

# Revitalizing Neighbourhood through Sustainable Waterfront Development

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## Article Info

Article history:

Received 25 January 2017

Received in revised form

20 February 2017

Accepted 28 February 2017

Available online 15 March 2017

## Keywords

Waterfront, riverfront development, environment

## Abstract

Water gives birth to human life and civilization; accordingly, a unique fascination emanates from the riverfront. Many famous cities all over the world are generally located at the junctions of rivers and seas. These last two features allow for convenient transportation and multi-cultural integration, which imparts its unique charm to these cities.

The waterfront front development provides a unique opportunity for developing a strong city image along with providing an opportunity to scientifically design systems for recharging ground water from the only large natural resource of the city.

An environmentally conscious approach for integration of the river into the urban fabric development has been devised. There has been an appropriate consideration of the natural potential of the land for developing into a biodiversity zone for conserving the natural heritage of the river basin as well as the local and transient requirements of facilities at the city level, like large level city greens of varying nature along with some recreational facilities.

## 1. The need of Waterfront Development

People are inherently drawn to water, hence the importance of waterfront development. It is the lure of water, its sparkle, its reflection, its endless movement and change that both captures man's imagination and provides a variety of opportunities from business to recreation, from active to passive activities.

Water is a defining force that fundamentally shapes the character of each place it touches. River sites have been an important part of city development since early civilizations. The role of water in transport, industry, sanitation and nourishment made it the reason of human settlement.

- Today many waterfronts are a staple of modernism and city beautification.
- Minimum avenues for recreation and open green spaces.
- Affects the feel of belonging, and the social cohesion within a community.
- City image-branding.
- Often in larger cities that border a river, the riverfront will be lined with marinas, docks, trees, or minor attractions.
- Historic documentation
- Riverine tourism on its banks,
- Alternative mean of transportation.
- Human/Environmental connections
- Sustainability of place & Maintenance of river bank.

## 2. Historical Development of Waterfronts

With industrial era, this relationship was interrupted due to some uses, such as huge ports, commercial, industry, warehouses and transportation. Through the evolution of containerization technology, port activities moved to outside the city. Accordingly, industrial plants were abandoned and forms of transportation changed.



Fig.1 Singapore Waterfront

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Also with the increasing environmental awareness and as a consequence of the pressure for upgrade in a urban areas, waterfronts were rediscovered in the city.

So, phenomenon of waterfront regeneration emerged. Urban waterfront regeneration projects have become an effective tool for urban planning and politics an international dimension since 1980's.



Fig. 2 Alexandria Waterfront, Virginia, US

## 3. Trends of Waterfront Development Worldwide

1960s - Massive waterfront development began and consequently initiated the world-wide era of waterfront revitalization.

1970s - Urban waterfront redevelopment bloomed.

1980s - Accelerated and continued in the future.

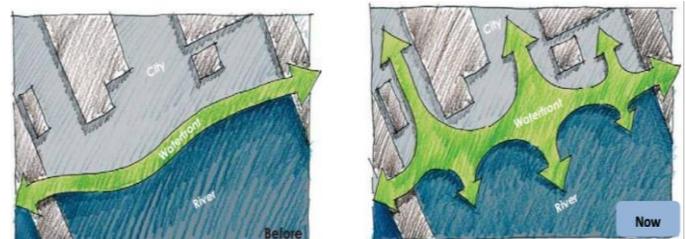


Fig.3 Integrating waterfront with neighborhood

Clearly, interest in promoting waterfront development in many countries was caused by environmental protection, shoreline access, water quality, historic preservation, tourism and economic development, as well as the growing potential of the waterfront for recreational, commercial and residential uses. Moreover, festival and water sports are perhaps the most visible public-oriented activities that have played a key role in the rediscovery of waterfronts.

## 3. Riverfront Development Concept

### 3.1 River as a main attraction of development

- According to the guideline, for any reason, river's role is remaining as a main attraction for the development.

- River itself must be developed earlier than any others development planning.
- Removal and changing river line or row are not permitted.

### 3.2 Beautification of river reserves

- According to the guideline, developers are required to provide recreation and beautification plan for river.
- Maintaining river reserve as a buffer zone to control environmental problem such as soil erosion.
- Utilization river reserve for green areas and recreational use are allowed to the developers.

### 3.3 Level of river flow

- According to the guideline, a development close to river areas would not increase level of river flow. Development are more than 10 ha are required to build retention pond with maximum area approximately between 3-5% of total development area.

### 3.4 Development of permanent infrastructure

- According to the guideline, the development of permanent building and infrastructure are not allowed within river and river reserves, unless facilities for recreational purposes such as playground.

## 4. General Principles of Waterfront Development

Waterfront development planning is often guided by four priorities:

- (1) balanced land use;
- (2) respect for limited resources;
- (3) improved public access; and
- (4) safeguards for environmental quality.

The general principles for waterfront development are set out below:

### 4.1 Interconnected, linear waterfront development with broad public access

- Encouraging the use of the riverfront greenway as a daily commuter path and recreational amenity.
- Demonstrating the connection between access, greenway development and market demand.
- Creating a coherent, visually pleasing order to the water's edge

### 4.2 Protection and enhancement of the natural riverfront environment

- Documenting the ecological state of the waterfronts in order to preserve this environmentally diverse natural habitat.
- Preventing and, where possible, eliminating inappropriate uses and practices from the rivers' edge.
- Protecting existing natural areas from development.

### 4.3 Reclaim the city's identity as one of the best water cities

- Raising public expectations of what the city's waterfront offers.
- Attracting people, investment and the best aspects of urban living to the waterfront. A new urban park type is based on providing solutions to ecological problems and expressions of the human relationship to nature.

## 5. Waterfront Revitalization in the World

Throughout the history, urban waterfronts have been in a cycle of transformation and diverse uses took place on waterfronts such as fishing, defence, trade, transportation, industry, and recreation. Each of these activities shaped waterfronts in different ways and offered a different water-city integration model.

The main concern of this study is the revitalization of waterfront zones in contemporary cities.

Although every city has a different evolution period depending on its geographical features, size, economy and other local conditions, a common model of development can be determine for all port cities. "This process can be illustrated from San Francisco to Sydney, from Southampton to Singapore.... Each case is unique, but the underlying principle remain largely the same" (Hoyle 1993, 333)

Waterfront revitalization has been the most remarkable urban development attempt in the world during the last two decades. Bruttomesso defines waterfront revitalization as a "genuine urban revolution". (Bruttomesso 1993, 10)



Fig.4 Marine Drive Waterfront, India (Now)



Fig.4 Marine Drive Waterfront, India (Before 1950)

## 6. Public Spaces in Waterfront Development

A public space may be a gathering spot or part of a neighbourhood, downtown, special district, waterfront, or other area within the public realm that helps promote social interaction and a sense of community.

Examples include spaces such as plazas, town squares, parks, marketplaces, public commons and malls, public greens, piers, special areas within convention centres or grounds, sites within public buildings, lobbies, concourses, or public spaces within private buildings.

### 6.1 Characteristics of Public Spaces

- Promotes human contact and social activities.
- Has design and architectural features that are visually interesting.
- Promotes community involvement.
- Reflects the local culture or history.
- Relates well to bordering uses.
- Is well maintained.
- Has a unique or special character.
- Establish a water's edge that is continuous, publicly accessible and magnificent.
- Create a network of public spaces that attract and invite both localities and tourists to waterfront.

- Require design excellence for waterfront public spaces. Provide a wide-range of public spaces that foster culture and creativity in our city.
- Ensure all public spaces adhere to a high environmental standard.
- Strengthen connections along the waterfront on both sides of the river.
- Develop strong link between existing communities and emerging waterfront communities and spaces.
- Improve the aquatic habitat and water quality along the waterfront and integrate them with river and stream improvements.
- Maintain a consistency in waterfront design elements in all public spaces (i.e. Park benches and lamp posts).
- Coordinate the water usage and supporting land base to maximize the economic, recreational and environmental asset of Water bodies



Fig.5 Sabarmati Riverfront & Melbourne Riverfront

## 7. The Riverfront Vision – Rejuvenating the Neighbourhood

The community vision for the area along the waterfront should be considered in the Long Range Riverfront Plan for the City. Additional visioning will be undertaken in this process to further define the design goals and guidelines for the built environment along the riverfront in support of the direction established in the plan.

The following design objectives should be noted in the long range plan of Riverfront Development.

- Provide a continuous river walk so as to reflect the cultural heritage of the area.
- Accommodate a variety of users along the riverfront including locals, industry and visitors
- Enhance riverfront amenities.
- Maintain and enhance view corridors.
- Design buildings to reflect the architectural character of the place. Reflect the local culture and heritage in design when feasible.
- Provide mixed-use development.
- Improve public spaces.
- Provide public art.
- Provide streetscape amenities.
- Rehabilitate and conserve historic buildings.
- Maintain the natural quality of the waterfront experience.
- Enhance the pedestrian experience with high quality streetscape and waterfront amenities.
- Enhance the pedestrian experience with high quality building design and materials.

## 8. Malaysia Riverfront (Kuching)

Kuching Waterfront, which lines the south bank of Sarawak River, is the place to sample the city's cosmopolitan vibes. A result of a major restoration and land reclamation project, Kuching Waterfront today is the most popular meeting place in the city.



Fig. 6 Kuching Riverfront

The main objective of this development proposal is to strengthen the commercial and recreational activities which reflects character, social, culture & identity of the place. The design considers visual character and quality of the place as a riverside marketplace.

Social and cultural events and festivals as well as history and architecture of the place are the important aspects of the design.

## 8.1 Three Rivers Park Riverfront, Pittsburgh

Pittsburgh's identity has long been defined by its industry. When it lost the steel mills that forged its 20th-century reputation, it became part of the Rust Belt, with a fractured economy and three polluted rivers. Today, thanks to a visionary master plan, 65 acres of green space line Pittsburgh's downtown waterfront — all of it accessible to the public.



Fig.7 Pittsburgh Riverfront Proposal

## 8.2 Sabarmati Riverfront, Ahmedabad (India)

Sabarmati Riverfront is a waterfront being developed along the banks of Sabarmati river in Ahmedabad, India.

Proposed in 1960s, the construction began in 2005. Since 2012, the waterfront is opened to public.

The major objectives of project are environment improvement, social infrastructure and sustainable development.

The project aims to reclaim the private river edge as a public asset and restore the city's relationship with its river. The Riverfront project presents a great opportunity to create a public edge to the river on the eastern and western sides of Ahmedabad.



Fig.8 Sabarmati Riverfront

## 9. Recommendations for Waterfront Development

WEDG's guiding principles are a set of core values for best design practices for the waterfront edge. A well-designed edge is one where waterfront access, resilience, and ecological benefits are all incorporated into an integrated design. While each site and project has its own characteristics and goals guiding its outcome, these principles established a framework for the creation of WEDG by

MWA in conjunction with the interdisciplinary task force and end-users:

### 9.1 Enhance Ecology

Waterfront edge designs should protect existing aquatic habitats and use designs, materials, and shoreline arrangements to improve the ecological function of the coastal zone and strive to be consistent with regional

### 9.2 Encourage Maritime Use

Edge design should create a waterfront that is usable by the maritime community, commercial and recreational, where appropriate and feasible, thereby maximizing the maritime use and integrity of the harbour and waterfront. Edge design should enhance water-dependent uses, maritime business, maritime activity, and recreational boating activity. Use a Science-Based,

### 9.3 Evaluative Process for Restoration

Project decision makers should use all available science regarding ecological features of waterfront edge design. Projects with innovative ecological features should be monitored based on evidence in the literature and pre-project baseline ecological conditions to determine their effectiveness. Monitoring data should be used to improve designs over time.

### 9.4 Promote Resiliency

Waterfront edge designs must accommodate, mitigate, or be adaptable to the effects of sea level rise and increased coastal flooding. Increases in precipitation may lead to increased storm-water runoff, and green infrastructure and planted edge design can play an important role in improving water quality.

### 9.5 Enhance Public Access, Especially for Boats:

Waterfront edge design should incorporate good public access designs—which accommodate the highest number of uses including the widest range of boat types—that closely reflect user input. Recreation and opportunities to support human interaction with the water should be encouraged where appropriate, and designs should not preclude adding features that improve public access in the future.

### 9.6 Commit to Equity and Community Input:

Waterfront edge designs should seek to serve the diverse needs of all types of surrounding communities and land uses and be developed with local community and user input. Waterfront edge designs in underserved communities and communities with lack of waterfront access should be designed with special attention to their needs through robust outreach and feedback gathering processes.

### 9.7 Encourage Cost-Effective Solutions:

The costs of a project should be assessed given risks including those from climate change, initial capital costs, ongoing maintenance requirements, and other factors. Project designs should be assessed for the economic burden it places on owners and stakeholders. Analyses of a project's vulnerability to and consequences of changing coastal conditions due to sea level rise and coastal flooding should be considered in determining the cost-effectiveness of designs.



Fig.9 Development of Public Spaces

## 10. Design Guidelines for Riverfront Development Site Design Principles

The design character of a building's site and the manner in which its functions are some of the most important considerations for properties along the riverfront. The primary objective is to create an environment that is attractive to pedestrians, has a comfortable scale and provides visual interest while maintaining the character of the waterfront setting.

### 10.1 Building Placement and Orientation

Buildings should be sited to have active spaces for area users, provide pedestrian connections, help animate the street and waterfront, and define the street edge. The placement of the building on a site should, therefore be considered within the context of its setting, as well as how the structure will support the broader design goals for the area.

- Locate buildings at the sidewalk edge.
- Provide double-fronted buildings on through-lots.
- Where two or more buildings will be located on a site, arrange them to define an outdoor space.

### 10.2 Minimum Setbacks

Building setbacks should reinforce the pedestrian character envisioned for the area and help to define the street edge. In order to enhance the pedestrian zone, the buildings should align at the street edge, with storefronts and other visually interesting features provided at ground level. Buildings along the riverfront can be varied, but will be dictated by Zoning District.

### 10.3 Service areas

Should be visually subordinate and integrated into the design of the site and building. Orient service entrances, waste disposal areas and other similar uses toward service lanes and away from the waterfront and street, when feasible.

### 10.4 Pedestrian Connectivity

On larger sites, convenient pedestrian access should be provided between the street and the waterfront to increase accessibility to both areas, when feasible.

- Provide pedestrian access through larger sites, when feasible.
- Provide perpendicular connections between the waterfront and the street.
- Provide a continuous exterior river-walk through the site to connect to adjacent properties.
- Design these paths to be safe and convenient.

### 10.5 Surface Parking

Locating parking areas along the waterfront is discouraged and alternative locations should be considered. If providing a parking lot is necessary, the negative visual impacts of cars parked on the site should be minimized by designing surface lots to be attractive, compatible additions to the waterfront experience.

### 10.6 Views

It is important to the community to maintain views and access to the water, and to provide a pedestrian-friendly environment. Therefore, views from the public way to significant natural and cultural resources should be maintained when feasible. Site improvements should be planned to enhance such views. These view opportunities should be identified for all major site developments before the onset of the project.

### 10.7 Architectural Character

While it is important that new buildings and alterations be compatible with the traditional context, they should not imitate older building styles. New construction should be stylistically distinguishable from historic buildings. It should maintain a similar scale and also include character-defining features compatible with traditional buildings.

- New interpretations of traditional building styles are encouraged. Contemporary interpretations of architectural features used historically are encouraged in new construction.

### 10.8 Building Materials

Wood frame and concrete were the primary construction methods used. These should be continued in new construction. More modern materials may also be considered when they are compatible with those used traditionally.

- New materials should convey a sense of scale.
- Building materials should have similar characteristics as materials used traditionally.

All materials used should be durable and appropriate for the climate.

### 10.9 Pedestrian Interest

The waterfront area should continue to develop as a pedestrian-oriented environment. Buildings should convey a pedestrian friendly environment.

### 10.11 Public Streetscape, Riverwalk, Public Art & Plazas

The pedestrian environment should be designed to stimulate and enhance the experience along the street and the river-walk. It should portray a unified system by creating a sense of visual continuity while also celebrating a series of experiences along the way.

### 10.12 Building and Site Lighting

The primary function of lighting is for safety and. The primary goal for lighting in Juneau is that it should not be detrimental to the adjacent surroundings or the overall environment, but should still maintain a safe environment.

#### 10.12.1 Landscaping

Existing mature trees and other vegetation on site should be retained whenever feasible.

- Promote the use of indigenous species.
- Provide a landscaped edge along Egan Drive.

## 11. Outdoor Public Spaces

The development of outdoor public spaces should be encouraged in order to enhance the waterfront as a place for pedestrians. Buildings and other site functions should be planned to create outdoor public spaces, and the development of spaces connected with other activities is encouraged.

### 11.1 River walk

The river walk is envisioned to provide a safe enjoyable pedestrian experience along the waterfront edge and to interconnect all of the activities that occur there.

Several activities also occur along the river walk where docks, ramps, floats and piers interconnect. Consideration should be given to expanding the river walk in these areas to accommodate the additional foot traffic. Other activities such as plazas, parks and commercial establishments will also front the river walk and should be designed to enhance the experience.

### 11.2 Water Access

Provide a diversity of opportunities to experience the water along the river walk.

Consider creating areas where the water can be experienced from the riverwalk and, if feasible, from the shore.

- Docks, ramps, stairs and overlooks should be considered.
- Kayak or small craft launch zones should be considered at appropriate locations.

### 11.3 Seasonal Kiosks

Seasonal kiosks are temporary structures that are small in scale and usually designed for one or two people. They are utilized during the high tourist season for commercial or informational purposes.

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all over the world are generally located at the junctions of rivers and seas. These last two features allow for convenient transportation and multi-cultural integration, which imparts its unique charm to these cities.

## References

- [1.] General guidelines for preparing river morphological reports, Government of India Ministry of Water Resources Central Water Commission (Mar 2009), New Delhi.
- [2.] Gomti Riverfront, Lucknow Development Authority.
- [3.] Hoshangabad River Front Development. ICRA Management Consulting Services Limited.
- [4.] Heritage Development Plan for Varanasi. Architectural Heritage Division, Indian National Trust for Art and Cultural Heritage (INTACH) Oct 2011
- [5.] Planning Law & Environmental Laws. Landscape and Environment Planning Dept, Delhi Development Authority
- [6.] Riverfront Development – Kanakapura.
- [7.] ARAlagarsamy Urban Development Department, Government of Karnataka
- [8.] Sabarmati Riverfront -Socializing a River & Inclusive Development. Sabarmati Riverfront Development Corporation Limited & AMC
- [9.] Shape Your Waterfront How to promote access, resiliency, and ecology at the water's edge, Waterfront edge design guidelines
- [10.] Urban Waterfront Regenerations. Umut Rekin Timur, INTACH
- [11.] Waterfront Design Guidelines. Juneau, Alaska by Planning Commission Community Development Department
- [12.] Yamuna Riverfront Development 'Zone O' Back to the Nature, Landscape & Environment Planning Unit, Delhi Development Authority