

Green areas in public space – factor activizing urban waterfronts

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Abstract

The problem described in this study concerns the processes accompanying the revitalisation of waterfronts in urban public areas. This article has been an attempt to analyse the latest waterfront transformations and to extend the knowledge on shaping of public green spaces in riverbank areas.

The purpose of the study was to analyse and introduce the typology of urban green areas located along the waterfronts, concentrated around continuous walking or cycling routes. Another assumption of the author was to indicate the factors determining the vitality and activation of these areas.

The applied research methodology was based on factors shaping the coastal space, which the author presented as a group named “waterfront linearity”. Moreover, his paper examines the latest waterfront revitalisation undertaken in Rouen, Bordeaux, Lyon.

The conclusions found in this paper constitute an important element of research studies devoted to the ways of shaping green areas in the immediate vicinity of rivers as well as studies in the area of environmental psychology.

Keywords: waterfront revitalization; waterfront public areas; riverside green areas; waterfront linearity; waterfront linearity factors

1. Introduction

Growing ecological awareness is largely responsible for the changing perception of rivers in urban landscape and is seen as an element enhancing the quality of life of city inhabitants. Green areas in public space constitute one of the most important elements responsible for the vitality of waterfronts. The form of green areas, their accessibility, function and scale, they all influence the level of waterfront activation. Parks laid out alongside riverbanks help identify and define particular place and create public spaces capable of fulfilling various social needs (Lorens, 2009; Kantarek, 2012; Nyka, 2007; Gyurkovich, 2005).

The aim of the conducted analyses of the selected waterfront revitalisation projects is defining the correlation between the form and function of green areas with waterfront activation. The typology of recreational areas proposed by the author may be useful in planning and designing areas with a varied level of social interaction.

The author believes that one of the threats of contemporary waterfront transformations is the homogenous character of designed public spaces, which does not offer friendly environment for all city dwellers. Recent revitalisation projects of French cities have shown that the areas enhancing active recreation are as important as the ones which offer regeneration and are more natural. Adequate development of waterfront green areas may be the right answer to the contemporary needs of healthy urban environment.

2. Methodology of research

Describing the interrelationship between green areas and the level of waterfront activation was the starting point of this research study. For this purpose the author analysed elements responsible for appropriate functioning of public areas of revitalised waterfronts in several selected cities (Bordeaux, Rouen, Lyon). As a result of the analysis 4 main factors were distinguished by the author which, in his view, influence the character of the waterfront and its activation: recreation, mixed urban development, inflow and continuity (Fig. 1). The author has opted for choosing the term **waterfront linearity** to describe a group of factors which influence the direction and shape of connections between several points alongside a continuous and uninterrupted route covering the area between the river and another section of urban area (Zieliński, 2018). The issues of place identity and its connection to linearity and continuity refers to research and terms presented, among others, by Kevin Lynch (1960), Agnieszka Wójcik (2008) and Anna Januchta-Szostak (2014; 2011).

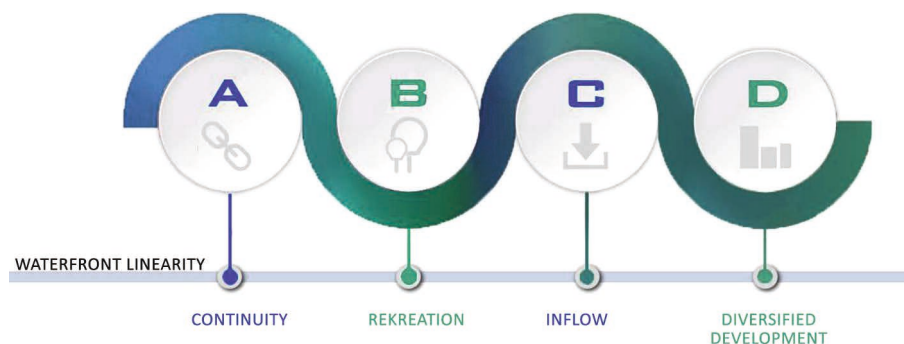


Fig. 1. Diagram showing waterfront linearity factors (own elaboration)

The author characterized the individual factors of waterfront linearity that influence activation as follows:

- a) Continuity – a factor characterizing an uninterrupted stretch of the waterfront, along which free movement is possible. This factor is also associated with determining orientation along the direction of movement, influenced by elements such as edges, boundaries and landmarks.
- b) Recreation – a factor responsible for the vitality of the waterfront, achieved by introducing recreational areas such as parks, squares, sports facilities, etc. When it accompanies other linearity factors, it strengthens them, ensuring an improvement in the quality of the surrounding space. In some cases, it can compensate for the absence of certain elements (e.g. supply).
- c) Inflow – a factor influencing the revitalization of the city-river relationship by facilitating the flow of people towards the waterfront. It determines the connection of the shoreline with adjacent development or districts through arteries, streets, or sidewalks. It also relates to what is called permeability, which affects freedom of movement.
- d) Diversified development – a factor involving the introduction of spatial organization and functional diversity in the vicinity of the waterfront. It influences the quality of space, which should create welcoming places for every age and social group. Ensuring the appropriate environment for each individual requires the integration of services, building types, and forms, as well as areas along the shoreline. This factor is also linked to the economy and legislation in a given area and describes the degree of integration of the waterfront with adjacent districts (Zieliński, 2021).

When conducting waterfront analyses a correlative research method has also been used. Level of activation has been compared with the scale of linearity factors which exist in a given area (Niezabitowska, 2010). This method of collecting data belongs to non-invasive measurement methods originating in environmental psychology (Bell et al., 2005). The research draws on Roger Baker's theory, who described public spaces as centres of activity. According to Baker they constitute basic environmental unit describing the influence of the surrounding space on human behaviour (Barker & Wright, 1968).

The model of waterfront linearity chosen by the author has been used as a tool for the description of revitalisation processes of the presented waterfronts and their character. This study discusses mainly the recreation factor and green areas related to it. The selection of analysed waterfronts was conducted in a way which allows to show various types of solutions regarding urban landscape, parks and green areas located alongside riverbanks.

It is worth noting that similar approach to describing public space through its attributes and determining elements can be found in works of such authors as Kevin Lynch (1981), Shervin Green (1992), Jan Gehl (2004), Matthew Carmon, Tim Health, Tanner Os and Steave Tiesdell (2003). Also worth pointing out are findings of Rachel Kaplan, Stephen Kaplan and Robert L. Rayan (1998), who distinguish four factors which define attractiveness of park spaces: coherence, legibility, complexity and mystery.

3. Waterfront Diversity

Various levels of urban waterfront activation are related to the idea of creating inhabitant-friendly environments as regards their social function. Adequately developed public areas may become an ideal place for people who wish to practise sports or who just want to find some rest from the hustle and bustle of a busy city. Lots of factors influence the vitality of the waterfront, but one of the most important is the recreation and the recreation-focused green areas and parks.

In this study the author has proposed his own typology of waterfront green areas, which enhance revitalisation processes and influence the activation of waterfronts in various ways. The division is based also on the level of activation and existence of other linearity factors. It has to be

remembered, however, that this typology refer to areas which are located alongside continuous walkways and cycleways and does not include individual fragments of green spaces which are accessible only from the city (i.e. they are inaccessible from the riverbank). Such cases form a separate group and shall be studied and analysed by the author in the future. Hence the following division of waterfront green areas has been proposed:

Table 1. Division of waterfront green areas located alongside continuous walkways and cycleways (own elaboration)

Recreation factor/ Type of green area	Other linearity factors/Features	Forms of green areas
Green areas stimulating physical activity	Linearity is present; inflow and mixed urban development should be at high level or slightly limited – areas should be accessible and connected with the city	large parks, linear parks, gardens, unique fragments of waterfronts
Green areas suitable for regeneration	there is full or slightly limited continuity; influx and mixed urban development is at low level or non-existent – areas should be connected with the rest of the waterfront and should constitute an enclave separated from urban development	park areas, natural green areas, areas with limited accessibility, landscape parks
Green areas supporting continuity of revitalised terrain	there is full or slightly limited continuity; inflow and mixed urban development is at average level – areas should be, wherever possible, accessible, coherent and connected with the rest of the waterfront	small parks, green urban squares, gardens, delineated green belts, floating gardens

The purpose of introducing the above-mentioned typology and the analysis of particular forms of green areas in revitalised areas is to emphasize the need for introducing various natural environments, which may activate waterfronts in various ways and, consequently, create public areas with varying levels of social interaction. Greater awareness in creating friendly waterfront environment may be a valuable element of waterfront landscape designing process.

4. Waterfront green areas – space stimulating physical activity

Connecting green areas with unique places which are highly attractive and easily identifiable allows for creating environment which stimulates various forms of activity. The presence of other factors of linearity, i.e., continuity, inflow and mixed urban development is necessary since they affect the legibility, accessibility and identity of the place. They create special zones which form part of the waterfront and attract equally tourists and city inhabitants. They also make convenient venues for organizing cultural events, as they facilitate social interactions and provide higher level of spatial behaviour stimulus. Public space organized in this way attracts all types of activity mentioned by J. Gehl in his works, i.e., essential – accessible, optional – attracting observer’s attention and social – attracting urban life. He enumerates three types of urban activities: 1. Essential – fulfils people’s existential needs; 2. Optional – results from a free choice; 3. Social – creates and strengthens social bonds (Gehl 2004). Green areas which meet the criteria defined above include large parks, linear parks, gardens and unique fragments of waterfronts. The research

studies conducted on the revitalised sections of waterfronts in Lyon, Rouen and Bordeaux seem to confirm the correlation between the aforementioned forms of public green spaces and a higher level of inflow, continuous uninterrupted walkways and bicycle paths and access to mixed urban development. Such public spaces are characterized by the following:

- better connection of the city with the waterfront,
- higher level of stimulus,
- creation and strengthening of social bonds,
- possibility of making references to local culture and cultural heritage of a particular area,
- greater attractiveness and economic vitality,
- higher level of social interactions,
- enhanced legibility and coherence of the area.

A good example of green spaces which enhance waterfront activation is the central section of Bordeaux waterfront (Fig. 2). At *Miroir d'eau* square the recreation factor is the dominant element and the one which effectively activates public space. The concept of a water mirror (with the area of 3450 m²) which is created on stone slabs by water mist sprayed at regular intervals was executed by Jean Mav Llorca, who used the idea of Michel Corajourd and Pierre Gangnet. The square together with the garden was completed in 2006. Corajourd designed *Jardin des Lumières* (the Garden of Lights) on both sides of the fountain. Water mist and gardens constitute part of the recreation factor, which is so prominent that it affects the whole waterfront (Fig. 3). This place has become the *genius loci* of the city, the focal point of Bordeaux waterfront. Thanks to its popularity the area in front of the palace has become a symbol shaping the identity of Bordeaux.

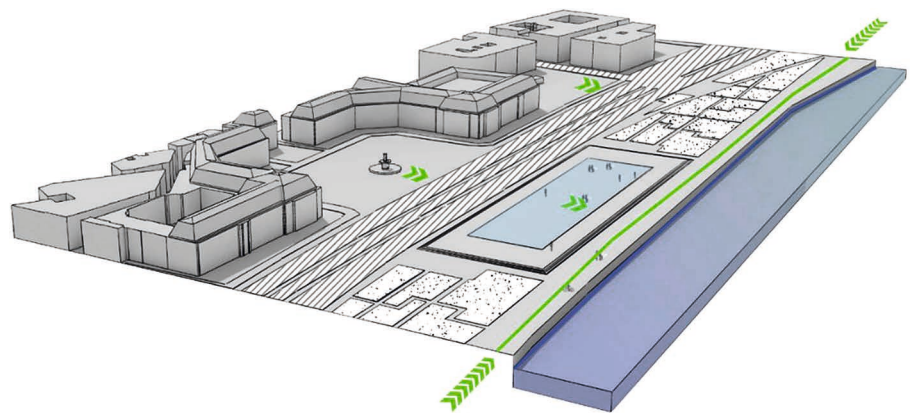


Fig. 2. Fragment of the left bank of the Garonne near Miroir d'eau (Bordeaux). Recreation factor (fountain with gardens) is the focal point of the waterfront generating activity (own elaboration)



Fig. 3. *Jardin des Lumières* (Bordeaux). Photo (a) – view on the river from the gardens; (b) – view from the gardens with the visible line of the river and the city; (c) – at dusk the lighting made up of colourful lamps adds to the ambience and charm of the place (own elaboration)

It is worth noticing, however, that such a high level of activation on a considerably longer stretch could also have negative influence on the riverside public space. Firstly, identity and legibility of a given place could be adversely affected since the place will no longer stand out from the rest of the waterfront.

Secondly, a large number of people and noise generated by them could be arduous and intolerable in the long run. Maintaining high level of activation throughout the whole length of the waterfront need not necessarily be the best solution and may deprive revitalised areas of various social functions. Worth noting here are the determining factors which define human attractiveness of urban space pointed out by E. Cicha Pazder (1998). The Author mentions three groups of factors which condition the possibility of identifying people’s spatial adaptation:

- Attributive factors – relating to perception and emotions;
- Range-based factors – related to the range of accessibility;
- Situational factors – affecting social integration and bonding, **interpersonal relationships** as well as spatial polarisation.

Another example of green area stimulating physical activity is the left riverbank in Rouen. Transformation of this waterfront of the Seine River was conducted in 2010. Revitalisation project was intended to transform this post-industrial zone into a continuous and attractive public space.

Despite slight limitations of linearity factors (inflow, mixed urban development) resulting from a bipartite waterfront profile, the redevelopment of the left waterfront enhanced its vitality. The promenade was connected with green areas which displayed considerable biodiversity on the whole length of the waterfront, and recreation and relaxation infrastructure was provided (Fig. 4). Green areas of different character and specificity intertwine with sports activity zones (e.g. football pitches, volleyball, basketball and boules courts, labyrinths and outdoor work-out zones) and thus prevent monotony of the waterfront line (Fig. 5). Squares with tall grass, trees and decorative shrubs create more secluded and more intimate zones. Larger and more open spaces resembling meadows serve city inhabitants as places for meetings and relaxation. In another part, on small hand-made hills, wooden deckchairs were installed offering a view on the right bank of the Seine with its historical architecture. It is worth pointing out that identity of the waterfront has been

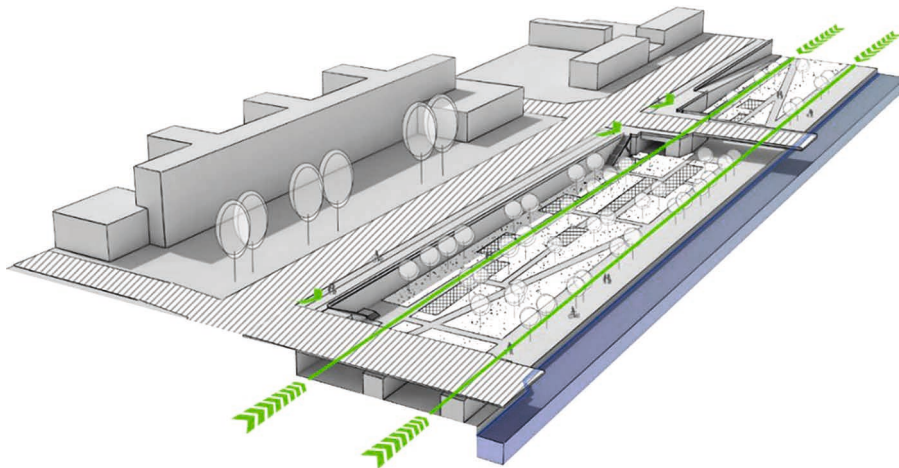


Fig. 4. Section of the left bank of the Seine – from Pierre Boieldieu Bridge to Jeanne-d’Arc Bridge (own elaboration)



Fig. 5. Various forms of recreation in a linear park on the left bank of the Seine (Rouen) (own elaboration)

carefully preserved by introducing some details testifying to the industrial history of this area, such as railway tracks or old cobblestones which were used in some parts of pavements and squares.

The left bank was transformed into a unique element of landscape which allows to define better the urban plan. Thanks to the concentration of green areas and squares alongside pedestrian walkways, the so-called linear park was established (LILA, n.d.). It was made possible thanks to adequate redevelopment of post-industrial area stretching for 3 kilometres. The river together with green areas has become the main axis in the spatial structure of the city.

5. Waterfront green areas – regeneration space

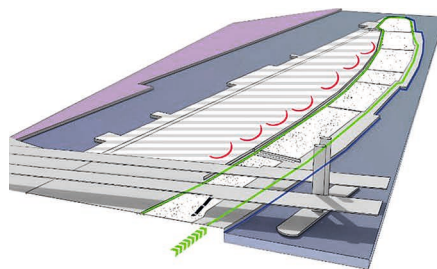
Another type of waterfront green areas constitutes places with a considerably lower level of activation. There may be a few reasons for it. One of them is the degradation of the waterfront line and deprivation of all linearity factors. Consequently, the riverbank becomes inaccessible, less coherent and deprived of characteristic and unique places. Another reason is limiting only two out of four factors of linearity: human inflow and mixed urban development. It mainly concerns fenced park areas, areas which are not easily accessible (wetlands, wildlife habitats, sensitive ecosystems) and landscape parks. These are very precious not only because of the attractive views of the river valley, but also because they enable various levels of social interactions. The main features of the green areas described above include:

- natural and quiet environment,
- activating public space with a lower level of stimulation,
- lower level of social interactions,
- lower level of noise,
- creating personal zones,
- lower level of safety and the resultant lower feeling of comfort.

Rollet Peninsula in Rouen on the left bank of the Seine is a good example of waterfront area offering regeneration character. Adequately utilized factors of recreation and continuity (function and movement) allowed to create a unique place offering lower level of stimulation and interaction.

At the edge of the waterfront the first part of Presqu'île Rollet Park project was completed. The place which was formerly used for storing coal has been completely transformed. The degraded terrain required a great deal of work to become usable again. One of the most challenging tasks was replacing large amount of soil which had been contaminated by industry. Due to the large scale of this project, the revitalisation process was divided into two stages. Stage one, which covered the area of ca.15 hectares, was completed in 2013. The area was fenced off temporarily until the moment when in Stage two the whole peninsula becomes transformed into a park-and-forest public space. Once the revitalisation project is completed, the area will be half-wild in its character, with a great number of trees and meadows (hatched area in Fig. 6).

Fig. 6. Rollet Peninsula on the left bank of the Seine (Rouen). Redevelopment project was divided into two stages, Stage 1 was completed in 2013. After completion of Stage 2 (indicated by the hatched area) the whole peninsula will be transformed into a park-and-forest area (own elaboration)



Currently there are 500 trees and 100,000 other plants on this area. Careful selection of plants allowed to create a wild character of this waterfront

section. One can find here gardens separated by wooden fences, wildflower meadows and zones offering peace and quiet. The authors of this design project, Jacqueline Osty & associés put the emphasis on the fact that 'the way of organizing this place restores the dialogue between the city and the harbour, making a connection between the nature and the urban element (Archi Rouen, n.d.). Green areas on the peninsula are connected with the nearby docks and the rest of the waterfront by means of paths and walkways. As a result, continuity borderline coupled with recreation factor creates a place which is full of life and attracts inhabitants.

After completion of stage one of the revitalisation project it can be observed how the waterfront green areas function when deprived of human inflow. Accessible only from the promenade, having no additional connections with the rest of the city, green areas create a different character of the waterfront. The location of the park and long distance from urban traffic contribute to the solitary feeling. The overriding factors are recreation and continuity. They are the ones which shape public space.

Lack of inflow factor may be utilized for creating a natural waterfront which will be ideal for rest and relaxation far away from busy streets and the hustle and bustle of the city. Such places are extremely desirable in urban environment. They create the so-called regeneration environments, which eliminate the effects of overburdening or overstimulation (Bell et al., 2005). Diversified waterfront may have activation (stimulation) zones as well as the ones which offer a lower level of stimulation (calming effect). Lack of inflow helps to create an environment with peripheral and regenerative character. For many people nature or green and natural part of waterfront may be such environment (Hartig et al., 1991).

Another example of natural green areas is the northern section of the left bank of the Rhône, between Lattre de Tassigny Bridge and Winston-Churchill Bridge – Bord du Rhône (Fig. 7, Fig. 8). This stretch of the promenade performs the function of regeneration zone offering some peace and quiet. The inflow factor is not necessary, and this fact has a positive influence on the character of this waterfront section. It is a welcome change after passing from a much busier stretch of the waterfront as it corresponds to people's natural need to find themselves in a more secluded area. Creating a friendly environment should take into account psychological aspect, which includes, among others, the so-called behavioral models – introvert and extrovert models (Hendricks & McNair, 1970).

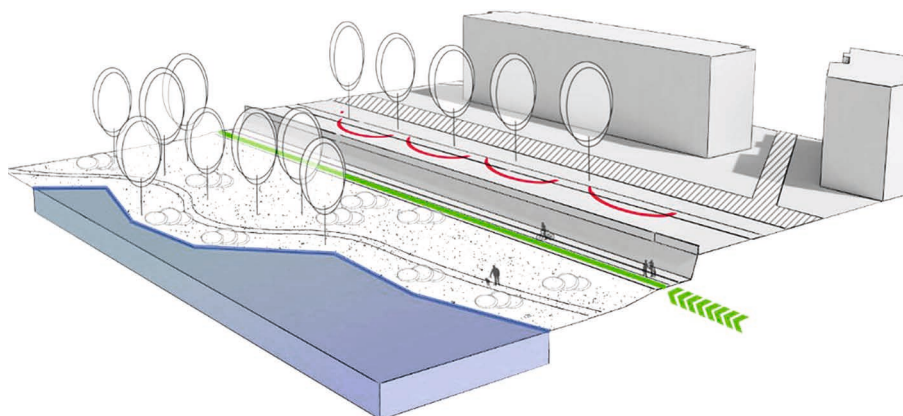


Fig. 7. Stretch of the left bank of the Rhone between Lattre de Tassigny Bridge and Winston Churchill Bridge (Lyon) (own elaboration)

It is also related to the possibility of spatial adaptation of the place mentioned by Ewa Cichy-Pazder in her book *Humanistyczne podstawy miast* (Ewa Cichy-Pazder, 1998). Apart from the attributes related to perception, accessibility and social integration, the Author also points to the importance of safety as an important element which affects public spaces. Fairly often the comfort of using natural recreation zones with limited accessibility is considerably lower after

dark. Safety is one of the more significant criteria affecting the quality of the recreation factor (Greene, 1992).



Fig. 8. Picture (a) and (b) – Stretch of the left bank of the Rhône between Lattre de Tassigny Bridge and Winston Churchill Bridge (Lyon) (own elaboration)

6. Waterfront green areas – space providing continuity

In recent years numerous transformations of waterfronts in Bordeaux, Lyon and Rouen have improved communication between the Rhône and Saône and their nearby city centres. Plant variety together with boulevards influenced their coherence and identity. Apart from the areas which activate public spaces and the quieter ones created for regeneration, it is the plants found in the immediate vicinity of continuous walkways and bicycle paths that are worth noting. In this context it seems only appropriate to refer to the division introduced by Christopher Alexander in one of his patterns – ‘degree of privacy’. He mentions three types of paths which are responsible for introducing diversified environment which would fulfil social needs of inhabitants. These are:

1. Paths which run alongside service points, wide, open to crowds of human traffic, paths which connect points with intensified activity, stimulating intensive through traffic.
2. Paths which are located far away from services, narrow and twisting, discouraging through traffic, with numerous dead-end alleys connected to the paths at a right angle.
3. Intermediate paths, which connect the busiest and centrally-located paths with the quiet and most remote ones (Aleksander & Ishikawa, 1977).

It may be concluded that green elements which accompany and support continuity are to a large extent connected with type 3 of the paths defined above. They include small parks, squares, gardens, delineated green belts and floating gardens. These forms of green forms are as valuable as the ones mentioned in previous paragraphs. They fulfil the following functions:

- support sports activities, e.g. jogging, cycling,
- enhance quality and vitality of waterfront areas,
- support various forms of social interactions,
- enhance legibility, coherence and identity of public spaces.

A good example illustrating the introduction of various forms of accompanying green elements which enhance waterfront continuity is the revitalised left bank of the Rhône in Lyon (Fig. 9). One of the first projects of this waterfront redevelopment (Berges du Rhône) was supposed to increase activity near the river. The waterfront was to become more accessible and diversified as regards recreation offering people numerous viewpoints, areas displaying nature as well as zones for practising sports.

Originally almost the whole area of the lower harbour was occupied by car parks. The revitalisation project assumed building new underground car parks, thanks to which it was possible to free the whole waterfront area and create a recreation zone in this place. It was very important to connect the waterfront

with active recreation and support it with smaller green forms and natural areas which protected local ecosystems. The waterfront was divided into 8 sections, each of which having a different style and character (Jażdżewska et al., 2011). All sections were joined by a promenade with green belts, meadows and rectangular gardens laid out alongside it. Thanks to such design continuous walkways and cycleways gained on their vitality, coherence and overall attractiveness.

Such redevelopment of waterfront area resulted in higher level of activation, it introduced diversity into public spaces and enhanced aesthetic attractiveness of the place.

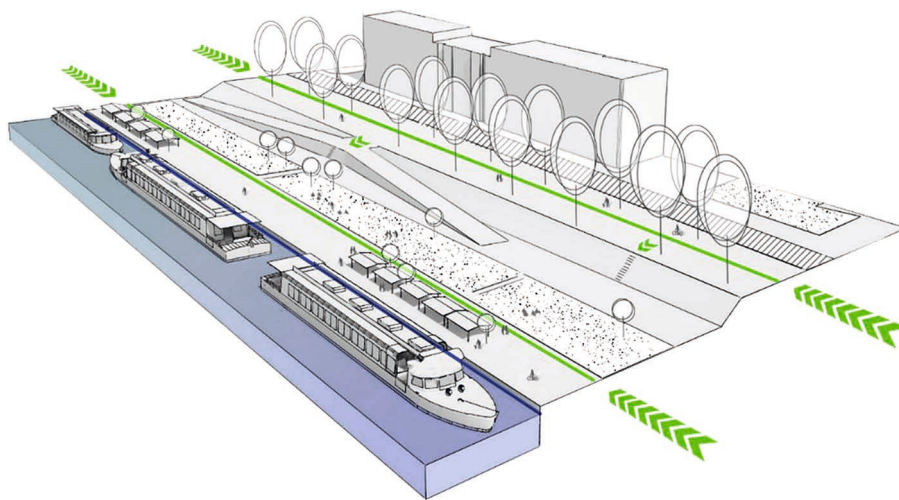


Fig. 9. Stretch of the left river bank of the Rhone near Lafayette Bridge (Lyon) (own elaboration)

7. Conclusions

Green areas are defined by similar criteria as public spaces. An important issue is user's expectations which decide whether a given area should perform a regeneration function, or influence a certain type of activity. Recreation factor, depending on its form and scale, may affect interpersonal relations and integration with the urban environment.

Green areas in public space enhance and restore vitality of waterfront, not only by introducing the recreation factor, but also by its diversification. They influence observer's perception of the spatial environment through which they are moving. Diverse waterfront offering various types of recreation is likely to entice the observer to carry on walking along the river. The environment shaped by humans should cater to various societal needs. The linearity of the waterfront, especially recreation factor, can be harnessed to create diverse spaces near water's edges. It is essential for everyone to find their place along the river: whether it's more or less lively, regenerative or activating, with an urban or natural character.

The green forms presented in this article together with continuous walkways and cycleways take part in shaping public spaces with different levels of social interactions. By creating regeneration, activation and the intermediate environments which enhance continuity, preferences of all city inhabitants are catered for. In this way monotony can be avoided in waterfront cityscape.

When it comes to waterfront designing and revitalisation process one has to bear in mind, however, that vitality and attractiveness of public spaces may be understood somewhat differently by each of us. By introducing green areas which form several levels of activation it is possible to create unique places which are close to nature and which respond to complex social needs. The described absence of an inflow factor can be utilized to create a natural waterfront that serves as a leisure destination away from bustling streets and urban noise. Such places are exceptionally valuable in urbanized

spaces. They create what are known as regenerative environments, which help alleviate the effects of overload or overstimulation (Bell et al., 2005). A diversified waterfront can feature highly vibrant and activating areas, as well as those that offer a lower level of stimulation, providing a sense of calm. The lack of supply contributes to the creation of a peripheral and regenerative environment. For many people, nature or a green, natural section of the waterfront serves as such an environment. Properly implementing the concept of waterfront linearity can prevent the monotony of revitalized waterfront areas. Maintaining the same level of activation across the entire shoreline, whether low or high, can diminish its appeal to many users.

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