Interim Project Report
under DST-NCSTC WaSH Programme

Project Title: Natural and Built Heritage mapping of Ulhas River

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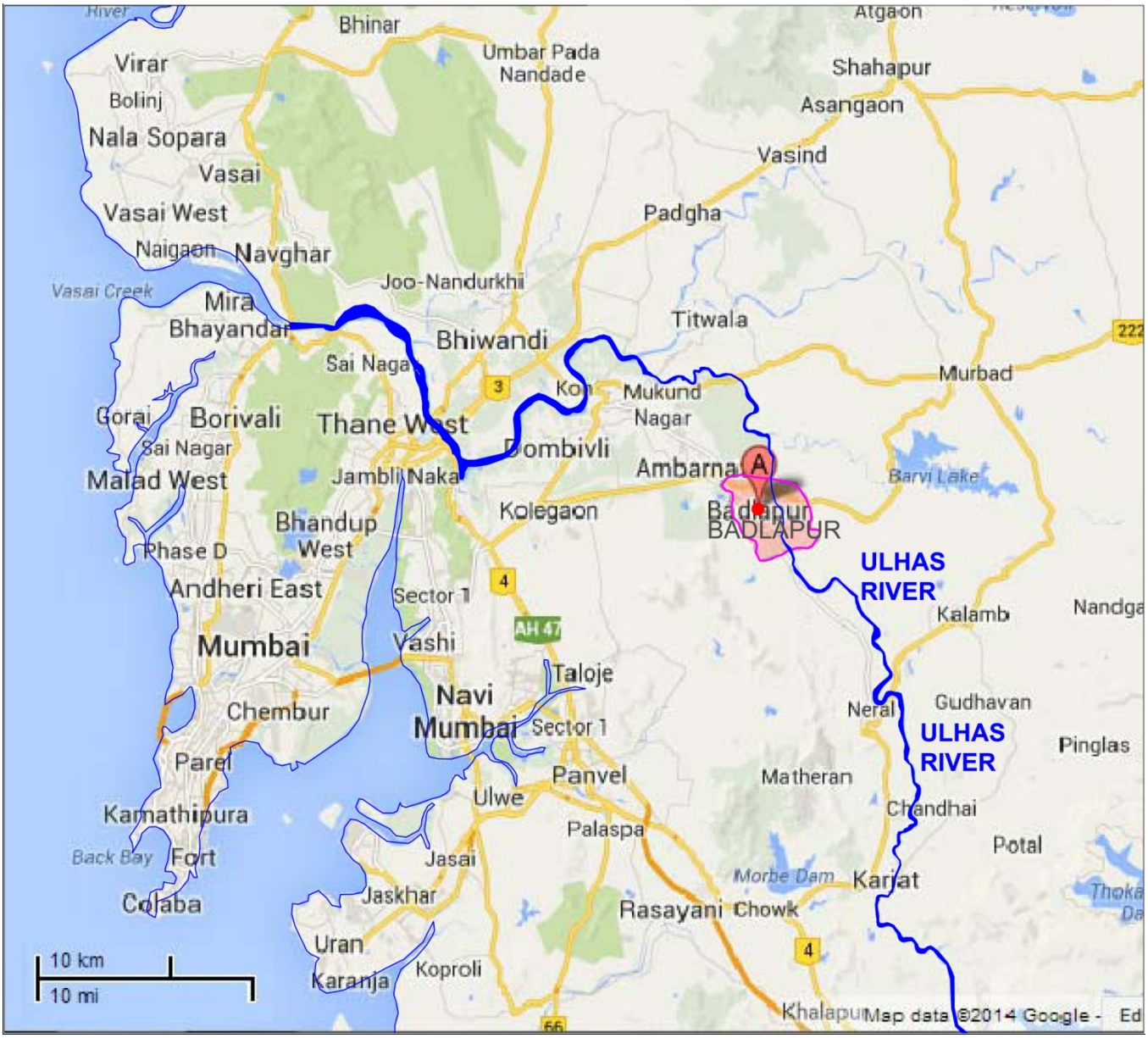
Project Start Date: January 2017

Project site:

Ulhas River originates in the Sahyadri mountains near Lonavala. It starts its journey northwards at the height 800 meters above MSL. The total length of this west flowing river from its origin to its outfall in to the Arabian Sea is 122 kms. It enters in to the deep valley near Rajmachi Hills and drops its height by almost 700 meters by the time it reaches Karjat town, within just 10 kms of distance. Being extremely steep, hilly and inaccessible; catchment area of river is in fairly good condition with deciduous and semi-deciduous forests. Many streams join the river from eastern side, from Dhak hills on the way. The river Ulhas originates in Karjat and flows westward. Almost all the rocks are varieties of Deccan trap-basalts.

The catchment area of the river comes under heavy rainfall zone (above 3000mm). This heavy rainfall and sudden drop in the height is the cause of the formation of deep valleys in the Basaltic rock. The heavy load water joins the sea at Vasai and Thane Creek ending its short journey without causing much flooding on its banks due these steep slopes. Both the creeks lay on the seismic fault lines.

REGIONAL CONNECTIVITY



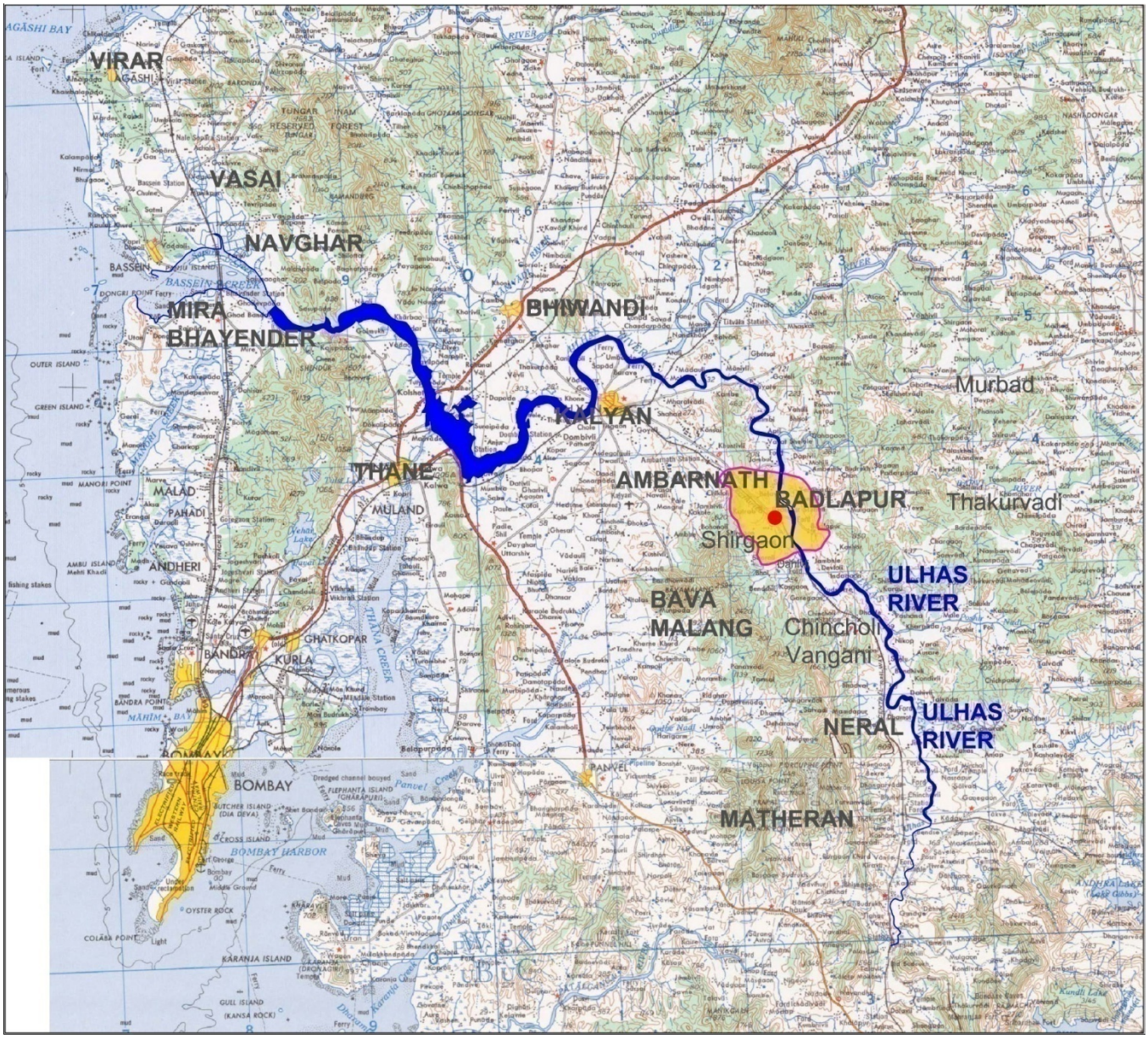
Introduction

Location and Connectivity

Badlapur is a railway station on the Mumbai-Pune route of the central railway. It is located about 68 km from Mumbai and 34 km from Thane. Badlapur is a terminal station for many Mumbai

suburban local trains. The town is also well connected to Navi Mumbai via regular bus services. The Kalyan - Badlapur - Vangani State Highway is being developed recently by MMRDA, which will considerably increase the connectivity and reduce the travel time. A monorail is also being planned connecting Badlapur and the neighbouring stations to Thane city.

REGIONAL TOPOGRAPHY



Introduction to Badlapur

Badlapur is a fast developing town in Thane district; and is a part of the Mumbai Metropolitan Region. Badlapur is one of the fastest growing towns in the region. Due to the population growth in the nearby cities, many people working in Mumbai have moved to Badlapur for affordable real estate prices, pleasant weather, beautiful location and quiet neighborhoods along with proximity to Mumbai and Thane.

Badlapur town encompasses the old Badlapur village, Kulgaon, Manjarli, Belavali, Katrap and many other small villages. Kulgaon Badlapur Municipal Council (KBMC) looks after the administrative affairs and is a Class-B Municipal council.

Badlapur city is virtually divided in two areas, East and West, by the railway station. The area of the city around the Badlapur railway station developed faster and more than the actual Badlapur village located a little away. The East-Badlapur is more developed with most of the older settlements developed there. The west side is today getting developed with a number of high end residential projects coming up along the foothills and along the river.

The Ulhas river flows between Kulgaon and Badlapur gaon on the west side of the railways. Of these Badlapur gaon still has rural settlements in the form of gaonthans and also many agricultural areas. The Badlapur gaon is connected with two bridges across the river.

Badlapur is located at 19.15°North and 73.262°East latitude. It has an average elevation of 44 meters (144 feet).The town of Badlapur lies in the Ulhas river valley. The town is surrounded by hill ranges, with the Matheran - Malang range to the west and the broken hills of the Sahyadri range to the east.

The Matheran range starts at Haji Malang in the north-north-west, continues to Tavli in the north, and then runs south and finally terminates at Bhivpuri Road hill. This range is not a part of the Sahyadri, but rather runs parallel to the Badlapur-Karjat railway line to its west. The Sahyadris proper run parallel to the same railway line but to its east. These hills form the watershed and drainage basin for the Ulhas river.

Kulgaon Badlapur Municipal Council Area is endowed with extensive and valuable ecological resources. The geographical setting itself, with the Matheran hills and the Matheran eco sensitive zone on the south west and the Barvi dam to its North west and the Ulhas river flowing across the municipal council area can be considered as a major environmental advantage.

Project Summary:

Aim:

"To study the natural ecological and built surroundings along the Ulhas River, evaluating various present and previous conditions along with mitigation measures to be adapted for revival connecting the people to its spine".

Ecology and Built Heritage are of utmost importance; latter being in limelight. Intrinsic connectivity of Badlapur Region as the main field of research knowledge of ecology can be related for present study. Through mapping existing ecological context along Ulhas river and reviving it will create an awareness about ecological landscape and will reconnect the city and the people to it. Today beautification of the river is not a major concern, there is a vital need to conserve and revive the eco-system of it through travelling back in the urban domain.

Objectives:

- To study the transformation of the river in the Mumbai Metropiltan Region, taking Ulhas River as a study model.
- To study the fabric of built heritage lost in Urban fabric and the Ecological fabric depleting along Ulhas River.
- To understand the thriving Natural Heritage in an Urban context and Rural context, taking Badlapur Region as base for studying environmental mitigation measures, methods like bio-technologies, ecological design guidelines and converting them as module.
- To study the existing Natural green edges thereby mapping them for protection.
- To initiate an understanding through public participation on reviving the depleting ecological systems of Ulhas river thereby reconnecting the city and its people to the spine.

Methodology:

In the case of present study, research methods adopted are condition assessment of Ulhas River along with its edge. Studying Badlapur region through public participation by understanding the issues relating to Built and Natural Heritage of the region. Understanding diverse river status through case study thereby collating from our present and previous studies. Physical and Photo documentation of the region.

Ulhas river has the potential to be recognized as ecological corridor. Cutting across through various towns it has carved a niche for itself at various Urban and rural contexts through built or natural contexts. By mapping and presenting this study as a module for future developing towns. A diverse mix of information the research methodology will focus on three main types:

1. A. Condition Assessment of natural ecology and built heritage along Ulhas River in Badlapur Region
   B. Case study collation
   C. Collection of various mitigation methods
2. Analysis
3. Conclusion

Project timeline: February 2017 to May 2017

Work /activities carried out so far:

Photo documentation

Site Survey

Observations

Mapping

K A L Y A N

B A D L A P U R

Rivers often pronounced as the arteries of the countries are important source of Livelihood, habitat to different people organism.

1. Increasing urbanisation in the recent decades has led to various problems like, increase in waste production, with no proper measure for its treatment and disposal. Many towns and cities which came up on the banks of rivers have not given a proper thought to problem of wastewater, sewerage, etc., with little local help in maintaining cleanliness.

2. Increasing industrialization is also posing a great problem, in form of continuous disposal of waste products in river streams, which later meet the river and pollute it, causing harm to local maritime life.

3. Agricultural runoff and improper agricultural practices also lead to mixing of harmful chemicals in fertilisers, by meeting with the groundwater eventually. Also, although much has been done by the govt to increase irrigational practices, there is still a problem for high salinity in return water.

4. Religious and social practices have also led to increase in river pollution to some extent. Carcasses of cattle and other animals are disposed in the rivers. Dead bodies are cremated on the river banks. Partially burnt bodies are also flung into the river. All this is done as a matter of religious faith and in keeping with ancient rituals. These practices pollute the river water and adversely affect the water quality.

---It should not be forgotten that only 0.3 per cent of total water available on this planet is fit for consumption for human beings, animals & plants. The remaining 99.7 per cent is present either as sea water or as glaciers on the mountains. Hence ignoring the issue of water pollution any longer would mean inviting a Third World War which would be fought for the control of water resources.

Protected Natural areas

For this indicator, the elements chosen are contained in the territorial plan of green infrastructure and Landscape of communities running parallel to the river. This establishes the ecological and functional connectors ensuring a continuous network of green areas that consists of open interconnected spaces (rivers, wetlands, forests, nature, parks, etc.) within the central rural areas and coastal towns.

Farra points out that the influence nature has on citizens is well known in a territorial scale (i.e. natural parks, reserves of biodiversity and ecosystem protected areas) but is still unexplored at the urban level.

Ceisura proposes that the existence of green spaces in the city leads to an awareness urban nature, an emotional dimension.

Therefore the system of protected natural areas within a sprawling *city requires the integration of natural areas and ecological systems in the production of multi scale urban green spaces that redefine the relationships between the city, nature and the citizen in order to create a system of parks.*

The creation of maps and cartographies, comparison and interaction clearly show two potential actions. These principal factors may guide strategies for the sustainable regeneration of tourist settlements given their consideration as integral parts of the coastal landscape. Protected natural areas offer a wide variety of environments and ecosystems that are reservoirs of biodiversity and areas of great potential for the implementation of a sustainable touristic model. The strategic plan may enhance the delimitation of these spaces (protecting the diversity) and procure connectivity among municipalities (defining secondary biological corridors). This will allow achieving two major objectives for the cities:

Connectors.

River edged paths, with their cattle trails and historical roads, shape a large communication network that allows a human scale linkage between the urban settlements and other parts of the municipality (interconnection of biodiversities). These paths become connection points along sections throughout the town area that define spaces in the territory that are new centralities-singular nodes-of different scales. An example of this already exists in a lower scale in various routes and hiking trails of the areas nature parks.

On the basis of analysis of the touristic potential through a method based on three factors:

1. The quantity and the quality of the resources of the studied area
2. The accessibility
3. The touristic and commercial facilities

This indicator would define few selected elements:

a) Pick out potential spots to create most important river edge landscape typical to the region
b) Improve consolidated products (unexploited natural edge and paths)
c) Promote gastronomic tourism and leisure at potential spots

Conducting research through the process mentioned above, following series of observation and analysis was generated:

Analysis of the observation from condition assessment of Ulhas River and its edge at Kalyan, Badlapur and Karjat.

Ulhas River originates in the Sahyadri mountains near Lonavala from an overflow of Tungarli Lake, it is a non-perennial river. The growing towns and cities is the main reason for the dying state of the river where it is subjected to encroachments along the natural edges, point and non-point sources of pollution, crematoria's, dhobi ghats, cultural festivities leading to water pollution and siltation are directly led into the river.

The new unplanned haphazard development along the bank has left no riparian or buffer area along the bank.

Depleting riparian area due to encroaching concrete edges destroying the natural sections of the river. There is no connection between the people and its river.

The Urban built is ruining the ecological heritage of the river. This transformation needs to be restricted through analysis and possible recommendations from evaluation of the existing guidelines and proposals.

Work to be done: (Provide objective wise work and activities left and justify how you would complete in the stipulated time)

1. To generate a map highlighting Natural and ecological corridors and edges along Ulhas river from its inception to Thane creek.
2. To generate a map highlighting lost built heritage along the river and reviving the corridors connecting it with the river.
3. To suggest bioremediation techniques used to clean the river.
4. To generate a model through Badlapur as the key area of research and presenting a module for further developing towns along the Ulhas river.
5. To create awareness and movement with active local involvement by conducting workshops in schools, NGO's and local enthusiasts.

Future directions:

(If you would like to continue this work in future and what you look for)

Citations: (If any)

Acknowledgements: