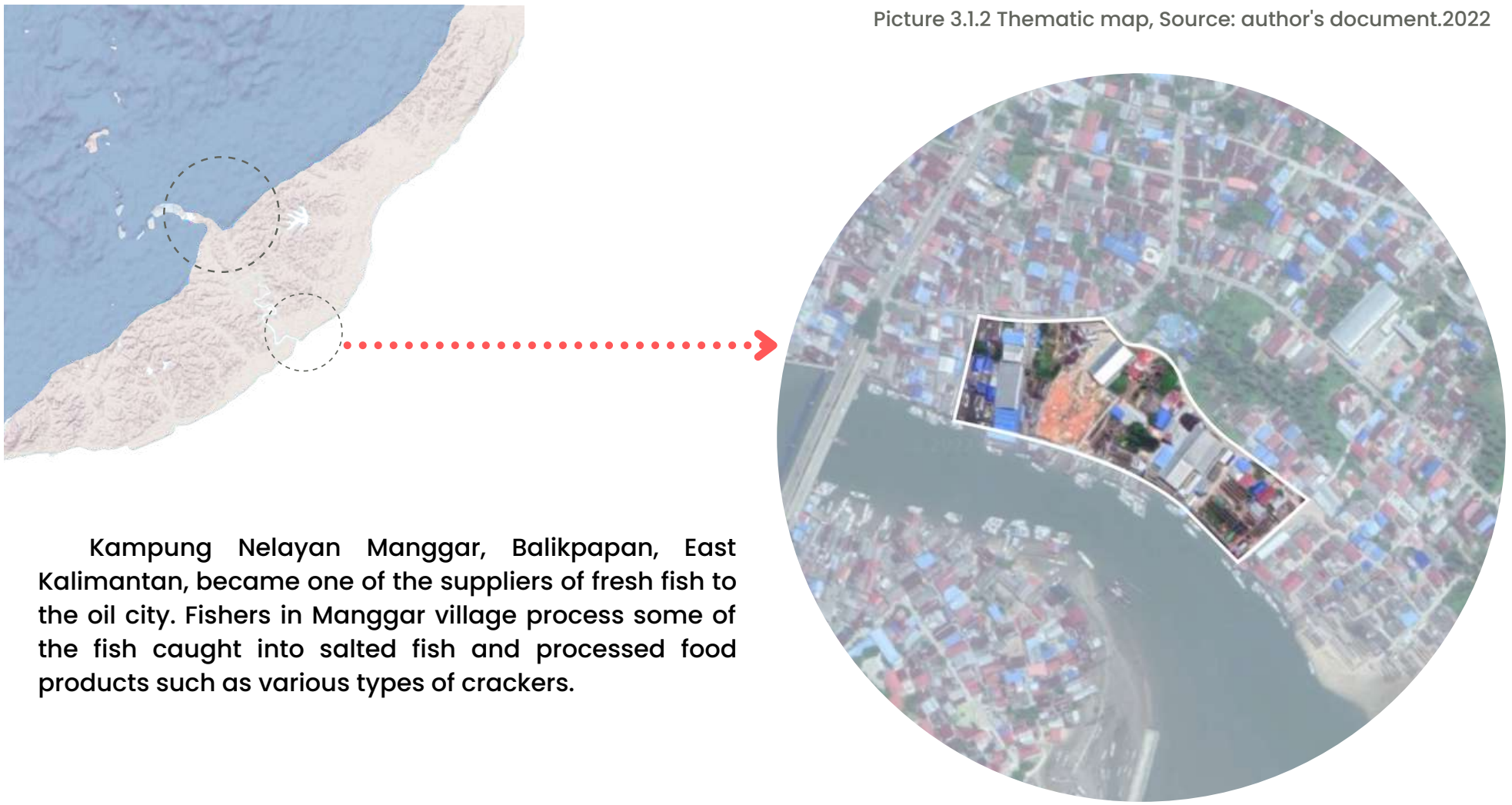
STREET FABRIC

SYNTHESIZE



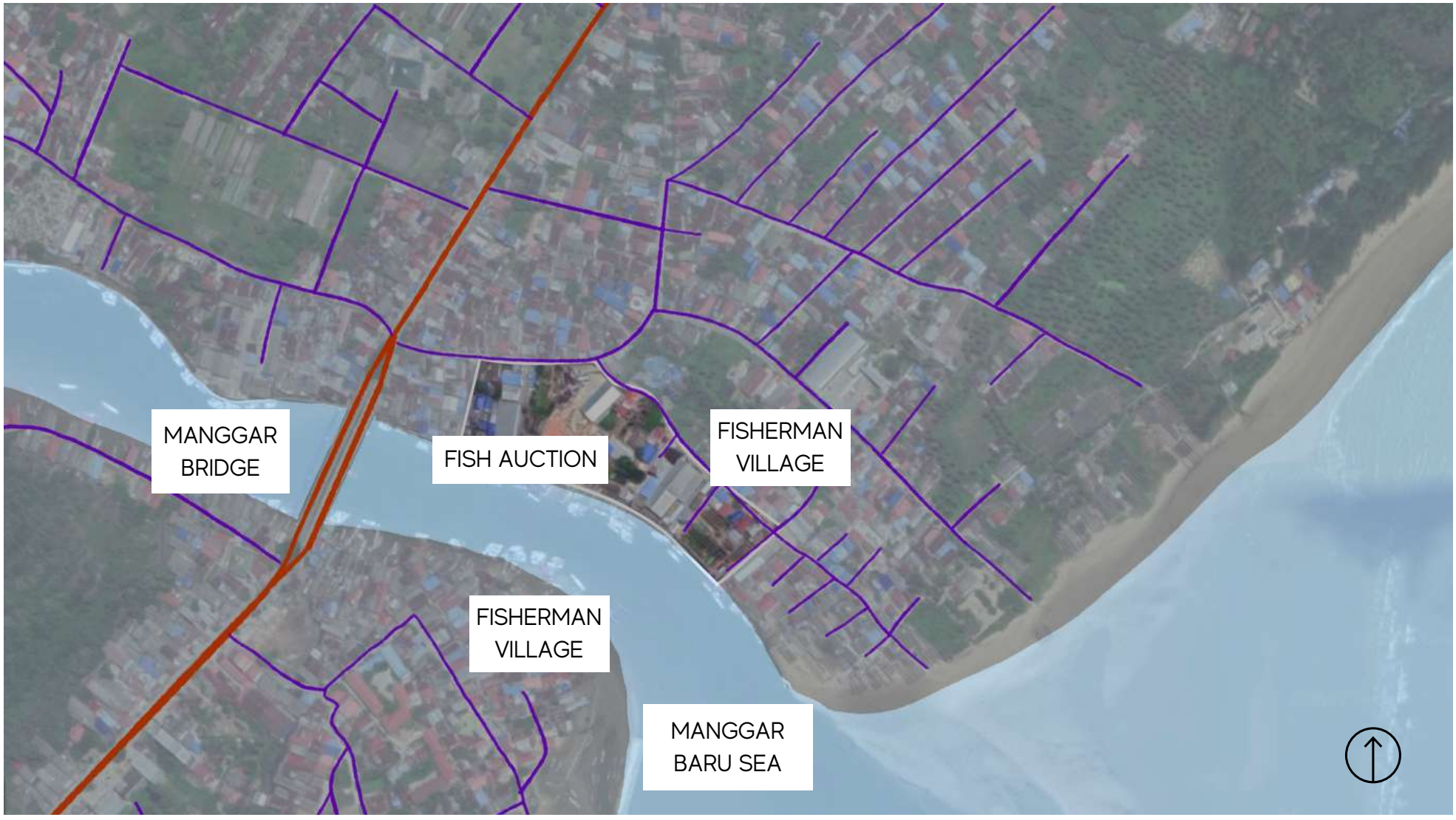


Picture 3.1.2 Thematic map, Source: author's document.2022



Kampung Nelayan Manggar, Balikpapan, East Kalimantan, became one of the suppliers of fresh fish to the oil city. Fishers in Manggar village process some of the fish caught into salted fish and processed food products such as various types of crackers.

Picture 1.14 micro map, Source: google earth.2022



Picture 1.13 Thematic map, Source: author's document.2022

3.1.2 PHYSICAL DATA

Coordinate : -1.216571, 116.976391
Address : Jl. Rekreasi, Manggar Baru, Balikpapan Timur, Balikpapan City, East Kalimantan
Classification : Fishery & Residential
Existing Use : Fish Processing, TPI & PPI

3.1.3 EXISTING LAND USE

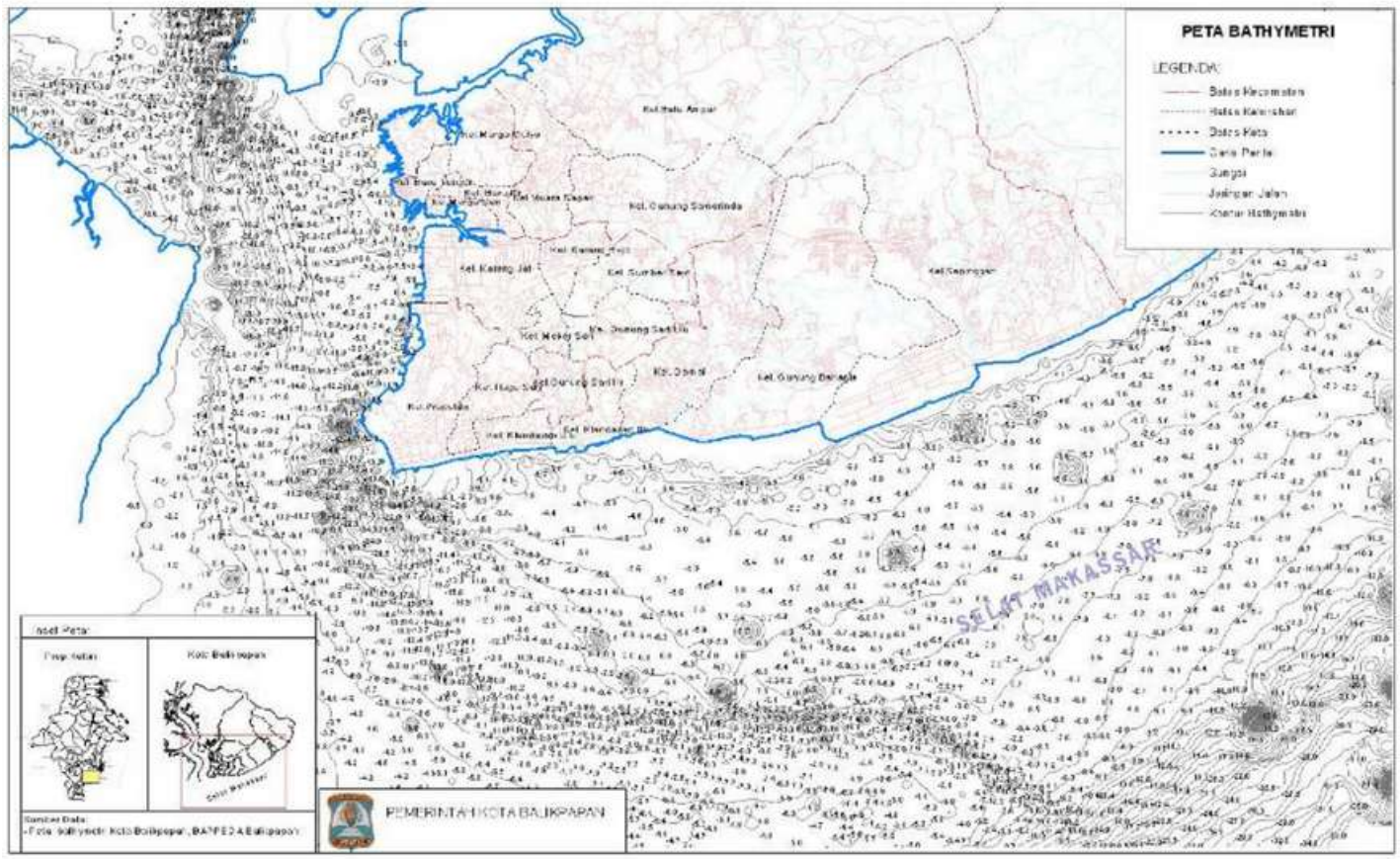
Land use in the planning area includes land use for residential areas (development of new housing areas, development of waterfront housing areas, development of old residential areas), trade and service areas, worship areas, education and sports areas, and green areas.

3.1.4 SITE CONNECTIVITY

Based on data from BPS Balikpapan City, the number of residents of East Balikpapan subdistrict at the end of 2020 amounted to 90,243 people. This population tends to increase when compared to the population in previous years. The increase in the population of east Balikpapan subdistrict, which increased by 3.92%.

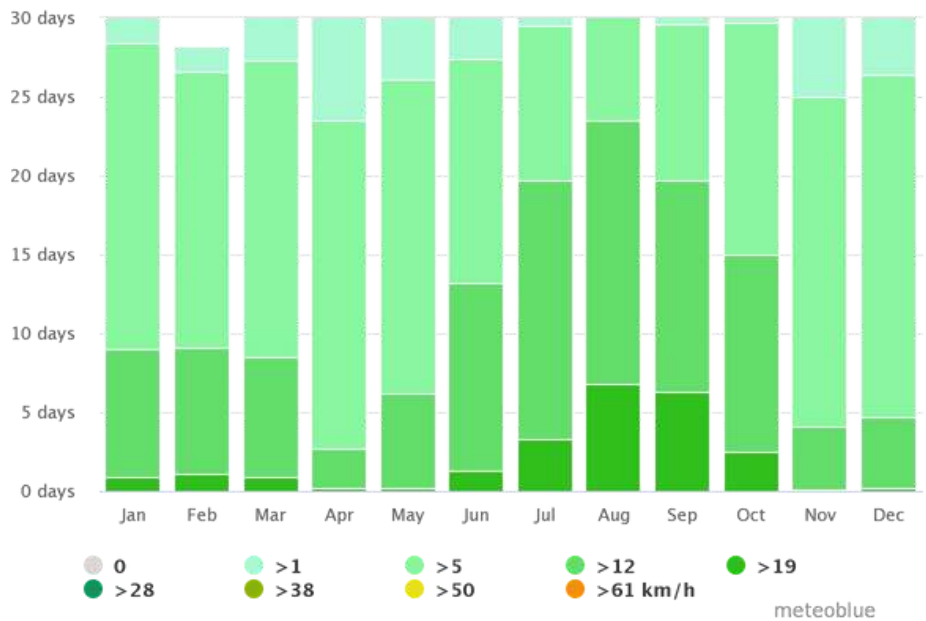
3.1.6 BATHYMETRY

Balikpapan City Beach includes ramps, with the base substrate dominated by sand and coral fragments. At one mile from the coast, the depth at the lowest low tide varies between 1–2 meters. In some locations, the bay's waters are about one mile from the coast, even under one meter, due to high sedimentation. Corals that arise to the surface will be seen at low tide in some parts.

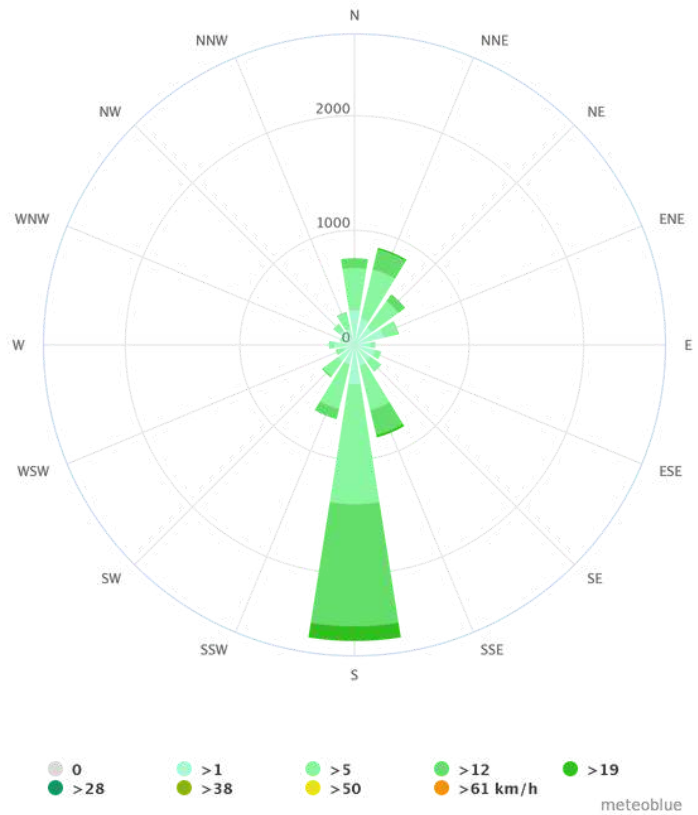


Picture 1.13 Thematic map, Source: author's document.2022

3.1.6 WIND SPEED



The wind speed data diagram shows the number of days in a month. The month of August has a high wind speed intensity of 5.27 m/s for approximately 6.8 days. Meanwhile, April has a low wind speed intensity of 0.27 m/s for 6.5 days.





Picture 1.13 Thematic map, Source: author's document.2022



3.1.8 CLIMATOLOGY

Balikpapan city belongs to a tropical climate with high relative air humidity with an average range of 82-93%. and the air temperature throughout the year is relatively constant, ranging from 25°- 35 ° C with annual rainfall of 1,329 mm / year.

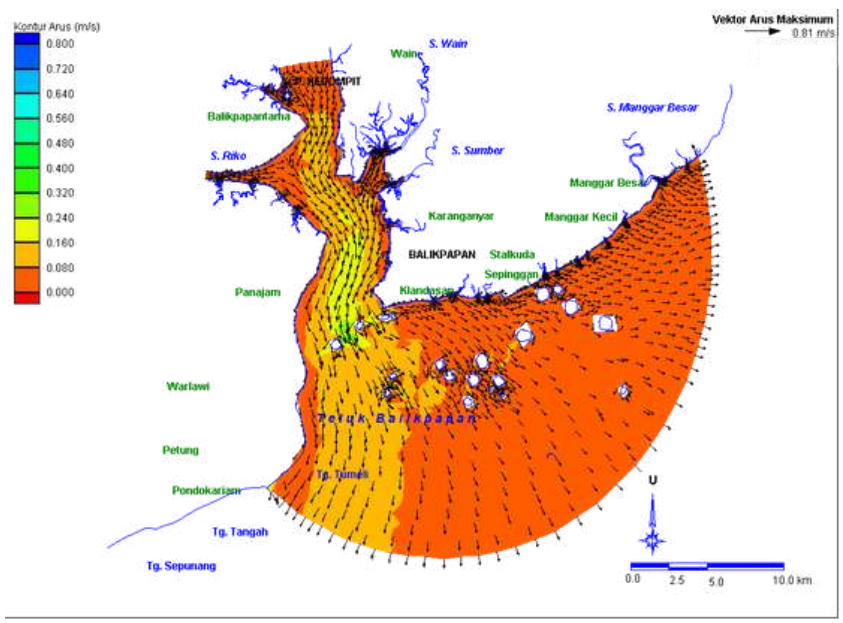
3.1.7 HYDRO-OCEANOGRAPHY

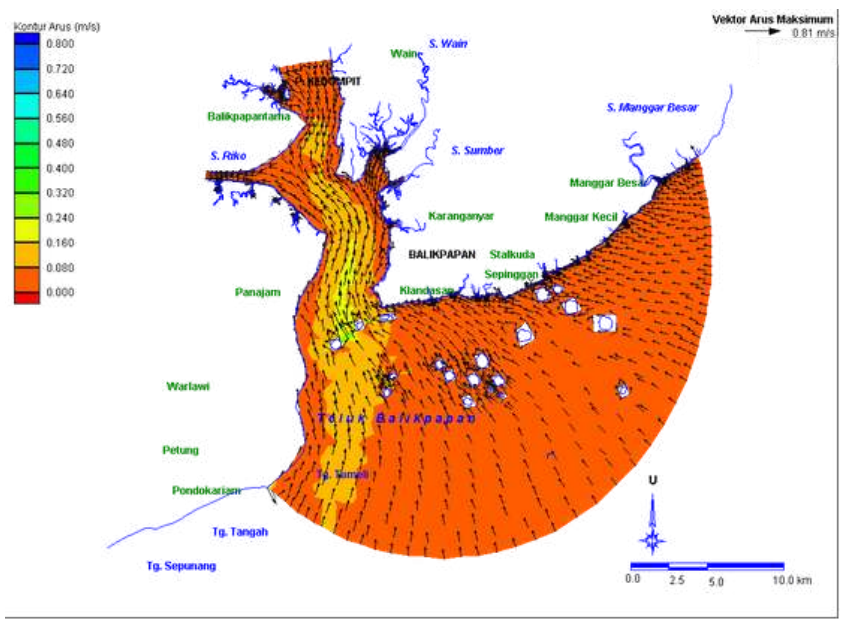
Wind

Wind speeds range from 3.5 knots to 7.2 knots. Every month, the average solar irradiation in Balikpapan City ranges from 30 to 72 percent. At the same time, air pressure, Balikpapan City has an average air pressure of 1,009.9 Mbs, with a minimum air pressure of 1,008.5 Mbs and a maximum pressure of 1,011.4 Mbs.

Tidal

From this graph, it can be known that the highest sea level elevation (HHWL), the average sea level (MWL), and the lowest sea level (LLWL = LWS). The chart shows that the most significant tidal difference is 290 cm, which is indicated by the position of LLWL and HHWL. The tidal type is a mixture skewed towards double daily.





Picture 1.13 Thematic map, Source: author's document.2022





Picture 1.13 Thematic map, Source: author's document.2022

3.19 NEIGHBORHOOD & CULTURE

Based on data from BPS Balikpapan City, the number of residents of East Balikpapan subdistrict at the end of 2020 amounted to 90,243 people. This population tends to increase when compared to the population in previous years. The increase in the population of east Balikpapan subdistrict, which increased by 3.92%.

For the number of inhabitants in the Minapolitan area can be seen in the following table:

Desa/Kelurahan	Penduduk (ribu)[1]	Laju Pertumbuhan Penduduk per Tahun 2010–2020[2,3]
(1)	(2)	(3)
Manggar	42 040	5,11
Manggar Baru	18 673	1,82
Lamaru	13 356	4,58
Teritip	16 174	3,24
Balikpapan Timur	**90 243**	**3,92**

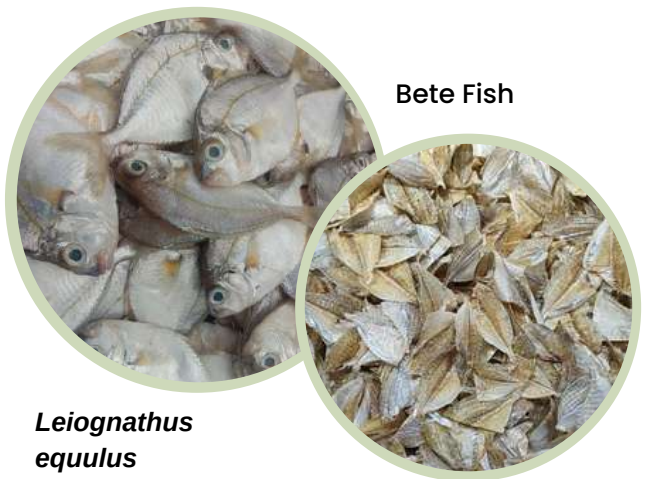
Picture 1.13 Thematic map, Source: author's document.2022

The dominance of livelihoods in the East Balikpapan subdistrict is the majority of farmers with a percentage of 23.4%, followed by fishers as much as 21% and traders as much as 19.9%,

The percentage of the number of people who have livelihoods as fishermen shows that the dominance is based on the potential of the fishery and its location adjacent to the coastal area. The characteristics of coastal communities when viewed in terms of economy are characterized by low levels of education, productivity and income and more waiting and seeing in efforts to improve technology and the level of its fullness to economic improvement.

3.20 TYPE OF FISH PRODUCT

DRIED FISH



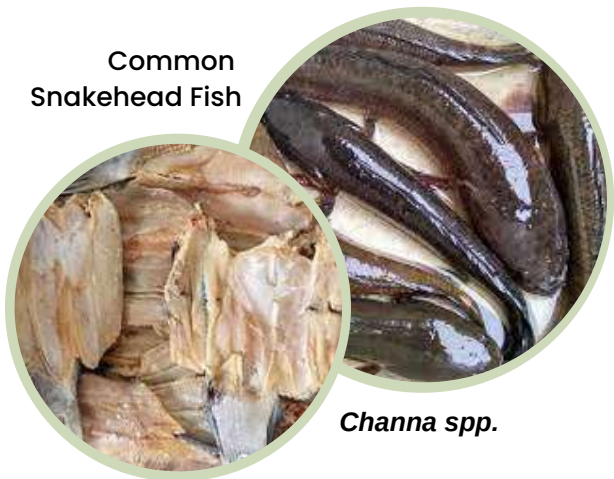
Bete Fish

Leiognathus equulus



Shortnose Gizzard Shad

Anodontostoma chacunda



Common Snakehead Fish

Channa spp.

The supply of fish that is processed into preserved fish is obtained from a collection of local fishermen's marine products.

TYPE OF PRESERVE FISH

FROZEN FISH



Tuna

Thunnini



Mackerel

Chub mackerels



Red Snapper

Lutjanus campechanus



Anchovy

Decapterus spp.



Yellowtail Scad

Selaroides leptolepis

3.21 EXISTING FISH PROCESSING CONDITION

In this fisherman's settlement, residents complained about odor pollution from the Fish Auction Place or a small market from residents or communities who dumped fish merchandise directly into the sea which made the smell unpleasant in the area of the settlement area. There are several environmental issues that need to be considered, especially for people who live very close to each other.





Supporting facilities at PPI Manggar include fishermen's meeting bodies as a place for fishermen to be trained, port managers (mess operators, guard posts and integrated service posts, MCK, Kiosks and government function organizers, namely as fisheries supervisors).



The problem is that there is still part of the TPI that has not been equipped with a building where the catch is stored, clean water, public toilets, lighting and has communication facilities.







The characteristic of this area is a communal fish drying place that still uses the traditional method of drying fish with solar heat so that it takes time and depends on the weather. If this drying process is at its worst, it will reduce the quality of the fish and cause a putrid odor that spreads to the surrounding area.

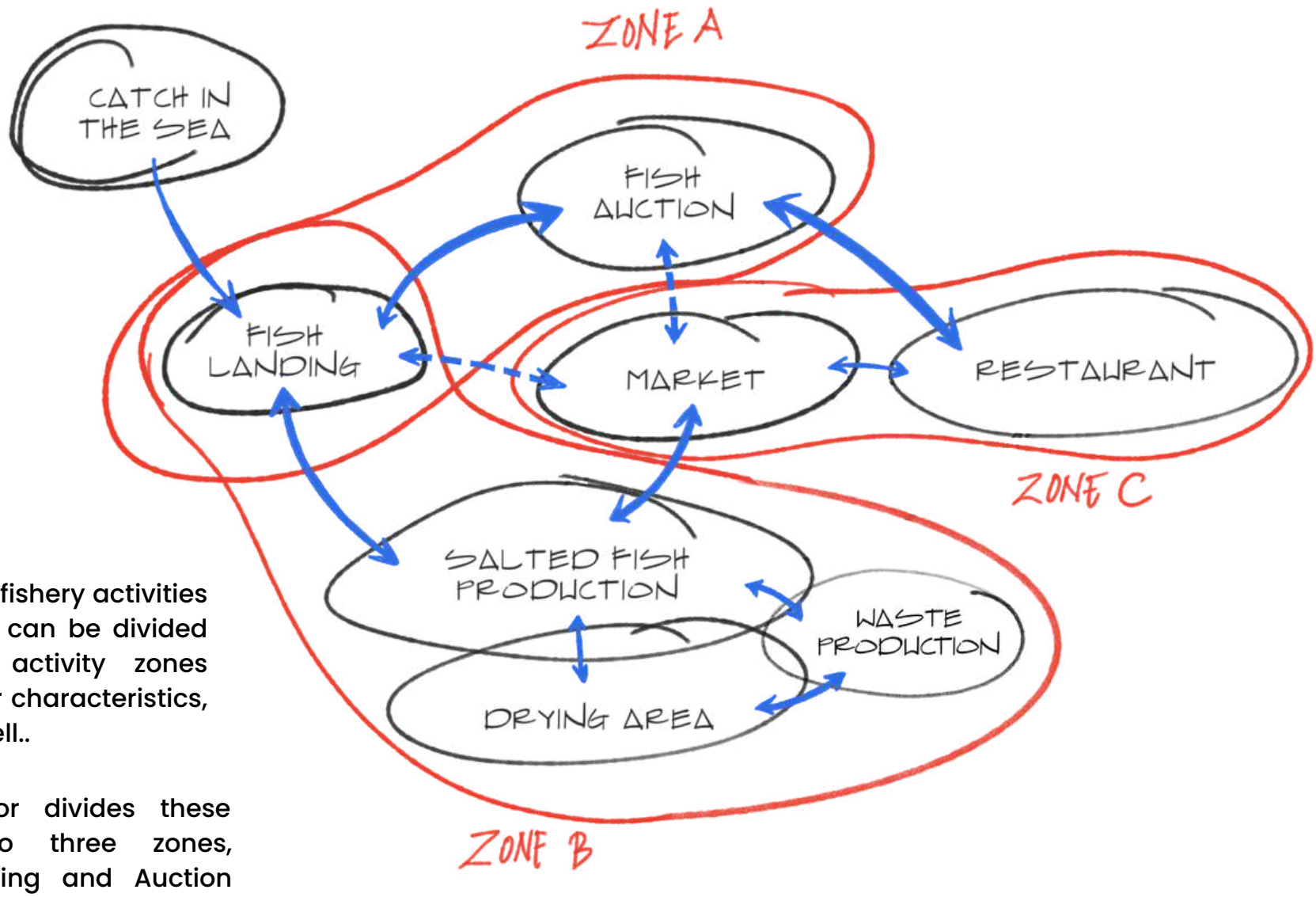




As for the community support room, namely the drying room of the catch, the fish will be dried in the sun for sale or private consumption, as well as space for the fishing boat dock to dock and some fishermen also repair their boats when docked at the ship dock.

3.2 DESIGN CONCEPT ANALYSIS

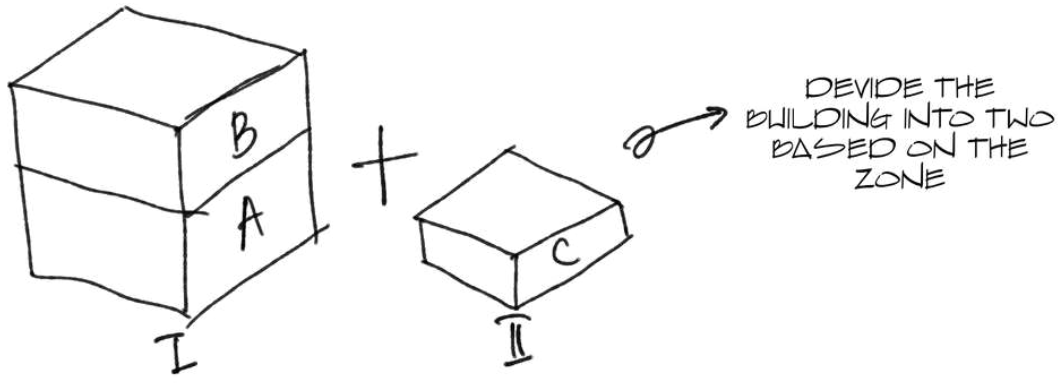
SITE CONTEXT ZONING



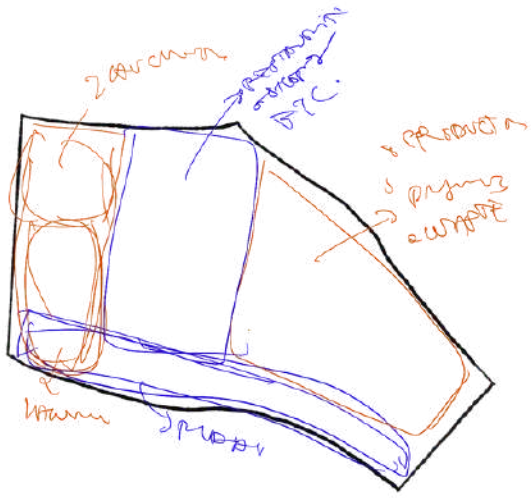
In the flow of fishery activities in the area, it can be divided into several activity zones based on their characteristics, especially smell..

The author divides these activities into three zones, namely: Landing and Auction Zone, Fish Production Zone, and Trade and Culinary Zone. In each activity flow, there are very close and non-close relationships, but they are still connected.

After determining the zone, then the building is divided into two because it considers the zone with a distinctive fish odor and the zone that does not require a fish odor

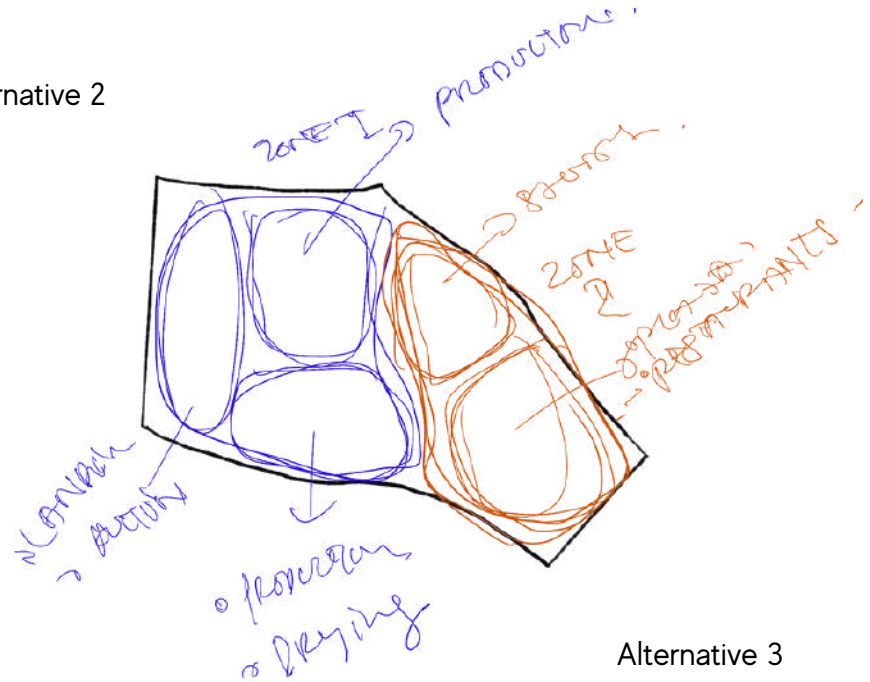


Alternative 1



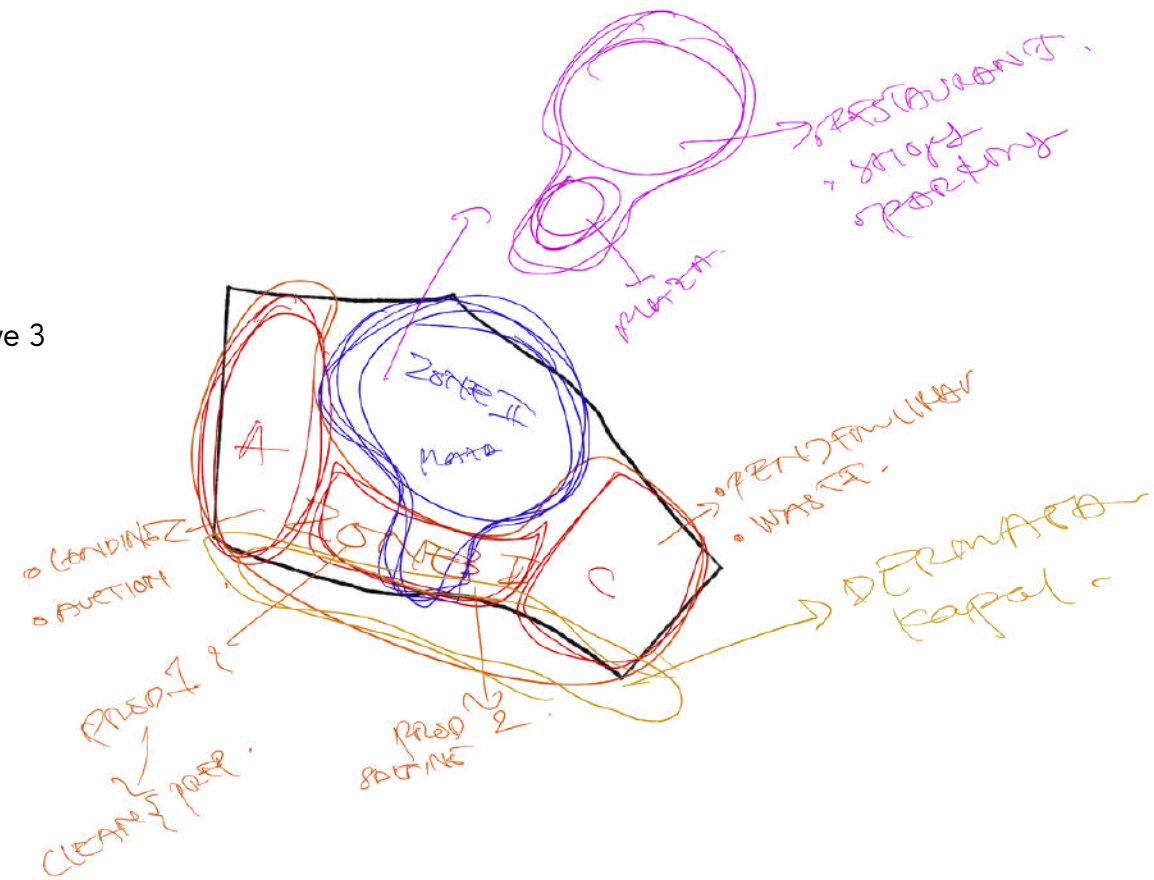
In alternative one, the division of zones follows the flow of activities and the existing placement without changing the conditions at all.

Alternative 2



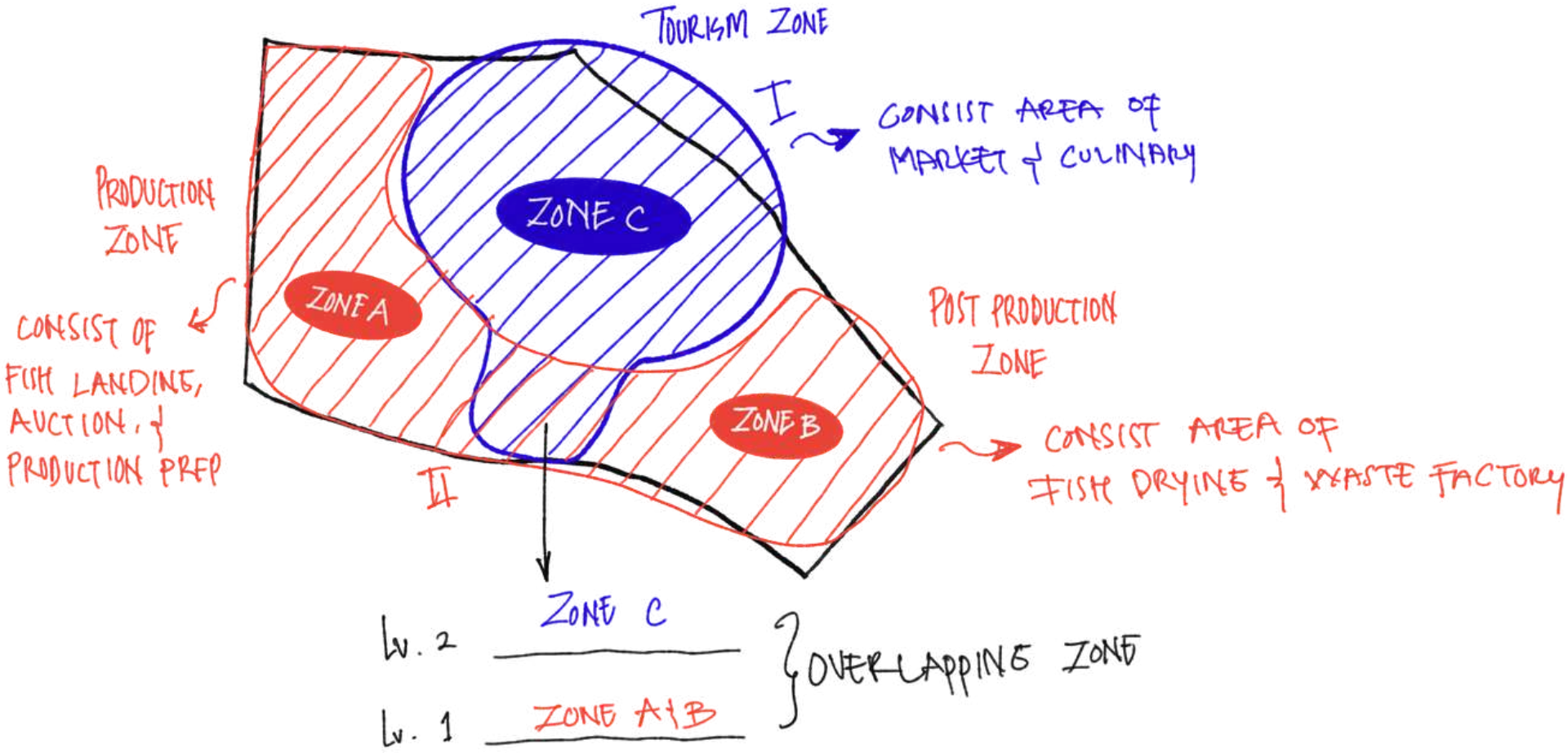
In alternative two, the zoning is divided into two following the description of the activities at the site and the needs of the activities.

Alternative 3



In the third alternative, still maintain the flow of existing conditions but add an activity layer so that it does not disturb the existing flow while adding new functions.

CONCLUSION



In the distribution of the selected zone is determined from:

- Production zone, which contains fish landing, auction, and salted fish production.
- Post-production zone, containing fish drying and processing of production waste
- Tourist zone, contains markets and restaurants as culinary centers

Of the three zones, according to the existing conditions, they are designed to be interconnected and follow the flow of activities.

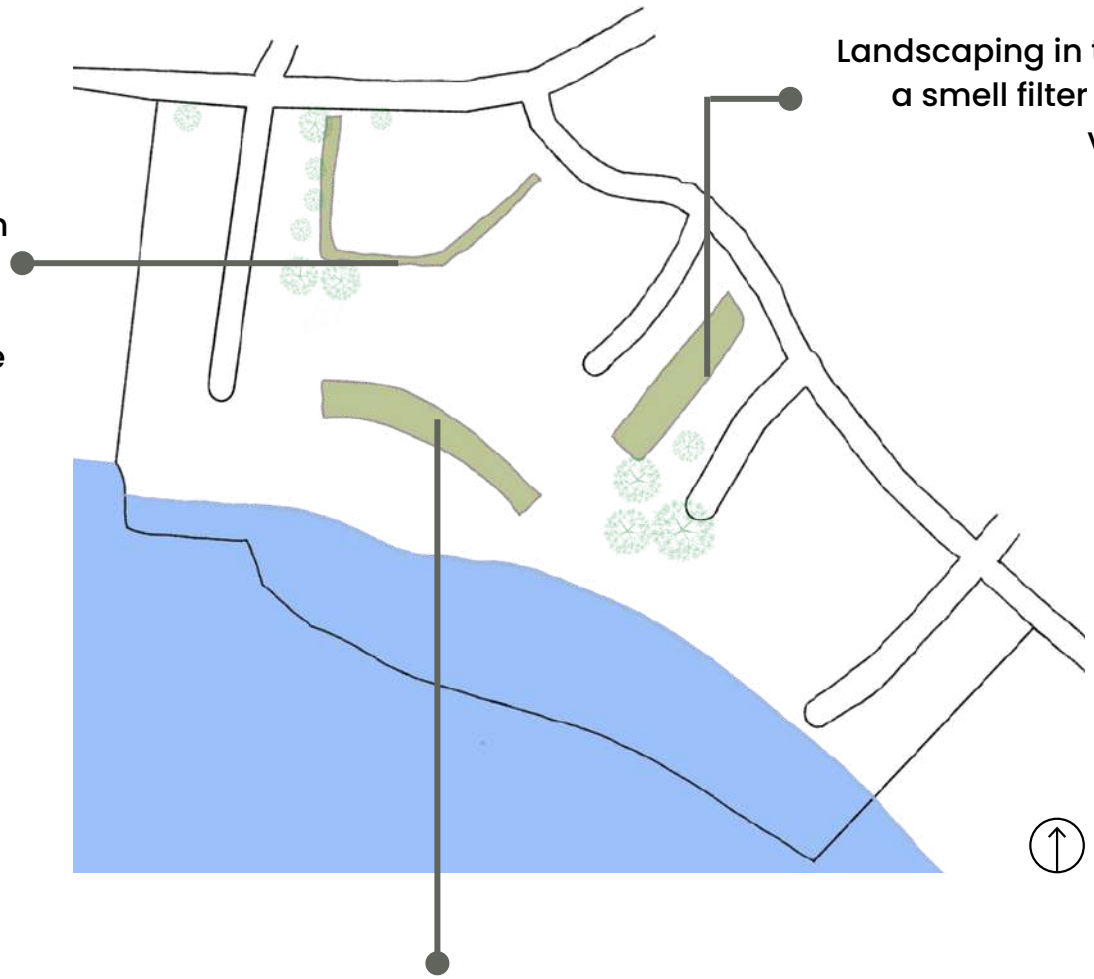
3.2.2 EXPLORATION OF THE CONCEPT OF THE DESIGN THEME

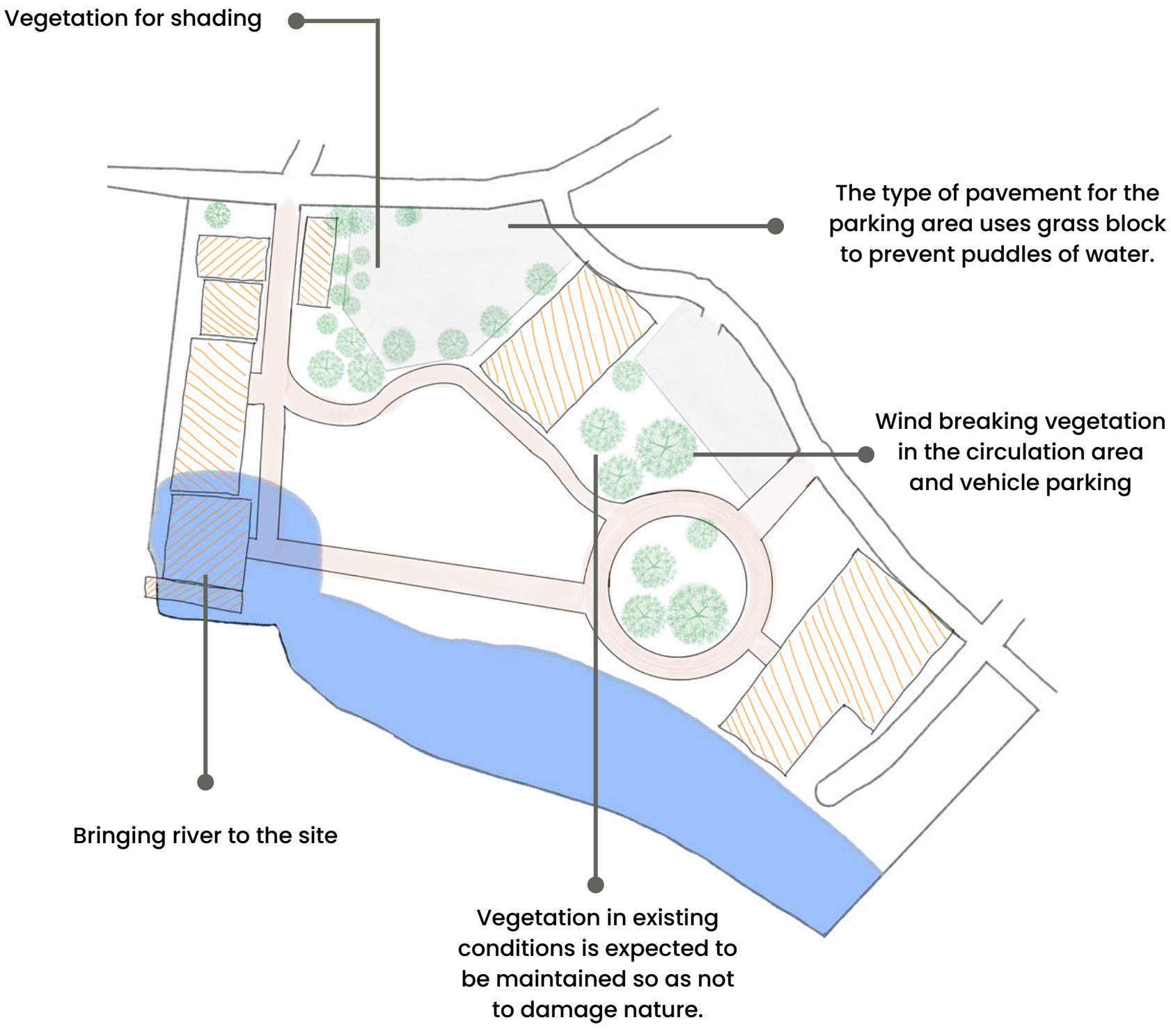
THE CONCEPT OF ECOLOGICAL LANDSCAPE ARRANGEMENT

Ecological landscape is a landscape arrangement that affects the interaction process of living things as well as the distribution of material energy flows with their environment. The basic considerations in ecological landscape arrangement are as follows:

a. Land unit with potential utilization on site

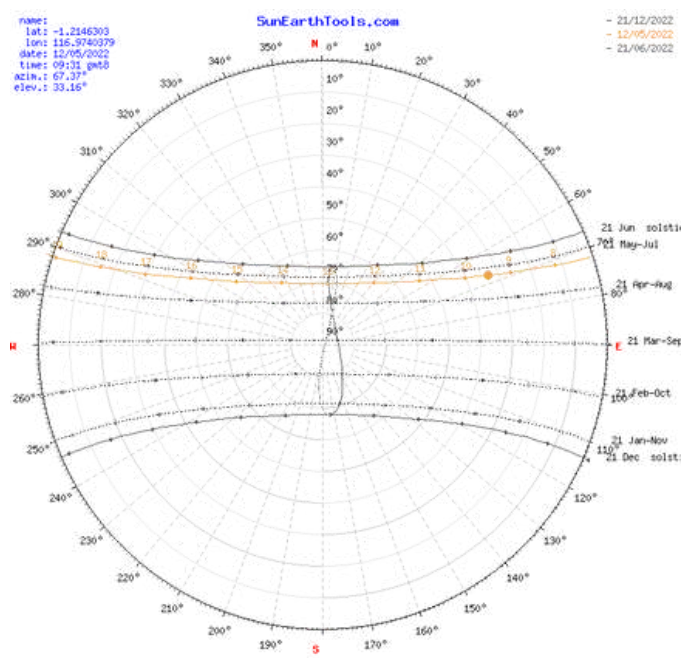
b. Selection of types of hardscape and softscape elements that are useful as climate and visual control




Vegetation for shading
The type of pavement for the parking area uses grass block to prevent puddles of water.
Wind breaking vegetation in the circulation area and vehicle parking
Bringing river to the site
Vegetation in existing conditions is expected to be maintained so as not to damage nature.

THE CONCEPT OF MASS SYSTEM ON THE MOVEMENT OF THE SUN





Picture 1.13 Sun Chart, Source: sunearthtools.com 2022

There are several aspects that become the basis for consideration in designing the building mass system according to the analysis of the sun's movement, including:

- Building Orientation

Determination of the orientation of the building is based on the movement of the sun. This is useful in creating the right building mass system in entering sunlight into the building according to the performance needs of the space in it.

- Spatial

The arrangement of indoor and outdoor spaces must be based on the time of use of the space. This is so that the arrangement can adjust to the needs of sunlight entering the room.

- Opening Position

Openings are placed on the north and south sides to let in sunlight without creating glare or excess light.

- Tree Placement

Placement of trees is placed on the side of the building that is exposed to excessive sunlight, such as the west and east sides

The existing landing and auction buildings are oriented to the south side with the introduction of primary vista.

The existing landing and auction buildings are oriented to the south side with the introduction of primary vista

Keep the existing condiition



Post production buildings on the west and east sides as the use of sunlight

THE CONCEPT OF MASS MANAGEMENT ON THE MOVEMENT OF THE WIND

Analysis of wind movement uses windrose data as a basis for design considerations. The direction of the wind at the design location is from ... equal to ... km/h and from .... equal to ... km/h.

Basic Considerations:

There are several aspects that are the basis for consideration in designing the building mass system according to the analysis of wind movements, including:

a) Wind Speed and Direction

The design of the mass system based on wind analysis must begin by assessing the speed and direction of the wind at the site.

b) Building Orientation

Determination of the orientation of the building is based on the wind direction. This is useful in creating the right mass arrangement of the building in entering the wind into the building according to the performance needs of the space in it.

c) Opening Position

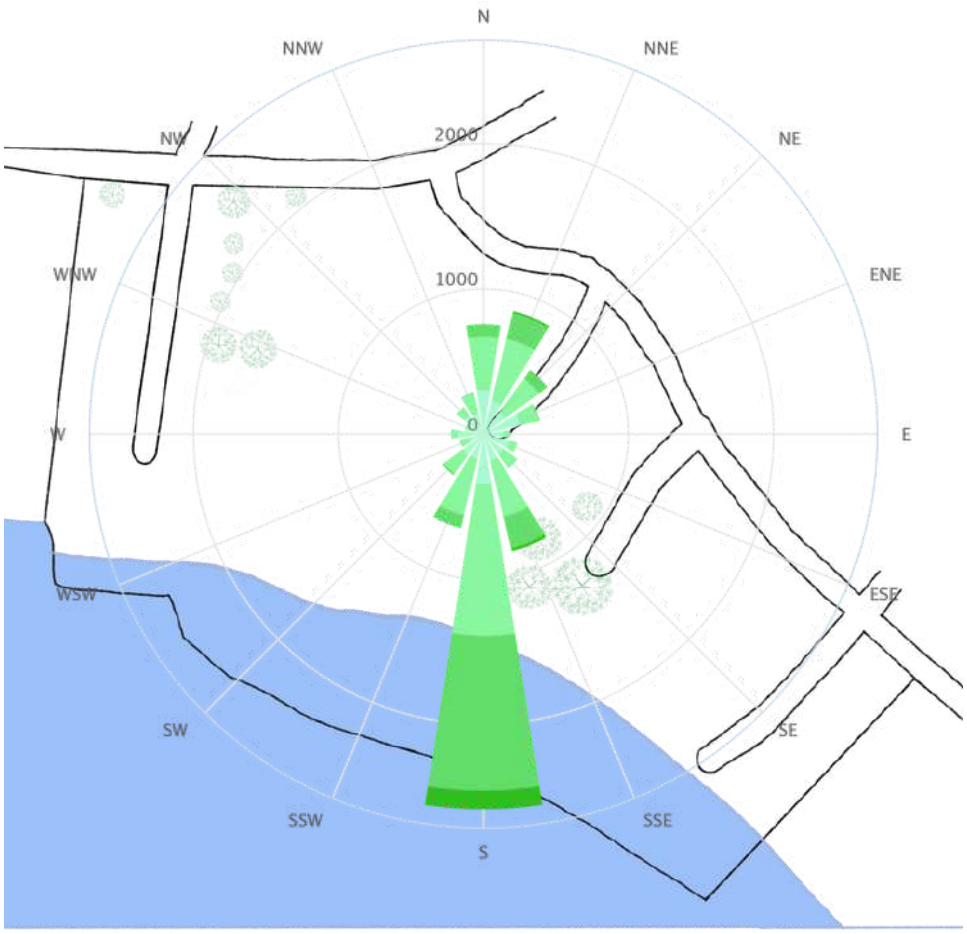
Openings are placed on the side facing the wind, namely southwest and north to create natural ventilation in the space.

d) Open Space

The function of open space in this case is in the form of a wind tunnel or a wind breaker area. Wind tunnels with the provision of vegetation are useful for directing the wind to areas or spaces that require natural ventilation. Wind breaker areas are wind-breaking vegetation such as cypress and cypress trees which function to break or break the wind direction to several sides.

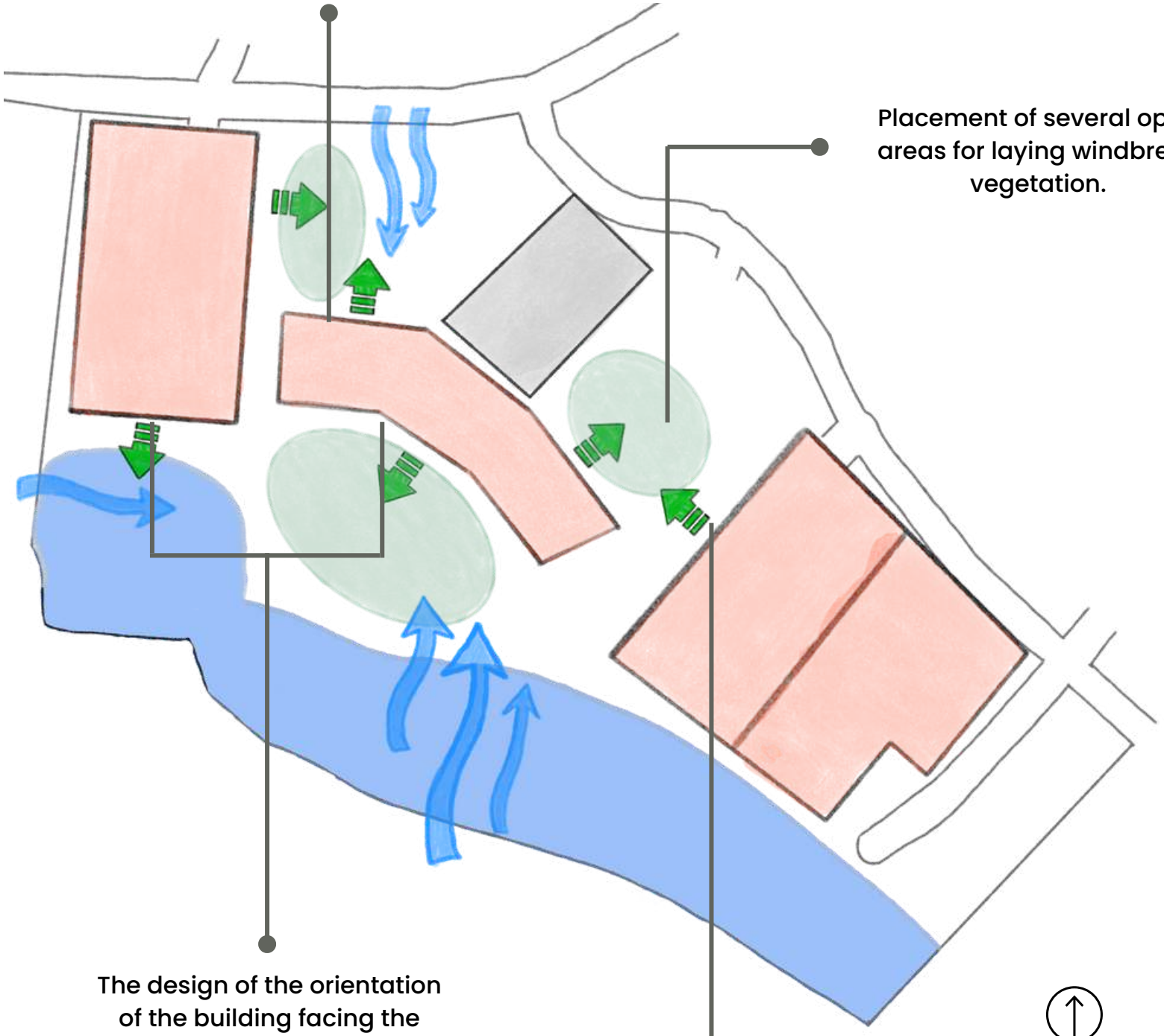
e) Odor Control

Pay attention to the function of certain spaces that require wind control so that they do not interfere with activities in them



Picture 1.13 Wind Rose, Source: meteoblue.com 2022

In this area able to catch the wind from the north



Placement of several open areas for laying windbreak vegetation.

The design of the orientation of the building facing the direction of the wind is south.

In post production buildings, minimizing air movement so as not to carry odors towards activities that do not require odors.

3.2.3 EXPLORATION OF THE CONCEPT OF BUILDING FUNCTIONS

PROGRAM

Based on its location in a tourist area, making the location has a relationship between local and tourists. This is found because of the potential of the sea, namely in the fisheries sector and one of its natural ways is the culture of the community to consume marine products. These products can be seen from the dynamics of the culinary sector activities that occur every day, where there are many street vendors along the area which are crowded with both local people and tourists. This shows that the fisheries sector and culinary culture are the two main potentials that can be developed through the combination of the functions of commercial and production buildings with recreation.

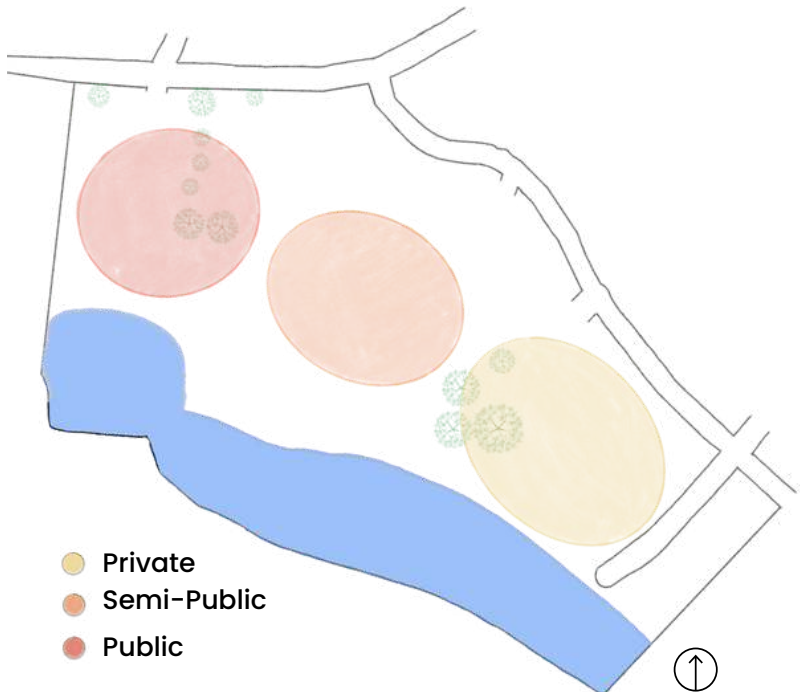
Referring to the program, there are several functions in the area which are divided into several zoning where it is useful to facilitate access and activities of each user. The zoning in the design is divided into three, namely public, semi-public, and private zones. There are several aspects that become the basis for consideration in designing mass planning according to zoning analysis, including:

a. Clear separation of each zone so that all activities in the area can run smoothly and under control.

b. The concept of zoning arrangement uses the concept of continuity of circulation where circulation for the public will be designed dynamically. This is useful so that the entire site can be explored by all visitors.

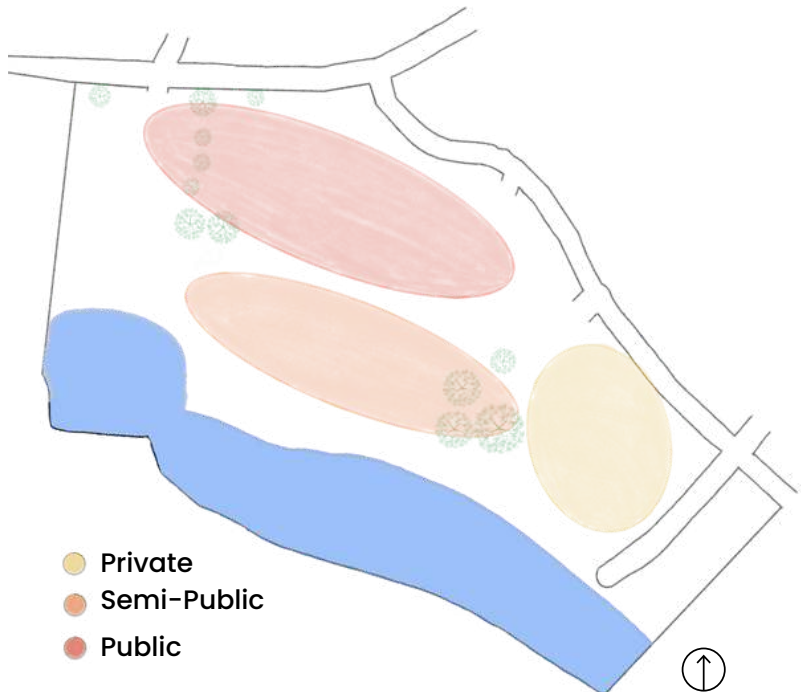
Several alternatives in the arrangement of masses according to zoning are as follows:

Alternative 1



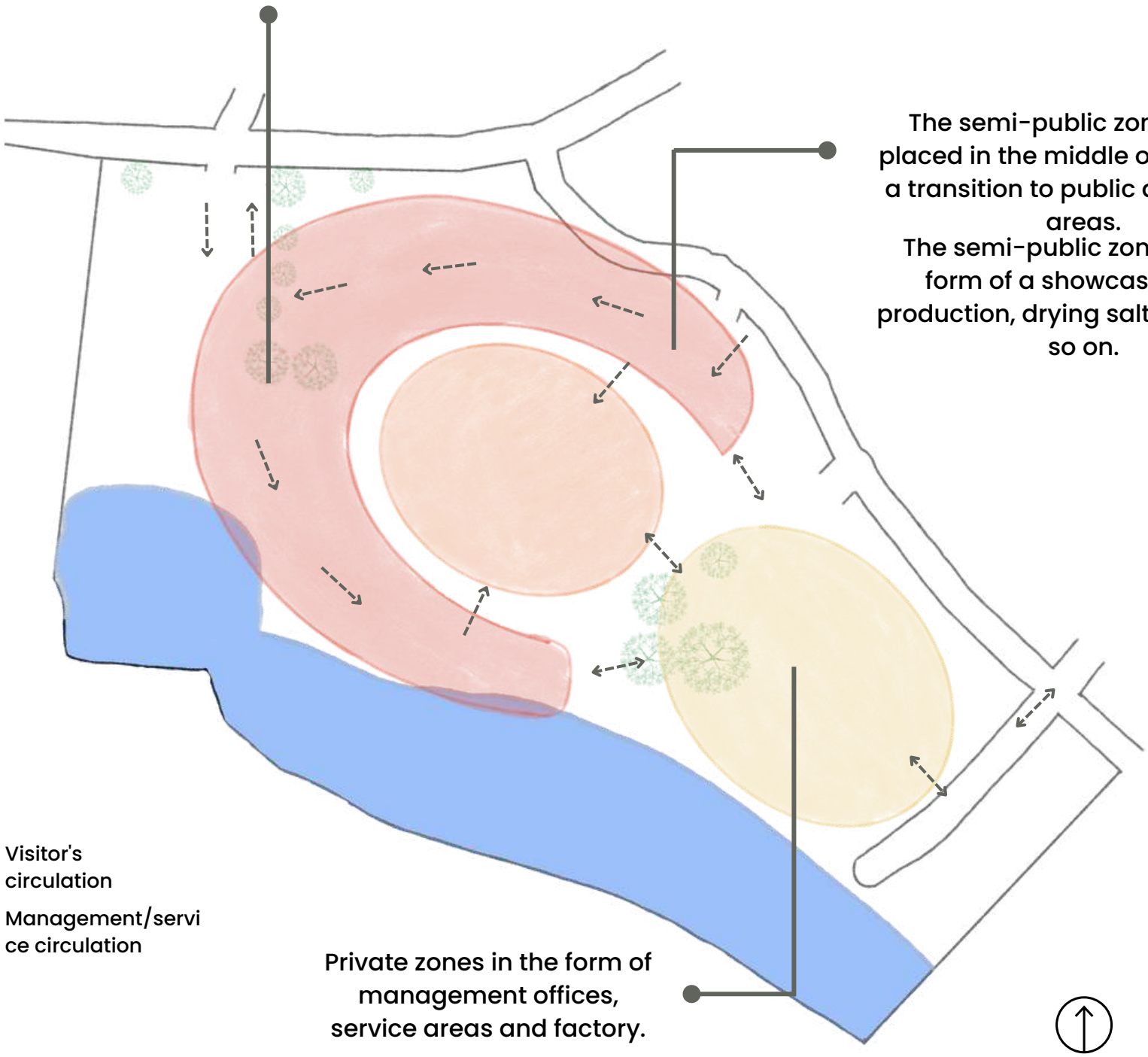
Excess :
Lack :

Alternative 2



Excess :
Lack :

The public zone is placed close to the fish auction place and is a tourist area, food court and others.



The semi-public zone area is placed in the middle of the site as a transition to public and private areas.

The semi-public zone is in the form of a showcase of fish production, drying salted fish, and so on.

Visitor's circulation

Management/service circulation

Private zones in the form of management offices, service areas and factory.

Access to private zone circulation is more limited, making it easier for users.

USER FLOW AND CIRCULATION

According to the analysis results of the previous research on fishing activities, there is a division of circulation activities in the design of the fish market. In the flow and dissemination of fish processing, it is divided into two categories: fish market and production, which are divided into six circuits:

1. Fisherman
2. Traders
3. Production
4. Manager
5. Fish
6. Visitors

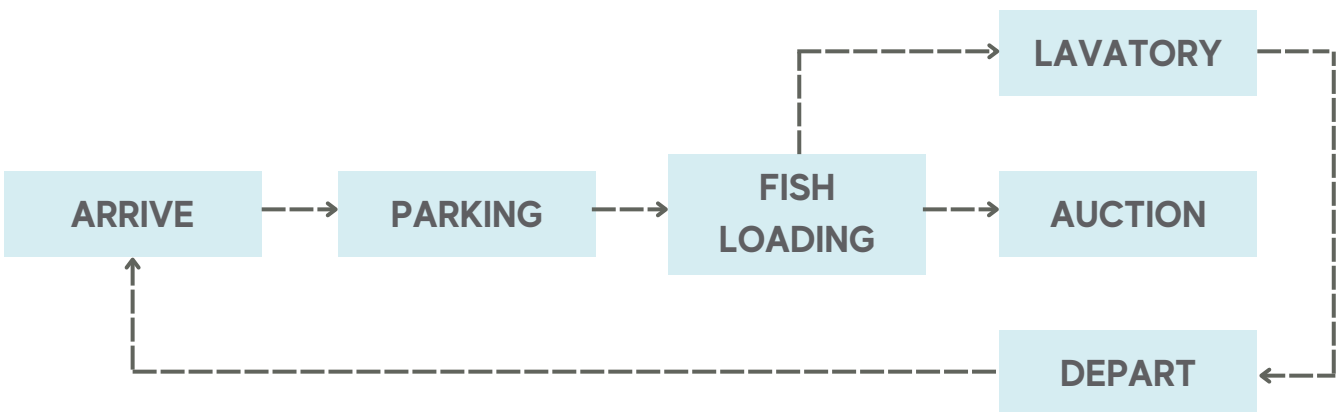
The six participants in this activity need a circulatory system that is fluid (distance) and flexible (adjusting their respective activities), which should be fluid and flexible, namely:

1. Separate the traffic routes of fishermen, managers, buyers and tourists so that they are free of obstructions, pushing and
   cutting movements.
2. Speed up the movement and removal of fish to maintain hygienic conditions.
3. Every activity is guaranteed, especially the fish activity assigned by the manager.
4. Create an effective and efficient space for the activities of fishery and tourists so as not to interfere with the processing
   activities of fish and vice versa.

Considering that the proposed design building, the users of the building are:

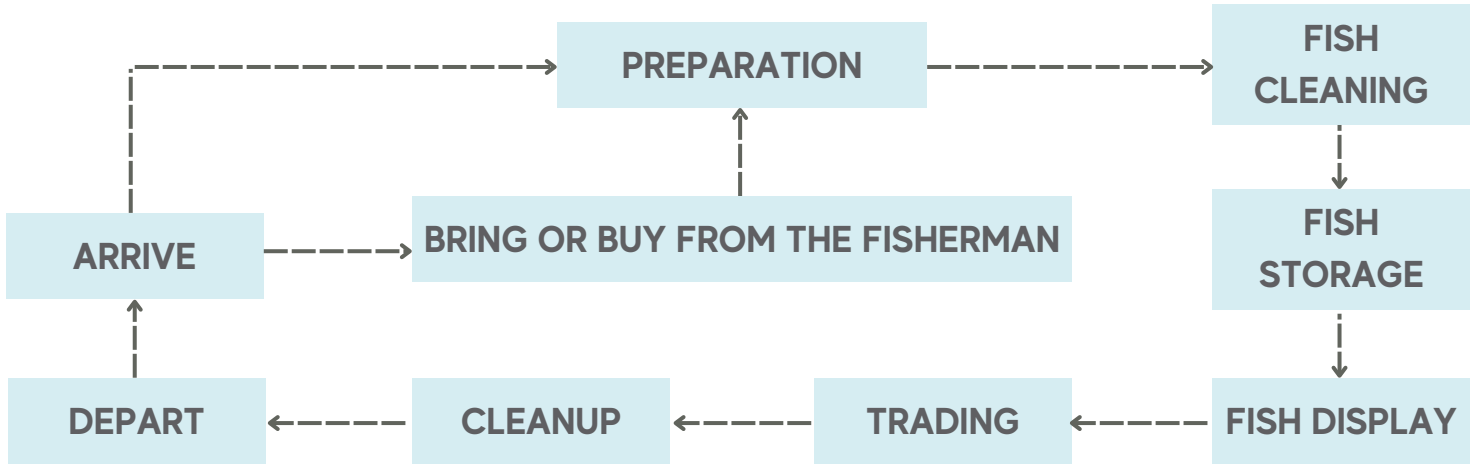
Fisherman

Move fish easily. Freedom of movement when unloading. Falling fish indoor one-way circulation. Safety and smoothness are guaranteed on the way to the auction site. Circuits must be separated for smooth operation. Fish delivery vehicles must be parked close to TPI for post-auction handling.



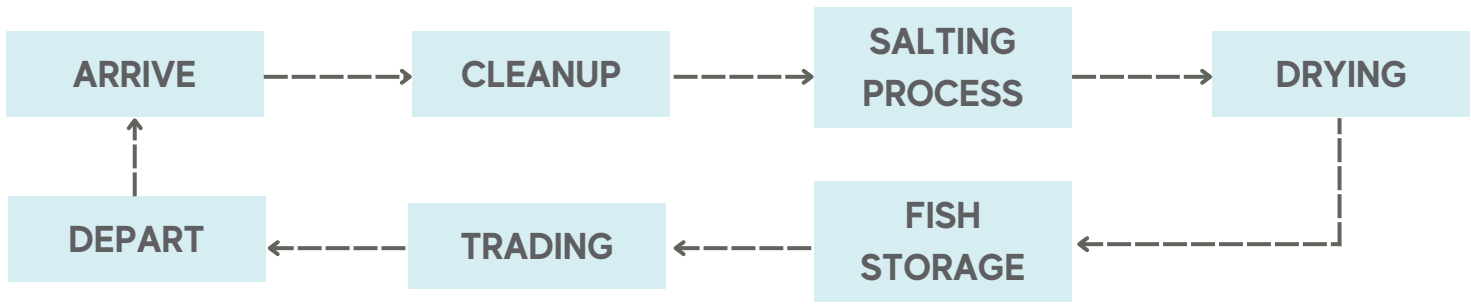
Traders

There is a differentiated circulation to the fish shop and a circulation linked to the auction, production and recreation areas



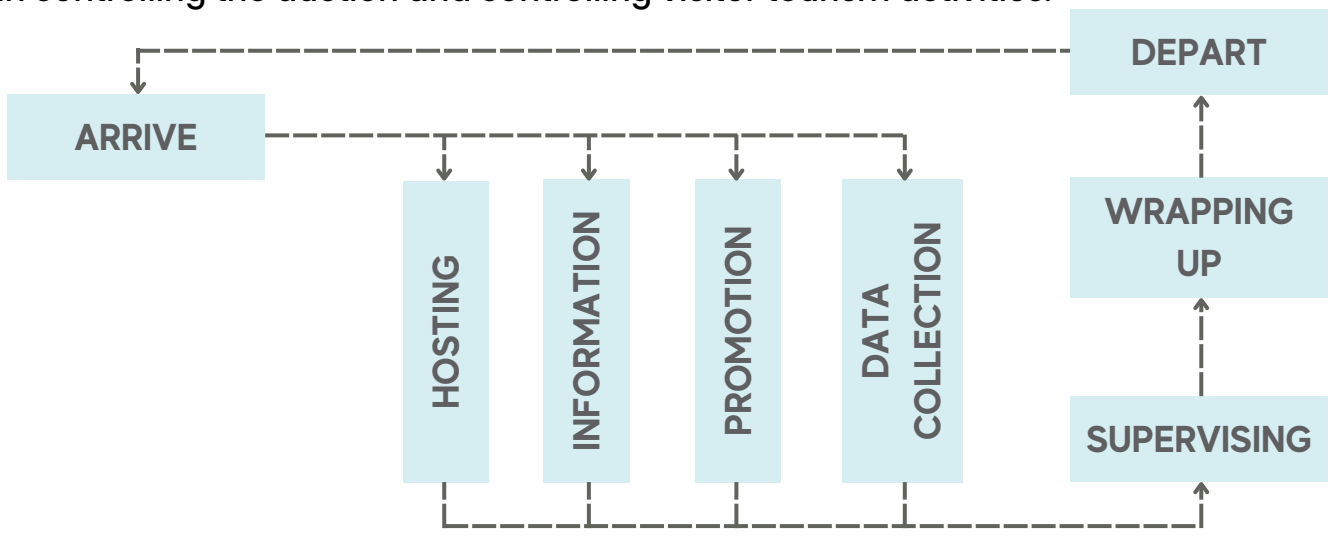
Production

Salted fish production has a different circulation and is linked to the auction.



Management

Can supervise all activities within the TPI. Can effortlessly perform administrative activities. smooth movement in controlling the auction and controlling visitor tourism activities.



Fish

Proximity between ships, docks and loading and unloading rooms and avoid sun exposure. The loading and unloading process up to the distribution process (loading dock)



Visitor

A strict zone of distinction to separate production activities from tourism activities. The flow and circulation activities related to service activities must be outside the activity zone related to fish production and the space that is directly related to the movement of fish circulation.



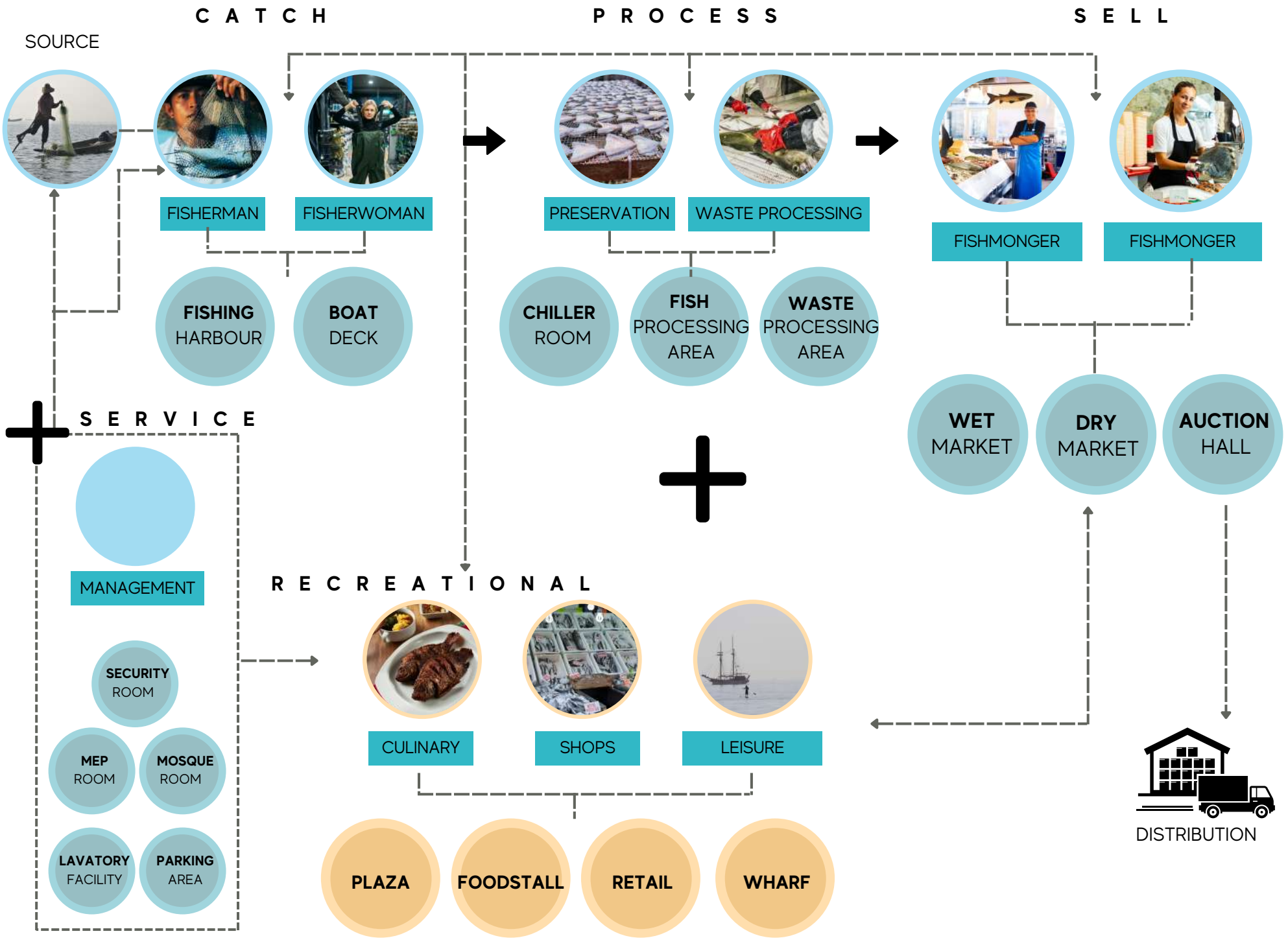
SPACE REQUIREMENT

In the design of the Manggar Fish Processing Center and Market, some of the space requirements and their quality are as follows:

Activity	Space Requirements	Zone	Quality				
			Access	PC	View	Sunlight	Ambience
Fish Market and Auction	Landing Dock	Semi Public	o	o	o		
	Admin Room	Private	o	o		o	
	Fisherman Transit Room	Semi Public		o	o	o	
	Fish Quarantine Room	Semi Public					
	Sorting and Weighing Room	Semi Public	o				o
	Display Room	Semi Public	o	o			o
	Lobby	Private	o	o			
	Cashier	Semi Public	o	o	o		
	Packing Room	Semi Public	o	o	o		
	Cold Storage	Semi Public	o	o			
	Loading Dock	Semi Public	o	o			
	Market Hall	Private	o	o			
	Meeting Room	Semi Public		o			
	Supervision Room	Private		o			
	Parking platform	Public	o	o			
Comercial Management	Administration Room	Private		o			
	Management	Private		o			
	Locker Room	Private		o			
	Lobby	Semi Public		o			
Recreational	Foodcourt	Public	o	o	o	o	o
	Outdoor Area	Public	o	o	o	o	o
	Observation Spot	Public	o	o	o	o	o
	Foodstall	Public	o	o	o	o	o
	Retailer Locker	Private		o			
	Plaza	Public	o		o	o	o
Service	Security	Service					
	MEP Room	Service	o				
	Mushola	Service	o		o	o	
	Lavatory	Service	o			o	
	Parking	Service				o	
Production	Admin Room	Private		o			
	Fish Transit Room	Private		o			
	Sorting Room	Private		o			
	Preparation Room	Private		o			
	Drying	Semi Public	o	o			
	Storage	Private				o	
	Packing Room	Semi Public	o				
	Supervision Room	Private		o			

SPACE ORGANIZATION

The following is the spatial organization of the Manggar Fish Processing Center and Market

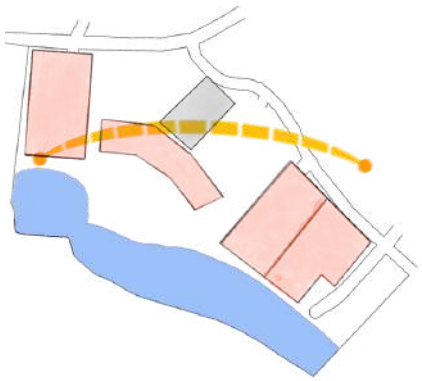


THE BASICS OF MASS PLOTTING CONSIDERATIONS

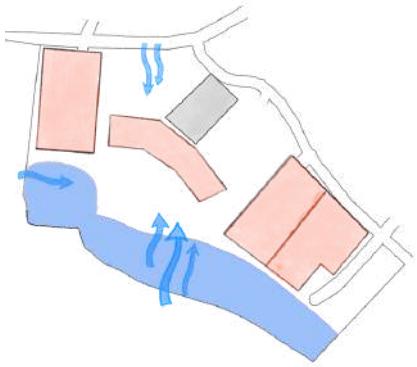
There are several aspects that become the basis for consideration in designing the Manggar Fish Processing Center and Market.
Aspects of these considerations are based on the selected ecological architecture variables, including:

1 Response to climate

The basis of consideration for this variable is in determining the orientation of the building according to the direction of the wind and sun.



Reducing mass composition facing east or west, except for salted fish drying places.



The opening faces the direction of the wind coming from the north and south.

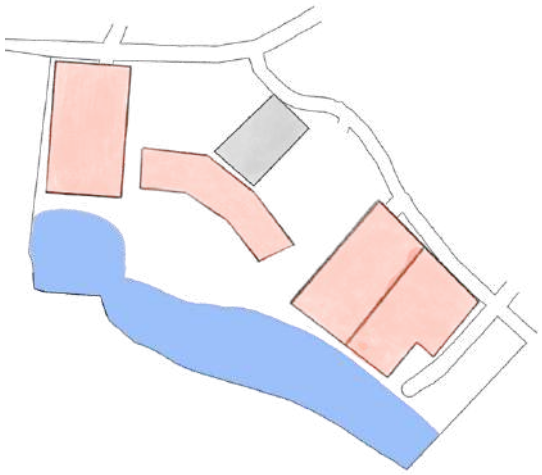
2. Green Base Area

The basis of consideration for this variable is procurement
green area around the building to create 40% KDH.



3. Energy Saving

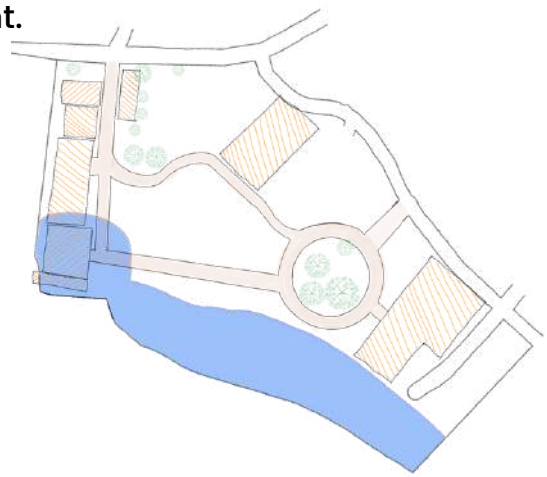
The basis of consideration for this variable is the arrangement of a diffuse mass. This is useful so that each mass can catch the wind so that it is able to apply natural ventilation to the space.



The arrangement of the scattered mass is also useful for proper zoning configuration on the site because the circulation between zoning is easier to regulate. In addition, visitors can also explore the site more if the mass arrangement is spread out.

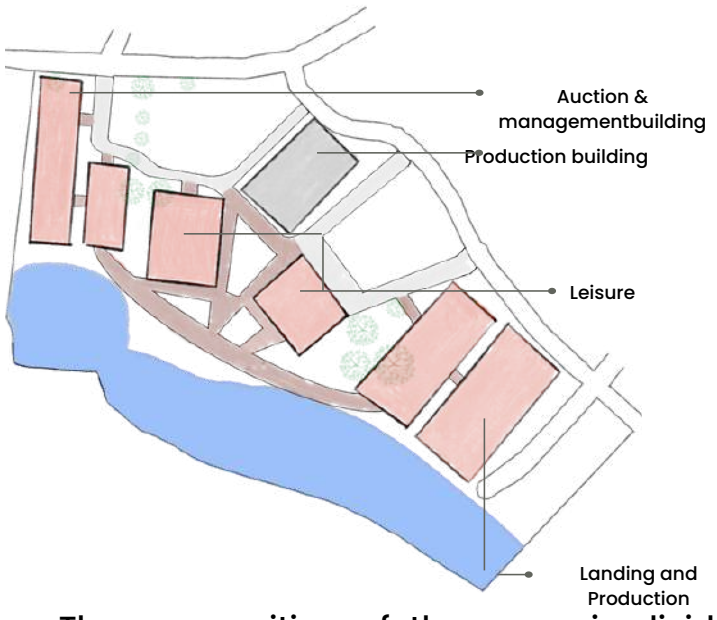
4.Ecological Local Material

The basis of consideration for this variable is the selection of building and pavement material in circulation that is able to create an ecological environment.



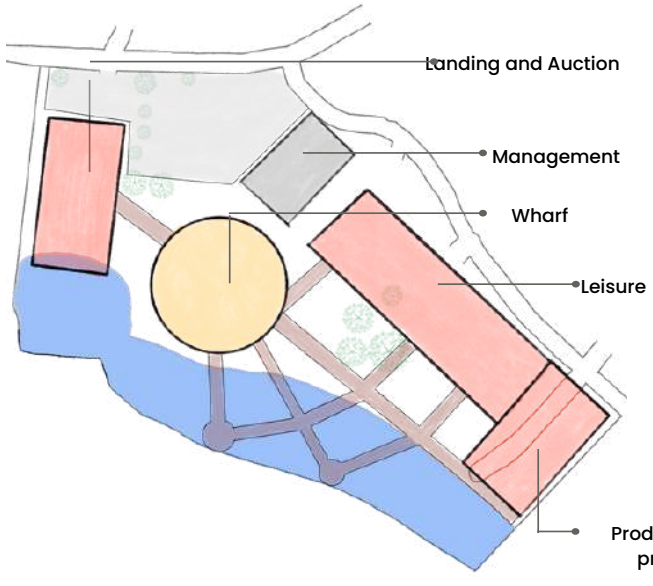
MASS COMPOSITION ALTERNATIVES

Alternative 1



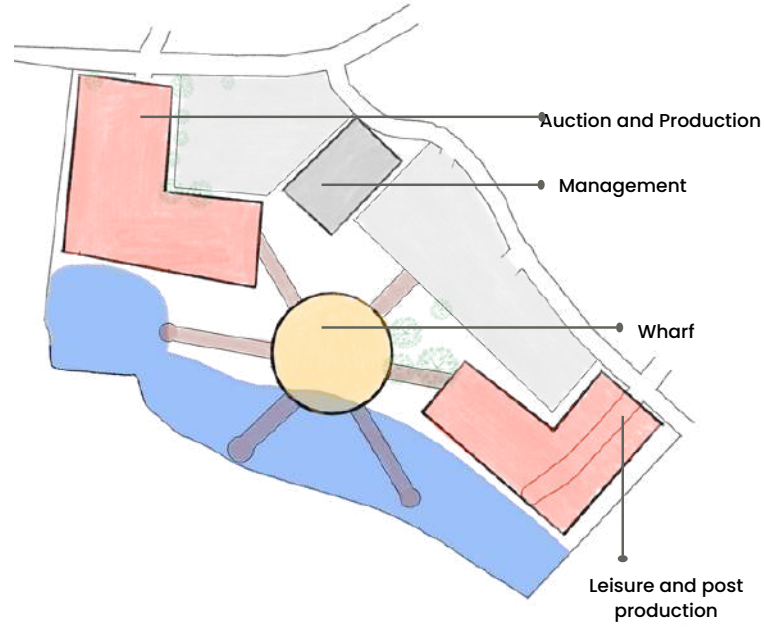
The composition of the mass is divided into several parts to distinguish functions, according to the variety of activities and needs. However, in this case the drawback is that it is less effective.

Alternative 2



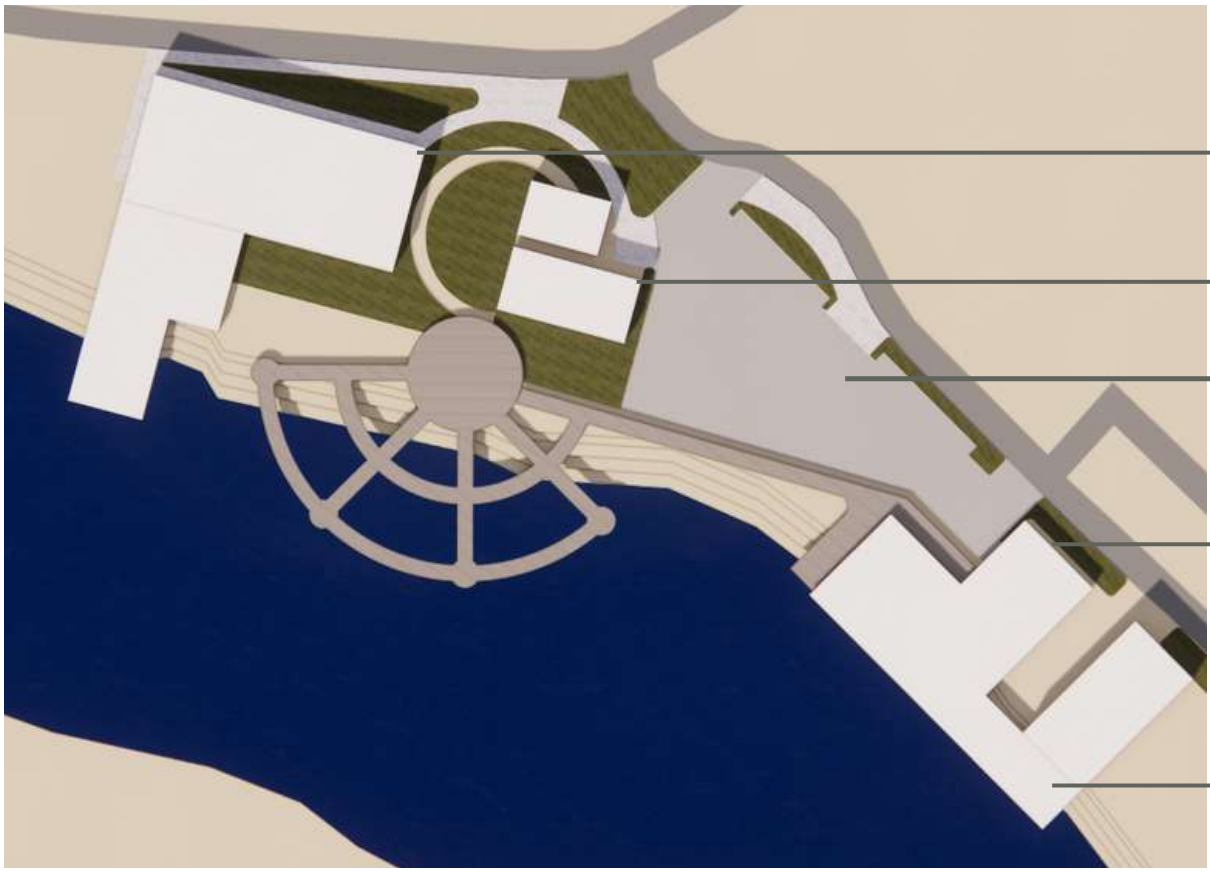
The composition of the mass began to be reduced by combining several functions and paying attention to the needs of their activities. However, there needs to be adjustments to some activities and their relation to odors.

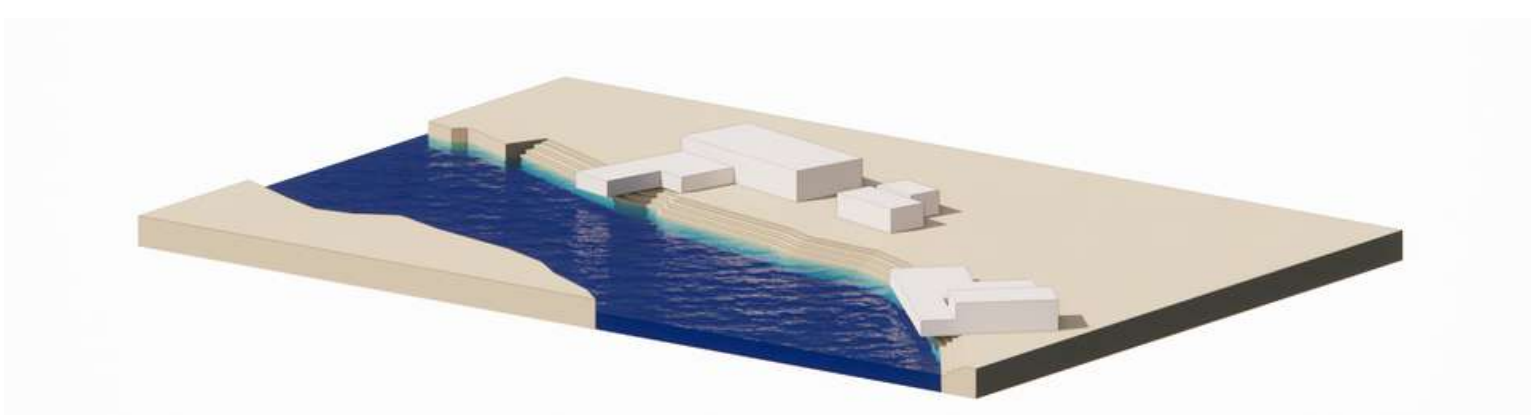
Alternative 3



The composition of the mass is divided but several functions are combined to create effectiveness in the mass. However, it still requires attention regarding the control of the air around the production mass.

Conclusion

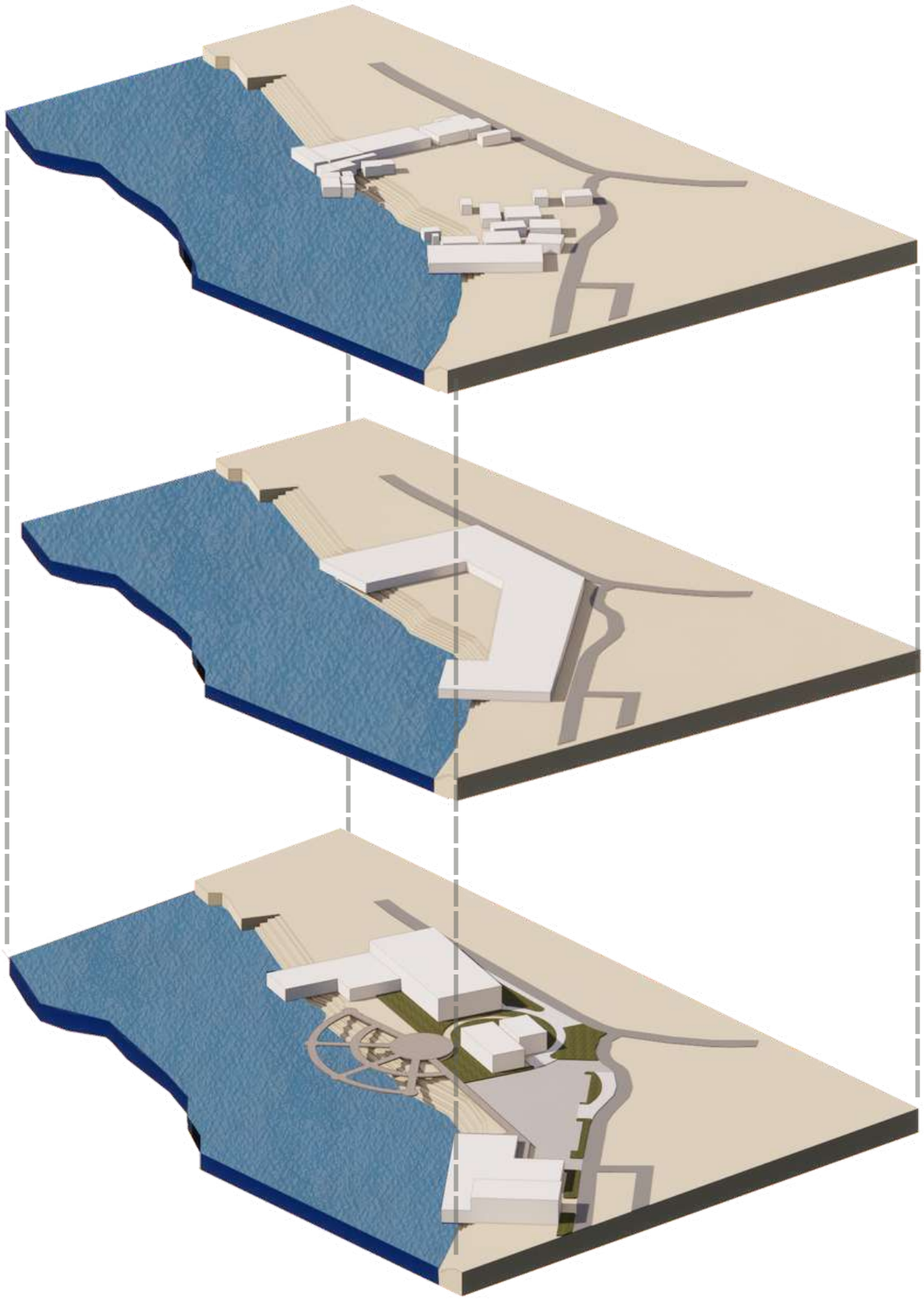




Exploration of mass compositions in this design is processed from a combination of alternatives because it overcomes the architectural issues raised by the author, where the issue focuses on activities and their effects on the environment overcome by an ecological approach..

The building mass is divided by production and recreation zones to distinguish the two circulations of activity and to avoid fishy odors that disturb the recreation zone. As for the separation of several buildings based on their function and integration with other buildings

3.3 FIGURATIVE DESIGN

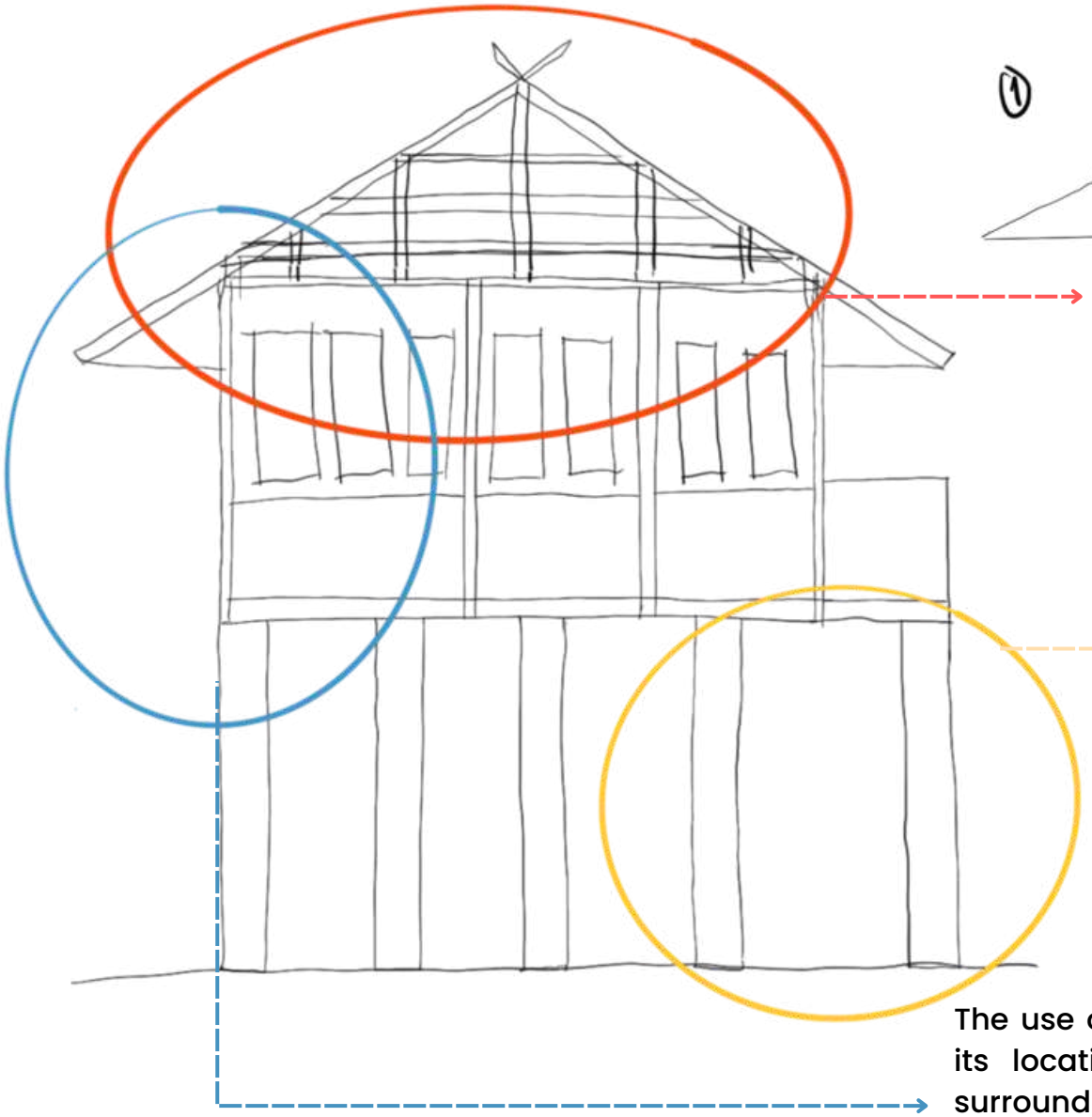


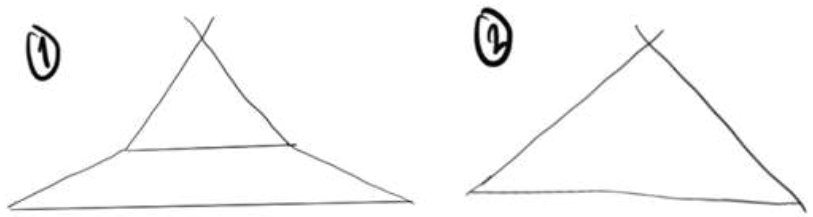
In the existing condition, there are various separate production buildings with the same function. In this case the integration and effectiveness of fishery activities need to be improved.

In the composition of this building following the form of the site, create places and introduce the primary vista.

Rational programming takes into account the characteristics of the program. Arrangement of facilities that consider production management in accordance with program content. Experience the natural space outside, set in harmony with nature.

THE IDEA OF BUILDING SHAPES AND ROOFS



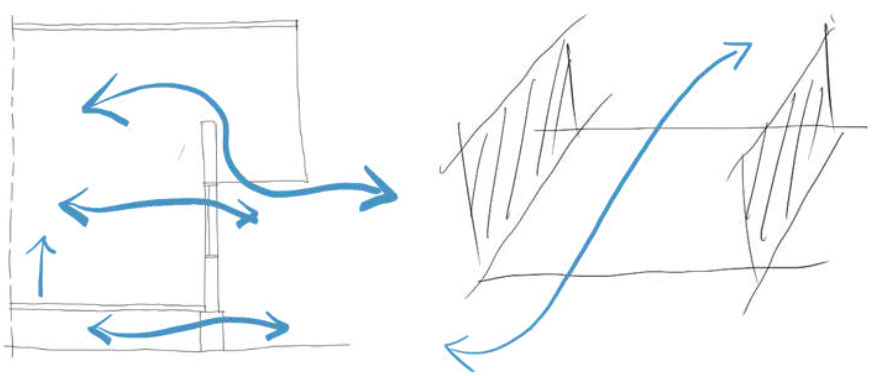


The basic shape of the roof is a triangle which was taken based on the modification of the roof of the Bugis fisherman's house and the surrounding buildings using tile material.



The existence under the house is also applied in the design as a facade and circulation space.

The use of the stage form in the building because of its location in the tidal zone, so learn from the surrounding buildings by using suitable materials



The shape of the leader and the selection of wood materials in buildings, especially floors, are able to condition air circulation and maintain humidity in the surrounding air. Air moves through under and into the gaps in the wooden floor and into the room, and by controlling the movement of air that carries odors.

The basic shape of the space in the building is a square, which is built with a rectangular stilt house building typology.. With the shape and openings in the building that are directed it allows to control odors through the air in the room

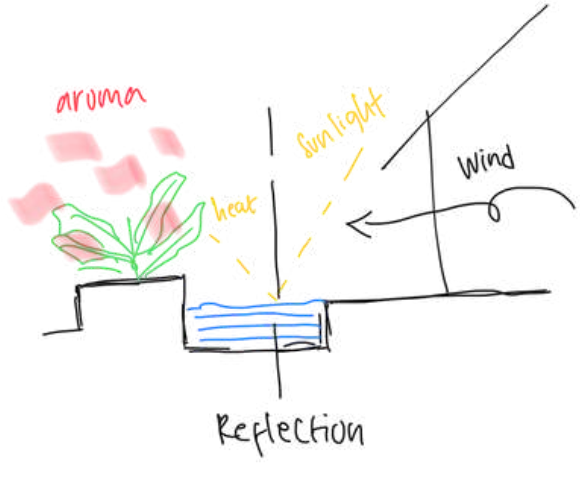
THE IDEA OF ODOR CONTROL

1. Landscape near water



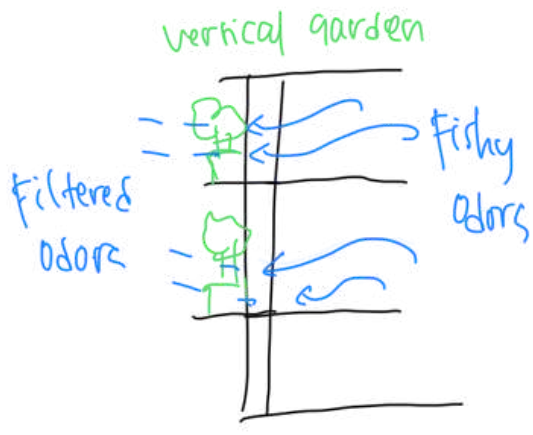
In the landscape around water, using mangrove and pandanus odorifer which works as a breakwater, prevents erosion and abrasion, and smells good so that it not only overcomes the wind that carries odors but also maintains the soil structure at the design location.

2. Landscape near building



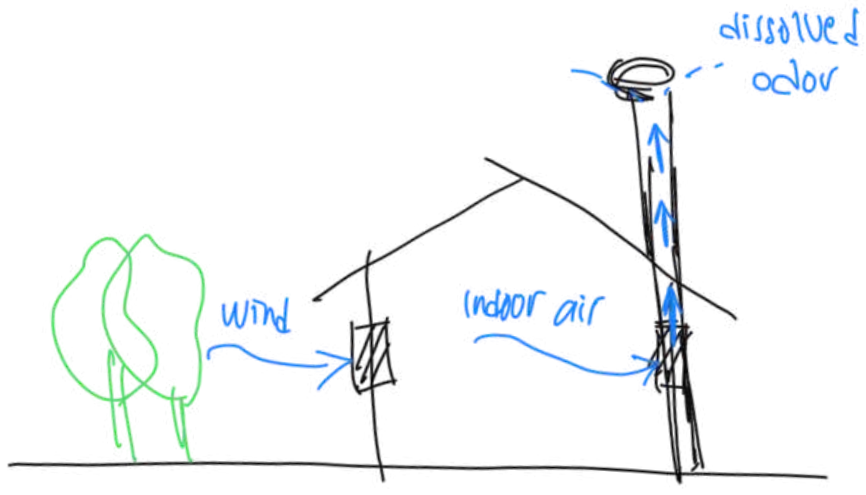
In the area around the building, follow the scentscape method in the Alhambra Palace landscape as an effort to neutralize odors around the building area.

3. Building system - facade



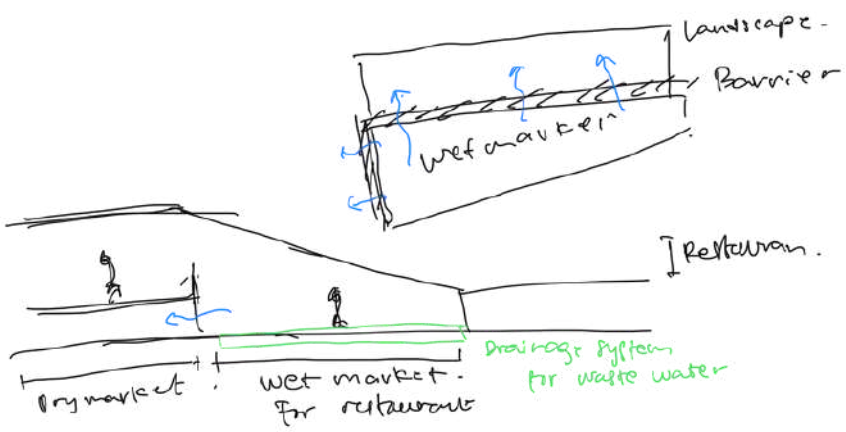
On the facade of the fish processing building, responding to the smell of fish being dried, vertical plants are made on the facade as an odor filter so that the odor carried by the wind is reduced..

4. Building systemm - indoor air circulation



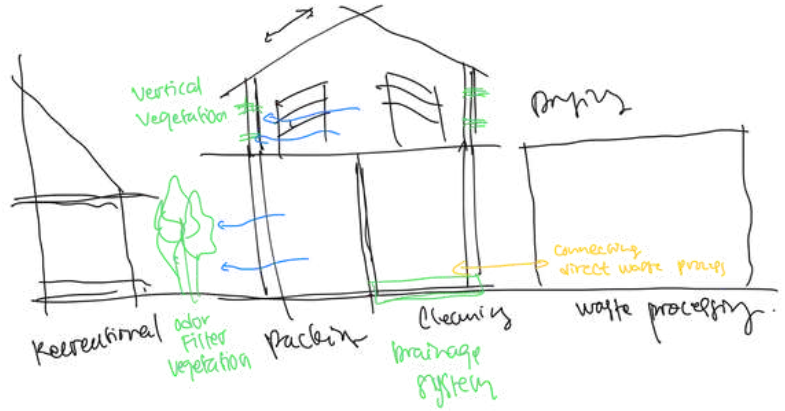
Meanwhile, in the waste processing building, the odor produced is minimal because the final product is in the form of powder, so a tower is made that responds to air circulation in the building.

5. Building system - waste management



In order to reduce odors in the fish market, implement a hygienic fish market. Not only based on the distribution of circulation and elevation, implementing reusable wastewater treatment..

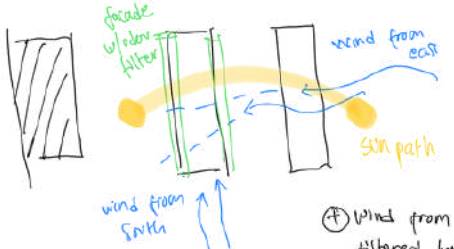
2. Landscape near building



The production building is directly connected to the waste treatment so that it does not spread odors and is more efficient in the processing flow. Of course, the waste water produced will also be recycled for reuse.

PRODUCTION BUILDING ORIENTATION

Alternative 1



⊖ the wind from south will be directly goes to north area

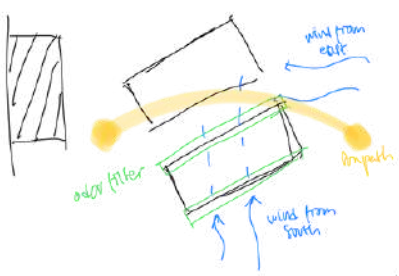
⊖ The production building only cover by the leisure building

⊕ Wind from east will be filtered by the waste building & the processing facade

⊕ The maximum use of sunlight.

⊕ The accessibility of production

Alternative 2

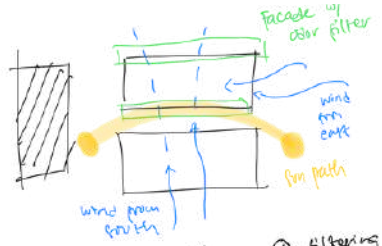


⊖ The organization of space needs to develop due to the site condition

⊖ the minimum amount of sun light for drying

⊕ The reduce of odor are maximum

Alternative 3



⊖ The wind from east goes directly to leisure area

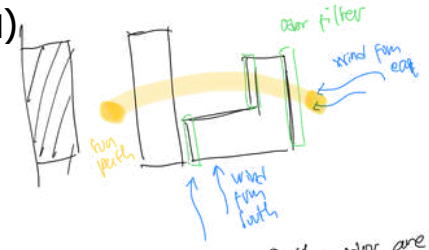
⊖ Minimum sun light for drying

⊖ The flow of production is lack due to the location of wharf and processing

⊕ filtering the wind from south

⊕ The leisure area can have visitor to the production area

Alternative 4 (Seleceted)



⊖ The maximum sunlight only for some areen

⊕ the odor are well filtered and not goes directly to leisure

⊕ The flow of production could efficient

⊕ The east side can get direct sunli



04 FINAL DESIGN

Design Description

FINAL DESIGN

4.1 Design Specifications
4.2 Design Result

4. 1 DESIGN SPECIFICATIONS

4.1.1 PROPERTY SIZE

The design of this Manggar Fish Processing Center and Market has a total area of 12,457 m² of site where there are 11 masses whose functions consist of a processing area, fisherman pod, fish market, eatery place and facility, There is a circulation in the form of pedestrians for access between the masses of the building and the corner of the read. Areas other than such buildings and circulations are used for green base areas. It is intended that the design of this Manggar Fish Processing Center and Market meets building regulatory standards and achieves benchmarks for the variable green base area. The presentation of the total area to comply with local building regulations is as follows:

		Percentage
TOTAL SITE AREA : 12,457 M^2	**BC (60%) : 2.456**	**32%**
	FAR (2.00): 24,914 M	**4.461 M/0.36%**
	GCR (>10%) : 1,325.5	**13.2%**

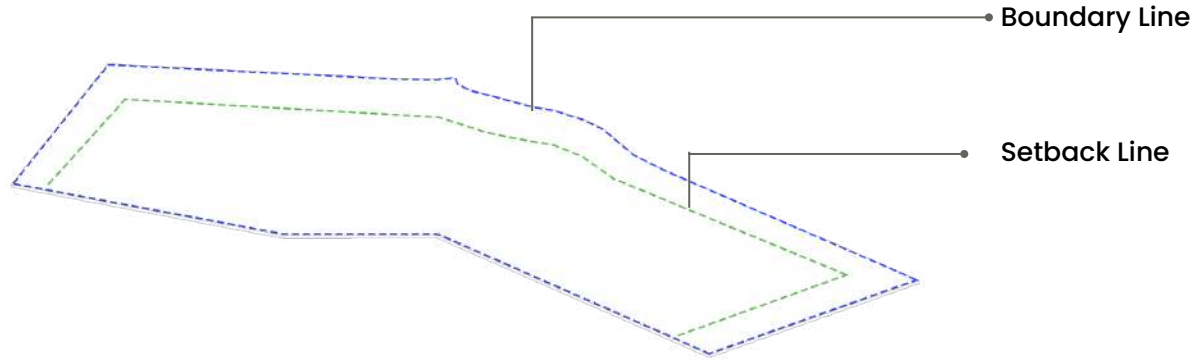
Following the building codes and regulation, the result of site engineering and building calculation is:
a. Maximum Building Coverage Ratio from the codes is 60% or 7,474.2 m² and the building have maximize the use of space which is the building coverage area is 2.456 m²
c. Floor Area Ratio from the site engineering is 2.00. Means the building's height should less than24,914 m. Total building's height is 4,461 m²
d. Minimum Green Coverage Ratio is 10% or 124.57 m². Green are a preserve in the building with no hardening is 13.2% or 1,325.5 m²

PUBLIC	SEMI PRIVATE	CIRCULATION SERVICE AND PARKING
FISH MARKET LOBBY EATERY AND FACIITY PUBLIC DECK JETTY	FISH AUCTION FISH LANDING FISH PROCESSING WASTE PROCESSING	RAMP STAIRS CORRIDORS PARKING

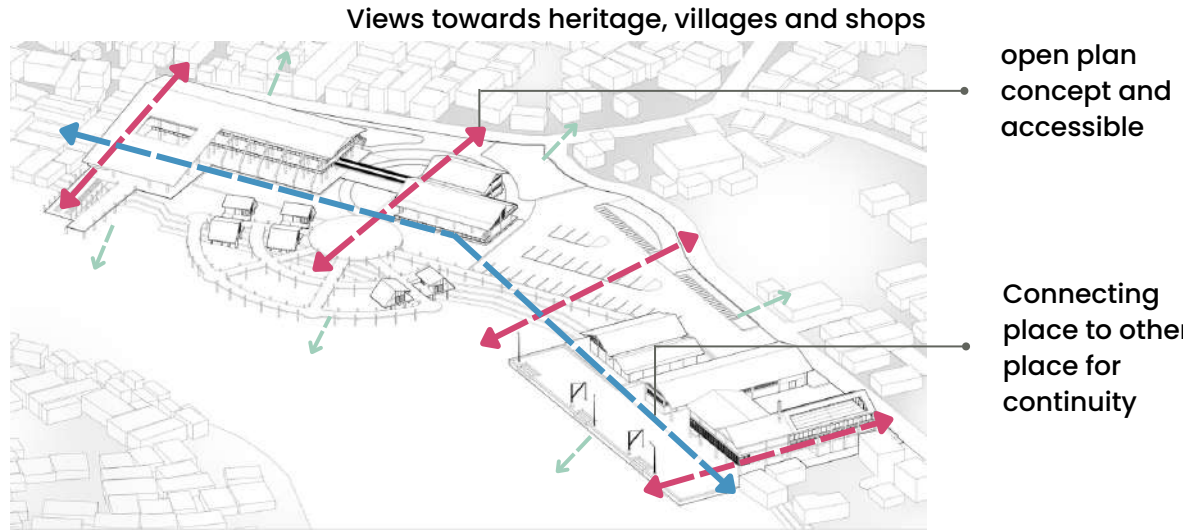
SUPPORT FACILITY
REST ROOM PRAYER ROOM

4.1.2 SPATIAL PROGRAMMING AND ZONING

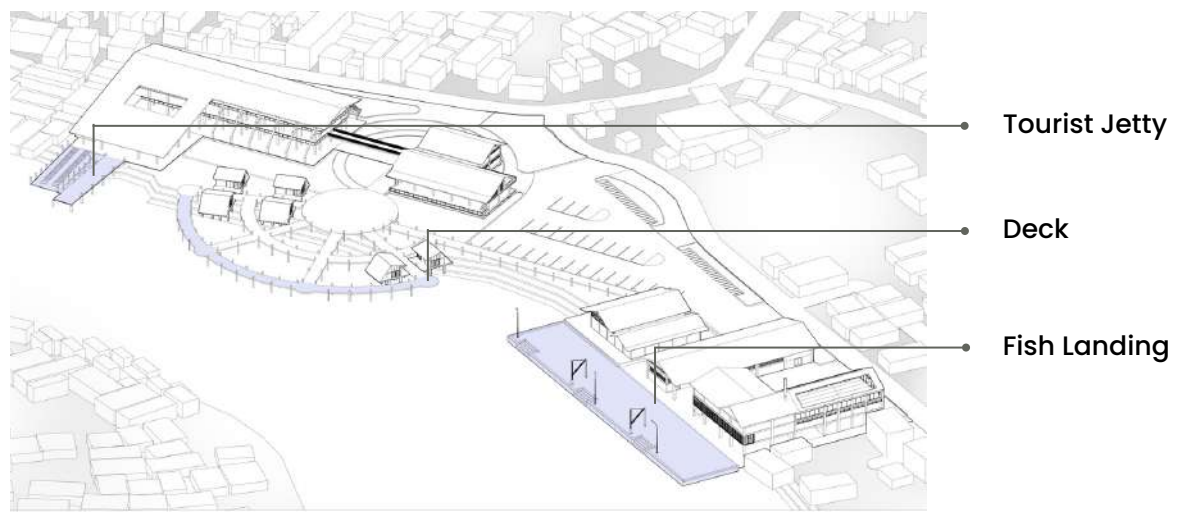
The road boundary is 5 meters and the untangleated river boundary line is less than 3 meters deep is 10 meters.

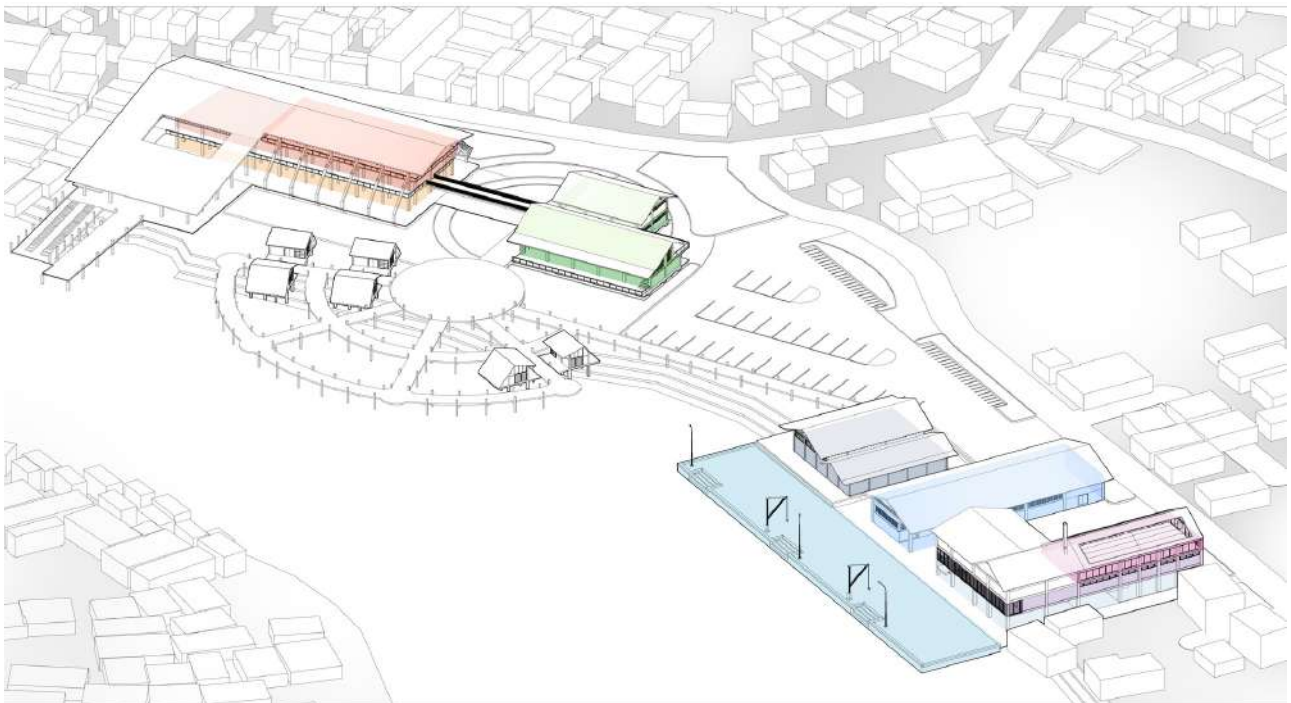


The mass of the buildings is placed based on a grid system linearly following the flow of the river to represent the character of the fishing village as well as provide the same spatial experience.



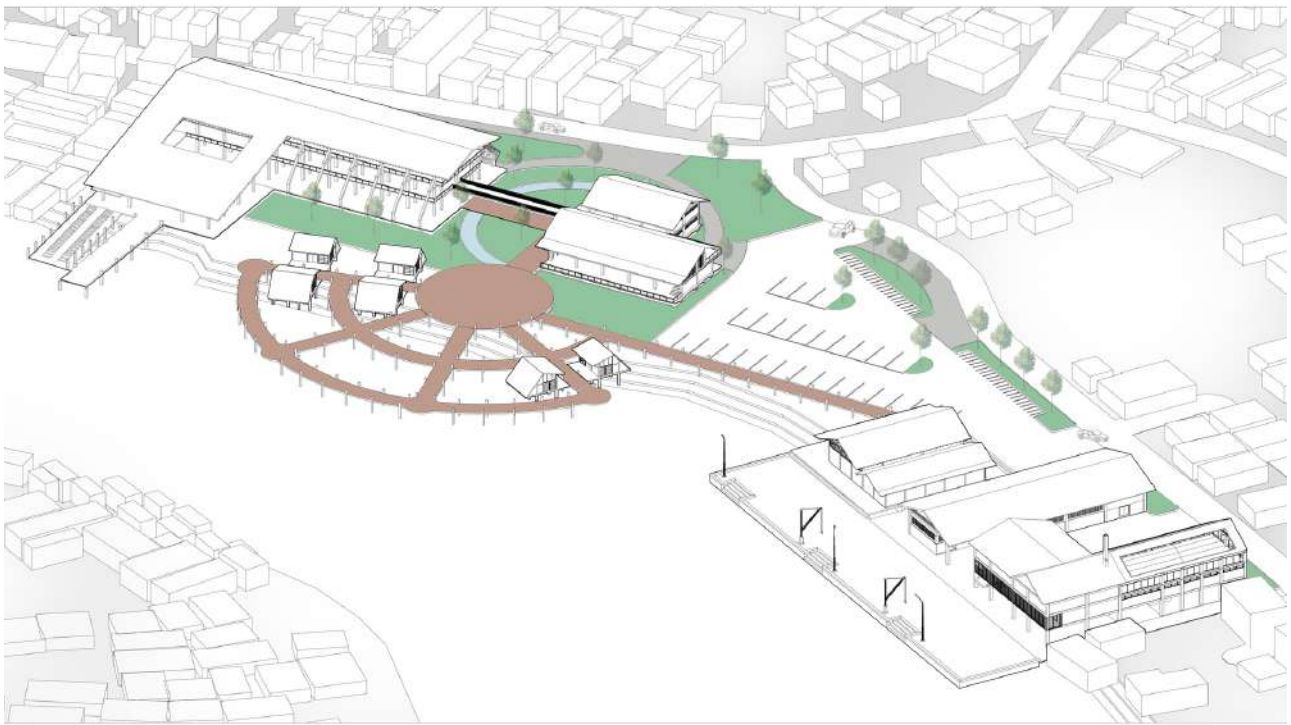
Facility arrangement considered of production movement-line in accordance with the content program.





INDOOR ZONING

The building mass zonation is divided into four main functions which are processing building, fisherman pods, fish market, eatery place and facility. The rest of mass will be use as a support function.



OUTDOOR ZONING

The character of the fisherman village is strengthened by the presence of plazas that represent the activities of local people, which are fishing and gathering.

4.2 DESIGN RESULT

4.2.1 SITUATION

The design of the Manggar Fish Processing Center and Market is located in a residential, fishery, trade and tourism area. The relationship between the site design and the condition of the surrounding site is realized by the application of ecological water culture architecture. The shape of the building that is designed also opens up all access to the site that can be reached from all directions to integrate directly with the surrounding environment.



LEGEND :

1	Jami Ad'Din MOsqoue		Commercial Area
2	Nurul Hidayah Mosque		Pasar Manggar
	Residential Area		Japanese Bunker

4.2.2 SITE PLAN

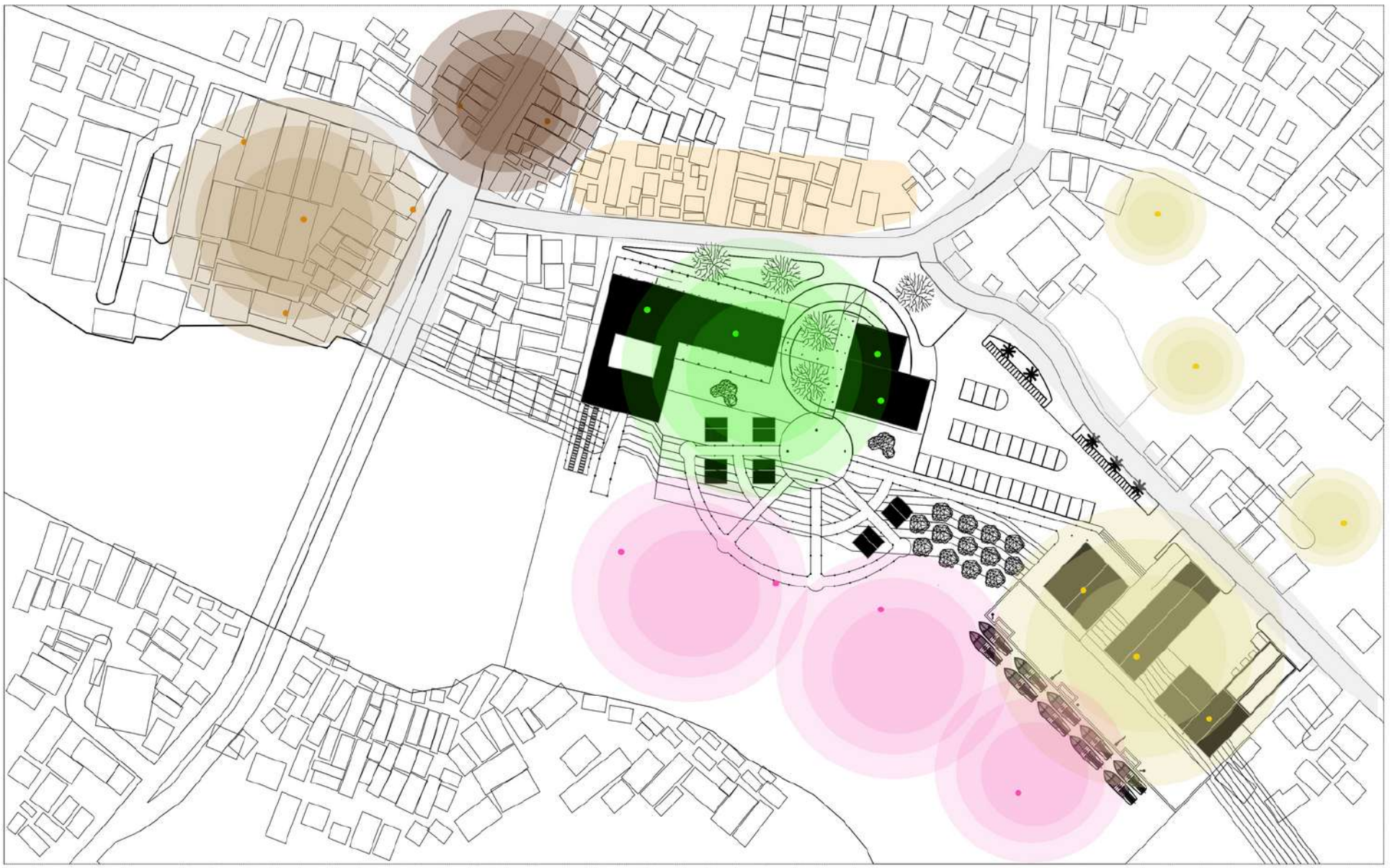


LEGEND :

1 Fish Landing
2 Fish Processing
3 Waste Processing
4 Fish Auction
5 Fish Market
6 Eatery Place and Facility
7 Fisherman Pod

The Manggar Proceesing Center and Fish Market site is designed using a cluster mass composition pattern, which takes into account local zoning and climate. The building zoning on the site is divided into three, namely public, semi-public, and private zones. Public zones include the lobby, eatery place, water tourism, and others. This zone is located in the entrance area (front) and the banks of the Manggar river. Semi-public zones include fish auction fish landing, fish processing area, waste processing and others. .

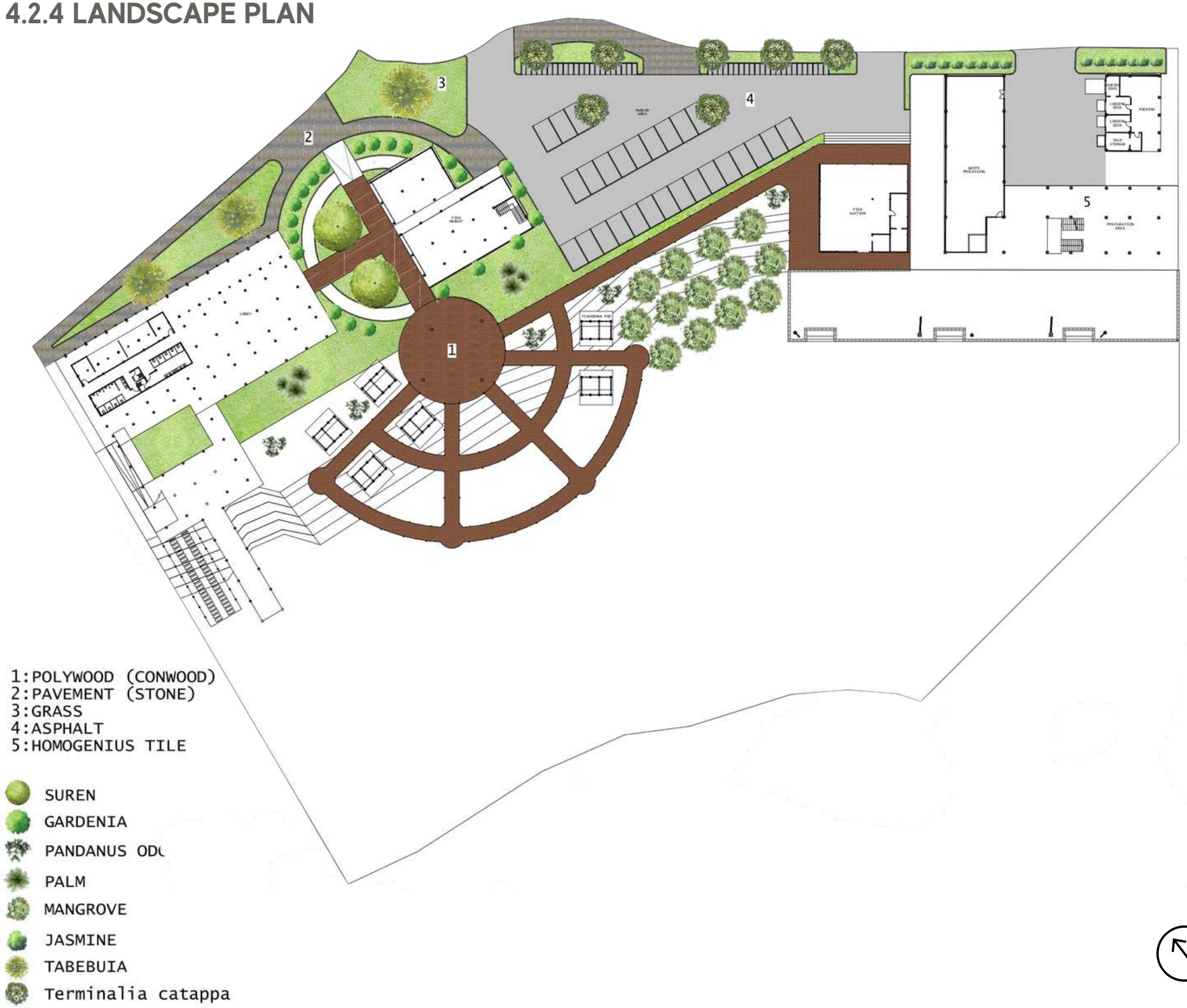
4.2.3 ODOR SCHEME



- Sea, Sand, River
- Traditional Market, Traders, Grilled food
- Food
- Fishy, Dried Fish
- Street, Vehicle
- Traders

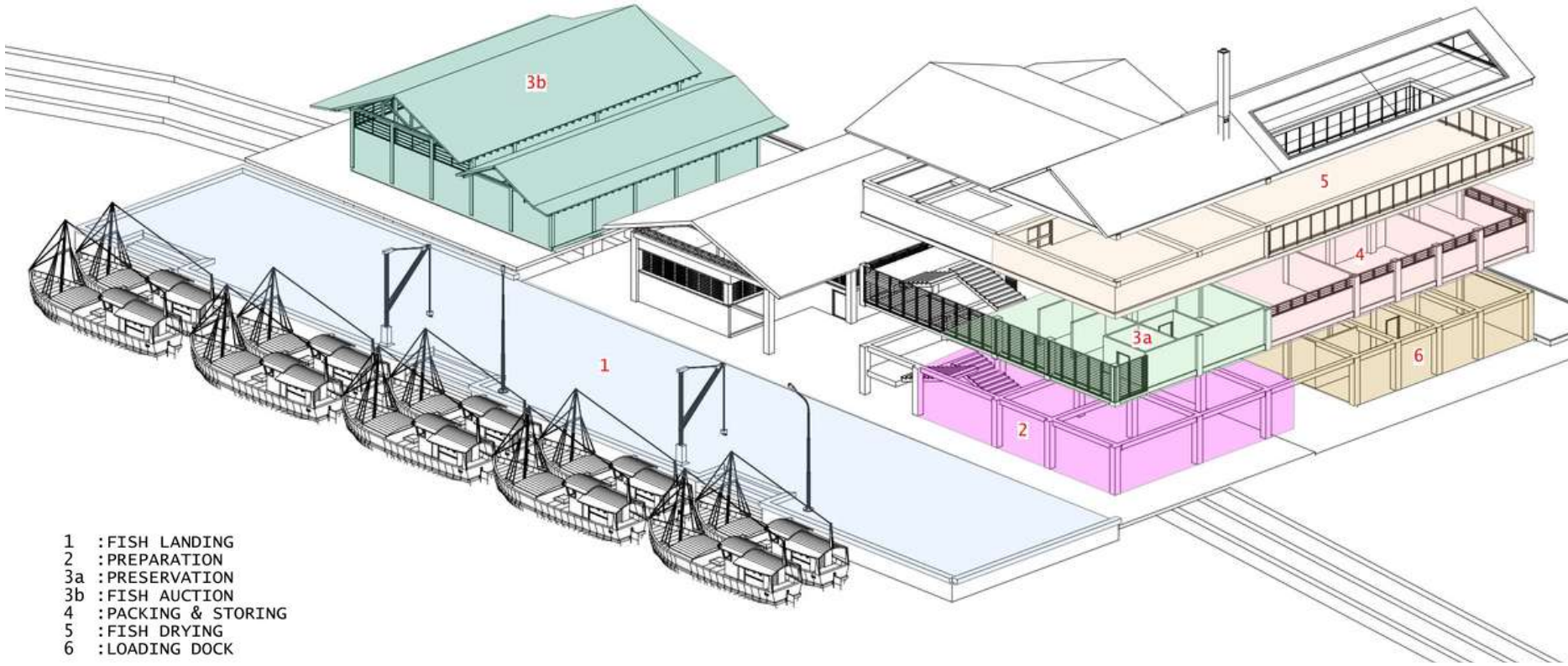
In the schematic mapping of odors on the design site, the main source of odors is fishery activities that cause fishy odors from fish. This is because the site is a fishery processing area. In addition, there are also odors that dominate in the surrounding area, namely the smell of the sea, the smell of food, the smell of the market and the smell of vehicles.

4.2.4 LANDSCAPE PLAN



The selection of vegetation types is based on the main focus on design, namely controlling odors, so that the vegetation includes; Gardenia as deodorizing, Pandanus odorifer which functions as a breakwater, prevents erosion, and scents. Jasmine as a plant which eliminates unpleasant odors. Suren trees that smell good and serve as windbreakers. And some shade trees like Tabebuia and Catappa. And some existing trees like Mangrove and Palm.

4.2.5 FISHERY PRODUCTION ZONES



In general, the supply chain of caught marine fish starts from the supply of fish caught from fishing fishermen to collecting traders, who then supply it for fresh consumption needs or in fish processing that produces processed products for local and export markets. Conceptually, a supply chain is a network of business units that jointly work to create and deliver a product into the hands of the end user. In general, the physical flow of fish from fishermen to collecting merchants, processing industries to processed products is channeled to consumer groups.

The main components/actors of the regional supply chain are;

- Pattern-1: fishermen to freezing/cold storage of consumers.
- Pattern-2: fishermen Fish Auction cold storage consumers.
- Pattern-3: Fish Auction fishermen processing wholesalers distributor retailers(in or out of town) consumers.
- Pattern-4: Fishermen's wholesaler wholesale distributors (in or out of town) consumer retailers

4.2.6 BUILDING DESIGN

FISH PROCESSING, WASTE PROCESSING AND FISH AUCTION

3RD FLOOR

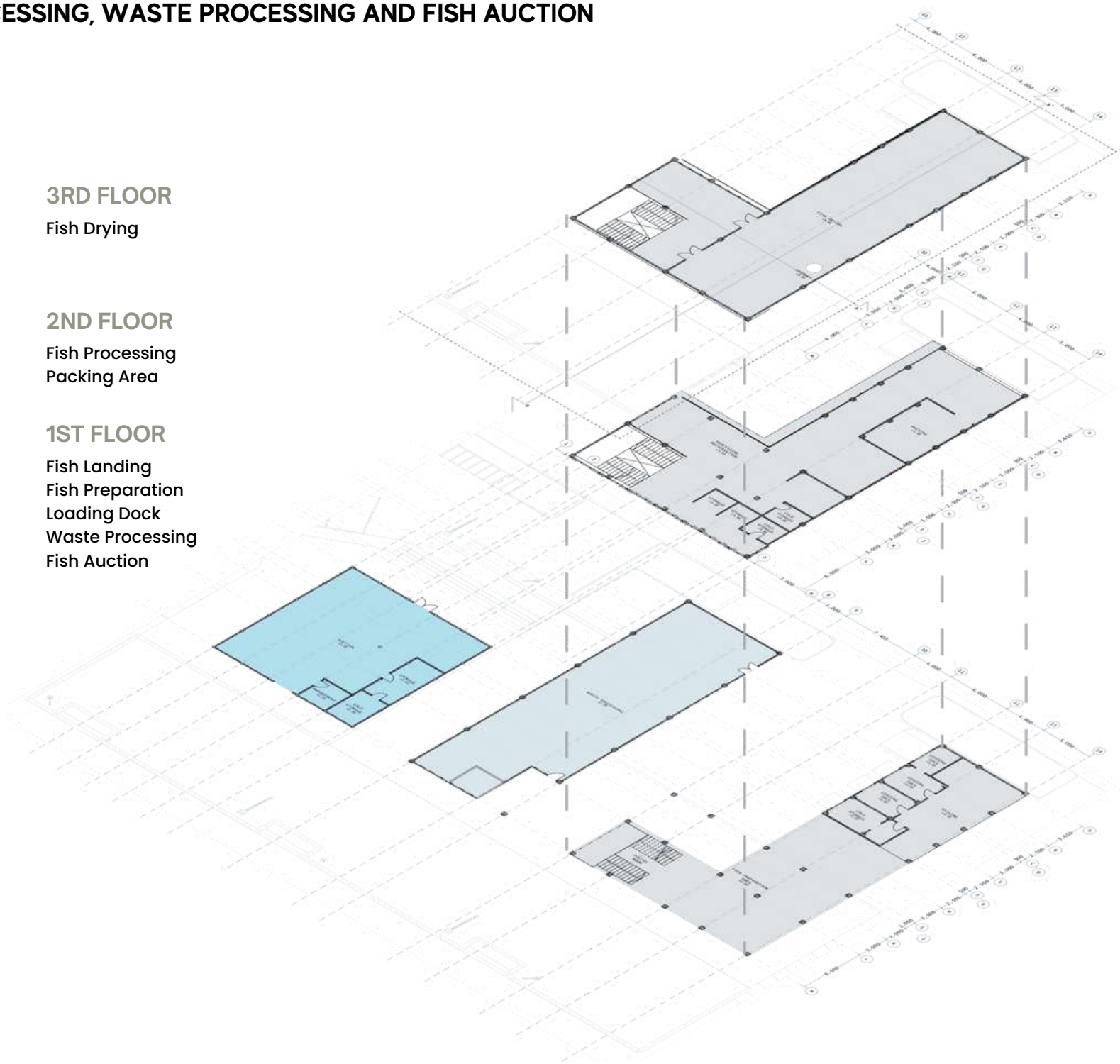
Fish Drying

2ND FLOOR

Fish Processing
Packing Area

1ST FLOOR

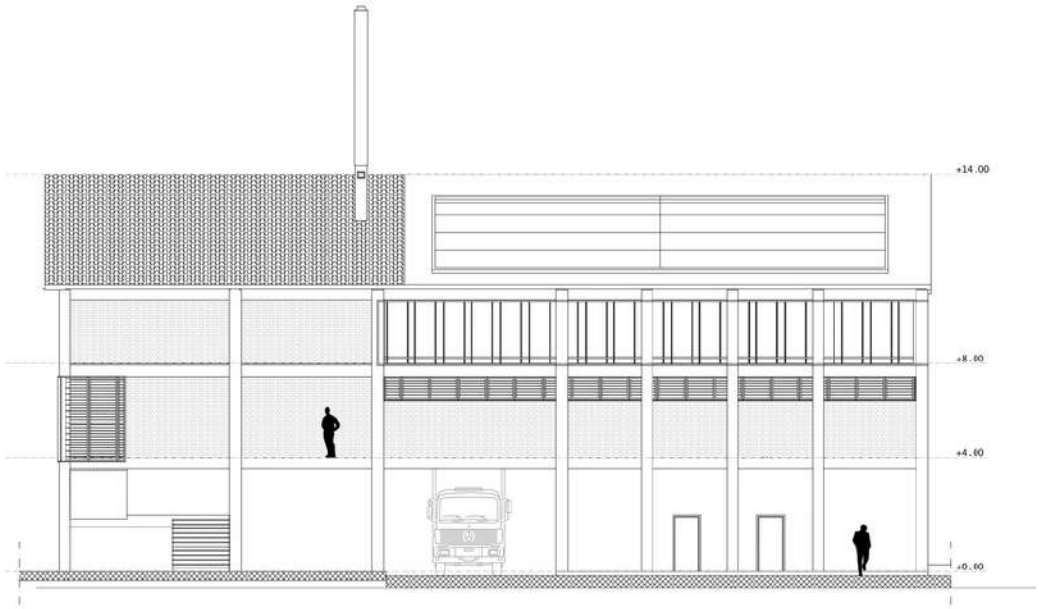
Fish Landing
Fish Preparation
Loading Dock
Waste Processing
Fish Auction



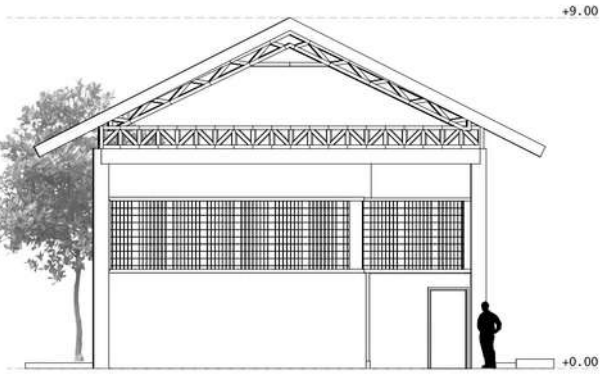
The fish processing area is an area where the surrounding community carries out fishery activities from landing fish, processing fish, packaging, to selling. The scheme of fisheries activities is divided into two, including:

1. The fish came at the landing, headed for the preparation area then auctioned at the fish auction
2. The fish comes at the landing, goes to the preparation area after it is processed, then the packaging in the distribution in the loading dock

The supporting buildings such as waste processing to reduce waste from fish production and fish auctions as a place for fish auctions to take place



FISH PROCESSING BUILDING

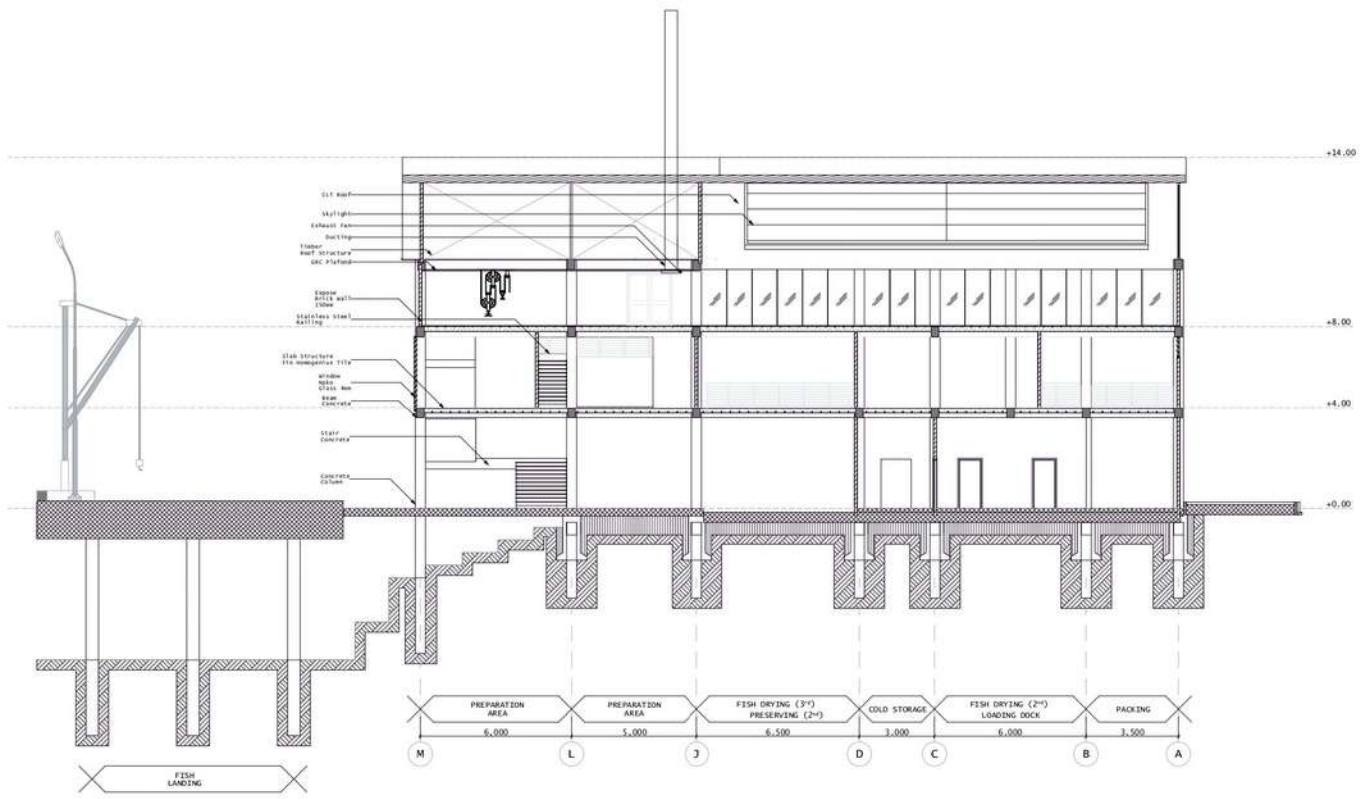


WASTE PROCESSING BUILDING



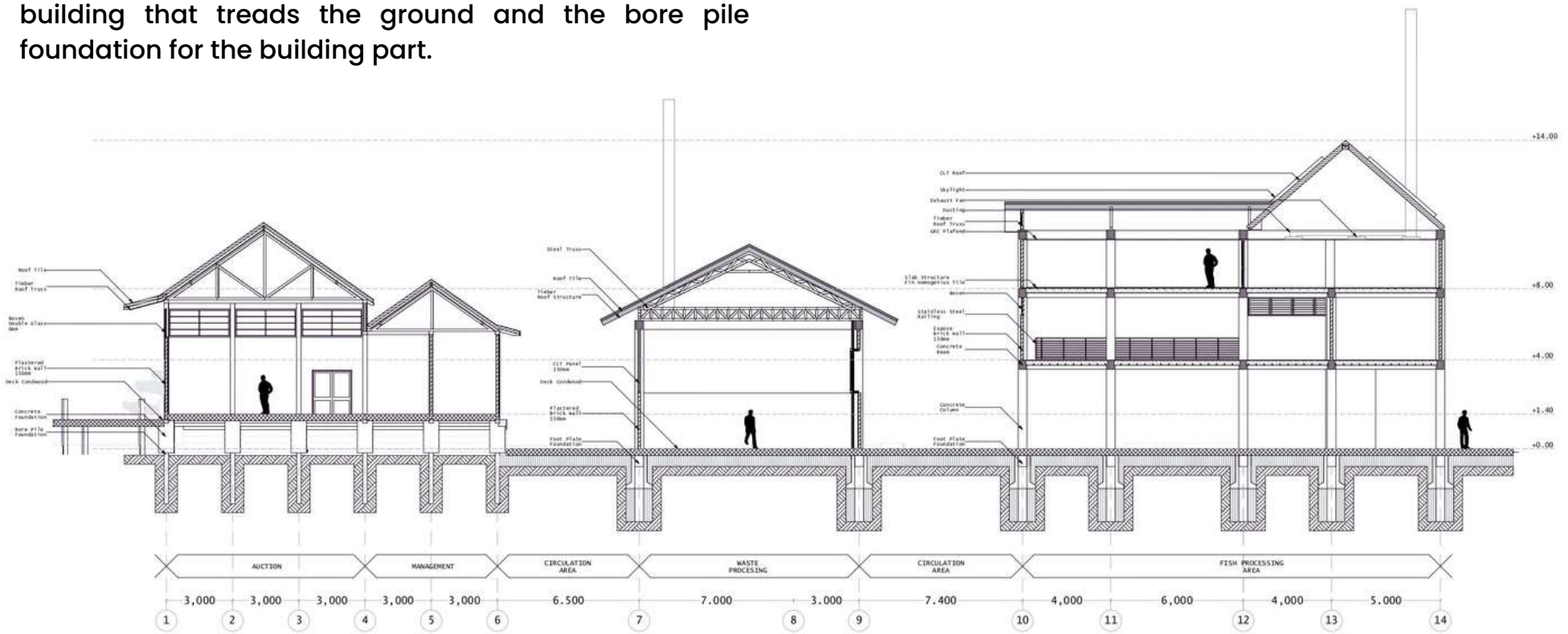
FISH AUCTION BUILDING

Fish processing areas are in the form of fish processing buildings, fish waste processors and fish auctions where natural lighting and indoor air circulation are used to support fishery production activities.

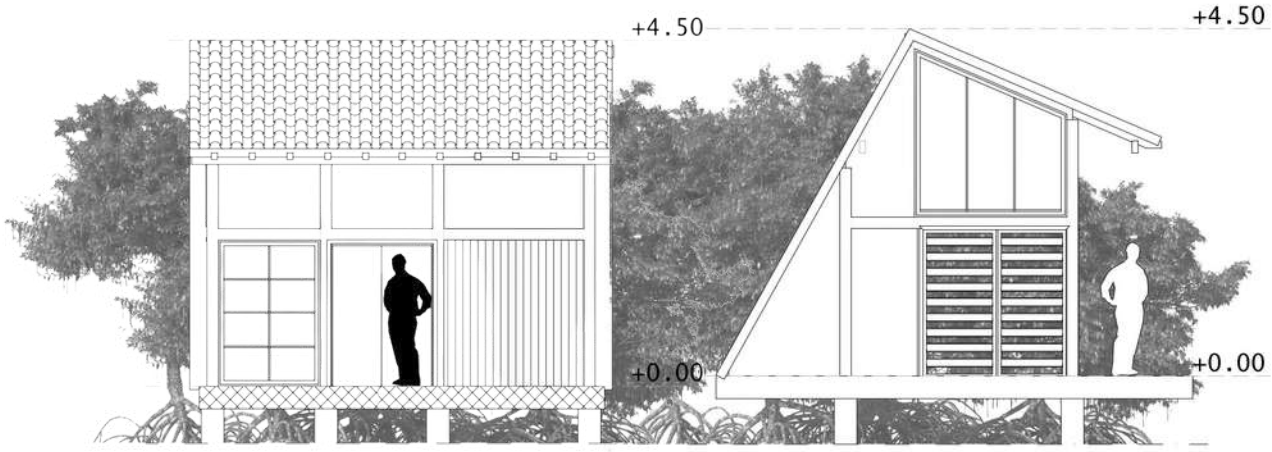


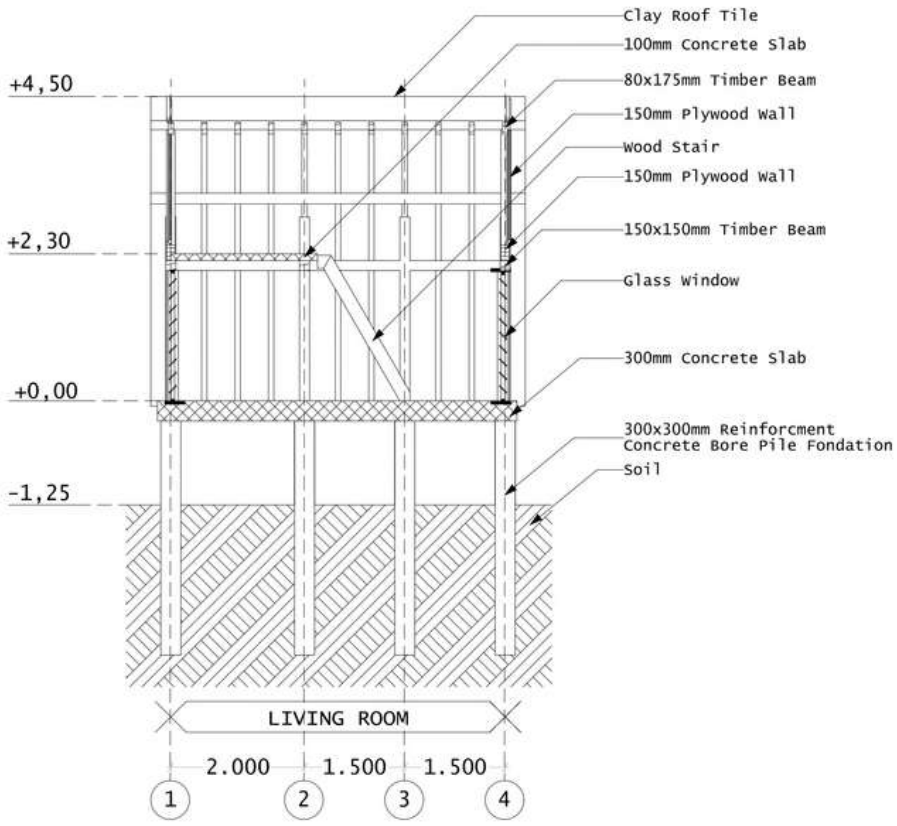
The building uses a structure of columns and concrete material blocks. Reinforcement on the foundation uses a concrete footplate foundation for the part of the building that treads the ground and the bore pile foundation for the building part.

Then on the roof using a reinforcing steel easel with a roof structure in the form of wood and the roof covering using roof tile and CLT Roof.



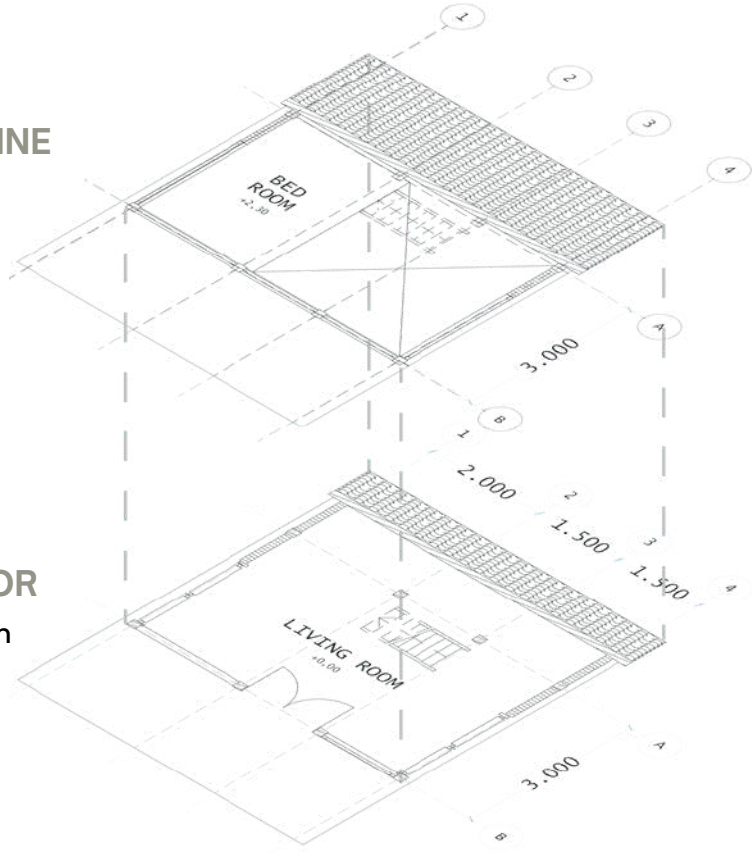
FISHERMAN POD





MEZZANINE

Bed Room



1ST FLOOR

Living Room

Fisherman Pod is a fishermen's supporting area located on the edge of the Manggar river and is directly connected to with a public deck. This is intended so that this area can integrate with fisheries and fishermen's social activities. Can be used for fishermen and families resting places with flexible modules.

This building uses a structure of columns and beams of wood material. In addition, timber floor decking is also reinforced with timber beams. Reinforcement on the runway using a concrete bore pile foundation where the columns timber is cast in such concrete. Then on the roof using strengthening steel truss with a timber roof structure and roof covering using clay roof tile. The use of this natural material as a manifestation in the application of ecological architecture and its existence in fishermen's houses

FISH MARKET

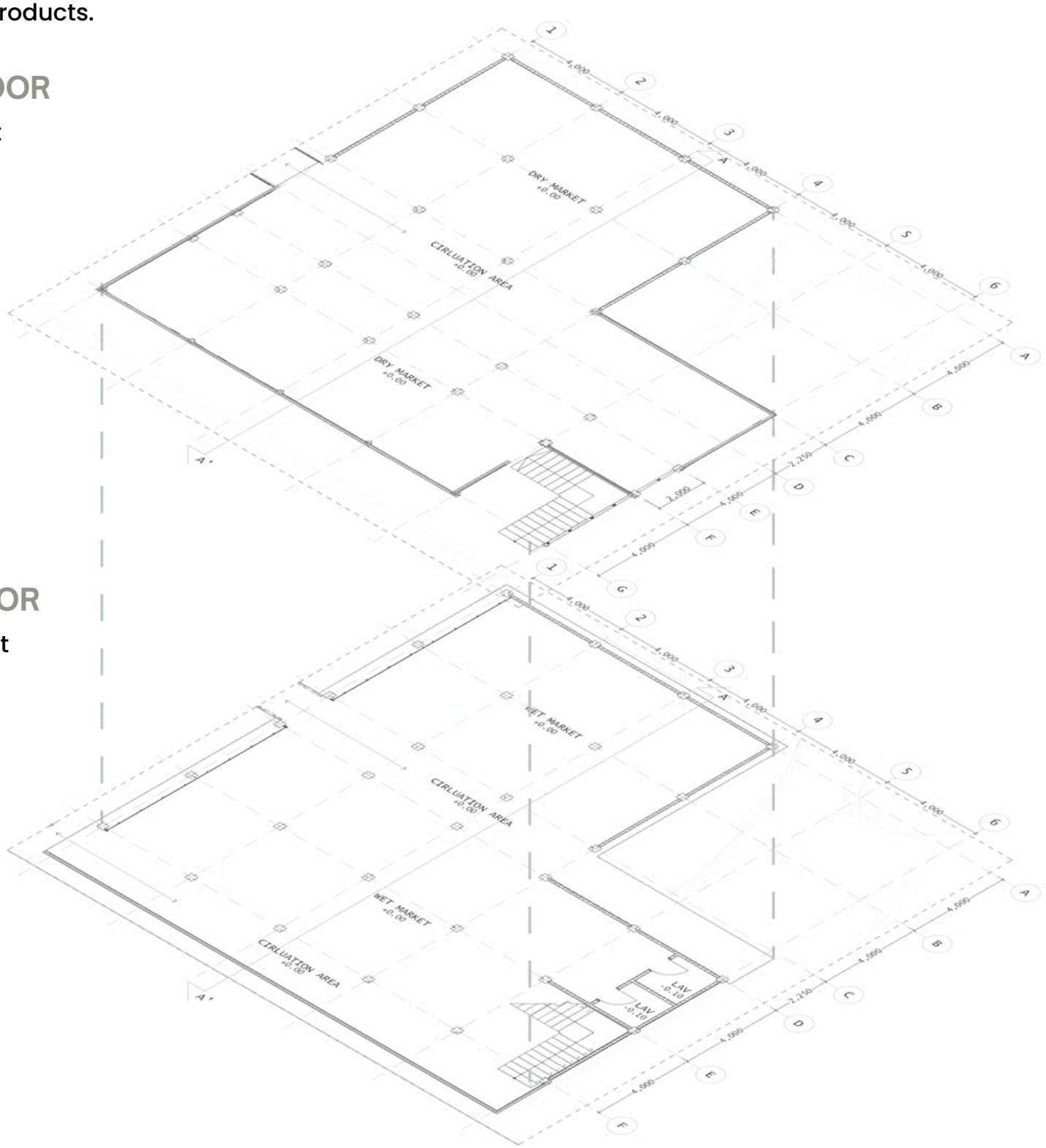
The fish market is still in the same area with an eatery place and facility located on the east side of the building. This fish market is used to sell processed fish products and can be directly consumed by visitors at the eatery place. There are two areas, namely, the wet market that sells fresh seafood products and the dry market that sells processed seafood products.

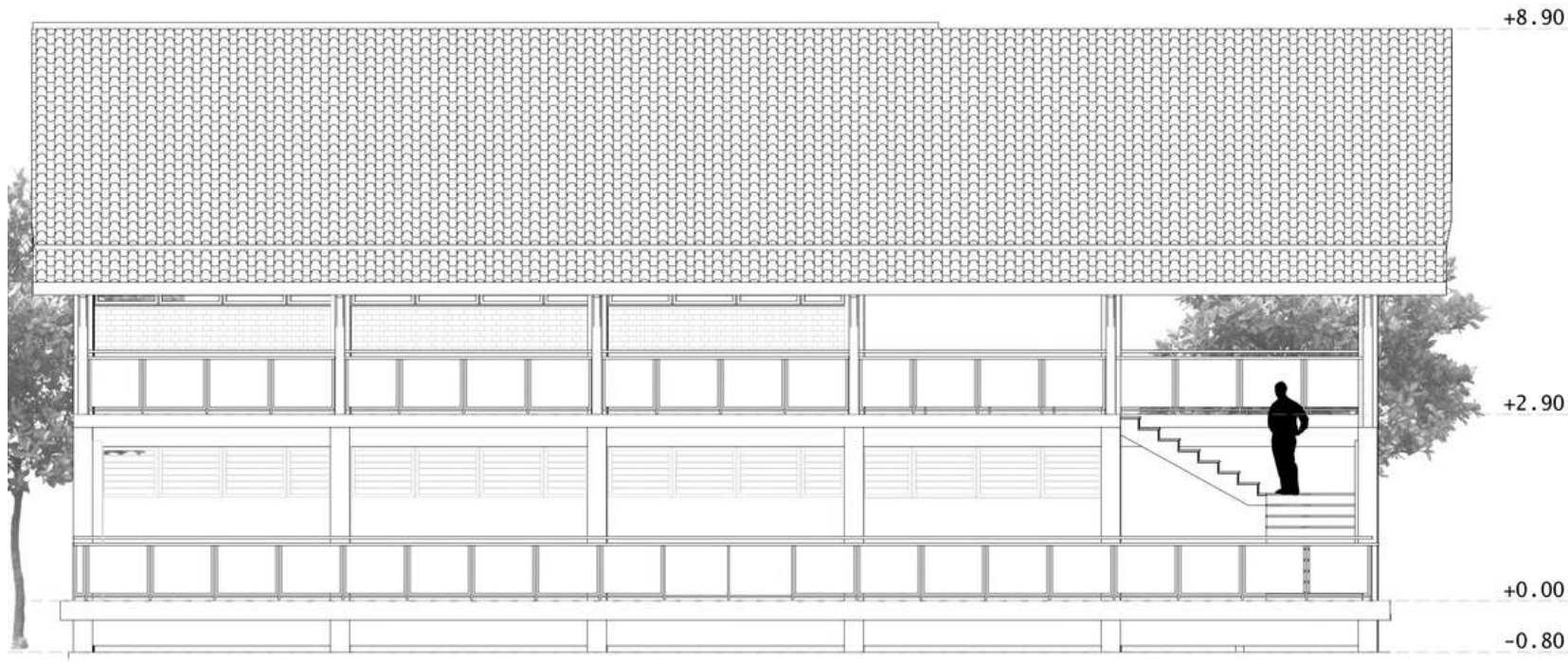
2ND FLOOR

Dry Market

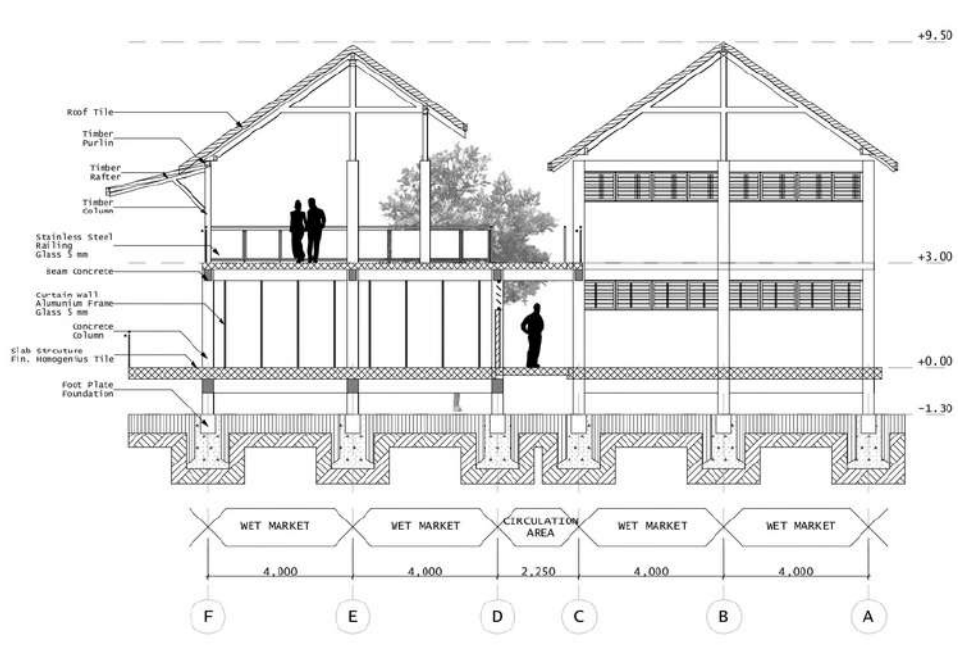
1ST FLOOR

Wet Market







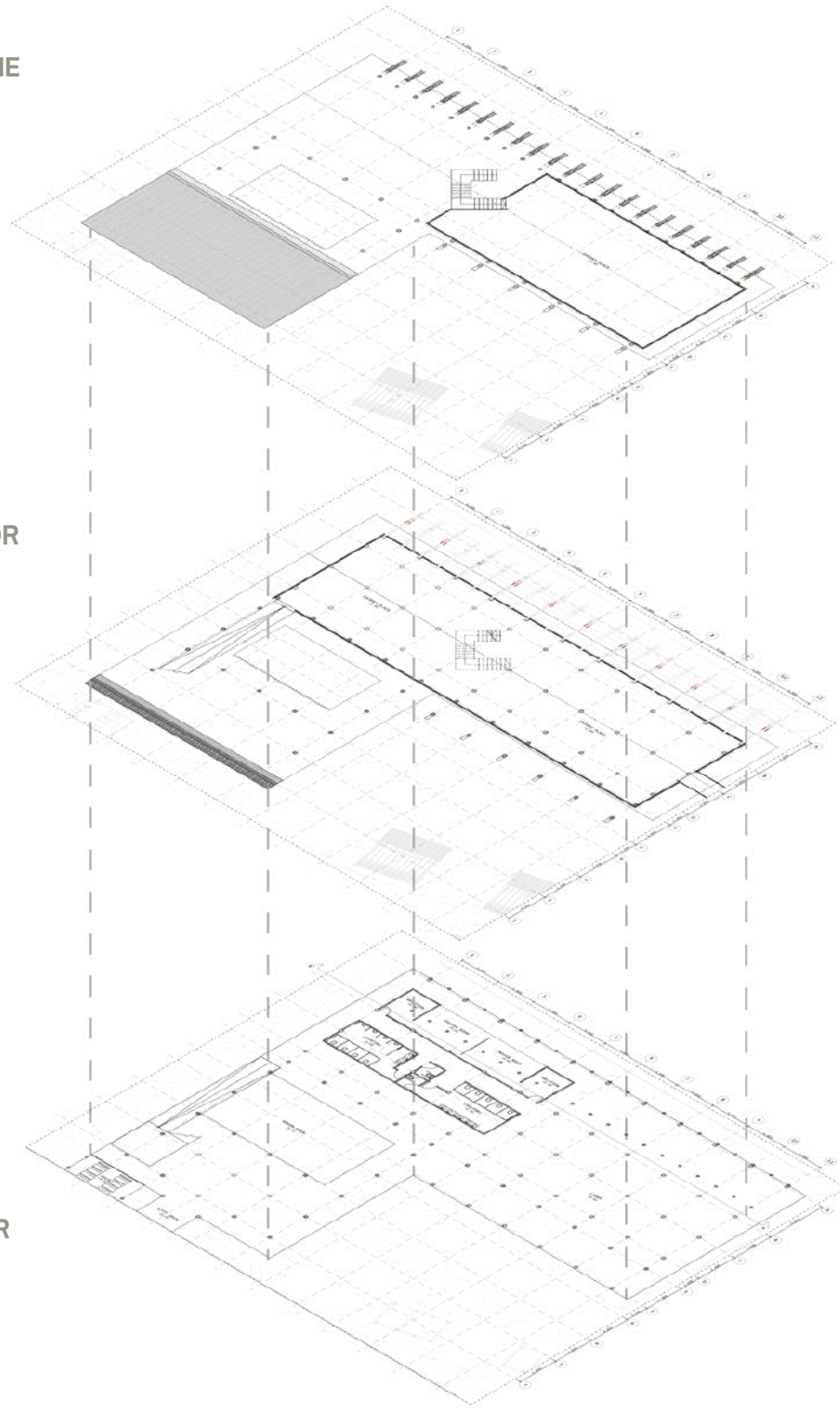


This building is semi-open and in the form of a stage. As a consideration to provide airflow and space of the water recycle system. Facing towards the river in the main vista of this area. For the structure of this building using concrete and wood materials, as well as steel truss.

EATERY PLACE AND FACILITY

MEZZANINE

Eatery Place



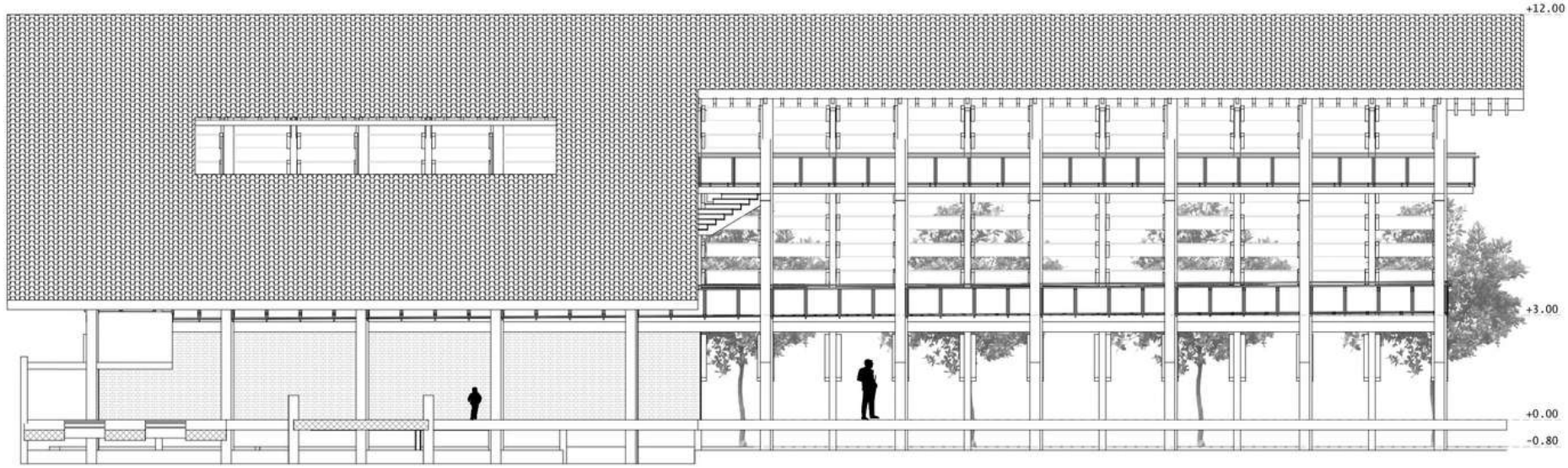
2ND FLOOR

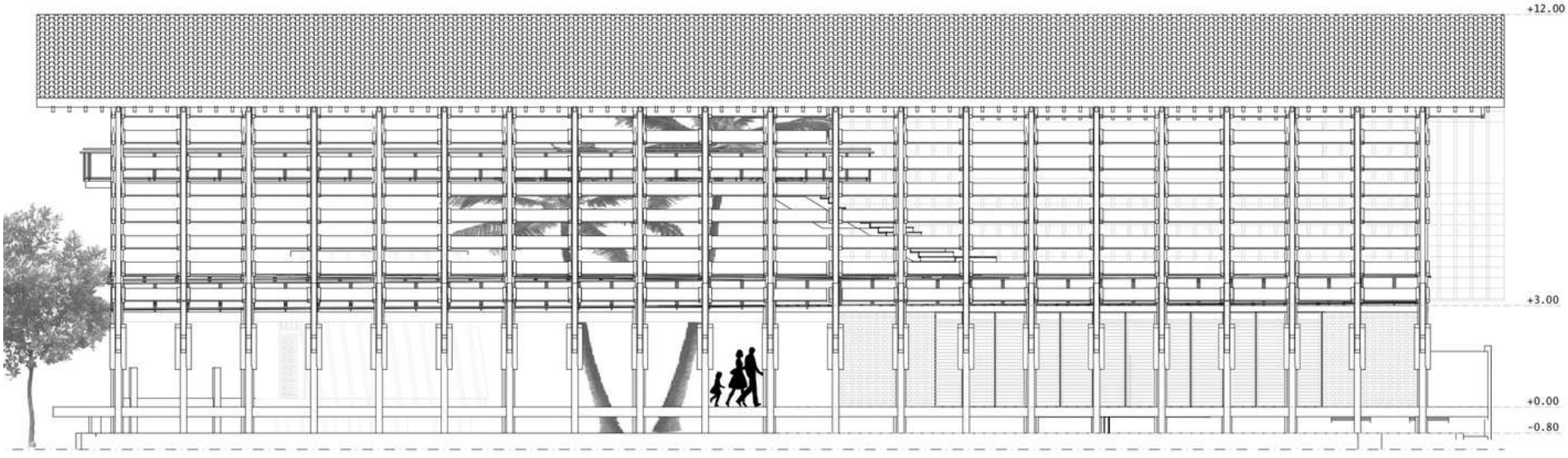
Eatery Place

1ST FLOOR

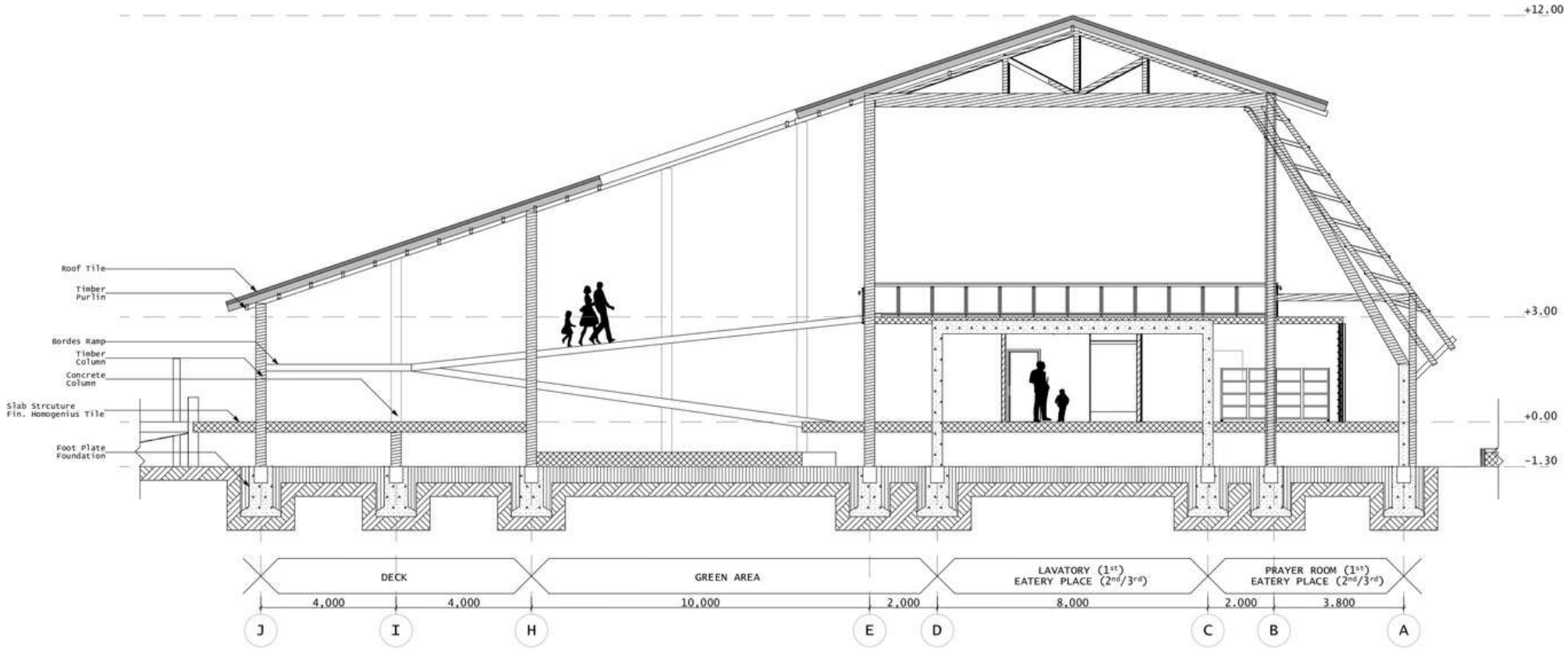
Lobby
Prayer Room
Lavatory
Jetty
Wharf

The eatery place and facility area is the main area for visitors to the Fish Processing Center and Market. This area has a lobby where visitors can search for information or water tourism activities available. In addition to the lobby, This building also has a dining area connected to the fish market where visitors can buy fresh seafood and directly processed, then there is a jetty deck, lavatory, prayer room, and other facilities.



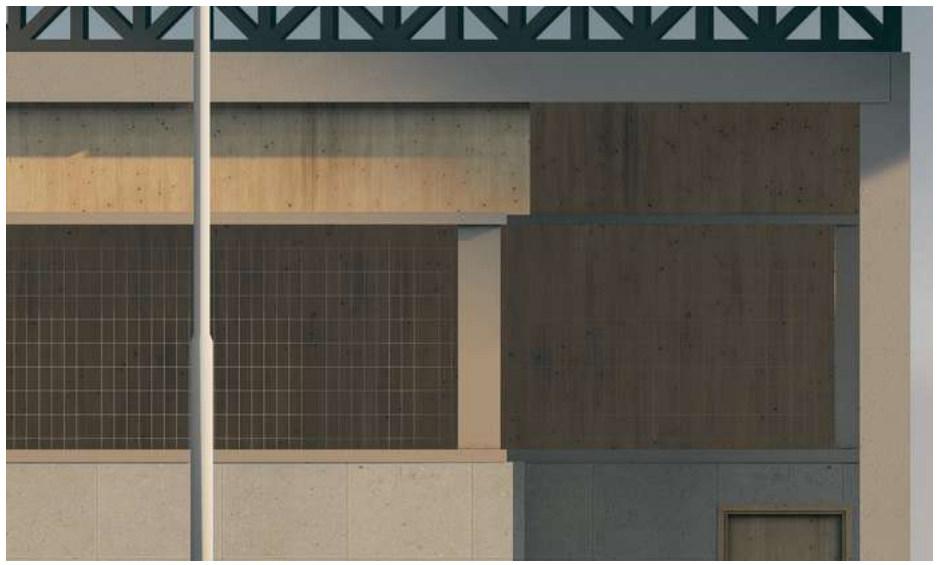


This building is a semi-outdoor that uses a structure of columns and blocks of concrete and timber materials. Reinforcement on the runway using a concrete footplate foundation where wooden columns are connected to concrete columns. Then on the roof using a timber truss reinforcement with a roof structure in the form of wood and the roof covering uses roof tiles.

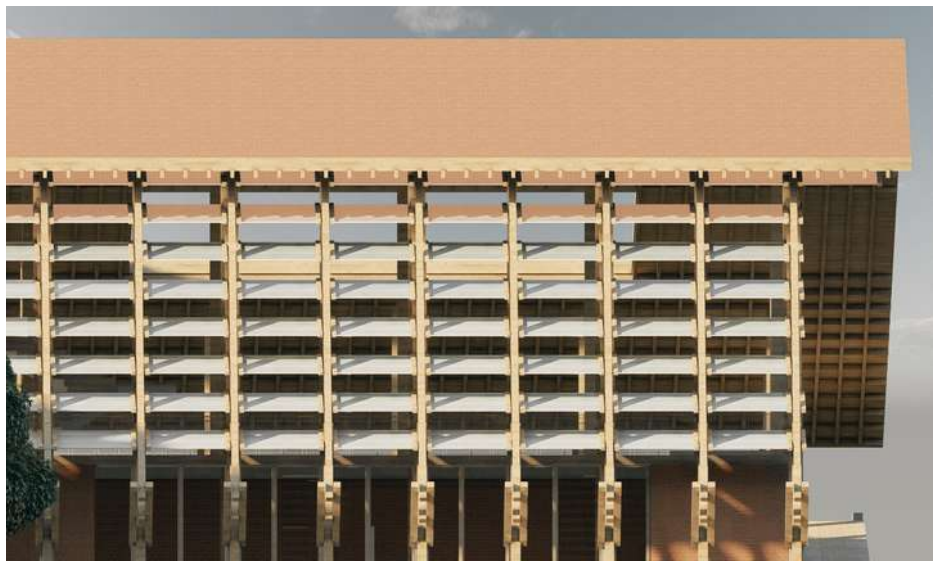


In this building, it uses stairs and ramps as its veritical circulation because it wants to provide barrier free to wheelchair users and introduce the main vista to the area, namely the river. Several facilities are provided on the 1st floor so that it is easy to access from anywhere.

4.2.7 BUILDING ENVELOPE DESIGN



In the design of the sewage processing building casing, it uses concrete walls and openings to maximize the flow of air in the room.

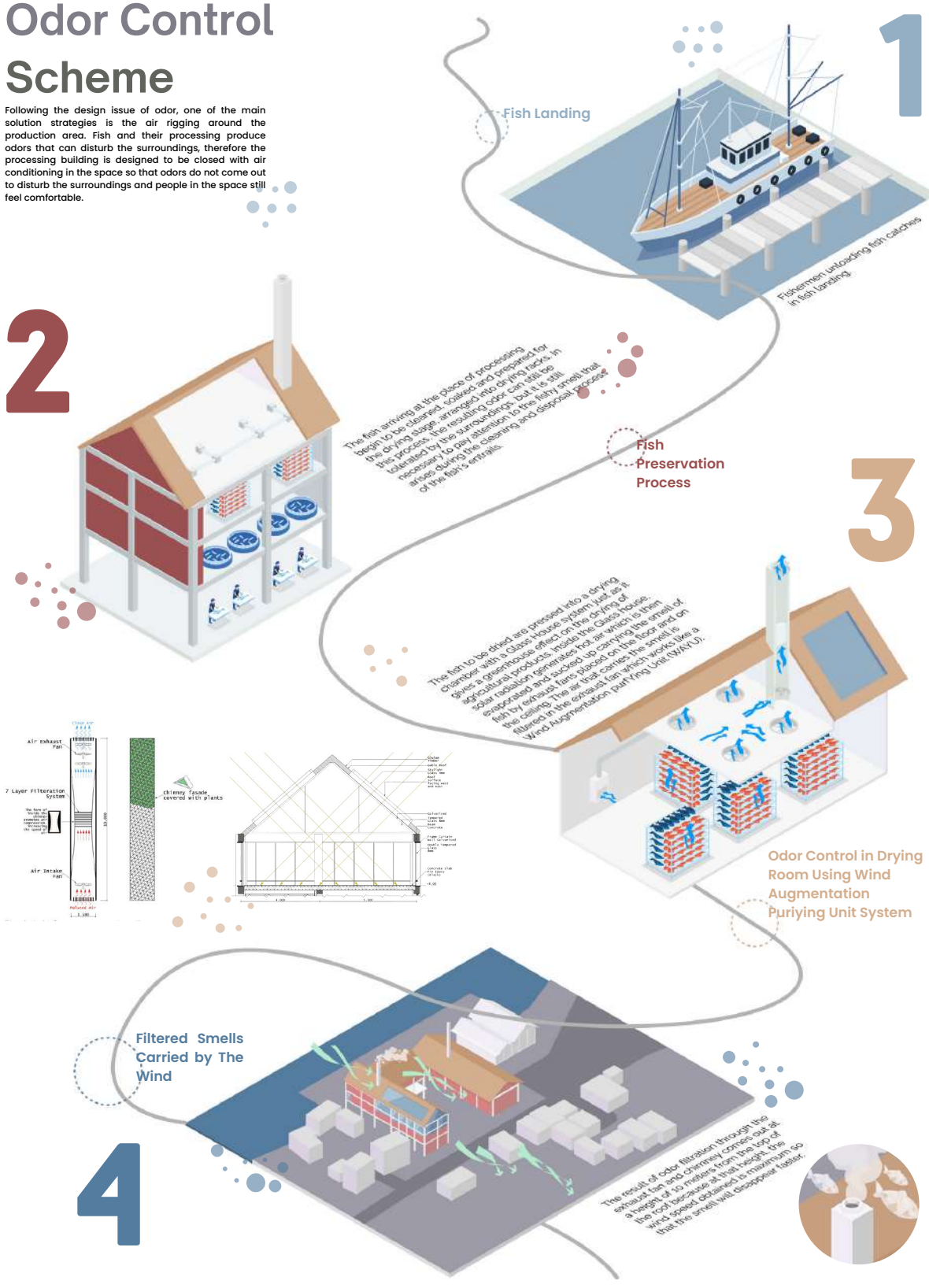


In public buildings, semi-open facades are used with wooden frames and shading for the openness of the building for visitors and provide passive cooling.



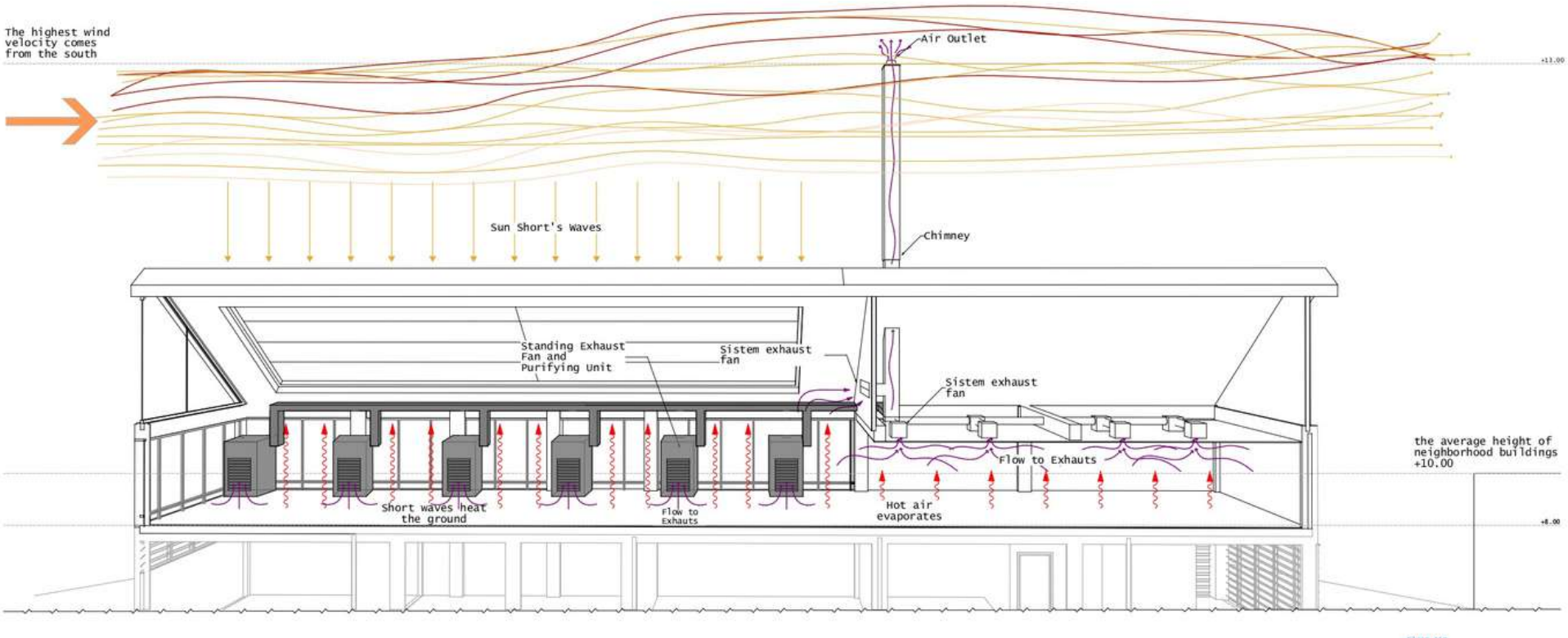
In the special fishery processing building design, most of the buildings are given brick walls and for the fish drying area, they are given glass walls to facilitate the drying process of fish.

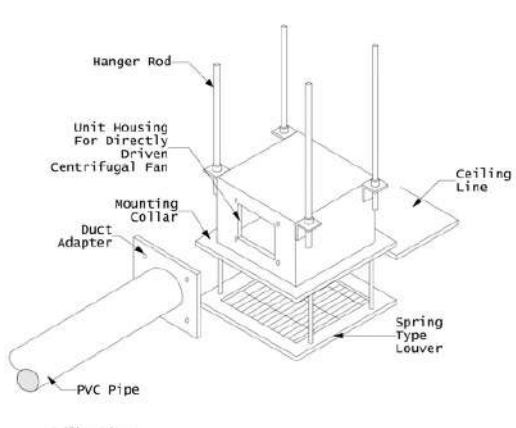
4.2.8 DESIGN PROBLEM SOLVING DETAIL

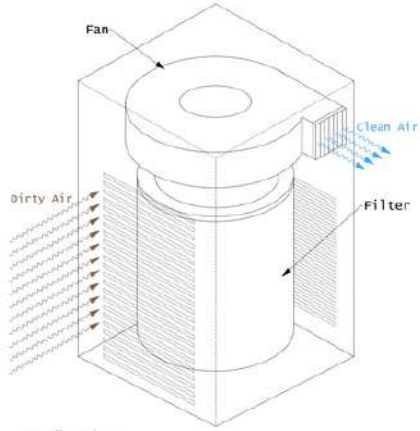


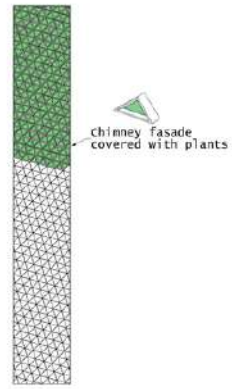
Following the design issue of odor, one of the main solution strategies is the air rigging around the production area. Fish and their processing produce odors that can disturb the surroundings, therefore the processing building is designed to be closed with air conditioning in the space so that odors do not come out to disturb the surroundings and people in the space still feel comfortable.

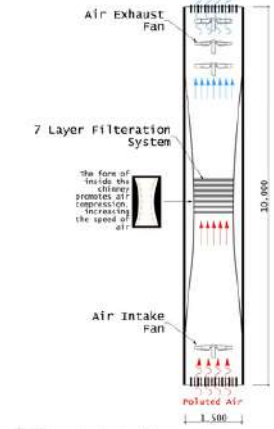
GLASS HOUSE FOR FISH DRYING AND ODOR CONTROL

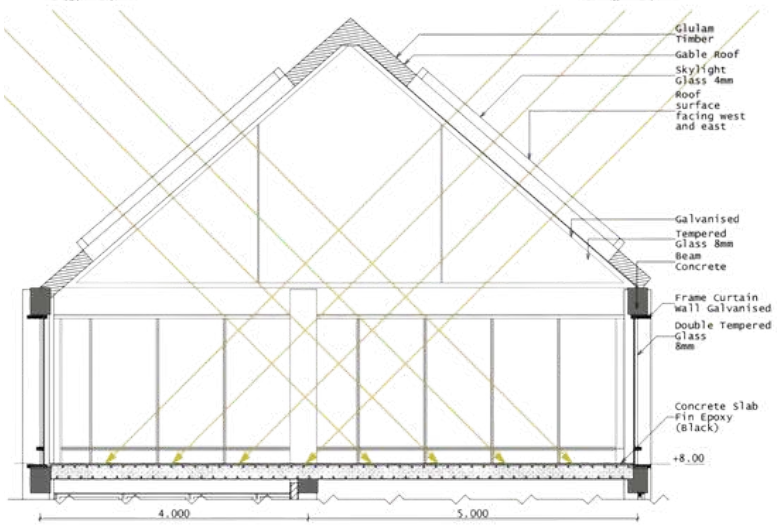






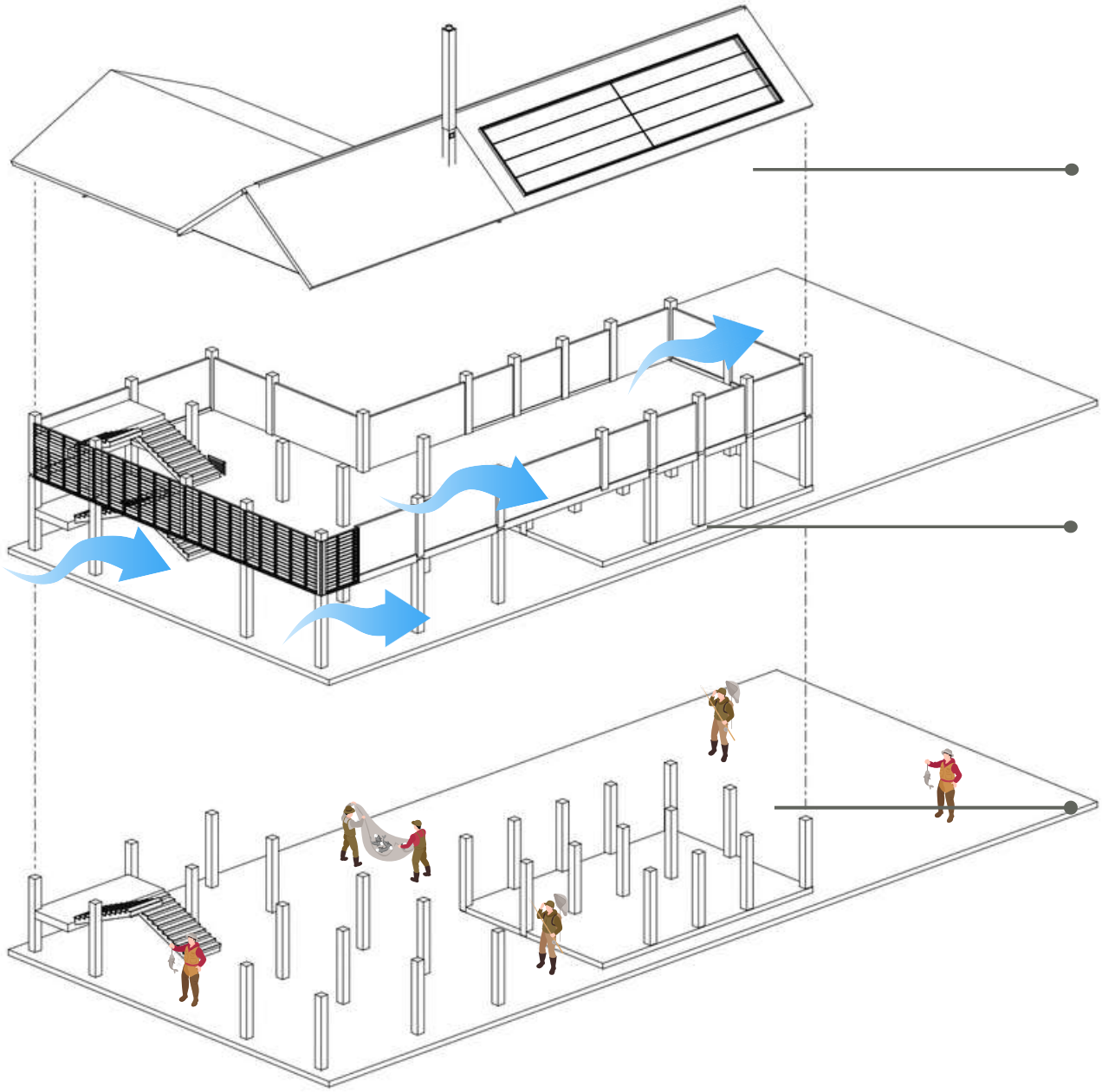






In the design of fish production buildings, the main focus of the issue is the smell that comes most from dried fish. So in this design, odor control is carried out in a drying room that uses glass house technology as a solution to maintain the quality of dried fish and make the distribution of odors only in the drying room. As well as an additional device, an exhaust fan system that is directly connected to air purifying and expels air through the chimney at an altitude of 10 m so that odors are carried away by the wind at maximum speed.

APPLICATION OF TRADITIONAL LOCAL ARCHITECTURE



The basic shape of the roof is a triangle which was taken based on the modification of the roof of the Bugis fisherman's house and the surrounding buildings using clay roof tile material.

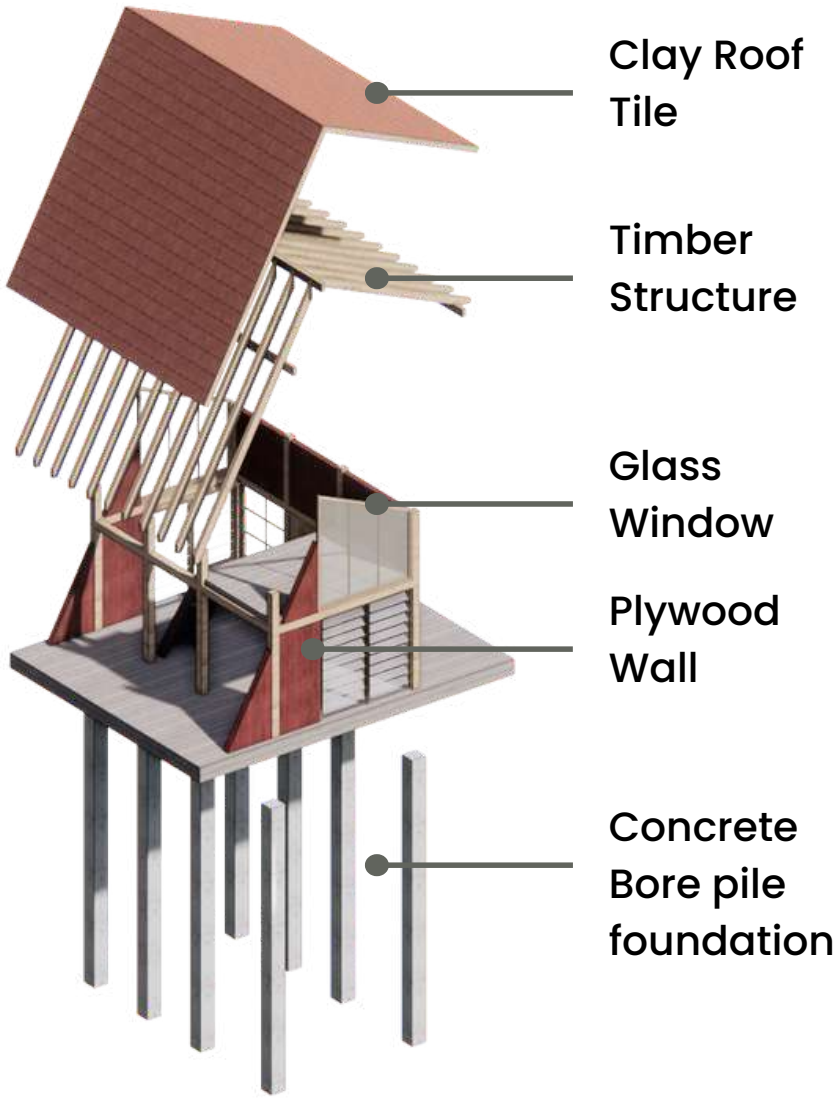
The basic shape of the space in the building is a square, which is built with a rectangular stilt house building typology. With the shape and openings in the building that are directed it allows to control odors through the air in the room

The existence space under the house is also applied in the design as a fish preparation of fishery activities and circulation

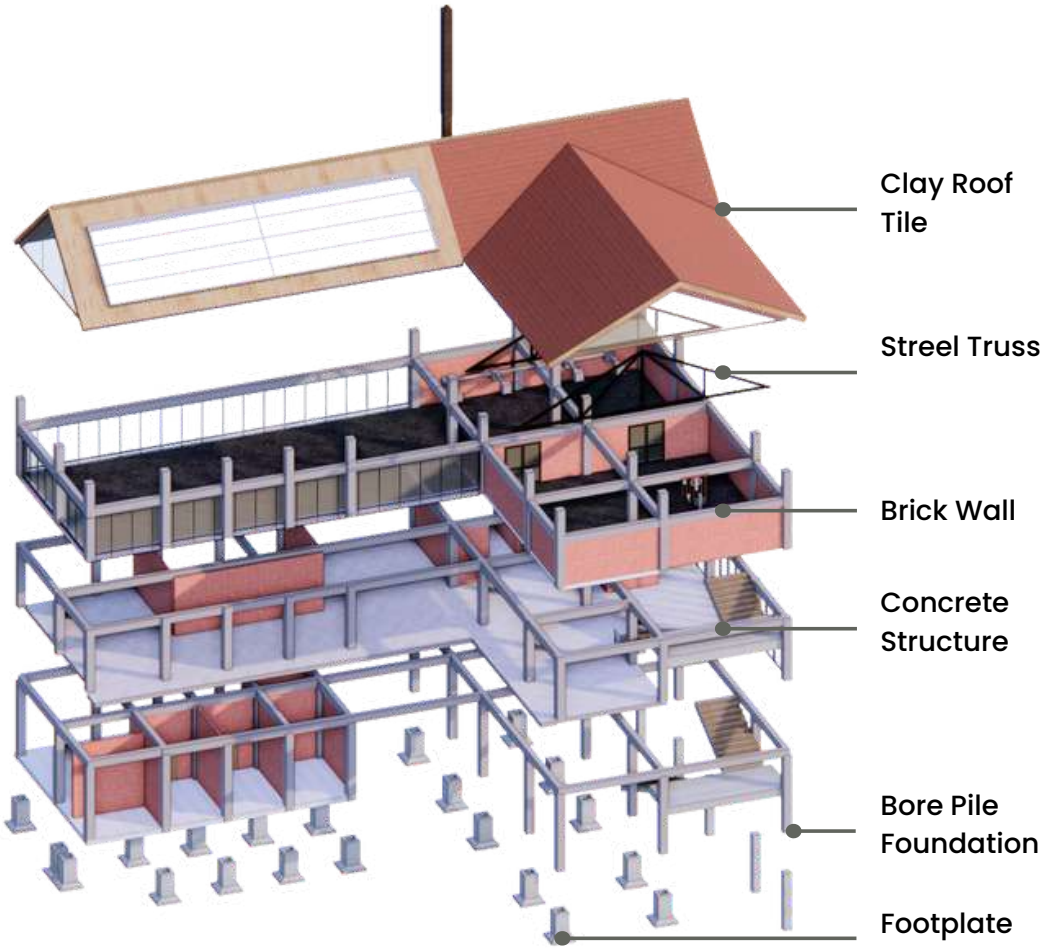
4.2.9 STRUCTURAL SYSTEM

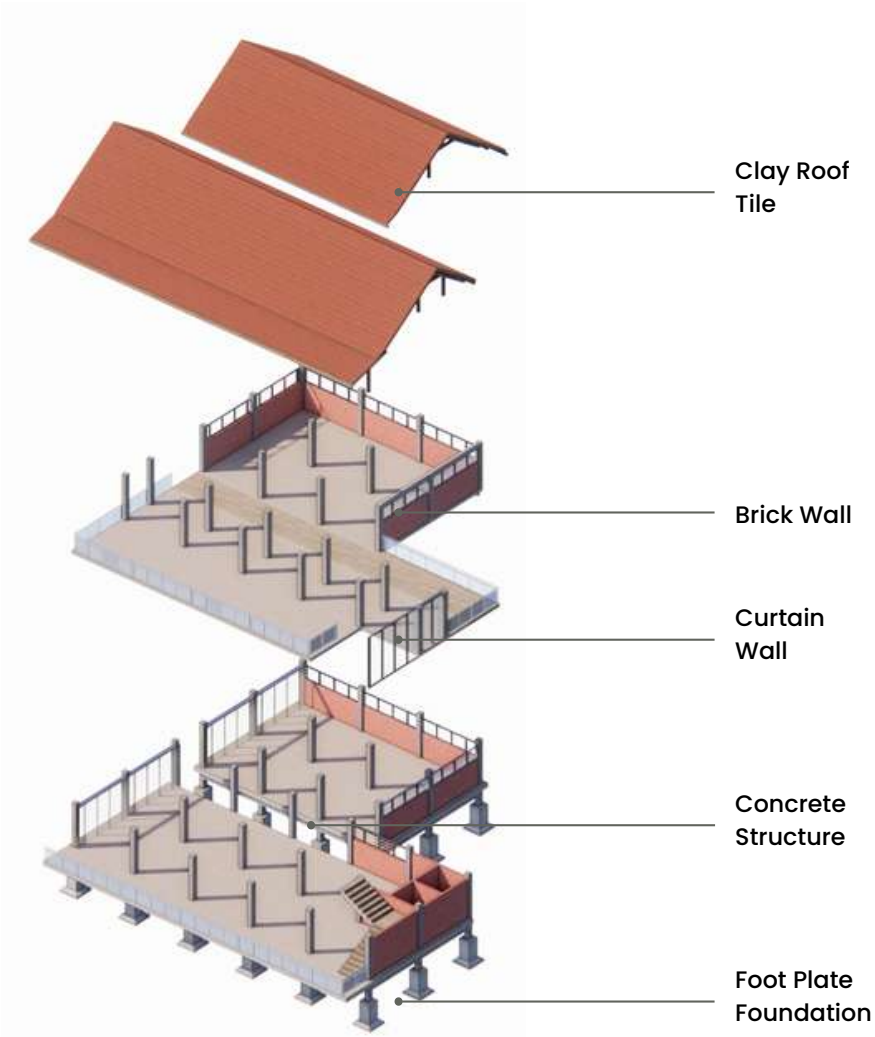
STRUCTURE ON TIDAL ZONE

Buildings that are above the tidal zone require adaptation to water conditions so that stilt houses are designed using a bore pile foundation structure and for the building use a wooden structure because it is more sustainable in terms of use and maintenance



STRUCTURE ON SEMI-TIDAL ZONE

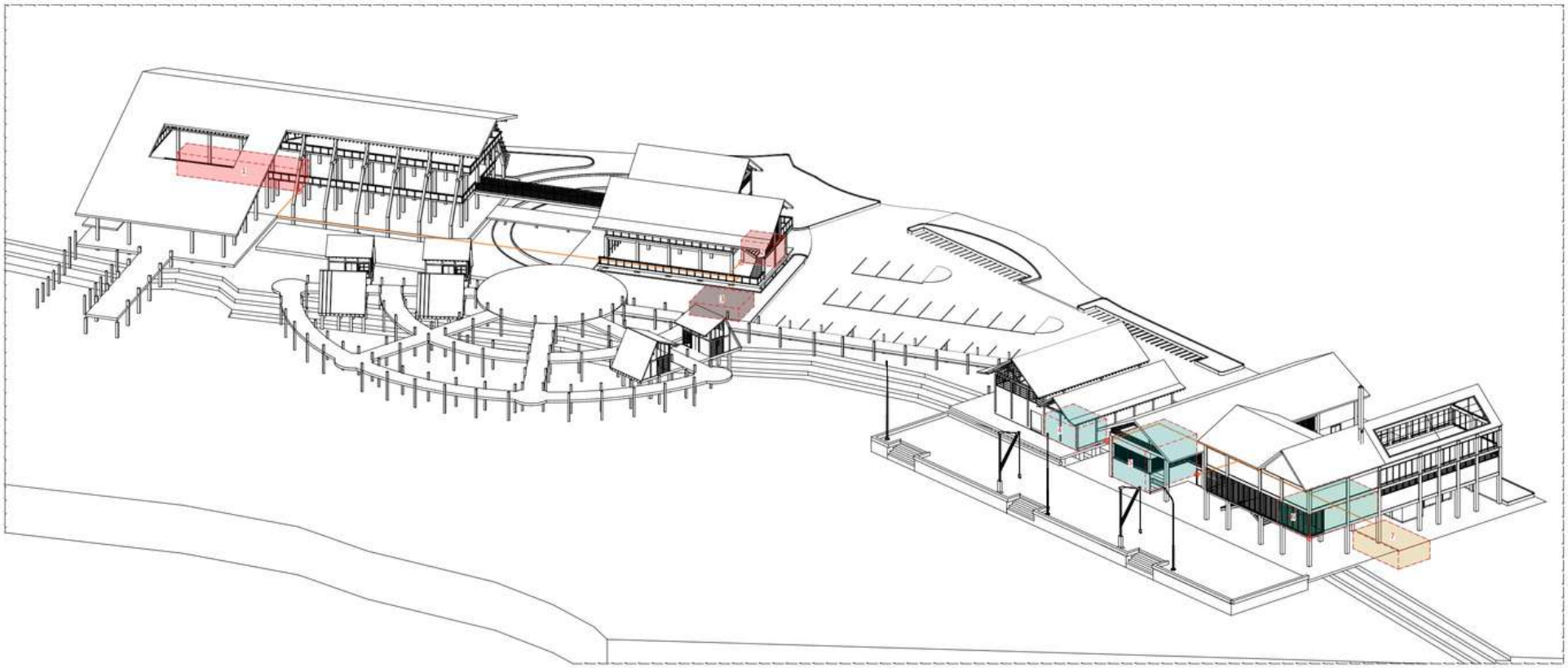




In the building there are 2 main types of construction that can be seen from the foundation, which mainly uses a concrete pile foundation because the building build on the tidal zone. While the second is the use of a footplate foundation.

4.2.10 UTILITY SYSTEM

WATER RECYCLE

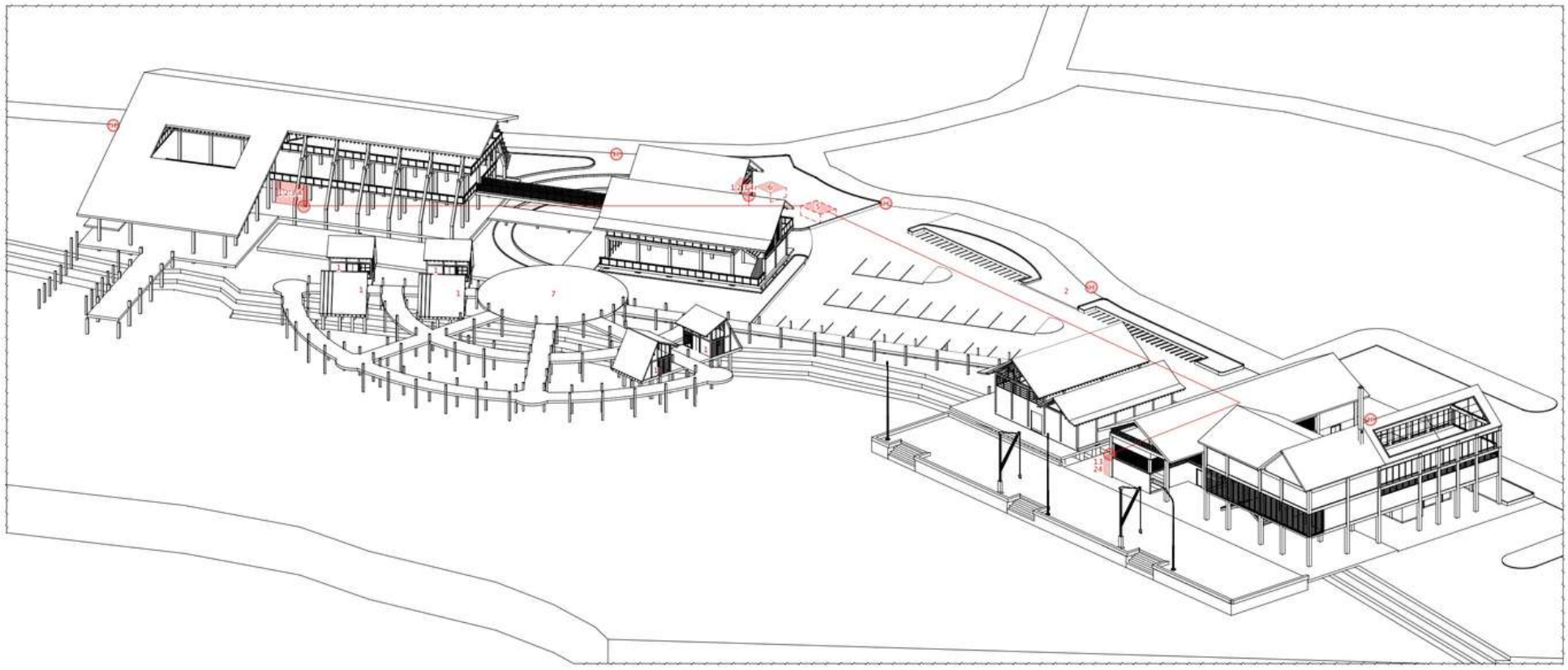


PLUMBING (RECYCLE)
1:500

1 :LAVATORY EATERY
2 :LAVATORY FISH MARKET
3 :RECYLE A
4 :FISH AUCTION
5 :WASTE PROCESSING
6 :FISH DRYING
7 :RECYLE B

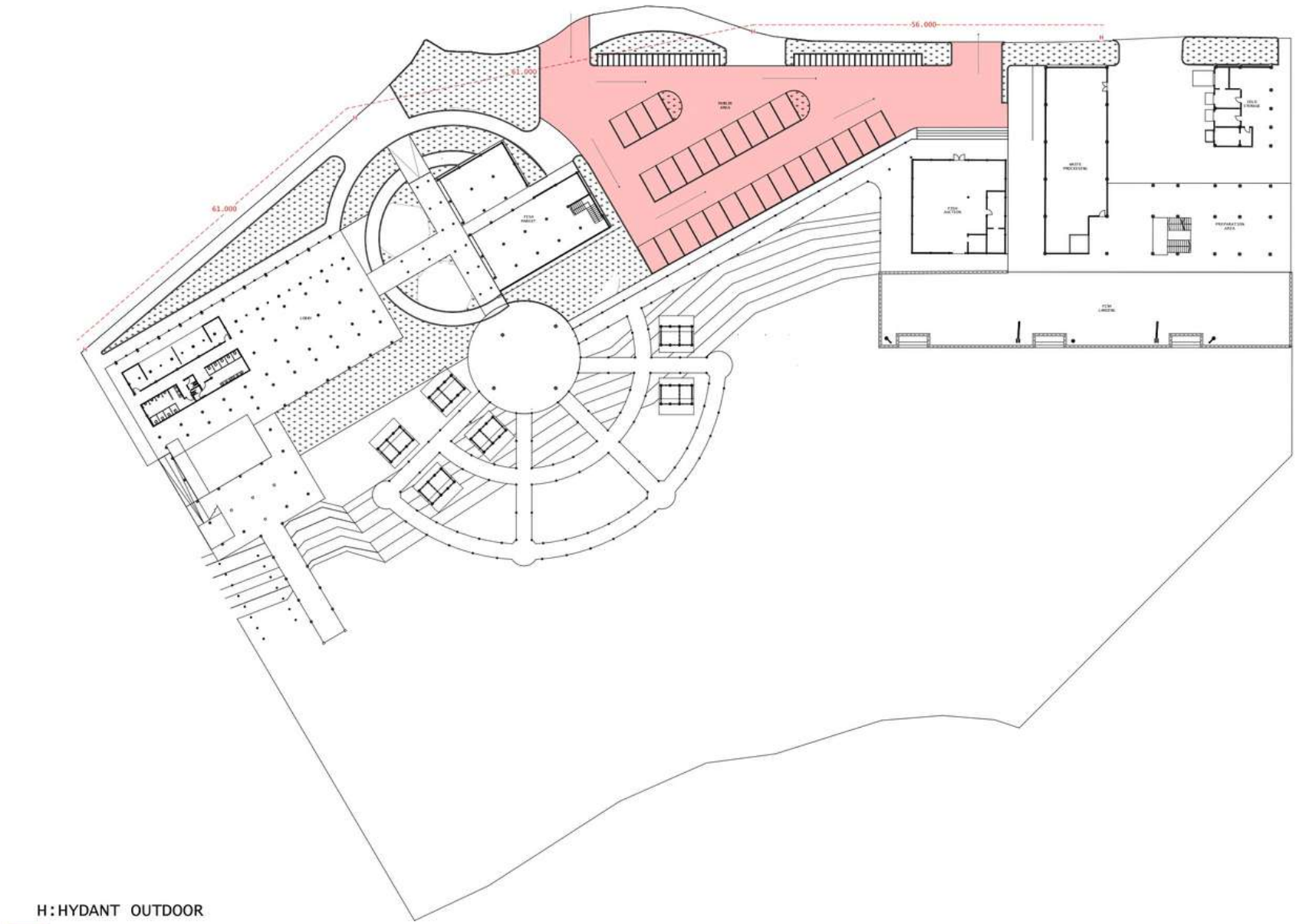
Plumbing system on the design focuses on recycling water from fishery treatment waste because one of the sources of odor in the design is liquid waste. So the system is divided into two places, processing waste from the processing area and coming from the market and facility.

FIRE PROTECTION



1 :APAR
2 :HYDRANT BOX
3 :FIRE ALARM
4 :SPRINGKLER
5 :SPRINGKLER TANK
6 :WATER TANK
7 :ASSEMBLY POINT
H :HYDRANT OUTDOOR

Building safety system with the procurement of hyndrant, apar, and others in the building while on the site a hydrant box and pillar hydrant are provided at each point. On the design land, several assembly points are also provided as gathering points during disaster evacuation.

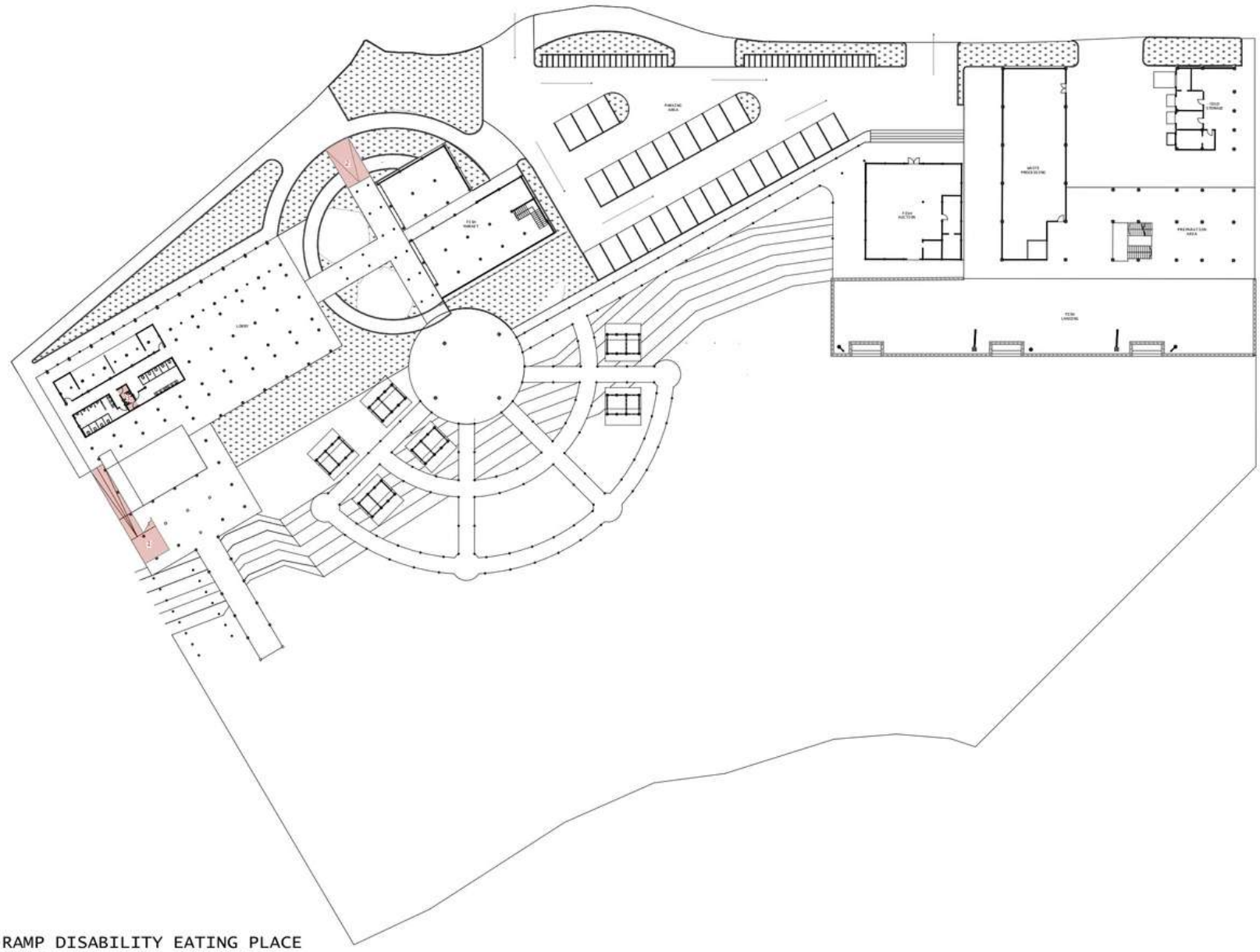


H:HYDANT OUTDOOR

:FIRE PROTECTION CIRCULATION

In building safety systems, circulation is available to direct users when there is a danger of fire and other disasters. This is to facilitate the evacuation process.

BARRIER FREE DESIGN



1 :RAMP DISABILITY EATING PLACE
2 :RAMP DISABILITY ENTRANCE
3 :LAVATORY DISABILITY

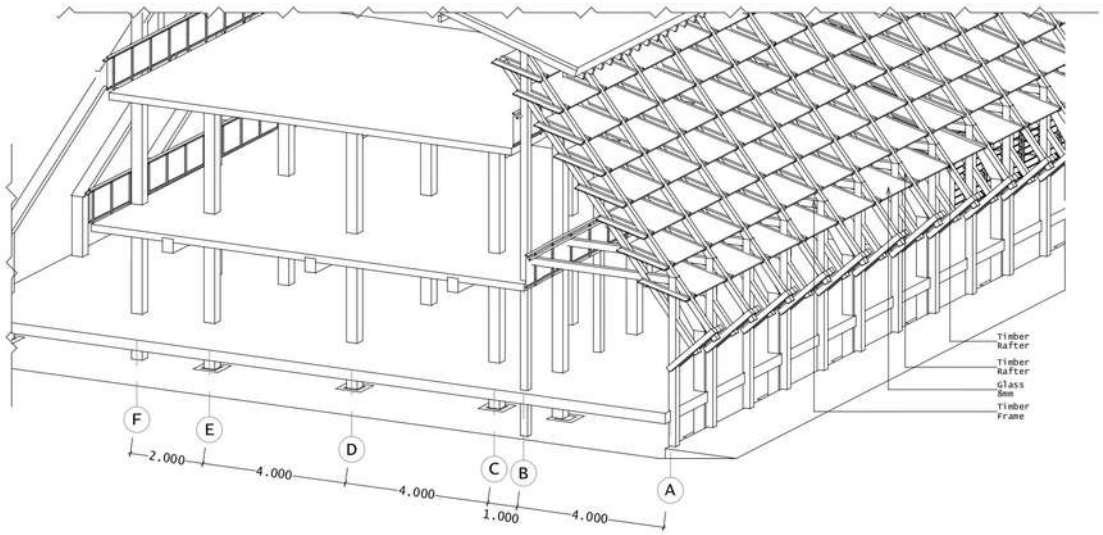
Vertical transport in the form of stairs connecting between floors. The provision of a disability ramp is to facilitate wheelchair access for users with disabilities. In addition to the ramp, this design also provides disabled toilets and disabled parking to facilitate access for users with disabilities.

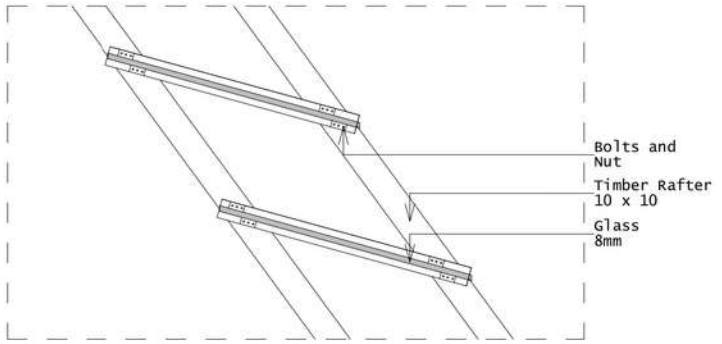
4.2.11 DESIGN OF SPECIAL ARCHITECTURAL DETAILS

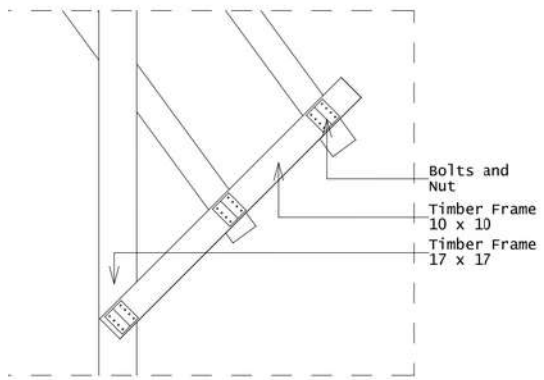
EATERY PLACE AND FACILITYY FACADE

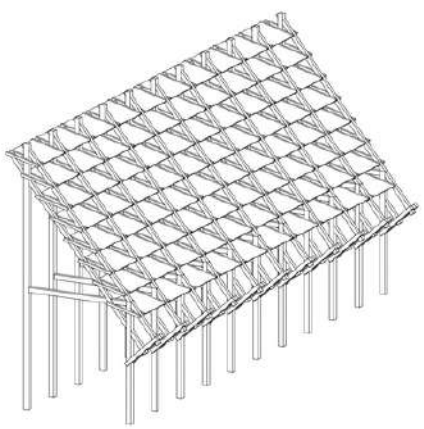


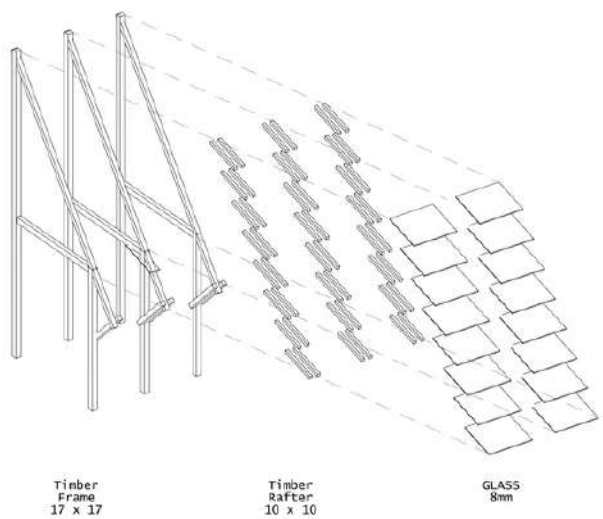
In eatery and place buildings the structure bears the burden of the roof structure, the interlocking wooden components serve for structural stability and form a corridor space that protects from heat and rain.

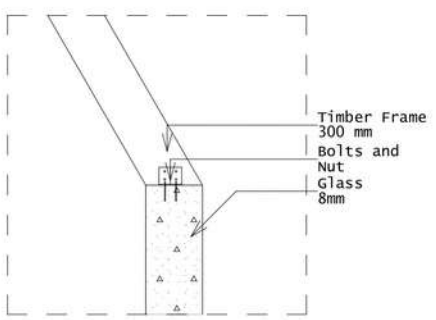












4.2.12 BUILDING EXTERIOR AND INTERIOR



The Fish Processing Center and Market is designed to synergize with the surrounding area to realize the Minapolitan area in Balikpapan City. Directly connected to settlements, tourist attractions, trade and fisheries activities.



As an area that has the main function of a fisheries-based economy, all activities (production, processing, marketing of fishery commodities, services, and/or other supporting activities) are adequately facilitated, in accordance with their potential.



The design is open, open not only to visitors and fisheries actors but open to anyone. Making this design accessible to anyone, especially local people who can also enjoy the process and the main view is the river so as to create integration.



This design is also made to integrate with local residents who process fishery products, by providing space for movement and easy access from fishermen's homes to the production area.



The existence of a connected fish market and dining area makes it easier for sellers and visitors to provide and taste directly the dishes provided. There are two types of markets including a wet market that sells fresh fish and a dry market that sells processed seafood.



Not only culinary, the attraction provided for this area is also available water tourism to enjoy its natural potential.



Fish processing buildings focus on drying areas where materials and systems are designed to solve odor issues in an area. With this closed system, it is expected to increase fishery productivity and increase user comfort and the environment.



The fish processing area has its own circulation flow to reduce the impact of odors caused and ease of access for managers. Organized into 3 zones, namely from preparation, processing and distribution.



Circulation that has no restrictions, can access the entire area and present its natural potential making this area open to all activities.

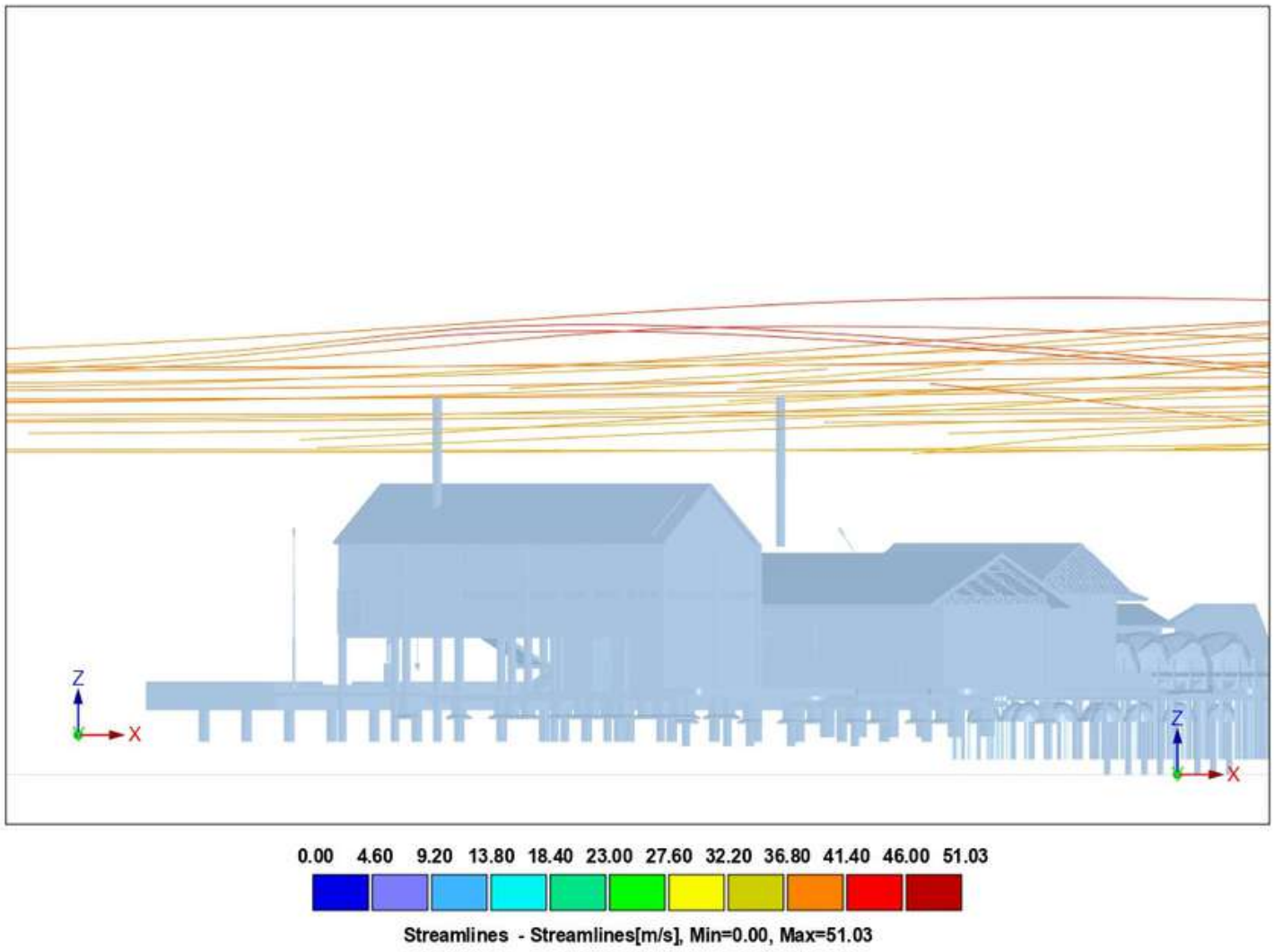


Fishermen's homes are generally located in the tidal zone, and in this design accommodates fisherman pods for fishermen and their families which can be a place to rest or a place to live at the same time. Because basically, this water culture is closely related to activity on the water.

4.2.13 DESIGN RESULT SIMULATION

WIND VELOCITY USING RWIND

The design test of the design results is a test of the success of the design against predetermined benchmarks. Variables and benchmarks are determined based on the design theme taken.

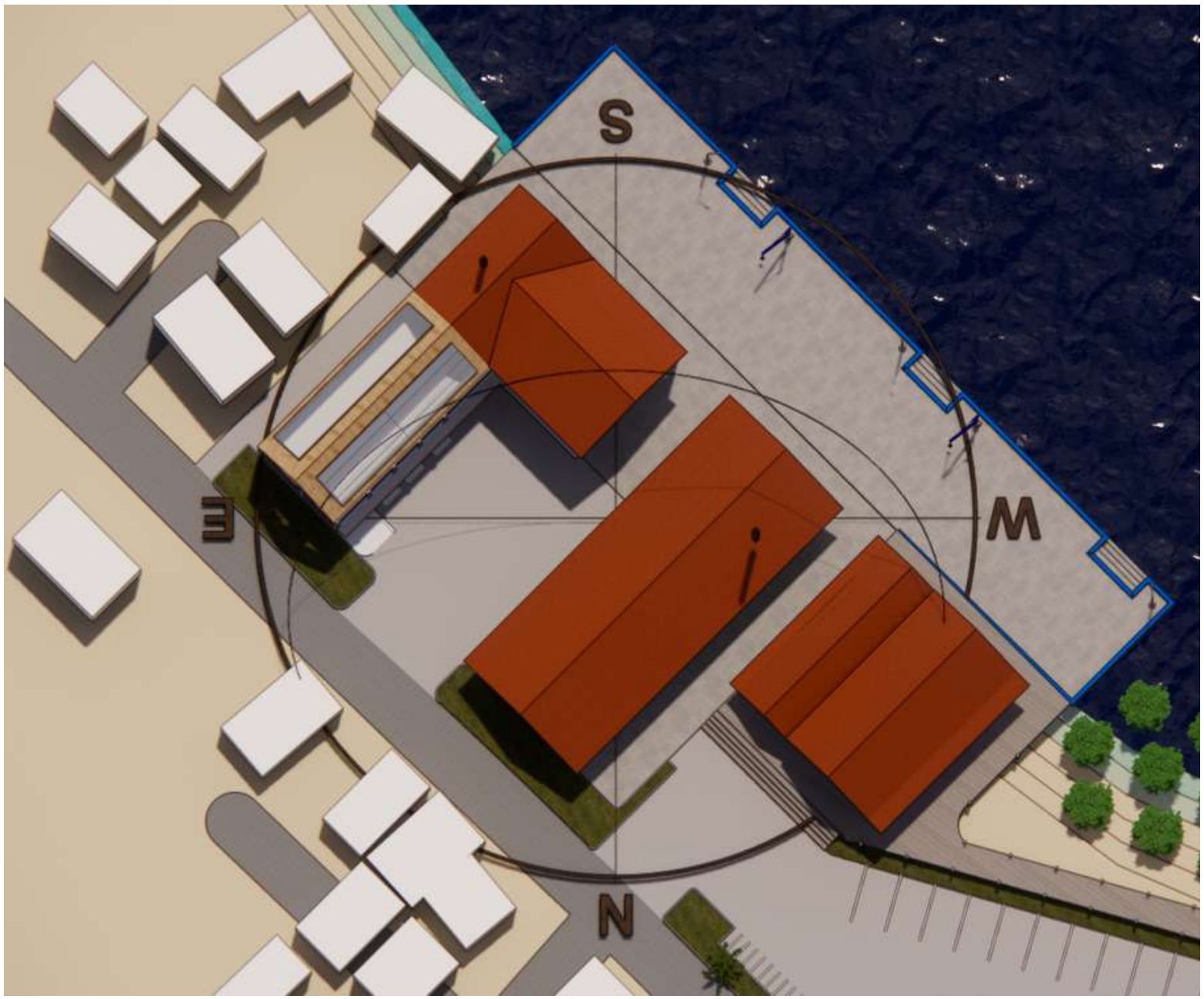


Project RWIND
Free Stream Velocity: 39.69 m/s
Results, Streamlines

The main issue in the design is smell, so its relationship is very closely related to the movement of the wind. In this design test, it uses Wind Simulation to determine the height and speed of the wind passing through the design building so that it can create one of the solutions to odor-related problems.

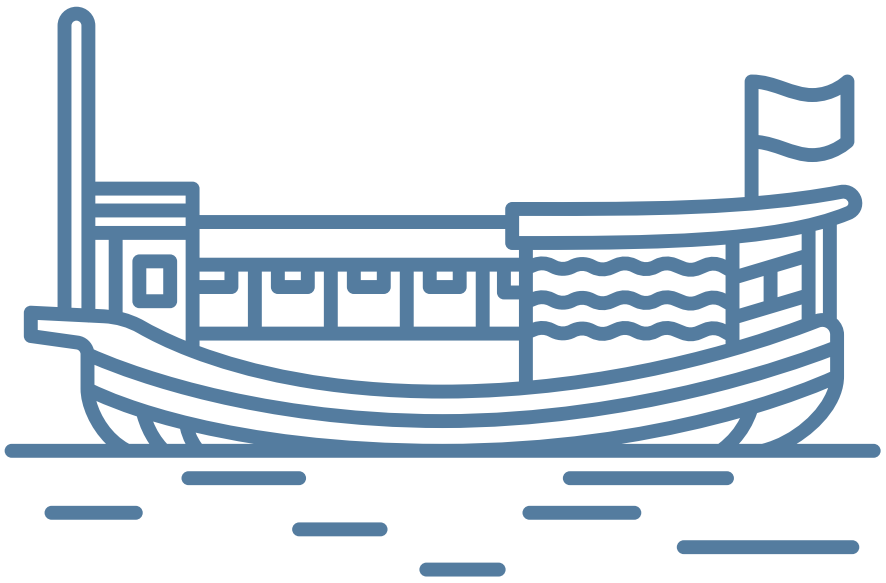
In its scale, the colors on the simulation describe the speed of the wind. In the design, the fastest wind blows from the south with a height of at least 5 meters from the roof surface to get maximum wind speed. This can make a reference in the design to design an odor outlet in space that can be carried away by the wind at high speed.

CLIMATE RESPONSE



Testing on this climate response variable is in the form of testing the results of the design design by looking at the angle of falling shadows on the building. This test was carried out using Archicad software with conditions in the critical month of June 21.

The results of the shadow fall angle test show that the sides of the building that are exposed to a lot of sunlight, namely the west and east sides, this makes the response of the building processing that requires maximum enumeration.



05 DESIGN REFLECTION

Questions - Comments

Q&A

5.1 How to Measure the Success?
5.2 How to Press the Air?
5.3 Waste Processing Reflection
5.4 The Transition of Local Architecture
5.5 Conclusion and Recomendation

In this Design Evaluation chapter, it describes the conclusions of the evaluation results on the input and responses given by the Supervisor and Examining Lecturer to the author at the Final Defense which was carried out on July 29th, 2022 In response to the subsequent development of the design.

5.1 HOW TO MEASURE THE SUCCESS?

As a design that pays attention to controlling odors in space, this design can be considered successful as solving problems on the medium scale of production because of the limitations of space and production capacity as well as the odors produced during the process compared to the original conditions on the site. This design is considered as a schematic of how to control odors in fishery production areas.

How can this design be considered a success? First of all in the design of buildings this production can maintain the quality of fish, since the quality of the fish affects the smell produced. So that the drying room in the building uses the principle of green house, the shape of the greenhouse building for drying. In green houses, this high air temperature also causes the evaporation process of the dried object, so to overcome this, the drying room is equipped with a wind augmentation and purifying air conditioning system.

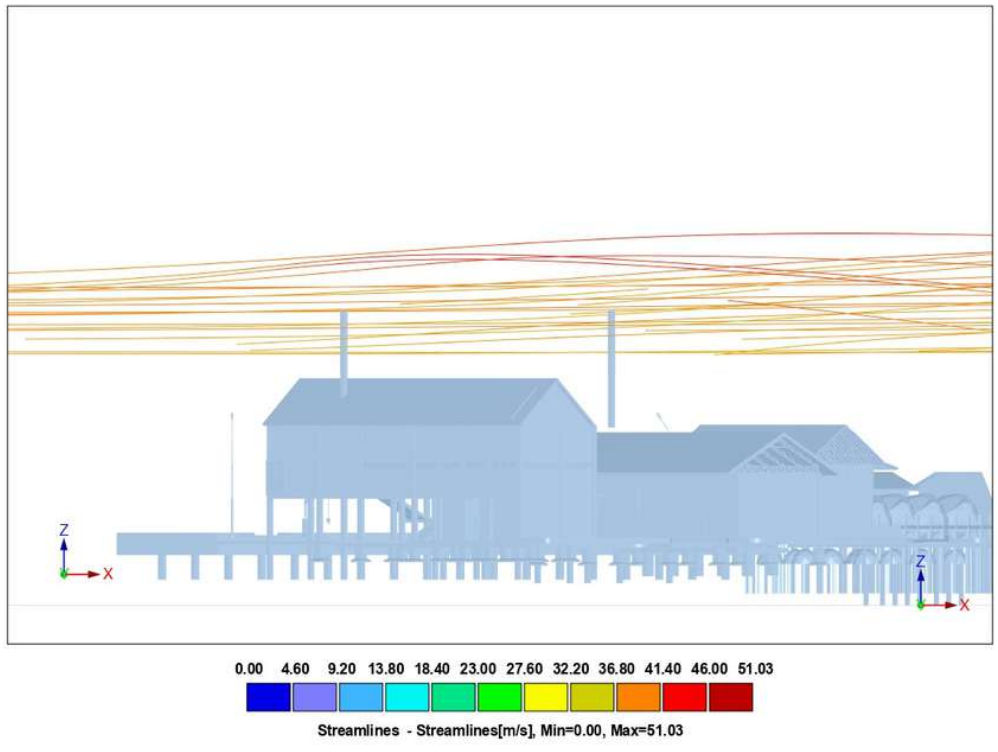


Glass House in the design

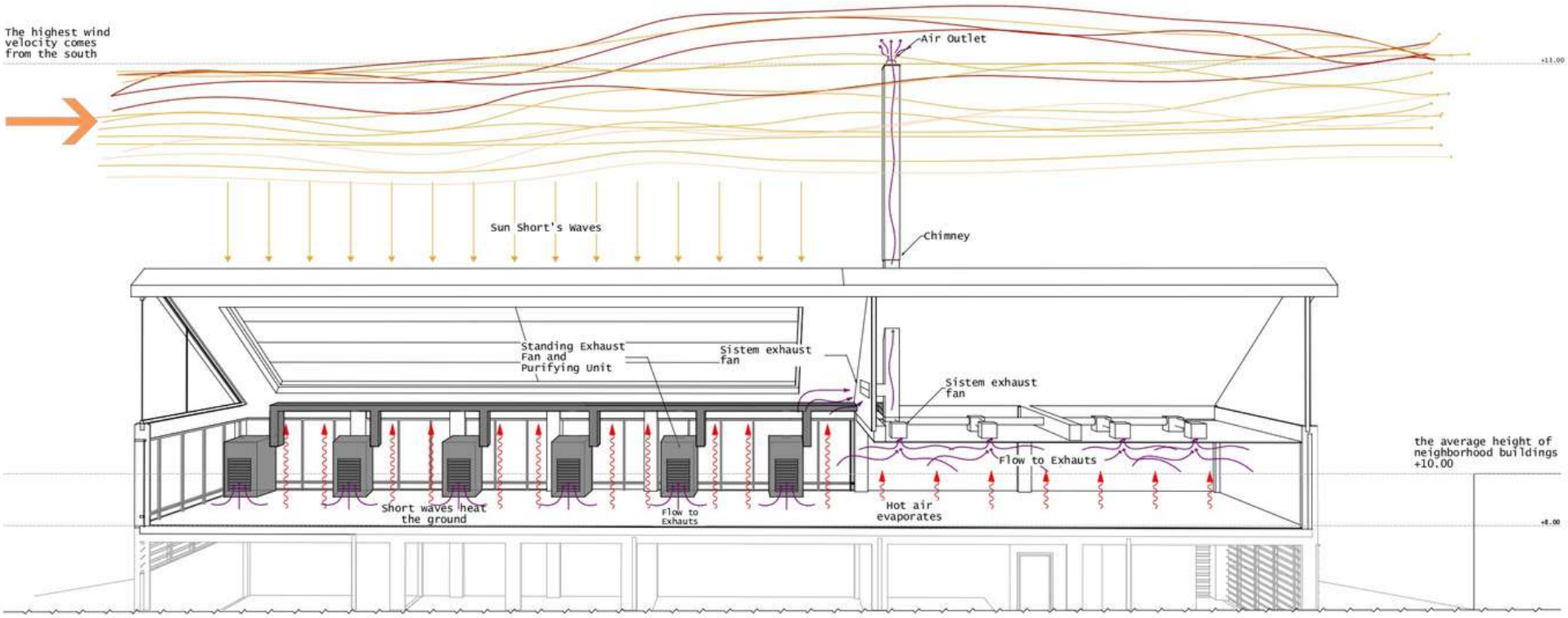
Then how can the design process pungent odor and turn it into a smell that is more tolerable to people, because basically even though the surrounding residents tolerate the smell, this smell is still a problem that needs to be solved.

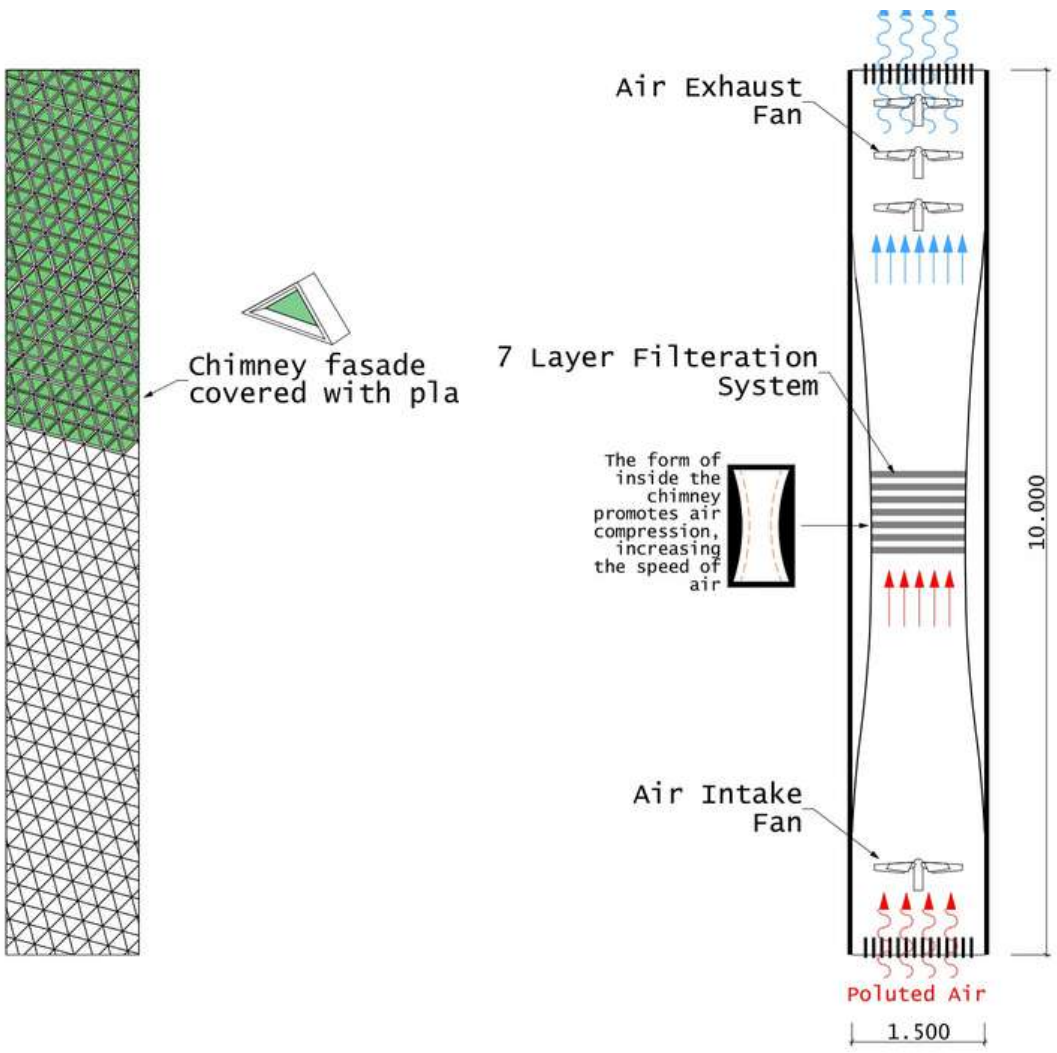
Smell is closely related to the wind. Thus, the solution to this odor problem is in the form of the building's response to wind. For this reason, this design uses simple measurements, namely looking at flow and wind velocity with RWIND Simulation. In this simulation, it determines the height of the chimney because it affects how the wind carries the air coming out of the chimney. Analogously, if we drive at a high speed then the smell passing by is almost not smelled by the nose.

So in this design, the height of the chimney in this design not only follows the standard but the chimney in the design has a height where the passing wind is at the highest velocity marked in red in the simulation. The air coming out of the chimney will be carried away faster by the wind and the smell will be less pronounced in the human nose.



Project RWIND
Free Stream Velocity: 39.69 m/s
Results, Streamlines





5.2 HOW TO PRESS THE AIR?

The drying room is on the third floor of the processing building, because it is a closed process and the distribution of odors is controlled to be above.

To push air into the chimney using an exhaust fan system so that the air in the drying chamber is sucked into the exhaust fan which is also a wind augmentation and purifying. Then the air flows into the chimney at high speed because the shape in the chimney promotes air compression, increasing the speed of wind where the wind passes through a small medium will make the wind move faster. At this speed, the wind passes through 7 layers of filtration so that the air released will be cleaner, and on the chimney façade there are also vertical air plants to absorb air.

5.3 WASTE PROCESSING REFLECTION

In this design, the handling of waste which is one of the sources of the pungent odor has not been fully depicted in detail. In response to this, as for the shortcomings in the design, it is re-described as a reflection for the subsequent development of the design.

Waste produced from fish processing can be solid, liquid or gas. In this case solid wastes include skin, viscera, fish heads, fish bones, and scraps of flesh. while on liquid wastes includes blood water and brine from drained storage tanks, water discharge from washing and cleaning, scraps of flesh, blood and soluble substances from entrails, detergents and other cleaning agents and effluent from the processing of oliy fish can also contain very high levels of oil.

Smell is often the most significant form of air pollution in the processing of fish. The main sources include:

- Storage sites for processing waste
- Cooking by-products during fish meal production
- Fish drying processes
- During filling and emptying of bulk tanks and silos

Fish quality may deteriorate under the anaerobic conditions found in onboard storage on fishing vessels and in the raw material silos of fish processing facilities. This deterioration causes the formation of odorous compounds such as ammonia, mercaptans, and hydrogen sulfide gas.

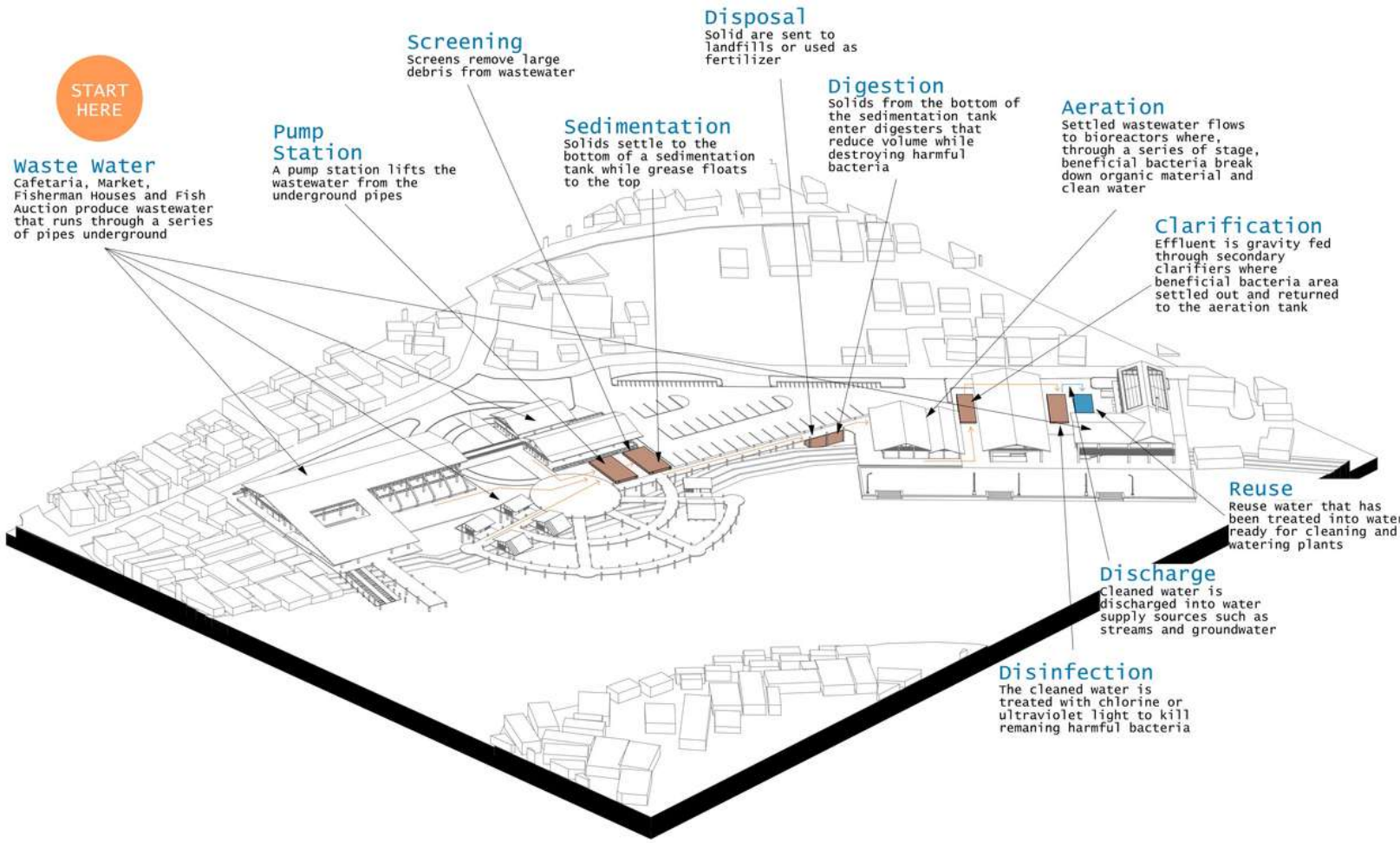
REDUCING THE POLLUTANT LOAD

Strategies for reducing the pollutant load of fish processing effluent focus on avoiding the loss of raw materials and products to the effluent stream.

- Sweeping up solid material for use as a by product, instead of washing it down the drain
- Cleaning dressed fish with vacuum hoses and collecting the blood and offal in an offal hopper rather than the effluent system
- Fitting drains with screens and/or traps to prevent solid materials from entering the effluent system
- Using dry cleaning techniques where possible, by scraping equipment before cleaning, pre-cleaning with air guns and cleaning floor spills with squeegees.

ODOR PREVENTION

- Avoid processing batches of raw material that are of considerably lower than average quality; this will reduce the odor components
- Reduce the stock of raw materials, waste, and by products and store this stock for short periods of time only in a cold, closed, well-ventilated place
- Seal by-products in covered, leak-proof containers
- Keep all working and storage areas clean and remove waste products immediately from the production line
- Empty and clean fat traps on a regular basis
- Cover all transfer systems, wastewater canals, and wastewater treatment facilities to reduce the escape of foul odors

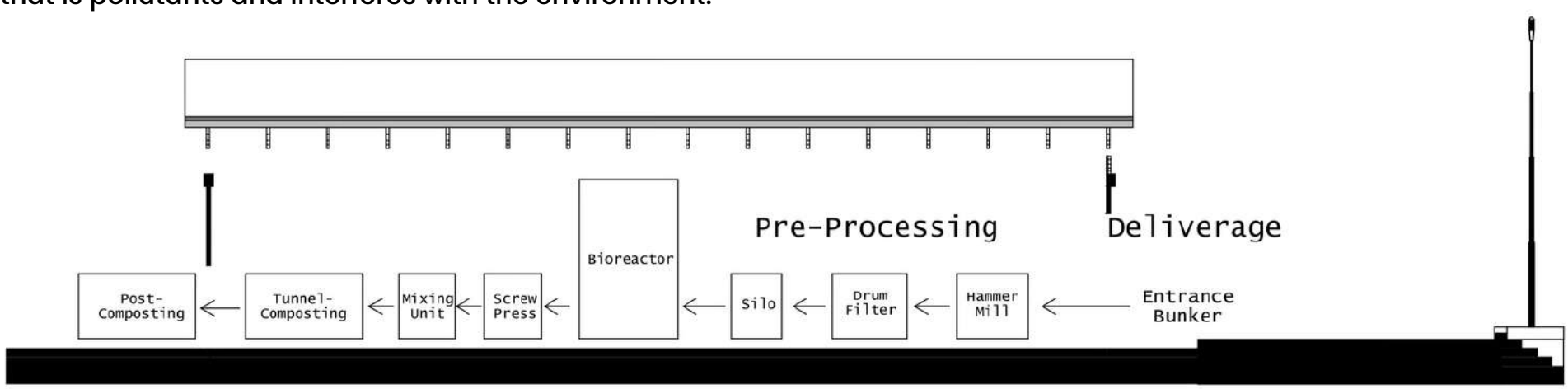


LIQUID WASTE SCHEME

The waste treatment process goes through three stages starting from the processing of primary treatment, secondary treatment and desinfection. The disinfection process of liquid waste is carried out after the waste treatment process is completed, namely after primary and secondary treatment, so that the water from the treatment can be reused. This principle is used by the treatment of industrial waste, especially waste that is pollutants and interferes with the environment.

SOLID WASTE SCHEME

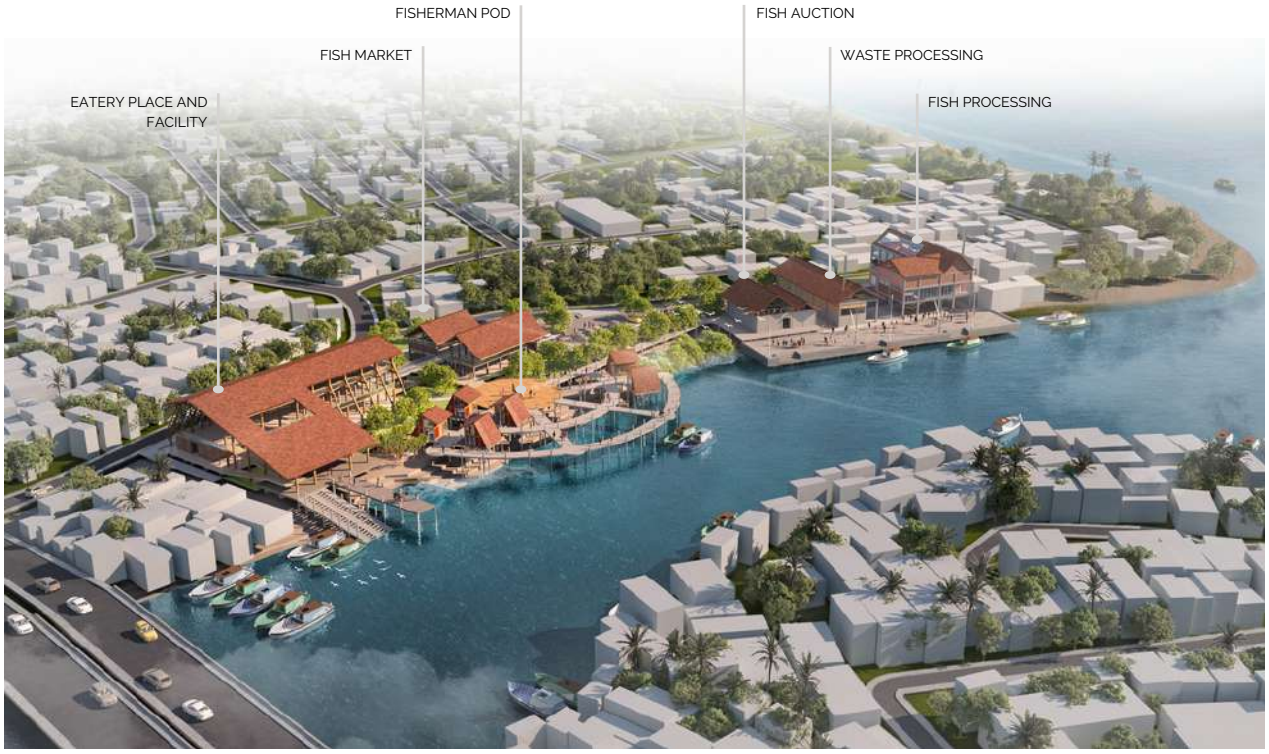
The process of processing fish solid waste starts from deliverage, pre-processing and post-processing. The use of machines that can produce fertilizer from solid waste is depicted in the scheme below. The application of machines in solid waste treatment can speed up the waste cleaning process, in addition to reducing unpleasant odors coming from unprocessed waste.



5.4 THE TRANSITION OF LOCAL ARCHITECTURE

In building design, the shape of the building is an adaptation of the traditional local architecture of bugis fishermen because of its location in the tidal zone and due to circulation adjustments to minimize the spread of odors. In the design, as for the zoning division, namely fishery processing zones and recreation zones, this is shown in the design of buildings within the fishery zone in a simple shape and prioritizing aspects of functionality which is also a semi-private area. Unlike the buildings inside the recreation zone, making this building more striking and contrasting to attract the attention of visitors to visit this area.

All buildings apply the local principles of traditional architecture which are shown in form, element, color and material but each building has its own main focus.



5.5 CONCLUSION & RECOMENDATION

From the results of the Final Defense, there are various kinds of criticism and input for the author which are then summarized in three points, namely:

1. need to understand the typology of smell, because there's so many types to deal with all of them. At least have the concept of the main source of one type of smell, but there' other smell that needs to take care.

2. The dimension of redesign is also to attention from the author and how do the author see that in her work, the before and after. It also need's to be visualized

3. The waste management; cleaning the fish - dirt fish - waste create smell



06 BIBLIOGRAPHY

Bibliography - Attachments

6.1 Bibliography
6.2 Attachment



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ATTACHMENT

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Judul Karya Ilmiah : Redesign of Fish Processing Center and Market in Kampung Manggar Balikpapan - Application of Ecological Water Culture Approach

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DIREKTORAT PERPUSTAKAAN
YOGYAKARTA

Joko S. Prianto, SIP., M.Hum

Redesign of

FISH PROCESSING CENTER AND MARKET

in Kampung Manggar Balikpapan

The water house on the stage is a traditional form of settlement for residents of fishing villages in many parts of the world. It was a significant past that illustrated the ingenuity of local artisans in solving environmental, economic and social constraints. Indonesia is a maritime country, most Indonesians make a living as fishermen. Every year, fishery production has increased, causing some environmental problems, this is inevitable, and for many people, physical invention is not an option.

Manggar Fisherman Village, was chosen as the location for the design study to test how an understanding of the form of fishery production settlement can inform the architecture for new developments aimed at addressing environmental issues in the fishery production area, improving people's lives, while maintaining the attractiveness of the place, the customs of its people, and responsiveness as architecture. Located in East Balikpapan subdistrict, Balikpapan city, Manggar Fisherman Village is a priority area for the improvement and development of facilities and infrastructure in the Minapolitan area. Being on the list of slums - there has been no organized settlement and environmental issues are beginning to lose their essence.

It is important to understand that the local culture and heritage of the Manggar Fisherman Village acts as Genius Loci to the place and this is always evolving which makes the future culture of this area will be hybird and will produce hybird in the form of domestic architecture by being remodeled by local culture.
The theory of Ecological Water Culture will be a catalyst that can solve problems for the people of Manggar Fisherman Village, especially through seafood production and tourism and can contribute to the sustainable development of a region and country.



DEPARTMENT of ARCHITECTURE | FINAL ARCHITECTURAL DESIGN STUDIO | REDESIGN OF FISH PROCESSING CENTER AND MARKET IN KAMPUNG MANGGAR BALIKPAPAN | UMMI HANIK ESAPUTRI 18512085 | SUPERVISOR IR. WIRYONO RAHARJO, M.ARCH., PH.D | JURY I DR.-ING. AR., IR. ILYA FADJAR MAHARIKA MA., IAI | JURY II DR. IR., REVIANTO BUDI SANTOSA M.ARCH | 1



SITE LOCATION
Kampung Nelayan Manggar

The development zone of the Minapolitan area is located in the Kampung Nelayan Manggar, which is around the mouth of the Manggar River, namely in the form of increasing Fish Auction and developing Fish Landing in accordance with its directions as an area for marine aquaculture, aquaculture, and pond cultivation. The existence of the port is also inseparable from the fishing.



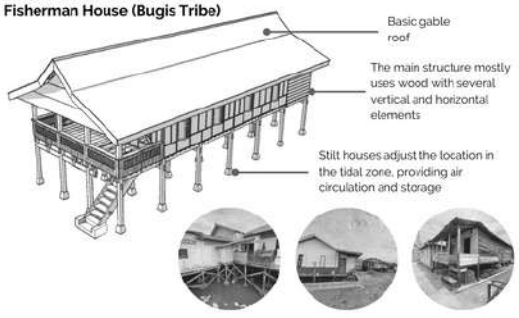
SITE CONTEXT

The fishery processing is an open air structure built over the river and empty land with the scenic views downstream towards the river mouth anad traditional fishermen's village with fishing boat park along the Manggar river.

As for the community support room, namely the drying area of the catch, the fish will be dried in the sun for sale or private consumption, as well as space for the fishing boat dock to dock and some fishermen also repair their boats when docked at the ship dock.

Manggar Fish Auction is one of the dominant spaces to support the development of minapolitan areas. Most of the activities in the minapolitan area are centered around Manggar Fish Landing starting from landing, auctioning, selling to processing of the production of capture fisheries and aquaculture.

LOCAL ARCHITECTURE
Fisherman House (Bugis Tribe)



ISSUE AND SCENARIO

Fish Processing Issue

Drying fish is still considered one of the eyes in the fish processing industry. It requires the ability to produce quality products and the presence of stable production continuity in quantities that can meet market needs.



Waste Management Issue

Fish processing waste management in Manggar has not been carried out optimally. The waste produced is left alone and is immediately dumped into the sea without being managed first.



Distinctive Aroma Issue

The aroma is often smelled in tourist areas, including Manggar Beach, and disturbs the activities of residents. Of course, it is not comfortable to smell in residential areas and tourist areas. However, the smell becomes common if we enter the traditional market area.

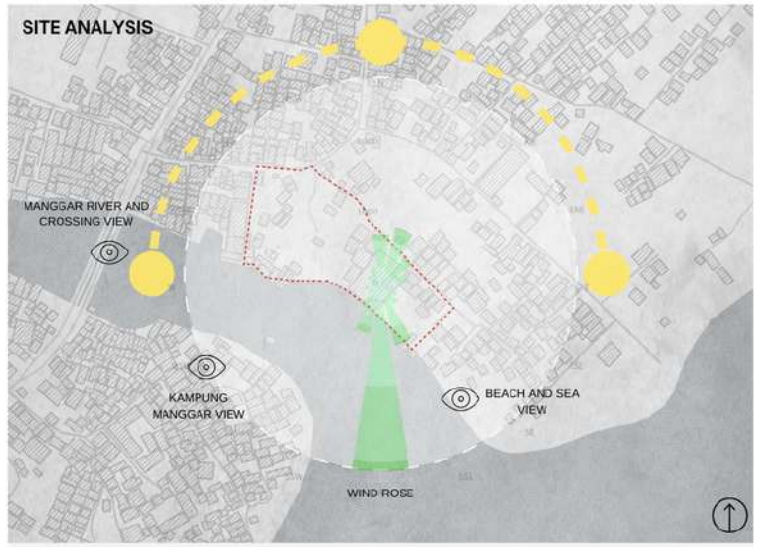


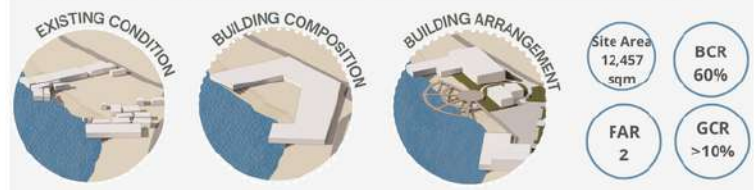
Architectural Issue

Designing using ecological water culture and integrate the local architectural tradition to the design of fish processing center and market.

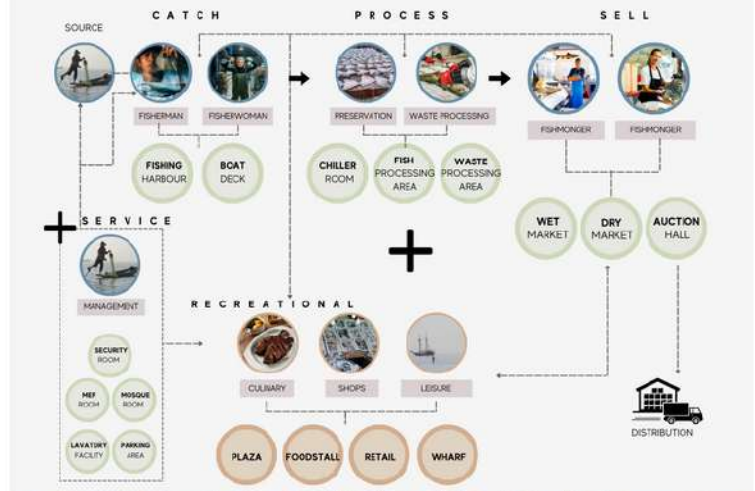


SITE ANALYSIS





SPACE ORGANIZATION





SITUATION

The design of the Manggar Fish Processing Center and Market is located in a residential, fishery, trade and tourism area. The relationship between the site design and the condition of the surrounding site is realized by the application of ecological water culture architecture. The shape of the building that is designed also opens up all access to the site that can be reached from all directions to integrate directly with the surrounding environment.

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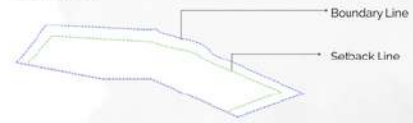
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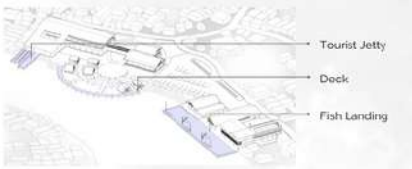
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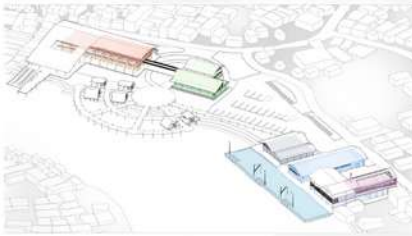
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SPATIAL PROGRAMMING & ZONING

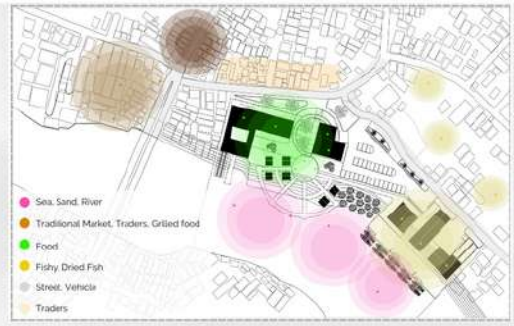












ODOR SCHEME

In the schematic mapping of odors on the design site, the main source of odors is fishery activities that cause fishy odors from fish. This is because the site is a fishery processing area. In addition, there are also odors that dominate in the surrounding area, namely the smell of the sea, the smell of food, the smell of the market and the smell of vehicles.

LANDSCAPE PLAN





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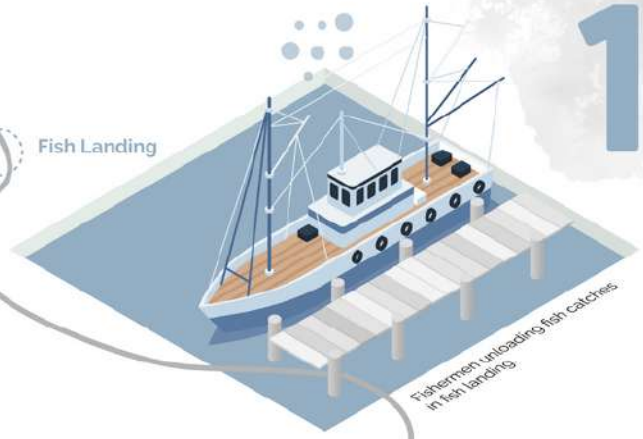
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Odor Control Scheme

Following the design issue of odor, one of the main solution strategies is the air rigging around the production area. Fish and their processing produce odors that can disturb the surroundings, therefore the processing building is designed to be closed with air conditioning in the space so that odors do not come out to disturb the surroundings and people in the space still feel comfortable.

1

Fish Landing



Fishermen unloading fish catches in fish landing

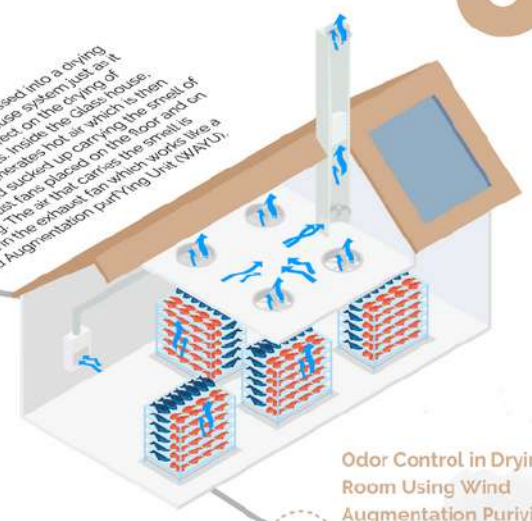
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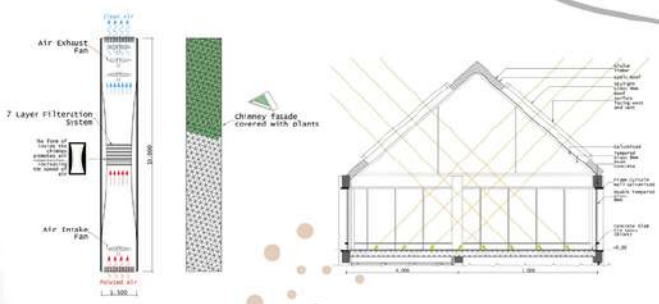
The fish arriving at the place of processing begin to be cleaned, soaked and prepared for the drying stage, arranged into drying racks. In this process, the resulting odor can still be tolerated by the surroundings, but it is still necessary to pay attention to the fishy smell that arises during the cleaning and disposal process of the fish's entrails.

Fish Preservation Process

3



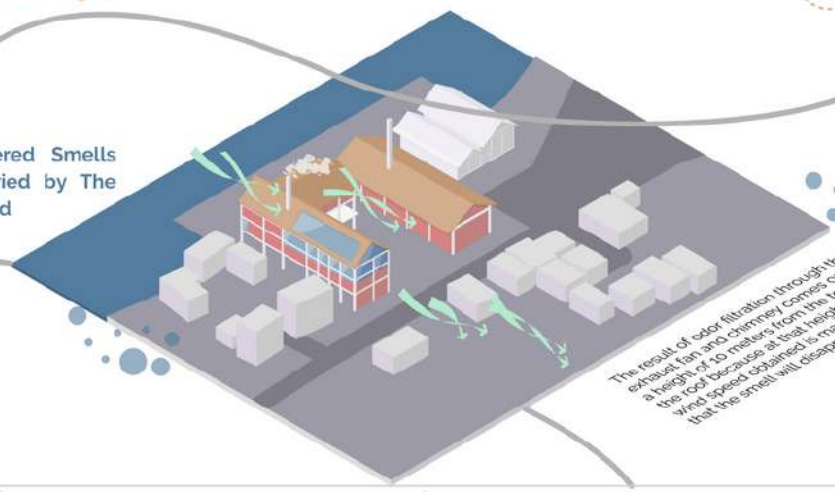
The fish to be dried are pressed into a drying chamber with a Glass House system just as it gives a greenhouse effect on the drying of agricultural products. Inside the class house, solar radiation generates hot air which is then evaporated and sucked up carrying the smell of fish by exhaust fans placed on the floor and on the ceiling. The air that carries the smell is filtered in the exhaust fan which works like a Wind Augmentation purifying Unit (WAYU).



Odor Control in Drying Room Using Wind Augmentation Puriying Unit System

Filtered Smells Carried by The Wind

4

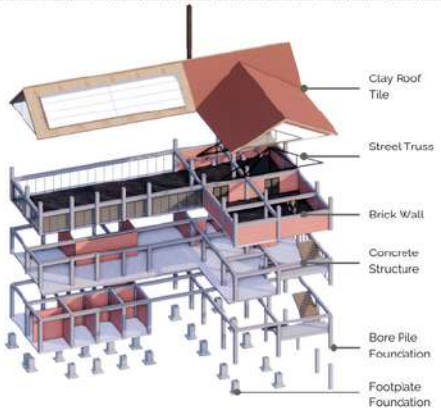


The result of odor filtration through the exhaust fan and chimney comes out at a height of 10 meters from the top of the roof because at that height, the wind speed obtained is maximum so that the smell will disappear faster.



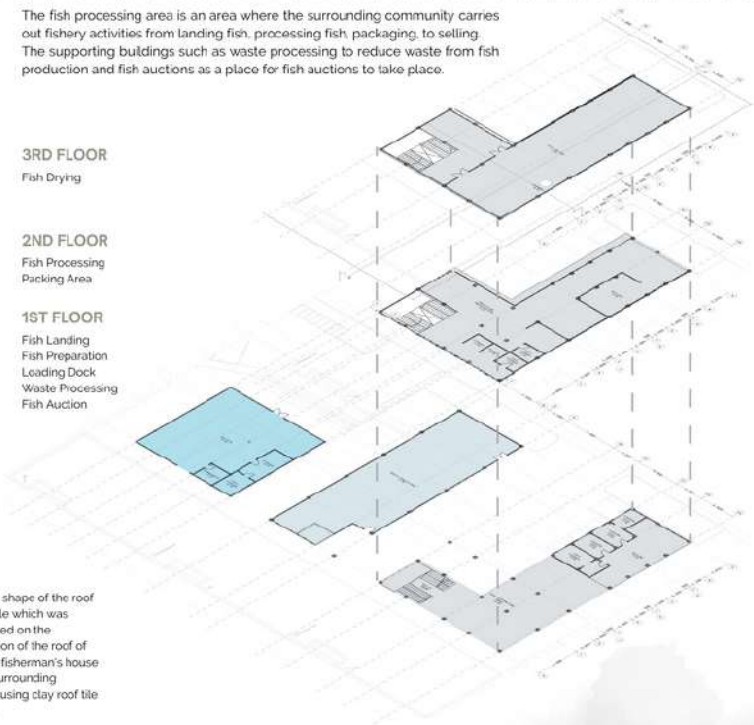
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FISH PROCESSING, WASTE PROCESSING AND FISH AUCTION

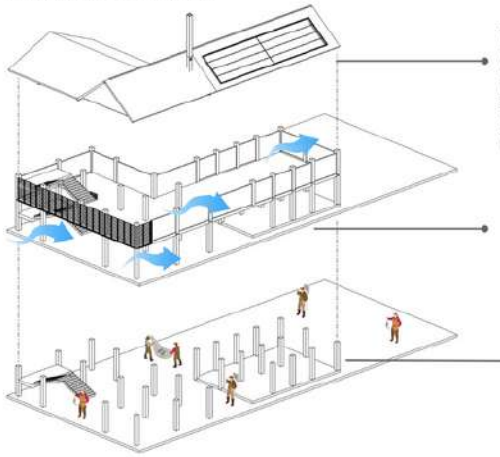


In the building there are 2 main types of construction that can be seen from the foundation, which mainly uses a concrete pile foundation because the building build on the tidal zone. While the second is the use of a footplate foundation.

The fish processing area is an area where the surrounding community carries out fishery activities from landing fish, processing fish, packaging, to selling. The supporting buildings such as waste processing to reduce waste from fish production and fish auctions as a place for fish auctions to take place.



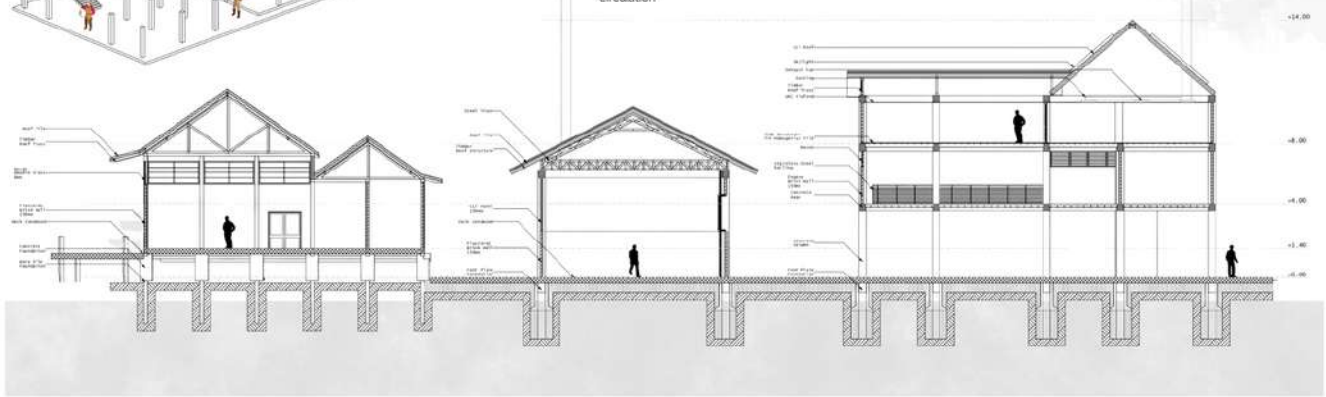
APPLICATION OF TRADITIONAL LOCAL ARCHITECTURE



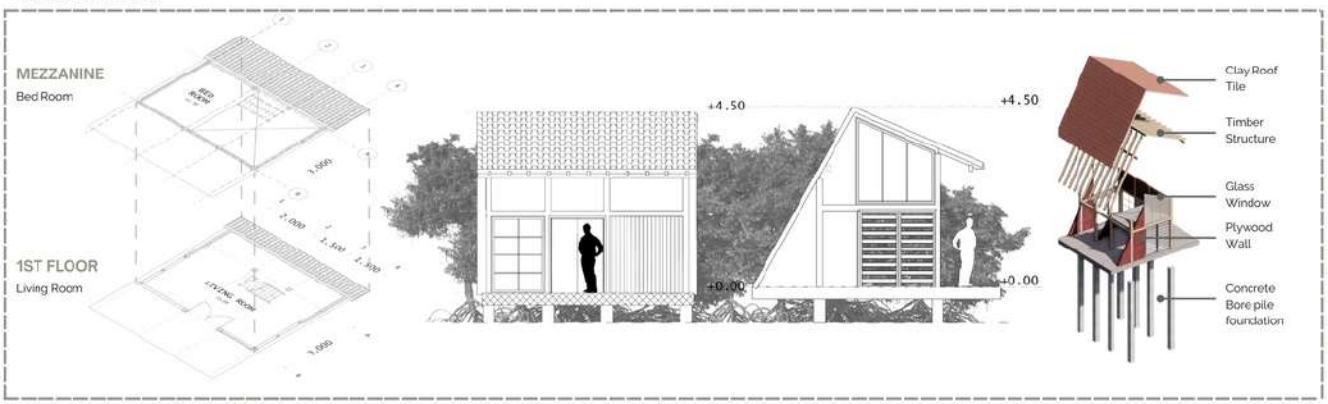
The basic shape of the roof is a triangle which was taken based on the modification of the roof of the Bugis fisherman's house and the surrounding buildings using clay roof tile material.

The basic shape of the space in the building is a square, which is built with a rectangular stilt house building typology. With the shape and openings in the building that are directed it allows to control oders through the air in the room

The existence space under the house is also applied in the design as a fish preparation of fishery activities and circulation



FISHERMAN POD



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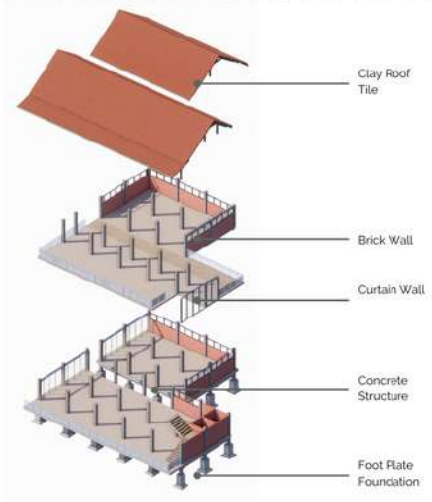
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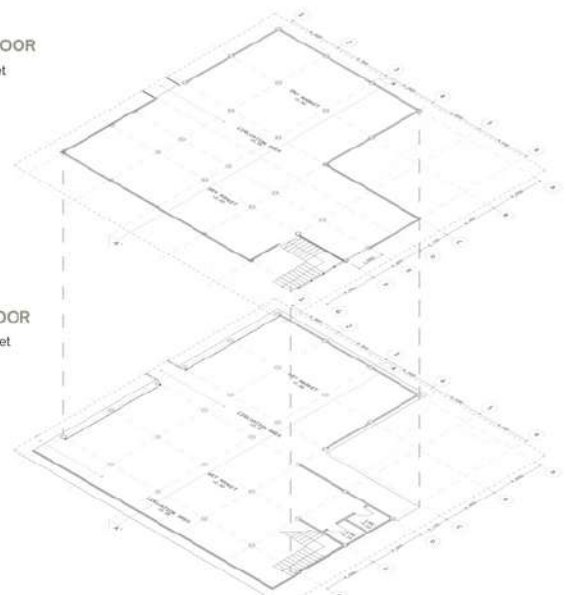
FISH MARKET

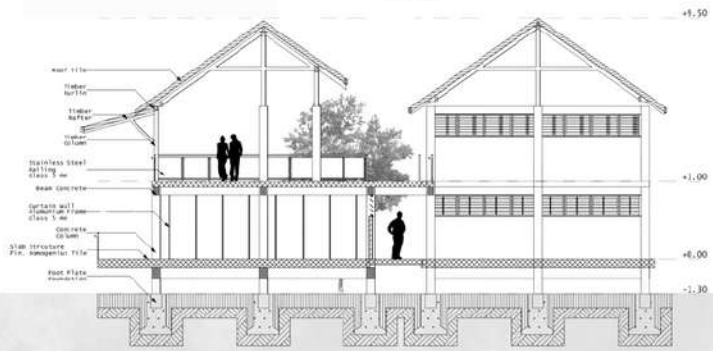


The fish market is still in the same area with an eatery place and facility located on the east side of the building. This fish market is used to sell processed fish products and can be directly consumed by visitors at the eatery place. There are two areas, namely, the wet market that sells fresh seafood products and the dry market that sells processed seafood products.

2ND FLOOR
Dry Market

1ST FLOOR
Wet Market





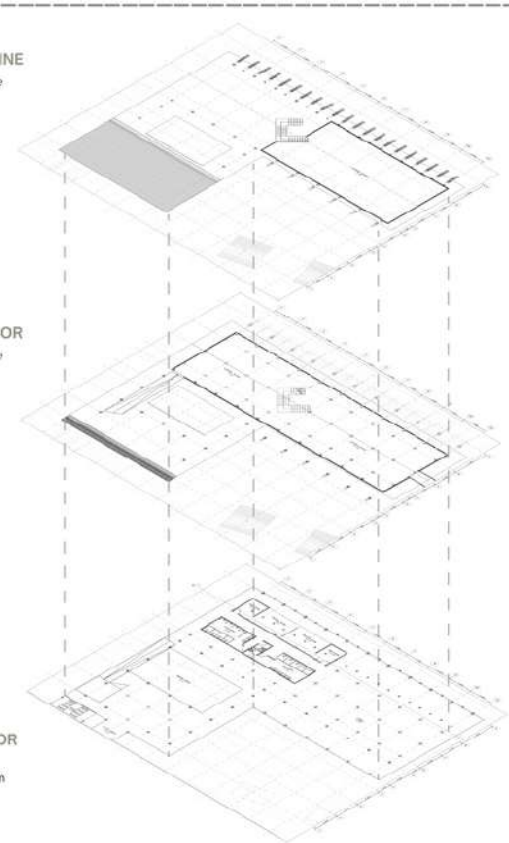
This building is semi-open and in the form of a stage. As a consideration to provide airflow and space of the water recycle system. Facing towards the river in the main vista of this area. For the structure of this building using concrete and wood materials, as well as steel truss.

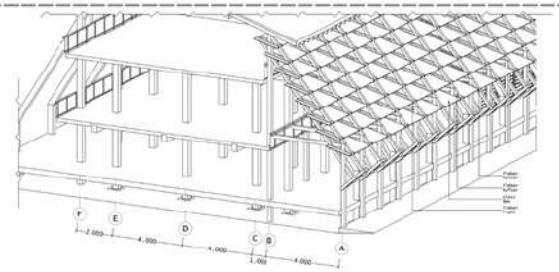
EATERY PLACE AND FISH MARKET

MEZZANINE
Eatery Place

2ND FLOOR
Eatery Place

1ST FLOOR
Lobby
Prayer Room
Lavatory
Jetty
Wharf

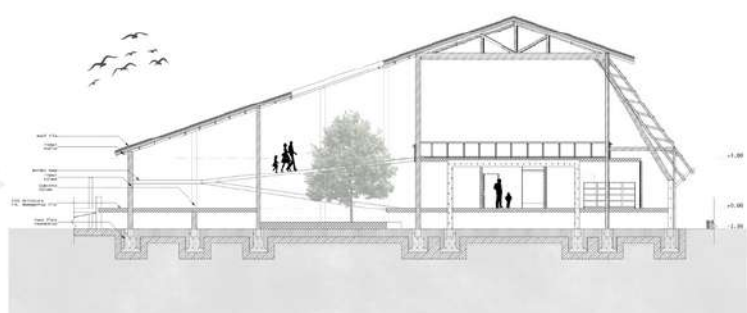






The eatery place and facility area is the main area for visitors to the Fish Processing Center and Market. This area has a lobby where visitors can search for information or water tourism activities available.

In addition to the lobby, This building also has a dining area connected to the fish market where visitors can buy fresh seafood and directly processed. then there is a jetty deck, lavatory, prayer room, and other facilities.



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EXTERIOR AND INTERIOR









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