

[RE]PRESENTING MOZAMBIQUE

A MOZAMBICAN CONSULATE AND CULTURAL CENTRE IN CAPE TOWN

by

EVANDRO SCHWALBACH

September 2009

University of Cape Town

The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

University of Cape Town

UNIVERSITY OF CAPE TOWN

⟦RE⟧PRESENTING MOZAMBIQUE

A MOZAMBICAN CONSULATE AND CULTURAL CENTRE IN CAPE TOWN

Design Research Project APG5058S

Submitted in partial fulfilment of the requirements for the degree
Master of Architecture (Professional)

by

EVANDRO M. T. SCHWALBACH

September 2009

CONTENTS

06_ **PREFACE**

08_ **INTRODUCTION**
- 09 PROJECT PROPOSAL
- 10 CULTURE
- 12 IDENTITY

14_ **PART I - MOZAMBIQUE**
- 14/15 CHRONOLOGY
- 16 LAND OF CONTRAST
- 18 MOZAMBICAN ARCHITECTURE
- 18 The past
- 21 The present
- 21 The future: The beginning of a manifesto

30_ **PART II - THE COMPLEXITY OF NATIONS**
- 31 HOMI BHABAH - TEMPORAL DIMENSION OF NATIONS
- 36 AMOS RAPOPORT – CULTURAL CONSTANCIES AND FORM

40_ **PART III - [RE]PRESENTING MOZAMBIQUE**
- 41 WAY OF LIFE
- 44 ARTISTIC MANIFESTATIONS
- 44 LANDSCAPE AND SEA
- 44 CULTURAL CONSTANCIES AS METAPHORS
- 52 CONCLUSION

54_ **PART IV - TECHNOLOGICAL INVESTIGATION: CERAMICS**
- 56 CERAMICS IN MOZAMBICAN ARCHITECTURE
- 60 DESIGN OF SURFACES AND PATTERNS
- 66 INTERNATIONAL EXPERIMENTS WITH CERAMICS
- 71 CONCLUSION

72_ PART V - DESIGN PROPOSAL: A MOZAMBICAN CONSULATE AND CULTURAL CENTRE IN CAPE TOWN

73 CAPE TOWN AS CONTEXT
74 SITE SELECTION: SALT RIVER
90 PRECEDENT STUDY
92 PROGRAMME
94 FORM DEVELOPMENT
111 TECHNICAL STUDIES

120_ ADDENDUM

126 BRIEF HISTORY OF CERAMICS
131 ARCHITECTURAL CERAMICS
135 LIMITATIONS OF ARCHITECTURAL CERAMICS

150_GLOSSARY

152_ REFERENCES

PREFACE

To study architecture in a foreign country has many advantages. Among them there is one which is of particular interest for me. Anyone who has studied abroad will understand that I am talking about the ability to be able to look at the differences and similarities of people, culture, climate, and landscape and how this has an affect on one's cultural behaviour and in the making of space. Having said that, I must tell you that I became more interested in the way space is used in Mozambican culture once I came across 'another way' of making architecture which responded to a completely different reality.

It was through great admiration of Pancho Guedes' work, amongst others, that this project developed. Through an uncertain path in the beginning, I finally found my way through to this topic. It comes from a personal concern as a Mozambican regarding the current state and evolution of it's architecture, in a post-colonial era, where the identification of what constitutes Mozambican architecture is a subject of great debate and controversy.

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 [re]present it in a foreign country.
As it developed, mainly through design, I started questioning if nations can in fact be represented, as the project developed a parallel concern regarding the limitations of architecture as a representative tool and the infinity of culture. Due to this fact, the body of this document has been partially altered and in some situations my conclusions have changed.

The project is divided into 3 parts namely: theoretical, technological investigation and design development. Together, they reflect and postulate the interpretation of Mozambican cultural values and its architectural expression through space, programme and materiality.
In the theoretical part, I explored the subject of architecture and identity and the way that cultural identity of nations can be represented, through architecture, within the current context of rapid cultural progression. Furthermore, I questioned how this can be translated into architecture, within the Mozambican scenario, when projecting its image into foreign countries.

The complementary technological investigation focuses on a more material approach to the subject. It is done through an investigation of architectural ceramics, which have been used extensively in Mozambican architecture and have become a modern material for Mozambican cultural expression. An extensive part of this study is very technical and can be found in this document as an addendum.

“We do not have architecture, therefore, but rather, a part of us is architecture. Architecture is a way of being. So when we come to define the true and deeper functions of architecture, we will not be simply describing the production of a certain type of artefact, but explaining one of the original ways in which we know ourselves.”

Chris Abel, 2000

INTRODUCTION

This project is about awakening interest and a sensibility on the subject of cultural identity and its representation in the form of a national culture, within the specific case of Mozambique without falling into the discourse of a nationalistic architectural language. 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 place 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 [my emphasis] is a view that defined the work of many architects of the so called 'the 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. I start this project with the assumption that there is such 'essence' and that this 'essence' is representative of its people's cultural behavior, time and locality. What I propose to take on is the issue of how to represent Mozambique as a nation in Cape Town.

PROJECT PROPOSAL

This project has much to do with the fact that I am dealing with the Mozambican identity in a foreign country, as mentioned above. Having said that, buildings that can better translate my ideas into architecture are Embassies and Consulates. My project proposes a new Mozambican consulate and cultural centre for the city of Cape Town. This building 'typology' was chosen for three main reasons:

>> It provides the opportunity to deal with the issue of how should a building that represents Mozambique be designed in a foreign country and in doing so, it asks the question of how should Mozambique as a nation be represented architecturally?

>> The current consulate does not capture the 'essence' of Mozambique.

>> To re-interpret the role of Consulates and Embassies as Diplomatic buildings.

Based on the above comments and further readings, I have identified two primary authors that deal with this subject: one from an architectural point of view, and the other from a literary point of view. I will show that their arguments work in a complimentary way and represent the main focus of analysis of this topic – they are Homi Bhabha & Amos Rapoport.

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 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). Amos Rapoport

(1969) explores how culture, human behavior, and the physical environment affect house form and the way people use and organize space. As stated before, my interest in these two texts are one of complementarity, rather than comparison. They elevate my discussion into two distinct dimensions:

>> How to look at the modern nation in order to identify forms of cultural identity in times of cultural progression?

>> What to look for in Mozambican culture that can most evidently be used to represent the essence of its culture.

However, to begin to understand this project I will make an attempt to define two of the most difficult words of the present time: culture and identity; and explore their relationship within architecture. Furthermore, I will introduce Mozambique as a nation and will give my insight into it's people and cultural richness, and what I consider to be the value of it's architecture, hoping that this will provide the necessary background for the project.

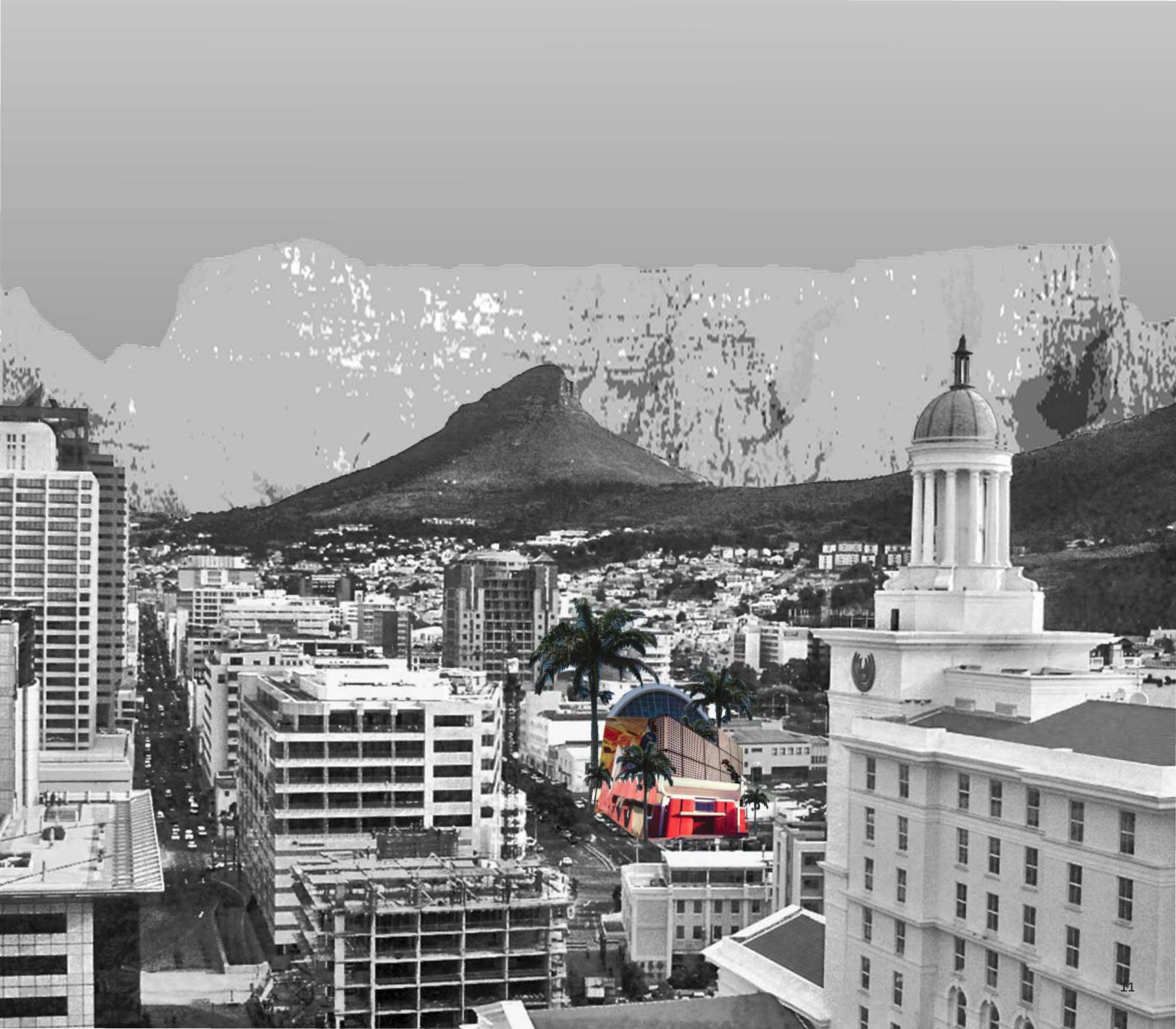
CULTURE

There have been several definitions of culture, differing completely from one another, since the beginning of cultural studies came to the fore. Culture is a term that is inevitably linked to politics, as those in power have always manipulated and enforced a certain culture on those without power (Storey, 1993). However, my interest is not in the political connotations of culture but architectural ones.

Raymond Williams in 1983 suggested that culture has three broad definitions. The first definition refers to culture as something that can be *"used*

'A true traditional culture is a living culture, which accepts new rituals, new traditions, new ways of speaking, and above all, it ensures that it carries on'.

Sopa, 1998



to refer to a general process of intellectual, spiritual, and aesthetic development" (Williams as cited in Storey, 1993, p.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 role 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 what interests me in this study.

IDENTITY

Identity has been a long debated issue amongst Mozambican thinkers as well as amongst thinkers in other post-colonial nations. Mozambican identity, according to Severino Ngoenha (1998), represents an inherited courage and bravery from those who have sacrificed their lives for independence. Moreover, for Macamo (1998) a Mozambican identity means to search in the historical records for specific elements that distinguish Mozambicans from non-Mozambicans.

I wish to distinguish my position from the above ones, as they express a view that identity is related to a restoration of traditional cultures and values, bounded by historicism and a certain exaggerated nationalism. Contrary to that, my concern lies in the need to identify what the manifold reasons that connect Mozambicans together as a nation are (focusing on popular culture rather than historicism), and, most importantly, how they can be expressed in architecture. Furthermore, I want to identity the present cultural elements of significance that I can work with when designing a building that represents Mozambique in a foreign country.

Having said that, I will put forward what I understand to be the most accurate and correct definition of identity:

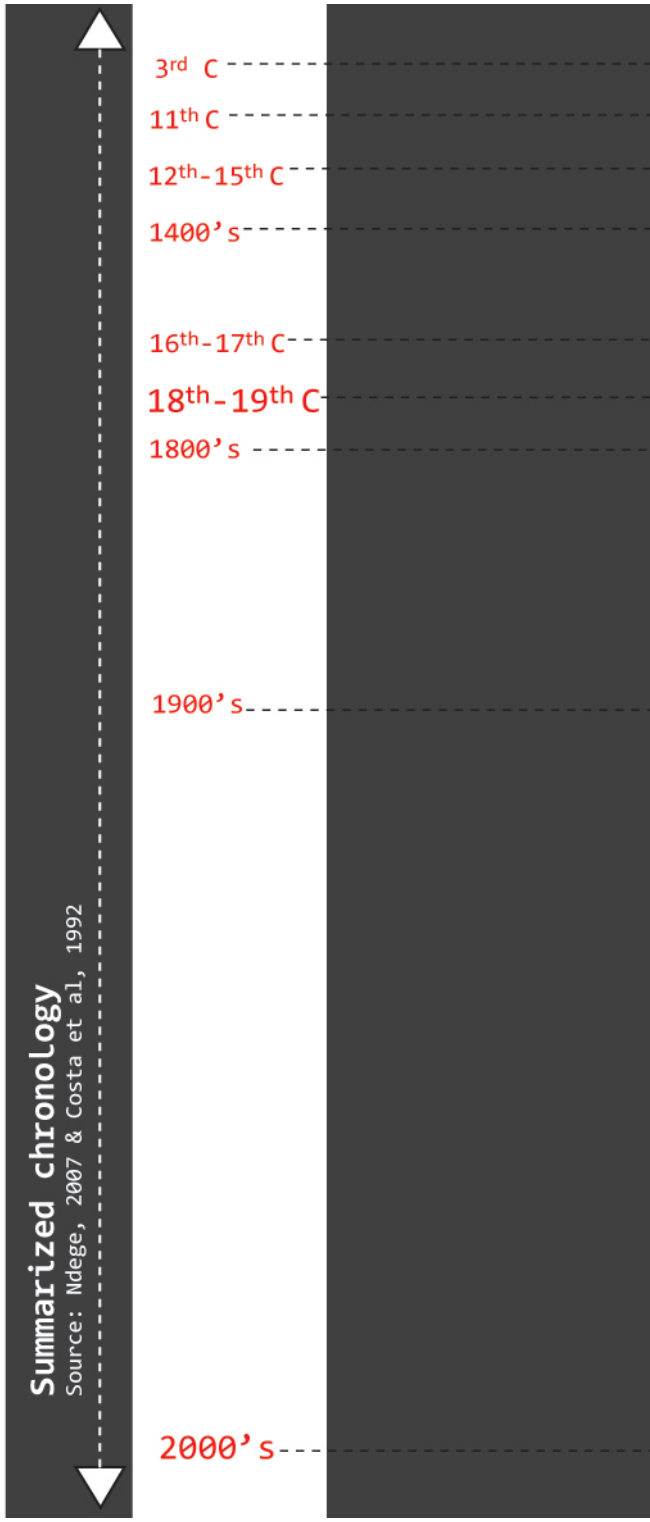
Identity, in the context of this project, is defined as the sense of self of a nation that is constituted by individuals, groups, and societies, who gives expression to both differences and similarities between cultures.

Using ideas derived from Rapoport (1969) and Bhabha (1990) I will show 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.



PART I

MOZAMBIQUE



Bantu-speaking communities move to the Mozambican region from west- central Africa.

Shona Empire develops between Limpopo and Zambezi rivers.

Arab traders dominate the coastal trade between Mozambican coast and Arabia.

1498 Portuguese navigator Vasco da Gama, on his way to India, arrives in Mozambique

1498-1572 Mozambique is administered by the governor general of Goa

Portuguese venture into interior. Colonialists set up trading posts and mining ventures

Mozambique becomes a major slave trading post

1820's Shoshangane, an Nguni warlord from northern Nguni (what is now South Africa) invades Mozambique, and founds the Gaza kingdom

1842 ***Portugal attempts to outlaw slave trade in Mozambique. However, clandestine trade continues***

1878 Portugal leases large parts of Mozambican territory to trading companies

1891 Portugal and Britain define Mozambique's western and southern borders

1895 - 1917 Portuguese pacification wars

1902 Lourenço Marques (now Maputo) becomes the colonial capital

1917 Barué revolt against Portuguese colonial rule

1932 Portugal breaks up trading companies and imposes direct rule over the colony

1950 - 1960's Colonial economy thrives and after WWII, new Portuguese settlers arrive

1962 The Mozambican Liberation Front (FRELIMO) is founded under the leadership of Eduardo Mondlane

1963 FRELIMO's first recruits go to Algeria for military training.

1964 War of independence begins

1969 Eduardo Mondlane is assassinated and Samora Machel succeeds him

1974 Portugal and Mozambique sign an accord in Lusaka, Zambia, which establishes A transitional government

1975 Mozambique obtains independence

1976 Anti-FRELIMO resistance group (RENAMO) is created by Mozambican rebels, apartheid South Africa, and the south Rhodesian regime

1977 Mozambique under President Samora Machel adopts Marxist-Leninist doctrine

1984 President Samora Machel and P.W. Botha sign Nkomati accord, which prevents South Africa from invading Mozambique

1986 President S. Machel dies in mysterious airplane crash. J. Chissano succeeds him

1989 Frelimo abandons Marxist-Leninist ideology and adopts political and economical reforms

1990 New constitution allows for multiparty elections and free market economy

1992 Accord peace between Mozambican government and Renamo is signed putting an end to civil war

1994 First national election held in December – President Chissano wins

1995 Mozambique becomes a Commonwealth member and sets up a strategic program and policy to combat poverty

1999 Chissano defeats Renamo's Dhaklama in Presidential elections

2005 Armando Guebuza replaces Joaquim Chissano as President

The independence of Mozambique was regarded as the starting point towards a definition of what constituted its national cultural identity. Mozambique was no longer under the dictatorship of the Portuguese colony, but it had inherited great parts of it's history, values, and culture. The local liberation force used this inherited culture alongside the Marxist-Leninist political doctrine to create a unified nation in which development was its great common goal.

The anxiety experienced at the time invoked a stimulus plan towards the reconstruction of it's national identity. This propelled cultural festivals and manifestations along with the collection of available material that would start to compose a historical interpretation of Mozambique's culture. It also stimulated development and implementation of a new national education curriculum. The first national festivals to be organized were the '*Festival Nacional de Canto e Dança popular*' (the National Festival of Popular Dance and Song) and the '*Festival Nacional da Canção e Música Tradicional*' (National Festival of Traditional Music and Song). Oral literature and the collective memory of the liberation struggle posited great importance in establishing a common national culture connected to the past and historicism, which is still alive today.

THE LAND OF CONTRASTS

Mozambique is a land of diversity and contrasts, with a population around 21 million people. Beaches, mountains, sky, green, and sunshine produce incommensurable natural beauty. Beauty in Mozambique comes laden with opportunity, which has been the source of inspiration for many great artists. With a total of 25 rivers, Mozambique has vast fertile lands conducive to agriculture and its coastline a source of immense touristic attractions. The climate varies from subtropical





















(south) to tropical (north) creating an exciting atmosphere for outdoor activities, which dominates the life style of Mozambicans.
The country is also well known for producing quality literature and for standing out in fields of fine arts and sculpture. Artistic creations in Mozambique forms a great part of its cultural value. Mozambicans are known for their hospitality and warmth, which visitors do not forget.

In architecture, Mozambique is the holder of a remarkable collection of colonial, modern and art-deco buildings. There is also a great dichotomy between the cement city (urbanity) and the reed city (informal settlements).

United by one language – Portuguese - Mozambique is an amalgam of people from 16 ethnic groups and several traditional languages of Bantu origin (Ndege, 2007). Its historical records enlighten us about migrations of different people who have come to settle there - Arabs, Indians, Persians, Swahili, and Portuguese. The Portuguese arrived in the 15th century and colonized the country until 1975 – their cultural influences are still noticeable today.

Despite being a multi-cultural and multi-ethnic country, Mozambique has managed to produce a strong sense of nationhood through the transformation of the inherited structures and values of the Portuguese as an element of national unity (Ngoenha, 1998).

MOZAMBICAN ARCHITECTURE

‘(…) 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’
(Conceded Memory- personal translation)

Opposite: Maputo coastline

Rui Knopfli in this poem pays homage to the beautiful city of Maputo, (the Capital city of Mozambique) where the contrast between the rigid geometry of the city layout and the more organic nature of the coastline that forms the Delagoa Bay can be seen in harmony. This harmony hovers over Mozambican cities and architecture, inspiring artists such as Knopfli to write about it. It is indeed this harmony that has the power to make us forget, for a few moments, that a great part of Mozambican architecture was built by colonial architects in a ‘Portuguese way’, for it feels so local and contextual as if it could not have been done in any other way.
To speak of Mozambican architecture and its value is to acknowledge that there was an architectural evolution after independence but also that the inherited Portuguese architecture carried certain characteristics which represent the inevitability of cultural exchange.

The past

Most of the modern architectural heritage was the product of the periods between the 1950’s - 1970’s, when Portugal adopted a neutral position during the World War II, a decision that resulted in its privileged economical position at the end of the war. These circumstances, together with the revision of the Portuguese constitution in 1951 under the Salazar fascist regime - which 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. A new stylistic freedom emerged with a creative rendering of modern architecture of the era in a compositional combination of local milieus, giving birth to a



new emblematic architecture, which cultivated innovation and progress. This new modern architecture was so well received that it made its way progressively throughout Mozambique and many other African colonies such as Guinea-Bissau and Angola, 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 stands out. Pancho was one of the leading figures in establishing an architectural identity for Mozambique. His architecture is still, today, the focus of discussions amongst architects and students in architectural schools. His work reflected a personal position in relation to western architectural principles, demonstrating an amazing capacity of absorbing and transmitting the local dynamics.

‘’…Pancho Guedes stands out with great vivacity for its enormous scope and an almost bewildering diversity, linking a set of diverse features such as Tradition, modern, local, art nouveau, Dadaism and cubism.” (Santiago, 2007, p.35)

This is what makes Pancho Guedes’ work so interesting. Some of his best 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. As Gadanho puts it:

“He welcomed the symbolic and ritualistic dimension of material culture, along with the animism of surfaces and form.” (Gadanho 2003, p.6)

However, Pancho was not the only leading figure in architecture at the time. In fact, before him there were a number of architects working in the same environment drawing great influences from the notorious ‘International Style’ together with Brazilian architecture due to it’s close affinity to Portugal, and climatic similarities. Amongst these architects, the distinguished ones include Francisco Castro, Alberto Soeiro, João José Tinoco and his wife Maria Carlota Quintanilha, João Garido do Carmo, Paulo Sampaio, Fernando Mesquita, Craveiro Lopes, Bernadino Vareta Ramalhete, Marco Miranda Guedes, Mário Jorge, Julião Azevedo and Carlos Ivo (Santiago, 2007).

The present

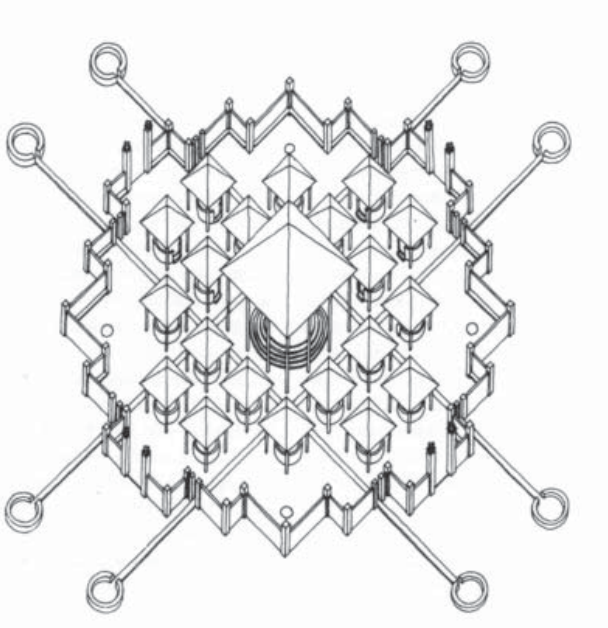
The years succeeding independence were marked by a great architectural depression. The civil war left it's print in the urban space and contributed towards the impoverishment of the country, thus contributing towards the architectural depression that characterized that period. After independence in 1975, few architects believed in a new Mozambique and thus saw an opportunity to practice architecture of great social meaning. 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. Amongst these few architects, José Forjaz stands out. Residing and practicing architecture in Swaziland before independence, he returned to Mozambique and assumed the responsibilities of the time - to search for a new architecture which contributed to the dichotomies between the 'reed' and 'cement' city, and responded to local limitations in terms of climate and resources.

As The Mozambican economy began to pick up and thrive after the civil war which ended in 1992 and it's political stability gained recognition around the World, many foreign investors believed in its reconstruction, thereby allowing the country the opportunity of upliftment. This is perhaps happening too quickly, without the necessary infrastructure to support this rapid growth. Now, Mozambican architecture is on the verge of submitting itself to an erosion of its unique cultural identity. An indicator of this is the incursion of alien buildings in the form of shopping centers, closed *'south African-like'* condominiums, and *'Chinese styled'* architecture, beginning to appear as prominent features of the current built environment. This is one of the characteristic of the pluralist modern nation as Homi Bhaba (1990) suggests.

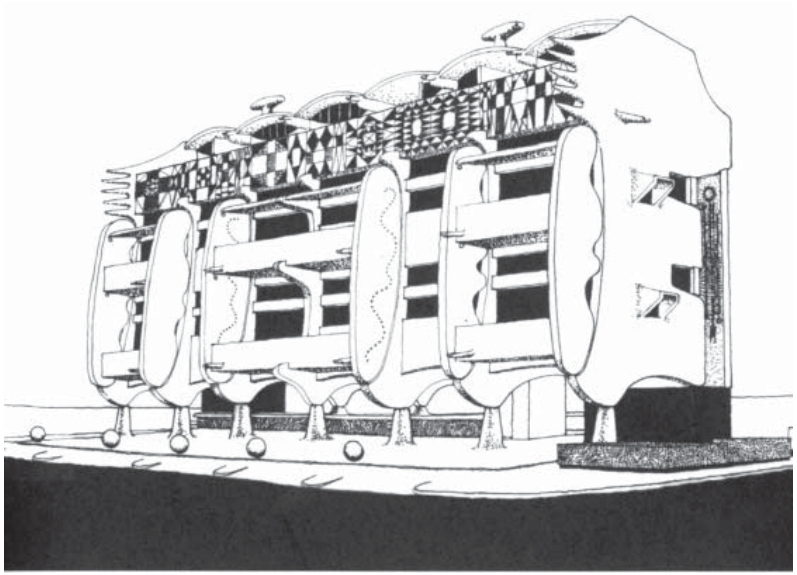
The Future: The beginning of a manifesto

The value of Mozambican architecture lies in the dynamic contrast between modern and traditional, in a positive response to its contextual milieu, and it's capability to make local the influence of western traditions. This way of working was the genesis of a modern architecture derived from the universal principles of modernism retrofitted by the local cultural and social traditions, technological possibilities and local environmental forces – capturing the essence of the place. These buildings have overcome the times of struggle for freedom and it's forms have recorded and still carry visible scars of the vibrant atmosphere to

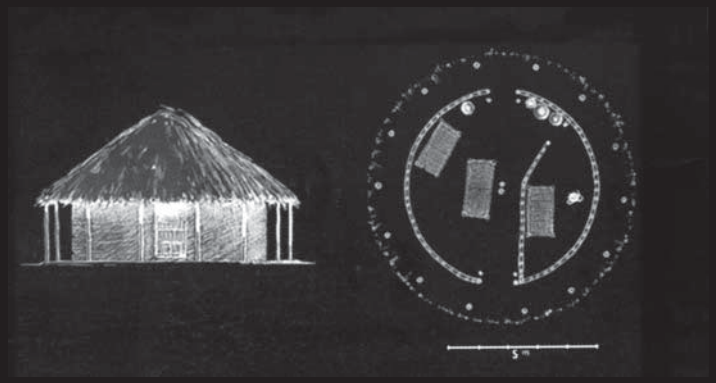

Aeroporto Internacional
de Maputo
Bairro Ferroviário
Campo de Golfe
Clube Marítimo de Dispo
ESPÍRITO SANTO
PONTA CHULUQUNE
CATEMBE
Clube Naval de Maputo
MAPUTO
Clube de Pesca
PONTA VERMELHA

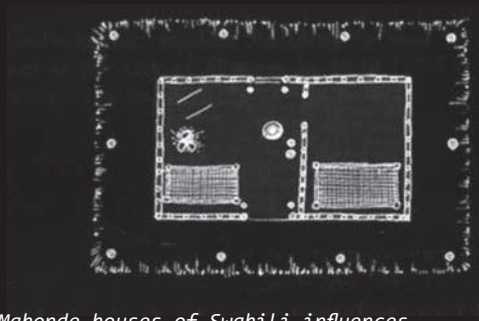


Cathedral oh Huts, Pancho Guedes

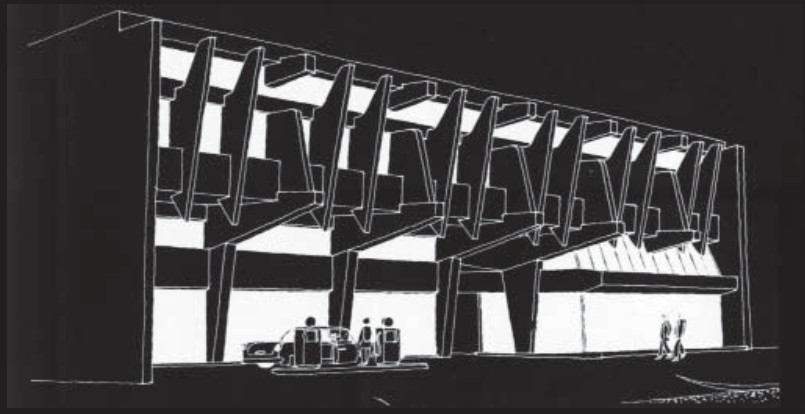


Smiling lion, Pancho Guedes

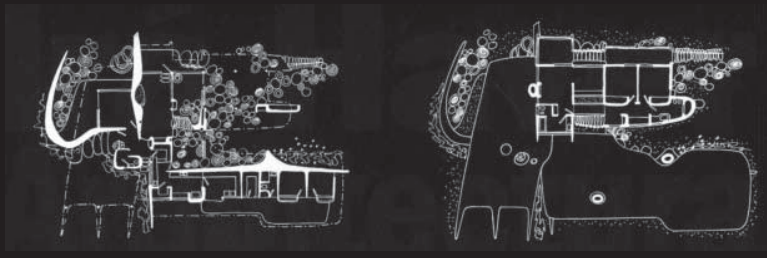




Typical Makonde houses of Swahili influences



Service station in Maputo, Pancho Guedes



Airplane house in Maputo, Pancho Guedes



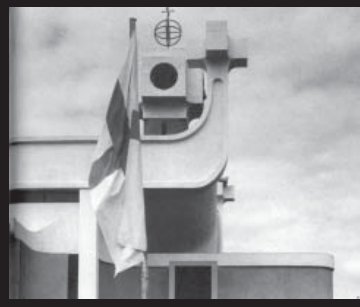







Mozambican Architecture

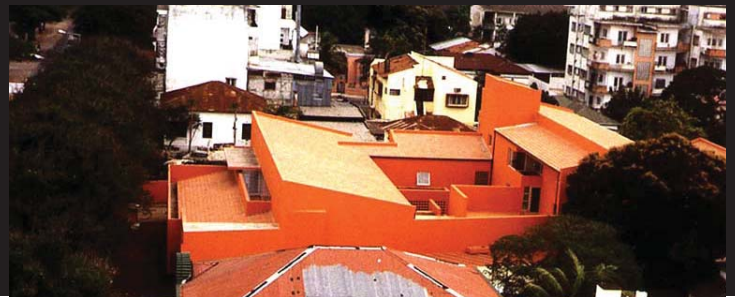







'The best examples of Mozambican architecture to date [...] are buildings by architects who did not negate the influences of the poetic and somehow autonomous spirit...'

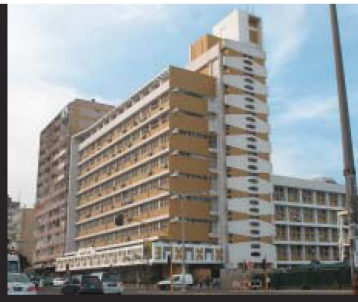




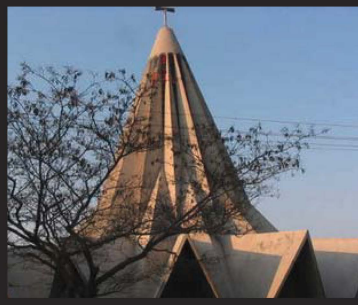


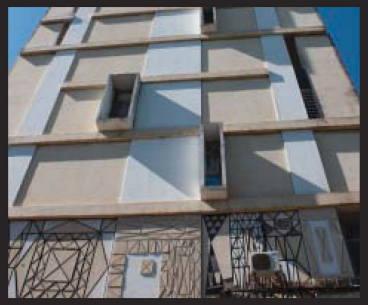




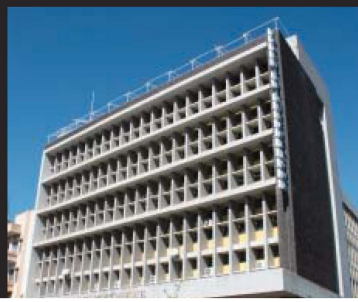






'...the quality of Mozambican buildings is in the contrast between the hardness of its material and softness feeling of its spaces and form...'



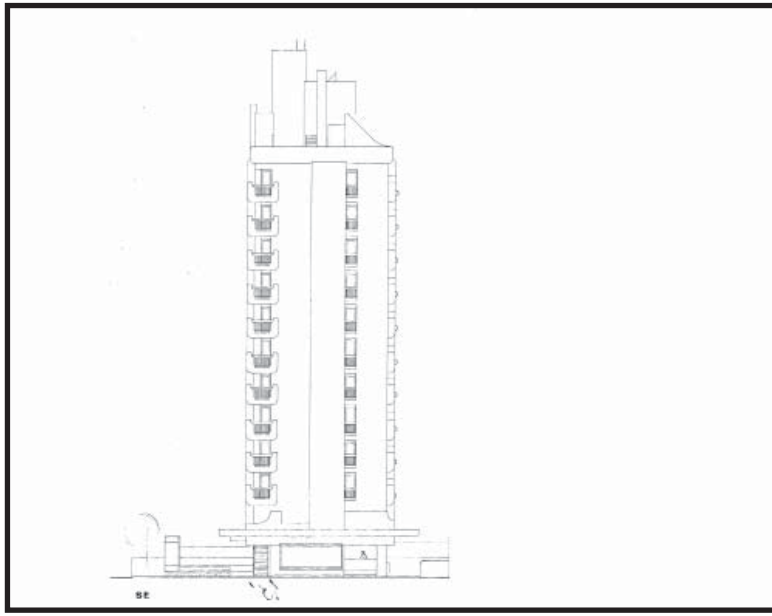
which it was exposed. Just as Mozambicans found a way to express their culture and values, as well as their desire for freedom through *Chope timbila* orchestras, *Mapico* and *Marrabenta* dances, *Makonde* wood carvings, and beautiful literature and poetry, so has architecture found that its forms where a way of expressing the Mozambican cultural identity. Moreover, in doing so, it assumed the responsibility of being used as an instrument of national unity.

The best examples of Mozambican architecture to date, in my mind, are buildings by architects who did not negate the influences of the poetic and somehow autonomous spirit (the magical) which has dominated the Mozambican arts and its nation's people.

Against the backdrop of great art deco and Victorian buildings (built by the presence of South Africans in the late 1800's), 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 inherited from the 1920's and 30's construction developments which emphasized the use of concrete.

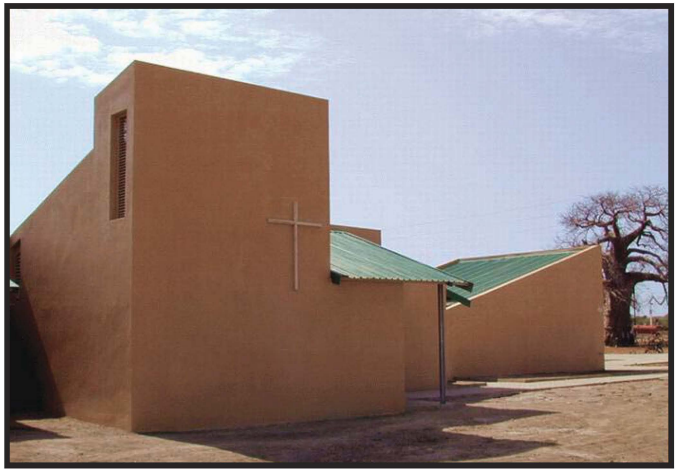
Opposite right: The social reality of architecture in Mozambique as seen in Forjaz's Work. An architecture which respond to the dichotomy of the reed and cement city.

Opposite left + drawings: Buildings by the Architect Jose J. Tinoco in Maputo.





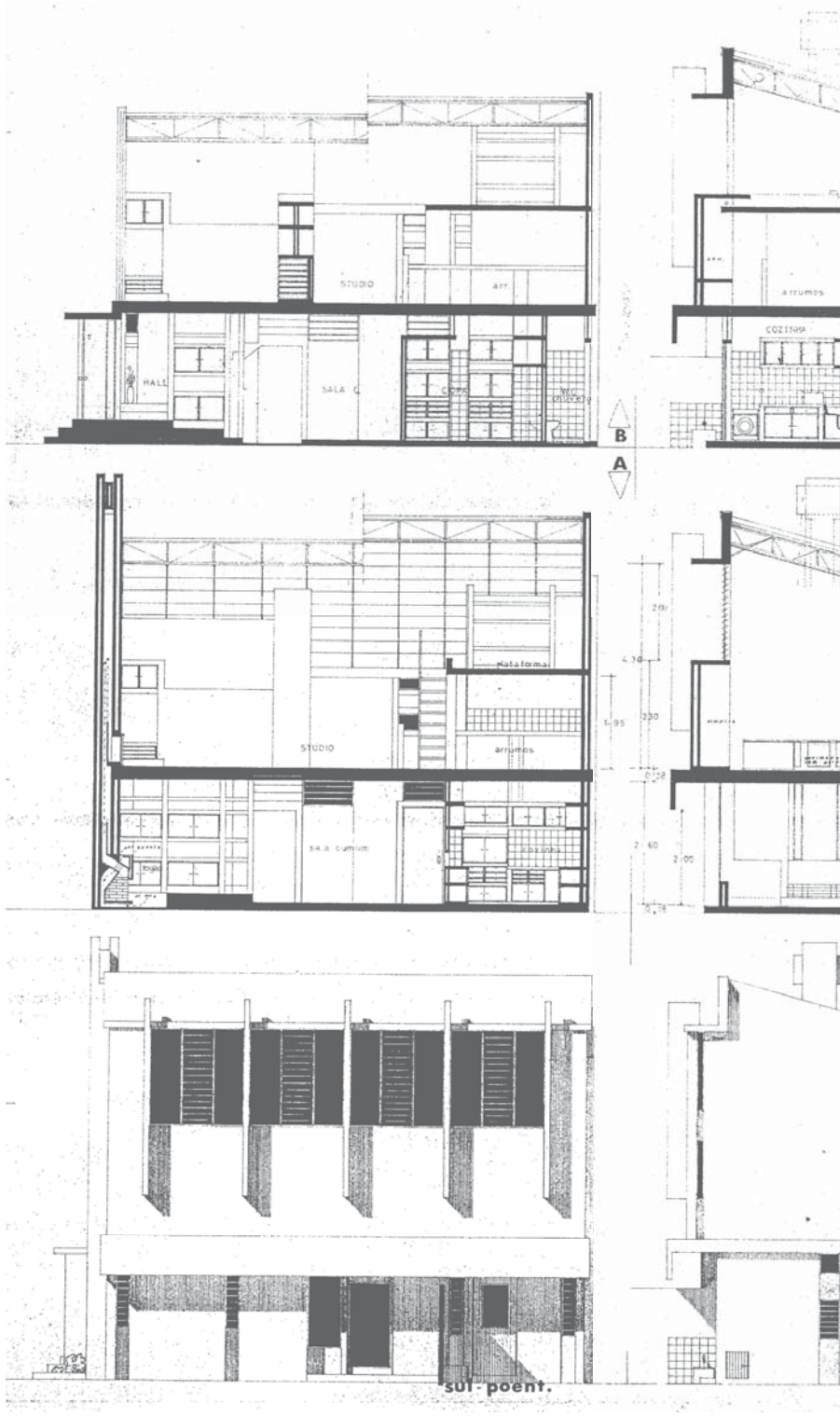




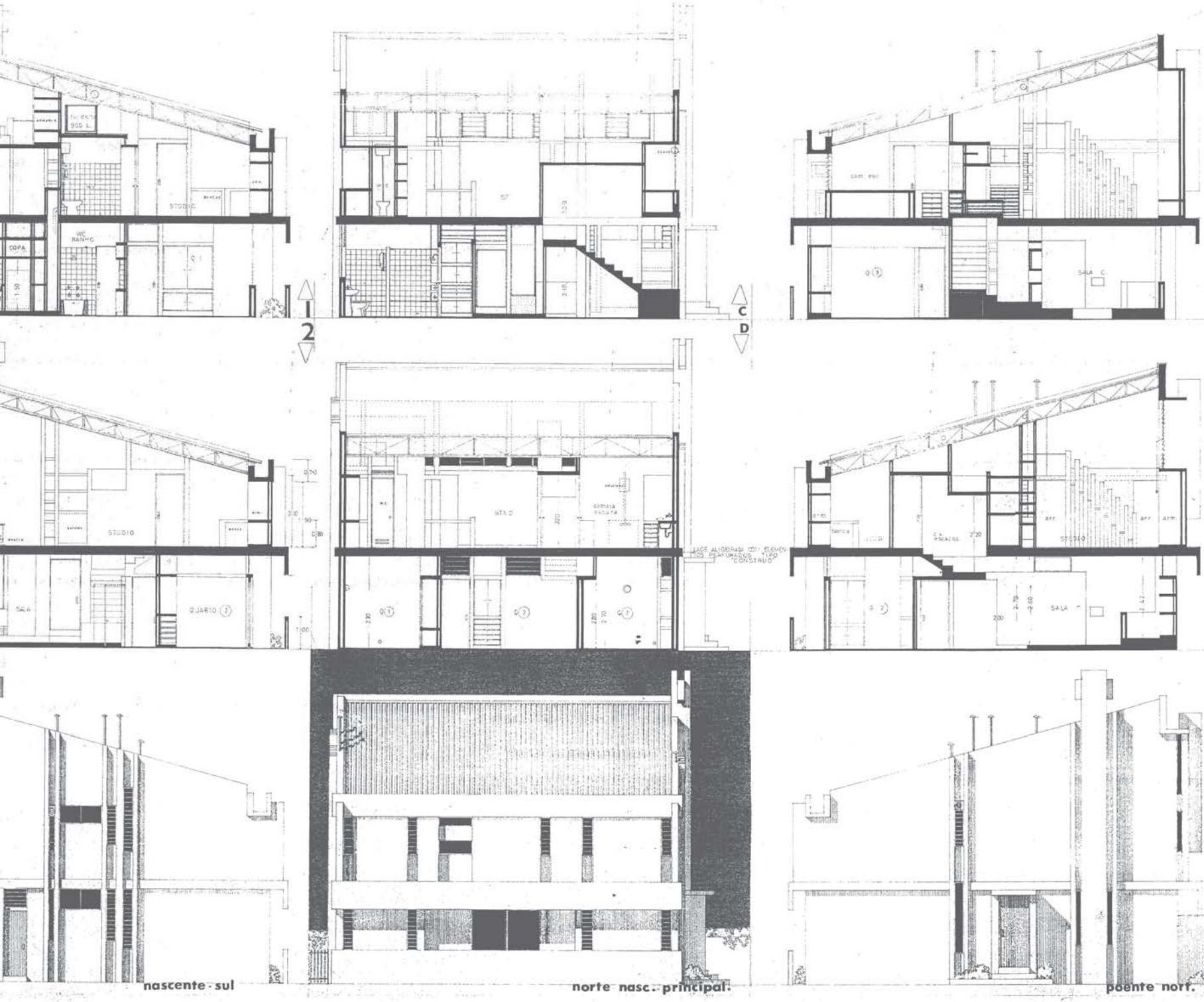




This created the opportunity for buildings to be built rapidly using ‘almost’ one material solely. For economical reasons, material continuity is still a strong adjective that characterizes the majority of Mozambican architecture. Another attribute contributing to the quality of Mozambican buildings is in the contrast between the ‘hardness’ of its material and ‘softness’ feeling of its spaces and form – something that is achieved through the feeling that buildings ‘breathe’ as a result of it’s climatic condition. These Buildings are porous for natural ventilation and light purposes, thus the use of light is associated with the outdoor ‘style’ of living. Although light becomes a climatic element which requires protection from it’s adverse affects, 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 informs the form of Mozambican architecture.



Council drawings for an unbuilt House in Triunfo, Maputo by Antonio Quadros. Date unknown.



nascente - sul

norte nasc. principal.

poente nort.



PART II

THE COMPLEXITY OF NATIONS

HOMI BHABHA - THE TEMPORAL DIMENSION OF NATIONS

'...uneven development of capitalism inscribes progression and regression, political rationality and irrationality in the very genetic code of the nation. This is a structural fact to which there are no exceptions and in this sense, it is an exact (not a rhetorical) statement about nationalism to say that it is by nature ambivalent.'

(as cited in Bhabha 1990, p.300)

Bhabha believes that modern nations live in a transitional time of collapse of cultural identity, 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 dominated discussion of 'historicism as a cultural force' - in the sense that the nation will always be taking an ambivalent position towards modernity. 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, an architecture that uses the combination of modern techniques with something else (usually traditional features) in order for architecture to communicate with the

“During the day I would spend most of my time playing with my friends at the Back of the building, were the parking lot was located. In between the parked cars, we played many games, invented by our ingenious child minds. The worry of time did not seem to exist, if I think of it right now… I was always reminded of lunch, dinner or any other of these daily burdens by the unmistakable calls of my mother from the veranda – I lived on the second floor, the call was loud and clear. The image that comes to my mind reminds me of the red burglar bars fixed to the white parapet wall of our veranda…It was so much better without them!

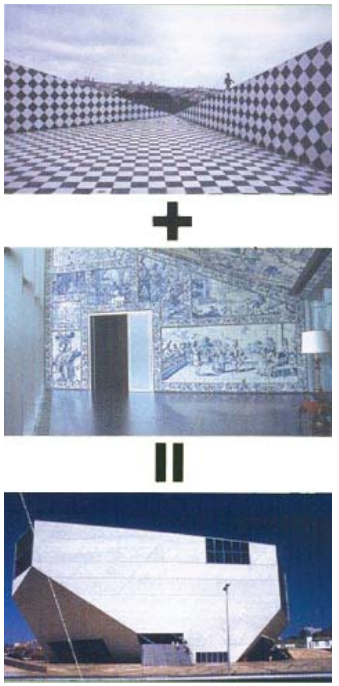
The feeling was of living in a fun building – I still call it my building.
It housed the offices of EDM (Mozambican Electricity Company) and ‘Aguas de Maputo’ (Maputo water affairs) and the residences for its workers. I was lucky to have my father work on same floor where we lived – we stayed on the left hand side and he worked on the right hand side – the symbiosis between working and living is common amongst buildings in Maputo…

My favorite place in the building was the entrance and the terrace. The terrace because it was where we could be expressive as rascals and experience the amazing *views of the city. The entrance was where I would sit with friends and neighbors whilst witnessing the rhythm of the city – people coming in and out of my building, meeting strangers and friends, etc… quite an interactive place these steps at the entrance.”*

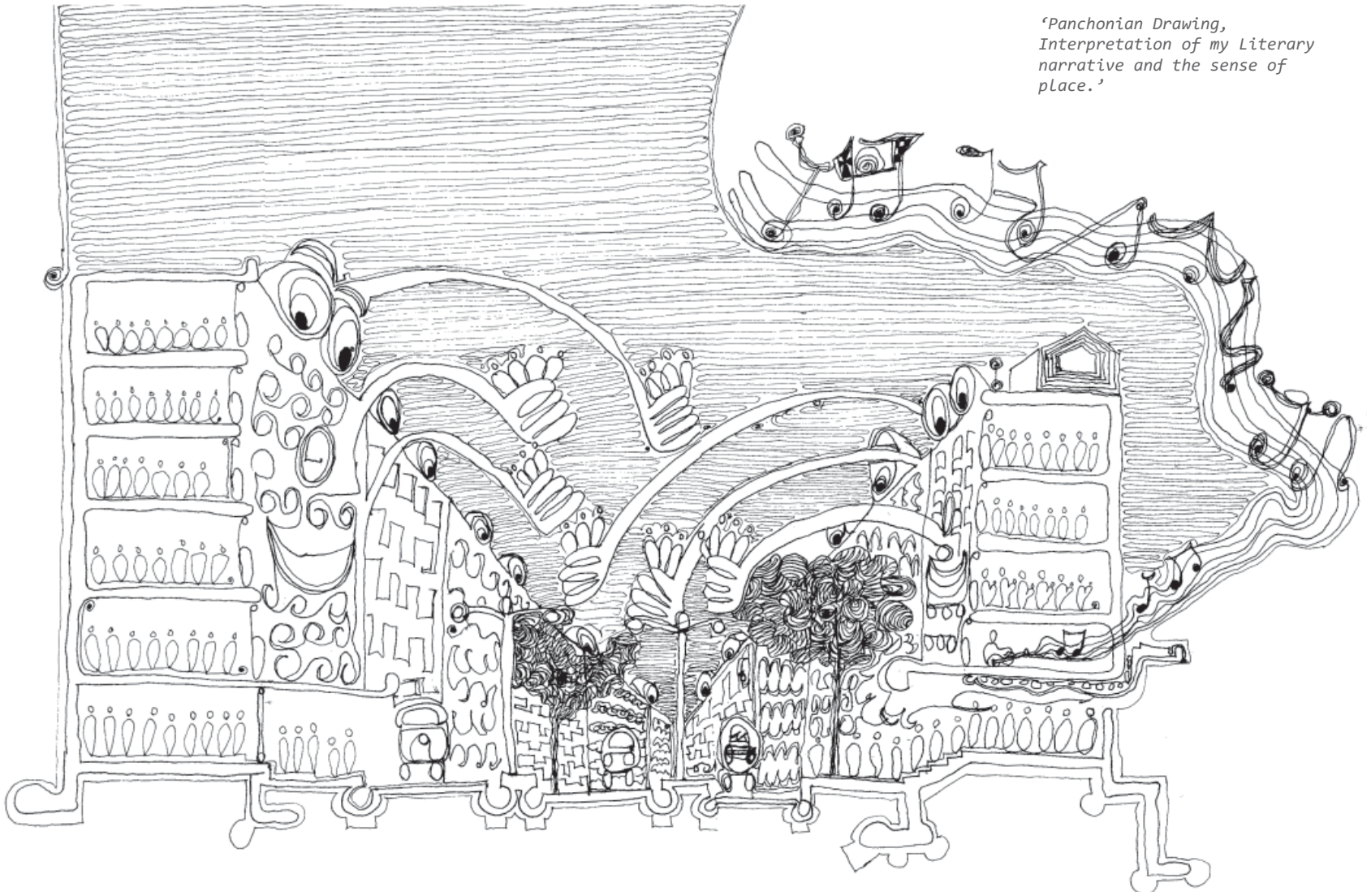
public. Double coding represents the ambivalent condition that Bhabha speaks of, as architecture seeks to communicate with both the elite and the popular public through representations of either direct or indirect double or multiple symbolic codes. The problem then arises when wanting to identify the codes than can render to an audience the 'known realities' (the qualities, or the essence) of the nation's culture. Accepting the pluralism of nations is what would lead to an identification of the possibilities of representing the heterogeneous society and to find it's own cultural signification. However, we know that the nation, city, town or State are an amalgam of people with common accepted values and goals, who work as a unified group to produce their living environment. Therefore, no matter how high the levels of ambivalence of the modern nation, there will always be cultural elements that would define its people. The complexities of defining a national culture in the presence of the ambivalent state represent, for Bhabha, as a literature expert, the need for a new type of literary narrative and 'language', which would enable the expression of the difficulties of writing about the *'cultural expression of a nation as events of the every day, and the advent of the epochal'* (Bhabha, 1990, p.293).

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. How can then architecture be selective and representative of such complexity? 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 (in general, my attempt with this project).

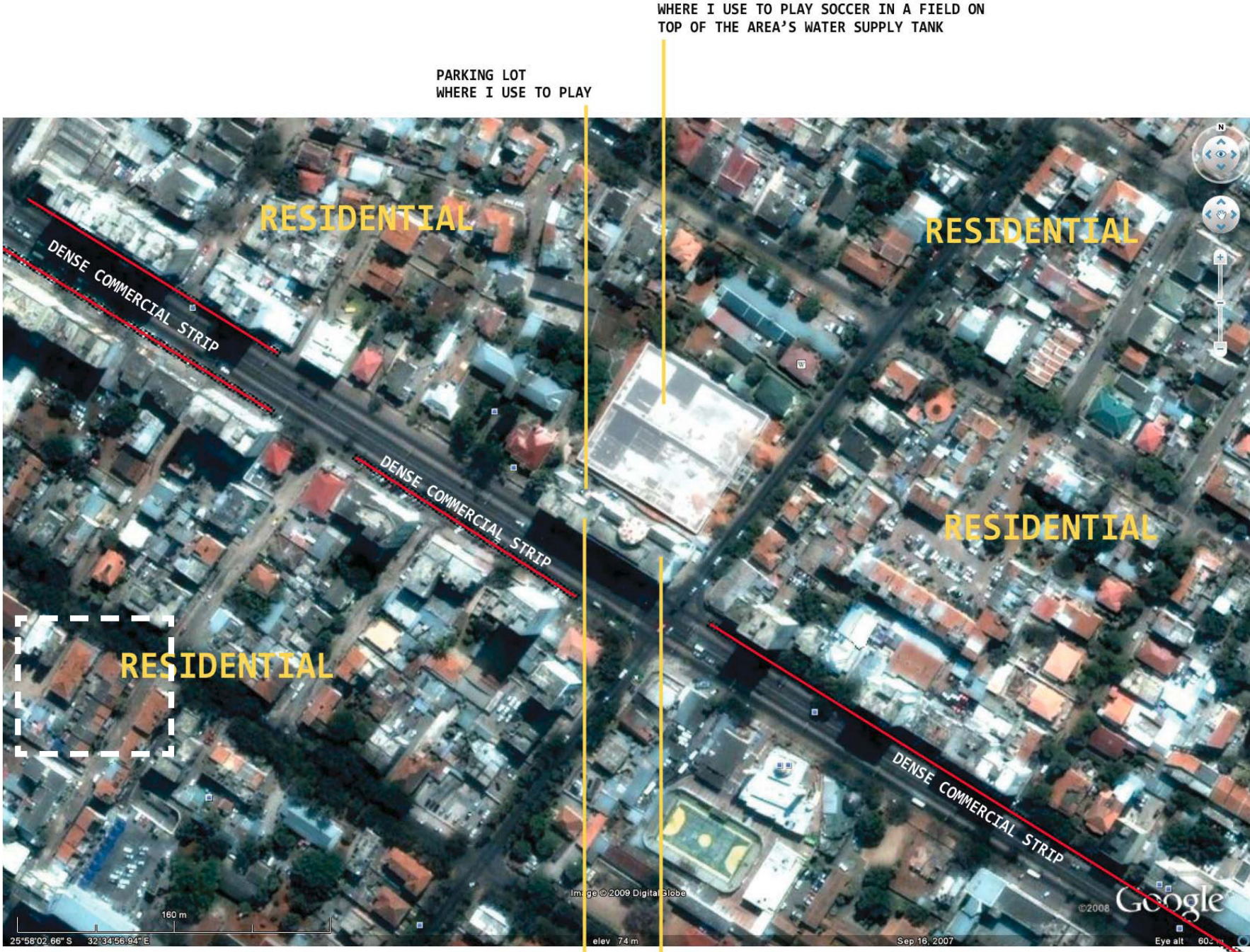
He gives an example in his text (which I will use as an exercise for myself) as an attempt to uncover the sense of locality. If realistic narratives are a way of our time, representing a sincere sense of locality - then, I will be exercising the right to use myself as a source for creating my unique sense of locality within the Mozambican context. I will describe part of my memory as a child living in Maputo, and try to represent graphically what this description has meant to me in an architectural sense:



Casa da Musica in Porto, Portugal
Double-coding in the Work of OMA - Rem Kolohaas



'Panchonian Drawing, Interpretation of my Literary narrative and the sense of place.'


WHERE I USE TO PLAY SOCCER IN A FIELD ON TOP OF THE AREA'S WATER SUPPLY TANK
PARKING LOT WHERE I USE TO PLAY
RESIDENTIAL
DENSE COMMERCIAL STRIP
RESIDENTIAL
DENSE COMMERCIAL STRIP
RESIDENTIAL
RESIDENTIAL
DENSE COMMERCIAL STRIP
OFFICES
MY HOME 2ND FLOOR
160 m
Image © 2009 DigitalGlobe
©2008 Google
25°58'02.66" S 32°34'56.94" E
elev 74 m
Sep 16, 2007

AMOS RAPOPORT - 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 way of life (Rapoport, 1969). 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 vernacular built environment. He explores certain forms of vernacular 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 primitive and vernacular architecture becomes an extremely important task for this type of architecture that 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 analyses of secondary and primary factors. Secondary (or Modifying) factors are forces which 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). Primary forces are socio-cultural factors – *'the accepted way of doing things, the socially unacceptable ways, and the implicit ideals'* (Rapoport, 1969, p.46). These factors include basic needs, the relation of house and settlement, site and its choice. Physical forces, or secondary factors, cannot determine form solely due to the most extreme cases of physical constraints of climate, material, site, technology, and economy, man still has a degree of freedom and choice with regards to built form as there are socio-cultural factors that supersede physical forces.

Form is the result of existing possibilities, as Rapoport suggests. He also suggests that these possibilities are influenced by primary and secondary factors, and that no matter what the constraints are, man will always have a certain degree of freedom and choice. The degree of freedom and choice will be higher if the modifying factors are lower, and if the modifying factors are high the degree of freedom and choice will be lower, but they will never cease to exist. Therefore, Rapoport 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.
Primary forces also assume the term of 'genre de vie' (Rapoport, 1969); it includes all the cultural, spiritual, material, and social aspects that affect form.

Rapoport takes this concept further and suggests that *'genre de vie'* is the sum of the concepts of culture, ethos, worldview, and national character, and he defines them as follows: culture represents conventionalized ideals and activities of people that in turn produce a character, in other words, an underlying sentiment that informs about people's beliefs, practices, and customs (ethos). Ethos, in turn, influences the way the nation looks upon the world, as well as their desires and aspirations (world view). National character becomes, as a result, the general characteristics that define a certain society, community or people.

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 an old building that is used in a way that is different to what it was intended for, 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, p.79).

Constancies can, therefore, assume the form of basic necessities and beliefs of people, such as the need for identity and place, the need for a living room or a meeting space in the house. These are seen as constant and symbolic, as they are used indefinitely. Constancies can also assume the form of past solutions, as novelty will always remain a [re]interpretation of old or previously used solutions.

Changes can be best exemplified with spaces such as bathrooms, services core, equipment rooms, etc; these change according to technological advancement and available equipment.

In summary, what Rapoport suggests is that the distinction in ones' culture between Constancy and change is helpful to understand what influences form. What is interesting to note is that constancies will always be supported by symbolic reasons. An example of 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. It is popular belief that the pitched roof that characterizes these dwellings should reflect the different compartments of the dwelling. They are regarded as visually imperative and can be best expressed metaphorically as a weathercock or a fan-like roof (Carrilho et al, 2004). 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, p.77).

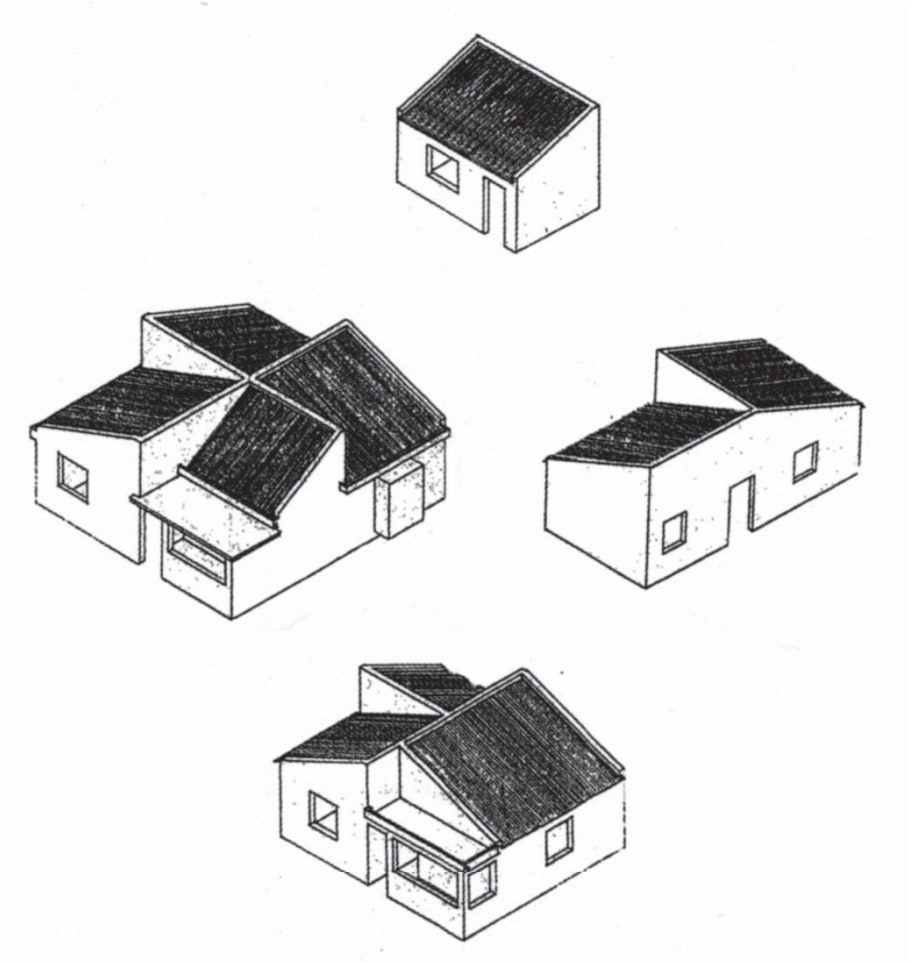
This shows that the consideration for symbolic meanings is paramount in Mozambique, given the fact that popular beliefs and traditions supersede practicality in importance. In fact, as Mumford suggested: *'ritual exactitude came before exactitude of work: man put his energy into symbolic rather than utilitarian for even when he was barely starting'* (Mumford in Rapoport, 1969, p.43). For Mumford, symbolisms and the poetic in the shaping of humanity assume man's primacy and supersedes the power of rationality and practicality.

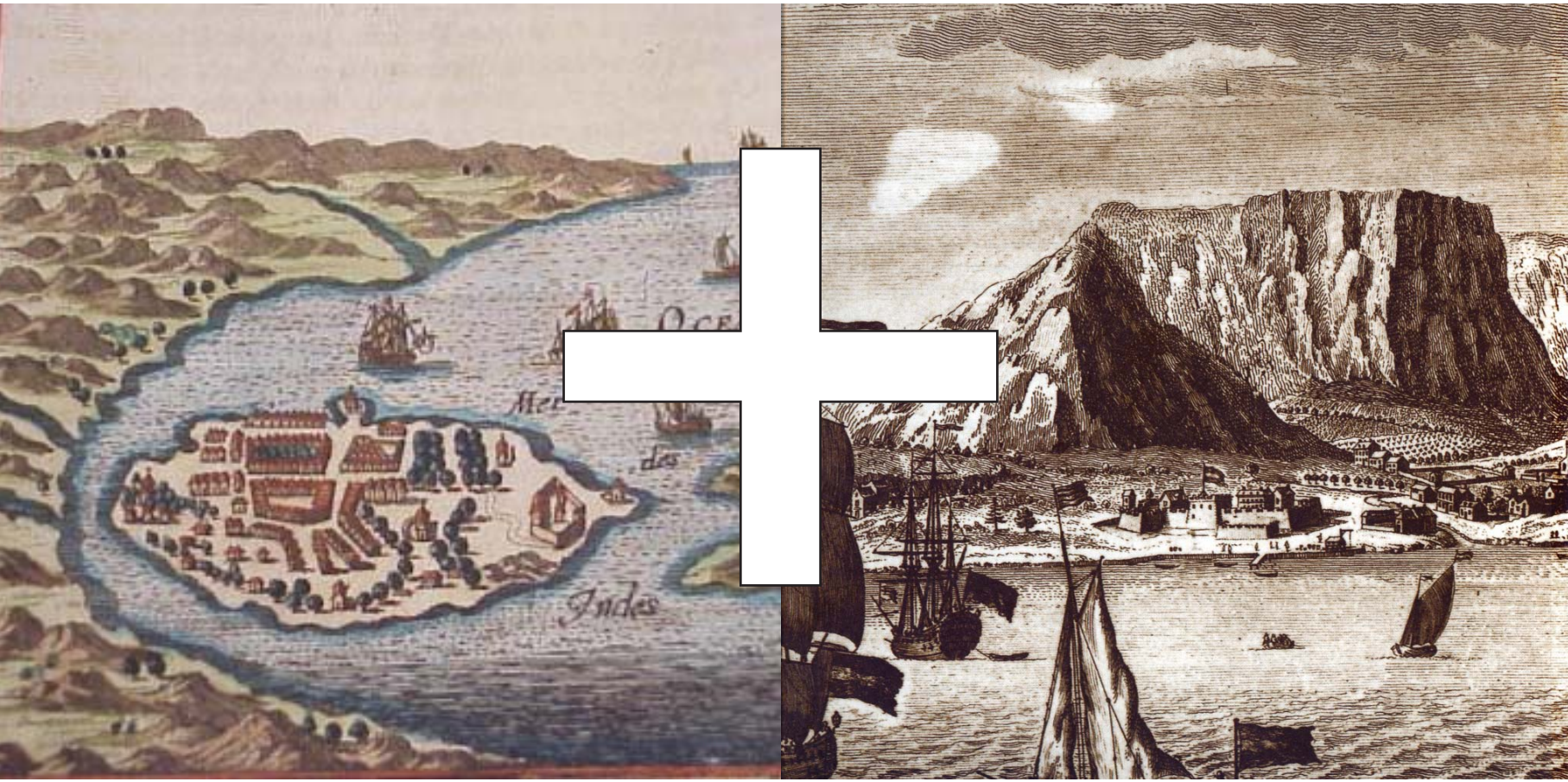






RIGHT and LEFT: Traditional informal settlements in Mozambique.





PART III

[RE]PRESENTING MOZAMBIQUE

Rapoport (1990) stressed the danger of isolating cultural variables when analyzing the aspects that influence cultural expression, as they belong to a complex network of interrelationships. Nevertheless, we must isolate them for the sake of understanding the small parts they play in the bigger complex picture.

We have seen that one of the ways of expressing the cultural identity of a nation is by searching in the present time for the cultural factors that have persisted through time and have remained constant. These represent the most sincere and authentic expressions of a nations' identity. Another method that must be considered is the use of literary narratives. In this case, my own view as a Mozambican is used to search within myself mundane aspects of cultural life that can be acknowledged as true and honest representative characteristics of the Mozambican way of life. Although it represents my personal point of view and my own deep sense of place and space in a given time, in a certain type of Mozambican society its validity is considered by Bhabha to be unquestionable. This means that each architect would have a completely different idea of how the Mozambican nation is to be represented. This is what makes the representation of the nation so incredibly complex.

To find the constancies in Mozambican cultural identity means to look for its socio-cultural forces and way of life ¬ as translated into basic needs, the importance and relevance of family, privacy, social interaction, cultural, spiritual customs and social practices, as seen in Rapoport's argument. However, whatever our conclusions are, we must bear in mind that these cultural variables used for expressing a Mozambican cultural identity will always suffer some modifications by the local physical forces of climate, materials, and technologies. Therefore, the question of how to translate these cultural variables into architectural ideas start to tell me that it will always be a subjective representation, due to the reasons stated above.

Way of life

Basic needs establishes a certain way of life. As an example, desired light levels vary greatly from culture to culture in relation to its territorial location. In Mozambique, the use of light is associated with the outdoor cultural living conditions. Interpersonal relationships are very important. Mozambican art and crafts represents this importance in an interesting symbolic way. *Makonde* art reflects the importance of family and social interpersonal relationships by using the carving system, where all human figures represented have a connection between them, which stresses the importance of living in community and

supporting one another. It is not my intention to find reasons to justify certain cultural behaviors; however, I cannot put aside the logical interpretation that the reason for the importance of interpersonal relationships might be due to having a climate that allows for outdoor activities and life styles. As a result, Mozambique's vernacular architecture makes use of verandas; these are considered to be very important within the urban context as well as within the informal settlements. Verandas form an important transition between the street and the private domain. They are regarded as threshold spaces and are usually covered by a concrete slab in informal settlements. People believe that *'a house without a veranda is like a face without a nose'*. This space is symbolic tough as the true outside space is the courtyard.

Houses are always built with the idea that a veranda is the most important space and needs to face the street, as it becomes an outdoor living room where guests are received and entertained. An interesting architectural manifestation of interpersonal relationships is seen in the importance given to the front façade of houses.

'The importance of the front façade and decoration has been part of Mozambican traditional cultural manifestations as buildings represent a public face to society and decoration gives the opportunity to impress and to promote dignity and solidarity of the people' (Denyers as cited in Carrilho et al, 2004, p.9).

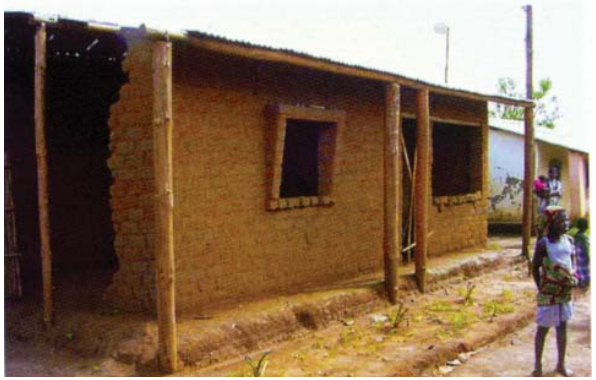
Family arrangements are also important. In Mozambican society, within informal settlements, it is common to see a group of houses on the same plot sharing a common courtyard, toilets, and other spaces. Usually in a situation like this, it is also common to observe that on this same plot live several members of a family, each having their own individual house. The shared courtyard becomes the main space of the plot and it is usually under a big tree that people come together and socialize.

There are many customs and spiritual beliefs in Mozambican culture. However, the ones that I have found interesting to present here and that somehow become connected to architecture as a cultural Constancy are Music and Dance as buildings express the rhythms familiar to human life; they should be reflected in the interplay between modern and rural, chaotic and organized, war and peace. This effect should allude to the eye as music does to the body.









Decoration of facade in Vernacular Mozambican architecture.

Artistic manifestations

Music and dance re-enforce religious and spiritual beliefs and enhance the sense of body expressions within people. A very popular music style that emerged as a protest against the Portuguese colony in the times of the revolution was the Marrabenta. Marrabenta comes from the word '*arrebenta*', which means to burst. The word was '*Mozambicanized*' and it refers to the dance moves of their performers who were very energetic. It was a product of urbanity, and it had a fusion of western music with traditional rhythms; sometimes it was played with improvised handmade materials (Ndege, 2007). Perhaps this culture of energetic dances and bodily expressions makes for an attraction to sensuous forms in Mozambican architecture, as Niemeyer draws inspirations from the beauty of women forms and the sinuous forms of the Brazilian landscape. In fact, in Mozambican art there is a certain expressionism or exaggeration of form. Form is intensified for expressive and emotional intent, thus creating a culture whereby the expression of geometry is strongly accepted.

Landscape and the sea

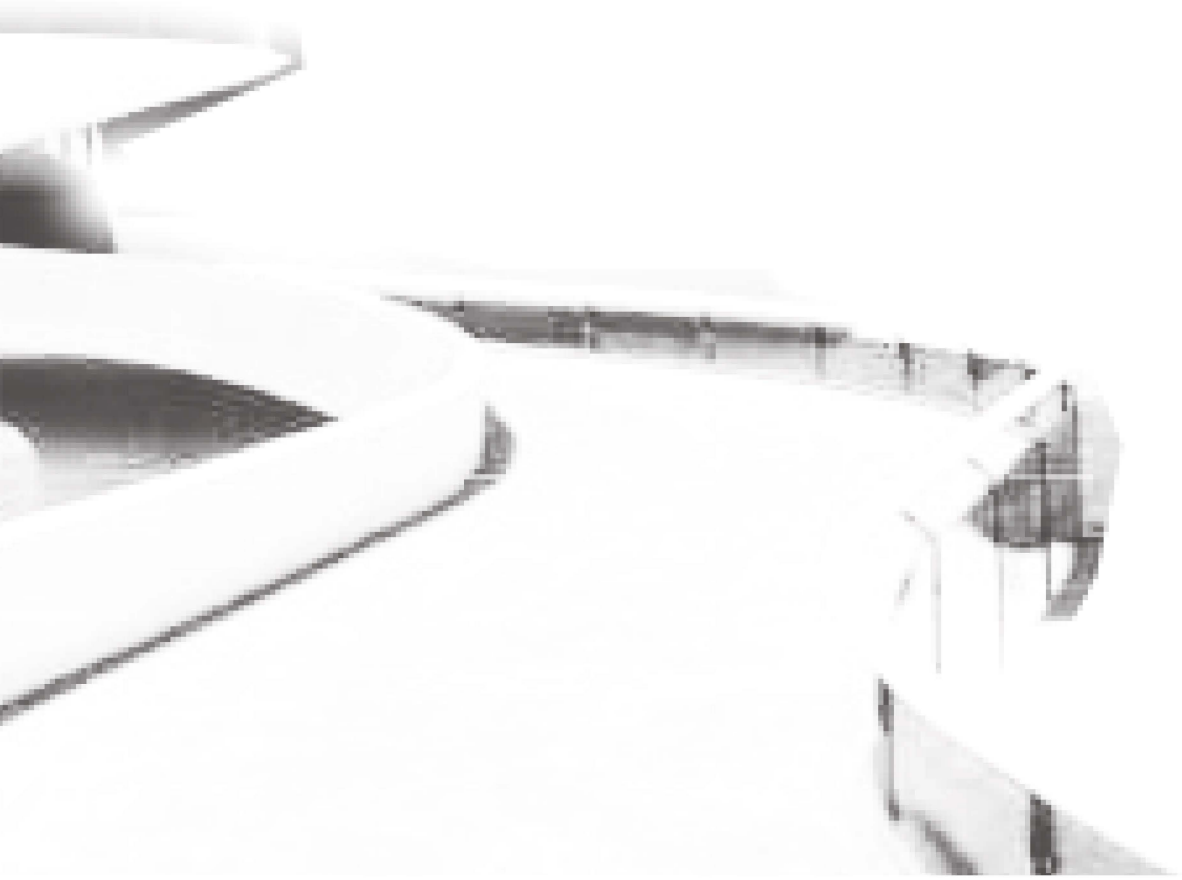
The landscape and the sea are tourist attractions in Mozambique. They influence the way of life dramatically. The coastline is one of the most desired places to be. It's importance echoes the way Mozambicans inhabit the edge, which can be read across different scales, from individual people to groups 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 disconnection of the 'hard and chaotic life' and a more 'soft' contact with nature.

This analogy of the coastline as an edge is of particular interest to me as it 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. The edge of the coastline is defined by the vegetation or urban infrastructure, sand and water. What we see is a recurring idea of the edge being a layered space, alluding to an interpretation of boundaries as transitional rather than fixed.

Cultural Constancies as Metaphors

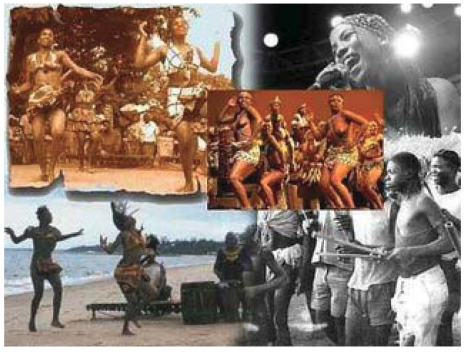
I have tried to prove, with this project, that the way to represent Mozambique as a nation is to find within it's culture the patterns, motivations, beliefs, and desires that unite Mozambicans as a nation using the theories of Bhabha and Rapoport. Within the many cultural variables that can be used to represent Mozambique, the ones that stand out are those that represent the theory of constancies, the most relevant













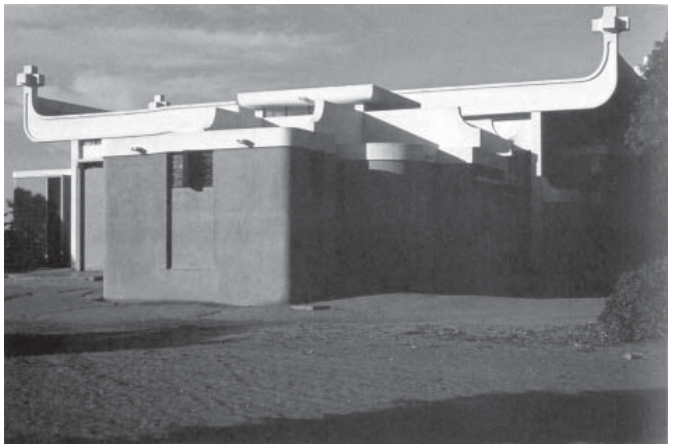
of which I have identified above. However, the way to represent a nation through architecture has not been discussed before. It was through the design process that I have developed an ambivalent position towards this. I was certain that my project would be unsuccessful in representing every aspect of Mozambican culture, but I found my expression of this project was rather mere fragments of the whole. And if nations can only be represented through fragments of its culture, then the choice of this fragment is completely subjective to the way I see Mozambique and to the place of where the building is going to be located. I will then say that architecture can never represent a nation as a Consul or as a president would – as architecture is unable of acting on the best interest of the nation. In addition, any attempt to put forward a prescriptive way of representation falls under the ideals of a nationalistic architecture, which, as I stated in the beginning of this project was something I wanted to avoid.

The language of architecture, then, in representing a nation, becomes a language of constancies that makes use of abstract symbolisms in order to communicate with the heterogeneous society of the present time.
As Mackay (2001, p.69) puts it *'Cultural meanings are communicated and learnt by us through the medium of a common 'language' of sounds, words, visual images, gestures or rituals that stand for – or represent - particular ideas or feelings. Cultural concepts are encoded in different signs, or symbols, which can be read like any other language and from our common understanding of the society in which we live and by which we identify ourselves as belonging to one culture or another'.*

The necessity to make use of symbolisms and to represent them in an abstract way has given rise to Jencks' theories of the iconic building (2005). For Jencks, the iconic building represents the response of architects to the question of how to express the kind of heterogeneous society in which we live by using the language of metaphors. This results in a level of abstraction that makes the building allude to different 'known realities', that can be interpreted in many different ways, thus being capable of surviving the cultural progression of time. A very good example of a building that makes use of metaphors in Mozambique is the *'Sagrada Familia Church'* by Pancho Guedes. It was built in Machava, Maputo, in 1964, after four failed attempts. It was envisaged to be a house, a pavilion, a look-out hill and as Chip factory. In the fifth 'dream' it was build 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’.

(as cited in Santiago, 2007)

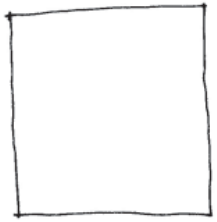




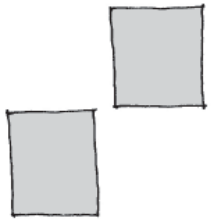
Sagrada Familia, by Pancho Guedes

As Abel (2000) states, the role of metaphors is an appeal to the human mind a known reality, and to make the subject in question more accessible and understandable by appealing to the intellectual, poetic, and visual sensitivities. Their use in the representation of Mozambique as a nation cannot assume a direct and objective association of the constancies of which they represent, but rather assume the abstract and subjective concepts of these constancies in order to appeal to the emotional intuition of similarity or disparity of its concepts.

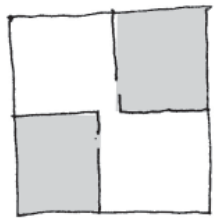
Diagrams of 'traditional' way of living in Mozambique



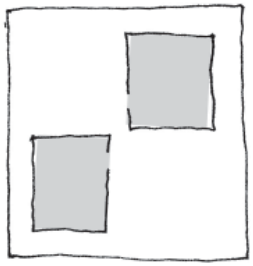
SITE PERIMETER



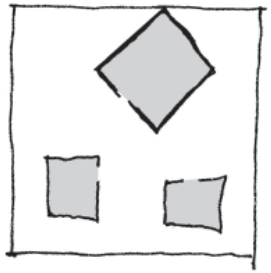
ROOMS ARE CREATED INSIDE THE PLOT



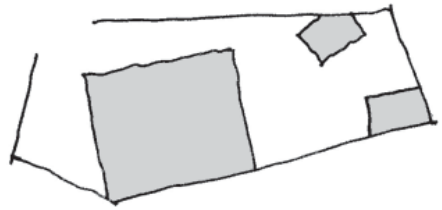
COOKING, AND LIVING ROOM ARE LOCATED OUT-SIDE



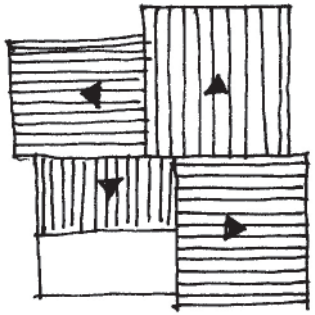
RELEASING THE EDGES



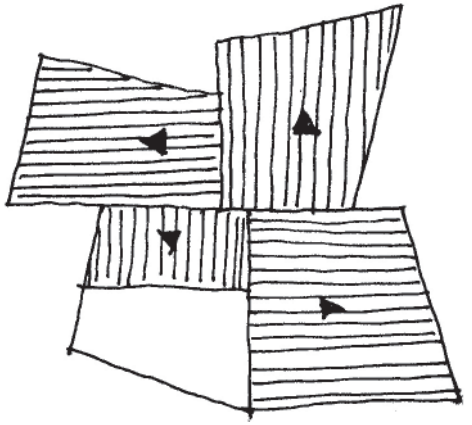
CREATING PROTECTED OUTDOOR SPACES



ACTUAL EXAMPLE OF TRADITIONAL WAY OF BUILDING



FAN ROOF - A ‘KNOWN’ FORM - STATIC

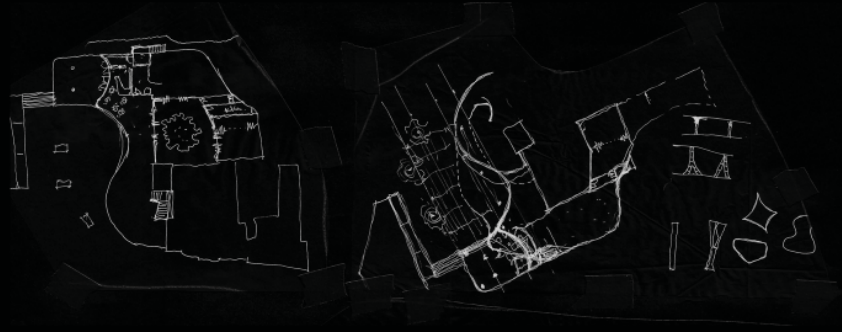


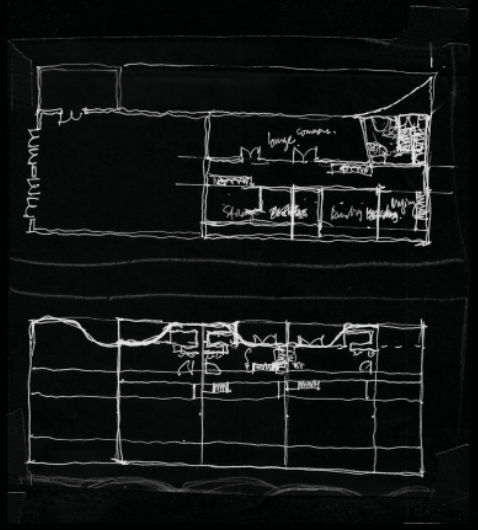
FAN ROOF - MOTION

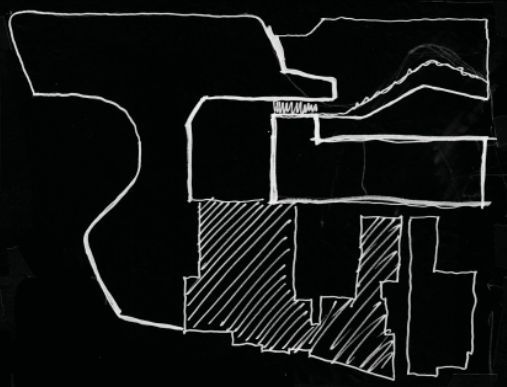
TESTING THIS CONCEPT OF EACH ROOM HAVING AN INDEPENDENT ROOF - A TRADITIONAL WAY OF BUILDING IN MAPUTO.

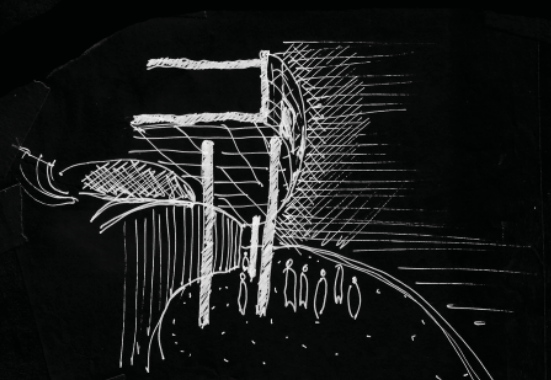
INCREASING THE SCALE OF THE BUILDING / OPPORTUNITIES FOR COURTYARDS

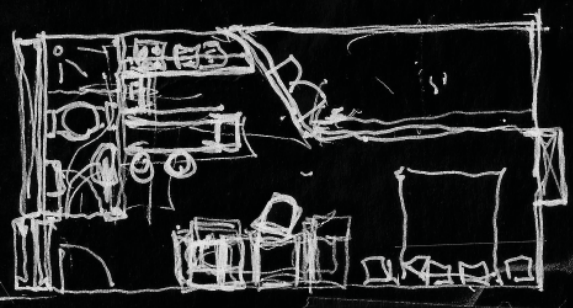


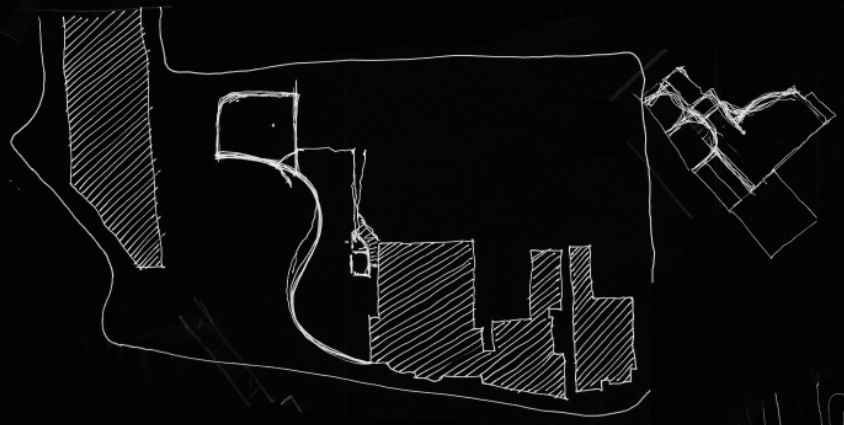




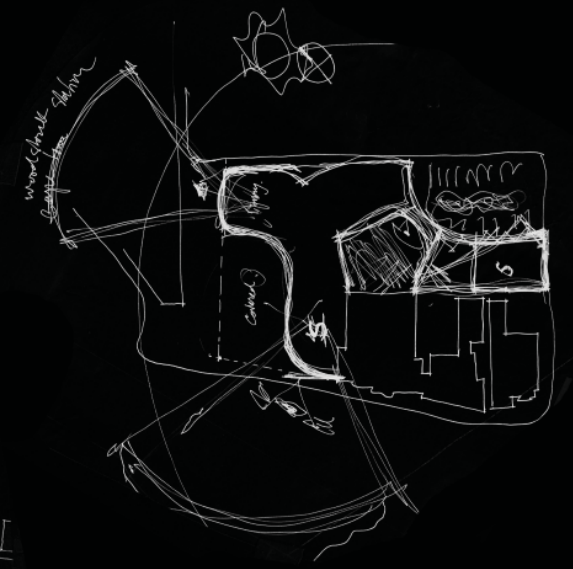






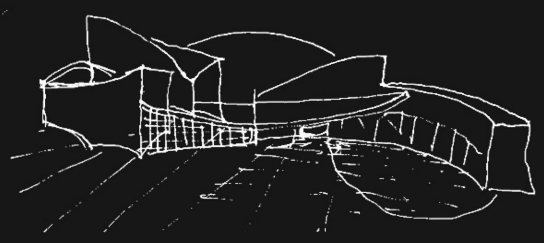






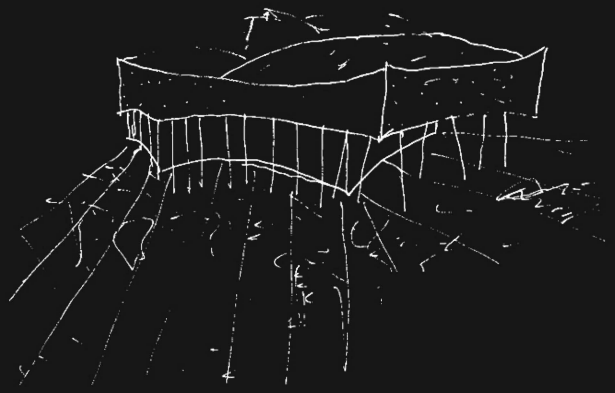
Conceptual sketches using analogies to sea, landscape and way of living to generate form.



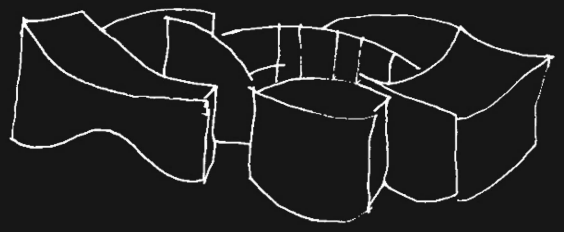


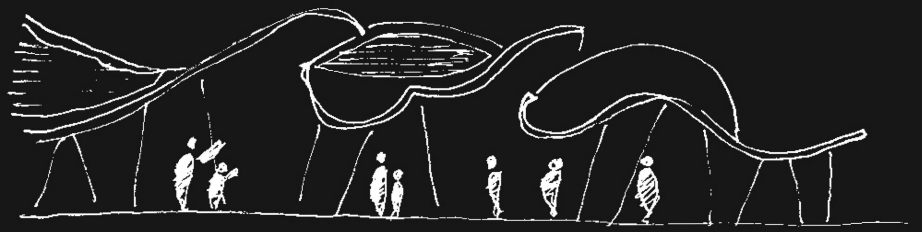












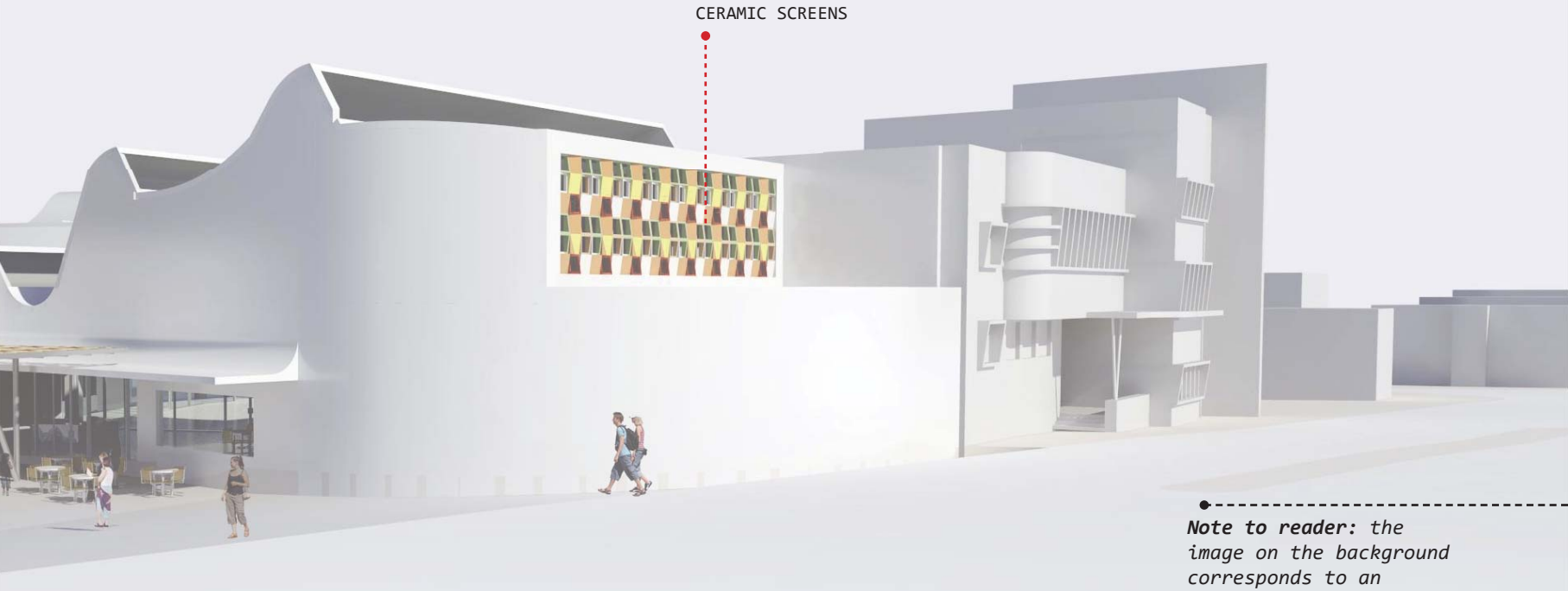
CONCLUSION

The issue of representing a nation through subjective fragments of its culture I believe is the most accurate and sensible one when dealing with such a complex issue. I have attempted to put forward a study, which has turned into a journey of discovery about the limitations of architecture and the artist and how the issue of identity, architecture and the nation can be subjective to different interpretations and that the 'essence' of Mozambican architecture can be another issue subject to discussion. Nevertheless, the conclusions of this study can be as follows:

In order to represent Mozambique's cultural identity it is necessary to be critical about the way we see nations and about what we assume to be a valid representation of the cultural identity of that particular nation. There is no right way of asserting the validity of such representation. In the end all architecture can do is represent it through the lenses of the architect and its interpretations as form and space. To make my point, I pose a question: Is the architecture of Oscar Niemeyer, Brazilian architecture or Oscar's architecture? Would his architecture change completely if he was to do a building elsewhere in the world? I am not sure that his buildings elsewhere would not have the 'always present' sinuous curves that he talks about as being reminiscent of his country's landscape – as we can see in his work for Algeria. The same can be said for the work of Pancho Guedes. Pancho was not solely inspired by Mozambican vernacular architecture. He was, primarily, inspired by architecture in a universal sense, which then was transcribed as his own interpretation having in consideration 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 is ultimately accepted as good, beautiful and appealing to people based on common and shared impressions of what they associate to be 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 (the users of the Consulate and cultural centre) would identify as 'authentic'.





Note to reader: *the image on the background corresponds to an intuitive design response done in the first semester. It does not represent the real building for this project.*

PART IV

TECHNOLOGICAL INVESTIGATION: CERAMICS



The re-interpretation of existing materials as well as the use of new materials cannot change the outlook or the 'style' of Mozambican architecture for it's principles of design and tectonics should be the same which reflect local available technologies. New materials are encouraged as it allows for new forms and spaces to be created based on the re-interpretation of traditional ones.

Architectural ceramics have been used extensively in Mozambican architecture and have become a modern material for Mozambican cultural expression - certainly inherited by Portuguese modern construction technologies.

Traditionally, the use of ceramics in Mozambique can be traced back to the *Makonde* sculpture artists. They used clay to produce the ceramic art of pottery. These artistic works where restricted to the *Makonde* women, as wood carving was to men. For the *Makonde*, Pottery is considered to be of great importance due to great distances that women had to travel to fetch water.
In architecture, the use of clay as adobe bricks or *'maticado'* has been one of the preferred traditional technologies, used in most rural villages and informal settlements. Generally, walls are erected with adobe bricks mixed on site where a factory as well is erected to bake the bricks. These bricks are then dried in the sun or oven baked according to the family's financial means (Carrilho, et al, 2001) - this construction method is still visible today.

CERAMICS IN MOZAMBICAN ARCHITECTURE

In the urban environment, architectural ceramics have been used extensively since colonial times and they mostly form part of the buildings that characterize what I consider to be the best examples of that which constitutes the Mozambican modernist and art deco architectural heritage. They are often used in the form of wall tiles, roof tiles, mosaics, sanitary ware and pre-fabricated elements which characterize the geometrical composition of many Mozambican buildings. When used in exterior conditions [my interest in this research] they

assume the form of ornamental pieces, cladding or *brise-soleil* elements providing protection against sound, weather and burglary. Consequently, ceramics have contributed in building the charming image of Mozambican architecture mostly by offering it's 'ageless' effect, durability and colorful compositional patterns and surfaces on buildings.

Today, Mozambican architecture still defines itself by the use of these strong compositional elements, many of which are now made of concrete. I grew up in Mozambique witnessing most of it's great modern buildings become dilapidated, waiting for innovative re-interpretations and use of this fantastic material - I recognize it's use as being very much part of the Mozambican culture.

My interest with architectural ceramics can be divided into two parts, both of which help define an architectural expression of contemporary Mozambican identity. One interest is related to the re-interpretation of architectural ceramics as facade elements (screens and thresholds, louvers, cladding, and brise-soleil) due to Mozambique's climatic environment which requires the necessity for such elements. The other, is concerned with architectural ceramics and its ability to animate space and forms through design of surfaces and patterns reminiscent of traditional Mozambican decoration and ornamentation.

My final aim is to test this knowledge in the design of the proposed project – A Mozambican Consulate and cultural centre - and consequentially, consider the existing relationship between local and international available fabrication process and production systems as well as its use, connected to Mozambican culture.

Amos Rapoport (1969) suggested that architectural form is a result of socio -cultural factors which influence form as primary forces. Climate, amongst other physical, economical and technological factors are considered by Rapoport to be a secondary modifier of form. Although Physical conditions, materials and technologies do not determine form, they have an enormous effect in shaping architectural form, as in the case of climate. In regard to Mozambique, its climate made it possible that plastic and exotic forms, associated to its vibrant cultural practices, could be built due to the wonderful plastic proprieties of concrete. In subtropical and tropical climatic conditions, materials require relatively few expansion joints due to weak climatic variations, thus making it propitious for the use of mosaic and wall tiles as cladding elements.





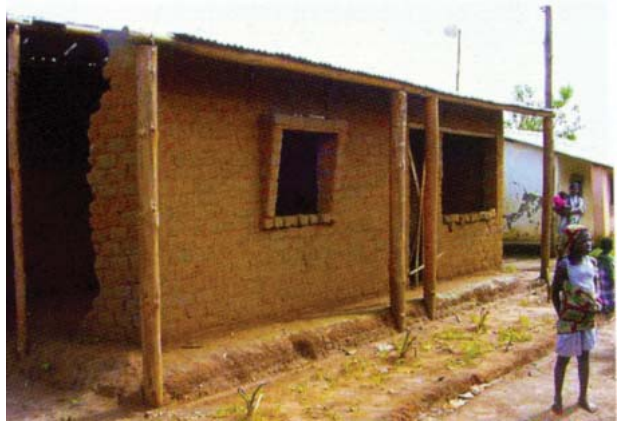


Top left: Makonde sculpture by Reinata Chadimba.

Top right: Rachas (cracks) by Victor Sousa. Clay sculpture

Middle: Informal settlement house built in adobe bricks in Lichinga, Niassa.

Below: Ode to Samora Machel (Ode to Samora Machel) - a mural by Mozambican artist Naguib in dedication to Samora Machel done with broken pieces of various ceramics.









Rapoport comments on the fact that the limitations and availability of materials together with its price pushes cultures to find certain forms that are more suitable and which do not require a varied amount of specialized techniques and technologies, such as vaulted and domed forms. This theory applies to the context of Mozambique where the question of materiality is very important due to it's dependency on foreign construction materials and technologies. As a result, architects have grown conscientious of using materials that require low maintenance, employ easy technologies and are robust and visually expressive.

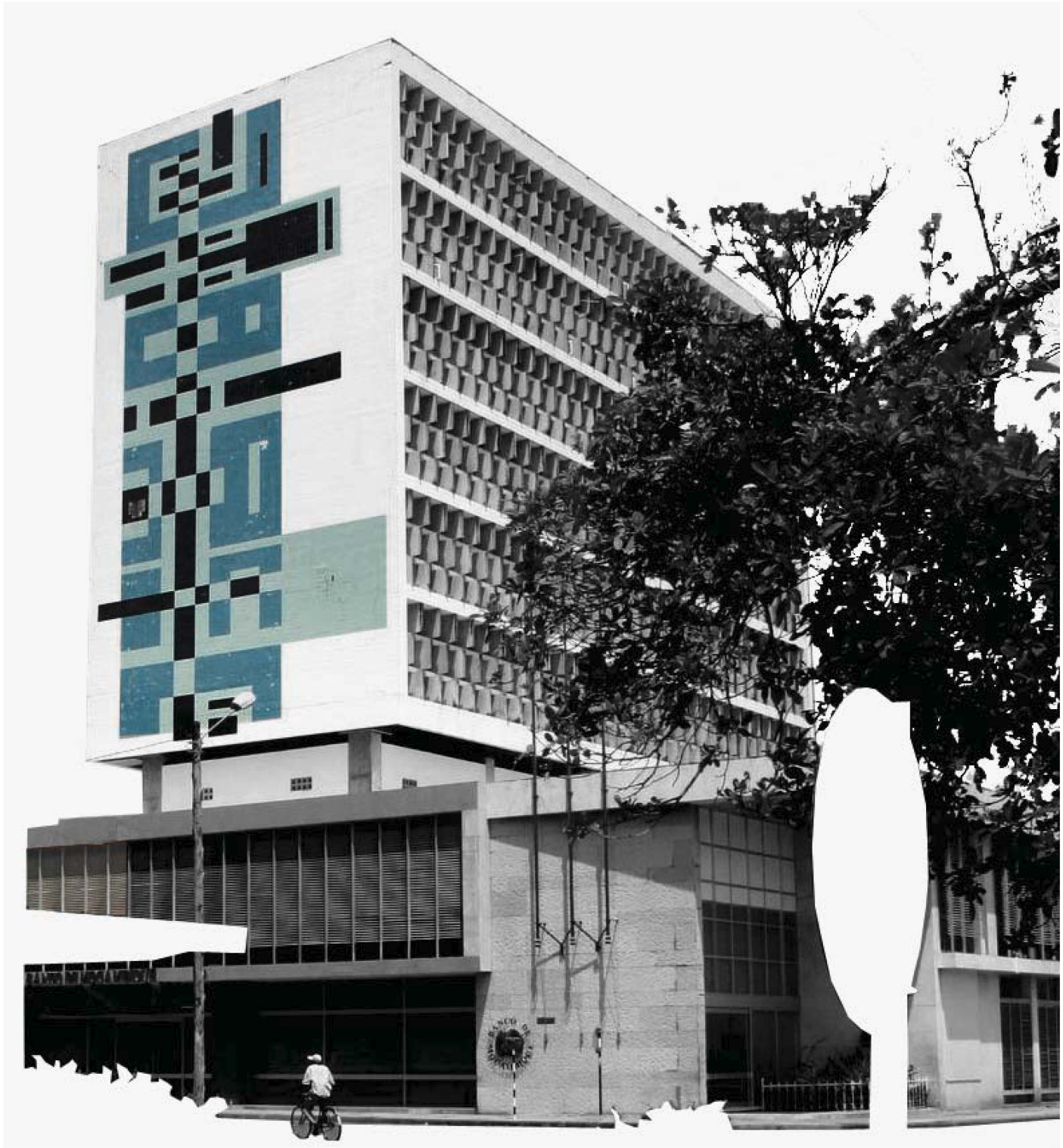
I can only speculate that the reason why the *azulejo* (ceramic tile) and the *mosaico* (ceramic mosaic) was often used as cladding elements to cover entire facades in modern buildings was due to Mozambican climatic conditions. In the Mozambican climatic scenario (which calls for open spaces, low heat storage buildings and good cross ventilation of buildings), we can assume that ceramic materials play an important role in helping to reduce heat gain. The glazing and colors of tiles can reduce sun radiation penetration and pleasant exterior shaded spaces can be created by making use of prefabricated elements used as sun screens - contributing toward the internal comfort of spaces. Windows have become elements of great architectural expression due to the necessity to filter light and avoidance of excessive radiation.

Another possible reason, that the use of *azulejos* or mosaics in exterior facades reduces the costs of maintenance and at the same time, are hygienically suitable for surfaces that need to be washed. Furthermore, I would hypothesize that a less convincing but nevertheless valid reason, that Mozambican building regulations ensured that row buildings needed to have blank facades on their sides. This might have created a culture for ornamentation that emerged as a necessity for 'filling' the blank facade with something. This does not disregard the influence of Indian decoration motifs imported from the Portuguese colony of Goa as another valid reason.

Ceramic tiles used in the roof are also a dominant feature in Mozambican culture. Huge overhangs protect the walls from solar radiation and provides shaded verandas that ensure that minimum mass is exposed to the sun, avoiding heat build up and subsequent re-radiation.

Currently, architectural ceramics are still used in exterior conditions by exploiting its ability to animate space and creation of textures and patterns. Clay blocks are still used in construction and are manufactured locally. However, over time, ceramic blocks have been gradually

Building in Mozambique with entire surface of the facade is cladded with a geometric pattern using mosaics.



substituted for cement blocks, as the latter is relatively easier to manufacture and are cheaper. Many people produce these blocks for construction which are then sold through the informal market.

I cannot dismiss the fact that a fruitful co-operation between architects, craftsman and artists have produced, in Mozambican architecture, ornamentation and architectural elements not only in ceramics that contributed to a strong relationship between architecture and the use of crafted materials. This relationship has to be revived as it contributes towards the growth of the relationship between materiality and identity.

DESIGN OF SURFACE PATTERNS

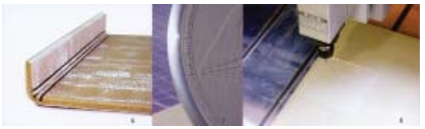
The design for surface patterns by using either floor or wall ceramic tiles is an ability that architectural ceramics have to animate space. However, this requires very basic understandings of its compositional rules such as tessellations and two-dimensional planar geometry (Hamilton, 1978).The use of simple geometrical patterns are better as some of these compositional matrixes can become quite complex and may require special methods for fabrication. Another consideration to bear in mind includes the angle of the proposed geometry, as these should not be too small for fabrication.

In Mozambican culture, as in most African cultures, patterns are part of the day to day experiences. There is a strong sense of geometric forms which can be witnessed in the decoration of artefacts such as sculptures, baskets and even paintings.

Tessellations
‘The simplest type of pattern for an infinitive surface is one that uses a single shape...’ (Hamilton,1978, p.142)

In fact, as Hamilton elucidates, there are only three polygons that will tessellate, and they are the square, triangle and the hexagon. A tessellation of these shapes is known as a regular tessellation. A combination of two or more of these polygons is called a semi-regular tessellation. Combining regular shapes with other shapes such as an octagon and a decagon would create infinitive variations of patterns which can lead to complex compositions.

Regular polygons can also be modified in various ways to produce more interesting patterns on example of FOA’s Spanish pavilion for Aichi,







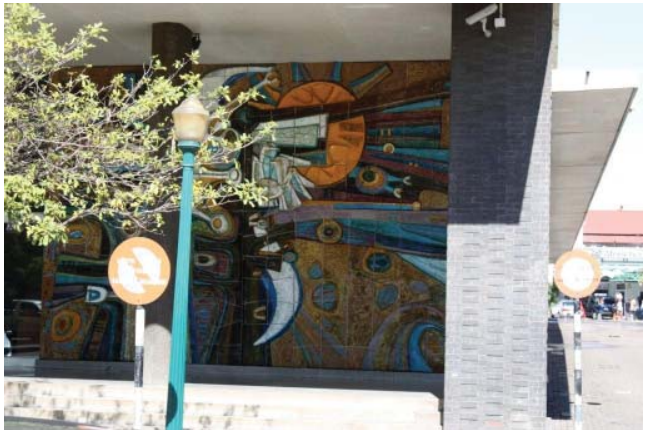


Top: Clay blockwork being used in the 'Casa da Alegria' Project by the architect Jose Forjaz.

Top right: The use of ceramic roof tiles in Veloso House. Roof tiles is still a preferred material for the roof of houses.

Below left: detail of brise-soleil by Pancho Guedes.

Below right: Detail of a facade showing both prefabricated concrete screen elements and mosaics in Maputo.







Top: Example of the collaboration between artists and architects in Maputo is shown in the Bank of Mozambique building.

Below: Pancho Guede's decorated facade, built in 1956 in Maputo.

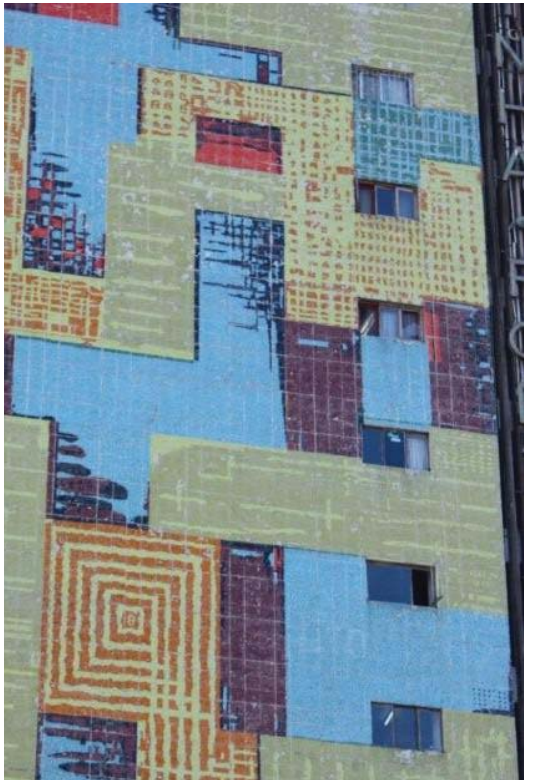
Below right: Exploration of carving a painting on a marble stone by Malangatana. Marble is available in Mozambique, and as just like ceramics they characterize the material palette of buildings in Mozambique. Malangatana is one of Mozambique's greatest artists . This exhibition was done in conjunction with the work of the architect Jose Forjaz and was entitled 'Architecture and Stone'

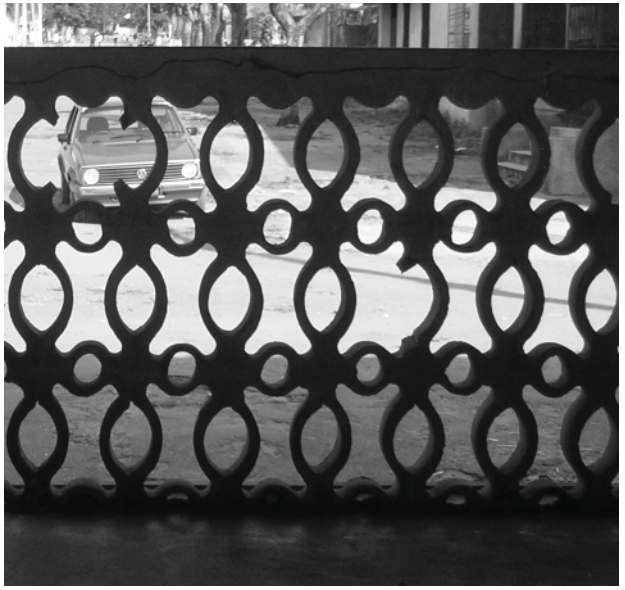
Top: A beach house cladded in mosaics in Maputo showing its use in the protection against the sea breeze that damages paint.

Below: An example of ceramic elements used as a screen on a parapet wall to achieve transparency - Maputo

Below right: An example of ceramic elements being used as a brise soleil. Its composition creates an interesting pattern on the facade of the building - Maputo









Japan. The addition of different colors further reinforces the degree of complexity of this composition whose main tessellation shape is made up of a composition of six different distorted hexagons.

There are many variations in creating tessellations to achieve desired patterns. Some techniques require just a simple variation of regular shapes. One such example is done through the change of the boundaries of the polygon and joining up the centres of each tessellation shape. In doing this, various secondary patterns arise determined by the way in which the basic tessellation shape is located (Hamilton, 1978). A further example can be demonstrated using a drawing design as the basis for the creation of a semi-regular tessellation pattern, which repeats indefinitely. This is done by cutting a regular shape in irregular ones and re-assembling them in different positions where the pattern inscribed on the shape is relocated and awaits for the 'missing' piece that completes the drawing. Many more variations can be found in tessellation studies. One of particular interest is called Kaleidoscope. It consists of seven different matching irregular shapes which together form an infinitive pattern. Kaleidoscope design is often used for very large surfaces and thus conceived to achieve complexity. The choice of using the hexagonal shape as a base shape provides the advantage of having a shape which can also be rotated thus creating great visual variation.

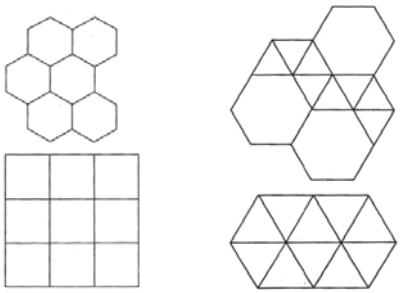
Top: Example of Regular tesselation (left) and semi-regular regular tessellation (right). Middle: Example of combination of semi-regular tesselation to achieve infinitive variations.

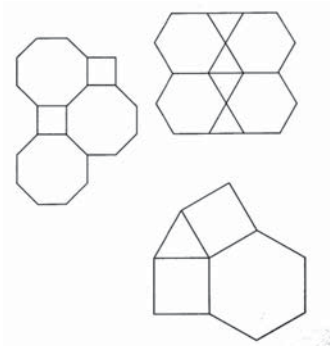
Below: Six different irregular hexagons used for the Spanish pavilion in Aichi, Japan. Architect: FOA

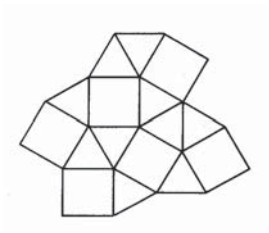
Patterns found in Mozambican culture. Top : Composition of Tonga Handbags from Maputo, Malangatana's painting and Pancho Guedes's Building in Maputo. All of which exploring geometric patterns.

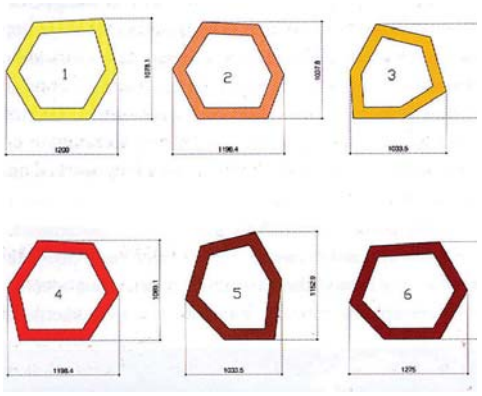
Below: Study of patterns from Tonga ethnic group in Mozambique by the ethnomatemathitian Paulus Gerdes.





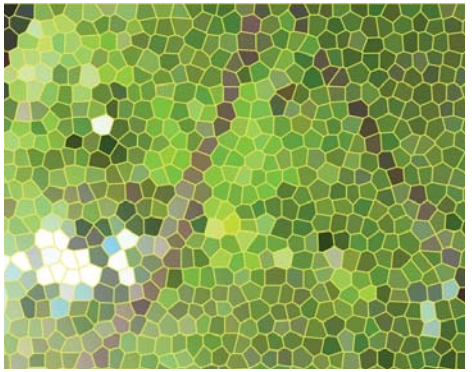




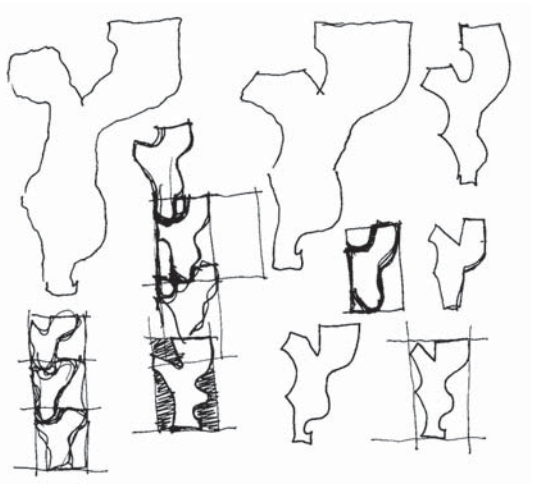




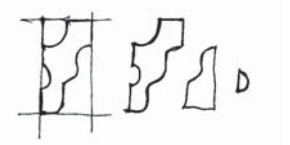


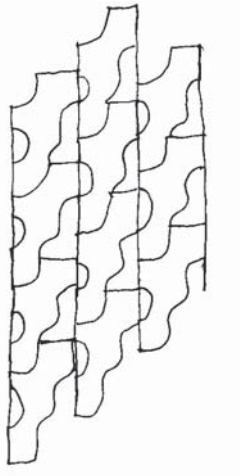


Exploring a process of creation of floor patterns and tesselation. An image of an Acacia tree was used to create a kaleidoscope tessellation. This was done using a Photoshop filter called 'mosaic'.









Exploring a process of creation of floor patterns and tesselation using and abstract image which derives from the map of Mozambique.

INTERNATIONAL EXPERIMENTS WITH CE

Cladding elements by moulding

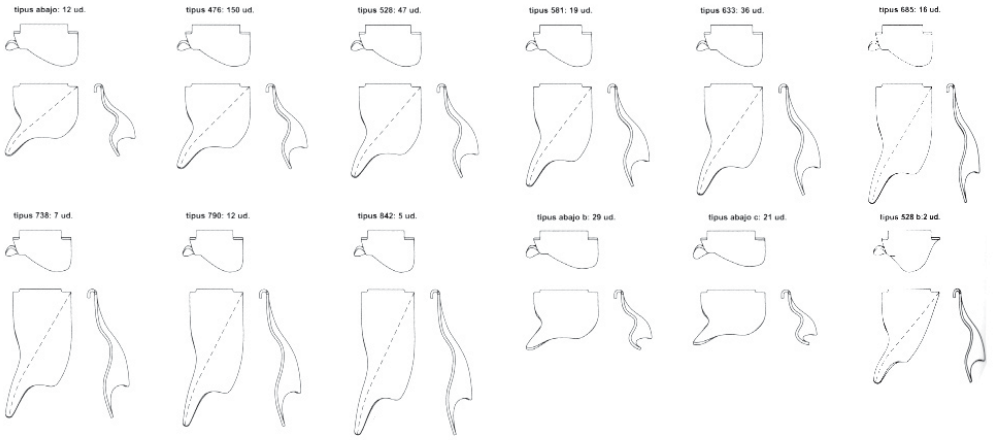
Villa Nurbs, Empuriabrava Spain
by Cloud 9 - Enric Ruiz-Geli

In this project Ceramics are used as a facade skin by implementing CAD/CAM interaction in design and fabrication. Ceramic tiles were designed in such a way as to respond to the aggressive environmental conditions and to protect this house from excessive solar radiation, rain and wind whilst at the same time allowing breezes to penetrate between the tiles. The tiles are fixed through tensioned steel cables forming a network structure. The fabrication of the tiles used CAM software to produce 3D mouldings for the tiles. The glazing of tiles was applied manually by an artist (ASCER, 2008).



Detail showing the CAM process for creating 3D moulds.



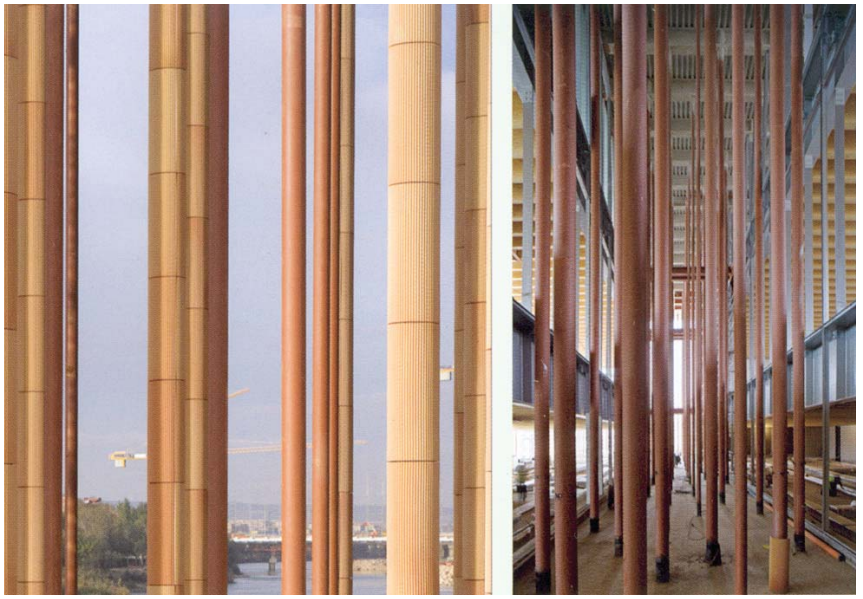


Cladding elements by extrusion

Zaragoza Spanish Pavilion
by Paxi Mangado

'The objective was to replicate a poplar or bamboo grove upon a water surface.' (ASCER, 2008, p.144)

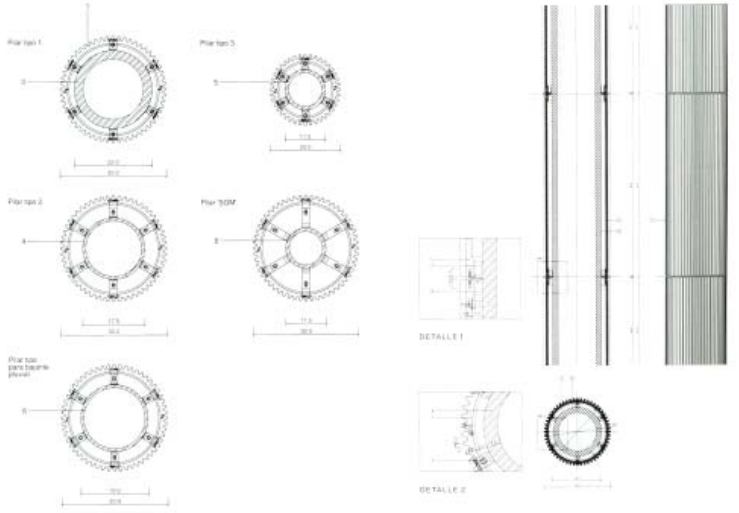
This was achieved through the creation of extruded ceramic pillars assembled in a metal core structure. These hollow ceramic cladding elements function as microclimates as their hollow chambers allow pipes inside through which water circulates, thus helping to cool down the spaces where most people would queue on hot summer days. In addition, all the air conditioning and electrical supplies are carried through these vertical ceramic pillars. (ASCER, 2008)





Images showing the method of extrusion of the ceramic pillars.

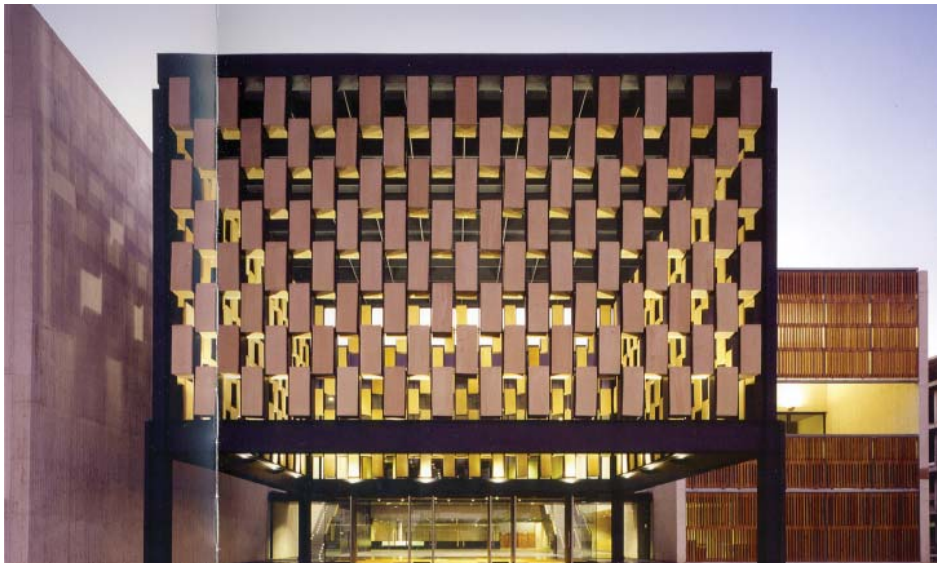




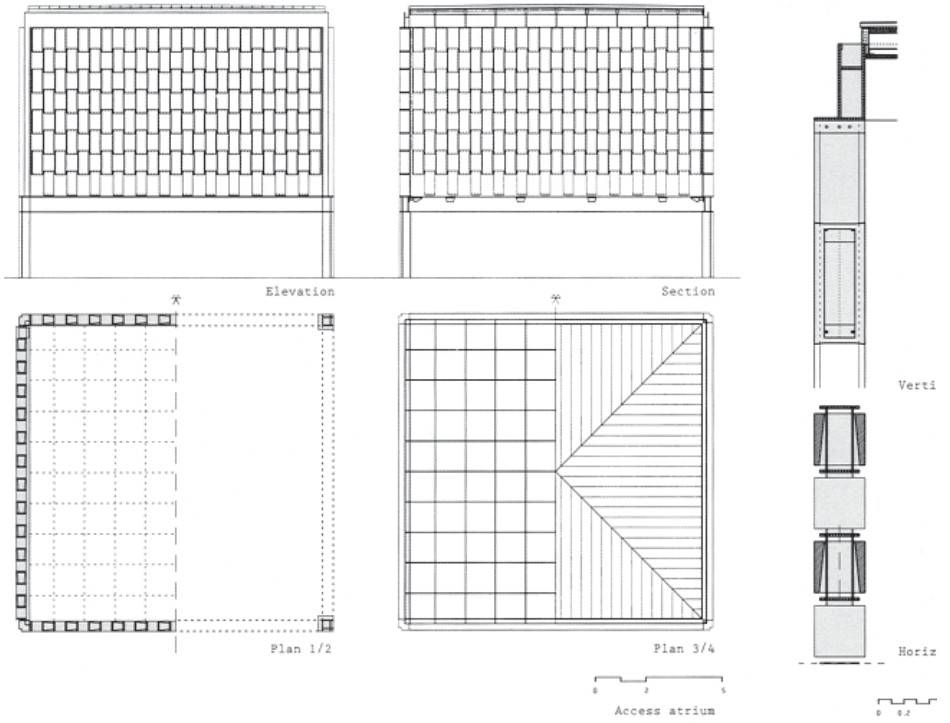
Screen elements by moulding

Congress centre in Peniscola, Spain
by Paredes Pedrosa Architects

In this project, ceramic elements are used as a lattice work to provide a transition between the exterior public space and the interior. The ceramic elements are hung from a steel structure forming a 3D textured fabric. A total of 400 ceramic pieces were used for the latticework which protects the transitional space by creating a shaded open space sheltered from excessive light, wind and rain. The ceramic pieces were made of 100x40x40 cm in natural stoneware texture weighing 80 kg each. They were made by artisans using contemporary firing techniques. The first pieces deformed beyond the expected allowance due to its great content of water, which lead to a slower firing process of production only obtained in older kilns. The pieces were assembled using metal rods and brackets girded into the steel framework structure. (ASCER, 2006)







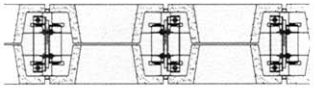
Detail of the assembly and moulding process of the latticework.

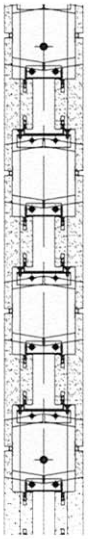
Spanish Pavilion, Expo 2005 in Aichi Japan
by FOA architects

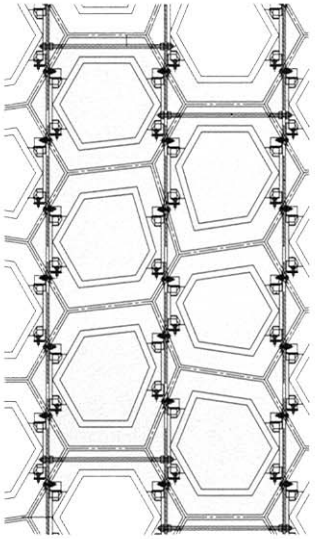
The pavilion represents a cultural link between eastern and western country and represents Spain's cultural tradition and history. This building is surrounded by an antechamber, which is reminiscent of the courtyard building model of Mediterranean architecture and middle eastern origins. The space in between the interior spaces and the ceramic facade is used for multiple purposes. The facade represents a lattice, something popular in Spanish architecture. The idea was to create a large perforated wall separated from the main building by 1,5 m that filters light and provides shelter, ideal to accommodate the queues of people visiting the pavilion.
The pattern was conceptualized with the intention of creating a homogeneous but constantly varying pattern. This was achieved by using six different hexagonal irregular ceramic shapes plus one regular shape used for the corners, and different colors. The sizes of the ceramic pieces are 50 cm in diameter and 12,5 cm high.(ASCER, 2006)

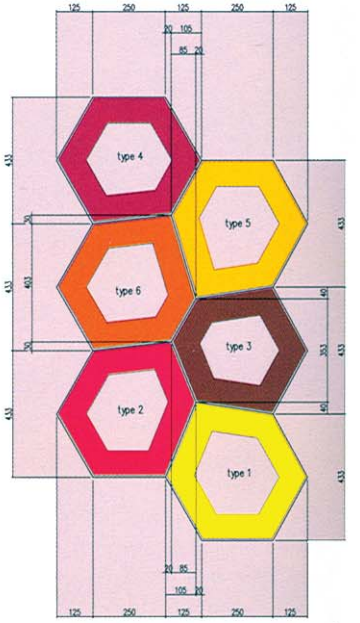


Detail of the assembly process of the latticework .



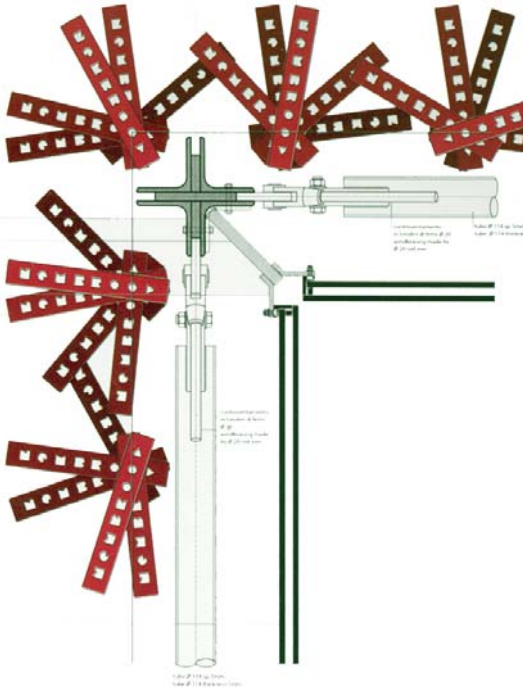






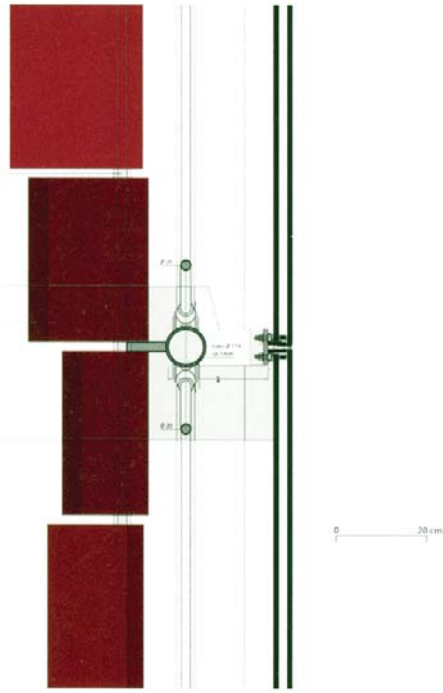
Nembro Municipal Library in Nembro, Italy
by Archea Associati

The need to create an extension to a 1897 building which was used as a library lead to the concept of creating a new wing that would close up the existing open side of the building creating a courtyard. The new 3 storey building was made to house a computer room for data base searches, consultation and reading rooms. The concept was to create a completely transparent building characterized by a skin of movable ceramic tiles of 36x36 cm red-glazed terracota tiles fixed to a steel framework. The tiles are freely positioned creating a variety of alternating shading and natural sunlight.(ASCER, 2006)



Detail of the terracota ceramic tiles with holes.





CONCLUSION

My interest in ceramics can be summarized as being a search for the relationship between materiality and identity specifically for Mozambique. Ceramics have proved to be a constant material and are able to sustain certain atavistic qualities concerning Mozambican culture. Furthermore, its manifold applications in different epochs (surviving stylistic trends and transcending time) and its versatility are what make this material the holder of a strong identity.

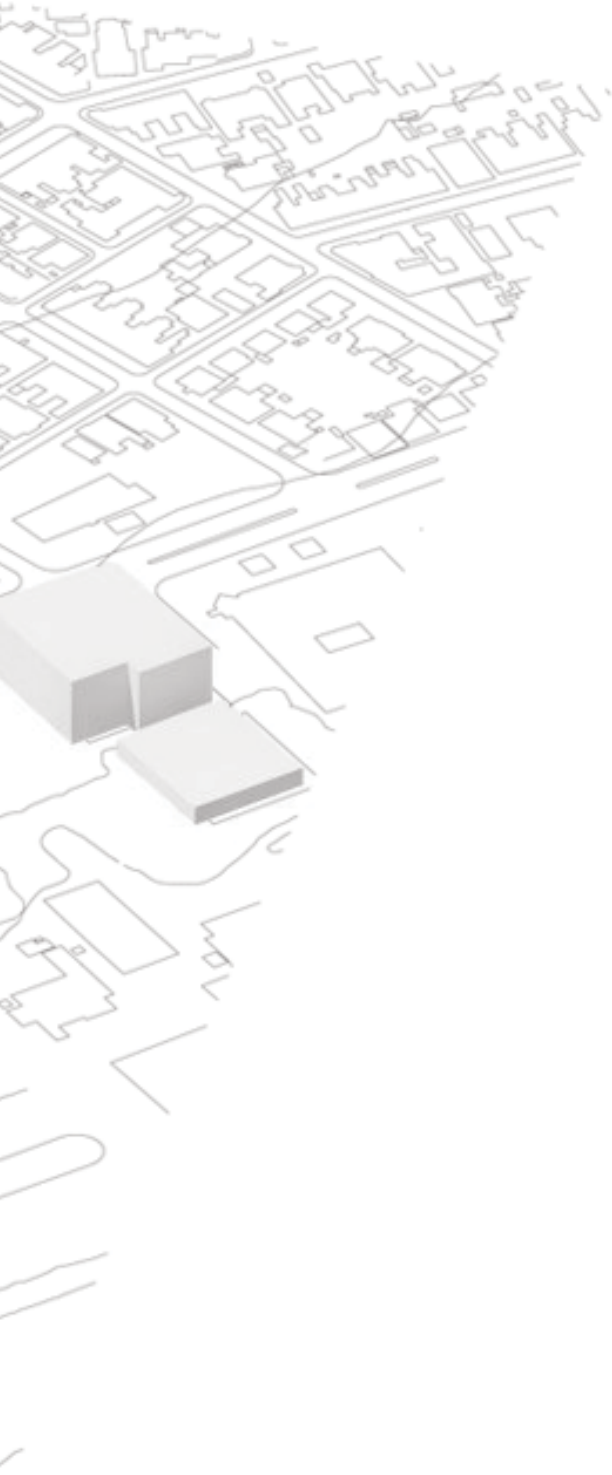
I will conclude that the partial yet important role that architectural ceramics have played in the contribution towards the creation of a unique and distinctive Mozambican architectural language has made this material a known element to the Mozambican people in the sense that they can associate to it consciously or subconsciously as part of the Mozambican architectural culture.

A few techniques and fabrication methods of architectural ceramics within the South African context were explored (see addendum) and some examples of its new application was put forward in the precedent studies. These represent partially the direction that I propose to undertake in the design phase that succeeds this study. This material can create the opportunity to express Mozambican culture within a foreign country due to its capacity to express symbolic forms either from the point of view of surface patterns that can animate outdoor living spaces, or in the form of facade elements such as sun screens and cladding, reminiscent of the building traditions of Mozambique. Ceramics reflect the pluralistic time - of which Mozambique as a nation is inevitable part of - through its great adaptability as seen in manifold applications of different environmental conditions.



PART V

DESIGN PROPOSAL:
A MOZAMBICAN CONSULATE AND CULTURAL CENTRE IN CAPE TOWN



CAPE TOWN AS CONTEXT

'…the experience of the Mozambicans at the Cape provides an example of the enormous cultural fluidity that has marked much of the history of South Africa. Culturally heterogeneous Mozambicans did not fit the grid of racial and ethnic categories, delineated by the state at the start of the twentieth century, aimed at explaining and controlling the black population. The resourceful way in which Mozambicans renegotiated their place in society at this time provides a vivid example of the malleability of identity'.

(Harries, 2001)

There is a long history of cultural relationship between Mozambique and South Africa that dates back to the 17th century with the history of thousands of migrant workers that migrated to work in South African plantations and mines. In the 17th century the Dutch Indian Company formed a successful refreshment station in the Cape that later came to be a powerful Dutch colony. Since the indigenous people showed resistance to the kind of hard work labour needed by the Dutch colony, slaves began to be imported from different parts of the African and Asian continent. By the mid 17th century, most slaves were coming from Madagascar, India and Indonesia. The latter was considered at this stage to be one of the biggest avenues for slaves. Slave trade increased continuously up until 1834 with their emancipation. However, this did not stop the trade of slaves in the Western Cape. There is historical evidence that between 1780 and 1880 around 2500 Mozambicans were brought to the Western cape first as slaves, then as Prize negroes or liberated slaves, and later as free workers. The slaves that were brought from Mozambique, Zambia, Malawi, Congo, among other countries were given the name of *'Mozbiekers'* slaves.

This project acknowledges this important historical fact and sees in this an opportunity to remember these Mozambicans that formed a substantial community in Cape Town. I propose that this project incorporates an exhibition space, which would tell this history to its visitors. According to my interview with the Mozambican Consul there are about 3000 Mozambicans residing in Cape Town. The current consulate serves the

Whole of the Western Cape and deals, as a result, with a larger number of Mozambicans. Currently, the consulate issues between 100 to 150 visas to South Africans; the visa section is a part of the Consulate that is always busy throughout the year reaching its busiest months during holiday season. >>

SITE SELECTION: SALT RIVER

In finding a site for diplomatic missions, governments have always preferred locations that ensured good security, good accessibility and that are well exposed in so called 'dignified areas'. This means that embassies and consulates end up being located in either city centres or high-income suburbia. Current demand for increasing security levels of some countries have led to Embassies and Consulates being located in areas away from city centres were accessibility and security can be controlled - this often leads to major setbacks of the main building, that introduce themselves with tall blank walls.

It is my intention to contest the current site criteria of diplomatic architecture by questioning the idea of Embassies and Consulates being closed off, inaccessible and sometimes unfriendly buildings. My proposal is that through initiated programmes, these buildings can fulfil their missionary functions and still contribute towards good quality urban spaces and activities. My site selection criteria includes:

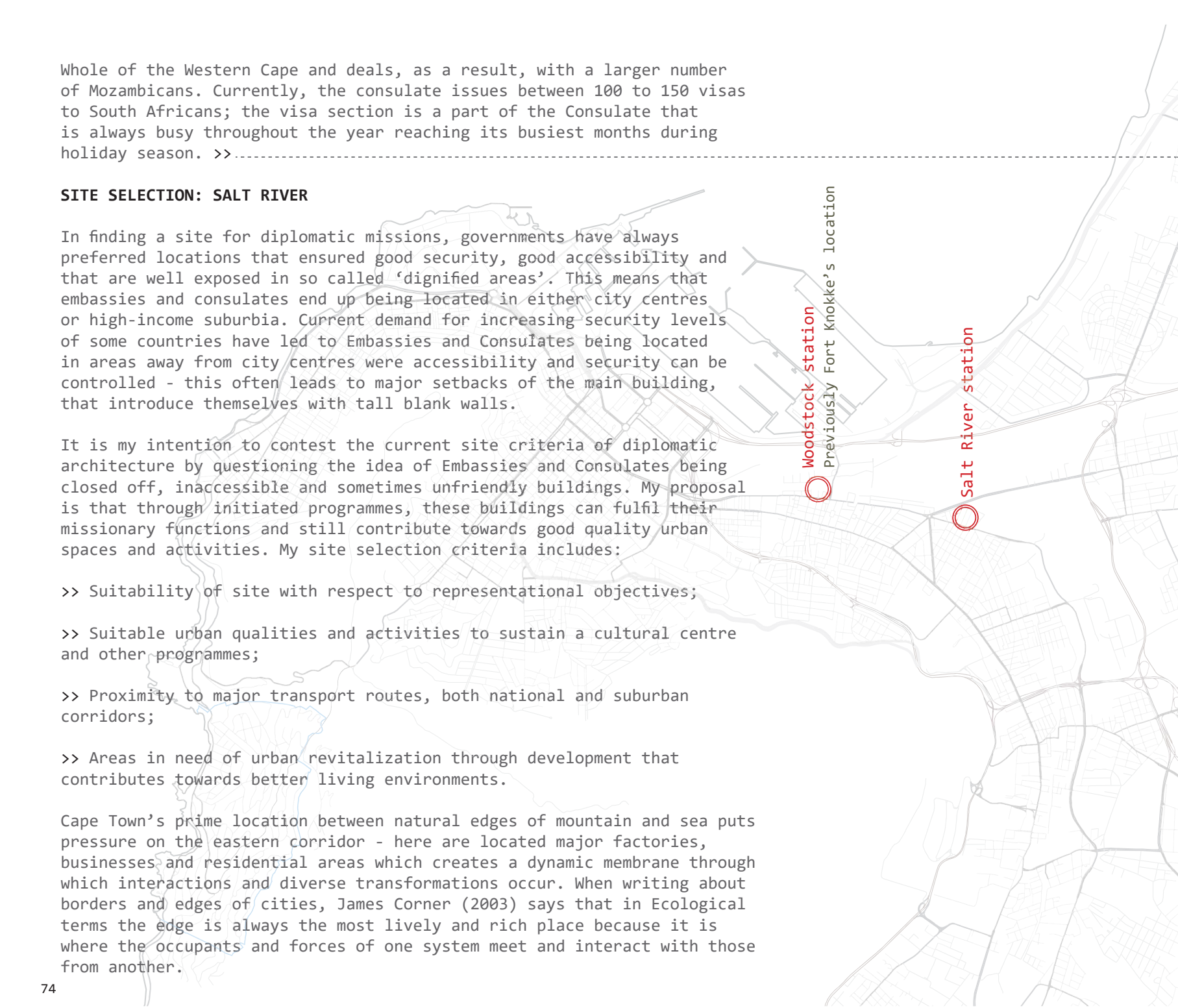
>> Suitability of site with respect to representational objectives;

>> Suitable urban qualities and activities to sustain a cultural centre and other programmes;

>> Proximity to major transport routes, both national and suburban corridors;

>> Areas in need of urban revitalization through development that contributes towards better living environments.

Cape Town's prime location between natural edges of mountain and sea puts pressure on the eastern corridor - here are located major factories, businesses and residential areas which creates a dynamic membrane through which interactions and diverse transformations occur. When writing about borders and edges of cities, James Corner (2003) says that in Ecological terms the edge is always the most lively and rich place because it is where the occupants and forces of one system meet and interact with those from another.



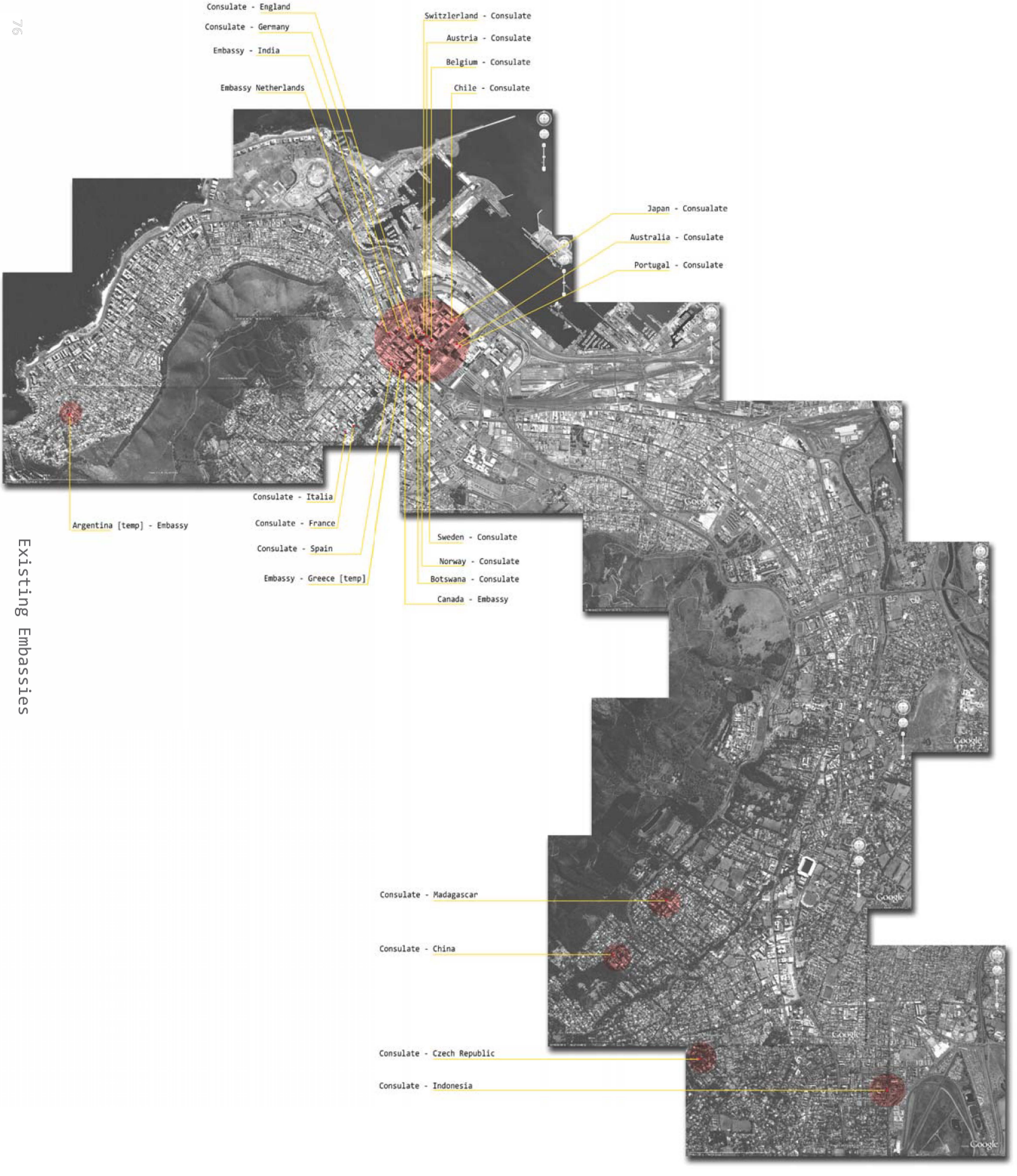
Skeletons from the *Pacquet Real*

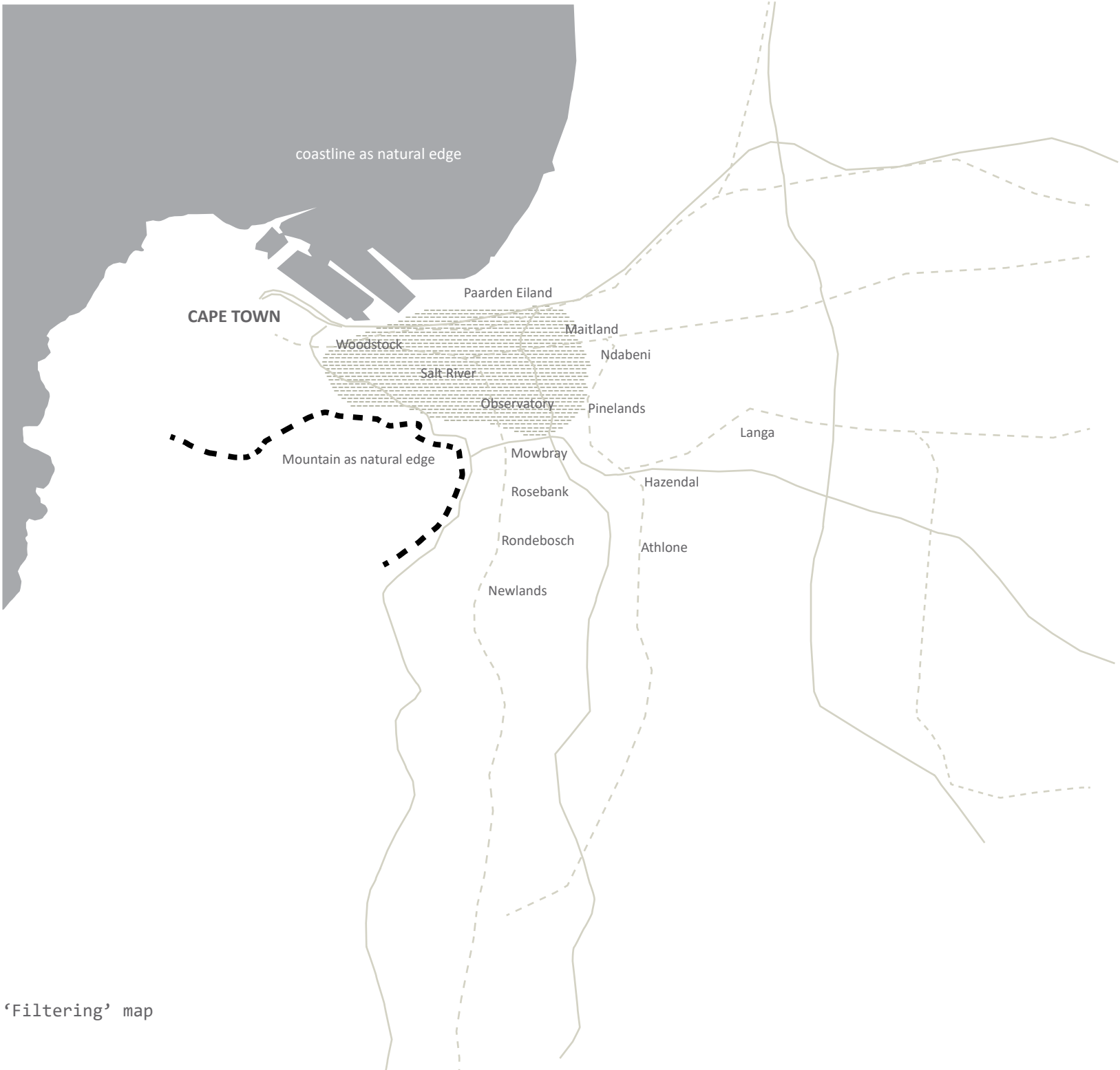
On 18 May 1818 the Portuguese slaving brig the *Pacquet Real* was wrecked in severe storms in Table Bay. It was carrying 171 slaves from Mozambique to Salvador in Brazil. Some 25 bodies were washed ashore and hastily buried on ground near the Fort Knokke fortification. The surviving slaves were indentured as 'prize negroes' in the colony.

In the early 1950s, railway workmen digging at the site uncovered a number of skeletons, which are now in the South African Museum and have been analysed by anatomists and archaeologists at the University of Cape Town. Some of those buried without coffins had teeth which were 'decorated' by deliberate chipping to points in the custom of the Maconde, Yao and Macua of eastern–central Africa. Isotopic bone analysis also showed that they had lived primarily on a diet of sorghum, millet and maize of the kind used in that region. Skeletons found in nearby coffins showed no such teeth markings and bone analysis revealed a diet of predominantly European grains. It thus seems highly likely that the former are skeletons of the *Pacquet Real*'s drowned slaves.[92]

Historical evidence
source: Worden et al, 1998

Existing Embassies





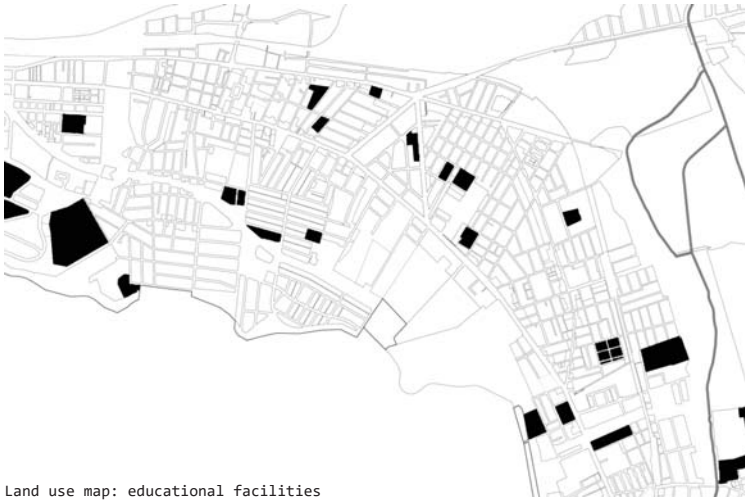
‘Filtering’ map

In the case of Cape Town, I have identified this location for its cultural hybridity, multiplicity and its productive exchange which is part of the filtering to the main attraction point - the CBD (Central Business District). Woodstock and Salt River are historical areas located approximately 3 km from the Cape Town CBD. Located between Devil's Peak mountain and the sea, these areas were established more than 200 years ago and represent one of Cape Town's best location given its strategic position in relation to the major transportation routes namely the N1, the N2, and the southern and northern suburb corridors. The area is well known for its great diversity of living patterns and standards. This mixed living environment amalgamates high and low-income residents, street people, business operators, visitors, shoppers, children, and professionals.

Woodstock and Salt River also exhibit the need for an urban revitalization in an attempt to ameliorate its current problems of urbanization characterized by poverty, unemployment, crime, and vandalism.



Land use map: commercial activity



Land use map: educational facilities

TIMELINE

1661 Roodebloem established as a settlement area

1788 Fishing village established [papendorp village] between Fort Knokke and the Craig Battery

1861 Railway line is built linking Cape Town to Wellington; it cuts Woodstock and Salt River off from the sea

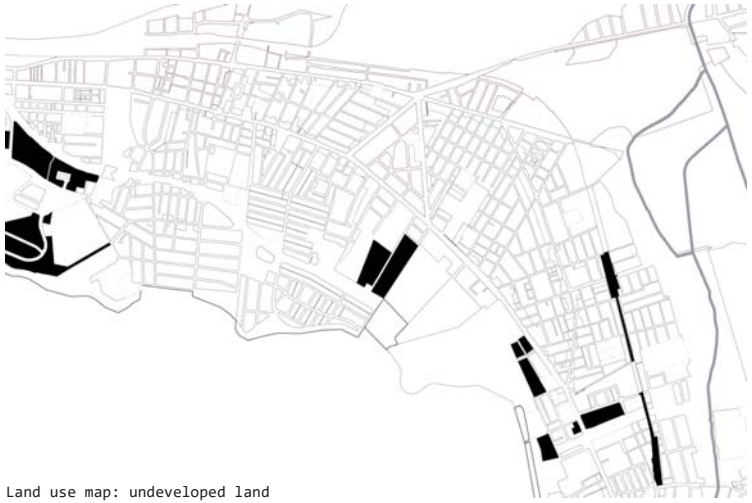
1900 503 houses built in one year

1910 Salt River Market gains prominence and becomes an attraction point for the area

1912 De Waal drive constructed as a single roadway



Land use map: health services



Land use map: undeveloped land



Land use map: industrial



Land use map: residential areas

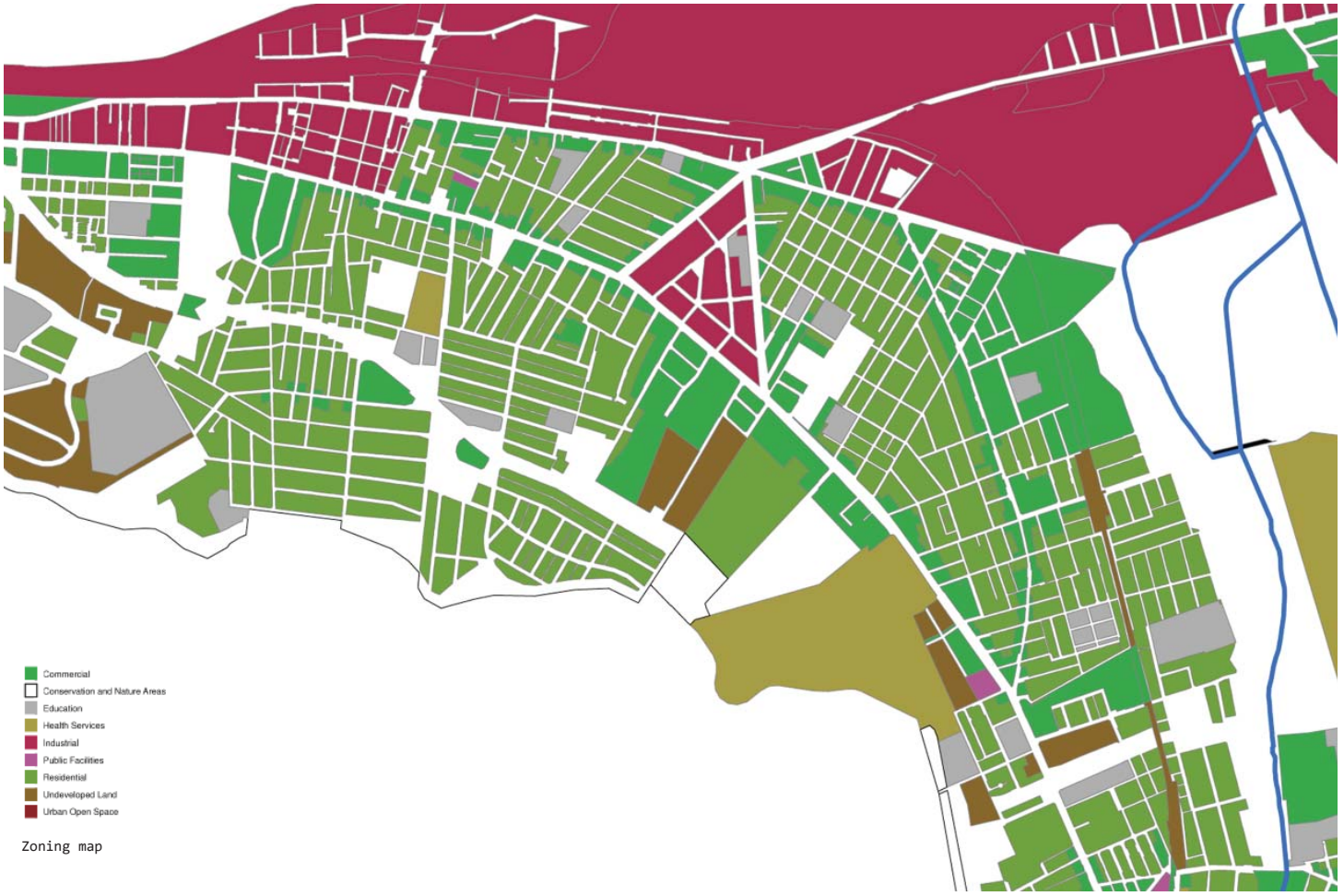
1930's Salt River and Durham Avenue become increasingly industrial

1920 Woodstock and Salt River's planning drawings show a great number of public spaces and facilities

1940-60's Land reclamation works on the Foreshore propel further expansion of the Railway systems destroying Woodstock beach and Salt River beach.

1968-70's Forced removals in District Six casued great uncertainty in mixed colour communities. Salt River and Woodstock face decay due to lack of investment.

Salt River was and still is an ethnical mixed society. One of the landmarks of this area was the Salt River Market, which was considered to be a place of social focus between coloureds, Indians, and Portuguese residents of the area (Worden et al, 1998). The vibrancy of this area is now lost, as some sources depict this area as having a rich street urban life:



Zoning map

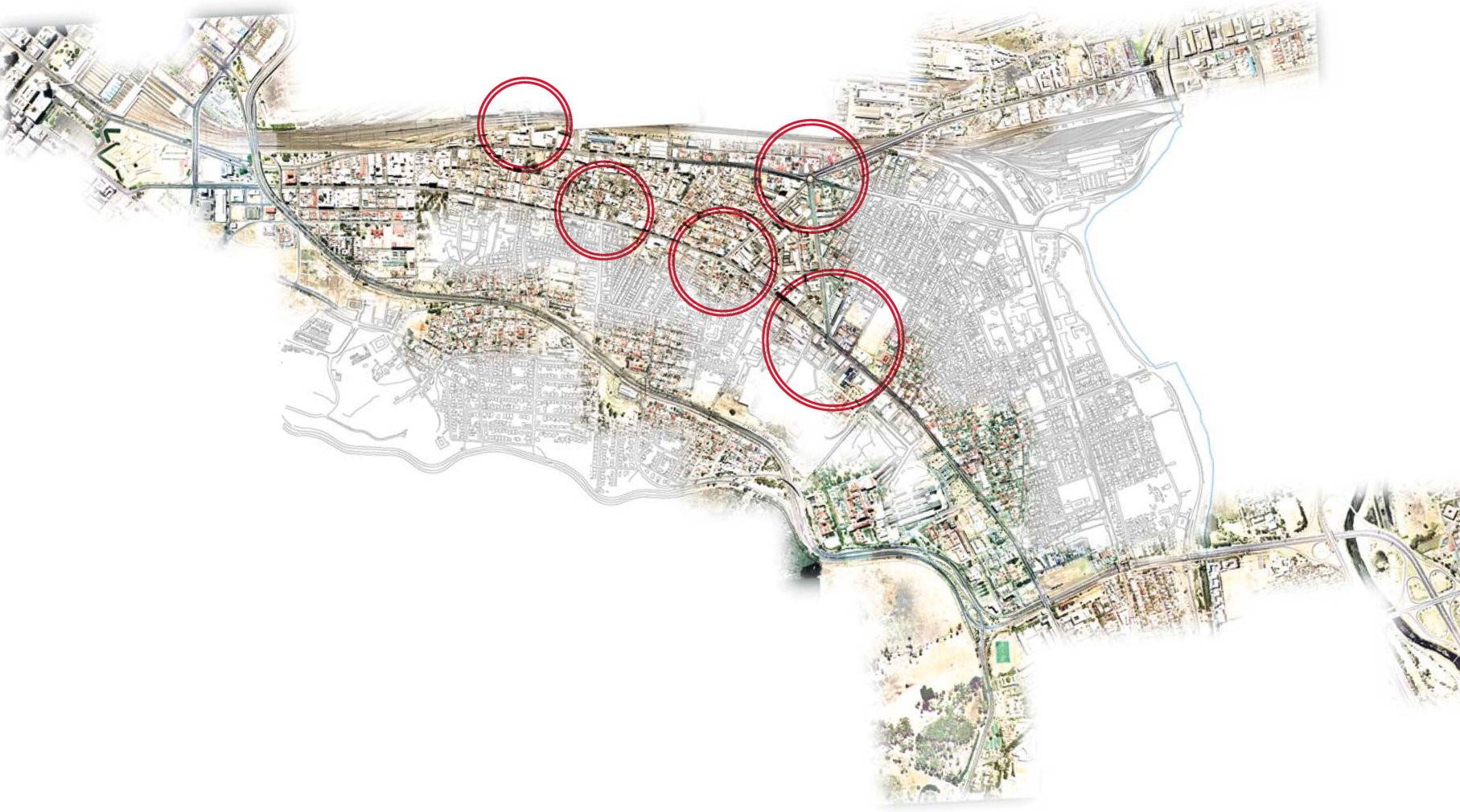
‘At lunch time young men from the railway works in the 1920’s used to go up to the Main road and go pick up the young girls working at OK Bazaars and Oblowitz’s and take them down to the beach at Mouille Point and have a royal good time’.

(as cited in Worden et al, 1998)



Woodstock/Salt River urban fabric


500 m Radius
N1 National Road
Woodstock Station
Voortreker Road
Albert Road
Salt River Station
Victoria Road
Keisergraght Road
Salt River Road
Durham Avenue
Cecil Street
Scott Road
Mountain road
Roodebloem Road
Chester Road
Coronation Road
De Waal Drive
Melbourne Road
Upper Mountain Road
Eastern Boulevard
Station Road
Liesbeek parway
0
100
250
500
750 m



Main activity routes showing propitious notes
for intervention



+ Vacant land
+ Located on busy road
- Surrounded by industrial buildings
- Site size might be too small

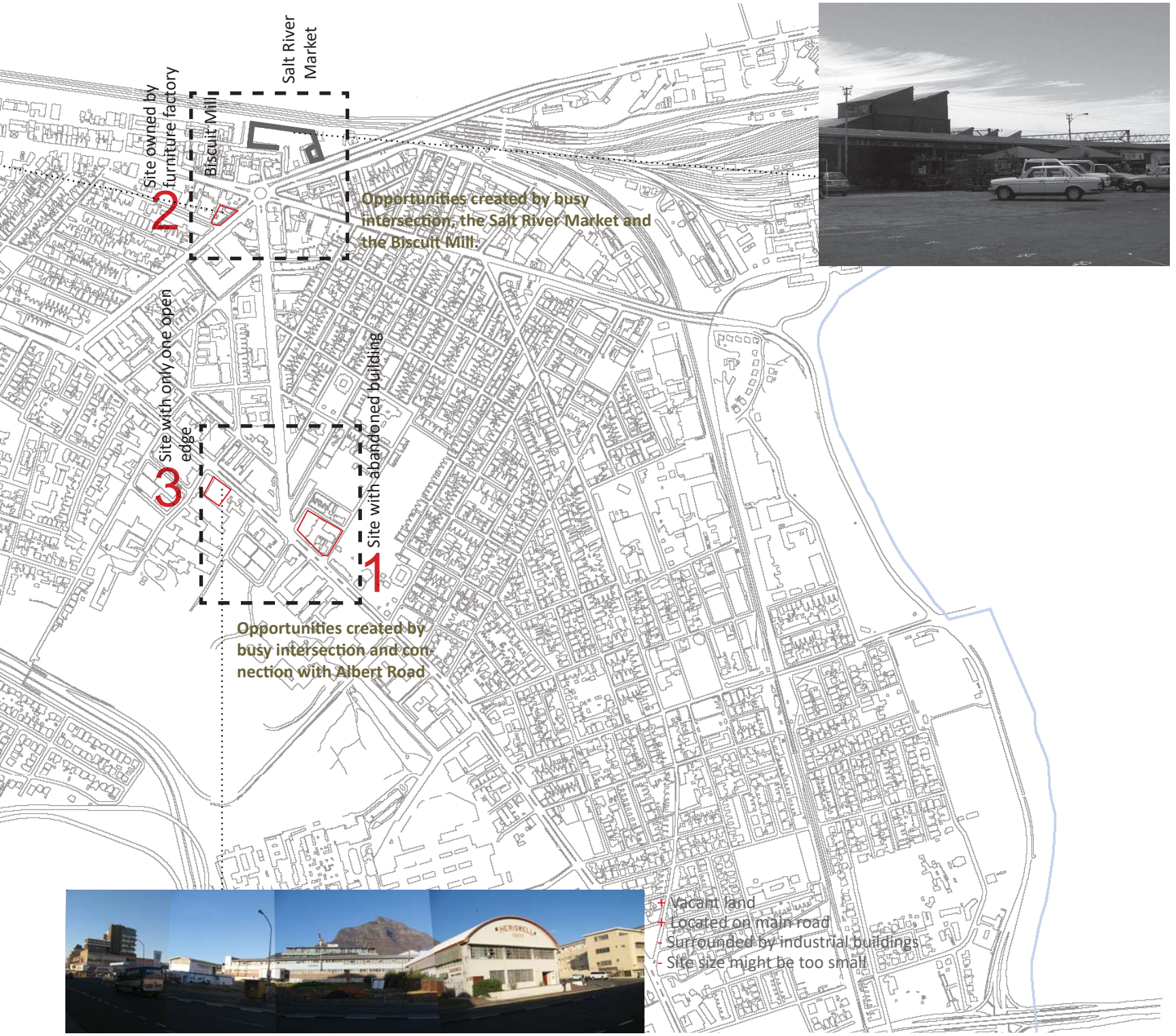


Opportunities created by the presence of historic public space

Opportunities created by the presence of a public institution



+ Vacant land
- Currently used by informal houses
- Located off main road


Salt River Market
Biscuit Mill
Site owned by furniture factory
2
Opportunities created by busy intersection, the Salt River Market and the Biscuit Mill.
Site with only one open edge
3
Site with abandoned building
1
Opportunities created by busy intersection and connection with Albert Road
+ Vacant land
+ Located on main road
- Surrounded by industrial buildings
- Site size might be too small

CHOSEN SITE

1

+ Vacant land
+ Located on main road
+ Possibility to use/demolish part of existing building
+ Suitable urban quality

+ Existing building makes it suitable with relation to representational objectives
- Adjacent to abandoned building
- Site size might be too small















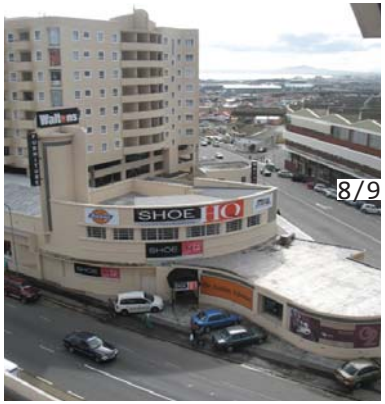



4


10

6





8/9


13

11

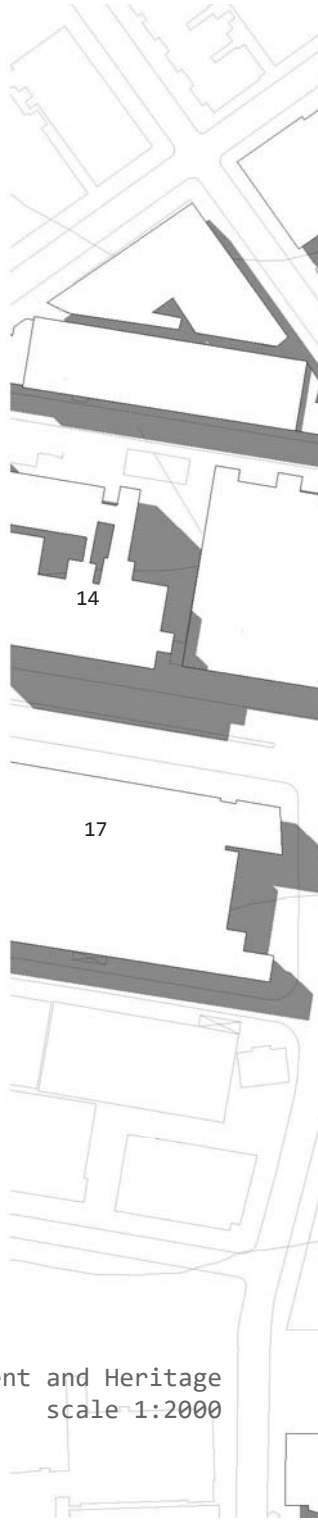


18



KEY

1_Public park
2_Black pool sports ground and park
3_Mixed-use commercial building
4_Proposed site: currently vacant
5_Vanguard House: Art Deco building, UNGRADED
6_Salt River fire station: early 20th century Art Deco building, GRADE 2
7_Nursery School
8_Art Deco building: Shops, GRADE 2
9_New Residential building
10_Union building
11_The Salt River Centre: currently to let
12_Victorial style commercial building, GRADE 2
13_House of Monatic: Modern movement industrial building, GRADE 2
14_Rex Trueform: Modern movement industrial building, GRADE 2
15_Vacant land
16_Residential houses
17_Queens Park factory: Modern movement industrial building, GRADE 2
18_Pals factory: industrial building
19_Salt River High school
20_Residential building by Uytenbogaardt



Built environment and Heritage
scale 1:2000


Durham Avenue
Cecil Road
Ford Road
Milne Road
Ross Road
Shelley Road
Victoria Road
Main Road
1
2
3
4
5
6
7
8
9
10
11
12
13
15
16
18
19
20

PRECEDENT STUDY

Embassy of Finland in Washington, USA
by Heikkinen-Komonen Architects

The architects have conceived this project as a ‘jewel box’ which displays on the inside Finland’s rich design heritage. This was achieved by using traditional and contemporary materials in innovative ways (Pearson, 1994). Moreover, the building takes into account that much of Finland’s architectural identity is connected to the way they design having nature in mind. As a result, the architects allowed nature to be part of the building’s experience through a generous use of Glass on the northern façade and by using a steel and copper trellis (on which plants would grow) on the southern facade.

The architects achieved a friendly look that distinguishes itself from the other ‘fortress’ like embassies within the surrounding area (Pearson, 1994).



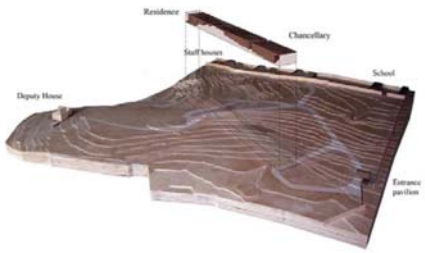






South African Embassy in Berlin, Germany
by MMA Architects

One of the ways that a cultural identity can be articulated in architecture is through an integration of arts and crafts as decorative pieces within the building. In this case, the approach to design was to use building materials and technologies reminiscent of a ‘South African way’ of building. Nevertheless, the presence of a being in a building which is representative of South Africa is better felt through decorative art and crafted materials incorporated into the detailing of the building.







Embassy of the Netherlands in Addis Ababa, Ethiopia
by Dick Van Gameren, Bjarne Mastenbroek

In this project, the architects created a building that uses cultural elements of both cultures. They used the red oxide colour that strongly characterizes the Ethiopian landscape and the remarkable Dutch water landscape as language of cultural expression. This was done by adding the red colour to the rough concrete walls and by using the roof as a reference to the Dutch landscape. Furthermore, the building was partially placed into the landscape given the sensation that it has been carved out of it - a reference to traditional Ethiopian architecture.

This project represents a good example of an architecture which begins to deal with the differences of cultural expression as metaphors to create a representation of both cultures. Nevertheless, although the building assumes a strong contextual image the idea of it's roof, which is representative of dutch water landscape, being used as a shallow pond seems rather forced and literal.





French-Mozambican cultural centre in Maputo, Mozambique
by Unknown, 1995

This project is situated in the heart of the historical district of Maputo. It was built on the ruins of what used to be an old colonial hotel built in 1896. It is predicated upon the cultural exchange between the two nations and it houses, through different programmes and spaces, a variety of cultural events. Some of it's biggest success are the entertainment events housed within the building such as concerts, art exhibitions and movie screenings. The building also opens its doors to local artists helping them in the creation of a more professional environment around their artistic productions.

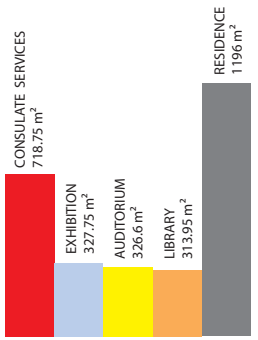
PROGRAMME

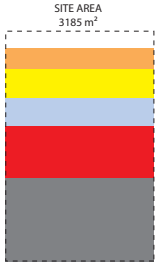
During the evolution of humanity, nations have always shared, and sometimes imposed, their way of life on other nations. It was through this interaction that nations evolved, as they learned from each other about different technologies and culture. It was through their interactions and negotiations that diplomacy emerged, alongside the need for diplomatic missions. In modern times, countries in continuous negotiations have felt the need to have their representatives residing in the foreign nation with the intention of rendering diplomatic services to their country as well as to their citizens who have emigrated. This need led to the emergence of a new 'type' of architecture - what Jane Loeffler (1998) calls the 'architecture of diplomacy'. The image reflected by the architecture of the nation of which it represented became very important as a way of expressing the grandeur of its culture. In the 1950's, Embassies and Consulates of developed countries were expressed in such a way that their image could be perceived as the reflection of *"architectural theory coupled with political necessity" (Loeffler, 1998, p. 8)* in an attempt to showcase their power as future-oriented nations.

A consulate is a form of diplomatic mission in charge of matters related to individual people and businesses, in other words issues outside inter-governmental diplomacy. The head of a consulate is known as a Consul. A consulate general is headed by a senior consul known as a Consul General, who typically has several Consuls and Vice Consuls working under him/her. A country may open multiple consulates (and/or consulates general) in major economic centres to support their economic interests. Consulates are subordinate posts of their home country's embassy, which is located in the capital city of the host country. Embassies are established with international law under the Vienna Convention on Diplomatic Relations while honorary consulates, vice-consulates, consulates, and consulates-general are established with international law under the Vienna Convention on Consular Relations.

A list of functions provided by the Vienna Convention stated that Diplomatic Missions should represent friendly relations and developing economic, cultural, and scientific relations. The existing consulate's main objectives is to support Mozambican people touring, studying in, residents, or visitors on business as well as to provide visa services for foreign visitors.

As Jane C. Loeffler (1999) said, when critiquing the role and image of recent American embassies:

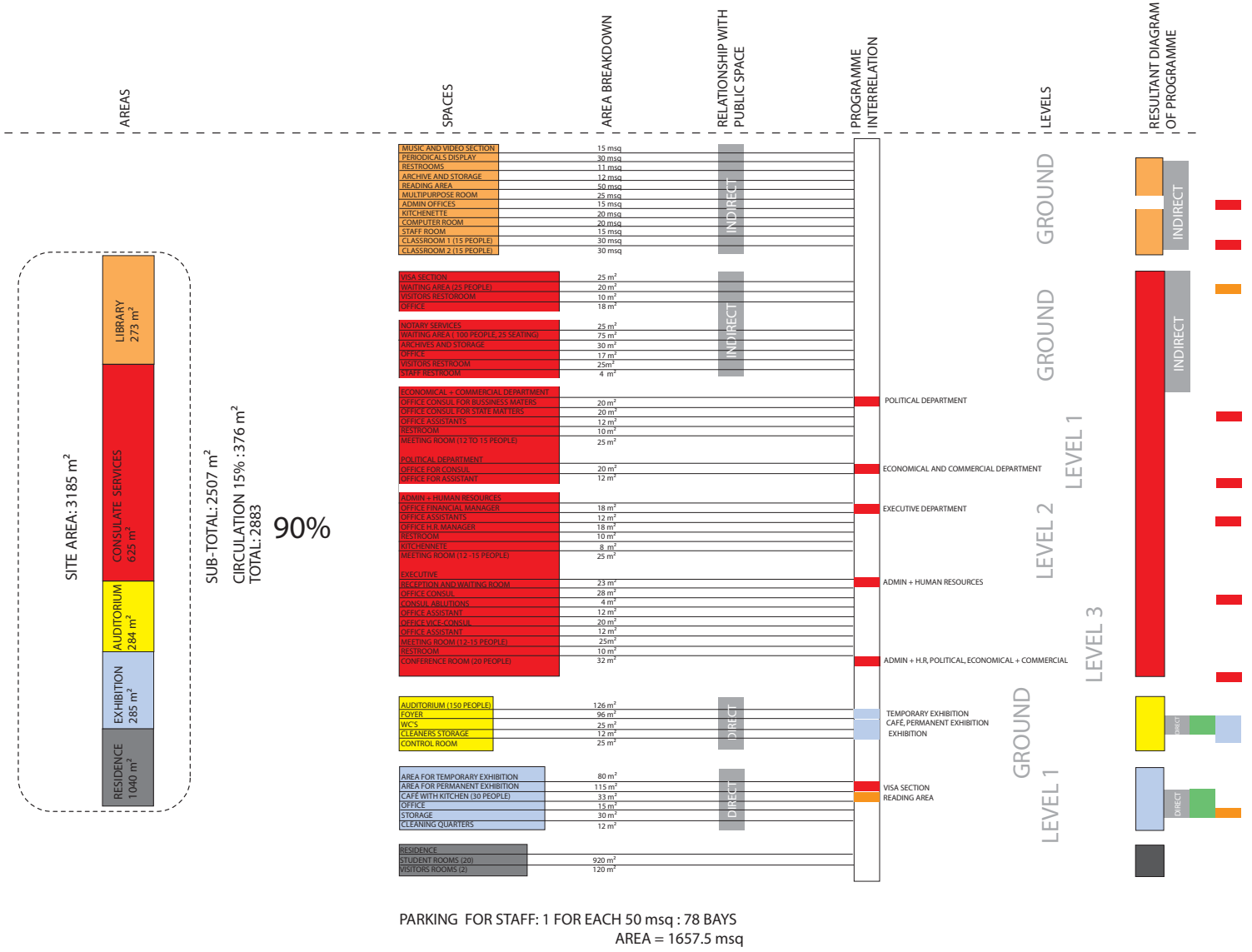




PROGRAME



FRAGMENTING PROGRAMME
creating an interaction between different spaces



PARKING FOR STAFF: 1 FOR EACH 50 msq : 78 BAYS
AREA = 1657.5 msq

Accommodation schedule and spatial relationship diagram

‘...embassies of the 1950’s welcomed visitors and explained the United States through easily accessible libraries and public programmes.[...] the openness that was once the hallmark of that era was since been lost...’

Embassies and Consulates should represent a way of expressing good will and a symbolic commitment between the two countries. The cultural centre incorporated into the consular grounds would be part of the programme of a diplomatic mission which would aim at promoting Mozambican culture: the promotion of Portuguese language, Mozambican arts, crafts and literature, as well as establishing a connection between Mozambique and South African culture through cross-cultural events.

FORM DEVELOPMENT

The project seeks to re-interpret the role of the Mozambican consulate in Cape Town not only between the relationship of programme and space, but also through its relationship and role in the city, as part of an existing urban fabric contributing towards its regeneration.

The Mozambican consulate in Cape Town would represent a perfect place to learn Portuguese, to find out more about Mozambique as tourists and business opportunities; to appreciate its art and history; to attend cultural events; to meet artists and authors; to participate in lecturers and conferences about Mozambique and/or South Africa.

The projects represents an opportunity for the user to experience a ‘journey’ of [re]discovery of the cultural relationship between Mozambique and Cape Town by making use of historical facts shared by the two countries whilst propelling cultural exchange in the activities that they would host. In this sense, I propose to create a house of Mozambique in Cape Town that does not serve Mozambicans and South Africans as separate entities, but rather propels their cultural interaction.

The sense of porosity that buildings transmit in Mozambique due to its climate is here re-interpreted and transformed into formal and spatial explorations. My intention is to recreate [architecturally] the feeling of a building which breathes through fluidity of spaces using the horizontal to create an experience of delay and transitions between spaces reminiscing the openness and natural forms of its landscape.



conventional programe





art + exhibitions



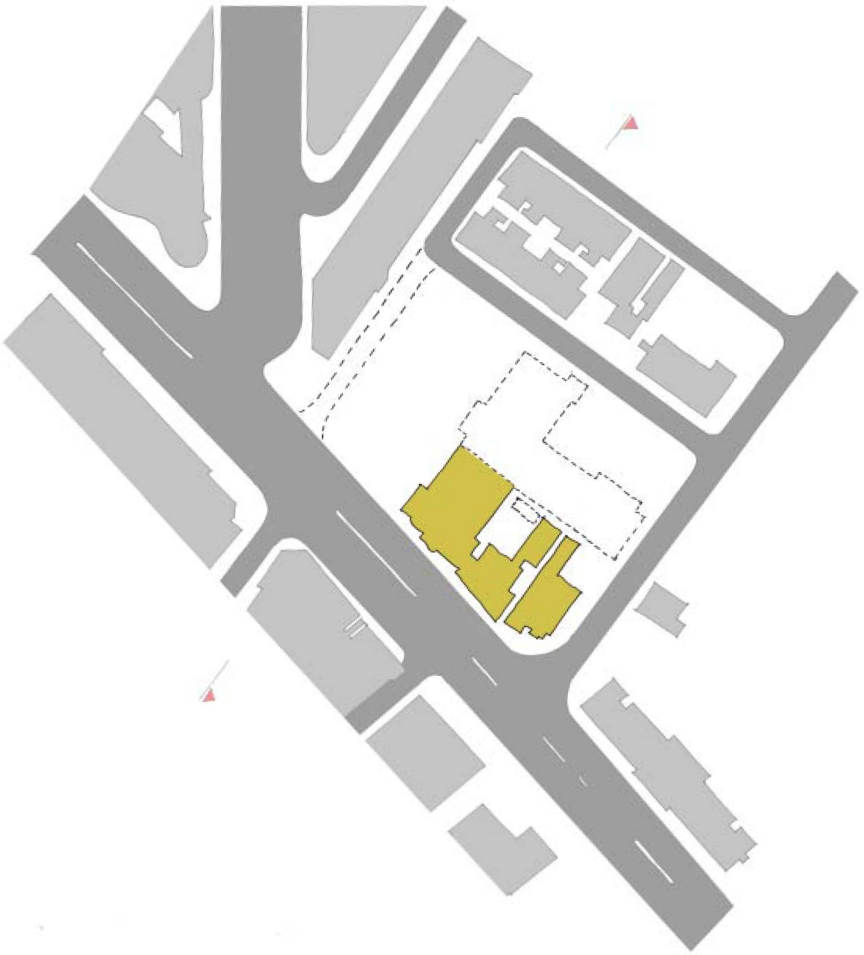
experience of culture

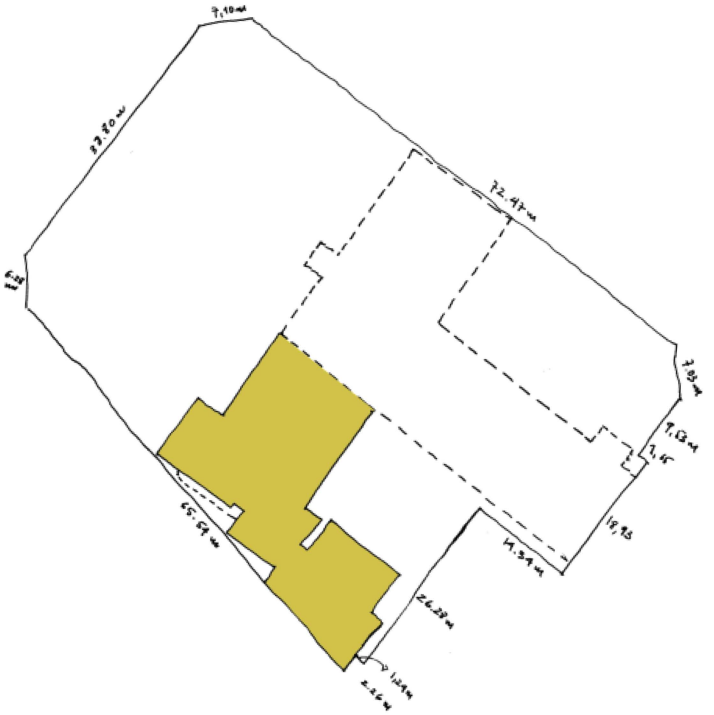




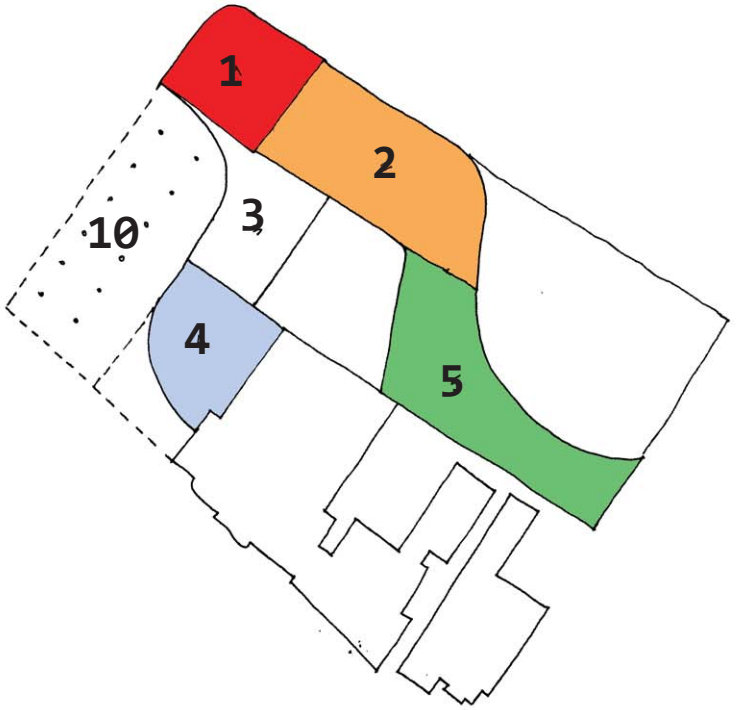
history of cultural interaction

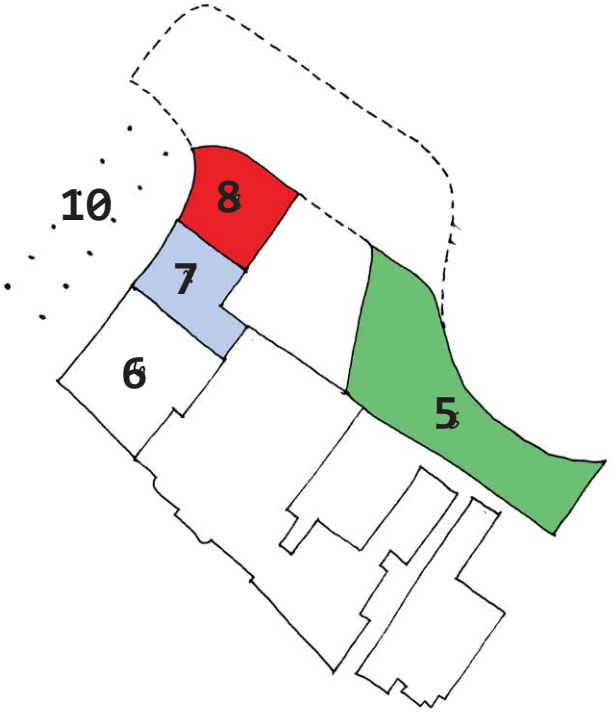
Concept diagram for spatial experience

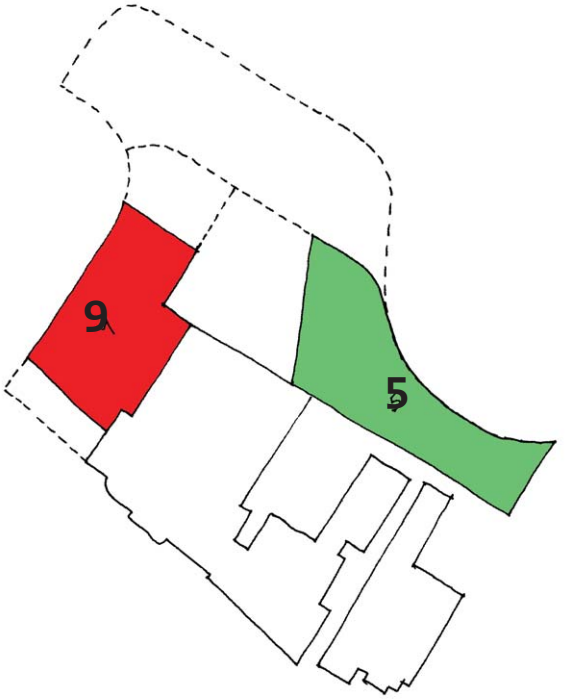




SITE PLAN **PROPOSED DEMOLITION 1:2000**

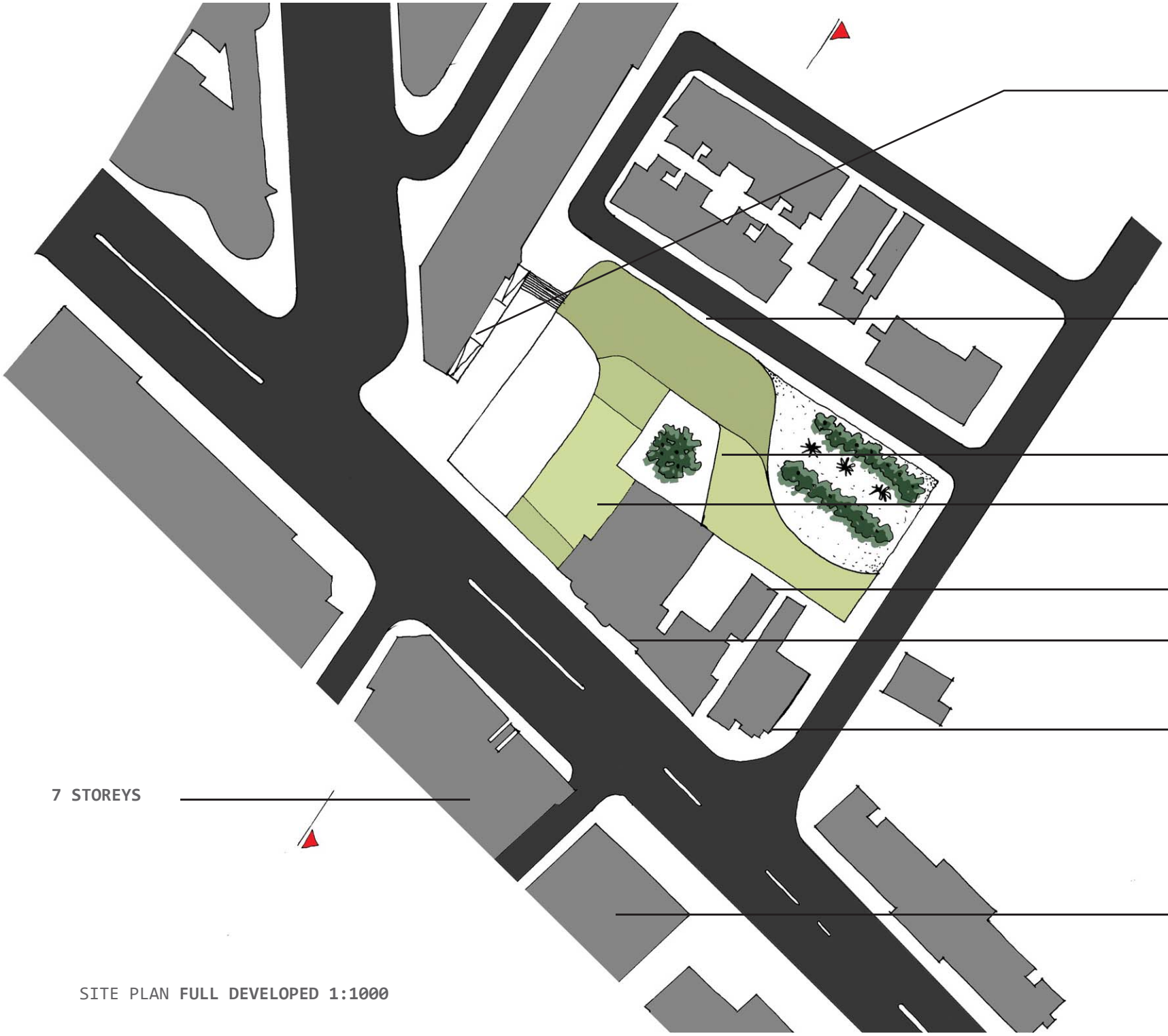






LEGEND
1 NOTARY SERVICES
2 LIBRARY
3 FOYER
4 TEMPORARY EXHIBITION + CAFE
5 RESIDENCE
6 AUDITORIUM
7 PERMANENT EXHIBITION
8 VISA SECTION
9 CONSULAR OFFICES
10 PUBLIC SPACE

SITE PLAN GROUND, FIRST FLOOR AND SECOND FLOOR 1:1000



SITE PLAN **FULL DEVELOPED 1:1000**

4 STOREYS

2 STOREYS

1 STOREY

6 STOREY

5 STOREY

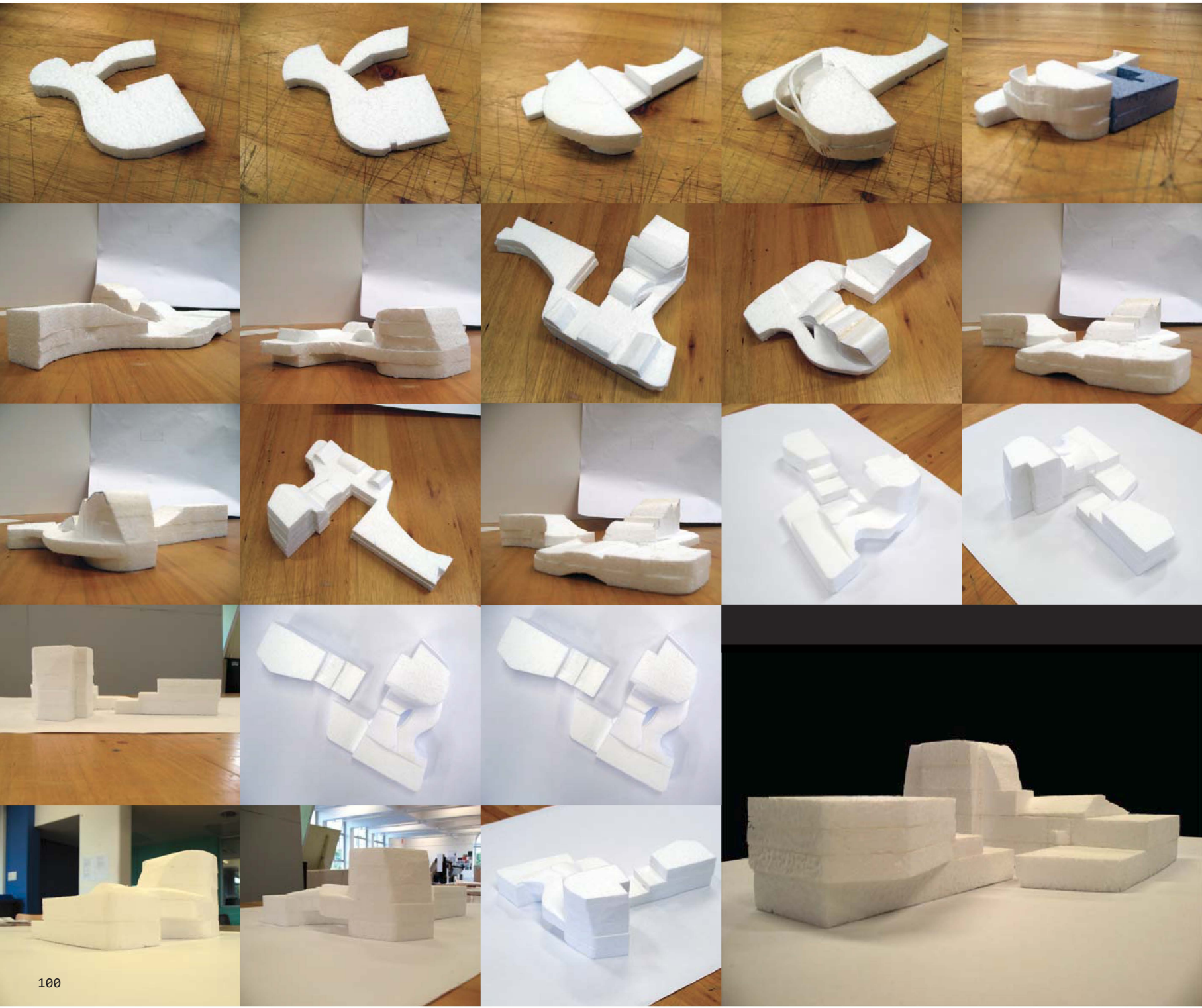
4 STOREY

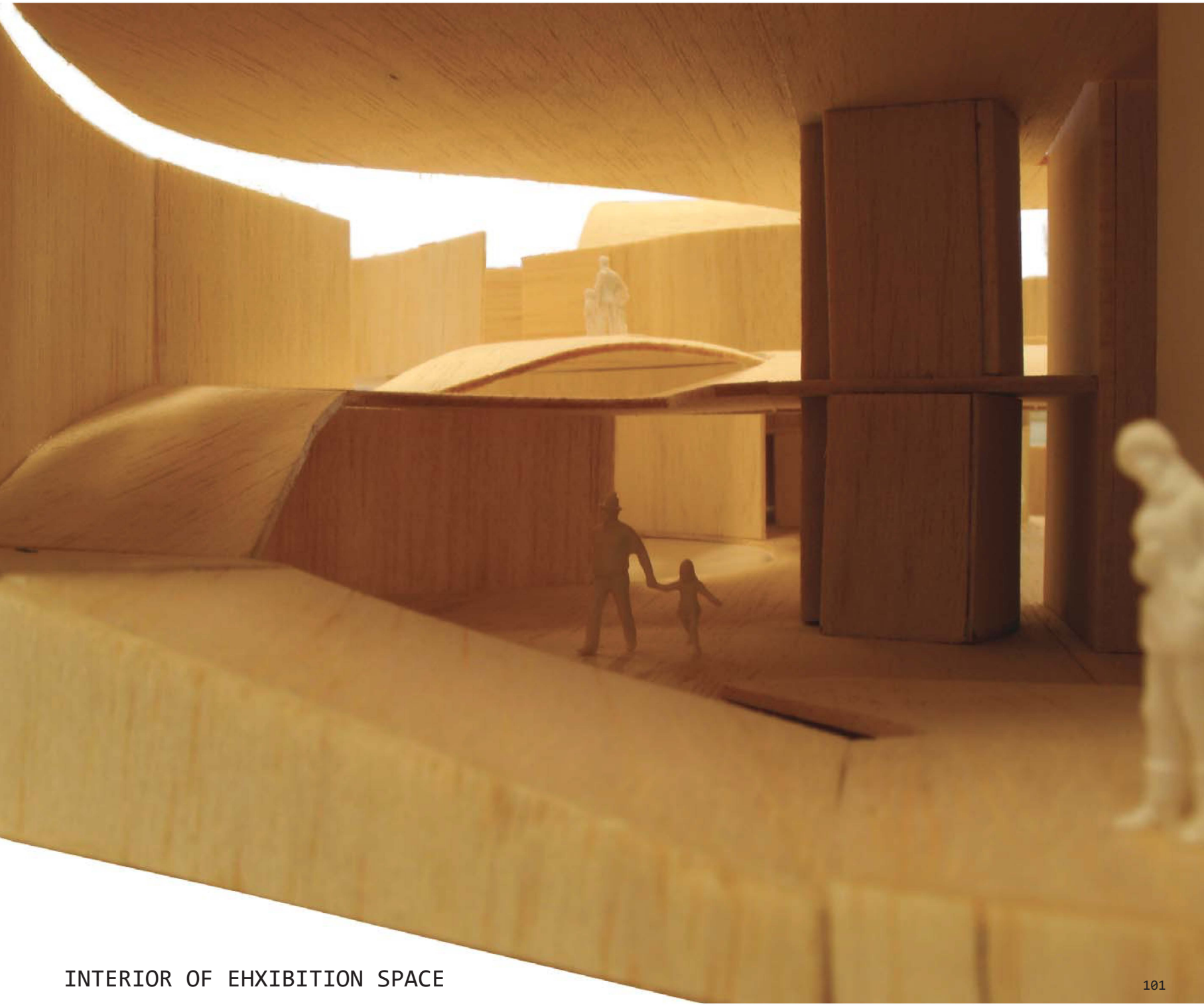
1 STOREY

7 STOREYS

Formal intentions come from my reading of Mozambican culture in terms of way of being and living, social interrelationships and the importance that its climate and landscape plays in shaping its culture –The intention was to translate the latter by making use of sensual forms referring to the strong bodily expression of Mozambican cultural practices (also depicted in the work of many Mozambican artists); and sinuous lines reminiscent of one of Mozambique's most precious features – the coastline.

To emphasize the importance of the outdoors in Mozambican culture, the building seeks to create a sense of openness and fluidity of spaces and form. The exterior skin would create openings that respond both to the necessity of light and ventilation but still protecting the internal spaces from excessive sun light, rain, and wind.
The presence of the sky is felt through the openings of the skin - a patterned surface that wraps the building emphasizing material continuity.

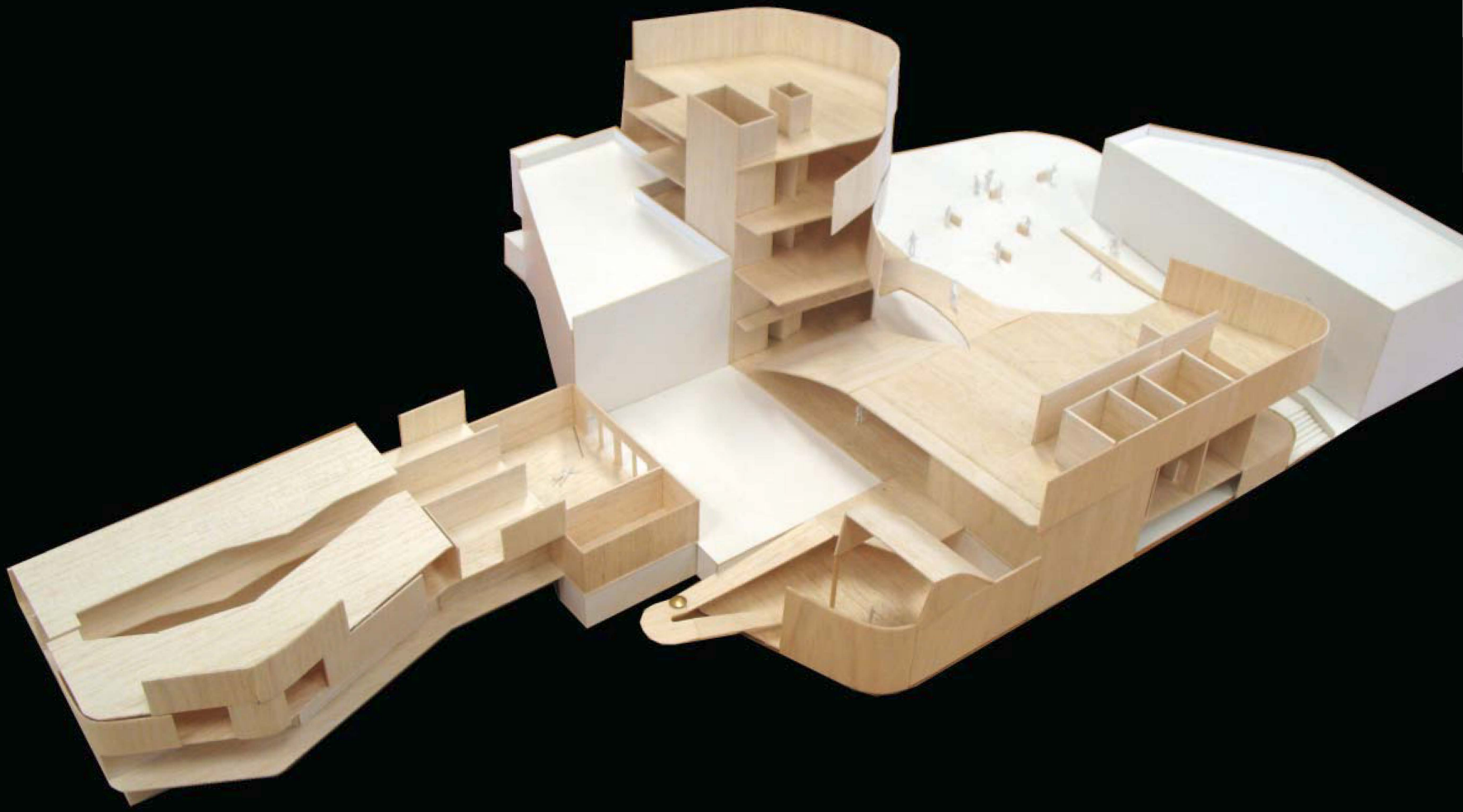


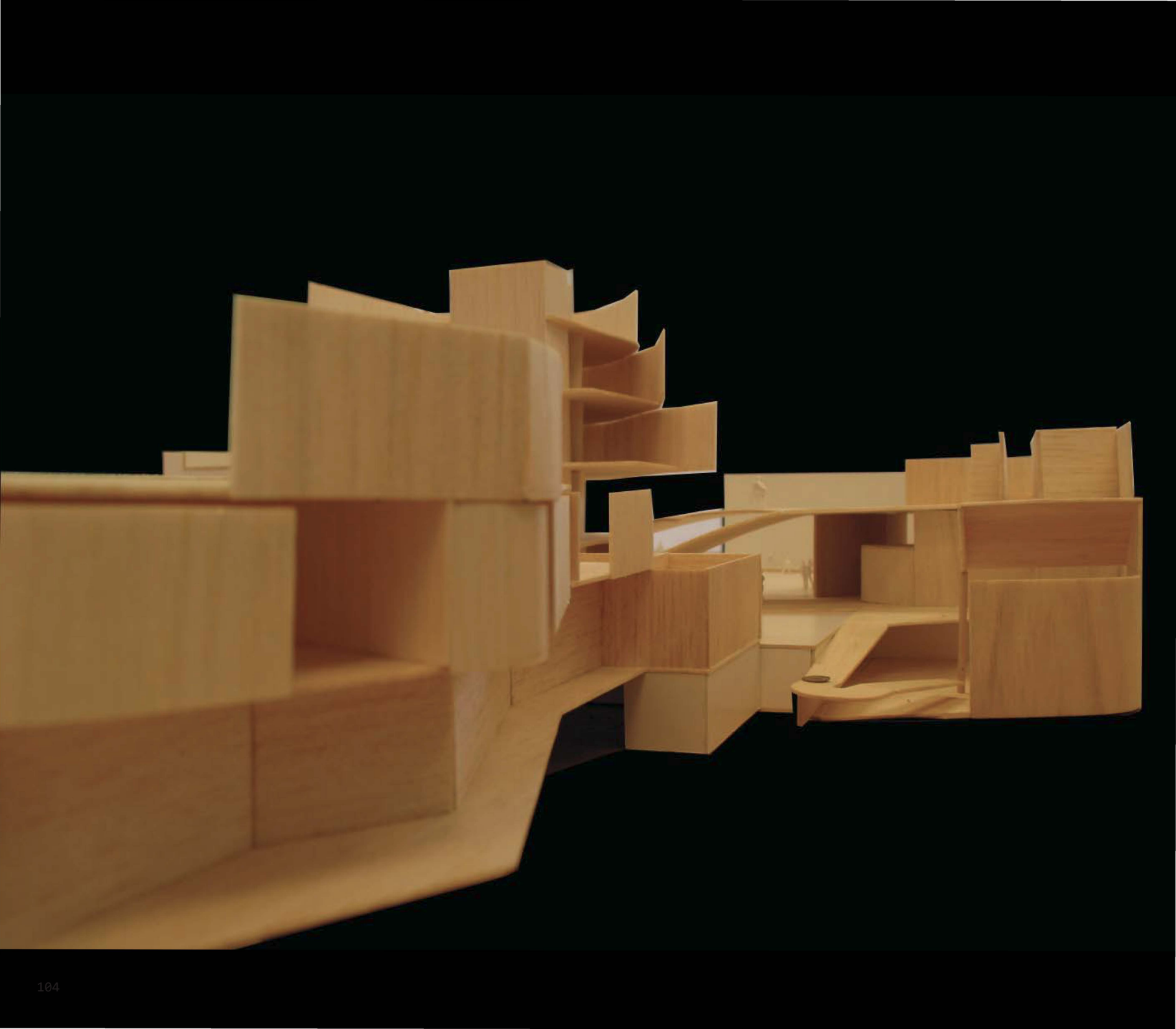


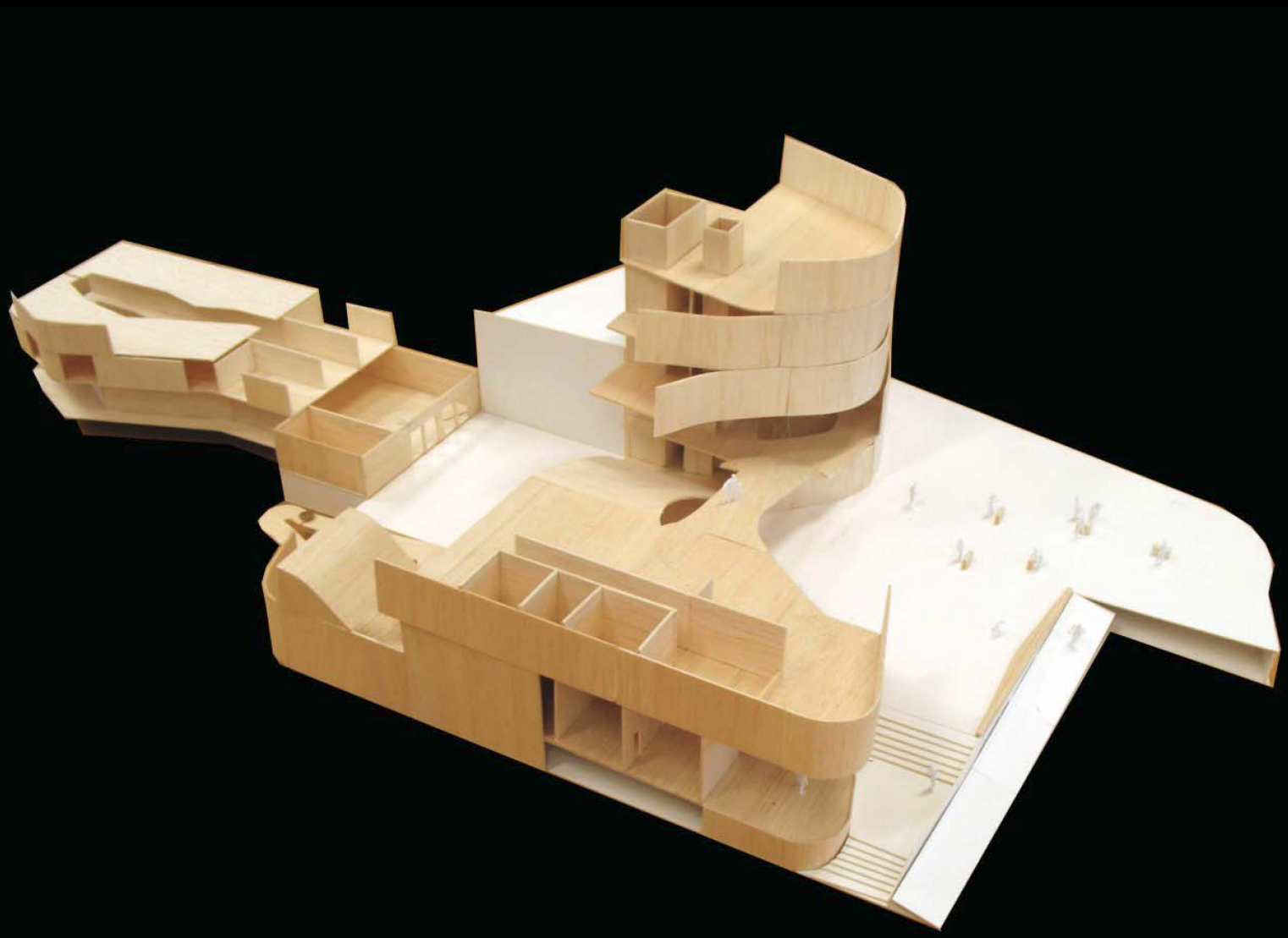
INTERIOR OF EHXIBITION SPACE


DUCHESS
VANGORD HOU
Duchess
FACTORY SHOP
UNIVERSAL
FOODS
Michael James
Organisation
SOLD
UNIVERSAL
FOODS
SHOE

 STREET VIEW





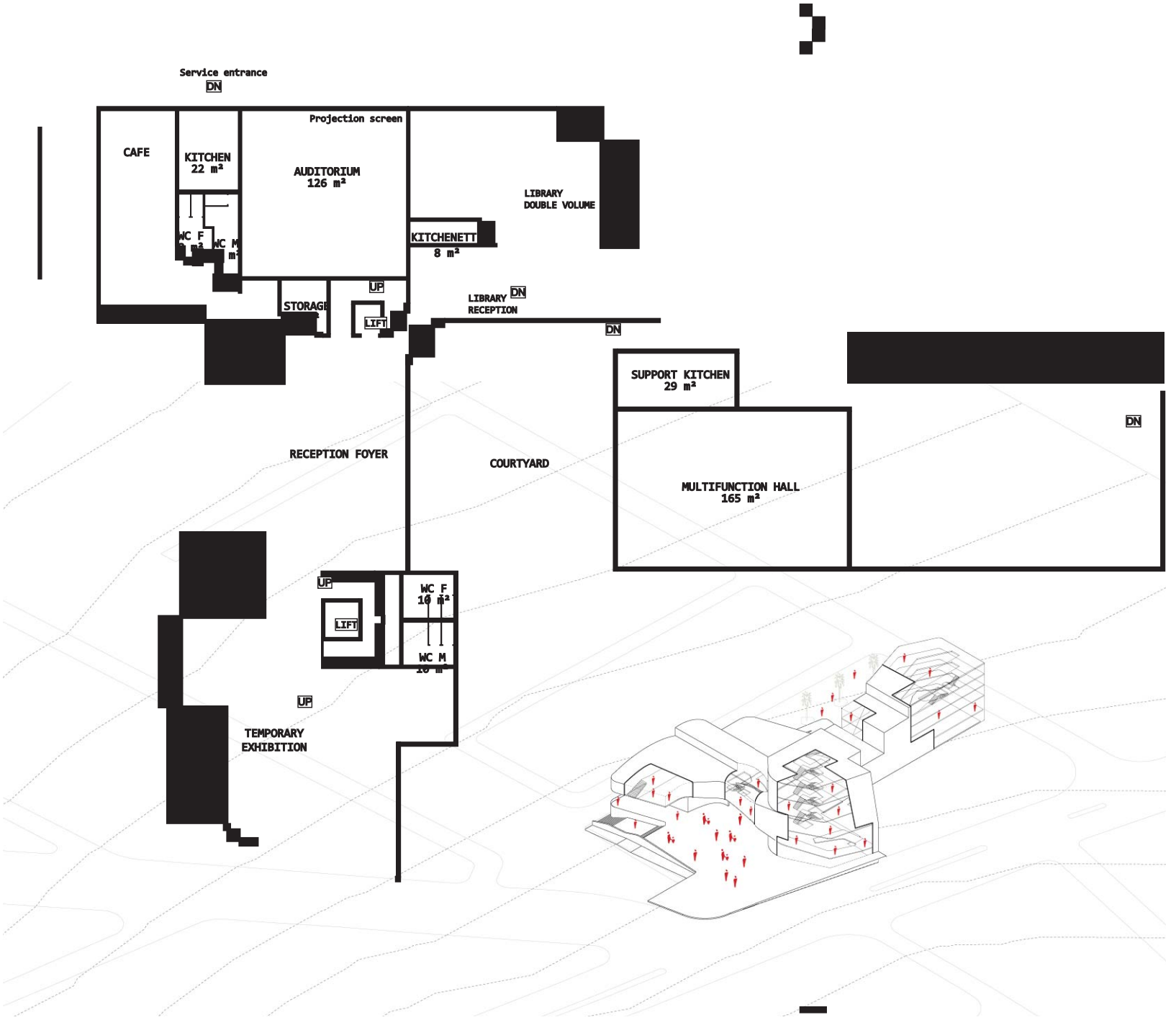







SHOE HQ
TO LET
275
step


DUCHESS
DUCHESS
SOLD
TOILET


Service entrance
DN
CAFE
KITCHEN
22 m²
Projection screen
AUDITORIUM
126 m²
LIBRARY
DOUBLE VOLUME
KITCHENETT
8 m²
UP
LIFT
LIBRARY
RECEPTION
DN
DN
SUPPORT KITCHEN
29 m²
DN
RECEPTION FOYER
COURTYARD
MULTIFUNCTION HALL
165 m²
UP
LIFT
WC F
10 m²
WC M
10 m²
UP
TEMPORARY
EXHIBITION

TECHNICAL STUDIES

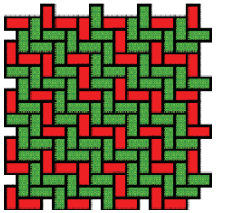
Fractals

A fractal is a fragmented geometric shape that can be split into parts, each of which is (at least approximately) a reduced-size copy of the whole, a property called self-similarity. A mathematical fractal is based on an equation that undergoes iteration, a form of feedback based on recursion. source: wikipedia

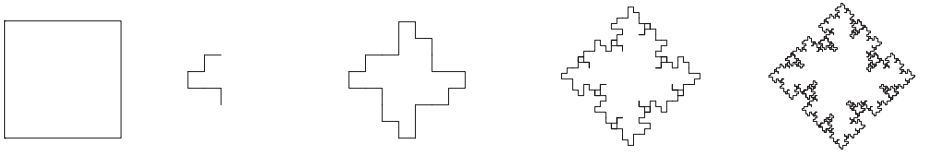
This technical study focuses on the making of the ceramic skin of my building. The pattern comes from the investigation of Paulus Gerdes work in Mozambican patterns and mathematics. A simple shape was chosen and subdivided several tines by the same shape. The final pattern that I have proposed was altered and simplified in order to be more economical as well as to simplify its fixing mechanisms.



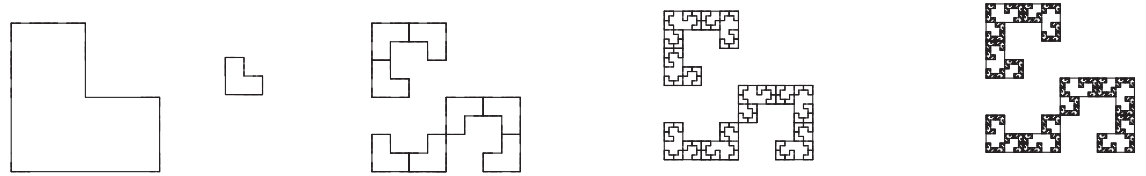


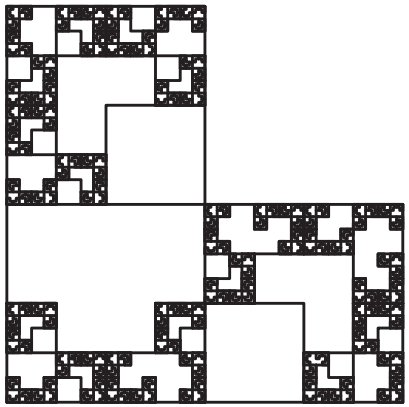


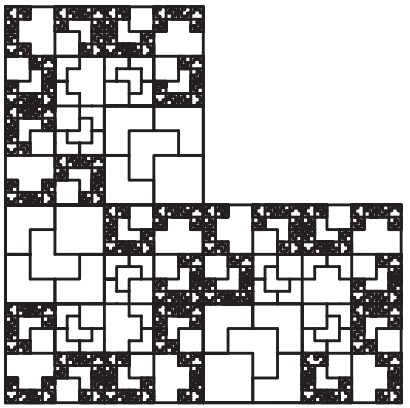
arbritary exampe

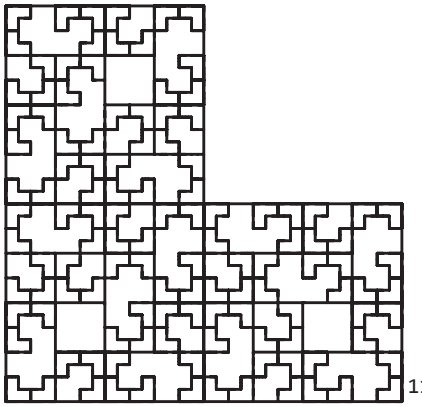


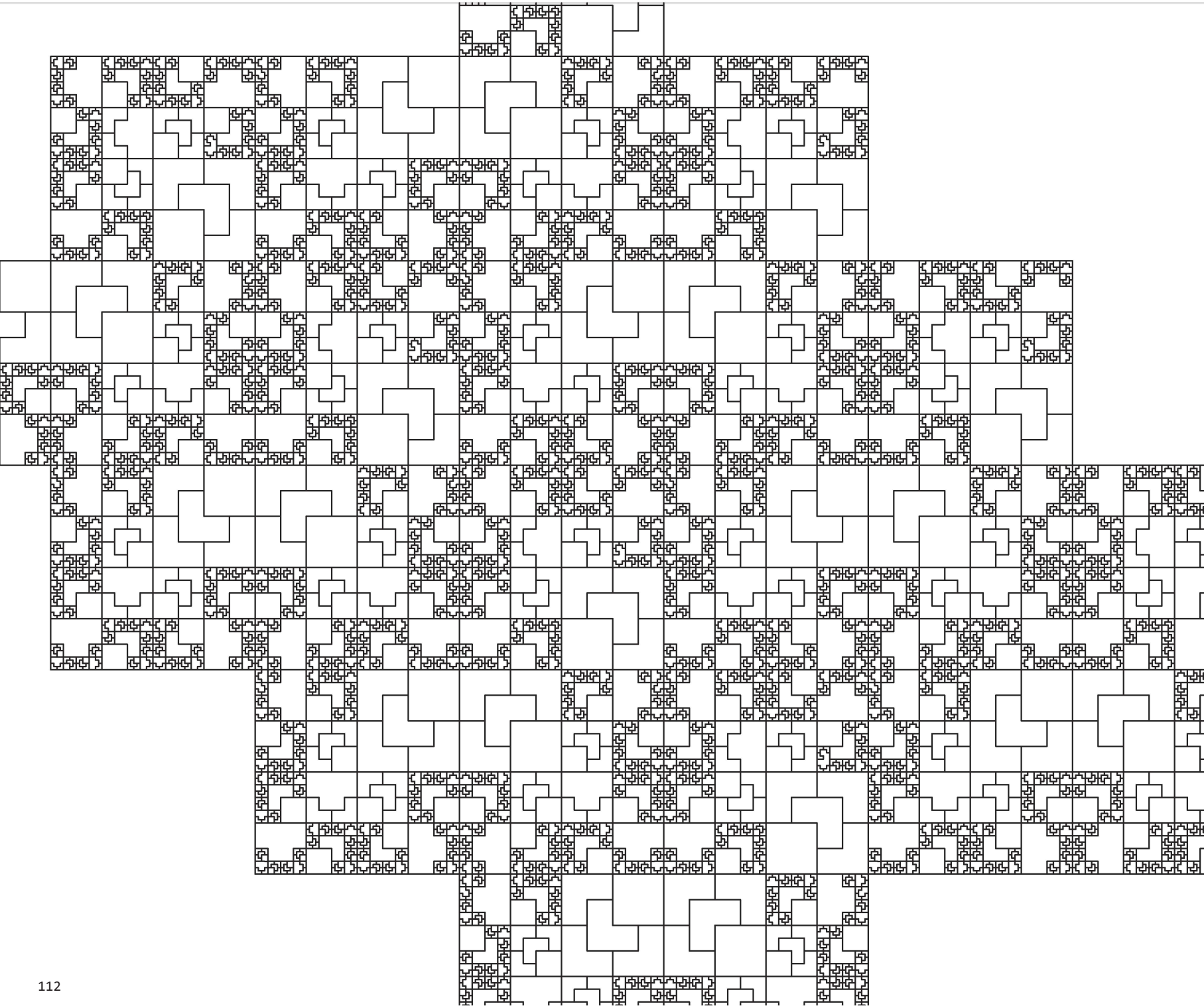
proposed design

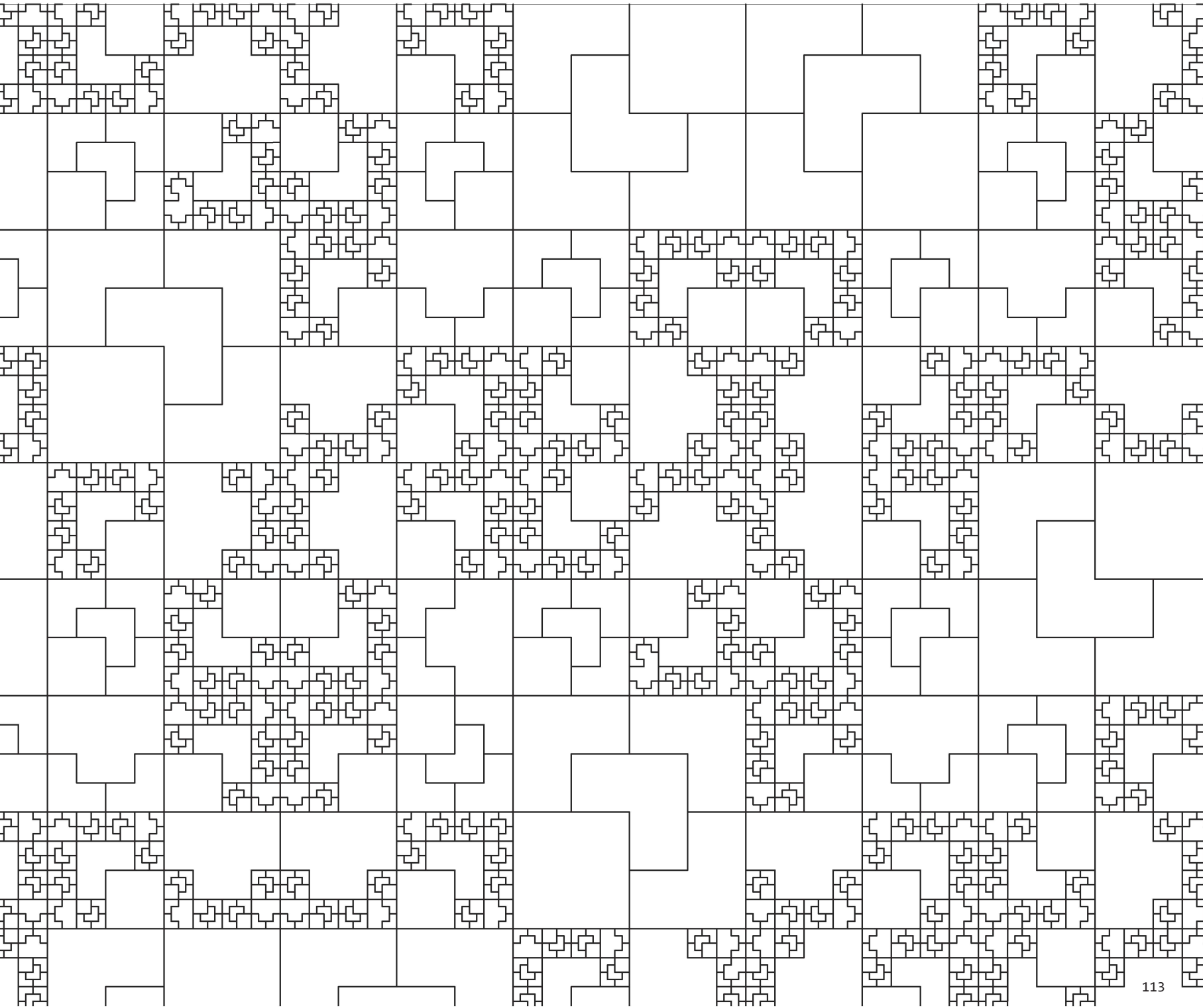




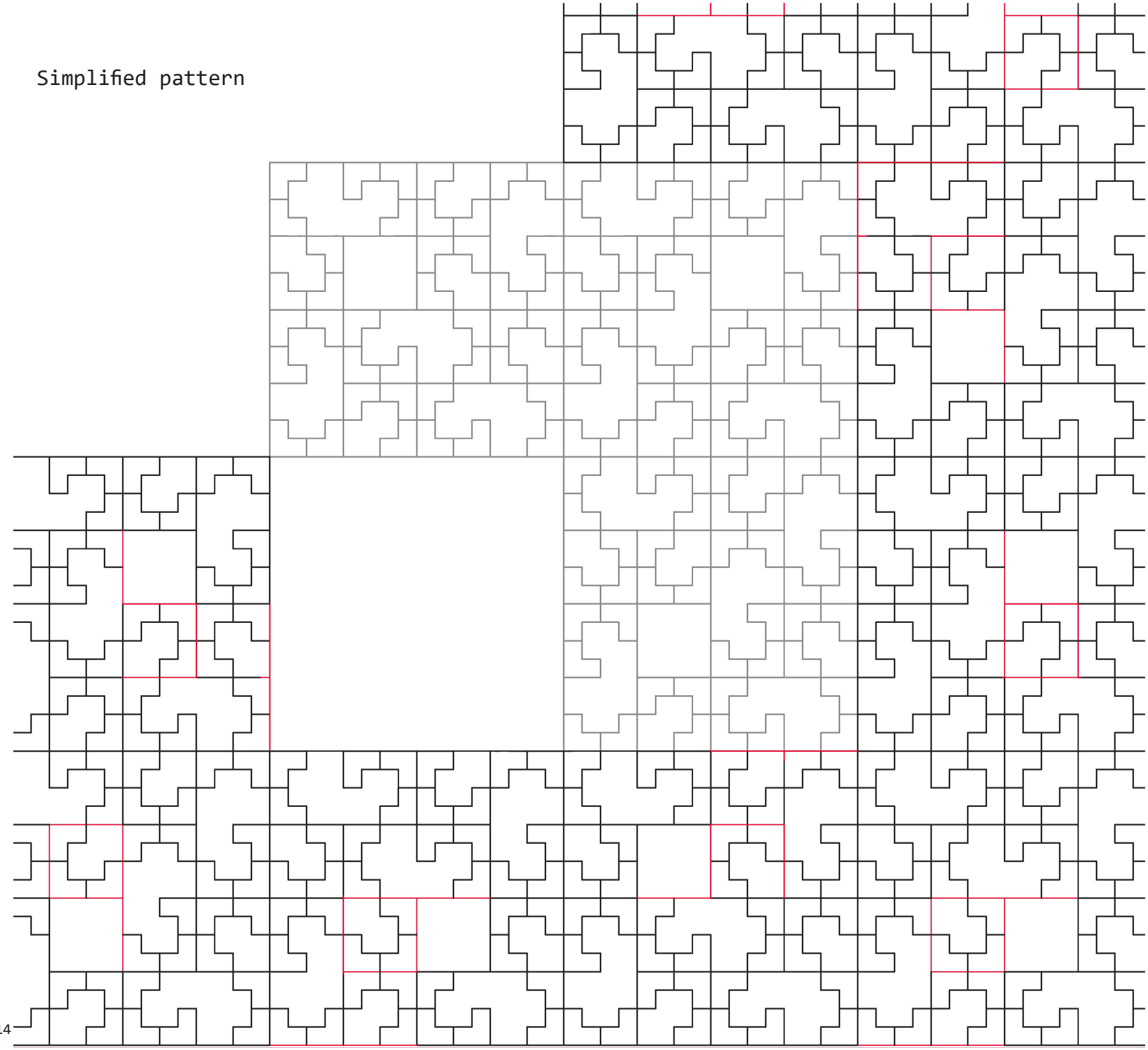


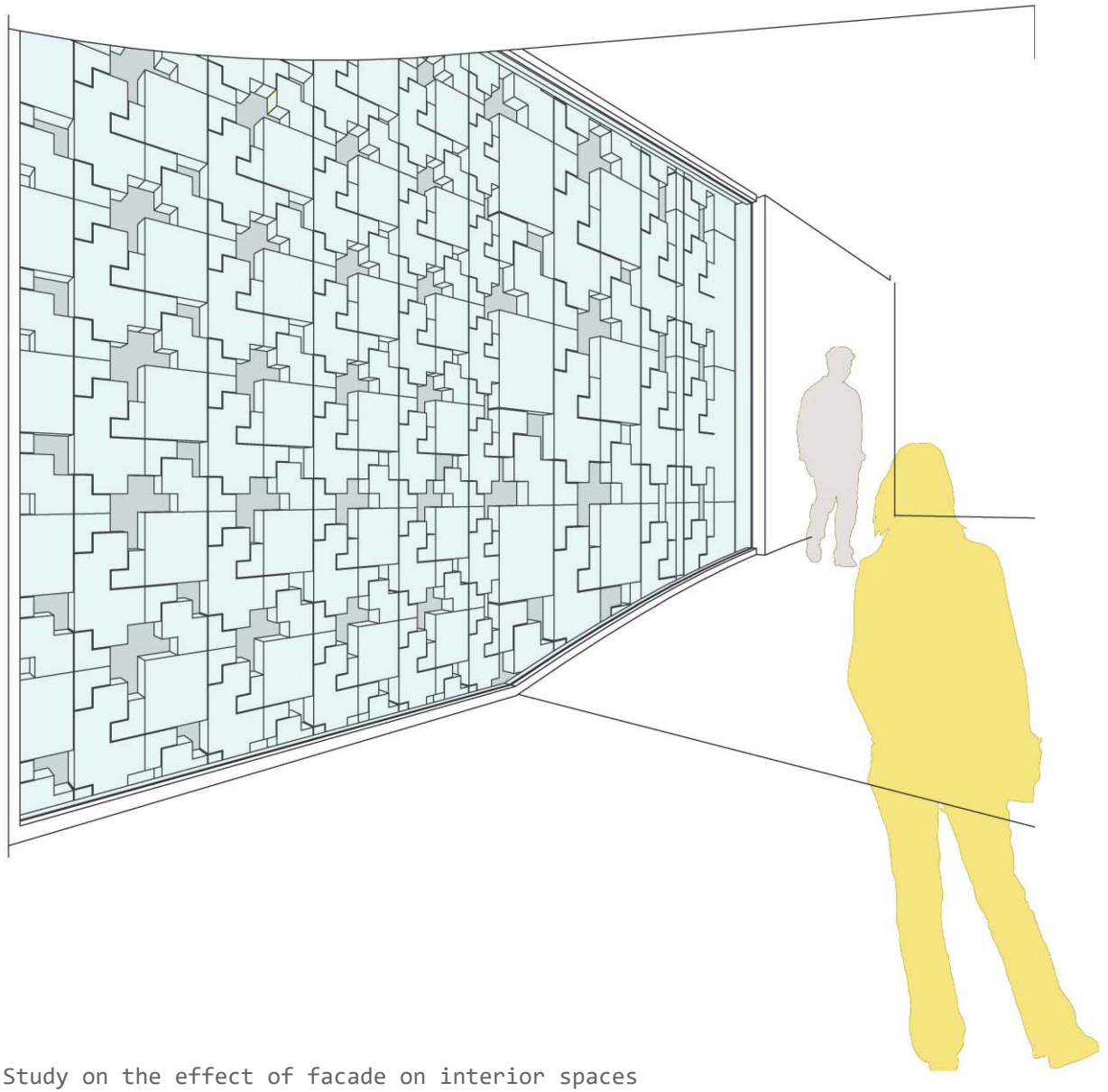




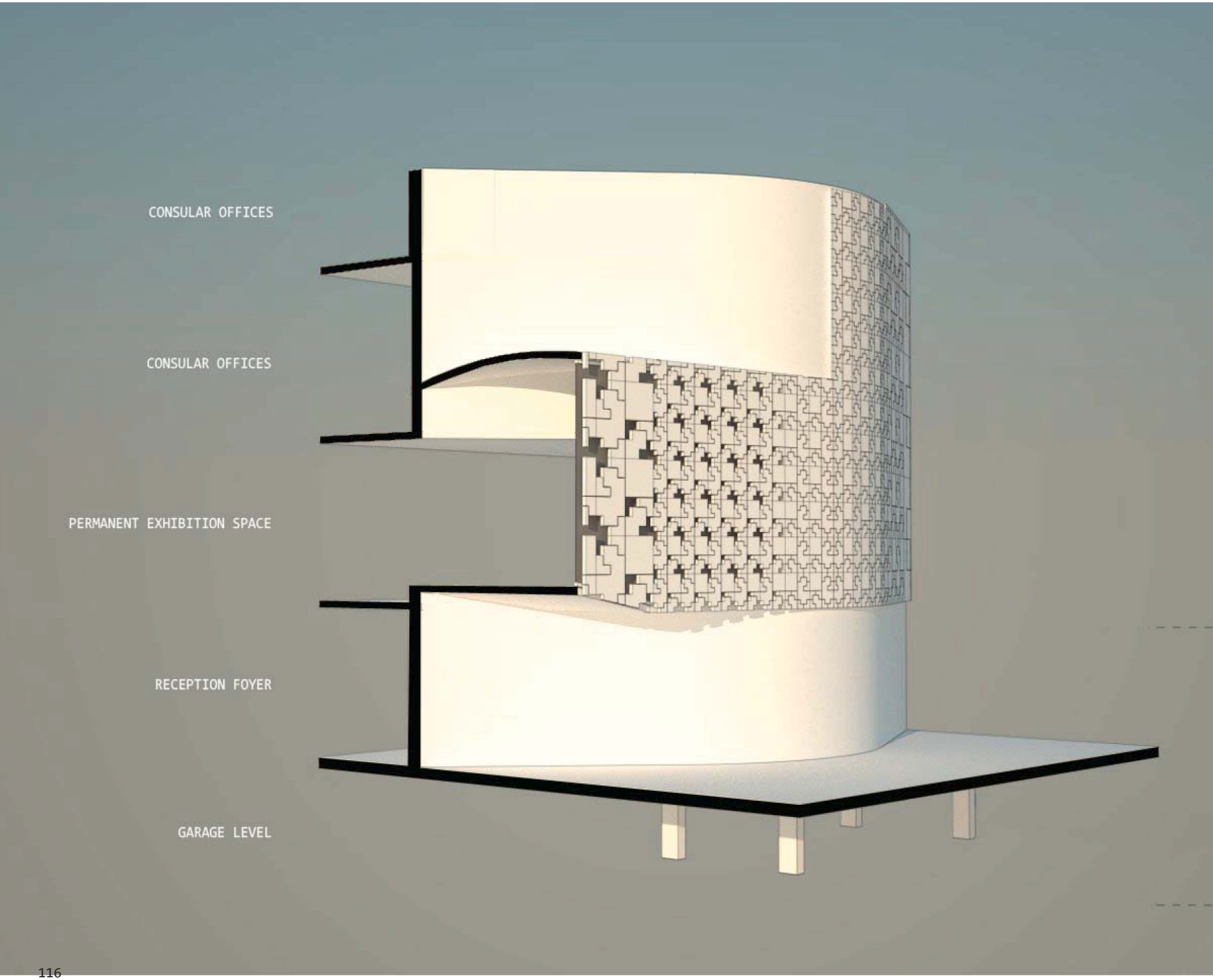


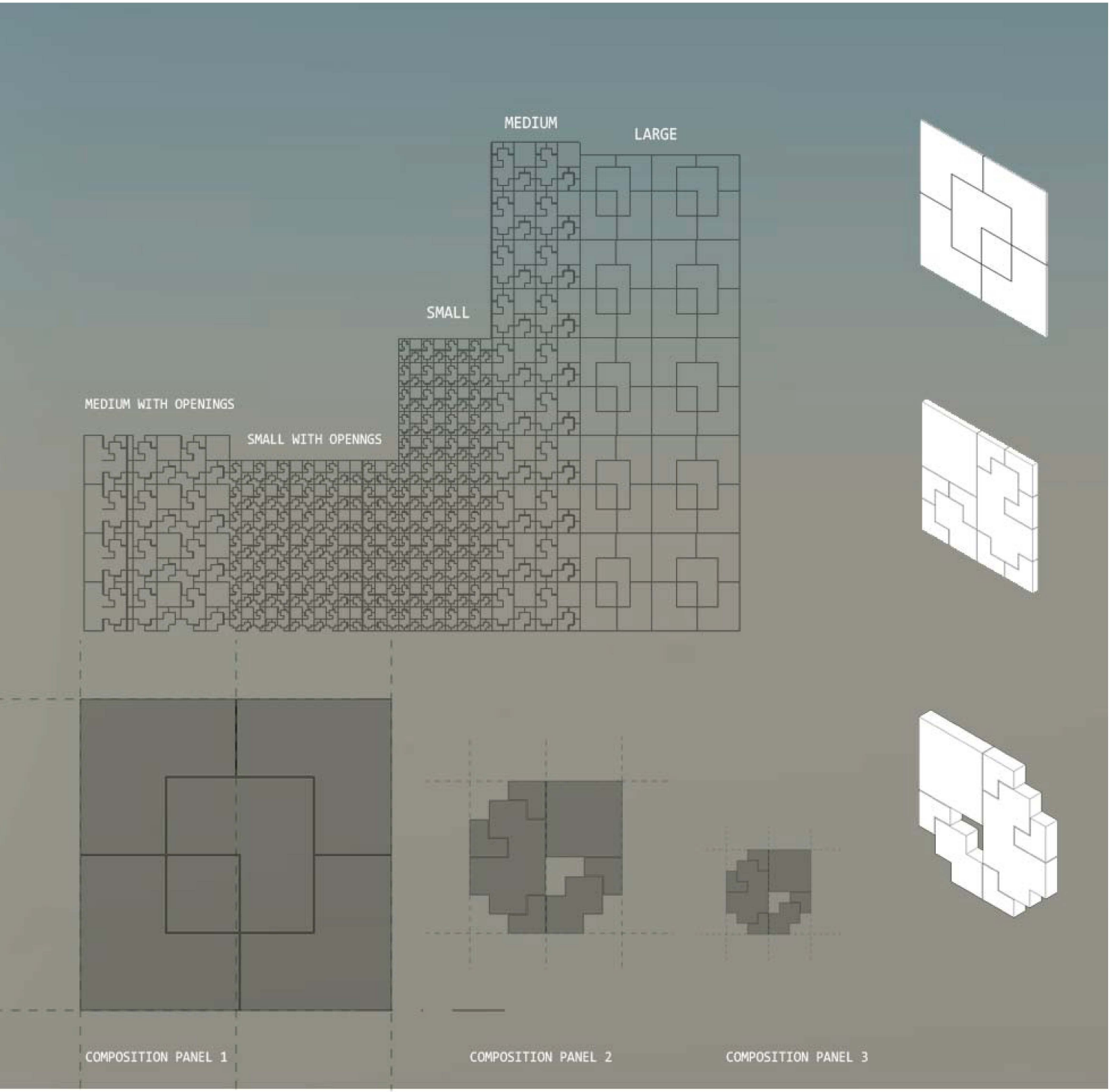
Simplified pattern

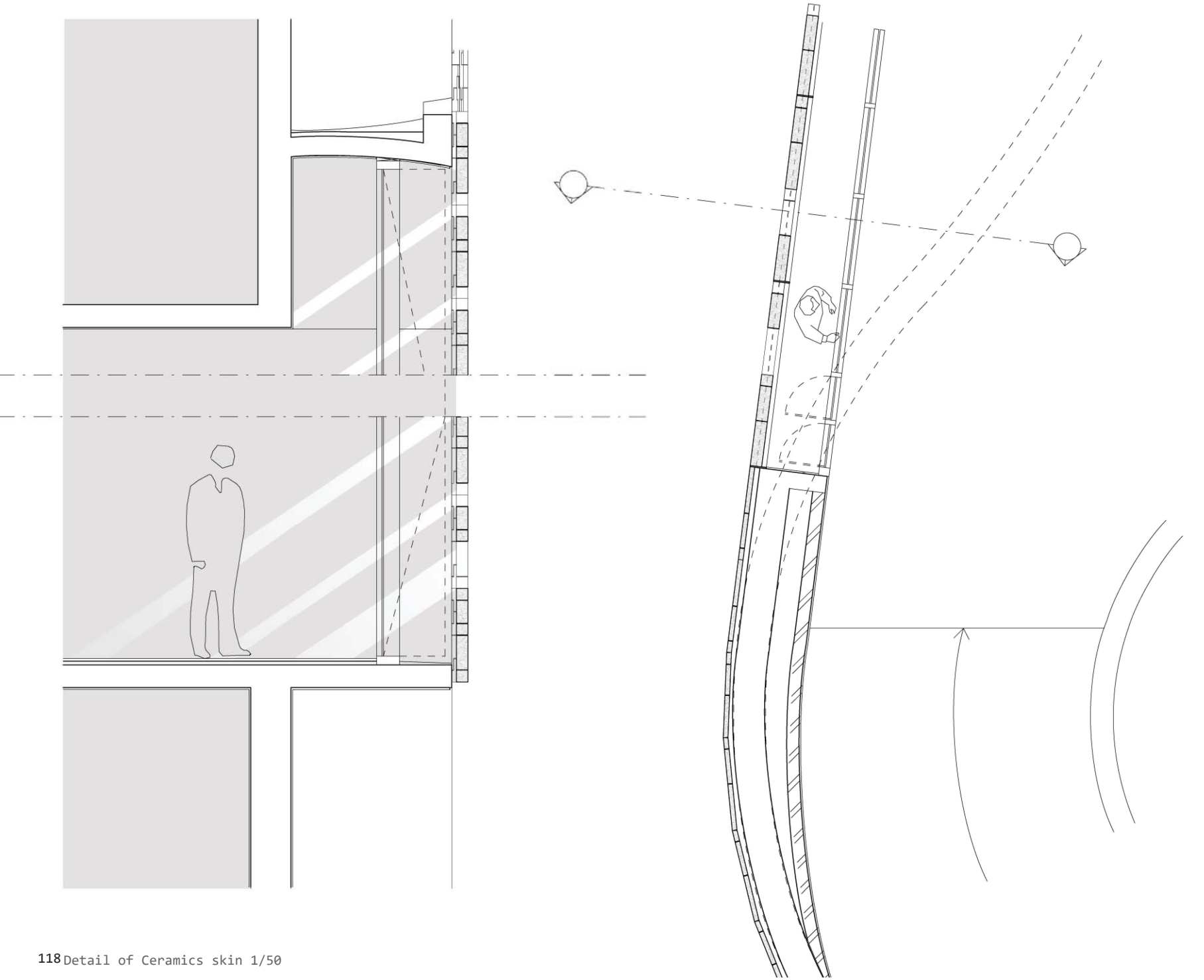


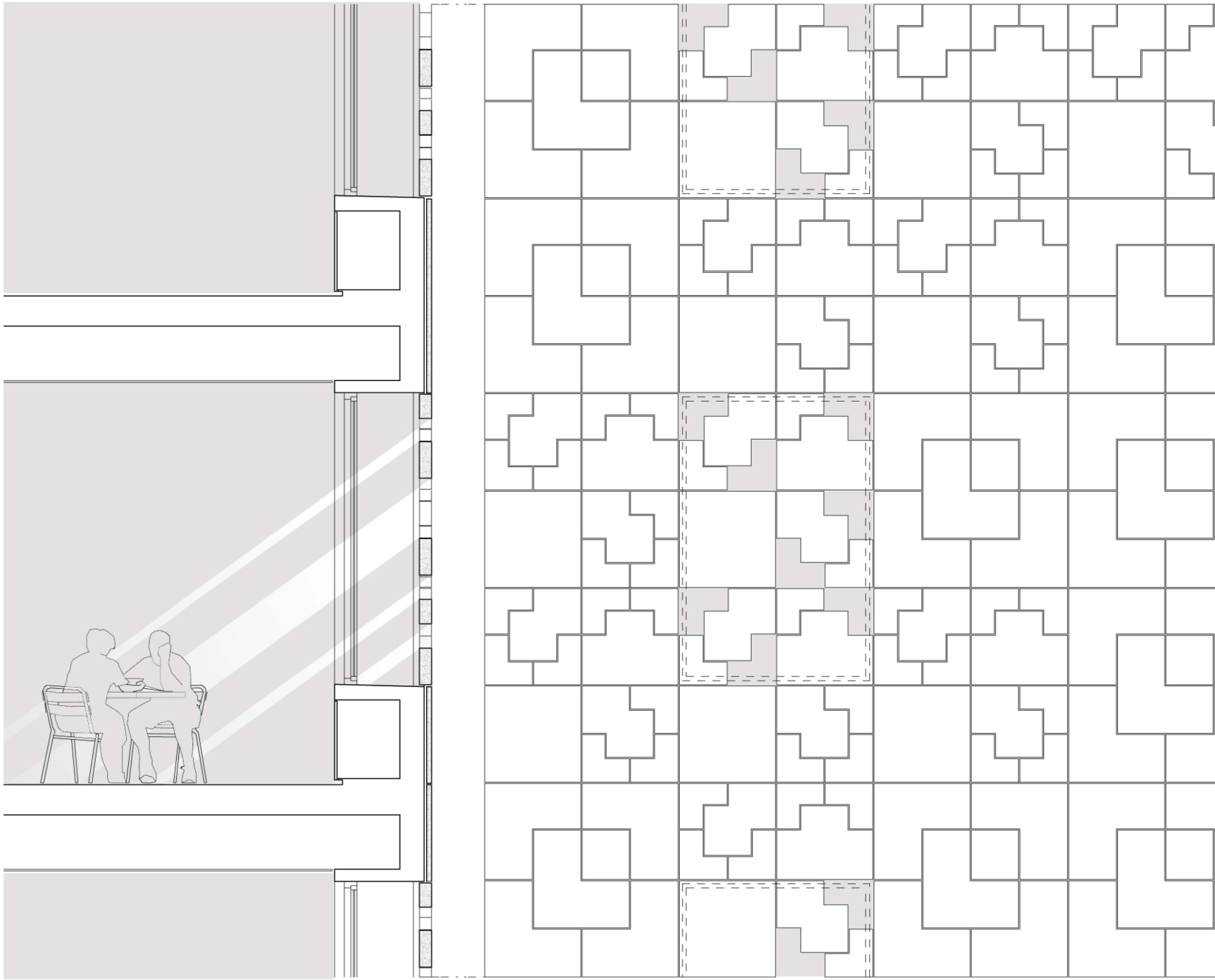


Study on the effect of facade on interior spaces


CONSULAR OFFICES
CONSULAR OFFICES
PERMANENT EXHIBITION SPACE
RECEPTION FOYER
GARAGE LEVEL

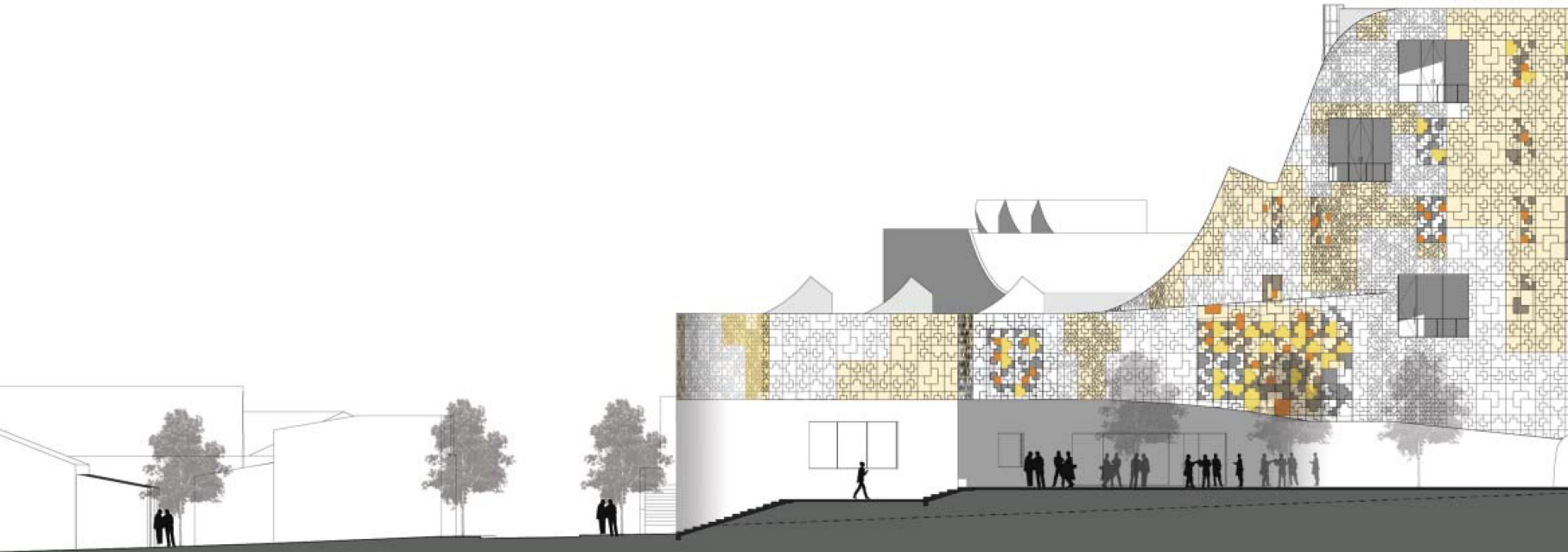

MEDIUM
LARGE
SMALL
MEDIUM WITH OPENINGS
SMALL WITH OPENNGS
COMPOSITION PANEL 1
COMPOSITION PANEL 2
COMPOSITION PANEL 3





Detail of Ceramic skin 1/50





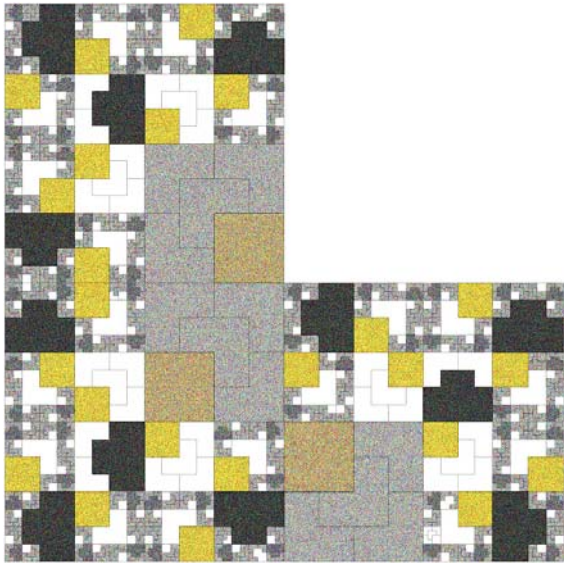




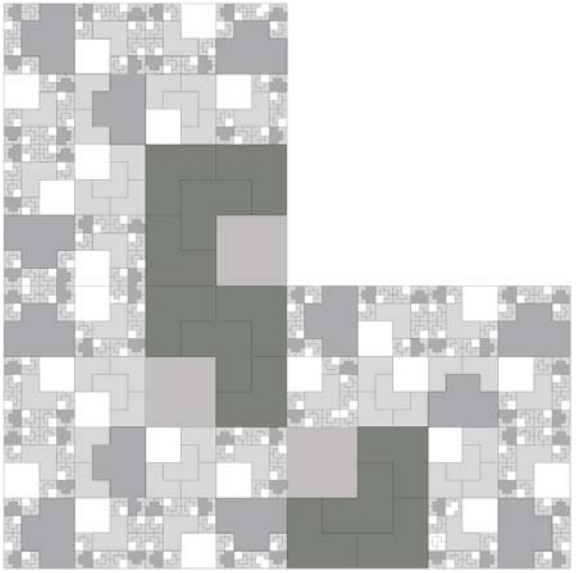


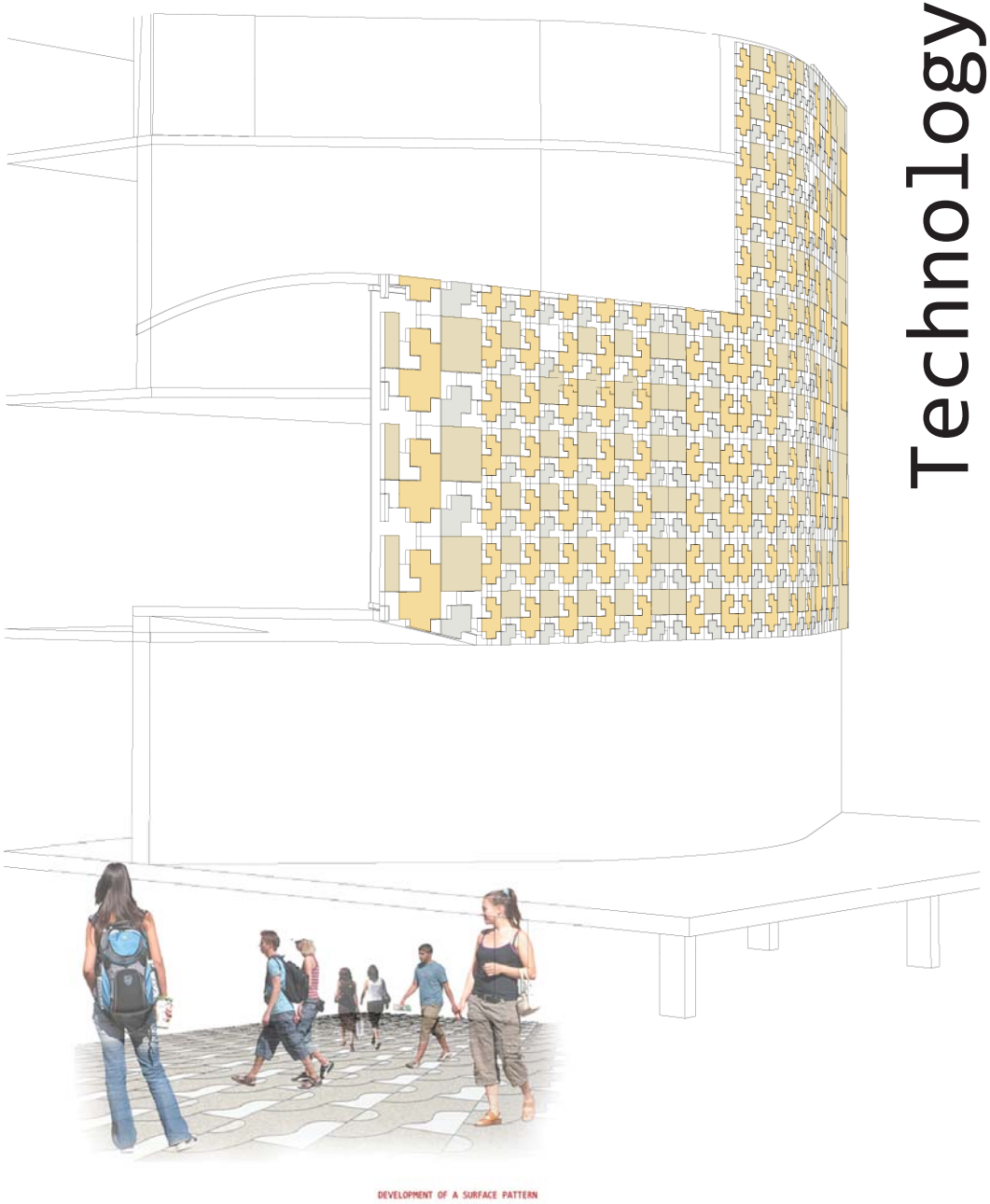


ADDENDUM



Color study

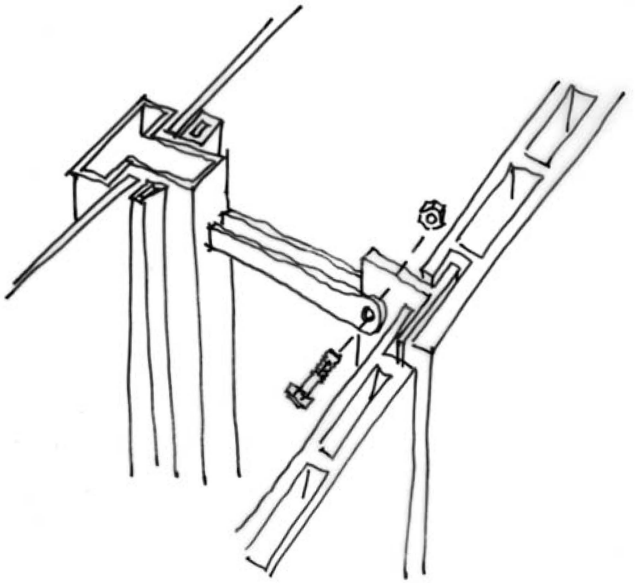


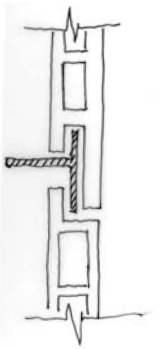


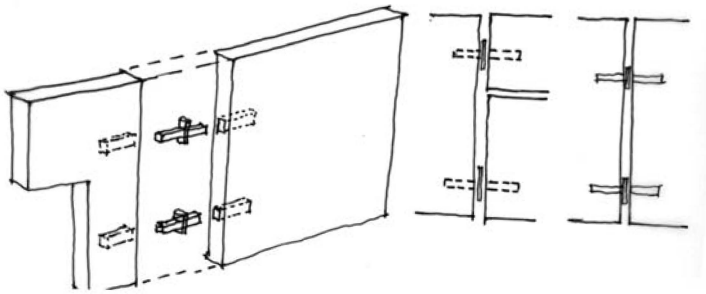
DEVELOPMENT OF A SURFACE PATTERN

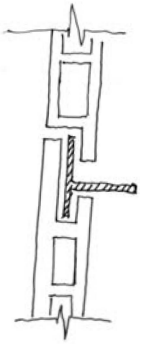
Technology

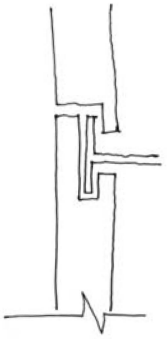
exploration on ceramic tiles assembly

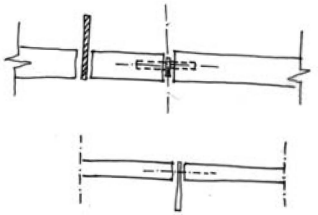


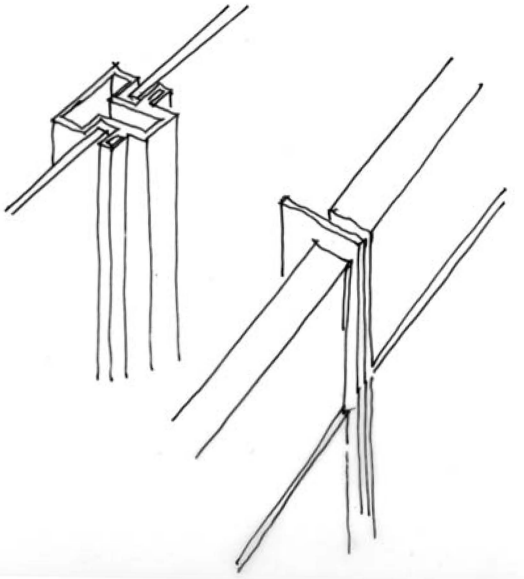


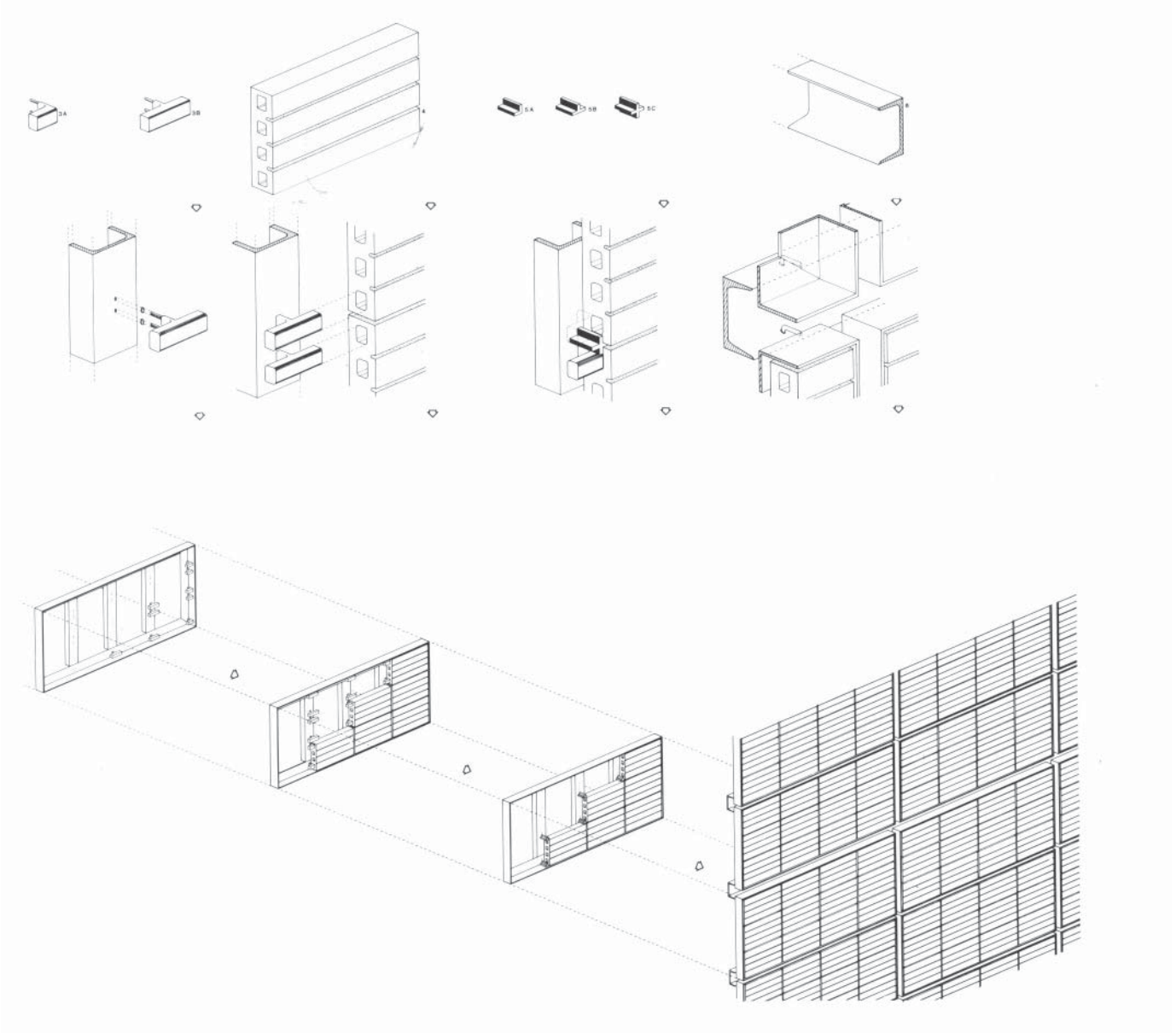








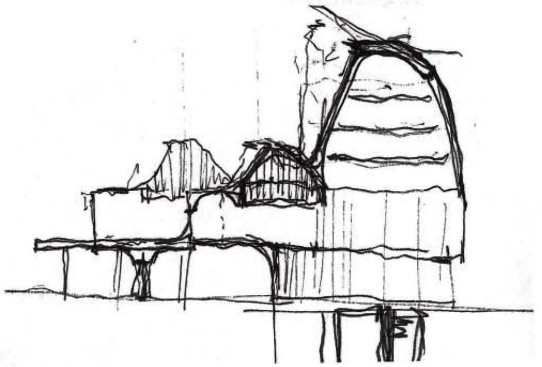


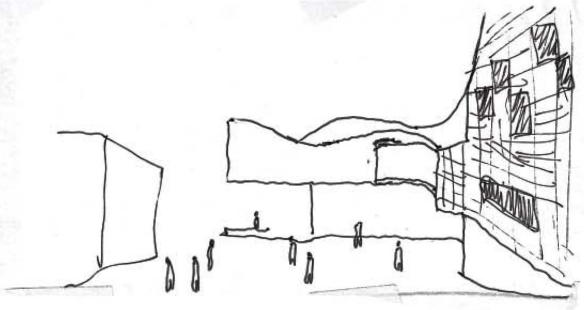


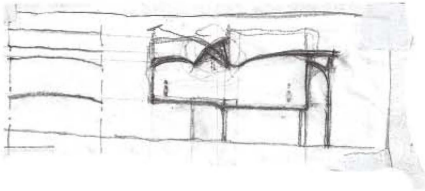
Precedent of ceramic facade assembly by
Renzo Piano building workshop.
Project: IRCAM extension, Paris 1988

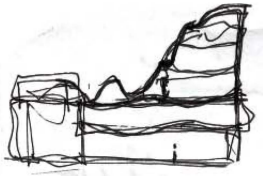
form

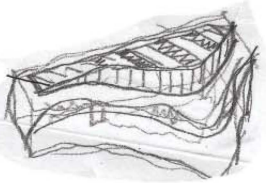




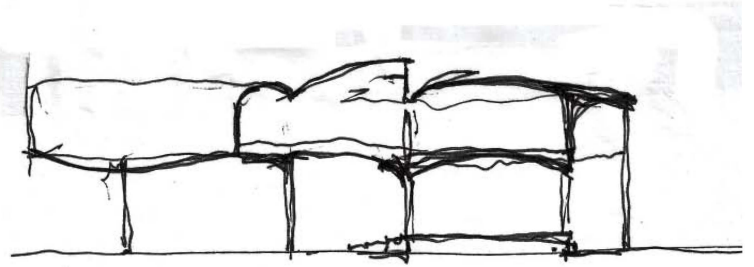


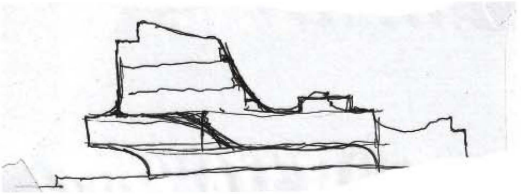


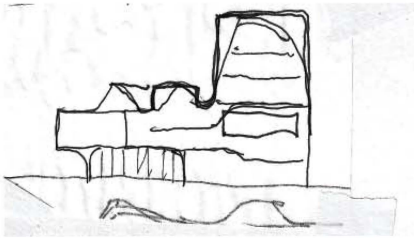


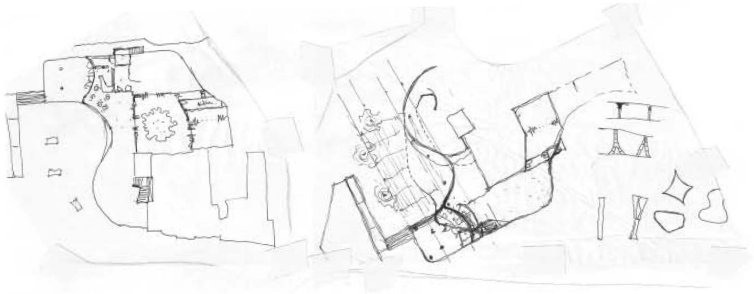


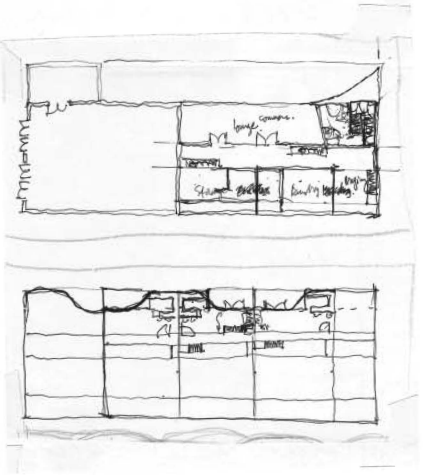


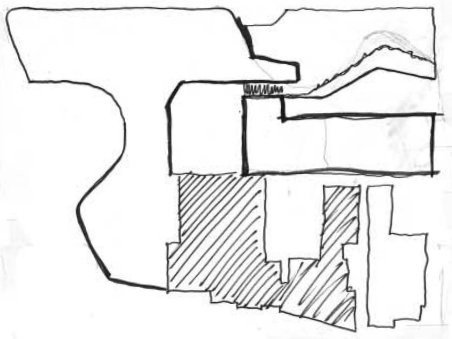


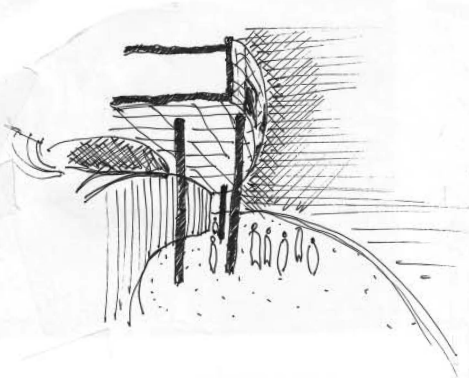


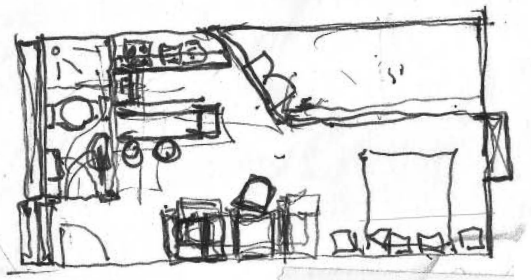


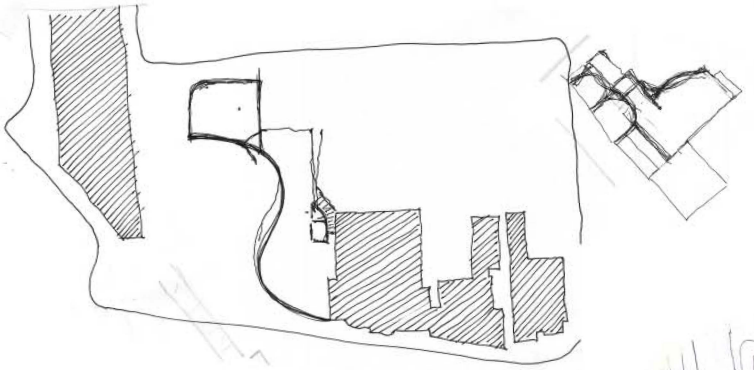


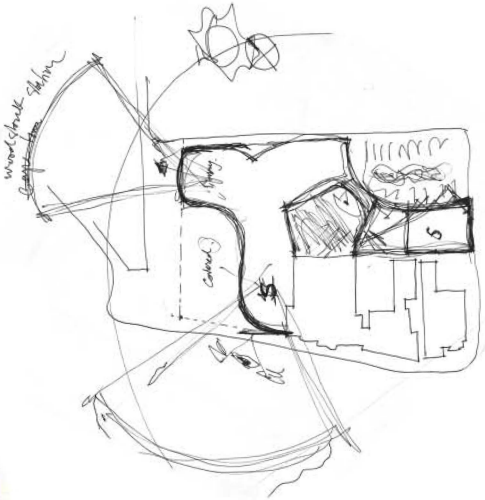


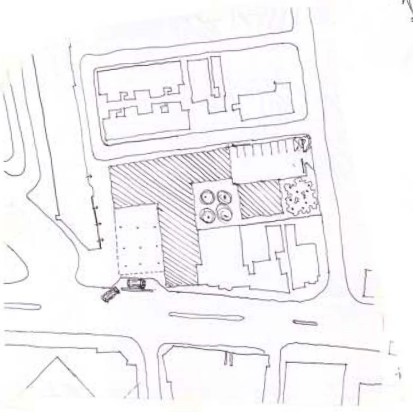












BRIEF HISTORY OF CERAMICS

Early Days

According to historical research clay has been used by many civilizations as a material for artistic expression as well as to produce utensils to help with everyday chores. Its use as ceramic pieces was understood as being different in European and Eastern cultures; In Europe it was seen as a functional material whereas in the Near east ceramics was seen as functional and decorative. This decorative use of ceramics was introduced to western civilization much later by the *Moorish* civilization.
Ceramics were first used in architecture in the fifth millennium BC by the Islamic civilization of the Near East. Their first association of ceramics and architecture was done through the creation of the clay brick used as a structural element. Besides that, clay was also considered to be a useful material that could be used for decoration. Techniques from pottery were borrowed and began to be incorporated into architecture in the ornamentation of buildings (Hamilton, 1978).

Two hundred years later, the Egyptians developed the concept of tiles. Their tiles were used on walls to depict stories and myths and to record events of their civilization. There is evidence that they even invented ceramic tiles of various colors by this stage (Hamilton, 1978). Around 580 BC the Babylon Empire were already using the same technology in decorative walls depicting mythical images and animals using glazed tiles in different colors.

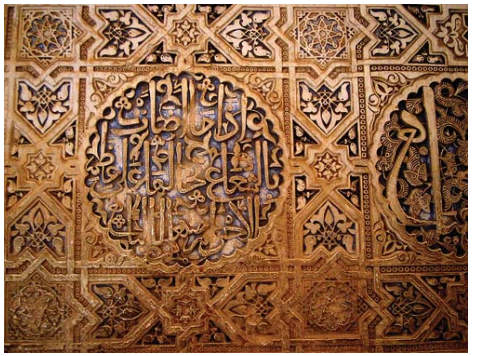
In Europe, brick and tiles spread very fast, under the Greek and Roman empires. It was through the territorial conquests and invasions that these empires spread their knowledge in construction technologies. The big difference was that their use remained purely functional.

The *Moorish* were an empire which conquered the Iberian peninsula around the 8th century. They played a crucial role in the dissemination of various decorative techniques developed by the East to Africa and Europe, as far as France and Spain. Their cultural richness is seen in the Alhambra - a palace and fortress built in the 14th century in Moorish occupied southern Spain.

In the 14th century, ceramics were being used mainly in churches, abbeys and other religious buildings in Europe. In addition, in the following century Europe saw the invention of the *terracota* and *Faience* tiles in Florence, examples illustrate how they were used in paintings and architecture in perfect harmony (Hamilton, 1978).



Painted and glazed ceramic tile dated around 880 B.C Nimrud From Designboom, 2009.



Ceramic tiles of the Alhambra with decoration and geometric patterns. Built in mid 14th century

In Persia, the same century, *lustre tiles* were invented. Imperial Persian mosques and palaces were decorated with painted mosaic tiles and glazed brick, which by this time included floriated design patterns.
With the development of Europe's social structure, architecture developed into more permanent materials, and consequently people felt the need for decoration. Decorated terracota facades were a feature of the 15th century Italian architecture. By the 17th century, ceramics were seen in domestic Italian houses in the form of glazed terracota signs and decorations.
(Hamilton, 1978).

By the 18th century, the evolution of ceramics into residential homes had spread to walls and ceilings of certain Dutch houses which were cladded entirely in ceramic tiles. In the churches of Holland, Portugal and Spain the use of patterned tiles was adopted. They substituted paintings and were used depicting suitable subject matters and were often carried through in monochrome, usually blue and white (Hamilton, 1978).

Modern days
With industrialization, bricks, tiles, mosaics and many other products suitable for prefabrication became very important. Ceramics gained great acceptance due to its durability and abundance, and propelled interest as the mentality of mass production was beginning to conquer the world. The revival of Gothic architecture in mid 19th century - a reaction against classic style of building - created a demand for new innovative ways of using ceramics which came in the form of terracota facades, encaustic and tessellation pavements as well as floor tiles. The boom of the building industry in subsequent decades impelled new methods and technologies of architectural ceramics. Development of techniques of tile printing, mechanical plastic and dust pressing tiles were a major factor in its widespread within usage of domestic buildings (Hamilton, 1978).

At the turn of the 20th century and with the art nouveau movement, architectural ceramics gained another dimension of importance. The revitalization of decoration and harmony between modern architectural forms - the aim of the art nouveau style - contributed to another important stage of the development of new technologies and techniques of architectural ceramics use. Experiments were made by architects and artists using the technological advances of the period which resulted in the new manufacturing and application methods we see today.



TOP: Composition of Portuguese mixed ceramics.

BELOW: Three examples of Portuguese azulejo used as repetitive pattern. Images from left to right dated: 17th C, 19th C & 20th C.







The Portuguese Azulejo

'The first known uses of the tile in Portugal as cladding elements of monumental walls were made with Spanish-Moorish tiles imported from Seville around 1503' (Magalhaes, 2007).

In the 15th century King Manuel I in a visit to the Alhambra in Spain was impressed with its architecture and decorative techniques and decided to order tiles from Seville to decorate his new palace in Sintra. These tiles, according to Islamic law had no portraits of Human figures, but geometric figures only. The palace in Sintra, decorated by Spanish tiles awakened the interest of Portuguese artists in ceramics. Afterwards, artists gradually began to employ human as well as animal figures in their locally produced azulejo (Golisbon, 2009).
The Portuguese word *azulejo* comes from the Arabic word *Az-Zulayj* - meaning polished stone (Golisbon, 2009). The use of the azulejo has evolved since the 18th century, were it had began to be used as an art form, and today we can see it being used as decoration for churches, walls, park seats, fountains and shops. They often portray scenes of historical significance for the country. They are also used in streets, signs, nameplates or house numbers.

In the Gothic period, the exclusive areas of plastered surfaces of churches were seen as propitious for some decoration - this produced the art of the fresco in Italy and the Azulejo in Portugal (Hamilton, 1978).

In Mozambique, by the 12th century Arab traders had already begun to establish trading posts along its coastline. It is therefore logical to assume that Mozambique was already exposed to the vast ceramic products. However, it was with the colonization of the Portuguese which had it's beginning with the arrival of Vasco da Gama in the 15th Century, that architectural ceramics became part of an architectural language. Portugal's taste for architectural ceramics reflected a certain interest in cultural exoticisms through their interest in other cultures.

'The ability to dialogue with other cultures, evident in the taste for exoticism that the themes of European culture are mixed, for example, those of Arab cultures and Indian' (Magalhaes, 2007, p 2. Personal translation).

This is further reflected within the architectural form produced in Mozambique where the exoticism of African culture, much of which as result of its climate ensured that this ability to dialogue with other





Portuguese azulejo was used extensively in the development of the subway system in Portugal in the 20th century.





The use of the Portuguese azulejo in Mozambique to depict religious beliefs and to record the history of its country. LEFT: View of the verandah of Vila Algarve. The whole building is decorated with these tiles. Currently the building is abandoned and used by homeless people.

RIGHT: Detail of the Portuguese azulejo used in a religious building in Namaacha, Maputo. The building is currently abandoned.

cultures could be explored in architectural expressions. The interaction between Portuguese architects and local Mozambican motifs produced many examples of exploration of patterns, surfaces and even decorative architectural elements, which are still visible, and well appreciated today.

ARCHITECTURAL CERAMICS

THE PROPERTIES OF CLAY

Clay is mainly composed of felspathic rock and can be found as two distinct types of clays as a result of its decomposition in nature. Clays which have been decomposed on the site of its original formation are know as primary clays and its main characteristics are lack of plasticity and good purity.
Clays which have been transported from its original site of decomposition and deposited into the beds of rivers and lakes are far more plastic and less pure. This type of clay is called secondary clay and tends to have much more reduced *refractory* properties. Their colors are also different and are dependent on its location as well as the different quantities of metal oxide that each type of clay possesses (Hamilton, 1978).

Two types of water can be found in clays: Chemically combined and physically combined. Physically combined water is the water which is driven off during the firing and drying process. During this process it acts as a lubricant in the platelets of clay. This water is also responsible for allowing the clay to hold its form after assuming a required shape - in this condition the clay is known as *slip*. In the drying process, physical water starts to evaporate at a temperature of 100° C whilst Chemically combined water requires a temperature of 300 ° C to start its process of evaporation which is completed at 500° C.

The firing of clay only begins at temperatures above 500° C, and from 573° C and the chemical reaction between several of its components starts to take effect. The rapid increase and decrease of temperature from cooling is an important factor to be considered - increase and decrease should happen at specific speeds so as to avoid cracks in the ceramic product. When the temperatures are very high, clay reaches a state where sufficient glass is formed within itself to prevent water impregnation on the cooling down process- a process known as *vitrification*. Also, the higher the temperatures of firing, the stronger the clay will be upon cooling down. And the higher the temperature, the more the clay shrinks. A

technique used to reduce the degree of shrinkage in clay is the addition of *grog* - this method is often used for large scale ceramics.

Clays for tile making
Suitable clay deposits for tile making are secondary clays which are preferred for their fine grain structure and high plasticity content. In the industrial production of tiles there are two most common methods: Extrusion and Pressing.

Plastic clays can only be used in the production of tiles if used with the extrusion method as they contain coarse materials that produce capillary action and permit water to evaporate easily. The plastic content of such clays should be enough to retain its own shape after forming. On the other hand, clays which are too plastic will shrink a lot once its water content has been evaporated.
Pressing factories will use a mixture of ball clay, china clay, flint and felspar, and this method is often preferred because it provides better control and gives good mechanical strength when fired at 1050° C (Hamilton, 1978).

Earthenware and *stoneware* can also be used in the production of tiles, although they are recommended only for small sizes. Tiles larger than 150 x 150 mm should be made by other methods as they require larger particle sizes.

China Clay - it is a primary clay with a white-firing and relative refractory proprieties.

Ball Clay - Is a high plastic secondary clay and is often used to provide good plasticity to mixtures.

Flint - Is produced by flint pebbles which are calcinated and crushed and used with mineral felspar and water to produce the slip.

TYPES OF ARCHITECTURAL CERAMICS

'Ceramics are made from a mixture of mineral material (generally quartz sand) and a clay binder (hydrated aluminium silicate) with impurities such as chalk, dolomite and sulphates, plasticized with water' (Everett, 1992, p.89).

Its use in architecture assumes the form of varied products which are

Hanging strips of Ceramics, a students research on its limitations.



produced as follows:

Fire clays
This category includes clay bricks, roof tiles and flooring quarries. Its high kaolin content allows this clay to be resistant to high temperature fires (Everett, 1992).

Terracota & Faience
These can be glazed or unglazed and constitute a variation of earthenware ceramics. The term *terracota* does not refer only to red-firing unglazed ceramics, contrary to popular belief, but represents any type of unglazed clay. The type of clays used for these products are usually a mixture of several natural clays, sometimes with the addition of *grog* - which reduces its shrinkage degree. Plasticity is not very important and shrinkage does happen although not excessively (Hamilton, 1978).

The term *Faience* is described as a glazed form of terracota ceramics, and is usually associated with large tiles. The underside faces of these ceramics are made roughly and present grooves or uneven surfaces so that it adheres to the mortar. Ceramic glazes are a durable product, but if water manages to penetrate through it from the back - the unglazed side - crystallization of salts may occur which leads to failure of the product.

Fireclay and Stoneware
Fireclay is a product that is mainly used due to its high fire resistance. It contains High levels of *kaolin* in the clay mixture. Stoneware is similar to fireclay differing only in the higher proportion of glass, thus making it harder and less absorbent than Fireclay. The proprieties of stoneware make this type of ceramic suitable for use as drainage pipes and other drainage elements.

Earthenware
Earthenware is a finer product than stoneware and is normally used as glazed wall tiles. Its water absorption is quite high which makes it less suitable for sanitary ware than vitreous china.

Vitreous China
Characterized by its high glass content, vitreous China becomes less absorbent than earthenware, thus, ideal for the making of sanitary ware and sanitary fittings. It is also considered to be stronger than earthenware.

Porcelain
Porcelain is made from very pure materials due to its use as electrical insulators. Its raw materials are similar to the ones mixed to produce the vitreous china.

ARCHITECTURAL CERAMICS AVAILABLE IN SOUTH AFRICA

Ceramic Industries Limited is a company which manufactures wall, floor and sanitary ware in South Africa and porcelain tiles in Australia and South Wales. This company is the largest manufacturing company of architectural ceramics in South Africa (Ceramic Industries Limited, 2009). The information that follows is based on the different products manufactured by the many factories that they have across the country.
These factories work with a combination of pressed and extruded tiles processed in various sizes, textures and finishes.

Hammanskraal, Pretoria North
In this factory floor tiles are manufactured in sizes of 480 x 480 mm and 500 x 500 mm aiming mainly at residential and light commercial applications. Wall tiles are produced in sizes of 200 x 200 mm; 200 x 250 mm; 200 x 300 mm; 250 x 300 mm; 250 x 400 mm and more recently 300 x 550 mm. Tiles are glazed and manufactured using the pressed method (Ceramic Industries Limited, 2009).

Krugersdorp
Specializing in the manufacture of sanitary ware, this factory incorporates the process of design, modelling and moulding. The type of clay used for sanitary ware is the vitreous china.

Vereeniging
This factory manufactures both glazed and unglazed hard wearing and heavy-duty floor tiles using the method of extrusion and *punching*. The sizes available are 300 x 300 mm; 400 x 400 mm, and 300 x 400 mm and they focus mainly in producing textures and prints for achieving certain realistic designs in competition with natural stone floor tiles.
Pressed glazed floor tiles are fabricated in a different factory in the same location in sizes of 350 x 350 mm.

In another factory a range of unglazed tiles are produced in sizes of 240 x 120; 40 x 240; 330 x 330 and 400 x 400 mm. Ceramic tiles manufactured using porcelain are manufactured in factories belonging to the same company which are located in Australia and in South Wales. (Ceramic Industries Limited, 2009).

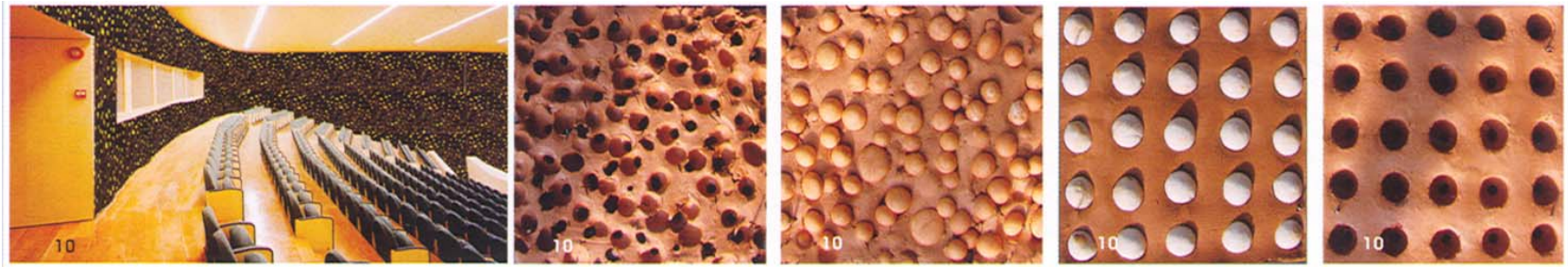
LIMITATIONS OF ARCHITECTURAL CERAMICS

Architectural ceramics is an extensive field with the capacity to generate a vast range of products available world wide and applicable in various ways.

The techniques and methods of fabrication that have been so far developed have in them centuries of embedded knowledge. They have been employed in the making of bricks, tiles, faience and terracota, large scale sculptures, roof tiles, chimney pots, fireplaces, louvres, signs, screens, sanitary ware and many other decorative elements (Hamilton, 1978). The field is so extensive and complex that it cannot be covered in its fullest detail in this project. In virtue of this fact, specific methods and techniques were selected that are considered to be relevant for the mentioned objectives of this study. These methods and techniques were also selected taking into consideration the current use of ceramics within the South African context. This will help to understand the modes of fabrication available in the field of architectural ceramics as well as its limitations, with the intention to speculate and propose new ways that this material can be used with the available technology.

Great innovations have been made in Europe and elsewhere with regards to exploring the limitations of architectural ceramics. These studies have focused mainly on techniques and production methods that are connected to the architectural field, such as moulding and model making, assembling and processes of tile making such as extrusion, pressing and punching. These innovative studies come from the revival of the interaction between architect, craftsmen, fabricator and designers (Hamilton, 1978). As a result, my focus will be in understanding different techniques used for moulding and model making and local fabrication studies of sanitary ware and tile making as well as the creation of the design of surface patterns in floor and walls tiles.

Hybrid Ceramic - experiments with pieces that are combined with other materials to create new technological possibilities such as rough textures, better acoustic proprieties, etc...



MODEL MAKING AND MOULDING

In general terms, the best material regarded by manufacturers for models is the plaster of Paris. Sometimes, materials such as wood, polystyrene, clay and others can be used as a result of complex form, design or even technology - as for the case of large complex forms. Nevertheless, plaster is and still remains one of the main materials used because of its qualities - lack of laminations or grains that can damage the final product (Hamilton, 1978).

Models are always made about 10 % larger than original clay pieces, due to shrinkage factors. It is recommended that only the finest grained type plaster should be used as they must be hard enough to withstand the handling and moulding of the desired piece. Furthermore moulds should also be strong enough to handle the repetitive factor of mass production (Hamilton, 1978).

METHODS TO FORM PLASTER

Sledging and Turning

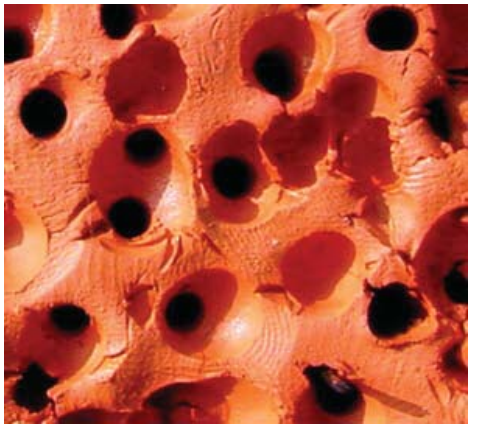
A sledge is an accurately engineered tool that reproduces the profile of a template by running along the template's edge whilst at the same time reproducing this edge using plaster. Sledging requires the plaster to be worked whilst still wet and soft, therefore it is a fast method of model making. One should not allow it to set before creating the model. Water to plaster ratio becomes very important, and additives are often used to increase its setting time. For sledging it is recommended that templates be done in flexible and easy to handle materials such as zinc and other types of flexible metal.

'The desired section of the plaster model is to cut from the metal and fix to a wooden backing so that the edge of the metal template may shape the plaster, with the wood providing additional support and rigidity. The template is then fastened on to the sledge, and the plaster mixed up and poured in approximately the right position'. (Hamilton, 1978, p.67)

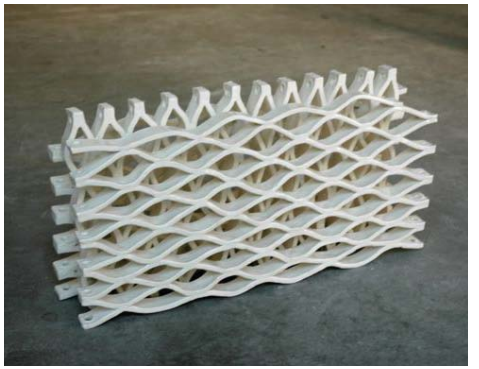
Turning consists of forming clay or plaster by spinning it upon either a vertical or horizontal lathe and shaping it using template or tools. Turning is mainly used for small radius models. Wood turning lathe is the most suitable for plaster and it must be used at low speed rotations to avoid cracks. A spindle or chuck of plaster must be prepared and used immediately before it starts to set. The forming of the plaster or clay can be done by a hand chisel or template (Hamilton, 1978).

The Horse
This method is used for the production of larger radius pieces and works similarly to the sledging modelling method, whereas the difference lies in the frame holding the template. This frame is fastened to an arm which revolves around a spindle.
In order to maintain a non-stick surface on the spindle upon the application of the plaster, several coats of shellac should be used. (Hamilton, 1978).

'[...] When the template has been prepared and fastened to the horse, plaster is mixed and poured upon the table in the appropriate area. As the horse is moved around the central pivot arc the desired size is produced with the section of the template.' (Hamilton, 1978, p. 69)



Complex models
Complex models can be done using a combination of the different techniques described above, sometimes requiring them to be hand finished. Another useful method is to break the complex form into several pieces which are later joined back together to create the mould. Also nowadays the use of CAD/CAM makes it easy to create more complex forms in three dimension. An example of this process of modelling can be seen further along in the villa Nurbs project.



MOULDING BY MACHINES

These are used in the fabrication of ceramic tiles using the method of pressing and dry pressing.

Extrusion
The process of extrusion starts by creating the right mixture of clay and the necessary components.

The moulding process occurs when the mixture is forced, under pressure, into a series of nozzles in an extruding press and when it comes out the machine can be programmed to cut the final product to sizes of desired length. The underside of the tiles is extruded with an uneven surface which can contain ribs or grooves. This allows the tiles to adhere to the mortar. Small imperfections such as pores and inclusions can be seen on this side as well as on the corner of the top side - this is considered to be the downside of this process (Gonzalez, 2006)





Dry-pressed
This process requires the clay to be ground to a fine powder which can be done using two different methods. The first method requires that the clay be dried and grounded to obtain a palpable powder. Water is then added to provide the necessary plasticity for the final product. The second method, a much more modern technique, requires the clay to be wet ground and mixed with silica balls which is then loaded into a hollow steel grinder with rubber and inert mineral compounds. This produces an aqueous suspension of clay. After several steps that follow this stage the outcome is clay in the form of minute spherical granules which give the clay mixture the necessary plasticity and it's high quality requirement. The mixture is then moulded in high pressure driers to produce pieces of desired shape and sizes.

FIXING METHODS

There are several methods of fixing architectural ceramics which depend on the types of product and its properties as well as the conditions of its application. Fixing can be done in walls, floors or as a detached skin which then requires a substructure. Understanding the properties of a specific material and how it fails, e.g. buckling, and how it contracts and expands will determine the necessary type of fixing method to be used. The classification of fixing methods can be done according to a fitting system of direct adherence, mechanical anchoring and mixed anchoring systems.

Direct adherence
Wall and floor tiles cannot be butt joint due to their need for expansion and contraction, which can cause cracks and uneven surfaces. The most common fixing method for wall and floor tiles is cement-based adhesives, mortar glues, adhesive pastes, and resin chemical based adhesives.

TOP and MIDDLE: Experiments with ceramic using moulding methods.

BELOW: Study for new applications of ceramics in construction . Architect: Lacaton & Vassal

In South Africa, tile specialists recommend that tiles should have joints between 3 to 10 mm on floors and 2 to 5 mm on walls. This variation will depend also on the nature of the material to which it is being fixed to. (Tilling tips, 2009). Further recommendation is made with regards to movement joints. These should be used in very large surfaces with interruptions at maximum intervals of 5 meters in each direction (Tilling tips, 2009).

Grouting and spacing - As mentioned above ceramic tiles should be fixed to accommodate expansion and contraction between different materials. Furthermore, in responding to climatic variations as well as its own

weight, ceramic tiles may buckle which can lead to tiles loosing themselves from their surface.

In thin industrial tiles, spacers are often used to ensure regular and neat spaces between each neighboring tile. The spaces between tiles are later filled with grouting, which can assume a matching or different color to the tiles and help create different readings of the surface. (Hamilton, 1978). Faience and terracota are considered to be structural ceramic tiles therefore they follow the same type of assembly as other stonework methods. This means that they can be fixed with mortar and cement based adhesives and laid in different ways as is the case of a brickwork wall. Also, Hollow blocks can be anchored by a steel frame structure (Hamilton, 1978).

Mechanical anchoring system
This fixing method comprises a more complex mechanism which in most of the cases include the use of a structure to which the tile is fixed to. The method of fixing can be expressive of its fixing mechanism or as in some of the fixing methods shown below, it can be concealed.

Visible bolt - this method uses four bolts placed in each corner of the tile which is fixed to a steel or aluminium substructure (Peidro, 2006).

Visible profile - Facade tiles are fixed between vertical frames. In between the tile and the profile a rubber bead is used to avoid vibrations and slippage. (Piedro, 2006)

Visible clamp - This method differs from the others by using clamps which fixes the corners of the tile. It is applied with a bead of polyurethane putty to prevent tile vibration (Peidro, 2006).

Grooved back tile - This fixing method conceals the anchoring system by using aluminium or steel continuous sections that are fixed on horizontal grooves made at the back of the tile. The groove needs to be about 30% of the thickness of the tile and must be done at a 45 degree angle (Peidro, 2006).

Groove edge - This method uses upper and lower continuous groove that runs in the actual tile with the principle of a interlocking system. The tile is then fixed to a substructure by means of clamps (Piedro, 2006).

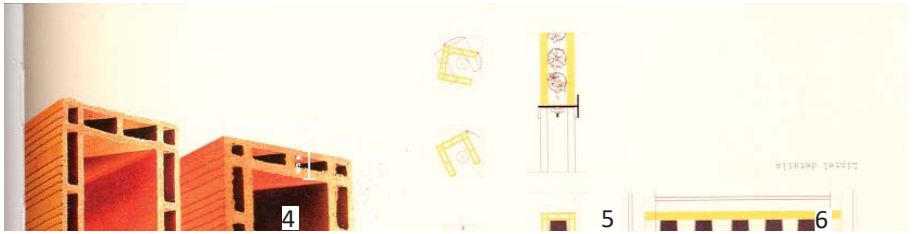
Expandable fastener - This method uses clamps and bearing profiles as fastening pieces. They are fixed to a substructure by making use of a

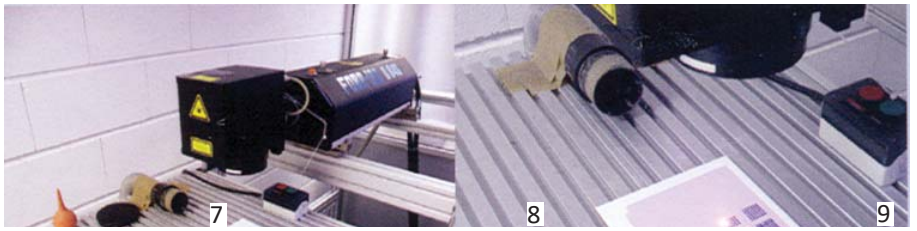


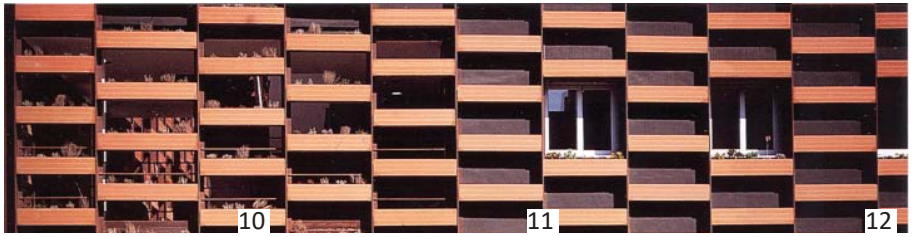


Detail of fixing ceramics by adherence in Maputo.











Examples of fixing methods
1. Visible bolts
2. Visible profile
3. Visible clamp
4. Variation of Visible clamp with a tab for easy fitting and removal
5. Grooved back tile
6. Variation with two back grooves
7. Variation with flexible back grooves
8. Grooved edge
9. Variation of Grooved edge
10. Expandable fastener
11. Overlapping expandable fastener
12. Anchoring system
13. Anchoring system with 'T' shape aluminium profile inserted in the grooves
14. Visible anchoring without structure
15. Concealed anchoring without substructure

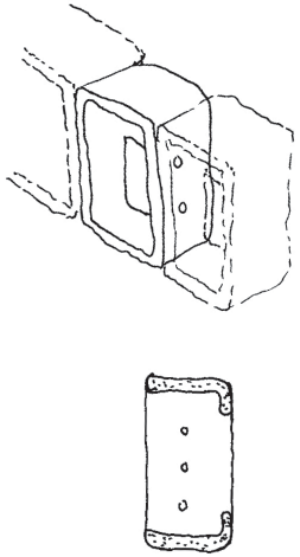
self locking nut. A neoprene gasket is applied between fastened pieces (Peidro, 2006).

Anchoring systems for extruded ceramic tiles - Extruded tiles have the particularity of coming with grooves. This groove can be modified to respond to desired requirements through the use of different extrusion profiles in the die. These methods make use of this particularity to fix tiles by means of steel claws or clamps of continuous or point specific profiles in both vertical and/or horizontal directions. A variation of this method is achieved by not having an anchoring substructure.

LOCAL INDUSTRIES MANUFACTURING STUDIES

VAAL SANITARYWARE,GAUTENG
Source: Vaal Sanitary ware, Processes & Facilities at Vaal Sanitary ware [online].

1. Design, modeling and case making
After the design phase of a new product, working drawings are made and prepared for the modeling department. A plaster model of the finished size product is produced and gets inspected by both marketing and manufacturing departments for approval. After approval, the modeler will then model the new article in its green size, which will be approximately 12% larger for vitreous china, and 4% larger for fireclay products, as they contract during the firing process.



Sketch: exploring screens made by process of modelling and moulding



2. Mould making
All moulds used in manufacturing the sanitary ware industry are made from plaster of Paris - an easy material with great absorbent proprieties. This plaster mould absorbs water from the slip - a mixture of raw materials - thus leaving a semi-hard clay layer on the surface of the plaster mould. Moulds last for about 80 casts and after that they need to be replaced.

3. Raw material blending and Slip preparation
A mixture of raw ingredients creates a slip. These ingredients are combined with water which eventually gets removed completely when going through the process of casting and drying. The major raw materials used at Vaal are Ball clays, China clays (Kaolin), Felsparth and Silica in various proportions.

All the raw materials are mixed separately with water to the required consistency and are then mixed together according to the appropriate recipe. The mixture is then stored in storage tanks and monitored by the laboratories to the exactitude of its laid down specifications.

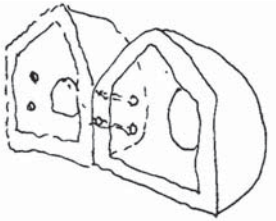
4. Casting
The casting here is done manually. The moulds are filled with the slip and allowed to cast for approximately 1,5 hours. After this any excess is removed and reused and the product resultant from the cast (ware) is left in the mold to dry for approximately two hours before being

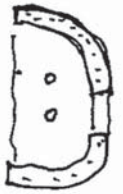


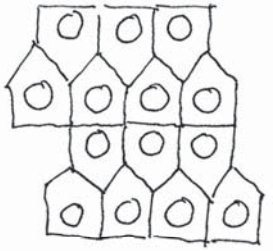




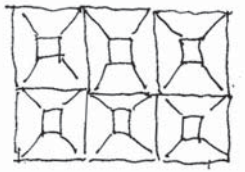
Sketch: exploring screens made by process of modelling and moulding

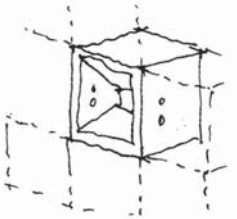












removed and transported into a dryer where it lays overnight. After 24 hours, the ware is then in a suitable condition to be ‘dressed’ prior to glazing.

5. Green product clay inspection
Inspection is done to the precision of the green product. This provides the chance for correction of imperfections and minor faults. It is considered to be the most important section in the factory as any ware that is not properly inspected in this section will be rejected after firing.

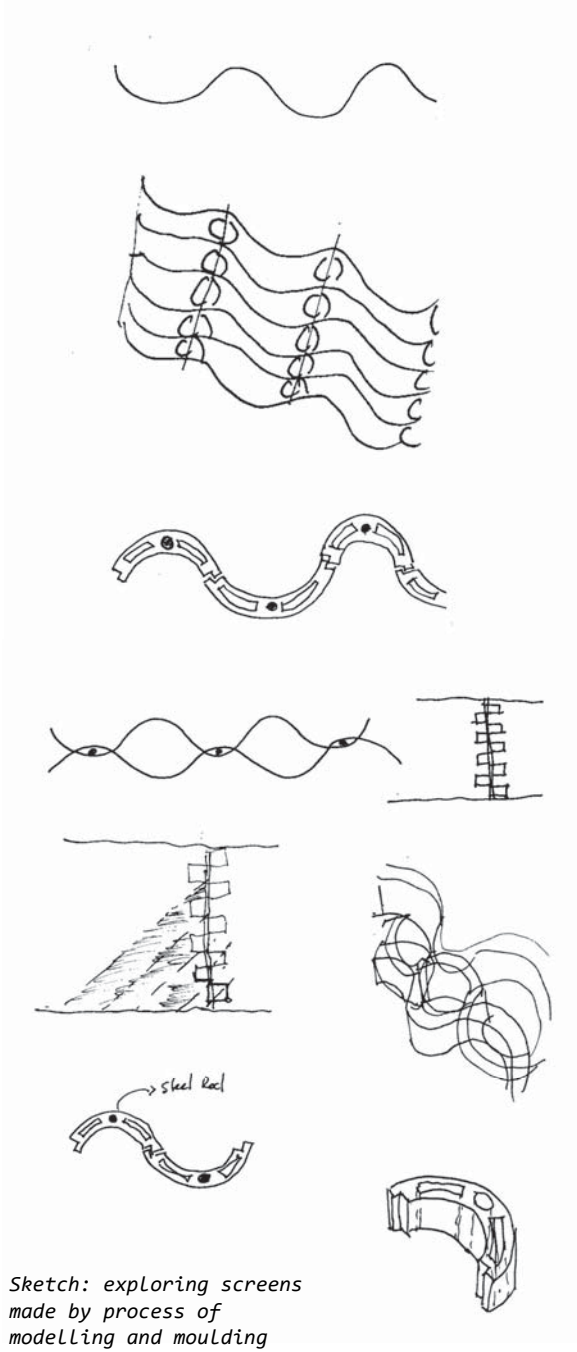
6. Glazing
Glaze consists in a spraying method application. At Vaal Sanitary ware, four layers of prepared glaze in liquid form are sprayed onto the ware.
Glaze consists of the following minerals: zircon, felspar, quartz, calcite, kaolin, zinc oxide and after glazing, the ware is placed into storage tanks adjacent to the kilns.

7. First fire
Vitreous china and Fireclay are fired in the same gas kiln because they have approximately the same firing temperature. The kiln runs 24 hours a day and is capable of firing approximately fifteen and a half thousand pieces of vitreous china per week.
Temperature control is of the utmost importance. The maximum temperature of the kiln is 1250°C with 5°C variations.







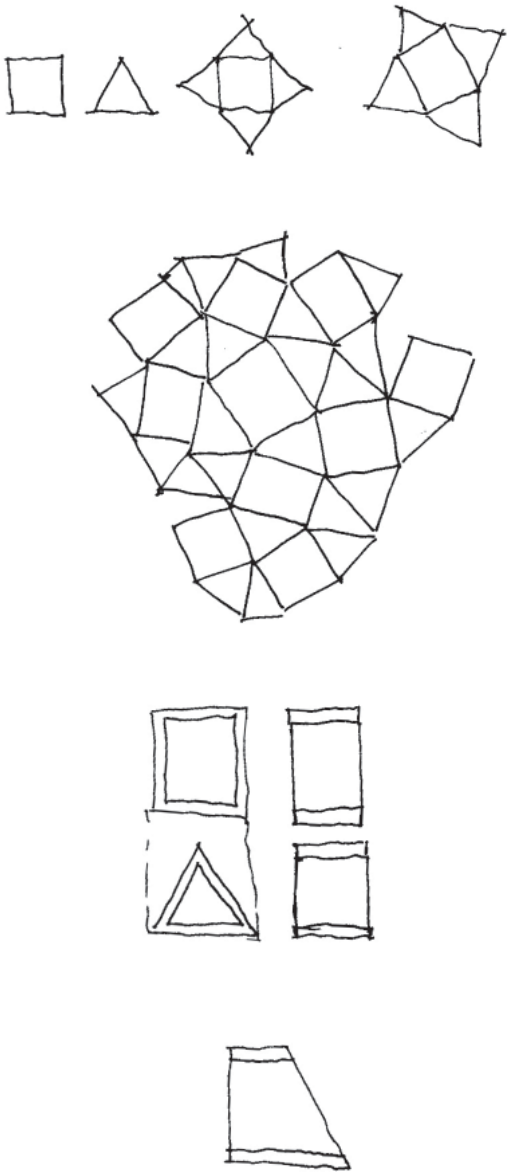


Sketch: exploring screens made by process of modelling and moulding using round bricks fixed to steel rod

8. Final inspection and packaging
After firing, each individual piece of ware is checked for quality purposes. The ware that passes the quality requirements goes to the stockyard and is ready to be packed. The ware that does not pass the quality requirements is divided into two categories: the ones that are able to be repaired because they only have minor faults, and the ones that are totally unacceptable. Ware that has only minor blemishes is sent to the re-firing process.







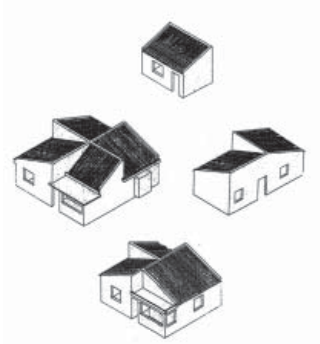
Sketch: exploring combination of two geometries to create a repetitive pattern for facades.

9. Cold patching and inspection.
The ware that have minor faults, such as blemishes, pinholes, and surface spots are sent back to be repaired and re-fired. They take on a second coat of glaze and are sent to the electrical top hat kilns. After the whole process has finished the object is re-inspected before being dispatched to the stockyard.

10. Re-firing and inspection
The final stage is re-firing and inspection.



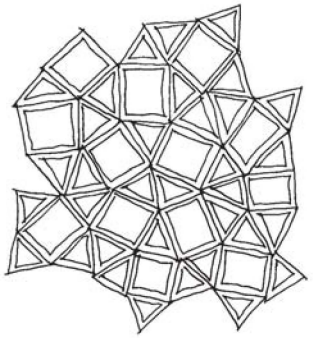


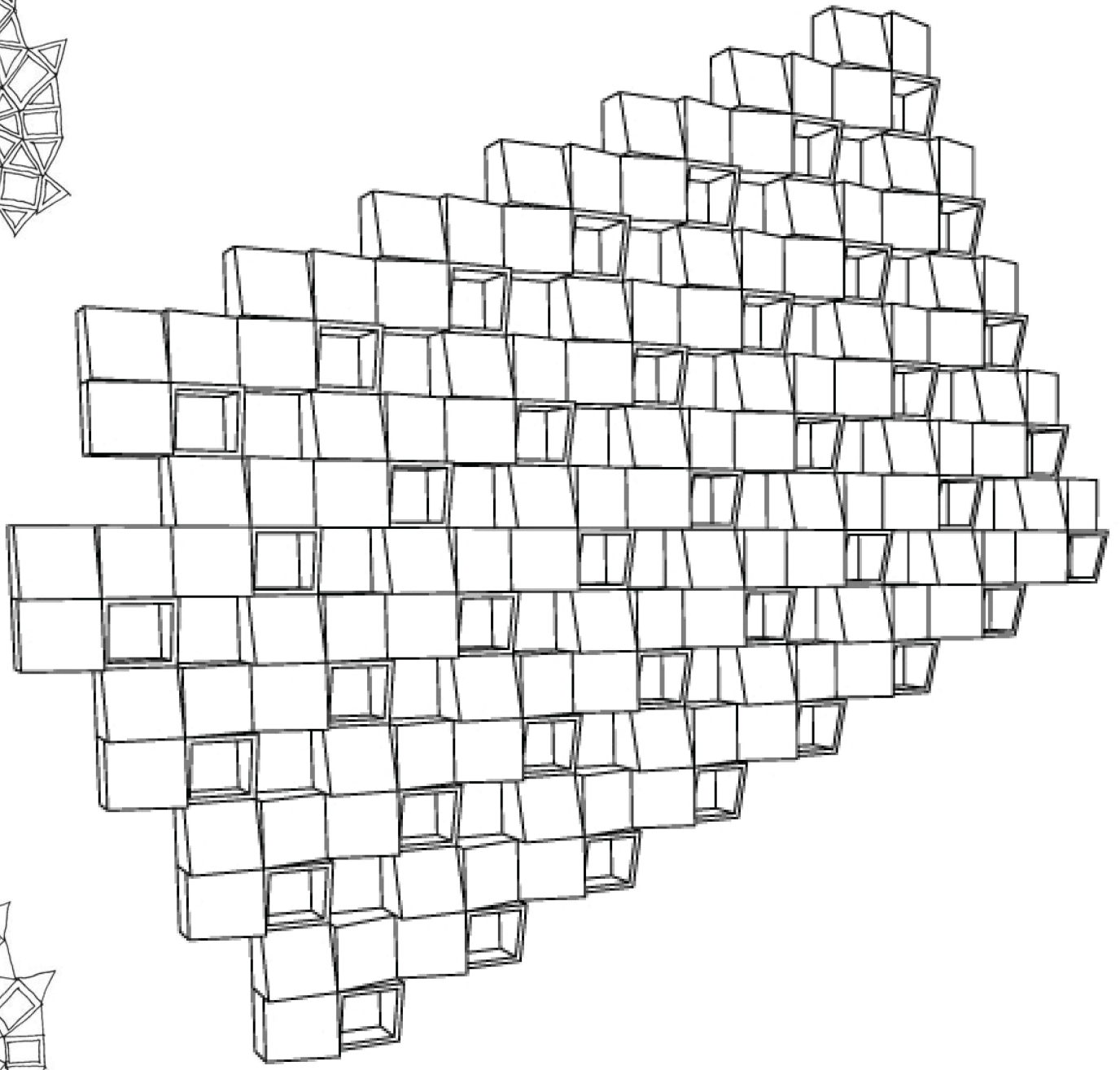


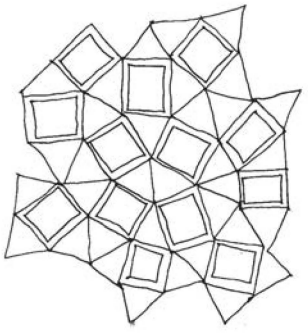




Sketch: exploring the process of creation of a repetitive pattern for facades using the geometry of the traditional informal housing in Mozambique. Most of these houses are incremental and make use of a modular form which is expressed by independent roofs.





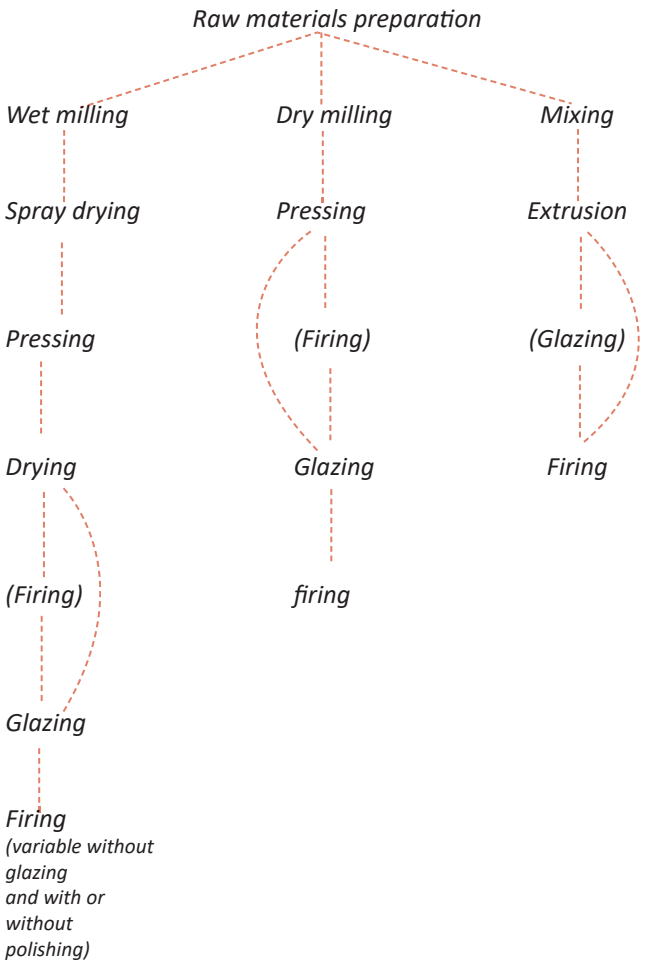


TILE MANUFACTURING PROCESS

The process of tile manufacturing depends on whether the product is single or twice fired and if it will be subject to glazing or not (Toumi, 2006). Therefore, tile manufacturing process can be identified as comprising tree different processes as illustrated on this page.
The Images shown as examples here are based on NCI's unglazed tile manufacturing process study in Vereeniging.

1. Raw materials preparation
This process is the preparation of the necessary recipe to create a mixture or slip. Materials required are mainly clays, felspars, sands, carbonates and kaolins. After the first mixing the slip can be, depending on the process, submitted to dry milling or wet milling. The former is the most common it consists of hammer or pendulum mills, and the latter consists of continuous ball mill. Milling is used in order to produce a necessary particle size of aggregates and agglomerates. With wet milling smaller particles sizes can be obtained in comparison to dry milling.

For floor and wall tiles that undergo a single firing, the method of wet milling and spray drying is often employed. This consists of taking the slip after the wet milling and submitting it to spray drying to obtain a product with a specific moisture content. This process is done by allowing fine drops of sprayed



suspension to come into contact with hot air to yield a solid surface with low water content (Toumi, 2006).

2. Extrusion of desired thickness
This process consists of putting the mixture through a die that produces a constant tile extrusion with the desired cross section. This equipment is made of three parts: a driving system, the die which can often produce different cross-sections as the underside is formed with grooves and/or uneven surfaces, and the cutter.

An alternative method also available in South Africa is the Dry pressing or Pressing, consisting of hydraulic presses which mechanically compress the slip in the die into a desired format. This method is considered to be most cost effective when manufacturing tiles with a regular geometry. (Toumi, 2006).

3. Punching of correct size
The extruded tile is punched into desired sizes using mechanical cutters. In this example the limitation of width of the tile is obvious. However, the length can be as long as desired provided that the tile manages to support its own weight.

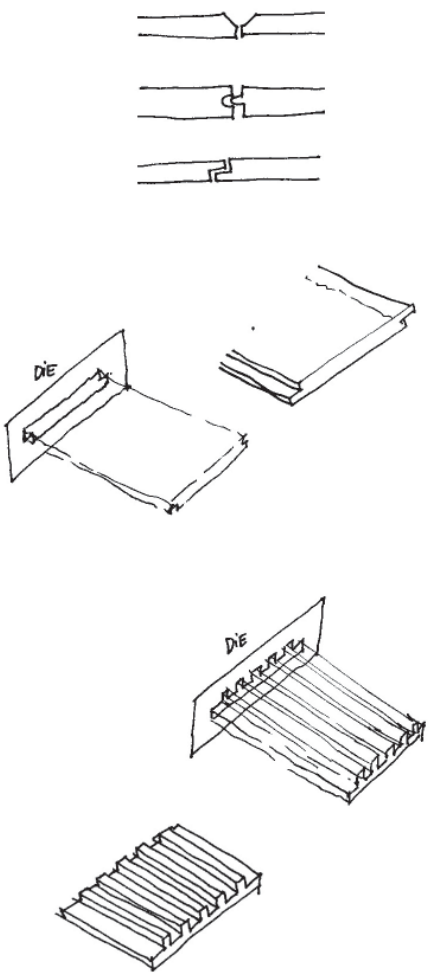
4. Firing process
Tiles are subjected to a thermal cycle during which a series of molecular reactions takes place which changes the molecular structure of







Images based on NCI's unglazed tile manufacturing process study in Vereeniging.
From NCI, 2009.

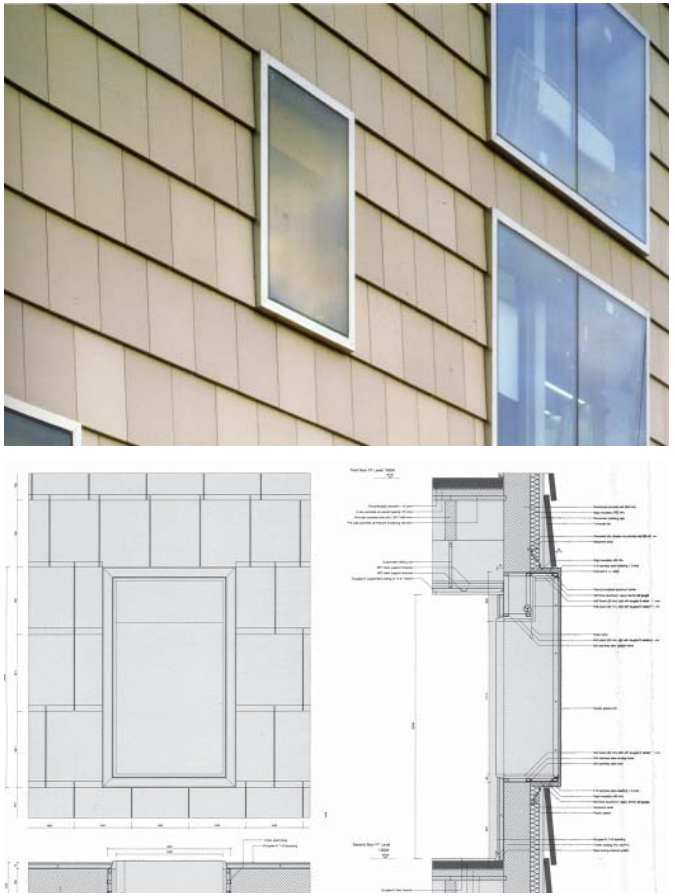


Sketch: exploring possible textures, and and joints of tiles

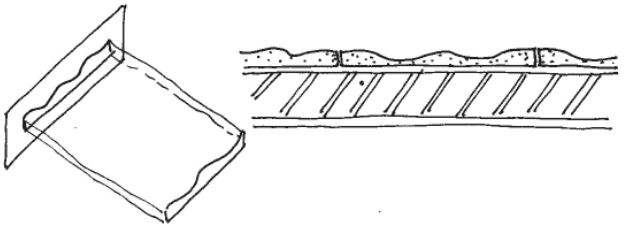
the tile. Single fired and twice fired are used for different outcomes. The unglazed tiles only need to be submitted to a single firing. Glazed tiles, on the other hand, can undergo one or two fires - one after applying the glaze to the green tile, or two when firing the tile before the glaze is applied, followed by the second after glazing application (Toumi, 2006).

Glazing consists of an application of silica coupled with other elements such as alkalins, alkaline earths, boron zinc, and opacifiers such as zirconium and titanium. Color agents such as iron, chromium cobalt, and manganese provide many properties to the tile such as impermeability, smoothness, gloss, color and surface, textures, and chemical and mechanical resistance.

5. Packing and storage
After additional treatments are made (when necessary) to the tiles, it is followed by a process of sorting and packaging.



Images based on NCI's unglazed tile manufacturing process study in Vereeniging.
From NCI, 2009.



Sketch: exploring undulated surface of wall tiles made by the profile of the die.

GLOSSARY

Cultural variables	Suitable vehicles in which cultural expressions can be carried.
Historicism	A theory that all cultural phenomena are historically determined and that historians must study each period without imposing any personal or absolute value system
Nation	A nation is seen here as a large body of people united by common language and culture, inhabiting the same territory or state.
Modern nation	the term modern nation here is referred to any given nation living in the current period of continuous change loosing its historical memories, which were once representative of a homogeneous national culture (Bhabha, 1990).
Primitive architecture	the term refers to an architecture, which is built by people using their intelligence and available resources.
Maticado	A form of plaster with adobe.
Vernacular architecture	The term refers to traditional or popular architecture.
Architectural ceramics	a variety of clay items used in architecture or large enough clay items which influence an architectural environment.
CAD	Computer aided design.
CAM	Computer aided manufacturing.
Die	A metal hole through which clay is pressed so that it takes the form of the hole in cross section commonly used in tile making (Hamilton, 1978).

Encaustic	Inlaid pattern with differently coloured clays burnt in to produce the pattern.
Earthenware	A type of porous ceramic.
Faience	Glazed earthenware or glazed terracota.
Grog	Grounded clay previously fired used to reduce shrinkage in new recipes.
Glaze	A finish applied to ceramics based on silica.
Kaolin	Fine white clay used in the manufacture of porcelain.
Terracota	Unglazed porous ceramic often made of red-burning clay.
Punching	the process of using a punch press to push a punch through the material and into a die to create a hole in the workpiece.
Slip	Mixture of clay and water.
Vitrification	A process of heating the clay into a glass like substance.
Lustre tiles	Polished glazed tiles.
Refractory	resistance to heat.
Moorish	people of Berber and Arab descent from North Africa which conquered and came to inhabit the Iberian Peninsula.

IMAGE REFERENCES

PART I
Land of contrasts (image) - several sources online. Most of it available at www.treakearth.com and flickr.com.
Pag.19 - Maputo coastline from www.joseforjazarquitectos.com
Pag.22 - Maputo bay from Corvaja, L. 1998.*'Maputo : città capitale del Mozambico : disegno e architettura'*. Imprint, Roma : Fratelli Palombi
Pag.23 - Pancho Guedes drawings, from Guedes, A., *1925. 'Manifestos, papers, lectures, publications'*. Lisboa, Portugal: Ordem dos Arquitectos, c2007.
Pag.23 - Makonde houses, from Carrilho, J., Bruschi, S., Menezes, C. and Lage, L., 2004. *'Traditional Informal Settlements in Mozambique: from Lichinga to Maputo'*. Maputo: FAPF
Pag.24 & 25 - Collage by author, from several sources.
Pag.26 Forjaz's buildings available at www.joseforjazarquitectos.com. Tinoco images and drawings courtesy of Vitor Tomas from Jose Forjaz Arcquitectos.
Pag.28 & 29 - Tinoco drawing, courtesy of Vitor Tomas.

PART II
Pag.30 - fritz Lang's poster 'metropolis' availabe online.
Pag.32 - Casa da musica by rem Koolhas, image from Jencks, C., 2007. .*Critical modernism: where is post-modernism going?'*. Chichester: Wiley-Academy.
Pag.39 - Traditional houses, from Carrilho, J., Bruschi, S., Menezes, C. and Lage, L., 2004. *'Traditional Informal Settlements in Mozambique: from Lichinga to Maputo'*. Maputo: FAPF

PART III
Pag.40 collage by author. Olad Mozambique's map available at www.raremaps.com & old Cape Town map from Worden, N., Van Heyningen, E.,Brickford-Smith, V., 1998. 'Cape Town: the making of a city - an illustrated social history'. Claremont, South Africa: D. Philip; Hilversum, Netherlands: Verloren.
Pag.43 - Traditional houses, from Carrilho, J., Bruschi, S., Menezes, C. and Lage, L., 2004. *'Traditional Informal Settlements in Mozambique: from Lichinga to Maputo'*. Maputo: FAPF
Pag.45 - Maputo. Photos by the author.
Pag.47 - Buildings by Pancho Guedes from Guedes, A., *1925. 'Manifestos, papers, lectures, publications'*. Lisboa, Portugal: Ordem dos Arquitectos, c2007.

PART IV
Pag.54 - Ceramics facade in a building in Maputo. Photo by Paulo Goncalves.
Pag.57 - Ceramic art by Mozambican artist Naguib. Photo by Paulo Goncalves. Ceramic pottery from Danielsson, K., 1988. 'Mozambique!: Exhibition, workshop, programmes'. Stockholm: Tkulturhuset.
Pag.59 - Ceramics facade in a building in Quelimane. Available online.
Pag.61 - Top left image from Forjaz, J. 2000. *'Building culture : a paper written for the Congress of the South African students of architecture, Cape Town, September 2000*, Cape Town. Top right image courtesy of Vitor Tomas. Bottom left photo by author. Bottom right photo by Tiago Damasceno.
Pag.62 - Top image by Paulo Goncalves. Below by author.
Pag.63 - Top left by author. Top right and bottom right by Paulo Goncalves. Bottom left by Tiago Damasceno.
Pag.64 - Image composition by author sourcing from the work of Paulus Gerdes and one photo by Paulo Goncalves (top right).
Pag.65 - First vertical section: top drawings from Hamilton, D., 1978. *'The Thames and Hudson Manual of Architectural Ceramics'*. 1st ed. London: Thames and Hudson. Below from

ASCER, 2006. *‘Moulding, Assembling, designing ceramics in Architecture’*. 1st ed. Spain: Spanish Ceramic Tile Manufacture’s Association. Second and vertical images by author.
Pag.66 to **70** - drawings and photos from ASCER, 2006. *‘Moulding, Assembling, designing ceramics in Architecture’*. 1st ed. Spain: Spanish Ceramic Tile Manufacture’s Association.

PART V
All images and drawings by author except pages 90 and 91.
Pag.90 - Finland embassy photos from http://www.heikkinen-komonen.fi/Frames_new_projects.htm, and South African embassy photos from http://www.mmaarch.co.za/projects_architecture.asp.
Pag.91 - French-Mozambican cultural centre photos from http://ccfmoz.com/rubrique.php3?id_rubrique=240. Netherlands embassy images from Balamir, A. *‘2007 On Site Review Report’* [online], available at: www.archnet.org/library/downloader/file/2368/file.../FLS1953.pdf.

ADDENDUM
Pag.121 - Top image from wwww.designboom.com. Bottom image from www.erasmuspc.com
Pag. 123 & **124** - Top image, collage from Magalhes, R. 2007, *‘Historia do azulejo em Portugal’*.[online]
Available at: http://www.cn-mirandela.pt/tiles/38/3882.pdf Available at: http://www.cn-mirandela.pt/tiles/38/3882.pdf Pag.125 - Left photo by Ray Langsten available at www.panoramio.com. Right photo by author.
Pag.127 - Image from EKWC available at: www.ekwc.nl
Pag.130 - Images from ASCER, 2006. *‘Moulding, Assembling, designing ceramics in Architecture’*. 1st ed. Spain: Spanish Ceramic Tile Manufacture’s Association.
Pag.132 - Top and middle from EKWC available at: www.ekwc.nl, Below image from ASCER, 2006. *‘Moulding, Assembling, designing ceramics in Architecture’*. 1st ed. Spain: Spanish Ceramic Tile Manufacture’s Association.
Pag.134 - photo by Paulo Goncalves.
Pag. 135 - Image from Peidro, J.M., 2006. Ventilated ceramic tile facades: advantages and anchoring systems. In ASCER, *‘Moulding, Assembling, designing ceramics in Architecture’*. 1st ed. Spain: Spanish Ceramic Tile Manufacture’s Association
Pag.136 to **140** - from Vaal sanitaryware available at: http://www.vaalsan.co.za/Vaalsan%20Processes%202007.html
Pag.143 to **144** - from NCI ceramic industry available at: www.nci.co.za

REFERENCES

BOOKS

Abel, C., 2000. *'Architecture & Identity: responses to cultural and technological change'*. 2nd ed. Oxford: Architectural Press.

ASCER, 2008. *'Public Private Ephemeral: Ceramics in Architecture'*. 1st ed. Spain: Spanish Ceramic Tile manufacturer's association.

ASCER, 2006. *'Moulding, Assembling, designing ceramics in Architecture'*. 1st ed. Spain: Spanish Ceramic Tile Manufacture's Association.

Bhabha, H.K., 1990. *'Dissemination: time, narrative, and the margins of the modern nation'*. In Bhabha, H.K. ed. Nation and Narration. London: Routledge.

Carrilho, J., Bruschi, S., Menezes, C. and Lage, L., 2004. *'Traditional Informal Settlements in Mozambique: from Lichinga to Maputo'*. Maputo: FAPF

Costa, A., Lemos, M. J.C. and Rungo, B., 1992. *'Maputo: um olhar sobre a cidade e a sua historia'*. Maputo: Universidade Eduardo Mondlane.

Danielsson, *K., 1988. 'Mozambique!: Exhibition, workshop, programmes'*. Stockholm: Tkulturhuset.

Everett, A., 1994. *'Mitchell's Materials'*. 5th ed. England: Longman Scientific & Technical.

Forjaz, J., 2005. *'Arquitectura, Ambiente e Sobrevivencia'*. 1st ed. Maputo: FAPF.

Santiago, M., 2007. *'Pancho Guedes – Metamorfoses Espaciais'*. Portugal: Caleidoscopio.

Gadanho, P., 2007. Pancho Guedes, echoes of an alternative modernity. In Verlag, C.M. *'Pancho Guedes, an alternative modernist'*. S AM no.3. Basel: Swiss Architecture Museum.

Gonzalez, M., 2006. Ceramic Tiles: production process, types and fixing techniques. In ASCER, Moulding, *'Assembling, designing ceramics in Architecture'*. 1st ed. Spain: Spanish Ceramic Tile Manufacture's Association

Guedes, A., *1925. 'Manifestos, papers, lectures, publications'*. Lisboa, Portugal: Ordem dos Arquitectos, c2007.

Hamilton, D., 1978. *'The Thames and Hudson Manual of Architectural Ceramics'*. 1st ed. London: Thames and Hudson

Jencks, C., 2007. *.Critical modernism: where is post-modernism going?'*. Chichester: Wiley-Academy.

Jencks, C. 2005. *'The iconic building: the power of enigma'*. 1st Francis Lincoln ed. London: Francis Lincoln.

Loeffler, J.C., 1998. *'The Architecture of Diplomacy – Building America's Embassies'*. 1st ed. New York: Princeton Architectural Press.

Macamo, E., 1998. A influencia da religiao na formacao de identidades socias no sul de Mocambique. In Serra, C. ed. *'Identidade, Mocambicanidade, Mocambicanizacao'*. Maputo: Livraria Universitaria, Universidade Eduardo Mondlane.

Mackay, H., Maples, W. and Reynolds, P. 2001. *'Investigating the information society'. London: Routledge*.

Ndege, G.O., 2007. *'Culture and Customs of Mozambique'*. Conneticut: Greenwood Press.

Ngoenha, S.E. 1998. Identidade Mocambican: ja e ainda nao. In Serra, C. ed. *'Identidade, Mocambicanidade, Mocambicanizacao'*. Maputo: Livraria Universitaria, Universidade Eduardo Mondlane.

Peidro, J.M., 2006. Ventilated ceramic tile facades: advantages and anchoring systems. In ASCER, *'Moulding, Assembling, designing ceramics in Architecture'*. 1st ed. Spain: Spanish Ceramic Tile Manufacture's Association

Rapoport, A., 1969. *'House Form and Culture'*. 1st ed. New Jersey: Prentice-Hall, Inc.

Worden, N., Van Heyningen, E.,Brickford-Smith, V., 1998. 'Cape Town: the making of a city - an illustrated social history'. Claremont, South Africa: D. Philip; Hilversum, Netherlands: Verloren.

PERIODICALS

Pallasmaa, J., 2001. *'Our image culture and its misguided ideas about freedom'*. Architectural Record, v.189, p.51-52.

Pearson, C., 1994. *'Diplomatic maneuvers'*. Architectural Record. v.182, November, p.60-67.

WEBSITES

Boots Group Plc., 2003.' *Corporate social responsibility*'. [Online]. Boots Group Plc. Available at: http://www.Boots-Plc.Com/Information/Info.Asp?Level1id=447&Level 2id=0 [accessed 23 July 2005]

Go Lisbon, 2003. *'Azulejos: Portuguese ceramic tiles'* (Hitting the headlines article) [Online]. Available at: http://www.golisbon.com/culture/azulejos.html [accessed May 2009].

ONLINE REPORTS

Harries, P. 2001, *'Culture and Classification: A History of the Mozbieker Community at the Cape'* [online] Available at: http://web.uct.ac.za/depts/cas/sd/Articles_Vol26no2/harries.pdf

Magalhes, R. 2007, *'Historia do azulejo em Portugal'*.[online] Available at: http://www.cn-mirandela.pt/tiles/38/3882.pdf