
Politecnico di Torino

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# Riverfront Interventions in Urban Settings

How do they affect and define the identity of cities?

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# ABSTRACT

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How do Riverfront Interventions in post-industrial uban settings, affect and define, the identity of cities?

This thesis aims to bring attention to the redevelopment of former industrial areas, marginalized spaces along urban rivers, in relation to design interventions and urban forms, and to understand the outcome of receptive and responsible planning. The morphology of the built environment is a critical tool for managing the future alterations of post-industrial riverfronts. By undertaking this study, my objective is to investigate how these interventions affect the quality of riverbank spaces while altering their functionality. A principle to further investigate would be the strong relation between urban morphology and the urban perception of riverfronts, which affects people's behaviors.

This research is based on a careful review of relevant literature and an in-depth examination of chosen riverfront projects, in order to understand how the urban changes and interventions affect the identity of the city as a riverfront city. The importance of riverfront development is investigated from three angles: The physical reconfiguration of cities in post-industrial periods according to urban policies, the attainment of wider social and economic growth targets due to the riverfront development and the experiences of restructured waterfront communities.

The main subject of study is the Beirut River in Beirut, Lebanon. The goal is to question how riverfront revitalization could be used as a tool in the case of Beirut to address a variety of challenges: from challenges in the physical environment to socio-economic challenges. The study of the Beirut river will be achieved using three approaches: A historic approach to understand the policies behind the urban morphology, a social approach by interviewing representatives of the riverfront community and a territorial approach to evaluate the current physical state of the riverfront.

*Keywords: Riverfront development, Urban Policies, De-industrialization, Architectural Interventions, Places, Geometrical Identity, Urban Morphology, Perception, Urban Practices*

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## 1.1 BACKGROUND

### PRINCIPLES

The study of the city's interaction with its rivers is vital in this context since water resources have played a major role in the placement and expansion of human settlements, as well as the historical evolution of cities and the formation of the urban fabric.[1] Through the examination of references relevant to the roles of rivers in relation to urban planning theories in the first part of this chapter, the effect of rivers on the built environment will be addressed. The concepts and principles connected to urban riverfront morphology will give useful information to influence the development of conceptual ideas when regenerating the riverfront. The regeneration of riverfronts in literature will be addressed in the second part of this chapter. In fact, riverfront revitalization has become over the past forty years a very popular subject. This is due to the fact that it creates exceptional opportunities for development on vast, highly centralized, and prominent sites in the heart of the cities. *"It is in the spaces provided by the urban riverfront that planners and designers wrestle with the appropriateness of their intentions for the present, and for the future."*[2] In order to boost international standing in a highly capitalized world, cities are constantly rebuilding their neglected riverfronts in order to stimulate economic growth and to combat the post-industrial crisis. In the last part of this chapter, the relation between urban morphology, urban identity and urban perception will be explained based on authors who have discussed it in literature. The aim is to understand the framework of the regeneration of post-industrial riverfronts through the development of the built environment by conceiving new places, and consequently, changing the way riverfronts are perceived: From an industrial infrastructure to a recreational infrastructure.

[1] Osorio, P., Neira, M., & Hermida, M. A. (2017). Historic relationship between urban dwellers and the Tomebamba River. International Journal of Sustainable Building Technology and Urban Development.

[2] Marshall, R. (2001). Contemporary urban space-making at the water's edge. In R. Marshall (Ed.), Waterfronts in Post Industrial Cities (pp. 4–14). Spon Press.

Fig. 1 Bilbao Avda Universidades
© Bilbao Ria 2000

# 1.2 RIVERS AND URBAN DEVELOPMENT

## A SETTING FOR SETTLEMENTS

Since water is necessary for human settlements, river valleys are frequently chosen as locations for settlement. Smith describes the first relations human settlements have had with water bodies and their different uses as hydrological and transport infrastructures to expand and develop cities: *"The first urban civilizations arose in river valleys, with a twofold link to water as a resource for established agriculture, and as a means of transport for trade and travel and as means to reach other lands for conquest and colonization"*.[3] In fact, the most convenient site for crossing the river is also a crucial setting for city growth: Access to natural resources, the requirement to maintain a defense system and the need for commerce, which is connected to the ease with which products and people can be transported, are favorable conditions for the establishment of towns and cities by riverside sites.[3]

The following section presents concepts to understand how urban forms were generated in riverfronts contexts, and how this affected the initial perception of inhabitants towards their riverfronts in industrial settings. River corridors in cities are frequently regarded in isolation from the urban context that surrounds them. As mentioned by L. Pattacini, there is an interdependence between cities, rivers, and valleys.[4] This relation has been referenced by various urbanists in their publications, such as Lynch and Bakema, who placed the river in the midst of his typical city evolution drawings.[5]

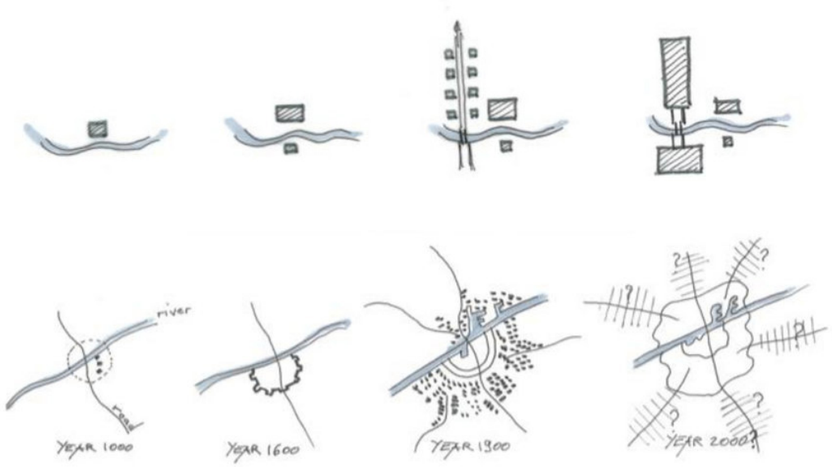



Fig. 2. Generic illustration of city development in close relationship with a river based on drawings
Drawings by J.B. Bakema, K. Lynch taken from L. Pattacini (2021)

(3) Smith, H. (2012). Sustainable Waterfront Regeneration around the North Sea in a Global Context. In H. Smith & M. S. Garcia Ferrari (Eds.), Waterfront Regeneration Experiences in City Building (pp. 3–16). Routledge.

(4) Pattacini, L. (2021). Urban Design and Rivers: A Critical Review of Theories Devising Planning and Design Concepts to Define Riverside Urbanity. Sustainability.

(5) Lynch, K. (1981). A Theory of Good City Form. The MIT Press.





## RIVER IMPLICATIONS IN URBANIZATION

The urbanization of the contexts surrounding rivers were driven by two factors: Function and Appearance.[6] In literature, this dual consideration offers the basis for identifying types of riverbank urban environments: From arteries necessary for navigation, to potentially attractive spaces. The different roles that river acquired during the urbanization of settlements dictated the way they were perceived by their communities. This will be explained in the following paragraphs.

**[FUNCTION: A TRANSPORT INFRASTRUCTURE]** The major purpose of streams deep enough with a consistent water flow is navigation. As D. Borgat described, along with the ability to generate electricity by canalizing and directing water flow, riverbank areas are the most suitable for industry. As industrial activity and the urban population grew, so did the transportation of commodities and people intensify.[7] From the theoretical study of L. Pattacini who cited T. Garnier, the cities depicted include major industrial zones along rivers, typically downstream to improve transportation links and therefore the urban centers are developed afar, to prevent polluting the city center. This was the main image for the "Industrial metropolis"[8] Rivers were not only navigable, but they were also a source of energy: engineering improvements such as runs, reservoirs, dams, and weirs are used to harness waterpower, which created the river's historic heritage. However, once the river became the outlet of waste water, it was the pivoting point that had a significant degrading impact on the landscape of urban rivers which consequently lead to the change of riverain settlements from natural habitats to industrial unhygienic spaces.[9] The creation of this wealth brought with it environmental degradation and toxicity, which at the time characterized these residual urban spaces.[10]

**[APPEARANCE: A PITURESQUE POTENTIAL]** As early as the beginning of the 1940's, the potential of rivers in urban settings was recognized. in L. Pattacini's study, authors from the early years of 1900's were mentioned to highlight the writings related to the river's aesthetic potential. C. Robinson, cited by L. Pattacini, considers *"picturesqueness"* to be an essential component of the use of rivers for urban development, and emphasizes the attractiveness of riverfront sites.[11] He discusses *"the value of waterfront treatment"*, saying that riverbank locations offer a more monumental setting for the built environment. Instead of imposing manufactured mathematical designs, urbanism practices should be influenced by the old towns and react to the qualities of the location and the demands of the people. E. Saarinen see the river corridor as critical to the gradual growth of the metropolitan environment.[12]

(6) Bourassa, S. C. (1988). Toward a theory of landscape aesthetics. In Landscape and Urban Planning (Vol. 15, pp. 241–252). Elsevier.

(7) Bogart, D. (2014). The transport revolution in industrializing Britain. In The Cambridge Economic History of Modern Britain (Vol. 1). Cambridge University Press; pp. 53–88.

(8) Pattacini, L. (2021). Urban Design and Rivers: A Critical Review of Theories Devising Planning and Design Concepts to Define Riverside Urbanity. Sustainability.

(9) Richardson, B. (2009). Hygeia, a City of Health. Book Jungle.

(10) Marshall, R. (2001). Contemporary urban space-making at the water's edge. In R. Marshall (Ed.), Waterfronts in Post Industrial Cities (pp. 4–14). Spon Press.

(11) Robinson, C. M. (1916). City Planning with Special Reference to the Planning of Streets and Lots. G.P.Putnam's Sons. cited in Pattacini, L. (2021). Urban Design and Rivers: A Critical Review of Theories Devising Planning and Design Concepts to Define Riverside Urbanity. Sustainability.

(12) Saarinen, E. (1943). The City: Its Gowth, Its Decay, Its Future. The MIT Press.

## 1.3 URBAN RIVERFRONT REGENRATION

After discussing in the previous section the fact that riverfronts have been recognized as important assets and opportunities for the revitalization of the built and natural environments of cities, the following discusses theoretical approaches to riverfront regeneration by various notable authors. They focused on different objectives and described processes in riverfront redevelopment with various interpretations, all the while reflecting on riverfront regeneration initiatives in post industrial cities from all across the world. Over the last half century, public perceptions of, riverfronts have shifted dramatically. They were locations to stay away from at all costs. Where as now, the waterfront is recognized "as an urban amenity, a special place in the city."[13]

### GLOBAL TREND

The main driving force behind the change of the role of the waterfront is what R. Robertson, as cited by H. Smith, refers to as the "third wave of globalization," in which the riverfronts are emptied and replaced due to technological advancements, primarily from containerization in the trade of goods, and from the move of the economic activities away from industrial centers of cities.[14] The collapse of the "industrial metropolis" that occurred in the second half of the twentieth century was both quick and massive in scale, drastically altering the image and form of the city. The repercussions of this passage are evident: vast industrial areas were neglected, buildings were deserted, and productive plants forced to shut down, all with the associated consequences of the degradation of the physical, social, economic and natural environments of the relevant portions of the city.[15]

### URBAN RIVERFRONT REGENERATION PRINCIPLES

**[A RESULT OF THE POST-INDUSTRIAL CITIES]** Borrowing the definition from Savitch, post-industrialism refers to a "broad phenomenon that encompasses changes in what we do for a living, how we do it, and where it occurs."[16] These changes reveal themselves in the construction of a new physical environment tailored to meet the needs of the inhabitants in the twenty-first century by seeking out new ways to make use of their abandoned waterfront zones. City-building is happening at a faster pace than ever before, both through the "creation and expansion" of new urban areas and the reconfiguration of existing urban centers, with riverfront development playing "a role in both types of process and being seen as an opportunity for growth in the city", as H. Smith stated it. [10] R. Bruttomesso discusses the concept of complexity and program as a method to detect urban visions on the waterfront in his reflection essay, "Complexity on the

(13) Marshall, R. (2001a). Connection to the waterfront. In R. Marshall (Ed.), Waterfronts in Post Industrial Cities (pp. 17–38). Spon Press.

(14) Robertson, R. (2003). The Three Waves of Globalisation: A History of a Developing Global Consciousness. Zed Books. as cited in Smith, H. (2012). Sustainable Waterfront Regeneration around the North Sea in a Global Context. In H. Smith & M. S. Garcia Ferrari (Eds.), Waterfront Regeneration Experiences in City Building (pp. 3–16). Routledge.

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

(16) Savitch, H. V. (1988). Post-industrial Cities: Politics and Planning in New York, Paris, and London, Princeton. Princeton University Press.



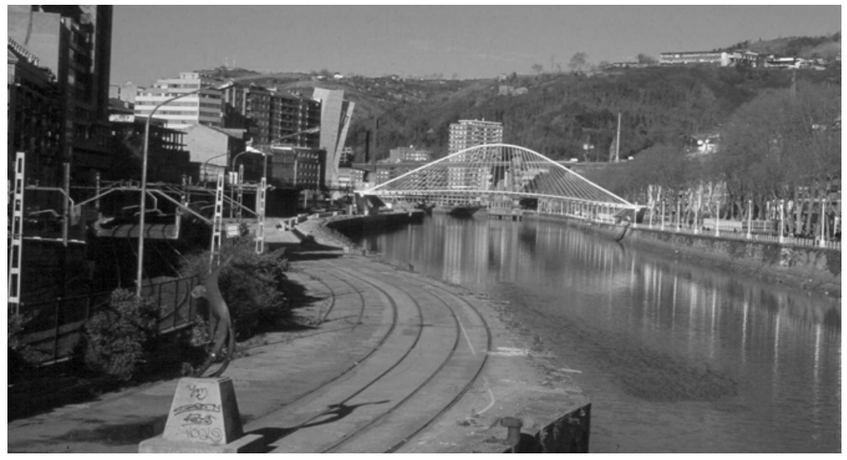


**DEVELOPMENT OF TRANSPORTATION, TRADE AND PORT ACTIVITY**

Fig. 3 Bilbao in 1875
© Xiaohui Jin

**ESTABLISHMENT OF SHIPYARDS AND BUSINESSES OF IRON AND STEEL**

Fig. 4 Bilbao in the middle of the 20th century
© SEM



**ABANDONMENT OF THE RIVERFRONT ENVIRONMENTAL, SOCAL & ECONOMIC DEGRADATION**

Fig. 5 Bilbao in the end of the 20th century
© SEM

Urban Waterfront." According to Bruttomesso, this is "an essential paradigm of the postindustrial city"[17], and there are three processes that are crucial in riverfront revitalization:

*Recomposition* is the idea of assembling the various components of the built environment and the natural environment into a unified whole, both physically and functionally. The waterfront will be "re-joined" to the urban fabric, giving it a new "personality" for future users.

*Regeneration* is the process of reviving large urban areas that are complementary to the waterfront and/or to the city center. The upgrade of these areas is necessary in order to re-introduce them in the "urban play" of the city as a whole. The waterfront, city center and revived areas, together, alter the city's role and image.

*Recovery* is the reintroduction of new activity in abandoned or neglected zones, frequently through the rehabilitation of historical structures. By assigning a new urban quality to the existing buildings, they become new "additions" that can provide a higher standard of living within the city.

**[A MODEL OF URBAN COMPLEXITY]** In light of this understanding of the modern condition, Bruttomesso investigates the application of programs, their ordering and articulation. The existence of multiple and diverse activities in the built environment on the riverfront, according to R. Bruttomesso, is what "gives life to new pieces of city."[17] Efforts have been made to ensure that several factors that are held to be necessary components of the riverfront operation, have also contributed significantly to the achievement of urban complexity. Some criteria related to these factors are outlined in the following:

*"The plurality of functions assigned to the area"*: In this way, the waterfront can serve a variety of tasks and purposes that complement each other

*"The multiple activities in the redeveloped zones"*: The combination of roles corresponding to the many sectors of major urban functions (economic-productive, residential, cultural and recreational, mobility)

*"The co-presence of public and private"* primarily in relation to: the functions, the spaces (piazzas, parks vs and private gardens, clubs) and the actors.

Coherently, according to R. Marshall, "Waterfronts became associated with ways to recreate the image of a city, to recapture economic investment and to attract people back to deserted downtowns."[18]

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

[18] Marshall, R. (2001). Contemporary urban space-making at the water's edge. In R. Marshall (Ed.), Waterfronts in Post Industrial Cities (pp. 4–14). Spon Press.

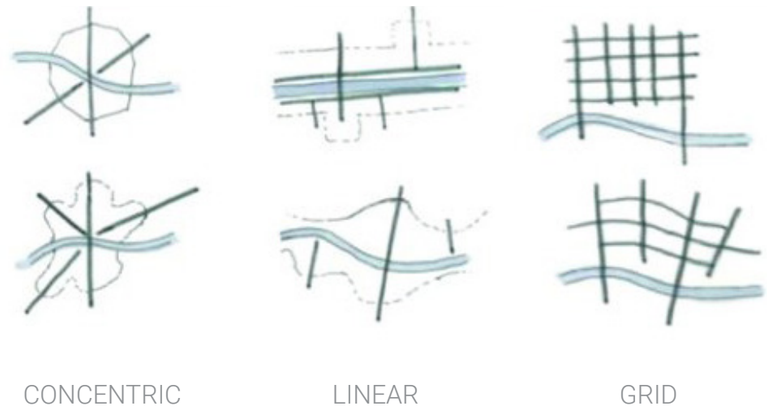




## URBAN RIVERFRONT MORPHOLOGY STRATEGIES

Urban morphology is one of the tools to regenerate riverfronts in cities. Its definition is provided for the better understanding of this chapter. Urban morphology gives useful information about the structural characteristics of a city. It reveals the structural roots and effects of historical change on the development and reconstruction of a city's chronological processes.[19] Morphology is analyzed through road networks, buildings, and land usage, all of which give information on the urban strategies that impacted the city's evolution.

**[URBAN PATTERNS RELATED TO RIVERS]** Rivers are an element of a location's geographic limits and serve as a fundamental infrastructure for urban development.[20] Therefore, river streams cannot be studied in isolation; they should be intimately linked to the surrounding urban forms and have an impact on urban development patterns. They should be associated with the development of transport infrastructure axes, the main axes of plots development and the axes of public spaces.[21] The figure below represents the different typologies that could be developed in relation to different river forms.




**[CIRCULATION PATTERNS RELATED TO RIVERS]** In Pattacini's research aiming to present variations of types of circulation patterns and urban layouts[20], the author cites P. Lavedan, who offers two forms of urban-river connections: "River cities" and "Bridge cities". Each type of city affects the urban morphology when re-developing the city. The "river cities," as described by Lavedan, are urban cities where the river has a direct impact on urban growth, with the main development layout following the river's course. The second type is the 'bridge cities,' which the main development axe is an infrastructure connecting the "island" to the neighboring territories. [22] Therefore, the river city can be linked to the linear city growth type, along

[19] 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.

[20] Pattacini, L. (2021). Urban Design and Rivers: A Critical Review of Theories Devising Planning and Design Concepts to Define Riverside Urbanity. Sustainability.

Fig. 6 Urban patterns related to rivers
© L. Pattacini

[21] Mangin, D., & Panerai, P. (1999). Projet Urbain (Parentheses ed.) [E-book].

[22] Lavedan, P. (1926). Qu'est-ce que l'urbanisme, introduction à l'histoire de l'urbanisme. Henri Laurencs. cited by Pattacini, L. (2021). Urban Design and Rivers: A Critical Review of Theories Devising Planning and Design Concepts to Define Riverside Urbanity. Sustainability

its river. The bridge city could adopt a linear growth strategy, but the first bridge serves as an anchor, securing the future layout and forms of the city.[23]

[23] Lynch, K. (1981). A Theory of Good City Form. The MIT Press.


Fig. 7a Circulation patterns related to rivers
© L. Pattacini

Development layouts can vary from a river-city to another: Radiating layouts that converge at the crossing point, or orthogonal and rectilinear layouts, known as grid layouts. When the development's core is linked to various roads converging on the settlement, a hybrid form may emerge, with the city's structure developing in a concentric pattern.


Fig. 7b Circulation patterns related to rivers
© L. Pattacini

**[OPEN SPACES ON RIVERS]** Redeveloping river banks and crossings could be coupled with the creation of open space systems placed at the angle, or extending from, the line of the water. These patterns are frequently connected to the surrounding urban fabric and serve as a checkpoint before entering the city.[24] The use of expanded or rectilinear urban squares on axes serving as points of entry, maximize views of the river and serve as a powerful node of traffic.[25] Other approaches favor a natural expansion along the river. Pocket parks are natural spaces scattered among the various axes leading to and from the river. Linear parks concentrate on a single main axis along the river where a succession of open spaces interlock, which provides physical and visual connections with the river and interconnects the mixed-use developments, residential and recreational areas on the river edge.[26]

[24] Lavedan, P. (1926). Qu'est-ce que l'urbanisme, introduction à l'histoire de l'urbanisme. Henri Laurencs.

[25] Bacon, E. N. (1975). Design of cities (pp. 220–221). Thames & Hudson.

[26] Pattacini, L. (2021). Urban Design and Rivers: A Critical Review of Theories Devising Planning and Design Concepts to Define Riverside Urbanity. Sustainability.

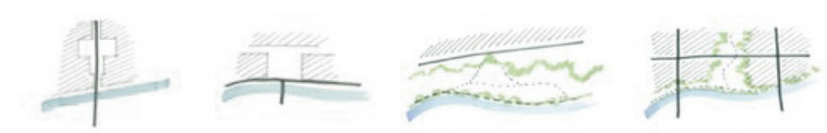



Fig. 8 Open spaces on rivers
© L. Pattacini





## RIVERFRONT REGENERATION: URBAN COMMON GOOD

In theory, the riverside of a post-industrial city should be restored for the benefit of all residents. Accessibility and the development of public facilities are two fundamental elements in riverfront development. In reality, however, the advantages of a restored riverfront are rarely evenly divided. Equity challenges may arise due to the planning structure and policies of some waterfront development projects. "*In these possibilities, we remember that urban development is not just for profit, or personal aggrandizement, but for the benefit of humanity and the planet as well. It is on the urban waterfront that these visions of the city are finding form. These are the sites of postindustrial city space-making.*"[27]
Some riverfront projects have been designed to serve the image and the prestige of the city, in order to enhance the visibility on riverain sites to attract funding, promoters and potential new residents, all the while neglecting the "less profitable" aspects of a riverfront. *"Waterfront redevelopment has been linked to the desire of cities to gain prestige and be competitive in a globalizing world."*[28] The interventions should be catalysers for the improvement of the current spatial, economic and social conditions, offering a variety of passive and active functions. Therefore, it is important to find a balance when proposing design solutions, between profitable real estate opportunities, and the three pillars of sustainable development: economic, social and environmental factors. Not all the factors are represented equally in most of the interventions on riverfronts, which may affect the long term success.[29]

## BENEFITS

With new economic activity, employment and housing, and a lively mix of households, new waterfront neighbourhoods can contribute to any riverfront city's overall development ideals. It is not enough, however, simply to build new buildings or to refurbish old ones. Given the importance of riverfront areas, it is vital to create real communities and re-establish links between the waterfront and the wider urban fabric. This presents major challenges in planning, urban design, citizen participation and infrastructure. Regeneration therefore needs to be carried out to a clear programme to meet multiple social, economic and physical objectives within a sustainable framework. In literature, authors have written about accomplished successful cases of riverfront projects, with each a different objective, that benefited the surrounding areas in distinctive ways. Below, two riverfront cities are mentioned, as their benefits were described and analyzed by the two authors R. Marshall, M. Millspaugh. The cities featured are: Shanghai in China and Amsterdam in The Netherlands.

[27] Marshall, R. (2001). Contemporary urban space-making at the water's edge. In R. Marshall (Ed.), Waterfronts in Post Industrial Cities (pp. 4–14). Spon Press.

[28] Avni, N. (2017, November). Planning a Just City: Examining Waterfront Redevelopment Projects From a Social Justice Perspective. McGill University.

[29] Lerner, D. N., & Holt, A. (2012). How should we manage urban river corridors? (No. 13). Procedia Environmental Sciences.

## SHANGHAI, CHINA

OBJECTIVE -
*Reshaping the city's identity*

## BENEFITS

Application of **environmental controls** to address air pollution, waste production, treatment of wastewater.

Redevelopment of port assets and **city's historic areas**.

Extension of the **accessibility on the waterfront** making it an asset for all and Incorporation of **movement on the water:** River, coastal and ocean ferry.

Improvement in the **urban infrastructure** by extending streets and neighborhood to link the waterfront to a larger system of open spaces.[30]

[30] Millspaugh, M. L., & Marshall, R. (2001). Remaking the image of the city. In R. Marshall (Ed.), Waterfronts in Post Industrial cities (pp. 53–73). Spon Press.

Fig. 9 Huangpu Riverfront
© Xiaohui Jin

## AMSTERDAM, THE NETHERLANDS

OBJECTIVE -
*Redevelopment of forgotten water corridors*

## BENEFITS

The re-established connection between the historic center and the harbor by **redevlopping the cultural and historic services** on the canal banks.

The oppenness to **new expression in the architecture** of its waterfront development, which are considered the "anchors" of the canal.

The **design of public spaces** along the inner city streets to reinforce the relationship between the islands and the historic city.

The new **relationship with water**: the former inner docks became spaces for houseboats, barges, historic ships, tour boats.[31]

[31] Marshall, R. (2001d). Waterfronts, development and World Heritage cities. In R. Marshall (Ed.), Waterfronts in Post Industrial Cities (pp. 137–159). Spon Press.

Fig. 10 Amsterdam canals
© NEMO Science Museum

Based on the theoretical analysis, the understanding of these case studies above and according to M. Moretti, deputy director in the International Centre Cities on Water, the benefits of riverfront regeneration can be summarized by the following points.[32]
**(A)** The re-establishment of direct contact with water through leisure and recreational activities was proven to be an integral element for the improvement of the environmental and living conditions in the city. **(B)** The restoration of the areas known for the presence of historical buildings and the preservation of their rich heritage is important in order to preserve its identity. **(C)** The management of the abandoned spaces and the attraction of public and private investors in the area contributes to the increase of the value of the land and to the constant economic growth of the city. **(D)** The provision of sustainable and green considerations to the environment to help enhance the conditions of the waterfront. **(E)** The establishment of strategical assets on the waterfront areas to contribute to the expansion of the city in central positions and for them to be convenient in terms of quality of scale, spaces and availability for new functions. **(F)** The contribution to the new symbolic value given to an area by providing a new identity to the global waterfront

## CHALLENGES

Planners may face challenges when revitalizing all types of waterfront cities. The case of Hong Kong is an example of struggle between the private and public sector. Planning procedures were legitimized denying citizen participation in decision-making, which was limited to those in positions of authority. The destruction of Queen's dock, a historic symbol, was amongst the most significant decisions that enraged the civil society.[33] The second case of Darling Harbour in Sydney is an example of a development project that failed to engage the urban fabric. On the waterfront, open areas and recreational activities were provided, but the project is entirely cut off from the city. There was no thought or effort given to connecting it by expanding existing streets to establish a coherent system of circulation which resulted in civic engagement failure.[34]

According to the examples listed and to Marta Moretti, deputy director in the International Centre Cities on Water, the following are the common issues that may exist when it comes to urban riverfront regeneration.[24]
**(A)** The inability to connect the urban context with the waterfront: It is very important to determine the proper strategies in order to properly revitalize and re-connect it with the urban spaces. **(B)** Loss of the heritage and consequently the identity of the waterfront. Historically important buildings should not be dismissed. **(C)** Avoid the loss of sense of the place: Interventions should not be standardized. **(D)** The policies should take into consideration both the private and public sector in order to avoid disputes and incoherent strategy plans.

[32] Moretti, M. & International Centre Cities on Water, Venice (Italy). (2008, September). Valorisation of waterfronts for sustainable development for sustainable development in cities on water in cities on water (IV).

[33] Dagdag, J. (2017). Study Of Successful Placemaking in Post-Industrial Waterfronts.

[34] Marshall, R. (2001a). Connection to the waterfront. In R. Marshall (Ed.), Waterfronts in Post Industrial Cities (pp. 17–38). Spon Press.






Fig. 11 Protesters atop the Queen's Pier, Hong Kong
© Samantha Sin

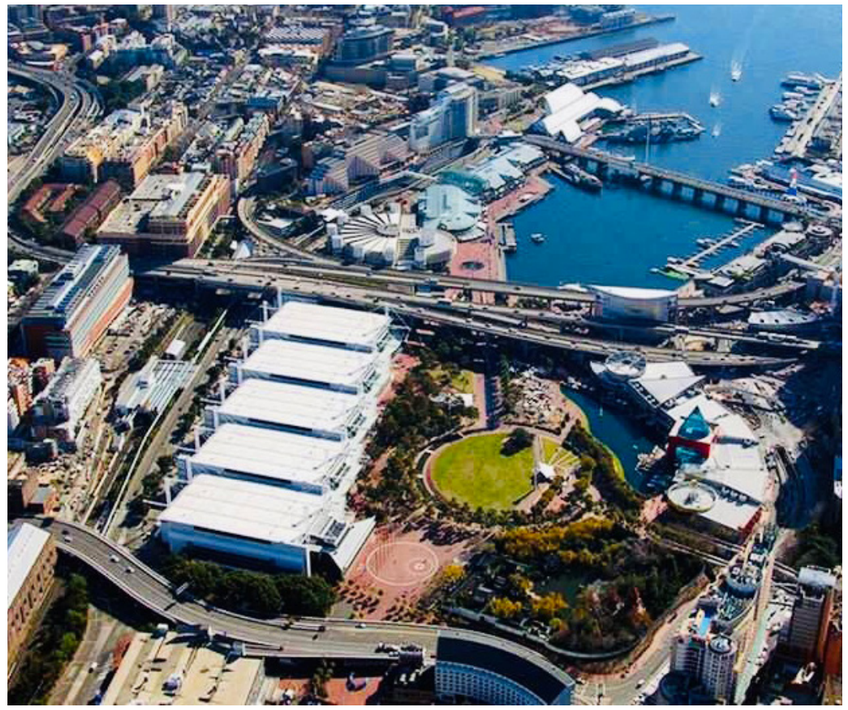


Fig. 12 Darling Harbour, Sydney
© Mark Merton

## 1.4 URBAN MORPHOLOGY AND URBAN PERCEPTION

### SPACES AND PLACES

Space and place are two important different concepts that have been studied in geography and philosophy. Defining them and identifying the differences between them will be crucial for this study. Space is an area without a specific importance. Place, however, brings up the awareness and attentiveness people have towards a certain location. Therefore, a place a simply a space with added value. Yi-Fu Tuan, a well renowned geography professor at the University of Wisconsin-Madison, a thinker and philosopher, contributed to defining the concepts of Space and Place. In his book, he specifies that the main difference between “space” and “place”, is the human experience component. By giving meaning to a certain location, humans will label it as a “place”. He goes on in and questions what is this meaning that we look for in a place, *“What gives a place its identity?”* [(7)] The meaning we look for in a place can both originate or deduced from an area in two forms: A direct or “intimate” form, which mainly involves our senses by looking, smelling, hearing and touching; and an indirect form, which evokes a “conceptual” approach to the place through art and architecture. *“Space is freedom, Place is security”*

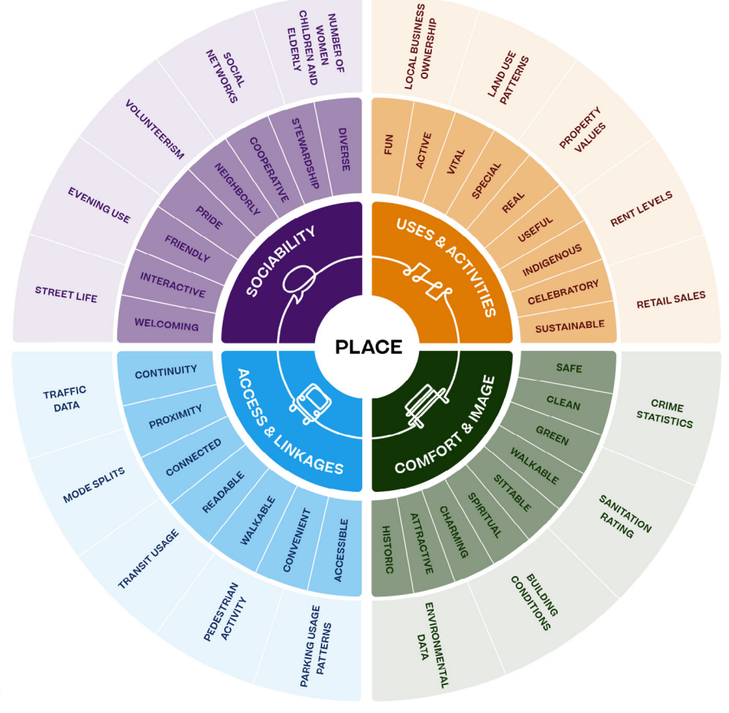
“Space” can be defined as a setting that has no in-depth connection with the humans occupying it.

“Place” is more than just an area, it holds value that comes from the human experiences within it. The size or nature of a space is irrelevant. It can be anywhere, as long as humans find a piece of themselves there, and have a feeling of belonging. According to Tuan, Places are *“where biological needs, […] are satisfied”*. It feels familiar. But what can be identified as an irrelevant space, has potential to become a place by giving it a significance and a specific purpose. This is where the two entities merge. Architects and urbanists are called to awaken a “sense of place” out of spaces in their designs. *“If we think of space as that which allows movements, then place is pause; each pause in movement makes it possible for location to be transformed into place”*[(35)]

### PLACEMAKING

After defining the meaning of a place and its importance in designs, concepts of placemaking started being discussed since the early 60's by pioneers such as Jane Jacobs and William H. Whyte published. They provided concepts for creating towns and neighbourhoods that prioritize people. They simply demonstrated that cities should be built for people, with pedestrian-friendly streets, welcoming public spaces, and vibrant communities. Architects and designers have been using this concept for the past 40 years to describe the process of designing places for the well-being of the community. PPS, or Project for Public Spaces, is a well-known placemaking advocate.[(36)] They were created in 1975 by William H. Whyte as a non-profit planning, design, and education organization.
*"We used our antecedents ideas to develop a unique method to help communities make better public spaces. We began calling this method "placemaking" to emphasize our belief that cities thrive on well-managed community places, not superficial designs. This simple idea, combined with the work of our predecessors, seeded a movement that is just now beginning to bloom in full."*[(37)]

**[DEFINITION: A SUCCESSFUL PLACE]** A "successful place," according to PPS, is one that has the following four characteristics: First, it should be *accessible*. A good public place is easy to find and navigate, and it is visible from afar and up close. Second, it should be a *comfortable*, pleasant and clean space. Third, it is a space that engages people in *different uses and activities*. Finally, it is a space that emphasizes *sociability*, communities and diversity. [(38)]




[(35)] Tuan, Y. (2001). Space and Place: The Perspective of Experience (Reprint ed.) (pp. 3-6). University of Minnesota Press.

[(36)] Dagdag, J. (2017). Study Of Successful Placemaking in Post-Industrial Waterfronts.

[(37)] The Placemaking Movement. (2004). Project for Public Spaces. https://www.pps.org/article/2003movement

[(38)] What Makes a Successful Place? (2015). Project for Public Spaces. https://www.pps.org/article/grplacefeat

Fig. 13 The Place diagram © PPS

## URBAN IDENTITY

Through the analysis of "Places", we come to understand that they are articulated through objects: *"Objects and places are centers of value"*.[39] When places and objects exist simultaneously in a space, they provide a geometric personality to this space. An area in any neighbourhood is at first a series of blurred images. It is unknown territory. By starting to identify streets, corners, landmarks, buildings, we become more accustomed to the neighbourhood and we start identifying "places" within. Therefore, as we get to know a city or a specific street, we become more familiar with its built environment; and consequently our movements become assimilated with these architectural and urban elements.[40]As defined by K. Lynch, the identity of a space refers to the differentiation between certain components from the whole, its recognition as a separate entity.[41] The different factors that define the urban identity of a space are the following: "built environment, urban space, socio-economic structure and socio-cultural structure."[42] Therefore each place has different geometric properties of size and shape that consequently define the activities and events that occupy the space.

## COMMUNAL AND INDIVIDUAL URBAN PERCEPTION

Whilst proposing new designs as solutions to problematic areas, the place acquires a new personality. The geometric personality of a space affects its social and economic factors. Therefore the perception of the place and how it is used varies as well. Hence, when we speak of urban morphology, it affects the urban identity of a place which affects the perception of the space as well. We can define urban perception as the operation of coming into contact with physical spaces and interpreting them from a subjective point of view. Understanding the relationship between man and built/natural environment requires observing the way people behave in specific urban settings and how they react in a specific context with different social and economic conditions. Even if places are designed to have a specific and clear purpose, the users social behaviours could be different. Accordingly, places and people reciprocally influence each other.[43]

[39] Tuan, Y. (2001). Space and Place: The Perspective of Experience (Reprint ed.) (pp. 8-18). University of Minnesota Press.

[40] Tuan, Y. (2001). Space and Place: The Perspective of Experience (Reprint ed.) (pp. 67-84). University of Minnesota Press.

[41] Lynch, K. (1960). The Image of the City. The M.I.T Press.

[42] Yaldiz, E., Aydin, D., & Siramkaya, S. B. (2014). Loss of City Identities in the Process of Change: The City of Konya-Turkey (Vol. 140) [E-book] (pp. 221-233). Procedia - Social and Behavioral Sciences.

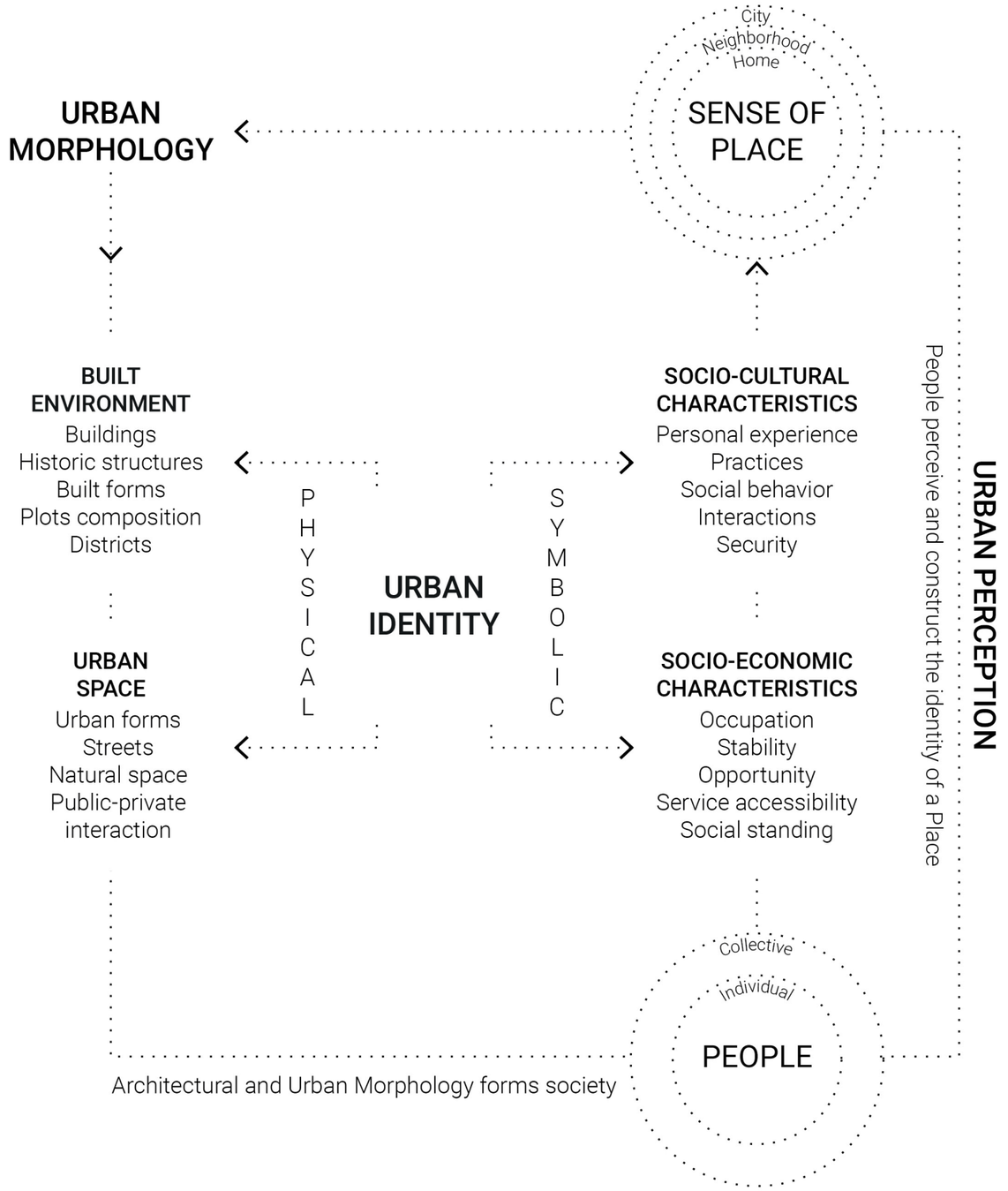
[43] Piga, B., & Morello, E. (2015). Les études sur la perception et la simulation en design environnemental : Une approche par le design urbain. Ambiances.





# URBAN MORPHOLOGY and URBAN PERCEPTION

Final Goal: Understand how the urban and architectural development of the environment affect the spaces on the riverfront which change how the inhabitants perceive them



# 02 MODELS OF SUCCESSFUL RIVERFRONTS

# 02 MODELS OF SUCCESSFUL RIVERFRONTS

## 2.1 ARCHITECTURAL INTERVENTIONS AS TRIGGERS TO RIVERFRONT DEVELOPMENT

Urban rivers have been renowned for their impact on cities' development on several levels, and their contribution to cities' economic, environmental and recreational values.[44] Lyon and Bilbao were selected to focus on the rediscovery of their riverfronts in the last thirty years after their deterioration during the industrial age. The context of urban renewal is studied according to the variants of each city: Its history, size, location, territory structure, economic situation and bio-diversity. Both Lyon and Bilbao are now recognized internationally according to each one's landmark: The Confluence museum in Lyon and the Guggenheim museum in Bilbao. These case studies were selected to understand the riverfront re-development strategy in the post-industrial era, triggered by the transformation of the built and natural environment. The observation's starting point will be analyzing the implementation of the known emblematic architectural projects and how the creation of these punctual places triggered the current growth and restoration of its urban context. We will look beyond the glamour of the designs to study the urban policies that were implemented in the re-activation of the riverfront[45] and its context, assess their achievements, recognize the difficulties that were addressed, and consider the strategies' long-term social and economic sustainability. The goal of studying urban policies used for the development of cities on post-industrial riverfronts is to analyze the factors that were taken into consideration when revitalizing the neglected areas, proposing a new physical composition of the spaces and understanding the new uses and connections. It is important to mention that the discussion will not only be restricted to the interventions on areas alongside the water, but an extensive focus will be made on the potentiality of the waterfront areas being mediators between the edges and the interior of the urban cities. The waterfront is an integral part of the city's development, hence, the study investigates the spatial nature and livability of these intermediate places and depicts the architectural interventions and the urban transformations that ensured this link and that morphed the urban fabric. Finally, through the study carried out below we will identify how the realized interventions and designs were able to provide the post-industrial riverfront with a new urban personality, offering possibilities for new identities of cities.

[44] Timur, U. P. (2013, July 1). Urban Waterfront Regenerations. IntechOpen. https://www.intechopen.com/chapters/45422

[45] Moretti, M. (2008, July). Cities on water and waterfront regeneration: a strategic challenge for the future. In II meeting Rivers of Change-River/Cities, Warsaw (Poland), July (Vol. 24).

## 2.2 **BILBAO, SPAIN: ABANDOIBARRA**

**ADMINISTRATIVE ENTITY**

*Ria 2000*

**PUBLIC & THIRD SECTOR STAKEHOLDERS**

*State administrations: SEPES, ADIF, Port Authority of Bilbao*

*Basque administrations: Basque Government, Provincial Council of Bizkaia, Bilbao City Council and Barakaldo Town Council*

**TOTAL SUFACE AREA**

*34.8 hectare*

**STARTING YEAR**

*1996*

**DELIVERY YEAR**

*2011*

**ABANDOIBARRA BUDGET**

*202 million euros*

**NUMBER OF HABITANTS (ABANDO)**

*50 903*

**URBAN RIVERFRONT CATEGORY**

*River city*

**TYPE OF INTERVENTION**

*Catalyst for a new image of the city*

**AWARDS**

*Lee Kuan Yew World City Prize*






Fig. 14 Bilbao metropolitan area

## INTRODUCTION

**[HISTORIC CONTEXT: A SEGREGATED AREA]** The city of Bilbao, capital of the Basque region, is located on the coast of northern Spain on the Nervion river. Bilbao was always recognized as an industrial-production economic powerhouse and known for its reputation as a portal city. Steel, metal industry and shipbuilding were at its core. The city's remarkable industrial growth reached its peak in the 1920's and attracted workers from different regions of Spain. Bilbao flourished physically, politically and culturally as a result of its expanding riches. Unfortunately, like many other cities around the world, the 1970's came with an industrial crisis which caused an economic decline. All industrial services on the banks shut down, and consequently lead people to lose their jobs. *"Between 1975 and 1995, Bilbao lost 60,000 industrial jobs, cutting industrial employment in half."* The phenomena was followed by a considerable exodus of the population, estimated at 80 000 individual and the abandonment of most sites and buildings in the city center and on the Nervión banks. In addition to the industrial collapse, the city was facing serious environmental problems: An unsettling event was the flood of the flood of the Nervión river in 1983 which caused the death of 37 people and the collapse of some of the docks.

**[POTENTIALITY OF THE POST-INDUSTRIAL CITY]** To evaluate the gravity of the situation, the Basque authorities identified the main issues at the time, which were the high unemployement rate, the emigration of the inhabitants, the urban stagnation of the city and the environmental degradation. In order to revive the city of Bilbao and restore it as a major point on Europe's shore, the region's economy was shifted from an industrialized core to a services foundation. The first step towards urban and waterfront recovery was taken 1989 when the city hall drafted the first Strategic Plan to rejuvenate the area.[46] Bilbao's rebirth is exceptional, and its riverfront redevelopment projects are essential to its success.

## REVITALIZATION STRATEGY: URBAN VISION AND POLICIES

**[THE ADMINISTRATIVE ENTITY]** The actors involved in the Strategic Plan were the port officials, the ministries, the government and the transport's company. Bilbao Ría 2000, a public-private organization, was founded in 1991 as a result of the public administrations' resolve to engage in the common mission, aimed at changing Bilbao's metropolitan area. Ría 2000's role was coordinating and carrying out a variety of measures that combine urban and environmental regeneration, transportation and accessibility in order to create a city that invests in its community. The involvement of the people living in Bilbao and their engagement was crucial to improve the city's social aspect. The area of intervention consisted of the Bilbao metropolitan territory, including the following areas: Abandoibarra and Ametzola both located in the center of Bilbao, Basauri and Olabeaga both

[46] Britannica, T. Editors of Encyclopaedia (2016, June 10). Bilbao. Encyclopedia Britannica. https://www.britannica.com/place/Bilbao



Chapter 2. Models of Successful Riverfronts

Fig. 15 Bilbao waterfront during the industrial era © Ibon Areso

on the south west of the metropolitan city of Bilbao and Miribilla located on the East of Bilbao.

**[THE VISION: A CULTURAL CENTER]** The aim of the Revitalization Plan was to provide an opportunity to Bilbao, a riverfront city, to create a new identity by making it a center of culture in the Basque region and establish a "shared prosperity" for all of Metropolitan Bilbao's people. Therefore, Bilbao built its own policy model by structuring a new dialogue between the city and the port around a mix of economic and cultural factors: *"La fonction culturelle est aujourd'hui perçue par ces villes comme une des fonctions les plus qualifiées pour redynamiser et diversifier la base de l'économie locale."*[47] which translates to: The cultural function is today perceived by these cities as one of the most qualified functions to revitalize and diversify the base of the local economy.

**[THE OBJECTIVES]** The city wanted to project a new image of what it can and wants to be. To guide the development of the Revitalization Plan, the following five main aims were identified:
1. Develop and invest in an area dedicated for culture.
2. Engage in urban and environmental regneration: Recover the built environment along the river that was severly affected by the floodings.
3. Establish an economic plan to repopulate the deserted areas.
4. Create a diverse and appealing range of urban recreational activities and green spaces for social activity and for well-being.
5. Develop a mobility system to interconnect Bilbao's many districts and improve accessibility.[48]

**[REVITALIZATION PLAN]** The Strategic Plan for the Revitalization of Metropolitan Bilbao was initiated at the request of the Basque Government and the Biscay County Council. The intention of this plan was to shape the image of Metropolitan Bilbao for the next century. Some critical aspects of the plan include:

- The enhancement of the metropolitan infrastructure, which includes an internal mobility system that allows for proper interconnection between sub-regions. The plan directed the growth of the public transportation system, as well as the construction of additional motorways and rail links to the rest of Europe. The city's regional, national, and international links are being expanded thanks to the new Port and the building of the Sondika Airport.

- The development of a social and cultural focal point. The most well-known of these is the Guggenheim Museum, which contributes to the city's exterior image. The aim is to transform Bilbao into a "Center of Art and Congresses."

[47] Rodrigues Malta, R. (2004). Une vitrine métropolitaine sur les quais. Villes portuaires au sud de l'Europe. Les Annales de La Recherche Urbaine, 97, 93–101. https://doi.org/10.3406/aru.2004.2582

[48] Marshall, R., & Millspaugh, M. L. (2001). Remaking the image of the city. In R. Marshall (Ed.), Waterfronts in Post Industrial cities (pp. 53–73). Spon Press.



Chapter 2. Models of Successful Riverfronts

Fig. 16 Abandoibarra masterplan model
© Congreso AEHE

- Redevelopment of deteriorating urban infrastructure and renovation of the old town are part of the city's image rejuvenation.

- The restoration of the river as a metropolitan axis, as well as its sanitation, in order to increase in the city's quality of life and aesthetic beauty.

- The investment in human resources, with an emphasis on training programs and educational initiatives to create advantages for the city's business development.

- The need to expand the economic base in order to establish Bilbao as a productive metropolis in a modern industrial region, that relies on the development of a high-tech infrastructure. Such efforts are critical nodes in the city' competitive position.

- The monitoring and management of water and air water quality, as well as effective solid waste management, in accordance with European Union regulations. The regeneration of ecologically deteriorated regions was an important aspect in improving the city's exterior appearance and, as a result, its competitive position on the international scale.[49]

**[AREA OF STUDY]** Abando is the compilation of two main areas: Abandoibarra, the former industrial site of the port and rail station that extended along the Nervión riverfront, and the historic downtown of Bilbao. In order to understand the large-scale intervention, I will be approaching it by focusing on the on Guggenheim museum, the catalyzer that inspired the drastic change which had respective urban and regional consequences: The Bilbao effect. The regeneration of the Abandoibarra area, where the Guggenheim museum and the new cultural district are located, and the connection established between the waterfront and the historic city center will be at the center of this analysis. Cesar Pelli, Diana Balmori, and Eugenio Aguinaga, winners of an international competition for ideas, drew up the Master Plan of Abandoibarra's new district. After the validation of the masterplan, the works began in 1998.

[49] Marshall, R. (2001c). Remaking the image of the city. In R. Marshall (Ed.), Waterfronts in Post Industrial cities (pp. 53–73). Spon Press.





**DISTRICTS DIVISION**

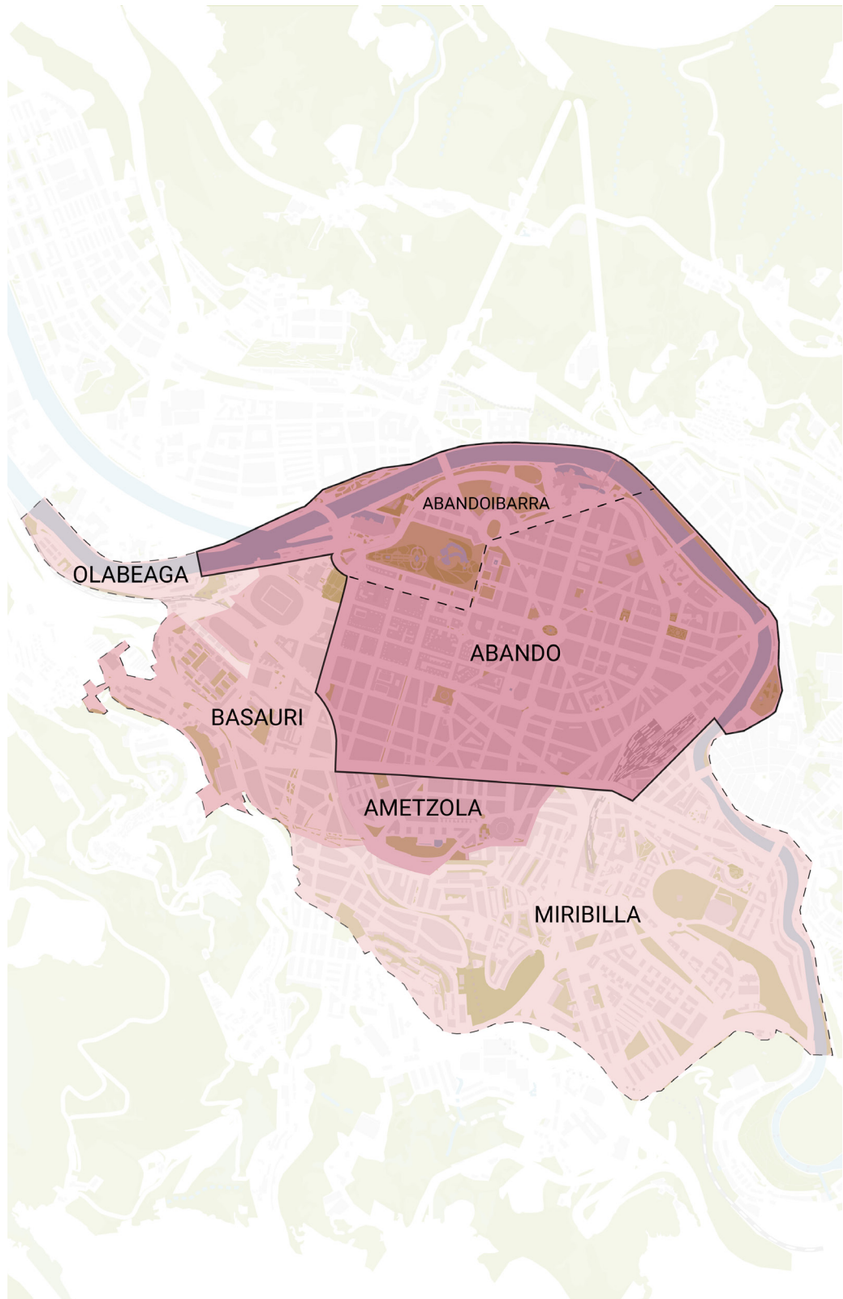
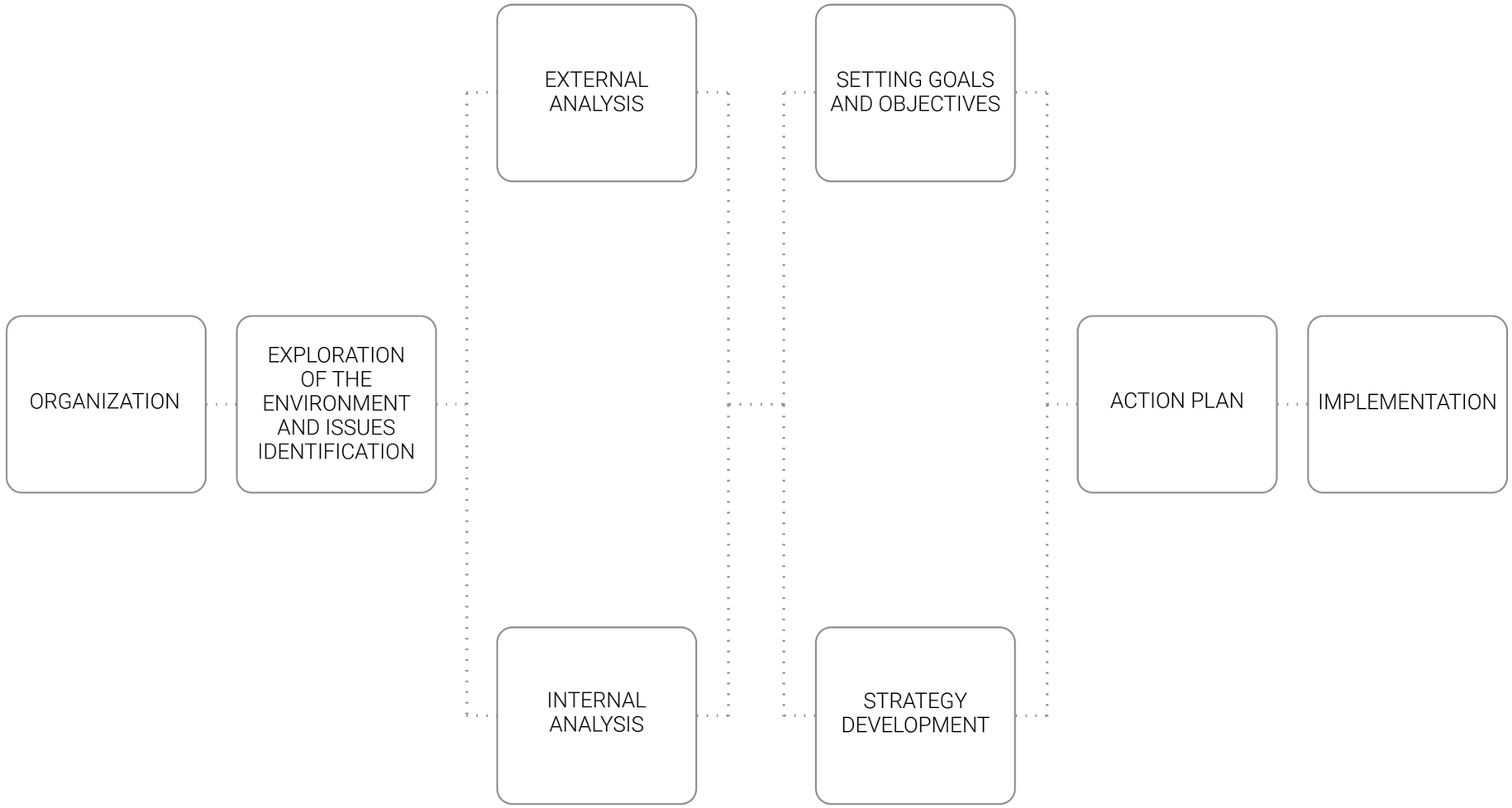



Fig. 17 Bilbao districts division

## PHASES OF THE REGENERATION PROCESSES






Chapter 2. Models of Successful Riverfronts

## GUGGEINHEIM MUSEUM

Located on the right side of the Nervión, in the area of Abandoibarra, the preservation and enhancement of the port and industrial heritage of the area was mixed with contemporary cultural initiatives. Frank Gehry's Guggenheim contemporary modern art museum is located on a 32 700 squares meter land on the riverfront. It opened its doors in 1997, five years after the works of the new public transportation by Norman Foster started. The museum is made out of interconnected buildings which suggest a unique volumetric and structural work characterized by its curving bitumen cladding. The museum itself is an exceptional landmark which culturally transformed the terrain and appeals to people and tourists and economically saved the city of Bilbao from its economic collapse. The development of a social and cultural focal point contributed to the city's exterior image, and fulfilled the aim of the strategic plan to transform Bilbao into a "Center of Art and Congresses." Nevertheless, the real attraction was the public refurbishment of the environment surrounding it[(50)], and specifically of the River, revitalizing the whole economic and social sector in Bilbao.

The city of Bilbao had developed with its back to the river. After the construction of the museum, it was found necessary to redevelop the waterfront in the region of Abandoibarra, covering a total of 31 hectares, where ancient shipyards used to be, and to turn its available unused sites into recreational and cultural opportunities by designing a convention hall, a music hall, universities, public equipments, residential unist and retail services. A riverfront promenade of more than 4 kilometers was created to connect the different sites and facilities.[(51)]

Major environmental actions were taken to restore the riverbanks from the existing industrial pollution "from the blast furnaces along a stinking river that trafficked in floating objects" as it was stated in the NY times. Actions were taken as well to protect them from future water floods. Furthermore, the restoration of the cleanliness of its waters have allowed for the resumption of sporting activities. According to data obtained by "Bilbao City Council's Department for Basque, Youth, and Sport" in the summer of 2013, athletic activities drew over 10,000 participants. Boat sailing, canoeing, paddle surfing, and rowing are among the sports available. That is why it is perceived as the face of the urban revitalization of Bilbao. Being the major touristic attraction of Bilbao at the time, it has generated an income that was able to make up for all the losses that the city endured during the economic crisis. 169,000 people visited Bilbao in 1996, the year before the museum opened. After one year, the figure had climbed to 1.36 million.

(50) Garvin, A. (2016, September 16). The real 'Bilbao Effect.' CNU. https://www.cnu.org/publicsquare/2016/09/15/real-%E2%80%98bilbao-effect%E2%80%99

(51) Laborde, P. (1996). Plan stratégique de revitalisation et projets urbains de Bilbao. In Villes en Projet(s) (pp. 339–349). Maison des Sciences de l'Homme d'Aquitaine.



Chapter 2. Models of Successful Riverfronts

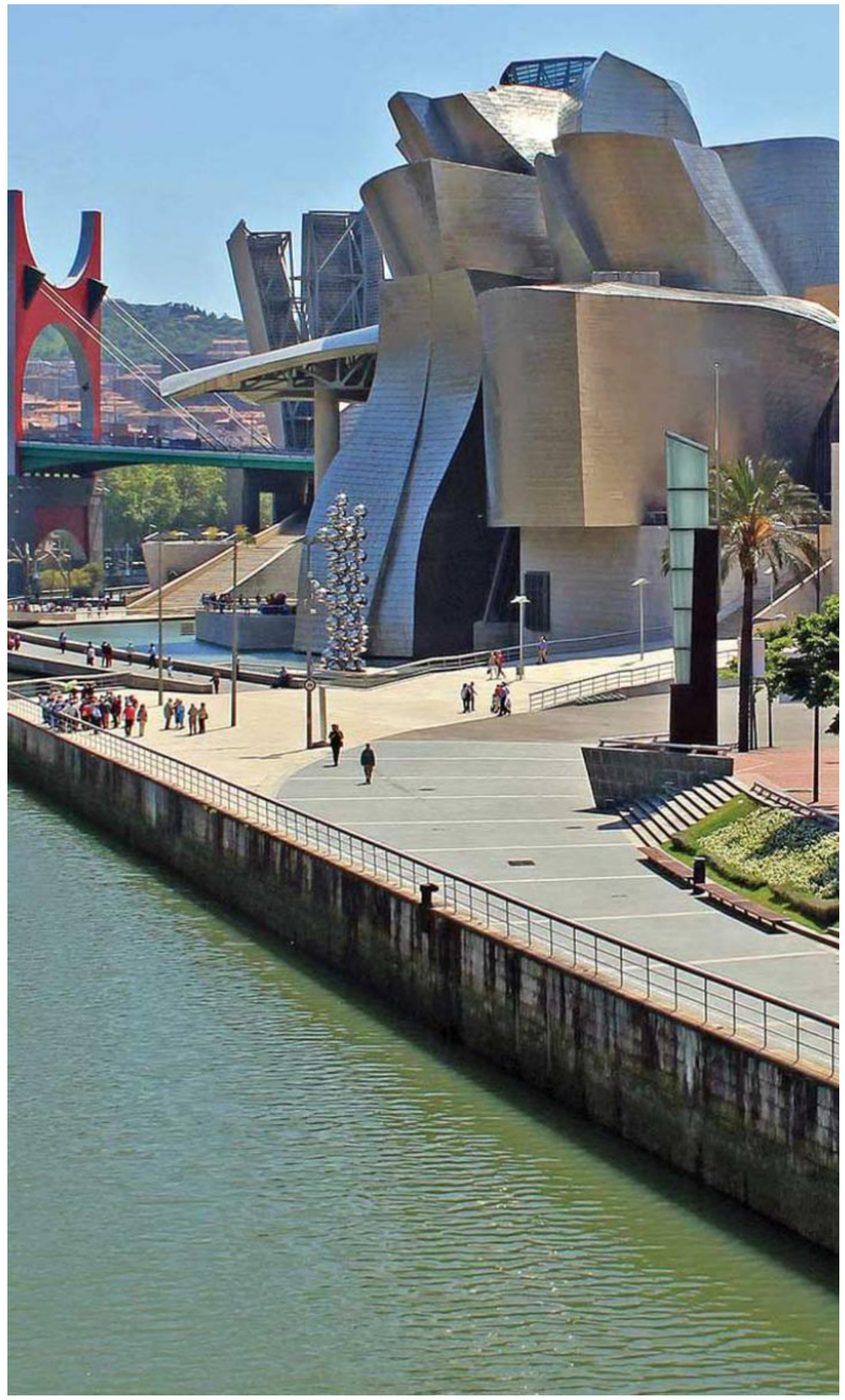


Fig. 18 The Guggenheim museum
© Zarateman

**THE BILBAO EFFECT**

The force and beauty of Gerhy's Guggenheim hides the work of a large number of people over the course of a decade. Bilbao's triumph is extraordinary, not just because of its remarkable design, but also because of the vision to improve the livelihood of the city for its inhabitants. In the following, the transformation of the built and natural environment, and the accessibility that were planned in the Revitalization Plan will be discussed. The creation of new constructions and the renovation of the historic urban fabric were both fundamental for the development of Abando.

**EMBLEMATIC AND PRODUCTIVE CITY**
MORPHOLOGY OF THE BUILT ENVIRONMENT

The abandoned industrial structures scattered along the riverbanks of the Nervión were all removed as part of the city's makeover, in order to make place to the new constructions. Consequently, the river's function in the city shifted: The Nervión river became the city's backbone. A number of significant buildings by famous architects led the transformation of the city's image.

**[CULTURAL CENTRALITY]** One of the major strategies was the creation of a new cultural district: the Museo de Bella Artes, the University de Duesto, the University of Bilbao and the Old Town Hall, he Euskalduna Concert and Conference Hall and of course the Guggenheim museum are some of the architectural elements that define the cultural standing of the city. These interventions have place Bilbao in the international art scene. These 20,000 squares meter of universities and public equipments aim to transform Bilbao into an Art Center, with an emphasis on offering a broad range of cultural activities and educational initiatives to engage the community and attract tourists. For example, the University of Deusto library designed by Rafael Moneo allows the public to examine hundreds of books from the academic institution's holdings. Many of the institutions feature computer rooms, exhibition halls, and food courts on their premises. (52)

**[LOGISTICAL ACTIVITIES ZONES]** Currently, thirty-eight start-up firms in biotechnology, telecommunications, software, and robotics are housed at the Zamodio Technological Park, which is located northeast of Bilbao. The construction of 100,000 squares meter of offices in the city attracted high-tech business activities and established a Logistics Activities Zone in Abandoibarra. Bilbao is the banking capital of Spain and is aiming to be the informational technology portal for Europe. The European Software Institute, was even established there by the European Union to help Bilbao's member nations compete with the United States and Japan. These projects demonstrate Bilbao's dedication to high-tech sectors and to their contribution to its economy. The designers even planned the expansion of the Port for innovative maritime related activities, honoring the past industrial heritage of the city.

(52) Marshall, R. (2001c). Remaking the image of the city. In R. Marshall (Ed.), Waterfronts in Post Industrial cities (pp. 53–73). Spon Press.

(53) Abandoibarra. (n.d.). Bilbao Ria 2000. https://www.bilbaoria2000.org/en/actions/abandoibarra/





**[MIXED DEVELOPMENT]** The development of the different plots in Abandoibarra was done with a diverse approach to compliment the projected image of the neighbourhood as an innovative contemporary district. The scheme includes an office tower to house the County Government of Biscay, residential units, retail facilities and a new Sheraton hotel. The Iberdrola Tower by architect Cesar Pelli is one of the most distinctive structures in the Abandoibarra neighborhood. At 165 meters, the office building was designed to be an urban landmark. It is the highest structure in northern Spain, and is one of the Bilbao's symbols. The tower is surrounded by two mixed use buildings: 30,000 squares meter of 600 premium and 40,000 squares meter of commerce created by architect Carlos Ferrater on both sides. The urban landscape differentiates the structures' access on the ground floor. In fact, various residential structures have been constructed on Abandoibarra's building plots in order to maintain a sense of continuity with the rest of Bilbao's riverfront.

**[LEISURE AREAS]** The construction of the Zubiarte Shopping Center made possible the integration of the district in the city's everyday life, by providing a diverse selection of retail and leisure activities to the inhabitants. The project was designed by Robert Stern, a North American architect and the aim of the project was to recreate the look of Bilbao's expanding streets within its inner structure, to connect the distinctive structures of Abandoibarra. The Meliá Bilbao hotel, another interesting structure, was created by Mexican architects Ricardo and Vctor Legorreta, and its construction references some of their country's architectural traditions. The presence of a five-star hotel facility on the territory emphasizes the Abandoibarra area's potential as a commercial district in the new Bilbao.

**[HISTORIC CONSERVATION]** As it was specified earlier, most of the industrial structures were removed to free up lands. One of the exceptions is La Alhóndiga, an wine, liquor and oil warehouse, located in the city center of Bilbao. The core of the building was reconstructed, while preserving the facade structure of the original building. BILBAO Ria 2000 was in charge of overseeing the construction of the building, which is today known as Azkuna Zentroa, as well as contributing six million Euros from the Abandoibarra action to make its conservation possible. The work was particularly complex due to the preservation of its historical structure, and also to its central location. The new centre is considered a new hub for Bilbao's cultural events.

Fig. 19 Deusto university library
© Bilbao Ria 2000

Fig. 20 Zubiarte shopping center
© Bilbao Ria 2000

Fig. 21 Residential buildings
© Bilbao Ria 2000

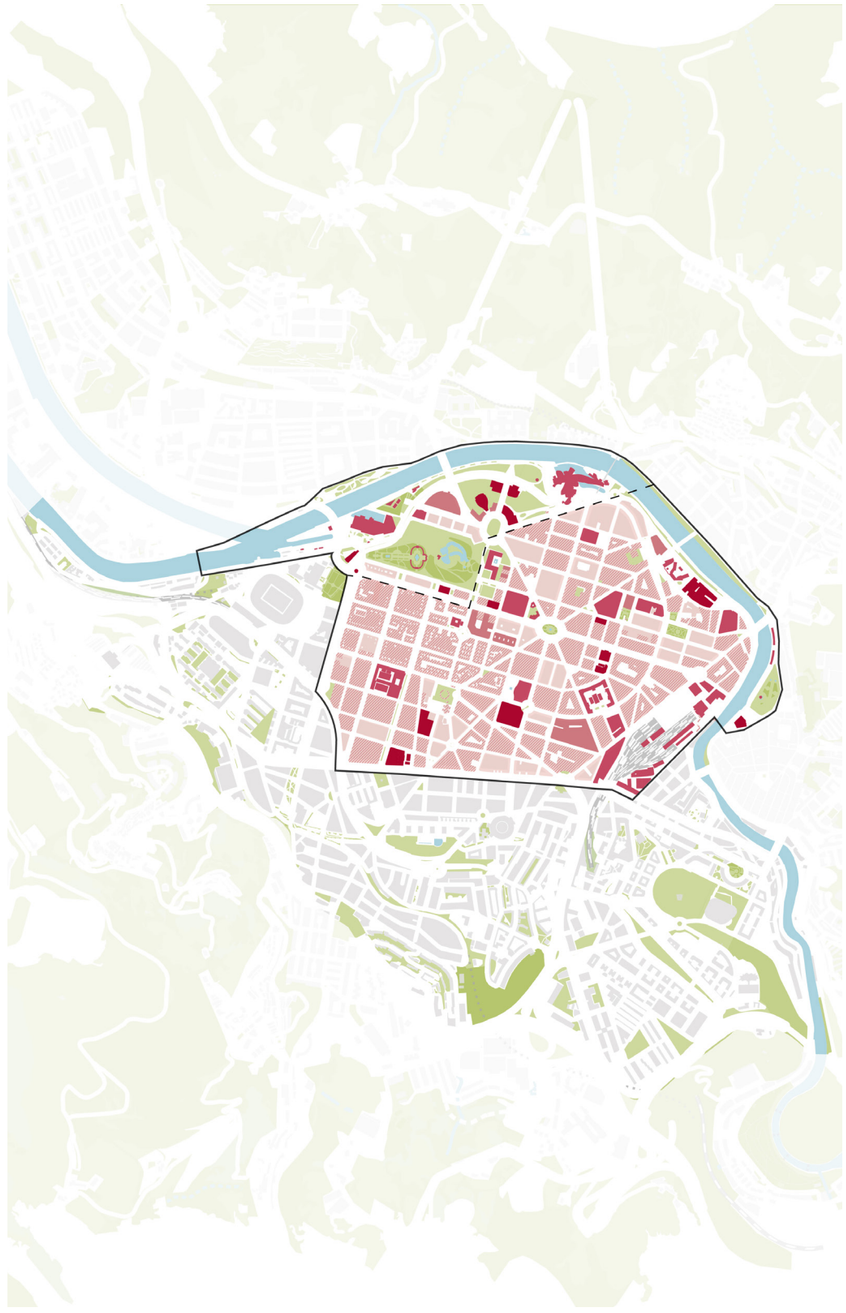
Fig. 22 Azkuna Zentroa renovated structure
© Bilbao Ria 2000





**LAND USE**

Location and repartition of the different programs on the territory



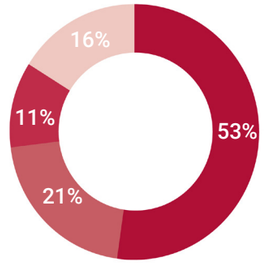



Fig. 23 Abandoibarra functions repartition

Fig. 24 Land use

**SHARED AND GREEN CITY**
DEFINING THE URBAN FORMS OF THE CITY

**[RE-VALUATION OF THE RIVER]** Major environmental actions were taken to restore the riverbanks from the existing industrial pollution and to protect the area from future water floods. The restoration and cleanliness of its waters have allowed for the resumption of sporting activities. According to data obtained by “Bilbao City Council's Department for Basque, Youth, and Sport” in the summer of 2013, athletic activities such Boat sailing, canoeing, paddle surfing, and rowing drew over 10,000 participants.

**[ENHANCEMENT OF THE RIBERA PIER]** The removal of the sills and existing industrial structures to recover land value and repurpose them were all part of the Evaristo Churruca Pier redevelopment. These improvements were critical for the area's development, and they were reinforced by the several structures on sculptures on the wooden decks.

**[THE RIBERA PARK: CULTURAL SPINE]** The 800 meters "Ribera Park" consists of a main park, promenades and cycle ways along the river. The competiton was launched in the early stages of the Abandoibarra project, and Javier López was selected to design this space. It is one of the first finished interventions on the embarkments and is highly appreciated by both the visitors and inhabitants for its spatial qualities.The park is also considered an open air gallery: It hosts multiple collections of sculptures by famous Basque artists that remind the industrial heritage and stenght of the area.

**[THE ENGLISH PARK: LUNGS OF ABANDOIBARRA]** The "Campa de los Ingleses" is labeled one of Abandoibarra's lungs. The park is located between several emblematic architectural projects: the Guggenheim museum, the Deusto bridge, the Deusto University Library, the Auditorium and the famous Iberdrola Tower. With its startegic location, the park not only physically connects different assets, but also creates a communal place for visitors to converge and socialize.

**[EUSKADI: CENTRAL SQUARE]** The Plaza de Euskadi is a vast green transition place between the Doa Casilda natural park in the western side of Abandoibarra, and the Campa de los Ingleses park. The square connects the Abandoibarra district to the Ensanche square, located in the historic city center. This park has many spots devoted for several functions: sitting, strolling, playing. This urban infrastructure serves as the axis around which Cesar Pelli's plan revolves for connecting Abandoibarra and the historic center. Its expansion is identical to that of the Plaza de Moya, in the heart Hence, the interdependence of the new district and historic center is based on the several public places conneted by the extension of existing streets.

(54) Abandoibarra. (n.d.). Bilbao Ria 2000. https://www.bilbaoria2000.org/en/actions/abandoibarra/





**ACCESSIBLE CITY**
MOBILITY IN ABANDOIBARRA

**[DEVELOPMENT LAYOUT: RIVER-CITY]** Bilbao Ra 2000 has reclaimed land along the banks and the Nervión will no longer constitute a physical and social limit. The position of the river along the post-industrial riverforont dictated the establishment of the linear recently built subway system, which runs beside the river. The many pedestrian and cycle pathways radiating from Abandoibarra' center, and the seven new bridges, will connect the riverfront over its entire length. This new mobility network gave a new identity to the riverfront as a mobility spine. The tramway's importance in the urban revitalization is based on the reality that the locations it serves coincide to the cultural amenities of Bilbao's urban strategic plan, and their connection would be impossible without it.

**[STREETS EXTENSIONS: RADIAL CONFIGURATION]** It is crucial to mention that the interconnection between Aandoibarra, the historic center and the riverfront would not have been possible without the extension of the existing grid system streets from the historic center to reach the river banks in a concentric typology, which connects to the linear axe along the river, creating a tight network and integrating the existing plots with the newly developed ones. The coastline was successfully re-connected to the city through trails, bridges and crossing, which connect to the pedestrian, cycle paths, tramway lines aligning with the river.

**[NEW TRANSPORT INFRASTRUCTURE: SUBWAY]** Mobility was one of the main issues identified in the Strategic Plan for the Revitalization of Bilbao. A metro plan was established to interconnect the different districts and allow inhabitants as well as tourists to move with ease. Norman Foster and Associates designed the stations for the Metro Bilbao. The basic design idea was to build an underground system, with direct and simple access from the street level. The access platforms design is unique, simple, and functional. From the street, the users see the canopies made of steel and glass peeking through: A design that contributed to the contemporary image of bilbao.

**[PEDESTRIANIZED AXES]** Many streets were re-designed in order to devote them exclusively for pedestrian and cycle use, in order to establish connections between different public places in Abando. An example would be the Alameda street that connects: the Calle Heros square, a public place that has been inserted in the existing urban fabric of Abando; to Plaza de Euskadi, a new designed green park in the Abandoibarra region. The pedestrianization of streets and public squares is an asset that creates places that rejuvenate the urban center, and helps connect the different activity poles. It also creates an active ground floor that rejuvenates the commercial activity of the neighborhood.

Fig. 25 (left) Mazarredo
© Bilbao Ria 2000

Fig. 26 (left) Tramway rails
© Bilbao Ria 2000

Fig. 27 (left) Avda Universidades promenade
© Ibon Areso

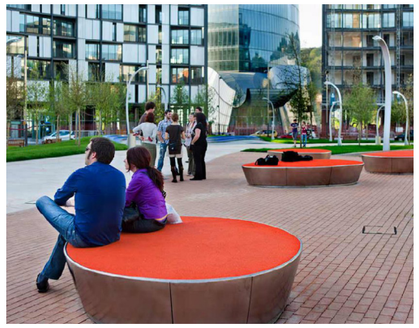


Fig. 28 (right) Euskadi central square
© Bilbao Ria 2000

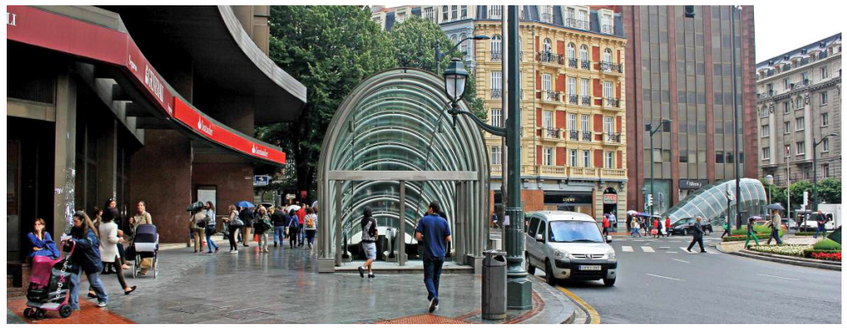


Fig. 29 Plaza Moyua by N. Foster
© Alexander Garvin

Fig. 30 The Ribera pier and park
© Bilbao Ria 2000





**STRATEGIC PLANNING**
Abandoibarra neighborhood and historic center

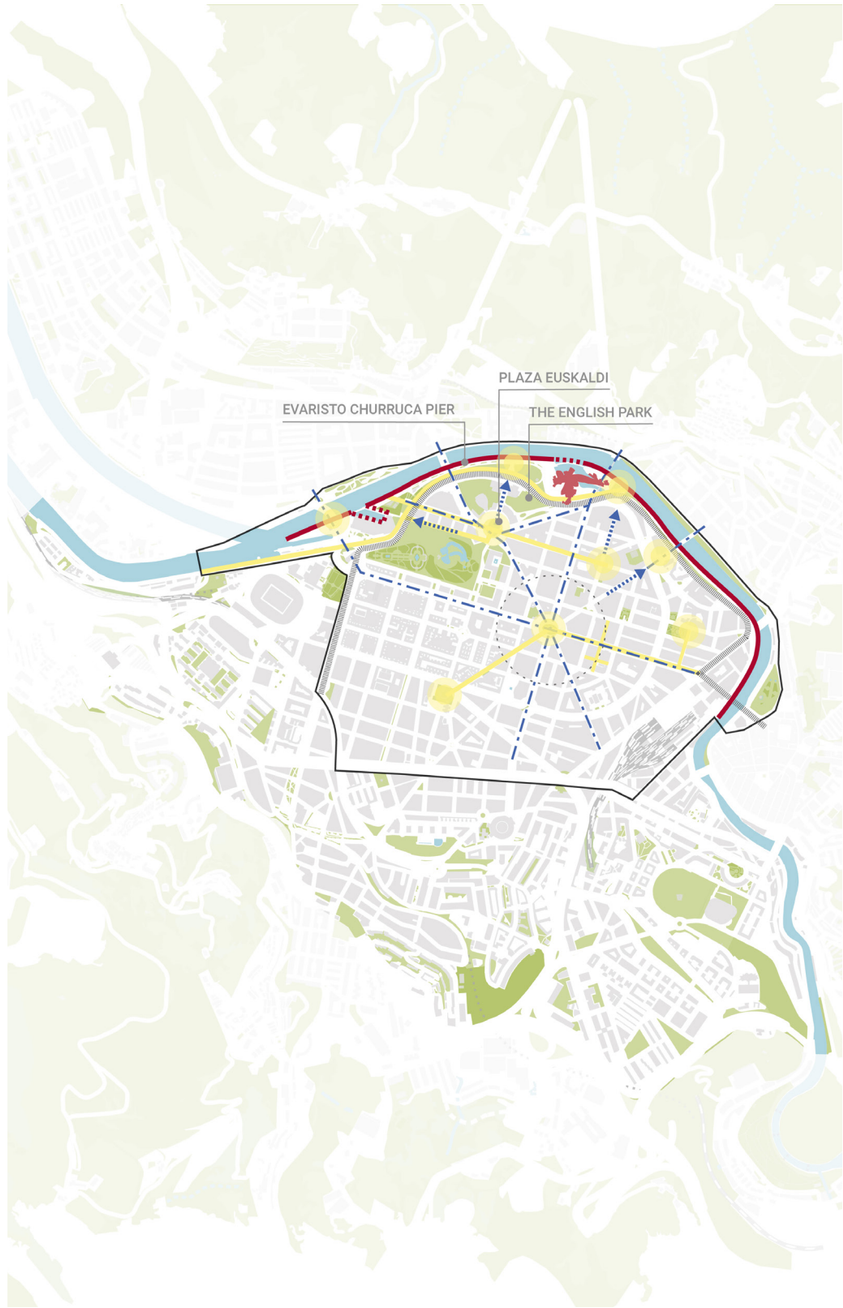
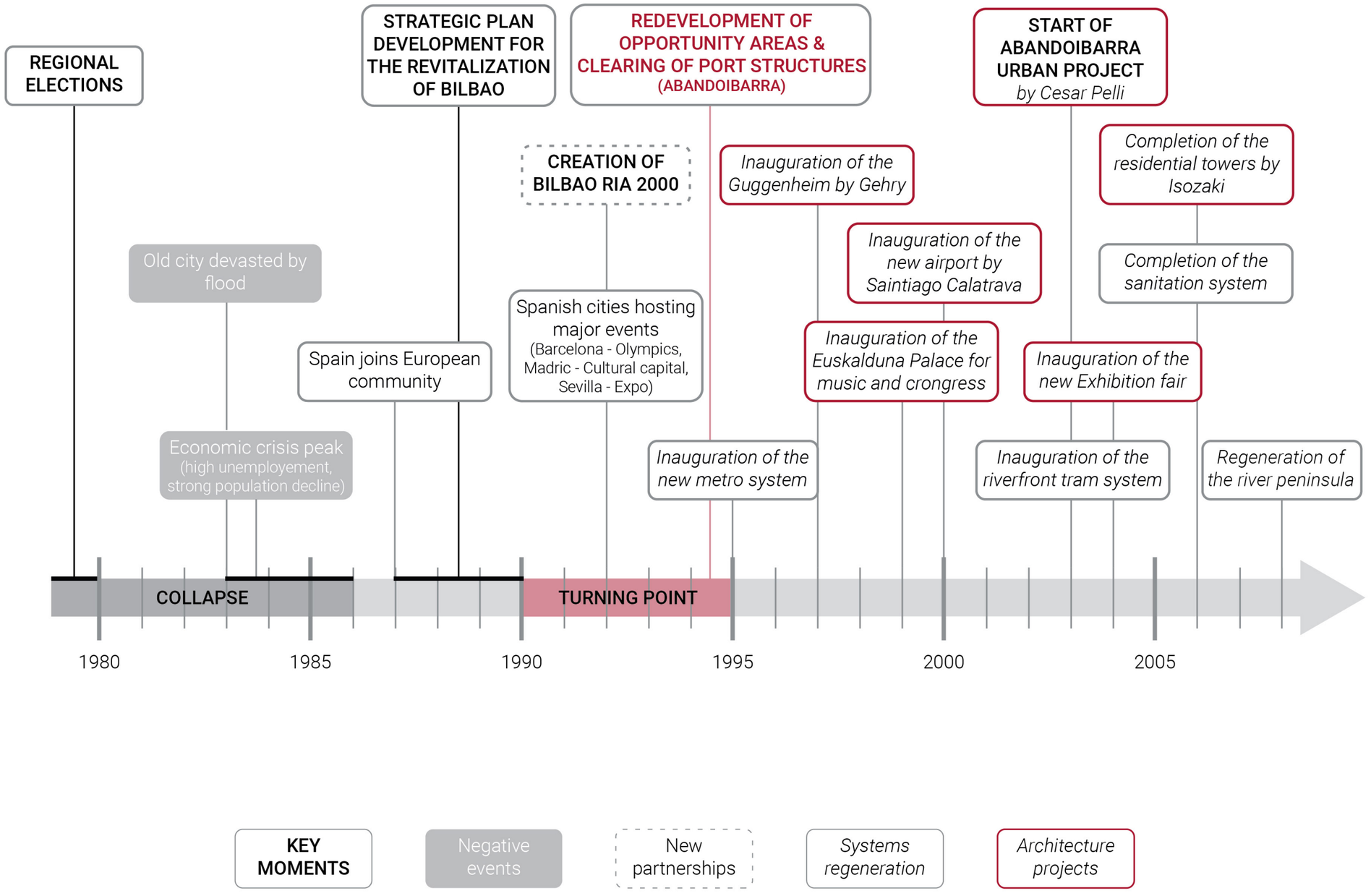



Fig. 31 Planning strategies

Chapter 2. Models of Successful Riverfronts

## TIMELINE OF THE REGENERATION PROCESSES



## CONCLUSION: BILBAO'S NEW IMAGE

**[ACHIEVED OBJECTIVES THROUGH URBAN MORPHOLOGY]** Urban regeneration is a success in Bilbao due to an internal awareness of the need for improvement and the generation of a new external image to attract development. The seafront in Bilbao was the location where these initiatives took shape: The linear axis along the riverfront became the supporting artery for the development of new central areas of the city and promoted the regeneration and growth of the Abandoibarra area by developping landmarks and distinguished architectural interventions along the riverfront. The longitudinal axe's presence was the base for the development of the river park and the establishment of the connecting linear tramway line. The restoration of damaged city infrastructure organized in a grid layout, the preservation of parts of the old town, and the interconnections created between the two districts through the city's new concentric layout were also part of the city's image renewal.

**[SOCIO-ECONOMIC OUTCOMES]** The improvements of the built environment in addition to the subway lines that were designed for the city, made the city certainly more accessible and appealing for its residents and visitors. The creation of a new external image was necessary to attract economic growth. Bilbao's economy thrived once the living conditions changed and its reputation as an innovative high-tech industry was developped: People started investing in the city by opening or growing business there. According to a study made by London School of Economics, the city created 113,000 job opportunities between 1995 and 2005, meaning that the "unemployment rate decreased from 25% to 14% in 10 years."[55]

**[SOCIO-CULTURAL OUTCOMES]** The Guggenheim can be considered as the catalyzer that launched all the coherent initiatives that re-invented the public domain, attracting people to live and work in the city, consequently making it thrive, leading to consider it one of Spain's finest cities. The population today amounts to 346 478, 3 times more than in the 1980 when the number amounted to 100 000 habitants. The consequent increase in cultural activities rejuvenated the city from within, while promoting Bilbao as a cultural hub to the world. The development of cultural activities, centres, sports facilities, and leisure services contributed to the vitality of the local community while determining the city's appeal. The international image of Bilbao shifted when the cultural scene introduced the new circumstances of the city.

**[ENVIRONMENTAL OUTCOMES]** The successful strategies to grow and manage the urban environment, based on sustainable principles and oriented towards its inhabitants, lead the Bilbao District to win the Lee Kuan Yew World City Prize, considered the "Nobel Prize" of cities, awarded by the city-state of Singapore in 2010. An additional reason behind their deserved win is how effective they were with the resources the city council had at hand and did not waste any, making Bilbao "one of the most transparent and least indebted cities in Spain."[56] Bilbao has survived and encouraged the growth of new green technologies, renewable energy and hightech start-ups. It is also important to mention that one of the essential parts of the environmental regeneration was the cleaning of the Nervión River to treat the water, enhance its quality and restore river-life. The work was done according to the European Union "Blue Flag" standards. The river was managed as a vital element in the development of the waterfront landscape and avoid future flodings. The river's rehabilitation as a metropolitan axis has improved the city's quality of life and appeal.

**[URBAN PERCEPTION]**

Bilbao has weathered its bank failures, its high public debt, its housing crash and shocking unemployment levels thanks to all the redevelopment initiatives focused on improving Bilbao's image. The Strategic Plan pushed for the redevelopment of the urban structure and of ecologically damaged regions in order to to improve the quality of the city, which gave Bilbao its competitive edge. Over the course of fifteen years in Bilbao, the goal was crystal clear, and the dedication of all the implicated members was steadfast. The redevelopment plan's progress was never hampered by political and administrative changes. Such dedication and teamwork have now shown to be successful. The city where it was once very hard to get around, became accessible and welcoming. The spaces in the city and on the waterfront that were once contaminated and heavily polluted became managed and welcoming places for community engagement and for cultural purposes. By giving a culture centrality to the city of Bilbao and basing its economy on a thriving sector of innovative industry, it resulted in the re-making of Bilbao's urban identity. The city became a common good that thrived on the engagement of the local and international community.

[55] Strategies for sustainable employment and urban development planning, case study: Bilbao. (2009). Forum Avignon.

[56] Especial, Z. A. E. (2010, June 30). Bilbao, un ejemplo urbanístico para el mundo. El Correo. https://www.elcorreo.com/vizcaya/v/20100630/vizcaya/bilbao-ejemplo-urbanistico-para-20100630.html

## 2.3 LYON, FRANCE: LYON CONFLUENCE

**ADMINISTRATIVE ENTITY**

*Local Public Company (SPLA) Lyon Confluence*

**PUBLIC & THIRD SECTOR STAKEHOLDERS**

*Lyon metropolitan area*

*TRIBU, Hespul, Enertech*

**TOTAL SURFACE AREA**

*150 hectare*

**STARTING YEAR**

*2000*

**DELIVERY YEAR**

*2030*

**TOTAL BUDGET**

*1.165 billion euros*

**NUMBER OF HABITANTS**

*17 000*

**URBAN RIVERFRONT CATEGORY**

*Bridge city*

**TYPE OF INTERVENTION**

*Urban Waterfront Development: Linear Strategy*

**AWARDS**

*Winner of the 2003 European Concerto program, First sustainable district of 2010 by the WWF, Sustainable District Grand Prize of the 2019 Green Solutions Awards*

[57] Les chiffres clés. (2021). Lyon Confluence. https://www.lyon-confluence.fr/fr/chiffres-cles






Fig. 32 Lyon metropolitan area

## INTRODUCTION

**[HISTORIC CONTEXT: A SEGREGATED AREA]** Located in the southern portion of the peninsula in Greater Lyon, the Confluence district is separated from the rest of the city by the Saône and Rhône, a highway that ran immediately through the center, and a railway. In the 1800's, Louis Pradel, the mayor at the time wanted to turn the "Perrache peninsula" into an industrial suburb. Therefore, he transformed half of the land into an industrial spine, through which goods were transported, and where complementary infrastructure, chemical companies and prisons were located. In the second half of the 1900's, the dynamics changed and the main Rambaud port, water transport and all industrial functions moved to the outskirts of the cities, which resulted in the release of wide portions of territory completely disconnected from the city center.

**[ISSUES AND POTENTIALITY OF THE POST-INDUSTRIAL CITY]** It wasn't until 1995 that the new mayor at the time, Raymond Barre, was alerted by the critical environmental and economic conditions of the riverfront and took the initiative to identify the issues that the industrial era left behind, and the potentiality of the territory. A city-wide consultation and recommendations for Confluence's prospective future were organized. At the time, other urban projects were being developed as well (Cité Internationale, Lyon Part-Dieu new TGV station, etc.). The main challenge was to take a site that has been long known for its industrial past functions, such as commodities port, gas power plants, jails; and turn it into a place that had a completely different purpose and use. The starting point was identifying the advantages of the neighborhood, which were many: Its centralized location in Greater Lyon; its rich landscape including the five kilometers on the Saône riverside, the western hills and the convergence of the two rivers; and finally its transportation network connected to the city center. After having identified these issues and the potentiality, the process to revitalize the post-industrial city was launched.[58]

## REVITALIZATION STRATEGY: URBAN VISION AND POLICIES

**[THE ADMINISTRATIVE ENTITY]** It was 1999 when a public-private company was founded by the Greater Lyon authority and the City of Lyon in order to plan the urban revitalization project of Lyon's new distric in relation to its river. The company was later renamed in 2008 Société Publique Locale d'Aménagement (SPLA) Lyon Confluence. The project consists of the urban renewal of the old industrial site into an city center, in between the two rivers, and the creation of housing, commerces and cultural facilities. The riverfront was planned to undergo a complete and radical transformation. Their vision was based on the main local issues, location's qualities, the river's role in the transformation and the demands of the community.

[58] Chronology of the urban project. (n.d.). Lyon Confluence. https://www.lyon-confluence.fr/en/chronology-urban-project



Chapter 2. Models of Successful Riverfronts

Fig. 33 Lyon Confluence in 1950
© IGN

Lyon is considered a successful model city not only for its waterfront makeover, but also for its planning process. There are multiple phases to the development process in Lyon: First, the establishment of a policy statement to guide the planning process; second, the production of a formal development plan; and lastly, the land planning and rezoning of the Lyon Confluence site to allow the development in conformity with the policies.

**[THE VISION: A SUSTAINABLE CITY]** The Lyon Confluence initiative was the way for Greater Lyon to attract employment, facilities, institutions, and important events to the city center, and therefore, defining the city's future on the international scene Because of its prominent location, the project arose in a specific political environment, in which the political forces were specially interested in sustainability as the main urban policy.

**[THE OBJECTIVES]** The five main aims guiding the development of the urban project are the following:
1. Develop a new residential district that will boost Lyon's image.
2. Create a diverse and appealing range of urban recreational activities.
3. Emphasize the river's geographical aspects
4. Reclaim the abandoned industrial lands
5. Expand access to the southern peninsula through public transportation

**[STRATEGY DEVELOPMENT]** The project outlines a strategic development defined by a step-by-step land planning process, divided by short-term goals and long-term goals:

**[LAND PLANNING: SHORT-TERM GOALS]** A 12 year stage, defined by "ZAC"
The large scale intervention was divided in two phases, and three main regions (land zoning): ZAC 1, ZAC 2, and Sainte-Blandine district. Its goal was to get the transformation process started as soon as possible. It served as the foundation for a key, attractive, and busy neighborhood that reflects Greater Lyon's worldwide objectives with a dynamic, creative image. The objectives of this project will be developed in detail the following paragraph.

**[LAND PLANNING: LONG-TERM GOALS]** A 30-year long-term project, specified by "constants"
Constants are important aspects of district development that will not change over the next 30 years and will give the region a sense of cohesion once the short-term project is complete in the district of Lyon Confluence. The long-term goals are for the project to become a large urban project that is fully integrated into its surroundings, to organize and develop and urban life that protects the rivers and the green spaces, and to create liveable, productive and comfortable neighbourhoods.[59]

[59] Courtot, M., Valentin, M., & Lyon Confluence. (2005). “Lyon Confluence” – major urban development.





**[PROGRESSIVE PLANNING]** An important aspect of the planning process is the progressive planning. It is a process built on a regulatory framework that involves extensive collaboration between the public and private sectors, as well as the community: Throughout the life of the urban project, all three were in continuous contact. For the design exercise, the public and private sectors were both engaged, politicians defined the policies, appointed officials provided development approvals, and the community was fully involved in the decision making process.

The inhabitants of the region were continually involved in the project development, which was of a major importance in the advancement of the operation. The consulations were structured in three ways: First, by organizing public open meetings in the presence of the architects and representatives of Greater Lyon; second, by arranging workshops specific to each sectors; and finally, by giving the opportunity to the community to evaluate discussions outcomes. Besides formal means of communication, the authorities were communicating ideas through different means, such as: permenant exhibitions on the development of Lyon Confluence, the website of the Confluence *(www.lyon-confluence.fr),* and circulating brochures. Furthermore, the construction of the Saone riverbanks adds to the project's appeal by allowing Lyon residents to examine the project area before becoming interested in the project as a whole. As a result, this is a method of communicating with the general population.[60]

[60] Courtot, M., Valentin, M., & Lyon Confluence. (2005). “Lyon Confluence” – major urban development.

Fig. 34 Presentation of the urban project
© Lyon Confluence

**[PHASE ONE]** In 2000, Francois Grether (architect) and Michel Desvigne (landscapist) were asked to plan the development project. After the first stages or design and consultation with the community, the first phase was approved. In 2003, the first phase of the urban development of the 41 hectare area, called ZAC 1, on the banks of the Saône, was launched. It consists of developing the available spaces around the "Marine square".
The fundamental principles of the spatial/urban planning were the following:
/SOCIO-CULTURAL/ Socially diverse and inclusive neighborhood.
/SOCIO-ECONOMIC/ Well balanced mix of uses and functions: Residential, Offices, Commerce, Cultural and Recreational.
/CULTURAL-ENVRIONMENTAL/ Extensive public spaces that have a structural function of creating a connected base.
/ENVRIONMENTAL/ Long-term sustainable growth of the districts.

The first phase was concluded in 2014. The overall investment amounted to €1.2 billion, and the ZAC 1 accounts for roughly 40% of the whole project's worth. Its built plan includes 400,000 m2 of net floor area with a wide range of functions. It includes several areas: including the Saône's banks as far as Cours Charlemagne, the confluence's point, and the Perrache train station area. The new projects benefits directly and immediately from the Lyon Confluence project. Phase One contains a considerable number of residential and tertiary-sector abandonned structures that were refurbished, preserving their historical heritage, as well as a number of notable public spaces devided between three main public squares and communal spaces between buildings integrating the water basins.[61]

**[PHASE TWO]** In 2009, the second phase of the urban development, ZAC 2 and Sainte Blandine, with a total of 35 hectare, was launched and concerns the spaces on the bank of the Rhône. Herzog & deMeuron (swiss urban planners and architects) were in charge of the development and their plan was approved in 2010. The fundamental principles of the masterplan were to develop the neglected avalable sites in ZAC 2, to enhance the connection of the Perrache station with its northern sites, and to refurbish the historic center of St-Blandine while preserving the territory's uniqueness:
/SOCIO-ECONOMIC/ The “Market Quarter” extension of the urban fabric of the center into the undeveloped areas of the territory.
/SOCIO-ENVRIONMENTAL/ Creation of Le Champ, a mostly natural setting that compliments the urban fabric at the southern edge of the territory.
/ECO-ENVRIONMENTAL/ Refurbishment and development of the old structures and reduction of greenhouse gas emissions.
/SOCIAL/ Roadbridges,footbridges, pedestrian and cycle paths connect the heart of the Confluence distric with the rest of the city of Lyon.

The total area of the project amounts to 150-hectare territory divided between 500 000 squares meter of existing floor area that was refurbished, and 1 000 000 squares meter of new constructions.[62]

[61] Lyon Confluence & Grand Lyon. (2012). La Confluence Lyon.

[62] Chronology of the urban project. (n.d.). Lyon Confluence. https://www.lyon-confluence.fr/en/chronology-urban-project





**INTERVENTIONS DISTRICTS**
Divisions according to the two phases

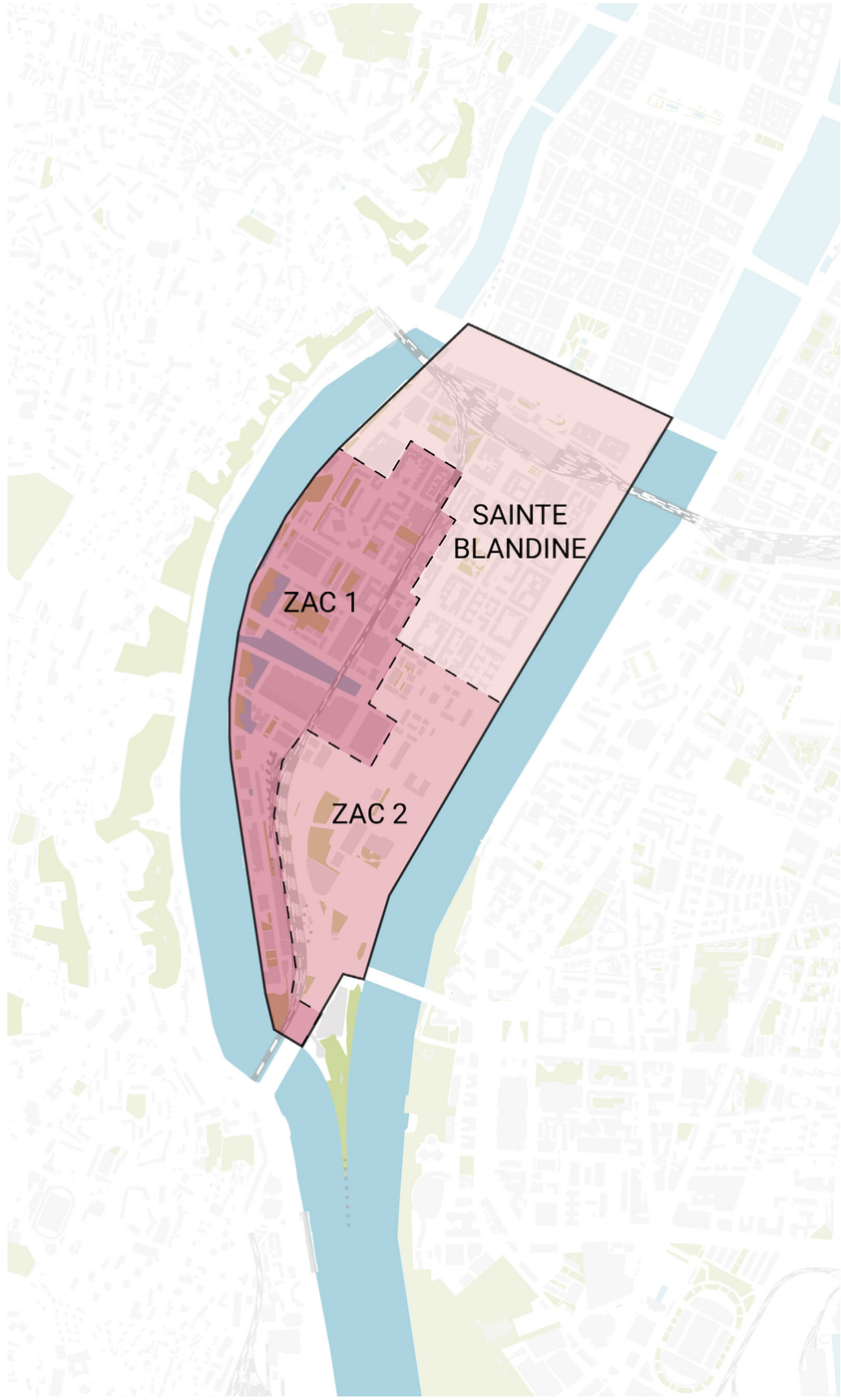
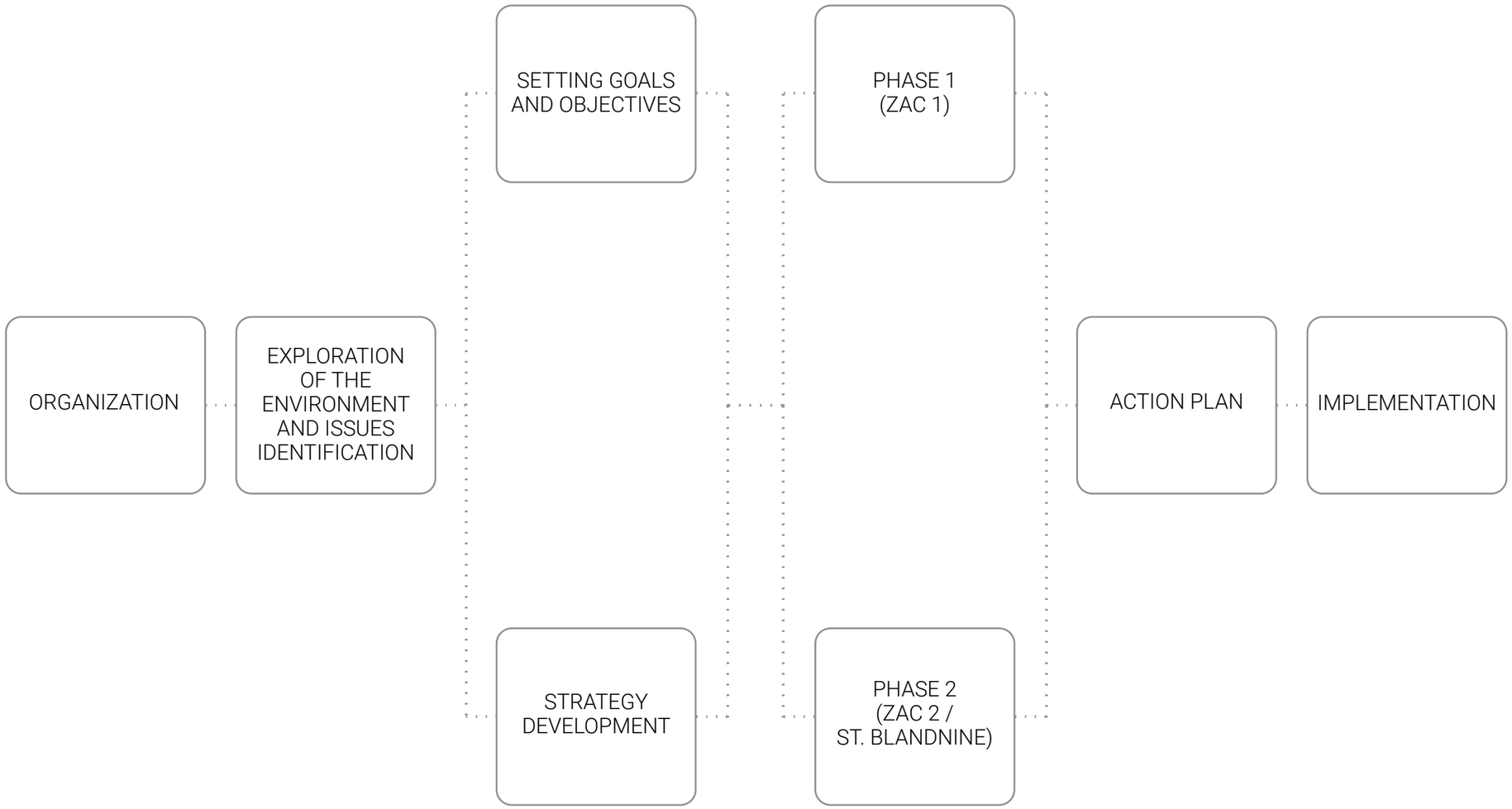



Fig. 35 Lyon interventions territorial divisions

## PHASES OF THE REGENERATION PROCESSES






Chapter 2. Models of Successful Riverfronts

## LYON CONFLUENCE MUSEUM

One of the first taken decisions in 2000 was to launch a competition to build the Confluence Museum at the distinguished site of the intersection between the Saône and Rhône. The competition was won by Coop Himmelb(l) in 2001. The Confluence Museum of science and society stands tall on the tip of the peninsula and was inaugurated in 2014 although the first building permit was issued in 2003. The museum made headlines in Lyon, as its cost was multiplied by five (from 61 to 330 million euros) between its first costing in 2000) and its delivery in 2014, and because of the many technical problems that were faced, especially at the level of the foundations, located in an unstable alluvial zone. For the mentioned resons, the museum has long been considered a burden by the SPLA and Grand Lyon who had to deal with a negative image of the museum associated with the name Confluence. Nevertheless, according to its 2019 activity report, the museum received 3.7 million visitors during its first five years of existence.

With its deconstructivist design by Coop Himmelb(l)au symbolizing a whale emerging from the ocean made of glass and steel structures, it is the emblematic building of the urban project's aspirations, despite the fact that it arose independently of the residential, tertiary, and commercial districts. The Design proposed was far more than an architectural intervention: The architect Coop Himmelb(l) also planned to intervene on the urban scale surrounding the site. One of the main concerns was the accessibility to the site and connectivity to the continuous promenade on the riverfronts. Therefore, an attention was given to the pedestrian and cycling trails connecting to the main linear peninsulas, through and under the project, and leading to a Park. The pedestrian paths do not stop on the edges of the project, but go through the exhibition areas on the two floors of the project and redirect the users to the outdoor extension. The architect was inspired from the saying “walking opens the mind”.[63] Both the project and its green extension’s roles are to re-direct the users to the peninsula. The intent behind the park was to give an outdoor space where all sorts of activities and performances could take place. An informal green space that is available for re-interpretation by its users. It is interesting to note that the city complemented the pedestrian and cycle paths proposed by this project and extended them on the riverfront. A bridge was also added in order to enhance the connection of the Rhône peninsula to the project. The pathways generating from the Museum and longing the riverfront have generated a sense of urban unity in a part that was completely abandoned. The project is also disserved by a highway and the intention is to connect it to the emerging science district on the other side of the Rhône river.

[63] Giovannini, J. (2014, December 19). Confluence Museum Opens in Lyon, France. The New York Times. https://www.nytimes.com/2014/12/21/arts/design/confluence-museum-opens-in-lyon-france.html



Chapter 2. Models of Successful Riverfronts

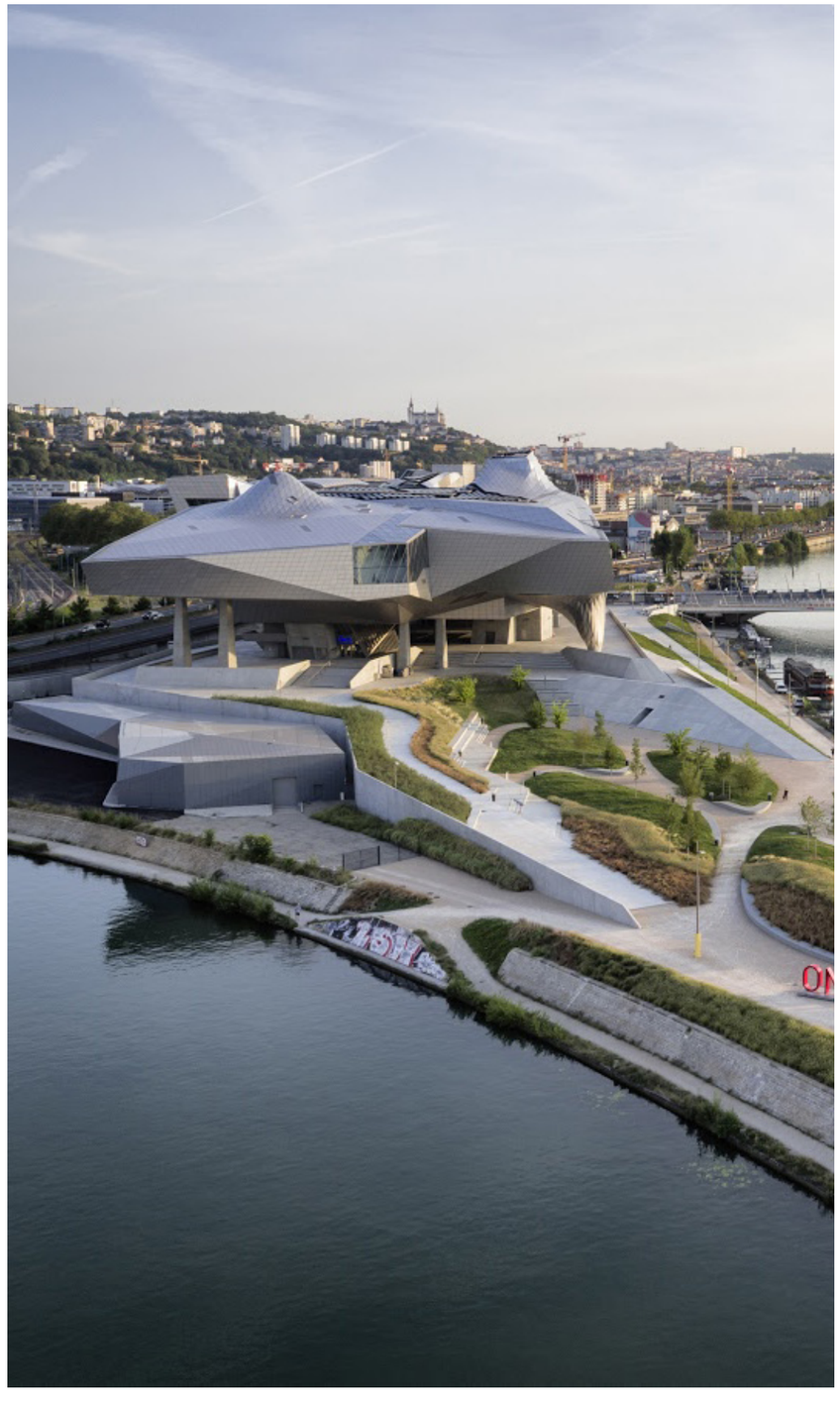


Fig. 36 Lyon Confluence museum
© Lyon Confluence

**LINEARITY PRINCIPLE**

Linearity in the case of Lyon Confluence was used as an axial system, parallel to the water, according to which the environmental and architectural interventions took place. Kevin Lynch defines linear elements as “edges”[64] This strategy could be seen as such, but it is characterized by its interconnection and immersion to the city. The successful strategies to morph the built environment as a post-industrial city followed the objectives of the first and second phase, while developpinng the built enviornment and the natural public spaces. In the following paragraph, the interventions will be analyzed according to their contribution in changing the urban identity of the Confluence, and consequently affecting the urban perception by the local and international community.

**DIVERSE AND INCLUSIVE CITY**
MORPHOLOGY OF THE BUILT ENVIRONMENT

**[FUNCTIONAL DIVERSITY]** The different buildings were developed with a widespread diverse set of functions and services: Housing (around 2,000 homes were provided) office, retail and tertiary were the primary functions. The ground floor of buildings is dedicated for public services such as commerce and hotels with the intentions of having an active base linking the totality of the built environment. In fact, in order to achieve the mix of functions in each plot, no specific zoning was made. The district's urban identity is therefore conceived as a multi-purpose meeting place and activity location. Each plot has created a place within itself to live, work, meet, shop, walk and cycle.

**[SOCIAL INCLUSIVITY]** The housing projects were one of the main project's objectives and therefore take up the most floor area in consideration to the other programs. Following the Greater Lyon policy, social housing should amount to 23% in the first phase. Therefore, the developpers followed the porportions requested by the public sector, and on each plot developed numerous and diverse housing units for any inhabitant to be able to find a suitable place to live according to their status, including student accommodation, social housing, social home ownership, housing for elderly and high end homes.[65]

**[HIGH ENVIRONMENTAL QUALITY]** As it was previously mentioned, one million square meters out of the total area of the territory consists of new buildings. The additional one million square meters was developed without increasing greenhouse gas emissions due to the increased local renewable energy production, to the use of photovoltaics and the use of natural or recycled materials with high performance and positive energy settlements. All the constructions followed tight requirements for great environmental

[64] Lynch, K. (1960). The Image of the City. The M.I.T Press.

[65] Lyon Confluence & Grand Lyon. (2012). La Confluence Lyon.





quality. 80% of the consumption of buildings is renewable energy. The promotion of such initiatives has a big positive impact on the attitude of the neighborhood’s residents. It rises awarness and educates them for the behavioral adjustments they will need to make in order to better manage their energy consumption.

**[ARCHITECTURAL IDENTITY]** The wide variety of emblematic architectural interventions of cultural, commercial, residential and bureaucratic nature, by world renowned architects, were the key factors to redefine the image of Lyon Confluence and transform it into a “Cosmopolitan city” on national and international levels. An example could be the school of animation and design ESMA located on the Saône riverfront added to the diversity of public establishments and enhanced the value neighborhood by offering educational opportunities through workshops, university events, conferences. One could only mention the orange cube, one of the most remarkable and striking buildings on the riverfront. Designed by Jacob + MacFarlane, it hosts the headquarters of the cardinal party developer. It’s been known for its revolutionary approach of experimenting with the envelope.[66]

**[HISTORICAL HERITAGE]** A significant amount of effort has gone into preserving the legacy of the existing neighborhood. La Sucrière, an old sugar warehouse of 10,000 m2 was renovated into an exhibition and leisure center and hosted the Contemporary Art Biennale for the first time. This event was a milestone at the time because the design strategies implemented to renovate the structure not only morphed the built environment, but also the way the local and international community perceived these places: the new hubs for cultural activities. 40% of the former industrial structures were renovated and are now public facilities that contribute to the diversity of the neighborhood: Startups, Sports establishments, Showrooms, Social Housing.

**[INNOVATIVE DEMONSTRATON PROJECTS]** The Japanese New Energy and Industrial Technology Development Organization (NEDO) and the Greater Lyon authority formed a collaboration in December 2011 which lasted until 2017. The agreement was focused on the Confluence region, where they created solutions to meet energy goals. Lyon Confluence was chosen as a demonstration ground for Japanese technology, because of its size, and its reputation as an eco-district. Four goals were aimed at: First, the development of one of the first positive energy building: A residential building that is not only efficient in means of saving energy but also produces it. Second, the creation of an electric car sharing system, made available all over the districts and powerd by solar energy. Third, The establishment of an energy management system for each eco-renovated household in order to regulate energy consumptions of gaz, electricity and water, mainly concentrated in Sainte-Blandine.[67]

[66] Chronology of the urban project. (n.d.). Lyon Confluence. https://www.lyon-confluence.fr/en/chronology-urban-project

[67] Marshall, T. (2012). Lyon Confluence: from smart grid to smart community?


Fig. 37 Urban landscape
© Matthieu Adam

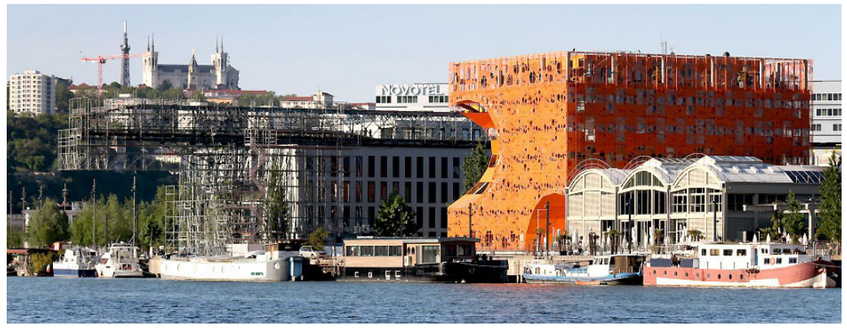



Fig. 38 Orange cube and its surroundings
© CreditPhoto

Fig. 39 La Sucrière refurbishment into retail spaces
© Laurence Danière

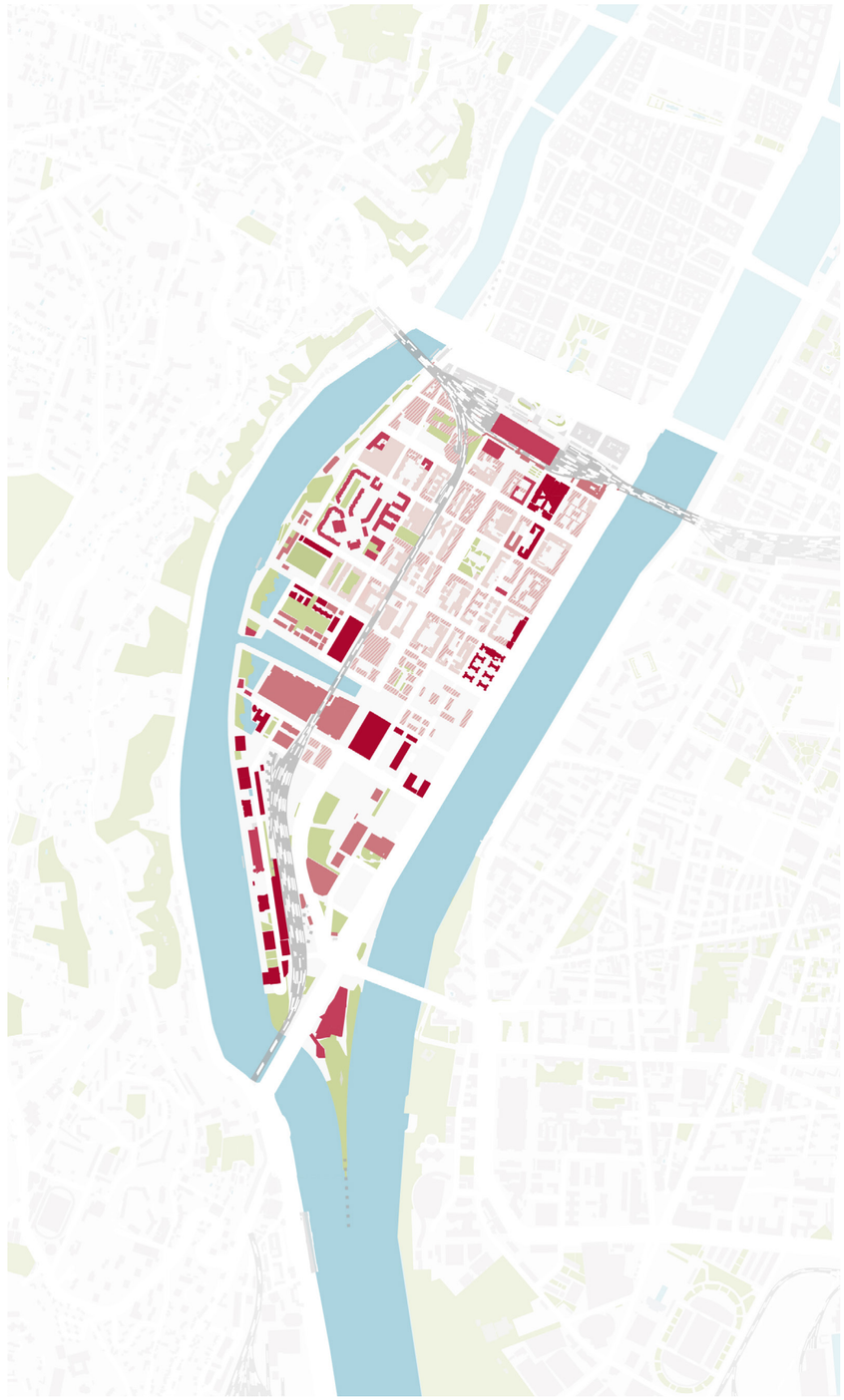
Fig. 40 Residential district
© Laurence Danière





**LAND USE**

Location and repartition of the different programs on the territory



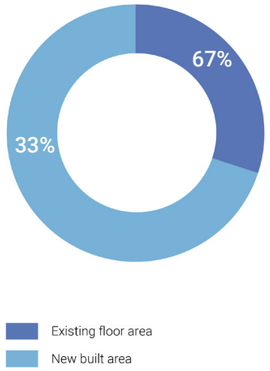



Fig. 41 Repartition of preserved and new areas

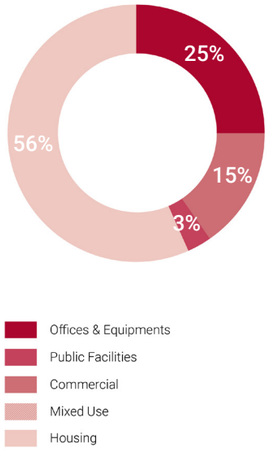



Fig. 42 Functions diversity

Fig. 43 Land use

**FERTILE AND BREATHABLE CITY**
DEFINING THE URBAN FORMS OF THE CITY

The revitalization of Public Spaces was crucial in the redefinition of the district's activities. Confluence's public spaces are known for their spatial qualities, intimately linking the river and buildings.The public areas that counterbalance the heavily developed built environment are extremely vast. They amount to 35 ha in total, offering a generous ratio of 20.59 m²/ inhabitant. They allow the city to breathe and make walking easier which morphed their perception of the banks. Many organized events and festivals were also held in the newly designed public places, such as “La Confluence, let’s dance”, “Le temps de cerises" and "Kiosk Festival".[67]

**[ENHANCEMENT OF THE SAONE EMBARKMENTS]** The Quai Rambaud five kilometers continuous promenade starts from the Confluence museum and leads to the Perrache Station. It was a key component in the suggestion of a new urban identity to the region, by highlighting the historic heritage, architectural diversity, landscape qualities and environmental potential of the region. The coastline was successfully re-connected to the city through trails, bridges and crossing, which connect to the pedestrian, cycle paths, tramway lines aligning with the river. Continuity of the adapted and revitalized places on the riverfront is essential when applying a linear strategy, therefore the Saone embarkments connect, to the river, the different buildings and squares developed inside the urban fabric.[68]

**[THE SAONE PARK: GREEN SPINE]** is the project's backbone. It is a green spine that runs the length of the river, spanning the whole town of La Confluence: Starting from the museum and extending till the train station. Walkers and bikers can use this major corridor to navigate through the water gardens. The park extends southward with the riverbank's public areas, which integrates green and hydrolic pockets[69] inside the urban fabric, while also repurposing 3.8 hectares of the port's heritage fabric into an enormous common open space.

**[PLACE NAUTIQUE: LIVING WITH THE WATER]** is a 340 meters long waterway that channels the river into the urban fabric, making the central place in the city a public peninsula. The peninsula accomodates leisure boats, but its majority is dedicated for watersports classes and water activties. The place nautique is a perfect example of how the Confluence reclaimed its rivers and how its inhabitants have created a new habit and culture of living with the water, which reflects the socio-cultural objectives that the designers initially targeted.

**LE CHAMPS: FERTILE SETTINGS]** Water gardens were designed to improve the experience of the users and enhance the environmental

[67] Chronology of the urban project. (n.d.). Lyon Confluence. https://www.lyon-confluence.fr/en/chronology-urban-project

[68] Zieliński, R. (2018, January). The issue of the linearity of the waterfront based on the redevelopment of Lyon’s river banks. https://doi.org/10.4467/2353737XCT.18.022.7995

[69] Pattacini, L. (2021). Urban Design and Rivers: A Critical Review of Theories Devising Planning and Design Concepts to Define Riverside Urbanity. Sustainability. https://doi.org/10.3390/su13137039





conditions and the quality of their everyday life. These kinds of initiatives promote awareness about biodiversity and the importance of water reuse and management. According to a 2015 survey, the quantity of flora and fauna in the area has expanded dramatically. The project's second phase committed even more land to biodiversity development, thanks to the creation of a wooded park called "Le Champ."[70]

**[PLACE DES ARCHIVES: NEIGHBOURHOOD SQUARE]** is an example of a neighbourhood square, in-between the designed plots of buildings, that improves the conditions of the residential disitricts by offering local communal shared places. It was also designed facing the entrance of the Perrache railway station, and the Municipal Archives piazza to articulate intermediate links between major public functions.

**ACCESSIBLE CITY**
MOBILITY IN LYON CONFLUENCE

**[DEVELOPMENT LAYOUT: BRIDGE-CITY]** The tramway line connecting the Lyon Confluence "island" to the Greater Lyon neighboring areas to the Perrache Station, served as an anchor that secured the connection and development of the new district to the existing ones. Moblity and accessibility along the Lyon Confluence would not have been possible without the development of the tramway infrastructure and the establishment of regular stops along the lines.

**[STREETS EXTENSIONS: TRANSVERSAL CONFIGURATION]** It is crucial to mention that from the tramway line, the axis parallel to the river, were extended the existing streets in transversal axes that connected the different plots to the Saone park, the green spine of Lyon Confluence, and to the several pocket parks along the river. The interconnection between the districts, the riverfront and the series of public spaces would not have been possible without this. The connection is not only physical, but also visual. The coherent system of vehicular, pedestrian, and cycle circulation resulted in civic engagement and the active use of the created open spaces.

**[SOFT MOBILITY]** Lyon is a driving force behind significant improvements in regional mobility, known for its long history of converting roads into streets. The plan encouraged soft mobility by reducing the number of cars, transforming streets into pedestrian and bicycle pathways, making electric cars accessible by developing an infrastructure for electric transportation and creating a bike sharing system including 9 stations for availability. The existing district's energy renovation adds up to 70,000 squares meter sustainable transportation. An advantage was that the scale of the city is at the scale of the pedestrian and the different establishments and functions are all at close proximity.[71]

[70] Vignali, E. (2020, May 7). Lyon-Confluence. Construction21.Org. https://www.construction21.org/city/fr/lyon-confluence.html

[71] Chronology of the urban project. (n.d.). Lyon Confluence. https://www.lyon-confluence.fr/en/chronology-urban-project

Fig. 44 (left) Pedestrian and cycle pathways on the Saone Bank
© Laurence Danière

Fig.45 (right) Festival at la sucrière
© Michel Denancé

Fig. 46 (left) Saone playgronds
© Thierry Fournier

Fig. 47 (right) Place nautique
© Laurence Danière

Fig. 48 Soft edges on the Saoneembarkments
© Laurence Danière

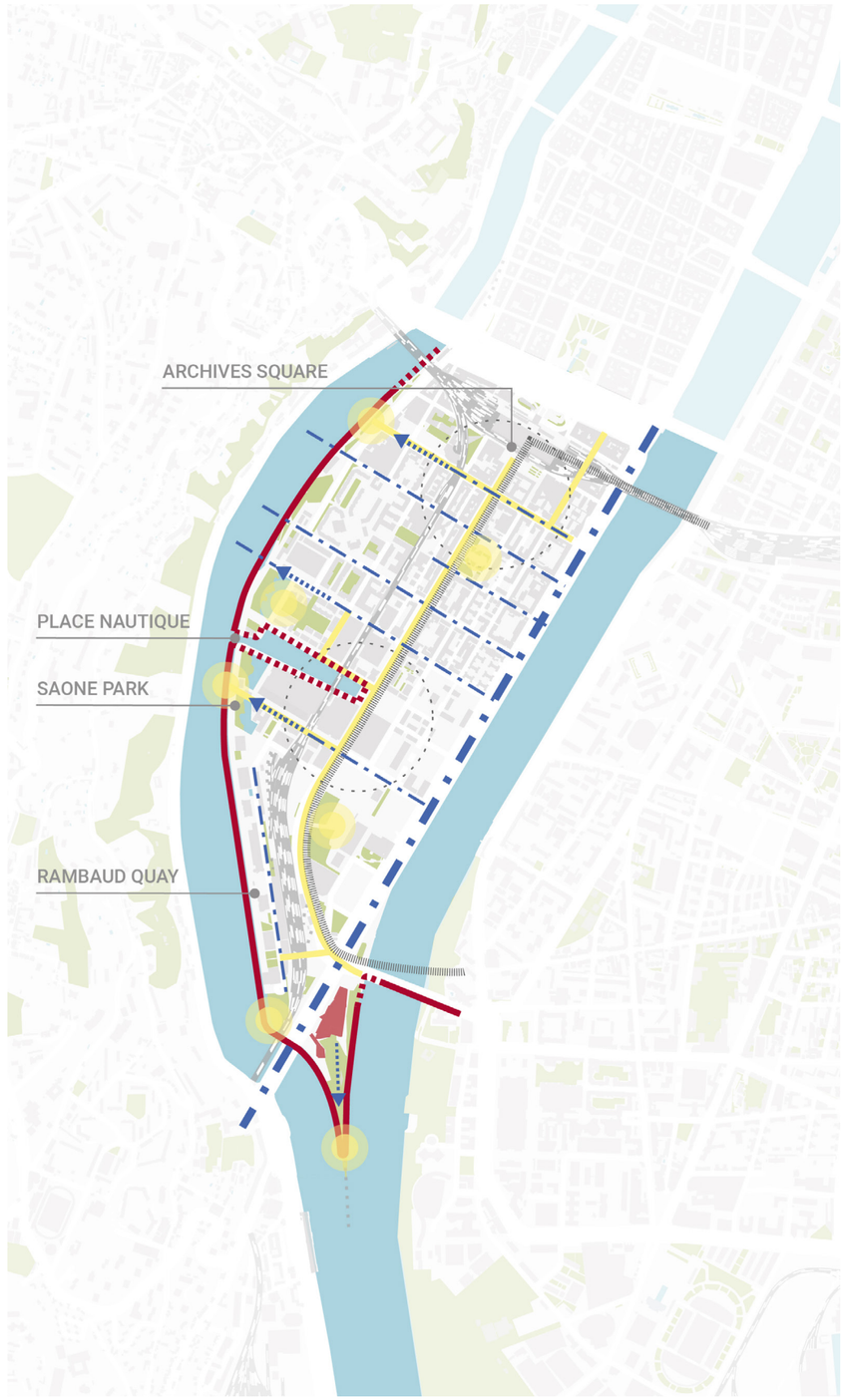
Fig. 49 Floating park on Saone waterfront facing the residences
© Thierry Fournier





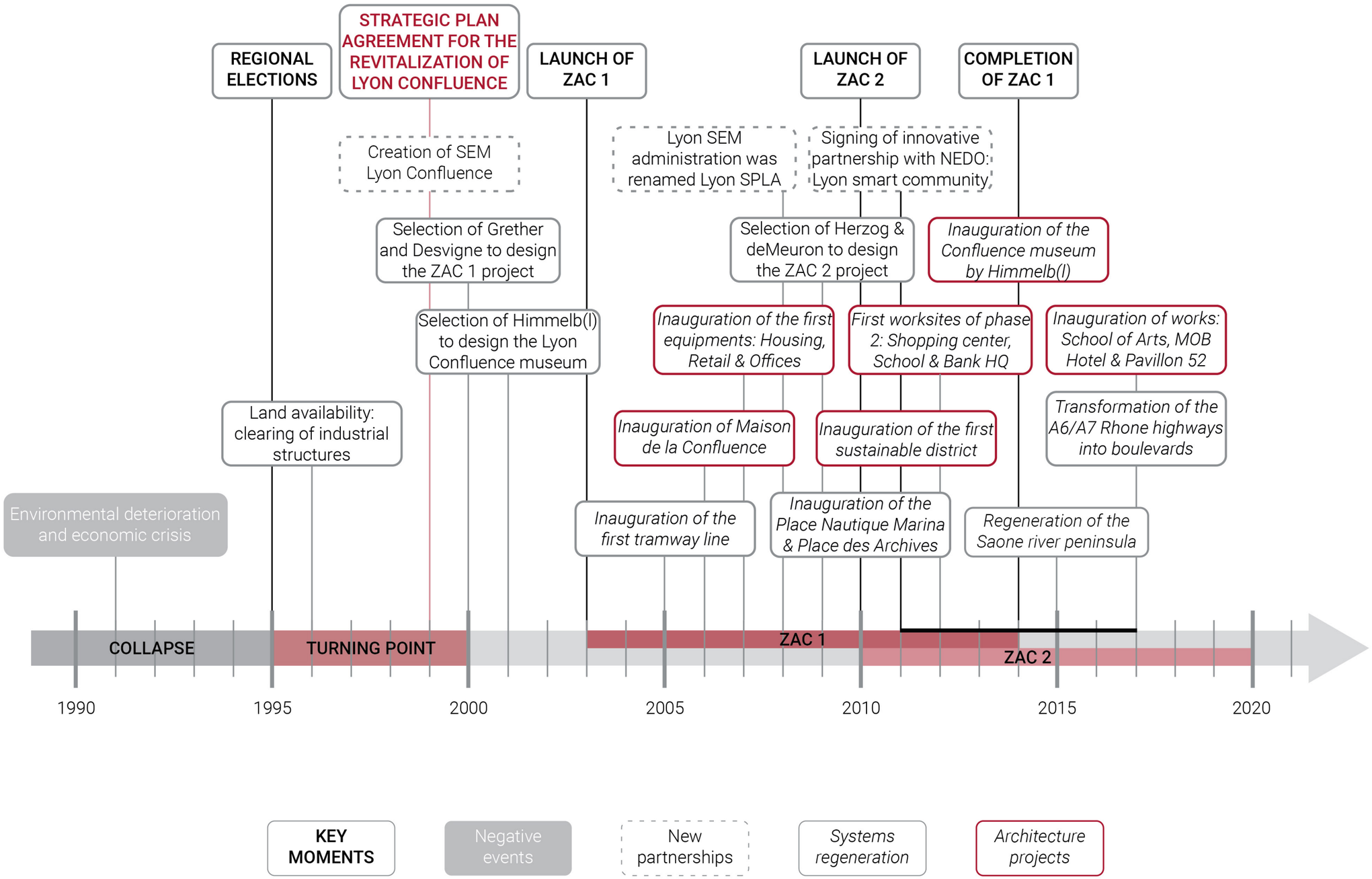
**STRATEGIC PLANNING**

Lyon confluence district's development



Chapter 2. Models of Successful Riverfronts

## TIMELINE OF THE REGENERATION PROCESSES



**CONCLUSION: LYON'S NEW URBAN IDENTITY**

**[ACHIEVED OBJECTIVES THROUGH URBAN MORPHOLOGY]** The design strategies listed above were the responses to the earlier defined goals of the short-term land planning by the Greater Lyon authorities. By applying the linearity strategy over the two defined phases (ZAC 1 and ZAC 2), the morphology of the built environment, the infrastructure and the natural environment was successful. Due to the successful transformation of the spatial parameters of the territory that is still on-going and its current status as a innovative hub in formation, Lyon Confluence stands out as an innovative, modern, sustainable and dynamic district.

**[SOCIO-ECONOMIC OUTCOMES]** Due to its well connected and strong transportation system, the district acquired several assets for becoming a center for business and commerce. The media exposure and size of the available space lead to large companies, in particular the headquarters of public institutions, to set up their regional or national headquarters there. Before, only 6 000 people worked in the area. The current urban transformations were catalyzers for the creation of 25 000 new jobs that either relocated to Lyon Confluence or newly oppened there. There were also noticeable real estate opportunities due to the wide variety of programs (such as offices, cultural spaces, educational establishments) that the mixed use districts offer**:** The residential district was Lyon's most expensive asset in the year 2006.[72]

**[SOCIO-CULTURAL OUTCOMES]** The interventions involving the built environment and the public spaces encouraged the engagement of the community. It is mainly due to the fact that the designers created "Places". The extension of the existing streets and the establishment of a connected network system facilitated the accessibility to public spaces and river banks, both visual and physical. The public spaces were designed with an assigned use, which gave purpose and meaning to the geometric parameters of each public space. The communal places immersed in the urban fabric created perfect settings for sociability and for communities to grow. As the image of Lyon is changing, its inhabitants are changing and growing significantly. Due to the initiatives of creating cultural, educational and recreational equipments, the current population of the city is young and highly educated, welcoming new students and young professionals to its scene.

**[ENVIRONMENTAL OUTCOMES]** Lyon has made sustainable development an asset in its strategy. At the forefront of green or "respectful" technologies, the project has notably benefited from European Concerto funding The Confluence was designed as an eco-district: The neighborhoods were developed with tight environmental requirements: Quality buildings,

[72] Chronology of the urban project. (n.d.). Lyon Confluence. https://www.lyon-confluence.fr/en/chronology-urban-project





district heating network, use of recycled materials, rainwater collection on water gardens and the renewable energy production. Such initiatives had a positive impact on the attitude and well being of the inhabitants. The urban interventions aimed as well for the betterment of the environment: The equivalent of 50,000 vehicles were withdrawn from the circulation in the Lyon metropolitan area which reduced CO2 emissions by 126,000 tons per year. This was one of the main goals of the Metropolitan Climate and Energy Plan. In accordance with the previously mentioned plan, the Greater Lyon has been working on a transformation project of the motorhighway one the Rhône since 2020, to turn it into a 16-kilometer multimodal, bikeable and walkable urban boulevard, with the possibility of recovering the 11-kilometer Rhône frond.

**[URBAN PERCEPTION]** By understanding the critical points of the abandoned sites on the riverfront in Lyon and evaluating the suitable interventions to address them, the old industrial sites were given a new personality by re-defining their spatial properties. The riverfront city, that was once industrial, was able to acquire a new urban identity deriving from the changes of the socio-economic, socio-cultural and environmental conditions. The perception of the Lyon Confluence is nothing but a relfection of these factors. By allowing the urban change, the Lyon Confluence area is now used to its full potential by the inhabitants and tourists. Therefore, when we speak of architectural interventions and urban morphology it does not only affect the physical environment and the factors that derive from it, but the perception of the riverfront, as well as the user's urban practices. Behaviors that are related to the way they use the places that are made available to them, and how to sustain them and assure their growth.

## 2.4 DEDUCED OBSERVATION

Interesting insights can be gained from Bilbao's strategic growth that lead to its overall urban alterations and Lyon's approach to the linearity development and a critical distinction is articulated through a selective approach of relevant elements. Nevertheless, some principles were common to both case studies and lead to their success, which could be incorporated into the urban planning cultures of Beirut. The goal is to eventually create a planning style inspired from the case studies, that takes into account Beirut's unique history and contextual characteristics.

**POST INDUSTRIAL REDEVELOPMENT: RELEVANT VARYING OUTCOMES**

| | BILBAO | LYON |
|---|---|---|
| CITY TYPOLOGY | LINEAR RIVER CITY | BRIDGE CITY |
| URBAN PATTERNS | CONCENTRIC CONFIGURATION | TRANSVERSAL CONFIGURATION |
| CIRCULATION PATTERNS | DOUBLE LINEAR INFRASTRUCTURE ALONG THE RIVER | BRIDGE INFRASTRUCTURE |
| URBAN VISION | CULTURAL CENTRALITY | SUSTAINABILITY AND INNOVATION |
| SOCIO-ECONOMIC MODEL | INNOVATIVE INDUSTRIAL NATIONAL MODEL | CENTER FOR BUSINESS AND COMMERCE |
| SOCIO-CULTURAL MODEL | EMBLEMATIC GROWTH BY ESTABLISHING CULTURAL FACILITIES | PUBLIC LEISURE FACILITIES AT THE SCALE OF THE NEIGHBORHOOD |
| ENVIRONMENTAL ASPECT | GROWTH OF NEW GREEN TECHNOLOGIES | INNOVATIVE ENERGY-EFFICIENT DISTRICTS |





**POST INDUSTRIAL REDEVELOPMENT: COMMON PRINCIPLES**

**[ADMINISTRATIVE ENTITIES]** In order to successfully achieve the interdependency of interventions between the different districts that constitute the region to be developed as a whole and the riverfront, an administrative entity should be defined. In the case of Lyon and Bilbao, the administrations that were created (SPLA Lyon and Ria 2000) were key factors to strategically coordinate the different actors: The public stakeholders, the third sector, the community and the designers (Architects, urbanists and landscape designers). Since the administrations responsible of the development of the project work closely with public entities, the income generated was used for the general public good.

**[URBAN LAYOUT AND ACCESSIBLITY PATTERNS]** Bilbao and Lyon are a testimony of how river streams cannot be studied in isolation. In both cities, the rivers were associated with the development of infrastructure axes, the main axes of plots development and the axes of public spaces. Each city type developed its own typology. In Bilbao, the main development circulation layout follows the river's course, which is linked to the linear city growth type. A radiating layout converges at the center of Abandoibarra to connect the new districts to the old city center.In Lyon's case, the main development axis is the tramway infrastructure connecting the territory to the neighboring lands. It adopts an additional linear growth strategy on the riverfront. The two axes are connected by a grid layout: Transversal axes.

**[INTERDEPENDENT MIXED DISTRICTS]** The importance of interdependency between mixed-use districts and the riverfront should be pre-conceived by phases, which consequently leads to the development of the project as a whole: economic, strategic (mobility) and social cohesion. Factors that ensure the interdependency and growth of districts are the two concepts of multi-functional plots and proximity/accessibility. They are related to and vary according to the scale of the study area and to the different amenities and services that need to be established and connected. In Lyon, the divisions were made according to three phases: ZAC 1, ZAC 2 and Sainte Blandine. In Bilbao, the development of the mobility and the economic responses and the 4 districts were triggered by Abandobirra.

**[ECONOMIC PROSPERITY THROUGH PRODUCTIVE MODELS]** One of the goals behind the architectural interventions on the built environment and the urban morphology is the economic restructuration of the city. Bilbao and Lyon both adapted an economic strategy for the rejuvenation of the city that at first gravitates towards the implementation of a new cultural public landmark, generating an important income and making for the previous losses. On the long term, the project was a tool to develop the city as an innovative industrial city on the national scale in the case of Bilbao, and as a center of Business and Commerce in the case of Lyon

# 03 PRESENTATION OF THE STUDY AREA: BEIRUT RIVER, LEBANON

# 03 PRESETANTION OF THE STUDY AREA: BEIRUT RIVER, LEBANON

## 3.1 CONTEXT

### INTRODUCTION: CIRCUMSTANTIAL URBAN DEVELOPMENT

Beirut river, known as Nahr Beirut, is located in Lebanon and flows from the valleys of Mount Lebanon to reach the Beirut Peninsula's coastal plain before joining the Mediterranean Sea. After decades of the river being on the outskirts of Beirut, its importance peaked once the Naquoura-Tripoli-Beirut train station was inaugurated in the 1940's on its riverfront. Beirut river then became the core spine of Beirut, connecting the coast and the urban area. The river witnessed the succession and co-presence of many occupations: agricultural, recreational, industrial and residential areas. In the 1970's, with the hopes of modernizing and de-industrializing the riverfront, the river's conditions worsened. When planning Beirut's urban growth, strategic orientations toward cohesion, optimization of resource management, and directives for a coherent urban development were all missing concepts. As a result, our resources have been exhausted, our landscapes have been defaced, and our city has continued to grow in chaos. The riverfront became an infrastructure of transport and sewage: The urban fabric and road networks kept extending in its direction, eventually crossing and suffocating it, leading to the complete degradation of the riverfront and adjacent zones' conditions.

While developed countries succeed in integrating initiatives, aiming for long-term continuity and growth for their cities, Beirut continues to pursue a failed mode of evolution, designing strategic plans without considering the various layers of the territory. After having set the theoretical framework of the study and understanding how the urban morphology of post-industrial river cities can enhance and change the identity of the territory, we understand how essential it is to reawaken the potential of the river in the urban fabric and its relevant contribution as a public space capable of strengthening social and economic resilience.[73] The following chapter will serve as an introduction to understand the important stages of Beirut's evolution through a historic and urban analysis, and to understand the political aspirations and urban strategies over time that did not contribute to the completion of a bigger scheme, and therefore led to the degradation of the urban context and to the disruption of any rapport with the city.[74]

[73] Osorio, P., Neira, M., & Hermida, M. A. (2017). Historic relationship between urban dwellers and the Tomebamba River. International Journal of Sustainable Building Technology and Urban Development.

[74] Kiame, J., & Bou Aoun, C. (2011). Le fleuve de Beyrouth au cœur d'une stratégie métropolitaine durable. Académie libanaise des beaux-arts (ALBA), Université de Balamand, 40–54.

Chapter 3. Presentation of the Study Area

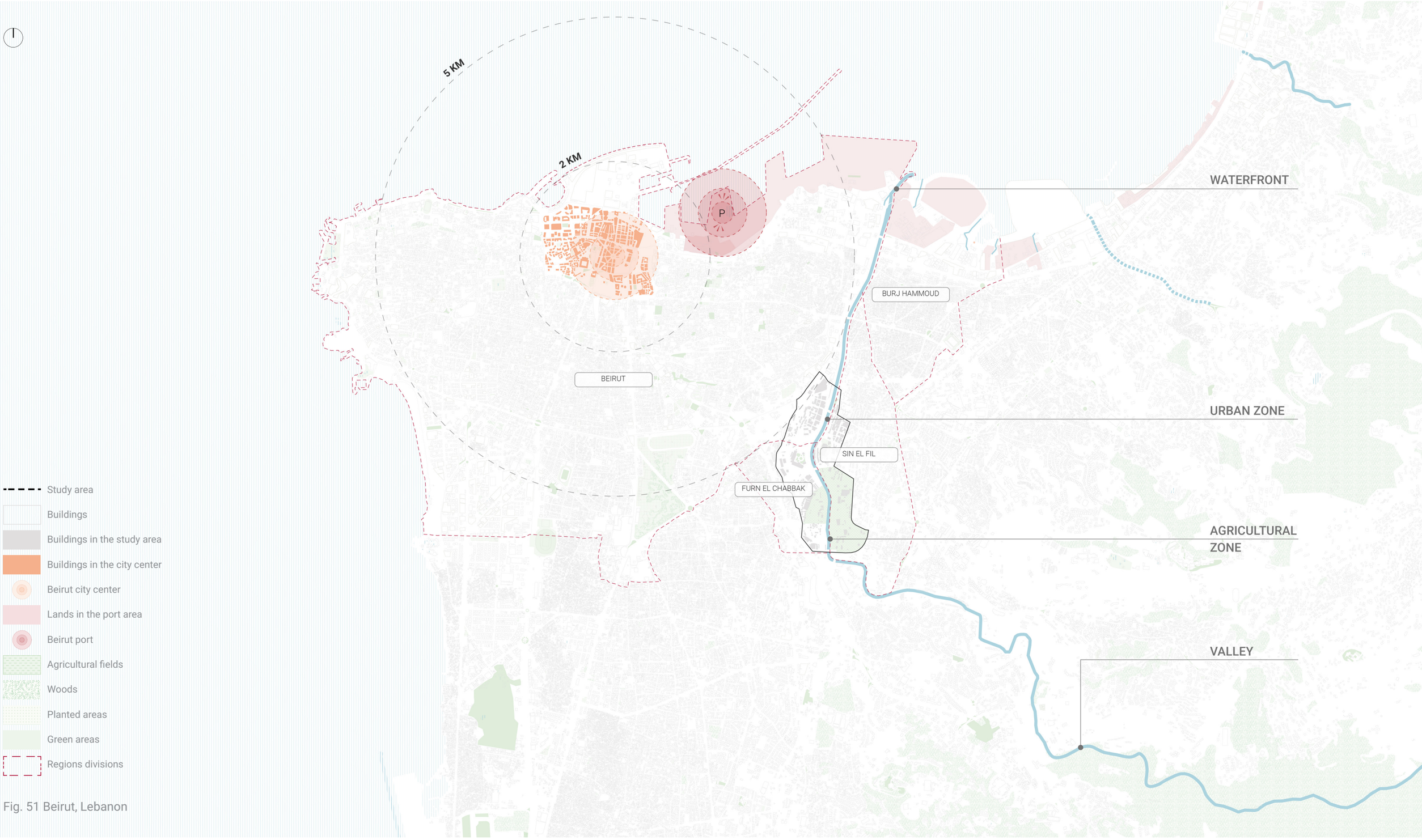



Fig. 51 Beirut, Lebanon

**100 MILLION M³**
TOTAL ANNUAL DISCHARGE

**100 000 M³**
ANNUAL ERODED MATERIALS [75]

**1751 M²/S**
FLOOD MAXIMUM FLOW RATE

**16 M²/S**
AVERAGEMAXIMUM FLOW RATE

**0.01 M²/S**
MINIMUM FLOW RATE

## NATURAL AND URBAN GEOGRAPHIES

The Beirut river is one of the main natural elements punctuating the Lebanese coast, reaching the Mediterranean sea. The river rises at an altitude of 1890 meters on the western slopes of Mount Lebanon and flows westward for approximately 25 kilometers from a mountainous natural upper basin. It turns north for the final 5 kilometers through the densely urbanized plain that is called the Beirut Peninsula, and finally reaches the Mediterranean Sea at Beirut. The basin, located in a humid Mediterranean environment, receives a significant amount of rainfall, which is the major element affecting its hydrology. The flow of the rivers varies with the seasons: The first season, which is very dry, from May to November; and the second, from December to April, with flow rates ranging from 0.01 to 16 $m^3$/sec.[76] The Beirut river is divided into four primary zones, as indicated on the previous map: The valley, the agricultural transition, the urban zone and the waterfront. The flow of the Beirut River in each zone is explained in the following analysis.

**[VALLEY]** The hills in the upper basin of the river have built deep valleys with tight gorges amongst which the river has formed deep valleys. Due to the traditional agriculture fields on the sides of the mountains, the valley absorbs the majority of rainfall and snowstorms. Therefore the area has never experienced any flooding.

**[AGRICULTURAL TRANSITION]** It is one of the last remaining vast open spaces in Beirut. It consists of agricultural fields extending from the valley on both sides of the river, and the railway station that is now abandonned. With a width of 23 meters, a height of 7 meters, and a slope of 6.5%, the concrete canal becomes tighter and the walls higher in this portion. [77] The vegetation acts as a buffer between the river and neighboring highways.

**[URBAN ZONE]** This section of the basin has had a long history of flooding prior to being canalized in the 1950's. The urban zone consists of dense residential districts on the Bourj Hammoud, Sin El Fil and Achrafiyeh sides. The river is wedged between a regional highway on the west and a local road on the east. This seciton just as the rest of Beirut severly lacks of public spaces and natural areas. The canal is 35 meters broad, 5 meters high with a 3.5% slope. [77]

**[WATERFRONT]** The waterfront zone is used for industrial purposes. Property fences delimite the public domain as the waterfront is not accessible to the public. On the waterfront are located a 30-year-old landfill, a historic fisherman port, a beach and a slaughterhouse. The lands are contaminated because of the industrial outfall canals, the waste treatment facility, and the port's market. This canal is 43 meters wide and gradually narrows as it approaches the edge, with an average height of 3 meters.[77]

[75] Fawaz, M., & Zein, P. (1965). L'amenagement du Nahr Beyrouth. Horizons Techniques Du Moyen Orient, 5, 24–36.

[76] Gerard, P. C. (2001). Les Transformations de l'Hydro-Systeme Fluvial dela Partie Aval du Nahr Beyrouth. (Vol. 21–22). Geospheres, Annales de Geographies.

[77] Frem, S. (2009). Nahr Beirut: Projections on an Infrastructure Landscape. Massachusetts Institute of Technology.





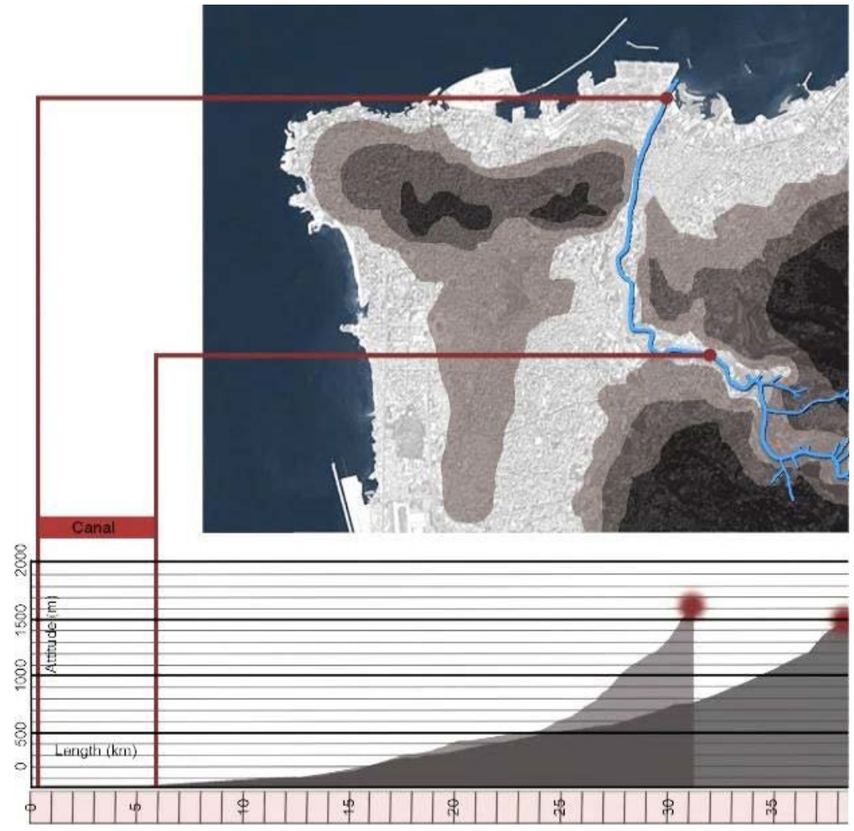



Fig. 52 Beirut River path in Beirut and section shows its vertical flow from the source to its estuary, 2015
© Lebanese Army geological data

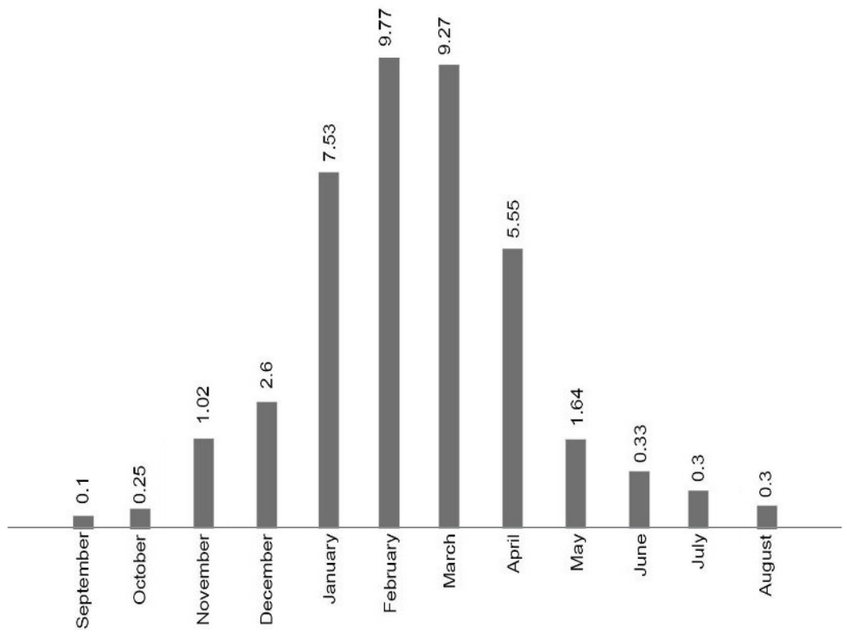



Fig. 53 Beirut River flow statistics, 2001
© Pierre Gerard

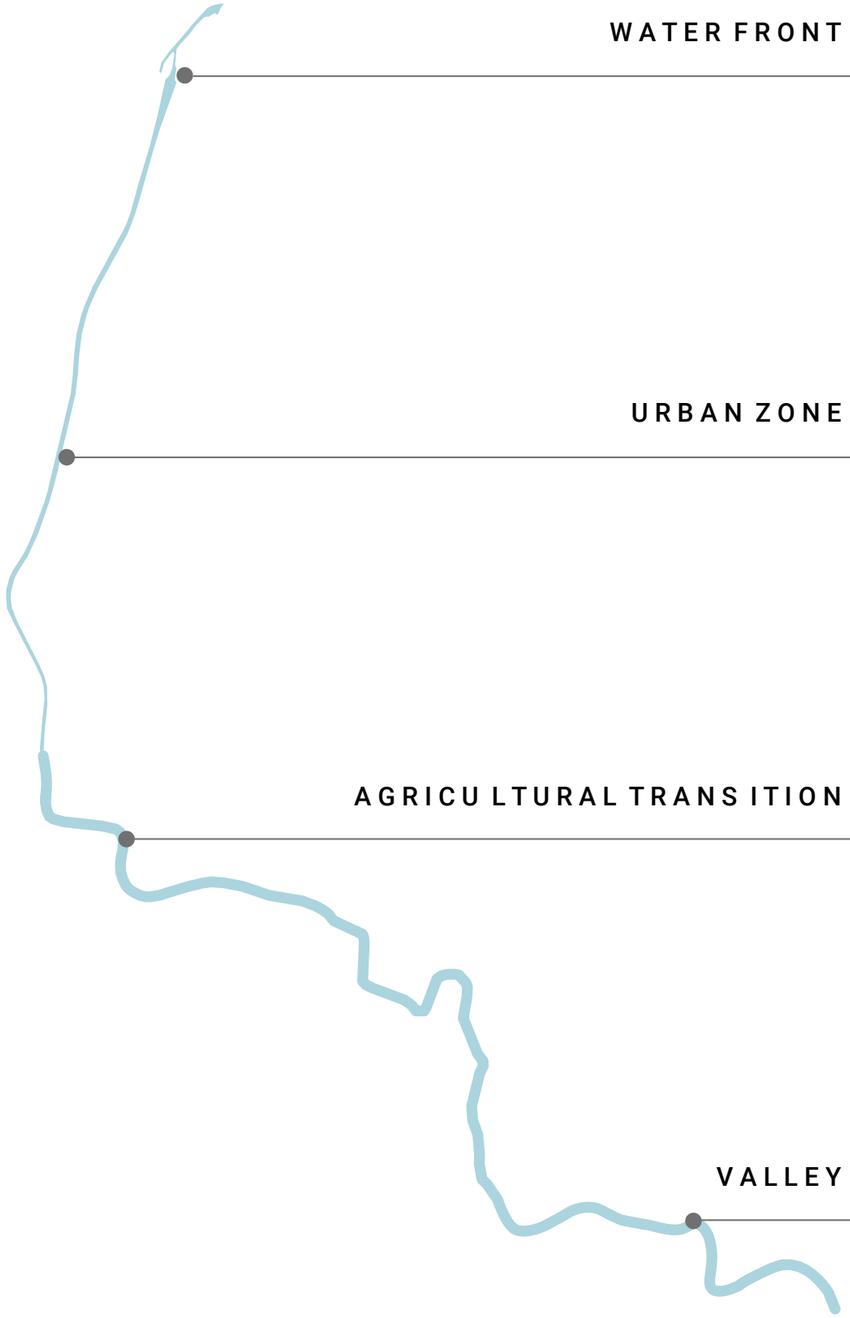







Fig. 54 Beirut portal area
© Joelle Chidiac

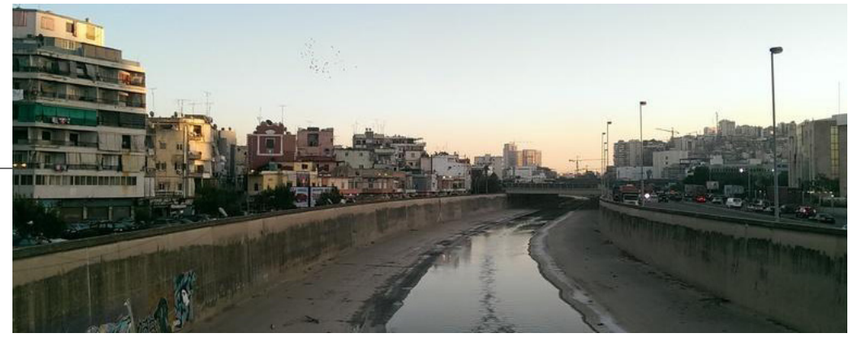


Fig. 55 Sin el Fil
© The Other Dada

Fig. 56 Agricultural area
© The Other Dada

Fig. 57 Falougha
© Joelle Chidiac

## 3.2 HISTORIC APPROACH AND TERRITORIAL EVOLUTION

### THE OTTOMAN CITY: TERRITORY PROGRESSIVISM A HYDROLOGICAL INFRASTRUCTURE

Seduced by the Western urban planning experience in the 18th century, the Ottomans who occupied Lebanon at the time triggered a series of reforms allowing the passage of Beirut from a traditional Arab-Ottoman urbanism to a progressive urbanism. Beirut, subject to the demands of international trade and increased travel needs, underwent a reorganization of its territory in several places: In the city center, the straight lines replaced the sinuous line and the orthogonal grid replaced the tangled medieval mesh. The partial destruction of the old souks in the city center of Beirut at the end of the Ottoman era in 1915, in addition to the expansion of the port, remain the two most emblematic operations of this transformation.[78] The objectives of the urban policies adopted for the regeneration of the urban fabric were first, to satisfy the demands and concerns of the inhabitants for a more hygienic and aesthetic structure of the city, and second, to build a new business center according to the new economic standards of a portal city of the Levant area, preserving the importance of its regional position. An alarming matter when restructuring the city center was the neglect of the area's historic heritage. But for the Ottomans the current growth of the city center was the equal of growing it to fulfill its full function as a portal city.

**[BEIRUT RIVERFRONT]** With the growing urbanization of Beirut during this period, the demand for flowing water surpassed the capabilities of existing wells and springs. Water was obtained from one of the springs along the Beirut River as a solution. The "Daychounieh" source, twenty kilometers southeast of Beirut, was the closest spring. The Roman architects constructed a water conduit to transmit this water across the Beirut River and into Beirut. [79] The river fulfilled its role as a hydrological infrastructure. The first urban settlements on the riverfront began to develop independently. As shown on this map, the river was a twisted stream with shallow banks, before it was canalized. Because of the rail yards and rail tracks that were nearby the regions of Sin El Fil and Furn El Chebbak, urbanization concentrated along the waterfronts of Bourj Hammoud and Achrafiyeh. The riverfront in its southern parts was a distant geographical trace in the landscape of Mount Lebanon, solely devoted for agricultural lands. The waterfront was sustained solely by the presence of both the Mediterranean sea ecosystem and the river's ecosystem. The meeting of the two made it a very rich environment in terms of ecological conditions and in its diversity of plans and animals. The Beirut riverfront was the main social place of encounter and leisure. Some of the most common activities were fishing and picnicking beneath the area's pine and pistachio trees. [80]

[78] Kiame, J., & Bou Aoun, C. (2011). Le fleuve de Beyrouth au cœur d'une stratégie métropolitaine durable. Académie libanaise des beaux-arts (ALBA), Université de Balamand, 40–54.

[79] Qanater Zbeydi – Roman Aqueduct, Mount Lebanon. (n.d.). Come To Lebanon. https://www.cometolebanon.com/mount-lebanon/qanaterzbeydi-roman-aqueduct

[80] Frem, S. (2009). Nahr Beirut: Projections on an Infrastructure Landscape. Massachusetts Institute of Technology.





**BEIRUT RIVERFRONT**
1936

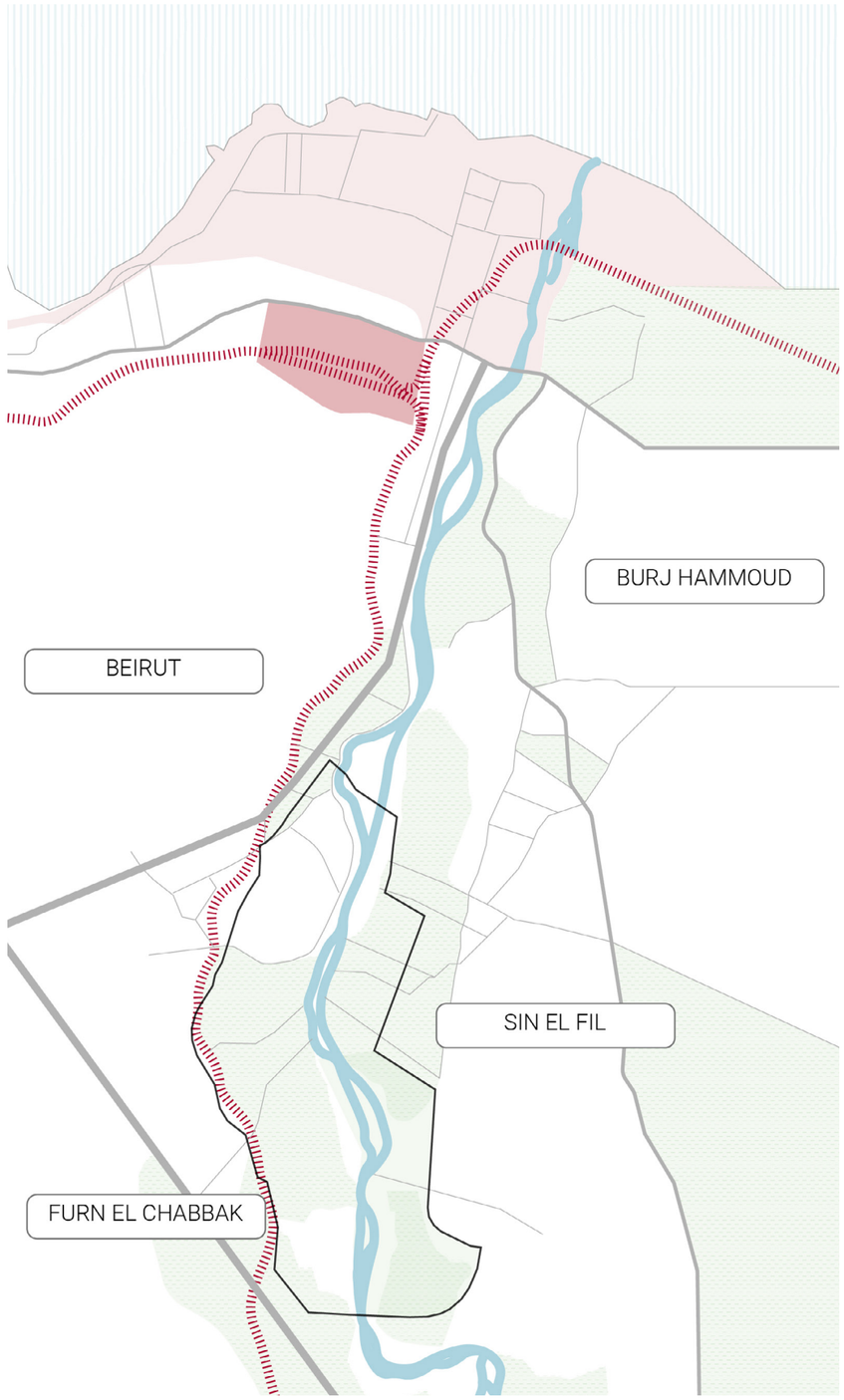



Fig. 57 Falougha
© Joelle Chidiac

Fig. 58 Beirut river, 1936

## ECOCHARD AND THE FRENCH MANDATE: BEIRUT MODERNIZATION A TRANSPORT INFRASTRUCTURE

Closing four centuries of Ottoman presence, The French Mandate named Beirut as the Capital of a newly constituted Nation, Greater Lebanon with a total surface of 10,452 km2, and began a process of reorganizing Lebanon's administration and urban landscape.[81] The ambition of the Ecochard plan, that was first designed in 1940, bears on an enlarged space of the city, developing the urban riverfront of Beirut, crossing the river towards the East and orienting a parallel growth towards the South. In his design proposal, the diagram of road lanes and train rails was the major structuring element. His plan was to criss-cross the city by a hierarchical network of roads allowing: the opening up of the center and the port and the easy accessibility of the city due to its strategic location from Saida, Tripoli and Damas.

**[BEIRUT RIVERFRONT]** In the proposed mesh, the Beirut River gains great functional importance; it becomes a distribution organ to different towns. Along the coast, a highway was constructed. Along this new axis of the river, the meeting point of the main lines corresponds to the intersection of the railways linking the four cardinal points of the country. The NBT station becomes the largest multimodal interchange station, confirming the double centrality of the Beirut river in the metropolitan area: geographical and functional. The planning was based on the establishment of a modern and efficient infrastructure, reconciling the aspirations of France and the wishes of the habitants of the region. The finalization of the road networks was followed by an economic boom of the portal waterfront, which resulted in the development of an adjacent industrial zone and the urbanization of the riverfront, directly connected to the port through the Nahr Boulevard that passes through the lower part of Beirut. Thus, the development of road networks in 1954 based on Ecochard's 1940 plan tranforms Beirut into a city without borders, connecting the entire Lebanese territory to the regional cities. By superimposing the urban and natural layer, the Ecochard plan succeeded to unify the site of Beirut River through its geographical centrality and its potential to become a capital interface. A second proposal by Eccochard for the 1963 Beirut featured a freeway connecting the coastal highway and Damascus, and the development of the riverfront as a residential and mixed zone. However, the canalization of the river in 1968 prevented the execution of his plans. The obstructions in the river's flood zone caused the basin to overflood frequently, specially on the bridge connecting Sin el Fil to Beirut, "Jisr el wati" (The Low Bridge). In 1958, an american engineering company conducted a study to determine the modifications on the river's canal to prevent water floods from exceeding their limitations. The first part of the plan was finalized in 1968.[82] We now understand that the decision to incase the river in concrete reduced the floodings, but led to decades of environmental and social degradation.[83]

[81] Verdeil, E. (2010a). Chapitre 1 - L'urbanisme du Mandat français : ruptures et continuités [E-book]. In Beyrouth et ses urbanistes: Une ville en plans (1946–1975) (pp. 31–49). Presses de l'Ifpo. https://doi.org/10.4000/books.ifpo.2167

[82] Maged, Y., & Bashir, A. A. (2016). Revival of forgotten rivers through recreating the cultural promenade: A case study of the revival of Beirut River, Lebanon.

[83] Mishlawi N. (Host), (2021, August 21). Voices of a Forgotten Network: The River (No. 1) [Audio podcast episode]. In Temporary Art Platform (TAP). https://open.spotify.com/episode/1iL2IWIlOtY5omoIwdsJVH





**BEIRUT RIVERFRONT**
1950

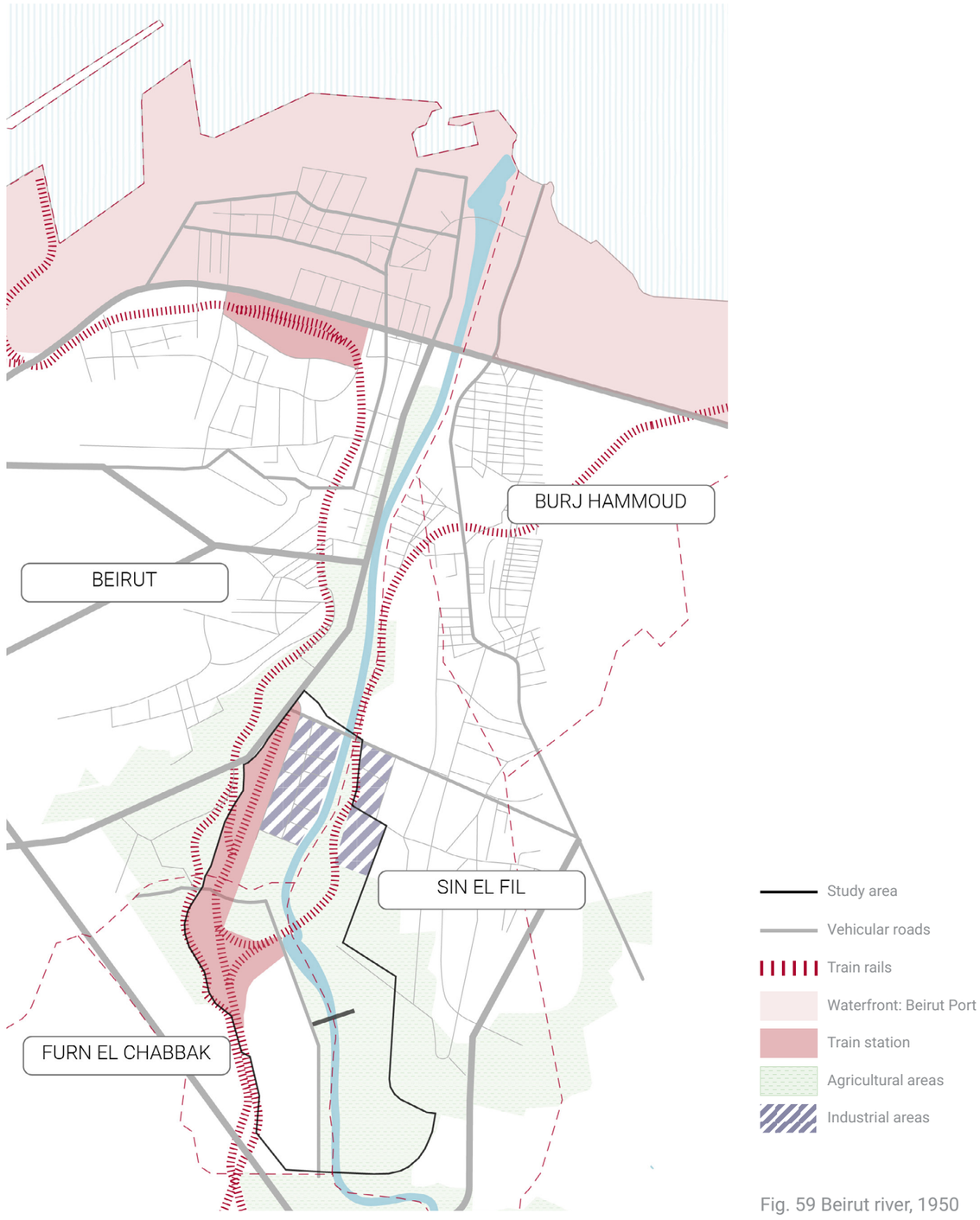



Fig. 59 Beirut river, 1950

ECOCHARD'S 1963 AMBITIOUS MASTERPLAN II

Fig. 60 Proposed main transportation networks of Beirut and its suburbs, 1963
© Ecochard Fun





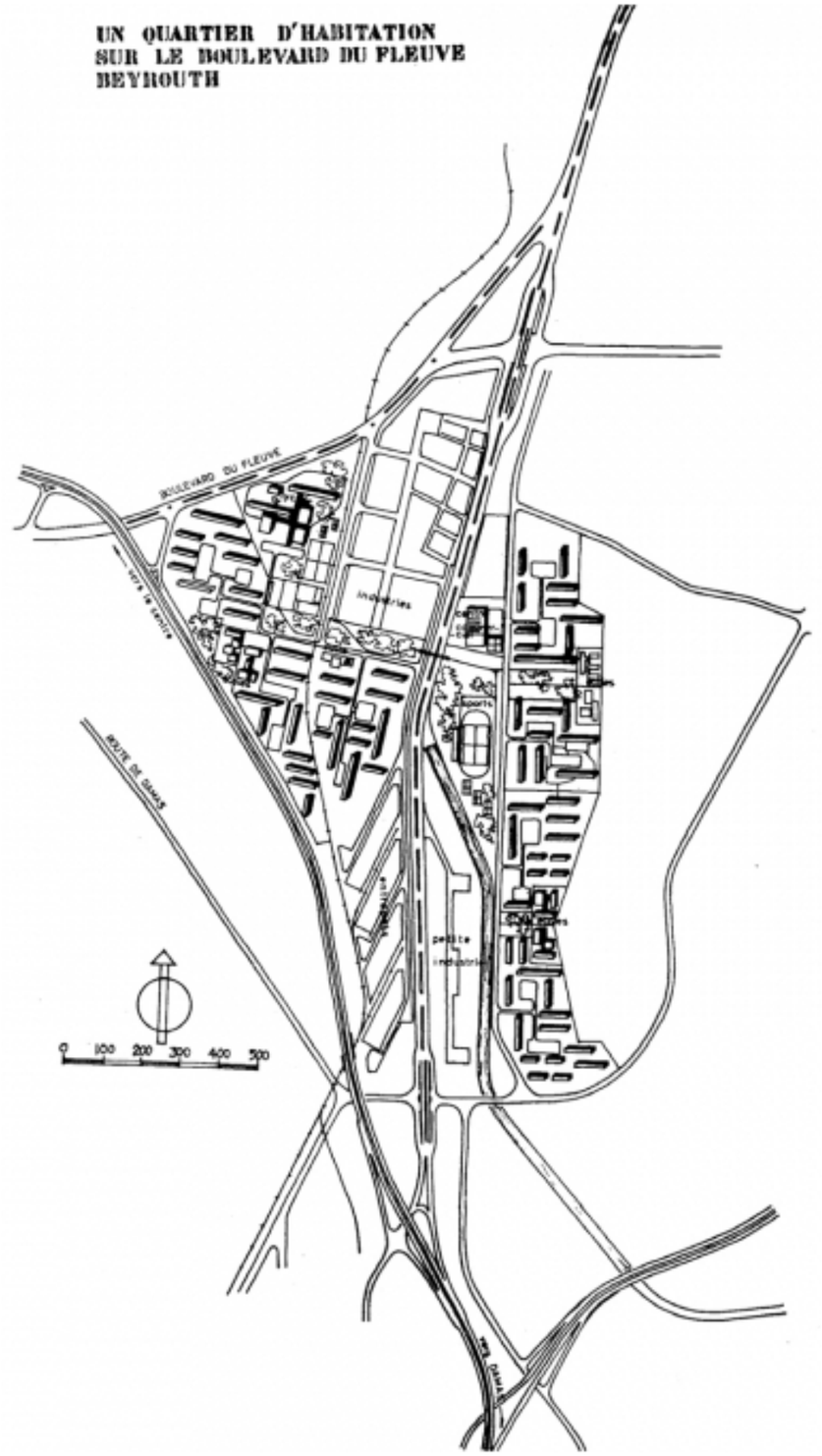



Fig. 61 Proposed master plan of Beirut riverfront, 1963
© Ecochard Fun

## INDEPENDANCE TO PRESENT DAY: RIVERFRONT DEGRADATION FROM RIVER TO HIGHWAY

The Ecochard masterplan II for a sustainable growth of the metropolitan area was doomed to failure, and the few existing railways on the riverfront were completely devastated, a decade later, by the civil war. The few agricultural zones that had survived the urbanization were erased in the late 1990's due to the war. The Greater Beirut Transport Plan was designed in 1995 on behalf of the Council for Development and Reconstruction as part of the country's infrastructure reconstruction over a span of twenty years. While the original vision for Eccochard's transport plan included a hierarchical road network: a heavy railway network including a service from Jounieh to Damour, 2 metro lines in high density areas, three dedicated bus lines, and a series of stations; the plan was never implemented.(84)

**[BEIRUT RIVERFRONT]** The riverfront that was supposed to be de-industrialized and restructured to gain its role back as the main node of connections was never achieved. Instead, traffic patterns were dealt with on a case-by-case basis, with no regard for a larger scheme. On both the edges of the river, a vehicular transportation system was developed, with an alarming deficit of proper road infrastructure, creating a suffocating disruption between the two banks. Due to the division of the riverfront upon three municipalities, the riverfront's form and land use reflected each municipality's interest. Some industrial warehouses were renovated, some plots upgraded to better standards of buildings, but the majority of structures remain untouched. Each district has developed its own commercial streets, but the overall dense urban fabric prevails mixed use services. The division caused by the morphology of the riverfornt has seperated the communities from the river, and the abandoned public lands on the riverfront became a no man's land. After its denaturalization, wastes where being dumped in the river: raw sewage, industrial waste, slaughter house waste and even dead animals. During the 2015 trash crisis in Lebanon, thousands of tons of trash that were not being treated ended up in the river. (85)

**[FOREIGN IMPLICATION AND FUNDING]** An Urban Transport Development Project initiated in 2005 and funded by the World Bank, was put at the disposal of the authorities to reconsider developing public transportation. Since then, a number of bridges and tunnels have been built but raise various problems in terms of major urban cuts and poor road safety. The public transportation amenities that were being studied in the conceptual phase were never executed: Today, only 2% of trips are public and private buses, compared to 26% that were supposed to be executed. Again in 2018, "*the World Bank approved a $295 million package to jumpstart the country's first modern public transport system*" that would redefine the current highways, especially in the capital, to reduce traffic and pollution. However, the project never happened.(86)

(84) Kiame, J., & Bou Aoun, C. (2011). Le fleuve de Beyrouth au cœur d'une stratégie métropolitaine durable. Académie libanaise des beaux-arts (ALBA), Université de Balamand, 40–54.

(85) Verdeil, E. (2010b). Chapitre 4 - Beyrouth dans les plans de l'IRFED et d'Écochard. In Beyrouth et ses urbanistes: Une ville en plans (1946-1975) (pp. 107–141). Presses de l'Ifpo. https://doi.org/10.4000/books.ifpo.2171.

(86) Lebanon's car culture questioned in crisis. (2021). France 24.





**BEIRUT RIVERFRONT**
Current state

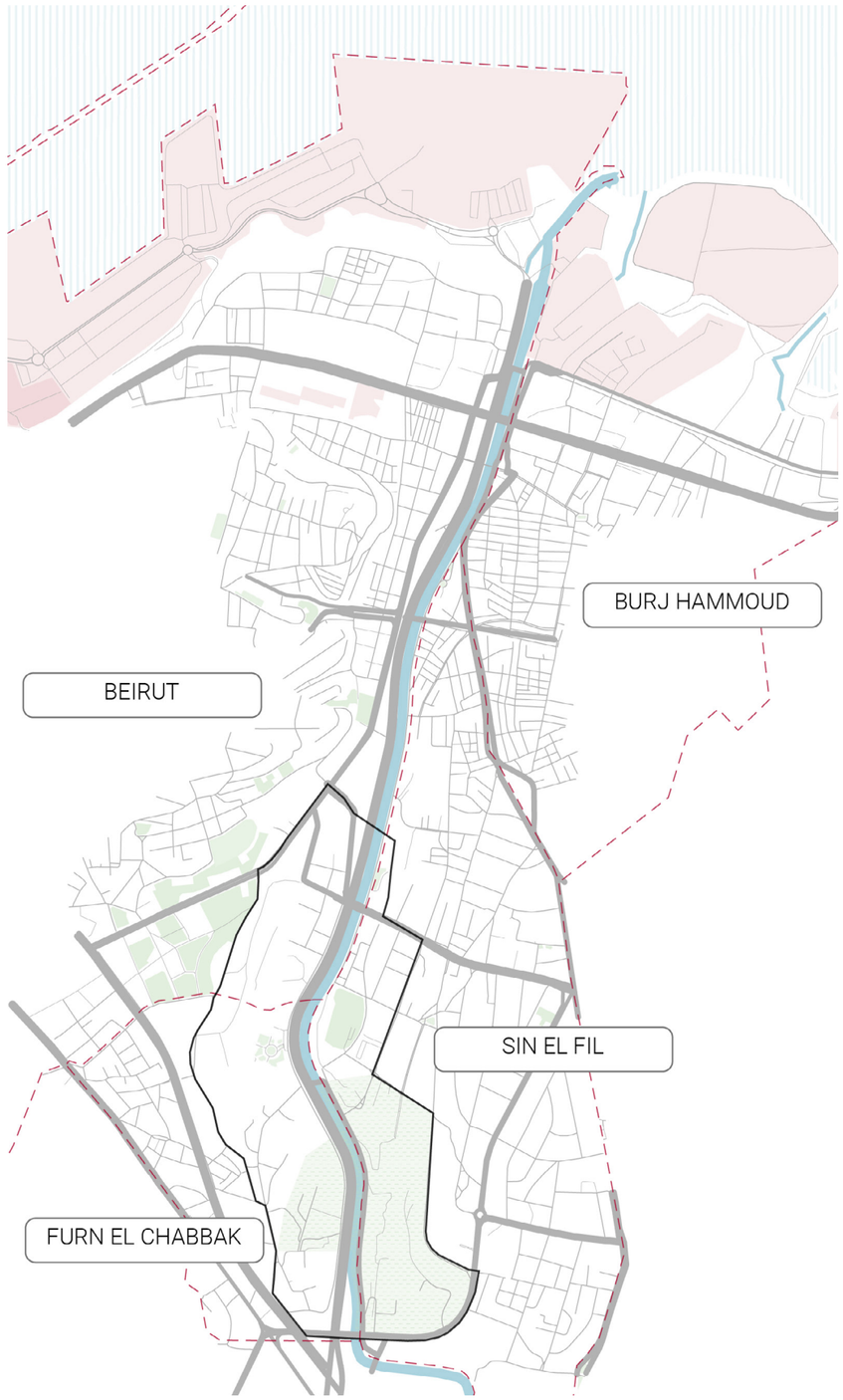
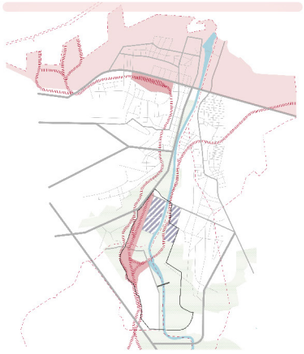
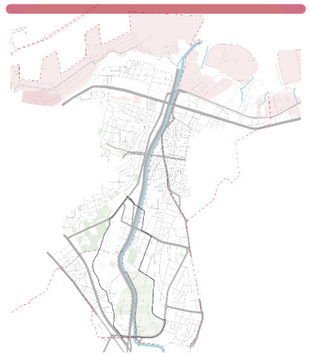



Fig. 62 Beirut river, current state

Chapter 3. Presentation of the Study Area

## TIMELINE OF BEIRUT RIVERFRONT URBAN MORPHOLOGY





Roman Aqueduct «Qanater Zbeydi» 1

Start of Urbanization 2

NBT Train station & National coastal highway construction 3

Economic boom & Industrialisation of the river corridor 4

Floods 5

Completion of the river walls construction (Port to Sin el fil) & road development 6

Completion of the river walls (Sin el fil to Jisr el Bacha) & the Emile Lahoud highway 7

Construction of Sukomi waste treatment 8

Burj Hammoud River Solar Snake project 9

Trash crisis 10

Beirut Riverless project 11

OTTOMAN | FRENCH MANDATE | INDEPENDANCE | CIVIL WAR | PRESENT DAY

1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020


1


2


4


6

8


10


3


5


7


9


11

## 3.3 **OBSERVATIONS**

### BEIRUT RIVERFRONT: AN UNFINISHED METROPOLIZATION

Beirut was exposed to contradictory influences: some policies favored the formation of a true metropolitan structure, while others delayed its growth. The totality of the urban area near the riverfront does not have a relevant relationship with the region in terms of functions nor organization. The review of past urban transformations allowed us to understand that the presence of the NBT train station transformed the landscape and role of the Beirut river, creating a spatial and structural coherence between the transportations equipment and the surroundings. But unfortunately, after its deterioration during the civil war, the infrastructures and equipment put in place were never optimized in order to re-compose the riverfront. The urban transformations had as well a major influence on the width and the flow of the river. The river goes from being a wild element finding its way through to the Mediterranean Sea, while irrigating the generous agriculture fields on it way, to a narrow channel completely disconnected from the areas surrounding it. By comparing the morphology of the river over the years, it is clear that some lands were gained and others lost by the respective municipalities after the alternance of its banks because of the respective urban plans that were designed. The reclaimed areas were all used to design the infrastructure of the highways, suffocating the Beirut river and connecting the Beirut port to the nearby regions: Burj Hammoud, Achrafiyeh, Badaro, Sin el fil and Tahwitat al Naher. These modifications highlight the devaluation and neglect of the river, which justifies the disappearance of most agricultural land, and the failor of properly de-industrializing the riverfront, which highly polluted the river and turned their back on what was considered the vital element of Beirut. Despite the numerous infrastructure and urban projects presented for the development of its territory, the metropolitan area and never experienced the implementation of approved strategic directives: all the works were carried out without any cohesive vision. The lack of a central organization responsible for metropolitan urban development management, similar to that of major world cities, is clearly a major obstacle.

### BEIRUT METROPOLITAN REGION: QUESTIONNING THE LIMITS

Despite the comprehensive visions and relevant ideas of the Master Plans previously established, the Beirut river is only considered an extension, without being an integral part of the metropolitan region. By marginalizing the riverfront areas and creating a division aligning with the edge of the Beirut river, each region in the global network of Beirut is growing according to their respective municipality's conditions, and each riverine district is developed as an independent agglomeration, without taking





into consideration the unified built, economic and territorial growth of the riverfront. The global limits of Beirut should be redefined while incorporating its available natural resources, such as the Beirut river and the neighboring agricultural lands, a perimeter offering an enlarged space and presenting favorable opportunities to the diversification of economic functions in multiple geographical settings, which eventually will provide a sustainable growth of the riverfront and consequently, the city of Beirut. Hence, the Beirut river becomes another constituent of the metropolitan composition and Beirut's main capital basin, where economic stability and healthy living environment are combined for a sustainable growth of the area.

### CONCLUSION: DE-INDUSTRIALIZING BEIRUT RIVERFRONT LEARNING FROM THE BILBAO AND LYON URBAN MODELS

While Beirut river serves as a physical and virtual barrier between its neighborhoods, it also serves as a network connector due to its substantial transportation infrastructure, which serves as a crossing point for commuters, residents, and visitors. Beirut river is almost always a stopover, never a destination. Due to its intersection with the agglomeration and its dual infrastructure, it is the perfect opportunity to implement a strategy that would simultaneously revive the riverfront and develop the neighboring region. A deep understanding of the urbanized waterfront territory, according to its multiple components, will be the guide to appropriate solutions to properly de-industrialize the riverfront. The aim is to reinstate the river in the ecosystem of Beirut and to seize the potential of public and natural spaces that the area has to offer for it to become a tool for the development of the urban context. Lyon and Bilbao developed strategic urban policies to rediscover their riverfronts after their deterioration during the industrial age, successfully projecting new images of their cities. The previously developed case studies will serve as learning models to develop an effective urban planning strategy for the restoration of Beirut's riverfront, taking into account its unique history and contextual characteristics, to transform the riverfront by proposing a new physical composition of the spaces. Through this study, I would like to revive the common memory of the river and redefine it as a natural corridor, providing the wellbeing of the city and its users. My ambition is to highlight its importance in the redevelopment of the region by reintroducing it as an integral part of the city which will contribute to improving the quality of life and redefining the image of Beirut.

# 04 BUILDING AN APPROACH FOR THE TERRITORY ANALYSIS

# 04 BUILDING AN APPROACH FOR THE TERRITORY ANALYSIS

In this chapter, both the social and urban geographies of the site will be analyzed in order to understand the complexity of issues that contribute to the degraded identity of the post-industrial and urban scene: Socio-economic, socio-cultural, environmental factors. The framework of the area of study and the tools that will be used to study the territory will be introduced. Two main tools will be introduced: Interviews, in order to study the social geographies and evaluate the past and current perception of the riverfront; and the Comb Structure, which will be used to do an on-site observation of the physical conditions of the built environment and evaluate the urban geoographies, using the walking methodology. The outcome of the previous analysis will be the creation of a data base of graphical boards, connecting all the identified issues and potentials, in order to fully grasp the current identity of the territory.

## 4.1 FRAMEWORK DEFINITION

The entirety of the Beirut riverfront needs urgent care and restoration in order to reconcile the surrounding communities and neighborhoods with the river. For this thesis, a framework has been selected to focus the revitalization efforts of the transition area between the urban zone and agricultural zone. The selection of the framework was based on the perimeter associating the Beirut river, the site of the former NBT train station in Furn el Chebbak, the site of the former industrial structures and abandoned landfills in the Achrafiyeh and Sin el fil areas, and agricultural lands on the South East of Sin el Fil. Within this perimeter, the river will be the subject of an urban study to articulate strategies for the redevelopment of the post-industrial zone, reconciling the several needs of the community and hopefully providing a new image of the riverfront. Within the defined boundary, the river flows in two different zones: An urban zone, and agricultural zone, both previously specified. The region of study is also at the intersection of 3 municipal areas: Municipality of Beirut, municipality of Furn el Chebbak and the municipality of Sin el fil. This division is reflected by the conditions of the riverfront and the lack of interdependencies. Even if these borders are virtual in nature, the limitations are translated:  Physically, because of the state the built environment that differs from a region to another; economically: the different income levels of the different municipalities; and socially. Due to the different natures of the built environment, and the socio-economic and socio-cultural levels, the urban perception of the territory changes from a district to another. The aim of the intervention is to reconcile the differences and create a homogenous interdependent riverfront.

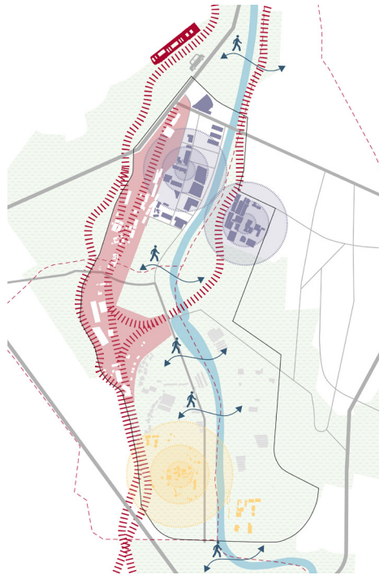
The few surviving open areas in Beirut may be found on the riverfront in this district, formerly known as the national and regional rail line district. The gated and inaccessible yards of the former train station hold a lot of potential in its vast and abandoned lands. Despite the lack of maintenance and complete neglect, the presence of the historic train station attracts private development. Nearby, old industrial warehouses are being turned into art galleries and offices, while adjacent plots are sprouting new high-end residential complexes. The importance of the river's placement in the city, according to this concept, is too great for it to be subjected to gentrified redevelopment schemes. The river is an appropriate place for the planned public realm, a hydrological, environmental, and cultural spine that transcends its physical isolation to connect with the various social, urban, and ecological geographies surrounding it, because it lies in neither zone and yet is near to so many.

**INDUSTRIALISATION**

Establishment of the train station, industries and soft urbanisation, while preserving the agricultural lands and the connection between the river banks.

**GENTRIFICATION**

Establihsment of the Emile Lahoud disruptive highway, requalification of some industrial structures but an overall heavy urbanization



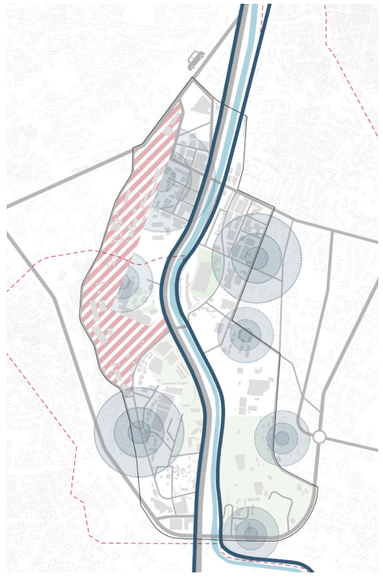


Fig. 63(left) Industrialisation

Fig. 64(right) Gentrification

## 4.2 CURRENT SITUATION: LAND USE

**[INDUSTRIAL CORRIDOR]** Industrial factories seeking low-cost labor and available lands have been settled on the Beirut riverfront for decades now. The lack of strict construction regulations, the flatness of the territory and the direct access to the main highway along the river, helped the growth of industries in the highlighted area, which partially explains the overall low economic income level of the region.[87] Due to current real estate pressures, some industrial buildings on the riverfront district are being converted to office spaces, artists' studios, commercial ground floors, and art galleries on Beirut's side. Given the heavy presence of industry in the riverfront region, these efforts aim to imply a delicate blend of industry and other uses.

**[NBT TRAIN STATION]** The Naqura-Beirut-Tripoli train station, mentioned previously, was the terminus of the train line that connected the two ends of the country. After its destruction and damage due to the civil war, the management of the remaining abandoned structures became problematic. Within it are the last few surviving open areas in Beirut. Unfortunately, the historic train yard is gated and inaccessible by the public.

**[RESIDENTIAL DISTRICT]** For fear of obstructing the 1946 industrial growth, urban zoning on the Riverfront did not limit habitation. This lead to the current situation: A high concentration of Beirut's working class works and resides by the Beirut river. The most common typologies are middle and low - income residential complexes. Given the rising residential demand from the river's opposite side, Sin El Fil is a zone that is vulnerable to urban transformation.

**[COMMERCIAL SERVICES AND OFFICES]** Being located in three different municipal territories, the constructions of the study area are updated as a result of each municipalities' initiatives to enhance the architectural features of the districts, including the construction of office buildings recently. The most common typology in the urban fabric is the mixed uses buildings integrating commercial ground floors.

**[AGRICULTURAL LANDS]** Initially, the agricultural fields dominated the river's scenery and grew products such as fruits, vegetables, cereals, and olives across the majority of the Beirut river plain. The current agricultural landscapes on the plains of the study area are patchworks of lands and green houses. Unfortunately, agriculture is gradually surrendering to the strong need for residences and industries, and is at risk of disappearing for real estate expansions rather than being considered an opportunity to developing the agricultural industry.

(87) OCHA. (2020, September 1). Beirut : Economic Vulnerability by Operational Zones [Map]. Relief Web. https://reliefweb.int/sites/reliefweb.int/files/resources/beirut_economic_vulnerability_classification_by_zone_unhabitat_aug_2020.pdf





**LAND USE**

Location and repartition of the different programs on the territory

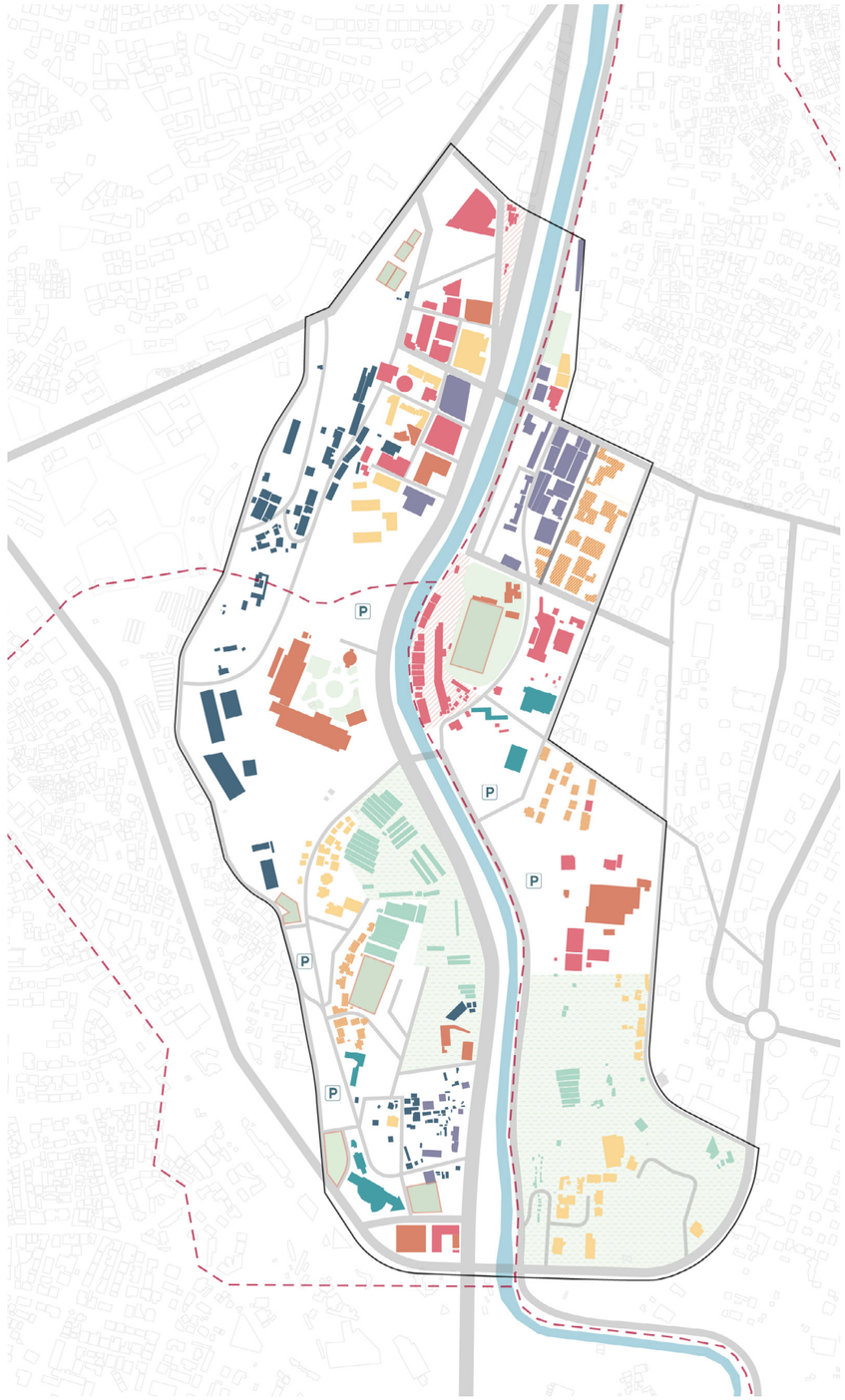



Fig. 65 Beirut riverfront land use

Fig. 66 Beirut riverfront, view from above, Vegetable market and its surroundings

Fig. 67 Beirut riverfront, view from above, Biel center, NBT abandoned fields and agricultural lands





Fig. 68 Current land use

## 4.3 TOOLS DEFINITION FOR THE VISUALIZATION OF THE TERRITORY

### TOOL 1
### UNDERSTANDING THE PUBLIC OPINION: FORMAL INTERVIEWS

It is important at this stage of the study to engage with the residents of the area and collect statements. This will provide their perception of the current state of the study area and their opinions on way to develop the currently neglected waterfront. *"Too often, communication between decision-makers and designers and planners only occurs after major decisions have already been made. The aim of this initiative was to open a dialogue and create possibilities for more engaging and informed discussions."*[88] The goal of the implication of the Beirut residents is to revive the common past memory of the Beirut river, to assess their current needs and concerns, and respectively asses the areas of intervention. A closed questionnaire was drafted both in Arabic and English, and distributed to representatives of the current communities in the municipalities of Sin el Fil and Furn al Chabbak, belonging to the age group between 25 and 85 years old. Two maps of the Beirut riverfront belonging to two different time periods (1950-now) were presented along with the questionnaire. The goal of this type of research is not only to expand knowledge about the critical themes and issues of the study area, but also to encourage public engagement in the riverfront revitalization project, especially in a country where the community is marginalized by the government who is the only decision maker. The interviews were made with active members of the community present in the area. The individuals were chosen based on their knowledge of the surroundings in past and current conditions, and their ability of expressing their thoughts and opinions. The people interviewed belong to different environments and have different occupations, in order to gather a variety of answers from different points of view. Therefore, the following statements each provide a separate narrative of how the river's usage both in the past and present, in order to understand its previous and current significance in the social life of the surrounding areas. Some interviews were held in Arabic, and the answers transcript below were translated from Arabic to English. The questionnaire consisted of the following questions:

*Do you have any memories or information about the once prosperous Beirut riverfront and the former Naqoura-Tripoli-Beirut train station? Share them below.*

*How often did/do you go to the Beirut riverfront?*

*Which roads did/do you use to access the highlighted area in red on the riverfront?*

[88] Marshall, R. (2001). Contemporary urban space-making at the water's edge. In R. Marshall (Ed.), Waterfronts in Post Industrial Cities (pp. 4–14). New York: Spon Press.





*What was/is your main means of transportation to get around in the area?*

*From your observations, which effects, positive as well as negative, has the infrastructure of the highway along the riverfront had on the area of study?*

*What are the biggest issues in the area? How could they be solved in order to make the area more pleasant and attractive for its users?*

*Do you consider the spaces on the riverfront safe? If not, please specify the reason. (The meaning of safety in this question is left to be interpreted by the person interviewed)*

*In your opinion, what are the strong points of the area? How can we make use of the existing potential?*

The purpose of the engagement of potential users is to grasp the complexity of the systems that constitute the riverfront in all its layers. Consequently the relationship between human behavior and perception with the urban environment can be studied. The relationship is linked to memory, culture, knowledge and emotions and generates urban identity.[89] Evaluating the strengths and the weaknesses in the area through the point of view of the current users, consequently lead to: frame the basic principles that should be discussed, identify the goals that should be achieved and take into consideration the constraints to work within. Ultimately, the goal is to recognize the possible adequate approaches for a future project.

[89] Osorio, P., Neira, M., & Hermida, M. A. (2017). Historic relationship between urban dwellers and the Tomebamba River. International Journal of Sustainable Building Technology and Urban Development.

(Translated from Arabic to English)

**NAJIB ABOU KHALIL**
MAYOR OF FURN EL CHABBAK
/between 50 and 64 years old/

Najib has been the mayor of Furn El Chabbak for the past 7 years. He was born and grew up in Tahwitat Al Nahr, Furn al Chabbak.

*Do you have any memories or information about the once prosperous Beirut riverfront and the former Naqoura-Tripoli-Beirut train station? Share them below.*

I have so many nice memories there. We used to sneak around in the train station, play around the railway without being seen. My family used to take it to go to Jounieh and visit family members. Those were really good times.

*How often did/do you go to the Beirut riverfront?*

We used to go there on weekends usually because we had school during the week.

*Which roads did/do you use to access the highlighted area in red on the riverfront?*

We used to pass by Joe Tabet's Villa, go through the lemon groves, pass by the Municipal stadium and then get to the train station. Usually when we wanted to access the riverfront we used to talk the same route. Going through the train station was the easiest way.

*What was/is your main means of transportation to get around in the area?*

Before we used to walk around to get anywhere. Everything was at close proximity. Now, I access the same road I used to take as a kid but I use my car. The area is deserted, that's why there is no public transportation. It's only an area of passage from the Beirut port to the outskirts.

*From your observations, which effects, positive as well as negative, has the infrastructure of the highway along the riverfront had on the area of study?*

The highway changed completely the area. You can pass in the area without even noticing the presence of the river. It is no longer a river, it is a small stream of water that is dry most of the seasons. The biggest disappointment for most of the residents, including me, is that the area is not green anymore. The concrete cast helped control the floods at the time but its execution turned the river into a vast dump in the heart of the area. In my opinion, there was no economic growth that was directly linked , so





no positive outcomes, it might have reduced traffic a little bit but that's it.

*What are the biggest issues in the area? How could they be solved in order to make the area more pleasant and attractive for its users?*

I believe that the river canal should have been kept natural, as it initially was, while installing a drainage system that would control the floods. I also would like to mention that it is urgent to clean and de-pollute the river water. There was a very diverse marine life before, a fish reserve could be suggested to bring the diversity back. The highway should have been designed less wide, because there is no need for such a wide highway. By making the highway less wide, it becomes possible to do a lot of change: People will be able to walk and bike there.

*Do you consider the spaces on the riverfront safe? If not, please specify the reason. (The meaning of safety in this question is left to be interpreted by the person interviewed)*

The biggest problem on the highway are the deadly car and motorcycle accidents that happen at least once every two months. As for the riverfront, it is very unsafe to walk on the sidewalks: there are many cases of prostitution during the day, and a lot of cases of theft and mugging at night.

*In your opinion, what are the strong points of the area? How can we make use of the existing potential?*

The area has a lot of potential to become a recreational area. If some works were to be done in order to re-center the river in the middle of the area, re-vegetalize the banks, and plant trees on the linear edge of the river, it would without a doubt enhance the living conditions in the area. That is my personal opinion. Another way to revive the area would be to open commercial activities, retaurants and coffee shops on the ground floor. This would attract a lot of people to the area and would also give an economic boost to the area. Unfortunatly, the municipality cannot act on it because these works are handled by the Counsil of Construction of Development.

(Translated from Arabic to English)

**RACHID DAOU**
CONTRACTUAL EMPLOYEE AT FURN EL CHABBAK MUNICIPALITY
/above 64 years old/

Rachid was born in Tahwitat Al Nahr, Furn al Chabbak, and has been living there ever since. He is as been member of the municipality in Furn el Chabbak for over 20 years.

*Do you have any memories or information about the once prosperous Beirut riverfront and the former Naqoura-Tripoli-Beirut train station? Share them below.*

I remember very well the train station, and how the trains used to transport passengers and cargo shipments to Zahle, Bekaa, Tripoli, and Naqoura. There was a metal bridge that connected Tahwitet el Nahr (the left bank of the river) and Sin el Fil (the right bank of the river) that people used to cross on foot to access the station. This bridge has been removed. The residents of the area used to frequently gather on the banks to spend their weekends enjoying the nice weather dring spring and summer time. Even during national holidays such as during the Pentecost, it was a tradition for people to go down to the river. I do recall these times although I was still in my early adolescence. Sadly, the access to the river is no longer possible due to the over population of the area and the excessive need for new buildings to accommodate the growing number of residents. In fact, back in the time, all residents had mostly ground floor houses surrounded with private and public gardens. I remember the green spaces along the river, rich in citrus plants such as lemon, mandarin orange, and griffon. On the bottom side of the river, there were fields of vegetables, mainly tomatoes, cucumbers, lettuce and cauliflower. I never personally bathed in the river -I was not a big fan of swimming or of the cold water- but other young people did swim in it since the water was very clean. Today it is heavily contaminated by soil erosion and sewers.

*How often did/do you go to the Beirut riverfront?*

I used to go down to the river on a weekly basis: once, twice, and even three times per week. We used to do all kinds of activities there, including bird hunting. People had the habit of hunting as a hobby, it was very common, mainly because of the territorial conditions, birds diversity and trees density. Today I do not even have the time nor do I want to visit the river. There is not much left of what once was. It is mainly surrounded by buildings and factories.

*Which roads did/do you use to access the highlighted area in red on the riverfront?*

Back then, we used to walk down the streets between the houses that would lead to the riverfront. Today the access the river is harder and takes more time.

*What was/is your main means of transportation to get around in the area?*

I still move around by foot in Furn Al Chabbak, to go from my home, to the municipality and to the church. If I have to go to a specific place near the riverfront on Sin el Fil side I take my car. There are some taxis that ciculate in the area from 6:30 till 19:30, but it is not very common to take them.

*From your observations, which effects, positive as well as negative, has the infrastructure of the highway along the riverfront had on the area of study?*

It negatively affected the area by dividing Tahwitet el Nahr into two different parts. It used to be considered as a village where everyone knew each other. The highway also attracted the construction of many residential buildings making the area very highly populated. One of the positive effects was the economic prosperity: the real estate sector witnessed a significant growth, and it was amplified by the construction of the The Beirut International Exhibition & Leisure Center (BIEL).

*What are the biggest issues in the area? How could they be solved in order to make the area more pleasant and attractive for its users?*

The highway disfigured the whole area and does not allow the residents access to the river like in the old days. It is nothing but cement on top of cement, which isolated the residents from the once beautiful river and its green public spaces. The area would gain a bit of its old character if some green public spaces were to be brought back. There are some NGO's that are currently taking permission from the municipality in order to replant neglected municipal lands on the river.

*Do you consider the spaces on the riverfront safe? If not, please specify the reason. (The meaning of safety in this question is left to be interpreted by the person interviewed)*

The river is bordered by two tall concrete walls which allow the safe passage of the cars on the highway. However the actual sides of the river are inaccessible, and if they, were it would not be safe.

*In your opinion, what are the strong points of the area? How can we make use of the existing potential?*

Behind the vegetable market there is a big sports field, but its access is difficult and the area is always crowded. It would be great to make use of its presence and create an adjacent sports facility.

(Translated from Arabic to English)

**NAJI KARAM**
OWNER OF A MECHANICS GARAGE IN FURN EL CHABBAK
/above 64 years old/

Naji was born and grew up in Furn al Chabbak.

*Do you have any memories or information about the once prosperous Beirut riverfront and the former Naqoura-Tripoli-Beirut train station? Share them below.*

Some of my best memories were at the river, dating back to before 1972. Back then, there were only vast gardens of lemon, a variety citrus trees, and even cacti. There was a forest we used to call the Kina forest, that contained very old kina trees, around fifty of them. When I was young, my friends and I used to always play by the river. When we got older, around 13 years old, our fathers taught us how to hunt. During spring, we never missed a chance to swim in the river. There was a bridge built by the British that used to connect Furn el Chabbak to Sin el fil. My friends and I used to always challenge each other to jump off the bridge. It was indeed beautiful. On Sunday, all the families used to go down by the riverside to have lunch with the rest of the residents. Back then, we considered Furn el Chabbak to be a village. As for the train, it had a lot of advatnages. For many people, it made moving around easier, especially to reach far towns. When we were kids, we found a couple of ways to have fun as well: We used to wait for the train to pass by, and when it slowed down, we tried to jump on it. It always ended with the supervisor of the train scolding us to get off.

*How often did/do you go to the Beirut riverfront?*

Every time we had the chance to. My friends and I used to have lunch everyday after school next to the train rails and play games. We used to also go there as a family almost every weekend and on national holidays. It was an opportunity for all the residents to gather, even if the weather was not ideal. Currently, it's been a long time since I last passed by the riverfront, but when I do, I would be taking the highway to reach a specific destination.

*Which roads did/do you use to access the highlighted area in red on the riverfront?*

There were a couple of roads we used to take, one of these was through the olive tree forest that does not exist anymore. It has been sadly earased by the highway. The other two inner streets we used to walk down on have as well been reclaimed for the construction of the highway.





*What was/is your main means of transportation to get around in the area?*

Like everyone else in the area, by car. There is no adequate public transportation that the residents can rely on. Some people might use bicycles, but it can be a bit dangerous, specially on the highway.

*From your observations, which effects, positive as well as negative, has the infrastructure of the highway along the riverfront had on the area of study?*

Some of the advantages of the highway are the improved roads making transportation easier and quicker. It is undeniable that the highway created new opportunities: a lot of new investments were possible due to its presence. In parallel, its construction earased the green spaces and made the area very dense. It changed the lives of the residents of the area, drifting them apart not only from the river, but also from from each other since the riverfront was the only place to meet. After its construction, the area was split in two: the upper part and lower part. Personally, I think the highway only benefited the people who owned or rented apartments and/or buildings in the riverfront area.

*What are the biggest issues in the area? How could they be solved in order to make the area more pleasant and attractive for its users?*

Before, farmers used to gather the vegetables they recolt by the river side and directly sell them. Today we either import vegetables from other parts of Lebanon or even from foreign countries. It would be interresting to use the preserved agricultural lands and re-launch this initiative of selling our own products since the fields are available, and we are in need of an economic shift.

*Do you consider the spaces on the riverfront safe? If not, please specify the reason. (The meaning of safety in this question is left to be interpreted by the person interviewed)*

The river has been eradicated. Now it is only a dry concrete canal alongside separative concrete walls: I do not consider it safe in any way.

*In your opinion, what are the strong points of the area? How can we make use of the existing potential?*

Our reality now is very different from the past. The access to the river is impossible. We lost the only place we had in the city to walk, camp, do picnics. I don't see how it would be possible to revitalize the river, because a lot of the spaces have been reclaimed by the authorities and used for the construction of buildings. Many residential and office buildings that are recently being built have irreversibly changed the area and its landscape.

(Translated from Arabic to English)

**JOSEPH SEMAAN**
OWNER OF OFFICES AND SHOPS IN SIN EL FIL
/above 64 years old/

Joseph was born in Tahwitat Al Nahr, but grew up in Sin el Fil.

*Do you have any memories or information about the once prosperous Beirut riverfront and the former Naqoura-Tripoli-Beirut train station? Share them below.*

The train station was parallel to the river, and led to the south and north of Lebanon. The land on which the train station was built, belonged to the Tabet family, from Tahwitet el Nahr. There was as well a bridge built over the river that connected Tahwitet el Nahr with Sin el Fil. On the bridge there was a metallic plaque that said: “A gift from the Queen to the Lebanese people”. The hills from which flow the river of Beirut are very charming. At the border of our village, on the river sides, were planted cactus of the highest quality, and along the river, there were many orange tree gardens. The family of Tabet had planted as well a forest of Kina which lured different species of birds. Back then, there was no presence at all of any concrete structure near the river. The river attracted everyone. One special occasion I clearly remember is Ash monday: husbands, wives, and their children, spent the whole day at the river side.

*How often did/do you go to the Beirut riverfront?*

When I was around 14 years old, I used to wake up at 4am in the morning, before the start of school, and go practice on my aim, hunting birds that passed by the forest of citrus trees. This happened almost 4 times a week, as long as the weather was good.

*Which roads did/do you use to access the highlighted area in red on the riverfront?*

I used to walk by the riverside on Sil el fil's banks and take the bridge in order to get to Furn el Chebbak's side of the river.

*What was/is your main means of transportation to get around in the area?*

My parent’s house was 10 minutes away from the river so I used to go there by foot because it was not accessible by car, not that we had a car to use.

*From your observations, which effects, positive as well as negative, has the infrastructure of the highway along the riverfront had on the area of study?*





Ever since I was young, I always dreamt that the river of Beirut would be transformed into something majestic. My dream was short lived when the construction of the highway started, all the green pastures were terminated. The highway accelerated the increase of the population and the fast construction of new buildings, which eventually led the increase of the prices of the real estate sector. The rustic houses were all demolished and the original inhabitants were forced to move out.

*What are the biggest issues in the area? How could they be solved in order to make the area more pleasant and attractive for its users?*

One of the main issues is that some of the lands on the riverfront are owned by the Tabet family. Thereofre, if the owners of the lands next to the river decide to make a change a revitalize the areas, it might be possible to improve the infrastructure and recuperate the green spaces that once were. Otherwise it would be impossible to make any improvements.

*Do you consider the spaces on the riverfront safe? If not, please specify the reason. (The meaning of safety in this question is left to be interpreted by the person interviewed)*

Before there were a lot of deadly floods, which made the riverfront areas very unsafe. Since they have constructed the high borders of the river canal the riverfront became somehow safe. But on the other side, ever since they have constructed these borders, it became impossible to access the riverside, they earased it.

*In your opinion, what are the strong points of the area? How can we make use of the existing potential?*

There are a lot of free neglected lands on both sides of the river. They are currently being used as parking spaces for the factories and buildings alongside the riverfront. Believe it or not, these are some of the last available lands in Beirut. They have a lot of potential. Imagine what would happen if the municipalities were to naturalize these lands, make them public and accessible, offer green spaces for the elderly to walk and sit, playgrounds for the kids to play, paths for pedestrian and cyclist... the possibilities are endless. The spaces are available, it would be a shame not to use them.

(Translated from Arabic to English)

**SAMI SAADE**
OWNER OF A RESIDENTIAL BUILDING IN SIN EL FIL
/above 64 years old/

Sami is originally from the North of Lebanon. In 1960, his parents moved to Gemmayzeh, Beirut. He has been living in Beirut ever since, a city he knows by heart. He shared with me his stories and experiences being an owner of a residential building in the area of Sin el Fil.

*Do you have any memories or information about the once prosperous Beirut riverfront and the former Naqoura-Tripoli-Beirut train station? Share them below.*

Two of the most appreciated projects of the time were the tramway and train that were put in place by the French mandate. The train connected us with the South and the North. Whereas the tramways were the fastest and cheapest way to get around the city. Sadly, it was closed in 1965. They were replaced by the project of the vehicular road network and the highways. I also remember vividly the water of the river flooding over 2 bridges, one of which is Jisr el Wati, the bridge on the northern part of the area of study.

*How often did/do you go to the Beirut riverfront?*

I was not used to going to the river frequently. Now I pass by the river in my daily comings and goings, but I do not feel the presence of the river since it has almost completely disappeared.

*Which roads did/do you use to access the highlighted area in red on the riverfront?*

Through Furn el Chabbak, Burj Hammoud and Sin el Fil.

*What was/is your main means of transportation to get around in the area?*

I used to move around Beirut with the tramway that connected the different areas of Beirut at the time: I used to take it from Gemmayzeh (in front of the current electricity company), and go to Dawra, El Burj, Furn el Chabbak (which is on the riverfront), El Raouche, basically everywhere. Now I am too old to drive. A family member usually drives me around since there is no public transportation for me to use.

*From your observations, which effects, positive as well as negative, has the infrastructure of the highway along the riverfront had on the area of study?*

The highway has its advantages. It connected all the area around the river





to the city center. I personally was able to rent the apartments at a higher price due to the presence of the highway. But it came at the cost of losing the identity of Beirut as it was in the 60's. I would have preferred if both the NBT train and the tramway remained. First they were historic elements that molded Beirut into the prosperous city that it was, second, they were a public good at the service of the citizens and third it prevented and reduced traffic significantly.

*What are the biggest issues in the area? How could they be solved in order to make the area more pleasant and attractive for its users?*

One of the most problematic things that I and every person living in Beirut can agree on, is the state of the highway boarding the river. There should be a lot more maintenance for the roads. Another matter that does not make sense is the width of the highways: When the government reclaimed these lands to do the highways, they added additional parking spaces on both sides of the lanes. But the fact remains the same: the traffic in the area is suffocating. A solution would be removing the useless parking spaces and adding circulation lanes.

*Do you consider the spaces on the riverfront safe? If not, please specify the reason. (The meaning of safety in this question is left to be interpreted by the person interviewed)*

I used to go anywhere because I knew Beirut well, but during the civil war, and specially at the beginning of the turbulences, some spaces on the riverfront were avoided because of the presence of foreign military settlements.

*In your opinion, what are the strong points of the area? How can we make use of the existing potential?*

There are alarming problems when it comes to the infrastructure of the river and its water recuperation system. Ever since they casted it in concrete, the water floods during the winter months, and the river is very dry during summer months. Lebanon's strong advantage is its climate. They should take advantage of the storms we have in the winter months to properly drain the wate and maintain it. If it was up to me, I would have always imagined that the river canal would be extended to the Khalde region on the coast near the airport, and re-connect it to the Mediterranean sea. Beirut would become an island.

(Translated from Arabic to English)

**AIDA KHOURY**
FORMER RESIDENT OF FURN EL CHABBAK
/above 64 years old/

Aida is born in Furn al Chabbak where she lived until the civil war. During her adolescent years, she was an employee at Joe's Library, a high end bookshop at the Hotel Saint George located on the Beirut bay, near the port. The library was shut down in 1970, right before the civil war started.

*Do you have any memories or information about the once prosperous Beirut riverfront and the former Naqoura-Tripoli-Beirut train station? Share them below.*

My first memory of the riverfront is in 1940, I was around 8 years old. My family and I went with all the habitants of the region to the river to spend the day in nature. It was the day of ash Monday, the first day of lent, which also coincides with the beginning of spring. At the time, there were no constructions on the riverfront and it was exclusively an agricultural area. It was a huge field, rich in its plantations: lemon trees, lettuce, radish, cauliflower, chard are the few vegetables I remember.

*How often did/do you go to the Beirut riverfront?*

We used to go to the riverfront once per month. Every summer, my siblings and I used to look forward to go down and swim in the river. Now the river is dry, but back then water used to flow down from Falougha and the river would fill up enough for us to swim. I haven't been there since the civil war.

*Which roads did/do you use to access the highlighted area in red on the riverfront?*

We used to go from our house in Furn al Chabbak to the NBT train station, and go through the station to reach the riverfront.

*What was/is your main means of transportation to get around in the area?*

Back then the road network was not developed and there were no highways. Therefore, it was easy to move by foot in Beirut and to reach the waterfront.

*From your observations, which effects, positive as well as negative, has the infrastructure of the highway along the riverfront had on the area of study?*

The construction of the highway and the cast of the river in concrete created a clear cut between us, the community, and the river. After its construction it became impossible to reach the riverfront because of the separating walls





that were built along the limits of the river. The habitants of both Furn al Chabbak and Sin el Fil plead their case to the municipalities of both areas. The main demand was to reconfigure the highway and demolish the walls around the river. We wanted to be able to take advantage of the natural lands, that were at the time reclaimed by the municipalities to build the highway. With no luck, it remained the same ever since, and all the natural lands that made the riverfront one of the few natural spaces in the heart of Beirut, were all gone.

*What are the biggest issues in the area? How could they be solved in order to make the area more pleasant and attractive for its users?*

The biggest issue that remains till this day is the degradation of the natural lands and the separation that has been created between us and the river. In my opinion, one of the solutions could be to demolish the separating walls between us and the river and revive the natural lands, most of which are currently neglected, or have been turned into a public parking.

*Do you consider the spaces on the riverfront safe? If not, please specify the reason. (The meaning of safety in this question is left to be interpreted by the person interviewed)*

They were before. The riverfront was a place for all. It was lively all day long, especially during spring and summer: Farmers taking care of their lands, kids playing on the banks, people going in and out of the NBT train station. During the second half of the 70's, the riverfront facing Sin el Fil was occupied by uncontrolled settlements of refugees resulting from the civil war. This created an unsafe environment for the local habitants until the beginning of the 80's, when the Lebanese army restored the order.

*In your opinion, what are the strong points of the area? How can we make use of the existing potential?*

The agrictultural prosperity and dependance on the production is an advantage that should be rediscovered. The area was very rich: There were more than 17 kinds of trees, and so many animals. Even though it is gone now, there should be ways to revive it.

**KEVIN MATAR**
ENVIRONMENTAL ARCHITECT AND ACTIVIST IN THE OTHER DADA
/between 25 and 49 years old/

Kevin is an environmental architect and activist. He worked on many environmental campaigns and projects with The Other Dada, an architecture and design consultancy firm who is known for its engagement in saving the Beirut river. The team has been working since 2019 on planting first Miyawaki forest in Lebanon: Beirut's RiverLESS Forest.

*Do you have any memories or information about the once prosperous Beirut riverfront and the former Naqoura-Tripoli-Beirut train station? Share them below.*

I have heard stories about a time when the inhabitans in Beirut had created a culture of living on the riverfront and had a strong connection to the river.

*How often did/do you go to the Beirut riverfront?*

Twice a month, I used to do study in the area of Sin el Fil.

*Which roads did/do you use to access the highlighted area in red on the riverfront?*

I take two roads, either the highway from the Beirut Forum or The Emile Lahoud highway.

*What was/is your main means of transportation to get around in the area?*

I use my car.

*From your observations, which effects, positive as well as negative, has the infrastructure of the highway along the riverfront had on the area of study?*

The highway not only killed the river and the access to it but also split the riverfront area in two.

*What are the biggest issues in the area? How could they be solved in order to make the area more pleasant and attractive for its users?*

The biggest and most urgent issue is the degradation of the Beirut river. We have to bring back the river, restore the ecosystem by bringing back biodiversity, which is what the Other Dada is doing with the Other Forest Initiative on a 500 squares meter land on the bank of the river. It is primordial as well to find solutions to have a cleaner river that could be used by the





people. A good step forward would also be removing the concrete walls to connect the earth to the water, and to create on the riverbanks connections for pedestrian and bicycle pathways.

*Do you consider the spaces on the riverfront safe? If not, please specify the reason. (The meaning of safety in this question is left to be interpreted by the person interviewed)*

The only spaces on the riverfront are the current highways where a lot of deadly car accidents happen very frequently.

*In your opinion, what are the strong points of the area? How can we make use of the existing potential?*

The river is the strongest! The richness of the soil is definitely an advantage that should be rediscovered. Also It would be great to reuse the station somehow (which is not very realistic at the moment due to the economic crisis and inflation the country is facing) or at least preserving its structures.

**KARLA HAGE**
GENERAL DOCTOR AT HOTEL DIEU
/between 25 and 49 years old/

Karla lives in Kaslik, Keserwan. She studied medecine at the Université Saint-Joseph (USJ) and currently works at the affiliated hospital, Hotel Dieu in Beirut Achrafiyeh.

*Do you have any memories or information about the once prosperous Beirut riverfront and the former Naqoura-Tripoli-Beirut train station? Share them below.*

I am aware of its current state since it is on the way to my work everyday. I have no specific information but we had distant relatives that used to live in Achrafiyeh.

*How often did/do you go to the Beirut riverfront?*

More than twice a week.

*Which roads did/do you use to access the highlighted area in red on the riverfront?*

I use the Sin el Fil road adjacent to the riverfront and reach Achrafiyeh by crossing the Emile Lahoud bridge.

*What was/is your main means of transportation to get around in the area?*

My car or my colleague's car when we carpool.

*From your observations, which effects, positive as well as negative, has the infrastructure of the highway along the riverfront had on the area of study?*

One positive effect of the highway is that it was able to connect the small towns along the river to the Beirut city center. An inconvenience is that it created a segregation between Sin el Fil, from Achrafiyeh and Furn el chebbak.

*What are the biggest issues in the area? How could they be solved in order to make the area more pleasant and attractive for its users?*

One of the major inconveniences of the area is the congested traffic, especially under the Emile Lahoud bridge. In addition to the traffic, the roads are in a disastrous shape because of the lack of maintenance. During winter, rain water floods the streets and circulation becomes almost impossible,





specially at the corner of the Souk el Ahad entrance. In my opinion it all goes down to the lack of governmental supervision and their neglect of the riverfront area. There is a lot of potential but if the government is not willing to put in the effort and take part in the enhancement of the riverfront nothing will change.

*Do you consider the spaces on the riverfront safe? If not, please specify the reason. (The meaning of safety in this question is left to be interpreted by the person interviewed)*

I personally do not feel safe when driving on the highway alone at night. A lot of car accidents happen and a lot of theft occurs, especially at night.

*In your opinion, what are the strong points of the area? How can we make use of the existing potential?*

The area at the intersection of Sin el Fil, Furn al Chebbak and Achrafiyeh is located in a very central position in Beirut. Its geographical location has a lot of advantages, the major one being at a close proximity of several key functions in the city and being accessible to many essential buildings, such as hospitals, like the Quarantina hospital or Hotel Dieu and many other small governmental hospitals. Its location should be taken advantage of in order to enhance the quality of living there, and transform it into a livable part of Beirut.

**ANTOINE BOU FARHAT**
STUDENT AT THE SAGESSE UNIVERSITY AND RESIDENT OF SIN EL FIL
/less than 25 years old/

Antoine is born in Bsallim, Mount Lebanon and currently lives in Sin el Fil. He recently graduated from high school and has since starting his bachelor studies in law at the Sagesse university, located in the area of study in Furn el Chebbak.

*Do you have any memories or information about the once prosperous Beirut riverfront and the former Naqoura-Tripoli-Beirut train station? Share them below.*

I have never heard stories about the Beirut river.

*How often did/do you go to the Beirut riverfront?*

Almost 6 years ago, when I was 14 years old, my friends who live in the area of Sin el Fil and I used to play football in the river basin but only in the summer days, when the river is completely dry. But I haven't actually been to the river ever since. Recently, I started my studies in Sagesse university and therefore I pass by the riverfront almost twice per week.

*Which roads did/do you use to access the highlighted area in red on the riverfront?*

Emile Lahoud bridge to cross the river and reach my destination using the Emile Lahoud highway.

*What was/is your main means of transportation to get around in the area?*

I use my car.

*From your observations, which effects, positive as well as negative, has the infrastructure of the highway along the riverfront had on the area of study?*

The highway makes it really easy to move in the area. Whether to get to university or go from the university to the city center to hang out with friends, the highway connected so many areas in Beirut to the riverfront. Nevertheless, it is impossible to ignore the suffocating traffic, the loud noises and honks of cars and the pollution.

*What are the biggest issues in the area? How could they be solved in order to make the area more pleasant and attractive for its users?*





As a student there are some issues that we encounter on a daily basis. First, car parks are an issue in the area. Near my university there are two parking: a free of charge public parking on the Northern side of the university, and another paying parking on the left adjacent plot of the university. Since all the students like myself use their own private cars to get to class, there is a daily common struggle of finding places to park. Both car parks are at their maximum capacity by noon. The solution to this issue would be providing a proper public transportation that would make the area easily accessible, and that would free up the car park lands and replace them with parks or outdoor public places.
Another issue is the student's accommodations. There is one student dorm that belongs to the Sagesse university, but the spaces are very limited and therefore my friends who live very far from Beirut struggle to book an accommodation every academic year. They usually end up renting a standard apartment in the area which most of the times is more than what they can afford. It is definitely more expensive than a student's dorm. Additional student's accommodations definitely need to be made available.

*Do you consider the spaces on the riverfront safe? If not, please specify the reason. (The meaning of safety in this question is left to be interpreted by the person interviewed)*

The areas on the highway are safe enough during summer. However, whenever it rains during winter the water stagnates on the sides of the road and huge water puddles make it hard to drive.

*In your opinion, what are the strong points of the area? How can we make use of the existing potential?*

Near the university there are some sports fields that we use to play badminton, tennis, football and basketball. The fields are public property and we pay a fee to use them. Since the university doesn't have its own fields, we use the public ones to practice sports and host sports event related to the university. It would be a very big asset to have fields designed in the university campus that would be used by the faculty members, free of charge. That would offer a place on campus where students can meet, spend time together and play sports. We definitely need as students open public places and public parks that are accessible without paying a fee. It has become impossible in Lebanon, especially in Beirut, to hang out in a decent outdoor space that isn't private.

## TOOL 2
## ON-SITE TERRITORIAL OBSERVATION: COMB STRUCTURE

**[THE APPROACH]** In order to study the waterfront a multi-disciplinary approach is adopted. The methodology adapted for the territory analysis of the chosen framework is built on an on-site observation of the main waterfront area and the punctual nodes connecting it to the interior urban area, which is followed by a graphic configuration to study the areas of interest in their multiple dimensions. To evaluate the waterfront city, the main urban axes were identified in order to understand each territorial scheme, according to a configuration called the Comb Structure: A horizontal urban axis which is parallel to the riverfront, and a series of vertical axes which follow the several transversal roads, perpendicular to the riverfront.[90] The longitudinal axis helps understand the changes and urban transformations that occurred on the riverfront. The transversal axes will help identify the physical connections between the riverfront and the city, and the ways they evolved and affected the relationship of the riverfront with the city and its people.[91] The observation that will be concluded from the analysis will depend strongly on factors such as the policies, the physical situation and the social connections.

**[GLOBAL STRATEGY MASTERPLAN]** The launching of the fieldwork was made possible using the comb structure global strategy masterplan. While only considering the boundaries of the framework previously defined, the selection of the vertical axes that would structure the study was made according to the following standards: First, it should be an urban route that could be potentially projected on both sides of the river; Second, the road should have a physical and visual connection with the river; Third, the road should be distinguished by its connection to an urban space or vacant land on the riverfront. The Global Strategy masterplan produced highlights the comb structure intersecting urban spaces of interest on the riverfront. The map shows the vertical axes that consist of the routes chosen, their length, starting point and ending point; and the horizontal axis that is the main path longing the riverfront.

[90] Ochoa, R. (2017). The Way to the Waterfront. A Walking Methodology for the Analysis of Public Space. Revista de Estudios Sobre La Ciudad Como Espacio Plural, 91–98.

[91] Mackaness, W. A., Ruass, A., & Sarjakoski, T. (2007). Generalisation of Geographic Information: Cartographic Modelling and Applications. The International Cartographic Association.





### COMB STRUCTURE: GLOBAL STRATEGY MASTERPLAN

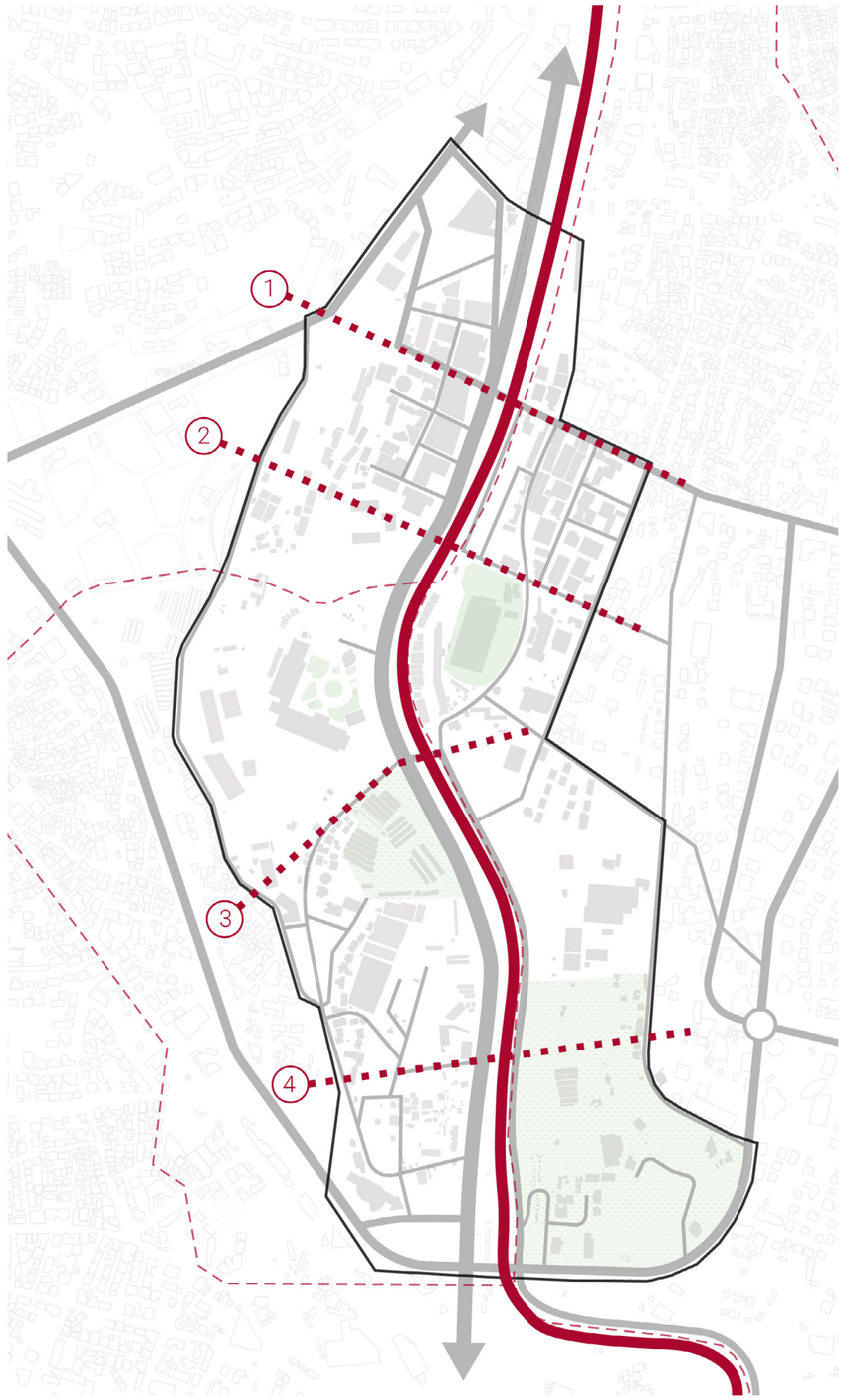



Fig. 69 Global strategy masterplan

## 4.4 METHODOLOGY

*"La promenade constitue la première manière d'explorer et d'aimer une ville"*[92] which translates to: the walk is the first way to explore and love a city. The implementation of the Comb Structure was initiated in order to start visualizing the riverfront and its connections to the urban neighbouring areas. Since a simple map reading is not enough to determine the connections and experiences that happen in-between the edges of the river and the urban city, the best way was to interact with the terrain.[93] Having lived and experienced everyday life in Beirut, the direct contact mentioned above was adapted in the study as the main methodology to analyse the territory first hand. This approach allowed me to obtain a specific set of data such as pictures and statements, which would be combined to graphical data such as plans and sections, in order to build a complete database. This method leads to unravel the different pillars affecting the design and identity of the waterfront, such as physical, social, political and economic factors, and shows the importance of studying a the city through a close and direct observation in-situ to grasp its image.

*"Walking then turns out to be a tool which, lends itself to attending to and interacting with the mutability of those spaces, so as to intervene in their continuous becoming by acting in the field, in the here and now of their transformation, sharing from the inside in the mutations of these spaces that defy the conventional tools of contemporary design."* [94]

The narrative of the book "Sur les quais. Un point de vue parisien" pushes the reader to discover Paris by going on a walk on its 15 riverbanks and to embrace the particularities and the different identities of each, projected through the materiality, geometry, use, state, etc. These are represented graphically using drawn maps and pictures. The landscape architect Alexandre Chemetoff and the engineer arhcitect Bertrand Lemoine unravel a new way perspective on embracing riverfront cities.[95] Therefore, the work would consist of first, observing and investigating each area of interest first hand, then documenting and creating a data base of the information gathered using graphical data. The final step is interpreting the results and understanding the co-relation between the current situation of the physical spaces with the social, economical and political factors. The concluded hypothesis would help better understand how it is possible, in the case of Beirut riverfront to contribute to the activation of thepost-industrial urban environment and to transform the edges of the city into liveable areas: To turn the current spaces into places.

[92] Sansot, P. (2004). Poétique de la ville. PAYOT. (p.248)

[93] Ochoa, R. (2017). The Way to the Waterfront. A Walking Methodology for the Analysis of Public Space. Revista de Estudios Sobre La Ciudad Como Espacio Plural, 91–98.

[94] Careri, F. (2002). Walkscapes: Walking as an aesthetic practice. Gustavo Gili, Barcelona.

[95] Chemetoff, A., & Lemoine, B. (1998). Sur les quais. Un point de vue parisien. Picard.





## 4.5 DATA BASE CREATION AND INTERPRETATION

Despite the lack of time and unpredictable weather conditions, most of the routes were covered on weekdays and in the morning. Even though some minor details, such as the amount of people, the movements and the lighting, differ from one route to another; the main spaces characteristics brought consistency to the study. As the walk took place, pictures are taken in the direction of the riverfront and focus on the urban elements that distinguish each chosen track. The images lack contrast and brightness in order to highlight the authentic character of the pictured urban spaces. The majority of the pictures were captured at the regular's observer's height, except for some which were taken from a residential building on the riverfront. Interviews were held in parallel with the different stakeholders and users of the area. After the completion of the in-situ investgation, a data base was created to allow a later analysis of the relationship between the physical territory, the built environment and its inhabitants.
Two main group of elements were poduced.

**[PERCEPTION MAPS]** The in-depth interviews previously annexed provided a new outlook on how the past usages and role of the Beirut river, and the changes that occured, which affected its image across time. The main aim of the interviews was to understand the current needs and aspirations of the inhabitants. Nevertheless, the answers were also used to select repetitive keywords that describe the natural environment, the built environment, the state of the river and the uses on the riverfront. The computer program Atlas.ti was used to perform the qualitative selection of keywords from the interview's transcripts, revealing how the Beirut riverfront's perception by the inhabitants changed over time. The several selected keywords are represented according to their frequency and relevance in interviews. The size of the words reflect how many times they were detected in the interview's transcripts. Some terms may be present in the 20$^{th}$ century map, and not in the 21$^{st}$ century, and vice versa: The changes in the occurence of words reflects how time affected the Beirut river's perception.

[**ITINERARY BOARDS]** Each one of the four previously selected axes will be represented in an itinirary board by a section, a plan, and a series of pictures, categorizing the spaces on the riverfront according to their nature and different characteristics. This analysis will further deepen the understanding of the needed physical interventions on the public spaces on the riverfront, and the needed services and changes that should be applied on the built environment, by clearly identifying the issues and potentiality in each area.

**PERCEPTION MAP: BEIRUT RIVER IN THE 20TH CENTURY**
Key world cloud /Atlat.ti/


Fig. 70 Word cloud produced with Atlas.ti





**PERCEPTION MAP: BEIRUT RIVER IN THE 21ST CENTURY**
Key world cloud /Atlat.ti/


Fig. 71 Word cloud produced with Atlas.ti

## CONSIDERATIONS

**[BUILT ENVIRONMENT]** The western side of Beirut's river at this particular point is witnessing a fast-paced dense development of new mixed-use buildings. The speculative real-estate investments instigated by the flawed urbanism model in Lebanon encourages over-exploitation for purely lucrative purposes. The result is a flagrant contrast between the new built areas and the existing buildings. The existing factories that were used for the production and manufacturing of glassware, furniture, tiling and brickwork, leather goods, have now been converted into artists' studios and art galleries. Beirut Art Center and Ashkal Alwan are two examples of art centers in the area that now attract the younger generation of artists to the riverfront. Moreover, this side is physically obstructed towards the river by an elevated bridge (Emile Lahoud highway) parallel to the river. This ensues a loss of visual connection to the river and unpleasant noise coming from the commuters, hence devaluating the quality of the built environment around it. However, this area presents great potential for a better dialogue with the river, which would impact the quality of the surrounding sloped built environment. Given the rising residential demand from this side of the river that is currently being developed, Sin El Fil, the eastern side of Beirut river has been prove to urban transformations.

**[URBAN FORMS]** Beirut suffers from a serious lack of public space. According to UN habitat, While the World Health Organization (WHO) specifies a minimum of 9 square meters of green space per person, Beirut only has 0.8 square meters.[96] The areas below and surrounding the infrastructure are being used by the communities to express their need for public spaces. Under the bridge, the empty parking spots were appropriated: used as a skateboarding arena by teens and places for card games between the elders. In fact, Souk el ahad (Sunday souk), a popular market, emerged on an adjacent abandoned industrial land to the Emile Lahoud bridge in 1980. The land initially belonged to the municipality but was reclaimed by the inhabitants of the area. They utilized the infrastructure as a venue for public meetings, which reflects the desperate of public space on the level of the neighborhood. The infrastructure was not adequate to accomodate such services, which lead to the Souk being shut down by the municipality, as it was in disastrous hygienic conditions. In addition to that, the pollution is very remarkable due to its proximity to an industrial zone that dumps untreated industrial waste. The lack of waste management pollutes the area and contributes to the urban heat island effect.

**[ACCESSIBILITY]** This section can be characterized as a node in terms of intersecting roads. Crossing the river, "the Low Bridge" (Jisr el Wati), connects the urban fabric from Sin el Fil to Achrafiyeh. The crossing is overly saturated during rush hours due to the lack of options to cross the river.

[96] Nazzal, M., Chinder, S., & UN-habitat Lebanon. (2018). Lebanon Cities' Public Spaces. The Journal of Public Space, 3(1), 119–152.





## ITINERARY ONE

Fig. 72 Under Emile Lahoud bridge

Fig. 73 Jisr el Wati (The low bridge)

Fig. 74 Industrial zone over-densification

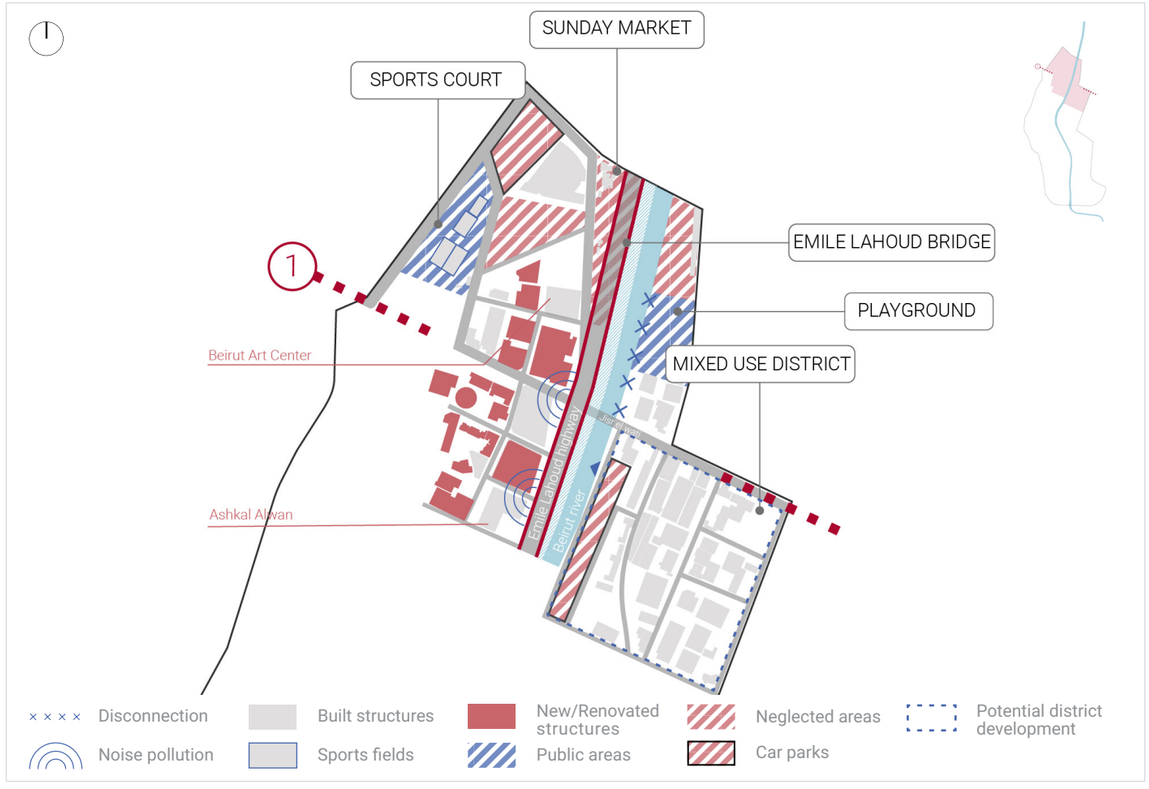



Fig. 75 Zone 1 plan

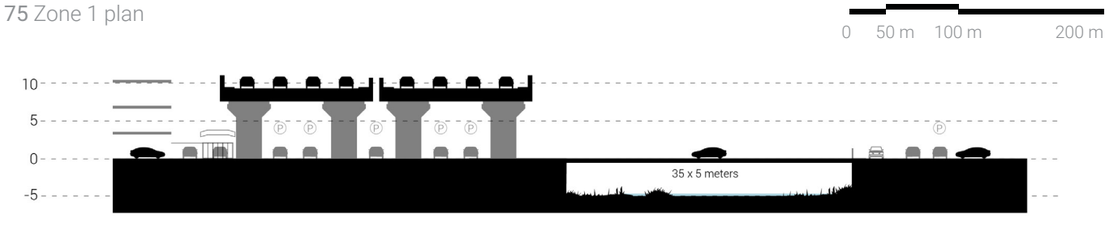



Fig. 76 Section 1

## CONSIDERATIONS

**[BUILT ENVIRONMENT]** At this section, two main elements are monopolizing the area. The first one, is the Beirut International Exhibition & Leisure Center (BIEL). It is an event hall that caters a wide range of users when expositions or concerts are hosted, and has amplified the economic exposure of the region significantly. The second is the local vegetables market where farmers and owners of the adjacent agricultural lands sells their products to the inhabitants of the region and of Beirut. However, the settlement of the vegetable market is problematic in its position, since it blocks the linear path on the eastern side of the river for the inhabitants commuting from Sin el Fil. The NBT Station that once was the main embarking train station in Beirut, is now abandoned. The lack of management resulted in its structures being completely neglected. Its location at the southern-east entry of the city is very strategical, especially considering the availability of its vast lands. Unfortunately, the yard is completely gated and inaccessible to the public.

**[URBAN FORMS]** Current public events are progressively utilizing the abandoned lands on the riverfront as a venue for public meetings, making their way around the canal walls. That is the case of the informal vegetable market.These behaviors reflect the critical need for public spaces on a local level, justifying the use of any accessible open space. The drastic lack of public spaces is closely associated to the lack of collective effort in government organizations and social structures. Unfortunately, one of the consequences of unorganized settlements on the riverfront is water pollution. Along the river, there are channels that direct the waste canalization of the vegetable market and of the neighboring residential areas directly into the water streams. the The river has consequently been environmentally deteriorated and heavily polluted due to the outflow of home sewers and untreated waste.

**[ACCESSIBILITY]** The construction of the highway led to the complete eradiction of the river's biodiversity. It changed the lives of the residents of the area, drifting them apart not only from the river, but also from from each other since the riverfront was the only place to meet. After its construction, the area was split in two: the upper part and lower part. This was caused not only due to the location of the highway, but also due to its geometric properties. Its width is exagerated considering the frequency of passing cars. The car park lanes on the both sides of the highway are questionable as well: Inhabitants avoid using them because of the high theft risks in the area. These unused spaces could be managed in order to fully exploit their existing potential. It is important to mention that even the inner roads and streets are completely disconnected from the urban plots: Boards delimit the edges of each plot, privatizing them.





## ITINERARY BOARD TWO

Fig. 77 Vegetable market

Fig. 78 Untreated waste dumped in the river canal from the Vegetable market

Fig. 78 BIEL event hall: Disruptive limit


Fig. 79 Zone 2 plan

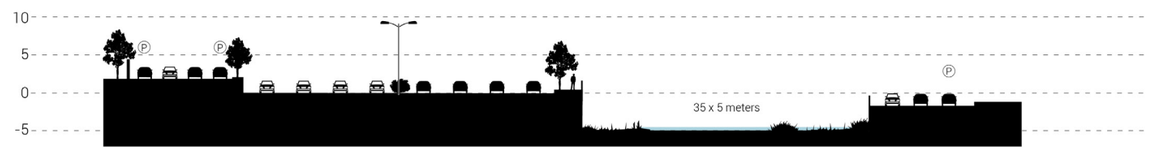



Fig. 80 Section 2

## CONSIDERATIONS

**[BUILT ENVIRONMENT]** This area is a testimony of riverfront's transition from a heavily urbanized area to and agricultural zone. Amongst the industrial structures on Beirut's side, some of them are being reused as warehouses and others have been completely demolished to be replaced by new residential complexes. Two main developing districts can be distinguished. One on the western side of the river, developing towards the agricultural lands and threatening their presence which formerly dominated the river's scenery. On the other side of the river, the mixed use district is growing on lands that are currently neglected. This area shows great potential in the interventions as there is a vast availability of lands and an urgent need in services.

**[URBAN FORMS]** Whenever the transport problem is mentioned, decision makers rush to identify potential parking spaces instead of trying to find durable solutions for alternative means of transportation. The several vast lands on Sin el Fil's riverfront are a testimony to the last few available open spaces connected to the riverfront and are currently being used carelessly: Public car parks during the day and drift courses at night. Their central presence between an elementary school, a residential and commercial district and the agricultural fields urges its rehabilitation as there is an urgent need for public spaces in Lebanon. Another wasted asset in this section of the study are the agricultural lands. Their direct presence on the highway threatens the quality of the collected agricultural products. In addition to that, untreated agricultural waste is frequently thrown in the river.

**[ACCESSIBILITY]** Along this major axis of the highway, only one pedestrian bridge connects the riverbank of Furn el Chabbak to the Sin el Fil area; the two remaining bridges at the extremities of the study area are exclusively vehicular passages. The passage coincides with the third axe, and is located in front of Biel. One major problem is the difficulty to access the bridge. The movement of the pedestrian on the Emile Lahoud highway is very unsafe and almost impossible: narrow sidewalks, badly paved pathways, unpleasant noise and visual pollution, and above all the proximity of the cars driving at high speed. By observing the following section, the separation the highway has created between the city and the river on both banks is striking. The vast abandoned spaces on the two shores bear witness to a community that has lost its link with the river.



## ITINERARY THREE

Fig. 81 Entrance to the residential buildings and underused lands

Fig. 82 Typical residential courtyard

Fig. 83 Marginalized agricultural fields due to the urban sprawl

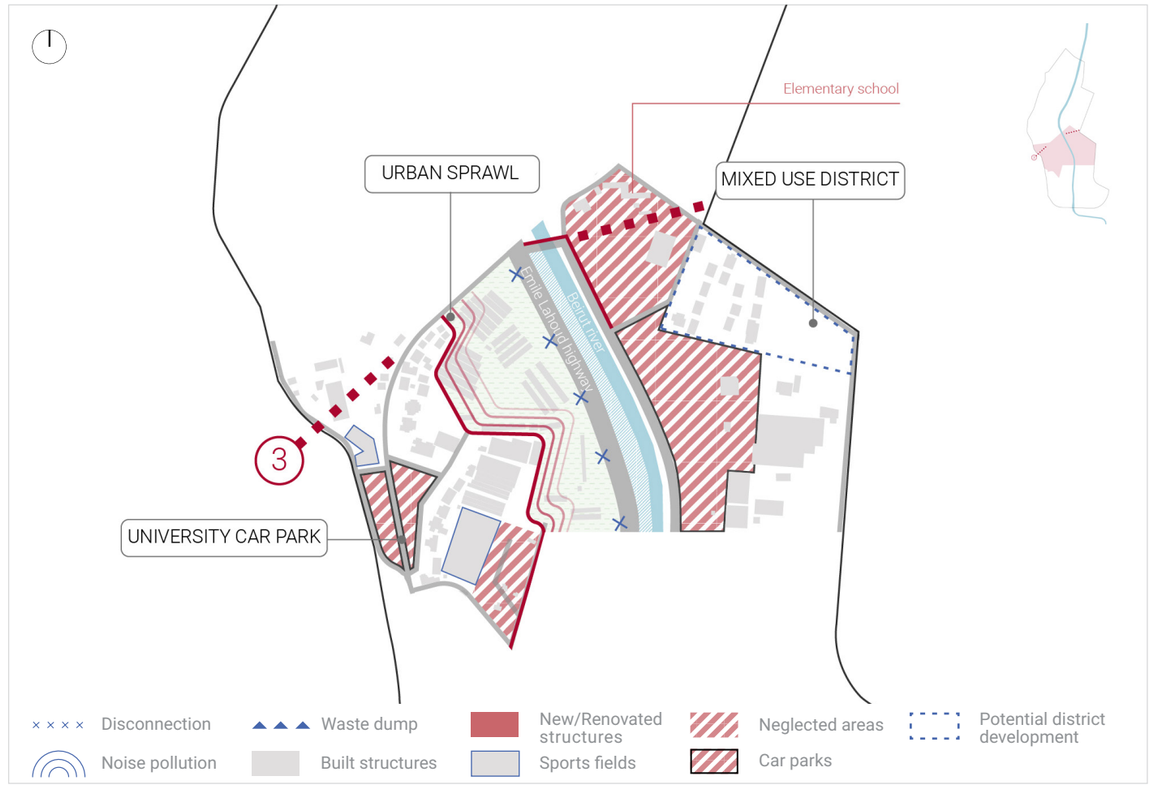



Fig. 84 Zone 3 plan

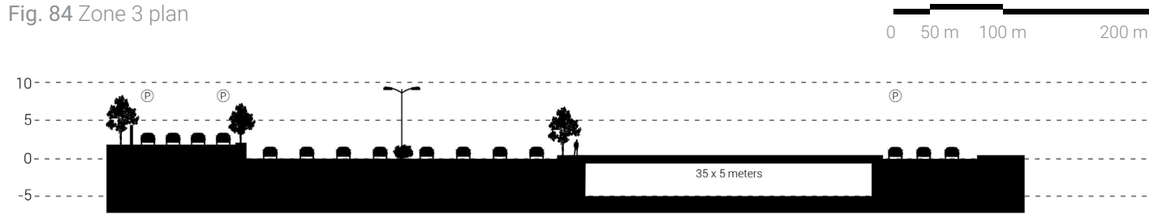



Fig. 85 Section 3

## CONSIDERATIONS

**[BUILT ENVIRONMENT]** The main asset of this study area revolves around the Sagesse University campus in the area of Furn el Chebbak. There are two buildings dispersed on the extremity for the Law & Business departments, and annexed is the student's dorms. The student's dorm is limited to one building; therefore, the capacity of students is brought down to a minimum. An adjacent sports field is located on the western side of the main university building but it is public property. Since the university doesn't own any private sports facilities, the students are forced to pay a fee in order to use the currently available badminton, tennis and basketball fields. Therefore, a lack of complementary facilities can be identified, such as co-working spaces, outdoor communal spaces, sports facilities and student accommodations.

**[URBAN FORMS]** The eastern side of the Beirut's river at this part of the sequence, still accommodates the historically situated agricultural fields. However, due to the current poor and unstable conditions of the river, the area remains in the sights of opportunity seekers and real estate developments. The urban expansion on the eastern side of the river continues to threaten the remaining agricultural lands. Despite the absence of proper infrastructure such as roads and sewage in the agricultural area, residential buildings continue to spread closer to the fields, and some have even been constructed within the remaining lands. Rather than considering the agricultural sector a developing opportunity, it is currently at risk of disappearing.

**[ACCESSIBILITY]** The Sagesse university campus is currently surrounded by two car parks, one that is free of charge for the students and another private car park. One of the main issues of commuting students is the lack of places to park their car. Since the area is not connected to a public transportation system, students have no other way but to use their own cars, which makes parking near the university problematic. The establishment of a public transportation network is a must. Another issue regarding the infrastructure along the riverfront is its proportion: it is excessively wide, making space for a total of 8 fast lanes, and 4 inner ones including two parking lanes. This highway has gained its importance by connecting all the neighboring towns to the Beirut port. However, the vehicular activity is not as busy as it was planned to be. Therefore, an enhancement in the management of the different road networks and the incorporation of public transportation is required.





## ITINERARY FOUR

Fig. 86 Urban sprawl threatening agricultural fields

Fig. 87 Landfill polluting the agricultural lands

Fig. 88 Neglected and dry canal

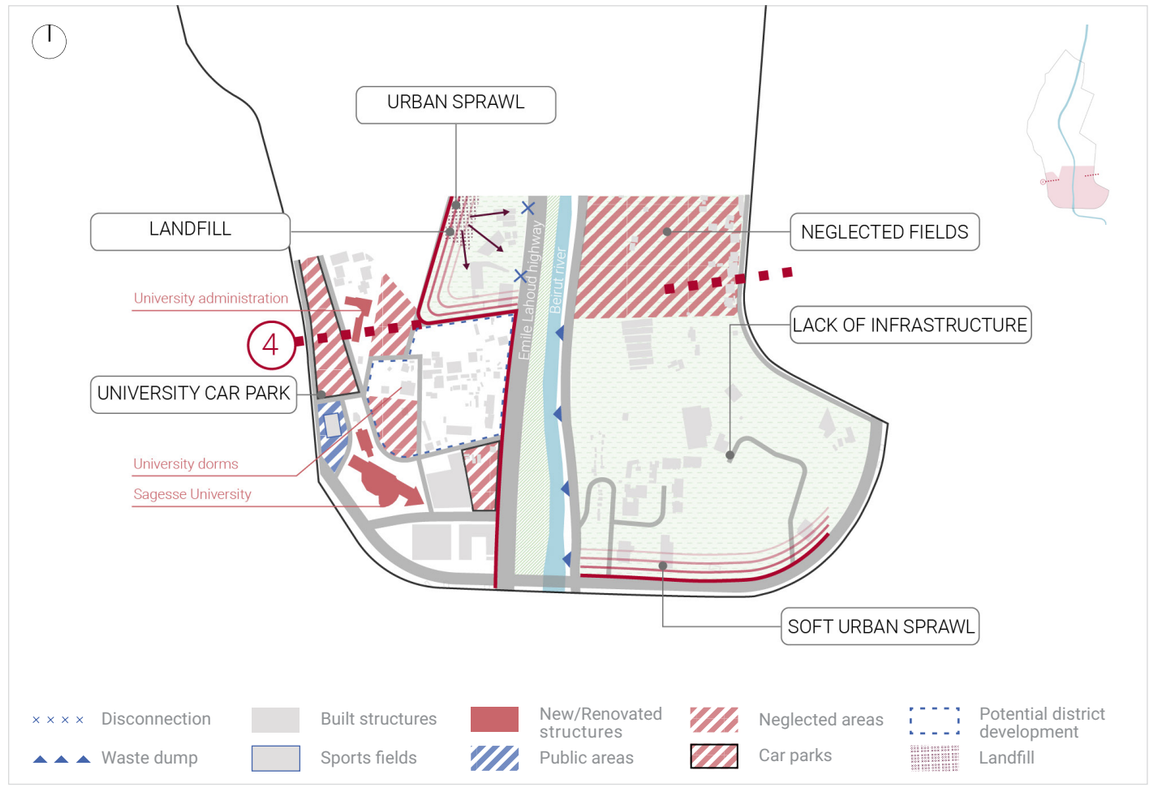



Fig. 89 Zone 4 plan

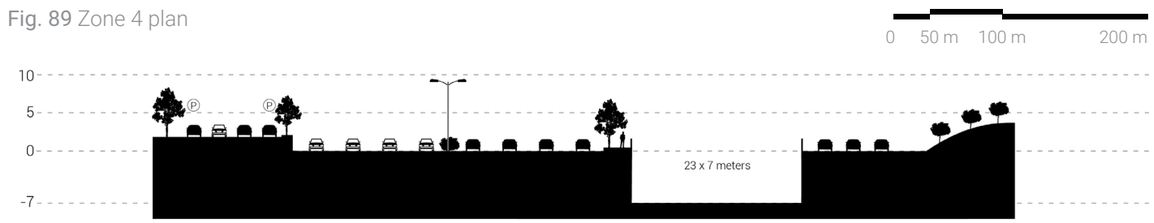



Fig. 90 Section 4

# 05 PRELIMINARY STRATEGIC PROPOSAL

# 05 STRATEGIES AND DESIGN SOLUTIONS

## 5.1 FUNDAMENTAL PRINCIPLES

Through the previous analysis, we understand that the approach to the urban development of the area was a pragmatic and practical approach that did not take into consideration the potentiality and qualifications of the riverfront. At the heart of the capital, it has formed a largely rapid traffic netowrk, a hostile pedestrian environment, a poorly accessible infrastructure, and a densified urban entity detached from its neighboring districts: An unfinished metropolization that has never been properly and effectively de-industrialized. The opportunity of restoring the riverfront will be grasped by undoubtedly tackling the issues of governance, economic instability, social degradation, and ecological degradation. The previous study of Bilbao and Lyon's riverfronts has highlighted valuable principles and relevant factors that contribute to the effective transformation of the riverfront, triggered by the growth of the built and natural environment according to defined urban policies. The studied models inspired the following inter-related principles that will guide the development of Beirut's riverfront.

**PRINCIPLE 1**
RESTRUCTURE THE GOVERNANCE

As previously mentioned, the region of study is at the intersection of three municipal areas: Municipality of Beirut, Municipality of Furn el Chebbak and Municipality of Sin el fil. From both the models of Lyon and Bilbao, to successfully achieve the interdependency of interventions between the different districts a unified administrative entity should be defined. The governance leading Beirut's rehabilitation strategies should no longer exclusively represent the power of the state, as it previously did, but should constitute an administration regrouping the multiple involved actors, forming a balanced partnership between public entities, third-party sector actors and the community, in its density and diversity. This partnership pleads in favor of the constitution of a Regional Council federating the municipalities and including the influential actors and stakeholders in order to define the vision and the policies. Under the supervision of this entity, an Institute of Planning would be formed. The institute includes Lebanese architects, urbanists and planners, who would carry out all studies, surveys and research relating to the urban development in the Beirut metropolitan area, and specifically the urban planning of its riverfront. Similar to the Maison de La Confluence in Lyon, where the administration SPLA, the stakeholders and citizens share their ideas and visions of the project, a headquarters for the Institute of Planning will be designed and will take place on the riverfront. The establishment of this structure creates a place for dialogue, for the exchange of ideas and for opinions to be heard, further centralizing the riverfront in its administrative and physical importance.

**[REGIONAL COUNCIL]** Members and stakeholder management is critical in the development of cities, which aim to produce a sustainable and livable environment. In the case of Beirut, it was critical to engage public, third sector and private stakeholders and to make use of their interests to invest and take part in the usage of the riverfront rejuvenation project's goals. Below are listed some of the selected members.

**[INSTITUTE OF PLANNING]** The institute will be formed by Lebanese architects, urbanists and planners based in Lebanon. The selection of the architects taking part in the design or refurbishment of the built environment will be selected through the launch of competitions regarding each plot to be developed. As for the landscape design of the riverfront, local urban planners would be directly selected to develop the public squares, parks and agricultural fields based on the firm's knowledge and past experiences.

**[USERS ENGAGEMENT]** The collaboration between the public entities, the stakeholders, the planners and the community is at the core of the planning process of the project. Throughout the life of the urban project, all four are encouraged to be in continuous contact. The community should be made aware of the policies and design decisions taken by the appointed members in order to engage with the choices. Therefore, communication is key for the advancement of the riverfront rejuvenation. The users can be made aware of the project by several means: By organizing public open meetings at the headquarters of the Institue of Planning, by arranging workshops specific to each category of users with the mediation of the Beirut Art Center, or by simply communicating policies and design strategies by means of installing information panels along the site.

**PRINCIPLE 2**
RE-DEFINE THE MOBILITY AND URBAN LAYOUT

The process of metropolisation of the areas on the Beirut river is closely linked to the City-Mobility couple. It has been proven that the construction of the highways on both sides of the river connecting all the neighboring areas to the port, have been major triggers for the urbanization of the region. On the downside, they have suffocated the river and created an aggressive separation between the two banks. The models of Bilbao and Lyon are a testimony of how their river streams were associated with the development of infrastructure axes, the main axes of plots development and the axes of public spaces. In Beirut's case, the main development axis of Emile Lahoud highway will be adapted to integrate a linear public transport network that would interconnect the three regions along the river properly. The highway would also be transformed into a boulevard, slowing down the maximum speed and incorporating traffic lights. The transversal axes leading to the riverfront would then be re-defined creating a grid layout, which would repair the current fragmentation amongst the built fabric and the segregation of the different districts from the river. Re-defining the inner streets conditions is necessary to restructure the metropolitan area, plan its sustainable growth, and let go of the perception of the riverfront as a highly congested and polluted area. The riverfront will be the Public spine of the central riverfront area with public spaces and parks along the main circulation axes as tools for social inclusion along the course of the river.

**PRINCIPLE 3**
REDUCE THE ECOLOGICAL FOOTPRINT

In 1992, at the Rio Earth Summit, the notion of ecological footprint was introduced. It is the assessment of human activity's impact on the natural environment.[97] Urban regeneration strategies should attempt to blend urbanization speed with environmental and ecological quality in long-term policies. A model proven to be efficient in Lyon Confluence through the implementation of a sustainable action plan in the development of its eco-neighborhoods. Beirut will adopt strategies in the development of the different districts with the goal of achieving a balance between naturalized spaces and the built environment and reducing $CO_2$ emissions.

[97] United Nations. (1992). Conference on Environment and Development, Rio de Janeiro, Brazil, 3–14 June 1992. https://www.un.org/en/conferences/environment/rio1992





**PRINCIPLE 4**
IMPLEMENT NEW PRODUCTION MODELS

One of the main goals behind the rejuvenation of the Beirut riverfront is the urgent economic restructuration of the city. In Bilbao, the development of an innovative industrial national exonomic model based on the existing industrial sector was a tool to ensure the project's growth on the long term. The existing agriculture sector is a weak link as it is threatened by the urban expansion. Preserving and empowering the agricultural sector, through the implementation of strategies, will allow a new economic reliance on an innovative model based on the agricultural sector. The implementation of integrative productive models within the existing fabric would allow a financial gain to start the project and a long term financial stability. This productive urbanism aims to rediscover a sustainable economy and a balance between local production and consumption systems. Producing becomes one of the main pillars of the rejuvenation strategies of the area and its economic sector.

**PRINCIPLE 5**
RENEW THE URBAN FABRIC AND INTRODUCE MIXED USE NEIGHBORHOODS

To properly articulate urban planning and transportation, city and mobility, urban densification around the project's main nodes is essential for the development of the framework. The riverfront must initiate a new development policy with the aim of bringing together residential, educational and working equipment around the city's structuring axes. This densification “in the right place” will promote the development of dynamic neighborhoods with mixed programs where short distances prevail. This model of multi-functional plots combined with accessibility has proven to significantly enhance and transform the inhabitant's experience in the regeneration of Lyon Confluence. In fact, one major operation of the project will be to apply requalification operations to wastelands, obsolete buildings, abandoned infrastructure and under-exploited lands. Transformation of the urban fabric by recovering and rehabilitating existing buildings and their immediate surroundings, not only helps in the fight against excessive urban sprawl in an already dense area, but also morphs the perception of the surroundings into a favorable image. The empty and abandoned landfills become transitional attractive places for activity, preserving the linear development of the riverfront and reviving the critical spaces into valuable ones.

## 5.2 DESIGN STRATEGIES

After having identified the fundamental principles of the project, this chapter articulates, according to the principles, the clear ambitions and key actions that will frame the development of the Beirut riverfront. The strategies put in evidence a new scenario of the riverfront in a central location in Beirut: A mixed of urban services and agricultural production aiming to reconnect the two riverbanks along with their respective communities The goal is to ultimatly mold the urban identity of Beirut into a livable, equitable and sustainable city. The four following themes will be structuring the urban morphology of the riverfront: Mobility, Environmental dimension Socio-Economic dimension, and Socio-Cultural dimension.

### MOBILITY STRATEGIES

**[ADAPTIVE MODE OF TRANSPORTATION: NBT HUB]** The element at the core of the rejuvenation of the riverfront area is the transformation of the Emile Lahoud highway from a high-speed motorway to a Boulevard. A hierarchy of streets was designed: an inner pedestrian street connected to the urban context, a two way inner car road with an adjacent parking lane, two two-way roads on the Emile Lahoud Boulevard, connecting all the districts along the riverfront, a public transportation lane on which electric tramways and buses circulate offering a decent public transportation to the commuters of the area, and finally a riverside promenade dedicated exclusively for pedestrian and bicycle use connecting the two river banks thanks to new incorporated bridges. The development of the tramway system will be made in close relation to the development of a mobility hub in the former NBT train station.

**[CARBON-FREE MOBILITY]** The refurbishment of the existing inner streets transversal to the riverfront is necessary in order to integrate proper sidewalks for the movement of the pedestrian. Furthermore, to encourage the use of public transportation and soft modes of mobility and to reduce the usage of vehicular roads, several Silo car parks are made available at the main entry points of the area, near tramway and bus stops, and near solar charging stations for electric vehicles and bicycles. Silo car parks[98] are vertical parkings that occupy an existing abandoned structure and that reduce the footprint of cars parks on the ground floor. The cars can then be parked in the structures and the inhabitants can freely use alternative soft modes of transportation which would consequently reduce traffic, and pollution. This solution could be a temporary response that would absorb the current flow of cars, hoping that in a span of 20 years, the habitants of Beirut will solely rely on public transportation. These silo car parks then could be rehabilitated and assigned a different function.

[98] Le parking en silo à étages - Une solution de stationnement idéale. (2019, August 7). Park'Up. https://www.parkup-systems.com/guide-du-parking/parking-en-silo/





### ENVIRONMENTAL STRATEGIES

**[SITE RE-NATURALIZATION AND SOIL RECOVERY]** The territory being highly artificialized and the river being completely casted in concrete; it will be essential to work on the reintroduction of nature and to create islands of freshness, specially on the banks of the river. The urban project's ambition is to recover a maximum of artificial floor space and to promote permeable soils by the "renaturation" of the used parking spaces, the abandoned, and polluted lands on the river banks. One re-naturalized, the integration of fauna and flora in both the public and private domains will allow the complete transformation of the urban landscape into an ecosystem.

**[WATER RE-COLLECTION]** By re-naturalizing the river banks, providing porous grounds and creating water gardens, they become a support for the management of the water through rainwater infiltration: storm water will infiltrate the surface and recharge the atmosphere, instead of flooding the streets. Rainwater management equipment will also be integrated within the river: A water reservoir is designed to be incorporated within the agricultural fields and connected to the river bassin, capable to relief water in the event of flooding. Water will then be conducted from the river to the bassin, purified, and used to irrigate the agricultural fields

**[SUSTAINABLE SITE MAINTENANCE: AGRICULTURAL LANDS]** The theme of urban agriculture will be developed through the site of the riverfront on different scales. For the smallest scale, containers and vegetable gardens could be place on rehabilitated roofs and abandoned ground floors. The intermediate scale would be dedicated for shared gardens in new reclaimed public spaces on the site of the area, and on the restored soil on the sides of the river. The biggest scale is devoted for the existing agricultural lands dedicated to professionals, to which greenhouses and experimental organic farming could also be added. The goal is to create an agro-district on the waterfront and develop the sector of agriculture based on the circular economy principle.

**[ECO-DISTRCTS RESTORATION]** The city of Beirut has always been confronted with a complex densification equation: how to reduce the density of certain areas in order to offer local green spaces for everyone. It is therefore important to prioritize the comfort of the users and create a suitable environment to live in and produce. The project takes advantage of the territorial conditions, such as the climate, sun, wind, to enhance the living conditions: integrate greenery into the existing structures, bring the sun into the heart of the islands, favor the natural ventilation of the urban and architectural systems, convert the roofs into vegetable gardens which would also allow the reduction of rainwater runoff.

## SOCIO-ECONOMIC STRATEGIES

**[ON-SITE FOOD PRODUCTION]** One of the main strategies put in evidence is the development of the agricultural sector. It is considered in the preliminary phase of the project as an important tool, in its spatial but also economic dimensions. The ambition behind this principle is to achieve a local food production system, short food circuits and food self-sufficiency. The strategy can only be accomplished through the development of the few existing agricultural lands into a fertile riverfront.

**[INTEGRATIVE ECONOMIC TYPOLOGIES]** In a city as dense as Beirut, the creation of attractive places to live, favoring the porosity of exchanges is crucial for the livelihood of the citizens. The intervention proposes to harness the potentiality of the existing urban fabric by transforming the current ground floor from a neglected space to an active base. It becomes an intermediate zone between working spaces, residential spaces and recreational spaces. It awakens into the existing structures new places of exchanges, creativity and activity all year round. This productive urbanism aims to restore the existing structures and rediscover a sustainable economy, through architectural typologies grafted onto the already existing buildings: shops, small factories, workshops and the small offices.

**[BUSINESS PARKS]** An analysis of the existing business fabric was conducted in order to identify the spaces in between that can integrate volumes capable of accommodating productive activity complementing the existing sectors. The non-constructed neglected spaces will become a support for the business parks: a new typology of offices to rent temporarly or permenantly, aiming to replace the old industrial models and lands. These offices and their complementary parks encourage productivity amongst a socially inclusive environment, targeting a broad range of users.

**[TERTIARY SERVICES AND MARKETS]** Riverfront amenities and markets will be installed to economically activate the riverfront regeneration project during the day and night. The creation of such public structures in currently neglected and underused spaces will allow the creation of job opportunities for the local residents and communities, answering to the striking unemployment rate in Beirut due to the current economic crisis. Some markets will be dedicated to selling locally produced products, encouraging local production and consumption.

**[ALTERNATIVE HOUSING]** Two types of housing will be developed. The first is the student housing, answering to the lack of student accommodations in the Sagesse university's proximities. The second is the SOHO (Small Office Home Office), a typology of living and working from the same place. Ever since the global pandemic, the working paradigm has shifted. The soho are an answer to a new alternative and adaptive way of working in the modern days: A supply to the increasing demand of working from home.





## SOCIO-CULTURAL STRATEGIES

**[RECREATION SPACES]** There is an urgent need to develop public spaces and uses promoting urban comfort. The project will consequently combine the created green patches, the de-artificialized soil and the new public squares to create communal places favoring uses and encounters, such as the river park, the Biel urban park and the cultural square. Their development will be prioritized on the linear axe of the river.

**[CULTURAL LANDMARK]** An emblematic cultural project, would be conceived to take part in renewing the image of the area, learning from the previous case studies of Lyon and Bilbao. The cultural center near the riverfront, would be used as a catalyzer for the area's public development funding. This complex will include an auditorium, library, temporary and permanent exhibition spaces attracting the locals with the aspirations of even reaching the international scene.

**[PROXIMITIES AND FUNCTIONAL DIVERSITY]** To build a healthy city that fights against urban nuisance, is also to build a city diverse in its nearby functions, that reduces transport time for daily trips. Carlos Moreno, teacher and researcher, created the "quarter hour city" concept: "the city where, in less than 15 minutes, dwellers can access their essential living needs"[(99)]. It would be an interesting strategy to apply in Beirut, especially on the congested Beirut riverfront, where the habitants have been demanding to have an easy access to quotidian services. The main idea is ensuring functional diversity by developing social, economic, and cultural amenities and creating an interdependency between the different services across the river banks. This ensures substantial densification in the neglected areas, while increasing spaces for public meetings and enhacning the connections between the two riversides.

**[COMMUNITY GARDENS]** Community shared gardens are a major factor of social inclusivity, favoring the creation of productive activities and the meeting in the heart neighborhoods. Rehabilitating the existing agricultural areas and developing new punctual community gardens, offers a new relationship to the landscape, a rediscovery for city dwellers of the possible daily relationship and practices between human and the fertile soil. It is a tangible intervention that people can engage with, to indirectly bring them to the preivously unloved part of the riverfront, making it once again a major social place in the heart of Beirut.

[(99)] Brain, S. (2020, May 15). The 15 minutes-city: for a new chrono-urbanism! - Pr. Carlos Moreno. https://www.moreno-web.net/the-15-minutes-city-for-a-new-chrono-urbanism-pr-carlos-moreno/

Chapter 5. Strategies and Design Solutions

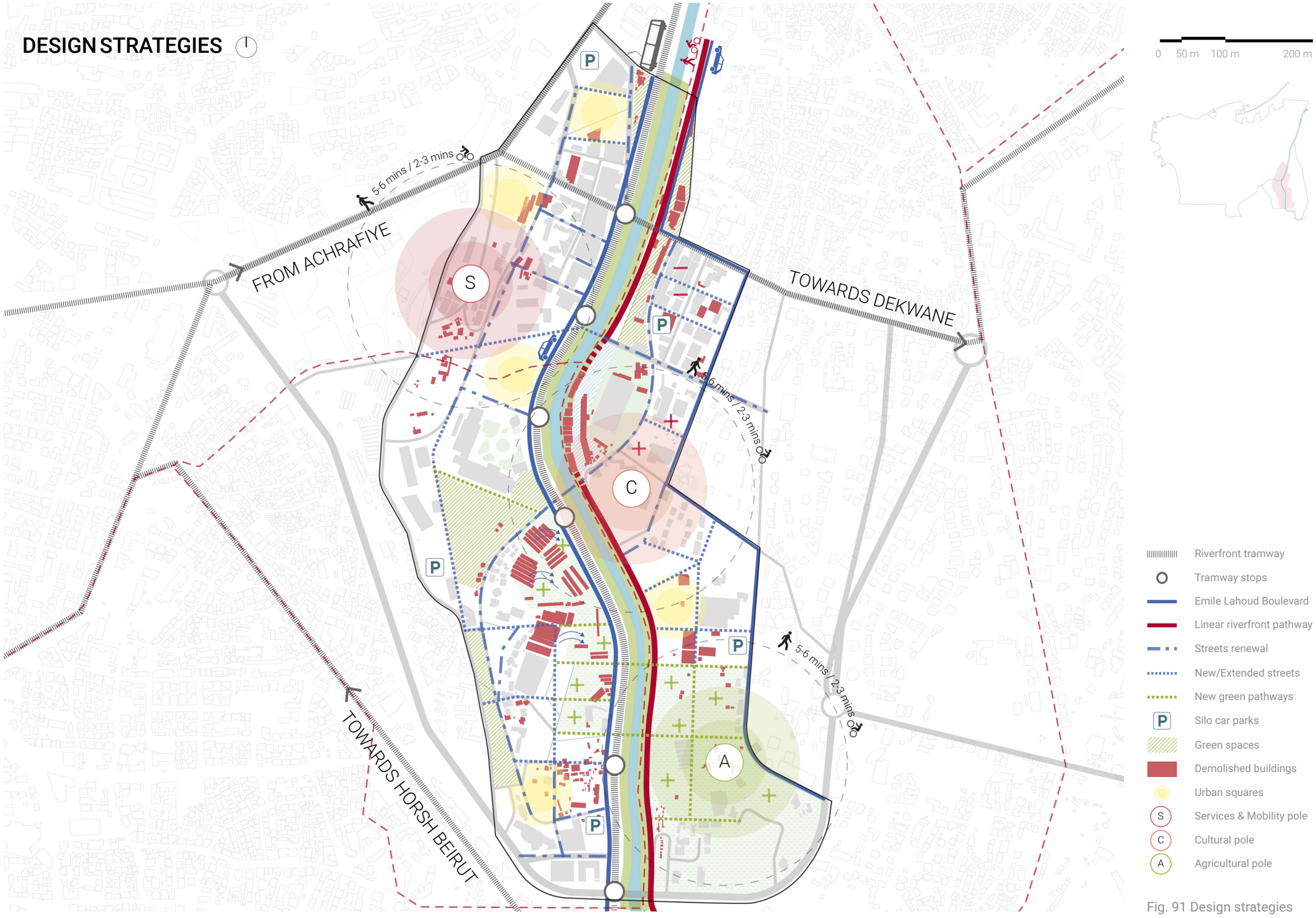



Fig. 91 Design strategies

## 5.3 TACTICAL INTERVENTIONS: CONCEIVING PLACES

Architects and urbanists are called to awaken a “sense of place” out of spaces in their designs. The place, as it was previously defined in earlier chapters, is a physical space that is assigned a significance and a specific purpose in the urban intervention, and becomes one of the centers of the project. This concept is translated in the rejuvenation of the riverfront through the architectural refurbishment of the abandoned structures and the new designs of four main “places” that will be identified below. The actions will be concentrated on creating places out of the neglected and abandoned sites, by articulating them through a mixity of new urban services and production models, making it a strategic, shared, inclusive and mixed place of interest. The development of inter-dependencies between the designed places make it possible to envision the operation as a global urban strategy, interlinking the riverfront with the urban fabric, through the development of the new Emile Lahoud Boulevard. The organization of the site in sequences will follow a linear strategy, alligned with the course of the naturalized river, and the main transportation axis. Each sequence, linked to their location and to their programming, showcases the creation of ponctual places, which completes the large-scale strategy. The following poles punctuate the linear axis on the Beirut river, from North to south:

**[PRODUCTIVE POLE]**
DE-DENSIFICATION AND REJUVENATION OF THE INDUSTRIAL AREA

**[STATION AND MOBILITY POLE]**
RE-ESTABLISHMENT OF A HUB

**[CULTURAL POLE]**
CREATION OF A LANDMARK: THE CULTURAL CENTER

**[AGRI-URBAN PRODUCTIVE POLE]**
URBAN FARMING TO TRIGGER ECONOMIC STABILITY

Each pole will be classified according to the interventions made on the built environment, on the urban surroundings and on the mobility systems, which will affect the urban identity of Beirut's riverfront. In order to evaluate the design strategies and their effectivness in transforming Beirut's urban image, the externalities of each intervention will be categorized below according to the environmental, economic and social nature of the outcomes.

Environmental Economic Social



Chapter 5. Strategies and Design Solutions

**ZONE 1: PRODUCTIVE POLE**
DE-DENSIFICATION AND REJUVENATION

| | INTERVENTIONS | EXTERNALITIES | |
|---|---|---|---|
| BUILT ENVIRONMENT | OFFICES AND RETAIL | Introduction of mixed use districts which fosters a local economic dependency with the surroundings (Scenario: Employee during lunch break buys food from the sunday market). | |
| | RIVERFRONT AMENITIES | Economic output due to renting out the shop modules, which is used to fund and ensure the durability of the riverfront's maintenance.<br>Introduction of new job opportunities in the hospitality industry.<br>Promotes safety during the night due to the presence of nocturnal activties. | |
| | ECO-RENOVATION / MIXED DISTRICTS | Health and lifestyle improvements in a previsouly densified industrial district by reconfiguring the existing plots.<br>Transform the ground floor into an active base by inserting retail typologies to stimulate economic activity. | |
| URBAN FORMS | BUSINESS PARK | Promotion of a new productive image of the district which accounts to a better quality of life. | |
| | SPORTS FIELDS AMENITIES | Strengthen and emphasise the existing sports fields and leisure spaces. | |
| | EMILE LAHOUD BRIDGE JUNCTION / SUNDAY MARKET | Generate social development upon marganilized communities by relocating the Sunday Market to the neglected space, under the bridge and restoring the mental/ physical image of the bridge as a social infrastructure. | |
| | RIVER PARK | Allowing the equitable site use of the previously abandoned space, complementing the existing kid's park. | |
| MOBILITY | TRAMWAY LINE | Dual incorporation of tramway lanes to anchor the central position of the riverfront (North-South), and Reduce traffic (East-West). | |
| | SILO CAR PARK AND ELECTRICAL RECHARGING STATIONS | At the entry point from Achrafiyeh (North-West of the terrain) to allow easy access to the new productive pole created and the de-congestion of internal traffic. | |





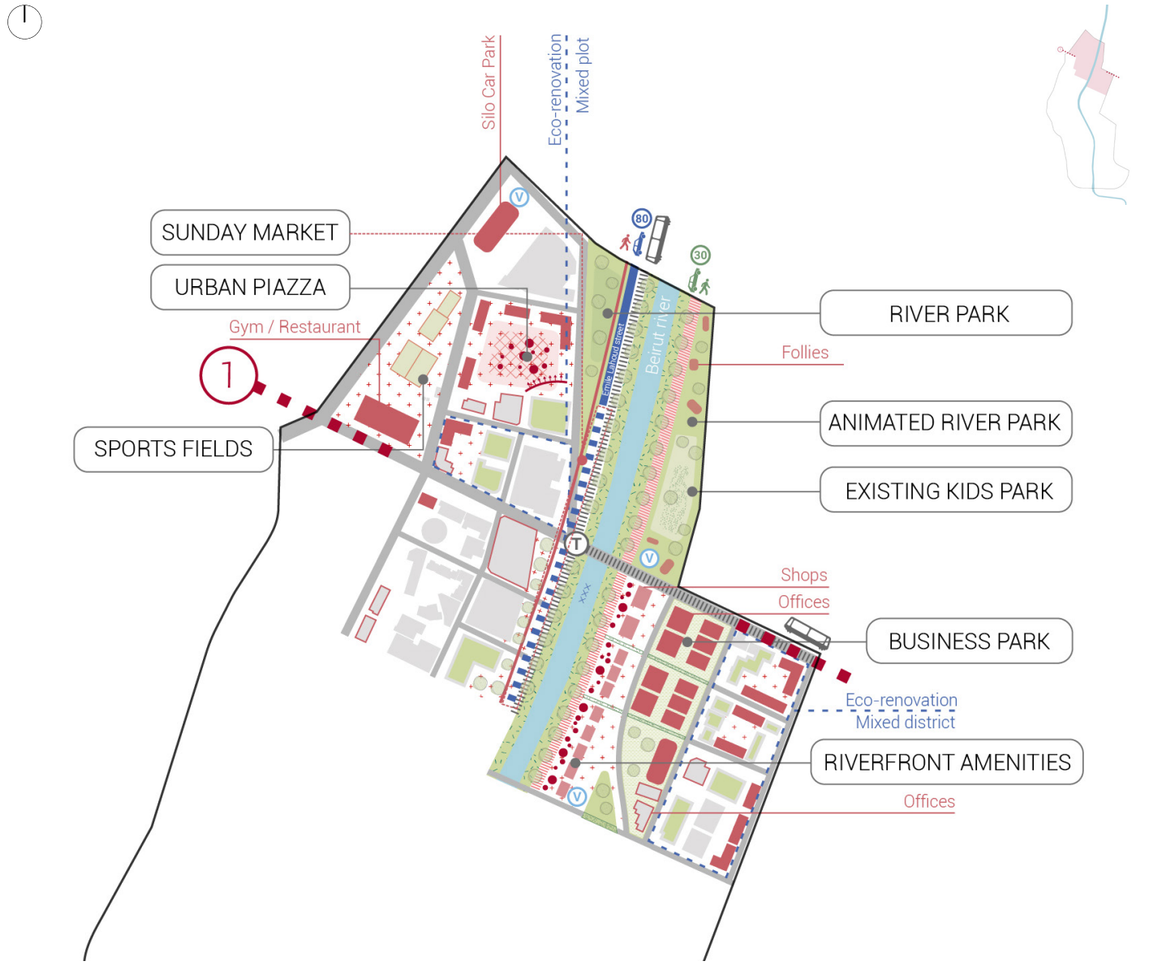



Fig. 92 Productive pole

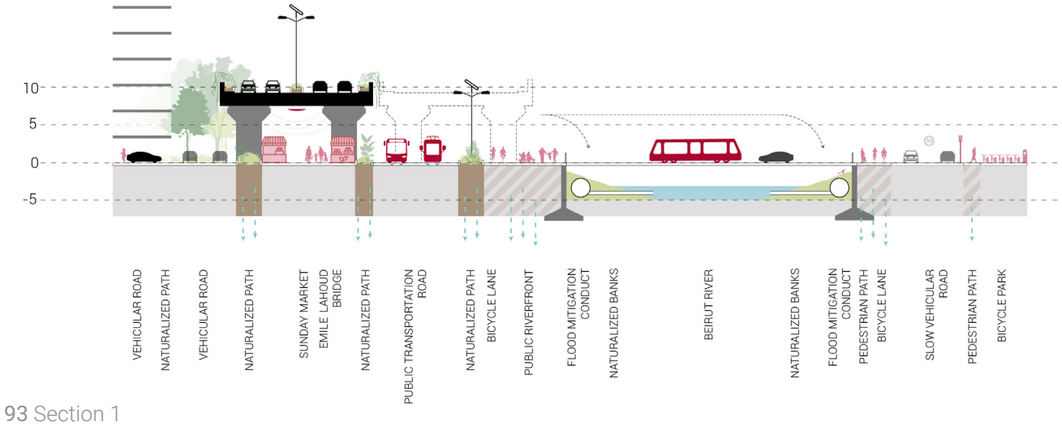



Fig. 93 Section 1

**ZONE 2: SERVICES AND MOBILITY POLE**
RE-ESTABLISHMENT OF A HUB

| | INTERVENTIONS | EXTERNALITIES | |
|---|---|---|---|
| BUILT ENVIRONMENT | NBT TRAMWAY STATION | Allows the revival of the past uses of the station, offers a variaty of new job opportunities: Tramway station workers, engineers, managers and merchants. | |
| | RAILWAY MUSEUM | Commemorate the train station's historic heritage, spread awarness about the importance of public transport and encourage future investments in the sector. | |
| | SPORTS EQUIPMENT: GYMNASIUM | Strengthen and emphasise the existing sports fields and leisure spaces and promote a healthier lifestyle for the inhabitants. | |
| | SOHO | An answer to the current increasing and future demand of housing and working spaces and allows the economic growth of the real estate sector.<br>Targets inter-generational users. | |
| | INSTITUTE OF PLANNING | Allows a place for dialogue between decision makers, stakeholders, designers and inhabitants for urban projects, including Beirut's riverfront regeneration. The institute takes part in the desired centrality of the developed area. | |
| URBAN FORMS | URBAN PARK AND WATER GARDEN | Allows the democratization of the available lands while creating an eco-habitat, expanding the quantity of flora and fauna, regulating the ambiant temperature. | |
| | MARINE SQUARE | Recover the lost relationship with water as a response to the privatization of waterfronts on a national scale. This will launch the revival of water activties. (Scenario: Merchant receives his goods from the Port, and transports them across the river canal to sell them in the Souk) | |
| | CULTURAL SQUARE | Reconversion of the previous parking lot. New asset to Biel allowing community engagement with the possible outdoor events. | |





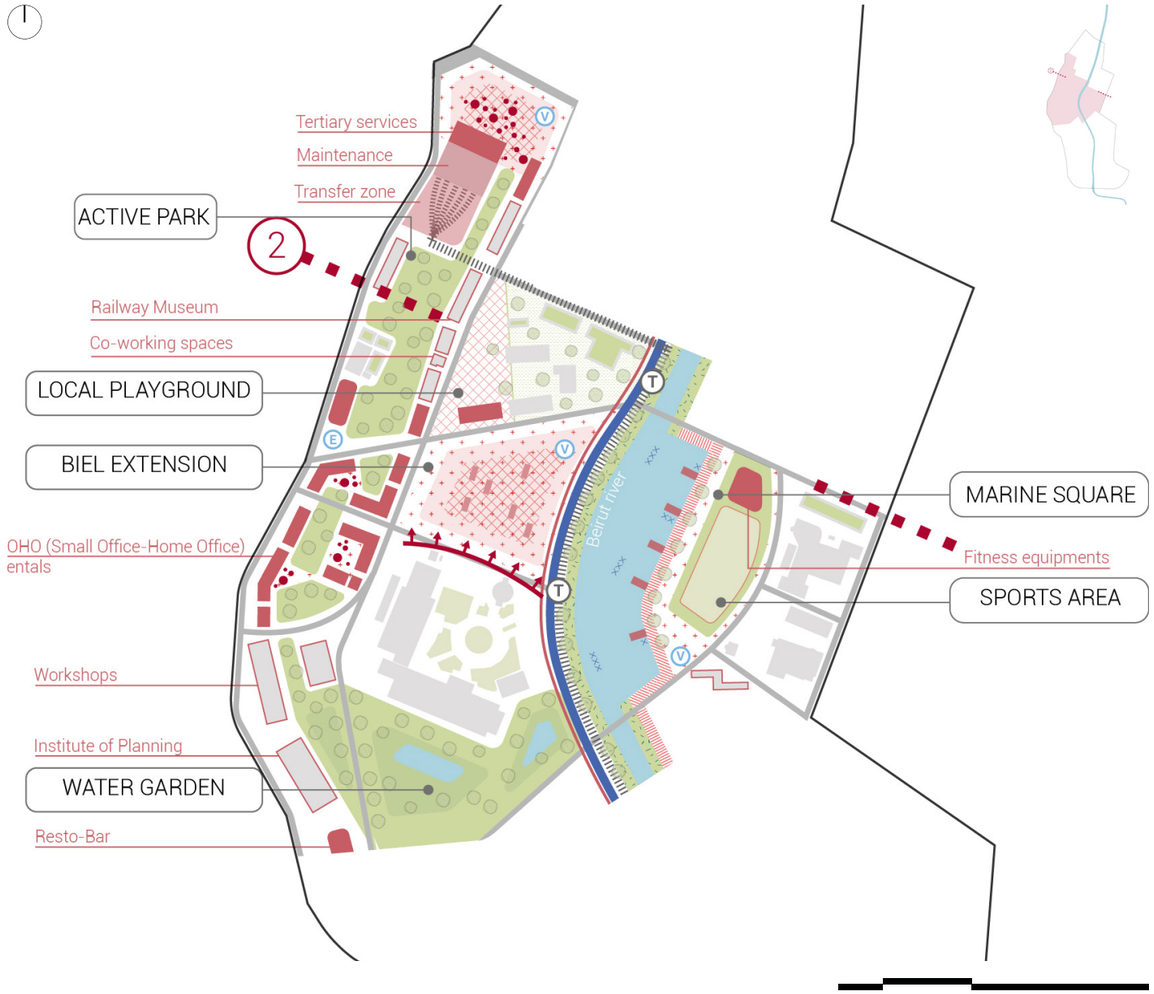



Fig. 94 Service and mobility pole

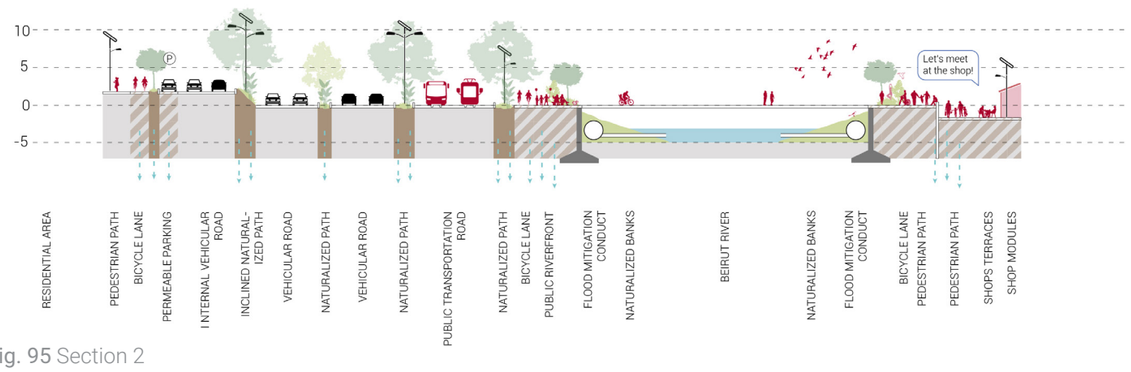



Fig. 95 Section 2

**ZONE 3: CULTURAL POLE**
CREATION OF A LANDMARK: THE CULTURAL CENTER

| | INTERVENTIONS | EXTERNALITIES | |
|---|---|---|---|
| BUILT ENVIRONMENT | ECO RENOVATION: ROOFTOP FARMING | Shared rooftop vegetable gardens encouraging social inclusivity and favoring the creation of productive activities. | |
| | CULTURAL CENTER | Boosts the image of the riverfront, attracts new potential investors and funds public development projects.<br>Offers various job opportunities, engages the surrounding users (university students, young professionals, artists, visitors) across the metropolitan area. | |
| URBAN FORMS | SCHOOL PLAYGROUND | Responds to the urgent need of safe playgrounds for the younger generation. | |
| | COMMUNITY GARDENS | Designed to improve the landscape of the existing districts and promote awarness about food production and consumption while physically engaging in activities within the local community. | |
| | AGRICULTURAL FIELDS | Healthier lifestyle through local food production and the growth of the industry while limiting the urban sprawl.<br>Protection from the nuisances linked to the motorways thanks to the buffer vegetation zone. | |
| MOBILITY | PEDESTRIAN BRIDGE | Safe and practical pedestrian connection between the two river banks, connecting the mobility hub with the cultural center. | |
| | URBAN LAYOUT | Extension of the existing streets while regulating the urban grid to establish accessibility and connectivity between the previously segragated plots. | |





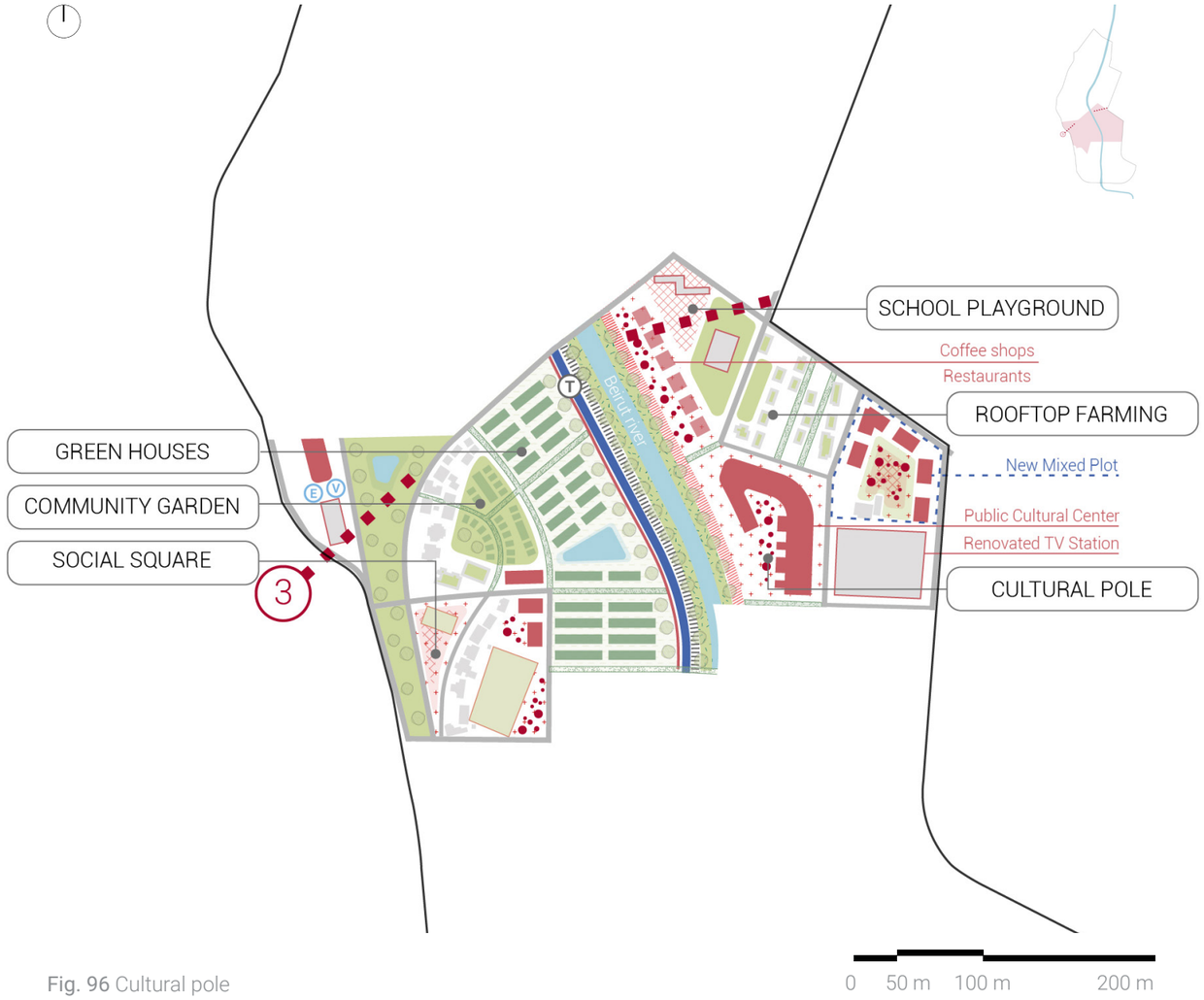



Fig. 96 Cultural pole

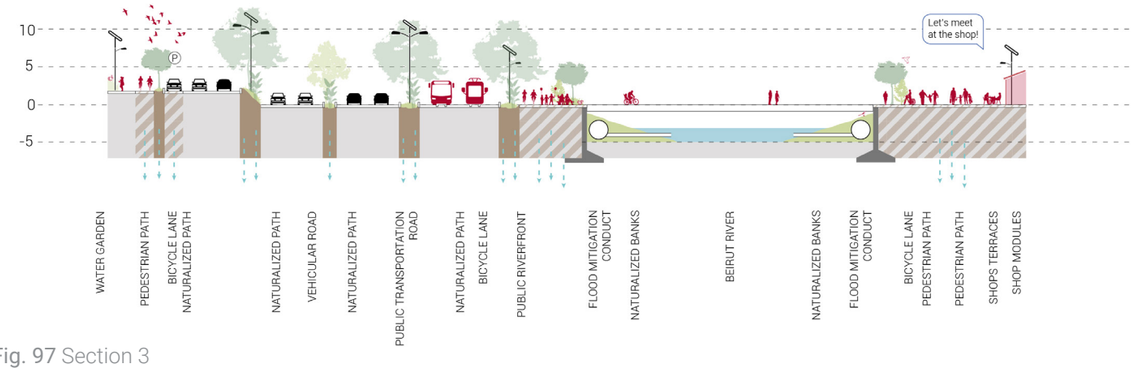



Fig. 97 Section 3

**ZONE 4: AGRI-URBAN POLE**
URBAN FARMING TO TRIGGER ECONOMIC STABILITY

| | INTERVENTIONS | EXTERNALITIES | |
|---|---|---|---|
| BUILT ENVIRONMENT | RECYCLING AND ENERGY RECOVERY FACILITY | Depollution of the riverfront by treating household and agricultural waste. Assisting households in increasing their recycling participation. | ● ● |
| | SAGESSE UNIVERSITY CAMPUS | The development of the Sagesse Campus allows the densification of previous under-used areas. The university is complimented with the annexed facilities, sports, fields, library, co-working spaces that will attract young intellectuals and professors to the area.<br>Proposed student housing units, answer to the saturated needs. | ● ● |
| URBAN FORMS | FARMER'S MARKET | Relocated in order to preserve the linear continuity on the riverfront. The market functions as a common platform and creates interaction between the producers and the buyers.<br>Distribution of local products amongst Beirut metropolitan area allows a financial independance and long-term economic stability and forming a resilient community. | ● ● |
| | WATER BASIN | The rainwater harvested through conducts, mitigate extreme floods while also enabling the irrigation of the near-by agricultural fields with the water stored in the large basin on the eastern side. | ● |
| MOBILITY | TRAMWAY LINE | Facilitates majoritarily the mobility of the students at the Sagesse University. It relieves congestion and the need for excessive car parks. | ● ● |
| | SILO CAR PARK AND ELECTRICAL RECHARGING STATIONS | The southern most part of the area of study, incorporates the traffic coming from Hazmieh and Sin el Fil. The silo car park with the recharging stations, incite new habits of relying on soft and public modes of transportation. | ● ● |





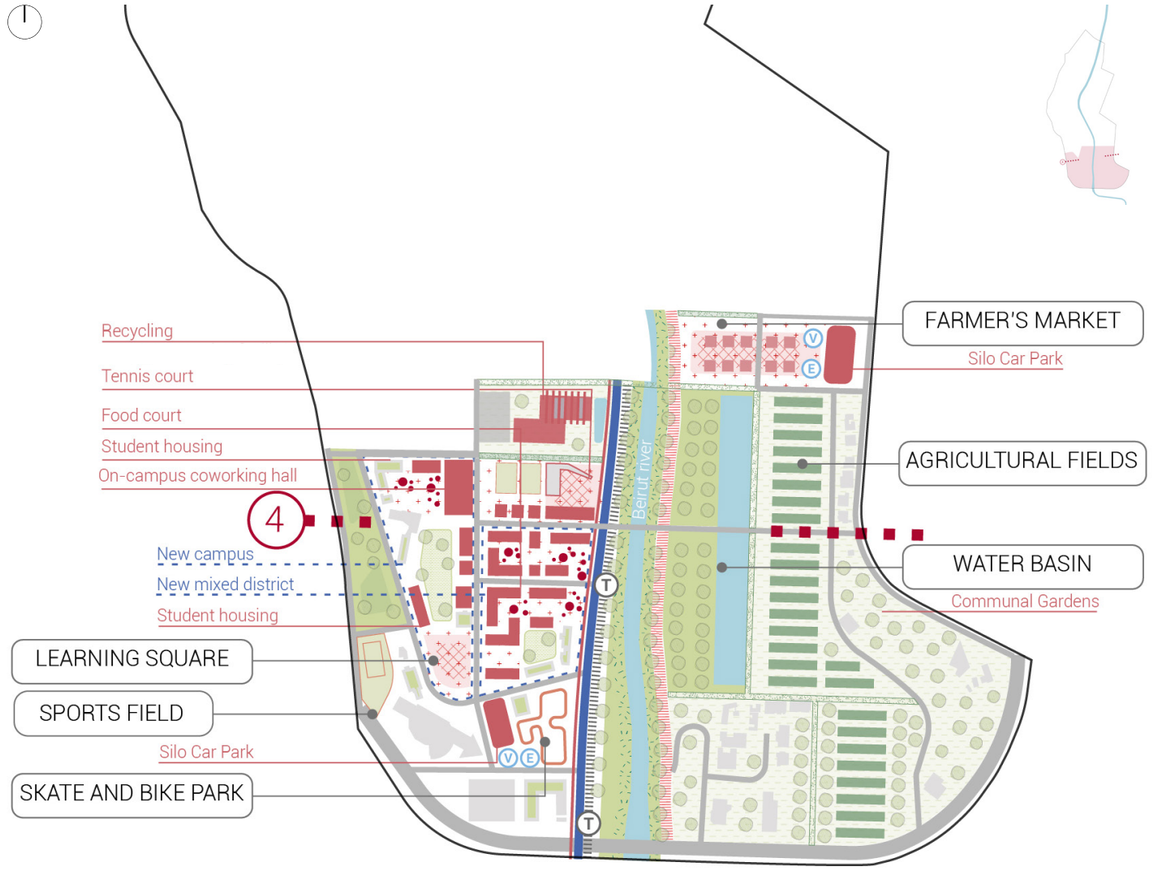



Fig. 98 Agricultural pole

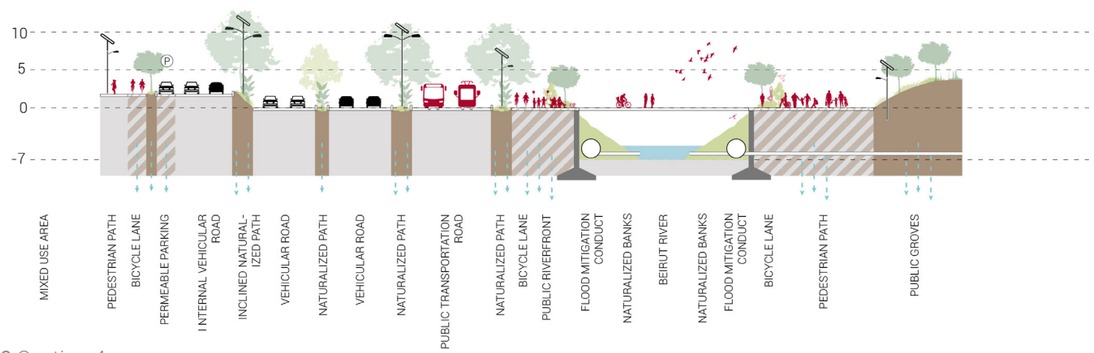



Fig. 99 Section 4

**GOVERNANCE MAP: REGIONAL COUNCIL**
MEMBERS AND STAKEHOLDER MANAGEMENT

**[PUBLIC SECTOR]** In the public sector were identified the following administrations who will principally fund the public amenities in the rehabilitation of the riverfront:
The municipalities of Beirut, Furn el Chebbak and Sin el fil; the Ministry of Public Works who will head the transportation network transformations; the Ministry of Agriculture and the Ministry of Culture.

**[THIRD-PARTY SECTOR]** In the third-party sector, Arc-en-ciel was identified:
Arc-en-ciel, a Lebanese non-profit NGO that encourages the integration and development of communities mainly through environmental initiatives such as agriculture and recycling and through social initiatives to encourage the re-integration of indivudals in their communities. Arc-en-ciel is a valuable stakeholder and its presence will be indispensable for the environmental recovery and social re-integration of the riverfront area.

**[PRIVATE SECTOR]** In the private sector, several stakeholders were identified as investors and actors in the development action plan:
The Sagesse university, a valuable stakeholder, would invest and gain from the development of its campus and annexing services, beneficial for its students.
The Biel event hall, located in the selected framework, would benefit from the enhancement of its current state and surroundings, rendering it more attractive to visitors.
The Beirut art center, a non-profit association, and platform committed to art study, cultural activities, and public spaces in Beirut.
Dar el Handasa, a consultant firm in architecture, engineering, environment and project management would take in charge the development of the public facilities, retail, offices and manage the restoration of the existing districts.
The Other Dada, a regenerative & architecture consultancy firm headed by Adib Dada, who already launched an urban initiative called the "Riverless Forest".[100] Its purpose is to demonstrate how a unique planting strategy can transform a neglected parcel of land on the banks of the Beirut River into a bio-diverse environment. The Other Dada would also support the inhabitants in the appropriation of the lands and in their management.

[100] Afforestation. (2019). TheOtherDada. https://theotherdada.com/en/the-otherforest/412/beiruts-riverless-forest





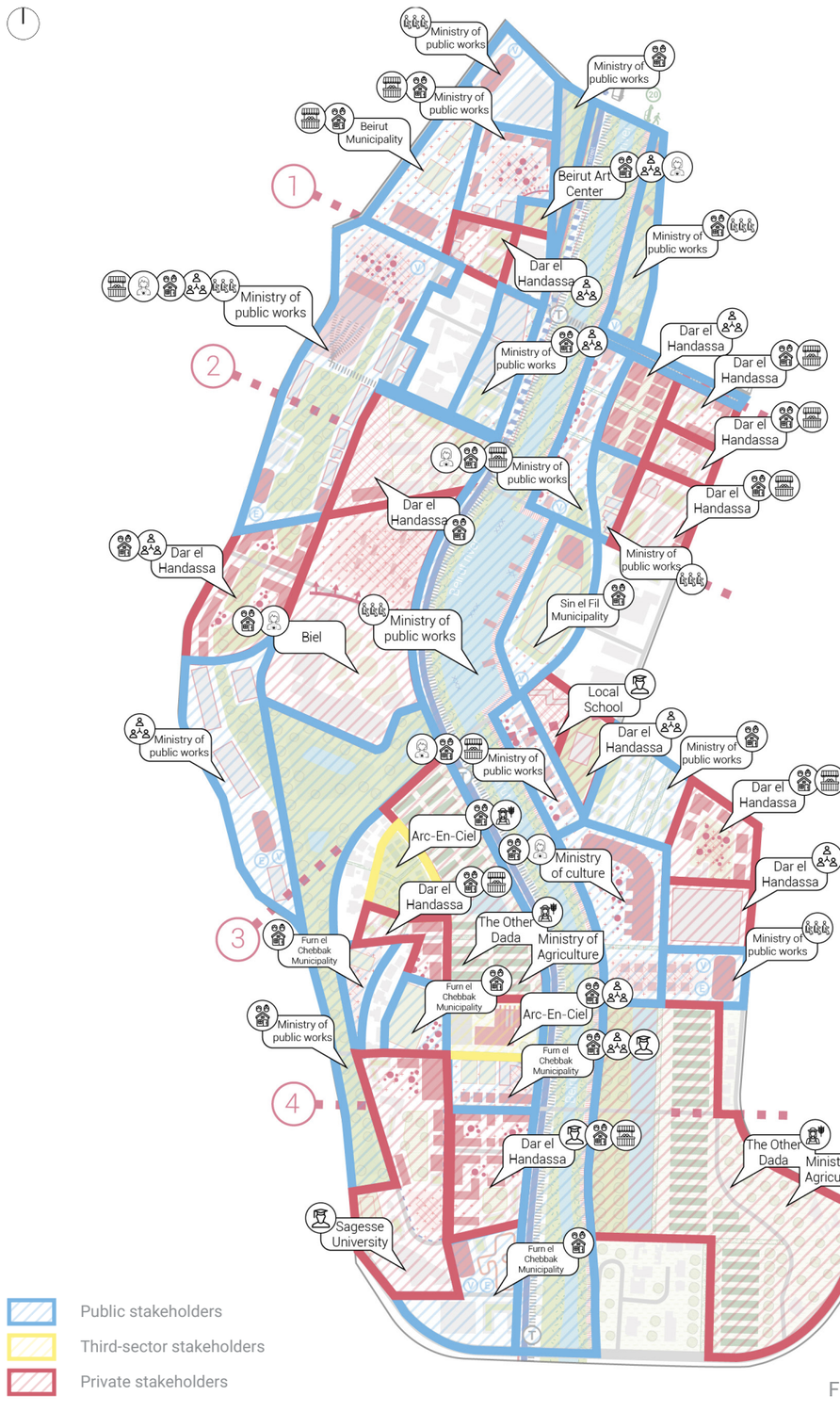



Fig. 100 Governance map

Chapter 5. Strategies and Design Solutions

## 5.3 SCHEME PROPOSAL OVERVIEW

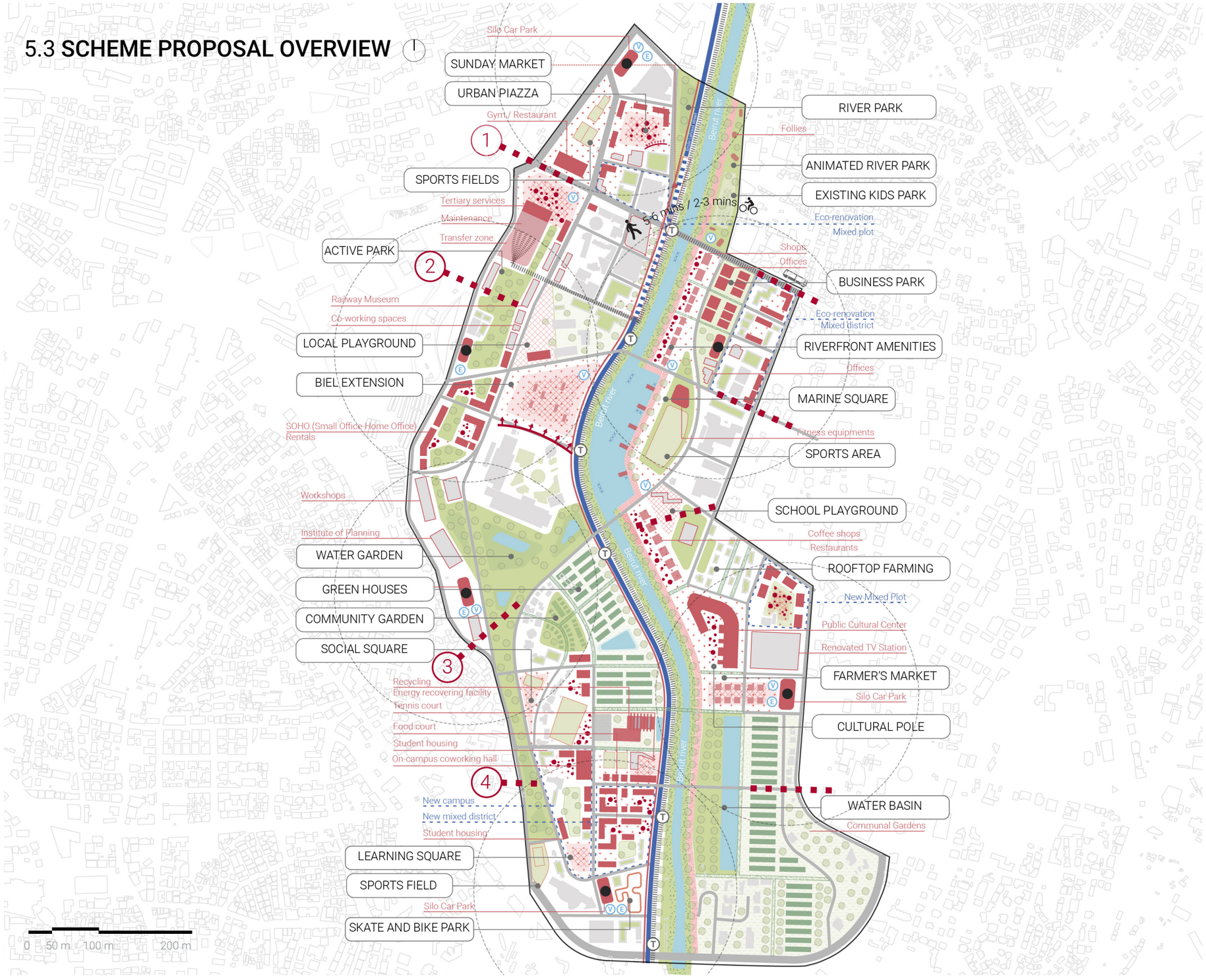



Fig. 101 Masterplan

# CONCLUSION

Rivers have had an important role in the creation and placement of cities, their provision in water, and their ability to enable trading goods and people rendered them intrinsic to the city's development. However, rivers have been ignored and canalized as industrial cities grew. At the second half of the 20th century, the potential of rivers in urban settings was once again recognized when industries started moving out of the city, which had a tremendous impact on the post-industrial city's image and form, resulting in neglected vast industrial zones and abandoned structures. River corridors are increasingly seen as valued resources that give access to nature and recreational opportunities. However, riverfronts in cities have been frequently regarded as seperate from the urban context that surrounds them. As mentioned by L. Pattacini, there is an interdependency between cities, rivers, and valleys, that should not be ignored.[101]

This thesis argues that with the notion of urban morphology, passing from spaces to places, riverfronts acquire a new urban identity. Therefore, the perception of the place and how it is used varies accordingly. Understanding the relationship between man, and the built and natural environment, requires observing the way communities behave in specific urban settings and how they react according to different social and economic conditions. Consequently, if nowadays the definition saying that sustainable development in post-industrial riverfronts is an integrated approach at the intersection of the three ecological, economic and social concerns, is unanimously admitted; it remains that its application differs according to the context and its relative perception.

For this reason, the two successful post-industrial riverfront models Lyon and Bilbao were selected, to understand their riverfront re-development strategies triggered by the transformation of the built and natural environment. Through the studies carried out, interesting insights were gained from Bilbao's strategic growth and Lyon's approach to the linearity development. Valuable principles that contributed to the effective transformation of the riverfront were identified and were able to provide the post-industrial riverfront with a new urban personality, offering possibilities for new identities of cities. The case studies served as learning models to develop an effective urban planning strategy for the deindustrialization of Beirut's riverfront, based on the identification of principles derived from the cases (Defined administrative entities, accessible patterns according to the urban layout, interdependent mixed districts and productive economic models) and taking into account Beirut's unique history and contextual characteristics. Due to Beirut River's centralized intersection with the urban agglomeration, it is the perfect opportunity to implement a strategy that simultaneously revives the riverfront and re-establishes its image amongst its communities. A deep understanding of the urbanized waterfront territory,

[101] Pattacini, L. (2021). Urban Design and Rivers: A Critical Review of Theories Devising Planning and Design Concepts to Define Riverside Urbanity. Sustainability.

according to its urban morphology and historic evolution was necessary.

The direct contact with the terrain was conducted in the study as the main methodology to analyze the territory first hand, to determine the experiences that happen in-between the edges of the river and the urban city. This method leads to unravel the identity of the waterfront, and shows the importance of studying the city through an observation in-situ to grasp its image. Two main tools were used: Interviews, in order to evaluate the past and current perception of the riverfront; and the Comb Structure, which was implemented to visualize the physical conditions of the riverfront and its connections to the urban areas. The walking methodology, following the Comb Structure plan, allowed to obtain a specific set of data to study the social geographies (pictures and statements); and the urban geographies (plans and sections). Combined, they unraveled the complexity of issues that contribute to the degraded identity of the post-industrial urban scene.

The outcome of the analysis was the creation of a data base of perception maps and graphical itinerary boards highlighting the identified issues and potentials, in order to fully grasp the current identity of the territory and its relationship with the built environment and its inhabitants. The concluded hypothesis identifies how it is possible to contribute to the activation of the post-industrial urban environment and to turn the neglected spaces into places, by articulating them through a mixity of new urban services and production models. The development of inter-dependencies between the designed places make it possible to envision the operation as an urban strategy, interlinking the riverfront with the urban fabric. The organization of the site in sequences follows a linear strategy, alligned with the course of the naturalized river and the main transportation axis.

One global strategy to harmonize the totality of the territory would have been the optimal choice to approach the redevelopment of the riverfront in its entirety, from the Beirut waterfront to the Falougha Valley. However, with Beirut's current complex situation, and with the intricate involvement of multiple stakeholders, such optimistic approach would not be possible due to current economic, social and political contingencies. Therefore, a framework was defined on a peculiar industrial section of the riverfront, that transitions from a heavily densified zone to an agricultural zone, and at the intersection of three municipal areas. By selecting a relatively small and limited part of Beirut's riverfront to be developed, the redefined image that would come out and the achievement of a new urban identity thanks to the schematic proposal, hopes to encourage and instigate the development of other parts of the riverfront, gradually leading to its complete transformation. Furthermore, carrying this project to a design development phase requires further technical data and a detailing of the project's phasing in order to properly reconsider the mobility models and the performance of each proposed pole, in order to successfully engage the public domain.

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