

ACPCL | Architecture and Creative  
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University of Bologna  
Department of Architecture

## **El-Warraq Island urban development: -**

A Nature-Based Strategy for Inclusive Urban and Ecological  
Development

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### **Abstract**

El-Warraq Island, located in Giza within Greater Cairo, Egypt, is among the largest islands on the Nile. In recent decades, the island has experienced rapid informal urbanization, leading to complex social and ecological challenges. In response, the government introduced the Horus City development proposal, intended to redevelop the island. However, this project has generated controversy, as it threatens to displace long-established communities whose livelihoods depend on agriculture and fishing. Such intervention risks disrupting both the social fabric and ecological sustainability of El-Warraq Island.

This thesis proposes an alternative vision grounded in nature-based and regenerative strategies to mitigate the anticipated impacts of displacement from the Horus City proposal. Its main objective is to transform the existing informal settlement into a formally planned, ecologically balanced urban area through interventions that prioritize environmental restoration and social inclusion. Key components include wetland rehabilitation to purify Nile waters—addressing the island’s lack of a sewage system—alongside efforts to enhance biodiversity, establish ecological buffer zones between highways, residential areas, and farmland, and create a linear fruit forest along the Nile that provides inclusive public spaces and environmental benefits.

The proposal is based on ecological assessments and an understanding of local social dynamics. Its central aims are to protect the community from displacement, restore ecological balance, and improve accessibility and safety for residents. Rather than promoting demolition and reconstruction, this thesis advocates for upgrading existing systems and infrastructure, demonstrating that sustainable, equitable, and resilient outcomes can be achieved when urban development aligns with ecological preservation, social justice, and regenerative urbanism.

**Keyword:** - El-Warraq Island, Informal Settlements, Nile River Ecology, Wetland Restoration, Ecological Buffer Zones, Inclusive Urban Development

# Contents

Abstract .....	2
1. Introduction .....	4
2. History of the site.....	6
2.1. The history of informal settlements in Egypt.....	6
2.2. El-Warraq Island transformation. ....	6
3. Current Conditions.....	9
3.1. Social & ecological realities.....	9
3.2. Land use & accessibility. ....	9
3.3. Services.....	10
3.4. Swot analysis .....	11
4. Problem Statement.....	12
4.1. Social issues .....	13
4.2. Ecological degradation.....	14
4.3. Urban challenges .....	16
5. Design Proposal .....	16
5.1. Vision .....	16
5.2. Strategies.....	18
5.2.1. <i>Development of the urban area on the island</i> .....	19
5.2.2. <i>Public spaces</i> .....	20
5.2.3. <i>Agri-tourism park</i> .....	21
5.2.4. <i>Wetland regeneration</i> .....	22
5.2.5. <i>Urban buffering</i> .....	23
6. Expected Impacts.....	24
7. Conclusion.....	26
8. References .....	27

## 1. Introduction

El-Warraq Island is one of the largest and most densely populated islands on the Nile. Located in Giza, Greater Cairo, it was classified as a nature reserve from 1998 to 2018. The island presents a unique case study for its ecological value, agricultural productivity, and distinct patterns of informal urbanization. Between 1972 and 2025, El-Warraq shifted rapidly from an agricultural landscape to a mixed-use area combining residential and agricultural functions. Despite this transformation, the local population continues to depend primarily on fishing and farming for their livelihoods.

Egypt's post-World War II housing crisis in the 1940s and 1950s triggered large-scale migration to Cairo, as people sought better living and economic conditions. The shortage of affordable housing encouraged the growth of informal settlements, including on El-Warraq Island. Migrants built self-constructed homes to reduce costs, establishing communities without formal planning or infrastructure. Over time, this led to unregulated urban expansion and significant ecological decline—marked by water pollution, poor drainage, inadequate waste management, and the loss of wetlands. These interconnected issues have produced both environmental degradation and social vulnerability, necessitating a comprehensive response.

Due to its strategic location within the Nile and proximity to central Cairo, El-Warraq has become highly desirable to real estate developers. Plans are underway to demolish existing housing and construct Horus City, a luxury urban district of high-rise towers and commercial centers. This top-down redevelopment would reshape the island's social structure, replacing long-standing communities with higher-income residents and accelerating gentrification. In reaction, island residents have repeatedly protested and negotiated with authorities, voicing concerns over the loss of homes, livelihoods, and cultural identity.

The government's current approach includes relocating residents to new high-rise housing on or near the island—a process already underway. However, this relocation threatens to disconnect communities from their traditional agricultural and fishing practices. It also risks erasing the island's rural identity and transforming a self-sufficient community into one dependent on centralized urban systems.

Under Law No. 168 of 2025, the Egyptian government can legalize or remove unlawfully occupied state land. This directly affects El-Warraq, where legalization remains prohibited because housing was built on agricultural land, even though the area was reclassified as urban in 2018.

This thesis takes a critical stance, arguing that upgrading existing conditions is more sustainable than complete redevelopment. The proposed project demonstrates how El-Warraq can address its social, ecological, and economic challenges through context-sensitive and inclusive strategies. Unlike Horus City, this approach prioritizes community resilience, biodiversity, and sustainable livelihoods over profit-driven transformation.

The study employs spatial analysis, site observation, and ecological design methodologies to explore how vulnerable territories like El-Warraq can be developed through regenerative and inclusive planning.

My interest in this project stems from both academic curiosity and personal commitment. As an architect, I am drawn to El-Warraq's complexity as a site where environmental, cultural, and social dimensions intersect. I believe that architecture and planning must prioritize ecological sustainability and social equity. This research seeks to raise awareness of environmentally responsible design and to advocate for approaches that balance community well-being with ecological resilience.

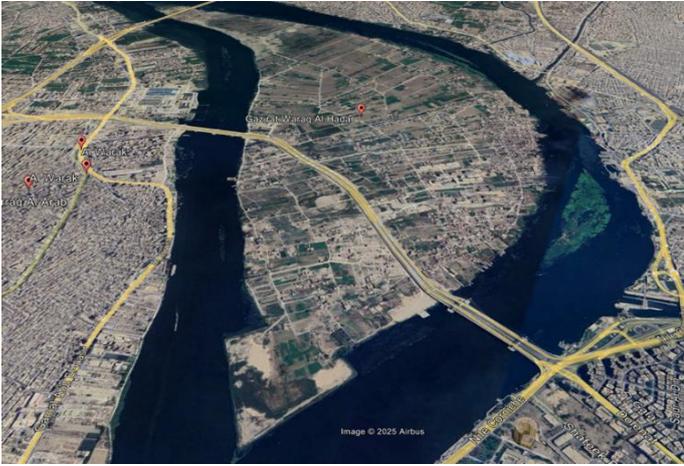


Figure 01:- google earth satellite view of El-Warraq island



Figure 02:- rendered view of Horas city



Figure 03:- People protesting about the situation



Figure 04:- Ferry is the only way of reaching the island



Figure 05:- Water pollution



Figure 06:- Wetland shrouding the island

## 2. History of the site.

### 2.1. *The history of informal settlements in Egypt*

Informal settlements in Egypt began in the 1920s, when people migrated from rural areas to cities in search of jobs amid economic and social difficulties. The 1952 Revolution, which ended British rule and established a republic, increased migration.

As urban populations in cities such as Cairo and Giza soared, housing shortages worsened. Migrants responded by building informal dwellings on public or agricultural land. These were the beginning of informal settlements in Egypt. Over time, without effective urban regulation, these huts became permanent residences. This led to entire unplanned districts.

The spread of informal settlements increased with later political events, especially the 2011 revolution, which arose from deep economic and political issues. From 2011 to 2014, weakened local governance led to widespread unauthorized construction on agricultural land, especially in Greater Cairo and the Nile Delta.

Today, informal settlements are a core challenge in urban planning in Egypt and house over 60% of Greater Cairo's population. They reveal both failures of formal planning and the resilience of communities seeking housing and livelihoods with little help from state.

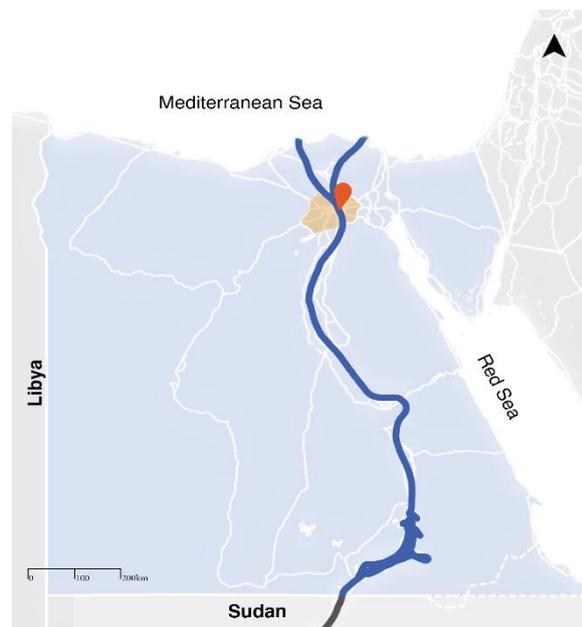


Figure 07:- The location of El-Warraaq Island

### 2.2. *El-Warraaq Island transformation.*

El-Warraaq Island covers about 636 hectares (6.36 km<sup>2</sup>) with about 120,000 residents. Its Nile location gives it fertile soil, which once supported agriculture as the main activity. Until 2017, it was classified as a nature reserve; in 2018, it became an urban area open to development.

Urban expansion and population growth transformed El-Warraaq from a largely farmland area into a densely populated urban area. This began between 1960 and 1970, as early settlers, mainly local farmers, built informal housing for families and newcomers.

Because of its previous classification as a nature reserve, the government withheld basic public services and infrastructure, such as roads, electricity, and sewage systems, arguing that such developments were incompatible with the island's protected status. Despite this, residents established an informal yet vibrant community, developing self-organized systems for water distribution, fishing, and small-scale agriculture. However, the absence of essential services led to water pollution, waste accumulation, and environmental degradation, which continue to affect both soil fertility and public health.

Land ownership has long been a source of dispute between the government and residents. Authorities claim that parts of the island emerged after the construction of the High Dam in Aswan (1960s), suggesting that such areas belong to the state. In contrast, local inhabitants assert ancestral ownership predating the dam's construction and have produced legal documents proving land possession. In 2002, Egyptian courts ruled in favor of residents holding valid ownership contracts, recognizing them as legitimate landholders.

Despite this legal precedent, Parliament in 2018 initiated procedures to expropriate private land in El-Warraq to facilitate new development projects. By 2022, the government began offering limited financial compensation to residents to purchase land, paving the way for their displacement and for the proposed Horus City project to take shape.

The Horus City proposal, officially announced in late 2022, envisions transforming the island into a luxury urban district featuring high-end residential towers, commercial centers, hotels, tourist marinas, and a central park. The estimated project cost is approximately USD 915 million, with projected economic returns of around USD 408 million annually over 25 years.

From the government's perspective, this development is framed as an effort to modernize the urban landscape, increase investment, and integrate El-Warraq into Greater Cairo's metropolitan economy. However, for residents, this project represents a threat to their homes, livelihoods, and cultural heritage. The compensation offered remains far below market value, and relocation sites are inadequate to preserve their agricultural and social traditions.

These decisions, combined with El-Warraq's strategic location and its status as one of the largest Nile islands, have turned it into a symbolic battleground between two urban paradigms: one focused on

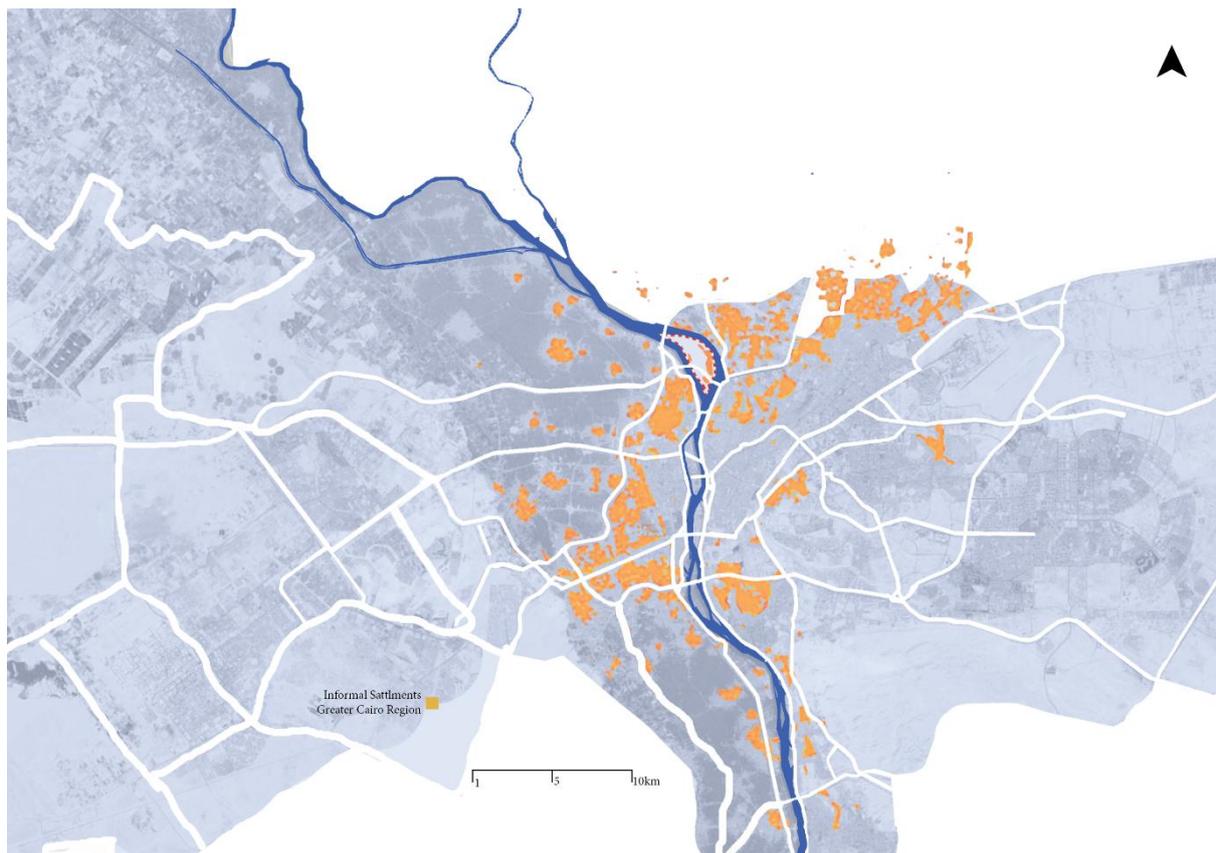


Figure 08:- informal settlement in the greater Cairo Region

top-down economic redevelopment, and the other on inclusive, community-driven ecological restoration.

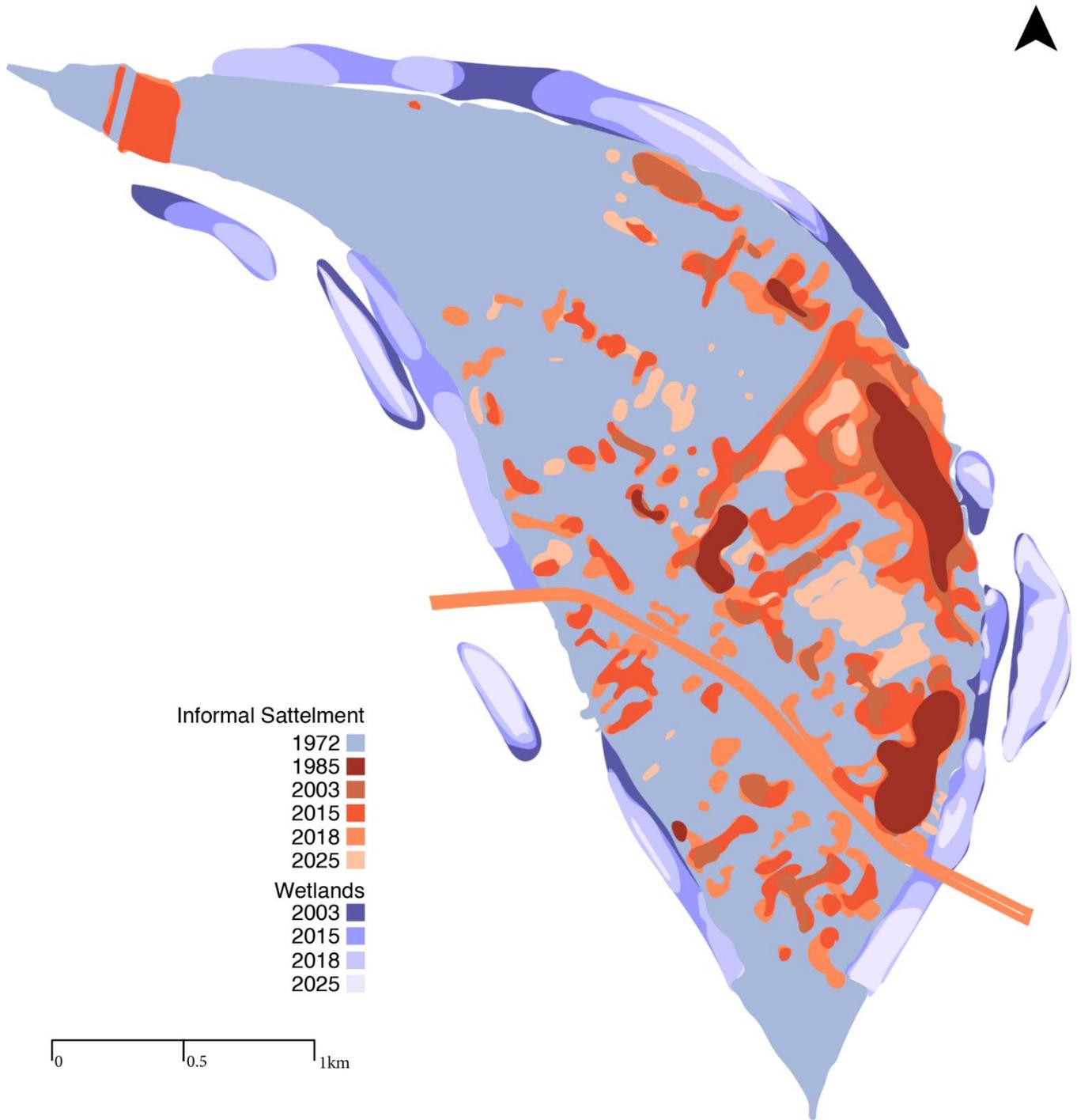


Figure 09:- how the informal settlement formed and the wetland disappeared

### 3. Current Conditions

El-Warraq Island was originally agricultural land; however, it was rapidly and informally populated, leading to the development of a dense, organic urban fabric. The island's flat topography facilitated construction, and by 2025, it was home to approximately 120,000 inhabitants.

#### 3.1. Social & ecological realities

Most residences are concentrated along the eastern side of the island, adjacent to the Nile River. Residents built homes near the river to ensure easy access to water, especially after the land was classified as a nature reserve, when the municipality withheld infrastructure development. Consequently, essential public services such as water, sewage, electricity, and paved roads were never formally provided. Proximity to the river also ensured access to employment, as most residents continue to depend on agriculture and fishing for their livelihoods.

The absence of public services has resulted in serious ecological consequences, including untreated sewage directly discharged into the Nile. Residents still rely on Nile water for everyday activities such as cleaning, washing, and sometimes irrigation. Moreover, informal construction and waste disposal have contributed to soil contamination, progressively degrading the island's fertile agricultural land, which has long been sustained by the Nile.

#### 3.2. Land use & accessibility.

The majority of El-Warraq Island's land was originally dedicated to agriculture, but over time, a significant portion has been converted to residential use. This process began gradually during the 1970s and accelerated following the 2011 revolution, when building regulations weakened. Today, the remaining agricultural zones are surrounded by unplanned, high-density urban clusters.

Most residential buildings were self-built by inhabitants, often without adherence to building codes. The exteriors are typically unfinished red-brick facades, a cost-saving measure common across informal settlements, while the interiors are often complete. The spaces between buildings are

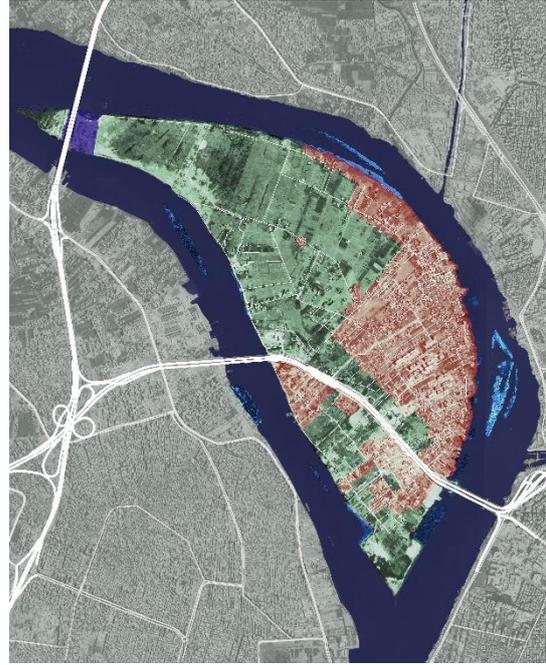


Figure 10:- Way of accessibility donkey



Figure 11:- Way of accessibility donkey

extremely narrow, and public open spaces are almost entirely absent—a condition that reflects the broader lack of accessible public spaces in Cairo.

In 2018, the government introduced an elevated ring road that crosses above the island. Although intended to support future urban development, this infrastructure has created a physical barrier dividing the island into northern and southern sectors, further fragmenting its spatial structure.

Access to and from El-Warraq Island is still limited to ferry transport (ma'diyya) across the Nile. Within the island, tuk-tuks and donkey-drawn carriages serve as the main means of transportation, supporting both mobility and agricultural activities. The circulation network consists of unpaved, organically developed pathways, often narrow and irregular, which double as drainage and waste-collection zones during heavy rain.

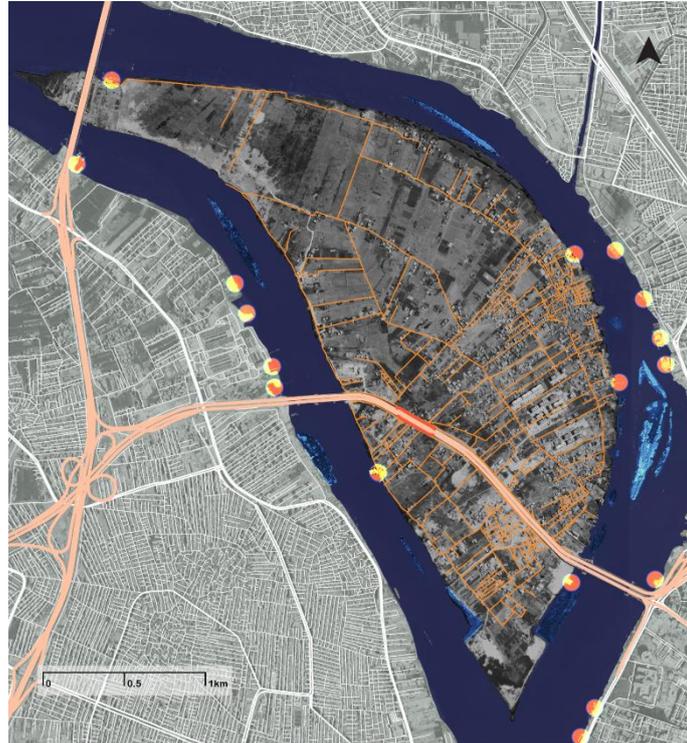


Figure 12:- Accessibility



Figure 13:- Way of accessibility donkey



Figure14:- Way of accessibility tuktuk

### 3.3. Services

Public services on El-Warraq Island remain extremely limited. The municipality denied formal infrastructure for decades, citing the island's previous classification as a nature reserve. As a result, residents have resorted to informal connections for both electricity and water. Small community-managed water plants have been established, while waste and sewage continue to be discharged

directly into the Nile. Solid waste is either burned in open spaces, dumped into the river, or left to accumulate on vacant land—causing pollution and health risks.

Educational and healthcare services are almost absent. The island has only one informal educational center serving preschool-aged children, and there are no medical clinics or hospitals, forcing residents to travel to the mainland for healthcare and schooling despite limited transportation.

Social and religious life persists through community initiatives. There are five mosques, one church, two small sports clubs, and several local restaurants and markets, but no public parks, libraries, or community centers. Despite these limitations, the island retains a strong sense of social cohesion and community solidarity.

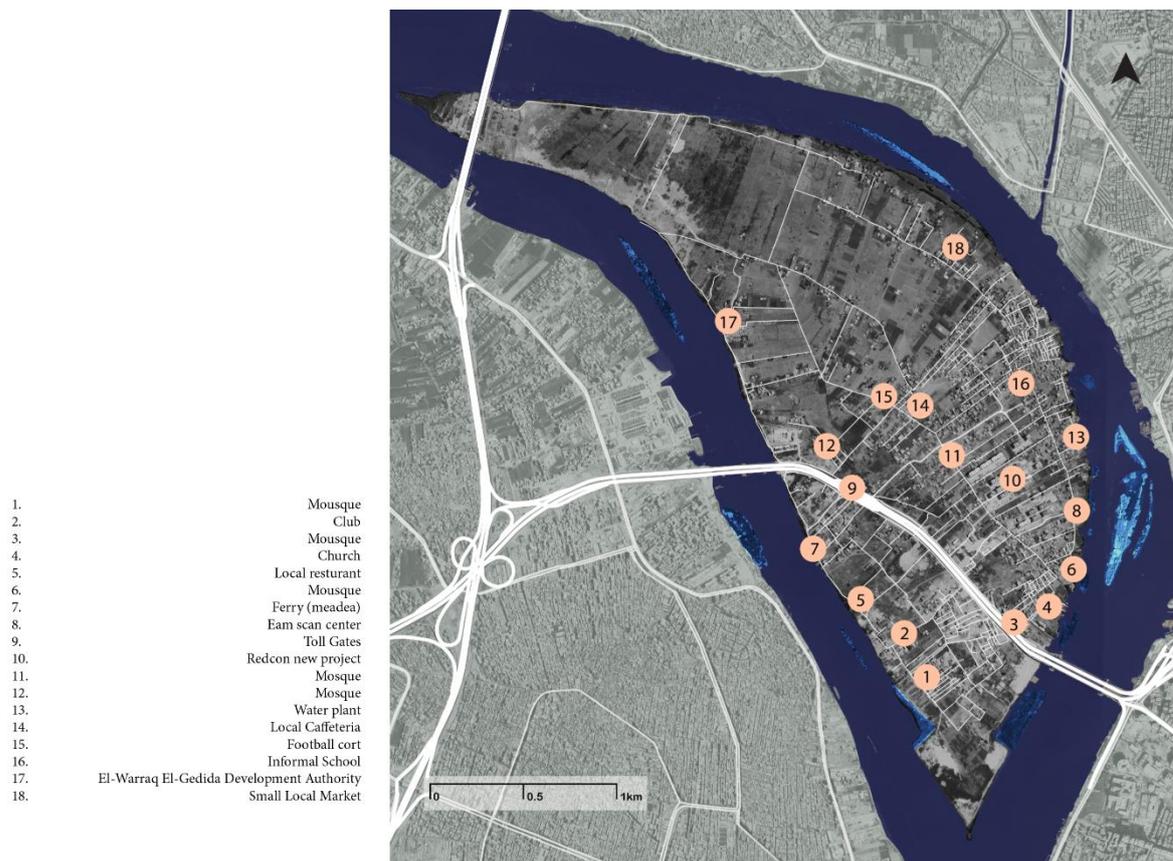


Figure 15:- Services in the island

### 3.4. Swot analysis

#### Strengths

- Strategic location within Greater Cairo:- El-Warraq lies between Cairo, Giza, and Qalyubia, giving it a central position and strong potential for regional connectivity.
- Fertile agricultural land and proximity to the Nile:- The island’s nutrient-rich soil supports productive agriculture, creating opportunities for urban farming and agri-tourism.
- Strong community and cultural identity:- Residents maintain cooperative social ties and traditional livelihoods rooted in fishing, farming, and craftsmanship.
- Existing ecological assets:- Surrounding wetlands and water bodies support biodiversity and provide a foundation for future ecological restoration.

## **Weaknesses**

- Lack of basic infrastructure and services:-Absence of formal sewage, waste management, healthcare, and education systems results in poor living conditions.
- Unregulated urban growth:- Informal construction has produced overcrowded areas with limited open and public spaces.
- Environmental degradation:- Untreated sewage and solid waste pollute the Nile, degrading soil fertility and water quality.
- Limited access and mobility:- Dependence on ferries and unpaved roads isolates residents and restricts emergency access.

## **Opportunities**

- Ecological regeneration:- Restoring wetlands and agricultural land can improve biodiversity, water quality, and climate resilience.
- Agri-tourism and eco-economic potential:-The island's rural identity and its location near Cairo support sustainable tourism, local food markets, and eco-education.
- Creation of inclusive public spaces:- Developing parks and green corridors can enhance the quality of life and strengthen community interaction.
- Model for sustainable urban upgrading: - El-Warraq can serve as a prototype for inclusive, ecological regeneration of informal settlements in Egypt.

## **Threats**

- Gentrification and displacement:- Redevelopment may raise land values, forcing residents out of the community.
- Community behavior:- Informal building and waste dumping increase pollution and hinder sustainable management.
- Ongoing pollution:- Continuous waste inflow and urban pressure threaten environmental restoration.
- Loss of ecological balance:- The decline of wetlands and farmland endangers biodiversity and natural resilience.

## **4. Problem Statement**

While this research does not advocate for informal settlements as a permanent alternative to organized development, it argues that demolishing existing structures and displacing residents to construct a new luxury enclave is neither sustainable nor just. It is ethically questionable to force communities to evacuate their homes and lose the social systems they have built over generations.

The Horus City proposal treats the island as a blank slate, disregarding its existing social networks, ecological value, and cultural identity. This top-down vision focuses on maximizing investment rather than addressing the island's genuine social and environmental needs. It aims to replace the organic

urban fabric and self-built housing with a modernized image of urban order that neglects the local community's right to remain and thrive in their own environment.

By contrast, this thesis proposes an alternative development approach that improves existing conditions without resorting to demolition or displacement. The objective is to demonstrate that ecological regeneration and urban upgrading can coexist with social inclusion and community continuity. The approach prioritizes sustainability, cultural identity, and environmental health, presenting El-Warraq as a model for regenerative transformation rooted in the existing community and landscape.

This vision challenges conventional urban renewal policies that prioritize economic growth over ecological and social balance. It advocates for a bottom-up, nature-based strategy that works with the existing urban fabric, improving infrastructure, accessibility, and environmental quality while reinforcing residents' sense of belonging and ownership.

In doing so, the thesis seeks to redefine the concept of "development" not as displacement and reconstruction, but as revitalization through coexistence—an approach where environmental and social systems are restored together to create an inclusive and resilient urban future for El-Warraq Island.

#### *4.1. Social issues*

Residents of El-Warraq Island face the constant threat of losing their homes, livelihoods, and way of life, even after decades of living there. These communities have deep roots on the island, where generations have depended on agriculture, fishing, and local craftwork as their main sources of income. However, the introduction of top-down urban development agendas has placed these communities under intense social and economic pressure.

For years, the lack of basic public services—such as formal water supply, sewage systems, waste management, education, and healthcare—has affected the quality of life and public health of residents. Yet, instead of addressing these long-standing issues, government efforts have focused on transforming the island into an investment and real estate destination. This vision prioritizes economic gain and aesthetic renewal over social well-being and community stability.

The government's redevelopment approach aims to replace the existing population with a new, higher-income social group. This process risks gentrification, the loss of cultural identity, and the erasure of traditional livelihoods. Although authorities have proposed relocating residents to newly built high-rise housing blocks or offering financial compensation, these measures have not been sufficient to ensure fairness or to maintain the island's existing social and cultural structure.

For many inhabitants, home ownership and proximity to their land and the Nile are integral to their daily survival. The proposed relocation would not only displace them physically but also disconnect them from their cultural roots and livelihood sources. The social consequences of such displacement would be severe— weakening community bonds, increasing poverty, and reducing access to traditional income sources such as farming and fishing.

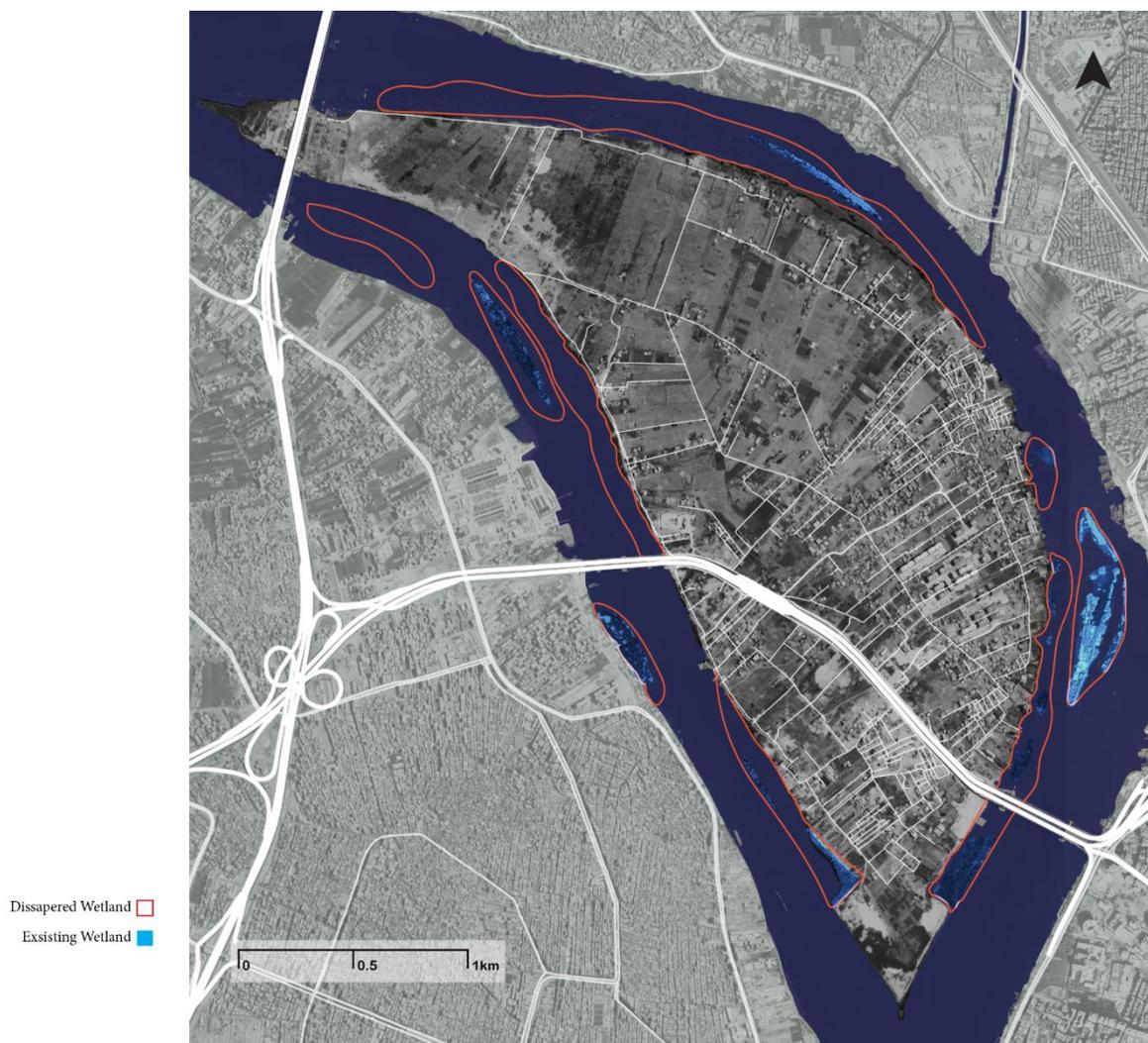
This project approaches El-Warraq's social issues through a human-centered, participatory framework. It seeks to empower residents by improving living conditions, upgrading existing housing,

and formalizing access to essential services without disrupting community life. By doing so, it supports the island's residents in retaining their identity and economic independence, while ensuring that future development remains inclusive, equitable, and socially sustainable.

#### 4.2. Ecological degradation

El-Warraq Island was once an ecologically rich and fertile landscape, functioning as a green oasis within the Nile River. For decades, it served as an important area for agriculture, biodiversity, and water purification, sustained by the island's natural wetlands and nutrient-rich soil. However, in recent years, unregulated construction and rapid informal urban expansion have caused severe environmental deterioration and the loss of the island's natural ecosystems.

The conversion of productive agricultural land into dense residential areas has significantly reduced the amount of open and permeable land, weakening the island's ability to absorb and filter water. As a result, the local ecosystem has become increasingly fragile. The lack of formal sewage systems has led to the direct discharge of wastewater into the Nile, while the absence of organized waste management has caused widespread pollution through the burning and dumping of solid waste. These practices have contaminated the soil and water, threatening both human health and aquatic life.



Moreover, the degradation of wetlands—once natural filters and habitats for many species—has disrupted the ecological balance and contributed to biodiversity decline around the island. The island’s once-healthy relationship with the Nile has been replaced by an unsustainable dynamic characterized by pollution, waste, and erosion.

The accumulation of pollutants has also affected the island's agricultural productivity. Farmers have observed reduced soil fertility and lower crop yields due to chemical runoff and waste residue altering soil composition. In turn, this impacts the economic stability of the residents, who depend heavily on farming and fishing as their main livelihoods.

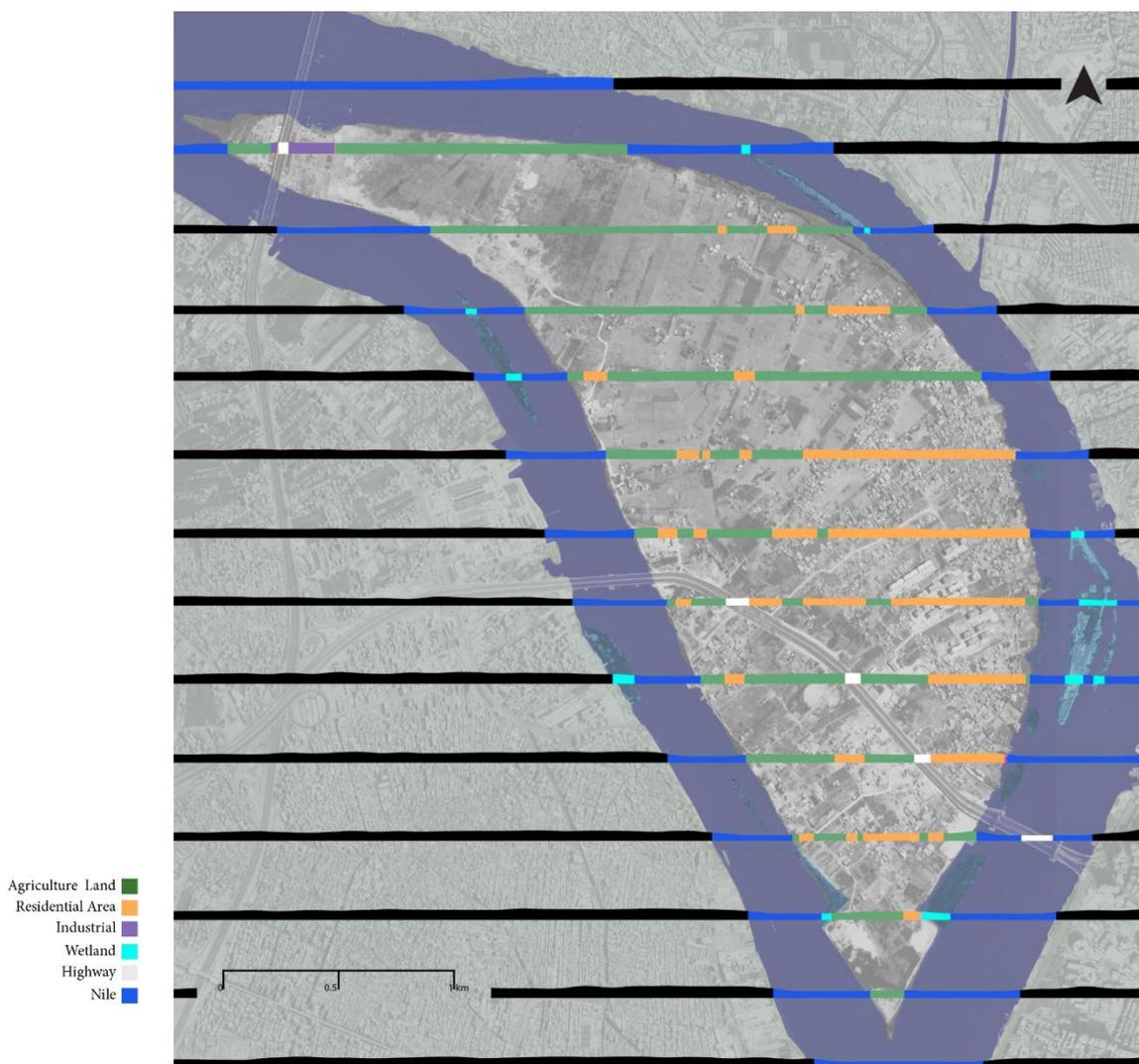


Figure 17:- section showing the topography.

Addressing this ecological degradation is therefore central to the project’s vision. The proposed interventions aim to restore the island’s ecological systems through wetland regeneration, wastewater filtration, and biodiversity enhancement. By introducing nature-based infrastructure such as constructed wetlands, green buffers, and sustainable drainage systems, the project seeks to

reconnect El-Warraq's urban life with its ecological foundation—turning environmental vulnerability into resilience and restoring the island's balance between people and nature.

### *4.3. Urban challenges*

El-Warraq Island faces numerous urban challenges that stem from decades of informal expansion, weak regulation, and the absence of integrated planning. What was once a rural landscape of fields and water channels has gradually transformed into a dense and unplanned urban fabric, lacking the essential infrastructure and public services needed for a healthy living environment.

The transformation of agricultural land into residential areas occurred without formal building permits or regulatory oversight. As a result, the island's housing fabric consists of narrow, unpaved streets and closely packed buildings, which limit natural light, air circulation, and emergency accessibility. These physical conditions have created unsafe and overcrowded living environments, where many structures were built without compliance with safety or construction standards.

Another major challenge is the absence of efficient mobility and transportation systems. The ferry (*ma'diyya*) remains the only formal means of connecting El-Warraq to mainland Cairo or Giza. This dependence isolates residents from vital services, including education, healthcare, and employment opportunities. Although a ring road was recently constructed above the island, it was designed primarily for regional traffic and does not serve local needs. Instead of improving connectivity, it has physically divided the island into two parts—north and south—creating new barriers within the community.

The island's infrastructure deficit further compounds these problems. Without formal sewage, drainage, or waste management systems, wastewater and solid waste are disposed of directly into the Nile or onto vacant land. During rainfall, unpaved pathways flood easily, disrupting mobility and causing further pollution. The absence of reliable electricity and street lighting also contributes to unsafe nighttime conditions, particularly for women and children.

Moreover, the lack of public and communal spaces has limited opportunities for social interaction and recreation. In contrast to the dense, noisy environment of central Cairo, El-Warraq could have offered relief through open areas and green corridors. However, informal development has filled nearly every available plot, leaving little room for parks, playgrounds, or shared spaces that could enhance the residents' quality of life.

These interrelated urban challenges—infrastructure deficits, mobility isolation, unsafe housing, and the loss of open space—have deepened the island's vulnerability and held back its functioning as a sustainable urban environment. Addressing them requires a holistic and inclusive approach that combines urban upgrading, ecological restoration, and community participation. The design strategies proposed in this thesis respond to these challenges by improving access, services, and environmental quality while preserving the island's social and cultural fabric.

## **5. Design Proposal**

### *5.1. Vision*

The vision for El-Warraq Island is to establish a model of inclusive, ecological, and community-centered urban development that strengthens the island's fabric without displacing its residents or

erasing its cultural identity. This vision recognizes the value already embedded in the island—its fertile land, traditional livelihoods, and strong social relationships—and seeks to integrate these assets into a coherent, sustainable urban system.

The proposed transformation aims to create a healthier, more equitable living environment by improving infrastructure, restoring the environment, and formalizing essential services. In parallel, it supports and expands local livelihoods by introducing new economic opportunities that align with the island’s ecological and cultural character. These include Agri-tourism programs, community-based markets, educational and ecological centers, and public spaces that can host seasonal events, workshops, and local production activities.

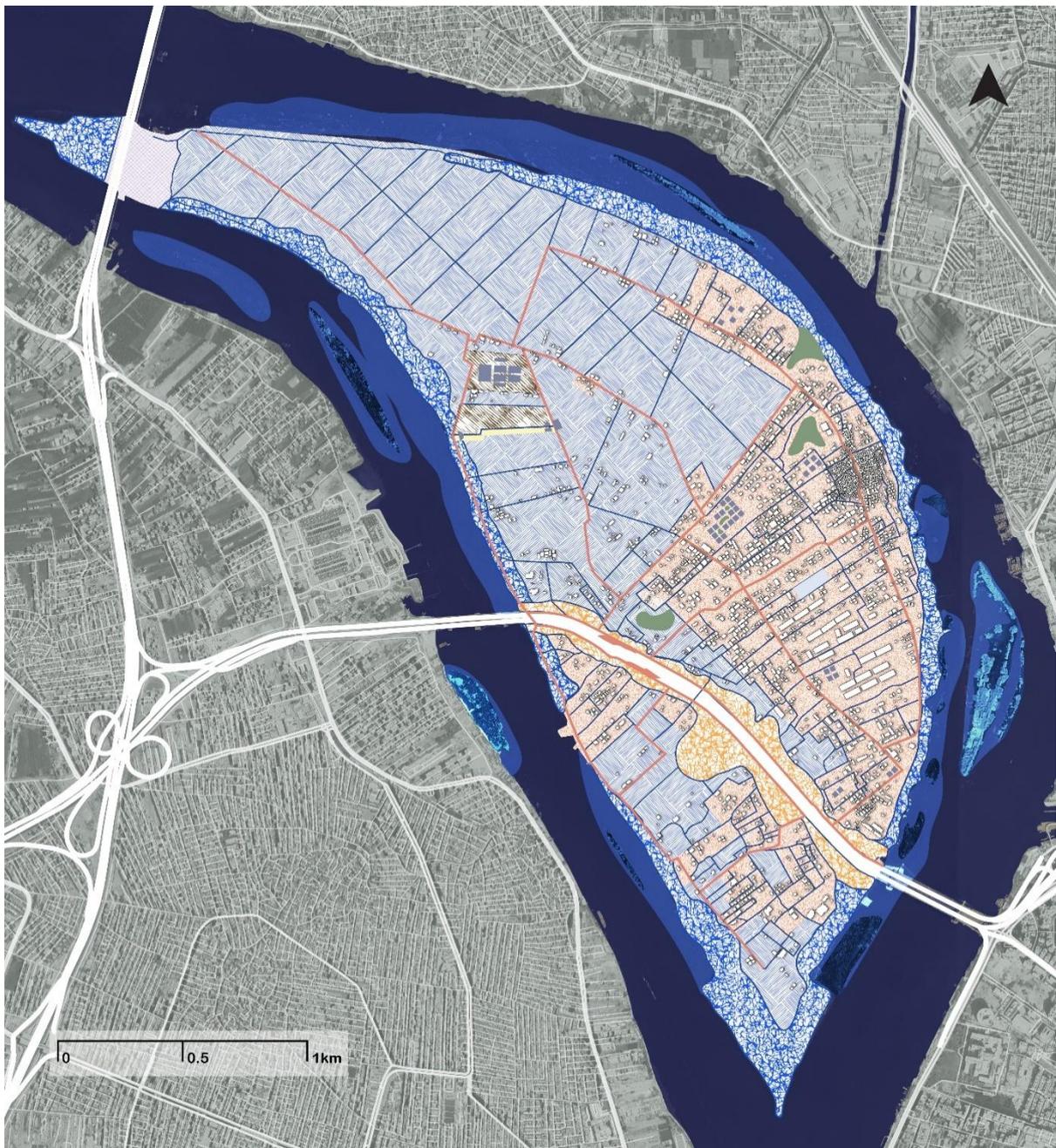


Figure 18:- The proposed strategies for the development

By diversifying income sources and building upon existing skills in agriculture, fishing, and craftwork, the project envisions El-Warraq becoming a self-sustaining and resilient community. The goal is not only to stabilize the existing population but also to open new pathways for economic growth that remain accessible to residents and maintain their social cohesion.

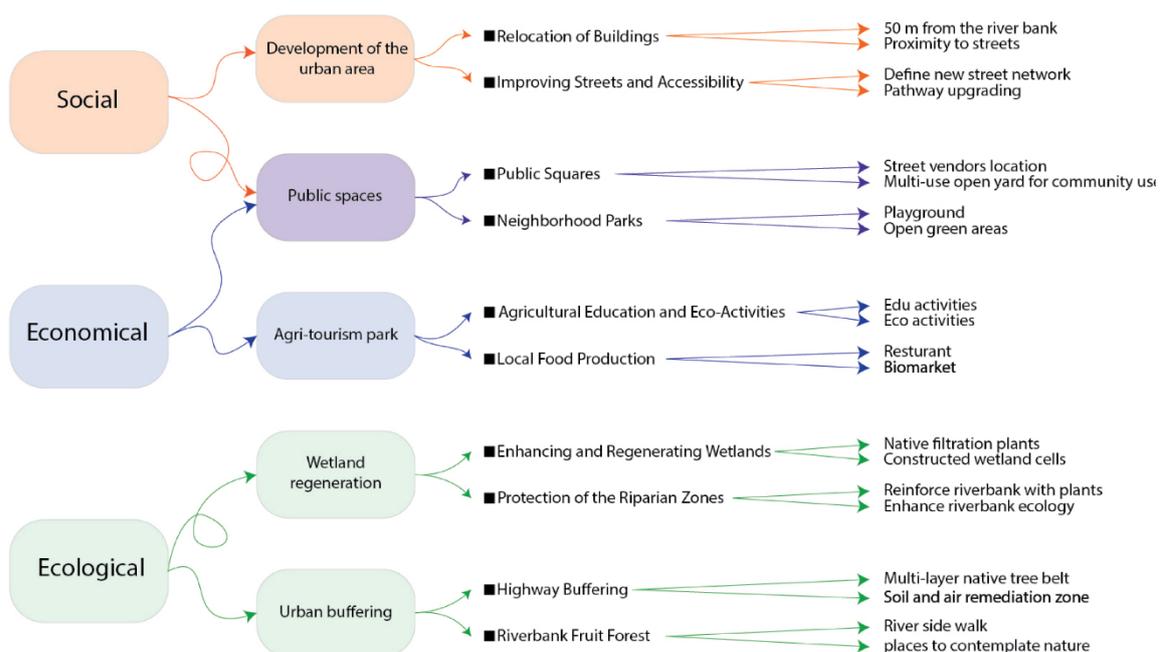


Figure 19:- section of the island after the development

Ultimately, the vision positions El-Warraq Island as a living example of regenerative urbanism, where ecological restoration, social equity, and economic vitality evolve together—demonstrating how urban development can enhance rather than replace the life and identity that already exist on the island.

## 5.2. Strategies

The design strategies proposed in this thesis address the social, ecological, and economic challenges of El-Warraq Island. They aim to regenerate the environment, improve urban conditions, and reinforce community identity without displacement. Each strategy operates at a different scale—from urban infrastructure to ecological restoration—but together they form a comprehensive framework for inclusive and sustainable transformation.



### 5.2.1. *Development of the urban area on the island*

This strategy focuses on transforming the existing urban fabric into a more organized, connected, and environmentally balanced system while preserving the island's social and cultural character. It is implemented through two sub-strategies: improving the street network and accessibility and selectively relocating buildings to ensure safety and connectivity.

#### 5.2.1.1. *Improving Streets and Accessibility*

Street network that enhances mobility and circulation. The main streets will be paved and designed to include cycle paths, pedestrian walkways, and tree-lined edges, improving air quality, comfort, and safety for residents.

Secondary pathways will remain unpaved but upgraded, maintaining the island's rural character while improving drainage and accessibility. Together, this network strengthens the island's organization, providing reliable movement for people and goods while preserving the human scale of neighborhoods.

#### 5.2.1.2. *Relocation of Buildings*



Figure 20:- plan showing the 50m from the riverbank and the building that are going to be demolished

This sub-strategy addresses the relocation of specific buildings for safety, environmental, and connectivity reasons. Buildings located within the 50-meter riverbank setback, as declared by the Egyptian environmental and building code, will be relocated to allow for ecological restoration. Structures positioned too close to the elevated highway will also be moved farther inland, to protect residents from air pollution, noise, and soil contamination caused by heavy traffic. In addition, a small number of buildings will be reorganized to complete the main street network, improving access.

All relocations will be carried out within the island, ensuring that no residents are displaced outside their community. Affected families will be relocated to nearby upgraded areas, maintaining neighborhood relationships while benefiting from improved safety and environmental conditions.

### 5.2.2. *Public spaces*

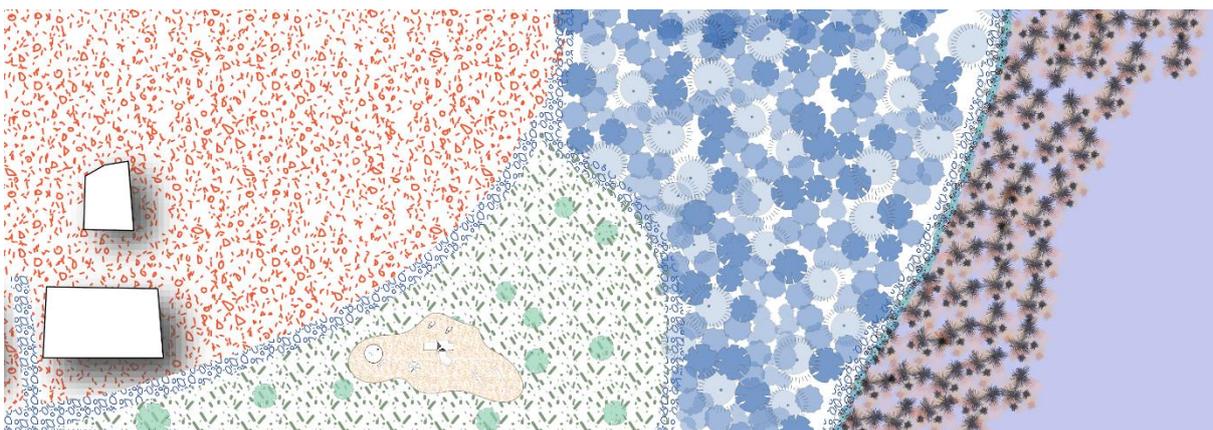
This strategy aims to create a network of inclusive and multifunctional public spaces that support community life, encourage social interaction, and improve environmental quality. It is implemented through two sub-strategies: the creation of public squares and the establishment of neighborhood parks.

#### 5.2.2.1. *Public Squares*

Public squares will be developed within dense residential clusters where social activity is concentrated. These areas will provide space for local vendors and informal economic activity, becoming small community gathering points that serve daily needs. Built with locally available materials and simple design elements, these squares will maintain the island's character while offering accessible, comfortable public spaces close to people's homes.

#### 5.2.2.2. *Neighborhood Parks*

Neighborhood parks will introduce green recreational spaces accessible to people of all ages. They will include open lawns, small play areas, and shaded green zones that enhance microclimatic comfort and provide visual relief within the dense urban fabric. Vegetation will focus on native and adaptive plant species that support biodiversity and improve air quality. Together, the public squares and parks will form a connected open-space network that strengthens social cohesion and improves the island's overall livability.



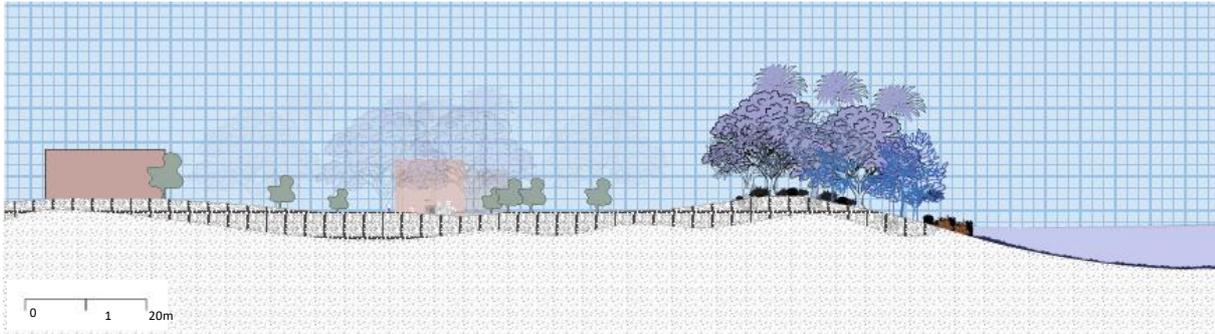


Figure 21 & figure 22 : plan and section showing the park and the protection of the riparian zone

### 5.2.3. Agri-tourism park

This strategy integrates agriculture, education, and recreation to celebrate El-Warraq’s agricultural heritage and create new economic and social opportunities. It is implemented through two sub-strategies: agricultural education and eco-activities, and community recreation and local food production.

#### 5.2.3.1. Agricultural Education and Eco-Activities

Part of the island’s farmland will be transformed into an educational agricultural landscape where visitors can learn about organic farming, composting, and sustainable irrigation methods. This sub-strategy includes workshops, guided visits, and shaded teaching spaces that promote hands-on learning. Local farmers will participate as mentors, providing expertise and generating new sources

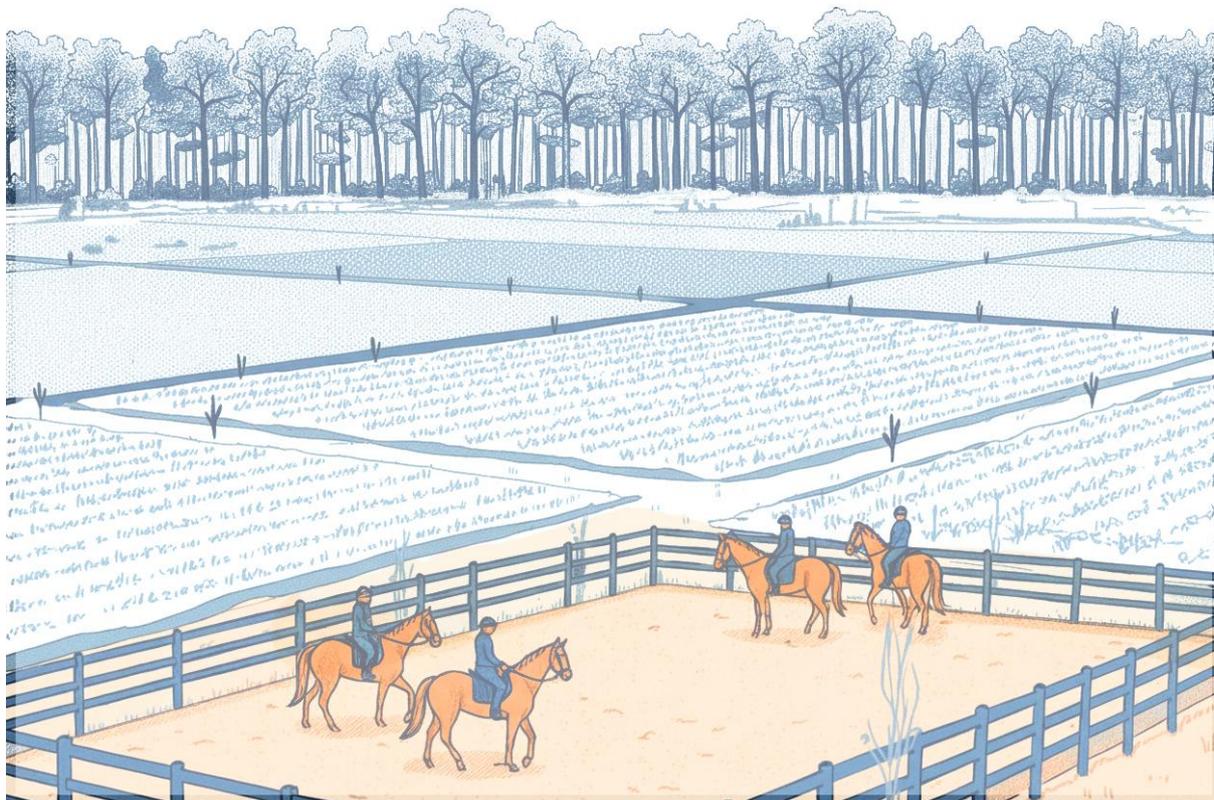


Figure 23:- showing the activity in the agritourism park

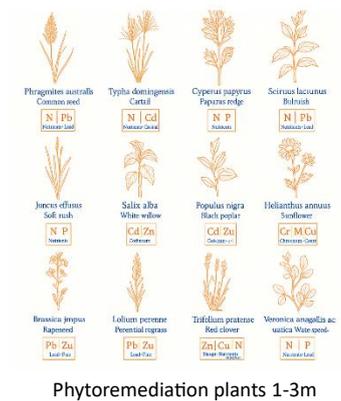
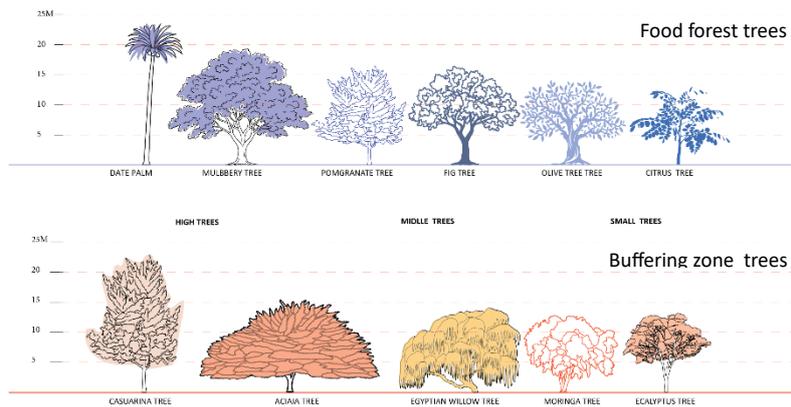
of income. Through these activities, the park will encourage environmental awareness and eco-tourism while preserving the island’s farming culture.

### 5.2.3.2. Local Food Production

The park will also include public recreation and community-oriented facilities, such as shaded seating areas, event spaces, and horse-riding paths. A bio-restaurant will serve meals made from organic produce grown locally on the island, promoting farm-to-table sustainability. The park will serve as both a social and economic hub, supporting eco-tourism, local entrepreneurship, and agricultural education while strengthening the island's cultural identity.

### 5.2.4. Wetland regeneration

This strategy aims to restore and enhance the wetland ecosystems of El-Warraq Island to improve water quality, biodiversity, and the overall ecological performance of the Nile edge. It is implemented through two sub-strategies: enhancing existing wetlands and regenerating lost wetlands.



### 5.2.4.1. Enhancing and Regenerating Wetlands

This strategy aims to restore El-Warraq’s ecological function by enhancing existing wetlands and recreating those that have been lost. Native plants such as Papyrus, Common Reed, and Cattail will be used to filter pollutants, stabilize soil, and support biodiversity. Where wetlands have disappeared, wetland systems constructed will be introduced using natural materials and aquatic vegetation to treat wastewater. These areas will also reconnect fragmented ecosystems and provide habitat for wildlife. By enhancing and regenerating wetland zones, this intervention supports water purification, microclimate regulation, and ecological resilience on the island.

### 5.2.4.2. Protection of the Riparian Zones

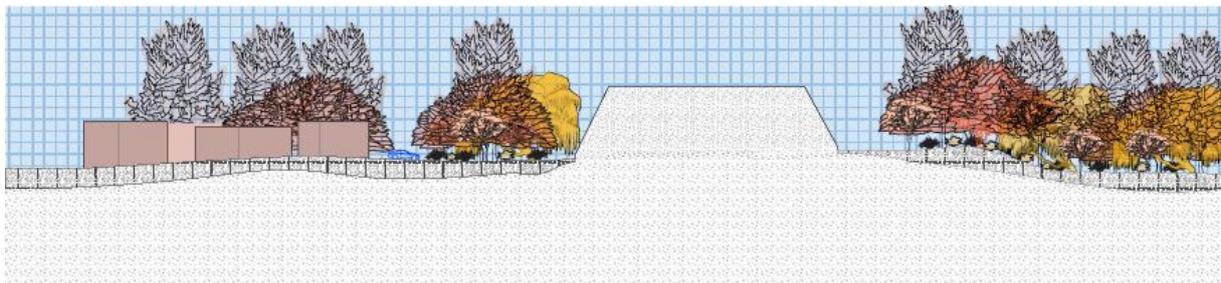
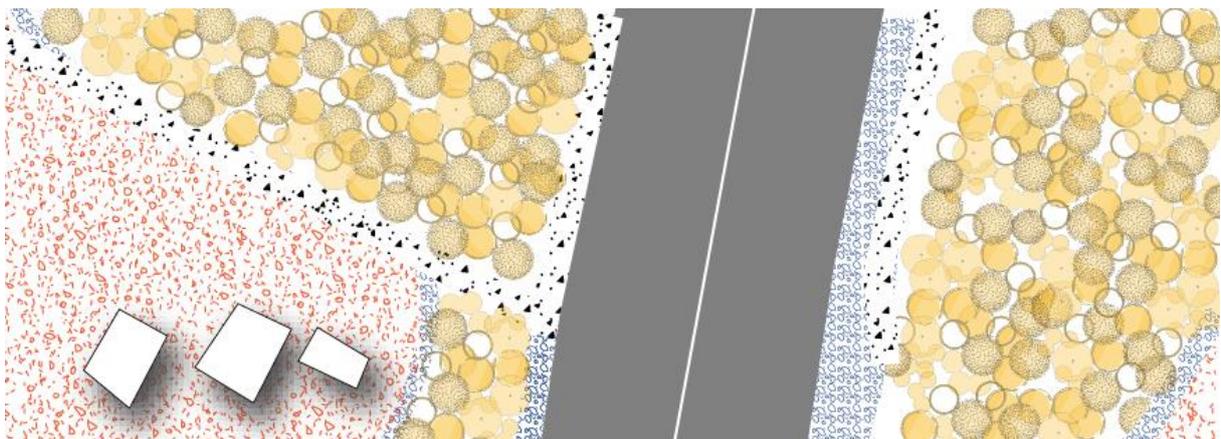
To protect the edges of the Nile, this strategy focuses on stabilizing and maintaining the island’s riparian zones. Native erosion-resistant vegetation will be planted to strengthen riverbanks, reduce runoff, and prevent further soil loss. This green edge will also act as a buffer against flooding and pollution, while enhancing the scenic and ecological value of the river corridor. Maintaining healthy riparian zones ensures long-term resilience and supports the ecological health of both the island and the surrounding Nile system.

### 5.2.5. Urban buffering

This strategy aims to create continuous ecological buffers that protect residential areas from pollution and safeguard the island's environmental boundaries. It is implemented through two sub-strategies: highway buffering and the riverbank fruit forest.

#### 5.2.5.1. Highway Buffering

A green ecological belt will be established between the elevated highway and the nearest residential zones to protect inhabitants from air, noise, and soil pollution. The buffer will consist of multi-layered vegetation, including trees and shrubs such as Casuarina, Acacia, Moringa, and Eucalyptus, known for their ability to absorb pollutants and resilience to harsh urban conditions. Shaded paths and resting areas will be integrated into this green edge, transforming an infrastructure barrier into a healthier, safer environment for nearby residents.

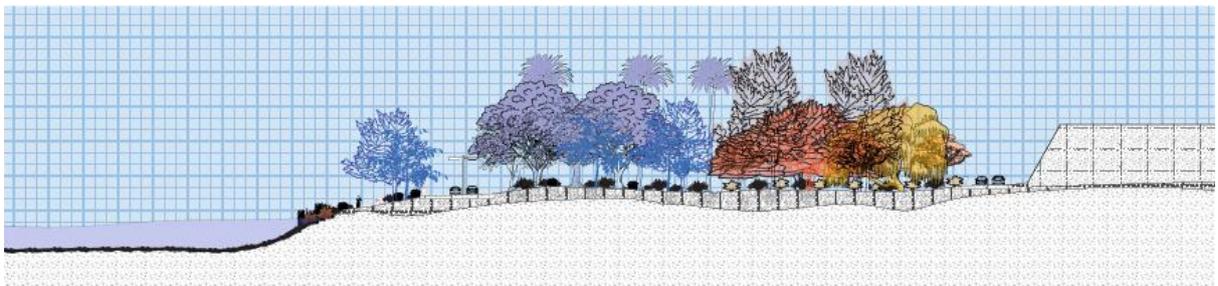
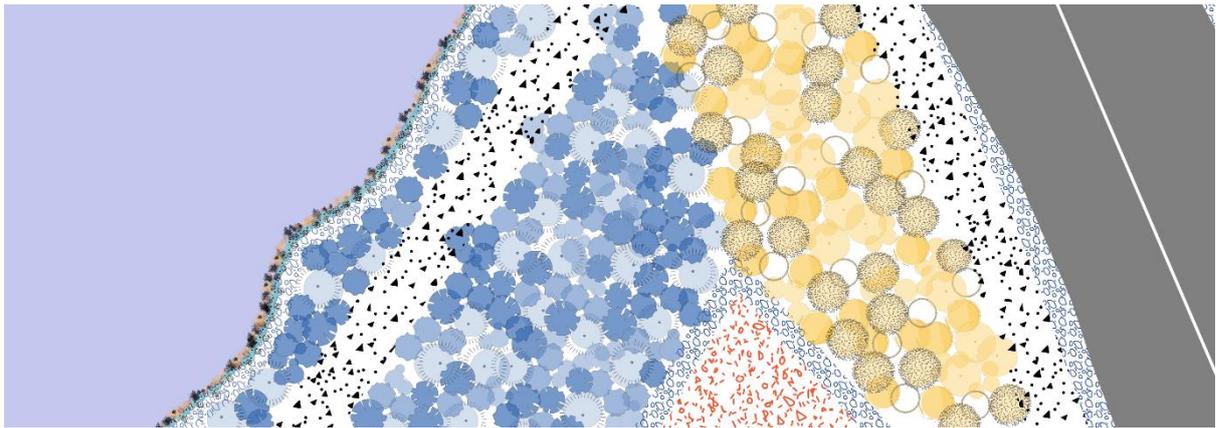


0 10 20m

Figure 24 & figure 25 : plan and section showing the buffering zone from the highway

#### 5.2.5.2. Riverbank Food Forest

Along the Nile edge, a linear fruit forest will be planted. This intervention will help restore the ecological stability of the riverbank while preventing illegal construction. The forest will include fig, date palm, pomegranate, mulberry, and citrus trees, all native or adapted to the Nile environment. Small walkways and observation points will be integrated within the forest to allow people to experience and learn from the ecological landscape. This area will serve both as an educational forest garden and as a productive ecological barrier, reconnecting the community with the Nile while improving environmental quality.



0 10 20m

Figure 26 & figure 27: plan and section showing the relation between the ecological path and the food forest and the Nile

## 6. Expected Impacts

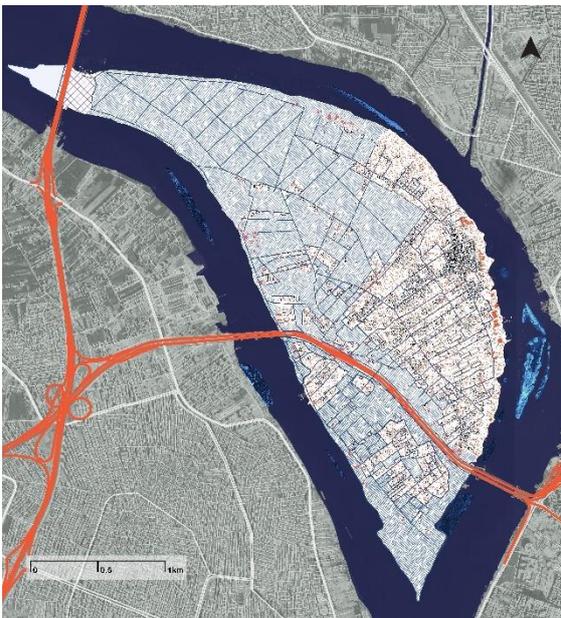


Figure28:- First phase of development demolishing the building

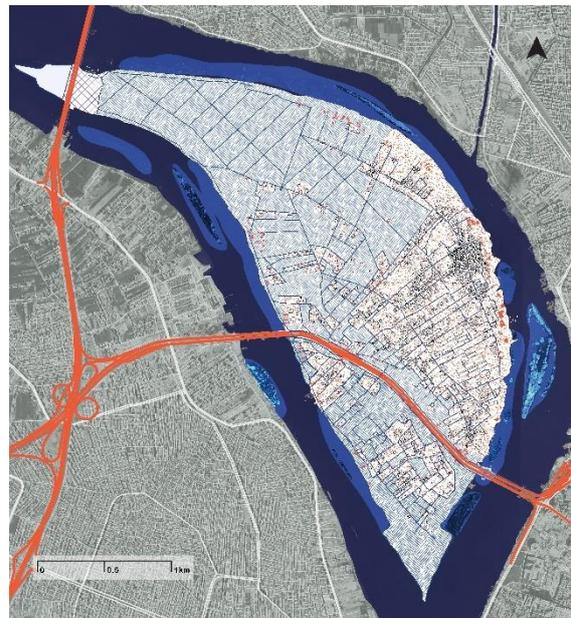


Figure29:- second phase of development restore the wetland

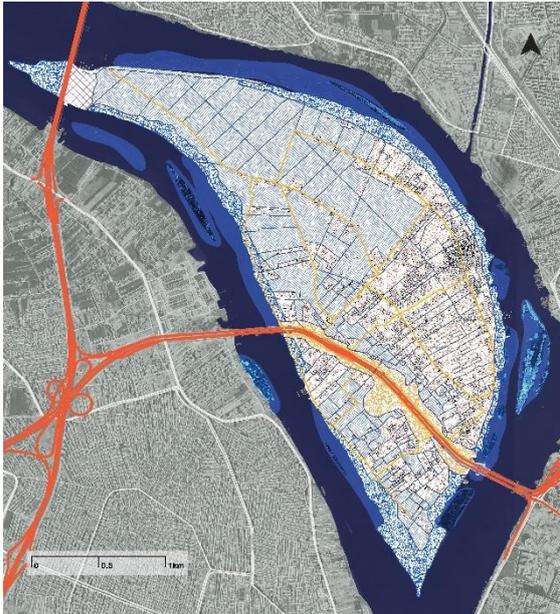


Figure30:- Third phase of development street network

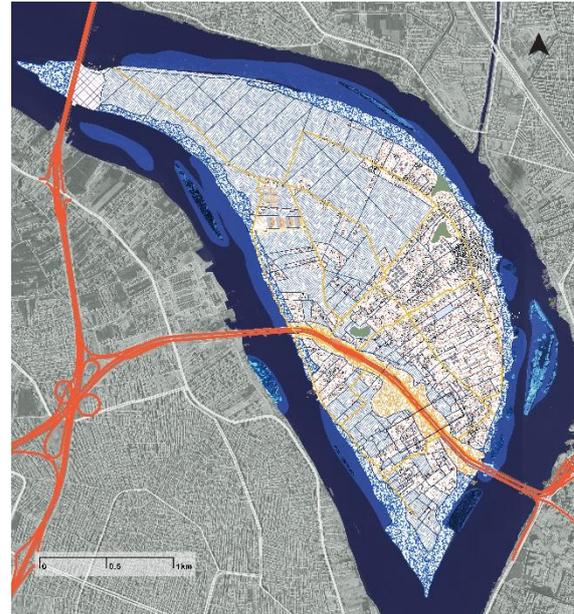


Figure31:- Forth phase of development public spaces

The proposed development strategy for El-Warraq Island is expected to generate significant social, ecological, and economic benefits by addressing the island's vulnerabilities through integrated, context-sensitive, and inclusive interventions. Rather than displacing the community or erasing the existing urban fabric, the project focuses on upgrading current conditions while preserving the island's identity and supporting its residents.

From a social perspective, the project seeks to enhance the quality of life by safeguarding residents' right to remain on the island, improving the built environment, and providing essential services. The establishment of structured street networks, safer housing conditions, and accessible public spaces will reduce spatial isolation, promote safety, and foster social cohesion.

Ecologically, the intervention revitalizes natural systems through wetland restoration, urban buffering, and sustainable land use practices. Wetland regeneration will purify the Nile's waters, enhance biodiversity, and improve the overall health of the environment. The green buffer will reduce air and noise pollution from the highway, protect soil quality, and contribute to a stable microclimate.

Economically, the project introduces productive landscapes and agri-tourism initiatives, thereby creating new sources of income for residents. Eco-markets, educational gardens, and seasonal events will support local employment and attract visitors from Greater Cairo, thereby promoting internal tourism. Transforming the island into a partially self-sustaining system is intended to reduce dependency on external resources and facilitate inclusive, community-driven economic development.

Collectively, these interventions position El-Warraq Island as a model of regenerative urbanism, where success is measured not by demolition and profit, but by long-term resilience, social inclusion, and ecological health.

## 7. Conclusion

El-Warraq Island presents a complex and dynamic case at the intersection of ecological vulnerability, informal urbanization, and community resilience. This thesis has proposed an alternative vision for the island's future—one that embraces inclusive development grounded in nature-based strategies and ecological thinking.

Through an analysis of the island's spatial, social, and environmental conditions, this research has identified key challenges, such as the absence of essential public services, ongoing ecological degradation, and socio-economic marginalization. In response, a cohesive set of strategies has been proposed to restore natural systems, upgrade infrastructure, and empower local communities. Notable interventions include wetland regeneration, the establishment of agri-tourism parks that integrate public space with productive land use, the implementation of urban buffering to mitigate pollution, and the incremental enhancement of the existing built environment.

Rather than imposing a new identity, this project aims to enhance and support what already exists. It values the community's long-standing connection to agriculture and fishing, and seeks to preserve the cultural and economic life that has sustained the island for generations. The design proposal promotes self-sufficiency by introducing economic opportunities grounded in the island's unique ecological and spatial context.

This thesis envisions El-Warraq Island as a model of regenerative urbanism, integrating social equity, environmental health, and economic sustainability. By prioritizing ecological restoration and community well-being, the project establishes a framework for transforming vulnerable urban landscapes through inclusive, place-based design.



Figure 32: Shoot of the public spaces in the island

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### **Note on Language Editing**

Artificial intelligence tools (e.g., Grammarly) were used solely for linguistic refinement, grammar correction, and enhancing the clarity of expression. The intellectual content, interpretations, and final conclusions presented in this thesis are entirely the author's responsibility.