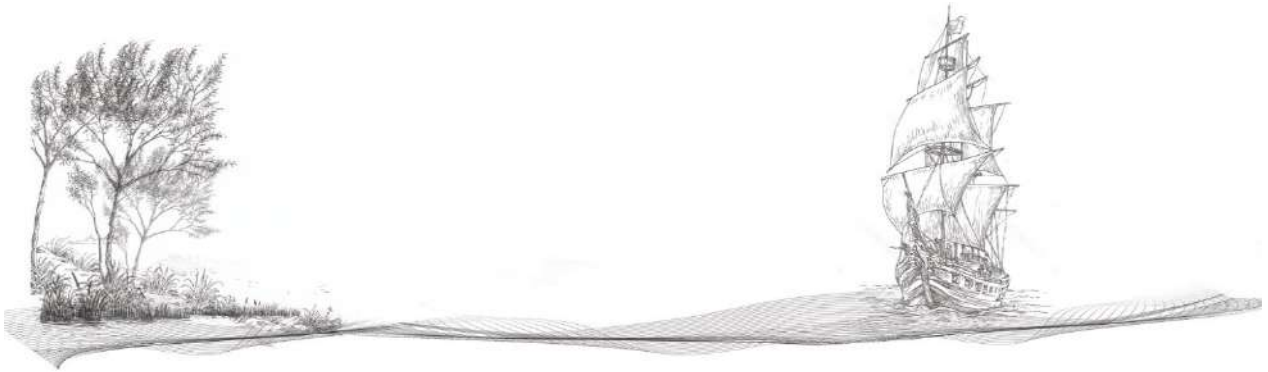




HUNGARIAN UNIVERSITY OF AGRICULTURE AND LIFE SCIENCES INSTITUTE OF
LANDSCAPE ARCHITECTURE, URBAN PLANNING AND GARDEN ART BUDAPEST

MASTER OF ARTS IN LANDSCAPE ARCHITECTURE AND GARDEN ART



KARNAPHULI MARINERS PARK

CHITTAGONG, BANGLADESH

BY

ABDUL RAIHAN RIZVEE

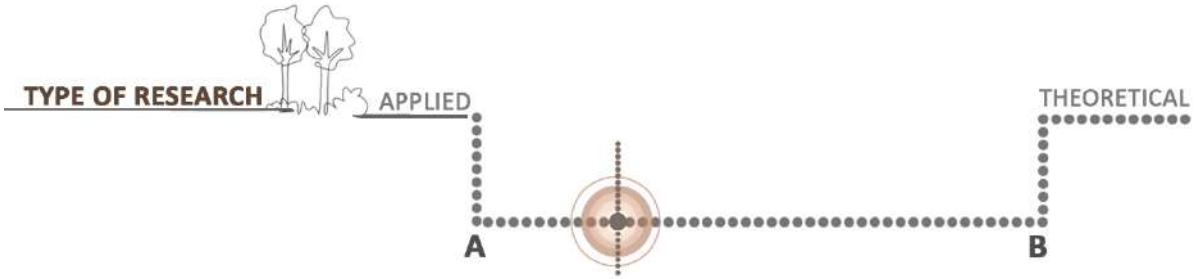
Advisor: PÉTER ISTVÁN BALOGH

BUDAPEST, 2020 - 2023



REGENERATION OF GREEN HUB

DIRECTION OF THE THESIS



Abstract



Karnaphuli Mariner's Park is a public park in Chittagong, Bangladesh, that is designed to give a green oasis in the midst of a highly populated metropolitan area. Chittagong City Corporation proposed the park, which area around 19.5 acres. The park, which runs alongside the Karnaphuli River, includes a number of green spaces, recreational facilities, and art works.

The park's architecture is inspired by the city's nautical tradition, and i near to entrance has a plaza with sculptural installation and water elements that resembles the shape of a ship's hull. A set of interlocking steel panels form a dynamic, undulating pattern throughout the installation.

Other art projects in the park include a line of colorful masts in abstract way that recall the city's shipbuilding past. A flower garden, vegetables garden, a playing ground, amphitheater and a children's playground are among the park's recreational amenities. There are also several outdoor seating places in the park, including a series of s pavilions and a seaside promenade. The landscaping of the park contains a variety of trees, bushes, and grasses, as well as a number of water elements, including a big water fountain. Overall, Karnaphuli Mariner's Park is a daring and forward-thinking addition to Chittagong's public spaces. Its design successfully combines the city's rich maritime history with modern recreational and artistic characteristics, resulting in a one-of-a-kind and unforgettable destination for both visitors and locals.

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1. Introduction & Goals of the Research Topic



1.1 Definition of Regeneration of Green Hub

The term "**hub**" refers to the effective centre of an activity, region, or network, and The **Green Hub** is a green gathering place where people may be encouraged to live a little more sustainably, in a way that fits with their individual lifestyle, and undertake some activity to generate some bonding with the surroundings.

Regeneration is the process of rejuvenating or restoring something after it has been ruined or damaged.



Figure 1: Interactive public green spaces

1. Introduction & Goals of the Research Topic



1.2 Objective

The objective is to revive the past glory of the site and bring it back in life connecting the people of all socio-status. The main purpose of redoing the greenscape is to rejuvenate the culture and saving the environment from deterioration.

1.3 Goals

- Emerging people and nature.
- Save nearly extinct Aerial & Aqua life.
- Bring back people to their dedicated profession
- Providing the relaxation space to the community.
- Ensuring the playground for the children who almost their childhood to the techno-monster

2. SITE SELECTION



2.1 Introduction

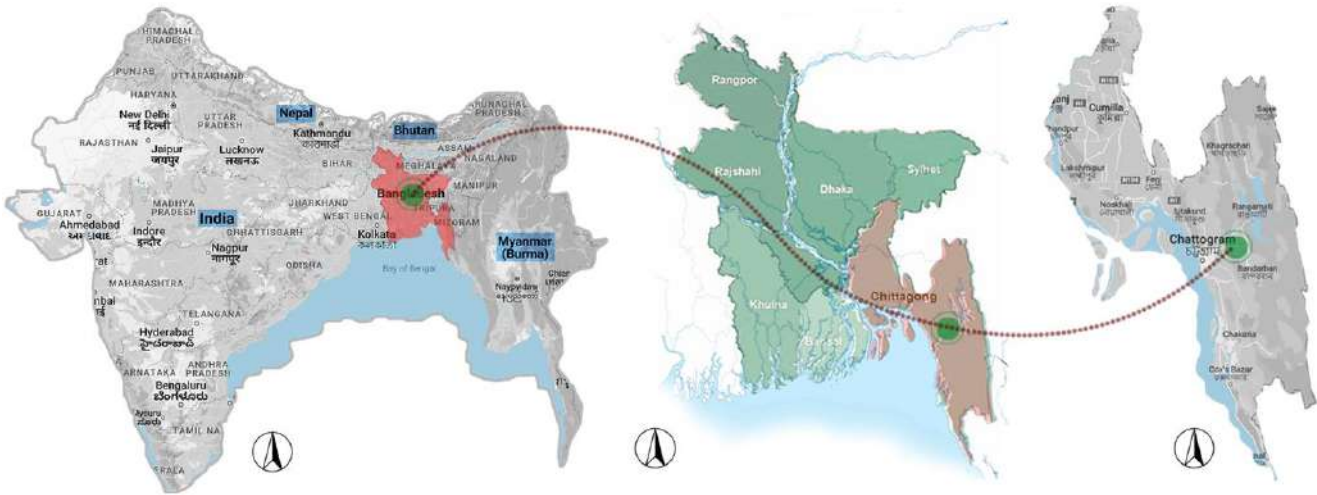


Figure 2: Bangladesh to Chittagong (City) map

Bangladesh is a riverine country. The total area of this country is 147,998 sq km. among which 13,830 sq km water land. About 700 rivers including tributaries flow through the country constituting 24,140 km of water. In other Words, rivers formed this country as a Delta. Delta has been contributing to spring life to this land with agriculture, food, transportation, and tranquil beauty, creating opportunity for different occupations specially fishing. Most of the country's land is formed through silt brought by the rivers. Some important rivers in Bangladesh are Padma, Meghna, Jamuna, Brahmaputra, etc. Karnaphuli is one of the most important rivers in this country.

2. SITE SELECTION



2.1 Introduction

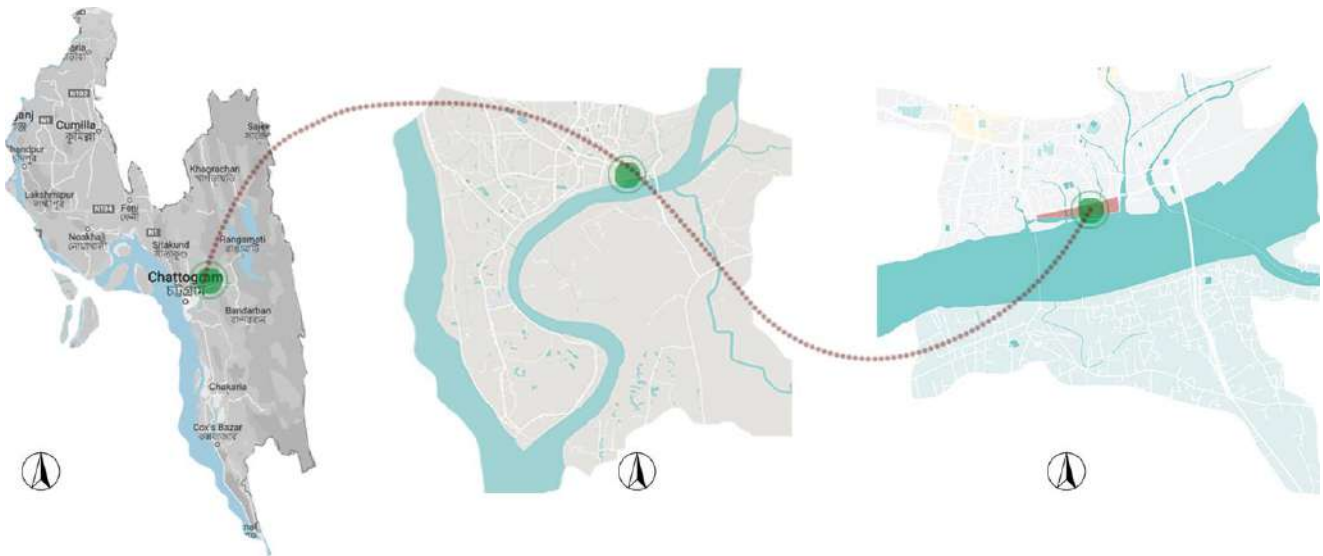


Figure 3: Chittagong (City) map to site location

Chittagong which is the main port and second largest city of Bangladesh is located on the banks of the Karnaphuli. Karnaphuli is the largest and most important river in Chittagong and the Chittagong Hill Tracts. It is 667 meters (2,188 ft)-wide river in the south-eastern part of Bangladesh which originates from the Lushai hills in Mizoram, India. It flows 270 km (170 mi) southwest through Chittagong Hill Tracts and Chittagong into the Bay of Bengal. The mouth of the river hosts Chittagong's sea port, the main port of Bangladesh.

Karnaphuli Mariners Park is located at Karnaphuli Mariners Park, Mariner's Dr Rd, Chittagong, Bangladesh which is proposed by CDA along the bank of the river in order to facilitate tourism and also to protect the area from tidal and flash flood.

2. SITE SELECTION



2.2 History



Bangladesh vegetation is a part of the Indo-Myanmar region, which is one of the most important hot spot areas for biodiversity and rich biological diversity due to its unique geophysical location. The country has a rich biological heritage containing about 3,611 species of angiosperms of which 2,260 species were reported from Chattogram region alone. The diversity of tree is fundamental to forest biodiversity, because tree provides resources and habitats for almost all other animals.



Figure 5: Development phases of the site.

- Greens on sediments.
- Less of infrastructure
- Site underwater
- No road networks
- Surrounding boat ghat
- Proposed Park
- Growth of settlement density
- Two-way road connection
- Alongside boat ghat
- Bridge connection
- Loss of park identity
- Increasing number of industrial settlements
- Illegal settlements inside park
- Green character is faded
- Decreasing functionality.

2. SITE SELECTION



2.3 Culture (River as a Transportation mode)



Figure 6: Boats being used as a mode of Transportation.

The most common material for boats crafting is wood. Boats have traditionally been built by carpenters who learned their trade through apprenticeship. Seasoning of timber is essential in boat building. Timber from local forests is commonly used. These boats perform a variety of functions, including fishing, transporting people or large goods, conducting business, and providing shelter.

The Bengali people largely depend on water transportation like boats, launches, steamers etc. for transportation. They have been using water transportation for both passenger and goods. In Bangladesh, water transportation is an important mode of communication.



Figure 7: A boat is being used as a conventional goods or cargo carriers.

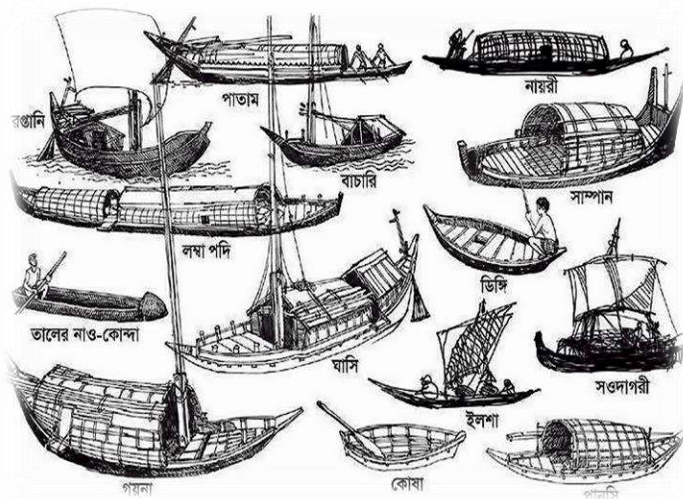


Figure 8: Various types of Bengali boat

Traditional country boats are still popular, and they provide inexpensive and convenient transportation in this vast network of inland waterways. The floodplain still has about 150 different types of boats, which vary in design, size, and construction materials. They would be of the Baintata or flat bottom variety. A baintata boat has a golui fore and a spoon shaped hull, whereas a flat bottom boat does not. Rivers and boats are central to traditional Bengali culture, inspiring generations of Bengali artists and poets.

2. SITE SELECTION



2.3 Culture (*River as a Source of Life*)



Figure 9: Preparing fishing net

Bangladeshi fishermen rely on both fishing and crop cultivation for a living. However, the majority of fishermen rely solely on fishing. They fish with simple and traditional equipment. Fishermen use non-motorized boats and traditional nets to fish in inland waters. The only hint of modernity is the recent use of nylon nets. However, for fishing expeditions at sea, seagoing fishers generally use motorized boats and modern nets.

Fisherman in the fisheries sector plays an important role in food consumption, nutrition, employment and export. The sector contributes more than 5% of Bangladesh's GDP and it creates job opportunities of 1.4 million people. From time immemorial, a large number of Bengali people have depended for their livelihood on fishing and related occupations. Fishermen in rural Bangladesh usually live a community life in neighbourhoods or villages around the water bodies.

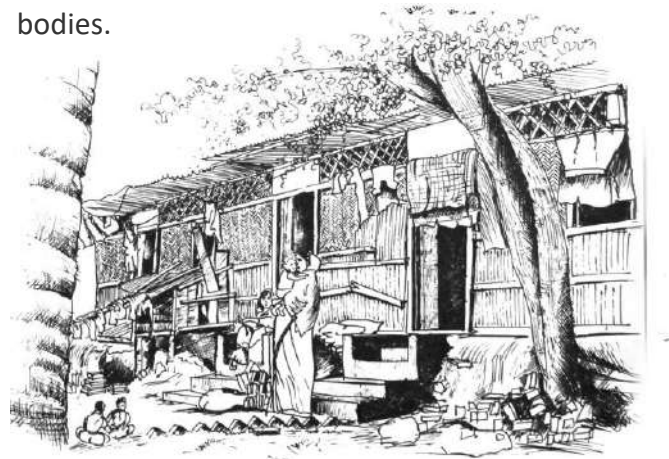


Figure 10: Fisherman colony



Figure 11: Catching fishes.

The fishing community is a low-income socioeconomic culture, with poverty stemming from inadequate human potential and a lack of environmental support in harnessing the natural potential and resources that are already present. The distinctive cultural traits of fishing settlements may not always support maximizing the potential of its residents, occasionally even impeding the development of the community as a whole. Fishermen's communities don't pay as much attention to the circumstances of their areas, which need to be structured to improve, particularly the presence of open spaces.

2. SITE SELECTION



2.4 Tradition (River as a Source of Joy & Entertainment)

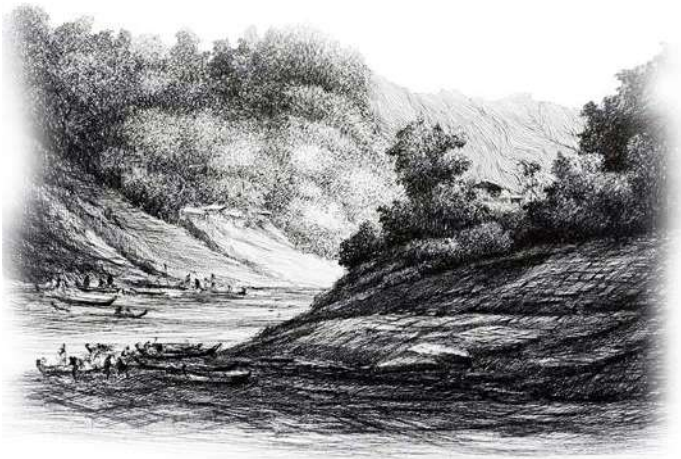


Figure 12: Floating market in river

The rivers in Bangladesh are a vital component of the country's socioeconomic structure and are important for both economic growth and leisure time activities. The boat race, one of the most thrilling entertainments, is a wonderful festival to enjoy with tens of thousands of spectators cheering, colors, festivity, and diverse athletic conditions. One of Bangladesh's traditional rural games, it is played in the nation's various waterways. This is typically held in September when the river is flooded following the rainy season. Additionally, boat races are held across the nation, and each one is a huge celebration of passion and festivity.

At Lushai Hills, there is a river where there is a floating market. One simple way to appreciate the market as well as the charming appearance of the homes, schools, and wooden bridges along the river is to take a boat trip. Slowly moving tiny boats carrying guavas, bananas, vegetables, and other fruits and goods allow me to see the activity of the market in the tranquil environment.



Figure 13: Boat race



Figure 14: Activity of local children's

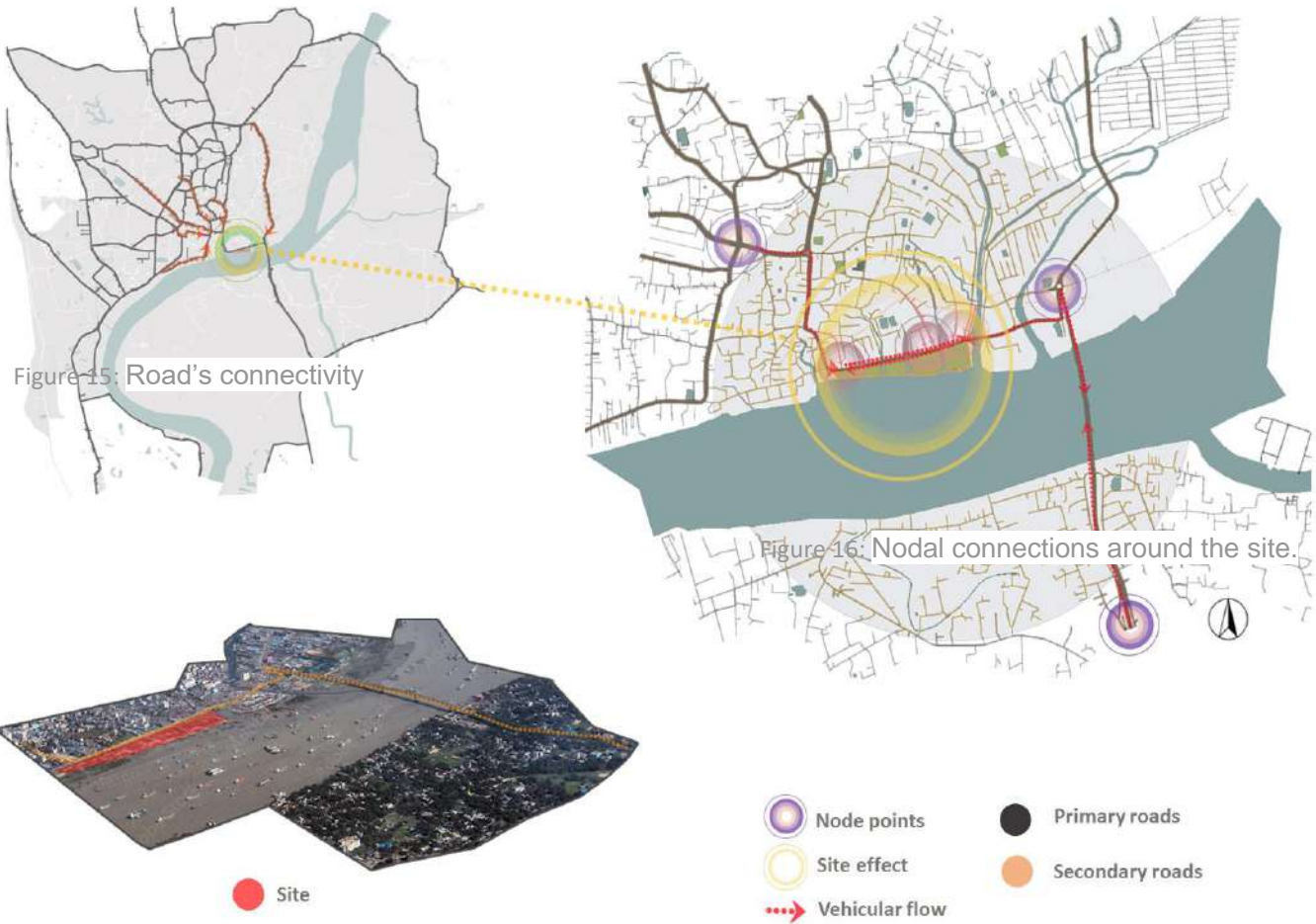
Children are running and having fun on the karnaphuli bank. Playing in and near the water is a regular activity for local kids, serving as one of their main forms of recreation.

SITE SELECTION



2.5 SITE ANALYSIS

2.5.1 Macro Scale: Road Connection (Vehicular Connectivity)



A region's road network is regarded as one of the most important factors in its regional development. The high development cost of the road network necessitates effective utilization, which can be achieved only if proper connectivity and orientation are in place. The road networks within the city area grow in an organic manner. To connect the other parts of the city, a major road was built adjacent to the site to provide convenient movement of heavy traffic and to reduce traffic congestion. Secondary roads link parallel to the major road, diverting traffic to the nearby distance.

SITE SELECTION



2.5 SITE ANALYSIS

2.5.2 Meso Scale: Road Connection (Vehicular Connectivity)

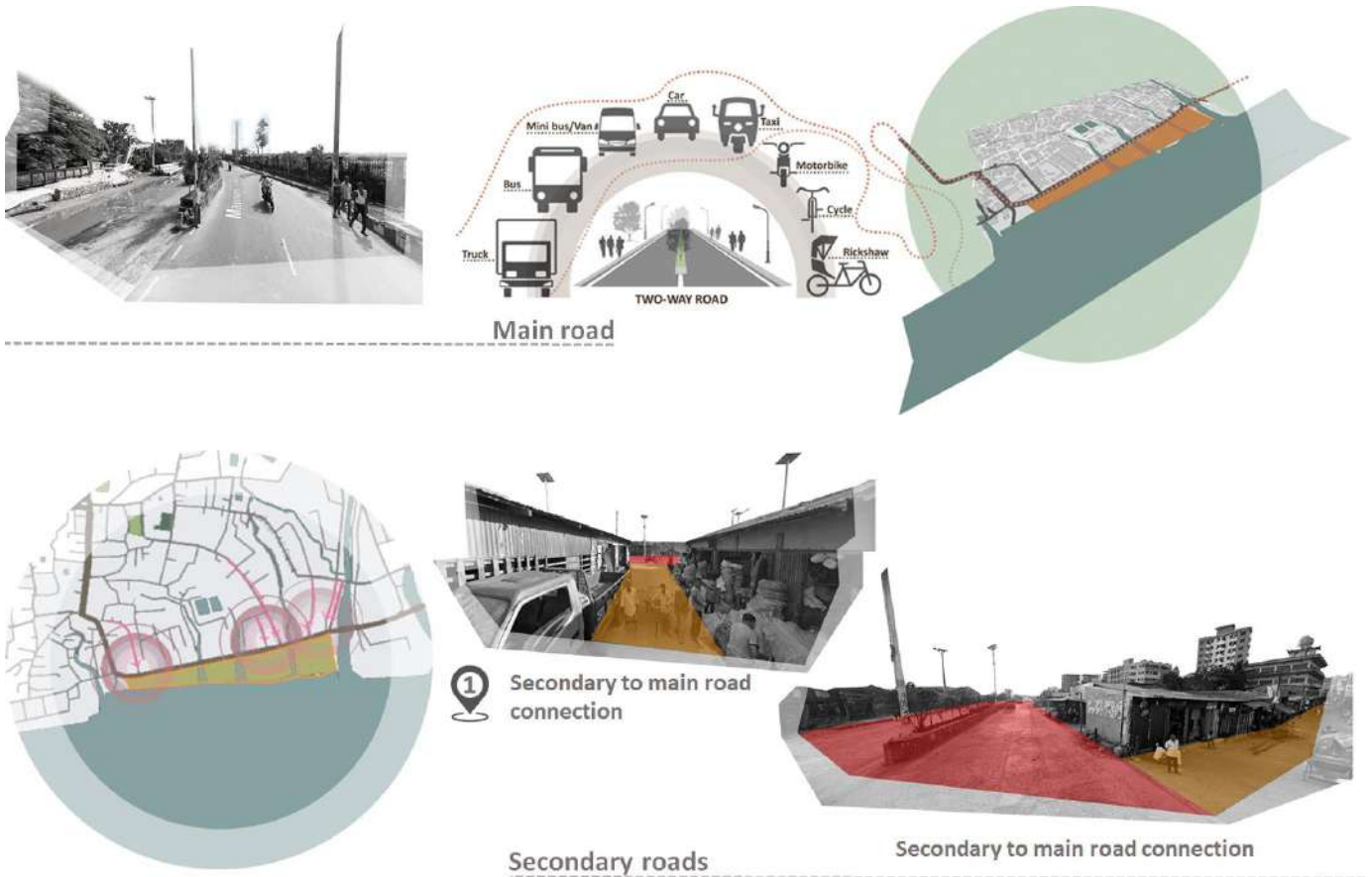


Figure 18: Primary Road connection and vehicular types

A two-way road, also known as a divided highway, is a type of highway with opposing traffic carriageways separated by a central reservation or a median. This road has no continuation pedestrian path and no crossing path. Secondary roads are not linked to main roads by a signal. The roads have a significant impact on the site.

SITE SELECTION



2.5 SITE ANALYSIS

2.5.3 Site Area & Diversity of the Site



• SITE AREA = 19.2 ACRE



1 Fisherman community



2 Local activity and Rituals

Figure 20: Selected Site

Figure 21: Surrounding Activity

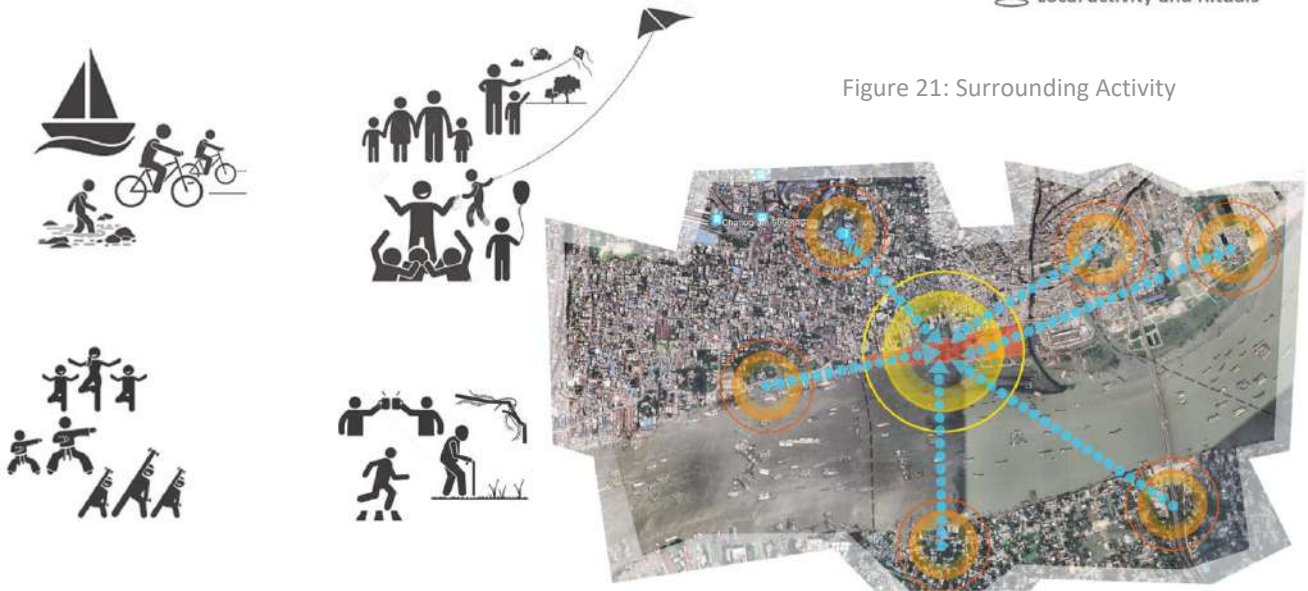


Figure 22: The surrounding activities of the site have a diverse impact.

The surrounding environment has a number of impacts on the place. There is no nearby park or recreational location where residents can spend their leisure time. Because the surrounding environment influences this site, it may be appealing to residents. It is currently used by residents and has everyday activities. Cultural activities are also held at this location, which the residents attend.

SITE SELECTION



2.5 SITE ANALYSIS

2.5.4 Surrounding Settlements



Figure 23: Surrounding Settlements

- SITE
- MIXED USE (Factories, Offices, Shops and Residential)
- RESIDENTIAL
- GOVT. OFFICES
- EDUCATIONAL INSTITUTE

The land has a combination of uses, including residential, government, educational, and industrial, which has a considerable impact on the current site. Because most communities are owned by locals, there is minimal space for recreational activities. Most settlements are mixed use, which is why the spaces are used for strategic reasons. They utilize the site space for leisure purposes, while others use it for business objectives.

SITE SELECTION



2.5 SITE ANALYSIS

2.5.5 Site Surroundings



Figure 23: Site surrounding Photos (Inside site).

Fishermen frequently use this spot to unload merchandise from boats and to prepare their fishnets before going fishing. The arch-shaped bridge unites the property's several regions, each of which is dedicated to a different activity. In this location, taking a boat ride is a popular activity and method of transportation. The road's turning point begins at the site's corner, making it accessible from the start, and local children visit for recreational purposes.

SITE SELECTION



2.5 SITE ANALYSIS

2.5.5 Site Surroundings



Figure 25: Site surrounding Photos (Outside site).

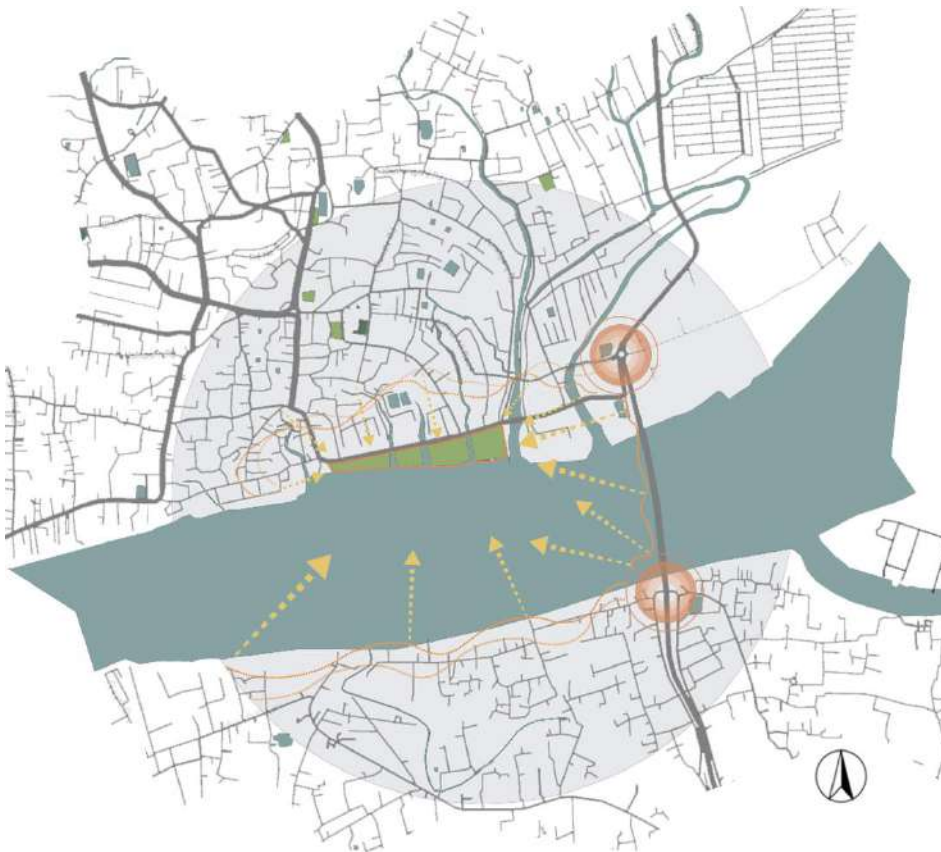
The majority of the settlement's ground level is used for shops, offices, and small mills, although the higher floors are used for residential purposes. They use it as an office and a bank at times. This area is primarily utilized for goods storage and the sale of dry fish. Some government structures benefitted the local people by enriching the community and meeting their needs.

SITE SELECTION



2.5 SITE ANALYSIS

2.5.6 Visual Connection



Due to its location at a corner of the region, the site is visible from every angle from the bridge and the opposite bank of the river.

Consequently, it might be visually appealing while crossing the river on this side.

Figure 26: The visibility of the surroundings to the site.

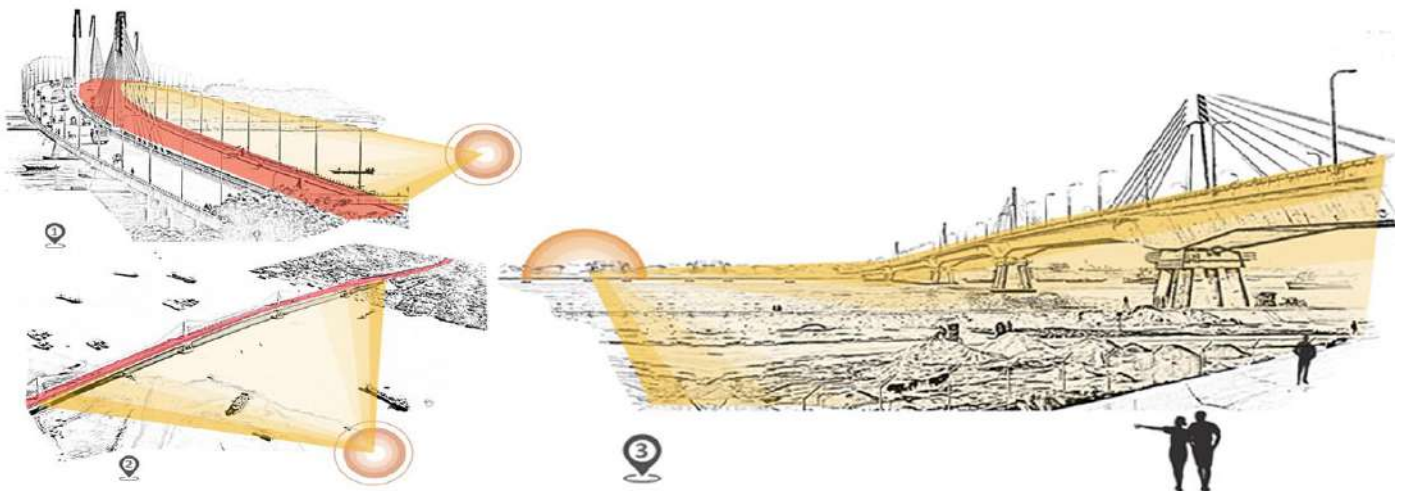


Figure 27: Visual connections.



2.5 SITE ANALYSIS

2.5.7 Site Activity

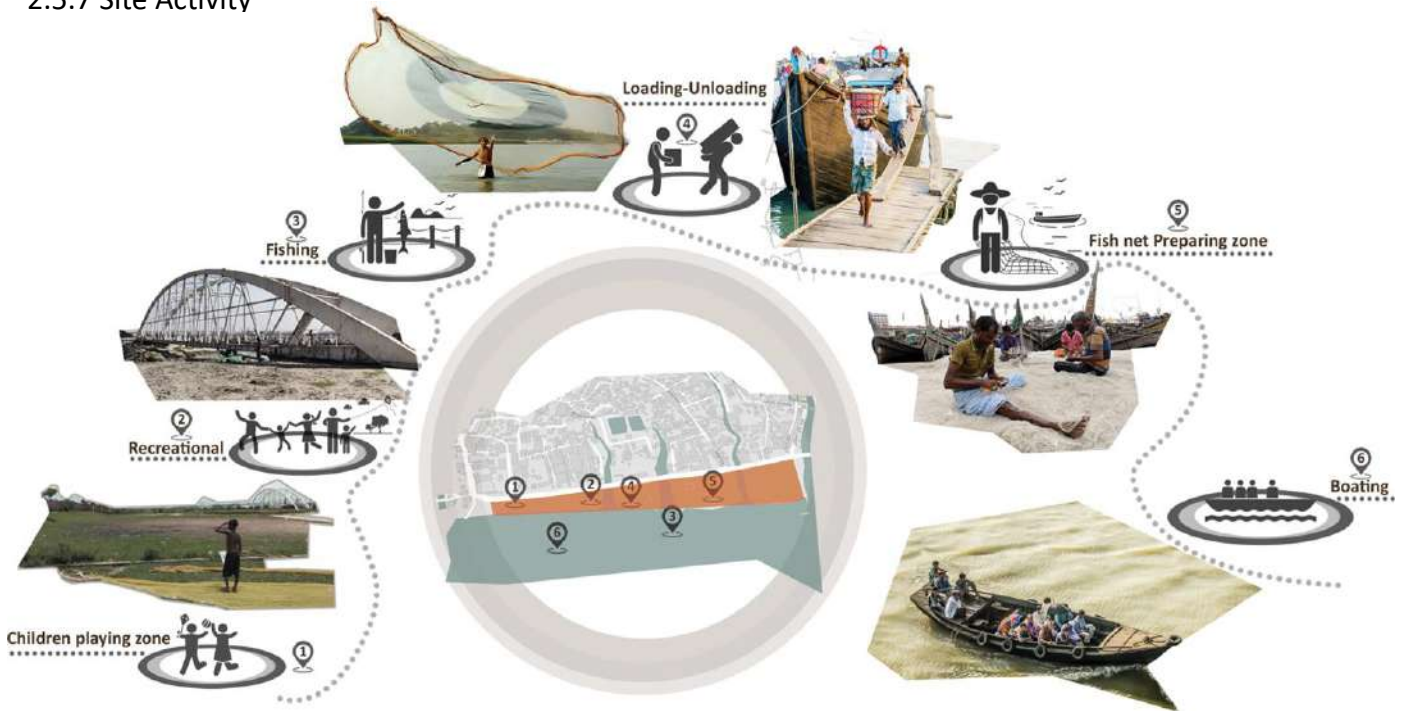


Figure 28: People's activity on the site

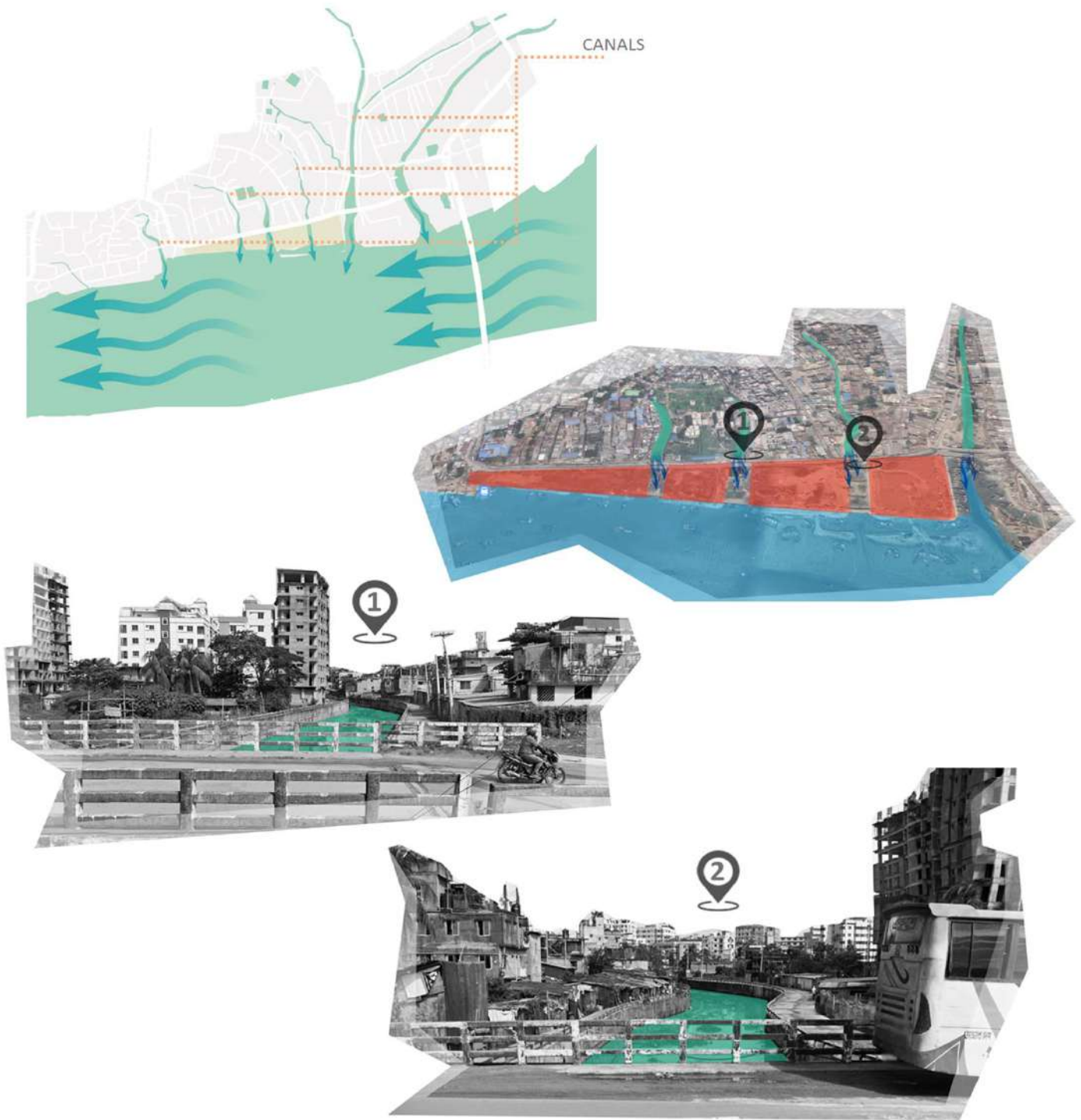
Locals try to visit during the weekdays to capture images as a hobby. People allegedly engage in recreational activities on weekends. Although there isn't a renowned scenery close to view, there are some excellent opportunities at this location. The sunset is truly extremely content as it observes the kids riding the skinny pony in the river. Getting ready for fishing season, locals using boats as a mode of transportation

SITE SELECTION



2.5 SITE ANALYSIS

2.5.8 River & Canals Flow Direction



The area has been separated by three canals that connect the city to the Karnophuli River. The canals have an impact on this area since they divert the city's waste away from the river.

SITE SELECTION



2.5 SITE ANALYSIS

2.5.9 Wind Speed

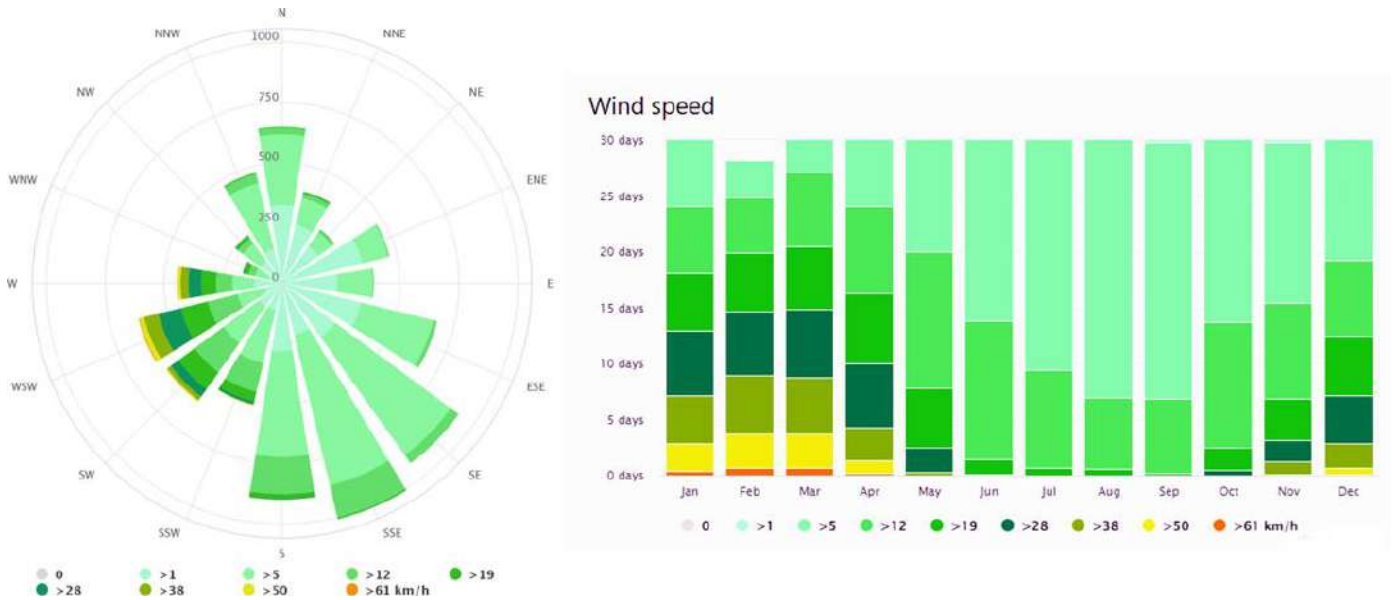


Figure 29: The diagram for Chittagong shows the days per month, during which the wind reaches a certain speed

The wind rose for Chittagong indicates how many hours of wind blow from the particular direction every year. SW: The wind is blowing from the south-west (SW) to the north-east (NE) (NE). Cape Horn, South America's southernmost land point, features a strong west wind that makes passages from east to west difficult, particularly for sailing boats.

The Chittagong figure depicts the number of days per month when the wind exceeds a specific speed. The Tibetan Plateau is an interesting example, where the monsoon provides consistent gusty winds from December to April and moderate winds from June to October.

SITE SELECTION



2.5 SITE ANALYSIS

2.5.10 Sun path Diagram and Temperature

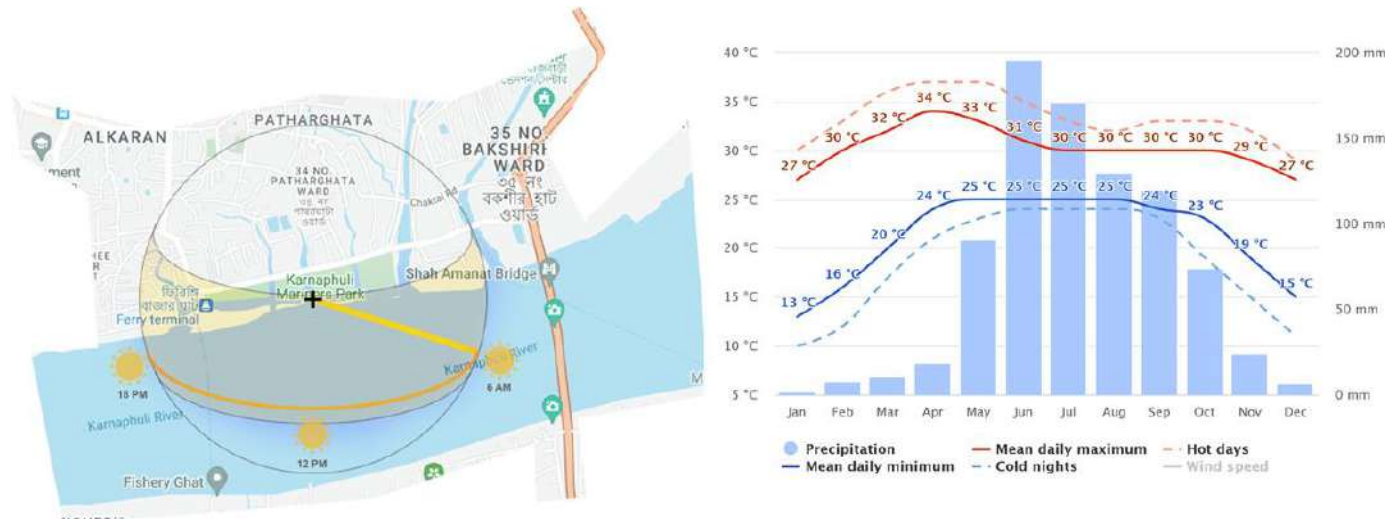


Figure 31: Average temperatures and precipitation

In Chittagong, the "mean daily maximum" (solid red line) displays the highest temperature on a typical day for each month. The average minimum temperature is shown by the "mean daily minimum" (solid blue line). The average of the warmest day and warmest night of each month over the past 30 years are represented by the solid red and blue lines. You can plan your trip based on the average temperatures, but you should also be ready for warmer and colder days. Although they are not displayed by default, wind speeds can be seen if you enable them at the graph's base.

We display the total amount of precipitation that has collected more than a moving 31-day static ones around each day in order to highlight seasonal variance rather than just monthly totals.

In Chittagong, the annual sliding 31-day rainfall is rising; it begins the year at 10.1 inches, rarely rising above 22.1 inches or falling below 2.9 inches, and ends the season at 11.0 inches, rarely rising above 21.6 inches or falling below 2.7 inches.

SITE SELECTION



2.5 SITE ANALYSIS

2.5.11 Tidal Effects

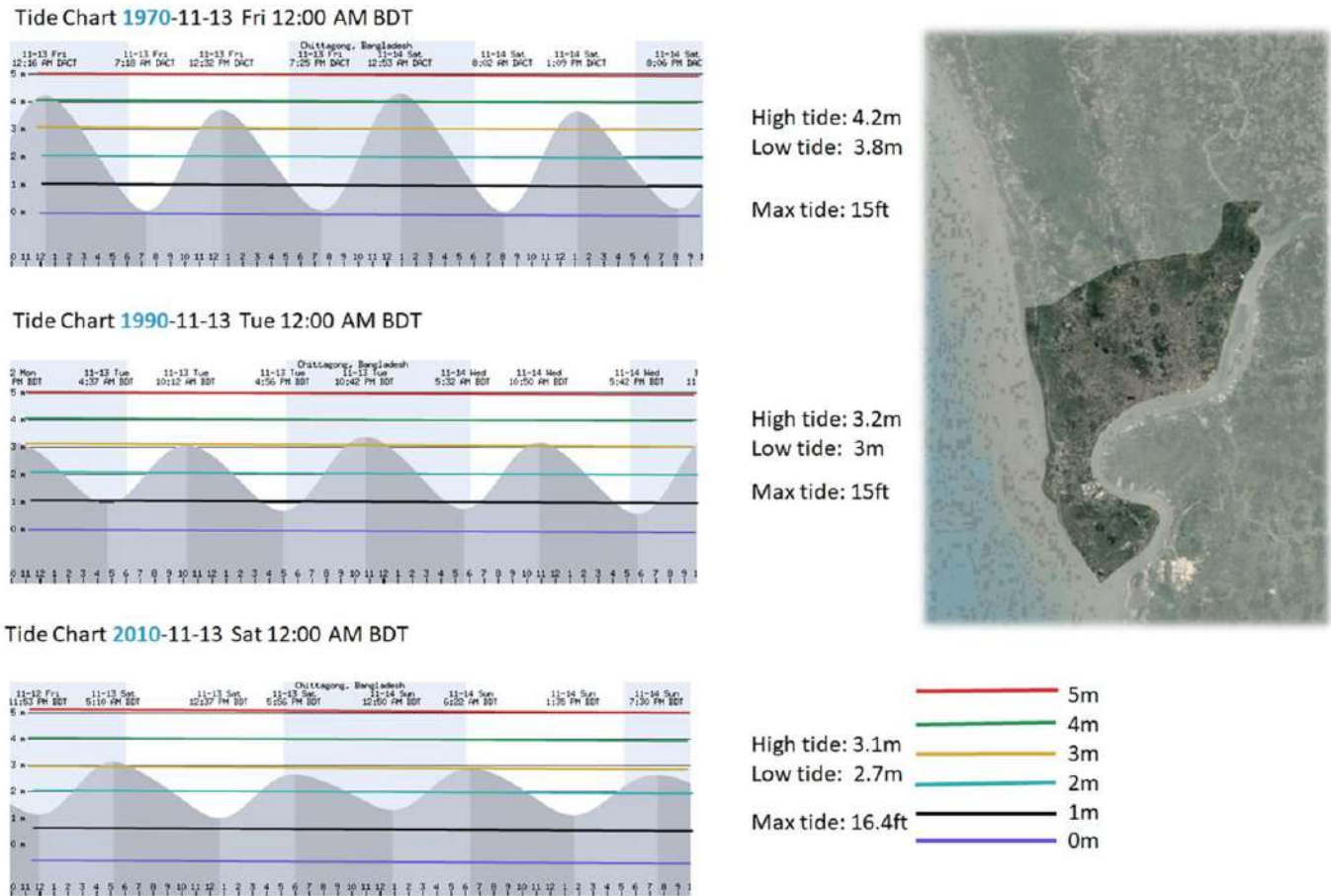


Figure 32: Tidal effects

The tide chart currently displays the effects of tides in Chittagong during various years. In 1970, the 4.2 m high tide and 3.8 m low tide, respectively, occurred at 12:53 am and 12:32 pm. The tide in 1990 peaked at 3.2 meters at 10.42 p.m. and peaked at 10.12 a.m. In 2010, the greatest tide at 5.10am was 3.1m, while the lowest was 2.7m. The blue to red line shows the predicted height of the flood from the past to the present and future.

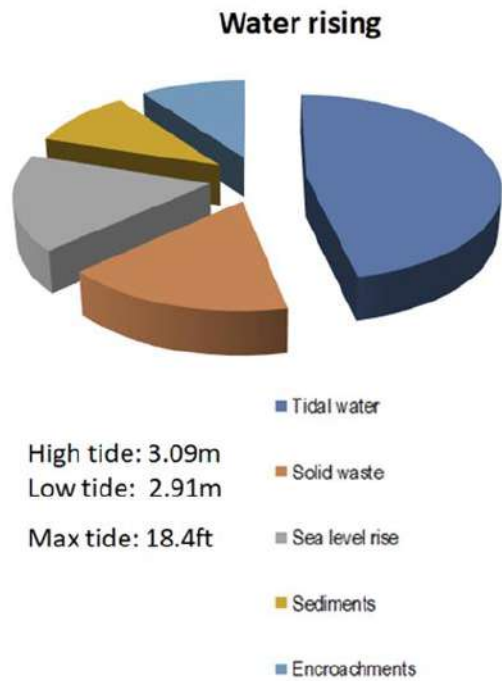
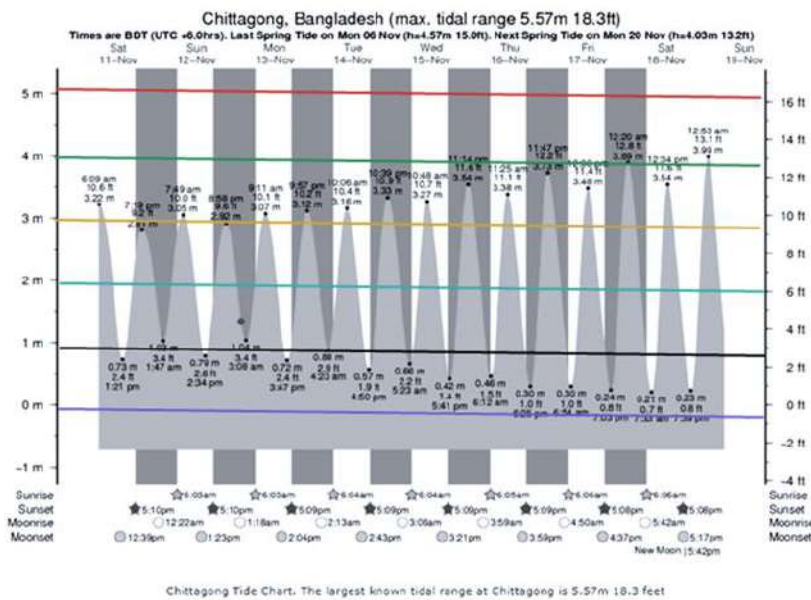
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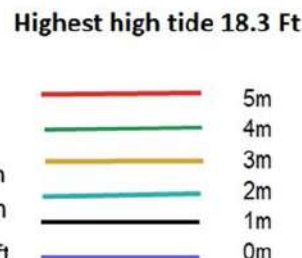
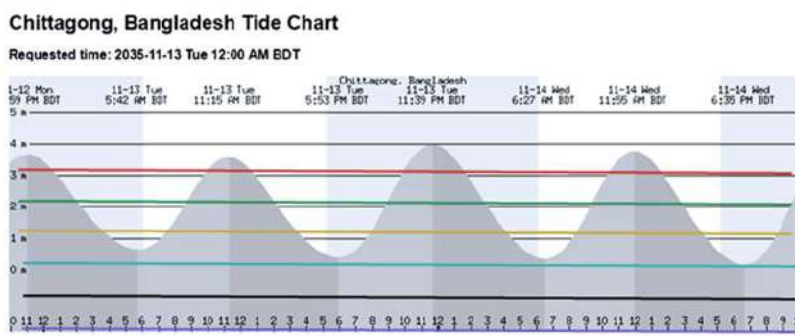
2.5 SITE ANALYSIS

2.5.11 Tidal Effects

Tide Chart 2017-11-06 Mon



Tide Chart 2035-11-13 Tue 12:00 AM BDT



Tide Prediction in 2035

Figure 33: Tidal effects and future prediction

SITE SELECTION



2.5 SITE ANALYSIS

2.5.12 Topography Map

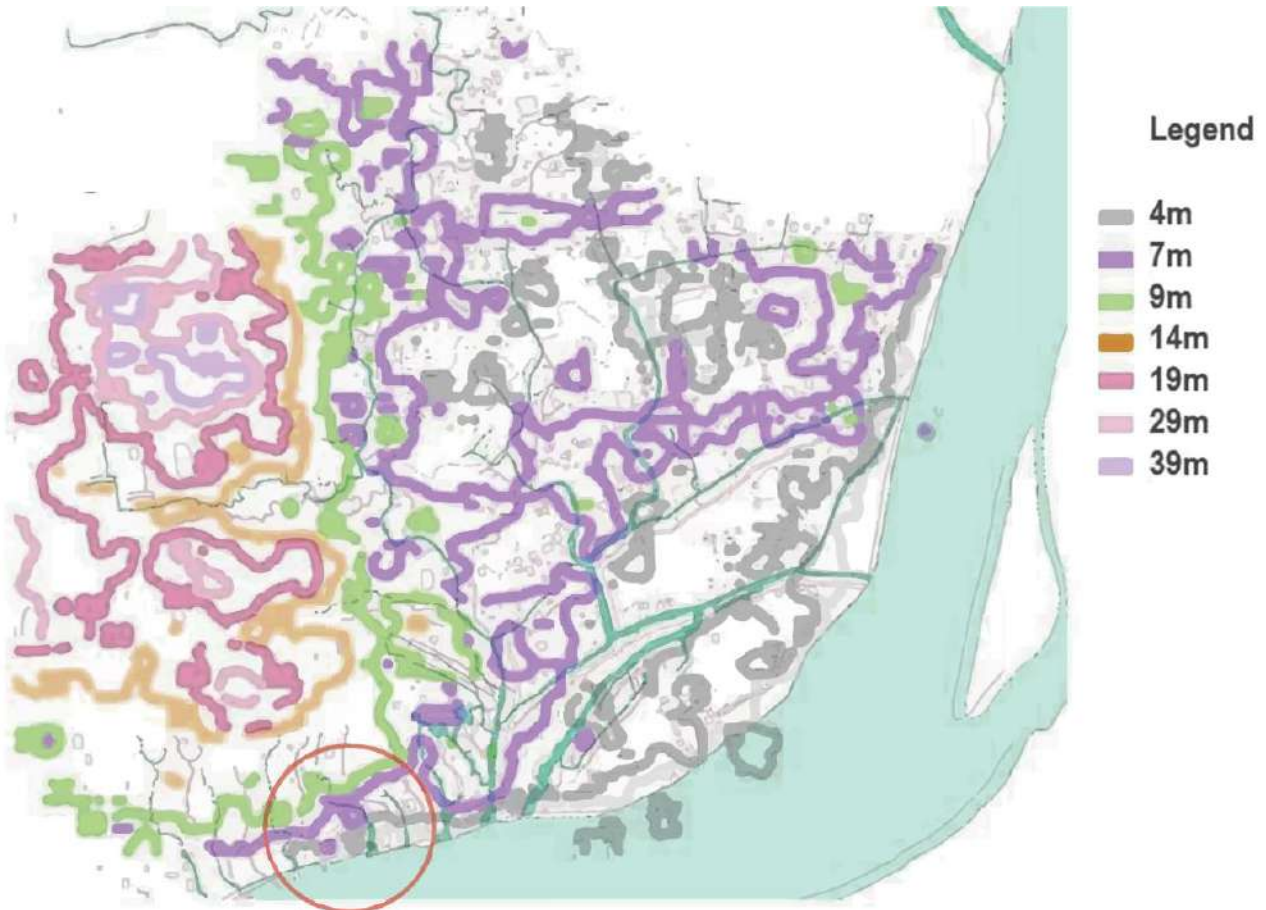


Figure 34: Topography map.

The topography map, which depicts elevations from sea level to surrounding ground level and denotes various heights.

SITE SELECTION



2.5 SITE ANALYSIS

2.5.13 Flood Level Section

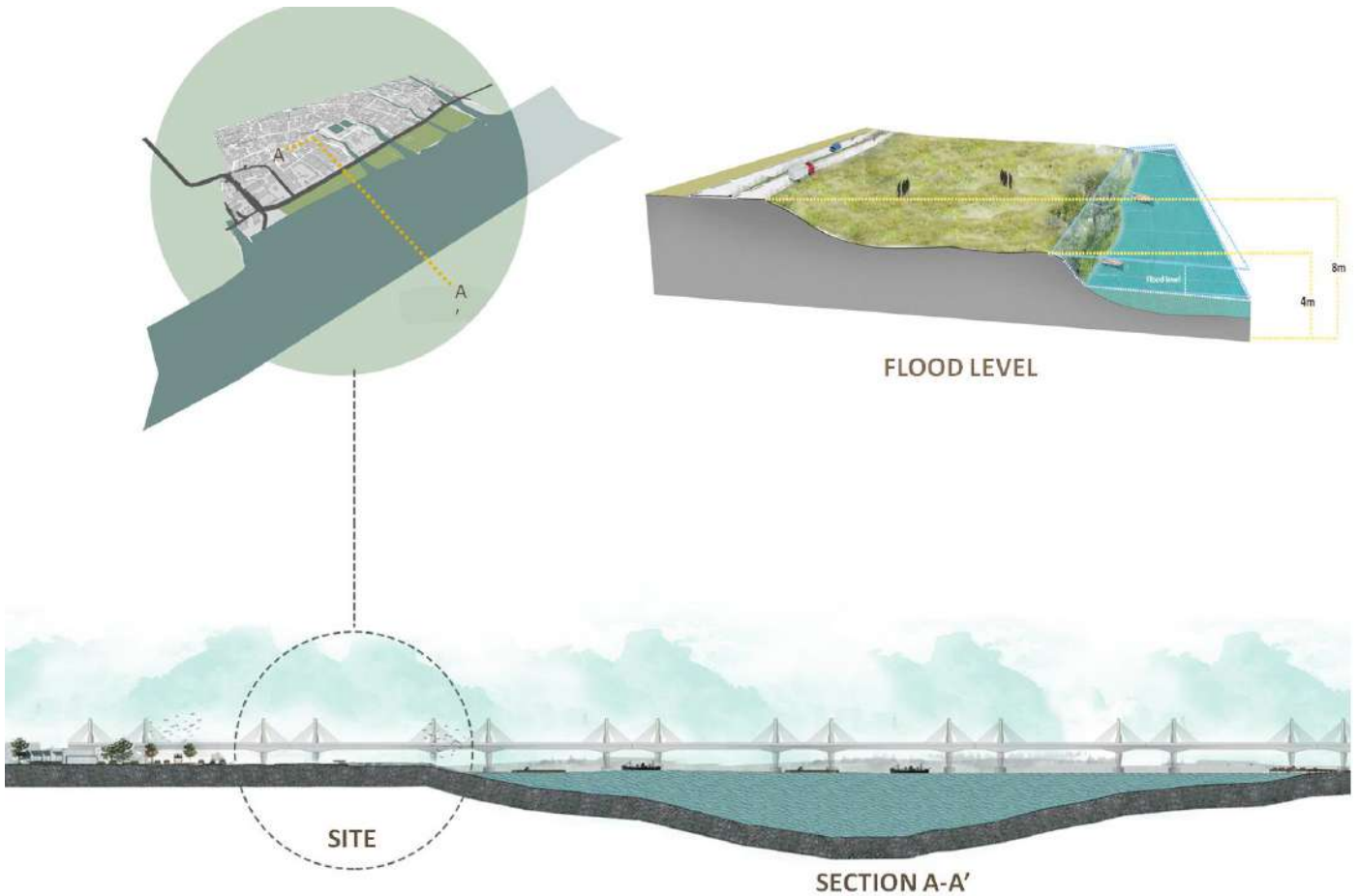


Figure 35: Flood level and section

The current site is 4 meters high from sea level, which is in line with the predicted flood level for the future, but to avoid the predicted flood, they are currently filling it with road level, which is nearly 8 meters high. The section of the site according the chart that displays the levels in relation to the tidal prediction.



2.5 SITE ANALYSIS

2.5.14 Habitat (Rare/Extinct)

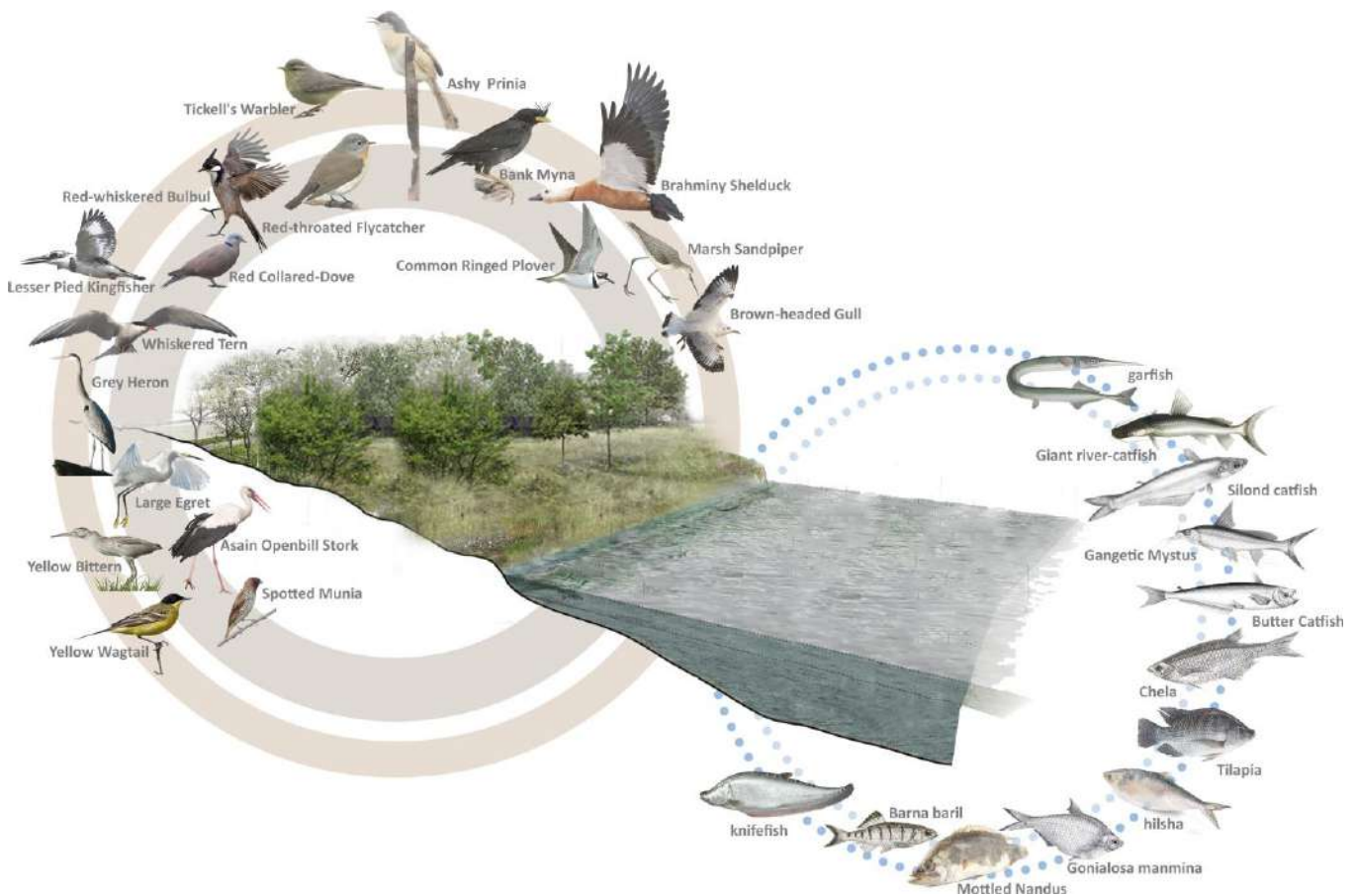


Figure 36: Rare and extinct habitat

With hills and valleys, plain lands, homestead vegetations, sand dunes, sea beach, mangrove forest patches, and tidal flats, the Karnaphuli River Delta and nearby environs are the most scenic parts of the Chittagong District.

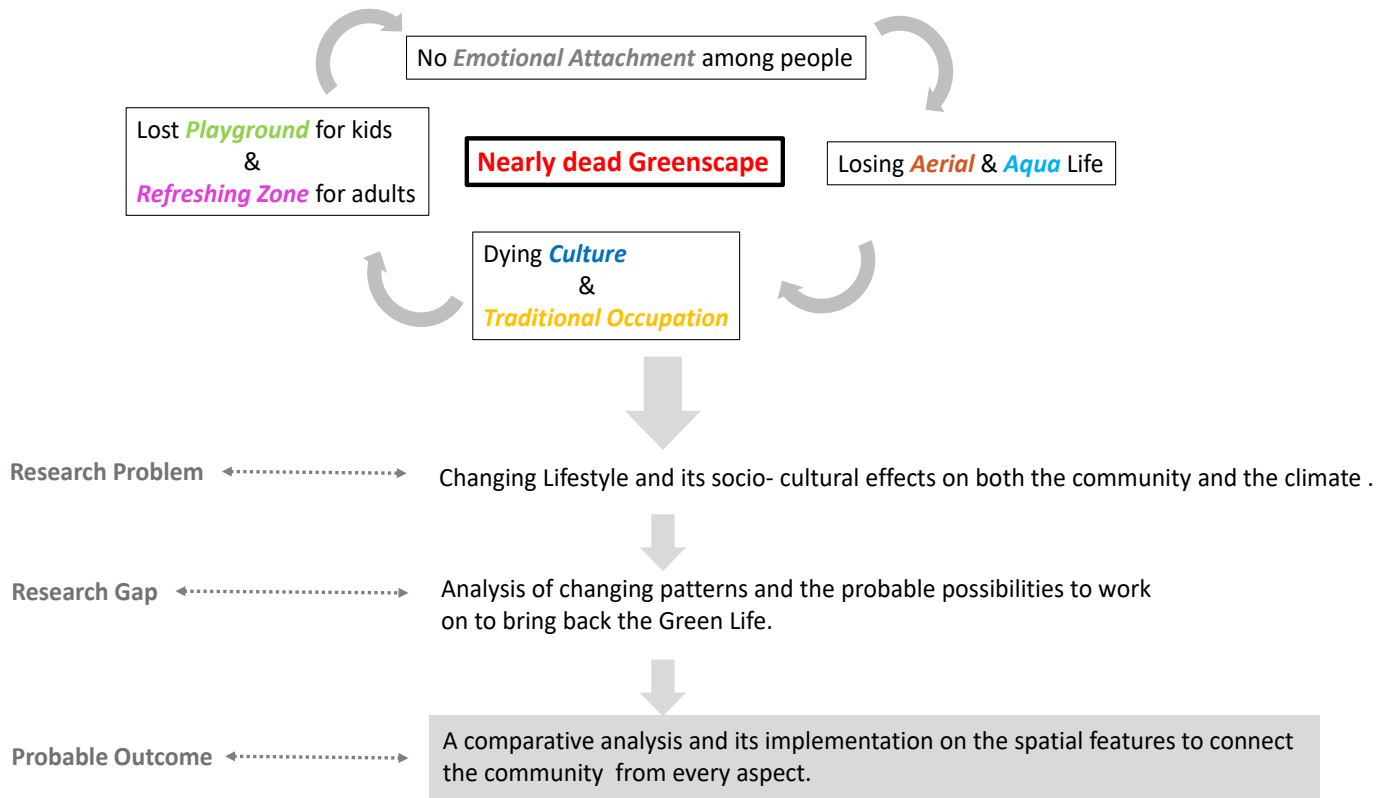
Over the last decade, at least 17 species of native fish have been on the verge of extinction in Chattogram's five major rivers due to industrial waste polluting rivers and sluice gates harming breeding sites. According to a study, 11 fish species are no longer found in the Karnaphuli river, while 10 are endangered. Eight fish species have died in the Sangu River in recent years, and another 12 are endangered. Six fish species are critically endangered in the Halda River.

Even some bird species have been threatened with extinction in the area of the Karnaphuli river due to tree cutting and trash pollution.

3. Conceptual Approach & Design Development

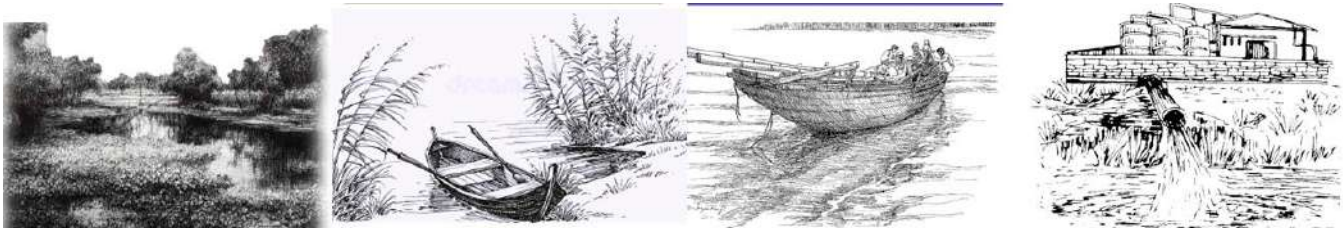


3.1 Present State of the Problem



3.2 Conceptual Framework

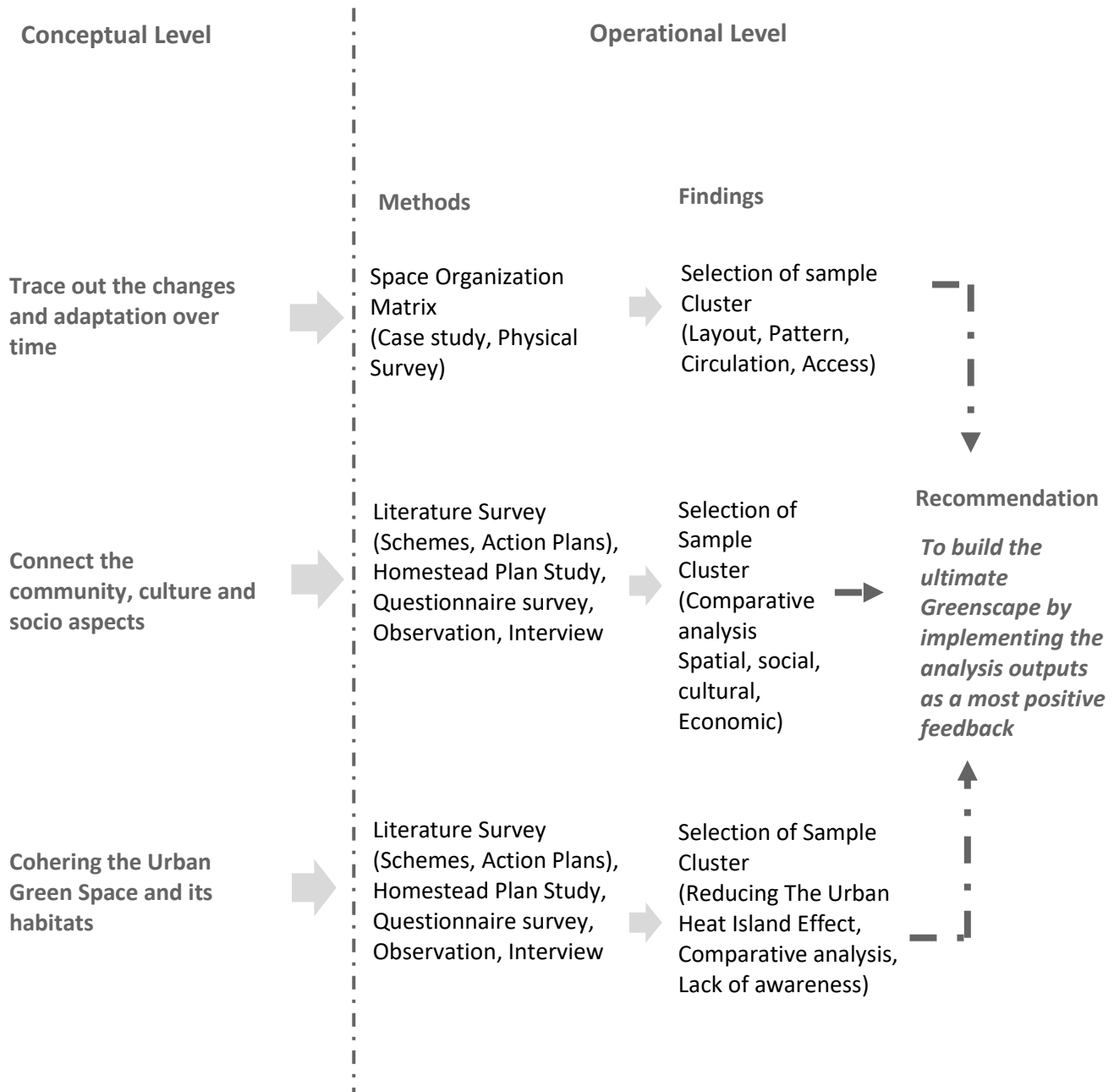
Recognized Problem	Aim	Objectives
<ul style="list-style-type: none"> • Evolving Socio-cultural Pattern • Unauthorised and desynchronized Spatial organization • Extinction of Green Life 	<p>To ensure the Greenscape from dying and incorporating the community with potential mass participation that will act as the Conservative Guideline to save the habitats too.</p>	<ul style="list-style-type: none"> • Trace out the changes and adaptation over time • Connect the community, culture and socio aspects • Cohering the Urban Green Space and its habitats (birds and other animals)



3. Conceptual Approach & Design Development



3.3 Methodology

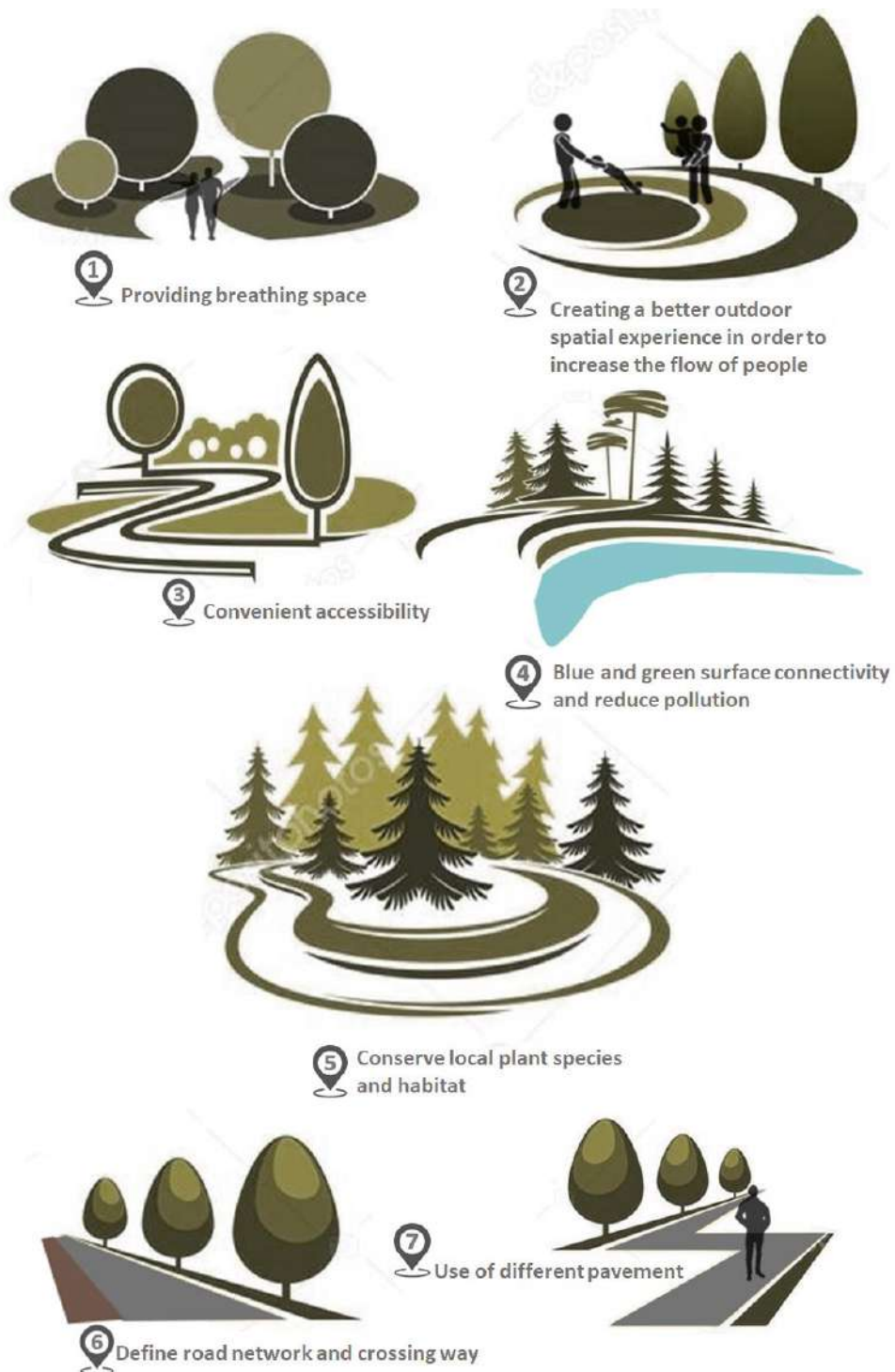


3. Conceptual Approach & Design Development



3.4 Strategy

The strategy takes a comprehensive approach that emphasizes sustainability, environmental protection, and social equality. The design ideas take into account the area's natural elements, such as marshes and mangroves. It also aims to create an appealing and functional public area where they may spend their leisure time, as well as establish a connection between water and green surface to prevent pollution.



3. Conceptual Approach & Design Development



3.5 Circulation

The conceptual circulation plan aims to provide a secure and accessible environment for walkers and cyclists while still accommodating automotive traffic. The concept comprises a network of red walking paths and orange auxiliary pathways connecting various amenities such as plaza, fountain, and playground. The paths are large enough to accommodate people, and there is a waterside lookout line that creates a lovely view along the river. The circulation plan includes elements such as bridges and crossings to increase connectivity between the park and nearby areas.

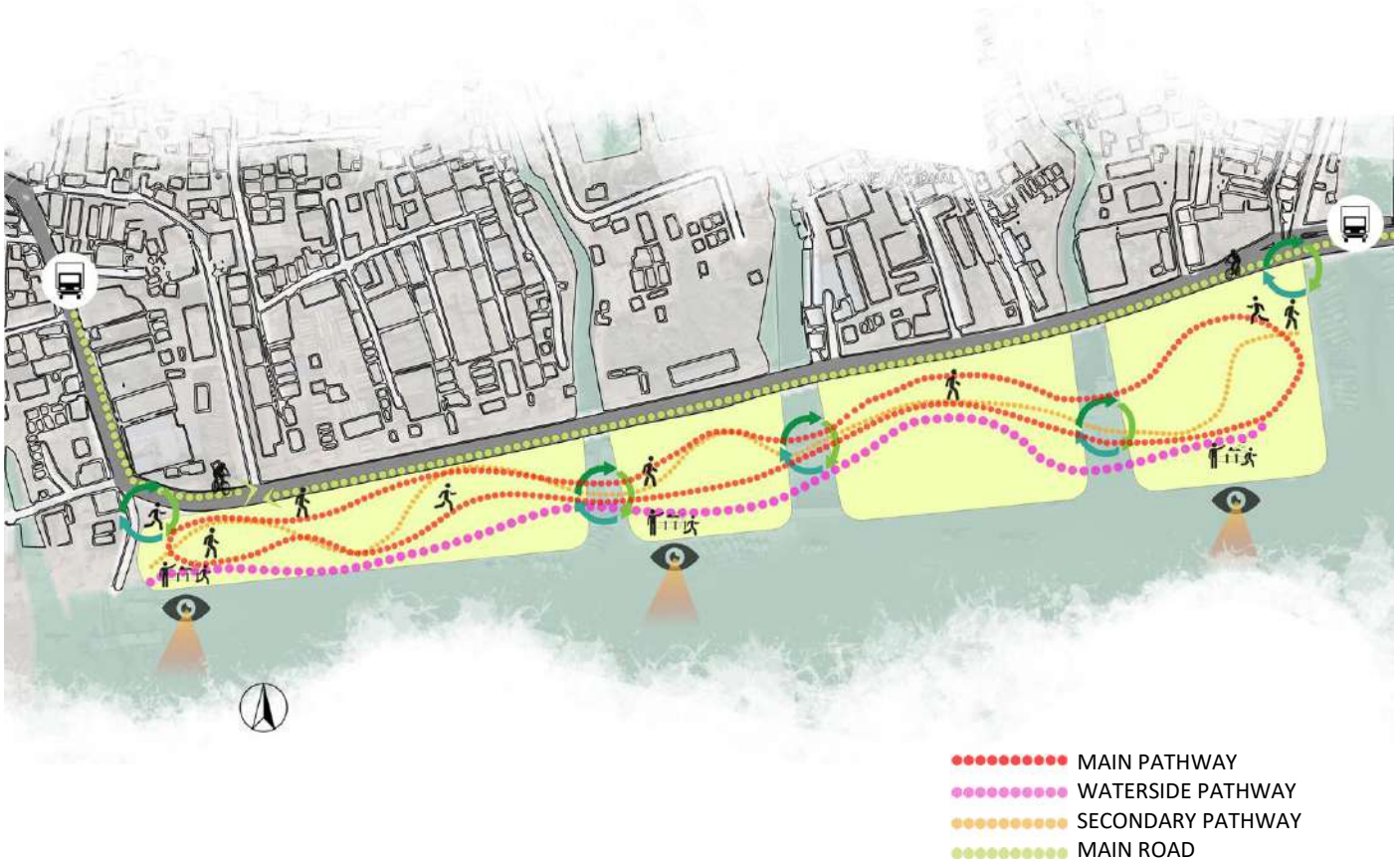


Figure 37: Circulation

3. Conceptual Approach & Design Development



3.6 Bubble Diagram

The function bubble diagram strives to meet the actual demands of the neighborhood. Each function zoning develops based on neighbor needs, for example, commercial zones or mixed use zones have distinct needs, and educational and residential zones have different requirements.



Figure 38: Bubble Diagram

3. Conceptual Approach & Design Development



3.7 Master Plan

Karnaphuli Mariners Park is a public park in Chattogram, Bangladesh's port city. It is a famous tourist and local site, with spectacular views of the Karnaphuli River and the surrounding hills. In this approach, the entrance is positioned at the nodal point of the road from the city to welcome tourists into the entry area, and the entrance to the plaza has a sculptural fountain representing the city's history. It has loop pathways to conveniently integrate with the functions while also enjoying the beauty of the riverfront. With the needs of the inhabitants in mind, the entire park master plan was created in such a way that it would meet the needs of the locals as well as the city, becoming one of the city's key breathing spaces.



Figure 39: Master Plan

- | | |
|-------------------------|---------------------|
| ① ENTRY | ⑬ SITTING ZONE |
| ② PLAZA | ⑭ VIEW WALKING ZONE |
| ③ RESTROOM | ⑮ FLOWER GARDEN |
| ④ OUTDOOR EXERCISE | ⑯ ELDER ZONE |
| ⑤ GREEN FIELD | ⑰ VEGETABLE GARDEN |
| ⑥ FOUNTAIN | ⑱ FISHERMAN ZONE |
| ⑦ STEPPING SITTING ZONE | ⑲ BOAT DECK |
| ⑧ FLOATING DECK | ⑳ RESTING NET ZONE |
| ⑨ CAFE | ㉑ ARTIST ZONE |
| ⑩ DAM CONTROL ROOM | ㉒ AMPHITHEATRE |
| ⑪ CHILDREN PLAYING ZONE | ㉓ PARKING |
| ⑫ SAND ZONE | |



Section A-A'

3. Conceptual Approach & Design Development



3.8 Road Details

The road is a key road on the outer edges of the town that connects one side to another and allows direct access to the city. It has heavy automobile traffic. Two sides of the road are designed in such a way that passers-by may easily enter securely, while bike users have a distinct lane to travel without impediments. The trees and plants on the center island provide shade for passersby.

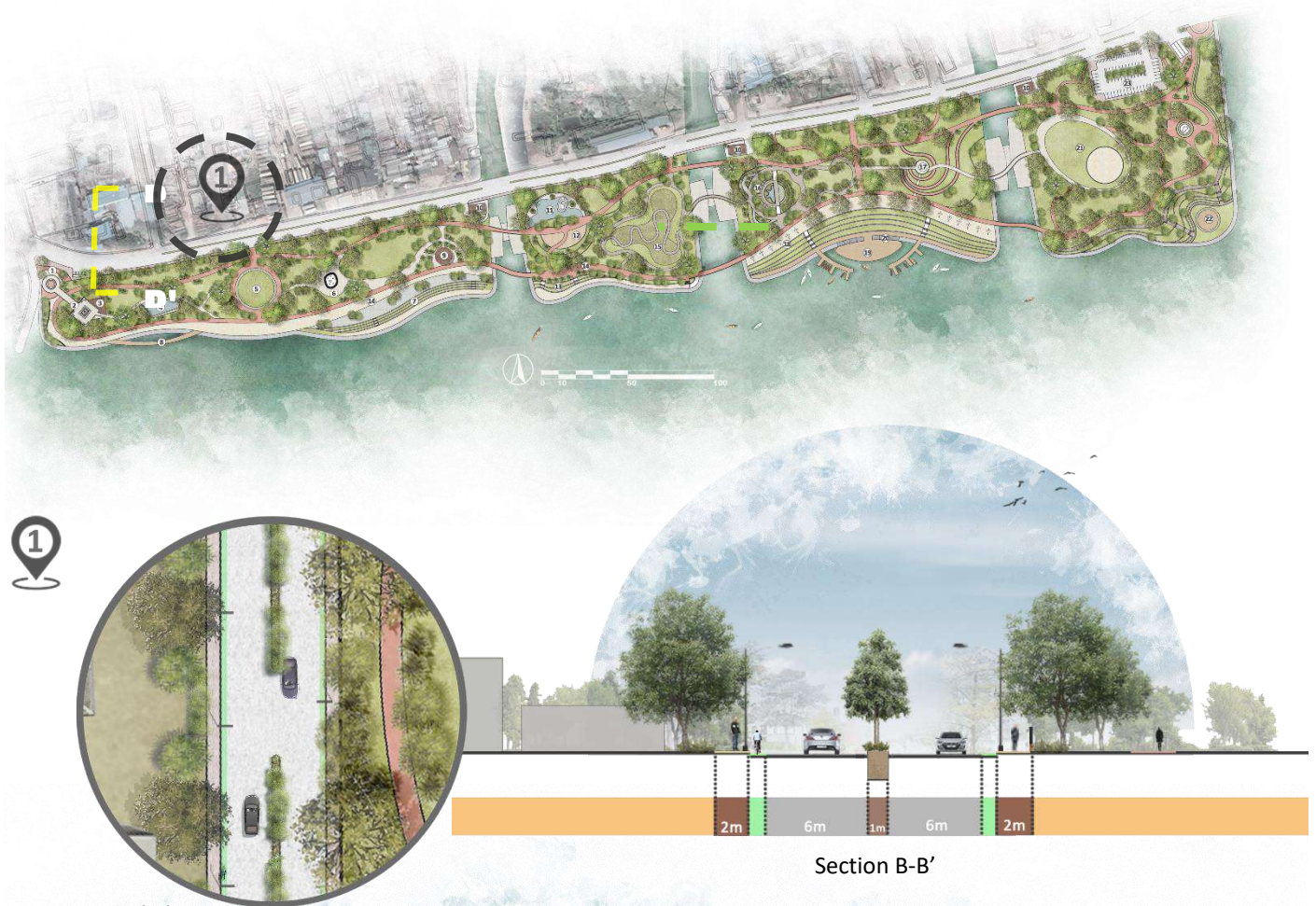


Fig 40: Road Plan



Fig 41: Main Road

3. Conceptual Approach & Design Development



3.9 Entrance & Plaza

The park's entrance has friendly approaches with the side of the road with pedestrians that easily welcome passersby and provide shade on the entrance. There is also a bike park on the left of the entry. The plaza fountain has a clear visual draw from the entrance, where people may relax on concrete seats and with indigenous plants that provide shade and a calming setting. The plaza also has a rest room where visitors can get basic services.



Fig 42: Entrance



Fig 43: Plaza

3. Conceptual Approach & Design Development



3.10 Outdoor Exercise & Fountain

The park features an outdoor exercise area where locals can simply go to do activity with furniture and sitting places in the middle next to the exercise zone, a green field, and a fountain with interesting water play to draw everyone not only with sound but also with visual attraction. The end of the corner side is a cafe that serves local delicacies and has a river edge step sitting area where you can feel the river ambience. The outside pedestrian zone features concrete sitting benches and a floating platform with amazing views of the river.



Fig 44: Sitting Zone

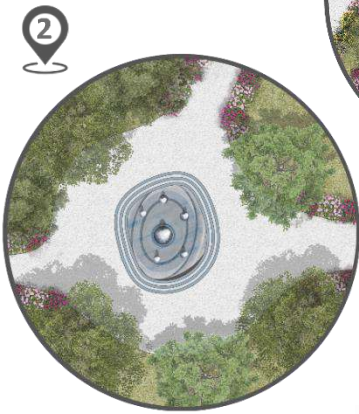


Fig 48: Cafe



Section C-C'

Fig 48: Fountain



Fig 47: Outdoor Exercise



Fig 45: River View Zone

3. Conceptual Approach & Design Development



3.11 Flower Garden & Children Zone

In accordance with local children's demands, the playground zone symbolizes the city's history with boat-shaped furniture with rubber flooring on one side and a sand zone with engaging activities on the other. The flower garden is an intriguing area of the park that provides local flowers as well as educational opportunities to educate youngsters about local plant species through signage and elevated wooden pathways to protect the plant species.



Fig 50: Flower Garden

Fig 49: Children Playing



3. Conceptual Approach & Design Development

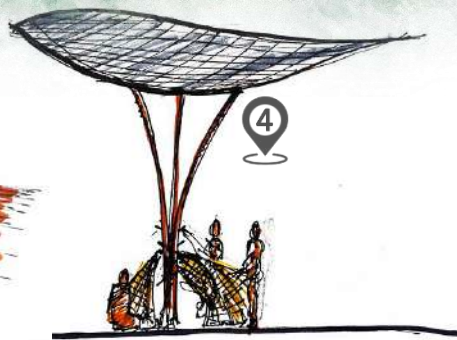
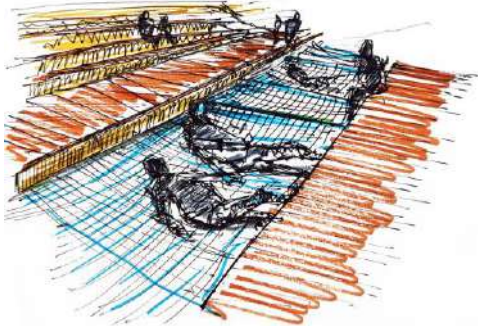


3.12 OLDER ZONE, VEGETABLE GARDEN, FISHERMAN AND DECK AREA,

The elderly are among the most important tourists. According to local demand, a space for elderly individuals to enjoy calm leisure time has been built, including a seasonal vegetable garden to educate people about farming and local crops. The fisherman zone offers an exciting activity to prepare them before going fishing in the sculptural stand inspired by the fish net, as well as deck sitting locations to undertake boat activity and resting area above the water to feel the river.



1 Fig 51. Deck Zone



4 Fig 52. Fishermen Zone



2 Fig 53: Vegetable Garden



3 Fig 54: Older Zone



Section D-D'

3. Conceptual Approach & Design Development



3.13 Amphitheatre and Artist zone

The younger generation has always wanted to learn art, and some of them are accomplished artists. So, to represent local art and crafts, an artist zone was designed with an open exhibition for visitors. The site's corner has an open amphitheater to conduct the activity, and it has a fantastic view from the opposite side of the bridge, creating an ambient sense during performance, as well as the surrounding people.

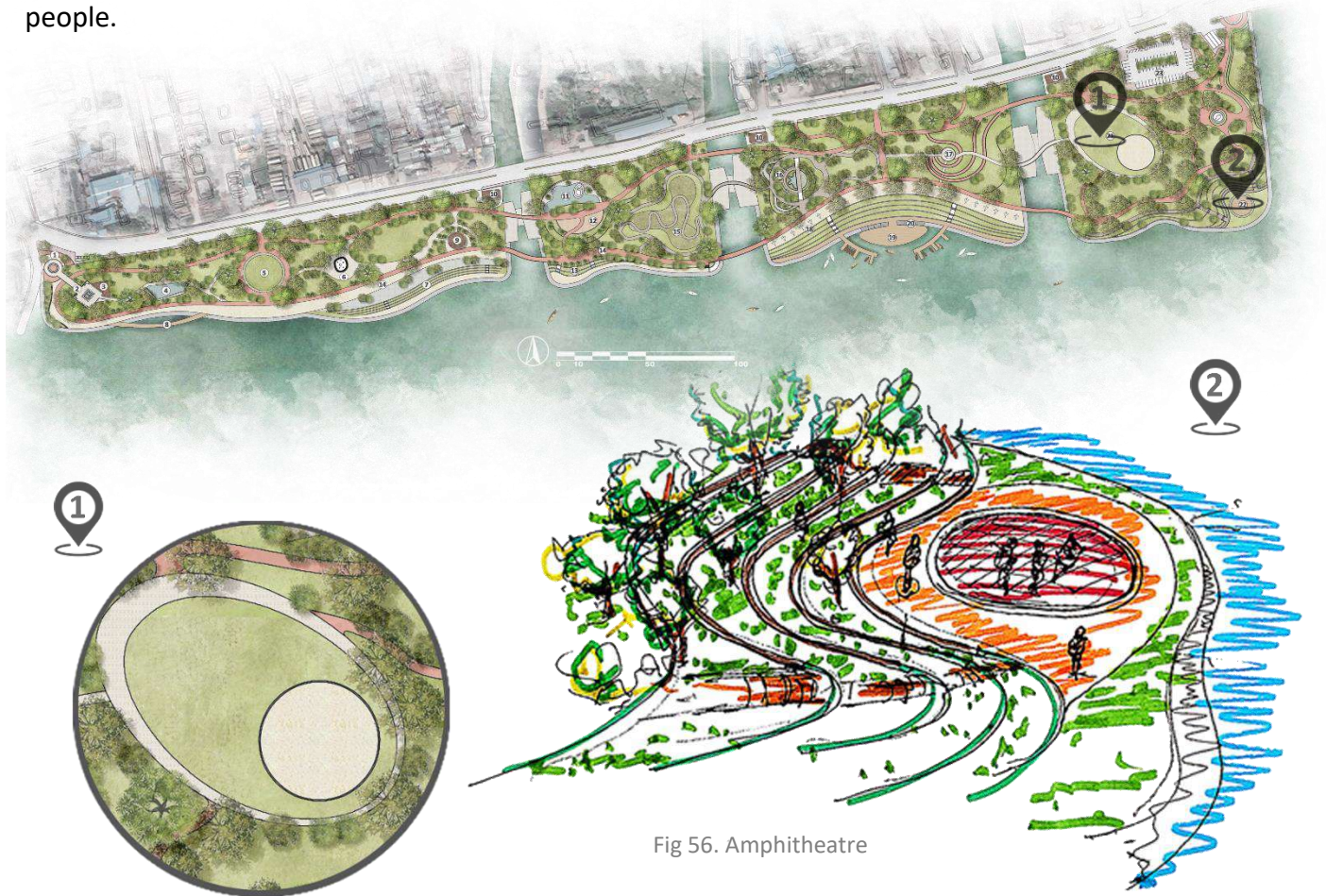


Fig 56. Amphitheatre

Fig 55. Artist Zone



3. Conceptual Approach & Design Development



3.14 Signage

Signage is an important part of giving accurate navigation across a park. Certain signs in this design's palette identify plant species names made of local ship breaking steels, as well as perforated bird and fish lists that are now extinct in this area.



1 Fig 57: Flower Chart

2 Fig 58: Extinct Fish Panel



3 Fig 59: Birds Panel

3. Conceptual Approach & Design Development



3.15 Signage and Benches:

To promote sustainability and reduce expenses, local timbers are being used to make benches, signage to lead tourists, and lamps. Local bricks were utilized for seats at the corners of the paths, where visitors could relax while exploring the park.



3. Conceptual Approach & Design Development



3.16 Furniture Ideas

Some furniture concepts that illustrate the maritime history of the region and use regional materials like concrete, bamboo, and steel not only for leisure or entertainment but also to impart knowledge of the region's and the city's past.

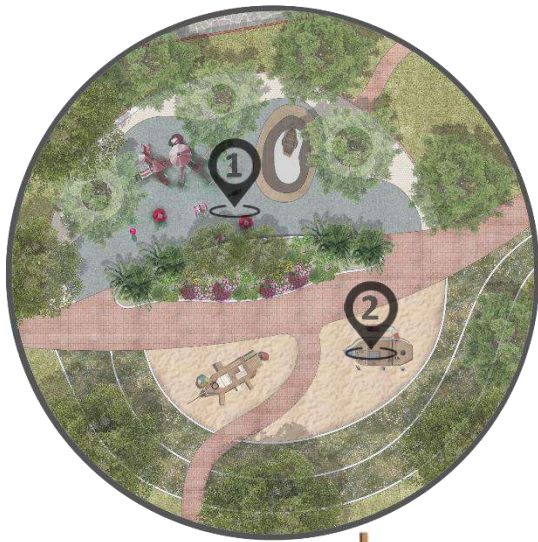


Fig 60: CHILDREN ZONE

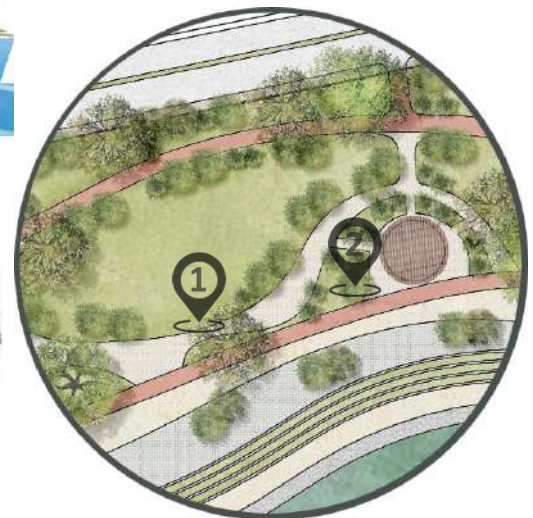


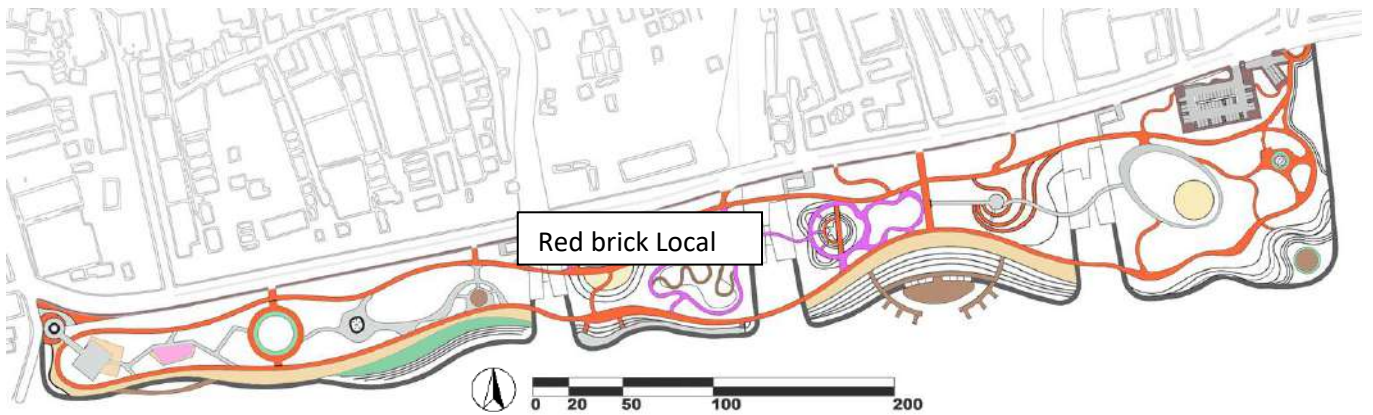
Fig 61: CAFÉ AND OPEN SPACE

3. Conceptual Approach & Design Development



3.17 Pavements

Brick is the most affordable and readily available local material that can be used for parks in the neighborhood. Local resources are also readily available and environmentally friendly. The vast majority of pavement materials, including concrete, permeable pavement materials, wood, and hollow concrete, are selected locally.



Red brick (Local)



Paver Block



Wood



Paver Block (Ped.)



Hollow Conc.



Conc. Block



Rubber



Asphalt



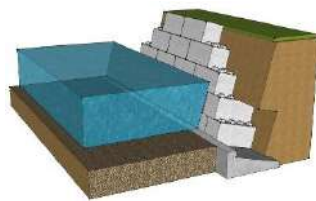
Sand



Red brick Local



Erosion Conc. Blocks

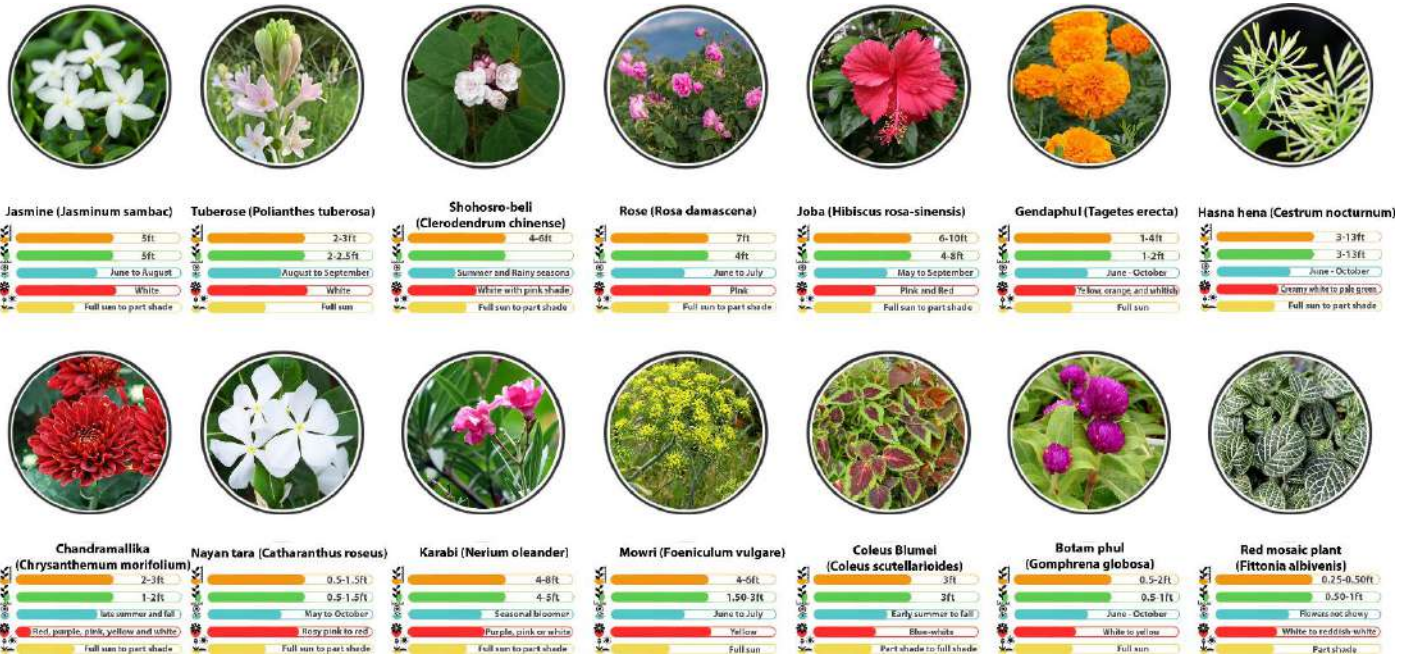


3. Conceptual Approach & Design Development



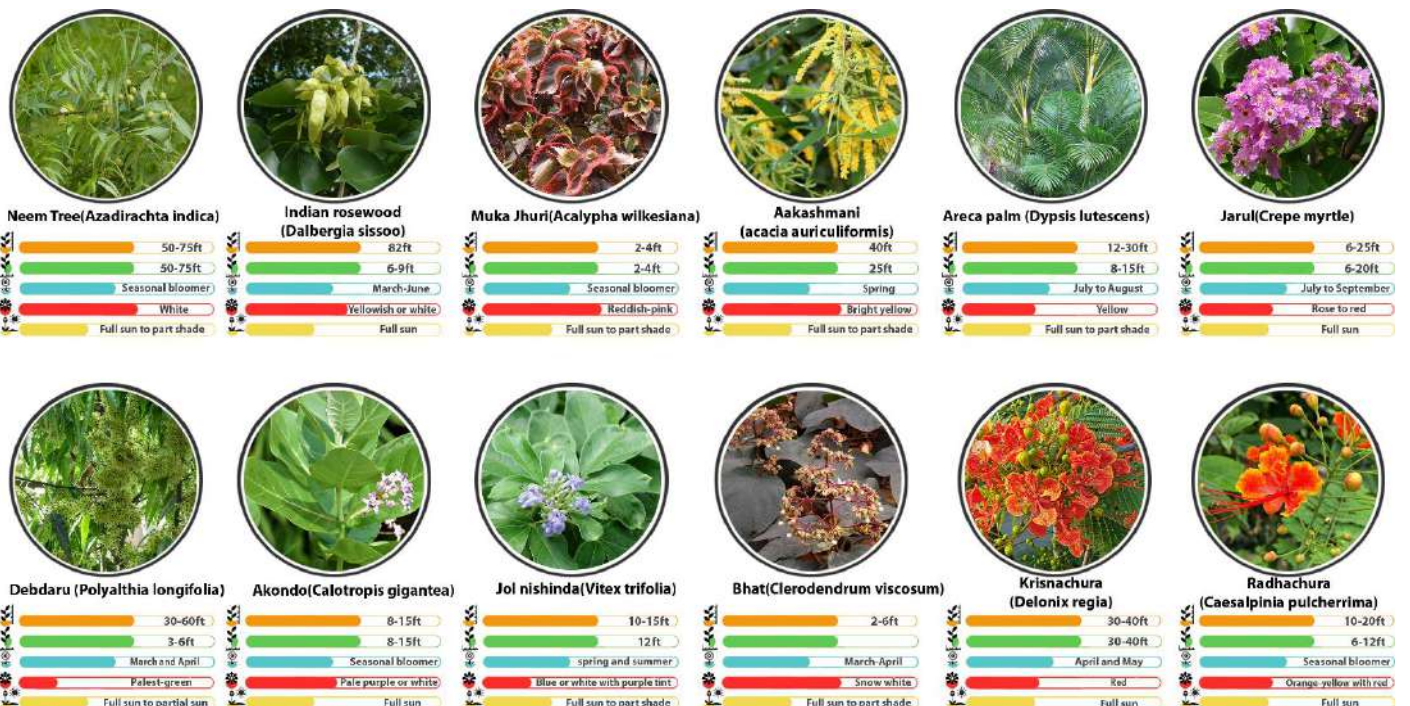
3.18 Flower Garden Plants

The native plant species have importance as flower garden plants. The majority of plants have fragrant, colorful flowers that draw butterflies and provide a tranquil, fragrant environment. Some plants also have features that attract birds.



3.19 Roadside Plants

It is increasingly challenging to choose roadside plants due to dust and pollution difficulties. Plants were chosen for this location from local species that can resist heavy traffic, reduce noise pollution, and provide shade to pedestrians and onlookers.



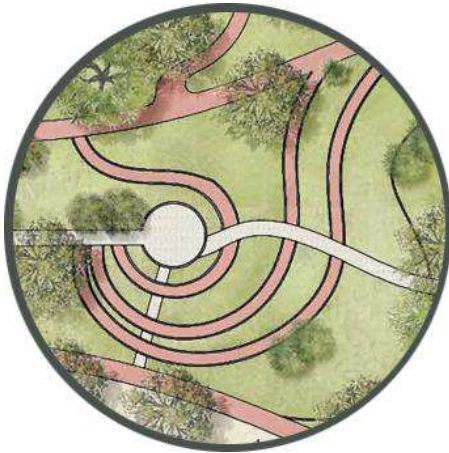
3. Conceptual Approach & Design Development



3.20 Vegetable Garden

Vegetable plants were carefully selected to produce vegetables all year, with a focus on seasonal, winter, and summer vegetables that can educate people about vegetable gardening all year.

All year



Pumpkin (*Cucurbita*)



Okra *Abelmoschus esculentus*



Chilli



Curry Leaves



Brinjal

Winter



Cabbage (*Brassica oleracea*)



Tomato (*Solanum lycopersicum*)



Cauliflower (*Brassica oleracea* var. *botrytis*)



Radish (*Raphanus sativus*)



Green Peas (*Pisum sativum*)

Summer



Bottle gourd (*Lagenaria siceraria*)



Spinach (*Spinacia oleracea*)



Bitter melon (*Momordica charantia*)



Cucumber (*Cucumis sativus*)



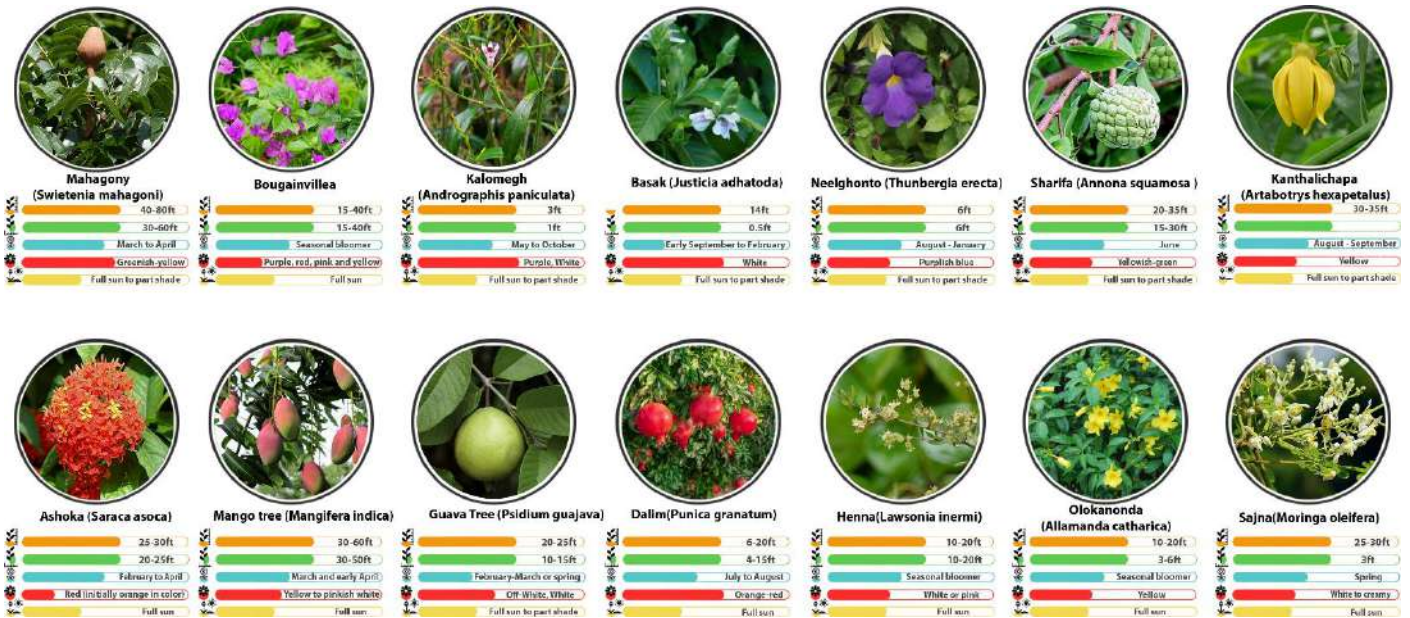
Snake gourd (*Trichosanthes cucumerina*)

3. Conceptual Approach & Design Development



3.21 Park plants

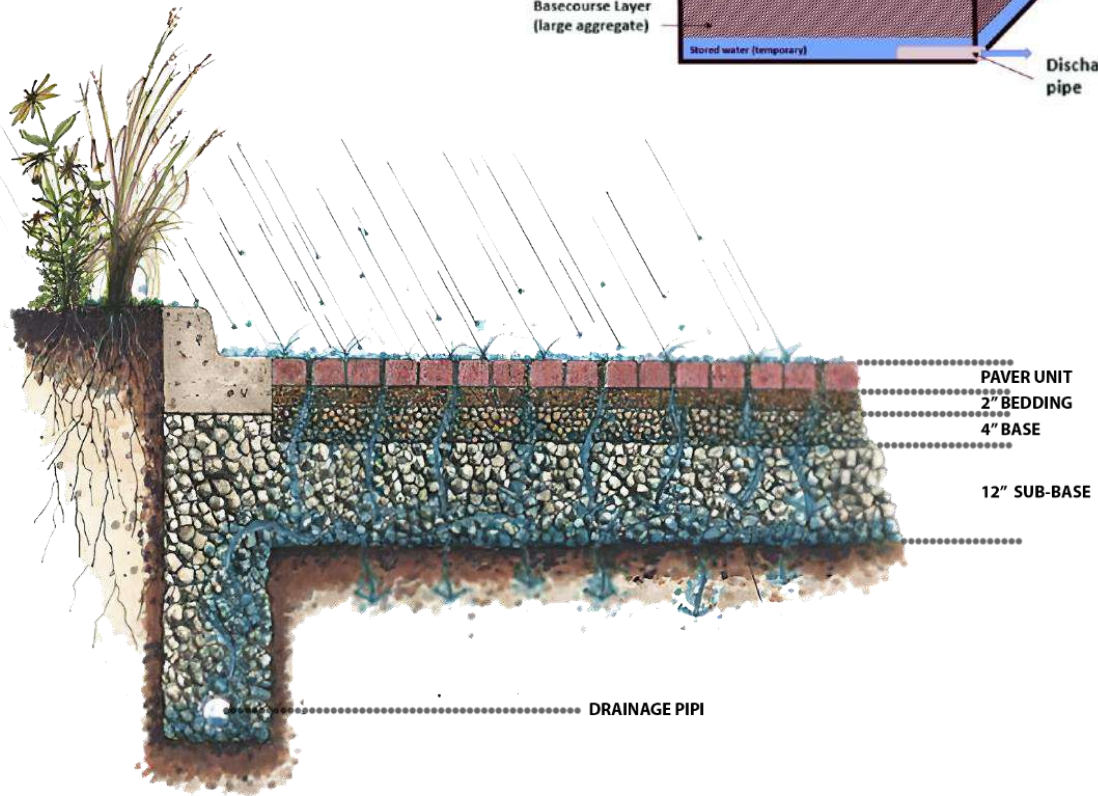
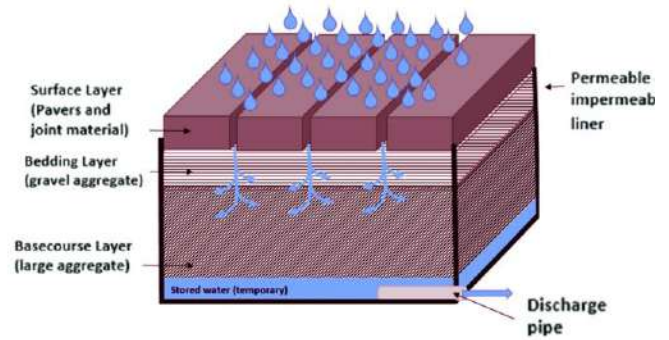
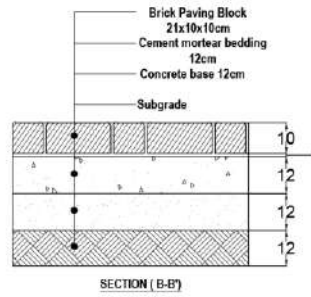
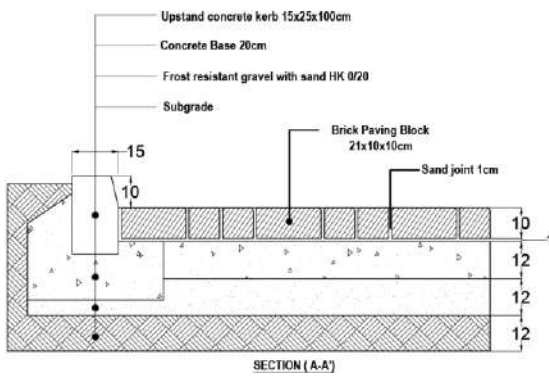
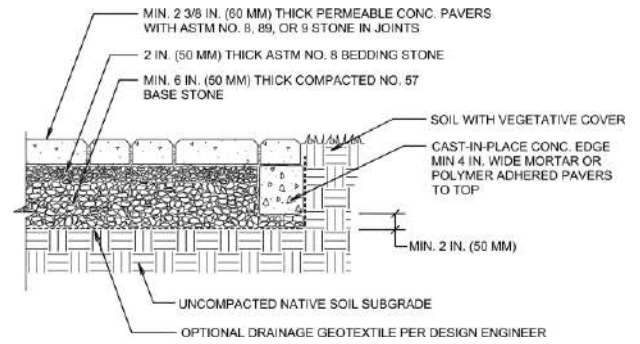
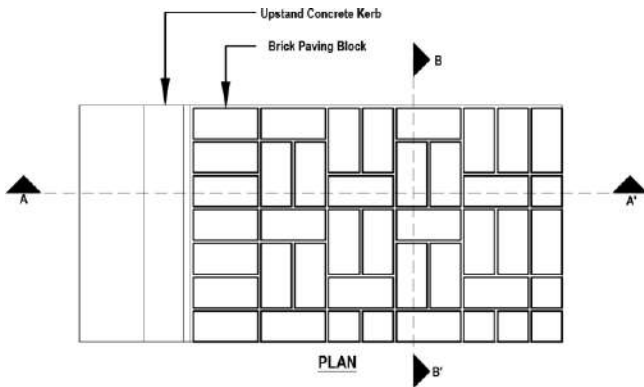
Plants in the park were selected with soil and visual attractiveness in consideration. Local fruit trees were picked to attract locals and bird species and to create a joyful environment. Some native species have lovely colorful flowers that add visual interest.



4. Technical Details



4.1 Permeable Pavement



4. Technical Details



4.2 Drainage Water Management Ideas

In order to efficiently drain rainwater from the surface and prevent overflow inside the park, some water management methods were proposed in connection to the design park. A few ideas have been presented for draining water from the surface to the earth.

1 FLOWER GARDEN

2 PARKING

3 LAWN

4 PAVEMENT

5 GRASS BED

Diagram 1: Flower Garden
 Shows a tree and a person on a paved area. Arrows indicate water flow from the surface into a drainage structure. The cross-section shows a concrete curb, a drainage pipe, and a stone-filled trench.

Diagram 2: Parking
 Shows a parking lot with a drainage structure. Arrows indicate water flow from the pavement into a drainage structure. The cross-section shows a concrete curb, a drainage pipe, and a stone-filled trench.

Diagram 3: Lawn
 Shows a lawn area with a drainage structure. Arrows indicate water flow from the surface into a drainage structure. The cross-section shows a concrete curb, a drainage pipe, and a stone-filled trench.

Diagram 4: Pavement
 Shows a paved area with a drainage structure. Arrows indicate water flow from the pavement into a drainage structure. The cross-section shows a concrete curb, a drainage pipe, and a stone-filled trench.

Diagram 5: Grass Bed
 Shows a grass bed area with a drainage structure. Arrows indicate water flow from the surface into a drainage structure. The cross-section shows a concrete curb, a drainage pipe, and a stone-filled trench.

Diagram 4 Labels:
 6"-12" TYP. PONDING DEPTH
 3H:1V SIDE SLOPES MAX. TYP.
 BEEHIVE RIM
 RIM EL. = XXX.XX
 WIDTH (6" MIN.)
 12" OUT = XXX.XX
 NATIVE PLANTS
 BERM AS NEEDED
 COMPACTED STRUCTURAL FLL
 EXISTING GRADE
 2-3" MULCH
 UNDISTURBED NATIVE SUBGRADE
 AREA DRAIN
 NON-PERFORATED OVERFLOW PIPE
 MIN. SLUMP DEPTH
 3" 3/4" Ø DRAIN ROCK, CPT.
 COMPACTED NATIVE SUBGRADE

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- <https://www.tbsnews.net/bangladesh/environment/halda-losing-fish-species-spawning-crisis-274981>

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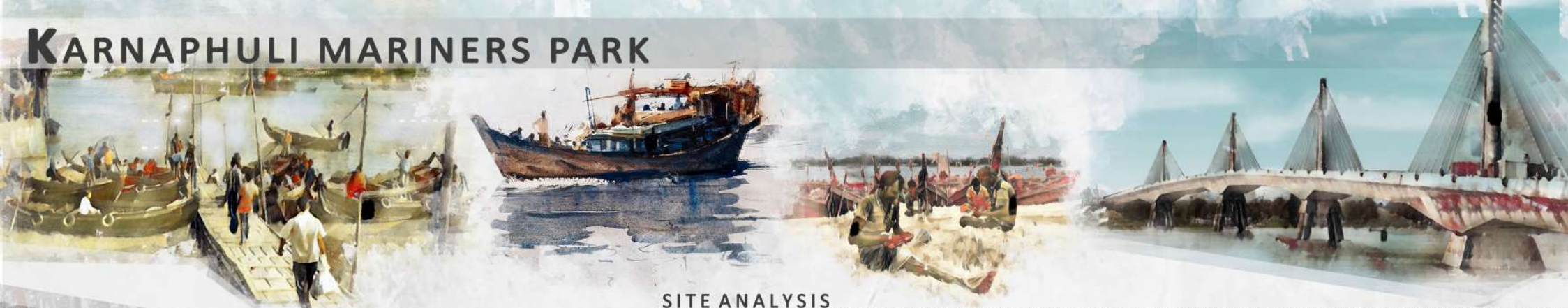
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Internal supervisor

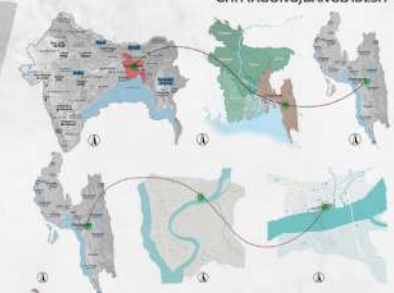
KARNAPHULI MARINERS PARK



LOCATION

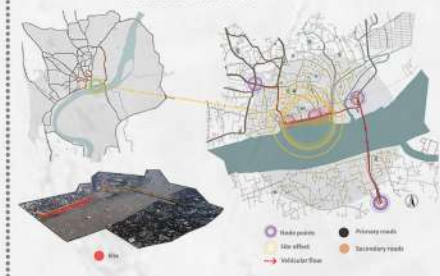
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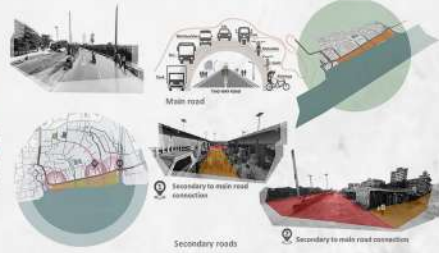


SITE ANALYSIS

ROAD CONNECTION



VEHICULAR CONNECTIVITY



DIVERSITY OF THE SITE



HABITAT (RARE/EXTINCT)



FLOOD LEVEL



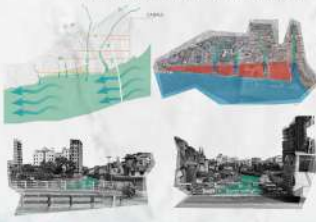
SITE ACTIVITY



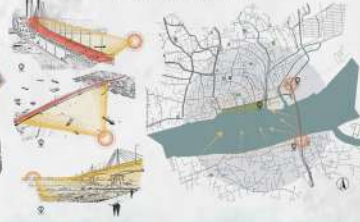
SWOT ANALYSIS

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> Strategic location of the site Proximity to water bodies Rich cultural heritage Existing infrastructure Strong community support Proximity to major roads High potential for tourism Water body is clean Low population density Low risk of flooding 	<ul style="list-style-type: none"> Lack of infrastructure Low population density High risk of flooding Low economic activity Low awareness of the site Low investment in the site Low quality of infrastructure Low quality of services Low quality of environment Low quality of life 	<ul style="list-style-type: none"> Developing water body Developing infrastructure Developing tourism Developing culture Developing environment Developing quality of life Developing quality of services Developing quality of environment Developing quality of life 	<ul style="list-style-type: none"> High risk of flooding High risk of pollution High risk of degradation High risk of loss of heritage High risk of loss of identity High risk of loss of community High risk of loss of environment High risk of loss of quality of life High risk of loss of services High risk of loss of environment High risk of loss of quality of life

RIVER & CANALS FLOW DIRECTION



VISUAL CONNECTION



STRATEGY

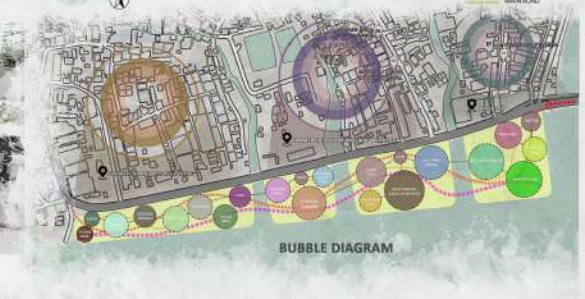
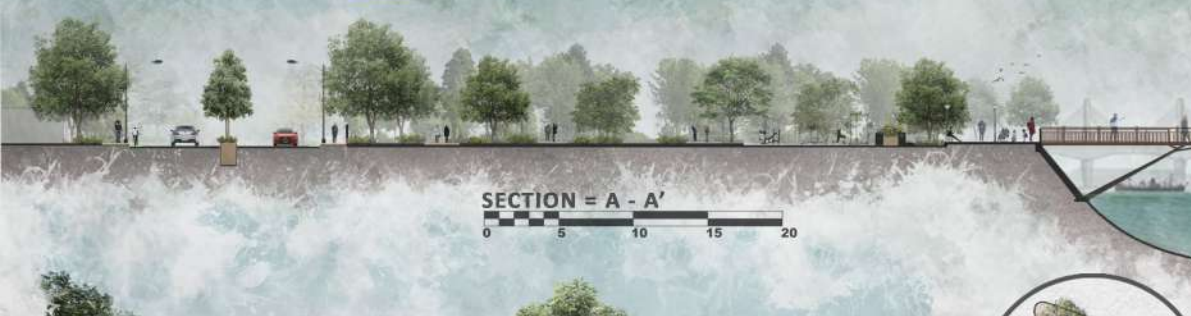
- Providing breathing space
- Creating a better outdoor spatial experience in order to increase the flow of people
- Consistent accessibility
- Blue and green surface connectivity and reduce pollution
- Conserve local plant species and habitat
- Define road network and crossing way



SITE

SECTION = A-A'

KARNAPHULI MARINERS PARK "REGENERATION OF GREEN HUB"



KARNAPHULI MARINERS PARK "REGENERATION OF GREEN HUB"



9 FISHERMAN ZONE

VEGETABLE GARDEN

BOATING DECK

OLDER ZONE

FLOWER GARDEN

CAFE

FOUNTAIN

OUTDOOR EXERCISE

SECTION B-B'

2 RESTING ZONE (DECK)

3 OLDER ZONE

SECTION C-C'

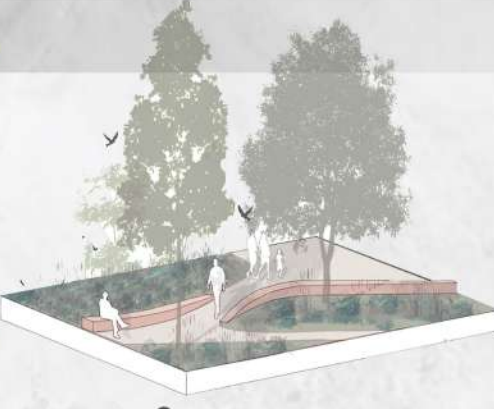
4 CHILDREN ZONE

5 RIVERSIDE SITTING AREA

FLOWER GARDEN



KARNAPHULI MARINERS PARK "REGENERATION OF GREEN HUB"



FURNITURE IDEAS

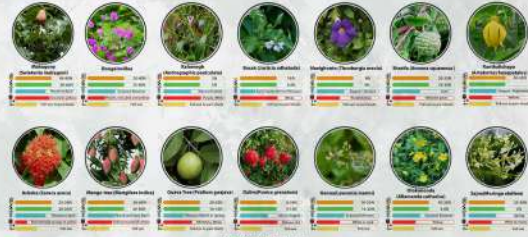


CORNER BRICK BENCHES

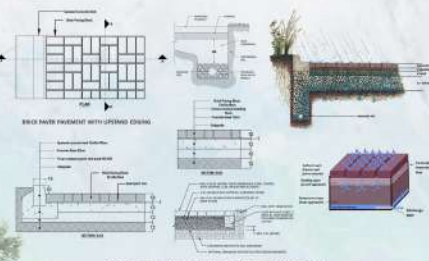
ROAD SIDE PLANT LIST



FLOWER GARDEN PLANT LIST



VEGETABLE GARDEN PLANT LIST



TECHNICAL DETAILS(PERMEABLE PAVEMENT)

PARK PLANT LIST



PAVEMENT MATERIALS



SIGNAGE AND BENCHES IDEAS



DRAINAGE WATER MANAGEMENT IDEAS

