



RECLAIM THE RIVER

PUNE, MAHARASHTRA, INDIA

Master of Science Thesis [in the Master Degree Programme, MP DSD]

ABHINAV GAURAV

Department of Architecture
CHALMERS UNIVERSITY OF TECHNOLOGY
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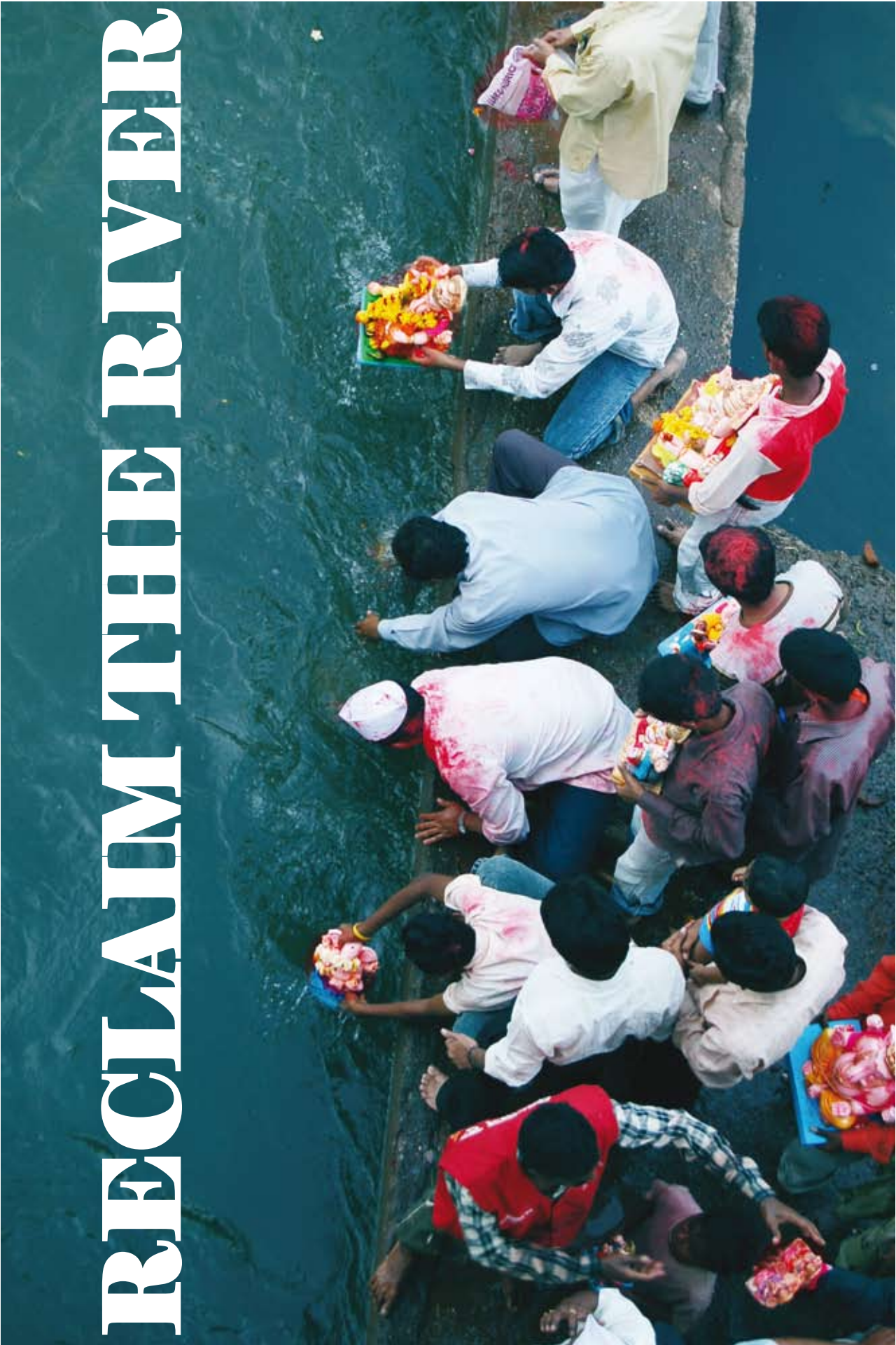
Even though India has seven mega cities, it is the smaller towns and the so called metro cities - cities with up to 4 million inhabitants - which are growing rapidly. This diploma thesis is situated in city of Pune, the eighth largest city in India with a population of 3.3 million.

Most of the ancient cities in India grew along rivers, seeking proximity to a perennial source of clean water. Early agrarian based societies and trading societies needed this close proximity for irrigation of crops standing on fields and navigation of boats and barges ferrying goods along the river ways. Water was celebrated; represented in social, cultural and religious symbolism. This physical, mental and spiritual interaction has lost its way through the times.

The thesis focuses on the banks of the river Mutha, where the urban patterns from different time periods come together, close to the historic city centre. The catchment of this river is dominated by the typical humid tropical cycle of a long dry spell punctuated by a short rainy season. Hydrological, climatic and geological reasons cause erratic flows in this river. The lack of installed capacity for sewage treatment, and illegal dumping of unprocessed industrial waste into the river and rivulets results in a smelly, dirty and dying river landscape unused by the citizens of the city. How can this river be recaptured in the collective consciousness of the people of Pune? What steps and measures need to be taken? The thesis is an attempt to answer these questions.

/ Abhinav Gaurav

RECLAIM THE RIVER



By studying the various physical and cultural conditions, we can add new experiences to the discussion on the future of the city. What are the inherent potentials existing in the Indian city's diversity? India's status as a developing nation with a growing urban economy, coupled with the sheer magnitude of people and social potential, provides an ideal platform for the analysis and discussion on the future shape of urban society.

Since the mid-1980s there has been a discernible shift in urban development in India and other developing countries towards a more liberal system of governance. This shift has come at a time when most of the cities in these countries were reportedly experiencing a 'phenomenal demographic growth' and consequent crisis in the provision of adequate urban infrastructure.

The need to free the market from the state's regulative framework to facilitate private investment in infrastructure and the empowerment of local government are central components of an emerging urban strategy in India. This has led to the development of capital markets for resource mobilisation and efforts to ensure the cost of the provision of urban infrastructure, through elimination or reduction of government subsidies. Simplification of the legislative system and flexibility to bring about appropriate land use changes and location of economic activities has likewise been advocated as a part of the remedial package for Indian cities and city regions. The proponents of this neo-liberal strategy argue that it will accelerate rural-to-urban migration, boost the pace of urbanisation, promote regional balance and ensure sustainable development in the country. Critics of the strategy, on the other hand, have argued that globalisation could jeopardise sustainable development both in rural and urban areas and accelerate the exodus from rural areas. There is little research evidence that supports either of these two different perspectives. There is a point of convergence between the two

that envisages that rapid urbanisation and acceleration of growth will be concentrated mainly in large cities of the Indian sub continent.

Today an increasing number of India's population of over 1.1 billion is fuelling urban centres across the subcontinent, with over 300 million city dwellers making up one tenth of the world's urban population. Even though India has seven mega cities, it is the smaller towns and the so called metro cities - cities with up to 4 million inhabitants- which are growing relatively faster. This diploma thesis proposes to focus on Pune, the eighth largest city in India with a population of 3.3 million. It is the second largest city in the state of Maharashtra, after Mumbai. The city has a geographical spread of around 5.2 million km² and a population density of 7,200 per/km² is situated 560 metres above sea level on the Deccan plateau at the confluence of the Mula and Mutha rivers.

Most of the ancient cities in India grew along rivers, seeking proximity to a perennial source of clean water. Early agrarian based societies and trading societies needed this close proximity for irrigation of crops standing on fields and navigation of boats and barges ferrying goods along the river ways. Water was celebrated; represented in social, cultural and religious symbolism.

This physical, mental and spiritual interaction has lost its way through the times. Pune is the only city in the country with three rivers flowing through it and merging here. The river Mula emerges at Deoghar, 70 km west of Pune, and meets Pavana at Dapodi. Then, it joins the Mutha at Sangam and together they flow as the Mula- Mutha to Bhima along with Indrayani and Ghod rivers. Later Bhima merges into Krishna and drains in to the Bay of Bengal. The catchment of the Mula- Mutha is dominated by the typical humid tropical cycle of a long dry spell punctuated by a short rainy season. The city lying on the leeward side of the Western Ghats (mountain system) does not get comparatively much rain during

the monsoons. The result is a river with typically weak flows (around three cubic meters per second), with a monsoon surge of around 1,500 cubic meters per second. Lack of installed capacity for sewage treatment, and illegal dumping of unprocessed industrial waste into the river and rivulets results in a smelly, dirty and dying river landscape. The loss of many local plant and animal species, and widespread occurrence of water hyacinth, ipomea weeds in the river make it unattractive for the citizens too. How can the river be recaptured in the collective consciousness of the people of Pune? What steps and measures need to be taken?

The 74th amendment to the Indian constitution created an elaborate administrative structure for all urban areas. Urban settlements are classified as Corporations, Municipalities or Nagar Panchayats (a hybrid designed for settlements in transition from rural to urban). All these three categories, broadly labelled as Nagarpalikas, are to be constituted with representatives elected from territorial constituencies called wards. The diploma project proposes to focus on two wards (Ward No 35, Modern College and Ward No 52 Ramanbaug). These are outlined in red marker in the map enclosed. The larger impact area proposed to be studied is marked in green marker, which is a belt along the river. The total study area is around 9.7 sq km, however almost a third of the total area is the river and its banks. There will be an aim to establish contact the respective ward officer and corporator (locally elected representative).

This study is being undertaken along with the Resources.09 studio being conducted by Kungliga Konsthogskolan, Stockholm and in collaboration with (Dr Bhanuben Nanavati College for Architecture) BNCA, Pune and a nongovernmental organisation CEE (Centre for Environmental Education) also based in Pune. ■

REPUBLIC OF INDIA

India, officially the Republic of India, is a country in South Asia. It is the seventh-largest country by geographical area, the second-most populous country with over 1.18 billion people, and the most populous democracy in the world. Bounded by the Indian Ocean on the south, the Arabian Sea on the west, and the Bay of Bengal on the east.

It is bordered by Pakistan to the west; China, Nepal, and Bhutan to the north; and Bangladesh and Burma to the east. India is in the vicinity of Sri Lanka, and the Maldives in the Indian Ocean



PUNE MAHARASHTRA, INDIA

Pune is the eighth largest metropolis in India, and the second largest in the state of Maharashtra, after Mumbai(Bombay). Once the capital of the Maratha Empire, Pune is the administrative capital of Pune district.

Pune is known by many epithets like the 'City of Virtues' in the ancient times,'Queen of Deccan' due to its scenic beauty and rich natural resources, 'Monsoon Capital' of Bombay presidency during British Rule, 'Pensioner's Paradise' for its salubrious weather and laid back lifestyle, 'Oxford of the East' with more than a hundred educational institutes and nine universities.

Pune has a growing industrial hinterland, with many information technology and automotive companies setting up factories in Pune district, and hence also called the 'IT City' and 'Detroit of India'. Pune is known for various cultural activities like classical music, spirituality, drama, sports, and literature and also called as the 'Cultural capital of Maharashtra'.

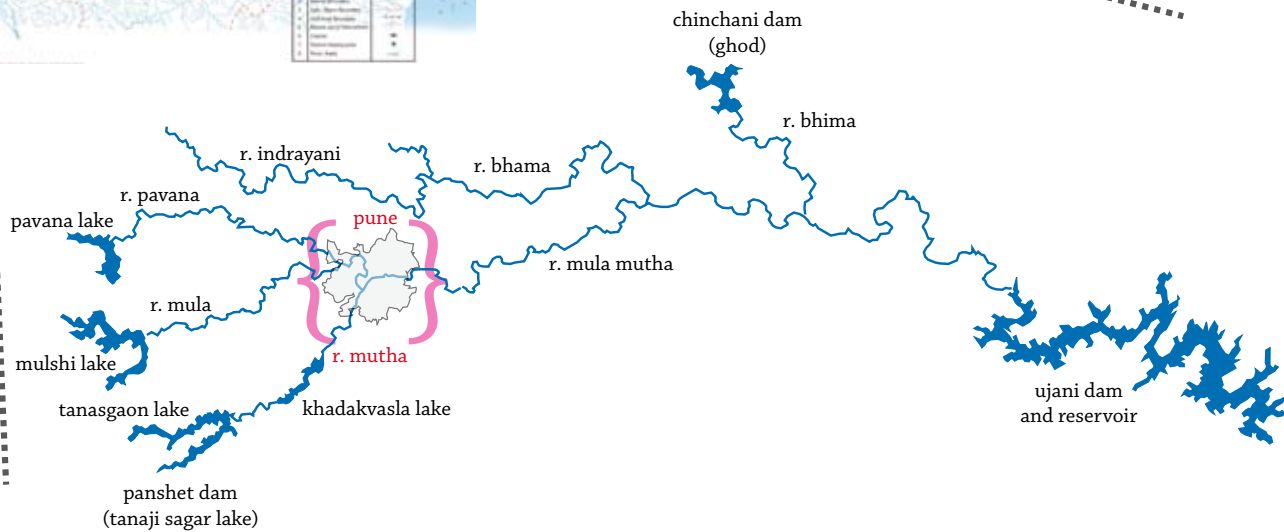




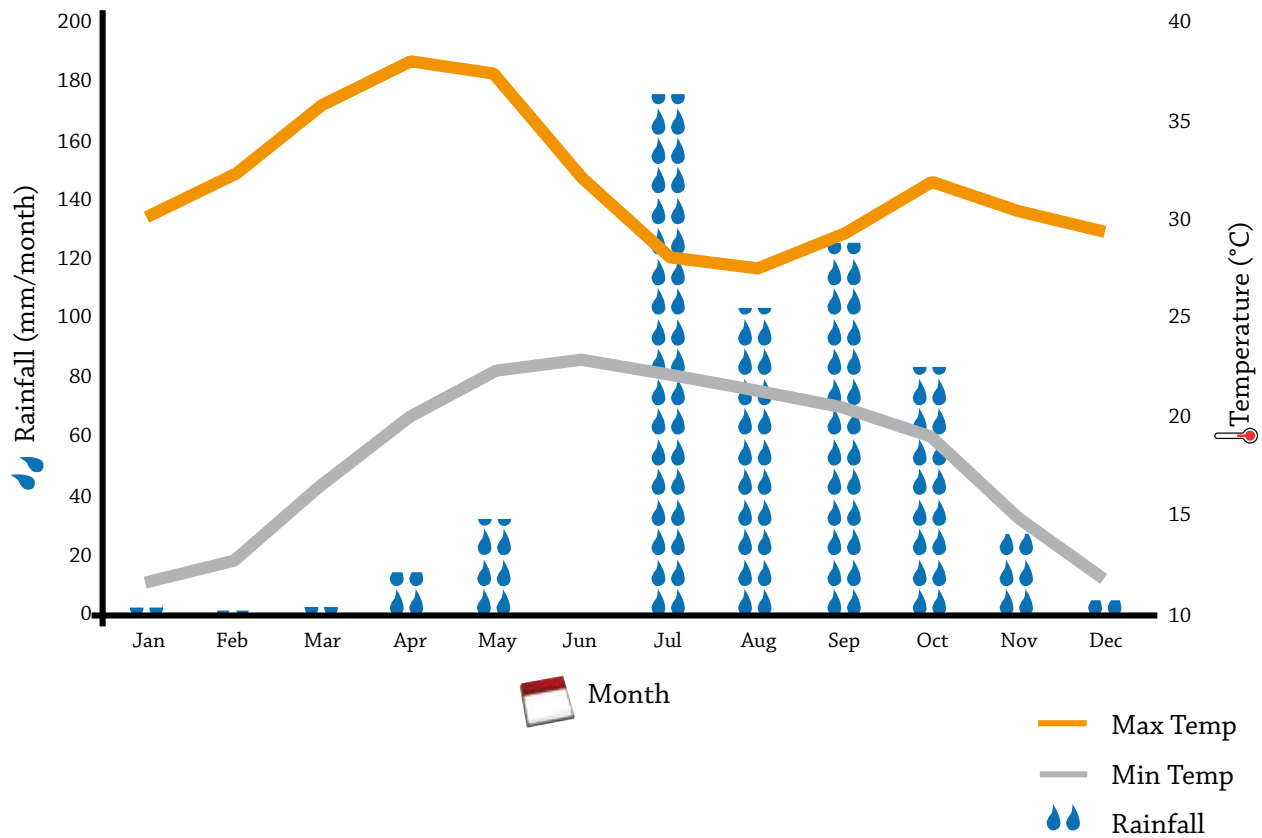
WESTERN GHATS

Also known as the Sahyadri Mountains, is a mountain range along the western side of India. It runs north to south along the western edge of the Deccan Plateau, and separates the plateau from a narrow coastal plain along the Arabian Sea.

These hills cover 60,000 km² and form the catchment area for a complex of river systems that drain almost 40% of India.



Mean Annual Cycles of Rainfall and Temperature at Pune



GEOGRAPHY

Pune is located 560 m (1,840 ft) above sea level on the western margin of the Deccan plateau. It is situated on the leeward side of the Sahyadri mountain range (the Western Ghats), which separate it from the Arabian sea. It is a relatively hilly city, with its tallest hill, Vetal Hill, rising to 800 metres (2,600 ft) above sea level.

Central Pune is located at the confluence of the Mula and Mutha rivers. The Pavana and Indrayani rivers, tributaries of the Bhima river, traverse the northwestern outskirts of metropolitan Pune.

CLIMATE

Pune has a tropical wet and dry climate with average temperatures ranging between 20 to 28 °C. Pune experiences three distinct seasons: summer, monsoon and winter. Typical summer months are from March to May. Even during the hottest months, the nights are usually cool due to Pune's high altitude.

The monsoon lasts from June to October, with moderate rainfall and temperatures. Most of the 722 mm of annual rainfall in the city fall between June and September, and July is the wettest month of the year.

HISTORY



Copper plates dated to 758 and 768AD show that, by the 8th century, an agricultural settlement known as Punnaka existed where Pune is today.

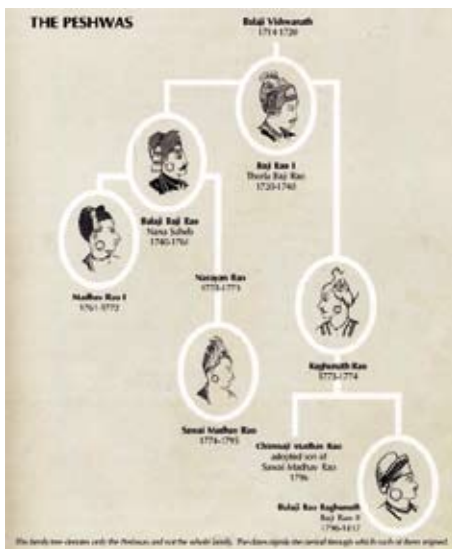
The plates indicate that this region was ruled by the Rashtrakuta Dynasty. Pune was part of Yadava Empire of Deogiri from the 9th century to 1327.

Pune was ruled by the Ahmadnagar Sultanate until being annexed by the Mughal Empire in the 17th century.

In 1625, Rango Bapuji Dhadphale as the administrator of Pune, oversaw construction of the Kasba, Somwar, Raviwar and Shaniwar Peths. Shivaji was crowned Chhatrapati in 1674. He oversaw further development in Pune, including the construction of the Guruwar, Somwar, Ganesh and Ghorpade Peths. By 1730, the palace of Shaniwarwada had been constructed on the banks of the Mutha River, ushering in the era of Peshwa control of the city. The Sadashiv, Narayan, Rasta and Nana Peths were developed in this era.

The Peshwas were defeated at the Battle of Khadki near Pune, and the city was seized in 1817. It was placed under the administration of the Bombay Presidency, and the British built a large military cantonment to the east of the city (now used by the Indian Army).

Two major events shaped the civic growth: the Greater Indian Peninsula Railway reached Pune, and the city acquired a municipality in 1858. Pune was at one time the “monsoon capital” of the Bombay Presidency. Navi Peth, Ganj Peth and Mahatma Phule Peth are believed to have developed during the British Raj.





India attained independence in 1947 from British Rule. Increasing population, apart from rural migration and the arrival of refugees from Pakistan, saw the expansion of municipal limits from a mere 44 sqkm to 139 sq km. The fledgling Pune Municipal Corporation formed in 1950 coped with the problems of resettlement, economic provision and public order.

In 1949, in recognition of its importance as an educational centre, the University of Pune was started. Industrial developments started in the 1950s and '60s in Hadapsar, Bhosari, Pimpri, and Parvati. Telco (now Tata Motors) started operations in 1961, which gave a huge boost to the automobile sector.

In July 1961, Panshet dam broke and its waters flooded the city, destroying most of the older sections of town. This unfortunate incident led constructive developments in the city, including giving an opportunity for modern town planning concepts to be put into use.

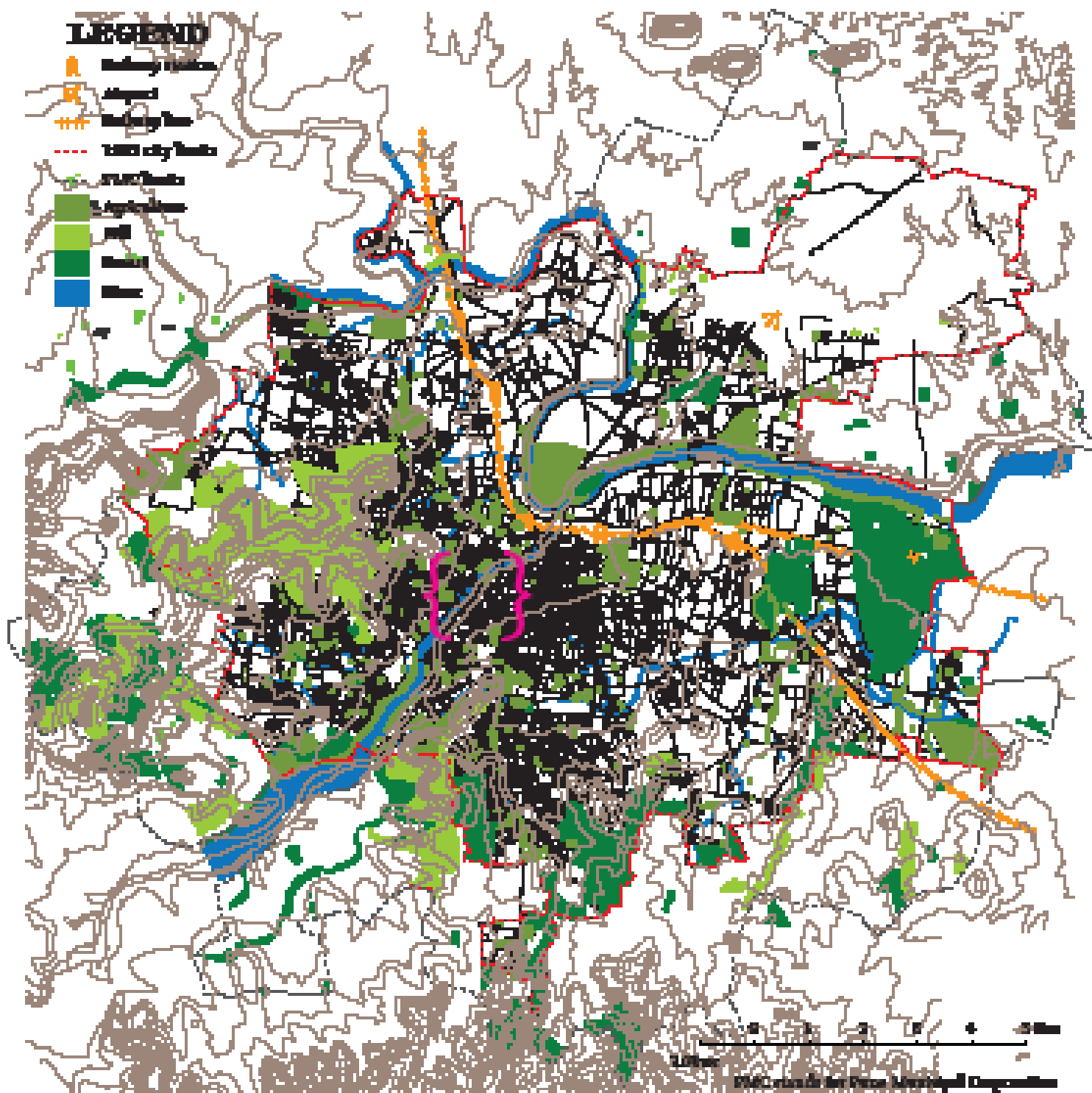
The economy of the city witnessed a boom in the construction and manufacturing sectors. By 1966, the city had expanded in all directions.

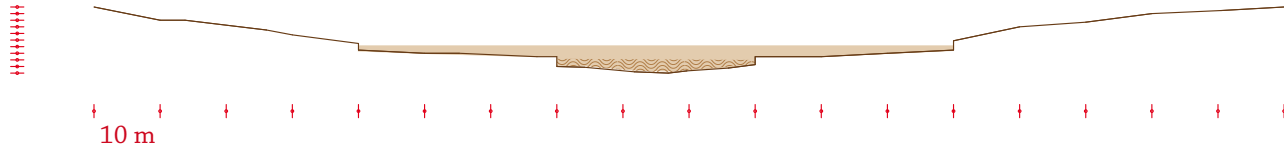
In 1990 Pune began to attract foreign capital, particularly in the information technology and engineering industries; new businesses like floriculture and food processing began to take root in and around the city. In 1998, work on the six-lane Mumbai-Pune expressway began; a huge accomplishment for the country, the expressway was completed in 2001.

In the three years before 2000 Pune saw development in the Information Technology sector, and IT Parks formed in Aundh, Hinjawadi and Nagar road.

In 2008 the Commonwealth Youth Games took place in Pune, which encouraged additional development in the northwest region of the city.







Present Section, River Mutha



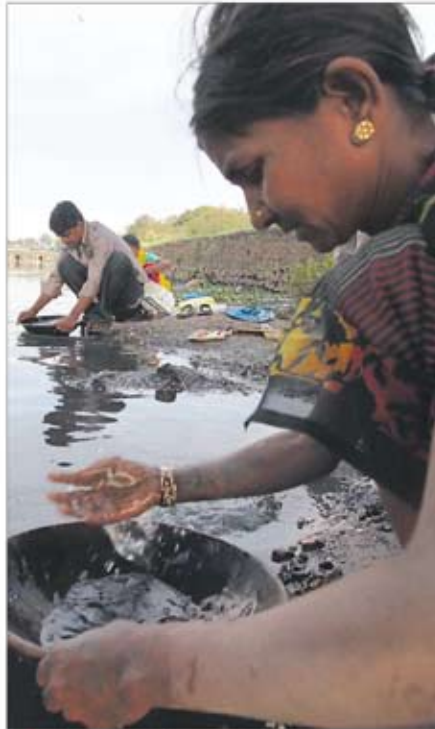
Untreated Sewage being dumped into the river

THE PRESENT SITUATION

All the rivers in Pune (Mula, Mutha, Pavana and Indrayani) are heavily polluted. The main reason for Mutha River being polluted is the release of untreated raw sewage.

The river bank seems to have been forgotten by the citizens at large, seen as a smelly stinky part of the city. The horizontal gradient and geology of the river bank creates the phenomenon of annual flooding during the monsoons (rainy season) and also the ever present risk of flash floods. The unwanted and the forgotten river bank is the shelter for the poor and disadvantaged sections of the society.

The river banks come alive only on the occasion of the festival of Ganesh Chaturthi (during the festival; idols of the elephant-headed god are immersed in the specially constructed tanks along the river bank or in the river itself). The festival is usually falls between 20 August and 15 September.



RIVERS NO MORE

A frame-by-frame record of dying rivers, Mula and Mutha, brought alive by photojournalists Arul Horizon and Oinam Anand shows that the city has a lot to worry about saving the rivers from vanishing

Industry effluents released into Mula are causing skin diseases in fishermen and have kept away migratory birds.



A grim picture of river pollution

Sifting for gold in the ashes discarded by jewellery shops



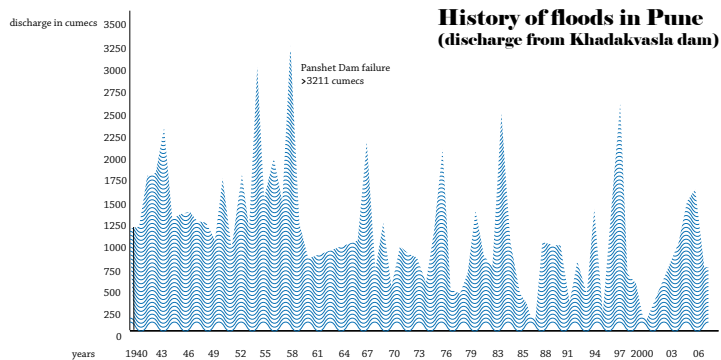
Mula is also a haven for cattle



Mula river bank turned into dump yard in Auradh

Drain water pumped into Mutha river. Kalyan





Annual flooding during Monsoons render some bridges unsafe for vehicular usage.



Presence of pollution tolerant flora and fauna slowly choking the River Mutha to a near certain death

ENVIRONMENTAL FLOWS: POLLUTION & THE ECOSYSTEM

Over the past decades, the biota of the region has deteriorated due to the pollution loads from the domestic, agricultural and industrial sources. Studies enumerating the floral species show a decline of 244 species in the last four decades. Simultaneously there has been an increase in Pollution tolerant bio indicator hydrophytes are present e.g. Eichornia crassipes (Water hyacinth), Typha latifolia (Broadleaf cattail) and Ipomea carnea (Besharam). Studies enumerating the avifauna; birds along the rivers, streams and lakes; show a decline of 25 species in the last two decades. Aquafauna studies indicate that the total number of fish species observed in 1964 were 110. In 1995, they were reduced to 83. By 2002, they were 65 (23 were abundant, 31 common, 6 occasional, 5 rare) and 18 had become extinct. Increased presence of pollution tolerant birds like little cormorant (*Phalacrocorax niger*) and black winged stilt (*Himantopus himantopus*). Bivalve species preferring unpolluted water are now being replaced by pollution tolerant snail, *Bellamya bengalensis*.

The 'Nature' Magazine describes Environmental Flow as the quality, quantity and timing of water flows required to maintain the components, functions, processes, and resilience of aquatic ecosystems which provide goods and services to people. Environmental flows which provide critical contributions to the river health are currently absent in the Mutha River.



weekend markets, circuses are held on the river bank



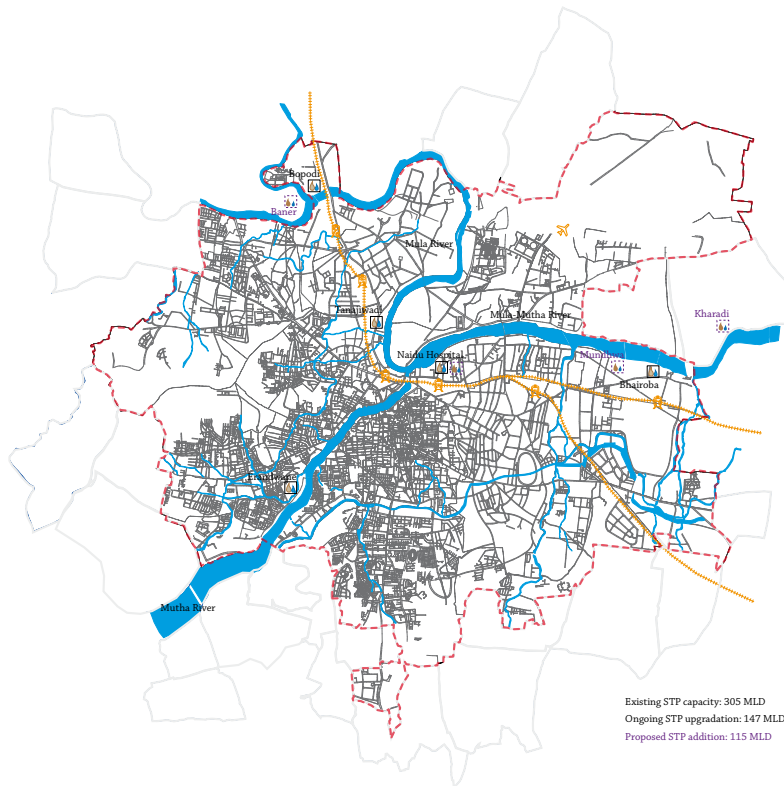
cheap informal eateries under the bridge

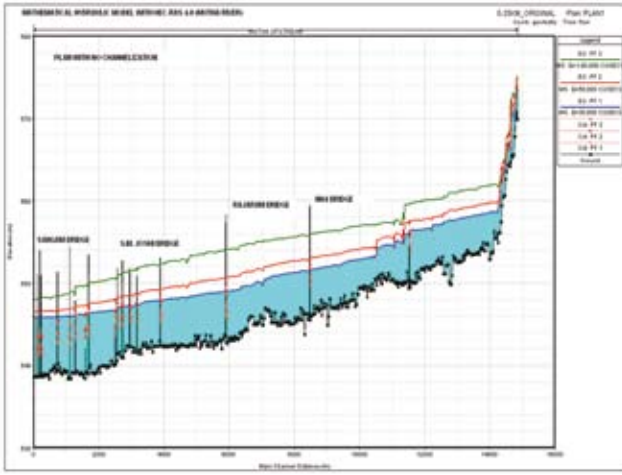


existing immersion tanks for idols during festivals

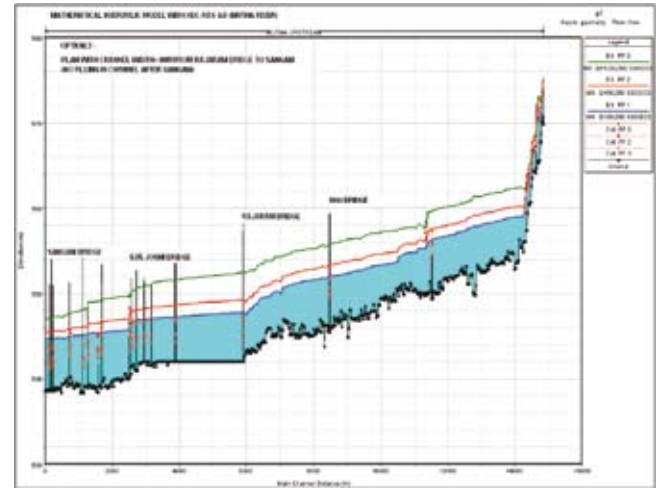


laundry facilities and the river bank

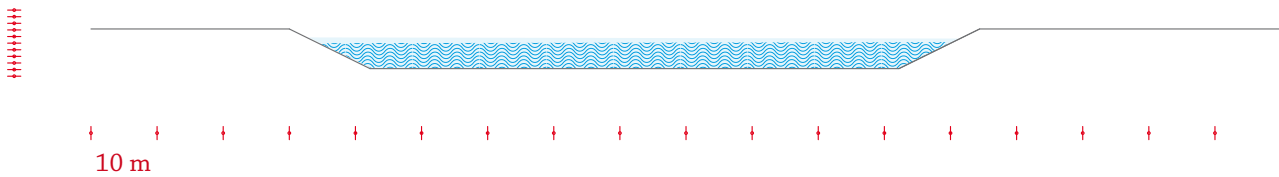




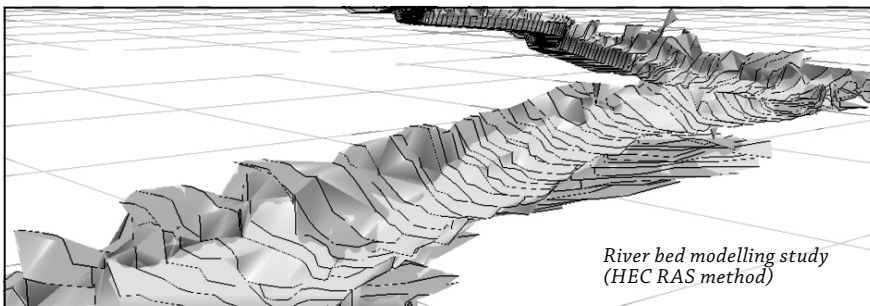
Mathematical Simulation Studies : Present situation



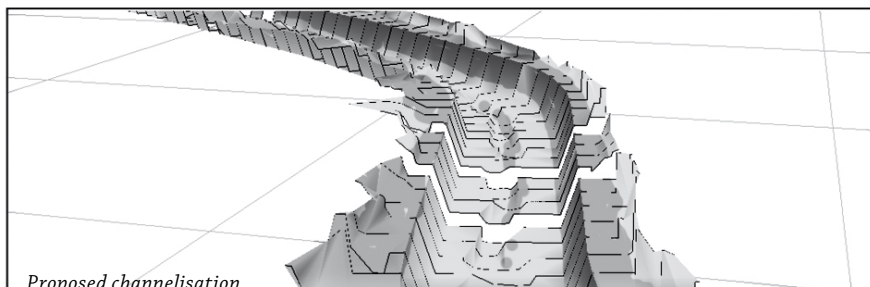
Mathematical Simulation Studies : NERIL plan proposal



Proposed Section according to NERIL plan, River Mutha



River bed modelling study
(HEC RAS method)

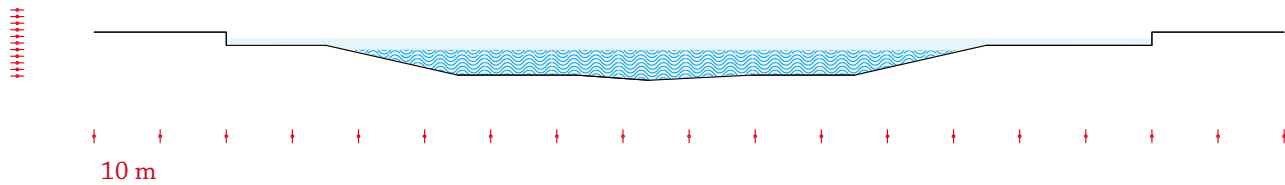


Proposed channelisation

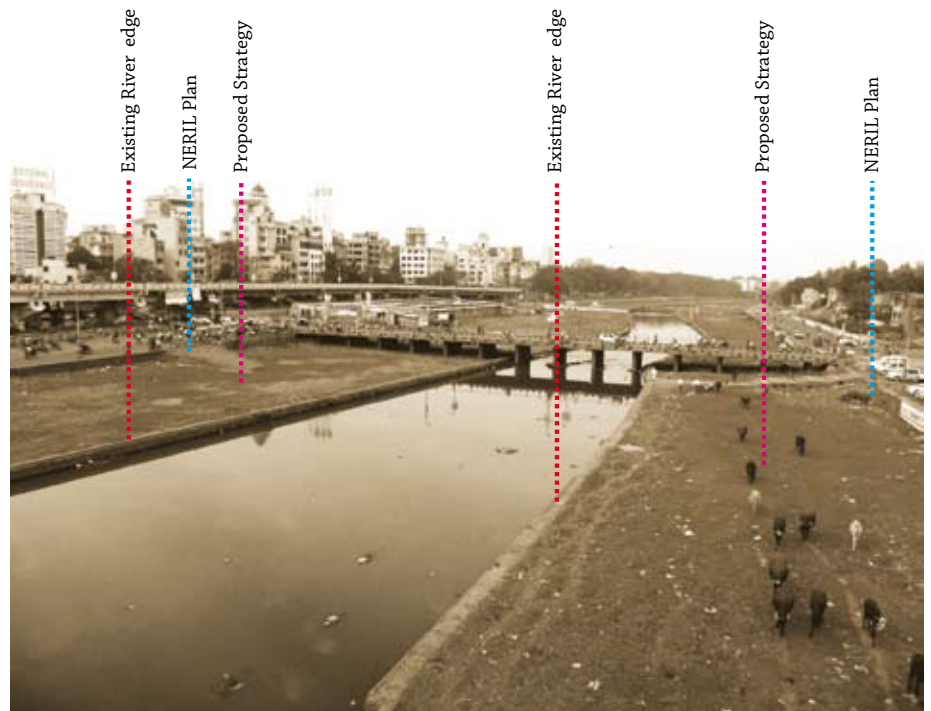
THE NERIL PLAN

The Pune Municipal Corporation, asked experts to create a feasibility report on 'Restoration of Pune Rivers' also known as the NERIL plan. The report cited exhaustive Hydrological, Ecological, Urban and Transport planning studies conducted.

The NERIL plan proposes channelisation of the river bed to achieve stable and constant water flows (accounting for seasonal variations in rainy Monsoon and dry summer months). This plan is linked with the existing attempts by the municipality under the National Urban Regeneration Scheme, which shall be financed partially by Central and partly by State government funds.



Proposed Section with controlled flooding, River Mutha



SCENARIO PLANNING

The Mutha River cuts like a grand corridor of air through the congested heart of Pune. Its unique potentials to be a vital part of the Puneites (the citizens of the city of Pune) daily life contrasts sharply against a reality where long dry spells, a collapsing sewage system and poor maintenance efficiently limits the range of possible events and users on, near or next to the river. Scenario Planning is used as a tool to understand the present and the ramifications of the NERIL plan. The lessons learnt are:

- Everyone gains from pure water which is made possible by purification and greater water volumes.
- The temporary condition seems intrinsically linked to the river's capacity to function as a truly public space.

PROPOSED STRATEGY

Analysing the two ways in which the NERIL plan, could pan out in; i.e. "Business as Usual" and "Commercial Development" : the strategy seems to be flawed in terms that by design it excludes all the possible user groups in the city from interacting with the cleaned River unhindered. A New strategy taking advantage of controlled flooding; a part of the newly created river bank which is temporarily submersible is proposed. Wherein by the reintroduction of Events, Spaces and Movements aims to recapture the relationship of the citizens of the city with the River Space.

PRESENT SITUATION

- POLLUTED WATER
- ANNUAL MONSOON FLOODING
- RISK OF FLASH FLOODS
- LOW USAGE OF RIVER BANKS
- SHELTER FOR THE HOMELESS



NERIL PROPOSAL

- PURE & CLEAN RIVER
- STABILIZED WATER TABLE
- IMPROVED WATER QUALITY
- INCREASED LAND VALUES
- HIGHER ATTRACTIVENESS



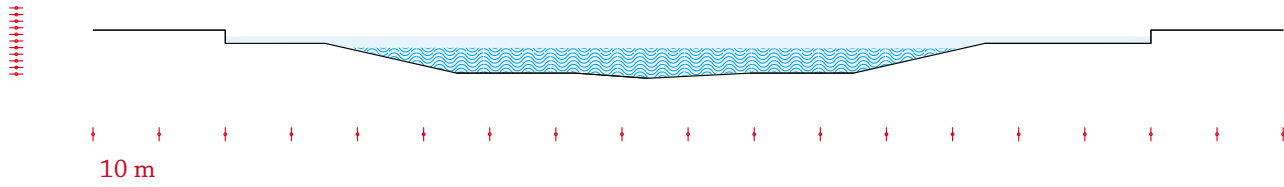
BUSINESS AS USUAL

- HIGH POSSIBILITY OF ENCROACHMENTS
- DIFFICULT TO MANTAIN SPACE PUBLIC
- INCREASED POLLUTION

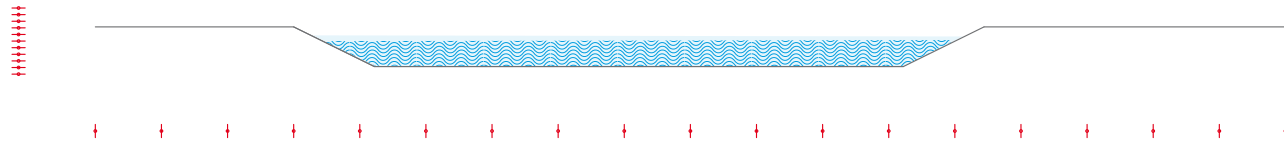


COMMERCIAL DEVELOPMENT

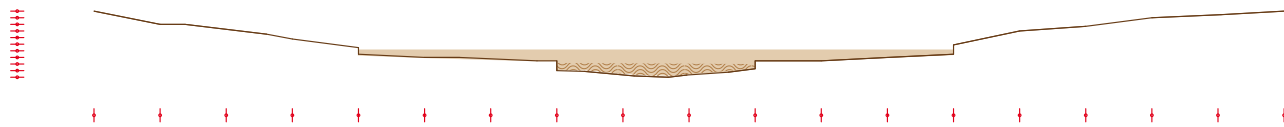
- PRIVATIZATION OF PUBLIC SPACE
- EXCLUSION OF THE MASSES
- INCREASED ENVIRONMENTAL PRESSURE ON THE RIVER



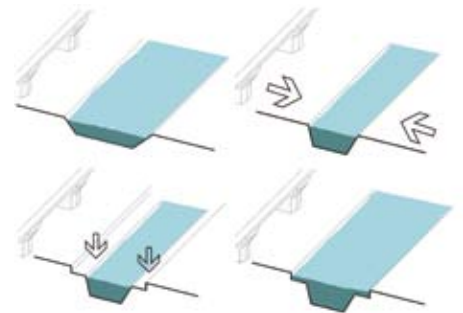
Proposed Section with controlled flooding, River Mutha



Proposed Section according to NERIL plan, River Mutha



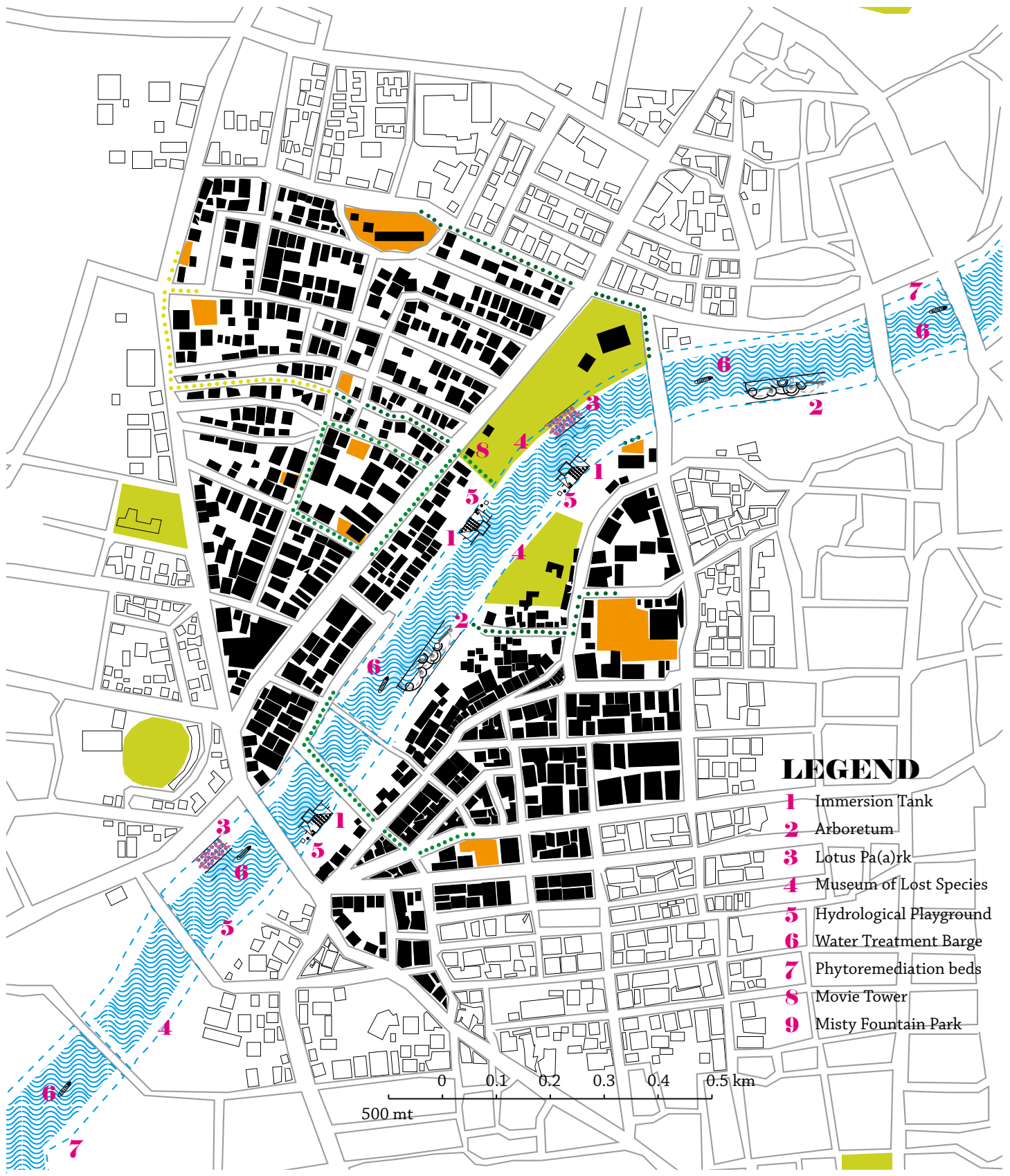
Present Section, River Mutha

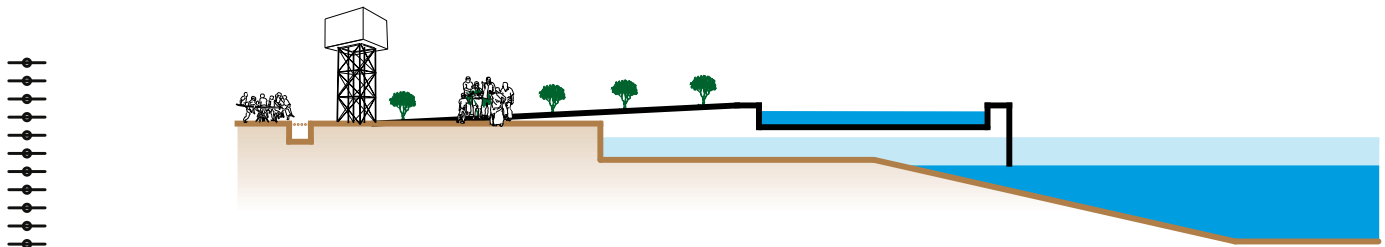
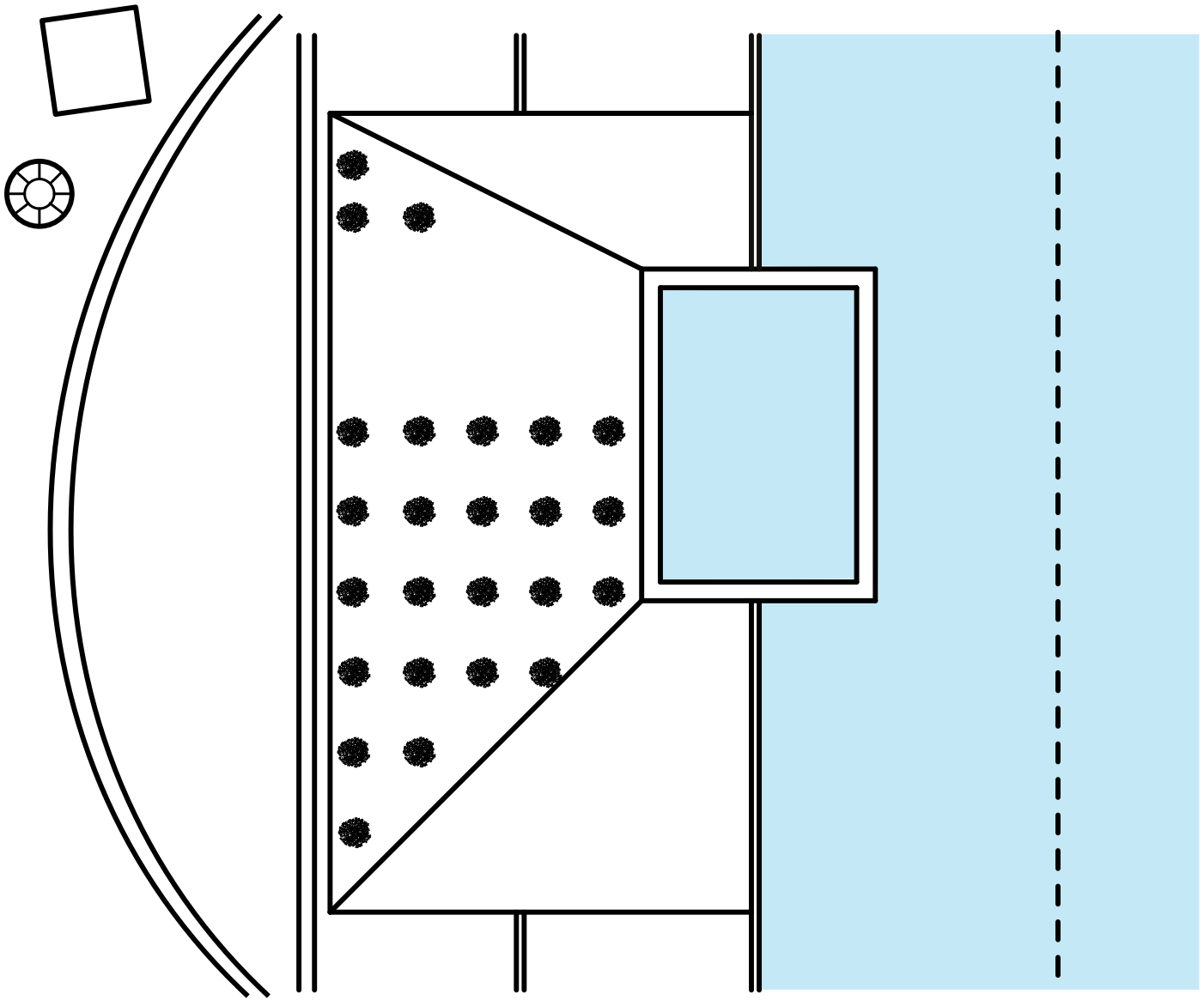


PRESENT SITUATION



PROPOSED STRATEGY





IMMERSION TANK (VISARJAN HOUD)

The river banks come alive on the occasion of the festival of *Ganesh Chaturthi* (during the festival; idols of the elephant-headed god are immersed in the specially constructed tanks along the riverbank or in the river itself). The immersion of these idols into the river is an environmental hazard as the statues are now made of plaster of paris (gypsum) and coloured with paint containing heavy metals; as opposed to in the olden times when they were made of mud, clay, straw and wooden framework.

In its present form the immersion tanks are in a state of neglect and disrepair throughout the year, being used only during the festival.

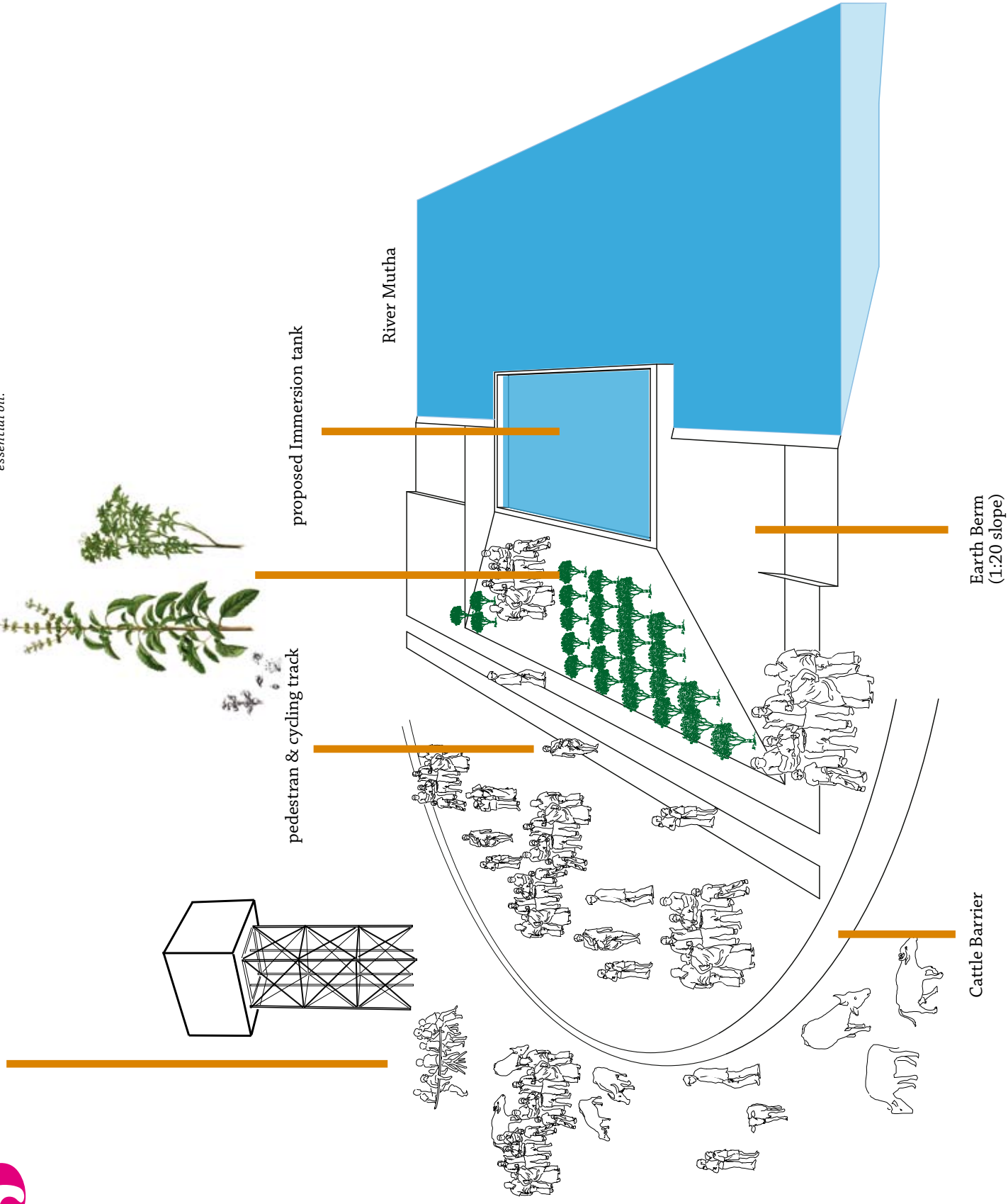


existing immersion tanks along the river bank



HYDROLOGICAL PLAYGROUND

The Tulsi plant, *Ocimum tenuiflorum*, is cultivated for religious and medicinal purposes, and for its essential oil.



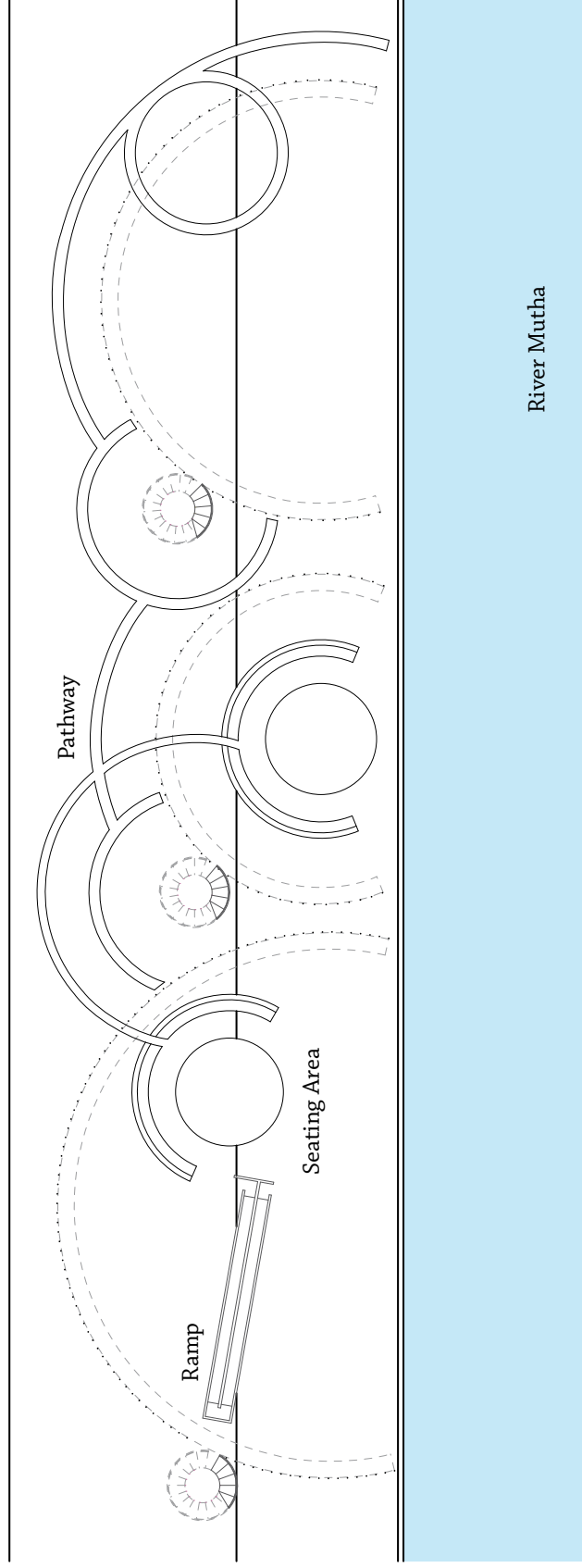
Cattle Barrier

Earth Berm
(1:20 slope)

pedestrian & cycling track

proposed Immersion tank

River Mutha



Proposed Plan



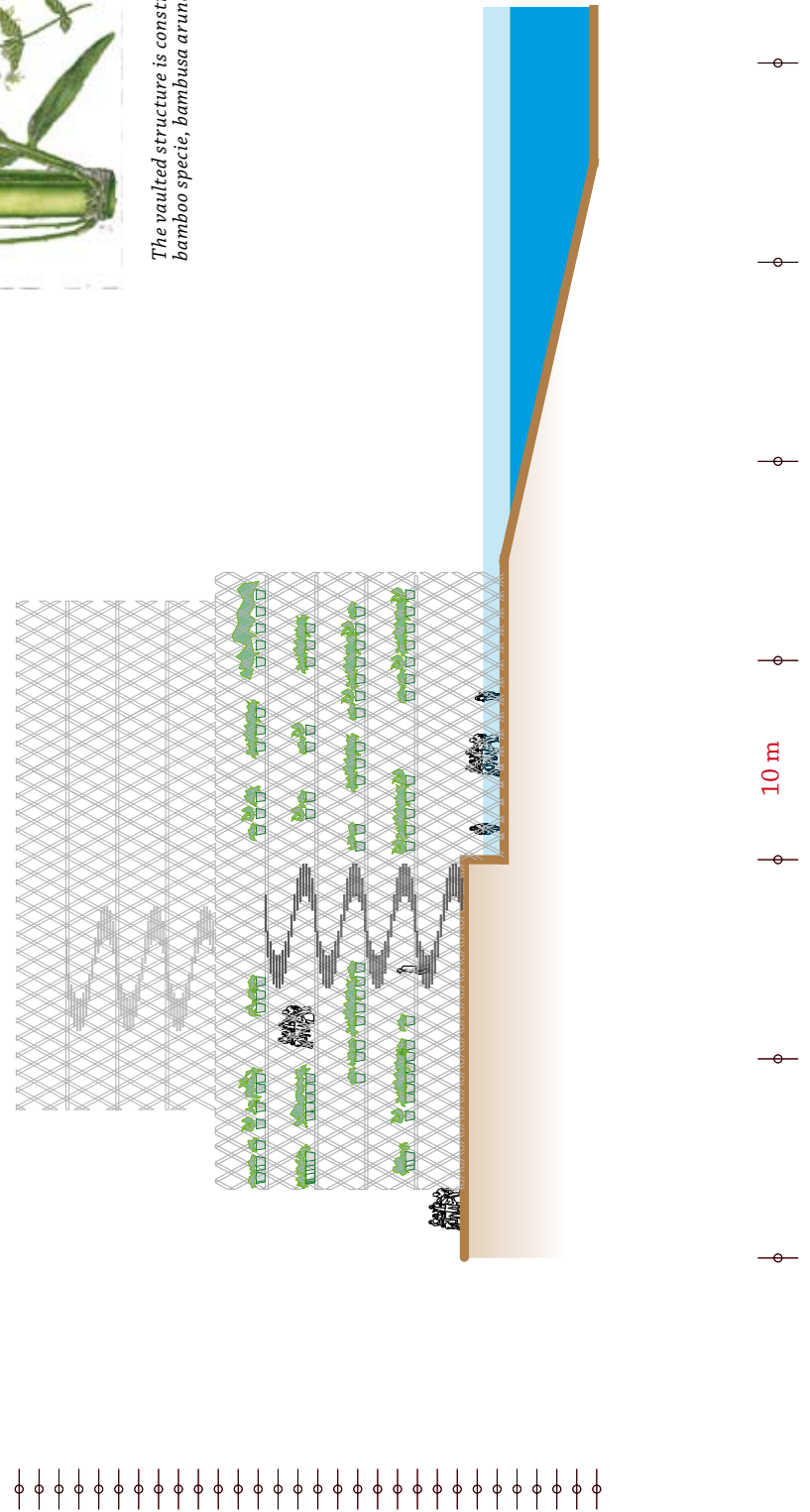
ARBORETUM

The proposed structure is a plant nursery for the indigenous or native species to be replanted along the paths leading to prominent public spaces like a museum, youngsters' library, classical music school, a open performance arena, a community self-help centre amongst others (marked in Orange on the Site Plan). These species are suitable to climate, rainfall, topography & current status of land, apart from creating a new aromatic or edible landscape is created reinforcing the connections between various public spaces. The proposed structure also serves a pedagogical purpose, teaching the citizens of the plant species which grew along the river bank before rapid urbanization and introduction of other species by human activity. The Arboretum also provides semi-shaded zones of seating.

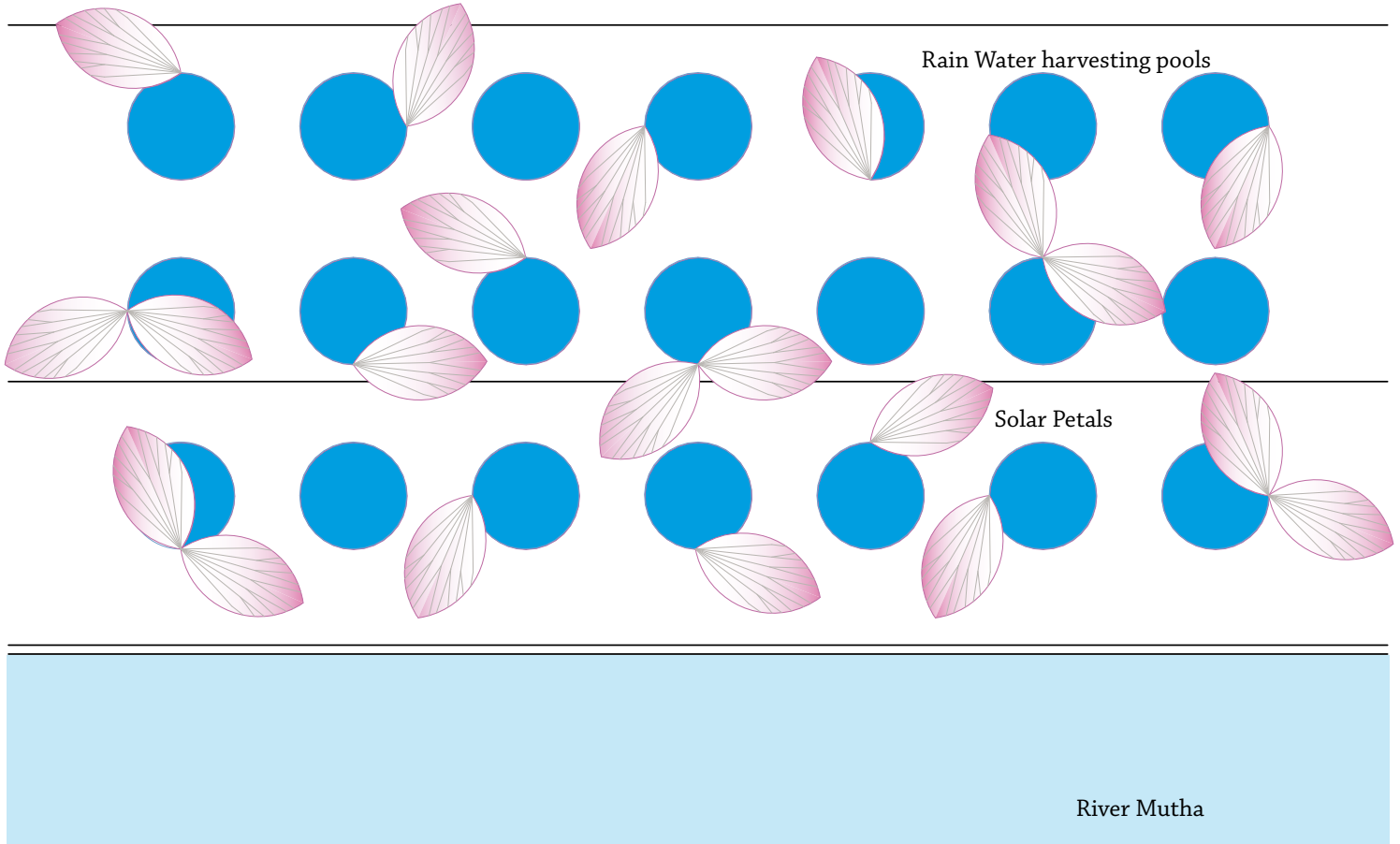




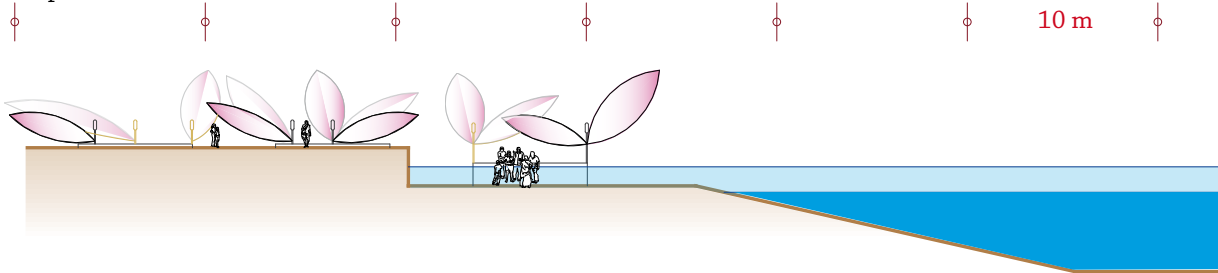
The vaulted structure is constructed from a native bamboo specie, *bambusa arundinacea*



Proposed Section



Proposed Plan



Proposed Section



LOTUS PA(A)RK

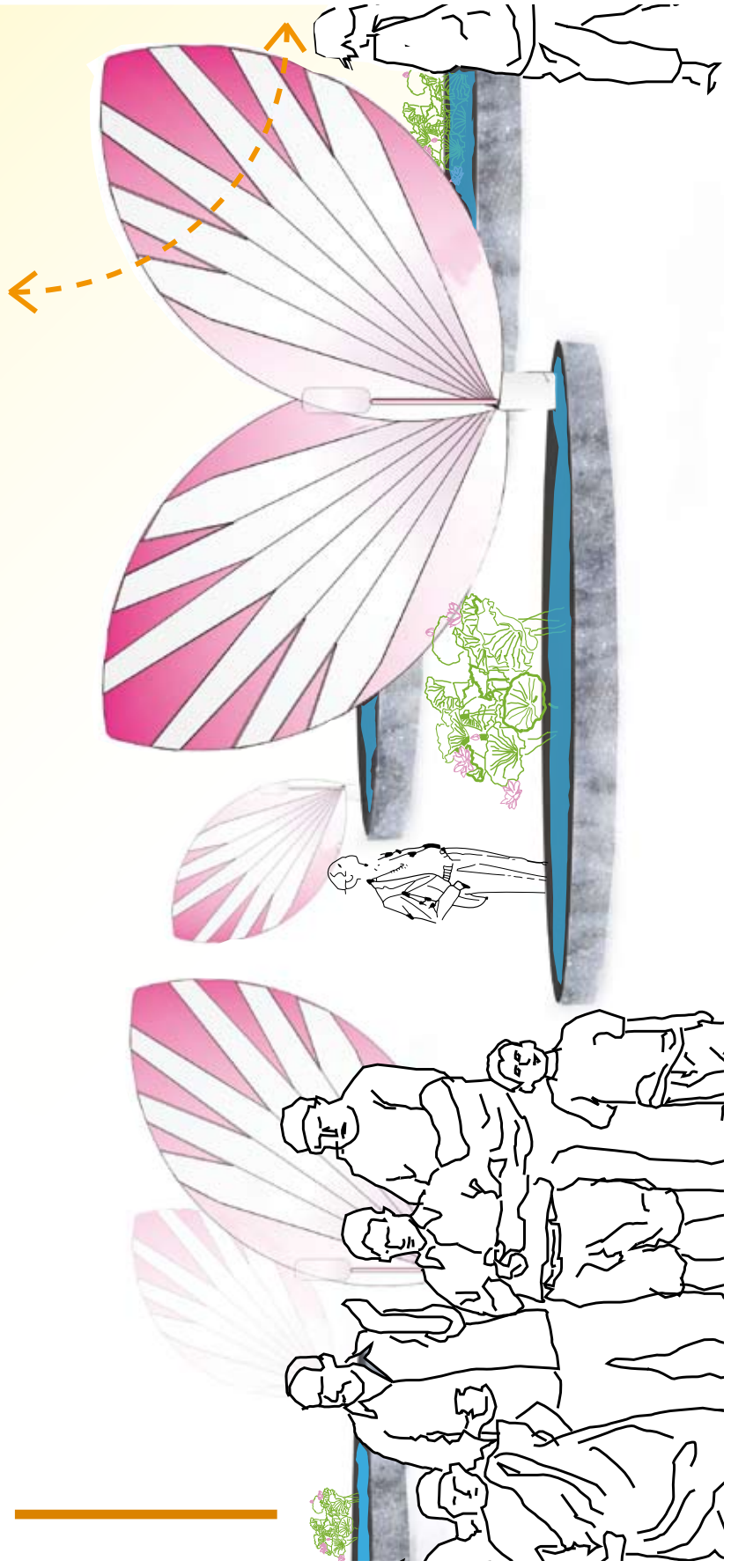
The paar is a social space, which is the name in the local language, Marathi for the pan-Indian phenomenon of a Chaupal . The Chaupal can be understood as an Indian form of the ancient Greek Agora, where citizens of all ranks, ages, castes, and faiths sit together and discuss serious and non-serious issues.

This social space has been designed to provide shade, in the form of an individual lotus petals. These petals are proposed as solar harvesting devices coated with a coloured thin-film solar photovoltaics with solar tracking system. At the base of these petals are pools for rain water harvesting , the ledges of these pools are proposed as seating. By moving along the field of these individual petals, the form of a whole lotus lower would be revealed from a few certain specific angles and positions.



Nelumbo nucifera, or the Lotus is the national flower of India. The lotus flower has a strong presence in religious iconography of the various beliefs in India.

A solar tracker is a device for orienting a daylighting reflector, solar photovoltaic panel or concentrating solar reflector or lens toward the sun. The sun's position in the sky varies both with the seasons and time of day as the sun moves across the sky.



4

MUSEUM OF LOST SPECIES

Panels along the river bank in various places are proposed providing information to the citizens about the various species of Flora and Fauna, now extinct (around the geographical region of Pune) or under danger of becoming so. Studies show a decline of 244 plant species, 25 bird species, 45 fish species over the past decades.

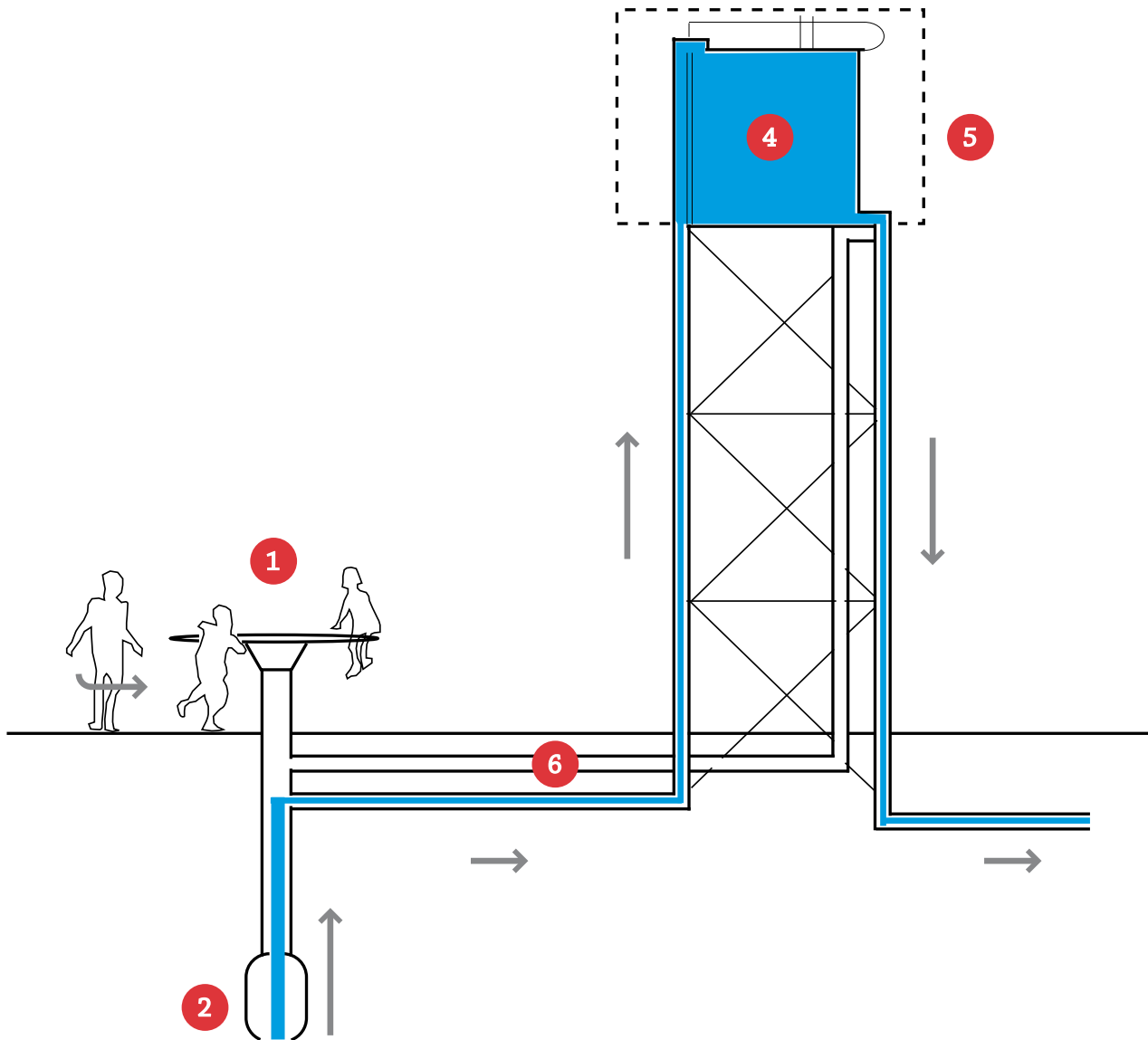


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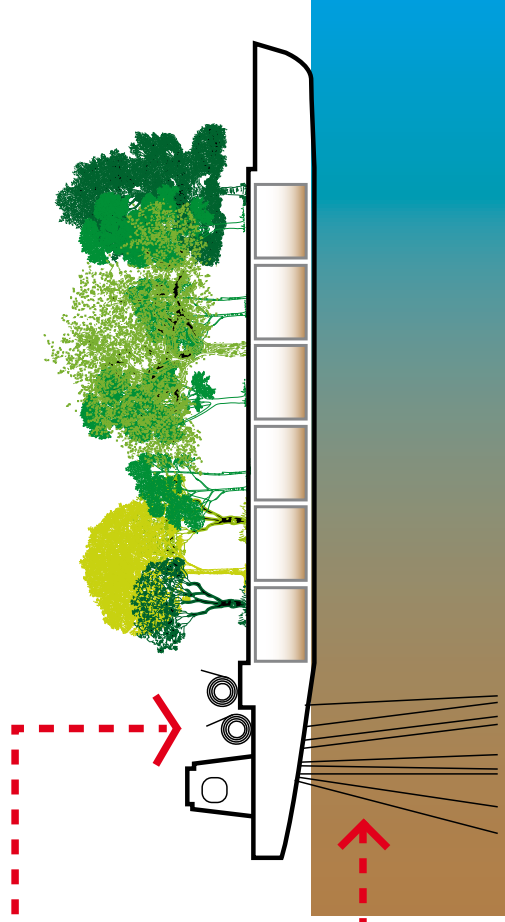
HYDROLOGICAL PLAYGROUND

While children have fun spinning on the PlayPump merry-go-round (1), clean water is pumped (2) from the river Mutha (3) into a 2,500 liter tank (4), standing seven meters above the ground the water tank is used for filling the immersion pond **Project 1** (7). Excess water is diverted from the storage tank into the river (6).

The water storage tank (5) is used as advertisement tower. All four sides of the tank are leased as billboards, with two sides for consumer advertising and the other two sides for health and educational messages. The revenue generated by this unique model pays for pump maintenance.



Extra effluents from the existing sewage chambers are sucked through a pipe



the capillary action along with a back-up motor is the mechanism to draw the water from the river. 250 pipes of diameter 100mm spaced in a grid of 200 mm C/C made of polyamide-imide like "Torlon".

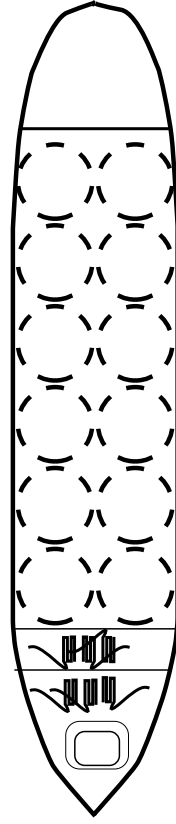
Schematic Section



ELECTRICITY
Sewage Power

PALLAVI POLANKI

In a country where clean water and electricity are in short supply, a technology that promises both at one go is bound to catch people's attention. Manoj Mandelia, a 23-year-old student at the Indian Institute of Technology, Kharagpur, has won the 2010 Young Innovator award conferred by the Indian edition of the MIT-owned tech magazine, *Technology Review*. Called *Locus*, the technology generates electricity from sewage water! And if that's not enough, it also cleans the water in the process. Hope the municipal corporation is reading this space.

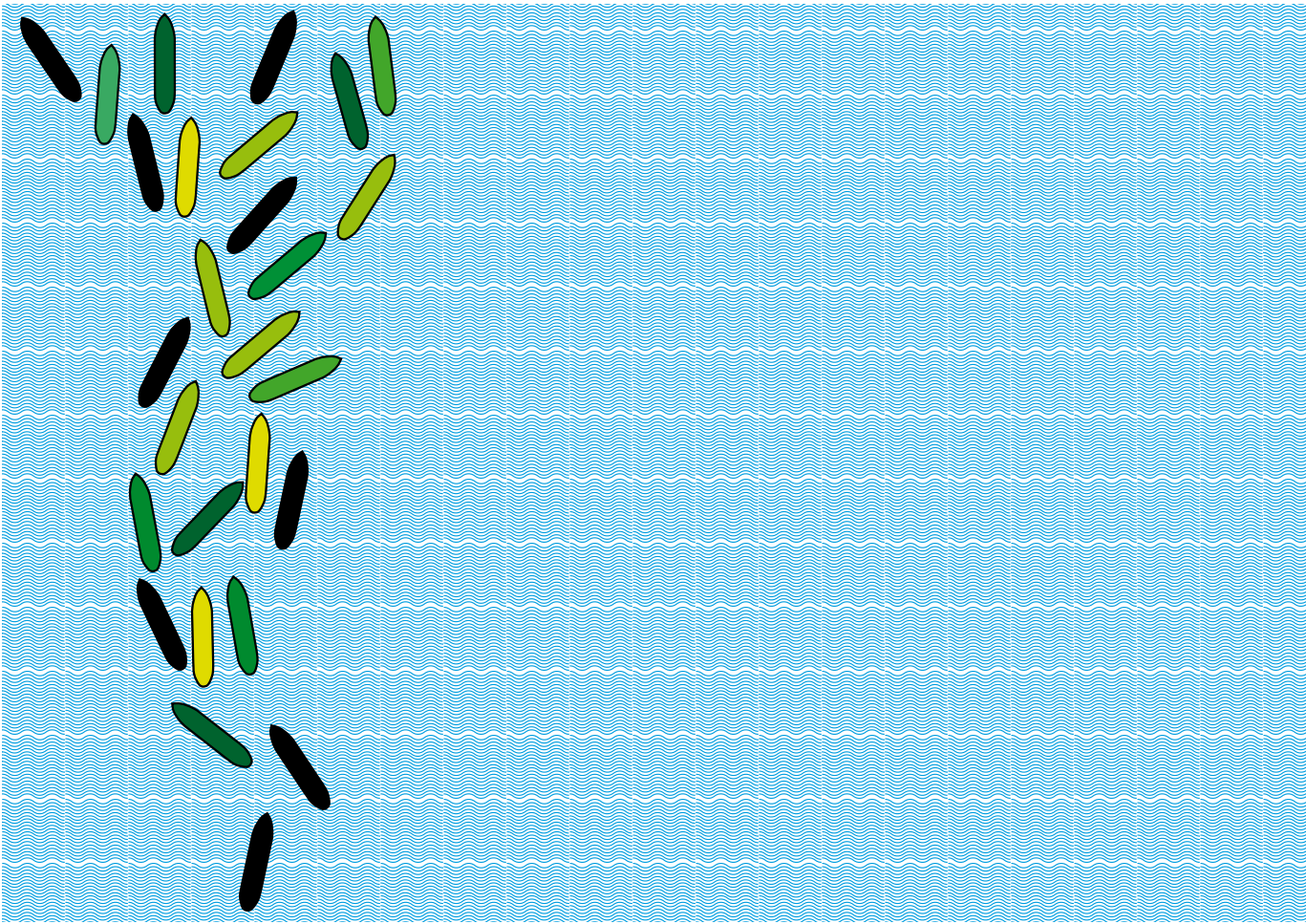


Schematic Plan

WATER TREATMENT BARGE

A Barge is proposed to be floating along the River Mutha, which is a floating facility for sewage treatment. Its a futuristic extrapolation of the technology known as LOCUS which stands for Localized Operation of Bio-cells Using Sewage, a microbial fuel cell integrated with sewage treatment systems to treat wastewater and simultaneously generate electricity.





The concept of LOCUS is based upon a microbial fuel cell (MFC is a bio-electrochemical system that drives a current by mimicking bacterial interactions found in nature). The biocell is designed to have a capacity of 50 cubic metres as it takes care of 50,000 litres of raw sewage. The fleet of barges in total can be assumed to have 1000 biocells onboard. As the total projected demand for sewage is 115 MLD (million litres daily); of raw sewage production. The bio cell has a processing period of 14 days, the sewage remains on the barge before being released as fertilizerish sludge for growing vegetables and trees on top of this and other floating barges. This means that one would need $115,000,000 \times 14 = 1661000000$ litres capacity. The bio cell could be assumed to be a 10m radii cylinder and 17.5 m high with a volume of around 4500 cu m, and there would be 12 of these on each barge: the dimension of the barge would be 22 m wide and 70m long. A fleet of 30 such barges to do the job till the year 2047!

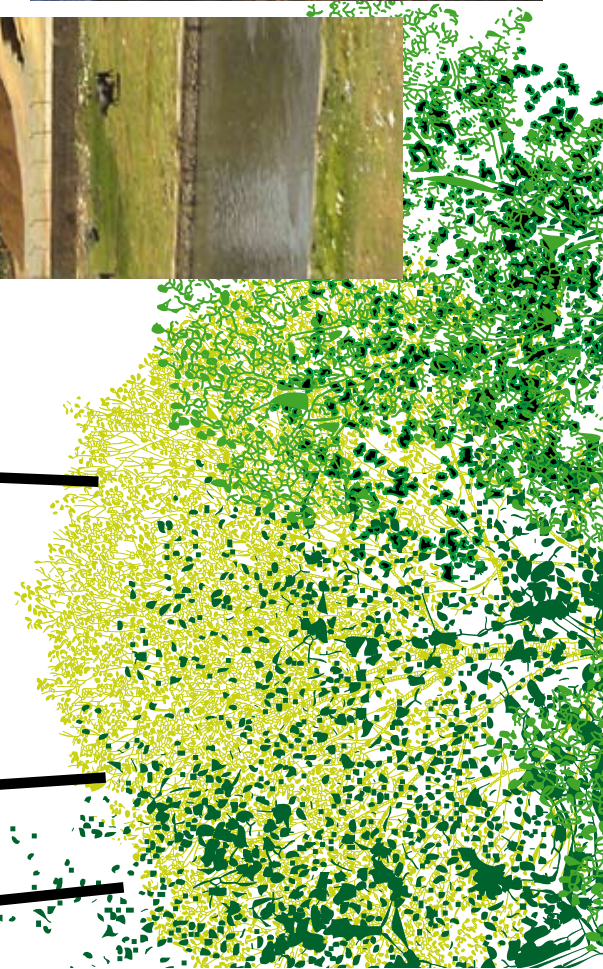
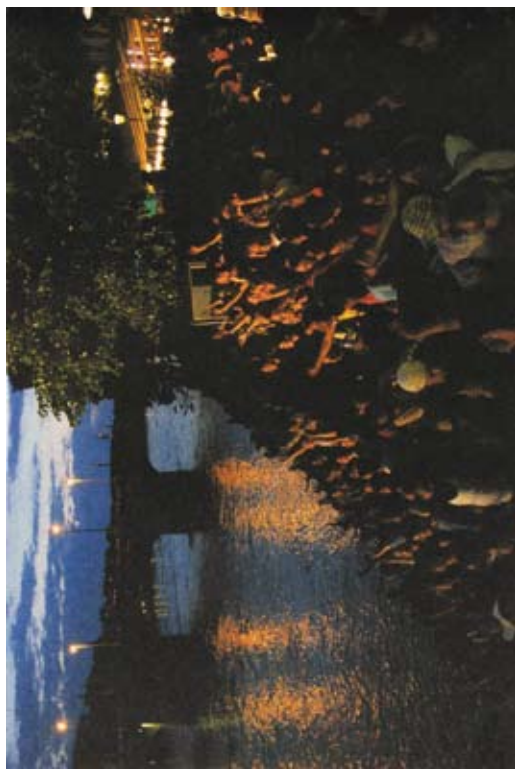
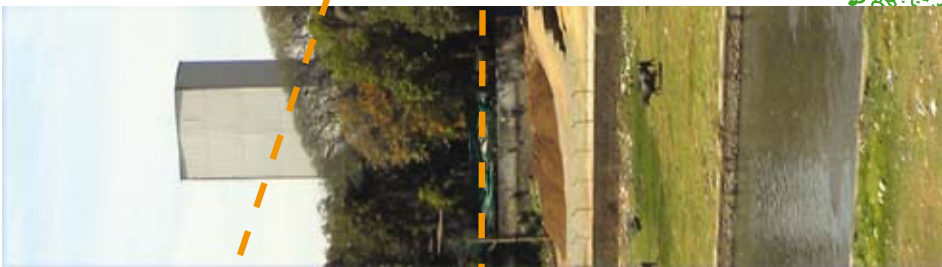


PHYTOREMEDIATION BEDS

7 Phytoremediation describes the treatment of environmental problems (bioremediation) through the use of plants which mitigate the environmental problem without the need to excavate the contaminant material and dispose of it elsewhere. Phytoremediation mitigates pollutant concentrations in contaminated soils, water or air with plants able to contain, degrade or eliminate metals, pesticides, solvents, explosives, crude oil and its derivatives, and various other contaminants, from the media that contain them. In India, aquatic vascular plants like *Hydrilla verticillata*, *Spirodela polyrrhiza*, *Bacopa monnieri*, *Phragmites karka* and *Scirpus lacustris* have been used.

MOVIE TOWER

Tall buildings rising above the foliage line, can be utilised as projection screens for advertisement, socially important and relevant messaging or even Bollywood films!





MISTY FOUNTAIN PARK

Drawing inspiration from the work of landscape architects Claire and Michel Corajoud's "water mirror" in Bordeaux, France where a central reflecting pool has been made participatory. The water mirror both forces people backwards to observe the reflection and then bring them together in the play of splashing water and hide-and-go-seek fog.



* reference/other strategies

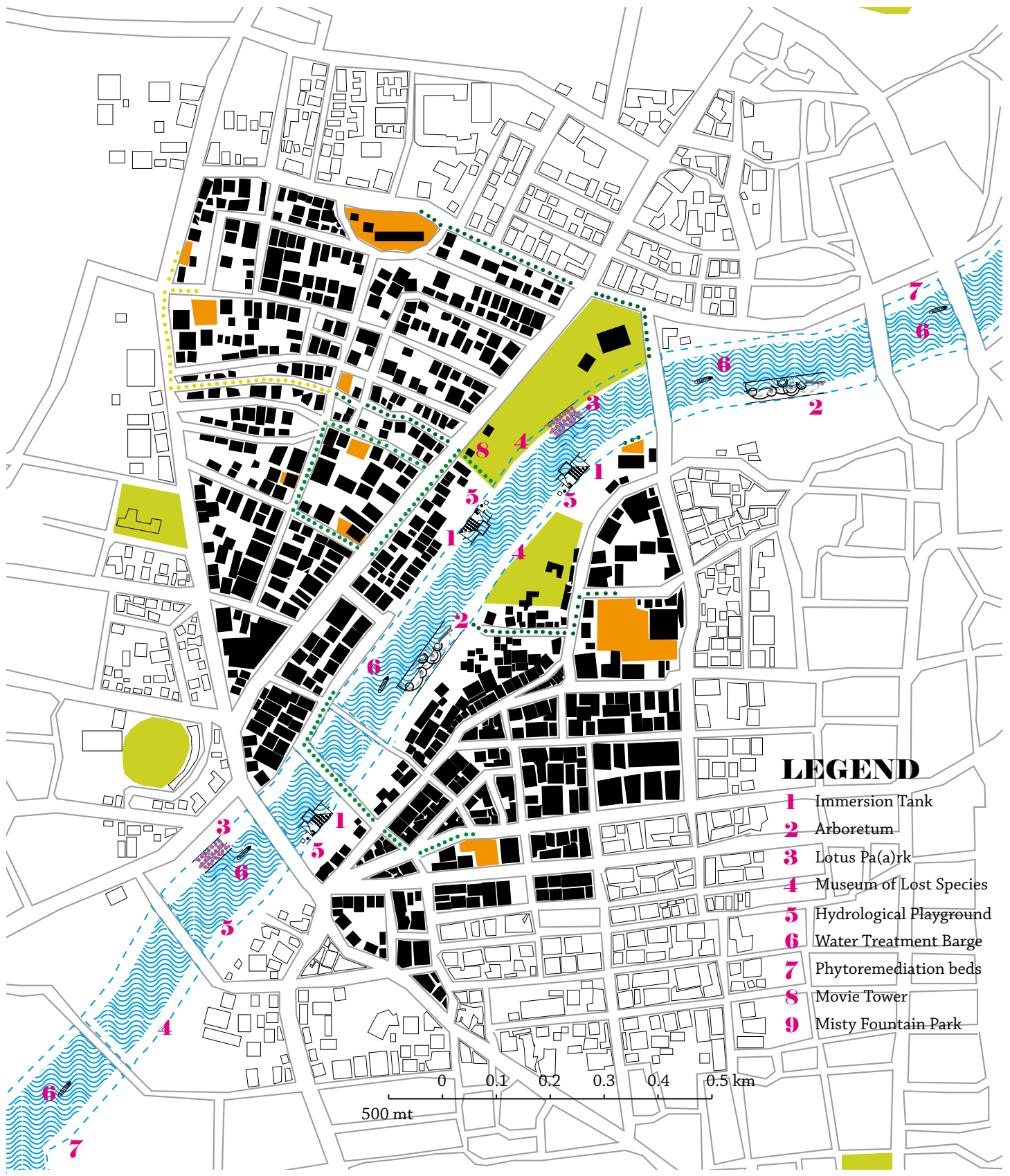
Other References/Strategies



The city of Lyon, France successfully redeveloped the Berges du Rhône embankment - a area in the densely builtup city centre - as a sequence of leisure and recreational spaces for the benefit of its citizens. Images from Le port de l'Université Lyon and Les terrasses de la Guillotière show examples of successful spaces for sport activities, along with provision for cycling and pedestrians along the strand and entertainment in form of shallow depth pools.



In Cologne and Basel, Germany illumination is used as a strategy to see the city's skyline with new eyes. Web applications can be developed to create an online calendar of events along the river banks, a pragmatic tool for regulating acceptance of public life along the river and provides planning security for organizers.

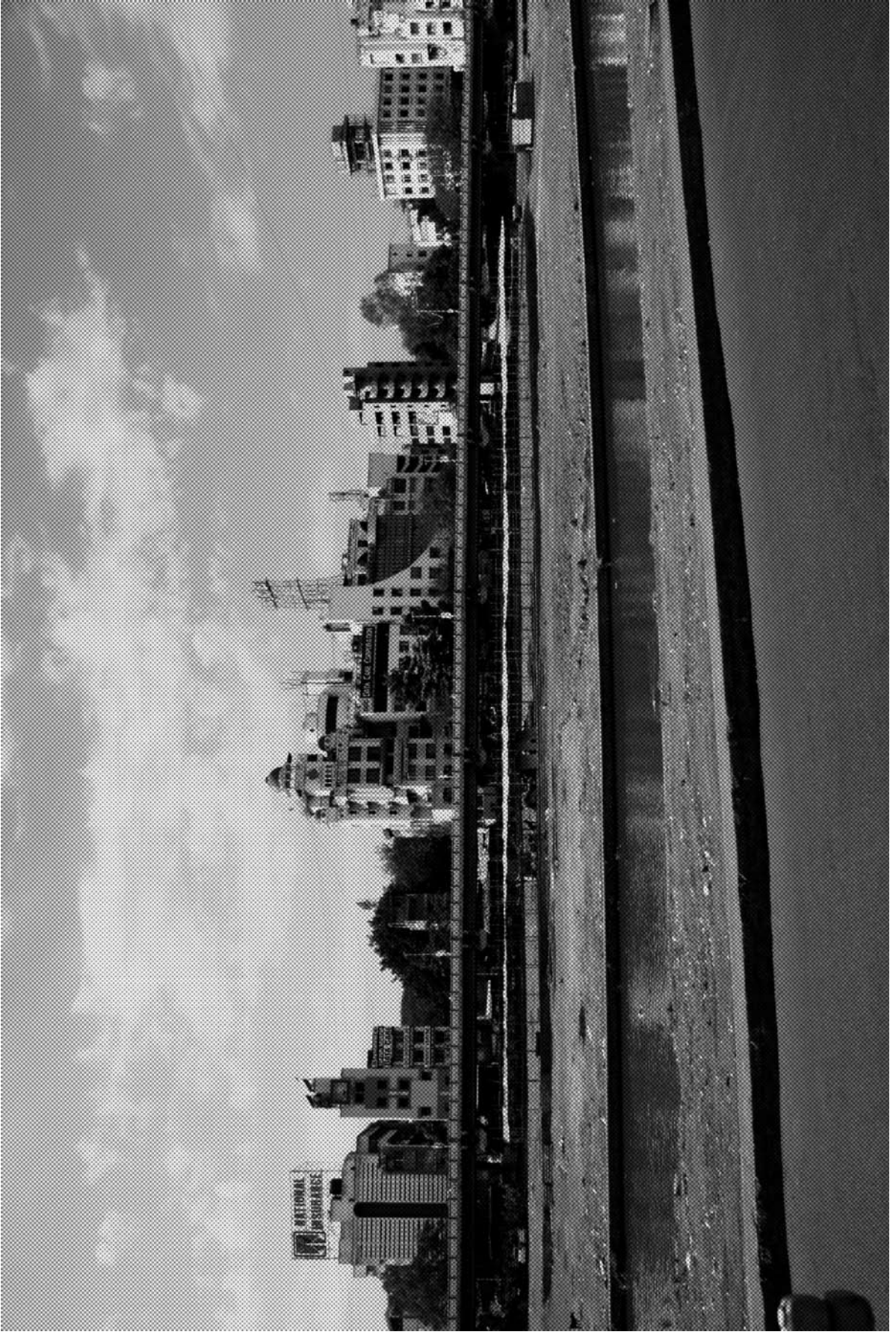


LEGEND

- 1** Immersion Tank
- 2** Arboretum
- 3** Lotus Pa(a)rk
- 4** Museum of Lost Species
- 5** Hydrological Playground
- 6** Water Treatment Barge
- 7** Phytoremediation beds
- 8** Movie Tower
- 9** Misty Fountain Park

0 0.1 0.2 0.3 0.4 0.5 km
500 mt

PRESENT SITUATION



PROPOSED STRATEGY



PRESENT SITUATION



PROPOSED STRATEGY

