Linking the city and the lake: Guaíba waterfront, Porto Alegre, RS, Brazil

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ABSTRACT: Porto Alegre had a history of connections to the waterfront of the Guaíba Lake since it was been built on the banks of the lake. But following the flood that occurred in 1941, Porto Alegre created a series of waterfront protection measures that now are perceived as cutting the city from its lakefront location. Due to this separation and length of time since the disaster, many citizens feel the flood protection measures should be removed. The proposal we have is to adapt the flood protection structures (the dike and the wall) creating lively urban fronts, natural settings, covered automobile infrastructure, tramways, etc. And doing so, bringing people to water creating public awareness of pollution and water quality matters.

1 INTRODUCTION

Porto Alegre (from portuguese, Happy Harbour) is the tenth most populous municipality in Brazil, with 1,409,351 inhabitants (IBGE, 2010). It is also the capital city of the southernmost Brazilian state of Rio Grande do Sul. Porto Alegre is one of top cultural, political and economic centers of Brazil (Figure 1).

This city was founded in 1772 by immigrants from the Azores archipelago, Portugal. The city lies on the eastern bank of Guaíba Lake, formed by the delta of five rivers. The connection of Guaiba Lake to the Atlantic Ocean goes to the Patos Lagoon, the biggest lagoon of Brazil. The city has an important port as well as a chief commerce and services center of Brazil.

Figure 1. Porto Alegre (Brazil) and Guaiba waterfront.

The city has a history of connections to the waterfront of the Guaíba Lake since it was been built on the banks of the lake. But things changed with an extreme flood that occurred in 1941. In 1970 a dyke was built to protect the city against flooding. But now this waterfront protection measures are perceived as cutting the city from its lakefront location. Due to this separation and length of time since the disaster, many citizens feel the flood protection measures should be removed.

Recently, in this economically successful region there has been much interest in development along the waterfront. However, there has been a lack of vision as to how to develop the waterfront as a complete urban design strategy.

The proposal monetizes the value of the protection, proving its need to be retained. The plan harnesses the developments new and industrial buildings to generate money to pay for longer public stretches of the waterfront, and ensures they contribute greater attractions.

Tactics build upon existing protection to create a rich diversity of urban edges that emerge from the existing character of the communities.

Flooding is controlled by a combination of non-structural and structural measures enabling the riverside population to minimize its losses and continue to live in harmony with the river (Tucci, 2006). These include engineering and social, economic and administrative measures.

The proposal we have is to adapt the flood protection structures (the dike and the wall) creating lively urban fronts, natural settings, covered automobile infrastructure, tramways, etc. And doing so, bringing people to water.

This facilitates a rebranding of city – creating a truly Porto Alegre – ‘Happy Harbor’. This will be a

new Brazilian urban waterfront. It's more than beaches, bodies, and football – but about people engaging with the water - a truly interactive waterscape.

2 MATERIAL AND METHODS

2.1 *SWOT Analysis*

The first step in the Guaiba waterfront strategy was the SWOT analysis. The SWOT analysis (or SLOT analysis) is a strategic planning method used to evaluate the Strengths, Weakness, Opportunities, and Threats involved in a project.

It was used the SWOT analysis in the environment of Porto Alegre city and the connection to the waterfront. The objective was defined – how to connect the city to the lake – and identified the internal and external factors that are favorable and unfavorable to achieve this objective. Based on the SWOT analysis the concept of this project was defined.

2.2 *Project concept*

Focusing in how to create an identity to Porto Alegre, it was done a research on references to cities with a connection to water (even lakes, rivers or the ocean). The main references used were Parque España (Rosário, Argentina), Waterfront (Toronto, Canada), Murazzi del Po (Torino, Italy) and Doca de Santos (Lisboa, Portugal).

The idea of the project is to develop the waterfront, in a mix of public areas and commercial and business buildings. And, the intense urbanized areas – such as the buildings – will pay for the public and leisure areas, with the regulation of the municipality.

2.3 *Cost-benefits analysis*

In parallel with the waterscape project, it was developed a simple cost-benefits analysis. Using GIS (Geographic Information System), it was estimated the total area of Porto Alegre that will be benefit with the project; the area of commercial and residential uses that are protected with the flood measures; the area of cultural services existing and improved – measure as km of walking and cycling lane; and the tourism economy that exists and with the project.

The objective of this analysis was to obtain the real benefits or cost of the existing flood protection measures and the future (the project proposed).

3 RESULTS

3.1 *SWOT, Project concept and cost-benefits analysis*

The main topic obtained in the SWOT analysis was showed in Table 1.

Table 1. Main results of the SWOT analysis for Guaiba waterfront.

Strenght	Opportunities
Natural Beauty	Touristic potential / new services
Cultural corridor / existing landmarks	Water public transport
Public support for waterfront use	Night live activities Brand city
Flood protection	Brand city
Weakness	**Treats**
Barriers (wall/dike)	Developmental pressure / real estate speculation
Fragmented urban planning	Lack of urban planning culture
Discontinuities / lack of integration	Lack of maintenance
Lack of pedestrian infrastructure	

Based on these points, the concept of the project was reached:

_Multi-modal north/south connection of the city by water;

_Water connecting diverse places;

_Flood protection does not hinder, but even enhance urban quality;

_Build upon existing urban (infra) structures;

_Access to more activities at water;

_Link of water with more improve in city center.

The cost/benefit analysis present that a total area of 90km² will benefit from this project by increasing land and property values in riverfront and adjacent areas. The area that is safe from flooding is 10km² of commercial buildings and 6km² of residential building. In the existing situation there is almost none biodiversity protection area. With the project it will be about 8km² of natural vegetation areas at riverbanks and wetlands. As cultural services, the recreation and leisure will be improved from 6km to 17km of walking and cycling lane. The area used for tourism economy nowadays is about 20,000m², it will be of 5km².

3.2 *Linking the city and the lake: Guaíba Waterfront*

The final result of this project was the division of the Guaiba waterfront in eight areas, in which a specific proposal was made based on the references cited above and the existing buildings and uses in which area:

– Business Harbor: in southern most part of the Guaiba eastern bank. There is a big shopping mall near the waterfront. It idea is to make a pedestrian

connection from the mall with the waterfront, in which it will be the business offices, restaurants and leisure activities.

– Party Harbor: Nearby the Beira Rio stadium. It is proposed a connection between the soccer stadium and the lake, with an area of bars and night life activities floating in the lake.
– Beach Harbor: In this area there is a big park called Marinha. With a project for cleaning the water of the lake, using artificial wetland, can be made a beach connected to the park (Figure 2).

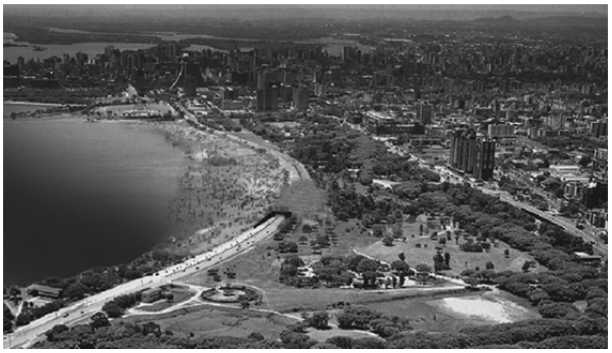

Figure 2. Marinha Park.

– Sport Harbor: This part has a green area without good infrastructure near the waterfront and building of the city center in the back. The project for this area is a gradient of building coming from the waterfront to the city center – more building in the back, less buildings and sports areas in the waterfront.
– Rendezvous Harbor: There are here some antique, beautiful and empty docks. Here, the flood protection is a wall. The idea is to use these docks for bars and restaurants. The wall will be integrated with the city putting stores in the city side of the wall.
– Conference Harbor: In this part there area warehouses, some empty and others with public services (such as fire department and federal policy). The proposal is to use the empty builds to temporary events, such as conferences. A connection with the city will be made through the dike (Figure 3).
– Startup Harbor: There is here a small harbor. The idea is to change this area from a port to an area of water transport and leisure.
– Archipelago Harbor: Nearby the Arena Soccer Field. This is an area with low lands, that many time of the year are socked. So, there is a possibility to make small islands and leave the water coming in and out.

The several images created for each area is present in the presentation of this article.

Figure 3. Converted harbor.

4 CONCLUSION

The city of Porto Alegre has an old traditional relation with the lake, but it the last century it was constructed a barrier that isolate the city from the lake. Even so, this barrier is strength that the city has – it is a measure of flood protection.

Besides the idea of destroying the flood protection dike and wall, this article works with the idea of integration – linking the city and the lake using the benefits provided by the flood protection.

The larger strategy of this work is to bring people to water creating public awareness of pollution and water quality matters.

A diverse array waterfront experiences are formed allowing people to interact with the water - including the cleaning of creeks that empty into the lakefront.

5 REFERENCES

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