



Master's Thesis/Project

# The Rebirth of Paradise

A Systematic approach to anticipate the sea-level rise challenge and benefit from it to improve Alexandria's habitable landscape



# “The Rebirth of Paradise”

A habitable landscape that happens to be pragmatic

Key words: *Alexandria, sea level rise, protection, greenization, value change, transitions, urban, integration, future, stakeholders*

June 21, 2021

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Class 2021

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# The Rebirth of Paradise

“The Rebirth of Paradise” is a protective system around the historical city center of Alexandria, Egypt, The proposed system not only shields the city against floods and stormwater; it provides social and environmental benefits to the community, an improved public realm. Each compartment comprises a physically separate floodprotection zone, isolated from flooding in the other zones, but each is equally a field for integrated social and community planning. The zones work in concert to protect and enhance the city, but each proposal is designed to stand on its own. In this handbook I will explain the process that leads to such decisions and the strategy behind it.

The Thesis was created by a Master students attending the Urbanism track at  
Tilburg Academy of Architecture and Urbanism MA+U

I would like to thank my studio instructors - J.W Kuilenburg, P. Feenstra and S. Del Hierro for their attentive guidance, supportive approach and overall good advice in a project that proved challenging and complex at times, but ended in a positive result i feel it was successful and has taught my much.

I would also like to thank the subjects of my interview process: Steffen Nijhuis Research Leader Department of Urbanism, TU Delft, Mohamed Hesham, senior Architect, my reliable source of information inside the Alexandria’s decision making process.

Thank you all in your assistance.

Mohamed Hassan



# Abstract

“My project’s main aim is to protect, not just Alexandria’s city center, but actually the whole city. I came up with a concept called “Re-imagine the protection wall”, rather than just fortifying the entire city center, I felt the Necessity to address public space and the the local inhabitants’ needs, by adding value to their everyday experience in the city, and also to find a solution, once and for all, for the challenges Alexandria face as a result of the sea level rise.

Therefore, my design wove those two ideas together into what I think will be a habitable landscape that happens to be pragmatic.

“Re-imagine the wall” is more than a protection system, it’s an integrated, interlocking, and connected system of nature-based solutions interwoven throughout the urban fabric, which is the quintessential Alexandria.

It is about utilizing the urgently needed flood management infrastructure, to accommodate and combine new means of social infrastructure, in a very integrated manner. Thus, the park would be providing flood protection for the communities along the waterfront and the south-side spine facing the Nile delta, which could become a communal, cultural and active use of space.



Alexandria, Egypt, East Mediterranean Sea

# Alexandria

population  
5.2 million

area  
2679 km<sup>2</sup>

founded  
331 BC



# INTRODUCTION

to Alexandria and the project



in this chapter

Introduction

Situation and statement

Vision and Plan

Design Methodology

Benefits

# The Essay

## CHAPTER 1. INTRODUCTION

Since the beginning of time, Alexandria, Egypt, has been in a continuous struggle against water, which has become a unique urban characteristic that reflects the succession of historical events Alexandria had witnessed throughout 2300 years of historical layers. Thus, it led to Alexandria being known as the city of water.

Today, Alexandria is facing one of its biggest challenges ever. The Mediterranean coast and the Nile Delta have been identified as highly vulnerable to climate change-induced by sea-level rise (SLR). As a result, this will have a direct and critical impact on 9 million inhabitants and on Egypt's entire future.

In addition to the sea-level rise challenge, Alexandria is among the cities that have the lowest percentage of public green spaces in the world; with only 40 cm square per person, which is 22 times less than the world standard.

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infrastructure, to accommodate and combine new means of social infrastructure, in a very integrated manner. Thus, the park would be providing flood protection for the communities along the waterfront and the south-side spine facing the Nile delta, which could become a communal, cultural and active use of space.

## CHAPTER 2. CHALLENGE STATEMENT

In 2011, a heavy storm hit Alexandria and caused a lot of devastation and sabotage. Unfortunately, the storm wiped out most of Alexandria's waterfront. And since then, the storm keeps hitting infrequently but Surely, every few years, with the latest one in 2020.

This happened because of the geometrical shape of Alexandria, which has this sort of a funnel shape that causes the storm to surge into the most densely populated city in all of the Mediterranean regions, putting a third of the city's inhabitants at risk.

Through looking at the map of Alexandria, you can see that since the first century, we've been expanding the city through landfill. This landfill is exactly the area that is now prone to flooding. Accordingly, one could say that the areas we have been responsible for creating, are also the ones we need to take greater responsibility in protecting. A man-made problem requires a nature-based solution.

Yet, the main questions are, how can we protect the whole city of Alexandria without creating a wall concept that segregates the life of the city from the water around it?  
Can protective measures become the city's attraction?



How can the city plan for its resilience while also planning for its future growth?

The idea also started from questioning that: “Maybe we could learn from the waterfront?”

The waterfront is a piece of commissioned infrastructure that, despite its lack of quality, is now turned into the most popular promenades in Alexandria. When you look at the 100-year flood and the 200-year flood, you will realize that two-thirds of Alexandria’s city center neighborhoods are threatened by future floods, as it’s primarily a residential neighborhood.

Unfortunately, the stormwater and the sea flood are not the only threats Alexandria is facing. This is because, on the Southeast side of the city, Alexandria is also facing the Nile delta flood zone, which will contribute to escalated flood rates.

In order to protect the city from such a threat, the local government built protection lines in the shape of concrete blocks on the waterfront side, and an elevated highway on the south-side of the city.

Such a development worsen an already harmed relations, between the city and the water, and developed a feeling of isolation and lack of safety among the locals.

The historical city center neighborhood is rather curved by vehicle transportation identity, in return, it has a highway cutting it off from the waterfront.

This lead to 95% of the city’s surface is impervious asphalt and concrete, which makes it more prone to flood. Additionally, when you walk down the city, you can feel as if it is getting tortured through a love-hate relationship with the infrastructure.

## CHAPTER 3. VISION AND PLAN

In this case, a holistic intervention is what is needed to this multifaceted problem, one that tackles the physical, environmental, and social needs in one integrated approach.

Only a solution that spawns out of the city’s DNA itself and speaks to the needs and issues of the local communities, has the chance of succeeding and make a lasting positive effect. In other words, to resist a certain amount of storm, you need a certain geometry that could be made in a way so that when you experience it in person, you won’t be able to tell that it’s part of a protection system but rather a natural continuum of the city fabric. A piece of landscape that also becomes what protects the city from flooding. It’s a work of land art, or almost like furniture landscaping that, also protects the city from flooding. without being intuitively readable.

The strategy represented by the existing infrastructure of the city, those lines are going to be used as an integrated defence mechanism. A reminder that risk management is not only an engineering problem, but it’s an opportunity for placemaking.

Starting on the North side along the Mediterranean seafront to protect the city from projected sea-level rise, and crawling towards the inner city in spinal form until reaching out the existing historical ‘El-Mahmoudia canal’. On the South side, there will be a protection line forming a matrix of water channels and integrated flood protection measures, to prevent and secure the city from sea-level rise, stormwater, and delta floods.

The result is a network of versatile and various measures, embedded in the city’s fabric, upgrading the quality of life and forming the protection system the city truly needs.

The proposal breaks the area into compartments, each compartment comprises a physically separate flood-protection zone, isolated from flooding in the other zones, but each of them is a field for physical integrated social and community planning designed to stand on its own.

## CHAPTER 4. DESIGN

The plan envisioned a complementary array of large- and small-scale interventions that, combined together, would radically improve the city's ability to protect itself from sea level rise and storms threats, while bringing Alexandria back to its previous state as the role model of the Middle East.

A series of strategies have been formulated to match the topographical and social character differences of the different parts of the city center.

For instance, in the East side of the city center. Waterfront Park has been created to serve the connection between city and water, so residents can enjoy easy access and peaceful walk, cycling, or running across the waterfront. With a possibility for lite structures to be created to host temporary music or cultural events, those activities can be done while being protected with a horizontal levee along its sloped shore to absorb wave energy and reduce the impacts of coastal flooding, storm surge, and wave action. While in the mid side of the city, the park is replacing part of the highway and extending towards the sea side, creating a space for sports and activities, and introducing a cycling infrastructure as a valid alternative to a city dominated by cars and engines. A terrace step holds benches and seating areas for social activities as a hardscape design,

while integrating landscaping that is derived from the local and vernacular vegetation as soft scape design.

And since Alexandria is one of the top hubs for fishing in the region, on the West side of the city, you can find what is called "the fishermen village".

The area is re-imagined to regenerate Alexandria's fishing identity by upgrading the existing structures and proposing more platforms for fishermen and hobby fishers, while giving space to the society to participate.

A new fish market will be created on this part of the water front to enjoy the whole experience of fishing, selling, and dining on the spot.

And because the design of the defense system is embodied as part of the whole city functions and activities, whether it is on the waterfront or the inner part, the inner-city boulevard spines are meant to be more friendly and lively, while also protecting the city from the Nile delta flooding threat. The interventions implanted in the spines are oriented in a way so that it can always connect the waterfront as the vital element with the city's other important hubs. All done without blocking the view from the side streets, so you always look uninterrupted down to the water.

On the South side of the city, you can find one of the main inner-city spines, The historical city wall that was neglected for decades, and its little presence became a burden to the ancient edge. Throughout some interventions, a hiding defense system parallel to the old city wall is implemented, with a setback where it creates an urban passage and alleys.

These alleys visually resemble an old market, or "souk" in Arabic, where people can exploit the spaces inside and behind the defensive line, with many possible activities to be added, to back-up start-up businesses in Alexandria by freeing up spaces, or through providing low rentals, so that the youth may



exploit their businesses and new job opportunities in a friendly environment, while also working on some side activities such as: street food kiosks or flower shops.

This would create a nicer and a more attractive area, not only for start-ups, but also as a local touristic space, which may also host some cultural and artistic activities.

And finally, where the city wall meets the water again, you can find the West tip of Alexandria, where an extended park formed along the coastline, strategically located so as to protect the ducts of the infrastructure below and create a continuous protective upland landscape. In place of the former shipyard, the plan envisions a new fishing spot re-connecting to the “fishermen village” with a programme of a maritime museum or environmental education facility. where giving a view into the different flood lines and storms and inform more people about the threats that the city is facing.

Overall, the design of the inner-city streets aims to close the water loop by increasing water- reserve capacity, recharging “subterranean” underground water, treating wastewater locally, and implementing water design into the landscape and architectural designs. The new road system aims for slow traffic and for giving the space back to the pedestrian. Meanwhile, roads are narrowed down to give more space for water management.

## CHAPTER 5. BENEFITS

The results of such a project will increase the green spaces per person from 0.4-meter square to 9-meter square, matching the recommended standard for the quality of green space. In addition to this, it will lead to an estimated increase of the economical revenue of the city, from 1.2 billion euros to 6 billion euros, and will also guarantee keeping Alexandria’s historical city center protected for the coming decades.

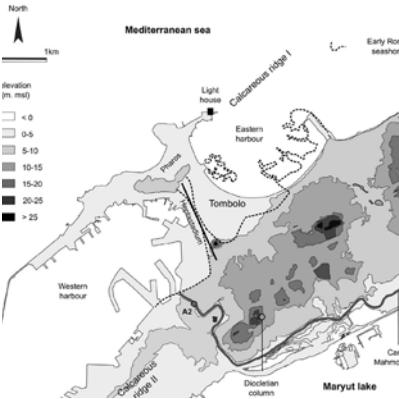
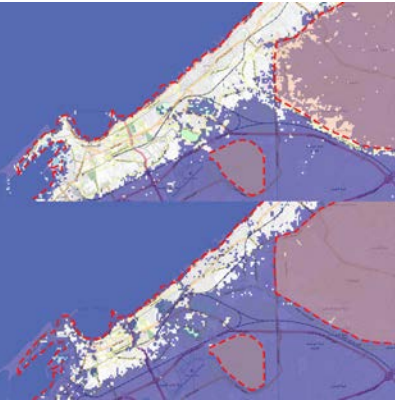
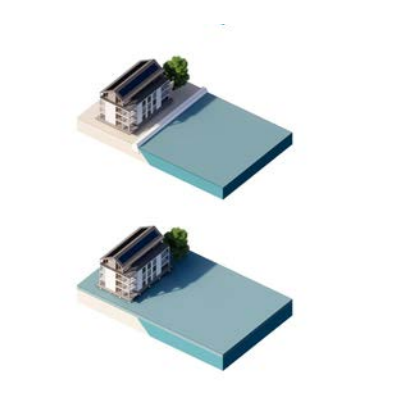
This project will encourage a different design dialogue in any future flood protection decision, and can be a powerful guideline to any future expansions. Not only for Egypt , but also for the rest of the Mediterranean region.

So next time when you move along the coast, you won’t sense an incarcerated city, but actually a re-birthered city; so that even when the next flood crashes, it’s going to remain a lively place with a beautiful and safe environment. lovely enough to walk across its coast line without the fear of getting caught up by cars or waves. lovely enough so the pressure of having to deal with the turmoil and devastation that comes with the water flood can be forgotten.

Alexandria will be back a paradise in the eyes of its inhabitants, and a warm breeze of fresh air, rather than a place at constant risk. They will no longer look at the sea as a meaning of danger, but as the essence of the city that brings them calmness and peacefulness, today, and every day.



October 2020  
First Presentaion

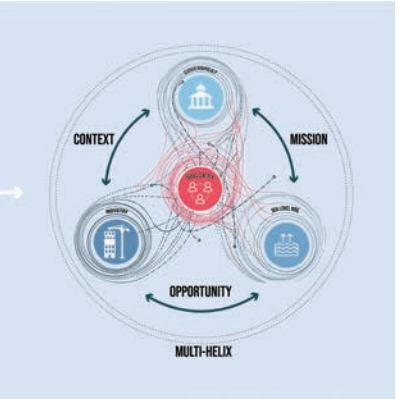
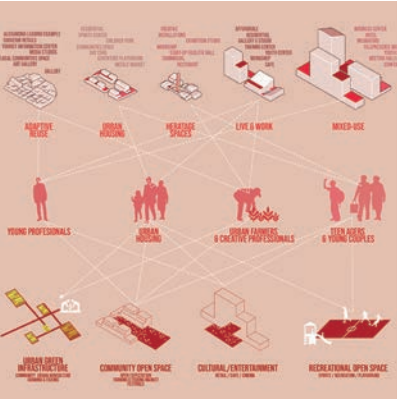
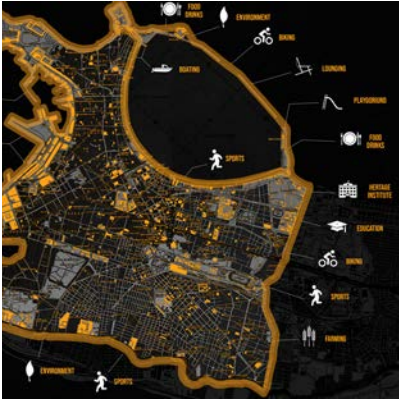
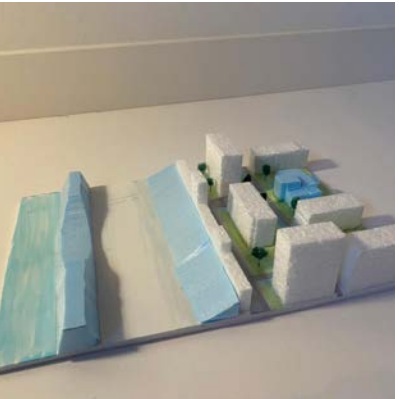
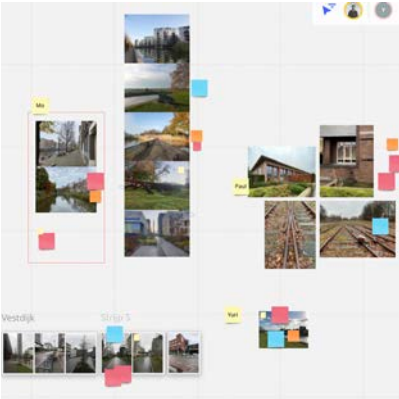


Alexandria: Choice segment length weighted

December 2020  
Conceptual Design

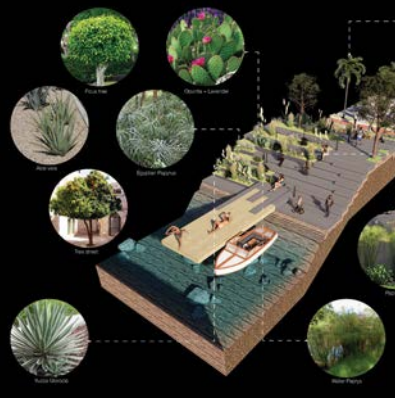
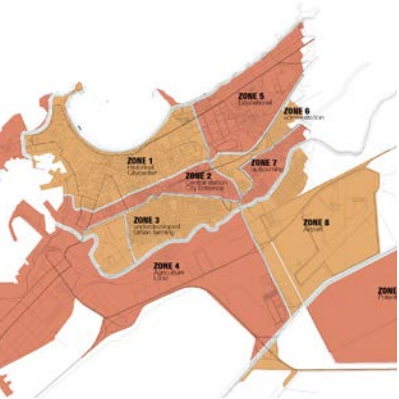


January 2021  
Workshop



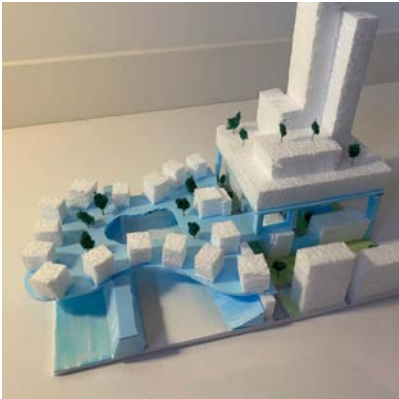
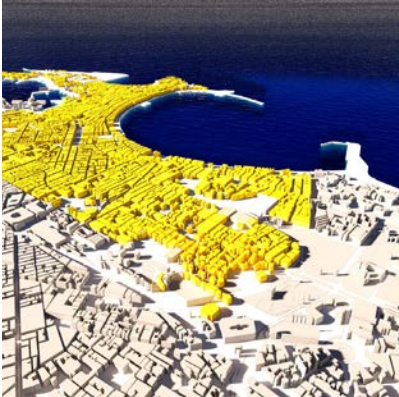
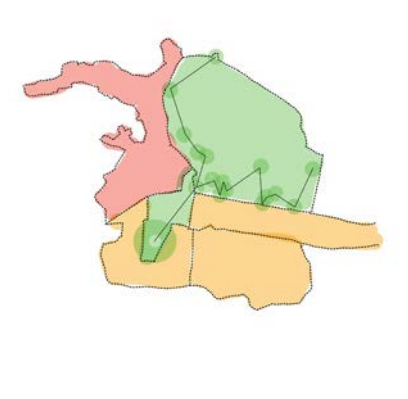
March 2021  
Compartments

April 2021  
Definitive Design

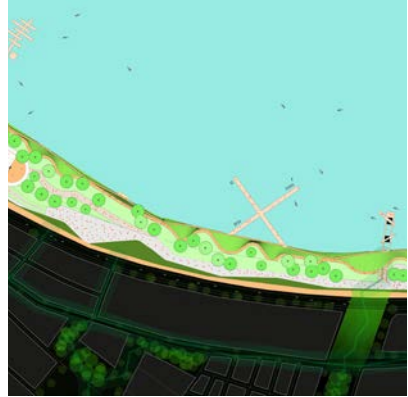
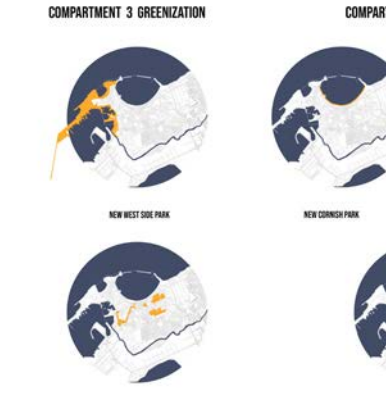
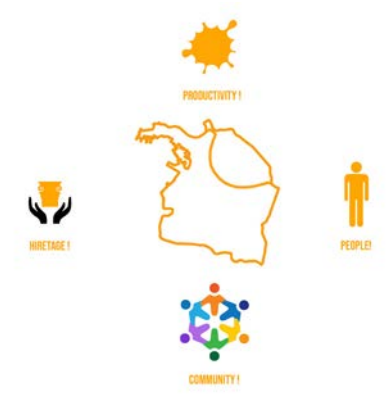




Novwmber 2020  
Research Study



February 2021  
Preliminary Design













# The challenge

## Focus of the project

Future sea-level raise is an inevitable incident happing in slow-motion with larger uncertainty and can lead to wider range of futures.

Alexandria with its huge population, long waterfront, deep overlaying history and Heritage is already been identified as highly vulnerable to spot induced Sea Level Rise.

Alexandria is already subnet to severe coastal erosion, even without accelerated sea level rise. warns that the present coastal erosion and retreat of the Delta are aggravated by human interventions such as reduced sediment input, groundwater extraction, and hard engineering work in coastal strip.

Egypt's Mediterranean coast and the Nile Delta have been identified as highly vulnerable to climate change induced Sea Level Rise (SLR). Due to the concentration of much of Egypt's infrastructure and development along the low coastal lands and the reliance on the Nile delta for prime agricultural land, coastal inundation or saline intrusion caused by anthropogenic climate change induced sea-level rise will have a direct and critical impact on Egypt's entire economy.

Several studies on the vulnerability of Alexandria in particular, the second largest city in Egypt, indicated that a 0.3m SLR in Alexandria would inundate

large parts of the city. This would result in land and property losses worth tens of billions of dollars, including damage to infrastructure, over half a million inhabitants to be relocated and approximately 70,000 lost nob. Based on many possible new scenarios:

- Global sea level is to rise at least 0.3 meter in most positive senarios

- likely 1 meter by 2100 even on a low-emissions pathway.

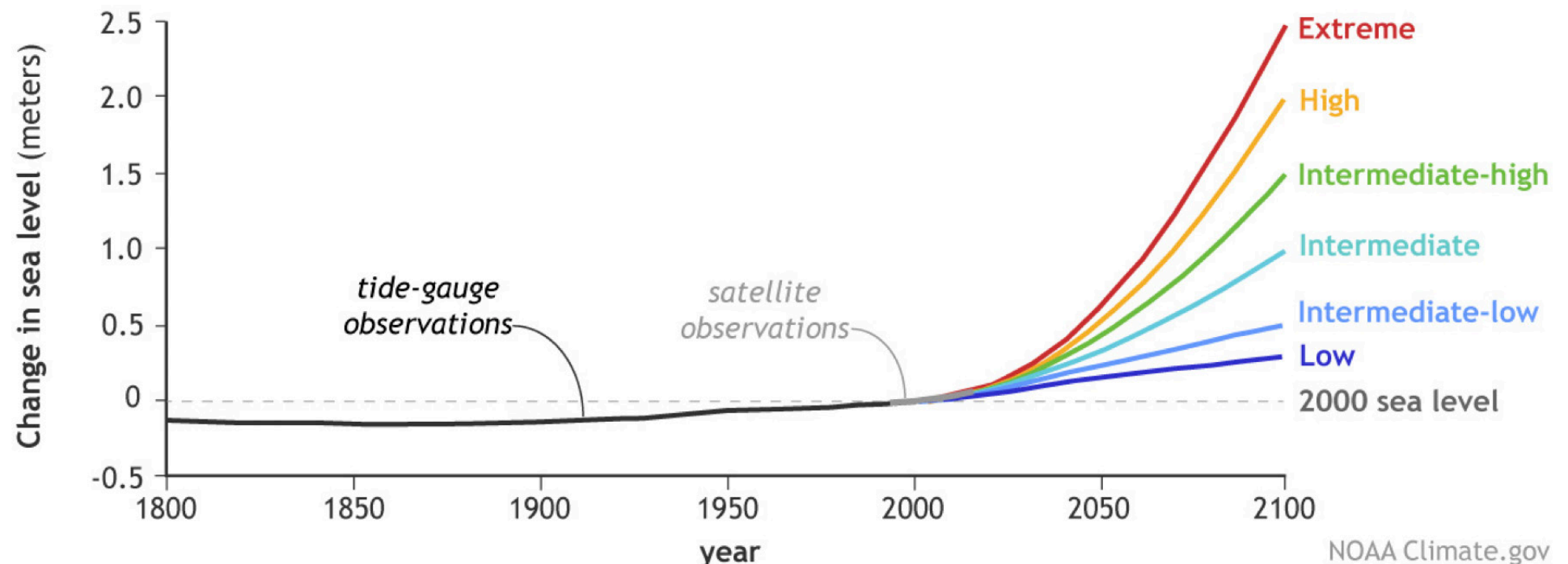
- The highest greenhouse gas emissions, sea level rise could be as high as 2.5 meters by 2100.

Both the low-end and "worst-case" possibilities were revised upward.

The higher worst-case scenario—which is extremely unlikely, but can't be ruled out. Research has emerged showing that some of the more extreme estimates of how quickly those ice sheets could melt were more plausible than they previously seemed.

With signs coming from both ends, I decided to us intermediate to the intermediate path in my upcoming measurements and considerations.

In all cases, however, rising sea levels are increasing coastal flood risk. High-tide flooding is already a serious problem in many coastal communities, and it is only expected to get much worse in the future with continued rising seas.







Picture of existing protection lines along waterfront



# Research Question

Focus of the project



HOW CAN THE CITY PLAN FOR IT'S RESILIENCY WHILE ALSO PLANNING FOR IT'S FUTURE GROWTH?

CAN IT BE DESIGNED IN A WAY THAT IT CAN PROTECT, PROVIDE AND UPGRADE THE URBAN FABRIC?



WAY TO  
GRADE THE SOCIAL AND



CAN PROTECTIVE MEASURES BECOME THE CITY'S AT-  
TRACTIONS?

# Objectives and Goals

project values

This project making the sea level rise  
as a mission for the government.  
and opportunity for the businesses and industries.

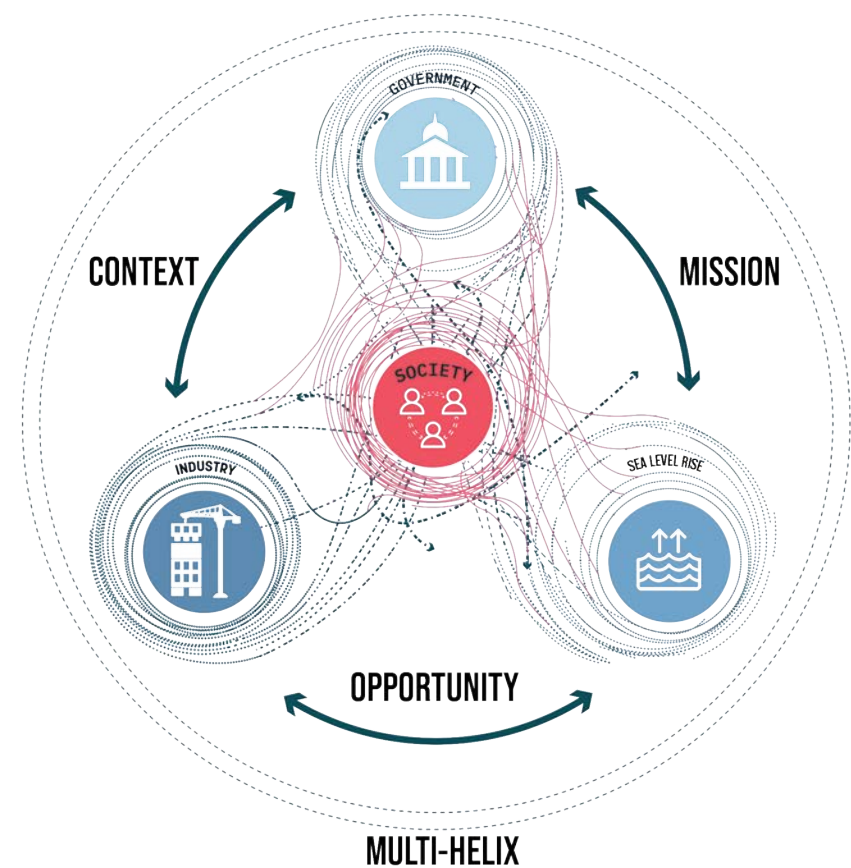
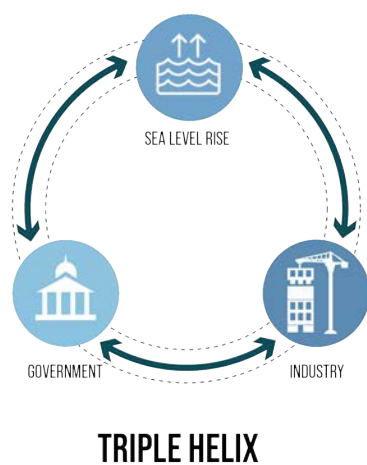


Illustration of the goals of "The Rebirth of Paradise"

These 3 operators are part of one main goal which is:

**ADDED  
VALUE**

seeing, experiencing and  
using new protection  
development as a valuable  
part of a recognized  
sustainable circular flood  
system.

These goals are related to both Egypt  
VISION2030 and the Sustainable Development  
Goals (SDGs) from the UN.



# Hybrid Solutions

Design solutions for protection in the city become hybrid solutions, each custom tailored to their specific place, time and program. The artful combination of a classic engineered infrastructural element with desirable social functions of each community can produce an almost unnoticeable protection. There is something that is not so complex about protection. On the most basic level, the task is to make a barrier of a certain height. At the core of these design challenges is the requirement that it be done in a way that does not look like concrete barriers, but is an upgrade to the social and urban condition.

One of the main missions is to introduce the sea level rise with its virtues, as one of the main operators in the decision making process. And make the Society gain the optimum benefit from the relation between every decision could be made, and generating economical profit to account for future technological, economic and political changes.

With this, the MULTI HELIX concept came out, making the sea level rise as a mission for the government. and on opportunity for the businesses and industries.

The Key-players in this process coming from many disciplines. like scientists, researchers, self-made people, student, and professionals.

# The Sustainable Development Goals

The Sustainable Development Goals (from now on SDGs), are part of the 2030 Agenda for Sustainable Development, which was adopted by all UN Member States in 2015 (United Nations Department of Economic and Social Affairs, 2015).

The SDGs are a model for both peace and prosperity for people and the planet, building upon the three pillars of sustainability: social, environmental and economic.

In total, there are 17 goals. While this project will touch upon many of these goals, some can be seen as most relevant and significant to "The Rebirth of Paradise". These are illustrated in the icons below.







Inner city Alexandria, photograph by the author

# Theoretical framework

## conceptualisation

“The Rebirth of Paradise” is designed under the influence of a few theories and concepts. In this chapter these will be explained to give a basic understanding of “The Rebirth of Paradise” as a project.

The plan envisioned a complementary array of large and small scale interventions that, in combination, would radically improve the City’s ability to weather increasingly dramatic storms. On the North Side, the plan recommended: a multipurpose wall or levee at the East Side that would protect Alexandria’s city center from flooding and create economic opportunity; protection of critical infrastructure; economic recovery initiatives in areas impacted by 2011’s and 2015’s storms; where economic uncertainty threatened to reduce residents’ quality of life.

The main spines of the city designed to give the tourists and the local community a complete experience and access of the city’s new green areas, recreation spaces, public squares, cultural and environmental hubs and Anchors. Anchors like : sea-level rise observation and early alarm systems, heritage conservation centres, new agriculture and financial trading center, new sports center and outdoor facilities.

### Holistic protection

The proposal breaks the area into compartments: Water front; Size canal street and Shallot park; The old city wall located on the south side; and the West industrial area. Like the hull of a ship, each can provide a flood-protection zone, providing separate opportunities for integrated social and community planning processes for each.

Each compartment comprises a physically separate floodprotection zone, isolated from flooding in the other zones, but each equally a field for integrated social and community planning. The compartments work to protect and enhance the city, but each compartment’s proposal is designed to stand on its own.

### Waterfront

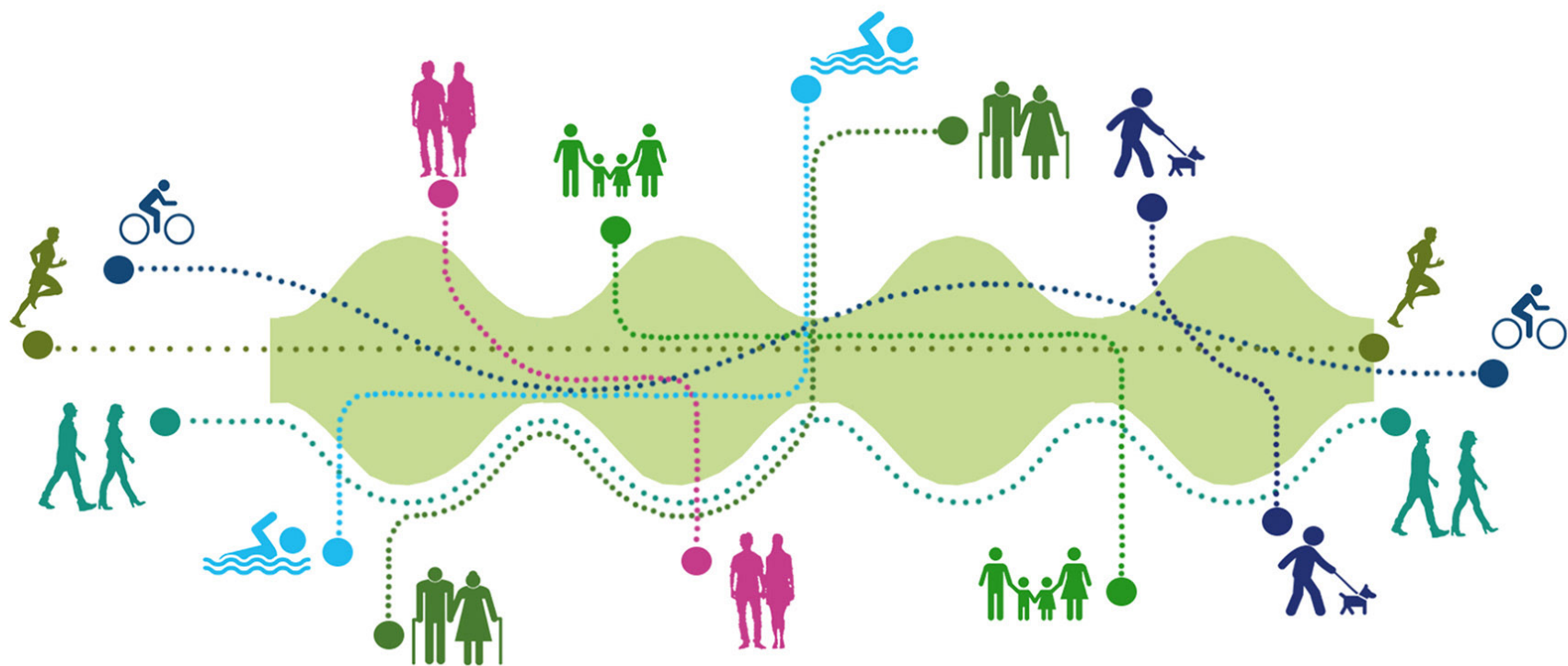
The waterfront strip is a complex and diverse place whose inhabitants span a wide range of ages and incomes. Fittingly for an area that historically served as home to Capital of Egypt, more than a third of the area’s users are living for different area and commuting daily for the purpose of working, shopping, banking and issuing official papers. The neighborhood has served as home fishermen, one of the main historical characteristics of the city. Today, that diversity creates a vibrant, complex neighborhood that enriches the city. The waterfront strip also encompasses a wide diversity of access to transportation and essential services, and social power. It is home to the largest remaining reservoir of historical housing inhabited with the oldest age average among the whole city, most of them living there since childhood with a strong attachment and pride to the area and its identity. The population closest to the waterfront is not only the neighborhood’s most physically vulnerable but also the most socially vulnerable. Acutely self-aware, these residents perceive their situation as tenuous, and fear that any improvements will accelerate gentrification and lead to displacement in this area adjacent to increasingly desirable inland areas. By combining contextually appropriate social infrastructure with flood protection measures, the project seeks to improve quality of life on the waterfront without contributing to resident displacement.











## Conceptual framework

The strategy represented by the existing infrastructure of the city, those lines are going to be used as an integrated defence mechanism. A reminder that risk management is not only an engineering problem, but it's an opportunity for placemaking.

forming a matrix of water channels and integrated flood protection in between in order to prevent and secure the city not only from sea-level rise but also from storms, heavy rains and delta floods that the city has been encountered in the past years and expecting to increase in the next decades.

The proposal breaks the area into compartments, each compartment

comprises a physically separate flood-protection zone, isolated from flooding in the other zones, but each equally a field for integrated social and community planning. but each compartment's proposal is designed to stand on its own.

The protection spines will become a crucial integrated element of both; the waterfront and the back of city vision. to connect the urban fabric as a whole together and benefit from every new intervention to be made. Value change between producer and consumer happens by the use of the circular economy. Both the circular economy and value change are based upon the three pillars of sustainability: social, environmental and economic. Throughout this project we want to achieve justice, both spatial and social.



# **GETTING TO KNOW ALEXANDRIA**

historical analysis and diagnosis  
of the city and the systems within

in this chapter

**Territorial conditions**

**SLR effect**

# Alexandria's Location

## morphological conditions

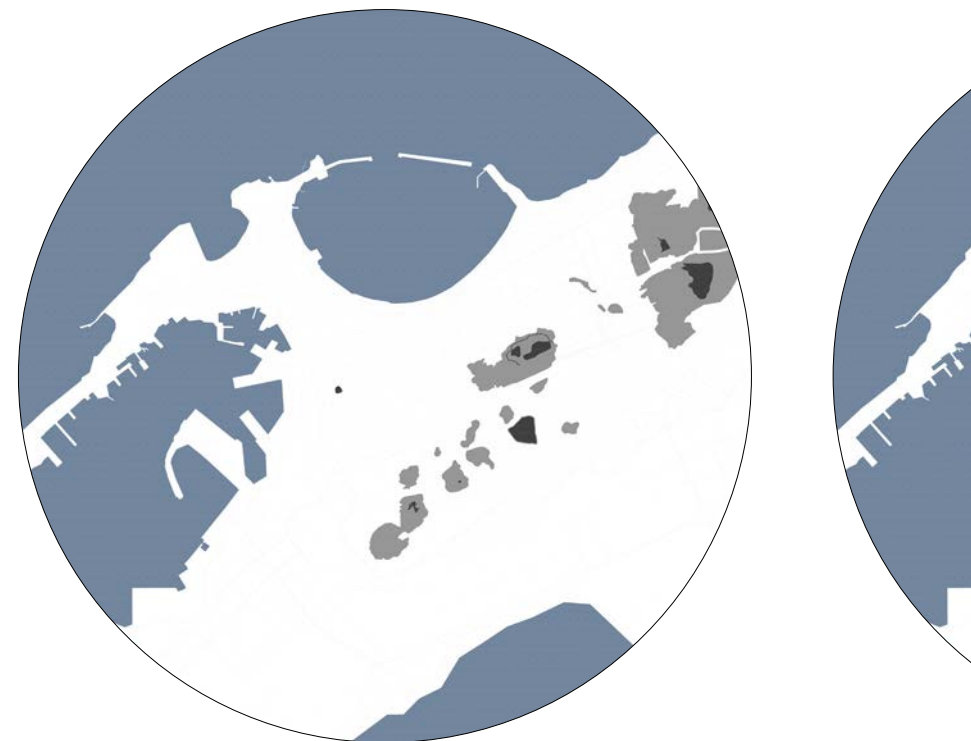
Alexandria is more known with a significant history as one of the old cities in the world; founded by Alexander the great 331 BCE, Alexandria was Egypt capital for centuries. in addition to that the city has a delicate environmental system combine Mediterranean Sea with Mariout lake, agriculture with urban planned city side by side.

Assessments of future impacts of sea level rise have taken place to global scales. The assessment\* suggest potentially large impacts, especially increases in inundation, flooding, and storm damage. in absolute numbers, South, Southeast, and East Asia and north east Africa appear to be most threatened by sea level rise.

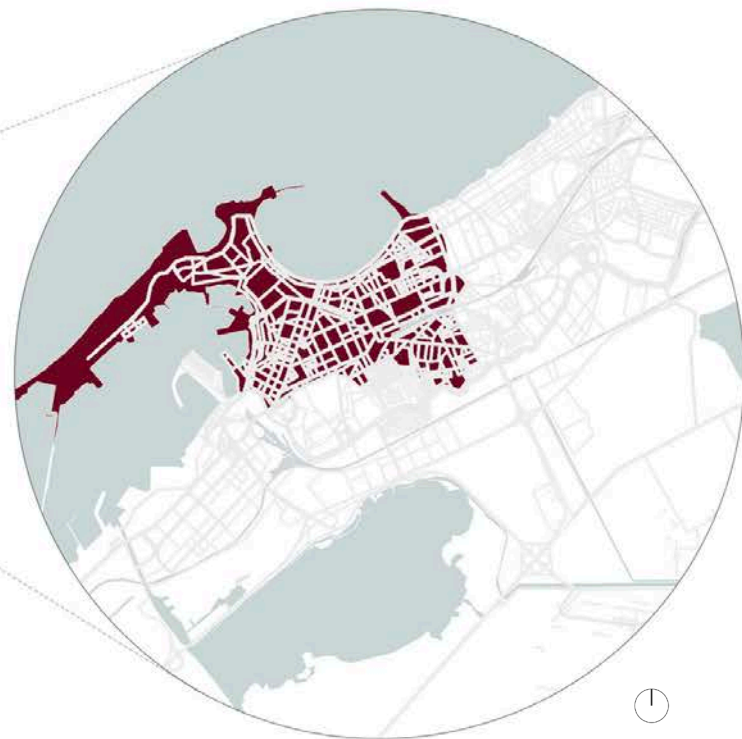
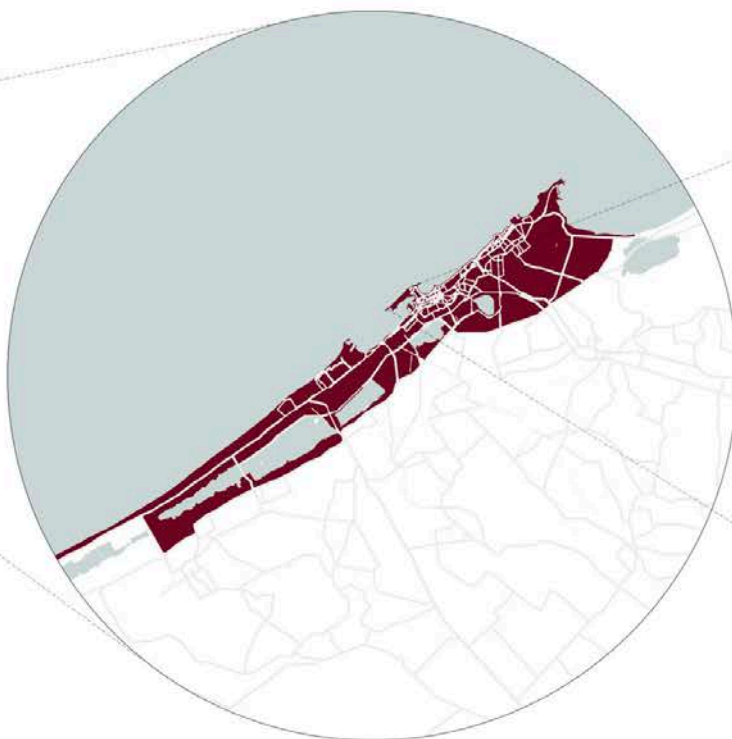
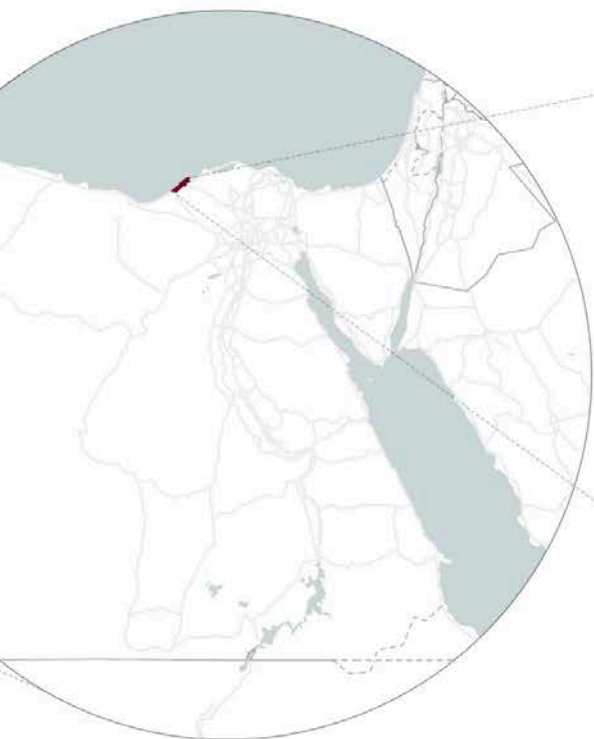
The coastal zones of Egypt are expected to be vulnerable to the rise of the sea level in the Eastern Mediterranean. Depending on the scenario of sea level rise, A major share of the precious agricultural land in Egypt is threatened, likely to cause not only economic losses but also risks to the livelihoods of millions of inhabitants

At this very location in 332.BC Alexandria became a Ptolemaic city, later on with the Turkish conquest in 1517, When Napoleon landed in 1789, the built area was mainly centred on the Turkish town. After Mohammed Ali declared Egypt an autonomous state and encouraged by the efforts of its Egyptian governors to promote modernisation from there, This enormous priceless of cultural, architectural and spiritual locations makes this area a top-class prospect to me for a serious preservation move against the Sea-level rise.

Alexandria Governorate, Egypt  
Coordinates: 30.35968 29.47161 31.59032 30.09312 - Minimum elevation: -20 m  
Maximum elevation: 30 m  
Average elevation: 10 m



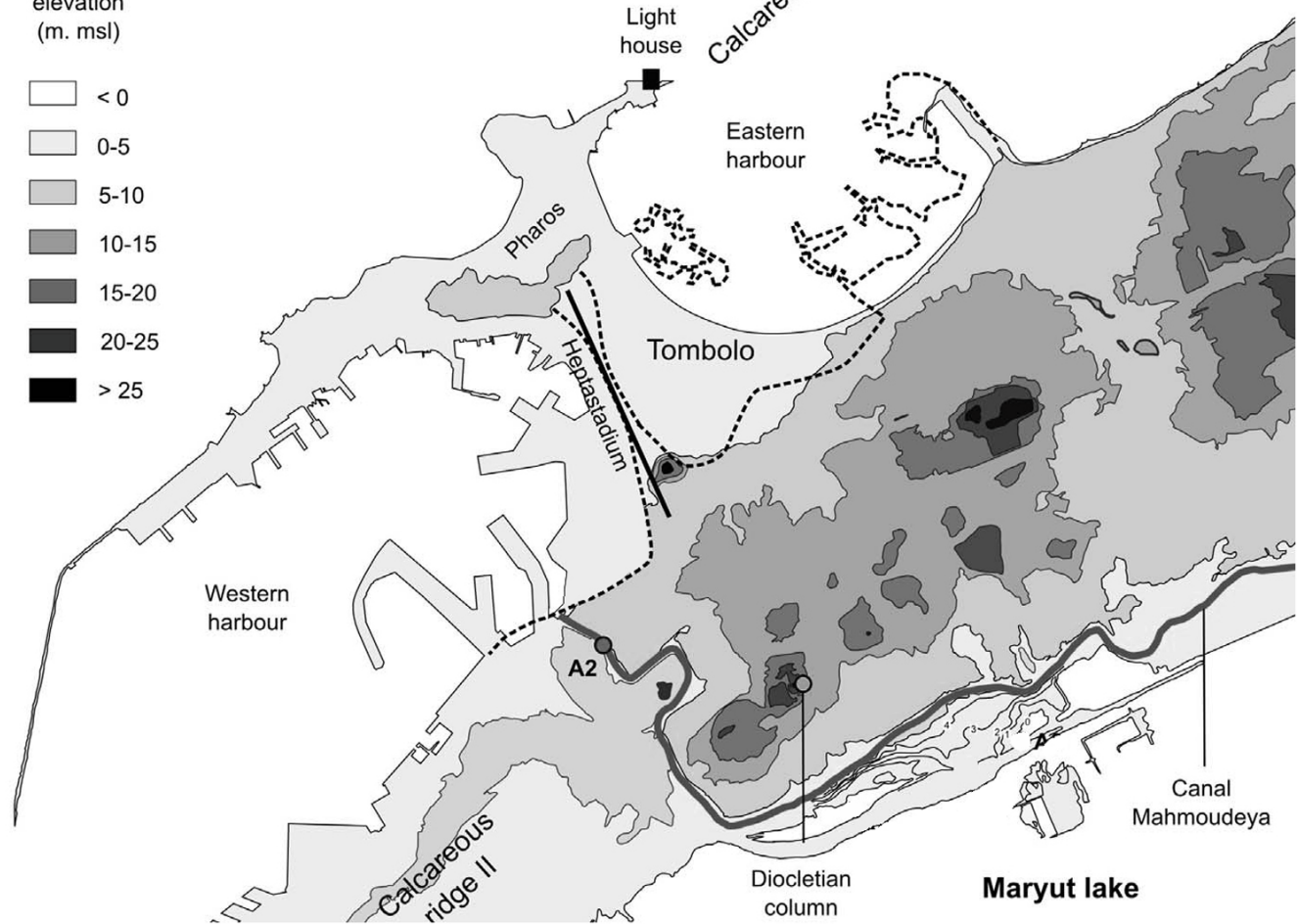
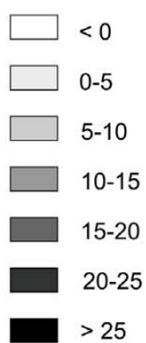




Mediterranean sea

Early Roman  
seashores

elevation  
(m. msl)



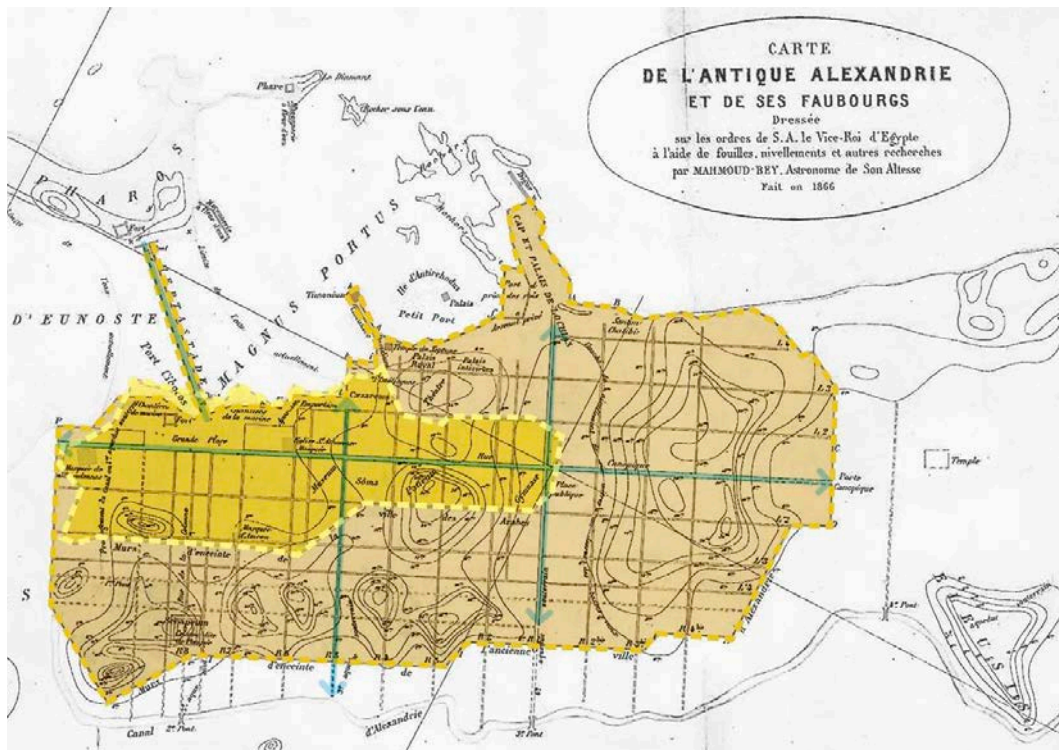
# Historical Analysis

## urban shapes

At this very location in 332.BC Alexandria became a Ptolemaic city, later on with the Turkish conquest in 1517, When Napoleon landed in 1789, the built area was mainly centred on the Turkish town. After Mohammed Ali declared Egypt an autonomous state and encouraged by the efforts of its Egyptian governors to promote modernisation from there, This enormous priceless of cultural, architectural and spiritual locations makes this area a top-class prospect to me for a serious preservation move against the Sea-level rise.

### 1. The Hellenistic city (331 BC)

Hellenistic, Alexandria founded by Alexander the Great in 331 BC who took personal interest in the choice of its site. Its effective planning and the specific location of its most significant buildings were carefully laid by the architect 'Dinocrates' along the principles of Hypodamian practice, in the tradition of Hellenistic cities. While Alexandria was distinctly unique in its planning and in the dominance of the classical language of its architecture, the capital of Egypt was characteristically alien to other Egyptian cities



First known technical map of Alexandria (Adapted by author)

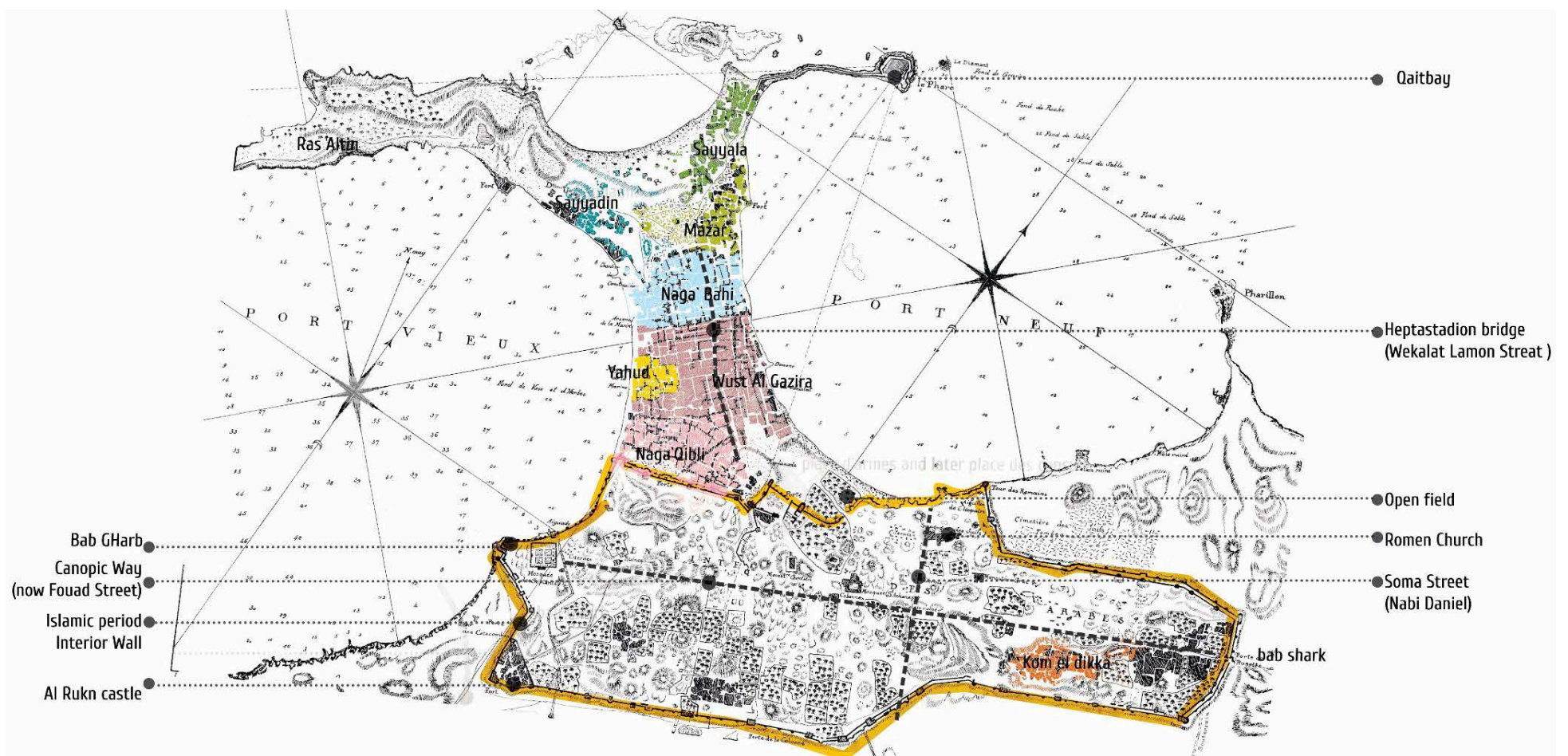






## 2. The Arab Town (1517)

The medieval city was subjected to natural and man-made disasters that resulted in dramatic physical and topographical Urban changes. Natural disasters caused destruction and the disappearance of its most important monuments such as its famous lighthouse. The Pharos, while great movements in its topographical strata buried others under piles of rubble and caused entire districts, such as its royal quarter, to sink in the deep Mediterranean waters.





### 3. The European Town (1805-1882).

Transforming Alexandria to a European Town started by taking stipes to enhance the region potentials; In 1819, Mohamed Ali dug El Mahmoudia Canal, which linked the Nile River with the western harbour. The alignment of the roads and the buildings for the enlargement of the new city had no beginning until 1832. by 1834 Civil Engineer Mr Francesco Mancini the led Engineer created an Ornate Commission, which he Directed September 29 of the same year.

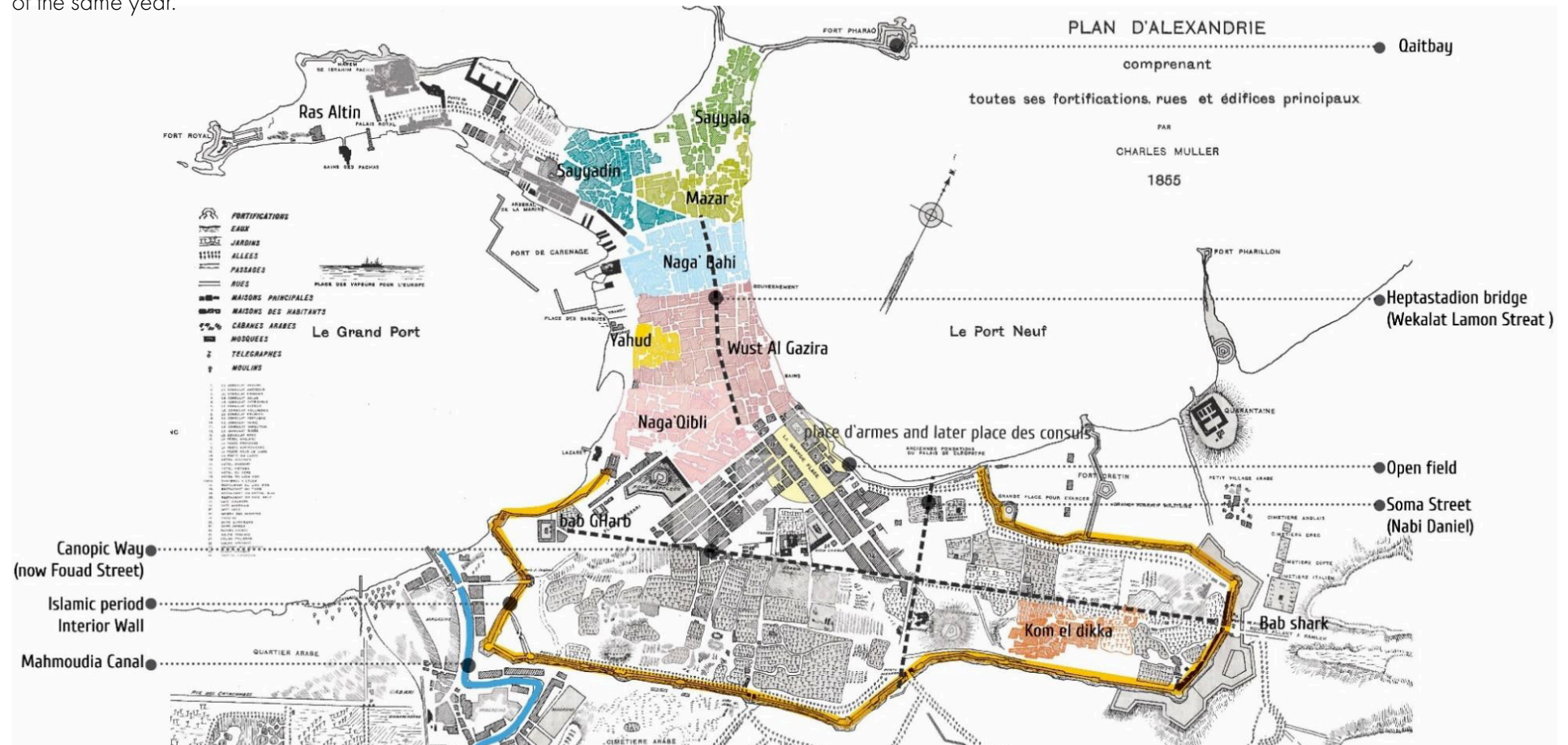
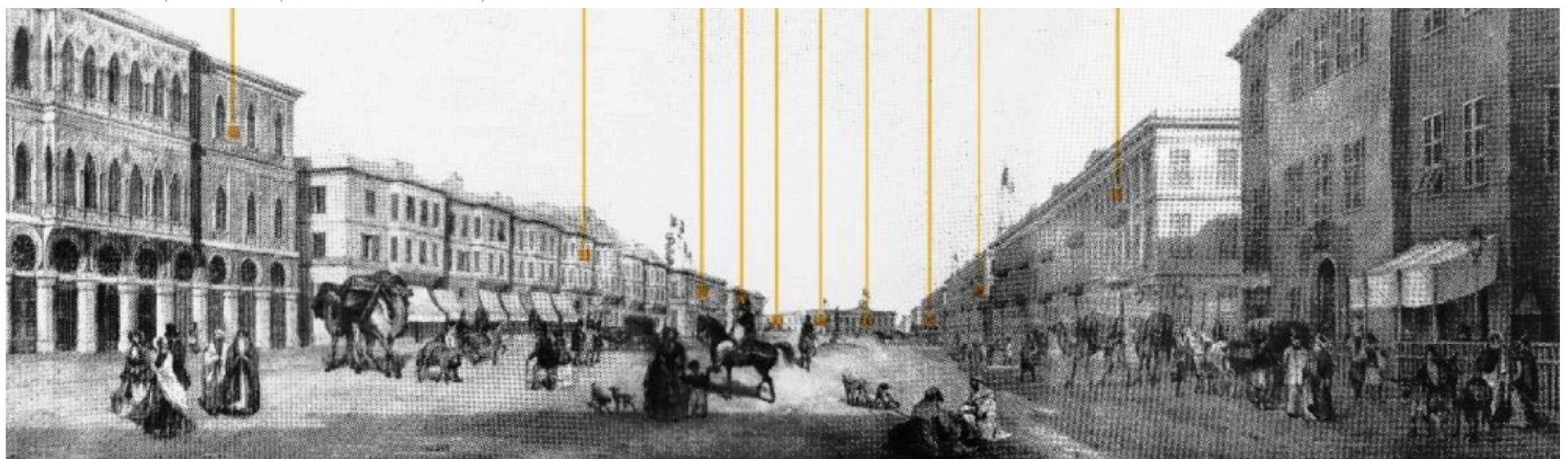


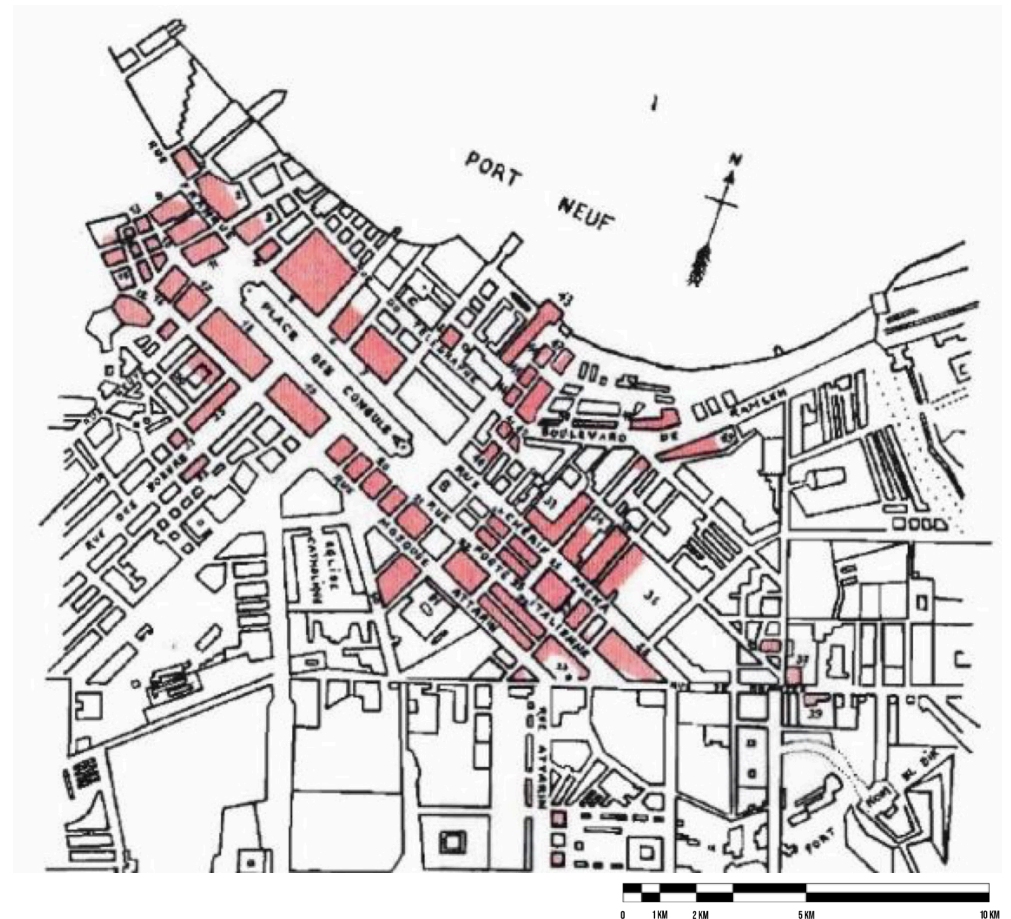
Photo of the main square of the city center (Now: Almanshiya)





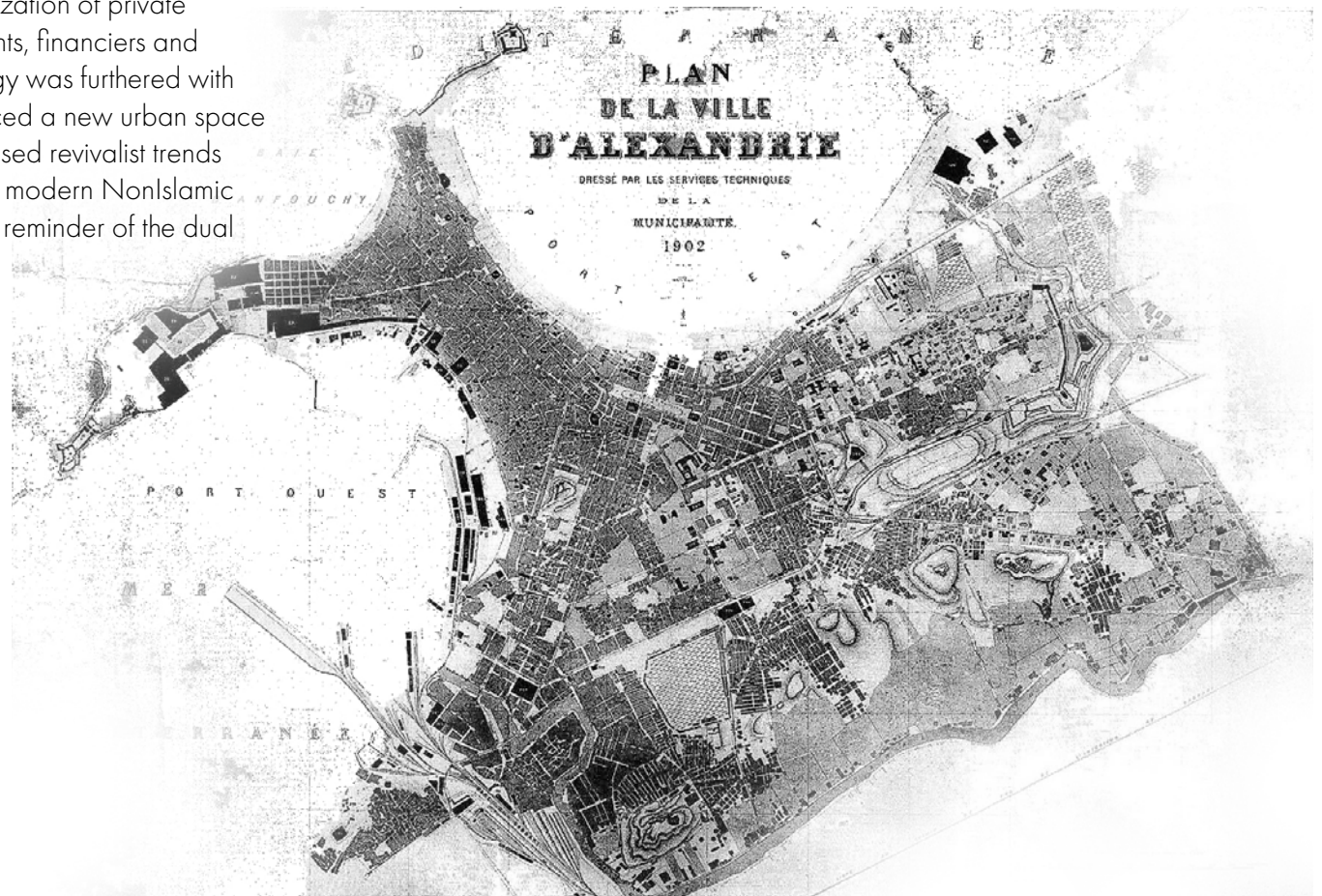
#### 4. Reconstruction of Alexandria (1882)

Alexandria massacres of June 1882 in which thousands of Egyptians and tens of Europeans were killed or wounded. The Place Mohamed Ali and its adjacent areas were the scenes of these events, which served as a pretext for the British bombardment of the city and the occupation which followed. The European quarters, including the Place Mohamed Aly, were targeted and devastated by the bombardment of 11 July 1882 and the subsequent looting and burning. Of the destroyed square, only two buildings survived, namely the stock exchange and St. Mark's church. The destruction covered a total surface of 96,709 square meters, including approximately 500 apartments in the center of the city and a handful of villas in rue Moharem Bey. A military tribunal was set up in front of the Tossiza Palace and speedy judgments were passed. Mansheyah was the scene of public executions and served as a graveyard for those put to death. Following the bombardment, the Egyptian government compensated owners for the loss of their property. The amount reached 4.5 million pounds and covered 4,080 claims. There was a burst of prosperity due to the flow of such capital, and the city was quickly rebuilt.



#### 5. The Reconstruction after 1882

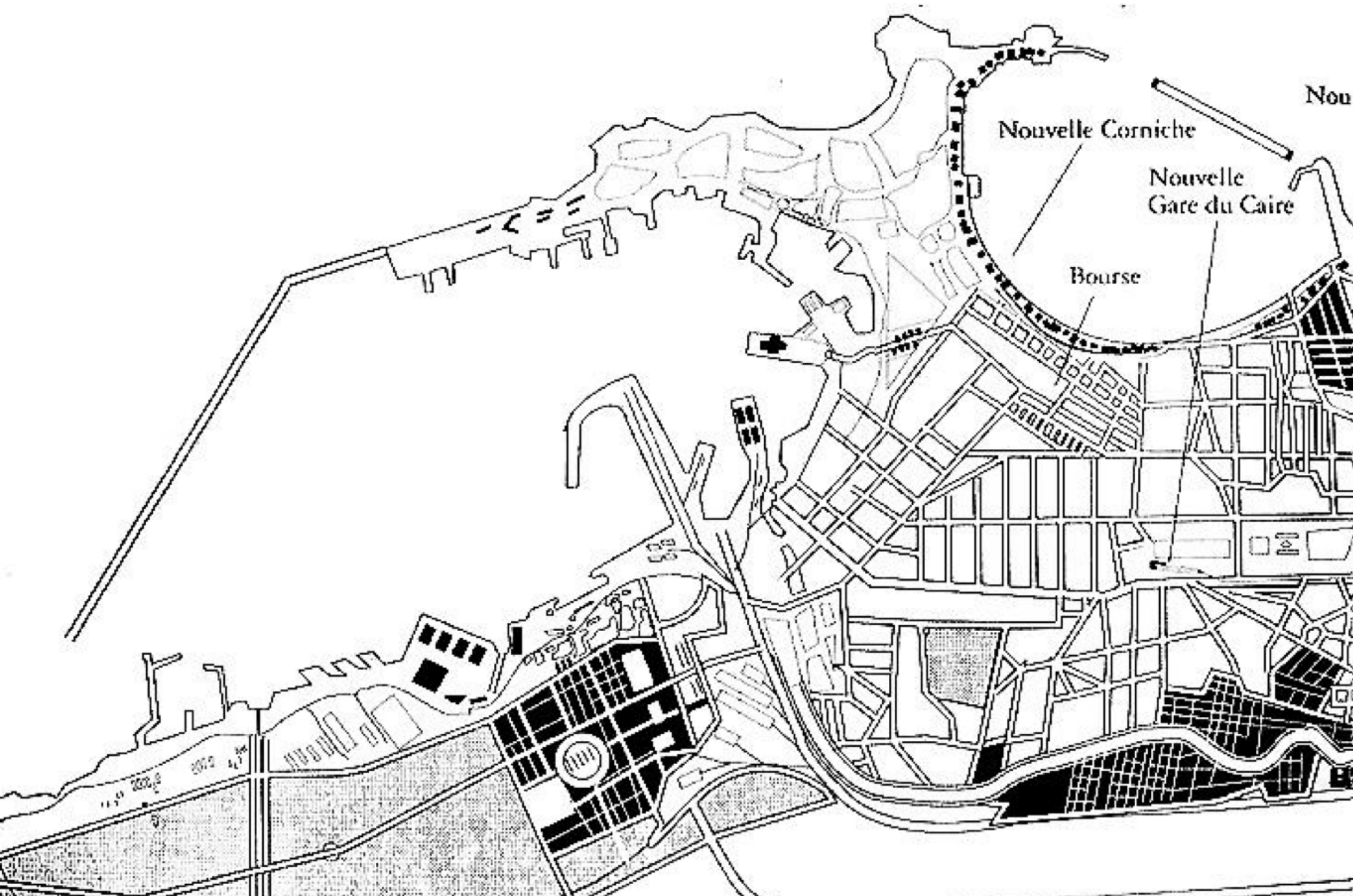
The rapid post 1882 development was primarily a direct result of which compensations. Gradual expansion in profitable trade and the extraordinary rise in the price of raw cotton contributed to the stabilization of private wealth among the bourgeoisie composed of merchants, financiers and landowners. The Europeanisation of urban morphology was furthered with the unusual development (1905); this typically produced a new urban space - La Place des Jardins Français (1909). The Europeanised revivalist trends typically continue dominantly despite the presence of modern NonIslamic architecture in noble Prince Ibrahim's palace, a weak reminder of the dual morphology of the cosmopolitan city.



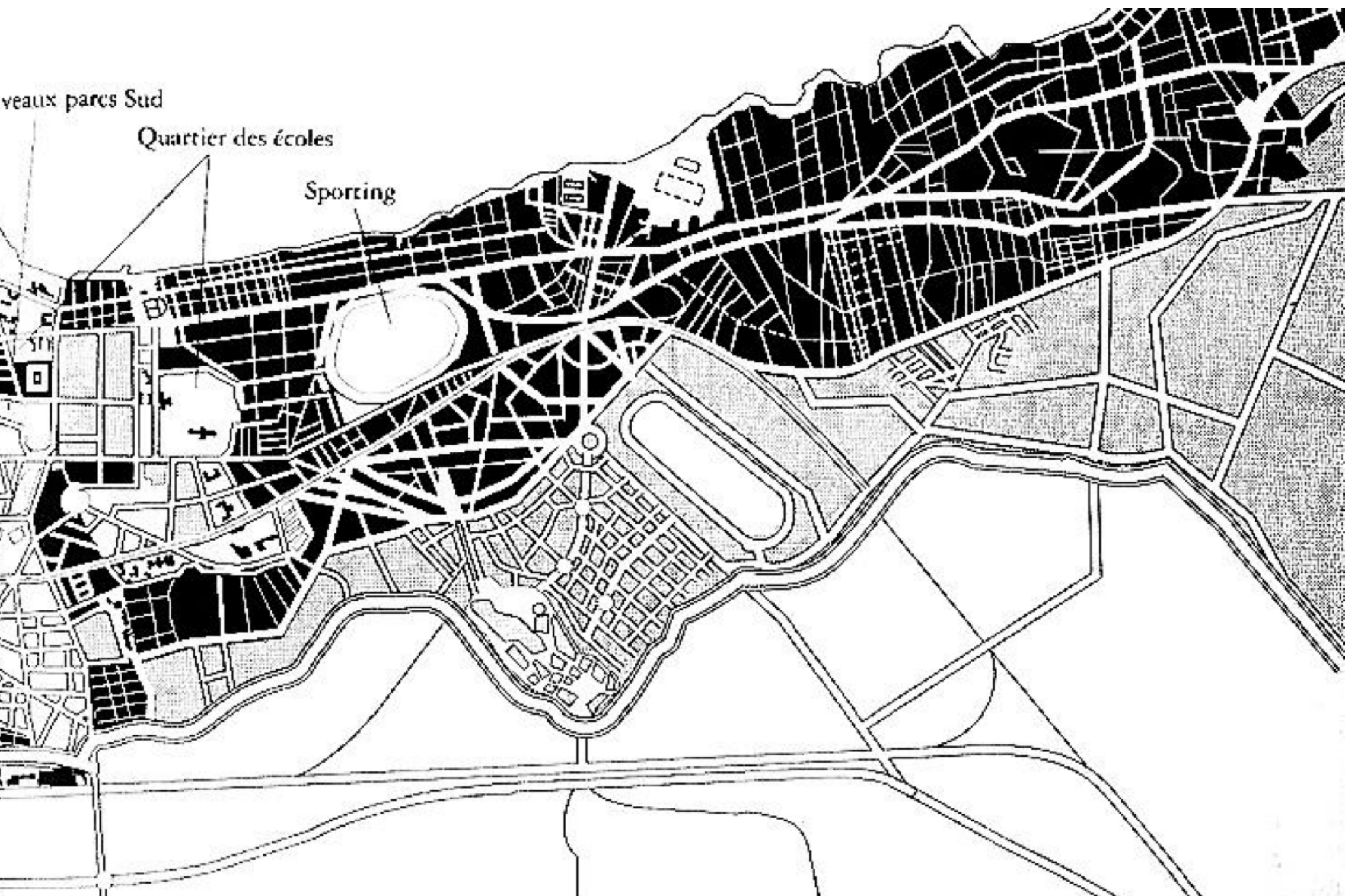


## 6. Nationalization of Alexandria (1952)

Following the revolution of 1952, the nationalization measures led to a shift of ownership of much of the property on the southern side. Properties were under public ownership—one of the factors for losing several heritage properties—A new development program was implemented at the advent of the new government in 1958. In the historical centre, there were several projects to modify the architecture of the buildings and destroy the stimulation to implement Nasr Street F28 without regard for its effect on the socio-economic structure or urban fabric. The historical centre of Alexandria has been an important monument to many historic events.





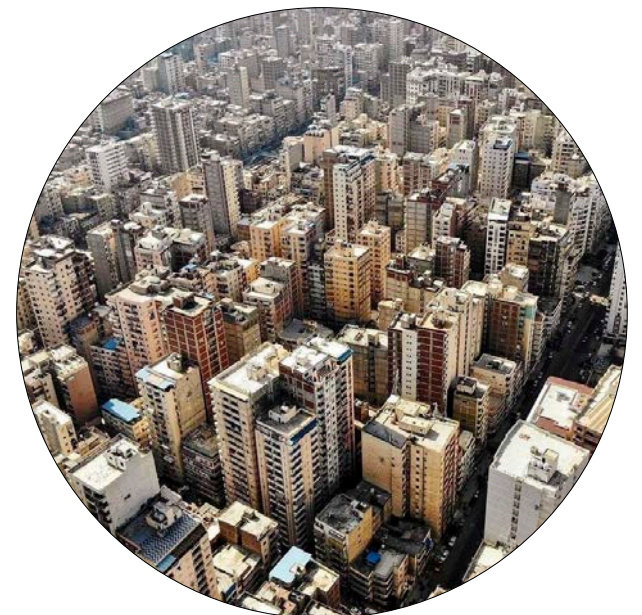




## 7. revitalization of Alexandria (2000)

In 2000 the central government and the modern city initiated an enormous project to revitalize Alexandria. Almost at the same time, the new Alexandria Library was opened. The aggressive neoliberal economic policies implemented in Egypt and the growth of the culture of globalization produced negative effects on Alexandria.

The famous waterfront cafés, restaurants and urban beaches were demolished to give way to prestigious hotels and private beaches in the modern Dubai style. Many commercial malls and entertainment centers were established in Alexandria's new development areas in the south and southwest near Lake Mariout, even encroaching on the lake









# Morphological Analysis

## throughout history

Since i have already analyzed the historical system and its potentials, it is necessary to look into the current morphological distribution of each element throughout the history of the city.

### First Morphological Phase

There is as yet no clear evidence of the ancient urban character of the current Alexandria; however, the exploration of the reconstruction maps of the historical publications, and the reports from the archaeologist provide the impetus for assuming an ancient neighbourhood character more than one of a Paneium.

### Second Morphological Phase

is based on the presumption of the morphology of the same spine, yet not upon a commercial genesis but a religious one. On the current Sayed Darwesh street stands the mosque of Sidi Surr, where his shrine is located. It can be presumed that the spine of the current Sayed Darwish street first originated upon settlements next to Sufi

### Third Morphological Phase

is placed between the mid—sixteenth century and the end of the eighteenth century. The commercial genesis proceeds with a probable development of the original path of Sūq Kōm ad-Dikka into a village, based on Vansleb's description of the Jardin du Marchand—in the 17th century—and the concurrent illustrations on historical maps.

### Fourth Morphological Phase

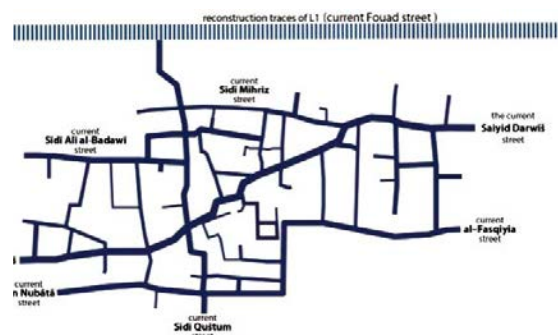
is placed between the end of the eighteenth century and mid nineteenth century and witnesses the main readable footprint of the sinuous urban structure. During this phase, Sayed Darwesh street extends further, whereas other byways branch off from it. From the main spine of the current Sidi Qus um street other paths branched such as Sidi Mi riz, the current street of Ibn Nubata, and al-Fasqiya. These later developed into subsequent main access streets.

### Fifth Morphological Phase

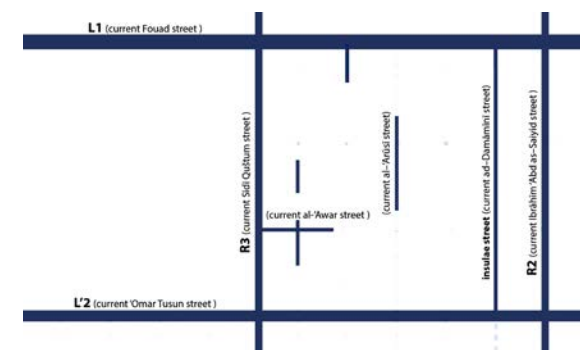
is placed from 1855 until mid—twentieth century, The city map of 1907 displays the enclosure application of the sinuous fabric by the new westernized streets. These are the eastern street Dr. Ibrāhīm 'Abd as-Saiyid, the western street Sidi al- aiāši and the southern street 'Omar usun. This phase marks the current predominant urban formation of the core of Alexandria. Between the early twentieth century and today little urban development has changed.



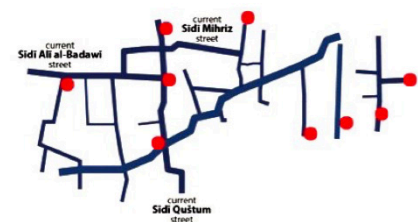
SECOND morphological phase



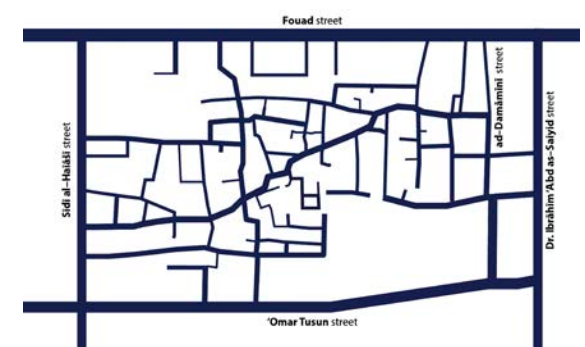
FOURTH morphological phase



FIRST morphological phase



THIRD morphological phase



FIFTH morphological phase

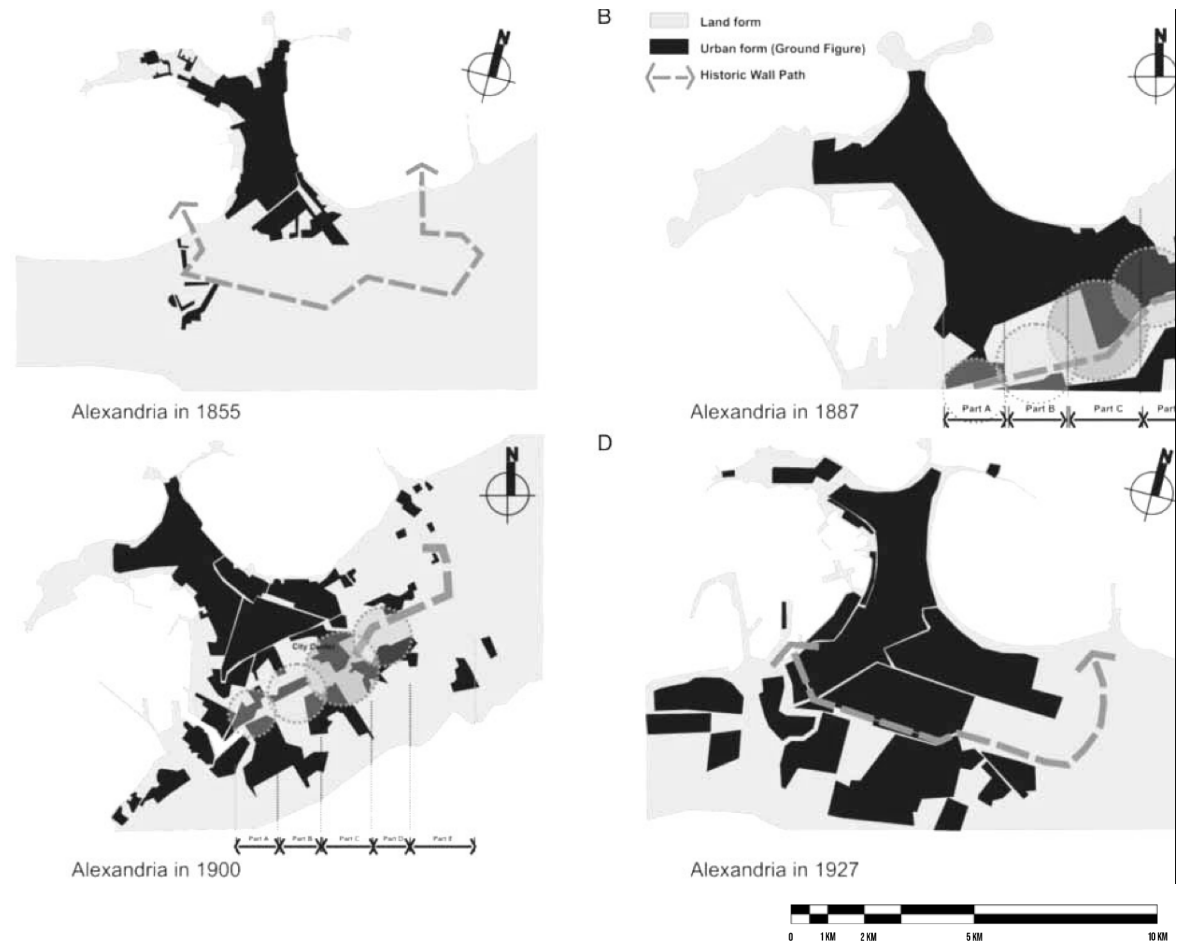


The city wall of Alexandria passed throughout many phases that defines the characteristic of the city. There were once three defensive walls in Alexandria. However, they are almost entirely demolished, with only three main parts existing from the Hellenistic-Roman wall.

The first wall was built in the Hellenistic period and enclosed a huge area of the city compared to the sizes of walled cities at that time.

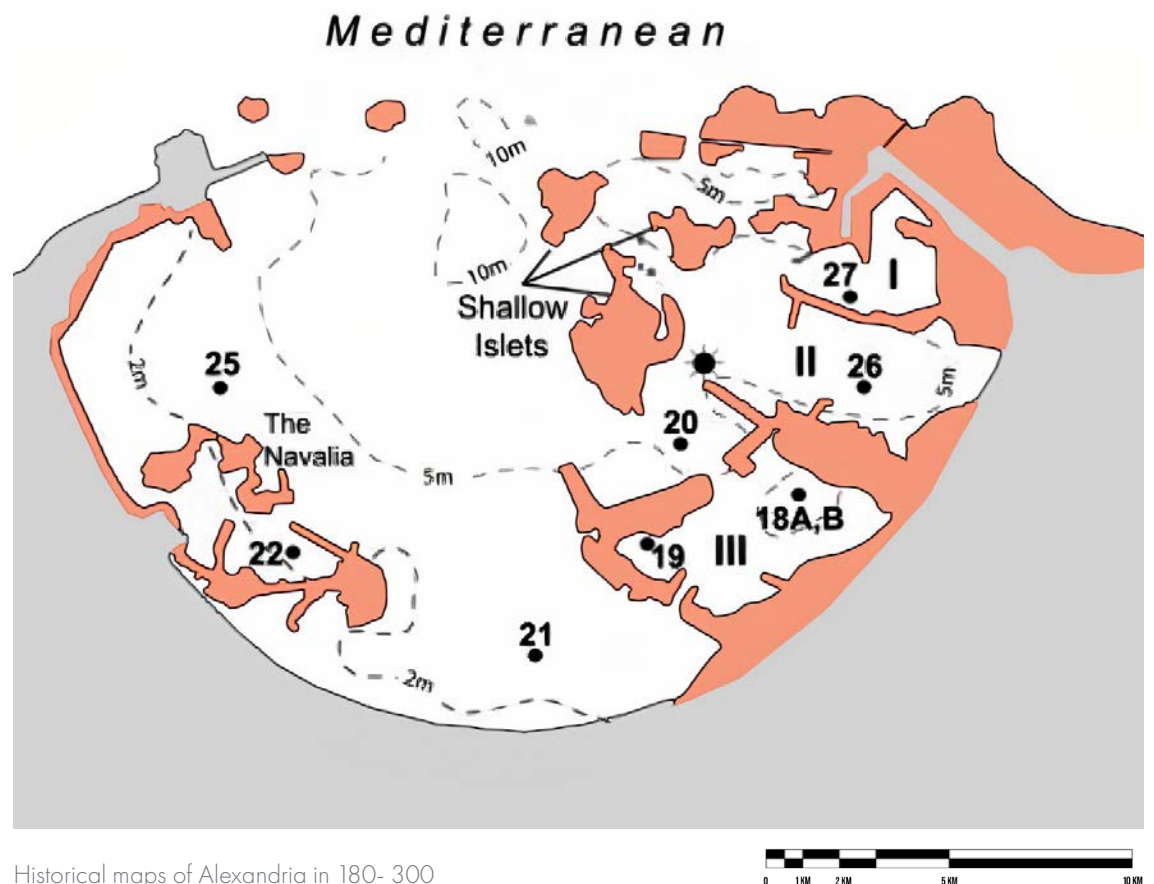
The Roman wall was an extension to the original wall towards the east built to include more settlements outside the city walls.

The last wall was a supplementary medieval wall built in the ninth century by Sultan Ahmed Bin Tulun. It was smaller in size as the city had declined in area and population. flavour of Islamic architecture with the limited building heights of traditional buildings.



Historical maps of Alexandria in 1855, 1887, 1900, and 1927. (Adapted from LISA data, 2019)

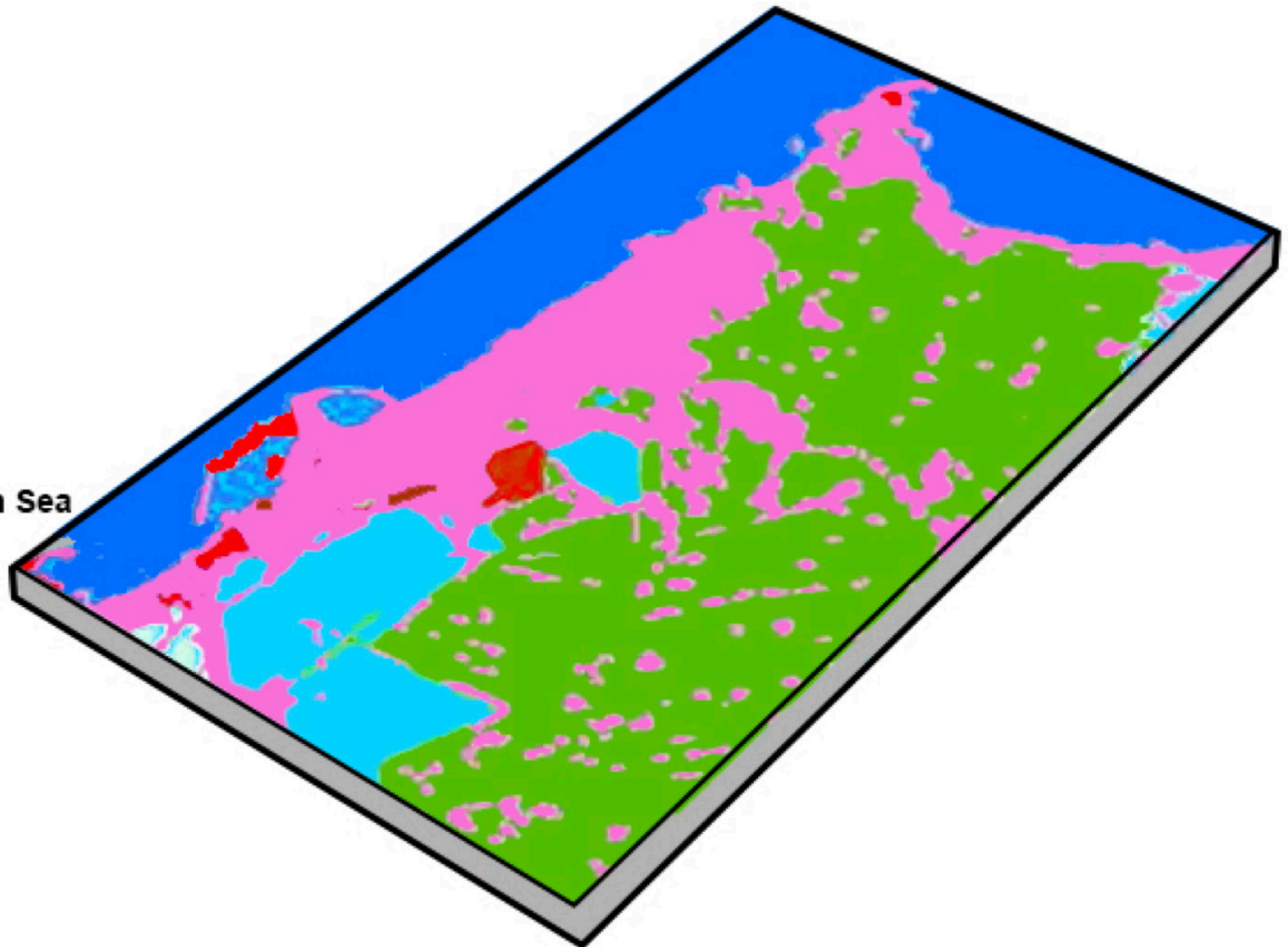
- Location of submerged platforms profiles of east harbor show that the harbor platforms become under the current mean sea level between 5- 6.5.
- Although the eustatic sea level from Roman time less than two meters, it means that the erosion rate plus tectonicsubsidence were between 3 - 4.5 meters during last two centuries.
- The results of underwater excavations found a geoarchaeological settlements dating Sedimentary boring in addition to comparisons with the submerged archaeological ruins in Alexandria east harbor show that Alexandria had been the victim of subsidence.
- In 1997 to examine both underwater and in the silt deposits on either side of the Heptastadion. Some geomorphic features were recognised from analysis the side scan surviving.



Historical maps of Alexandria in 180- 300

# Land-use Analysis

throughout history

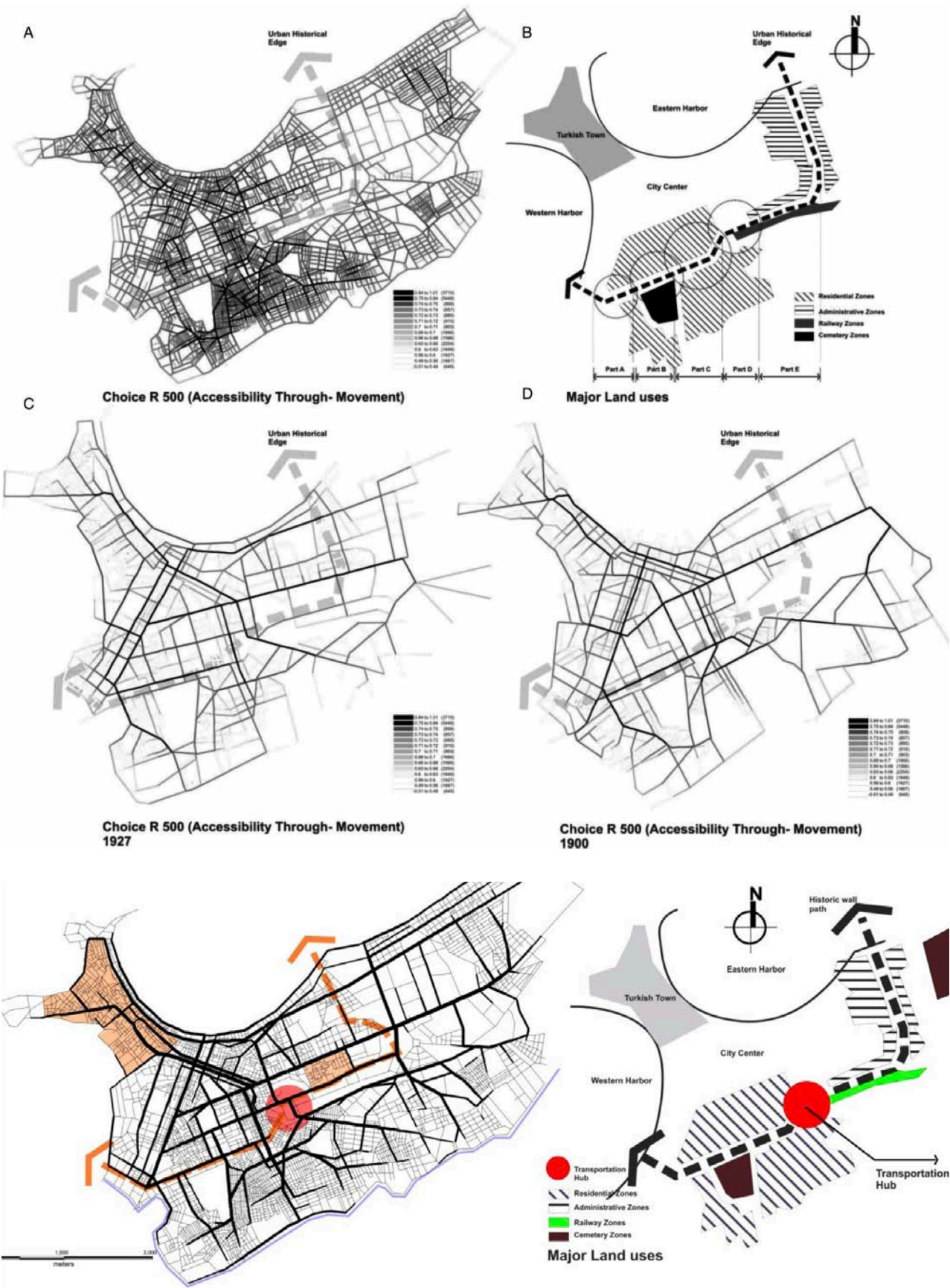




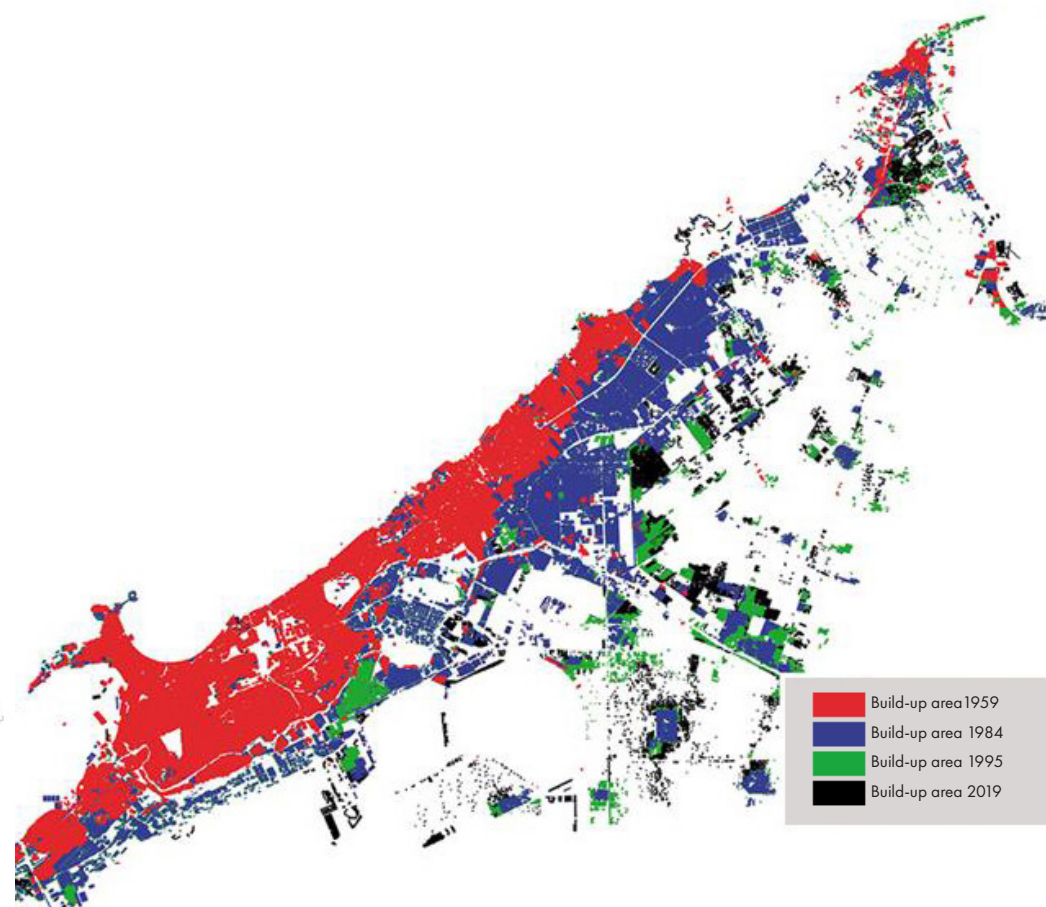
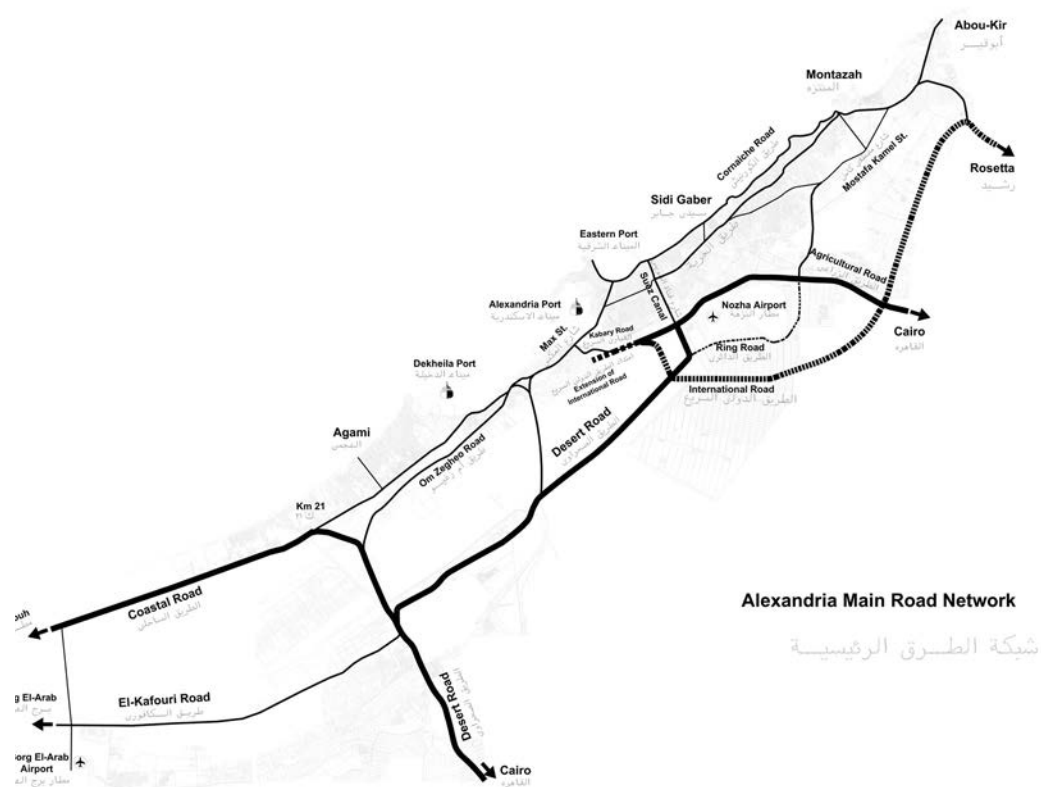
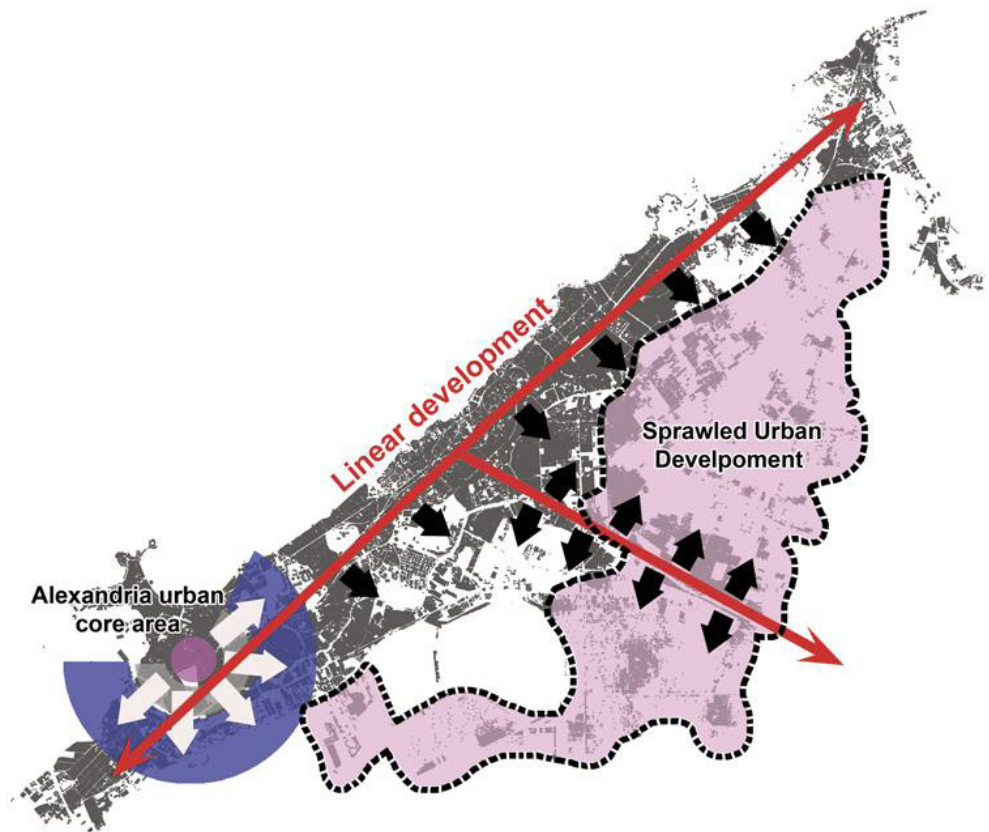
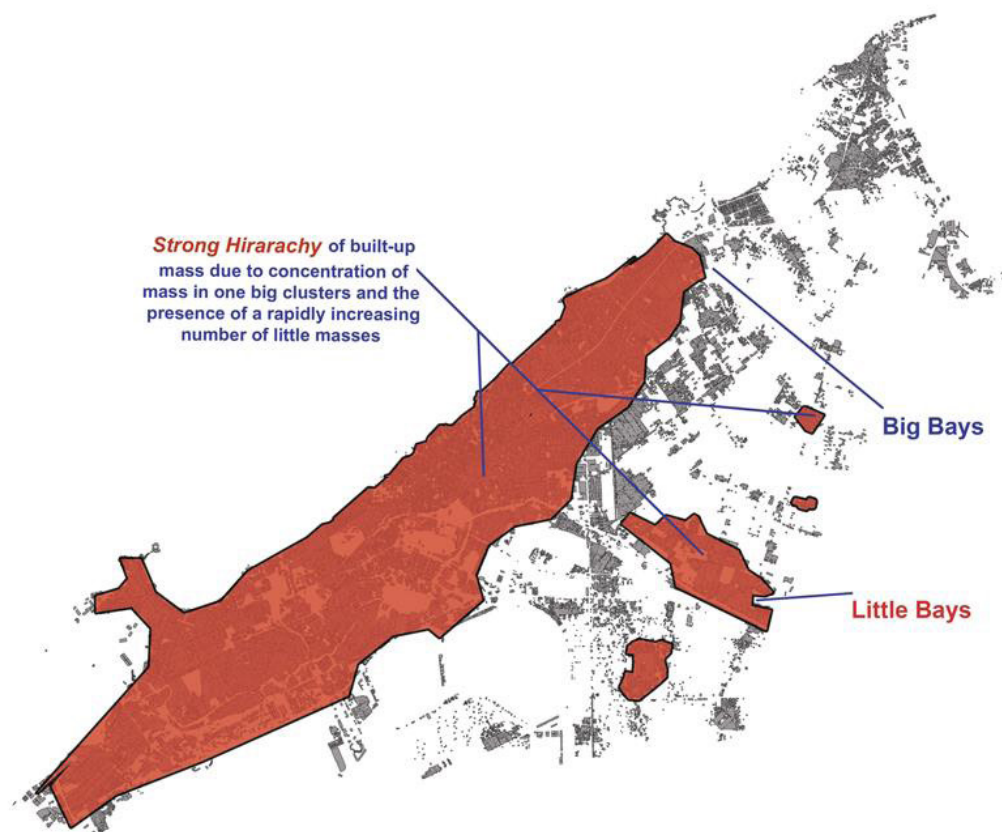
The spatial planning of Alexandria have changed over time; starting with the late Roman Empire; and the Islamic city that has different changes from the Mamluk to the Ottoman period. In the Ottoman period, the main city inside the defensive walls was deserted and a new fabric was gradually established on the ‘Heptastadion’, which was a constructed link that connected the mainland with ‘Pharos’ Island forming two harbours. This part is currently called the ‘Turkish town’. The city gained the image of European cities between the Nineteenth century and the mid of the Twentieth century under ‘Mohamed Ali’ and his dynasty (1805-1953). Europeans heavily affected the city’s economy, culture, architectural styles, the formation of the new CBD (CentralBusiness District), and the main ‘Cornish’ (waterfront promenade).

The built-up area is distributed rather homogeneously in one main big cluster, surrounded by several small settlements of roughly different size and spatial distribution. This observation demonstrates the fractal behaviour of the eastern part of Metropolitan Alexandria, where the main cluster is the CBD and the formal city extension while the rest of the clusters is sprawled development over agricultural land.

Alexandria is a continuously developing city that used to provide space for a broad range of people. But the demographics of the city are changing in which Alexandria shifts to a city that is focussing on only concrete housing development without any considoration of the green quality in the city. This is caused by value increases in the area. The surrounding and mostly deprived areas undergo also an increase of dwelling and amenity values. Most residents cannot experience any kind of green interaction in their daily life. The walking environment was totally neglected. Mainly, roads and streets are designed for vehicular transportation and most planning priorities focus primarily on its circulation. When existing cities are developed, roads can be too wide to match their capacity again without consideration to any environmental impact









# Greenery and Water

## survey analysis

The city's drainage system needs to be upgraded and separated from the sewer, to prevent flooding and water shortages, using integrated water storages in the urban environment wherever possible and encourage the installation of green roofs to reduce water runoff.

Mahmoudeia canal can be an opportunity to discharge excess floodwater to the sea. constructing a separated stormwater drainage system can save sufficient water supply that can be easily treated and reuse. The stormwater drainage system is to be constructed under main roads, excess water discharge to mahmodia canal. The city was divided into sectors, each sector has flood storage and water treatment unite, overflow water can be directorate to other sectors or discharges into the canal. Using of Semi-natural systems such as infiltration trenches and swales in secondary roads and railways, and reducing the peak outflow and thus lowering the flood risk. By using Permeable Paving, roads and railways can store up to 8926.68 km<sup>3</sup> of water (by the assumption that max roads speed is 50k/h).

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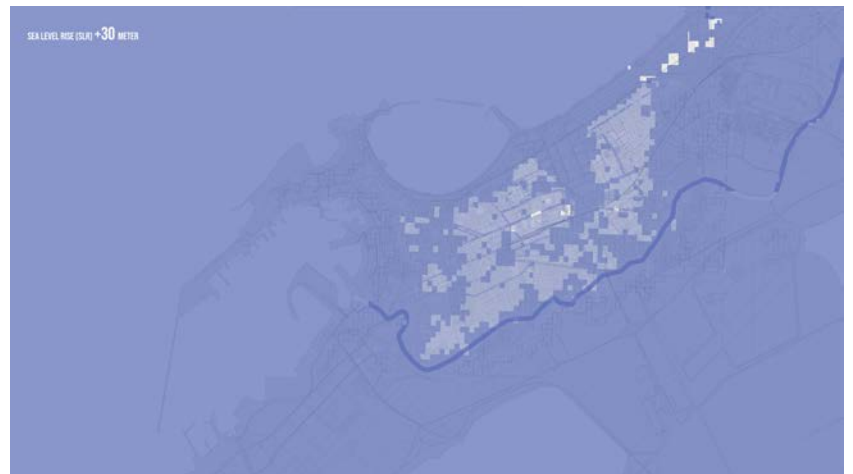
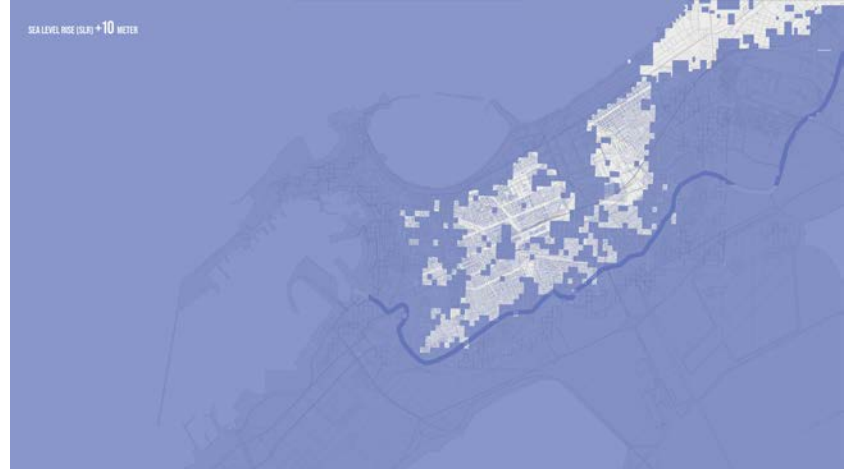
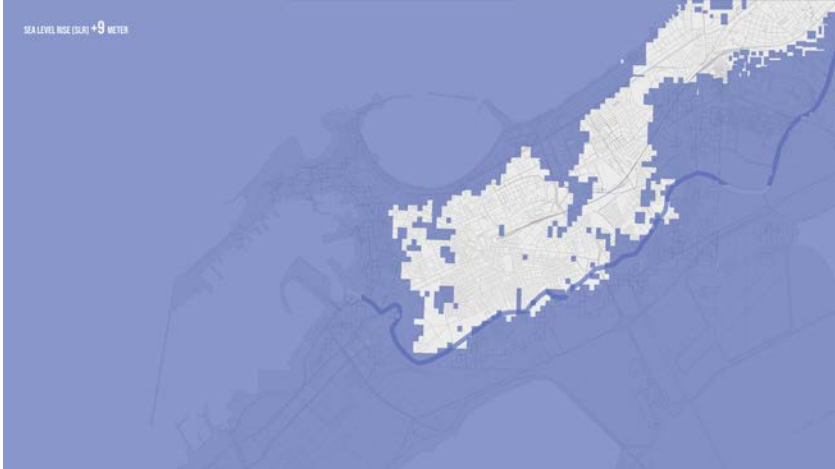
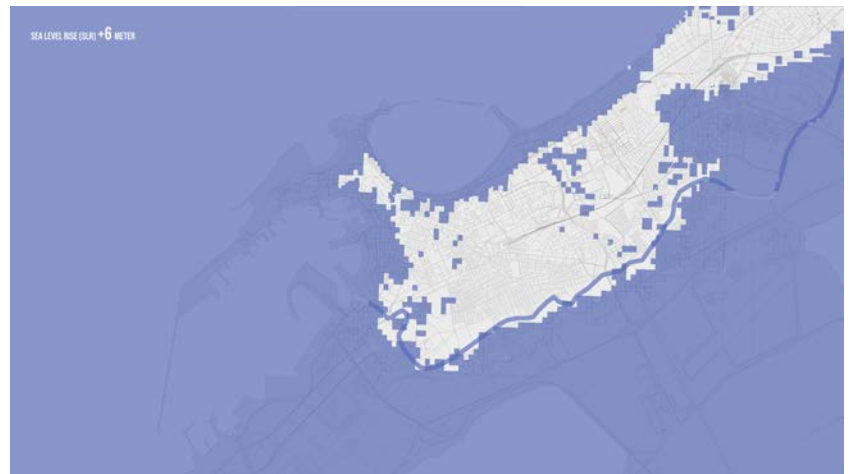
# Sea level rise effect and Nile delta

Future sea-level raise is an inevitable incident happing in slow-motion with larger uncertainty and can lead to wider range of futures.

Alexandria with its huge population, long waterfront, deep overlaying history and Heritage is already been identified as highly vulnerable to spot induced Sea Level Rise.











**BEFORE**





**AFTER**



# Green structure

## observation

Alexandria is a continuously developing city that used to provide space for a broad range of people. But the demographics of the city are changing in which Alexandria shifts to a city that is focussing on only concrete housing development without any considration of the green quality in the city. This is caused by value increases in the area. The surrounding and mostly deprived areas undergo also an increase of dwelling and amenity values. Most residents cannot experience any kind of green interaction in their daily life.

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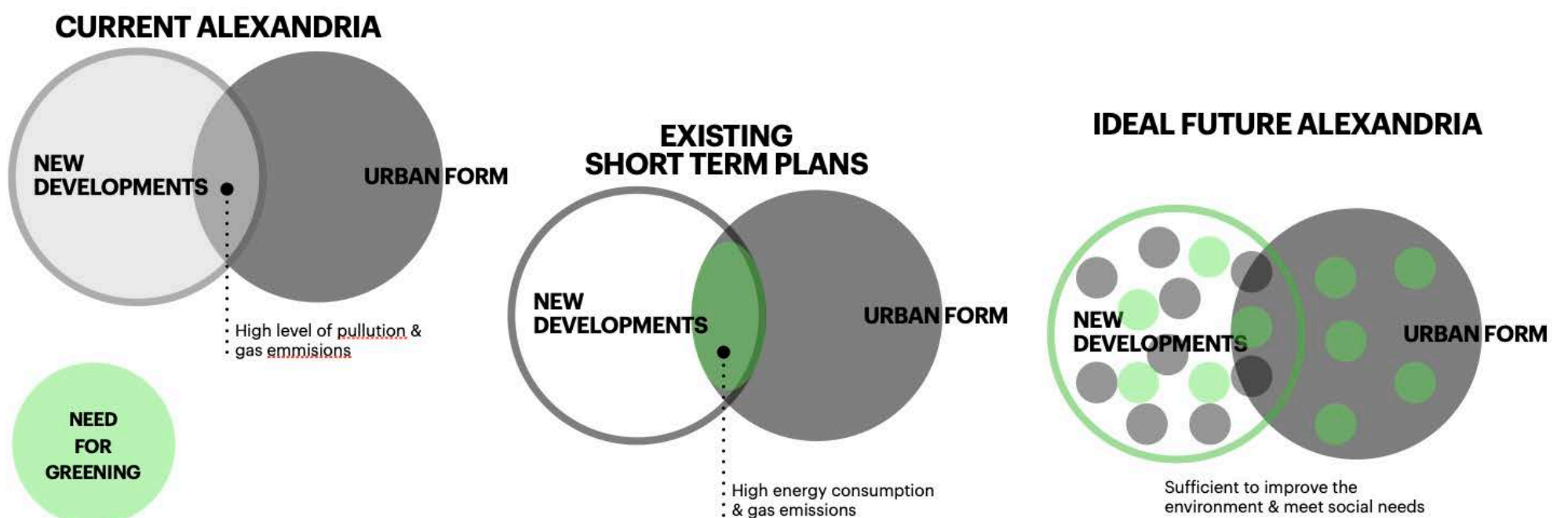


# Agriculture and the relation to space framework

There is a need for long term new ways in which big regeneration projects can be developed without creating displacement of the original population. In order to do this, it comes up with interventions that aim to contribute to minimising displacement caused by new built regeneration projects.

These interventions are based on the idea on preserving different part the city against the forthcoming climate change and can work as an allied forces to create a new social and environmental quality of preserving current and longterm developments.

This areas will be the next big new built regeneration project and is surrounded by deprived areas.









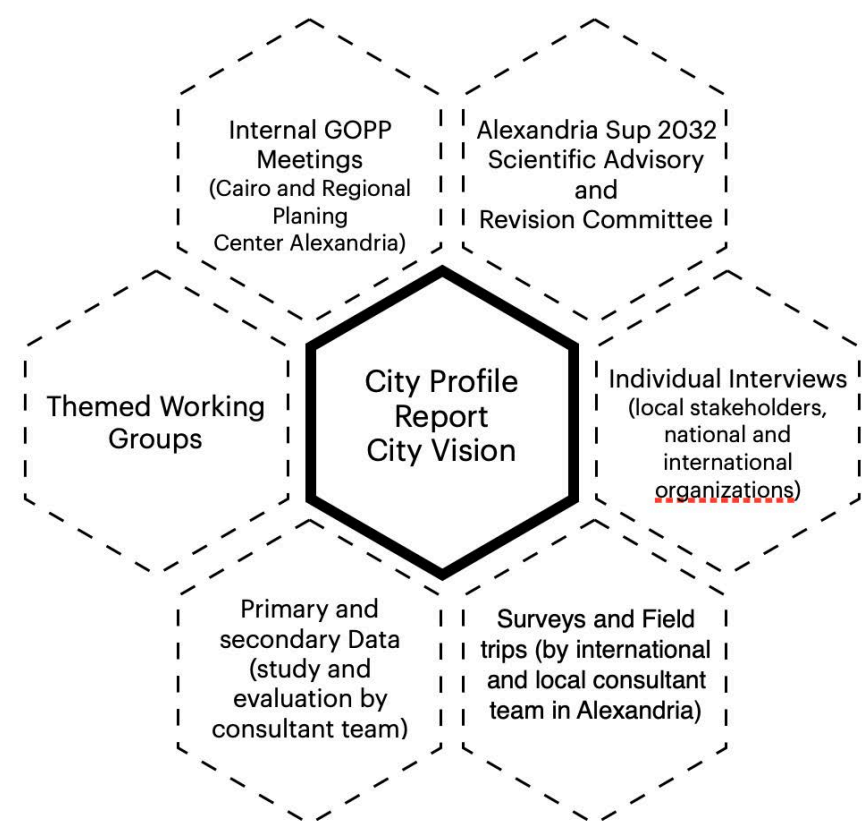
# Policy & legislations

## Vision 2030

1. The central government and the city  
Dealing with the relationship between the central government and the cities in Egypt is a difficult task. First, there is no tradition in this respect. Egyptian administrations have been top heavy, as life in Egypt has always been totally dependent on the Nile River and the need for a central authority to distribute the water. Second, the relationship between the city and the central government is subject to the personality of the governor of the governorate or head of the city.

2. The city administration and the governor  
Almost 15 years ago, under an active governor, the city started a huge project to revitalise the city, concentrating on waterfront projects, designing a new Corniche and opening the new Alexandria Library. The decision to build the library and to widen the Corniche was taken in Cairo and implemented by the Ministry of Housing through its agency for north coast development, but the decision on revitalising many Corniche palaces and theatres on the waterfront was taken by the governor. Unfortunately, the Corniche took more than its fair share of allocated investments. But this experience has demonstrated that an active governor can take decisions for the city and can negotiate with central government and the local businessmen for the benefit of the development of the city.  
The most recent plan for Alexandria is the participatory Strategic Urban Plan (SUP) for Alexandria City. It has a time horizon of 2032 and is being prepared through a partnership between the General Organization for Physical Planning (GOPP) and United Nations Development Programmed. The planning studies started 2010 until 2018. The main objective was to develop an urban management strategy and guidelines that ensure a sustainable long-term city development and direct the implementation of the proposed projects.

development strategy and methodology the Strategic Urban Plan for



Alexandria 2032 highlighted six sectoral diagnoses strategic Matrix for Sectoral Analyses

1. Urban Planning and Housing Sector.
2. Services and infrastructure Utilities and Infrastructure Sector.
3. Local Economic Development Sector.
4. Transport Sector.
5. Environment Sector.
- A. Supporting the decentralization of urban communities.
- B. Improving quality of life and environmental quality.
- C. Encourage successful economic and social development.
- D. Supporting cultural and architecture heritage.
- E. Supporting the implementation of planning policies.

**Strategic Sector Analysis Matrix**

Five interdisciplinary goals

1	2	3	4	5
Urban planning and housing	Services and infrastructure	Transportation	Local economy development	Environment
A. Supporting the decentralization of urban communities				
B. Improve quality of life and environmental quality				
C. Encourage successful economic and social development				
D. Supporting cultural and architectural heritage				
E. Supporting the implementation of planning policies				



# VISION

## 2030-2032

### Vision 2030

Alex 2032 vision analysis identified 5 urban patterns in Alexandria:

- A. Alexandria urban core area (high density with multi-storey buildings with a hierarchical road structure, in the area along the waterfront and going up to Matar Lake);
- B. Peri-urban unplanned growth zone (high density and tall buildings, less planned road structure, close to the urban core area and along the South-East rail tracks);
- C. Western coastal urban expansion zone (new urbanisation for medium to high-class residents, projects juxtaposing lower density developments with villa subdivision or small 2-storey buildings, resorts, in the area along the beach towards West);
- D. Western inland expansion zone (less planned development featuring a lower density than the core urban zone but with development possibilities on wastelands);
- E. New Borg El Arab New urban community, a highly planned area, with hierarchical road structure and mid-rise buildings.



**URBAN EXTENSION AREA**

**URBAN EXTENSION AREA**

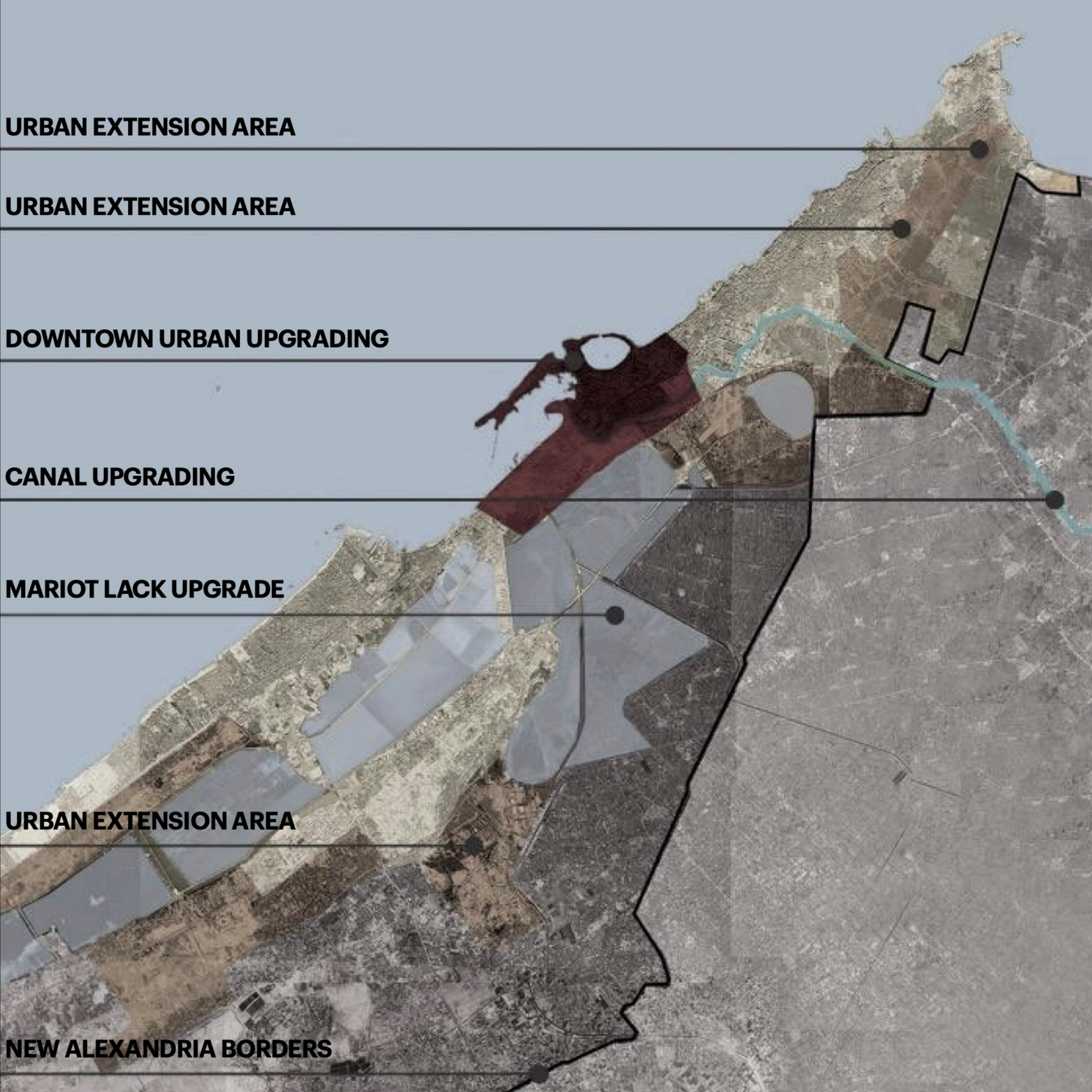
**DOWNTOWN URBAN UPGRADING**

**CANAL UPGRADING**

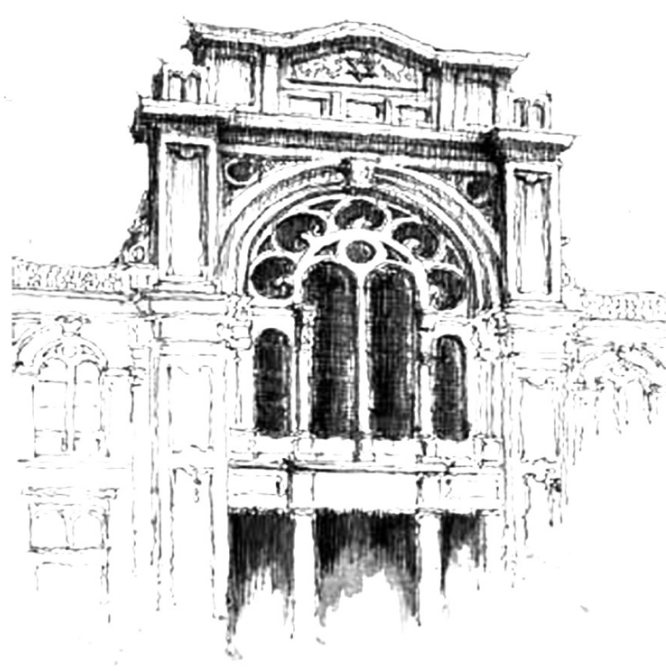
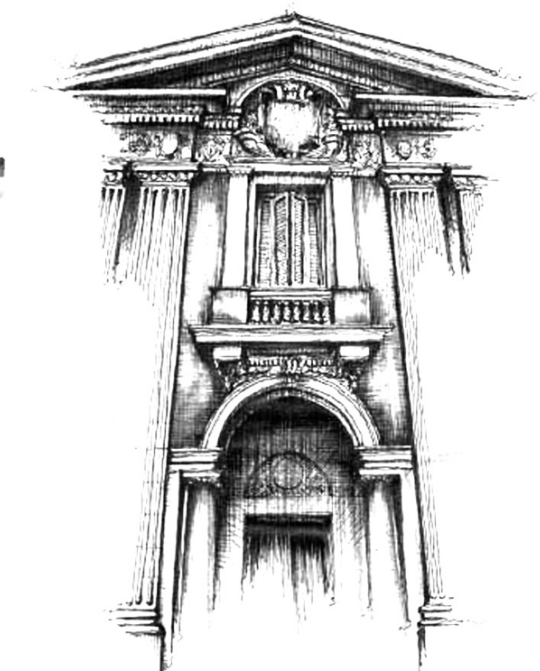
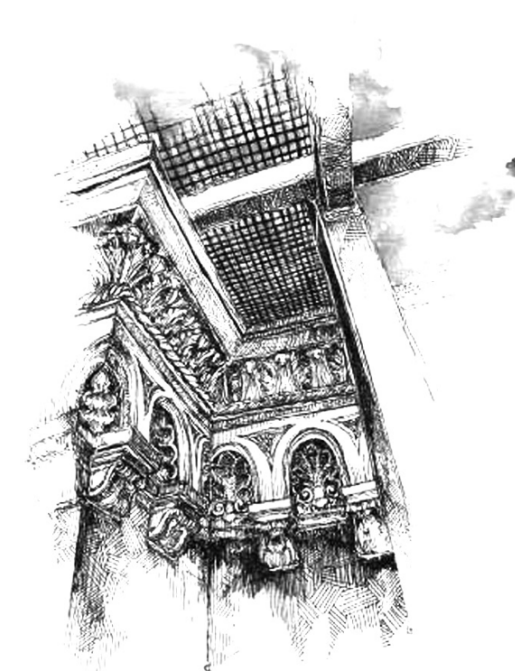
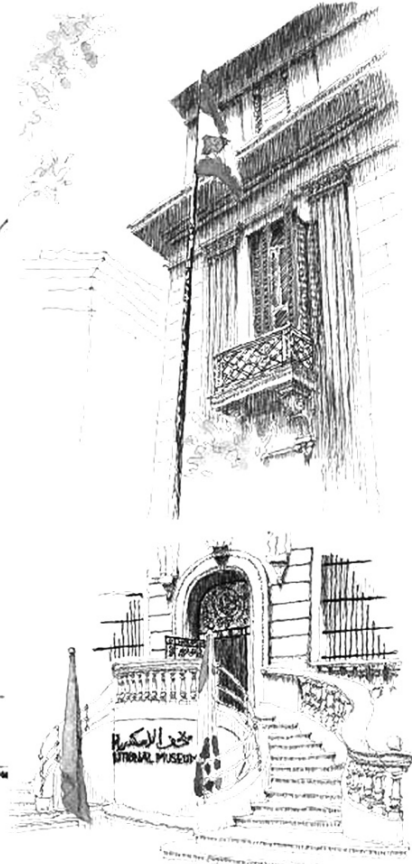
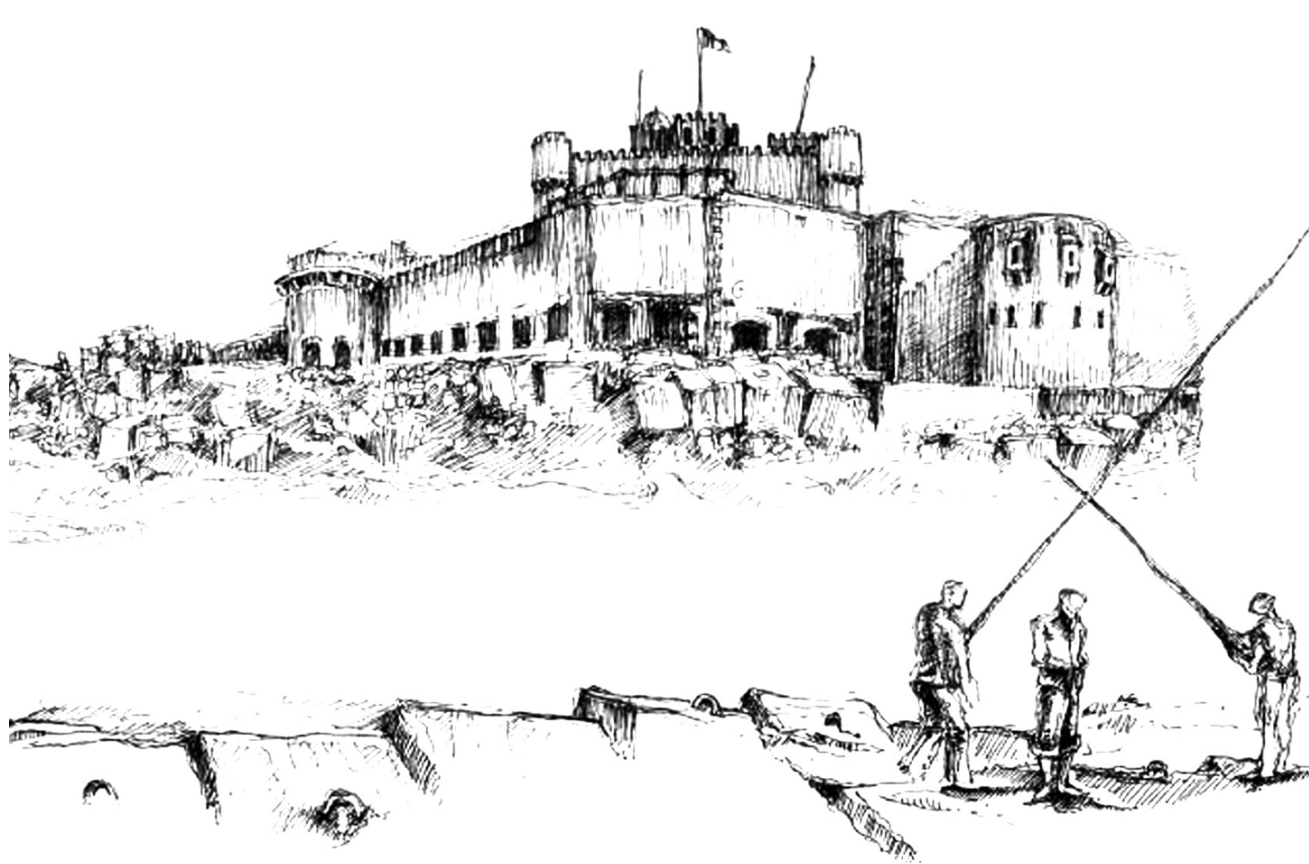
**MARIOT LACK UPGRADE**

**URBAN EXTENSION AREA**

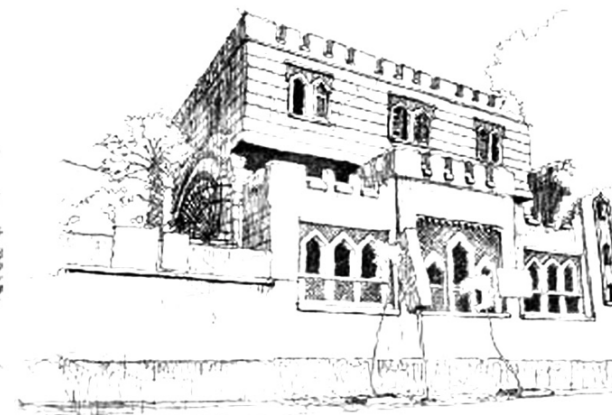
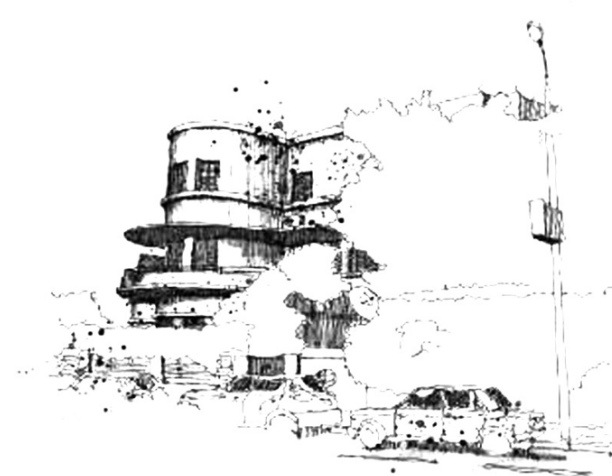
**NEW ALEXANDRIA BORDERS**













# THE REBIRTH OF PARADISE

the new paradise

in this chapter

Vision statement and goals

Compartments system

vision map




# The Rebirth of Parc vision

by 2300,

The plan envisioned a complementary array of large and small scale interventions that, in combination, would radically improve the City’s ability to weather increasingly dramatic storms. On the North Side, the plan recommended: a multi-purpose wall or levee at the East Side that would protect Alexandria’s city centre from flooding and create economic opportunity; protection of critical infrastructure; economic recovery initiatives in areas impacted by 2011’s and 2015’s storms; where economic uncertainty threatened to reduce residents’ quality of life.

The main spines of the city designed to give the tourists and the local community a complete experience and access to the city’s new green areas, recreation spaces, public squares, cultural and environmental hubs and Anchors.

Anchors like: sea-level rise observation and early alarm systems, heritage conservation centres, new agriculture and financial trading centre, new sports centre and outdoor facilities.

- 
- LEGEND
  - TRANSPORTATION HUB
  - GREEN PUBLIC SQUARE
  - WATER RESERVOIR
  - INTEGRATED DEFENCE DAMS
  - FISHING VILLAGE & MARKET
  - ELEVATED PARK
  - HERITAGE & RESEARCH CENTER
  - SPORTS & OUTDOOR PUBLIC FACILITIE
  - SLR OBSERVATION & EARLY ALARM SYSTEM
  - ALEXANDRIA PORT AUTHORITY
  - TOURIST INFORMATION CENTER
  - URBAN AGRICULTURAL TRADING CENTER
  - FINANCIAL & TRADING HUBS
  - GREEN AND BLUE SPINES
  - FOUCES ZONE







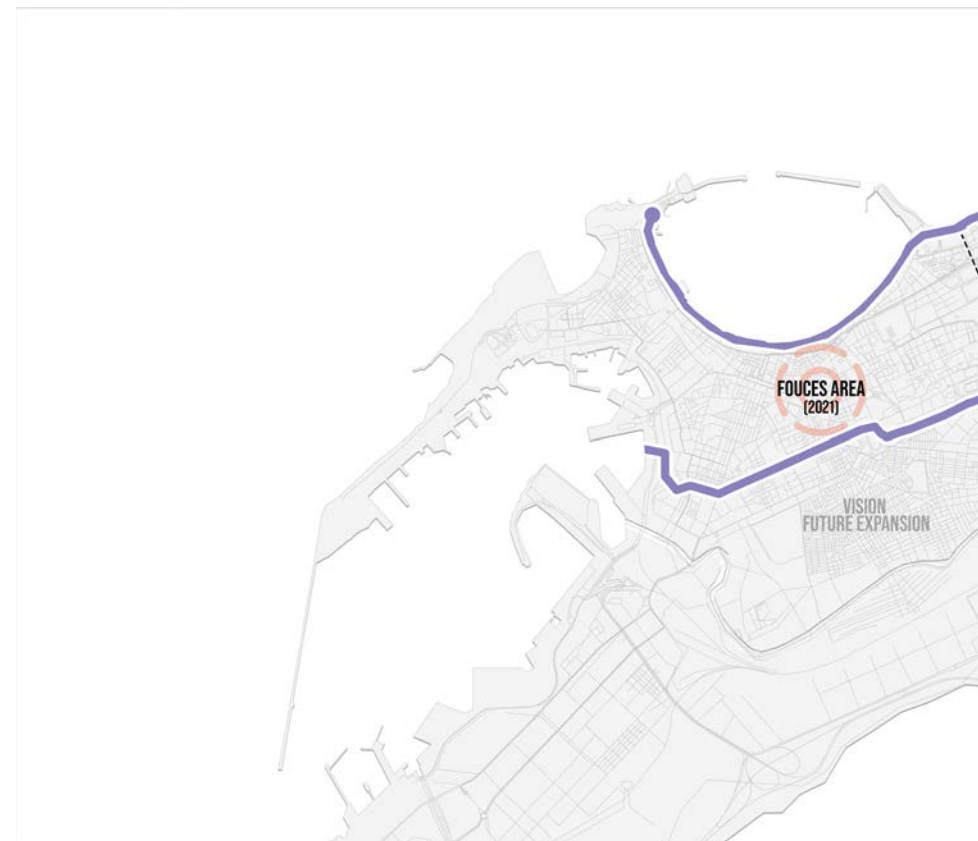
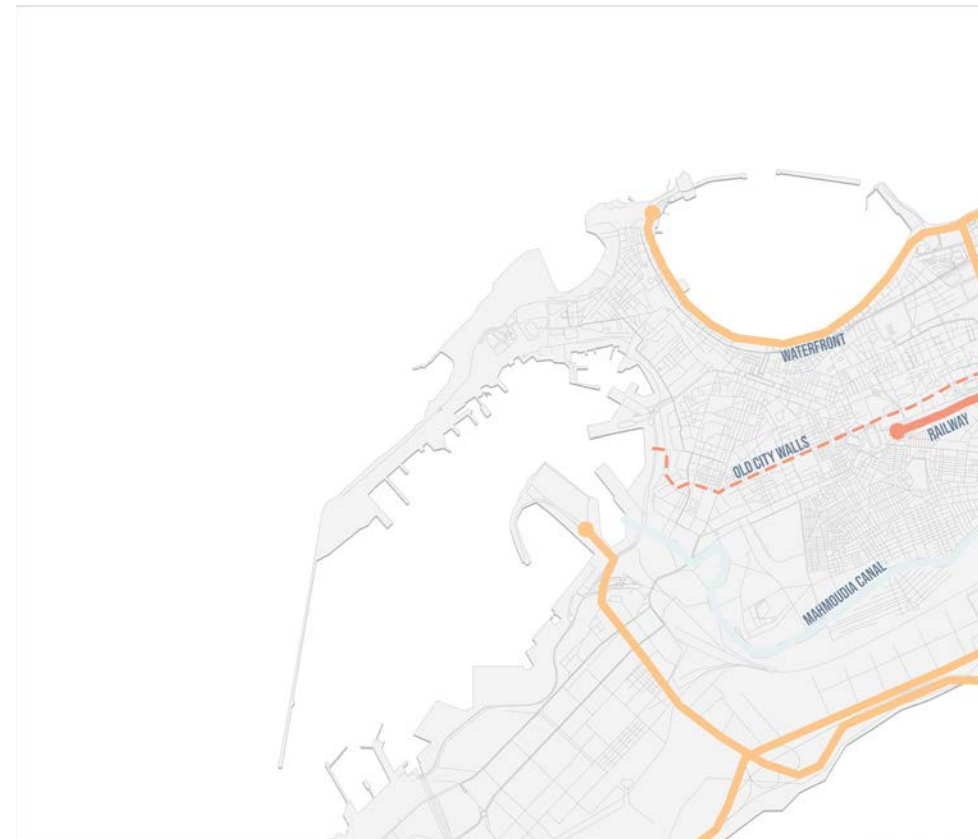
# Protection lines

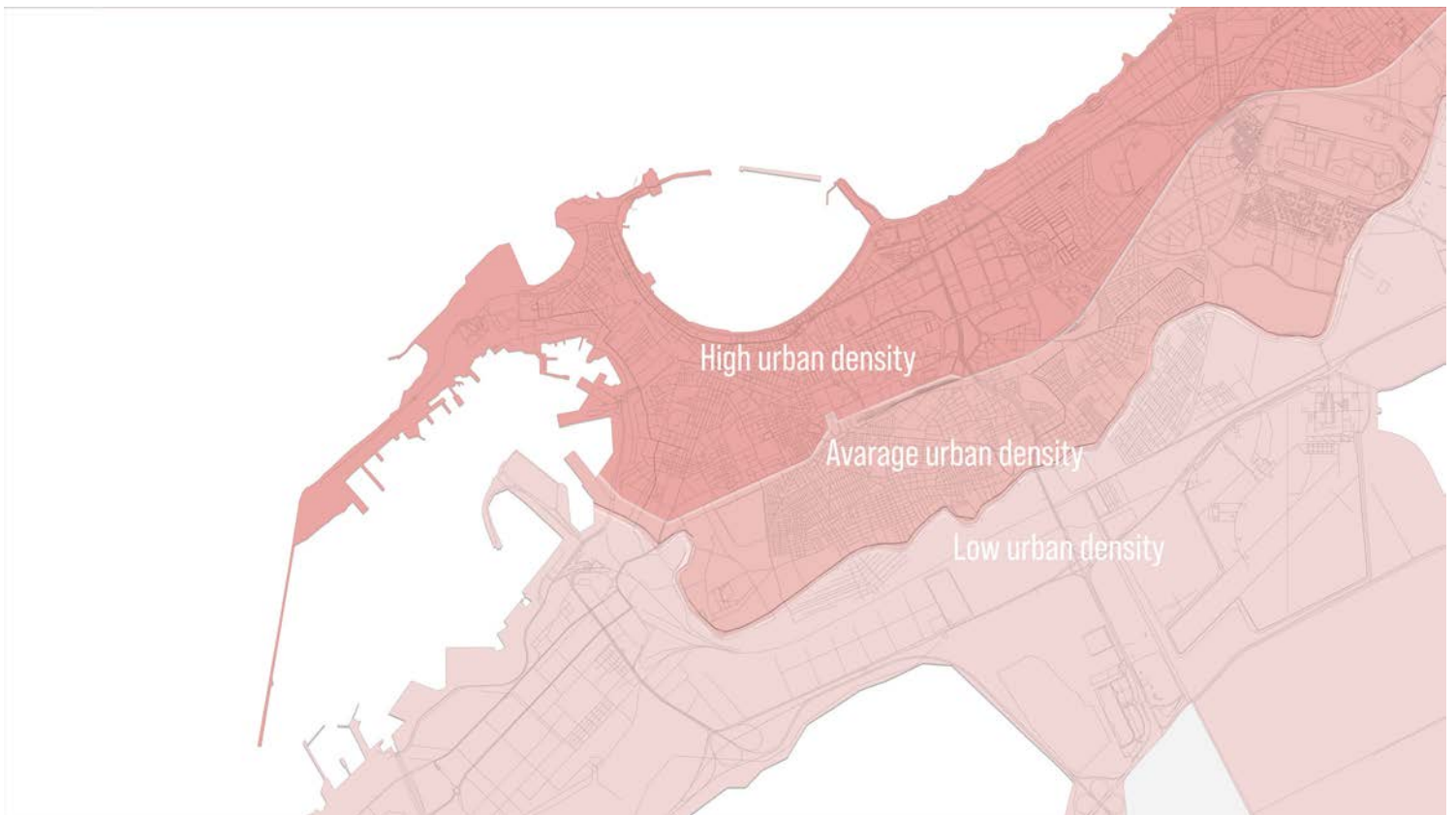
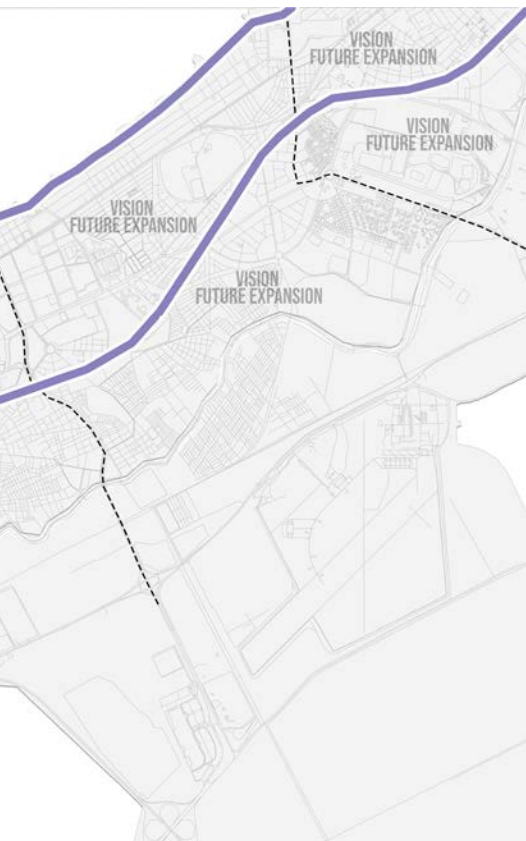
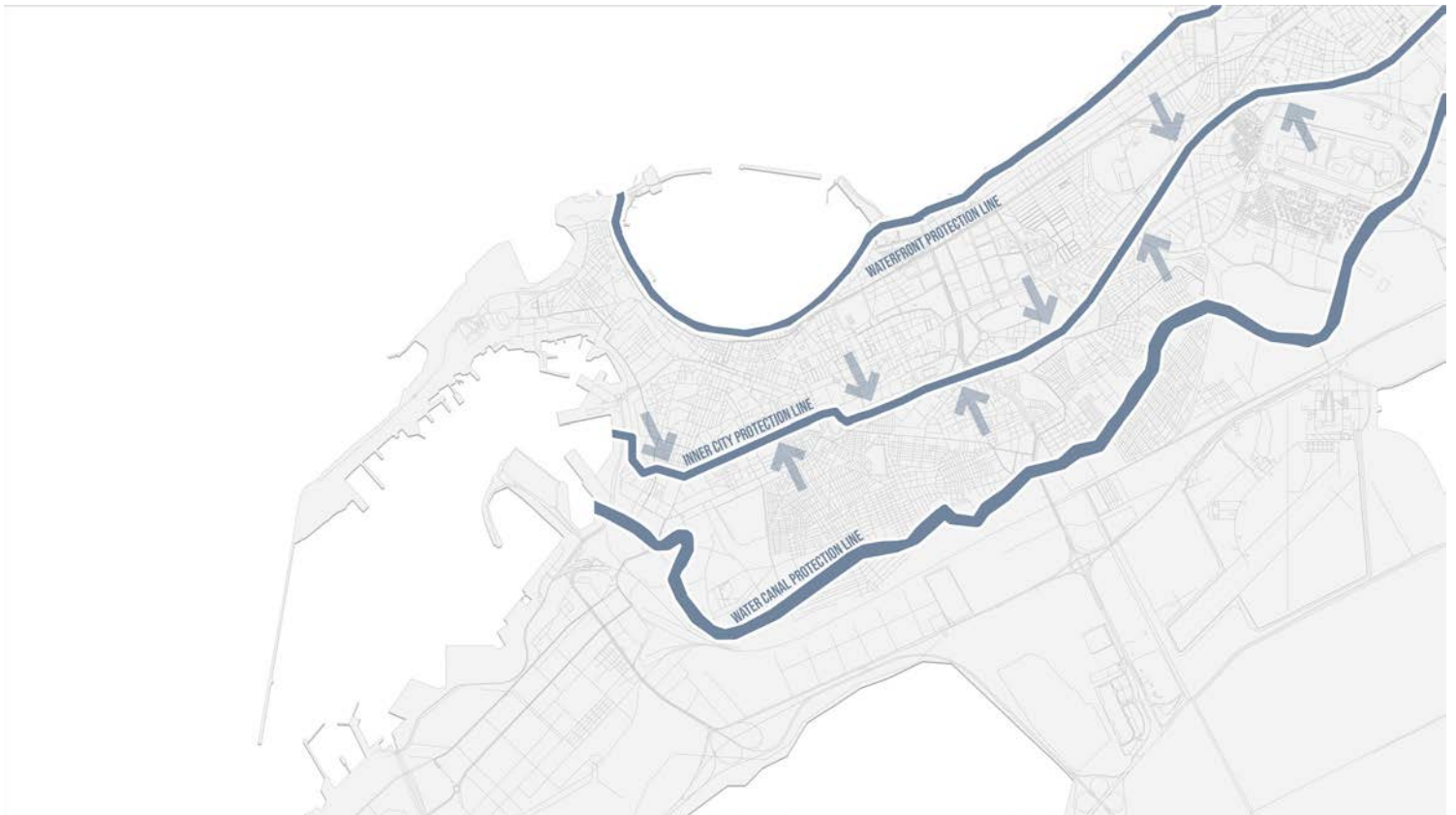
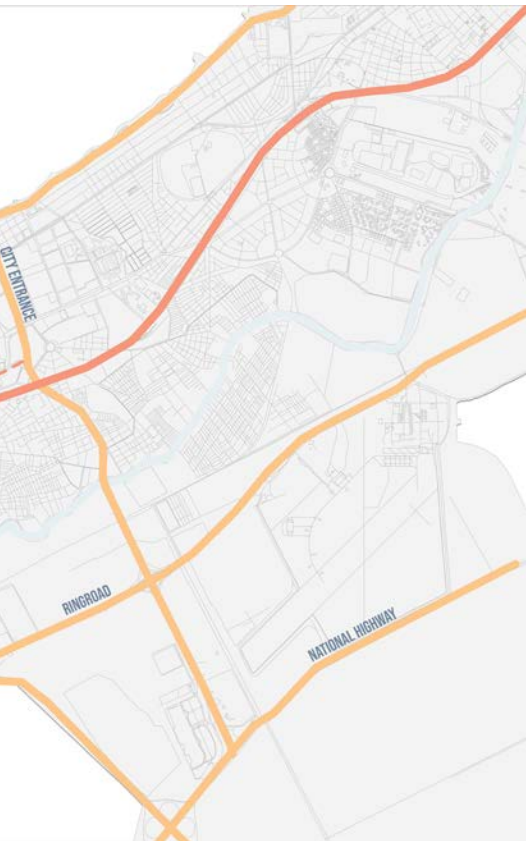
## vision

In this chapter Alexandria will be decomposed to expose the focus areas of the vision.

By combining contextually appropriate social infrastructure with flood protection measures, the project seeks to improve the quality of life on the waterfront without contributing to resident displacement.

The result for this Phase proposal is for two zones that, while linked together, function independently in terms of flood protection. Each is a particular solution to the problems posed by a particular portion of the city, and each response to the needs and wishes of the particular communities concerned.

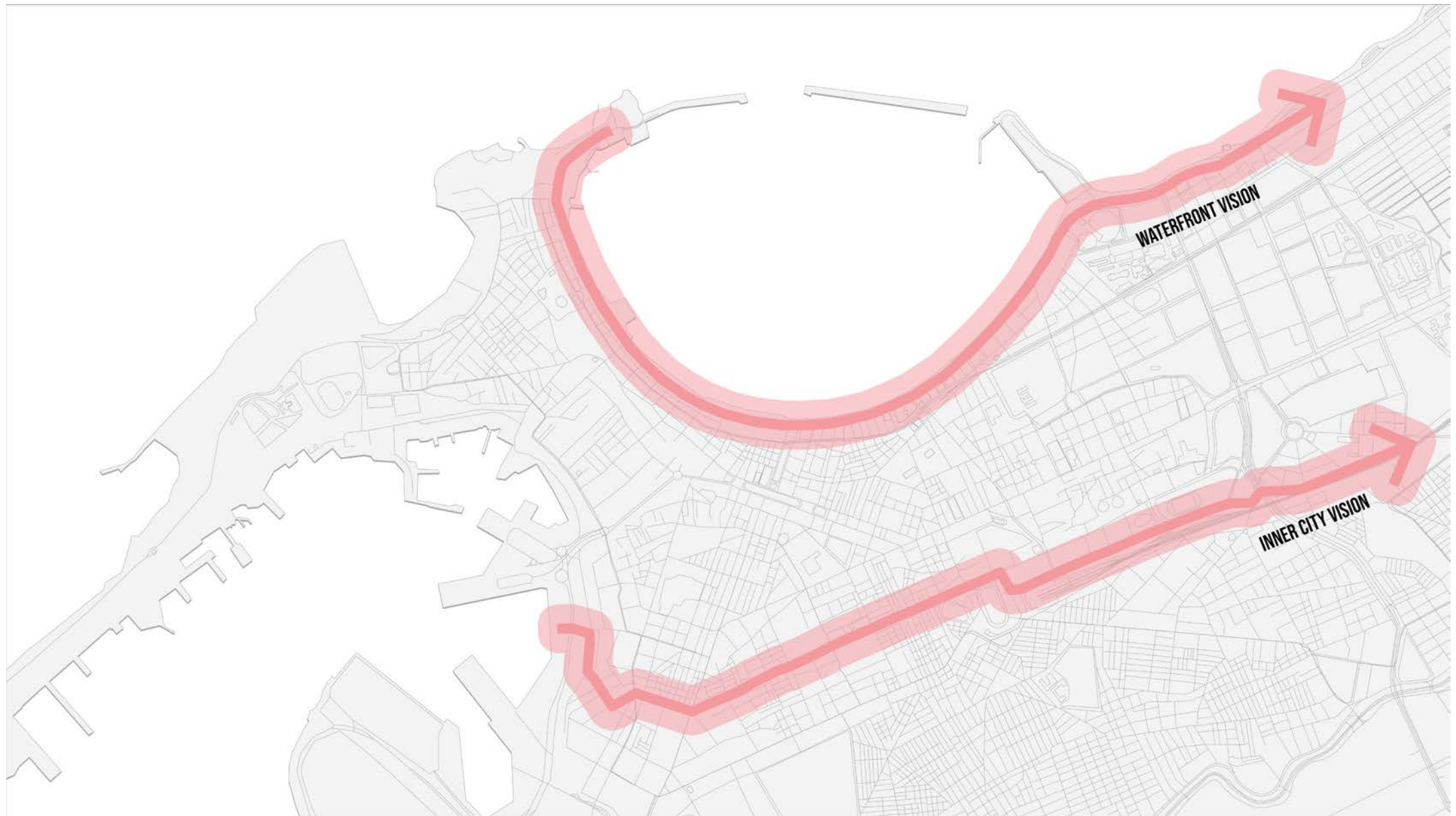






# Points of transition

vision







## Connections with the water

Alexandria's waterfront is by far one of the most meaningful instillations in Egypt. Large parts of it are currently dedicated to the industry. Part of the project's vision is the assumption that in the future oil would lose its prominence, and with it, its role within the port. And so, the port is envisioned as a space that could readily incorporate new technological and social functions that would correspond with both the city and the nearby regions with its greenery.

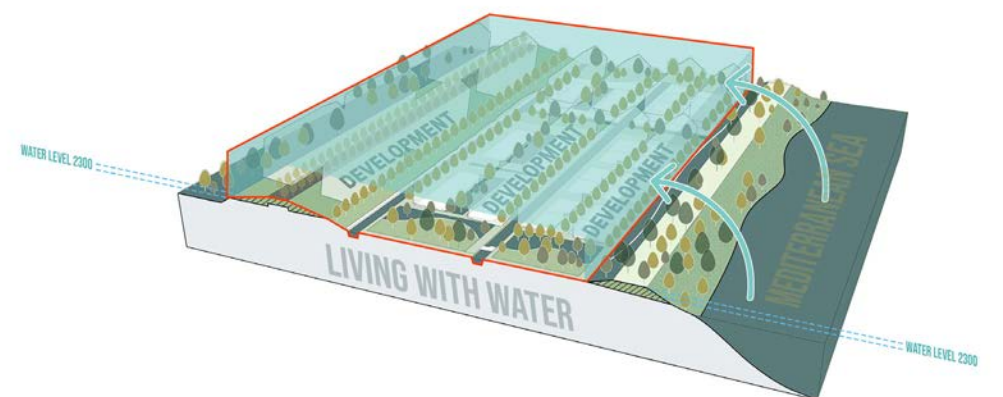
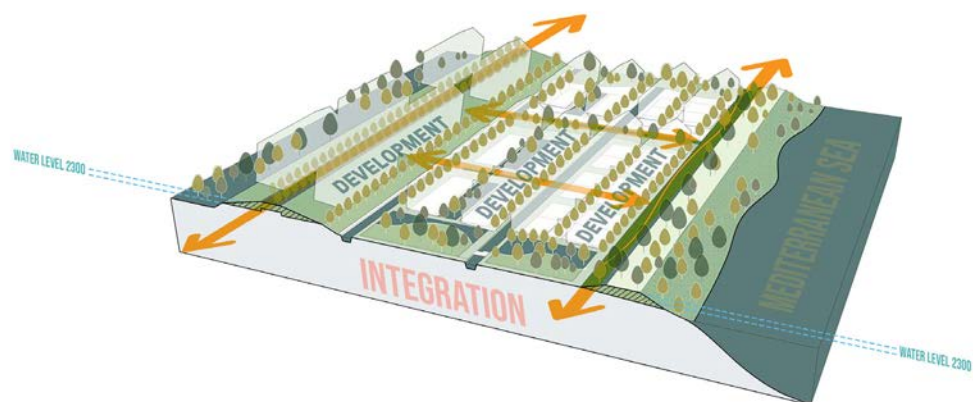
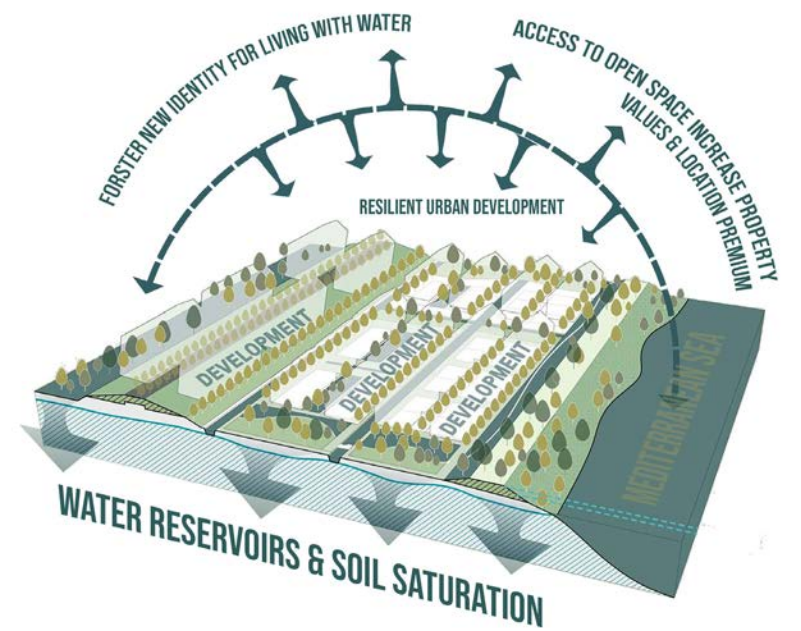
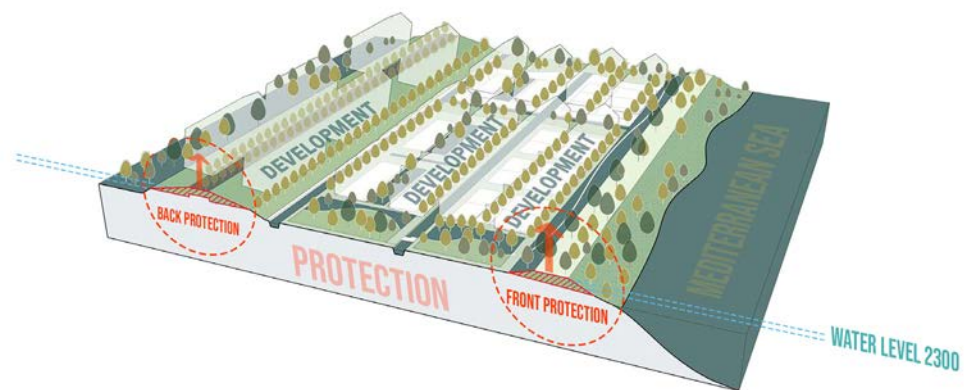








# FUNDAMENTALS



### **INTEGRATION PROTECTION**

that does not look like concrete barriers, but is an upgrade to the social and urban condition while connect the urban fabric as a whole and benefit from every new intervention to be made.

### **LIVING WITH WATER**

The concept that willing to find new equilibria in which foster a new identity for the city .

### **SUSTAINABILITY**

with been areas works as a natural climate filterizer, cooling system , natural water reservoirs and soil restoration system.

### **WATER HOLISTICALLY**

Water behaves as water, whether it arrives as standard precipitation, rain bombs, tidal flow, rising seas or storm surge. Protecting what we value requires seeing how each dynamic interacts with our built and natural forms, in tandem or in concert.

### **GROUND**

The protection choosed should respond to Alexandria's identity and be woven into the urban fabric that speaks to Alexandria's unique character.

### **DUTCH DIALOGUES**

The wisdom shared throughout the Dutch Dialogues process, and the common vocabulary we developed through our participation, should serve as the foundation for major infrastructure decisions moving forward.

### **LAYERING BENEFITS**

Water is part of the context of this place and what has attracted people here for thousands of years. The solutions offer benefits beyond storm surge protection, such as increased recreation and fishing opportunities, improved transportation access, improved flood control and water quality, enhanced aesthetics, and even carbon sequestration.

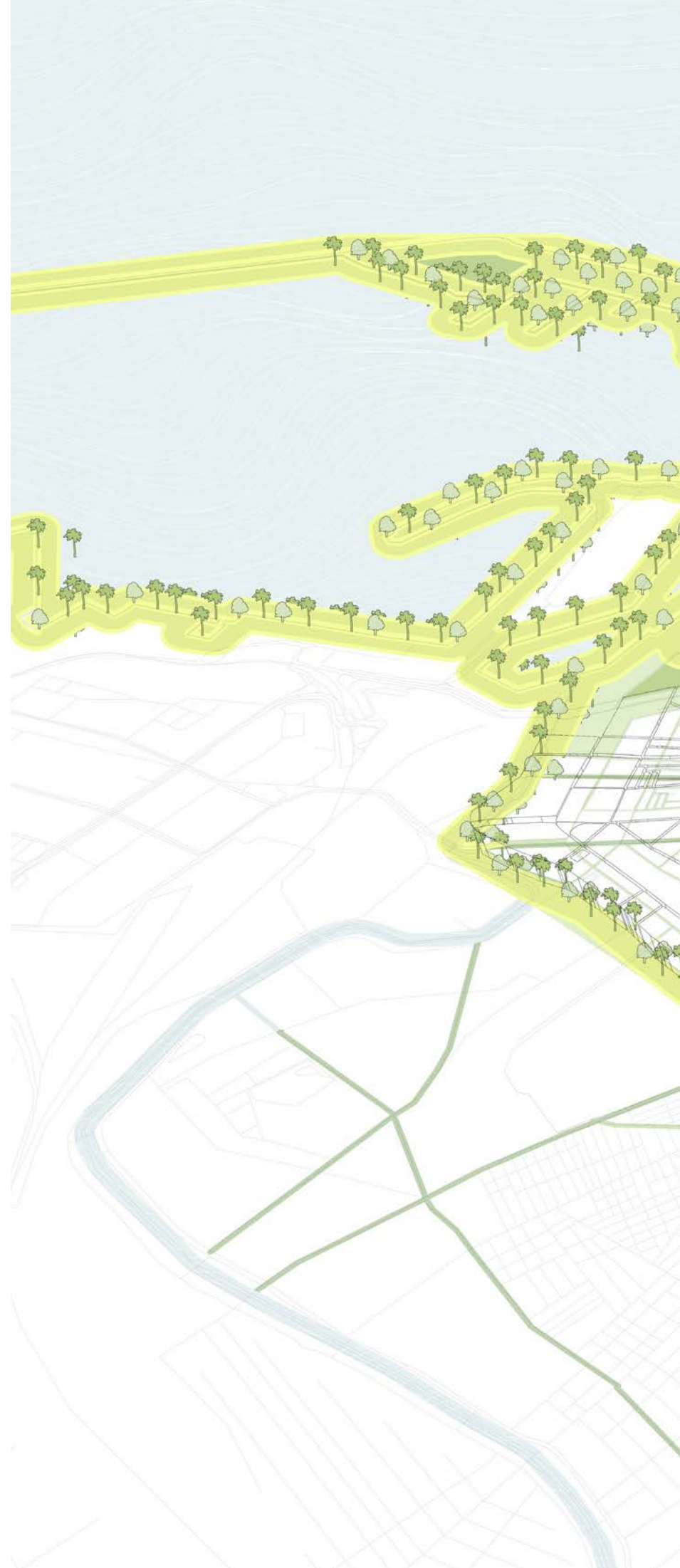
### **EQUITABLE**

A designer working over a few months cannot create an equitable plan, nor do equitable outcomes result from financial cost-benefit analyses based on property values. Recognizing the limits of the thought experiment presented on these pages, The hope is to spark conversation that brings us closer to protection outcomes that are a result of genuine community-based design.



## Connections within the green urban setting

Urban spaces could incorporate more social functions from the waterfront both in terms of distribution of activities, but more meaningfully could allow new activities into the city, with agricultural community gardens and parks or rooftop greenhouses. However, it could also further participate in the technical-technological aspect of the system, with universities and research centers taking a more active part withing the system.

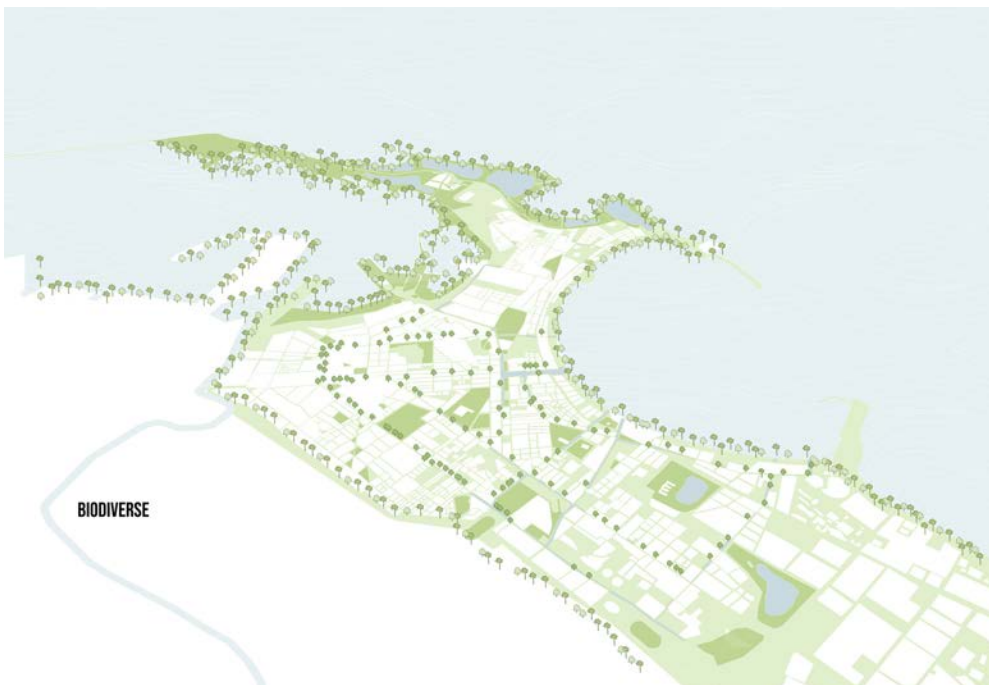






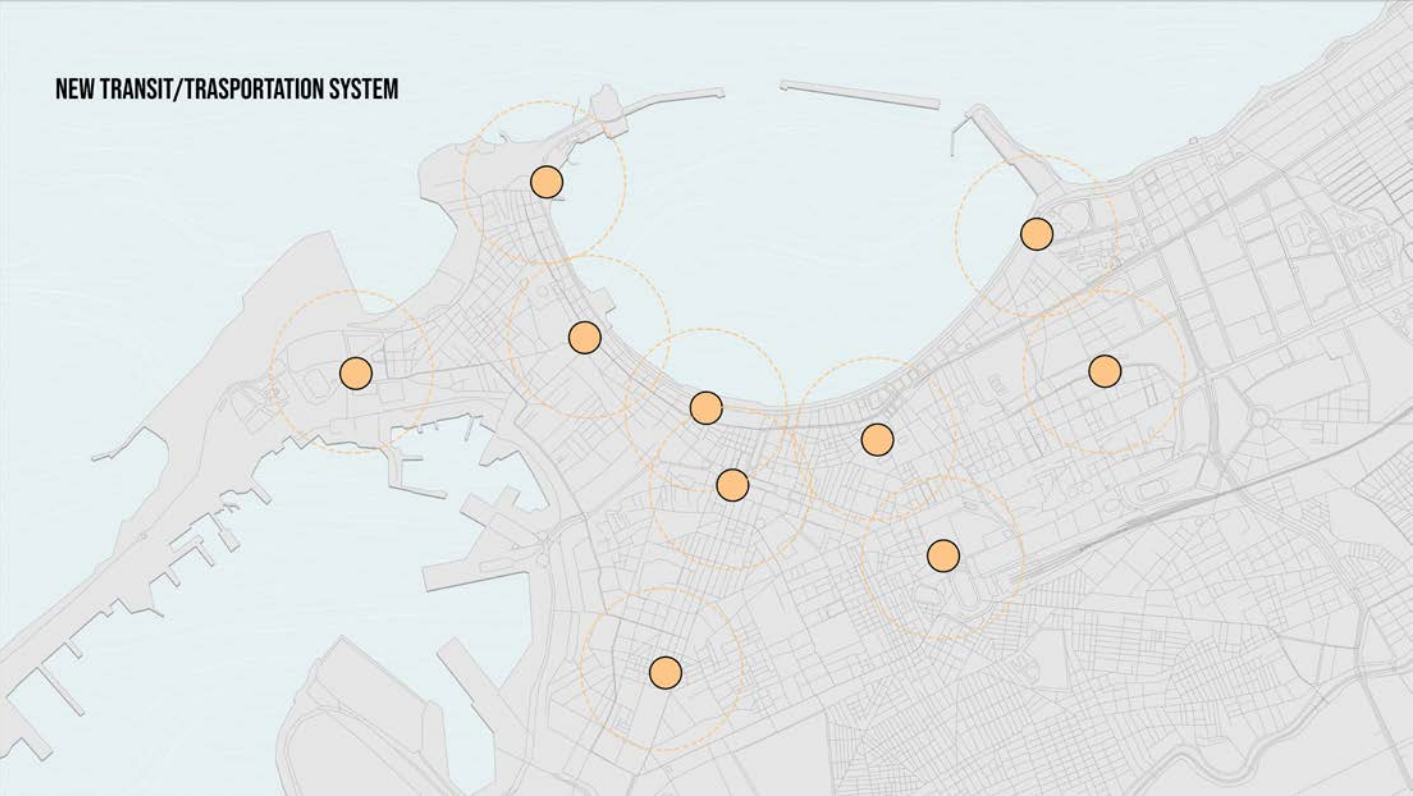
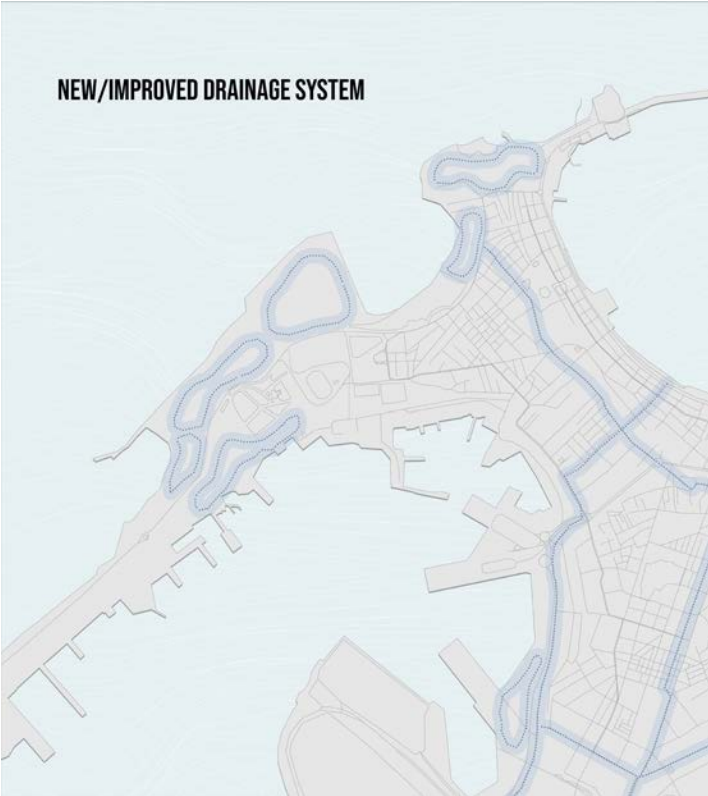


# THE SYSTEM

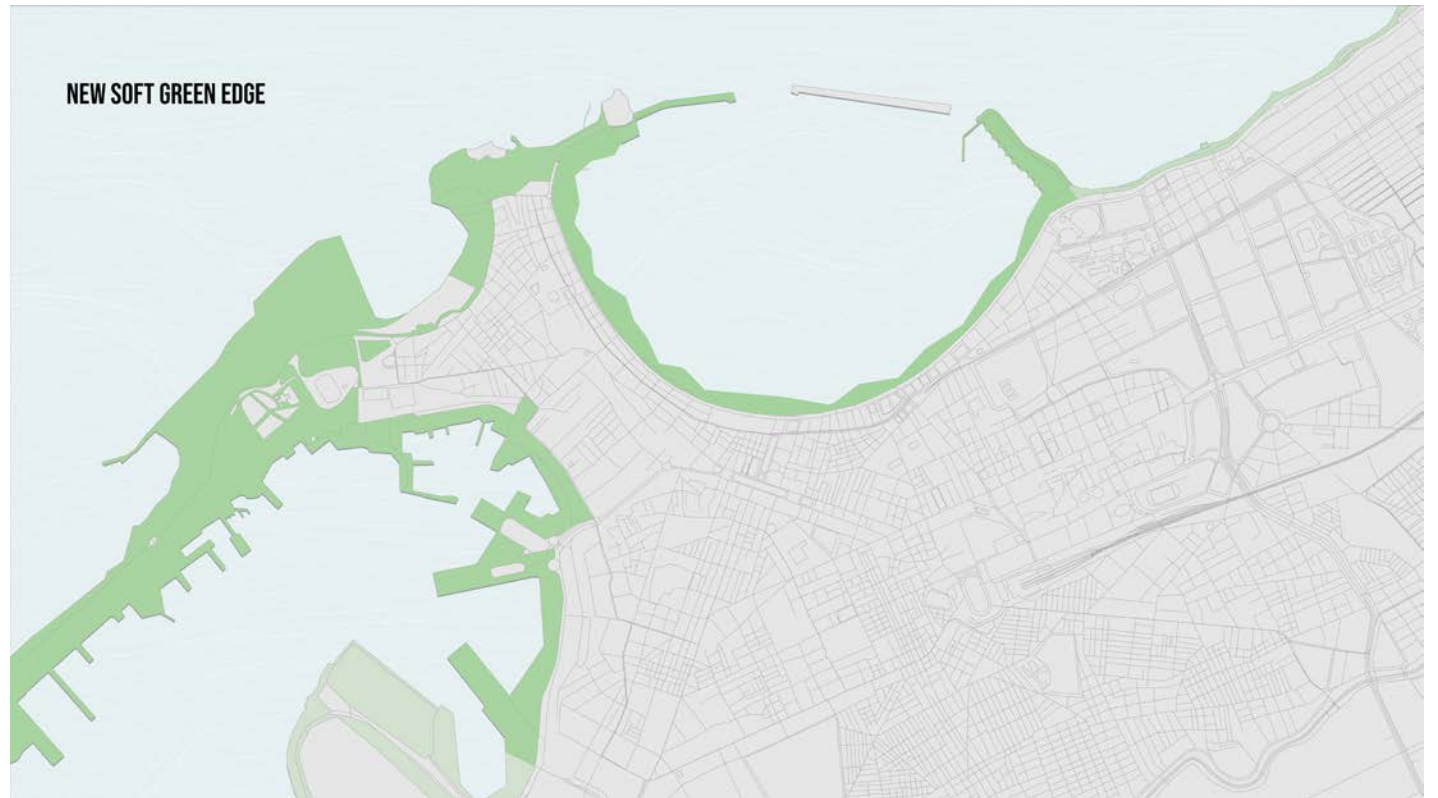










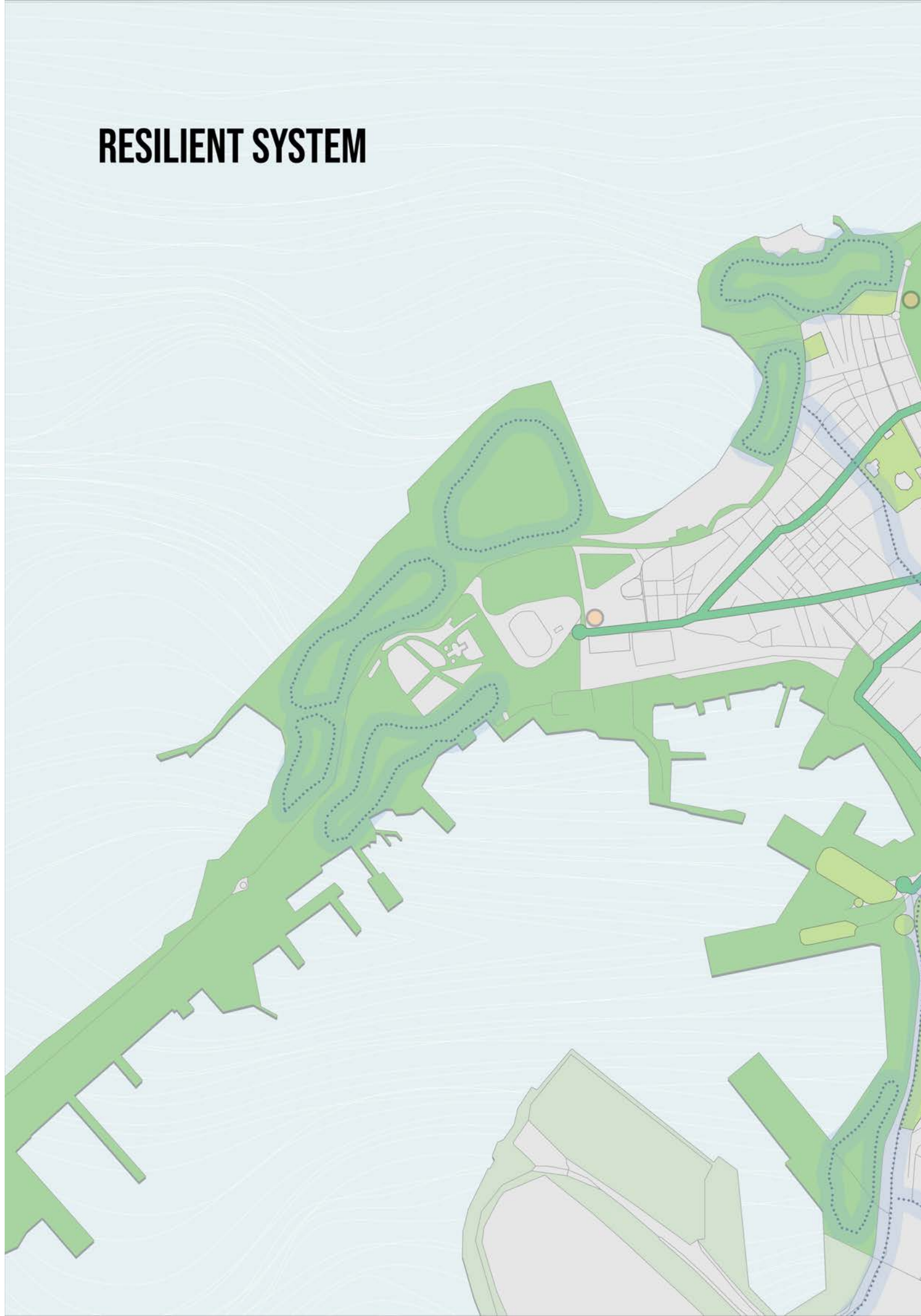




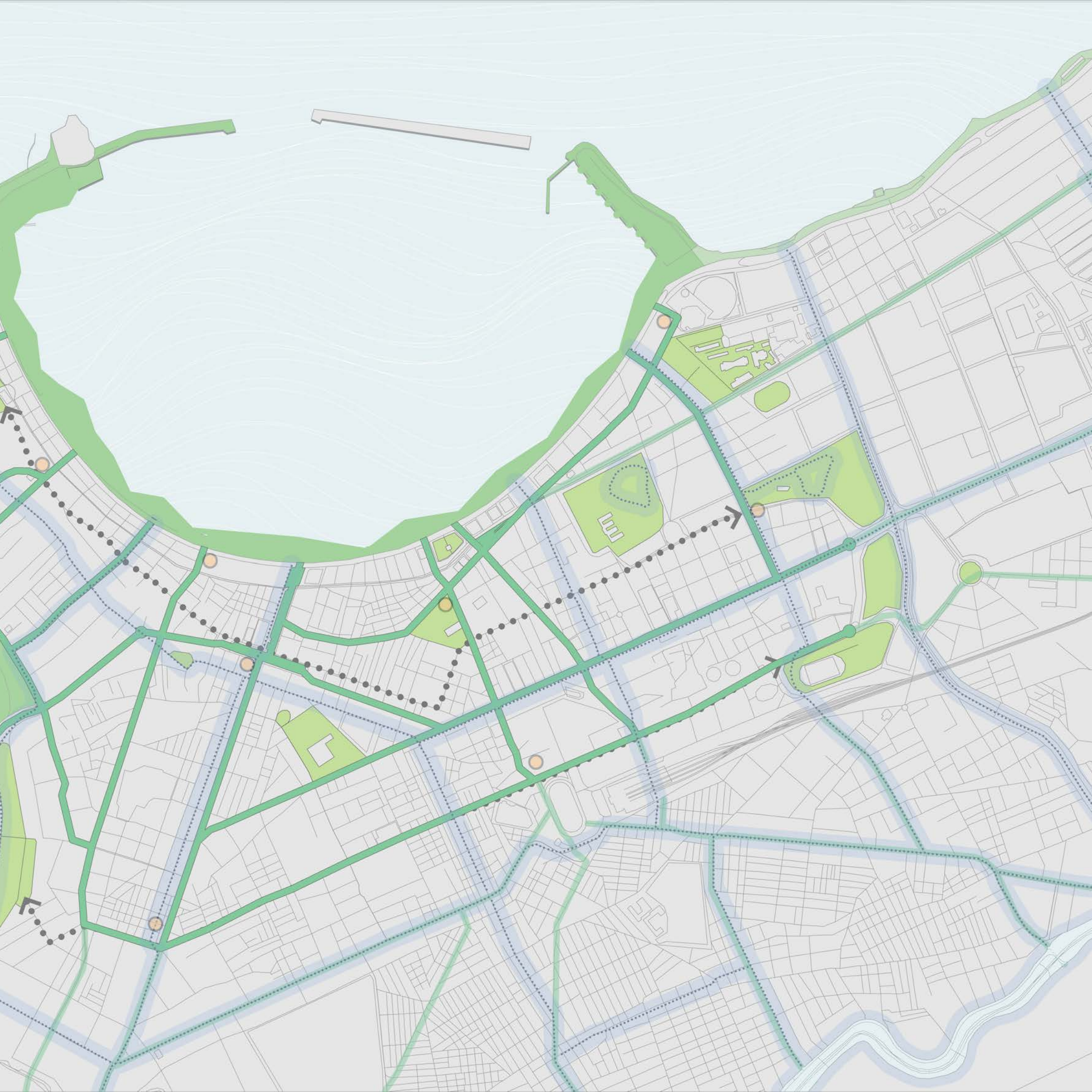
# RESILIENT SYSTEM

## RESILIENT SYSTEM

The design of the defence is embodied as part of the city functions and activities, whether it is on the inner part of the sea part. A trace step holds benches and seating areas for social activities as hardscape design while integrating landscaping that is derived from the local and vernacular vegetation's as soft scape design. instead of building a defence wall, I elaborated more on creating activities as an investment in the social prospect of the city, in other words, the defence walls are now new urban parks and promenades which provides new typologies in the city fabric.









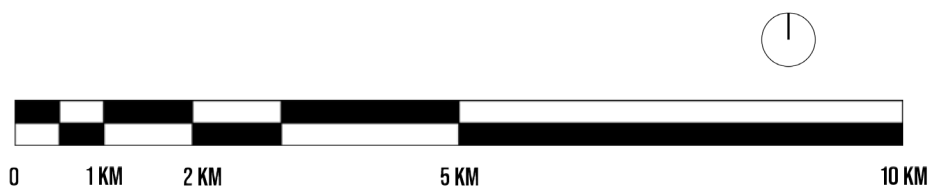
# The Rebirth of Par vision

The vision map is a culmination of the ideas and approaches defined up to this point.

The idea to combine many programs in one compact space, and increase the landscaping areas to inject more greenery since unpaved areas help on absorbing water into the terrain. While rejuvenating the vernacular landscaping by reintroducing vegetations such as the papyrus plant which represents a historical value. Moreover, the selection of vegetation is based on a resilient and sustainable plantation that is based on local & Mediterranean products that do not need high maintenance and irrigation.

Alexandria is one of the best hubs for fishing in the whole region, for that, I wanted to regenerate this fishing identity and transform it to the next level. Through my intervention, I wanted to elaborate more on this exquisite identity and create more fishing spots to make it beyond its current position. Hence, I proposed more fishing platforms for fishermen and hobby fisher to enjoy the experience of fishing, and they can also exhibit their products in public spaces “ designed fish market”. This will provide another resilient activity within the defence wall and will enhance a new micro-economy in the city, where people have easy access to fresh seafood and enjoy Alexandria’s famous street food experience.

On the peak of the gulf of Alexandria, a smart alarm system will be introduced for an early alert of any unwanted natural threat. This will be through introducing a radar that works as a mitigator to anticipate the risks. The peak of the gulf could be closed at any time, yet I suggest leaving it open to ensure the ecological and biodiversity of the general marine life of the gulf and never touch the micro-climates unless there is a real threat.







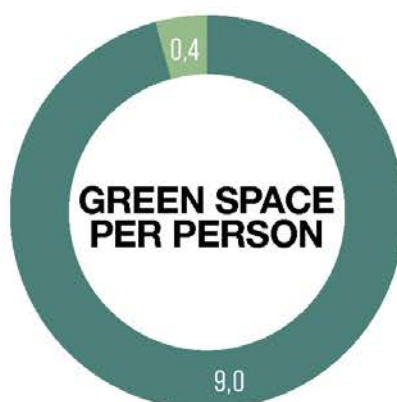
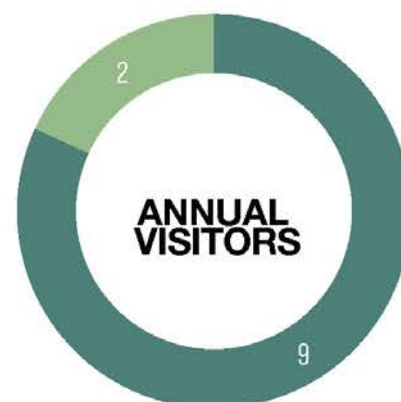
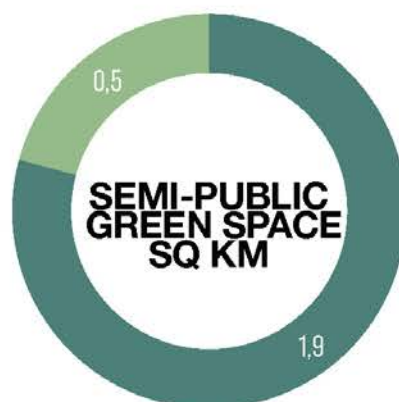
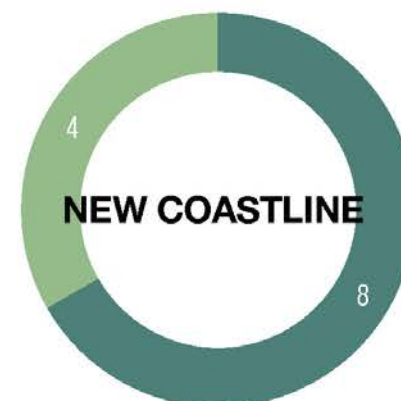
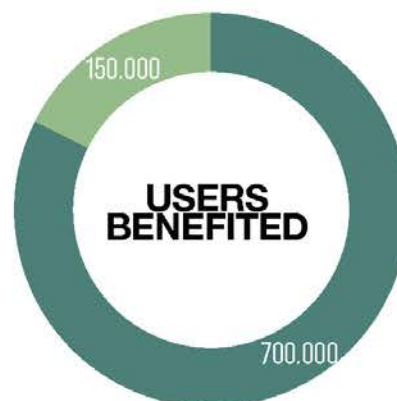
# HOW IT WILL BE REBIRTHED?

Design

in this chapter

Typology of interventions  
Imagination impressions

















# Living with Water and Nature

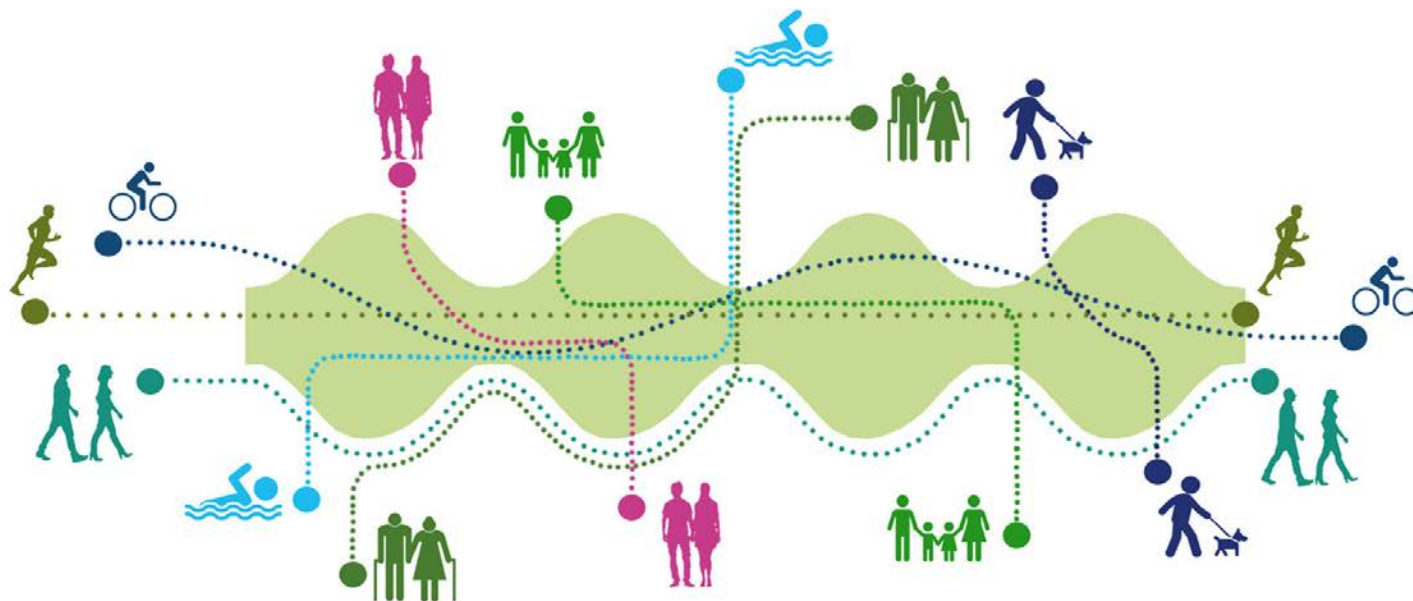
**The concept of living with water and nature** is an array of 'green infrastructure' strategies can be applied throughout the city

to collect, treat and manage stormwater.

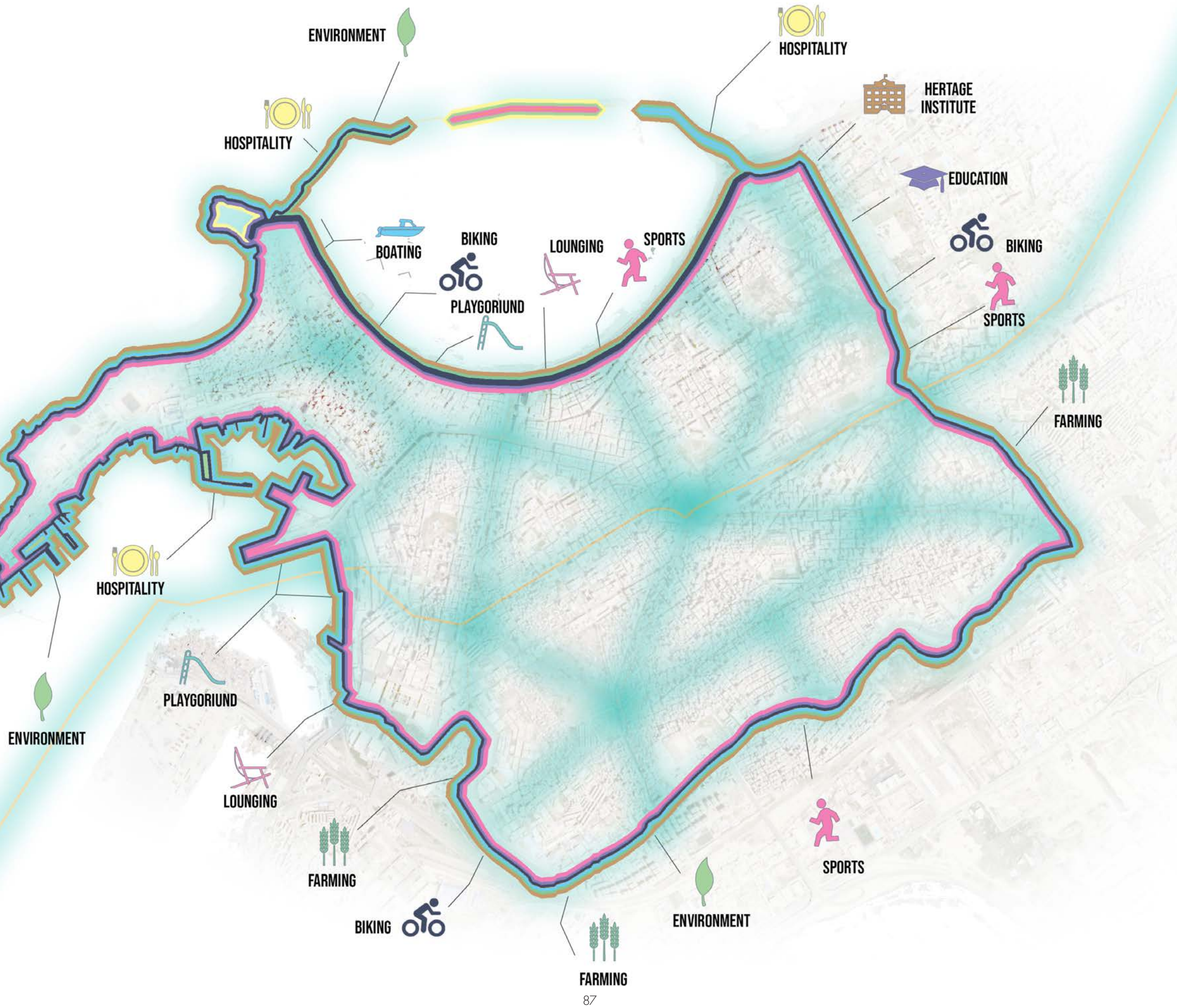
Highlighting social activities and historical hotspots.

Injecting rain gardens, bio-swales, green roofs and urban canals are just some of the techniques that can be used to reduce flooding while living with water.

**A project that combine natural and engineered systems to produce more value and a broader array of benefits is gaining increasing attention worldwide.**









# HYBRID SOLUTIONS

## Prototyping

In this case, it could be interesting to look at the holistic perspective and use this infrastructure to provide the water protection network you need.

it needs to happen rooted in the city D.N.A and the local communities.

Essentially the main challenge is to resist a certain amount of storm, you need a certain geometry that could be made in a way so that when you go there you won't notice that this is actually part of a protection system.

it could be like a piece of landscape that also becomes what protects the city from flooding.

it could be like various artworks. or almost like furniture landscaping. that also protects the city from flooding.

### STRATEGY WATER CAPTURE & GREEN TREATMENT

**35.8 KM**  
TOTAL GREEN WALKING PATHS

**8.0 KM**  
ADDED COST-LINE

**3.6 KM<sup>2</sup>**  
NEW PUBLIC GREEN SPACES

**1.9 KM<sup>2</sup>**  
SEMI-PUBLIC GREEN SPACES



**1 CAPTURE**  
LINER OPEN SPACES COLLECT  
AND DRAIN STORM WATER  
INTO PARKS, PONDS  
AND DRAINAGE CANALS



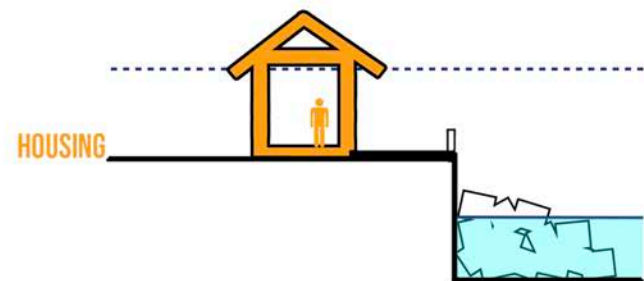
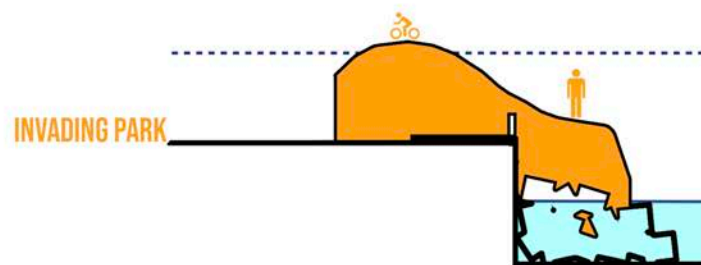
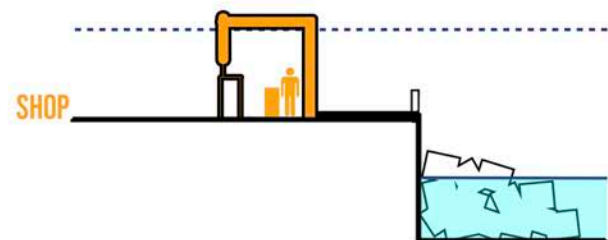
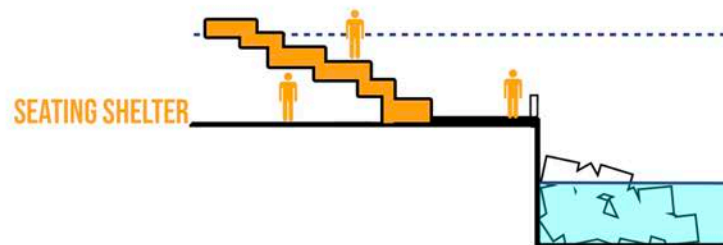
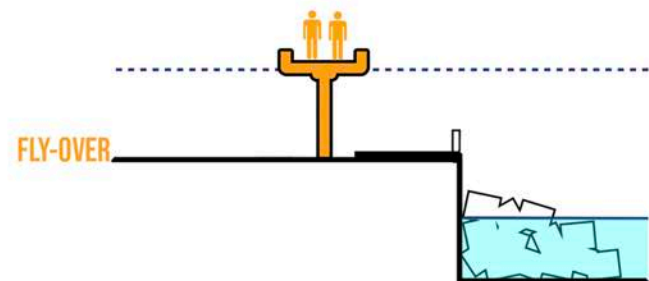
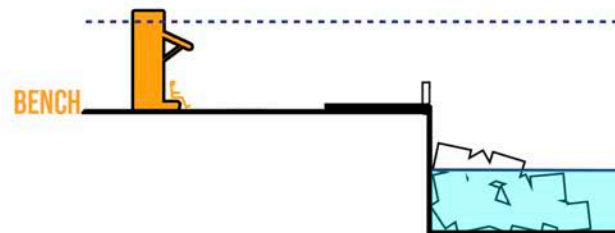
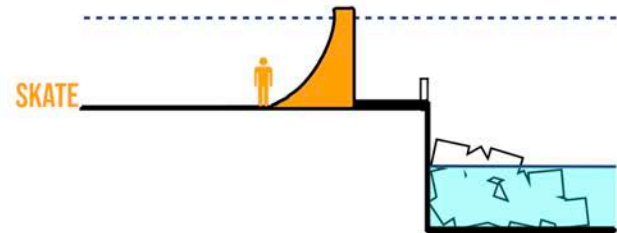
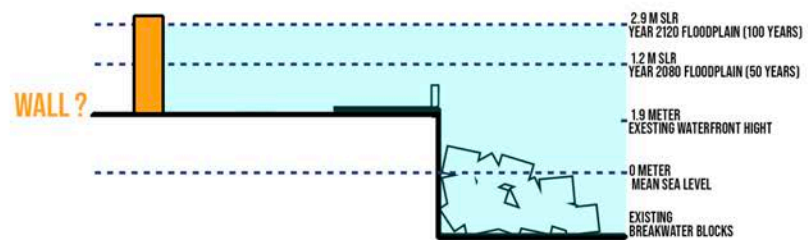
**2 STORE  
& RECHARGE**  
OPEN GRASS AREAS DETAIN  
FLOODWATERS AND ALLOW  
INFILTRATION FOR  
GROUNDWATER RECHARGE



**3 FILTER  
& CLEAN**  
DIVERSE PLANTING FILTERS  
AND CLEAN STORM WATER



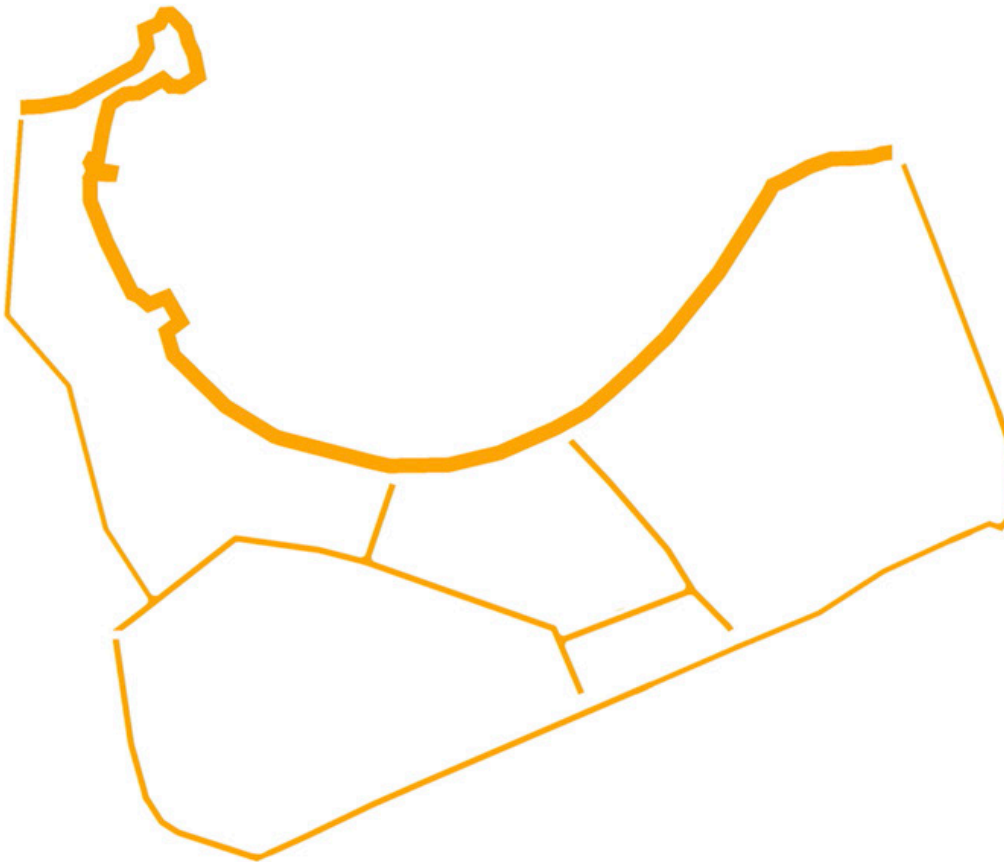
**4 RE-USE**  
FILTERED WATER CYCLED  
BACK FOR PARK LANDSCAPE  
IRRIGATION





## WATER FRONT

- Qaitbay Citadel.
- El Morsi Abo El Abbas Mosque
- The Swedish Institute.
- Alexandria Court.
- Monument to the Unknown Soldier
- The French Consulate
- Saad Zaghloul statue/plaza
- Raml Post Office
- Immortals Plaza
- Al Qaaed Ibrahim Mosque
- Mohamed Abdel Wahab Theater
- Alexandria Summer Book Fair
- Bibliotheca Alexandrina

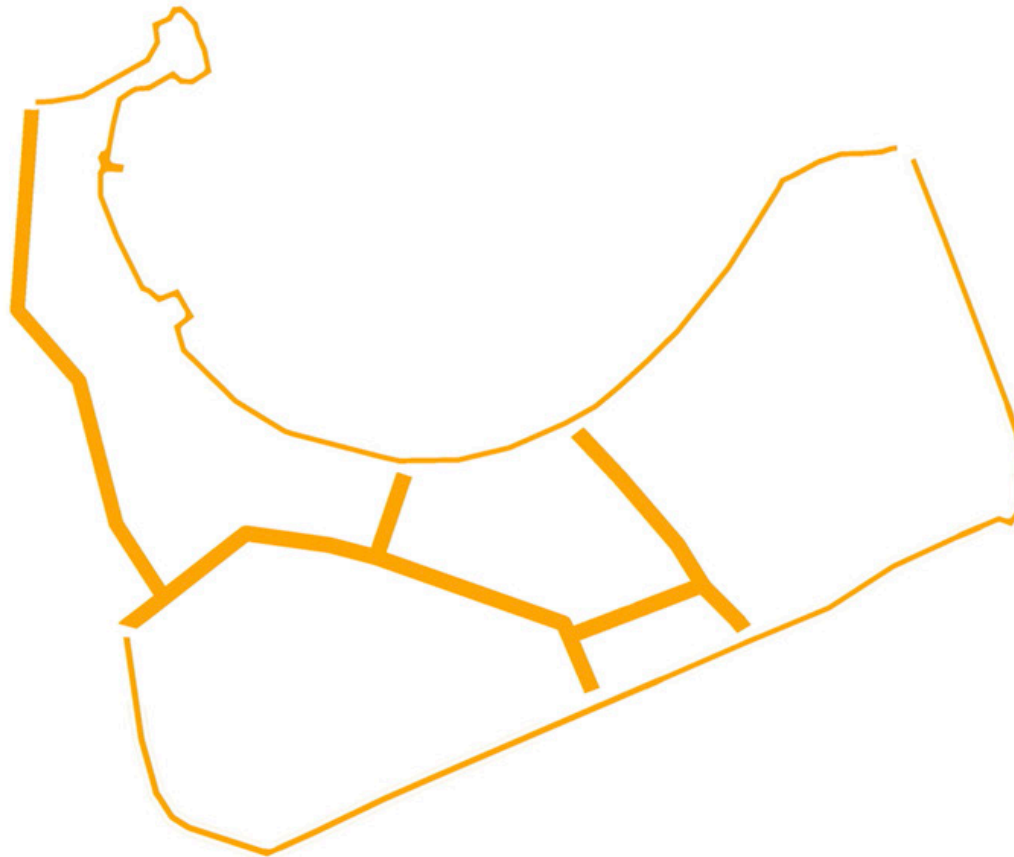


## CITY WALL

- Alexandria National Museum
- Alexandria Stadium
- Consulates strip
- Juvenile care centre
- Ancient Roman Amphitheater
- Alexandria Railway Station square
- Deutsche Schule der Borromäerinnen
- Old Security Directorate of Alexandria
- Civil Status Administration



## INNER CITY



- Greco-Roman Museum
- The Greek Orthodox Patriarchate
- The Turkish House, Sesostris street.
- Constantine Cavafy museum.
- Al-Ahram newspaper and bookshop.
- L'Atelier D'Alexandrie.
- The Cathedral of St. Mark
- Mohamed Ali Pasha Statue
- University Hospital
- Central Bank Of Egypt
- St. Catherine's Church
- Com Naaddourh

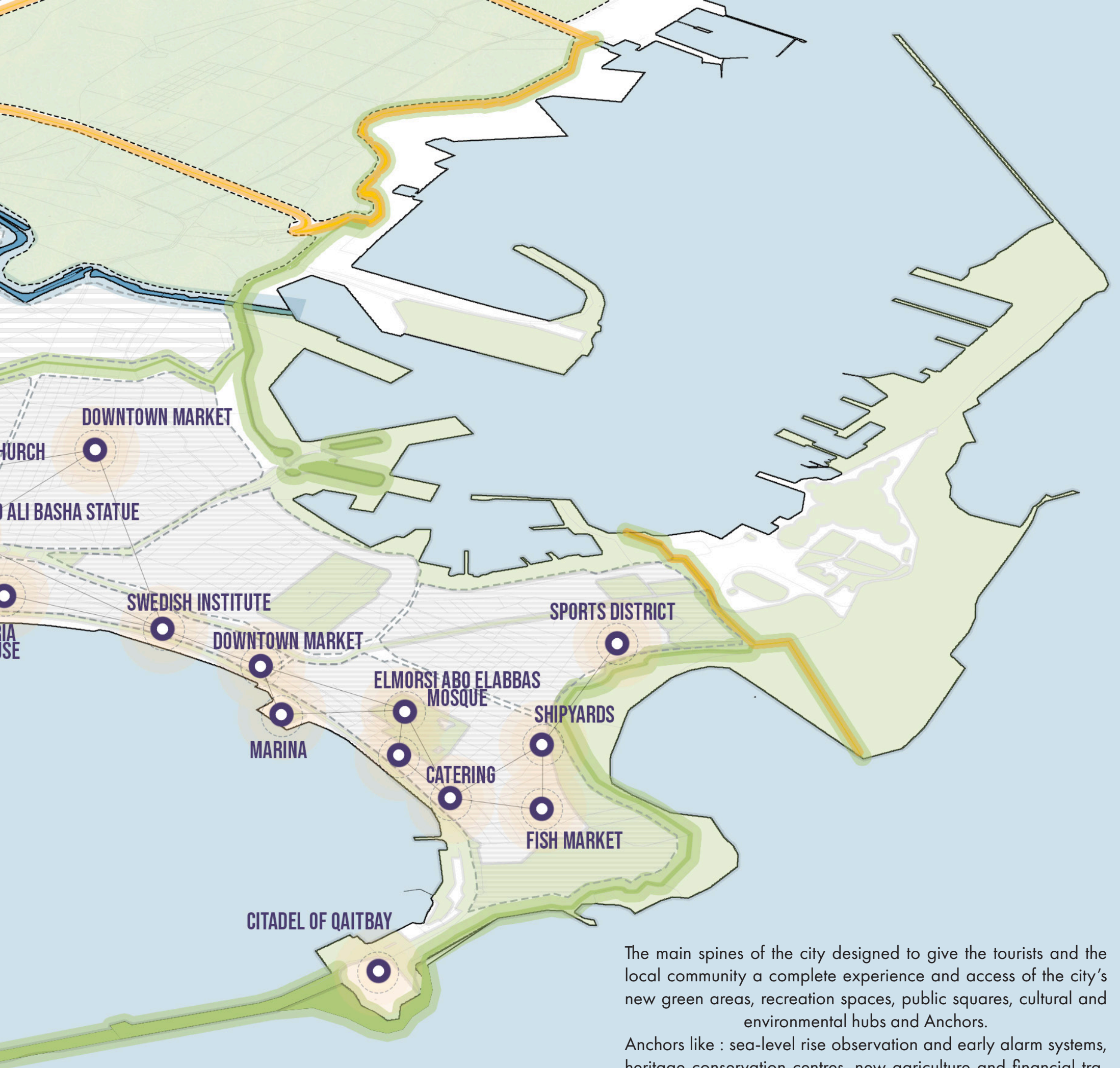


# HYBRID SOLUTIONS

Spines







The main spines of the city designed to give the tourists and the local community a complete experience and access of the city's new green areas, recreation spaces, public squares, cultural and environmental hubs and Anchors.

Anchors like : sea-level rise observation and early alarm systems, heritage conservation centres, new agriculture and financial trading center, new sports center and outdoor facilities.



# PROTECTIC

## Spines

The proposal breaks the area into compartments: Water front; The old city wall located on the south side; and the inner city's spines. Like the hull of a ship, Each compartment comprises a physically separate flood-protection zone, isolated from flooding in the other zones, but each equally a field for integrated social and community planning. The compartments work to protect and enhance the city, but each compartment's proposal is designed to stand on its own.





HERITAGE  
CONSERVATION CENTER

HERITAGE  
CONSERVATION CENTER



FINANCIAL &  
TRADING CENTER



SPORTS CENTER &  
OUTDOOR PUBLIC FACILITIES



TOURIST  
INFORMATION CENTER



TRANSPORTATION HUB



RESEARCH CENTER



SLR OBSERVATION  
& EARLY ALARM SYSTEM













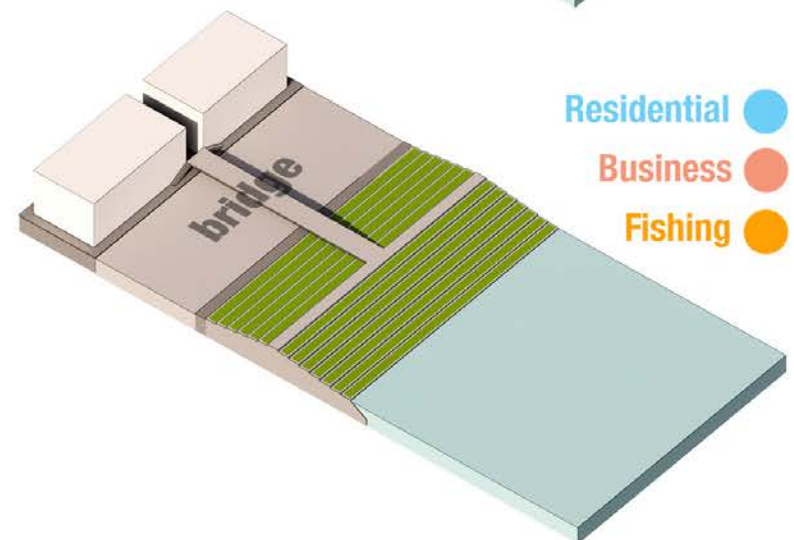
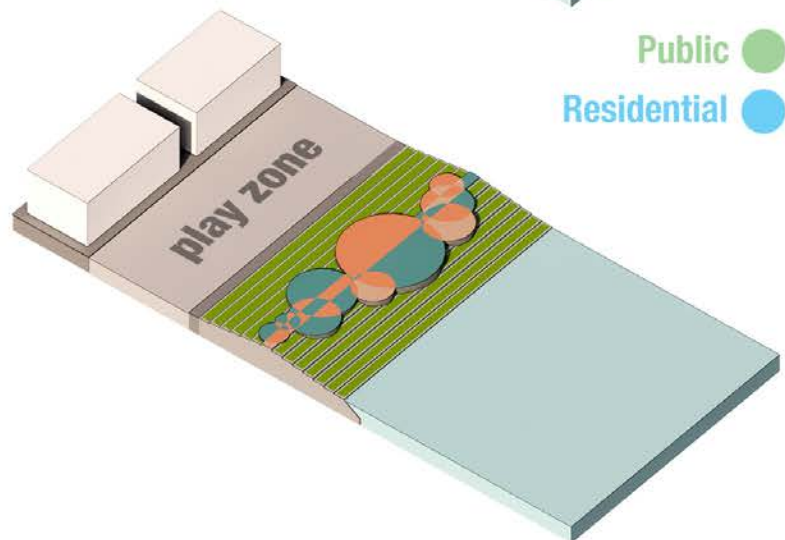
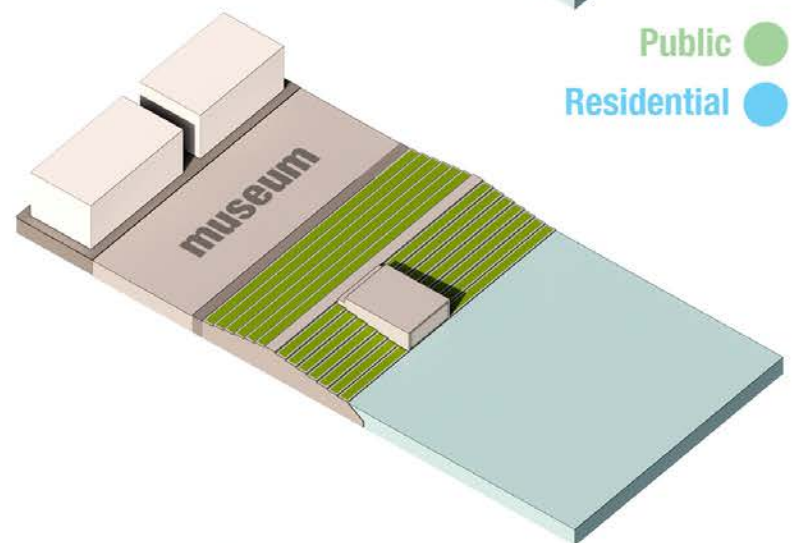
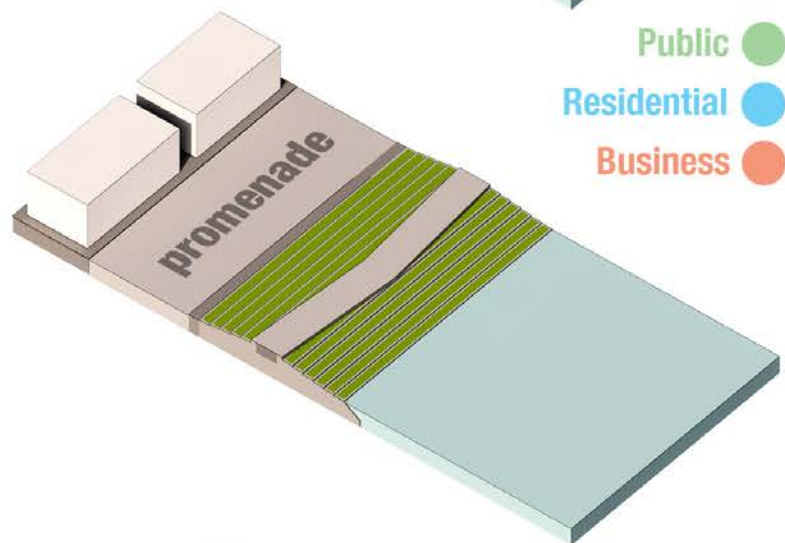
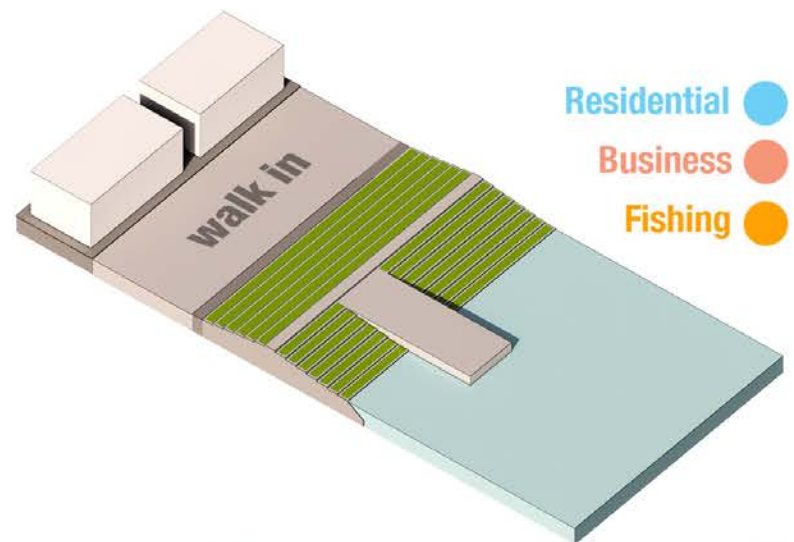
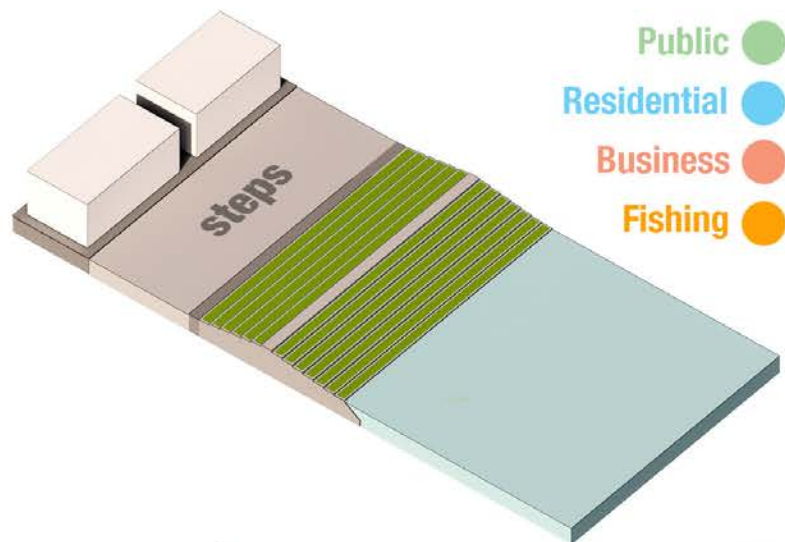


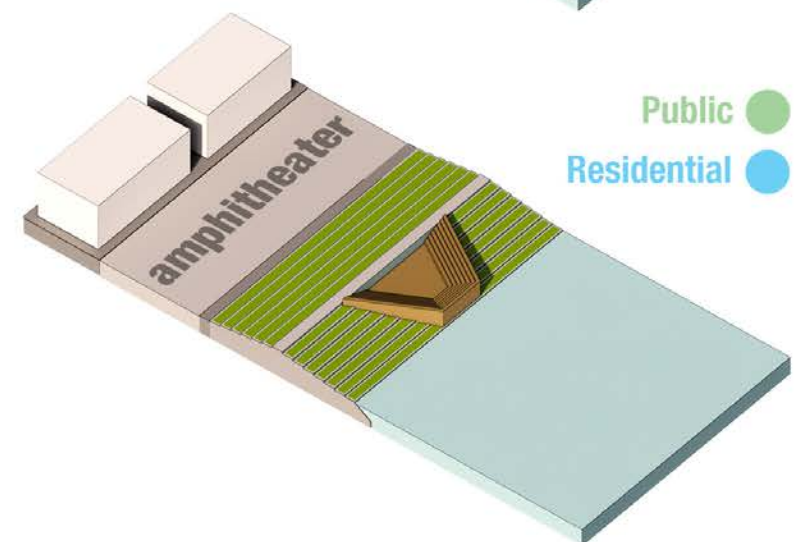
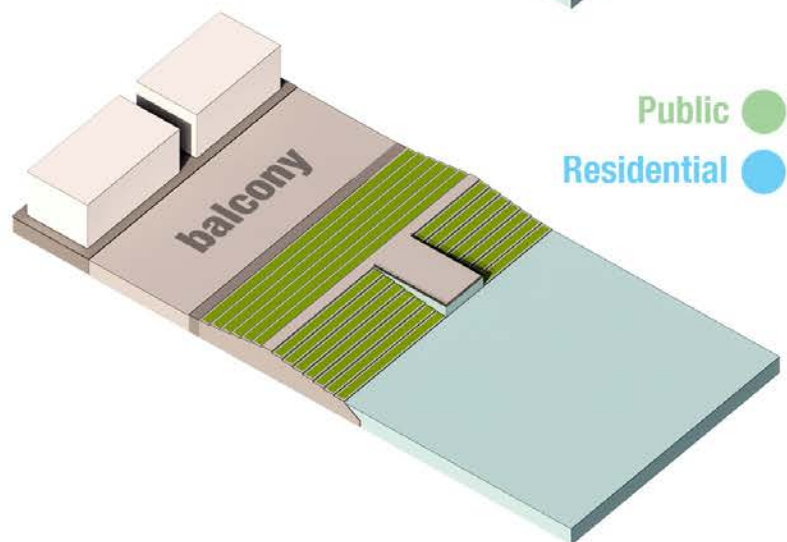
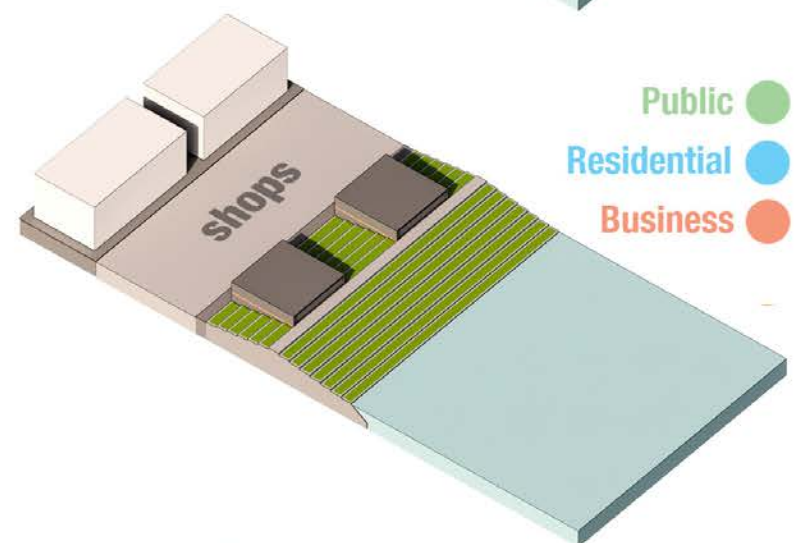
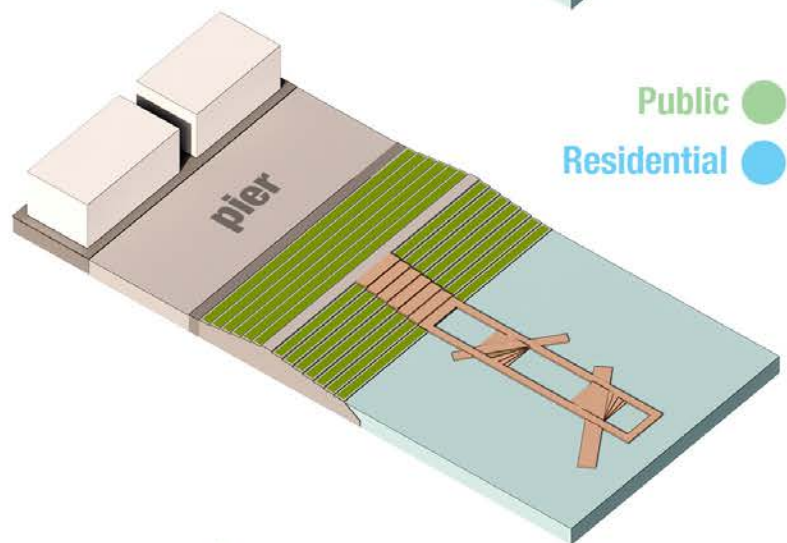
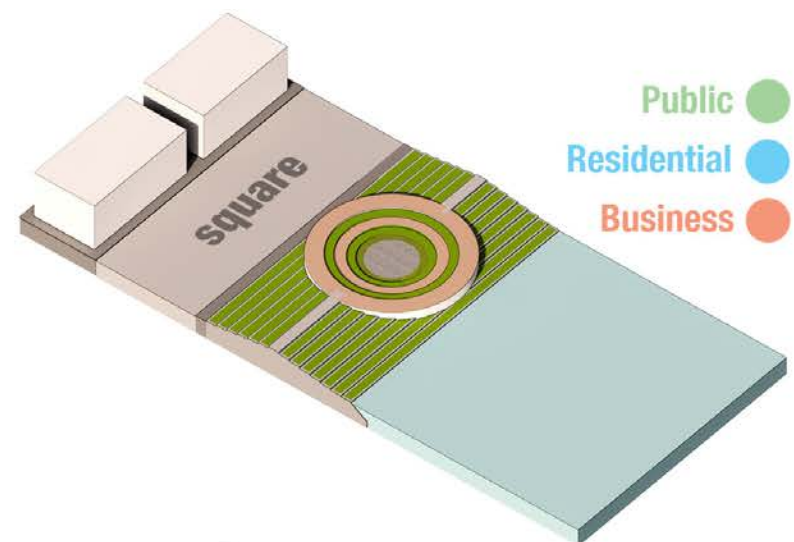
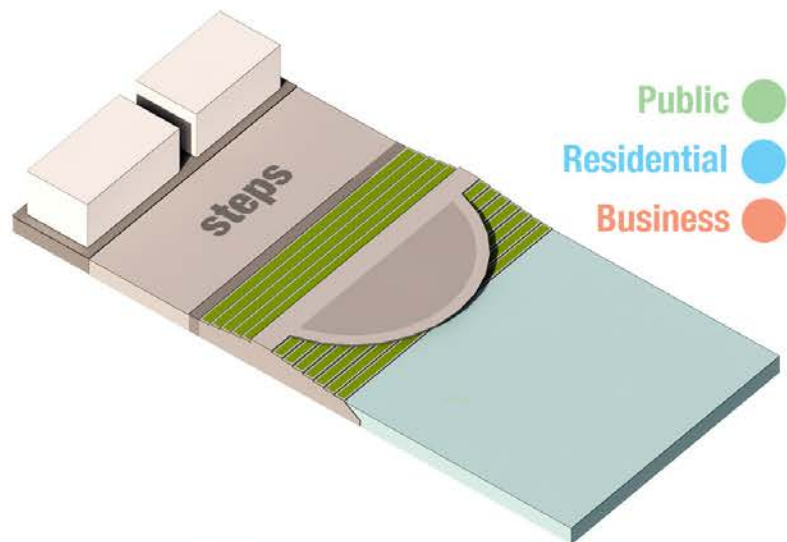




# Library of interventions

## Design







# COMPLETE PROTECTION SYSTEM

## strategic project

The design of the defence is embodied as part of the city functions and activities, whether it is on the inner part of the sea part. A trace step holds benches and seating areas for social activities as hardscape design while integrating landscaping that is derived from the local and vernacular vegetation's as soft scape design.

STRATEGY  
**WATER CAPTURE  
& GREEN TREATMENT**

**35.8 KM**  
TOTAL GREEN WALKING PATHS  
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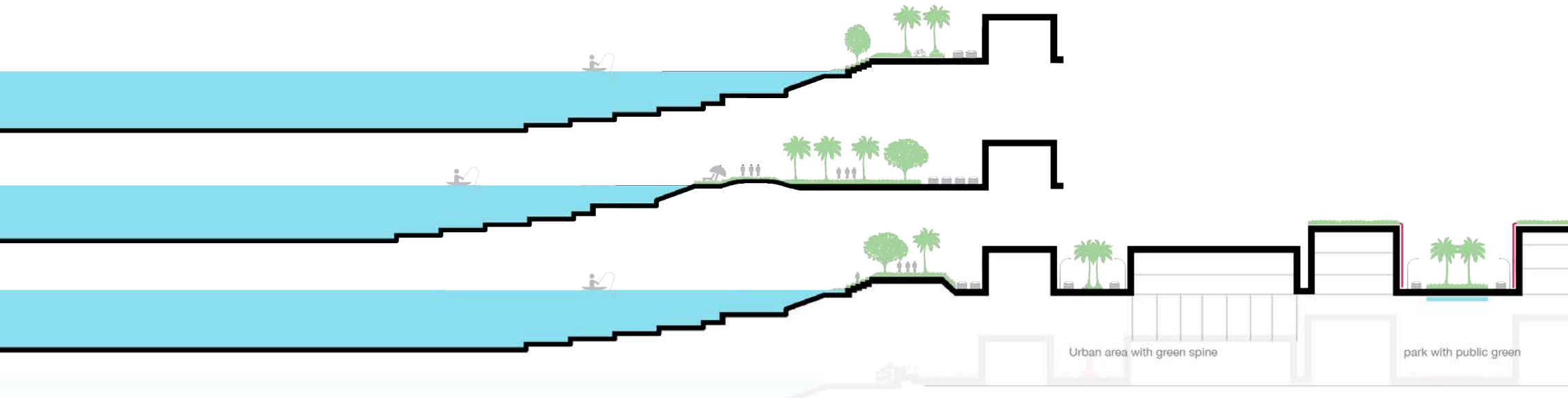
**2**  
**STORE  
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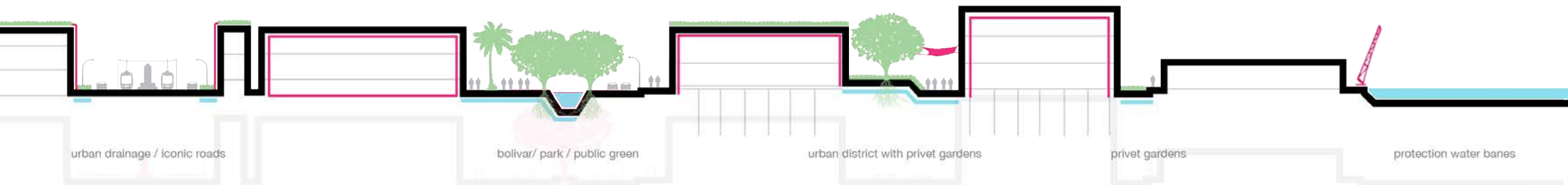
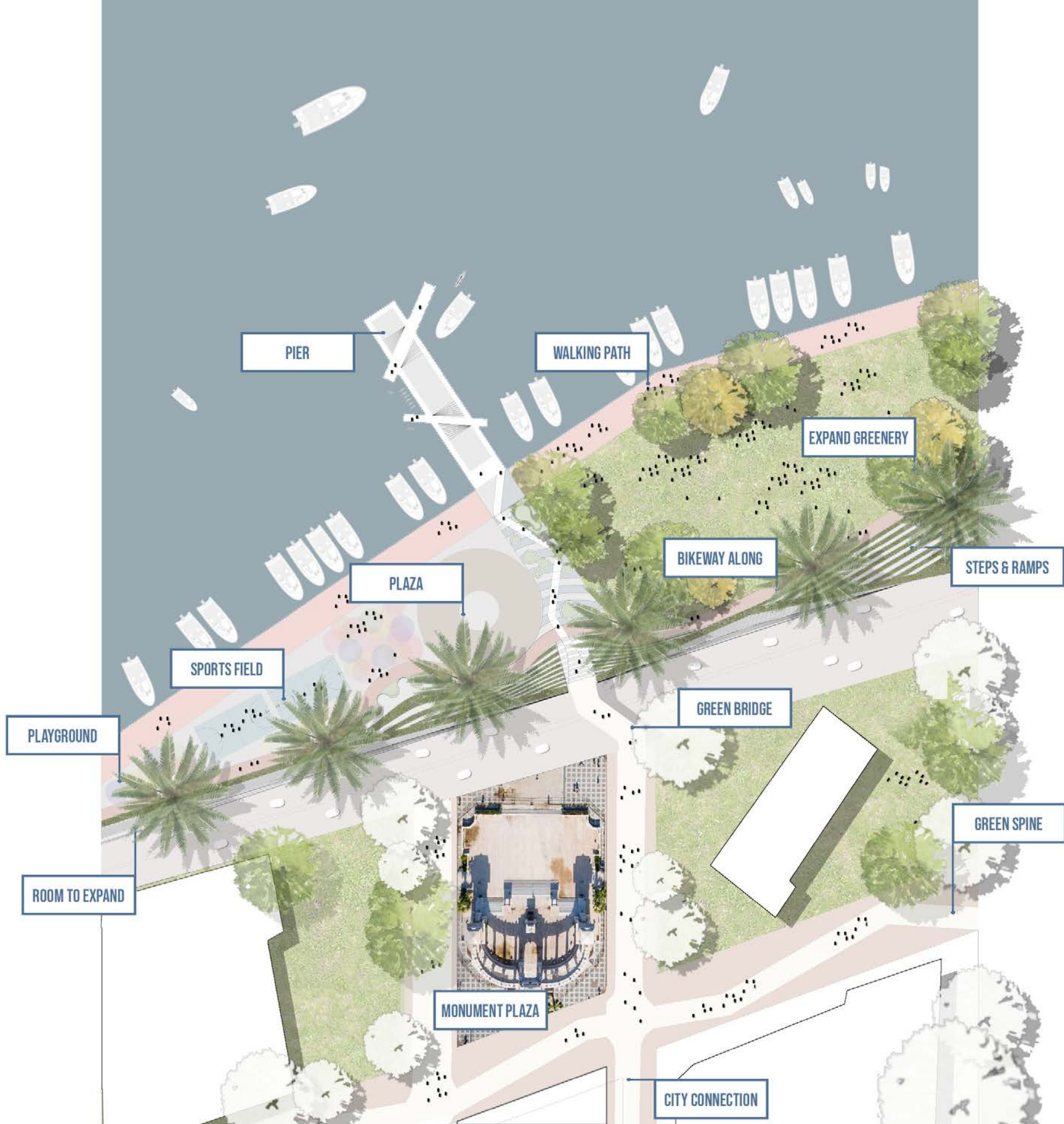
**3**  
**FILTER  
& CLEAN**  
DIVERSE PLANTING FILTERS  
AND CLEAN STORM WATER



**4**  
**RE-USE**  
FILTERED WATER CYCLED  
BACK FOR PARK LANDSCAPE  
IRRIGATION



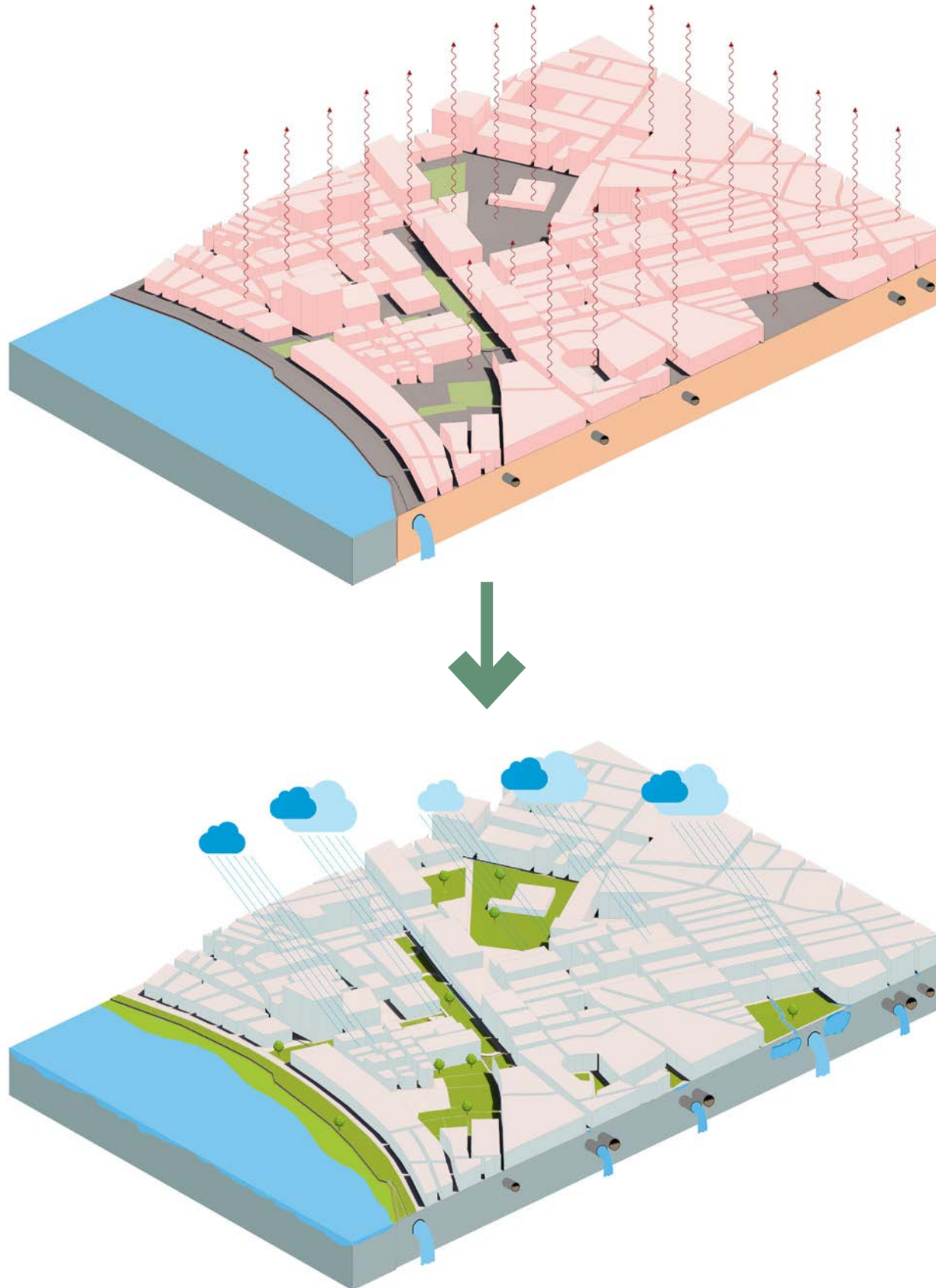




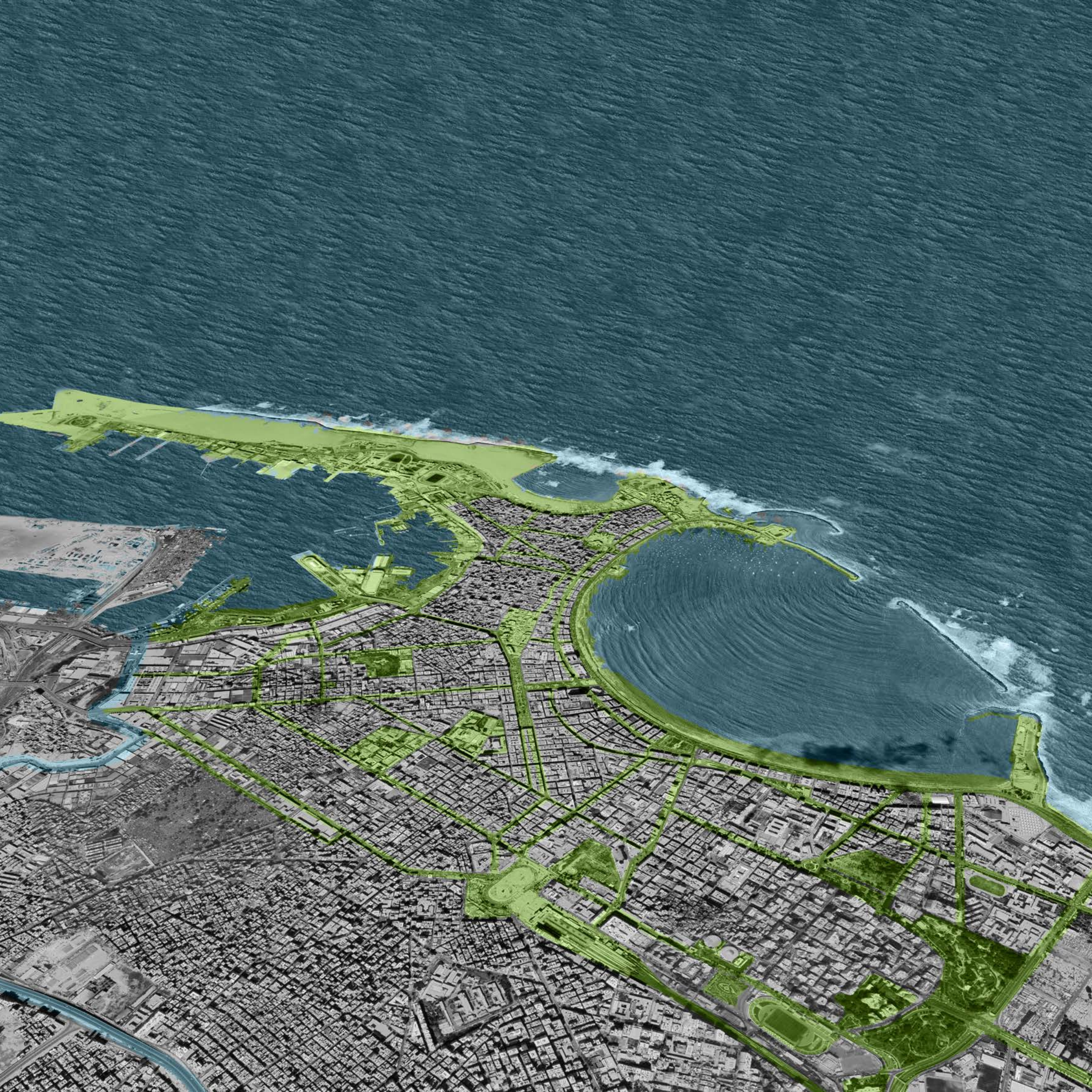


# HEAT ISLAND EFFECT

strategy









PEDESTRIAN WALK

FERRY TERMINAL

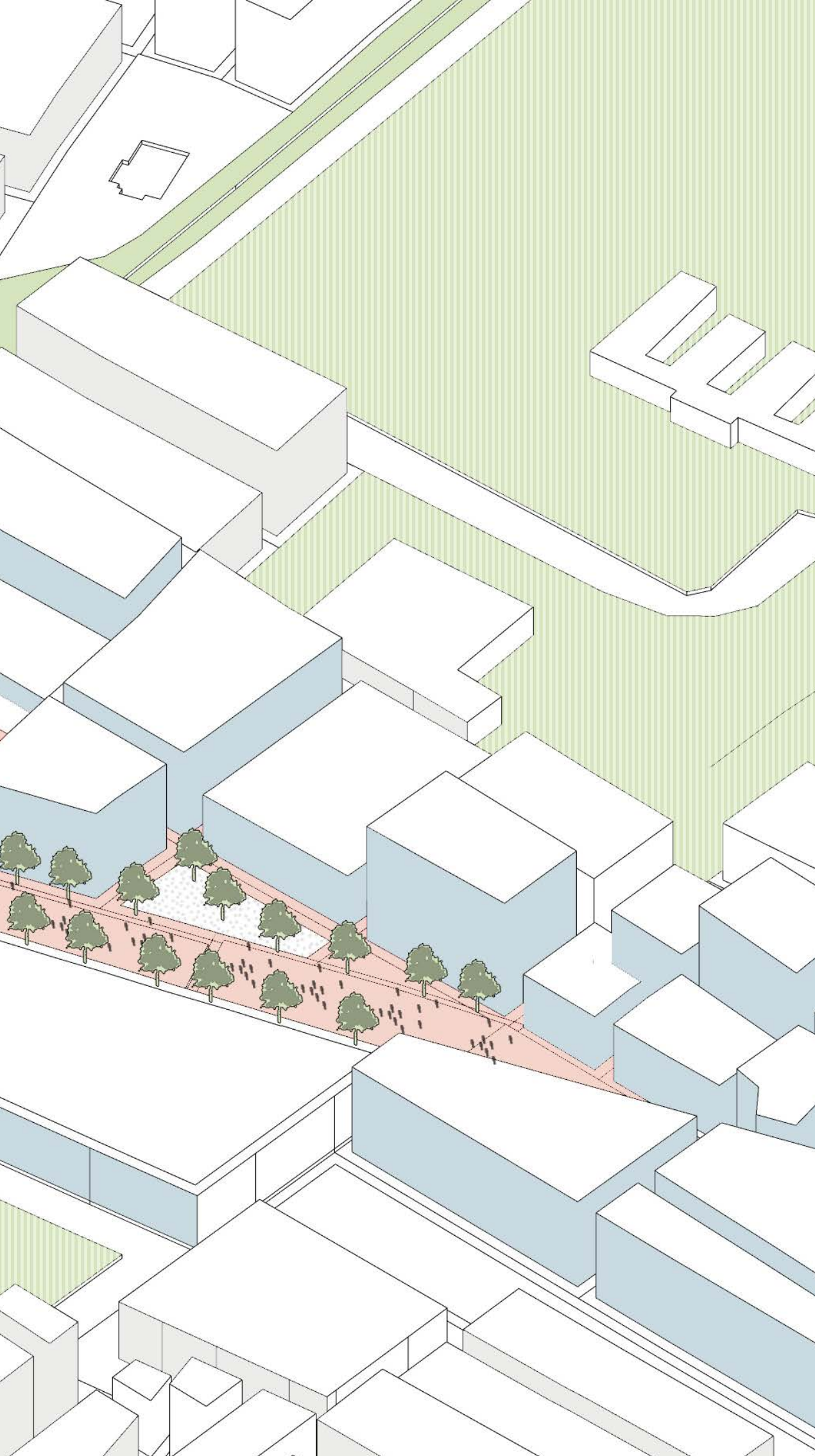
OPEN-AIR CINEMA

PUBLIC BEACH

UNDERWATER CIVIC CENTER







## DESIGN SOLUTIONS

Design solutions for protection in the city should be a hybrid solutions,

Like the hull of a ship, each Hub can provide a flood-protection zone, providing separate opportunities for integrated social and community planning processes for each.

Each Hub comprises a physically separate flood-protection zone, isolated from flooding in the other zones, but each equally a field for integrated social and community planning.

The Hubs work to protect and enhance the city, but each compartment's proposal is designed to stand on its own.  
*disclaimer: this is not a chronological timeline. It's a step guideline that can be affected by external forces, which could tamper with the chronological process. Therefore it should be considered that sometimes you have to go back in this model to achieve the change that is desired.*



# Library of interventions

## Design

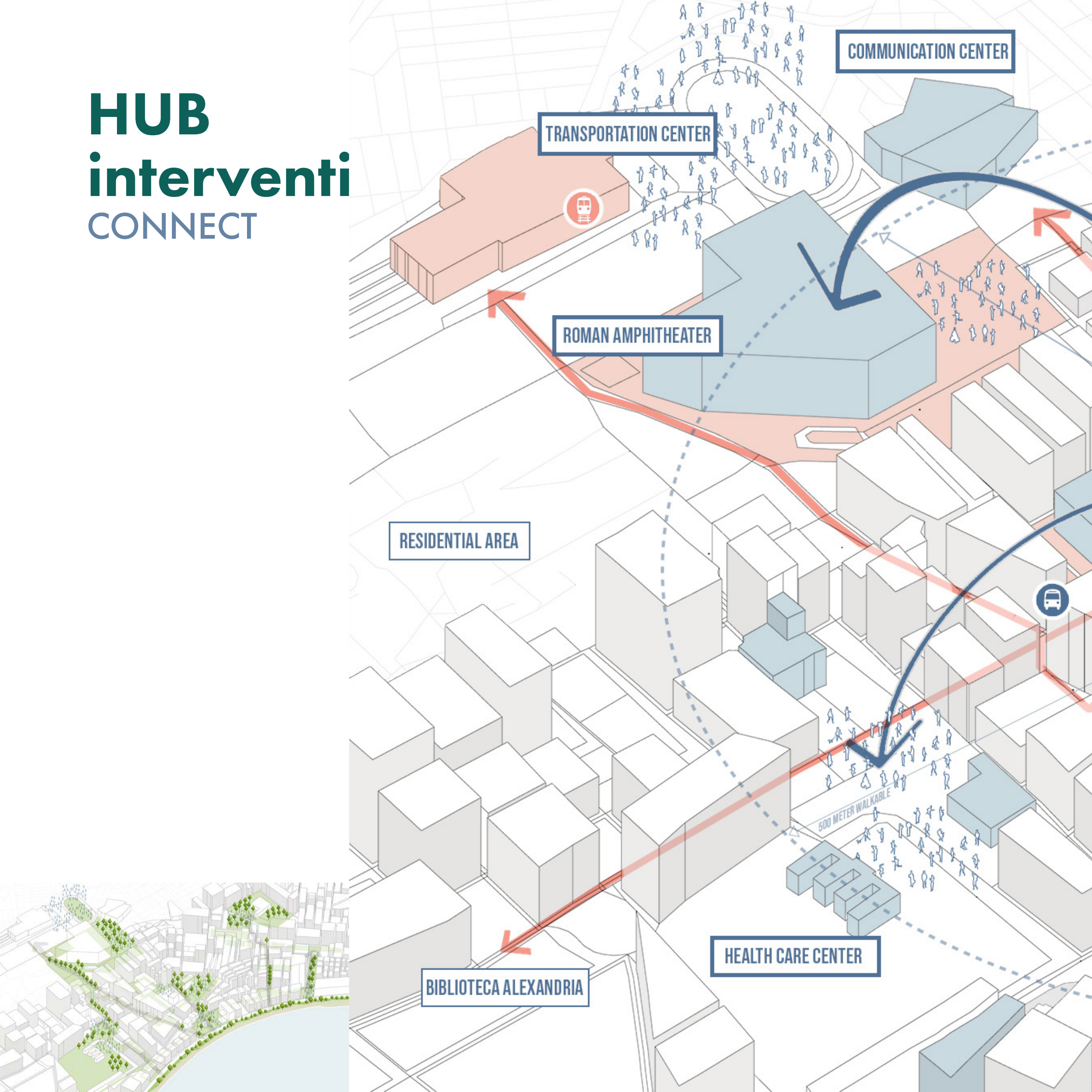








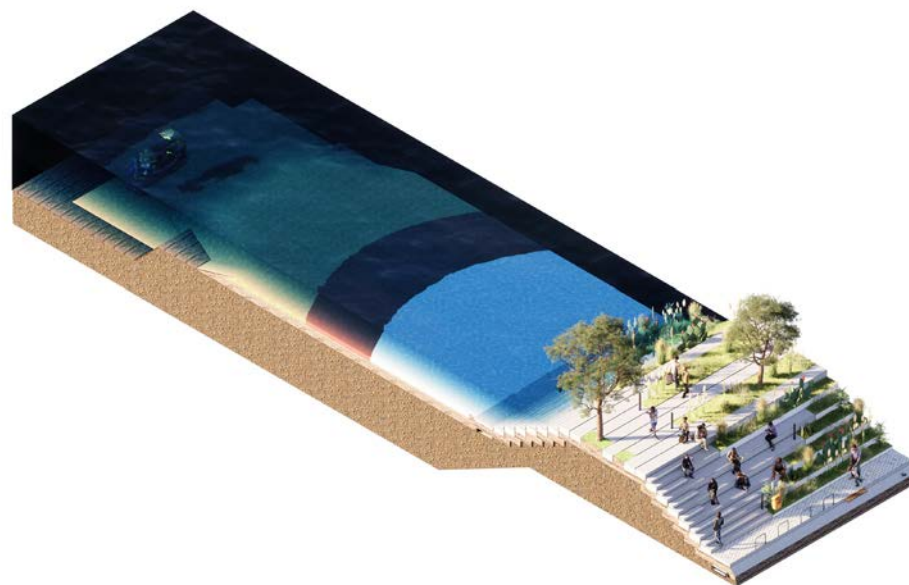
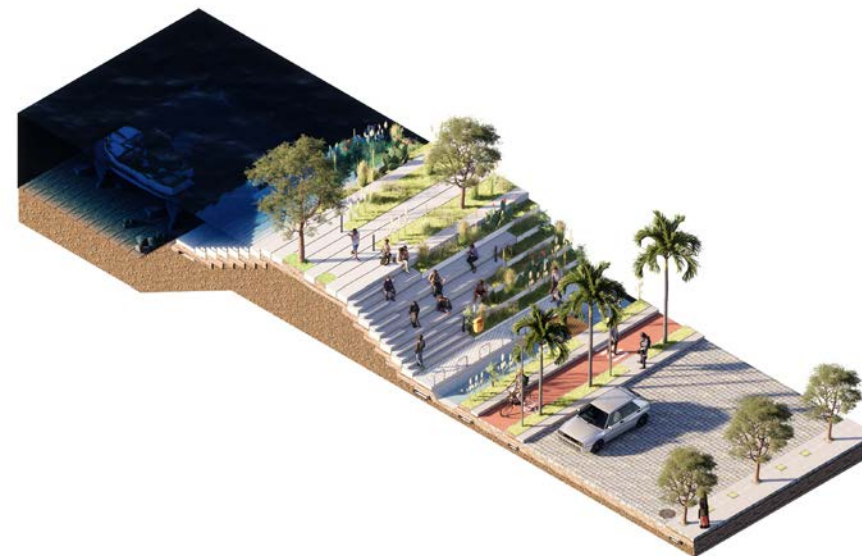
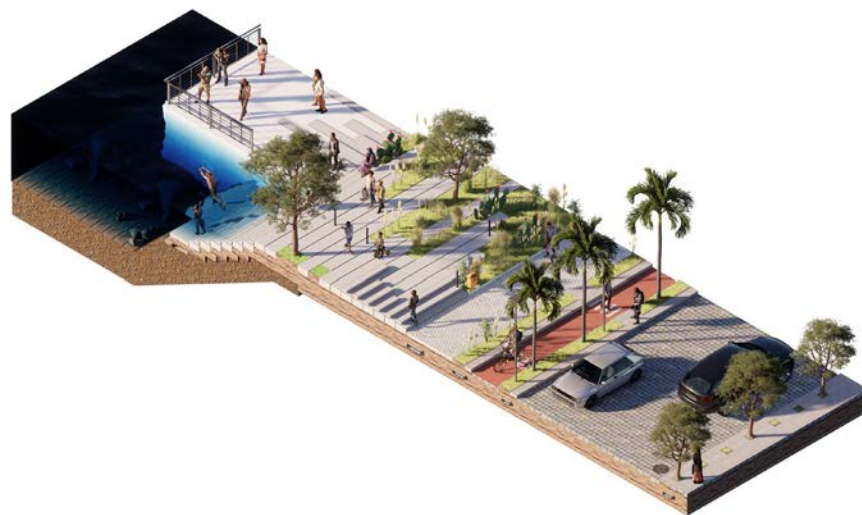
# HUB interventi CONNECT





[illegible][illegible]









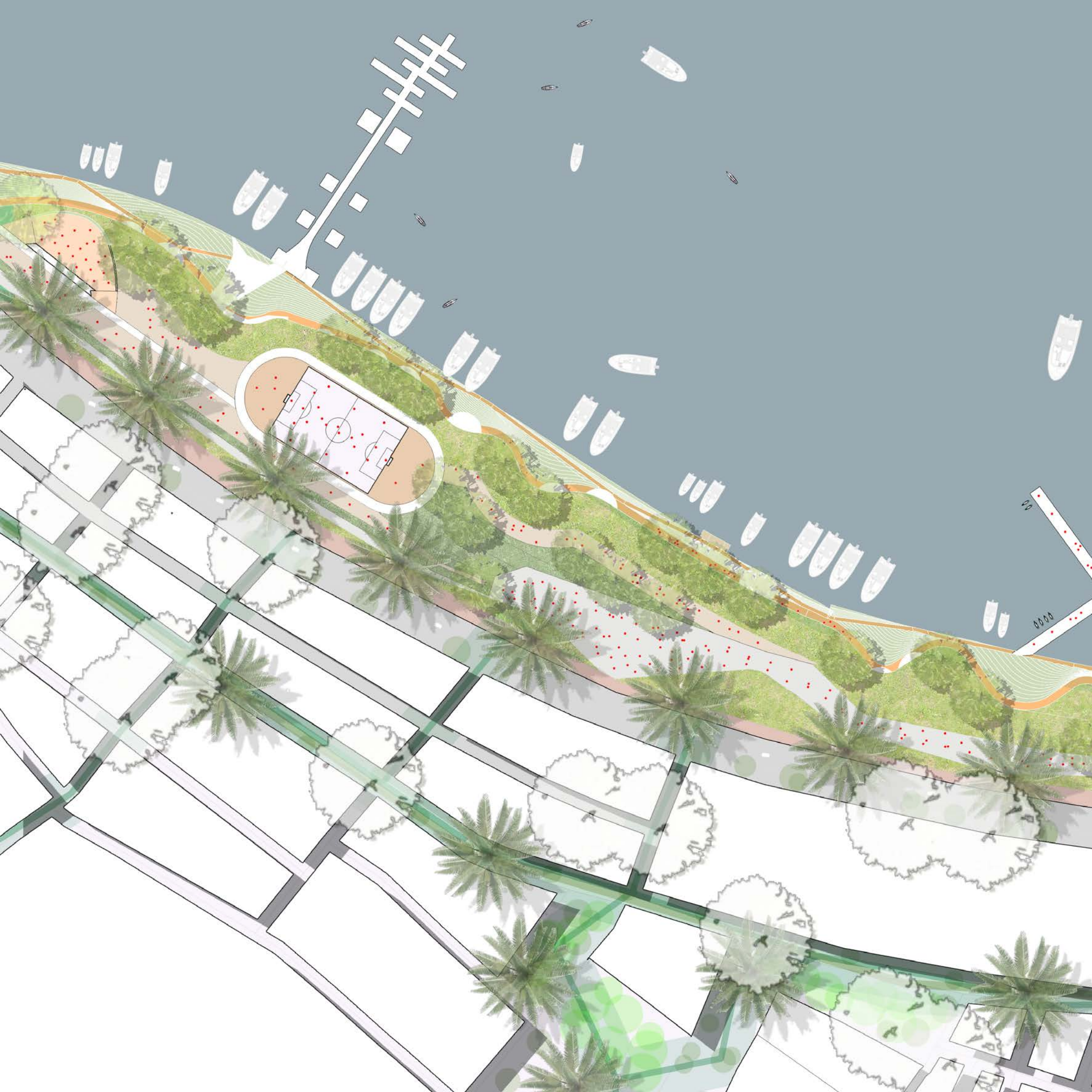








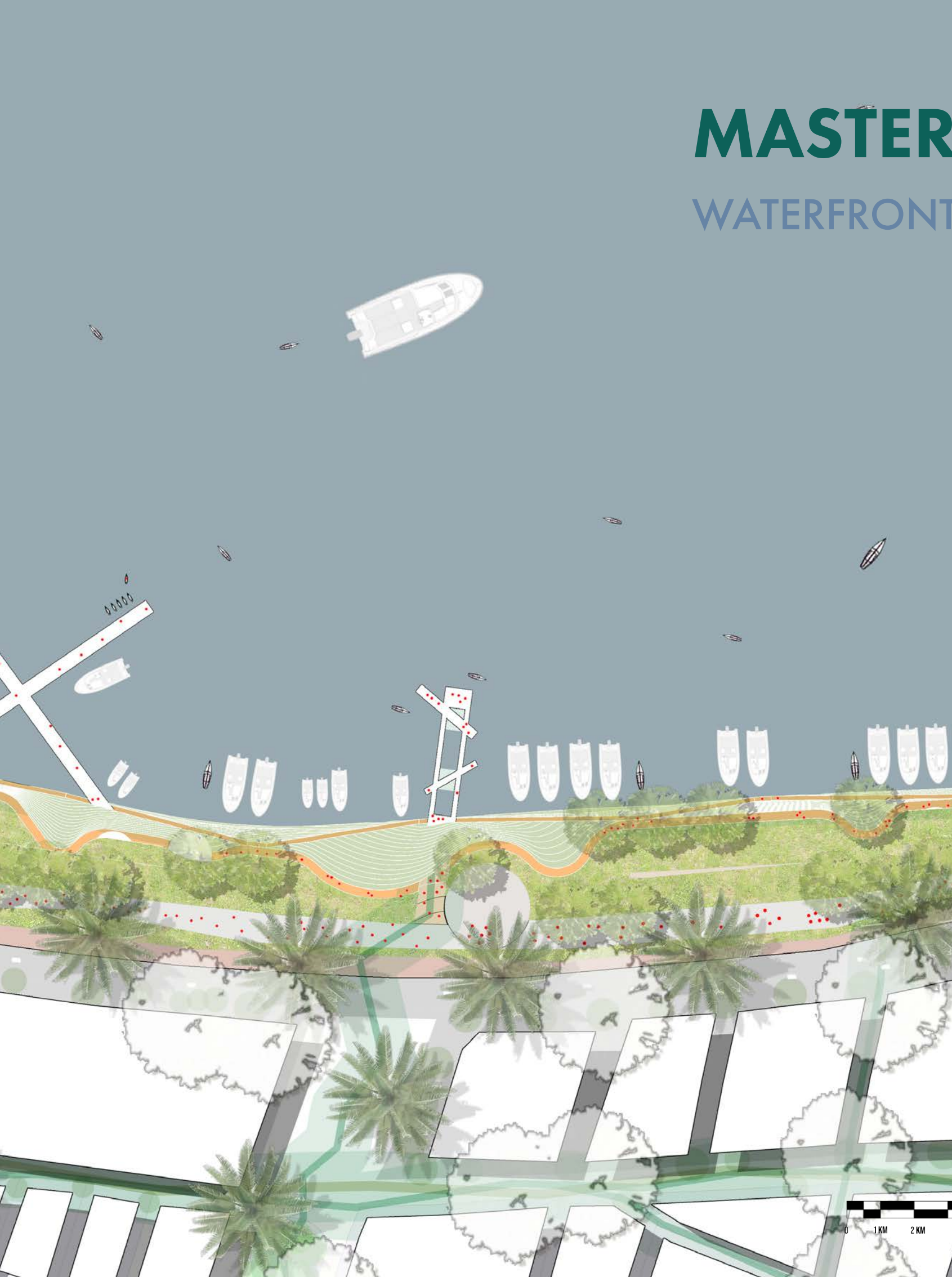






# MASTERPLAN 1

## WATERFRONT

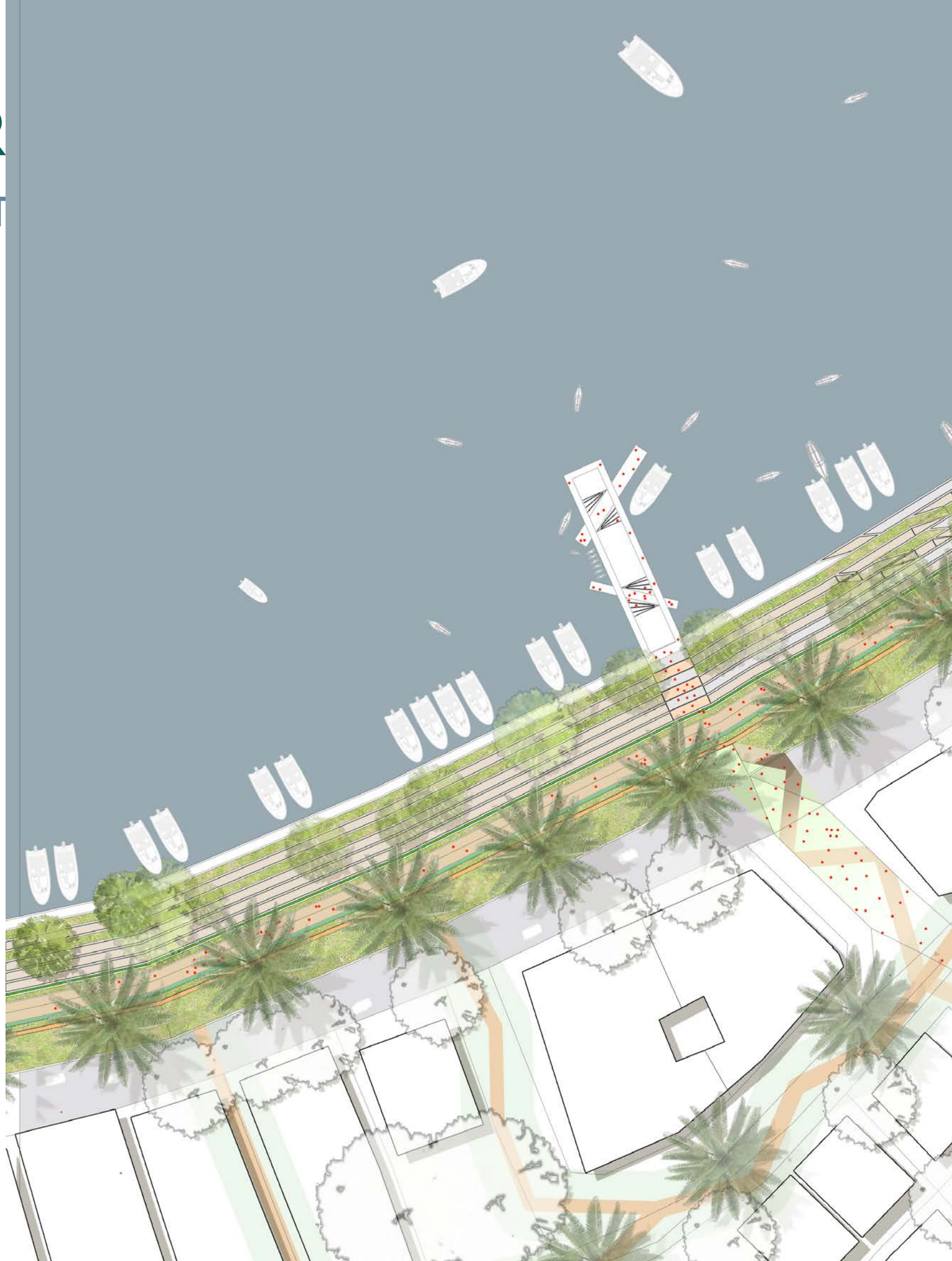


0 1 KM 2 KM 5 KM 10 KM





# MASTER WATERFRONT









# FISHING IDENTITY REGENERATE





# REGENERATING ALEXANDRIA'S IDENTITY

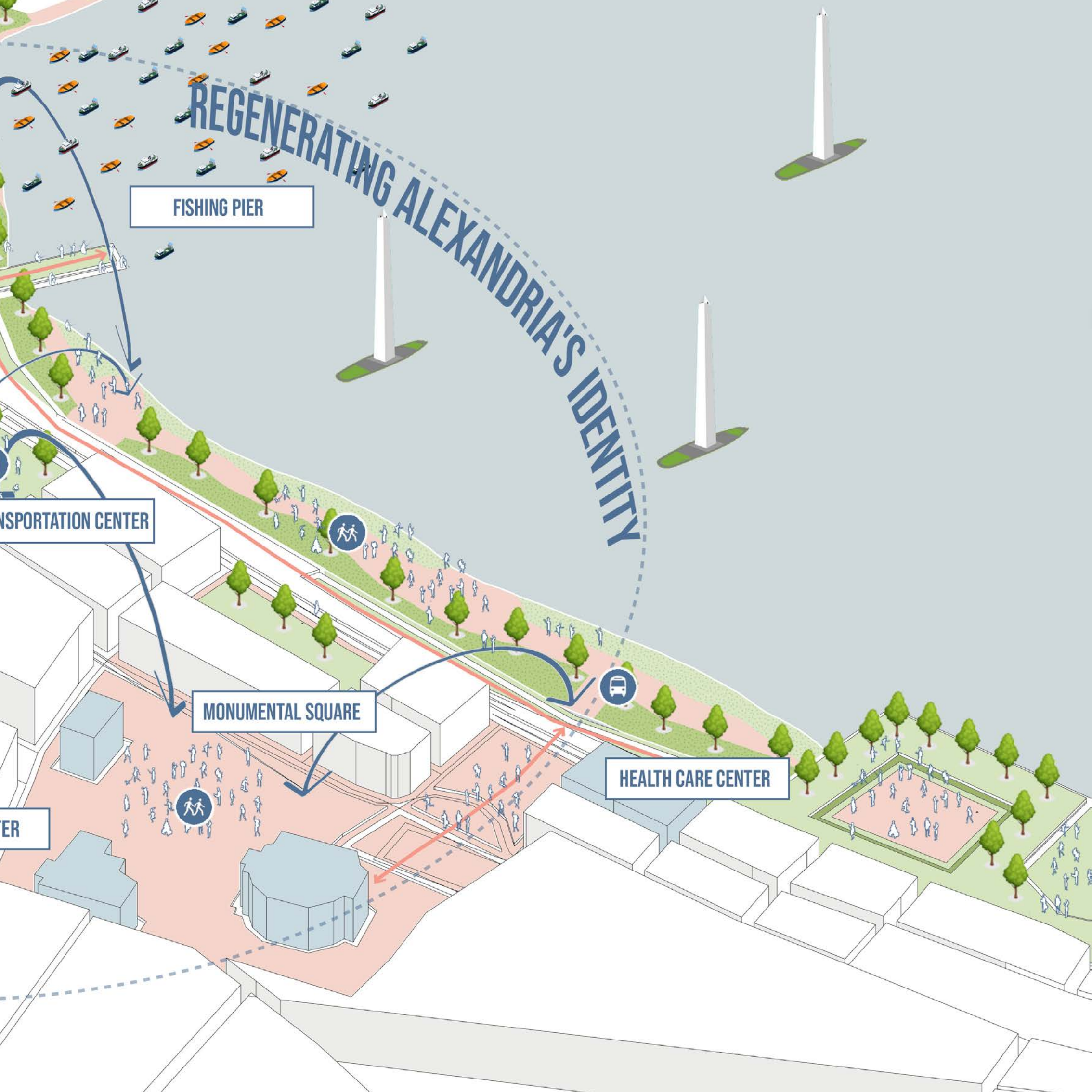
FISHING PIER

TRANSPORTATION CENTER

MONUMENTAL SQUARE

HEALTH CARE CENTER

ER







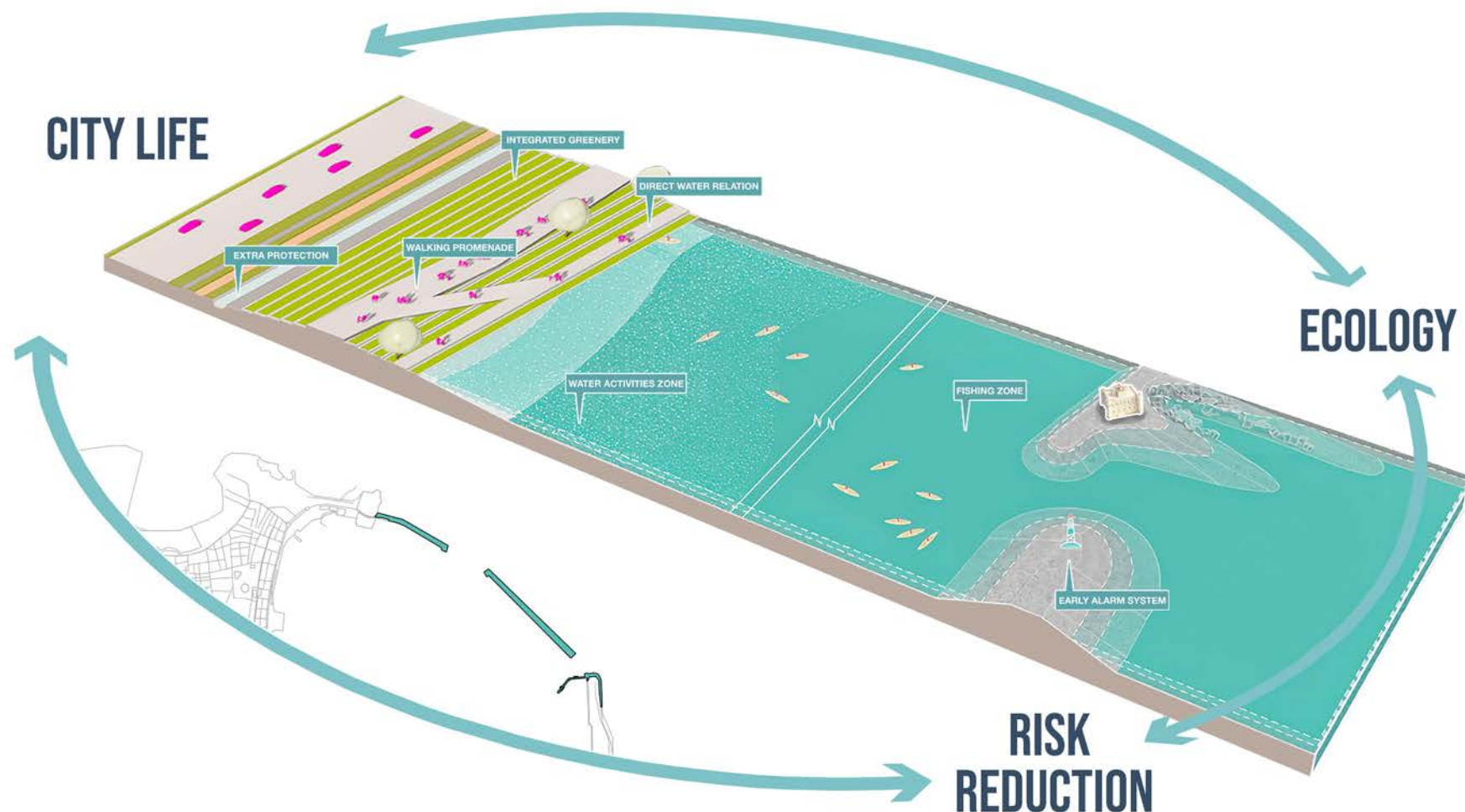






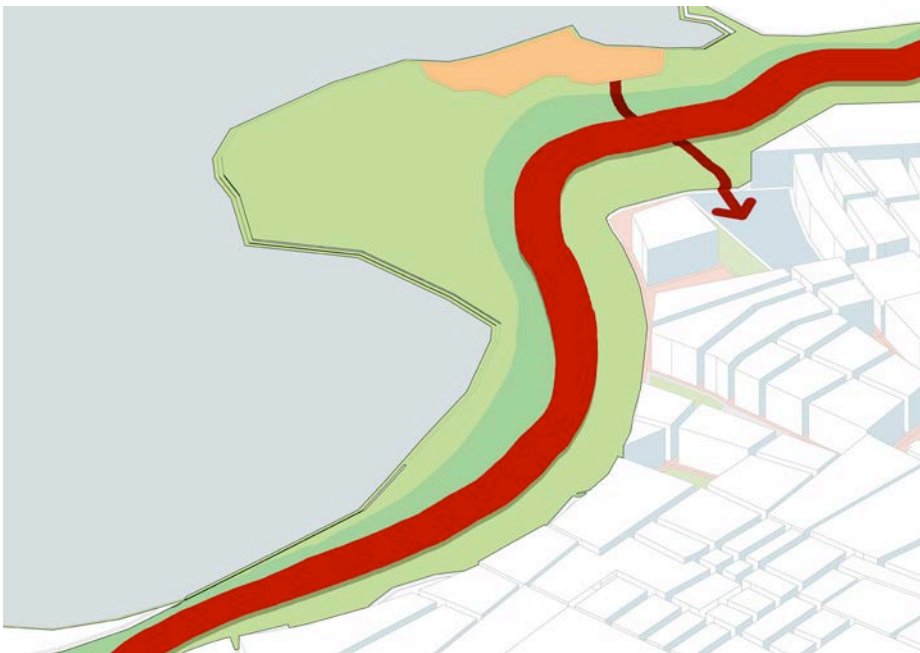
# EASING MEASUREMENTS PRESERVE

On the peak of the gulf of Alexandria, a smart alarm system will be introduced for an early alert of any unwanted natural threat. This will be through introducing a radar that works as a mitigator to anticipate the risks. The peak of the gulf could be closed at any time, yet I suggest leaving it open to ensure the ecological and biodiversity of the general marine life of the gulf and never touch the micro-climates unless there is a real threat.

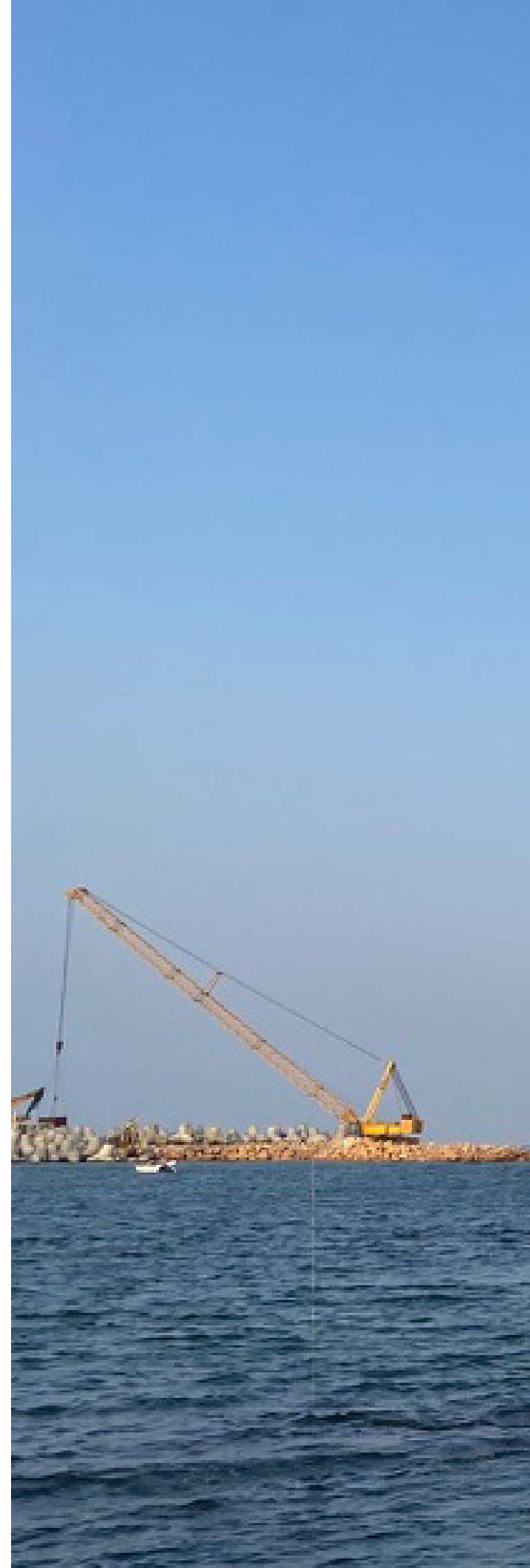




# WEST SIDE PARK





















# LANDSCAPING

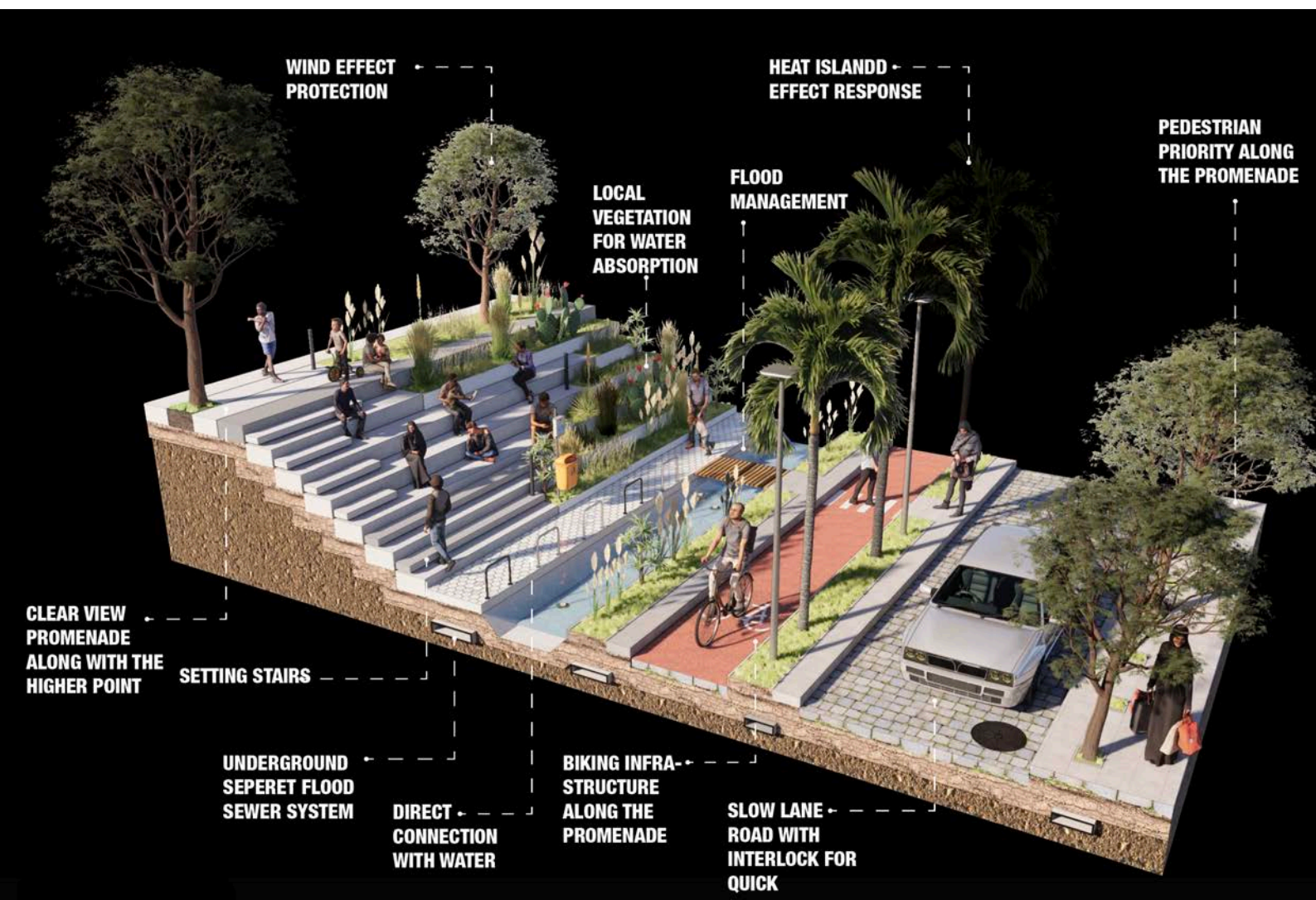
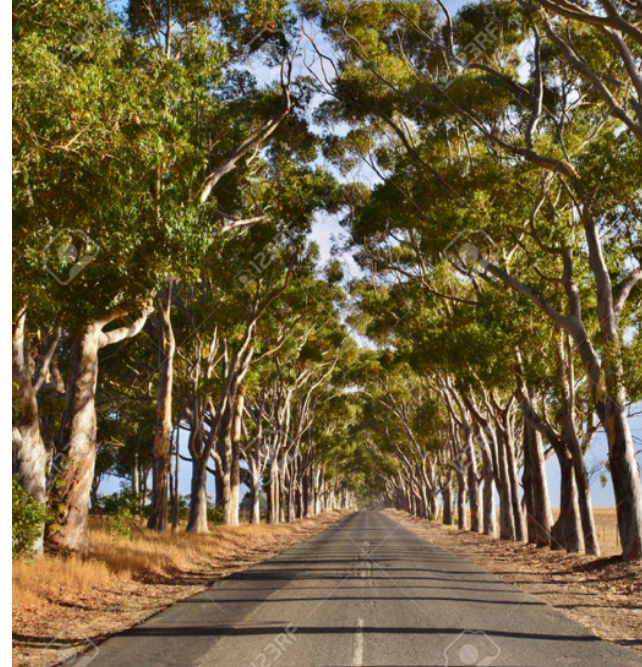
## strategy

While rejuvenating the vernacular landscaping by reintroducing vegetations such as the papyrus plant which represents a historical value. Moreover, the selection of vegetation is based on a resilient and sustainable plantation that is based on local & Mediterranean products that do not need high maintenance and irrigation.

Most of the landscaping is usable and productive which the stakeholders could share and use as public equity, for instance, palm trees produce dates, while the Eucalyptus tree works as an air purifier, and creates lots of shadows, and it grows fast without lots of irrigation, and finally, its leaves are utilized for medical purposes. Furthermore, the orange trees provide an ethical value while it provides an astonishing aroma when blooms and fruits that are accessible to all.

Also, the Papyrus plant is an old Egyptian plant that the ancient people used it produces the first known paper in history. Its presence is a reminder for Alexandria as a world hub of knowledge with its biggest library in the ancient world.

Other plantations such as Aloe-vera and cactus are easy to access to vernacular medicine, yet they are attractive and doesn't need any future to maintain ace and grow and multiply naturally.

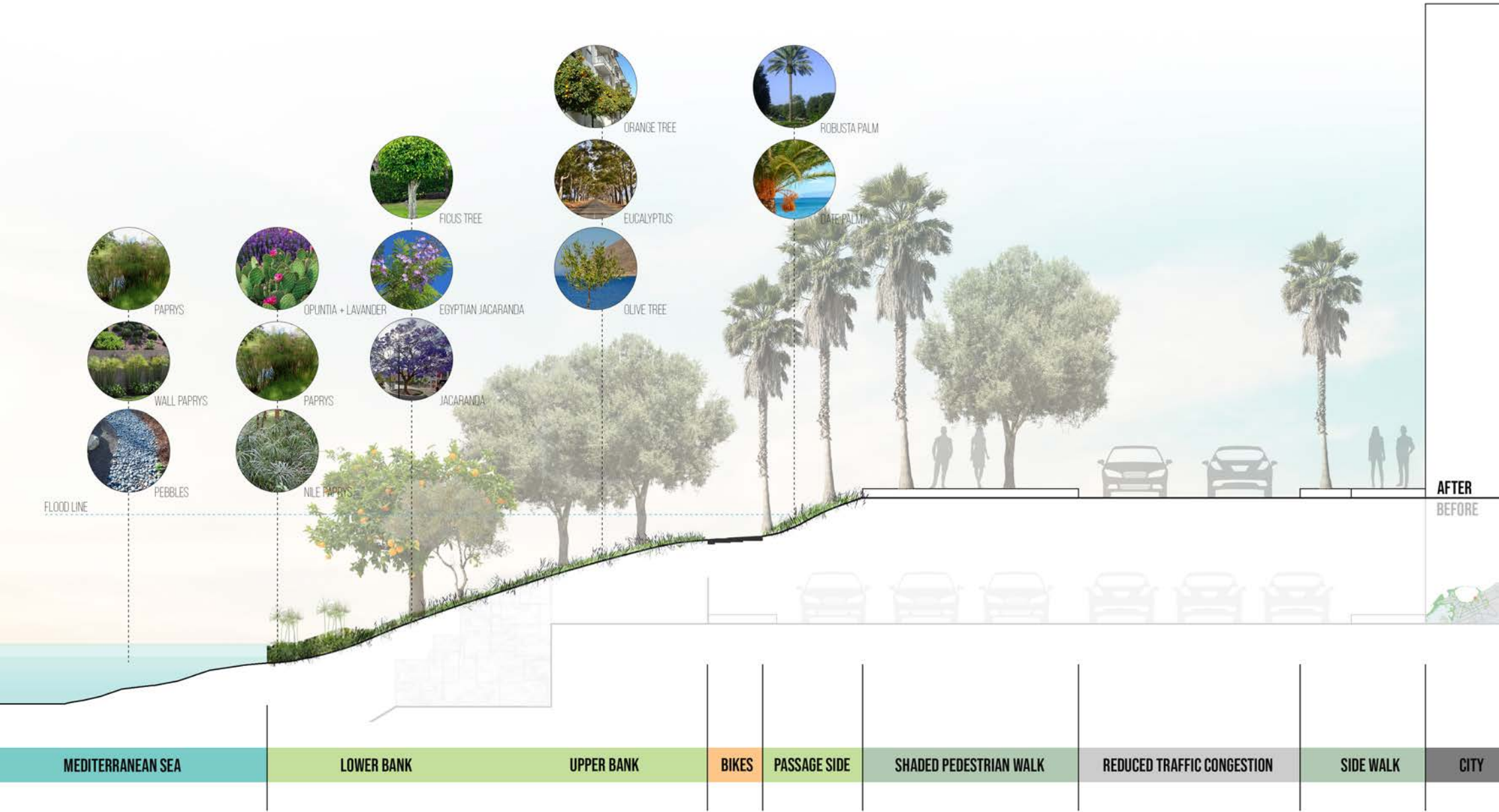








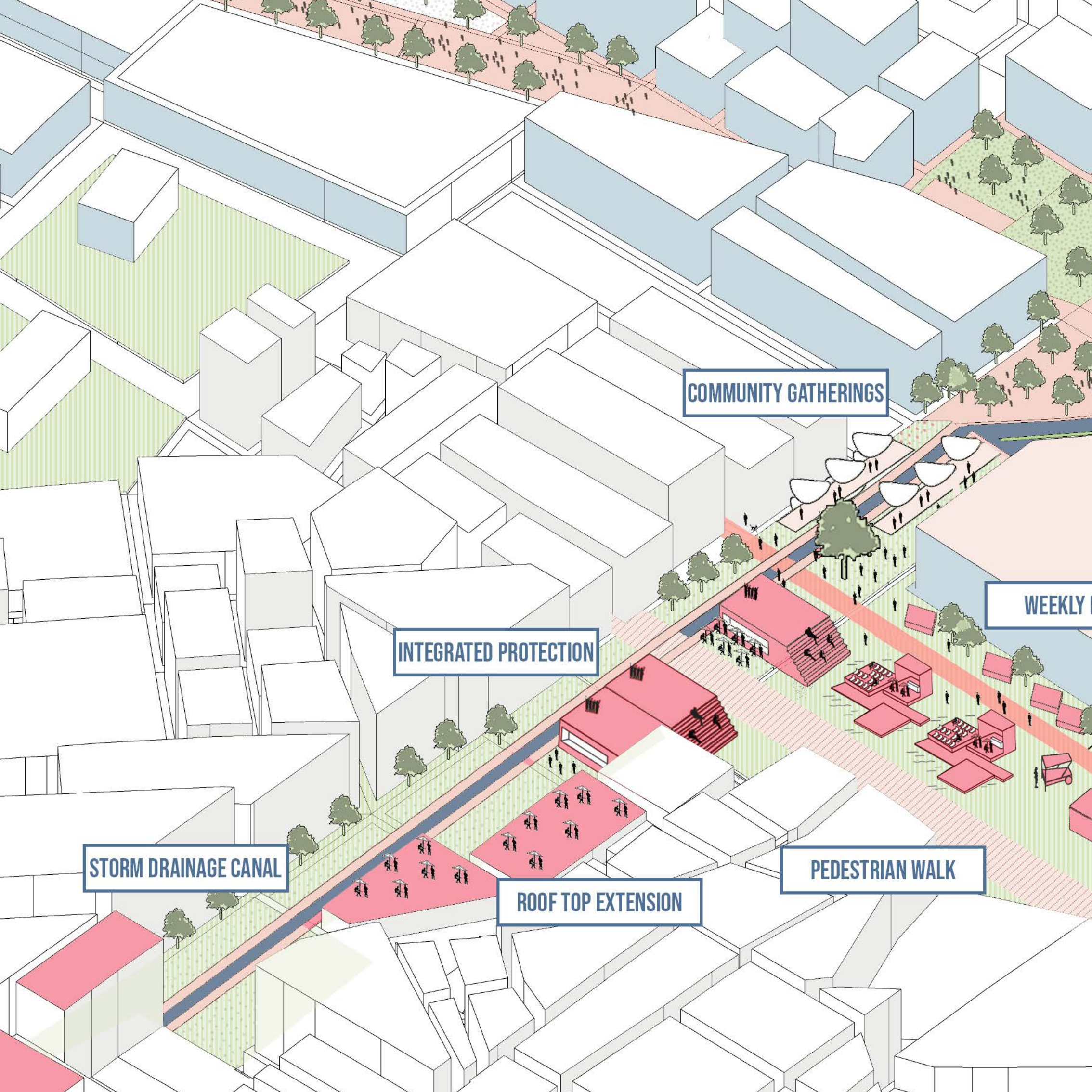
# LANDSCAPING











COMMUNITY GATHERINGS

WEEKLY MARKET

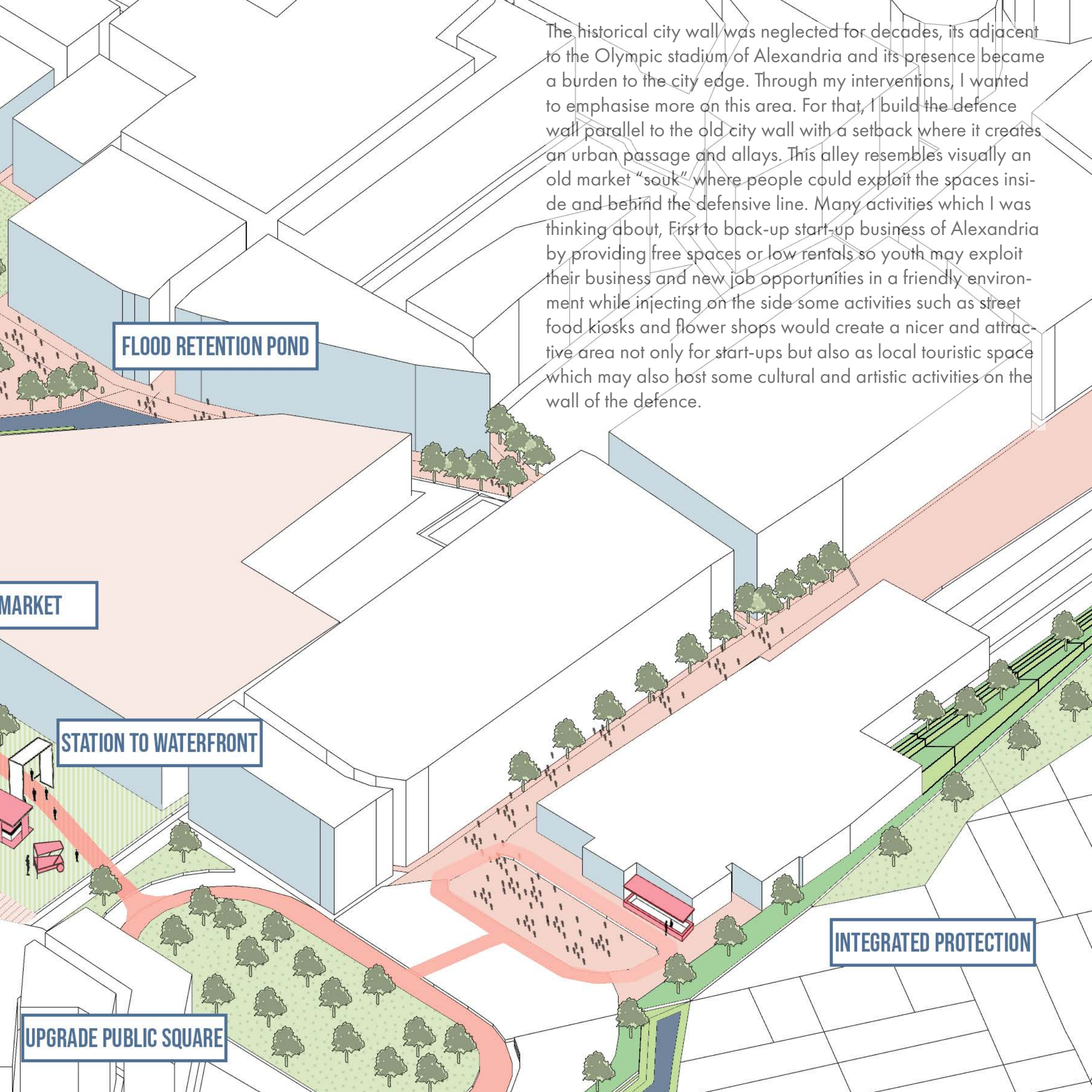
INTEGRATED PROTECTION

STORM DRAINAGE CANAL

ROOF TOP EXTENSION

PEDESTRIAN WALK





The historical city wall was neglected for decades, its adjacent to the Olympic stadium of Alexandria and its presence became a burden to the city edge. Through my interventions, I wanted to emphasise more on this area. For that, I build the defence wall parallel to the old city wall with a setback where it creates an urban passage and allays. This alley resembles visually an old market "souk" where people could exploit the spaces inside and behind the defensive line. Many activities which I was thinking about, First to back-up start-up business of Alexandria by providing free spaces or low rentals so youth may exploit their business and new job opportunities in a friendly environment while injecting on the side some activities such as street food kiosks and flower shops would create a nicer and attractive area not only for start-ups but also as local touristic space which may also host some cultural and artistic activities on the wall of the defence.

**FLOOD RETENTION POND**

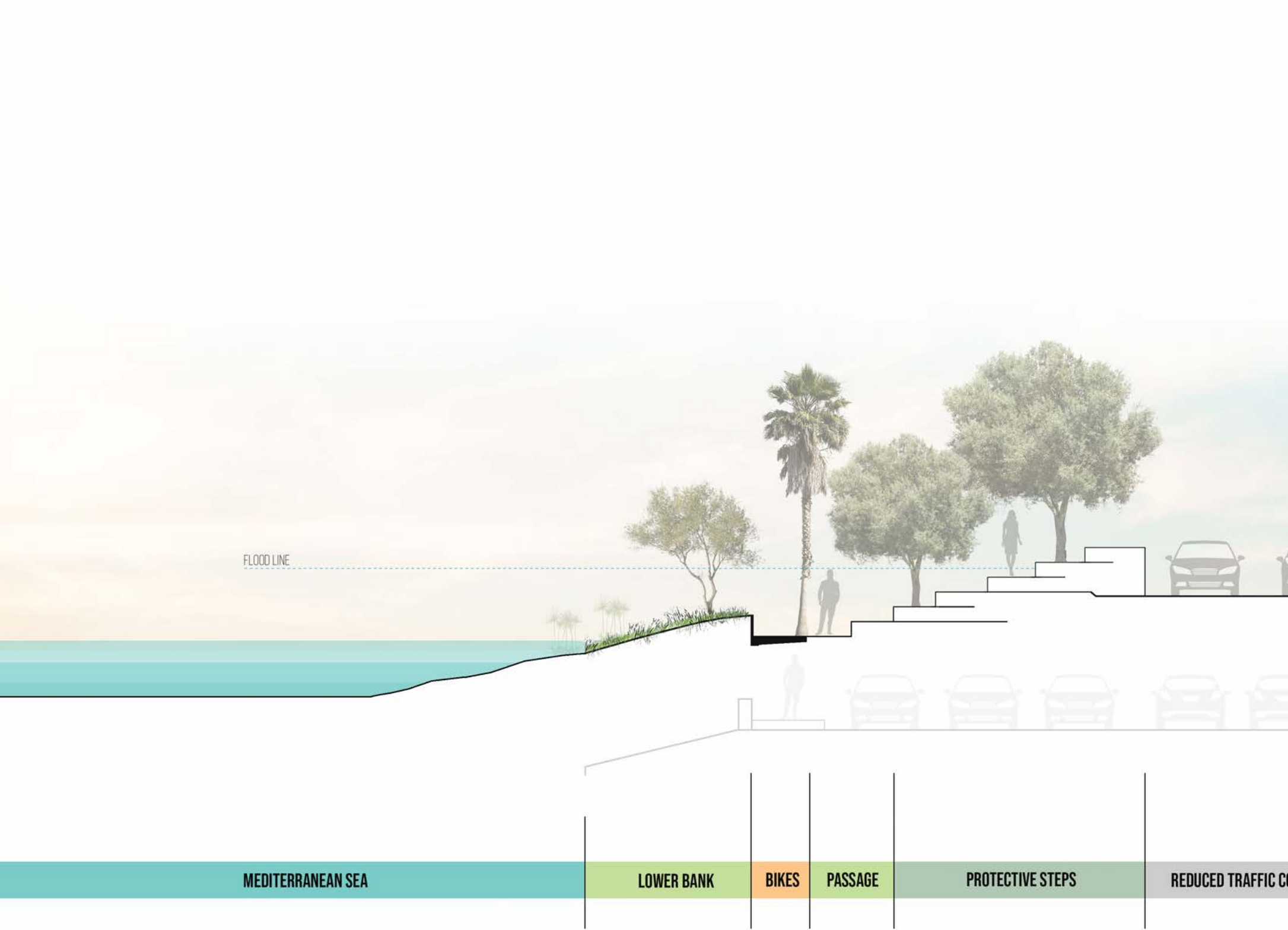
**MARKET**

**STATION TO WATERFRONT**

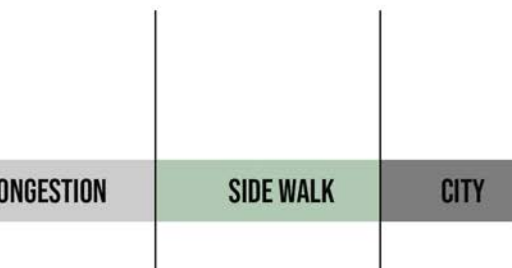
**UPGRADE PUBLIC SQUARE**

**INTEGRATED PROTECTION**





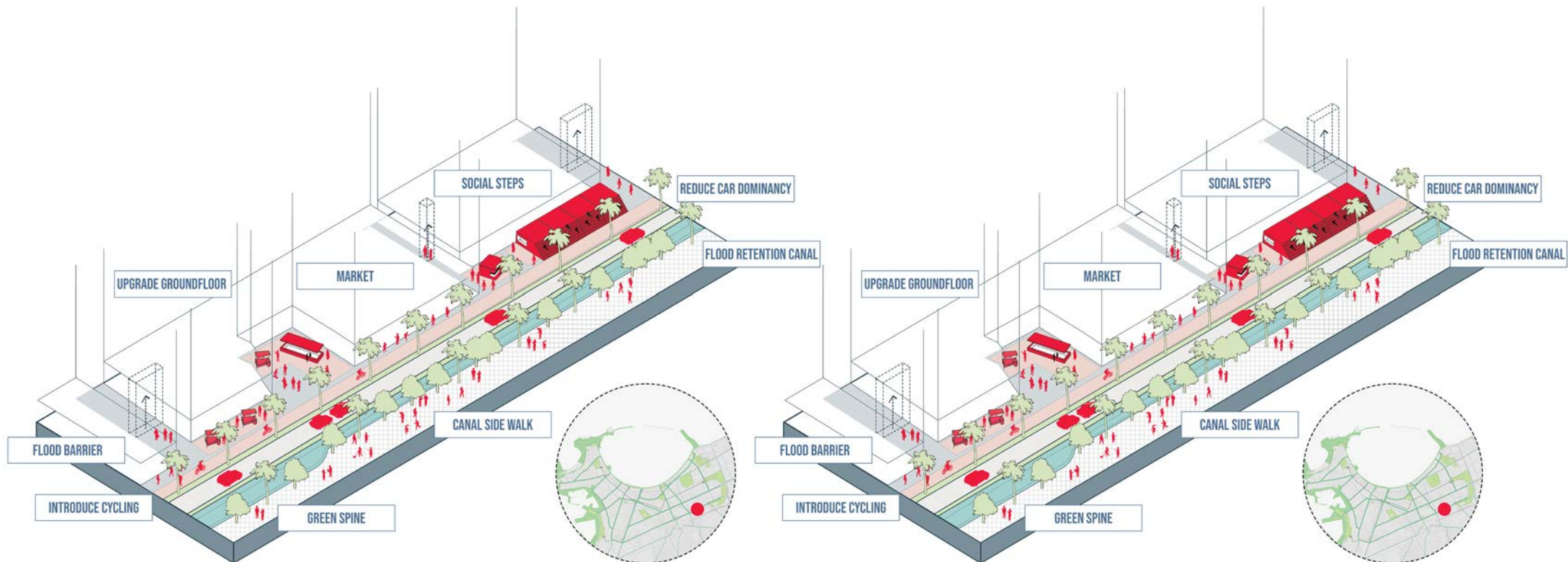






# Strategic INTERVENTION

strategy

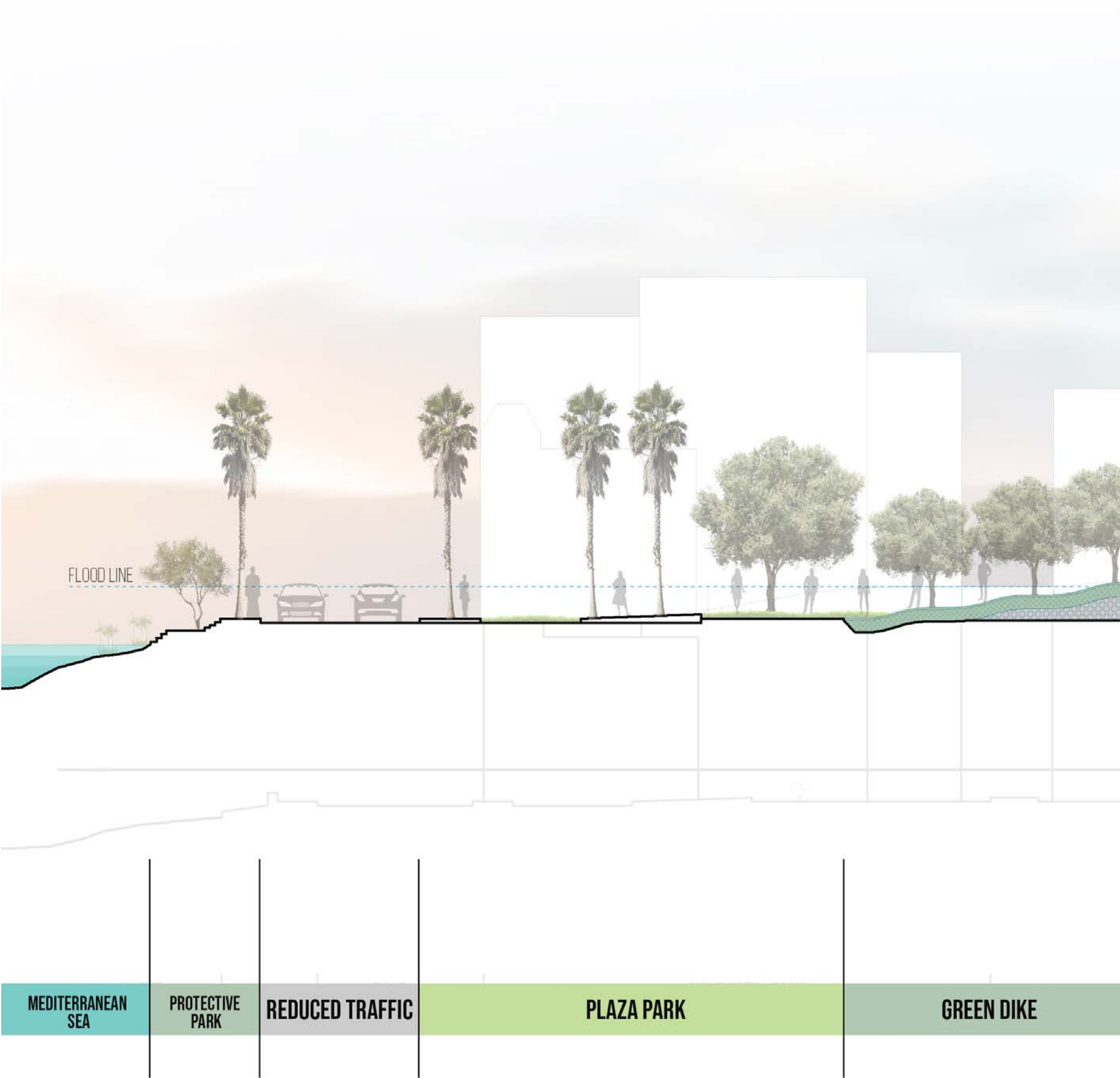








# HERITAGE PROTECTION







BIKES	ABU ELABBAS PLAZA	STREET	ELMORSI ABUELABBAS MOSQUE	CITY





To back-up start-up businesses in Alexandria by freeing up spaces, or through providing low rentals, so that the youth may exploit their businesses and new job opportunities in a friendly environment, while also working on some side activities such as: street food kiosks or flower shops.

This would create a nicer and a more attractive area, not only for start-ups, but also as a local touristic space, which may also host some cultural and artistic activities.









# PROTECTION SYSTEM

## Detailing







BEFORE

AFTER

TOP SOIL

CLAY COVER

COMPACTED EMBANKMENT

RECYCLED ASPHALT BIKE LANE

CONCRETE BLOCK

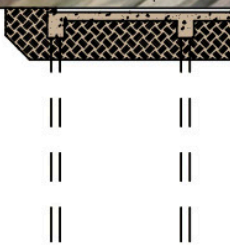
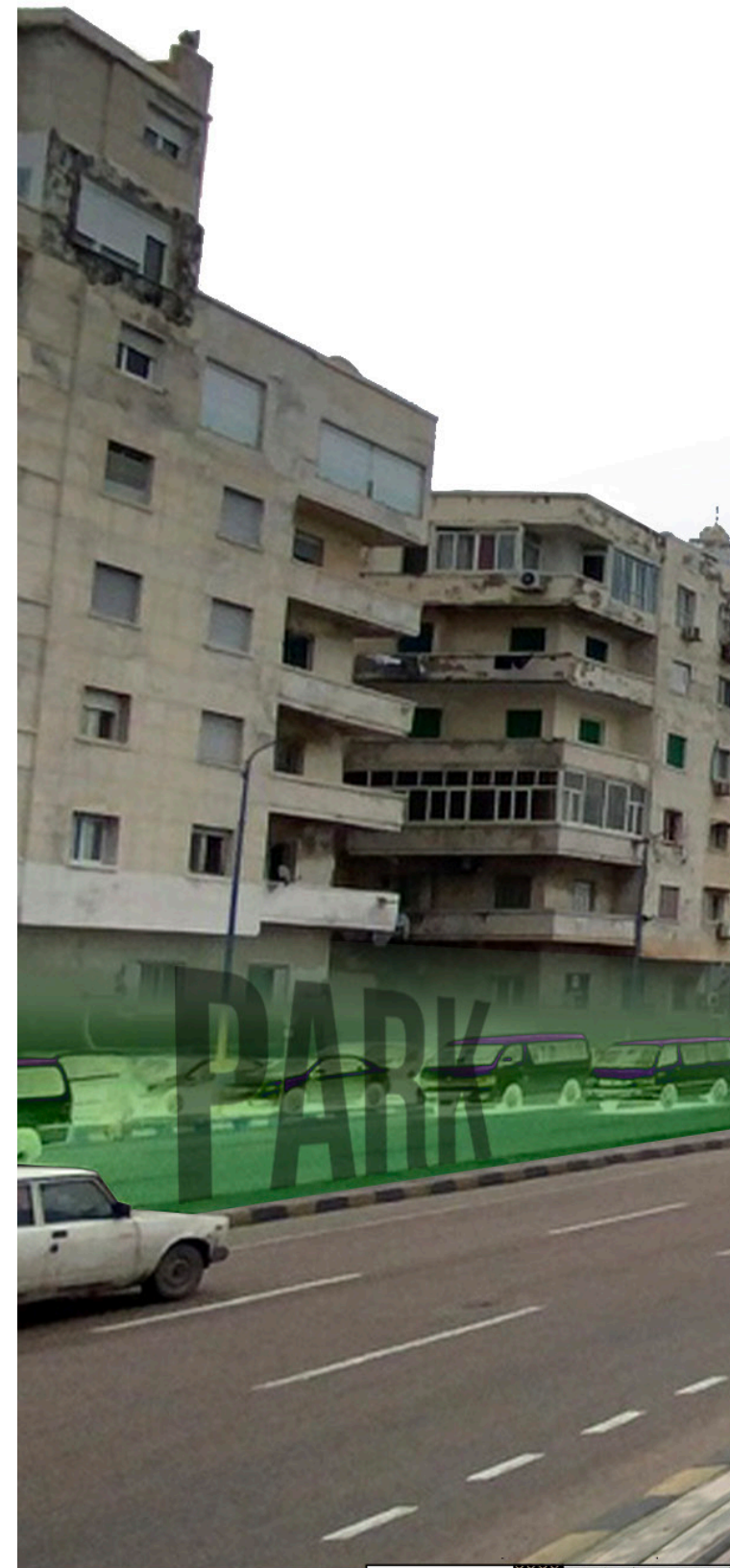
CONCRETE PROTECTION WALL AND PILE

UNDERGROUND PROTECTION WALL

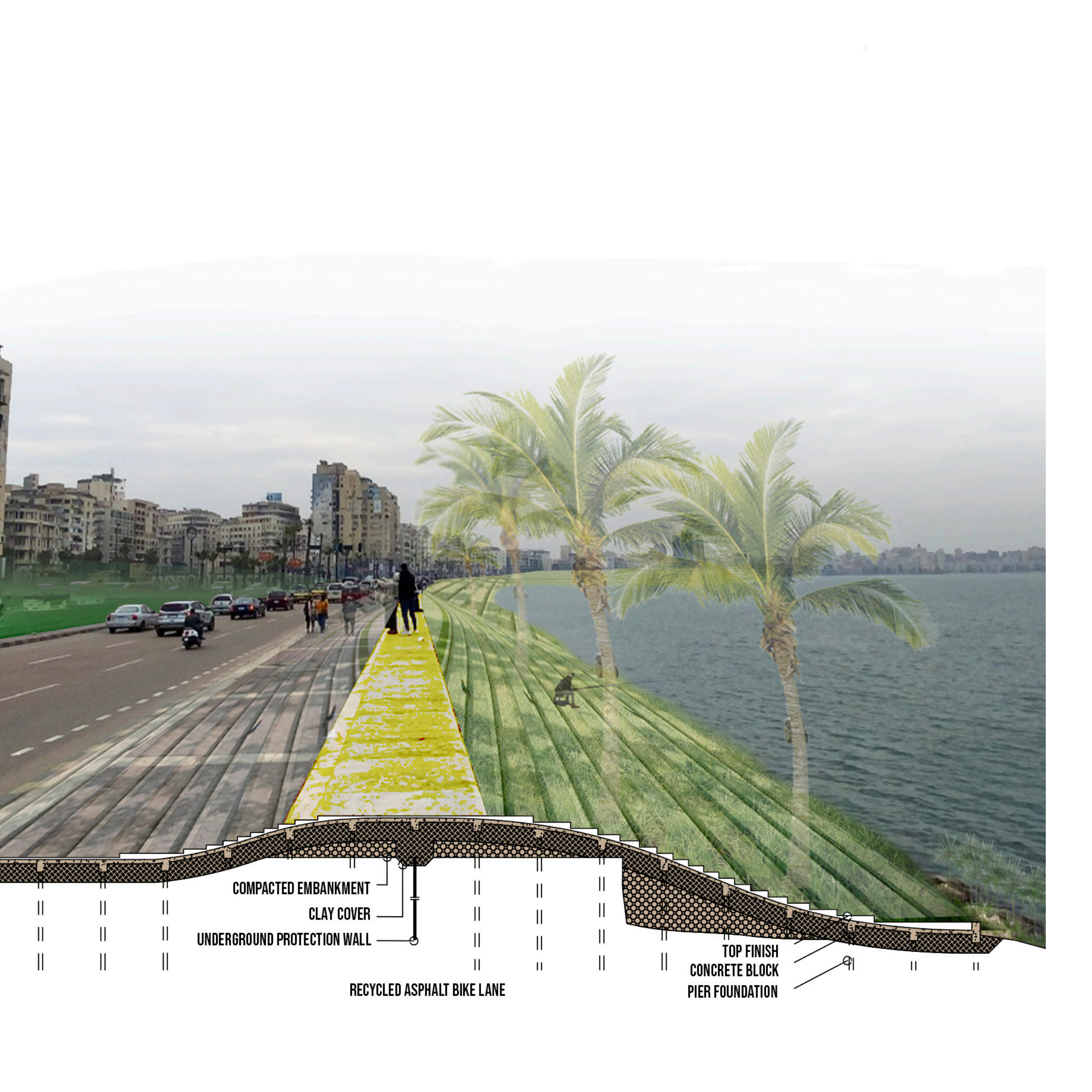


# PROTECTION SYSTEM

## Detailing







COMPACTED EMBANKMENT

CLAY COVER

UNDERGROUND PROTECTION WALL

RECYCLED ASPHALT BIKE LANE

TOP FINISH  
CONCRETE BLOCK  
PIER FOUNDATION

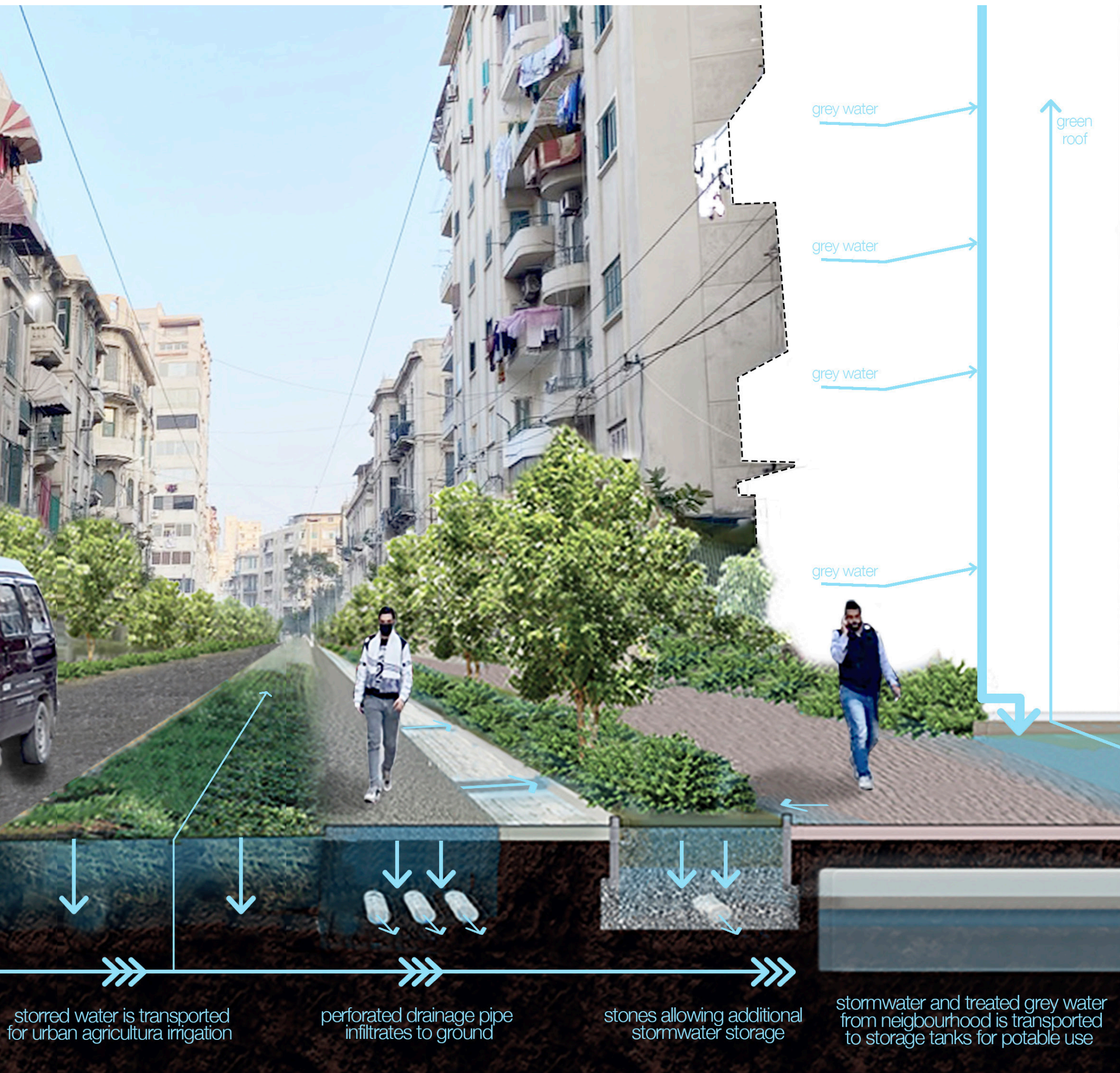


# CIRCULAR PROTECTION

water treatment detail









# **CONCLUDING THE REBIRTH OF PARADISE**

looking back on the project and goals



in this chapter

Assessment  
Conclusion  
Discussion  
Recommendations



# Assessment

## The Rebirth of Paradise

In this portion we reflect on the SDGs that are most relevant to The Rebirth of Paradise transition and how these goals are achieved. There are the most important goals that coincide with my vision but nearly all are in some way aided by other elements, considering our design is highly social.

### 1. Good health and well-being

A healthy diet with all the necessary nutrition and minimal spatial impact is introduced. The engagement of people in the local chain creates a healthy living environment.

### 2. Quality education

One of the main goals is allowing equitable access to education about food and agriculture while promoting a sustainable diet and cultivation methods. Education engages people in fishing and urban agricultural production as a key point in their curriculum.

### 3. Clean water and sanitation

The design secures access to water by reducing subsidence and creating more space for aquaculture.

### 4. Affordable and clean energy

Livestock is seen as a vital part in the energy transition. Residual heat flows are reused and hydrogen is extracted from manure. There's also more financial incentive for farmers to become more sustainable when the food is bought by local citizens.

### 5. Decent work and economic growth

The diversification of agricultural areas brings more revenue to farmers and the functional expansion of the city gives opportunities for local growth and small businesses. Farming will have a higher added value and a more stable income when food is sourced locally.

### 6. Industry innovation and infrastructure

We foster innovation by allocating places for research and implementation. The technical transition allows circular industrialization in the socio-economic sector.

### 10. Reduced inequalities

The injustice to locals caused by the disconnect between waterfront and inner city is improved greatly by giving them social and economical value.

### 7. Sustainable cities and communities

The transition zones creates resilient communities in both a social and ecological way, while introducing new typologies of buildings and public space that connect people to part of the chain in circular ways.

### 8. Climate action

Lowering greenhouse gases emissions in the livestock, horticulture and energy sectors by connecting them in new circular ways. We are reducing emissions by shortening the chain and buying food locally by replacing the high export import ratios.

### 9. life below water

Biodiversity underwater will rise in the cultivation areas where aquaculture farms regional fish and endemic species are grown for fodder.

### 10. life on land

Sustainable cultivation methods halt land degradation and help soil recovery. For example, increasing greenery protects biodiversity by farming in an urban farming methods.

### 11. partnerships for the goals

The role of Alexandria changes from the export point of goods to that of knowledge, forming new coalitions to spread knowledge about sea level rise change locally and internationally.



# Conclusion

## The Rebirth of Paradise

The results of such a project will increase the green spaces per person from 0.4-meter square to 9-meter square, matching the recommended standard for the quality of green space.

In addition to this, it will lead to an estimated increase of the economical revenue of the city, from 1.2 billion euros to 6 billion euros, and will also guarantee keeping Alexandria's historical city center protected for the coming decades.

This project will encourage a different design dialogue in any future flood protection decision, and can be a powerful guideline to any future expansions. Not only for Egypt, but also for the rest of the Mediterranean region.

So next time when you move along the coast, you won't sense an incarcerated city, but actually a re-birthed city; so that even when the next flood crashes, it's going to remain a lively place with a beautiful and safe environment.

lovely enough to walk across its coast line without the fear of getting caught up by cars or waves. lovely enough so the pressure of having to deal with the turmoil and devastation that comes with the water flood can be forgotten.

Alexandria will be back a paradise in the eyes of its inhabitants, and a warm breeze of fresh air, rather than a place at constant risk. They will no longer look at the sea as a meaning of danger, but as the essence of the city that brings them calmness and peacefulness, today, and every day.



# Discussion

## The Rebirth of Paradise

Local participants' feedback about program and the challenges was received via individual surveys and written notes. A tally of program elements requested via surveys and the table requirements reveals interesting trends. by far the largest number of programs requested focused on increasing opportunities for outdoor recreation. social spaces, including fishing areas, fitness spaces, areas with programming and facilities for seniors and teens, dog runs, and libraries were very popular. People also showed desire for food services, with options ranging from farmers' markets to cafes and food trucks.

Specific program requests covered a wide and interesting range, including a museum of underwater lost history, jobs and cultural centers, better sea connections, less cars present and more.

social less cars flexible space  
football fields music jogging  
peaceful walk museum greenery  
wooden benches bike path trees  
fitness area fishing pier cafe  
food market boating outdoor movies  
playground gardens amphitheater  
dog path water access shops



# Recommendations

## The Rebirth of Paradise

A clear structure of the planning process is needed, that define the responsibility and Hierarchy to manage flood in each stage throughout the time.

Relay on more flexible, incremental approaches to flood management, due to uncertain future.

With only 1% of the water in the world being suitable for drinking, freshwater flooding is a significant problem. This invaluable commodity is also under threat from rising global temperatures as the waterfalls from the sky it has less time to seep through the soil and repeat their cleansing cycle.

It is important to consider the social and ecological consequences of flood spending.

Implementing flood management measures requires multi-stakeholder cooperation in the near future and maybe autocracy might be applied at some point far ahead.

Structural measures, particularly defence works, should avoid disconnecting one part of a community from another and should preserve visual /physical continuity between the community and rivers and coastline.

New development or regeneration should be seen as an opportunity to change existing land use in urban areas to make space for water. Money should not be wasted on short-term, unsustainable developments and improvements to defences that cannot be maintained.



# APPENDIX



in this chapter

**Refrances**

**Experts consulted**



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## GRASS

is the most popular and well known open source software application which has raster and vector processing systems with data management and spatial modeling system. It works with Windows, Macintosh, Linux, Sun-Solaris, HO-Ux platforms.

## gvSIG

is a GIS software application written in Java and works in Windows, Macintosh and Linux platforms.

## ILWIS

is a multi-functionality GIS and remote sensing software which has the capacity of model building. Regular updates are available for this software.

## Quantum GIS

is a GIS software which works with Windows, Macintosh, Linux and Unix

## SPRING

is a GIS and remote sensing image processing software with an object oriented model facility. It has the capacity of working with Windows, Linux, Unix and Macintosh.

## uDig GIS

is a desktop application which allows viewing of local shape files and also remote editing spatial database geometries.

## KOSMO

is a desktop application which provides a graphic user interface with applications of spatial database editing and analysis functions.

## globalfloodmap

Interactive visualization tools Showing sea level rise: <http://globalfloodmap.org/>

## Global Archive map of extreme flood events

(1985-2002): <http://floodobservatory.colorado.edu/Archives/GlobalArchiveMap.html>.



# Experts consulted

Mohamed Sherif

Alexandria Governor (Alexandria Governorate Office)

Henk Ovink

Special Envoy for International Water Affairs at Kingdom of the Netherlands.

Steffen Nijhuis

Research Leader Department of Urbanism, TU Delft

Henk Ovink

Special Envoy for International Water Affairs at Kingdom of the Netherlands.

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Mariska Ruiter

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Forbes Davidson

Director urban and regional management Forbes Davidson Planning

Ahmed Elseragy

Director of Enterprise, School of Engineering, University of Lincoln, UK

Claudio Acioly Jr

leading the implementation of a capacity building. Dutch government in cooperation with the Egyptian Ministry of Housing.

Hamed Mousa

Head of the New Administrative Capital for Urban Development(ACUD).

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Mohamed Kabbara

Senior Architect and Urbanist, AECOM





Hello reader,

I would like to thank you for your interest in my Masters' thesis.

And I would like to let you know a little bit more about me  
I spend the last few years working in urbanism, architecture and environmental design. Designing, planning, putting strategy and consulting.  
My approach always to engage with different urban scales: from strategic planning to architectural details. In my previous 4 years, and next to my study, I have been contributed to the design of numerous architecture and urban projects in many places around the world. For me, the aim is to develop these components further and make them equal, thereby gradually helping me to make the world a better place.

Hope you enjoyed your journey throughout this thesis and get the most of it, as it's very personal to me

Yours,  
Mohamed

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