

# Riverfront Development- A tool to Improve and restore urban green spaces

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**Abstract** - Rivers had always been the lifeline for any human settlement. One of the most challenging urban spaces that offers great opportunity for the development of the city is the waterfront. Communities near water bodies that are full of amenities are supported in adapting to their economic and social circumstances. Not just in terms of the riverfront context but also for the whole region. It brings together various aspects of place making, such as environmental responsibility, social equality, and economic viability, as well as planning and transportation laws, and architectural design, to create places with different character and aesthetic appeal. A successful riverfront with relevant socio-interactive spaces can be created using several case studies, which will be analyzed to give the strategies. The south-west and west zones of Surat city will be the focus of this research's study of contemporary riverfront projects. This planning proposal gives the plan of the development of recreational spaces, active zones, greens spaces and create safe, clean and healthy environment. The objective of this planning proposal would be to develop riverfront in Surat city and provide a socially interactive space with specific amenities for leisure and entertainment to the city.

**Key Words:** Riverfront Development, Urban Green Spaces, Surat city

## 1. INTRODUCTION

Waterfronts are important locations. The importance of the waterfront is even increased when it is inside a city. A successful waterfront development has a positive effect on both the quality of urban life and the economy of the region. Over time, waterfront areas have been used for a variety of purposes. Many of them were used as docks and ports. However, as technology for transportation advanced, they lost their usefulness and ceased to be active ports. Governments carried out riverfront redevelopment for these areas in the 1970s and 1980s after the docklands were abandoned during those decades. The revitalization of the waterfront has created opportunities to convert unused docklands in the city into commercial space, homes, or public open space. The regeneration plan will draw potential investors and provide capital.

Trade and transportation played a role in the growth and decline of numerous cities. Villages with waterfront locations developed into fishing communities and trading ports. During the Industrialization Era, a lot of industrial areas were constructed close to rivers and the ocean, mostly for the benefit of efficient transportation. However, the phenomenal advancements in communication and technology, as well as the growing understanding of how these developments affect communities' social, health, and environmental well-being, have led to the dramatic shift in industrial structures that has taken place globally since the industrial revolution. The majority of industrial businesses, areas, and districts moved their operations outside the boundaries of cities and to the periphery.

Due to their advantageous typical geographical positions in proximity to downtown, Urban planning professionals and academics have increasingly focused on the vacant land in former industrial areas and ports. (Amireh, 2020) According to Hoyle (1999), the successful experience of The massive spatial, economic, and ecological changes to waterfronts around the world brought about by Baltimore inner harbour renewal since the mid-1960s (also known as the Baltimore Type) have had an enormous effect on waterfront redevelopment in developed countries, nations that are developing, cosmopolitan cities, and small towns. Development along the riverfront and along the waterfront is purportedly intended for community use.

The water (river, sea, or lake) visually connects the major cities of Europe and the rest of the world. In the nineteenth century (during the industrial revolution), the river waterfront played a significant role in urban life due to its practical uses that were more related to the economy than to the public sphere. Over the past 30 years, cities have been reviving urban waterfronts (Souers, 2005)

There are numerous learning and trial-and-error processes involved in waterfront development, which is an international phenomenon. In addition to taking into account engineering-related factors, water front development projects must also give careful consideration to systematic planning and sustainable management. Waterfronts serve as the meeting place of the terrestrial and aquatic worlds, the site of complex deep communities, the origin of wave action,

and the means of movement for many different dispersion patterns in the non-human world. In relation to human development and use, waterfronts have a long history of changing types and levels of uses, and they may soon revert to vibrant and layered public access. They have long been used as harbours, trade centres, hubs for transportation, destinations for tourists, and a variety of other things. They were once the site of the initial settlements and exploration. For trade, entertainment, and general enjoyment, humans have made considerable use of waterfronts. However, these same patterns of use have also led to cycles of neglect and exploitation.

Water is a resource that we cannot live without, just like food. The canal can be used for a variety of purposes, including irrigation, storm water management, transportation, and sanitation, which served as a driving force behind its construction. In addition to that, the canal improved the area's aesthetics and helped regulate the microclimate. Regarding multifaceted behavioral patterns that benefit both parties, canals and cities have a harmonious relationship. Both result in a symbiotic affinity, which is reflected in their physical and functional characteristics.

The river waterfront's role in the urbanization of the city is currently being determined. The riverfront's contribution to reflecting the image of the city is also acknowledged. The riverfront in cities shaped by rivers can be characterized in the same way. The urban riverfront in its surrounding context is disintegrated by areas that require consideration for redevelopment, prohibiting interactions between nearby areas. Fragmented interests and a lack of identity in the urban context are influenced by spatial and social disconnections. (Warner, 1993)

A waterfront development is any building that is situated close to a body of water, such as a river, lake, ocean, bay, creek, or canal. Considered the possibility that a waterfront development might only need to appear to be close to the water in the development area—it wouldn't necessarily need to be on the water itself.

A more precise definition states that the waterfront is the spot where land and water meet. It also includes any land that is between 200 and 300m from the edge of the water and 1 to 2 kilometres from the land site, and is within 20 minutes of walking distance. It is a region that is close to an area of water, but this description should go beyond a single sentence. Rather, it should be understood as a network of locations, uses, and additions that are connected to city coasts, ports, and urban activities. Any structure close to the water should stimulate more activity in the neighborhood.

### 1.1 Aim

To study the existing condition of riverfront. Give planning proposal for its development and to provide adequate urban

green spaces in the West and south west zone of Surat city to meet the desired level of sustainability in the lifestyle of the citizens.

### 1.2 Objectives of the study

- To study existing scenario of riverfront and identify needs of socio-cultural response to recreation use in Surat city.
- To improve the quality of urban areas of Surat and especially the riverfront and its neighbourhood
- To safeguard the future of green spaces in rundh, pal, adajan area which is in west and south west zone of Surat city.
- The creation of public spaces, the redevelopment of riverside areas, and the provision of amenities for the sociocultural life of the city.
- To prepare master plan for riverfront development for better environment and socio-cultural aspects.
- Study and evaluate looking at various parameters.
- To form guidelines and policies regarding river front.

### 1.3 Problem Definition

Now a days due to rapid development and urbanization more growths and development are seen in cities in such as tall buildings, large shopping malls, commercials etc. In this race of urbanization, the river also has to face many issues.

Urban poor people move into the huts along the banks of rivers because they can no longer afford the rising cost of living. Due to the city's proximity to the river's mouth and the inflow of both domestic and industrial waste, this slum frequently floods and lacks basic infrastructure services.

The Tapi River has always been significant to Surat as a source of drinking water, a place for recreation, a place to congregate, a place for the underprivileged to erect their hutments, a place for farming, a place for washing and drying clothes, and as a religious aspect. Despite this, Tapi was abused and neglected, it turned into a place to dump trash, and it was eventually completely destroyed. Untreated sewage was dumped into the river by storm water drains, a few nalas also carried sewage there, and encroachments decreased the river's capacity to carry floodwaters. Thus, the public was no longer able to access the river.

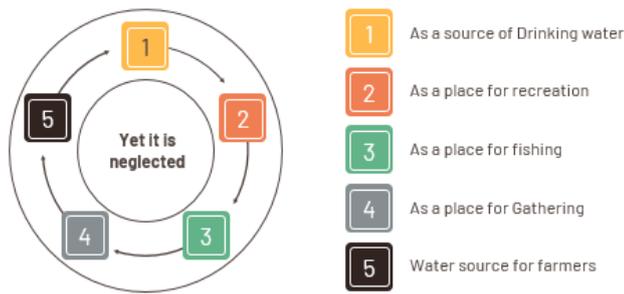


Figure 1 Tapi River importance to Surat

### 1.4 Justification of work

Surat is a port city located on the banks of the Tapi River. There is no space for recreation activities, open spaces and gathering places near waters. So, peoples use bridges for gathering. Which leads to the traffic problems on the bridge sometimes.

## 2. RIVERFRONT

### 2.1 Riverfront Introduction

Cities are rediscovering their rivers. For at least 30 years, towns and cities have been moving back to their rivers, converting abandoned industrial and commercial property into new parks, homes, and commercial space. The trend seems to be sustaining, if not accelerating, with significant planning and construction projects currently underway in cities all across the nation. Urban rivers are important economic and social resources that have been abused and neglected for years.

A riverfront is the area where an urban settlement meets a river. Riverfront refers to a location or part of a city or town that is directly on a river. The riverfront presents a unique challenge in urban development. It is also an important tool for escaping the stresses of city life. The opportunities provided by urban rivers to locals enhance their quality of life in a variety of ways, including social, cultural, and economic. Furthermore, the riverfront and greenery along the corridor caused to minimize water pollution, strengthen the species variety, as well as moderate climate changes in their urban and environment.

Water and rivers are significant resources that are necessary for national development, the environment, and human survival. On a global scale, riverfront improvement is already a well-known phenomenon. In the 1980s, as the economy started to grow, so did the use of the land along many of the riverfronts. Urbanisation and population growth in cities, along with pressure from new technology, forced a transition away from water-dependent industries and to a variety of non-water-dependent urban developments. Utilising the space made available by the change in land use, residential

riverfront development has included water amenities as a feature or "selling point" of the development. Without much guidance from the state, the federal government, or the local government, riverfront development has sometimes resulted in flooding and pollution.

Riverfronts are desired by city dwellers for recreational purposes. They look for riverfront properties with significant physical and visual attractions that are present throughout the day. Additionally, people want the riverfront to fulfil a variety of purposes and to be a location that enhances the economic, social, and cultural aspects of daily life.

Water is necessary in the city for a number of reasons, including practical, aesthetic, and spiritual ones, according to Postel and Richter. Unfortunately, the majority of significant riverfronts today are contaminated by environmental problems, disrupted habitats, and unstable landfills. As a result, the soil and water have been contaminated. The scenario's main driver is the ongoing and rapid urbanisation, which raises the demand for already-existing resources.

### 2.2 Riverfront then and Now

Historically, trading commodities by boat was the most effective method. Before the invention of the internal combustion engine and the materials needed to construct permanent roads, travel overland with horses and carts on tracks was the norm. As a result, the riverfront was dominated by warehouses, where goods were kept while being moved along the river. Additionally, some factories are situated close to rivers so that waste can be dumped into the water. As a result, dangerous chemicals were released into the waterways. This polluted large bodies of water, contributing significantly to the urban pollution problem. The need for boats to transport goods rapidly decreased as road construction expanded. As a result, factories and warehouses started to move to strategic locations near major thoroughfares so they could ship goods more quickly. Little was done to put the commercial space that organizations had left behind over the years to better use, and the old buildings fell into disrepair and disuse.

Modern urban planners recognized the potential in the vacant riverfront properties. They understood that reusing this land could provide cities with a number of advantages, such as: increased tourism income as a result of job growth Enhanced culture and quality of life in the community green belt development in the city decreased crime along the riverfront employment generation for infrastructure construction and maintenance saving the environment. To achieve this, riverfront revitalization and rehabilitation initiatives were started in a number of cities around the globe, with urban planners aiming to restore rivers as an integral component of each city.

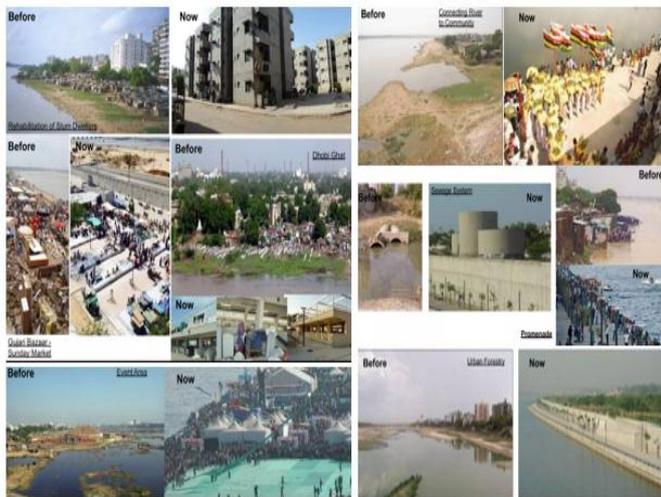


Figure 2 Riverfront Development Then and Now

### 2.3 General Principles of Riverfront

Four priorities are frequently used as a framework for riverfront development: resource conservation, improved public access, balanced land use, and environmental quality protection.

- A linear, interconnected riverfront development with wide public access
- Promoting the use of the greenway as a recreational amenity and daily commuter path, and illuminating the relationship between market demand, access, and greenway development.
- Creating a seamless, aesthetically pleasing order at the water's edge
- Protection and improvement of the natural environment
- Recording riverfront ecological conditions to protect this ecologically diverse natural habitat.
- Protecting already-existing natural areas from development and preventing and, to the extent possible, eliminating inappropriate river-edge uses and practises.
- Regain the city's standing as one of the top water cities.

### 2.4 Benefits of Riverfront

- Job creation: a location for commercial activities
- Government revenue sources include shops, restaurants, sports activities, transportation, boating, and so on.

- Tourism development: by providing a variety of attractions such as water sports, entertainment arenas, parks, shopping areas, and so on.
- Economic spin-offs: property values rise, acting as a catalyst for redevelopment and renewal of nearby areas.
- Habitat protection and restoration: river water conservation, human/environmental connections, land conservation and development, flora and fauna conservation.
- Riverbank maintenance and flood control measures
- Provide an open space for leisure and recreation for the general public. Creating a healthy and active urban environment by revitalising the neighbourhood.

## 3. STUDY AREA

### 3.1 History

The East India Company established itself in Surat as a trader in 1608. The city served as a trade and business hub due to its geographic location, primarily through the ports of the River Tapi and the Dumas beach. The three main Ovaras (Ports) constructed around 1625 were Furza Ovara, Raja Ovara, and Navdi Ovara. At that time, the customs checkpoint was located at Furza ovara. A huge metal bell hanging at the gate rings to announce each new ship that enters the port. While Navdi Ovara was primarily used by Dutchmen for cargo loading and unloading, Raja Ovara was only for royalty and their belongings. In 1668, the East India Company founded a business in Mumbai, and trade gradually decreased. In 1668, the East India Company founded a business in Mumbai, and trade gradually decreased. Up until 1776, ships flying the flags of up to 84 different nations could be seen along the Tapi River's banks. The English East India Company, Armenian traders, French seamen, and Dutch Masters of maritime trade all contributed to the city's and its culture's global fame before India's metropolises were founded.

### 3.2 Surat City

**Table 1** Surat City Profile, (Source SMC)

Surat City	2nd largest city of Gujarat in terms of Area and Population
Area	326.515 sq.km.
Population	44,66,826 (Census 2011)
Density	13680 Persons/Sq.Km. (Census -2011)
Location	Latitude: 21.112°N Longitude : 72.814°E
Municipality Established	1852 AD
Corporation Established	1966 AD

### 3.2 Population

In terms of population and density, Surat is the second-largest city in Gujarat and the eighth-largest city in all of India. Surat has grown significantly since the 1800s. However, the population fell by more than 15% between 1921 and 1931. However, the 1940s saw significant population growth, with the population reaching over 170,000 people. Since then, the population has grown steadily, surpassing the 1.5 million mark in 1991. The population was nearly 3 million at the time of the next census. The population has now risen to over 4.5 million people. Surat has a reputation as one of the best cities in India, having been named the third cleanest city in the country.

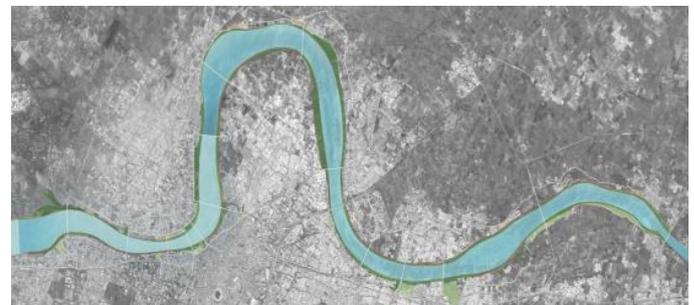
**Table 2** Projected Surat City Population

Year	Population
1991	16,34,605
2001	28,76,374
2011	44,66,826
2021	59,50,831
2031	74,34,835
2041	89,18,840

### 3.3 River Tapi

River Tapi, the river, has been crucial to the country's economic growth and development. The river is now a major source of water, and its banks and bed provide shelter and income for the poor. There are multiple historical structures on the bank. There are slums that are at risk of flooding and

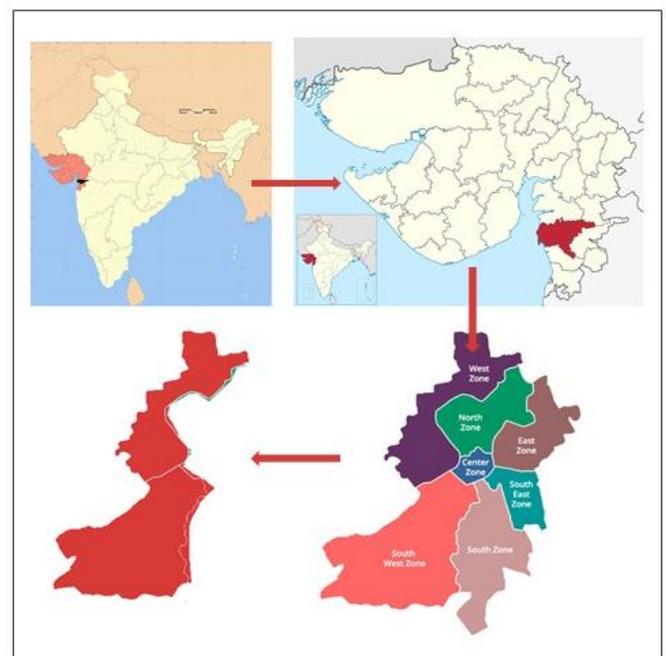
lack basic infrastructure services; inflow of waste from homes and industries into the river; and tidal flooding due to the city's closeness to the river's mouth. SMC intends to comprehensively develop the Tapi River Front, deal with some of the challenges, and turn it into a city assets.



**Figure 3** Tapi Strech in Surat

### 3.4 Site Location

At latitude 21 12°N and longitude 72 52°E, Surat is situated on the banks of the Tapi River, with the Arabian Sea coast to the west. 13 metres above sea level is the average elevation. It is located in the southern Gujarat region, which is developed. It is 306 kilometres south of Gandhinagar, the state capital. Surat is the gateway to the Ahmedabad Mumbai region corridor, with a 225-kilometer industrial area directly connected to the cities of Vadodara, Ankleshwar, and Vapi. Surat has emerged as an important economic centre of the south Gujarat region due to its location on India's Golden Quadrilateral Highway Network.



**Figure 4** Location of West and South West ward

The urban riverfront of Tapi river is chosen as a study area, which is located in the south west and west ward of Surat city. The Tapi River originates in Madhya Pradesh's Betul district and has a length of about 724 km. Around 5km long stretch of Tapi riverfront is chosen as a study area, which is between proposed barrages to Pandit Din Dayal bridge.



Figure 5 5km Stretch of Site

### 3.5 Data Collection

Data or Information can be isolated into two sorts,

1. Primary Data. Researchers collect primary data directly from important sources like observations, surveys, questionnaires, etc.
2. Secondary Data - Secondary data is a term used to describe information that has already been produced by earlier studies. It consists of newspaper articles, websites, official records, books, and more.

### 3.6 Site Photos

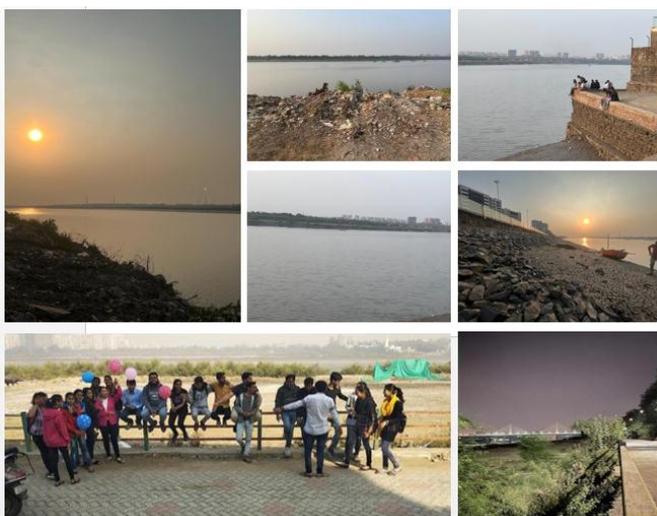


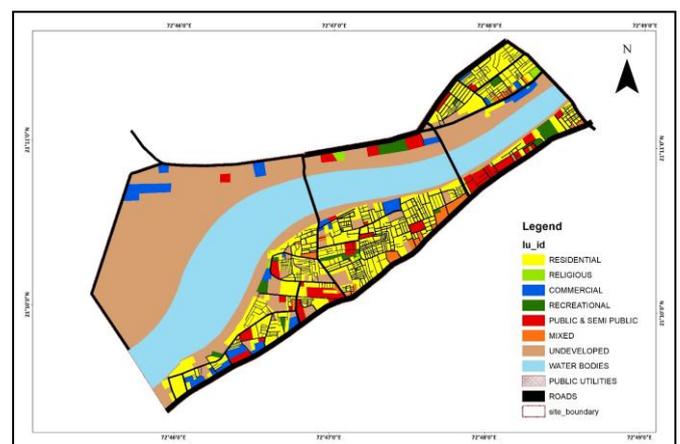
Figure 6 Site Photos

## 4 PLANNING PROPOSAL

### 4.1 Land use Analysis

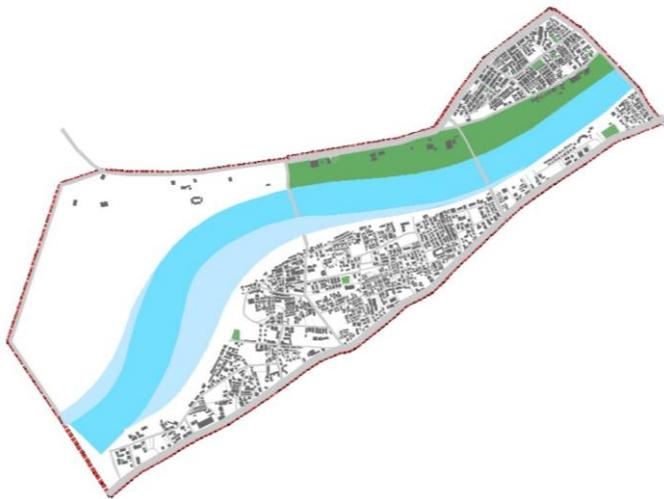
To better understand and identify the patterns and depth of factors affecting the river Tapi, a thorough GIS analysis was carried out. Total area is 9.36 SQKM. Existing land use pattern of the stretch which mainly consists of semipublic spaces, residential and recreational land use. The following land use mainly consists of potential govt.

The existing Land use map consists of 33% undeveloped and rest 67% of land is still not developed which has the scope of development. By embracing the idea of mixed land uses on vacant, which includes commercial, residential, and institutional uses, you can create an active corridor for recreation and leisure. These would include open spaces for the public to use, such as playgrounds and theme parks, and they would be treated as open recreational areas for city dwellers.



### 4.2 Proposal

Safeguarding the west zone by implementing no construction zone of 100m from the edge of the river and utilizing the land for public and green spaces. Total area of riverfront development is 264.4 hectare.



### Proposal for The retaining wall and the promenade

According to MoEF policies and guidelines, the riverfront development stretch cannot be less than 2 kilometres long, and there must be a no-construction zone of 10-15 metres due to the presence of riparian vegetation. Because of the presence of lights, trees, and plantation along the lower promenade, it must be at least 15-20 feet long.

**Riverfront walkway-** The riverfront walkway concentrates on developing a riverfront walk that connects people to various recreational activities and provides access to the formal market, as well as restoration and infrastructure development.

#### Component Proposal

- Improving approach roads leading to pilgrimage assets along the river and Improvements to Approach Roads leading to Pilgrimage Assets along the Riverfront Walk.
- Temple facade restoration along the walk.
- Closing open drains.
- Local architecture inspired street lighting.
- Enhancement of the walkway and Benches for seating.

### 3. CONCLUSIONS

Public Riverfronts are something that cities want. They desire a waterfront that offers constant, unrestricted public access to the land and the water. Cities also desire waterfronts that have multiple uses, including being a place to live, work, and play. The river, as a natural potential and asset for the city, can provide significant benefits. Water attachment can be achieved through a variety of activities involving the dependent and independent use of water. The goal is to re-create the relationship between the river and the city.

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