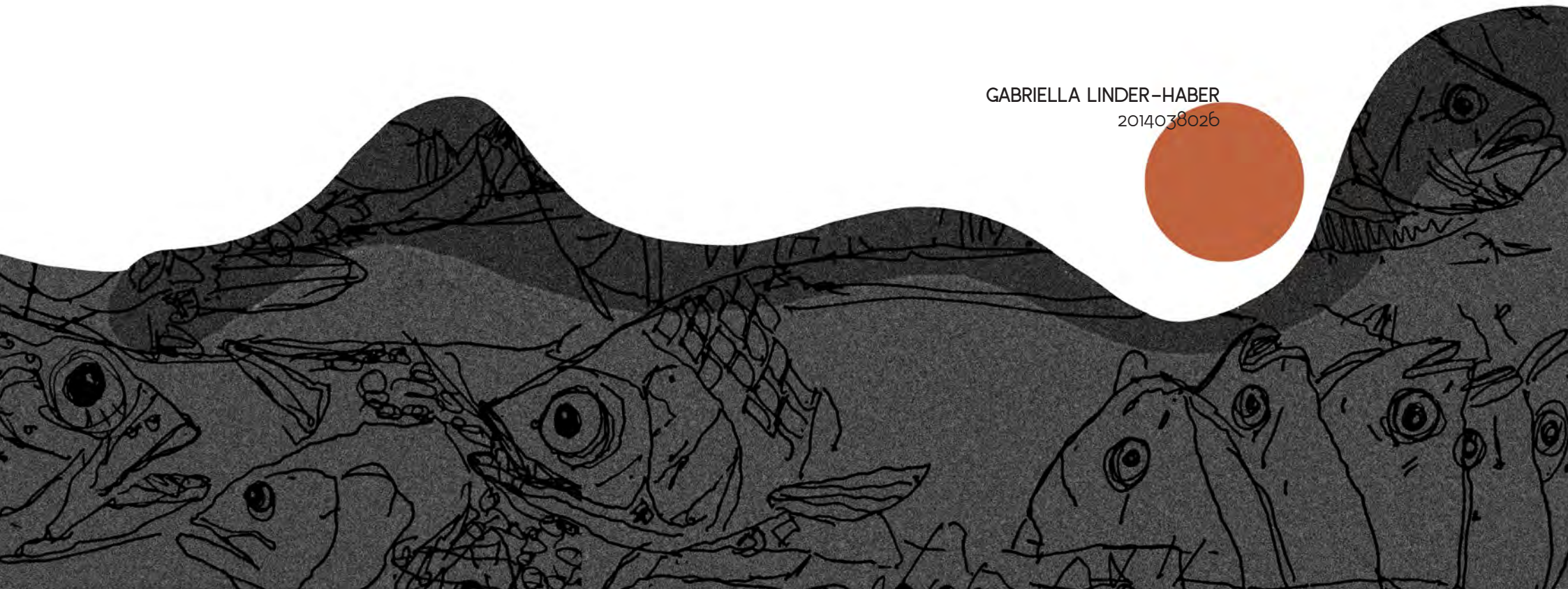
MAPUTO BAY **FISHERY** COMPLEX

AN ARCHITECTURAL INVESTIGATION OF MAPUTO'S EDGE

GABRIELLA LINDER-HABER
20140038026



This dissertation is submitted for fulfilling in part the requirements of the Masters Degree in Architecture, at the University of the Free State, 2019. All of the work contained in this document is my own, apart from where otherwise acknowledged.

Supervisors:
Prof. J.D. Smit, P. Smit, Dr. H.A. Auret, A. Wagner

Proofread by:
Sonia Pelletreau

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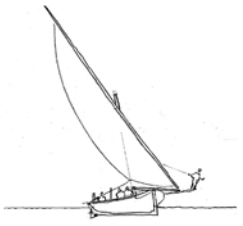
G.L. Linder-Haber 2014038026

ABSTRACT

"We must become technicians of the emotions, makers of smiles, tear jerkers, exaggerators, spokesmen of dreams, performers of miracles, messengers; and invent raw, bold, vigorous and intense buildings without taste, absurd and chaotic, to invent **an architecture the size of life.** Buildings shall yet belong to the people, architecture shall yet become real and alive, and beauty shall yet be warm and convulsive."

- Amâncio d'Alpoim Miranda "Pancho" Guedes

Pancho Guedes was not a purist - he celebrated that his architecture had a life of its own and would be appreciated and adapted by the people who made their homes in it (Guedes, 2015: online). One of the aims of this dissertation was to mine the poetic depths of the architectural contribution of the most influential Mozambican architect, Pancho Guedes (1925-2015).



PREFACE

"(...) Your gaze has the tender
and fierce curve of a wide angle lens.
That distant profile of cement
and mortar a much lauded
delicious geometry immersing the hips
and luxuriating in the sweet pool of
the bay (...)"

Rui Knopfli in 'Memoria Consentida,' 1982
(Conceded Memory- translation by author)

Rui Knopfli in this poem pays homage to the vibrant city of Maputo, where the contrast between the rigid geometry of the city layout and the more organic nature of the coastline that forms the Delagoa Bay are brought into harmony. The following dissertation deals with an approach to architecture in this developing 'third-world' country, in an area with strong environmental and historical influences. I started this project with the intention to identify the Mozambican 'local distinctiveness' and its qualities that have influenced its architecture throughout history in an attempt to represent it through an architectural intervention.

FIG 1. MAPUTO COASTLINE (FORJAZ, 2004: ONLINE).

INTRODUCTION

This thesis details the design of a fish market complex and ice distribution building in the Maputo Bay Fishery Port. The 'port' is explored as a threshold between city and the ocean. Simultaneously, the identified spatial permanence of city is brought into dialogue with the perpetually dynamical forces of the harbour across this threshold. The cyclic fluidity of communal life mediates this dialogue to express an architectural conscious design and a manifestation of the temporal.

"...the boat is a floating piece of space, a place without a [fixed] place, that exists by itself, that is closed in on itself and at the same time is given over to the infinity of the sea and that, from port to port... goes in search of the most precious treasures ... [It is] the great reserve of the imagination. The ship as the heterotopia par excellence, in civilizations without boats, dreams dry up..." (Foucault, 1986: 27)

A dialogue exists between the resources of the seaport and the congestion of varied human play in its neighboring open spaces. Through considerations of the active actions and events that surface within this dialogue and its association with the more static parts of the neighboring urban fabric, the port may be experienced as an accessible platform and its social practices may find appropriate expression. In this way the disposition of architecture to 'colonize' the social practice that it seeks to house, through enclosure, is displaced by human flux.

FIG 2. LOCATION OF MOZAMBIQUE (AUTHOR , 2019).
FIG 3. TRADITIONAL DHOW SAIL (AUTHOR, 2019).

MOZAMBIQUE

PART 1

HISTORIC & CULTURAL OVERVIEW
THE ARCHITECTURAL LANGUAGE
THE URBAN LANGUAGE OF MAPUTO
SITE ANALYSIS

[1] HISTORIC & CULTURAL OVERVIEW

1.1 MAPUTO BAY: BACKGROUND

In the fourteenth century, the Portuguese explorer Vasco da Gama landed in the north of the present Mozambique, on the island Ilha de Moçambique, which then became the capital of the new Portuguese colony (Torp, 1989: 12). The South was first discovered by Portuguese navigator Lourenço Marques in 1544, who started exploring the area near the Maputo Bay. Starting from 1825 the first groups of colonists arrived and settled down, living by cultivating and trading in the nowadays capital, Maputo, at that time called Lourenço Marques (Torp, 1989: 12).

The first infrastructure plan was designed in 1857, with six streets running parallel to the Maputo River. Starting from this point, the population started to increase due to the growing port and trade activities (Torp, 1989: 12). This structure found its model in a typical military matrix, leading to a very open and ventilated infrastructure net that could sustain the possible expansion of the city (Torp, 1989: 12).

The city was provided with the first electric public transport in 1904, considering it as an essential condition for Lourenço Marques to branch off, and in 1907, the Portuguese developed an expansion plan for Lourenço Marques by drawing with a compass two arcs: the first 2017m long, and the second 5000m, with the centre located in the 'Baixa' (Conselho Municipal de Maputo, 2008: 120). These arcs were supposed to define the limits of the city, delineating the directions of the possible expansion, yet without giving any rigid layout to follow.

In 1912, the infrastructure for the functional harbour adjacent to the 'Baixa', including the fishing port, was constructed. This happened along a area that was formerly submerged, but rescued through the refill project (Nyambir, 2002: 19). As the site of the original Maputo Fortress (Fortaleza de Maputo), the 'Baixa' is the point where the established western urban-center began, and developed around, due to the growing port and trade activities. It is therefore the historical centre of Maputo, and the portion of the city with the highest density of historic buildings.

About thirty years later, many solid buildings rose up, transforming the city into a well-advanced European oasis surrounded by a tropical African landscape. During the following decades, the trend followed the expectations, and many buildings started to be built according to the principles of Modernism.

Two reasons among others drew local people to the capital: the hope for job opportunities in the city and the fact that Lourenço Marquez was located near the border with South Africa, where diamond and coal mines often represented good chances of employment. Meanwhile, the Portuguese had to deal with the problems of finding areas to locate their industrial activities and developing appropriate strategies to accommodate the increasing population and density. That resulted in a new urban plan in order to block the uncontrolled boom in those areas lacking in proper infrastructure.

FIG 4. FISHERMEN OUT ON SEA (AUTHOR , 2019).
FIG 5. WOMEN WAITING TO COLLECT FISH (AUTHOR, 2019).

1.2 HISTORIC TIMELINE: SUMMARY

Africans migrated into coastal regions from the West and North of the continent of what is nowadays Mozambique. Towards the late 1400s, trade ports were built along the coast to deal with the Arabs, who had already been trading with Madagascar and the Far East.

Vasco Da Gama, a Portuguese sailing master, first reached Mozambique on the year 1498. The Portuguese began to settle and trade on the coast in the 16th century. Mozambique's strategic situation along the Indian Ocean trade routes stimulated colonial change in the area (Torp, 1989: 12). In 1781, a military trading office named after an early Portuguese traveler, Lourenço Marques, was also established on the bay (Jenkins, 2000: 3).

The Port of Lourenço Marques was properly built by 1850, adjacent to the original 1787 Portuguese fortress. From 1851 to 1867, a new fortress was built on the site of the original fort (Lage & Carrilho, J, 2010). In 1876, the bay was given the place of a village, and in 1887 was accepted as a town (Da Silva, 1964: 26).

Mozambique was under the control of Portugal as an 'overseas province' from 1951, which developed strong links with South Africa through import and export via Netherlands South African Railway Company (NZASM) railway connecting the formerly-named Transvaal Republic with the Port of Lourenço Marques.

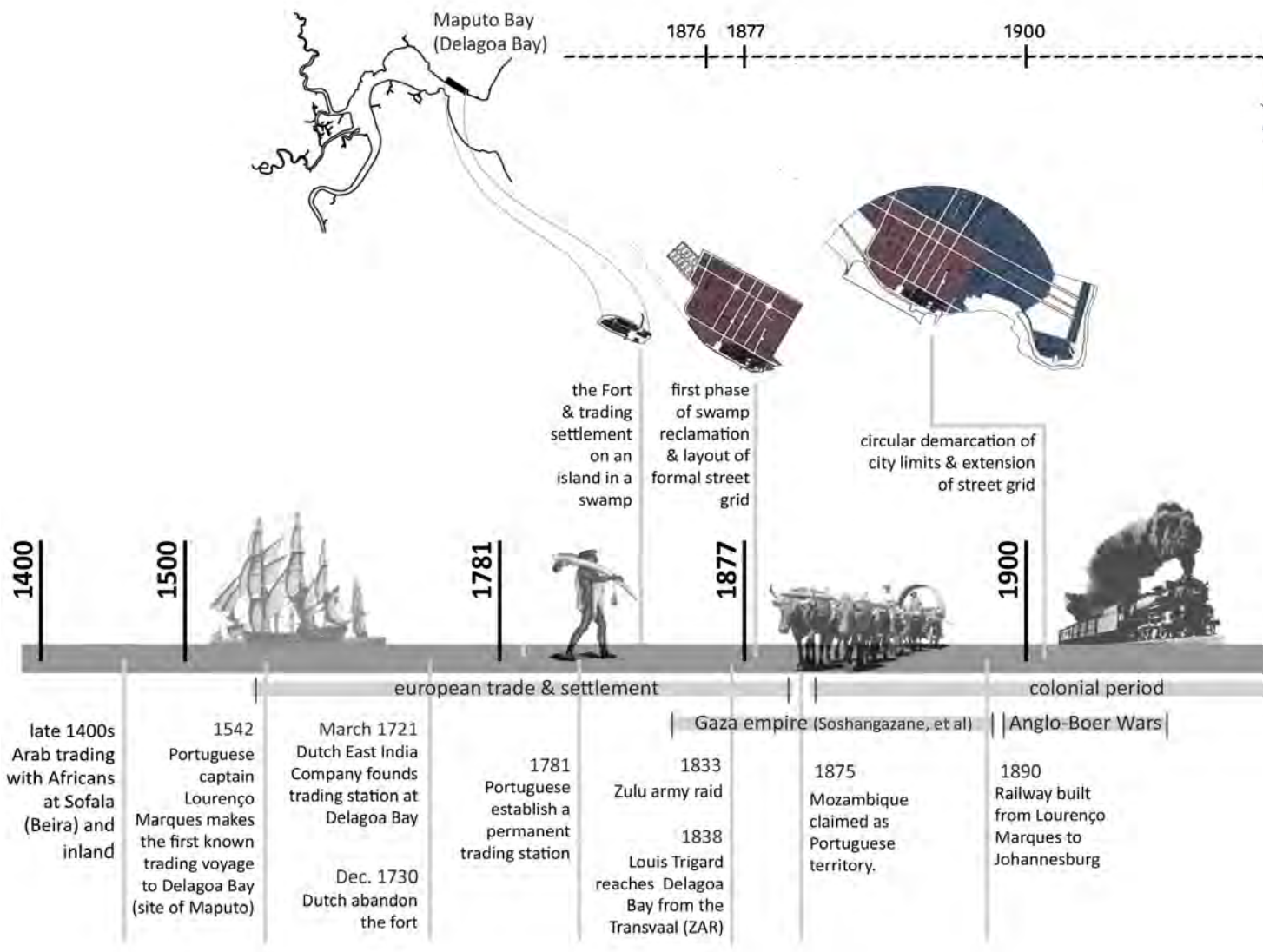
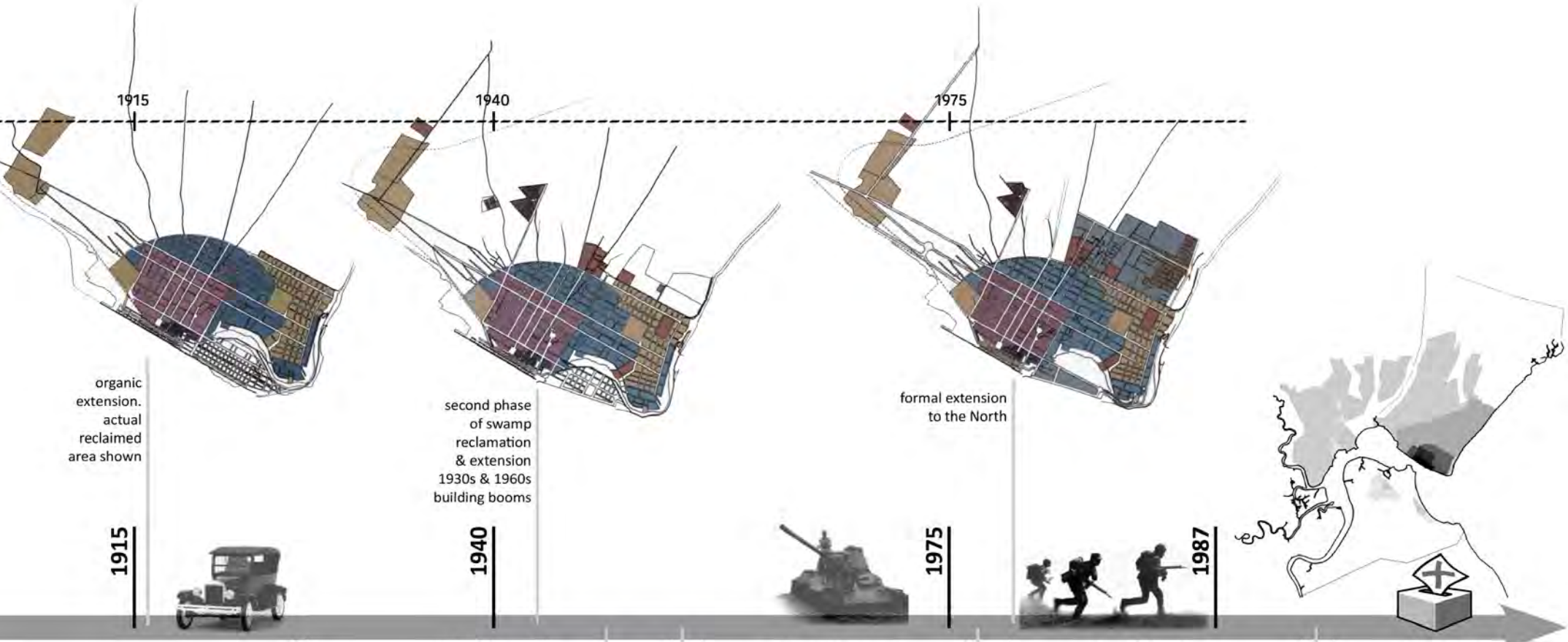


FIG 6. HISTORIC TIMELINE ADAPTED BY AUTHOR (DEACON, 2011).


1915
1940
1975
organic extension. actual reclaimed area shown
second phase of swamp reclamation & extension 1930s & 1960s building booms
formal extension to the North
1915
1940
1975
1987
colonial period
independence war
civil war
democracy
communism
1951
Mozambique is made a province of Portugal
1962
Nationalist movement FRELIMO is formed
Sept. 1964
FRELIMO launch a 'military campaign for independence'
April 1974
Military coup d'état in Portugal
25 June 1975
Mozambique's independence granted
1980
FRELIMO engages RENAMO in civil war
4 Oct 1992
Peace Agreement signed
1994; 1999; 2004
National Elections. FRELIMO dominate

1.3 THE GEOGRAPHICAL LOCATION

25.9603° S, 32.5454° E

Mozambique is situated along the east coast of South Africa. The country's Indian Ocean coastline extends for 2470km, with a number of bays that create natural harbours which are absolute for the growth of modern trade ports (Torp, 1989: 12). The Bay of Maputo, one such bay, is in the south end of the country. The larger bay is 95km in length and 30km wide. The joining of the Matola, Tembe and Umbeluzi Rivers created the vast and abstruse estuary of Espirito Santo. The estuary forms a natural seaport harbour (Da Silva, 1964: 30).

In the southern part of Mozambique is the city called Maputo. It is appointed as its own province. The capital city of Maputo Province is Matola, which is governed under its own municipality. Despite their separate control and planning, Maputo and Matola can be described as one undivided greater metropolitan.

The map in figure 8 provides an orientation of the City of Maputo in the surroundings of the water and encompassing regions. The estuary of Espirito Santo opens into the western side of Maputo Bay. The island of Inhaca is found to the East of the bay, Southeast of Maputo. On the Southern face of the bay is the settlement of Catembe which was highly-developed under the legalpower of Maputo.

Maputo has several identities that can be perceived as soon as you enter the city. Like many African colonial cities, it is founded on a very strong dual system due to the historical evolution of the city. In addition to that, as part of a Portuguese expansion plan, during the sixteen hundreds we witnessed the creation of "reservas" (reserves), located in the outer part of the city (Bilato, 2016: online). These identities are all part of the same city, but have completely different features and embody very dissimilar ways of living.

As a result, the city of Maputo consists of two distinct areas, the "Cidade de Cimento", or the Cement City and the "Canicos", or the Reed City; respectively, also described as the formal and informal city. The historic growth of the metropolitan area from island to the main land and the expansion of informal areas on the city's fringe, is illustrated in figure 9.

Furthermore, in this study, the causes involved in the establishment of these two distinct city zones as well as the present day relationship between them is demonstrated. The 'Baixa', referring to the low flat land around the seaport, is defined by a low crescent-shaped shaped escarpment to the North and East, and the Maputo Bay to the South (historically DeLagoa Bay).

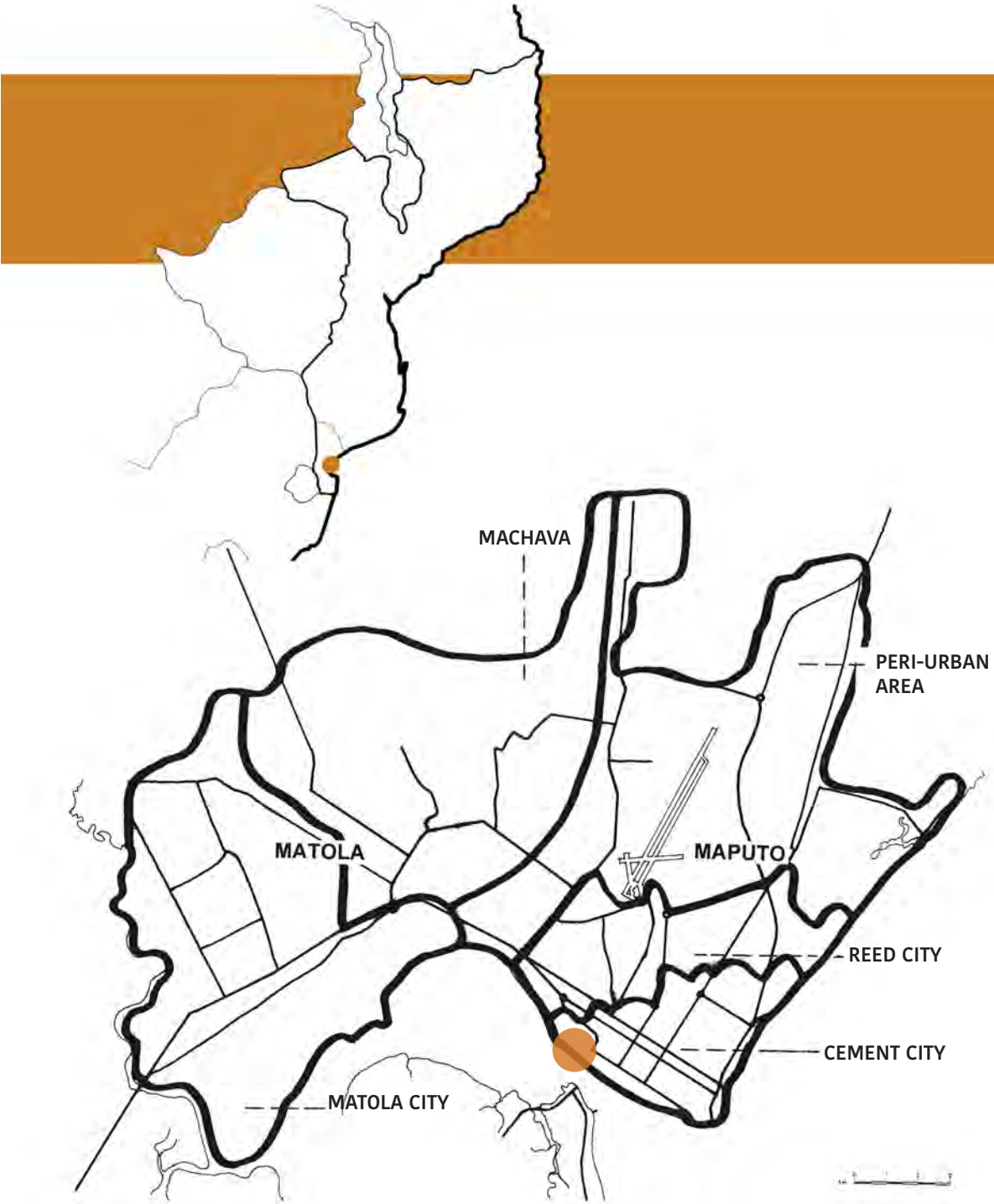
Nowadays, the port precinct can be see as a distinct barrier between the 'Baixa' and the Bay of Maputo. A mass of large scale industrial port activities have shifted and expanded in a north-westward direction beyond the inner city. Given its state of partial disuse, it is assumed from port management speculation that the port will undergo extensive redevelopment in the future. The potential of the city reconnecting to the water is thus latent.

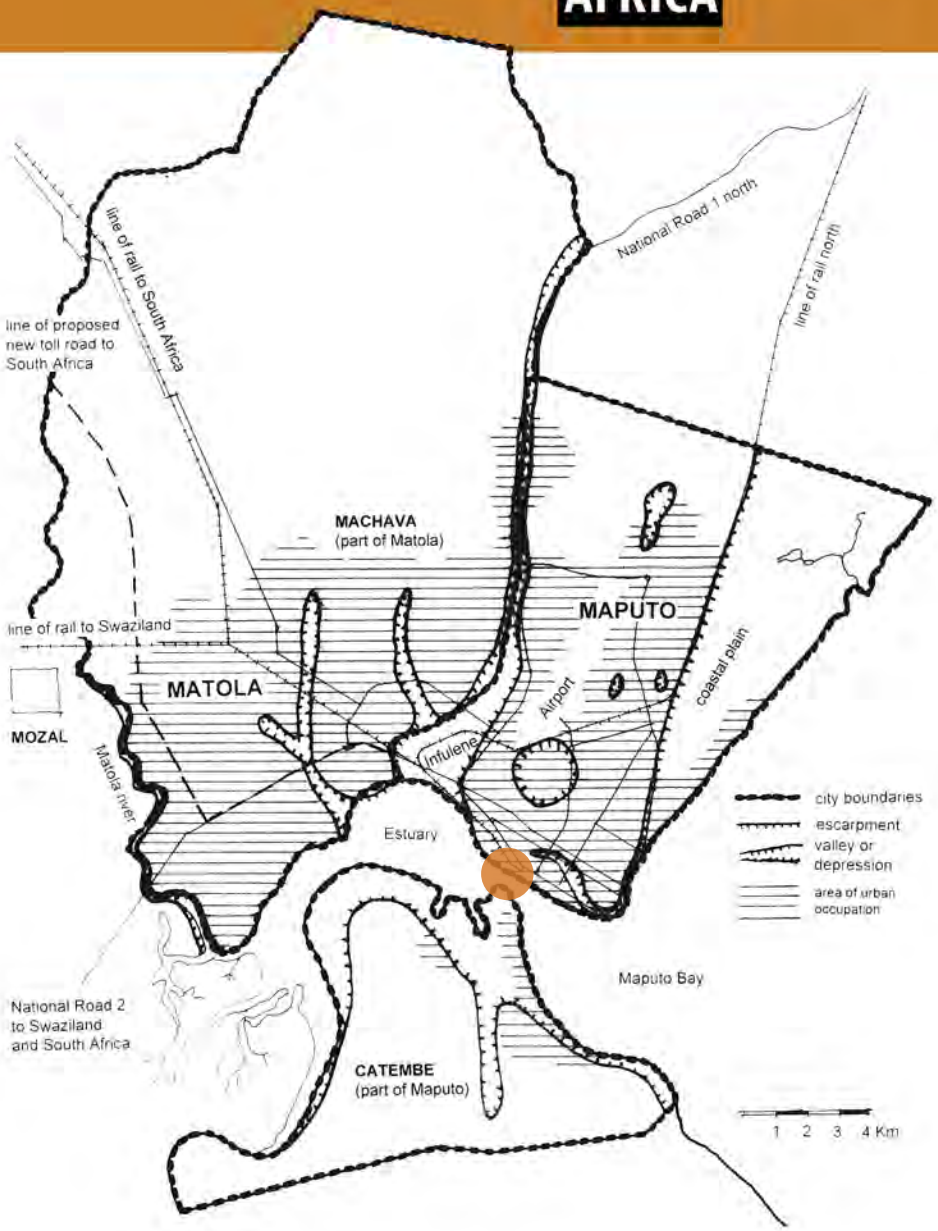
Kim Dovey (2004: 9) refers generally to the relocation of global ports beyond the confines of inner cities and from this, he positions the partially disused urban port of the late 20th century at the forefront of adaptive and experimental reuse and growth. He cites that the redevelopment of the urban port repeatedly unfolds in a tension between global and local place identity - which has as its result functional gentrification - and between public and private interests through commercial exclusions.

This disposition parallels closely to the port of Maputo in which emphasis is placed by Maputo Fisheries Port (MFP) officials on the historic and cultural significance of the marine port in relation to the city (Nyambir, 2002: 13).

FIG 7. MAP OF MOZAMBIQUE (AUTHOR , 2019).
FIG 8. URBAN FORM IN RELATION TO SITE (AUTHOR, 2019).
FIG 9. SURROUNDING DIVISIONS AND PHYSICAL FEATURES (AUTHOR, 2019).

Mozambique is located in **SOUTHEAST AFRICA**





1.4 MAPUTO CITY PROFILE

The nationalist movement, Frente de Libertaçao de Moçambique (FRELIMO) during 1964 began a war of independence fronting colonial Portugal, and on the 25th of June 1975, Mozambique gained independence. Samora Machel was named the first President of the "Republica de Moçambique" (Cravinho, De Sousa, George & Pelissier, 2011: 842).

After a few years of serenity, the country plunged into a civil war that took place until October 1992, when a Peace Agreement was signed after FRELIMO relinquished its 'Marxist-Leninist' principles and embraced the free-market arrangement (Cravinho, et al., 2011: 844). The country's infrastructure was seriously damaged during the fighting. The fall in construction of buildings and infrastructure from the civil war time is visually apparent, contributing to the surpassing sense of place.

Since 1992, the Mozambican government further concentrated on the development of 'transport corridors', linking a few places of importance together, in order to encourage development and investment. This also includes the Maputo Corridor which links Johannesburg in South Africa to the port at the city of Maputo (Cravinho, et al., 2011: 849). Currently, much of this built fabric remains precisely as it was half a century ago, as does the rest of the city, remnants of the colonial construction boom, although with the beginnings of a current modern-day layer of development (Le Grange, 2009: 10-17). This has resulted in an unusual built fabric, one where the modern sometimes contrasts powerfully with the historic fabric, in terms of form, fabric, grain, and particularly the scale of buildings.

The 'Baixa' became the city centre, with inhabitants from all across Africa and the world; this lead to a fusion of building typologies. It is the heart of formal and informal trade of the metropolis wit many different levels of activity, banks, ministries, and other small formal and informal markets and shops ranging in age. It also supports a large quantity of micro-enterprises and traders, who act as 'wholesalers' who repackage large volume shipments into achievable portions, which are then sold locally. The micro-enterprises are a critical part of the economic play of Maputo and Mozambique. In the Maputo "Baixa," they are accommodated in the Mercado Central (Maputo Central Market), owned by the Municipality.

Adjacent to the Baixa district, increased industrial privatizations of the harbour strip led to the relocation of public functions, away from the downtown water's edge and so disconnecting city life from the water. The Avenue Samora Machel can be seen as the official gateway into the city of old.

According to the urban redevelopment plan, the street is upgraded to a pedestrian avenue, connecting the Municipal buildings on the north-eastern border of the precinct with Praça 25 de Juhno, a civic square, in the centre of the Baixa. The intentions and effect of Avenue Samora Machel on the proposal are discussed further in this study.

FIG 10. MAPUTO AERIAL VIEW INDICATING THE CITY AXIS TO THE SEA (FORJAZ, 2014: ONLINE)


AVENUE SAMORA MACHEL

[2] THE ARCHITECTURAL LANGUAGE

2.1 INTRODUCTION

This section is an introduction to the ‘given’ context explored in the Maputo 'Baixa'. It strives to outline the context to which an architectural intervention can relate. The exploration consists of an historical analysis of the architecture and social living conditions perceived in modern-day Mozambique.

A description of the local character describes the context to which new fabric can relate. The existing scale, massing and spatial character of the area can be used as a contextual adviser for creating a new built fabric. The available architectural materials also contributes to the character of the proposed intervention and the sense of place. Simultaneously, it is important to consider how such a concept of modernity and progression was developed within the framework of a colonial society.

2.2 TRADITIONAL

Maputo is in a numerous ways characteristic of an African city, where some regions of the city are highly developed with all the facilities and services of the average developed city in the West, but where an ‘informal city’ co-exists with the formal city (Folkers, 2010: 143).

Beyond the formal city grid where the tarred roads stop, the ‘other city’ starts and there is a sprawling mass of badly-serviced informal buildings, occasionally placed out to a systematic pattern. This informal city is a mass of usually self-constructed houses, from the use of local materials such as reeds, corrugated iron sheeting and concrete blocks.

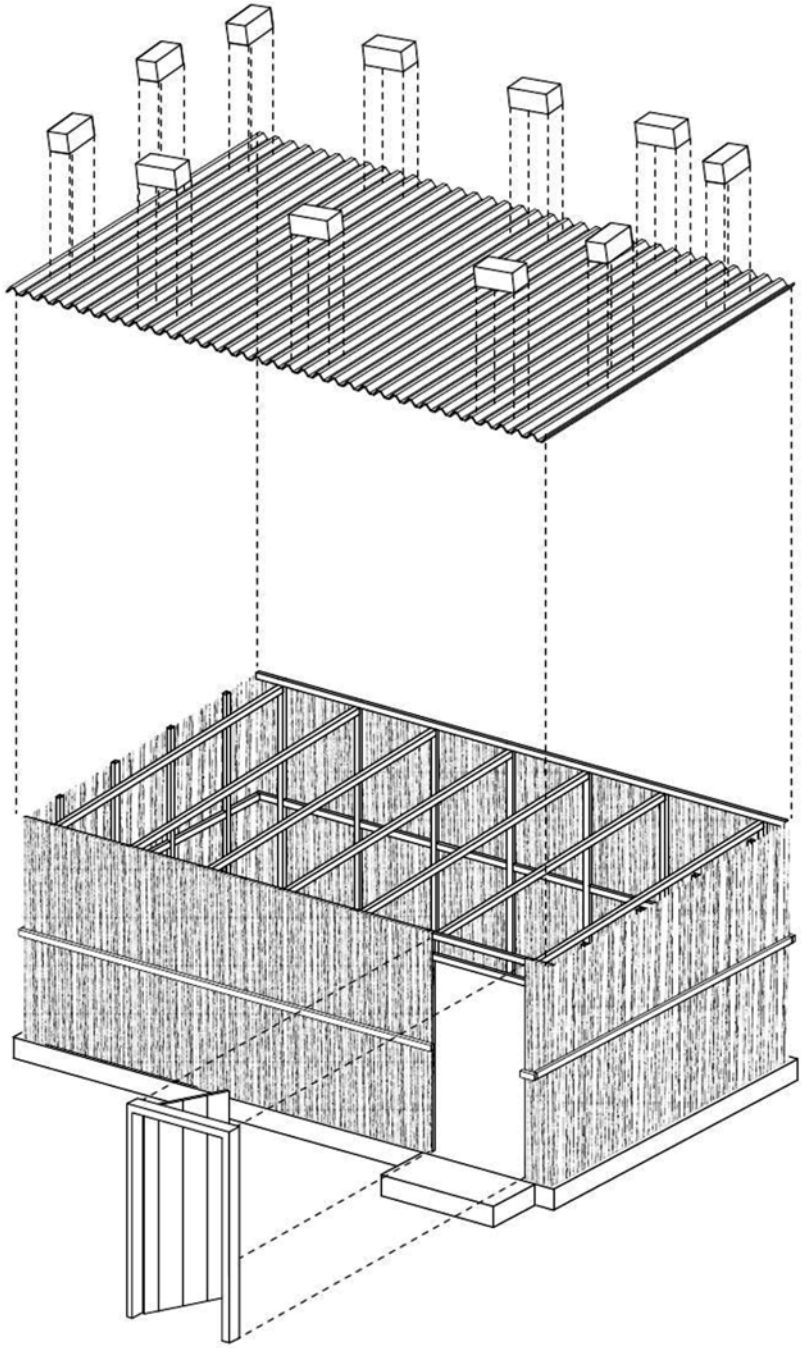
In the years of civil war, what seems to have happened is the increased expansion of the ‘other city’. The 'Baixa', in the centre of Maputo, seems to contain a spontaneous, informal layer of concrete blocks, corrugated iron, and reed screening that was added as users adapt and accommodate these spaces. This informal layer is an important part of the regional character of the 'Baixa', contrasting and softening the industrial presence of many of the larger buildings seen today.

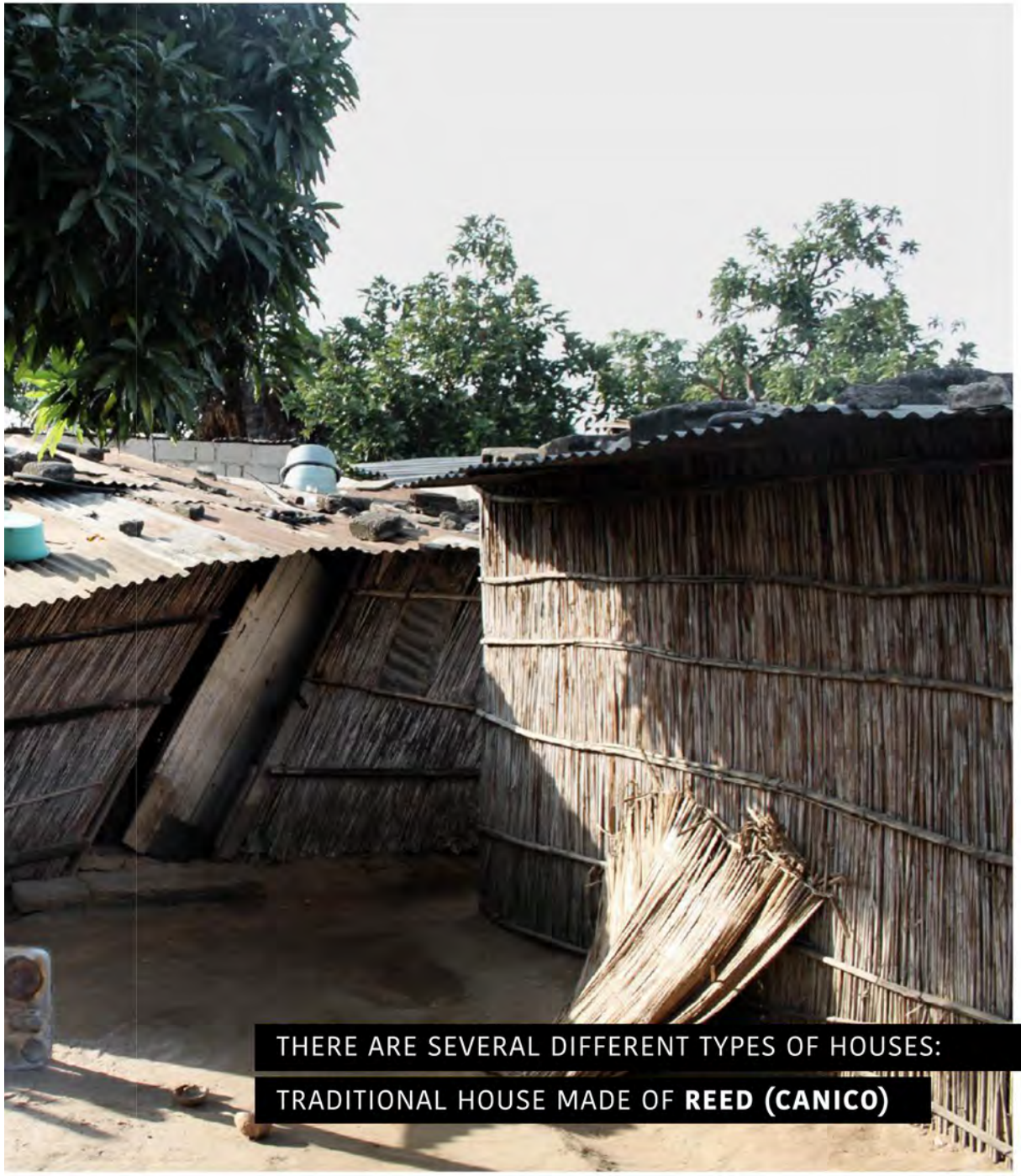
Basic needs establish a certain way of life. In Mozambique, interpersonal relationships are very important. One logical interpretation could be that the importance of interpersonal relationships is due to having a mild climate that allows for outdoor activities and life styles. As a result, Mozambique’s traditional architecture is examined and is discussed further in Part 3 of the dissertation.

In order to understand this situated dichotomy of heritage and discourse, it is necessary to note the traditional architectural character in the “bairros” (neighbourhoods) of the ‘reed city’ — notably those created after independence. The following pages contain a photographic summary.

FIG 11. TYPICAL SKETCH OF THE REED HOUSE (AUTHOR, 2019).
FIG 12. THE TRADITIONAL REED HOUSE (AUTHOR, 2019).

HOUSE TYPOLOGY: **REED** (CANICO)





THERE ARE SEVERAL DIFFERENT TYPES OF HOUSES:

TRADITIONAL HOUSE MADE OF **REED (CANICO)**

HOUSE TYPOLOGY: **BRICKS** (BLOCOS)

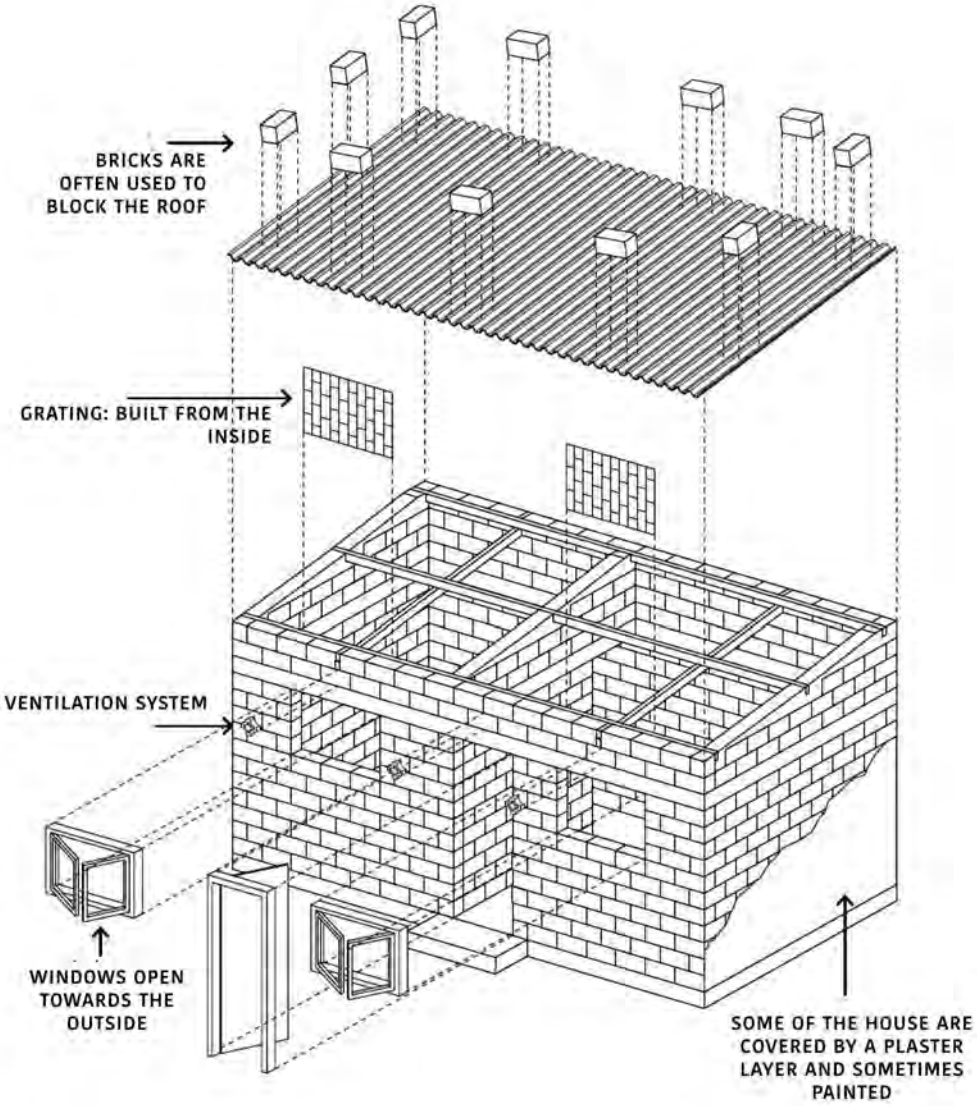


FIG 13. TYPICAL SKETCH OF THE BRICK HOUSE (AUTHOR, 2019).

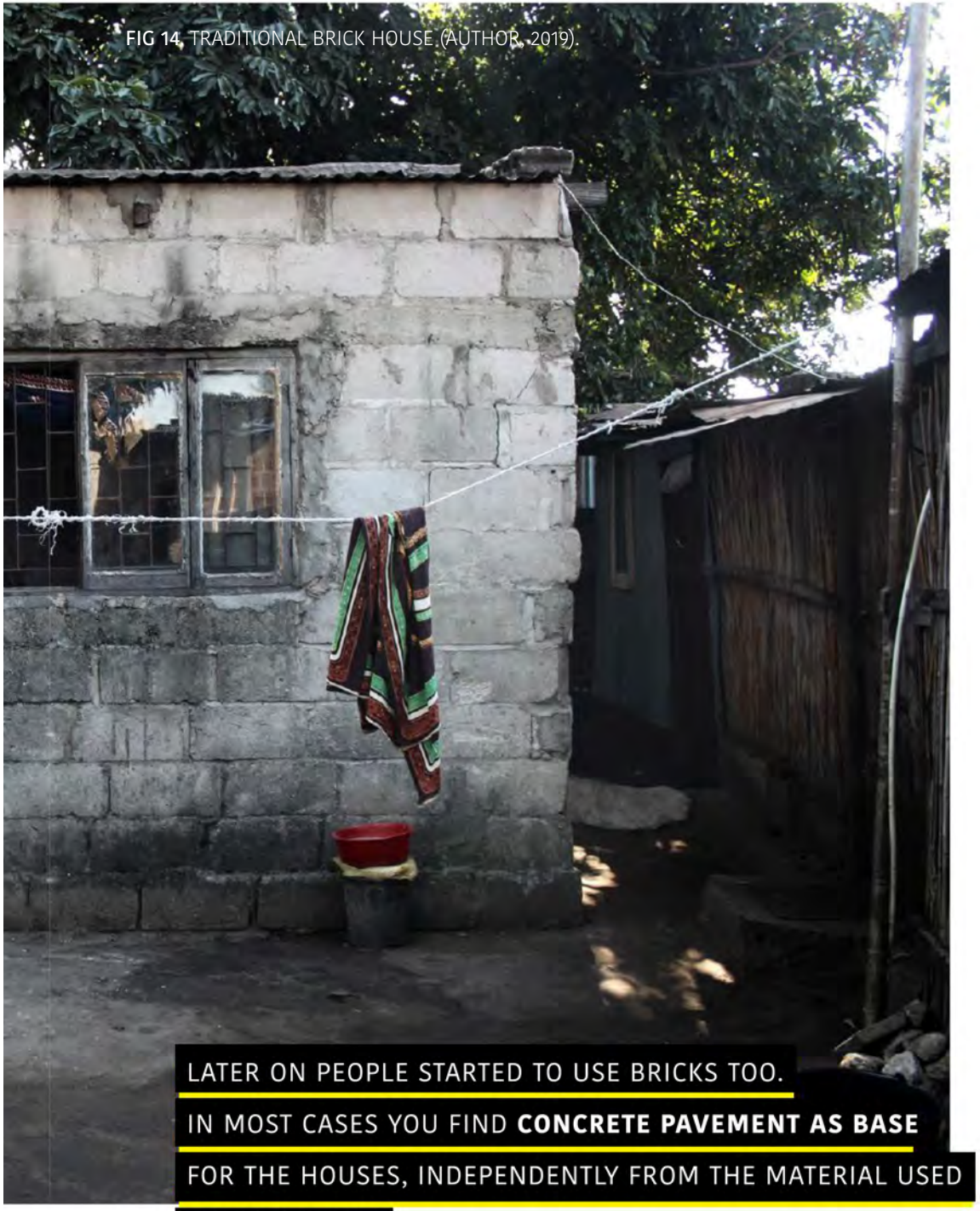


FIG 14. TRADITIONAL BRICK HOUSE (AUTHOR, 2019).

ANOTHER COMMON **MATERIAL**
USED FOR HOUSES
IS **IRON SHEETS**

FIG 15-16. TRADITIONAL IRON SHEETED HOUSE (AUTHOR, 2019).

Ways of life

Often the houses cover the full area on the front and leave a courtyard located typically at the back with outbuildings used as kitchen, bathroom, latrine or storage space. They create an enclosure and altogether an intimate private space. The courtyard is primarily used for household work purposes, it is also used as a scene for daily life, a place for socialization and occasionally for economic business activity.

In the past, various kitchen set-ups and practices were observed. There were some cases where the veranda or front porch functioned as a space for cooking and storage for the kitchen. Today, the traditional dwelling is becoming more and more one whole with many of the functions placed within the house, which is in contrast to the traditional way of living more outside.

FIG 17. THE COURTYARD (AUTHOR, 2019).

FIG 18-19. NARROW INNER PATHS WITHIN THE REED CITY (AUTHOR, 2019).

2.3 IMPOSED COLONIAL WAYS OF LIFE

For this dissertation, the value of Mozambican architecture lies in the dynamic contrast between modern and traditional, in a positive response to its contextual surroundings, and its capability to localize the influence of western traditions. Just as Mozambicans found a way to express their culture and values, as well as their desire for freedom through Chope timbila orchestras, Mapico and Marrabenta dances, Makonde wood carvings, and beautiful literature and poetry, so has architecture found a way to re-appropriate past impositions by contemporary ways of life and necessities, as seen in the Maputo market and Railway station.

2.4 THE MERCADO CENTRAL DE MAPUTO

In 1901, the Maputo Central Market was constructed and is the only built-infrastructure provided to support the micro-entrepreneurs and local traders in Maputo. The market streets north of the Central Market have become cracked and disconnected from facilities, with the available market and market square situated behind it, filled to capacity and in desperate need of care. This disconnection from facilities affects the cleanliness, comfort and hygiene around the trade. Micro-enterprises and vendors who are excluded from the market facilities have to sell their trade on the streets where they are considered illegitimate, and therefore have no rights as entrepreneurs.

Heritage

The Market Central building has become an important part of the enterprising civilization today in the Maputo Baixa. It is possibly the oldest continuously-operating commercial creation in the historic area. The market building's fabric and functions are therefore of importance, in that they display the longevity and persistence of the local enterprising spirit.

The building is protected by the Municipal and Mozambican statue law, requiring permission on a ministerial level before alterations or demolitions can take place. This is appropriate considering the significance of the building as a symbolization of the city character, and a tribute to the entrepreneurial liveliness that has added to the growth of Maputo.

Tourism

The tourism industry is driven by superficial appraisals of places and, for the most part, “the aesthetic meaning is the only meaning the building needs” in order to fulfill the tourists’ requirements (Bauman, 1993: 241). The facades and functional romanticism of the building are therefore prime to tourism in Maputo.

The Customer

The average customer arrives at the market by all of the available transport methods in the Baixa including the train, bus, car, chappa mini-bus, tuk-tuk and by foot.

The Existing Market Square

Situated behind the building is the market square which is significant in the manner that it has developed. This area has developed ad-hoc, as the market expanded, and the grain of the layout reflects the movement patterns of passerby around important parts of the market. The construction of the stalls in this square are mostly self-built, except for a few areas of market tables, each of these market stalls responds to the owners’ individual requirements and preferences, strengthening to Pancho Guedes’ idea that architecture had a life of its own and that it would be appreciated and adapted by the people who made their homes in it.

FIG 20. ENTRANCE TO THE CENTRAL MARKET (AUTHOR, 2019).
FIG 21. EXTENSION TO THE FISH SALE AREA AT THE CENTRAL MARKET (AUTHOR, 2019).
FIG 22. FISH SALE AREA AT THE MAPUTO MUNICIPAL MARKET (AUTHOR, 2019).


CIDADE DE MAPUTO
POVO UNIDO E SOBERANO
MUNICIPALIDADE DE 1901
MERCADO MUNICIPAL
Coca-Cola


17
18

2.5 CFM RAILWAY STATION

This study explores an awakening interest and a sensibility on the subject of cultural identity as a form of appropriation. It acknowledges that the relationship between architecture and identity has always been open to much debate for it sits uncomfortably between the theories of architecture as a universal and autonomous form of human culture versus architecture as the process of formation of emplaced identities.

The Universalist view sees architecture as a composition of many factors drawn from different experiences of different cultures, which has its own right, with its own purpose, logic and form of expression. Its counterpart is a view that defined the work of many architects of the so called ‘other tradition’ which believed - without disregarding the validity of the above statement - that architecture possesses a specific ‘essence’ of its place and is seen as a process of identification between man and place. This ‘essence’ is representative of its people’s cultural behavior, time and locality.

The early architectural significant buildings in Maputo are based on classical European designs, such as the Central Train Station (CFM) designed by Alfredo Augusto Lisboa de Lima, Mario Veiga and Ferreira da Costa, and built between 1913 and 1916. The grand five-star Polana Hotel was designed by Herbert Baker in 1922.

Before that, Thomas Honney designed the Tunduru Botanical Gardens in 1885. This colonial architecture still exists and continues to structure the city, giving it a clear architectural identity as it not commonly found in other African cities.

The bronze dome of the Maputo Central Railway Station projects a monumental silhouette against the sky backdrop surrounding it, a high-water mark of Portuguese colonial architecture. The Railway Station overlooks Workers' Square (Praça dos Trabalhadores). The building features a painted green-and-white exterior, wrought-iron latticework and a display of antique steam locomotives.

Today, it features a railway museum that was opened at the station and contains exhibitions, food venues and holds music and other events, therefore current re-appropriation of the colonial past by contemporary ways of life.

FIG 23. ENTRANCE TO TRAIN STATION (AUTHOR, 2019).
FIG 24. CLASSICAL EUROPEAN DETAIL (BARTH, 2019: ONLNE).
FIG 25. CAST IRON ARCHITECTURAL DETAIL (BARTH, 2019: ONLNE).


C F M


P.T.C.
POSTO POLICIAL

2.6 IMPOSED MODERNIST: JOSE FORJAZ

The historical centre of the city is the Maputo Baixa, with the majority of the built fabric between 1880 and 1975. Other parts built during the construction period between the 1930s and 1960s are equally evident. However, it was during the 1960s when a "...mature modernism emerged..." (Le Grange, 2009: 10), known for the use of modern reinforced concrete and plastered walls often contradicting with the historical buildings by means of scale and the use of contemporary cladding materials.

This is probably more noticeable in Maputo than in any other South African city, due to the segregation and lack of maintenance into the buildings during the past war occurrences, as well as the impact of Portuguese architects, occasionally saw Mozambique as a testing ground for new ideas, drawing great influences from the illustrious'International Style' as well as from Brazilian architecture due to its close affinity to Portugal and climatic similarities. Architect Jose Forjaz was amongst these architects.

Residing and practicing architecture in Swaziland before independence, Forjaz returned to Mozambique and assumed the responsibilities of the time - to search for a new architecture that contributed to the dichotomies between the 'reed' and 'cement' city and responded to local limitations in terms of climate and resources.

The precise attributes of this architectural construction was practicable because of a mastering of the technical and structural capacities of reinforced concrete as a standard, industrial production material, as well as the expressive qualities it has regarding plasticity and texture. A example of this is the brise-soleil, which works for both the shading and natural ventilation of buildings in tropical climates.

This architectural shift brought about changes in design, which became more rooted in an awareness of social reality and conditions of overpopulated urban spaces, as the 'reed' inhabitants moved to the 'cement' city.

Against the backdrop of great Art Deco and Victorian buildings, Mozambique is the host of an amazing collection of mature modernist buildings, which amongst other qualities reflect some evidence of a common architectural 'style'. This 'style' emerged from the advances on technology and construction developments that emphasized the use of concrete. Another attribute is in the contrast between the 'hardness' of its material and 'softness' feeling of its spaces and form, something that is achieved through the use of various forms of screen walls that allow buildings to 'breathe' in response to the shifting tropical conditions. These buildings are porous for natural ventilation and light purposes, and thus the use of light is associated with the outdoor 'style' of living.

Although light becomes a climatic element which requires protection from its adverse effects, the climate calls for the celebration of outdoor living culture and activities. The poetic relationship between inside and outside and the careful control of light are some of the strong elements that inform the thresholds, bulk and form of Mozambican architecture.

FIG 26- 31. THE SOCIAL REALITY OF ARCHITECTURE IN MOZAMBIQUE AS SEEN IN FORJAZ'S WORK. AN ARCHITECTURE WHICH RESPOND TO THE DICHOTOMY OF THE REED AND CEMENT CITY (FORJAZ, 2014: ONLINE).

FIG 32. JOSE FORJAZ'S FISHERIES MUSEM (AUTHOR, 2019).

2.7 IMPOSED MODERNIST: PANCHO GUEDES

Most of the modern architectural heritage was the product of the periods between the 1950's -1970's. Because Portugal had adopted a neutral position during the World War II, it had a privileged economical position at the end of the war. These circumstances, together with the revision of the Portuguese constitution in 1951 that reinforced a new colonial policy, provided for more aid and development for its colonies (Santiago, 2007).

This stage proved itself to be of the utmost importance for architects and developers living in the Portuguese colonies. This new modern architecture was so well-received that it made its way progressively throughout Mozambique and many other African colonies, introducing an architectural language of functional lines and plastic forms (Santiago, 2007).

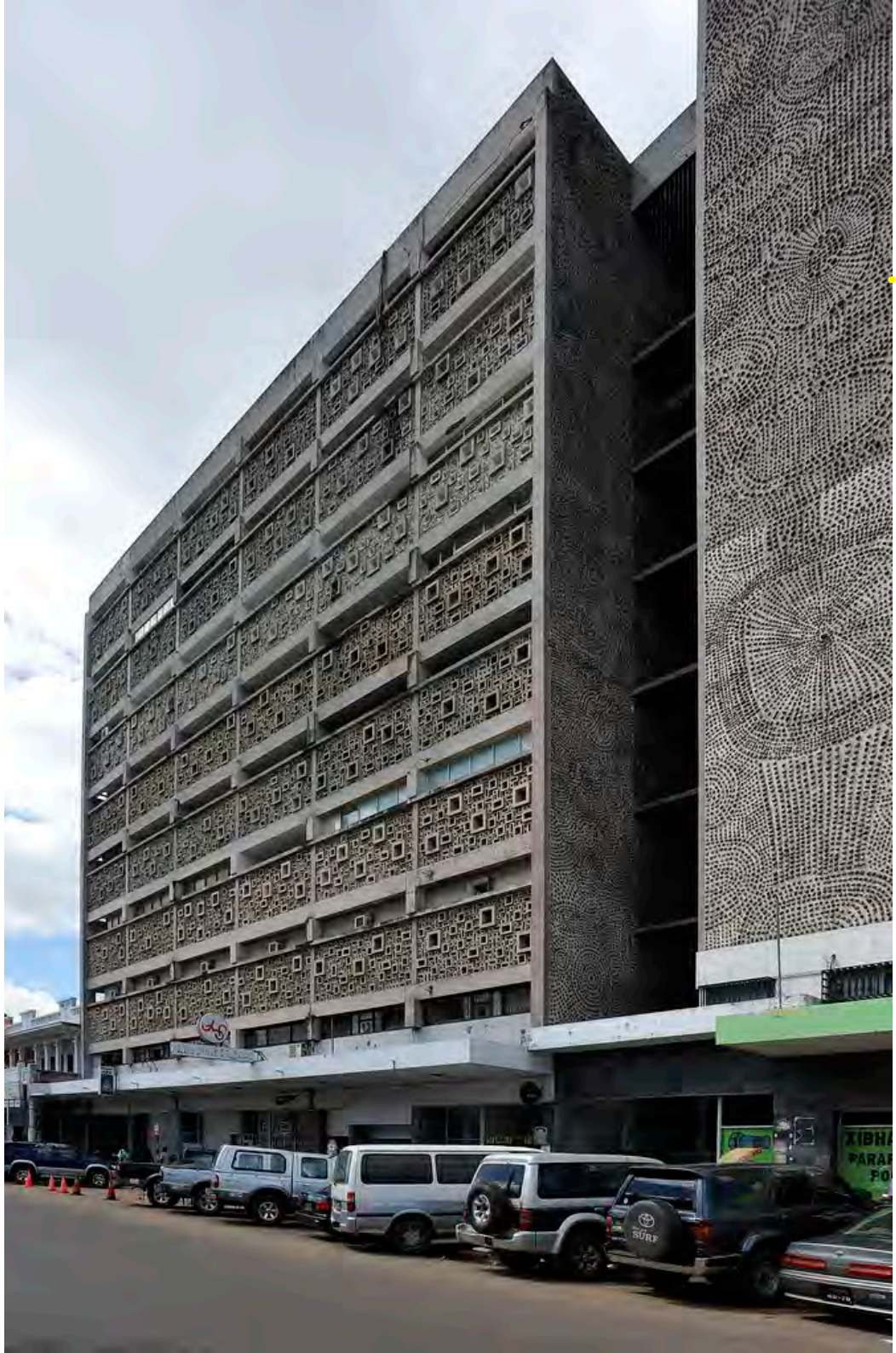
It is during this period of great enthusiasm that the work of Pancho Guedes (1925-2015) stands out. Guedes was one of the leading figures in establishing an architectural identity for Mozambique. His work reflected a personal position in relation to western architectural principles, demonstrating an amazing capacity to absorb and transmit the local dynamics. The method of creation of his work admits plenty impurities and metamorphoses from the various artistic areas in space and time:

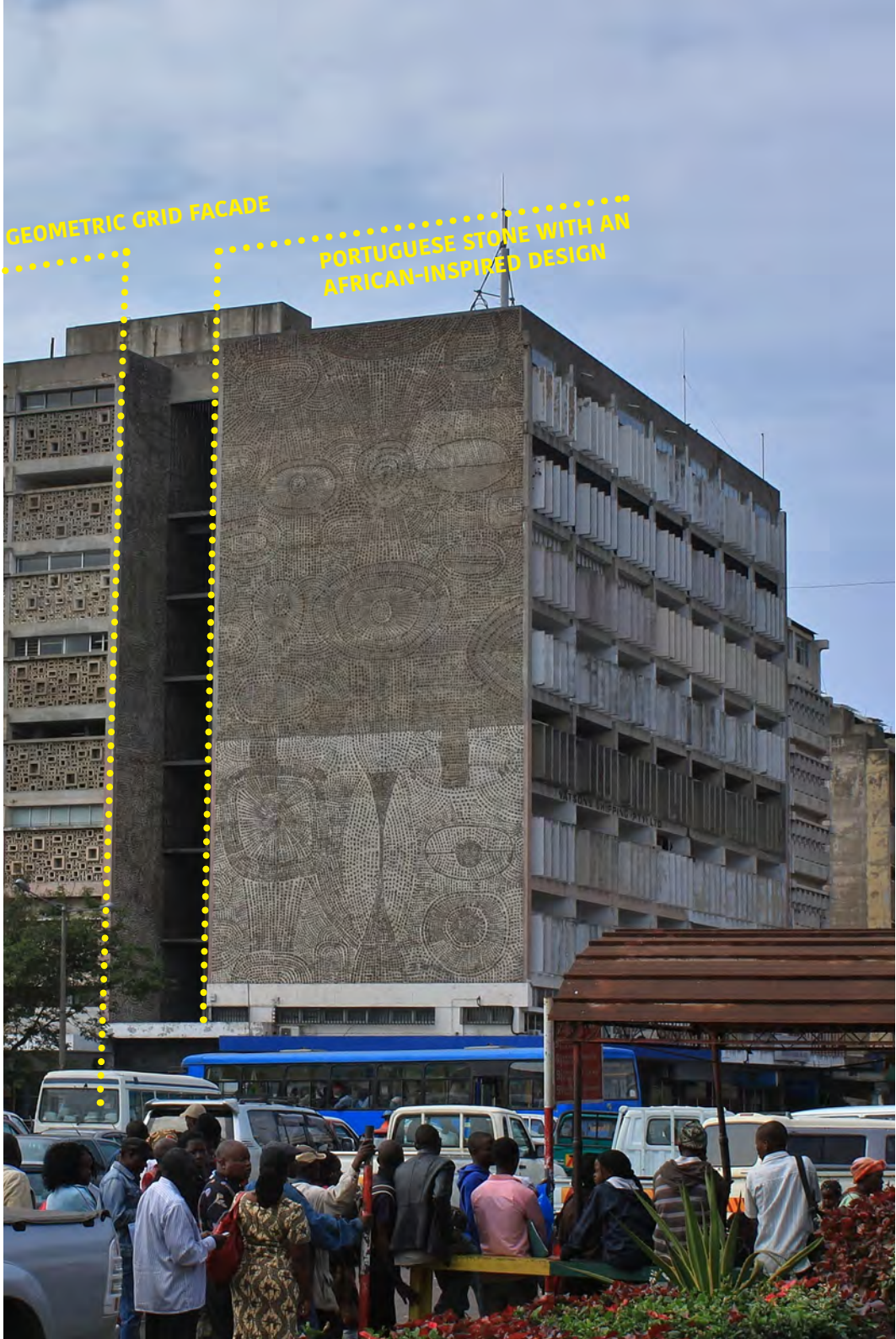
"Drawing, painting, sculpture and architecture are a single language with many words and an endless alphabet. The words they lend one another area ideas, dreams and gestures – Lines, shapes, colours, volumes and time" (Guedes, 2009: 39).

Pancho Guedes suggests, in most of his buildings, the creation of murals. These are drawn by him and executed with lasting, resistance materials. On the Abreu, Santos e Rocha building (1953), a mural consisting of small stone finishes on one of the facades of the building, by means of a perforation effect that formalizes African arts and crafts imagery (Figure 33). This mural is completed as a reinterpretation of the "calçada à portuguesa" (Portuguese stone paving), further strengthening the architect's concerns as to durability of the materials and exploration of new (old) textures. His work shows a concealed rationality with intuitive and artistic demonstrations of understanding for local culture, most of the time making use of cultural symbols and forms.

FIG 33. ABREU, SANTOS E ROCHA BUILDING, MAPUTO, MOZAMBIQUE (1953), PANCHO MIRANDA GUEDES. DETAIL FACADE. (GONÇALVES, 2008: 172).

FIG 34. SANTOS E ROCHA IS LOCATED ON THE PRAÇA DOS TRABALHADORES (WORKERS' SQUARE) IN MAPUTO, ACROSS FROM THE HISTORIC RAILWAY STATION (HESS, 2012: ONLINE).




GEOMETRIC GRID FACADE
PORTUGUESE STONE WITH AN AFRICAN-INSPIRED DESIGN

[3] THE URBAN LANGUAGE OF MAPUTO

3.1 INTRODUCTION

Diverse influences mark the Baixa's character. The Portuguese colonial influences is evident in the urban layout. Public outdoor squares and plazas, narrow colonnaded streets accompanied by wide generous avenues and classic colonial buildings all narrate the Portuguese heritage of the city.

The informal trading on the streets contribute to another character-defining layer to the urban centre, revealing the African attributes of the city. The gifts of informality thrive in the area, with the stalls repeatedly being coupled to the conventional shop behind it. The informal trade is closely linked with high pedestrian density, more focused at places of interest, recreation and public transit nodes. The urban liveliness and craft are usually fluid, operated from "Tchovas", which are custom-built carts on wheels that supply anything from fresh produce to cell phones. Some of the selling is joined to necessities, such as clothing, food, and mobile phone airtime.

The history of the "Baixa" is undeniably connected to industry. This, including the industrial advances repeatedly triggered growth throughout the history of the "Baixa". This included the first trading of mass-produced cloth and beads by the first European settlers for raw materials and ivory, the construction of a railway link to Pretoria, and the use of pre-manufactured building elements (such as columns and cast-iron) in buildings all over the "Baixa".

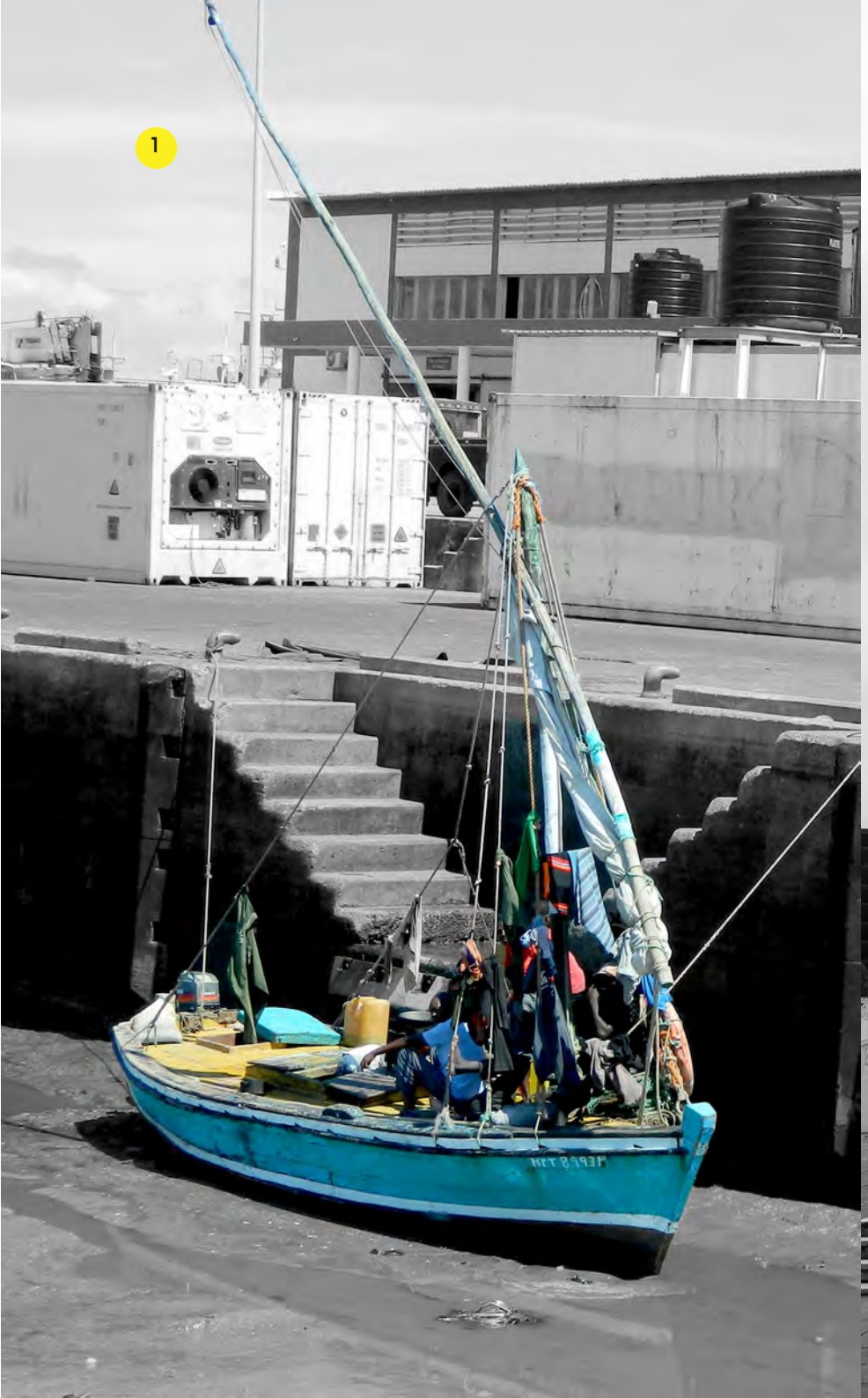
The connection to the non-bulk section of the port and the historical also supports the industrial link. With the historic connection to the industrial developments in architecture it becomes appropriate that an architectural intervention in the proposed area should acknowledge the industrial heritage. Contradictorily, the southern waterfront of the "Baixa" is industrial in character.

In 2008, the PEUMM (Plano de Estrutura Urbana Municipio de Maputo, the Urban Structure Plan of the Municipality of Maputo) set out thorough principles of urban development. A proposal for an urban master plan was issued by the municipality in 2010 (Figure 35). The main focus was solving traffic specifically in the Baixa area and the redevelopment of Avenue Samora Machel into a pedestrian boulevard. It also addressed the development of under-utilized land along the marginal to the city east.

The Baixa comes across as identifiable with a coherent character.

The scale of functions and the combination of formal and informal develop a rich dynamic. However, there are spaces that are in varying states of decay and under-utilized resulting in disconnection throughout the area. The most noticeable is the barrier between the old Baixa and the sea in the form of the industrial harbour. The reconnection of old Baixa with the sea is a clear motive for re-awakening this historic heart of Maputo.

FIG 35. URBAN MASTER PLAN PROPOSAL (AUTHOR, 2019).
FIG 36. END OF CITY AXIS: MAUPTO PORT (AUTHOR, 2019).
FIG 37. START OF CITY AXIS: MAPUTO CATHEDRAL(AUTHOR, 2019).


1


2

3.2 SITE: URBAN AND AXIAL CONDITION

The choice of site was due to a motive to revitalize the industrial zone bordering the sea, to reconnect city to sea, and to inject public life into redundant space.

Situated at the end of Avenue Samora Machel is the port. This boulevard is the axis linking sea to the city and is apart of the wider urban framework for the industrial waterfront of the "Baixa". Since the increased industrialization of the harbour during the mid-twentieth century, the area which was originally the location of a water transportation node, has been relocated.

Maputo's Municipality identified Avenue Samora Machel to be upgraded as a main pedestrian boulevard in the city as discussed earlier in this chapter. Currently, the avenue connects historic landmarks such as the City Hall and the cathedral to Praça de 25 Junho and the Maputo Fort.

The design proposal in this dissertation along with the existing Fisheries Museum create a gateway across Avenue Samora Machel. The avenue is framed by this gateway to expose the entrance to the port as well as to frame a vista of the port and the ocean beyond.

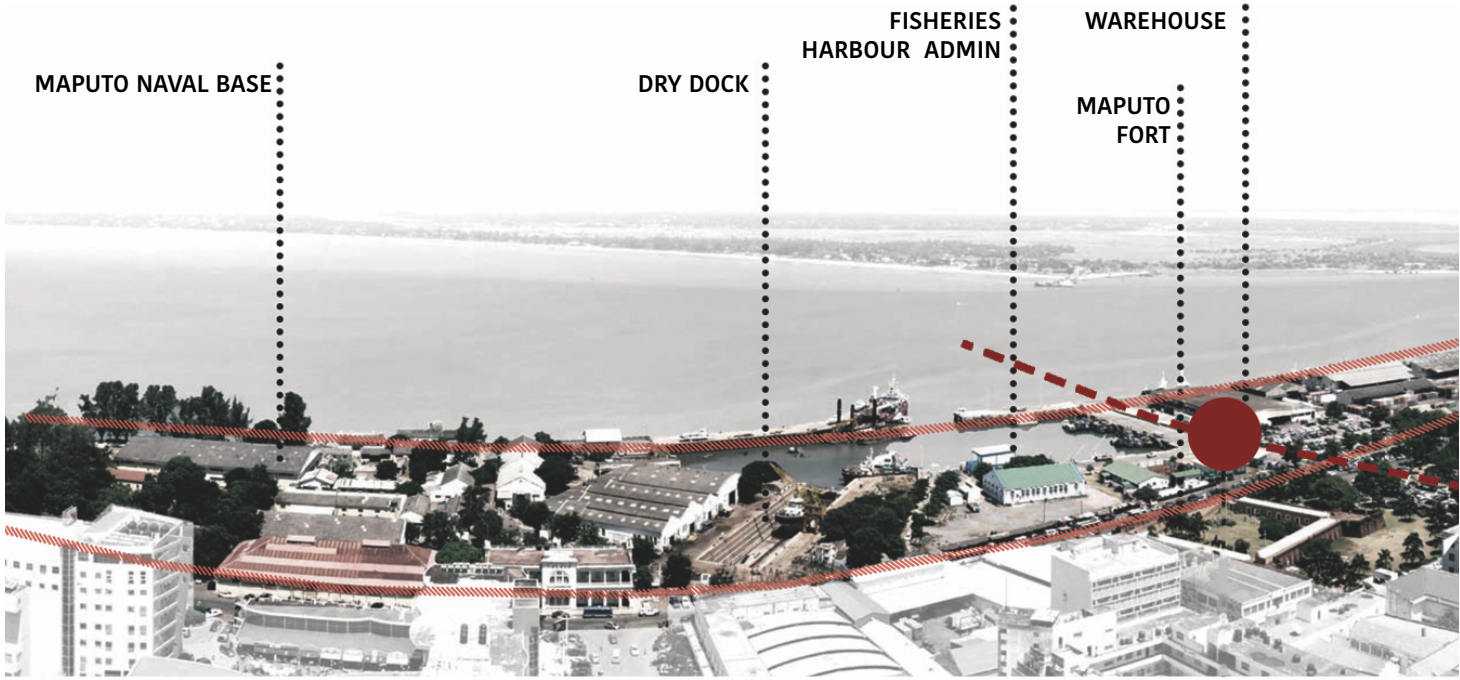
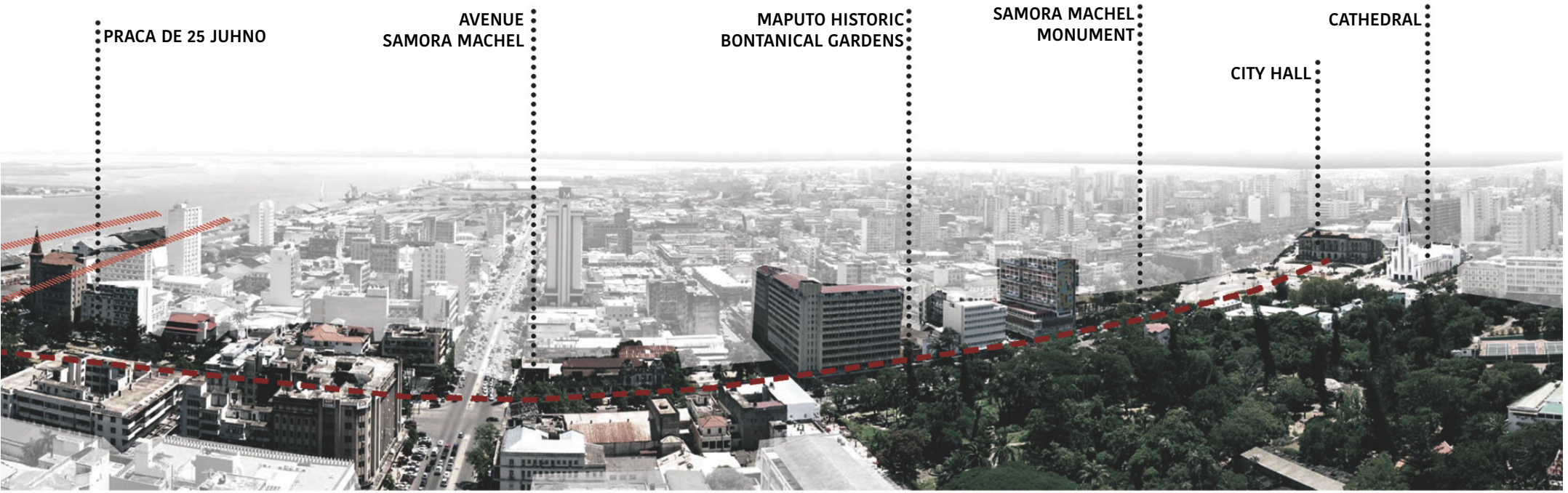
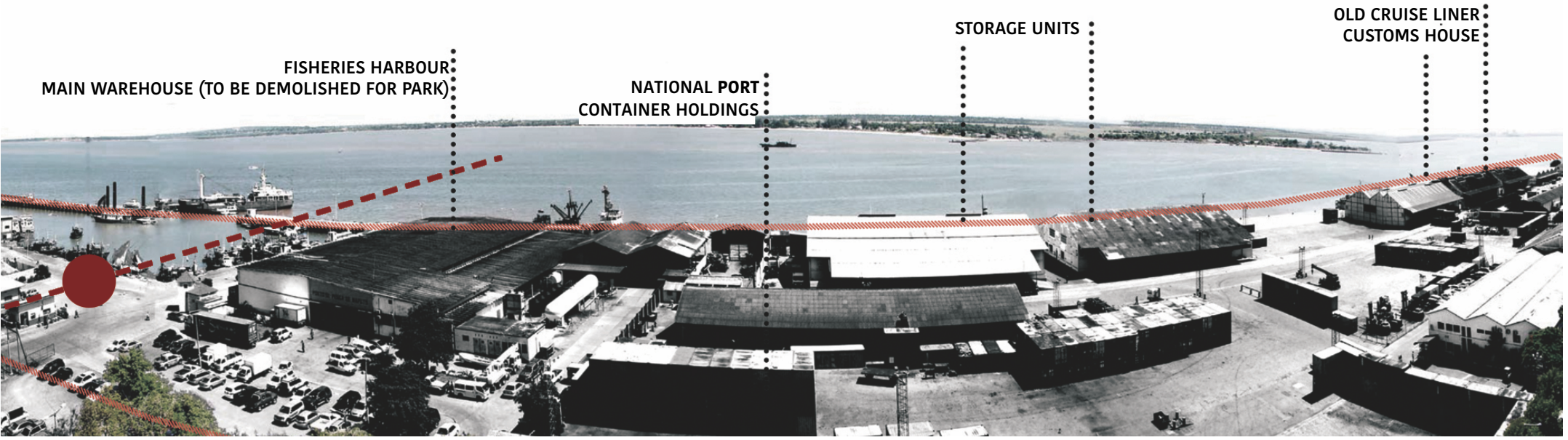


FIG 38. SITE IN CONTEXT WITH PORT TO CATHEDRAL AXIS, ADAPTED BY AUTHOR (DEVENISH, 2012: 43).
FIG 39. SITE IN CONTEXT, COASTLINE AXIS SHOWN, ADAPTED BY AUTHOR (DEVENISH, 2012: 43).


PRACA DE 25 JUHNO
AVENUE
SAMORA MACHEL
MAPUTO HISTORIC
BONTANICAL GARDENS
SAMORA MACHEL
MONUMENT
CITY HALL
CATHEDRAL


FISHERIES HARBOUR
MAIN WAREHOUSE (TO BE DEMOLISHED FOR PARK)
NATIONAL PORT
CONTAINER HOLDINGS
STORAGE UNITS
OLD CRUISE LINER
CUSTOMS HOUSE

3.3 THE PORT

The Mozambican government continues to have ownership of the MFP. This is managed by the Ministry of Fisheries. The Ministry works closely with various financially-independent organizations that fund developments within the fisheries sector. Some of these include the Fisheries Development Fund, the National Small-scale Fisheries Development Institute and the National Fisheries Research Institute. The main benefactor of the project is likely to be the Small-scale Fisheries Development Institute due to its aim of improving facilities for small-scale artisanal fishermen.

The following agents influence and determine the brief and program for the design investigation:

a. Port Management and Administration: Currently, the artisanal fishing section of the MFP is ill-managed. There is hardly any information regarding the number and variety of boats entered into the harbour or on details of the type and volume of fish caught. This lack of information is potentially harmful to the long-term sustainability of the fishery sectors, especially the lack of regulation of threatened fish and harvesting methods.

b. Local Fishermen: As stated, there is a need for the provision of processing facilities intended for local sale and consumption. These facilities include temporary chill storage, ice storage and adequate auction space for the sale of large quantities of fish. Artisanal fishermen mainly use one of two types of vessels, small scale trawlers and dhows. Dhows are involved in the transfer of more than just fish. After unloading the catch, they often stock up with supplies for their local villages. The trawlers are more exclusively involved with the handling of fish and therefore often dock overnight.

c. Fish traders: The street fronting the MFP is occupied by the daily afternoon sale of fish from the harbour. These traders are usually women, some of whom are related to the fishermen whilst others act as independent agents. The street represents an area where trade is free and no rent is paid. However, these traders battle with the lack of adequate access to fresh water, a lack of ice and a lack of waste disposal. The number of fishing ports and ice making plant capacity in Mozambique do not meet the increasing demand (Nyambir, 2002: 8). Thus, high post-harvest losses are being caused by the shortage of ice supply and lack of cold storage facilities to support the fishermen's activities for the purpose of realising high valued quality fish products (Nyambir, 2002: 8). This lack of facilities together with the outdoor and exposed condition of street vending lead to frequent spoiling of portions of the catch.

The role of the fisheries cooperatives in Maputo is critical for the future well-being of the small-scale fisheries, as they are the only existing institutional bodies owned and operated by the fishermen themselves. There are over 200 boats in the fisherman villages in the vicinity of Maputo Fishing Port (Nyambir, 2002: 11).

The program will make provision for the problems identified in this chapter. The building can be described as a Fish Processing, Auction and Market Complex and can be divided into zones accordingly. The aim is that these zones (processing, auction and distribution) relate to a common urban infrastructure as well to a common urban design spatial gesture.

FIG 40. SPOILAGE OF FISH CAUGHT DUE TO LACK OF FACILITIES (AUTHOR, 2019).
FIG 41. MAPUTO FISHERIES HARBOUR SURROUNDINGS (BARTH, 2019: ONLINE).


CAPACITY 15KG


SECTOR 13
33
32

[4] SITE ANALYSIS

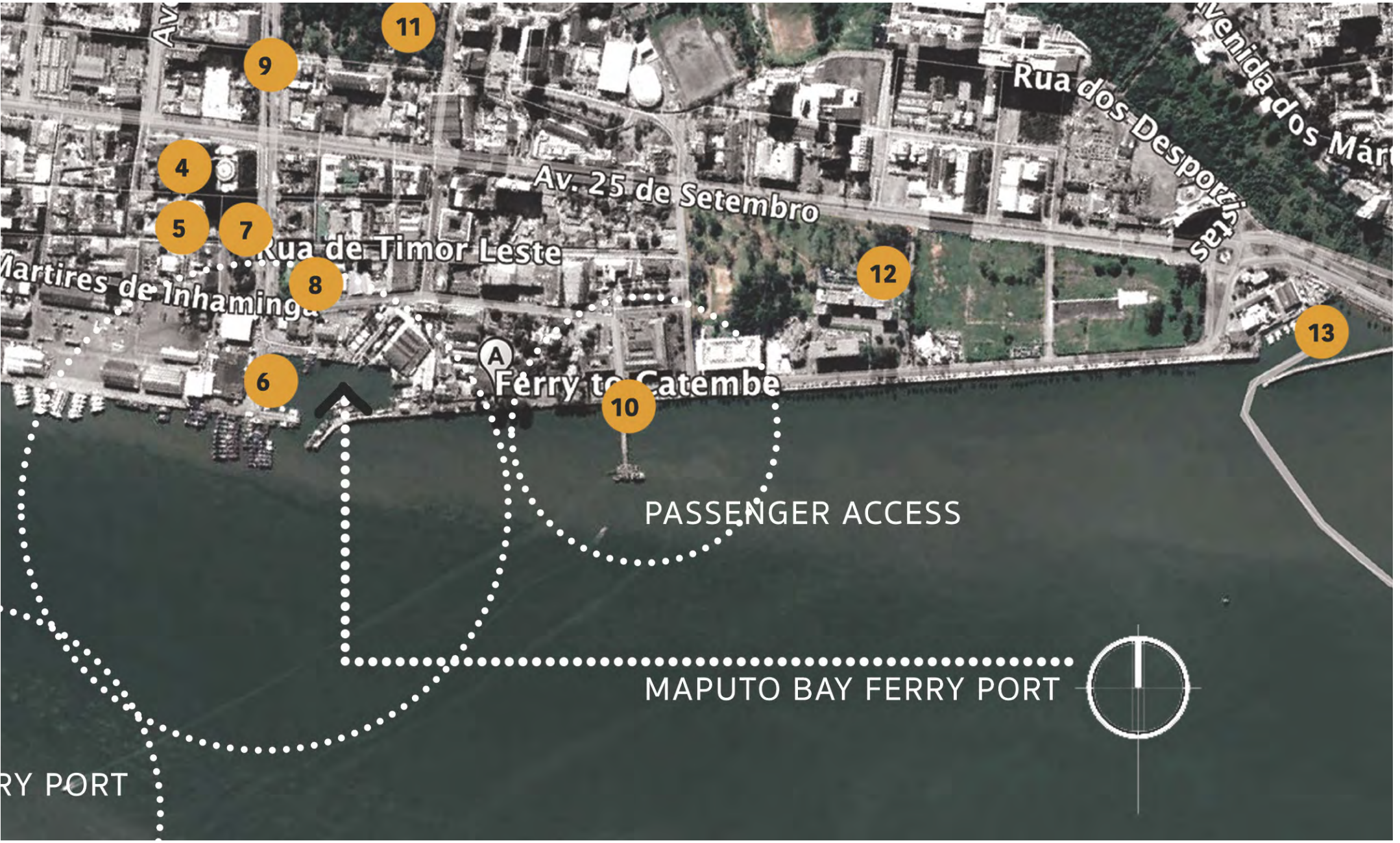
4.1 PORT SURROUNDINGS

The Maputo Bay is surrounded by the fishing villages of Matola, Catembe and Inhaca. With Maputo inner city as the main centre for distribution and sale of fish, the MFP is the main location for fishermen from these villages to unload and sell their catch and also to prepare boats for sail. While most of boats using the harbour are artisan and concerned primarily with local distribution, the facilities provided are strongly geared towards the handling of frozen fish (as mass commercial produce).

The harbour has very few facilities catering towards local distribution, where the demand is high for fresh produce. For these reasons the harbour is under-utilized (Nyambir, 2002: 12). In addition, the local distribution of fish into Maputo is afforded little platform within the harbour with the majority of fresh fish sales marginalized to just beyond the fence on the street's edge. This is a primary example of a functional segregation of scales of economy between the port and the historic core of the Baixa. The port precinct can be seen as a significant barrier between the Old Baixa and the Bay of Maputo.

1 CURRENT CRUISE SHIP DOCK
2 START OF PORT OF MAPUTO
3 RAILWAY STATION
4 BANK (COMMERCIAL)
5 MUSEUM OF MONEY
6 SITE
7 PRACA 25 DE JUHNO
8 MAPUTO FORT
9 AVENUE SAMORA MACHEL
10 CURRENT FERRY DOCK
11 OLD BAIXA
12 NEW BAXIA
13 MAPUTO YACHT BASIN

FIG 42. ADAPTED GOOGLE EARTH AERIAL MAP OF PRECINCT IN CONTEXT (GOOGLE EARTH, 2019: ONLINE).


11
9
4
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6
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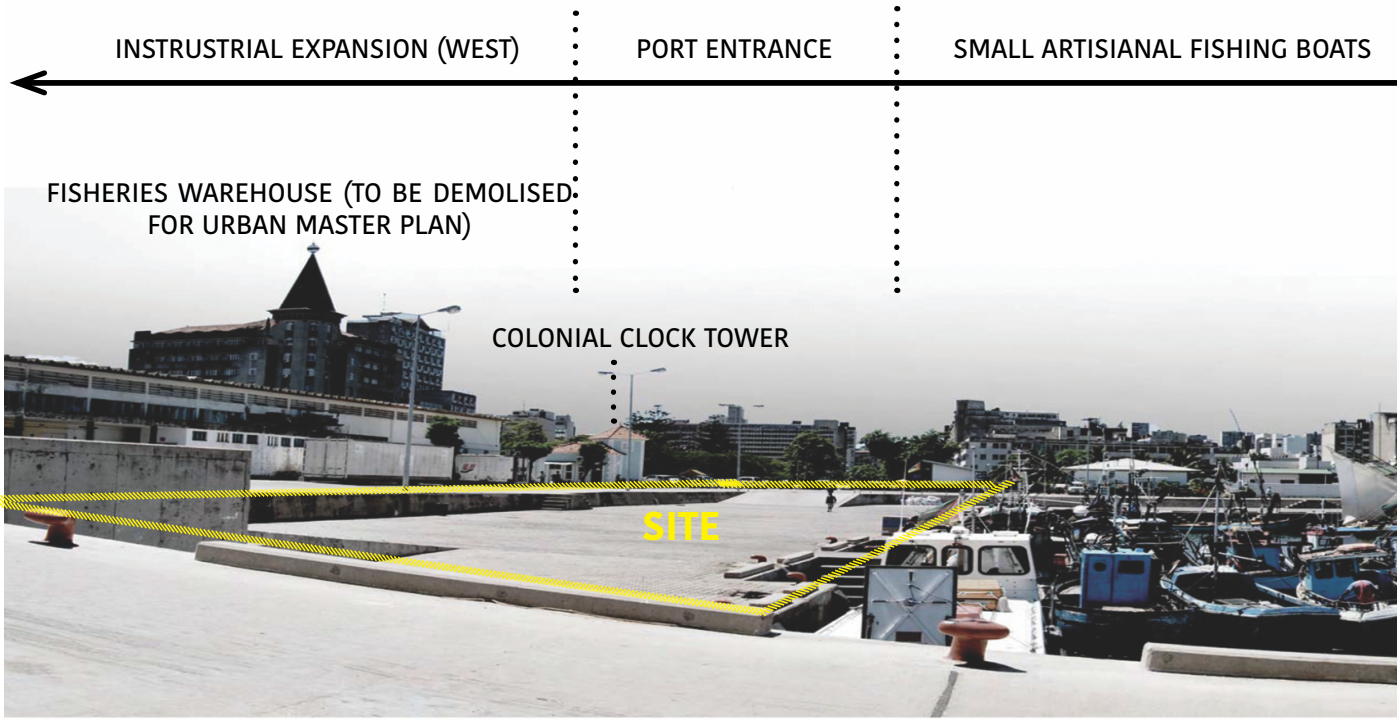
12
13
Av. 25 de Setembro
Rua de Timor Leste
Rua dos Desportistas
Ferry to Catembe
PASSENGER ACCESS
MAPUTO BAY FERRY PORT



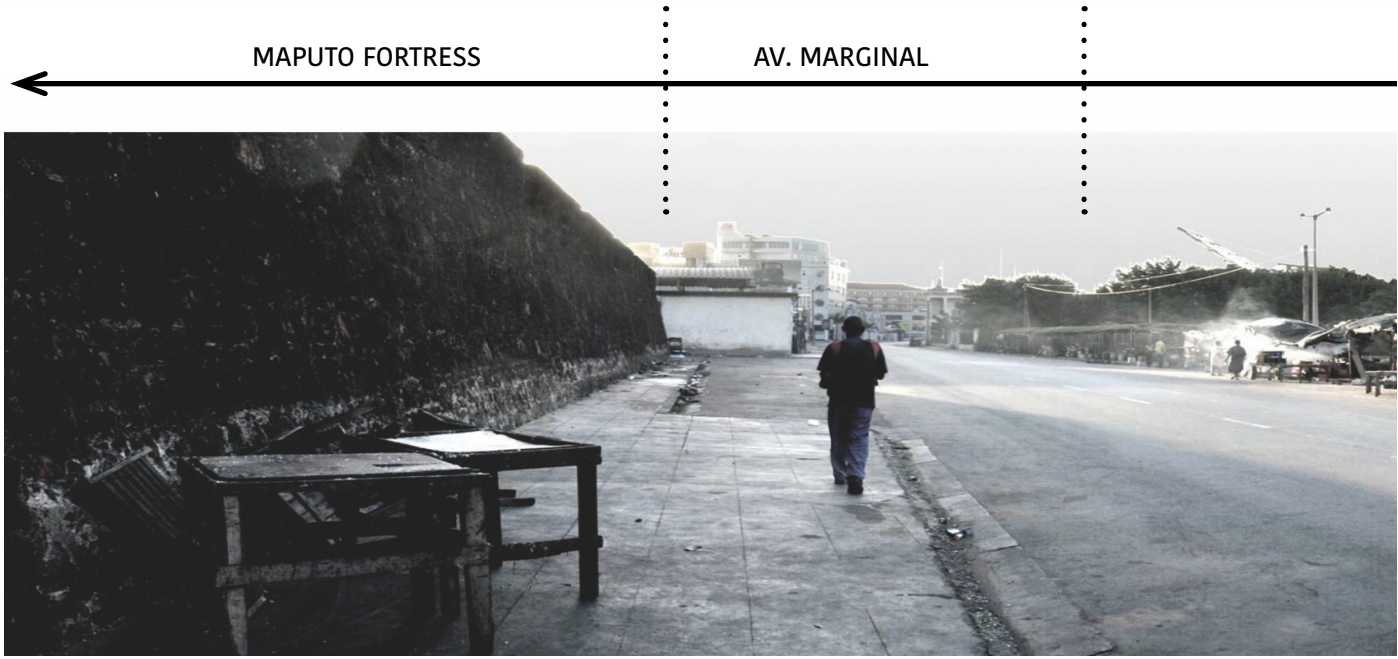


FIG 43. MAPUTO FISHERIES HARBOUR ADAPTED BY AUTHOR (DEVENISH, 2012: 43).

FIG 44. STREET BETWEEN MAPUTO FORT AND THE PORT BOUNDARY SHOWING THE INFORMAL STREET SALE ACTVITY ADAPTED BY AUTHOR (DEVENISH, 2012: 43).

PORT ADMINISTRATION BUILDINGS

ICE BUILDING

PORT DRY DOCK FOR REPAIRS

SEA

INFORMAL TRADERS INHABITING THE EDGE

ENTRANCE TO PORT

4.2 SCALE ANALYSIS

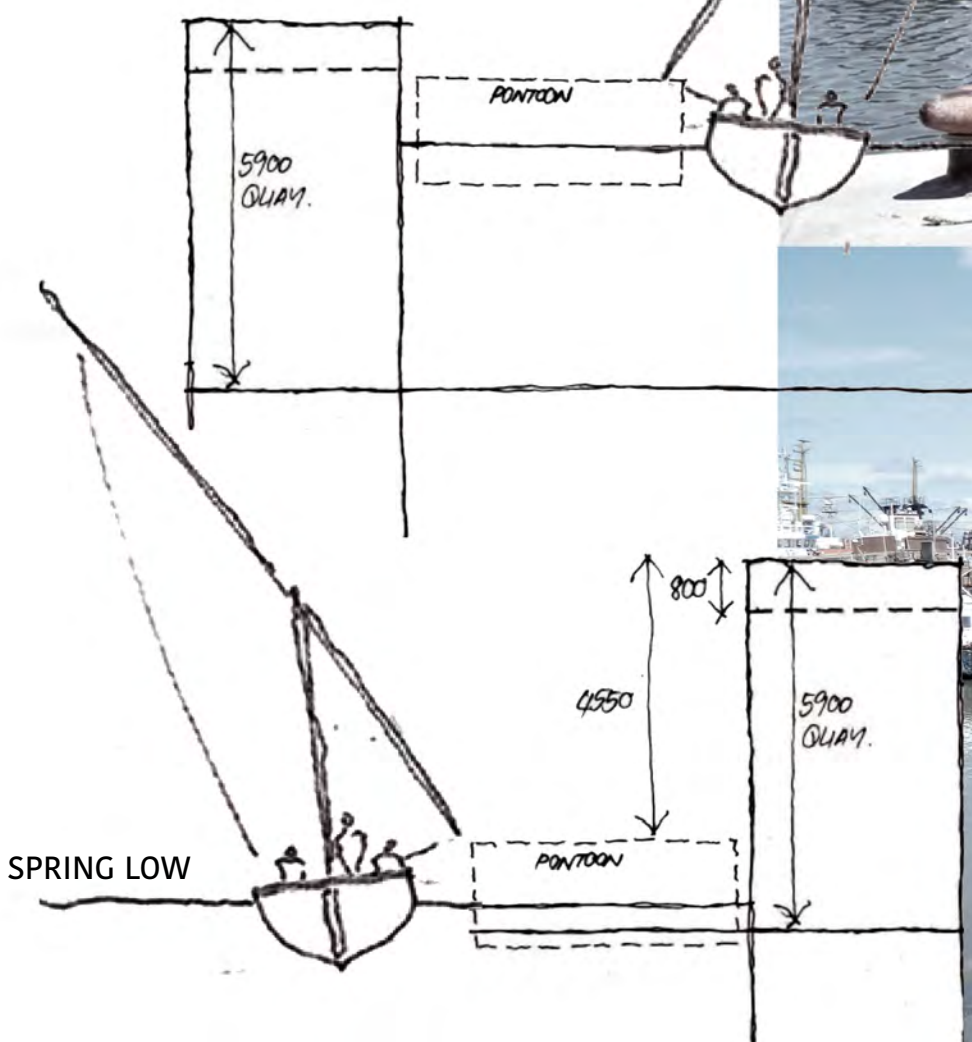
The Port

1 CURRENT CRUISE SHIP DOCK
2 START OF PORT OF MAPUTO
3 RAILWAY STATION
4 BANK (COMMERCIAL)
5 MUSEUM OF MONEY
6 SITE
7 PRACA 25 DE JUHNO
8 MAPUTO FORT
9 AVENUE SAMORA MACHEL
10 CURRENT FERRY DOCK
11 OLD BAIXA
12 NEW BAXIA
13 MAPUTO YACHT BASI

FIG 45-50. MAPUTO FISHERIES HARBOUR SURROUNDINGS (AUTHOR, 2019).

4.3 TIDE RANGE STUDY

SPRING HIGH



SPRING LOW

FIG 51. HIGH VS LOW TIDE SKETCHES (AUTHOR, 2019).
FIG 52-53. HIGH VS LOW TIDE PHOTO COMPARISION (AUTHOR, 2019).

4.4 SUN/ WIND STUDY

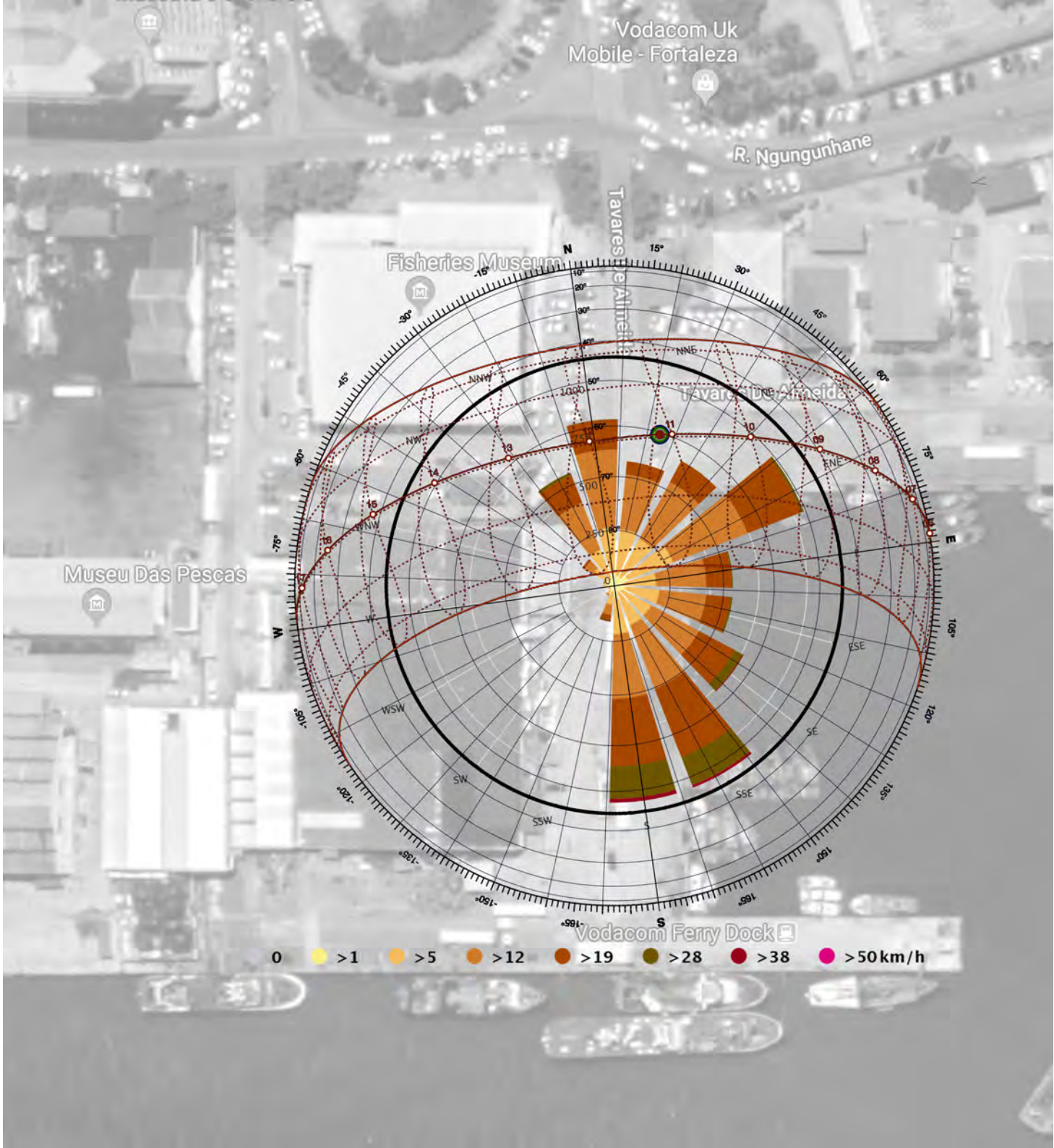
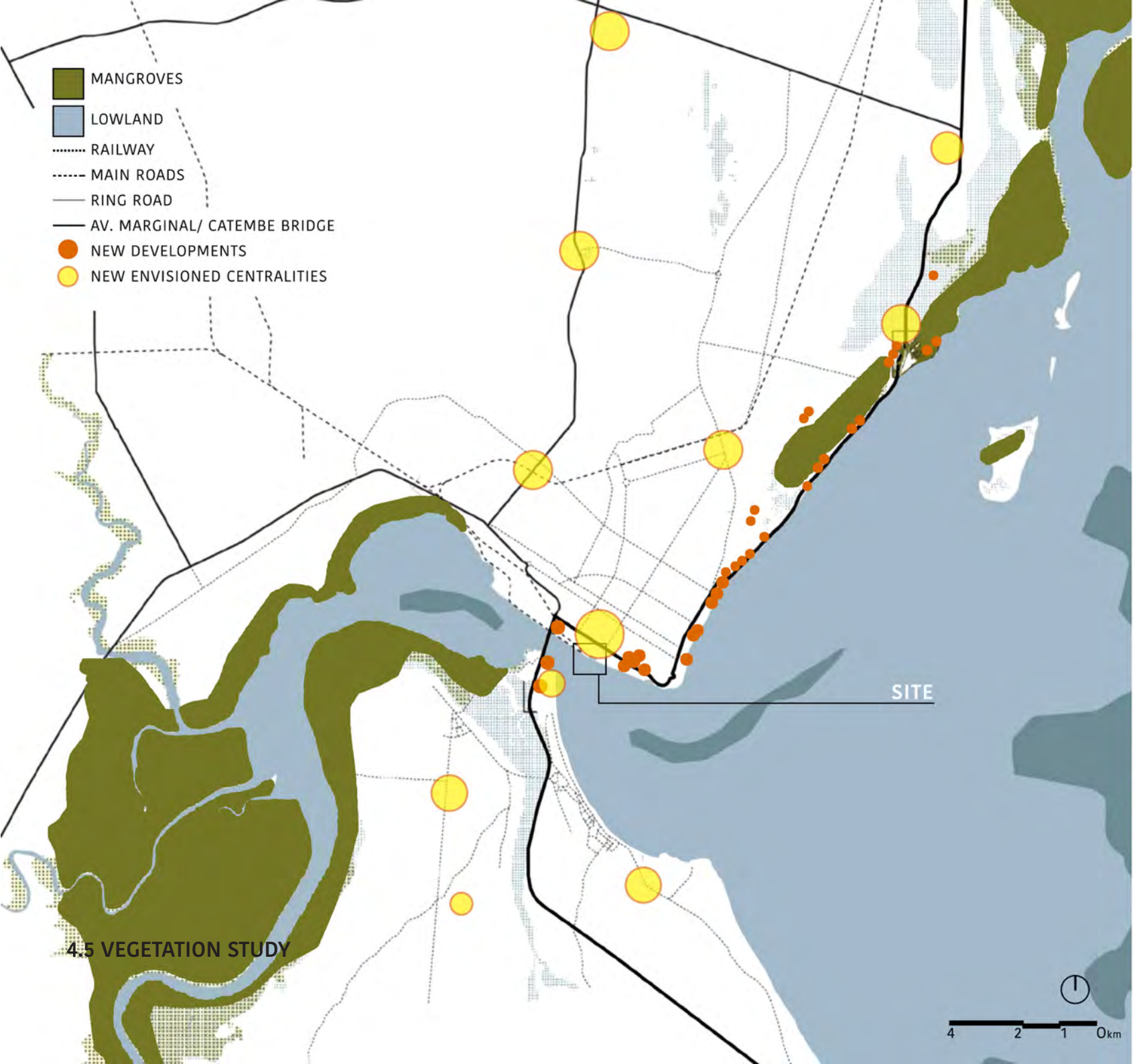
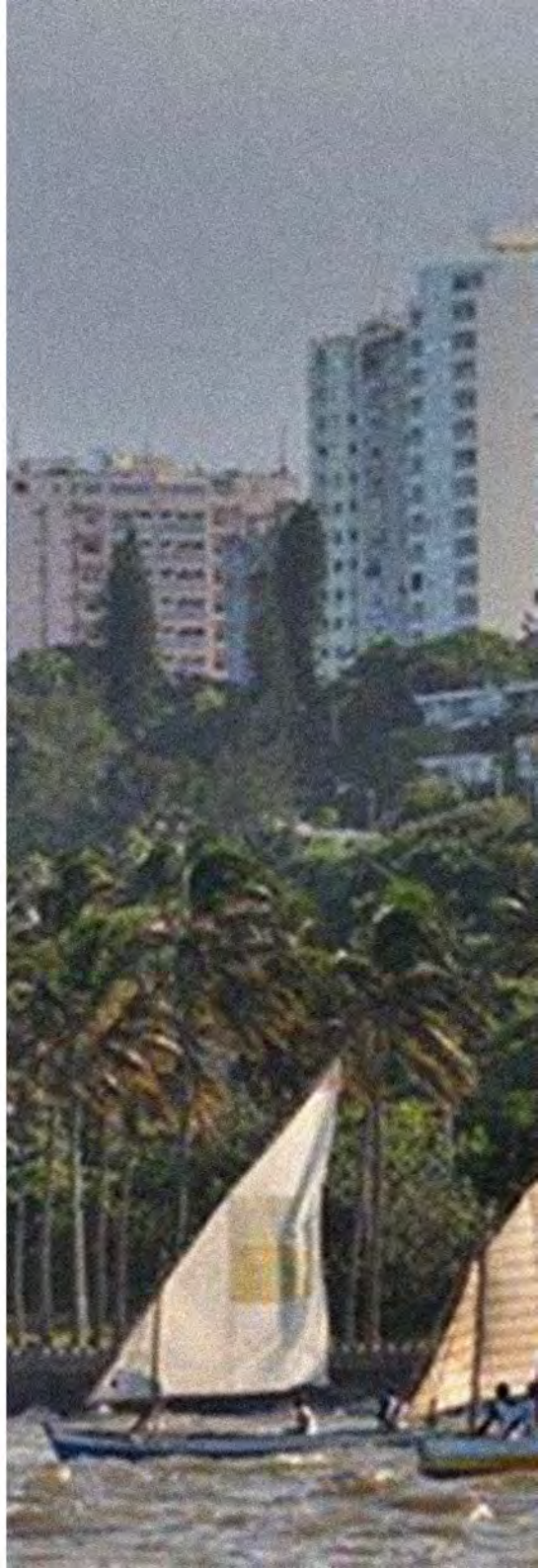


FIG 54. SUN AND WIND STUDY (AUTHOR, 2019).
FIG 55. NATURAL AND MAN-MADE INFRASTRUCTURE (AUTHOR, 2019).
FIG 56. DHOW PHOTOGRAPHY (VAN DER ELST, 2013).

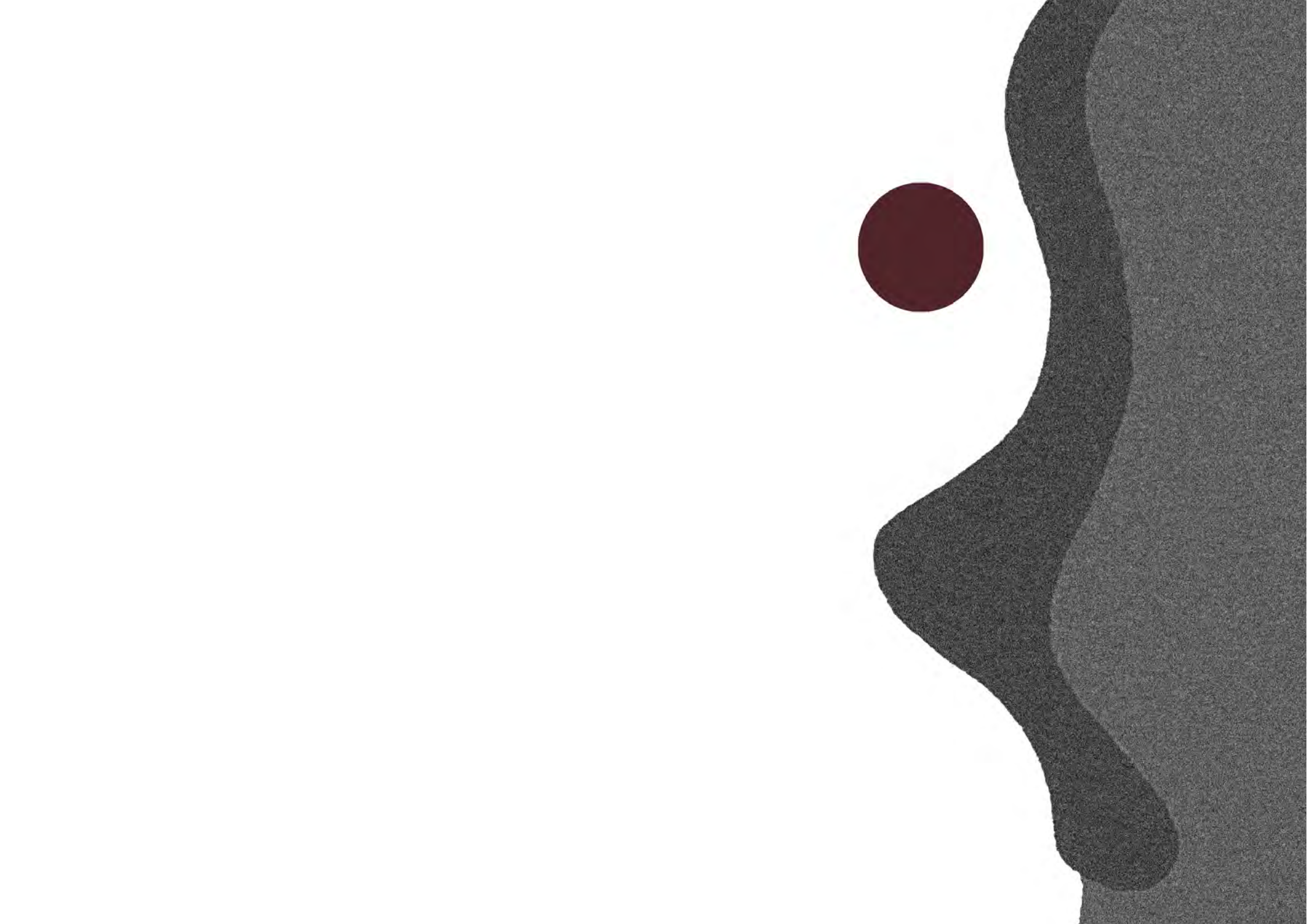




4.5 VEGETATION STUDY

PART 2

THEORETICAL INVESTIGATION
PRECEDENT STUDIES



[5] THEORETICAL INVESTIGATION

5.1 INTRODUCTION

This chapter will formulate a coherent theoretical approach aimed at suggesting and motivating possible design approaches. The goal is to develop a general understanding of how design decisions may provide appropriate contemporary interpretations.

5.2 LANDSCAPE AND THE SEA

The coastline is one of the most desired places to be. Its importance echoes the way Mozambicans inhabit the edge, which can be read across different scales, from individual people to groups of people; from houses and buildings to cities. Furthermore, the coastline as an edge serves as a source of income, is associated with religious purposes and represents the potential fusion of the 'hard and chaotic life' and a more 'soft' contact with nature.

First, this analogy of the coastline as an edge can be translated into architecture as a particular way that Mozambicans occupy space. The edge of the informal house is defined by the fence, the courtyard and the veranda, where the veranda forms an important transition between the street and the private domain. Verandas are regarded as threshold spaces, and people believe that 'a house without a veranda is like a face without a nose'. The edge of the coastline is defined by the vegetation or urban infrastructure, sand and water. There is a recurring idea of the edge being a layered space, alluding to an interpretation of boundaries as transitional rather than fixed.

The port is the spatial platform where the individual meets and affirms himself/herself to the 'other', or where that which is rooted finds itself exposed to the greater unknown of the sea. It is the position in this study that architecture can develop as built form manifesting from human activity as well as the architecture that houses this human activity. In this respect, Rem Koolhaas locates design between the formal and social (Cunningham and Goodburn, 2009: 47); he speaks of 'architecture' as that which brings context to and ascribes form for human practices (Dickson and Dovey, 2002: 5).

The term 'port' has its origins in the Latin word porta, meaning gateway or entrance, and for this reason the term is closely linked to notions of threshold and transition in architecture. The port establishes the means to root the 'local' with a network of regions outside of its own immediate context. As a result, ports are seen as dynamic places of constant movement. The migration or resources bring the ideas of architectural permanence into continuous question. Ports are therefore fundamentally places of flows, portals that mediate local and global flows.

In "Of Other Spaces," Michel Foucault (1986: 23) discussed a shift from a finite perception of space to a more infinite one. He considered that at the position where the locally-rooted discovers the unknown, emplacement (characterized as hierarchy, order and spatial relationships) is replaced with extensions (understood as traces of unpredictable movement and spatial relationships).

The Maputo port is read as an example of this place where the local discovers the greater unknown, and for this reason it is explored as the site for which the architectural investigation will develop.

FIG 57. THE WATERFRONT EDGE BETWEEN LAND AND SEA (AUTHOR, 2019).

5.3 CULTURE & IDENTITY

The critical theorist, Homi Bhabha (1990) shows that the modern nation is an ambivalent nation in constant struggle with defining its national culture due to the use of historicism, and he proposes new complex strategies of cultural identification looking at time, people and nation as the focus of his 'performative' view of culture (daily lived reality). Raymond Williams in 1983 suggested that culture has three broad definitions. The first definition refers to culture as something that can be "used to refer to a general process of intellectual, spiritual, and aesthetic development" (Williams as cited in Storey, 1993: 52). In the second definition, culture is seen as a "particular way of life, whether of a people, a period or a group of people", and in the third definition, Williams suggests that culture could refer to the meaningful works and activities of intellectuals and artists whose roles in society are dedicated to the production of meaning (Storey, 1993). The second definition by Williams, whereby culture is seen as a way of life, is further explored in this chapter.

In the context of this project, identity is defined as the sense of self of a nation that is constituted by individuals, groups, and societies, who give expression to both differences and similarities between cultures.

Using ideas derived from Rapoport (1969) and Bhabha (1990), it is clear that Mozambique's cultural identity should be represented subjectively through elements of the everyday, which can transport certain experiences associated with their way of life rather than reverting to nationalistic images of the nation and symbolism created by historicism.

5.4 THE SEQUENCE OF GENERATIONAL MEMORY

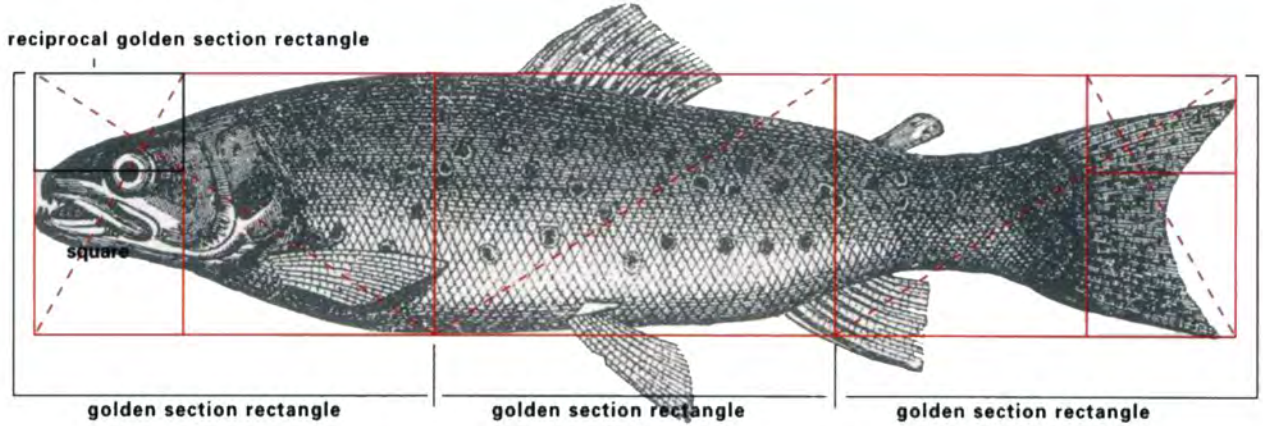
Most often in the profession of architecture, Most often in the profession of architecture, architects are given a program to respond to and create for. However in the circumstances in question, where new layered ground is to be made in the latent cultural and ritualistic uses of the past dialogue, the responsibility of programmatic genesis tentatively belongs in the creative hands of the architect. This leads to the following questions to be explored:

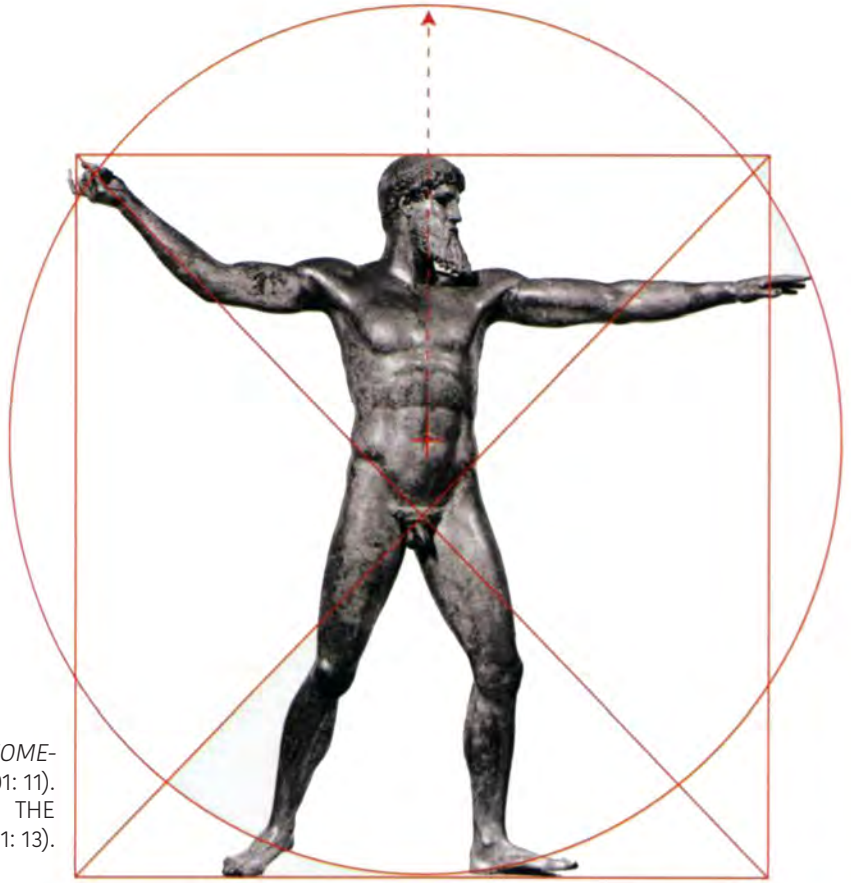
How may this tentative stance find the creative strength to add a meaningful layer to the generational memories sedimented on the site?

Determining a program which would redefine and offer a significant contribution to the culture requires a sensitive analysis of the current ways in which a specific culture engages with the site. Affected by the cyclic temperament of nature, inspiration was found in nature itself. Specifically, by expressing the beauty and appropriateness of the fish through a pragmatic and architectural narrative. It was important to study the nature of narrative and to define it as a sequence of events or experiences strung together to create an understanding motif. This idea of a sequence lead to a search for one within nature that could be investigated and later transformed into a program that would address the site issues identified.

One of the most studied sequences regarding nature is the Fibonacci sequence. This mathematical progression has been studied for centuries and has had significant precedent in many iconic pieces of historical and modern architecture. The fractal-esque geometries of this progression and its proportions have been studied in relationship to natural patterns in nature and within the proportional structure of the human body. It was believed that the proportions found within this numerology were divine due to their apparent connection between nature, man and the universe.

The geometries in nature, the mapping of the site and the analysis of current issues needed to unite to create a rich environment which would allow these components to be stitched together and materialized into more than just an idea. This is the junction where these ideas could now be manifested as an architectural intervention. I desired an architectural language which could become an instrument to play out the complex emotion and ritualized harmonies through space and time.





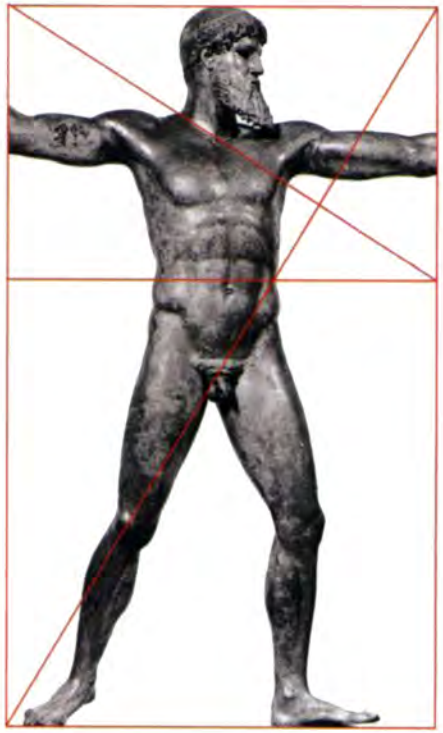


FIG 58.GOLDEN SECTION: FISH PROPORTIONS FROM THE BOOK *GEOMETRY OF DESIGN* (Elam, 2001: 11).

FIG 59.GOLDEN SECTION WITHIN HUMAN PROPORTIONS FROM THE BOOK *GEOMETRY OF DESIGN* (Elam, 2001: 13).

5.5 THE EDGE CONDITION

Architecturally, contextual design is an important driving force behind this dissertation. Contextualism in all spheres is considered, with certain aspects being particularly relevant.

First, due to the public nature of its program, the social context of the city is of specific importance. The layers of formal and informal trade prevalent in the Baixa are a character-defining trait in order to ask the following research question: What in Mozambican culture can most evidently be used to represent the essence of its culture?

Next, historical context is an important reference in order to integrate the building sensitively into an incredibly dynamic and layered context. The industrial character of the precinct itself guides the architectural response, and drawing on the heritage of the area, both tangible and intangible, aids in considering the project in a way that is historically relevant.

Contextualizing the design proposal is equally important. It should acknowledge the industrial tradition of the chosen site, whilst responding to climatic requirements and social nuances. If the two portions (cement and reed) of the Maputo Metropolitan area are placed in opposition to one another, the design can be seen to unfold in a polarity of economic levels. This polarity is particular to the colonial city form (Andrag, 2007: 1). However, it is important to note that this condition is not completely unique to colonial African cities. The inhabitants of the margins of global cities have always been, as the edge condition aptly describes, marginalised:

"To be in the margin is to be part of the whole but outside the main body... the railroad tracks were a daily reminder of our marginality. Across those tracks were paved streets, stores we could not enter, restaurants we could not eat in, and people we could not look directly in the face... We could enter that world but we could not live there. We had always to return to the margin" (Hooks, 1989: 206).

Maputo is no exception. It once centered around the Cement City, which itself centered around the "Baixa" (historic city centre). This historic centre has become just one within a large web of poly-centrality. The "Baixa" (adjacent to the harbour) can be read simultaneously as an economic centre for the city, but also as a gateway for resources and migrants into the city and therefore an edge or periphery of the city. Both local and global, the city centre exhibits an urban form characterized through strong emplacement while in the same instance it is conversely characterized through strong extensions.

FIG 60. THE REED CITY (AUTHOR, 2019).

5.6 ARCHITECTURE: TEMPORAL DIMENSION

Bhabha (1990) believes that modern nations live in a transitional time of collapse of cultural identity and that forms of identity within this scenario can only be understood through complex strategies of temporal dimension. The use of the concept of temporal dimension should substitute the traditional use of historicism, as the latter has dominated the discussions of nations about the importance of its cultural force, a built-up national culture from historians proposing that the power of the nation comes from the importance of keeping alive the image of its 'origins'.

By temporal dimension, Bhabha (1990) wants to alert us to the fact that nations live in a double-time whereby the past is linked to the image of their origins, which thus concerns the stability of the national culture and fears the more transitional social reality of modernity, and the present is seen as a period of cultural progression. In other words, the modern nation lives in the dichotomy between the cultivation of the spirit of individualism and difference, and the dominant discussion is of 'historicism as a cultural force,' in the sense that the nation will always be taking an ambivalent position towards modernity (Bhabha, 1990: online).

This causes the modern nation to be in a constant struggle with itself, for it seeks to integrate the 'marginal individuals' in a community and to maintain a status and sense of unity, whilst at the same time wanting to project its image as modern (Bhabha, 1990).

This point of view is discussed by Jencks (2007) from an architectural perspective. Jencks believes that the double-time era creates an architecture of 'Double coding.' In other words, it is an architecture that uses the combination of modern techniques with something else (usually traditional features) in order for architecture to communicate with the public. A problem then arises when trying to identify the codes that can render to an audience the 'known realities' (the qualities, or the essence) of, in this case, Maputo's culture.

This same complexity appears in architectural language because architecture, as a form of self-expression of its time, inherits the difficulties of the present ambivalent forces of the nation. Bhabha also leads us to believe that realistic narratives produce a 'national history time', a 'performative' representation of the sense of locality in space and time of the historical life of people. This has the power to transform the idea and essence of place into space.

FIG 61. MAPUTO CATHEDRAL (AUTHOR, 2019).

5.7 CULTURAL CONSTANCIES AND FORM

Amos Rapoport's argument complements that of Bhabha as he introduces ways of identifying the constant cultural forces of a nation that influences architectural form. For Rapoport, built form is the physical embodiment of cultural behavior – form once built affects cultural behavior and the way of life (Rapoport, 1969:46). Understanding these behaviors (patterns, desires, motivations, and feelings) is essential to the understanding of form.

Rapoport's concerns are the lessons that architects can learn from the study of the traditional built environment. He explores certain forms of traditional architecture from different cultures that have persisted through time to explain a close relationship between these forms and the culture in which they are embedded. For Rapoport, tradition as a regulator of form has disappeared due to a greater demand for different buildings as well as due to the rise of specialization and individualism; consequently, there's been a loss of common shared values. The study of traditional architecture in part 1 therefore becomes important because it represents the direct expression of changing values, images, and perceptions of a certain culture. In addition, this type of study can identify what Rapoport has called constancies and changes.

Constancy and changes are the climax of his argument. They are identified through careful analysis of forces which firstly, influence the form of buildings but do not determine them; they include climate and the need for shelter, materials, construction and technologies, site, defense, and religion (Rapoport, 1990: 46). Secondly, forces with socio-cultural factors – "the accepted way of doing things, the socially unacceptable ways, and the implicit ideals" (Rapoport, 1969: 46). These factors include basic needs, the relation of house and settlement, site and its choice.

Rapoport also suggests that no matter what the constraints are, man will always have a certain degree of freedom and choice, he concludes that the degree of choice and freedom embedded in the socio-cultural factors will never allow us to fully understand form unless one identifies the true meaning and beliefs of a certain culture, in other words its constancies and changes.

His concept of constancy and change evolves from the conclusion that culture is not a static factor and that, as we have seen in Bhabha's argument, is in constant progression. Its evolution or change implies that form can remain unchanged, but its meaning, like in the case of past colonial buildings being used in a way that is different to what it was intended for, as discussed in part 1, remains the same.

"This suggests that certain elements of behavior and the way of life are constant, or change very slowly, and that replacement of old forms is often due to prestige value of novelty rather than lack of utility or even unsatisfactory relation to the way of life" (Rapoport, 1969: 79).

Constancies can, therefore, assume the form of basic necessities and beliefs of people, such as the need for identity and place. Constancies can also assume the form of past solutions. In summary, what Rapoport suggests is that the distinction in ones' culture is helpful to understand what influences form. In this case the constancy in the Mozambican way of life is the evolution of traditional house forms within the outskirts of cities. In the informal settlements, dwellings have evolved from its primitive 'original' models by drawing on architectural features such as concrete gutters, eaves-through, and brise-soleil. In addition, new materials contributed in creating more permanent and physically stronger houses. Although the form of these and many other features of the informal dwellings have been altered, its principle of living still remains the same. For example, the veranda is still an element from which people are not willing to abdicate: "Houses have maintained their basic scheme in its open and closed spaces that characterize the way of life of these people, whose habits are still tied to rural life" (Carrilho et. al, 2004: 77).

FIG 62. PAST COLONIAL DOOR (AUTHOR, 2019).

FIG 63. TRADITIONAL REED HOUSE DOOR (BLANCK, 2013: ONLINE).

FIG 64. MODERN VILLA DOOR (AUTHOR, 2019).

5.8 PANCHO GUEDES

One of the aims of this dissertation is to look at the architectural approaches of Pancho Guedes (1925-2015), considering his attitude against the prevailing functionalism of his time and his aptitude for developing a deeper modern and human architecture. He defined architecture as "built meaning", evoking its multiple significances, languages and responsibilities (Tostões, 2018: 48). He envisaged architecture as a language with an emotional impact emphasizing its social and cultural scope. The value he recognized in the role of the community and the importance of the social being explain the way he conceived architecture as a dialogue, designing buildings as means of creating relationships between people, rather than as an end in itself. Pancho Guedes had a fascination with remote, non-European cultures. The discovery of these other worlds, and the power of otherness, undoubtedly marked his character in the most decisive period of his development, his childhood.

"BUILDINGS SHOULD SPEAK AND SMILE"

Pancho Guedes (1925), the Luso-African architect active in Mozambique, the Portuguese colony, until its independence in 1975, made in his writings and architectural production a major contribution to the reassessment of architectural modernity, connecting different disciplines and cultures. He strived to createan architecture full of significance, carrying a personal dimension based on research focused on all formal dimensions and on the possibility for architectonical elements to contain and express emotion: "I claim for architects the same rights and freedom painters and poets have had for so long." Guedes wanted to appropriate the primitive's universal motifs, mixing them with his own sophisticated architectonical culture, in order to achieve the atmosphere of a de Chirico painting in his buildings (Tostões, 2018: 50).

Unlike the majority of architects working in Africa forced to design in dialogue with climate constrains, Guedes also claimed the creator's right to innocence stimulated by the sensuality and drama of the surrounding African culture. The will to discover an alternative modernity was a response to an African awakening. In this topic of architecture, there were important "Stiloguedes" buildings in Maputo, such as the Prometeus Apartment Block (1951-1953); The Smiling Lion (1954-1955); the Saipal Bakery; the Otto Barbosa Garage (1952); the Abreu Rocha and Tonelli Building (1955), and the Pyramidal Nursery School (1959-1961).

Guedes promoted the success of a new African art rooted in the character of local roots and cultural conditions (Tostões, 2018: 50). In his designs, he developed an original style and intense expression. Establishing links with the local population, he found in Maputo a favourable atmosphere for the realization of his projects. By showing interest in issues ranging from African sculpture or indigenous architecture, from Gaudi to Art Nouveau, freely revisiting and reinventing both modern and primitive art in his constructions, that borrowed from his painting and sculpture in a complete artistic process, we can see a geometry that reflects patterns resembling the tattoos of African mythology in his work. With careful attention to the myriad of cultural influences and local features that define societies, from culture to climate, Guedes was able to express his design challenges with a creative response.

It was through great admiration of Guedes' work, amongst others, that this project developed. His work shows a concealed rationaelity with intuitive and artistic demonstrations of understanding for local culture, most of the time making use of cultural symbols and forms. As Gadanho puts it: "He welcomed the symbolic and ritualistic dimension of material culture, along with the animism of surfaces and form" (Gadanho, 2003: 6).

FIG 65. PANCHO GUEDES FACE COLLAGE (GUEDES, ONLINE)

5.9 CONCLUSION

The theoretical study which has turned into a journey of discovery about the limitations of Mozambican architecture. Guedes was not solely inspired by Mozambican traditional architecture. He was primarily inspired by architecture in a universal sense, which then was transcribed as his own interpretation in consideration of the cultural context of the place. Just like in art, which is representative of its society and cultural behavior, there are different styles and different techniques and no right way of expression. The quality and validity are ultimately accepted as good, beautiful and appealing to people based on common and shared impressions of what they consider as representative of their culture. Having said that, I return to the origin of this project, which attempted from the first to make it clear through the theories of Bhabha and Rapoport that the identification of possible ‘cultural variables’ of Mozambican culture are part of the things that either Mozambicans and South Africans would identify as ‘authentic’.

[6] PRECEDENT STUDIES

6.1 THE SMILING LION

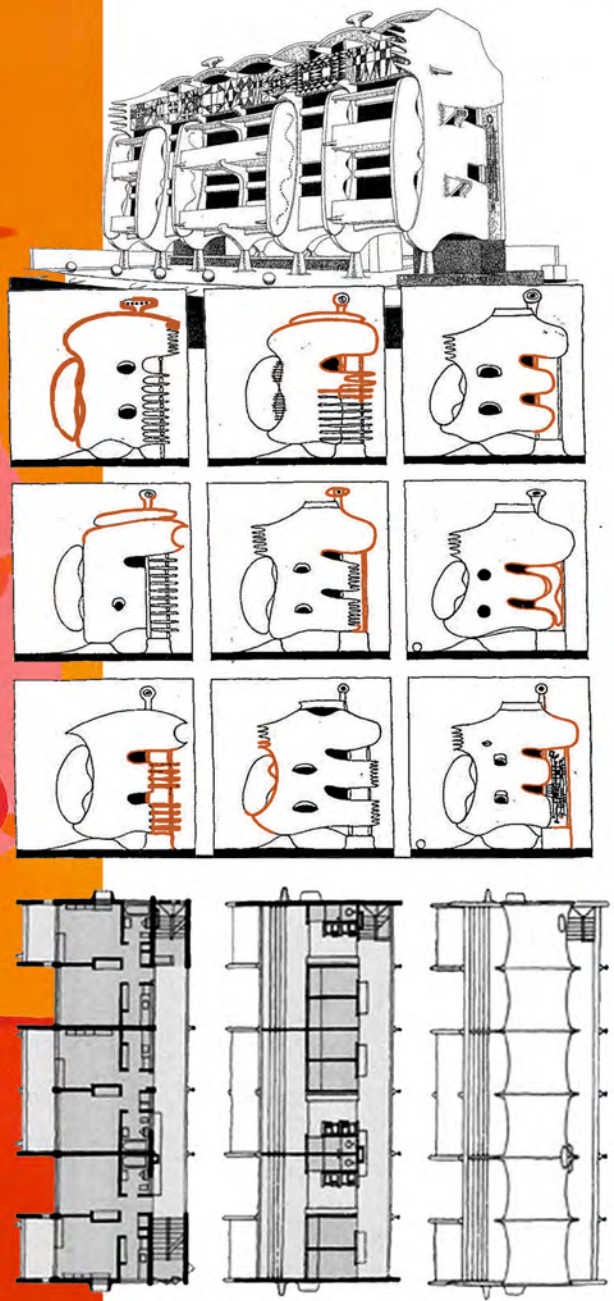
Location: Maputo, Mozambique
Architect: Pancho Guedes.
Year completed: 1958

Plan - Section relationship:

The Smiling Lion is a block of six flats, straightforwardly planned, but uninhibitedly sculpted. His plans are always closely related to the logic of concrete construction, with sensible spans and columns. The privacy fins are there, the cars neatly parked bay-by-bay between voluptuous, erotic, cavernous columns. There are combs again at the ends of the building, but now part of a virtual smiling face. Plan-forms inform painted images, paintings inform sculptures, sculptures inform building forms, and all inform the narrative which is the substance of his writings.

FIG 66-70. THE SMILING LION (1954-1955) (GUEDES, 2019: ONLINE).

PANCHO GUEDES



6.2 THE SAIPAL BAKERY

Location: Maputo, Mozambique
Year completed: 1952

Exuberant form-giving:
Located in the Maxaquene Quarter, this industrial building is marked by the curvilinear plasticity characteristic of Guedes. A series of curved concrete arches that expressively draw the outer profile of the building also define the main inner spaces of the naves for bread production. It belongs to the self-described "Stiloguedes"; it was, along with the residential building Prometheus at Polana (1951), one of the first examples, dating from 1952-1954.

The Bakery was originally designed to serve as the seat and factory of the Cooperativa de Padeiros de Lourenço Marques (Bakers Cooperative), a role that it played for a short period. It consists of a rectangular-plan volume, with a transversal section composed by the structural connection of two parabolic arches, repeated several times along the longitudinal development of the building and shown in the top exterior elevations, in a cluster united by the vaulted roofs, marked by the sculptural volume of the chimney and interrupted at the centre of the south-western elevation, where the fantastic shapes of the elements of inner support are visible from outside. The back area of the building was recently subject to alterations for its conversion into the headquarters of the Fipag water company.

FIG 71-78. SAIPAL BAKERY (1952-1954) (GUEDES, 2019: ONLINE).

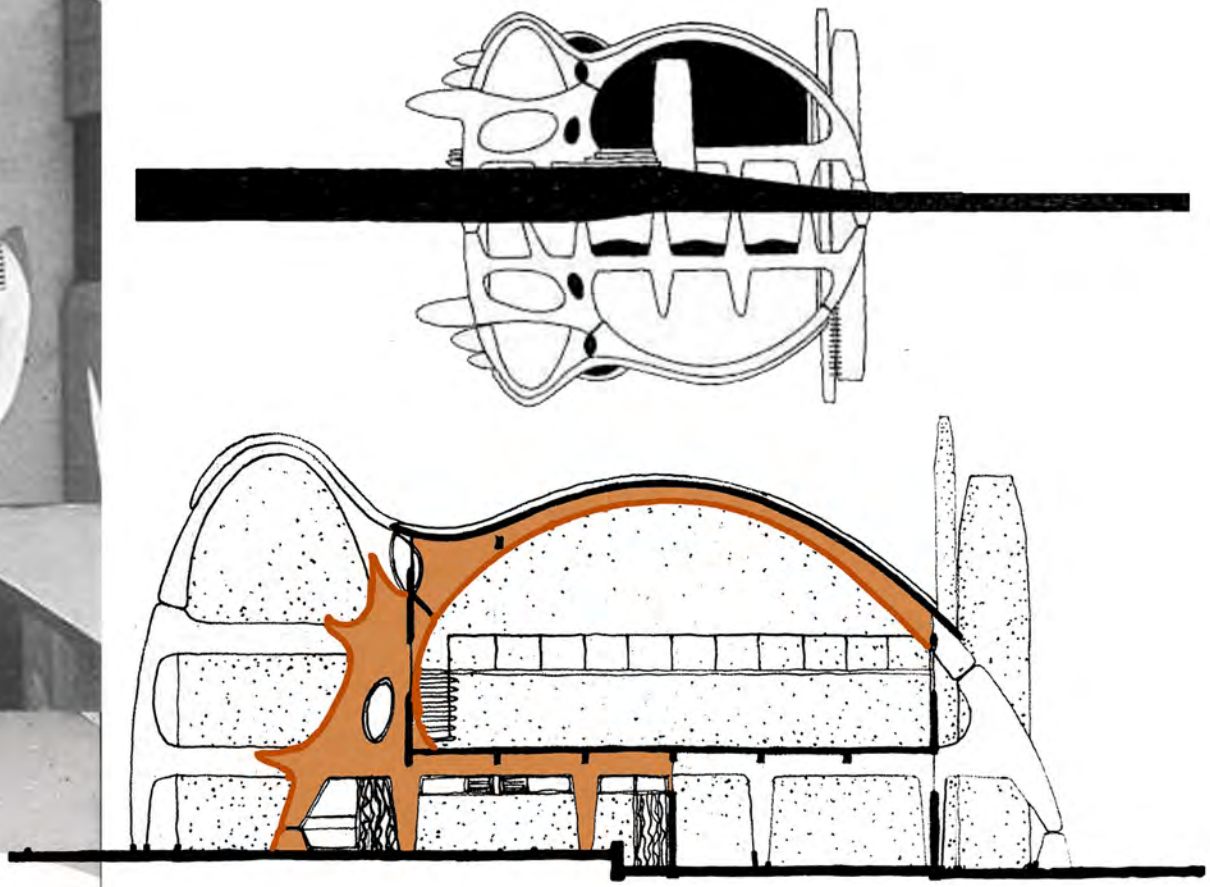
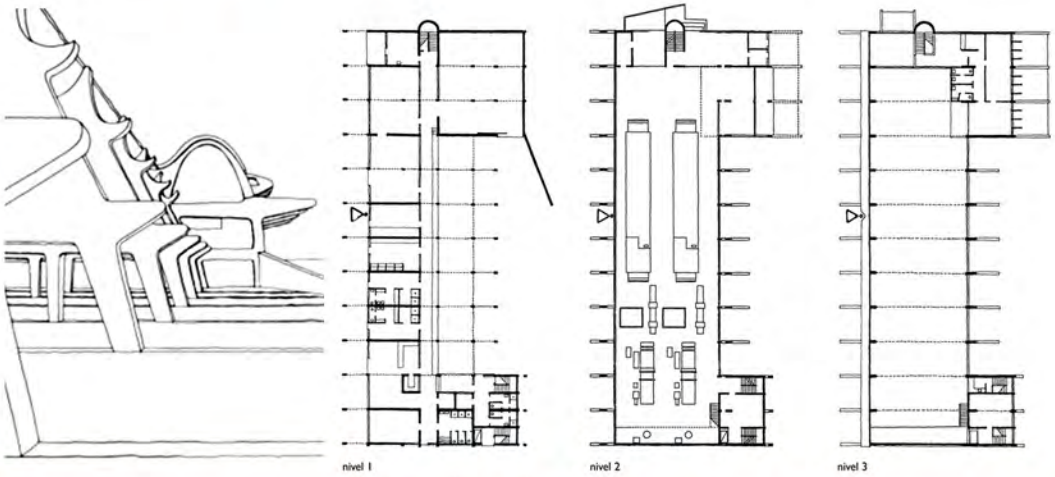


FIG 74. SECTION OF SAIPAL BAKERY ADAPTED BY AUTHOR (GUEDES, 2019: ONLINE).



STILOGUEDES 'GUEDESSTYLE'

6.3 CULTURAL CONSTANCIES

Sagrada Familia Church
Architect: Pancho Guedes.
Machava, Maputo, Mozambique

It was built in 1964, after four failed attempts. It was envisaged to be a house, a pavilion, a look-out hill and as a chip factory. In the fifth 'dream,' it was built as a catholic church. The metaphorical image of the building can be described as looking like a gondola, a Portuguese vessel, or even people holding crosses in a religious procession. The architect's own description states the following:

'A building making signs.
A plan like a crucifix.
A church turning into crosses at the extremities and entrances.
A mommy house surrounded by children in funny hats.
A wedding hall.
A roof like a gondola.
The ship of life guarded by four fat two-way crosses.
A round eyed bell box ringing to the four winds.
A house of rolling walls twisting and turning into corners, crevices and concavities – for old men in the sun – for hide and seek games – for lovers- for young gangs.
Buildings shall become habitable – outside'.

PANCHO GUEDES IN (SANTIAGO, 2007).

FIG 79-81. SAGRADA FAMILIA CHURCH: BUILDING WITH METAPHORS (GUEDES, 2019: ONLINE).

6.4 FISHERIES MUSEUM “MUSEU DAS PESCAS”

Architect: Jose Forjaz
Location: Maputo, Mozambique
Year: 2006

Jose Forjaz was born in 1936 in Coimbra, Portugal, and graduated in architecture in 1966 (Frey, 2018: online). He established himself in Mozambique in 1975. Since 1990, he has directed the faculty of Architecture and Physical Planning at Eduardo Mondlane University (Frey, 2018: online).

The Fisheries Museum project went out to public tender and caught the interest of Jose Forjaz due not only to the fact that the site proposed for this museum was located at the top of one of the most important squares “praças” of the Maputo City Centre, but also because as a result of budget restrictions, the project would have to be built in phases without the first phase looking incomplete (Agencia de Informacao de Mocambique, 2014: online). In order to accomplish this, Forjaz proposed a solution to take advantage of the idea of playing with a great transparency of the building while at the same time revealing the interior and highlighting the large exhibition of boats and accessories, establishing a true scale of this equipment (Agencia de Informacao de Mocambique, 2014: online). In choosing these technologies, Forjaz not only took into account economic aspects, environmental performance and also ease of maintenance, but also the soulfulness and affinities to the maritime theme of the museum. The shape and the structure of the roofs reflect the rhythms and forms of a naval building, as well as the detailing and treatment of space elements.

The museum helps to protect the Mozambique’s cultural heritage in the fishing area. It displays and preserves fisheries artifacts, which are centuries old, and samples the country’s main fisheries resources. The museum, along with the design proposal, will act as a gateway to the port area.

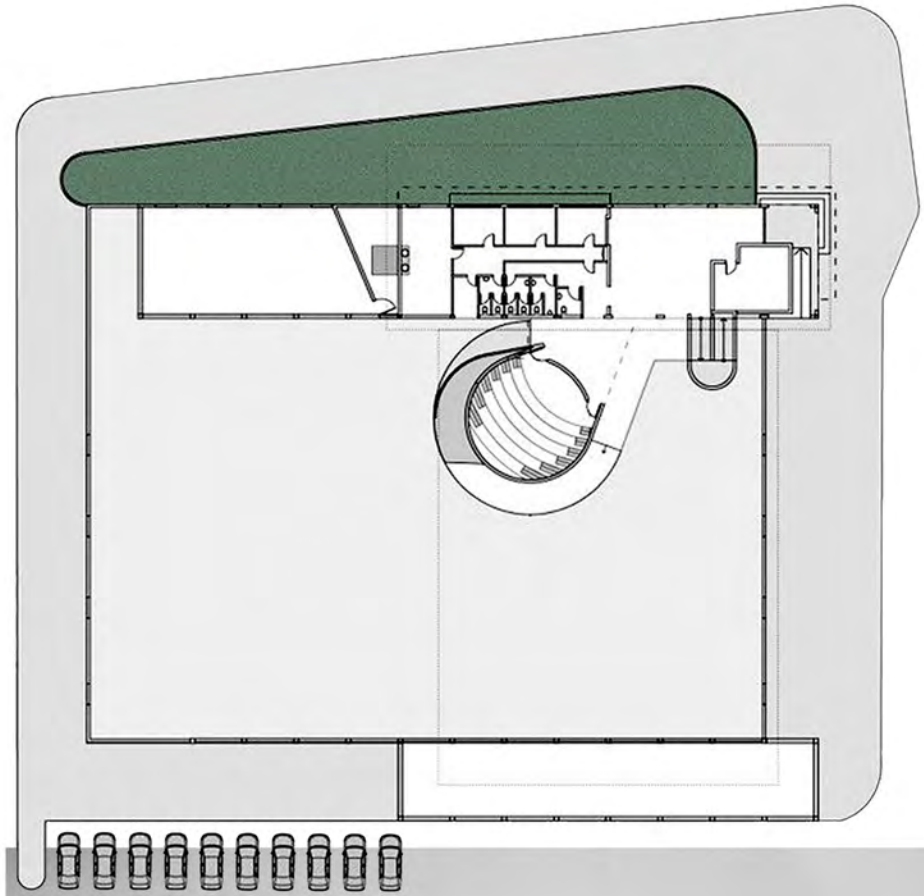


FIG 82. Fisheries museum fround floor plan (Forjaz, 2006: Online).
FIG 83. Structure exploration model built by the authour (Authour, 2019).

FIG 84. Section showing the structural system (Forjaz, 2006: Online).
FIG 85-86. Building Renders (Forjaz, 2006: Online).

FIG. NORTH ELEVATION SHOWING CLIMATIC RESPONSE (AUTHOR, 2019).

6.5 SANTA CATERINA

The quality design lines

Architects: Enric Miralles & Benedetta Tagliabue EMBT studio
Location: Barcelona, Spain
Year completed: 2005
Area: 5000m2

The husband and wife team of Enric Miralles and Benedetta Tagliabue were commissioned to design the restoration of the Santa Catarina Market in Barcelona after winning the bid for this project (Glancey, 2005: online). The market is in Barcelona's city centre. The market stalls are covered by a wave-like roof adorned with 325,000 colourful ceramic tiles resembling a magic carpet. Individual laminated roof panels were cut by hand with a large number of awkward curves in the design. The building is a contrast of ultra-modern look and old in spirit and technique (Studio P10, 2013: online). The roof design has been called the "largest life size jigsaw puzzle in the world" (Studio P10, 2013: online).

The long span trusses are supported by intertwined steel columns. This provides long spans so that the stall configuration could change. The project accommodates a market floor with 100 stalls. Next to the market are two new buildings that provide 59 public housing flats for the elderly (Archiseek: 2009: online). Its roof accentuates the vibrant colours of the fruit sold within its walls and represents the colourful life of the city (Lomholt, 2018: online). From the outside, the dominant forms are the rippling vaults of the roof edges. The facades are playful with changing rhythms and at the same time over-shadowed by the roof.

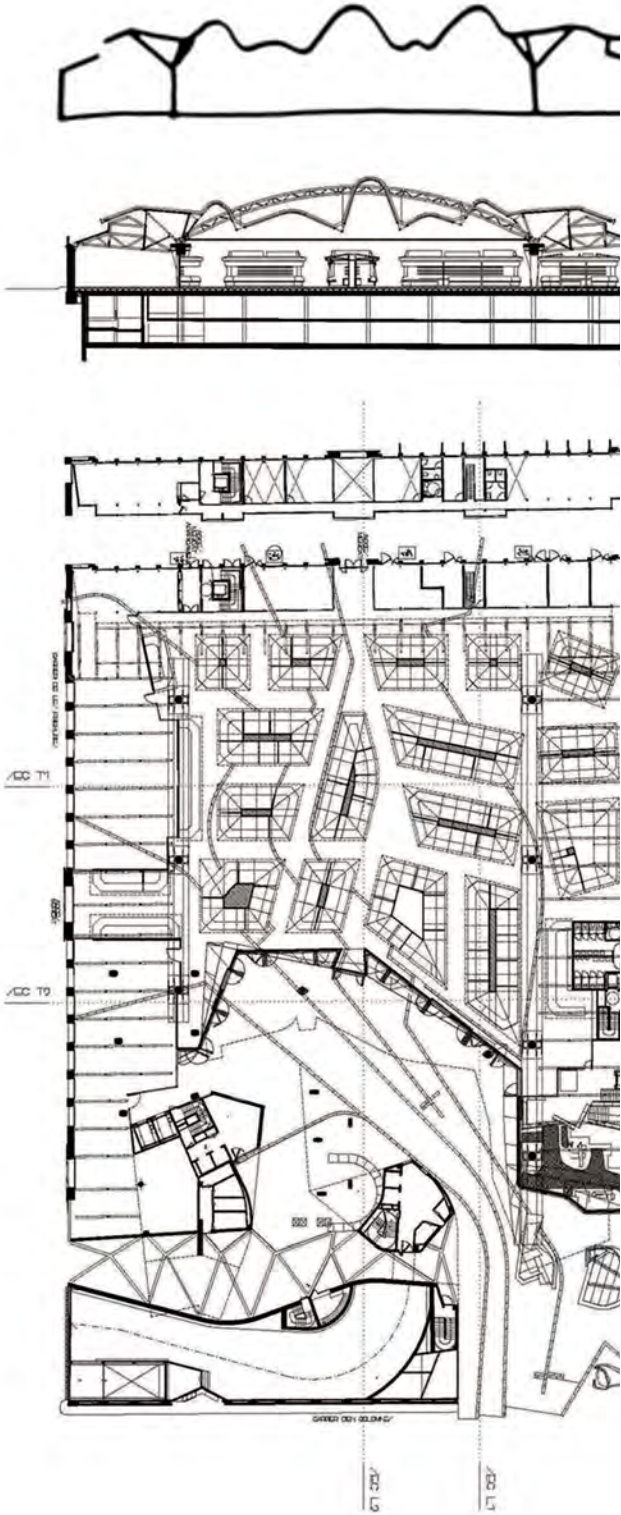


FIG 88. Santa Caterina Floor plan (Metalocus, 2014: Online).
FIG 89-92. Photographs by: (Gaultier, 2005: online)

6.6 THE OLYMPIC ARCHERY RANGE

THE DYNAMIC SECTION

Architects: Enric Mirelles & Benedetta Tagliabue EMBT studio
Location: Barcelona, Spain
Year completed: 1991
Area: 5000m2

The design philosophy of Enric Miralles and first wifer Carme Pinós originates from the integration of pragmatic conceptualism with poetic metaphor and holds a strong reference to nature in architecture that develops into a site-specific tectonic expression. It describes the archery pavilion as mediation between athletes, spectators, and the sports hall that rises above the playing field as a visage that surveys the sports field (Arcidi 1992: 74).

LeCuyer (2000: 29) aptly describes architecture's effect on the individual in the public realm: "In addition to the enhancement of individual experience, its architecture is directed towards the creation of shared social landscapes, rather than being an esoteric private dialect of the elite, the richly expressive language of the art of construction, is firmly engaged in the public realm."

Massive metal gutters correspond to the contours in the landscape, highlighting articulation and tectonic expression where different materials meet, especially where weightlessness is achieved. The finishes are utilitarian, the lighting exceptional: curved walls of cerulean blue tile are silhouetted by the perforated concrete walls (Arcidi, 1992: 78).

LeCuyer (2000: 30) also states that "tectonic" suggests a preoccupation with materiality and a championing of craft that respects the trace of the hand and the expressive potential of construction.

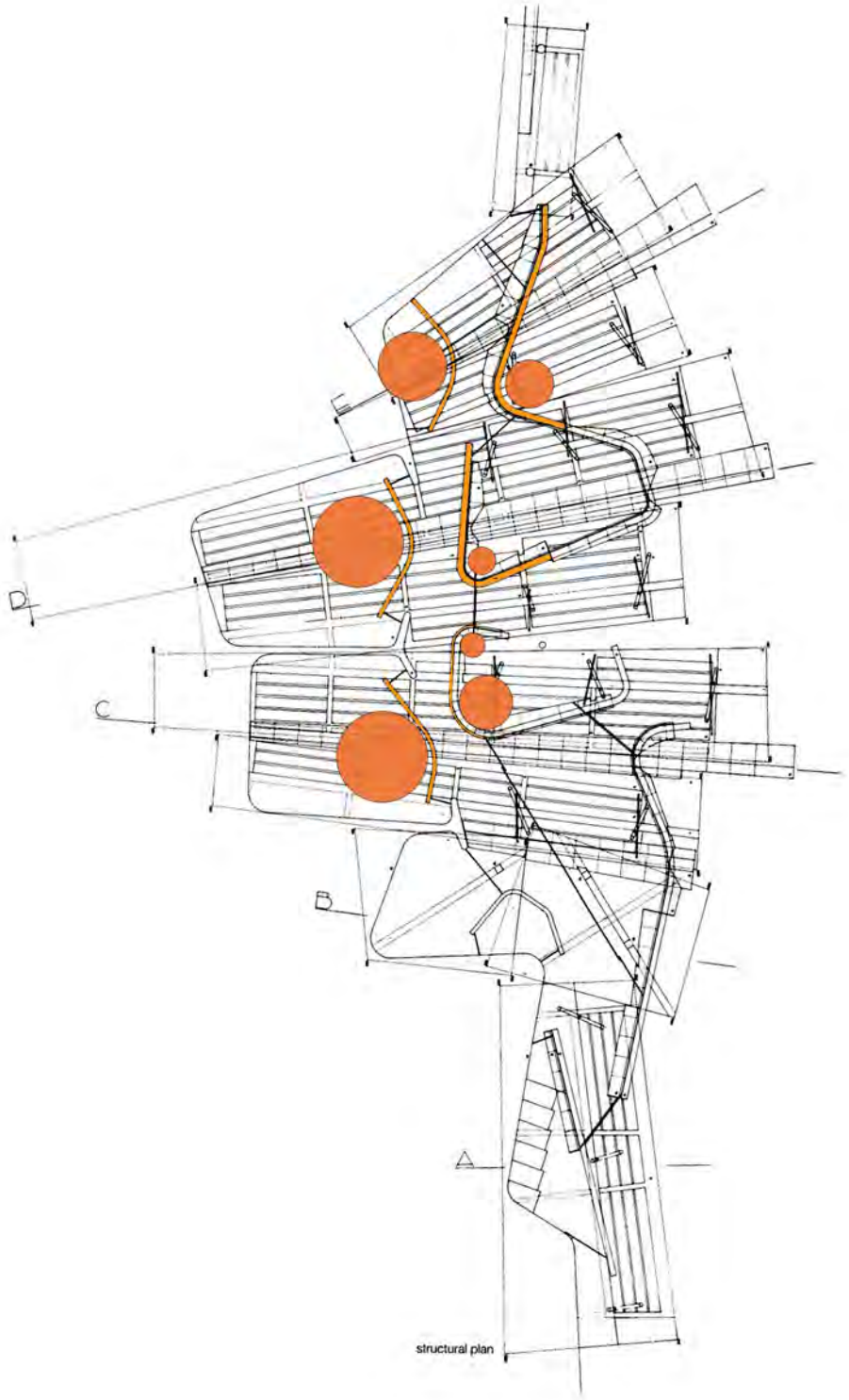
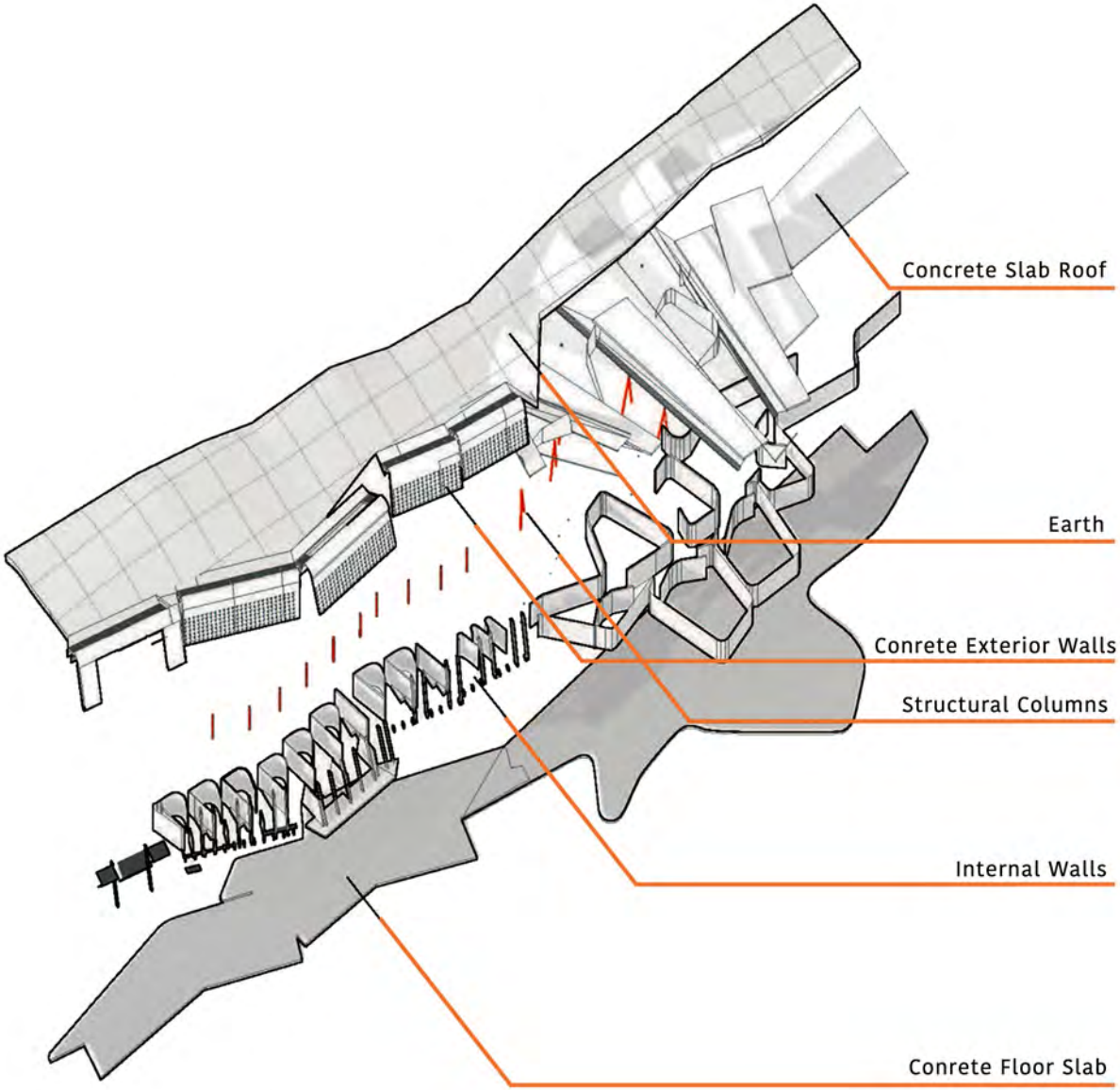
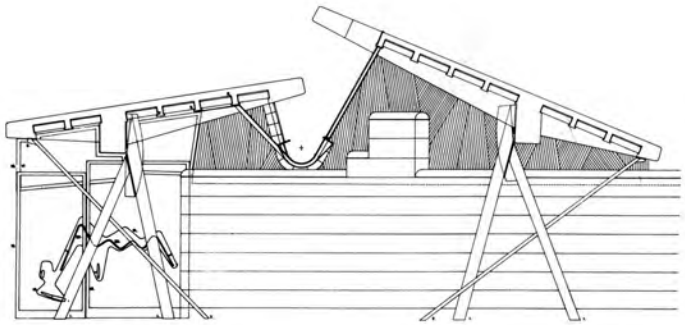
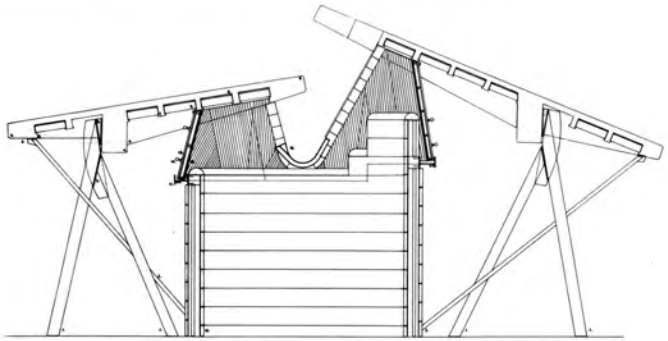


FIG 93. Floor plan adapted by author (Archdaily, 2014: Online).
FIG 94. Axonometric adapted by author (Taylor, n.d.: Online).
FIG 95-96. Section drawings (Archdaily, 2014: Online).
FIG 97-98. Photographs by: (Janssen, 2014: Online)


Concrete Slab Roof
Earth
Conrete Exterior Walls
Structural Columns
Internal Walls
Conrete Floor Slab





6.7 ROBERTO BURLE MARX

Born in Sao Paulo, Brazil, in 1909, Roberto Burle Marx was a modernist and landscape architect. He studied painting in Berlin in 1928, where his trips to Dahlem Botanical Gardens introduced him to the artistic possibilities of tropical planting (Tclf.org, 2018: online). After his return to Rio de Janiero in 1930, he began experimenting with native plants while studying at the National Academy of Fine Arts. He designed his first garden for Schwartz House when he was enlisted by architect Lucio Costa, who was also his professor (Tclf.org, 2018: online).

His most well-known projects are the seaside curving mosaic pavements on Copacabana Beach, Rio de Janeiro, as well as the abstract garden designs (Thejewishmuseum.org, 2016: online). He transformed garden design by eradicating symmetry and using abstract and grand-colorful sweeps of local vegetation. He used landscape architecture as a way to repair the rift between nature and humanity. He referred to himself as “the poet of his own life” (Thejewishmuseum.org, 2016: online). He introduced modernist landscaping architecture to his home country. Burle Marx’s garden designs are works of modern art. He uses flat planes, abstract shapes and bold colours. He exploits bold combinations of massed plantings and colourful amorphous paving shapes as his palette. His work prompts awareness of oneself in relation to the built environment.

Burle Marx was a painter working in landscape. The designs he created with paving and bed shapes and his architectural forms control his work. They are bold and joyous. They emphasize the modern city that Rio de Janeiro was developing into in the early part of his career (Hartlage, n.d.: online).

FIG 99-101. Photographs by: (Finotti, 2016: Online)

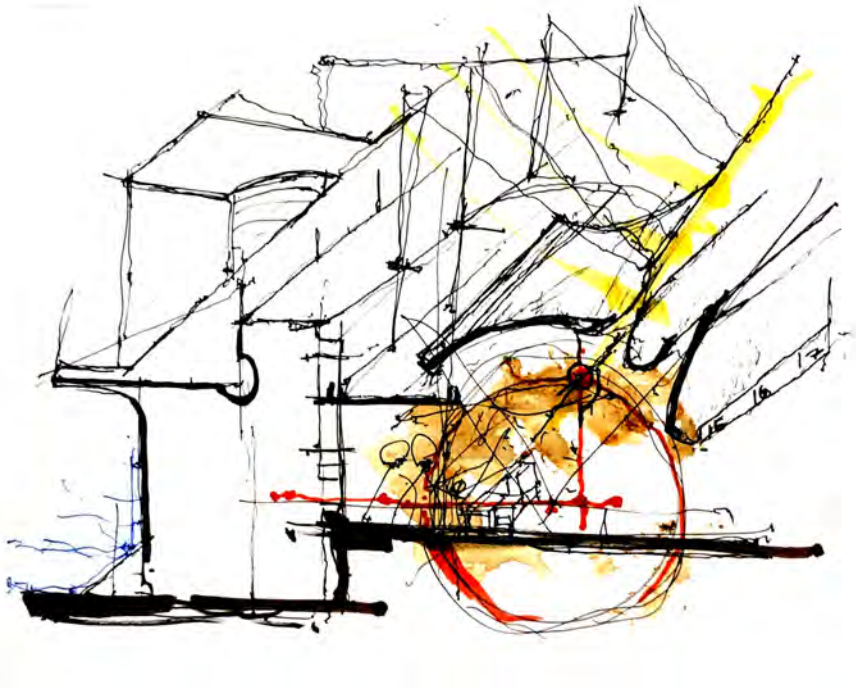
PART 3

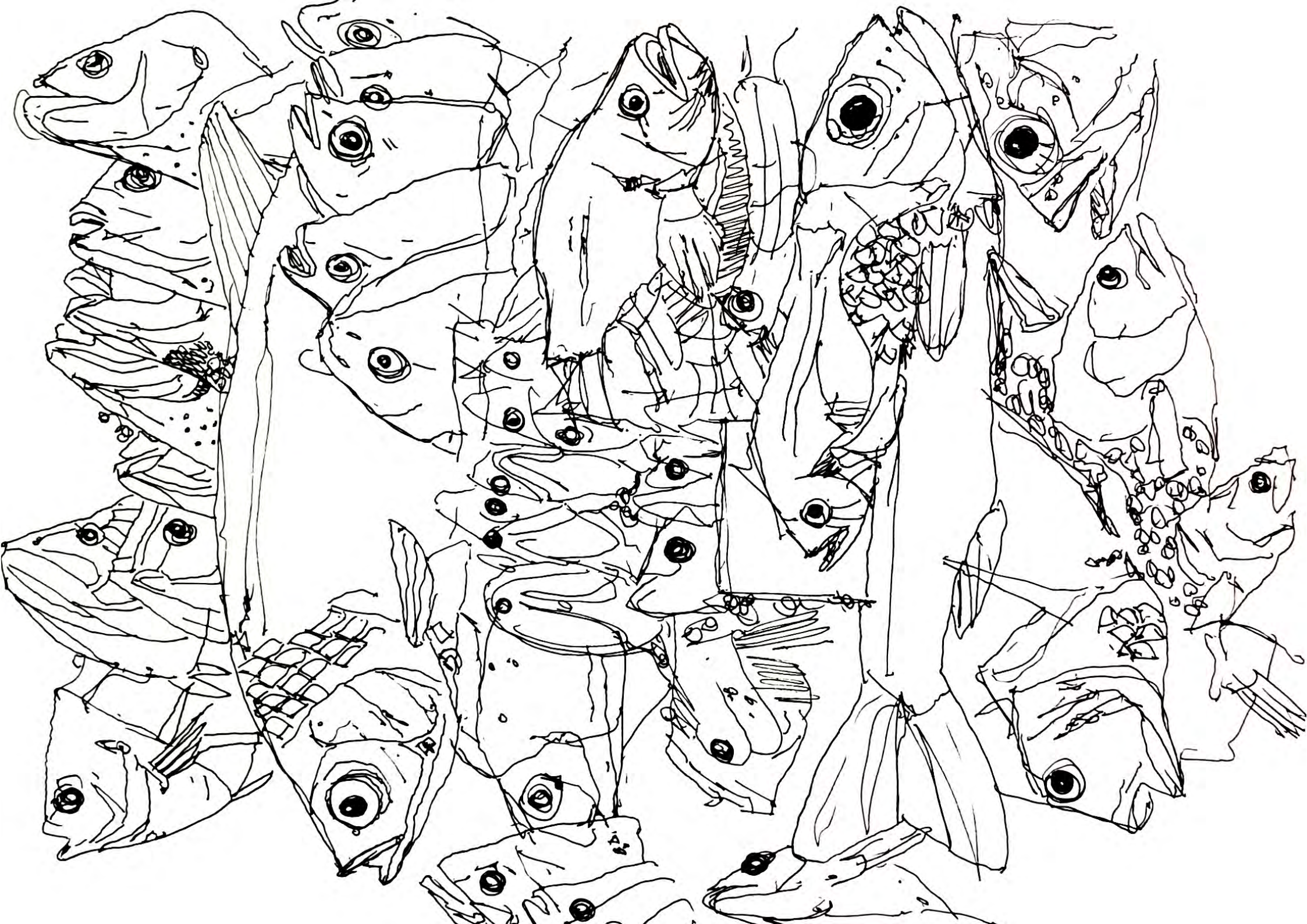
DESIGN GENERATORS
ACCOMODATION & BRIEF
DESIGN DEVELOPMENT

ALL PHOTOGRAPHS/SKETCHES IN THIS PART ARE DONE BY: (AUTHOR, 2019).

[7] DESIGN GENERATORS

7.1 EXPLORATION SKETCHES



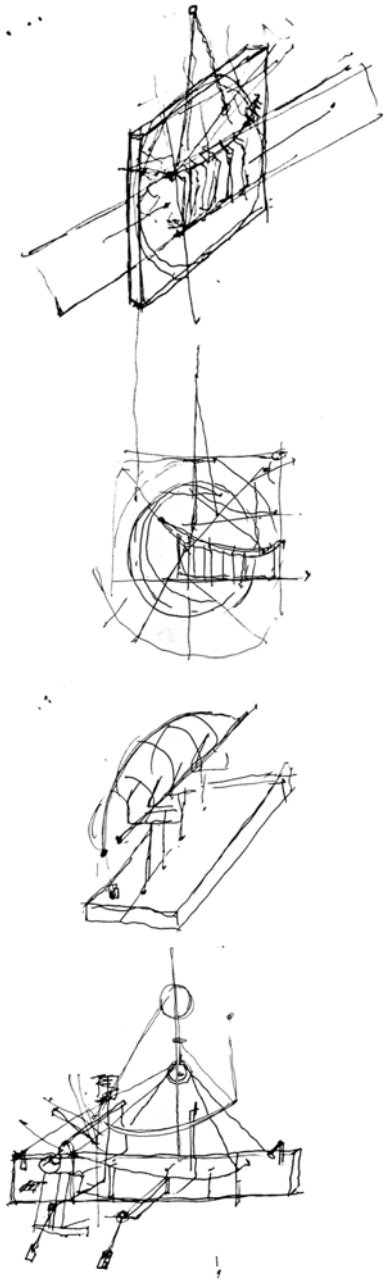


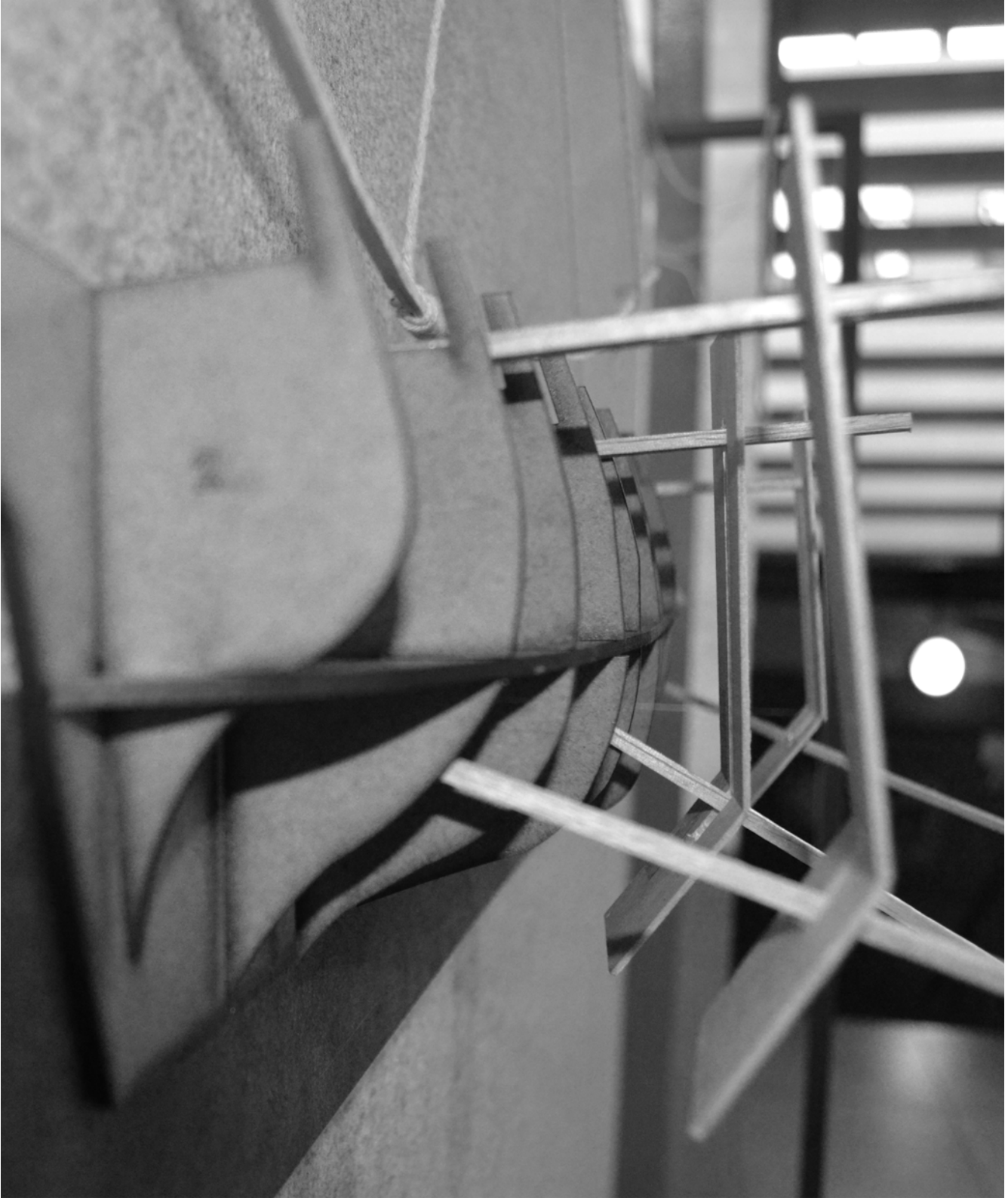
7.2 TOUCHSTONE

An exploration of the function of a ‘port’ as a threshold between a city and sea.

The informal sale of fish to the public and fishing, the actual activity, is influenced by cycles such as tides, seasons, weather and time of day. All of these aspects have ritualistic qualities to them. The idea between the dynamic events that come with fishing that unfolds and its association with the static - being Maputo port

The term ‘port’ also means gateway and is linked to notions of threshold between sea and city, therefore it becomes a place of flux. Just like the port, the ‚boat’s structure, though static, allows for this movement and the human action. One can say that the services that the boat’s structure houses are situated between the dynamic and the permanent spaces. The same can be translated into architecture if the spatial dynamics takes the form of the grid: the degree to which activities within that region are free to expand and contract are understood as the services and utilities required for the operation of the fisheries harbour.



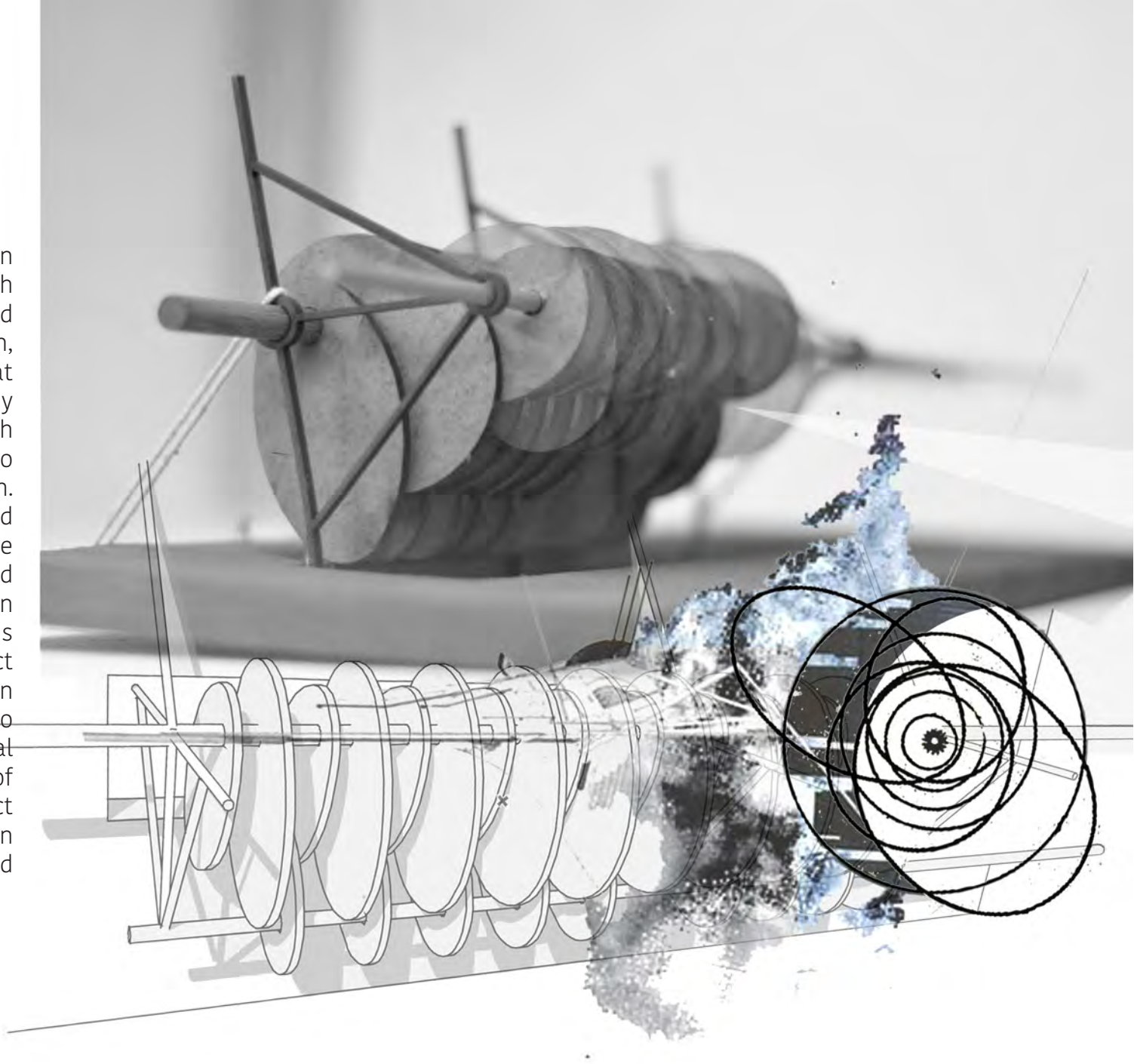


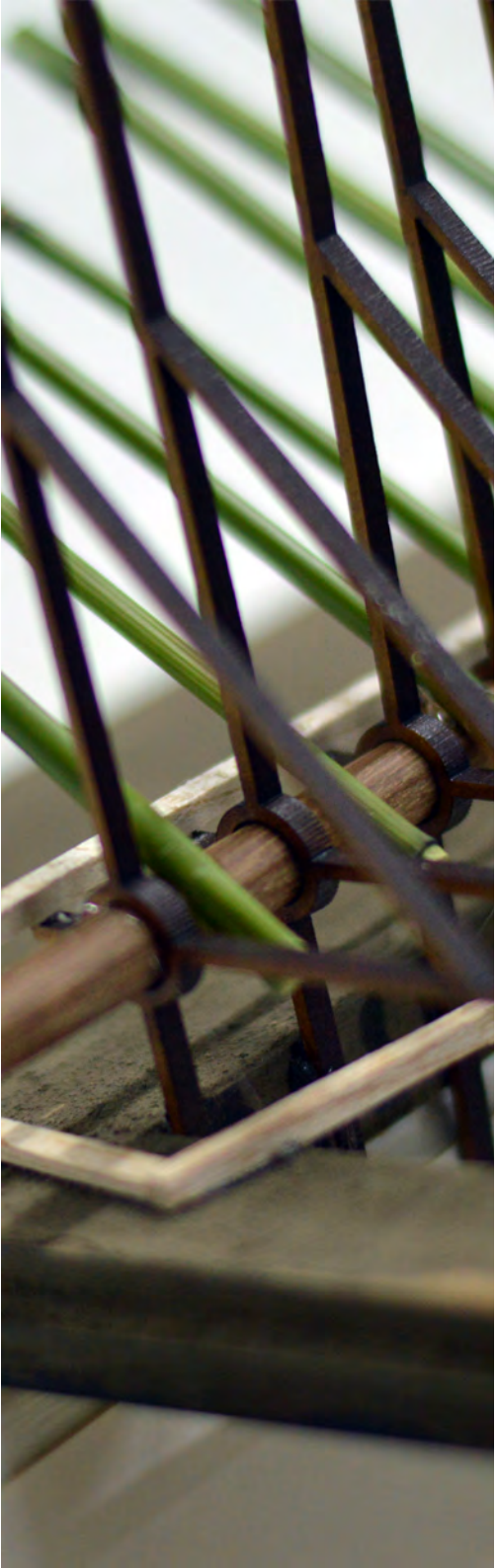
7.3 CONCEPTUAL REINTERPRETATION

CYCLIC

SEASONAL - TIME - RELIGIOUS PRAYERS

This concept explores the moon's effect on tidal movements and seasonal changes, which has consequences that are deeply embedded in our culture and history. The fishermen, such as the Goan fishing community living at Catembe port, gather for a religious ceremony on the shore overlooking the Indian Ocean with Maputo's skyline as a backdrop. They pray to bless their boats for the coming fishing season. Afterwards, they take out their decorated vessels into Maputo Bay for a maritime procession. This rite of passage has endured over four generations and largely relies on fishing as a way of life. Architecturally, this could address how the building can re-connect with its topographical context, global position and celestial interrelationships, which is to say, how built form can connect with natural phenomena caused by the movements of the moon. How these relationships interact with one another is then considered in an urban context alongside human interest and activities.

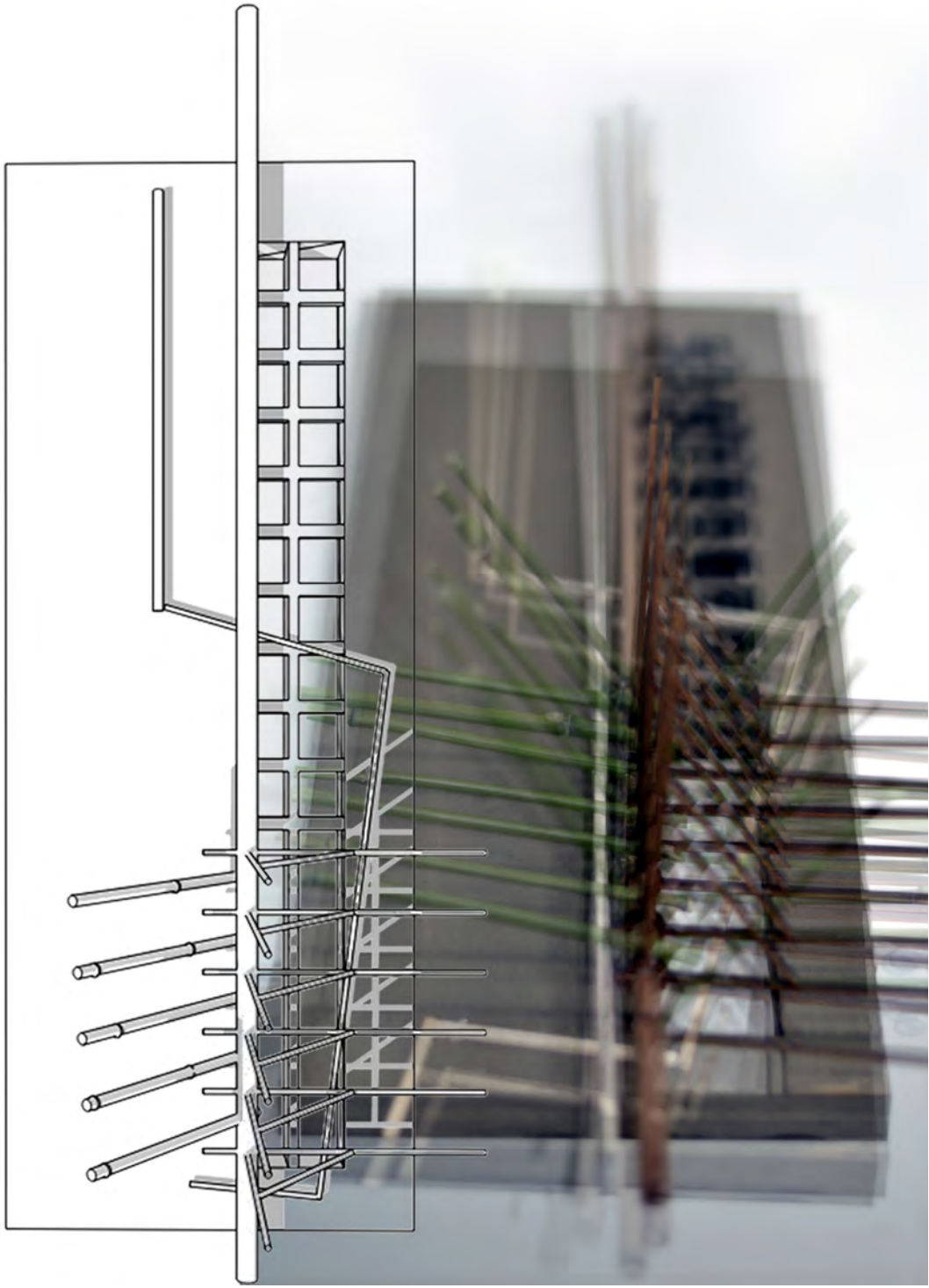




SCARS

TRADE ROUTES - HERITAGE- MOVEMENT - LINEARITY

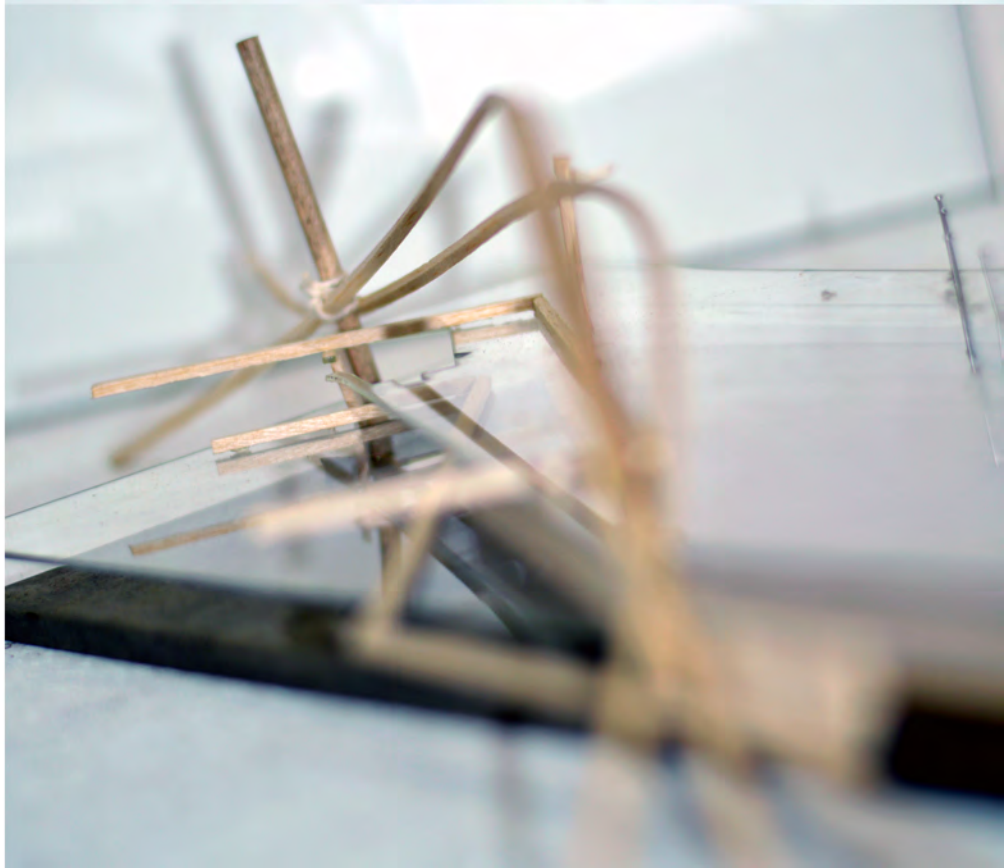
The concept derived its form from the ‘scar’ like strips created from the site’s previous use as a rifle range. These ‘scars’ can be used architecturally and re-interpreted as ‘vectors’ which define the keys routes for fish trading. A lightweight skeletal frame wraps around in order to emphasize the current trade route and layouts of the city and the new knowledge that is being layered onto old ones. The concept also plays with the use of light and how it can be manipulated and celebrated. The stereo-atomic base displays a typical patterned facade which celebrates shadow qualities of the cement city, where the use of reed is more exposed.

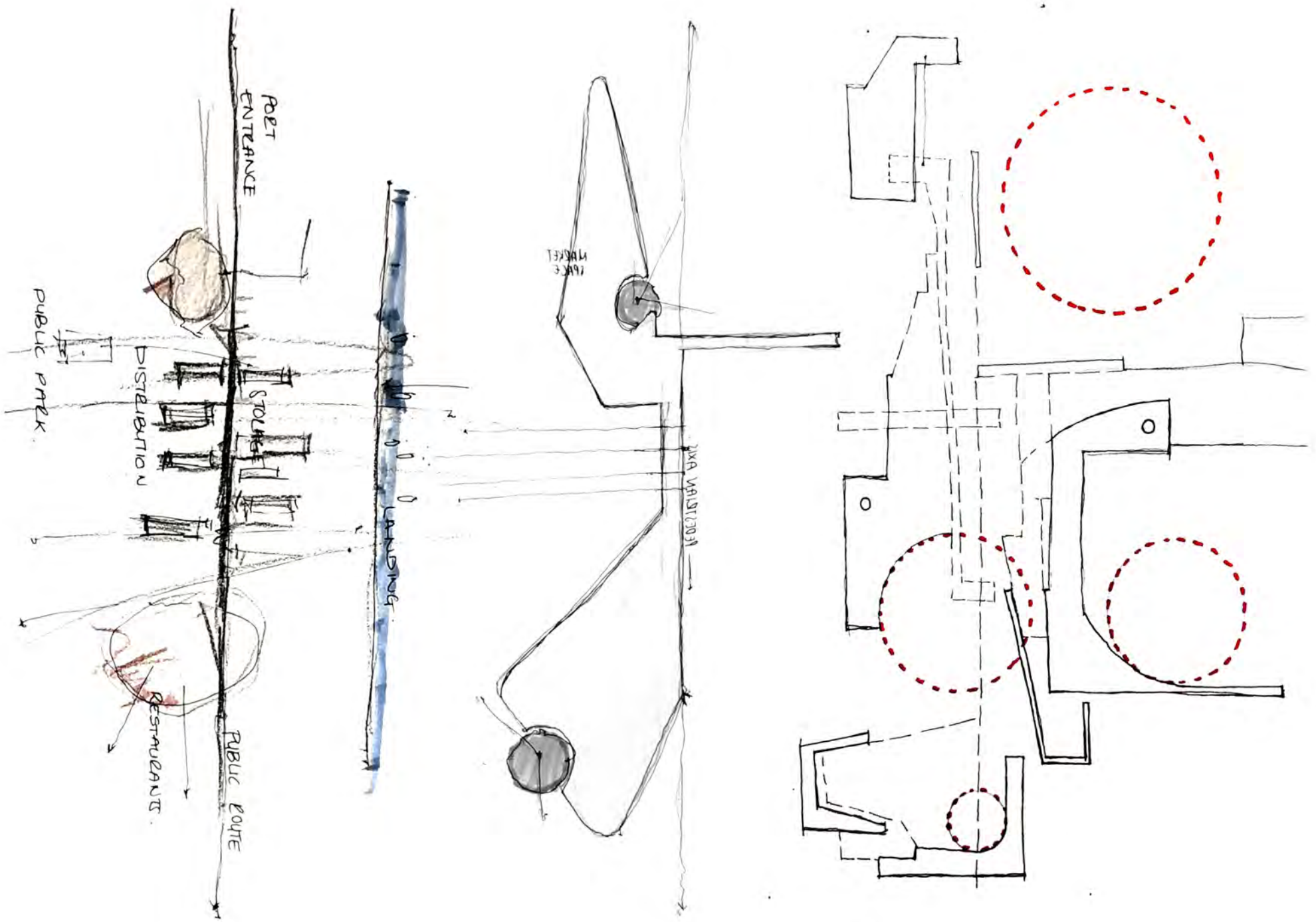


ABSOLUTE, LAND AND SEA

IMPROVISION - INSTABILITY - INDEFINTE DURATION

The term absolute is used as something that is resolutely itself after being separated from its other. In this concept, the other is the space of the city, its extensive organization and its government. The continuous interaction between the land and sea can lead to an aggressive dialogue and a constant act of claiming space from each other, resulting in the formation of uncertain and shifting boundaries. The conceptual approach was to explore the shifting relationship between natural, urban and rural contexts. Maputo Baixa's natural forms questions the condition of 'the edge', accessibility and the relationship between ground and water. The contours celebrate the Baixa, showing surrounding landform and the original position of the island. The opposition between land and sea is a dialogue between something with intelligible borders and something unstable and in permanent flux.





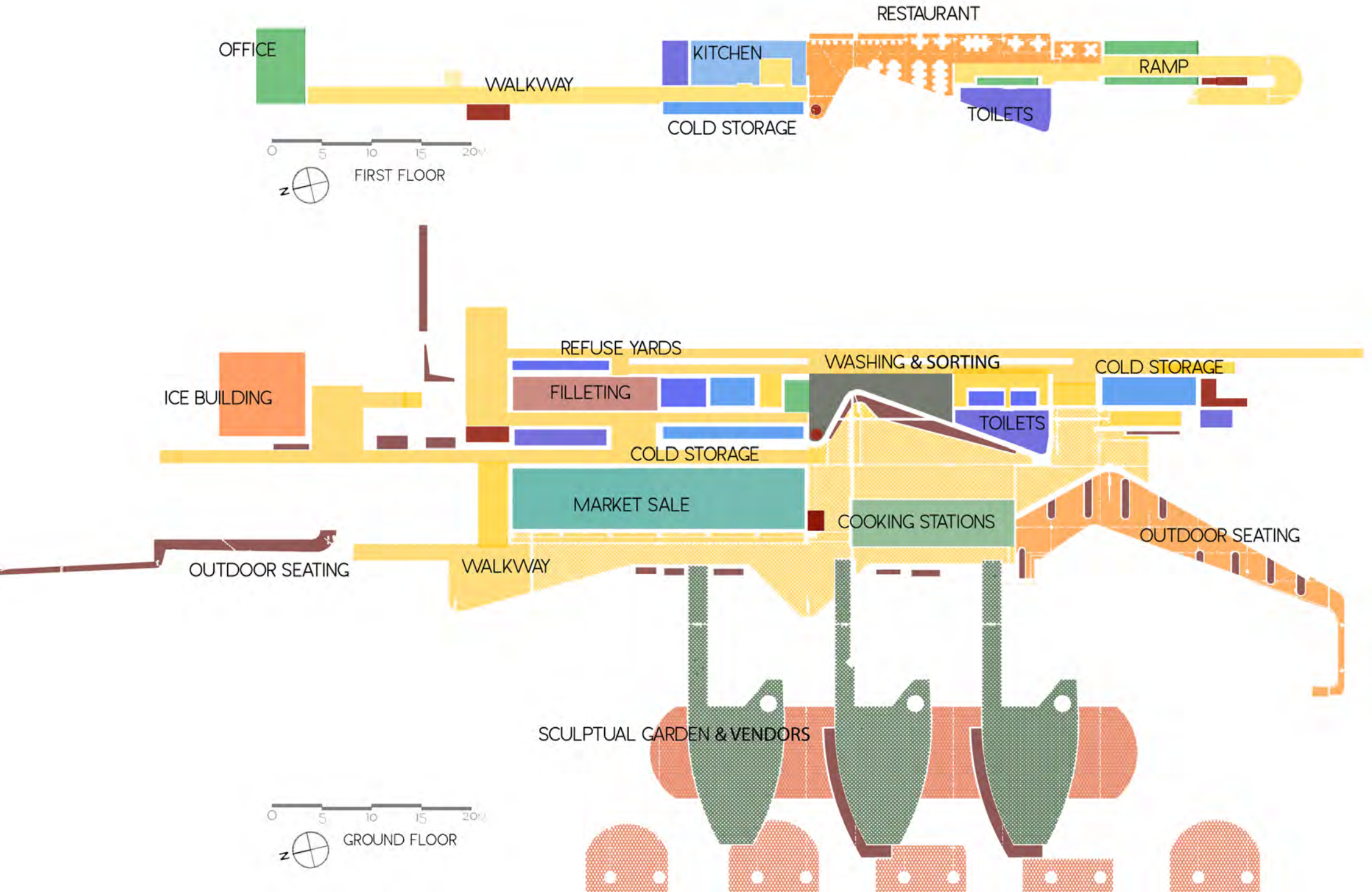
AXIS EXPLORATION SKETCHES (AUTHOR, 2019).

[8] ACCOMODATION & USERS

8.1 USERS

8.2 SPACE DIAGRAM

ICE BUILDNG		
Plant Room		75m2
Office		25m2
Fish Sale Areas		
Public sale (in addition to sale on street)		350m2
Outside cooking stations		200 m2
Fish Processing Area		
Washing and Sorting		50-150m2
Weighing and Packaging		150-300m2
Cold Storage (Chillers)		220-460m2
Filleting and bulk sale		250m2
Harbor Management Offices		
Admin offices for auction and handling facilities, regulation of water quality and treatment		150m2
Fish Restaurant		
Kitchen area		60m2
Restaurant patron area		100m2
Existing		
Refrigerator room	(TO BE DEMOLISHED)	580m2
Chillers	(TO BE DEMOLISHED)	520m2
Generator room	(TO BE DEMOLISHED)	80m2
Compressor room	(TO BE DEMOLISHED)	135m2
Guard house	(PRESERVED ON SITE)	30m2
Cooling tower	(PRESERVED ON SITE)	65m2
Ablution facilities	(PRESERVED ON SITE)	26m2


RESTAURANT
OFFICE
KITCHEN
RAMP
WALKWAY
TOILETS
COLD STORAGE
0 5 10 15 20M
N
FIRST FLOOR
REFUSE YARDS
WASHING & SORTING
COLD STORAGE
ICE BUILDING
FILLETING
TOILETS
COLD STORAGE
MARKET SALE
COOKING STATIONS
OUTDOOR SEATING
OUTDOOR SEATING
WALKWAY
SCULPTUAL GARDEN & VENDORS
0 5 10 15 20M
N
GROUND FLOOR

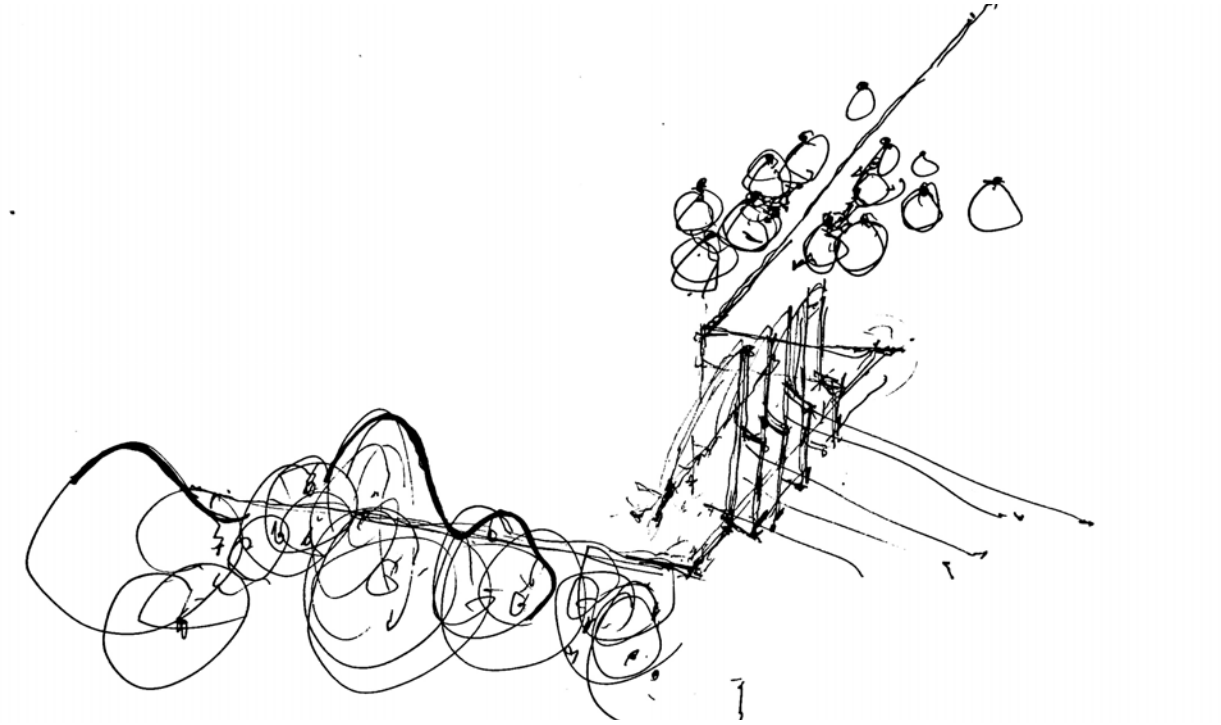
[9] DESIGN DEVELOPMENT

9.1 INTRODUCTION

Contemporary architectural design often focuses on the dynamics of place and situates its informants within a complex layering of history, movement and the flux of space. In his paper, Mythforms: Techniques of migrant place-making, Paul Carter (2003: 93) describes a contemporary urban condition of migrant place-making. He describes the place-making mechanisms as traces and extensions which contradict what he refers to as 'formal placism', during which enclosure and hierarchy dominate.

Furthermore, Mckenzie Wark (2000: 37) explains that in these kinds of place-making situations design informants become vectors, an establishment that has fixed length without a fixed position. This further suggests an architecture that, on the one hand, creates structures, which are planes of relatively long duration, across which a great deal will flow. On the opposite hand, upon this plane, is architecture lite, which constructs a prop for an attractor, a "stall" literally, a temporary stop, of much shorter duration. Under the corrosive force of the vector, design becomes liquid (Wark, 2000: 37).

Through this understanding of events, human activity is then situated between the temporal and the permanent. Architecture becomes that which both houses and manifests from events. Therefore, architecture, too, is placed between the temporal and the permanent. It responds to the surrounding order and the sense of emplacement, while concurrently responding to the vectorial force of 'trace' and the impermanence of the activities and actions it houses.



EXPLORATION SKETCH OF THE ESSENCE OF THE SITE
(AUTHOR, 2019).

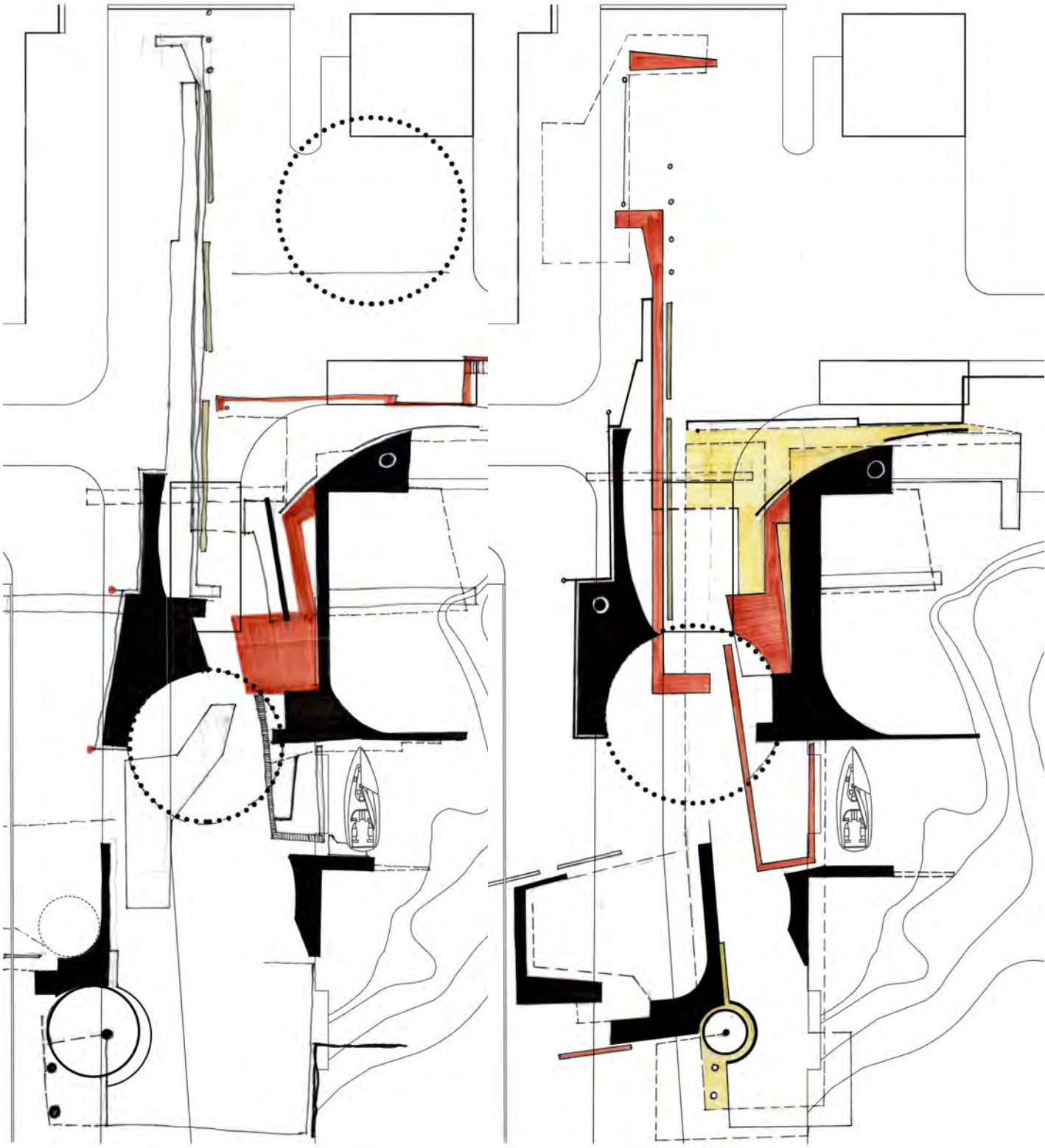
9.2 GROUND FIGURE DIAGRAMS

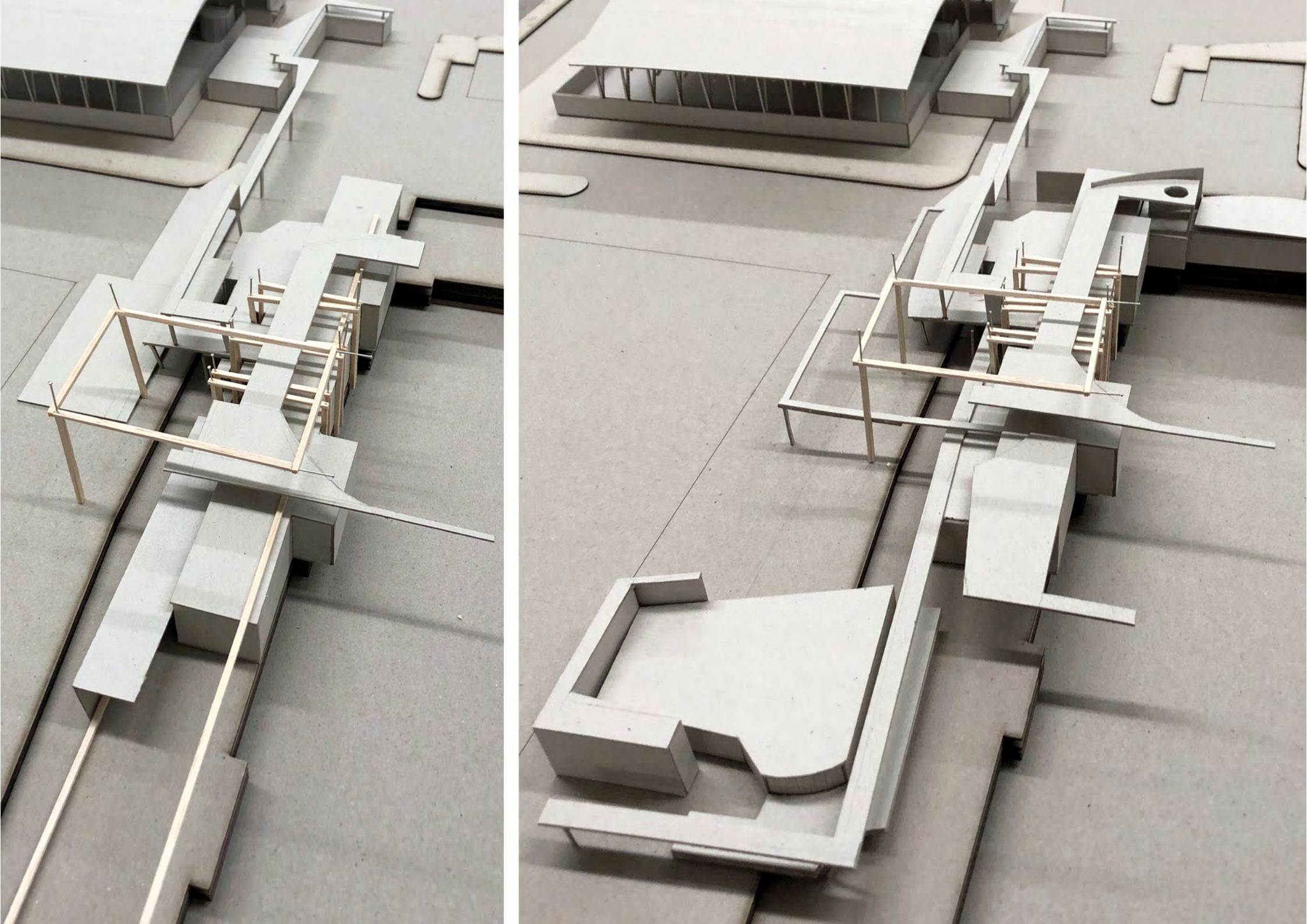
According to architect Stephen Kendall (1999: 2), the main problem with a large proportion of buildings built in the last century, is

"...a misguided attitude that sees the built environment as a rigid artefact made up of finished, single-use buildings ... An approach more congruent with the principles of sustainable development and good architecture is to view the built environment as an artefact that is never finished."

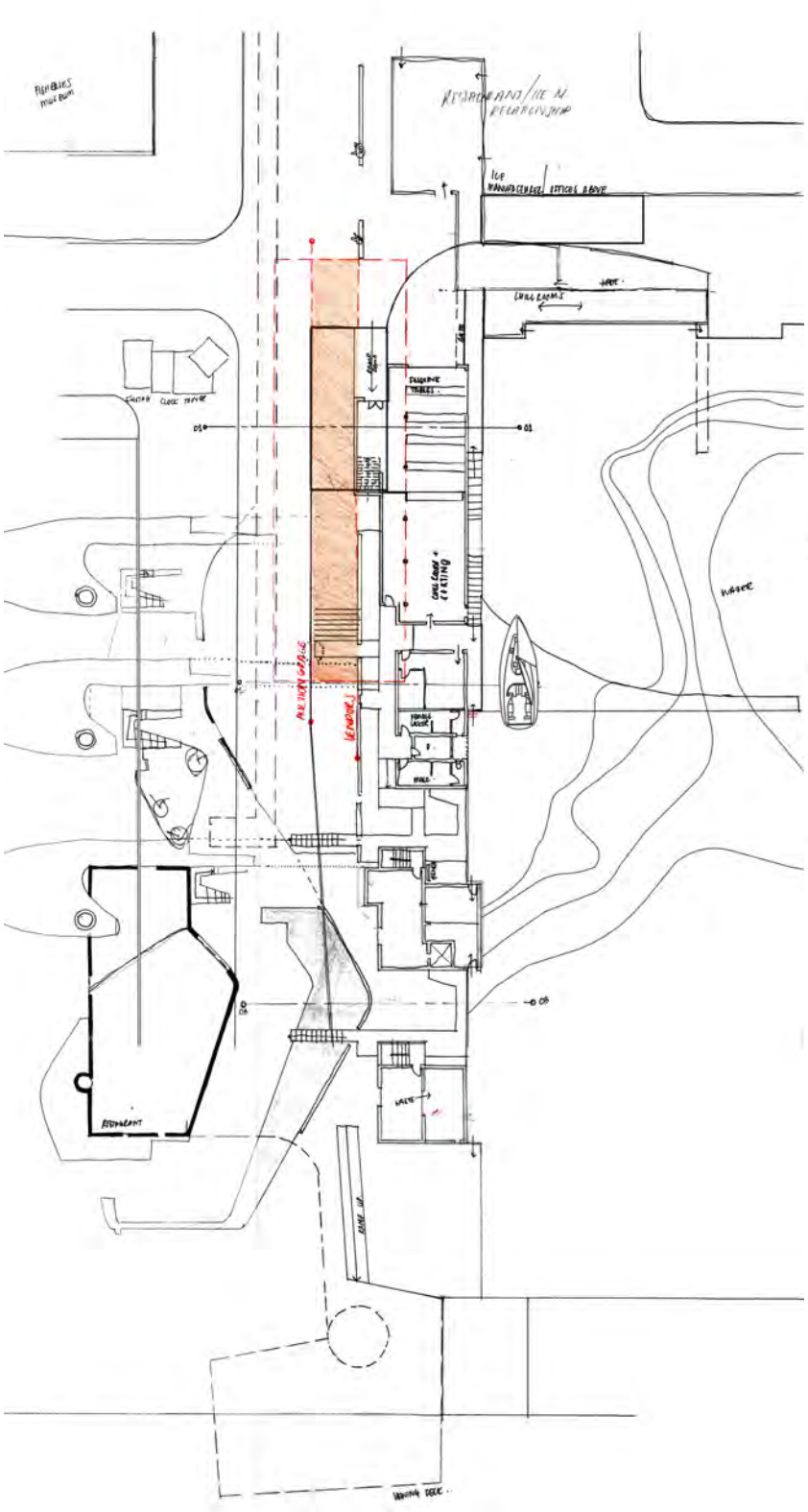
Ype Cuperus takes this idea further in his concept of 'Open Building,' which suggests exploring different levels of decision-making in order to separate the building elements with the different life cycles controlled by different users (2001: 1). Open Buildings encourage the user to take ownership of and appropriate parts of a building. It advocates a system where defined spaces are allocated to various parties and individuals, who then become responsible for the care and development of these spaces (Cuperous, 2001: 2).

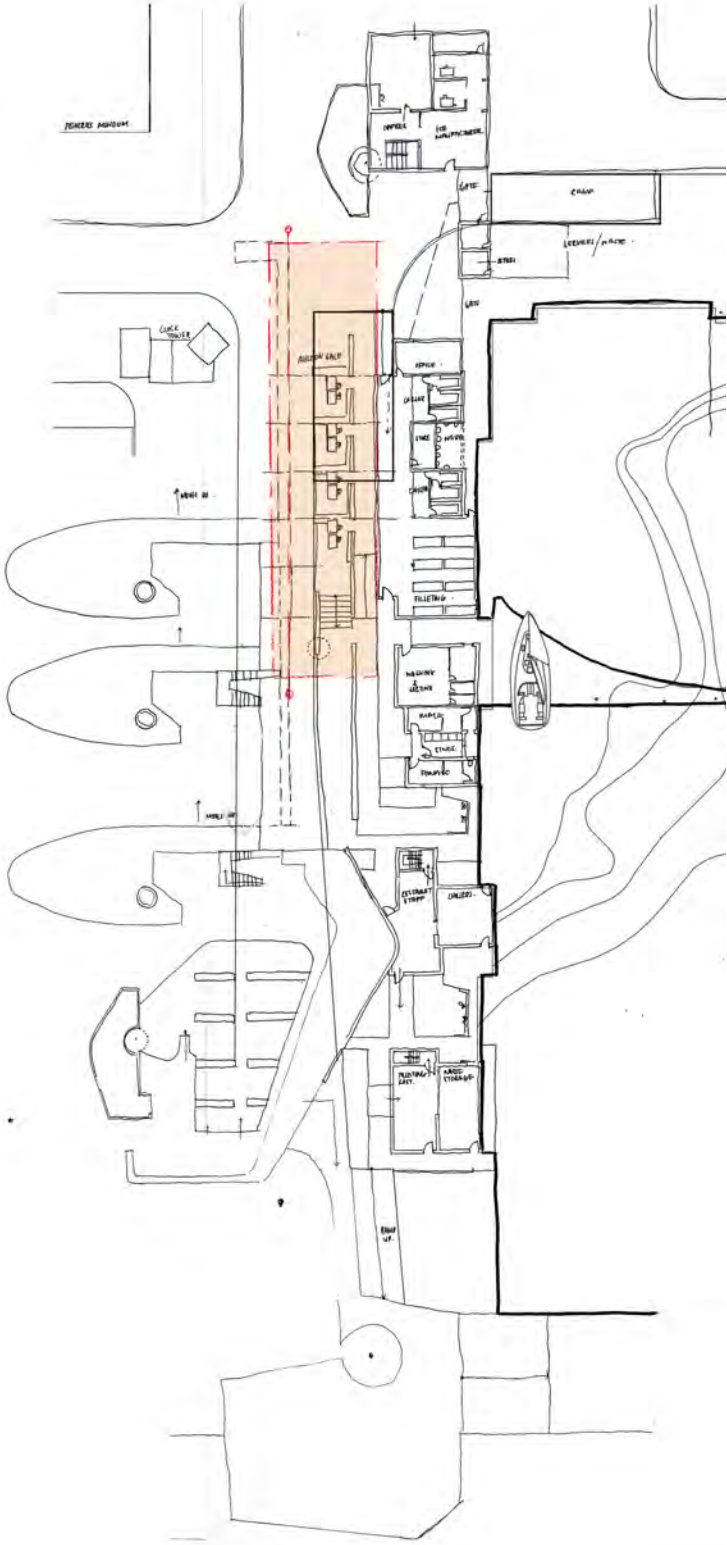
For the proposed market complex, it would therefore be appropriate to use industrial processes to create a basic structure or component that can be allocated to traders and groups of traders who are allowed to make modifications to suit their specific requirements. A 'loose fit' design in contrast to form follows function, where there is breathing space for the architecture to let be different forms of life.

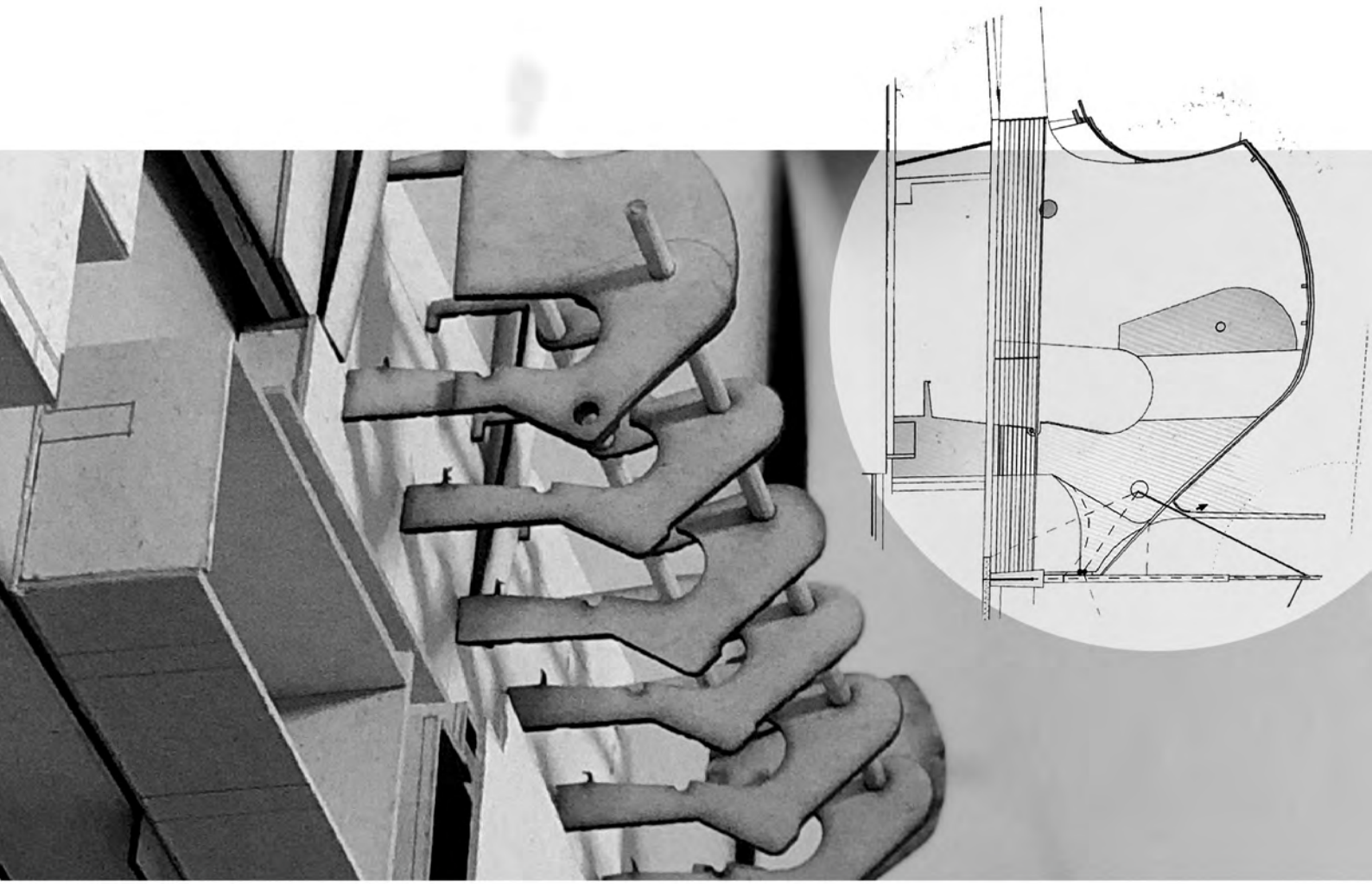


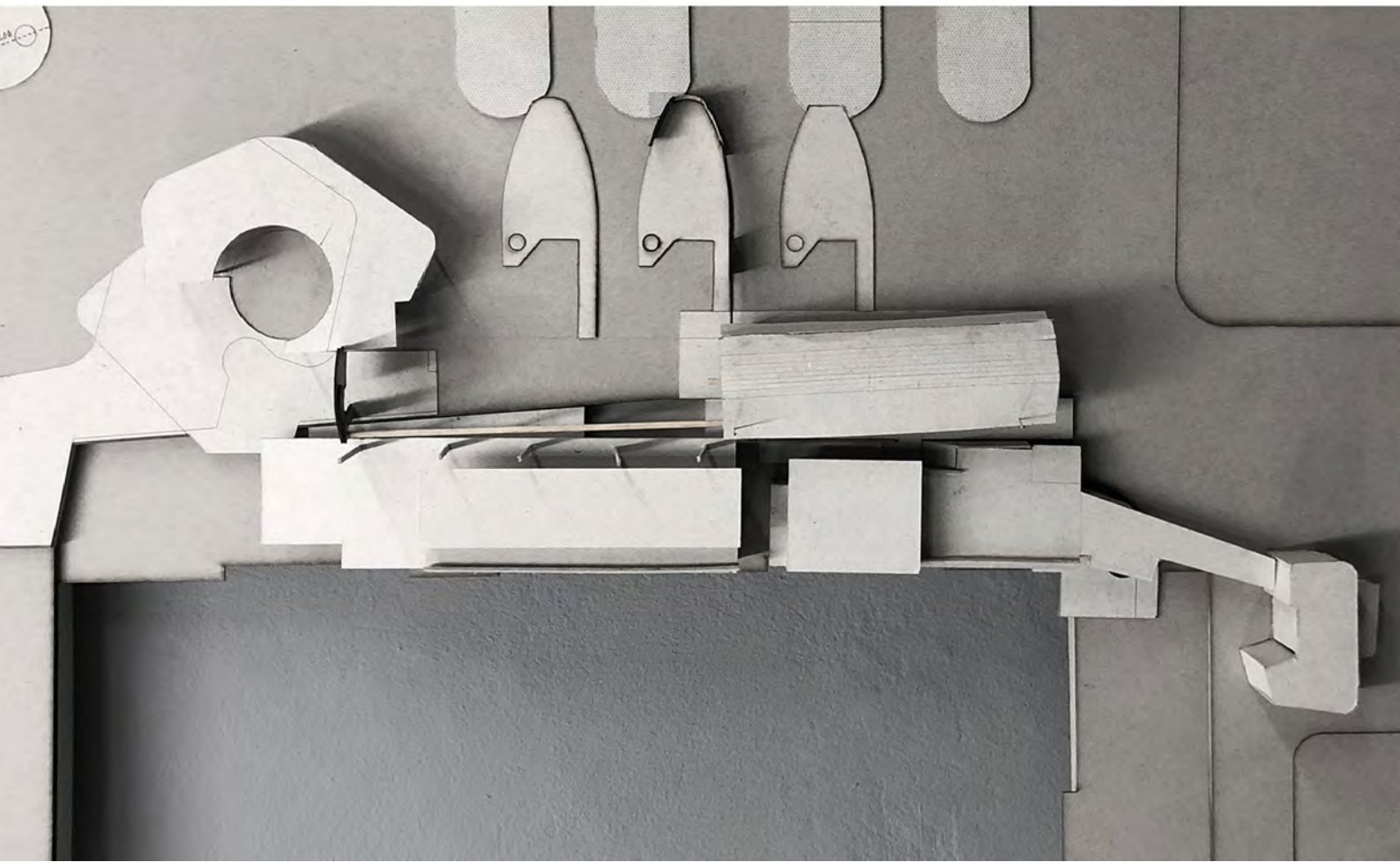


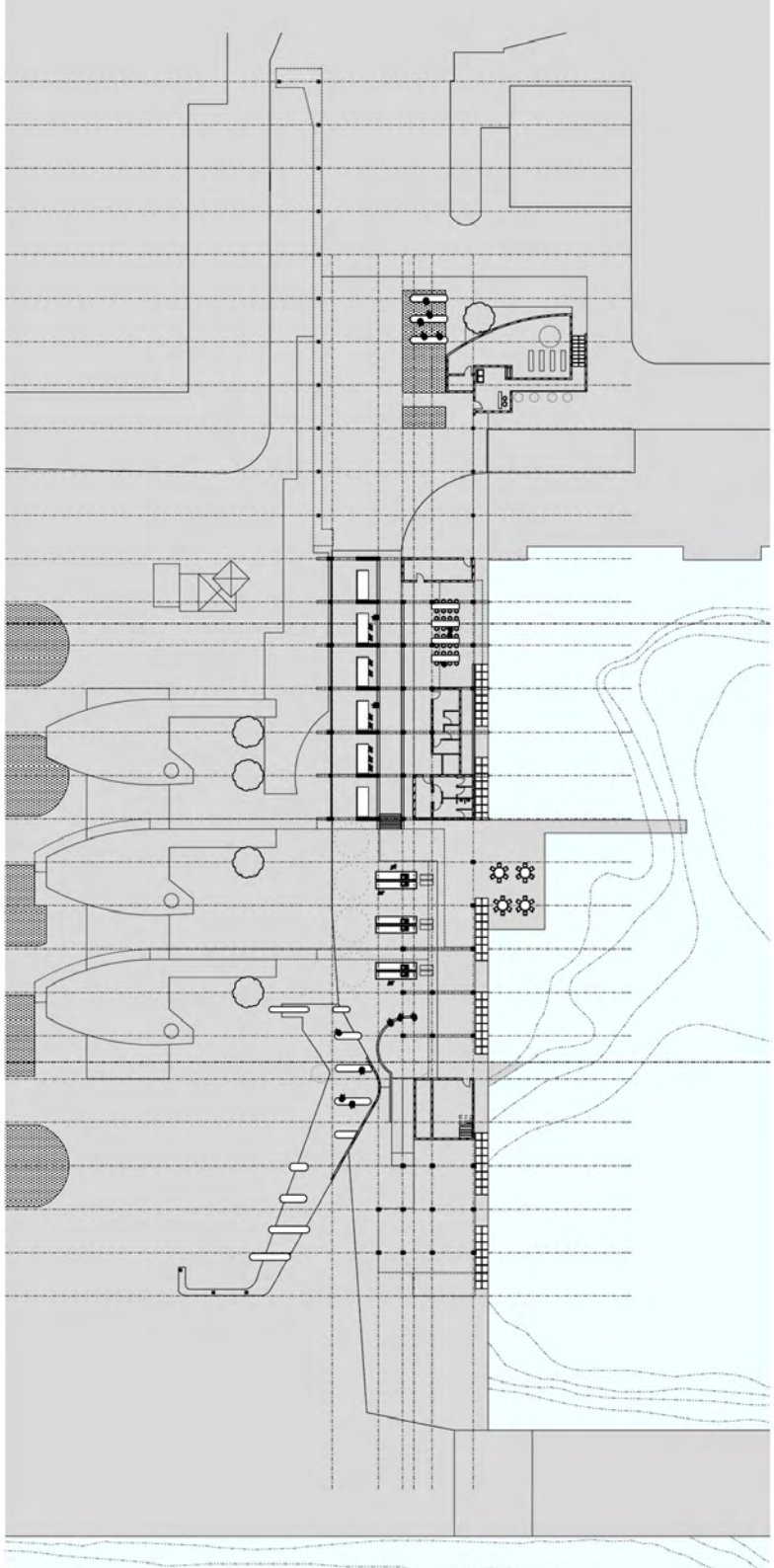
9.3 PLAN DEVELOPMENT

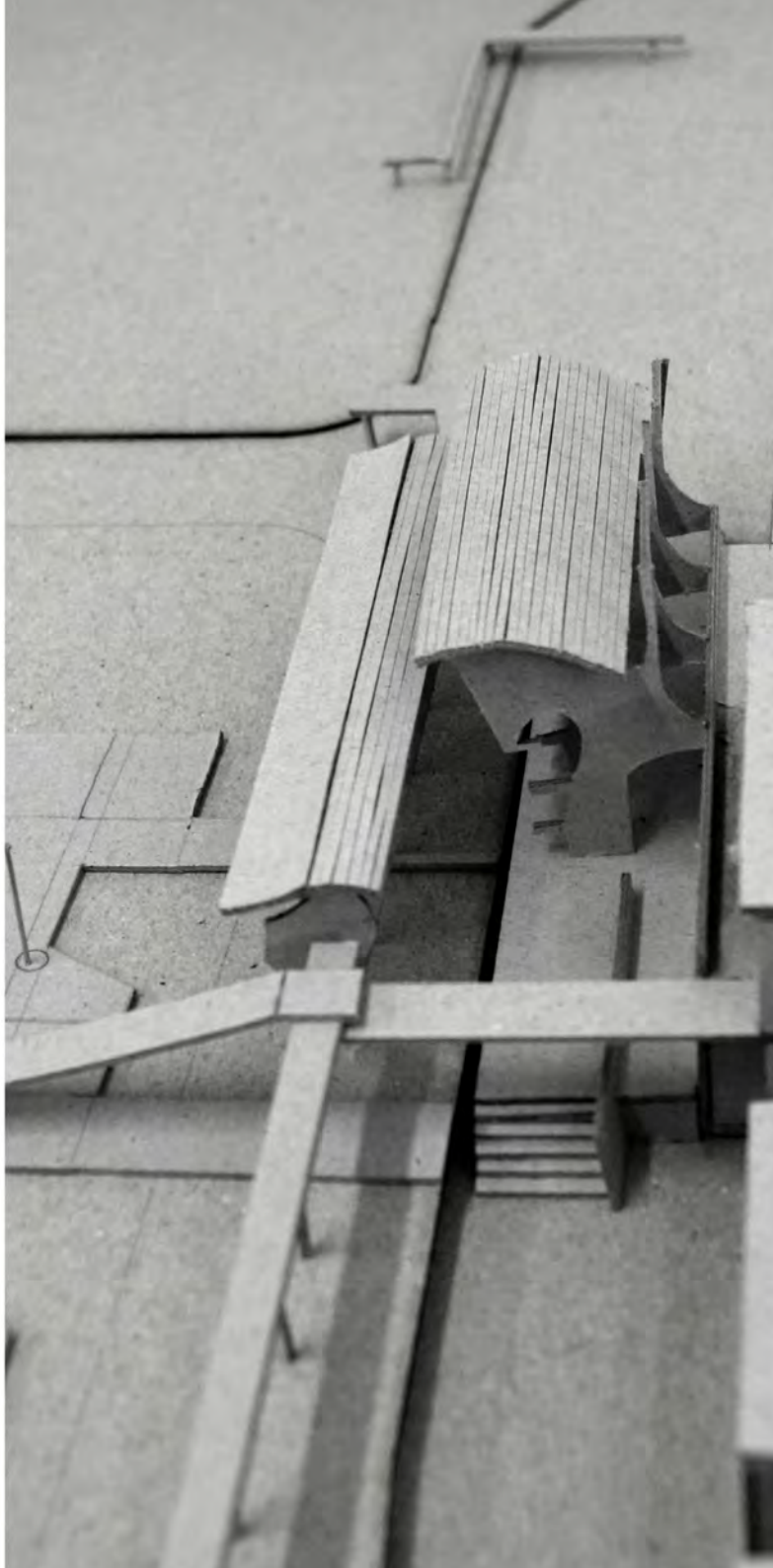


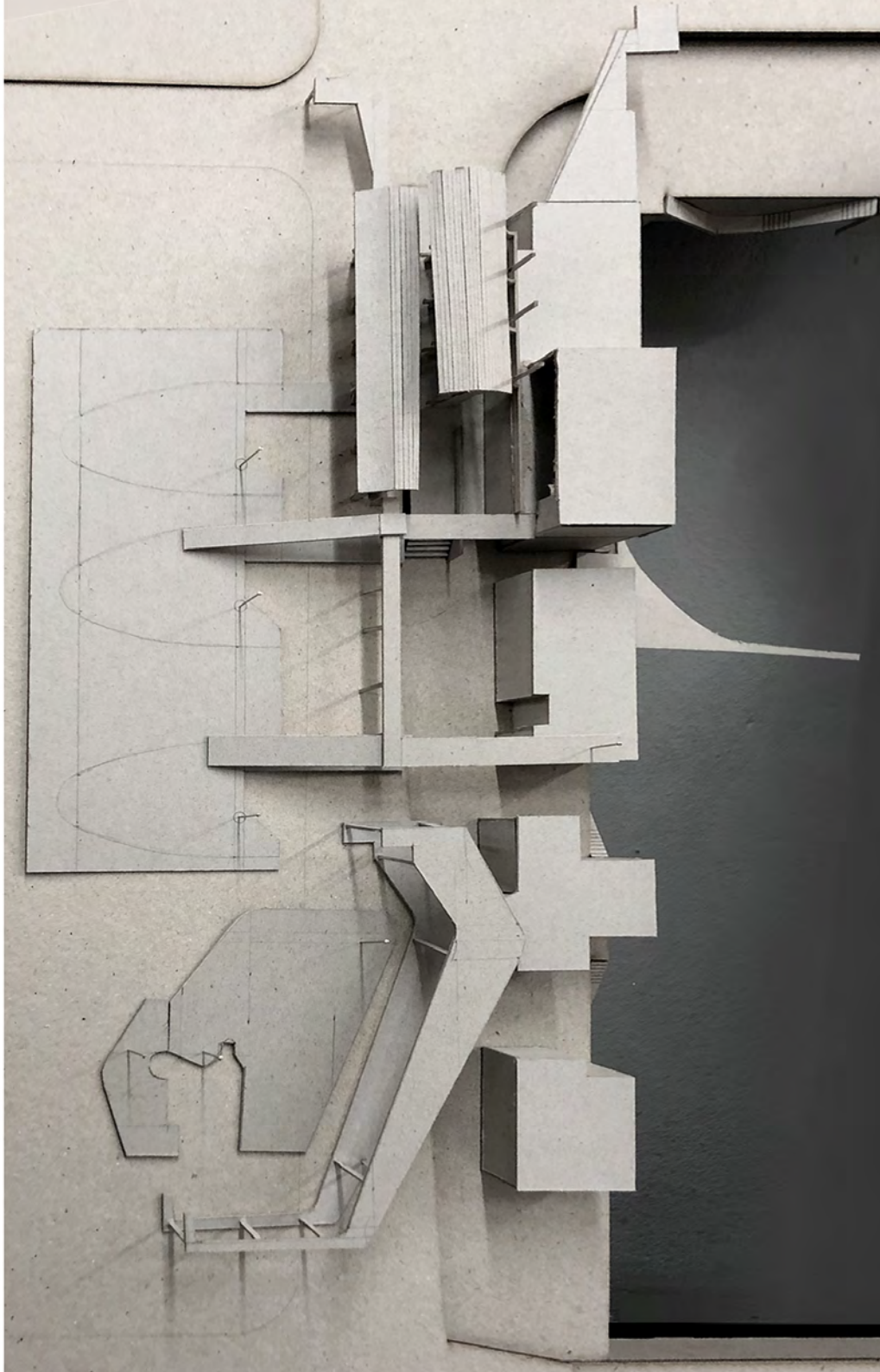




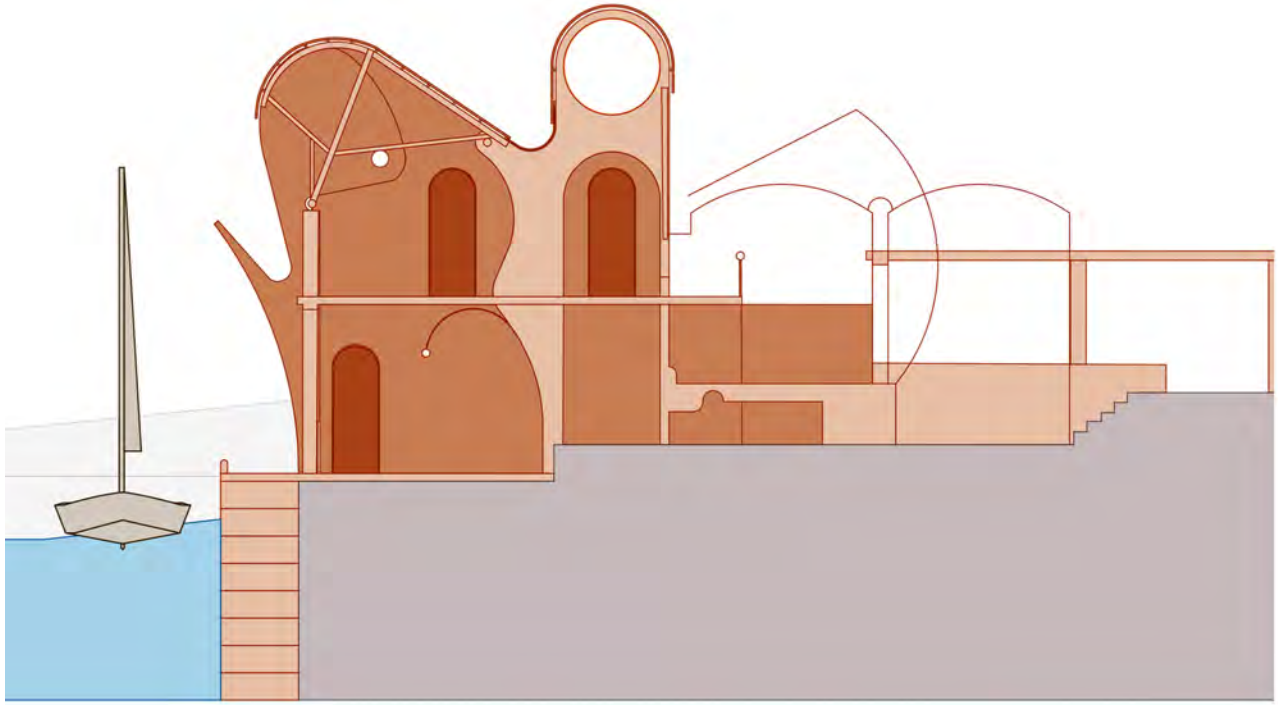


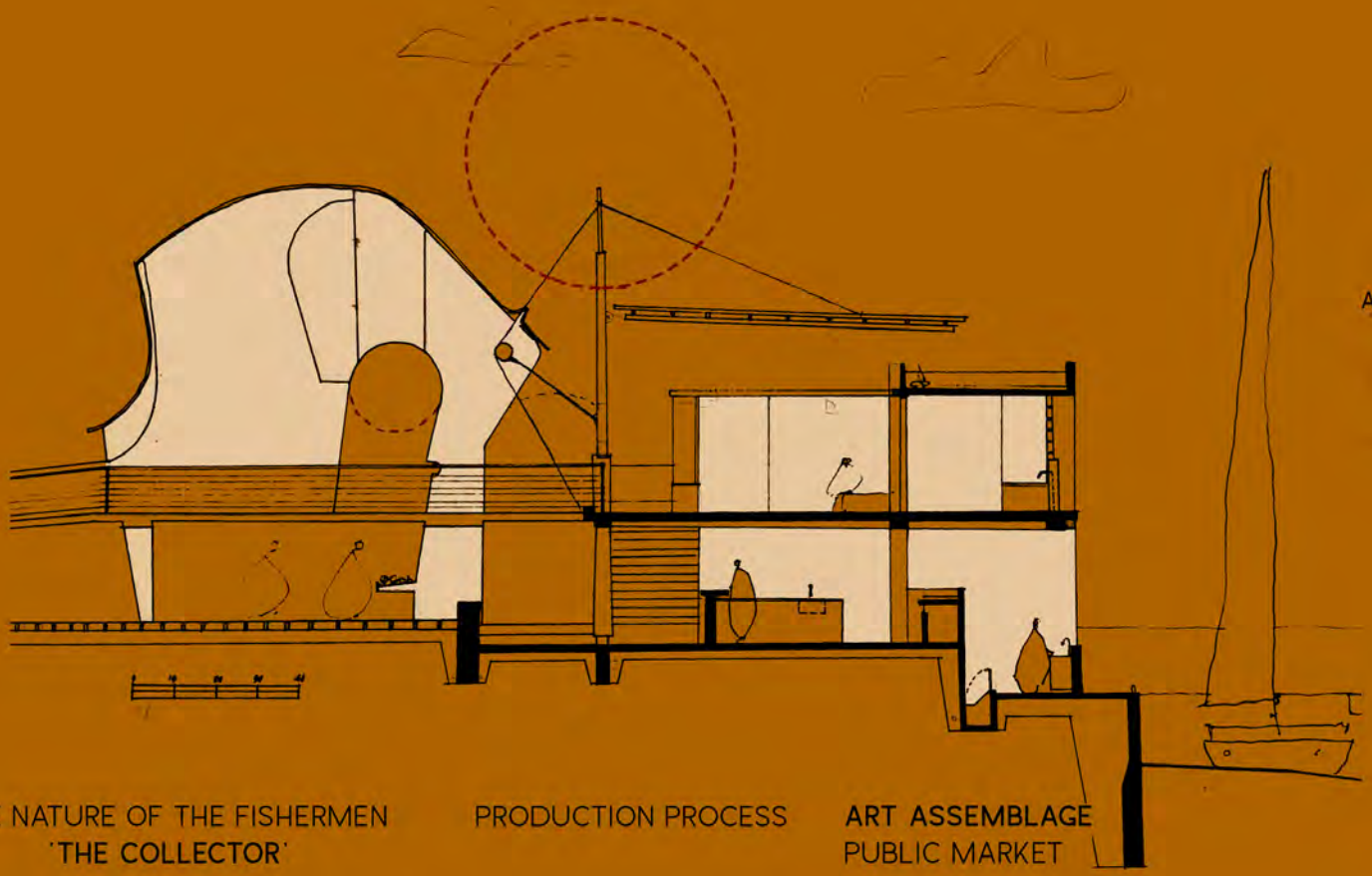






9.4 SECTION DEVELOPMENT

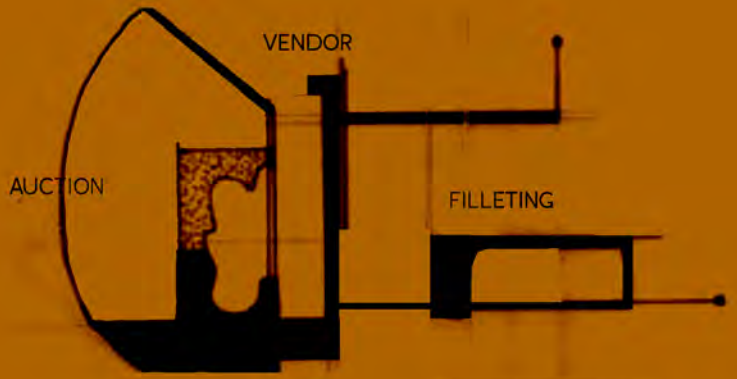


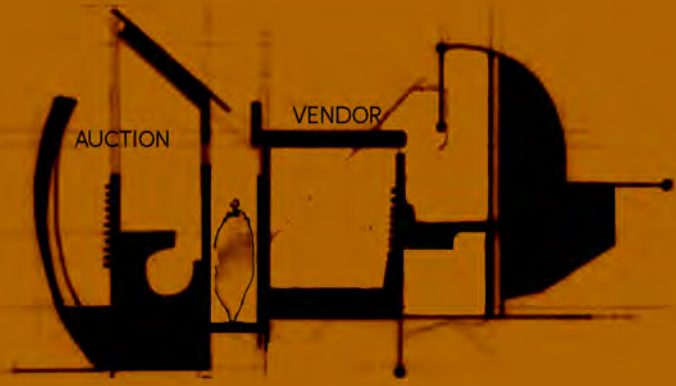


THE NATURE OF THE FISHERMEN
'THE COLLECTOR'

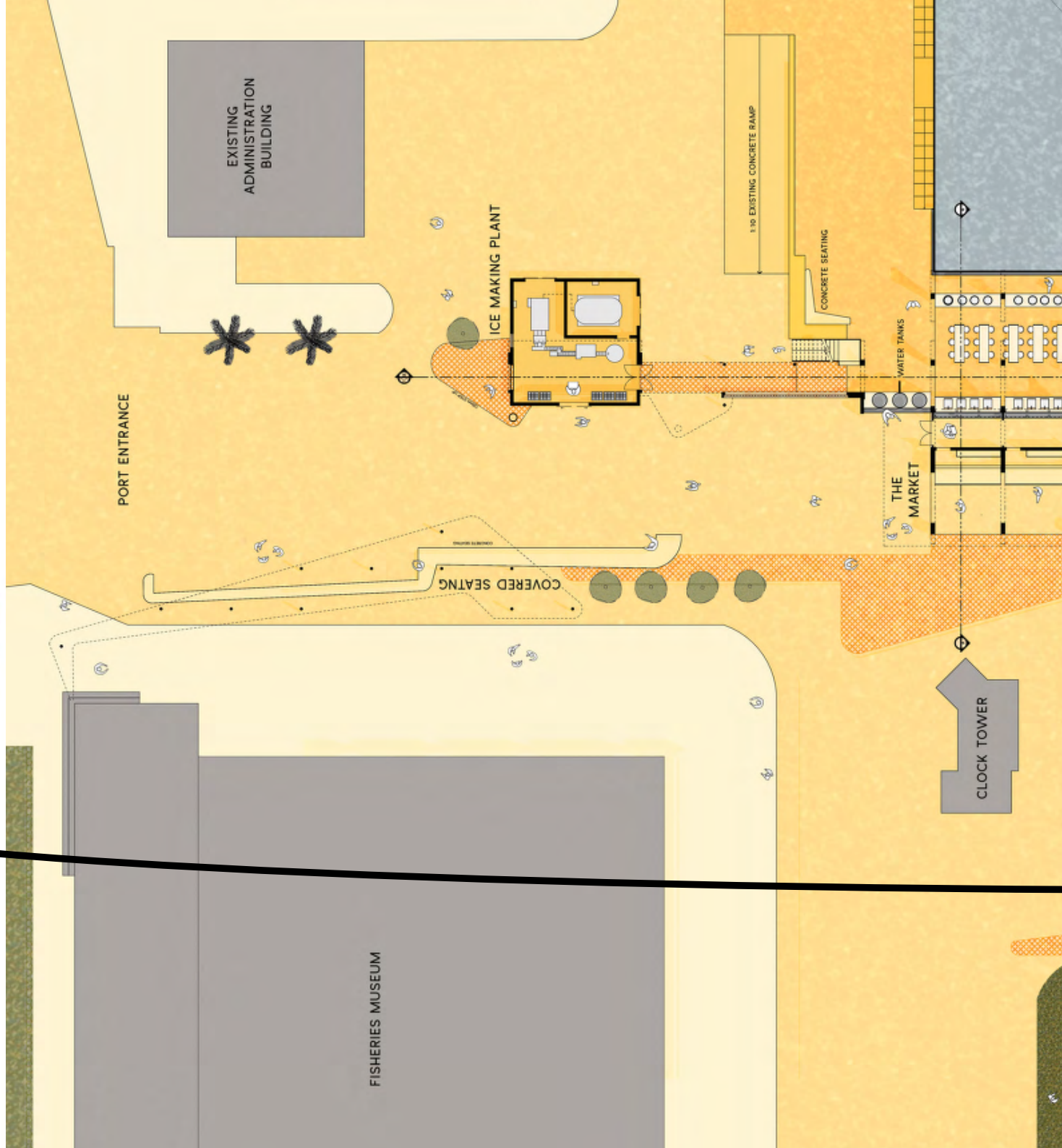
PRODUCTION PROCESS

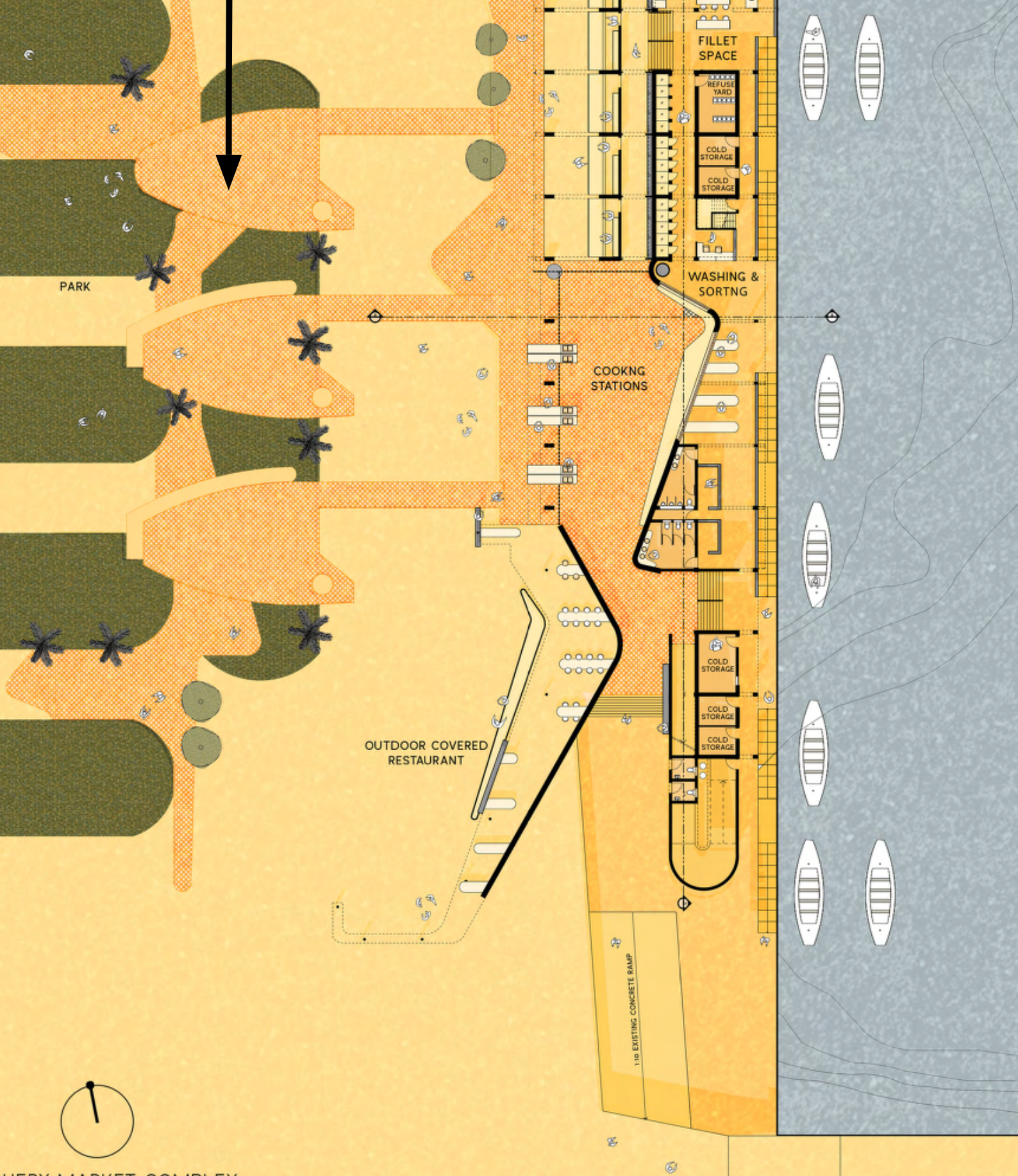
ART ASSEMBLAGE
PUBLIC MARKET





9.5 FINAL DESIGN: GROUND FLOOR PLAN



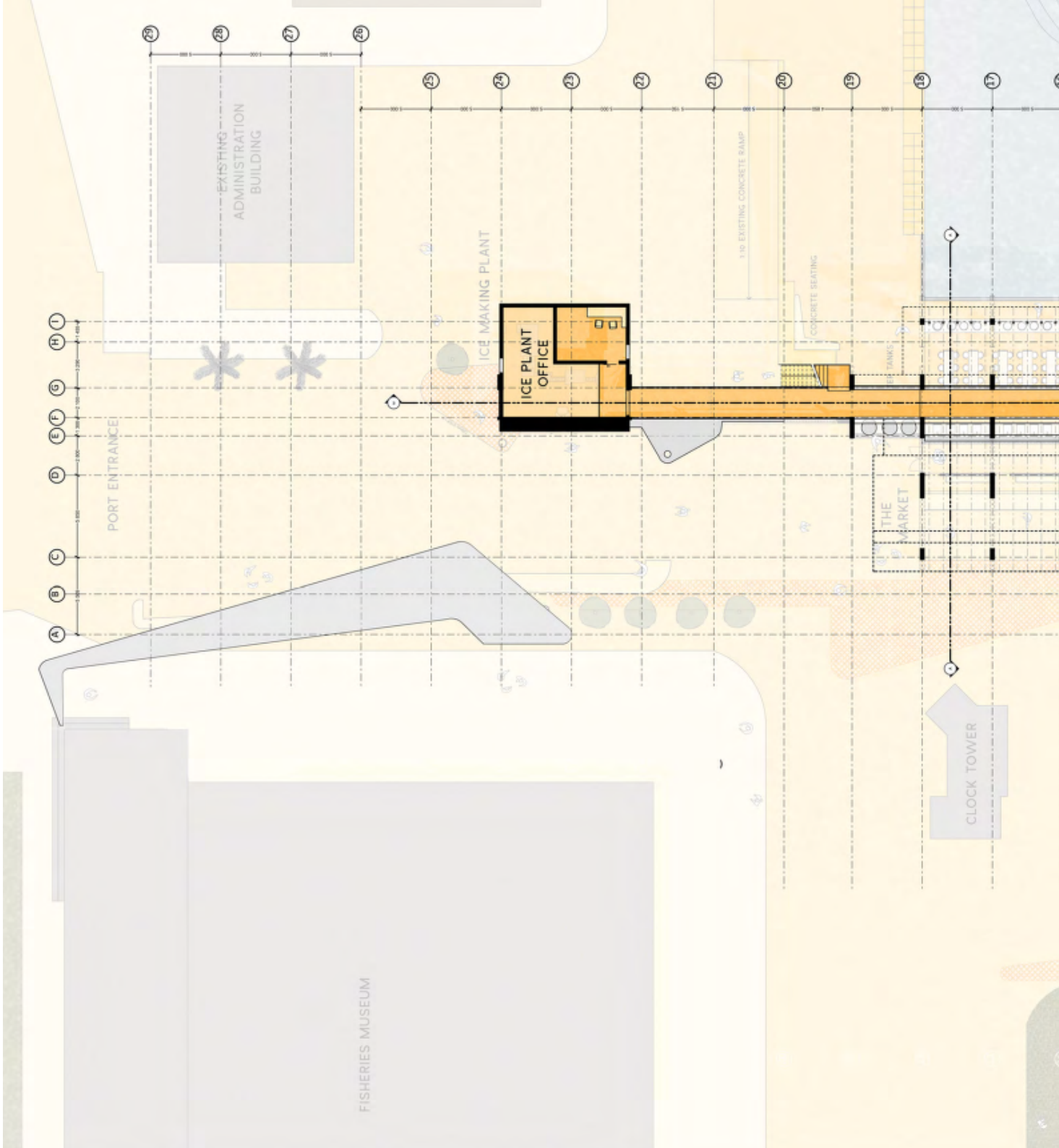


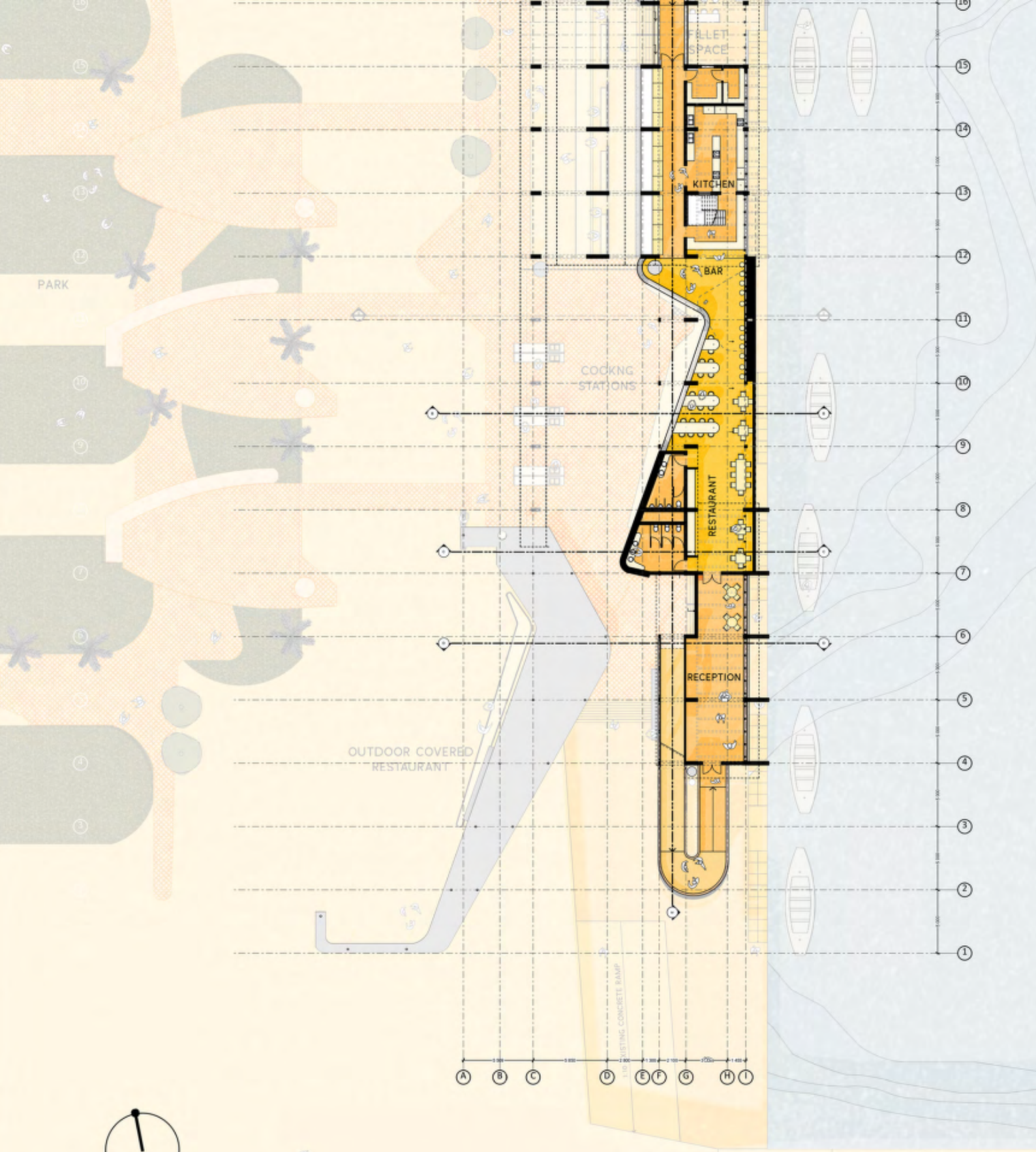
HERY MARKET COMPLEX

FIRST FLOOR PLAN

SCALE 1:200

FIRST FLOOR PLAN

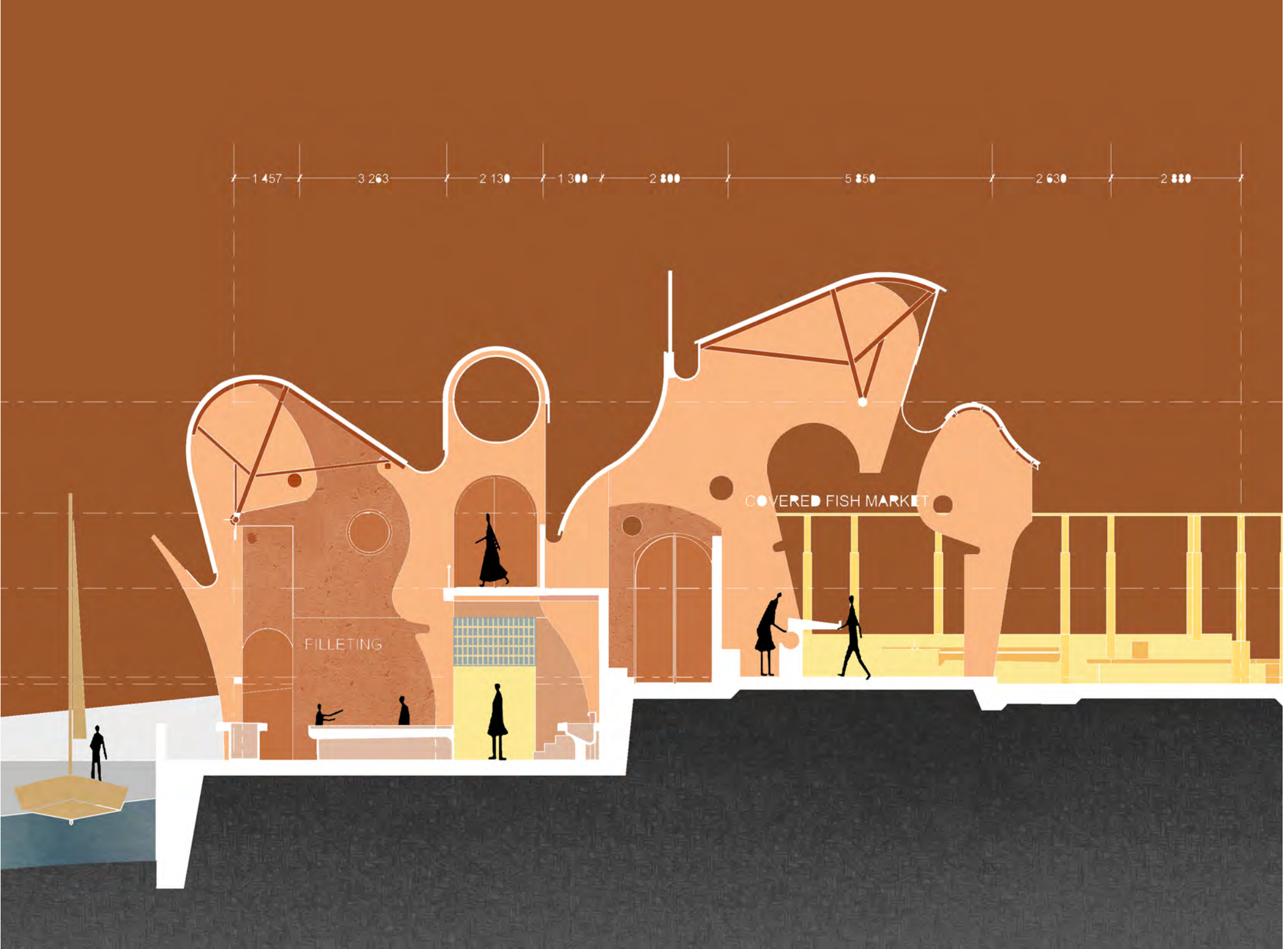


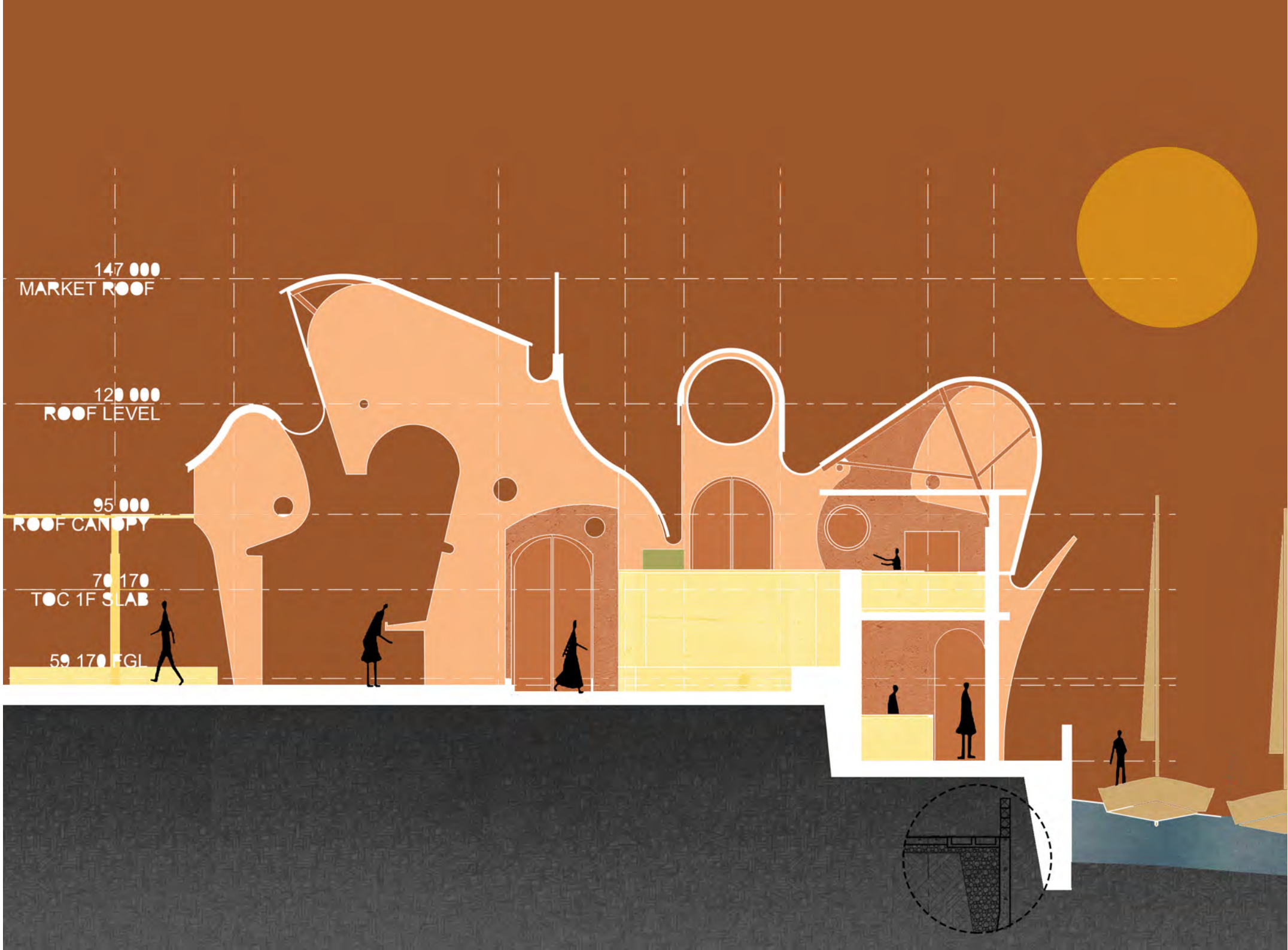


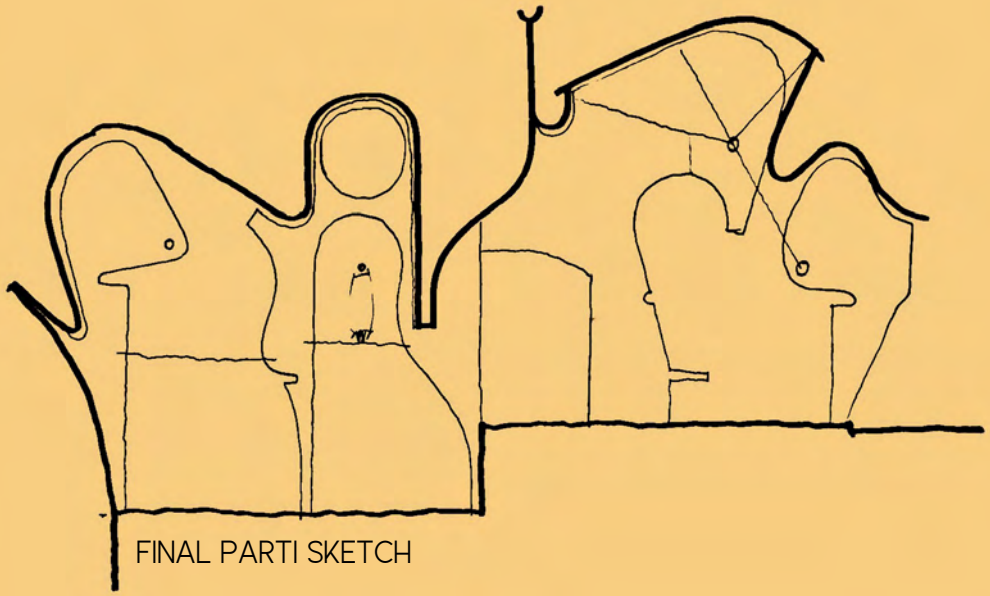
FISHERY MARKET COMPLEX

FIRST FLOOR PLAN

SCALE 1:200

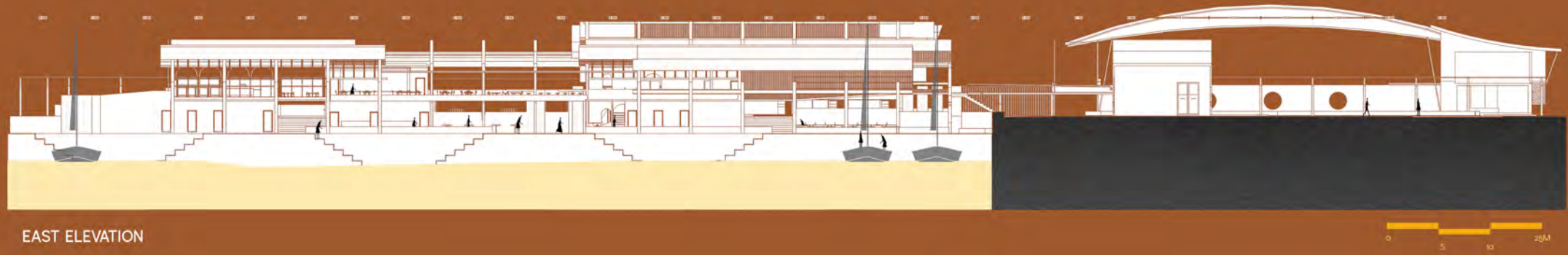

1 457
3 263
2 130
1 300
2 800
5 850
2 630
2 880
COVERED FISH MARKET
FILLETING


147 000
MARKET ROOF
120 000
ROOF LEVEL
95 000
ROOF CANOPY
70 170
TOC 1F SLAB
59 170 FGL



FINAL PARTI SKETCH

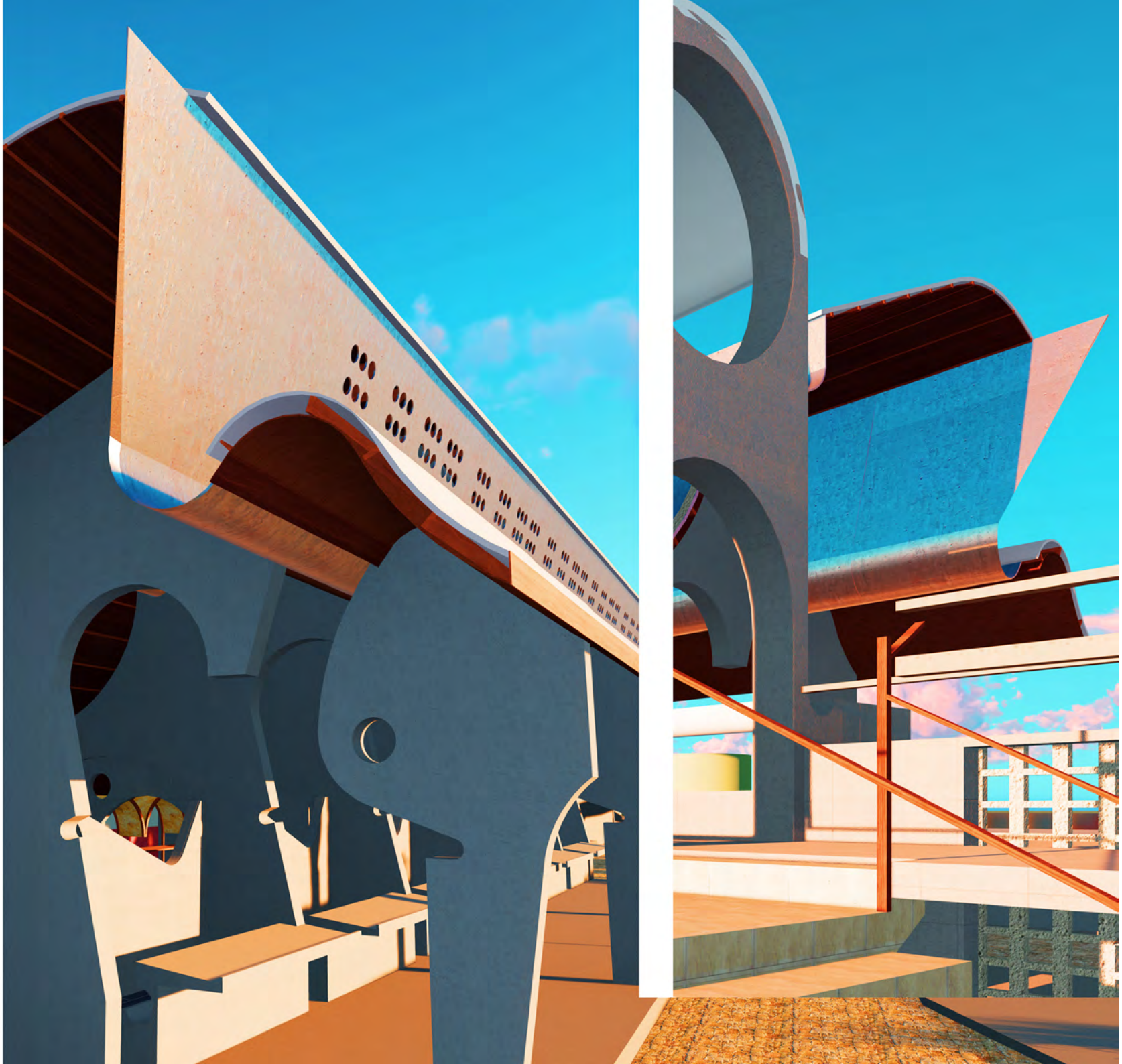
SECTION A

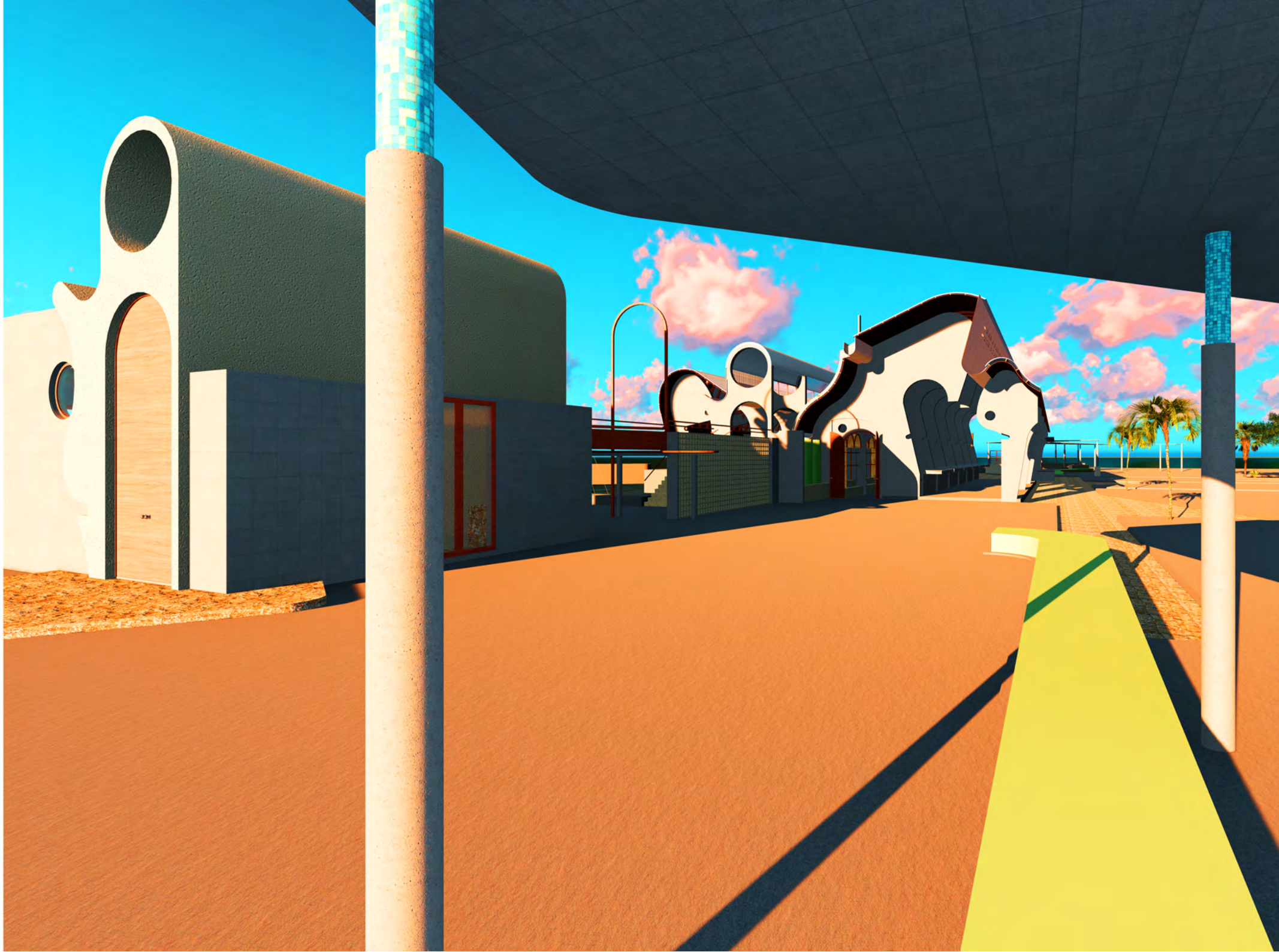


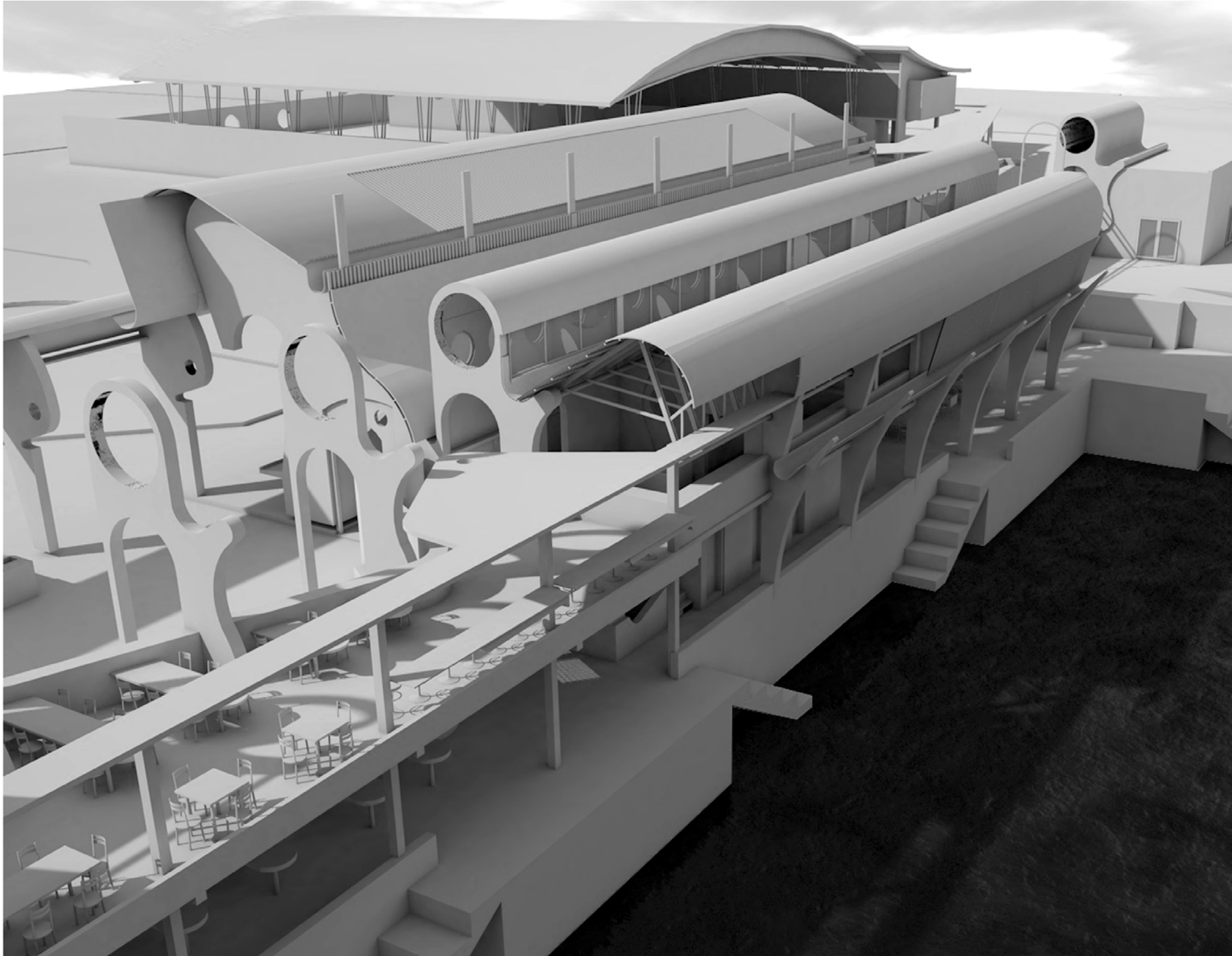
EAST ELEVATION

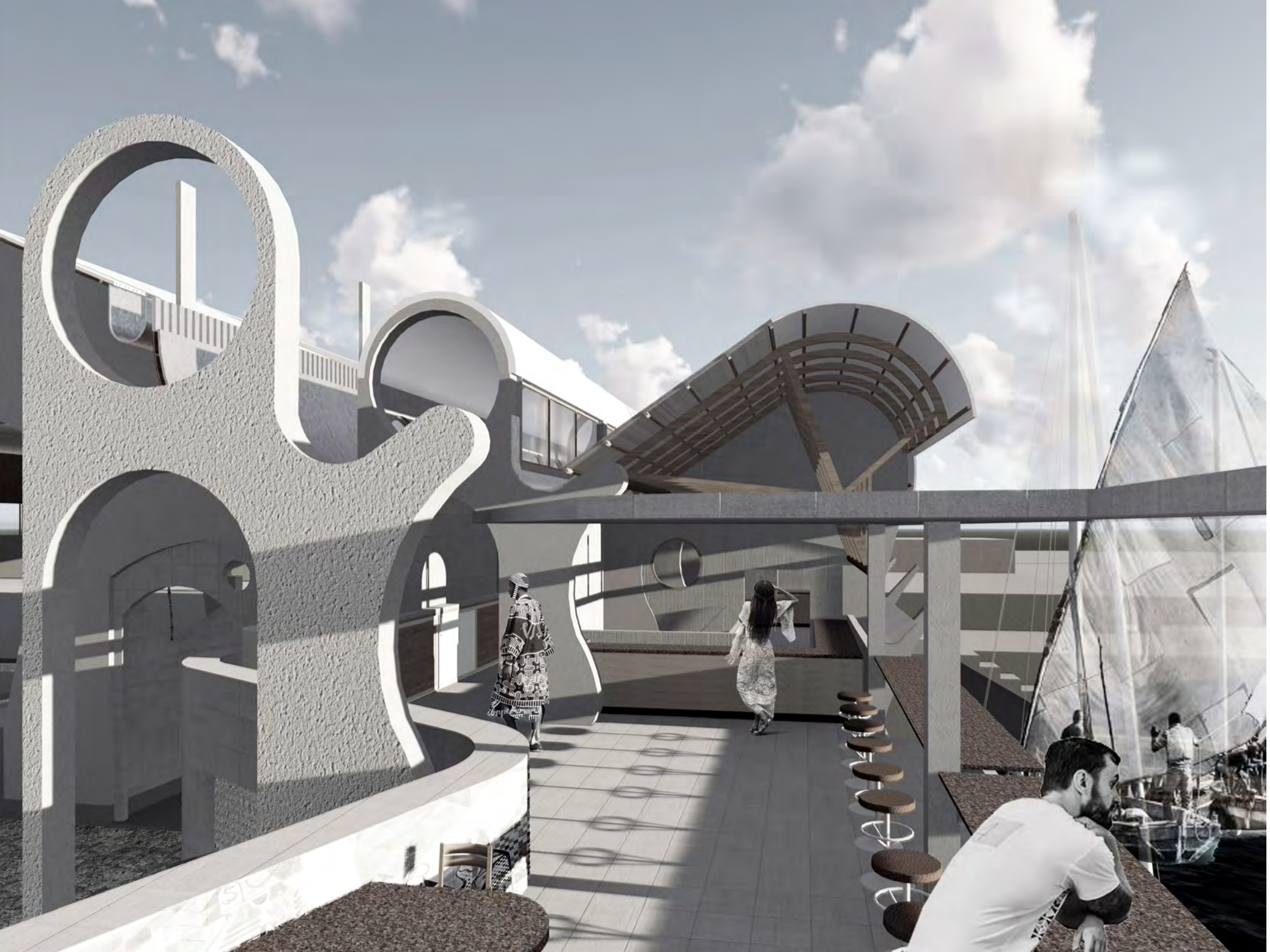
WEST ELEVATION

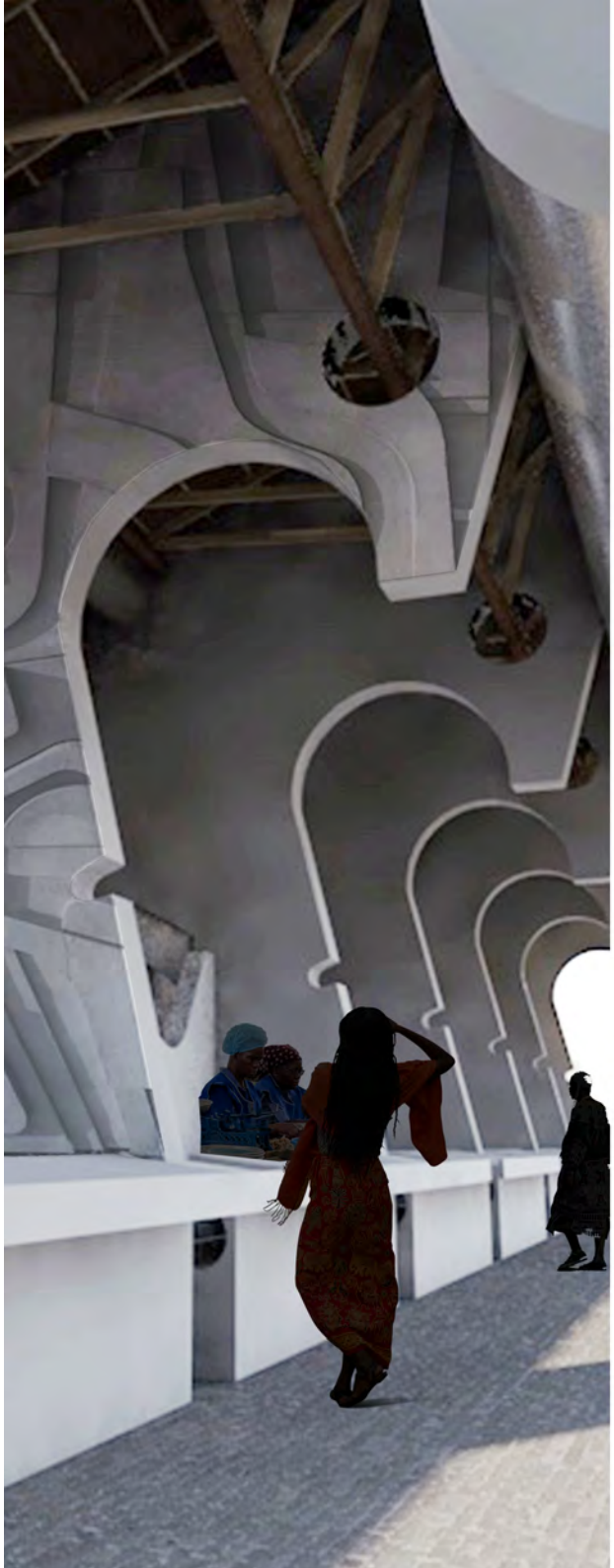
9.6 RENDER EXPLORATIONS



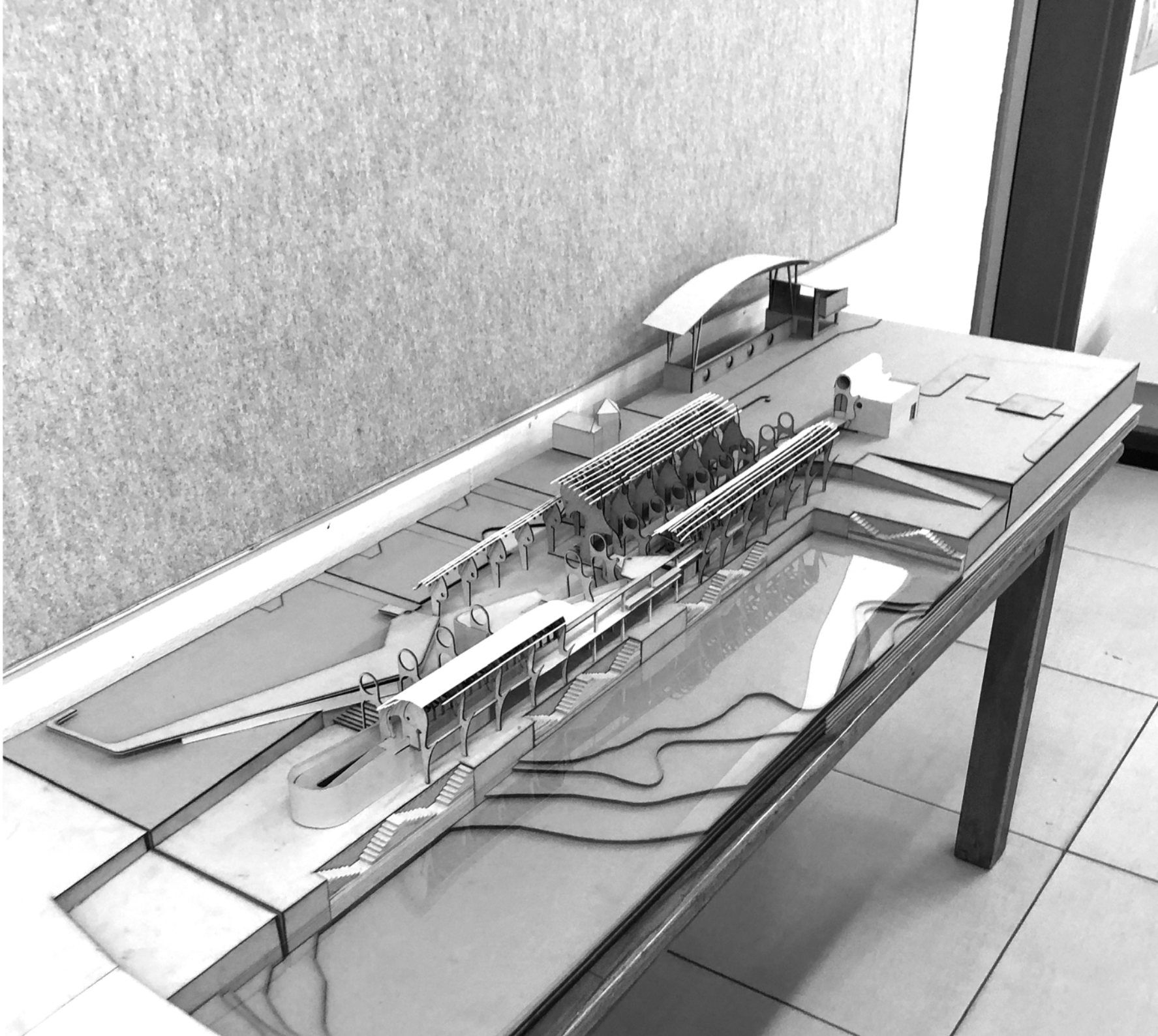




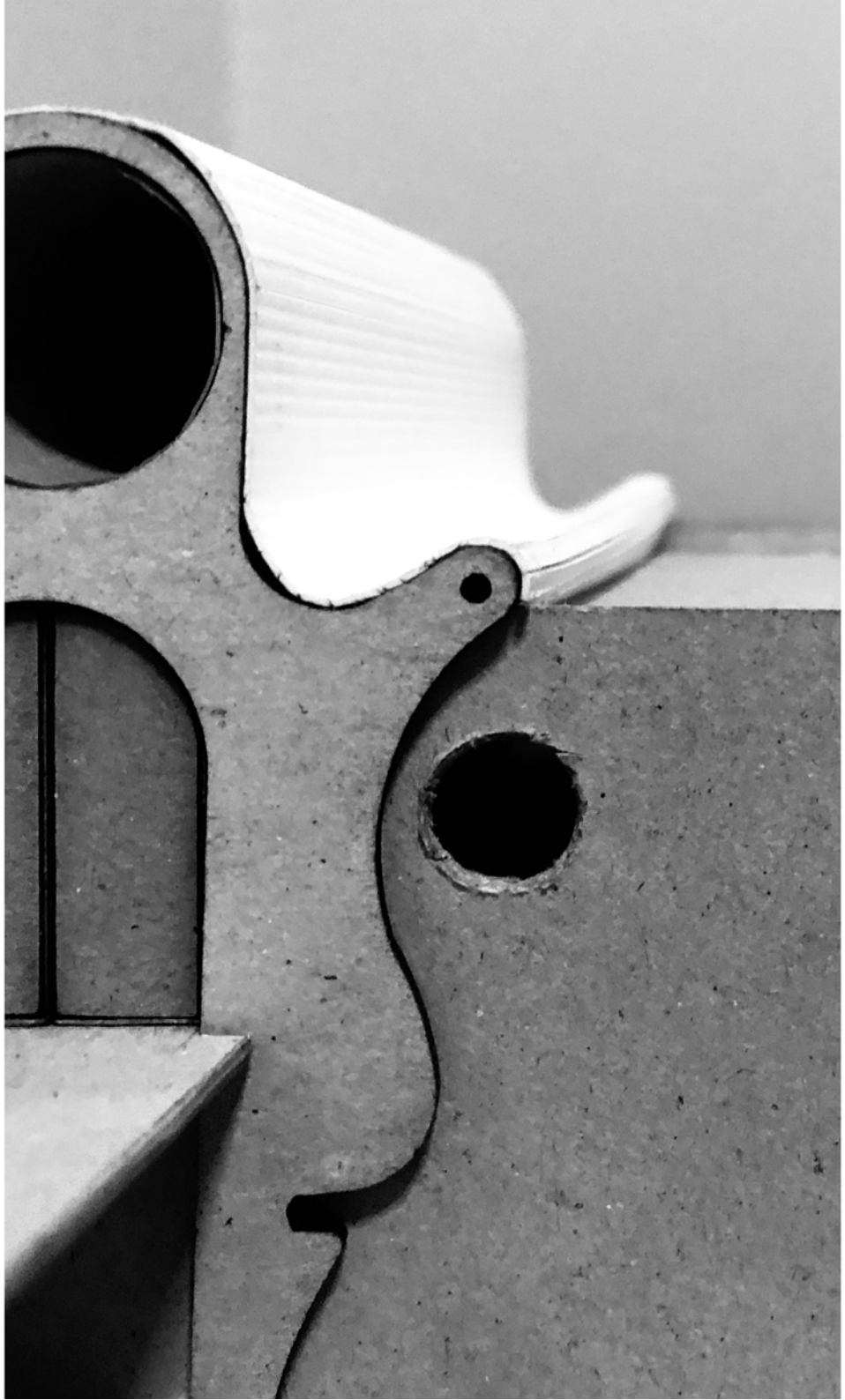


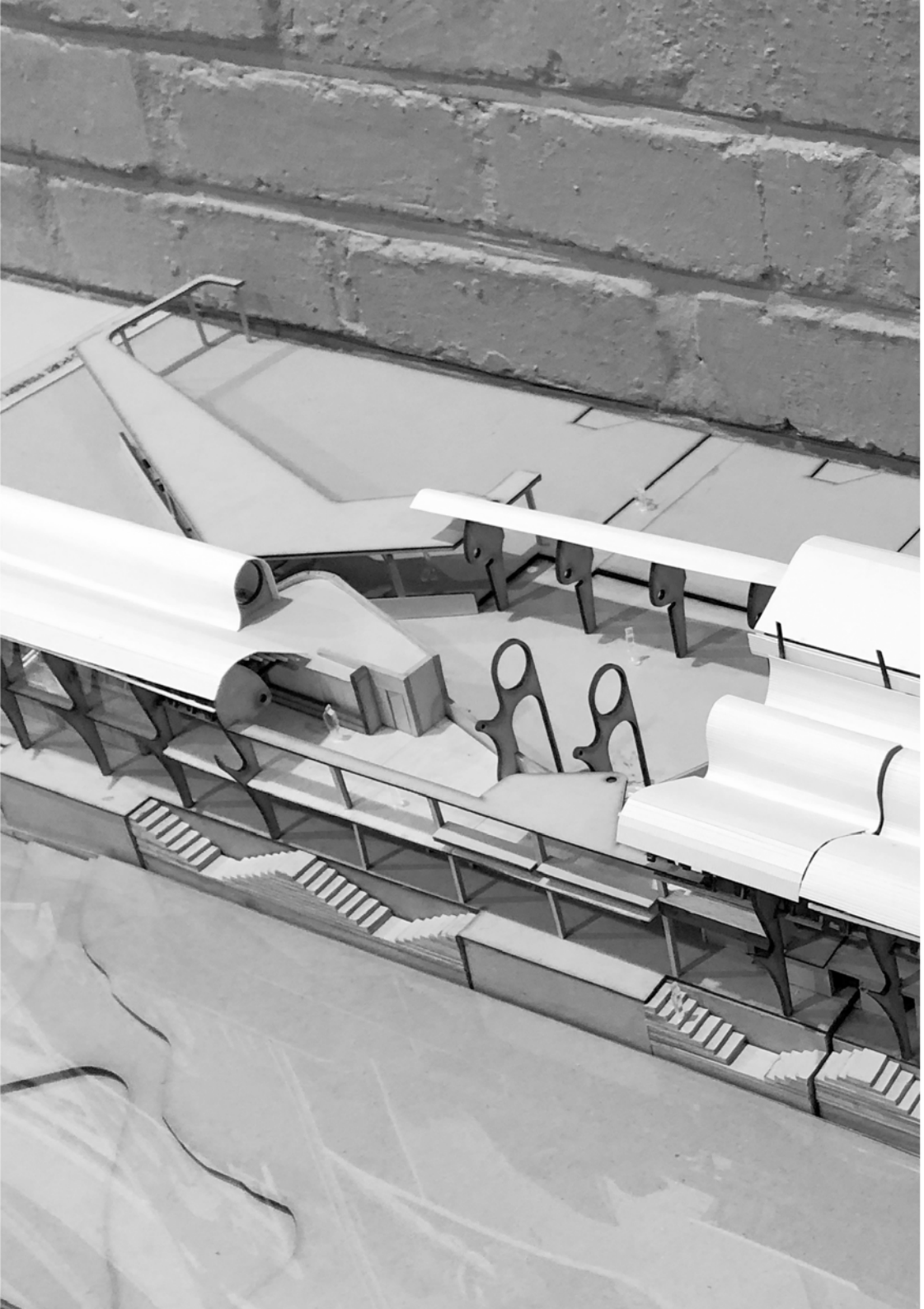


9.7 FINAL MODEL




MAPUTO PORT FISHERY COMPLEX
SCALE 1000





PART 4

TECHNICAL INVESTIGATION

-INTRODUCTION
-LOCATION AND SITE
-SITE TOPOGRAPHY
-MATERIALITY
-SITE DESIGN & LAYOUT
-STRUCTURAL COMPOSITION
-SERVICES
-SUSTAINABILITY
-FACADES
-LANDSCAPING

CONSTRUCTION DOCUMENTATION

[10] TECHNICAL INVESTIGATION

10.1 INTORDUCTION

The objective of the technical report is to present the design system used for the chosen tropical area of Maputo. The approach was based on the complex analysis of local conditions in order to provide inhabitants with suitable design solutions. In the book Dry and Humid Zones, Tropical Architecture can be seen as a manifesto of a regionalist modernism. Two apparently opposite terms find a compromise in a design system that seeks to build a new cosmopolitan modernity (Galli, 2016: 193).

In the first part of this chapter discusses the existing layout of site, as well as the materials and their availability. The second part of this chapter discusses the fish handling process, its utilities and resolution on plan. Lastly, the tectonic resolution of the design is discussed.

FIG 1. WORLD MAP LOCATING MOZAMBIQUE (AUTHOR, 2019).
FIG 2. THE TRADITIONAL ARTISANAL BOAT AT MAPUTO BAY PORT (AUTHOR, 2019).


MOZAMBIQUE

10.2 LOCATION & SITE
25’58’32.05”S and 32’34’9.42”E

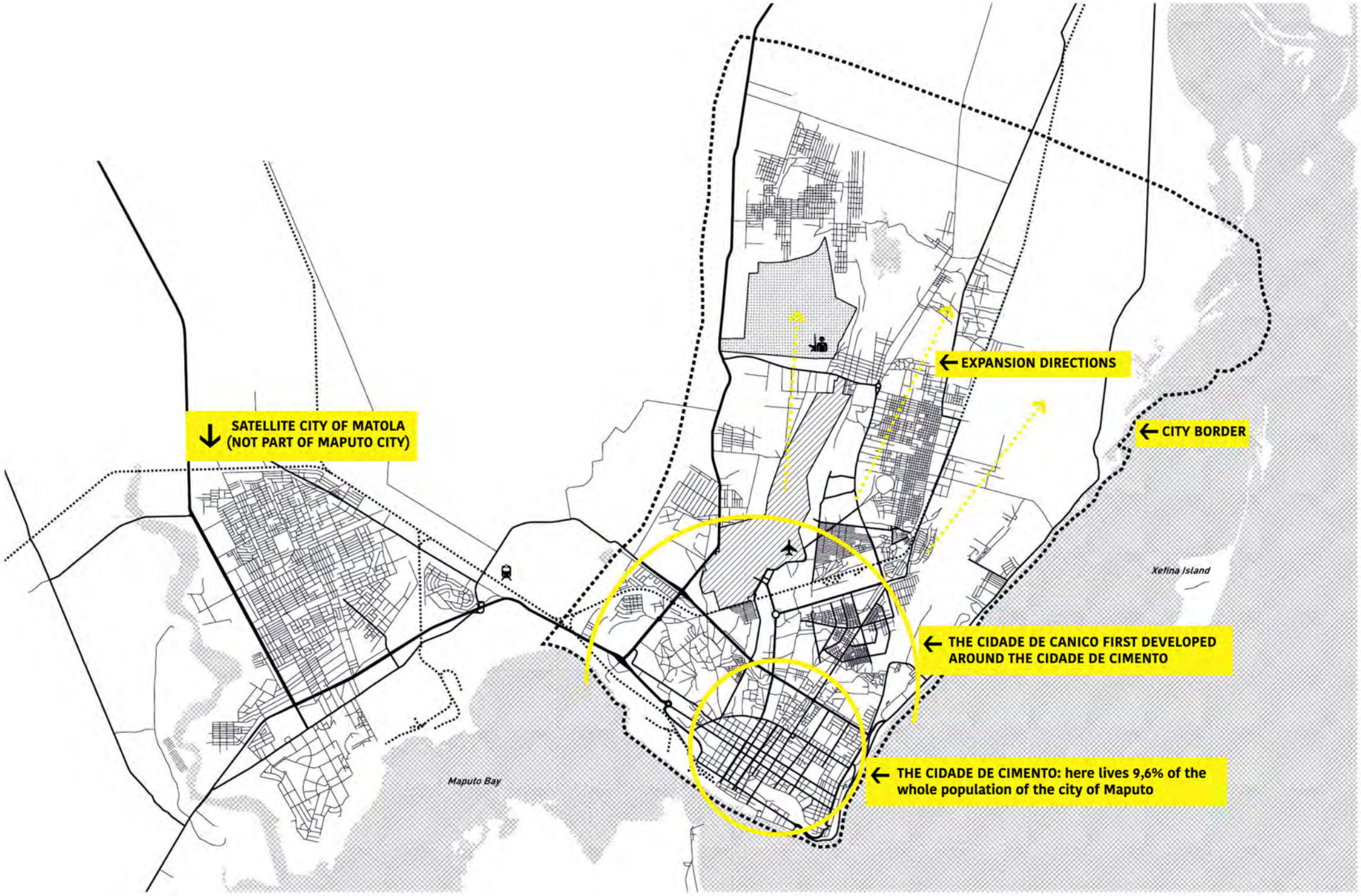
Maputo is a city located on the southern part of Mozambique’s coastline surrounded by low-lying swamps. It is on the north bank of the Maputo River, which empties into Maputo Bay, an inlet of the Indian Ocean 90 km long and 32 km wide (Fig. 4). Maputo is a port city, and the “Baixa”, situated in the city center beside the harbour, is a major center of commerce in southern Mozambique (Cravinho, et al., 2011: 849-850). The “Baixa” also supports a large number of local traders, such as fishermen, who repackage large bulk shipments into manageable portions, which their agents then sell locally. With Maputo inner city as the main center for distribution and sale of fish, the port is a primary location for fishermen from surrounding villages to unload, sell their catch and prepare boats for sail.

THE PROPOSED SITE IN MAPUTO CITY

The site is located at Maputo Bay Ferry Port, which is situated at an elevation of 6m above sea level. The port precinct can be read as a significant barrier between the Old “Baixa” and the Bay of Maputo. Maputo Bay is surrounded by the fishing villages of Matola, Catembe and Inhaca. While the majority of boats using the harbour are artisanal (Fig. 2) and concentrate primarily with local distribution, the facilities provided, such as the fishery warehouse (refer to page 36), are strongly geared towards the handling of frozen fish (as mass commercial produce).

The harbour has minimal facilities geared towards local distribution. Here the demand is high for fresh produce. For these reasons, the harbour is under-utilized. In additional to this, the local distribution of fish into Maputo is given little opportunity within the harbour, with the majority of fresh fish trading sales marginalized to just beyond the fence on the street’s edge. This is seen as a primary example of a functional segregation of scales of economy between the port and the historic core of the “Baixa”.

FIG 3. MOZAMBICAN CITIES AND POPULATION (AUTHOR, 2019).
FIG 4. MAP OF MAPUTO ADAPTED BY (AUTHOR, 2019).



MAP OF MAPUTO.

10.3 SITE TOPOGRAPHY

To understand Maputo's landscape, geology and topography were the first steps for the cartographic interpretation. Through these maps, one can have an indication of the original landscape, topoclimate, and the wet and dry systems, in order to understand water behavior that influences soil formation and the type of developing vegetation. The maps also show how the areas of natural risk and environmental impact can be evaluated in the development of the city's infrastructure and urban tissue (Tomás de Oliveira et al., 2012). An ESRI ArcGIS (Esri, 2017: online) base map provided an outline of land use changes over the past fifty years.

The mangrove ecosystems of Maputo Bay arise from the northern border of the Municipality, to the flood plain at the mouth of the Incomati River. Mangroves re-occur in the southern margin of Maputo's Municipality, in Katembe, on the right margin and mouth of the Tembe River. In Inhaca Island, they occur in the North and at Saco da Inhaca Bay (Fig. 5).

It was said by de Boer (2002) that the mangroves in the Maputo Municipality area have declined by 90%, showing a clear negative evolution in the Western margin of the bay, instigated by direct use, exploitation, urban and infrastructure development. However, in other areas, he states that mangrove patches were actually increasing, counterbalancing the overall total area of mangrove (de Boer, 2002).

In the Southern margin of the bay lies Katembe, which is mostly from the Congolote formation of interior fixed dunes (Canhanga & Dias, 2005: 85). The mangroves occur where silty and clay soils deposited by river discharge and where there is a strong tidal impact.

Due to the geology and geomorphological processes that influence these intertidal planes, the formed flat areas have numerous shared characteristics, such as very low heights of no more than 5 m above sea level and slopes of no more than 5% (Canhanga & Dias, 2005: 85).

The site is situated on what was a mangrove swamp surrounding the original trading island in what was then Delagoa Bay (Maputo Bay). The part that the market and its immediate surrounds are located on was reclaimed before 1900 with fill, probably brought in by rail during the construction of the railway (Canhanga & Dias, 2005: 85).

Most of the territory of the Northern margin of Maputo bay became a consolidated urban area within a period of fifty years. In the coastal plain, urban area with non-consolidated urban tissue can be found, occupying the former sand dunes and temporary flood areas. The flood areas that continue free of urbanization are occupied with agriculture and the existing mangroves have their edges being reclaimed.

The temporary flood zones that accommodate seasonal tropical storm floods and tidal variations are increasingly being used for agriculture, as people cultivate for subsistence and to sell, and are also being occupied by formal and informal low-density urban expansion, tourism facilities and infrastructure, as is the case of the Marginal de Maputo ring road (Fig. 6.) (da Costa & Ribeiro, 2017: 629-651).

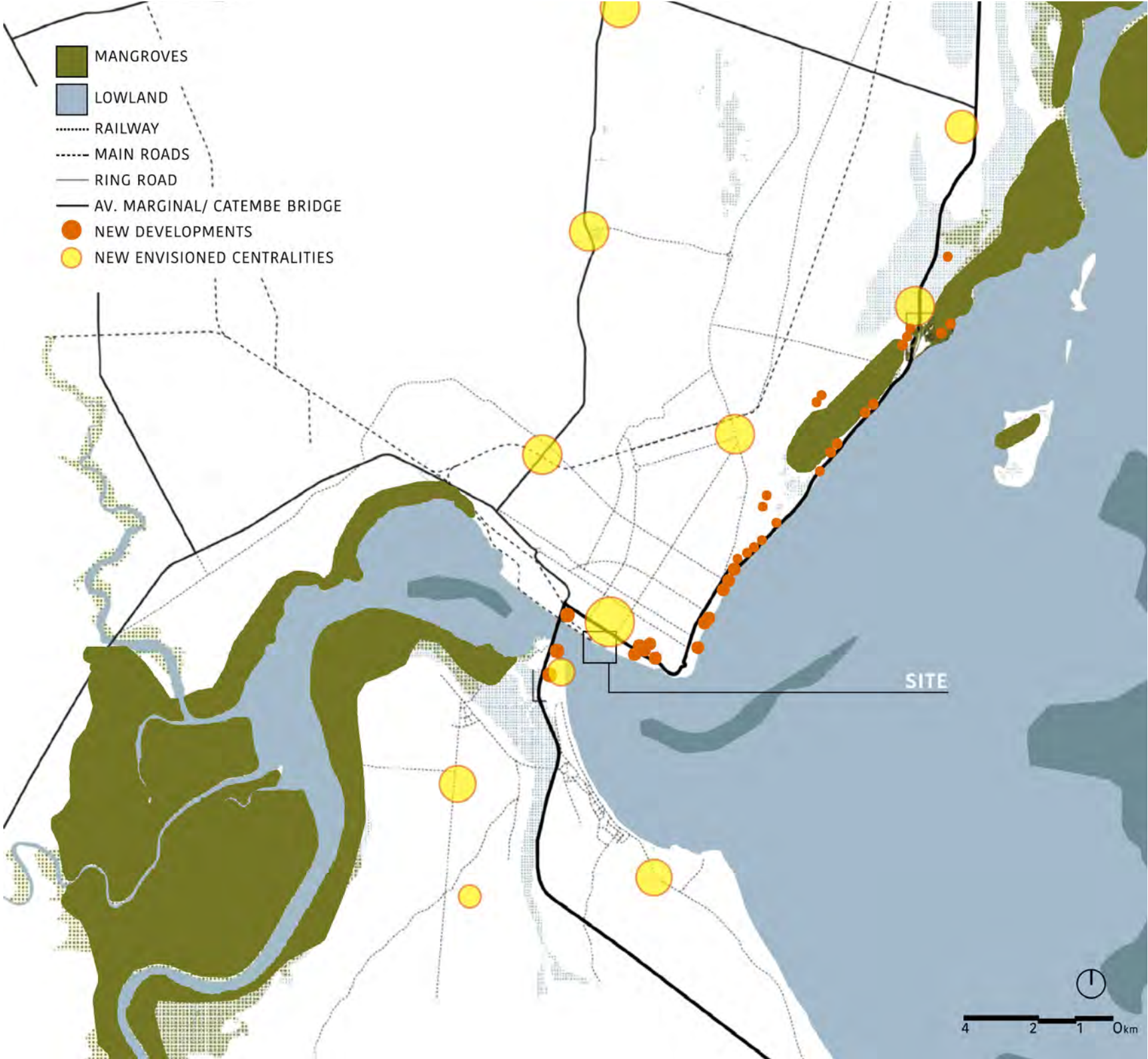


FIG 5. (AUTHOR, 2019).

Sea-level Rise Flooding

The coastline of Mozambique is disposed to occasional cyclones, which cause flooding due to storm surges into low-lying areas. This, coupled with the predicted increase in cyclonic activity, means that sea flooding of the "Baixa" will occur more regularly than it has in the past (Republic of Mozambique National Institute for Disaster Management (INGC), 2009: 10-12).

The port (1) is currently under construction, where the piers are being rehabilitated and extended. It has no beach width, so only a flood analysis was done (see Figure 7). Praia da Polana Zone (2) has a wide beach, due to the influence of the existing spores. 1 and 2 have the highest medium-high vulnerabilities to flooding, with very high danger of passing through and damage to vehicles. The vulnerability of this change to structural damage is medium-high because a large part of the new buildings that have appeared in the city are located in this area.

Area 3 with beach in front of the structure, even at high tide, shows low flood vulnerability indices, without considering the presence of a natural phenomenon as a cyclone.

Since the site is very close to being perfectly flat and that flooding is a problem. It is, however, proposed that to ensure proper drainage, areas of the site (particularly sales areas) should be raised in a series of 150mm high steps to a level of 600mm above the surrounding pavement level.

A system of open surface drainage channels that allow for the fast drainage of flood water is planned, and it is assumed that this will be effective in draining this area.

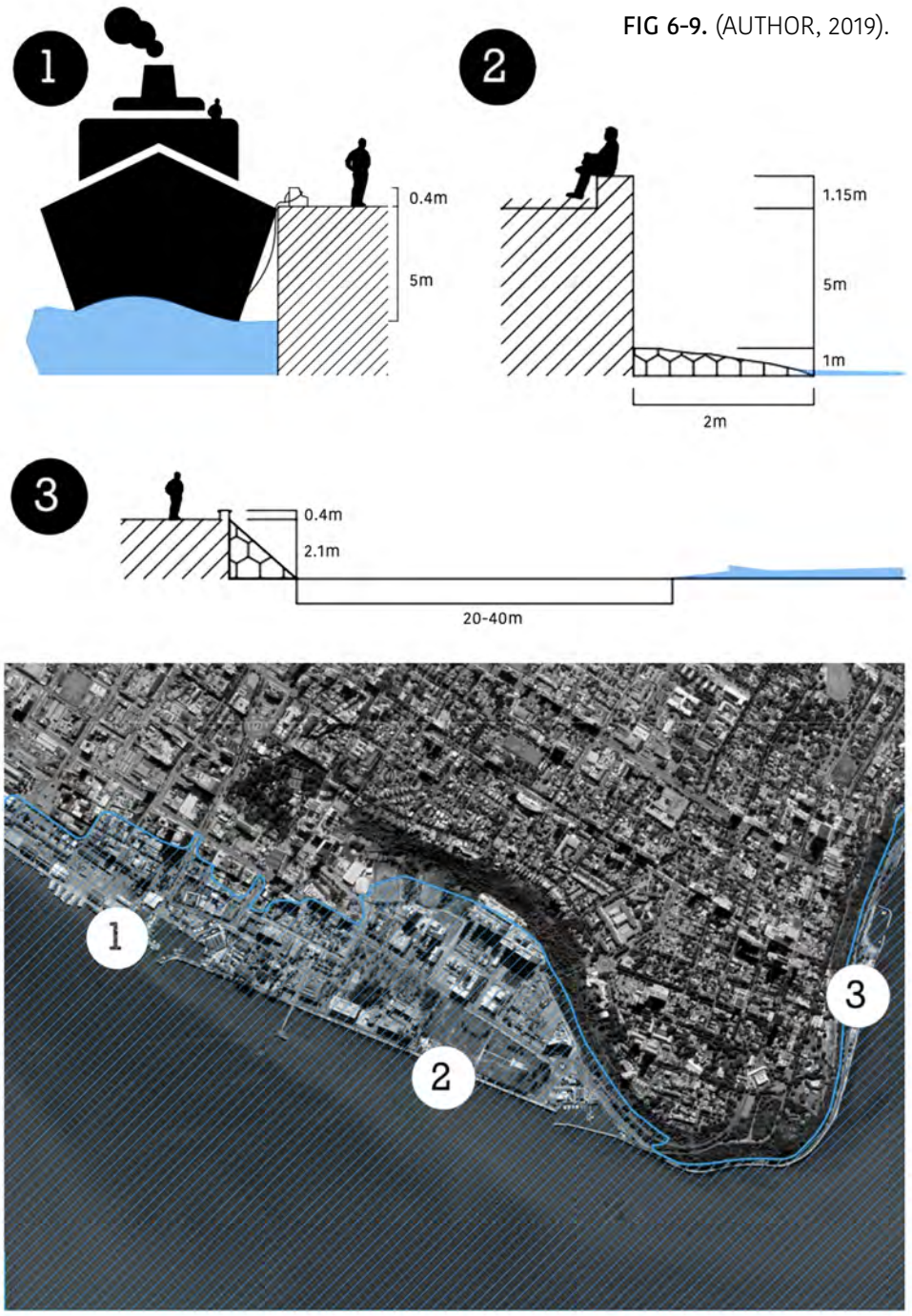


FIG 6-9. (AUTHOR, 2019).

Water waste drainage

The sewerage system is only found in the 'Cement' city and in a part of the "Jardim district" and was planned by the Portuguese. In the rest of the city, either traditional latrines or septic tanks are used. The effort was even made to pump domestic wastewater from the "Baixa" uphill from where it could flow gravitationally to the treatment plant, while a second system drained stormwater from the "Baixa" directly into the bay. Today the pumping station is out of use, meaning that both stormwater and effluent from septic tanks south of the watershed line discharge into the bay directly. (WSUP, 2011: 118). As for rain drainage system, only 30% of the total surface is covered (Dray & Nhancale. 2010: 3).

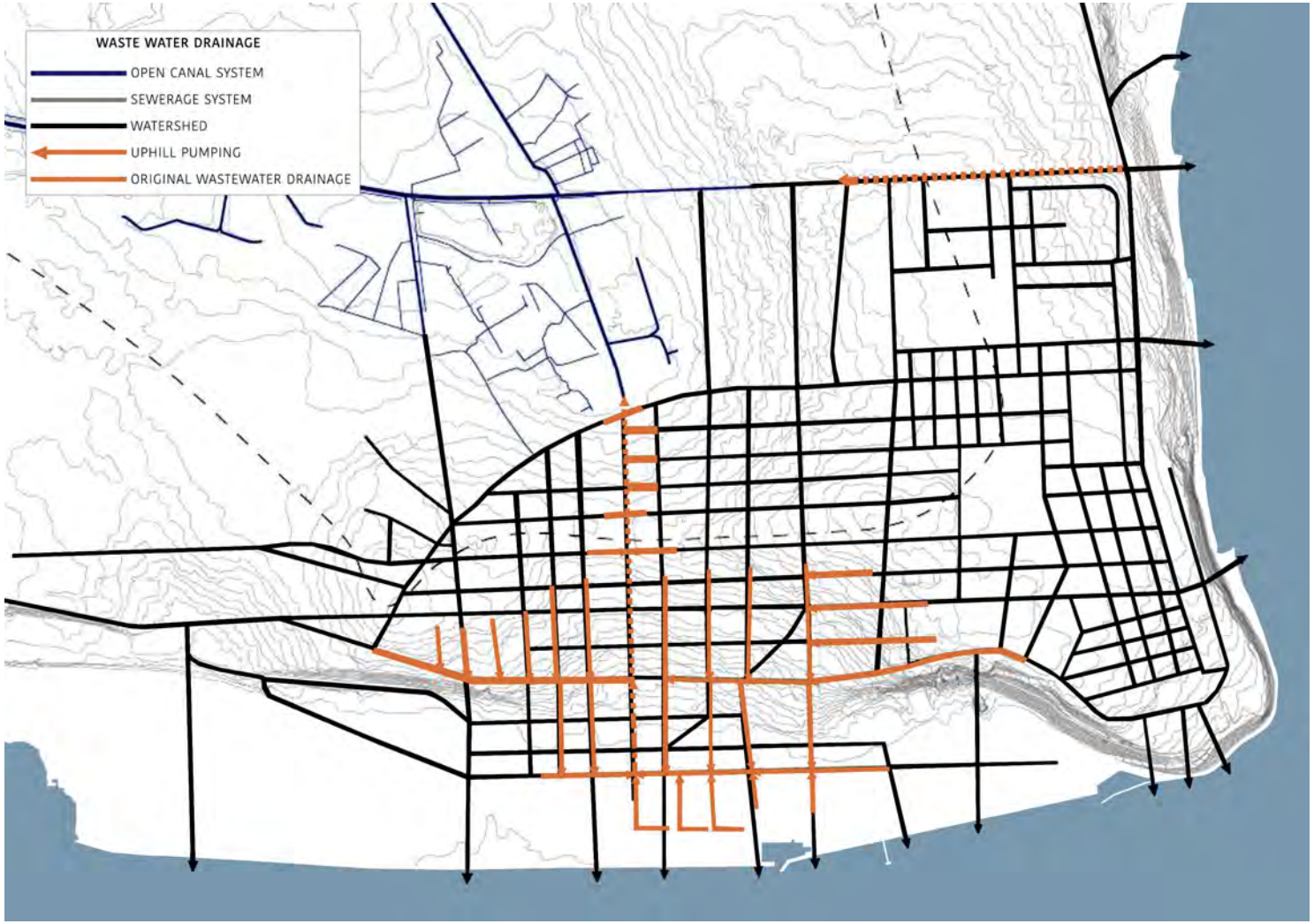


FIG 10. CITY WAST WATER DRAIINAGE (AUTHOR, 2019).

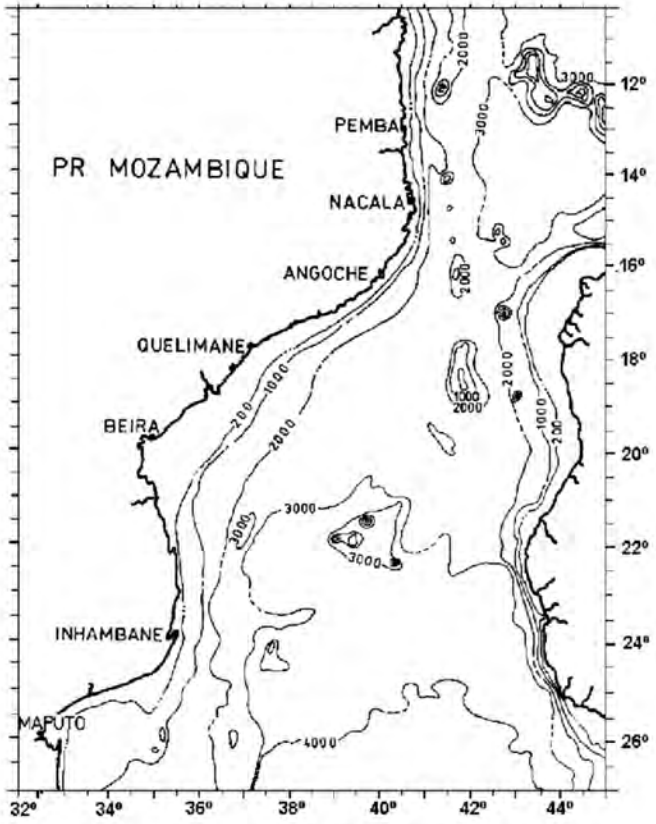


Fig.11. Mozambique Channel Topography (Sætre & Silva, 1979).

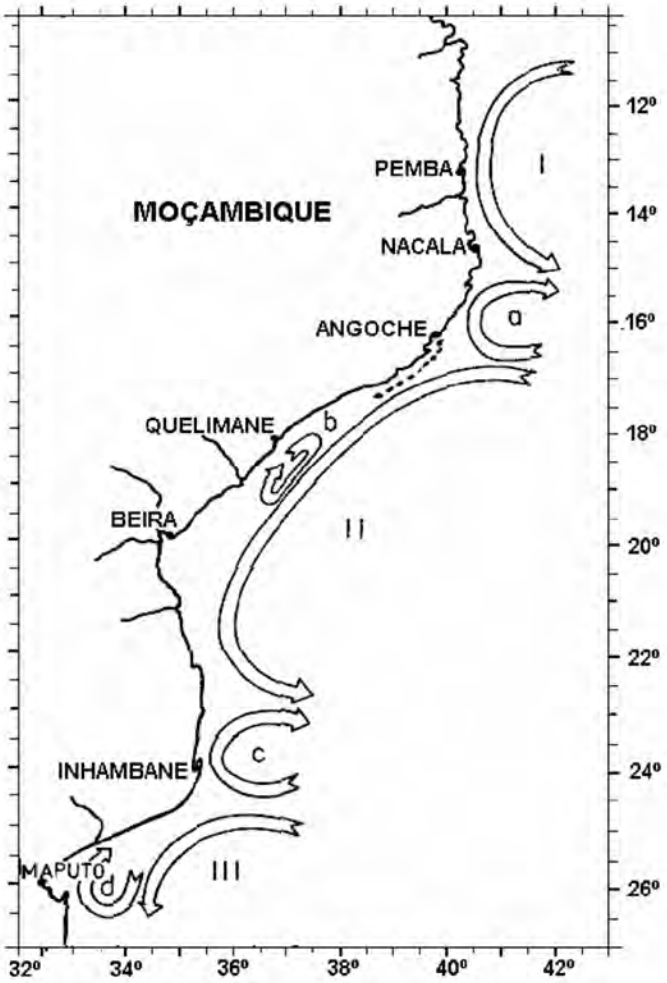


Fig.12. Mozambique Channel circulation pattern (Saetre & Silva, 1982).

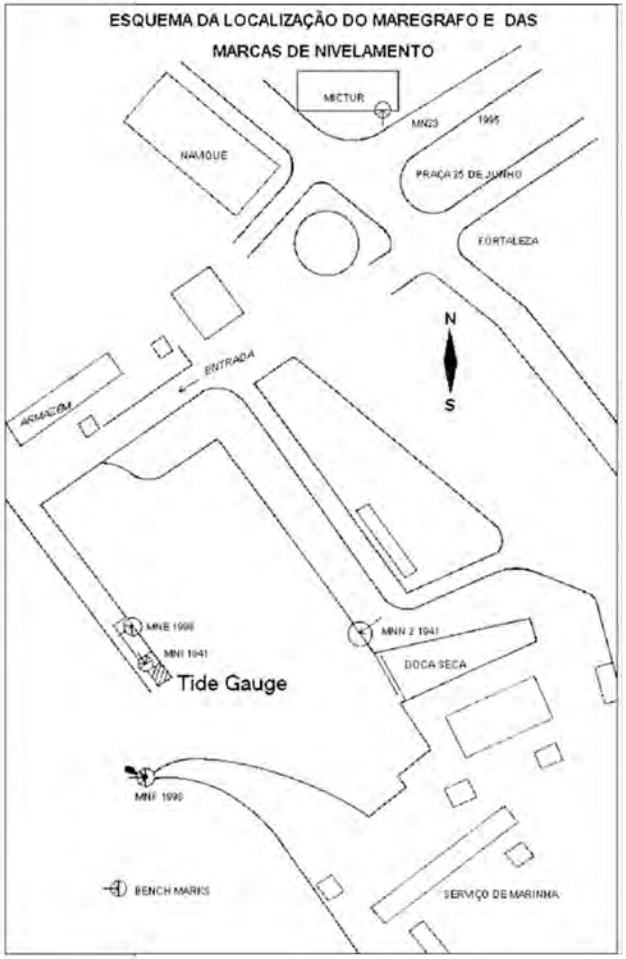


Fig.13. Location of tide gauge at Maputo Port (Saetre & Silva, 1982).

Climate

Maputo, located on the east coast of Africa, is affected by the warm Mozambican current flowing through the channel between Mozambique and Madagascar. This results in a tropical climate, with warm and prevalent humidity during the daytime. Winds are predominately easterly, south easterly and southerly (Fig. 14).

In winter, the rainfall is much less than in summer. The climate here is classified as Aw according to the Köppen-Geiger system. The average annual temperature is 22.7 °C in Maputo. The average annual rainfall is 781 mm (Climate-data, 2019: online).

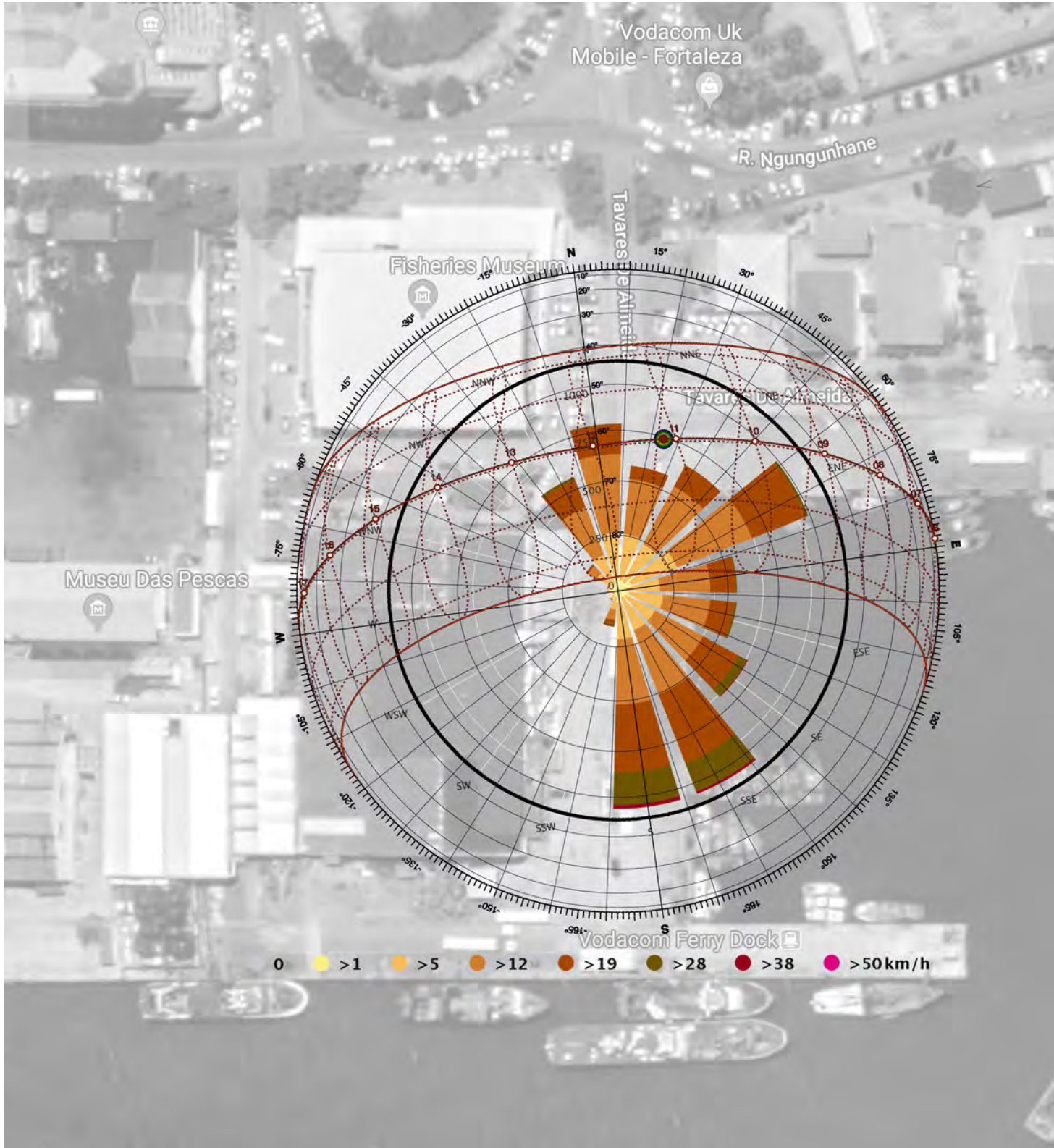


FIG 14. WIND AND SUN STUDY ON PORT (AUTHOR, 2019).

10.4 MATERIALITY

The functional and utility requirements in the technical resolution of a fish market and ice distribution building are usually composed of corrosion-resistant surfaces and components, as well as their ability to be easily cleaned. In 'Towards a Critical Regionalism', Kenneth Frampton (1983: 27), places emphasis on the idea that the technical must not be confused with the tectonic. Where the 'technical' suggests the resolution of a structure or a piece of infrastructure, the 'tectonic' suggests a relational delineation of the materials and other technical components in a design. While durability and robustness of materials and details is therefore central to the technical resolution of the design, it is in the dialogue between the tectonic and the stereotomic that the architectural intervention becomes a work of architecture.

Contextual Materiality

Since about 1880, the existing buildings in the "Baixa" area were built according to western tradition using solid formal materials. This places the "Baixa" firmly into the 'concrete city' discussed by Folkers in The Contemporary African City (2010: 143). A multitude of architectural influences are visible in the building finishes and textures, ranging from prefabricated European colonial cast-iron verandas and ornate patterned steel burglar guards, to fine texture Portuguese pavement cobbling and the African-inspired textures of the Mozambican architect Guedes.

Local buildings are mostly finished with a smooth material, such as plaster. Many buildings have not been repainted, and in many places the organic nature of the informal 'reed city' is seen in this area. The buildings have been allowed to develop a patina over time. The formal 'concrete-city' fabric has in many places provided a framework into which the current occupants have added a layer of less permanent materials such as timber, corrugated-iron, reeds, and welded reinforcing bar lattices, adapting the spaces to their own specific needs (Fig 15).

It is recognized that buildings in this area will be allowed to develop a patina, adapted and re-appropriated by the organic 'reed-city'. The choice of materials and finishes in the area should take this into account. Finishes, such as paint, requiring regular re-work are therefore not appropriate. Rough concrete finishes, such as those often used in the architecture of American brutalist architect Paul Rudolph (1918-1997), will not be suitable since the humid climate of the sea-side location is conducive to the growth of mosses and structurally-destructive plants such as the strangler-fig trees (Ficus Burkei) in this finish. The use of fair-faced concrete is, however, extensive in Maputo City, often to sculptural effect, and its hardiness in harsh marine environments. This is especially evident in the work of Guedes.

FIG 15. COLLAGE OF THE MATERIALS OF THE REED AND CEMENT CITY (DEVENISH, 2012: ONLIINE).

Material Availability

The availability of materials has a great influence on the character of the contextual built fabric. The fact that the “Baixa” is adjacent to a harbour means that international materials are easily obtainable. Materials that are made locally at a low-cost, do however still have a significant inspiration on the built fabric. Table 1: Materials locally unique to Maputo, Mozambique, shows the most important of these materials.

Material	Description	Produced	Sizes (mm)	Comments
Timber - Eucalyptus	Fairly consistent hardwood including some knots	Informal sawmills Xiquelene, Maputo	2400, 1300 lengths	- Not kiln dried - Exotic species
Timber - Pine	Fairly consistent softwood	Informal sawmills Xiquelene, Maputo	4900, 5500-6000 lengths	- Not kiln dried - Exotic species
Timber - Chanfuta	High quality hardwood, no defects, termite and borer resistant	Informal sawmills Xiquelene, Maputo	2300, 1550 lengths	- Not kiln dried - Indigenous species - (Khaya anthotheca IUCN Red-list: Vulnerable) - (Afzelia quanzensis Protected in SA)
Timber - Mopani Poles	Raw Mopani poles	Informal pole merchants Xiquelene, Maputo	4500	- Indigenous species
Timber - Eucalyptus Poles	Raw hardwood poles	Informal pole merchants Xiquelene, Maputo	4500	- Exotic species
Timber - Lead-wood Poles	Raw Lead- wood (Simbiri/iN-timbi) poles	Informal pole merchants Xiquelene, Maputo	4500	- A protected species in South Africa - Very hard timber
Reeds	River reeds	Xiquelene, Maputo	4500	- Seen as a sub-economic material
Clay “ceramic” Bricks	Large extruded clay bricks	Maputo surrounds	Length: 300 Height: 200 Width: 70/100/150/200	Strengths: - 1,5 mPa - 2,5 mPA
Concrete Blocks	Interlocking concrete block	Maputo	Length: 400 Height: 200 Width: 70/100/150/200	- Used widely throughout Maputo
Grill Block	Concrete grill block	Maputo	Various	- Used widely throughout Maputo

Table 1: Materials locally unique to Maputo, Mozambique.

It is preferable that materials are produced or sourced locally, either from around Maputo, within Mozambique, or neighbouring countries

Concrete

- Cement made in Mozambique
- In-situ concrete work
- Precast units

The buildings of Tropical Architecture fully explore the positive possibilities of concrete using it both structurally and for the finishing. Swishcrete, which is a mixture of raw cement and earth, is baked in the sun in wooden molds used by Alfred Alcock in the construction of the Asawasi Village near Kumasi, Ghana (Galli, 2016: 202)

Concrete was identified as a construction material due to its sturdiness in high trafficked areas, and also for its hardiness in harsh marine environments. The reinforcement cover is 35mm minimum due to the highly corrosive marine environment. The fair-faced finish as seen in figure(..) is attained by using rough sawn timber sheeting as shuttering.

Precast concrete grill-blocks (grelhas) is popular in Maputo and extensively used. The thinning of low-level concrete edges, and the addition and allowance of a layer of tectonically light and less permanent materials over the heavier concrete layer, is an effort to respond to the identified regional character.

FIG 16. COLLAGE OF CONCRETE USED THROUGHOUT MAPUTO ADAPTED BY AUTHOR (GOOGLE, 2019: ONLINE).

FIG 17. SAWN TIMBER FINISH (GOOGLE, 2019: ONLINE).

Exotic Eucalyptus timber from Salamanga, Southern Mozambique

Timber and other local materials in an exposed state are used, drawing on elements of Critical Regionalism. The imprecision of the raw materials also echoes the small variations in the market spaces which contributes to the vibrancy of the market.

FIG 18. EUCALYPTUS (MUNRO, 2016: ONLINE).

Mopani poles from Mongweni, Mozambique

FIG 19. MOPANI POLES (DEVENISH, 2012: ONLINE).

Stainless steel:

Stainless steel is the material of choice for balustrades and other detail work. Although expensive, it is extremely corrosion resistant and therefore suitable for use in harsh marine environments. Stainless steel detailing elements are prepared off-site as far as possible and fitted on site via bolting, to limit on site welding.

Galvanized steel will be used for structural steelwork. Zinc coating can be effectively overcoated with paint to deliver a Duplex system. Duplex systems are used in aggressive environments such as this one, where the zinc on its own cannot effectively protect the steel.

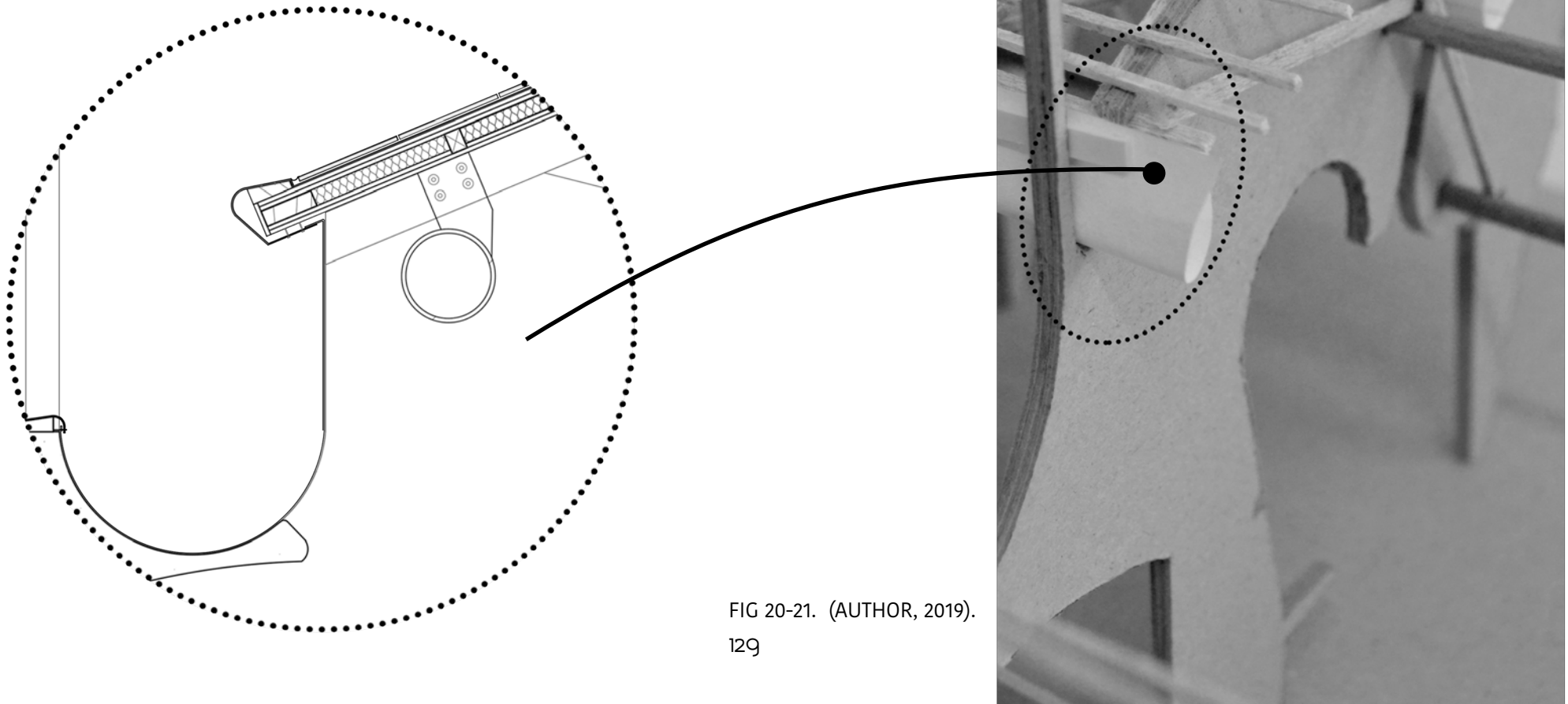


FIG 20-21. (AUTHOR, 2019).

Coconut Palms:

Located in a tropical country, coconut palms are predominant around Maputo. The purpose on the facade screen is to allow for portions of natural material within a patterned 'weave' facade, in reference to the African craft of weaving. The material of choice is the coconut husk, which as an organic material has proven itself resilient as a rope product and in netting applications. The coconut weave accent panels are accompanied by metal weave patterns of varying densities to create a textured shading facade.

Cobblestone:

The majority of the area features an exposed concrete slab as ground cover. However, the historic wharf edge holds the original railway tracks and brick paving from its industrial past. Furthermore, evident in the "Baixa" precinct, is the Calçada Portuguesa (Portuguese type patterned crushed-stone pavements). The paving is a decorative style composed by contrasting black and white paving stones laid in various patterns. The paving method is predominant in Portugal and is evident in Maputo as a reminder of its colonial heritage. Thus, the use of this method is appropriate to the site.

FIG 22. COCONUT PALMS (POWELL, 2019: ONLINE).
FIG 23. COBBLESTONE (AUTHOR, 2019).

10.5 SITE DESIGN & LAYOUT

This section aims to communicate graphically the essential elements of the design in terms of sketch plans, sections, elevations, and details.

Diagrammatic overview of functions

The layout of the Fish Process & Distribution Centre was determined by the functional composition of the fish handling process. Fishermen approach the complex of the eastern side, therefore there is a complex circulation perpendicularly from the fishermen and parallel from the public. The use of larger courtyards and wind tunnels create circulation spaces between the functions, parallel to the rectangular East-West orientation of the gantries and multi-functional spaces.

Four external courtyards can be identified, which gather and provide outdoor workspaces:

- Workers courtyard: A large open-ended space providing water, shade and seating for the fishermen and those working on fish filleting
- Waste Courtyard: This space acts as an open-air space to allow fishermen to dispose guts and with the required cleaning stations
- Cooking station: This open space enjoys the canopy of trees for the staff
- The restaurant reception: This courtyard space is placed at the end of the walkway axis, acting as an outdoor gathering space, servicing the following: administration offices, the pier and the restaurant. The courtyard is articulated by a small tower, acting as an orientation beacon for pedestrians and fishermen.

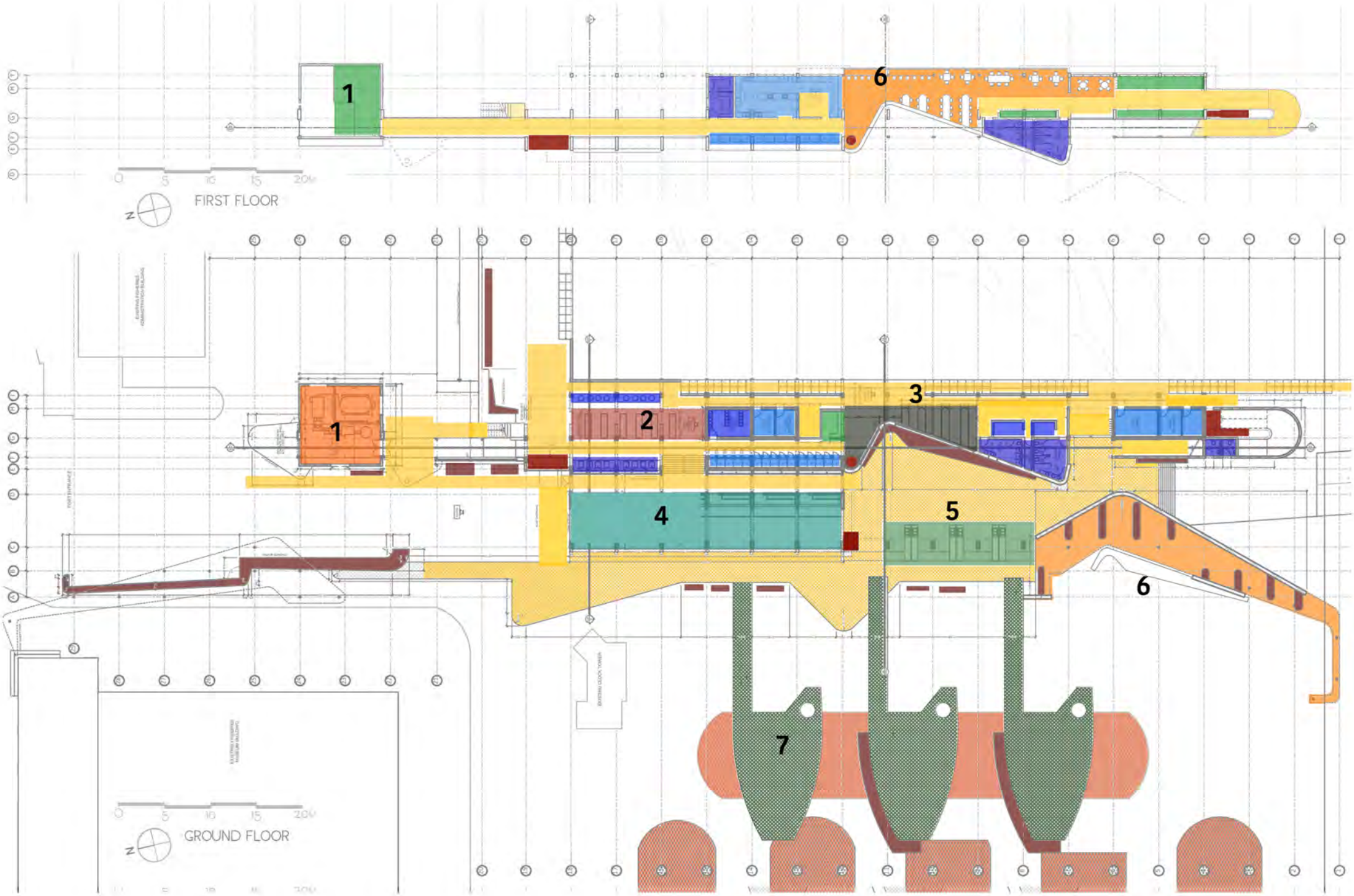
Work-flow process

The building complex consists of seven individual building functions (from the left to right) as follows:

1. The ice manufacturing plant and Reception
2. Workshop 1: Fish filleting
3. Workshop 2: Sorting & Weighing
4. Covered Market
5. Cooking Stations
6. Outdoor Restaurant
7. Sculptural Garden

Level	Circulation	Character
Production Level +4200	This will allow the adaptation of this level to a different system or function as required.	Open, semi-public, secure space, accessed for periods of time during the day. Lower level of flux (Fishermen and agents). Perhaps quite a dirty and messy level.
Street / Ground Floor +4900	The ground floor is deliberately open, allowing easy access and integration with the street. The market threshold consists mainly of a slight constriction in space with a small level change, into the park, and can be secured at night	Linear spaces, open, accessible, Market levels operating at a lower level of formality, subject to the highest rates of flux.
Upper level +9000	The widths of the walkways are restricted to allow the spatial width required to allow two people to move past.	A good link with the Ground Floor is required.

The relationship between the different levels is important. Circulation points such as stairs and ramps, are placed at or near busy intersections, allowing easy and convenient transfer between levels for the customer.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10.6 STRUCTURAL COMPOSITION

Diagram overview of structural compositions:

Floor:

Floor surfaces must be highly durable, but still human in scale. On ground level, the extensive use of Calçada Portuguese crushed-stone paving, frequently used in Maputo, particularly in the “Baixa”, is proposed. This will allow for a durable textured surface, in which the touch of a human hand is clearly evident. A multicolored patterned surface is proposed. The finish of all concrete surface-beds as well as the floor and roof surface of all the suspended slabs could be a stained, polished, and waterproofed screed, with the screed on appropriate suspended slabs falling to full bore drains. This will allow all concrete roofs to be trafficable, to allow for future ad-hoc expansion.

The foundation foot is reinforced concrete strip footing at different dimensions for the concret wall panel, cast into place and will act as a lower beam on which the substructure will displace most of its gravitational pull.

Walls:

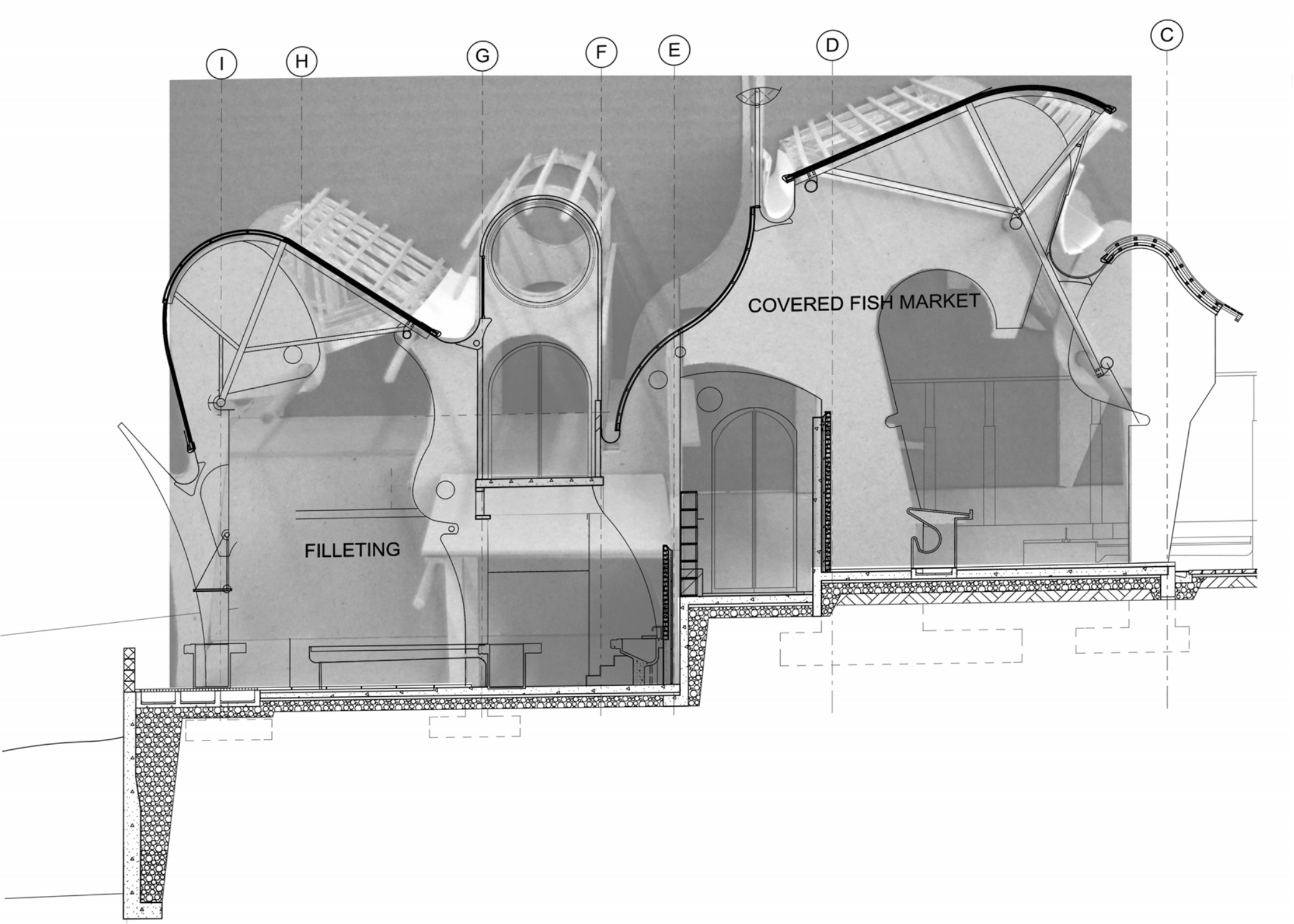
Where possible, the finishes of solid vertical elements will be either smooth finished off-shutter concrete, stained bag-wash finished block work, or precast concrete grill blocks frequently used in Maputo to allow ventilation. Where a transparent vertical element is essential, this will either be a galvanized, primed, and painted mild-steel welded mesh within a timber frame, or local timber screens. Timber screens will be built from vertical Mopani poles, blade-stripped of their bark and fixed in such a way that their bases are suspended off the ground to prevent water related rot. This timber will be intentionally allowed to age.

In market area, is an open covered structure this will allow for permeability in terms of sight and sound, guaranteeing that goods are visible to customers, since they become the primary obscuring element within these spaces as well as proper ventilation needed for fish odour.

Roof:

It is proposed that Soffit ceilings of unpainted smooth steel shuttered concrete that has had the joints polished smooth is used for its durability and maintenance free character. The roof over the Market space is to be supported predominantly by a lightweight timber structure, the greater part of this roof drains into a broad steel gutters. The internal width of the gutters is bewteen 500-800mm, which allows for ease of application of a waterproofing layer. The water is to fall to full-bore outlets and water tanks, which collect rainwater for storage.

The beams on the ends of the gutters are lower than the sides and are specially designed for the gutter shape. Due to the highly corrosive marine environment, an aluminum roof sheeting is selected. Youngman Concealed-Fix Snaplock sheeting is available in aluminum as per the drawing. The fall of the main roof structures is 6˚, which is well above the minimum 1˚ that the Snaplock system can manage. The sheeting is fixed to purlins which lie at intervals of 1000mm.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FILLETING

10.7 SERVICES

The market authorities are to facilitate services as a way to minimize the administrative load and ensuring effective service delivery. The fish handling process, its utilities and resolution are shown on the plan below.

Seafood:

The fresh seafood sold in the market is not chilled or frozen. It is only kept wet and shaded to prevent it from drying out. A potential for odour and dangerous bacterial levels arises from the following issues:

• Water running off fish stagnating requires suitable drainage and hoses allowing the area to be properly cleaned

• Waste from cleaning fish and also fish that is not suitable for consumption is not disposed of in the correct manner. A provision of 'Food Waste Disposers' that liquidize and dispose of this waste into the sewage system is used.

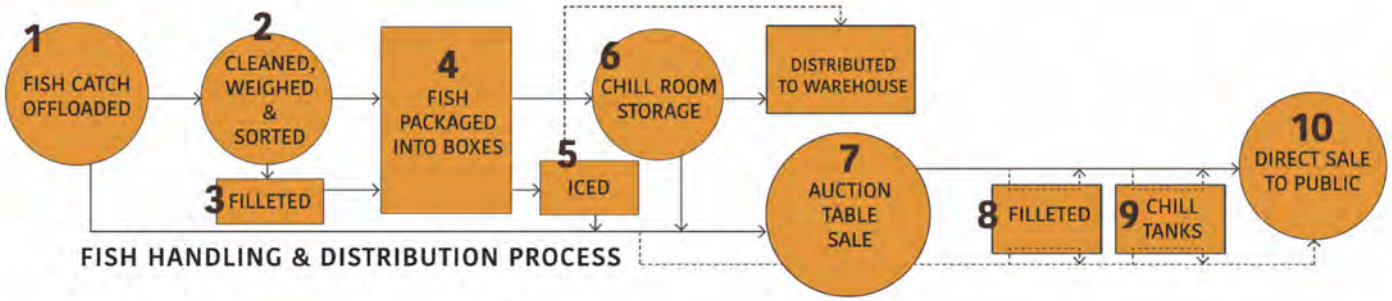
The run-off from the seafood area must drain into the sewage system and not into the storm water system. The areas surrounding the seafood sales to be raised by 150mm to prevent the flow of contaminated water into this zone.

Refrigeration:

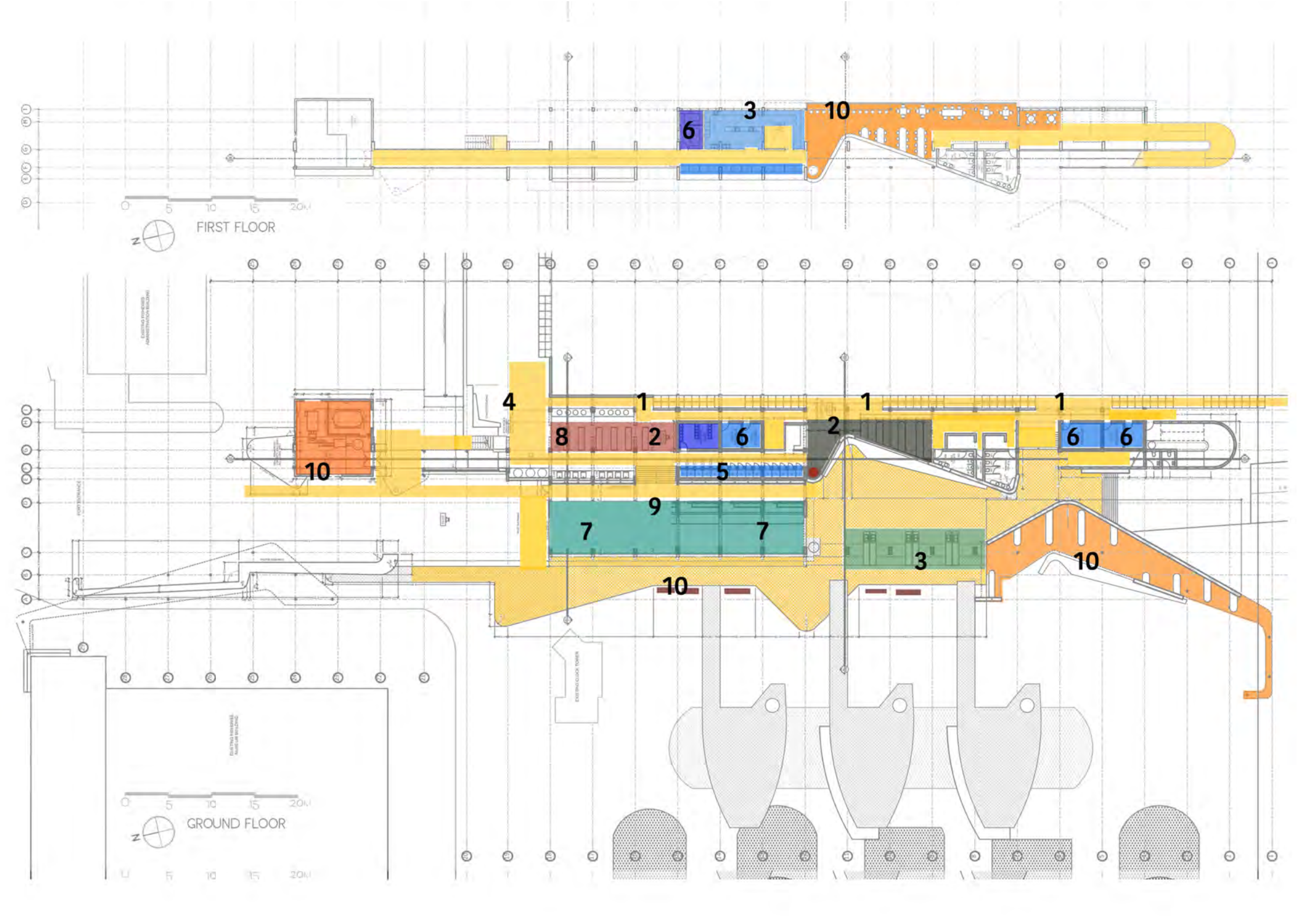
It is proposed that refrigeration and freezing cold rooms be available as part of the Expanded Market Framework. This can be operated as a sector of the market, with this sector also providing ice to customers. Vendors will then be able to store produce and keep perishables fresh for longer periods of time, and buy in larger amounts. This should have a direct physical link to the fish and vegetable sectors.

Cooking:

These areas are also a possible hygiene risk. It is proposed that the floors of these areas be epoxy sealed screed, falling to a grease trap in each area, and that basic washing facilities be provided in sealed impervious concrete.



FISH HANDLING & DISTRIBUTION PROCESS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Ablutions: (1)

Ablution facilities are ventilated by the extraction of air through dedicated ventilation stacks. These draw fresh air into the toilet facilities, from the surrounding market spaces; this air is then drawn over the WCs and out through the stacks to a higher level. This draw is created by the extraction of air from these stacks by large 'whirly-birds' driven by the natural aero-motive force of the sea-breeze. Ablutions will have stained and polished screed flooring with a coved skirting, as well as durable vandal proof fittings. Walls will be plastered smooth, with the plaster having been stained to eliminate the necessity of paint.

Waste Removal & 'Self-cleaning' (2)

A waste yard is proposed on the ground floor next to the filleting tables in an area with appropriate circulation to the outside. Waste of various types to be kept temporarily in skips in this area. A municipal removal truck can then collect these skips. Placing an economic value on waste will inspire the formation of an informal waste removal service within the Market and immediate surroundings, and it is probable that tshova push-cart (which is a custom made card on wheels) operators will collect rubbish for delivery from the depot on a return trip to the goods delivery or storage areas proposed. The accessibility of the whole market area to tshova push-cart becomes important and results in an effectively 'self-cleaning' market.

Water (3)

Water has an important function for the building complex and it is proposed that this sector be expanded to control the provision, and payment for the water provided in the market. Water will be sourced from the following two sources:

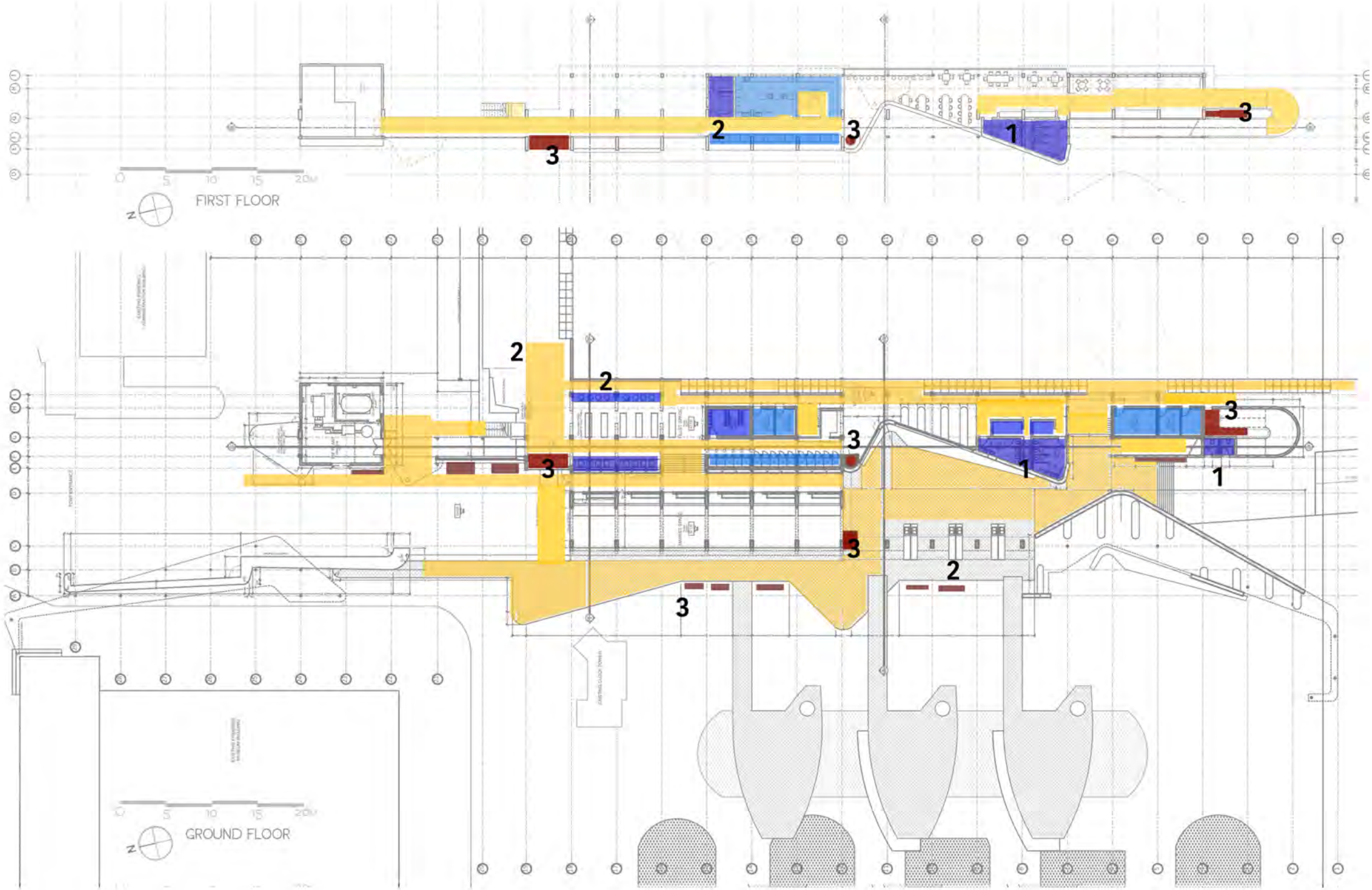
- Rain-water storage
  - stored in water tanks (see plan).
  - Gathered from the roofs, not from the potentially very dirty market areas
  - Used for flushing toilets and urinals
  - Used for sinks

- Municipal water
  - Used in the food sectors
  - Fire Hydrants

Harvested rain water from the roof is used in addition the municipal supply required for ablution and washing facilities throughout the building. Storage tanks occur above the first floor slab as indicated on plan. Most of the water used on the island will consist of collected rainwater and water collected by means of mist harvesting technology. When necessary, a small desalination unit will be used to purify water extracted from the sea. All grey-water will be recycled for further use.

- Ingress of contaminated water into surfaces.

All surfaces (tables, floor, etc) to be impervious. It is proposed that this be a smooth concrete or screeded finish sealed with a cement 'Sika Seal' sealant and with coved skirtings.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10.8 SUSTAINABILITY

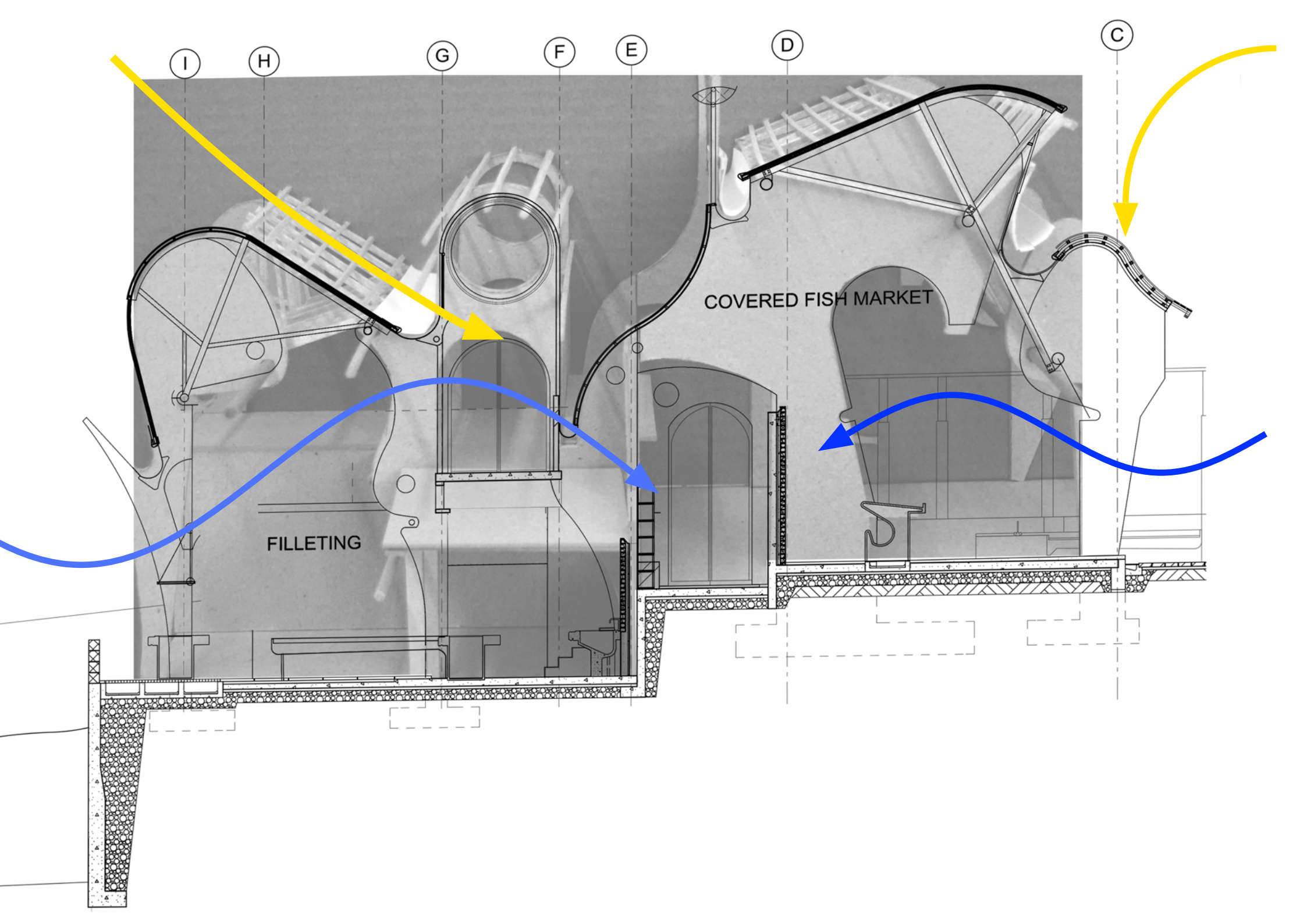
Natural ventilation:

The environmental sustainability of the building is addressed through the:
• Natural ventilation of market spaces. The breezes off the sea can cool the building as no obstructions occur in-between.
• Aeromotive ventilation of ablution facilities.
• Avoiding high embodied energy materials such as Aluminum.
• The use of locally-sourced materials (lowered transportation).
• Rain-water and Raw-water harvesting on site through storage, or hand and solar pumping.
• Use of low-voltage LED solar lighting (Maputo receives a high proportion of full sunlight per day).
• Removal of the use of paint, and VOC producing materials.
• The use of photo-voltaic powered solar pumping to move ground and stored rain water to raised tanks.

In the humid coastal tropical climate of Maputo, the ventilation of this building is crucial. The fairly narrow floor grids are purposely unenclosed to allow for natural cross ventilation. Ceiling heights are high, and double volume in places to increase the ventilation. Openings are minimized, and air exchange is entrusted to an inner patio. The patio, a typical feature of the area, is re-proposed strictly for climatic reasons. Attention to conditions of climate leads most directly to a strongly marked character of building appropriate to the region in which occurs and satisfactory to its inhabitants. Climatic considerations lead to the construction of a heavy concrete structure, which completely defines the building and outdoor spaces, while the upper floor is solved by the use of lightweight timber elements that can quickly disperse the heat accumulated during the day. The structural pattern is mixed, structural concrete wall panels to delimitate interior spaces on the ground floor and are wrapped in a structure of concrete pillars with an external circulation in order to defend the internal space from direct radiation without sacrificing natural light and for waste disposal to be directly removed.

Orientation:

Orientation of the building generally responds to the east west axis, maximizing eastern sun exposure. Western sun penetration is limited through large overhangs and shading devices. The building's orientation further benefits from prevailing winds occurring from the east. Brise Soleil is a shading technique widely used in Maputo. The technique includes a shading screen that prevents high-angle summer sun penetrating the building, at the same time is designed to allow low-angle winter sun to deliver some passive solar heating and is employed on the southeastern facade of the building, facing onto the water.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10.9 FACADES

The geographical location of Maputo provides for two main sun cycle throughout the year. A Common structural pattern usage determines a single depth for the proposal that are then characterized by different choices in section and facade. The restaurant is orientated east-west and has a large seating area on the northern façade. The ventilation is forced by positioning offset openings in the two opposite walls, to create an internal air ventilation. The different coverage and ventilation systems and facade solutions, in addition to the choice of materials, is an important factor to the design.

Durability

Materials must be durable and have a long, maintenance free life-span. No paint is to be used throughout the building, with the exception of the roof sheeting. The closeness of the building to the sea means that steel will rust rapidly and will have to be very well protected against oxidation, or preferably avoided in preference of timber or high grade (316 grade) stainless-steel.

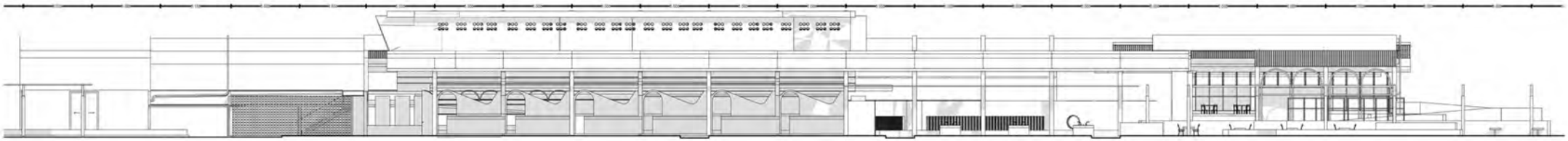
The building's facade:

1. Curtain wall: A timber framed curtain wall. Timber is selected due to it being readily available in the area. This curtain wall comprises openable sections to provide some control over the passive ventilation of the building

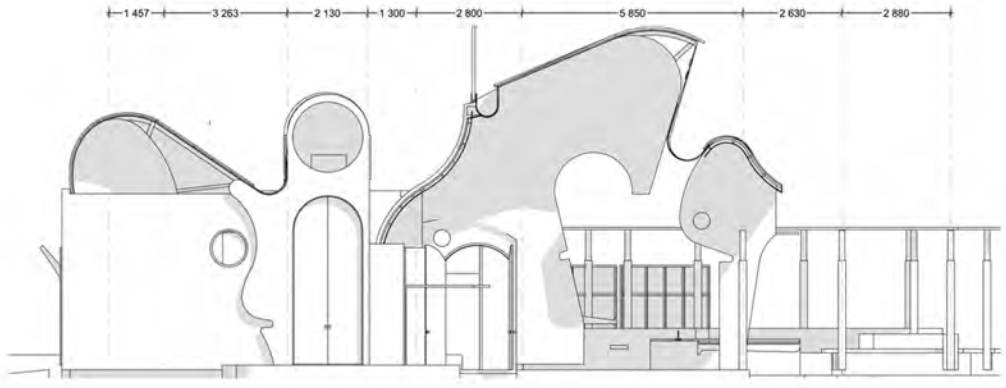
2. Shading Device: Adjustable vertical timber louvres on the northwest and southeast facades allow for thermal sun control. The louvres are installed on the exterior side of the façade and attract represent a minimal heat gain.

Furthermore, usage of mosaic detailing and other artworks throughout the building inspires participation from local artists and craftsmen, instilling a sense of ownership of the building within the local population.

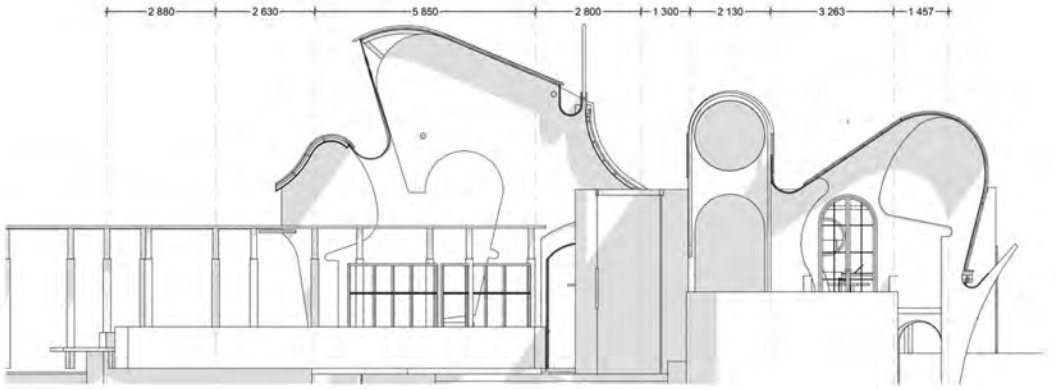
EAST ELEVATION



WEST ELEVATION



NORTH ELEVATION



SOUTH ELEVATION

10.10 LANDSCAPING

External floor finishes:

The street scape of Maputo is made up of concrete cast slabs and small pavers. These external finishes display geometric patterns which reveal shadow lines against the contrasting sharp light quality of the equatorial sun. Two types of floor finishes are used which celebrate the contrast between the horizontal finished surface.

1. Concrete Screeds
2. Geometric patterned pavers

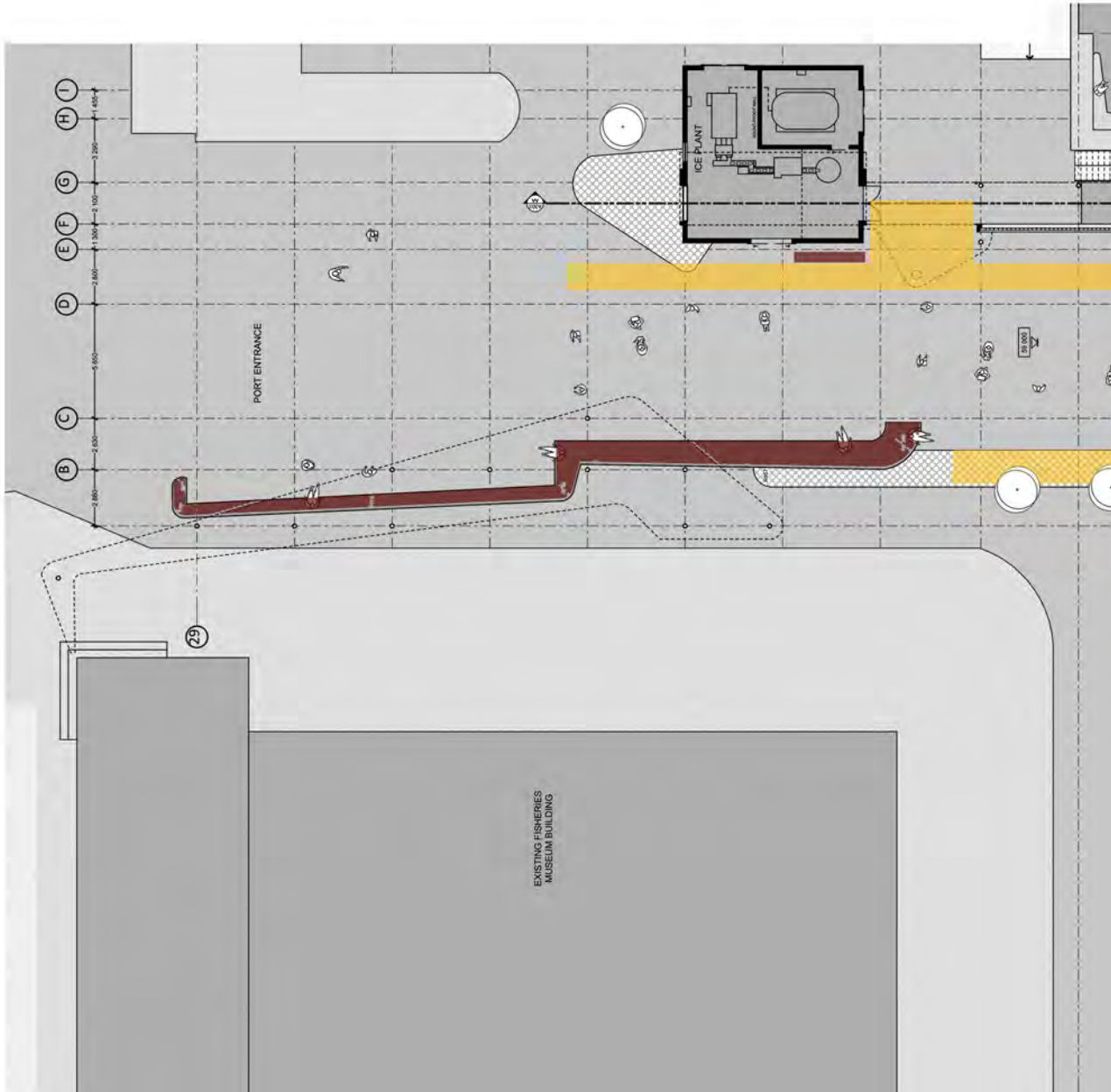
Existing trees vs new trees: The following tree types are indigenous to Maputo and can be found on the city and local waterfronts and will be used on the site:

1. Mozambican Flame Tree
2. Acacia xanthopholea
3. Acacia Tortilis
4. Jacaranda

Urban terracing

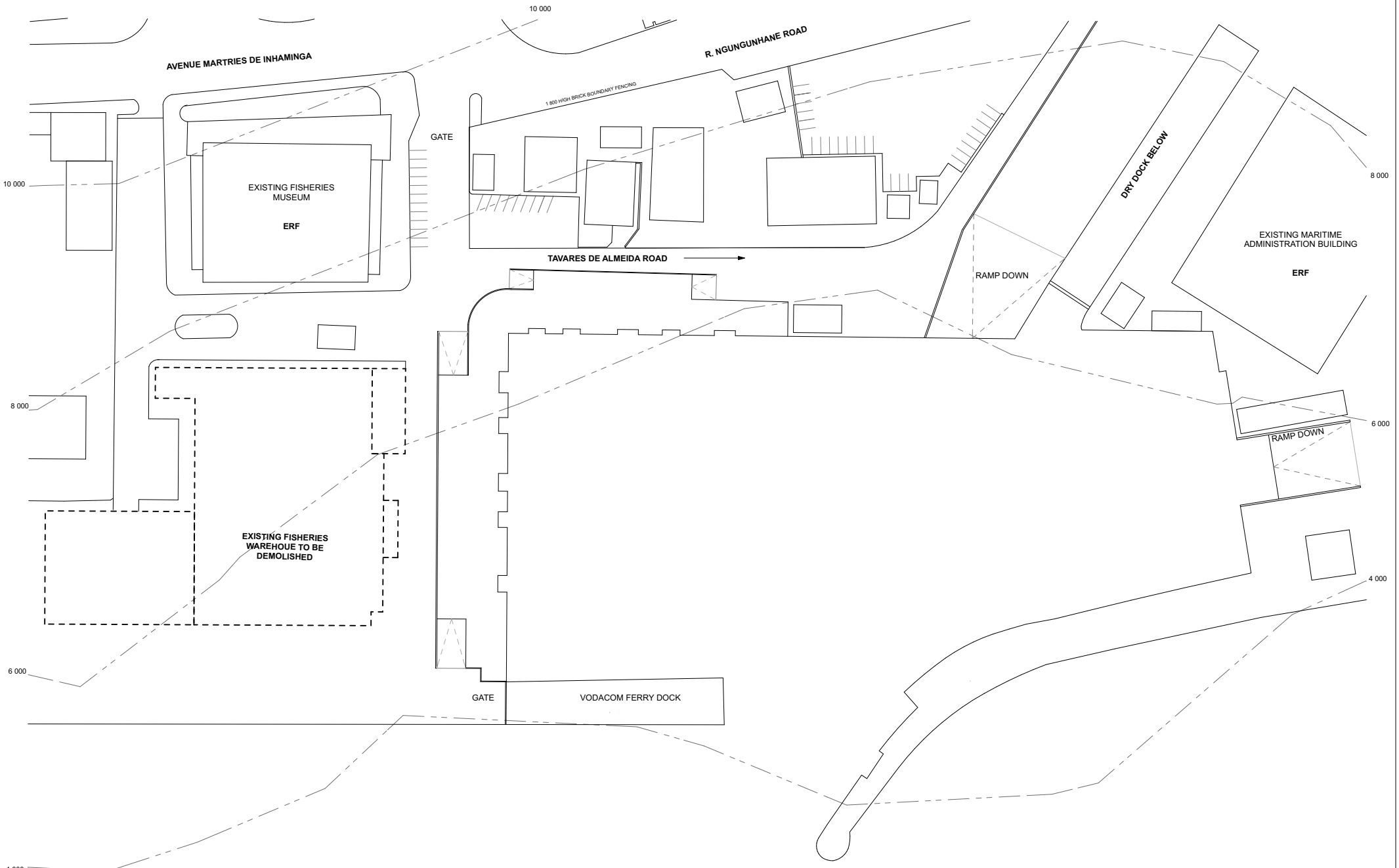
The ground plane endures a series of decrements in altitude as it approaches the ocean. In section, the building form adapts to this principle in its tectonics through a series of segmented terraces. This terracing as well as its translation into the primary concrete structure is demonstrated in section.

Planting is proposed to introduce greenery to a harsh harbour environment. As mentioned earlier, on the northwestern façade, trees of the Acacia species will be planted along the shared park interface with the square. This is in reference to Maputo being informally called the Acacia city and also to the prevalence of the species.



GROUND FLOOR
1:200
N
FILLET SPACE
42.1m²
MARKET SPACE
69.1m²
REFUSE YARD
COLD STORAGE
COLD STORAGE
WASHING & SORTING
COLD STORAGE
COLD STORAGE
COLD STORAGE
1:10 EXISTING CONCRETE RAMP
EXISTING CLOCK TOWER

[11] CONSTRUCTION DOCUMENTATION



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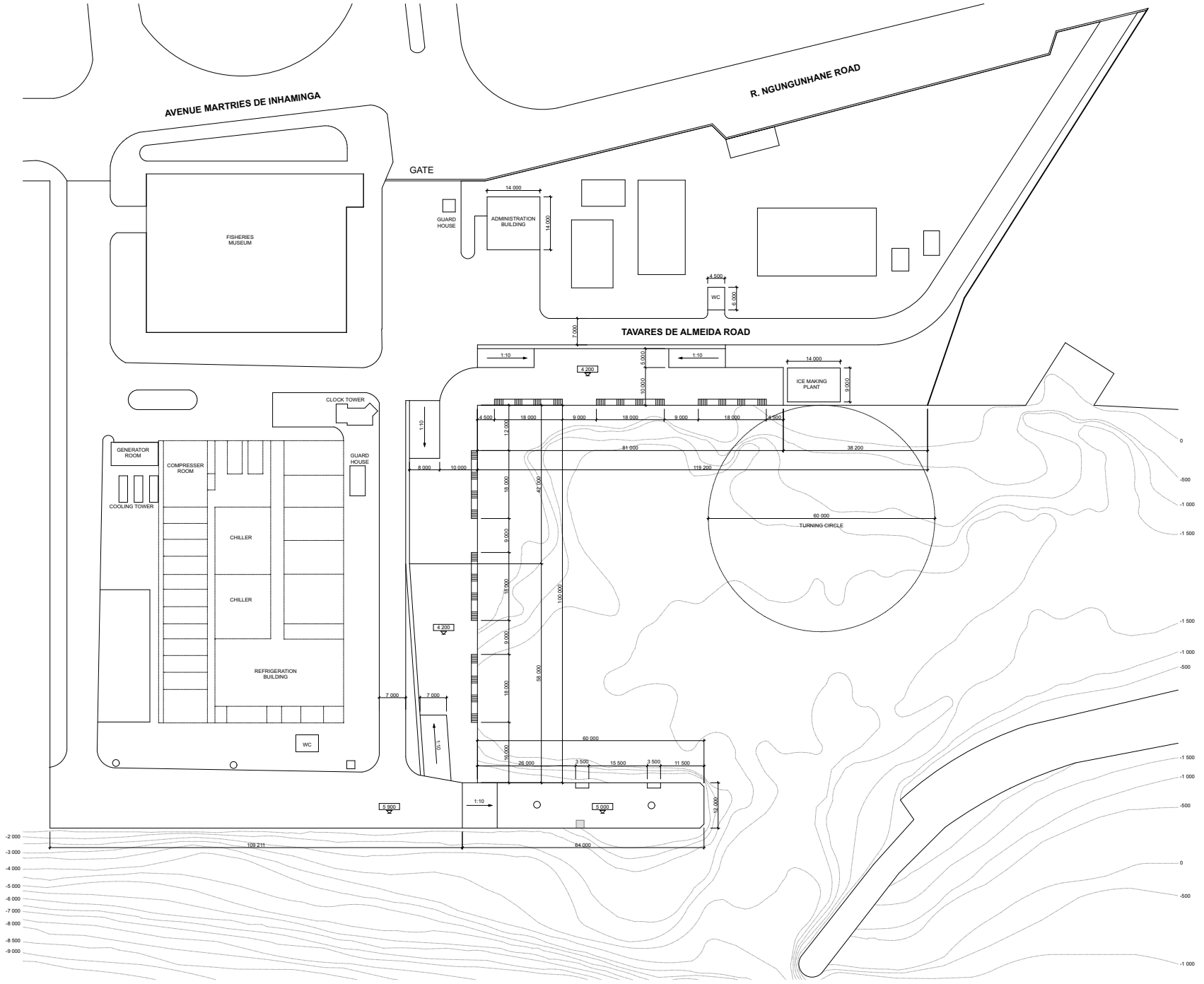
CONS 7908 2019
DEPARTMENT OF ARCHITECTURE
UNIVERSITY OF THE FREE STATE

CONSTRUCTION TECHNICAL DOCUMENTATION

PROJECT: FISH MARKET COMPLEX AND ICE DISTRIBUTION BUILDING	DRAWING TITLE: LOCALITY PLAN	DATE: 29 OCTOBER 2019	SCALE: 1: 500	
		STUDENT NO: 2014038026	DRAWING NO: A100	
LOCATION: **MAPUTO BAY PORT**	BUILDING: **FISH MARKET COMPLEX**	SURNAME: **LINDER-HABER**	NAME: **GABY**	



CONS 7908 2019

DEPARTMENT OF ARCHITECTURE
UNIVERSITY OF THE FREE STATE

PROJECT: TECHNICAL DOCUMENTATION

PROJECT:

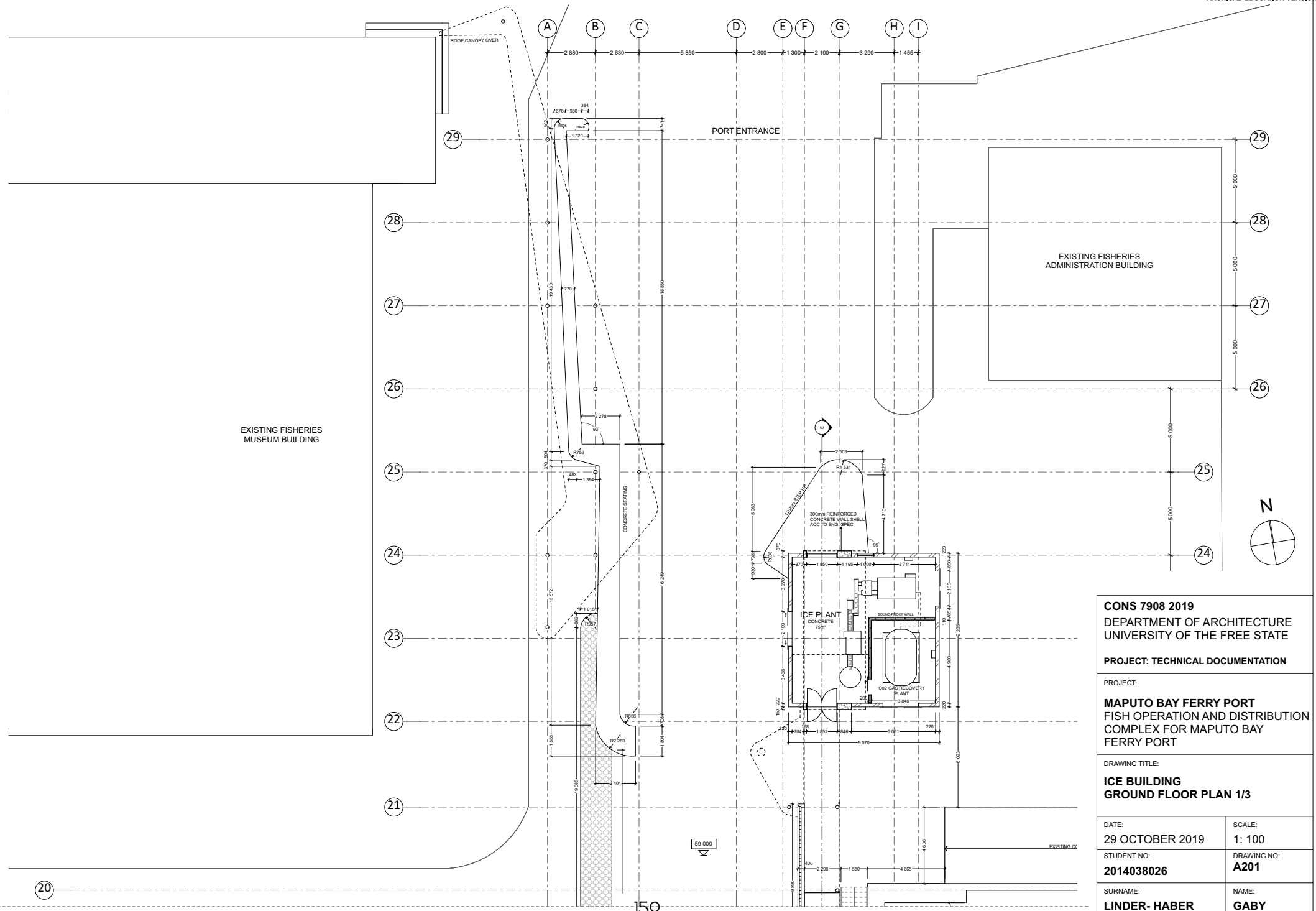
MAPUTO BAY FERRY PORT
FISH MARKET COMPLEX AND ICE BUILDING FOR MAPUTO PORT

DRAWING TITLE:

MAPUTO PORT
SITE PLAN

DATE:	SCALE:
29 OCTOBER 2019	1: 500
STUDENT NO: **2014038026**	DRAWING NO: **A101**
SURNAME: **LINDER- HABER**	NAME: **GABY**

GROUND FLOOR PLAN



CONS 7908 2019
DEPARTMENT OF ARCHITECTURE
UNIVERSITY OF THE FREE STATE

PROJECT: TECHNICAL DOCUMENTATION

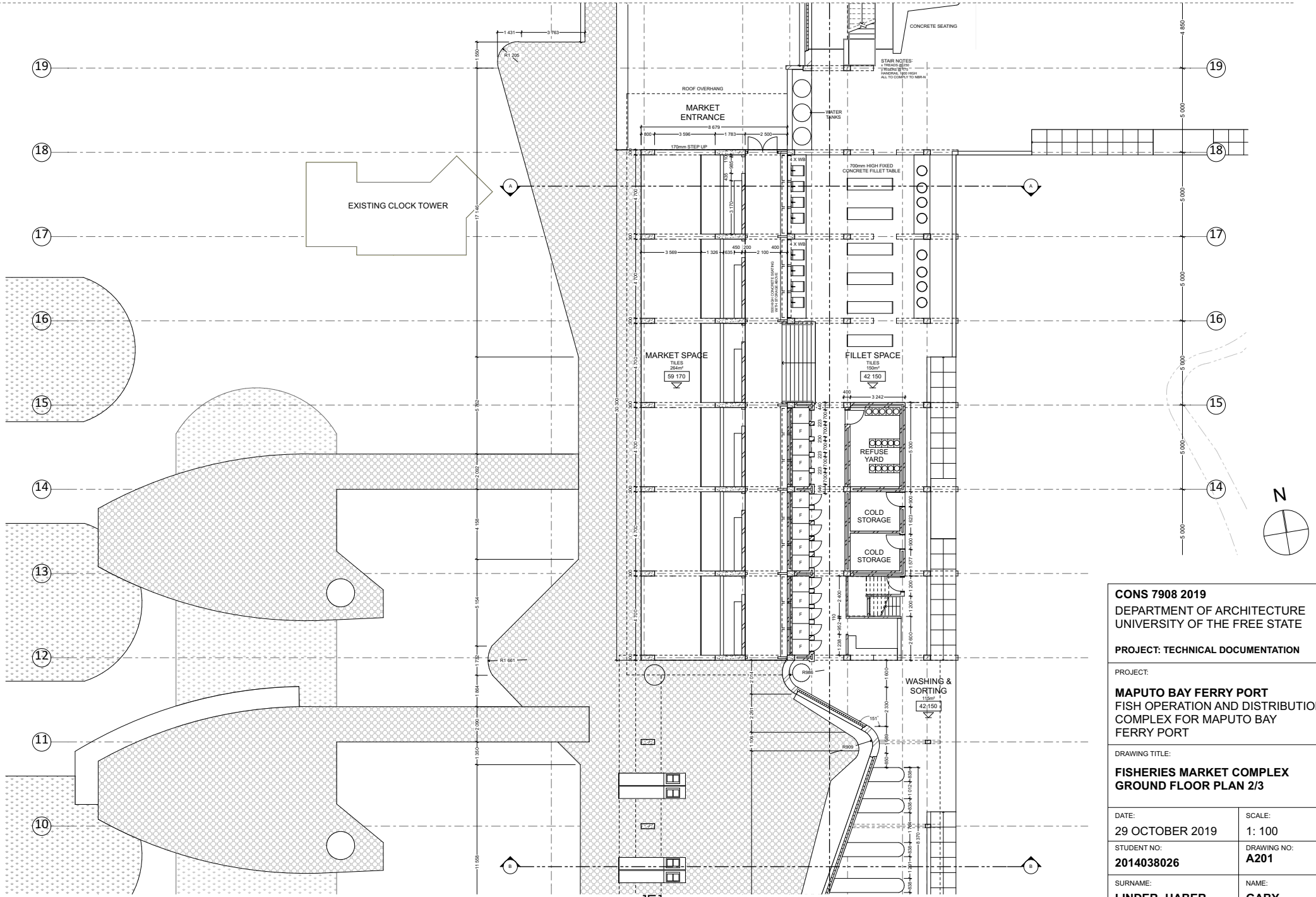
PROJECT:

MAPUTO BAY FERRY PORT
FISH OPERATION AND DISTRIBUTION COMPLEX FOR MAPUTO BAY FERRY PORT

DRAWING TITLE:

ICE BUILDING
GROUND FLOOR PLAN 1/3

DATE:	SCALE:
29 OCTOBER 2019	1: 100
STUDENT NO:	DRAWING NO:
2014038026	**A201**
SURNAME:	NAME:
LINDER- HABER	**GABY**



CONS 7908 2019
DEPARTMENT OF ARCHITECTURE
UNIVERSITY OF THE FREE STATE

PROJECT: TECHNICAL DOCUMENTATION

PROJECT:

MAPUTO BAY FERRY PORT
FISH OPERATION AND DISTRIBUTION COMPLEX FOR MAPUTO BAY FERRY PORT

DRAWING TITLE:

FISHERIES MARKET COMPLEX GROUND FLOOR PLAN 2/3

DATE:	SCALE:
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STUDENT NO:	DRAWING NO:
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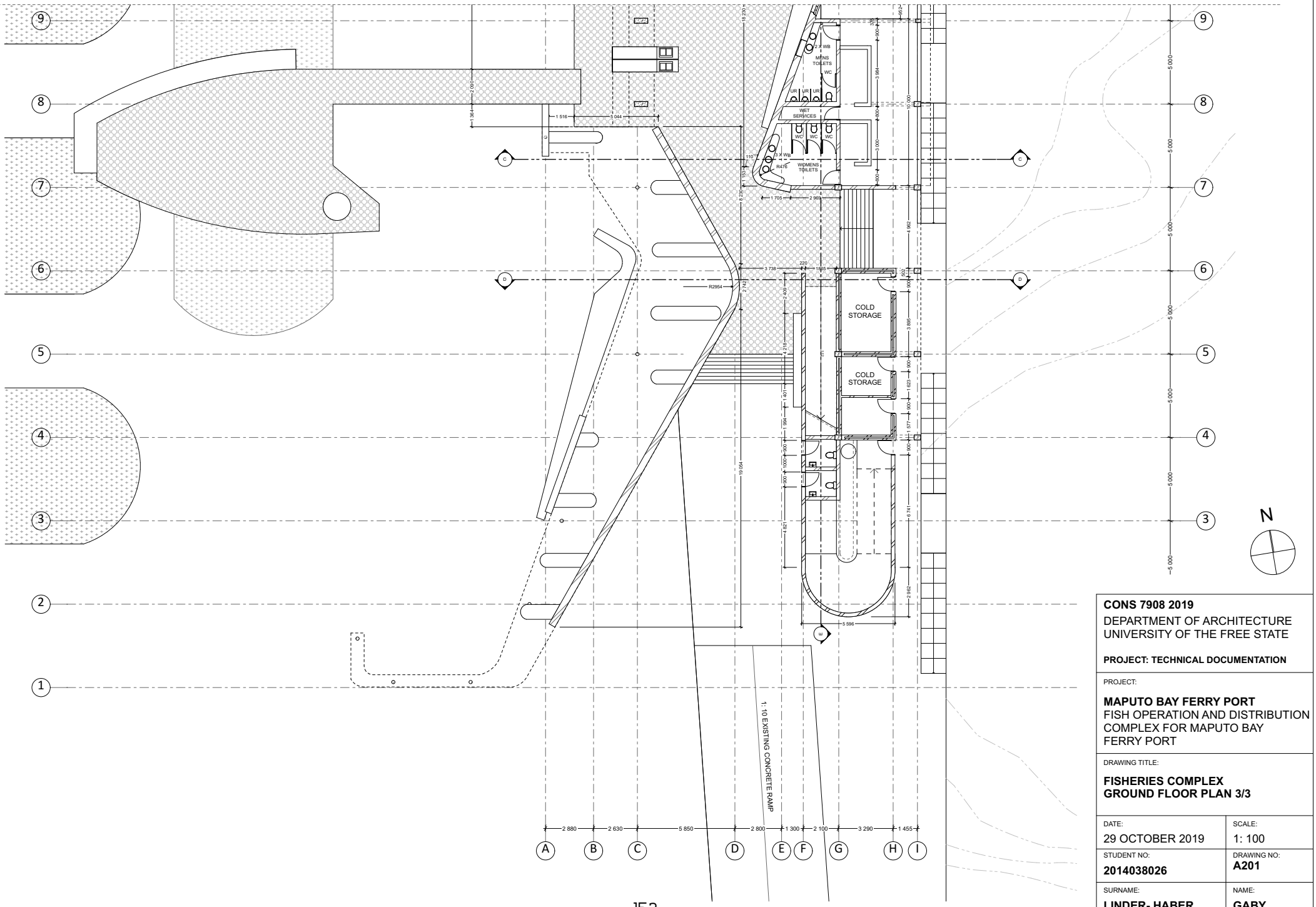
SURNAME:	NAME:
LINDER- HABER	**GABY**



CONS 7908 2019
DEPARTMENT OF ARCHITECTURE
UNIVERSITY OF THE FREE STATE

PROJECT: TECHNICAL DOCUMENTATION

PROJECT:

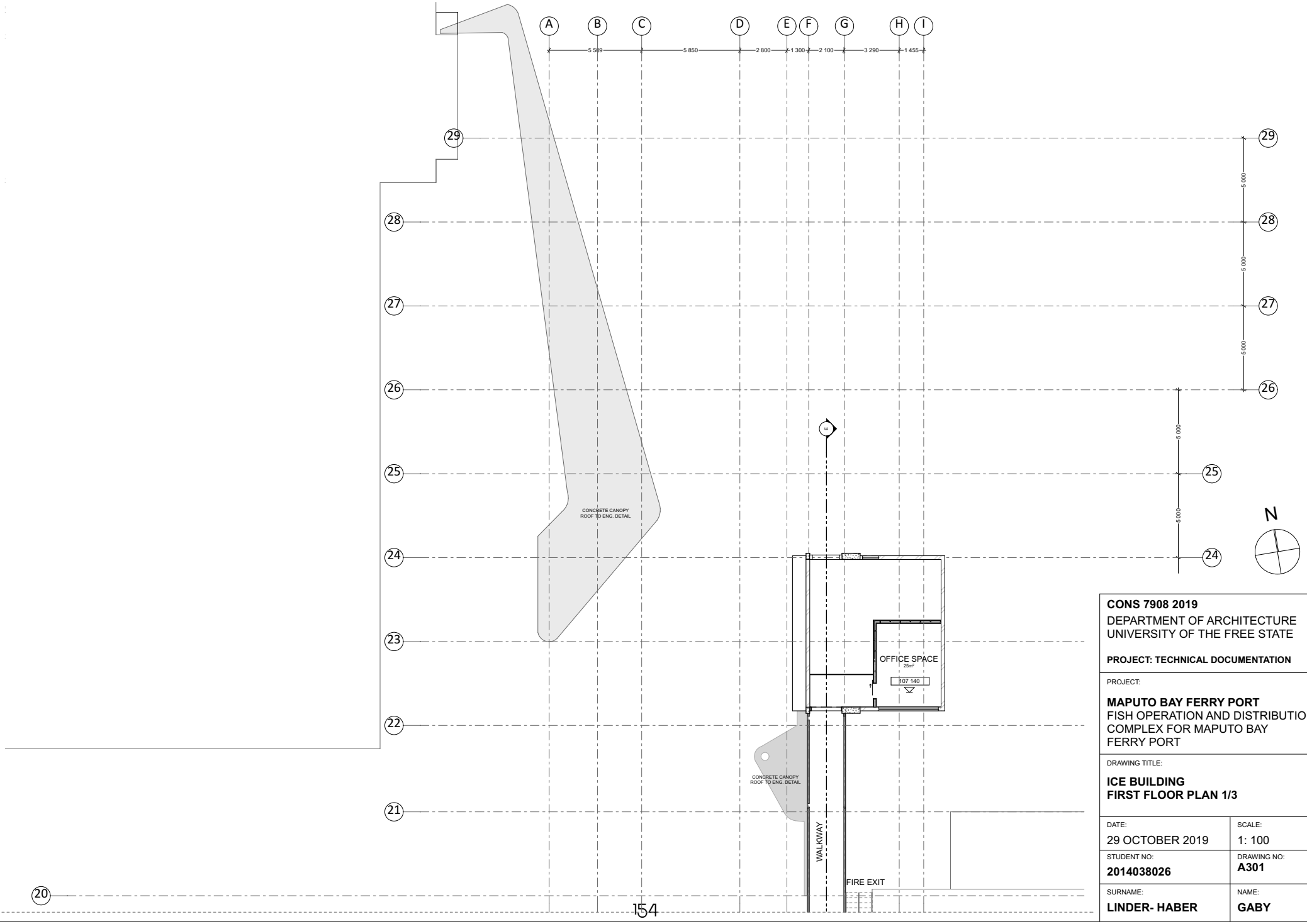
MAPUTO BAY FERRY PORT
FISH OPERATION AND DISTRIBUTION COMPLEX FOR MAPUTO BAY FERRY PORT

DRAWING TITLE:

FISHERIES COMPLEX
GROUND FLOOR PLAN 3/3

DATE:	SCALE:
29 OCTOBER 2019	1: 100
STUDENT NO:	DRAWING NO:
2014038026	**A201**
SURNAME:	NAME:
LINDER- HABER	**GABY**

FIRST FLOOR PLAN



CONS 7908 2019
DEPARTMENT OF ARCHITECTURE
UNIVERSITY OF THE FREE STATE

PROJECT: TECHNICAL DOCUMENTATION

PROJECT:

MAPUTO BAY FERRY PORT
FISH OPERATION AND DISTRIBUTION COMPLEX FOR MAPUTO BAY FERRY PORT

DRAWING TITLE:

ICE BUILDING
FIRST FLOOR PLAN 1/3

DATE:	SCALE:
29 OCTOBER 2019	1: 100
STUDENT NO:	DRAWING NO:
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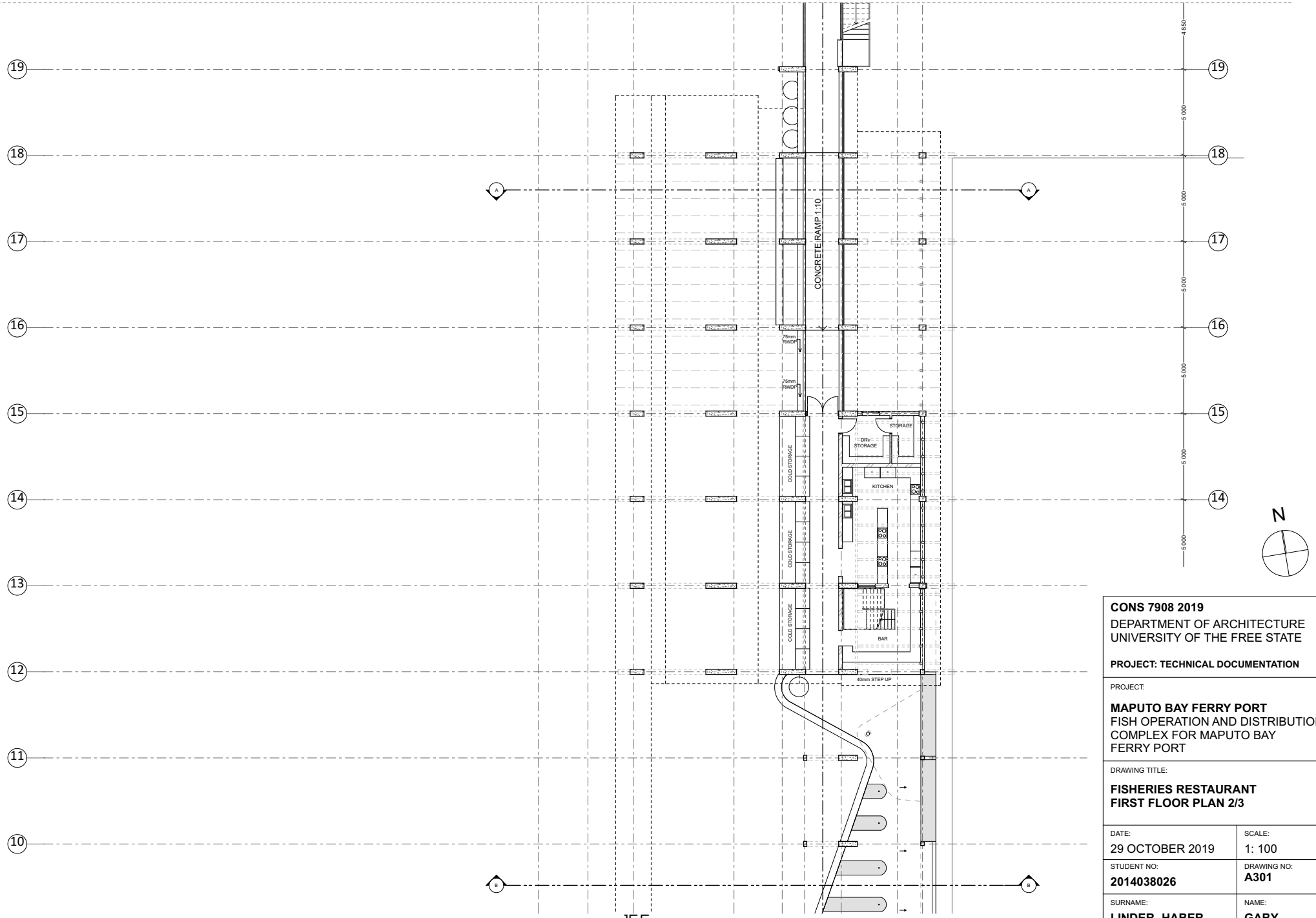
SURNAME:	NAME:
LINDER- HABER	**GABY**



CONS 7908 2019
DEPARTMENT OF ARCHITECTURE
UNIVERSITY OF THE FREE STATE

PROJECT: TECHNICAL DOCUMENTATION

PROJECT:

MAPUTO BAY FERRY PORT
FISH OPERATION AND DISTRIBUTION COMPLEX FOR MAPUTO BAY FERRY PORT

DRAWING TITLE:

FISHERIES RESTAURANT
FIRST FLOOR PLAN 2/3

DATE:	SCALE:
29 OCTOBER 2019	1: 100
STUDENT NO:	DRAWING NO:
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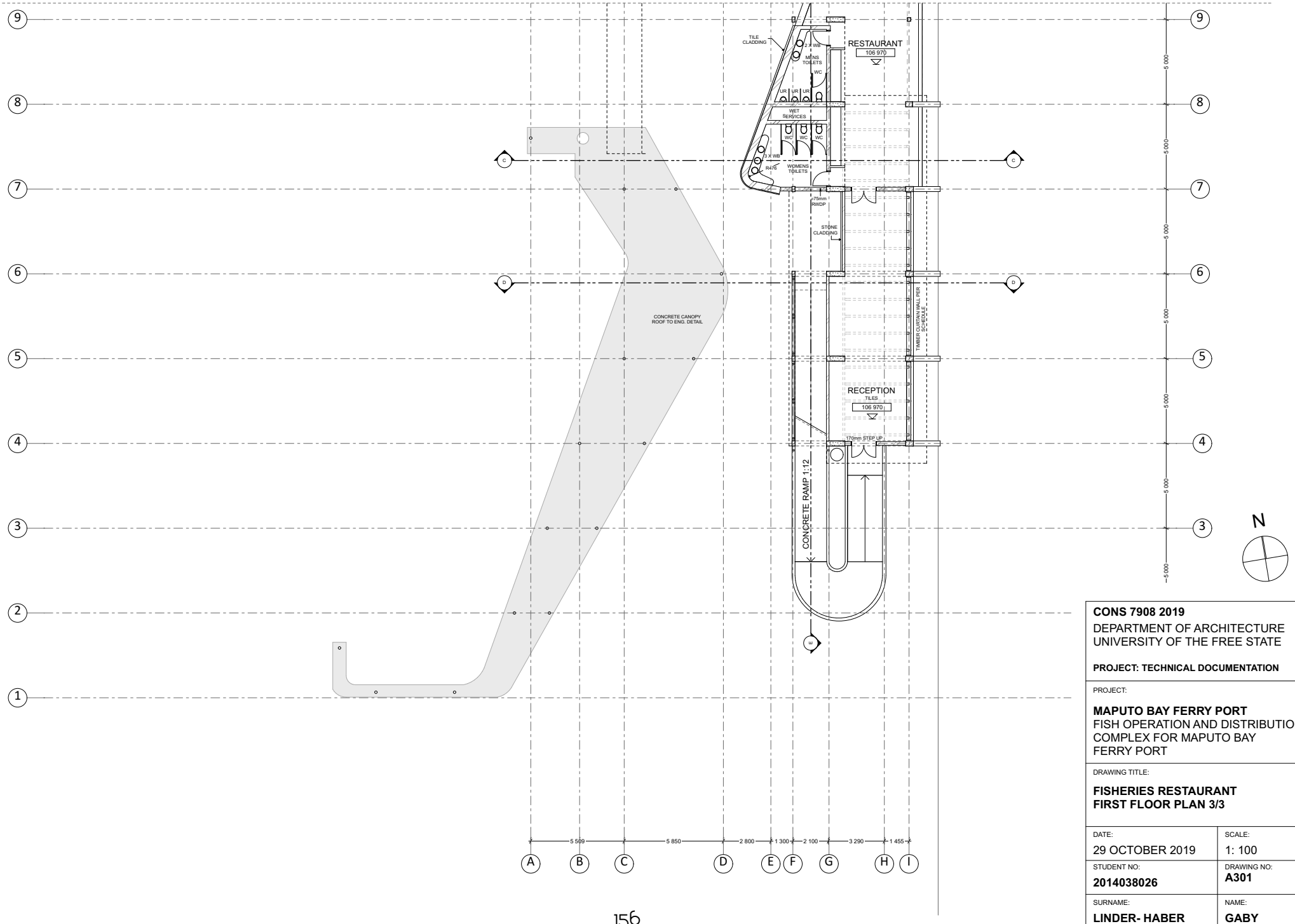
SURNAME:	NAME:
LINDER- HABER	**GABY**



CONS 7908 2019
DEPARTMENT OF ARCHITECTURE
UNIVERSITY OF THE FREE STATE

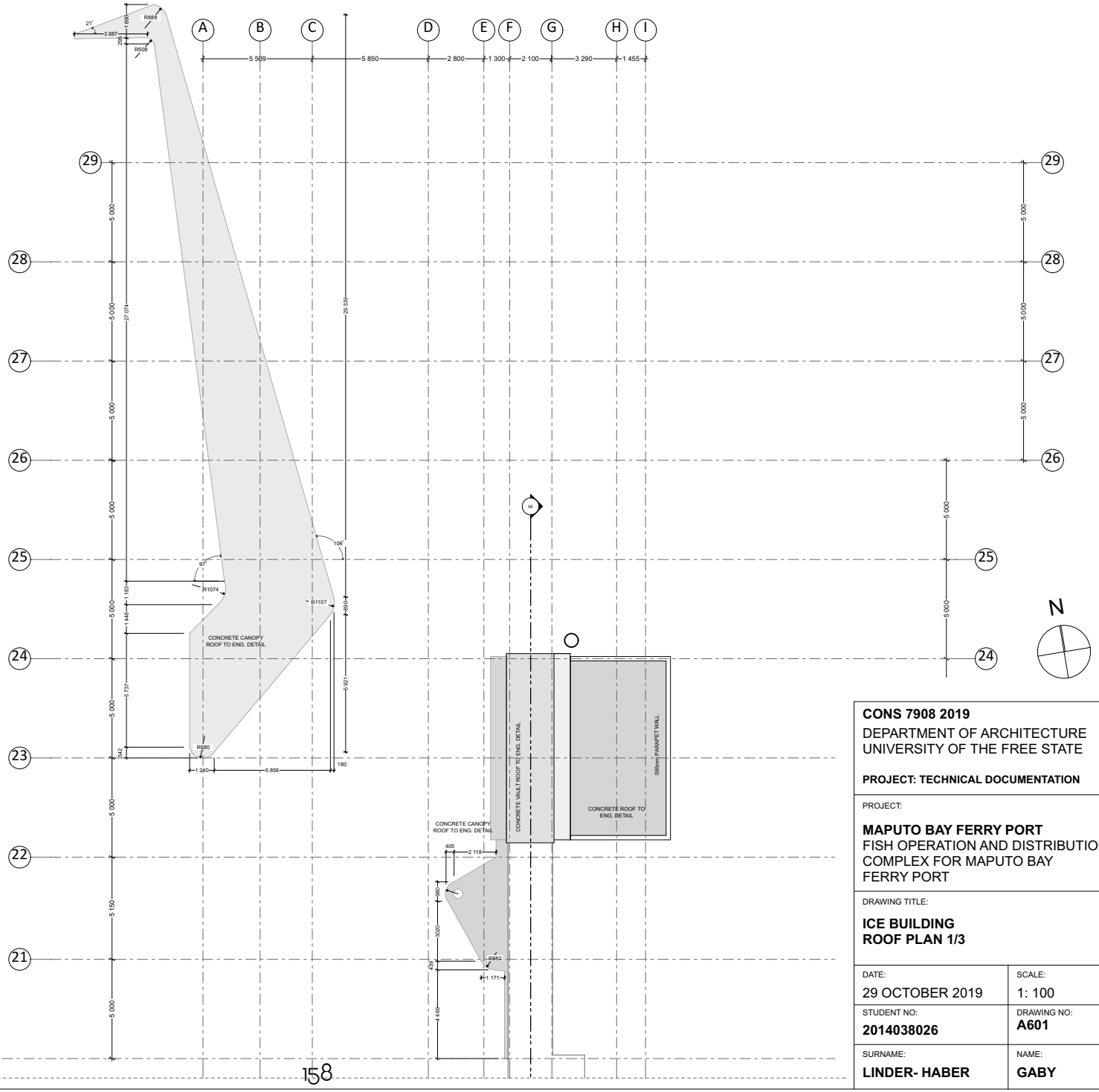
PROJECT: TECHNICAL DOCUMENTATION

PROJECT:
MAPUTO BAY FERRY PORT
FISH OPERATION AND DISTRIBUTION COMPLEX FOR MAPUTO BAY FERRY PORT

DRAWING TITLE:
FISHERIES RESTAURANT
FIRST FLOOR PLAN 3/3

DATE:	SCALE:
29 OCTOBER 2019	1: 100
STUDENT NO:	DRAWING NO:
2014038026	**A301**
SURNAME:	NAME:
LINDER- HABER	**GABY**

ROOF PLAN



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DEPARTMENT OF ARCHITECTURE
UNIVERSITY OF THE FREE STATE

PROJECT: TECHNICAL DOCUMENTATION

PROJECT:

MAPUTO BAY FERRY PORT
FISH OPERATION AND DISTRIBUTION COMPLEX FOR MAPUTO BAY FERRY PORT

DRAWING TITLE:

ICE BUILDING
ROOF PLAN 1/3

DATE:	SCALE:
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STUDENT NO:	DRAWING NO:
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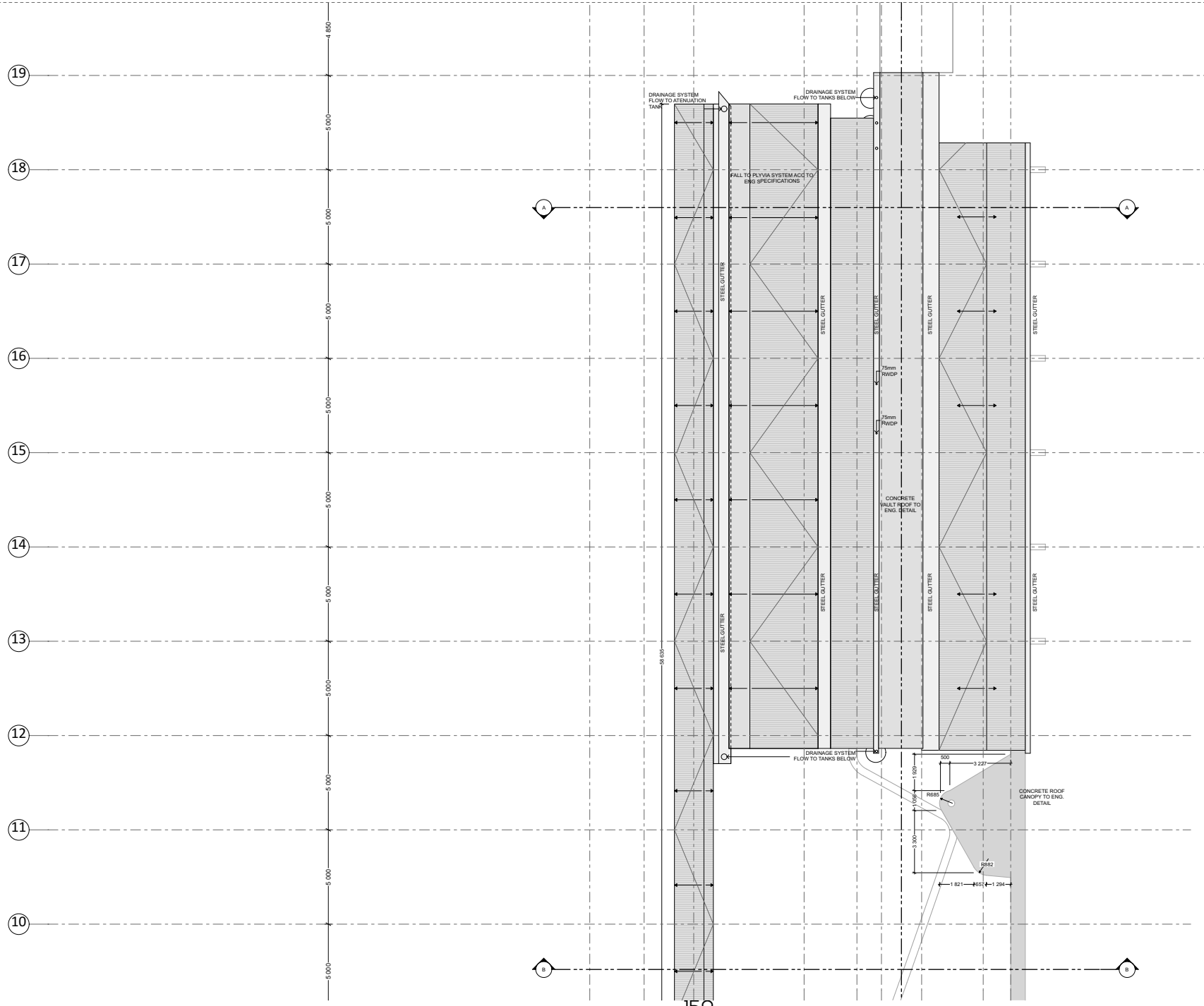
SURNAME:	NAME:
LINDER- HABER	**GABY**



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DEPARTMENT OF ARCHITECTURE
UNIVERSITY OF THE FREE STATE

PROJECT: TECHNICAL DOCUMENTATION

PROJECT:

MAPUTO BAY FERRY PORT
FISH OPERATION AND DISTRIBUTION COMPLEX FOR MAPUTO BAY FERRY PORT

DRAWING TITLE:

FISHERY COMPLEX
ROOF PLAN 2/3

DATE:	SCALE:
29 OCTOBER 2019	1: 100
STUDENT NO:	DRAWING NO:
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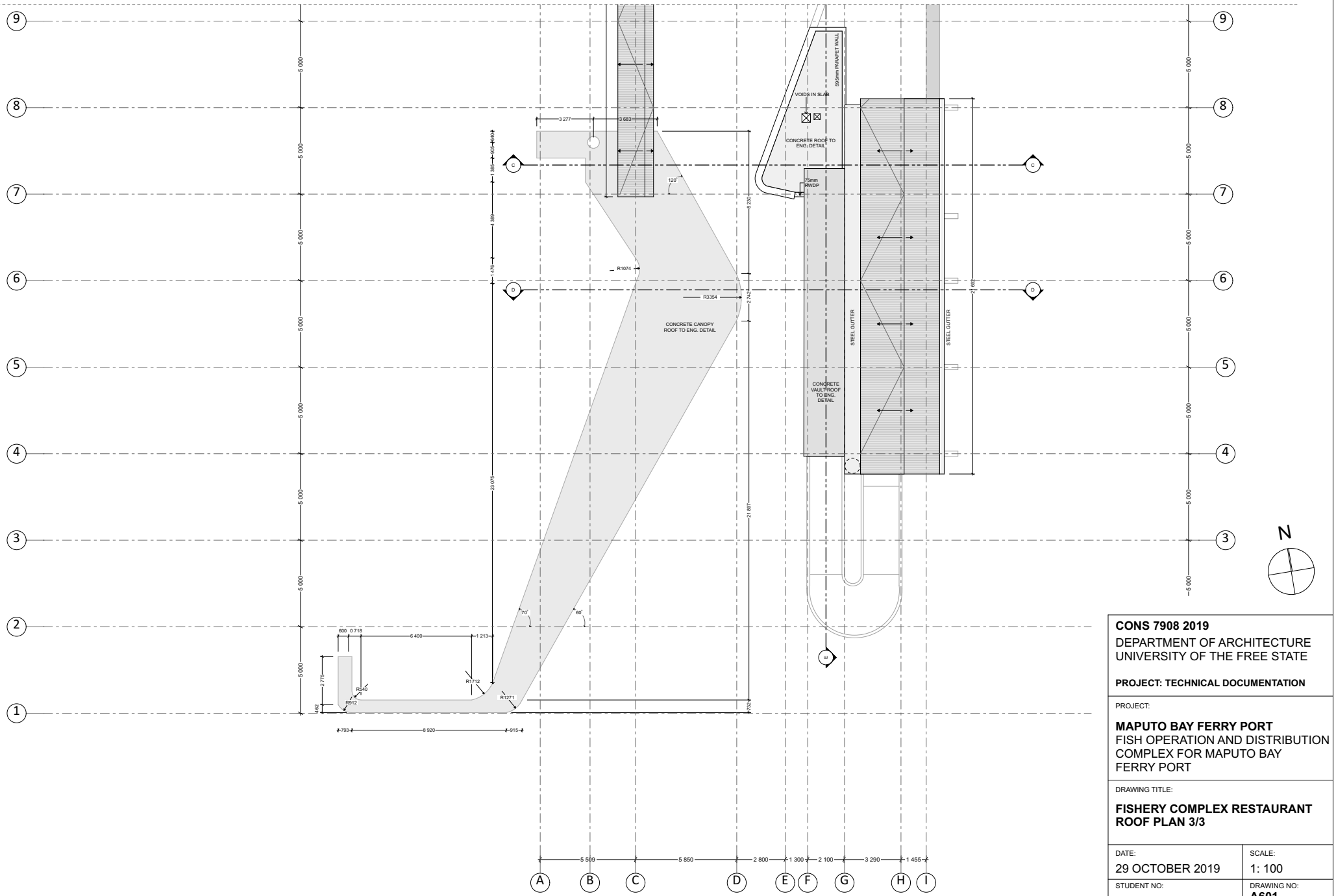
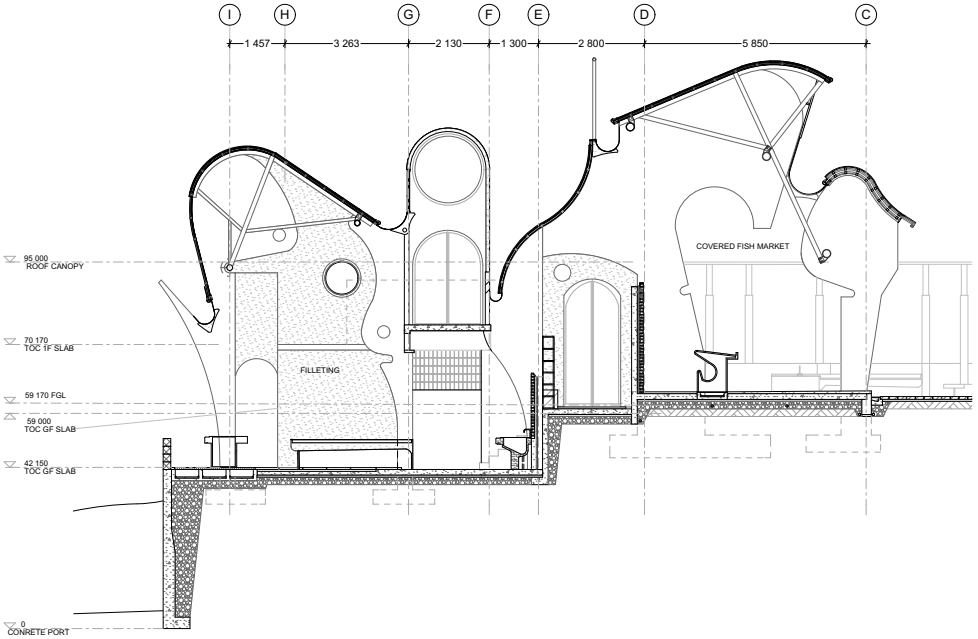
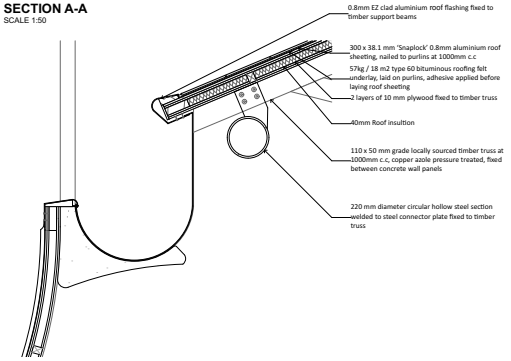
SURNAME:	NAME:
LINDER- HABER	**GABY**



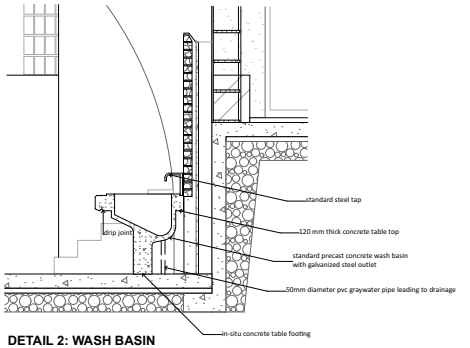
CONS 7908 2019	
DEPARTMENT OF ARCHITECTURE UNIVERSITY OF THE FREE STATE	
PROJECT: TECHNICAL DOCUMENTATION	
PROJECT: **MAPUTO BAY FERRY PORT** FISH OPERATION AND DISTRIBUTION COMPLEX FOR MAPUTO BAY FERRY PORT	
DRAWING TITLE: **FISHERY COMPLEX RESTAURANT ROOF PLAN 3/3**	
DATE: 29 OCTOBER 2019	SCALE: 1: 100
STUDENT NO: **2014038026**	DRAWING NO: **A601**
SURNAME: **LINDER- HABER**	NAME: **GABY**



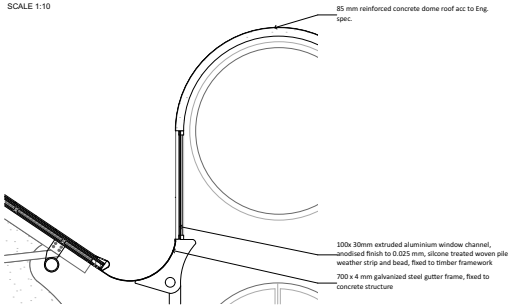
SECTION A-A
SCALE 1:50



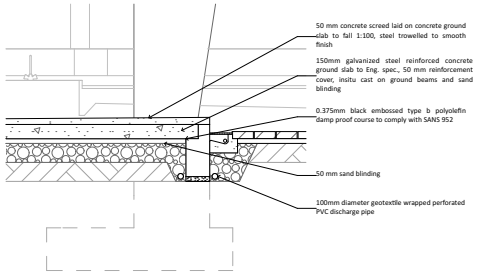
DETAIL 1: ROOF
SCALE 1:10



DETAIL 2: WASH BASIN
SCALE 1:20



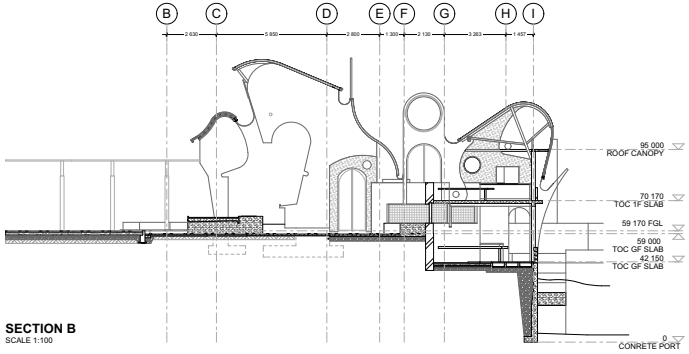
DETAIL 4: WALL SECTION
SCALE 1:20



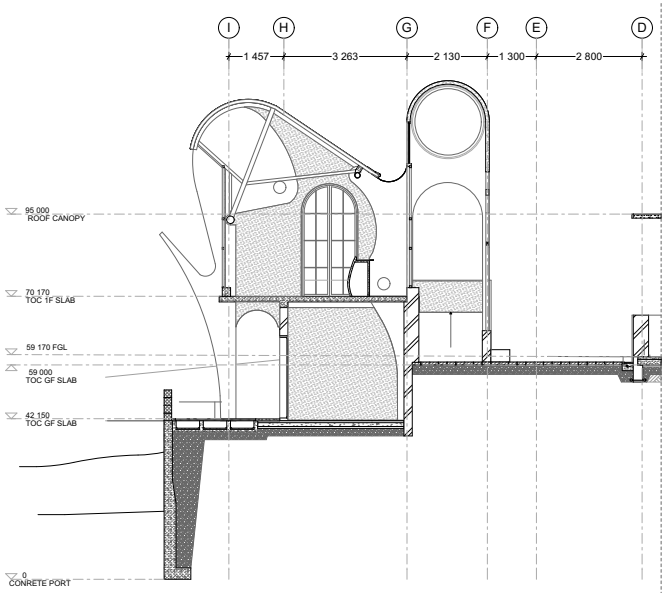
DETAIL 3: DRAINAGE
SCALE 1:20

CONS 7908 2019 DEPARTMENT OF ARCHITECTURE UNIVERSITY OF THE FREE STATE CONSTRUCTION TECHNICAL DOCUMENTATION	PROJECT: FISH MARKET COMPLEX AND ICE DISTRIBUTION BUILDING	DRAWING TITLE: SECTION A DETAILS 1-4	DATE: 29 OCTOBER 2019	SCALE: 1: 50/20/10	
			STUDENT NO: 2014038026	DRAWING NO: A100	
	LOCATION: **MAPUTO BAY PORT**	BUILDING: **FISH MARKET COMPLEX**	SURNAME: **LINDER-HABER**	NAME: **GABY**	

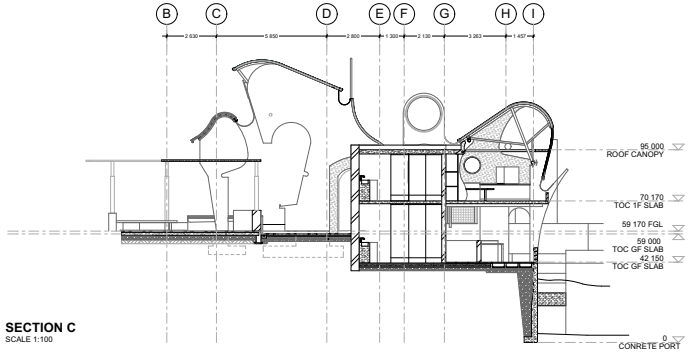
ARCHICAD-EDUCATION-VERSION



SECTION B
SCALE 1:100

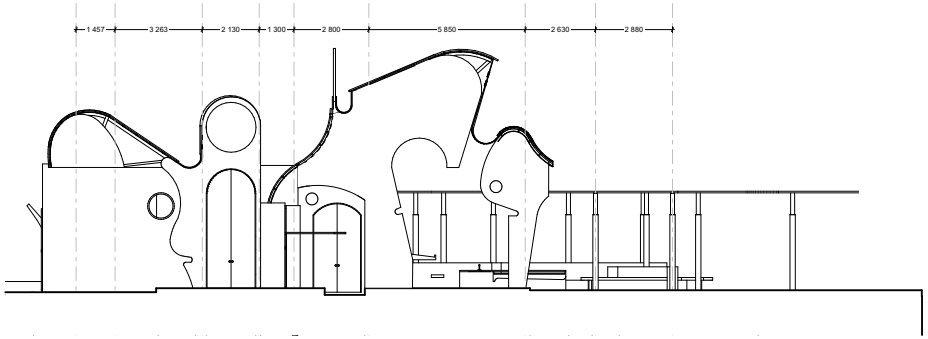


SECTION D
SCALE 1:50

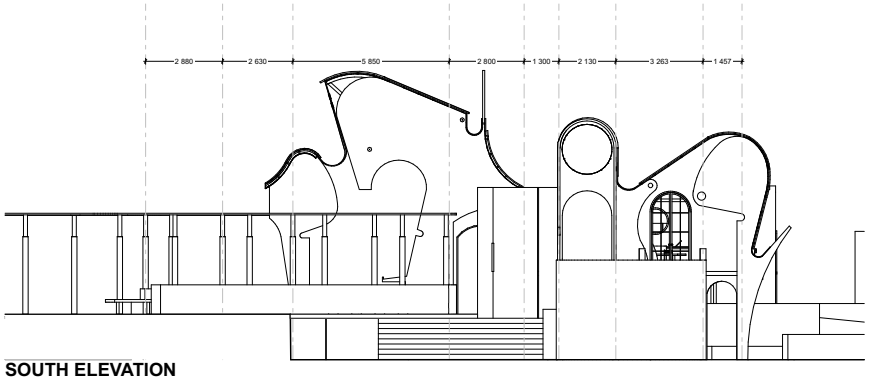


SECTION C
SCALE 1:100

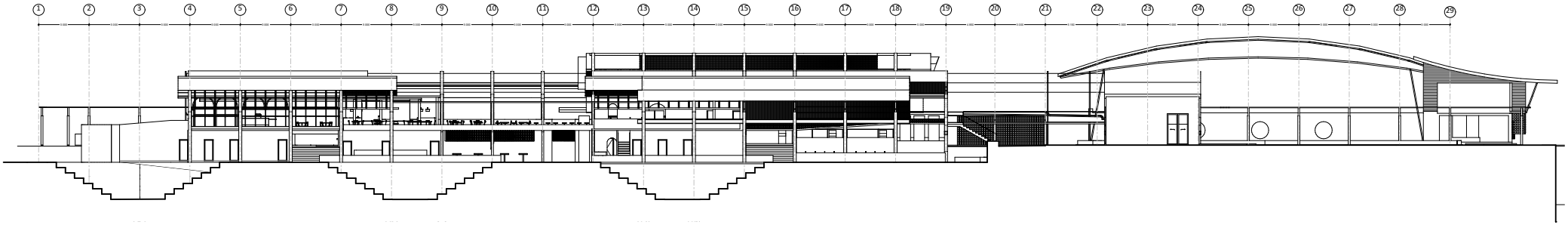
CONS 7908 2019 DEPARTMENT OF ARCHITECTURE UNIVERSITY OF THE FREE STATE CONSTRUCTION TECHNICAL DOCUMENTATION	PROJECT: FISH MARKET COMPLEX AND ICE DISTRIBUTION BUILDING	DRAWING TITLE: SECTION B SECTION C SECTION D	DATE: 29 OCTOBER 2019	SCALE: 1: 100 & 1:50	
			STUDENT NO: 2014038026	DRAWING NO: A100	
	LOCATION: **MAPUTO BAY PORT**	BUILDING: **FISH MARKET COMPLEX**	SURNAME: **LINDER-HABER**	NAME: **GABY**	



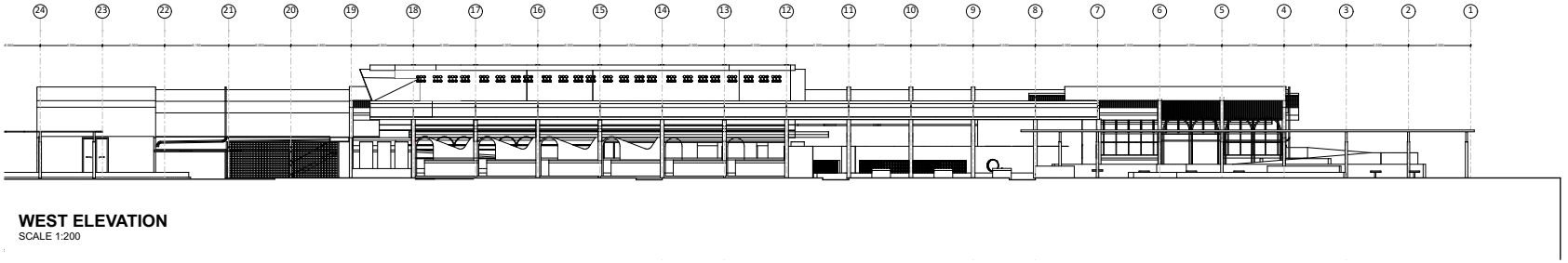
NORTH ELEVATION
SCALE 1:100



SOUTH ELEVATION
SCALE 1:100



EAST ELEVATION
SCALE 1:200

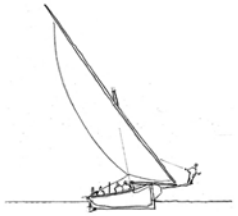


WEST ELEVATION
SCALE 1:200

	CONS 7908 2019 DEPARTMENT OF ARCHITECTURE UNIVERSITY OF THE FREE STATE CONSTRUCTION TECHNICAL DOCUMENTATION	PROJECT: FISH MARKET COMPLEX AND ICE DISTRIBUTION BUILDING	DRAWING TITLE: ELEVATIONS	DATE: 29 OCTOBER 2019	SCALE: 1: 100 & 1:200
				STUDENT NO: 2014038026	DRAWING NO: A200
		LOCATION: **MAPUTO BAY PORT**	BUILDING: **FISH MARKET COMPLEX**	SURNAME: **LINDER-HABER**	NAME: **GABY**

LIST OF FIGURES

Fig. 58. Golden Section: Fish proportions from the book *Geometry of Design*, 2001. Kimberly Elam.
Fig. 59. Golden Section within human proportions from the book *Geometry of Design*, 2001. Kimberly Elam.
Fig. 60. Author's collection
Fig. 61. Author's collection
Fig. 62. Author's collection
Fig. 63. Traditional reed house door, 2013. Blanck.
Fig. 64. Author's collection
Fig. 65. Pancho Guedes art, 1012. Pancho Guedes, viewed on 03 /march 2019, from https://www.architectural-review.com/essays/reputations/pancho-guedes-1925-2015/8628204.article
Fig. 66-70. The Smiling Lion (1954-1955), n.d. Pancho Guedes, viewed of 03 March 2019, from http://www.guedes.info/
Fig. 71-78. Saipal Bakery (1952-1954), n.d. Pancho Guedes, viewed of 03 March 2019, from http://www.guedes.info/
Fig. 79-81. Sagrada Familia Church: building wiith metaphors, n.d. Pancho Guedes, viewed of 03 March 2019, from http://www.guedes.info/
Fig 82. Fisheries Museum ground floor plan, 2006. Jose Forjaz, viewed 03 March 2019, from http://joseforjazarquitectos.com
Fig 83. Author's collection
Fig 84. Section showing the structural system, 2006. Jose Forjaz, viewed 03 March 2019, from http://joseforjazarquitectos.com
Fig 85-86. Fisheries Museum renders, 2006. Jose Forjaz, viewed 03 March 2019, from http://joseforjazarquitectos.com
Fig. 87. Author's collection
Fig. 88. Santa Caterina floor plan, 2014. Metalocus, viewed 25 August 2019, from https://www.metalocus.es/en/news/santa-caterina-market-embt
Fig. 89-92. Santa Caterina photographs, 2005. Alex Gaultier, viewed on 25 August 2019, from http://www.mirallestagliabue.com/project/santa-caterina-market-renovation/
Fig. 93. Floor plan, adapted by author, 2014. Archdaily, viewed on 25 August 2019, from https://www.archdaily.com/539870/ad-classics-olympic-archery-range-enric-miralles-and-carme-pinos
Fig. 94. Axonometric, adapted by author, 2014. Bryce Taylor, viewed on 25 August 2019, from http://cargocollective.com/brycetaylor/filter/Enric-Miralles/Olympic-Archery-Range-Precedent-Study
Fig. 95-96. Section drawngs, 2014. Archdaily, viewed on 25 August 2019, from https://www.archdaily.com/539870/ad-classics-olympic-archery-range-enric-miralles-and-carme-pinos
Fig. 97-98. Photographs, 2014. Dieter Janssen, viewed on 25 August 2019, from https://www.archdaily.com/539870/ad-classics-olympic-archery-range-enric-miralles-and-carme-pinos
Fig. 99-101 Photographs, 2016. Leonardo Finotti, viewed on 25 August 2019, from https://www.archdaily.com/783433/roberto-burle-marx-brazilian-modernist



Technical Investigaton List of Figures

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