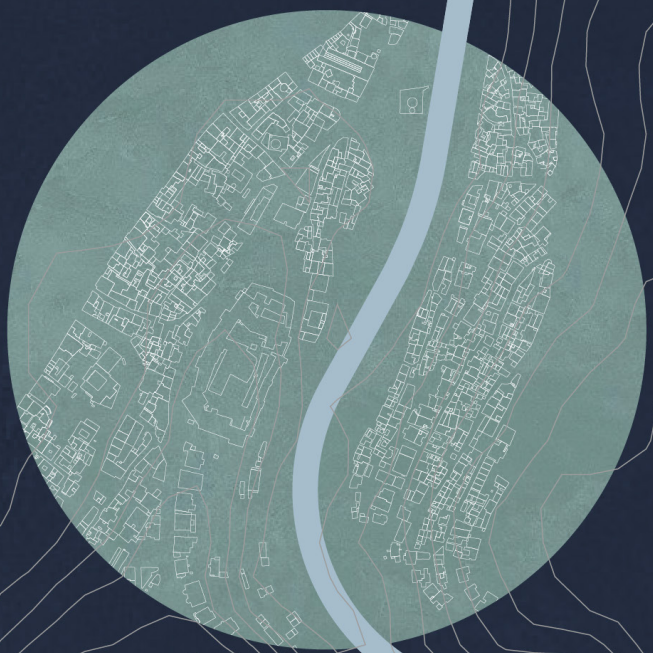
Riverfront Revitalization of The Abu Ali River



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Urban Riverfront Revitalization:
The Case of The Abu Ali River

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ABSTRACT

Younan, E. 2025.

How can riverfront regeneration processes mend disconnected spaces in dense urban settings? The case of The Abou Ali River.

This thesis aims to bring attention to the redevelopment of deteriorating urban rivers that got disconnected over the years from their cities and its people and lost their ecological functions, by developing sustainable urban design strategies to reactivate neglected spaces by the river and create new opportunities for the city.

The main subject of this study is the Abu Ali River in Tripoli, Lebanon. Over the years, urban planning initiatives failed to integrate it into the urban and socio-cultural fabric of the city, leading to its complete deterioration and the creation of a big physical and symbolic barrier disconnecting the neighbourhoods in the city from each other, and distancing the people from the riverfront. Accordingly, this thesis investigates the different socio-economic, historical, and spatial dynamics surrounding the Abou Ali River to propose a multi-scalar revitalization strategy and urban design intervention that could combine environmental restoration, urban connectivity, and placemaking principles, in order to re-integrate the river in the city as a public, cultural and ecological amenity. To achieve that, this research will carry out a thorough review of the existing literature to extract the key principles discovered in riverfront revitalization practices, backed up by an analysis of four chosen case studies to further inform the design strategy process. The general research will be then followed by an analysis of the chosen site in Tripoli following a historic, hydrologic, socio-economic, territorial and an urban analysis approach. This multi-dimensional and multi-scalar investigation will lead to the definition of a general zone of intervention, comprised of three sub-zones with the potential to reconnect the riverfront and reactivate its public spaces, going from the Mawlawiya garden all the way to the Bourtassi Square.

The thesis will conclude with an urban and architectural design proposal in the chosen zone where a cultural centre targeted for the youth is implemented, pedestrian accessibility is improved, and existing abandoned public spaces will be redesigned to reactivate their use in the city.

Keywords: Riverfront Revitalization, Connectivity, Accessibility, Public Space Activation, Green Corridor, Placemaking, Socio-Economic Factors, Multiscalar Approach.

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00 INTRODUCTION

How can riverfront regeneration processes mend disconnected spaces in dense urban settings? The case of The Abu Ali River.

Historically, rivers have played a defining role in the establishment of human settlements, however urbanization has degraded them, often to the point where they can no longer provide to society the services responsible for the settlements' initial developments.[1] Increasingly being used for industrial and infrastructural purposes, rivers lost the link they used to play between people and water in cities, becoming barriers responsible for social disconnection and sources of ecological and health concerns.

Interestingly, in dense urban contexts, urban riverfronts are central to green and public space networks, and hold the potential to host a variety of activities including commercial, residential, and touristic to cite a few ,offering a wide range of environmental, social and economical benefits.[2] Concerns over sustaining these services has led to the recent global surge in interest in these waterfronts, leading to more and more river restoration efforts; efforts that introduced broad ideas of environmental and social sustainability;[3] to redefine and uplift cities' identities.

In order to better integrate the river to its urban fabric, literature has brought special attention to social planning implementations, to develop river-spaces into hubs of social interaction and connection and create a livelier and healthier environment around the urban river.[4] Additionally, considering the influence short-term societal outcomes have on future ecological actions, working with the socio-ecological approach to develop restoration strategies could prove to be the most efficient way to reach high ecological quality aspirations.[5]

Riverfronts possess many varying features whether we're comparing rivers from different cities or even different segments of the same urban river.[6][7] Following that, this research aims to explore how revitalization interventions can re-shape the use and quality of various riverfront spaces in a way that re-connects them to each other and to the surrounding fabric.

This study will follow a thorough review of relevant literature in the field, followed by further analysis of strategies and outcomes extracted from selected case studies, as a means to better understand how and what kind of interventions on the riverfront can better integrate its different stretches to the city and restore its lost relation with the people. The literature review is structured following four main points: the evolution of the human/river and river/city relationship, the classification of riverfront spaces and the impact of riverfront open spaces in revitalization considerations, the role placemaking plays in creating sustainable riverspaces, and the main principles already set behind riverfront revitalization.

The results of this research will lay the groundwork for the topic of my thesis on the revitalization of the Abu Ali river in Tripoli, Lebanon. This river witnessed major transformations, degradations and neglect through the years. While losing its ecological functions and becoming a separating concrete-covered corridor between two sides of the historic city center, the river also witnessed a disconnection along its riverfront having multiple segments each with different characteristics, uses and issues, requiring specific solutions for each to join them all. Therefore, the question is: What riverfront interventions should be implemented to reconnect the fragmented urban fabric around and along the Abu Ali river and to turn it back into this active green corridor in the city like it used to be?

[1] Everard, M. and Moggridge, H.L. (2011) 'Rediscovering the value of urban rivers', Urban Ecosystems, 15(2), pp. 293–314.

[2] Samant, S., Brears, R. (2017). 'Urban Waterfront Revivals of the Future'. In: Tan, P., Jim, C. (eds.) Greening Cities. Advances in 21st Century Human Settlements. Springer, Singapore, pp.331-356.

[3] Sairinen, R., & Kumpulainen, S. (2006). 'Assessing social impacts in urban waterfront regeneration', Environmental Impact Assessment Review, 26(1), 120–135.

[4] Miradyanti, L., Srinaga, F. and Dewi, J. (2021) 'River-space development as a social interaction space through the placemaking approach', Built Environment Studies, 2(2), pp. 1–8.

[5] Zingraff Hamed, A. (2018). Urban River Restoration: a socioecological approach.

[6] Forgaci, C. (2018). 'Integrated Urban River Corridors: Spatial design for social-ecological resilience in Bucharest and beyond', Architecture and the Built Environment, (31).

[7] Hofmann, M. et al. (2012). 'Perceptions of parks and urban derelict land by landscape planners and residents', Urban Forestry and Urban Greening, 11(3).

01 LITERATURE REVIEW

objective A Trace the historical evolution of urban riverfronts, to understand their shifting roles and significance in urban development.

objective B Understand riverfront spaces through their morphology, functional components, and connectivity to the urban fabric.

objective C Classify and characterize public spaces within open urban riverfronts to establish a framework for analyzing their social and spatial dynamics.

objective D Examine principles and global trends in urban riverfront regeneration projects, to identify strategies that integrate ecological, social, economic, and urban considerations.

objective E Explore the concept of placemaking and its application in riverfront developments, focusing on its role in fostering vibrant and inclusive river spaces.

1.1 EVOLUTION OF THE URBAN RIVERFRONT

In order to understand how vibrant and connected urban riverfront spaces are created and what constitutes them, it is necessary to first understand the evolution of events that led to the rivers' disconnection from their urban fabric, to learn what can be potentially recovered or not. For that, let us first start with an overview of humans' relationship with rivers throughout history.[8]
Urban riverfront developments can be categorized into six key periods across history. These six phases illustrate the humans relationships with the rivers across the years:[9]

1- First Riverfront Settlements :
Rivers served as primary pathways of transportation and trade, and society expanded along the river's edge, but riverfronts weren't yet a primary criteria behind a city's birth. This period illustrates the first form of relation between people and rivers (Fig.01).

2- The Middle Ages:
Travelers began to colonize the riverbanks as the water resources were used for everyday purposes such as fishing, irrigation and domestic use as well as for trade (Fig.02).

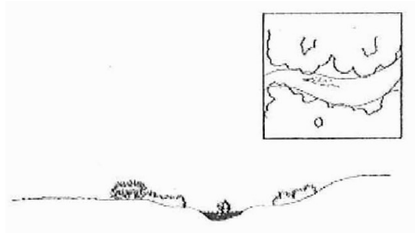


Fig. 01: The river was the most important way of domestic transportation and trade.
© H. Hussein, 2006

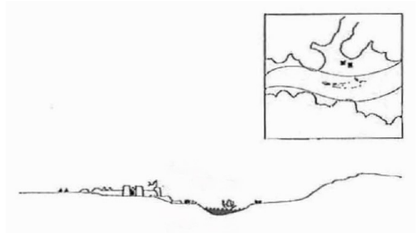


Fig. 02: The river became a primary factor of city development.
© H. Hussein, 2006

3- The Renaissance period:
Settlements grew around rivers, as previously surrounding dense tree covered areas were cleared for developments. River-related businesses thrived and rivers became necessary for a city's growth (Fig.03).

4- Industrialization :
This period witnessed fast advancements in technology and human sciences, as the small colonies evolved into active business cities where long buildings, warehouses and industrial plants were built along the rivers to facilitate trading and industrial activities. On the other hand it is during that period that human-made disasters occurred due to the advances in industrial practices leading to the demise of humans' relationship to the rivers (Fig.04).

(8) Miradyanti, L., Srinaga, F. and Dewi, J. (2021) 'River-space development as a social interaction space through the placemaking approach', Built Environment Studies, 2(2), pp. 1–8.

(9) Hussein, H. (2006). 'Urban Recreational Riverfronts: Successful Revitalisation Elements', Journal of Design and the Built Environment, 2(1).

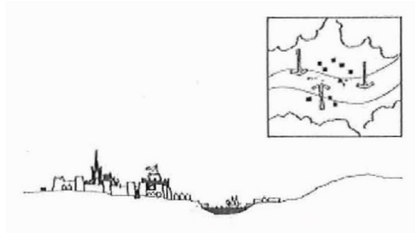


Fig. 03: With the city's development, the river became a necessity.
© H. Hussein, 2006

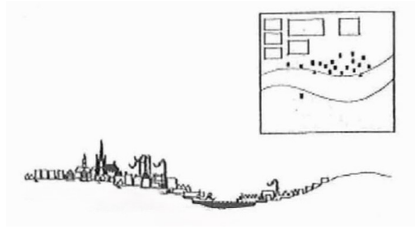


Fig. 04: Continuous development determined rivers as public open space corridors in people's perception. © H. Hussein, 2006

5- Riverfront's decline:
As time passed, newer and more practical ways of transportation were developed like roads and railroads, resulting in a decline in rivers' communication purposes (Fig.05). Additionally, long industrial buildings developed in the previous centuries along the river banks and the transport infrastructures implemented in vicinity, resulted in many urban riverfronts becoming environmentally and morphologically degraded during the second part of the 20th century.[10] Additionally urban sewage discharges and uncontrolled industrial wastewaters led to the contamination of waters.[11] This major degrading impact on the landscape of urban rivers inevitably led to the shift from natural habitats to industrial unhygienic spaces in riverain settlements.[12] With time these riverfronts were progressively neglected, and eventually abandoned by the residents (Fig.06), transforming them into unwelcoming urban residual spaces.These developments harmed the ecological function of rivers[13] as well as disconnected them physically from their urban context and symbolically from the urban life that used to take place within it, since the water edge lost its previous social and retail identity.[14]

6- Post industrial period:
Following the disconnection between urban residents and rivers due to water pollution, industrial developments, transportation infrastructure and river channeling, environmental awareness amongst the people started gaining popularity and policy-makers grew their interests in urban riverfront regeneration. By improving sewage disposals and relocating river-related industries, riverfronts regained their potential and attractiveness for commercial, residential and most importantly, recreational developments. Projects to restore and improve riverfronts surfaced aiming to reconnect people to these waterfronts and reintegrate the riverfronts to their urban fabrics.[15]

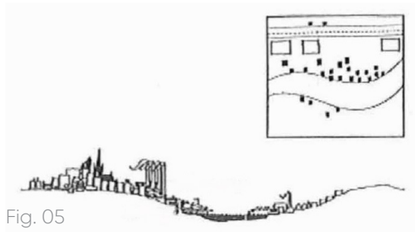


Fig. 05



Fig. 06

(10) Wantzen, K. M. et al. (2016) 'River Culture: an eco-social approach to mitigate the biological and cultural diversity crisis in riverscapes'. International Journal of Ecohydrology & Hydrobiology, 16(1), pp. 7–18.

(11) Kondolf, G.M. and Pinto, P.J. (2017) 'The social connectivity of Urban Rivers', Geomorphology, 277, pp. 182–196.

(12) Hussein, H. (2006). 'Urban Recreational Riverfronts: Successful Revitalisation Elements', Journal of Design and the Built Environment, 2(1).

(13) Everard, M. and Moggridge, H.L. (2011) 'Rediscovering the value of urban rivers', Urban Ecosystems, 15(2), pp. 293–314.

(14) Otto, B., McCormick, K., & Leccese, M. (2004). 'Ecological Riverfront Design: Restoring Rivers, Connecting Communities', American Planning Association.

(15) Durán Vian, F., Pons Izquierdo, J.J. and Serrano Martínez, M. (2021) 'River-city recreational interaction: A classification of urban riverfront parks and walks', Urban Forestry & Urban Greening, 59.

Riverfront evolution summary:

-Riverfront as a founding feature of human settlments

-Riverfront as a central element to the establishment and growth of urban form

- Riverfront's decline

-Rediscovery of the riverfront and its potentials

Fig. 05: Better transportation with easier access resulting in the river's decline as a form of communication
© H. Hussein, 2006

Fig. 06: The river was perceived as the back alley of the developing city. This led to the abandonment of riverfronts © H. Hussein, 2006

1.2 **CLASSIFICATION OF RIVERFRONT SPACES**

MORPHOLOGY OF URBAN RIVERFRONTS

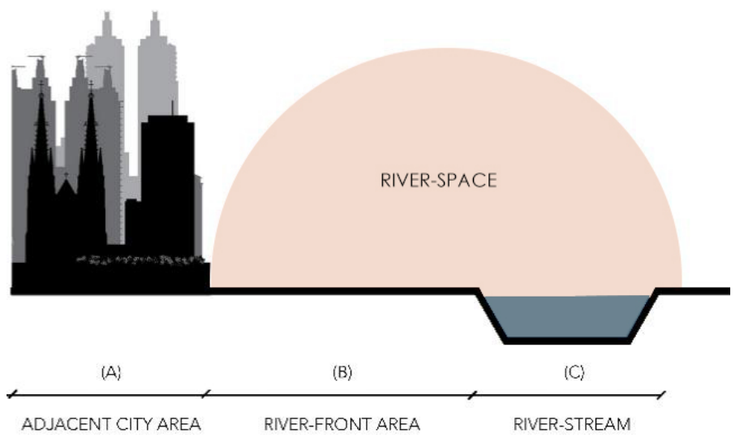
Studying a city's urban morphology helps understand its fundamental characteristics, as it presents us with the origins and consequences of the city's development and reconstruction throughout history.[16] Understanding the urban morphology of a river is done by analyzing adjacent buildings,the road networks, and land usage of its surrounding urban fabric,as these elements inform us on the urban strategies that influenced its evolution.

Three element in an urban river's morphology are to be considered as they affect and play a role in the river's development and vice versa:[17]
1- The urban fabric in relation to the river
2- The circulation infrastructure in relation to the river
3- The open spaces on and around the river

UNDERSTANDING THE RIVER SPACE COMPONENTS

After having presented the historical evolution of riverfronts that led to the "recent" global riverfront revitalization initiatives, and having introduced key elements to consider in riverfront developments, this following section aims to dive deeper into understanding the open space dimension of riverfronts, understanding what constitutes the river-spaces, and classifying the public and open spaces that exist within them, along with the functions they can host. A focus on socio-ecological approaches in the revitalization developments will be given to restore social connectivity and environmental sustainability.

According to Miradyanti[18] the river-space in relation to the adjacent city area; meaning the open spaces on and around the river; can be divided into 2 zones :the riverfront area and the riverstream (Fig.07).



(16) Ariza-Villaverde, A. B., Jiménez-Hornero, F. J., & Ravé, E. G. D. (2013) 'Multifractal analysis of axial maps applied to the study of urban morphology', Computers, Environment and Urban Systems, 38, 1–10.

(17) Pattacini, L. (2021) 'Urban Design and rivers: A critical review of theories devising planning and Design Concepts to define riverside urbanity', Sustainability, 13(13), p. 7039

(18) Miradyanti, L., Srinaga, F. and Dewi, J. (2021) 'River-space development as a social interaction space through the placemaking approach', Built Environment Studies, 2(2), pp. 1–8.

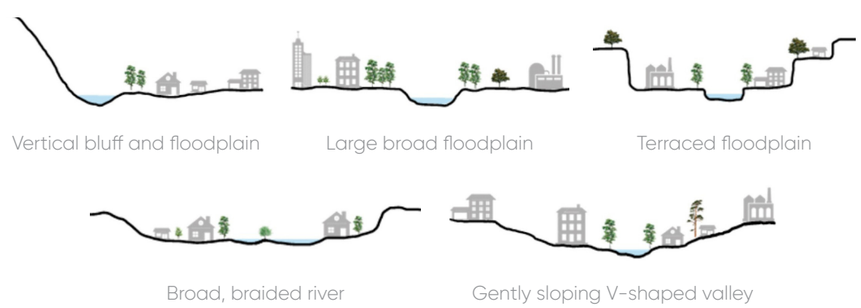
Fig.07: Division of river-spaces and its relation to the city. © Miradyanti, 2021

Academic interpretation of the words "Riverfront" has evolved, and its meaning took different shapes from one author to the other. Following a more ecological point of view, recent literature has referred to it as the "transition zone between urban development and water" rather than a contact zone (Fig.08).[19] In the frame of this study, the term "riverfront" will be referring to a transitional zone between the urban fabric and the water stream.



Riverfront's characteristics can vary drastically, between one city's river and the anothers, and even between different stretches of the same urban river.[20] [21] Differences can range from natural environments to heavily modified and artificial ones. In fact river corridors can go from being completely ignored, to being preserved and holding their ecological function, to being aesthetically controlled and landscaped,[22] even hardscaped. By paying attention to the natural characteristics of the river-stretch and the social, political and historical background of the urban fabric where they are present, a better understanding of riverfronts is obtained.[23] [24]

While it has been determined that historic developments of cities have played a central role in shaping various riverside spaces and influencing the river's connection to the city,[25] a river's geographical location has also had a big impact on the river-city relationship. [26] Additionally, the width of the river space, the configuration of its banks and the morphology of the valley in which a river is located, are factors that greatly affect riverfront developments.[19]
Based on Duran Vian et al., 2021 research there are five valley morphologies that are usually urbanized: (Fig.09)



(19) Durán Vian, F., Pons Izquierdo, J.J. and Serrano Martínez, M. (2021) 'River-city recreational interaction: A classification of urban riverfront parks and walks', Urban Forestry & Urban Greening, 59.

(20) Forgaci, C. (2018). 'Integrated Urban River Corridors: Spatial design for social-ecological resilience in Bucharest and beyond', Architecture and the Built Environment, (31), 1-382.

Fig.08: Interpretation of riverfront zones according to current (right) and previous (left) studies.
© Duran Vian et al., 2021

(21) Hofmann,M. et al. (2012). 'Perceptions of parks and urban derelict land by landscape planners and residents', Urban Forestry and Urban Greening, 11(3).

(22) Gregory, K.J. (2006) 'The human role in changing river channels', Geomorphology 79 (3-4), 172–191.Gunn, C.A., 1977.

(23) Timur, U. P. (2013) 'Urban waterfront regenerations', in Özyavuz, M. (ed.). Advances in Landscape Architecture.

(24) Hussein, H. (2006). 'Urban Recreational Riverfronts: Successful Revitalisation Elements', Journal of Design and the Built Environment, 2(1).

(25) Yassin, A.B., Eves, C., McDonagh, J. (2010) 'An evolution of waterfront development in Malaysia'. 16th Pacific Rim Real Estate Society Conference Wellington 1–17.

(26) Díaz, E., Ollero, A.. (2005) 'Metodología para la clasificación geomorfológica de los cursos fluviales de la cuenca del Ebro', Geographicalia 47, 23–46.

Fig.09: Valley shapes that are frequently urbanized.
© Duran Vian et al., 2021

CONNECTIVITY IN RIVERFRONT SPACES

With the global establishment of riverfront revitalization redevelopments, major efforts to restore the river-city relationships were set to improve rivers' social connectivity.[27] This resulted in an increase in diverse activities on the riverbanks and around the river streams.[28] In fact riverfront developments that insure public access to the river's edge are considered successful in today's literature.[29]

According to S. Schmutz (2018) [30] and L. Miradyanti (2021)[31] planning social connectivity relies on three spatial dimensions (longitudinal, lateral and vertical) and one temporal dimension.
These connectivity dimensions are elaborated as follows:

- The longitudinal connectivity (Fig.10) refers to the trail that goes alongside the entirety

- The lateral connectivity (Fig.11) refers to the river's floodplain. This aspect needs to be developed. Some examples to do so could be by implementing strategic bridges and stepping-stones to connect one riverside side to the other.

- The vertical connectivity (Fig.12) refers to the y axis joining the atmosphere to the groundwater. This aspect needs to be developed. Some examples to do so could be by placing ramps, natural slopes, stairs, and wooden docks for people to be able to reach the water.

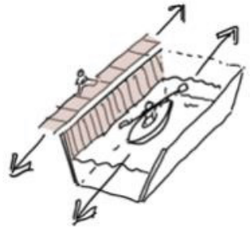


Fig. 10: Longitudinal connectivity



Fig. 11: Lateral connectivity



Fig. 12: Vertical connectivity

Fig. 10: Longitudinal connectivity
Fig. 11: Lateral connectivity
Fig. 12: Vertical connectivity
© Miradyanti, 2021

Throughout history the longitudinal connectivity has been deeply developed with rivers being used as channels for enlarged navigation and transportation routes. These developments are what led to the disconnection of people from their rivers as lateral and vertical connectivities to the river were also lost. Consequently a first step into transforming rivers to social spaces would be to overlap the spatial dimensions together (Fig.13), as social connectivity within the context of river-spaces is defined as:
"the communication and movement of people, goods, ideas, and culture along and across rivers, recognizing longitudinal, lateral, and vertical connectivity". [32]

[27] Kondolf, G.M., Comby, E. and Le Lay, Y.F.(2018), 'Connectivity of urban rivers and environmental justice'. In International Conference on Integrative Sciences and Sustainable Development of Rivers.

[28] Sairinen, R., & Kumpulainen, S. (2006). 'Assessing social impacts in urban waterfront regeneration', Environmental Impact Assessment Review, 26(1), 120–135.

[29] Timur, U. P. (2013) 'Urban waterfront regenerations', in Özyavuz, M. (ed.). Advances in Landscape Architecture.

[30] Schmutz, S. and Sendzimir, J. (eds.). (2018) Riverine Ecosystem Management. Amsterdam, The Netherlands: Springer International Publishing.

[31] Miradyanti, L., Srinaga, F. and Dewi, J. (2021) 'River-space development as a social interaction space through the placemaking approach', Built Environment Studies, 2(2), pp. 1–8.

[32] Kondolf, G.M. and Pinto, P.J. (2017) 'The social connectivity of Urban Rivers', Geomorphology, 277, pp. 182–196.

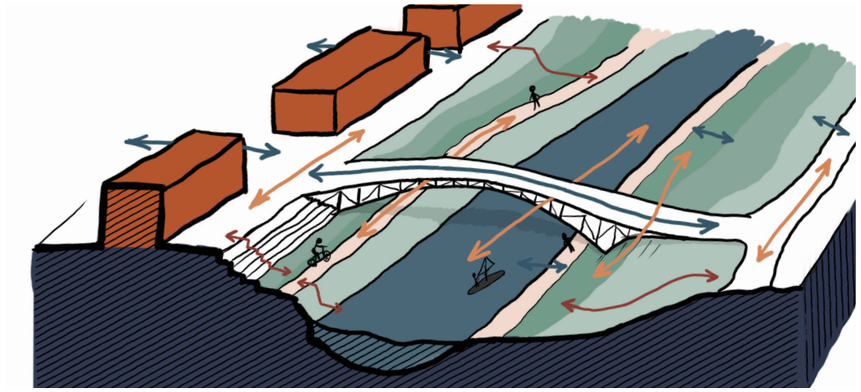


Fig.13 :Sketch visualizing the different types of connectivity to, along, and across an urban stretch of river. Dark Blue arrows show lateral connectivity, red arrows are for vertical connectivity, and pink ones are used for longitudinal connectivity.
©Adapted from Kondolf and Pinto, 2017

As for the river's temporal dimension, it is mainly associated with the continuous interaction men and rivers have over a time period. According to P, Haygarth (2009) [32], it is through the "use-value" connections that we can understand what constitutes these interactions and how they can exist within the river-space, as these connections highlight the different ways in which society uses and recognizes rivers.
Moreover, there are three types of "use-value" connections between river and men:
-Aesthetic : rivers are valuable elements that can affect humans' well-being
-Resource: rivers serve as a commodity, ie. water or trade route
-Recreation: rivers are a place with physical characteristics that allow water-based / water-related activities to happen within or around the space.
Therefore, these tangible and intangible aspects play a major role in shaping social connectivity in rivers.[33]

CLASSIFICATION OF PUBLIC SPACES IN OPEN URBAN RIVERFRONTS

As stated in the previous section, successful riverfront developments are those that ensure public access to the river's edge.[34] Following green infrastructure projects implemented in recent riverfront re-developments, alot of multifunctional open spaces are now integrated within river-spaces globally.[35] Although these spaces usually respect a similar linear pattern, their design and spatial characteristics vary greatly. The design and environmental features of these spaces along with their level of interaction with the river, shape the types of riverfront public spaces and activities they can host.[36] Therefore open river-spaces, in urban public riverfronts are a fundamental aspect of riverfront revitalization developments and need to be properly understood.

Several factors affect open spaces on urban riverfronts. Usually, riverfront developments on lightly modified river stretches are very different from the ones we find on deeply channeled rivers.[36]

[32] Haygarth, P. M. (2009). 'River Futures: An Integrative Scientific Approach to River Repair', Journal of Environment Quality, 38(4), 1778.

[33] Miradyanti, L., Srinaga, F. and Dewi, J. (2021) 'River-space development as a social interaction space through the placemaking approach', Built Environment Studies, 2(2), pp. 1–8.

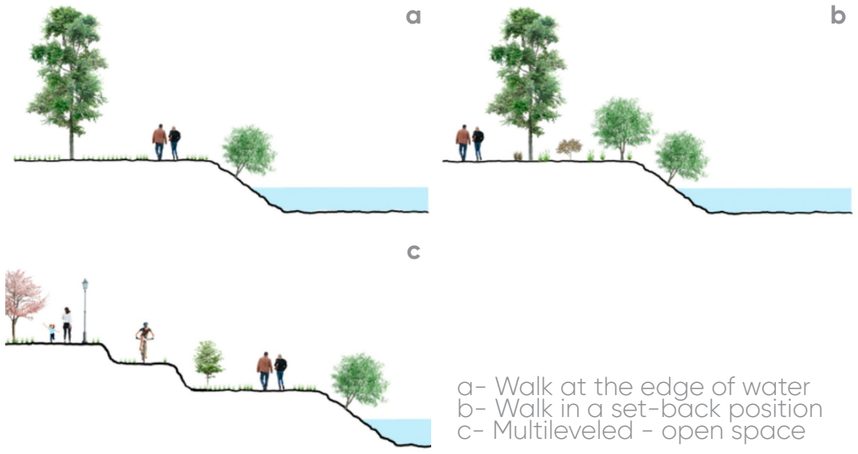
[34] Timur, U. P. (2013) 'Urban waterfront regenerations', in Özyavuz, M. (ed.). Advances in Landscape Architecture.

[35] Zhang, L. (2002). An evaluation of an urban riverfront park, Riverfront Park, Spokane, Washington: Experiences and lessons for designers (Doctoral dissertation, Washington State University).

[36] Durán Vian, F., Pons Izquierdo, J.J. and Serrano Martínez, M. (2021) 'River-city recreational interaction: A classification of urban riverfront parks and walks', Urban Forestry & Urban Greening, 59.

Spaces for public use are usually small along channeled river stretches, as the natural reach of the floodplain is modified and delimited by embankment and buildings (Kondolf and Pinto, 2017).[37] These stretches are usually located in the city centers where planning of riverfront areas are affected by densification policy strategies (Prominski et al., 2017),[38] and their spaces usually have artificial hardscape surfaces. On the other hand, river stretches that have their original state preserved have more space available along them. They are usually in peripheral urban areas, where the riverbanks bordering these stretches are usually natural and unbuildable green zones. Depending on the river's morphology, these spaces can be accessible, offering public activities (Prominski et al., 2017),[38] with "soft surface" treatments like those of gardens, parks or urban forests.[39]

Generally, in riverfront developments different activities like cycling, walking and sightseeing for instance, are implemented in the open spaces along the riverfront, and the most common open spaces present along these rivers are parks (also referred to as "greenways") and urban walks.[40] Urban walks are usually wider in densely populated cities and offer a promenade experience, as they pass by commercial, cultural and recreational attractions often present along them.[41] [42]
These public spaces, although present in different river stretches, are usually interconnected to form one network system. [43] Their positions vary both from their vertical distance to the waterstream and from their horizontal distance from the water-edge (directly on it or setback from it). Some spaces even exist simultaneously at different levels of the riverbank, creating a riverfront with multilevel open spaces (Fig.14)[40]



a- Walk at the edge of water
b- Walk in a set-back position
c- Multileveled - open space

Fig.14 :Variations in the location of the riverfront open spaces in relation with the distance to the water.
© Duran Vian et al., 2021

Urban walks and greenways on riverfronts can be classified according to two main criterias:
1- The open spaces' position within the river corridor
2- The physical accessibility from the open spaces to the water

[37] Kondolf, G.M. and Pinto, P.J. (2017) 'The social connectivity of Urban Rivers', Geomorphology, 277, pp. 182–196.

[38] Prominski, M., et al. (2017). River. Space. Design: Planning Strategies, Methods and Projects for Urban Rivers. Third and Enlarged Edition. De Gruyter.

[39] Silva, J.B. et al. (2004) 'Classification of the aesthetic value of the selected urban rivers. Methodology', Urban River basin enhancement methods-FP5 Project (2002-2005).

[40] Durán Vian, F., Pons Izquierdo, J.J. and Serrano Martínez, M. (2021) 'River-city recreational interaction: A classification of urban riverfront parks and walks', Urban Forestry & Urban Greening, 59.

[41] Macdonald, E. (2007). 'Urban Waterfront Promenades And Physical Activity By Older Adults: The Case Of Vancouver', Journal of Architectural and Planning Research, 24(3), 181–198.

[42] Macdonald, E. (2017). Urban waterfront promenades. Taylor & Francis, pp. 86-98.

[43] Keith, S. J. et al. (2018) 'Greenway use and preferences in diverse urban communities: Implications for trail design and management', Landscape and urban planning, 172, pp. 47–59.

And to define said position of spaces, a consideration of the zones existing within the river corridor (A) and of the interventions modifying locally the natural form of the floodplain, is taken into account (B). [44]

(A) The zones constituting a river corridor (Fig.16) are:
- The riverstream
- The riparian zones: Borders the water stream. It is a transition area going from a land ecosystem to a water ecosystem. Vegetation on it depends on the frequency of floods it encounters and the capacity of its soil to absorb water.[45]
- The topographic floodplain zone: area with many variants. It can be flooded rarely or frequently. and the transitional upland fringes, these areas arent standard to all river corridor as their form and existence varies depending on the morphology of the valley in which the river is located and on the urban developments that affected it.[44]
- The upland fringe zone: Transition area between the river's floodplain and the surrounding natural or urban fabric.

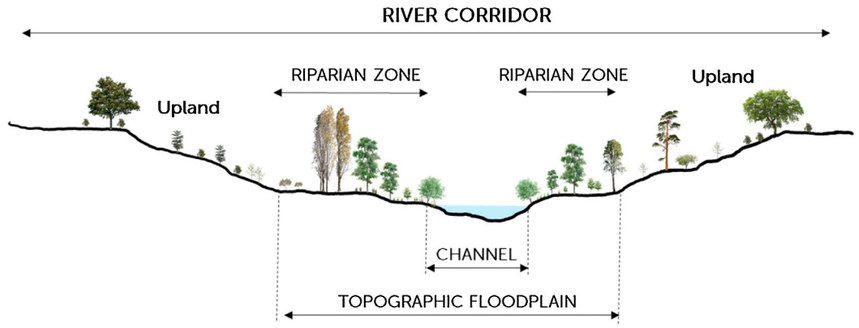
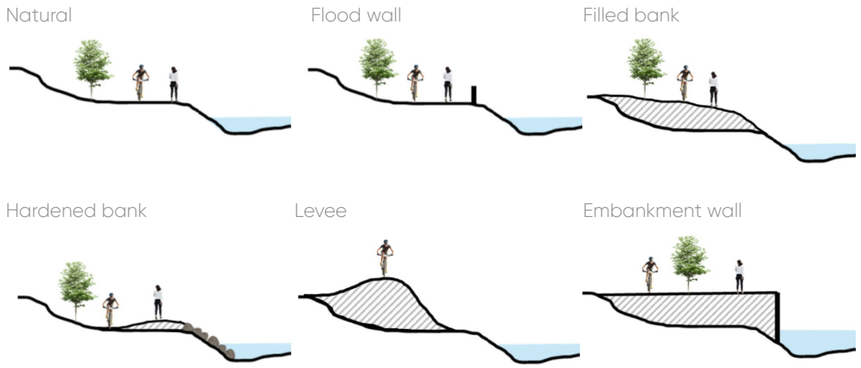


Fig.16: Cross section of a symmetric natural corridor.
© Duran Vian et al., 2021

(B) Urban rivers differ from natural river corridors as stated previously, as man-made interventions, usually aiming to avoid flood risks, have highly altered natural floodplains in cities.[46] The most common man-made urban river interventions are: embankments, flood walls, hardened banks, filled banks and simplification of the channel (Fig.17). [47]



[44] Durán Vian, F., Pons Izquierdo, J.J. and Serrano Martínez, M. (2021) 'River-city recreational interaction: A classification of urban riverfront parks and walks', Urban Forestry & Urban Greening, 59.

[45] Naiman, R.J., Decamps, H. (1997). 'The ecology of interfaces: riparian zones', Annual Review of Ecology and Systematics, 28 (1), 621–658.

[46] Silva, J.B. et al. (2004) 'Classification of the aesthetic value of the selected urban rivers. Methodology', Urban River basin enhancement methods-FP5 Project (2002-2005).

[47] Kondolf, G.M. and Pinto, P.J. (2017) 'The social connectivity of Urban Rivers', Geomorphology, 277, pp. 182–196.

Fig.17: Natural river edge vs usual water edge barriers.
© Duran Vian et al., 2021

[48] Hussein, H. (2006). 'Urban Recreational Riverfronts: Successful Revitalisation Elements', Journal of Design and the Built Environment, 2(1).

[49] Durán Vian, F., Pons Izquierdo, J.J. and Serrano Martínez, M. (2021) 'River-city recreational interaction: A classification of urban riverfront parks and walks', Urban Forestry & Urban Greening, 59.

Although these interventions all serve to avoid flood risks, they offer different types and qualities of open spaces, therefore can host different public uses. One factor that can affect said uses is the accessibility to water; whether it be physical or visual.[48] Furthermore, water accessibility relies on three considerations:
First, the vertical distance between the floor of the space and the level of the water.
Second, the horizontal distance between the space and the edge of the water.
And third, the visual and physical obstacles (ie.walls, stones, natural vegetation, balusters, gentle/steep slope, ect) separating the space and the stream (Fig.18). [49]

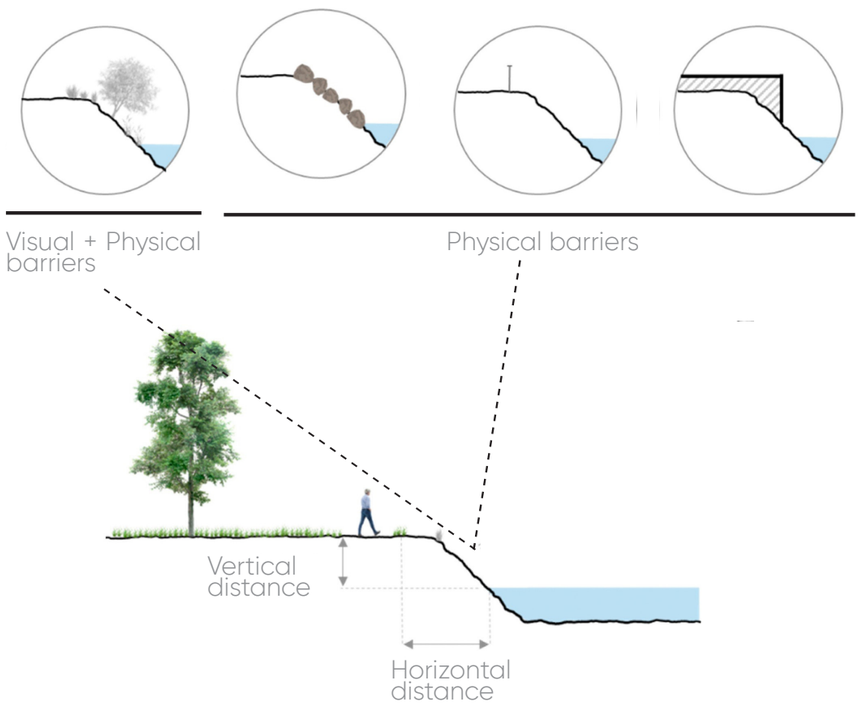


Fig.18: Factors influencing water accessibility.
© Duran Vian et al., 2021

Additionally, the extent of how much physical accessibility exists between an open space and a river stream also distinguishes one space from the other. Subsequently, Duran Vian et al. (2021) [49] identify three degrees of physical accessibility to water along an open river-space (Fig.19):

1- A regular access, where interaction between water and space is common along the river.
2- An occasional access, where connections are still possible but less frequent.
3- No access at all, where the barriers cover the whole area separating the land from the water.

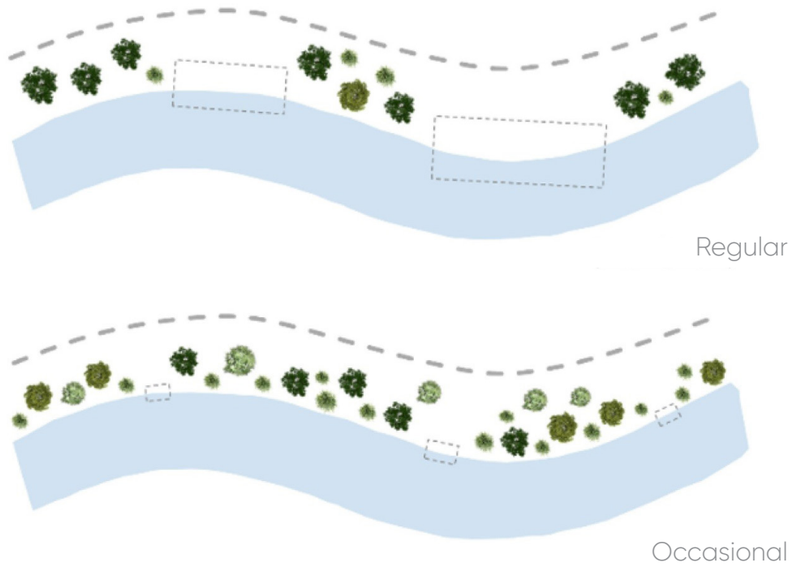


Fig.19: Types of physical access along a riverfront park.
© Duran Vian et al., 2021

CHARACTERIZATION OF PUBLIC SPACES IN OPEN URBAN RIVERFRONTS

A summarizing table interpreting the results of Duran Vian et al. (2021) [49] study, combines the different river corridor zones factor; divided into four subcategories: the "floodplain fluvial", the "floodplain riparian", the "upland spaces" and the "raised spaces; as well as the water accessibility factors previously studied, to classify and categorize open spaces along riverfronts. (Table.01)

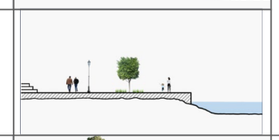
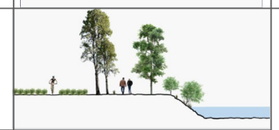
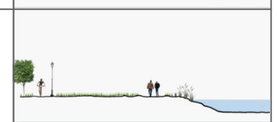
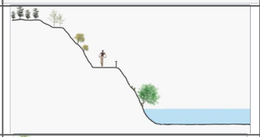
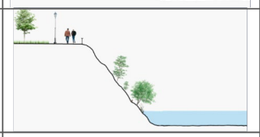
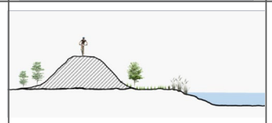
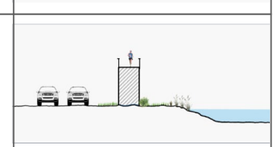
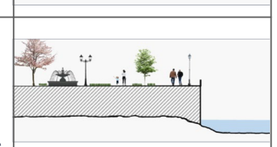
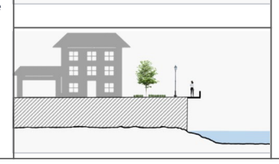
		River corridor classes	River corridor Sub-classes	Location of the riverfront walks and parks		Surface treatment	Illustrative scheme	Vertical distance between ground and water surface	Physical access to water	Visual access to water	Relationship with water	Type of activites and uses supported	
												In-stream activities/functions	Banktop activities/functions
Open spaces classification in river corridors	On the floodplain		Fluvial Floodplain Space	In a floodplain with regular access to water	Rare type in cities	Floodable softcaped-spaces with vegetation (Natural)		Short	Regular	Common	Normally compatible or adapted to floodings Recreational uses restricted to flood-free periods	Rowing Swimming Diving Fishing	Events facilities Sport facilities Leisure facilities Sunbathing meadows Barbecue areas Kids Playgrounds
						Floodable paved-spaces (Artificial)							
			Riparian Floodplain Space	In a floodplain with occasional or no access to water	Most common subclass of the floodplain type	High vegetation barrier		Varies (but higher than fluvial subclass)	Occasional / no access	Varries	Steep banks, flood walls, rails or unmaintained vegetation act as a barrier to access to the water The boundaries are more frequent in steep banks	Jumping Rowing	Sport facilities Recreational activities Barbecue areas Kids Playgrounds
						Low vegetation barrier							
	Out of the floodplain		Upland Spaces	In valleys with vertical bluffs and terraced plains	Usually far from the river channel	On a lower-middle terrace or excavated hillslope		High	No access	Varries	Separated from the water by a riparian zone and/or a steep slope Occasional planned entries to the water edge but spontanuous entries are more common	-	Cycling Walking Scenic view
						On a bluff top							
			Raised Spaces (artificially elevated areas that are not flooded)	On Levee Greenway	urban periphery	Usually landscaped		High	No access	Common	Elements (plants, urban furniture, infrastructures, etc.) and designs can be chosen regardless of the water presence	-	Cycling Walking Scenic view (depends on abundance of shore vegetation)
				On Floodwall walk	used	Walk on a concrete wall							
				On embankment	More frequent in areas where buildings are close to the river	Promenades are normally paved and formal landscape designs are predominant in green spaces			Occasional / no access	Common	River access is occasional or does not exist dues to high vertical masonery wall Can be improved with steps down to the water, docks and floating islands	-	Walking bordered by commericial, recreational and cultural facilities
				Suspended walkway on embankment									

Table.01: Riverfront open spaces classification. Adapted from Duran Vian et al., 2021

1.3 URBAN RIVERFRONT REGENERATION

GLOBAL TREND

In the seventies, regeneration processes of deteriorated waterfronts were introduced in America. This initiative was later on followed by the United kingdom in the eighties. Since then, national government departments as well as local authorities and developers all around the world have expressed their growing interests in waterfront regeneration processes, as the potential benefits it held became more evident.[50] In fact waterfronts are generally strategic zones for urban development, as their usage impacts the identity of the city in various ways (indirect or direct), and offers oftentimes unbuilt natural areas in the heart of the dense urban fabric.[51]

Furthermore, there exists many different reasons behind the regeneration projects initiatives, that includes: the desire for historical preservation, changes in technologies, and the rise of concerns on environmental issues, coupled with intentions to increase the availability of public spaces in the city.[51] Yet, these riverfront regeneration processes hold many challenges. For instance, balancing efforts to preserve and restore the environment while also ensuring economic social viability of the project is a core concern.[52]

URBAN RIVERFRONT REGENERATION PRINCIPLES

There are many more aspects that should be considered when planning urban waterfront revitalizations.[51] To achieve proper urban complexity, multiple components of the riverfront revitalization process are necessary. An overview of these factors goes as follow:[53]
- Assigninging a diversity of functions to the riverfront area, so that it can serve a range of different yet complementary purposes.
- Combining multiple activities relative to various major sectors (residential, commercial, cultural and recreational, mobility, economic,productive) in the zone to be redeveloped.
- Having the private and public entities co-exist, in terms of actors involved, functions and spaces to design (ie. private gardens vs. public piazzas/ parks).

In addition to Bruttomesso's contribution, other researchers in the field have investigated different riverfront regeneration projects in order to set a series of principles behind sustainable and successful riverfront interventions. These principles encompass many regeneration aspects, similar to the ones previously mentioned, that are different yet complementary to achieve a properly integrated riverfront. From the results of different literature reviews, a table combining different principles developed in the literature, summarizes the many regeneration aspects and interventions to consider, sorting them into four categories: Environmental, Urban, Social and Economic/ Financial/ Managerial. Adaptation from (Tarek, 2022). (Table 02)

[50] Jones, A. (1998) 'Issues in waterfront regeneration: More sobering thoughts-A UK perspective', Planning practice and research, 13(4), pp. 433–442.

[51] Sairinen, R., & Kumpulainen, S. (2006). 'Assessing social impacts in urban waterfront regeneration', Environmental Impact Assessment Review, 26(1), 120–135.

[52] Tarek, S. (2022). 'Health promoting qualities framework for blue and green landscapes: applying perceived restorativeness on a case study of nile riverfront in greater cairo region', Journal of Engineering Research, 6(4), 41-55.

[53] Bruttomesso, R. (2001). Complexity on the urban waterfront. In R. Marshall (Ed.), Waterfronts in Post Industrial Cities (pp. 39–49). Spon Press.

		Principles from literature
Enviromental	River	Maintain a high quality of water and environmental standards by utilizing innovative technical designs that: - enhances the human/environmental interaction - develops the economic activities of a recreational waterfront - decreases (pre-existing) industrial pollution (Breen and Rigby, 1994; PPS 2009)
	Ecology	- Protect green areas - Sustain and enhance the ecology of the waterfront (flora and fauna) (Elhalabi et al., 2017)
Urban	Accessibility	Ensure public accessibility - both physical and visual - to the water and waterfront. (Abdullatip & Shamsuddin 2012) (Zhang 2002)
	Connectivity	- Integrate the waterfront development to the surrounding environmental context and urban fabric, through: creating a waterborne transport system connecting to the surrounding neighborhoods (and city-center) by developing an entertainment and a cultural hub, (Zhang 2002) transforming the river from a barrier to a meeing place
	City Improvement	- Take cities identiyu into consideration. - Revival of the riverfront is the first step intothe Revival of the wole city - Insure proper infrastrucutre - Revitalize riverfront neighborhoods
	Open spaces and park	- Emphasize social connectivity and sustainability of waterfronts by creating parks and green spaces. (Zhang 2002) (PPS 2009) (Wang 2000) - Design with regards to urban needs and aesthetics. (Abdullatip & Shamsuddin 2012) - Ensure efficient landscape design (seating shading- safety –lighting-plantation) (Elhalabi et al., 2017) - Integrate a diversity of spaces and functions (Duran Vian et al., 2021)
	Mobility	- Move away the road network and Decrease vehicular entry to create easy pedestrian access to the public waterfront– i.e. underground network - Create cycling paths (Hussein, 2006)
	Transportation	- Support multiple transport systems which includes pedestrian and vehicular. (PPS 2009) - Provide more pedestrian accessibility via sidewalks. (Elhalabi et al., 2017)
	Buildings	-Preserve and restore heritage structures and take identity into consideration. (Breen & Rigby 1994)
	Services and activities	- Prioritize mixed uses and create multiple destinations thus encouraging 24 hour activity.(PPS 2009)(Pattacini, 2021)
Social	Social	- Engage citizens in the development of the public space, by encouraging participation and providing information (Elhalabi et al., 2017)
Economic Financial Managerial	Economic, Financial and Managerial	- Introduce a mix of public and private partnership for investments and management (Wang 2000) - Develop a plan with all the stakeholders to maximize the benefits and values of the riverfront (Elhalabi et al., 2017) - Enhance the informal economy through designing and managing former informal markets (Elhalabi et al., 2017)

Table.02: Summary of general principles of urban riverfront revitalization. Adapted from Elhalabi, 2017

1.4 PLACEMAKING IN URBAN RIVERFRONT REGENERATION

GENERAL CONCEPT OF PLACEMAKING

To understand the idea behind "placemaking" we have to first understand what a "place" is, and how it offers the concept of "space". According to Y. Tuan, Y., (2001) [54], "Space" refers to an area where humans occupying it hold no connection or attachment to it, while "Place" refers to more than just an area without impostance: It possesses value in the eyes of the people using it and is associated to a certain experience they live in it. Thus places are spaces that are valuable to the users.
But, even though a space is different from a place. A space can still become a place if modified to have a purpose and a meaning. In fact, it is part of our job as architects and urban designers, to find out the potential and the "sense of place" within a space, to transform and design them into places for the people. [55]

The concept of placemaking is not new, as some of the main ideas behind it were introduced and developed by pioneers in the field like William Holly Whyte and Jane Jacobs back in the 60's. In their works, they advocated for designing cities "for the people", focusing on the cultural and the social importance of creating welcoming public spaces, pedestrian friendly streets and vibrant community hubs. For the past forty years, designers and architects have been applying the placemaking approach in their works as a way to design places for the communities' wellbeing. Project for public space also known as PPS, created in 1975 as a non-profit planning and design educational organization, is today well-known for developing a comprehensive placemaking approach. [56]

Furthermore, PPS describes a "successful public place" as a place that posses these four aspect [57] (Fig.20):
1- Accessibility and linkages: It should be accessible, easy to find and navigate, and be visible from both close and far distance.
2- Sociability: It should focus on the community, diversity, and sociability.
3- Uses and activities: It should engage people with its different activities and uses.
4- Comfort and image: It should be clean, comfortable and pleasant to be in

PLACEMAKING IN RIVERFRONT DEVELOPMENTS

In (Miradyanti, 2021) [58], the author takes the four aspects from PPS's placemaking approach and compares them to PPS's 10 Qualities of a Great Waterfront Destination and the qualities from the book "Reframing Urban Spaces Spaces", to find elements and variables that are suitable for river-spaces. They then add factors favoring social connectivity in river-spaces, and end up with a final list of characteristics needed in the creation of successful public river-spaces. The list goes as follows: "External and Internal interface, User Access, Water attraction, Public Facility and Management, Use and Activity, Identity and Character."

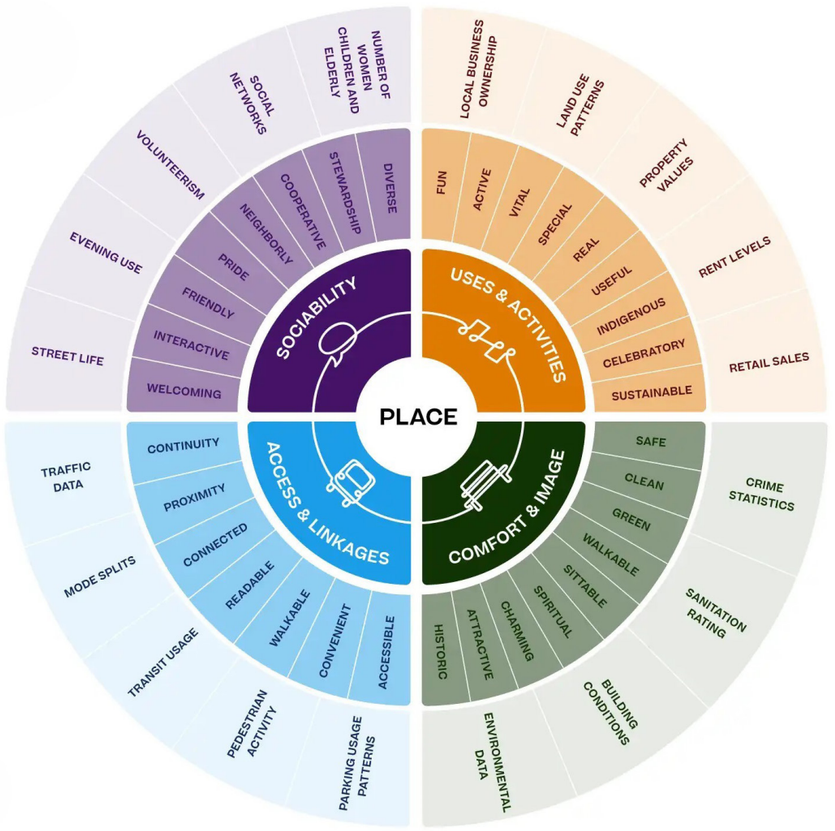


Fig.20: Diagram of PPS to "what makes a great space".
© PPS, 2009

[54] Tuan, Y. (2001). Space and Place: The Perspective of Experience. University of Minnesota Press.

[55] The Placemaking Movement. (2004). Project for Public Spaces.

[56] Project for Public Spaces. (2007) What Is Placemaking?

[57] Project for Public Spaces. (2009) What makes a successful public space?

[58] Miradyanti, L., Srinaga, F. and Dewi, J. (2021) 'River-space development as a social interaction space through the placemaking approach', Built Environment Studies, 2(2), pp. 1–8..

02 CASE STUDIES

objective A Analyze the transformation strategies implemented in the revitalization of four different riverfront projects, focusing on their social, ecological, and urban impacts.

objective B Identify the key design and planning interventions that successfully integrate environmental restoration with urban redevelopment in these projects, highlighting the sustainable features implemented.

objective C Examine the challenges faced in each case and how they were adressed to achieve successful results.

objective D Highlight contextual similarities and differences between the selected case studies and the Abou Ali River to establish a foundation for adaptive strategies in the proposal.

2.1 **LOCATION AND CRITERIA OF SELECTION**



Fig.21: Map locating the case studies

	Completed	Urban River	Covered river	Covered Riverbed	Canalised River	Intervention in the floodplain	Intervention out of the floodplain	Renaturalization of stream
The Cheonggyecheon Stream, Seoul - Korea	■	■	■	■	■	■		■
The Los Angeles River, LA - California - USA		■		■	■	■	■	■
The chicago River Walk, Chicago - Illinoi - USA	■	■			■	■	■	
Sabarmati riverfront, Ahmedabad - India	◢	■			■		■	

Table.03: Criteria of case study selection

2.2 **THE CHEONGGYECHEON STREAM, SEOUL - KOREA**

Location:
Cheonggyecheon, Seoul, South Korea
Climate Zone:
Humid continental
Size of the restored area:
5.84 km long
Project Type:
Park/Open space, Stream restoration
Former Land Use:
Transportation
Designers:
SeoAhn Total Landscape
Budget:
~$380 million USD - Total project:
~$120 million USD - Landscape portion
Start date:
2003
Completion date:
2005

OVERVIEW

The Cheonggyecheon Stream is an 11 km-long stream that runs through downtown Seoul. Existing since the Joseon Dynasty (1392-1910), the stream was later partially covered after the Korean war, with concrete and an elevated highway measuring 5.84 km in length and 16 m in width as part of the country's post-war economic development plan (1958 1976).[59] In 2003 the "Cheonggyecheon Stream Restoration Project" was launched by dismantling the highway and uncovering the 5.84 km section of the historic stream, and re-naturalizing the river's channel, with the project reaching completion in 2005. The revitalization of the stream transformed the area from a congested and polluted area to an ecological and green pedestrian corridor, bordered with recreational activities, providing environmental, social and economic benefits within its immediate proximity. [60]

OBJECTIVES

- Enhance the urban environment and improve residents' quality of life by creating a green urban space in the heart of the dense fabric.
- Restore the natural ecosystem and biodiversity of the stream area.
- Revive the downtown area to attract tourism and boost economic development.
- Improve the transportation system by reducing traffic congestion and promoting public transportation.
- Highlight and preserve the historical and cultural heritage of Seoul. [61]

CHALLENGES

- **Safety issue:** The aging elevated highway and the concrete deck covering required repairs or complete removal due to safety concerns. To address that, the metropolitan government of Seoul decided to completely remove the deck covering the stream and the elevated highway.
-Connectivity issues: As the freeway divided the city's north and south sides, the government wanted to improve the connectivity between them. To improve the linkages between north and south, 22 bridges (including 10 car/pedestrian bridges and 12 pedestrian bridges) were proposed to connect the two sides of the river.
- Traffic concerns: Experts were concerened that traffic congestion would increase causing chaos, if the elevated highway was removed since it served thousands of vehicles daily. Experts were concerened that traffic congestion would increase causing chaos, if the elevated highway was removed since it served thousands of vehicles daily. The

[59] Harvard University Graduate School of Design. (no date) Cheonggyecheon Restoration Project. Urban Design Case Study Archive.
[60] Urban Nature Atlas. (2023) Cheonggyecheon Stream Restoration Project.
[61] Robinson, A. and Hopton, M. (2011) 'Cheonggyecheon Stream Restoration Project'. Landscape Performance Series - Landscape Architecture Foundation.



Fig.22: The highway that covered up the stream was removed and the area became a city park after the major reconstruction.
© The nature of cities, 2016



Fig.23: Conceptual site plan presented in 2002 by the Research Center Director of the Seoul Development Institute, Seoul Metropolitan Government.
© Landscape architecture foundation, 2011



Fig.24: Natural stones are used to both create walkways for pedestrians and to help regulate water speeds and levels and various points along the stream.
© Alamy Stock Photo

restored Cheonggyecheon was left with only 13.5 meter wide roads on each side, consisting of two lanes for vehicular traffic, sidewalks and riverside walks. Traffic congestion was reduced due to the government discouraging car use in the city center, and the addition of rapid bus lines.

- **Community opposition:** many local business owners were initially opposed to the idea of removing the highway. To address business owners' concerns, over 4,200 meetings to build consensus were hosted by the Seoul Metropolitan Government. As a result , they gave Economic support to the businesses and made special agreements with the vendors impacted who had to be displaced due to the project's construction.
- **Water Supply:** As water is not naturally present in the Cheonggyecheon for most of the year except during the summer rainy season, it was difficult to create and maintain a consistent flow in the river. In reaction to the irregular flow in the Cheonggyecheon stream, they created a consistent flow in the river with a depth of 40 cm on average, by pumping and treating water from the Han River and several subway pump stations into the Cheonggyecheon.
- **Public private partnership issue:** by including private properties in the project the budget was going to significantly increase, and would need more time to deal with all the administrative matters. So, the restoration was limited to the public owned property to avoid high costs and administrative delays from including private properties and ensure the feasibility of the project. After the revitalization of the public stream and the creation of an attractive waterfront through public investments, private investments to revitalize the downtown and neighboring areas will follow, benefitting both sectors. (62) (63)

SUSTAINABLE FEATURES

- Better connectivity and transportation networks in the city.
- Creation of a continuous green corridor for pedestrians, cyclists, and wildlife from east to west.
- Connections between waterways were re-established connecting the Cheonggyecheon with the Jungraechon stream and the Han river. At their meeting points the wetlands are designed to be ecological conservation areas.
- Native marshes, shallows and willow swamps, were built in 29 different locations along the restored stream, creating a natural habitat for insects, fish, amphibians, and birds.
- The terraced vertical walls were designed in a way to give visitors different access to the river even with changes in water levels, to create seasonal interests as levels get submerged and re-emerged. The walls also provide flood protection for the city.
- The two banks of the river are connected by natural stones that create a fun walkway for pedestrians while also helping in regulating the speed and level of the water along the stream.

(62) Robinson, A. and Hopton, M. (2011) 'Cheonggyecheon Stream Restoration Project'. Landscape Performance Series - Landscape Architecture Foundation.

(63) Urban Sustainability Exchange USE. (no date) Seoul Urban Renewal: Cheonggyecheon Stream Restoration.

- Construction materials from the concrete deck structure and elevated highway demolition were recycled and reused. (64)

(64) Robinson, A. and Hopton, M. (2011) 'Cheonggyecheon Stream Restoration Project'. Landscape Performance Series - Landscape Architecture Foundation.

ACHIEVEMENTS

The restoration of the Cheonggyecheon Stream positively impacted the city environmentally, economically and socially:

- **Environmental Benefits:** It improved the air quality and reduced the urban heat island effect and restored natural habitats and increased biodiversity, as various plants and animals came back.
- **Economic Benefits:** It boosted the local economy with increased property values and business opportunities, and attracted millions of tourists, contributing to Seoul's global identity and economy.
- **Social and Cultural Benefits:** It created a vibrant public space to host cultural events and activities for the community and reconnected the residents with their historical and cultural heritage through restored historical landmarks such as old bridges and stoneworks along the stream.

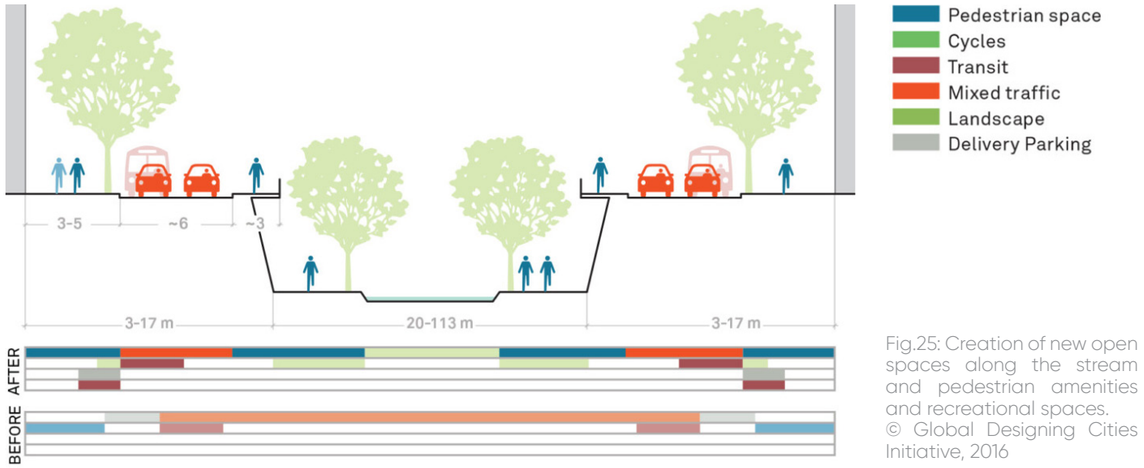


Fig.25: Creation of new open spaces along the stream and pedestrian amenities and recreational spaces.
© Global Designing Cities Initiative, 2016



Fig.26: Remnants of the elevated freeway stand as a testament to Cheonggyecheon's industrial past.
© Landscape architecture foundation, 2011

2.3 THE LOS ANGELES RIVER MASTER PLAN, LOS ANGELES - CALIFORNIA - USA

Location:
Los Angeles , California, USA
Climate Zone:
Hot-summer Mediterranean
Size:
82 km (first 51km run in the City of LA)
Project Type:
multi-benefit waterway: Park/Open space; removal of concrete and riverbed restoration; restoration of the freshwater marsh at the Los Angeles State Historic Park; restoration and reconnection to the historic floodplain at Taylor Yard.
Former Land Use:
Powered the City's industry and served as an important transportation corridor, flood control channel
Designers:
Olin, Geosyntec, Gehry Partners, Street Level Advisors LLC.
Budget:
Estimated budget for implementing the masterplan ~19 billion to $24 billion USD
Start date:
Masterplan: 2005
Completion date:
Planned in 2046

OVERVIEW

The Los Angeles River was originally a free-flowing river, central to the indigenous Tongva settlements and later on to the Spanish colonizers in 1781. It provided essential water resources for agriculture and settlements in the region. In the early 20th century, rapid urbanization and industrialization in Los Angeles led to significant changes in the river's landscape. Severe floods in the 1930s, led to the U.S. Army Corps of Engineers to channelize the river to reduce flood risks, transforming the river into a concrete channel, ruining with it the ecological and natural habitat of the river.during the 70's and 80's, local activists movements started advocating for the restoration of the river's natural state, with efforts to increase public access to the river and restoring it's ecological health. In 1986, the Friends of the Los Angeles River (FoLAR) was founded and played a central role in raising awareness amongst people and pushing for a river revitalization. In 1996 the LA County created the first LA River Master Plan, that aimed to restore parts of the river, create public open spaces, and improve water quality and ecosystem functions while managing flood risks. In 2007, the City of LA developed its own LA River Revitalization Master Plan, focused on improving the water quality, creating parks, pedestrian walkways and bike paths along the river, and enhancing the wildlife habitats. In 2015, the U.S. Army Corps of Engineers conducted a feasibility study on the LA River Ecosystem Restoration, aiming to restore 18 kilometers of the river's ecosystem from Griffith Park to downtown LA, and focusing on habitat restoration, recreation, and public access. In 2016 an update to the 1996 Master Plan was set by the LA County Board of Supervisors. This updated plan included over two decades of research and planning efforts, involving multiple stakeholders and extensive public engagement and focused on conducting ecosystem, demographic, and hydrologic studies for the entire watershed and on community approaches. The Master Plan process was guided by three main themes: Environment, People, Water, aiming to balance the environmental, social and hydrological needs. Concerning recent efforts and ongoing initiatives, two groups were formed to address specific segments of the river: the Lower LA River Working Group in 2018 and the Upper LA River and Tributaries Working Group in 2019. Additionally , coordination with various plans and organizations, such as the Metro, the LA County Sustainability Plan, and the Regional Water Quality Control Board, is pivotal to achieving the vision and goals of the Master Plan. (65)

OBJECTIVES

- Restore and enhance the natural ecosystem of the LA River and its

(65) LA River Master Plan (2021).

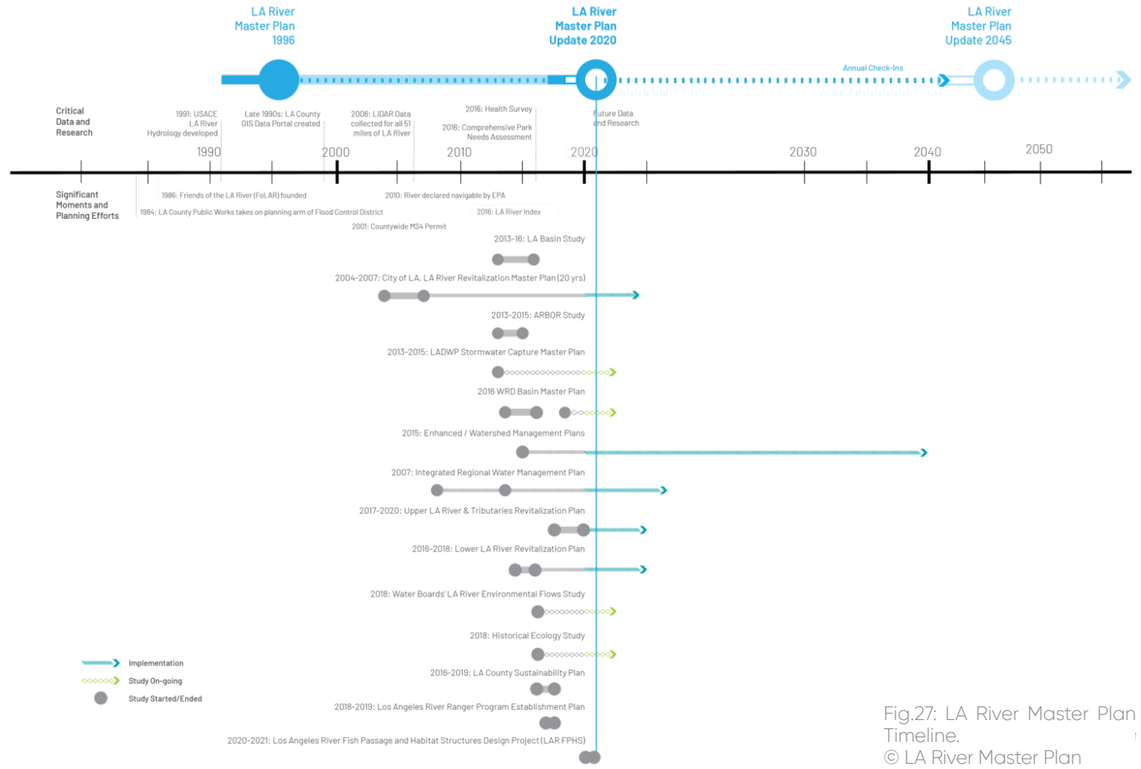


Fig.27: LA River Master Plan Timeline.
© LA River Master Plan

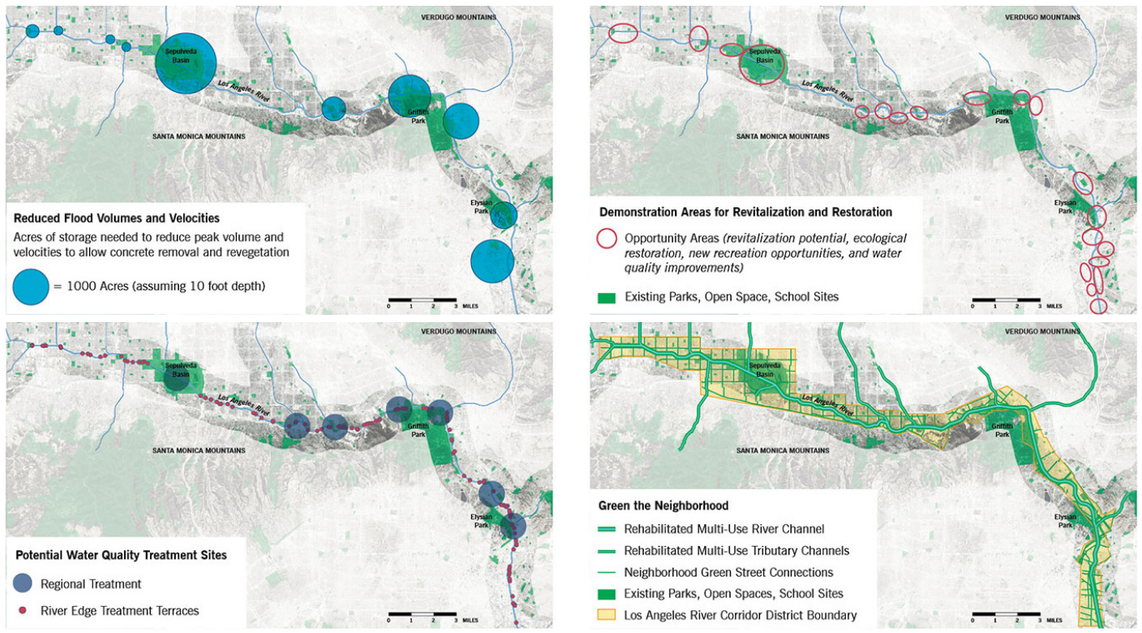


Fig.28: LA River Master Plan 2007.© Wenk Associates

watershed.
- Promote sustainable water management practices and improve the quality of the water.
- Enhance biodiversity, habitats for wildlife, and ecological connectivity along the river corridor.
- Maintain and enhance flood protection capabilities while integrating natural flood management approaches.
- Manage stormwater runoff to reduce flooding and improve water resilience.
- Develop and improve public access to the river through the creation of parks, trails, bikeways, and pedestrian pathways.
- Foster connectivity between neighborhoods and communities along the river.
- Provide recreational spaces for residents and tourists.
- Preserve and celebrate the cultural heritage and history associated with the LA River and its surrounding communities.
- Incorporate cultural programs and public art that reflect the diverse communities in the region and their history.
- Stimulate economic growth and local revitalization through infrastructure improvements and recreational amenities.
- Support local businesses, tourism, and job creation related to riverfront activities and green infrastructure projects.
- Enhance multimodal transportation options along the river corridor, including biking, walking, and public transportation.
- Improve connectivity to regional transportation networks and promote sustainable transportation alternatives.
- Enhance the river's resilience to climate change impacts, including sea-level rise, extreme weather events, and drought and incorporate green infrastructure and adaptive strategies to mitigate the climate risks .
- Ensure equitable access to the benefits of river revitalization for all communities, including underserved and marginalized populations.
- Engage diverse stakeholders in the planning and decision-making processes to promote social inclusion and community empowerment.
- Raise awareness about the importance of the LA River's restoration and its role in the region's history, environment, and future.
- Promote environmental stewardship and community engagement through educational programs and outreach initiatives.[66] [67]

CHALLENGES

The revitalization of the LA River faces several challenges, including securing funding, coordinating governance, balancing competing interests, overcoming infrastructure constraints, ensuring flood control, addressing environmental concerns, ensuring community engagement, navigating regulatory hurdles, and achieving long-term sustainability and equitable access.

[66] LA River RMP (2007). Plan Development Archive.

[67] LA River Master Plan (2021).

SUSTAINABLE FEATURES

The revitalization of the river will include various features, determined by agreements between the stakeholders, including: [68]
- Big and small parks, that are nature-oriented, recreation-oriented
- Cycling trails for recreation and transportation
- Walking paths and promenades
- Mixed-use areas integrating parks, housings, schools, jobs, retail, and other public institutions
- Restaurants, cafes, and other appropriate businesses
- Gathering spaces
- Community markers and public art installations to improve the sense of place and belonging of the different comunities there.
- Enhanced flood protection and flood storage systems
- Stormwater Capture and Storage
- Habitat Restoration

[68] LA River RMP (2007). Plan Development Archive.

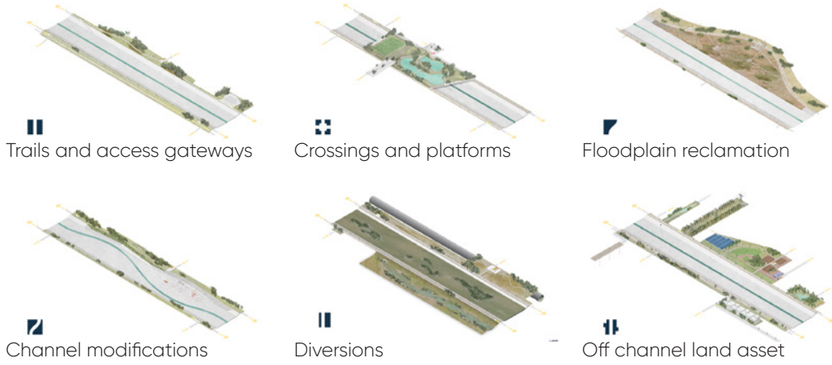


Fig.29: The LA River Master Plan utilizes a kit of parts that includes possible design typologies for sites along the LA River. Each typology is associated with certain Master Plan goals. The kit contains a collection of multiuse design components organized within six major infrastructure and urban river typologies.
© LA River Master Plan



Fig.30: Before and Simulated After Interventions.
© Wenk Associates

2.4 THE CHICAGO RIVER WALK, CHICAGO - ILLINOI - USA

Location:
Chicago, Illinoi, USA
Climate Zone:
Humid continental
Size of the restored area:
2 km long
Project Type:
Waterfront redevelopment
Former Land Use:
Pedestrian walkway
Designers:
Phase 1: Collins Engineers and Jacobs/Ryan Associates
Phases 2 adn 3: Sasaki, Ross Barney Architects
Budget:
Phase 1: $9.4 million USD;
Phase 2: $43,058,000 USD;
Phase 3: $52,419,000 USD
Start date:
2001
Completion date:
Phase 1: 2009
Phase 2: 2015
Phase 3: 2016

OVERVIEW

Throughout history, the Chicago river was used as a channel for commerce and was a subject for investments. During the Industrial Revolution, it was used exclusively for commercial and industrial purposes. To facilitate commercial activity, the riverbanks were transformed from muddy wetlands to the hard edges that define to this day the main branch of the Chicago River. Then, as the city kept developing, the river started functioning as a drainage system, for stormwater runoff, sewage water and animal waste from the stockyards. Following these developments, the river became heavily polluted and unpleasant, dividing the city. In 1990 city engineers reversed the river's flow, then in 1990, urban planner Daniel Burnham proposed a new vision for the Chicago river, to be transformed as a second waterfront for the city filled with promenades, and public use opportunities along its stream. But due to a lack in fundings and a lack of understanding how important the river was, the city took many years to realize the potential in Burnham's plan. It's only in the beginning of 2000s that transformations to the riverfront started, turning it into a space for the people. The new Chicago Riverwalk was gradually publicly opened in 3 phases, and was fully completed in 2016. The first phase focused on improving public access to the river and included the construction of the Vietnam Veterans Memorial Plaza in 2005. The second and third phases of the project created a promenade along the river that was divided into six distinct stretches defined by the city's bridges and street patterns, providing each a unique function.
The "Marina Plaza" links the existing Vietnam Memorial Riverwalk to created river promenade achieved in the 2nd and 3rd phases, and provides a docking space for boats. "The Cove"'s purpose is recreational, and the River Theater provides a vertical realtion between the water below and the city above. In the "Water Plaza", interactive fountains provide spaces to play with water and can be transformed into flexible spaces for events when turned off. "The Jetty" has recreational spaces with floating wetlands and proposes environmental education stations. "The Confluence" is the largest stretch of the inervention, hosting annual public art installations, and events on flexible lawn space with movable chairs. These spaces together support the revitalization of recreational use and the reactivation of the economic activities along the Chicago River. [69]
Additionally, many commercial and residential developments have begun construction; and some completed; since the completion of the second phase.
Today, the Chicago Riverwalk is a flood resilient, pedestrian promenade along the Chicago River in Chicago's downtown. Its revitalization created unobstructed river access with connections to the water and provided spaces for recreational activities, restaurants and a wide range of

[69] Hanson, S. and Callone, M. (2019) 'Chicago Riverwalk, Phases 2 & 3'. Landscape Performance Series - Landscape Architecture Foundation.

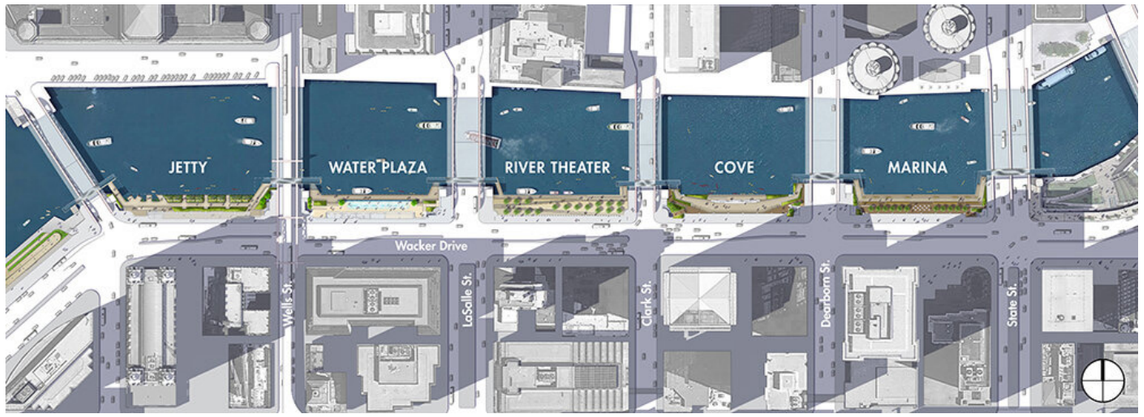


Fig.31: Phases 2 and 3 of the Chicago Riverwalk redeveloped the corridor from State Street to Franklin Street. © Sasaki



Fig.32: Before
The area that became the Chicago Riverwalk's Marina Plaza had narrow paths, a limited numbers of vendors, and little opportunity to engage with the river.
© Sasaki



Fig.33: After
The Marina Plaza on the Chicago Riverwalk now offers space for vendors along with flexible seating options for customers and the general public, providing much closer access to the Chicago River. © Sasaki



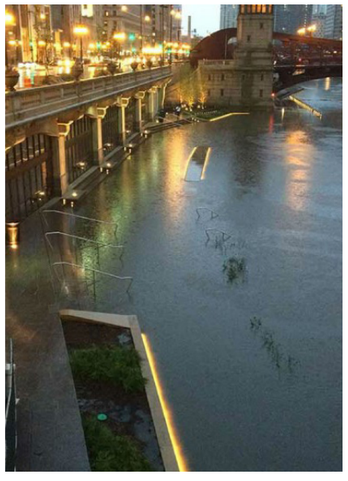


Fig.34: The riverwalk proved its resilience when it flooded a couple weeks after it opened, thanks to the lighting, planting and paving systems that were designed to flood. It was cleaned and reopened within 12 hours of the waters subsiding.
© Sasaki

amenities, as well as better paths and underbridge connections for pedestrians and cyclists. [70] [71] [72]

OBJECTIVES

- Reclaim the Chicago River to benefit the city ecologically, economically and recreationally.
- Explore the various urban river typologies and integrate restaurants, water features, boating facilities, floating wetlands and seating, to create diverse opportunities and programs that are adapted to each of the different stretches of the river.
- Improve people's experience in Chicago's downtown by offering an accessible riverfront destination for outdoor recreation and leisure activities to tourists and locals in the heart of the city.
- Adapt the underutilized waterfront infrastructure into a flood resilient, sustainable and highly integrated downtown amenity.
- Provide essential connection to the existing open space system in the city and enable uninterrupted mobility along the river from the city's center to the lakefront.
- Offer a continuous car-free environment that links a series of distinct community spaces at the edge of the river. [73]

CHALLENGES

- Maximize the pedestrian spaces and settle a series of under-bridge connections between the blocks within a tight permit-mandated 25-foot-wide build-out area.
- Create a highly flood-resilient urban landscape able to recover from potential flood incidents.
- Increase recreational and educational opportunities and Provide space for restaurants and retail businesses to increase the economic activity along the riverfront.
- Improve the water quality and the aquatic habitat
- Increase the accessibility to the river between the different spaces along the river and between the higher city levels and the lower river spaces.
- Create gathering spaces that are universally inclusive, diverse and accessible to all, to cater to a diverse group of users offer plenty of unique experiences while still having a clear and unique identity.[70] [71]

SUSTAINABLE FEATURES

- The riverwalk has 1,814 square meters of new planted areas, with 66 different species of plants including trees for shading and aquatic species (both submergent and emergent). Additionally, in order to provide healthy environments for trees, they expanded the soil volumes under the structural paving.
- Almost one kilometer of cycling, pedestrian and sailing infrastructure, enhances the transportation and recreation options in the city.
- Six stainless steel under-bridge crossings connect the six river stretches while also ensuring shelter to the riverside pedestrians from the loud vehicular bridges above.
- Durable materials used on site are resilient to frequent flooding events, therefore reducing maintenance needs and costs and extending longevity.[74]

[70] Architect magazine. (2021) Chicago Riverwalk.

[71] Hanson, S. and Callone, M. (2019) 'Chicago Riverwalk, Phases 2 & 3'. Landscape Performance Series - Landscape Architecture Foundation.

[72] Sasaki.(no date) Chicago Riverwalk.

[73] Rudy Bruner Award. (2017) Chicago Riverwalk Phase 2 & 3.

[74] Hanson, S. and Callone, M. (2019) 'Chicago Riverwalk, Phases 2 & 3'. Landscape Performance Series - Landscape Architecture Foundation.

[75] Rudy Bruner Award. (2017) Chicago Riverwalk Phase 2 & 3.

ACHIEVEMENTS

The Chicago riverwalk project impacted the city's development, ecology, and users' experiences: [75]

- **Development benefits:** The city's downtown is experiencing a building boom, especially near the river showcasing the area's rapid growth and connection to the riverwalk project.
- **Ecological benefits:** The Riverwalk both resulted from and contributed to the Chicago River's cleanup. Although it wasn't the direct cause, planning the riverfront's development triggered interest in improving the water quality, and gradual improvements made the Riverwalk project possible in the end. Its popularity has driven further ecological enhancement efforts, attracting residents and developers alike. The Riverwalk included elements like the fish hotel and water-tolerant plantings that help support a healthy river ecology and are resilient to floods.
- **Enhanced user experience:** The Riverwalk serves people who work and live downtown, offering them a variety of riverside experiences and scenery changes in each stretch, including diverse activities, walks, bars, restaurants, a children's water park, an outdoor theater, and fishing docks adapted both for group gatherings and individual outings. The city's atmosphere also changes below the street levels and near the river's edge as traffic noises are reduced, and the river becomes the center of attention.

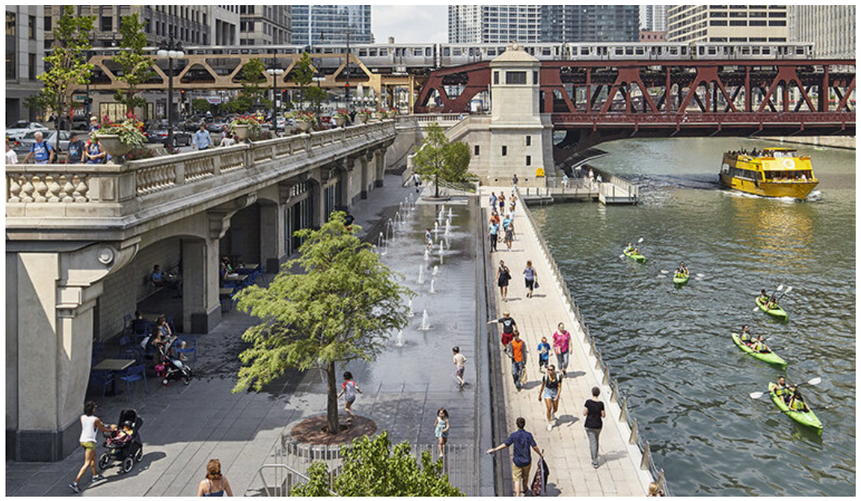


Fig.35: The Water Plaza features interactive fountains for children and adults. It also offers significant space for flexible programming when the fountains are turned off.
© Landscape architecture foundation, 2019

2.5 **SABARMATI RIVERFRONT, AHMEDABAD - INDIA**

Location:
Ahmedabad, India
Climate Zone:
Hot semi-arid
Size of the restored area:
11.25 km
Project Type:
Urban renewal and river-front revitalization development
Former Land Use:
Informal Settlements; agriculture during dry seasons; informal economic activities such as laundering clothes, dyeing textiles, and a sunday flea market; cultural and recreational activities; industrial use.
Designers:
HCP Design and Project Management Pvt. Ltd.
Budget:
~ $150 million USD
Start date:
1997
Completion date:
Phase 1: 2012, and subsequent sub phases have been completed in stages. Phase 2: scheduled to be completed by 2027.

OVERVIEW

Ahmedabad is located in the western part of India bordering the banks of the Sabarmati river. The Sabarmati River is a monsoon-fed river that flows north-south through Ahmedabad, parting the city into its western and eastern halves.The river has been a fundamental part in the history and evolution of the city, and has served the city's lifeline for years. In the past it was a major source for potable water and hosted many informal recreational activities for the city. However, by the end of the 20th century, following rapid and chaotic urban growth, the river became neglected, inaccessible and polluted, creating a virtual divide between the eastern and western part of the city, leading it to turn its back on the river. Efforts to develop the riverfront date back to the 1960s, with the french architect Bernard Kohn's proposal to create a mixed-use development along the river. But the actual detailed planning initiatives to transform Ahmedabad's riverfront were launched in 1997.
The Sabarmati Riverfront Development Project is a multi-dimensional project with several objectives aiming to reclaim the private river-edge and turn it into a public asset to the city, and redefine the city's relationship with its river by creating a booming people-centered network of waterside promenades, civic amenities, and parks in the heart of the city. The project creates a public riverfront extending to a length of 11.25 kilometers on both riverbanks. (76)
The Project was inaugurated in 2012 as its first phase was completed that year, and subsequent phases were completed in later stages. During the first phase the Sabarmati Riverfront was opened gradually to the people as the facilities were being built. The riverfront was designed to be a hub of activities for the city, hosting sport facilities, recreational activities and cultural events. The second phase is currently ongoing and scheduled to be completed in 2027. It focuses on achieving a greener development with more eco-friendly and sustainable spaces, creating a green corridor filled with parks, gardens, multi layered Promenades, play areas for kids, open space habitats for local flora and fauna, and well established road networks, ect. (76) (77)

OBJECTIVES

The objectives of this multidimensional project focus on three main topics: Environmental Improvements, Social Upliftment, and Sustainable Development. More specifically: (76)
- Make the riverfront accessible to the public.
- Reduce the risks of flooding and erosion in flood susceptible areas.
- Stop the sewage flow, and keep the river clean from pollution .
- Provide public spaces and socio-cultural facilities.

(76) Sabarmati Riverfront Development Corporation Ltd. (no date) Sabarmati Riverfront: Reconnecting Ahmedabad to its river.

(77) Ashaval. (2024) Sabarmati Riverfront, Ahmedabad: A Comprehensive Guide to the City's Iconic Landmark.

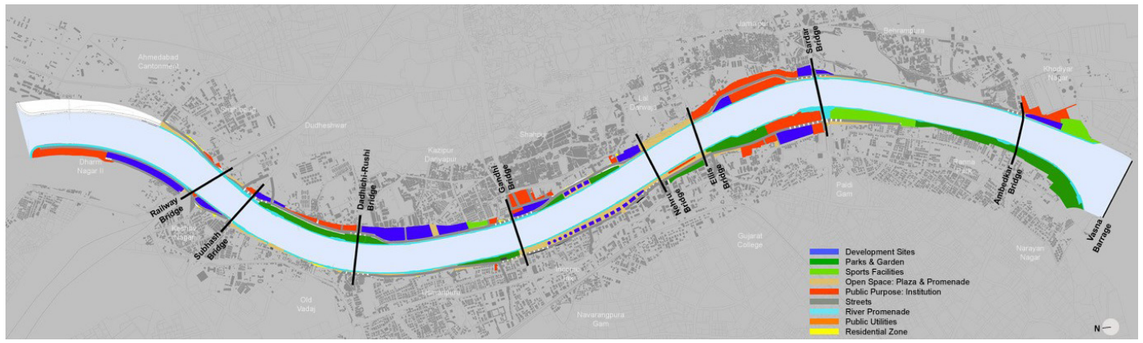


Fig.36: Master Plan, Land use. © SRFDCL

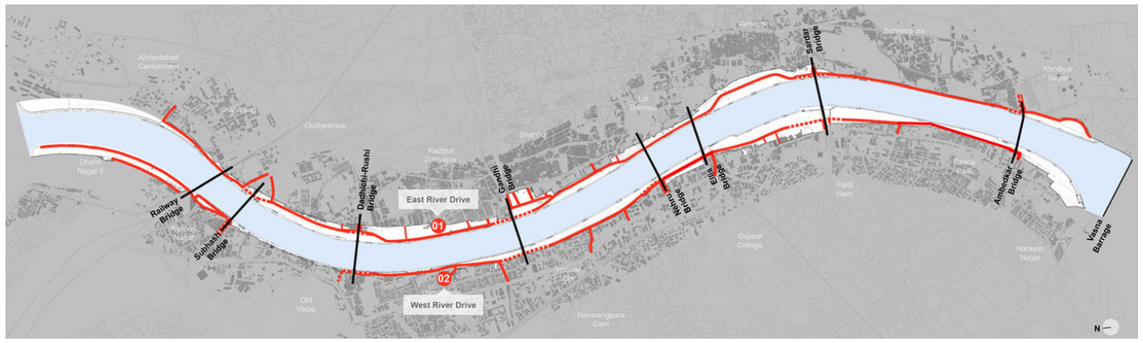


Fig.37: Master Plan, Street Network. © SRFDCL

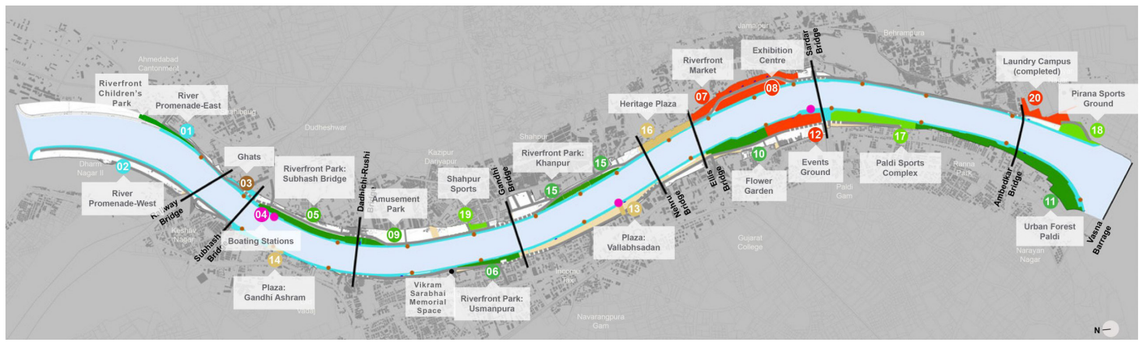


Fig.38: Master Plan, Recreational activities. © SRFDCL

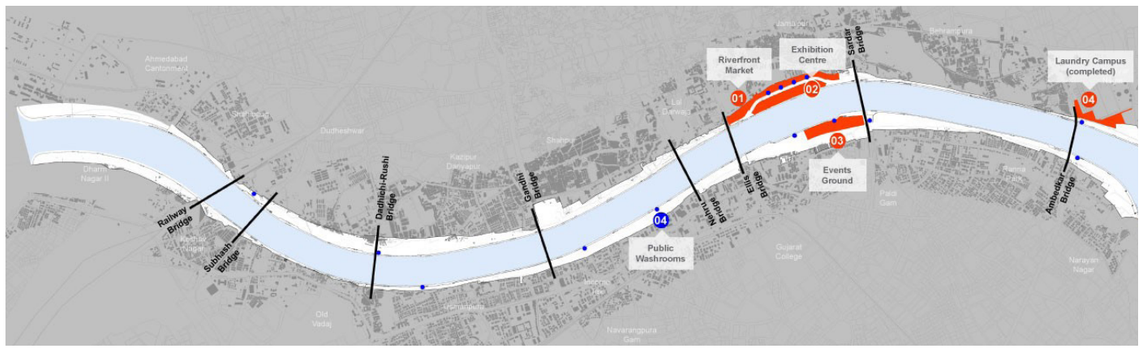


Fig.39: Master Plan, General facilities. © SRFDCL

- Generate resources for the project to be self-financed and not reliant on government fundings.
- Revitalize riverfront neighborhoods.
- Provide permanent housing for the slum dwellers on the riverbeds to remove the informal settlements.

CHALLENGES

- Untreated sewage and industrial waste flowing into the river, creating significant health and environmental hazards.The river became heavily polluted and neglected over time due to chaotic urban growth. So a stormwater collection and sewage system needed to be implemented to divert sewage from the river and clean it.
- The informal settlements along the river banks were prone to floods very frequently. People had to build their own retaining walls to protect themselves against flood erosion. So the project needed to implement strategies that reduce erosion and flood risks, like constructing diaphragm walls and retaining walls, and channelizing the river into a constant width.
- Lack of Infrastructure and Accessibility:
The settlement on the river banks lacked basic infrastructure facilities, and the riverfront became inaccessible to most of the city's residents due informal settlements along the banks and the privately owned spaces.
- The project required the resettlement of over 10,000 households living in the slums along the riverbanks, and needed to insure proper rehabilitation and integration of the informal economic activities that were present on the banks such as clothes laundering and the flea markets.
- The Sabarmati river is not a perennial river, so maintaining the water in it all year long needed strategies like using the Narmada Canal and the Vasna Barrage to retain and recharge the water.

SUSTAINABLE FEATURES

-Major interceptor sewer lines on both banks capture over 38 sewage outfalls, diverting them to sewage treatment plants where they treat water before discharging it into the river, reducing the pollution and improving the environmental health of the river.
- A storm-water drainage system collects rainwater and prevents flooding through underground pipes, open channels, and retention basins.
- Lime and cement are used to stabilize the soil to prevent erosion.
- The project used landfills to raise land levels and created flat surfaces for development, transforming previously industrial areas into public spaces.
- Creation of a 41-hectare park promoting biodiversity with various flora and fauna.

- Development of clean and safe areas on the riverfront with paved and well lit walkways, cycling tracks, green spaces, gardens, seating areas and landscaped areas with diverse plants and trees. The 11.5 km long walkway has multiple entry and exit points, facilitating walking and jogging.
- Facilities for boating and water sports, offering activities such as kayaking, paddle boating and water skiing.
- Construction of several bridges like the Ellis Bridge, Nehru Bridge and Subhash Bridge that improve connectivity to the city.
- Integration of systems of light rail, buses, and ferry services that improve the public transport connectivity in the city and designated parking areas.[78]

[78] Ashaval. (2024) Sabarmati Riverfront, Ahmedabad: A Comprehensive Guide to the City's Iconic Landmark.

ACHIEVEMENTS

The Sabarmati Riverfront Development has achieved many of its goals (SRFDCL, no date):
- Environmental Improvements: Cleaned the river, reduced pollution, and maintained water levels.
- Social Upliftment: Resettled slum dwellers, created parks and public spaces, and provided socio-cultural amenities.
- Recreational Facilities: Developed continuous promenades, boating stations, and sports facilities, enhancing the city's green network and livability.
- Sustainable Development: Ensured self-financing through commercial development, revitalized neighborhoods, and integrated public transportation.



Fig.40: River promenade.
© SRFDCL



Fig.41: Parks and gardens.
© SRFDCL

2.6 **LESSONS LEARNED**

	Cheonggyecheon Stream	Chicago River walk	Los Angeles River Master Plan	Sabarmati Riverfront
Location	Seoul, South Korea	Chicago, USA	Los Angeles, California, USA	Ahmedabad, India
Challenges	Safety issues, Connectivity issues, Traffic concerns, Community opposition, Water supply, Public-private partnership issues	Urban density, Water quality issues, Funding and maintenance	Urbanization and industrialization impacts, Flood risk management, Public awareness and support	Relocation of settlements, Flood management, Funding and maintenance
Sustainable Features	Better connectivity, Creation of green corridor, Reestablishment of waterways, Native marshes, Vertical walls, Natural stones, Recycled materials	Public walkways, Recreational spaces, Habitat creation, Water quality improvements	Ecological restoration, Public access improvements, Habitat creation, Connectivity enhancements	Public parks and gardens, Promenades, Flood management infrastructure, Recreational facilities
Achievements	Improved air quality, Boosted local economy, Created vibrant public space, Reconnected residents with cultural heritage	Boosted local economy, Enhanced public space, Improved water quality	Restored natural habitats, Increased public spaces, Enhanced ecological health, Improved flood management	Improved public space, Enhanced flood management, Boosted local economy
Placemaking Approaches - Sociability	Public events facilities and cultural activities	Social gathering spaces, Public event facilities	Community involvement and awareness	Public spaces for social interaction, Cultural events facilities
Placemaking Approaches - Uses and Activities	Recreational spaces, Green corridor	Recreational activities, Dining areas	Public parks, Recreational areas	Recreational facilities, Gardens
Placemaking Approaches - Comfort and Image	Flood management infrastructure, Seasonal interest	Aesthetic urban design, Comfortable public spaces, Flood management infrastructure	Natural habitat creation, Aesthetic improvements, Flood management infrastructure	Urban design aesthetics, Comfortable public areas, Flood management infrastructure
Placemaking Approaches - Access and Linkages	Improved connectivity, Improved public access, Pedestrian and cyclist pathways, Bridges for connectivity, improved transportation systems	Improved connectivity, Improved public access, Pedestrian and cyclist pathways, Bridges for connectivity	Improved connectivity, Improved public access, Pedestrian and cyclist pathways,	Improved connectivity, Improved public access, Pedestrian and cyclist pathways, Bridges for connectivity
Primary Focus	Ecological restoration, Social and cultural rejuvenation	Public access, Economic activities, Recreational opportunities	Ecological restoration, Flood control, Public access	Public access, Flood management, Socio-cultural upliftment, Economic activities
Secondary Focus	Transportation, Economic development	Environmental improvement	Recreational opportunities, Economic development	Ecological restoration, Recreational facilities

Table.04: Summary of lessons learned from the literature review applied to the case studies selected.

03 PRESENTATION OF THE STUDY AREA: ABU ALI RIVER

objective A Locate Tripoli and th Abu Ali river in its geographical and hydrological context and identify the different zones in which the river passes.

objective B Recognise the socio-economic characteristics of the area, showcasing the effects of high levels of illiteracy and poverty on it's urban morphology.

objective C Understand the important stages of Tripoli's evolution through a historic and urban analysis focusing on the river's development over time, and analyse the different urban strategies and policies proposed and applied (or not applied), that led to the degradation of the riverfront and to its disrupted relationship with it's surrounding.

3.1 CONTEXT

INTRODUCTION

The Qadisha River is located in Lebanon and flows from the valleys of Qadisha at the north of the Mount Lebanon chain, and merges with other rivers before reaching the coastal plain of Tripoli, where it becomes known as the Abu Ali river, passing by the citie's historic core, then joins the Mediterranean Sea. Considered Lebanon's second capital, Tripoli is situated 85km north of Beirut along the Mediterranean coast. (Fig.XX)
Throughout history, the Abu Ali river played a crucial role in Tripoli's economic and social life, as it served as a vital water source for agriculture and daily life, and its banks were always busy with commercial activities and everyday exchanges between the habitants. However in 1955 a tragic flood marked a turning point for the rivers future, destroying many of its surrounings and the historical value of the area. As a response to the flood an initiative to straighten, expand and cement the riverbed was taken, which killed the natural ecosystem of the river



Fig. 42 Locating Tripoli in Lebanon © Erika Younan

Chapter 3. Presentation of the Study Area

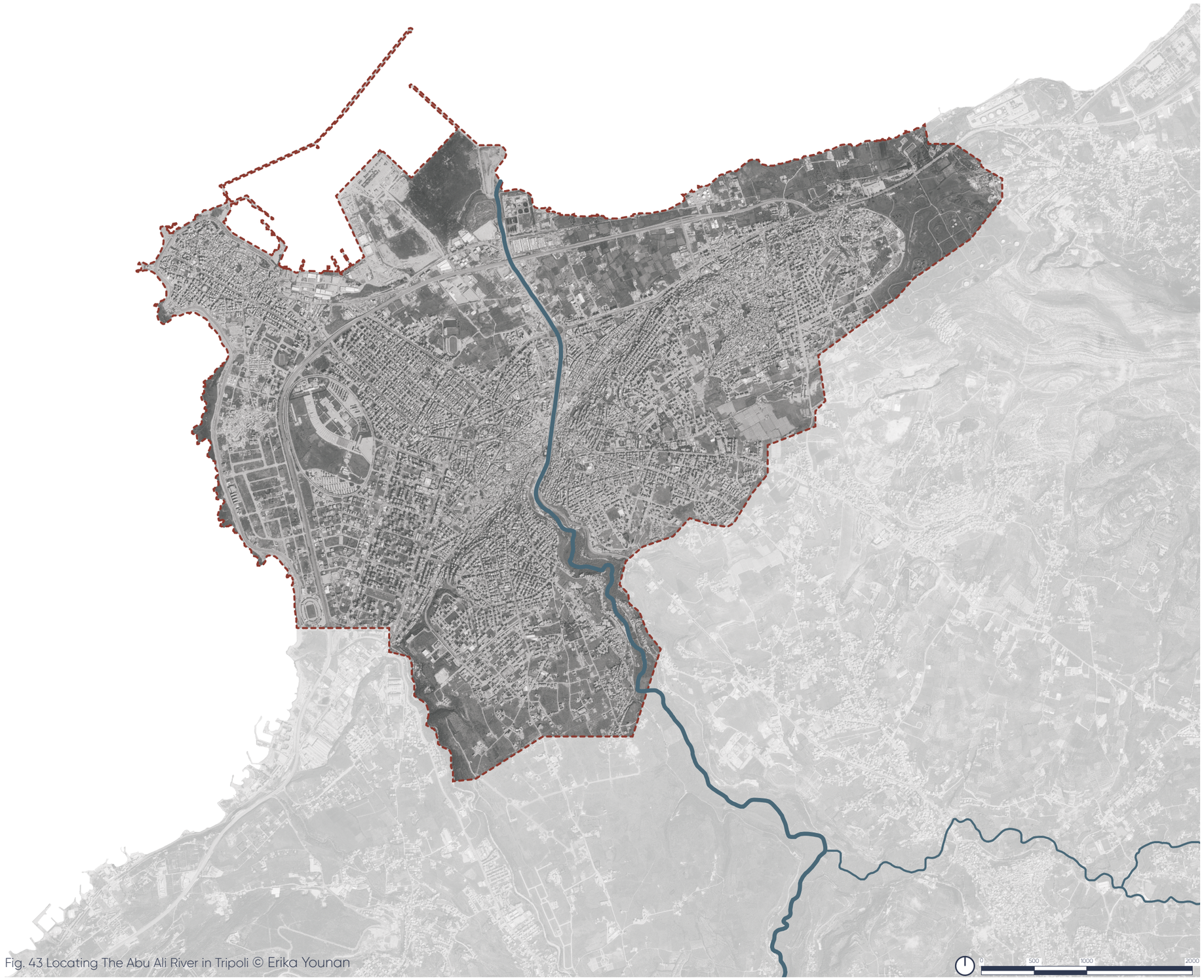


Fig. 43 Locating The Abu Ali River in Tripoli © Erika Younan

and disrupted the region's demographic and social dynamics, by dividing the river community into separated areas on both river banks.
And after years of neglect from the responsible autorities, and everyday bad behaviour from the habitants trashing it with no consequences, the river has become very polluted, emphasizing even more this disconnection in the city between the river and the urban fabric, and between the habitants and their river.
So to properly understand this shift in dynamics and in the urban morphology this chapter will further detail: first the river's hydrological and natural characteristics, then Tripoli's socio-economic characteristics and their impact on the urban fabric and finally the historic evolution or the river and its surrounding urban fabric dating from the mamluk period all the way to the present day, along with the initiatives taken/planned in each period.

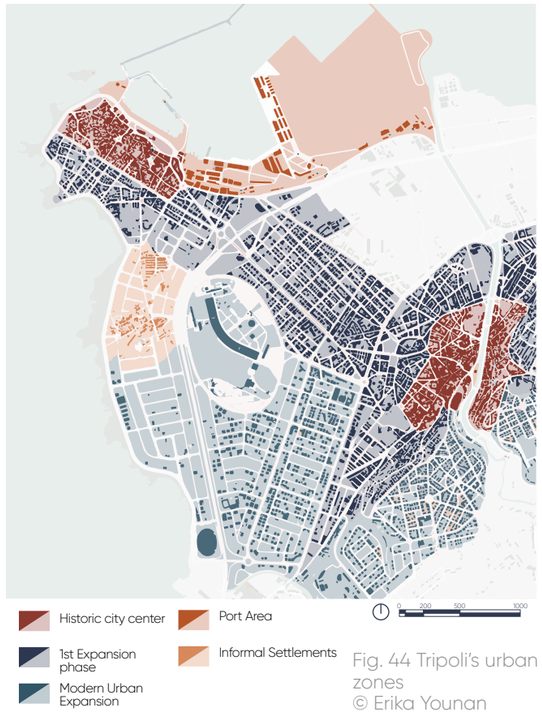


Fig. 44 Tripoli's urban zones
© Erika Younan

Chapter 3. Presentation of the Study Area

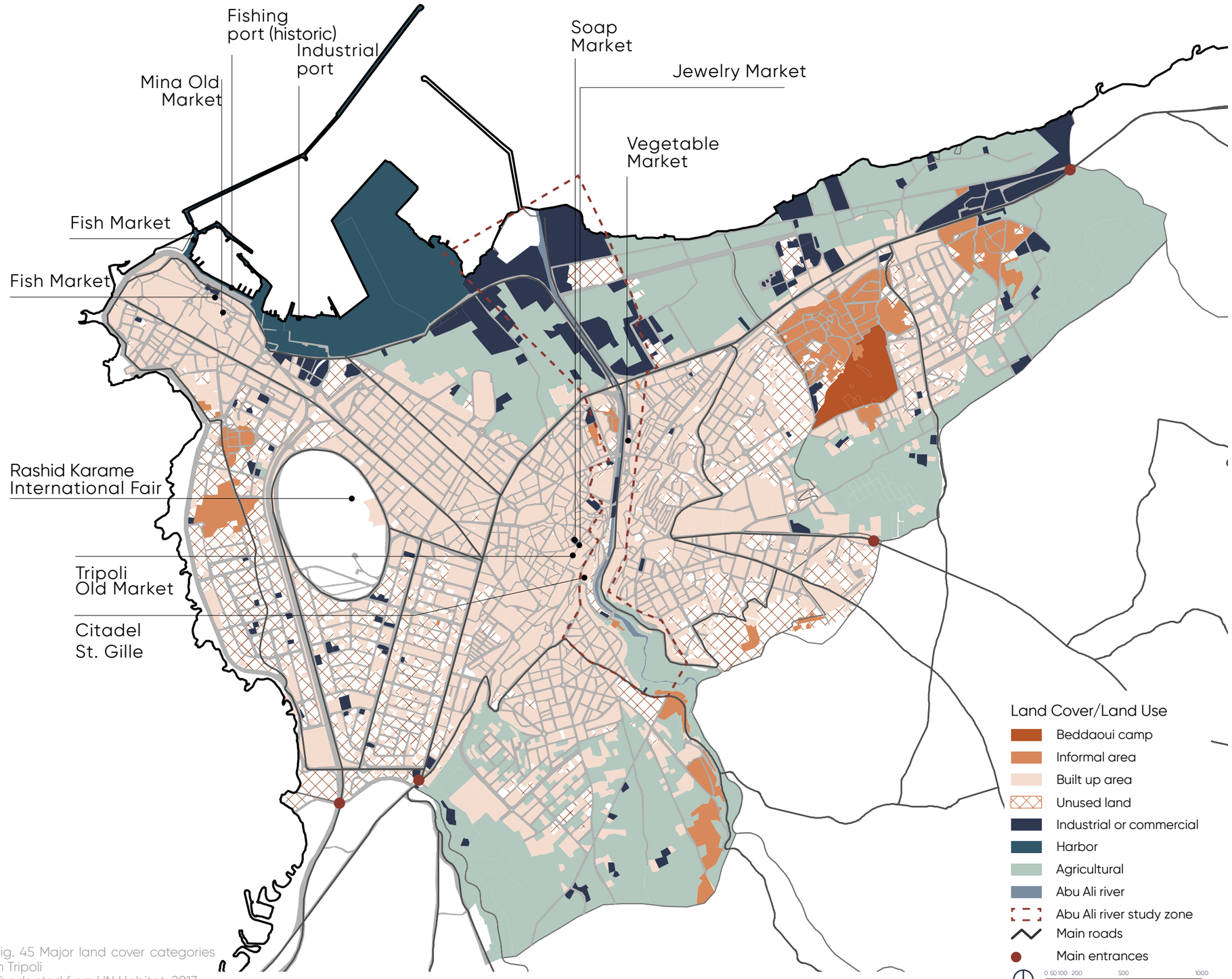


Fig. 45 Major land cover categories in Tripoli
© adapted from UN Habitat, 2017

NATURAL AND URBAN GEOGRAPHIES

262 MILLION M³
AVERAGE ANNUAL DISCHARGE RATE

212 MM³
AVERAGE ANNUAL FLOW

1,850 M
SOURCE ELEVATION

44.5 KM
TOTAL LENGHT

~ 3 KM
CANALIZED RIVER LENGHT

24~29 M
CANALIZED RIVER WIDTH

1,500 m³/s
MAXIMUM CHANEL FLOW CAPACITY

0.8 m³/s
AVERAGE FLOW RATE DRY SEASON

17.2 m³/s
AVERAGE FLOW RATE WET SEASON

The Abu Ali River stretches about 44.5 Km and has basin area of approximatively 484 Km2, with 97% of it being mountainous. It is catchment area includes around 236 villages and towns (Fig.46) and hosts around 600,000 inhabitants in it. [79] The river's source originates at an altitude of 1,850m from the village of Bcharre, and reaches sea level after passing through the flat coastal plain of Tripoli where it was transformed into a canal of approximatively 3Km in length, 24 to 29 m in width and 5 m in depth (supported by concrete retaining walls). it's capacity was designed to resist floods, supporting flows of 1,500m3/s. [80] The river basin and its coastal area are characterized by a Mediterranean climate with moderately warm and dry summer and autumn, and moderately cold, wet, and windy winter. [79] During the dry season, the average flow rate is around 0.8 m3/s compared to 17.2 m3/s during the wet season.

The Abou Ali River basin features an interconnected catchment system that consists of mountain ranges, valleys, and both small and large streams that converge into the main channel. It is characterized by different topographic and hydrologic parameters and land use patterns along its course. Therefore Massoud et al., 2006 have categorized the river's catchment into 3 sub-catchment areas, recognising the different land use patterns to assess its impact on the water quality of the river. By sampling 19 sites, they determined the sub-catchments general features (Fig. 47 & 48): the first sub-catchment is mainly rural and agricultural. The second sub-catchment is predominantly a rural mountainous zone in the higher altitudes with a mix of urbanized area at the lower elevations. And the third sub-catchment is almost completely urbanized with a majority of residential buildings. In the third sub-catchment, the river estuary (including the historic core in Tripoli) is the most polluted area of the river basin because of the flood canalization of the river there and the human waste thrown in it regularly. [79]

Studying the river at the landscape and territorial scale helps locate the different areas along the river with potential touristic and leisure space opportunities to link the site scale of the project to its larger context, as well as emphasizes the causes and severity of the pollution problem from which the river surfers. On the other hand, this thesis being an architecture and urban design thesis, the issue of pollution will be addressed by the design proposal, with punctual interventions of minor effects on it, as this issue requires specialists in the field to carry out a more thorough analysis and present strategies to clean the water and solve waste collection and sewage problems for instance.

[79] Massoud, M et al. (2006) 'Factors influencing development of management strategies for the Abou Ali River in Lebanon: I: Spatial variation and land use', Science of The Total Environment, 362 (1–3), 15-30.

[80] CES, BTD and LYSA (1998). Feasibility Study for Tripoli Sewerage. Project No. 1342-Contract No. 6261, Council for Development and Reconstruction and Ministry of Hydraulics and Electrical Resources.

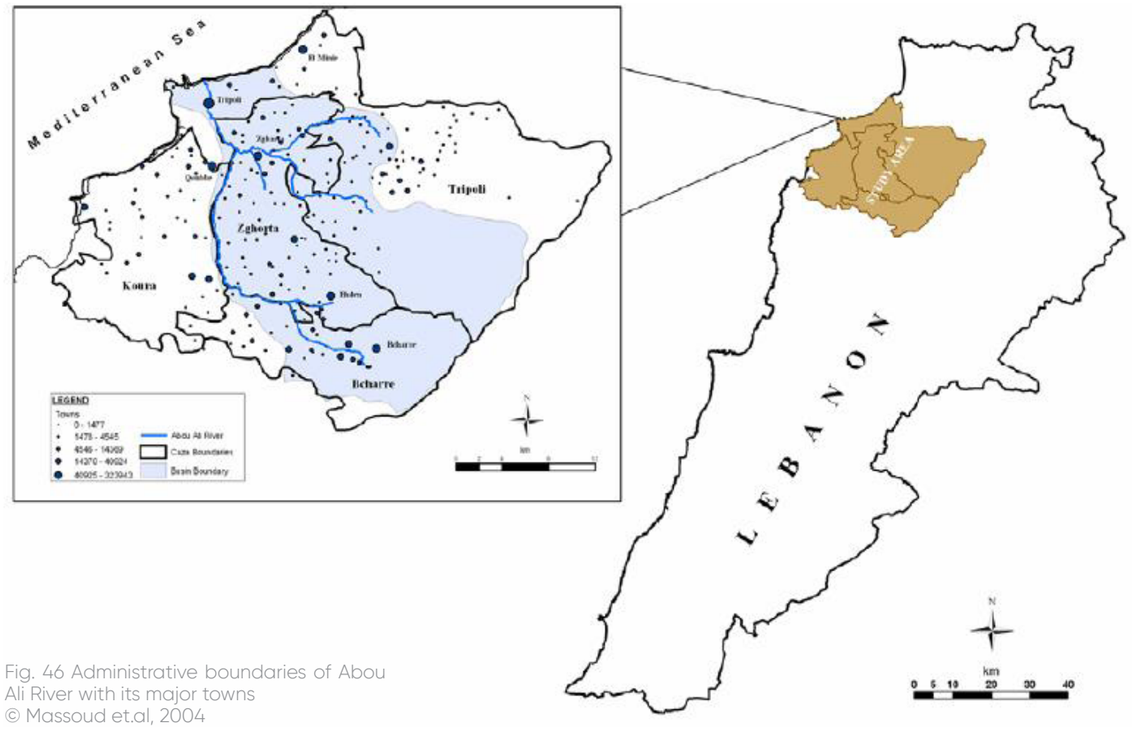


Fig. 46 Administrative boundaries of Abou Ali River with its major towns
© Massoud et.al, 2004

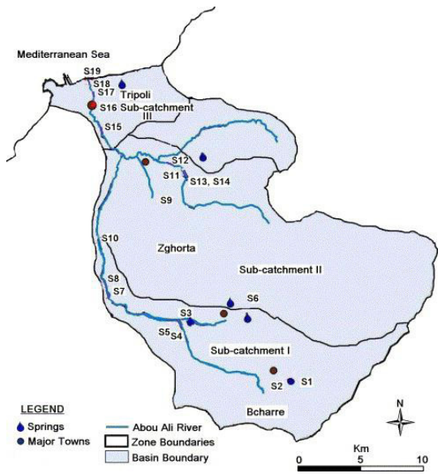


Fig. 47 determining the three sub-catchments
© Massoud et.al, 2004

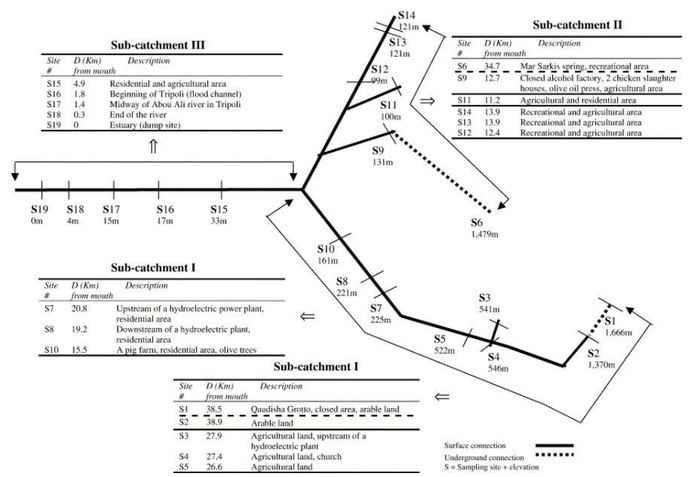


Fig. 48 Characteristics of the three sub-catchments
© Massoud et.al, 2004

DOCUMENTATION ON THE TERRITORIAL SCALE

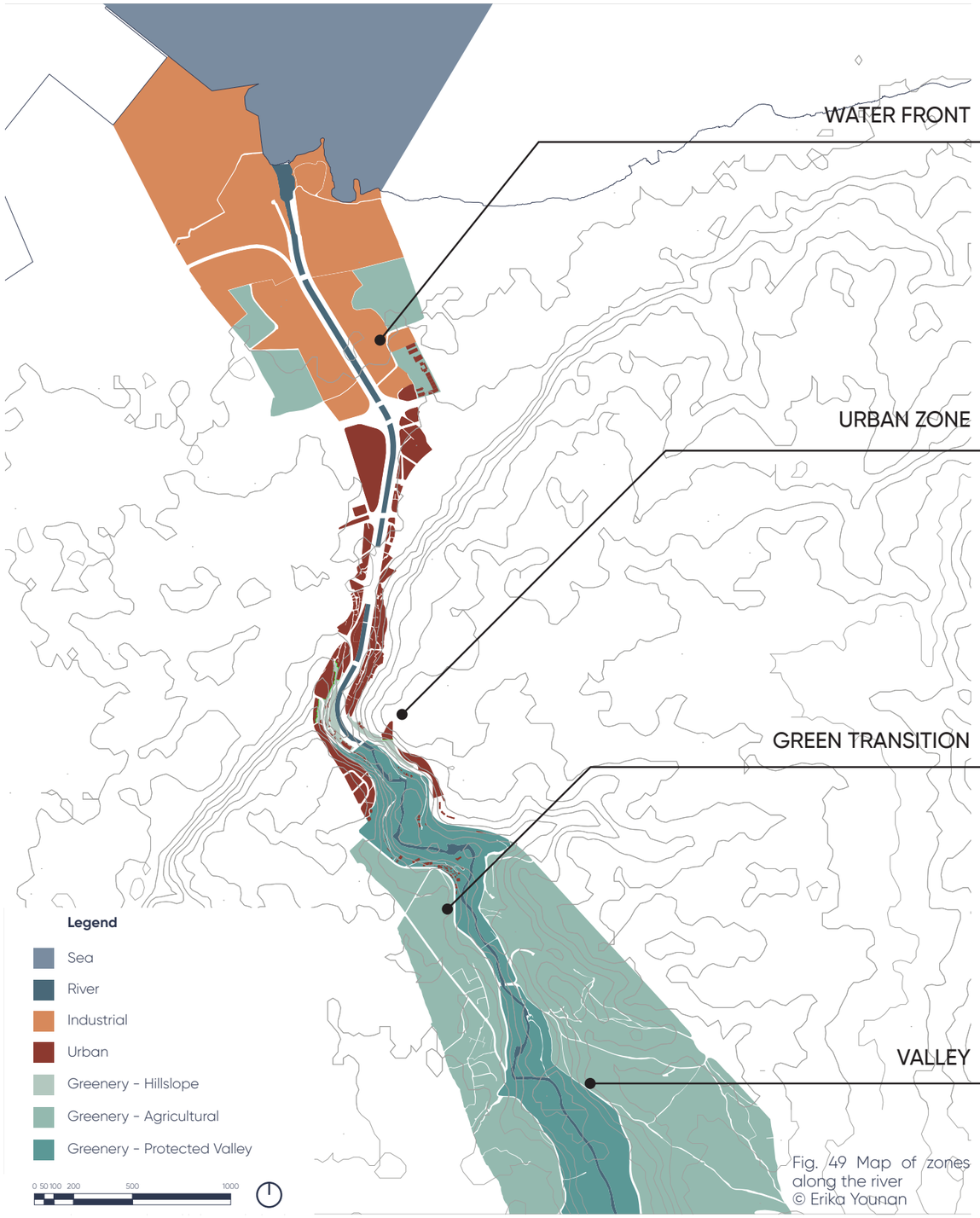


Fig. 49 Map of zones along the river
© Erika Younan



Fig. 50 Canalized river surrounded by empty and industrial lots before deserving in the sea
© Erika Younan



Fig. 51 Canalized river surrounded by dense urban fabric in Tripoli.
© Erika Younan



Fig. 52 Green transition, with agricultural patches and natural vegetation surrounding the untouched water stream.
© Erika Younan



Fig. 53 Natural river course flowing in the valleys
© Paul Saad, 2018

SOCIO-ECONOMIC CHARACTERISTICS

According to the U.N, Tripoli is officially the poorest city in the Mediterranean since 2016, because of a civil war, a massive influx of refugees escaping the Syrian civil war, an economic crisis and in general, years of neglect from a corrupted government. [81]

[Living Conditions] The old city and its surrounding neighbourhoods are marked by very clustered dwellings and a dense urban fabric with a very high number of people living there. According to Kayal and Atiyyé[82], multiple families live together in old houses that got partitioned into multiple apartments for each family. And on average each family has around seven members[83], with a maximum of 400 dollars as their monthly household income. These people live in extreme poverty with such low levels of resources below the acceptable threshold defined for Lebanon.[84] In the old city, the population density is around 260 to 500 persons per hectare, and it get exponentially higher in the surrounding neighbourhoods like "Tabbaneh" and "Es Souayqa" reaching 1000 to 1400 persons per hectare. [85]

[The issue of illiteracy] Poverty and education levels are deeply interconnected. In a study done in 2004, the north of Lebanon scored the highest in levels of illiteracy in the country with a score of 17.1%. [86]



Fig. 54

Fig. 54 Neighbourhoods and sub-neighbourhoods of Tripoli's Urban Area. © UN-Habitat, 2017.



Fig. 55 Congested Dwellings in Al Qobbeh neighbourhood adjacent to the river. © Erika Younan

This table done by Maha Kayal in 2007 [87] shows the levels of education in the old city and two of its surrounding neighbourhoods close to the river. (Table. 05)

Educational level	Al Qobbeh	Abou Samra	Old City
Illiterate	23%	20%	8%
Read and write	3%	14%	16%
Primary education	29%	26%	34%
Secondary education	33%	23%	33%
Vocational education	2%	5%	6%
Superior education	10%	12%	3%
Total	100%	100%	100%

Table.05: Education levels in the study area (sample of 3 neighbourhoods) © Kayal,2007.

(81) Jahic, N. (2024). 'Poverty in Tripoli: Causes and solutions'. Borgen Magazine.

(82) Attieh, A. & Kayal, M. (2006). Trâblus min al Dâkhil, (Tripoli de l'intérieur). Dar Mokhtarat, Beyrouth.

(83) Le Thomas, C. (2009). Pauvreté et conditions socio-économiques à Al-Fayhâ'a : Diagnostic et éléments de stratégie. Agence française de Développement. IECD pp.217.

(84) Laythi et al, (2008). 'Poverty, Growth and Income Distribution in Lebanon'. International Poverty Center, study no 13. (in Le Thomas, 2009)

(85) Information International, & CDR. (2001). Stakeholder analysis and social assessment for the proposed cultural heritage and tourism development project: Final report. Information International & CDR. pp. 82 . (in Le Thomas, 2009)

(86) Central Administration of Statistics, (2004). Annual reports.

(87) M. Kayal. (2007). 'L'eau en société, Pratiques et perceptions des usagers à l'égard du service public en charge de la distribution de l'eau et de l'assainissement à Tripoli', étude commanditée par l'association Corail.

Furthermore, according to Laythi et al's [88] statistics, families managed by people with less than a primary level education form 45% of the poor. Furthermore, many kids in Tripoli are forced to leave school at early age to go to physical labour activities to help increase the family income. The public schools in the areas have deteriorating infrastructure and are often overcrowded and don't have enough fundings to provide the kids with a proper education, contributing to this cycle of poverty and illiteracy.

[Poverty and corruption] The Islamic law requires people to donate to people in need to create a balance between the poor and the rich (this practice is common in Tripoli). Also, politicians take advantage of the lack of social and economic stability in the city and pay the poor people to secure new voters for upcoming elections. By receiving money for social, religious or political reasons, a relationship of obligation and dependence is created between the recipients and these "helping" parties,[89] normalizing this cycle reinforcing this "culture of poverty"[90] and impacting these communities negatively.

[The economic activities in the area] In the "Tabbaneh" neighbourhood economic activities are divided as such: 1.2% in the industrial sector, 11.6% in the artisanal sector and 87.2% in the commercial sector.[91] But due to the growing tensions in the area, these activities are declining over time, increasing the levels of unemployment and under qualification resulting in lower incomes.[91] In the old city the economic activities revolve mainly around commercial activities, with 35% of business owners there being illiterate and 55.2 % with only a primary education.[92] Additionally, only 16,4% of economic activities in the area are related to heritage and tourism (traditional crafts, catering, accommodation...), with only 96% of the customers being locals (therefore the economic activity barely increases in high touristic seasons).[93]

[The issue of unemployment] Tripoli has high unemployment rates compared to other poor Lebanese cities. In the old city, half of the educated youth are unemployed, suffering from the depressed economic status of the area. [94]

Observation

The issue of pollution mentioned in the previous sub-chapter can be linked to the levels of poverty in the area. Considering the problems of insecurity in the area, the bad economic situation and the social disadvantage of most residents in the old city, addressing the socio-economic and environmental challenges in the neighborhoods surrounding the Abou Ali River requires a comprehensive urban planning strategy and design approach. The strategies proposed should focus on improving the living conditions of the residents, and their access to quality education, creating new economic opportunities, and mitigating the existing environmental challenges. Community engagement and the participation of local stakeholders (ie. the residents, local NGOs, the municipality, institutional foundations, and local political parties), is essential for a successful implementation of the project.

(88) Laythi et al, (2008). 'Poverty, Growth and Income Distribution in Lebanon'. International Poverty Center, study no 13. (in Le Thomas, 2009)

(89) Briquet, JL. (1997). La Tradition En Mouvement. Clientelisme Et Politique En Corse. (pp. 303). Belin. (in Le Thomas, 2009)

(90) Attieh, A. & Kayal, M. (2006). Trâblus min al Dâkhil, (Tripoli de l'intérieur). Dar Mokhtarat, Beyrouth.

(91) Le Thomas, C. (2009). Pauvreté et conditions socio-économiques à Al-Fayhâ'a : Diagnostic et éléments de stratégie. Agence française de Développement. IECD pp.217.

(92) Debes, H. & Tabet, J. (2002). Réhabilitation et revitalisation urbaine de la ville ancienne de Tripoli, rapport préliminaire, CDR.

(93) Ginzarly, M. & Teller, J. (2016), 'Heritage Conservation in River Corridor Cities: The Case of Tripoli, Lebanon'. In Conference: The 23rd International Seminar on Urban Form.

(94) UNDP Lebanon. (2008). Mapping the living conditions in Lebanon between 1995 and 2004. United Nations Development Programme.

3.2 HISTORIC AND TERRITORIAL EVOLUTION

INTRODUCTION

Through the years, the Abu Ali river's functions and physical structure have been altered, impacting its ecological role and its relationship to the city and its people. This river that was once a green corridor bordered by public amenities and was a precious source of water, has become an infrastructural barrier, that disconnects the adjacent neighbourhoods from each other and degrades the environmental conditions in the city. The urban fabric in the historic core* of the city used to be characterized by small and irregularly shaped street blocks that formed an organic pattern and seemed to evolve naturally instead of being planned. (95)

This "natural looking" layout worked seamlessly with the river's natural flow, creating strong connections between the urban fabric and the natural environment. However, the canalisation of the river and the construction of modern roads on its sides in the 20th century, led to a fragmented urban landscape, isolated surrounding communities and a biologically dead water canal.

The following section will serve as an introduction to understand the important stages of Tripoli's evolution and the different change processes and urban development patterns that happened over time through a historic and morphological analysis of the historic core in Tripoli and its structural landform. In the analysis, key points like buildings structures, land uses, and street patterns will be developed. And so, by analysing the events, urban strategies and policies that led to the degradation of the urban context we'll be able to develop a better understanding of the cultural and social rupture between the residents, the city and the river.
This overview will include Malmluk, the Ottoman, the French mandate, the independence till the present-day periods.

(95) Ginzarly, M. & Teller, J. (2016), 'Heritage Conservation in River Corridor Cities: The Case of Tripoli, Lebanon'. In Conference: The 23rd International Seminar on Urban Form.

(96) National News Agency. (2012). Tripoli: Second Mamluki city to Cairo; its districts bear witness to cultural heritage.

*Context concerning the use of "historic core" of Tripoli:
Tripoli has two historic cores as it was built on two different sites by successive civilizations. The first one being the area of "Al- mina" (that means the port) that was founded by the people of Arwad, Tyre and Sidon in the first millennium BC.
And the second being the area where the Abu Ali River is located, because when the Mamluks took over the city they destroyed the old port area of the city and built a new city to the east, at the foot of the St. Gille citadel. (96)



Fig. 56 Abou Ali river and surrounding urban fabric 1936
© Institut Français Du Proche-Orient (ifpo)



Fig. 57 Abou Ali river and surroung urban fabric 2024
© Erika Younan

MAMLUK TRIPOLI (1289-1516)

During the Mamluk period, and to protect the city against the crusaders, Tripoli was displaced inland, around the Saint-Gilles castle (Fig.58), and by the banks of Abu Ali rivers. Even though the main reason to transfer the city was defence [97] Abu Ali rivers was the driving force and the backbone of the new settlement.
As seen in the party wall map* (Fig.59), the majority of the buildings are oriented towards the river.

[Economy] Tripoli's port gained significance and became a key trading port of Syria, providing Europe with candy, powdered sugar, and bread loafs. The main products were agricultural and small industry goods such as citrus fruits, olive oil, soap, and textiles (cotton and silk, especially velvet). The Mamluks used the Abu Ali River to supply both the agricultural fields and the urbanized area with their water needs. Therefore, the river became an important ecological corridor, generating economic benefits and growth. [98]

[Urban Form] Climate, site configuration, defence, and urban aesthetics were what defined the urban form of Tripoli during the Mamluk era. [99] Topography and prevailing winds determined the layout of major streets. The urban morphology was defined by an organic grid incorporating a fine-grain plot pattern. In addition, the streets were narrow and winding, and the buildings densely packed. The mosques were spread evenly in the city and the madrasas (schools) were especially concentrated around the Grand Mosque. All the khans were situated in the northern part of the city to ensure easy access to the roads leading to Syria. Public baths, or "Hammams", were thoughtfully located to serve areas with the most population concentrations: next to the Grand Mosque, in the middle of the commercial district, and in the right bank's settlements. [97] Given that the city was built around the river's banks, two bridges were built, connecting the city's two sides. Furthermore, many windmills were raised in the middle and along the river's edge. [97]

[Urban Growth] In the Mamluk era, Tripoli witnessed a fast-paced development and a rapid urban growth. Nodes of urban developments featured "Al Qobba" area, Abu Ali Riverbanks, the fortress, and the orchards in the flat plains to the west, north and south. The city lacked fortification but had several gates such as "El Hadid" to the east, "El Tebbaneh" to the northeast, "Al Haddadin", "Al Ramel", and "Al Tal" to the west. The city of Tripoli stayed within the gates and did not expand beyond it until the late ottoman period. [98]

* A party wall map points out hotspots and centres of attractions in a city by depicting only one façade of each building. The designated façade should have the same orientation across all the buildings. This map was first designed by Professor Omar Aziz Hallaj when he was working on a project in Aleppo.

[97] Tadmori, O. (1981). Tarikh Tarablus Al-Siyasi WalHadari Aabr Al-Ousour: Aasr Al-Mamalik. Al- mouassassa al-arabiya li al-dirasat wa al- nasher, Beirut.

[98] Ginzarly, M. (2014). An Ecological Approach to Riverfronts Revitalization: The Case of Abu Ali River Corridor In Tripoli. AUB university. Beirut, Lebanon.

[99] Jidejian, N. (1986.) Tripoli through the Ages. Beirut, Dar el Mashreq publishers, 65-102.



Fig. 58 Old drawing of Abu Ali River valley showing the Castle of Saint Giles and the old city of Tripoli.
© JideJian, 1973.



Fig. 59 Tripoli's party wall map
© Ginzarly, 2014

OTTOMAN TRIPOLI (1516-1918)

In the early Ottoman period, Tripoli was one of the three principal administrative districts. It played an important role of linking the coastal strip from the city of Byblos to the city of Tartus and the provincial towns of Homos and Hama. At this time, the city experienced economic growth and dominance and wasn't too preoccupied by defence goals. Tripoli preserved its historical core and expanded (Fig. 61). [100]

[Economy] Tripoli was considered the port of Aleppo and was depended on Syrian local trading and taxes of the rural mountain region until 1612. During the 17th and 18th centuries, French merchants had a strong presence in Tripoli, and it quickly turned into an intense trading competition for Europeans. [101] Tripoli maintained a great role for the country's economy, more important than Beirut's, from the 19th century until the end of the Ottoman period. The trade sector was the principal economical sector of the city, mainly the trade of agricultural products of the local citrus and olive fields. As a result, Abu Ali's River preserved its role as a major component of the economic growth of the city.

[Urban Form] In the early ottoman period, Tripoli saw the expansion of the southern entrance of the city (here we have the "Muallaq" Mosque and the "Hammam al Jadid" public baths). To control any uprising, the caravanserai of "Khan al Saboun" was constructed in the centre of the city, and it was originally a military barrack. Tripoli was introduced to new building typologies, street patterns and public spaces with the new settlements outside the city gate. Buildings used to be elements defining the urban space, they became elements within the urban space. [100] The first tram was built around 1881 and was pulled by horses [102], and new roads were built to connect the two cities of Tripoli and El-Mina. In addition, the ottomans established the first public garden named "Al Mashiya" in the "Al Tal" area.

[Urban Sprawl] The Ottomans' interest in the western world grew in the second half of the 19th century. The western products fascinated them, and they planned to trade with Europe, essentially through Tripoli. This was when the city started to witness an urban development in the west in the direction of the harbor city of El-Mina. Tripoli's residents started to move out of the old city, especially the Christians. [103] The reason that lead the ottomans to construct the tram and the new roads was their plan on expanding the development of the city beyond the old city wall and reinforcing the connection between the historic core of Tripoli and El-Mina for trading purposes. A railway to Syria was also constructed at the beginning of the 20th century, which motivated the Tripolitan investors to start building along it the new main street on both sides. The river was the vital component of the city during the Mamluk period, but in the Ottoman era, the transport networks became the catalysts for development. [100]

[100] Ginzarly, M. (2014). An Ecological Approach to Riverfronts Revitalization: The Case of Abu Ali River Corridor In Tripoli. AUB university. Beirut, Lebanon.

[101] Tadmori, O. (1981). Tarikh Tarablus Al-Siyasi WalHadari Aabr Al-Ousour: Aasr Al-Mamalik. Al- mouassassa al-arabiya li al-dirasat wa al- nasher, Beirut.

[102] MoPWT/DGUP. (2001). Ilghae Dam wa Fariz Makhraj Tarabolous Al Chamaly (Cancelling the division parcels plan project in Tripoli northern entrance). Beirut: 1.

[103] Attieh, A. & Kayal, M. (2001). Tahawulat Al Zaman Al Akhir (Change in the latest time). Beirut, Mokhtarat.



Fig. 60 Old drawing of Abu Ali River valley showing the Castle of Saint Giles and the old city of Tripoli in th 1800's.
© Ottoman Imperial Archives, FB, 2019.

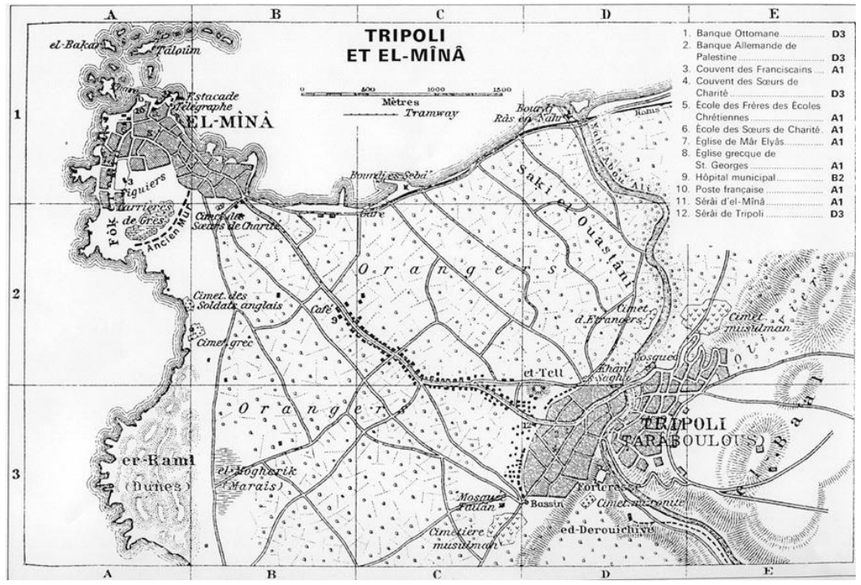


Fig. 61 1906 map of Tripoli and El Mina
© Baedeker, 1906

THE FRENCH MANDATE (1918-1946)

The "Great Lebanon" was founded by the French in 1921, with Beirut as the capital and Tripoli as the capital of northern Lebanese province. The residents of Tripoli strongly refused this decision and revolted against it, because they were aware that it would give the leading role to Beirut. (104) (105) (106) (107)

[Economy] Tripoli's economy was in decline, until the year 1930 when electric power supply reached the city for the first time. It was the first step in the industrialization of the city. And between 1931 and 1937, an important event took place, which was that the crafts industry flourished "while workers in Tripoli's old-style workshops were almost three times the number they had been in 1931" (Gulick , 1967). (106) Additionally, many other industries were established like the "Iraq Oil" refinery at the northern entrance of the city of "Bedaoui" and the "Arida" cotton industry at the southwest part of Tripoli, and they had a significant role in the economy of the city at back then.(107) Also, at this time the first water tanks were built, and a drinking water system had been implemented, supplying mainly the old city. The railway connecting Tripoli and Beirut was completed in 1940. In the late 1940's, Tripoli witnessed the last important economic boom, with the start of the campaign against the establishment of the Israeli state on Palestinian territory. Considering this political scene, the Iraq Petroleum Company (IPC) refinery had to close in Haifa and moved to Tripoli, which had a positive impact on Tripoli's economic growth. In fact, the IPC relocated all its staff from Haifa to Tripoli, and they were mainly English and Palestinians, and most of them stayed afterwards and lived in Tripoli. (107) At the same time, the first industrial zone in Tripoli "Bahsas", was established at the southern entrance of the city. However, this prosperity didn't last long as the civil war had a huge negative impact on the economy.

(104) Danawoui, M. (1998). Aawdat alzakira ila tarikh Tarablus wa al mintaka (Return of the Memory to Tripoli and the area's History). Tripoli, Dar Al Iman.

(105) MoPWT/DGUP. (2001). Ilghae Dam wa Fariz Makhraj Tarabolous Al Chamaly (Cancelling the division parcels plan project in Tripoli northern entrance). Beirut: 1.

(106) Gulick, J. (1967). 'Tripoli a Modern Arab City'. Harvard University press, Cambridge. 17-19.

(107) Attieh, A. & Kayal, M. (2001). Tahawulat Al Zaman Al Akhir (Change in the latest time). Beirut, Mokhtarat.

[Urban Sprawl] One of the main defining factors on the urban growth pattern, was the construction of the first road that connected the citadel and "El mina" port area, and the roads that linked Tripoli and Beirut with railways to the Syrian border in the 1930's. The city's growth persisted, especially around the old city, around the two Beirut-Tripoli-Homos roads and from the historic core to El-Mina (Fig. 62 & 63). Yet again the situation was disturbed by the civil war, and the city's further developments happened with no control or regulations. (107) After the French defeated the Ottomans and ruled the country, they developed new residential areas and many schools on the borders of the old Mamluk city. Tripoli kept developing around the old city until 1947 when the French planner Eglie developed a new master plan.

[Urban Form] During the French mandate period, Tripoli's urban planning took a more modernist and rational approach. From the medieval centre to the Mina region, Tripoli became more modern, with influences from the Haussmanian urban planning model. Grand boulevards, roundabouts and open spaces facilitated surveillance and control. The "place de L'Etoile" prototype was replicated near the historic core of the city like in most of the Lebanese cities at the time. These new types of roads and buildings that emerged around the old city changed its traditional character. While the Mamluk historic core was characterized with a fine grain type of structure, the new extensions to the city had a coarse grain structure, large blocks and free-standing buildings. (108)

(108) Ginzarly, M. (2014). An Ecological Approach to Riverfronts Revitalization: The Case of Abu Ali River Corridor In Tripoli. AUB university. Beirut, Lebanon.

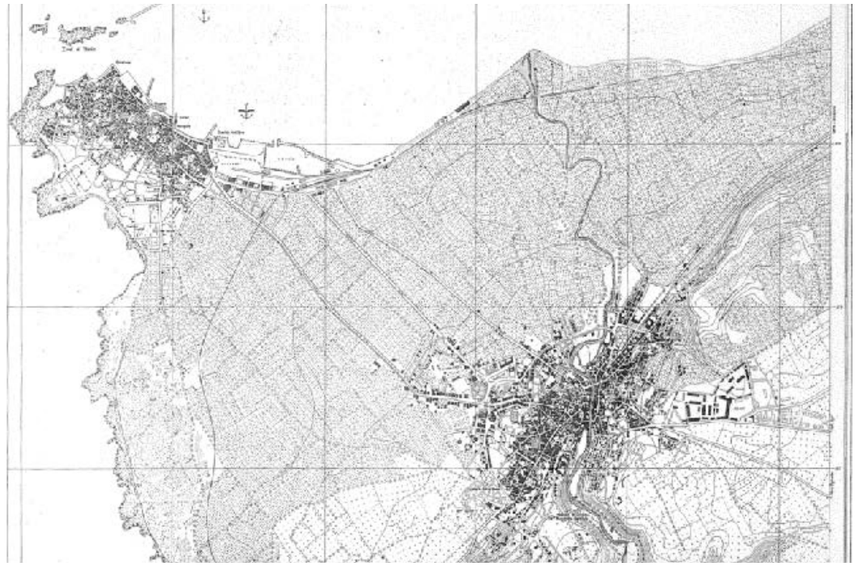


Fig. 62 1925 map of Tripoli and El Mina
© Archival documents at the Council of Development and Reconstruction

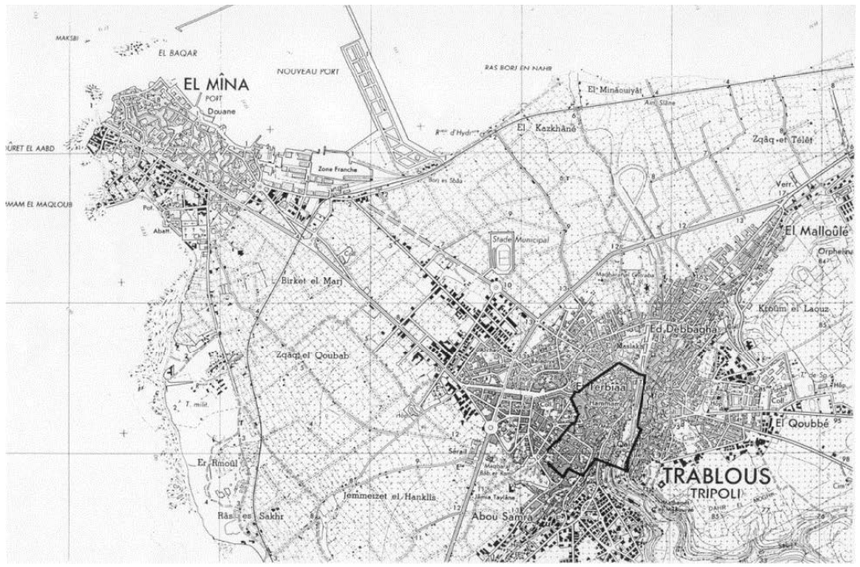


Fig. 63 1963 map of Tripoli and El Mina.
© Archival documents at the Council of Development and Reconstruction

INDEPENDENCE TO PRESENT DAY

Independence

[Economy] Tripoli's economy evolved from relying solely on agriculture and portal activities to being mainly dependant on the commercial and industrial sectors by the 1970'.
In 1975, the civil war began, and the economic sector of the whole country took a hit, including in Tripoli. [109]

[Urban Development] When the Lebanese state was announced, Tripoli witnessed different urban development projects. In the following section, we 'll present a detailed overview of the masterplans and zoning plans from 1947 till today, to determine the effect of urban design and planning projects on the form of the historic core, the morphology of Abu Ali River, and the land uses in the city and along the river, to clearly understand how these changes impacted the city-river spatial dynamics.

Tripoli's 1947 Master Plan

In 1943 Lebanon got its independence from the French, and in 1947, the first master plan for Tripoli (targeting the cities of Tripoli and Al-Mina) was developed by the Lebanese government. On one side, El-Mina was designed to expand towards the south and the southwest beach area, and on the other side, to connect with Tripoli in the middle, along the main road that links El-Mina and Tripoli's city center. As of Tripoli, it was planned to expand around the old city and along the Abu Ali River and the St. Gilles Citadel.[109]
As outlined in the plan (Fig. 64), the Abu Ali River can be divided into three sections with different land uses proposed: In the north (Section1), they maintained the agricultural fields along the river's edge, and two industrial zones were proposed along the coast. (Section 2) which is the urban riverfront maintained its lively economic centre status. In the South (Section3), along the river's edge, industrial zones started to develop, but a green buffer separated them from the river's floodplain. Overall, most of the existing agricultural fields along the river were preserved in this master plan, but a new industrial riverfront was planned in the south.[109]

Tripoli's 1964 Master Plan

In 1964, the ministry of Public Works and Transports (MoPWT) and the Directorate General of Urban Planning (DGUP) put in charge two Lebanese architects and urban planners* to prepare a new Masterplan for the city of Tripoli and Al-Mina (Fig.65). They faced a lot of pressure from the local authorities, mainly political stakeholders, and also from the major landowners who could influence the political leaders of the area.[110] Their proposal drew inspiration from the master plan of 1947. They suggested to

[109] Ginzarly, M. (2014). An Ecological Approach to Riverfronts Revitalization: The Case of Abu Ali River Corridor In Tripoli. AUB university. Beirut, Lebanon.

[110] Doumani, G. (2005). Tripoli 1964 Master Plan Preparation. Uploaded by El Nabbout, K., Tripoli.

* The lebanese planners Henri Edde and Georges Doumani

reclassify the residential areas and to move the industrial zones form the northern area to an area near the southern entrance of the city, called the "El-Bahsas" industrial area. [111] They also proposed to extend the northern coastal industrial area to the Iraq Petroleum Company harbour. They conserved the citrus fields in the north, and added an agricultural area in the south, adding it on almost all the lower plain area and classifying it as a protected agricultural zone. Their proposal kept the river safe from urbanization and industrial land uses along its edges. However, since this master plan doesn't benefit the landowners and the political stakeholders, it was not implemented. [111]

[111] Ginzarly, M. (2014). An Ecological Approach to Riverfronts Revitalization: The Case of Abu Ali River Corridor In Tripoli. AUB university. Beirut, Lebanon.

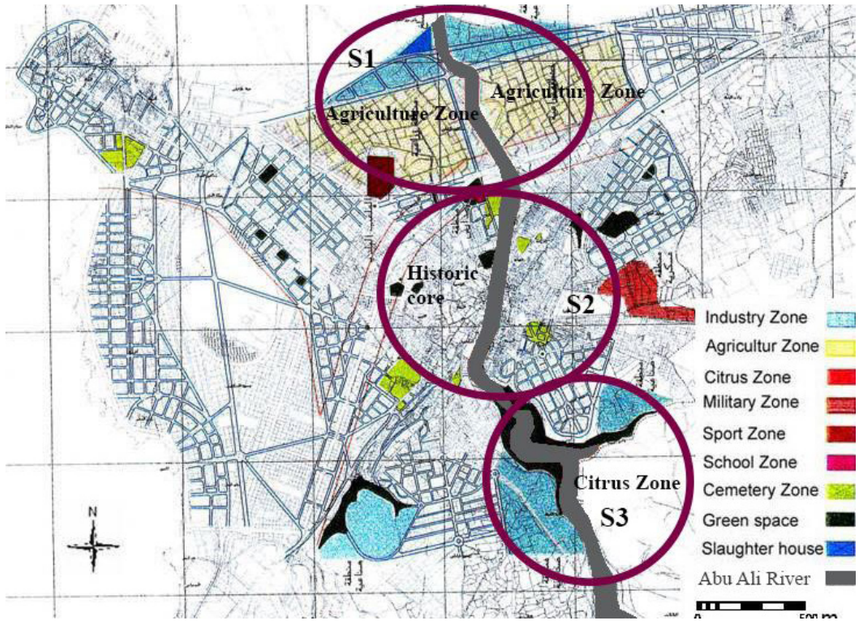


Fig. 64 Land uses along the Abu Ali River according to the 1947 master plan.
© Ginzarly, 2014

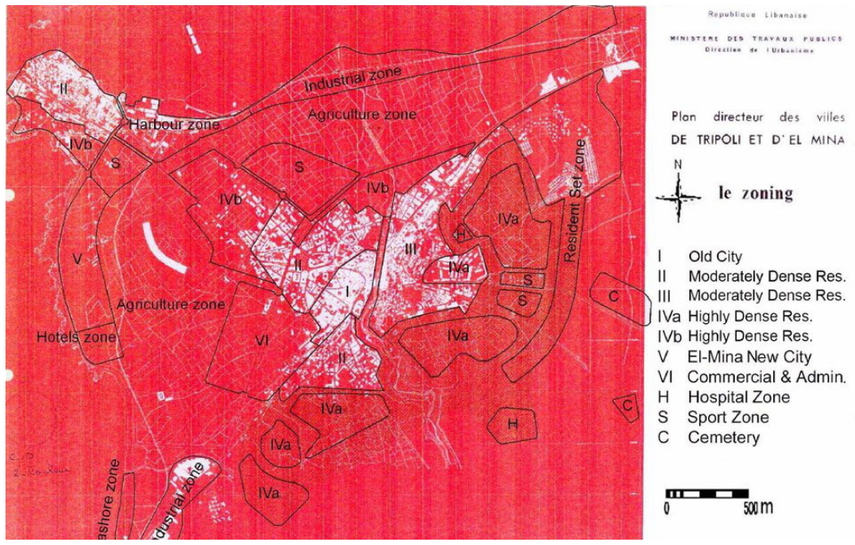


Fig. 65 Tripoli's 1964 master plan
© Edde and Doumani, 1964.

The Reconstruction Of The Abu Ali River Bed (1968)

Ever since Tripoli's historic core was relocated inland by the Mamluks near the Abu Ali River, and up until the middle of the 20th century, Tripoli's small medieval neighbourhoods had a close relationship with the river (Fig. 68); were it played a central role in the resident's everyday lives; and the settlements kept growing and developing steadily around it.[112] However, after the big flood of 1955 (Fig. 69), where a strong storm led to the rise of the river's water levels, many of the buildings and the bridges along the river were destroyed, leaving around 7000 people displaced and 200 dead [113]. As a result, by the end of 1968, the government decided to straighten and canalise the course of the river starting from the zone under the St. Gille castle reaching the river's estuary, to reduce and future risk of flooding (Fig. 66 & 67). The concrete channel they transformed the river into, was designed to allow the safe routing of a 1,000-year flood event.[114] However, this intervention had a very bad impact on the city and the river's cultural and social identity, and on the river's ecosystem (Fig. 70). Around 2000 homes and a couple of historical buildings and caravanserais (like Khan el Zeit, Khan el Laymoun, Khan el Barooudi, ect) were demolished [115] [116], in order to straighten the riverbed. Additionally, two 24 meter wide – avenues were implemented on each side of the river, then soon after, got transformed into major circulation arteries linking Tripoli to the city of Zgharta.

The recreational activities (cultural, religious, social, athletic ect) that used to happen around the river disappeared, stripping the Tripolitans from this public space in their city. Furthermore, covering the river with cement dried up its wetland and natural habitats and the river lost it ecological functions. [114] Finally, adding insult to injury, this cemented canal physically split the city in two parts, disconnecting the neighbourhoods from each other, having only two concrete bridges as connectors. [115]The disconnected areas of "Tabbaneh" and "EsSouayqa" became unsafe zones hosting the poorest people of Tripoli, that proceeded to treat the river as an open-air trash dump.

Fig. 66



Fig. 67

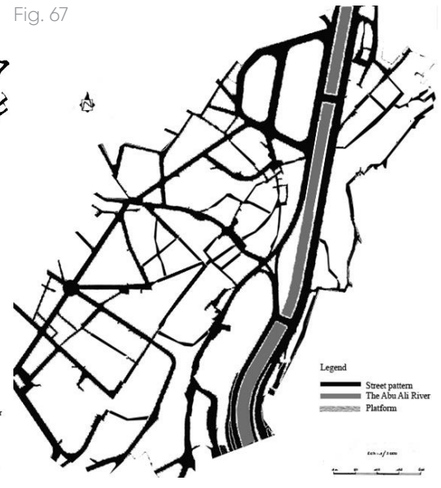


Fig. 66 The street pattern of the old city before the channelization of the riverbed
© Ginzarly, 2014.

Fig. 67 The street pattern of the old city after the channelization ofthe riverbed
© Ginzarly, 2014.

(112) Tadmori, O. (1981). Tarikh Tarablus Al-Siyasi WalHadari Aabr Al-Ousour: Aasr Al-Mamalik. Al-mouassassa al-arabiya li al-dirasat wa al- nasher, Beirut. (in arabic)

(113) Rajab, M., (1993), Le Vieux Tripoli, Un Espace Historique en Voie de Mutation: Problématique et Perspectives d'Avenir. Thèse des Nouveaux Doctorats Géographie et Aménagement. Université de Paris – Sorbonne, Paris.

(114) CES, BTD and LYSA. (1998). Feasibility Study for Tripoli Sewerage. Project No. 1342-Contract No.6261, Council for Development and Reconstruction and Ministry of Hydraulics and Electrical Resources.

(115) Nahas, C. (2001). 'Stakeholder Analysis and Social Assessment for the Proposed Cultural Heritage and Tourism Development Project'. Chapter 4- Tripoli. Council for Development and Reconstruction (CDR), Beirut, Lebanon.

(116) Krstić, H and Dib, A. (2020) 'When Disasters and Erroneous Governmental Decisions Meet In Historical Centre: The Case Of The Old Markets Of The Lebanese Tripoli'. In Conference: ICUP: International Conference on Urban Planning. Nis, Serbia.



Fig. 68 The Abou Ali riverbanks pre 1955 flood
© George Salame



Fig. 69 Tripoli post 1955 flood
© George Salame



Fig. 70 The Abou Ali canal in 2001
© George Salame

Tripoli's 1971 Master Plan

The DGUP proposed a master plan that was very different from the 1964 master plan, and the Lebanese government approved it on the 14th of September 1971. In this new proposal, all the plain areas were open to urban expansion, implying that the two agricultural zones planned in the 1964 proposal were discarded and no agricultural zones were bought up at all. [117]

The 1971 master plan presents six main zones (Fig. 71):

1- Zone A and A1: The old city
2- B1, B2 and B3: Subareas for the residential zone around the old city
3- C1, C2, C2.1 and C3: Subareas for the newly developed area and the area under development
4- D1, D2 and D3: Subareas for future expansion
5- E1 and E2: the two classes of the recreational zone, with E1 as a coastal area and E2 as a touristic area including beaches and hotel construction.
6- Industrial zone: divided into three areas
   - The old industrial areas
   - The southern entrance of the city, around the harbour area
   - From the northern entrance to the city to the Mediterranean coastal area.

Furthermore, the suggested interventions in the historic core in this masterplan are quite interesting. The two open market of "Al-Nahasin" (coppersmiths) and "Al-Kendarjiyeh" (shoemakers) were demolished to create space for two major arteries. These changes physically divided the city into four small islets and altered the essence of the historic core[117] (Fig. 72):

1- The "Bab el haddadin" area.
2- The "Muhaitra" area (has the highest concentration in historic and listed heritage monuments)
3- The "Al Tarjbaa" in the "Bab al-Hadid" islet (it lost most of its initial identity during the constructions planned by the 1971 Masterplan. Today, this area is the industrial sector of Tripoli where there is a dominance of furniture making enterprises and galleries, and the commercial extension of the neighbouring area of "Rummaneh".
4- The "Al- Souayqa" neighborhood across the river, which historically was the extension of the Mamluk city. This zone, built on the edge of a strong hill, is predominantly residential and has limited access due to the steep staircases. A big part of "Al- Souayqa" was destroyed during the expansion of the riverbed.

[117] Ginzarly, M. (2014). An Ecological Approach to Riverfronts Revitalization: The Case of Abu Ali River Corridor In Tripoli. AUB university. Beirut, Lebanon.

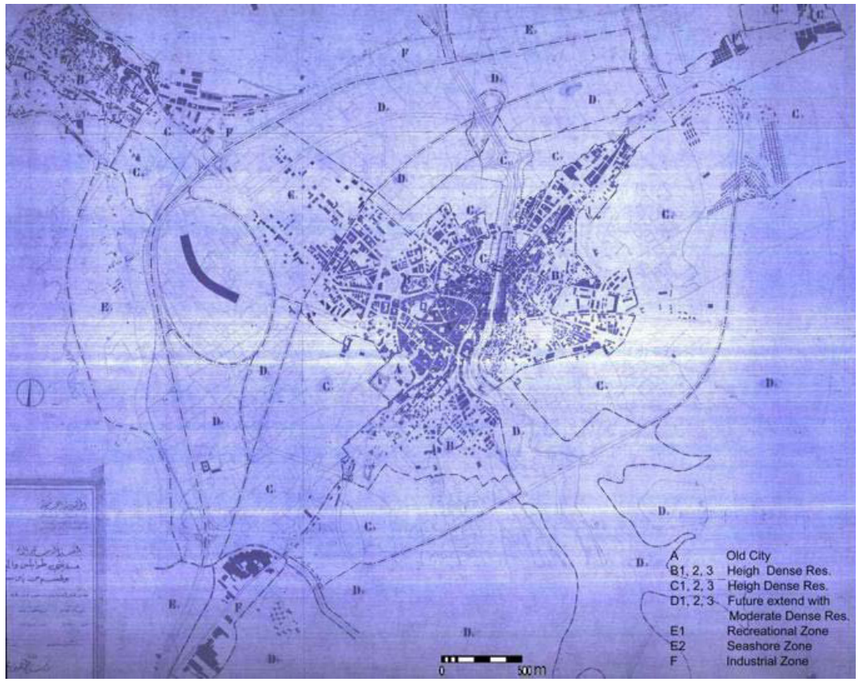


Fig. 71 Tripoli's 1911 master plan
© Directorate General of Urban Planning



Fig. 72 The 1971 master plan changed the essence of the historic core by dividing it into four small islets.
© Ginzarly, 2014

The Outbreak Of The Civil War (1975-1990)

Amid the civil war, the sidewalks constructed in 1968 on the two avenues along the canalized Abu Ali River were occupied by informal vendors selling vegetables and fruits. These vendors appropriating the public space near the roads created traffic congestion disrupting the circulation flows and they polluted furthermore the Abu Ali River, as they were treating it as a dumping waste site. [118] This behavior added to the river's already declining condition and turned it from being a public leisure area where residents can engage with one another and their natural surroundings, to a space secluded from the Tripolitan communities.[119]

Tripoli's Cultural Heritage And Urban Development Project

The Tripoli CHUD (Cultural Heritage and Urban Development) project is a key component of Lebanon's national cultural heritage and urban development initiative. It focuses on revitalizing historic centres in five main important cities (Baalbek, Byblos, Saida, Tripoli, and Tyre) that have suffered from damage, decay, poverty, and stagnation due to Lebanon's civil war. The project has two core goals: Foster local economic development and improve the quality of life in these urban centres and enhance the preservation and management of Lebanon's built cultural heritage. [120]

Profiling Tripoli's Cultural Heritage and Urban Development Project.

[Stakeholders] The Lebanese Government solicited the support of the World Bank to increase urban heritage restoration initiatives to a nationwide scale, by supporting major secondary cities and leveraging investment and technical assistance from other donors like the United Nations, and the Educational Scientific and Cultural Organization (UNESCO). The World Bank and the Agence Francaise de Developpement (AFD) both funded the project. The main institutions that were involved in the project implementation were, the Council for Development and Reconstruction (CDR)*, the municipalities*, the Directorate General of Antiquities (DGA) and the Directorate General of Urban Planning of the Ministry of Public Works (DGU).

*The CDR is a public authority, founded for organizing and executing initiatives to promote economic development and support the renewal and reconstruction of public infrastructure.
* Municipalities play a big part in this process, because local initiatives are ususally coordinated by small municipal task forces the cities. They engage with stakeholders and act as intermediaries between the public and the project.

[Planning Process] The Tripoli CHUD initiative focused on the city's historic core, aiming to transform it into a hub of cultural and economic opportunities, by investing in the cultural heritage of the city. To achieve its goals, they proposed different interventions that would affect the city directly, like for example: restoring some of the important heritage monuments so they could create new cultural and community activities for the city and attract tourists. Improving the access to the old city and rehabilitate the public spaces to improve the pedestrians experience walking in the city. And convincing historic building owners to maintain their historic state and value to attract private investments to rehabilitate them. [121]

Before proposing a masterplan and design interventions, comprehensive studies were conducted to analyse the area's social, environmental, and economic landscape. These studies identified two pressing challenges: the disconnection of the "Bab El Tebbaneh's neighbourhood from the rest of the historic city and the poor living conditions in the "Khan Al Askar" area, a deteriorated neighbourhood in urgent need of rehabilitation. [122] Therefore, to each problem identified in the old city, the planners set up a list of objectives to reach, in order to tackle them and developed a working strategy with targeted interconnected interventions to address these issues while preserving and enhancing Tripoli's historic character.

PROBLEMS	CONSEQUENCES	OBJECTIVES/GOALS
Khan Al Askar residents are living in poor conditions.	Investing in cultural heritage will not be enough to improve the living conditions of these residents.	Their case should be given priority during the planning process.
The disconnection of Tabaneh district from the rest of the city due to the river construction after the 1955 flood.	Tabaneh district have become unsafe.	Bab El Tabaneh neighborhood needs to be reconnected with the rest of the historic city.
Vegetables and fruits vendors are squatting the public space along the river.	Vendors are causing high traffic congestion and affecting the surrounding buildings.	Vendors' stands should be relocated.
The inhabitants of the historic city suffer from a depressed micro-economy, lack of social services, and general neglect by public institutions.	The physical condition of private properties and, monuments is declining over time. Moreover, the environmental condition of the city is deteriorating.	Inhabitants should be offered opportunities of local economic development and a better quality of urban life.
The historic city center is suffering from both lack of public spaces and pedestrian and vehicular accessibility difficulties.	This fact prevents people from visiting the city.	Better access to the old city must be provided.

Table. 06 CHUD Project goals
© Tabet and Debes, 2002

[118] Itani, N. (2024). Personal Interview.

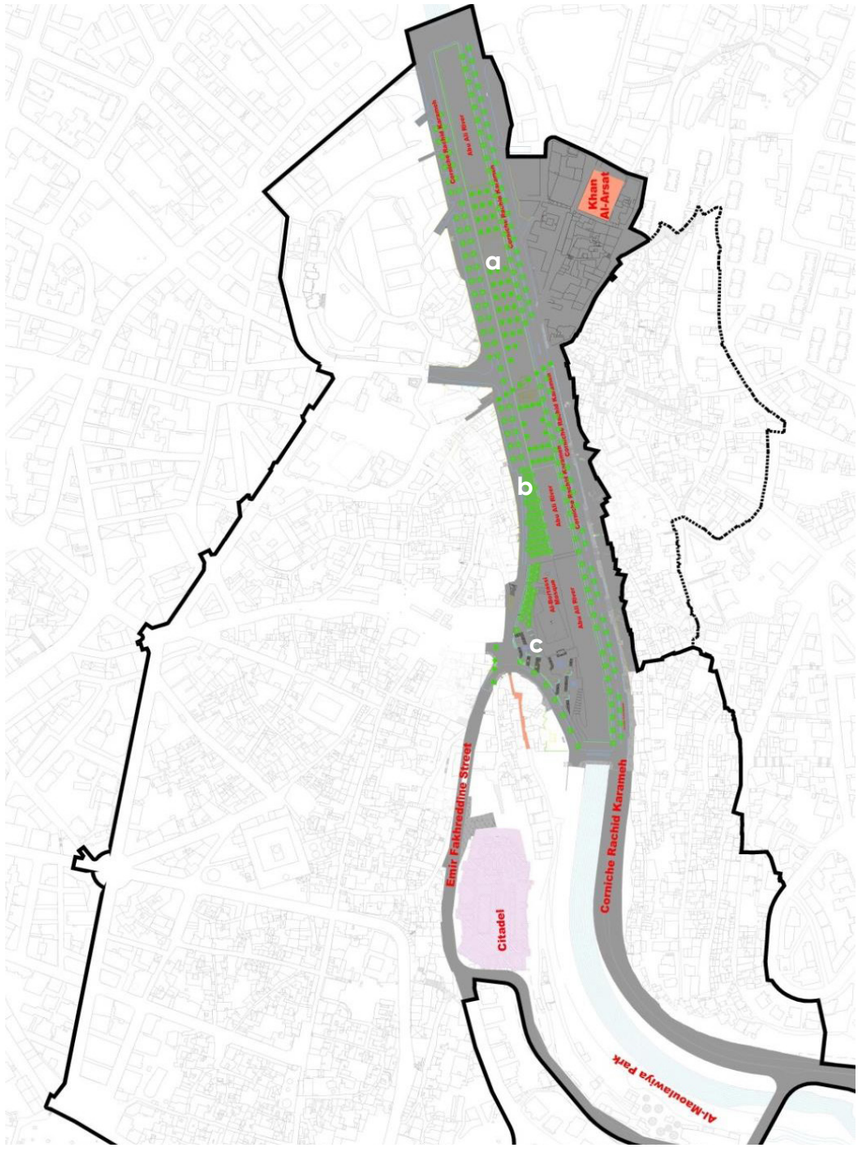
[119] Ginzarly, M. (2014). An Ecological Approach to Riverfronts Revitalization: The Case of Abu Ali River Corridor In Tripoli. AUB university. Beirut, Lebanon.

[120] World Bank. (2003). Project Appraisal Document For The Cultural Heritage And Urban Development Project. Report No: 24488-LE, 64-67.

[121] Itani, N. (2024). Personal Interview.

[122] Ginzarly, M. (2014). An Ecological Approach to Riverfronts Revitalization: The Case of Abu Ali River Corridor In Tripoli. AUB university. Beirut, Lebanon.

[Project Components] Overall, the project aimed to transform the historic core by prioritizing pedestrian-friendly streets, creating various open spaces along the Abou Ali River, implementing parking solutions, and restoring historic monuments and the deteriorating facades of the old souqs. But many design interventions that were submitted in the revitalization masterplan proposed, weren't implemented in the end and the project was interrupted many times because of security concerns caused by violent clashes between the residents of the "Bab el Tebbaneh" and "Jabal Mohsen" neighbourhoods. Also conflicts between the local stakeholders kept delaying the progress. The following paragraphs detail the proposed interventions that were implemented. [123] [124] (Fig. 73)



[123] Itani, N. (2024). Personal Interview.

[124] Ginzarly, M. (2014). An Ecological Approach to Riverfronts Revitalization: The Case of Abu Ali River Corridor In Tripoli. AUB university. Beirut, Lebanon.

Fig. 73 Open spaces strategy applied by the CHUD project along the river
(a) Market place on the platform over the river, with kiosks, and palm trees;
(b) Landscaping of the promenade along the river banks; (c) Bortassi garden with terraces going down till the river bed.
© Tabet and Debes, 2002

Bab El Tebbaneh, fresh produce market:
The historical city's Eastern side has suffered degradation due to the influx of modern high-rise apartment buildings and the poverty of the "Bab El Tebbaneh" neighbourhood. Catering to the population of this area, the vegetable and fruits market extended on the riverside boulevard leading to heavy traffic congestion (Fig. 74) on a major transit artery. Therefore, a broad pedestrian platform was constructed over the Abu Ali River to accommodate the market (Fig. 75).


Fig. 74

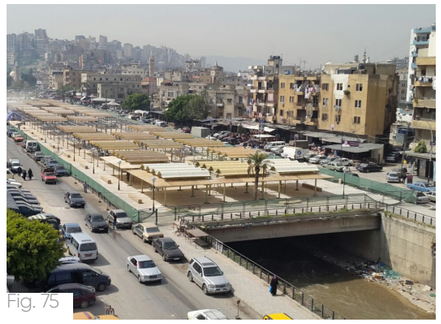


Fig. 75

Fig. 74 Informal vegetable vendors on the sidewalks encroching on the facade and creating congestion. © Municipality of Tripoli, Resettlement Action Plan, 2012.

Fig. 75 Platform constructed over the Abu Ali River to accommodate the vegetable market. © Municipality of Tripoli, Resettlement Action Plan, 2012.

Bortassi Square:
To revitalize the historic spatial connection relation between the Bortassi mosque and the Abu Ali River, a public space was developed near the mosque, incorporating terraces that extend downwards to the riverbed.

River-side circulation, parking solutions and landscaping:
The project suggested renovating the Western riverside Corniche Rachid Karame up to Al Bourtassi Square, incorporating sidewalks, tree planting, a reduced carriageway, and parking areas on both sides. And to ease the traffic congestion in the historic city it was proposed to redirect the traffic flow to the Eastern riverside. The dead-end street beneath the Citadel was designed to lead to a parking area, and the Mawlawiya Garden had a landscape design proposal to benefit the locals (Fig. 76).


a


b


a'

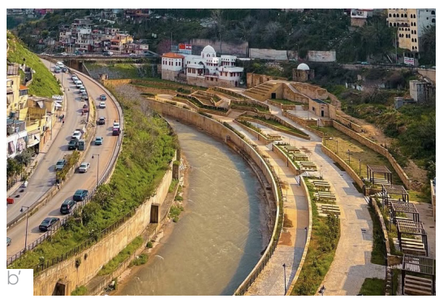

b'

Fig. 76 Mawlawiya garden before and after riverside design intervention. the intervention was completed around 2021.

a. Before
© Savas Bozkaya, 2011
a'. Before
© Clemens Schmillen, 2017
b. After
© Erika Younan, 2024
b'. After
© Ali Tradieh, 2022

Resettlement housing:
With the financing of the municipality, alternative housing was built on nearby public land to host the families and the activities that are currently occupying Khan Al Askar, and retail spaces for municipal use were allocated in the surrounding areas accordingly. The first phase saw the provision of 27 apartments and 28 commercial units, with the second phase adding 28 apartments and 3 commercial spaces (Fig. 77).

Northern neighbourhood, "Khan el Askar", public space and street frontage:
The proposal included rehabilitating Khan el Askar to house the "Lebanese University Center for Restoration and Conservation of Monuments and Historic Sites", the Municipality's departement for restoring the historic city, and other cultural, educational, and community spaces. It was planned that the square between the Khan and the Al-Taweb Mosque be transformed into a fully pedestrian space, linking it to the entrance of the main Souq Al Bazerkan. And the landscaping of The Western intersection between Abdel Hamnid Karame and the Souq al Najjarine, was to be enhanced, facilitating access to the historic city. Also, Souq al Najjarine leading to the Al Bourtassi Mosque Square, was to be fully pedestrian and a drop-off in front of Khan el Masriyyin was proposed (Fig. 78).



Fig. 77 Khan el Askar resettlement housing
© Tabet and Debes, 2002



Fig. 78 Restoration works proposed by the CHUD Project.
© Tabet and Debes, 2002


Fig. 80 Uplifting of facades on the eastern side of the river
©Ali Tradieh, 2022

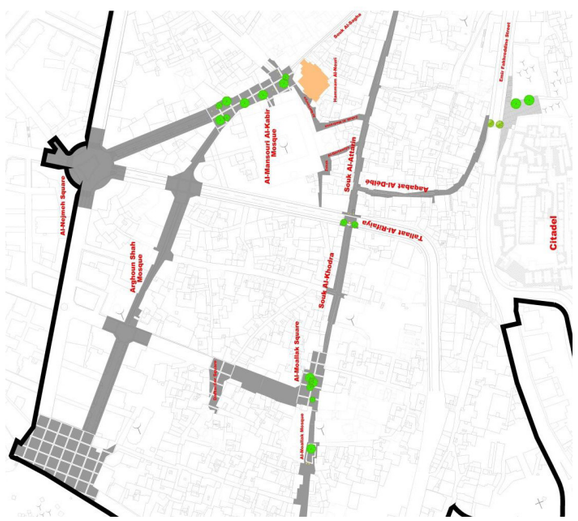


Fig. 79 Restoration of facades and public spaces in the central part of the Souks ©Tabet and Debes, 2002

Archaeological site of the St. Gilles Citadel:
The Citadel is Tripoli's most prominent and renowned monument, being the primary attraction for visitors to the historic city. Conservation efforts will focus on the Citadel's medieval structures and surfaces, and the introduction of handrails, signage, and other devices will improve accessibility and ensure the safety of visitors. Additionally, a central section of the Citadel, already partially renovated, will be fully equipped to house the Tripoli Museum, featuring local antiquities, panels, and artifacts that highlight the history of the city and the Citadel.

Circulation and landscaping around the St. Gilles Citadel (Fig. 79):
Emir Fakhreddine St., running parallel to the Citadel, will be converted to a one-way street heading towards the bridge and Al Bourtassi Sq., with a reduced carriageway, new sidewalks, and the addition of street furniture. On this street, and on the opposite of the citadel, a bus stop will be created to drop-off the tourists. Pedestrian alleyways and stairs will be newly built or upgraded to allow easy access for visitors and residents to the parking and Maoulawiya Park.



Fig. 81 Circulation and landscaping around the St.Gilles Citadel
© Tabet and Debes, 2002

3.3 **OBSERVATIONS**

Analysing the historic events that happened in Tripoli and its evolution in time and summing up the different projects, polices and masterplans that were proposed for the city and specifically for the Abu Ali river and the historic core (both the ones that got applied and changed the river and the ones that didn't) was essential to understand the consequences that these changes had on the socio-cultural relationship between the people and the river and on the connections between the urban fabric and the river. That way when recognising the problem, its source, and its impact on its surroundings it becomes easier to propose new solutions to treat it.

The main transformation that affected Abu Ali's River edge was the infrastructure projects proposed and applied during the 20th century. Large vehicle roads replaced the pedestrian walkways on the edges, and a concreate canal straightened the course of the river as a future flood prevention initiative. While this canalization initiative did solve the issue of floods it on the other hand completely disregarded the old cities' historical value by destroying many of its historical buildings and splitting the city in two, and killed the river's natural ecosystem, becoming an open sewage-like canal that people throw their trash in. Today, this corridor is no longer a space of social, cultural and environmental interaction but an infrastructure element acting like an open wound in the city. Of course, the current situation of the river can't be blamed on one actor or one event, as it is the result of multiple and compiling political, economic, cultural and social decisions. [125]

Therefore, taking all these factors into consideration and learning from the past, the revitalization proposal of the Abu Ali riverfront aims to find ways to reintegrate Abu Ali to the city by mending the fractured spaces and connecting the neighbourhoods back together and to the river while also providing new public spaces and amenities along it for the residents of the city who have been deprived of the right to a proper riverfront.

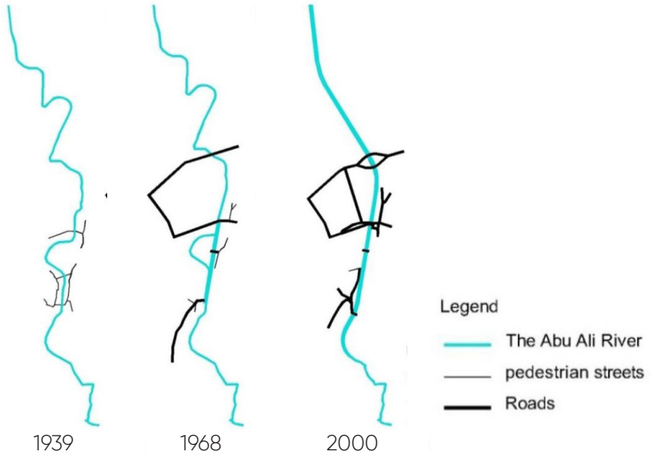


Fig. 82 Changes in the river course of the Abu Ali River and in the typology of physical connections between the western and eastern Bank
© Ginzarly, 2014

[125] Ginzarly, M. & Teller, J. (2016), 'Heritage Conservation in River Corridor Cities: The Case of Tripoli, Lebanon'. In Conference: The 23rd International Seminar on Urban Form.

04 TERRITORIAL AND URBAN ANALYSIS

objective A Territorial scale: Understand the topography in which the Abu Ali river crosses and it's different zones.

objective B Urban scale: Analize the built and open fabric of the area, it's ratio of permeability, the functions, flows, connections and accessibility, and present a SWOT analysis of the area.

objective C Site scale: Understand the spatial, architectural, and urban landscape identity of the context and how to connect the fragmented spaces on the riverfront. Choose a smaller area to implement revitalization strategies and design as a first step to reconnecting the whole riverfront.

4.1 **ANALYSIS ON THE URBAN SCALE**
Mapping the current situation

NOLLI MAP

The Nolli map of the Abu Ali River gives us a detailed representation of the spatial organization of the study zone and highlights characteristics of the urban fabric surrounding the riverfront, as well as making typological patterns stand out. Through the figure ground map, it becomes easier to analyse the relationship between the built and the open fabric, and between the private and the public spaces, as well as to understand the spatial flow and connectivity in the area.

We can see in the Nolli map the visible density of the build environment surrounding the river, and the limited availability of open spaces, specifically public open spaces . We can also point out how the roads on both sides of the river accentuate even more the physical separation between the two sides of the river, and how the level difference between the streets and the riverbed adds visual disconnection to the physical one.

In the historic core area, the open spaces are carved out from the building volumes in an angular typological pattern, following an organic grid and creating a continuous link between the private and public spaces, and different width spaces along the narrow streets.
The “Abu Samra” neighbourhood was developed during the early modern urban period, so the typology of its urban fabric differs from the old historic core. The built masses and open spaces follow a regular grid, resulting in wide streets bordered by independent buildings. With the street following a regular grid, its pattern delimitates the blocks and categorizing the public, private and semi-private spaces become more evident.
The buildings along the northern part of the river have a continuous linear building edge facing the road corridor that’s between them and the river. However, on the southern part of the river, this building edge is lost as the buildings and the open spaces start following an organic and curvilinear typological pattern following the curvature of the river, and the physical connection between voids and masses becomes more ambiguous.

After having analysed the map of the build and open spaces and extracted the patterns and textures followed by the urban fabric in the different zones along the river, a deeper analysis of the typologies open spaces is required to better understand the physical spatial structure of the urban landscape and what the voids on the map represent beyond being just private or public spaces, as these spaces encompass a range of typologies, land uses (including for instance civic space, corridors, nodes, etc..) and soil permeability factors. So, in the following map, the relationship between the buildings and open spaces will become clearer, and the open spaces will be arranged into different categories.

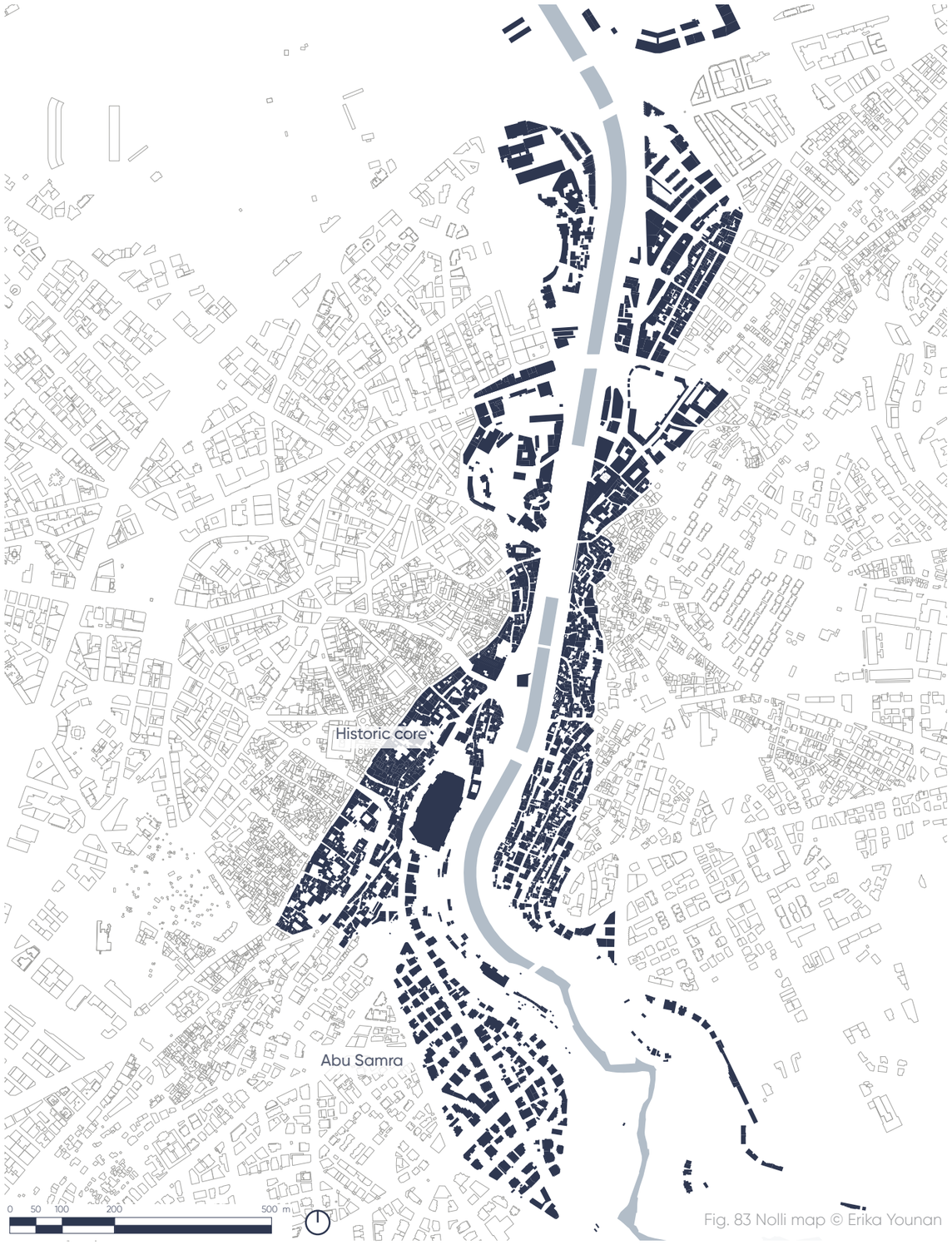


Fig. 83 Nolli map © Erika Younan

TYPES OF OPEN SPACE

We notice in the map the variety of open spaces available in the study area, with different usages and purposes. These spaces range from being agricultural lands, green fields with untouched natural shrubs and vegetation, sloped terrains with natural shrubs and vegetation offering a scenic view, designed public squares and gardens, pedestrian walkways, empty lots, cemeteries, courtyards inside buildings and setbacks outside of them.

These different open spaces do not only have different categories of uses, but they also have different spatial structures and levels of porosity. They can be categorized into five sub-types of spaces:

- Private open spaces that have permeable soil, like the agricultural fields for instance.

- Private open spaces with impermeable soil like the industrial lots in the northern area of the river and the residential buildings' courtyards.

- Semi-public permeable open spaces like the garden of the Al Bourtasi mosque that's owned and managed by the mosque.

- Public and permeable open spaces like the street vegetation, the newly designed garden near the Takia al Mawlawiya building, the cemeteries' outdoor planted areas and the lots and spaces with untouched natural vegetation growing in it.

- Public and impermeable open spaces, for example: the public squares, like the Bourtasi Square, the parking lots, the empty lots, the platform covering the river, the new pedestrian walkway designed with the garden near the Takia Mawlawia building, the setbacks and the sidewalks.

In addition to the map (Fig. xx), a visual survey accompanied by images of the open spaces along the river shows a realistic representation of their different characteristics and features (Fig. xx).

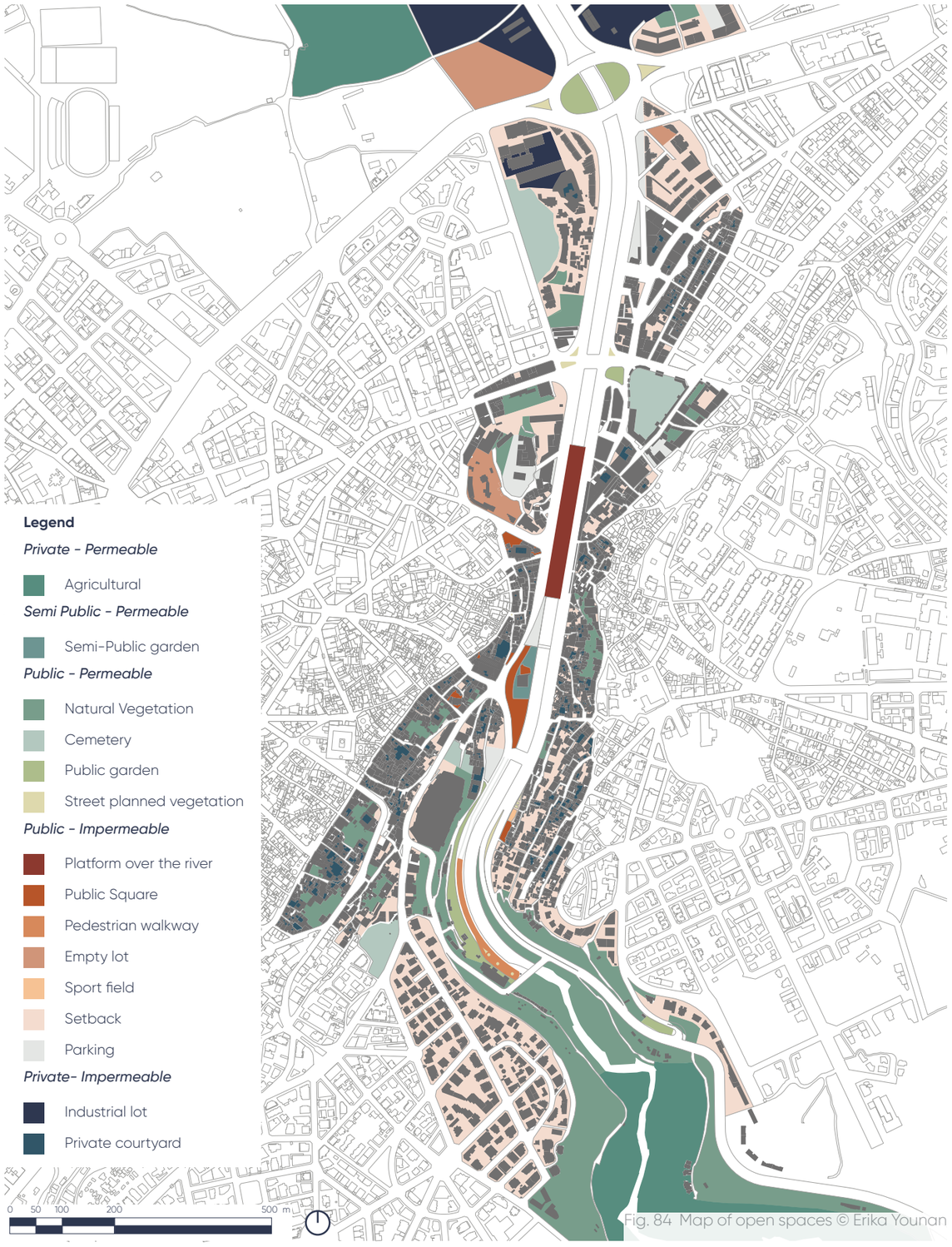


Fig. 84 Map of open spaces © Erika Younan

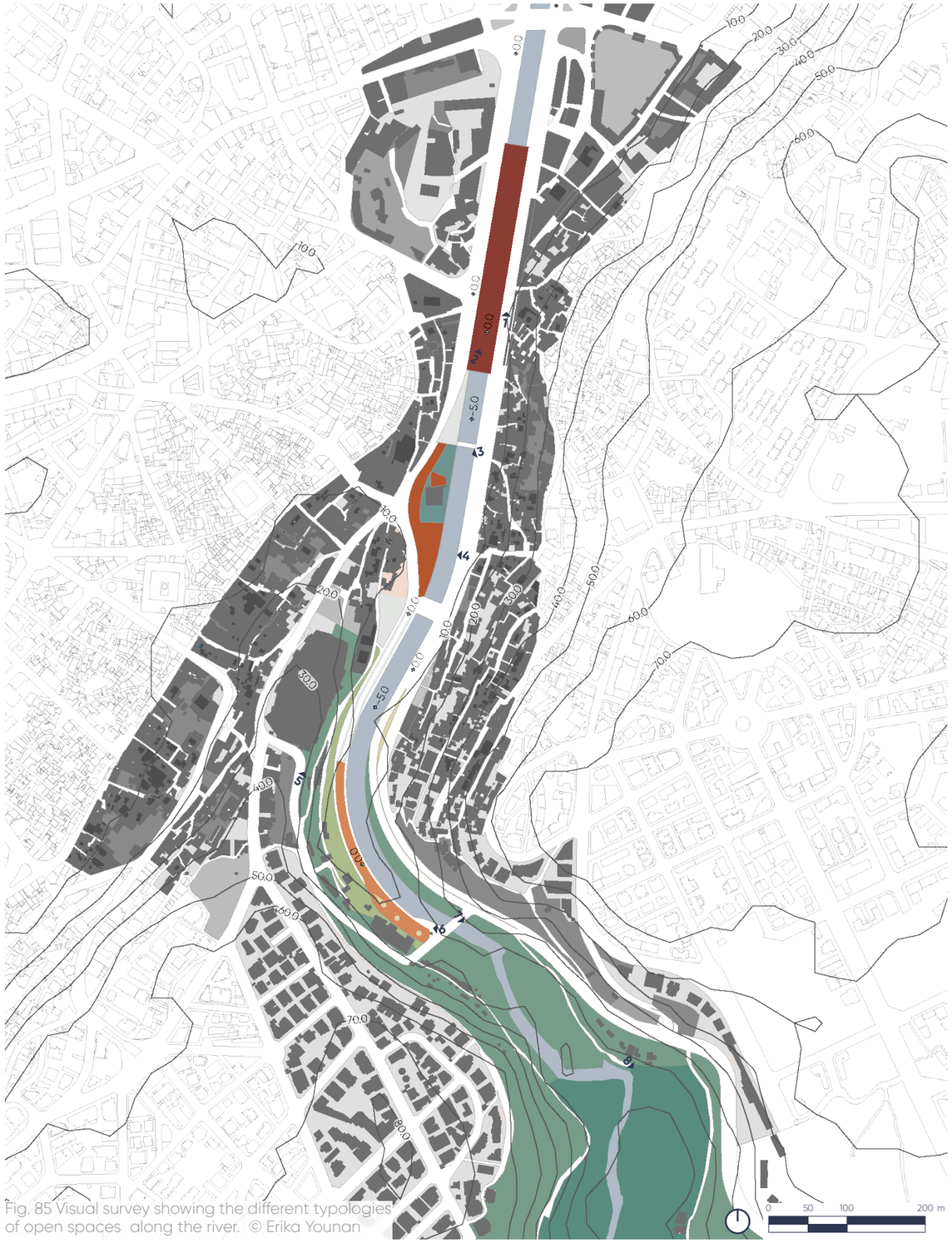


Fig. 85 Visual survey showing the different typologies of open spaces along the river. © Erika Younan



Fig. 86 view of the street markets on the side-walks on the opposite side of the river of the eastern road © Erika Younan



Fig. 87 View of the platform on the river beeing used as a parking lot today © Erika Younan



Fig. 88 View on the retaining wall between the river and the Al Burtasi mosque© Erika Younan



Fig. 89 View of the garden near the Al Burtasi mosque © Erika Younan



Fig. 90 View showing the St. Gille Citadel, the empty lot before the new public garden and the river © Erika Younan



Fig. 91 View on the Public garden near the Mawlawiya © Erika Younan



Fig. 92 View on the natural river stream © Erika Younan



Fig. 93 View on the agricultural patches near the river © Erika Younan

ROAD NETWORK

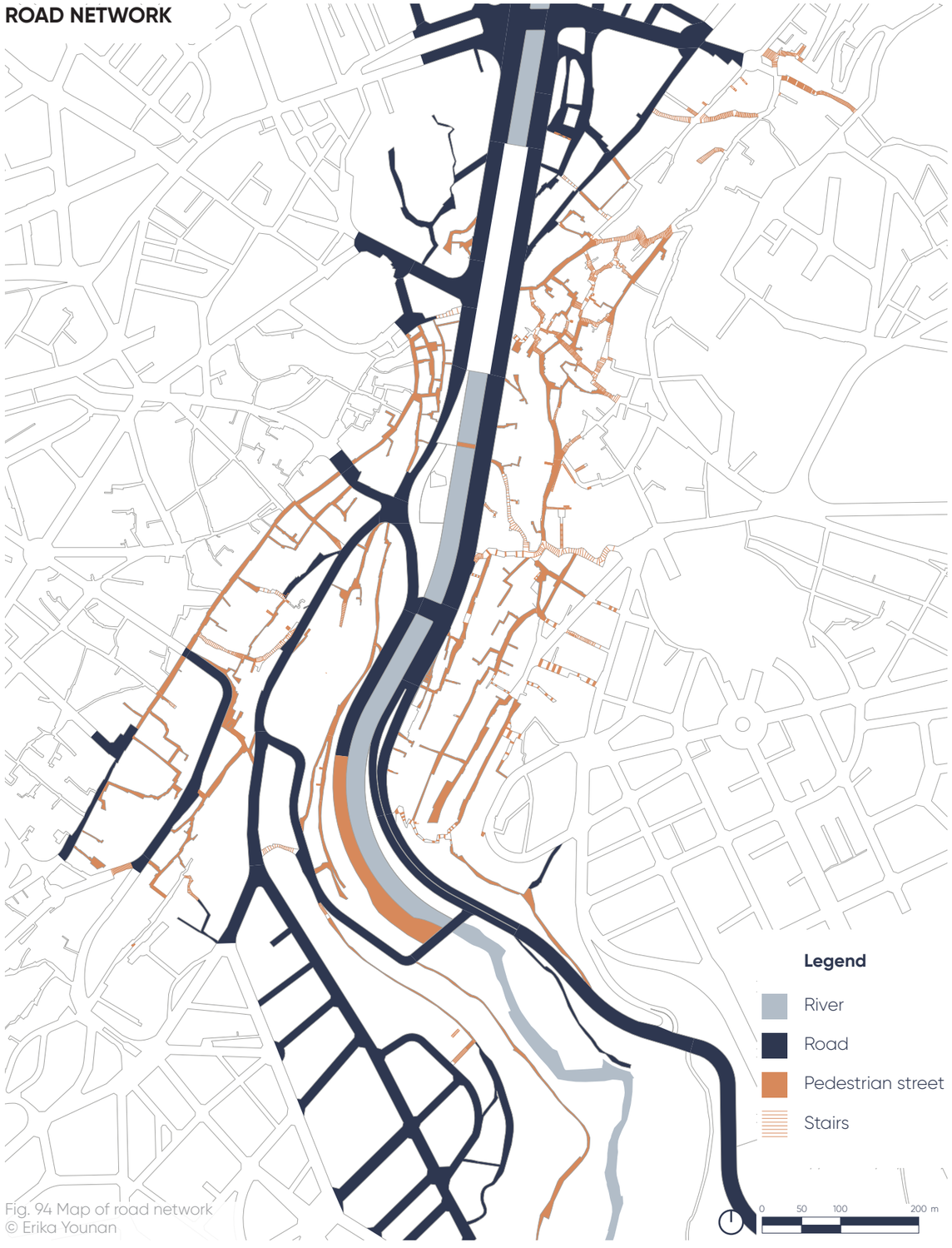


Fig. 94 Map of road network
© Erika Younan

ROADS AND CORRIDORS

In our study area we can find four types of corridors: the vehicular roads, the pedestrian streets, the stairways connecting the different levels of the sloped terrain and the river corridor. Corridors are also outdoor open spaces elements that have different physical characteristics and that can either be connecting elements or separating elements.

The natural river corridor (Fig. xx) on the southern part of the study area is narrow, surrounded by green fields and defined by a natural river edge, while the artificial concrete river corridor (Fig. xx) is wider and defined by infrastructural edges. The natural part of the river connects the city to the natural wildlife habitat, while the channelized part of the river corridor acts as an obstacle, both physically separating neighbourhoods from each other and the species from accessing the sea.

The roads along the river are either one way or two-way axes and vary in their hierarchy, going from primary, secondary and tertiary. Also, there is one small unused, dead end, segment between the Bourtasi garden and the Mawlawiya garden that offers an opportunity for a potential riverfront revitalization intervention). These roads operate as connecting vehicular nodes but disconnecting pedestrian obstacles on the riverfront.

The pedestrian streets and alleys and the stairs aren't uniform in dimensions but all fit into a human scale proportion in the city. (Fig. xx) They act as physical circulation connectors between the buildings and the slopped terrain, while also offering in some places urban activities like having open markets and gathering spots along them.

CHANELLIZED RIVER CORRIDOR



Fig. 95 © Erika Younan

NATURAL RIVER CORRIDOR



Fig. 96 © Erika Younan

PEDESTRIAN ALLEYS



Fig. 97 © Erika Younan



Fig. 98 © Erika Younan

STAIRS



Fig. 99 © Culture Trip (Fb)



Fig. 100 © Mira's tours (Fb)

ROAD HIERARCHY

The river has car roads on both its eastern and western sides. On the eastern side the road allows a two-way passage for cars and connects Tripoli to the city of Zgharta on its southern side. On the western side the road goes in only one direction (north to the south) and connects the river side to the historic core of the city. Except the sidewalks on the side of the roads, we don't have pedestrian streets directly on the riverfront, except on the southern part of the river, under the St. Gille citadel, where a public garden was recently developed. Both roads on the western and eastern side of the river are borderd by parking lanes, leaving potential for later to be removed and reduce the car lanes and improve and increase the pedestrian lanes/ sidewalks.
Therefore, the riverfront serves as a transportation infrastructure rather than a public place for the residents at the moment.



Fig. 101 Two way road on the west side of the river with sidewalk. © Erika Younan



Fig. 102 Road leading to Zgharta on the left and pedestrian access near the river in recent public garden project on the right © Ali Tradieh, 2022

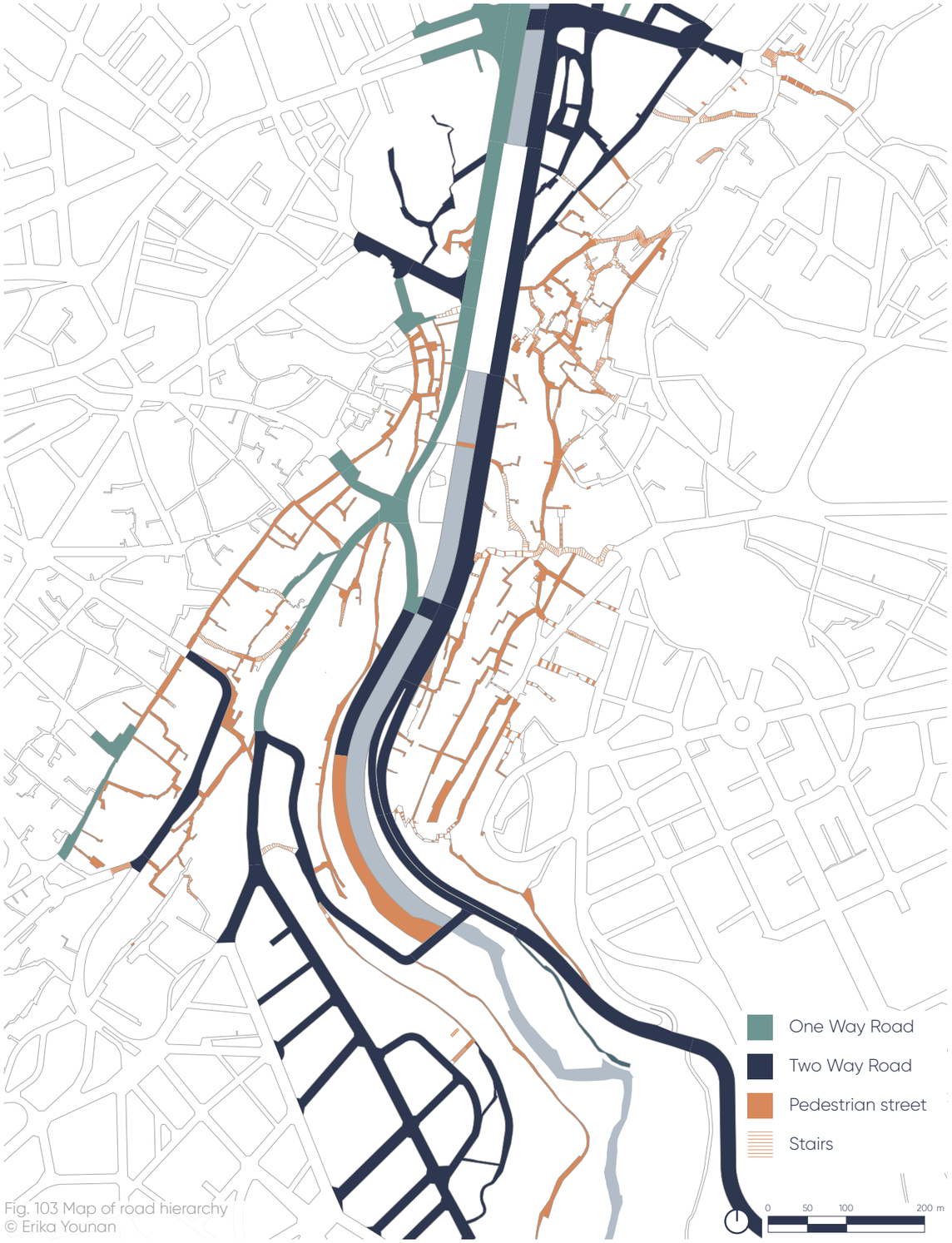


Fig. 103 Map of road hierarchy
© Erika Younan

TOPOGRAPHY ALONG THE RIVER

The four sections put in evidence the change in topography along the river: going from beeing a canal situated in a flat dense urban zone to beeing a natural stream in a vally shaped terrain in a more agricultural/rural setting with very strong slopes.

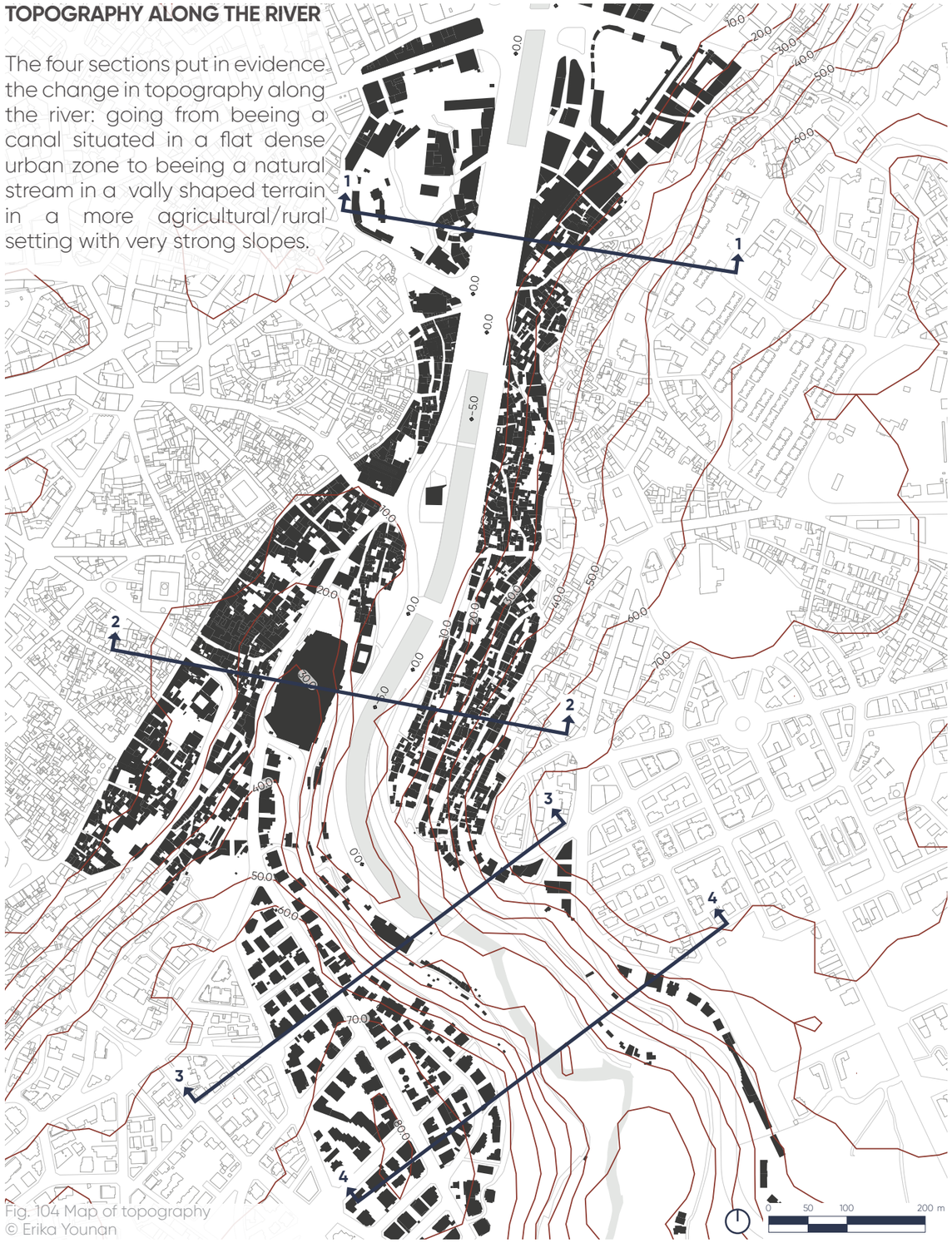


Fig. 104 Map of topography
© Erika Younan

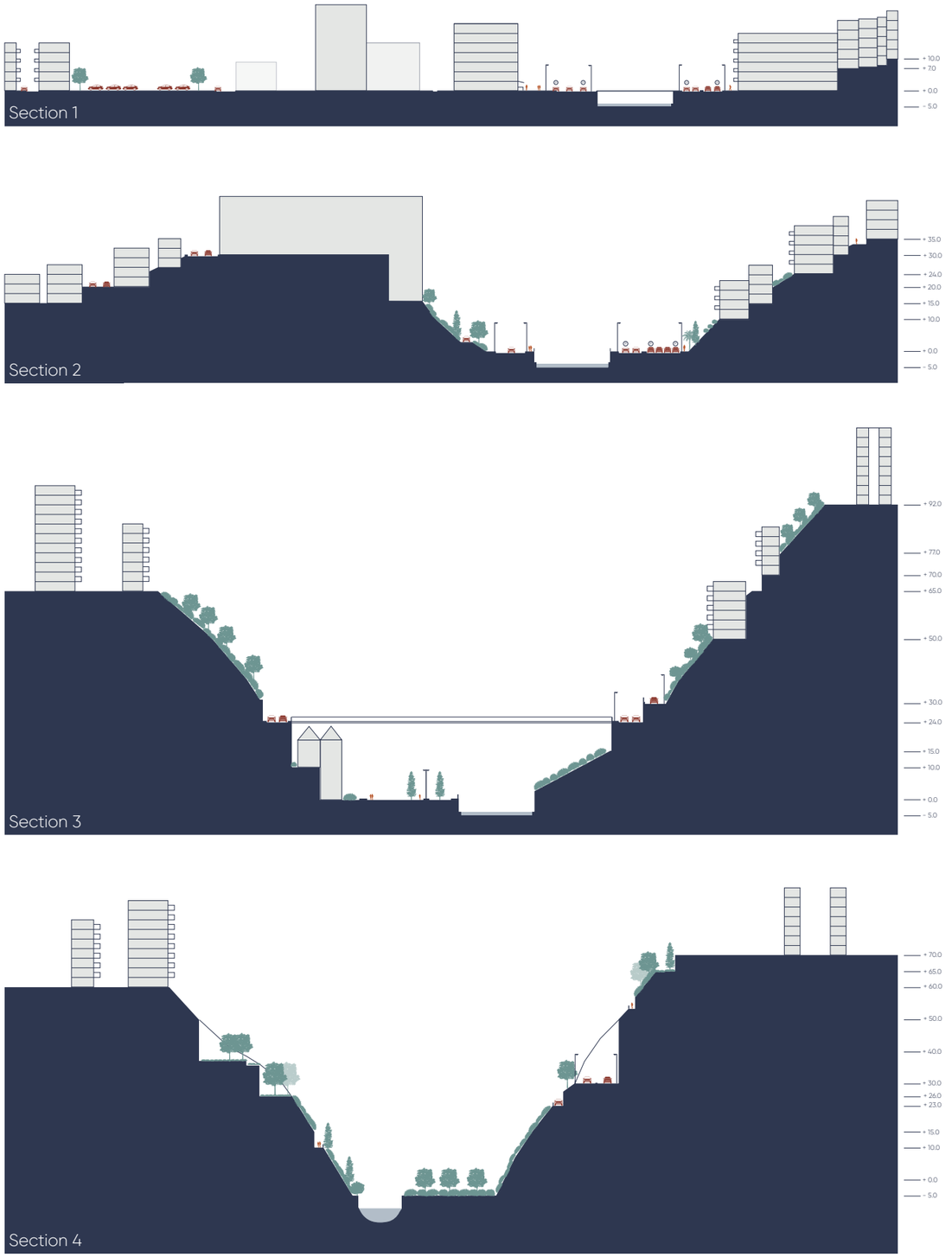


Fig. 105 Sections along the river © Erika Younan

MAP OF FUNCTIONS

The study area is mostly residential with commercial activities on the ground floor . The old city is residential/ touristic, the west bank of the river is mostly touristic/commercial, and the east bank of the river is residential/ commercial.

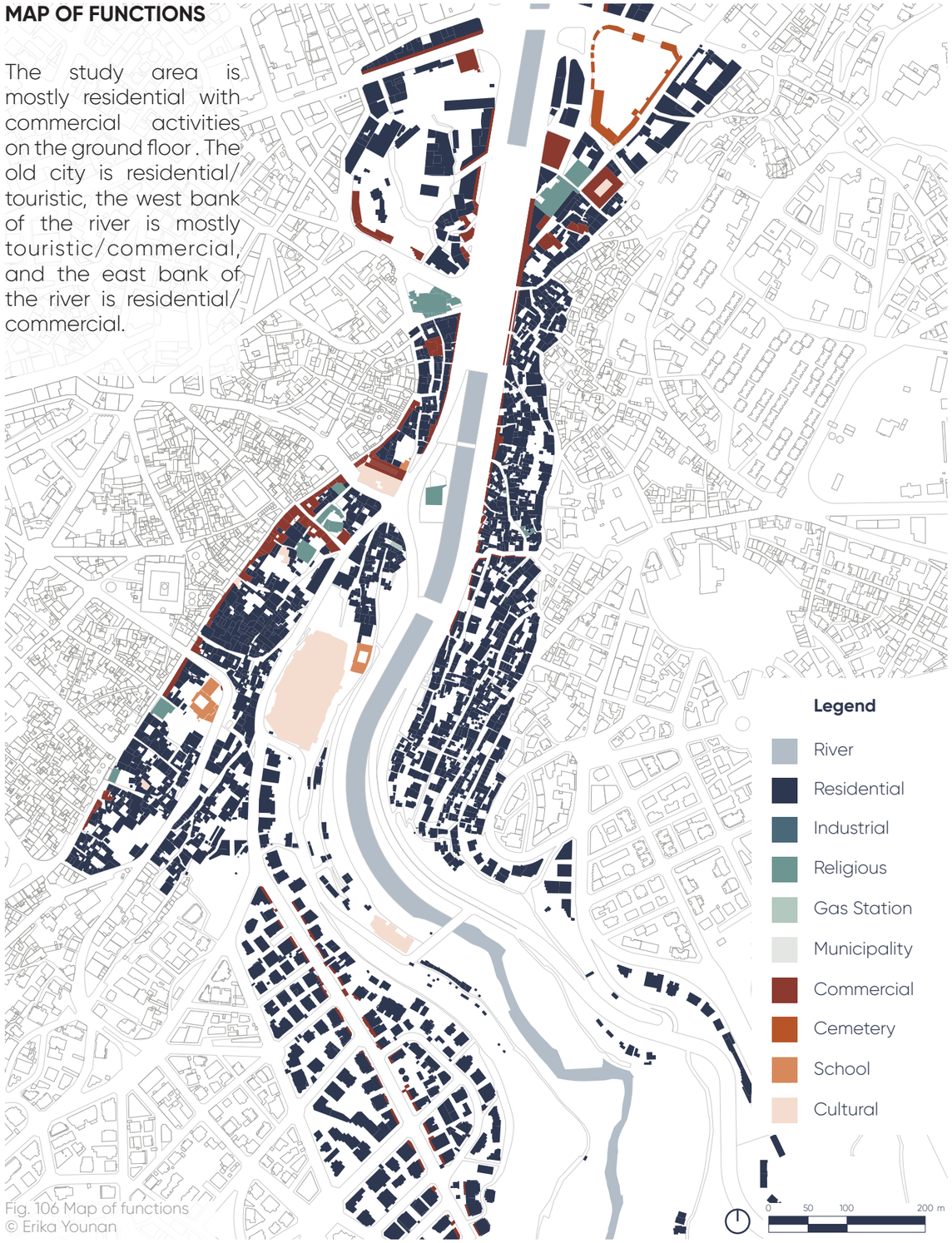


Fig. 106 Map of functions
© Erika Younan

MAP OF CLASSIFIED MONUMENTS

The study area beeing in the historic core of Tripoli, it is filled with classified buildings, and touristic cultural heritage monuments. These classified historic buildings remind us of the historic cultural value the river used to have in the past.

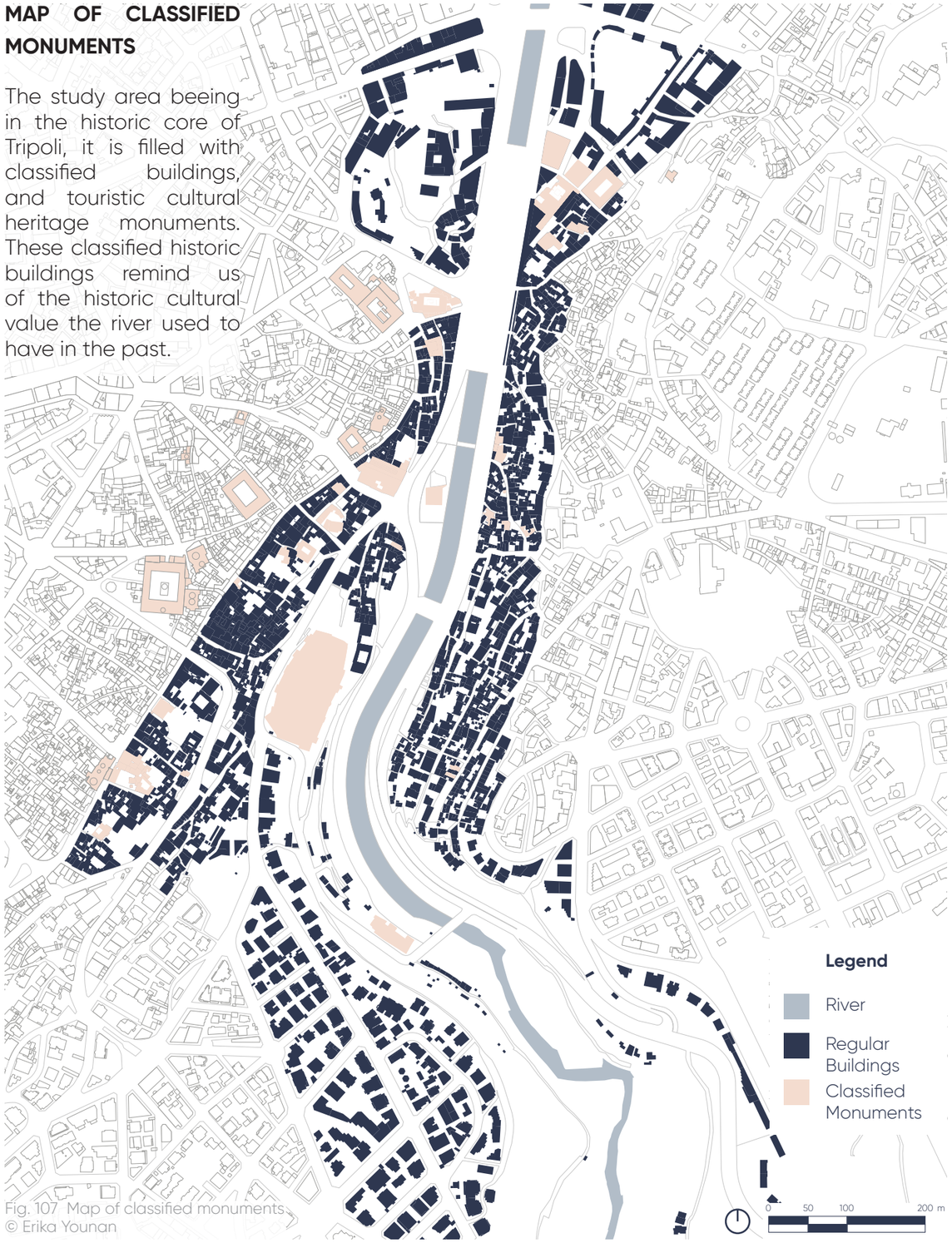


Fig. 107 Map of classified monuments
© Erika Younan

Chapter 4. Territorial and Urban Analysis

SWOT ANALYSIS

S

Historical Significance: The Abou Ali River flows through one of Lebanon's oldest cities, with historical landmarks and a rich cultural heritage, offering unique potential for cultural and tourism oriented redevelopment

Central Location: The river is centrally located, connecting various neighborhoods in Tripoli. This makes it accessible and offers the opportunity to enhance urban connectivity and integrate different parts of the city

Natural Aesthetic Value: Despite urban challenges, the river itself has intrinsic natural beauty that could become a focal point for eco-friendly and recreational spaces

Existing Infrastructure: There are existing bridge and road networks that cross or run alongside the river, which can be revitalized rather than built from scratch, offering cost savings in potential redevelopment projects

W

Fragmented and disconnected zones along the river: The river doesn't have one unified riferfront integrated space, meaning presence of different patches along the river not in relation to each other

Lack of green spaces and shaded public spaces: The surrounding areas along the riverbank are dominated by concrete infrastructure, with very limited greenery, leading to an urban heat island effect and lack of shade or recreational areas

Pollution and Environmental Degradation: The Abou Ali River suffers from severe pollution due to waste disposal, sewage runoff and industrial waste, affecting water quality and discouraging recreational use

Social and Economic Challenges: The surrounding neighborhoods, particularly those near the river, face high rates of poverty, social unrest, and poor living conditions, which can complicate efforts to revitalize the riverfront

O

Eco-Tourism and Cultural Tourism: There is potential to develop the riverfront as a destination for both eco-tourism and cultural tourism, attracting visitors to Tripoli's historic sites and a revitalized waterfront

Green Urban Corridor: Creating green corridors and public spaces along the river could improve the urban landscape, reduce pollution, and enhance quality of life for local residents

Public-Private Partnership Collaborations with local businesses, NGOs, and international organizations could bring funding and expertise to riverfront revitalization projects

Community Engagement and Social Impact: A riverfront project has the potential to engage the community through job creation, improved public spaces, and social projects that address the local economic and social challenges

T

Political Instability: Lebanon's political climate can lead to stalled projects or lack of sustained support, which can inhibit long-term development and discourage investors

Financial Constraints: The economic crisis in Lebanon means that funding for largescale projects may be limited, and there is a need for sustainable financing options to ensure maintenance and long-term benefits

Environmental Risks: Climate change and rising temperatures can exacerbate issues like droughts, flooding, and pollution which may undermine any improvements made to the riverfront

Resistance from Local Stakeholders: Local residents may resist major changes due to displacement fears, loss of traditional spaces, or distrust of development that doesn't directly benefit them

Fig. 108 SWOT analysis
© Erika Younan

4.2 **ANALYSIS ON THE SITE SCALE**
Area of intervention

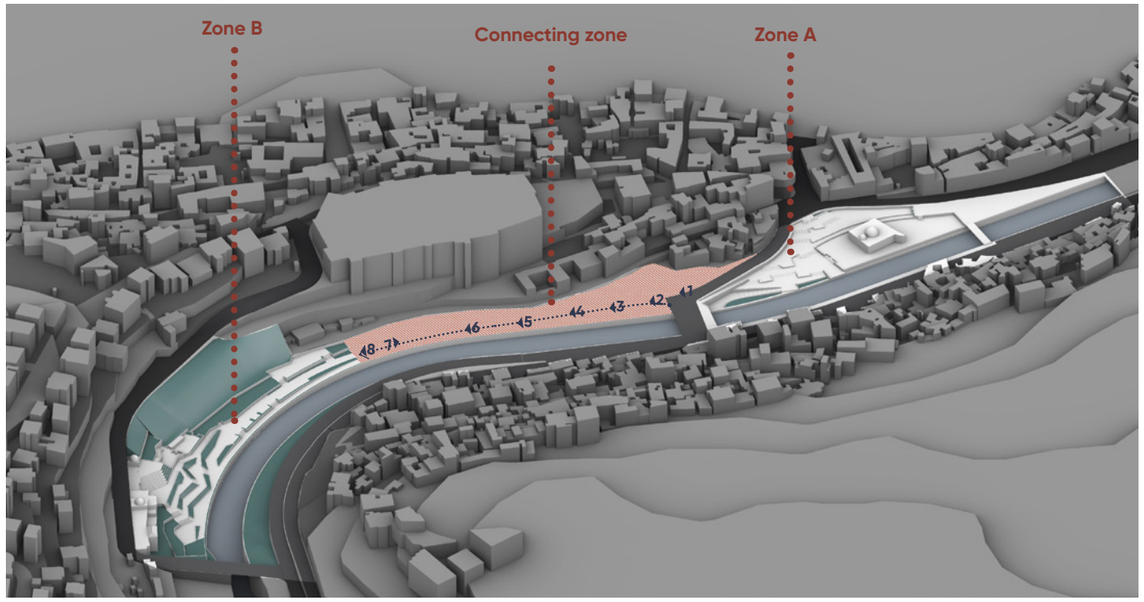


Fig. 109 Axonometric view of the chosen area with numbers referencing to the pictures of the spaces in it. ©Erika Younan



Fig. 110 Al Burtasi garden - Zone A - ©Erika Younan



Fig. 112 - Zone B - Jalal el Din Garden ©Erika Younan



Fig. 111 Al Burtasi garden - Zone A - ©Erika Younan



Fig. 113 - Zone B - Jalal el Din Garden ©Erika Younan

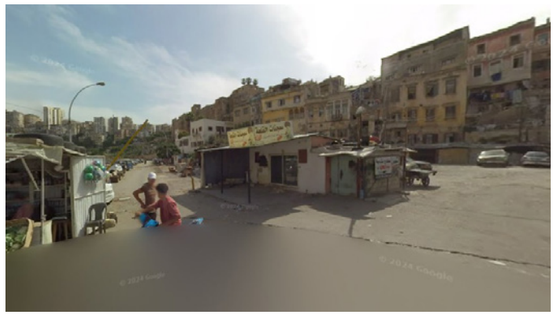


Fig. 114 -1 - ©Google Earth



Fig. 115 -2 - ©Google Earth



Fig. 116 -3 - ©Google Earth



Fig. 117 -4 - ©Google Earth



Fig. 118 -5 - ©Google Earth



Fig. 119 -6 - ©Google Earth



Fig. 120 -7 - ©Erika Younan



Fig. 121 -8- ©Google Earth

05 DESIGN PROPOSAL

objective A Improve soft mobility roads by enlarging the pedestrian paths, a bike lane and separating them from the car road with a green buffer space, and use permeable materials.

objective B Revive the non used existing public spaces by implementing green areas, shaded spaces and functions in them to attract people.

objective C Connect these two public space that are currently separated by a parking lot and unused land to create one uniform riverwalk.

objective D Create 3 dimentional connections between the riverbanks and the river (vertical horizontal and lateral).

objective E Implement a cultural center to improve residents education level and pollution awarness.

5.1 URBAN SCALE PROPOSAL

CONCEPT

From the urban analysis we concluded that there are not many open spaces available for implementing public spaces interventions to improve the riverfront. We also saw how the riverfront is disconnected both from its surrounding and within the spaces along it, and how the the area is mainly covered with hard non-permeable materials, that increase the urban heat iland and that aren't appropriate in case of floods.
Taking that into consideration, I chose this area because it has the Bourtasi public square (Zone A) and the Jalal el Din Garden (Zone B) that need to be improved and revitalized first and second need to be connected to eah other to create one public open space on the riverfront (as the current situation has the two zones disconnected by a dead-end asphalt road and a parking.
In addition to that, the large car way on the east side of the river accentuates the separation and disconnection of the river with the neighborhoods on the east, leaving the riverfront for car use mainly. So treating that and transforming it to a pedestrian friendly pathway is essential.
And finally, replacing the non permeable materials with permeable materials would enhance the ecological value of the riverfront in the city and provide the citizens with multiple sustainability benefits.

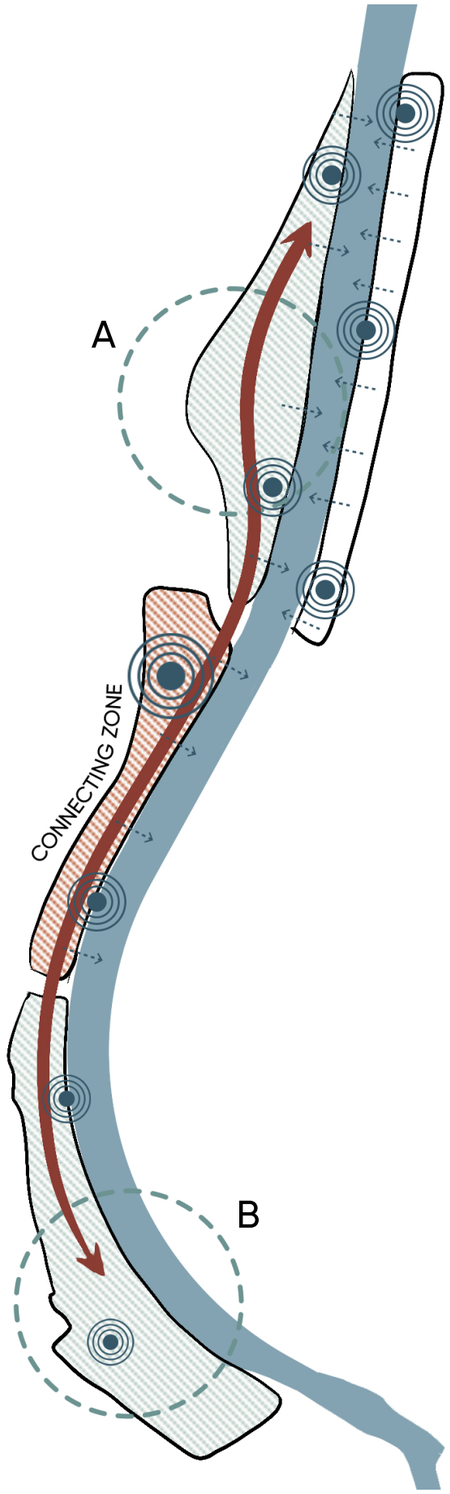


Fig. 122 Concept diagram
©Erika Younan

ZONE A

CURRENT ISSUES	INTERVENTIONS
- No shaded seated areas available in the bourtasi square. - No activities in these open spaces to attract people. - Area mainly non permeable and non sustainable. - The available open public spaces are unpleasant. - Large carway that disconnects neighbourhoods from riverside.	- Rain gardens. - Steps that go down to the river with lower banks hosting art events. - Picnic area in small park behind the mosque. - Replace hardscape with permeable pavement and planted natural soil. - Trees and benches for rest in the shade. - Replace part of the hardcape near the river with natural sloped soil. - Stepping stones on water that connect the two banks. - Reduced carway with green buffer and bike and pedestrian lanes.

ZONE CONNECTION

CURRENT ISSUES	INTERVENTIONS
- Open space used as a parking lot and a dead end road. -Disconnection of the public open space along the river. -Non permeable materials and no green area.	- Cultural center for education activities. - Steps going down to the river to relax and hang out near the river. - accessible green roof extending as a park. - Bike and pedestrian friendly ladscaping. - Permeable materials.

ZONE B

CURRENT ISSUES	INTERVENTIONS
- Non permeable hardscape. - No activities to attract people.	- Permeable materials. - Modular food trucks with Seating areas. - Children's playground. - Bike lane.

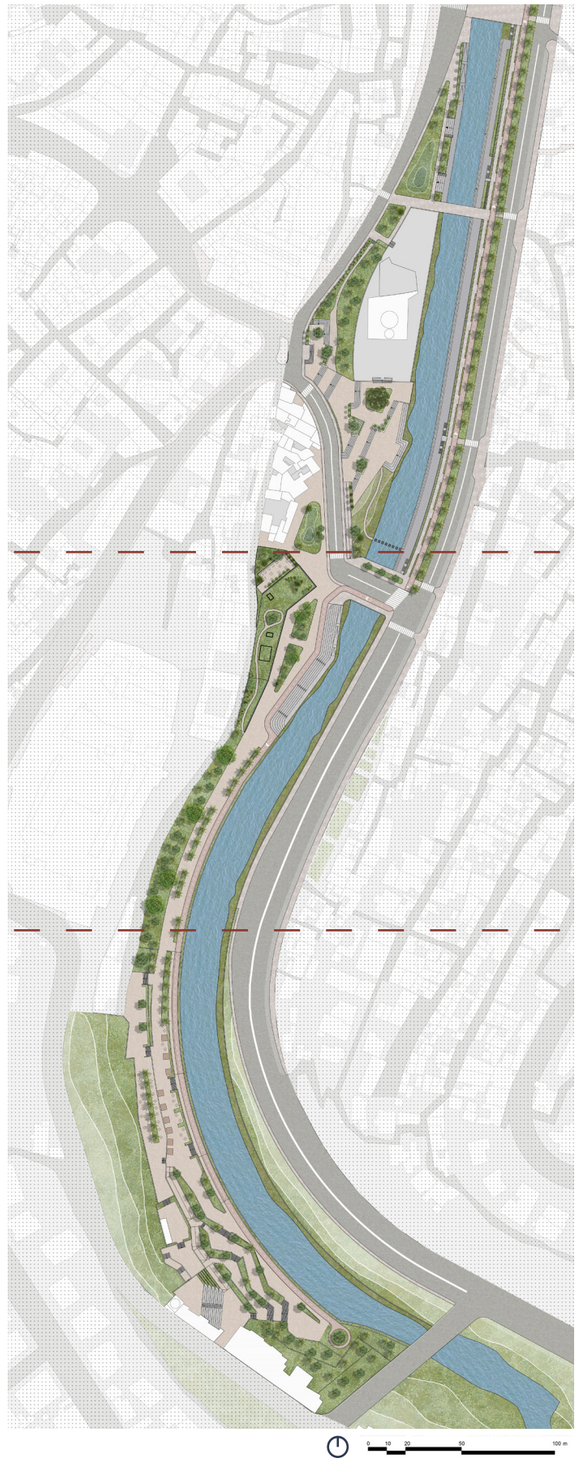


Fig. 123 General Masterplan- City Planning Scale ©Erika Younan

INTERVENTIONS ON THE RIVER EDGE

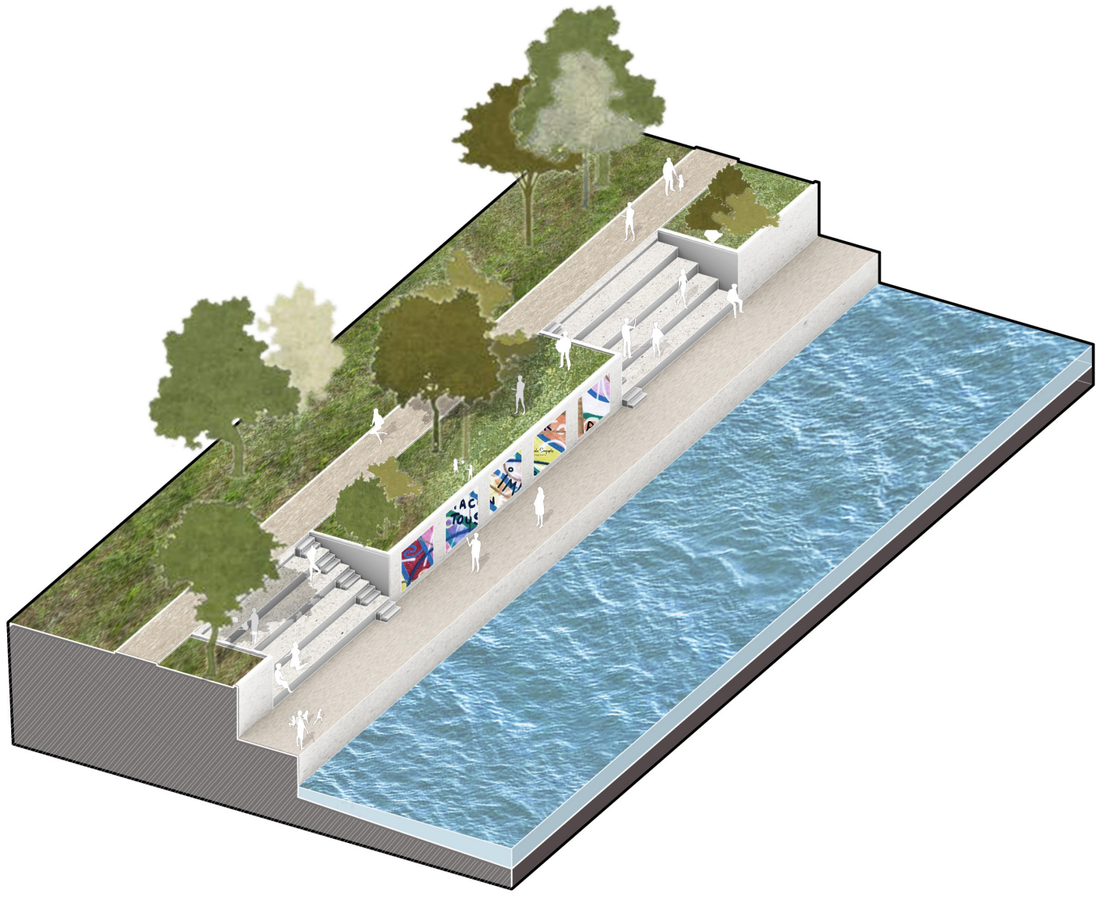


Fig. 124
Diagram of Interventions
on the river edge - Type 1
©Erika Younan

- Create teraced steps going down to the river as a space to rest and relax and as a way to increase peolple's physical connection the river.
- The lower bank hosts local art and temporary exhibitions adding cultural value to the area and offering people a place for socio-cultural exchange.
-Use permeable cement paving for the hardscaping and implement green planted areas that provide shade along the pedestrian paths.

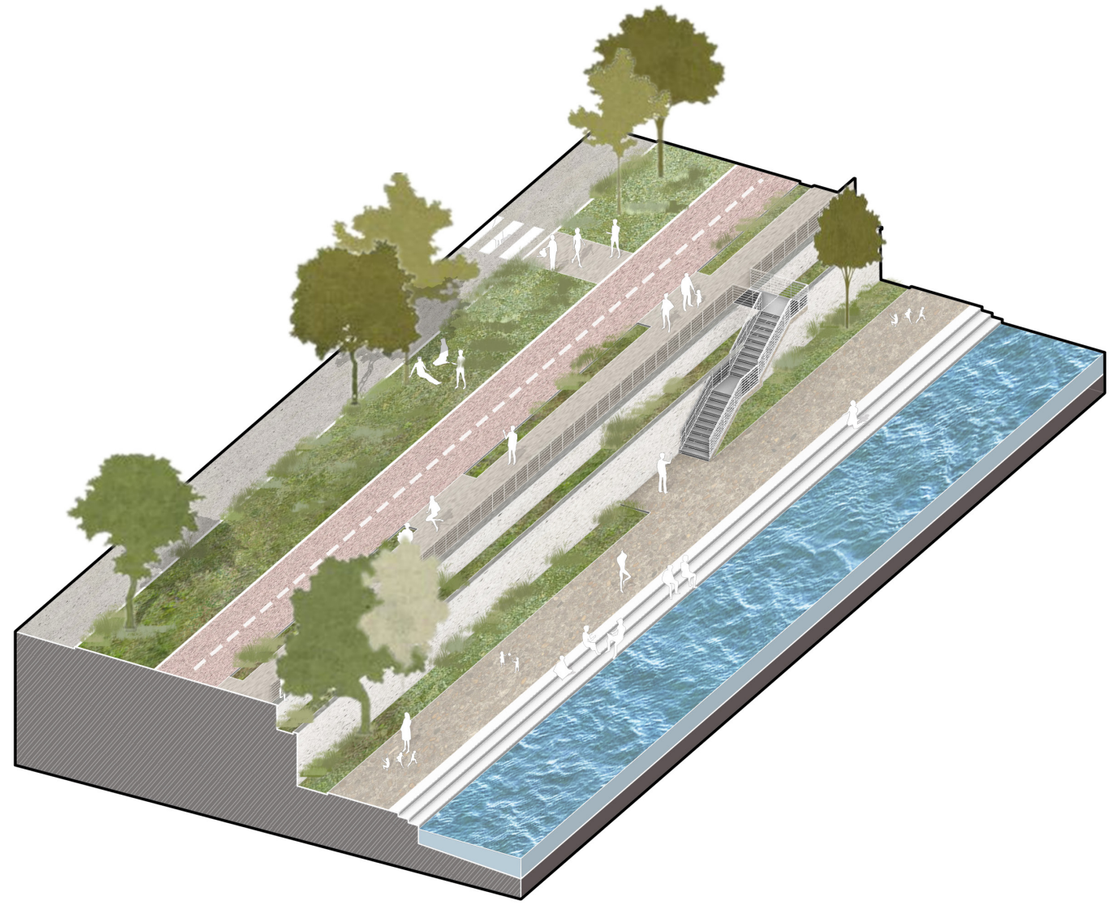


Fig. 125
Diagram of Interventions on
the river edge - Type 2
©Erika Younan

-Create a green buffer zone between the car road and the river lined with trees for shade.
- Create a bike lane to incourage soft mobility transportation on a scenic pathway next to the river.
-Create a pedestrian lane with a lower level bank near the water level with a few steps reaching the water to increase people's connection to the river.
- All materials used are permeable, making the spaces adaptable in situations of floods.

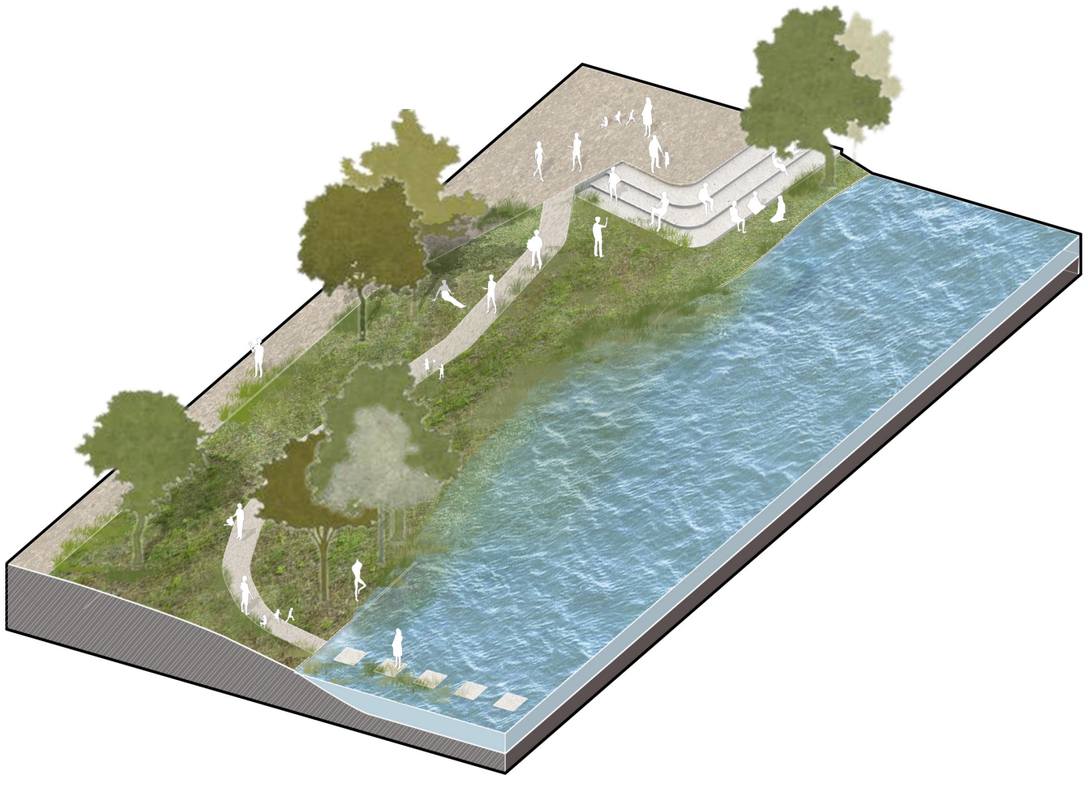


Fig. 126
Diagram of Interventions
on the river edge - Type 3
©Erika Younan

-Replace the hard pavement in the Bourtasi Square with a permeable cement pavement.
-Remove part of the hardscape in the square and replace it with a natural sloped terrain going down towards the riverbed. The permeable materials used are adapted for flood mitigation scenarios.
- Add trees and plants to insure shaded areas where people can sit and relax.
- Add small stepping stones in the river to let people cross from one bank to the other.

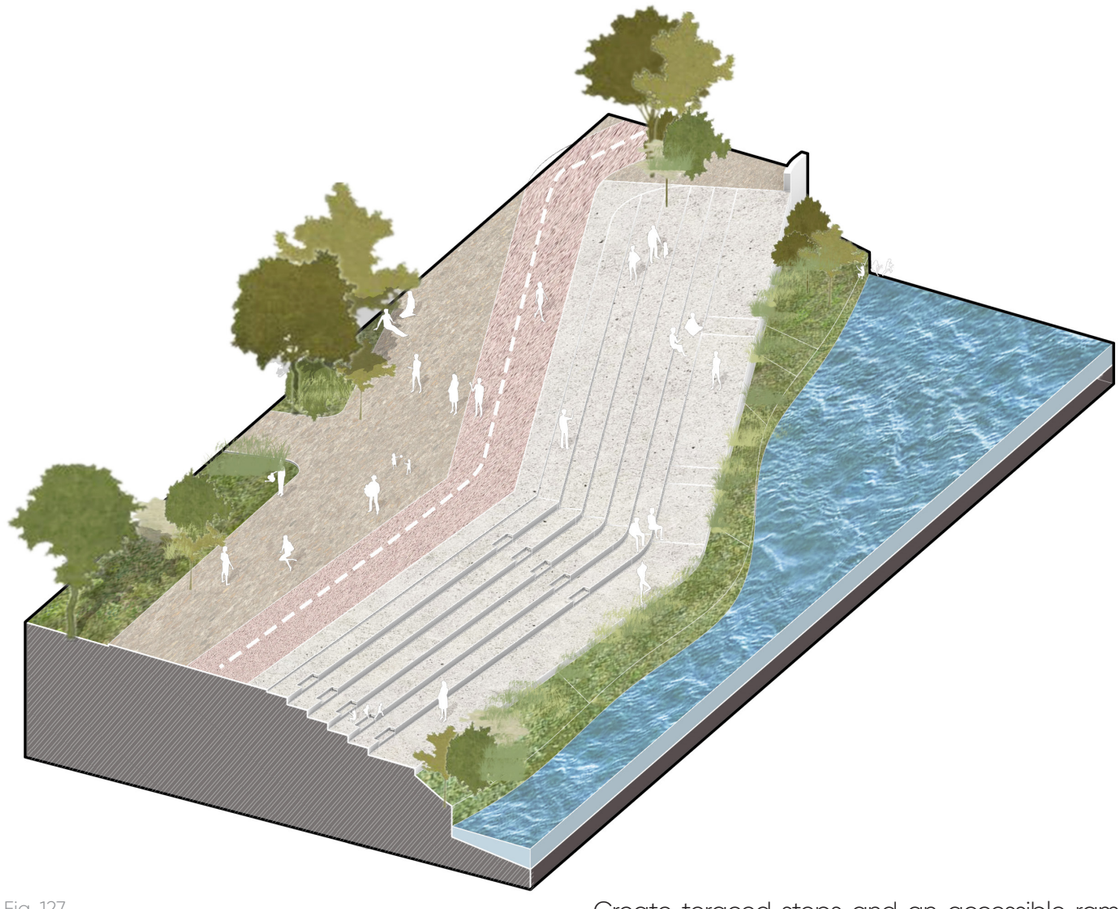


Fig. 127
Diagram of Interventions on
the river edge - Type 4
©Erika Younan

- Create teraced steps and an accessible ramp going down to the river as a space to rest and relax and as a way to increase peolple's physical connection the river.
- Create a bike lane along the river that encourages soft mobility in the historic core, and that has a scenic value.
-Use permeable cement paving for the hardscaping and implement green planted areas that provide shade.

Chapter 5. Design Proposal

MASTERPLAN



Fig. 128 Detailed Masterplan - Urban Design Scale
©Erika Younan



Fig. 129 Zoom-in on the interventions on the left side of the Bourtasi mosque ©Erika Younan



Fig. 130 Zoom in on the interventions on the right side of the Bourtasi mosque ©Erika Younan

Chapter 5. Design Proposal

BEFORE





Fig. 131 Section A - Before
©Erika Younan

AFTER

Fig. 132 Section A - After
©Erika Younan

Chapter 5. Design Proposal

BEFORE



Fig. 133 Section B - Before
©Erika Younan

AFTER

Fig. 134 Section B - After
©Erika Younan

Chapter 5. Design Proposal

5.2 **ARCHITECTURAL SCALE PROPOSAL**

CONCEPT

As shown in the previous chapter, the area suffers from high rates of illitracy and a lack of enviromental awareness. Educating the people could help prevent further damaging and trashing to the river and elevate the status quo. That's why I decided to implement a cultural center where NGO's can host classes and workshops, and people can come work and study in the library and common spaces.

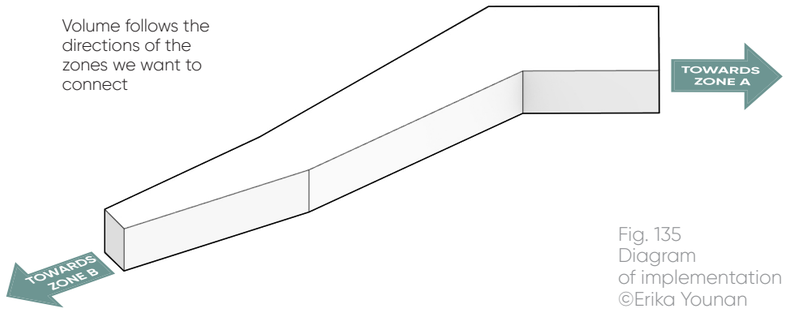


Fig. 135
Diagram
of implementation
©Erika Younan

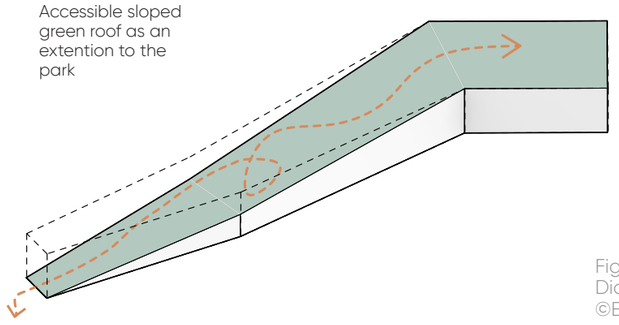


Fig. 136
Diagram of volume
©Erika Younan

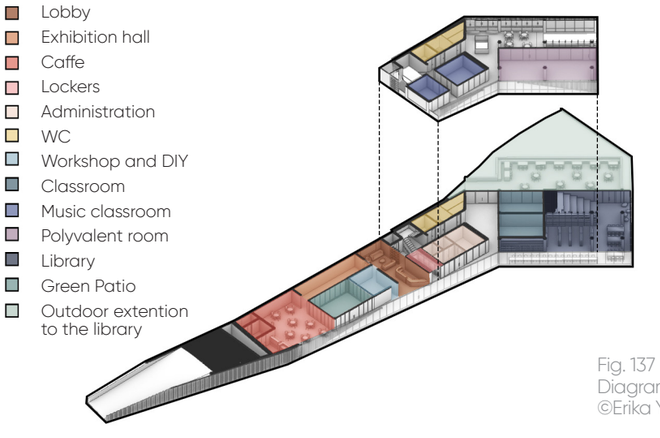


Fig. 137
Diagram of functions
©Erika Younan

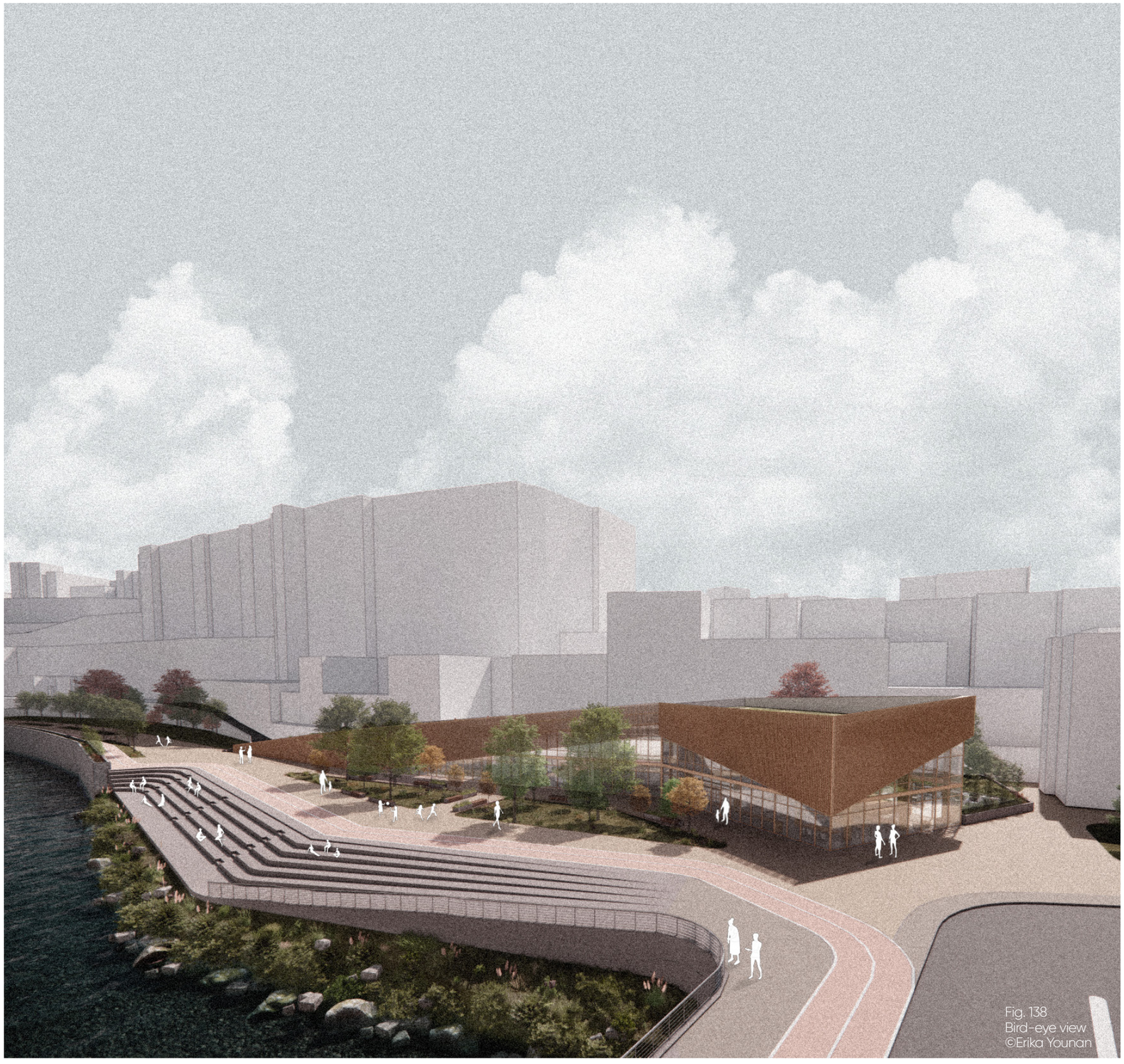


Fig. 138
Bird-eye view
©Erika Younan

Chapter 5. Design Proposal

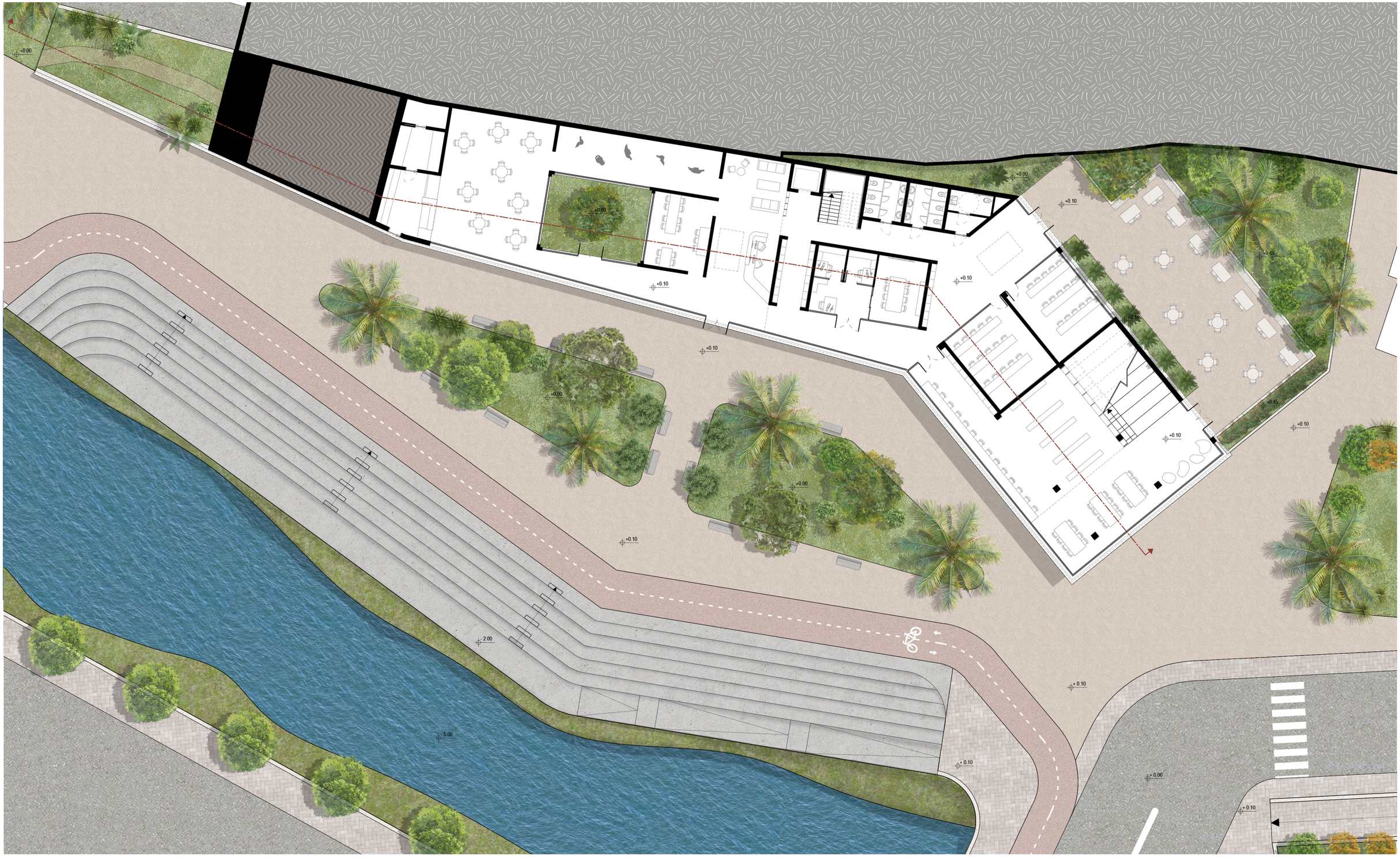


Fig. 139 Plan Ground Floor
©Erika Younan

Chapter 5. Design Proposal

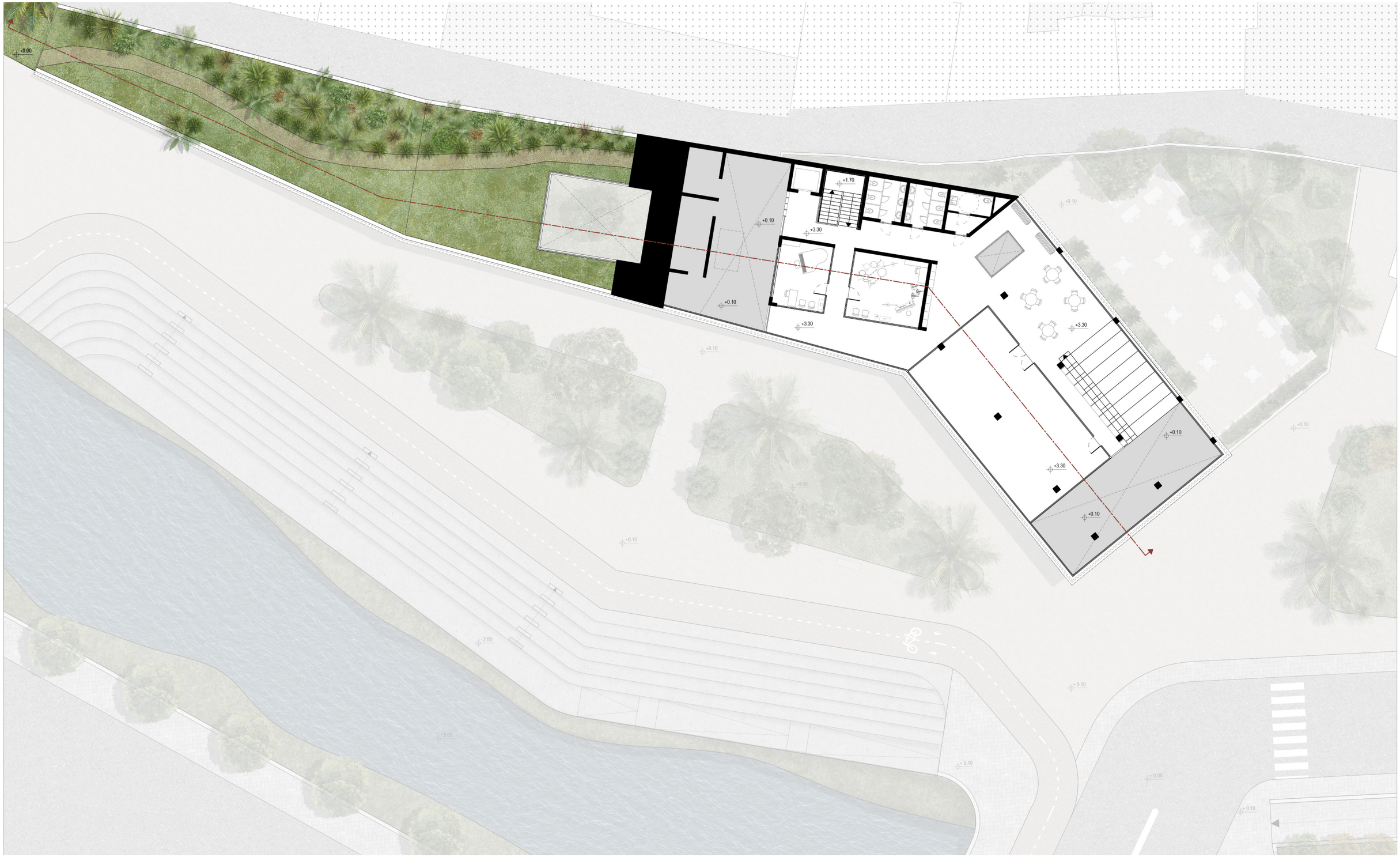


Fig. 140 Plan First Floor
©Erika Younan

Chapter 5. Design Proposal

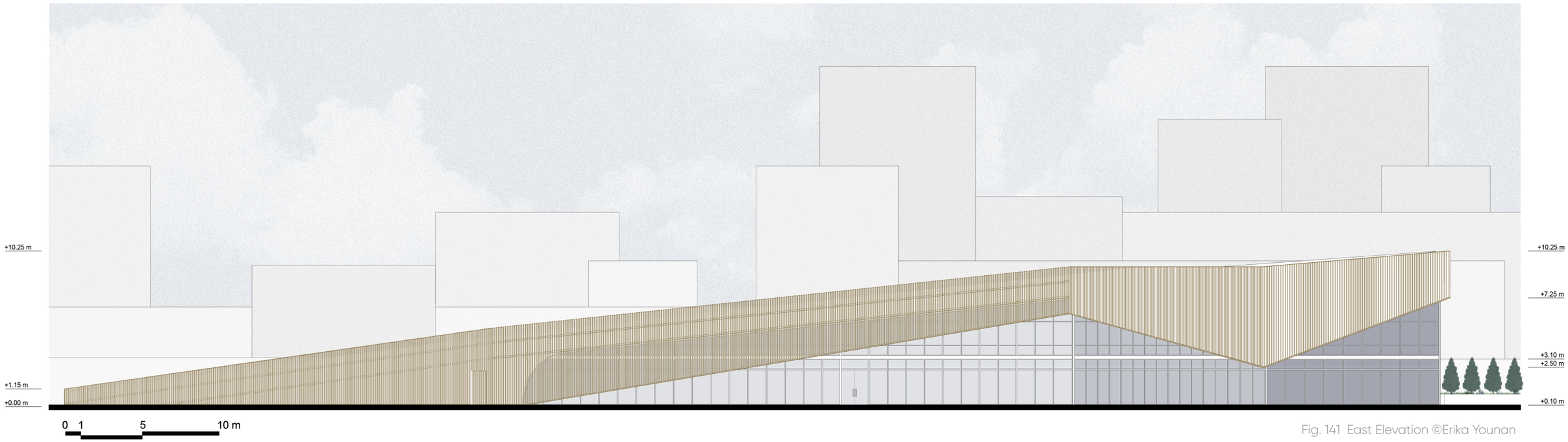


Fig. 141 East Elevation ©Erika Younan



Fig. 142 Stepped Section ©Erika Younan

5.3 **VIEWS** -INTERIOR

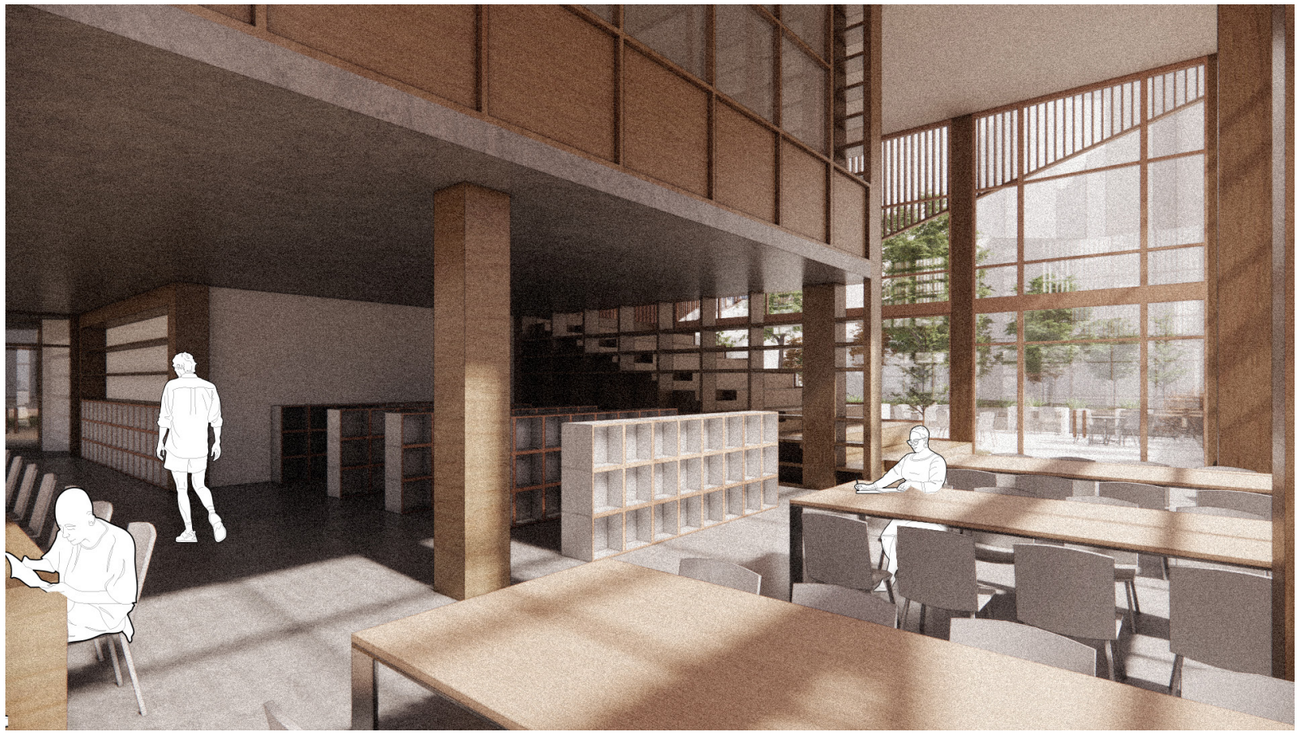


Fig. 143 View on Library
©Erika Younan



Fig. 144 View on entrance
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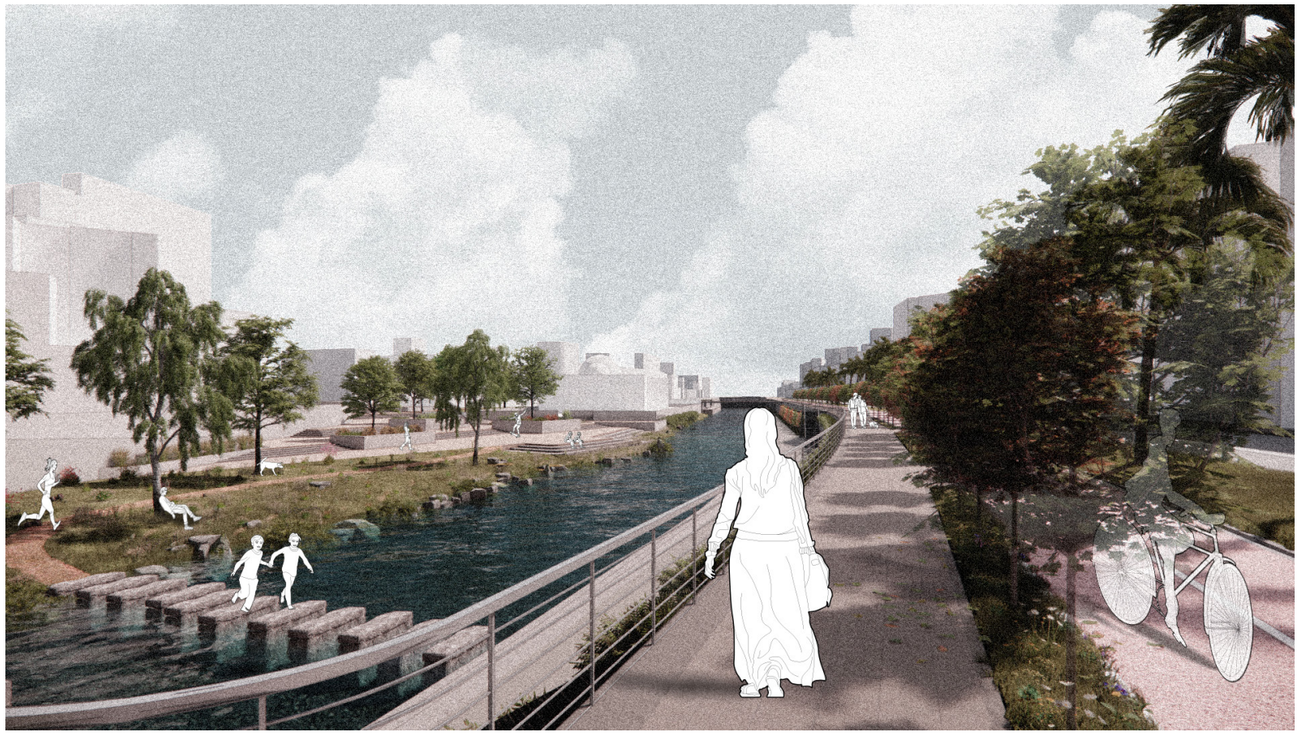
Chapter 5. Design Proposal

5.3 **VIEWS** -EXTERIOR



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Chapter 5. Design Proposal

Chapter 5. Design Proposal

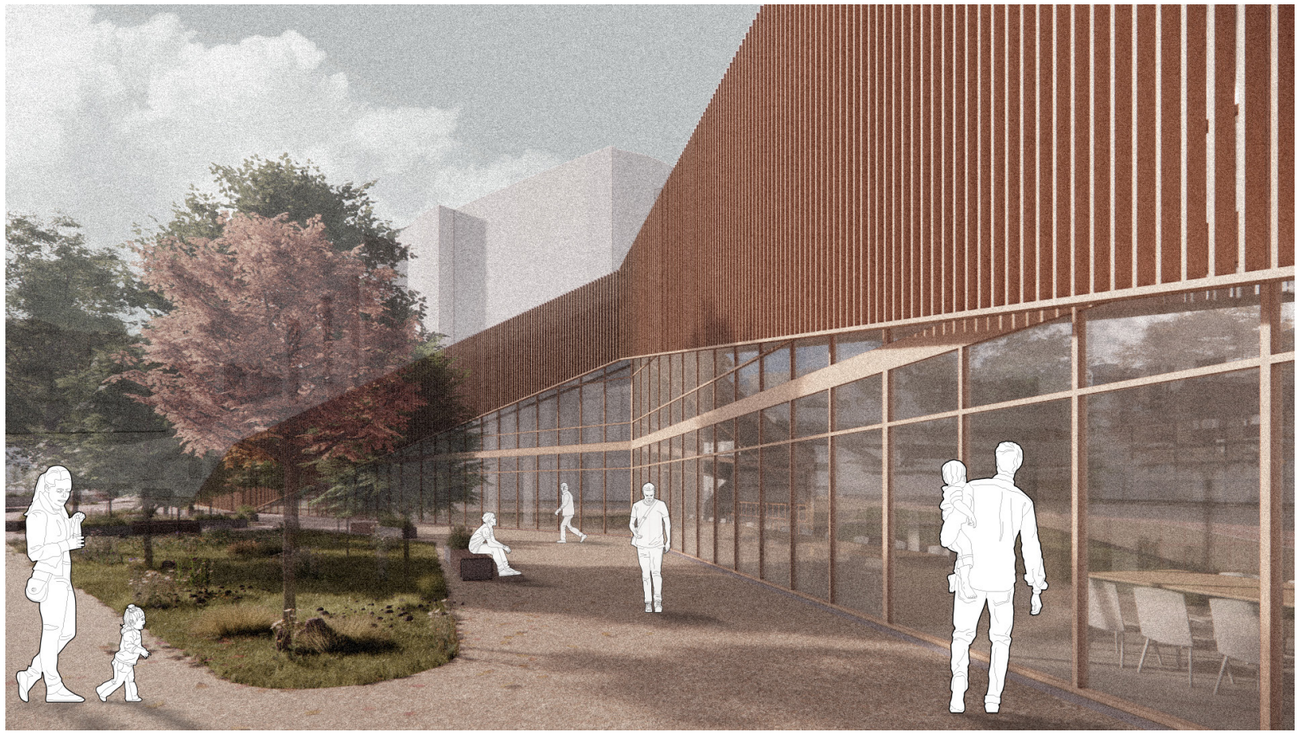
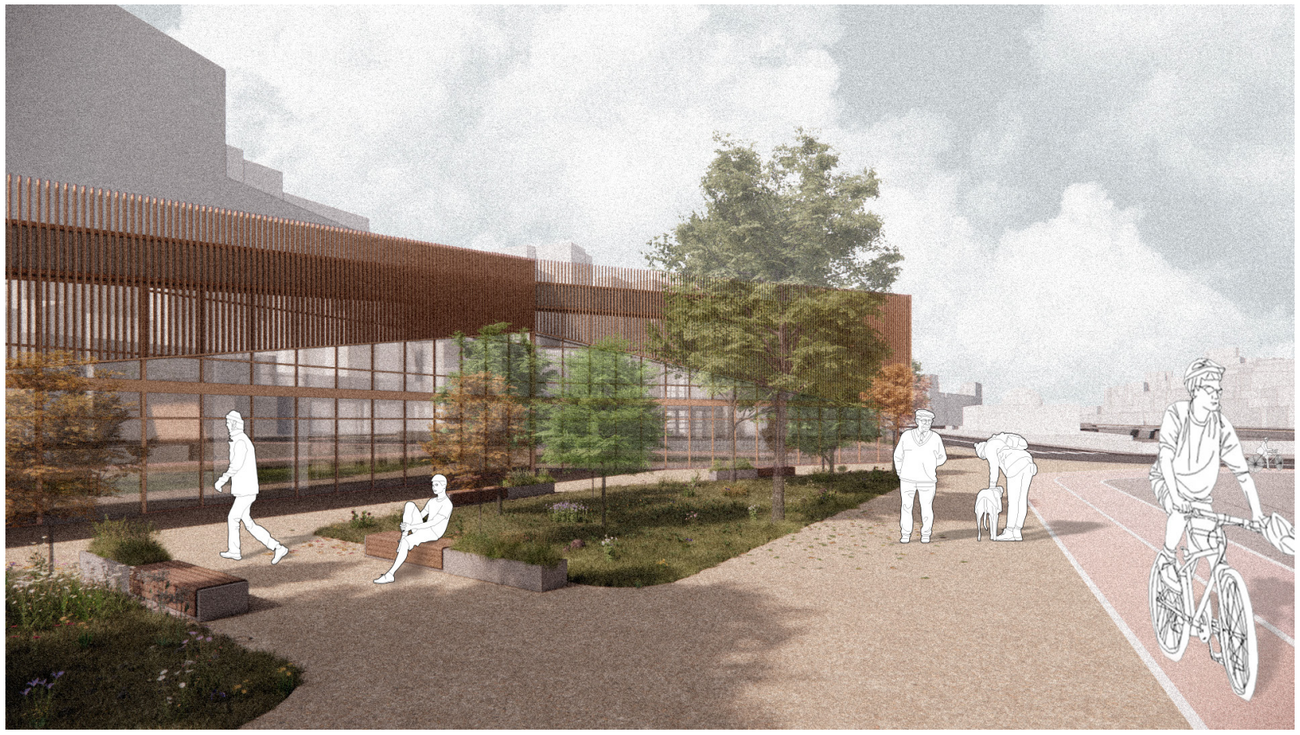


Fig. 147 View on the outside of the cultural center and it's surrounding - coming from "Zone A", Bourtassi Mosque Garden.
©Erika Younan



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06 CONCLUSION

Rivers have played a central role in the evolution of cities, shaping their geography, economy, and cultural identity. However, as cities developed, rivers were frequently overlooked and not integrated to the urban landscape in urban planning and development initiatives, canalizing them and transforming them into infrastructural entities instead of sociological and ecological ones. As industrial practices started declining inside city centers by the end of the 20th century, rivers appeared to be pivotal opportunities for urban renewal, creating interest in their ecological, recreational, and social potentials, and the desire to reconnect them to their surrounding urban fabric. This thesis applies a reimagined relationship between cities and rivers, where urban morphology, social context, and ecological principles work together to create sustainable, interconnected public places.

These ideas are contextualized into the case of the Abu Ali riverfront in Tripoli through an extensive analysis of the river's socio-economic and urban context. This research identified the historical neglect and spatial fragmentation that have degraded the riverfront's identity, and the historic events and decisions that led to its situation. Guided by lessons learned from successful case studies of riverfront regeneration like the Cheonggyecheon Stream, the Los Angeles River, the Chicago Riverwalk, and the Sabarmati Riverfront, the study extracted principles of sustainable and inclusive development that can be adapted to the unique challenges and opportunities in Tripoli.

A comprehensive understanding of the Abou Ali River's territory was achieved through an interdisciplinary approach combining urban morphology analysis, historical research, and on-site observations. Territorial analysis maps, urban fabric analysis maps, SWOT analysis, and an analysis of the stakeholders in charge, revealed the layered interaction between natural, built, and social systems that define and affect the riverfront. This methodology highlighted the existing issues of pollution, inaccessibility, and underutilization of the spaces along the river but also its potential to become a dynamic green-socio-cultural corridor in the city.

The design proposal for the Abou Ali Riverfront seeks to mend the rupture between the river and the city by transforming the neglected and degraded spaces into vibrant community gathering places. Drawing on placemaking principles and emphasizing ecological restoration, the intervention proposed imagines a series of interconnected public spaces that emphasize the river's natural and cultural heritage while fostering social cohesion and economic vitality. By reimagining the riverfront as an integrated part of the urban fabric and implementing commercial activities like food trucks and small vending stands along the river promenade, adding public gathering spaces where shading and seating by the river are provided, increasing greenery to mitigate heat problems in the city and to separate pedestrians from car roads, improving pedestrian connections, adding cycling axes to encourage green mobility, and creating a cultural center for the youth to teach younger generations to preserve their built heritage, the proposal addresses the community's immediate needs and reconnects the fragmented areas around it, fostering a renewed sense of place and identity for the city of Tripoli.

While the thesis offers a targeted intervention in one selected zone of the riverfront, it aspires to encourage thoughts for a long-term strategy for the revitalization of the whole Abou Ali Riverfront. Urban riverfront regeneration practices aren't a one-size-fits-all types of solutions but are context-sensitive processes that require balancing ecological, social, and economic priorities. By applying global insights to a local context this thesis offers a guideline for the Abou Ali Riverfront to become a catalyst for urban transformation.

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