

## Article

# Urban Regeneration Projects Bound to Water, along and towards the Tagus Estuary (Portugal)

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**Abstract:** Water is becoming a support for landscape and urban projects in a densely urbanised area settled along the Tagus Estuary, dubbed the City of the Tagus Estuary (CTE). Analysing two recent projects along and towards the Tagus Estuary hydrographic network, this article highlights how the most evident limit (the water) can function as the strongest binder, natural link, and shared public space of the CTE. Located, respectively, on the north and south banks of the estuary, the analysed projects become a way to think about urban strategies and promotions that use water as a way to build (re-build or reformulate) the image of the Lisbon Metropolitan Area. Today, open spaces bound to waterlines support an appealing and winning urban regeneration formula. Our goal is to understand what kind of role water is called to play with regard to the CTE. We ask: is the water called to play merely the role of building a new image of the city as a ground for investors? Is water the way to build a green and habitable CTE? This article concludes that the analysed projects contribute (as expected) to the promotion of the surrounding areas and propose appropriate solutions while occasionally overcoming the current local urban planning.

**Keywords:** city and river; water landscape; urban regeneration; water-related urban project; City of the Tagus Estuary; Lisbon Metropolitan Area

## 1. Introduction

Regardless of the width of a watercourse and whether it is a main riverbed or a tributary (with superficial or underground water flow), its riverbanks are considered to be potential grounds for both urban and territorial redevelopment projects. Urbanised areas historically marked by a waterway seem to be terrains where urban policy aspires to build a green and liveable metropolitan future and to promote a new image of the city. Hence, a city settled along a river (along the water) would acquire potential from the proximity to the waterline, which can structure the ground level project.

The aim of this article is to analyse how the Tagus Estuary hydrographic network and its banks located into the Lisbon Metropolitan Area (LMA), in the Portuguese provinces of Lisbon and Setúbal, are becoming the way and the place to support an appealing urban regeneration formula.

We can highlight some characteristics of rivers that are crucial terms in urban regeneration processes supported by open spaces bound to watercourses: the river as a corridor, the river as a support of an ecological network and an environmental transcalar project, the river as a resource and binder of the city that develops along it [1].

The river is a corridor of natural fluxes, winds, and climates, which is a natural element that affects the origin and development of human settlements. Both in the compact city and in less consolidated contexts, dispersed urbanisation, sprawls, or in predominantly agricultural areas, the river is the matrix of the original settlement and land use, as well as the mobility and energy infrastructure support. As an infrastructure support, it contributes towards determining the location of the town in the regional

context and the location of the historical city centres [2]. Moreover, the river corridor provides the soil suitable for urban growth.

As a geographical element, according to Besse [3], the river can be considered an inscription that characterises the human settlement. In urban consolidated contexts, the river is a 'green groove' that breaks urbanity, as well as a 'pause' that allows two sides of the city to look at each other. Often, the river is the main medium through which we build the city's image. At the same time, it is a public space that the city makes its own with the construction of bridges, parks, quays, and riverfronts.

The watercourse is the continuous corridor, which is the sum and result of what happens upstream. In addition, as a stream, it refers to a broad reality that binds the city to its geographical context by inviting a simultaneous reflection both at territorial and urban scales. Hence, the river can be the medium of the transcalar project, i.e., one that seeks simultaneous cross-reflection among various scales [4] including from the edge water-city to the entire river shed. As such, the river becomes the vehicle of the inter-municipal and inter-regional project.

The river's corridor is first of all a natural area and support of the ecological network, an element that can introduce in the city the project that entrusts the environmental system with the reorganization of the territory in its different scales. The water network offers the terrain for the ecologically-oriented project by becoming an inhabited territory's 'environmental infrastructure' [5] or a 'sustainable urban infrastructure' [6] *par excellence*.

The worsening of the environmental conditions of the planet, aggravated by the expansion of the city, calls for increased attention to water. In effect, the network of open spaces bound to water plays a fundamental role in governing the effects induced by climate change [7]. In addition to providing solutions to live together with the consequences of climate change, regeneration projects bound to water could offer a way out from the hydro-geological instability, help manage water abundance and scarcity, and suggest networks for leisure linked to the development of alternative transport.

In 'developed countries,' human settlements have lost the original layout linked to water due to the radical change in the economic and social model. Today, the proximity to the riverbed is no longer a necessary condition to settle, so the relationship that the city establishes with the territorial hydrographic network loses its importance. Residential and productive areas can be built anywhere. The city is expanding itself (it territorializes itself). The distance that the city establishes with the waters that cross the territory is becoming less and less decisive. Productive activities make use of other resources, agriculture regresses, and engineering of derivation/diversion allows the transport of water to areas with scarce resources, even those very far from the main riverbed.

A lifecycle linked to the water use is about to end. However, the number of projects linked to watercourses highlight how the river still plays an active role in the urban areas, assuming that the space bound to the hydrographic network can still be a resource for the city.

The renewed interest in water also seems to activate 'a satisfying recovery of the personality of places' [8] (p. 95, translation by the author). Water is a common good that enters into the process of conservation, preservation, enhancement, and construction of a territory's identity. The watercourse is a geographic and specific fact of a territory, a natural reality, and material support of human activity. Because it is both a natural and social reality [9], the river is able to become a vehicle of identity for the crossed territories.

Based on this understanding, the goal of this article is to study trends in the renewal policies of the Lisbon Metropolitan Area that use the Tagus' waterbody, on both banks of the river, as a support. Analysing two recent revitalisation projects, the current work intends to reveal urban regeneration strategies that develop 'along' the Tagus Estuary and 'toward' it. The analysed interventions—one riverfront and one river valley of a Tagus' tributary with piped water flow—are located on fluvial matrix soil. Namely, the project areas are terrains shaped by the Tagus Estuary's hydrographic network.

This article aims to extend the analysis from projects settled on 'land which physically touches the river' to ones settled on 'land that belongs to a river' by studying urban areas with

a morphological territorial character given by the fluvial dynamics, regardless of whether the water flow is currently visible or invisible.

Offering another point of view, this article points out the ‘memory of water presence’ (i.e., the historical relationship with water) as a key agent for urban regeneration processes. This adds to Martins Ochoa de Castro’s [10] definition of waterfront as a corridor of contact with the line of separation between land and water, extended to spaces that can enjoy the contemplation of water. Furthermore, it adds to Fernandes’ [11] definition of the waterfront as a land-water interface, which comprises the strip of land contiguous to a watercourse with urban/industrial use and the adjacent water space, confined to a strip of variable width (depending on, for example, urban morphology), integrated into an urban set that physically touches the river.

Beyond the intent of a riverfront spatial delimitation, see Reference [12], the visual perception of the river, in the sense of the entire hydrographic network (the entire humid system), as well as the memory of it, are appealing elements that characterise areas that become ground for urban regeneration.

## 2. Materials and Methods

In the first chapter, we briefly introduced the relationship between the city and the river, while highlighting the role of the watercourse in planning contemporary urban landscapes. In this section, we begin by presenting analytically-organised research approaches that move towards an idea of the river as a ‘tool’ for the planning of urbanised territories (Section 2.1). Second, we explain the perspective that leads us to consider the Tagus hydrographic network as a potential tool for the planning of the ‘City of the Tagus Estuary’ (CTE) (Section 2.2). Lastly, we present two recent revitalisation projects, located ‘along’ and ‘towards’ the Tagus’ main riverbed (Sections 2.2.1 and 2.2.2). What we suggest should be the main focus of local urban renewal policies is the Tagus Estuary hydrographic network as a core of the LMA. In this work, we refer to the entire context where the analysed interventions take place as the ‘CTE’: the city that develops along the Tagus Estuary’s hydrographic network, settled along the north and south banks of the river.

### 2.1. Reading the River as a Tool for the Planning of Urbanised Territories

Within this first subsection, we conduct a reading of recent research approaches (research lines or project focuses) concerning the ‘city and river’ issue. The intent is not to organise a catalogue of projects/realised interventions in fluvial contexts, nor to compose an atlas of fluvial capitals studied through the regeneration processes of their rivers. We do not wish to delineate an evolution of riverfront revitalisation processes starting from the post-industrial era (after industrial port conversion), nor describe the evolution of ‘city brand’ policies linked to the presence of rivers.

Instead, from the perspective of architecture and urbanism, more than that of landscape architecture, aware that the ‘city and river’ issue always concerns a multidisciplinary field, the following reading highlights different ways of dealing with the study of a city and its river. In light of the adopted approaches, we draw attention to four research perspectives including the perspective of geography (and geomorphology), that of forms of land colonisation carried out by men such as a (not solely urban) morphological perspective, that of the landscape such as perception and collective imagination, and that of eco-efficiency/sustainability [1].

We suggest that a geographical perspective leans on the idea of both river and city as geographical elements. According to this perspective, the territorialised contemporary city can be studied through fluvial geomorphological forms (terraces, fluvial islands, conoids of dejection). These last ones were emptied of their exact geographical content and were applied to the forms of urban construction. They become both an analysis and project tool, from the territorial and the urban scale all the way to that of building, contemporaneously, from large to small and vice versa [13]. This can lead—from the lack of definition of what belongs to nature and what is part of culture and human construction of places—to a metropolitan future that accommodates environmental realities, mobility, and settlement

developments—in environmental, economic, spatial, and qualitative terms—as a linear multipolar city along the river valley, where the river provides the trace of a ‘territorial urbanity’ [14].

From a wider morphological perspective, the morphogenesis and the forms of land colonisation (the built-up area of the river territory) become a ‘negotiation between geography and geometry’ [15], where fluvial natural dynamics coexist with the geometrical adaptation carried out by men. Hence, different reclamation patterns (formal models of reclaimed landscapes) can provide tools to intervene and direct the urbanisation processes in progress [16]. These last go hand in hand with river management and with the evolution of water control and containment techniques—namely with technical and cultural adaptations to geographical conditions and site resources. According to this perspective, topography is the key to intervening in urbanised fluvial contexts. Hence, mapping and cross sectioning are the tools adopted to inform about containment systems and, at the same time, to highlight ‘inherent directionality’ [15] in urban fabric morphology.

According to a landscape perspective, as perception, practice, and collective imagination, the complexity of river dynamics leads to observing and representing them as a ‘shifting landscape’ [17]. This means that the raw material for the design of a fluvial context lies in its unstable and enigmatic character. Among extreme solutions—from water regulation to reducing urbanisation in order to give more room to water—the compromise lies in bringing the public debate closer to a collective imagination linked to the ‘flood landscape’ accepted as a ‘river experience’ [17]. Today, the flood landscape is also recreated from dam demolition, to re-naturalised watercourses, and restored natural flood plains. The river’s capacity is increased to safely boost water discharge levels to the sea. The latter approach represents a turnaround in flood protection and related urban regeneration processes, ‘from higher dykes to river widening’ such as the Dutch Water Program ‘Room for the River’ [18].

A final perspective presents the fluvial water system as a vehicle for a more sustainable territory. Ecology enters urban reflection (from Geddes to Mumford, to McHarg) as water systems take on a key role in the design of future scenarios in which the increase in environmental performances foresees a reduction in the ecological footprint of the city [19]. Responding to increasing pressures—renewed irrigation techniques, environmental risk, urbanisation, soil sealing, and climate change—to contribute to energy production and to create a safer territory, this research approach suggests a long-term reflection (through future scenarios, as mentioned above). This means transforming environmental threats into project opportunities as well as integrating ecological, hydraulic, and urban dimensions towards an improved territorial eco-efficiency.

The above presented perspectives, where delving into one research focus does not mean forgetting the others, guide us to a point of view and research tools for the reading of the Tagus Estuary case study. The cited works put the river at the forefront of architectural and urban reflection. All the analysed urbanised river environments, such as of large hydraulic works and highly urbanised contexts (Mississippi, New Orleans, Dutch Delta, Veneto Region, Po River flood plain), are studied by drawing as a design tool. In line with Besse’s definition of the river as ‘inscription’ (page 2 of this article), we note that a fluvial environment needs to be represented, in order to be studied and planned—through plan, cross sections [15,17–19] or through new methods of representation [15] and new figures [13,16,17] that describe and ‘visualise’, as much as possible, the river’s specific dynamics.

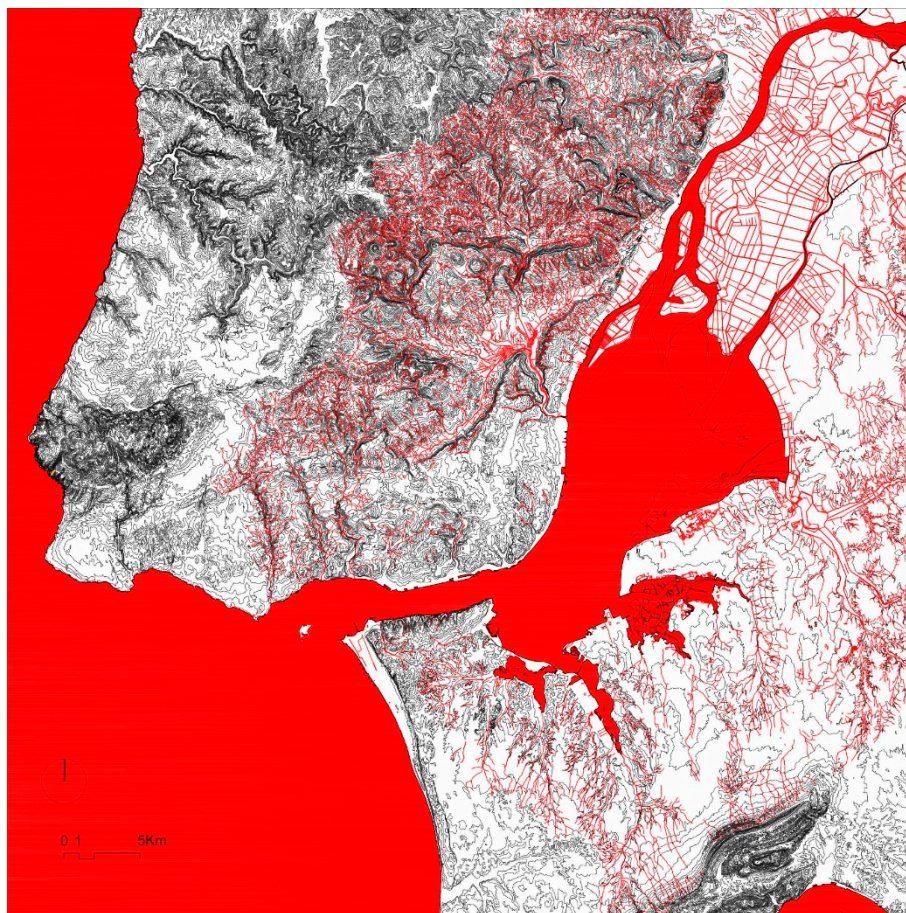
## 2.2. *Along and towards the Main Watercourse (the Tagus Estuary)*

As suggested by the above mentioned research studies, overcoming the natural-artificial dilemma—not in terms of a nostalgia for uncontaminated nature but, rather, an overcoming of the, by now, expired and impossible distinction between the natural and the artificial [20]—this article grasps the need to observe the specific river location through its history (and ‘memory’) and through means that probe its characteristic topography.

In contexts where the urban phenomenon does not seem to bind with the characteristics of the soil it occupies, a research approach that arises from the study of the local hydrographic network, such as from how the Tagus’ waters enter urban regeneration processes, aims to anchor the work to the



specificity of places, and to their own geography (Figure 1). In other words, terms such as ‘along’ and ‘towards’ the river, used in this article to name the two analysed interventions, refer to the location of the projects regarding the main riverbed and, at the same time, advocate a geographical-oriented (*graphia* as ‘writing’ and ‘transcription’) research.



**Figure 1.** The geographical support of the City of the Tagus Estuary (CTE): Tagus Estuary hydrographic network (in red) and topography. Source: Author’s drawing.

Reading a specific site through cross sections (orthogonal to the water flow) can provide thorough information. In addition, the comparison at constant intervals of river valley cross sections, as well as those of land-water interfaces, helps us probe the topography of the site while inviting us to operate a ‘geographical control’ of it [21] (p. 220). From an ecological point of view, the distance between two banks and, on each bank, the distance from the water together with the form of the valley section play a key role in the study of the characteristics of the corridor defined by the river, such as different ecological gradients, microclimate changes, humidity levels, and chemical characteristics of the soil. Moreover, we cannot separate the hydraulic operation of the network systems from adjoining surfaces and, therefore, the riverbed is inextricably linked to adjacent areas (banks) [20].

In order to achieve the article’s objective, for the analysis of the intervened areas, we adopted three main approaches. First, we collected data from two projects (‘along’ and ‘towards’ the Tagus Estuary) through literature review, meetings with the promoters and authors, and attending public presentations. Second, we conducted a study of the intervened areas, i.e., the specific site that supports the projects, and we analyse the data collection of the projects, their public presentations, and promotions. Lastly, we conducted direct observation of the interventions (where finished), in order to analyse the response that was given to the original objectives set by the authors and the effects on the liveability of the immediate urban surroundings.

To test the interventions on their specific site, the work presents schematic sections of the analysed river valley (north bank of the estuary) and sections of the water-land interface along the analysed riverfront (south bank of the estuary).

We used AutoCAD software to display the location of the analysed projects and to show guidelines of the in-effect plan, as well as to outline water-land interfaces and river valley sections. In the case of the riverfront, photographs allow for a comparison between the previous status and the current status of the interventions.

Within the first approach, in the framework of metropolitan renewal policies that use the Tagus as a support for urban projects and the well-known Tagus riverfronts (north bank of the Tagus Estuary), this work considers a recent riverfront promenade located along the south bank of the river known as the ‘Seixal Riverside Promenade’ (SRP) promoted by the Seixal Municipality (Figure 2). Following the national and international winning trend of opening the capital cities to the sea or to the river, local municipalities of small villages (re)build/restore and promote their urban river façades, with an aim to construct a renewed link between consolidated cities and water.



**Figure 2.** Location of the interventions (in red): Structural Green Corridor of the Alcântara Valley (SGCAV), north bank of the estuary, and Seixal Riverside Promenade (SRP), south bank of the estuary. Level curves every 10 meters. Source: Author’s drawing.

We collected data about the SRP project from a meeting with the authors (Risco Office) and from a guided tour organized by the Seixal Municipality.

Within the first approach, in order to reveal how water and the terrains that were historically shaped by it are currently potential ground for urban regeneration projects, this work considers the ‘Structural Green Corridor of the Alcântara Valley’ (SGCAV) (Figure 2), promoted by the Lisbon Municipality. The Alcântara Valley is formed by a Tagus’ tributary (currently canalised and buried),

which tends toward the main riverbed of the Tagus Estuary. Hence, urban regeneration trends take into account not only open riverfronts but also inner (inland) water. To design green corridors supported by watercourses, superficial or underground water flow appears to be an appealing and winning formula to intervene in consolidated and often degraded urban areas.

We collected data about the SGCAV project through meetings with the authors and the coordinator of the Green Structure Project Office, Municipal Direction of Environment, Green Structure, Climate and Energy of the Lisbon Municipality (*Gabinete de Projeto de Estrutura Verde/Direção Municipal de Ambiente, Estrutura Verde, Clima e Energia/Câmara Municipal de Lisboa—GPEV/DMAEVCE/CML*).

We based the second approach, towards our research goal, on the analysis of the SRP's and SGCAV's data projects retrieved from the authors' archives as well as their public presentations and promotions. In addition, AutoCAD drawings, elaborated by the author, aim to help situate the interventions in the context of the estuary.

Lastly, we based the third research approach on the direct observation of the intervened areas, through field reconnaissance of the implemented interventions, their integration in the urban context, and their repercussions in the immediate surroundings.

Both the second and the third research approaches (data analysis and direct observation of intervened areas) aim to point out the objectives set out by the projects' authors, while also verifying their achievements.

- We place out attention first in understanding how the interventions aim to formulate or re-formulate the local urban relationship with water.
- Given the fact that an urban regeneration process leads to a new image of the city that often becomes ground for investors, the purpose of this work is to understand if water facilitates to the construction of a greener, more habitable, and safer CTE.
- From a broader point of view, the focus is on revealing how public actions can contribute to the enhancement of the riverbanks' local identity as well as a wider Tagus Estuary's identity.

### 2.2.1. Seixal Riverside Promenade (SRP)

In 2009, the Risco Office won the 'Design Competition for the elaboration of the Base Program of the Execution Project of the Seixal River Promenade' (*'Concurso de concepção para elaboração do Programa Base do Projecto de Execução do Passeio Ribeirinho do Seixal—QREN'*) launched by the Seixal Municipality for the regeneration of the riverside of Seixal, an old city centre, and the main town of the municipality, located in the south bank of the Tagus Estuary. The National Strategic Reference Framework (*Quadro de Referência Estratégico Nacional—QREN*) supports the implementation of the community policy on economic and social cohesion in Portugal during the period of 2007 to 2013 [22].

The Seixal Riverside Promenade (a site area of about 2.1 ha) was designed and built by the architecture and urban design firm Risco Office based in Lisbon, together with NPK Associates Landscape Architects, ECLIPZ Lighting Design, and SOJEFER Projects and Constructions Lda. The project team was responsible for the general design of the overall site, public areas, and green spaces, for the coordination of minor projects, and for technical site supervision. The intervention was finished in 2017. However, due to financial constraints that arose during the economic crisis, the works were suspended between 2012 and 2015.

As presented by the Risco Office, the SRP 'is bordered by the river and the town's historic centre, whose buildings have symbolic and morphological characteristics that make it a unique asset in terms of heritage and culture' [23].

Until 2010, Seixal's old centre was almost abandoned, with an aged population and with impaired infrastructures and public space. The demographic growth over the last 40 years occurred in the southern areas of the municipality, close to the motorway intersections. In the old town, some buildings were headquarters of the Seixal municipal administration offices. Over the years, the public spaces all around them became a large and uncontrolled parking lot.

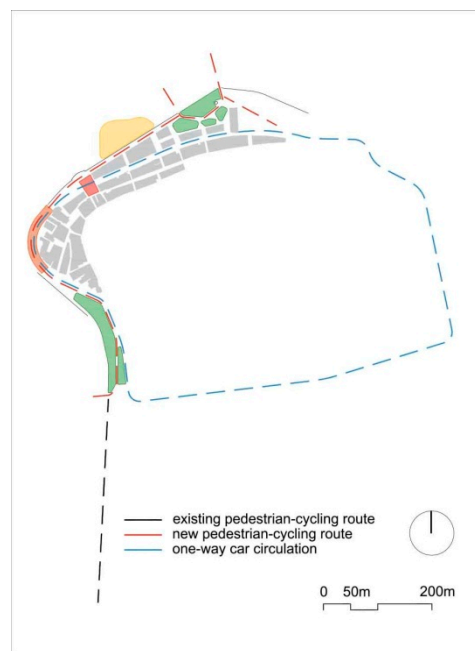


The construction of a new central building, in a more car-accessible area about 1 km further south, which combines all the municipality's departments previously spread in the old town, was an opportunity to rethink the city centre enhancing the historic relationship with the river (the Seixal Bay) and to reorganize the urban public space (Figures 3 and 4).



**Figure 3.** SRP, scheme of the project. Source: Risco Office. Reproduced with permission from [Risco Office].





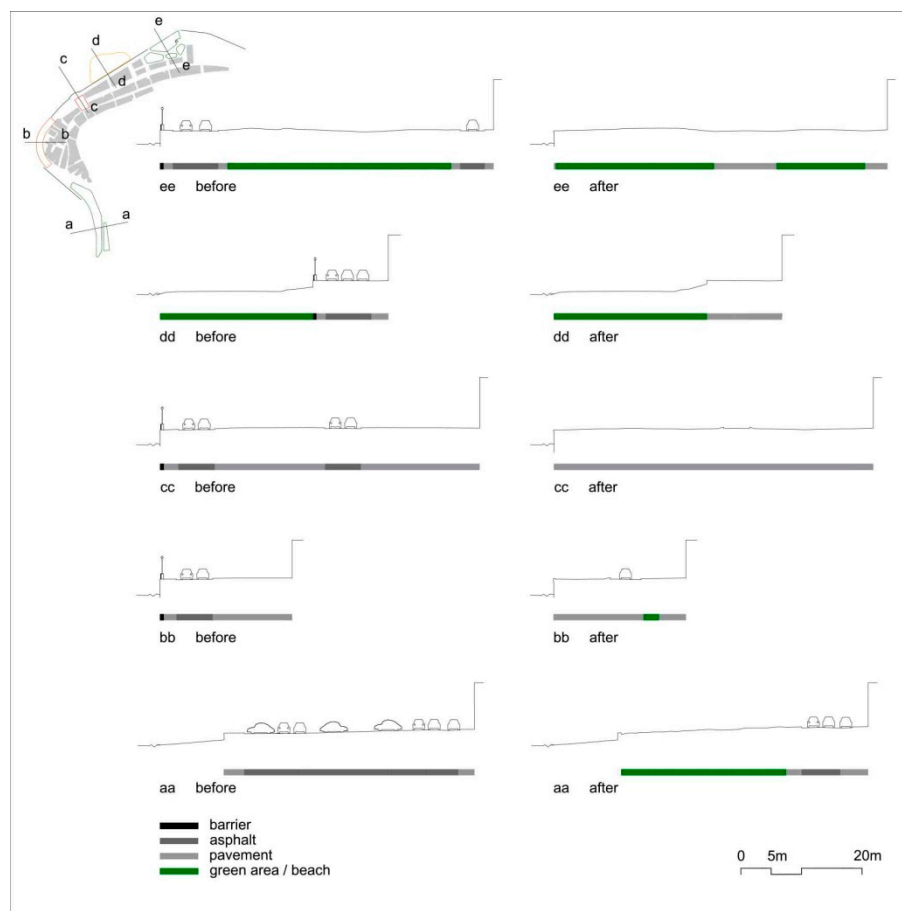
**Figure 4.** Proposed scheme for cars and pedestrian/cycling circulation. Source: Author's elaboration from [Risco Office].

As mentioned by Nuno Lourenço (Risco Office), the aim of the intervention was to reintegrate the old centre into the urban settlements and natural spaces all along the bay, which make up the city of Seixal. As described in the presentation of the project to the European Prize for Urban Public Space in 2018 [24], the intentions of the intervention were:

- to create a riverfront for pedestrians and cyclists in contact with the river;
- to redesign the road accesses and parking facilities in order to preserve the historic centre;
- to improve different existing public open spaces along the riverside belt, namely two squares (*Largo 1º de Maio* and *Praça da República*) as well as a public garden (*Jardim do Seixal*);
- to implement accessibility solutions in compliance with legal standards;
- to increase the presence of natural elements and green areas;
- to mitigate the impact of seasonal flooding by improving drainage infrastructures and increasing permeable soil surfaces and vegetation.

Only the first three points listed above appear in the 2009 Competition Proposal Report [25]. In the proposal, the three points are mentioned as an 'answer to the competition's objectives' [25] (p. 9).

Taking advantage of prominences and indentations present along the Seixal riverbank, the project aimed to build a route with distinctive physical features and characteristics by creating different types of contact with the water (Figure 5). It redefined car circulation. While not completely eliminating it, the project introduced one-way streets as well as pedestrian and cyclist areas (Figure 4). The previous parking lot was replaced by a green recreational area in contact with the estuary, which created a new square with planted and shaded areas as well as zones to accommodate cultural events. The intention of the authors was to introduce in the promenade only three new types of pavement surfaces: ceramic brick pavement with artisanal character that is resistant to car circulation, an uppermost organic layer with moulded soil and turf surface (in the wider zones), and limestone sidewalk borders consistent with the existing paved path.



**Figure 5.** Water-land interface along the Seixal Bay (sections): before and after the SRP intervention.

Source: Author's drawings. After the intervention, author's elaboration from Reference [25].

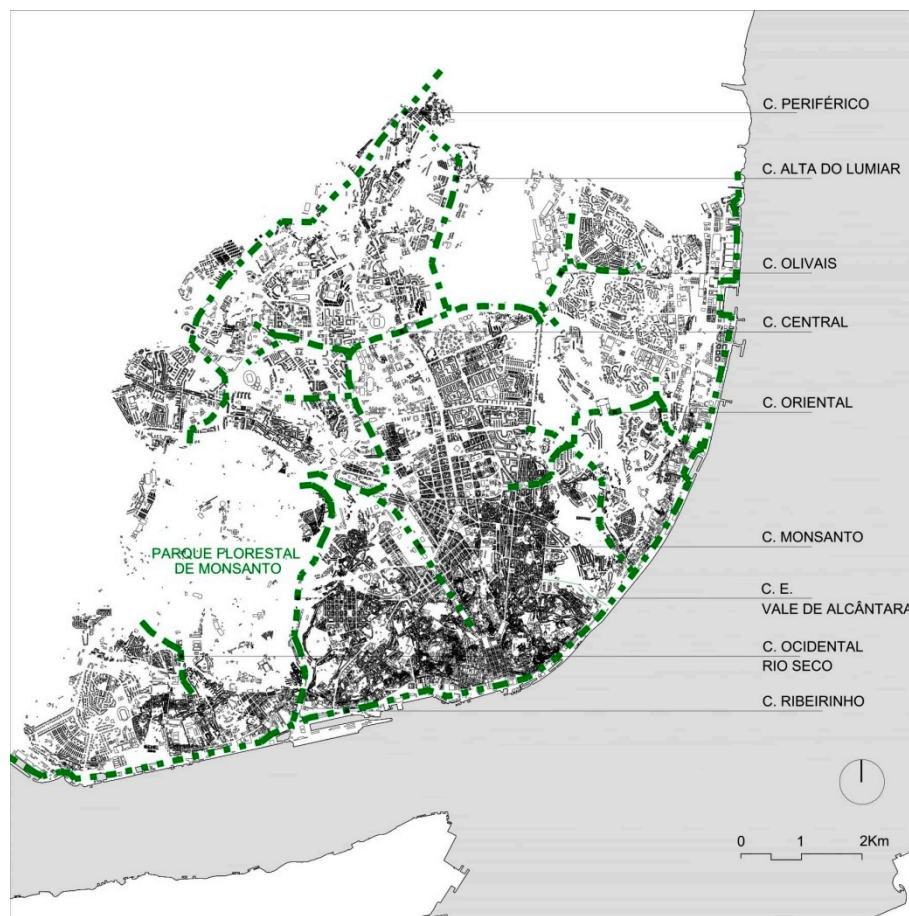
Seixal's new promenade is part of a more ambitious project that aims to connect the new path with Seixal's River Ferry Terminal (located in the northern part of the Seixal Bay) and a new bridge to connect Seixal with Barreiro. The assignment of the connection project was entrusted to the Risco Office. The new Seixal Promenade along the bay is connected, further south, with a pedestrian and cycling path (previous to the 2009 SRP competition) that connects all the small urban cores settled all along the Seixal Bay. The pedestrian and cycling route, which is about 4 km long, allows the general public to enjoy the bay and discover the local cultural heritage along with the Municipal Ecomuseum, the farm, and the Seixal Cultural Forum among others. With the future connection further north, it will be possible in the future to tour the entire Seixal Bay through an open and public riverside promenade.

In the authors' words, despite the delays due to the economic crisis, underground infrastructure works, and archaeological findings, the local population supported the project from its outset. During the several public meetings organized by the authors and the local municipality, participants expressed their concern regarding the future of the old town, hoping that the intervention would reverse its perceived decline.

### 2.2.2. Structural Green Corridor of the Alcântara Valley (SGCAV)

The Structural Green Corridor of the Alcântara Valley is one of the green corridors implemented from the Lisbon's Municipal Master Plan (*Plano Diretor Municipal*–PDM), approved in 2012, and currently in effect (Figure 6). The Lisbon's PDM, through the 'municipal ecological structure,' sought to define the guiding principles and the large-scale program for Lisbon's green structure [26]. The 2012 Master Plan gives the Lisbon Municipality the competence to develop the structural green corridors and to intervene in the requalification or implementation of non-structural ones. For management

purposes, however, under the administrative decentralization, the different Parish Councils (*freguesias*) are responsible for non-structural corridors.

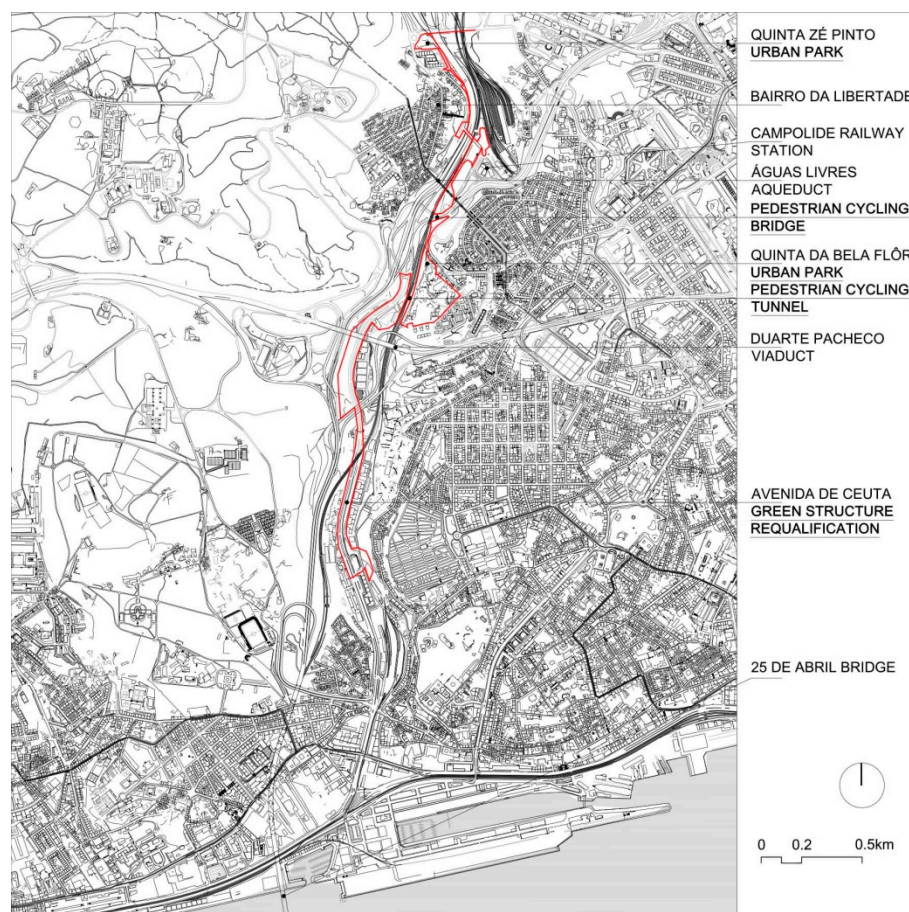


**Figure 6.** Lisbon’s administrative boundary, buildings, green corridors (C.), and structural green corridor (C.E.) in the implementation stage. Source: Information combined by the author, elaboration from Reference [27].

The Alcântara watershed, located in the north bank of the Tagus Estuary, is the largest watershed intersecting the city of Lisbon, being about 4700 ha and draining to a waterline of about 10 km, currently piped into the river [28]. The entire intervened area analysed in this article coincides with the Alcântara Valley, which is characterised by a gentle longitudinal slope, where the variation of the altimetric quotes are between 10–68 metres with steep declines of more than 30%. As a part of the city of Lisbon’s humid system and due to the above-mentioned morphological characteristics, the valley’s alluvial and very permeable soil should be dominant. However, the landfills (the reclaimed land), corresponding to the transformations made by human interventions, alter the valley’s original geomorphologic and pedological characterization [28].

In the Alcântara area, during the pre-industrial period, construction works such as the enlargement and restoration of the bridge over the Alcântara River (1743), which historically had always been an important entry point into Lisbon, and the *Águas Livres* Aqueduct (1731) were carried out to improve and enlarge the city and in response to the problems of water scarcity. Starting from the beginning of the 19th century, the industrialisation greatly affected the Alcântara Valley. Factories, linked to the textile industry, and new neighbourhoods to house workers were constructed, which established Alcântara as a suburb of Lisbon rather than merely as a physical limit of the city, which is how it was considered until the end of the 18th century. In the 1880s, the construction of two railway lines that linked Alcântara to Sintra, in the west, and to northern Lisbon, led to the fragmentation of Alcântara.

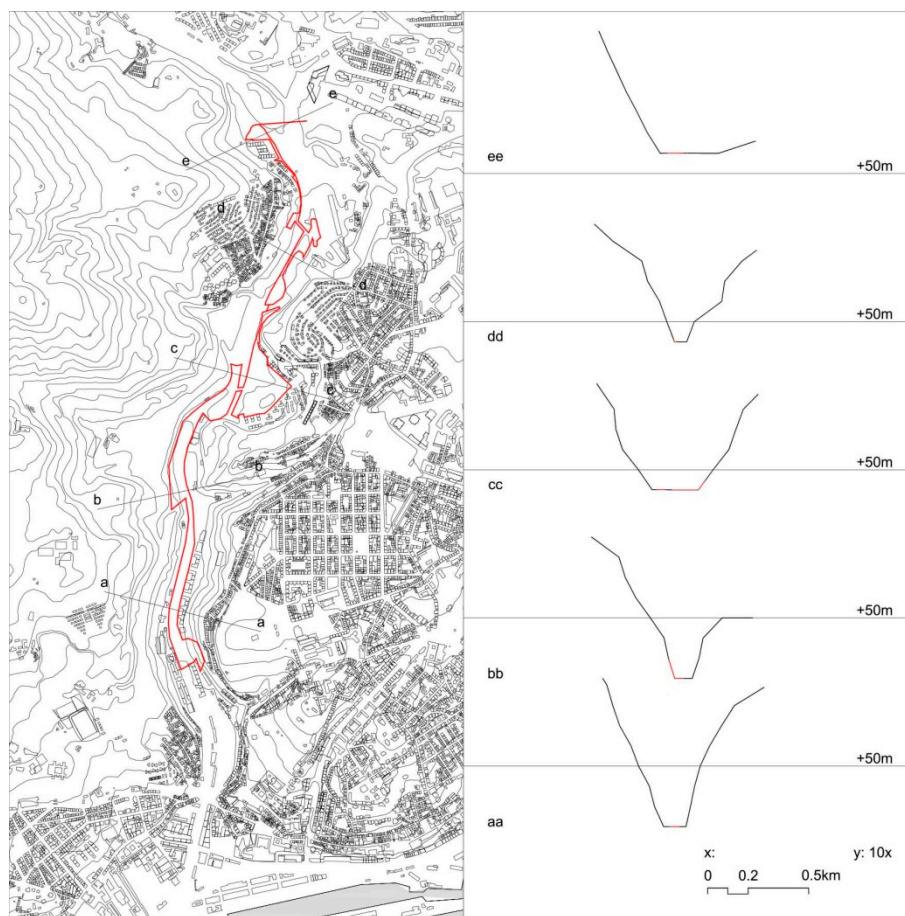
During the 20th century, the construction of Avenida de Ceuta along the main watercourse of the Alcântara Valley, in order to link it to the growing urban areas of northern Lisbon, required the entire Alcântara River to be piped. The river had already been piped, further south, to permit the construction of the railway infrastructure. The railways, the Avenida de Ceuta, the construction of the bridge over the Tagus River (*Ponte 25 de Abril* in the 1960s), the Duarte Pacheco Viaduct (in the 1940s), and the reclaimed land for the Lisbon Port firmly established the Alcântara Valley as an infrastructure channel and a gate to the city at both a local and a regional level [29] (Figure 7).



**Figure 7.** SGCAV intervened area (in red): planned interventions (in bold underlined). Source: Author's drawing, information combined by the author.

The Alcântara River, currently piped, coincides in some parts with the intervened area. Due to the morphological transformations after the burial of the river, the original watercourse does not coincide with the longitudinal axis of the valley. In spite of this, the present morphology reveals a relatively embedded valley, an element of prime importance in the water, and atmospheric drainage flows of the city of Lisbon [28] (Figure 8).





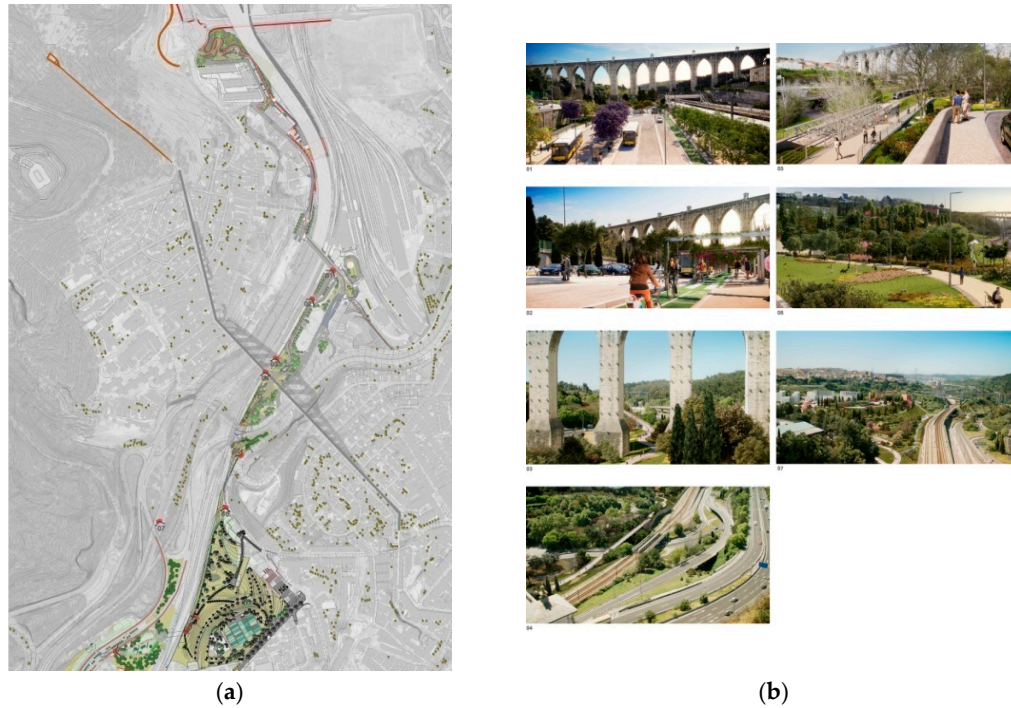
**Figure 8.** Alcântara Valley: orthogonal schematic sections (y: 10x) and intervened area (in red). The vertical dimension is exaggerated to highlight the height variations. Source: Author's drawings.

As presented by the Municipality of Lisbon, the ecological objectives and the environment make the SGCAV project fundamental to bring Lisbon closer to its inhabitants, linking Monsanto Forest to the Tagus River and attracting visitors to new points of interest. The planned corridor is characterised by aligning objectives of ecological importance (i.e., regularization of the water system, recovery and increase of the vegetation cover, ecological continuity with the Monsanto Forest Park, and use of recycled water to reduce drinking water consumption): with aspects of response to the lack of alternative mobility [30]. 'In view of a more ecological and environmentally sustainable city (...) this corridor has a vital importance in the process of adaptation to climate change, in particular, by increasing green areas and optimizing the water cycle' [30] (translation by the author).

The green corridor project for the Alcântara Valley—launched in 2016 by the Lisbon Municipality, with an intervened area of about 13 ha and a longitude of about 3 km—is divided into four main segments: from the urban park of *Quinta do Zé Pinto* to Campolide Railway Station, the *Águas Livres* Aqueduct's surrounding (new pedestrian and cycling viaduct), the new urban park of *Quinta da Bela Flôr* (leisure and horticultural production and new passage under the railway line), and the Avenida de Ceuta area (Figure 7). As presented by the authors, the intentions of the intervention were:

- to create a pedestrian and cycling route among the four intervened areas—the construction of a pedestrian and cycling bridge and a tunnel would guarantee the continuity of the route;
- to minimize the isolation of some closer neighborhoods that were locked due to the road and rail networks, and (re)qualify them;
- to correct, reinforce, and install vegetation cover;
- to recover the memory of the Alcântara River by introducing water into the Avenida de Ceuta area;

- to use, for scenic effect and for irrigation, water coming from the Alcântara Wastewater Treatment Plant (ETAR), settled in the intervened area;
- to value the local cultural heritage—the implemented route could offer a new proximity and perspective of the Águas Livres Aqueduct (Figures 7, 9 and 10).



**Figure 9.** SGCAV project (a) and renderings (b)—north—990 x 1495 meters. Source: *Gabinete de Projeto de Estrutura Verde/Direção Municipal de Ambiente, Estrutura Verde, Clima e Energia/Câmara Municipal de Lisboa* (GPEV/DMAEVCE/CML). Reproduced with permission from [GPEV/DMAEVCE/CML].



**Figure 10.** SGCAV project (a) and renderings (b)—south—990 x 1495 meters. Source: *Gabinete de Projeto de Estrutura Verde/Direção Municipal de Ambiente, Estrutura Verde, Clima e Energia/Câmara Municipal de Lisboa* (GPEV/DMAEVCE/CML). Reproduced with permission from [GPEV/DMAEVCE/CML].

### 3. Results and Discussion

Based on the analysis of the projects, meetings with the authors, public presentations, direct observation, and guided tours in the intervened areas, we can highlight some notes about the impact of these interventions in the urban environment. Depending on the state of the works, the following notes are more accurate where the projects have been completed (i.e., Seixal Promenade, Section 3.1), but they should be considered as first impressions where the works are not yet finished (i.e., Alcântara Valley, Section 3.2). This chapter closes with an intention to emphasize the potential key role of the Tagus Estuary towards a not merely announced but, rather, planned adaptation of ground level planning to the LMA's specific site (Section 3.3). That is, from a territory historically marked by the river towards a metropolitan public space system adapted/planned to live together with its 'waters' in best-performing ways and, at the same time, with the awareness of being a more habitable context that is linked with its 'natural' hydrographical network. Here, 'waters'—intended as geographical (estuarine humid system), urban/wasted and meteoric (all conditioned by climate change and global warming)—will become materials of the ground level metropolitan project.

#### 3.1. New-Found Estuary Promenade of an Attractive Old City Centre—SRP

Starting from the 1990s, when the radical transformation of the waterfront took place, since it was occupied mostly by industrial and port activities, many urban centres that settled along the Tagus Estuary have been regenerated and give special emphasis to pedestrian and cycling pathways in parallel to the river. Starting from the example of Lisbon, see Reference [31], from the regeneration of the Expo Area (1998 Lisbon World Exposition), we find the creation or renewal of riverside zones in all the municipalities of the north bank of the Tagus Estuary.

Lisbon first rediscovered its coastline (its riverfront) as a land for urban renewal. The success of the Expo '98 project and the *Parque das Nações* gave way to a requalification programme focused on the Tagus' banks, currently still in process: the Lisbon General Plan for Waterfront Interventions (*Plano Geral de Intervenções da Frente Ribeirinha*—PGIFR, 2008), which aims to establish new urban continuities, by extending the model of the Expo '98 from the west part of the city to the east.

Into the south bank of the estuary, the Seixal Riverside Promenade represents an example of (re)construction of a riverfront, where the municipality shows a clear intent to renovate its old town, together with its image, starting from the estuarine water. The competition of ideas, launched in 2009, as well as the clear intention to continue the regeneration of all the areas along the Seixal Bay, reveal the Seixal Municipality is looking at (and emulating) the waterfront regeneration process realized in the north bank of the estuary and at the Lisbon case as a winning formula.

Beyond a renewed access to water, an increase of green areas and the creation of pedestrian and cycling routes, in the logic of urban competitiveness, as suggested by Pedro Brandão, urban design can sometimes see some aspects of its matrix being de-chalked and being called to play only the function of building an image that 'helps to sell the city' [32] (p. 8, translation by the author). Hence, the water, in the case of Lisbon: *à beira Tejo* (next to the Tagus), as in many fluvial and coastal capitals, becomes an added value, often synonymous with luxury in the case of the promotion of private housing and hotels [33].

In Pedro Brandão's opinion, there is a sort of perversion in the waterfront urban project that materializes itself as a monofunctional space for leisure and a sort of theatre of appearances—'beautiful people at the docks' [34] (p. 5). Hence, the waterfront becomes a symbol of cosmopolitan culture, quality of life, future, and representation of an idea linked to an image of modernity lacking authenticity and presence of assorted functions [34].

As has happened in many other fluvial cities and as expected by the stakeholders implied into the SRP project, the urban area around the promenade has become, starting from 2017, an attractive region for new residents and ground for investors. As in the case of other urban waterfront regeneration processes, in Seixal, the impact of private investment is mostly visible in the refurbishment of the old buildings, with special emphasis on buildings with an estuary view. It is clear that, following the trend



of the most important cities in Portugal, small villages like Seixal benefit from the recent governmental tax policy.

Starting from 2009, after the economic crisis of 2008, the Portuguese government promotes a tax legislation that aspires, and data confirms that it has happened as expected, to stimulate economic recovery by attracting capital and people who usually reside in foreign countries. The aim of this policy is the increase in population density, in a country that is experiencing a profound demographic decline (a density that is capable of triggering rapid growth). Consequently, the number of foreign people spending long or short periods of time in Portugal (new residents or tourists) is increasing [33].

The advantages and disadvantages of attracting capital and people are well known to all the cities that experience tourism today (and/or new residents). In the Lisbon area, on the one hand, the capital injection produces occupation and redevelopment of central zones and buildings often previously reduced to ruins. On the other hand, prices of real estate rental properties and purchases dramatically increase, old tenants are driven to move to peripheral areas, proximity trade weakens in advantage of big commercial chains, souvenir shops proliferate, and public transport is congested [33].

In Seixal, especially after the riverfront renewal and the new riverside promenade as an attractive area, we find investment campaigns and calls to invest aiming to attract capital to reconvert abandoned buildings and former industrial areas and to stimulate the economic growth all around the bay. We indicate two examples of initiatives aimed at attracting capital for the regeneration of former industrial and abandoned areas into Seixal's administrative boundary. Both initiatives, even the ones prior to Seixal's riverside regeneration process, benefit from the new promenade along the Tagus.

The 'Lisbon South Bay' project, promoted by *Baía do Tejo* and the Municipal Councils of Almada, Barreiro and Seixal, for the requalification, development, and promotion of zones settled on the south bank of the Tagus River, is presented online as: 'The Atlantic Way of Business'. Focused on the requalification of three riverside areas known as Barreiro Business Park, Seixal Business Park, and the Water City (Almada), 'the Lisbon South Bay project will make the Lisbon Metropolitan Area more competitive. Empowering this area with an urban requalification plan and improving the current infrastructures to develop business, this territory will stand as a synonym of economic activity and development' [35].

As we can read online: 'Baía do Tejo SA, has the mission to valorise and develop its territories, promoting its urban and environmental requalification, while continuing the activity of management of Business Parks located in the municipalities of Barreiro, Seixal and Estarreja (...)' [36]. The company also has as its mission the promotion of the 'Arco Ribeirinho Sul Project', approved in 2008, regarding the territories located in the Councils of Barreiro, Seixal, and Almada, according to what was attributed by law in 2012 [36].

As an example of public initiative, under the motto 'A land with a sea of opportunities' [37], the Seixal Municipality's web page points out, in a downloadable brochure, areas that can be ground for investors. Almost all the locations, mostly public (municipal) property, with tourist and leisure potential such as recreational boating, are settled along the Seixal bay.

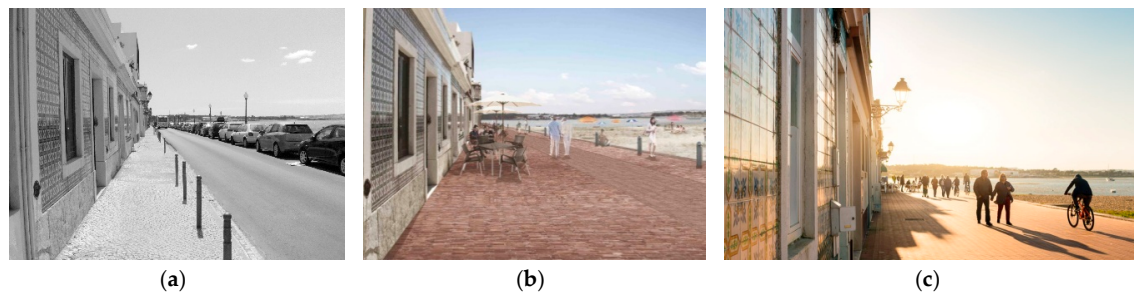
Based on this understanding and taking into account the objectives of the SRP project (see Section 2.2.1 of this article), we can state that the authors achieve their purposes, especially in terms of creating a new relationship of the old town with the bay and in terms of drastically reducing car circulation. As introduced above, this new relationship with water becomes an incentive to carry out the investments fostered by the Portuguese government.

The design of the promenade highlights the clear intention to improve the sense of continuity, both in a longitudinal as in a transversal direction. The pavement is almost homogeneous and traffic deterrents are reduced to a minimum. The project creates a new physical and visual opening to the estuary. The barrier elements are few and characterised by reduced height (Figures 11 and 12). The design of the land-water interface produces a new visual reference for the banks' curve.





**Figure 11.** Before (a) and after (b) the SRP intervention: Praça da República. Source: Risco Office (a). Reproduced with permission from the [Risco Office] and author's photograph (b).



**Figure 12.** Before (a), rendering (b), and after (c) the SRP intervention: Avenida D. Nuno Álvares Pereira pathway and urban beach. Source: Risco Office (a–c). (c) photograph Fernando Guerra/FG+SG. Reproduced with permission from [Risco Office].

Concerning the mitigation of the seasonal flooding impact, which was one of the specified objectives of the project (see page 9 of this article and Reference [24]), the intervention has increased the drainage efficiency. However, it has no significant impact on vulnerability to flooding in certain areas, when river waters rise above the level of the promenade. The drainage efficiency has been improved through the increase of permeable soil surfaces and vegetation (Figure 13), as well as the complete renovation of the pluvial drainage system, including the micro-modelling of the soil, the collection through grids and sinks, and the network of collectors.



**Figure 13.** Before (a) and after (b) the SRP intervention: Largo 1º de Maio—Source: Risco Office (a,b). (b) photograph Fernando Guerra/FG+SG. Reproduced with permission from [Risco Office].

Nonetheless, regarding the issue mentioned above, it is important to underline that, even if presented as one of the project's objective in the application of the 2018 European Prize for Urban Public Space [24], the 'mitigation of the impact of seasonal flooding' is not mentioned in the 2009 Competition Report [25]. The latter document defines the SRP project as 'a surface intervention work' [25] (p. 27). In the authors' own words, 'The decisive option of the project is to carry out a surface intervention work, without implying major restructuring of existing infrastructures, (...)' [25] (p. 27).

### 3.2. New-Found Slow Pathway, a Way to Link and Promote the Regeneration of Surrounding Urban Areas—SGCAV

Thanks to the new route across the four intervened areas, the Alcântara Valley Structural Green Corridor gives the general public and local neighbours, for the first in many years, the possibility to perceive the shape of the valley by walking or cycling through it. In addition to the fast mobility infrastructures, such as road and rail networks, the pedestrian and cycling route introduces a slow pathway into the river corridor.

Through open green areas (urban parks and orchards), settled along the main route, the Alcântara project helps to connect some neighbourhoods, currently isolated, and push them towards a regeneration process. The project activates a connection of the Liberdade neighbourhood (*Bairro da Liberdade*) with the lower parts of the city by offering new green public spaces equipped as urban parks, which frame the quarter in the direction of the Campolide station (see Figure 7 for the location of *Bairro da Liberdade*). With an improved public space and a renovated image of the neighbourhood, as in the case of Seixal's riverside promenade, urbanised areas and abandoned buildings along the new pathway can benefit from the recent governmental tax policy that stimulates economic recovery by attracting capital and people (new residents and investors) (Figures 14 and 15).



Figure 14. Quinta do Zé Pinto urban park. Source: author's photograph.

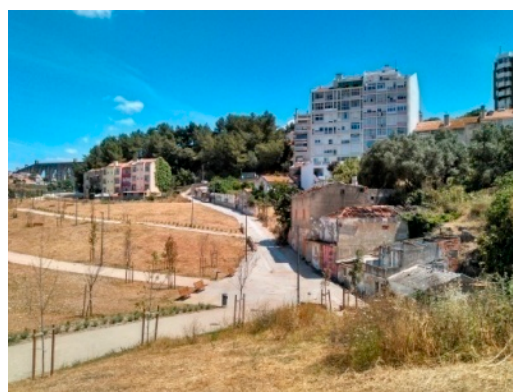


Figure 15. Quinta da Bela Flôr urban park. Source: author's photograph.

*Bairro da Liberdade*, confined between the railway line and the Monsanto Forest, was born in the beginning of the 20th Century and developed after World War I (1914/1918). The Lisbon Urban Rehabilitation Strategy 2011/2024 (*Estratégia de Reabilitação Urbana de Lisboa 2011/2024*), promoted by the Lisbon Municipality, considers the interventions in the *Bairro da Liberdade* among the priorities for future rehabilitation-focused actions. The Lisbon Urban Rehabilitation Strategy indicates (as a priority) the *Bairro da Liberdade* as an area where it may be justified to carry out a Systematic Urban Rehabilitation Operation (*Operações de Reabilitação Urbana Sistemática—ORUSt*). This kind of 'operation' could be

launched for reasons of degradation of the whole building environment and/or public space, or even for social, economic, and environmental reasons. These interventions foresee building rehabilitation, as well as infrastructure, equipment, and green and urban spaces qualification [38].

In addition to minimising the isolation of the closer neighbourhood, the new-found slow pathway integrates and signals a piece of local cultural heritage to the new route (the *Águas Livres* Aqueduct) and the intermodal connections involving two or more different modes of transport, such as bus stops and the railway station (Campolide). Once more, the new pedestrian and cycling route represents a new added element to the infrastructural corridor supported by the river valley. An element that, thanks to the use of a green colour, marks and claims a place for a slow alternative mode of transport (Figures 16 and 17).



**Figure 16.** *Águas Livres* Aqueduct and intermodal station of Campolide. Source: author's photograph.



**Figure 17.** *Águas Livres* Aqueduct and *Quinta da Bela Flôr* urban park. Source: author's photograph.

Based on this understanding and taking into account the Lisbon Municipality's objectives (see Section 2.2.2 of this article), we can state that the SGCAV project achieves them by providing an example of good practice, especially in terms of water use. Despite water flow not being physically present in the Alcântara Valley, it appears to be the common thread of the intervention. To reduce drinking water consumption, recycled water from the Alcântara Wastewater Treatment Plant, settled in the intervened area, is used for scenic effects in the Avenida de Ceuta area, and for irrigation in the entire intervened area. In effect, water reaches the intervened areas located to the north of the treatment plant by pumping, and the areas located further down by gravity.

Overcoming the recommendations of the recent Lisbon's General Drainage Master Plan (*Plano Geral de Drenagem de Lisboa 2016-2030*) [39], the SGCAV project advances a method for using water already present in the area. The General Drainage Master Plan, within the framework of the planned interventions for the improvement of the drainage system set by the Lisbon's Municipal Master Plan in

effect (PDM, 2012) aims ‘to meet the current and future challenges of drainage in the city, focusing on the protection of people and goods, within a framework of economic, social, and environmental sustainability’ [39] (p. 262, translation by the author). While suggesting the requalification of the watercourses together with the preservation and increasing superficial and underground drainage storm flows, the 2012 PDM and the accompanying documents give strong emphasis to the source control strategy [40]. ‘With the exception of traditional solutions, such as underground reservoirs or deviation tunnels, the PDM is a long way off from concrete adaptation actions, specifically concerning detailed implementation designs’ [40] (p. 8).

In line with the PDM, the Drainage Master Plan, within the framework of strategies to be adopted between 2016 and 2030, in order to control the risk of flooding and contribute to the adaptation of challenges posed by climate change, suggests the constructions of diversion tunnels to lead waters from the upper drainage basins towards the Tagus main riverbed. Although it recognises that complementary interventions are a fundamental measure to adopt, in the SGCAV’s project area, the Drainage Master Plan suggests a 5-km underground deviation tunnel from the upper city to the Tagus Estuary. The tunnel is expected to divert flows from the main pipe of the old Alcântara River (*Quinta do Zé Pinto*) towards the Tagus, in the Santa Apolónia area (west Lisbon). The underground tunnel (with a final section of about 200 m long, above ground) aims to control the risk of flooding in the downtown Alcântara area and the Lisbon city centre [39].

Hence, on the one hand, the Lisbon’s General Drainage Master Plan wants the water quickly removed from the city towards the Tagus River, while, on the other hand, the SGCAV intervention, re-using wastewater present in the area for irrigation or scenic effects, proposes a superficial and slower water flow. Although the Alcântara River is currently piped, almost emulating the geomorphological nature of the site (a river valley), the intervention gives once more a key role to water. Therefore, in terms of soft interventions and sustainability-sensitive regeneration approaches, the SGCAV project seems to go a step beyond the masterplans in effect.

### 3.3. *Towards a Planned Adaptation of the Ground Level Project to the Specific Site, Starting from the Tagus Estuary*

The two analysed interventions give us reason to hope for a metropolitan revitalisation policy directed towards the Tagus Estuary as a core of the LMA. Thus, the estuary becomes a ‘tool’ for city planning, in terms of water-sensitive and greener interventions, so as to achieve more habitable surroundings, as well as a wide and strengthened Tagus Estuary identity. The latter is guided by spatial recognition and the authenticity of a vaster geographical location, such as that of a river, where its spatial identity is based on a ‘specific geo-local entity’ [41].

The Tagus Estuary, with its relevant biophysical, historical, and cultural aspects, reflecting a rich landscape diversity, turns out to be a space of identity and metropolitan cohesion. Starting from the idea of ‘the city of two banks,’ which was the manifesto of the Regional Spatial Plan for the Territory of the Lisbon Metropolitan Area (*Plano Regional de Ordenamento do Território da Área Metropolitana de Lisboa*—PROT-AML, 2002), public bodies involved in the LMA planning and management defend an idea of a metropolitan city, symbolically as well as physically, centred on the estuary. However, it seems easier to achieve ‘the city of two banks’ there where the distance between the margins is smaller (between Lisbon and Almada). Moreover, almost only in the presentation and promotion of the riverfront (along the main riverbed), concepts such as ‘return the Tagus to the people’ [42] appear.

From this article, we understand how useful the Tagus River (its water presence and its view) was in forging the image of the new Lisbon waterfront, and we see how it was also used along the lesser-known side of the southern bank (in Seixal). However, the estuary can enter the structure of the metropolitan territory in a deeper way, through regeneration strategies that adopt it as a working tool as well as a new perspective. Both metropolitan green corridors and riverfront interventions—the latter as an ecological (green) corridor par excellence—can benefit from an estuarine-oriented, as well as a broader water-oriented approach.



Accordingly, on one hand, the LMA could have green corridors—some of them coinciding with the fluvial valleys of the Tagus River Basin—which could be designed as drainage or ridgelines. Here, water (visible or invisible) could be a strong element of the intervention, becoming a ‘material’ of the project from irrigation and scenic effects to a broader conditioning of the site, adapting the latter to its flood specific conditions. On the other hand, we also could have riverfronts along visible watercourses in which water is part of the public space design and does not have a merely promotion role.

Consequently, using water as a material for the ground level projects, in both ‘greener’ and ‘harder’ (less green) interventions, the LMA renewal policies could optimally enhance the interaction with the specific site, towards an ‘adaptation of the planned new systems to the site’ [43] (p. 16). This means to convey, to drain, to infiltrate, to harvest, and to store water (just to name a few ways to deal with water scarcity and abundance) which we can see in some examples of ‘adaptation’ to the specific site. This ranges from the ambitious scheme for Treasure Island in San Francisco (transportation planning and sustainability consulting by Arup) to European water-sensitive urban public spaces projects—the 2013 Water Square in Benthemplein, Rotterdam (De Urbanisten); Catene Park in Venice, (Czstudio Progetti); and the 1998 Waterscape in Potsdamer Platz, Berlin (Atelier Dreiseitl’s/now Ramboll Studio Dreiseitl)—, to recent local design solutions proposed for the Lisbon Municipality—urban flood adaptation through public space retrofits [40] (Appendix A) and the Praça de Espanha Urban Park project (Baldios Landscape Architects with Ventura Trindade Architects).

In brief, far from blindly trusting in large hydraulic works—instead looking for alternatives—and a long way from the conviction that water can actually be completely controlled, we move towards a broader integrated water-urban arrangement and a context-based design. In Ranzato’s words, concerning the critical point that has been reached in the water-urban dialectic, ‘the aspiration is to accomplish arrangements where urban ecosystems are in balance. The shift is rather clear: to give more room to water while turning the circumstances (land/water resources/uses and users) to good account’ [43] (p. 12).

#### 4. Final Considerations

Being conscious that it is still too early to evaluate the outcome of Alcântara’s unfinished intervention, the aim of this section is to point out achievements of the projects by taking into account the intentions of the current article (presented in Section 2.2). With a focus on the water-urban project relationship, aiming to highlight the strengths of urban projects bound to water, the work underlines a few closing notes that can contribute to the discussion of urban regeneration processes that benefit from the presence of water.

The two analysed public works change and reformulate the local urban relationship with water (the Tagus Estuary). In Seixal, the relation of the old city centre with the bay is enhanced by reducing car circulation, eliminating parking lots, and increasing public space for pedestrian and cyclists. Here, the pre-existence and characteristic of the specific site, different types of already existing public open spaces along the riverside, are improved. The urban design works with the existing public spaces improving different contacts with the water and always prioritizing the sense of continuity of the ‘new-found estuary promenade’ in connection with the existing pedestrian-cycling route further south. In Alcântara, the relationship between the urban context and water is recreated through a green corridor (‘a new-found slow pathway’) that marks the ‘old’ river valley, previously occupied only by mobility infrastructures, and through the introduction of the water for scenic purposes.

It is clear that both interventions promote new images of the intervened areas. They appear greener, and, consequently, healthier, even if not exactly safety-oriented. In Seixal, the increased drainage efficiency has no significant impact on the vulnerability of the land-water interface fragile area to flooding. In fact, the SRP project does not provide measures to mitigate the impact of seasonal flooding that rises above the level of the promenade. In Alcântara, the vegetation, existing throughout the intervention area, is residual and without significant expression, except for the tree alignments in

Avenida de Ceuta. The intervention foresees a reinforcement and establishment in vegetation, which provides for the integration and intensification of pre-existing urban orchards.

In both interventions, the pre-existing surrounding areas, even if not included in the intervention's boundary, benefit from a new-found relationship with water and geomorphology of the specific sites. Both the new-found relationship with water and the renewed image of the regenerated areas (greener and healthier) play a role as a trigger and create the propitious conditions for private investors, mostly in the case of the new promenade of Seixal.

The interventions contribute to the enhancement of the riverbanks' local identity, mostly in terms of revalorization of local cultural heritage (the aqueduct in Alcântara and the old town in Seixal). As part of the cultural heritage, the Tagus River enters into the regeneration strategies by establishing an embryo to strengthen a wider Tagus Estuary's identity. To look at the water with a renewed view and a stronger relationship with the estuary, the perception of prominences and indentations of a specific water landscape and a re-established sense of belonging to the fluvial matrix soil (i.e., shaped by the river)—the 'idea' of the valley—connect people with its river and become an added value.

Considering the water-urban project relationship and, therefore, the characteristics of urban projects bound to water, we can sum up some general conclusions and suggestions. 'General' in the sense that the following closing notes do not refer only to the analysed projects but rather aim to underline the potential of urban and regional water-related projects for the regeneration of urbanised areas.

#### 4.1. *Water (in Urban Project) as a Binder that Refers to the Idea of Continuity*

As the river shapes corridors of flows, climate, and infrastructure, it implies and propitiates continuity of open (green) public spaces and pathways. As we see in both analysed projects, pedestrian and cycling pathways (along and towards the river) can be the starting point to enhance the connection, beyond the administrative boundaries, that the waterline often materialises. Visible or piped, the waterline binds and, as a natural link, pushes the urban projects towards spatial continuity. In this case, spatial continuity appears as a structuring principle of the urban environment and can be considered 'as a notion of urban "publicness"' [44] (p. 123). In Ana and Pedro Brandão's words, urban spatial continuity is intended 'as a conceptual integration reference of common and persistent spatial service value: where public space (interaction, sharing and identity capacities) interacts with other urban systems—infrastructure (mobility facilitator, urban activities support) and landscape (life production potential, ecological sustain)' [44] (p. 125).

Starting from these reflections, the Seixal pedestrian and cycling path could be extended to the entire south bank, becoming an alternative way of daily mobility and not merely a space mostly used for recreational activities. In the same line of thought, and evoking spatial continuity, the Alcântara intervention should be considered and be the guide (most of all in term of water use) of two urban projects that currently separate the SGCAV intervened area from the Tagus River—Alcântara East and West Execution Units (*Unidades de Execução de Alcântara Levante e Poente*).

#### 4.2. *Water (in Urban Projects) as a 'Thick' Element of Public Space Able to Redesign Surroundings Areas*

The waterline becomes 'thick' because it can agglutinate contiguous free/open/public spaces. Hence, it 'would create open connections, establishing a porosity instead of a belt' (i.e., a limit) [45] (p. 26). Borrowing Desvigne's word 'thick,' that in the author's opinion, refers to 'borders' such as the lines of separation between the fields of extensive agriculture and areas of low-density housing' [45] (p. 26), we suggest to think about the waterline as a binder, both at a spatial level and a social level.

This thick and public waterline is able to support actions that tend to redesign spaces, becoming a trigger for the surrounding areas' regeneration processes, aimed to promote a more habitable city. As seen in the two analysed projects, the actions for a less car-dependent environment—the promotion of alternative modes of transportation well linked to transportation hubs—the enhancement of permeable and green areas, the ecological continuity with large green spaces, and the use of recycled

water for irrigation or scenic effects, show a planning strategy that moves towards developing more resilient urbanised territories. As mentioned, in the case of the Alcântara Valley, the intervention overcomes the current Lisbon Drainage Master Plan, by choosing a more resilient solution.

The proximity to water becomes a resource for the project of the city, in terms of regeneration processes of problematic urban areas. Even if not strictly oriented towards building rehabilitation, water-related regeneration projects can be the starting point to recover existing constructions. Being greener, better connected with the central urban areas, and characterised by an enhanced link with the local heritage, peripheral and degraded neighbourhoods close to the waterline can benefit from the regeneration improvements, which become attractive areas to live in. The attraction moves from a current trendy formula, which claims communities thrive in balance with habitats, pre-existences, and cultural heritage around them.

Hence, water is able to align ecologically-oriented objectives with other aspects of ‘territorial sustainability’ [46] (p. 86), not solely related to ecosystems. As argued by Dematteis, the sustainable development of territories is also based on their ‘cultural self-sustainability’, as well as cultural variety and diversity. This means supporting cultural diversification and ‘the co-evolutionary interactions of local societies with their territory-environment’ [46] (p. 88).

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